

6MBI550V-120-50

IGBT Modules

IGBT MODULE (V series) 1200V / 550A / 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 $T_c=25^\circ\text{C}$	750	A
		$I_{C(pulse)}$	1ms $T_c=100^\circ\text{C}$	550	
		$-I_C$		1100	
		$-I_{C(pulse)}$	1ms	550	
Collector power dissipation	P_C	1 device	1100	W	
Junction temperature	T_j		2500		
Operating junction temperature (under switching conditions)	T_{jop}		150	$^\circ\text{C}$	
Case temperature	T_c		125		
Storage temperature	T_{stg}		-40 ~ +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		

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)

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

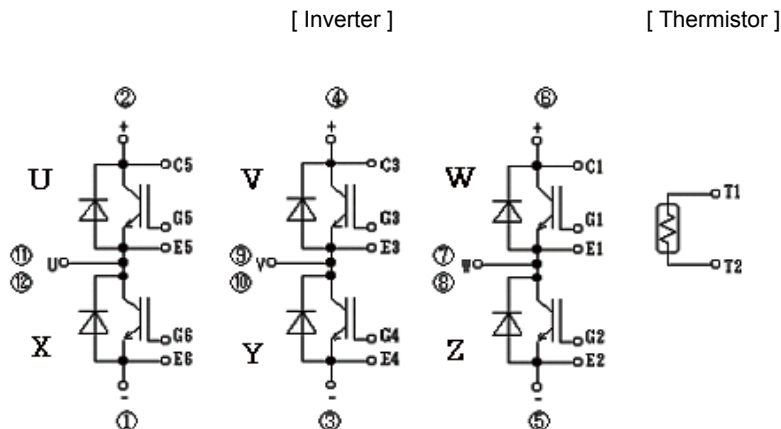
Items	Symbols	Conditions	Characteristics			Units	
			min.	typ.	max.		
Zero gate voltage collector current	I _{CEs}	V _{GE} = 0V, V _{CE} = 1200V	-	-	3.0	mA	
Gate-Emitter leakage current	I _{GES}	V _{CE} = 0V, V _{GE} = ±20V	-	-	600	nA	
Gate-Emitter threshold voltage	V _{GE(th)}	V _{CE} = 20V, I _c = 600mA	6.0	6.5	7.0	V	
Collector-Emitter saturation voltage	V _{CE(sat)} (terminal)	V _{GE} = 15V I _c = 600A	T _J =25°C	-	2.50	2.95	V
			T _J =125°C	-	2.85	-	
			T _J =150°C	-	2.90	-	
	V _{CE(sat)} (chip)	V _{GE} = 15V I _c = 600A	T _J =25°C	-	1.85	2.10	
			T _J =125°C	-	2.20	-	
T _J =150°C	-	2.25	-				
Internal gate resistance	R _{G(int)}	-	-	1.10	-	Ω	
Input capacitance	C _{ies}	V _{CE} = 10V, V _{GE} = 0V, f = 1MHz	-	48	-	nF	
Turn-on time	t _{on}	V _{CC} = 600V I _c = 600A V _{GE} = ±15V R _G = 0.62Ω L _S = 80nH	-	550	-	nsec	
	t _r		-	180	-		
	t _{r(i)}		-	120	-		
Turn-off time	t _{off}	R _G = 0.62Ω L _S = 80nH	-	1050	-	nsec	
	t _r		-	110	-		
Forward on voltage	V _F (terminal)	V _{GE} = 0V, I _F = 600A	T _J =25°C	-	2.40	2.85	V
			T _J =125°C	-	2.55	-	
			T _J =150°C	-	2.50	-	
	V _F (chip)	V _{GE} = 0V, I _F = 600A	T _J =25°C	-	1.75	2.20	
			T _J =125°C	-	1.90	-	
T _J =150°C	-	1.85	-				
Reverse recovery time	t _{rr}	I _F = 600A	-	200	-	nsec	
Thermistor	Resistance	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	-	-	0.060	°C/W
		Inverter FWD	-	-	0.100	
Contact thermal resistance (1device) (*5)	R _{th(c-f)}	with Thermal Compound	-	0.0167	-	

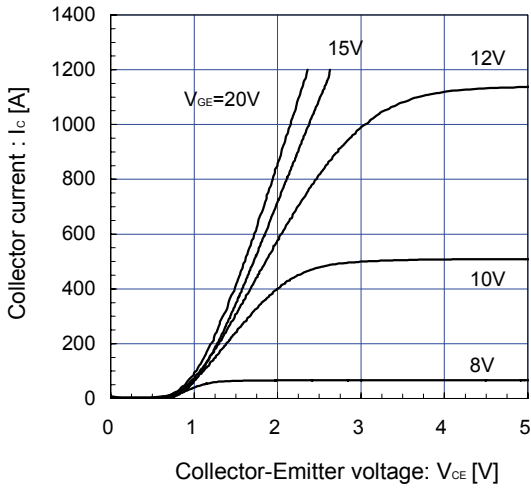
Note *5: This is the value which is defined mounting on the additional cooling fin with thermal compound.

■ Equivalent Circuit Schematic

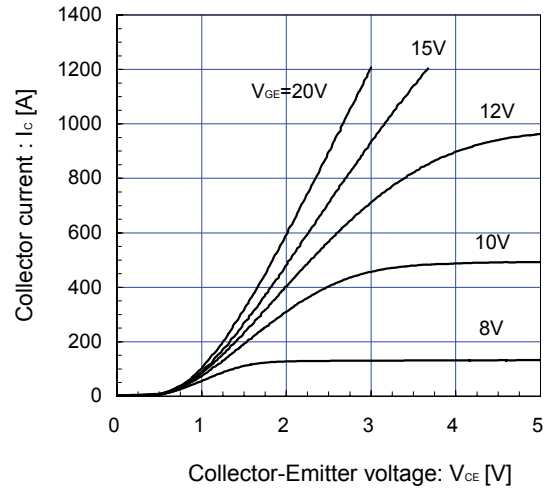


■ Characteristics (Representative)

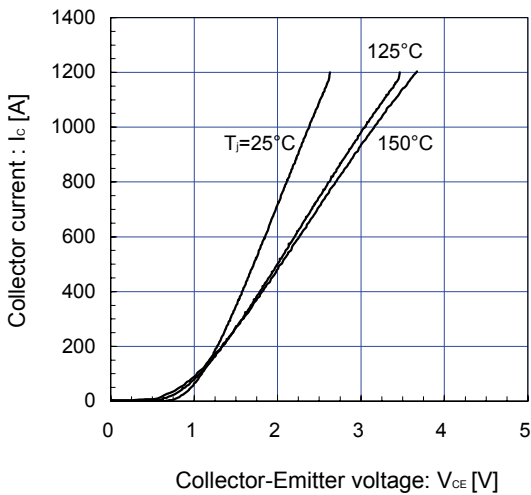
[Inverter]
Collector current vs. Collector-Emitter voltage (typ.)
 $T_j = 25^\circ\text{C}$ / chip



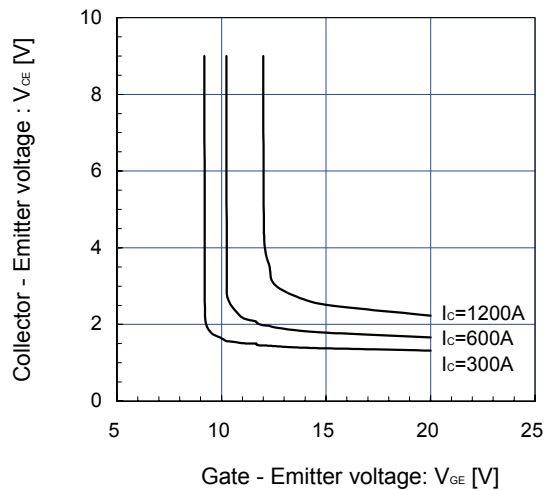
[Inverter]
Collector current vs. Collector-Emitter voltage (typ.)
 $T_j = 150^\circ\text{C}$ / chip



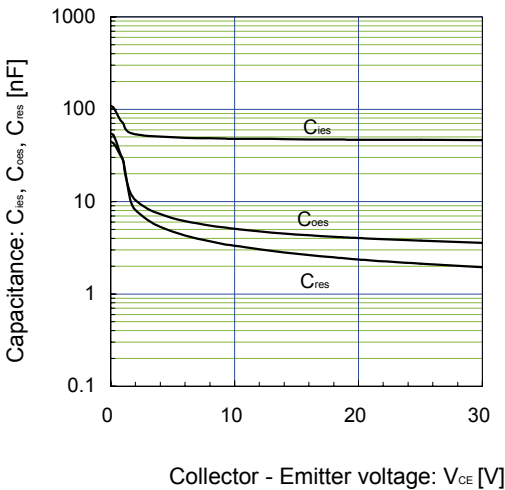
[Inverter]
Collector current vs. Collector-Emitter voltage (typ.)
 $V_{GE} = 15\text{V}$ / chip



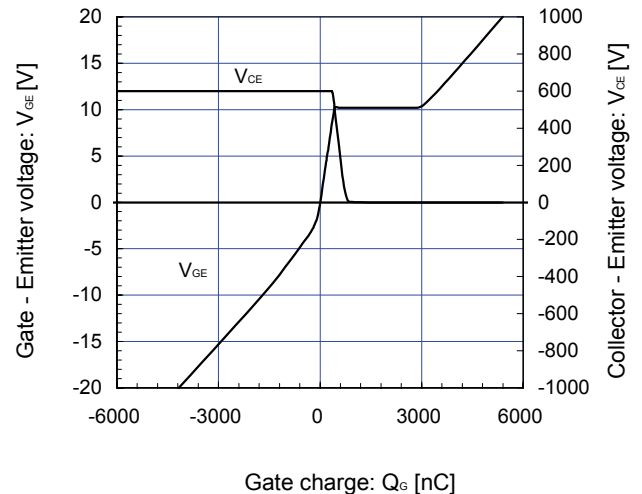
[Inverter]
Collector-Emitter voltage vs. Gate-Emitter voltage (typ.)
 $T_j = 25^\circ\text{C}$ / chip



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

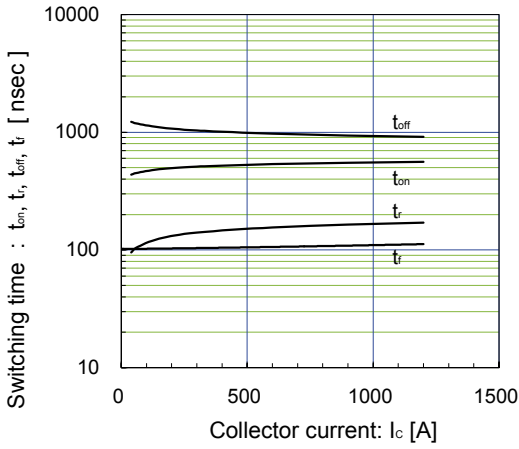


[Inverter]
Dynamic gate charge (typ.)
 $V_{CC} = 600\text{V}$, $I_c = 600\text{A}$, $T_j = 25^\circ\text{C}$



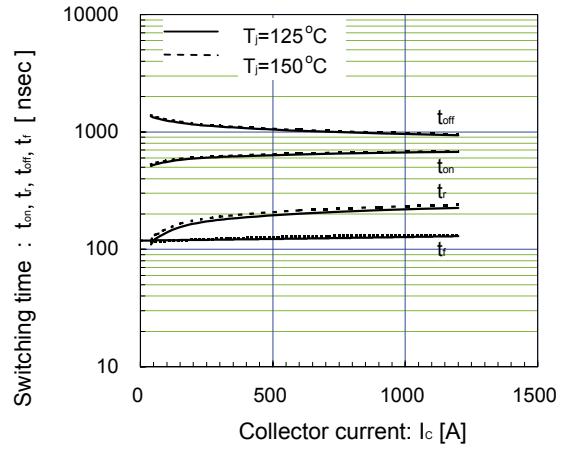
[Inverter]

Switching time vs. Collector current (typ.)
 $V_{CC}=600V, V_{GE}=\pm 15V, R_G=0.62\Omega, T_J=25^\circ C$



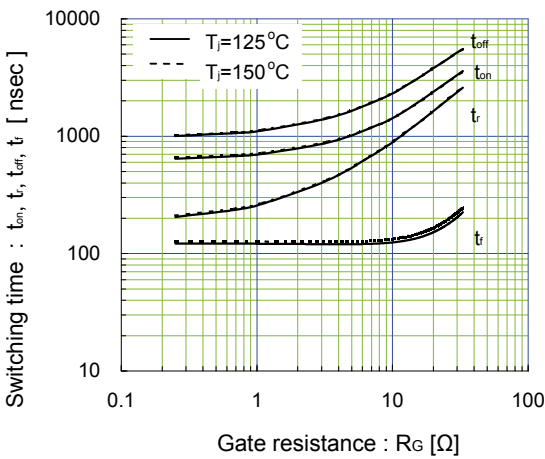
[Inverter]

Switching time vs. Collector current (typ.)
 $V_{CC}=600V, V_{GE}=\pm 15V, R_G=0.62\Omega, T_J=125^\circ C, 150^\circ C$



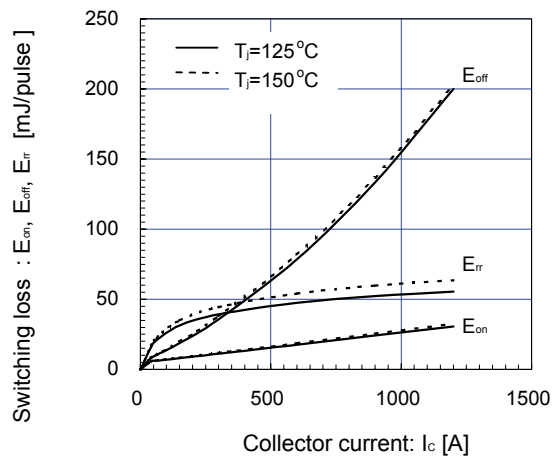
[Inverter]

Switching time vs. gate resistance (typ.)
 $V_{CC}=600V, I_C=550A, V_{GE}=\pm 15V, T_J=125^\circ C, 150^\circ C$



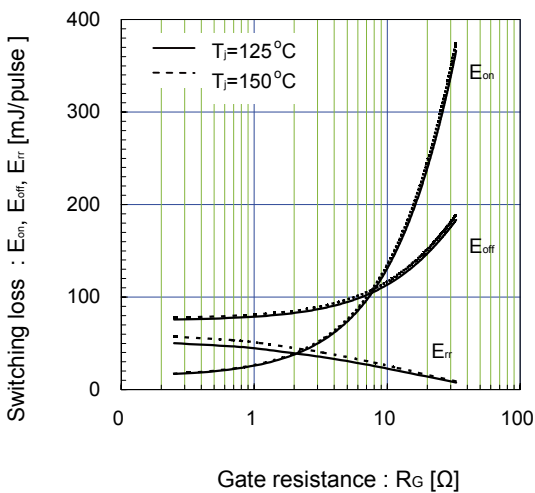
[Inverter]

Switching loss vs. Collector current (typ.)
 $V_{CC}=600V, V_{GE}=\pm 15V, R_G=0.62\Omega, T_J=125^\circ C, 150^\circ C$



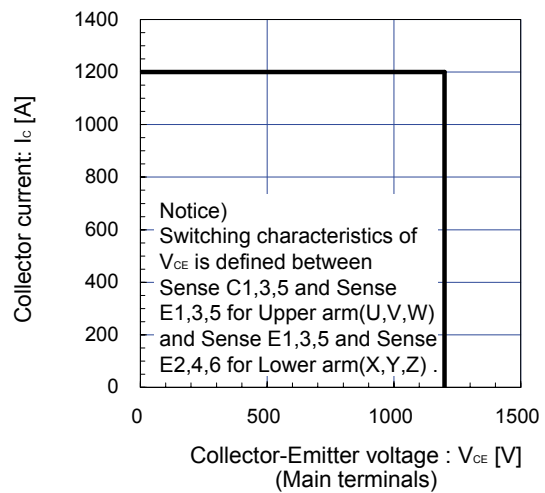
[Inverter]

Switching loss vs. gate resistance (typ.)
 $V_{CC}=600V, I_C=600A, V_{GE}=\pm 15V, T_J=125^\circ C, 150^\circ C$



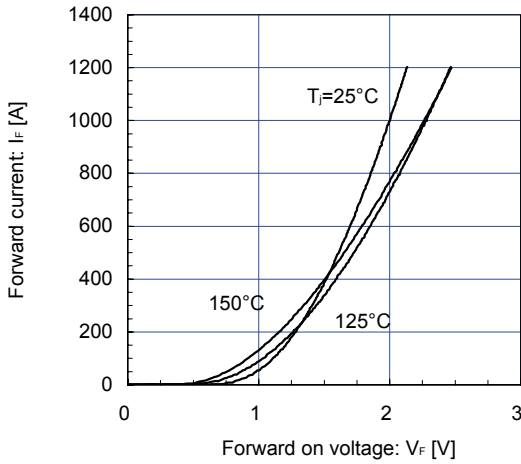
[Inverter]

Reverse bias safe operating area (max.)
 $+V_{GE}=15V, -V_{GE} \le 15V, R_G \ge 0.62\Omega, T_J=150^\circ C$



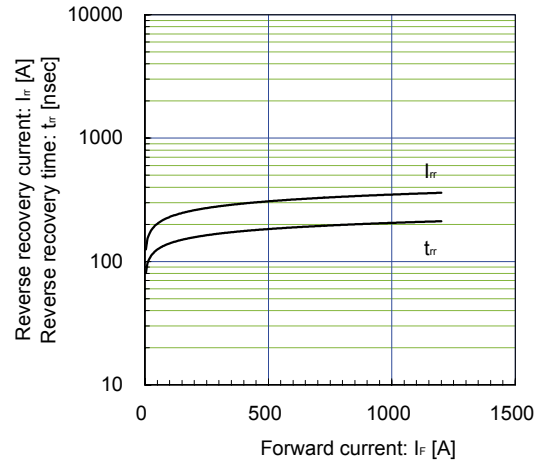
[INVERTER]

Forward Current vs. Forward Voltage (typ.)
chip



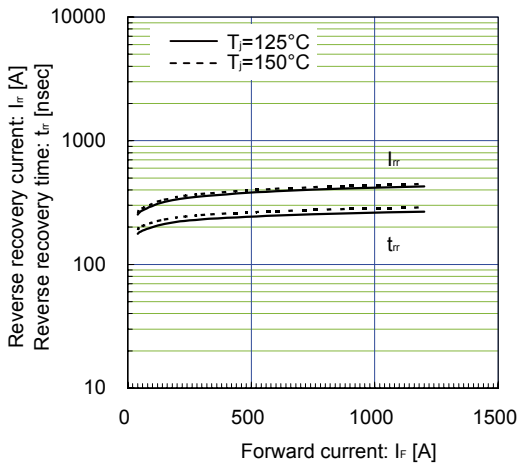
[INVERTER]

Reverse Recovery Characteristics (typ.)
 $V_{CC}=600V, V_{GE}=\pm 15V, R_G=0.62\Omega, T_J=25^\circ C$

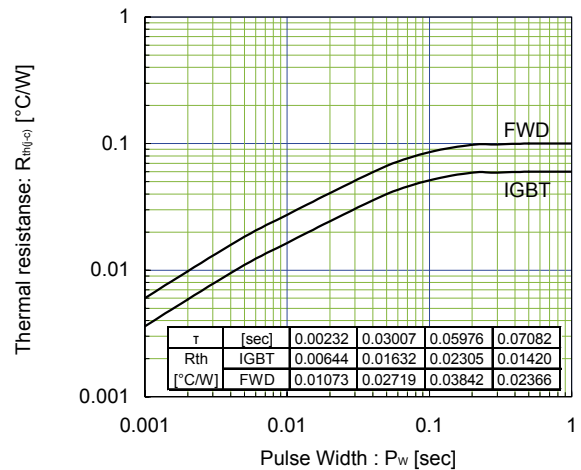


[INVERTER]

Reverse Recovery Characteristics (typ.)
 $V_{CC}=600V, V_{GE}=\pm 15V, R_G=0.62\Omega, T_J=125^\circ C, 150^\circ C$

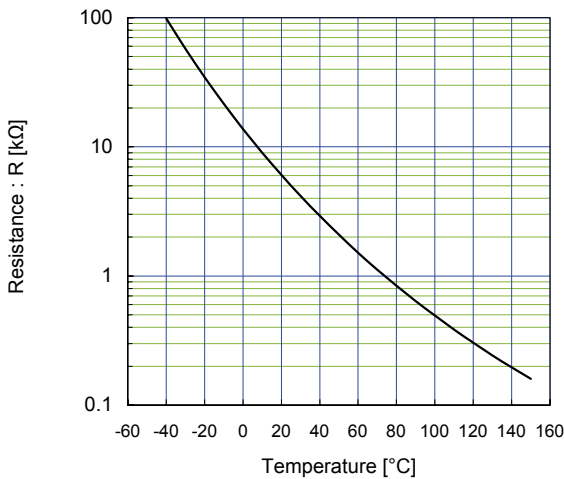


Transient Thermal Resistance (max.)



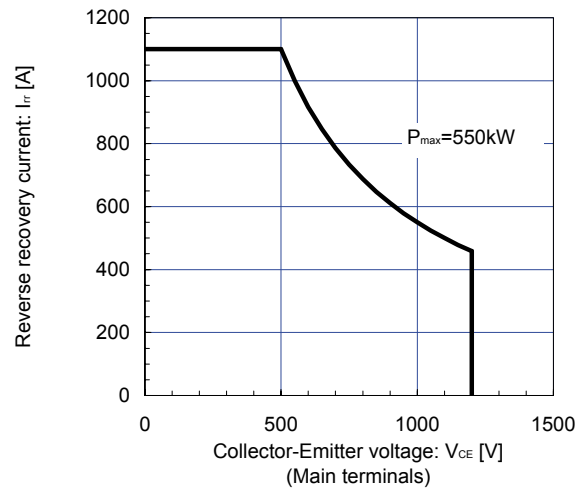
[THERMISTOR]

Temperature characteristic (typ.)

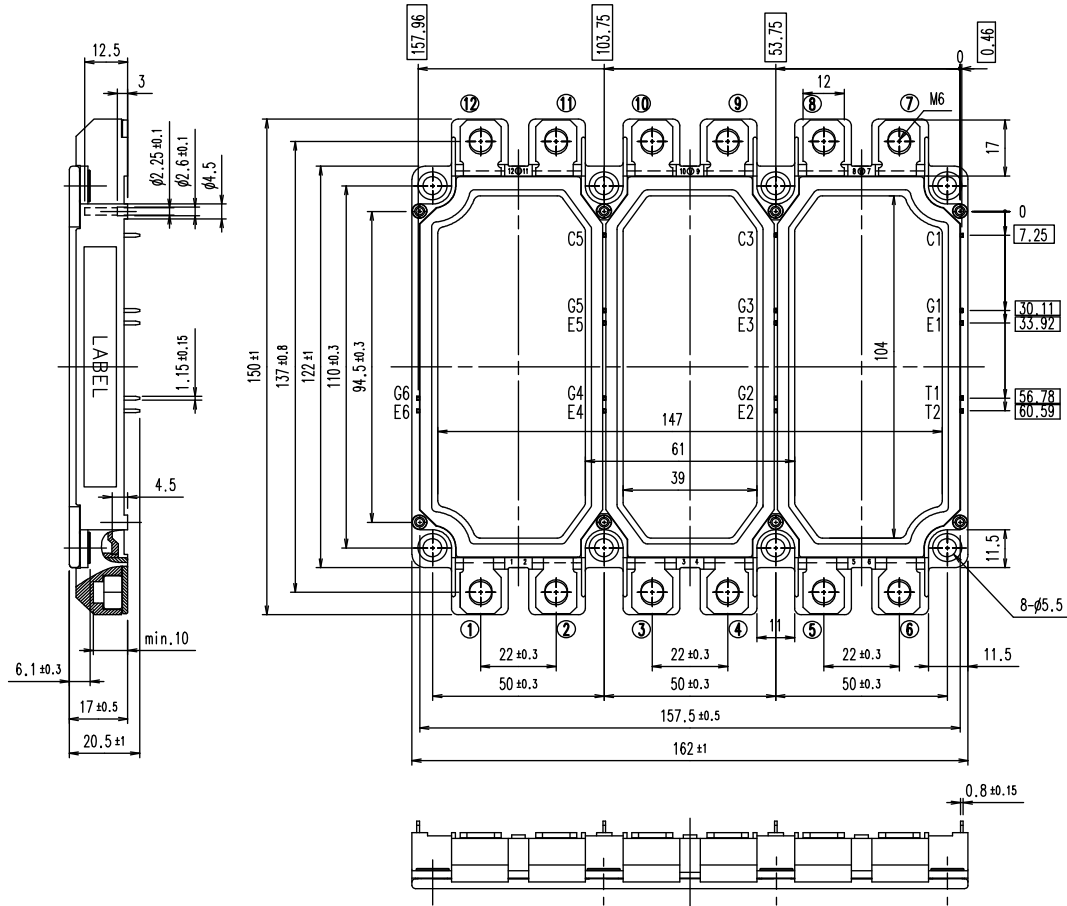


FWD safe operating area (max.)

$T_J=150^\circ C$



■ Outline Drawings, mm



WARNING

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