

2MBI550VN-170-50

IGBT Modules

IGBT MODULE (V series) 1700V / 550A / 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 $T_c=25^\circ\text{C}$ 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	Continuous	$T_c=25^\circ\text{C}$	A
			$T_c=100^\circ\text{C}$	
		1ms	750	
			550	
			1100	
	Collector power dissipation	1 device	1100	W
			3750	
Junction temperature	T_j		175	$^\circ\text{C}$
Operating junction temperature (under switching conditions)	T_{jop}		150	
Storage temperature	T_{stg}		-40 ~ 125	
Isolation voltage	between terminal and copper base (*1)	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 $T_j=25^\circ\text{C}$ unless otherwise specified)

Items	Symbols	Conditions	Characteristics			Units
			min.	typ.	max.	
Inverter	Zero gate voltage collector current	I_{CES} $V_{GE} = 0V, V_{CE} = 1700V$	-	-	3.0	mA
	Gate-Emitter leakage current	I_{GES} $V_{CE} = 0V, V_{GE} = \pm 20V$	-	-	600	nA
	Gate-Emitter threshold voltage	$V_{GE(th)}$ $V_{CE} = 20V, I_c = 550mA$	6.0	6.5	7.0	V
	Collector-Emitter saturation voltage	$V_{GE} = 15V$ $I_c = 550A$	$T_j=25^\circ\text{C}$	2.90	3.35	V
			$T_j=125^\circ\text{C}$	3.45	-	
			$T_j=150^\circ\text{C}$	3.55	-	
			$T_j=25^\circ\text{C}$	2.15	2.60	
			$T_j=125^\circ\text{C}$	2.70	-	
			$T_j=150^\circ\text{C}$	2.80	-	
	Internal gate resistance	$R_{G(int)}$ -	-	1.67	-	Ω
	Input capacitance	C_{ies} $V_{CE} = 10V, V_{GE} = 0V, f = 1MHz$	-	40	-	nF
	Turn-on time	$V_{CC} = 900V$ $I_c = 550A$	-	1000	-	nsec
			-	500	-	
			-	120	-	
	Turn-off time	$V_{GE} = \pm 15V$ $R_G = 3.3\Omega$ $L_S = 80nH$	-	1300	-	nsec
			-	100	-	
			-	100	-	
	Forward on voltage	$V_{GE} = 0V$ $I_F = 550A$	$T_j=25^\circ\text{C}$	2.70	3.15	V
			$T_j=125^\circ\text{C}$	3.00	-	
			$T_j=150^\circ\text{C}$	2.95	-	
			$T_j=25^\circ\text{C}$	1.95	2.40	
			$T_j=125^\circ\text{C}$	2.25	-	
			$T_j=150^\circ\text{C}$	2.20	-	
Thermistor	Reverse recovery time	t_{rr} $I_F = 550A$	-	250	-	nsec
	Resistance	R $T = 25^\circ\text{C}$ $T = 100^\circ\text{C}$	-	5000	-	Ω
	B value	B $T = 25/50^\circ\text{C}$	3305	3375	3450	K

● Thermal resistance characteristics

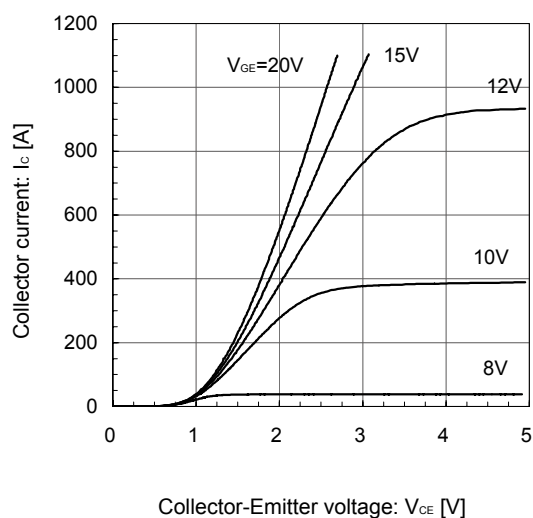
Items	Symbols	Conditions	Characteristics			Units
			min.	typ.	max.	
Thermal resistance(1device)	$R_{th(j-c)}$	Inverter IGBT	-	-	0.04	$^\circ\text{C/W}$
Contact thermal resistance (1device) (*5)	$R_{th(c-f)}$	Inverter FWD with Thermal Compound	-	0.0167	-	

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

■ Characteristics (Representative)

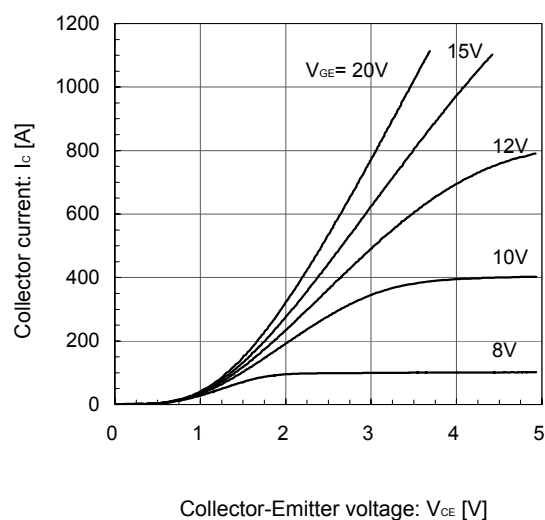
[INVERTER]

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



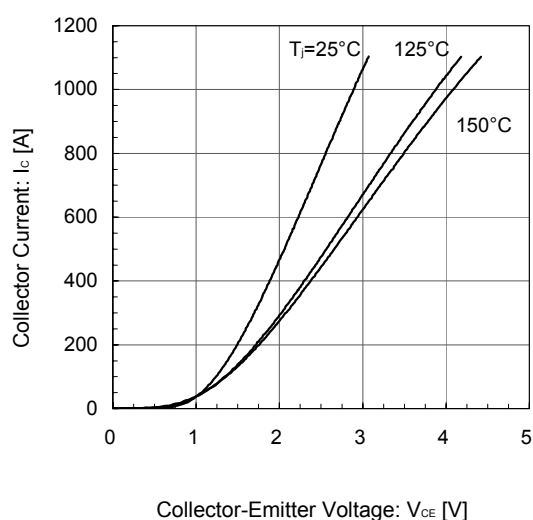
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Collector current vs. Collector-Emmitter voltage (typ.)
 $T_J = 150^\circ\text{C}$ / chip



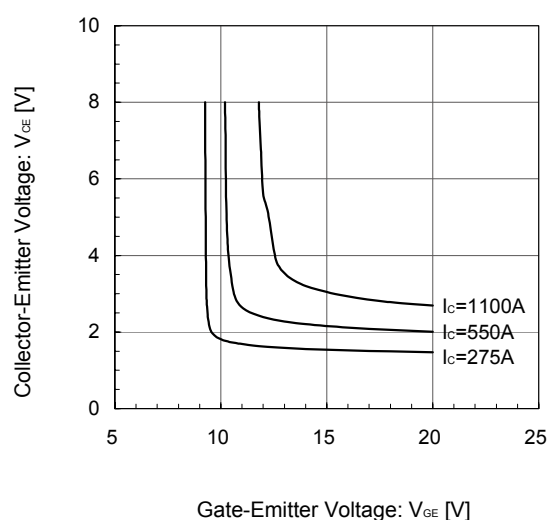
[INVERTER]

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



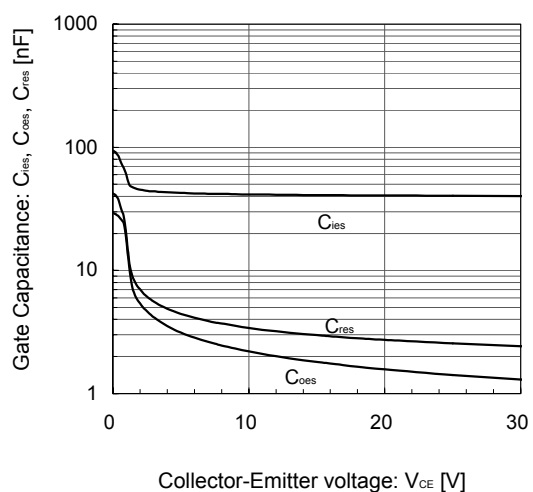
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Collector-Emmitter voltage vs. Gate-Emmitter voltage (typ.)
 $T_J = 25^\circ\text{C}$ / chip



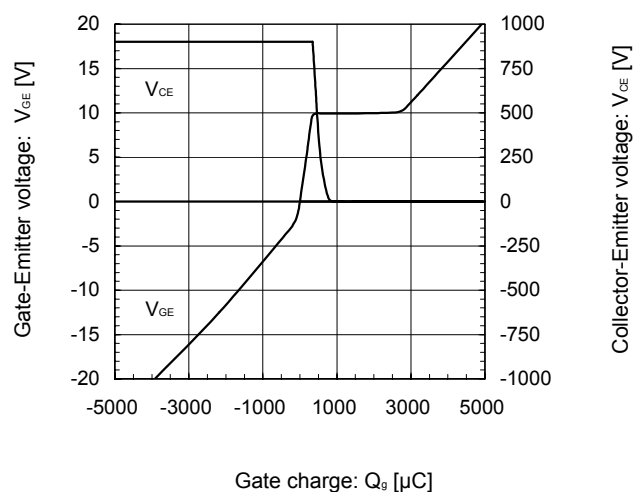
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Gate Capacitance vs. Collector-Emmitter Voltage (typ.)
 $V_{GE} = 0V, f = 1\text{MHz}, T_J = 25^\circ\text{C}$



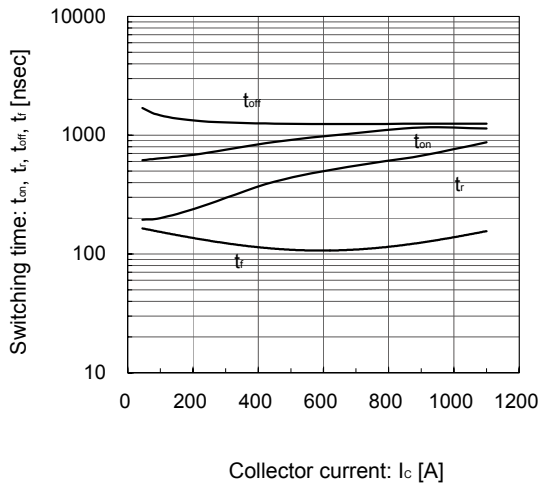
[INVERTER]

Dynamic Gate Charge (typ.)
 $V_{CC} = 900V, I_C = 550A, T_J = 25^\circ\text{C}$



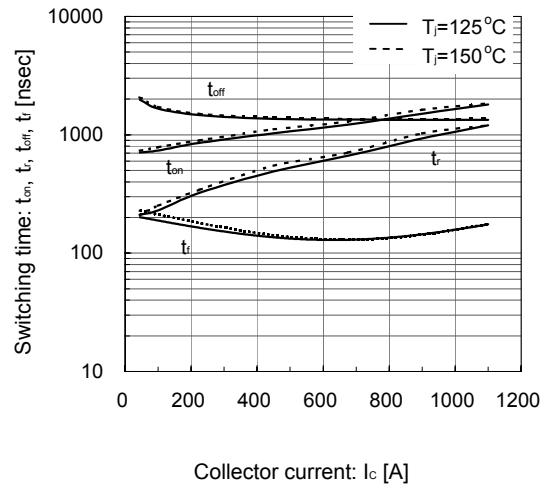
[INVERTER]

Switching time vs. Collector current (typ.)
 $V_{CC}=900V$, $V_{GE}=\pm 15V$, $R_G=3.3\Omega$, $T_J=25^\circ C$



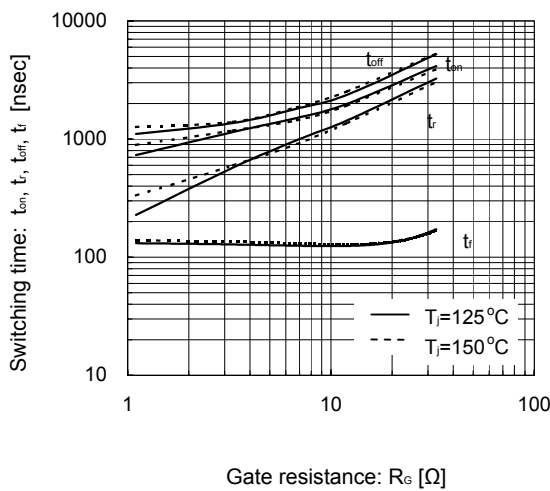
[INVERTER]

Switching time vs. Collector current (typ.)
 $V_{CC}=900V$, $V_{GE}=\pm 15V$, $R_G=3.3\Omega$, $T_J=125^\circ C, 150^\circ C$



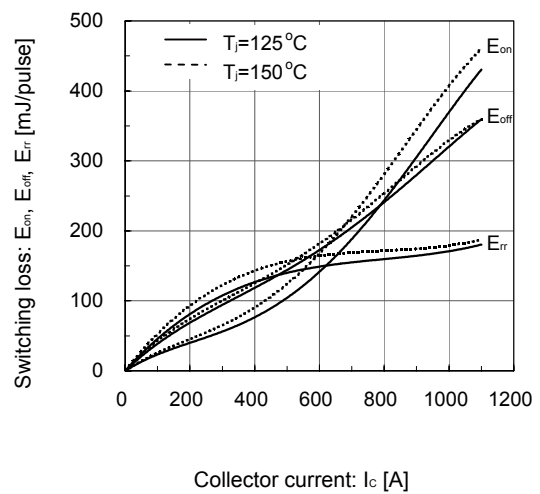
[INVERTER]

Switching time vs. Gate resistance (typ.)
 $V_{CC}=900V$, $I_C=550A$, $V_{GE}=\pm 15V$, $T_J=125^\circ C, 150^\circ C$



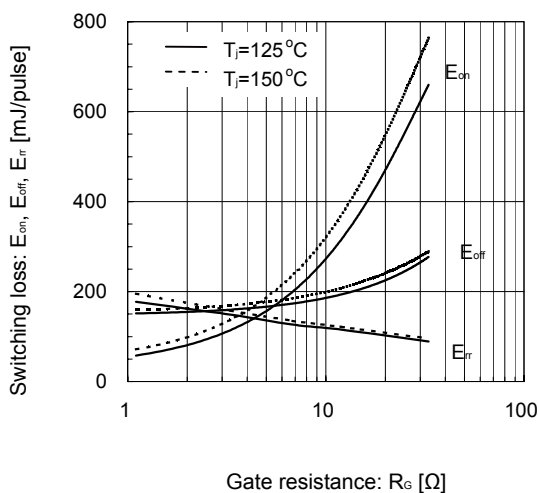
[INVERTER]

Switching loss vs. Collector current (typ.)
 $V_{CC}=900V$, $V_{GE}=\pm 15V$, $R_G=3.3\Omega$, $T_J=125^\circ C, 150^\circ C$



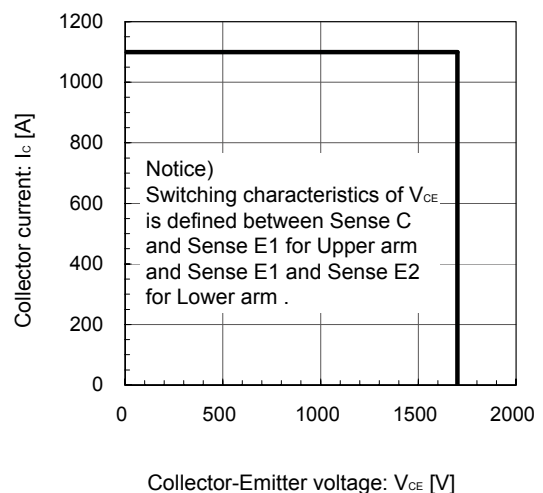
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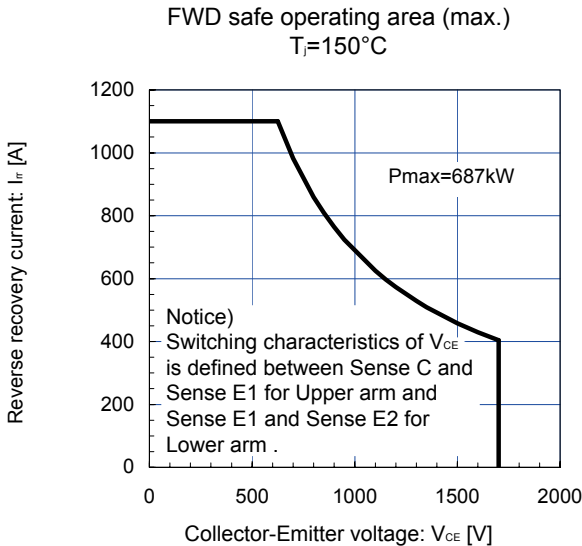
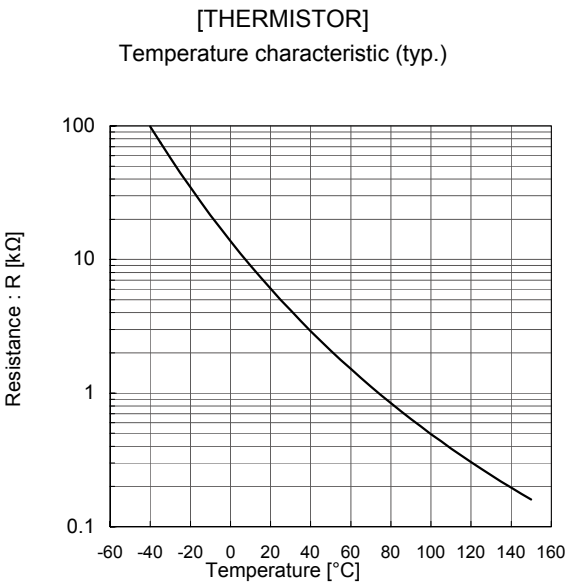
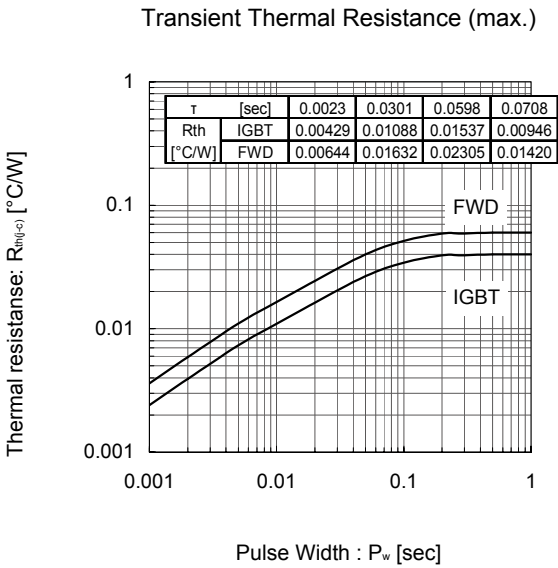
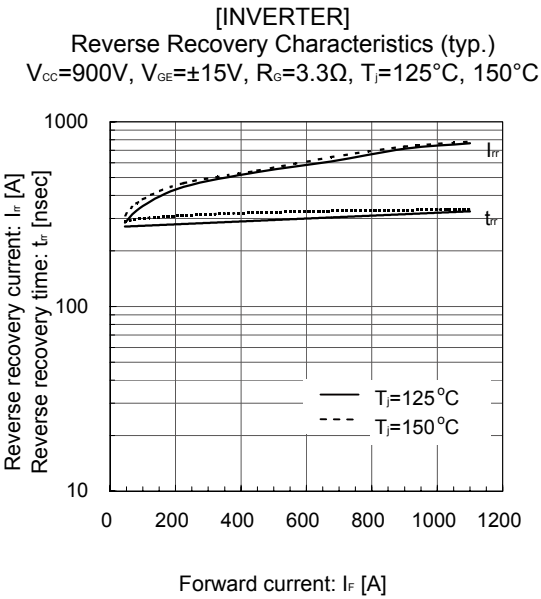
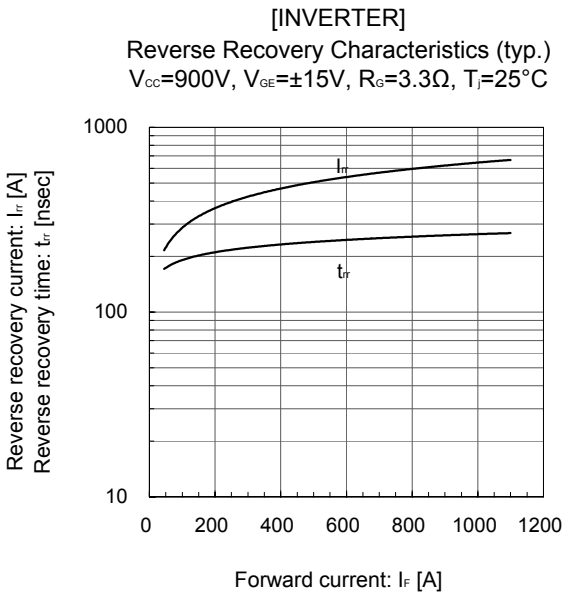
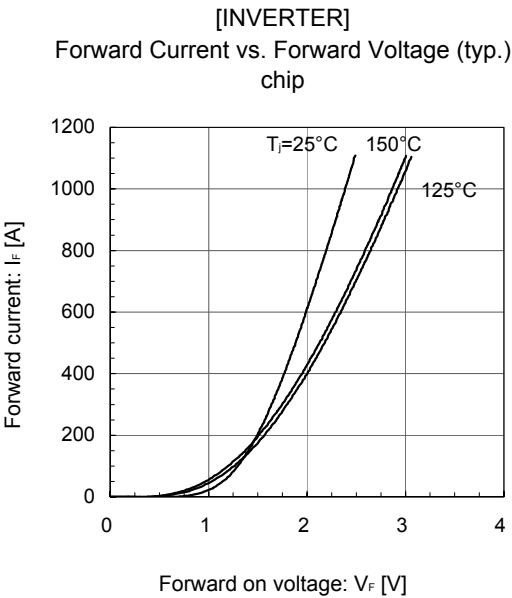
Switching loss vs. Gate resistance (typ.)
 $V_{CC}=900V$, $I_C=550A$, $V_{GE}=\pm 15V$, $T_J=125, 150^\circ C$



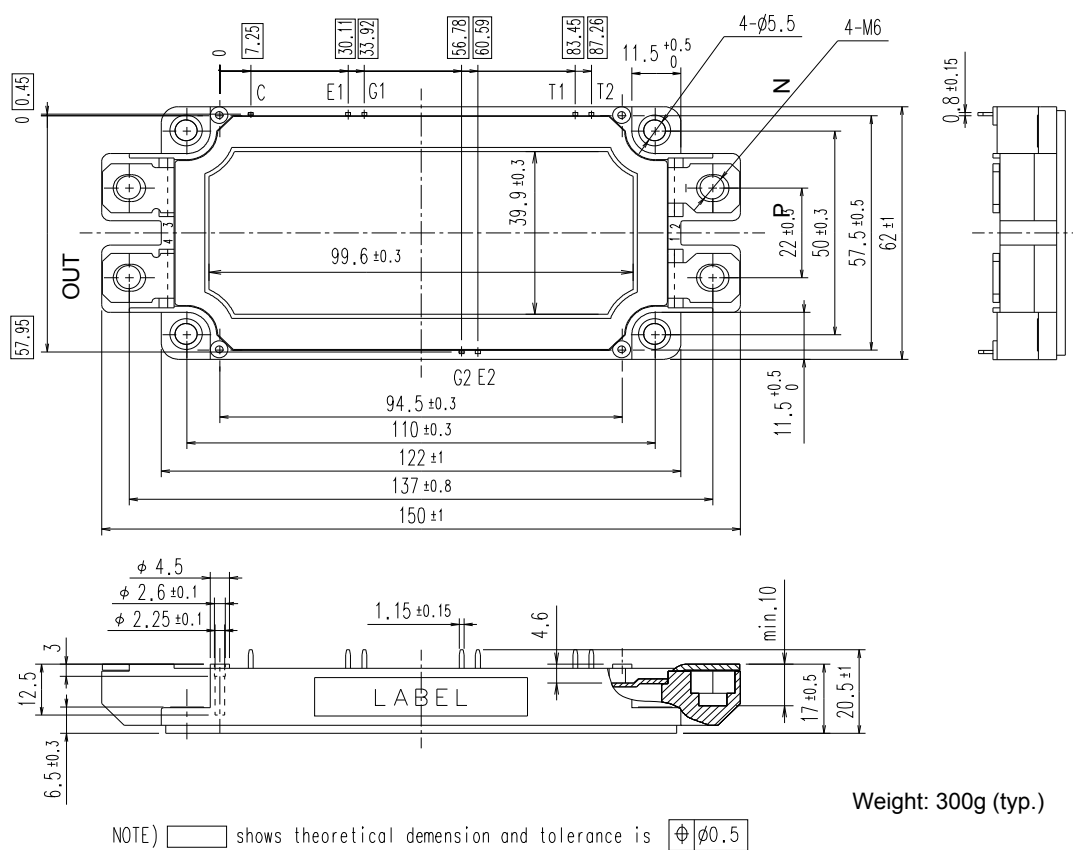
[INVERTER]

Reverse bias safe operating area (max.)
 $+V_{GE}=15V$, $-V_{GE}=15V$, $R_G=3.3\Omega$, $T_J=150^\circ C$

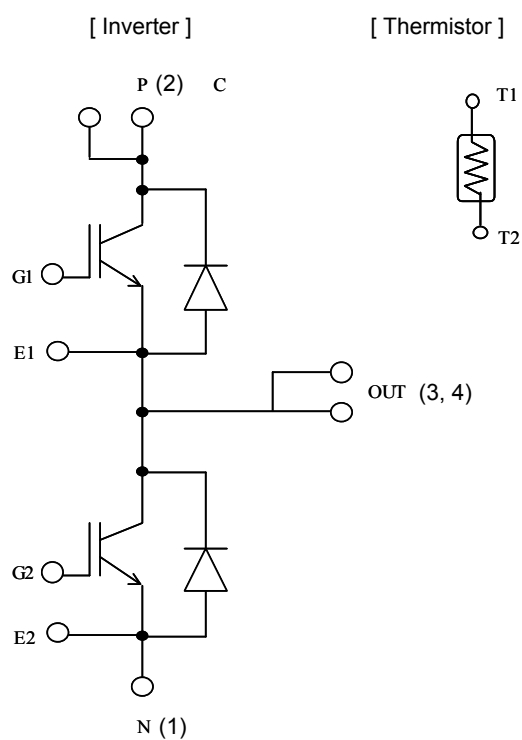




■ Outline Drawings, mm



■ Equivalent Circuit Schematic



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