

2MBI600VN-120-50

IGBT Modules

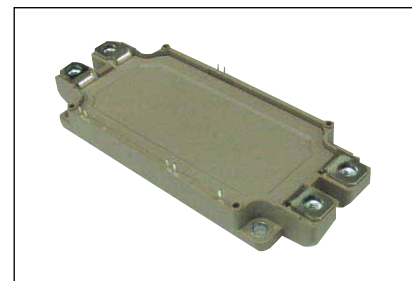
IGBT MODULE (V series) 1200V / 600A / 2 in one package

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	T _c =25°C	750	A
				T _c =100°C	600	
		I _c pulse	1ms	1200		
		-I _c		600		
		-I _c pulse	1ms	1200		
	Collector power dissipation	P _c	1 device	3750	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) between thermistor and others (*2)	V _{iso}	AC : 1min.		2500	VAC
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 : Mounting : 2.5-3.5 Nm (M5) Note *4: Recommendable value : Terminals : 3.5-4.5 Nm (M6)

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} = 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	-	2.65	3.10	V
						T _J =125°C	-	3.00	-	
						T _J =150°C	-	3.05	-	
				V _{CE (sat)} (chip)		T _J =25°C	-	1.85	2.30	
						T _J =125°C	-	2.20	-	
	Internal gate resistance			R _{g(int)}	-		-	1.25	-	Ω
	Input capacitance			C _{ies}	V _{CE} = 10V, V _{GE} = 0V, f = 1MHz		-	48	-	nF
	Turn-on time			ton	V _{CC} = 600V		-	550	-	nsec
				tr	I _C = 600A		-	180	-	
				tr (i)	V _{GE} = ±15V		-	120	-	
	Turn-off time			toff	R _G = 0.62Ω		-	1050	-	nsec
				tf	L _S = 80nH		-	110	-	
	Forward on voltage			V _F (terminal)	V _{GE} = 0V I _F = 600A	T _J =25°C	-	2.50	3.00	V
						T _J =125°C	-	2.65	-	
T _J =150°C						-	2.60	-		
V _F (chip)				T _J =25°C		-	1.70	2.15		
				T _J =125°C		-	1.85	-		
					T _J =150°C	-	1.80	-		
Reverse recovery time			trr	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

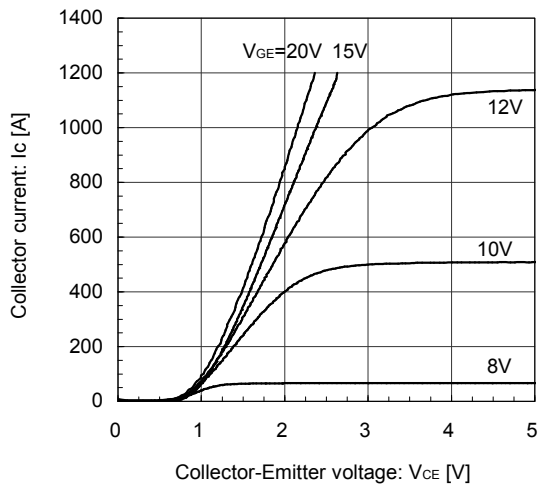
Items	Symbols	Conditions	Characteristics			Units
			min.	typ.	max.	
Thermal resistance (1device)	Rth(j-c)	Inverter IGBT	-	-	0.04	°C/W
		Inverter FWD	-	-	0.06	
Contact thermal resistance (1device) (*5)	Rth(c-f)	with Thermal Compound	-	0.0167	-	

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

■ Characteristics (Representative)

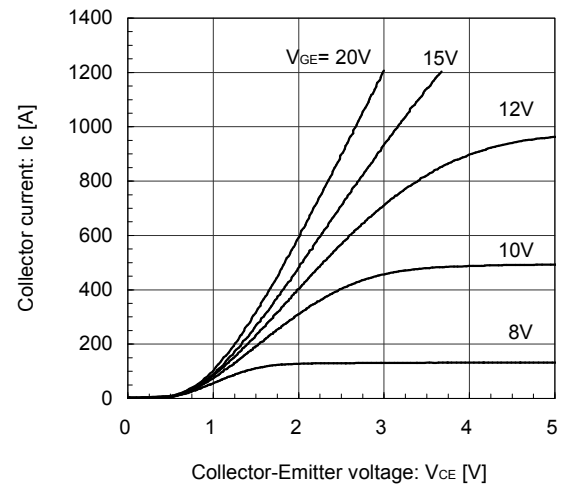
[INVERTER]

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



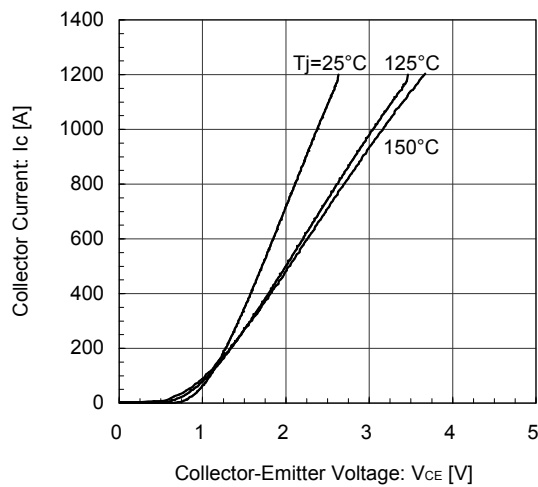
[INVERTER]

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



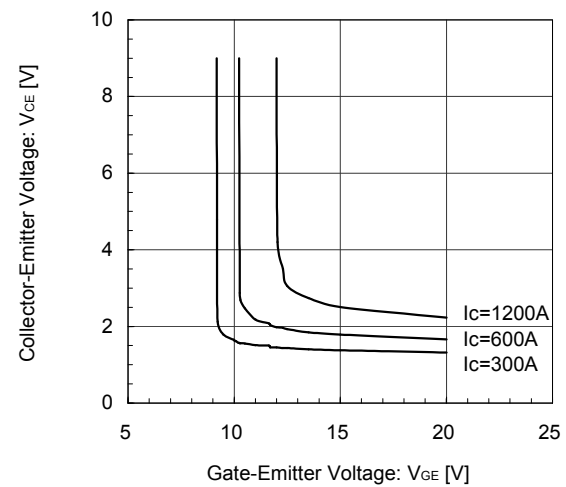
[INVERTER]

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



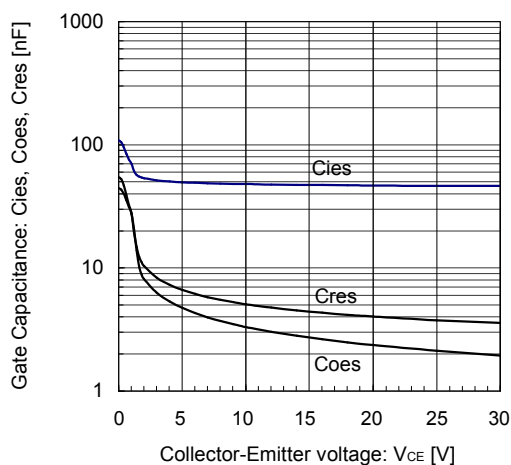
[INVERTER]

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



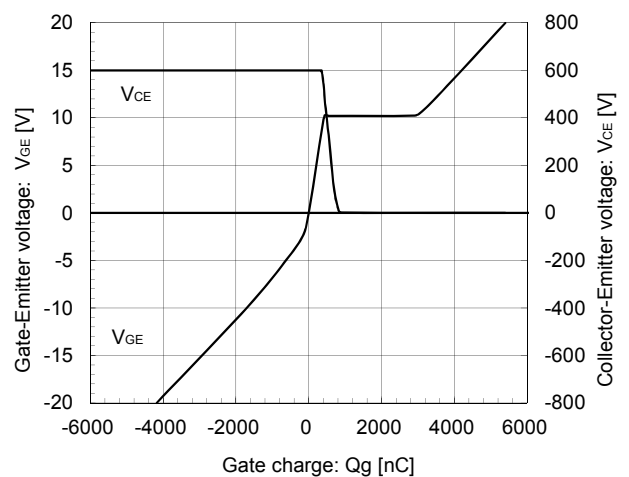
[INVERTER]

Gate Capacitance vs. Collector-Emittter Voltage (typ.)
 $V_{GE} = 0\text{V}$, $f = 1\text{MHz}$, $T_j = 25^\circ\text{C}$



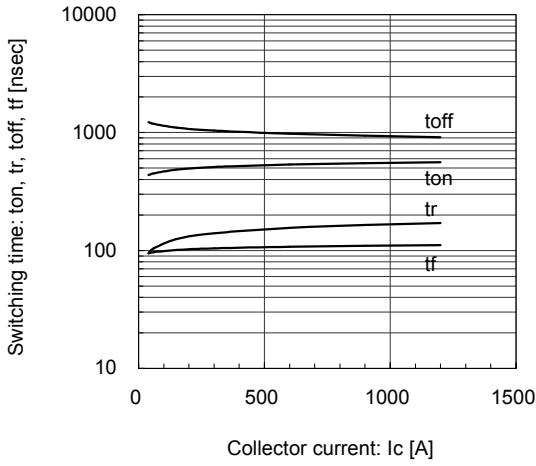
[INVERTER]

Dynamic Gate Charge (typ.)
 $V_{CC} = 600\text{V}$, $I_C = 600\text{A}$, $T_j = 25^\circ\text{C}$



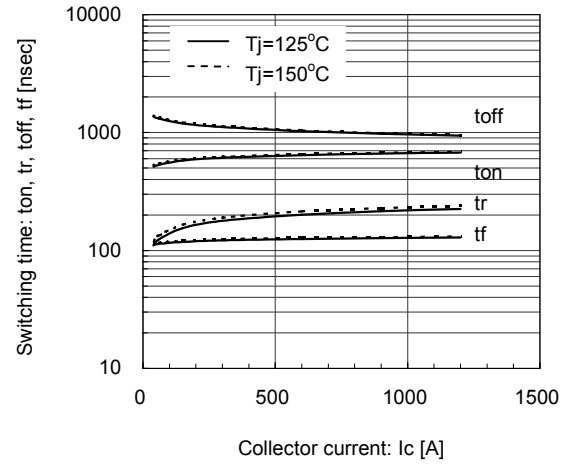
[INVERTER]

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



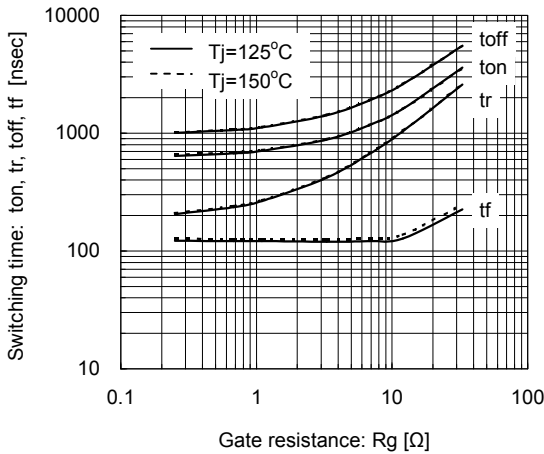
[INVERTER]

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



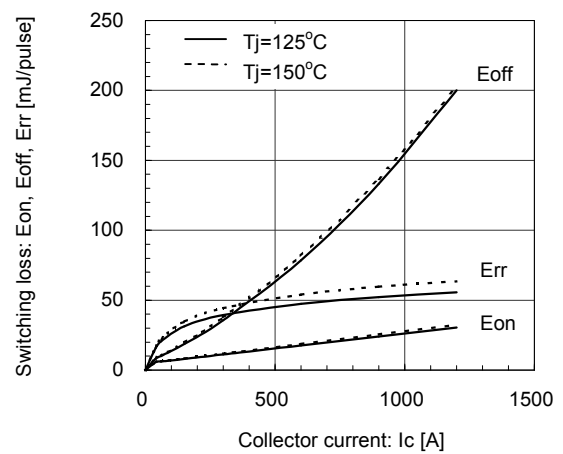
[INVERTER]

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



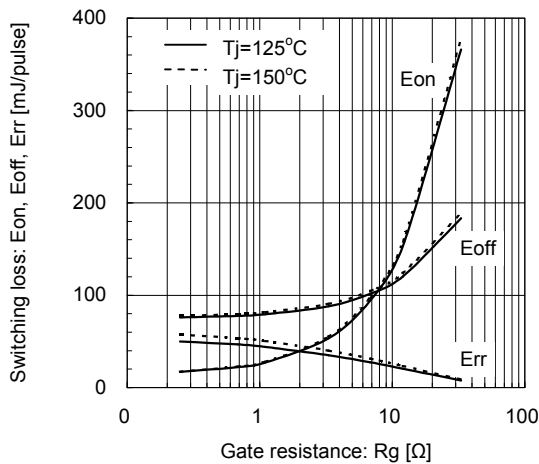
[INVERTER]

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



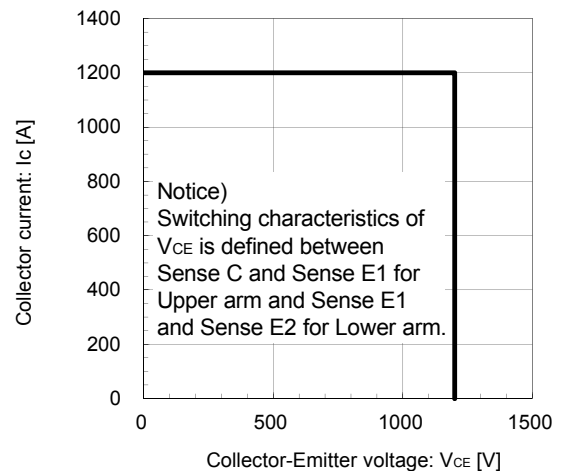
[INVERTER]

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

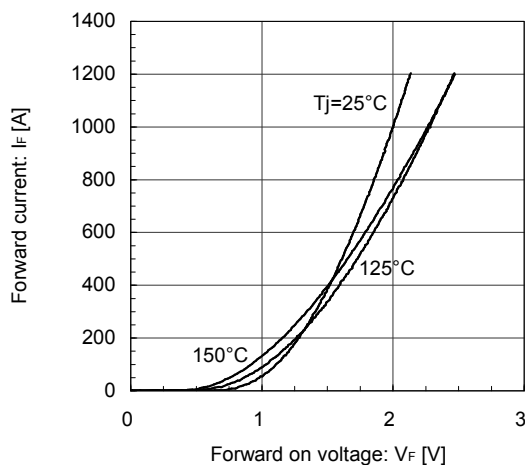


[INVERTER]

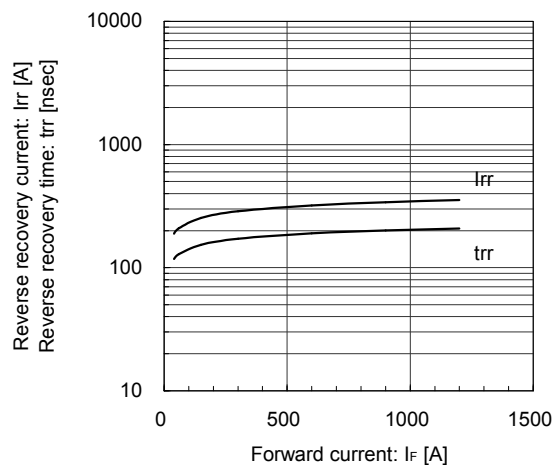
Reverse bias safe operating area (max.)
 $+V_{GE}=15V$, $-V_{GE}=15V$, $R_g=0.62\Omega$, $T_j=150^\circ C$



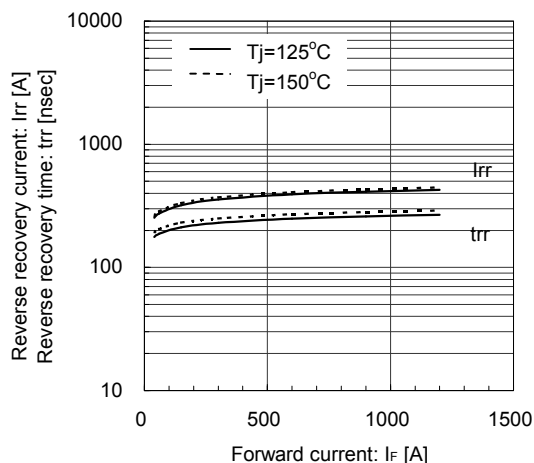
[INVERTER]

Forward Current vs. Forward Voltage (typ.)
chip

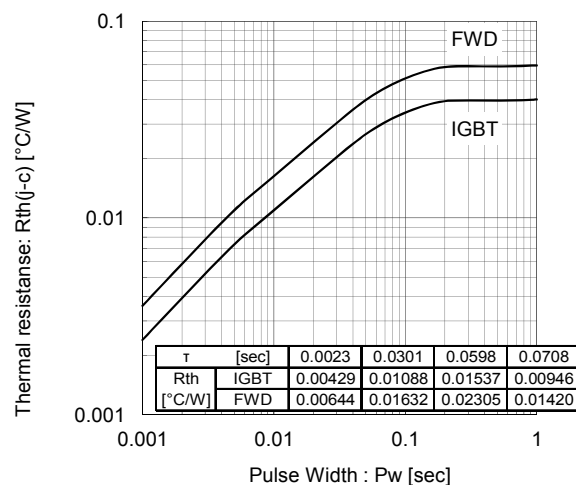
[INVERTER]

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

[INVERTER]

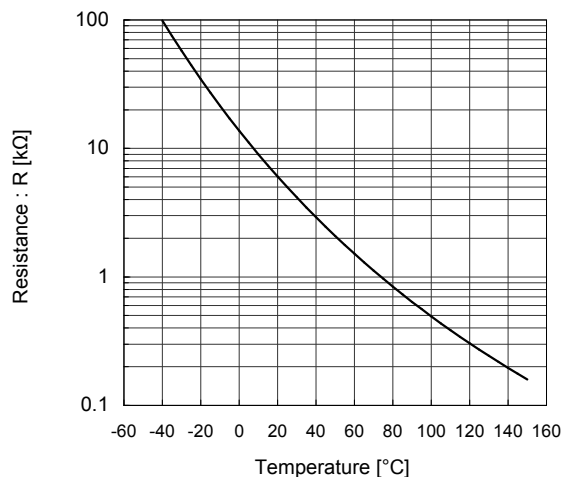
Reverse Recovery Characteristics (typ.)
 $V_{CC}=600V$, $V_{GE}=\pm 15V$, $R_g=0.62\Omega$, $T_J=125^\circ C$, $150^\circ C$ 

Transient Thermal Resistance (max.)

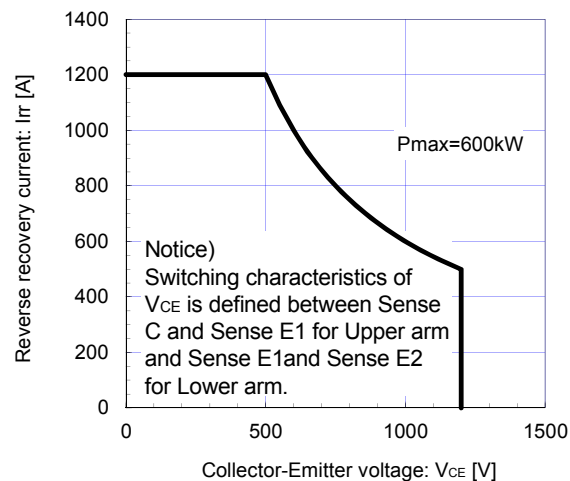


[THERMISTOR]

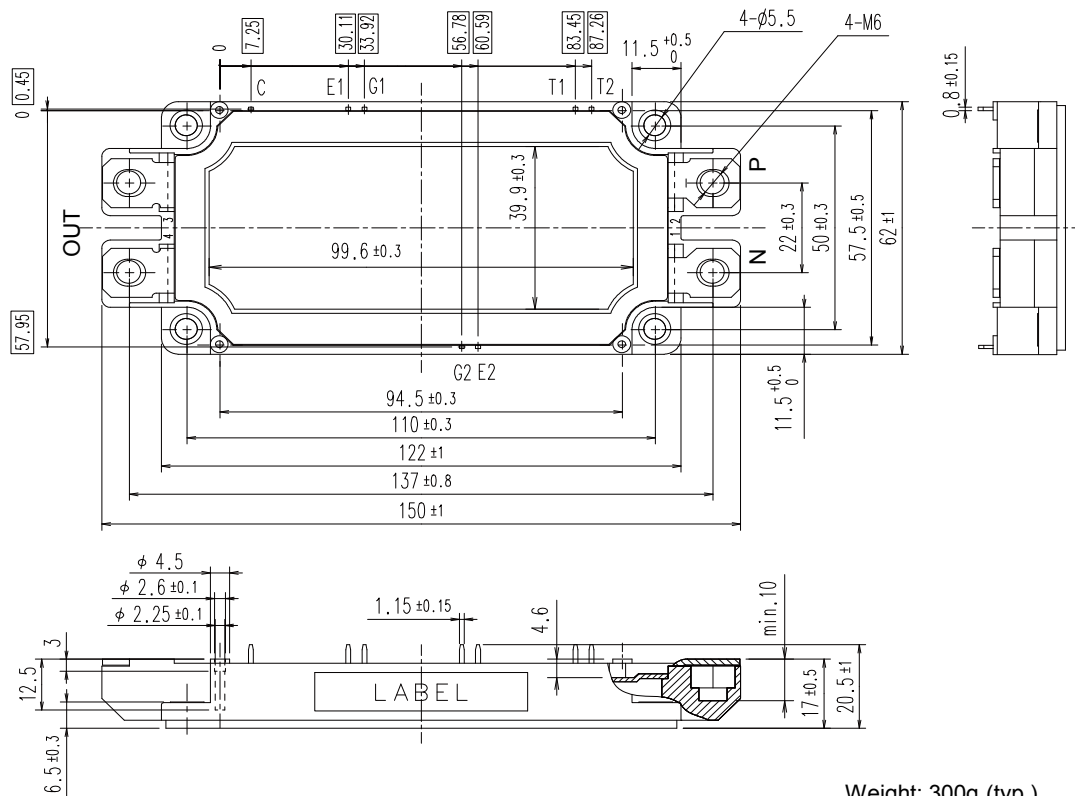
Temperature characteristic (typ.)



FWD safe operating area (max.)

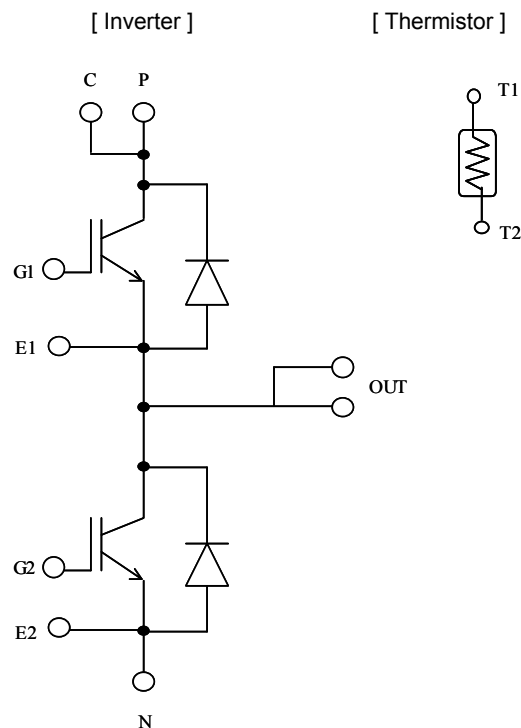
 $T_J=150^\circ C$ 

Outline Drawings (Unit : mm)



NOTE) shows theoretical demension and tolerance is ± 0.5

Equivalent Circuit



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