Fuji Electric

Innovating Energy Technology

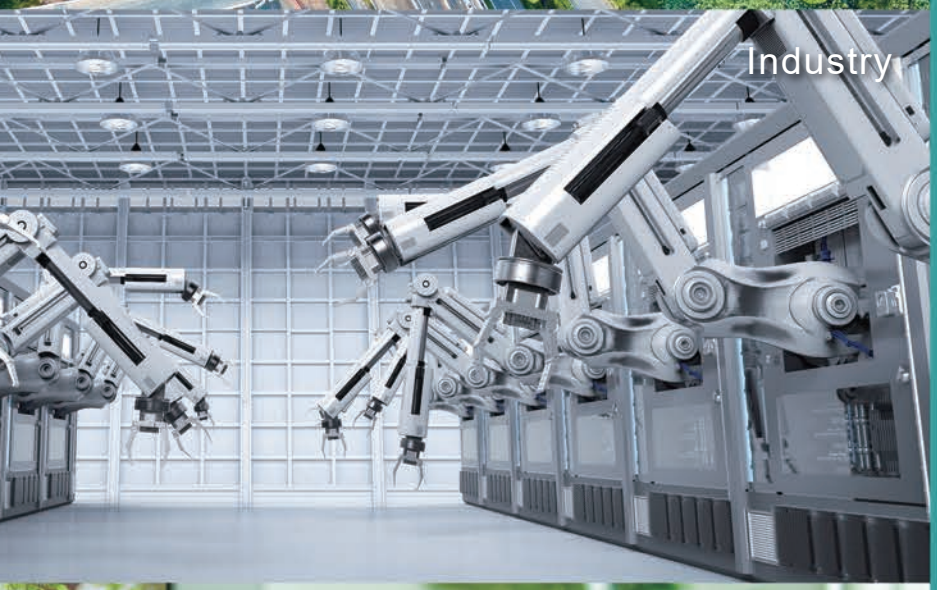
FUJI SEMICONDUCTORS

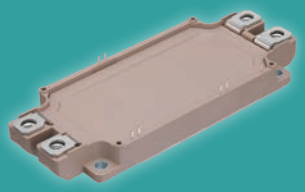
Supporting Society with
Energy and Environmental Technology

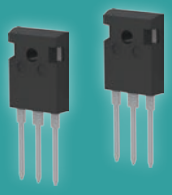
25A2-E-0001g

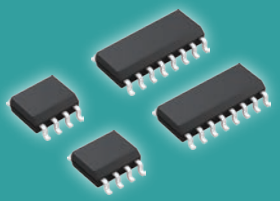
Fuji Electric Power Semiconductors contributing to Energy Management in various fields

Fuji Electric provides Power Semiconductors enabling high-efficiency energy usage in various fields such as industrial machinery, automobile, railroad, social infrastructure, renewable energy, consumer electronics and information equipment in order to achieve decarbonized society.
Fuji Electric contributes to realization of safe and secure sustainable society through continuous technology innovation and product development of Power Semiconductors as key devices in Power Electronics technology.









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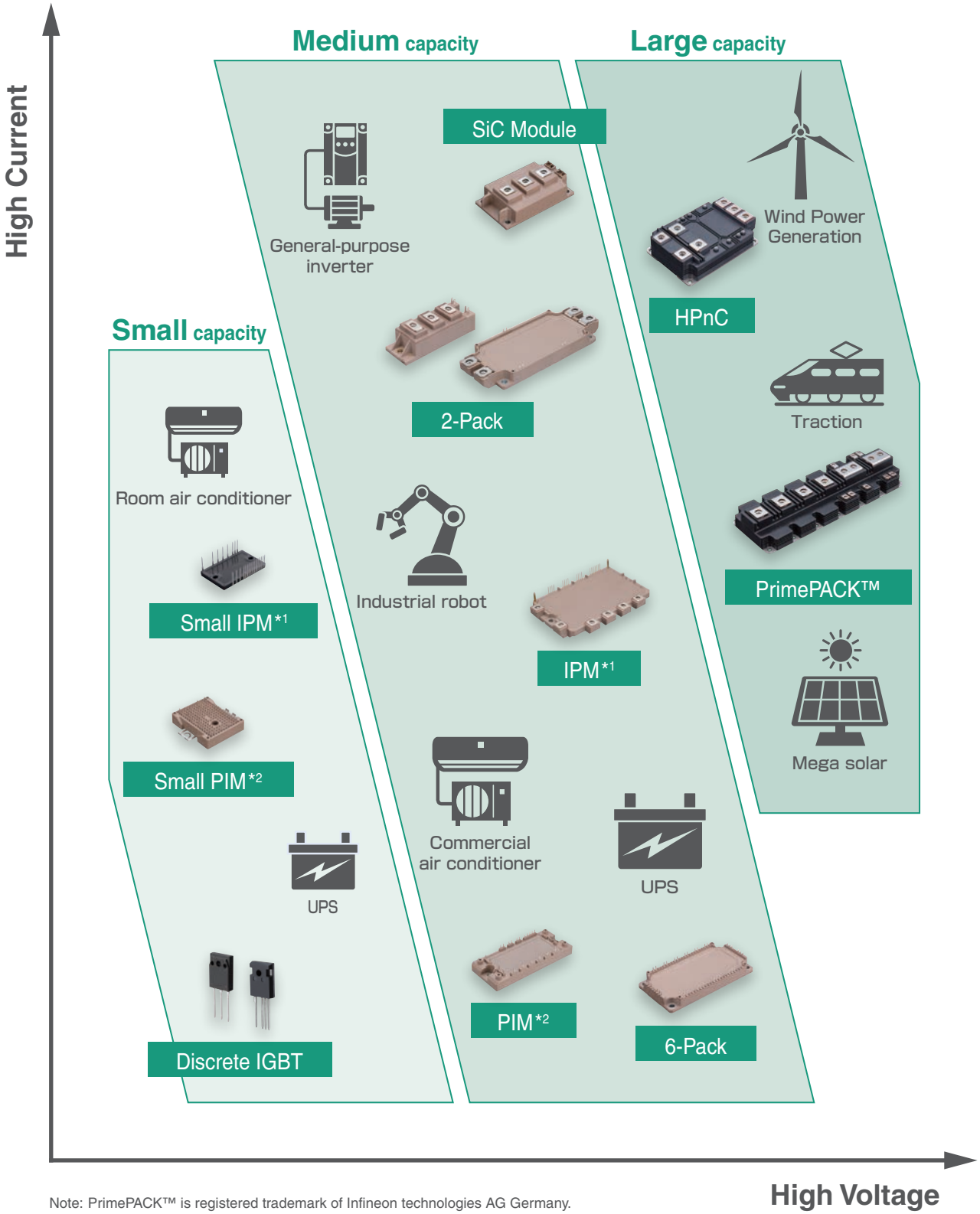
The pictures on this page show examples of various applications which may use Fuji Electric Power Semiconductors, they aren't necessarily used in the products in these pictures.

Product Map

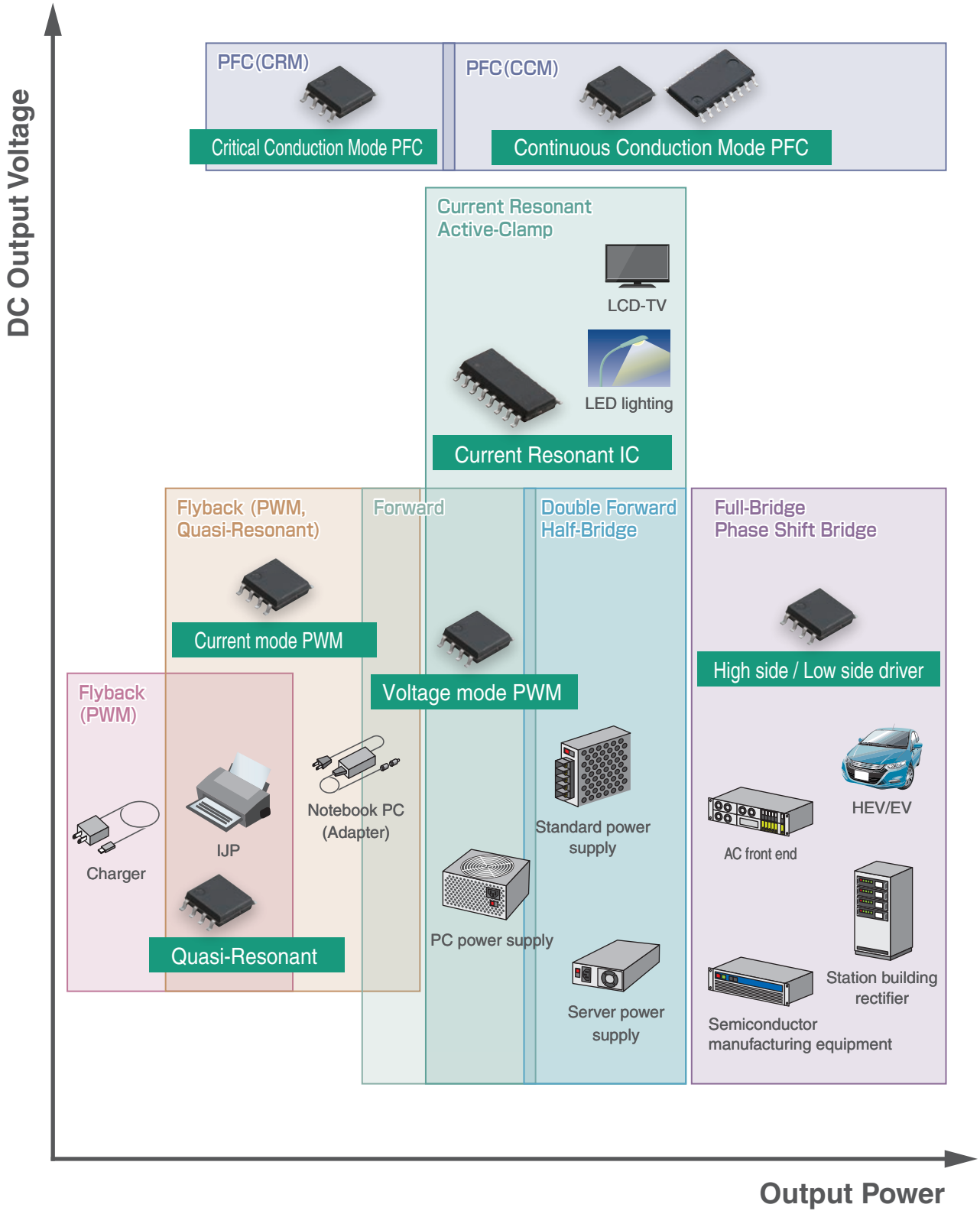
We offer an extensive lineup of power semiconductor products that achieve low-loss and high-efficiency power conversion for applications in a wide range of power capacities, such as industrial machinery, social infrastructure, renewable energy, home appliances, and information equipment.

Power Modules / Power Discrete



Note: PrimePACK™ is registered trademark of Infineon technologies AG Germany.
*1 Intelligent Power Module
*2 Power Integrated Module

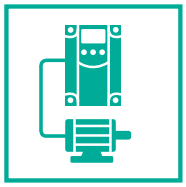
Power Supply Control IC



Fuji Electric provides Power Semiconductors well suited for various applications. You will find more information on products for each application shown below at our Web site.

www.fujielectric.com/products/semiconductor/usage/

Inverters



Semiconductor products best suited for general-purpose inverters that carry out variable-speed operation of motors in products such as belt conveyors, fans and pumps

Medium-Voltage Inverters

Semiconductor products suitable for medium-voltage inverters that drive 3-phase AC 3k/6k/6.6kV high-voltage motors used in iron and steel plants, textile plants and paper mills

NC / Servos

Semiconductor products best suited to NC and servos that carry out speed control and positioning of machine tools, as well as robots that have multi-spindle control features used in assembly, welding and conveyance

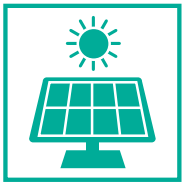
Railroads

Semiconductor products suited for the power electronics of railroad cars such as the main motor drive and auxiliary power supply equipment of rolling stock

Wind Power Generation

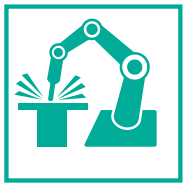
Semiconductor products suitable for AC/DC converters that convert the AC power output from wind turbine generators to DC power, as well as for inverters that convert DC power to the AC power of commercial frequencies

Solar



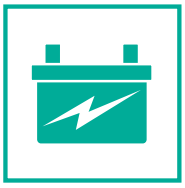
Semiconductor products best suited for power conditioners that convert solar-panel generated DC power into AC power to enable the residential consumption, as well as to facilitate the recovery of the power to the power systems of power companies

Welding Machines



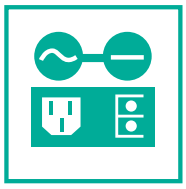
Semiconductor products suitable for switching circuits that generate resistance heat in welding machines to melt and integrate by adding heat or pressure to two or more metallic members

UPS



Semiconductor products ideal for the power conversion circuits of UPS (uninterruptible power supply) that prevent system shutdown during power outages and instantaneous power failures

Switching Power Supplies



Semiconductor products best suited for general-purpose switching power supplies used in a wide variety of applications such as equipment for general consumers and OA and communication devices

PC / Servers

Semiconductor products suitable for the power supplies of increasingly high-performance desktop PCs and servers, as well as of increasingly compact and lightweight notebook PCs

Flat-screen TVs

Semiconductor products ideal for the power supplies of TV sets that require low power consumption and large screens that are increasingly thinner and more lightweight

Automobiles

IGBT modules, power ICs, MOSFETs and pressure sensors as semiconductor products for automobiles developed with the theme "Car Electronics Solutions - Contributing to the Environment, Safety and Comfort"

LED Lighting

The power supply for LED lighting requires a PFC circuit that complies with harmonic regulations and a converter circuit that is compatible with the LED and driver circuit being used

Air Conditioners

Semiconductor products that are ideal for the inverters that control the fan motors that regulate the airflow and the compressor motors that compress the refrigerant on air conditioners

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Contents

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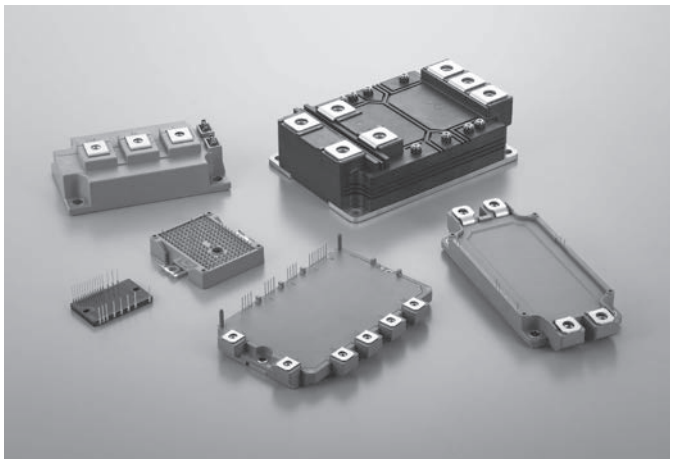
Fuji Electric Power Semiconductors

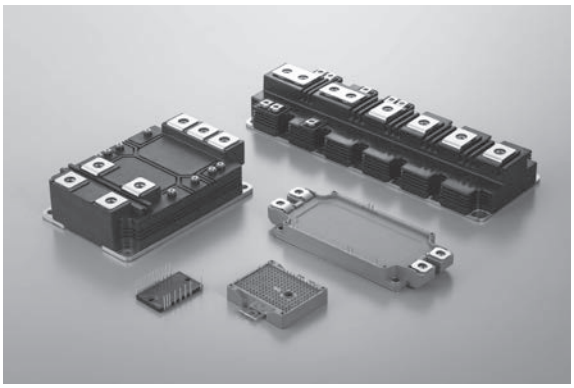
Power Modules

Power Modules

Fuji Electric offers a lineup of high-quality, highly reliable power modules suitable for various applications.



IGBT Modules



Fuji Electric's IGBT modules are designed to operate as switching devices for power conversion equipment such as variable-speed motor drives and uninterruptible power supplies. IGBTs are semiconductor devices that combine the high-speed switching performance of power MOSFETs with the high-voltage high-current processing capabilities of bipolar transistors.

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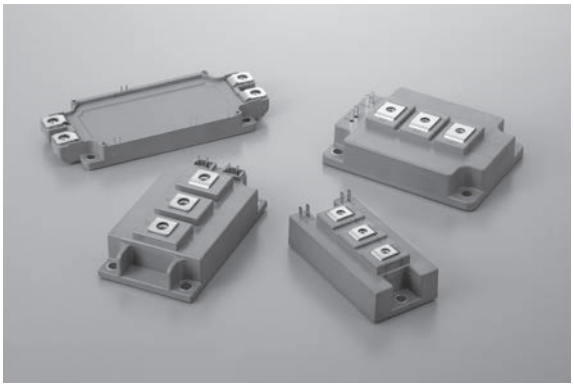
SiC Modules



SiC modules have excellent characteristics that realize high blocking voltage, low power dissipation, high-frequency operation and high-temperature operation.
Power modules that make use of SiC achieve significant reduction in energy consumption, and can be used to develop smaller and lighter products.

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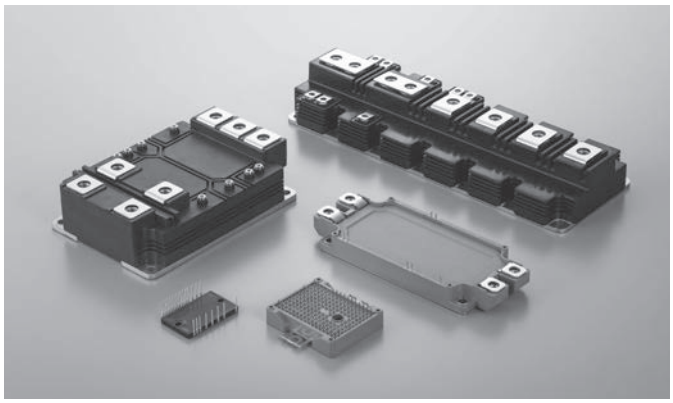
■ Product lineup

Number of Switches	Products Category	Page	Internal Configuration				Max V_{CE} (V)						Rated Current (A)					
			Standard Module	Power Integrated Module	Intelligent Power Module	3-level Module	600	650	1200	1700	2300	3300	≤50	>50 ≤150	>150 ≤300	>300 ≤600	>600 ≤1200	>1200
6,7	**Small IPM IPM**	17 to 32			✓		✓	✓	✓				✓	✓	✓	✓		
7	**Small PIM**	33,34,35		✓			✓	✓	✓				✓					
	PIM EconoPIM™	36,39		✓			✓	✓					✓	✓				
		37,38,40,41							✓				✓	✓				
6	**6-pack EconoPACK™ EconoPACK™+**	42,43	✓				✓		✓				✓	✓	✓			
		44								✓				✓				
		45							✓	✓					✓	✓		
2	**Standard 2-pack**	46	✓				✓	✓						✓	✓	✓		
		47,48,50,51							✓					✓	✓	✓	✓	
		49,52,53								✓				✓	✓	✓	✓	
1	**Standard 1-pack**	58	✓						✓	✓					✓	✓	✓	✓
	Chopper	59,60,61	✓				✓		✓	✓				✓	✓	✓	✓	✓
1,2	**HPnC**	54	✓							✓	✓	✓				✓	✓	✓
	PrimePACK™	55,56,57	✓						✓	✓						✓	✓	✓
4,12	**T/I-type NPC 3-level**	62,63				✓	✓		✓	✓			✓	✓	✓	✓	✓	
2	**Hybrid SiC Module**	64,65	✓						✓	✓					✓	✓		
	All-SiC Module	66	✓						✓	✓					✓	✓		

Note: EconoPIM™, EconoPACK™, EconoPACK™+, PrimePACK™ are registered trademark of Infineon Technologies AG, Germany.

IGBT Modules

Fuji Electric has been developing IGBT modules designed to be used as switching devices for power converters of variable-speed drives for motors, uninterruptible power supplies, and more. IGBT has superior characteristics combining the high-speed switching performance of a power MOSFET with the high-voltage/high-current handling capabilities of a bipolar transistor.



Features of IGBT Module X series

• Contributes to energy savings by reducing power loss
Reduces inverter loss by 10% and lower chip temperature by 11°C (Comparison with the 6th Generation V Series (1200V 75A), at f_c = 8 kHz)

• Achieves equipment miniaturization
Footprint size can be reduced by 36% by replacing the previous 6th Generation (1200V 75A) with the new 7th Generation X Series (1200V 75A) *1

*1 Mounting area ratio with 1200V PIM models

• Contributes to improved equipment reliability
Achieves guaranteed continuous operation at $T_{vj(op)}$ = 175°C

• Increased rated current with RC-IGBT technology.

Features of IGBT Module V series

• A compact design allows for greater power output
· High performance 6th-generation V series IGBT/FWD chipset
· $T_{vj(max.)}$=175°C, $T_{vj(op)}$=150°C

• Environmentally friendly modules
· Easy assemblage, solder free options
· RoHS compliant

• Turn-on switching characteristics
· Improved noise-loss trade-off
· Reduced turn-on dv/dt, and di_c/dt

• Turn-off switching characteristic
· Soft switching behavior, turn-off oscillation free

Part numbers

6MBI100XBA120-50 (example)

6	MB	I	100	X	BA	120	50
Number of IGBT Switches	IGBT Module	Internal Configuration	Rated Current	IGBT Device Technology	Package Type	Max. V_{CE}	RoHS Compliant
		I: Standard Modules	×1 (A)	X: X series (7th Generation)	See the Products map	060: 600V	50 to 99 RoHS Compliant
		R: Power Integrated Modules	ex) 100: 100A	XR: X series (7th Generation)		065: 650V	
		P: Intelligent Power Modules		V: V series (6th Generation)		120: 1200V	
						170: 1700V	
						230: 2300V	
						330: 3300V	

Letter symbols

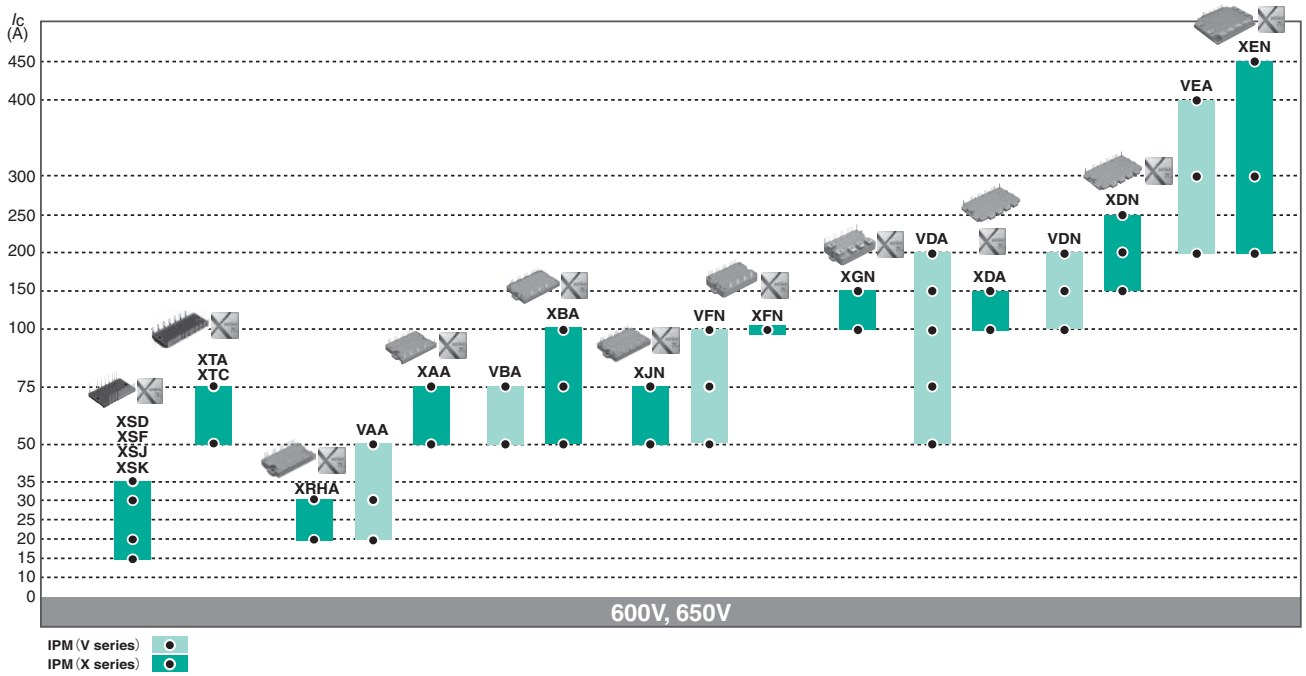
Letter symbols

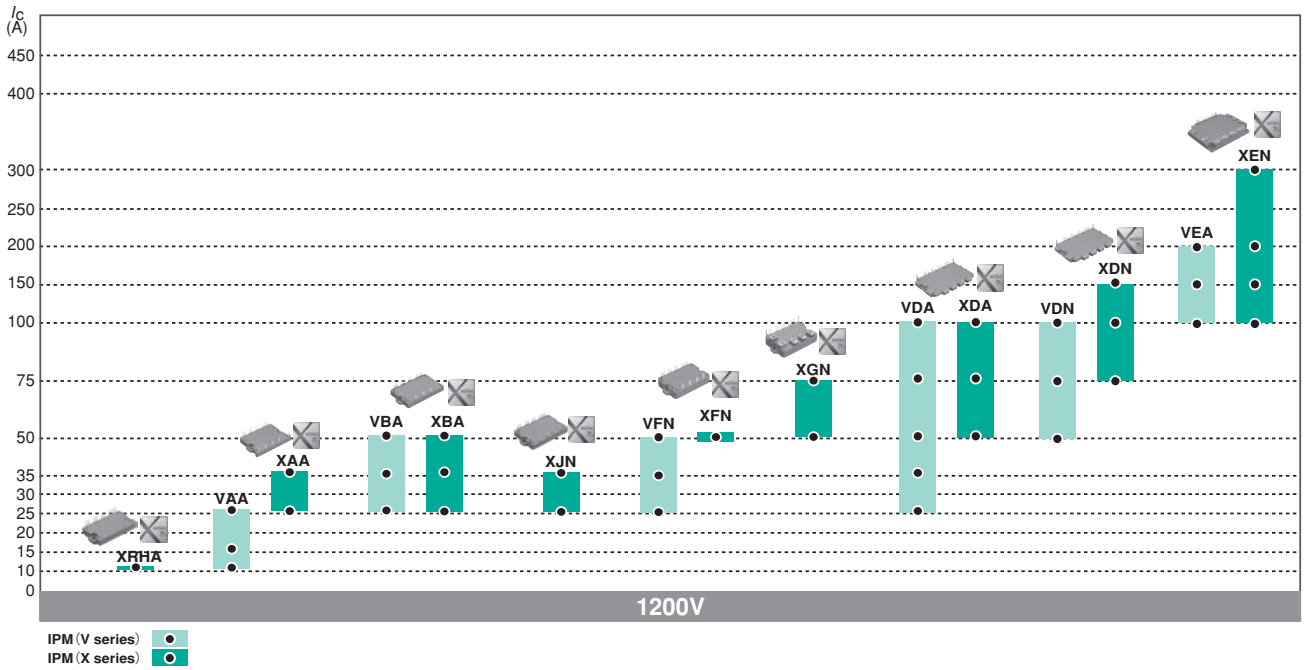
V_{CES} : Collector-to-emitter rated voltage (Gate-to-emitter short-circuited)
V_{GES} : Gate-to-emitter rated voltage (Collector-to-emitter short-circuited)
I_C : Rated collector current
P_{tot} : Maximum power dissipation
$V_{CE(sat)}$: Collector-to-emitter saturation voltage
V_{RRM} : Maximum repetitive reverse voltage
I_O : Output current of converter
V_{FM} : Maximum forward voltage drop of rectifier diode
I_{FSM} : Maximum surge forward current of rectifier diode
t_{on} : Turn-on time
t_{off} : Turn-off time
t_f : Fall time
$t_{d(on)}$: Turn-on delay time
$t_{d(off)}$: Turn-off delay time

Products Map

IPM (Intelligent Power Modules)

6/7MBP	Rated Current *Ic*	IGBT series & Package type		Size	V series		X series		Page
		V series	X series		7 in 1	6 in 1	7 in 1	6 in 1	
		–	XSD, XSF, XSJ, XSK	26×43mm	–	–	–	✓	17,18
		–	XTA, XTC	31×79mm	–	–	–	✓	17,18
		–	XRHA	36×70mm	–	–	–	✓	19,20
		VAA	XAA	49.5×70mm	–	✓	–	✓	19,20
		VBA	XBA	50.2×87mm	–	✓	–	✓	21,22
		–	XJN	50.2×87mm	–	–	✓	–	21,22
		VFN	XFN	55×90mm	✓	✓	✓	✓	23,24,25
		–	XGN	55×90mm	–	–	–	✓	23,24,25
		VDA, VDN	XDA, XDN	84×128.5mm	✓	✓	✓	✓	26,27,28,29
		VEA	XEN	110×142mm	✓	✓	✓	✓	30,31,32

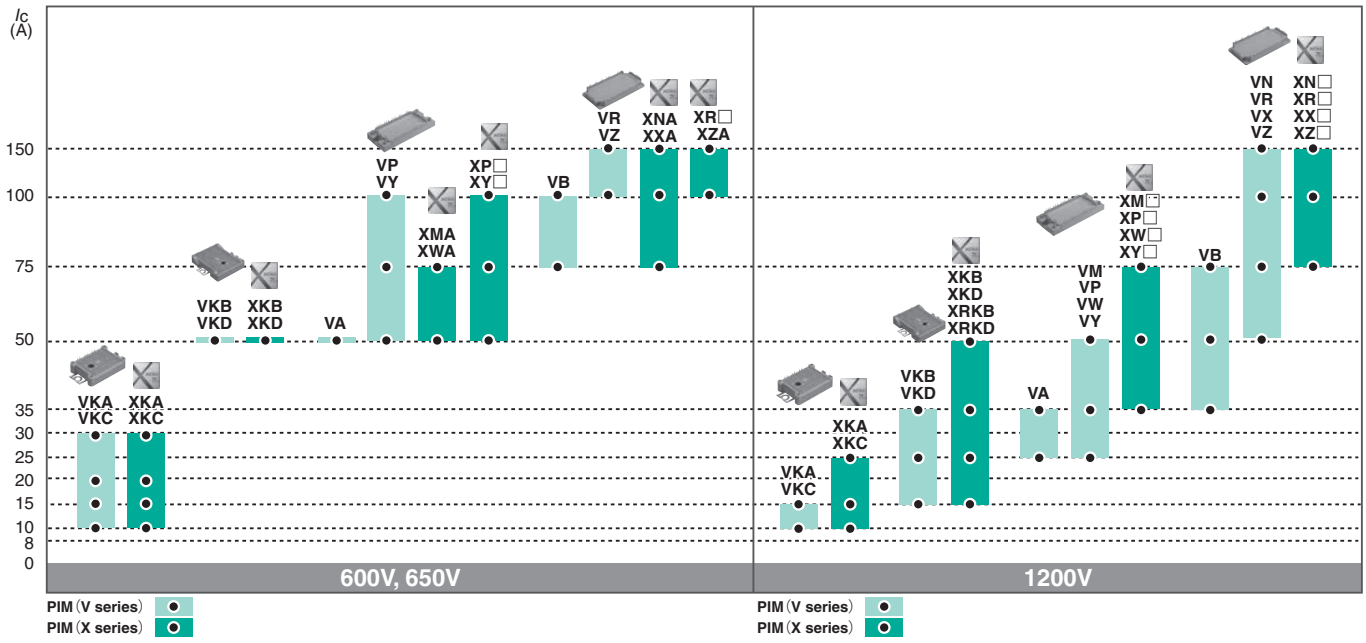




PIM (Power Integrated Modules)

7MBR	Rated Current *Ic*	IGBT series & Package type				Size	Page	
		V series		X series				
		Solder pins	Press fit pins	Solder pins	Press fit pins			
		VKC	VKA	XKC	XKA	33.8×62.8mm	33,34,35	
		VKD	VKB	XKD, XRKD	XKB, XRKB	56.7×62.8mm	33,34,35	
		VA, VM, VP	VW, VY	XM□, XP□	XW□, XY□	45×107.5mm	36,37,38,39,40,41	EconoPIM™
		VB, VN, VR	VX, VZ	XN□, XR□	XX□, XZ□	62×122mm	36,37,38,39,40,41	

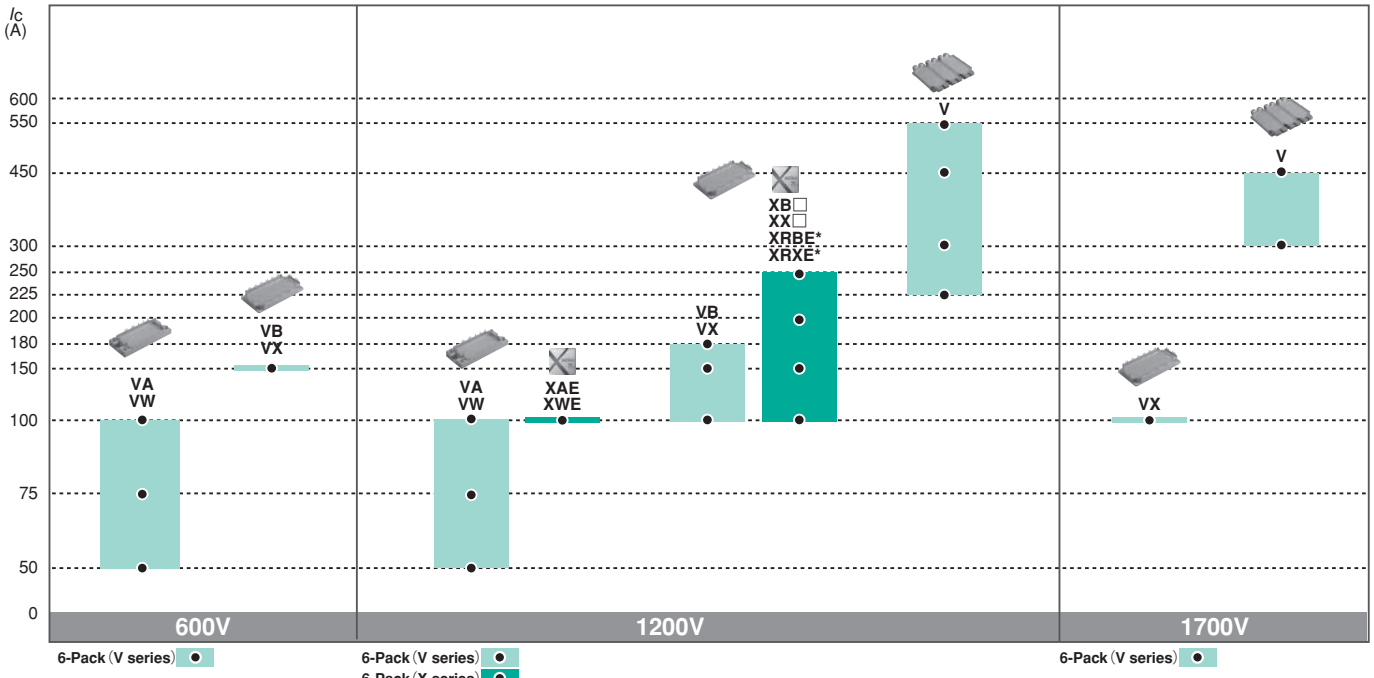
Note:EconoPIM™ is registered trademark of Infineon Technologies AG, Germany.



6-Pack

6MBI	Rated Current *Ic*	IGBT series & Package type				Size	Page	
		V series		X series				
		Solder pins	Press fit pins	Solder pins	Press fit pins			
		VA	VW	XAE	XWE	45×107.5mm	26,27	EconoPACK™
		VB	VX	XB□, XRBE	XX□, XRXE	62×122mm	26,27,28	EconoPACK™
		V				150×162mm	29	EconoPACK™+

Note:EconoPACK™, EconoPACK™+ is registered trademark of Infineon Technologies AG, Germany.

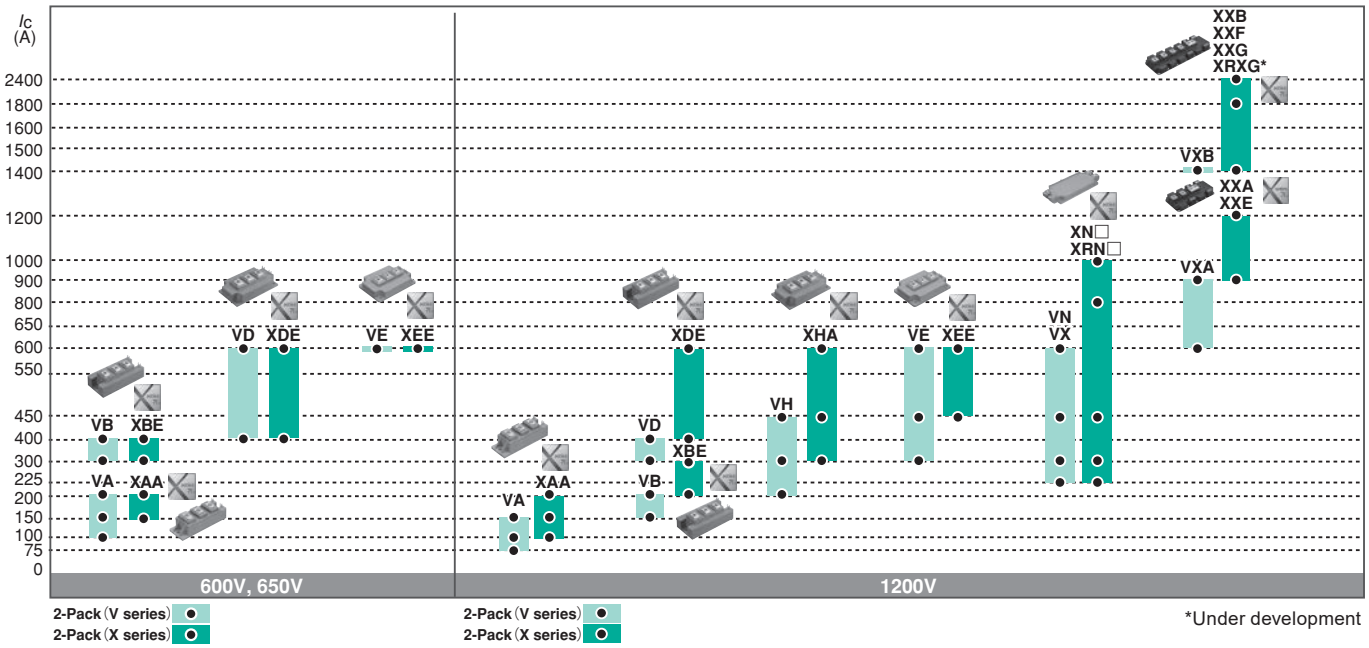


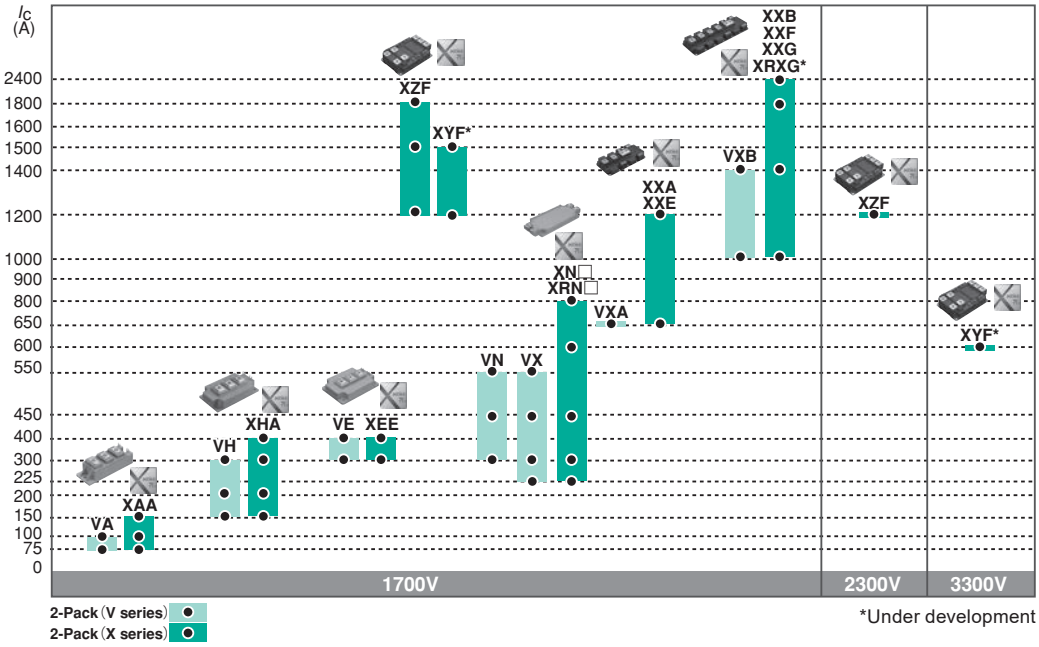
*Under development

2-Pack

2MBI	Rated Current *Ic*	IGBT series & Package type		Size	Page	
		V series	X series			
		VA	XAA	34×94mm	46,47,48,49	Standard Pack
		VB	XBE	45×92mm	46,47,48	
		VD,VH	XDE,XHA	62×108mm	46,47,48,49	
		VE	XEE	80×110mm	46,47,48,49	
		VN, VX	XN□, XRN□	62×150mm	50,51,52,53	Dual XT
		-	XYF, XZF	99.5×144mm	54	HPnC
		VXA	XXA, XXE	89×172mm	55,56,57	PrimePACK™
		VXB	XXB, XXF, XXG, XRXG	89×250mm	55,56,57	

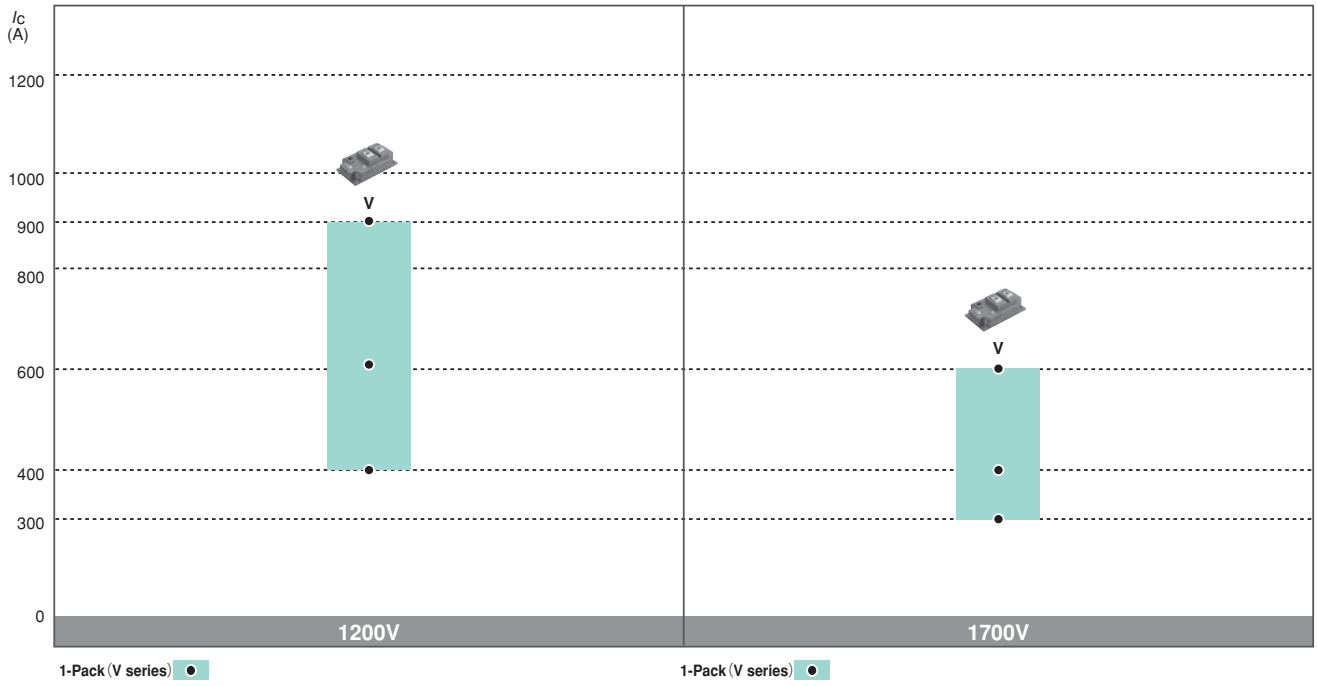
Note:PrimePACK™ is registered trademark of Infineon Technologies AG, Germany.





1-Pack

1MBI	Rated Current *Ic*	IGBT series & Package type			
		V series	Size	Page	
		V	62×108mm	58	Standard Pack

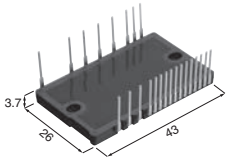
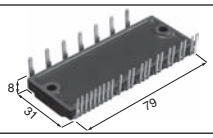
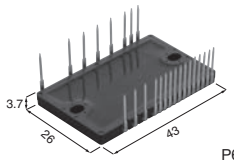


IGBT Module Small IPM < X series >

Small IPM（Intelligent Power Module）600V, 650V class

Built-in protection functions

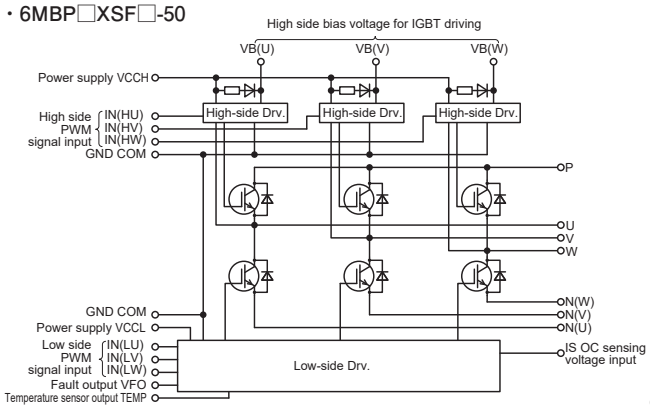
- P-side fault status output (Alarm)
- N-side fault status output (Alarm)
- Under voltage protection (self shutdown)
- Over current protection (External current detection and shutdown)
- Overheating protection (self shutdown)
- Temperature sensor output (Vtemp, out)

Small IPM with High Voltage Driver-IC without Brake-Chopper								600V / 650V
							I_C	X series
 P633A	✓		✓	✓	✓		15A	**6MBP15XSD060-50**
							20A	**6MBP20XSD060-50**
							30A	**6MBP30XSD060-50**
							35A	**6MBP35XSD060-50**
	✓	✓	✓	✓	✓		15A	**6MBP15XSF060-50**
							20A	**6MBP20XSF060-50**
							30A	**6MBP30XSF060-50**
							35A	**6MBP35XSF060-50**
 P642	✓		✓	✓	✓		50A	**6MBP50XTA065-50**
							75A	**6MBP75XTA065-50**
	✓	✓	✓	✓	✓		50A	**6MBP50XTC065-50**
							75A	**6MBP75XTC065-50**
 P633C	✓		✓	✓	✓		15A	**6MBP15XSJ065-50**
							20A	**6MBP20XSJ065-50**
							30A	**6MBP30XSJ065-50**
							35A	**6MBP35XSJ065-50**
	✓	✓	✓	✓	✓		15A	**6MBP15XSK065-50**
							20A	**6MBP20XSK065-50**
							30A	**6MBP30XSK065-50**
							35A	**6MBP35XSK065-50**

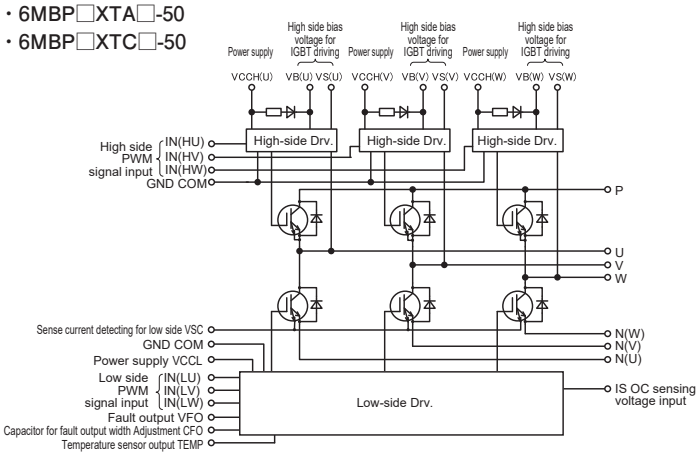
Dimension [mm]

●Block Diagram

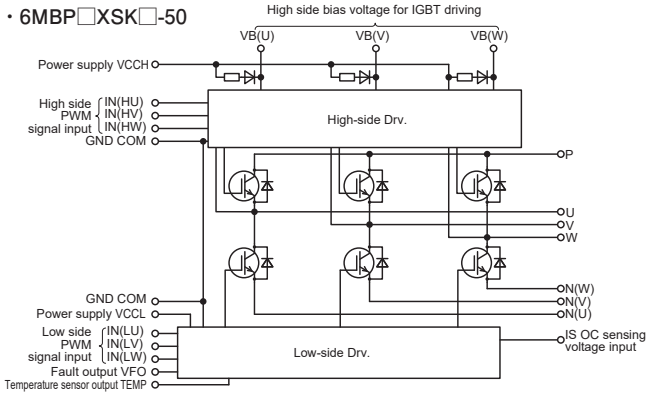
・6MBP□XSD□-50
・6MBP□XSF□-50



・6MBP□XTA□-50
・6MBP□XTC□-50



・6MBP□XSJ□-50
・6MBP□XSK□-50



■ X series

Device type	Inverter			Control			Protection function					Package	Net mass
	V_{CES}	I_C Cont.	$V_{CE(sat)}$ typ.	V_{CCL} V_{CCH} V_B typ.	Boot-strap Diode	Input signal Active logic and Voltage level	UV V_{CCL} V_{CCH} V_B	OC *1	Vtemp *2	TOH *2	VFO fault output		
	Volts	Amps.	Volts	Volts									Grams
6MBP15XSD060-50	600	15	1.60	15	Built-in	High(3.3/5V)	P&N-side	N-side	N-side	-	N-side(UV,OC)	P633A	9.3
6MBP20XSD060-50	600	20	1.60	15	Built-in	High(3.3/5V)	P&N-side	N-side	N-side	-	N-side(UV,OC)	P633A	9.3
6MBP30XSD060-50	600	30	1.60	15	Built-in	High(3.3/5V)	P&N-side	N-side	N-side	-	N-side(UV,OC)	P633A	9.3
6MBP35XSD060-50	600	35	1.40	15	Built-in	High(3.3/5V)	P&N-side	N-side	N-side	-	N-side(UV,OC)	P633A	9.3
6MBP15XSF060-50	600	15	1.60	15	Built-in	High(3.3/5V)	P&N-side	N-side	N-side	N-side(143±7℃)	N-side(UV,OC,TOH)	P633A	9.3
6MBP20XSF060-50	600	20	1.60	15	Built-in	High(3.3/5V)	P&N-side	N-side	N-side	N-side(143±7℃)	N-side(UV,OC,TOH)	P633A	9.3
6MBP30XSF060-50	600	30	1.60	15	Built-in	High(3.3/5V)	P&N-side	N-side	N-side	N-side(143±7℃)	N-side(UV,OC,TOH)	P633A	9.3
6MBP35XSF060-50	600	35	1.40	15	Built-in	High(3.3/5V)	P&N-side	N-side	N-side	N-side(143±7℃)	N-side(UV,OC,TOH)	P633A	9.3
6MBP50XTA065-50	650	50	1.30	15	Built-in	High(3.3/5V)	P&N-side	N-side	N-side	-	N-side(UV,OC)	P642	37
6MBP75XTA065-50	650	75	1.35	15	Built-in	High(3.3/5V)	P&N-side	N-side	N-side	-	N-side(UV,OC)	P642	37
6MBP50XTC065-50	650	50	1.30	15	Built-in	High(3.3/5V)	P&N-side	N-side	N-side	N-side(143±7℃)	N-side(UV,OC,TOH)	P642	37
6MBP75XTC065-50	650	75	1.35	15	Built-in	High(3.3/5V)	P&N-side	N-side	N-side	N-side(143±7℃)	N-side(UV,OC,TOH)	P642	37
● **6MBP15XSJ065-50**	650	15	1.60	15	Built-in	High(3.3/5V)	P&N-side	N-side	N-side	-	N-side(UV,OC)	P633C	9.3
● **6MBP20XSJ065-50**	650	20	1.60	15	Built-in	High(3.3/5V)	P&N-side	N-side	N-side	-	N-side(UV,OC)	P633C	9.3
● **6MBP30XSJ065-50**	650	30	1.60	15	Built-in	High(3.3/5V)	P&N-side	N-side	N-side	-	N-side(UV,OC)	P633C	9.3
● **6MBP35XSJ065-50**	650	35	1.40	15	Built-in	High(3.3/5V)	P&N-side	N-side	N-side	-	N-side(UV,OC)	P633C	9.3
● **6MBP15XSK065-50**	650	15	1.60	15	Built-in	High(3.3/5V)	P&N-side	N-side	N-side	N-side(143±7℃)	N-side(UV,OC,TOH)	P633C	9.3
● **6MBP20XSK065-50**	650	20	1.60	15	Built-in	High(3.3/5V)	P&N-side	N-side	N-side	N-side(143±7℃)	N-side(UV,OC,TOH)	P633C	9.3
● **6MBP30XSK065-50**	650	30	1.60	15	Built-in	High(3.3/5V)	P&N-side	N-side	N-side	N-side(143±7℃)	N-side(UV,OC,TOH)	P633C	9.3
● **6MBP35XSK065-50**	650	35	1.40	15	Built-in	High(3.3/5V)	P&N-side	N-side	N-side	N-side(143±7℃)	N-side(UV,OC,TOH)	P633C	9.3

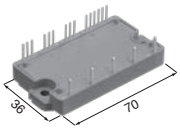
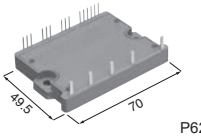
*1 External current detection
*2 Temperature detection in LVIC
●: New products

IGBT Module IPM < X series / V series >

IPM（Intelligent Power Module）600V, 650V class

Built-in protection functions

P-side fault status output (Alarm)
N-side fault status output (Alarm)
Under voltage protection (self shutdown)
Over current protection (self shutdown)
Overheating protection (self shutdown)

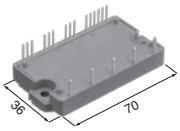
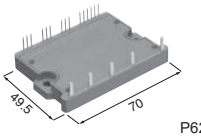
							650V		600V	
							X series		V series	
						*I*c	Without Brake-Chopper	With Brake-Chopper	Without Brake-Chopper	With Brake-Chopper
 P639	✓	✓	✓	✓		20A	**6MBP20XRHA065-50**			
						30A	**6MBP30XRHA065-50**			
 P629	✓	✓	✓	✓		20A			**6MBP20VAA060-50**	
						30A			**6MBP30VAA060-50**	
						50A	**6MBP50XAA065-50**		**6MBP50VAA060-50**	
						75A	**6MBP75XAA065-50**			

Dimension [mm]

IPM（Intelligent Power Module）1200V class

Built-in protection functions

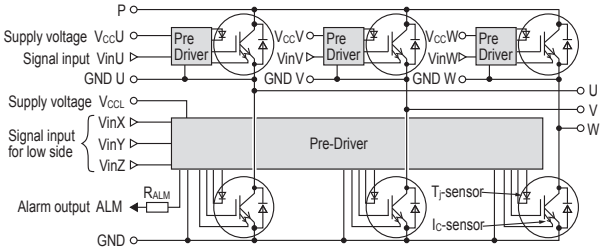
P-side fault status output (Alarm)
N-side fault status output (Alarm)
Under voltage protection (self shutdown)
Over current protection (self shutdown)
Overheating protection (self shutdown)

							1200V			
							X series		V series	
						*I*c	Without Brake-Chopper	With Brake-Chopper	Without Brake-Chopper	With Brake-Chopper
 P639	✓	✓	✓	✓		10A	**6MBP10XRHA120-50**			
 P629	✓	✓	✓	✓		10A			**6MBP10VAA120-50**	
						15A			**6MBP15VAA120-50**	
						25A	**6MBP25XAA120-50**		**6MBP25VAA120-50**	
						35A	**6MBP35XAA120-50**			

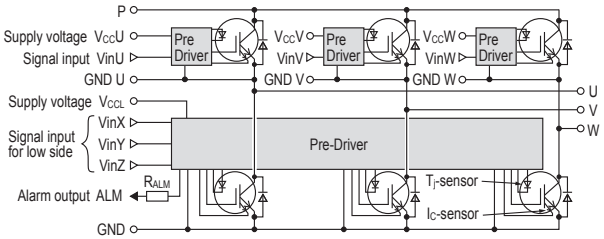
Dimension [mm]

●Block Diagram

• 6MBP□XRHA□-50



• 6MBP□XAA□-50
• 6MBP□VAA□-50



■ X series

Device type	Inverter			Brake		Control					Alarm signal hold time			Package	Net mass
	V_{CES}	I_C Cont.	$V_{CE(sat)}$ typ.	V_{CES}	I_C Cont.	V_{CC} typ.	I_{OC}[INV] min.	V_{UV} max.	T_{jw} min.	T_{jOH} min.	OC typ.	UV typ.	T_{jOH} typ.		
	Volts	Amps.	Volts	Volts	Amps.	(V)	(A)	(V)	(℃)	(℃)	ms	ms	ms		Grams
6MBP20XRHA065-50	650	20	1.4	-	-	15	30	12.5	-	175	2	4	8	P639	55
6MBP30XRHA065-50	650	30	1.4	-	-	15	45	12.5	-	175	2	4	8	P639	55
6MBP50XAA065-50	650	50	1.15	-	-	15	75	12.5	-	175	2	4	8	P629	80
6MBP75XAA065-50	650	75	1.15	-	-	15	113	12.5	-	175	2	4	8	P629	80
6MBP10XRHA120-50	1200	10	2.05	-	-	15	15	12.5	-	175	2	4	8	P639	55
6MBP25XAA120-50	1200	25	1.45	-	-	15	38	12.5	-	175	2	4	8	P629	80
6MBP35XAA120-50	1200	35	1.45	-	-	15	53	12.5	-	175	2	4	8	P629	80

Note : T_{jw} is the warning temperature for IGBT chip overheating.

$V_{CE(sat)}$: at T_{vj}=25℃, Chip

■ V series

Device type	Inverter			Brake		Control					Alarm signal hold time			Package	Net mass
	V_{CES}	I_C Cont.	$V_{CE(sat)}$ typ.	V_{CES}	I_C Cont.	V_{CC} typ.	I_{OC}[INV] min.	V_{UV} max.	T_{jw} min.	T_{jOH} min.	OC typ.	UV typ.	T_{jOH} typ.		
	Volts	Amps.	Volts	Volts	Amps.	(V)	(A)	(V)	(℃)	(℃)	ms	ms	ms		Grams
6MBP20VAA060-50	600	20	1.4	-	-	15	30	12.5	-	150	2	4	8	P629	80
6MBP30VAA060-50	600	30	1.4	-	-	15	45	12.5	-	150	2	4	8	P629	80
6MBP50VAA060-50	600	50	1.4	-	-	15	75	12.5	-	150	2	4	8	P629	80
6MBP10VAA120-50	1200	10	1.7	-	-	15	15	12.5	-	150	2	4	8	P629	80
6MBP15VAA120-50	1200	15	1.7	-	-	15	23	12.5	-	150	2	4	8	P629	80
6MBP25VAA120-50	1200	25	1.7	-	-	15	38	12.5	-	150	2	4	8	P629	80

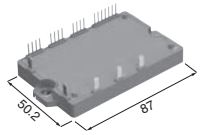
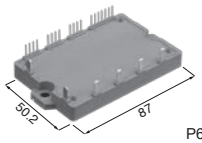
$V_{CE(sat)}$: at T_{vj}=25℃, Chip

IGBT Module IPM < X series / V series >

IPM（Intelligent Power Module）600V, 650V class

Built-in protection functions

P-side fault status output (Alarm)
N-side fault status output (Alarm)
Under voltage protection (self shutdown)
Over current protection (self shutdown)
Overheating protection (self shutdown)

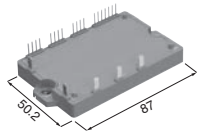
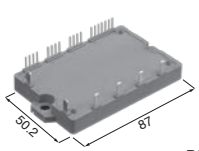
							650V		600V	
							X series		V series	
						Ic	Without Brake-Chopper	With Brake-Chopper	Without Brake-Chopper	With Brake-Chopper
 P626	✓	✓	✓	✓	✓	50A	**6MBP50XBA065-50**		**6MBP50VBA060-50**	
						75A	**6MBP75XBA065-50**		**6MBP75VBA060-50**	
						100A	**6MBP100XBA065-50**			
 P644	✓	✓	✓	✓	✓	50A		**7MBP50XJN065-50**		
						75A		**7MBP75XJN065-50**		

Dimension [mm]

IPM（Intelligent Power Module）1200V class

Built-in protection functions

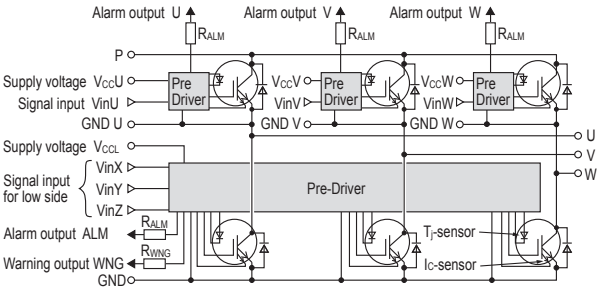
P-side fault status output (Alarm)
N-side fault status output (Alarm)
Under voltage protection (self shutdown)
Over current protection (self shutdown)
Overheating protection (self shutdown)

							1200V			
							X series		V series	
						Ic	Without Brake-Chopper	With Brake-Chopper	Without Brake-Chopper	With Brake-Chopper
 P626	✓	✓	✓	✓	✓	25A	**6MBP25XBA120-50**		**6MBP25VBA120-50**	
						35A	**6MBP35XBA120-50**		**6MBP35VBA120-50**	
						50A	**6MBP50XBA120-50**		**6MBP50VBA120-50**	
 P644	✓	✓	✓	✓	✓	25A		**7MBP25XJN120-50**		
						35A		**7MBP35XJN120-50**		

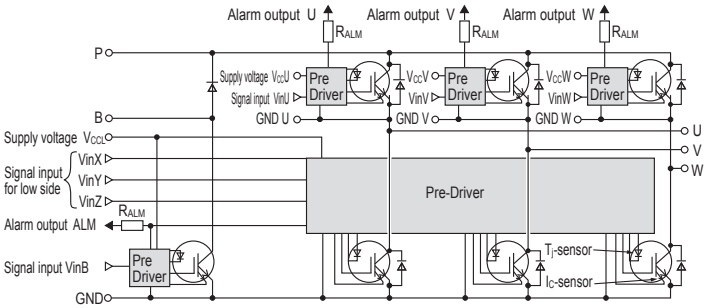
Dimension [mm]

● X series

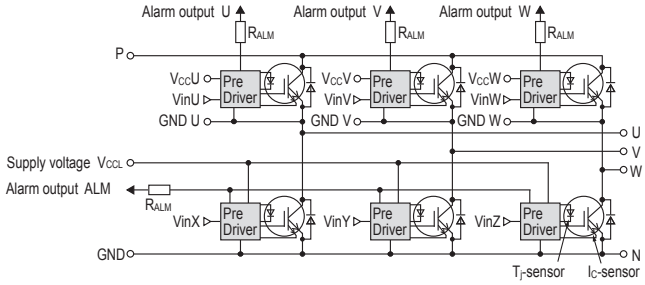
・6MBP□XBA□-50



・7MBP□XJN□-50



・6MBP□VBA□-50



■ X series

Device type	Inverter			Brake		Control					Package	Net mass
	V_{CES}	I_C Cont.	$V_{CE(sat)}$ typ.	V_{CES}	I_C Cont.	V_{CC} typ.	I_{OC}[INV] min.	V_{UV} max.	T_{jw} min.	T_{jOH} min.	Alarm signal hold time OC typ.	UV typ.	T_{jOH} typ.		
	Volts	Amps.	Volts	Volts	Amps.	(V)	(A)	(V)	(℃)	(℃)	ms	ms	ms		Grams
6MBP50XBA065-50	650	50	1.15	-	-	15	75	12.5	150	175	2	4	8	P626	100
6MBP75XBA065-50	650	75	1.15	-	-	15	113	12.5	150	175	2	4	8	P626	100
6MBP100XBA065-50	650	100	1.15	-	-	15	150	12.5	150	175	2	4	8	P626	100
7MBP50XJN065-50	650	50	1.15	650	30	15	75	12.5	-	175	2	4	8	P644	100
7MBP75XJN065-50	650	75	1.15	650	50	15	113	12.5	-	175	2	4	8	P644	100
6MBP25XBA120-50	1200	25	1.45	-	-	15	38	12.5	150	175	2	4	8	P626	100
6MBP35XBA120-50	1200	35	1.45	-	-	15	53	12.5	150	175	2	4	8	P626	100
6MBP50XBA120-50	1200	50	1.45	-	-	15	75	12.5	150	175	2	4	8	P626	100
7MBP25XJN120-50	1200	25	1.45	1200	15	15	38	12.5	-	175	2	4	8	P644	100
7MBP35XJN120-50	1200	35	1.45	1200	25	15	53	12.5	-	175	2	4	8	P644	100

Note : T_{jw} is the warning temperature for IGBT chip overheating.

$V_{CE(sat)}$: at T_{vj}=25℃, Chip

■ V series

Device type	Inverter			Brake		Control					Package	Net mass
	V_{CES}	I_C Cont.	$V_{CE(sat)}$ typ.	V_{CES}	I_C Cont.	V_{CC} typ.	I_{OC}[INV] min.	V_{UV} max.	T_{jw} min.	T_{jOH} min.	Alarm signal hold time OC typ.	UV typ.	T_{jOH} typ.		
	Volts	Amps.	Volts	Volts	Amps.	(V)	(A)	(V)	(℃)	(℃)	ms	ms	ms		Grams
6MBP50VBA060-50	600	50	1.4	-	-	15	75	12.5	-	150	2	4	8	P626	100
6MBP75VBA060-50	600	75	1.4	-	-	15	113	12.5	-	150	2	4	8	P626	100
6MBP25VBA120-50	1200	25	1.7	-	-	15	38	12.5	-	150	2	4	8	P626	100
6MBP35VBA120-50	1200	35	1.7	-	-	15	53	12.5	-	150	2	4	8	P626	100
6MBP50VBA120-50	1200	50	1.7	-	-	15	75	12.5	-	150	2	4	8	P626	100

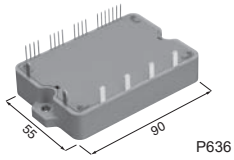
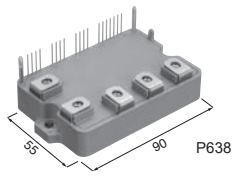
$V_{CE(sat)}$: at T_{vj}=25℃, Chip

IGBT Module IPM < X series / V series >

IPM（Intelligent Power Module）600V, 650V class

Built-in protection functions

P-side fault status output (Alarm)
N-side fault status output (Alarm)
Under voltage protection (self shutdown)
Over current protection (self shutdown)
Overheating protection (self shutdown)

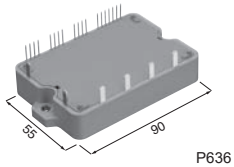
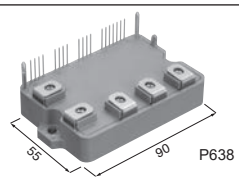
							650V		600V	
							X series		V series	
						Ic	Without Brake-Chopper	With Brake-Chopper	Without Brake-Chopper	With Brake-Chopper
 P636	✓	✓	✓	✓	✓	50A			**6MBP50VFN060-50**	**7MBP50VFN060-50**
						75A			**6MBP75VFN060-50**	**7MBP75VFN060-50**
						100A	**6MBP100XFN065-50**	**7MBP100XFN065-50**	**6MBP100VFN060-50**	**7MBP100VFN060-50**
 P638	✓	✓	✓	✓	✓	100A	**6MBP100XGN065-50**			
						150A	**6MBP150XGN065-50**			

Dimension [mm]

IPM（Intelligent Power Module）1200V class

Built-in protection functions

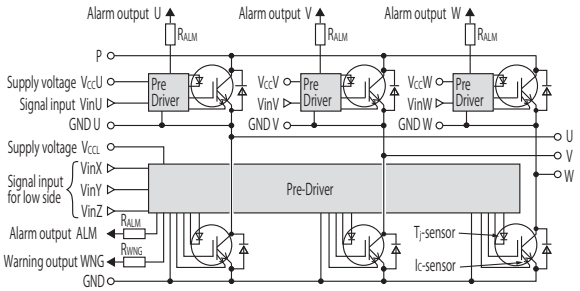
P-side fault status output (Alarm)
N-side fault status output (Alarm)
Under voltage protection (self shutdown)
Over current protection (self shutdown)
Overheating protection (self shutdown)

							1200V			
							X series		V series	
						Ic	Without Brake-Chopper	With Brake-Chopper	Without Brake-Chopper	With Brake-Chopper
 P636	✓	✓	✓	✓	✓	25A			**6MBP25VFN120-50**	**7MBP25VFN120-50**
						35A			**6MBP35VFN120-50**	**7MBP35VFN120-50**
						50A	**6MBP50XFN120-50**	**7MBP50XFN120-50**	**6MBP50VFN120-50**	**7MBP50VFN120-50**
 P638	✓	✓	✓	✓	✓	50A	**6MBP50XGN120-50**			
						75A	**6MBP75XGN120-50**			

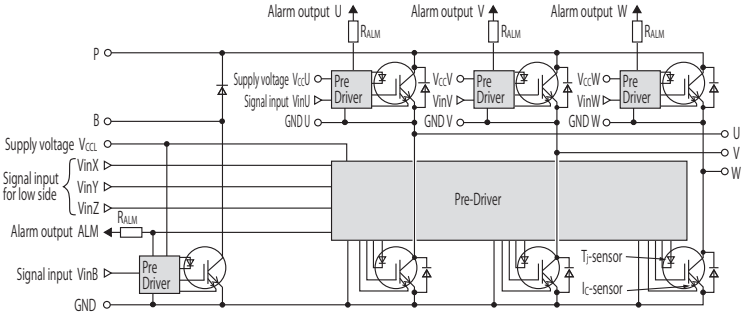
Dimension [mm]

●Block Diagram

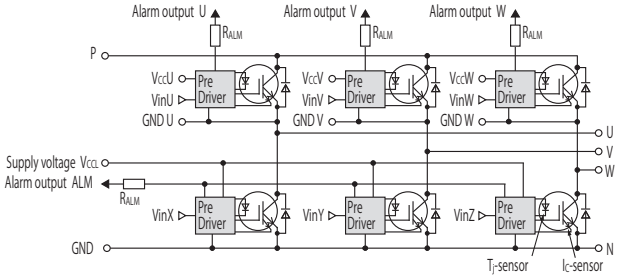
・6MBP□XGN□-50
・6MBP□XFN□-50



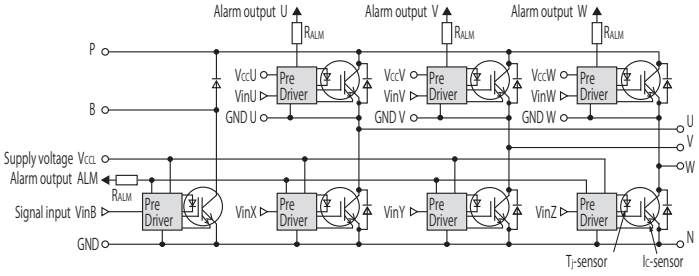
・7MBP□XFN□-50



・6MBP□VFN□-50



・7MBP□VFN□-50



■ X series

Device type	Inverter			Brake		Control					Alarm signal hold time			Package	Net mass
	V_{CES}	I_C Cont.	$V_{CE(sat)}$ typ.	V_{CES}	I_C Cont.	V_{CC} typ.	I_{OC}[INV] min.	V_{UV} max.	T_{jw} min.	T_{jOH} min.	OC typ.	UV typ.	T_{jOH} typ.		
	Volts	Amps.	Volts	Volts	Amps.	(V)	(A)	(V)	(℃)	(℃)	ms	ms	ms		Grams
6MBP100XFN065-50	650	100	1.15	-	-	15	150	12.5	150	175	2	4	8	P636	190
7MBP100XFN065-50	650	100	1.15	650	50	15	150	12.5	-	175	2	4	8	P636	190
6MBP100XGN065-50	650	100	1.15	-	-	15	150	12.5	150	175	2	4	8	P638	200
6MBP150XGN065-50	650	150	1.15	-	-	15	225	12.5	150	175	2	4	8	P638	200
6MBP50XFN120-50	1200	50	1.45	-	-	15	75	12.5	150	175	2	4	8	P636	190
7MBP50XFN120-50	1200	50	1.45	1200	25	15	75	12.5	-	175	2	4	8	P636	190
6MBP50XGN120-50	1200	50	1.45	-	-	15	75	12.5	150	175	2	4	8	P638	200
6MBP75XGN120-50	1200	75	1.45	-	-	15	113	12.5	150	175	2	4	8	P638	200

Note : T_{jw} is the warning temperature for IGBT chip overheating.

■ V series

Device type	Inverter			Brake		Control					Alarm signal hold time			Package	Net mass
	V_{CES}	I_C Cont.	$V_{CE(sat)}$ typ.	V_{CES}	I_C Cont.	V_{CC} typ.	I_{OC}[INV] min.	V_{UV} max.	T_{jw} min.	T_{jOH} min.	OC typ.	UV typ.	T_{jOH} typ.		
	Volts	Amps.	Volts	Volts	Amps.	(V)	(A)	(V)	(℃)	(℃)	ms	ms	ms		Grams
6MBP50VFN060-50	600	50	1.25	-	-	15	100	12.5	-	150	2	4	8	P636	190
6MBP75VFN060-50	600	75	1.25	-	-	15	150	12.5	-	150	2	4	8	P636	190
6MBP100VFN060-50	600	100	1.25	-	-	15	200	12.5	-	150	2	4	8	P636	190
7MBP50VFN060-50	600	50	1.25	600	30	15	100	12.5	-	150	2	4	8	P636	190
7MBP75VFN060-50	600	75	1.25	600	50	15	150	12.5	-	150	2	4	8	P636	190
7MBP100VFN060-50	600	100	1.25	600	50	15	200	12.5	-	150	2	4	8	P636	190
6MBP25VFN120-50	1200	25	1.7	-	-	15	50	12.5	-	150	2	4	8	P636	190
6MBP35VFN120-50	1200	35	1.7	-	-	15	70	12.5	-	150	2	4	8	P636	190
6MBP50VFN120-50	1200	50	1.7	-	-	15	100	12.5	-	150	2	4	8	P636	190
7MBP25VFN120-50	1200	25	1.7	1200	15	15	50	12.5	-	150	2	4	8	P636	190
7MBP35VFN120-50	1200	35	1.7	1200	25	15	70	12.5	-	150	2	4	8	P636	190
7MBP50VFN120-50	1200	50	1.7	1200	25	15	100	12.5	-	150	2	4	8	P636	190

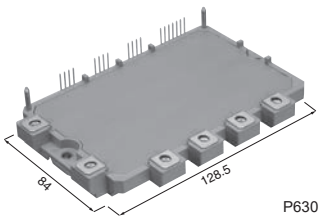
$V_{CE(sat)}$: at T_{vj}=25℃, Chip

IGBT Module IPM < X series / V series >

■ IPM（Intelligent Power Module）600V, 650V class

Built-in protection functions

P-side fault status output (Alarm)
N-side fault status output (Alarm)
Under voltage protection (self shutdown)
Over current protection (self shutdown)
Overheating protection (self shutdown)



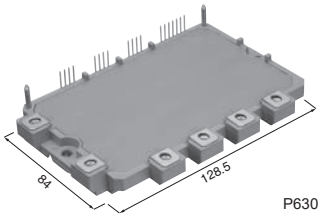
						650V		600V	
						X series		V series	
					Ic	Without Brake-Chopper	With Brake-Chopper	Without Brake-Chopper	With Brake-Chopper
✓	✓	✓	✓	✓	50A			**6MBP50VDA060-50**	**7MBP50VDA060-50**
					75A			**6MBP75VDA060-50**	**7MBP75VDA060-50**
					100A	**6MBP100XDA065-50**	**7MBP100XDA065-50**	**6MBP100VDA060-50**	**7MBP100VDA060-50**
								6MBP100VDN060-50	**7MBP100VDN060-50**
					150A	**6MBP150XDA065-50**	**7MBP150XDA065-50**	**6MBP150VDA060-50**	**7MBP150VDA060-50**
						6MBP150XDN065-50	**7MBP150XDN065-50**	**6MBP150VDN060-50**	**7MBP150VDN060-50**
					200A			**6MBP200VDA060-50**	**7MBP200VDA060-50**
						6MBP200XDN065-50	**7MBP200XDN065-50**	**6MBP200VDN060-50**	**7MBP200VDN060-50**
					250A				
						6MBP250XDN065-50	**7MBP250XDN065-50**		

Dimension [mm]

■ IPM（Intelligent Power Module）1200V class

Built-in protection functions

P-side fault status output (Alarm)
N-side fault status output (Alarm)
Under voltage protection (self shutdown)
Over current protection (self shutdown)
Overheating protection (self shutdown)

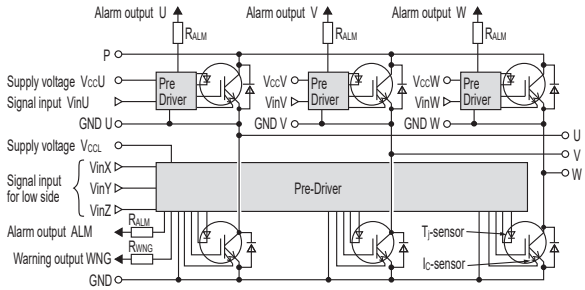


						1200V			
						X series		V series	
					Ic	Without Brake-Chopper	With Brake-Chopper	Without Brake-Chopper	With Brake-Chopper
✓	✓	✓	✓	✓	25A			**6MBP25VDA120-50**	**7MBP25VDA120-50**
					35A			**6MBP35VDA120-50**	**7MBP35VDA120-50**
					50A	**6MBP50XDA120-50**	**7MBP50XDA120-50**	**6MBP50VDA120-50**	**7MBP50VDA120-50**
								6MBP50VDN120-50	**7MBP50VDN120-50**
					75A	**6MBP75XDA120-50**	**7MBP75XDA120-50**	**6MBP75VDA120-50**	**7MBP75VDA120-50**
						6MBP75XDN120-50	**7MBP75XDN120-50**	**6MBP75VDN120-50**	**7MBP75VDN120-50**
					100A	**6MBP100XDA120-50**	**7MBP100XDA120-50**	**6MBP100VDA120-50**	**7MBP100VDA120-50**
						6MBP100XDN120-50	**7MBP100XDN120-50**	**6MBP100VDN120-50**	**7MBP100VDN120-50**
					150A				
						6MBP150XDN120-50	**7MBP150XDN120-50**		

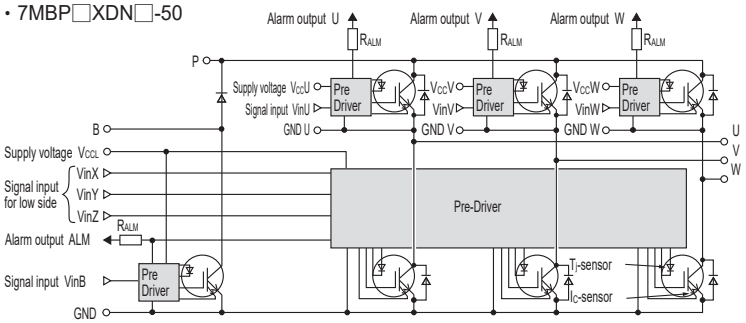
Dimension [mm]

●Block Diagram

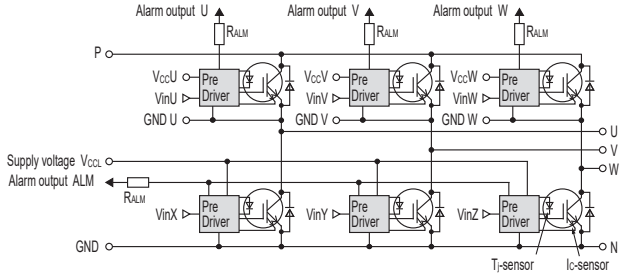
• 6MBP□XDA□-50
• 6MBP□XDN□-50



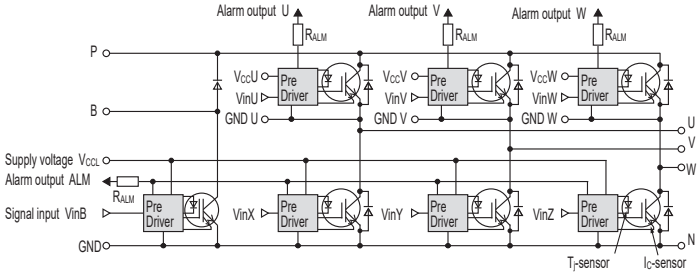
• 7MBP□XDA□-50
• 7MBP□XDN□-50



• 6MBP□VDA□-50
• 6MBP□VDN□-50



• 7MBP□VDA□-50
• 7MBP□VDN□-50



■ X series

Device type	Inverter			Brake		Control					Package	Net mass
	V_{CES}	I_C Cont.	$V_{CE(sat)}$ typ.	V_{CES}	I_C Cont.	V_{CC} typ.	I_{OC}[INV] min.	V_{UV} max.	T_{jw} min.	T_{jOH} min.	Alarm signal hold time OC typ. / UV typ. / T_{jOH} typ.		
	Volts	Amps.	Volts	Volts	Amps.	(V)	(A)	(V)	(℃)	(℃)	ms / ms / ms		Grams
6MBP100XDA065-50	650	100	1.15	-	-	15	150	12.5	150	175	2 / 4 / 8	P630	290
6MBP150XDA065-50	650	150	1.15	-	-	15	225	12.5	150	175	2 / 4 / 8	P630	290
6MBP150XDN065-50	650	150	1.15	-	-	15	225	12.5	150	175	2 / 4 / 8	P630	290
6MBP200XDN065-50	650	200	1.15	-	-	15	300	12.5	150	175	2 / 4 / 8	P630	290
6MBP250XDN065-50	650	250	1.15	-	-	15	375	12.5	150	175	2 / 4 / 8	P630	290
7MBP100XDA065-50	650	100	1.15	650	50	15	150	12.5	-	175	2 / 4 / 8	P630	290
7MBP150XDA065-50	650	150	1.15	650	75	15	225	12.5	-	175	2 / 4 / 8	P630	290
7MBP150XDN065-50	650	150	1.15	650	75	15	225	12.5	-	175	2 / 4 / 8	P630	290
7MBP200XDN065-50	650	200	1.15	650	100	15	300	12.5	-	175	2 / 4 / 8	P630	290
7MBP250XDN065-50	650	250	1.15	650	125	15	375	12.5	-	175	2 / 4 / 8	P630	290
6MBP50XDA120-50	1200	50	1.45	-	-	15	75	12.5	150	175	2 / 4 / 8	P630	290
6MBP75XDA120-50	1200	75	1.45	-	-	15	113	12.5	150	175	2 / 4 / 8	P630	290
6MBP75XDN120-50	1200	75	1.45	-	-	15	113	12.5	150	175	2 / 4 / 8	P630	290
6MBP100XDA120-50	1200	100	1.45	-	-	15	150	12.5	150	175	2 / 4 / 8	P630	290
6MBP100XDN120-50	1200	100	1.45	-	-	15	150	12.5	150	175	2 / 4 / 8	P630	290
6MBP150XDN120-50	1200	150	1.45	-	-	15	225	12.5	150	175	2 / 4 / 8	P630	290
7MBP50XDA120-50	1200	50	1.45	1200	25	15	75	12.5	-	175	2 / 4 / 8	P630	290
7MBP75XDA120-50	1200	75	1.45	1200	35	15	113	12.5	-	175	2 / 4 / 8	P630	290
7MBP75XDN120-50	1200	75	1.45	1200	35	15	113	12.5	-	175	2 / 4 / 8	P630	290
7MBP100XDA120-50	1200	100	1.45	1200	50	15	150	12.5	-	175	2 / 4 / 8	P630	290
7MBP100XDN120-50	1200	100	1.45	1200	50	15	150	12.5	-	175	2 / 4 / 8	P630	290
7MBP150XDN120-50	1200	150	1.45	1200	75	15	225	12.5	-	175	2 / 4 / 8	P630	290

Note1 : The products with “XDN” on this page have Low Thermal Impedance Version.
Note2 : T_{jw} is the warning temperature for IGBT chip overheating.

$V_{CE(sat)}$: at T_{vj}=25℃, Chip

■ V series

Device type	Inverter			Brake		Control					Alarm signal hold time			Package	Net mass
	V_{CES}	I_C Cont.	$V_{CE(sat)}$ typ.	V_{CES}	I_C Cont.	V_{CC} typ.	I_{OC}[INV] min.	V_{UV} max.	T_{jw} min.	T_{jOH} min.	OC typ.	UV typ.	T_{jOH} typ.		
	Volts	Amps.	Volts	Volts	Amps.	(V)	(A)	(V)	(℃)	(℃)	ms	ms	ms		Grams
6MBP50VDA060-50	600	50	1.4	-	-	15	75	12.5	-	150	2	4	8	P630	290
6MBP75VDA060-50	600	75	1.4	-	-	15	113	12.5	-	150	2	4	8	P630	290
6MBP100VDA060-50	600	100	1.4	-	-	15	150	12.5	-	150	2	4	8	P630	290
6MBP100VDN060-50	600	100	1.4	-	-	15	150	12.5	-	150	2	4	8	P630	290
6MBP150VDA060-50	600	150	1.4	-	-	15	225	12.5	-	150	2	4	8	P630	290
6MBP150VDN060-50	600	150	1.4	-	-	15	225	12.5	-	150	2	4	8	P630	290
6MBP200VDA060-50	600	200	1.4	-	-	15	300	12.5	-	150	2	4	8	P630	290
6MBP200VDN060-50	600	200	1.4	-	-	15	300	12.5	-	150	2	4	8	P630	290
7MBP50VDA060-50	600	50	1.4	600	30	15	75	12.5	-	150	2	4	8	P630	290
7MBP75VDA060-50	600	75	1.4	600	50	15	113	12.5	-	150	2	4	8	P630	290
7MBP100VDA060-50	600	100	1.4	600	50	15	150	12.5	-	150	2	4	8	P630	290
7MBP100VDN060-50	600	100	1.4	600	50	15	150	12.5	-	150	2	4	8	P630	290
7MBP150VDA060-50	600	150	1.4	600	75	15	225	12.5	-	150	2	4	8	P630	290
7MBP150VDN060-50	600	150	1.4	600	75	15	225	12.5	-	150	2	4	8	P630	290
7MBP200VDA060-50	600	200	1.4	600	100	15	300	12.5	-	150	2	4	8	P630	290
7MBP200VDN060-50	600	200	1.4	600	100	15	300	12.5	-	150	2	4	8	P630	290
6MBP25VDA120-50	1200	25	1.7	-	-	15	38	12.5	-	150	2	4	8	P630	290
6MBP35VDA120-50	1200	35	1.7	-	-	15	53	12.5	-	150	2	4	8	P630	290
6MBP50VDA120-50	1200	50	1.7	-	-	15	75	12.5	-	150	2	4	8	P630	290
6MBP50VDN120-50	1200	50	1.7	-	-	15	75	12.5	-	150	2	4	8	P630	290
6MBP75VDA120-50	1200	75	1.7	-	-	15	113	12.5	-	150	2	4	8	P630	290
6MBP75VDN120-50	1200	75	1.7	-	-	15	113	12.5	-	150	2	4	8	P630	290
6MBP100VDA120-50	1200	100	1.7	-	-	15	150	12.5	-	150	2	4	8	P630	290
6MBP100VDN120-50	1200	100	1.7	-	-	15	150	12.5	-	150	2	4	8	P630	290
7MBP25VDA120-50	1200	25	1.7	1200	15	15	38	12.5	-	150	2	4	8	P630	290
7MBP35VDA120-50	1200	35	1.7	1200	15	15	53	12.5	-	150	2	4	8	P630	290
7MBP50VDA120-50	1200	50	1.7	1200	25	15	75	12.5	-	150	2	4	8	P630	290
7MBP50VDN120-50	1200	50	1.7	1200	25	15	75	12.5	-	150	2	4	8	P630	290
7MBP75VDA120-50	1200	75	1.7	1200	35	15	113	12.5	-	150	2	4	8	P630	290
7MBP75VDN120-50	1200	75	1.7	1200	35	15	113	12.5	-	150	2	4	8	P630	290
7MBP100VDA120-50	1200	100	1.7	1200	50	15	150	12.5	-	150	2	4	8	P630	290
7MBP100VDN120-50	1200	100	1.7	1200	50	15	150	12.5	-	150	2	4	8	P630	290

Note：The products with “VDN” on this page have Low Thermal Impedance Version.

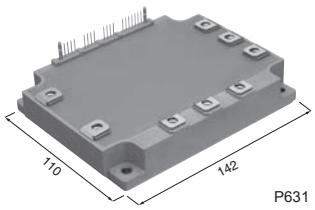
$V_{CE(sat)}$: at T_{vj}=25℃, Chip

IGBT Module IPM < X series / V series >

IPM（Intelligent Power Module）600V, 650V class

Built-in protection functions

P-side fault status output (Alarm)
N-side fault status output (Alarm)
Under voltage protection (self shutdown)
Over current protection (self shutdown)
Overheating protection (self shutdown)



P631

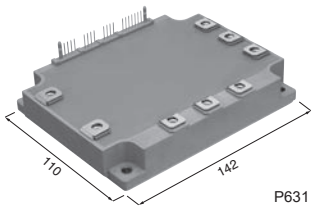
						650V		600V	
						X series		V series	
					Ic	Without Brake-Chopper	With Brake-Chopper	Without Brake-Chopper	With Brake-Chopper
✓	✓	✓	✓	✓	200A	**6MBP200XEN065-50**	**7MBP200XEN065-50**	**6MBP200VEA060-50**	**7MBP200VEA060-50**
					300A	**6MBP300XEN065-50**	**7MBP300XEN065-50**	**6MBP300VEA060-50**	**7MBP300VEA060-50**
					400A			**6MBP400VEA060-50**	**7MBP400VEA060-50**
					450A	**6MBP450XEN065-50**	**7MBP450XEN065-50**		

Dimension [mm]

IPM（Intelligent Power Module）1200V class

Built-in protection functions

P-side fault status output (Alarm)
N-side fault status output (Alarm)
Under voltage protection (self shutdown)
Over current protection (self shutdown)
Overheating protection (self shutdown)



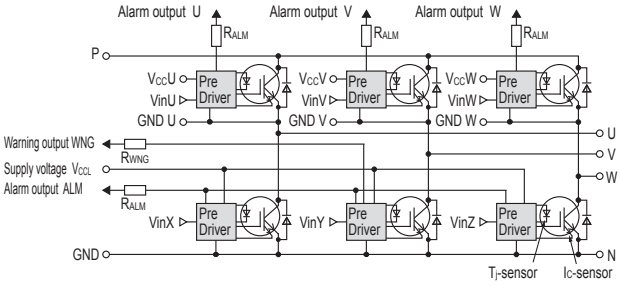
P631

						1200V			
						X series		V series	
					Ic	Without Brake-Chopper	With Brake-Chopper	Without Brake-Chopper	With Brake-Chopper
✓	✓	✓	✓	✓	100A	**6MBP100XEN120-50**	**7MBP100XEN120-50**	**6MBP100VEA120-50**	**7MBP100VEA120-50**
					150A	**6MBP150XEN120-50**	**7MBP150XEN120-50**	**6MBP150VEA120-50**	**7MBP150VEA120-50**
					200A	**6MBP200XEN120-50**	**7MBP200XEN120-50**	**6MBP200VEA120-50**	**7MBP200VEA120-50**
					300A	**6MBP300XEN120-50**	**7MBP300XEN120-50**		

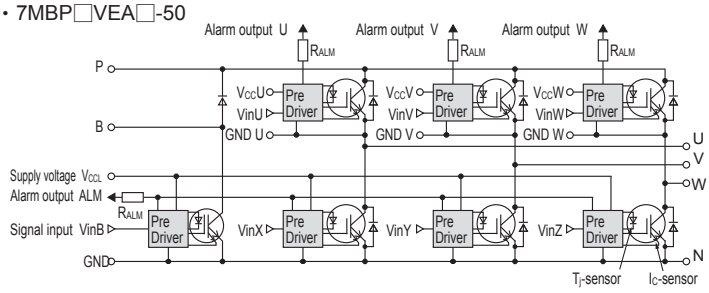
Dimension [mm]

●Block Diagram

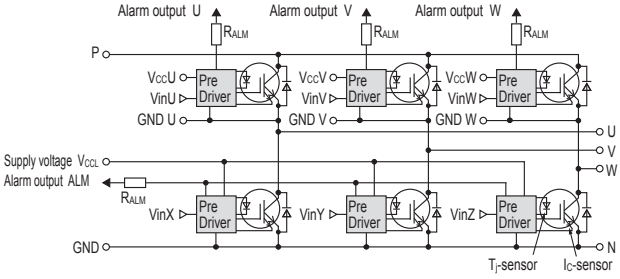
• 6MBP□XEN□-50



• 7MBP□XEN□-50
• 7MBP□VEA□-50



• 6MBP□VEA□-50



■ X series

Device type	Inverter			Brake		Control								Package	Net mass
	V_{CES}	I_C Cont.	$V_{CE(sat)}$ typ.	V_{CES}	I_C Cont.	V_{CC} typ.	I_{OC}[INV] min.	V_{UV} max.	T_{jw} min.	T_{jOH} min.	Alarm signal hold time OC typ.	UV typ.	T_{jOH} typ.		
	Volts	Amps.	Volts	Volts	Amps.	(V)	(A)	(V)	(℃)	(℃)	ms	ms	ms		Grams
6MBP200XEN065-50	650	200	1.15	-	-	15	300	12.5	150	175	2	4	8	P631	940
6MBP300XEN065-50	650	300	1.15	-	-	15	450	12.5	150	175	2	4	8	P631	940
6MBP450XEN065-50	650	450	1.15	-	-	15	675	12.5	150	175	2	4	8	P631	940
7MBP200XEN065-50	650	200	1.15	650	100	15	300	12.5	-	175	2	4	8	P631	940
7MBP300XEN065-50	650	300	1.15	650	150	15	450	12.5	-	175	2	4	8	P631	940
7MBP450XEN065-50	650	450	1.15	650	225	15	675	12.5	-	175	2	4	8	P631	940
6MBP100XEN120-50	1200	100	1.45	-	-	15	150	12.5	150	175	2	4	8	P631	940
6MBP150XEN120-50	1200	150	1.45	-	-	15	225	12.5	150	175	2	4	8	P631	940
6MBP200XEN120-50	1200	200	1.45	-	-	15	300	12.5	150	175	2	4	8	P631	940
6MBP300XEN120-50	1200	300	1.45	-	-	15	450	12.5	150	175	2	4	8	P631	940
7MBP100XEN120-50	1200	100	1.45	1200	50	15	150	12.5	-	175	2	4	8	P631	940
7MBP150XEN120-50	1200	150	1.45	1200	75	15	225	12.5	-	175	2	4	8	P631	940
7MBP200XEN120-50	1200	200	1.45	1200	100	15	300	12.5	-	175	2	4	8	P631	940
7MBP300XEN120-50	1200	300	1.45	1200	150	15	450	12.5	-	175	2	4	8	P631	940

Note : T_{jw} is the warning temperature for IGBT chip overheating.

$V_{CE(sat)}$: at T_{vj}=25℃, Chip

■ V series

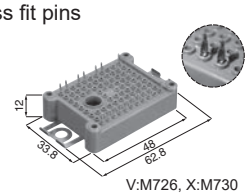
Device type	Inverter			Brake		Control								Package	Net mass
	V_{CES}	I_C Cont.	$V_{CE(sat)}$ typ.	V_{CES}	I_C Cont.	V_{CC} typ.	I_{OC}[INV] min.	V_{UV} max.	T_{jw} min.	T_{jOH} min.	Alarm signal hold time OC typ.	UV typ.	T_{jOH} typ.		
	Volts	Amps.	Volts	Volts	Amps.	(V)	(A)	(V)	(℃)	(℃)	ms	ms	ms		Grams
6MBP200VEA060-50	600	200	1.25	-	-	15	300	12.5	-	150	2	4	8	P631	940
6MBP300VEA060-50	600	300	1.25	-	-	15	450	12.5	-	150	2	4	8	P631	940
6MBP400VEA060-50	600	400	1.25	-	-	15	600	12.5	-	150	2	4	8	P631	940
7MBP200VEA060-50	600	200	1.25	600	100	15	300	12.5	-	150	2	4	8	P631	940
7MBP300VEA060-50	600	300	1.25	600	150	15	450	12.5	-	150	2	4	8	P631	940
7MBP400VEA060-50	600	400	1.25	600	200	15	600	12.5	-	150	2	4	8	P631	940
6MBP100VEA120-50	1200	100	1.7	-	-	15	150	12.5	-	150	2	4	8	P631	940
6MBP150VEA120-50	1200	150	1.7	-	-	15	225	12.5	-	150	2	4	8	P631	940
6MBP200VEA120-50	1200	200	1.7	-	-	15	300	12.5	-	150	2	4	8	P631	940
7MBP100VEA120-50	1200	100	1.7	1200	50	15	150	12.5	-	150	2	4	8	P631	940
7MBP150VEA120-50	1200	150	1.7	1200	75	15	225	12.5	-	150	2	4	8	P631	940
7MBP200VEA120-50	1200	200	1.7	1200	100	15	300	12.5	-	150	2	4	8	P631	940

$V_{CE(sat)}$: at T_{vj}=25℃, Chip

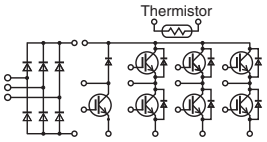
IGBT Module Small PIM < X series / V series>

Small PIM/Built-in converter and brake 600V, 650V class

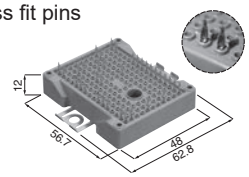
Press fit pins



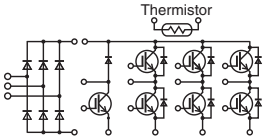
V:M726, X:M730



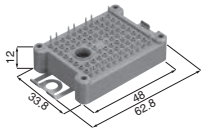
Press fit pins



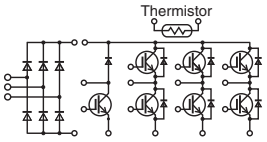
V:M727, X:M731



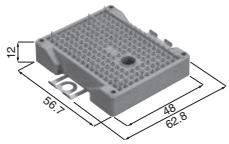
Solder pins



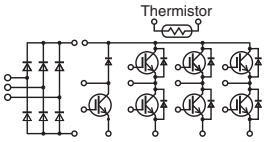
V:M728, X:M732



Solder pins



V:M729, X:M733



I_C	650V X series	600V V series
10A	**7MBR10XKA065-50**	**7MBR10VKA060-50**
15A	**7MBR15XKA065-50**	**7MBR15VKA060-50**
20A	**7MBR20XKA065-50**	**7MBR20VKA060-50**
30A	**7MBR30XKA065-50**	**7MBR30VKA060-50**
50A	**7MBR50XKB065-50**	**7MBR50VKB060-50**
10A	**7MBR10XKC065-50**	**7MBR10VKC060-50**
15A	**7MBR15XKC065-50**	**7MBR15VKC060-50**
20A	**7MBR20XKC065-50**	**7MBR20VKC060-50**
30A	**7MBR30XKC065-50**	**7MBR30VKC060-50**
50A	**7MBR50XKD065-50**	**7MBR50VKD060-50**

Dimension [mm]

X series

Device type	Inverter [IGBT]				Brake [IGBT+FWD]			Converter [Diode]				Package	Net mass
	V_{CES} Volts	I_C Cont. Amps.	P_{tot} Watts	$V_{CE(sat)}$ typ. Volts	V_{CES} Volts	I_C Cont. Amps.	V_{RRM} Volts	V_{RRM} Volts	I_O Cont. Amps.	V_{FM} typ. Volts	I_{FSM} Amps.		Grams
7MBR10XKA065-50	650	10	90	1.30	650	10	650	800	10	0.90	340	M730	25
7MBR15XKA065-50	650	15	110	1.30	650	15	650	800	15	0.95	340	M730	25
7MBR20XKA065-50	650	20	135	1.30	650	20	650	800	20	1.00	340	M730	25
7MBR30XKA065-50	650	30	180	1.30	650	30	650	800	30	1.05	340	M730	25
7MBR50XKB065-50	650	50	270	1.30	650	50	650	800	50	1.10	470	M731	45
7MBR10XKC065-50	650	10	90	1.30	650	10	650	800	10	0.90	340	M732	25
7MBR15XKC065-50	650	15	110	1.30	650	15	650	800	15	0.95	340	M732	25
7MBR20XKC065-50	650	20	135	1.30	650	20	650	800	20	1.00	340	M732	25
7MBR30XKC065-50	650	30	180	1.30	650	30	650	800	30	1.05	340	M732	25
7MBR50XKD065-50	650	50	270	1.30	650	50	650	800	50	1.10	470	M733	45

V series

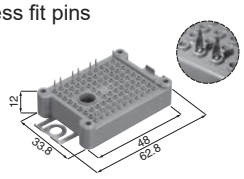
Device type	Inverter [IGBT]				Brake [IGBT+FWD]			Converter [Diode]				Package	Net mass
	V_{CES} Volts	I_C Cont. Amps.	P_{tot} Watts	$V_{CE(sat)}$ typ. Volts	V_{CES} Volts	I_C Cont. Amps.	V_{RRM} Volts	V_{RRM} Volts	I_O Cont. Amps.	V_{FM} typ. Volts	I_{FSM} Amps.		Grams
7MBR10VKA060-50	600	10	70	1.70	600	10	600	800	10	0.95	360	M726	25
7MBR15VKA060-50	600	15	85	1.75	600	15	600	800	15	1.00	360	M726	25
7MBR20VKA060-50	600	20	100	1.70	600	20	600	800	20	1.05	360	M726	25
7MBR30VKA060-50	600	30	125	1.70	600	30	600	800	30	1.15	360	M726	25
7MBR50VKB060-50	600	50	180	1.60	600	50	600	800	50	1.00	580	M727	45
7MBR10VKC060-50	600	10	70	1.70	600	10	600	800	10	0.95	360	M728	25
7MBR15VKC060-50	600	15	85	1.75	600	15	600	800	15	1.00	360	M728	25
7MBR20VKC060-50	600	20	100	1.70	600	20	600	800	20	1.05	360	M728	25
7MBR30VKC060-50	600	30	125	1.70	600	30	600	800	30	1.15	360	M728	25
7MBR50VKD060-50	600	50	180	1.60	600	50	600	800	50	1.00	580	M729	45

$V_{CE(sat)}$, V_{FM} : at T_{vj}=25℃, Chip

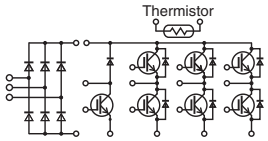
IGBT Module Small PIM < X series / V series >

Small PIM/Built-in converter and brake 1200V class

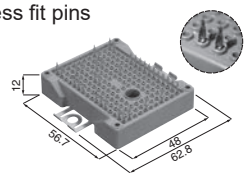
Press fit pins



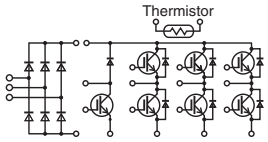
V:M726, X:M730



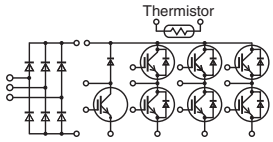
Press fit pins



V:M727, X:M731

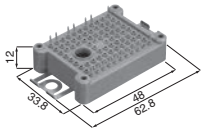


XKB, VKB

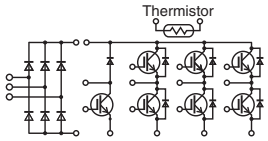


XRKB

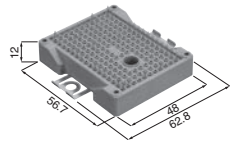
Solder pins



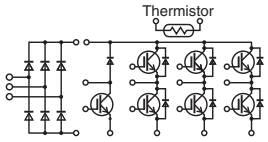
V:M728, X:M732



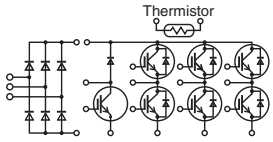
Solder pins



V:M729, X:M733



XKD, VKD



XRKD

I_C	1200V X series	1200V V series
10A	**7MBR10XKA120-50**	**7MBR10VKA120-50**
15A	**7MBR15XKA120-50**	**7MBR15VKA120-50**
25A	**7MBR25XKA120-50**	
15A	**7MBR15XKB120-50**	**7MBR15VKB120-50**
25A	**7MBR25XKB120-50**	**7MBR25VKB120-50**
35A	**7MBR35XKB120-50**	**7MBR35VKB120-50**
50A	**7MBR50XRKB120-50**	
10A	**7MBR10XKC120-50**	**7MBR10VKC120-50**
15A	**7MBR15XKC120-50**	**7MBR15VKC120-50**
25A	**7MBR25XKC120-50**	
15A	**7MBR15XKD120-50**	**7MBR15VKD120-50**
25A	**7MBR25XKD120-50**	**7MBR25VKD120-50**
35A	**7MBR35XKD120-50**	**7MBR35VKD120-50**
50A	**7MBR50XRKD120-50**	

Dimension [mm]

X series

Device type	Inverter [IGBT] V_{CES} Volts	I_C Cont. Amps.	P_{tot} Watts	$V_{CE(sat)}$ typ. Volts	Brake [IGBT+FWD] V_{CES} Volts	I_C Cont. Amps.	V_{RRM} Volts	Converter [Diode] V_{RRM} Volts	I_O Cont. Amps.	V_{FM} typ. Volts	I_{FSM} Amps.	Package	Net mass Grams
7MBR10XKA120-50	1200	10	105	1.50	1200	10	1200	1600	10	0.95	300	M730	25
7MBR15XKA120-50	1200	15	135	1.50	1200	15	1200	1600	15	1.00	300	M730	25
7MBR25XKA120-50	1200	25	155	1.70	1200	25	1200	1600	25	1.05	300	M730	25
7MBR15XKB120-50	1200	15	135	1.50	1200	15	1200	1600	15	0.95	385	M731	45
7MBR25XKB120-50	1200	25	195	1.50	1200	25	1200	1600	25	1.00	385	M731	45
7MBR35XKB120-50	1200	35	255	1.50	1200	35	1200	1600	35	1.05	385	M731	45
7MBR50XRKB120-50	1200	50	500	1.80	1200	35	1200	1600	50	1.10	385	M731	45
7MBR10XKC120-50	1200	10	105	1.50	1200	10	1200	1600	10	0.95	300	M732	25
7MBR15XKC120-50	1200	15	135	1.50	1200	15	1200	1600	15	1.00	300	M732	25
7MBR25XKC120-50	1200	25	155	1.70	1200	25	1200	1600	25	1.05	300	M732	25
7MBR15XKD120-50	1200	15	135	1.50	1200	15	1200	1600	15	0.95	385	M733	45
7MBR25XKD120-50	1200	25	195	1.50	1200	25	1200	1600	25	1.00	385	M733	45
7MBR35XKD120-50	1200	35	255	1.50	1200	35	1200	1600	35	1.05	385	M733	45
7MBR50XRKD120-50	1200	50	500	1.80	1200	35	1200	1600	50	1.10	385	M733	45

$V_{CE(sat)}$, V_{FM} : at T_{vj}=25℃, Chip

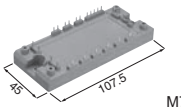
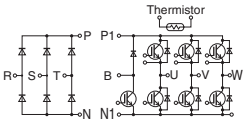
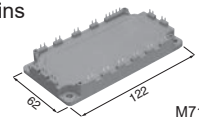
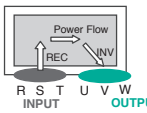
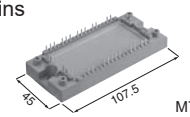
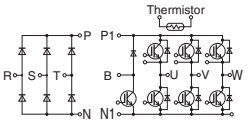
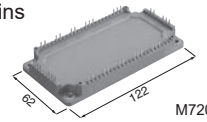
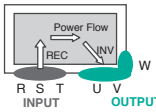
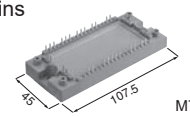
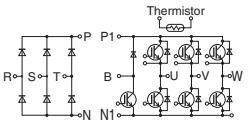
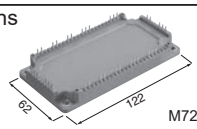
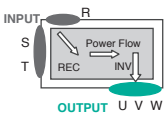
■ V series

Device type	Inverter [IGBT]				Brake [IGBT+FWD]			Converter [Diode]				Package	Net mass
	V_{CES} Volts	I_C Cont. Amps.	P_{tot} Watts	$V_{CE(sat)}$ typ. Volts	V_{CES} Volts	I_C Cont. Amps.	V_{RRM} Volts	V_{RRM} Volts	I_O Cont. Amps.	V_{FM} typ. Volts	I_{FSM} Amps.		Grams
7MBR10VKA120-50	1200	10	110	1.85	1200	10	1200	1600	10	0.95	245	M726	25
7MBR15VKA120-50	1200	15	135	1.90	1200	15	1200	1600	15	1.00	245	M726	25
7MBR15VKB120-50	1200	15	135	1.90	1200	15	1200	1600	15	1.00	245	M727	45
7MBR25VKB120-50	1200	25	180	1.85	1200	25	1200	1600	25	1.00	370	M727	45
7MBR35VKB120-50	1200	35	215	1.85	1200	35	1200	1600	35	1.05	370	M727	45
7MBR10VKC120-50	1200	10	110	1.85	1200	10	1200	1600	10	0.95	245	M728	25
7MBR15VKC120-50	1200	15	135	1.90	1200	15	1200	1600	15	1.00	245	M728	25
7MBR15VKD120-50	1200	15	135	1.90	1200	15	1200	1600	15	1.00	245	M729	45
7MBR25VKD120-50	1200	25	180	1.85	1200	25	1200	1600	25	1.00	370	M729	45
7MBR35VKD120-50	1200	35	215	1.85	1200	35	1200	1600	35	1.05	370	M729	45

$V_{CE(sat)}$, V_{FM} : at T_{vj}=25℃, Chip

IGBT Module PIM < X series / V series >

PIM/Built-in converter and brake EconoPIM™ 600V, 650V class

		I_C	650V X series	600V V series
Solder pins  M711		50A		**7MBR50VA060-50**
Solder pins  M712		75A		**7MBR75VB060-50**
		100A		**7MBR100VB060-50**
Solder pins  M719		50A	**7MBR50XMA065-50**	
		75A	**7MBR75XMA065-50**	
Solder pins  M720		75A	**7MBR75XNA065-50**	
		100A	**7MBR100XNA065-50**	
		150A	**7MBR150XNA065-50**	
Solder pins  M719		50A	**7MBR50XPA065-50**	**7MBR50VP060-50**
		75A	**7MBR75XPA065-50**	**7MBR75VP060-50**
		100A	**7MBR100XPE065-50**	**7MBR100VP060-50**
Solder pins  M720		100A	**7MBR100XRA065-50**	**7MBR100VR060-50**
		150A	**7MBR150XRA065-50**	**7MBR150VR060-50**
			7MBR150XRE065-50	

Dimension [mm]

X series

Device type	Inverter [IGBT]				Brake [IGBT+FWD]			Converter [Diode]				Package	Net mass
	V_{CES} Volts	I_C Cont. Amps.	P_{tot} Watts	$V_{CE(sat)}$ typ. Volts	V_{CES} Volts	I_C Cont. Amps.	V_{RRM} Volts	V_{RRM} Volts	I_O Cont. Amps.	V_{FM} typ. Volts	I_{FSM} Amps.		Grams
7MBR50XMA065-50	650	50	210	1.30	650	30	650	800	50	1.05	505	M719	200
7MBR75XMA065-50	650	75	270	1.30	650	50	650	800	75	1.15	505	M719	200
7MBR75XNA065-50	650	75	270	1.30	650	50	650	800	75	1.15	505	M720	310
7MBR100XNA065-50	650	100	330	1.30	650	50	650	800	100	1.10	745	M720	310
7MBR150XNA065-50	650	150	450	1.30	650	75	650	800	150	1.10	1260	M720	310
7MBR50XPA065-50	650	50	210	1.30	650	30	650	800	50	1.05	505	M719	200
7MBR75XPA065-50	650	75	270	1.30	650	50	650	800	75	1.15	505	M719	200
7MBR100XPE065-50	650	100	480	1.30	650	50	650	800	100	1.10	745	M719	200
7MBR100XRA065-50	650	100	330	1.30	650	50	650	800	100	1.10	745	M720	310
7MBR150XRA065-50	650	150	450	1.30	650	75	650	800	150	1.10	1260	M720	310
7MBR150XRE065-50	650	150	700	1.30	650	75	650	800	150	1.10	1260	M720	310

V series

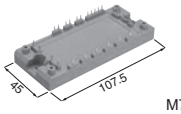
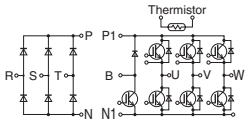
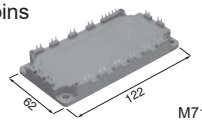
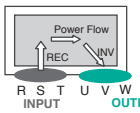
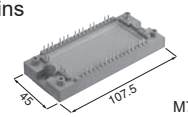
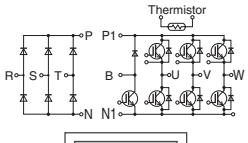
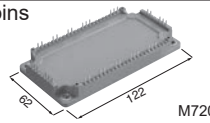
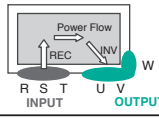
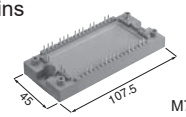
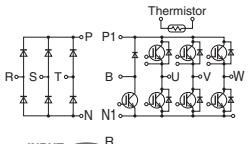
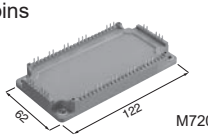
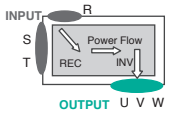
Device type	Inverter [IGBT]				Brake [IGBT+FWD]			Converter [Diode]				Package	Net mass
	V_{CES} Volts	I_C Cont. Amps.	P_{tot} Watts	$V_{CE(sat)}$ typ. Volts	V_{CES} Volts	I_C Cont. Amps.	V_{RRM} Volts	V_{RRM} Volts	I_O Cont. Amps.	V_{FM} typ. Volts	I_{FSM} Amps.		Grams
7MBR50VA060-50	600	50	200	1.60	600	50	600	800	50	1.30	210	M711	180
7MBR75VB060-50	600	75	300	1.60	600	50	600	800	75	1.25	500	M712	300
7MBR100VB060-50	600	100	335	1.60	600	50	600	800	100	1.25	700	M712	300
7MBR50VP060-50	600	50	200	1.60	600	50	600	800	50	1.30	210	M719	200
7MBR75VP060-50	600	75	300	1.60	600	50	600	800	75	1.25	500	M719	200
7MBR100VP060-50	600	100	430	1.85	600	50	600	800	100	1.25	700	M719	200
7MBR100VR060-50	600	100	335	1.60	600	50	600	800	100	1.25	700	M720	310
7MBR150VR060-50	600	150	485	1.60	600	75	600	800	150	1.25	960	M720	310

Note1: EconoPIM™ is registered trademark of Infineon Technologies AG, Germany.
Note2: The range of modules with pre-applied TIM (Thermal-Interface-Material) is being continually expanded.

$V_{CE(sat)}$, V_{FM}: at T_{vj}=25℃ , Chip

IGBT Module PIM < X series / V series >

PIM/Built-in converter and brake EconoPIM™ 1200V class

		I_C	1200V	
			X series	V series
Solder pins  M711		25A		**7MBR25VA120-50**
		35A		**7MBR35VA120-50**
Solder pins  M712		35A		**7MBR35VB120-50**
		50A		**7MBR50VB120-50**
		75A		**7MBR75VB120-50**
Solder pins  M719		25A		**7MBR25VM120-50**
		35A	**7MBR35XMA120-50**	**7MBR35VM120-50**
		50A	**7MBR50XMA120-50**	**7MBR50VM120-50**
		75A	**7MBR75XME120-50**	
Solder pins  M720		50A		**7MBR50VN120-50**
		75A	**7MBR75XNA120-50**	**7MBR75VN120-50**
		100A	**7MBR100XNA120-50**	**7MBR100VN120-50**
		150A	**7MBR150XNE120-50**	**7MBR150VN120-50**
Solder pins  M719		25A		**7MBR25VP120-50**
		35A	**7MBR35XPA120-50**	**7MBR35VP120-50**
		50A	**7MBR50XPA120-50**	**7MBR50VP120-50**
			7MBR50XPE120-50	
		75A	**7MBR75XPE120-50**	
Solder pins  M720		50A		**7MBR50VR120-50**
		75A	**7MBR75XRA120-50**	**7MBR75VR120-50**
			7MBR75XRE120-50	
		100A	**7MBR100XRA120-50**	**7MBR100VR120-50**
			7MBR100XRE120-50	
		150A	**7MBR150XRE120-50**	**7MBR150VR120-50**

Dimension [mm]

X series

Device type	Inverter [IGBT]				Brake [IGBT+FWD]			Converter [Diode]				Package	Net mass
	V_{CES}	I_C Cont.	P_{tot}	$V_{CE(sat)}$ typ.	V_{CES}	I_C Cont.	V_{RRM}	V_{RRM}	I_O Cont.	V_{FM} typ.	I_{FSM}		
	Volts	Amps.	Watts	Volts	Volts	Amps.	Volts	Volts	Amps.	Volts	Amps.		Grams
7MBR35XMA120-50	1200	35	200	1.50	1200	25	1200	1600	35	1.05	385	M719	200
7MBR50XMA120-50	1200	50	250	1.50	1200	35	1200	1600	50	1.05	520	M719	200
7MBR75XME120-50	1200	75	455	1.55	1200	35	1200	1600	75	1.15	520	M719	200
7MBR75XNA120-50	1200	75	335	1.50	1200	50	1200	1600	75	1.15	520	M720	310
7MBR100XNA120-50	1200	100	445	1.45	1200	75	1200	1600	100	1.05	775	M720	310
7MBR150XNE120-50	1200	150	880	1.50	1200	75	1200	1600	150	1.05	1400	M720	310
7MBR35XPA120-50	1200	35	200	1.50	1200	25	1200	1600	35	1.05	385	M719	200
7MBR50XPA120-50	1200	50	250	1.50	1200	35	1200	1600	50	1.05	520	M719	200
7MBR50XPE120-50	1200	50	340	1.50	1200	35	1200	1600	50	1.05	520	M719	200
7MBR75XPE120-50	1200	75	455	1.55	1200	35	1200	1600	75	1.15	520	M719	200
7MBR75XRA120-50	1200	75	335	1.50	1200	50	1200	1600	75	1.15	520	M720	310
7MBR75XRE120-50	1200	75	480	1.50	1200	50	1200	1600	75	1.00	775	M720	310
7MBR100XRA120-50	1200	100	445	1.45	1200	75	1200	1600	100	1.05	775	M720	310
7MBR100XRE120-50	1200	100	685	1.45	1200	75	1200	1600	100	1.05	775	M720	310
7MBR150XRE120-50	1200	150	880	1.50	1200	75	1200	1600	150	1.05	1400	M720	310

Note1: EconoPIM™ is registered trademark of Infineon Technologies AG, Germany.
Note2: The range of modules with pre-applied TIM (Thermal-Interface-Material) is being continually expanded.

$V_{CE(sat)}$, V_{FM}: at T_{vj}=25℃ , Chip

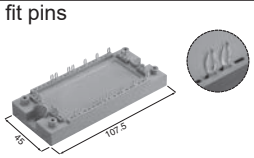
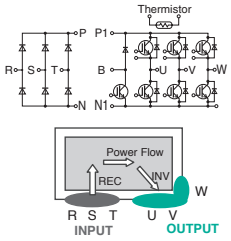
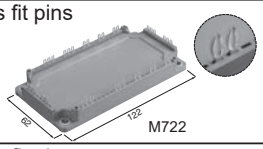
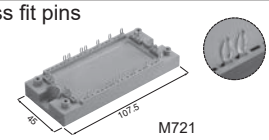
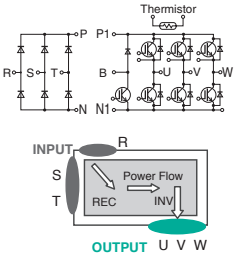
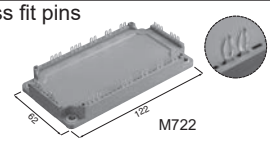
■ V series

Device type	Inverter [IGBT]				Brake [IGBT+FWD]			Converter [Diode]				Package	Net mass
	V_{CES}	I_C Cont.	P_{tot}	$V_{CE(sat)}$ typ.	V_{CES}	I_C Cont.	V_{RRM}	V_{RRM}	I_O Cont.	V_{FM} typ.	I_{FSM}		
	Volts	Amps.	Watts	Volts	Volts	Amps.	Volts	Volts	Amps.	Volts	Amps.		Grams
7MBR25VA120-50	1200	25	170	1.85	1200	25	1200	1600	25	1.42	155	M711	180
7MBR35VA120-50	1200	35	210	1.85	1200	25	1200	1600	35	1.35	260	M711	180
7MBR35VB120-50	1200	35	210	1.85	1200	25	1200	1600	35	1.35	260	M712	300
7MBR50VB120-50	1200	50	280	1.85	1200	35	1200	1600	50	1.35	360	M712	300
7MBR75VB120-50	1200	75	385	1.85	1200	50	1200	1600	75	1.40	520	M712	300
7MBR25VM120-50	1200	25	170	1.85	1200	25	1200	1600	25	1.40	155	M719	200
7MBR35VM120-50	1200	35	210	1.85	1200	25	1200	1600	35	1.35	260	M719	200
7MBR50VM120-50	1200	50	280	1.85	1200	35	1200	1600	50	1.35	360	M719	200
7MBR50VN120-50	1200	50	280	1.85	1200	35	1200	1600	50	1.35	360	M720	310
7MBR75VN120-50	1200	75	385	1.85	1200	50	1200	1600	75	1.40	520	M720	310
7MBR100VN120-50	1200	100	520	1.75	1200	75	1200	1600	100	1.50	520	M720	310
7MBR150VN120-50	1200	150	885	1.85	1200	100	1200	1600	150	1.40	780	M720	310
7MBR25VP120-50	1200	25	170	1.85	1200	25	1200	1600	25	1.40	155	M719	200
7MBR35VP120-50	1200	35	210	1.85	1200	25	1200	1600	35	1.35	260	M719	200
7MBR50VP120-50	1200	50	280	1.85	1200	35	1200	1600	50	1.35	360	M719	200
7MBR50VR120-50	1200	50	280	1.85	1200	35	1200	1600	50	1.35	360	M720	310
7MBR75VR120-50	1200	75	385	1.85	1200	50	1200	1600	75	1.40	520	M720	310
7MBR100VR120-50	1200	100	520	1.75	1200	75	1200	1600	100	1.50	520	M720	310
7MBR150VR120-50	1200	150	885	1.85	1200	100	1200	1600	150	1.40	780	M720	310

$V_{CE(sat)}$, V_{FM}: at T_{vj}=25℃ , Chip

IGBT Module PIM < X series / V series >

■ PIM/Built-in converter and brake EconoPIM™ 600V, 650V class

		I_C	650V X series	600V V series
Press fit pins  M721		50A	7MBR50XWA065-50	
		75A	7MBR75XWA065-50	
Press fit pins  M722		75A	7MBR75XXA065-50	
		100A	7MBR100XXA065-50	
		150A	7MBR150XXA065-50	
Press fit pins  M721		50A	7MBR50XYA065-50	7MBR50VY060-50
		75A	7MBR75XYA065-50	7MBR75VY060-50
		100A	7MBR100XYE065-50	7MBR100VY060-50
Press fit pins  M722		100A	7MBR100XZA065-50	7MBR100VZ060-50
		150A	7MBR150XZA065-50	7MBR150VZ060-50

Dimension [mm]

■ X series

Device type	Inverter [IGBT]				Brake [IGBT+FWD]			Converter [Diode]				Package	Net mass
	V_{CES}	I_C Cont.	P_{tot}	$V_{CE(sat)}$ typ.	V_{CES}	I_C Cont.	V_{RRM}	V_{RRM}	I_O Cont.	V_{FM} typ.	I_{FSM}		
	Volts	Amps.	Watts	Volts	Volts	Amps.	Volts	Volts	Amps.	Volts	Amps.		Grams
7MBR50XWA065-50	650	50	210	1.30	650	30	650	800	50	1.05	505	M721	200
7MBR75XWA065-50	650	75	270	1.30	650	50	650	800	75	1.15	505	M721	200
7MBR75XXA065-50	650	75	270	1.30	650	50	650	800	75	1.15	505	M722	310
7MBR100XXA065-50	650	100	330	1.30	650	50	650	800	100	1.10	745	M722	310
7MBR150XXA065-50	650	150	450	1.30	650	75	650	800	150	1.10	1260	M722	310
7MBR50XYA065-50	650	50	210	1.30	650	30	650	800	50	1.05	505	M721	200
7MBR75XYA065-50	650	75	270	1.30	650	50	650	800	75	1.15	505	M721	200
7MBR100XYE065-50	650	100	480	1.30	650	50	650	800	100	1.10	745	M721	200
7MBR100XZA065-50	650	100	330	1.30	650	50	650	800	100	1.10	745	M722	310
7MBR150XZA065-50	650	150	450	1.30	650	75	650	800	150	1.10	1260	M722	310

■ V series

Device type	Inverter [IGBT]				Brake [IGBT+FWD]			Converter [Diode]				Package	Net mass
	V_{CES}	I_C Cont.	P_{tot}	$V_{CE(sat)}$ typ.	V_{CES}	I_C Cont.	V_{RRM}	V_{RRM}	I_O Cont.	V_{FM} typ.	I_{FSM}		
	Volts	Amps.	Watts	Volts	Volts	Amps.	Volts	Volts	Amps.	Volts	Amps.		Grams
7MBR50VY060-50	600	50	215	1.60	600	50	600	800	50	1.30	210	M721	200
7MBR75VY060-50	600	75	300	1.60	600	50	600	800	75	1.25	500	M721	200
7MBR100VY060-50	600	100	430	1.85	600	50	600	800	100	1.25	700	M721	200
7MBR100VZ060-50	600	100	335	1.60	600	50	600	800	100	1.25	700	M722	310
7MBR150VZ060-50	600	150	485	1.60	600	75	600	800	150	1.25	960	M722	310

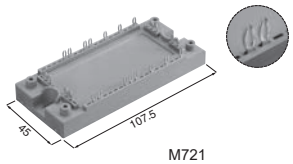
Note1: EconoPIM™ is registered trademark of Infineon Technologies AG, Germany.
Note2: The range of modules with pre-applied TIM (Thermal-Interface-Material) is being continually expanded.

$V_{CE(sat)}$, V_{FM}: at T_{vj}=25℃ , Chip

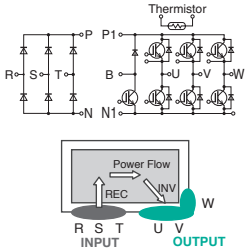
IGBT Module PIM < X series / V series >

PIM/Built-in converter and brake EconoPIM™ 1200V class

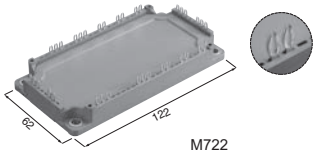
Press fit pins



M721

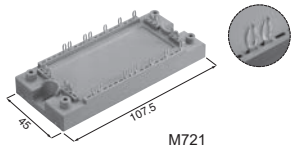


Press fit pins

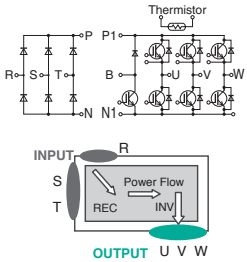


M722

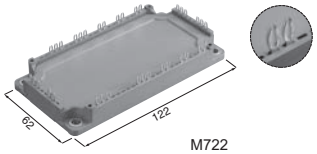
Press fit pins



M721



Press fit pins



M722

I_C	1200V X series	1200V V series
25A		**7MBR25VW120-50**
35A	**7MBR35XWA120-50**	**7MBR35VW120-50**
50A	**7MBR50XWA120-50**	**7MBR50VW120-50**
75A	**7MBR75XWE120-50**	
50A		**7MBR50VX120-50**
75A	**7MBR75XXA120-50**	**7MBR75VX120-50**
100A	**7MBR100XXA120-50**	**7MBR100VX120-50**
150A	**7MBR150XXE120-50**	**7MBR150VX120-50**
25A		**7MBR25VY120-50**
35A	**7MBR35XYA120-50**	**7MBR35VY120-50**
50A	**7MBR50XYA120-50**	**7MBR50VY120-50**
75A	**7MBR75XYE120-50**	
50A		**7MBR50VZ120-50**
75A	**7MBR75XZA120-50**	**7MBR75VZ120-50**
100A	**7MBR100XZA120-50**	**7MBR100VZ120-50**
150A	**7MBR150XZE120-50**	**7MBR150VZ120-50**

Dimension [mm]

X series

Device type	Inverter [IGBT]				Brake [IGBT+FWD]			Converter [Diode]				Package	Net mass
	V_{CES} Volts	I_C Cont. Amps.	P_{tot} Watts	$V_{CE(sat)}$ typ. Volts	V_{CES} Volts	I_C Cont. Amps.	V_{RRM} Volts	V_{RRM} Volts	I_O Cont. Amps.	V_{FM} typ. Volts	I_{FSM} Amps.		Grams
7MBR35XWA120-50	1200	35	200	1.50	1200	25	1200	1600	35	1.05	385	M721	200
7MBR50XWA120-50	1200	50	250	1.50	1200	35	1200	1600	50	1.05	520	M721	200
7MBR75XWE120-50	1200	75	455	1.55	1200	35	1200	1600	75	1.15	520	M721	200
7MBR75XXA120-50	1200	75	335	1.50	1200	50	1200	1600	75	1.15	520	M722	310
7MBR100XXA120-50	1200	100	445	1.45	1200	75	1200	1600	100	1.05	775	M722	310
7MBR150XXE120-50	1200	150	880	1.50	1200	75	1200	1600	150	1.05	1400	M722	310
7MBR35XYA120-50	1200	35	200	1.50	1200	25	1200	1600	35	1.05	385	M721	200
7MBR50XYA120-50	1200	50	250	1.50	1200	35	1200	1600	50	1.05	520	M721	200
7MBR75XYE120-50	1200	75	455	1.55	1200	35	1200	1600	75	1.15	520	M721	200
7MBR75XZA120-50	1200	75	335	1.50	1200	50	1200	1600	75	1.15	520	M722	310
7MBR100XZA120-50	1200	100	445	1.45	1200	75	1200	1600	100	1.05	775	M722	310
7MBR150XZE120-50	1200	150	880	1.50	1200	75	1200	1600	150	1.05	1400	M722	310

Note1: EconoPIM™ is registered trademark of Infineon Technologies AG, Germany.
Note2: The range of modules with pre-applied TIM (Thermal-Interface-Material) is being continually expanded.

$V_{CE(sat)}$, V_{FM}: at T_{vj}=25°C, Chip

■ V series

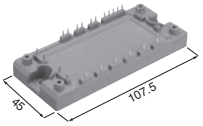
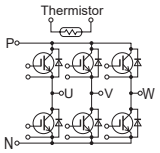
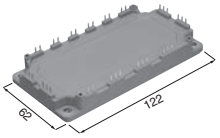
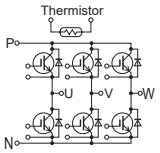
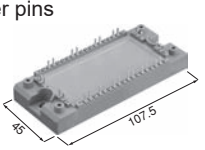
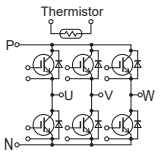
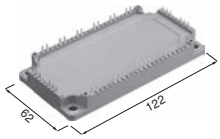
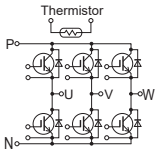
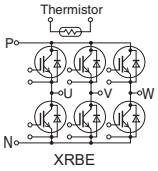
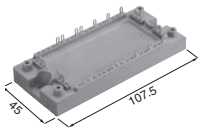
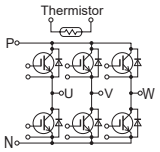
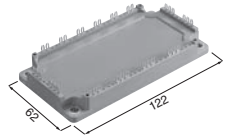
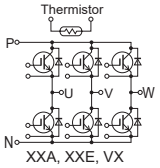
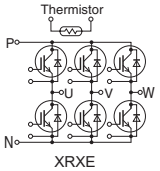
Device type	Inverter [IGBT]				Brake [IGBT+FWD]			Converter [Diode]				Package	Net mass
	V_{CES}	I_C Cont.	P_{tot}	$V_{CE(sat)}$ typ.	V_{CES}	I_C Cont.	V_{RRM}	V_{RRM}	I_O Cont.	V_{FM} typ.	I_{FSM}		
	Volts	Amps.	Watts	Volts	Volts	Amps.	Volts	Volts	Amps.	Volts	Amps.		Grams
7MBR25VW120-50	1200	25	170	1.85	1200	25	1200	1600	25	1.40	155	M721	200
7MBR35VW120-50	1200	35	210	1.85	1200	25	1200	1600	35	1.35	260	M721	200
7MBR50VW120-50	1200	50	280	1.85	1200	35	1200	1600	50	1.35	360	M721	200
7MBR50VX120-50	1200	50	280	1.85	1200	35	1200	1600	50	1.35	360	M722	310
7MBR75VX120-50	1200	75	385	1.85	1200	50	1200	1600	75	1.40	520	M722	310
7MBR100VX120-50	1200	100	520	1.75	1200	75	1200	1600	100	1.50	520	M722	310
7MBR150VX120-50	1200	150	885	1.85	1200	100	1200	1600	150	1.40	780	M722	310
7MBR25VY120-50	1200	25	170	1.85	1200	25	1200	1600	25	1.42	155	M721	200
7MBR35VY120-50	1200	35	210	1.85	1200	25	1200	1600	35	1.35	260	M721	200
7MBR50VY120-50	1200	50	280	1.85	1200	35	1200	1600	50	1.35	360	M721	200
7MBR50VZ120-50	1200	50	280	1.85	1200	35	1200	1600	50	1.35	360	M722	310
7MBR75VZ120-50	1200	75	385	1.85	1200	50	1200	1600	75	1.40	520	M722	310
7MBR100VZ120-50	1200	100	520	1.75	1200	75	1200	1600	100	1.50	520	M722	310
7MBR150VZ120-50	1200	150	885	1.85	1200	100	1200	1600	150	1.40	780	M722	310

Note1: EconoPIM™ is registered trademark of Infineon Technologies AG, Germany.

$V_{CE(sat)}$, V_{FM}: at T_{vj}=25℃, Chip

IGBT Module 6-Pack < X series / V series >

6-Pack EconoPACK™ 600V, 1200V class

		Ic	600V	1200V	
			V series	X series	V series
Solder pins	 M636 	50A	**6MBI50VA-060-50**		**6MBI50VA-120-50**
		75A	**6MBI75VA-060-50**		**6MBI75VA-120-50**
		100A	**6MBI100VA-060-50**		**6MBI100VA-120-50**
Solder pins	 M633 	100A			**6MBI100VB-120-50**
		150A	**6MBI150VB-060-50**		**6MBI150VB-120-50**
		180A			**6MBI180VB-120-50**
					6MBI180VB-120-55
Solder pins	 M669 	100A		**6MBI100XAE120-50**	
Solder pins	 M668  XBA, XBE  XRBE	100A		**6MBI100XBA120-50**	
		150A		**6MBI150XBA120-50**	
		200A		**6MBI200XBA120-50**	
				6MBI200XBE120-50	
		250A		**6MBI250XRBE120-50**	
Press fit pins	  M647 	50A	**6MBI50VW-060-50**		**6MBI50VW-120-50**
		75A	**6MBI75VW-060-50**		**6MBI75VW-120-50**
		100A	**6MBI100VW-060-50**	**6MBI100XWE120-50**	**6MBI100VW-120-50**
Press fit pins	  M648  XXA, XXE, VX  XRXE	100A		**6MBI100XXA120-50**	**6MBI100VX-120-50**
		150A	**6MBI150VX-060-50**	**6MBI150XXA120-50**	**6MBI150VX-120-50**
		180A			**6MBI180VX-120-50**
					6MBI180VX-120-55
		200A		**6MBI200XXA120-50**	
				6MBI200XXE120-50	
		250A		**6MBI250XRXE120-50**	

Dimension [mm]

Note: EconoPACK™ is registered trademarks of Infineon Technologies AG, Germany.

■ X series

Device type	V_{CES}	V_{GES}	I_C Cont.	P_{tot}	$V_{CE(sat)}$ (V_{GE}=15V) typ.	I_C	Switching time $t_{d(on)}$ typ.	$t_{d(off)}$ typ.	t_f typ.	Package	Net mass
	Volts	Volts	Amps.	Watts	Volts	Amps.	μ sec.	μ sec.	μ sec.		Grams
6MBI100XAE120-50	1200	±20	100	685	1.45	100	0.21	0.29	0.10	M669	200
6MBI100XWE120-50	1200	±20	100	685	1.45	100	0.21	0.29	0.10	M647	200
6MBI100XBA120-50	1200	±20	100	440	1.45	100	0.21	0.29	0.10	M668	310
6MBI150XBA120-50	1200	±20	150	625	1.40	150	0.31	0.35	0.15	M668	310
6MBI200XBA120-50	1200	±20	200	750	1.45	200	0.27	0.34	0.12	M668	310
6MBI200XBE120-50	1200	±20	200	1000	1.45	200	0.27	0.34	0.12	M668	310
○ **6MBI250XRBE120-50**	1200	±20	250	2080	1.60	250	0.39	0.36	0.14	M668	310
6MBI100XXA120-50	1200	±20	100	440	1.45	100	0.21	0.29	0.10	M648	310
6MBI150XXA120-50	1200	±20	150	625	1.40	150	0.31	0.35	0.15	M648	310
6MBI200XXA120-50	1200	±20	200	750	1.45	200	0.27	0.34	0.12	M648	310
6MBI200XXE120-50	1200	±20	200	1000	1.45	200	0.27	0.34	0.12	M648	310
○ **6MBI250XRXE120-50**	1200	±20	250	2080	1.60	250	0.39	0.36	0.14	M648	310

■ V series

Device type	V_{CES}	V_{GES}	I_C Cont.	P_{tot}	$V_{CE(sat)}$ (V_{GE}=15V) typ.	I_C	Switching time $t_{d(on)}$ typ.	$t_{d(off)}$ typ.	t_f typ.	Package	Net mass
	Volts	Volts	Amps.	Watts	Volts	Amps.	μ sec.	μ sec.	μ sec.		Grams
6MBI50VA-060-50	600	± 20	50	200	1.60	50	0.36	0.52	0.03	M636	180
6MBI75VA-060-50	600	± 20	75	275	1.60	75	0.36	0.52	0.03	M636	180
6MBI100VA-060-50	600	± 20	100	335	1.60	100	0.36	0.52	0.03	M636	180
6MBI150VB-060-50	600	± 20	150	485	1.60	150	0.36	0.52	0.03	M633	300
6MBI50VW-060-50	600	± 20	50	215	1.60	50	0.36	0.52	0.03	M647	200
6MBI75VW-060-50	600	± 20	75	300	1.60	75	0.36	0.52	0.03	M647	200
6MBI100VW-060-50	600	± 20	100	335	1.60	100	0.36	0.52	0.03	M647	200
6MBI150VX-060-50	600	± 20	150	485	1.60	150	0.36	0.52	0.03	M648	300
6MBI50VA-120-50	1200	± 20	50	280	1.85	50	0.39	0.53	0.06	M636	180
6MBI75VA-120-50	1200	± 20	75	385	1.85	75	0.39	0.53	0.06	M636	180
6MBI100VA-120-50	1200	± 20	100	520	1.75	100	0.39	0.53	0.06	M636	180
6MBI100VB-120-50	1200	± 20	100	520	1.75	100	0.39	0.53	0.06	M633	300
6MBI150VB-120-50	1200	± 20	150	770	1.75	150	0.39	0.53	0.06	M633	300
6MBI180VB-120-50	1200	± 20	150	835	1.85	200	0.39	0.53	0.06	M633	300
6MBI180VB-120-55	1200	± 20	150	1075	1.85	200	0.39	0.53	0.06	M633	300
6MBI50VW-120-50	1200	± 20	50	280	1.85	50	0.39	0.53	0.06	M647	200
6MBI75VW-120-50	1200	± 20	75	385	1.85	75	0.39	0.53	0.06	M647	200
6MBI100VW-120-50	1200	± 20	100	520	1.75	100	0.39	0.53	0.06	M647	200
6MBI100VX-120-50	1200	± 20	100	520	1.75	100	0.39	0.53	0.06	M648	300
6MBI150VX-120-50	1200	± 20	150	770	1.75	150	0.39	0.53	0.06	M648	300
6MBI180VX-120-50	1200	± 20	150	835	1.85	200	0.39	0.53	0.06	M648	300
6MBI180VX-120-55	1200	± 20	150	1075	1.85	200	0.39	0.53	0.06	M648	300

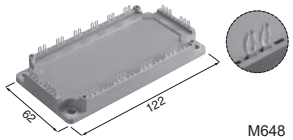
Note1: 6MBI180VB-120-55, 6MBI180VX-120-55; Low Thermal Impedance Version
Note2: The range of modules with pre-applied TIM (Thermal-Interface-Material) is being continually expanded.
○: Under development

$V_{CE(sat)}$: at T_{vj}=25℃, Chip

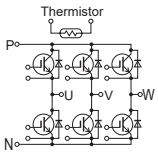
IGBT Module 6-Pack < V series >

6-Pack EconoPACK™ 1700V class

Press fit pins



M648



I_C	1700V V series
100A	**6MBI100VX-170-50**

Dimension [mm]

Device type	V_{CES}	V_{GES}	I_C Cont.	P_{tot}	$V_{CE(sat)}$ (V_{GE}=15V) typ.	I_C	Switching time t_{on} typ.	t_{off} typ.	t_f typ.	Package	Net mass
	Volts	Volts	Amps.	Watts	Volts	Amps.	μ sec.	μ sec.	μ sec.		Grams
6MBI100VX-170-50	1700	±20	100	665	2.00	100	0.63	0.70	0.10	M648	300

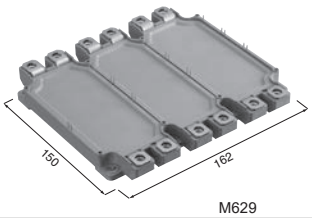
Note: EconoPACK™ is registered trademarks of Infineon Technologies AG, Germany.

$V_{CE(sat)}$: at T_{vj}=25℃, Chip

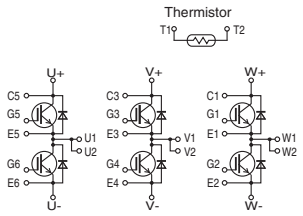
IGBT Module 6-Pack < V series >

6-Pack EconoPACK™+ 1200V, 1700V class

High power 6-pack



M629



I_C	1200V V series	1700V V series
225A	**6MBI225V-120-50**	
300A	**6MBI300V-120-50**	**6MBI300V-170-50**
450A	**6MBI450V-120-50**	**6MBI450V-170-50**
550A	**6MBI550V-120-50**	

Dimension [mm]

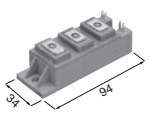
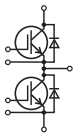
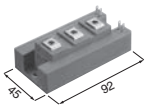
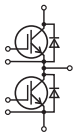
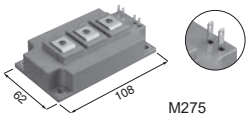
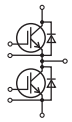
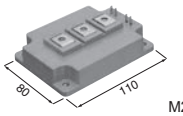
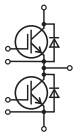
Device type	V_{CES} Volts	V_{GES} Volts	I_C Cont. Amps.	P_{tot} Watts	$V_{CE(sat)}$ (V_{GE}=15V) typ. Volts	I_C Amps.	Switching time t_{on} typ. μsec.	t_{off} typ. μsec.	t_f typ. μsec.	Package	Net mass Grams
6MBI225V-120-50	1200	±20	225	1070	1.85	225	0.55	1.05	0.11	M629	950
6MBI300V-120-50	1200	±20	300	1600	1.75	300	0.55	1.05	0.11	M629	950
6MBI450V-120-50	1200	±20	450	2250	1.75	450	0.55	1.05	0.11	M629	950
6MBI550V-120-50	1200	±20	550	2500	1.85	600	0.55	1.05	0.11	M629	950
6MBI300V-170-50	1700	±20	300	1665	2.00	300	0.90	1.30	0.10	M629	950
6MBI450V-170-50	1700	±20	450	2500	2.00	450	0.90	1.30	0.10	M629	950

Note: EconoPACK™+ is registered trademarks of Infineon Technologies AG, Germany.

$V_{CE(sat)}$: at T_{vj}=25℃, Chip

IGBT Module 2-Pack < X series / V series >

Standard 2-Pack 600V, 650V class

	I_C	650V X series	600V V series
 M263 	100A		**2MBI100VA-060-50**
	150A	**2MBI150XAA065-50**	**2MBI150VA-060-50**
	200A	**2MBI200XAA065-50**	**2MBI200VA-060-50**
 M274 	300A	**2MBI300XBE065-50**	**2MBI300VB-060-50**
	400A	**2MBI400XBE065-50**	**2MBI400VB-060-50**
 M275 	400A	**2MBI400XDE065-50**	**2MBI400VD-060-50**
	600A	**2MBI600XDE065-50**	**2MBI600VD-060-50**
 M277 	600A	**2MBI600XEE065-50**	**2MBI600VE-060-50**

Dimension [mm]

X series

Device type	V_{CES} Volts	V_{GES} Volts	I_C Cont. Amps.	P_{tot} Watts	$V_{CE(sat)}$ (V_{GE}=15V) typ. Volts	I_C Amps.	Switching time $t_{d(on)}$ typ. μsec.	$t_{d(off)}$ typ. μsec.	t_f typ. μsec.	Package	Net mass Grams
2MBI150XAA065-50	650	±20	150	500	1.30	150	0.31	0.35	0.12	M263	180
2MBI200XAA065-50	650	±20	200	625	1.30	200	0.31	0.56	0.10	M263	180
2MBI300XBE065-50	650	±20	300	1160	1.30	300	0.37	0.35	0.07	M274	240
2MBI400XBE065-50	650	±20	400	1740	1.30	400	0.35	0.68	0.07	M274	240
2MBI400XDE065-50	650	±20	400	1740	1.30	400	0.45	0.61	0.07	M275	370
2MBI600XDE065-50	650	±20	600	2775	1.30	600	0.39	0.49	0.09	M275	370
2MBI600XEE065-50	650	±20	600	2775	1.30	600	0.39	0.49	0.09	M277	470

V series

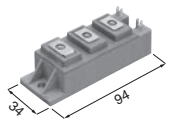
Device type	V_{CES} Volts	V_{GES} Volts	I_C Cont. Amps.	P_{tot} Watts	$V_{CE(sat)}$ (V_{GE}=15V) typ. Volts	I_C Amps.	Switching time $t_{d(on)}$ typ. μsec.	$t_{d(off)}$ typ. μsec.	t_f typ. μsec.	Package	Net mass Grams
2MBI100VA-060-50	600	±20	100	330	1.60	100	0.65	0.60	0.04	M263	180
2MBI150VA-060-50	600	±20	150	480	1.60	150	0.65	0.60	0.04	M263	180
2MBI200VA-060-50	600	±20	200	650	1.60	200	0.65	0.60	0.04	M263	180
2MBI300VB-060-50	600	±20	300	1360	1.60	300	0.65	0.60	0.07	M274	240
2MBI400VB-060-50	600	±20	400	1970	1.60	400	0.65	0.60	0.07	M274	240
2MBI400VD-060-50	600	±20	400	1970	1.60	400	0.65	0.60	0.07	M275	370
2MBI600VD-060-50	600	±20	600	2940	1.60	600	0.75	0.75	0.07	M275	370
2MBI600VE-060-50	600	±20	600	2940	1.60	600	0.75	0.75	0.07	M277	470

Note: The range of modules with pre-applied TIM (Thermal-Interface-Material) is being continually expanded.

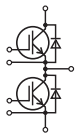
$V_{CE(sat)}$: at T_{vj}=25℃, Chip

IGBT Module 2-Pack < X series / V series >

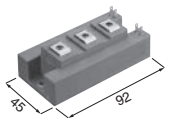
Standard 2-Pack 1200V class



M263



I_C	1200V X series	1200V V series
75A		**2MBI75VA-120-50**
100A	**2MBI100XAA120-50**	**2MBI100VA-120-50**
150A	**2MBI150XAA120-50**	**2MBI150VA-120-50**
200A	**2MBI200XAA120-50**	



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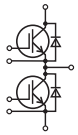
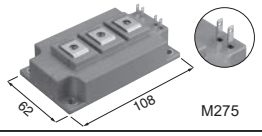


150A		**2MBI150VB-120-50**
200A	**2MBI200XBE120-50**	**2MBI200VB-120-50**
300A	**2MBI300XBE120-50**	



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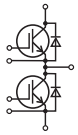
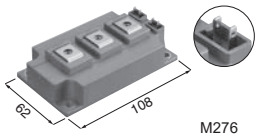


300A		**2MBI300VD-120-50**
400A	**2MBI400XDE120-50**	**2MBI400VD-120-50**
600A	**2MBI600XDE120-50**	



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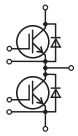
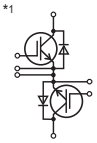
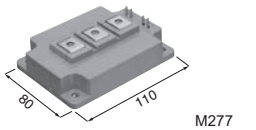




2MBI450VH-120F
Common Emitter

200A		**2MBI200VH-120-50**
300A	**2MBI300XHA120-50**	**2MBI300VH-120-50**
450A	**2MBI450XHA120-50**	**2MBI450VH-120-50**
	2MBI450XHA120-81	**2MBI450VH-120F-50*1**
600A	**2MBI600XHA120-50**	
	2MBI600XHA120-81	



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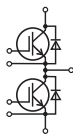


300A		**2MBI300VE-120-50**
450A	**2MBI450XEE120-50**	**2MBI450VE-120-50**
600A	**2MBI600XEE120-50**	**2MBI600VE-120-50**

Dimension [mm]

X series

Device type	V_{CES} Volts	V_{GES} Volts	I_C Cont. Amps.	P_{tot} Watts	$V_{CE(sat)}$ (V_{GE}=15V) typ. Volts	I_C Amps.	Switching time $t_{d(on)}$ typ. μsec.	$t_{d(off)}$ typ. μsec.	t_f typ. μsec.	Package	Net mass Grams
2MBI100XAA120-50	1200	±20	100	530	1.40	100	0.34	0.31	0.16	M263	180
2MBI150XAA120-50	1200	±20	150	680	1.50	150	0.22	0.25	0.11	M263	180
2MBI200XAA120-50	1200	±20	200	830	1.45	200	0.39	0.38	0.10	M263	180
2MBI200XBE120-50	1200	±20	200	1485	1.40	200	0.32	0.36	0.13	M274	240
2MBI300XBE120-50	1200	±20	300	1875	1.50	300	0.23	0.35	0.11	M274	240
2MBI400XDE120-50	1200	±20	400	3000	1.40	400	0.38	0.36	0.13	M275	370
2MBI600XDE120-50	1200	±20	600	3655	1.45	600	0.40	0.37	0.11	M275	370
2MBI300XHA120-50	1200	±20	300	1425	1.45	300	0.40	0.34	0.15	M276	370
2MBI450XHA120-50	1200	±20	450	1850	1.45	450	0.39	0.35	0.13	M276	370
○ **2MBI450XHA120-81**	1200	±20	450	1850	1.45	450	0.39	0.35	0.13	M276	370
2MBI600XHA120-50	1200	±20	450	1850	1.45	450	0.39	0.35	0.13	M276	370
○ **2MBI600XHA120-81**	1200	±20	450	1850	1.45	450	0.39	0.35	0.13	M276	370
2MBI450XEE120-50	1200	±20	450	3000	1.45	450	0.35	0.34	0.14	M277	470
2MBI600XEE120-50	1200	±20	600	3945	1.40	600	0.42	0.40	0.12	M277	470

Note1: "-81" : Pre-Applied Thermal-Interface-Material for -50
Note2: The range of modules with pre-applied TIM (Thermal-Interface-Material) is being continually expanded.
○: Under development

$V_{CE(sat)}$: at T_{vj}=25°C, Chip

■ V series

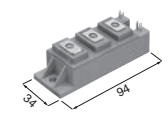
Device type	V_{CES}	V_{GES}	I_C Cont.	P_{tot}	$V_{CE(sat)}$ (V_{GE}=15V) typ.	I_C	Switching time t_{on} typ.	t_{off} typ.	t_f typ.	Package	Net mass
	Volts	Volts	Amps.	Watts	Volts	Amps.	μ sec.	μ sec.	μ sec.		Grams
2MBI75VA-120-50	1200	±20	75	390	1.85	75	0.60	0.60	0.04	M263	180
2MBI100VA-120-50	1200	±20	100	555	1.75	100	0.60	0.60	0.04	M263	180
2MBI150VA-120-50	1200	±20	150	785	1.75	150	0.60	0.60	0.04	M263	180
2MBI150VB-120-50	1200	±20	150	1070	1.85	150	0.60	0.80	0.08	M274	240
2MBI200VB-120-50	1200	±20	200	1500	1.75	200	0.60	0.80	0.08	M274	240
2MBI300VD-120-50	1200	±20	300	2205	1.85	300	0.60	0.80	0.08	M275	370
2MBI400VD-120-50	1200	±20	400	3330	1.75	400	0.60	0.80	0.08	M275	370
2MBI200VH-120-50	1200	±20	200	1110	1.75	200	0.60	0.80	0.08	M276	370
2MBI300VH-120-50	1200	±20	300	1600	1.75	300	0.60	0.80	0.08	M276	370
2MBI450VH-120-50	1200	±20	450	2400	1.80	450	0.60	0.80	0.08	M276	370
2MBI450VH-120F-50	1200	±20	450	2400	1.80	450	0.60	0.80	0.08	M276	370
2MBI300VE-120-50	1200	±20	300	2200	1.85	300	0.60	0.80	0.08	M277	470
2MBI450VE-120-50	1200	±20	450	3350	1.80	450	0.60	0.80	0.08	M277	470
2MBI600VE-120-50	1200	±20	600	4800	1.75	600	0.60	0.80	0.08	M277	470

Note1: The range of modules with pre-applied TIM (Thermal-Interface-Material) is being continually expanded.

$V_{CE(sat)}$: at T_{vj}=25°C, Chip

IGBT Module 2-Pack < X series / V series >

Standard 2-Pack 1700V class



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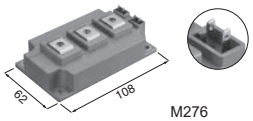

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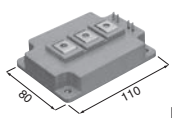


M277

I_C	1700V	
	X series	V series
75A	**2MBI75XAA170-50**	**2MBI75VA-170-50**
100A	**2MBI100XAA170-50**	**2MBI100VA-170-50**
150A	**2MBI150XAA170-50**	
150A	**2MBI150XHA170-50**	**2MBI150VH-170-50**
200A	**2MBI200XHA170-50**	**2MBI200VH-170-50**
300A	**2MBI300XHA170-50**	**2MBI300VH-170-50**
400A	**2MBI400XHA170-50**	
	2MBI400XHA170-81	
300A	**2MBI300XEE170-50**	**2MBI300VE-170-50**
400A	**2MBI400XEE170-50**	**2MBI400VE-170-50**

Dimension [mm]

X series

Device type	V_{CES}	V_{GES}	I_C Cont.	P_{tot}	$V_{CE(sat)}$ (V_{GE}=15V) typ.	I_C	Switching time $t_{d(on)}$ typ.	$t_{d(off)}$ typ.	t_f typ.	Package	Net mass
	Volts	Volts	Amps.	Watts	Volts	Amps.	μ sec.	μ sec.	μ sec.		Grams
2MBI75XAA170-50	1700	±20	75	460	1.60	75	0.38	0.41	0.45	M263	180
2MBI100XAA170-50	1700	±20	100	560	1.65	100	0.41	0.42	0.47	M263	180
2MBI150XAA170-50	1700	±20	150	730	1.60	150	0.43	0.43	0.44	M263	180
2MBI150XHA170-50	1700	±20	150	925	1.60	150	0.37	0.43	0.50	M276	370
2MBI200XHA170-50	1700	±20	200	1125	1.65	200	0.40	0.60	0.63	M276	370
2MBI300XHA170-50	1700	±20	300	1685	1.60	300	0.44	0.62	0.60	M276	370
2MBI400XHA170-50	1700	±20	400	2270	1.65	400	0.45	0.65	0.64	M276	370
○ **2MBI400XHA170-81**	1700	±20	400	2270	1.65	400	0.45	0.65	0.64	M276	370
2MBI300XEE170-50	1700	±20	300	3025	1.60	300	0.44	0.60	0.54	M277	470
2MBI400XEE170-50	1700	±20	400	3665	1.65	400	0.45	0.65	0.64	M277	470

V series

Device type	V_{CES}	V_{GES}	I_C Cont.	P_{tot}	$V_{CE(sat)}$ (V_{GE}=15V) typ.	I_C	Switching time $t_{d(on)}$ typ.	$t_{d(off)}$ typ.	t_f typ.	Package	Net mass
	Volts	Volts	Amps.	Watts	Volts	Amps.	μ sec.	μ sec.	μ sec.		Grams
2MBI75VA-170-50	1700	±20	75	555	2.00	75	1.25	1.30	0.15	M263	180
2MBI100VA-170-50	1700	±20	100	665	2.00	100	1.25	1.30	0.15	M263	180
2MBI150VH-170-50	1700	±20	150	1110	2.00	150	0.95	1.05	0.14	M276	370
2MBI200VH-170-50	1700	±20	200	1250	2.00	200	1.15	1.05	0.14	M276	370
2MBI300VH-170-50	1700	±20	300	1805	2.00	300	1.15	1.05	0.14	M276	370
2MBI300VE-170-50	1700	±20	300	2830	2.00	300	1.15	1.05	0.14	M277	470
2MBI400VE-170-50	1700	±20	400	3840	2.00	400	1.15	1.05	0.14	M277	470

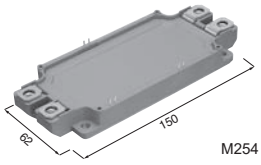
Note1 : "-81" : Pre-Applied Thermal-Interface-Material for -50
Note2: The range of modules with pre-applied TIM (Thermal-Interface-Material) is being continually expanded.
○ : Under development

$V_{CE(sat)}$: at T_{vj}=25°C, Chip

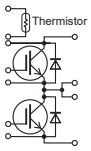
IGBT Module 2-Pack < X series / V series >

Standard 2-Pack 1200V class

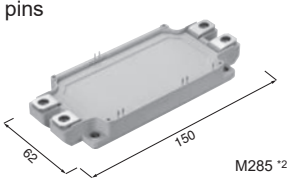
Solder pins



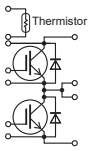
M254



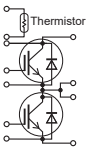
Solder pins



M285 *2

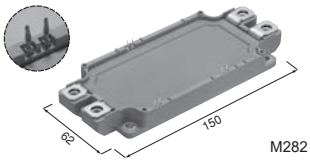


XNE

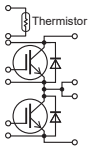


XRNE

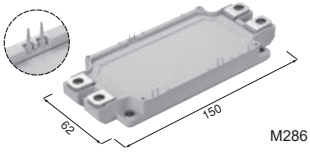
Press fit pins



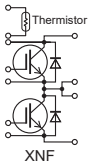
M282



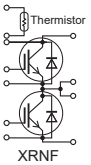
Press fit pins



M286 *2



XNF



XRNF

I_C	1200V X series	1200V V series	1200V V series *1 With SiN-substrate
225A	**2MBI225XNA120-50**	**2MBI225VN-120-50**	**2MBI225VN-120S-50**
	2MBI225XNA120-81		
300A	**2MBI300XNA120-50**	**2MBI300VN-120-50**	**2MBI300VN-120S-50**
450A	**2MBI450XNA120-50**	**2MBI450VN-120-50**	**2MBI450VN-120S-50**
600A	**2MBI600XNG120-50**		**2MBI600VN-120-50**
600A	**2MBI600XNE120-50**		
800A	**2MBI800XNE120-50**		
1000A	**2MBI1000XRNE120-50**		
225A	**2MBI225XNB120-50**	**2MBI225VX-120-50**	
300A	**2MBI300XNB120-50**	**2MBI300VX-120-50**	
	2MBI300XNB120-81		
450A	**2MBI450XNB120-50**	**2MBI450VX-120-50**	
	2MBI450XNB120-81		
600A	**2MBI600XNH120-50**		**2MBI600VX-120-50**
	2MBI600XNH120-81		
600A	**2MBI600XNF120-50**		
800A	**2MBI800XNF120-50**		
	2MBI800XNF120-81		
1000A	**2MBI1000XRNF120-50**		
	2MBI1000XRNF120-81		

Dimension [mm]

X series

Device type	V_{CES} Volts	V_{GES} Volts	I_C Cont. Amps.	P_{tot} Watts	$V_{CE(sat)}$ (V_{GE}=15V) typ. Volts	I_C Amps.	Switching time $t_{d(on)}$ typ. μsec.	$t_{d(off)}$ typ. μsec.	t_f typ. μsec.	Package	Net mass Grams
2MBI225XNA120-50	1200	±20	225	1030	1.45	225	0.23	0.33	0.05	M254	350
● **2MBI225XNA120-81**	1200	±20	225	1030	1.45	225	0.23	0.33	0.05	M254	350
2MBI300XNA120-50	1200	±20	300	1325	1.40	300	0.26	0.36	0.05	M254	350
2MBI450XNA120-50	1200	±20	450	1760	1.40	450	0.37	0.40	0.07	M254	350
2MBI600XNG120-50	1200	±20	600	3125	1.45	600	0.42	0.42	0.07	M254	350
2MBI600XNE120-50	1200	±20	600	3125	1.45	600	0.42	0.42	0.07	M285 *2	350
2MBI800XNE120-50	1200	±20	800	4050	1.45	800	0.47	0.45	0.08	M285 *2	350
2MBI1000XRNE120-50	1200	±20	1000	8330	1.60	1000	0.36	0.50	0.09	M285 *2	350
2MBI225XNB120-50	1200	±20	225	1030	1.45	225	0.23	0.33	0.05	M282	350
2MBI300XNB120-50	1200	±20	300	1325	1.40	300	0.26	0.36	0.05	M282	350
● **2MBI300XNB120-81**	1200	±20	300	1325	1.40	300	0.26	0.36	0.05	M282	350
2MBI450XNB120-50	1200	±20	450	1760	1.40	450	0.37	0.40	0.07	M282	350
● **2MBI450XNB120-81**	1200	±20	450	1760	1.40	450	0.37	0.40	0.07	M282	350
2MBI600XNH120-50	1200	±20	600	3125	1.45	600	0.42	0.42	0.07	M282	350
● **2MBI600XNH120-81**	1200	±20	600	3125	1.45	600	0.42	0.42	0.07	M282	350
2MBI600XNF120-50	1200	±20	600	3125	1.45	600	0.42	0.42	0.07	M286 *2	350
2MBI800XNF120-50	1200	±20	800	4050	1.45	800	0.47	0.45	0.08	M286 *2	350
● **2MBI800XNF120-81**	1200	±20	800	4050	1.45	800	0.47	0.45	0.08	M286 *2	350
2MBI1000XRNF120-50	1200	±20	1000	8330	1.60	1000	0.36	0.50	0.09	M286 *2	350
● **2MBI1000XRNF120-81**	1200	±20	1000	8330	1.60	1000	0.36	0.50	0.09	M286 *2	350

*1 Low Thermal Impedance Version
*2 Low thermal impedance and high tracking capability type
Note1: "-81" : Pre-Applied Thermal-Interface-Material for -50
Note2: The range of modules with pre-applied TIM (Thermal-Interface-Material) is being continually expanded.
● : New products

$V_{CE(sat)}$: at T_{vj}=25°C, Chip

■ V series

Device type	V_{CES} Volts	V_{GES} Volts	I_C Cont. Amps.	P_{tot} Watts	$V_{CE(sat)}$ (V_{GE}=15V) typ. Volts	I_C Amps.	Switching time t_{on} typ. µsec.	t_{off} typ. µsec.	t_f typ. µsec.	Package	Net mass Grams
2MBI225VN-120-50	1200	±20	225	1070	1.85	225	0.55	1.05	0.11	M254	350
2MBI225VN-120S-50 *3	1200	±20	225	1360	1.85	225	0.40	0.55	0.05	M254	350
2MBI300VN-120-50	1200	±20	300	1595	1.75	300	0.55	1.05	0.11	M254	350
2MBI300VN-120S-50 *3	1200	±20	300	2000	1.75	300	0.45	0.65	0.06	M254	350
2MBI450VN-120-50	1200	±20	450	2270	1.75	450	0.55	1.05	0.11	M254	350
2MBI450VN-120S-50 *3	1200	±20	450	3000	1.75	450	0.47	0.70	0.07	M254	350
2MBI600VN-120-50	1200	±20	600	3750	1.85	600	0.55	1.05	0.11	M254	350
2MBI225VX-120-50	1200	±20	225	1070	1.85	225	0.55	1.05	0.11	M282	350
2MBI300VX-120-50	1200	±20	300	1595	1.75	300	0.55	1.05	0.11	M282	350
2MBI450VX-120-50	1200	±20	450	2270	1.75	450	0.55	1.05	0.11	M282	350
2MBI600VX-120-50	1200	±20	600	3750	1.85	600	0.55	1.05	0.11	M282	350

*3 The products with'S': Low Thermal Impedance Version

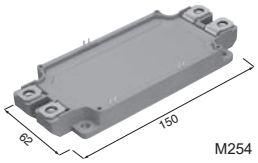
$V_{CE(sat)}$: at T_{vj}=25°C, Chip

Note: The range of modules with pre-applied TIM (Thermal-Interface-Material) is being continually expanded.

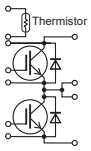
IGBT Module 2-Pack < X series / V series >

Standard 2-Pack 1700V class

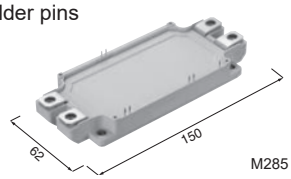
Solder pins



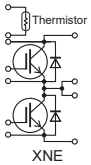
M254



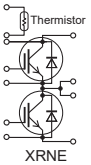
Solder pins



M285 *2

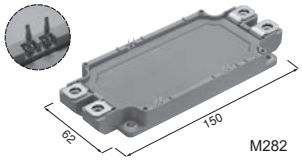


XNE

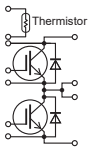


XRNE

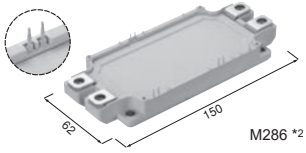
Press fit pins



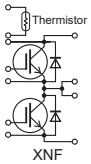
M282



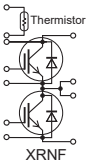
Press fit pins



M286 *2



XNF



XRNF

I_C	1700V X series	1700V V series	1700V V series *1 With SiN-substrate
225A	**2MBI225XNA170-50**		
300A	**2MBI300XNA170-50**	**2MBI300VN-170-50**	
450A	**2MBI450XNA170-50**	**2MBI450VN-170-50**	
550A			**2MBI550VN-170-50**
600A	**2MBI600XNG170-50**		
600A	**2MBI600XNE170-50**		
800A	**2MBI800XRNE170-50**		
225A	**2MBI225XNB170-50**	**2MBI225VX-170-50**	
300A	**2MBI300XNB170-50**	**2MBI300VX-170-50**	
450A	**2MBI450XNB170-50**	**2MBI450VX-170-50**	
550A			**2MBI550VX-170-50**
600A	**2MBI600XNH170-50**		
600A	**2MBI600XNF170-50**		
800A	**2MBI800XRNF170-50**		

Dimension [mm]

X series

Device type	V_{CES} Volts	V_{GES} Volts	I_C Cont. Amps.	P_{tot} Watts	$V_{CE(sat)}$ (V_{GE}=15V) typ. Volts	I_C Amps.	Switching time $t_{d(on)}$ typ. μ sec.	$t_{d(off)}$ typ. μ sec.	t_f typ. μ sec.	Package	Net mass Grams
2MBI225XNA170-50	1700	±20	225	1470	1.60	225	0.35	0.46	0.44	M254	350
2MBI300XNA170-50	1700	±20	300	1720	1.60	300	0.39	0.47	0.42	M254	350
2MBI450XNA170-50	1700	±20	450	2340	1.60	450	0.41	0.52	0.42	M254	350
2MBI600XNG170-50	1700	±20	600	3845	1.70	600	0.49	0.58	0.42	M254	350
2MBI600XNE170-50	1700	±20	600	3845	1.70	600	0.49	0.58	0.42	M285 *2	350
2MBI800XRNE170-50	1700	±20	800	7140	2.30	800	0.47	0.57	0.23	M285 *2	350
2MBI225XNB170-50	1700	±20	225	1470	1.60	225	0.35	0.46	0.44	M282	350
2MBI300XNB170-50	1700	±20	300	1720	1.60	300	0.39	0.47	0.42	M282	350
2MBI450XNB170-50	1700	±20	450	2340	1.60	450	0.41	0.52	0.42	M282	350
2MBI600XNH170-50	1700	±20	600	3845	1.70	600	0.49	0.58	0.42	M282	350
2MBI600XNF170-50	1700	±20	600	3845	1.70	600	0.49	0.58	0.42	M286 *2	350
2MBI800XRNF170-50	1700	±20	800	7140	2.30	800	0.47	0.57	0.23	M286 *2	350

*1 Low Thermal Impedance Version
*2 Low thermal impedance and high tracking capability type

$V_{CE(sat)}$: at T_{vj}=25°C, Chip

■ V series

Device type	V_{CES}	V_{GES}	I_C Cont.	P_{tot}	$V_{CE(sat)}$ (V_{GE}=15V) typ.	I_C	Switching time t_{on} typ.	t_{off} typ.	t_f typ.	Package	Net mass
	Volts	Volts	Amps.	Watts	Volts	Amps.	μ sec.	μ sec.	μ sec.		Grams
2MBI300VN-170-50	1700	±20	300	1665	2.00	300	0.90	1.30	0.10	M254	350
2MBI450VN-170-50	1700	±20	450	2500	2.00	450	0.90	1.30	0.10	M254	350
2MBI550VN-170-50 *3	1700	±20	550	3750	2.15	550	1.00	1.30	0.10	M254	350
2MBI225VX-170-50	1700	±20	225	1500	2.00	225	0.90	1.05	0.08	M282	350
2MBI300VX-170-50	1700	±20	300	1665	2.00	300	0.90	1.30	0.10	M282	350
2MBI450VX-170-50	1700	±20	450	2500	2.00	450	0.90	1.30	0.10	M282	350
2MBI550VX-170-50 *3	1700	±20	550	3750	2.15	550	1.00	1.30	0.10	M282	350

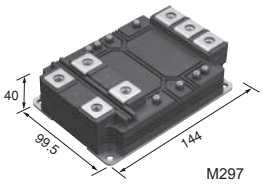
*3 550A Low Thermal Impedance Version

$V_{CE(sat)}$: at T_{vj}=25°C, Chip

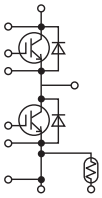
Note: The range of modules with pre-applied TIM (Thermal-Interface-Material) is being continually expanded.

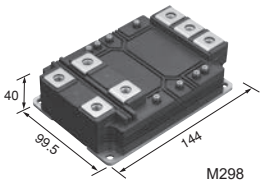
IGBT Module 2-Pack < X series >

High Power Module HPnC 1700V, 2300V, 3300V class

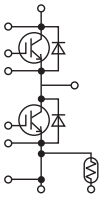


M297





M298



I_C	1700V	2300V	3300V
	X series		
600A			**2MBI600XYF330-50**
1200A	**2MBI1200XYF170-50**		
1500A	**2MBI1500XYF170-50**		
1200A	**2MBI1200XZF170-50**	**2MBI1200XZF230-50**	
1500A	**2MBI1500XZF170-50**		
1800A	**2MBI1800XZF170-50**		

Dimension [mm]

■ X series

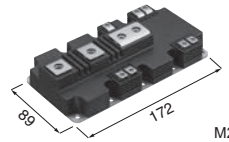
Device type	V_{CES}	V_{GES}	I_C Cont.	P_{tot}	$V_{CE(sat)}$ (V_{GE}=15V) typ.	I_C	Switching time $t_{d(on)}$ typ.	$t_{d(off)}$ typ.	t_f typ.	Package	Net mass
	Volts	Volts	Amps.	Watts	Volts	Amps.	μ sec.	μ sec.	μ sec.		Grams
○ **2MBI1200XYF170-50**	1700	±20	1200	TBD	TBD	1200	TBD	TBD	TBD	M297	TBD
○ **2MBI1500XYF170-50**	1700	±20	1500	TBD	TBD	1500	TBD	TBD	TBD	M297	TBD
● **2MBI1200XZF170-50**	1700	±20	1200	6815	1.8	1200	0.71	1.84	0.33	M298	1050
● **2MBI1500XZF170-50**	1700	±20	1500	7315	1.9	1500	0.78	0.90	0.33	M298	1050
● **2MBI1800XZF170-50**	1700	±20	1800	8570	1.8	1800	0.74	0.97	0.44	M298	1050
● **2MBI1200XZF230-50**	2300	±20	1200	8105	1.9	1200	0.74	1.15	0.54	M298	1050
○ **2MBI600XYF330-50**	3300	±20	600	TBD	TBD	600	TBD	TBD	TBD	M297	TBD

Note1: M297: MgSiC-baseplate, M298: Cu-baseplate.
Note2: The range of modules with pre-applied TIM (Thermal-Interface-Material) is being continually expanded.
● : New products ○ : Under development

$V_{CE(sat)}$: at T_{vj}=25℃, Chip

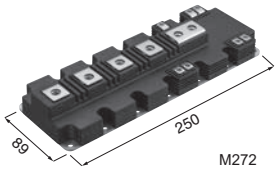
IGBT Module 2-Pack < X series / V series >

■ PrimePACK™ 1200V class



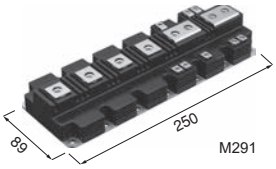
M271

Inverter Thermistor



M272

Inverter Thermistor



M291

Inverter Thermistor

	1200V		
	X series	V series	
I_C		Low switching loss	Soft turn off
600A		**2MBI600VXA-120E-50**	
		2MBI600VXA-120E-54	
900A	**2MBI900XXA120P-50**	**2MBI900VXA-120E-50**	**2MBI900VXA-120P-50**
	2MBI900XXA120P-81	**2MBI900VXA-120E-54**	**2MBI900VXA-120P-54**
1200A	**2MBI1200XXE120P-50**		
1400A	**2MBI1400XXB120P-50**	**2MBI1400VXB-120E-50**	**2MBI1400VXB-120P-50**
	2MBI1400XXB120P-81	**2MBI1400VXB-120E-54**	**2MBI1400VXB-120P-54**
1800A	**2MBI1800XXF120P-50**		
1800A	**2MBI1800XXG120P-50**		
	2MBI1800XXG120P-81		
2400A	**2MBI2400XRXG120-50**		

Dimension [mm]

■ X series

Device type	V_{CES}	V_{GES}	I_C Cont.	P_{tot}	$V_{CE(sat)}$ (V_{GE}=15V) typ.	I_C	Switching time $t_{d(on)}$ typ.	$t_{d(off)}$ typ.	t_f typ.	Package	Net mass
	Volts	Volts	Amps.	Watts	Volts	Amps.	μ sec.	μ sec.	μ sec.		Grams
2MBI900XXA120P-50	1200	±20	900	3600	1.45	900	1.10	0.90	0.16	M271	850
○ **2MBI900XXA120P-81**	1200	±20	900	3600	1.45	900	1.10	0.90	0.16	M271	850
2MBI1200XXE120P-50	1200	±20	1200	7100	1.45	1200	1.10	0.90	0.16	M271	850
2MBI1400XXB120P-50	1200	±20	1400	5400	1.45	1400	1.10	0.90	0.16	M272	1250
○ **2MBI1400XXB120P-81**	1200	±20	1400	5400	1.45	1400	1.10	0.90	0.16	M272	1250
2MBI1800XXF120P-50	1200	±20	1800	10700	1.45	1800	1.10	0.90	0.16	M272	1250
● **2MBI1800XXG120P-50**	1200	±20	1800	10700	1.45	1800	1.10	0.90	0.16	M291	1350
○ **2MBI1800XXG120P-81**	1200	±20	1800	10700	1.45	1800	1.10	0.90	0.16	M291	1350
○ **2MBI2400XRXG120-50**	1200	±20	2400	21100	1.50	2400	1.14	0.99	0.13	M291	1350

■ V series

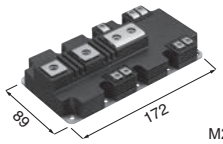
Device type	V_{CES}	V_{GES}	I_C Cont.	P_{tot}	$V_{CE(sat)}$ (V_{GE}=15V) typ.	I_C	Switching time t_{on} typ.	t_{off} typ.	t_f typ.	Package	Net mass
	Volts	Volts	Amps.	Watts	Volts	Amps.	μ sec.	μ sec.	μ sec.		Grams
2MBI600VXA-120E-50	1200	±20	600	3350	1.75	600	1.00	1.20	0.15	M271	850
2MBI600VXA-120E-54	1200	±20	600	3350	1.75	600	1.00	1.20	0.15	M271	850
2MBI900VXA-120E-50	1200	±20	900	5100	1.75	900	1.00	1.20	0.15	M271	850
2MBI900VXA-120E-54	1200	±20	900	5100	1.75	900	1.00	1.20	0.15	M271	850
2MBI1400VXB-120E-50	1200	±20	1400	7650	1.75	1400	1.00	1.20	0.15	M272	1250
2MBI1400VXB-120E-54	1200	±20	1400	7650	1.75	1400	1.00	1.20	0.15	M272	1250
2MBI900VXA-120P-50	1200	±20	900	5100	1.65	900	1.00	1.20	0.15	M271	850
2MBI900VXA-120P-54	1200	±20	900	5100	1.65	900	1.00	1.20	0.15	M271	850
2MBI1400VXB-120P-50	1200	±20	1400	7650	1.65	1400	1.00	1.20	0.15	M272	1250
2MBI1400VXB-120P-54	1200	±20	1400	7650	1.65	1400	1.00	1.20	0.15	M272	1250

Note1: PrimePACK™ is registered trademark of Infineon Technologies AG, Germany.
Note2: The products with suffix '-54'on this page are labeled to specify the rank of $V_{CE(sat)}$ and V_F.
Note3: "-81": Pre-Applied Thermal-Interface-Material for "-50"
Note4: The range of modules with pre-applied TIM (Thermal-Interface-Material) is being continually expanded.
● : New products ○ : Under development

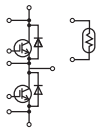
$V_{CE(sat)}$: at Tvj=25°C, Chip

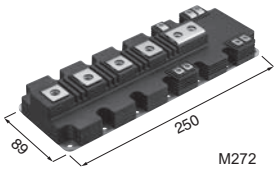
IGBT Module 2-Pack < X series / V series >

PrimePACK™ 1700V class

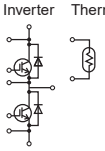


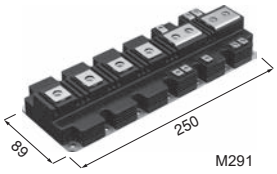
M271



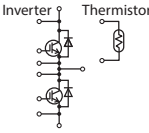


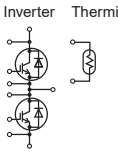
M272





M291





	1700V		
	X series	V series	
I_C	Low switching loss	Low switching loss	Soft turn off
650A	**2MBI650XXA170-50**	**2MBI650VXA-170E-50**	
		2MBI650VXA-170E-54	
		2MBI650VXA-170EA-50	
		2MBI650VXA-170EA-54	
1200A	**2MBI1200XXE170-50**		
1000A	**2MBI1000XXB170-50**	**2MBI1000VXB-170E-50**	
		2MBI1000VXB-170E-54	
		2MBI1000VXB-170EA-50	
		2MBI1000VXB-170EA-54	
1400A	**2MBI1400XXB170-50**	**2MBI1400VXB-170E-50**	**2MBI1400VXB-170P-50**
		2MBI1400VXB-170E-54	**2MBI1400VXB-170P-54**
1800A	**2MBI1800XXF170-50**		
1800A	**2MBI1800XXG170-50**		
	2MBI1800XXG170-81		
2400A	**2MBI2400XRXG170-50**		

Dimension [mm]

X series

Device type	V_{CES}	V_{GES}	I_C Cont.	P_{tot}	$V_{CE(sat)}$ (V_{GE}=15V) typ.	I_C	Switching time $t_{d(on)}$ typ.	$t_{d(off)}$ typ.	t_f typ.	Package	Net mass
	Volts	Volts	Amps.	Watts	Volts	Amps.	μ sec.	μ sec.	μ sec.		Grams
2MBI650XXA170-50	1700	±20	650	2500	1.65	650	1.23	0.95	0.38	M271	850
2MBI1200XXE170-50	1700	±20	1200	8600	1.70	1200	1.11	1.02	0.20	M271	850
2MBI1000XXB170-50	1700	±20	1000	3700	1.65	1000	1.23	0.95	0.38	M272	1250
2MBI1400XXB170-50	1700	±20	1400	6900	1.65	1400	1.11	1.02	0.20	M272	1250
2MBI1800XXF170-50	1700	±20	1800	13000	1.70	1800	1.11	1.02	0.20	M272	1250
2MBI1800XXG170-50	1700	±20	1800	13000	1.70	1800	1.11	1.02	0.20	M291	1350
● **2MBI1800XXG170-81**	1700	±20	1800	13000	1.70	1800	1.11	1.02	0.20	M291	1350
○ **2MBI2400XRXG170-50**	1700	±20	2400	18500	2.75	2400	0.92	0.95	0.21	M291	1350

Note1: PrimePACK™ is registered trademark of Infineon Technologies AG, Germany.
$V_{CE(sat)}$: at T_{vj}=25°C, Chip
Note2: "-81": Pre-Applied Thermal-Interface-Material for "-50"
Note3: The range of modules with pre-applied TIM (Thermal-Interface-Material) is being continually expanded.
● : New products ○ : Under development

■ V series

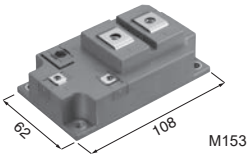
Device type	V_{CES}	V_{GES}	I_C Cont.	P_{tot}	$V_{CE(sat)}$ (V_{GE}=15V) typ.	I_C	Switching time t_{on} typ.	t_{off} typ.	t_f typ.	Package	Net mass
	Volts	Volts	Amps.	Watts	Volts	Amps.	μ sec.	μ sec.	μ sec.		Grams
2MBI650VXA-170E-50	1700	±20	650	4150	2.00	650	1.25	1.55	0.15	M271	850
2MBI650VXA-170E-54	1700	±20	650	4150	2.00	650	1.25	1.55	0.15	M271	850
2MBI650VXA-170EA-50	1700	±20	650	4150	2.00	650	1.70	1.60	0.11	M271	850
2MBI650VXA-170EA-54	1700	±20	650	4150	2.00	650	1.70	1.60	0.11	M271	850
2MBI1000VXB-170E-50	1700	±20	1000	6250	2.00	1000	1.25	1.55	0.15	M272	1250
2MBI1000VXB-170E-54	1700	±20	1000	6250	2.00	1000	1.25	1.55	0.15	M272	1250
2MBI1000VXB-170EA-50	1700	±20	1000	6250	2.00	1000	1.70	1.60	0.11	M272	1250
2MBI1000VXB-170EA-54	1700	±20	1000	6250	2.00	1000	1.70	1.60	0.11	M272	1250
2MBI1400VXB-170E-50	1700	±20	1400	8820	2.15	1400	1.35	1.60	0.15	M272	1250
2MBI1400VXB-170E-54	1700	±20	1400	8820	2.15	1400	1.35	1.60	0.15	M272	1250
2MBI1400VXB-170P-50	1700	±20	1400	8820	1.90	1400	1.35	1.80	0.20	M272	1250
2MBI1400VXB-170P-54	1700	±20	1400	8820	1.90	1400	1.35	1.80	0.20	M272	1250

Note1: The products with suffix '-54'on this page are labeled to specify the rank of $V_{CE(sat)}$ and V_F.
Note2: EA types reduce V_F and thermal resistance and are suitable for applications with high diode loads.
Note3: The range of modules with pre-applied TIM (Thermal-Interface-Material) is being continually expanded.

$V_{CE(sat)}$: at Tvj=25°C, Chip

IGBT Module 1-Pack < V series >

Standard 1-Pack 1200V, 1700V class



I_C	1200V		1700V
	V series	V series With AlN substrate	V series
300A			**1MBI300V-170-50**
400A	**1MBI400V-120-50**	**1MBI400VF-120-50**	**1MBI400V-170-50**
600A	**1MBI600V-120-50**	**1MBI600VF-120-50**	**1MBI600V-170-50**
900A	**1MBI900V-120-50**		

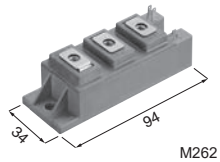
Dimension [mm]

Device type	V_{CES}	V_{GES}	I_C Cont.	P_{tot}	$V_{CE(sat)}$ (V_{GE}=15V) typ.	I_C	Switching time t_{on} typ.	t_{off} typ.	t_f typ.	Package	Net mass
	Volts	Volts	Amps.	Watts	Volts	Amps.	μ sec.	μ sec.	μ sec.		Grams
1MBI400V-120-50	1200	±20	400	2410	1.75	400	0.60	1.00	0.14	M153	380
1MBI600V-120-50	1200	±20	600	3000	1.75	600	0.70	0.90	0.10	M153	380
1MBI900V-120-50	1200	±20	900	4280	1.90	900	0.75	0.85	0.10	M153	380
1MBI400VF-120-50	1200	±20	400	3330	1.75	400	0.60	1.00	0.14	M153	380
1MBI600VF-120-50	1200	±20	600	4680	1.75	600	0.70	0.90	0.10	M153	380
1MBI300V-170-50	1700	±20	300	1705	2.00	300	0.70	0.80	0.14	M153	380
1MBI400V-170-50	1700	±20	400	2500	2.00	400	0.70	0.80	0.14	M153	380
1MBI600V-170-50	1700	±20	600	3610	2.00	600	0.70	0.80	0.14	M153	380

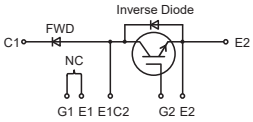
$V_{CE(sat)}$: at T_{vj}=25°C, Chip

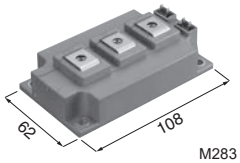
IGBT Module Chopper < V series >

Chopper 600V, 1200V class

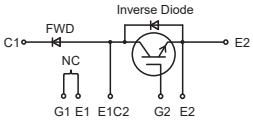


M262





M283



I_C	600V V series	1200V V series
150A		**1MBI150VA-120L-50**
200A		**1MBI200VA-120L-50**
400A	**1MBI400VH-060L-50**	

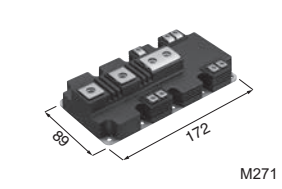
Dimension [mm]

Device type	V_{CES}	V_{GES}	I_C Cont.	P_{tot}	$V_{CE(sat)}$ (V_{GE}=15V) typ.	I_C	Switching time t_{on} typ.	t_{off} typ.	t_f typ.	Package	Net mass
	Volts	Volts	Amps.	Watts	Volts	Amps.	μ sec.	μ sec.	μ sec.		Grams
1MBI400VH-060L-50	600	±20	400	1250	1.60	400	0.73	0.61	0.07	M283	370
1MBI150VA-120L-50	1200	±20	150	785	1.85	150	0.60	0.60	0.04	M262	180
1MBI200VA-120L-50	1200	±20	200	880	1.80	200	0.60	0.60	0.04	M262	180

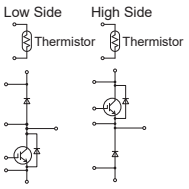
$V_{CE(sat)}$: at T_{vj}=25°C, Chip

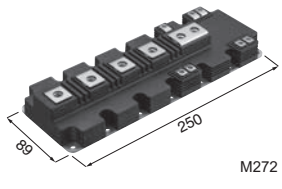
IGBT Module Chopper < V series >

PrimePACK™ 1200V, 1700V class

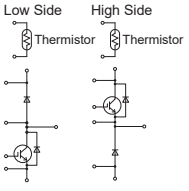


M271





M272



I_C	1200V V series		1700V V series	
	Low side configuration	High side configuration	Low side configuration	High side configuration
650A			**1MBI650VXA-170EL-50**	**1MBI650VXA-170EH-50**
			1MBI650VXA-170EL-54	**1MBI650VXA-170EH-54**
1000A			**1MBI1000VXB-170EL-50**	**1MBI1000VXB-170EH-50**
			1MBI1000VXB-170EL-54	**1MBI1000VXB-170EH-54**
1400A	**1MBI1400VXB-120PL-54**	**1MBI1400VXB-120PH-54**	**1MBI1400VXB-170PL-50**	**1MBI1400VXB-170PH-50**
			1MBI1400VXB-170PL-54	**1MBI1400VXB-170PH-54**

Dimension [mm]

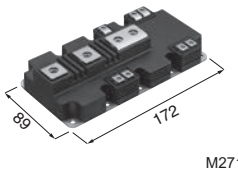
Device type	V_{CES}	V_{GES}	I_C Cont.	P_{tot}	$V_{CE(sat)}$ (V_{GE}=15V) typ.	I_C	Switching time t_{on} typ.	t_{off} typ.	t_f typ.	Package	Net mass
	Volts	Volts	Amps.	Watts	Volts	Amps.	μ sec.	μ sec.	μ sec.		Grams
1MBI1400VXB-120PL-54	1200	±20	1400	7650	1.65	1400	1.00	1.20	0.15	M272	1250
1MBI1400VXB-120PH-54	1200	±20	1400	7650	1.65	1400	1.00	1.20	0.15	M272	1250
1MBI650VXA-170EL-50	1700	±20	650	4150	2.00	650	1.25	1.55	0.15	M271	850
1MBI650VXA-170EL-54	1700	±20	650	4150	2.00	650	1.25	1.55	0.15	M271	850
1MBI1000VXB-170EL-50	1700	±20	1000	6250	2.00	1000	1.25	1.55	0.15	M272	1250
1MBI1000VXB-170EL-54	1700	±20	1000	6250	2.00	1000	1.25	1.55	0.15	M272	1250
1MBI1400VXB-170PL-50	1700	±20	1400	8820	1.90	1400	1.35	1.80	0.20	M272	1250
1MBI1400VXB-170PL-54	1700	±20	1400	8820	1.90	1400	1.35	1.80	0.20	M272	1250
1MBI650VXA-170EH-50	1700	±20	650	4150	2.00	650	1.25	1.55	0.15	M271	850
1MBI650VXA-170EH-54	1700	±20	650	4150	2.00	650	1.25	1.55	0.15	M271	850
1MBI1000VXB-170EH-50	1700	±20	1000	6250	2.00	1000	1.25	1.55	0.15	M272	1250
1MBI1000VXB-170EH-54	1700	±20	1000	6250	2.00	1000	1.25	1.55	0.15	M272	1250
1MBI1400VXB-170PH-50	1700	±20	1400	8820	1.90	1400	1.35	1.80	0.20	M272	1250
1MBI1400VXB-170PH-54	1700	±20	1400	8820	1.90	1400	1.35	1.80	0.20	M272	1250

Note1: PrimePACK™ is registered trademark of Infineon Technologies AG, Germany.
Note2: The products with suffix '-54'on this page are labeled to specify the rank of $V_{CE(sat)}$ and V_F.
Note3: The range of modules with pre-applied TIM (Thermal-Interface-Material) is being continually expanded.

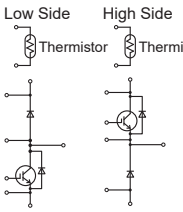
$V_{CE(sat)}$: at T_{vj}=25℃, Chip

IGBT Module Chopper < V series >

PrimePACK™ 1200V class



M271



I_C	1200V V series Boost (Low side) Chopper	1200V V series Buck (High side) Chopper
900A	**1MBI900VXA-120PD-50**	**1MBI900VXA-120PC-50**
	1MBI900VXA-120PD-54	**1MBI900VXA-120PC-54**

Dimension [mm]

Device type	V_{CES}	V_{GES}	I_C Cont.	P_{tot}	$V_{CE(sat)}$ (V_{GE}=15V) typ.	I_C	Switching time t_{on} typ.	t_{off} typ.	t_f typ.	Package	Net mass
	Volts	Volts	Amps.	Watts	Volts	Amps.	μ sec.	μ sec.	μ sec.		Grams
1MBI900VXA-120PC-50	1200	±20	900	5100	1.65	900	1.10	1.20	0.15	M271	850
1MBI900VXA-120PC-54	1200	±20	900	5100	1.65	900	1.10	1.20	0.15	M271	850
1MBI900VXA-120PD-50	1200	±20	900	5100	1.65	900	1.10	1.20	0.15	M271	850
1MBI900VXA-120PD-54	1200	±20	900	5100	1.65	900	1.10	1.20	0.15	M271	850

Note1: PrimePACK™ is registered trademark of Infineon Technologies AG, Germany.
Note2: The products with suffix '-54'on this page are labeled to specify the rank of $V_{CE(sat)}$ and V_F.
Note3: Antiparallel diode current rating is 120A. Application circuit is Boost/Buck chopper only.
Note4: The range of modules with pre-applied TIM (Thermal-Interface-Material) is being continually expanded.

$V_{CE(sat)}$: at T_{vj}=25℃, Chip

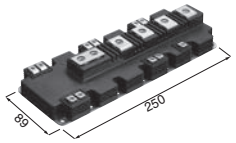
IGBT Module 3-level < V series >

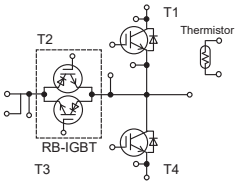
T/I-type NPC 3-level Circuits 1200V, 1700V class

Features

- Applicable to T/I-type NPC 3-level circuit, for high power conversion efficiency.
- There are 1-leg or 3-leg (3 phase) circuits in one package and it is easier to make external wiring of modules.
- Lower surge voltage by smaller internal package stray inductance.
- Lower power loss can be achieved by using RB-IGBT *1 as for T-type AC-SW devices.
- Lowest power loss can be achieved by using 6th Gen. IGBT and FWD as for Main-SW devices.

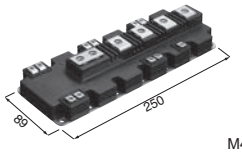
1-leg T-Type

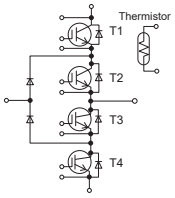




M404

1-leg I-Type





M404

I_C \ T1, T4 / T2, T3	1200V 600V	1200V 900V	1200V 1200V	1700V 1200V
450A		4MBI450VB-120R1-50		4MBI450VB-170R2-50
		4MBI450VB-120R1-60		4MBI450VB-170R2-60
600A				4MBI600VB-170R2-50
				4MBI600VB-170R2-60
650A		4MBI650VB-120R1-50		
		4MBI650VB-120R1-60		
900A	4MBI900VB-120RA-50	4MBI900VB-120R1-50		
	4MBI900VB-120RA-60	4MBI900VB-120R1-60		
600A			4MBI600VC-120-50	
			4MBI600VC-120-60	

Dimension [mm]

Device type	T1, T4 V_{CES} Volts	I_C Cont. Amps.	P_{tot} Watts	$V_{CE(sat)}$ (V_{GE}=15V) typ. Volts	I_C Amps.	T2, T3 V_{CES} Volts	I_C Cont. Amps.	P_{tot} Watts	$V_{CE(sat)}$ (V_{GE}=15V) typ. Volts	I_C Amps.	Package	Net mass Grams
4MBI450VB-120R1-50	1200	450	2205	1.85	450	900	450	1980	2.30	450	M404	1300
4MBI450VB-120R1-60	1200	450	2205	1.85	450	900	450	1980	2.30	450	M404	1300
4MBI650VB-120R1-50	1200	650	3060	1.80	650	900	650	2660	2.25	650	M404	1300
4MBI650VB-120R1-60	1200	650	3060	1.80	650	900	650	2660	2.25	650	M404	1300
4MBI900VB-120R1-50	1200	900	3950	1.85	900	900	900	3675	2.30	900	M404	1300
4MBI900VB-120R1-60	1200	900	3950	1.85	900	900	900	3675	2.30	900	M404	1300
4MBI900VB-120RA-50	1200	900	3950	1.85	900	600	900	2660	2.45	900	M404	1300
4MBI900VB-120RA-60	1200	900	3950	1.85	900	600	900	2660	2.45	900	M404	1300
4MBI600VC-120-50	1200	600	2460	1.85	600	1200	600	2460	1.85	600	M404	1300
4MBI600VC-120-60	1200	600	2460	1.85	600	1200	600	2460	1.85	600	M404	1300
4MBI450VB-170R2-50	1700	450	2830	2.00	450	1200	450	2660	2.70	450	M404	1300
4MBI450VB-170R2-60	1700	450	2830	2.00	450	1200	450	2660	2.70	450	M404	1300
4MBI600VB-170R2-50	1700	600	3410	2.00	600	1200	600	3680	2.70	600	M404	1300
4MBI600VB-170R2-60	1700	600	3410	2.00	600	1200	600	3680	2.70	600	M404	1300

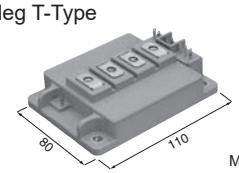
Note : The products with suffix '-60' on this page are labeled the characteristic data.
*1 RB-IGBT Reverse-Blocking IGBT, which has reverse blocking capability (between emitter and collector)

$V_{CE(sat)}$: at T_{vj}=25°C, Chip

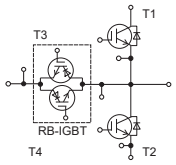
IGBT Module 3-level < V series >

T type NPC 3-level Circuits 600V, 1200V, 1700V class

1-leg T-Type



M403



I_C \ T1, T2 / T3, T4	600V	1200V		1700V
	600V	600V	900V	1200V
220A				4MBI220VF-170R2-50
300A		4MBI300VG-120R-50	4MBI300VG-120R1-50	
340A		4MBI340VF-120R-50		
400A	4MBI400VG-060R-50	4MBI400VF-120R-50 *1		

Dimension [mm]

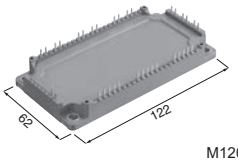
Device type	T1, T2					T3, T4					Package	Net mass
	V_{CES} Volts	I_C Cont. Amps.	P_{tot} Watts	$V_{CE(sat)}$ (V_{GE}=15V) typ. Volts	I_C Amps.	V_{CES} Volts	I_C Cont. Amps.	P_{tot} Watts	$V_{CE(sat)}$ (V_{GE}=15V) typ. Volts	I_C Amps.		Grams
4MBI400VG-060R-50	600	400	1135	1.60	400	600	400	1560	2.45	400	M403	460
4MBI300VG-120R-50	1200	300	1250	1.85	300	600	300	1250	2.45	300	M403	460
4MBI300VG-120R1-50	1200	300	1500	1.85	300	900	300	1550	2.30	300	M403	460
4MBI340VF-120R-50	1200	340	1500	1.85	300	600	340	1500	2.45	300	M403	460
4MBI400VF-120R-50	1200	400*1	1835	2.00	400	600	450	2230	2.45	400	M403	460
4MBI220VF-170R2-50	1700	220	1500	2.00	200	1200	220	1865	2.70	200	M403	460

Note : VF type is lower thermal impedance version.
*1 -I_C: 300 (A)

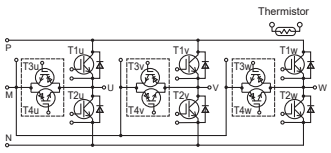
$V_{CE(sat)}$: at T_{vj}=25°C, Chip

T type NPC 3-level Circuits 1200V class

3-leg Solder pins

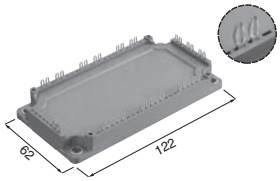


M1203

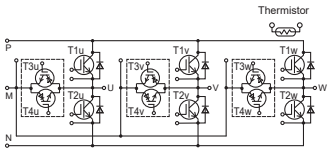


I_C \ T1, T2 / T3, T4	1200V
	600V
50A	**12MBI50VN-120-50**
75A	**12MBI75VN-120-50**
100A	**12MBI100VN-120-50**

3-leg Press fit pins



M1202



50A	**12MBI50VX-120-50**
75A	**12MBI75VX-120-50**
100A	**12MBI100VX-120-50**

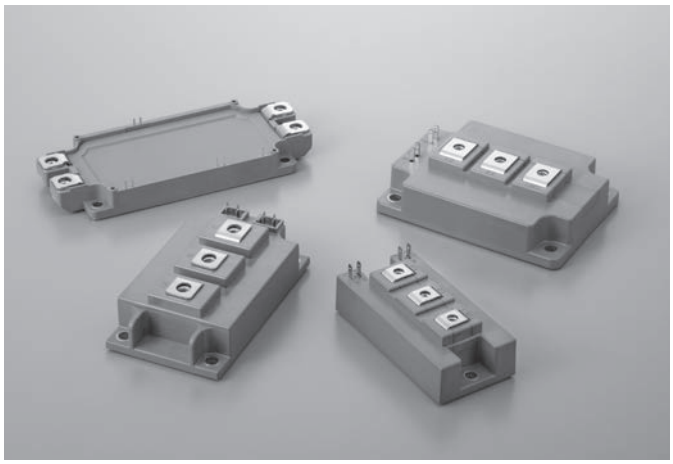
Dimension [mm]

Device type	T1, T2					T3, T4					Package	Net mass
	V_{CES} Volts	I_C Cont. Amps.	P_{tot} Watts	$V_{CE(sat)}$ (V_{GE}=15V) typ. Volts	I_C Amps.	V_{CES} Volts	I_C Cont. Amps.	P_{tot} Watts	$V_{CE(sat)}$ (V_{GE}=15V) typ. Volts	I_C Amps.		Grams
12MBI50VN-120-50	1200	50	230	1.85	50	600	50	235	2.45	50	M1203	302
12MBI75VN-120-50	1200	75	320	1.85	75	600	75	305	2.45	75	M1203	302
12MBI100VN-120-50	1200	100	430	1.75	100	600	100	400	2.45	100	M1203	302
12MBI50VX-120-50	1200	50	230	1.85	50	600	50	235	2.45	50	M1202	302
12MBI75VX-120-50	1200	75	320	1.85	75	600	75	305	2.45	75	M1202	302
12MBI100VX-120-50	1200	100	430	1.75	100	600	100	400	2.45	100	M1202	302

$V_{CE(sat)}$: at T_{vj}=25°C, Chip

SiC Modules

SiC modules have excellent characteristics that realize high blocking voltage, low power dissipation, high-frequency operation and high-temperature operation.
Power modules that make use of SiC achieve significant reduction in energy consumption, and can be used to develop smaller and lighter products.



IGBT Hybrid Modules with SiC-SBD V series

Features

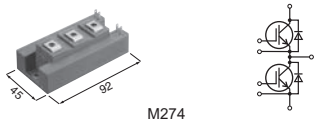
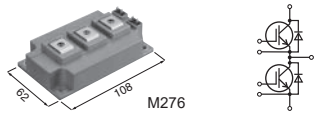
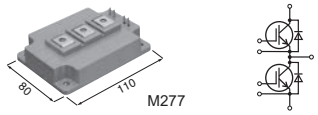
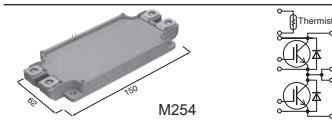
- High performance chips
  - V series IGBT for low loss operation
  - SiC-SBD for low loss operation
- The same package lineup as the conventional Si-IGBT modules

Part numbers

2MSI300VAH-120C-53 (example)

2	MS	I	300	V	A	H	120	C	53
Number of IGBT Switches	Chip : Si-IGBT+SiC-SBD	Internal Configuration	Rated Current	IGBT Device Technology	SBD Device	Package Type	Max V_{CE}	SiC-SBD for converter	RoHS Compliant
	MS Si-IGBT+SiC-SBD	I: Standard Modules	×1	V: V series (6th Generation)	A: 1st Generation		120: 1200V	C: Large current	None, 01 to 49 Non RoHS Compliant
				VW: VW series (6th Gen High speed)			170: 1700V		50 to 99 RoHS Compliant

■ Standard 2-pack 1200, 1700V class

	I_C	1200V	1700V	1200V
		IGBT Hybrid Modules with SiC-SBD V series		IGBT Hybrid Modules with SiC-SBD VW series
 M274	200A	**2MSI200VAB-120-53**		
 M276	200A			**2MSI200VWAH-120-53**
	300A	**2MSI300VAH-120C-53**		**2MSI300VWAH-120-53**
 M277	400A		**2MSI400VAE-170-53**	
 M254	300A	**2MSI300VAN-120-53**		
	450A	**2MSI450VAN-120-53**		
	600A	**2MSI600VAN-120-53**		

Dimension [mm]

Device type	V_{CES}	V_{GES}	I_C Cont.	P_{tot}	$V_{CE(sat)}$ (V_{GE}=15V) typ.	I_C	Switching time t_{on} typ.	t_{off} typ.	t_f typ.	Package	Net mass
	Volts	Volts	Amps.	Watts	Volts	Amps.	µsec.	µsec.	µsec.		Grams
2MSI200VAB-120-53	1200	±20	200	1500	1.75	200	0.64	0.70	0.07	M274	240
2MSI300VAH-120C-53	1200	±20	300	1600	1.75	300	0.82	0.84	0.09	M276	370
2MSI300VAN-120-53	1200	±20	300	2050	1.75	300	0.49	0.72	0.12	M254	350
2MSI450VAN-120-53	1200	±20	450	3135	1.75	450	0.36	0.72	0.07	M254	350
2MSI600VAN-120-53	1200	±20	600	3720	1.85	600	0.47	0.79	0.10	M254	350
2MSI200VWAH-120-53	1200	±20	200	1245	2.25	200	0.22	0.30	0.06	M276	370
2MSI300VWAH-120-53	1200	±20	300	1610	2.30	300	0.33	0.32	0.06	M276	370
2MSI400VAE-170-53	1700	±20	400	4540	2.00	400	1.05	1.95	0.09	M277	470

All-SiC Modules

Features

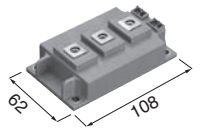
- The latest generation SiC trench gate MOSFETs for significantly low loss operation
- The compatible package lineup as the conventional Si-IGBT modules
- Lower inductance package

Part numbers

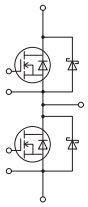
2CSI300DAHE120-50 (example)

2	CS	I	300	D	A	HE	120	50
Number of MOSFET Switches	Chip	Internal Configuration	Rated Current	MOSFET Device	SBD Device	Package Type	Max V_{CE}	RoHS Compliant
	CS:SiC-MOSFET +SiC-SBD C:SiC-MOSFET S:SiC-SBD	I: Standard Modules	×1	D: 2nd Generation	A: 1st Generation		120: 1200V 170: 1700V	50 to 99 RoHS Compliant

Standard 2-pack 1200, 1700V class



M295



I_D	1200V	1700V
	2G SiC-MOSFET Modules with 1G SiC-SBD	
200A		**2CSI200DAHE170-50**
300A	**2CSI300DAHE120-50**	**2CSI300DAHE170-50**
400A		**2CSI400DAHE170-50**
450A	**2CSI450DAHE120-50**	
600A	**2CSI600DAHE120-50**	

Dimension [mm]

Device type	V_{DSS}	V_{GES}	I_D Cont.	P_{tot}	$V_{DS(ON)}$ (V_{GS}=15V) typ.	I_D	Switching time t_{on} typ.	t_{off} typ.	t_f typ.	Package	Net mass
	Volts	Volts	Amps.	Watts	Volts	Amps.	µsec.	µsec.	µsec.		Grams
● **2CSI300DAHE120-50**	1200	+20V/-7V	300	905	1.25	300	0.280	0.305	0.055	M295	370
● **2CSI450DAHE120-50**	1200	+20V/-7V	450	1175	1.30	450	0.280	0.305	0.055	M295	370
● **2CSI600DAHE120-50**	1200	+20V/-7V	600	2115	1.35	600	0.280	0.305	0.055	M295	370
● **2CSI200DAHE170-50**	1700	+20V/-7V	200	1055	1.20	200	0.270	0.265	0.055	M295	370
● **2CSI300DAHE170-50**	1700	+20V/-7V	300	1580	1.25	300	0.265	0.275	0.050	M295	370
● **2CSI400DAHE170-50**	1700	+20V/-7V	400	2115	1.25	400	0.280	0.300	0.055	M295	370

●: New products

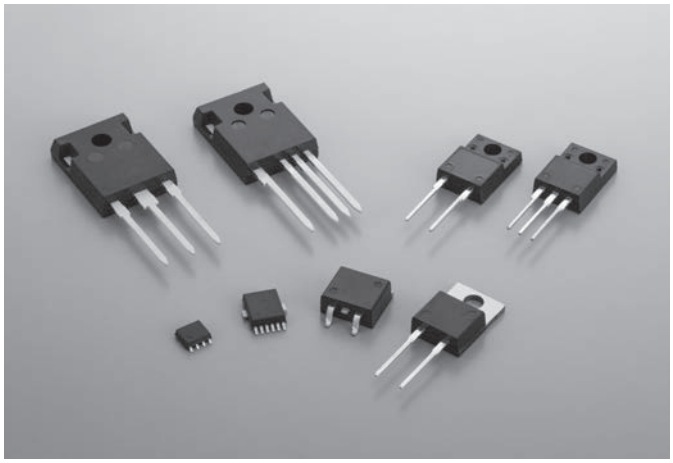
Power Discrete

2

Fuji Electric Power Semiconductors

Power Discrete

Fuji Electric offers power discrete products such as discrete IGBTs, SiC Schottky Barrier Diodes, and power MOSFETs for automotive applications.



Discrete IGBT

■ Features of Discrete IGBT XS series

- IGBT in Trench-gate structure and Field-stop technology
- Low $V_{CE(sat)}$ and low switching Loss

■ Features of Discrete IGBT V series

- IGBT in Trench-gate structure and Field-stop technology
- Short circuit withstand time; t_{sc}=10μs

■ Features of Discrete RB-IGBT

- Reverse blocking characters are realized for 1 chip by Fuji's original technology.
- High efficiency by applying a T-type 3 level inverter circuit.

■ Part numbers

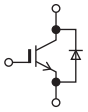
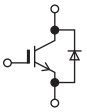
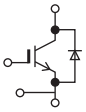
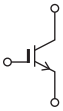
FGW40XS65C (example) : XS series

F	G		W		40	XS		65	C	
Company	Device code		Package code		Current	Series		Voltage	Diode Type	
Fuji	G	IGBT	W	TO-247 (Type: B)	×1	XS	XS series	×1/10	C	w/ Diode (Full rated)
			Z	TO-247-4					D	w/ Diode
									Blank	w/o Diode

FGW50N60VD (example) : Except for XS series

F	G		W		50	N		60	V		D	
Company	Device code		Package code		Current	Polarity		Voltage	Series		Diode Type	
Fuji	G	IGBT	W	TO-247 (Type: B)	×1	N	N-ch	×1/10	V	V series	D	w/ Diode
									RB	RB-IGBT	Blank	w/o Diode

Discrete IGBT

Package	V_{CES} (V)	I_C (A)	Trench-FS				RB-IGBT
			V series	XS series			
							
 TO-247 (Type: B)	600/650	30	**FGW30N60VD**	**FGW30XS65C**		**FGW30XS65**	
		40		**FGW40XS65C**		**FGW40XS65**	
		50	**FGW50N60VD**	**FGW50XS65D**		**FGW50XS65**	
				FGW50XS65C			
		75		**FGW75XS65D**		**FGW75XS65**	
				FGW75XS65C			
		85					**FGW85N60RB**
	1200	15	**FGW15N120VD**				
		25	**FGW25N120VD**				
		40	**FGW40N120VD**	**FGW40XS120C**		**FGW40XS120**	
		75		**FGW75XS120C**		**FGW75XS120**	
 TO-247-4	650	75			**FGZ75XS65C**		
	1200	75			**FGZ75XS120C**		

Discrete IGBT XS series

650Vclass

Device type	Maximum Ratings					$V_{CE(sat)}$ typ.	E_{on} (R_G=10Ω) typ.	E_{off}	Q_G typ.	V_F typ.	Q_{rr} typ.	Package	Net mass
	V_{CES}	I_C T_C=100°C	I_{CP}	I_F T_C=100°C	P_D IGBT								
	Volts	Amps.	Amps.	Amps.	Watts	Volts	mJ	mJ	nC	Volts	µC		Grams
FGW30XS65	650	30	120	-	174	1.35	0.27	0.21	130	-	-	TO-247 (Type: B)	6.0
FGW30XS65C	650	30	120	30	174	1.35	0.27	0.21	130	1.70	0.74	TO-247 (Type: B)	6.0
FGW40XS65	650	40	160	-	234	1.35	0.40	0.30	160	-	-	TO-247 (Type: B)	6.0
FGW40XS65C	650	40	160	40	234	1.35	0.40	0.30	160	1.70	0.90	TO-247 (Type: B)	6.0
FGW50XS65	650	50	200	-	290	1.35	0.60	0.38	210	-	-	TO-247 (Type: B)	6.0
FGW50XS65D	650	50	200	30	290	1.35	0.54	0.38	210	1.70	0.50	TO-247 (Type: B)	6.0
FGW50XS65C	650	50	200	50	290	1.35	0.60	0.38	210	1.70	0.80	TO-247 (Type: B)	6.0
FGW75XS65	650	75	300	-	437	1.35	1.30	0.94	300	-	-	TO-247 (Type: B)	6.0
FGW75XS65D	650	75	300	30	437	1.35	1.00	0.94	300	1.70	0.56	TO-247 (Type: B)	6.0
FGW75XS65C	650	75	300	75	437	1.35	1.30	0.94	300	1.70	1.10	TO-247 (Type: B)	6.0
FGZ75XS65C	650	75	300	75	437	1.35	0.50	0.74	300	1.70	2.50	TO-247-4	6.0

1200V class

Device type	Maximum Ratings					$V_{CE(sat)}$ typ.	E_{on} (R_G=10Ω) typ.	E_{off}	Q_G typ.	V_F typ.	Q_{rr} typ.	Package	Net mass
	V_{CES}	I_C T_C=100°C	I_{CP}	I_F T_C=100°C	P_D IGBT								
	Volts	Amps.	Amps.	Amps.	Watts	Volts	mJ	mJ	nC	Volts	µC		Grams
FGW40XS120	1200	40	160	-	351	1.60	1.40	1.70	250	-	-	TO-247 (Type: B)	6.0
FGW40XS120C	1200	40	160	40	351	1.60	1.40	1.70	250	2.90	1.10	TO-247 (Type: B)	6.0
FGW75XS120	1200	75	300	-	649	1.60	4.40	3.00	500	-	-	TO-247 (Type: B)	6.0
FGW75XS120C	1200	75	300	75	649	1.60	4.40	3.00	500	2.90	1.7	TO-247 (Type: B)	6.0
FGZ75XS120C	1200	75	300	75	649	1.60	1.50	3.00	500	2.90	2.4	TO-247-4	6.0

Discrete IGBT V series

600V class

Device type	Maximum Ratings					$V_{CE(sat)}$ typ.	E_{on} E_{off} (R_G=10Ω) typ.		Q_G typ.	V_F typ.	Q_{rr} typ.	Package	Net mass
	V_{CES}	I_C Tc=100°C	I_{CP}	I_F Tc=100°C	P_D IGBT								
	Volts	Amps.	Amps.	Amps.	Watts	Volts	mJ	mJ	nC	Volts	μC		Grams
FGW30N60VD	600	30	60	25	230	1.6	1.2	0.7	225	1.5	0.7	TO-247 (Type: B)	6.0
FGW50N60VD	600	50	100	35	360	1.6	2.4	1.4	360	1.5	0.75	TO-247 (Type: B)	6.0

1200V class

Device type	Maximum Ratings					$V_{CE(sat)}$ typ.	E_{on} E_{off} (R_G=10Ω) typ.		Q_G typ.	V_F typ.	Q_{rr} typ.	Package	Net mass
	V_{CES}	I_C Tc=100°C	I_{CP}	I_F Tc=100°C	P_D IGBT								
	Volts	Amps.	Amps.	Amps.	Watts	Volts	mJ	mJ	nC	Volts	μC		Grams
FGW15N120VD	1200	15	30	15	155	1.85	1.1	0.8	150	1.7	0.85	TO-247 (Type: B)	6.0
FGW25N120VD	1200	25	50	25	260	1.85	2.2	1.4	235	1.7	1.2	TO-247 (Type: B)	6.0
FGW40N120VD	1200	40	80	40	340	1.85	4.3	2.2	320	1.88	2.8	TO-247 (Type: B)	6.0

Discrete RB-IGBT

600V class

Device type	Maximum Ratings					$V_{CE(sat)}$ (V_{GE}=15V) typ.	E_{on} E_{off} (R_G=10Ω) typ.		Q_G typ.	t_{rr} typ.	Package	Net mass
	V_{CES}	I_C Tc=100°C	I_{CP}	t_{sc}	P_D IGBT							
	Volts	Amps.	Amps.	μs	Watts	Volts	mJ	mJ	nC	n sec		Grams
FGW85N60RB	600	85	170	10	600	2.45	4.7	2.4	300	165	TO-247 (Type: B)	6.0

SiC Schottky Barrier Diodes (SiC-SBD)

Features of SiC-SBD 2G Series

- Achieves high power supply efficiency
  Reduces conduction loss by 18% compared to conventional products by lowering V_F
- Reduces device temperature rise
  Achieves even lower conduction loss than conventional products in all temperature ranges
- Improves reliability
  Improves device stress resistance due to surge forward current by about 64%.
- Low I_R characteristic

Features of SiC-SBD 1G Series

- High speed switching
- Low-V_F
- Low-I_R
- High surge current capability

Part numbers

2G Series: FDC2PT10S65(example)

F	DC		2		PT		10	S		65
Company code	Device code		Series		Package code		Current	Polarity		Voltage
Fuji	DC	SiC-SBD	2	2G	AT	TO-220F-2	×1	S	Single	× 1/10
					PT	TO-220-2 (Type: A)		C	Cathode Common	
					WT	TO-247-2				

1G Series: FDCP10S65A (example)

F	DC		P		10	S		65	A	
Company code	Device code		Package code		Current	Polarity		Voltage	Application	
Fuji	DC	SiC-SBD	A	TO-220F / TO-220F-2	×1	S, T	Single	× 1/10	A	For Automotive
			C	T-Pack(S)		C	Cathode Common			
			P	TO-220 / TO-220-2 (Type: B)						
			Y	TO-247 (Type: A)						
			W	TO-247-2						

SiC-SBD 2G Series

SiC-SBD 2G Series			TO-220-2 (Type: A)	TO-220F-2	TO-247-2
					
Chip	V_{RRM} (V)	I_F (A)			
Single	650	6	✓	✓	
		8	✓	✓	
		10	✓	✓	
	1200	20			✓
		40			✓

Device type	Maximum rating			Thermal rating	Characteristics (T_a=25°C)		Package	Net mass
	V_{RRM}	I_F	I_{FSM} *1	T_{vj}	V_F	I_R *2		
	Volts	Amps.	Amps.	max.(°C)	typ. Volts	max. μA		Grams
● **FDC2PT06S65**	650	6	54	175	1.30	30	TO-220-2 (Type: A)	2.0
● **FDC2PT08S65**	650	8	68	175	1.30	40	TO-220-2 (Type: A)	2.0
● **FDC2PT10S65**	650	10	82	175	1.30	50	TO-220-2 (Type: A)	2.0
● **FDC2AT06S65**	650	6	54	175	1.30	30	TO-220F-2	1.7
● **FDC2AT08S65**	650	8	68	175	1.30	40	TO-220F-2	1.7
● **FDC2AT10S65**	650	10	82	175	1.30	50	TO-220F-2	1.7
● **FDC2WT20S120**	1200	20	190	175	1.57	10	TO-247-2	6.0
● **FDC2WT40S120**	1200	40	305	175	1.57	20	TO-247-2	6.0

*1 Half sine wave t_p=10ms *2 V_R=V_{RRM}
● : New products

■ SiC-SBD 1G Series

SiC-SBD 1G Series			TO-220-2 (Type: B)	TO-220	TO-220F-2	TO-220F	TO-247-2	TO-247 (Type: A)	T-Pack (S)
									
Chip	V_{RRM} (V)	I_F (A)							
Single	650	10	✓		✓			✓	✓
		25	✓		✓			✓	✓
	1200	18			✓		✓	✓	
Dual	650	20		✓		✓		✓	✓
		50						✓	
	1200	36						✓	

Device type	Maximum rating V_{RRM} Volts	I_F Amps.	I_{FSM} *1 Amps.	Thermal rating T_{vj} max.(°C)	Characteristics (T_a=25°C) V_F max. Volts	I_R *2 max. μA	Package	Net mass Grams
FDCP10S65	650	10	50	175	1.8	10	TO-220-2 (Type: B)	2.0
FDCP20C65	650	20	50	175	1.8	10	TO-220	2.0
FDCP25S65	650	25	100	175	1.7	10	TO-220-2 (Type: B)	2.0
FDCA10S65	650	10	50	175	1.8	10	TO-220F-2	1.7
FDCA20C65	650	20	50	175	1.8	10	TO-220F	1.7
FDCA25S65	650	25	100	175	1.7	10	TO-220F-2	1.7
FDCY10S65	650	10	50	175	1.8	10	TO-247 (Type: A)	6.4
FDCY20C65	650	20	50	175	1.8	10	TO-247 (Type: A)	6.4
FDCY25S65	650	25	100	175	1.7	10	TO-247 (Type: A)	6.4
FDCY50C65	650	50	100	175	1.7	10	TO-247 (Type: A)	6.4
FDCC10S65	650	10	50	175	1.8	10	T-Pack (S)	1.6
FDCC20C65	650	20	50	175	1.8	10	T-Pack (S)	1.6
FDCC25S65	650	25	100	175	1.7	10	T-Pack (S)	1.6
FDCA18S120	1200	18	90	175	1.8	10	TO-220F-2	1.7
FDCY18S120	1200	18	90	175	1.8	10	TO-247 (Type: A)	6.4
FDCW18T120	1200	18	90	175	1.8	10	TO-247-2	6.0
FDCY36C120	1200	36	90	175	1.8	10	TO-247 (Type: A)	6.4

*1 Half sine wave t_p=10ms
*2 V_R=V_{RRM}

■ Automotive SiC-SBD 1G Series

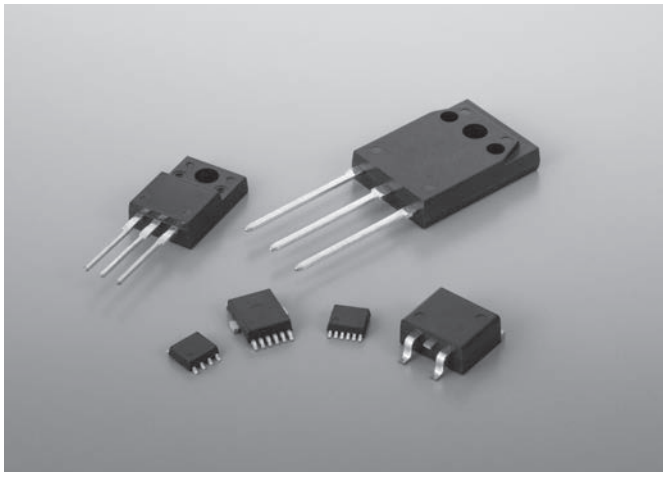
SiC-SBD Series			TO-220-2 (Type: B)	TO-220	TO-247 (Type: A)	T-Pack (S)
						
Chip	V_{RRM} (V)	I_F (A)				
Single	650	10	✓		✓	✓
		25	✓		✓	✓
	1200	18			✓	
Dual	650	20		✓	✓	✓
		50			✓	
	1200	36			✓	

Device type	Maximum rating			Thermal rating	Characteristics (T_a=25°C)		Package	Net mass
	V_{RRM} Volts	I_F Amps.	I_{FSM} *1 Amps.	T_{vj} and T_{stg} °C	V_F max. Volts	I_R *2 max. µA		Grams
FDCP10S65A	650	10	50	-55 to +175	1.8	5	TO-220-2 (Type: B)	2.0
FDCY10S65A	650	10	50	-55 to +175	1.8	5	TO-247 (Type: A)	6.4
FDCC10S65A	650	10	50	-55 to +175	1.8	5	T-Pack (S)	1.6
FDCP20C65A	650	20	100	-55 to +175	1.8	5	TO-220	2.0
FDCY20C65A	650	20	100	-55 to +175	1.8	5	TO-247 (Type: A)	6.4
FDCC20C65A	650	20	100	-55 to +175	1.8	5	T-Pack (S)	1.6
FDCP25S65A	650	25	100	-55 to +175	1.7	10	TO-220-2 (Type: B)	2.0
FDCY25S65A	650	25	100	-55 to +175	1.7	10	TO-247 (Type: A)	6.4
FDCC25S65A	650	25	100	-55 to +175	1.7	10	T-Pack (S)	1.6
FDCY50C65A	650	50	200	-55 to +175	1.7	10	TO-247 (Type: A)	6.4
FDCY18S120A	1200	18	90	-55 to +175	1.8	10	TO-247 (Type: A)	6.4
FDCY36C120A	1200	36	180	-55 to +175	1.8	10	TO-247 (Type: A)	6.4

*1 Half sine wave t_p=10ms
*2 V_R=V_{RRM}

Automotive Power MOSFETs

Fuji Electric has a lineup of power MOSFETs with features such as low power loss, low noise, and low on-resistance.



■ Part numbers

FMY100N06T (example)

F	M		Y		100	N		06	T	
Company Symbol	Device code		Package code		Current	Polarity		Voltage	Series	
Fuji	M	MOSFET	C	T-Pack (S)	×1	N	N-ch	×1/10	T	Trench
			Y	TO-247 (Type: A)					R	3G-Trench

■ Letter symbols

V_{DS}: Drain-source voltage
I_D: Continuous drain current
I_D(pulse): Pulsed drain current
R_{DS}(on): Drain-source on-state resistance
P_{tot}: Maximum power dissipation
V_{GS}: Gate-source voltage
$V_{GS(th)}$: Gate threshold voltage

Automotive MOSFET (Trench Power MOS)

Automotive Trench Power MOSFET series			TO-220	TO-220F	TO-3P	TO-247 (Type: A)	T-Pack (L)	T-Pack (S)
								
V_{DS} (V)	$R_{DS(on)}$ (Ω)	I_D (A)						
40	0.006	70				✓		
60	0.0065	70		✓				
		80	✓				✓	✓
		100			✓	✓		
75	0.0079	70		✓				
	0.0085	70						✓
100	0.0067	80						✓
		100				✓		

Automotive Trench Power MOSFET

■ 40−100V class

Device type	V_{DS} Volts	I_D Amps.	$I_{D\ (pulse)}$ Amps.	$R_{DS\ (on)}$ max. *1 Ohms	P_{tot} *2 Watts	V_{GS} Volts	$V_{GS\ (th)}$ typ. Volts	Package	Net mass Grams
2SK4068-01	40	70	280	0.006	115	+30/-20	3.0±0.5	TO-247 (Type: A)	4.9
2SK3273-01MR	60	70	280	0.0065	70	+30/-20	3.0±0.5	TO-220F	1.7
2SK3270-01	60	80	320	0.0065	135	+30/-20	3.0±0.5	TO-220	2.0
2SK3272-01L, S	60	80	320	0.0065	135	+30/-20	3.0±0.5	T-Pack (L, S)	1.6
2SK4047-01S	60	80	320	0.0065	195	+30/-20	3.0±0.5	T-Pack (S)	1.6
FMY100N06T	60	100	400	0.0065	282	+30/-20	3.0±0.5	TO-247 (Type: A)	6.3
2SK3271-01	60	100	400	0.0065	155	+30/-20	3.0±0.5	TO-3P	5.5
2SK3730-01MR	75	70	280	0.0079	70	±20	3.0±0.5	TO-220F	1.7
2SK3804-01S	75	70	280	0.0085	135	±20	3.0±0.5	T-Pack (S)	1.6
FMC80N10R6	100	80	320	0.0067	180	+30/-20	2 to 4	T-Pack (S)	1.6
FMY100N10R6	100	100	400	0.0067	280	+30/-20	2 to 4	TO-247 (Type: A)	6.3

*1 $R_{DS\ (on)}$: V_{GS}=10V
*2 P_{tot}: T_C=25°C

Automotive IPS series (Intelligent Power Switches)

Automotive IPS Series				SOP-8	SSOP-12	PSOP-12
						
Type	V_{CC} (V)	$R_{DS(om)}$ (Ω)	I_D (A)			
High side	35	0.12	1.6		✓(2ch)	
			2	✓		
				✓(Built-in Amp)		
		0.005	80			✓
Low side	40	0.14	1.9	✓(2ch)		

Self protection

Device type	Type	Channels	V_{CC} DC (pulse) Volts	I_D Amps.	$R_{DS\ (on)}$ typ. Ohms	$R_{DS\ (on)}$ max. Ohms	P_{tot} Watts	Package	Net mass Grams	Remarks
F5106H	High side	1	35 (50)	2	0.1 *1	0.12 *1	1.5	SOP-8	0.2	Built-in Amp
F5112H	High side	1	35 (50)	2	0.1 *1	0.12 *1	2	SOP-8	0.2	
F5114H	High side	2	35 (50)	1.6	0.1 *1	0.12 *1	1.5	SSOP-12	0.2	
F5074H	High side	1	35 (50)	80	0.004 *1	0.005 *1	114	PSOP-12	0.4	
F5063L	Low side	2	40	1.9	0.095 *2	0.14 *2	1.75	SOP-8	0.2	

*1 $R_{DS\ (on)}$: V_{CC}=13V
*2 $R_{DS\ (on)}$: V_{IN}=5V

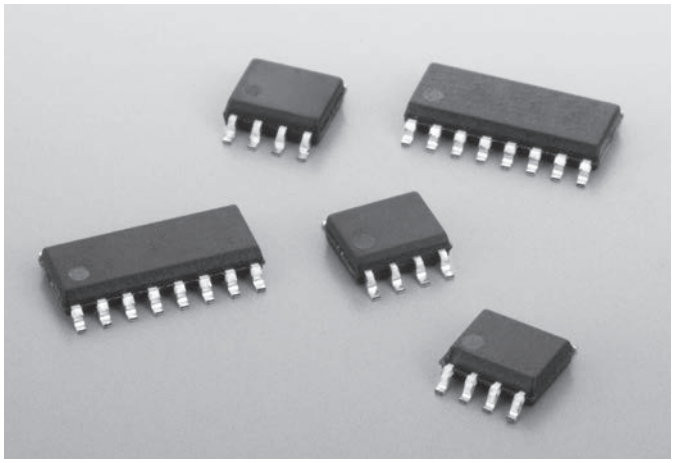
3

Fuji Electric Power Semiconductors

Power Supply Control ICs

Power Supply Control ICs

Fuji Electric offers a lineup of AC/DC power supply control ICs that support a variety of power circuits. These highly efficient, low-noise products with low standby power consumption are compatible with environmental regulations. Furthermore, many protection functions are built into the ICs themselves, allowing for smaller power circuits.



Features of Power Supply Control ICs

Green Mode PWM-ICs

■ Features

- Built-in 500/650/710V750V withstand voltage start up circuit
- Green mode functions (Burst Switching/ Linearly reduced switching frequency)
- Protect functions (Over voltage/Brown out/ 2 stage Over power etc.)
- Low EMI noise by EMI jittering of frequency

General PWM-ICs

■ Features

- Built-in error amplifier
- Adjustable switching frequency
- 5V reference voltage output

Green Mode Quasi-resonant ICs

■ Features

- Built-in 500V withstand voltage start up circuit
- Green mode functions (Burst Switching/ Linearly reduced switching frequency)
- Protect functions (Over voltage/Over load etc.)

Power Factor Correction ICs

■ Features

- Wide electric power range(From 75W to 1kW)
- Power factor ≧ 0.99
- Protect functions (FB Pin open short/Over voltage etc.)
- Improved power efficiency at light load by frequency reduction

Current Resonant ICs

■ Features

- Built-in 600V/650V withstand voltage start up circuit
- Built-in High side driver
- Preventing capacitive region operation, Self-adjusting dead time function
- Protect functions (Over current/Over voltage/Over load/Over heat/Brown out)
- Green mode function (Burst switching)
- Realize 1 convertor circuit structure at world wide input power

High and Low side driver ICs

■ Features

- High robustness of negative transient voltage on VS pin
- Wide range supply voltage up to 30V
- 3.3V logic compatible
- Built-in under voltage lockout
- Allowable offset supply voltage transient dVs/dt up to 50kV/us
- High speed response: Turn on/off delay time 125ns (typ.)

■ Part numbers

FA8A00N（example）

F		A		8		A	00	N	
Company Symbol		Control System		Series		Generation	Number	Package code	
F	Fuji	A	Analog	1	CRM_PFC	A	Two-digit integer	N	SOP
				6	LLC	B			
				8	PWM	C			
						…			

FA5590N（example）

F		A		55		90	N	
Company Symbol		Control System		Series		Generation	Package code	
F	Fuji	A	Analog	3X	AC/DC	Two-digit integer	M/N	SOP
				5X				
				13X				

CRM_PFC: CRitical conduction Mode PFC

AC/DC Power Supply Control ICs

Green mode PWM-ICs (Current mode)

Generation	Type Name	Duty	Brown out function	Input voltage	Frequency		Current sense	Over load protection	Over power protection	Over voltage protection	Built-in start up circuit	Green mode function	X-Cap discharge function
					65kHz	100kHz							
7th generation	● **FA8C71N**	85%	–	10 - 33V	✓		Positive	Timer-latch	1Stage	Latch	710V	Linearly frequency reduction + Burst operation	✓
	FA8B16N	85%	✓	12 - 24V	✓			Auto-Recovery	2Stage (OPP ratio 1:1.5)*		500V		
	FA8A00N				✓			Auto-Recovery	2Stage (OPP ratio 1:1.4)*				
	FA8A01N				✓			Timer-latch					
	FA8A40N					✓		Auto-Recovery					
	FA8A41N					✓		Timer-latch					✓
	FA8A27N			10 - 28V	✓				2Stage (OPP ratio 1:1.8)*				
	FA8A37N				✓								
	FA8A39N				✓								
	FA8A12N		–	12 - 24V	✓			Auto-Recovery	2Stage (OPP ratio 1:1.4)*				
	FA8A60N			10 - 24V	✓				1Stage				
	FA8A61N				✓			Timer-latch					
	FA8A64N					✓		Auto-Recovery					
	FA8A65N					✓		Timer-latch					
6th generation	**FA8A70N**	83%			✓			Auto-Recovery					✓
	FA8A71N				✓			Timer-latch					
	FA8A74N					✓		Auto-Recovery					
	FA8A75N					✓		Timer-latch					
	FA8A80N				✓			Auto-Recovery			650V		
	FA8A81N				✓			Timer-latch					
	FA8A83N		✓		✓								✓
	FA8A84N		–			✓		Auto-Recovery					
	FA8A85N					✓		Timer-latch					
	FA8A86N		✓			✓		Auto-Recovery		–			
	FA8A87N		–		✓			Timer-latch		Latch			
	FA8A90N				✓			Auto-Recovery					
	FA8A91N				✓			Timer-latch					✓
	FA8A94N					✓		Auto-Recovery					
	FA8A95N					✓		Timer-latch					
5th generation	**FA5680N**	85%	–	11 - 24V	✓		Negative	Auto-Recovery	1Stage		750V		
	FA5681N				✓			Timer-latch					

PKG：SOP-8
*OPP ratio= Overload threshold (OLP) : Overcurrent threshold (OCP)
● : New products

■ Green mode PWM-ICs with Brown out function

Green Mode PWM IC									
Brown out	With								
Current sense	Positive								
Over power protection	2 Stage OPP ratio 1:1.4*				2 Stage OPP ratio 1:1.8*			2 Stage OPP ratio 1:1.5*	1 Stage	
Frequency (kHz)	65		100		65			65	65	100
Overload protection	Auto-Recovery	Timer-latch	Auto-Recovery	Timer-latch	Timer-latch			Auto-Recovery	Timer-latch	Auto-Recovery
OLP Delay time (ms)	70	70	70	70	860	1600	2500	3560	200	200
X-Cap discharge	With									Without
Type (start up circuit 500V)	FA8A00N	FA8A01N	FA8A40N	FA8A41N	FA8A27N	FA8A37N	FA8A39N	FA8B16N		
Type (start up circuit 650V)									FA8A83N	FA8A86N

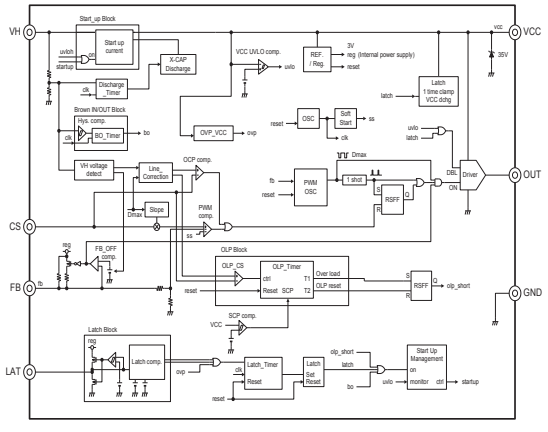
*OPP ratio= Overload threshold (OLP) : Overcurrent threshold (OCP)

■ Green mode PWM-ICs without Brown out function

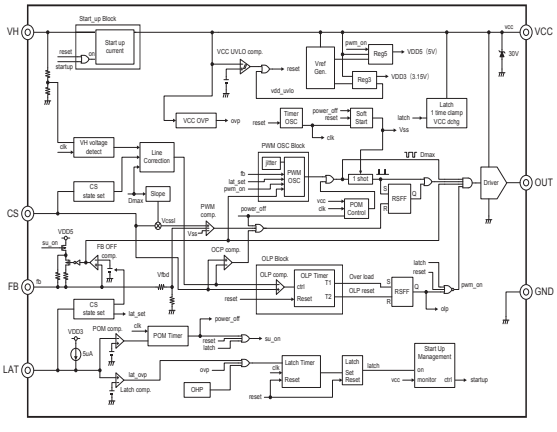
Green Mode PWM IC											
Brown out	Without										
Over power protection	1 Stage										2 Stage
Current sense	Negative		Positive								Positive
Overload protection	Auto-recovery	Timer-latch	Auto-recovery		Timer-latch						Auto-recovery
Frequency (kHz)	65	65	65	100	65			100			65
X-Cap discharge			With	With	With			With		With	With
OCP OLP Line compensation			With					With			
Product type 500V			FA8A60N	FA8A70N	FA8A64N	FA8A74N	FA8A61N	FA8A71N		FA8A65N	FA8A75N	FA8A12N
Type (start up circuit 650V)			FA8A80N	FA8A90N	FA8A84N	FA8A94N	FA8A81N	FA8A91N	FA8A87N	FA8A85N	FA8A95N	
Type (start up circuit 710V)								FA8C71N				
Type (start up circuit 750V)	FA5680N	FA5681N										

■ Block diagram (Examples)

FA8A00N (With Brown out)



FA8A61N (Without Brown out)

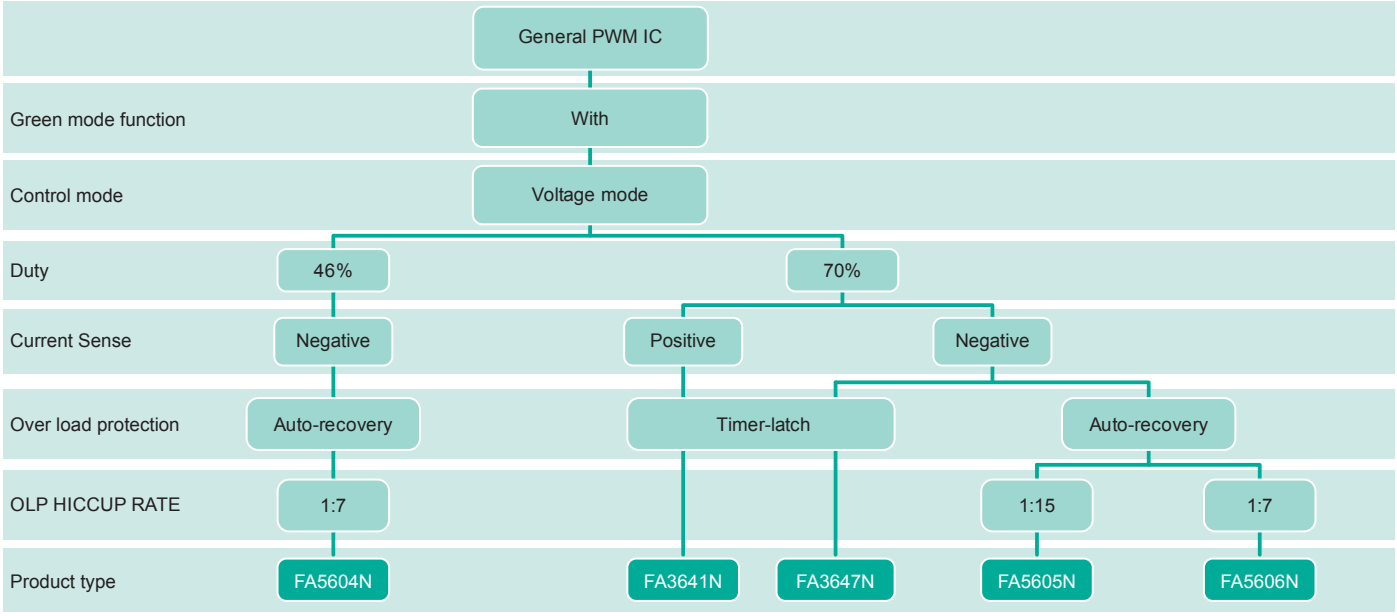


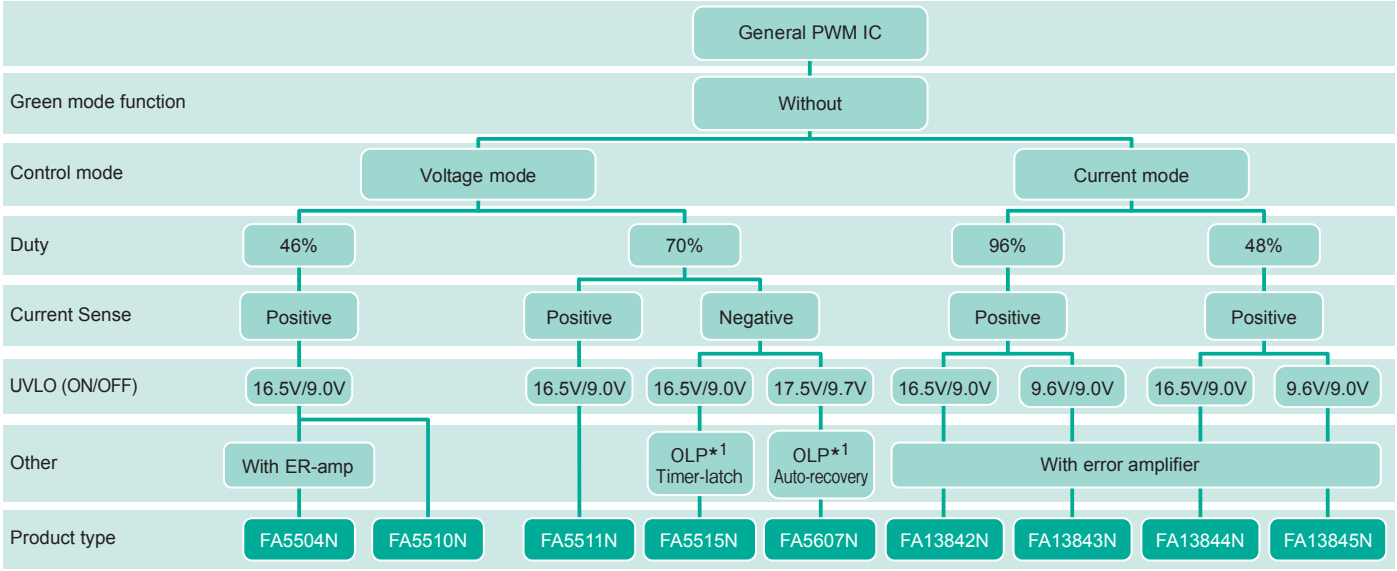
■ General PWM-ICs

Type Name	Control mode	Duty	Input voltage	Current sense	Over load protection	Over voltage protection	Under-voltage lockout (ON/OFF)	Remarks
With Green mode function								
FA3641N	Voltage mode	70%	10 - 28V	Positive	Timer-latch	Latch	16.5V/9.0V	Frequency reduction at light load
FA3647N				Negative				Frequency reduction at light load
FA5604N		46%	10 - 30V	Negative	Auto-Recovery		17.5V/9.7V	Overcurrent limit correction function, Frequency reduction start/stop FB voltage under light load 1.80V/1.95V
FA5605N		70%						
FA5606N								Overcurrent limit correction function, Frequency reduction start/stop FB voltage under light load 1.55V/1.65V
Without Green mode function								
FA13842N	Current mode	96%	10 - 25V	Positive	–	–	16.5V/9.0V	With error amplifier
FA13843N							9.6V/9.0V	
FA13844N		48%					16.5V/9.0V	
FA13845N							9.6V/9.0V	
FA5504N	Voltage mode	46%	10 - 28V		Timer-latch	Latch	16.5V/9.0V	With error amplifier
FA5510N								
FA5511N		70%						
FA5515N		70%		Negative				
FA5607N			10 - 30V		Auto-Recovery		17.5V/9.7V	Overcurrent limit correction function

PKG: SOP-8
Frequency: Adjustable

■ General PWM-ICs

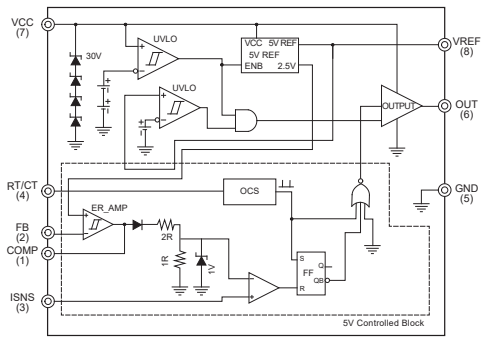




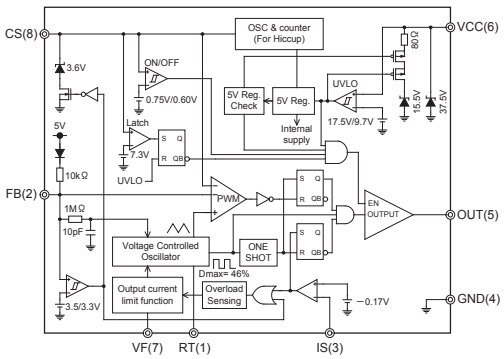
*1 OLP: Over Load Protection

■ Block diagram (Examples)

FA13842N



FA5604N

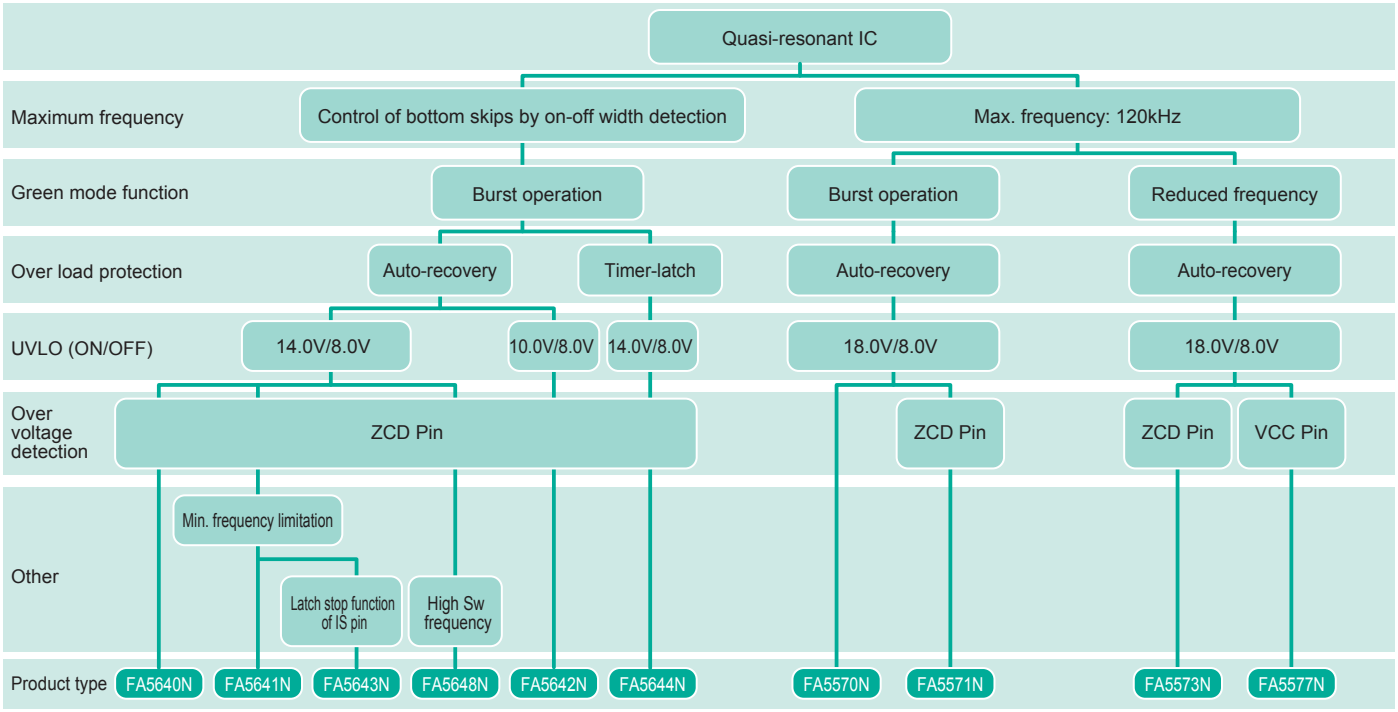


■ Green mode Quasi-resonant ICs (Current mode)

Generation	Type Name	Input voltage	Maximum frequency	Over load protection	Over voltage sense	Built-in start up circuit	Green mode function	Under-voltage lockout (ON/OFF)	Remarks
4th generation	**FA5640N**	11 - 26V	Bottom skip control by on-off width detection	Auto-Recovery	ZCD Pin	500V	Burst operation	14.0V/8.0V	
	FA5641N								Min. frequency limitation
	FA5642N							10.0V/8.0V	
	FA5643N							14.0V/8.0V	Min. frequency limitation, Latch stop function (IS pin)
	FA5644N			Timer-latch					
	FA5648N			Auto-Recovery					For High SW frequency
3rd generation	**FA5570N**	10 - 28V	Max. frequency limitation 120kHz		–			18.0V/8.0V	
	FA5571N				ZCD Pin				Over voltage protection latch
	FA5573N						Linearly frequency reduction		
	FA5577N				VCC Pin				

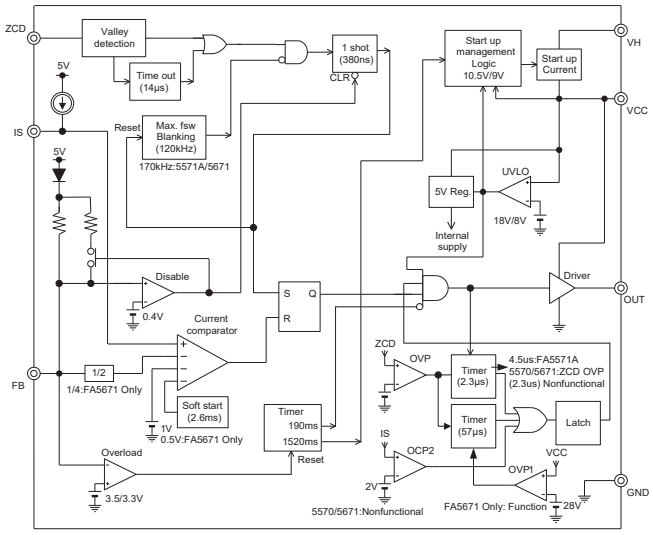
PKG: SOP-8

■ Green mode Quasi-resonant ICs

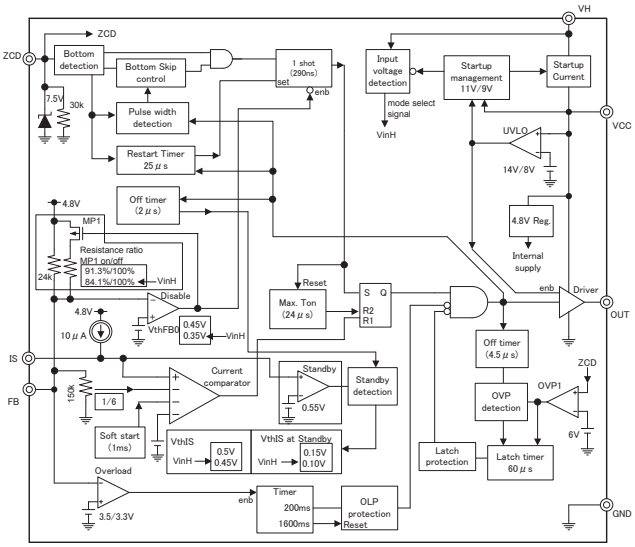


■ Block diagram (Examples)

FA5570N



FA5640N



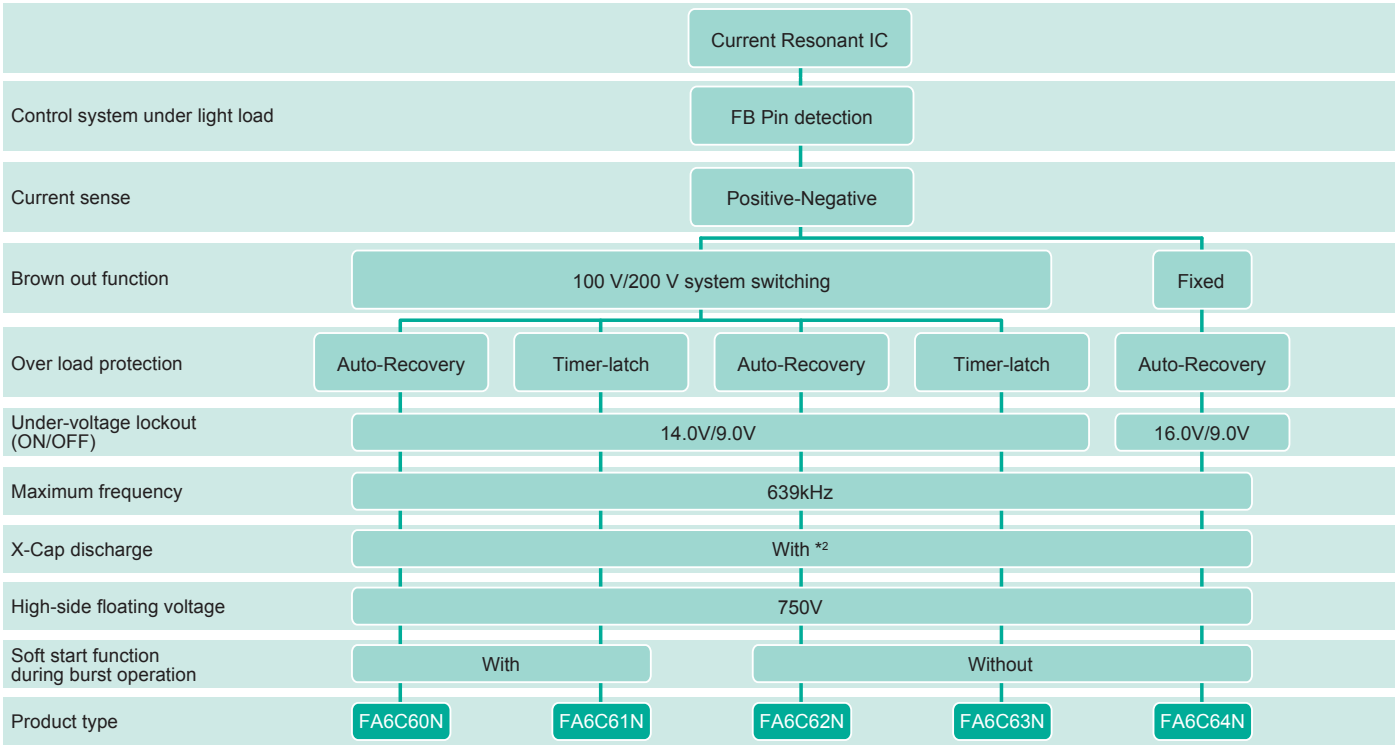
■ Current Resonant ICs

Generation (Control system)	Type Name	Input voltage	Under-voltage lockout (ON/OFF)	Current sense	Maximum frequency	Over current protection	Over load protection	Over voltage protection	Built-in start up circuit	High-side floating voltage	Brown out function	X-Cap discharge function
4th generation (Current mode)	● **FA6C60N**	10-36V	14.0V/9.0V	Positive-Negative	639kHz	Auto-Recovery	Auto-Recovery	Auto-Recovery	650V	750V	100 V/ 200 V system switching	With ("Without" can be selected using the state setting)
	● **FA6C61N**					Timer-latch	Timer-latch					
	● **FA6C62N**					Auto-Recovery	Auto-Recovery					
	● **FA6C63N**					Timer-latch	Timer-latch					
	● **FA6C64N**		16.0/9.0V			Auto-Recovery	Auto-Recovery				Fixed	
3rd generation (Voltage mode)	**FA6B19N**	14 - 29V	14.0V/9.0V		450kHz	Auto-Recovery	Auto-Recovery	Auto-Recovery	600V	600V		Without
	FA6B20N									750V		With
	FA6B21N											
	FA6B22N[*1]									600V		
2nd generation (Voltage mode)	**FA6A00AN**	14 - 27V	12.0V/9.0V		350kHz	Timer-latch	Auto-Recovery	Latch				
	FA6A10N					Auto-Recovery	Auto-Recovery				Adjustable	
	FA6A11N					Timer-latch	Timer-latch					
	FA6A30N		13.0V/9.0V			Auto-Recovery	Auto-Recovery					
	FA6A31N					Timer-latch	Timer-latch					

PKG: SOP-16(N)
[*1] BO detection delay time extension type
● : New products

■ Current Resonant ICs

4th generation (Current mode)



[*2] :"No X-Cap. Discharge" can be selected using the state setting.

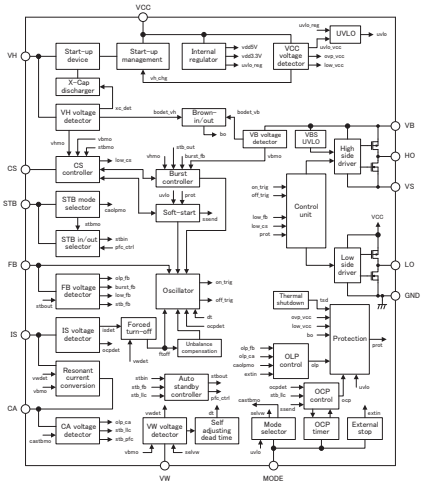
3rd, 2nd generation (Voltage mode)

Current Resonant IC							
Control system under light load	VCC Pin detection		FB Pin detection				
Current sense	Positive-Negative		Positive-Negative				
Brown out function	Fixed	Adjustable	Adjustable			Fixed	
Over load protection	Auto-Recovery	Auto-Recovery	Timer-latch	Auto-Recovery	Timer-latch	Auto-Recovery	
Under-voltage lockout (ON/OFF)	12.0V/9.0V			13.0V/9.0V		14.0V/9.0V	
Maximum frequency	350kHz					450kHz	
X-Cap discharge	With						Without
High-side floating voltage	600V					750V	600V
Product type	FA6A00AN	FA6A10N	FA6A11N	FA6A30N	FA6A31N	FA6B20N FA6B22N*1	FA6B21N	FA6B19N

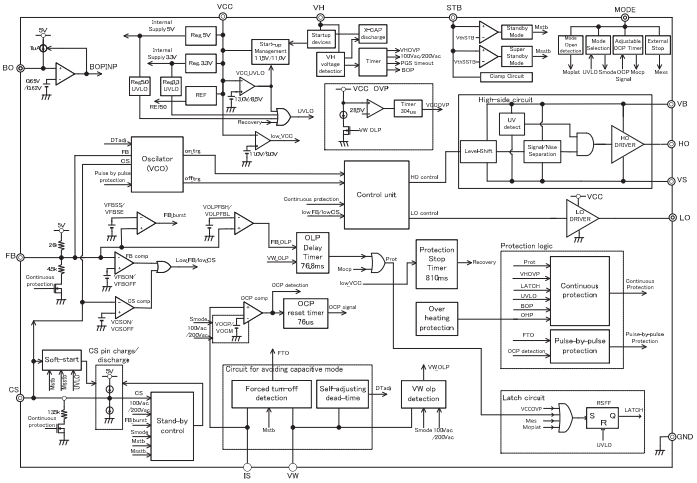
*1 Brown out delay time extension type

■ Block diagram (Examples)

FA6B20N



FA6A30N/31N



■ Power factor correction ICs

Critical Conduction Mode PFC Control IC

Generation	Type Name	Input voltage	Duty	Current sense	Under-voltage lockout (ON/OFF)	Frequency	Maximum frequency	Zero Current Detection	FB open short protection	Over voltage protection	Remarks
4th generation	**FA1B00N**	10 - 24V	–	Positive	13.0V/9.0V	Self-oscillation	Adjustable	Auxiliary-winding	✓	Dynamic OVP + Voltage-Limit (V_{CC}, OVP)	Successor to FA5601N
	● **FA1B10N**						Fixed	Auxiliary-winding			THD improvement function, X-Cap. discharge function, 650V startup circuit, Cooperate with FA6C64N
	FA1B20N	10 - 26V		Negative	12.5V/7.5V			Current sense			Cooperate with FA6C6X
3rd generation	**FA1A00N**				9.6V/8.8V					Dynamic OVP + Voltage-Limit (OVP)	
	FA1A01N				12.4V/8.8V						
	FA1A10N				9.6V/8.8V						
	FA1A11N				12.4V/8.8V						
	FA1A50N				9.6V/8.8V						
	FA1A60N				12.5V/7.5V						Improve light load efficiency, Cooperate with FA6B19N/20N/22N
	FA1A61N								✓(Open protection only)		Improve transient response, Cooperate with FA6B21N
	FA1A21N			Positive	17.3V/9.6V			Auxiliary-winding	–	Dynamic OVP + Voltage-Limit (V_{CC}, OVP)	For Flyback Over load protection
2nd generation	**FA5590N**			Negative	9.6V/9.0V		Adjustable	Current sense	✓	Dynamic OVP + Voltage-Limit (OVP)	
	FA5591N				13.0V/9.0V						
	FA5696N				9.6V/9.0V						

● : New products

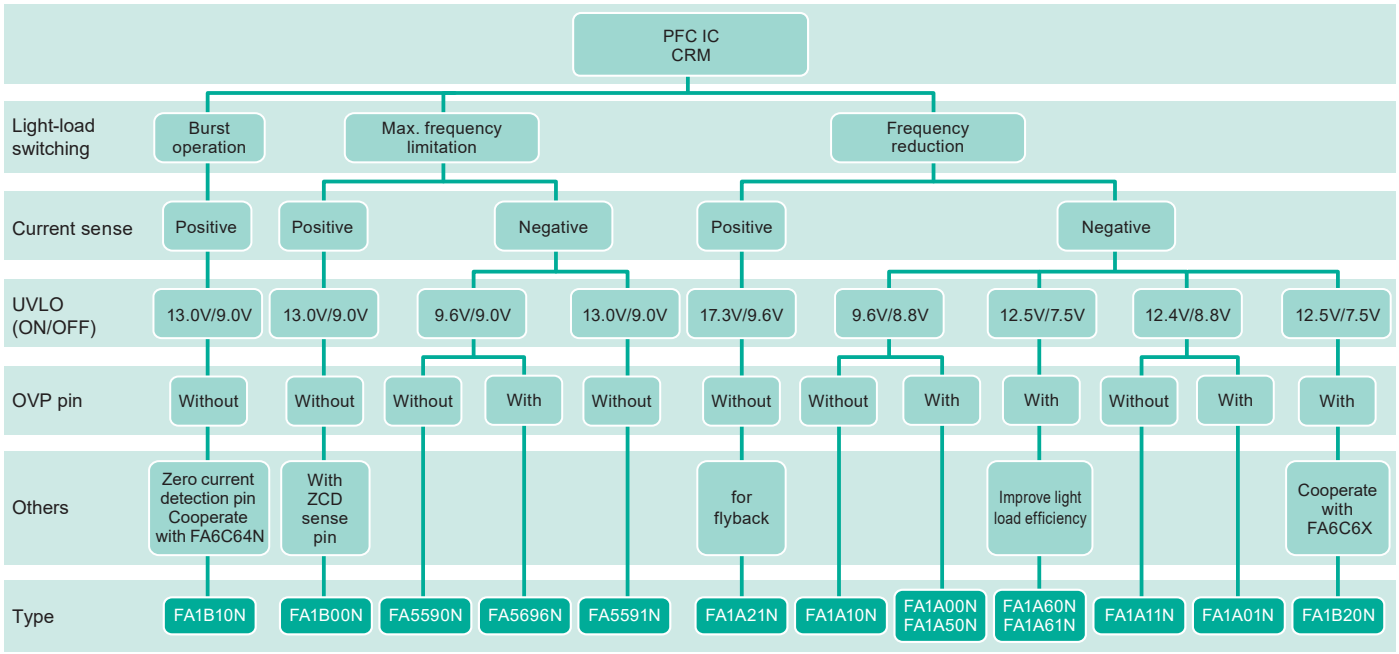
Continuous Conduction Mode PFC Control IC

Type Name	Input voltage	Duty	Current sense	Under-voltage lockout (ON/OFF)	Frequency	Maximum frequency	Zero Current Detection	FB open short protection	Over voltage protection	Remarks
FA5612N	10 - 26V	94%	Negative	9.6V/9.0V	Choice 65/60kHz/ Frequency diffusion (50-70kHz)	–	–	✓	Voltage-Limit by Pulse width	Frequency diffusion function
FA5613N				13.0V/9.0V						
FA5502M	10 - 28V			16.5V/8.9V	Adjustable	150kHz		–	Voltage-Limit (OVP)	

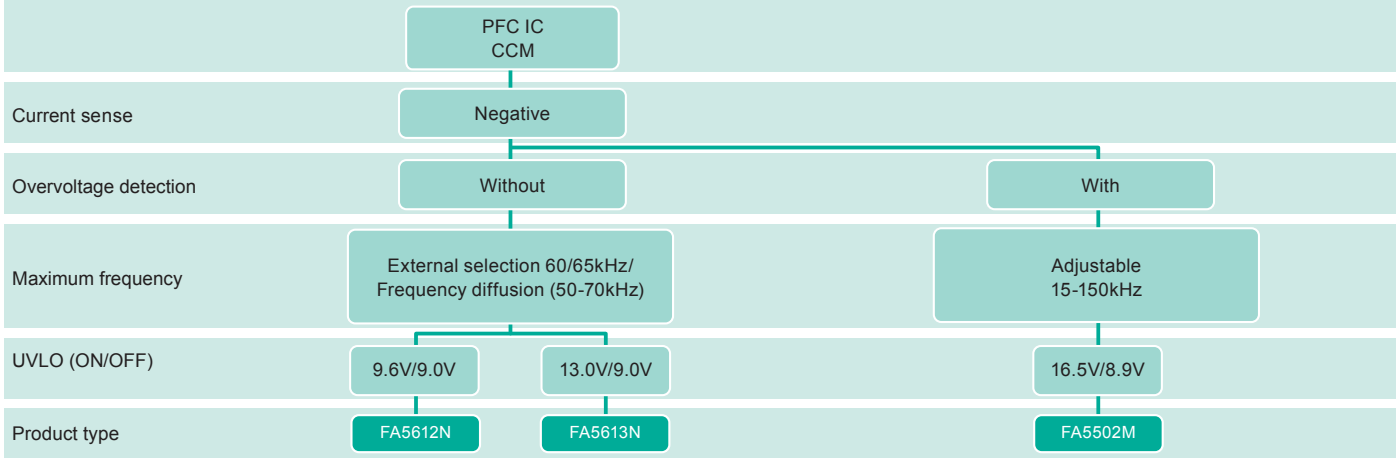
PKG: "M":SOP-16(M), others are SOP-8

■ Power factor correction ICs

Critical Conduction Mode PFC Control IC

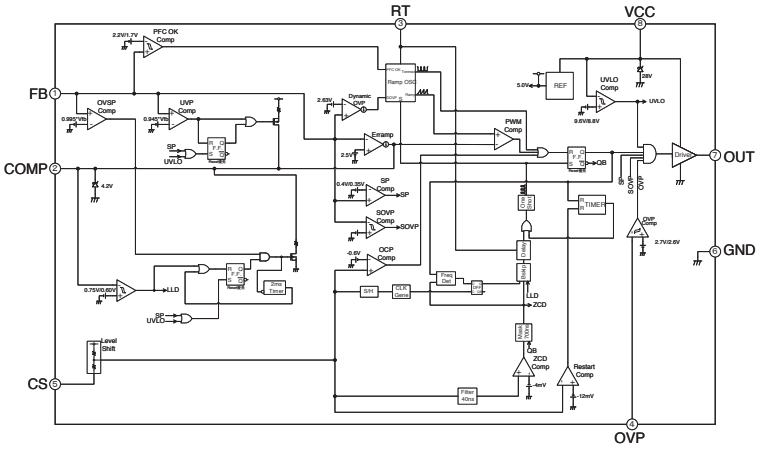


Continuous Conduction Mode PFC Control IC

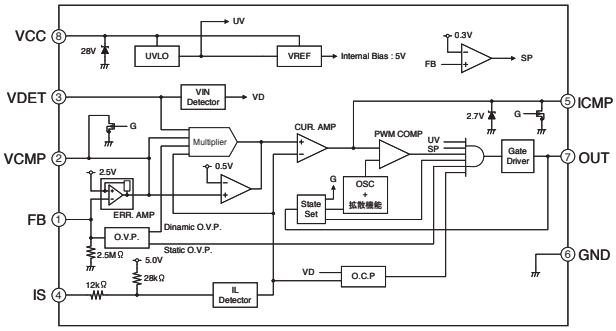


■ Block diagram (Examples)

FA1A50N



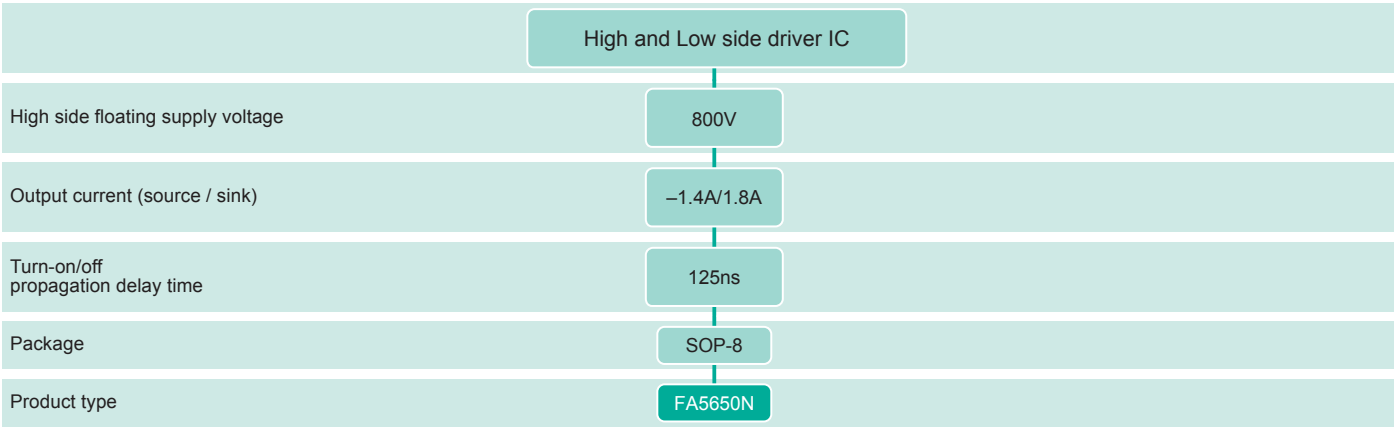
FA5612N, FA5613N



■ High and Low side driver ICs

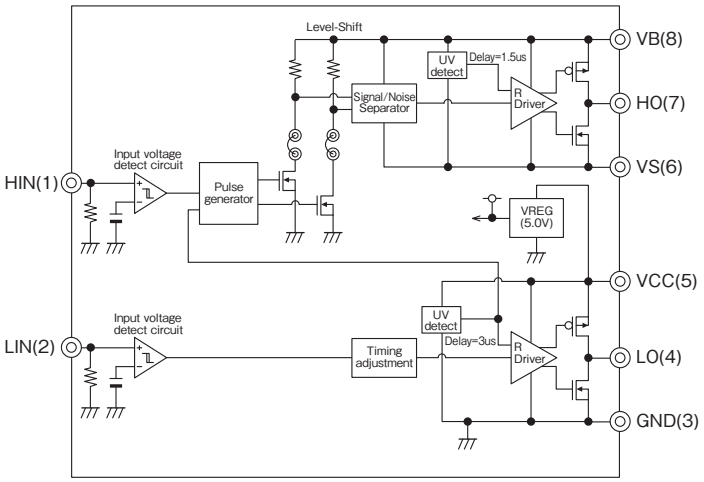
Type name	Absolute maximum ratings				Electrical characteristics				
	High side floating supply voltage	Maximum supply voltage	Output current source / sink	Maximum input frequency	Logic"1" / "0" Input voltage level (typ.)	Turn-on/off propagation delay time (typ.)	VCC and VBS supply under-voltage threshold (typ.)	Number of Input terminal	Package
FA5650N	800V	30V	-1.4A/1.8A	500kHz	Logic"1" 2.1V Logic"0" 1.1V	125ns	positive going 8.9V negative going 8.2V	2	SOP-8

■ High and Low side driver ICs

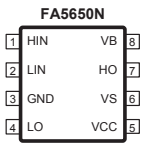


■ Block diagram

FA5650N



■ Pin Layout



Pressure Sensors

4

Fuji Electric Power Semiconductors

Pressure Sensors

IATF 16949

Fuji Electric's pressure sensors combine piezo resistance, compensation circuits, and EMC protection on single chip and contribute to reduction of system size. They operate in wide pressure range and are applicable to various uses.

Features of Pressure Sensors

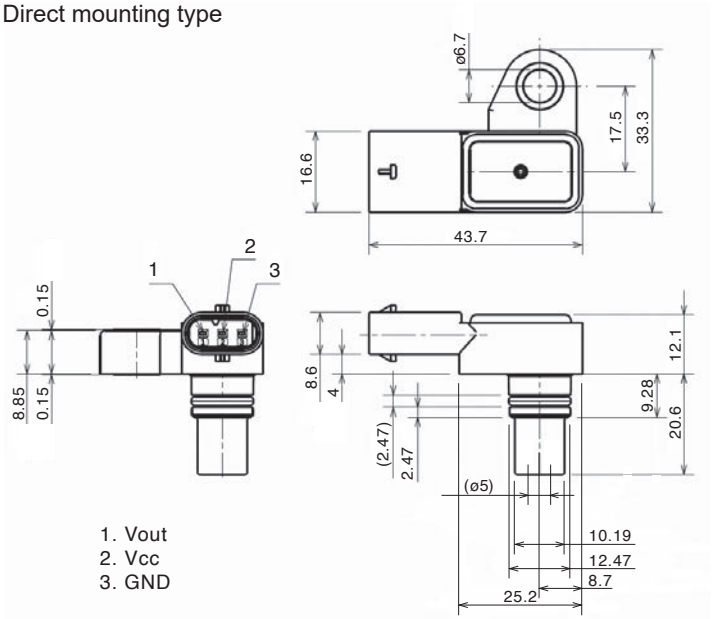
- Absolute pressure measurement
- High accuracy with digital trimming
- Wide pressure range, full scale of 100kPa to 300kPa
- Provided with overvoltage protection circuit, EMC filter, and surge protective device in the sensor chip
- Diagnostic self-detecting function in the event of a wire opened among Vcc, Vout and GND terminals
- High reliability ensured by EPROM bit redundancy

Products

Device type	Max. applied voltage (kPa.abs)	Allowable voltage (V)	Operating temperature (°C)	Operating pressure (kPa.abs)	Operating voltage (V)	Output Voltage range (V)	Absolute pressure/ Relative pressure	Package
EPL4PC-R3S	500	7	-40 to 125	20 to 106.7	5.0±0.25	0.789 to 4.211	Absolute pressure	Assembly type

Dimensions, mm

Direct mounting type



5

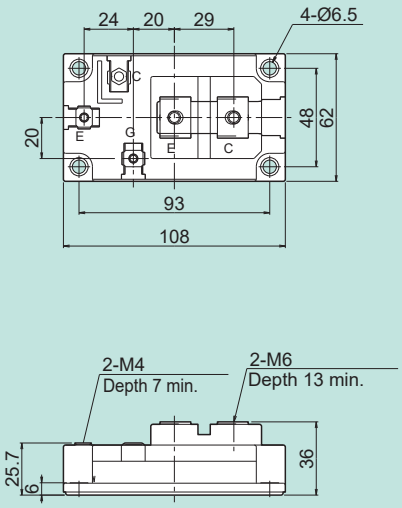
Fuji Electric Power Semiconductors

Outline

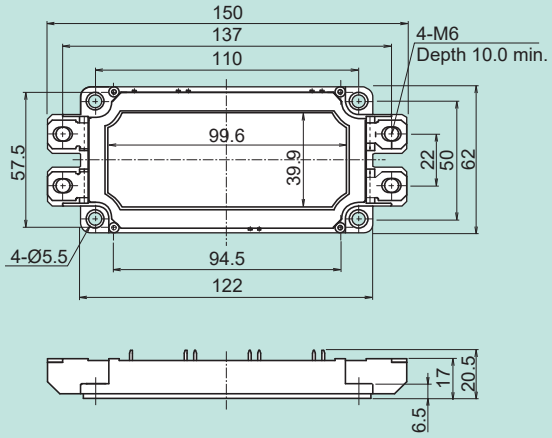
Power Modules

Unit: mm

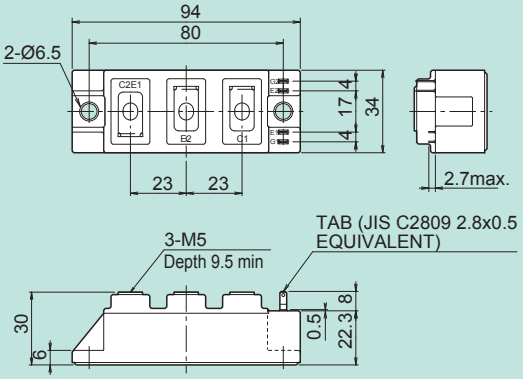
M153



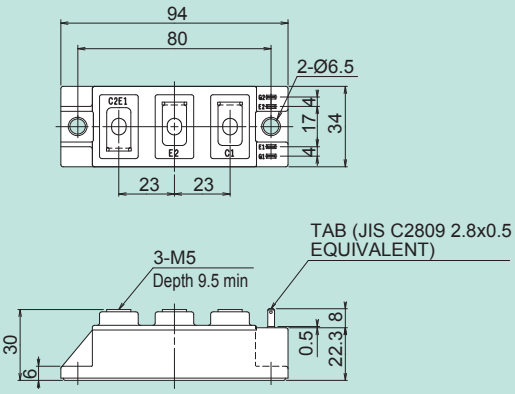
M254



M262



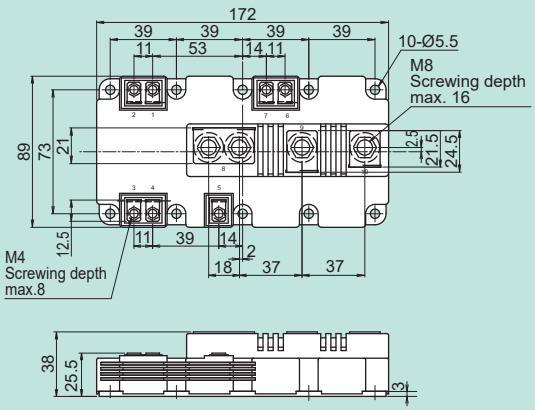
M263



Power Modules

Unit: mm

M271



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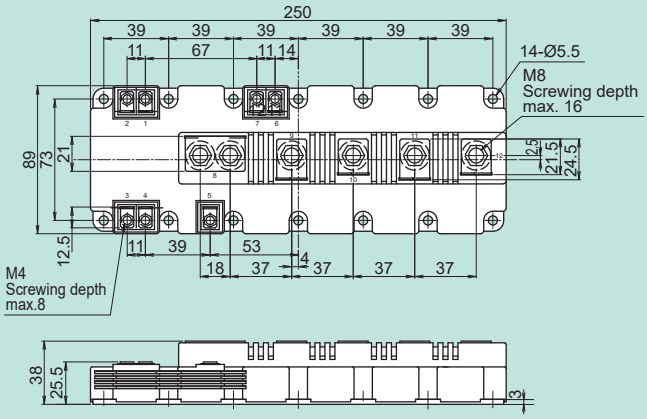

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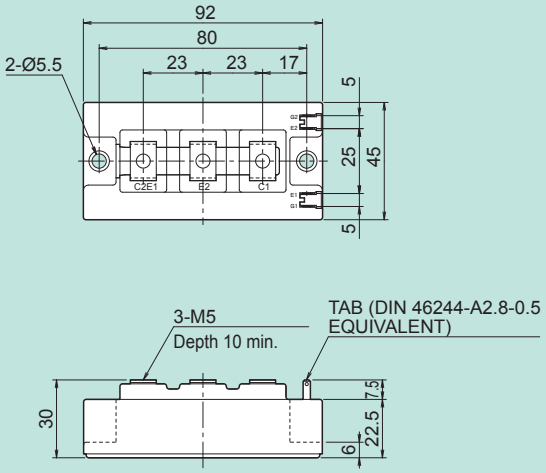

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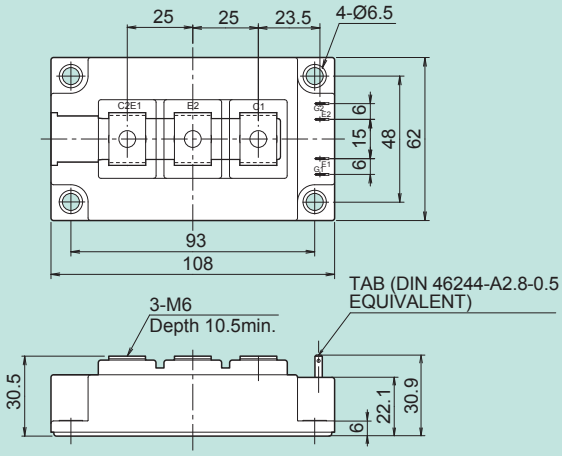
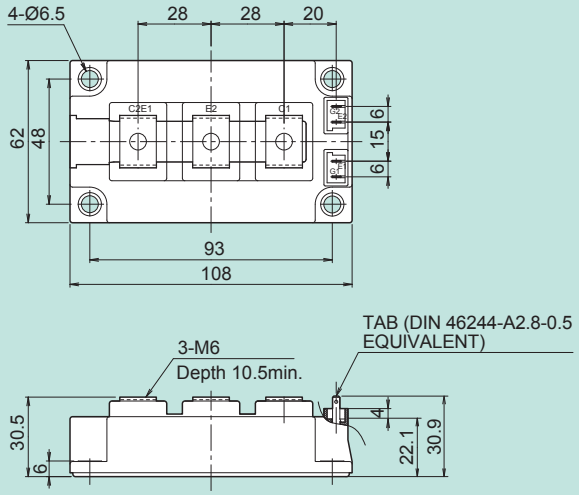


Power Modules

Unit: mm

M276



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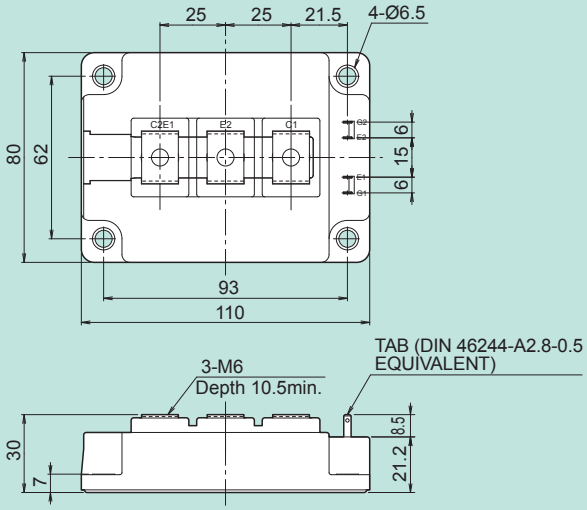
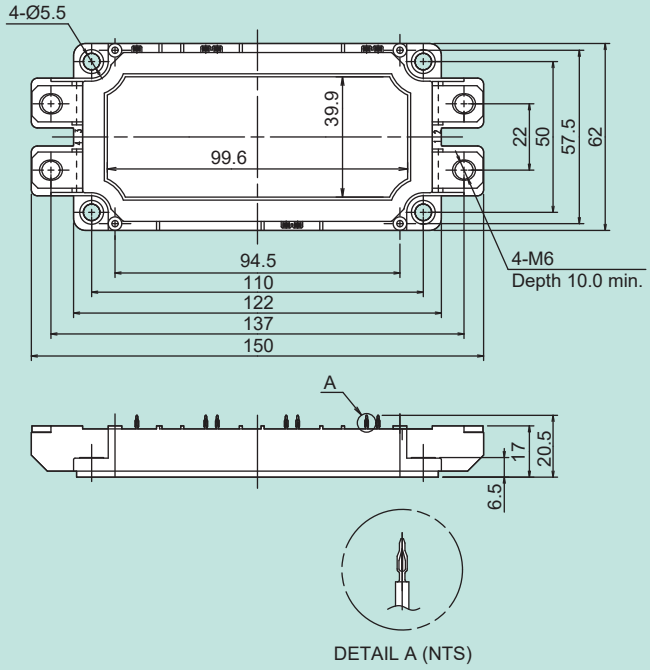
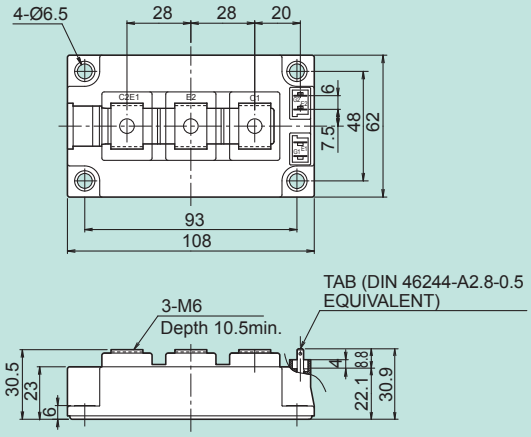


M282



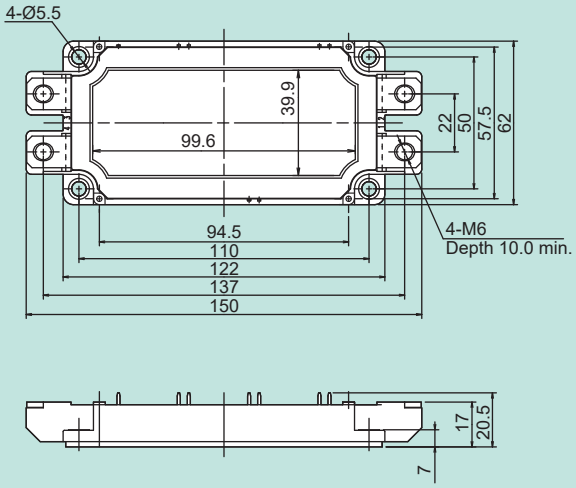
M283



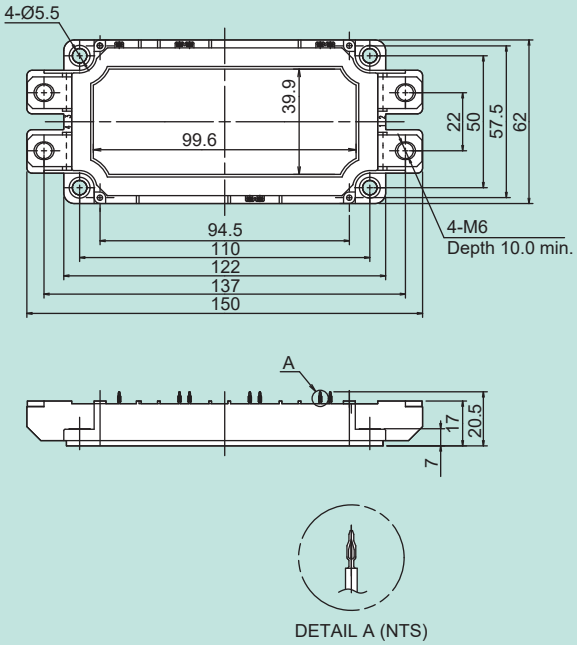
Power Modules

Unit: mm

M285



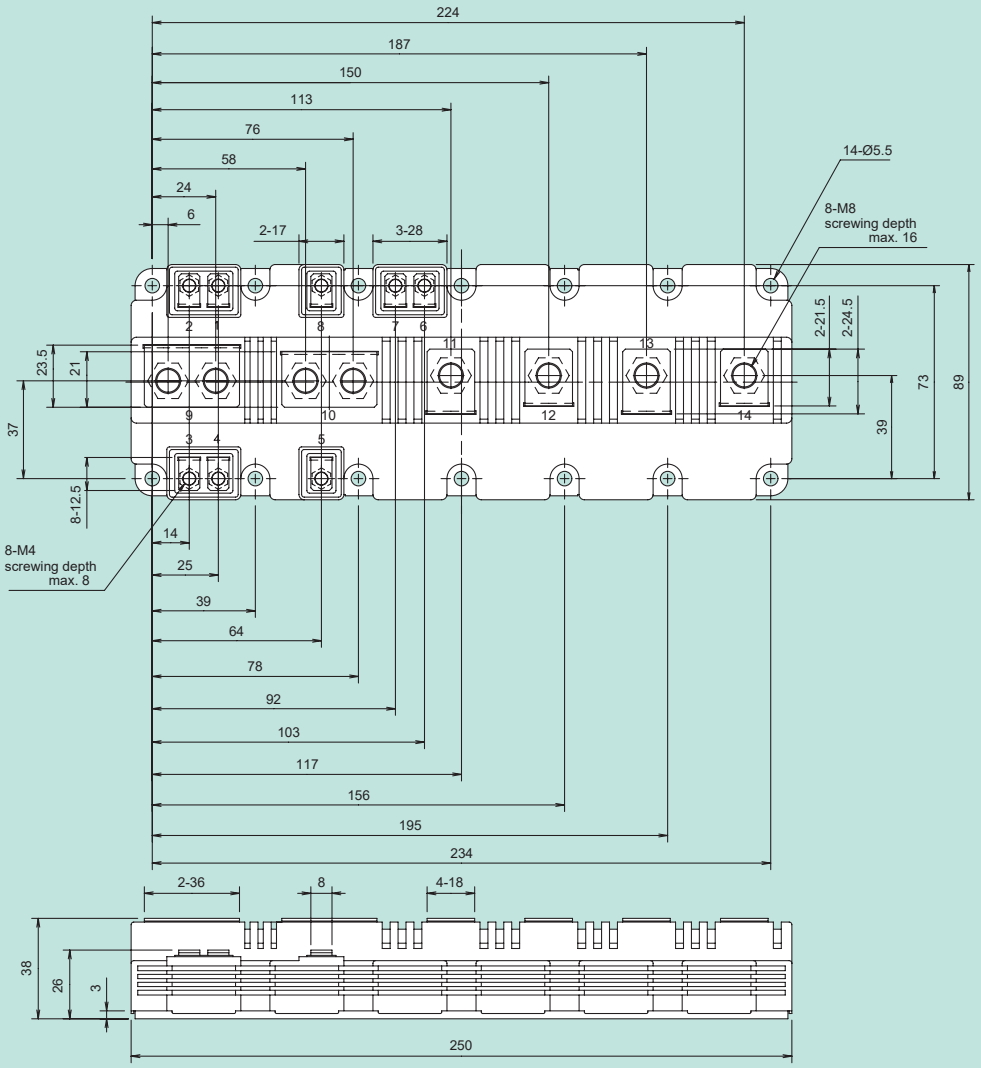
M286



Power Modules

Unit: mm

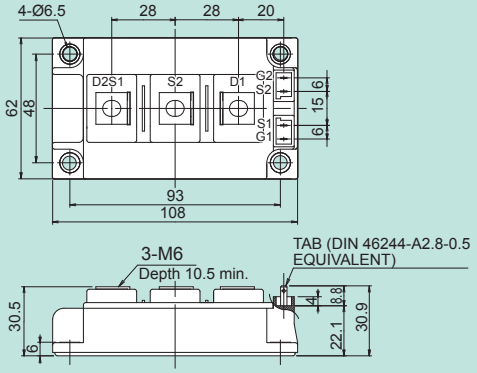
M291



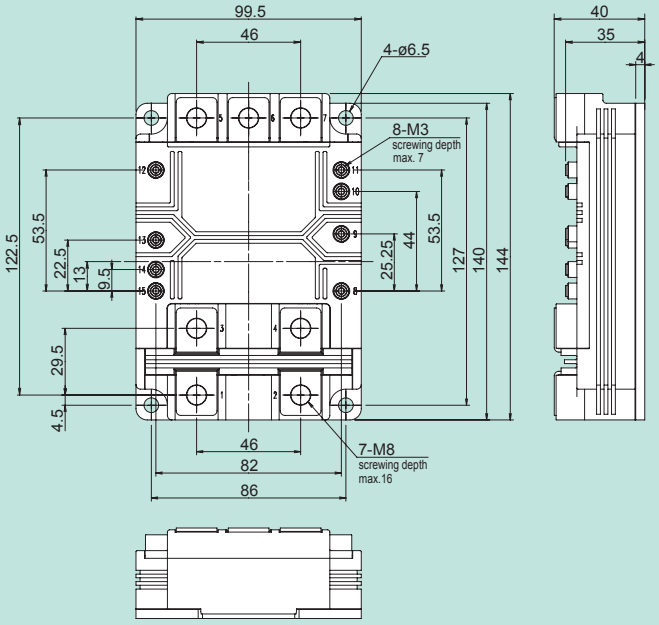
Power Modules

Unit: mm

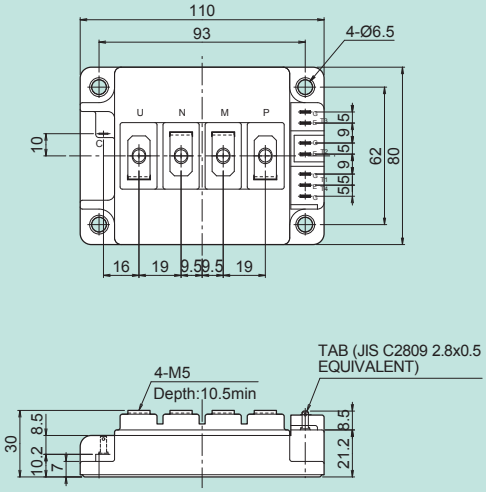
M295



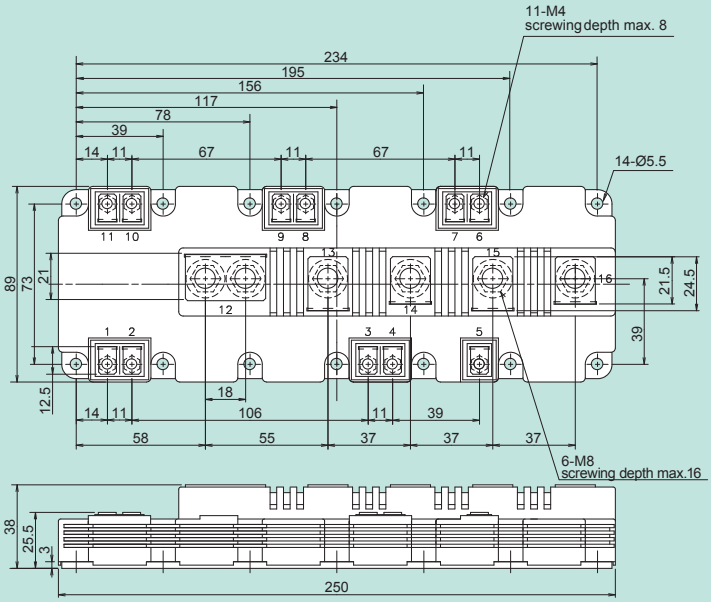
M297, M298



M403



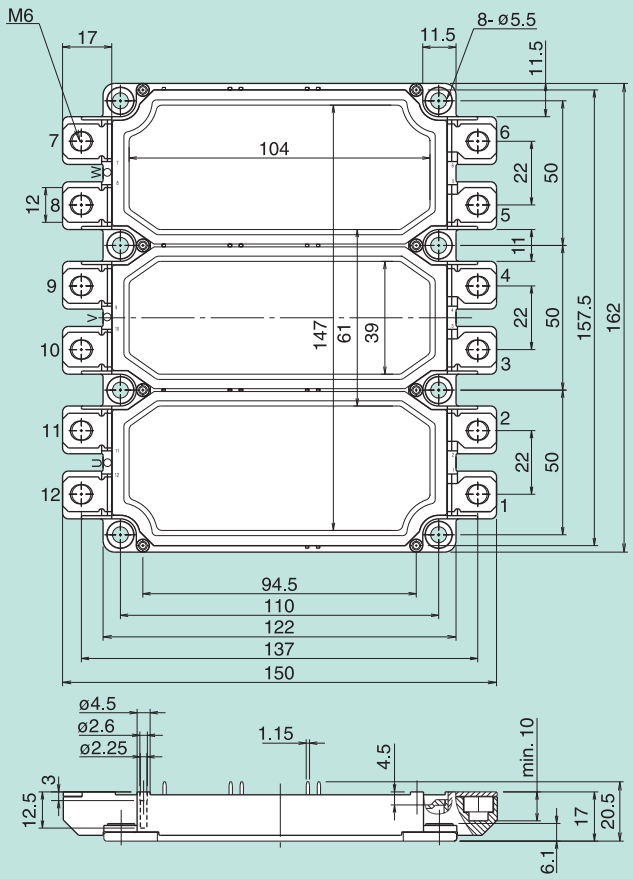
M404



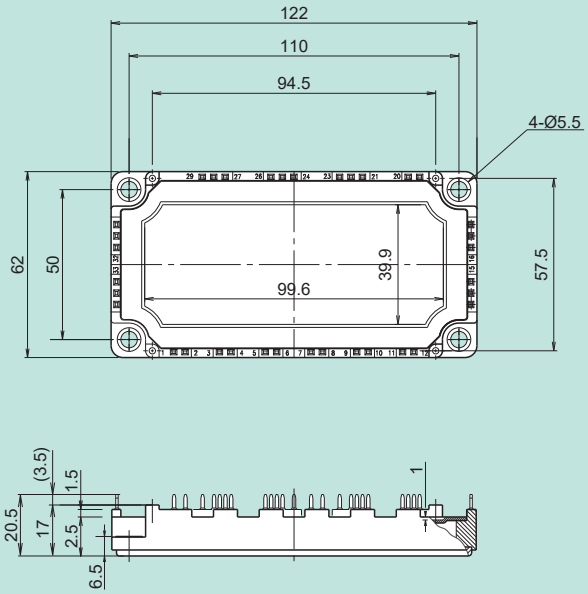
Power Modules

Unit: mm

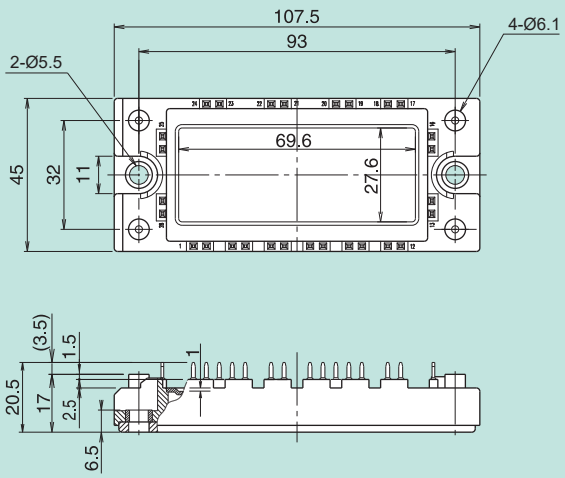
M629



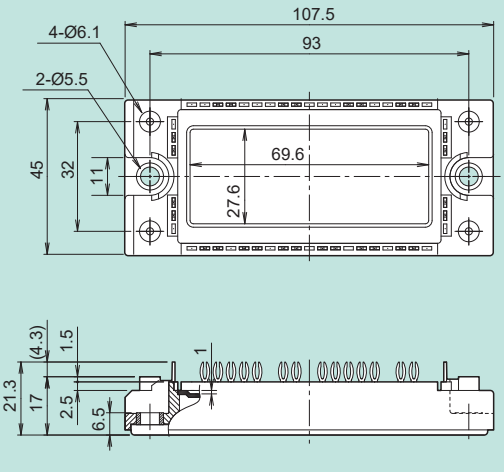
M633



M636



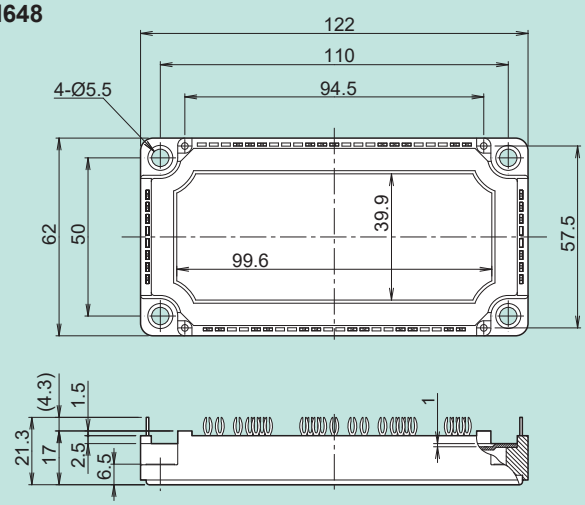
M647



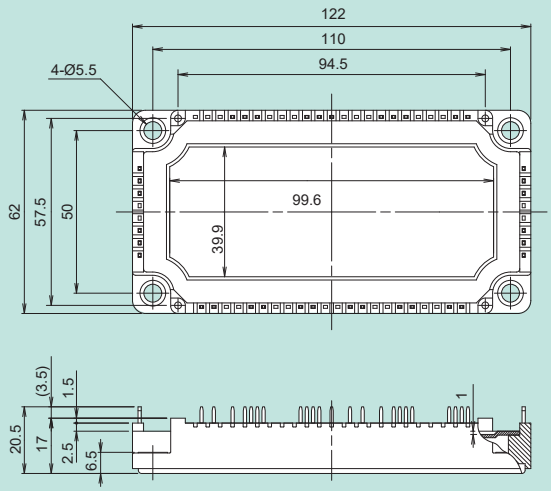
Power Modules

Unit: mm

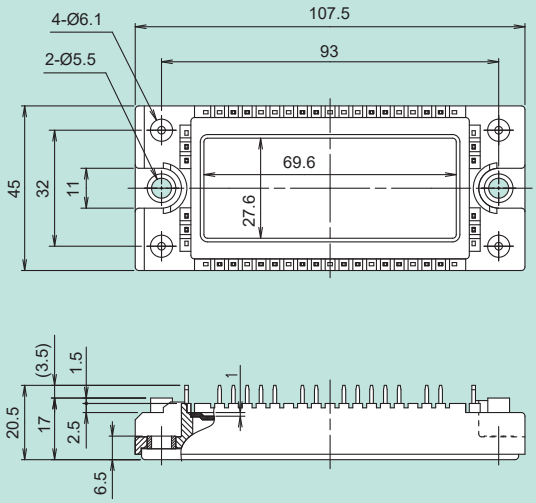
M648



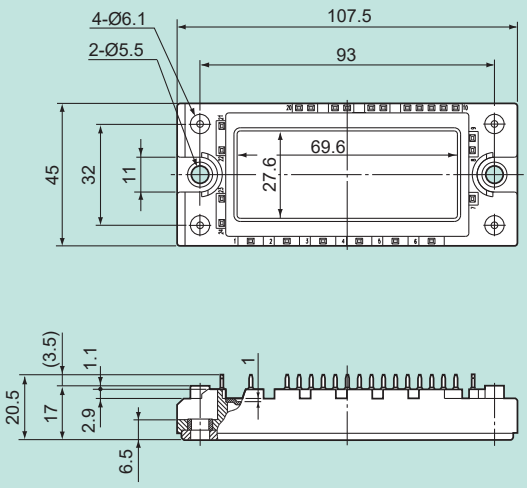
M668



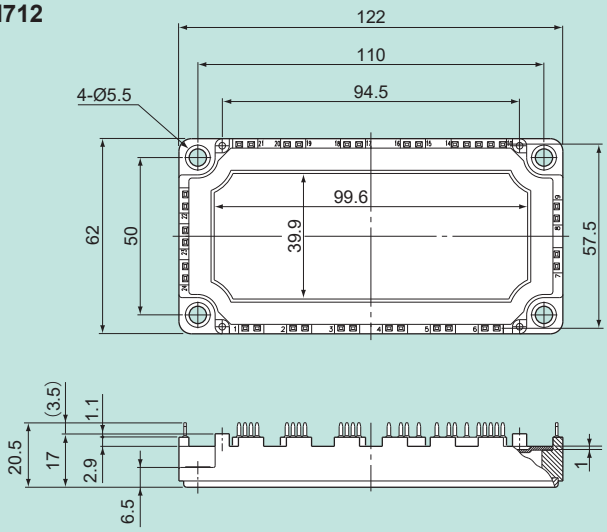
M669



M711



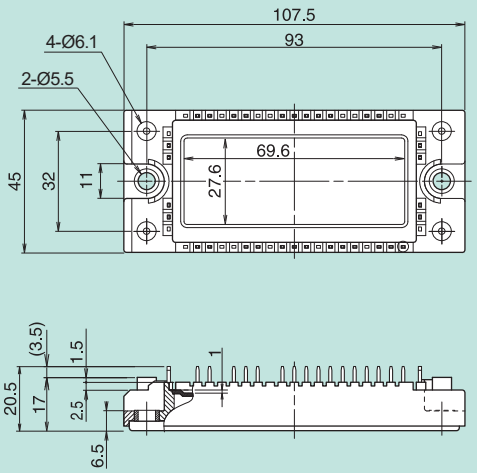
M712



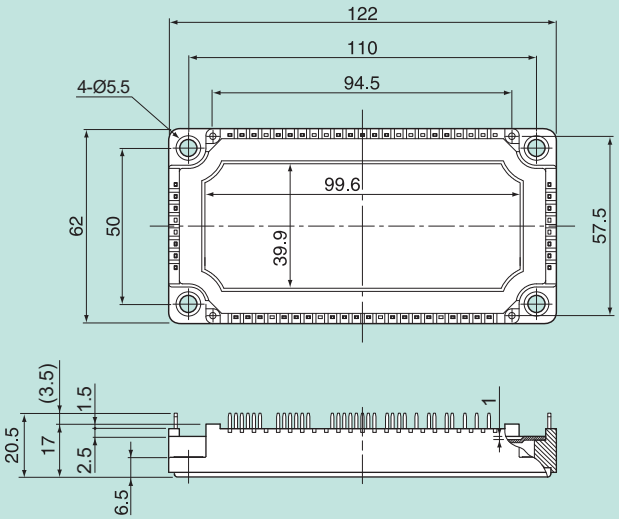
Power Modules

Unit: mm

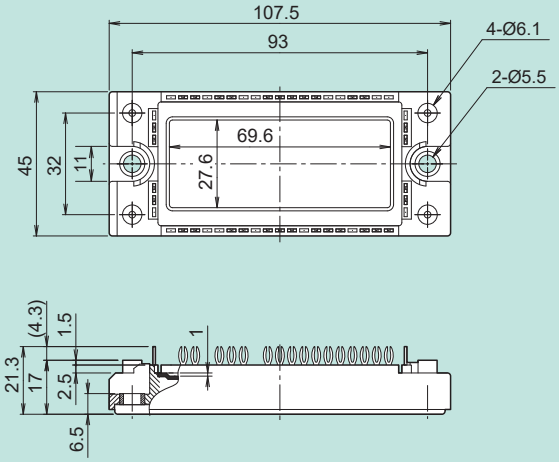
M719



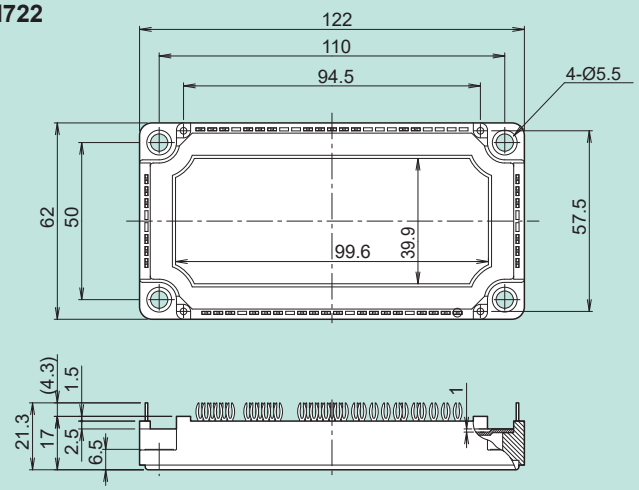
M720



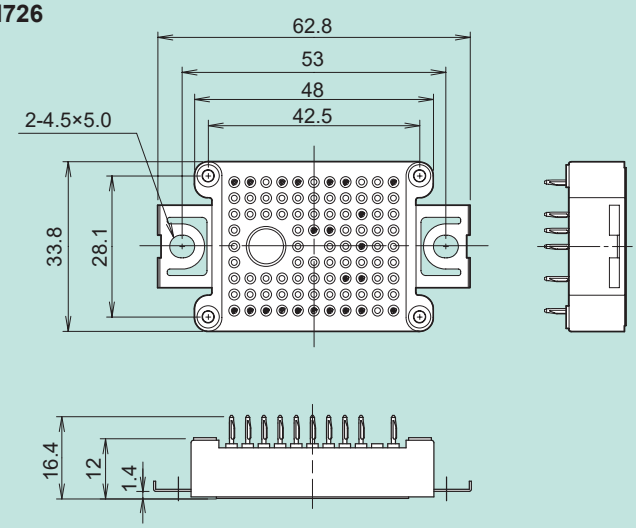
M721



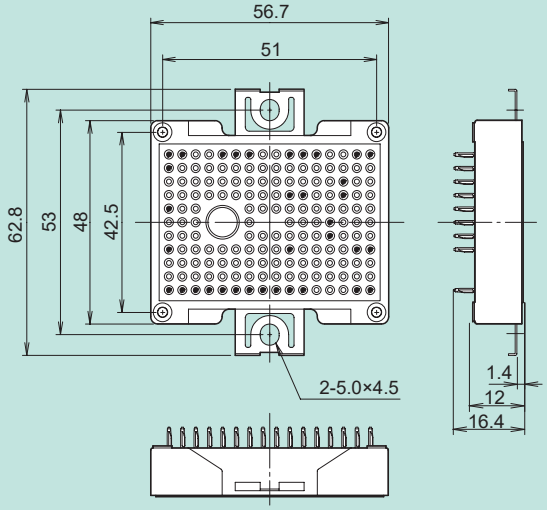
M722



M726



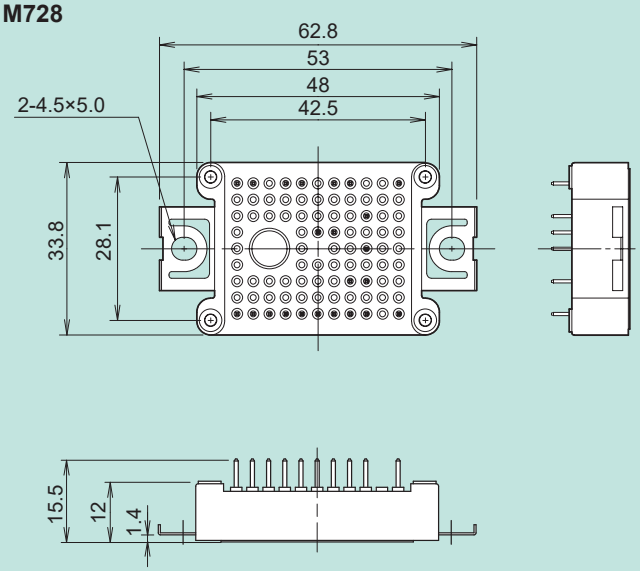
M727



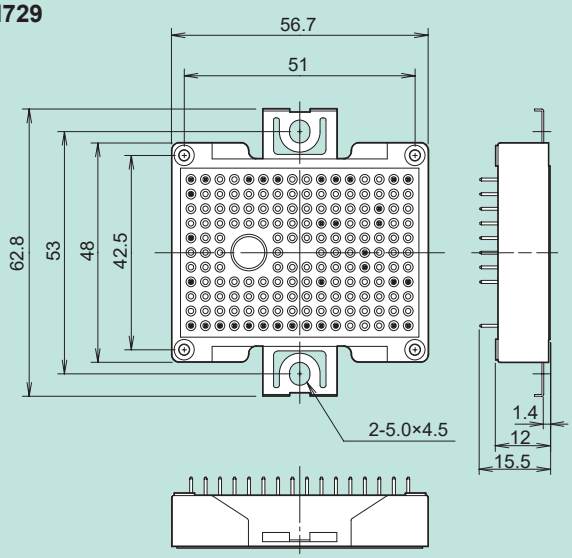
Power Modules

Unit: mm

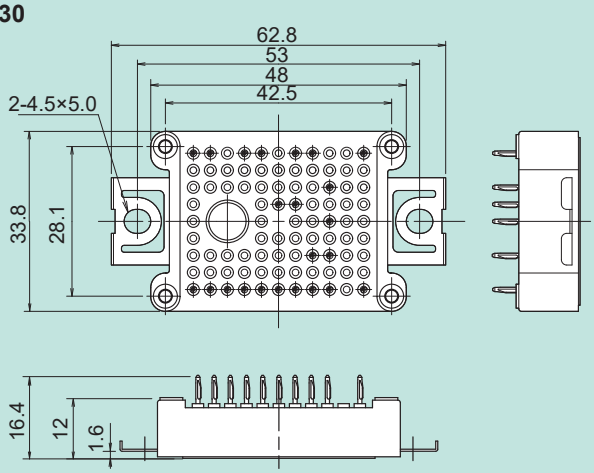
M728



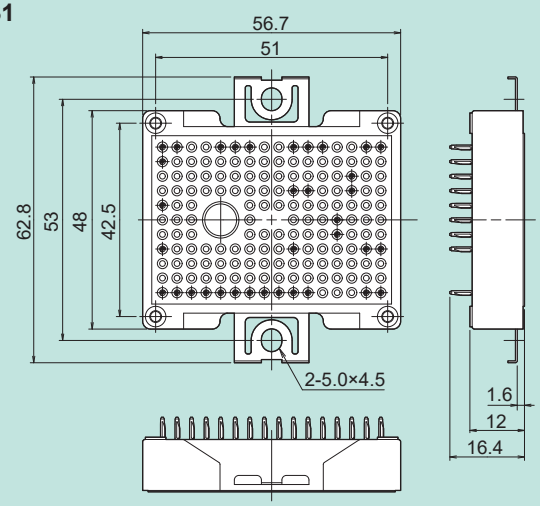
M729



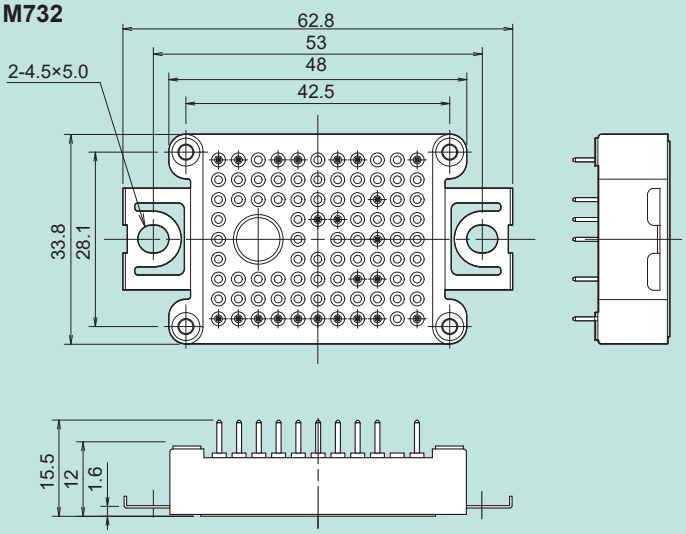
M730



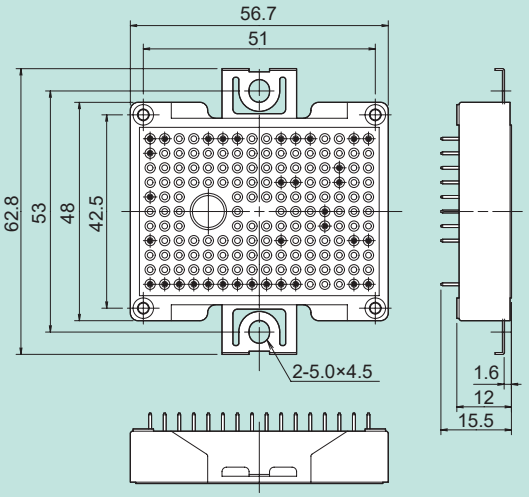
M731



M732



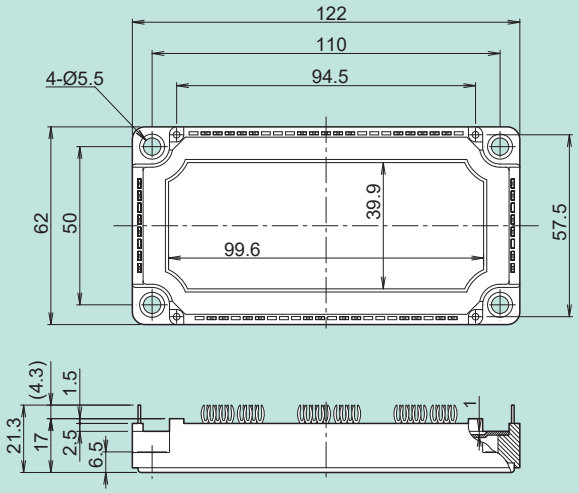
M733



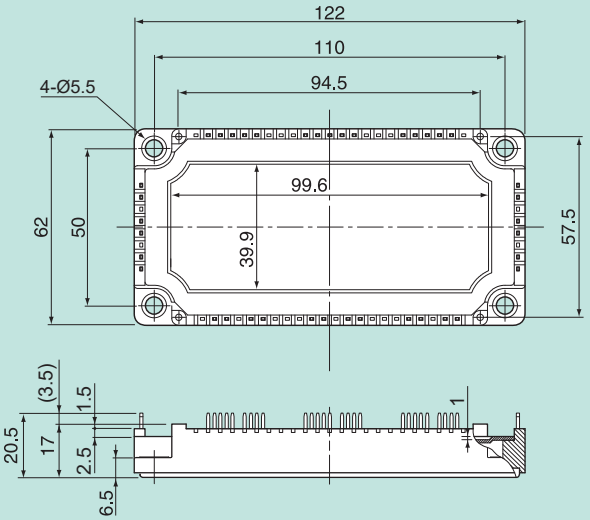
Power Modules

Unit: mm

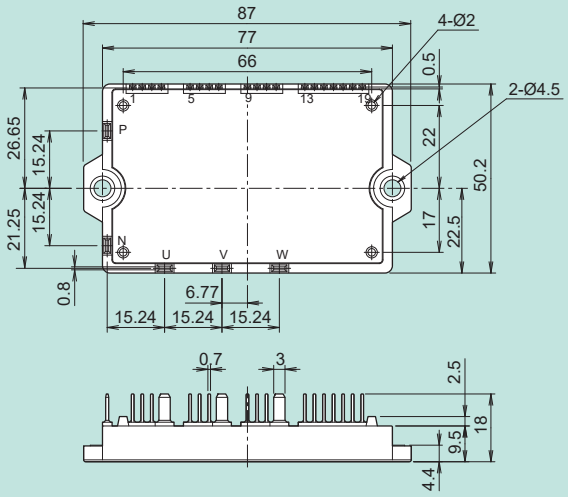
M1202



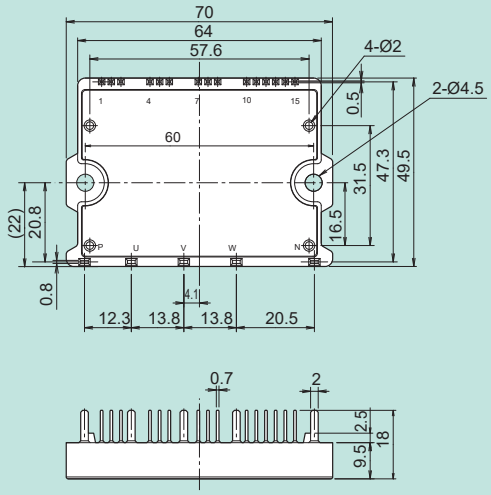
M1203



P626



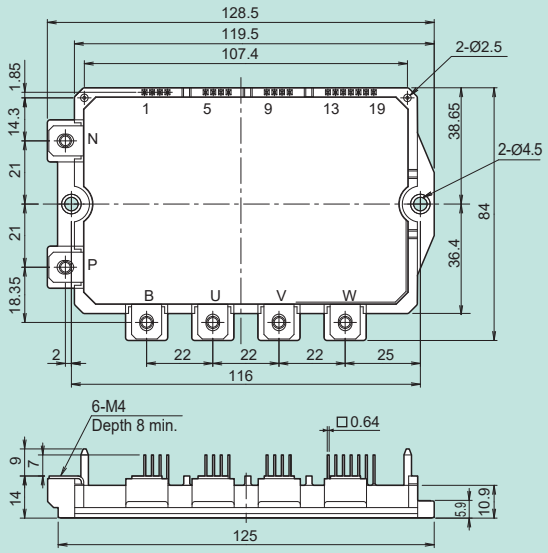
P629



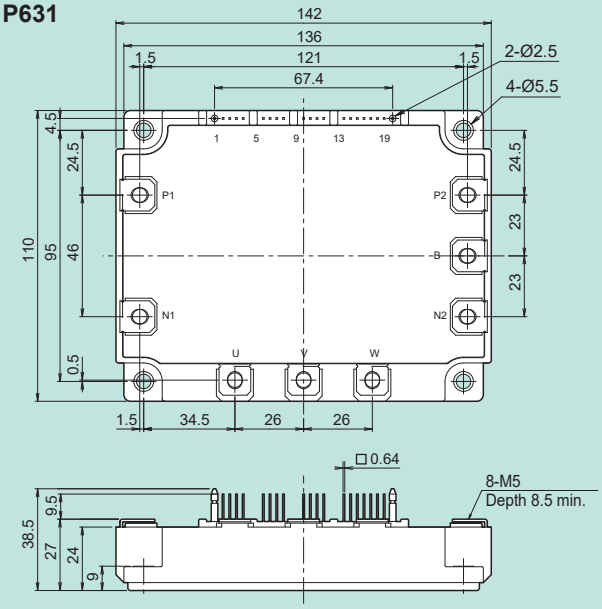
Power Modules

Unit: mm

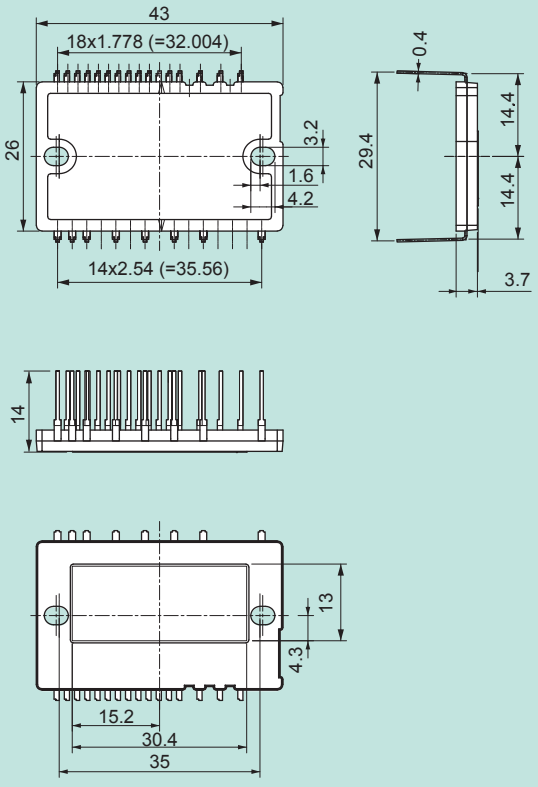
P630



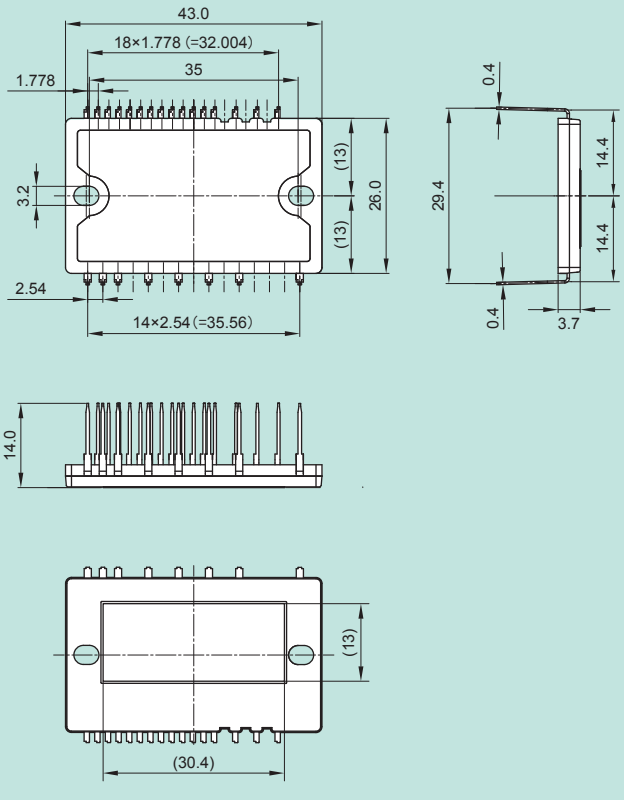
P631



P633A



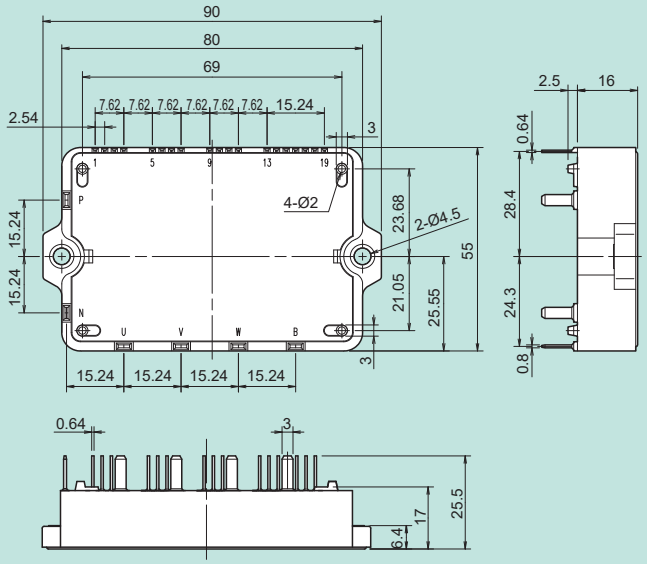
P633C



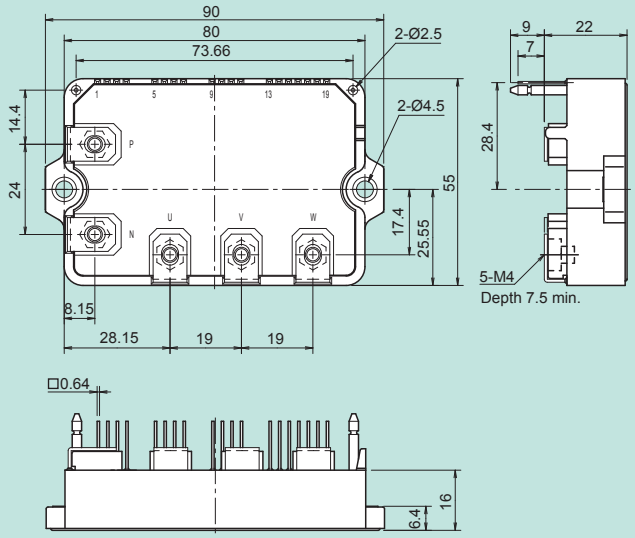
Power Modules

Unit: mm

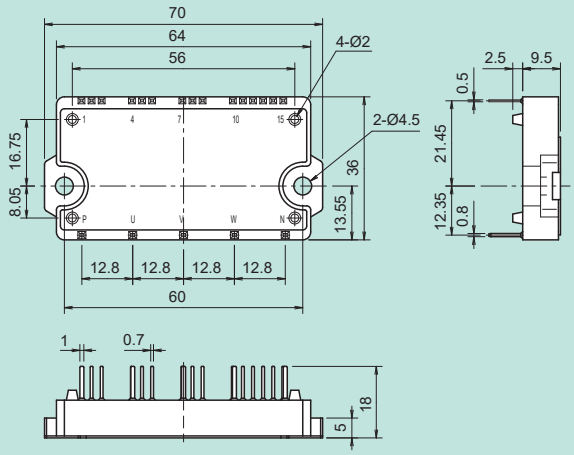
P636



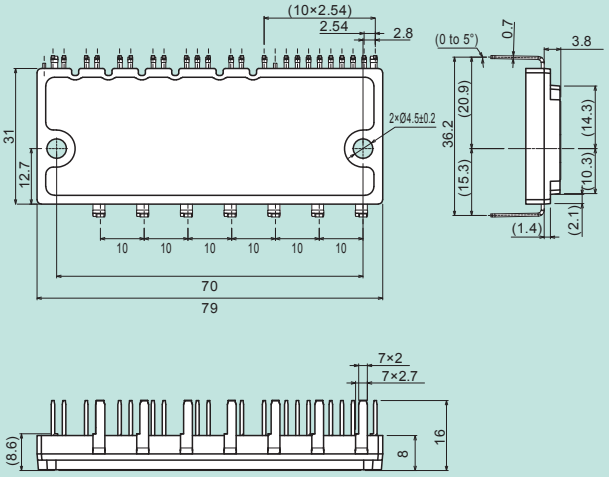
P638



P639



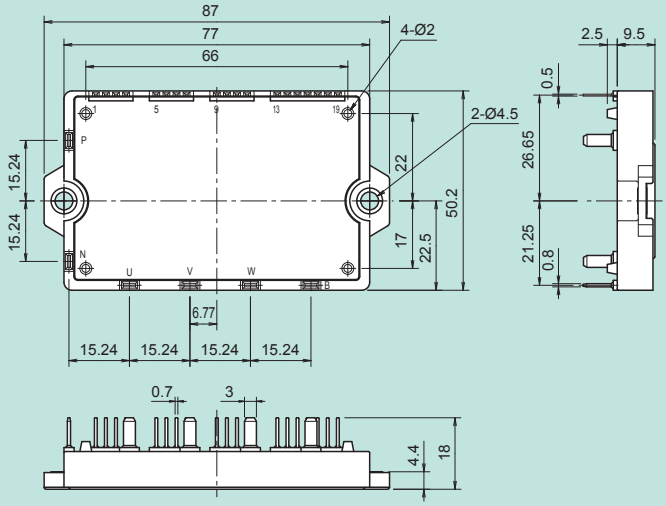
P642



Power Modules

Unit: mm

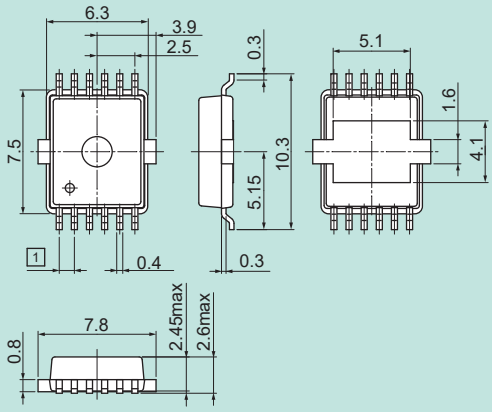
P644



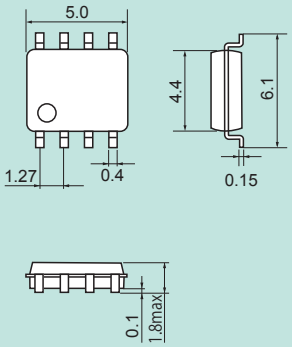
Power Discrete

Unit: mm

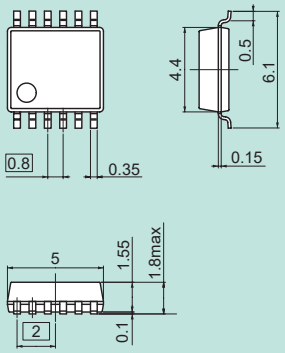
PSOP-12



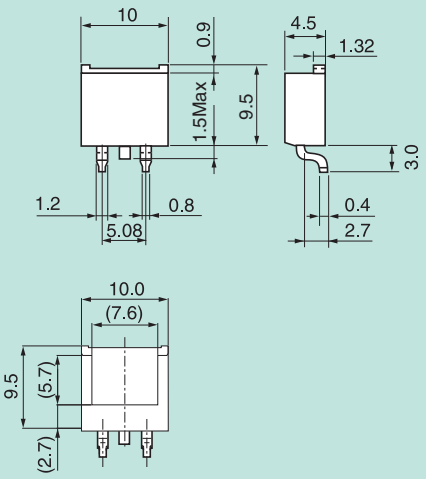
SOP-8



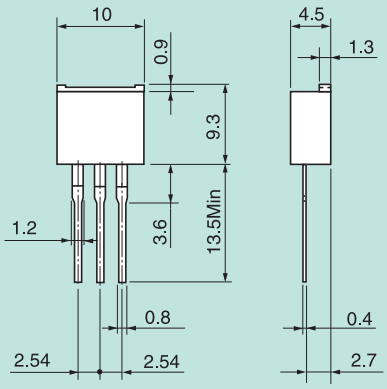
SSOP-12



T-Pack(S)



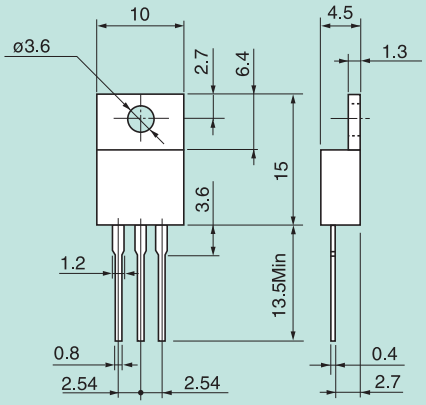
T-Pack(L)



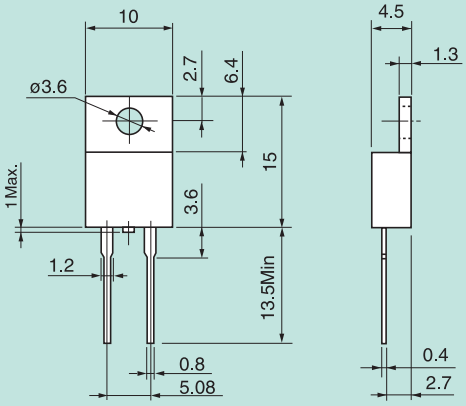
Power Discrete

Unit: mm

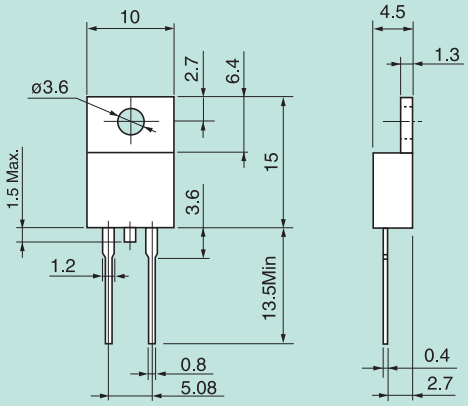
TO-220



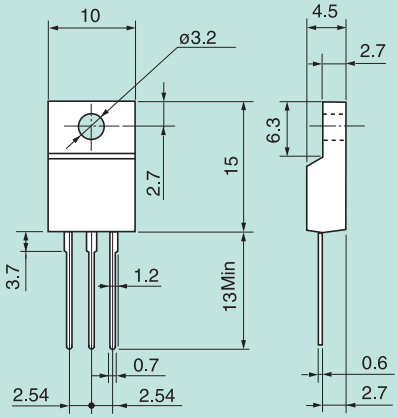
TO-220-2 (Type: A)



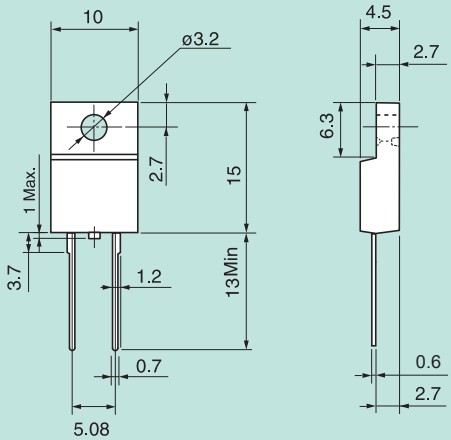
TO-220-2 (Type: B)



TO-220F



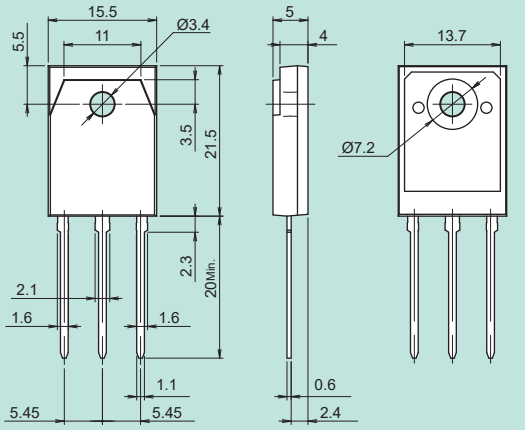
TO-220F-2



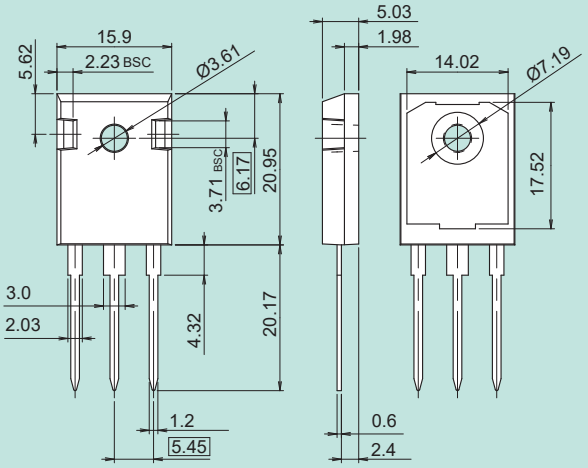
Power Discrete

Unit: mm

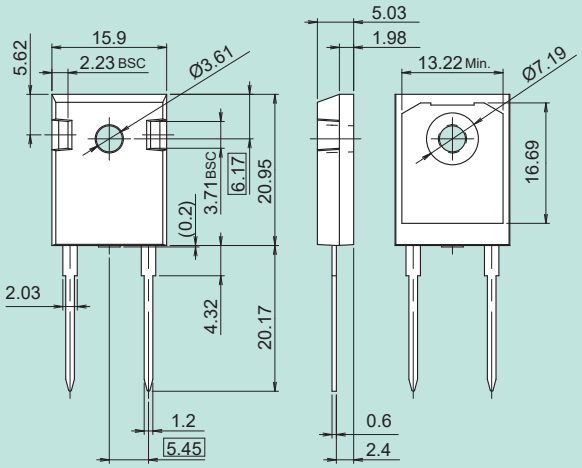
TO-247 (Type: A)



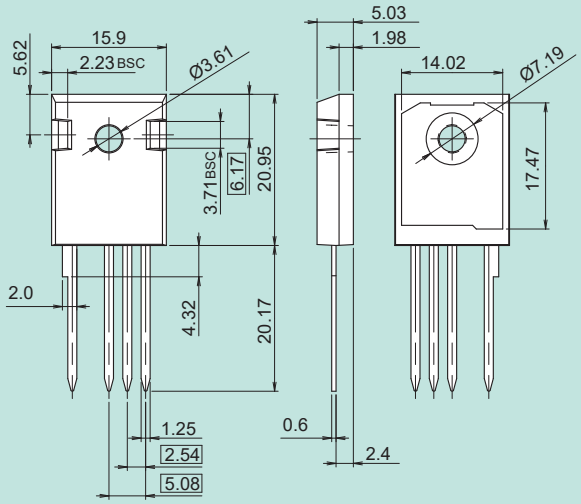
TO-247 (Type:B)



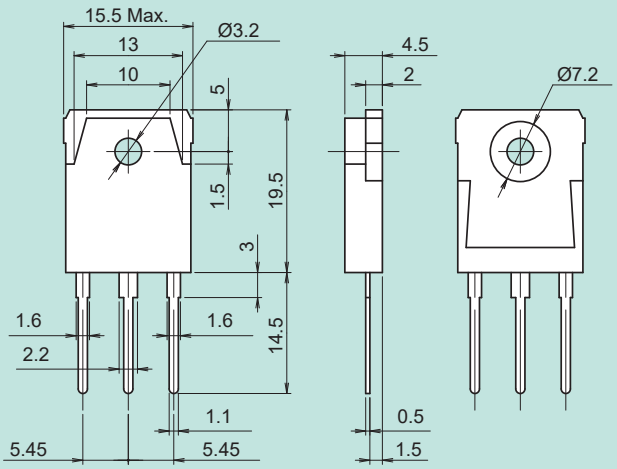
TO-247-2



TO-247-4



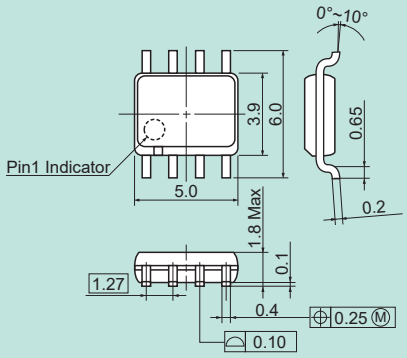
TO-3P



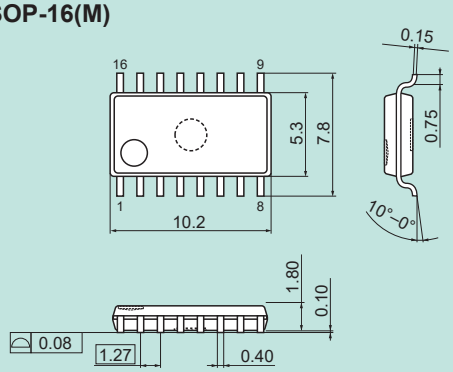
Power Supply Control ICs

Unit: mm

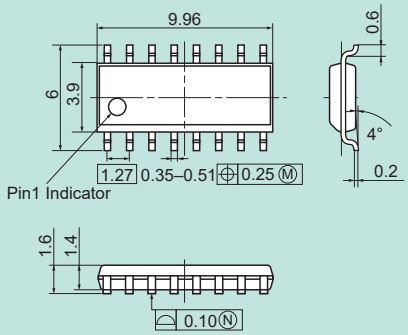
SOP-8*1



SOP-16(M)



SOP-16(N)



*1) This is the package size for the representative device type (FA8AxxN). For other ICs, please refer to the separate application note (specifications).

Fuji Electric
Power
Semiconductors

- Order unit is the number in “Min. quantity per order” or its integral multiplication.
- This table covers single or reel package items (Except for taping items).
- Order unit of taping package is different for each specification.
  Please contact us for more detail.

Products	Package	Type number	Min. quantity per packing
Power MOSFETs Discrete IGBTs	TO-220, TO-220-2 (Type: B), TO-220F	All types (except for below types)	500
		-S2□PP (Tube)	1,000
	TO-220-2 (Type: A), TO-220F-2	All types	1,000
	TO-247 (Type:A)		500
	TO-247 (Type:B)		600
	TO-247-2 (Type:A)		600
	TO-247-4		600
	TO-3P	All types (except for below types)	500
		-S3□PP (Tube)	600
	T-Pack(S)	All types	1,000
	T-Pack(L)		500
Power Supply Control IC		All types (except for below types)	3,000
		FA5650N	2,000
		FA5502M	2,000

・Models listed below are for maintenance products only.
・Do not use them for new designing

Products	Type number	Products	Type number	Products	Type number
Power MOSFETs	2SK3450-01	Power MOSFETs	2SK3890-01	Power MOSFETs	FMC06N60ES
	2SK3451-01MR		2SK3891-01		FMC06N80E
	2SK3468-01		2SK3916-01		FMC06N90E
	2SK3469-01MR		2SK3917-01MR		FMC07N50E
	2SK3496-01MR		2SK3928-01		FMC07N65E
	2SK3501-01		2SK3929-01MR		FMC07N90E
	2SK3502-01MR		2SK3930-01		FMC08N80E
	2SK3504-01		2SK3930-61		FMC09N65E
	2SK3505-01MR		2SK3931-01		FMC10N60E
	2SK3512-01		2SK3932-01MR		FMC11N60E
	2SK3513-01		2SK3933-01		FMC11N60ES
	2SK3514-01		2SK3985-01		FMC12N50E
	2SK3515-01MR		2SK3986-01MR		FMC12N50ES
	2SK3516-01		2SK3987-01		FMC12N60ES
	2SK3519-01		2SK3988-01		FMC13N60E
	2SK3520-01MR		2SK3989-01MR		FMC13N60ES
	2SK3521-01		2SK3990-01		FMC16N50E
	2SK3522-01		2SK4004-01MR		FMC16N50ES
	2SK3523-01		2SK4008-01MR		FMC16N60E
	2SK3523-61		2SK4009-01MR		FMC16N60ES
	2SK3523-62		2SK4010-01MR		FMC20N50E
	2SK3524-01		FMA03N60E		FMC20N50ES
	2SK3525-01MR		FMA05N50E		FMH06N80E
	2SK3525-61MR		FMA05N60E		FMH06N90E
	2SK3526-01		FMA06N60E		FMH07N90E
	2SK3527-01		FMA06N80E		FMH08N80E
	2SK3528-01		FMA06N90E		FMH09N70E
	2SK3554-01		FMA07N50E		FMH09N90E
	2SK3555-01MR		FMA07N65E		FMH11N70E
	2SK3556-01		FMA07N65GX		FMH11N90E
	2SK3581-01		FMA08N50E		FMH13N60ES
	2SK3598-01		FMA08N60G		FMH13N80E
	2SK3599-01MR		FMA08N60G2		FMH16N50E
	2SK3600-01		FMA08N60GX		FMH16N50ES
	2SK3602-01		FMA09N65E		FMH16N60ES
	2SK3603-01MR		FMA09N65GX		FMH16N60G
	2SK3604-01		FMA10N60E		FMH17N60ES
	2SK3651-01		FMA11N60E		FMH19N50G
	2SK3680-01		FMA12N50E		FMH19N60E
	2SK3681-01		FMA12N60ES		FMH19N60ES
	2SK3682-01		FMA13N57E		FMH20N50E
	2SK3683-01MR		FMA13N60E		FMH20N50ES
	2SK3684-01		FMA16N50E		FMH21N50ES
	2SK3684-62		FMA16N55G		FMH21N60G
	2SK3685-01		FMA16N60E		FMH23N50E
	2SK3686-01		FMA19N60E		FMH23N50ES
	2SK3687-01MR		FMA20N50E		FMH23N60E
	2SK3688-01		FMA20N50GX		FMH23N60ES
	2SK3689-01		FMA23N50E		FMH25N50G
	2SK3692-01		FMB06N60ES		FMH28N50E
	2SK3693-01MR		FMB06N90E		FMH28N50ES
	2SK3694-01		FMB07N90E		FMI03N60E
	2SK3695-01		FMB11N60ES		FMI05N50E
	2SK3696-01MR		FMB12N50ES		FMI05N60E
	2SK3697-01		FMB12N60ES		FMI06N60ES
	2SK3725-01		FMB13N60ES		FMI06N80E
	2SK3726-01MR		FMB16N50ES		FMI06N90E
	2SK3752-01		FMB16N60ES		FMI07N50E
	2SK3753-01		FMB20N50ES		FMI07N65E
	2SK3887-01		FMC03N60E		FMI07N90E
	2SK3888-01MR		FMC05N50E		FMI08N80E
	2SK3889-01		FMC05N60E		FMI09N65E

Products	Type number
Power MOSFETs	FMI10N60E
	FMI11N60ES
	FMI12N50ES
	FMI12N60ES
	FMI13N60ES
	FMI16N50ES
	FMI16N60ES
	FMI20N50ES
	FMP03N60E
	FMP05N50E
	FMP05N60E
	FMP06N60E
	FMP06N60ES
	FMP07N50E
	FMP07N65E
	FMP08N50E
	FMP09N65E
	FMP10N60E
	FMP11N60E
	FMP11N60ES
	FMP12N50E
	FMP12N50ES
	FMP12N60ES
	FMP13N60E
	FMP13N60ES
	FMP16N50E
	FMP16N50ES
	FMP16N60E
	FMP16N60ES
	FMP20N50E
	FMP20N50ES
	FMR09N90E
	FMR11N90E
	FMR17N60ES
	FMR19N60E
	FMR19N60ES
	FMR21N50ES
	FMR21N55G
	FMR23N50ES
	FMR23N57E
	FMR23N60ES
	FMR28N50ES
	FMV03N60E
	FMV05N50E
	FMV05N60E
	FMV06N60E
	FMV06N60ES
	FMV06N80E
	FMV06N90E
	FMV07N50E
	FMV07N65E
	FMV07N70E
	FMV07N90E
	FMV08N50E
	FMV08N60GX
	FMV08N80E
	FMV09N65E
	FMV09N70E
	FMV09N90E
	FMV10N60E
	FMV10N80E
	FMV11N60E
	FMV11N60ES
	FMV11N70E

Products	Type number
Power MOSFETs	FMV11N90E
	FMV12N50E
	FMV12N50ES
	FMV12N60ES
	FMV13N60E
	FMV13N60ES
	FMV13N80E
	FMV15N70E
	FMV16N50E
	FMV16N50ES
	FMV16N60E
	FMV16N60ES
	FMV17N55ES
	FMV17N60ES
	FMV18N50ES
	FMV19N57ES
	FMV19N60E
	FMV19N60ES
	FMV20N50E
	FMV20N50ES
	FMV21N50ES
	FMV23N50E
	FMV23N50ES
	FMV24N25G
	FMV30N25G
	FMW21N55G
	FMZ06N90E
	FMZ12N50ES
	FMZ13N57E
	FMZ13N60E
	FMZ16N50E
	FMZ16N55G

・Models listed below are discontinued products.
・Do not use them for new designing
・Models that were discontinued before 2013 are not listed.

Products	Type number	Products	Type number	Products	Type number
Power Modules	1MBI1000UG-330	Power Modules	2MBI1200VG-120P	Power Modules	2MBI300U4E-120
	1MBI100U4F-120L-50		2MBI1200VG-170E		2MBI300U4H-120
	1MBI1200U4C-120		2MBI1200VT-170E		2MBI300U4H-120-50
	1MBI1200U4C-170		2MBI150HH-120-50		2MBI300U4H-120E
	1MBI1200U7C-120S-02		2MBI150PC-140		2MBI300U4H-170
	1MBI1200UE-330		2MBI150SC-120		2MBI300U4H-170-05
	1MBI1200VC-120P		2MBI150TA-060		2MBI300U4H-170-06
	1MBI1200VC-170E		2MBI150TA-060-50		2MBI300U4H-170-08
	1MBI1200VR-170E		2MBI150U2A-060		2MBI300U4H-170-50
	1MBI1500UE-330		2MBI150U2A-060-50		2MBI300U4J-120-50
	1MBI1600U4C-120		2MBI150U4A-120		2MBI300U4N-120-50
	1MBI1600U4C-170		2MBI150U4A-120-50		2MBI300U4N-170-50
	1MBI1600VC-120P		2MBI150U4B-120		2MBI300UC-120
	1MBI1600VC-170E		2MBI150U4B-120-50		2MBI300UC-120-03
	1MBI1600VR-170E		2MBI150U4H-120		2MBI300UC-120-50
	1MBI200HH-120L-50		2MBI150U4H-120-50		2MBI300UC-120-53
	1MBI200U4H-120L-50		2MBI150U4H-170		2MBI300UC-170
	1MBI2400U4D-120		2MBI150U4H-170-05		2MBI300UD-120
	1MBI2400U4D-170		2MBI150U4H-170-07		2MBI300UD-120-02
	1MBI2400VC-120P		2MBI150U4H-170-50		2MBI300UD-120-03
	1MBI2400VC-170E		2MBI150UA-120		2MBI300UD-120-50
	1MBI2400VD-120P		2MBI150UA-120-50		2MBI300UD-120-53
	1MBI2400VD-170E		2MBI150UB-120-50		2MBI300UE-120
	1MBI2400VR-170E		2MBI150UM-120-50		2MBI300UE-120-01
	1MBI2400VS-170E		2MBI150UR-120-01		2MBI400TB-060
	1MBI300HH-120L-50		2MBI150US-120-50		2MBI400U2B-060
	1MBI300U2H-060L-50		2MBI200HH-120-50		2MBI400U2B-060-50
	1MBI300U4-120		2MBI200N-060		2MBI400U2W-060-50
	1MBI3600U4D-120		2MBI200S-120		2MBI400U4H-120
	1MBI3600U4D-170		2MBI200TA-060		2MBI400U4H-120-50
	1MBI3600VD-120P		2MBI200TE-060		2MBI400U4H-170
	1MBI3600VD-170E		2MBI200U2A-060		2MBI400U4H-170-01
	1MBI3600VS-170E		2MBI200U2A-060-50		2MBI400U4H-170-05
	1MBI400HH-120L-50		2MBI200U4B-120		2MBI400U4H-170-06
	1MBI400U4-120		2MBI200U4B-120-50		2MBI400U4H-170-07
	1MBI50U4F-120L-50		2MBI200U4D-120		2MBI400U4H-170-50
	1MBI600PX-120		2MBI200U4D-120-50		2MBI400U4W-120-50
	1MBI600PX-140		2MBI200U4H-120		2MBI450U4E-120
	1MBI600U2A-060-50		2MBI200U4H-120-50		2MBI450U4J-120-50
	1MBI600U4-120		2MBI200U4H-170		2MBI450U4N-120-50
	1MBI600U4-120-02		2MBI200U4H-170-05		2MBI450U4N-170-50
	1MBI600U4-120-03		2MBI200U4H-170-07		2MBI450UE-120
	1MBI600U4B-120		2MBI200U4H-170-50		2MBI450UE-120-03
	1MBI75U4F-120L-50		2MBI200U4W-120-50		2MBI600U2E-060
	1MBI800U4B-120		2MBI200UB-120		2MBI600U4G-120
	1MBI800UG-330		2MBI200UB-120-50		2MBI600U4G-170
	2FI1200U4L-120		2MBI200UC-120-50		2MBI600U4G-170A
	2FI200U4H-170-05		2MBI200UD-120-50		2MBI600U4G-170B
	2FI400U4H-170-05		2MBI200UM-120		2MBI600VG-120P
	2FI400U4H-170-06		2MBI200UM-120-50		2MBI600VG-170E
	2MBI100HB-120-50		2MBI200UR-120-01		2MBI600VT-170E
	2MBI100N-060		2MBI225U4J-120-50		2MBI75U4A-120
	2MBI100SC-120		2MBI225U4N-120-50		2MBI75U4A-120-50
	2MBI100TA-060		2MBI225U4N-170-50		2MBI75UA-120
	2MBI100TA-060-50		2MBI300N-060		2MBI75UA-120-50
	2MBI100U4A-120		2MBI300NB-060-01		2MBI800U4G-120
	2MBI100U4A-120-50		2MBI300S-120		2MBI800U4G-170
	2MBI100U4H-170-05		2MBI300TA-060		2MBI800U4G-170A
	2MBI100U4H-170-07		2MBI300TE-060		2MBI800U4G-170B
	2MBI100U4H-170-50		2MBI300U2B-060		2MBI800VG-120P
	2MBI1200U4G-120		2MBI300U2B-060-50		2MBI800VG-170E
	2MBI1200U4G-170		2MBI300U4D-120		2MBI800VT-170E
	2MBI1200U4G-170A		2MBI300U4D-120-50		3MBI150U-120-52
	2MBI1200U4G-170B		2MBI300U4D-120-55		4MBP100RTY060-50

Products	Type number	Products	Type number	Products	Type number
Power Modules	6MBI100U2B-060-50	Power Modules	6MBP150RTB060-50	Power Modules	7MBP100RA060
	6MBI100U4B-120-50		6MBP150RTC060-50		7MBP100RA060-05
	6MBI100U4B-170-50		6MBP150RTJ060		7MBP100RA060-55
	6MBI100UB-120-50		6MBP150TEA060-50		7MBP100RA120
	6MBI150U2B-060-50		6MBP15RA120		7MBP100RA120-05
	6MBI150U4B-120-50		6MBP15VRD060-50		7MBP100RTA060-50
	6MBI150U4B-170-50		6MBP15VSC060-50		7MBP100RTB060
	6MBI150UB-120-50		6MBP15VSG060-50		7MBP100RTB060-50
	6MBI225U-120-03		6MBP15VSH060-50		7MBP100RTJ060
	6MBI225U-120A-05		6MBP200RA060		7MBP100TEA060
	6MBI225U-170-05		6MBP200RSM120		7MBP100TEA060-50
	6MBI225U4-120		6MBP200RTM060		7MBP150RA060
	6MBI225U4-120-50		6MBP20RTA060		7MBP150RA060-05
	6MBI25S-120		6MBP20VSA060-50		7MBP150RA060-55
	6MBI300U-120A-05		6MBP20VSC060-50		7MBP150RA120
	6MBI300U-170-05		6MBP250RTM060		7MBP150RA120-05
	6MBI300U4-120		6MBP25RA120		7MBP150RTB060
	6MBI300U4-120-01		6MBP25RA120-55		7MBP150RTB060-50
	6MBI300U4-120-50		6MBP25TEA120-50		7MBP150RTE060
	6MBI300U4-170		6MBP300RA060		7MBP150RTJ060
	6MBI300UE-120-03		6MBP300RSM120		7MBP150RUC060
	6MBI300UE-120-04		6MBP30RTB060		7MBP150TEA060
	6MBI35U4A-120-50		6MBP30RTB060-50		7MBP150TEA060-50
	6MBI400UW-170		6MBP30VSA060-50		7MBP160RTA060-50
	6MBI450U-120		6MBP30VSC060-50		7MBP200RA060
	6MBI450U-120-02		6MBP35RJB120-50		7MBP200RA060-05
	6MBI450U-120A-05		6MBP400RTM060		7MBP200RUC060
	6MBI450U-170		6MBP500RTM060		7MBP200RUC060-50
	6MBI450U-170-01		6MBP50RA060		7MBP25RA120
	6MBI450U-170-05		6MBP50RA060-55		7MBP25RA120-05
	6MBI450U4-120		6MBP50RA120		7MBP25RA120-55
	6MBI450U4-120-01		6MBP50RA120-55		7MBP25RU2A120-50
	6MBI450U4-120-06		6MBP50RJ120		7MBP25TEA120-50
	6MBI450U4-120-50		6MBP50RTB060		7MBP300RA060
	6MBI450U4-170		6MBP50RTB060-50		7MBP300RA060-05
	6MBI450UE-120-03		6MBP50RTD060-50		7MBP50RA060
	6MBI450UE-120-04		6MBP50RTJ060		7MBP50RA060-05
	6MBI450UM-170		6MBP50RU2A120		7MBP50RA060-55
	6MBI50U4A-120-50		6MBP50TBA060-50		7MBP50RA120-05
	6MBI50UA-120-50		6MBP50TEA060		7MBP50RA120-55
	6MBI75U2A-060-50		6MBP50TEA060-50		7MBP50RE120
	6MBI75U4A-120-50		6MBP50TEA120-50		7MBP50RJ120
	6MBI75U4B-120-50		6MBP75RA060		7MBP50RTA060-50
	6MBI75UA-120-50		6MBP75RA060-05		7MBP50RTB060-50
	6MBP100RA060		6MBP75RA060-55		7MBP50RU2A120-50
	6MBP100RA060-05		6MBP75RA120		7MBP50TEA060
	6MBP100RA060-55		6MBP75RA120-05		7MBP50TEA060-50
	6MBP100RA120		6MBP75RA120-55		7MBP50TEA120-50
	6MBP100RA120-05		6MBP75RJ120		7MBP75RA060
	6MBP100RD060		6MBP75RTB060		7MBP75RA060-05
	6MBP100RSM120		6MBP75RTB060-50		7MBP75RA060-55
	6MBP100RTB060		6MBP75RTJ060		7MBP75RA120-05
	6MBP100RTB060-50		6MBP75RU2A120		7MBP75RA120-55
	6MBP100RTD060-50		6MBP75RU2A120-50		7MBP75RE120
	6MBP100RTJ060		6MBP75TBA060-50		7MBP75RJ120
	6MBP100TEA060		6MBP75TEA060-50		7MBP75RTB060
	6MBP100TEA060-50		6MBP75TEA120-50		7MBP75RTB060-50
	6MBP150RA060		6MBR35SB120-50		7MBP75RU2A120
	6MBP150RA060-05		6MBR50UA060-50		7MBP75RU2A120-50
	6MBP150RA060-55		6MBR50UA060P-50		7MBP75TEA060
	6MBP150RA120		6MBR75SB060-50		7MBP75TEA060-50
	6MBP150RA120-05		7MBI100U4E-120-50		7MBP75TEA120-50
	6MBP150RSM120		7MBI100U4S-120-50		7MBP80RTA060-50
	6MBP150RTB060		7MBI75U4S-120-50		7MBR100SB060-50

Products	Type number
Power Modules	7MBR100SD060-50
	7MBR100U2B060-50
	7MBR100U2B060L-50
	7MBR100U2H060-50
	7MBR100U2P060-50
	7MBR100U4B120-50
	7MBR100UB120-50
	7MBR10SA120-50
	7MBR10SC120-50
	7MBR10U2S060B-50
	7MBR10U2S120B-50
	7MBR10UG120-50
	7MBR150U2R060-50
	7MBR15SA120-50
	7MBR15SC060-50
	7MBR15SC120-50
	7MBR15U2S060B-50
	7MBR15U2S120B-50
	7MBR15UG120-50
	7MBR20SA060-50
	7MBR20SC060-50
	7MBR20SG060-50
	7MBR20U2S060B-50
	7MBR25SC120
	7MBR25SC120-50
	7MBR25U2S120B-50
	7MBR25U4P120-50
	7MBR25UA120-50
	7MBR25UG120-50
	7MBR30SA060-50
	7MBR30SC060-50
	7MBR30SG060-50
	7MBR30U2A060-50
	7MBR35SB120-50
	7MBR35SB140-50
	7MBR35SD120-50
	7MBR35SD120A-50
	7MBR35U4A120-50
	7MBR35U4P120-50
	7MBR35UA120-50
	7MBR35UB120-50
	7MBR35UH120-50
	7MBR50SA060-50
	7MBR50SB060-50
	7MBR50SB120-50
	7MBR50SB140-50
	7MBR50SC060-50
	7MBR50SD060-50
	7MBR50SD120-50
	7MBR50SD120A-50
	7MBR50SG060-50
	7MBR50U2A060-50
	7MBR50U2P060-50
	7MBR50U4P120-50
	7MBR50UA120-50
	7MBR50UB120-50
	7MBR50UH120-50
	7MBR5U2S120B-50
	7MBR75SB060-50
	7MBR75SD060-50
	7MBR75SD120A-50
	7MBR75U2B060-50
	7MBR75U2H060-50
	7MBR75U2P060-50
Power Modules	7MBR75U4B120-50
	7MBR75U4R120-50
	7MBR75UB120-50
Power Discrete	FGW15N120H
	FGW15N120HD
	FGW25N120W
	FGW25N120WD
	FGW25N120WE
	FGW30N120H
	FGW30N120HD
	FGW30N65W
	FGW35N60H
	FGW35N60HC
	FGW35N60HD
	FGW40N120H
	FGW40N120HD
	FGW40N120W
	FGW40N120WD
	FGW40N120WE
	FGW40N120WQ
	FGW40N65W
	FGW40N65WD
	FGW40N65WE
	FGW50N60H
	FGW50N60HC
	FGW50N60HD
	FGW50N60WQ
	FGW50N65W
	FGW50N65WD
	FGW50N65WE
	FGW60N65W
	FGW60N65WD
	FGW60N65WE
	FGW75N60H
	FGW75N60HC
	FGW75N60HD
	FGW75N60WQ
	FGW75N65W
	FGW75N65WE
	FGZ40N120WE
	FGZ50N65WD
	FGZ50N65WE
	FGZ75N65WE
Power Supply Control ICs	FA13842P
	FA13843P
	FA13844P
	FA13845P
	FA23842N
	FA23843N
	FA23843P
	FA23844N
	FA23845N
	FA3635P
	FA3641P
	FA3647P
	FA5500AP
	FA5500N
	FA5501AP
	FA5501N
	FA5501P
	FA5502P
	FA5504P
Power Supply Control ICs	FA5507P
	FA5510P
	FA5511P
	FA5514N
	FA5514P
	FA5515P
	FA5516P
	FA5517P
	FA5518P
	FA5526N
	FA5526P
	FA5527P
	FA5528P
	FA5531P
	FA5532P
	FA5536P
	FA5537N
	FA5540AN
	FA5541AP
	FA5541N
	FA5541P
	FA5542N
	FA5542P
	FA5546N
	FA5547N
	FA5550N
	FA5550P
	FA5551AN
	FA5551N
	FA5551P
	FA5553N
	FA5558N
	FA5571AN
	FA5571P
	FA5572N
	FA5572P
	FA5573P
	FA5574N
	FA5574P
	FA5581N
	FA5587N
	FA5601N
	FA5610N
	FA5612P
	FA5614N
	FA5615N
	FA5623P
	FA5627N
	FA5636N
	FA5651N
	FA5671N
	FA5752N
	FA5760N
	FA7700V
	FA7701V
	FA7707E
	FA7730F
	FA7735F
	FA7738N
	FA7738P
	FA7764P
Rectifier Diodes	ESAC92-02R
	ESAD83-004R

Products	Type number	Products	Type number	Products	Type number
Rectifier Diodes	ESAD83-006R	Rectifier Diodes	PH865C15	Rectifier Diodes	YA852C12R
	ESAD83M-004RR		PH865C25		YA852C15R
	ESAD83M-006RR		PH868C12		YA855C12R
	ESAD85-009R		PH868C15		YA855C15R
	ESAD85M-009RR		PH868C25		YA858C12R
	ESAD92-02R		PH869C15		YA858C15R
	ESAD92-03R		PH975C6		YA860C10R
	ESAD92M-02RR		PH985C6		YA862C04R
	ESAD92M-03RR		TP802C04R		YA862C06R
	ESAE92-03R		TP858C12R		YA862C08R
	ESAF92-03R		TP862C12R		YA862C10R
	FDRP15S60L		TP862C15R		YA862C12R
	FDRP20S120J		TP862C25R		YA862C15R
	FDRP25S60L		TP865C12R		YA862C25R
	FDRW12S120J		TP865C15R		YA865C04R
	FDRW15S60L		TP865C25R		YA865C06R
	FDRW20S120J		TP868C10R		YA865C08R
	FDRW25S60L		TP868C12R		YA865C10R
	FDRW30S120J		TP868C15R		YA865C12R
	FDRW35S60L		TP868C25R		YA865C15R
	FDRW40C120J		TP869C04R		YA865C25R
	FDRW50C60L		TP869C06R		YA868C04R
	FDRW60C120J		TP869C08R		YA868C06R
	FDRW60T65L		TP869C10R		YA868C08R
	FDRW70C60L		TP901C2R		YA868C10R
	FDRW75T60L		TP902C2R		YA868C12R
	KP883C02		TP902C3R		YA868C15R
	KP923C2		TP906C2R		YA868C25R
	KS823C03		TP985C3R		YA869C06R
	KS823C04		TS802C04R		YA869C08R
	KS823C09		TS805C04R		YA869C10R
	KS826S04		TS808C06R		YA869C12R
	KS883C02		TS862C04R		YA869C15R
	KS923C2		TS862C06R		YA872C10R
	KS926S2		TS862C08R		YA872C12R
	KS926S3		TS862C10R		YA872C15R
	KS986S3		TS862C12R		YA872C20R
	KS986S4		TS862C15R		YA875C10R
	MS808C06		TS862C25R		YA875C12R
	MS838C04		TS865C04R		YA875C15R
	MS862C08		TS865C06R		YA875C20R
	MS865C04		TS865C08R		YA878C10R
	MS865C08		TS865C10R		YA878C12R
	MS865C10		TS865C12R		YA878C15R
	MS865C12		TS865C15R		YA878C20R
	MS865C15		TS865C25R		YA885C02R
	MS868C04		TS868C04R		YA951S6R
	MS868C10		TS868C06R		YA952C6R
	MS868C12		TS868C08R		YA952S6R
	MS868C15		TS868C10R		YA955C6R
	MS906C2		TS868C12R		YA962S6R
	MS906C3		TS868C15R		YA971S6R
	MS985C3		TS868C25R		YA972S6R
	MS985C4		TS902C2R		YA975C6R
	PA868C10R		TS902C3R		YA981S6R
	PA868C15R		TS906C2R		YA982C3R
	PA905C4R		TS952C6R		YA982C4R
	PG865C15R		TS955C6R		YA982C6R
	PG985C3R		TS982C3R		YA982S6R
	PG985C4R		TS982C4R		YA985C3R
	PH862C12		TS982C6R		YA985C4R
	PH862C15		TS985C3R		YA985C6R
	PH862C25		TS985C4R		YG801C04R
	PH865C12		TS985C6R		YG801C06R

Products	Type number	Products	Type number	Products	Type number
Rectifier Diodes	YG801C10R	Rectifier Diodes	YG901C3R	Power MOSFETs	2SK3786-01
	YG802C04R		YG902C2R		2SK3787-01
	YG802C06R		YG902C3R		2SK3872-01
	YG802C10R		YG906C2R		2SK3873-01
	YG803C04R		YG911S2R		2SK3881-01
	YG803C06R		YG911S3R		2SK3882-01
	YG804S06R		YG912S2R		2SK3886-01
	YG805C04R		YG971S6R		2SK3914-01
	YG805C06R		YG971S8R		2SK3915-01
	YG805C10R		YG972S6R		2SK3920-01
	YG808C10R		YG975C6R		2SK3921-01
	YG811S04R		YG975C6RC		2SK3922-01
	YG811S06R		YG981S6R		2SK3923-01
	YG812S04R		YG982C3R		2SK3924-01
	YG812S06R		YG982C4R		2SK3925-01
	YG831C03R		YG982C6R		2SK3927-01
	YG831C04R		YG982S6R		2SK3981-01
	YG832C04R		YG985C3R		2SK3982-01
	YG838C04R		YG985C4R		2SK3983-01
	YG852C12R		YG985C6R		2SK4040-01
	YG855C12R				FMA18N25G
	YG858C12R	Power MOSFETs	2SK2768-01		FMH13N60S1
	YG861S06R		2SK3474-01		FMH15N60S1
	YG861S12R		2SK3535-01		FMH20N60S1
	YG861S15R		2SK3537-01		FMH20N60S1
	YG862C06R		2SK3579-01		FMH22N60S1
	YG862C08R		2SK3580-01		FMH22N60S1FD
	YG862C10R		2SK3589-01		FMH30N60S1
	YG862C12R		2SK3590-01		FMH30N60S1
	YG862C15R		2SK3591-01		FMH35N60S1FD
	YG862C25R		2SK3592-01		FMH40N60S1
	YG864S06R		2SK3593-01		FMH40N60S1FD
	YG865C04R		2SK3594-01		FMH47N60S1
	YG865C06R		2SK3595-01		FMH47N60S1FD
	YG865C08R		2SK3596-01		FMH60N190S2
	YG865C10R		2SK3597-01		FMH60N280S2
	YG865C12R		2SK3597-53		FML12N50ES
	YG865C15R		2SK3597-54		FML12N60ES
	YG865C25R		2SK3606-01		FML13N60ES
	YG868C04R		2SK3607-01		FML16N50ES
	YG868C06R		2SK3608-01		FML16N60ES
	YG868C08R		2SK3609-01		FML19N50G
	YG868C10R		2SK3610-01		FML20N50ES
	YG868C12R		2SK3611-01		FML60N093S2FD
	YG868C15R		2SK3612-01		FML60N104S2FD
	YG868C25R		2SK3647-01		FML60N118S2FD
	YG869C06R		2SK3648-01		FML60N150S2FD
	YG869C08R		2SK3649-01		FML60N191S2FD
	YG869C10R		2SK3650-01		FMP07N60S1
	YG869C12R		2SK3676-01		FMP08N60S1
	YG869C15R		2SK3690-01		FMP10N60S1
	YG872C10R		2SK3698-01		FMP13N60S1
	YG872C12R		2SK3699-01		FMP15N60S1
	YG872C15R		2SK3727-01		FMP20N60S1
	YG872C20R		2SK3728-01		FMP20N60S1FD
	YG875C10R		2SK3769-01		FMP22N60S1
	YG875C12R		2SK3772-01		FMP22N60S1FD
	YG875C15R		2SK3773-01		FMP30N60S1
	YG875C20R		2SK3774-01		FMP30N60S1FD
	YG878C10R		2SK3775-01		FMP60N079S2
	YG878C12R		2SK3778-01		FMP60N084S2FD
	YG878C15R		2SK3779-01		FMP60N088S2
	YG878C20R		2SK3784-01		FMP60N094S2FD
	YG901C2R		2SK3785-01		FMP60N099S2

Products	Type number	Products	Type number
Power MOSFETs	FMP60N105S2FD	Power MOSFETs	FMW60N079S2
	FMP60N125S2		FMW60N084S2FD
	FMP60N133S2FD		FMW60N088S2
	FMP60N160S2		FMW60N094S2FD
	FMP60N170S2FD		FMW60N099S2
	FMP60N190S2		FMW60N105S2FD
	FMP60N280S2		FMW60N125S2
	FMP60N380S2		FMW60N133S2FD
	FMV07N60S1		FMW60N160S2
	FMV08N60S1		FMW60N170S2FD
	FMV10N60S1		FMW60N190S2
	FMV13N60S1		FMW79N60S1
	FMV14N25G		FMW79N60S1FD
	FMV15N60S1		
	FMV20N60S1		
	FMV20N60S1		
	FMV20N60S1FD		
	FMV22N60S1		
	FMV22N60S1FD		
	FMV30N60S1		
	FMV30N60S1FD		
	FMV35N60S1		
	FMV35N60S1FD		
	FMV40N60S1		
	FMV40N60S1FD		
	FMV60N070S2		
	FMV60N075S2FD		
	FMV60N079S2		
	FMV60N084S2FD		
	FMV60N088S2		
	FMV60N094S2FD		
	FMV60N099S2		
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	FMV60N125S2		
	FMV60N133S2FD		
	FMV60N160S2		
	FMV60N170S2FD		
	FMV60N190S2		
	FMV60N280S2		
	FMV60N380S2		
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	FMW60N043S2FD		
	FMW60N055S2		
	FMW60N059S2FD		
	FMW60N070S2		
	FMW60N075S2FD		

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   • Medical equipment

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