

2MBI300VN-170-50

IGBT Modules

IGBT MODULE (V series) 1700V / 300A / 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 T_c=25°C unless otherwise specified)

Items	Symbols	Conditions	Maximum ratings	Units	
Inverter	Collector-Emitter voltage	V _{CEs}	1700	V	
	Gate-Emitter voltage	V _{GES}	±20	V	
	Collector current	I _c	Continuous	T _c =25°C T _c =100°C	450 300
		I _{c pulse}	1ms		600
		-I _c			300
		-I _{c pulse}	1ms		600
Collector power dissipation	P _c	1 device	1665	W	
Junction temperature	T _j		175		
Operating junction temperature (under switching conditions)	T _{top}		150	°C	
Storage temperature	T _{stg}		-40 ~ 125		
Isolation voltage	between terminal and copper base (*1)	V _{iso}	AC : 1min.	3400	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} = 1700V	-	-	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 = 300mA	6.0	6.5	7.0	V	
Collector-Emitter saturation voltage	V _{CE(sat)} (terminal)	V _{GE} = 15V I _c = 300A	T _j =25°C	-	2.45	2.90	V
			T _j =125°C	-	2.90	-	
			T _j =150°C	-	2.95	-	
	V _{CE(sat)} (chip)		T _j =25°C	-	2.00	2.45	
			T _j =125°C	-	2.45	-	
			T _j =150°C	-	2.50	-	
Internal gate resistance	R _{G(int)}	-	-	2.5	-	Ω	
Input capacitance	C _{ies}	V _{CE} = 10V, V _{GE} = 0V, f = 1MHz	-	30	-	nF	
Turn-on time	t _{on}	V _{CC} = 900V	-	900	-	nsec	
	t _r	I _c = 300A	-	400	-		
	t _{r(i)}	V _{GE} = ±15V	-	100	-		
	t _{off}	R _G = 4.7Ω	-	1300	-		
Turn-off time	t _r	L _s = 80nH	-	100	-		
			-	100	-		
Forward on voltage	V _F (terminal)	V _{GE} = 0V I _F = 300A	T _j =25°C	-	2.25	2.70	V
			T _j =125°C	-	2.55	-	
			T _j =150°C	-	2.55	-	
	V _F (chip)		T _j =25°C	-	1.80	2.25	
			T _j =125°C	-	2.10	-	
			T _j =150°C	-	2.10	-	
Reverse recovery time	t _r	I _F = 300A	-	250	-	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

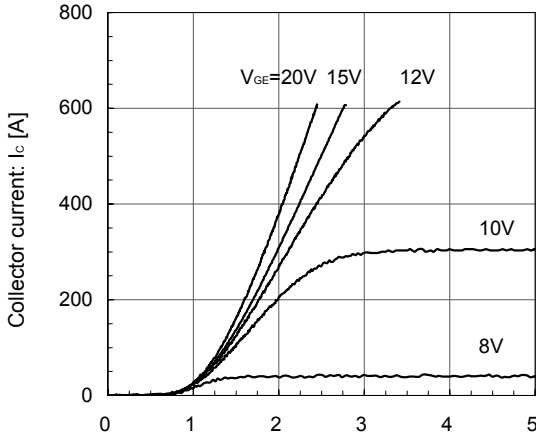
Items	Symbols	Conditions	Characteristics			Units
			min.	typ.	max.	
Thermal resistance(1device)	R _{th(j-c)}	Inverter IGBT Inverter FWD	-	-	0.09	°C/W
Contact thermal resistance (1device) (*5)	R _{th(c-f)}	with Thermal Compound	-	0.0167	-	

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

■ Characteristics (Representative)

[INVERTER]

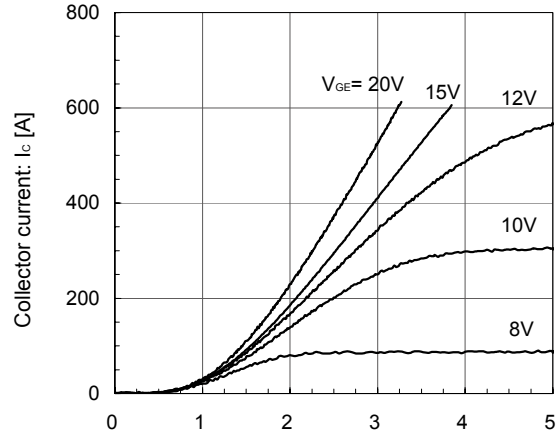
Collector current vs. Collector-Emittter voltage (typ.)
 $T_J = 25^\circ\text{C}$ / chip



Collector-Emittter voltage: V_{CE} [V]

[INVERTER]

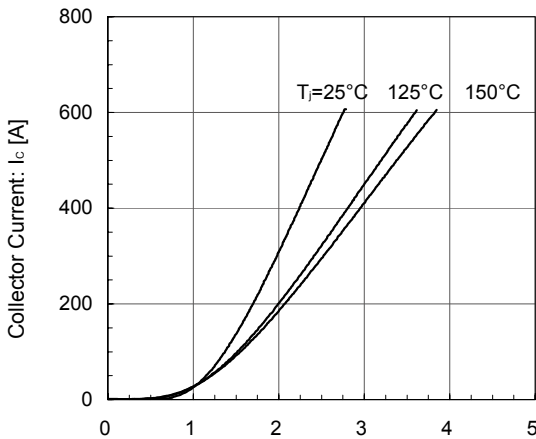
Collector current vs. Collector-Emittter voltage (typ.)
 $T_J = 150^\circ\text{C}$ / chip



Collector-Emittter voltage: V_{CE} [V]

[INVERTER]

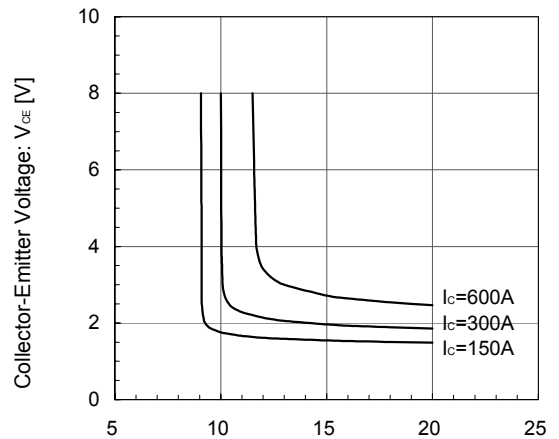
Collector current vs. Collector-Emittter voltage (typ.)
 $V_{GE} = 15\text{V}$ / chip



Collector-Emittter Voltage: V_{CE} [V]

[INVERTER]

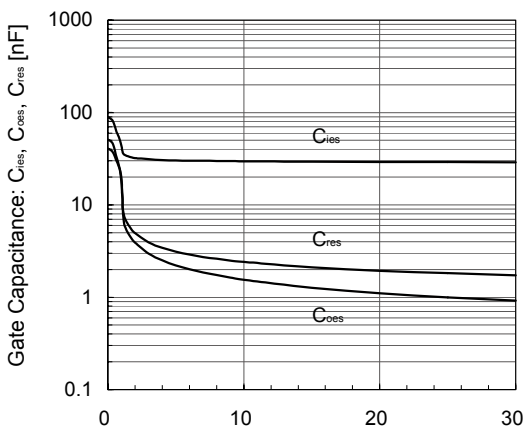
Collector-Emittter voltage vs. Gate-Emittter voltage (typ.)
 $T_J = 25^\circ\text{C}$ / chip



Gate-Emittter Voltage: V_{GE} [V]

[INVERTER]

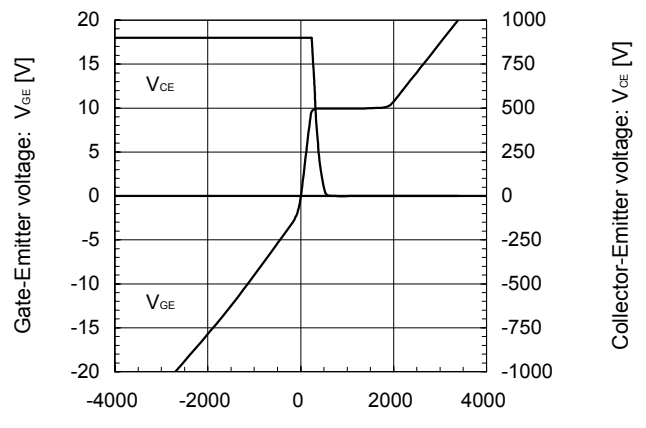
Gate Capacitance vs. Collector-Emittter Voltage (typ.)
 $V_{GE} = 0\text{V}$, $f = 1\text{MHz}$, $T_J = 25^\circ\text{C}$



Collector-Emittter voltage: V_{CE} [V]

[INVERTER]

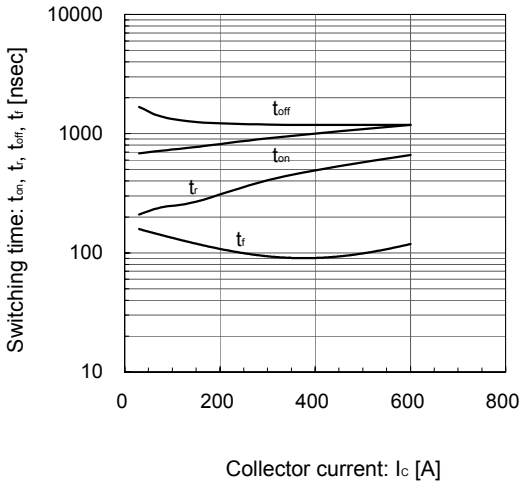
Dynamic Gate Charge (typ.)
 $V_{CC} = 900\text{V}$, $I_c = 300\text{A}$, $T_J = 25^\circ\text{C}$



Gate charge: Q_s [μC]

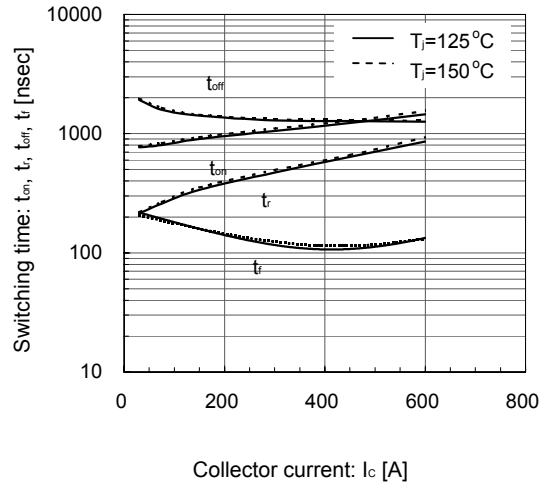
[INVERTER]

Switching time vs. Collector current (typ.)
 $V_{CC}=900V, V_{GE}=\pm 15V, R_G=4.7\Omega, T_J=25^\circ C$



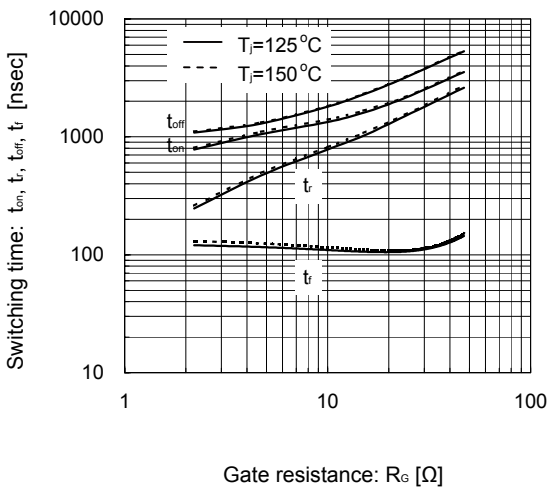
[INVERTER]

Switching time vs. Collector current (typ.)
 $V_{CC}=900V, V_{GE}=\pm 15V, R_G=4.7\Omega, T_J=125^\circ C, 150^\circ C$



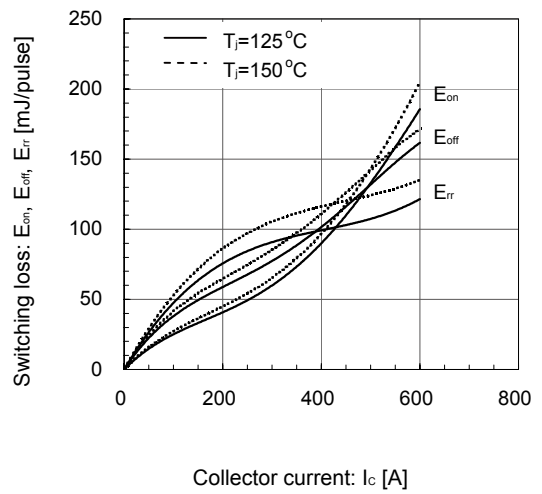
[INVERTER]

Switching time vs. Gate resistance (typ.)
 $V_{CC}=900V, I_c=300A, V_{GE}=\pm 15V, T_J=125^\circ C, 150^\circ C$



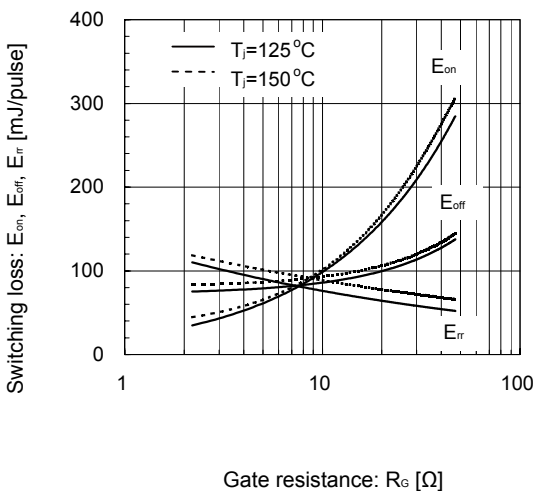
[INVERTER]

Switching loss vs. Collector current (typ.)
 $V_{CC}=900V, V_{GE}=\pm 15V, R_G=4.7\Omega, T_J=125^\circ C, 150^\circ C$



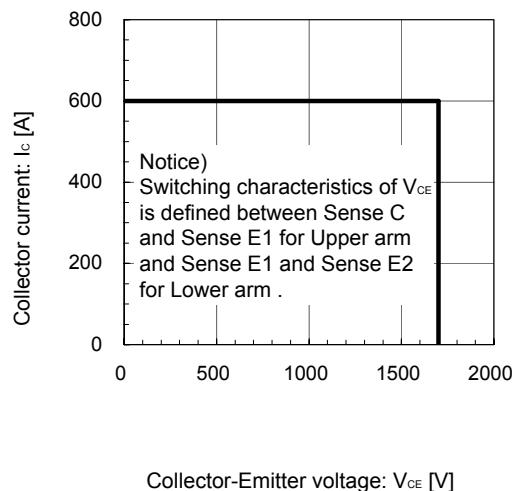
[INVERTER]

Switching loss vs. Gate resistance (typ.)
 $V_{CC}=900V, I_c=300A, V_{GE}=\pm 15V, T_J=125^\circ C, 150^\circ C$



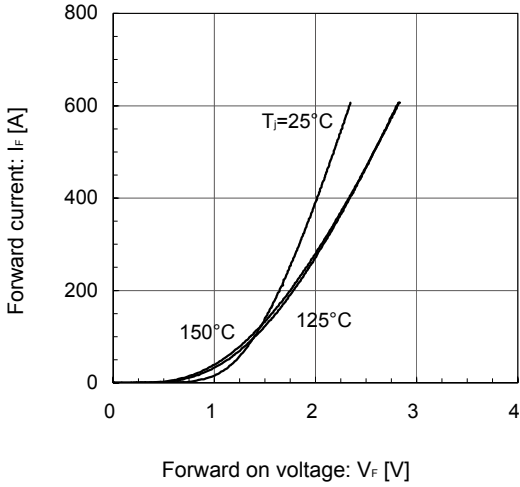
[INVERTER]

Reverse bias safe operating area (max.)
 $+V_{GE}=15V, -V_{GE}=15V, R_G=4.7\Omega, T_J=150^\circ C$



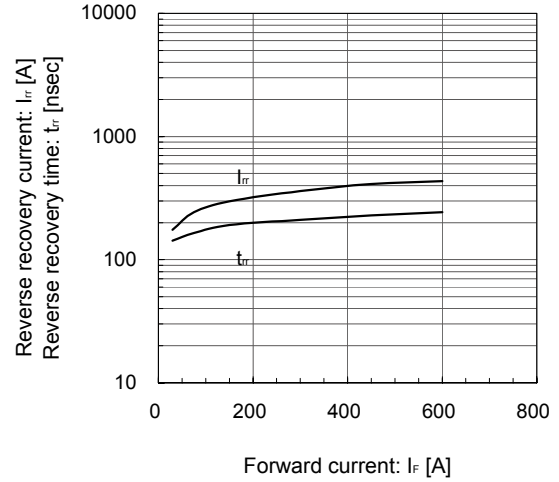
[INVERTER]

Forward Current vs. Forward Voltage (typ.) chip



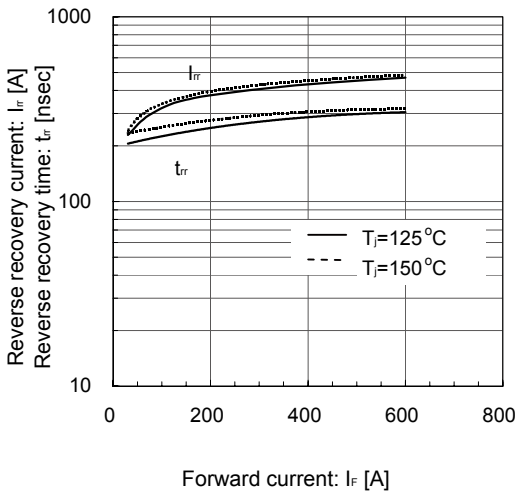
[INVERTER]

Reverse Recovery Characteristics (typ.)
V_{CC}=900V, V_{GE}=±15V, R_G=4.7Ω, T_J=25°C

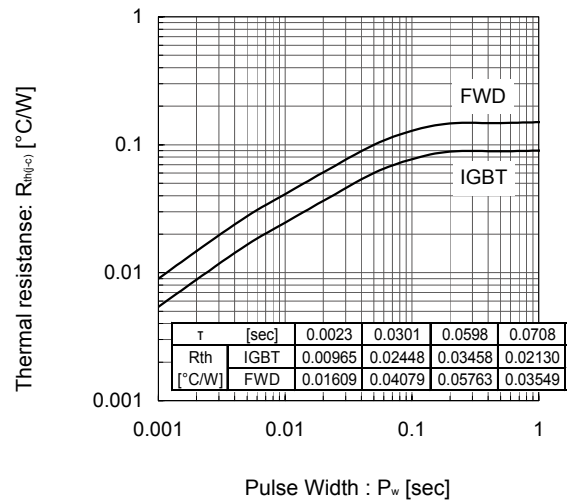


[INVERTER]

Reverse Recovery Characteristics (typ.)
V_{CC}=900V, V_{GE}=±15V, R_G=4.7Ω, T_J=125°C, 150°C

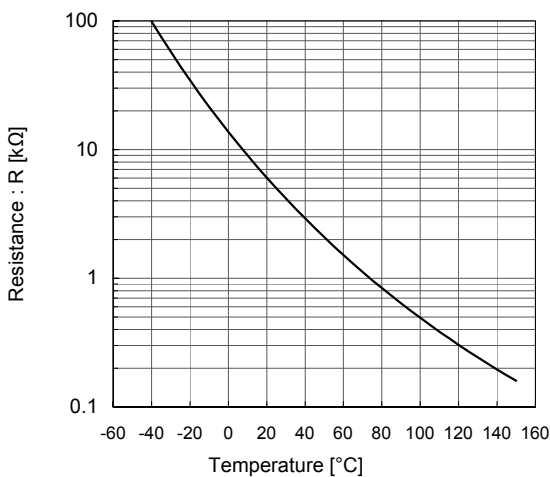


Transient Thermal Resistance (max.)

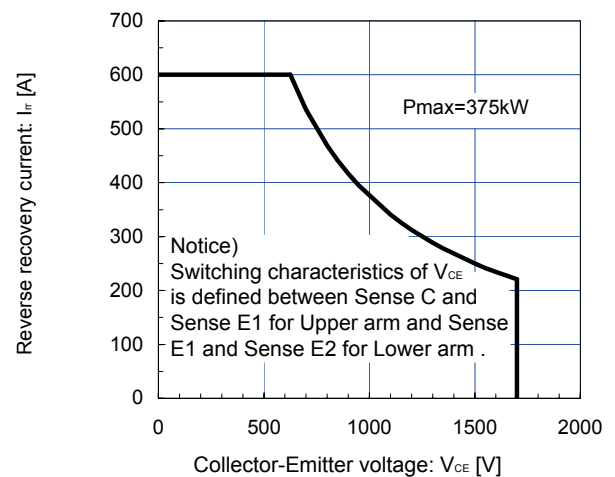


[THERMISTOR]

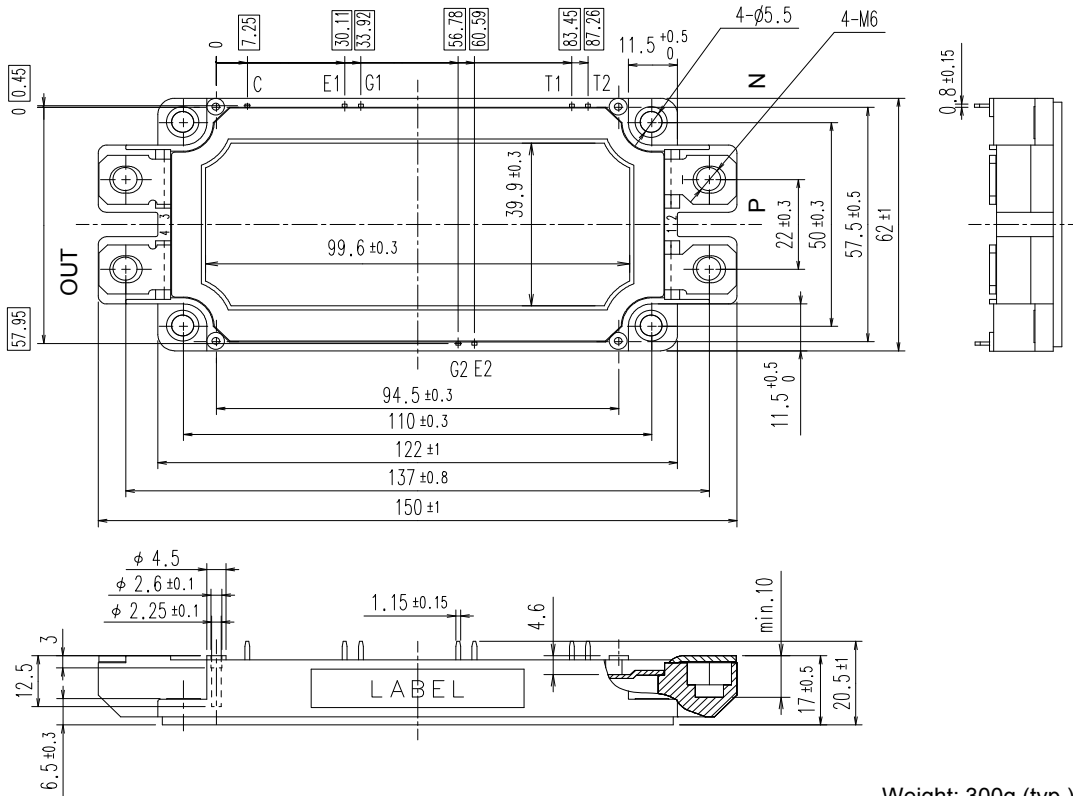
Temperature characteristic (typ.)



FWD safe operating area (max.)
T_J=150°C



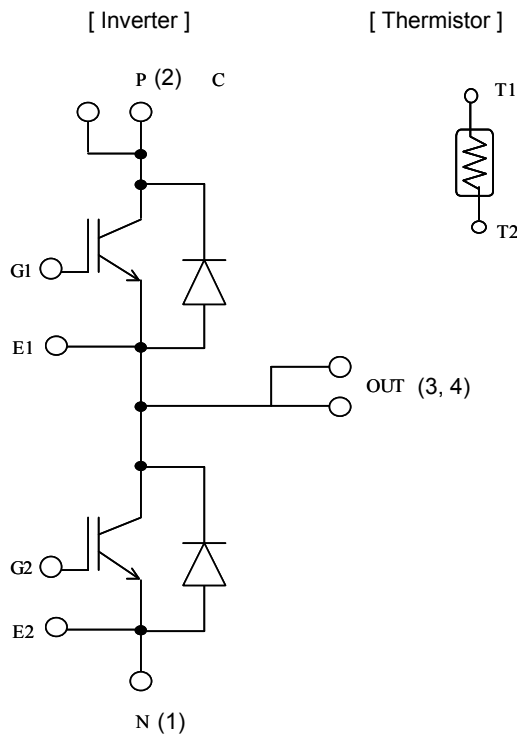
Outline Drawings, mm



Weight: 300g (typ.)

NOTE) shows theoretical demension and tolerance is ± 0.5

Equivalent Circuit Schematic



WARNING

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