

# 2MBI300HJ-120-50

IGBT Modules

**Power Module (V series)**  
**1200V / 300A / 2-in-1 package**

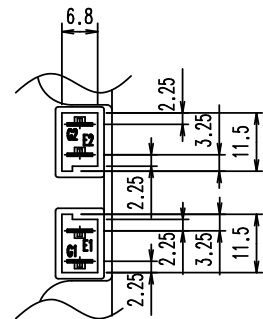
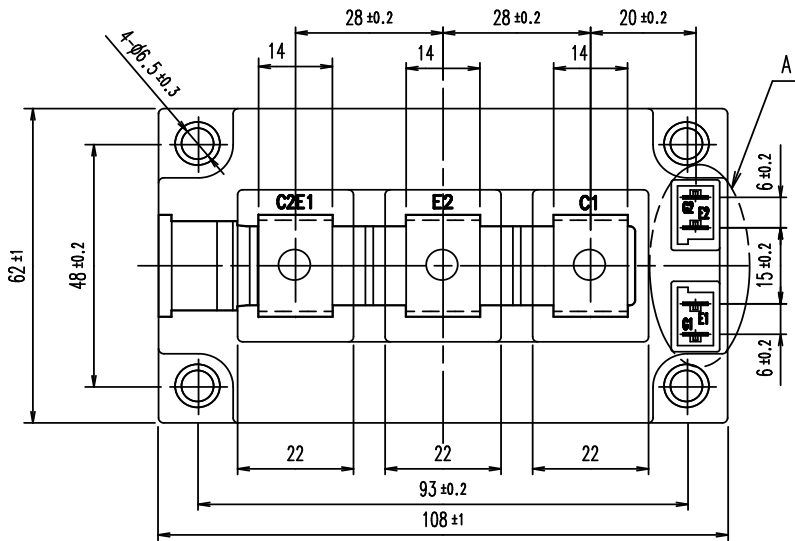
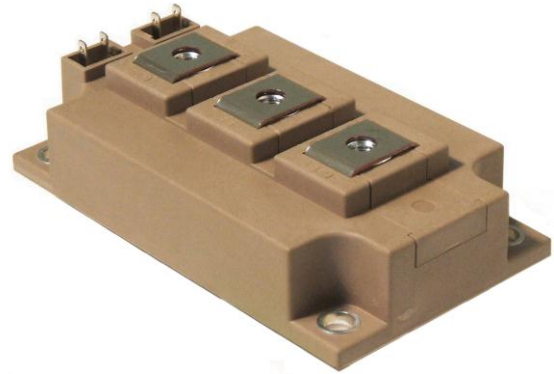
■ **Features**

- High speed switching
- Voltage drive
- Low Inductance module structure

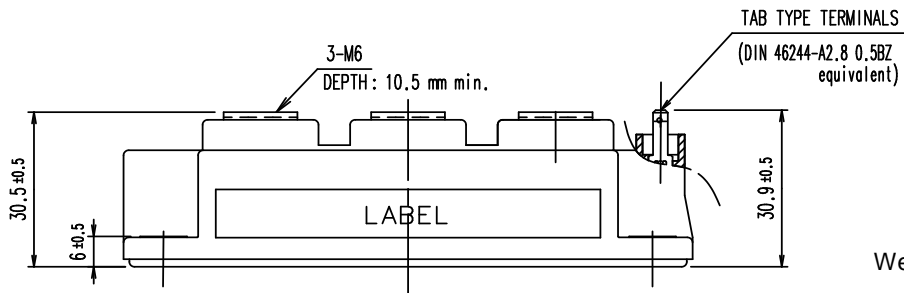
■ **Applications**

- Soft-switching Application
- Industrial machines, such as Welding machines

■ **Outline drawing ( Unit : mm )**

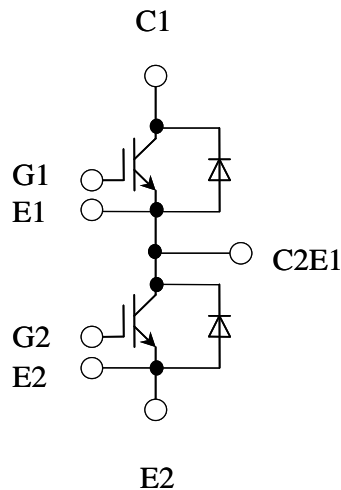


DETAIL A



Weight: 370g (typ.)

■ **Equivalent Circuit**



# 2MBI300HJ-120-50

**IGBT Modules**
**■ Absolute Maximum Ratings (at T<sub>c</sub>= 25°C unless otherwise specified)**

Items		Symbols	Conditions	Maximum Ratings	Units
Collector-Emitter voltage		V <sub>CES</sub>		1200	V
Gate-Emitter voltage		V <sub>GES</sub>		±20	V
Collector current		I <sub>C</sub>	Continuous	T <sub>C</sub> =60°C 300 T <sub>C</sub> =25°C 370	A
		I <sub>C</sub> pulse	1ms	600	
		-I <sub>C</sub>		400	
		-I <sub>C</sub> pulse	1ms	800	
Collector power dissipation		P <sub>C</sub>	1 device	1950	W
Junction temperature		T <sub>J</sub>		150	°C
Case temperature		T <sub>C</sub>		125	
Storage temperature		T <sub>stg</sub>		-40 ~ 125	
Isolation voltage	between terminal and copper base (*1)	V <sub>iso</sub>	AC: 1min.	2500	VAC
Screw Torque	Mounting (*2)	-		6.0	N m
	Terminals (*3)	-		5.0	

(\*1) All terminals should be connected together during the test.

(\*2) Recommendable Value : 3.0-6.0 Nm (M5 or M6)

(\*3) Recommendable Value : 2.5-5.0 Nm (M6)

# 2MBI300HJ-120-50

**IGBT Modules**
**■ Electrical characteristics (at T<sub>j</sub>= 25°C unless otherwise specified)**

Items	Symbols	Conditions	Characteristics			Units	
			min.	typ.	max.		
Zero gate voltage Collector current	I <sub>CES</sub>	V <sub>GE</sub> =0V, V <sub>CE</sub> =1200V	-	-	4.0	mA	
Gate-Emitter leakage current	I <sub>GES</sub>	V <sub>CE</sub> =0V, V <sub>GE</sub> =±20V	-	-	800	nA	
Gate-Emitter threshold voltage	V <sub>GE(th)</sub>	V <sub>CE</sub> =20V, I <sub>C</sub> =300mA	5.7	6.2	6.7	V	
Collector-Emitter saturation voltage	V <sub>CE(sat)</sub> (terminal)	V <sub>GE</sub> =15V, I <sub>C</sub> =300A	T <sub>j</sub> =25°C	-	3.40	3.70	V
			T <sub>j</sub> =125°C	-	4.20	-	
	V <sub>CE(sat)</sub> (chip)	V <sub>GE</sub> =15V, I <sub>C</sub> =300A	T <sub>j</sub> =25°C	-	3.20	3.50	
			T <sub>j</sub> =125°C	-	4.00	-	
Internal gate	R <sub>G(int)</sub>	-	-	0.5	-	Ω	
Input capacitance	C <sub>ies</sub>	V <sub>CE</sub> =10V, V <sub>GE</sub> =0V, f=1MHz	-	36.0	-	nF	
Turn-on time	t <sub>on</sub>	V <sub>CC</sub> = 600V I <sub>C</sub> = 300A V <sub>GE</sub> = ±15V R <sub>G</sub> = 3.3Ω T <sub>j</sub> = 125°C L <sub>S</sub> = 30nH	-	250	-	nsec	
	t <sub>r</sub>		-	180	-		
	t <sub>r(i)</sub>		-	40	-		
Turn-off time	t <sub>off</sub>		-	300	-		
Forward on voltage	V <sub>F</sub> (terminal)	V <sub>GE</sub> =0V, I <sub>F</sub> =400A	T <sub>j</sub> =25°C	-	1.85	2.30	V
			T <sub>j</sub> =125°C	-	2.00	-	
	V <sub>F</sub> (chip)	V <sub>GE</sub> =0V, I <sub>F</sub> =400A	T <sub>j</sub> =25°C	-	1.70	2.15	
			T <sub>j</sub> =125°C	-	1.85	-	
Reverse recovery time	t <sub>rr</sub>	I <sub>F</sub> =400A	-	130	-	nsec	

**5. Thermal resistance characteristics**

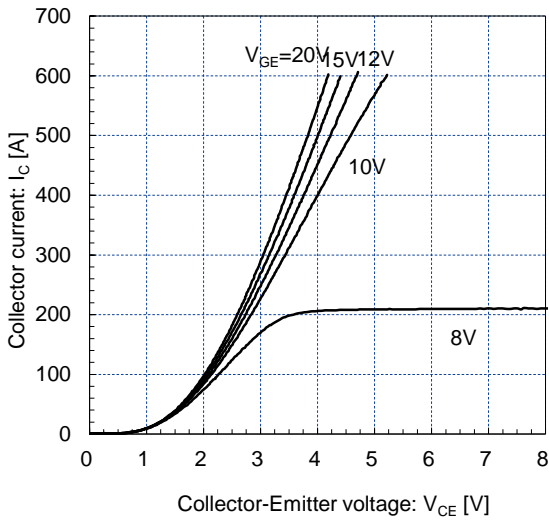
Items	Symbols	Conditions	Characteristics			Units
			min.	typ.	max.	
Thermal resistance(1dev)	R <sub>th(j-c)</sub>	IGBT	-	-	0.064	°C/W
		FWD	-	-	0.110	
Contact thermal resistance	R <sub>th(c-f)</sub>	with Thermal Compound	-	0.0125	-	

(\*1) This is the value which is defined mounting on the additional cooling fin with thermal compound.

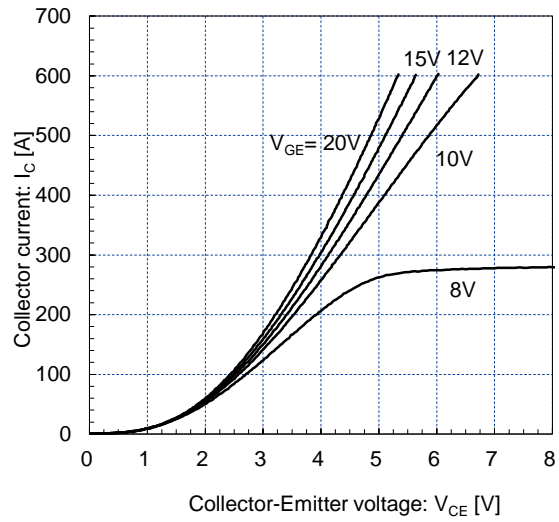
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IGBT Modules

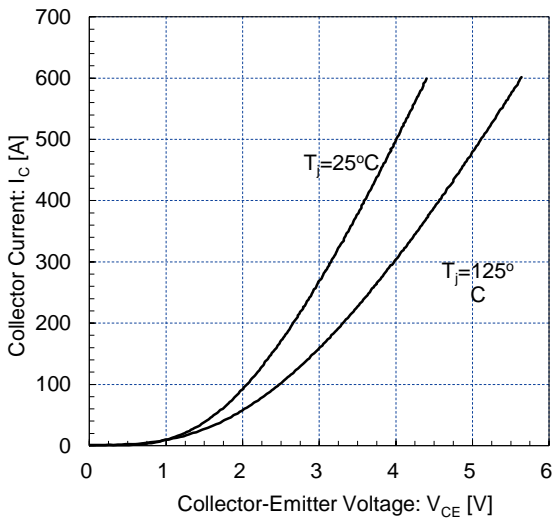
Collector current vs. Collector-Emittor voltage  
 $T_i = 25^\circ\text{C} / \text{chip}$



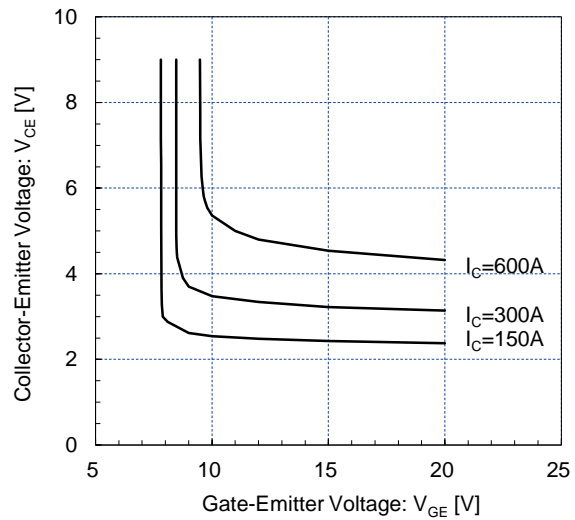
Collector current vs. Collector-Emittor voltage (typ.)  
 $T_i = 125^\circ\text{C} / \text{chip}$



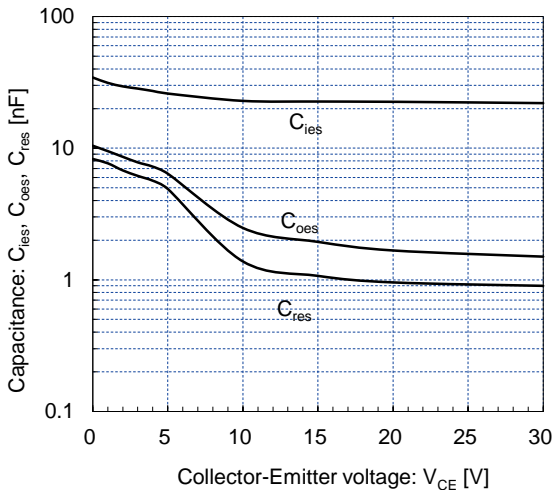
Collector current vs. Collector-Emittor voltage  
 $V_{GE} = 15\text{V} / \text{chip}$



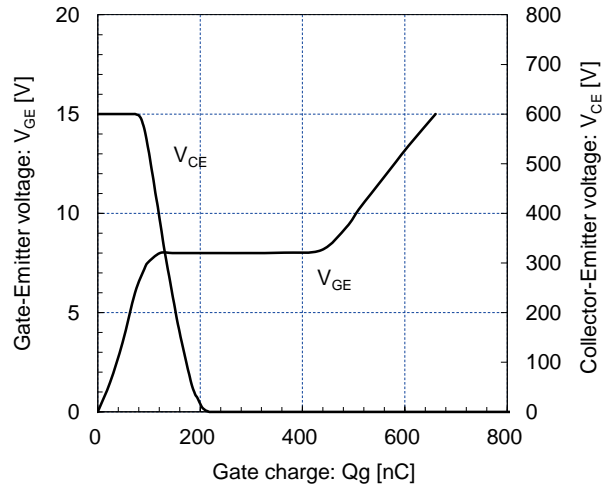
Collector-Emittor voltage vs. Gate-Emittor voltage  
 $T_i = 25^\circ\text{C} / \text{chip}$



Capacitance vs. Collector-Emittor Voltage  
 $V_{GE} = 0\text{V}, f = 1\text{MHz}, T_i = 25^\circ\text{C}$



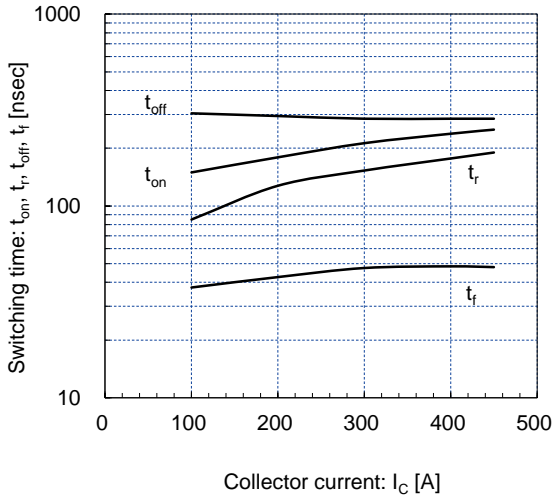
Dynamic Gate Charge (typ.)  
 $V_{CC} = 600\text{V}, I_C = 300\text{A}, T_j = 25^\circ\text{C}$



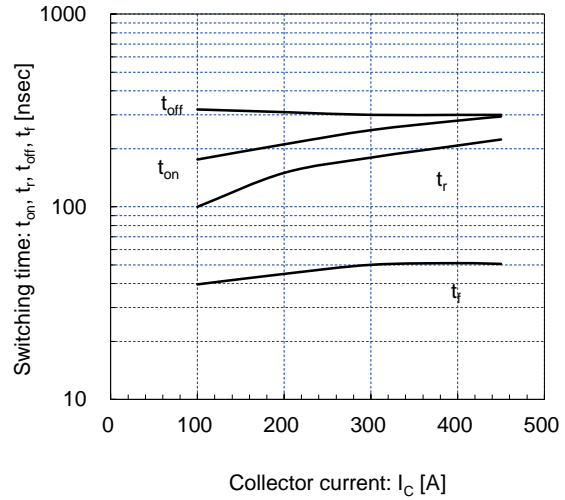
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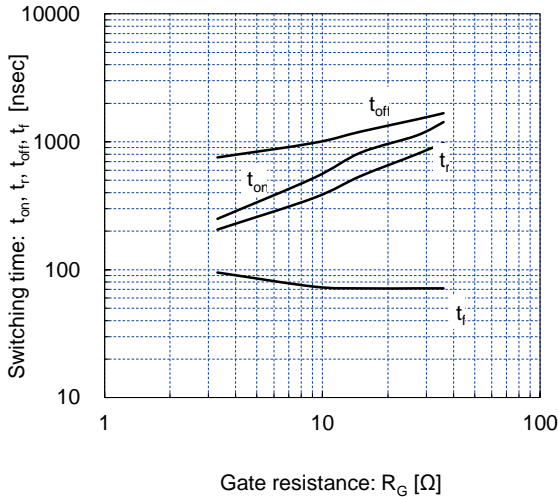
Switching time vs. Collector current (typ.)  
 $V_{CC}=600V, V_{GE}=\pm 15V, R_g=3.3\Omega, T_j=25^\circ C$



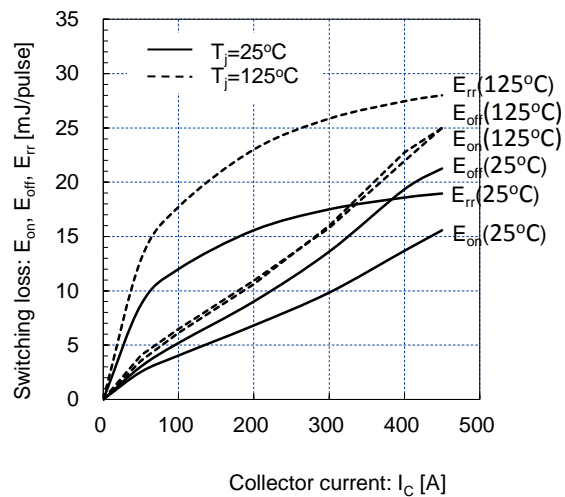
Switching time vs. Collector current (typ.)  
 $V_{CC}=600V, V_{GE}=\pm 15V, R_g=3.3\Omega, T_j=125^\circ C$



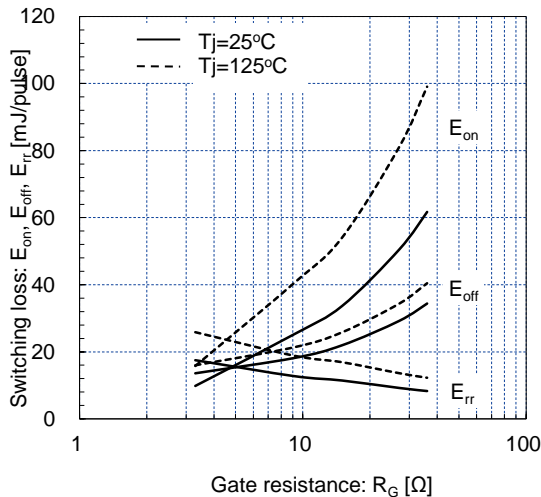
Switching time vs. Gate resistance (typ.)  
 $V_{CC}=600V, I_C=300A, V_{GE}=\pm 15V, T_j=125^\circ C$



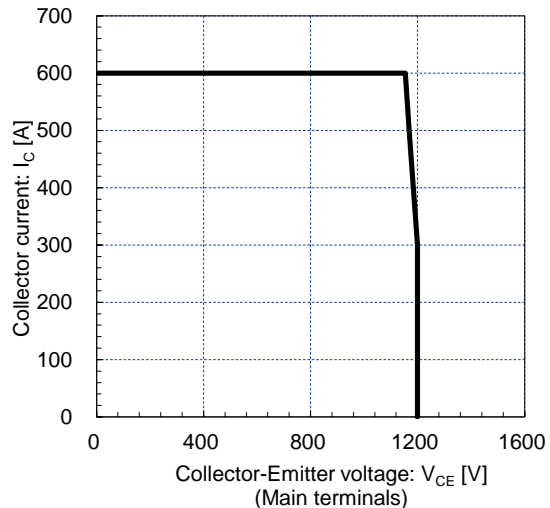
Switching loss vs. Collector current (typ.)  
 $V_{CC}=600V, V_{GE}=\pm 15V, R_g=3.3\Omega, T_j=25, 125^\circ C$



Switching loss vs. Gate resistance (typ.)  
 $V_{CC}=600V, I_C=300A, V_{GE}=\pm 15V, T_j=25, 125^\circ C$



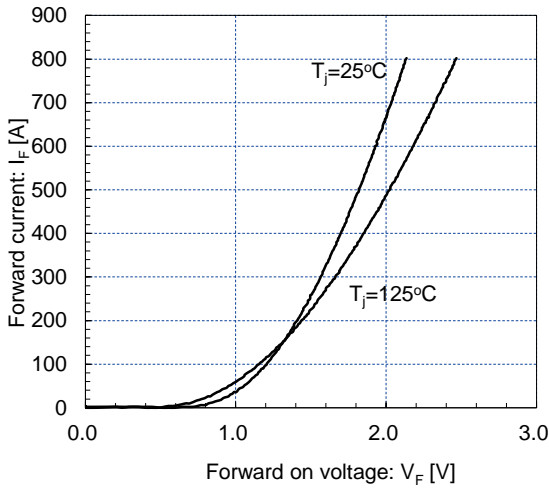
Reverse bias safe operating area (max.)  
 $+V_{GE}=15V, -V_{GE}=15V, R_g=3.3\Omega, T_j=125^\circ C$



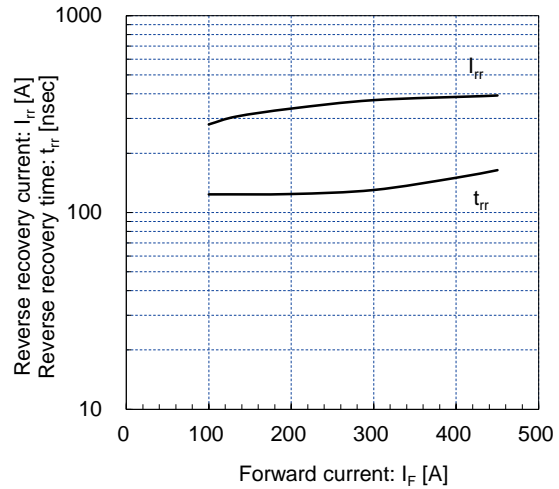
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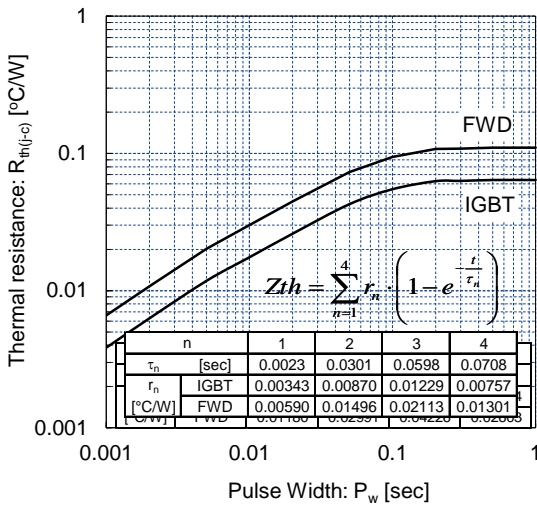
Forward current vs. Forward vltage (typ.)  
chip



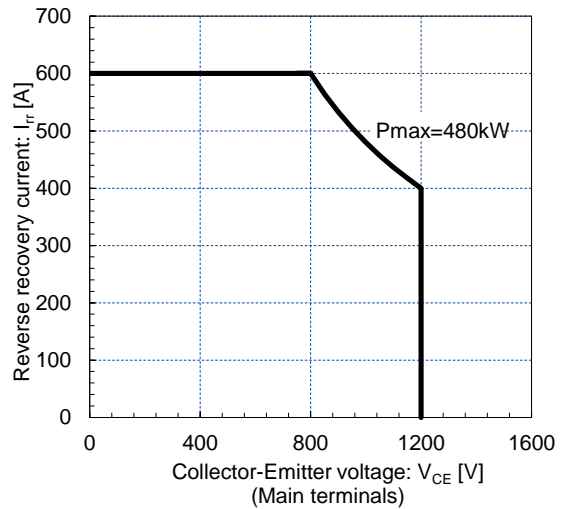
Reverse recovery characteristics (typ.)  
 $V_{CC}=600\text{V}$ ,  $V_{GE}=\pm 15\text{V}$ ,  $R_g=3.3\Omega$ ,  $T_j=125^\circ\text{C}$



Transient thermal resistance (max.)



FWD safe operating area (max.)  
 $T_i = 125^\circ\text{C}$



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