

2MBI450VN-120-50

IGBT Modules

IGBT MODULE (V series) 1200V / 450A / 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	450	A
		I_C pulse	900	
		$-I_C$	450	
		$-I_C$ pulse	900	
	Collector power dissipation	P_C 1 device	2270	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} $V_{CE} = 0V, V_{GE} = \pm 20V$	-	-	600	nA
	Gate-Emitter threshold voltage	$V_{GE(th)}$ $V_{CE} = 20V, I_C = 450mA$	6.0	6.5	7.0	V
	Collector-Emitter saturation voltage	$V_{CE(sat)}$ (terminal) $V_{GE} = 15V$ $I_C = 450A$	$T_J = 25^\circ C$	2.35	2.80	V
			$T_J = 125^\circ C$	2.65	-	
			$T_J = 150^\circ C$	2.70	-	
			$T_J = 25^\circ C$	1.75	2.20	
			$T_J = 125^\circ C$	2.05	-	
			$T_J = 150^\circ C$	2.10	-	
	Input capacitance	C_{ies} $V_{CE} = 10V, V_{GE} = 0V, f = 1MHz$	-	41	-	nF
	Turn-on time	$V_{CC} = 600V$ $I_C = 450A$	t_{on}	55	120	nsec
			t_r	180	600	
			$t_{r(i)}$	120	-	
	Turn-off time	$V_{GE} = \pm 15V$ $R_G = 0.52\Omega$	t_{off}	1050	2000	nsec
			t_f	110	350	
	Forward on voltage	$V_{GE} = 0V$ $I_F = 450A$	V_F (terminal) $T_J = 25^\circ C$	2.30	2.75	V
			$T_J = 125^\circ C$	2.45	-	
			$T_J = 150^\circ C$	2.40	-	
			$T_J = 25^\circ C$	1.70	2.15	
			$T_J = 125^\circ C$	1.85	-	
			$T_J = 150^\circ C$	1.80	-	
Thermistor	Reverse recovery time	t_{rr} $I_F = 450A$	-	200	600	nsec
	Resistance	R $T = 25^\circ C$	-	5000	-	Ω
		$T = 100^\circ C$	465	495	520	
	B value	B $T = 25/50^\circ C$	3305	3375	3450	K

● Thermal resistance characteristics

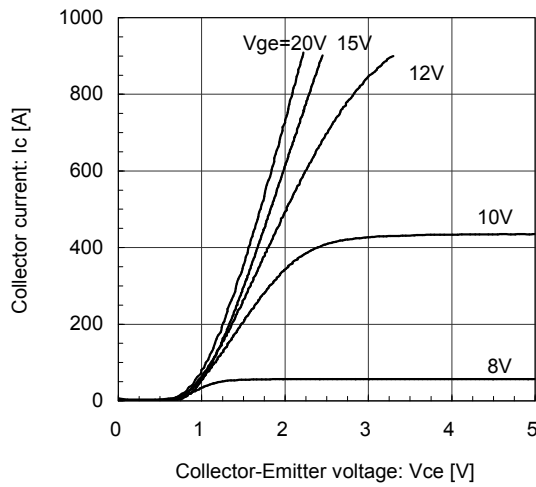
Items	Symbols	Conditions	Characteristics			Units
			min.	typ.	max.	
Thermal resistance (1device)	$R_{th(j-c)}$	Inverter IGBT	-	-	0.066	°C/W
		Inverter FWD	-	-	0.100	
Contact thermal resistance (1device) (*5)	$R_{th(c-f)}$	with Thermal Compound	-	0.0167	-	

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

■ Characteristics (Representative)

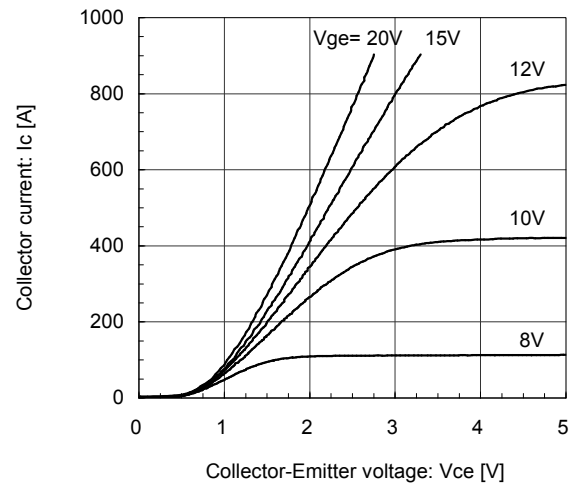
[INVERTER]

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



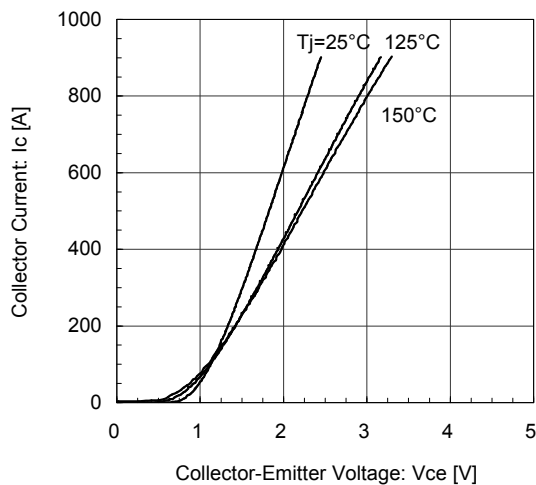
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Collector current vs. Collector-Emitter voltage (typ.)
 $T_j = 150^\circ\text{C}$ / chip



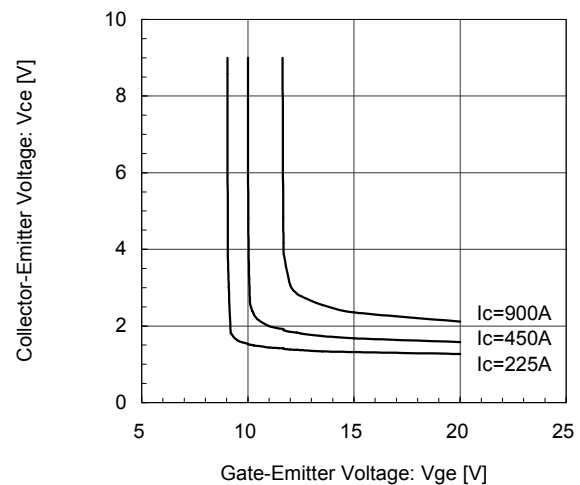
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Collector current vs. Collector-Emitter voltage (typ.)
 $V_{ge} = 15\text{V}$ / chip



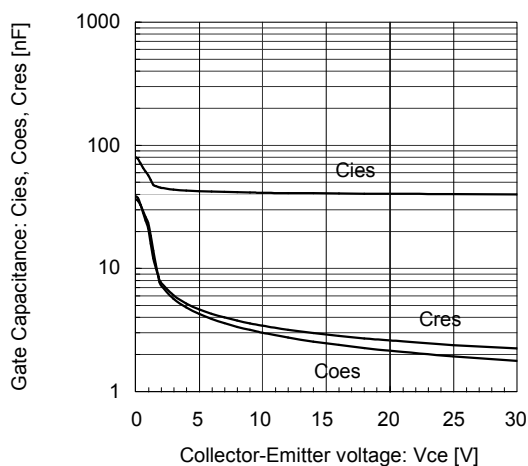
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Collector-Emitter voltage vs. Gate-Emitter voltage (typ.)
 $T_j = 25^\circ\text{C}$ / chip



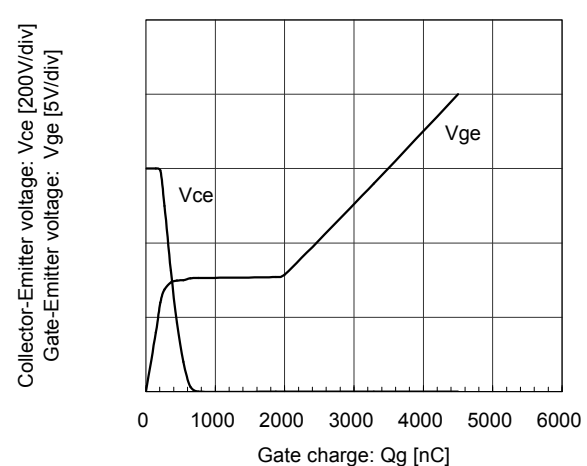
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Gate Capacitance vs. Collector-Emitter Voltage (typ.)
 $V_{ge} = 0\text{V}$, $f = 1\text{MHz}$, $T_j = 25^\circ\text{C}$



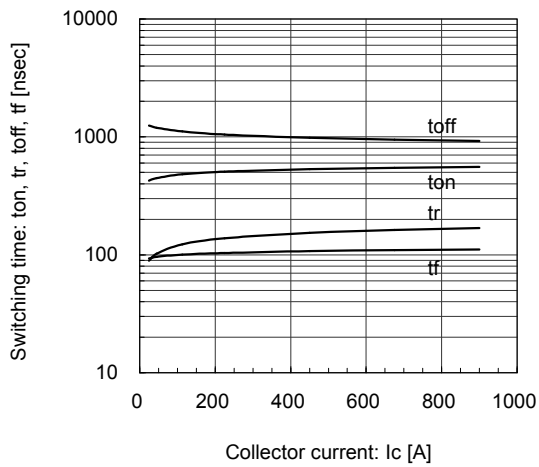
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Dynamic Gate Charge (typ.)
 $V_{cc} = 600\text{V}$, $I_c = 450\text{A}$, $T_j = 25^\circ\text{C}$



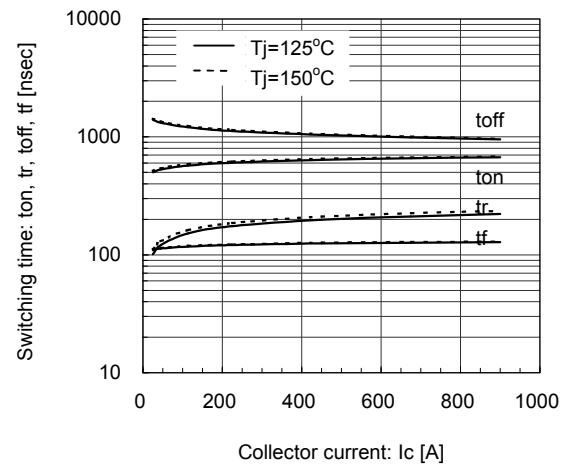
[INVERTER]

Switching time vs. Collector current (typ.)
 $V_{cc}=600V$, $V_{ge}=\pm 15V$, $R_g=0.52\Omega$, $T_j=25^\circ C$



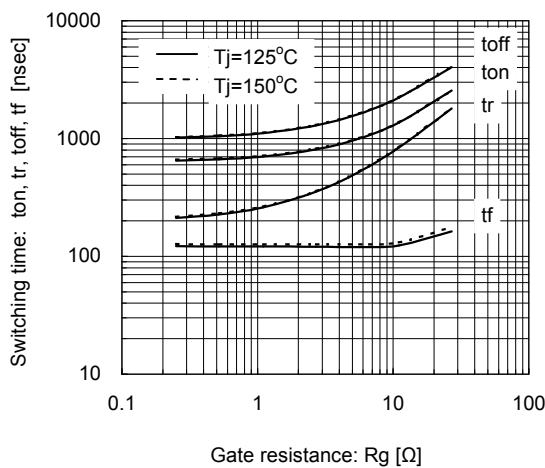
[INVERTER]

Switching time vs. Collector current (typ.)
 $V_{cc}=600V$, $V_{ge}=\pm 15V$, $R_g=0.52\Omega$, $T_j=125^\circ C, 150^\circ C$



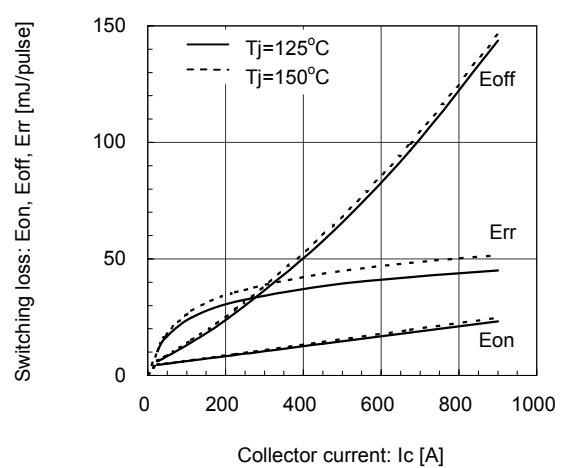
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Switching time vs. Gate resistance (typ.)
 $V_{cc}=600V$, $I_c=450A$, $V_{ge}=\pm 15V$, $T_j=125^\circ C, 150^\circ C$



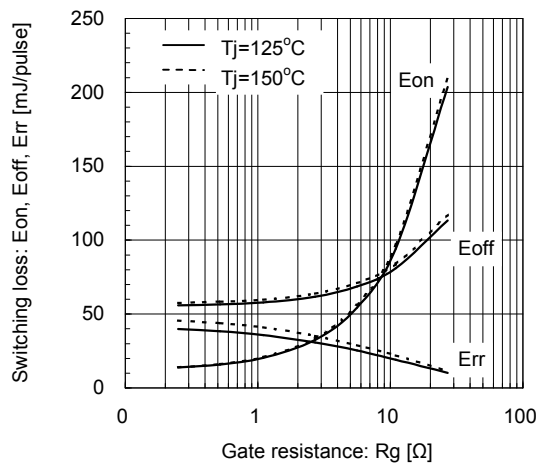
[INVERTER]

Switching loss vs. Collector current (typ.)
 $V_{cc}=600V$, $V_{ge}=\pm 15V$, $R_g=0.52\Omega$, $T_j=125^\circ C, 150^\circ C$



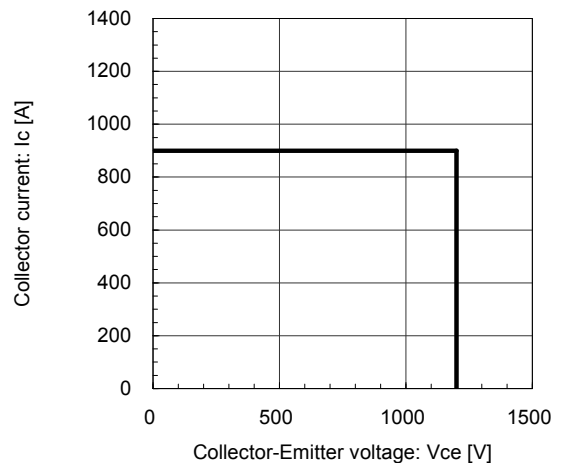
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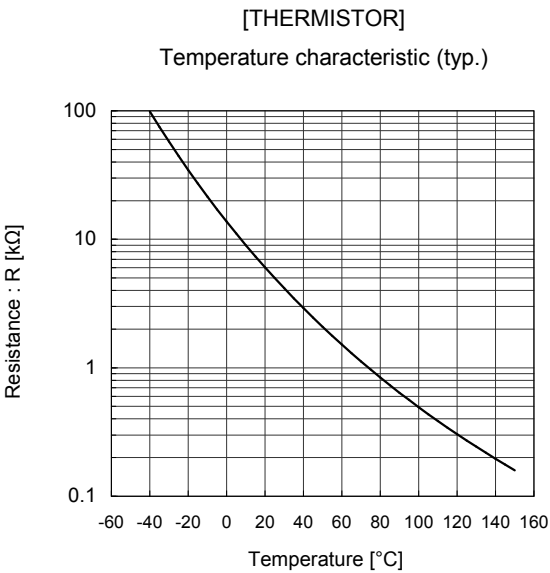
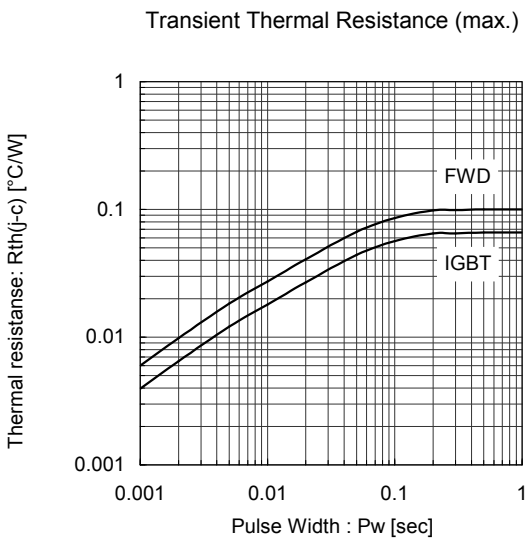
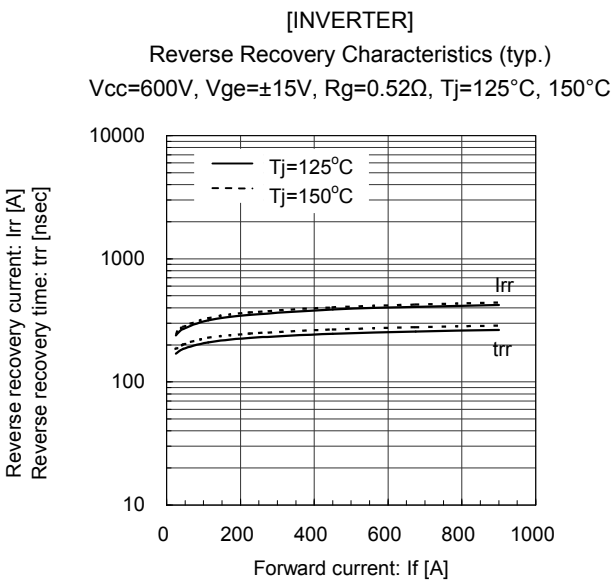
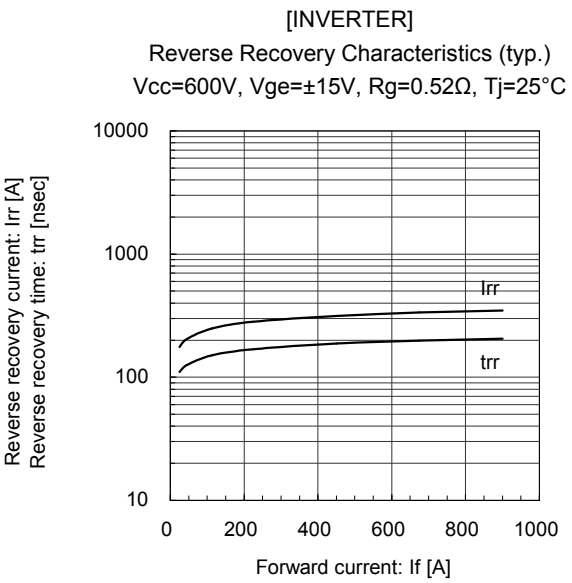
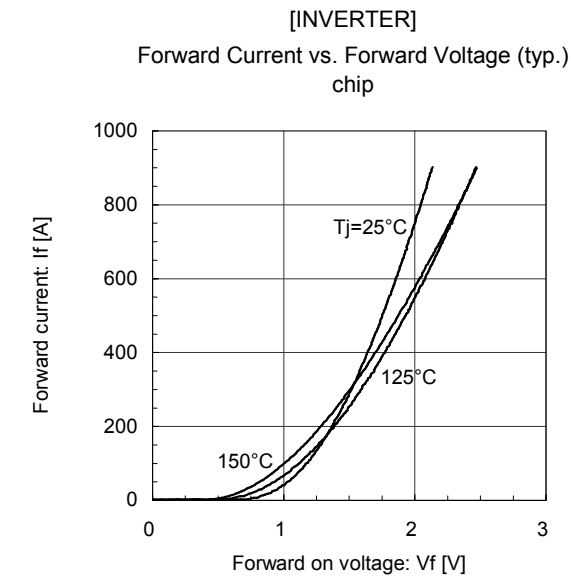
Switching loss vs. Gate resistance (typ.)
 $V_{cc}=600V$, $I_c=450A$, $V_{ge}=\pm 15V$, $T_j=125^\circ C, 150^\circ C$



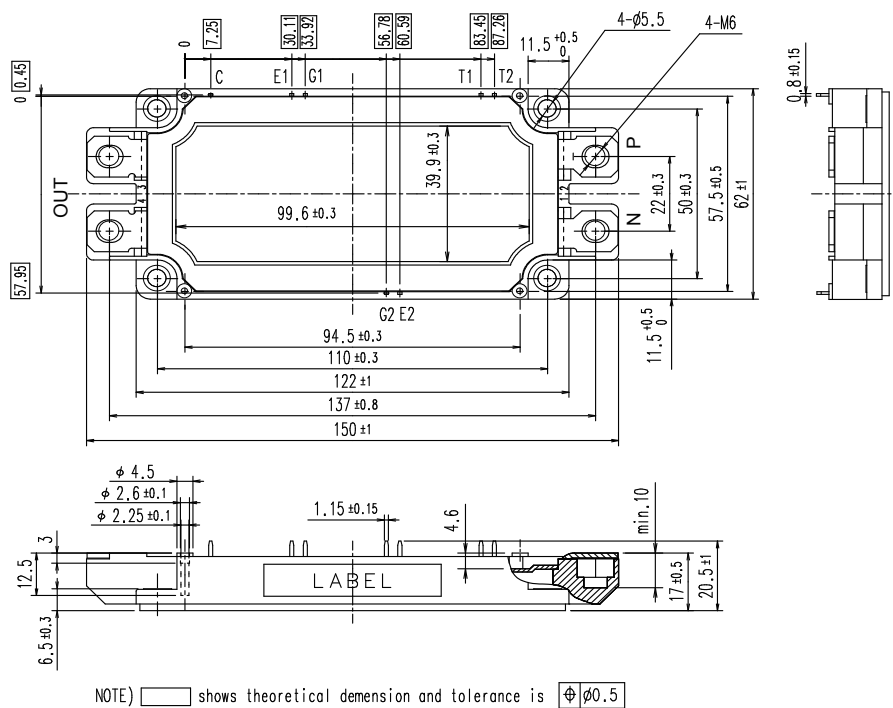
[INVERTER]

Reverse bias safe operating area (max.)
 $+V_{ge}=15V$, $-V_{ge}=15V$, $R_g=0.52\Omega$, $T_j=150^\circ C$

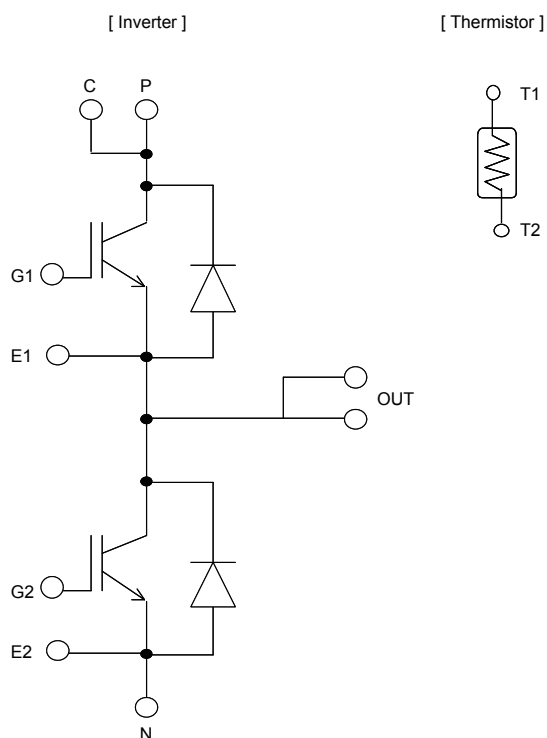




Outline Drawings, mm



Equivalent Circuit Schematic



WARNING

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