

2MBI600VG-120P

IGBT Modules

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
Collector-Emitter voltage	V _{CEs}		1200	V
Gate-Emitter voltage	V _{GEs}		±20	V
Collector current	I _c	Continuous	Tc=25°C 800 Tc=100°C 600	A
	I _{cp}	1ms	Tc=100°C 1200	
	-I _c		600	
	-I _{c pulse}	1ms	1200	
Collector Power Dissipation	P _c	1 device	3940	W
Junction temperature	T _j		175	°C
Operating junction temperature(under switching conditions)	T _{jop}		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	M6	5.75	N m
	Main Terminals	M8	10	
	Sense Terminals	M4	2.5	

(*1) All terminals should be connected together when isolation test will be done.

(*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 _{CE(S)}	V _{GE} = 0V V _{CE} = 1200V	-	-	1.0	mA	
Gate-Emitter leakage current	I _{GES}	V _{CE} = 0V V _{GE} = ±20V	-	-	1200	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)} (main terminal)	V _{GE} = 15V I _c = 600A	T _j = 25°C	-	1.88	2.15	V
			T _j = 125°C	-	2.18	-	
	T _j = 150°C		-	2.28	-		
	V _{CE(sat)} (chip)		T _j = 25°C	-	1.70	1.95	
			T _j = 125°C	-	2.00	-	
T _j = 150°C	-	2.10	-				
Internal gate resistance	I _{nt Rg}	-	-	2.92	-	Ω	
Input capacitance	C _{ies}	V _{CE} = 10V, V _{GE} = 0V, f = 1MHz	-	53	-	nF	
Turn-on	t _{on}	V _{CC} = 600V I _c = 600A	-	1.86	-	μs	
	t _r	L _m = 75nH	-	0.65	-		
Turn-off	t _{off}	V _{GE} = ±15V, T _j = 125°C	-	1.25	-		
	t _r	R _{gon} = 2.4 Ω R _{goff} = 0.22 Ω	-	0.12	-		
Forward on voltage	V _F (main terminal)	V _{GE} = 0V I _F = 600A	T _j = 25°C	-	1.88	2.15	V
			T _j = 125°C	-	2.03	-	
			T _j = 150°C	-	1.98	-	
	V _F (chip)		T _j = 25°C	-	1.70	1.95	
			T _j = 125°C	-	1.85	-	
T _j = 150°C	-	1.80	-				
Reverse recovery	t _{rr}	I _F = 600A, T _j = 125°C	-	0.26	-	μs	
Lead resistance, terminal-chip	R _{lead}	-	-	0.292	-	mΩ	

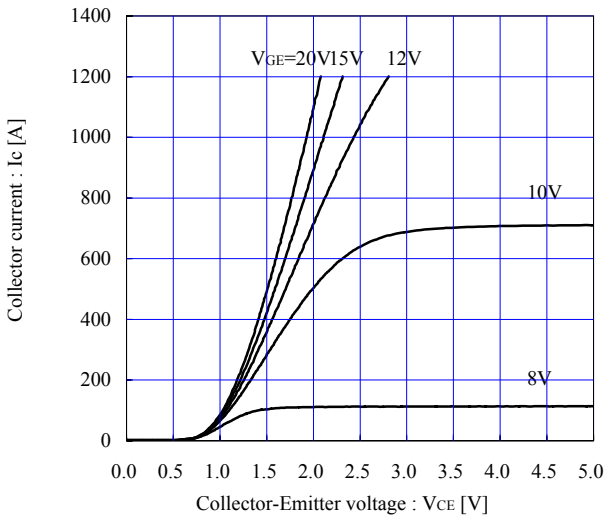
● Thermal resistance characteristics

Items	Symbols	Conditions	Characteristics			Units
			min.	typ.	max.	
Thermal resistance	R ^{th(j-c)}	IGBT	-	-	0.0380	°C/W
		FWD	-	-	0.0610	
Contact thermal resistance	R ^{th(c-f)}	with Thermal Compound (*)	-	0.0060	-	

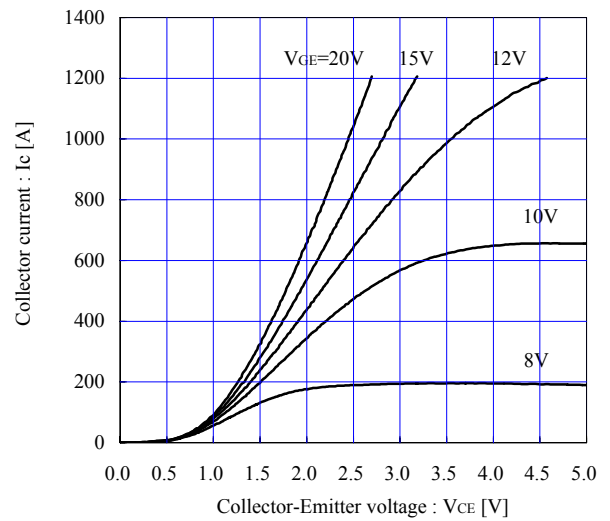
*This is the value which is defined mounting on the additional cooling fin with thermal compound.

■ Characteristics (Representative)

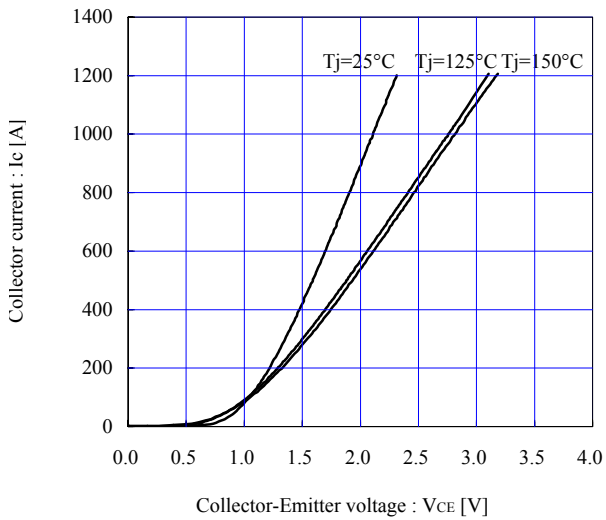
Collector current vs. Collector-Emitter voltage (typ.)
T_j=25°C, chip



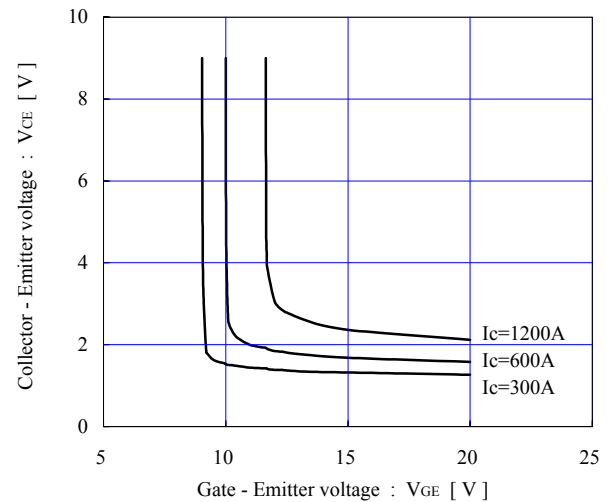
Collector current vs. Collector-Emitter voltage (typ.)
T_j= 150°C, chip



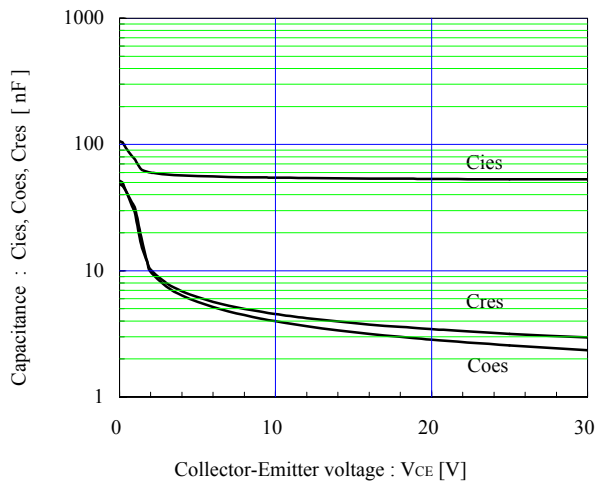
Collector-Emitter voltage vs. Gate-Emitter voltage (typ.)
V_{GE}=+15V, chip



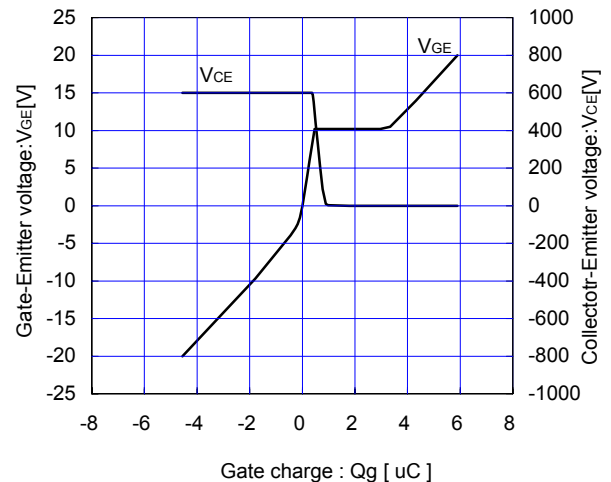
Collector-Emitter voltage vs. Gate-Emitter voltage (typ.)
T_j=25°C, chip



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

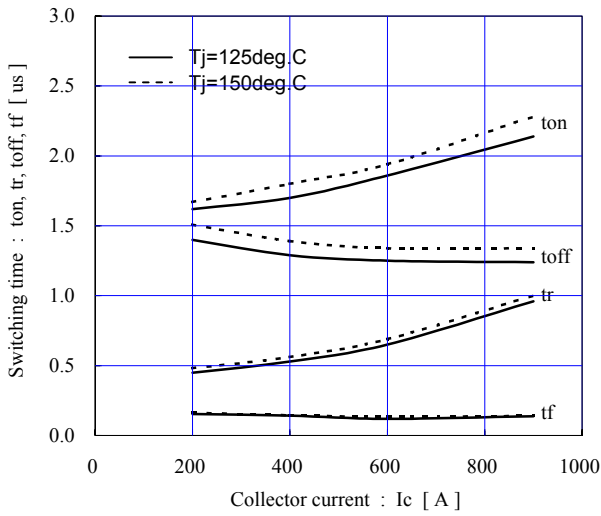


Dynamic Gate charge (typ.)
T_j= 25°C



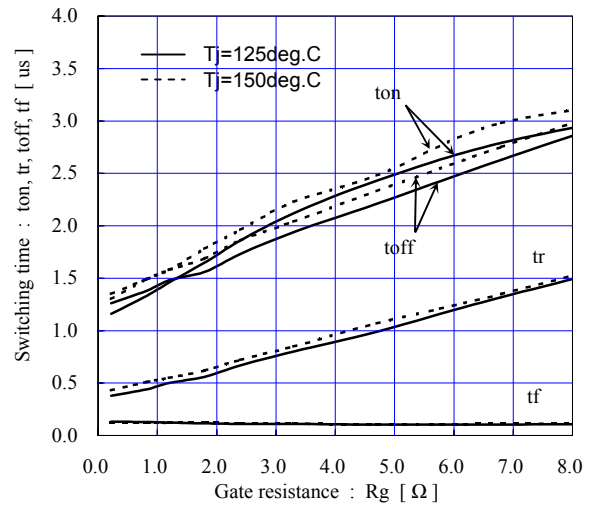
Switching time vs. Collector current (typ.)

V_{CE}=600V, V_{GE}=±15V, R_{gon}=2.4 Ω, R_{goff}=0.22 Ω



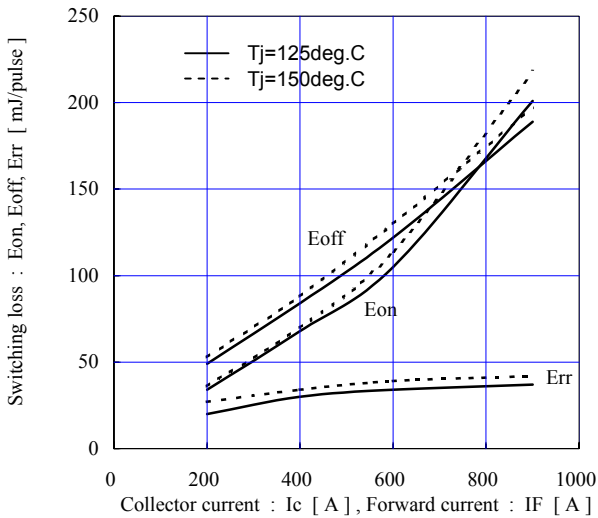
Switching time vs. Gate resistance (typ.)

V_{CE}=600V, Ic=600A, V_{GE}=±15V



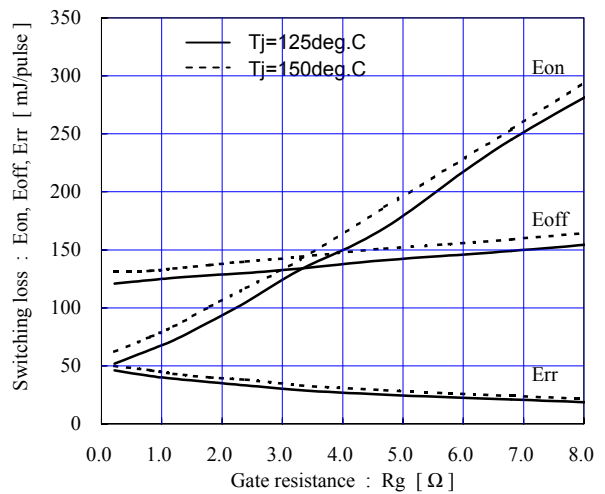
Switching loss vs. Collector current (typ.)

V_{CE}=600V, V_{GE}=±15V, R_{gon}=2.4 Ω, R_{goff}=0.22 Ω



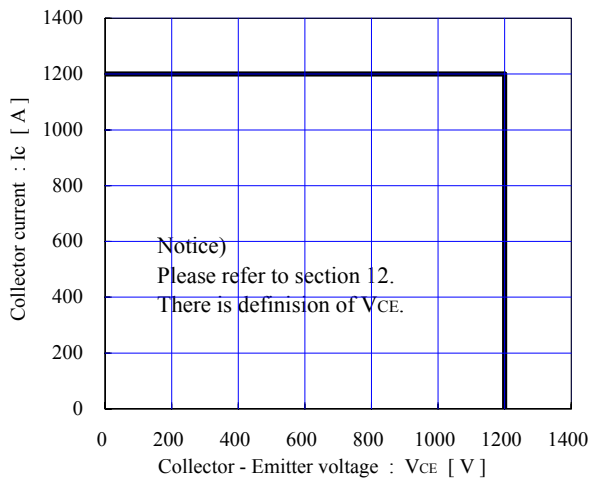
Switching loss vs. Gate resistance (typ.)

V_{CE}=600V, Ic=600A, V_{GE}=±15V

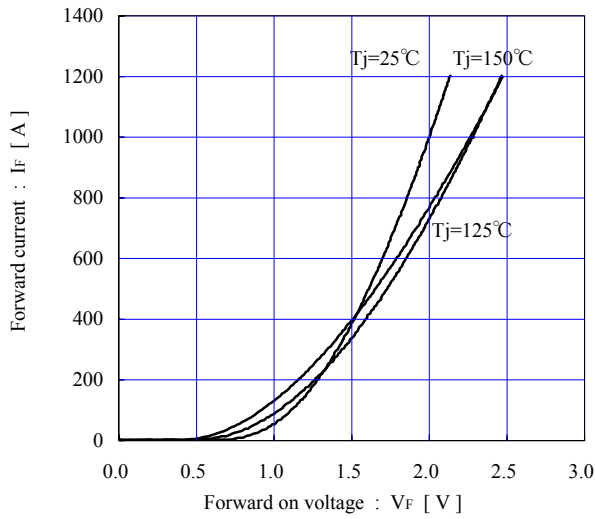


Reverse bias safe operating area (max.)

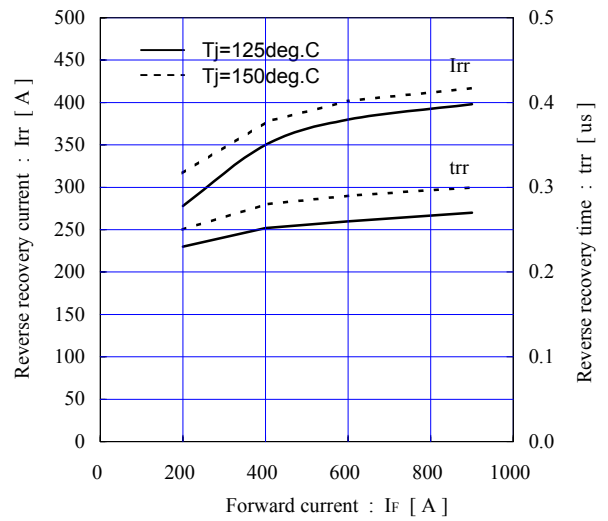
±V_{GE}=15V, T_j = 150°C



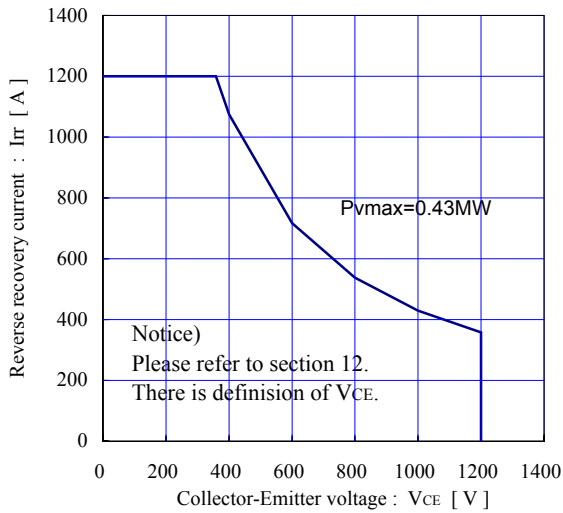
Forward current vs. Forward on voltage (typ.)
chip



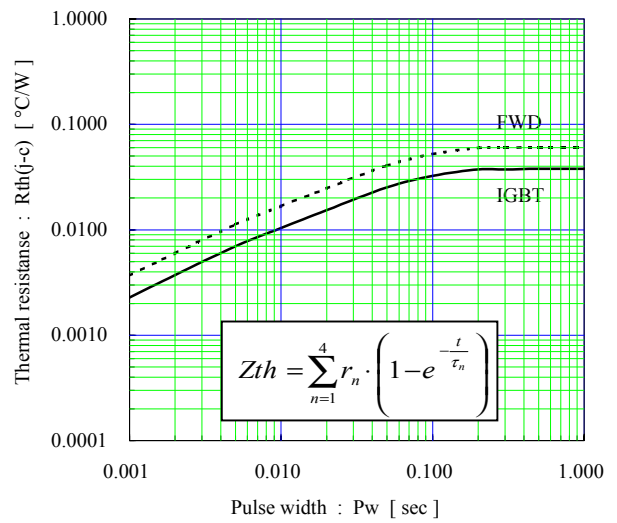
Reverse recovery characteristics (typ.)
V_{CC}=600V, V_{GE}=±15V, R_{gon}=2.4 Ω



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

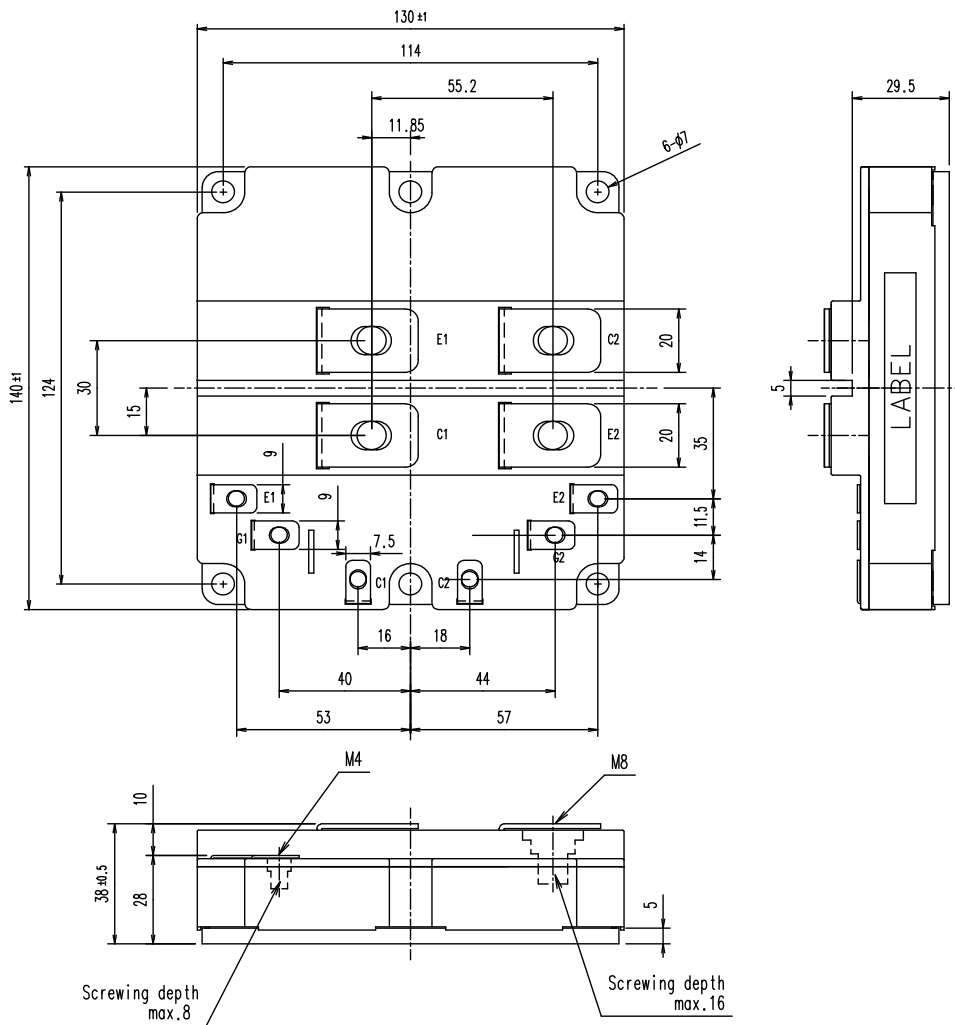


Transient thermal resistance (max.)

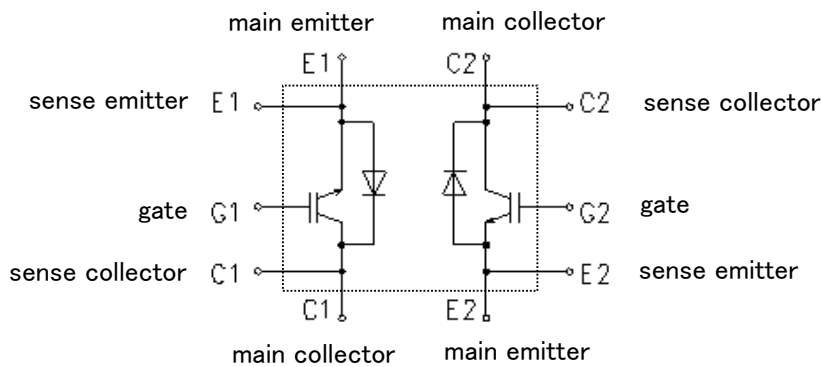


	IGBT	FWD
r1	0.00408	0.00654
r2	0.01115	0.01790
r3	0.01347	0.02162
r4	0.00931	0.01494
τ1	0.0023	0.0023
τ2	0.0310	0.0310
τ3	0.0623	0.0623
τ4	0.0682	0.0682

■ Outline Drawings, mm



■ Equivalent Circuit Schematic



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