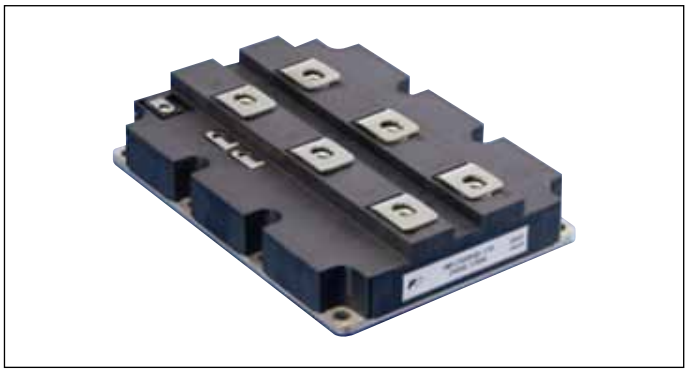
1MBI1200UE-330

IGBT MODULE (U series)
3300V / 1200A / 1 in one package

Features

AlSiC Baseplate
AIN DCB substrate
CTI ≥ 600
V_{iso} 6000 Vac
Low Inductance module structure



Applications

Traction drives
Industrial motor drives
Wind power
Chopper

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}			3300	V
Gate-Emitter voltage	V_{GES}			±20	V
Collector current	I_c	Continuous	T_c=25°C	2000	A
			T_c=80°C	1200	
	$I_{c\ pulse}$	1ms	T_c=25°C	4000	
			T_c=80°C	2400	
	$-I_c$			1200	
	$-I_{c\ pulse}$	1ms		2400	
Collector power dissipation	P_C	1 device		14.7	kW
Junction temperature	T_j			150	°C
Storage temperature	T_{stg}			-40 ~ +125	
Isolation voltage — Between terminal and copper base (*1)	V_{iso}	AC : 1min.		6.0	kVAC
Partial discharge extinction voltage	V_e	AC, Q≤10pC (acc. To IEC 1287)		2.6	kVAC
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 N·m (M6), Main Terminal : 8-10 N·m (M8), Sense Terminal : 1.7-2.5 N·m (M4)

● Electrical characteristics (at Tj= 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} = 3300V		-	-	1.0	mA
Gate-Emitter leakage current	I_{GES}	V_{CE} = 0V, V_{GE} = ±20V		-	-	4800	nA
Gate-Emitter threshold voltage	$V_{GE\ (th)}$	V_{CE} = 20V, I_C = 1200mA		6.0	6.75	7.5	V
Collector-Emitter saturation voltage	$V_{CE\ (sat)}$ (main terminal)	V_{GE} = 15V, I_C = 1200A	T_j=25°C	-	2.43	2.66	V
			T_j=125°C	-	3.15	3.45	
	$V_{CE\ (sat)}$ (chip)		T_j=25°C	-	2.28	2.51	
			T_j=125°C	-	3.00	3.30	
Input capacitance	C_{ies}	V_{GE} = 0V, V_{CE} = 10V, f = 1MHz		-	240	-	nF
Turn-on time	t_{on}	V_{CC} = 1800V, I_C = 1200A, V_{GE} = ±15V, T_j = 125°C, R_g = 1.6Ω		-	3.40	-	μs
	t_r			-	2.30	-	
Turn-off time	t_{off}			-	2.40	-	
	t_f			-	0.40	-	
Forward on voltage	V_F (main terminal)	V_{GE} = 0V, I_F = 1200A	T_j=25°C	-	2.73	2.96	V
			T_j=125°C	-	2.95	3.25	
	V_F (chip)		T_j=25°C	-	2.58	2.81	
			T_j=125°C	-	2.80	3.10	
Reverse recovery time	t_{rr}	I_F = 1200A		-	0.85	-	μs
Lead resistance, terminal-chip	R lead			-	0.124	-	mΩ

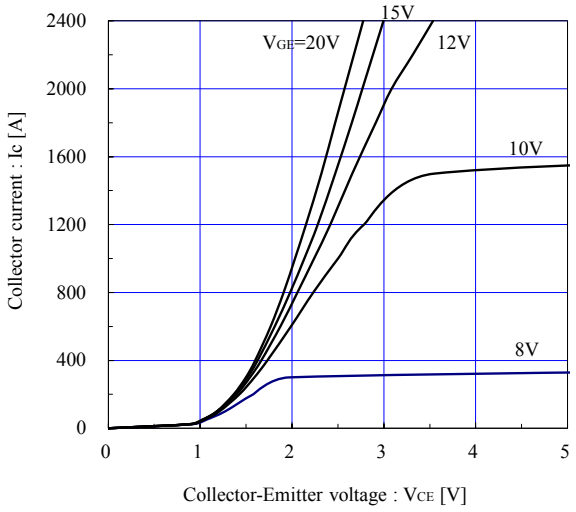
● Thermal resistance characteristics

Items	Symbols	Conditions	Characteristics min.	Characteristics typ.	Characteristics max.	Units
Thermal resistance (1device)	$R_{th(j-c)}$	IGBT	-	-	8.5	°C/kW
		FWD	-	-	17.0	
Contact thermal resistance (1device)	$R_{th(c-f)}$	with Thermal Compound (*3)	-	4.0	-	

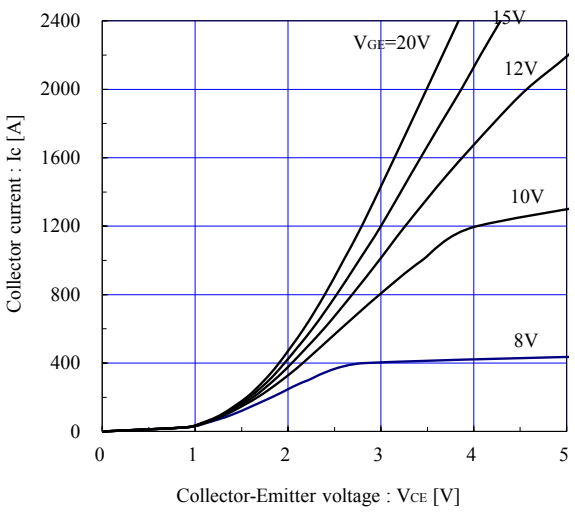
Note *3: This is the value which is defined mounting on the additional cooling fin with thermal compound.

■ Characteristics (Representative)

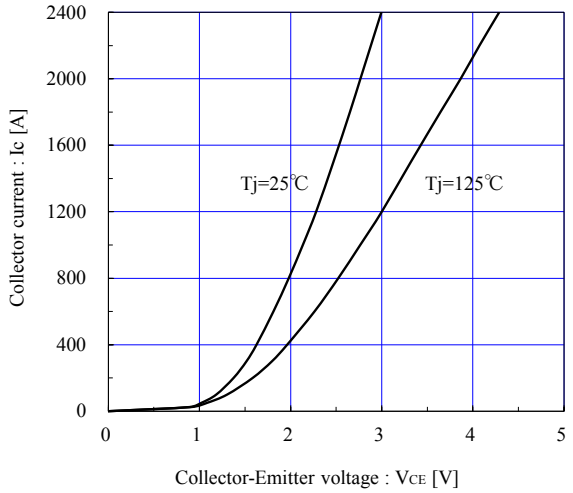
Collector current vs. Collector-Emitter voltage (typ.)
Tj= 25℃ / chip



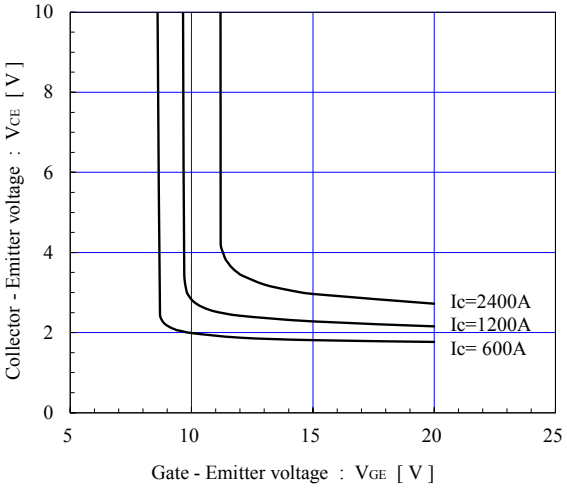
Collector current vs. Collector-Emitter voltage (typ.)
Tj= 125°C / chip



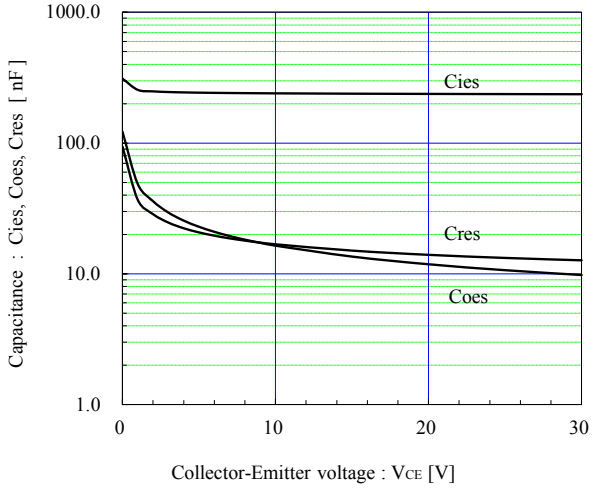
Collector current vs. Collector-Emitter voltage (typ.)
VGE=15V / chip



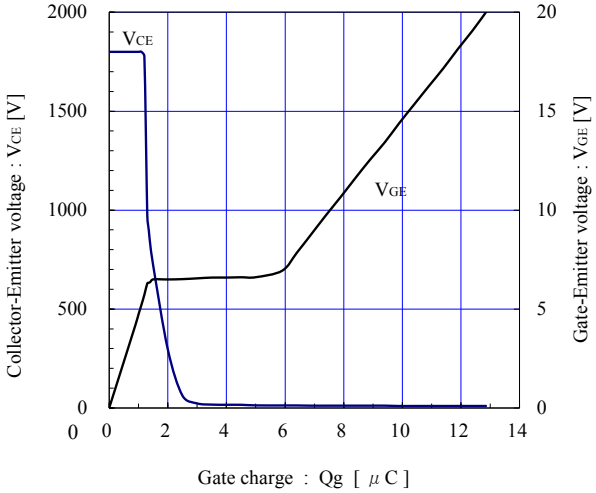
Collector-Emitter voltage vs. Gate-Emitter voltage (typ.)
Tj=25°C / chip



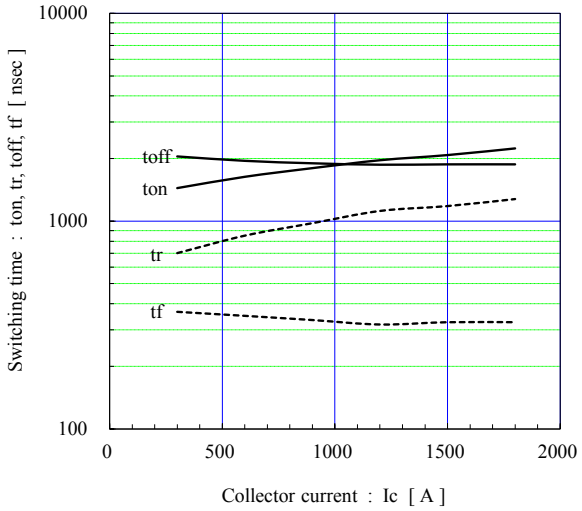
Capacitance vs. Collector-Emitter voltage (typ.)
VGE=0V, f= 1MHz, Tj= 25°C



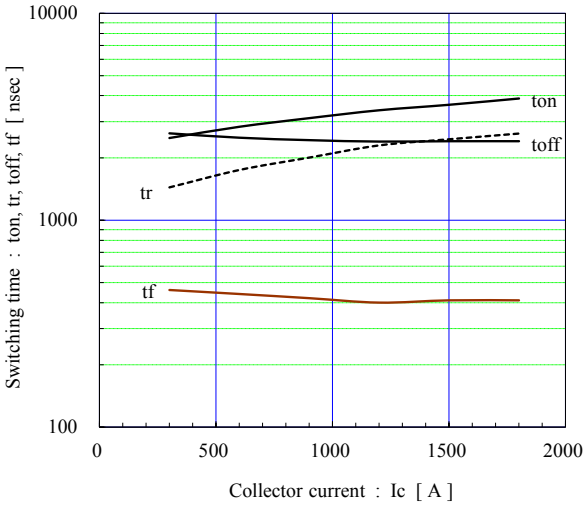
Dynamic Gate charge (typ.)
Vcc=1800V, Tj= 25°C



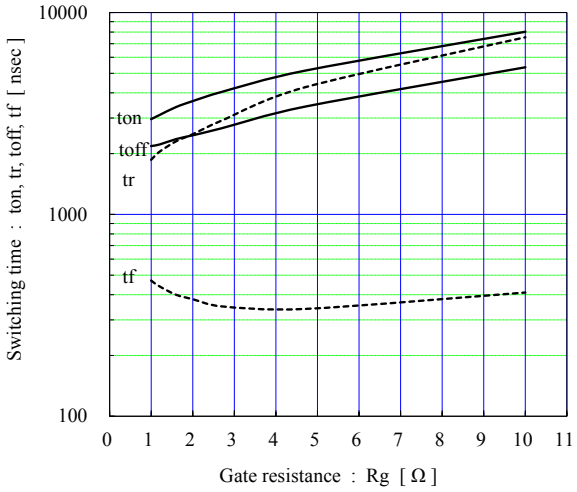
Switching time vs. Collector current (typ.)
Vcc=1800V, VGE=±15V, Rg=1.6Ω, Tj= 25°C



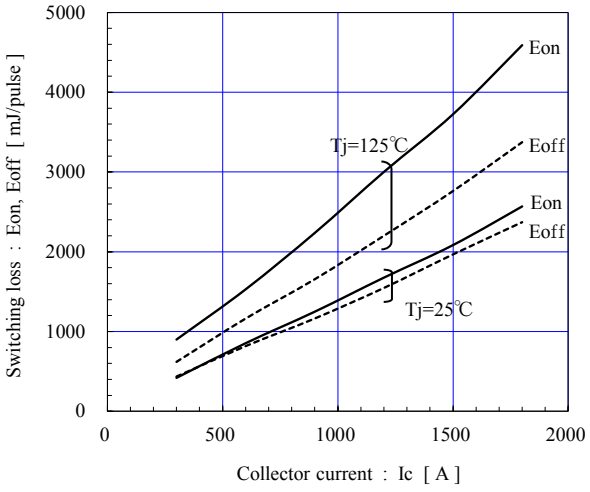
Switching time vs. Collector current (typ.)
Vcc=1800V, VGE=±15V, Rg=1.6Ω, Tj=125°C



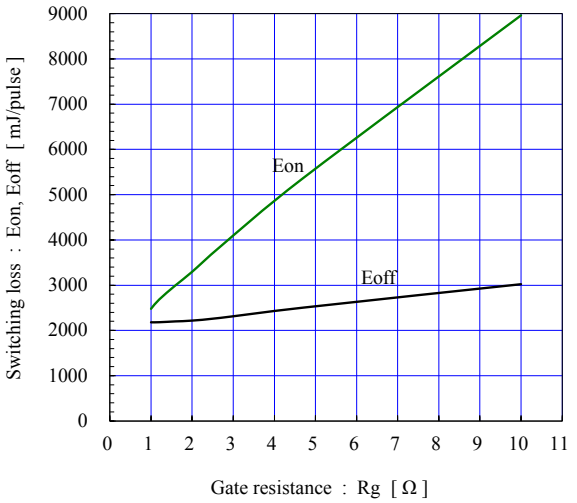
Switching time vs. Gate resistance (typ.)
Vcc=1800V, Ic=1200A, VGE=±15V, Tj= 125°C



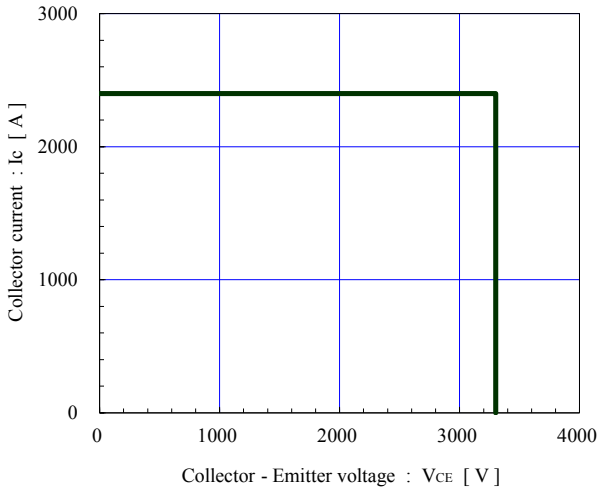
Switching loss vs. Collector current (typ.)
Vcc=1800V, VGE=±15V, Rg=1.6Ω



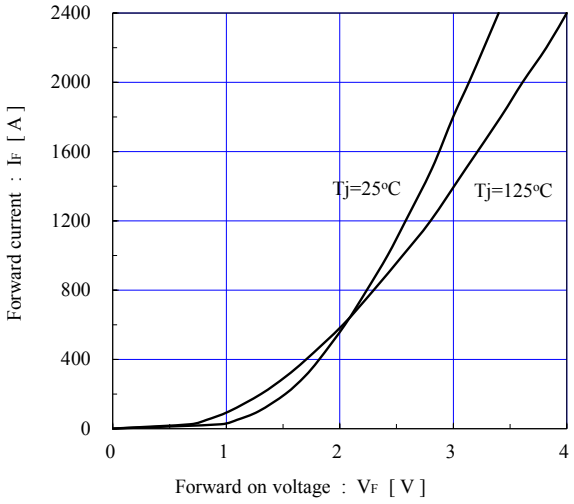
Switching loss vs. Gate resistance (typ.)
Vcc=1800V, Ic=1200A, VGE=±15V, Tj= 125°C



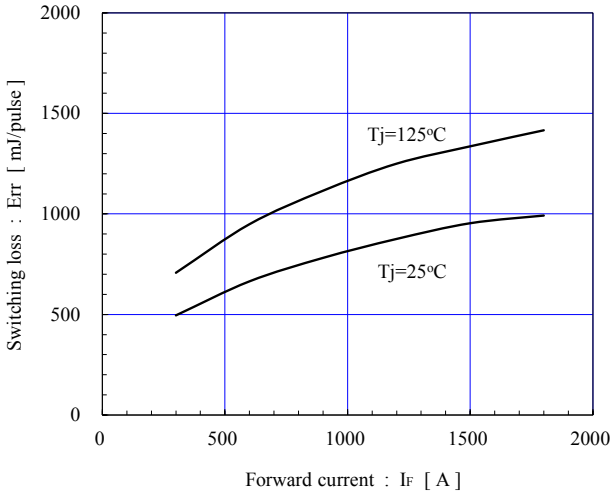
Reverse bias safe operating area (max.)
±VGE=15V, Tj=125 °C / chip



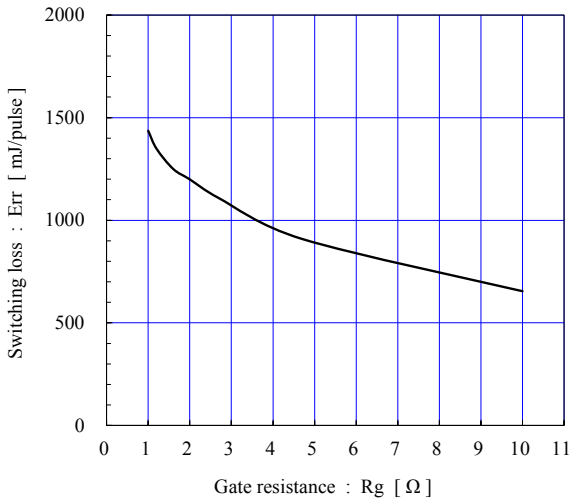
Forward current vs. Forward on voltage (typ.)
chip



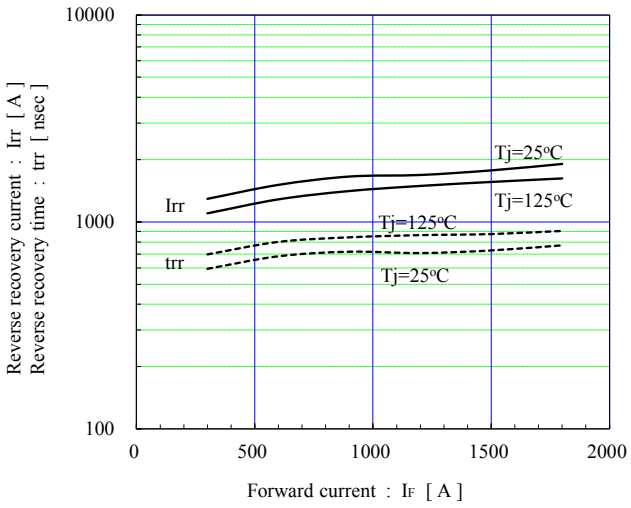
Switching loss vs. Collector current (typ.)
Vcc=1800V, VGE=±15V, Rg=1.6Ω



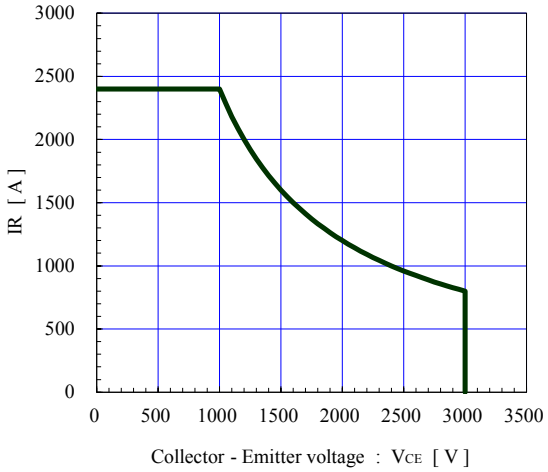
Switching loss vs. Gate resistance (typ.)
Vcc=1800V, IF=1200A, VGE=±15V, Tj= 125°C



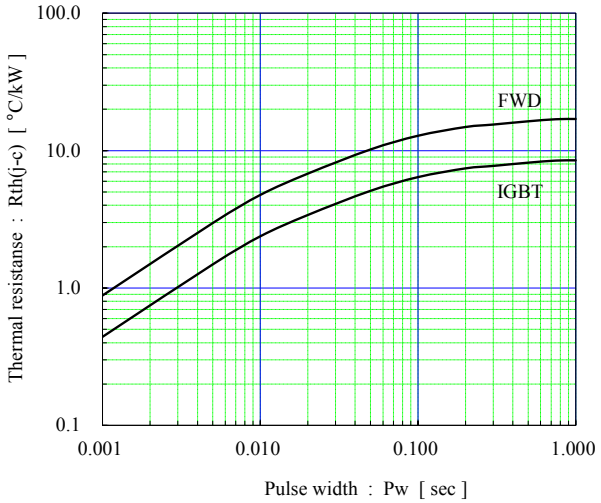
Reverse recovery characteristics (typ.)
Vcc=1800V, VGE=±15V, Rg=1.6Ω



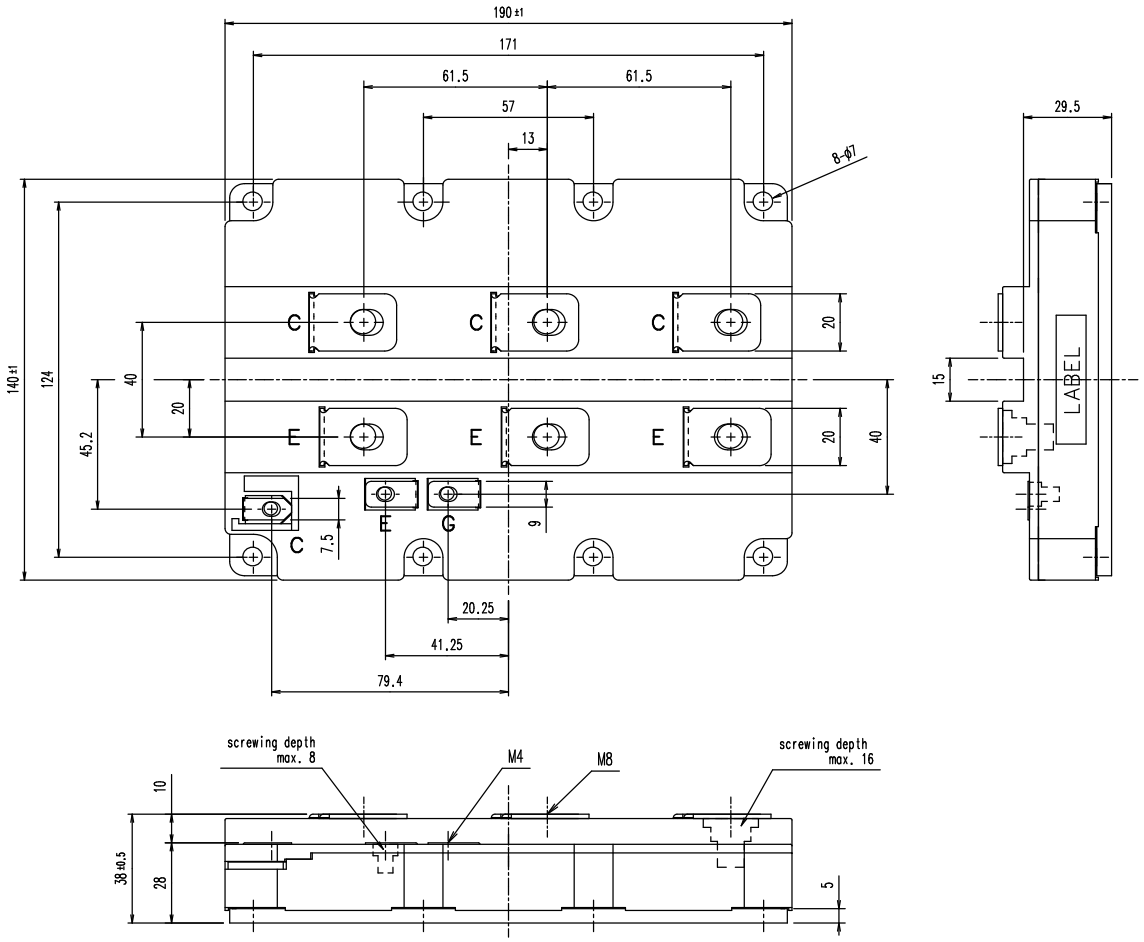
FWD safe operating area (max.)
Tj=125°C



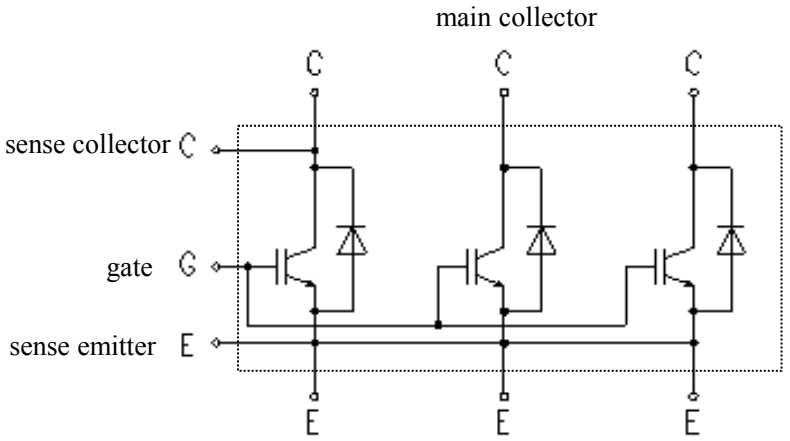
Transient thermal resistance (max.)



■ Outline Drawings, mm



■ Equivalent Circuit Schematic



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