

2MBI1200VG-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 T _c =100°C 1200	A
	I _{cP}	1ms	2400	
	-I _c		1200	
	-I _{c pulse}	1ms	2400	
Collector power dissipation	P _c	1 device	7500	W
Junction temperature	T _j		175	°C
Operating junction temperature (under switching conditions)	T _{top}		150	
Storage temperature	T _{stg}		-40 ~ +150	
Isolation voltage	between terminal and copper base (*1) V _{iso}	AC : 1min.	4000	VAC
Screw torque (*2)	Mounting	-	5.75	N m
	Main Terminals	-	10	
	Sense Terminals	-	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			Units	
			min.	typ.	max.		
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 _{int} 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} = 1.8Ω	-	2.76	-	μs	
	t _r	I _c = 1200A R _{goff} = 0.82Ω	-	1.03	-		
Turn-off	t _{off}	L _m =75nH	-	2.29	-		
	t _r	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	-	2.12	2.52	V
			T _j =125°C	-	2.32	-	
			T _j =150°C	-	2.30	-	
	V _F (chip)		T _j =25°C	-	1.80	2.15	
			T _j =125°C	-	2.00	-	
			T _j =150°C	-	1.98	-	
Reverse recovery	t _{rr}	I _F = 1200A, T _j = 125°C	-	0.44	-	μs	
Lead resistance, terminal-chip	R lead		-	0.268	-	mΩ	

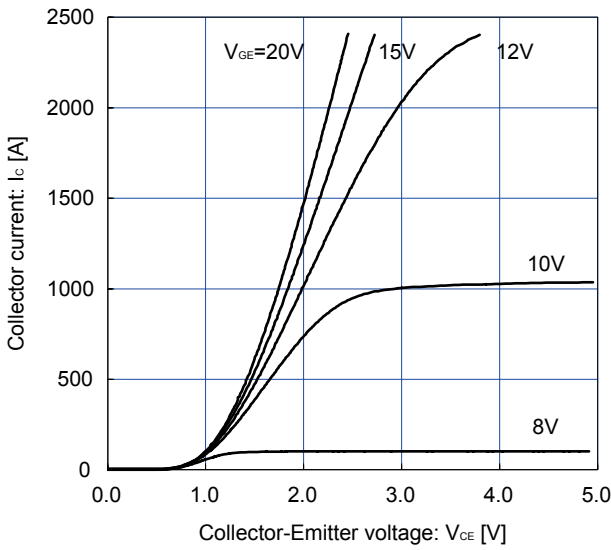
● Thermal resistance characteristics

Items	Symbols	Conditions	Characteristics			Units
			min.	typ.	max.	
Thermal resistance(1device)	R _{th(j-c)}	IGBT	-	-	0.020	°C/W
		FWD	-	-	0.033	
Contact thermal resistance (1module) (*3)	R _{th(c-f)}	with Thermal Compound	-	0.006	-	

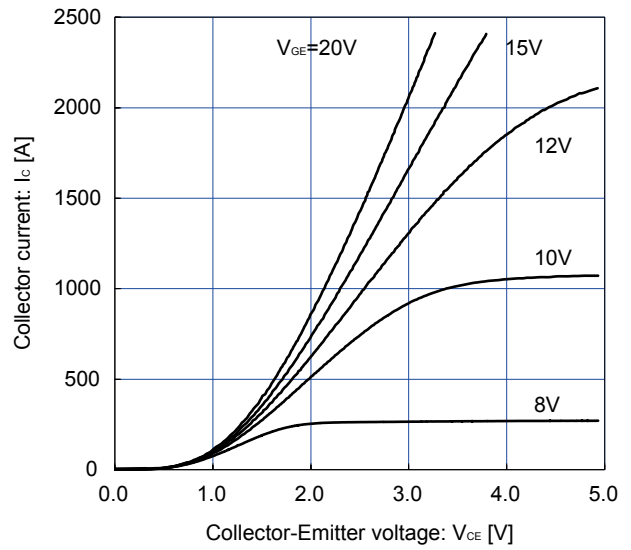
Note *3: This is the value which is defined mounting on the additional cooling fin with thermal compound.

■ Characteristics (Representative)

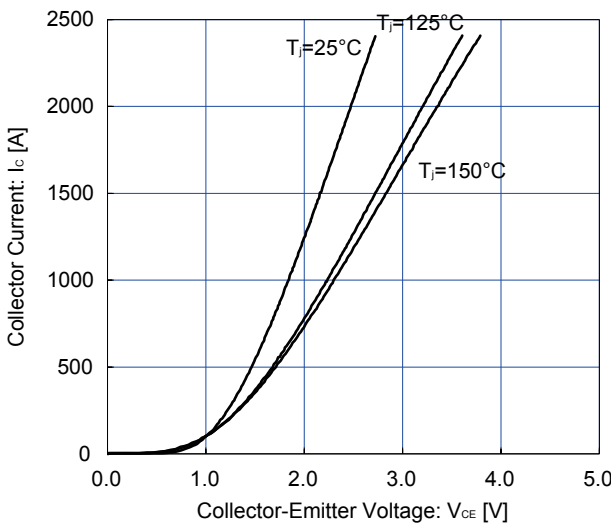
Collector current vs. Collector-Emitter voltage (typ.)
 $T_J = 25^\circ\text{C}$, chip



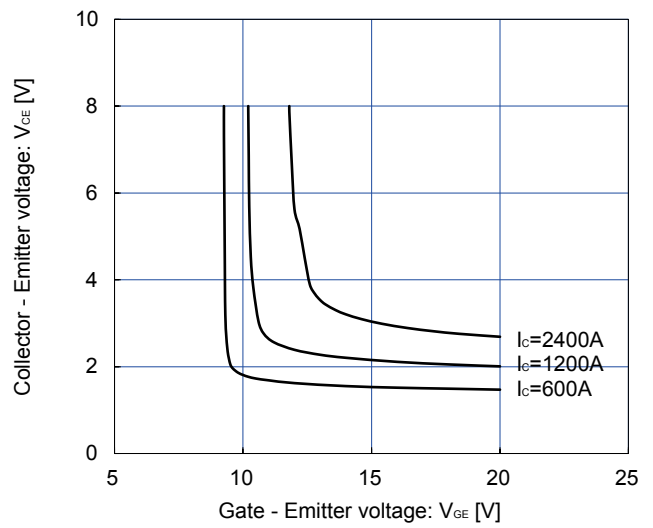
Collector current vs. Collector-Emitter voltage (typ.)
 $T_J = 150^\circ\text{C}$, chip



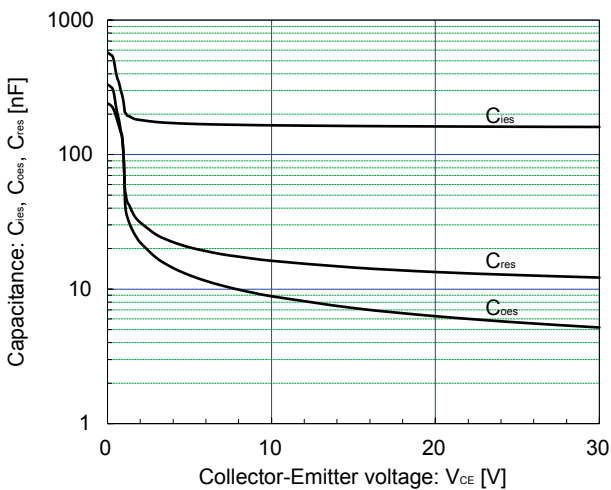
Collector current vs. Collector-Emitter voltage (typ.)
 $V_{GE} = +15\text{V}$, chip



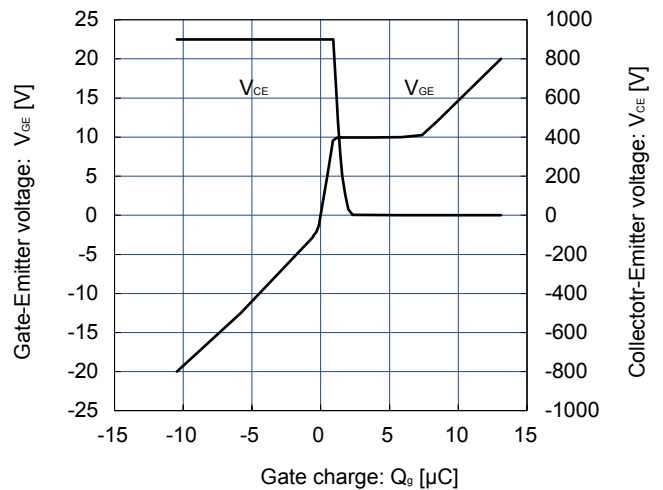
Collector-Emitter voltage vs. Gate-Emitter voltage (typ.)
 $T_J = 25^\circ\text{C}$, chip



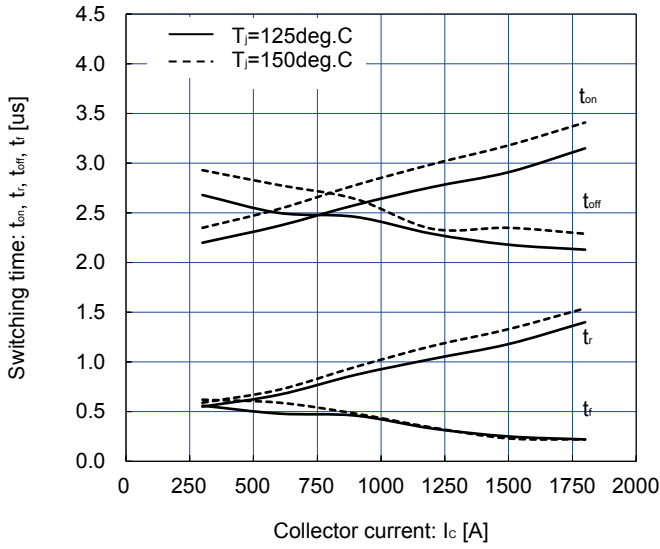
Capacitance vs. Collector-Emitter voltage (typ.)
 $V_{GE} = 0\text{V}$, $f = 1\text{MHz}$, $T_J = 25^\circ\text{C}$



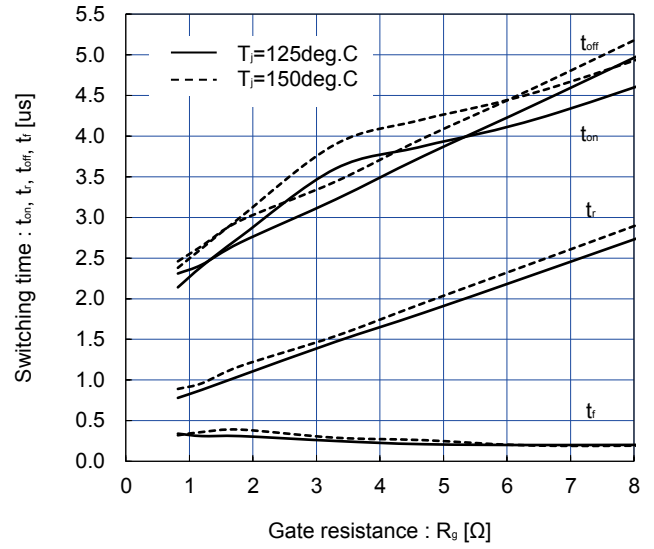
Dynamic Gate charge (typ.)
 $T_J = 25^\circ\text{C}$



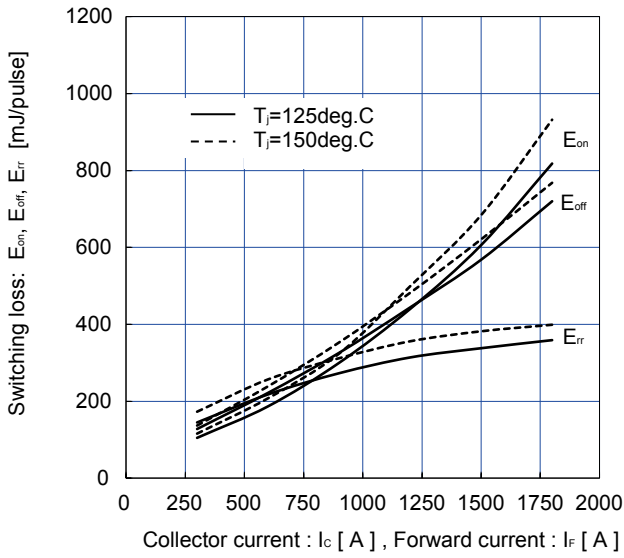
Switching time vs. Collector current (typ.)
 $V_{CC}=900V, V_{GE}=\pm 15V, R_{gon}=1.8\Omega, R_{goff}=0.82\Omega$



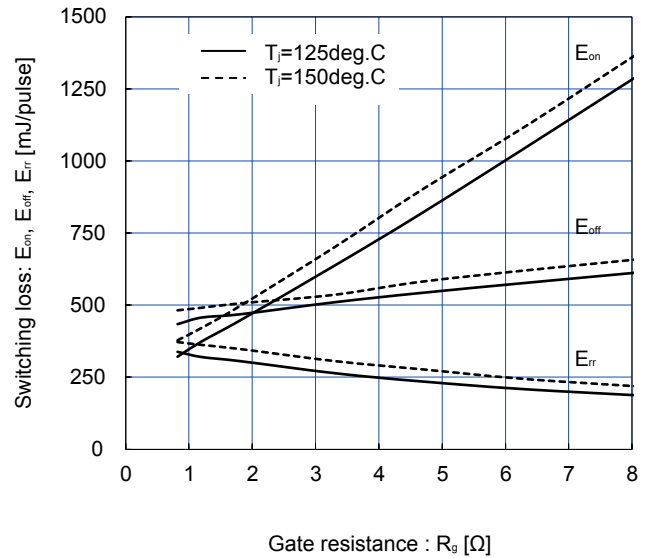
Switching time vs. Gate resistance (typ.)
 $V_{CC}=900V, V_c=1200A, V_{GE}=\pm 15V$



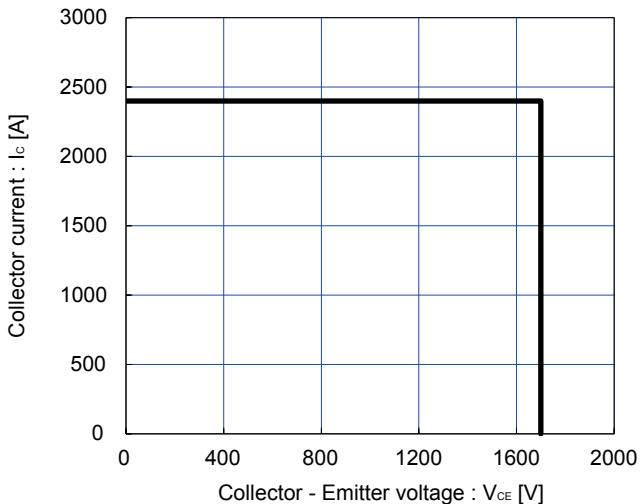
Switching loss vs. Collector current (typ.)
 $V_{CC}=900V, V_{GE}=\pm 15V, R_{gon}=1.8\Omega, R_{goff}=0.82\Omega$



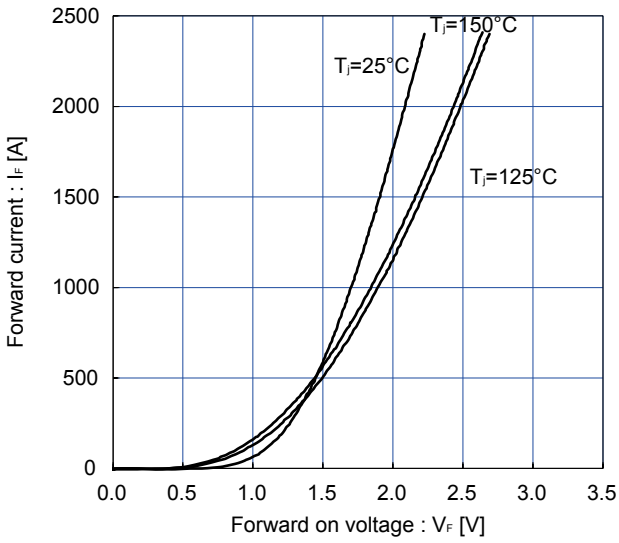
Switching loss vs. Gate resistance (typ.)
 $V_{CC}=900V, I_c=1200A, V_{GE}=\pm 15V$



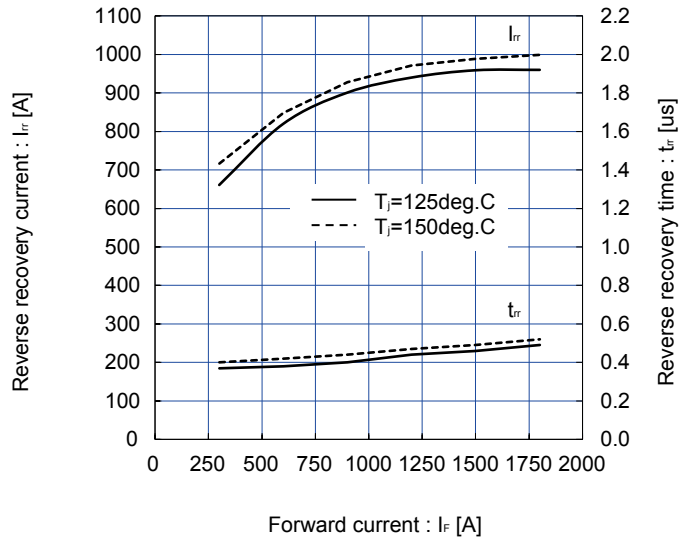
Reverse bias safe operating area (max.)
 $\pm V_{GE}=\pm 15V, T_j=150^\circ C / \text{chip}$



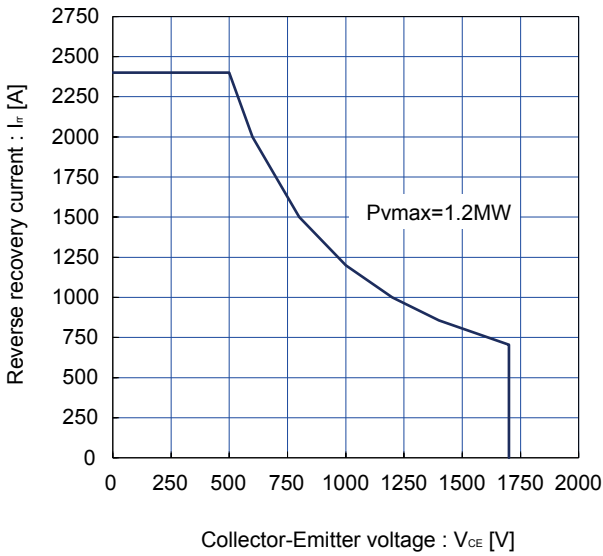
Forward current vs. Forward on voltage (typ.) chip



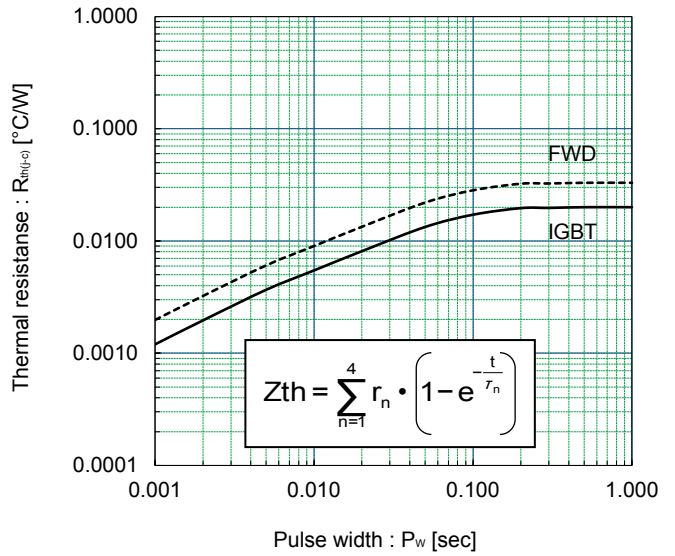
Reverse recovery characteristics (typ.)
 $V_{CC}=900\text{V}$, $V_{GE}=\pm 15\text{V}$, $R_{gon}=1.8\Omega$



FWD safe operating area (max.)
 $T_j=150^\circ\text{C}$ / sence terminals

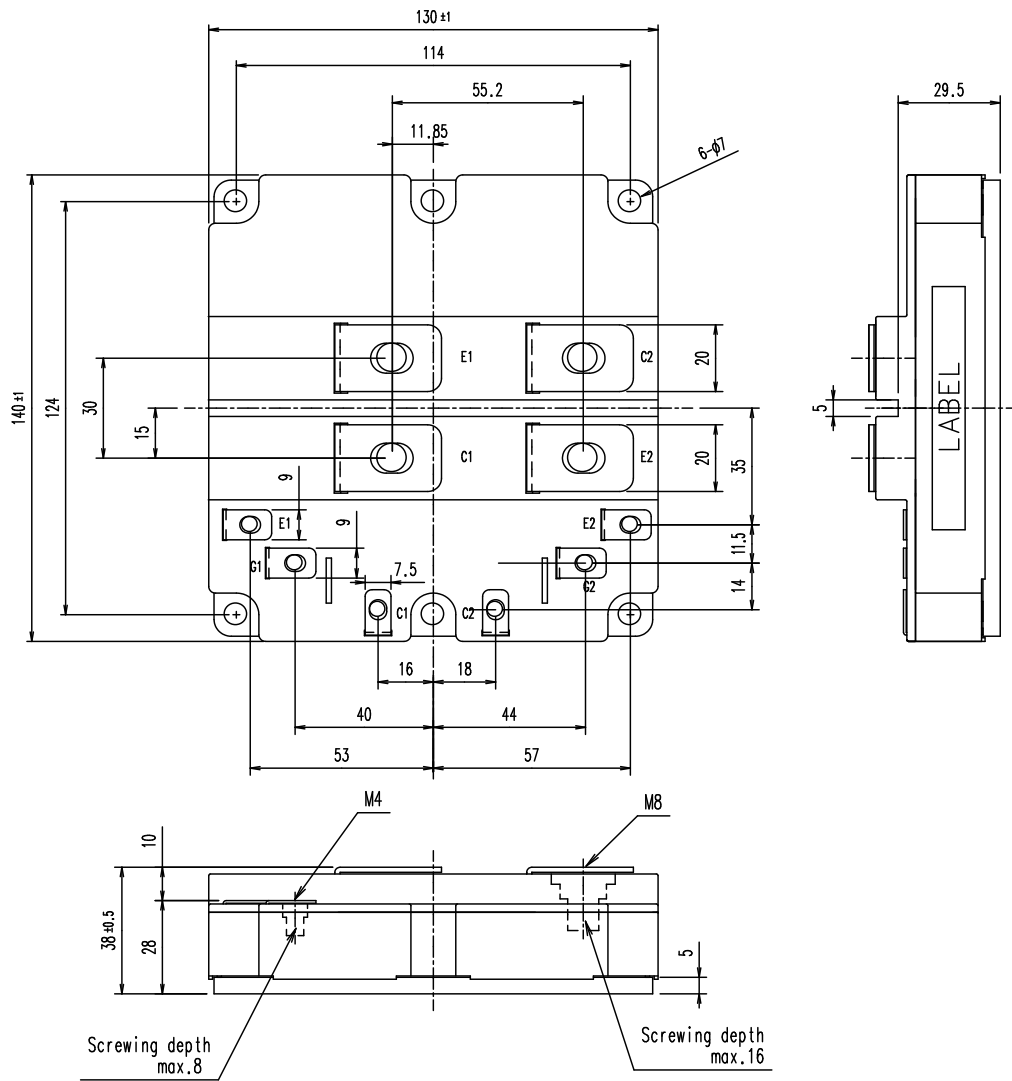


Transient thermal resistance (max.)

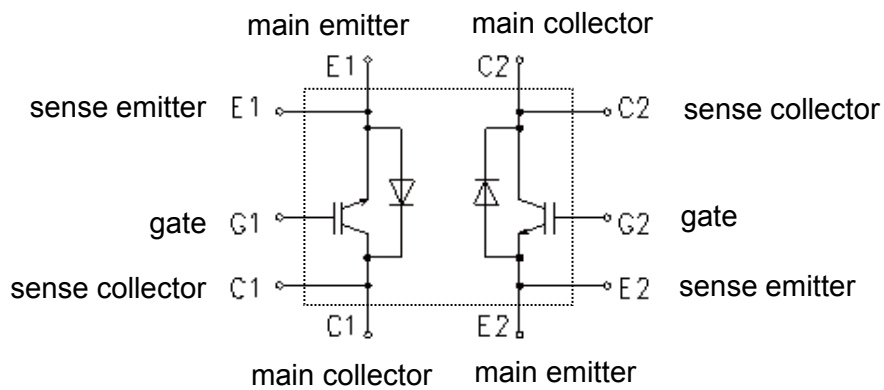


	IGBT	FWD
r1	0.00307	0.00373
r2	0.00706	0.01272
r3	0.00548	0.00913
r4	0.00439	0.00741
τ_1	0.0039	0.0024
τ_2	0.0457	0.0360
τ_3	0.0560	0.0625
τ_4	0.0714	0.0744

■ Outline Drawing (Unit : mm)



■ Equivalent circuit



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IGBT Modules

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