

6MBI50VW-120-50

IGBT Modules

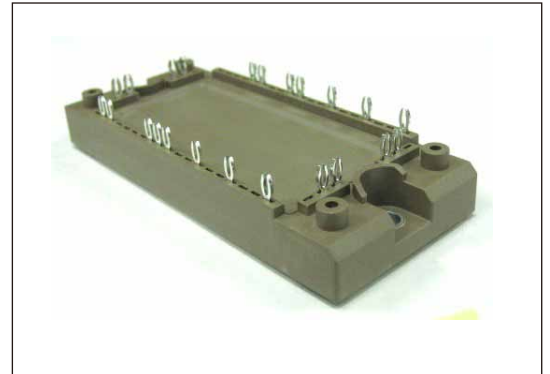
IGBT MODULE (V series) 1200V / 50A / 6 in one package

■ 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	$T_c=100^\circ\text{C}$		50	A
		I_{cp}	1ms	$T_c=80^\circ\text{C}$		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)

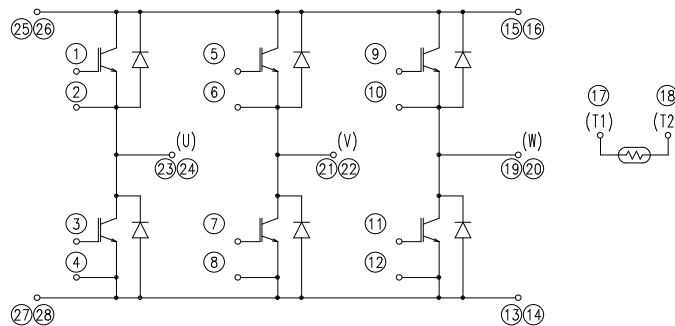
Items	Symbols	Conditions	Characteristics			Units	
			min.	typ.	max.		
Zero gate voltage collector current	I_{CES}	$V_{GE} = 0V, V_{CE} = 1200V$	-	-	1.0	mA	
Gate-Emitter leakage current	I_{GES}	$V_{GE} = 0V, V_{GE} = \pm 20V$	-	-	200	nA	
Gate-Emitter threshold voltage	$V_{GE(th)}$	$V_{CE} = 20V, I_c = 50mA$	6.0	6.5	7.0	V	
Collector-Emitter saturation voltage	$V_{CE(sat)}$ (terminal)	$V_{GE} = 15V$ $I_c = 50A$	Tj=25°C	-	2.15	2.60	V
			Tj=125°C	-	2.50	-	
			Tj=150°C	-	2.55	-	
	$V_{CE(sat)}$ (chip)	$V_{GE} = 15V$ $I_c = 50A$	Tj=25°C	-	1.85	2.30	
			Tj=125°C	-	2.20	-	
			Tj=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}	$R_G = 15Ω$	-	0.53	1.00	μs	
	t_f		-	0.06	0.30		
Forward on voltage	V_F (terminal)	$I_F = 50A$	Tj=25°C	-	2.00	2.45	V
			Tj=125°C	-	2.15	-	
			Tj=150°C	-	2.10	-	
	V_F (chip)	$I_F = 50A$	Tj=25°C	-	1.70	2.15	
			Tj=125°C	-	1.85	-	
			Tj=150°C	-	1.80	-	
Reverse recovery time	t_{rr}	$I_F = 50A$	-	-	0.35	μs	
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

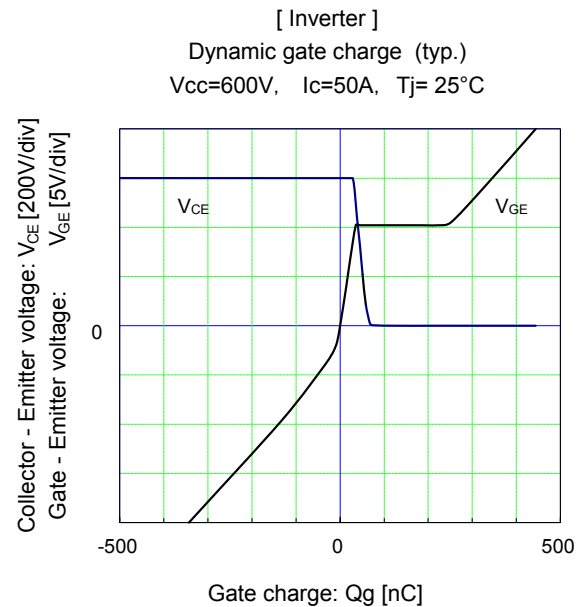
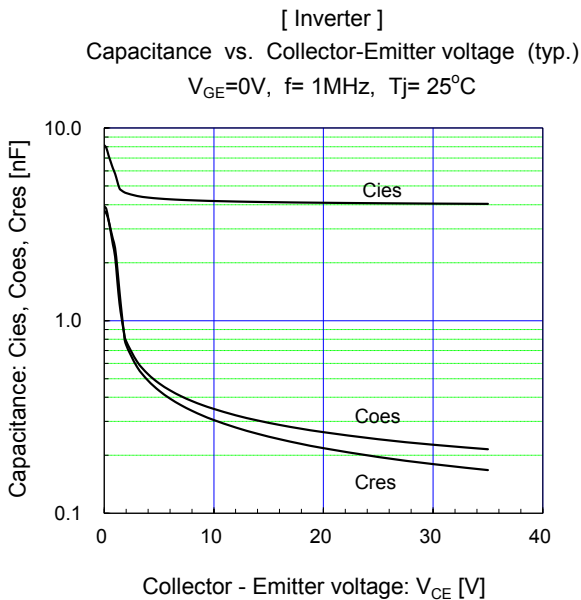
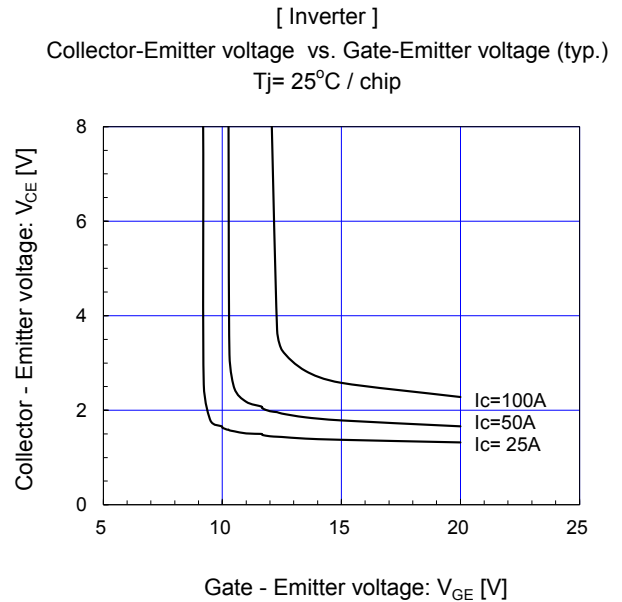
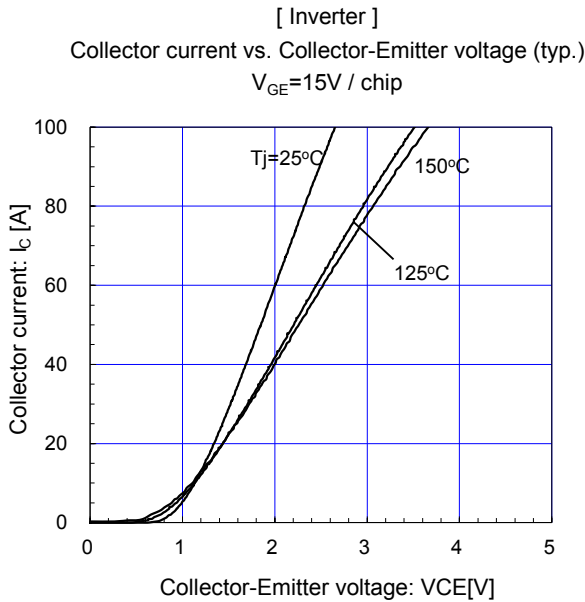
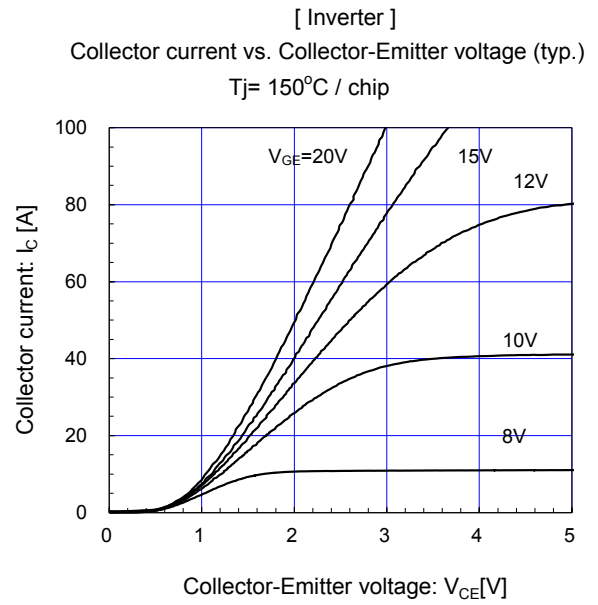
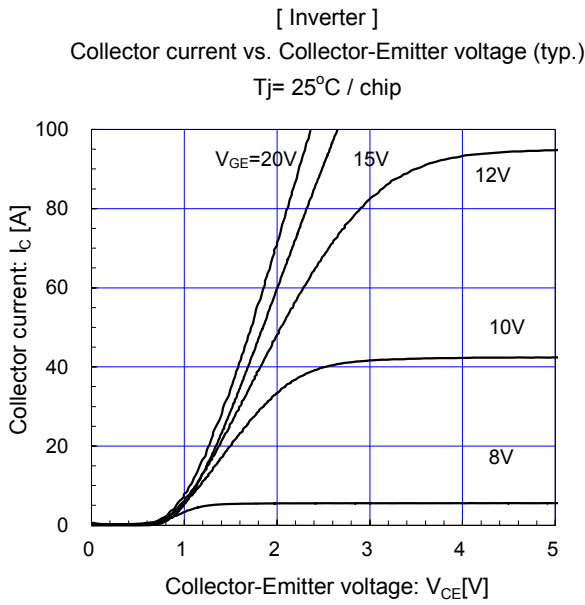
Items	Symbols	Conditions	Characteristics			Units
			min.	typ.	max.	
Thermal resistance (1device)	Rth(j-c)	Inverter IGBT	-	-	0.54	°C/W
		Inverter FWD	-	-	0.73	
Contact thermal resistance (1device) (*4)	Rth(c-f)	with Thermal Compound	-	0.05	-	

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

■ Equivalent Circuit Schematic

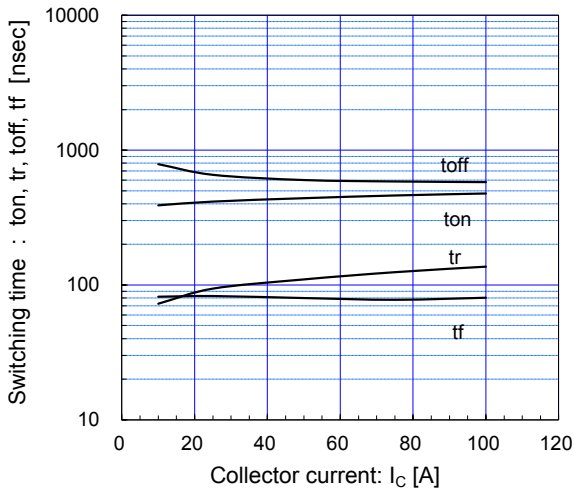


■ Characteristics (Representative)



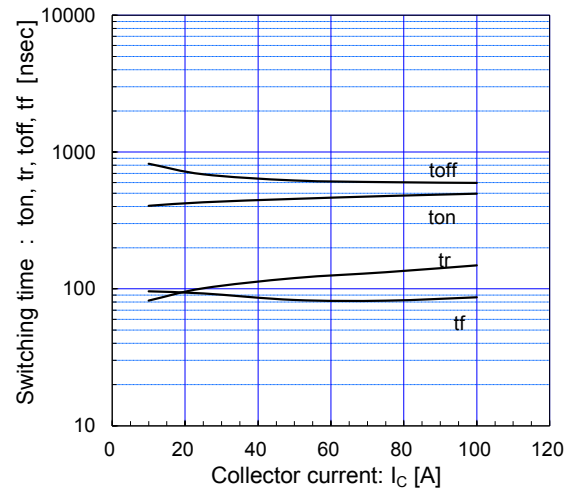
[Inverter]

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



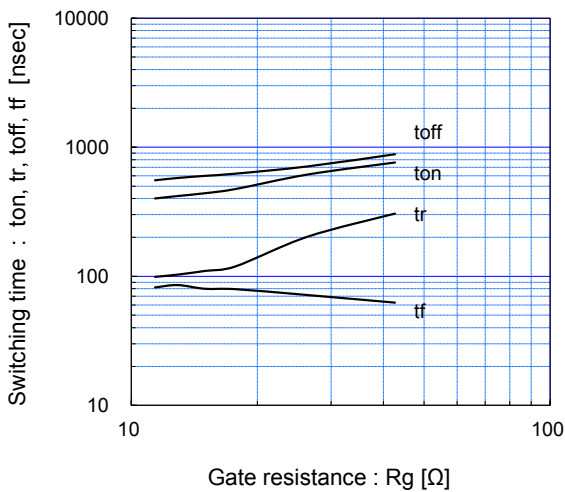
[Inverter]

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



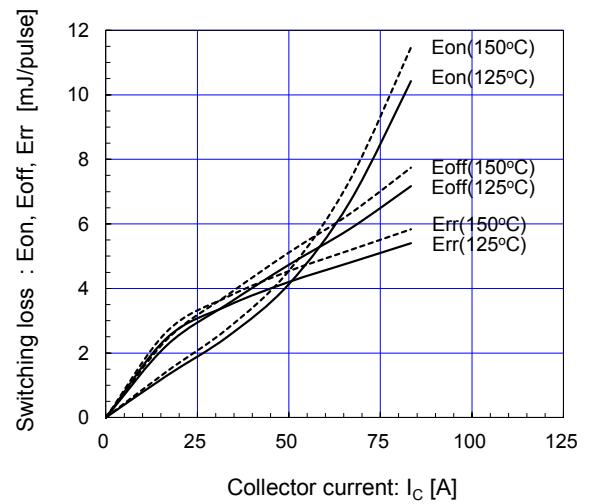
[Inverter]

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



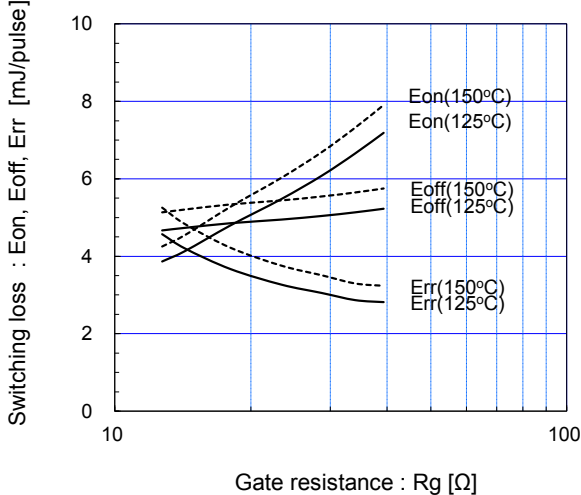
[Inverter]

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



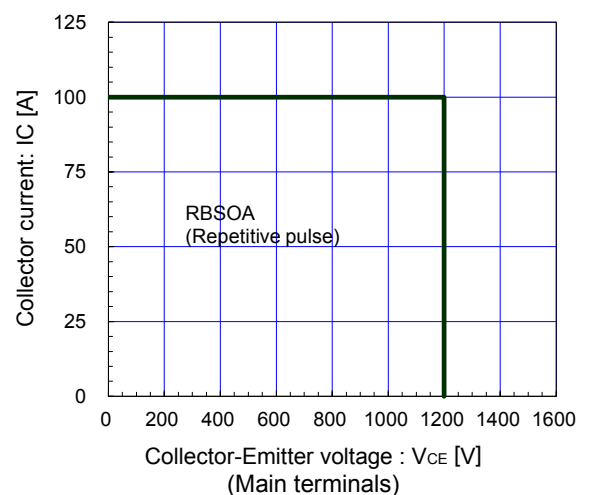
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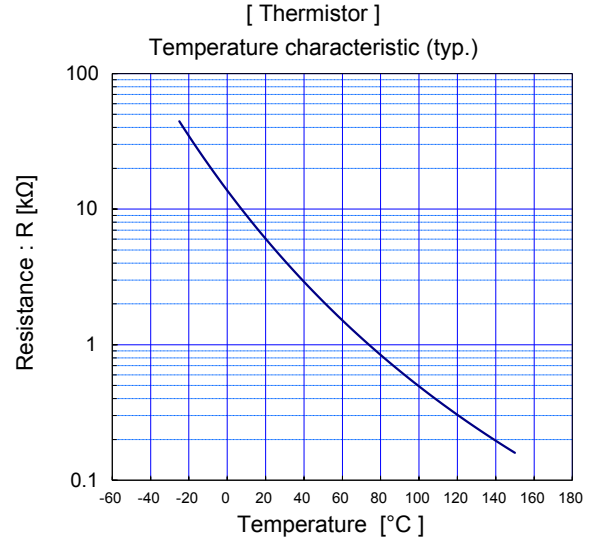
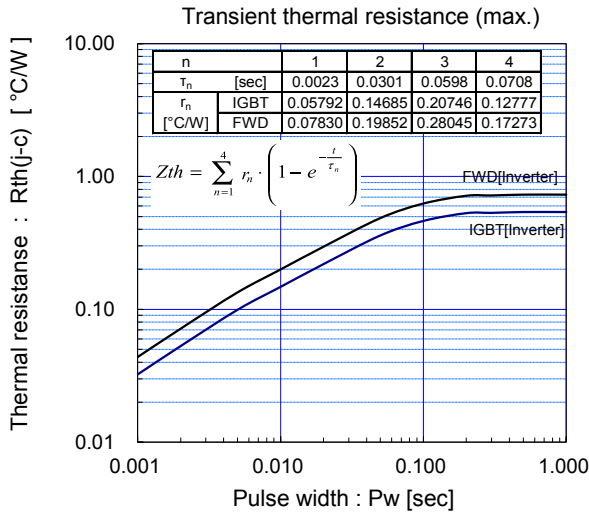
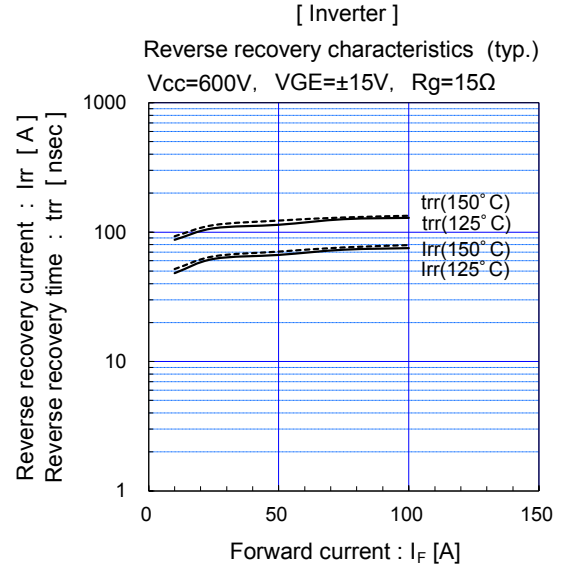
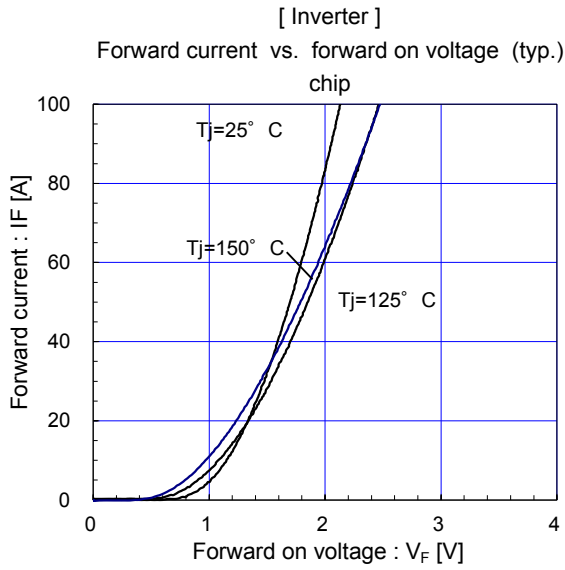
Switching loss vs. gate resistance (typ.)
 $V_{cc}=600V, I_C=50A, V_{GE}=\pm 15V$



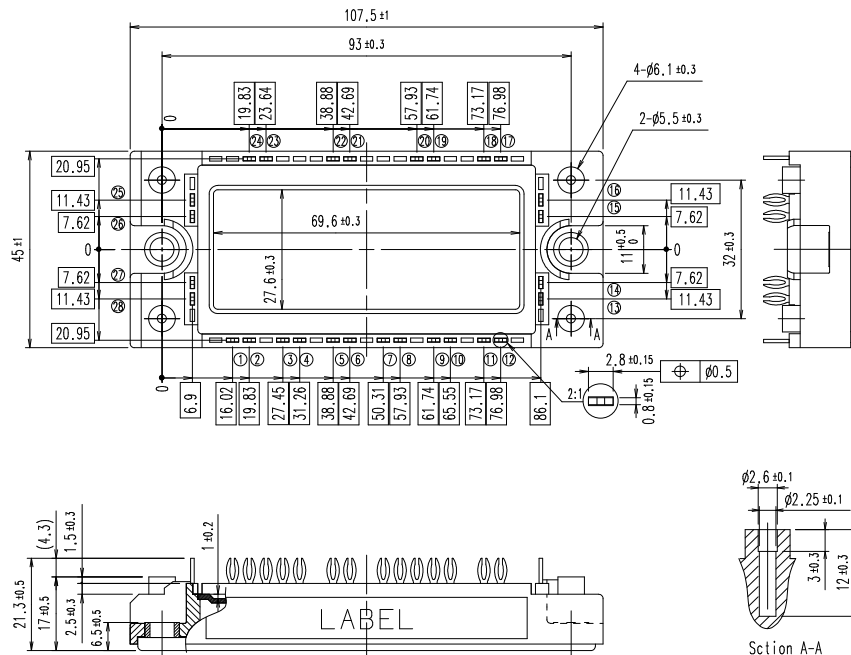
[Inverter]

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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IGBT Modules

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