

2MBI1000VXB-170EA-50

IGBT Modules

IGBT MODULE (V series) 1700V / 1000A / 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 _{CE}	1700	V
	Gate-Emitter voltage	V _{GE}	±20	V
	Collector current	I _C	Tc=25°C 1400	A
		I _C pulse	Tc=100°C 1000	
		I _C pulse	1ms 2000	
		-I _C	1400	
		-I _C pulse	1ms 2800	
	Collector power dissipation	P _C	1 device 6250	W
	Junction temperature	T _J	175	°C
	Operating junction temperature (under switching conditions)	T _{JOP}	150	
	Case temperature	T _C	150	
	Storage temperature	T _{stg}	-40 ~ +150	
Isolation voltage	between terminal and copper base (*1)	V _{iso}	AC : 1min. 4000	VAC
	between thermistor and others (*2)			
	Mounting			
	Main Terminals			
Screw torque (*3)	Sense Terminals	-	M5 6.0	N m
			M8 10.0	
			M4 2.1	

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 : Mounting 3.0 ~ 6.0 Nm (M5) Recommendable Value : Main Terminals 8.0 ~ 10.0 Nm (M8)
Recommendable Value : Sense Terminals 1.8 ~ 2.1 Nm (M4)

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} = 1700V	-	-	6.0	mA
	Gate-Emitter leakage current	I _{GES} V _{CE} = 0V, V _{GE} = ±20V	-	-	1200	nA
	Gate-Emitter threshold voltage	V _{GE(th)} V _{CE} = 20V, I _C = 1000mA	6.0	6.5	7.0	V
	Collector-Emitter saturation voltage	V _{CE(sat)} (terminal) (*4) V _{GE} = 15V I _C = 1000A	Tj=25°C	2.10	2.55	V
			Tj=125°C	2.50	-	
			Tj=150°C	2.60	-	
			Tj=25°C	2.00	2.45	
			Tj=125°C	2.40	-	
			Tj=150°C	2.50	-	
	Internal gate resistance	R _{g(int)}	-	2.00	-	Ω
	Input capacitance	C _{ies} V _{CE} = 10V, V _{GE} = 0V, f = 1MHz	-	94	-	nF
	Turn-on time	t _{on} V _{CC} = 900V	-	1700	-	nsec
		t _r I _C = 1000A	-	500	-	
		t _{r(i)} V _{GE} = ±15V	-	150	-	
	Turn-off time	t _{off} R _G = +1.2/-1.2Ω	-	1600	-	nsec
		t _f L _s =60nH	-	110	-	
	Forward on voltage	V _F (terminal) (*4) V _{GE} = 0V I _F = 1000A	Tj=25°C	1.75	2.20	V
			Tj=125°C	1.90	-	
			Tj=150°C	1.85	-	
			Tj=25°C	1.65	2.10	
			Tj=125°C	1.80	-	
			Tj=150°C	1.75	-	
Thermistor	Reverse recovery time	t _{rr} I _F = 1000A	-	300	-	nsec
	Resistance	R T=25°C	-	5000	-	Ω
	B value	B T=100°C	465	495	520	K

Note *4: Please refer to page 6, there is definition of on-state voltage at terminal.

Thermal resistance characteristics

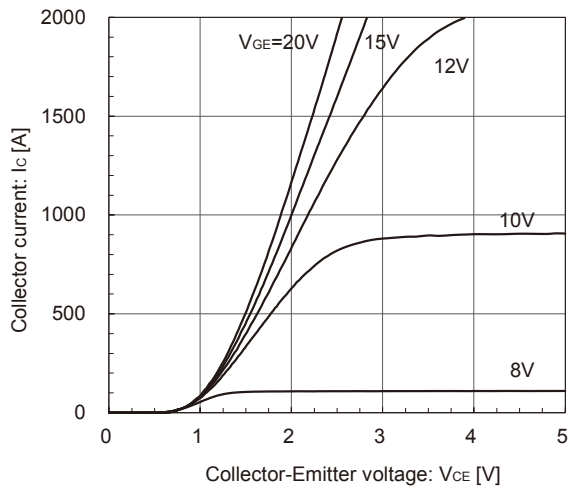
Items	Symbols	Conditions	Characteristics			Units
			min.	typ.	max.	
Thermal resistance (1device)	R _{th(j-c)}	Inverter IGBT	-	-	0.024	°C/W
		Inverter FWD	-	-	0.032	
Contact thermal resistance (1device) (*5)	R _{th(c-f)}	with Thermal Compound	-	0.0083	-	

Note *5: This is the value which is defined mounting on the additional cooling fin with thermal compound.

■ Characteristics (Representative)

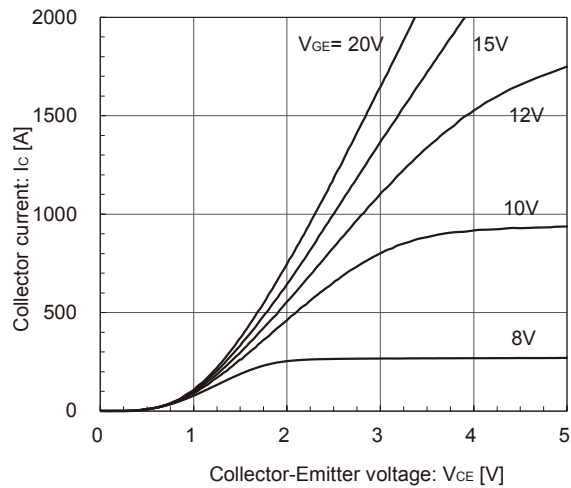
[INVERTER]

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



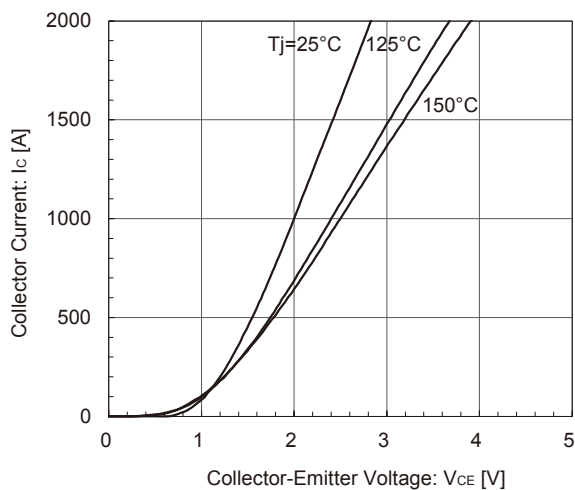
[INVERTER]

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



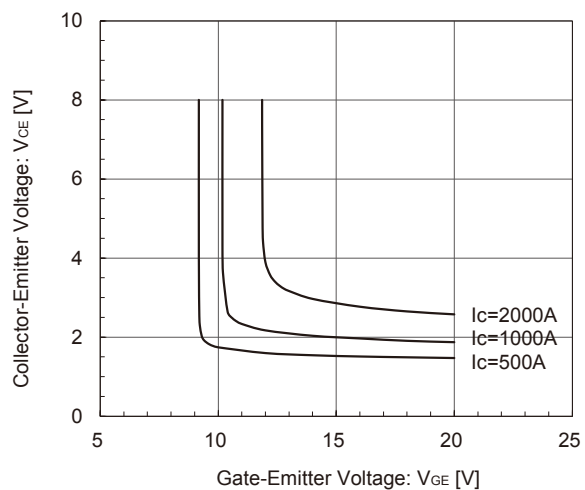
[INVERTER]

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



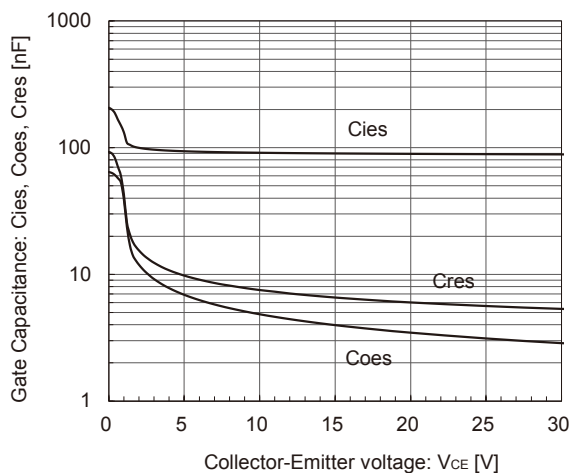
[INVERTER]

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



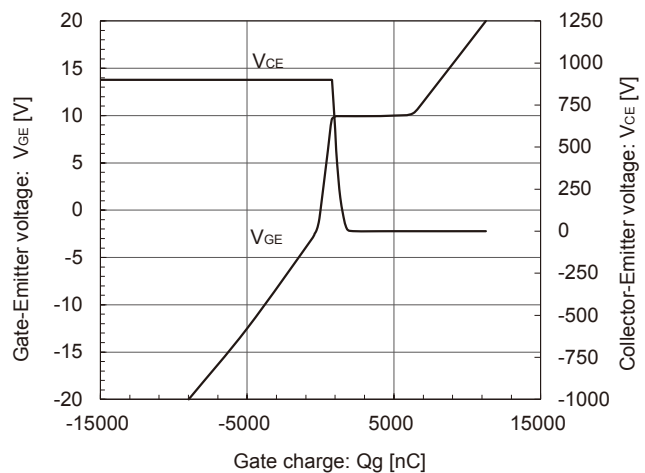
[INVERTER]

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



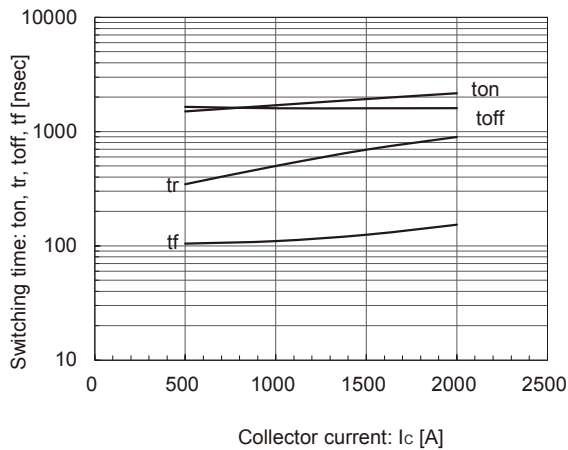
[INVERTER]

Dynamic Gate Charge (typ.)
V_{CC} = 900V, I_C = 1000A, T_j = 25°C



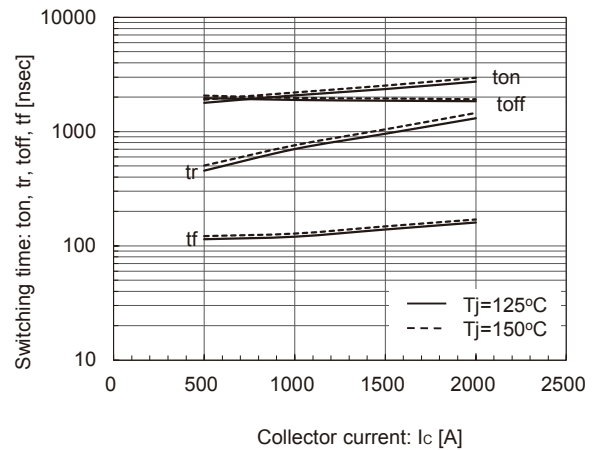
[INVERTER]

Switching time vs. Collector current (typ.)

 $V_{CC}=900V$, $V_{GE}=\pm 15V$, $R_g=+1.2/-1.2\Omega$, $T_J=25^\circ C$ 

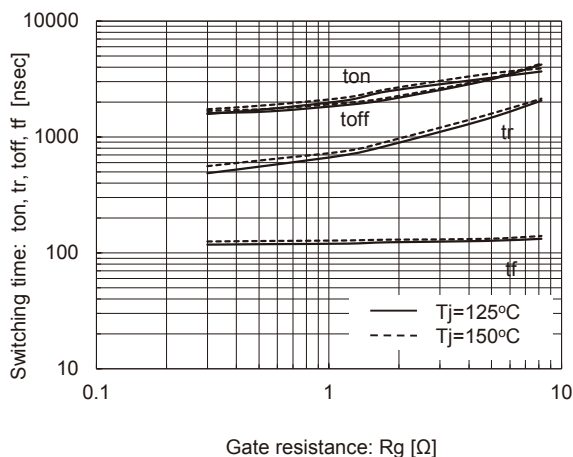
[INVERTER]

Switching time vs. Collector current (typ.)

 $V_{CC}=900V$, $V_{GE}=\pm 15V$, $R_g=+1.2/-1.2\Omega$, $T_J=125^\circ C, 150^\circ C$ 

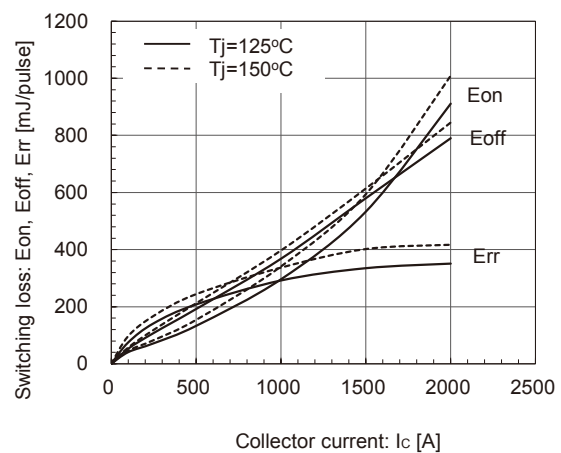
[INVERTER]

Switching time vs. Gate resistance (typ.)(b)

 $V_{CC}=900V$, $I_c=1000A$, $V_{GE}=\pm 15V$, $T_J=125^\circ C, 150^\circ C$ 

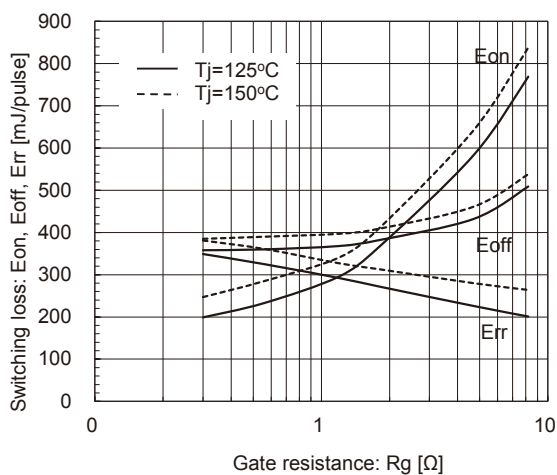
[INVERTER]

Switching loss vs. Collector current (typ.)

 $V_{CC}=900V$, $V_{GE}=\pm 15V$, $R_g=+1.2/-1.2\Omega$, $T_J=125^\circ C, 150^\circ C$ 

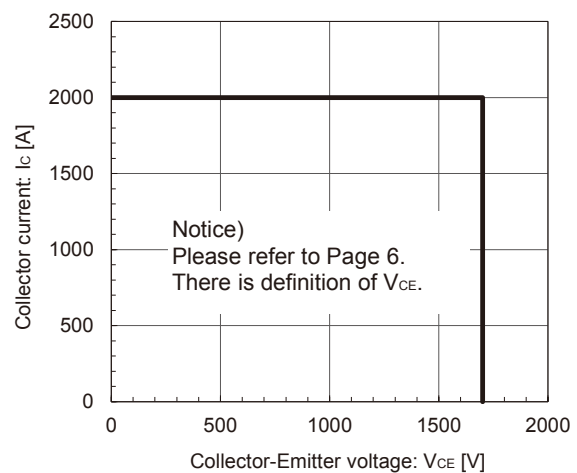
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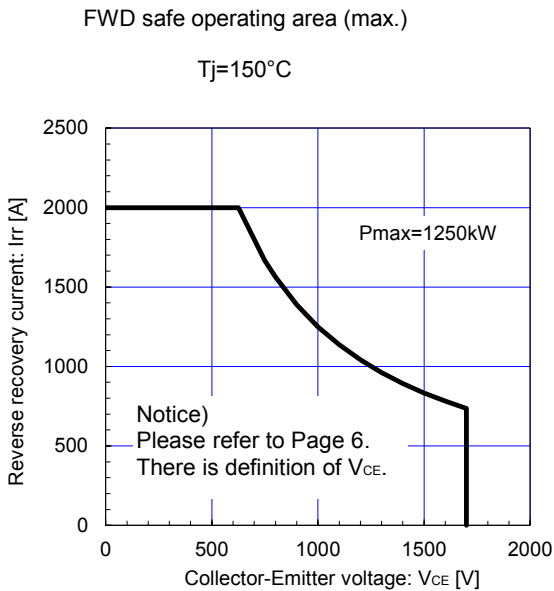
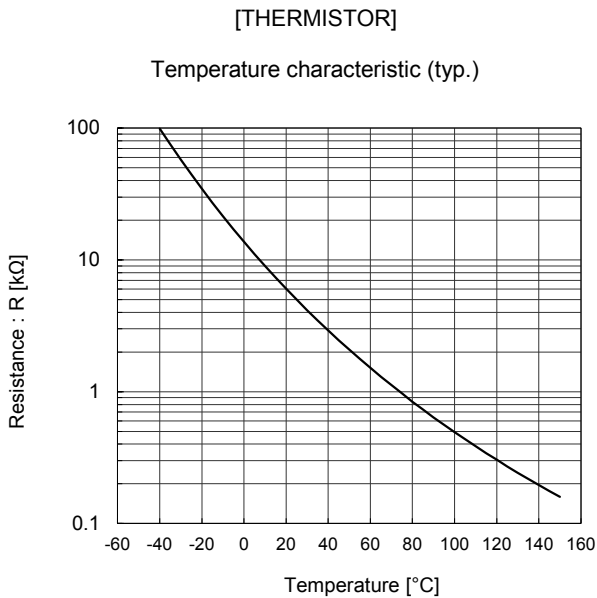
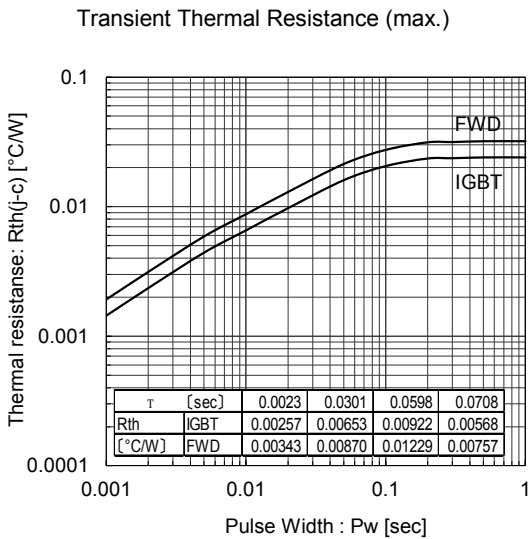
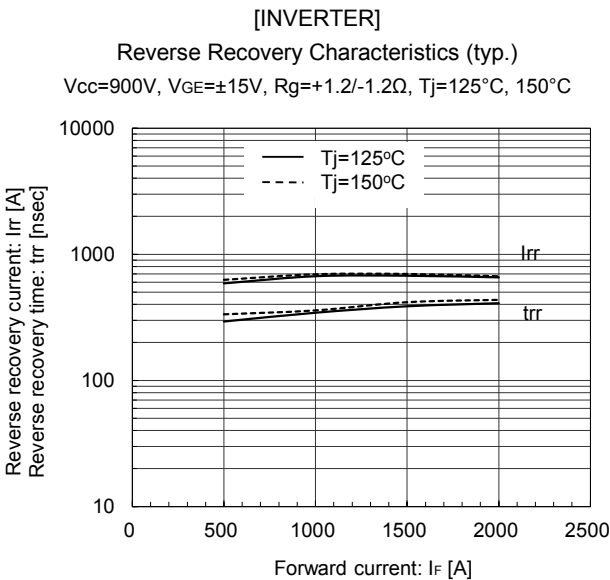
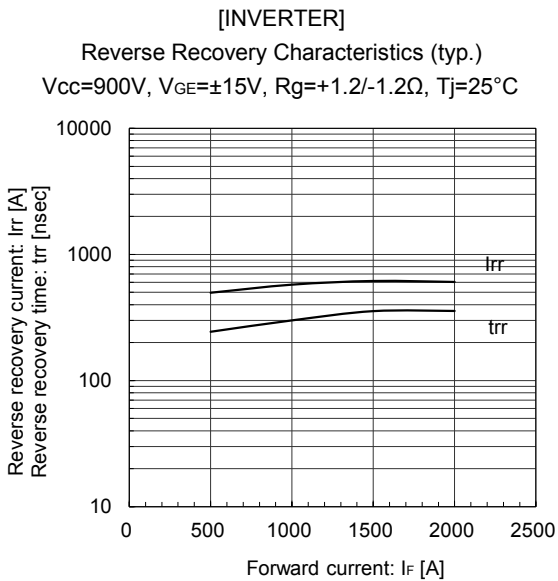
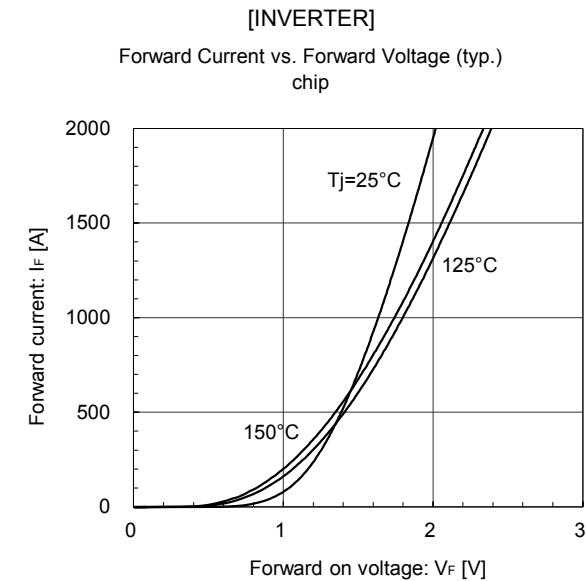
Switching loss vs. Gate resistance (typ.)

 $V_{CC}=900V$, $I_c=1000A$, $V_{GE}=\pm 15V$, $T_J=125^\circ C, 150^\circ C$ 

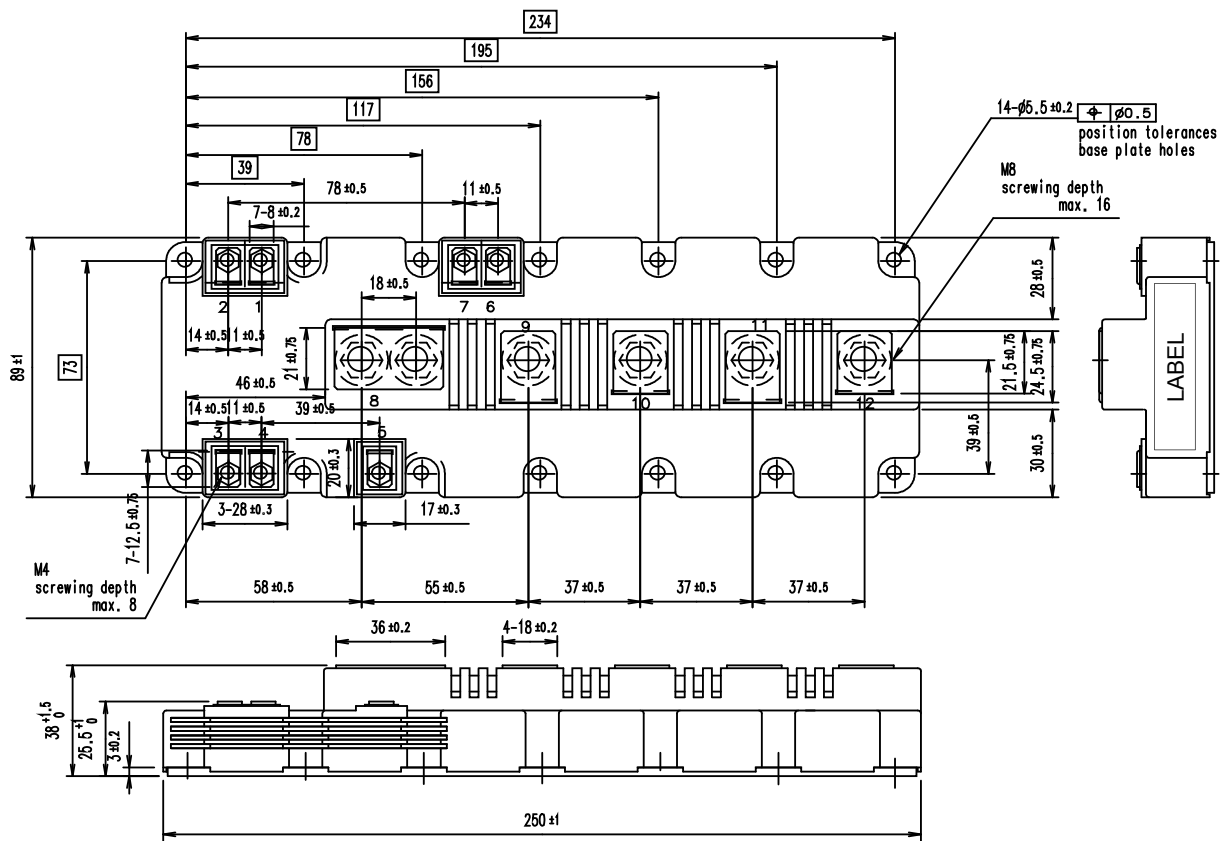
[INVERTER]

Reverse bias safe operating area (max.)

 $+V_{GE}=15V$, $-V_{GE}=15V$, $R_g=+1.2/-1.2\Omega$, $T_J=150^\circ C$ 

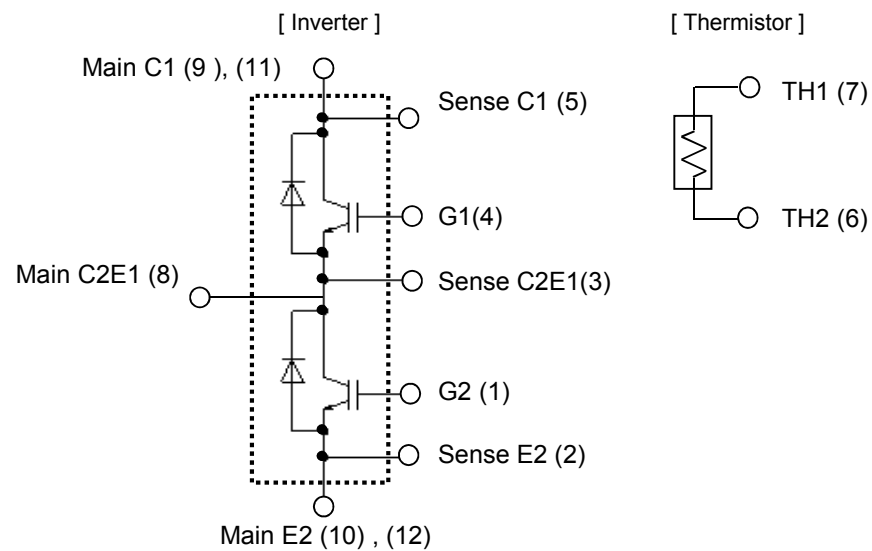


Outline Drawings (Unit: mm)

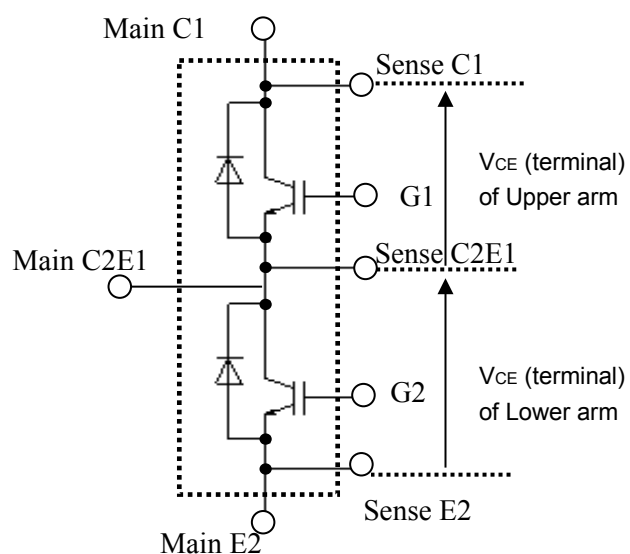


Weight: 1250g(typ.)

Equivalent Circuit



■ Definition of on-state voltage at terminal and switching characteristics



Fuji defined V_{CE} value of terminal by using Sense C1 and Sense C2E1 for Upper arm and Sense C2E1 and Sense E2 for Lower arm .

Switching characteristics of V_{CE} also is defined between Sense C1 and Sense C2E1 for Upper arm and Sense C2E1 and Sense E2 for Lower arm .

Please use these terminals whenever measure spike voltage and on-state voltage .

WARNING

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			• Industrial robots etc.
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• Emergency equipment for responding to disasters and anti-burglary devices	• Safety devices
• Medical equipment	
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• Submarine repeater equipment		
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