

2MBI600VN-120-50

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 Tc=80°C	600	A
		I_C pulse	1ms Tc=80°C	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.		
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	$V_{GE(th)}$	$V_{CE} = 20V, I_C = 600mA$	6.0	6.5	7.0	V	
Collector-Emitter saturation voltage	$V_{CE(sat)}$ (terminal)	$V_{GE} = 15V$ $I_C = 600A$	Tj=25°C	-	2.65	3.10	V
			Tj=125°C	-	3.00	-	
			Tj=150°C	-	3.05	-	
	$V_{CE(sat)}$ (chip)		Tj=25°C	-	1.85	2.30	
			Tj=125°C	-	2.20	-	
			Tj=150°C	-	2.25	-	
Inverter	Input capacitance	C_{ies}	$V_{CE} = 10V, V_{GE} = 0V, f = 1MHz$	-	48	-	nF
	Turn-on time	t_{on}	$V_{CC} = 600V$ $I_C = 600A$ $V_{GE} = \pm 15V$ $R_G = 0.62\Omega$	-	550	1200	nsec
t_r		-		180	600		
$t_r(i)$		-		120	-		
Turn-off time	t_{off}	-	1050	2000	nsec		
	t_f	-	110	350			
Forward on voltage	V_F (terminal)	$V_{GE} = 0V$ $I_F = 600A$	Tj=25°C	-	2.50	3.00	V
			Tj=125°C	-	2.65	-	
			Tj=150°C	-	2.60	-	
	V_F (chip)		Tj=25°C	-	1.70	2.15	
			Tj=125°C	-	1.85	-	
			Tj=150°C	-	1.80	-	
Reverse recovery time	t_{rr}	$I_F = 600A$	-	200	600	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

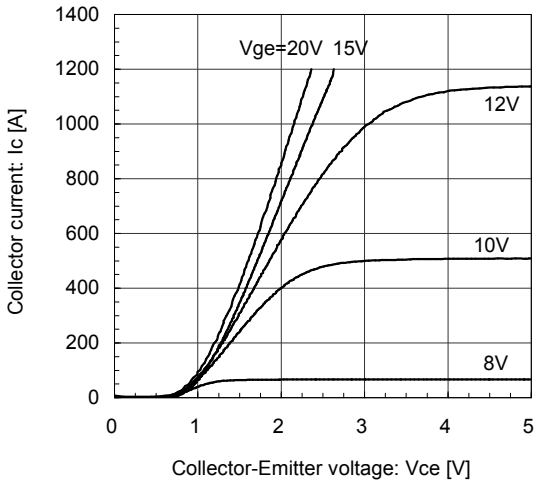
Items	Symbols	Conditions	Characteristics			Units
			min.	typ.	max.	
Thermal resistance (1device)	$R_{th(j-c)}$	Inverter IGBT	-	-	0.04	°C/W
		Inverter FWD	-	-	0.06	
Contact thermal resistance (1device) (*5)	$R_{th(c-f)}$	with Thermal Compound	-	0.0167	-	

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

■ Characteristics (Representative)

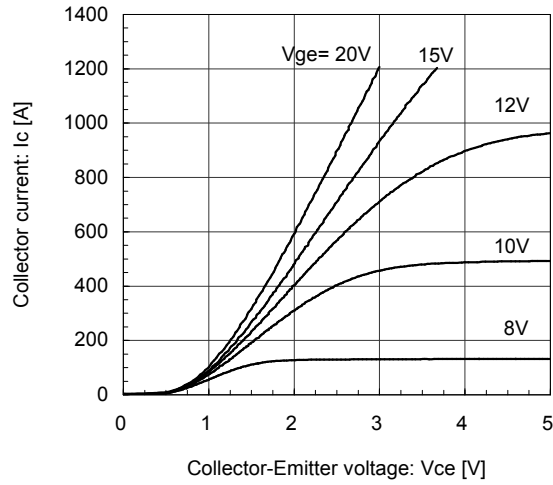
[INVERTER]

Collector current vs. Collector-Emmitter voltage (typ.)
Tj= 25°C / chip



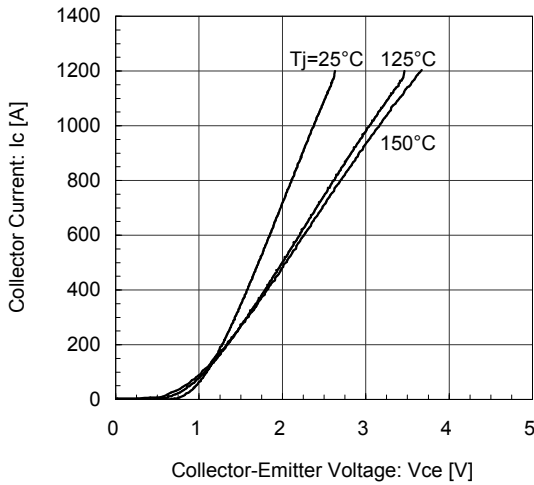
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Collector current vs. Collector-Emmitter voltage (typ.)
Tj= 150°C / chip



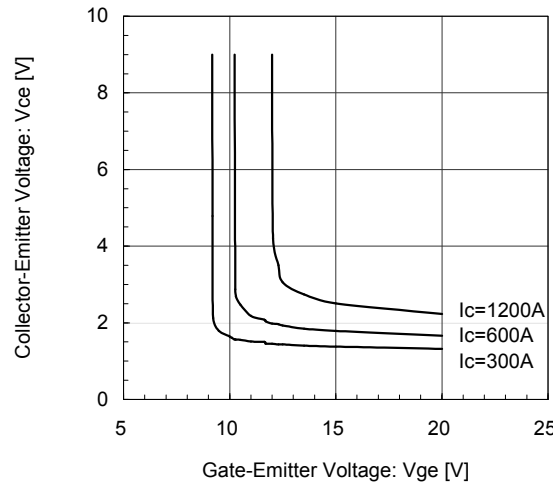
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Collector current vs. Collector-Emmitter voltage (typ.)
Vge= 15V / chip



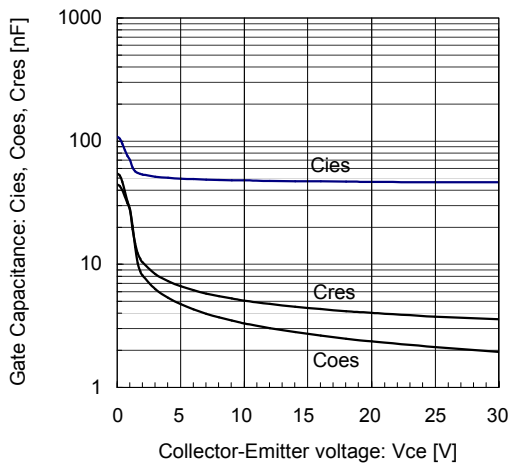
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Collector-Emmitter voltage vs. Gate-Emmitter voltage (typ.)
Tj= 25°C / chip



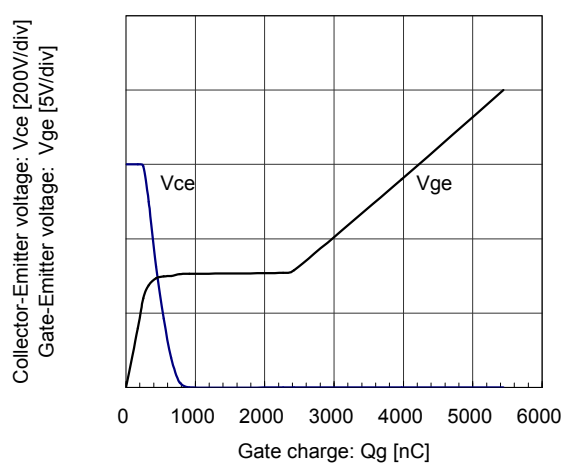
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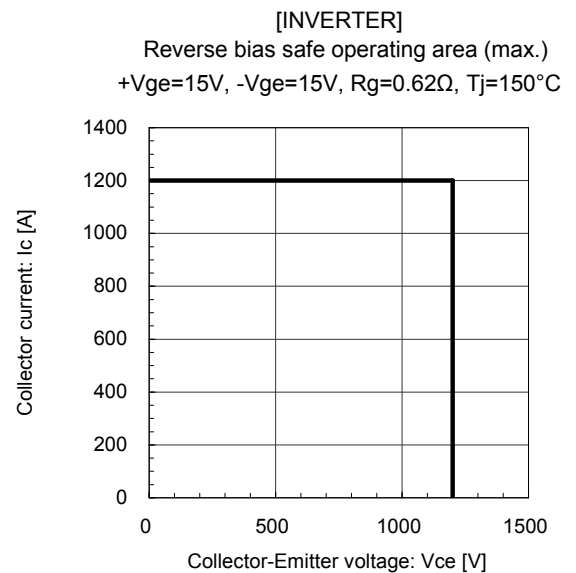
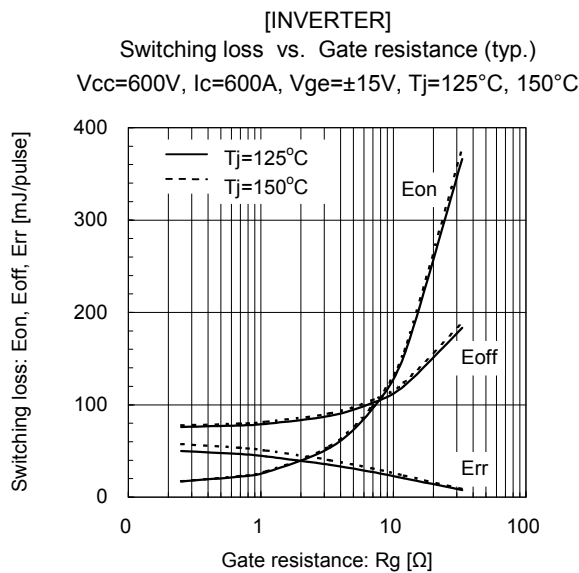
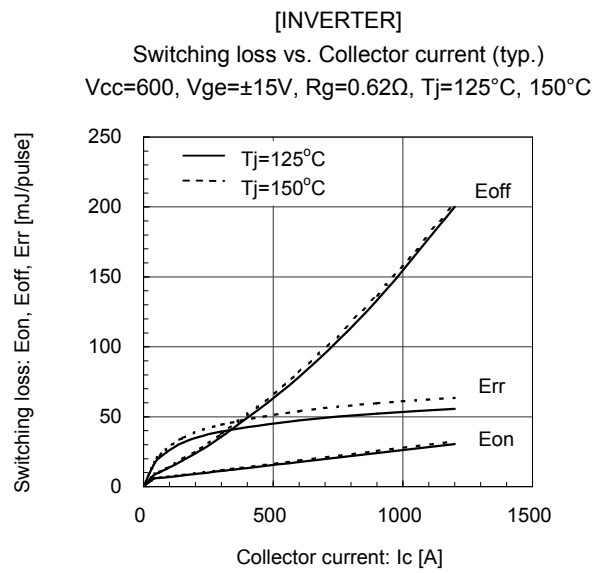
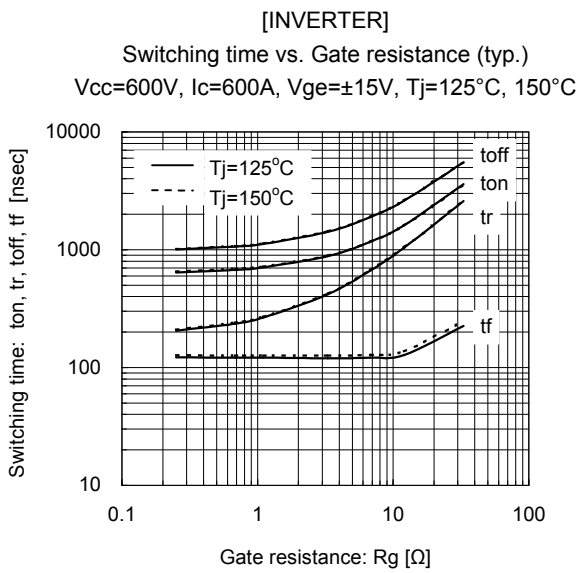
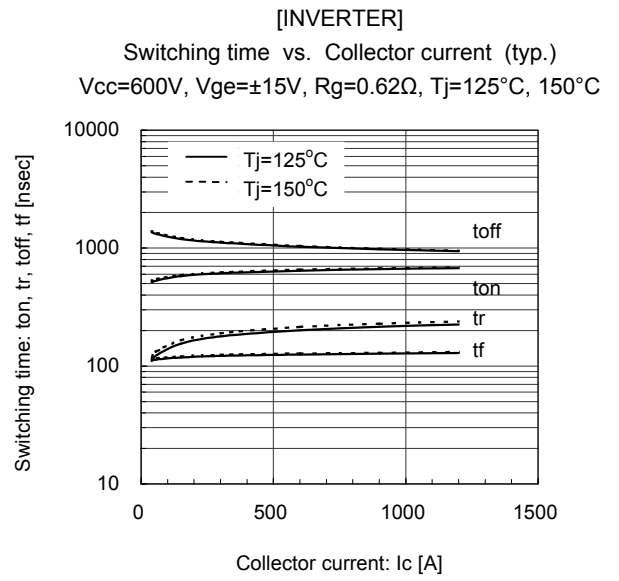
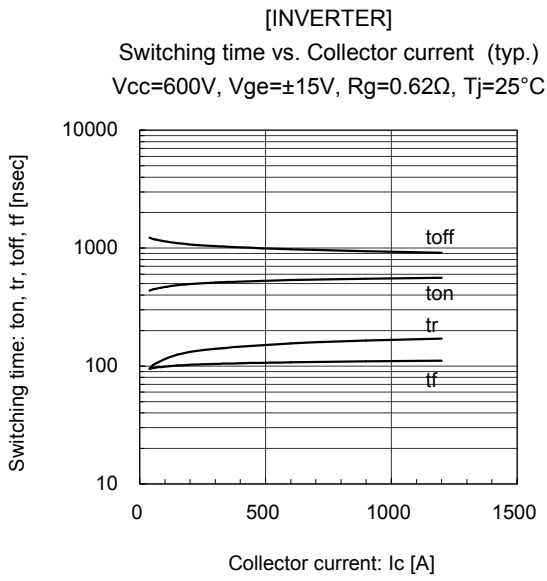
Gate Capacitance vs. Collector-Emmitter Voltage (typ.)
Vge= 0V, f= 1MHz, Tj= 25°C



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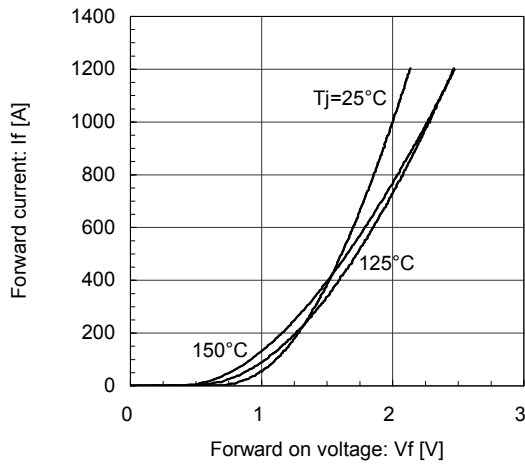
Dynamic Gate Charge (typ.)
Vcc=600V, Ic=600A, Tj= 25°C





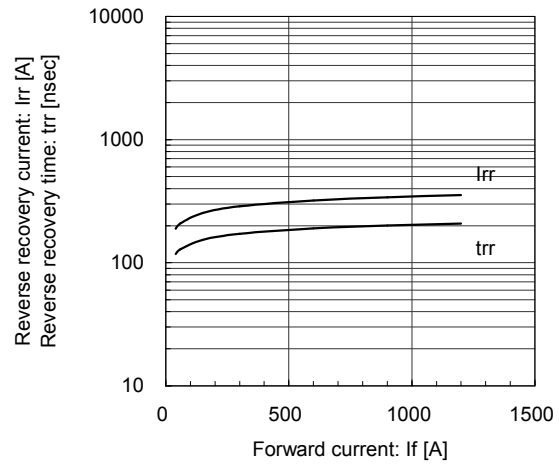
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Forward Current vs. Forward Voltage (typ.)
chip



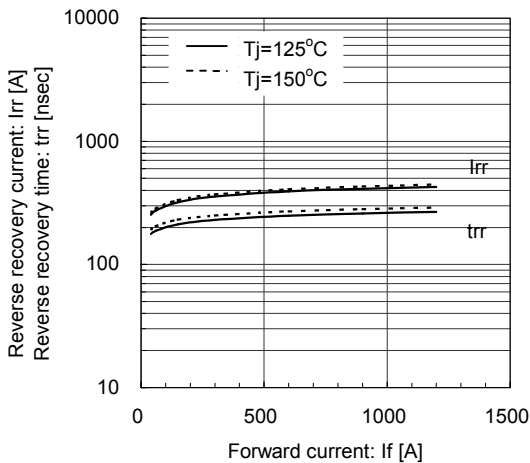
[INVERTER]

Reverse Recovery Characteristics (typ.)
Vcc=600V, Vge=±15V, Rg=0.62Ω, Tj=25°C

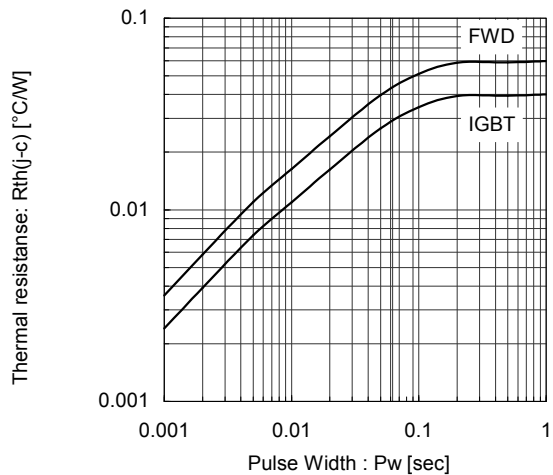


[INVERTER]

Reverse Recovery Characteristics (typ.)
Vcc=600V, Vge=±15V, Rg=0.62Ω, Tj=125°C, 150°C

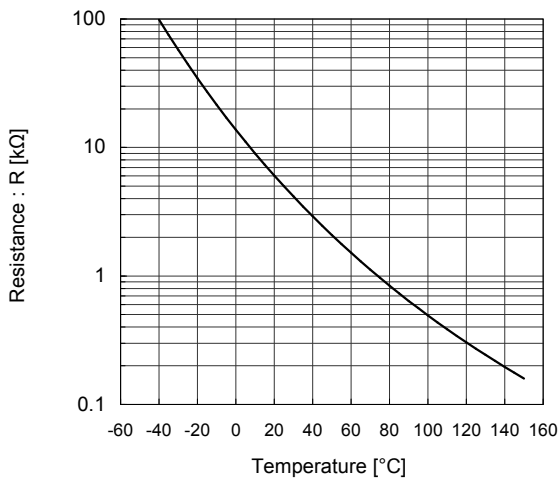


Transient Thermal Resistance (max.)

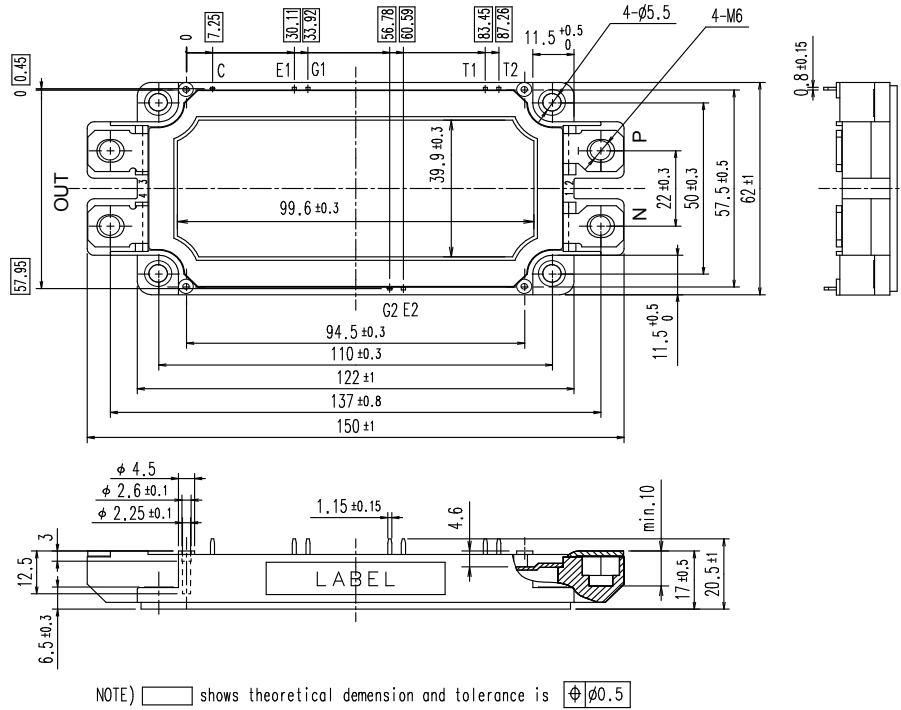


[THERMISTOR]

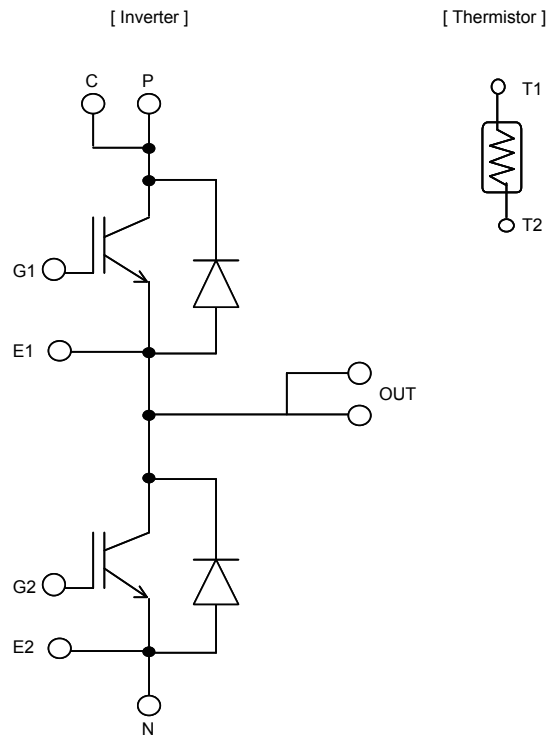
Temperature characteristic (typ.)



Outline Drawings, mm



Equivalent Circuit Schematic



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