

6MBI550V-120-50

IGBT Modules

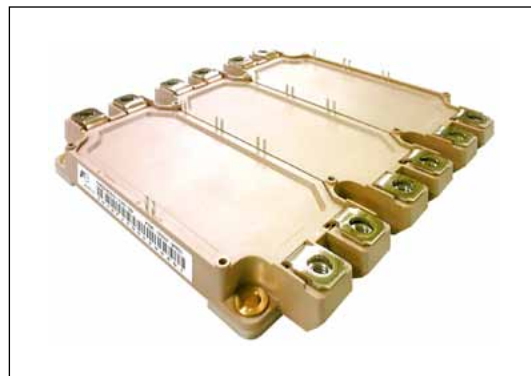
IGBT MODULE (V series) 1200V / 550A / 6 in one package

■ Features

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

■ 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
				$T_c=100^\circ\text{C}$	550	
		$I_{c\ pulse}$	1ms		1100	
		$-I_c$			550	
		$-I_{c\ pulse}$	1ms		1100	
	Collector power dissipation	P_c	1 device		2500	W
Junction temperature		T_j			175	$^\circ\text{C}$
Operating junction temperature (under switching conditions)		T_{jop}			150	
Case temperature		T_c			125	
Storage temperature		T_{slg}			$-40 \sim +125$	
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 $T_J = 25^\circ\text{C}$ unless otherwise specified)

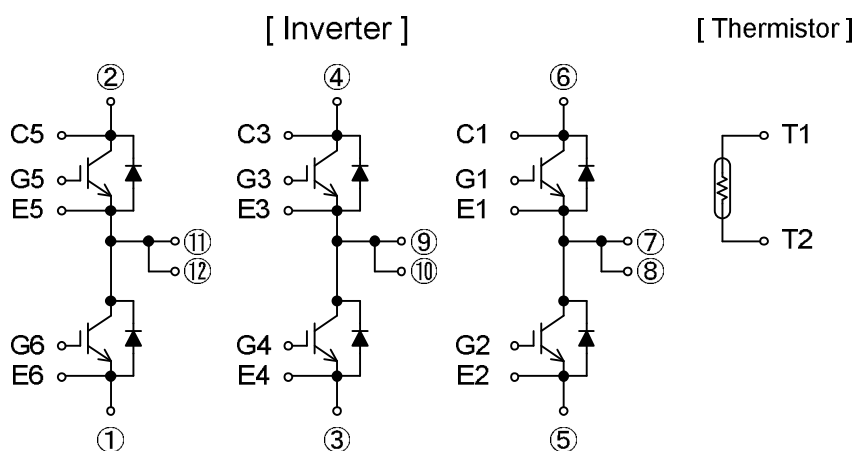
Items		Symbols	Conditions		Characteristics			Units
					min.	typ.	max.	
Inverter	Zero gate voltage collector current	I _{CES}	V _{GE} = 0V, V _{CE} = 1200V		-	-	3.0	mA
	Gate-Emitter leakage current	I _{GES}	V _{CE} = 0V, V _{GE} = ±20V		-	-	600	nA
	Gate-Emitter threshold voltage	V _{GE (th)}	V _{CE} = 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}			-	1050	-	nsec
		t _f			-	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	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	-	-	0.060	$^\circ\text{C/W}$
		Inverter FWD	-	-	0.100	
Contact thermal resistance (1device) (*1)	$R_{th(c-f)}$	with Thermal Compound	-	0.0167	-	

Note *1: This is the value which is defined mounting on the additional cooling fin with thermal compound.

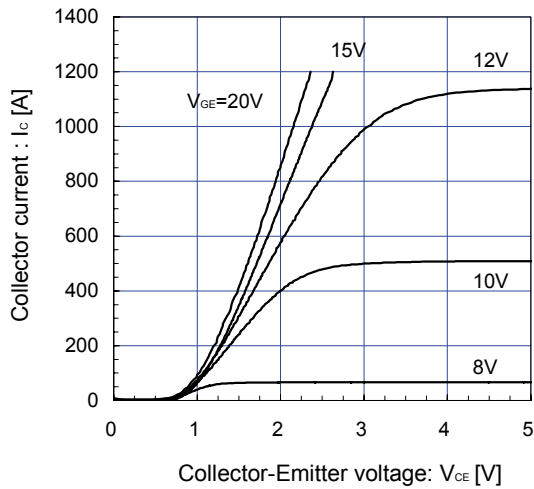
■ Equivalent Circuit Schematic



■ Characteristics (Representative)

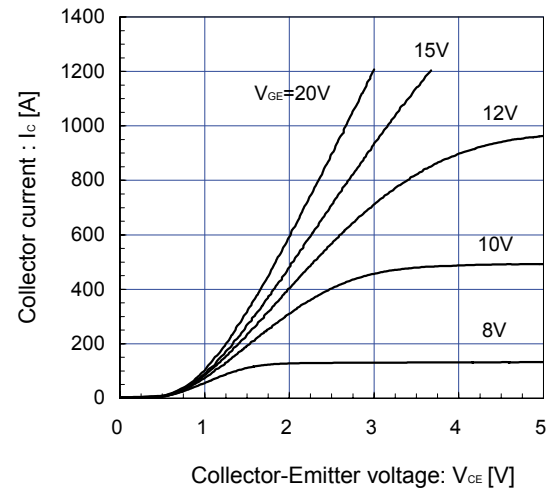
[Inverter]

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

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

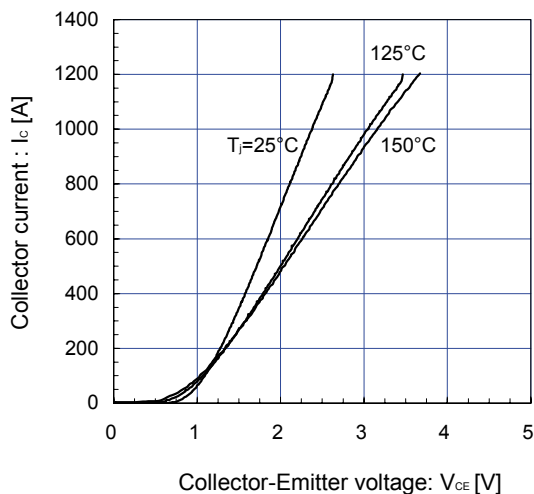
[Inverter]

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

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

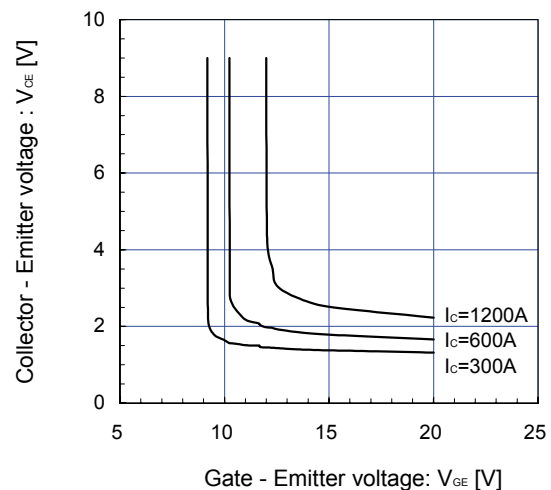
[Inverter]

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

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

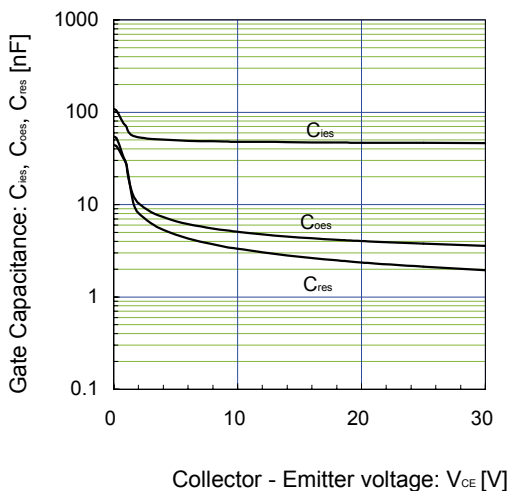
[Inverter]

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

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

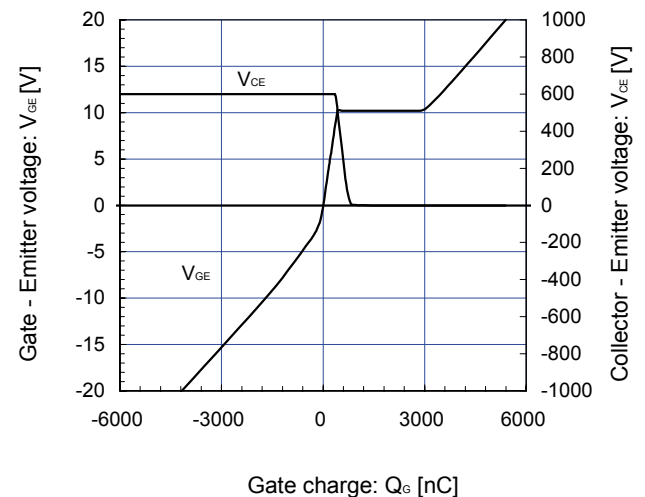
[Inverter]

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

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

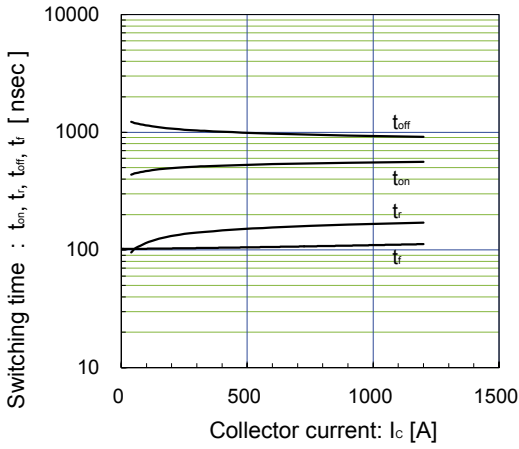
[Inverter]

Dynamic gate charge (typ.)

 $V_{CC} = 600\text{V}$, $I_C = 600\text{A}$, $T_J = 25^\circ\text{C}$ 

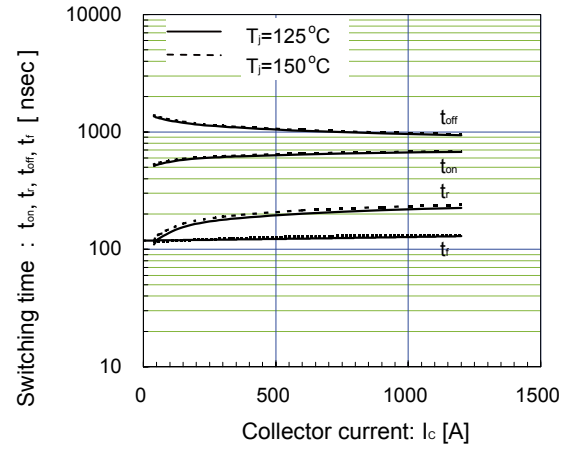
[Inverter]

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



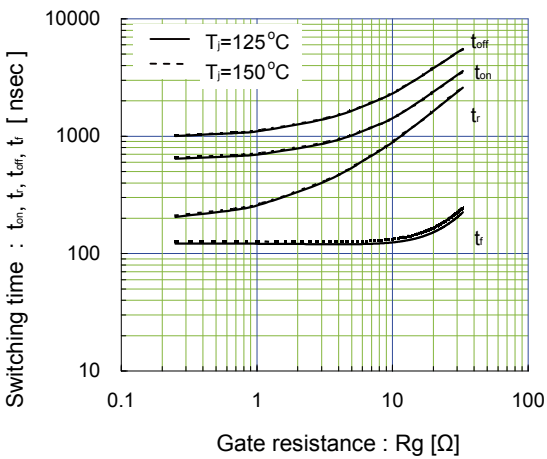
[Inverter]

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



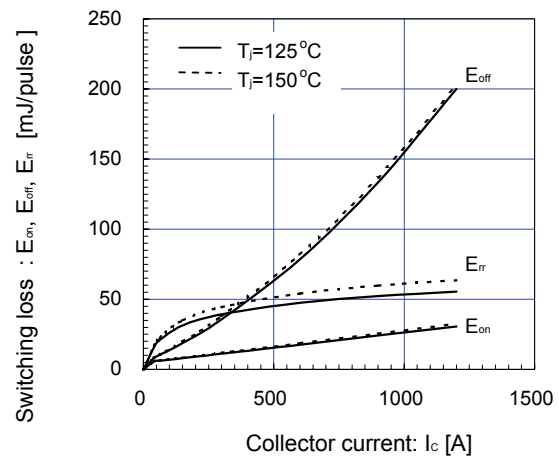
[Inverter]

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



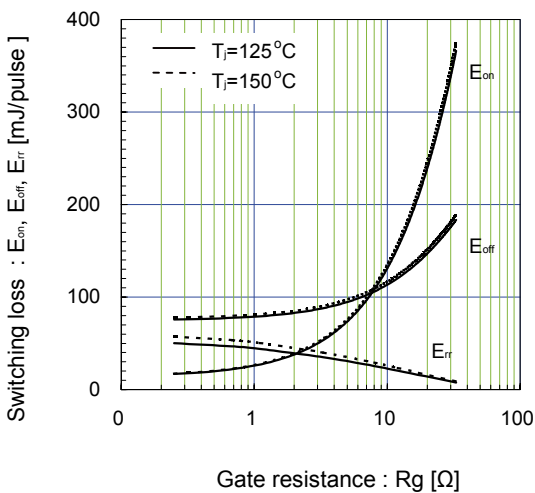
[Inverter]

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



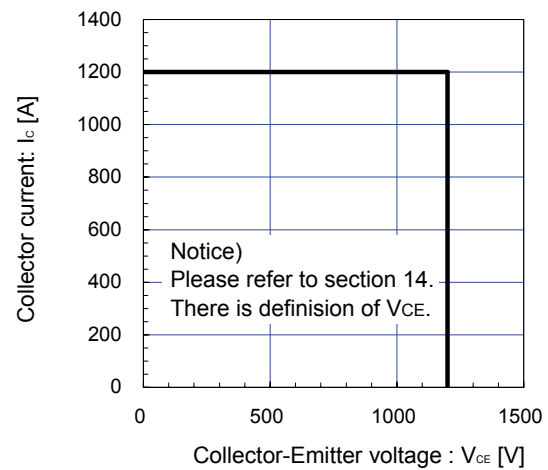
[Inverter]

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



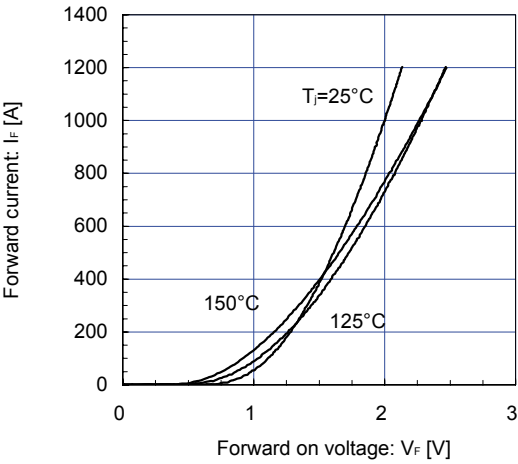
[Inverter]

Reverse bias safe operating area (max.)
 $+V_{GE}=15V, -V_{GE} \leq 15V$, $R_g \geq 0.62\Omega$, $T_j=150^\circ C$



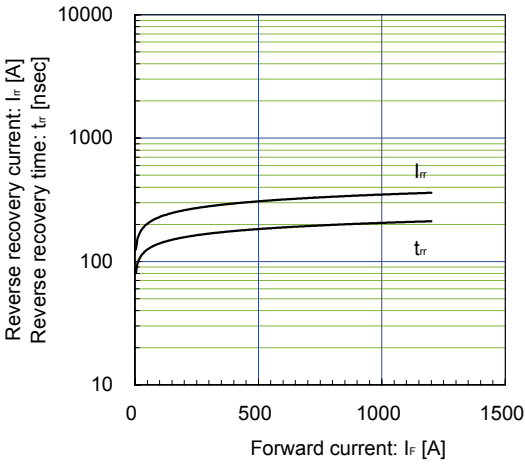
[INVERTER]

Forward Current vs. Forward Voltage (typ.)
chip



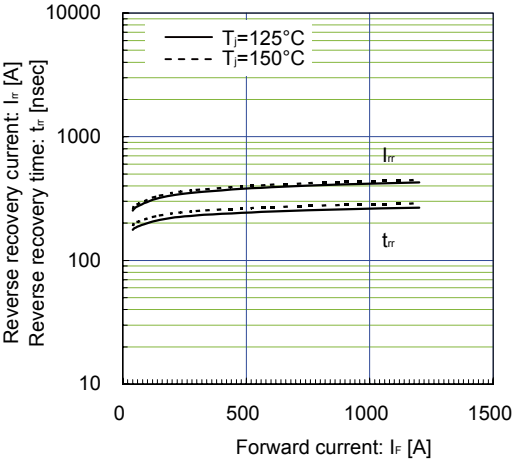
[INVERTER]

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

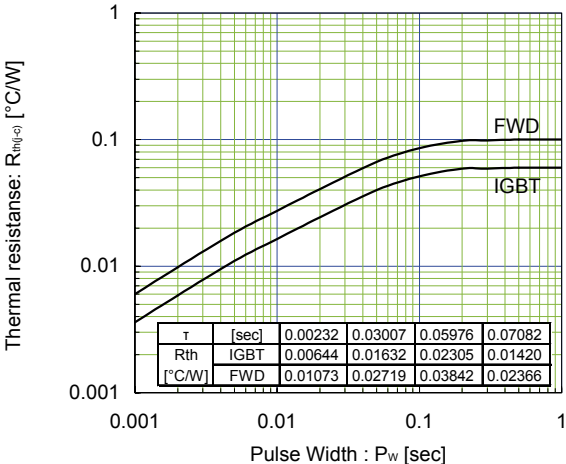


[INVERTER]

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

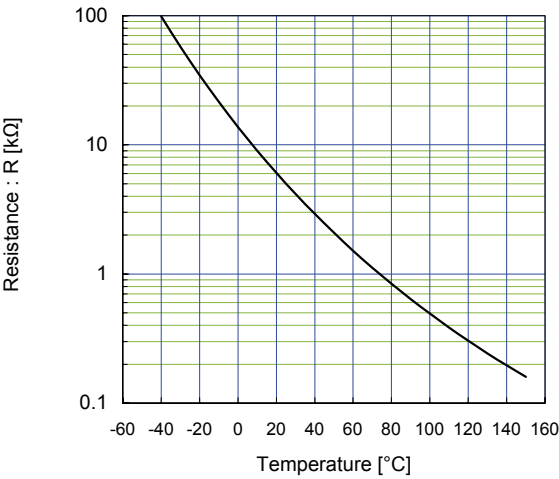


Transient Thermal Resistance (max.)

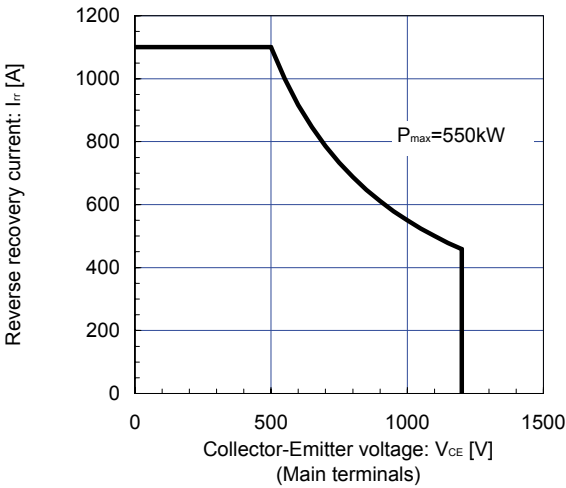


[THERMISTOR]

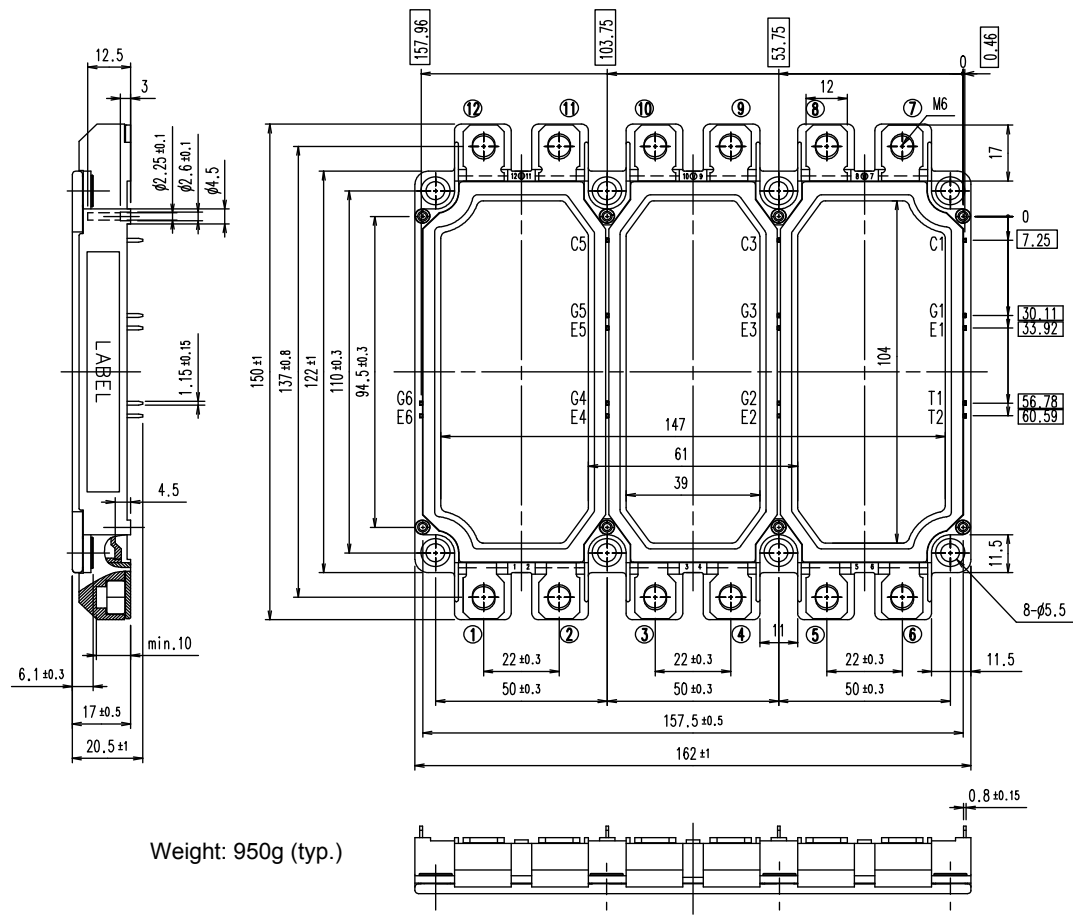
Temperature characteristic (typ.)



FWD safe operating area (max.)
 $T_J=150^{\circ}\text{C}$



■ Outline Drawings, mm



WARNING

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