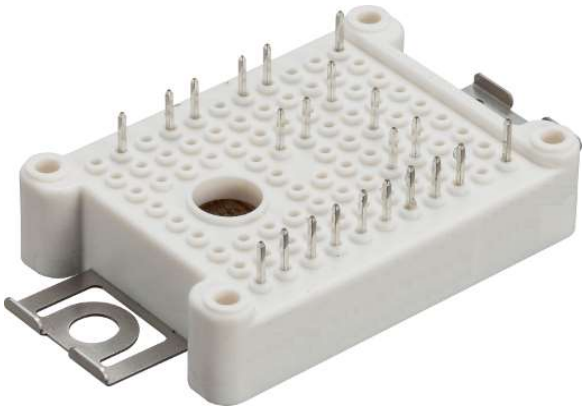
7MBR30VKC060-50

IGBT Modules

Power Module (V series)
600V / 30A / PIM



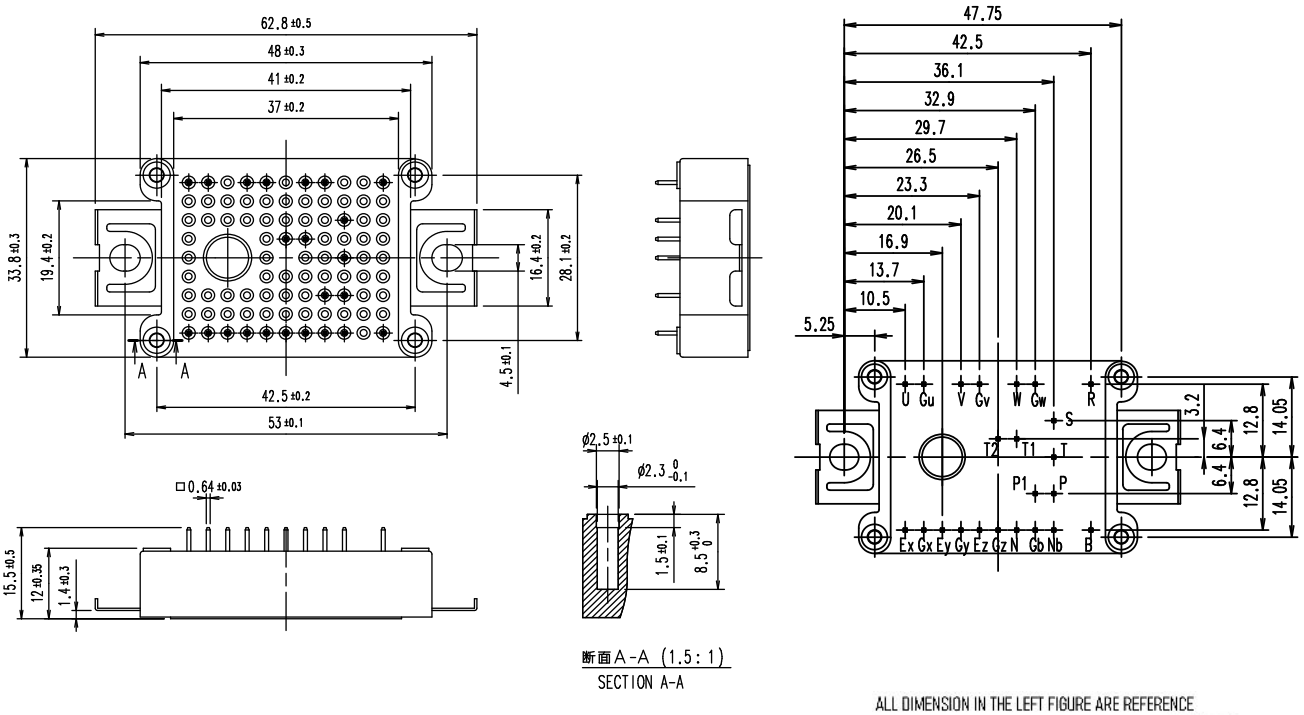
■ Features

Low $V_{CE(sat)}$
Compact Package
P.C.Board Mount Module
Conveter Diode Bridge Dynamic Brake Circuit
RoHS compliant product

■ Applications

Inverter for Motor Drives
AC and DC Servo Drive Amplifier
Uninterruptible Power Supply

■ Outline drawing (Unit : mm)



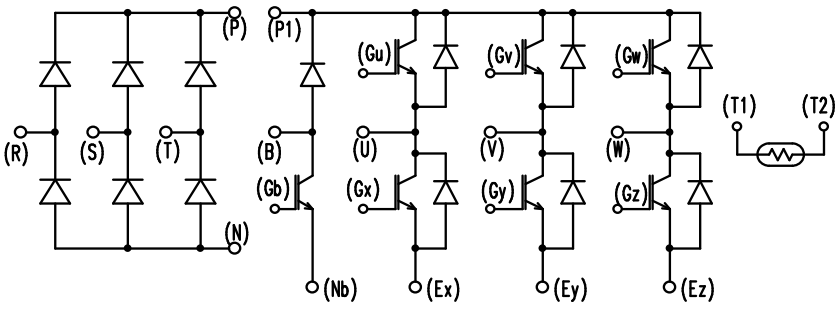
断面A-A (1.5 : 1)
SECTION A-A

ALL DIMENSION IN THE LEFT FIGURE ARE REFERENCE
PIN POSITION TO DESIGNED CENTER OF MODULE ⌖ ø0.8
PIN-GRID SPACING 3.2mm

Weight: 25g (typ.)

■ Equivalent Circuit

[Converter] [Brake] [Inverter] [Thermistor]



7MBR30VKC060-50

■ Absolute Maximum ratings (at T_c= 25°C unless otherwise specified)

	Items		Symbols	Conditions		Maximum ratings	Units
Inverter	Collector-Emitter voltage		V_{CES}			600	V
	Gate-Emitter voltage		V_{GES}			±20	V
	Collector current		I_C	Continuous	T_C=100°C	30	A
			I_{CP}	1ms	T_C=80°C	60	
			$-I_C$			30	
			$-I_C$ pulse	1ms		60	
	Collector power disspation		P_C	1 device		125	W
Brake	Collector-Emitter voltage		V_{CES}			600	V
	Gate-Emitter voltage		V_{GES}			±20	V
	Collector current		I_C	Continuous	T_C=80°C	30	A
				1ms	T_C=80°C	60	
	Collector power disspation		P_C	1 device		125	
	Repetitive peak reverse voltage (Diode)		V_{RRM}			600	V
Converter	Repetitive peak reverse voltage		V_{RRM}			800	V
	Average output current		I_O	50Hz/60Hz, sine wave		30	A
	Surge current	(Non-Repetitive)	I_{FSM}	10ms, T_j=150°C		360	A
	I^2t	(Non-Repetitive)	I^2t	half sine wave		660	A^2s
Junction temperature			T_j	Inverter, Brake		175	°C
				Converter		150	
Operating junciton temperature (under switching conditions)			T_{jop}	Inverter, Brake		150	
				Converter		150	
Case temperature			T_C			125	
Storage temperature			T_{stg}			-40～+125	
Isolation voltage	between terminal and copper base (*1) between temperature and others (*2)		V_{iso}	AC : 1min.		2500	VAC
Screw torque	Mounting	(*3)	-	M4		1.7	N m

(*1) All terminals should be connected together during the test.

(*2) Two thermister terminals should be connected together, other terminals should be connected together and shorted to base plate during the test.

(*3) Recommendable value : 1.3-1.7 Nm (M4)

7MBR30VKC060-50

■ Electrical characteristics (at T_j= 25°C unless otherwise specified)

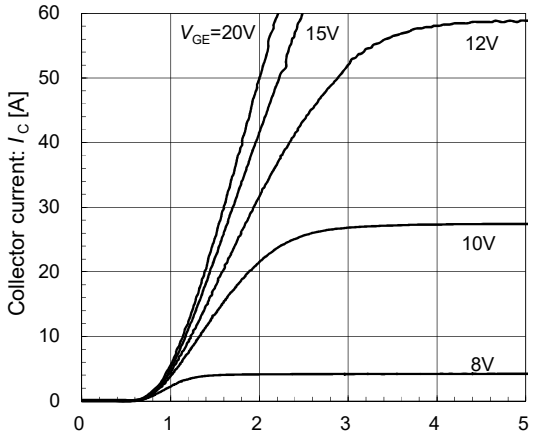
	Items	Symbols	Conditions		Characteristics min.	typ.	max.	Units
Inverter	Zero gate voltage collector current	I_{CES}	V_{GE} = 0V, V_{CE}= 600V		-	-	1.0	mA
	Gate-Emitter leakage current	I_{GES}	V_{CE} = 0V, V_{GE}= ±20V		-	-	200	nA
	Gate-Emitter threshold voltage	$V_{GE(th)}$	V_{CE} = 20V, I_C = 30mA		6.2	6.7	7.2	V
	Collector-Emitter saturation voltage	$V_{CE(sat)}$ (terminal)	V_{GE}= 15V, I_C = 30A	T_j= 25°C	-	1.95	2.35	V
				T_j=125°C	-	2.30	-	
				T_j=150°C	-	2.40	-	
		$V_{CE(sat)}$ (chip)	V_{GE}= 15V, I_C = 30A	T_j= 25°C	-	1.70	2.10	
				T_j=125°C	-	2.05	-	
				T_j=150°C	-	2.15	-	
	Internal gate resistance	$R_{g(int)}$	-		-	0	-	Ω
	Input capacitance	C_{ies}	V_{CE} = 10V, V_{GE} = 0V, f= 1MHz		-	1.6	-	nF
	Turn-on time	t_{on}	V_{CC} = 300V, I_C = 30A, V_{GE}= ±15V, R_G = 15 Ω		-	0.08	1.20	μs
		t_r			-	0.06	0.60	
		$t_{r(i)}$			-	0.02	-	
	Turn-off time	t_{off}			-	0.14	1.20	
		t_f			-	0.02	0.45	
	Forward on voltage	V_F (terminal)	I_F = 30A	T_j= 25°C	-	2.25	2.65	V
				T_j=125°C	-	2.30	-	
				T_j=150°C	-	2.30	-	
		V_F (chip)	I_F = 30A	T_j= 25°C	-	2.00	2.40	
				T_j=125°C	-	2.05	-	
				T_j=150°C	-	2.05	-	
	Reverse recovery time	t_{rr}	I_F = 30A		-	-	0.35	μs
Brake	Zero gate voltage collector current	I_{CES}	V_{GE} = 0V, V_{CE}= 600V		-	-	1.0	mA
	Gate-Emitter leakage current	I_{GES}	V_{CE} = 0V, V_{GE}= ±20V		-	-	200	nA
	Collector-Emitter saturation voltage	$V_{CE(sat)}$ (terminal)	V_{GE}= 15V, I_C = 30A	T_j= 25°C	-	1.95	2.35	V
				T_j=125°C	-	2.30	-	
				T_j=150°C	-	2.40	-	
		$V_{CE(sat)}$ (chip)	V_{GE}= 15V, I_C = 30A	T_j= 25°C	-	1.70	2.10	
				T_j=125°C	-	2.05	-	
				T_j=150°C	-	2.15	-	
	Internal gate resistance	$R_{g(int)}$	-		-	0	-	Ω
	Turn-on time	t_{on}	V_{CE}= 300V, I_C = 30A, V_{GE}= +15/-15V, R_G = 15 Ω		-	0.08	1.20	μs
		t_r			-	0.06	0.60	
	Turn-off time	t_{off}			-	0.14	1.20	
		t_f			-	0.02	0.45	
	Reverse current	I_{RRM}	V_R= 600V		-	-	1.00	mA
Converter	Forward on voltage	V_{FM}	I_F = 30A	terminal	-	1.40	1.85	V
				chip	-	1.15	-	
	Reverse current	I_{RRM}	V_R= 800V		-	-	1.0	mA
Thermistor	Resistance	R	T = 25°C		-	5000	-	Ω
			T = 100°C		465	495	520	
	B value	B	T = 25/50°C		3305	3375	3450	K

■ Thermal resistance characteristics

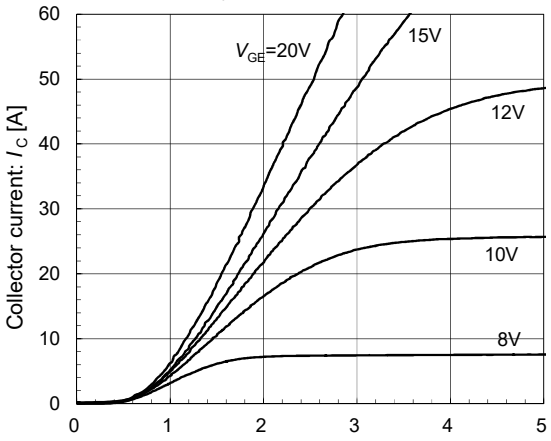
Items	Symbols	Conditions	Characteristics			Units
			min.	typ.	max.	
Thermal resistance(1device)	$R_{th(j-c)}$	Inverter IGBT	-	-	1.24	°C/W
		Inverter FWD	-	-	1.78	
		Brake IGBT	-	-	1.24	
		Converter Diode	-	-	1.35	
Contact thermal resistance(*4) (1device)	$R_{th(c-f)}$	Inverter IGBT	-	0.71	-	
		Inverter FWD	-	0.88	-	
		Brake IGBT	-	0.75	-	
		Converter Diode	-	0.77	-	

(*4) This is the value which is defined mounting on the additional cooling fin with thermal compound.

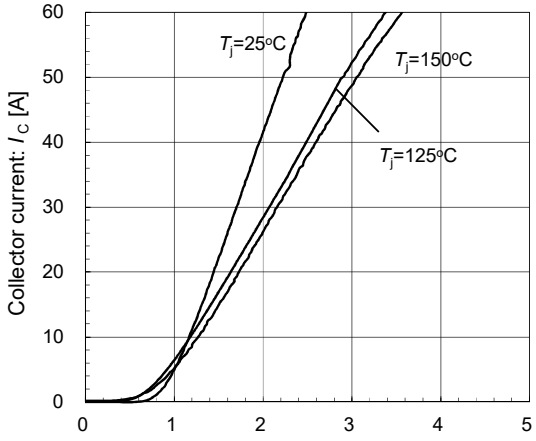
[Inverter]
Collector current vs. Collector-Emitter voltage (typ.)
T_j= 25°C / chip



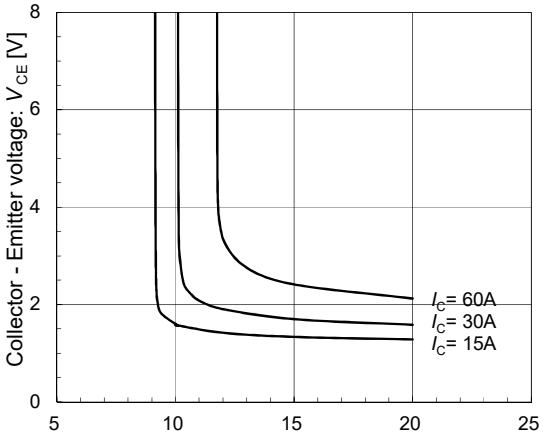
[Inverter]
Collector current vs. Collector-Emitter voltage (typ.)
T_j= 150°C / chip



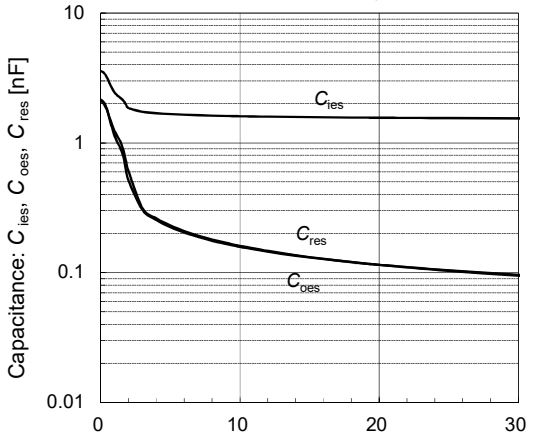
[Inverter]
Collector current vs. Collector-Emitter voltage (typ.)
V_{GE}=15V / chip



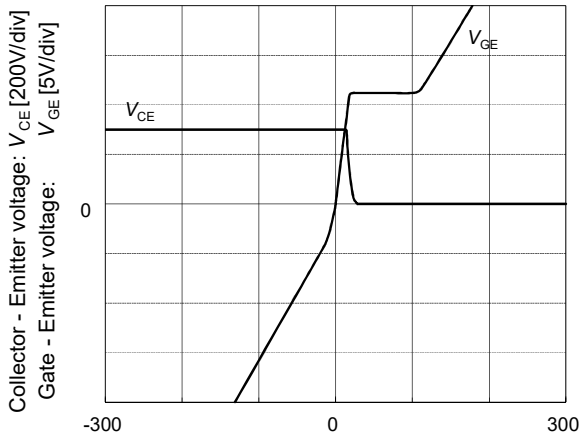
[Inverter]
Collector-Emitter voltage vs. Gate-Emitter voltage (typ.)
T_j= 25°C / chip



[Inverter]
Capacitance vs. Collector-Emitter voltage (typ.)
V_{GE}=0V, f= 1MHz, T_j= 25°C

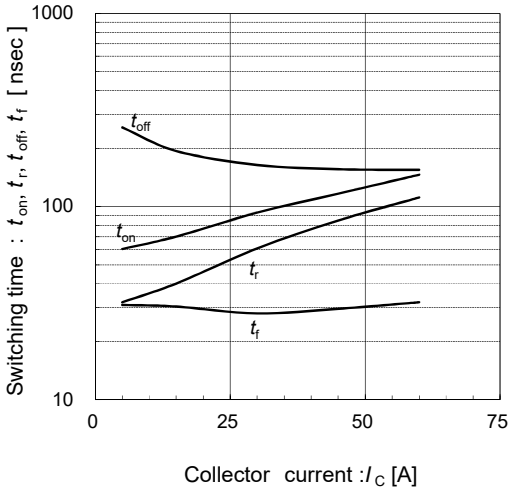


[Inverter]
Dynamic gate charge (typ.)
V_{CC}=300V , I_C=30A , T_j=25°C

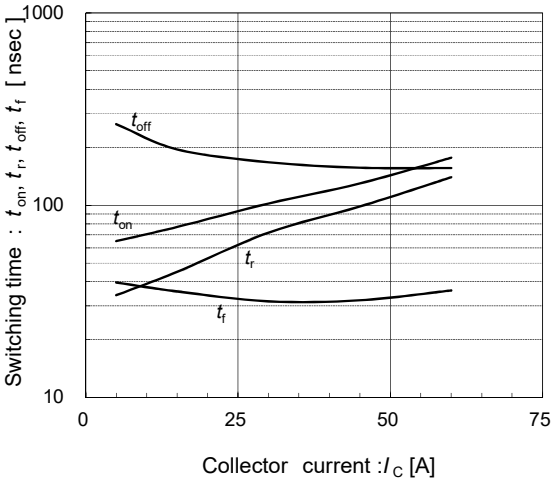


7MBR30VKC060-50

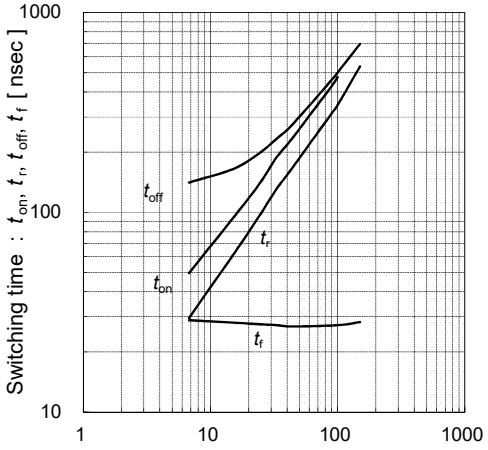
[Inverter]
Switching time vs. Collector current (typ.)
V_{CC}=300V, V_{GE}=±15V, R_G=15Ω, T_j= 125°C



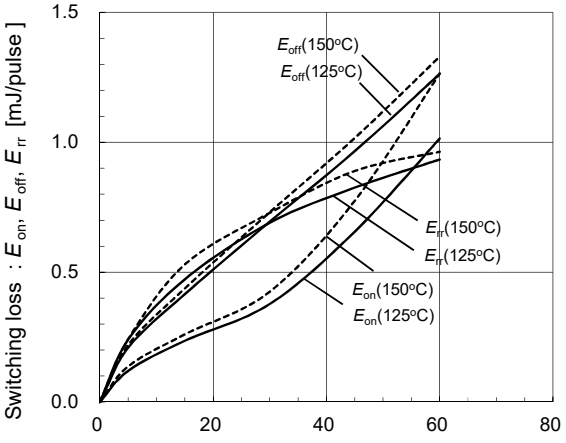
[Inverter]
Switching time vs. Collector current (typ.)
V_{CC}=300V, V_{GE}=±15V, R_G=15Ω, T_j= 150°C



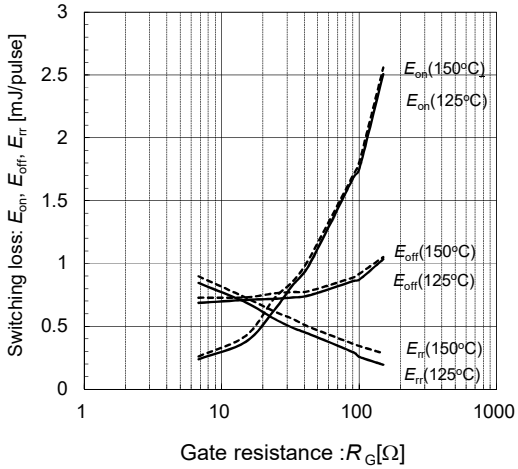
[Inverter]
Switching time vs. Gate resistance (typ.)
V_{CC}=300V, I_C=30A, V_{GE}=±15V, T_j= 125°C



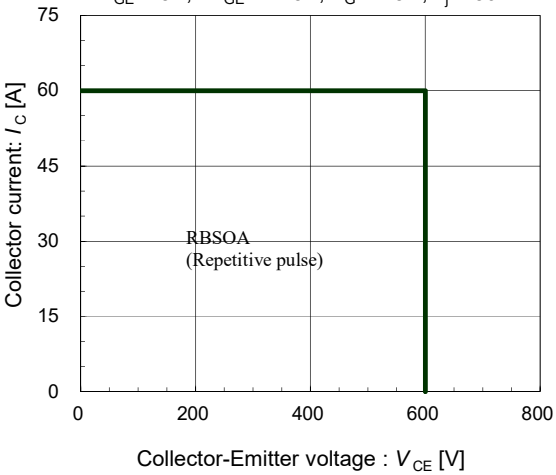
[Inverter]
Switching loss vs. Collector current (typ.)
V_{CC}=300V, V_{GE}=±15V, R_G=15Ω



[Inverter]
Switching time vs. Gate resistance (typ.)
V_{CC}=300V, I_C=30A, V_{GE}=±15V



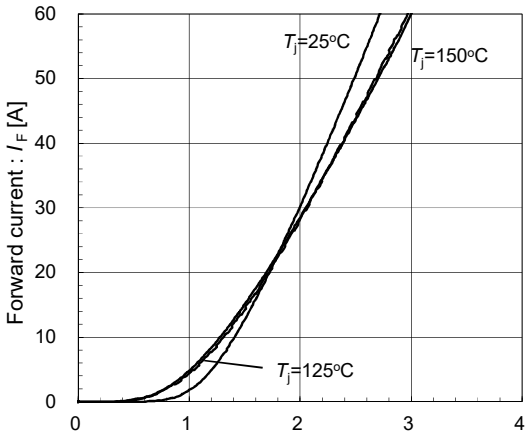
[Inverter]
Reverse bias safe operating area (max.)
+V_{GE}=15V, -V_{GE}<= 15V, R_G>=15Ω, T_j=150°C



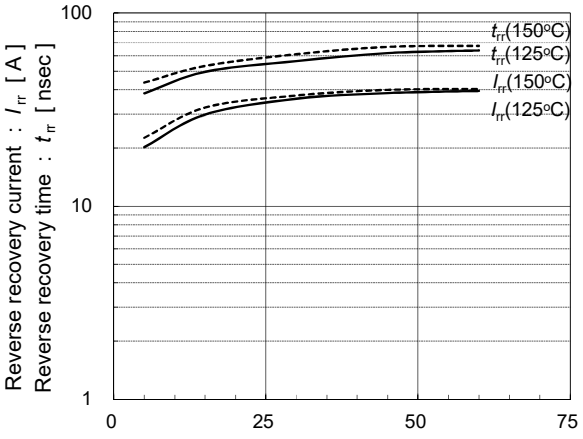
(Main terminals)

7MBR30VKC060-50

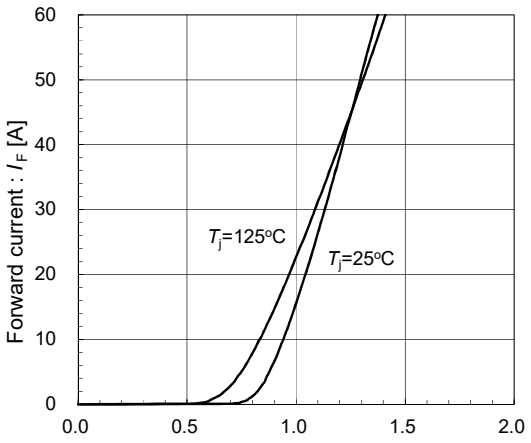
[Inverter]
Forward current vs. forward on voltage (typ.)
chip



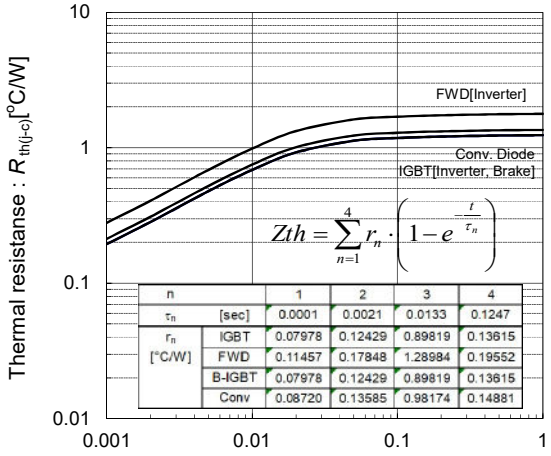
[Inverter]
Reverse recovery characteristics (typ.)
V_{CC}=300V, V_{GE}=±15V, R_G=15Ω



[Converter]
Forward current vs. forward on voltage (typ.)
chip

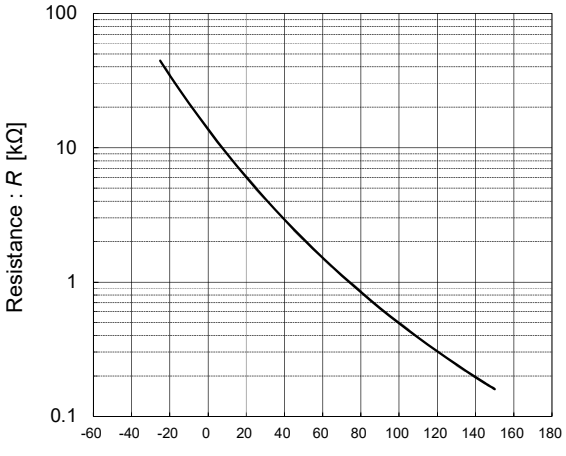


Transient thermal resistance (max.)

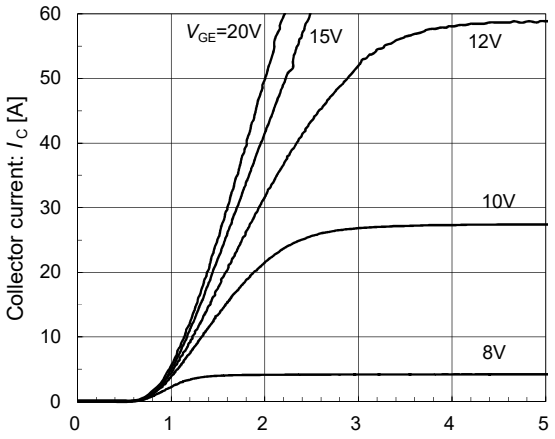


n		1	2	3	4
τ_n	[sec]	0.0001	0.0021	0.0133	0.1247
r_n [°C/W]	IGBT	0.07978	0.12429	0.89819	0.13615
	FWD	0.11457	0.17848	1.28984	0.19552
	B-IGBT	0.07978	0.12429	0.89819	0.13615
	Conv	0.08720	0.13585	0.98174	0.14881

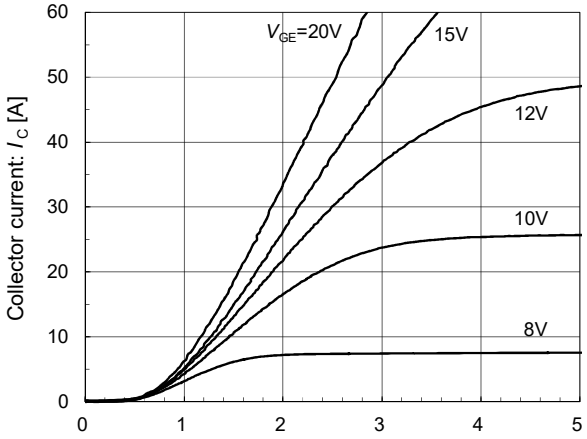
[Thermistor]
Temperature characteristic(typ.)



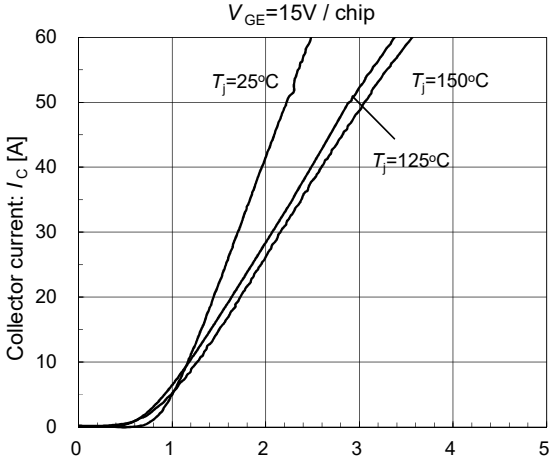
[Brake]
Collector current vs. Collector-Emitter voltage (typ.)
T_j= 25°C / chip



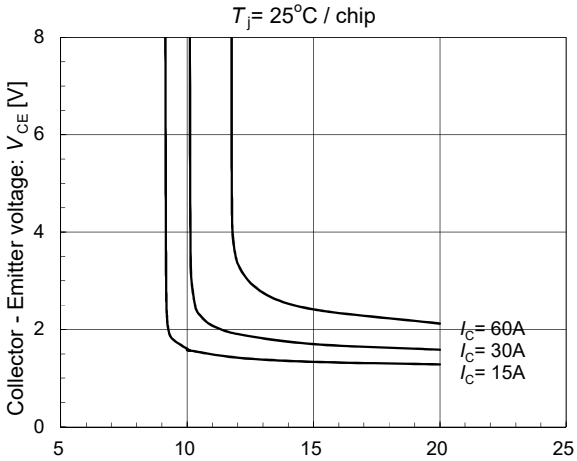
[Brake]
Collector current vs. Collector-Emitter voltage (typ.)
T_j= 150°C / chip



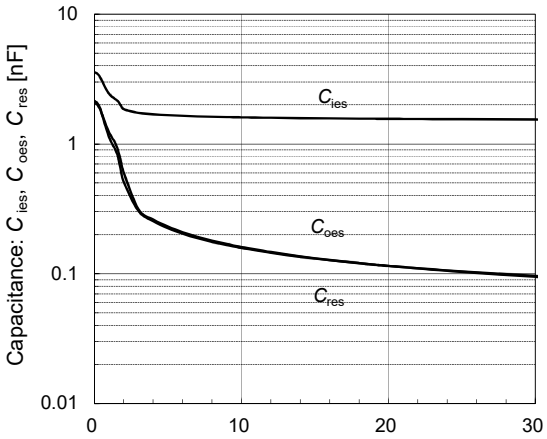
[Brake]
Collector current vs. Collector-Emitter voltage (typ.)
V_{GE}=15V / chip



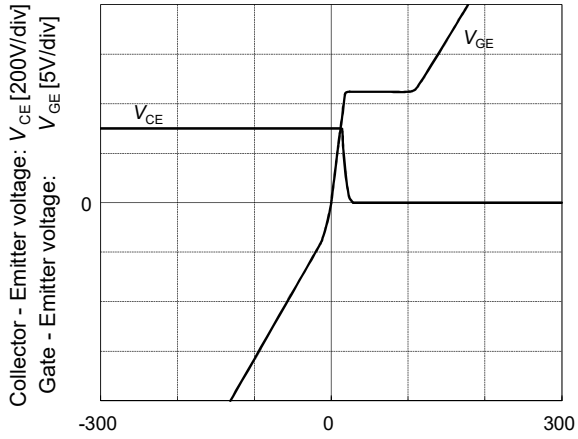
[Brake]
Collector-Emitter voltage vs. Gate-Emitter voltage (typ.)
T_j= 25°C / chip



[Brake]
Capacitance vs. Collector-Emitter voltage (typ.)
V_{GE}=0V, f= 1MHz, T_j= 25°C



[Brake]
Dynamic gate charge (typ.)
V_{CC}=300V , I_C=30A , T_j=25°C



Warnings

1. This Catalog contains the product specifications, characteristics, data, materials, and structures as of 6/2021. The contents are subject to change without notice for specification changes or other reasons. When using a product listed in this Catalog, be sure to obtain the latest specifications.

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4. The products introduced in this Catalog are intended for use in the following electronic and electrical equipment which has normal reliability requirements.
・Computers ・OA equipment ・Communications equipment (terminal devices) ・Measurement equipment
・Machine tools ・Audiovisual equipment ・Electrical home appliances ・Personal equipment ・Industrial robots etc.

5. If you need to use a product in this Catalog for equipment requiring higher reliability than normal, such as for the equipment listed below, it is imperative to contact Fuji Electric Co., Ltd. to obtain prior approval. When using these products for such equipment, take adequate measures such as a backup system to prevent the equipment from malfunctioning even if a Fuji's product incorporated in the equipment becomes faulty.
・Transportation equipment (mounted on cars and ships) ・Trunk communications equipment
・Traffic-signal control equipment ・Gas leakage detectors with an auto-shut-off feature
・Emergency equipment for responding to disasters and anti-burglary devices ・Safety devices ・Medical equipment

6. Do not use products in this Catalog for the equipment requiring strict reliability such as the following and equivalents to strategic equipment (without limitation).
・Space equipment ・Aeronautic equipment ・Nuclear control equipment ・Submarine repeater equipment

8. If you have any question about any portion in this Catalog, ask Fuji Electric Co., Ltd. or its sales agents before using the product. Neither Fuji Electric Co., Ltd. nor its agents shall be liable for any injury caused by any use of the products not in accordance with instructions set forth herein.

富士電機 Innovating Energy Technology

Technical Information

IGBT Modules

- Please refer to URLs below for futher information about products, application manuals and design support.
- 关于本规格书中没有记载的产品信息，应用手册，技术信息等，请参考以下链接。
- 本データシートに記載されていない製品情報，アプリケーションマニュアル，デザインサポートは以下のURLをご参照下さい。

FUJI ELECTRIC Power Semiconductor WEB site

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