

6MBI50VW-120-50

IGBT Modules

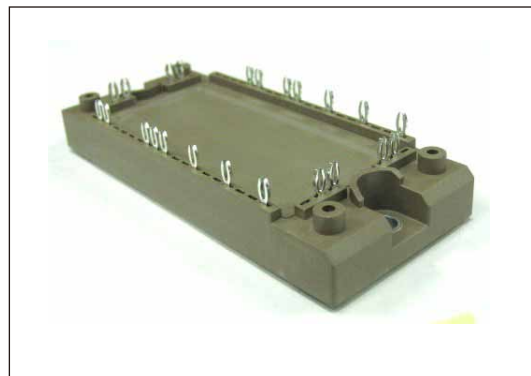
IGBT MODULE (V series) 1200V / 50A / 6 in one package

■ Features

- Compact Package
- P.C.Board Mount
- Low $V_{CE(sat)}$

■ Applications

- Inverter for Motor Drive
- AC and DC Servo Drive Amplifier
- Uninterruptible Power Supply
- Industrial machines, such as welding machines



■ Maximum Ratings and Characteristics

● Absolute Maximum Ratings (at $T_c=25^{\circ}\text{C}$ unless otherwise specified)

Items			Symbols	Conditions		Maximum ratings	Units	
Inverter	Collector-Emitter voltage		V _{CES}			1200	V	
	Gate-Emitter voltage		V _{GES}			±20	V	
	Collector current		I _c	Continuous	T _c =100°C	50	A	
			I _{cp}	1ms	T _c =80°C	100		
			-I _c					50
			-I _c pulse	1ms				100
	Collector power dissipation		P _c	1 device		280	W	
Maximum junction temperature		T _{jmax}			175	°C		
Temperature under switching conditions		T _{jop}			150			
Case temperature		T _c			125			
Storage temperature		T _{stg}			-40~+125			
Isolation voltage	between terminal and copper base (*1) between thermistor and others (*2)	V _{iso}	AC : 1min.		2500	VAC		
Screw torque	Mounting (*3)	-	M5		3.5	N m		

Note *1: All terminals should be connected together during the test.

Note *2: Two thermistor terminals should be connected together, other terminals should be connected together and shorted to base plate during the test.

Note *3: Recommendable value : 2.5-3.5 Nm (M5)

● Electrical characteristics (at Tj= 25°C unless otherwise specified)

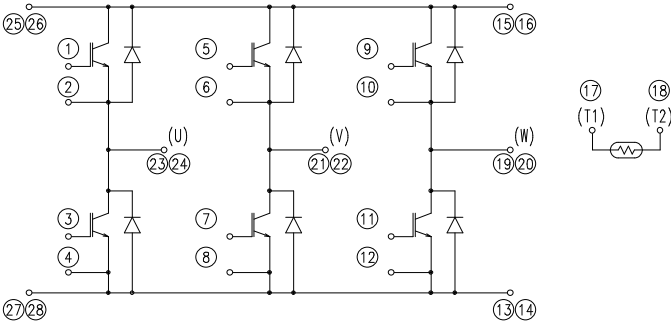
Items		Symbols	Conditions		Characteristics			Units	
					min.	typ.	max.		
Inverter	Zero gate voltage collector current	I _{CES}	V _{GE} = 0V, V _{CE} = 1200V		-	-	1.0	mA	
	Gate-Emitter leakage current	I _{GES}	V _{GE} = 0V, V _{GE} = ±20V		-	-	200	nA	
	Gate-Emitter threshold voltage	V _{GE (th)}	V _{CE} = 20V, I _c = 50mA		6.0	6.5	7.0	V	
	Collector-Emitter saturation voltage	V _{CE (sat)} (terminal)	V _{GE} = 15V I _c = 50A	T _j =25°C	-	2.15	2.60	V	
				T _j =125°C	-	2.50	-		
				T _j =150°C	-	2.55	-		
		V _{CE (sat)} (chip)	V _{GE} = 15V I _c = 50A	T _j =25°C	-	1.85	2.30		
				T _j =125°C	-	2.20	-		
				T _j =150°C	-	2.25	-		
	Internal gate resistance	R _g (int)	-		-	4	-	Ω	
	Input capacitance	C _{ies}	V _{CE} = 10V, V _{GE} = 0V, f = 1MHz		-	4.2	-	nF	
	Turn-on time	t _{on}	V _{CC} = 600V I _c = 50A V _{GE} = +15 / -15V R _g = 15Ω		-	0.39	1.20	μs	
		t _r			-	0.09	0.60		
		t _r (i)			-	0.03	-		
		Turn-off time			t _{off}	-	0.53		1.00
					t _f	-	0.06		0.30
		Forward on voltage	V _F (terminal)	I _F = 50A	T _j =25°C	-	2.00		2.45
	T _j =125°C				-	2.15	-		
	T _j =150°C				-	2.10	-		
	V _F (chip)		I _F = 50A	T _j =25°C	-	1.70	2.15		
				T _j =125°C	-	1.85	-		
				T _j =150°C	-	1.80	-		
	Reverse recovery time	t _{rr}	I _F = 50A		-	-	0.35	μs	
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	-	-	0.54	$^\circ C/W$
		Inverter FWD	-	-	0.73	
Contact thermal resistance (1device) (*4)	$R_{th(c-f)}$	with Thermal Compound	-	0.05	-	

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

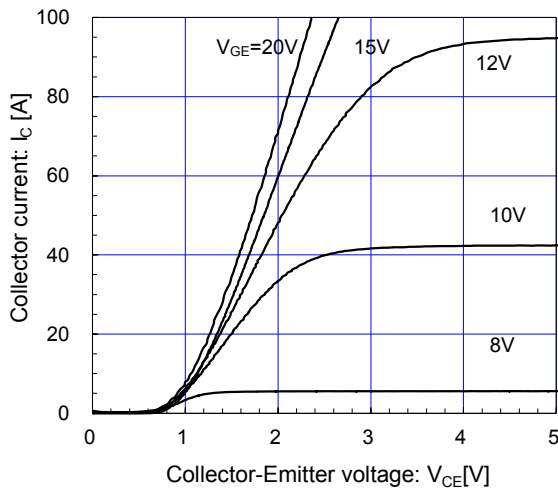
■ Equivalent Circuit Schematic



■ Characteristics (Representative)

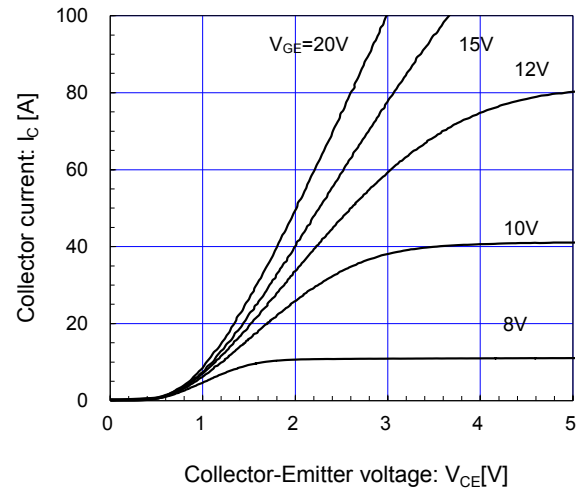
[Inverter]

Collector current vs. Collector-Emitter voltage (typ.)

 $T_j = 25^\circ\text{C}$ / chip

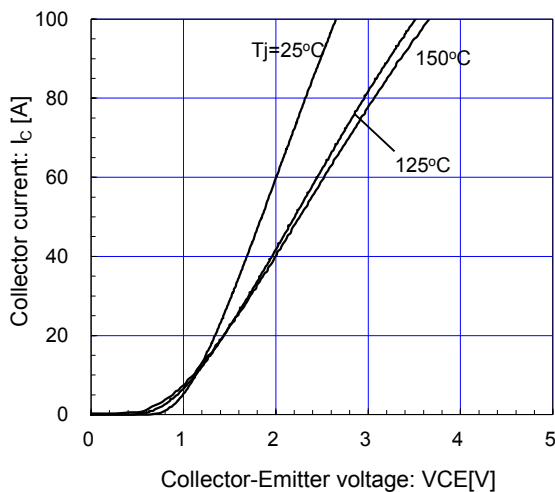
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Collector current vs. Collector-Emitter voltage (typ.)

 $T_j = 150^\circ\text{C}$ / chip

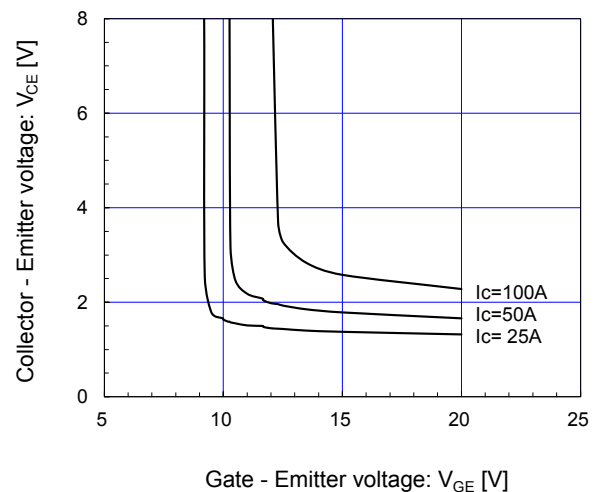
[Inverter]

Collector current vs. Collector-Emitter voltage (typ.)

 $V_{GE} = 15\text{V}$ / chip

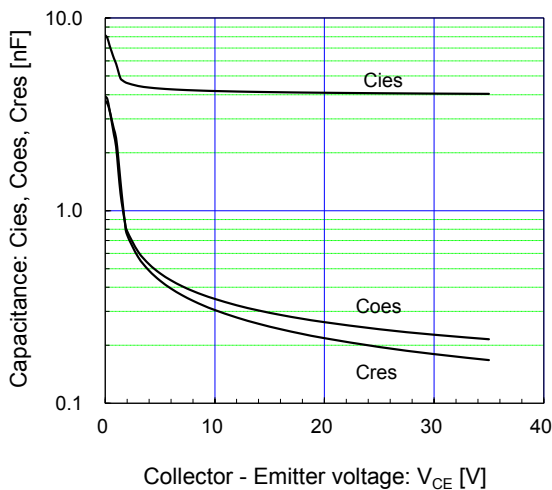
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Collector-Emitter voltage vs. Gate-Emitter voltage (typ.)

 $T_j = 25^\circ\text{C}$ / chip

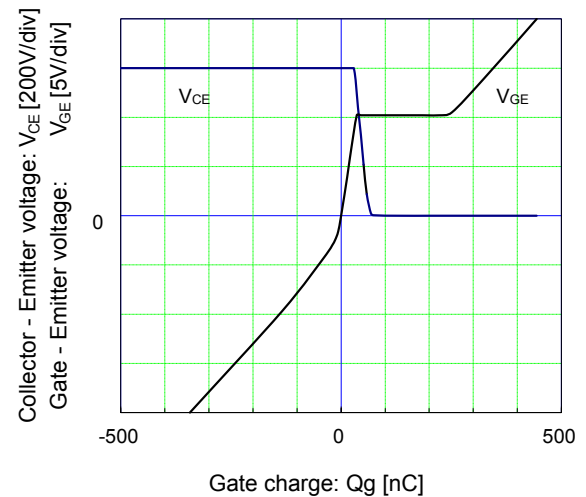
[Inverter]

Capacitance vs. Collector-Emitter voltage (typ.)

 $V_{GE} = 0\text{V}$, $f = 1\text{MHz}$, $T_j = 25^\circ\text{C}$ 

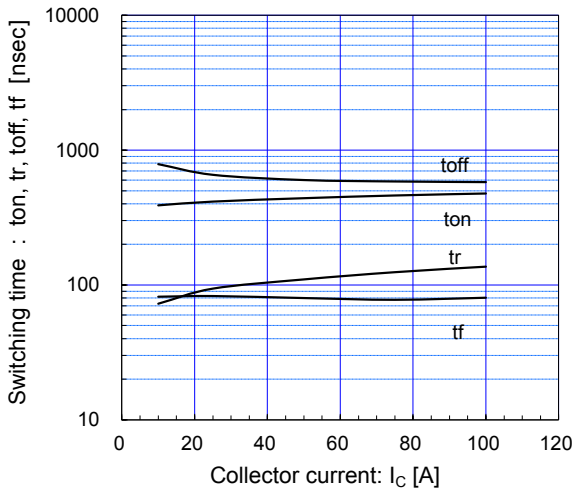
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Dynamic gate charge (typ.)

 $V_{CC} = 600\text{V}$, $I_c = 50\text{A}$, $T_j = 25^\circ\text{C}$ 

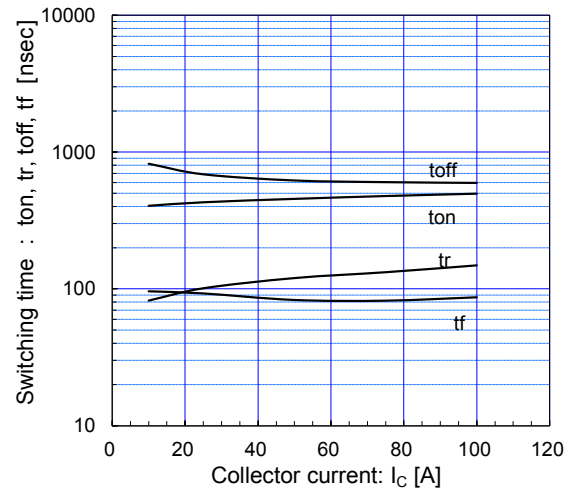
[Inverter]

Switching time vs. Collector current (typ.)
 $V_{cc}=600V$, $V_{GE}=\pm 15V$, $R_g=15\Omega$, $T_j=125^\circ C$



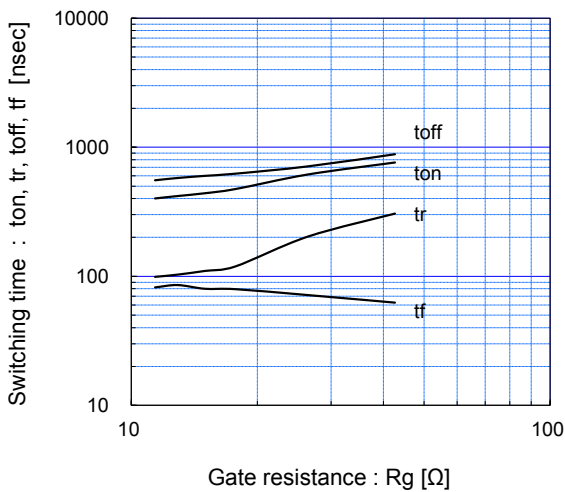
[Inverter]

Switching time vs. Collector current (typ.)
 $V_{cc}=600V$, $V_{GE}=\pm 15V$, $R_g=15\Omega$, $T_j=150^\circ C$



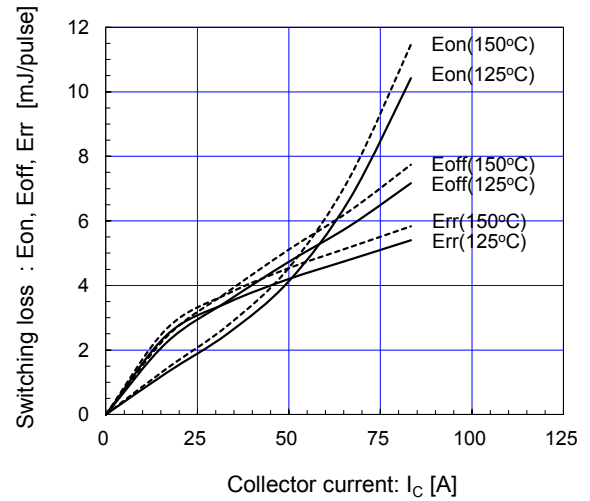
[Inverter]

Switching time vs. gate resistance (typ.)
 $V_{cc}=600V$, $I_c=50A$, $V_{GE}=\pm 15V$, $T_j=125^\circ C$



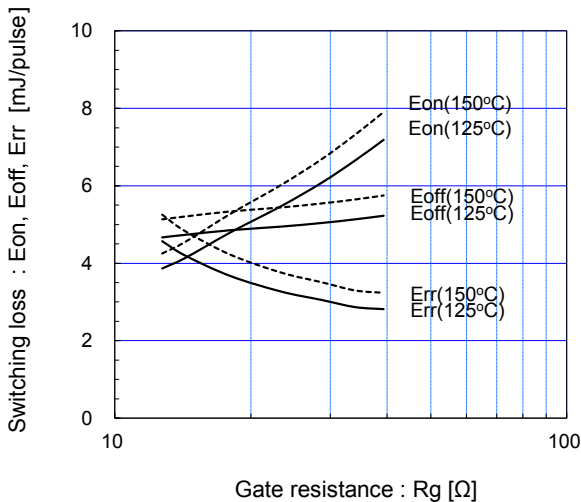
[Inverter]

Switching loss vs. Collector current (typ.)
 $V_{cc}=600V$, $V_{GE}=\pm 15V$, $R_g=15\Omega$



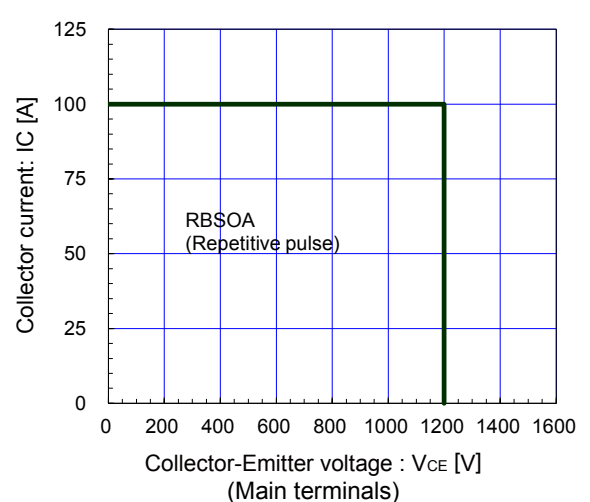
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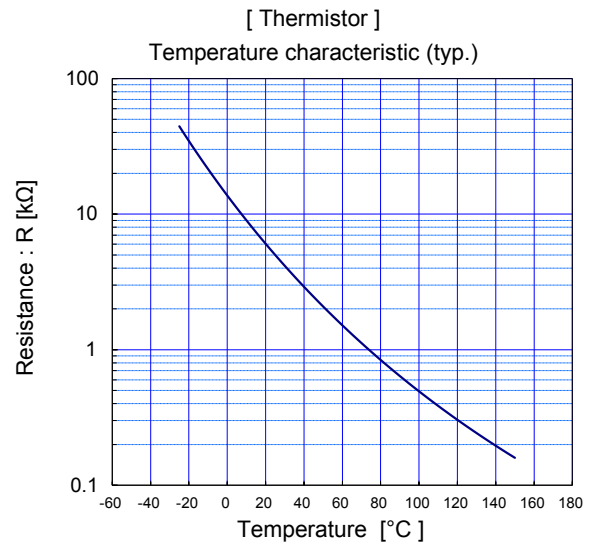
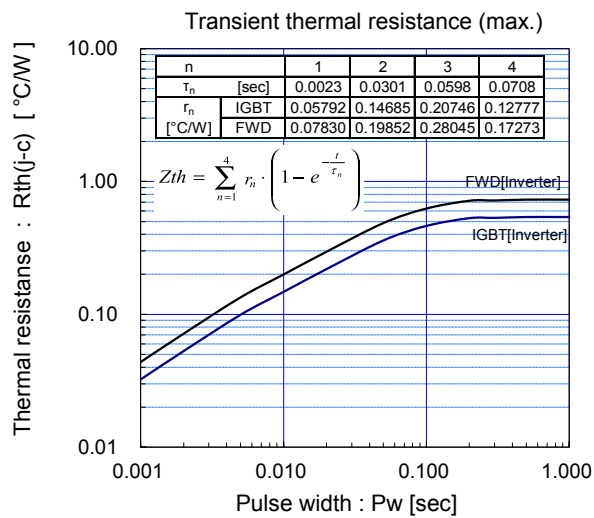
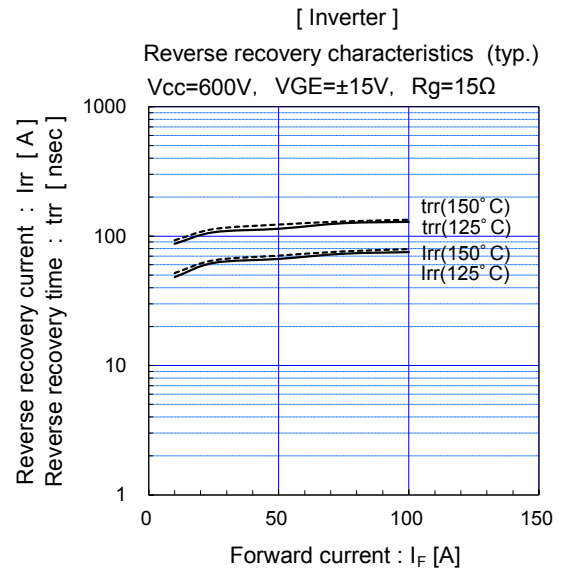
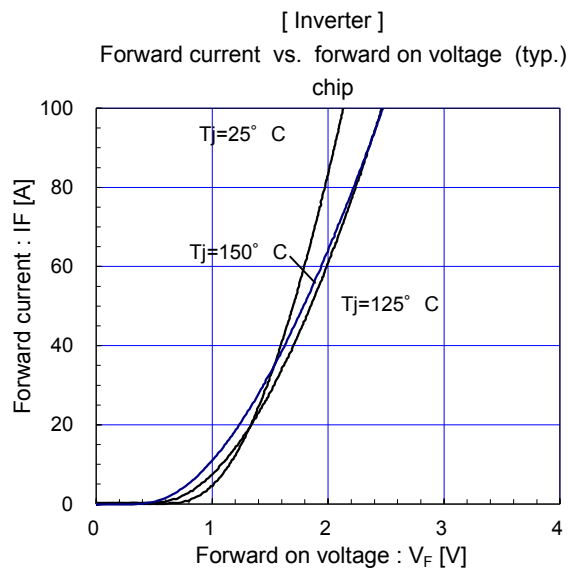
Switching loss vs. gate resistance (typ.)
 $V_{cc}=600V$, $I_c=50A$, $V_{GE}=\pm 15V$



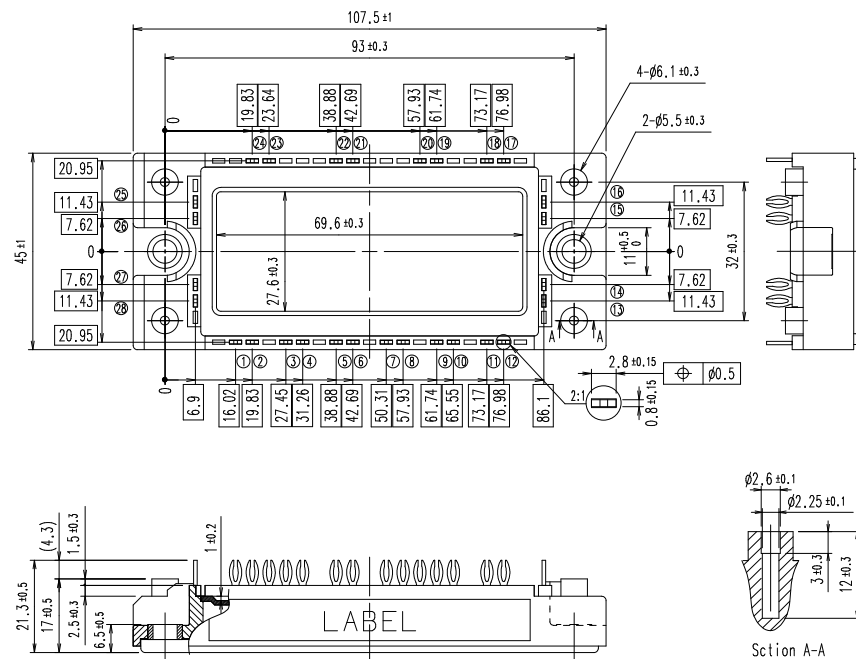
[Inverter]

Reverse bias safe operating area (max.)
 $+V_{GE}=15V$, $-V_{GE} \leq 15V$, $R_g \geq 15\Omega$, $T_j=150^\circ C$





Outline Drawings, mm



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