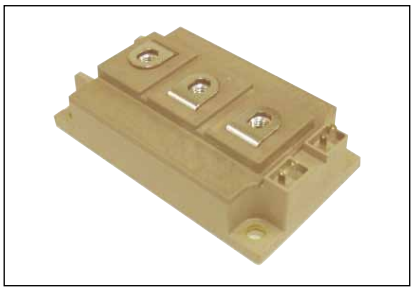
1MBI200HH-120L-50

IGBT Modules

IGBT MODULE
1200V / 200A / 1 in one package



Features

High speed switching
Voltage drive
Low Inductance module structure

Applications

Inverter DB for Motor Drive
AC and DC Servo Drive Amplifier (DB)
Active PFC
Industrial machines

Maximum Ratings and Characteristics

Absolute Maximum Ratings (at T_c=25°C unless otherwise specified)

Items		Symbols	Conditions		Maximum ratings	Units
Collector-Emitter voltage		V_{CES}			1200	V
Gate-Emitter voltage		V_{GES}			±20	V
Collector current		I_C	Continuous	T_c=25°C	300	A
				T_c=80°C	200	
		I_{cp}	1ms	T_c=25°C	600	
				T_c=80°C	400	
		-I_C			75	
		-I_C pluse	1ms		150	
Collector Power Dissipation		P_C	1 device		1390	W
Reverse voltage for FWD		V_R			1200	V
Forword current for FWD		I_F	Continuous		200	A
		$I_{F\ pulse}$	1ms		400	
Junction temperature		T_j			+150	°C
Storage temperature		T_{stg}			-40 to +125	
Isolation voltage	between terminal and copper base (*1)	V_{iso}	AC : 1min.		2500	VAC
	between thermistor and others (*2)					
Screw Torque	Mounting (*3)	-			3.5	Nm
	Terminals (*4)				4.5	

Note *1: All terminals should be connected together when isolation test will be done.
Note *2: Two thermistor terminals should be connected together, each other terminals should be connected together and shorted to base plate when isolation test will be done.
Note *3: Recommendable Value : Mounting 2.5 to 3.5 Nm (M5 or M6)
Note *4: Recommendable Value : Terminals 3.5 to 4.5 Nm (M6)

● Electrical characteristics (at T_j= 25°C unless otherwise specified)

Items		Symbols	Conditions		Characteristics min.	Characteristics typ.	Characteristics max.	Units
IGBT+Inverse Diode	Zero gate voltage collector current	I_{CES}	V_{CE} = 1200V V_{GE} = 0V		-	-	2.0	mA
	Gate-Emitter leakage current	I_{GES}	V_{CE} = 0V V_{GE}=±20V		-	-	400	nA
	Gate-Emitter threshold voltage	$V_{GE(th)}$	V_{CE} = 20V I_C = 200mA		5.7	6.2	6.7	V
	Collector-Emitter saturation voltage	$V_{CE(sat)}$ (terminal)	I_C = 200A V_{GE}=15V	T_j= 25°C	-	3.25	3.55	V
				T_j=125°C	-	4.15	-	
		$V_{CE(sat)}$ (chip)		T_j= 25°C	-	3.10	3.40	
				T_j=125°C	-	4.00	-	
	Input capacitance	C_{ies}	V_{CE}=10V,V_{GE}=0V,f=1MHz		-	18	-	nF
	Turn-on time	t_{on}	V_{CC} = 600V I_C = 200A V_{GE} = ±15V R_G = 3.1 Ω L_S = 20nH		-	0.20	0.50	μs
		t_r			-	0.10	0.40	
		$t_{r\,(i)}$			-	0.30	-	
	Turn-off time	t_{off}			-	0.30	0.70	
		t_f			-	0.05	0.20	
	Forward on voltage	V_F (terminal)	I_F = 75A V_{GE}=0V	T_j= 25°C	-	1.80	2.30	V
				T_j=125°C	-	1.95	-	
		V_F (chip)		T_j= 25°C	-	1.70	2.15	
				T_j=125°C	-	1.85	-	
FWD	Reverse Current	I_R	V_{CE} = 1200V		-	-	1.0	mA
	Forward on voltage	V_F (terminal)	I_F = 200A V_{GE}=0V	T_j= 25°C	-	8.15	9.40	V
				T_j=125°C	-	4.45	-	
		V_F (chip)		T_j= 25°C	-	7.90	9.15	
				T_j=125°C	-	4.20	-	
	Reverse recovery time	t_{rr}	I_F = 200A		-	-	0.20	μs
Lead resistance, terminal-chip (*5)		R lead			-	0.70	-	mΩ
Thermistor	Resistance	R	T = 25°C		-	5000	-	Ω
			T = 125°C		465	495	520	
	B value	B	T = 25/50°C		3305	3375	3450	K

Note *5: Biggest internal terminal resistance among arm.

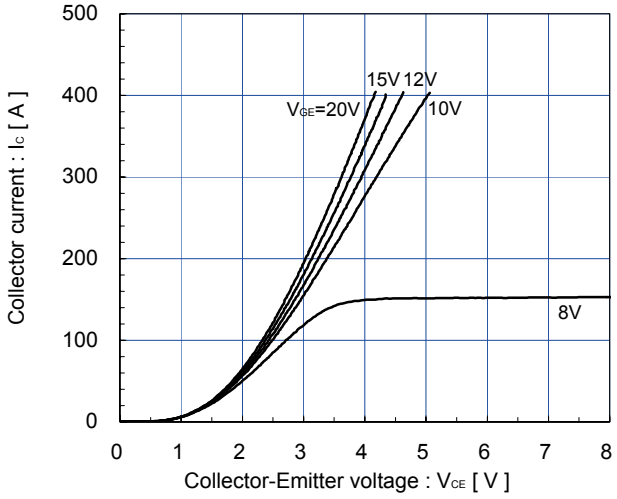
● Thermal resistance characteristics

Items	Symbols	Conditions	Characteristics min.	Characteristics typ.	Characteristics max.	Units
Thermal resistance(1device)	$R_{th(j-c)}$	IGBT	-	-	0.067	°C/W
		Inverse Diode	-	-	0.460	
		FWD	-	-	0.150	
Contact Thermal resistance	$R_{th(c-f)}$	with Thermal Compound (*6)	-	0.0250	-	

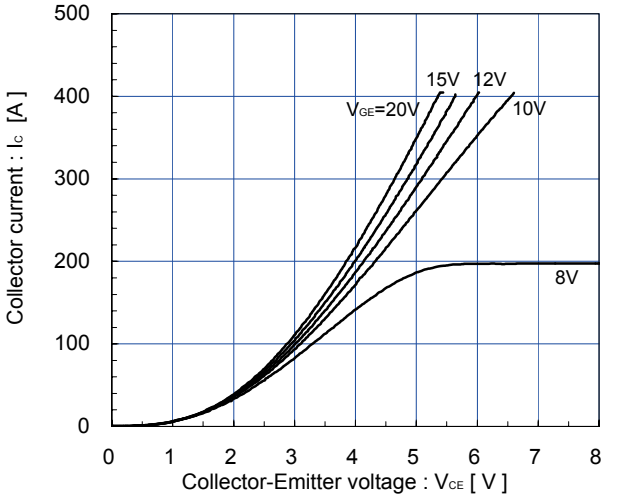
Note *6: This is the value which is defined mounting on the additional cooling fin with thermal compound.

■ Characteristics (Representative)

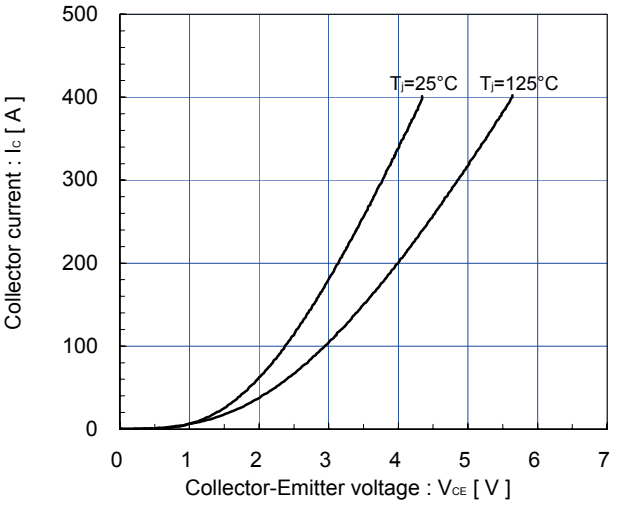
Collector current vs. Collector-Emitter voltage (typ.)
T_j=25°C / chip



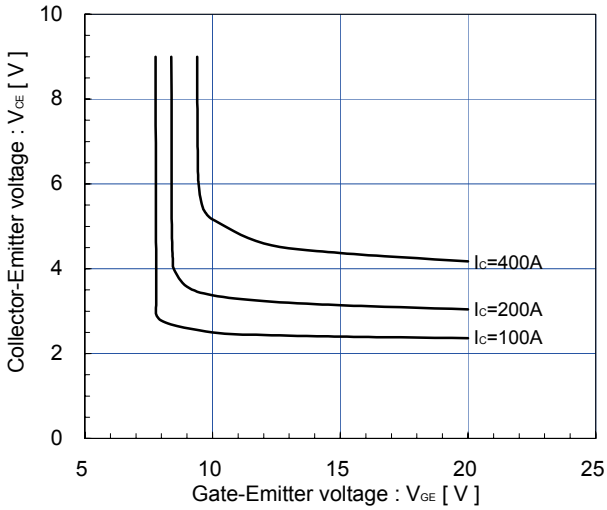
Collector current vs. Collector-Emitter voltage (typ.)
T_j=125°C / chip



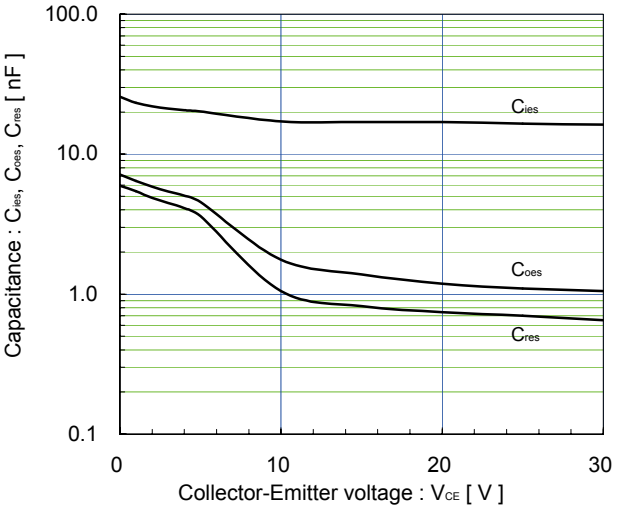
Collector current vs. Collector-Emitter voltage (typ.)
V_{GE}=15V / chip



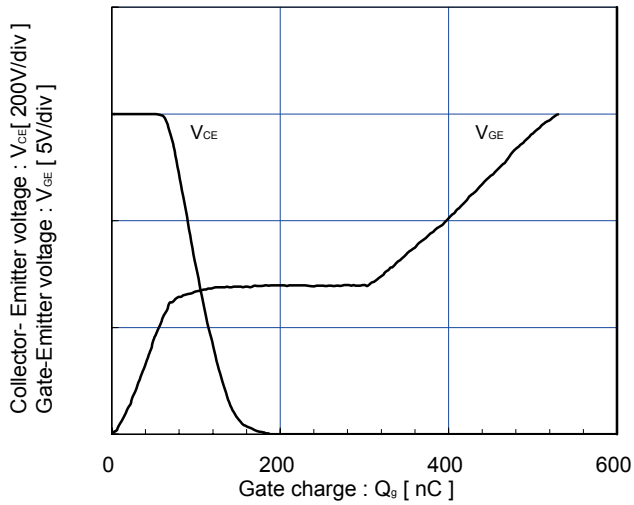
Collector-Emitter voltage vs. Gate-Emitter voltage (typ.)
T_j=25°C / chip



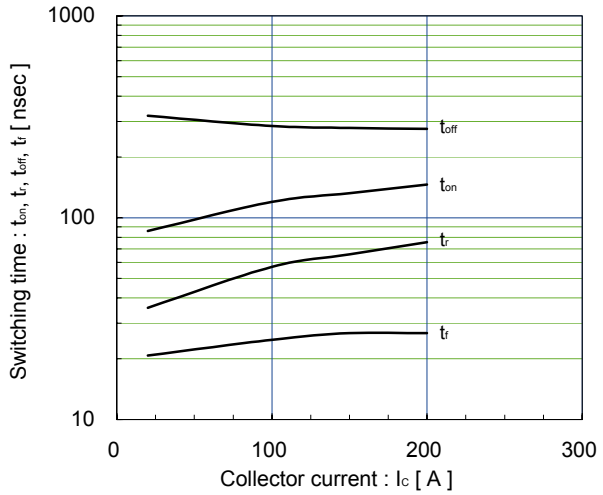
Capacitance vs. Collector-Emitter voltage (typ.)
V_{GE}=0V, f=1MHz, T_j=25°C



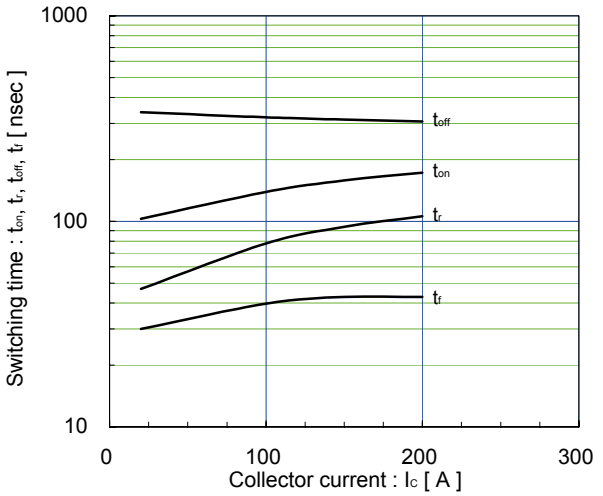
Dynamic Gate charge (typ.)
V_{CC}=600V, I_C=200A, T_j=25°C



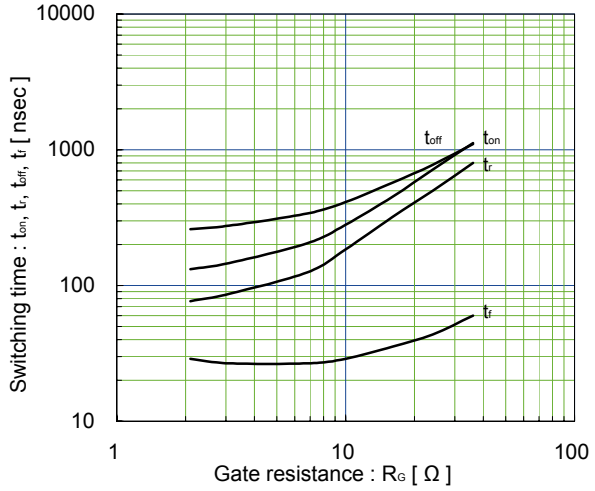
Switching time vs. Collector current (typ.)
V_{CC}=600V, V_{GE}=±15V, R_G=3.1Ω, T_j=25°C



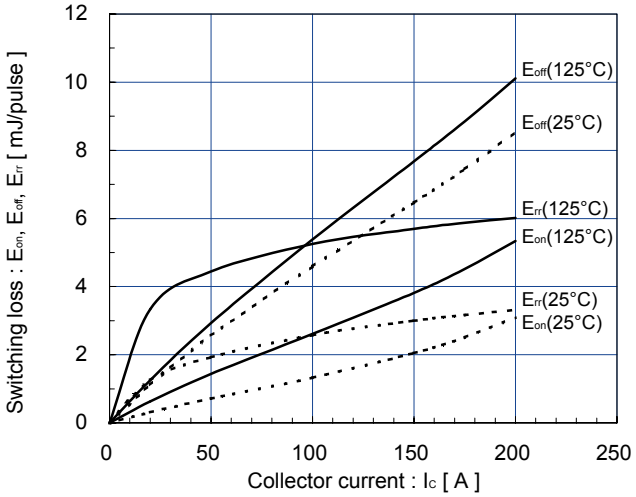
Switching time vs. Collector current (typ.)
V_{CC}=600V, V_{GE}=±15V, R_G=3.1Ω, T_j=125°C



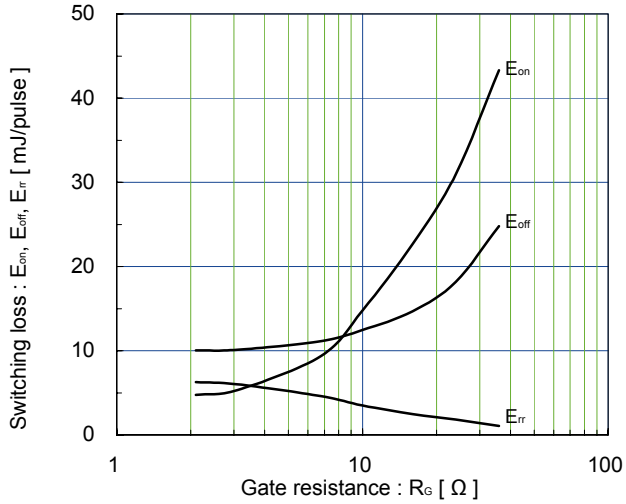
Switching time vs. Gate resistance (typ.)
V_{CC}=600V, I_C=200A, V_{GE}=±15V, T_j=25°C



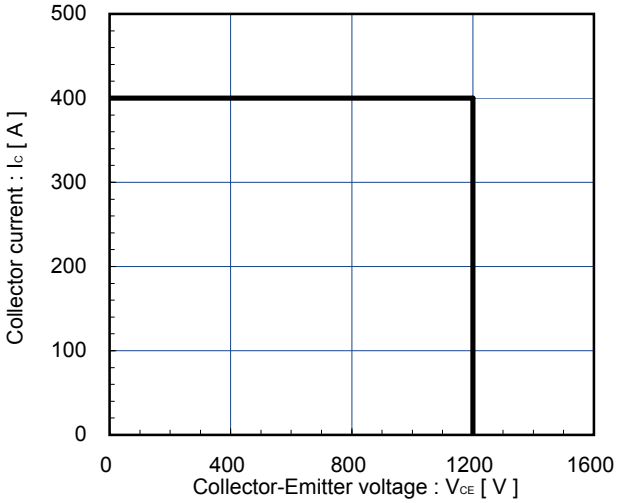
Switching loss vs. Collector current (typ.)
V_{CC}=600V, V_{GE}=±15V, R_G=3.1Ω



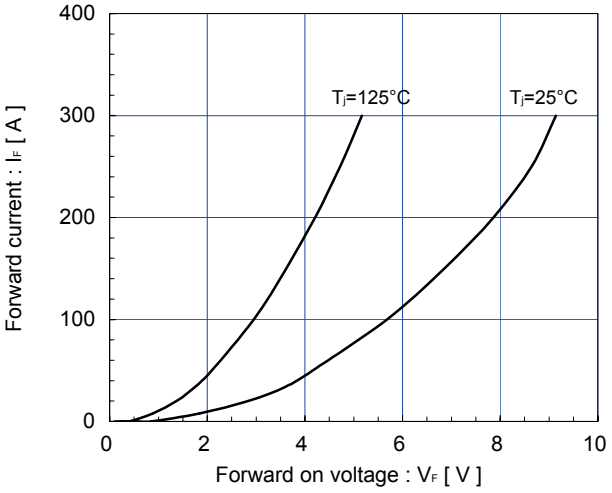
Switching loss vs. Gate resistance (typ.)
V_{CC}=600V, I_C=200A, V_{GE}=±15V, T_j=125°C



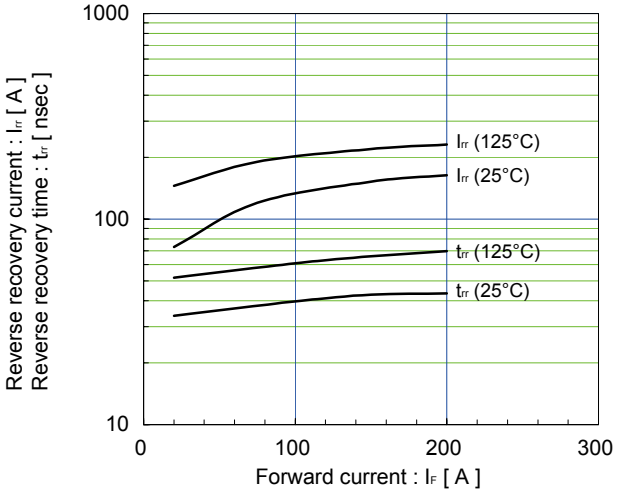
Reverse bias safe operating area (max.)
+V_{GE}=15V, -V_{GE} <= 15V, R_G >= 3.1Ω, T_j <= 125°C



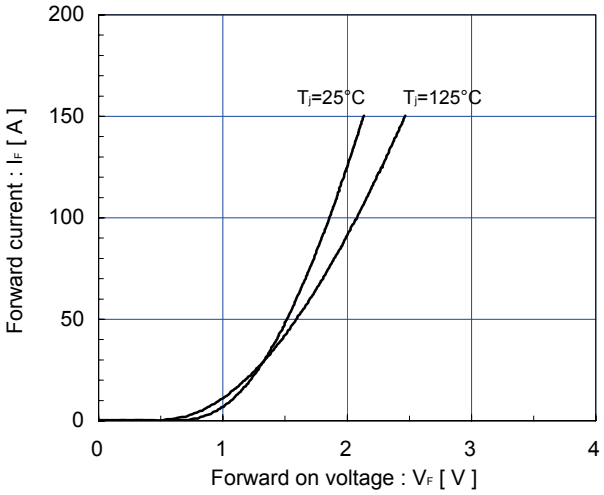
FWD
Forward current vs. Forward on voltage for Inverse Diode (typ.)
chip



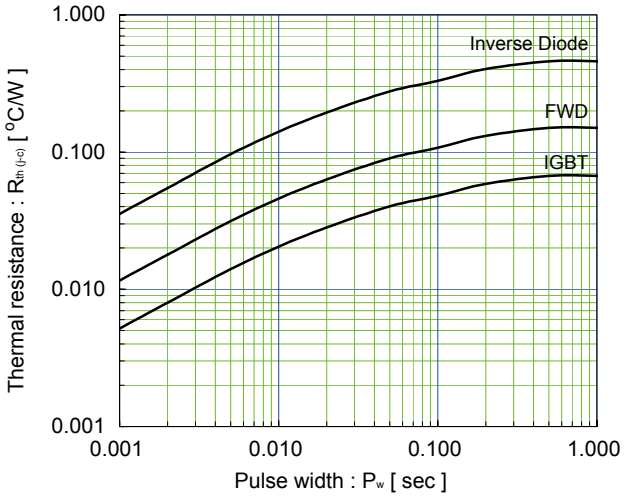
FWD
Reverse recovery characteristics (typ.)
V_{CC}=600V, V_{GE}=±15V, R_G=3.1Ω



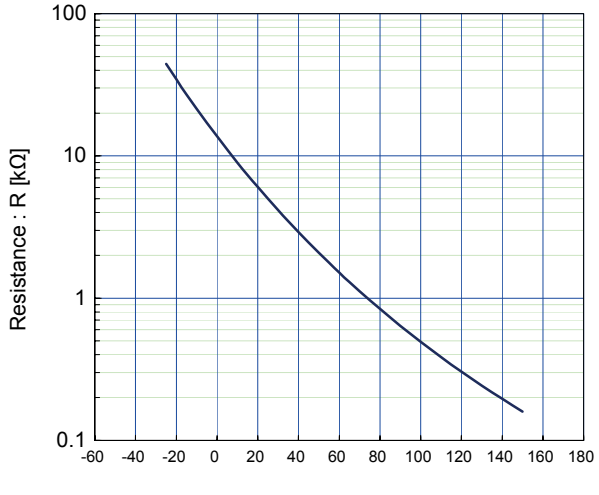
Inverse Diode
Forward current vs. Forward on voltage (typ.)
chip



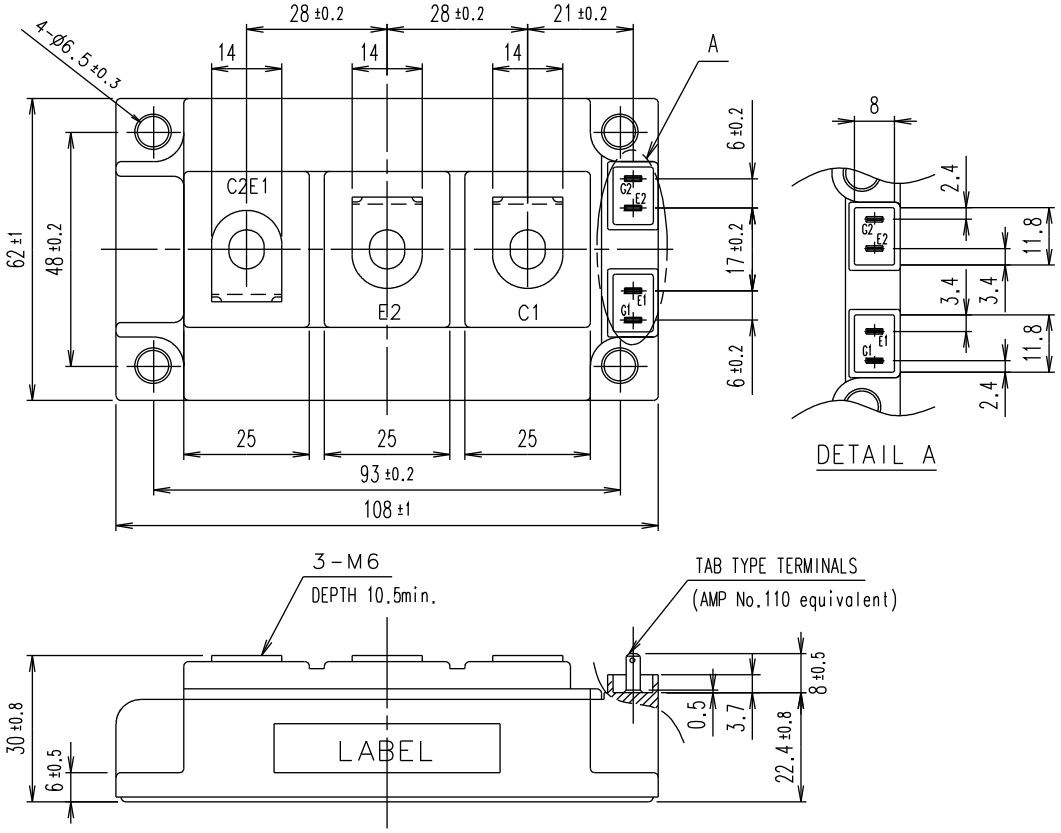
Transient thermal resistance (max.)



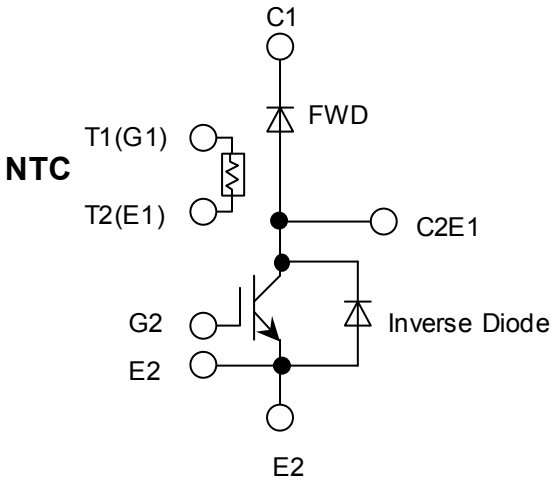
Thermistor
Temperature characteristic (typ.)



■ Outline Drawings, mm



■ Equivalent Circuit Schematic



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