

# 2MBI200HJ-120-50

IGBT Modules

**Power Module (V series)**  
**1200V / 200A / 2-in-1 package**

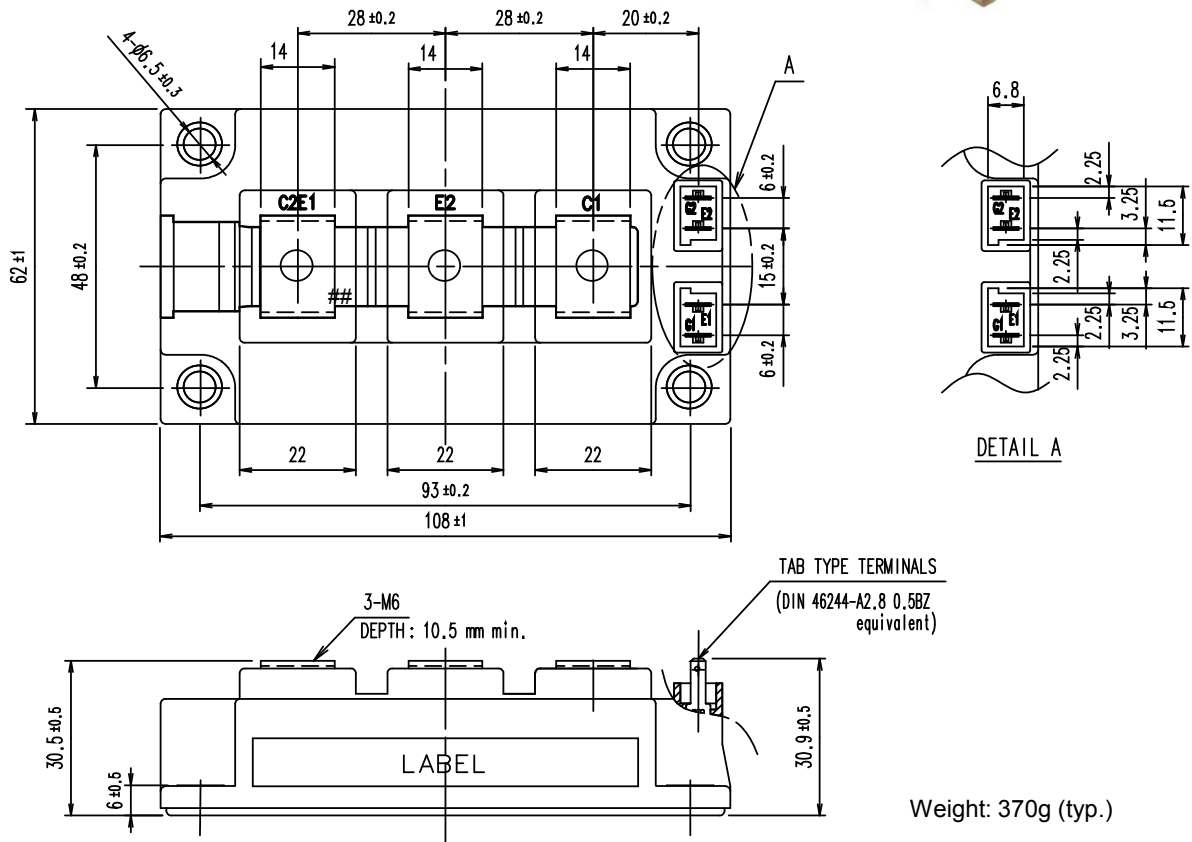
■ **Features**

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

■ **Applications**

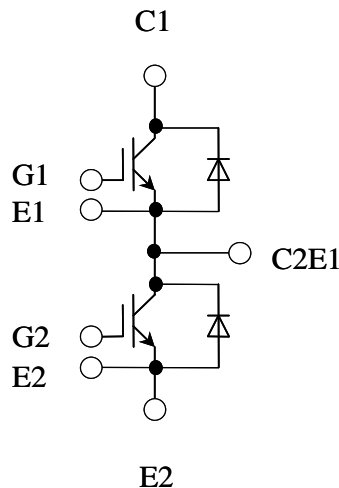
- Soft-switching Application
- Industrial machines, such as Welding machines

■ **Outline drawing ( Unit : mm )**



Weight: 370g (typ.)

■ **Equivalent Circuit**



# 2MBI200HJ-120-50

**IGBT Modules**
**■ Absolute Maximum Ratings (at  $T_C=25^\circ\text{C}$  unless otherwise specified)**

Items		Symbols	Conditions	Maximum Ratings	Units
Collector-Emitter voltage		$V_{CES}$		1200	V
Gate-Emitter voltage		$V_{GES}$		$\pm 20$	V
Collector current	$I_C$	Continuous	$T_C=60^\circ\text{C}$	200	A
			$T_C=25^\circ\text{C}$	275	
	$I_C$ pulse	1ms		400	
	$-I_C$			300	
		$-I_C$ pulse	1ms	600	
Collector power dissipation		$P_C$	1 device	1385	W
Junction temperature		$T_j$		150	$^\circ\text{C}$
Case temperature		$T_C$		125	
Storage temperature		$T_{stg}$		-40 ~ 125	
Isolation voltage	between terminal and copper base (*1)	$V_{iso}$	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)

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**IGBT Modules**
**■ Electrical characteristics (at  $T_j = 25^\circ\text{C}$  unless otherwise specified)**

Items	Symbols	Conditions	Characteristics			Units	
			min.	typ.	max.		
Zero gate voltage Collector current	$I_{CES}$	$V_{GE}=0V, V_{CE}=1200V$	-	-	4.0	mA	
Gate-Emitter leakage current	$I_{GES}$	$V_{CE}=0V, V_{GE}=\pm 20V$	-	-	800	nA	
Gate-Emitter threshold voltage	$V_{GE(th)}$	$V_{CE}=20V, I_c=200mA$	5.7	6.2	6.7	V	
Collector-Emitter saturation voltage	$V_{CE(sat)}$ (terminal)	$V_{GE}=15V, I_c=200A$	$T_j=25^\circ\text{C}$	-	3.60	3.90	V
			$T_j=125^\circ\text{C}$	-	4.50	-	
	$V_{CE(sat)}$ (chip)	$V_{GE}=15V, I_c=200A$	$T_j=25^\circ\text{C}$	-	3.20	3.50	
			$T_j=125^\circ\text{C}$	-	4.10	-	
Internal gate resistance	$R_{G(int)}$	-	-	0.8	-	$\Omega$	
Input capacitance	$C_{ies}$	$V_{CE}=10V, V_{GE}=0V, f=1MHz$	-	15.2	-	nF	
Turn-on time	$t_{on}$	$V_{CC}=600V, I_c=200A$ $V_{GE}=\pm 15V, R_G=4.7\Omega$ $T_j=125^\circ\text{C}, L_s=30nH$	-	250	-	nsec	
	$t_r$		-	180	-		
	$t_{r(i)}$		-	40	-		
Turn-off time	$t_{off}$		-	300	-		
	$t_f$		-	50	-		
Forward on voltage	$V_F$ (terminal)		$V_{GE}=0V, I_F=300A$	$T_j=25^\circ\text{C}$	-		2.15
		$T_j=125^\circ\text{C}$		-	2.30	-	
	$V_F$ (chip)	$V_{GE}=0V, I_F=300A$	$T_j=25^\circ\text{C}$	-	1.70	1.95	
			$T_j=125^\circ\text{C}$	-	1.85	-	
Reverse recovery time	$t_{rr}$	$I_F=200A$	-	130	-	nsec	

**5. Thermal resistance characteristics**

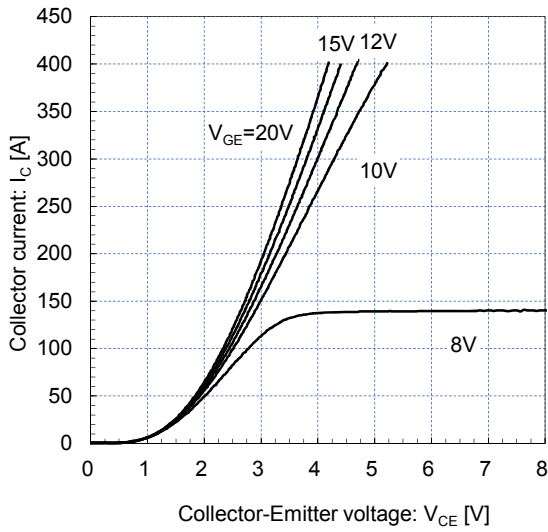
Items	Symbols	Conditions	Characteristics			Units
			min.	typ.	max.	
Thermal resistance (1device)	$R_{th(j-c)}$	IGBT	-	-	0.090	$^\circ\text{C/W}$
		FWD	-	-	0.140	
Contact thermal resistance (1device) (*1)	$R_{th(c-f)}$	with thermal compound	-	0.0125	-	

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

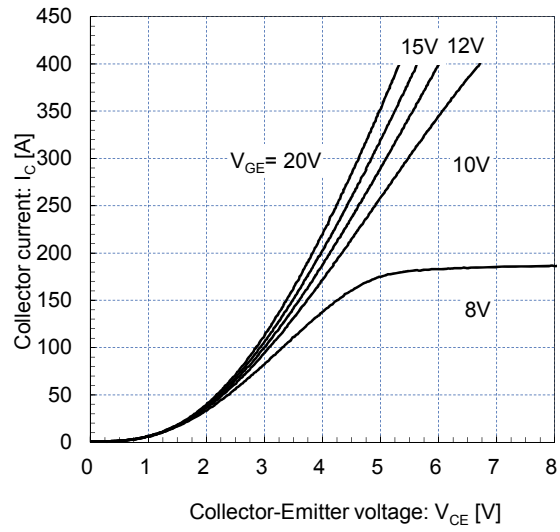
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IGBT Modules

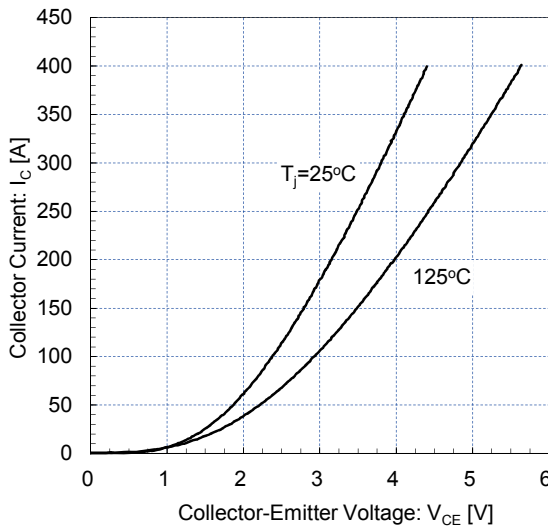
Collector current vs. Collector-Emitter voltage  
 $T_j = 25^\circ\text{C}$  / chip



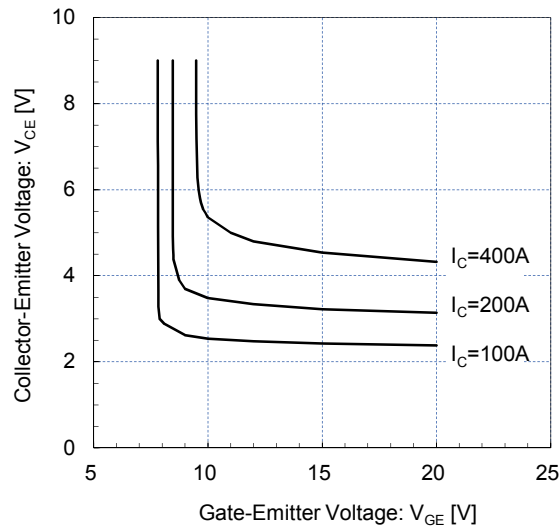
Collector current vs. Collector-Emitter voltage (typ.)  
 $T_j = 125^\circ\text{C}$  / chip



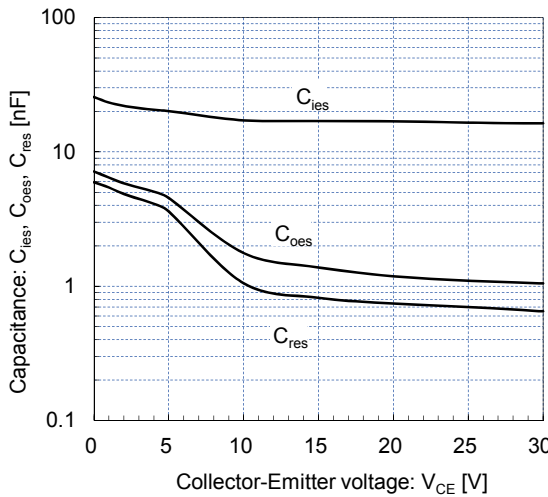
Collector current vs. Collector-Emitter voltage  
 $V_{GE} = 15\text{V}$  / chip



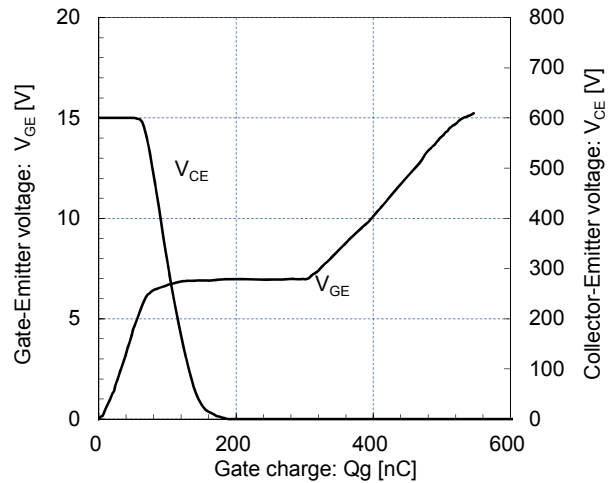
Collector-Emitter voltage vs. Gate-Emitter voltage  
 $T_j = 25^\circ\text{C}$  / chip



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



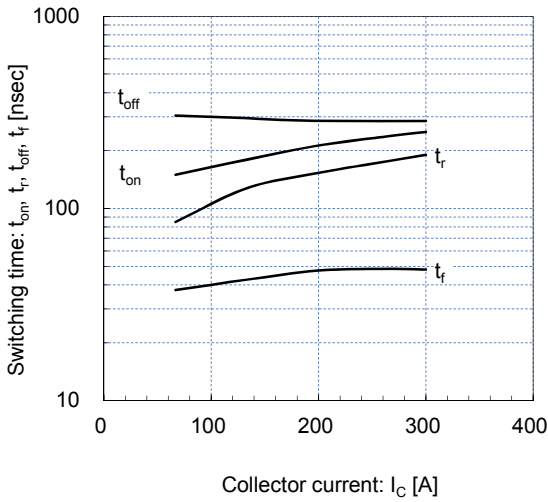
Dynamic Gate Charge (typ.)  
 $V_{CC} = 600\text{V}$ ,  $I_C = 200\text{A}$ ,  $T_j = 25^\circ\text{C}$



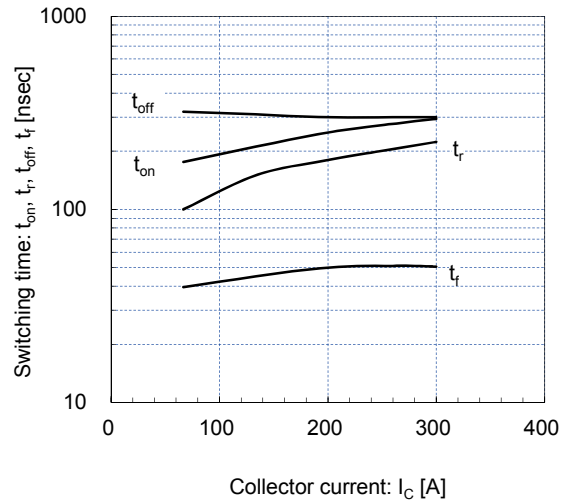
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IGBT Modules

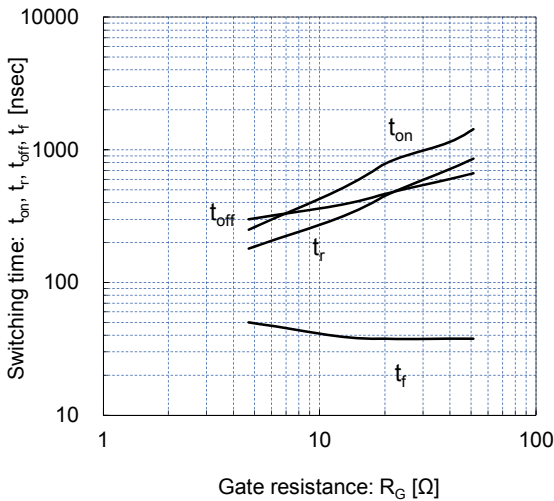
Switching time vs. Collector current (typ.)  
 $V_{cc}=600V, V_{GE}=\pm 15V, R_g=4.7\Omega, T_j=25^\circ C$



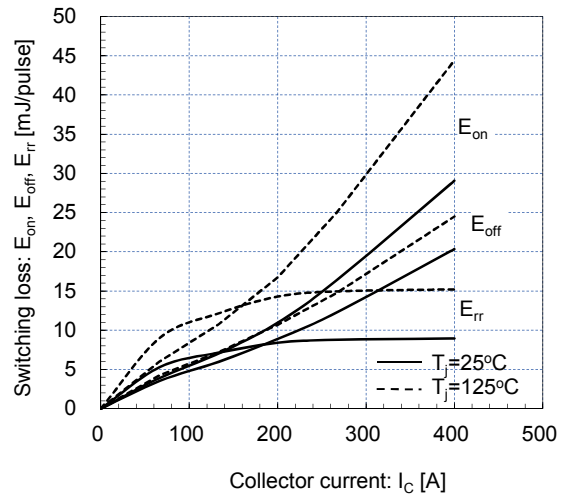
Switching time vs. Collector current (typ.)  
 $V_{cc}=600V, V_{GE}=\pm 15V, R_g=4.7\Omega, T_j=125^\circ C$



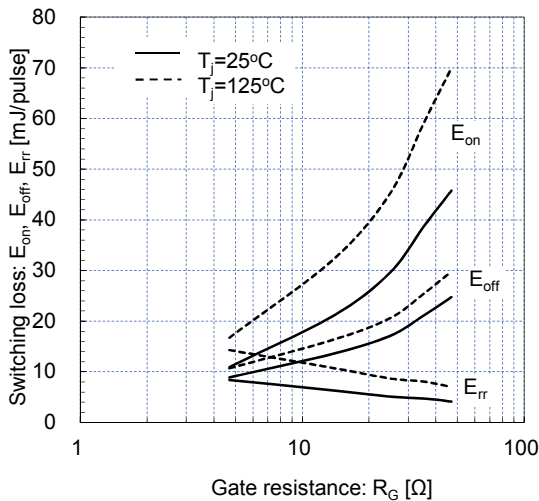
Switching time vs. Gate resistance (typ.)  
 $V_{cc}=600V, I_c=200A, V_{GE}=\pm 15V, T_j=125^\circ C$



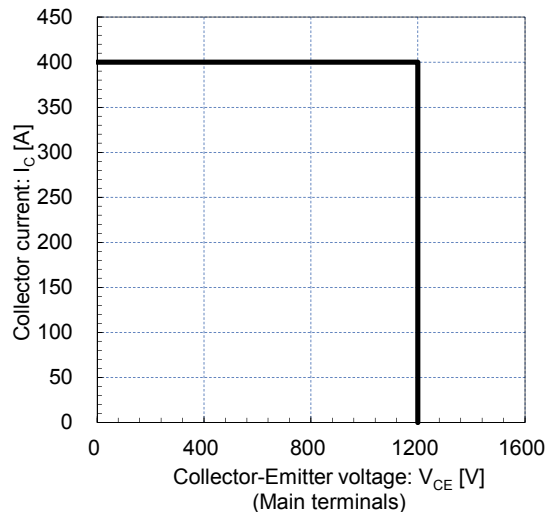
Switching loss vs. Collector current (typ.)  
 $V_{cc}=600V, V_{GE}=\pm 15V, R_g=4.7\Omega, T_j=25, 125^\circ C$



Switching loss vs. Gate resistance (typ.)  
 $V_{cc}=600V, I_c=200A, V_{GE}=\pm 15V, T_j=25, 125^\circ C$



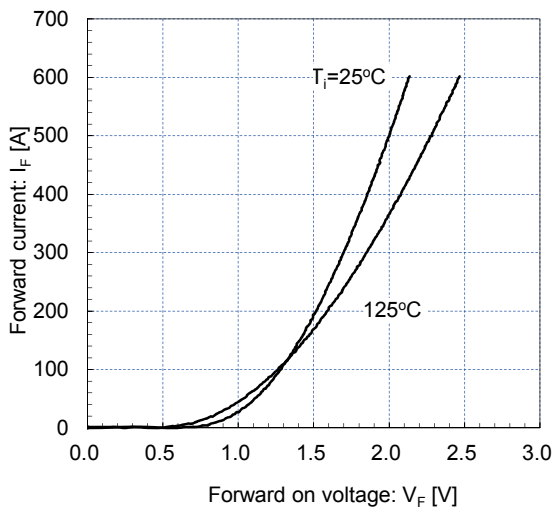
Reverse bias safe operating area (max.)  
 $+V_{GE}=15V, -V_{GE}=15V, R_g=4.7\Omega, T_j=125^\circ C$



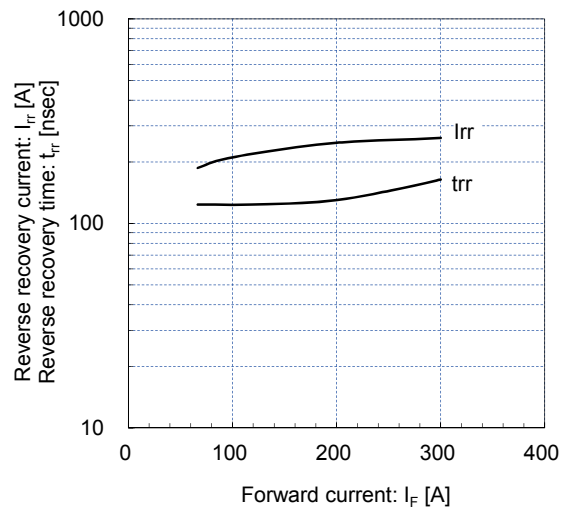
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IGBT Modules

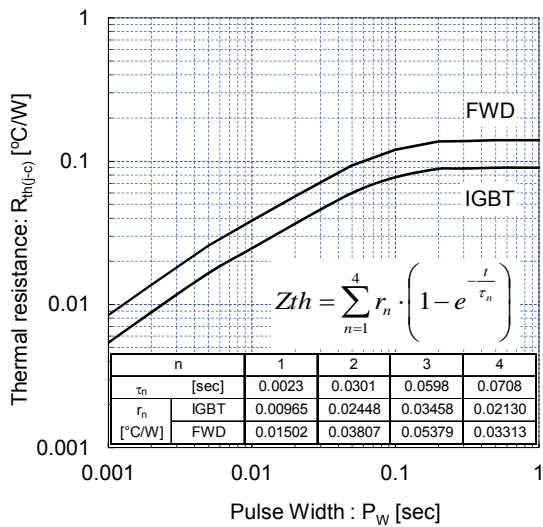
Forward current vs. Forward vltage (typ.)  
chip



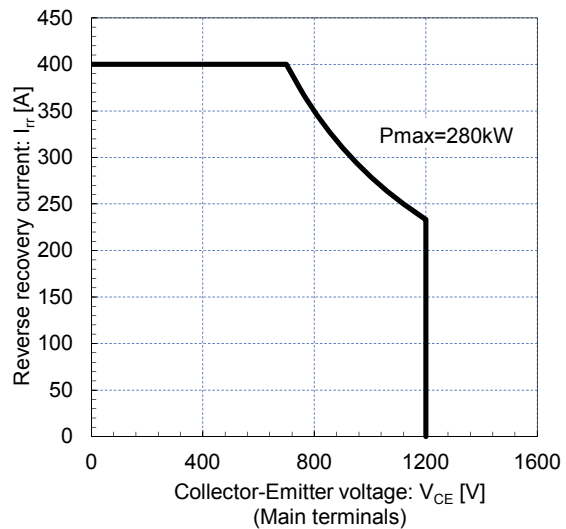
Reverse recovery characteristics (typ.)  
V<sub>CC</sub>=600V, V<sub>GE</sub>=±15V, R<sub>g</sub>=4.7Ω, T<sub>J</sub>=125°C



Transient thermal resistance (max.)



FWD safe operating area (max.)  
T<sub>J</sub> = 125°C



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