2MBI1200VT-170E

IGBT Modules

IGBT MODULE (V series)
1700V / 1200A / 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°C unless otherwise specified)**

Items		Symbols	Conditions		Maximum ratings	Units
Collector-Emitter voltage		V_{CES}			1700	V
Gate-Emitter voltage		V_{GES}			±20	V
Collector current		I_C	Continuous	T_C=25°C	1600	A
				T_C=100°C	1200	
		I_{CP}	1ms		2400	
		$-I_C$			1200	
		$-I_{C\ pulse}$	1ms		2400	
Collector power dissipation		P_C	1 device		7040	W
Junction temperature		T_j			175	°C
Operating junction temperature (under switching conditions)		T_{jop}			150	
Storage temperature		T_{stg}			-40 ~ +125	
Isolation voltage	between terminal and copper base (*1)	V_{iso}	AC : 1min.		4000	VAC
Screw torque (*2)	Mounting	-	M6		5.75	N m
	Main Terminals	-	M8		10	
	Sense Terminals	-	M4		2.5	

Note *1: All terminals should be connected together when isolation test will be done.
Note *2: Recommendable Value :
Mounting 4.25~5.75 Nm (M6) , Main Terminals 8~10 Nm (M8) , Sense Terminals 1.7~2.5 Nm (M4)

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

Items	Symbols	Conditions		Characteristics min.	Characteristics typ.	Characteristics max.	Units
Zero gate voltage collector current	I_{CES}	V_{GE} = 0V, V_{CE} = 1700V		-	-	1.0	mA
Gate-Emitter leakage current	I_{GES}	V_{CE} = 0V, V_{GE} = ±20V		-	-	1600	nA
Gate-Emitter threshold voltage	$V_{GE\ (th)}$	V_{CE} = 20V, I_C = 1200mA		6.0	6.5	7.0	V
Collector-Emitter saturation voltage	$V_{CE\ (sat)}$ (main terminal)	V_{GE} = 15V, I_C = 1200A	T_j=25°C	-	2.32	2.61	V
			T_j=125°C	-	2.72	-	
			T_j=150°C	-	2.77	-	
	$V_{CE\ (sat)}$ (chip)		T_j=25°C	-	2.00	2.25	
			T_j=125°C	-	2.40	-	
			T_j=150°C	-	2.45	-	
Internal gate resistance	I_{nt} R_G			-	1.88	-	Ω
Input capacitance	C_{ies}	V_{CE} = 10V, V_{GE} = 0V, f = 1MHz		-	109	-	nF
Turn-on	t_{on}	V_{CC} = 900V R_{gon} = 0.47Ω		-	2.14	-	μs
	t_r	I_C = 1200A R_{goff} = 0.82Ω		-	0.79	-	
Turn-off	t_{off}	L_m=75nH		-	2.29	-	
	t_f	V_{GE} = ±15V, T_j=125°C		-	0.33	-	
Forward on voltage	V_F (main terminal)	V_{GE} = 0V, I_F = 1200A	T_j=25°C	-	1.98	2.34	V
			T_j=125°C	-	2.14	-	
			T_j=150°C	-	2.11	-	
	V_F (chip)		T_j=25°C	-	1.66	1.98	
			T_j=125°C	-	1.82	-	
			T_j=150°C	-	1.79	-	
Reverse recovery	t_{rr}	I_F = 1200A, T_j = 125°C		-	0.47	-	μs
Lead resistance, terminal-chip	R lead			-	0.268	-	mΩ

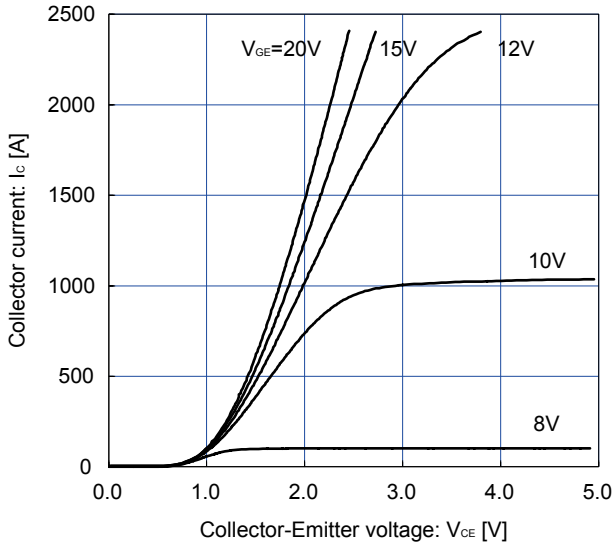
● **Thermal resistance characteristics**

Items	Symbols	Conditions	Characteristics min.	Characteristics typ.	Characteristics max.	Units
Thermal resistance(1device)	$R_{th(j-c)}$	IGBT	-	-	0.0213	°C/W
		FWD	-	-	0.0294	
Contact thermal resistance (1module) (*3)	$R_{th(c-f)}$	with Thermal Compound	-	0.0077	-	

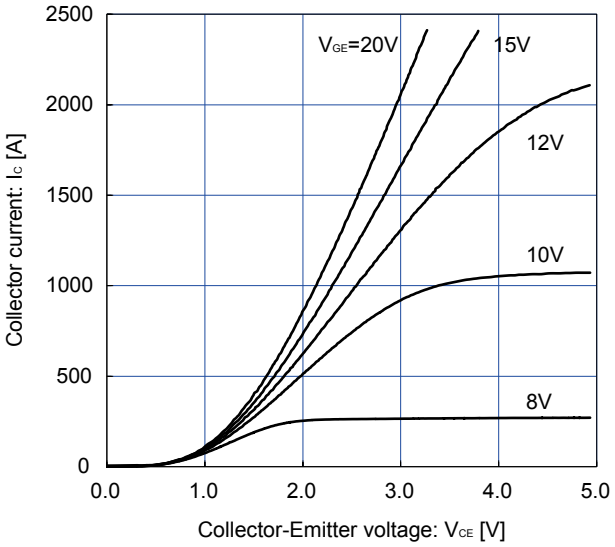
Note *3: This is the value which is defined mounting on the additional cooling fin with thermal compound.

■ Characteristics (Representative)

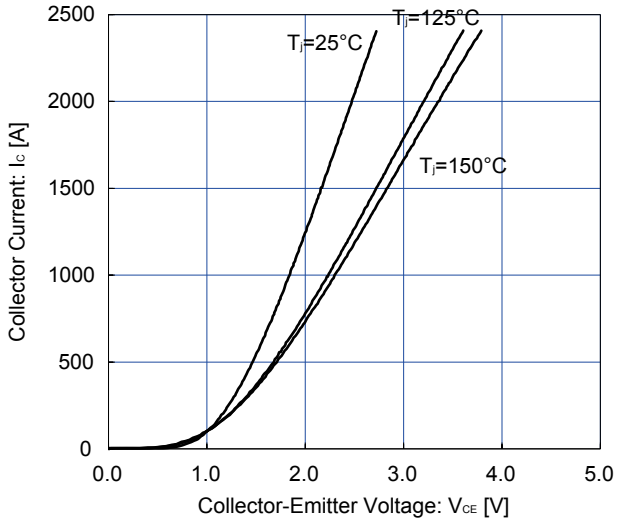
Collector current vs. Collector-Emitter voltage (typ.)
T_j= 25°C, chip



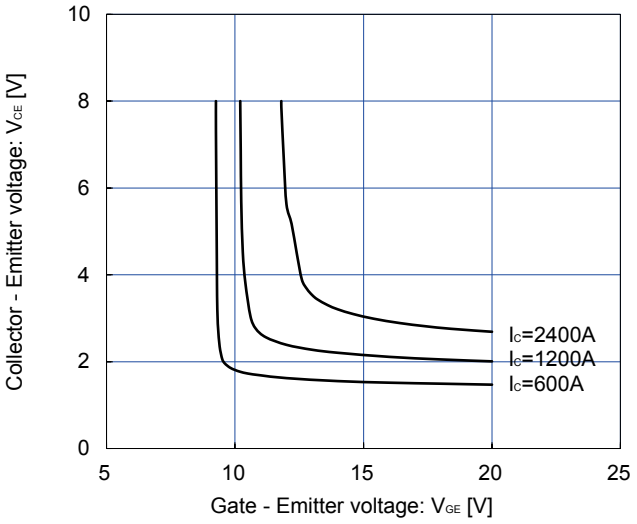
Collector current vs. Collector-Emitter voltage (typ.)
T_j= 150°C, chip



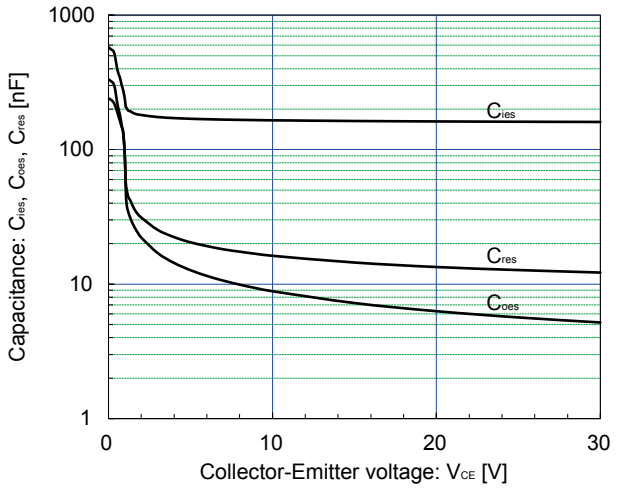
Collector current vs. Collector-Emitter voltage (typ.)
V_{GE}= +15V, chip



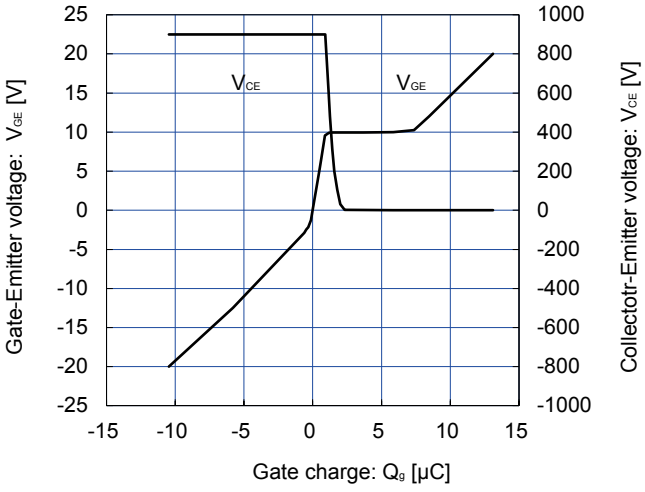
Collector-Emitter voltage vs. Gate-Emitter voltage (typ.)
T_j= 25°C, chip



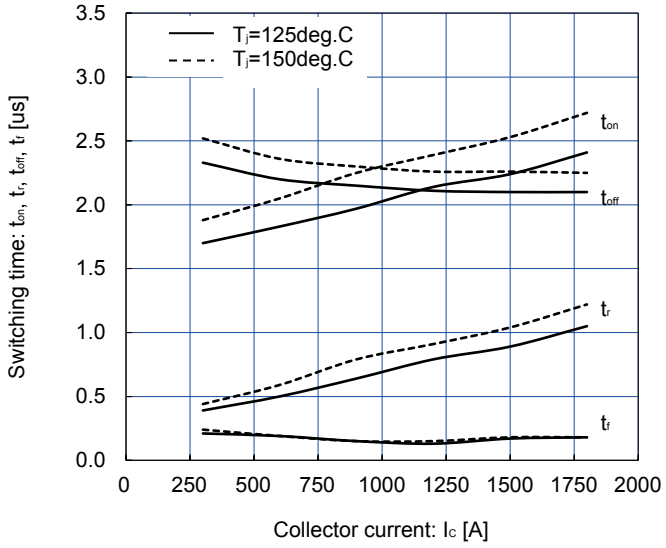
Capacitance vs. Collector-Emitter voltage (typ.)
V_{GE}= 0V, f= 1MHz, T_j= 25°C



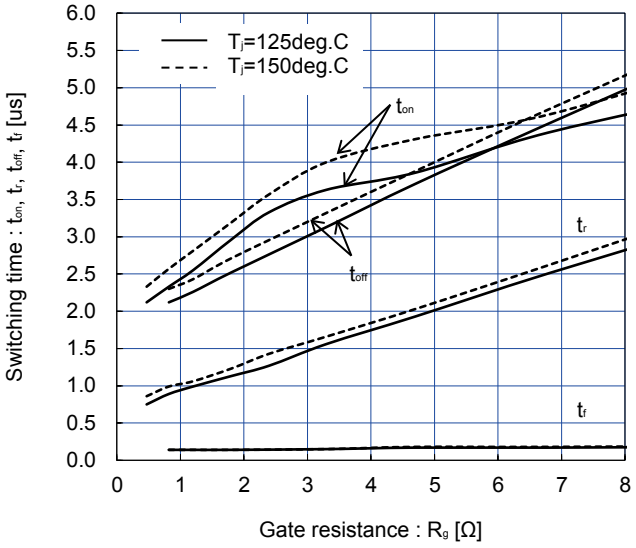
Dynamic Gate charge (typ.)
T_j= 25°C



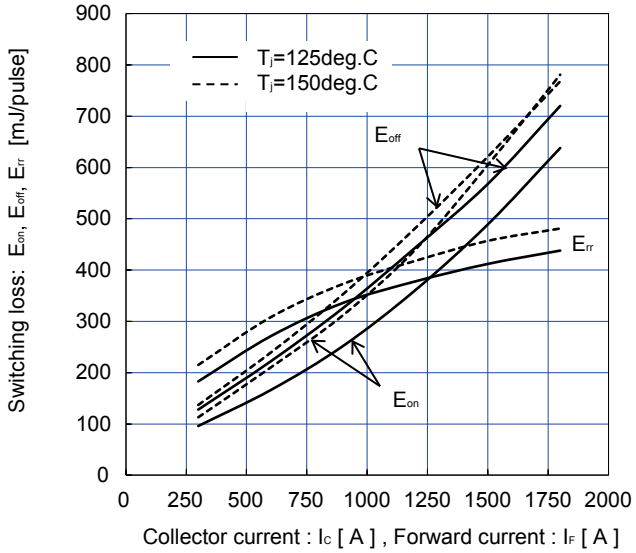
Switching time vs. Collector current (typ.)
V_{CC}=900V, V_{GE}=±15V, R_{gon}=0.47Ω, R_{goff}=0.82Ω



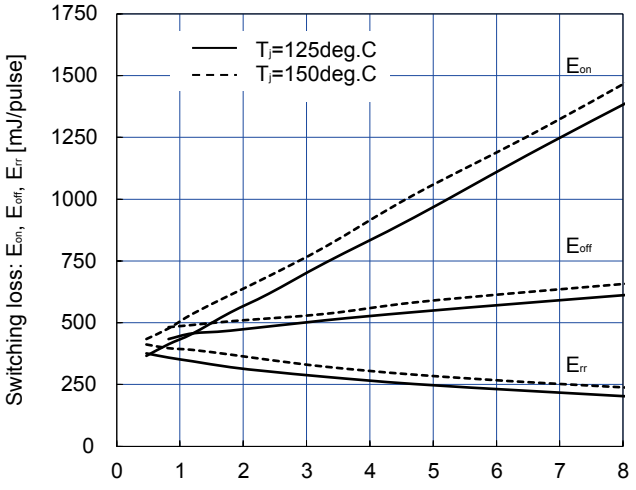
Switching time vs. Gate resistance (typ.)
V_{CC}=900V, V_C=1200A, V_{GE}=±15V



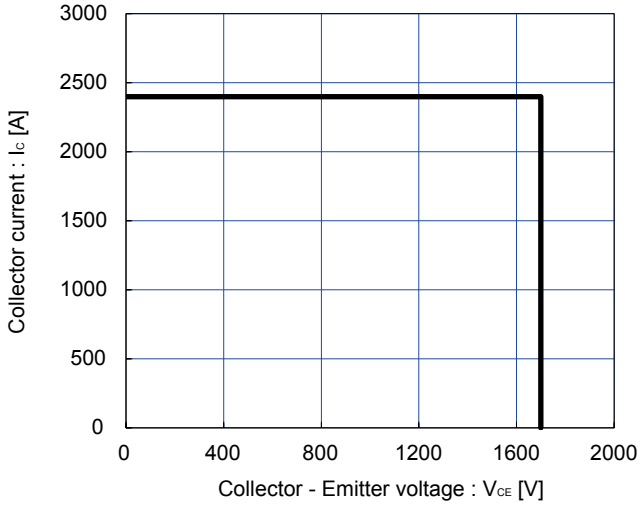
Switching loss vs. Collector current (typ.)
V_{CC}=900V, V_{GE}=±15V, R_{gon}=0.47Ω, R_{goff}=0.82Ω



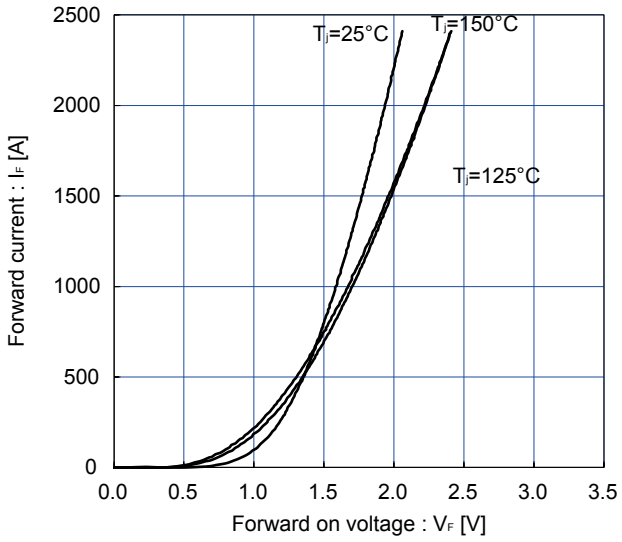
Switching loss vs. Gate resistance (typ.)
V_{CC}=900V, I_C=1200A,V_{GE}=±15V



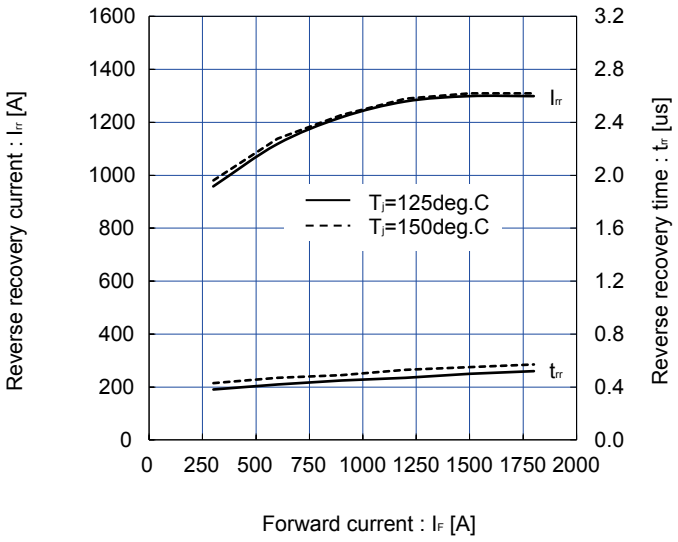
Reverse bias safe operating area (max.)
±V_{GE}=15V, T_j=150°C / chip



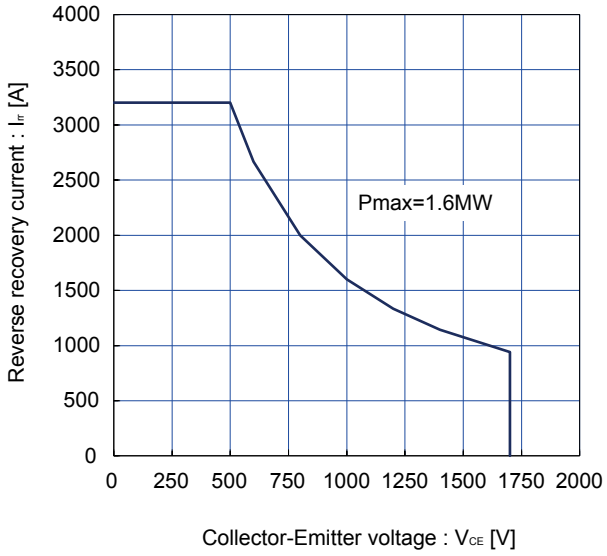
Forward current vs. Forward on voltage (typ.)
chip



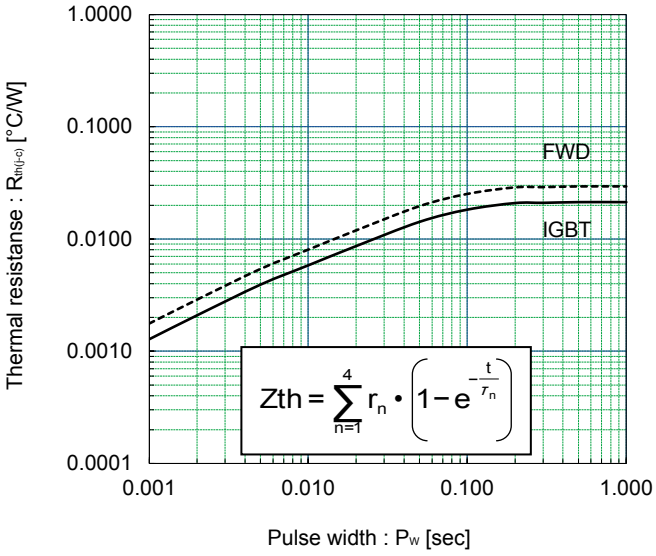
Reverse recovery characteristics (typ.)
V_{CC}=900V, V_{GE}=±15V, R_{gon}=0.47Ω



FWD safe operating area (max.)
T_j=150°C / sence terminals

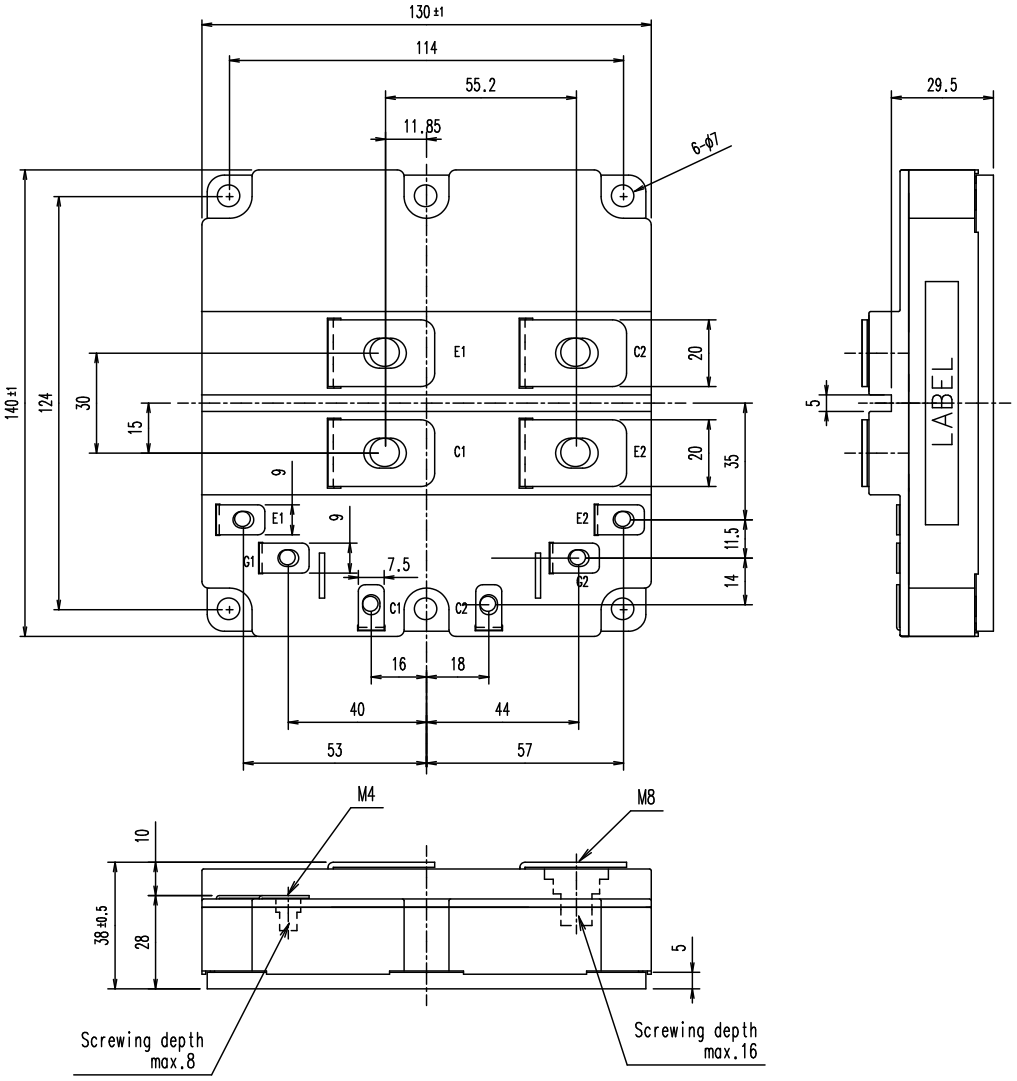


Transient thermal resistance (max.)

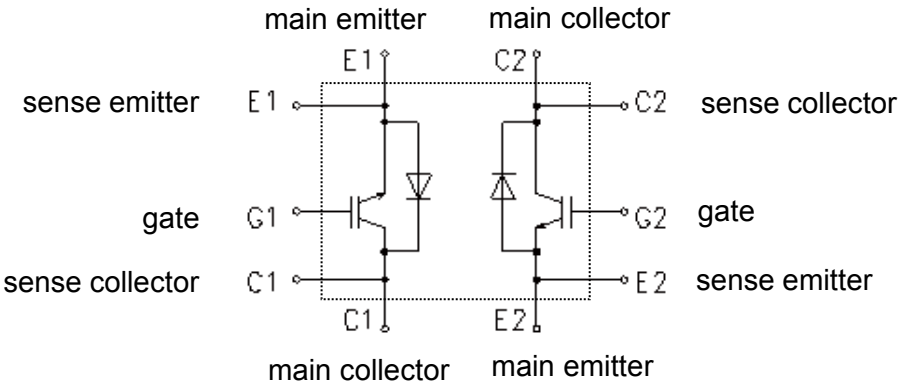


	IGBT	FWD
r1	0.00236	0.00325
r2	0.00823	0.01133
r3	0.00589	0.00812
r4	0.00482	0.00670
τ1	0.0024	0.0024
τ2	0.0355	0.0353
τ3	0.0641	0.0650
τ4	0.0730	0.0720

■ Outline Drawing (Unit : mm)



■ Equivalent circuit



WARNING

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   - Computers
   - OA equipment
   - Communications equipment (terminal devices)
   - Measurement equipment
   - Machine tools
   - Audiovisual equipment
   - Electrical home appliances
   - Personal equipment
   - Industrial robots etc.

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   - Trunk communications equipment
   - Traffic-signal control equipment
   - Gas leakage detectors with an auto-shut-off feature
   - Emergency equipment for responding to disasters and anti-burglary devices
   - Safety devices
   - Medical equipment

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   - Space equipment
   - Aeronautic equipment
   - Nuclear control equipment
   - Submarine repeater equipment

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