

# 2MBI225VN-120-50

## IGBT MODULE (V series) 1200V / 225A / 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	225	A
		$I_C$ pulse	1ms	450	
		$-I_C$		225	
		$-I_C$ pulse	1ms	450	
Collector power dissipation	$P_C$	1 device	1070	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	$V_{GE(th)}$	$V_{CE} = 20V, I_C = 225mA$	6.0	6.5	7.0	V	
Collector-Emitter saturation voltage	$V_{CE(sat)}$ (terminal)	$V_{GE} = 15V$ $I_C = 225A$	$T_j = 25^\circ C$	-	2.20	2.65	V
			$T_j = 125^\circ C$	-	2.55	-	
			$T_j = 150^\circ C$	-	2.60	-	
	$V_{CE(sat)}$ (chip)		$T_j = 25^\circ C$	-	1.85	2.30	
			$T_j = 125^\circ C$	-	2.20	-	
			$T_j = 150^\circ C$	-	2.25	-	
Inverter	Input capacitance	$C_{ies}$	$V_{CE} = 10V, V_{GE} = 0V, f = 1MHz$	-	18	-	nF
	Turn-on time	$t_{on}$	$V_{CC} = 600V$ $I_C = 225A$	-	550	1200	nsec
$t_r$		-		180	600		
$t_r(i)$		-		120	-		
Turn-off time		$t_{off}$		$V_{GE} = \pm 15V$	-	1050	
	$t_f$	$R_G = 1.6\Omega$	-	110	350		
Forward on voltage	$V_F$ (terminal)	$V_{GE} = 0V$ $I_F = 225A$	$T_j = 25^\circ C$	-	2.05	2.50	V
			$T_j = 125^\circ C$	-	2.20	-	
			$T_j = 150^\circ C$	-	2.15	-	
	$V_F$ (chip)		$T_j = 25^\circ C$	-	1.70	2.15	
			$T_j = 125^\circ C$	-	1.85	-	
			$T_j = 150^\circ C$	-	1.80	-	
Reverse recovery time	$t_{rr}$	$I_F = 225A$	-	200	600	nsec	
Thermistor	Resistance	$R$	$T = 25^\circ C$	-	5000	-	Ω
	B value	$B$	$T = 100^\circ C$	465	495	520	K
			$T = 25/50^\circ C$	3305	3375	3450	

#### ● Thermal resistance characteristics

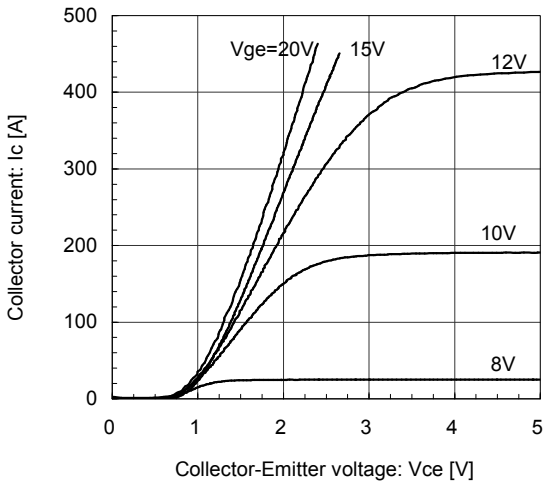
Items	Symbols	Conditions	Characteristics			Units
			min.	typ.	max.	
Thermal resistance (1device)	$R_{th(j-c)}$	Inverter IGBT	-	-	0.14	°C/W
		Inverter FWD	-	-	0.19	
Contact thermal resistance (1device) (*5)	$R_{th(c-f)}$	with Thermal Compound	-	0.0167	-	

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

■ Characteristics (Representative)

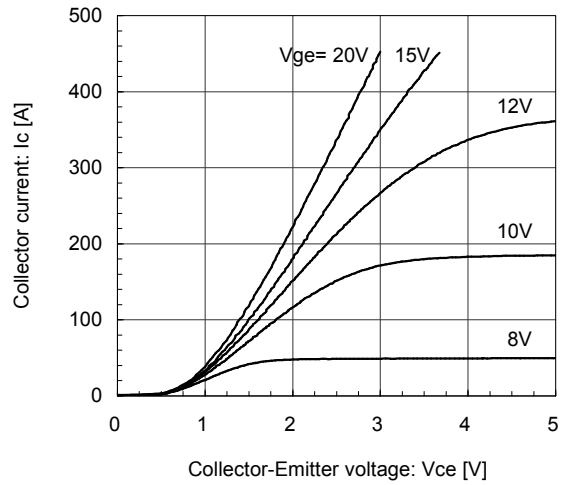
[INVERTER]

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



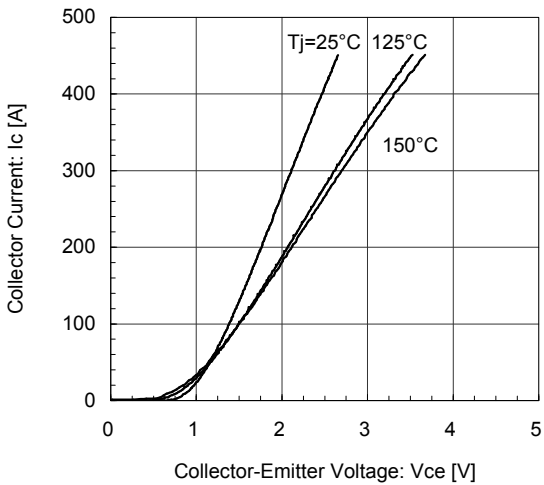
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Collector current vs. Collector-Emitter voltage (typ.)  
Tj= 150°C / chip



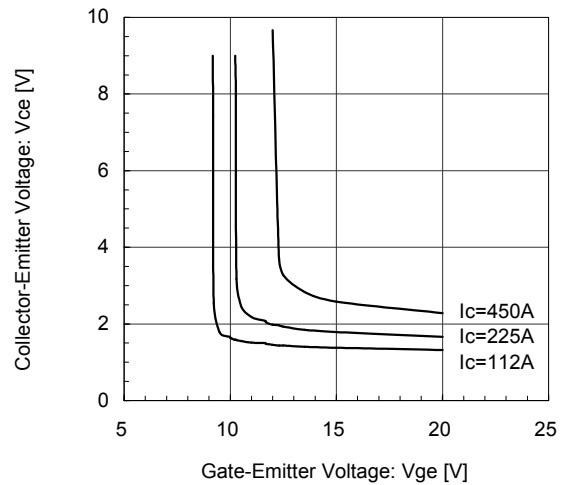
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Collector current vs. Collector-Emitter voltage (typ.)  
Vge= 15V / chip



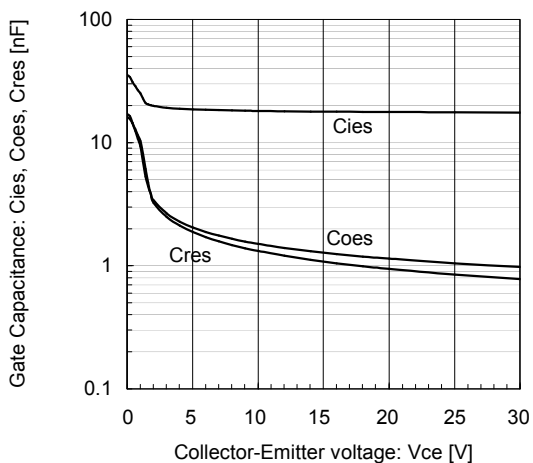
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Collector-Emitter voltage vs. Gate-Emitter voltage (typ.)  
Tj= 25°C / chip



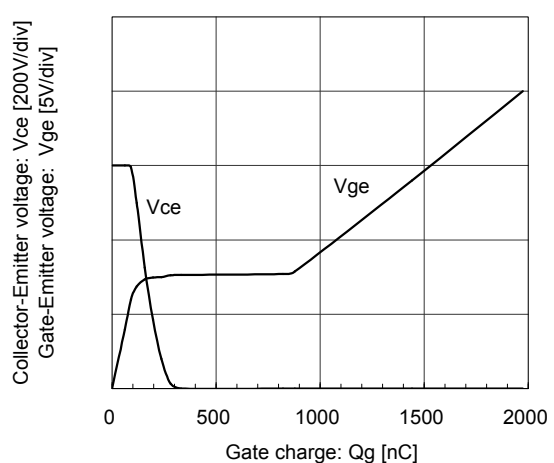
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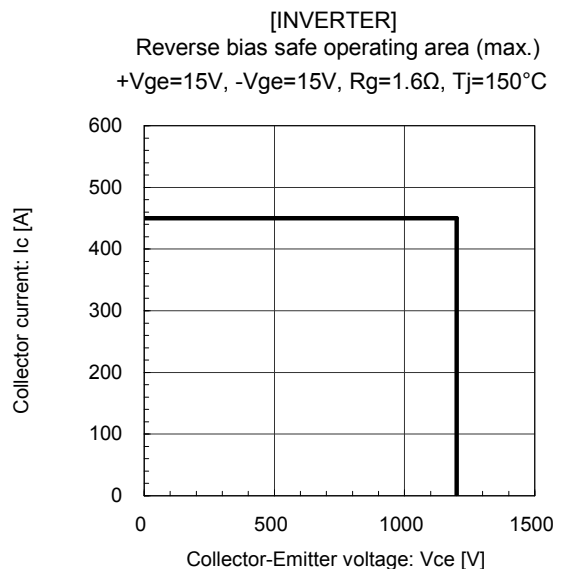
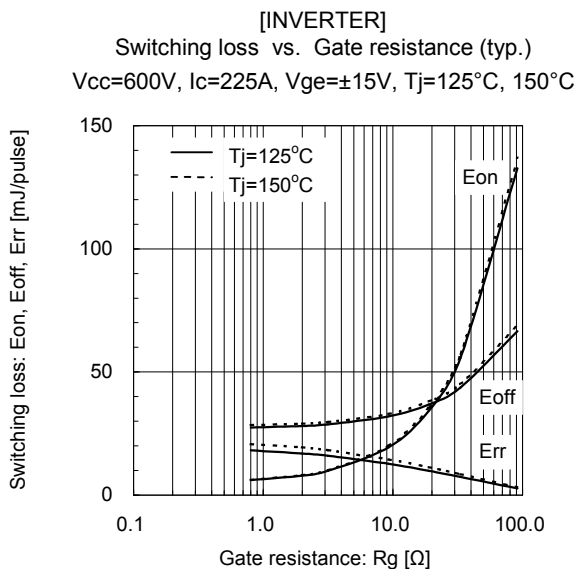
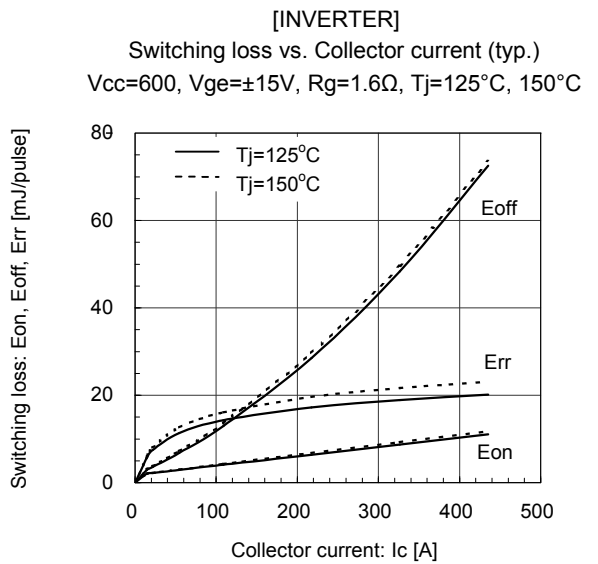
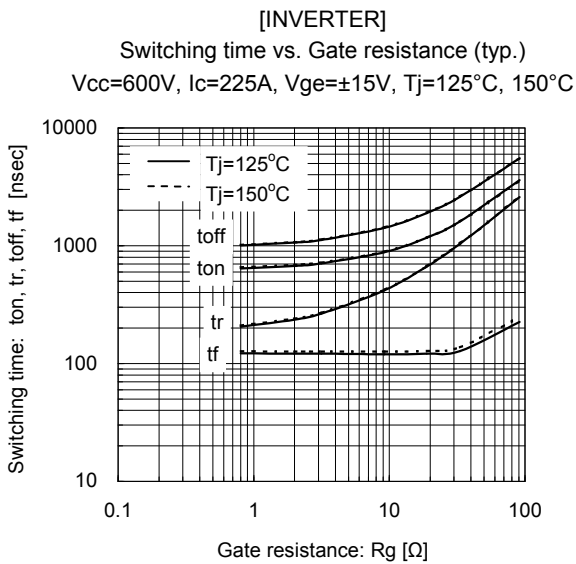
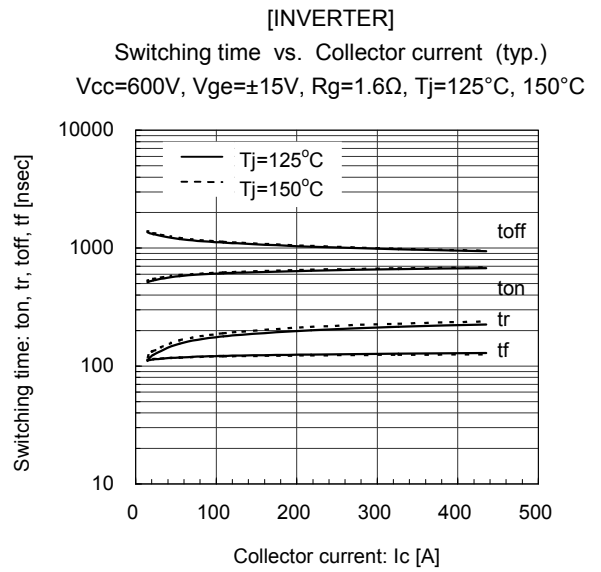
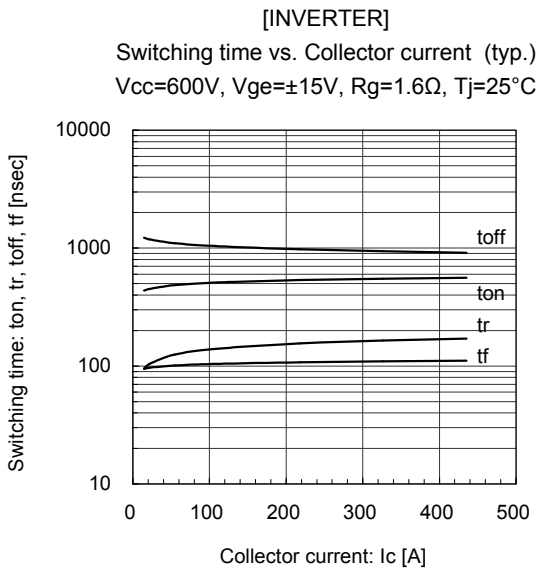
Gate Capacitance vs. Collector-Emitter Voltage (typ.)  
Vge= 0V, f= 1MHz, Tj= 25°C



[INVERTER]

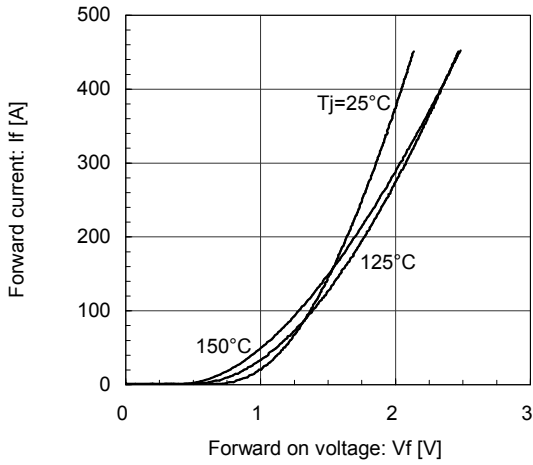
Dynamic Gate Charge (typ.)  
Vcc=600V, Ic=225A, Tj= 25°C





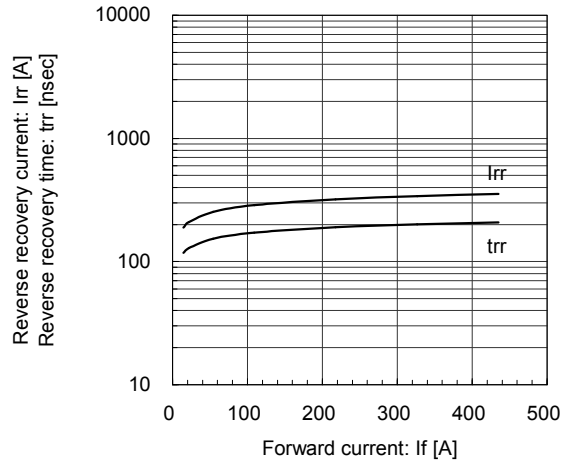
[INVERTER]

Forward Current vs. Forward Voltage (typ.)  
chip



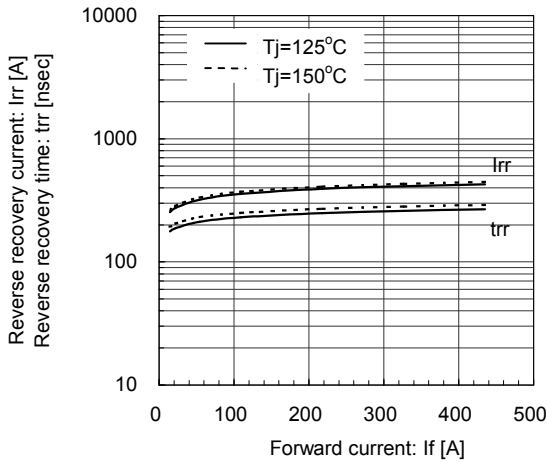
[INVERTER]

Reverse Recovery Characteristics (typ.)  
Vcc=600V, Vge=±15V, Rg=1.6Ω, Tj=25°C

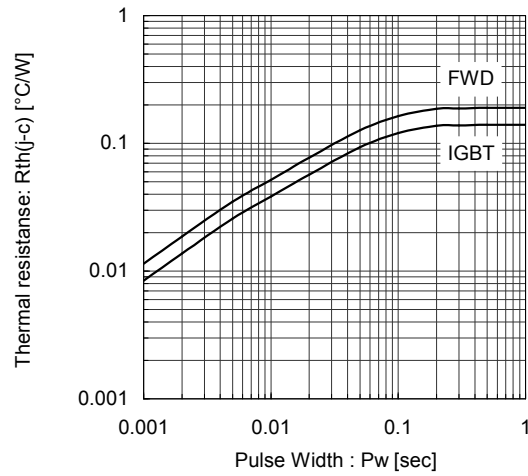


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Reverse Recovery Characteristics (typ.)  
Vcc=600V, Vge=±15V, Rg=1.6Ω, Tj=125°C, 150°C

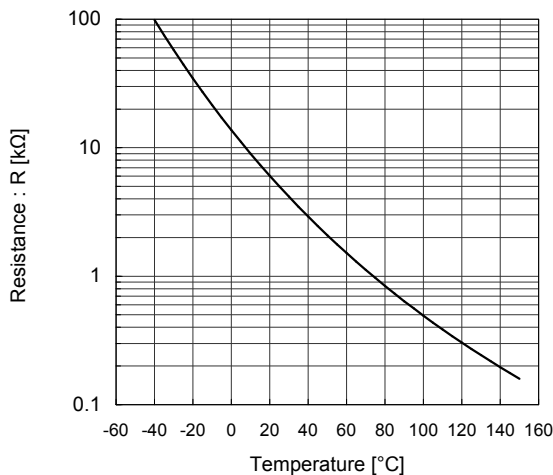


Transient Thermal Resistance (max.)

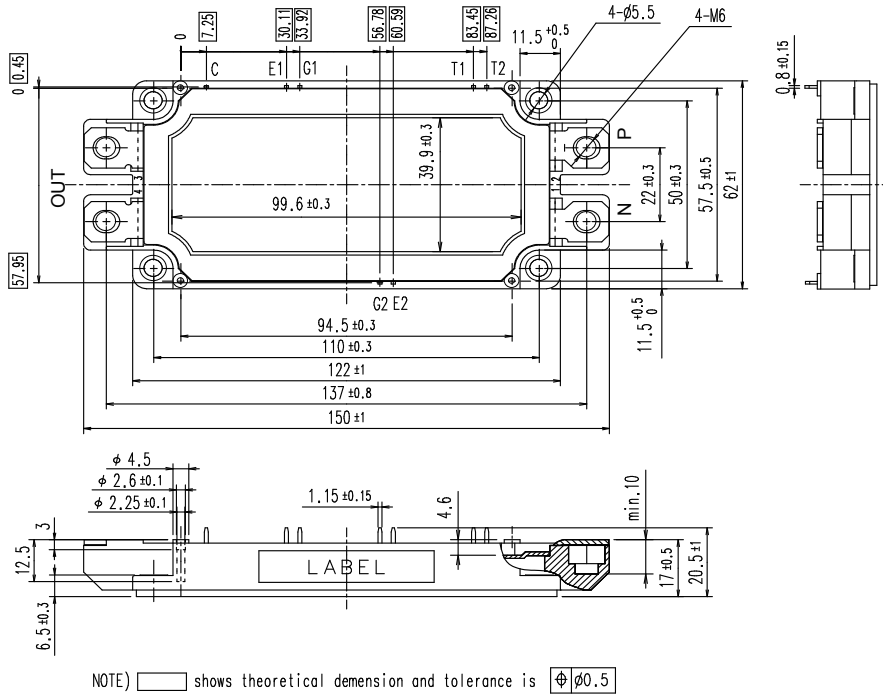


[THERMISTOR]

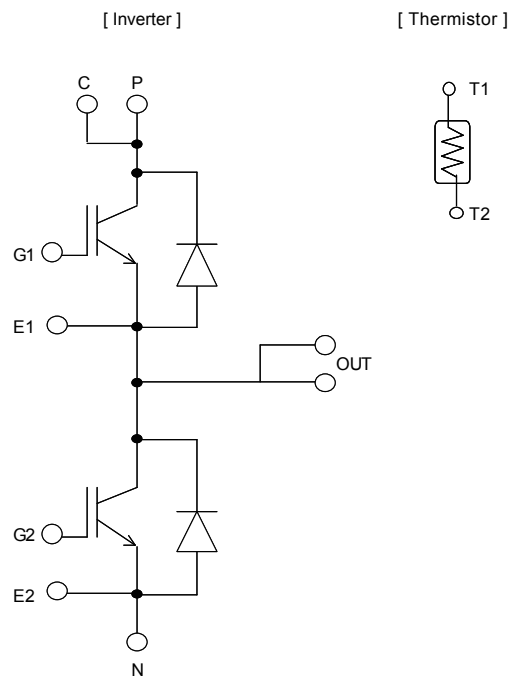
Temperature characteristic (typ.)



Outline Drawings, mm



Equivalent Circuit Schematic



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