

2MBI450VJ-120-50

IGBT Modules

IGBT MODULE (V series) 1200V / 450A / 2 in one package

■ Features

- High speed switching
- Voltage drive
- Low Inductance module structure

■ 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 Tc=25°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 Tc=80°C	450	A
		I _c pulse	1ms Tc=80°C	900	
		-I _c		450	
		-I _c pulse	1ms	900	
Collector power dissipation	P _c	1 device	2270	W	
Junction temperature	T _j		175	°C	
Operating junction temperature (under switching conditions)	T _{jop}		150		
Case temperature	T _c		125		
Storage temperature	T _{stg}		-40 to +125		
Isolation voltage	between terminal and copper base (*1)	V _{iso}	AC : 1min.	2500	VAC
	between thermistor and others (*2)				
Screw torque	Mounting (*3)		3.5	N m	
	Terminals (*4)		4.5		
	PC-Board (*5)		0.6		

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) Note *4: Recommendable value : 3.5-4.5 Nm (M6)

Note *5: Recommendable value : 0.4-0.6 Nm (M2.5)

● 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	-	-	3.0	mA	
Gate-Emitter leakage current	I _{GES}	V _{GE} = 0V, V _{CE} = ±20V	-	-	600	nA	
Gate-Emitter threshold voltage	V _{GE(th)}	V _{CE} = 20V, I _c = 450mA	6.0	6.5	7.0	V	
Collector-Emitter saturation voltage	V _{CE(sat)} (terminal)	V _{GE} = 15V I _c = 450A	Tj=25°C	-	2.25	2.70	V
			Tj=125°C	-	2.55	-	
			Tj=150°C	-	2.60	-	
	V _{CE(sat)} (chip)		Tj=25°C	-	1.75	2.20	
			Tj=125°C	-	2.05	-	
			Tj=150°C	-	2.10	-	
Input capacitance	C _{ies}	V _{CE} = 10V, V _{GE} = 0V, f = 1MHz	-	41	-	nF	
Turn-on time	t _{on}	V _{CC} = 600V I _c = 450A V _{GE} = ±15V R _G = 0.52Ω	-	550	1200	nsec	
	t _r		-	180	600		
	t _{r(i)}		-	120	-		
Turn-off time	t _{off}	R _G = 0.52Ω	-	1050	2000	nsec	
	t _f		-	110	350		
			-	110	350		
Forward on voltage	V _F (terminal)	V _{GE} = 0V I _F = 450A	Tj=25°C	-	2.20	2.65	V
			Tj=125°C	-	2.35	-	
			Tj=150°C	-	2.30	-	
	V _F (chip)		Tj=25°C	-	1.70	2.15	
			Tj=125°C	-	1.85	-	
			Tj=150°C	-	1.80	-	
Reverse recovery time	t _{rr}	I _F = 450A	-	200	600	nsec	
Thermistor	Resistance	T=25°C	-	5000	-	Ω	
		T=100°C	465	495	520		
		T=25/50°C	3305	3375	3450		
B value	B	T=25/50°C	3305	3375	3450	K	

● Thermal resistance characteristics

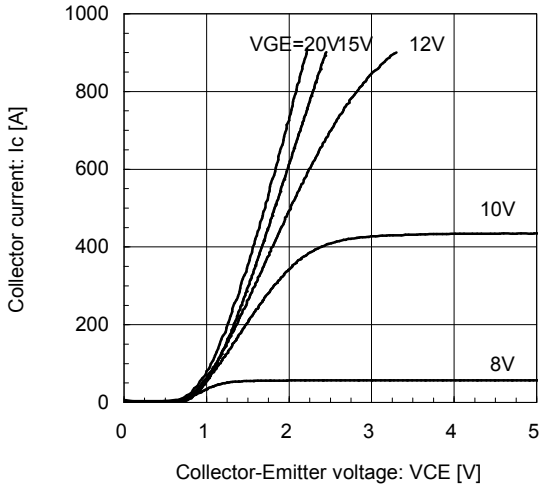
Items	Symbols	Conditions	Characteristics			Units
			min.	typ.	max.	
Thermal resistance (1device)	R _{th(j-c)}	Inverter IGBT	-	-	0.066	°C/W
		Inverter FWD	-	-	0.100	
Contact thermal resistance (1device) (*6)	R _{th(c-f)}	with Thermal Compound	-	0.0167	-	

Note *6: This is the value which is defined mounting on the additional cooling fin with thermal compound.

■ Characteristics (Representative)

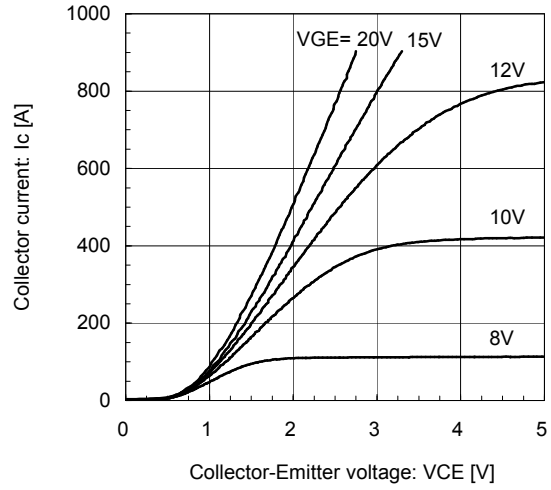
[INVERTER]

Collector current vs. Collector-Emmitter voltage (typ.)
T_j = 25°C / chip



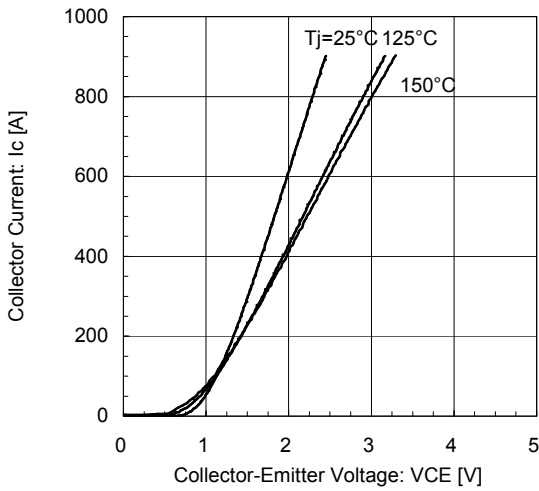
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Collector current vs. Collector-Emmitter voltage (typ.)
T_j = 150°C / chip



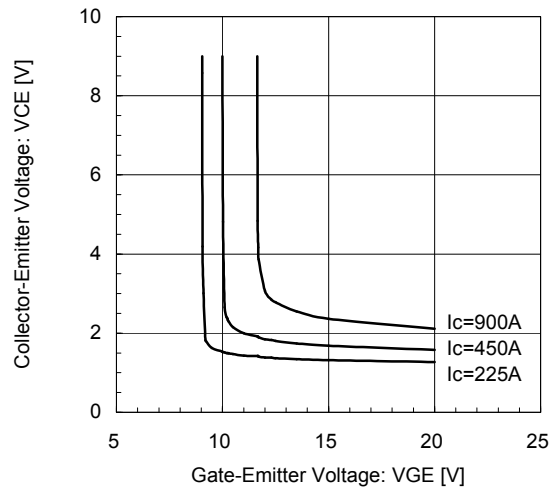
[INVERTER]

Collector current vs. Collector-Emmitter voltage (typ.)
VGE = 15V / chip



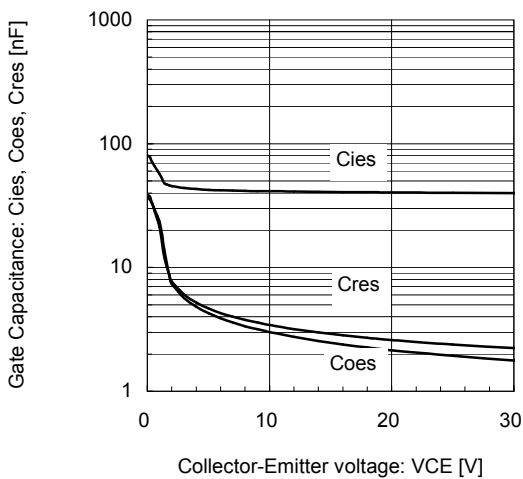
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Collector-Emmitter voltage vs. Gate-Emmitter voltage (typ.)
T_j = 25°C / chip



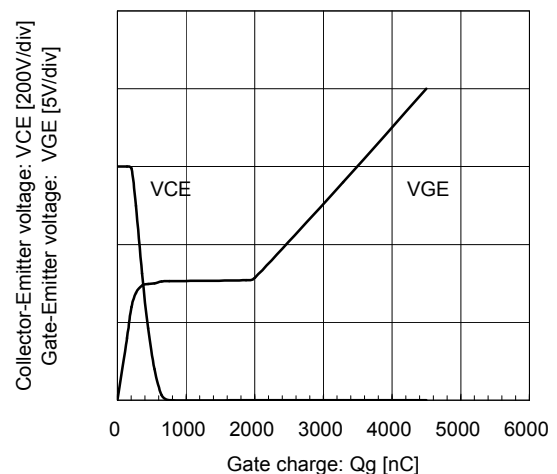
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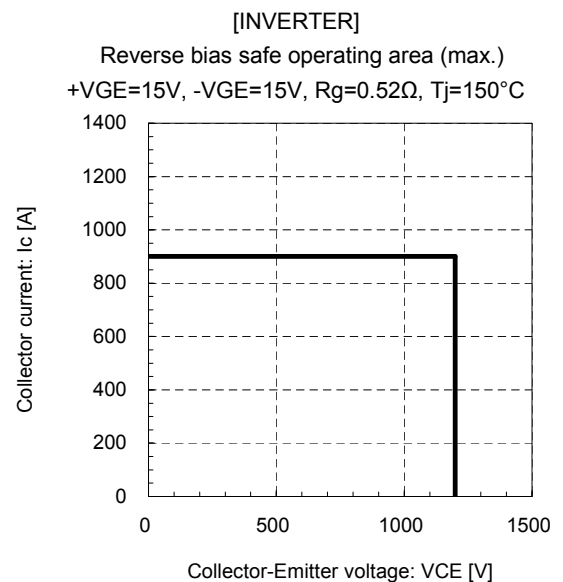
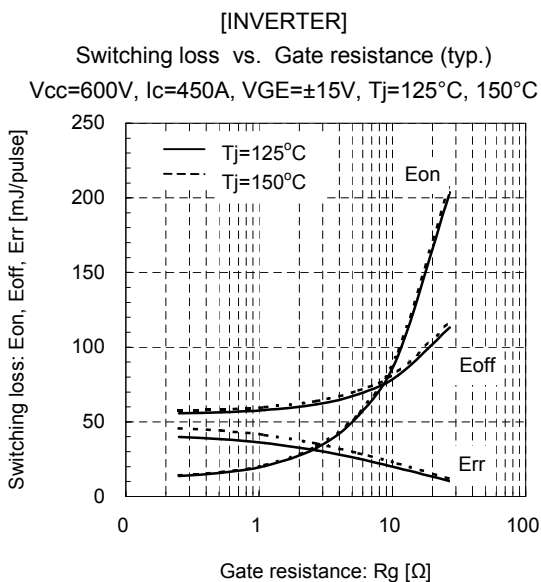
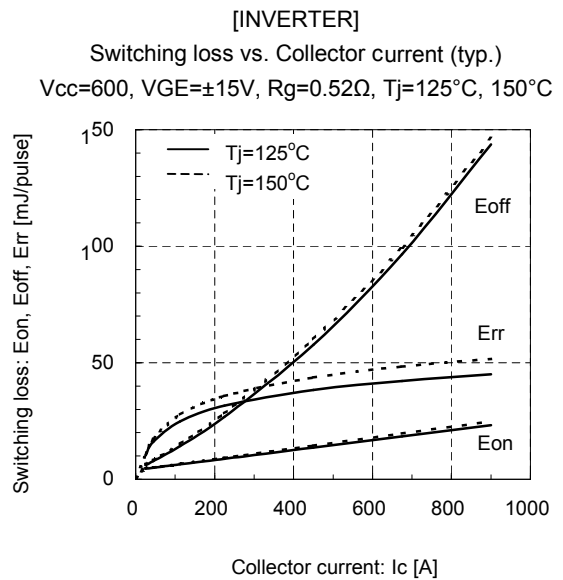
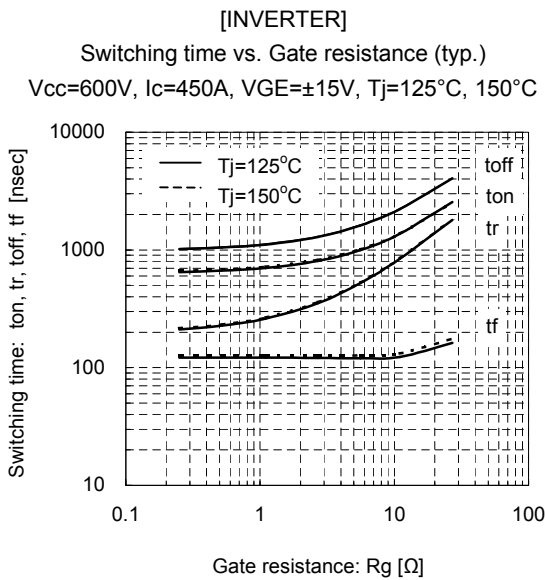
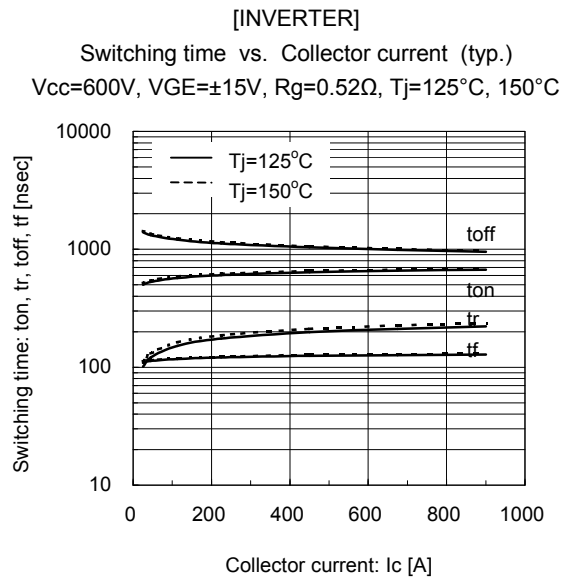
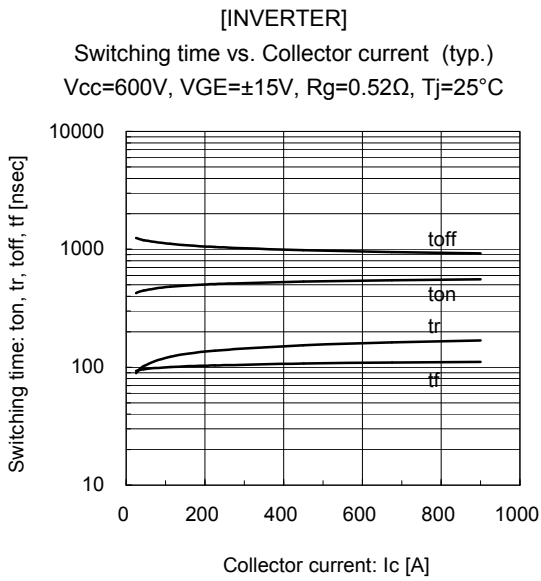
Gate Capacitance vs. Collector-Emmitter Voltage (typ.)
VGE = 0V, f = 1MHz, T_j = 25°C



[INVERTER]

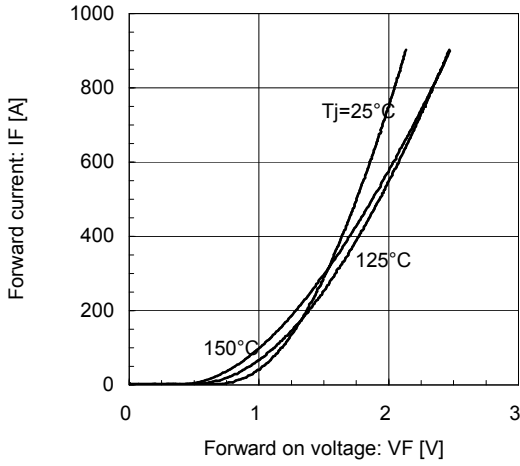
Dynamic Gate Charge (typ.)
Vcc = 600V, Ic = 450A, T_j = 25°C





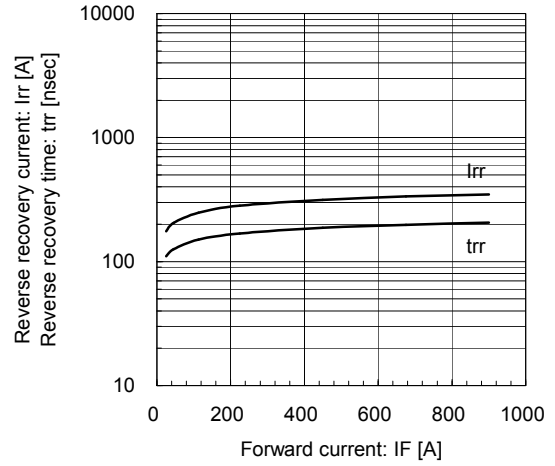
[INVERTER]

Forward Current vs. Forward Voltage (typ.)
chip



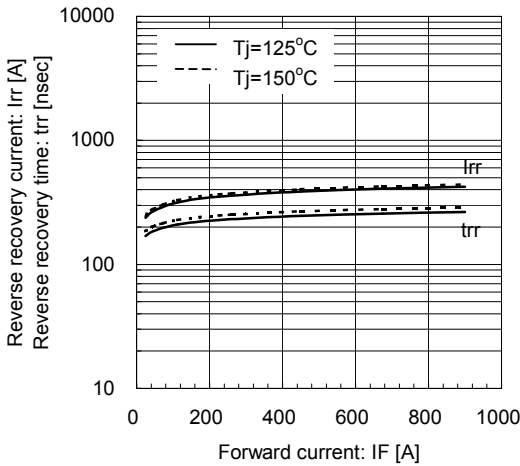
[INVERTER]

Reverse Recovery Characteristics (typ.)
Vcc=600V, VGE=±15V, Rg=0.52Ω, Tj=25°C

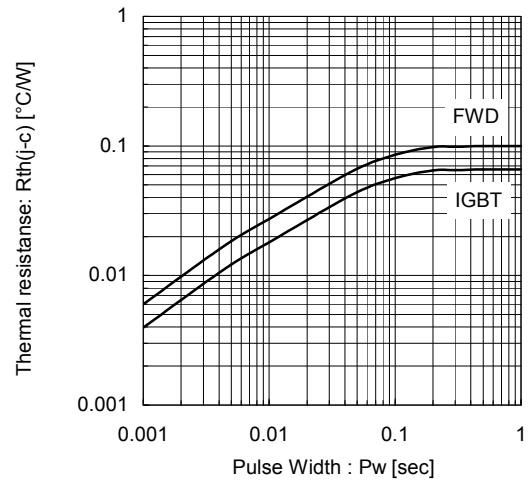


[INVERTER]

Reverse Recovery Characteristics (typ.)
Vcc=600V, VGE=±15V, Rg=0.52Ω, Tj=125°C, 150°C

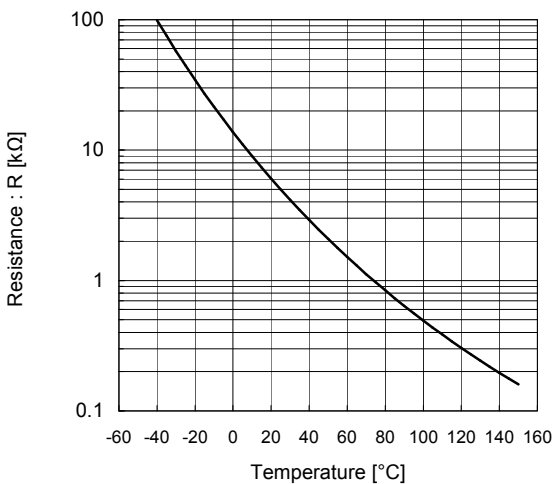


Transient Thermal Resistance (max.)

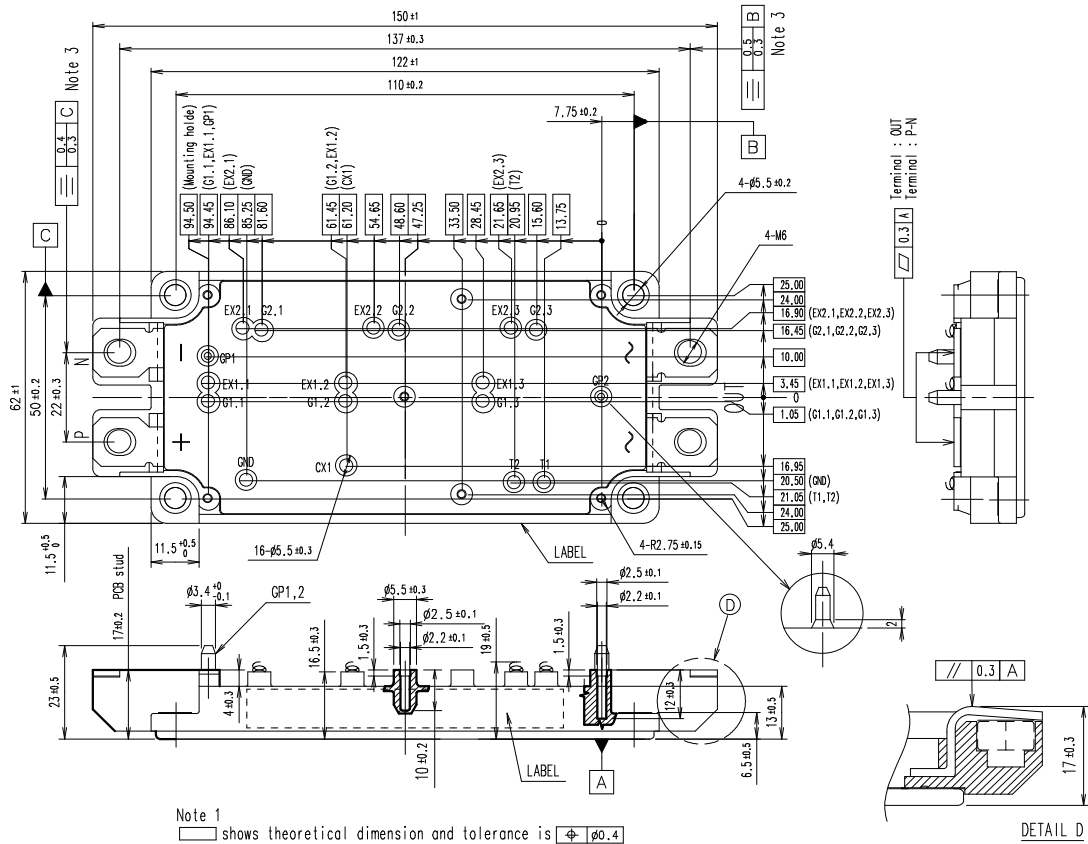


[THERMISTOR]

Temperature characteristic (typ.)



Outline Drawings, mm



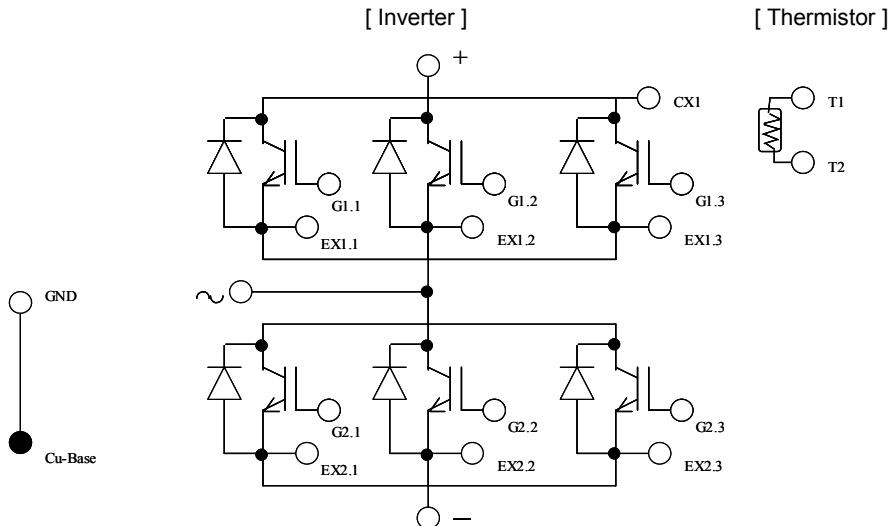
Note 1
 shows theoretical dimension and tolerance is $\phi \pm 0.4$

Note 2
 Rule for PCB
 · Guide pin hole : $\phi 4.0 \pm 0.1$
 · Guide pin distance : 94.45 ± 0.1
 · Spring contact pad : $\phi 3.8 \pm 0.2$
 · Position tol.pad : $\phi \pm 0.4$

Note 3

 Upper value : Terminal hole center
 Lower value : Nut center
 (Including margin of the nut position.)

Equivalent Circuit Schematic



WARNING

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