2MBI300VE-170-50

IGBT Modules

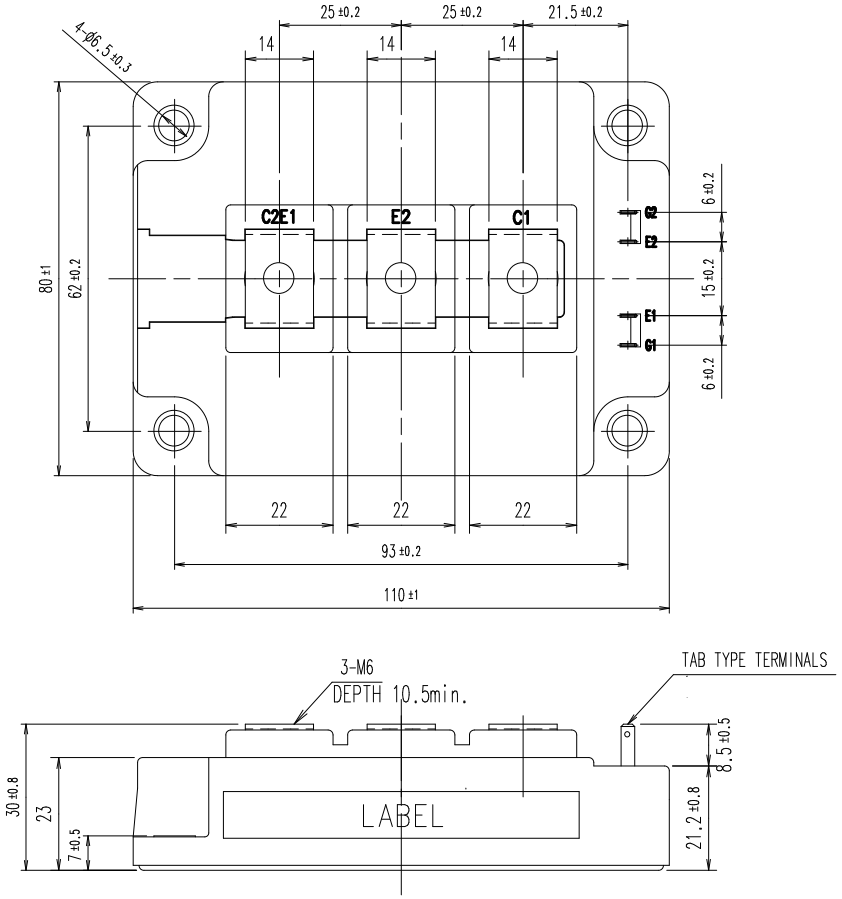
Power Module (V series)
1700V / 300A / 2-in-1 package

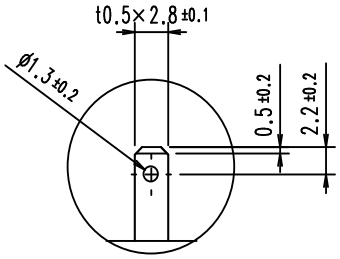


■ Features
AC-switch
High speed switching
Voltage drive
Low Inductance module structure

■ Applications
AC-switch for UPS,PCS and etc.

■ Outline drawing (Unit : mm)

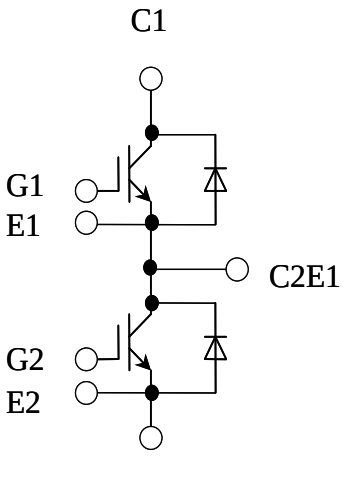




DETAIL TAB TYPE TERMINALS

Weight: 470g (typ.)

■ Equivalent circuit



FM5F8227d
2023/06

2MBI300VE-170-50

■ 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=100°C	300	A
				T_C=25°C	440	
		I_C pulse	1ms		600	
		$-I_C$			300	
		$-I_C$ pulse	1ms		600	
Collector power dissipation		P_C	1 device		2830	W
Junction temperature		T_j			175	°C
Operating junction temperature (under switching conditions)		T_{jop}			150	
Case temperature		T_c			125	
Storage temperature		T_{stg}			-40 ~ 125	
Isolation voltage	Between terminal and copper base (*1)	V_{iso}	AC: 1min.		4000	VAC
Screw torque	Mounting	-	M5 or M6		3.0～6.0	N m
	Terminals	-	M6		2.5～5.0	

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

■ Electrical characteristics (at T_j= 25°C unless otherwise specified)

NOTICE:
The external gate resistance (R_{g_on}, R_{g_off}) shown in below is one of our recommend value for the purpose of minimum switching loss. However the optimum R_g depends on circuit configuration and/or environment. We recommend that the R_g has to be carefully chosen based on consideration if IGBT module matches design criteria, for example, switching loss, EMC/EMI, spike voltage, surge current and no unexpected oscillation and so on. Especially, we recommend to choose R_{g_on} value shown in below or more. Otherwise it might be exceeded the FWD safe operating area.

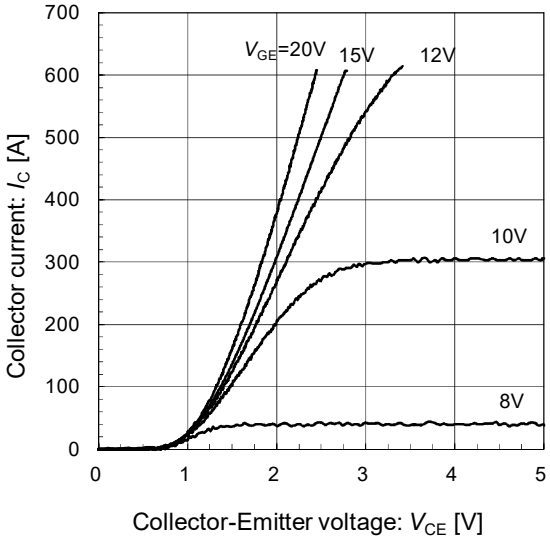
Items	Symbols	Conditions		Characteristics min.	Characteristics typ.	Characteristics max.	Units
Zero gate voltage collector current	I_{CES}	V_{GE}=0V,V_{CE}=1700V		-	-	2.0	mA
Gate-Emitter leakage current	I_{GES}	V_{CE}=0V,V_{GE}=±20V		-	-	800	nA
Gate-Emitter threshold voltage	$V_{GE(th)}$	V_{CE}=20V,I_C=300mA		6.0	6.5	7.0	V
Collector-Emitter saturation voltage	$V_{CE(sat)}$ (terminal)	V_{GE}=15V,I_C=300A	T_j=25°C	-	2.15	2.60	V
			T_j=125°C	-	2.55	-	
			T_j=150°C	-	2.60	-	
	$V_{CE(sat)}$ (chip)	V_{GE}=15V,I_C=300A	T_j=25°C	-	2.00	2.25	
			T_j=125°C	-	2.40	-	
			T_j=150°C	-	2.45	-	
Internal gate resistance	$R_{g(int)}$	-		-	2.5	-	Ω
Input capacitance	C_{ies}	V_{CE}=10V, V_{GE}=0V, f=1MHz		-	33	-	nF
Turn-on time	t_{on}	V_{CC}=900V,I_C=300A,V_{GE}=±15V, R_{g_on}=4.7Ω,R_{g_off}=2.4Ω T_j=150°C、L_s=30nH		-	1150	-	nsec
	t_r			-	580	-	
	$t_{r(i)}$			-	60	-	
Turn-off time	t_{off}			-	1050	-	
	t_f			-	140	-	
Forward on voltage	V_F (terminal)	V_{GE}=0V,I_F=300A	T_j=25°C	-	1.95	2.25	V
			T_j=125°C	-	2.15	-	
			T_j=150°C	-	2.15	-	
	V_F (chip)	V_{GE}=0V,I_F=300A	T_j=25°C	-	1.80	1.95	
			T_j=125°C	-	2.05	-	
			T_j=150°C	-	2.05	-	
Reverse recovery time	t_{rr}	I_F=300A		-	220	-	nsec

■ Thermal resistance characteristics

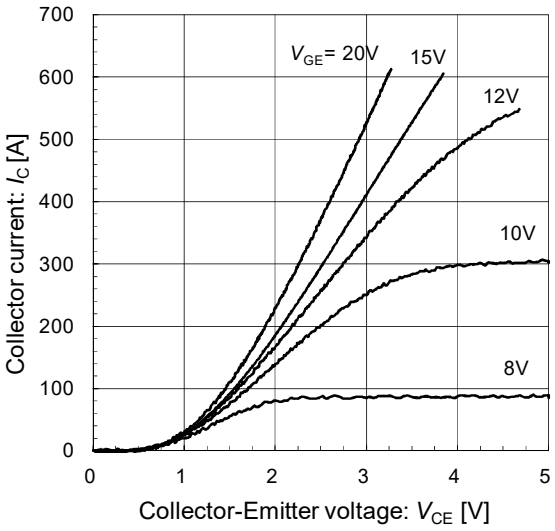
Items	Symbols	Conditions	Characteristics min.	Characteristics typ.	Characteristics max.	Units
Thermal resistance (1device)	$R_{th(j-c)}$	IGBT	-	-	0.045	°C/W
		FWD	-	-	0.094	
Contact thermal resistance (1device) (*1)	$R_{th(c-f)}$	with thermal compound	-	0.0125	-	

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

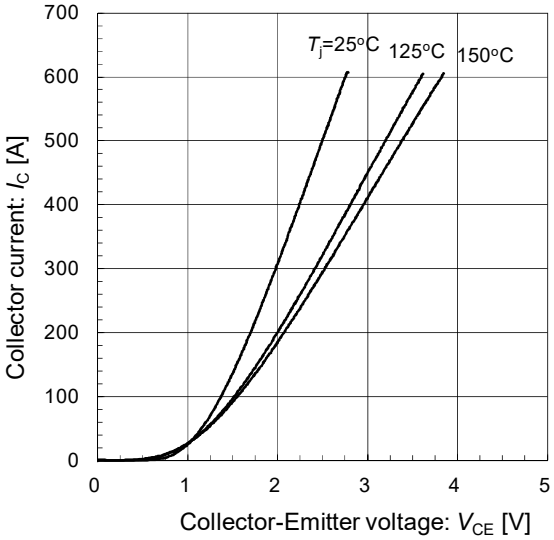
Collector current vs. Collector-Emitter voltage (typ.)
T_j= 25°C / chip



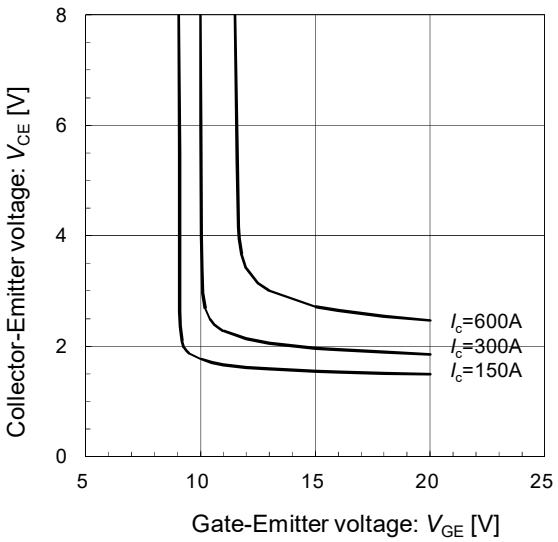
Collector current vs. Collector-Emitter voltage (typ.)
T_j= 150°C / chip



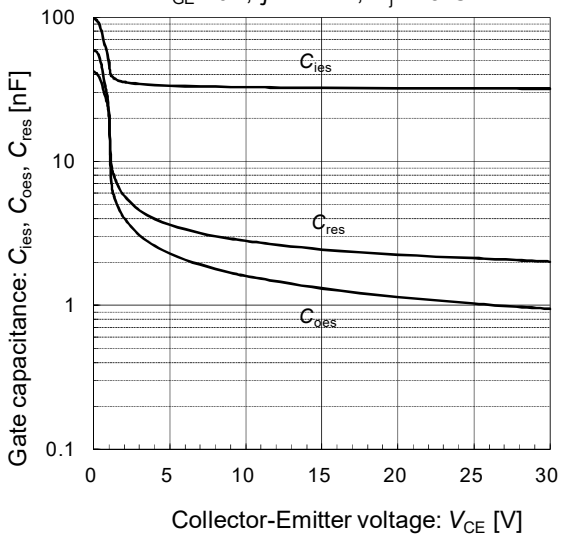
Collector current vs. Collector-Emitter voltage (typ.)
V_{GE}= 15V / chip



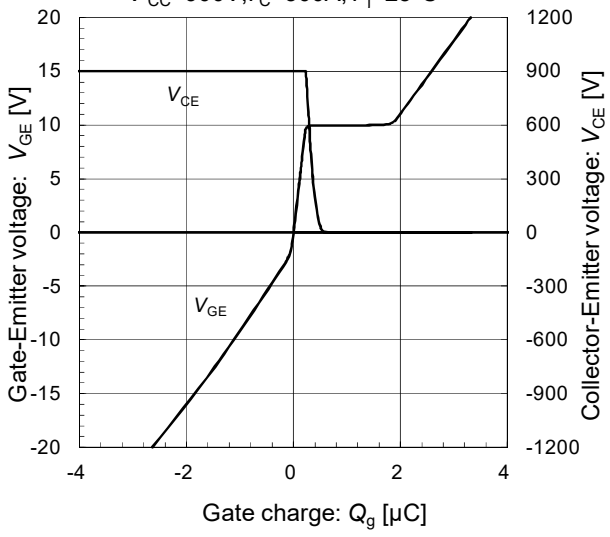
Collector-Emitter voltage vs. Gate-Emitter voltage (typ.)
T_j= 25°C / chip



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



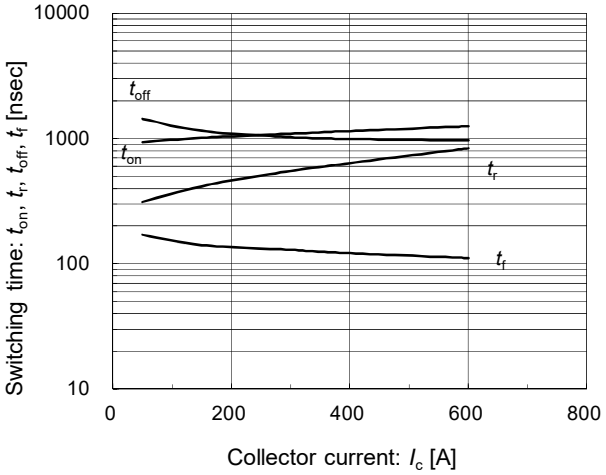
Dynamic gate charge (typ.)
V_{CC}=900V, I_C=300A, T_j=25°C



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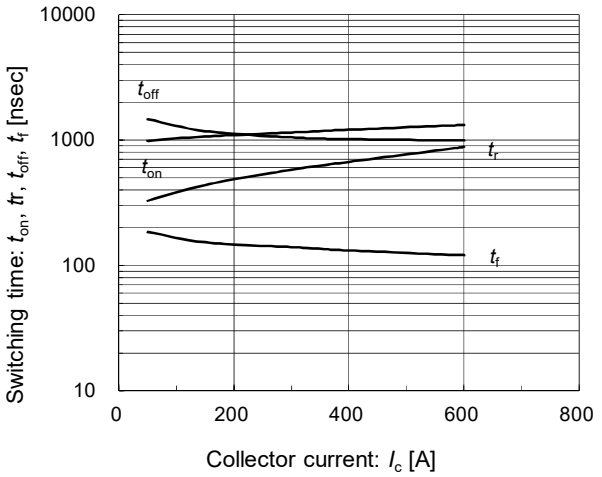
Switching time vs. Collector current (typ.)

V_{CC}=900V, V_{GE}=±15V, R_{g_on}=4.7Ω, R_{g_off}=2.4Ω, T_j=125°C



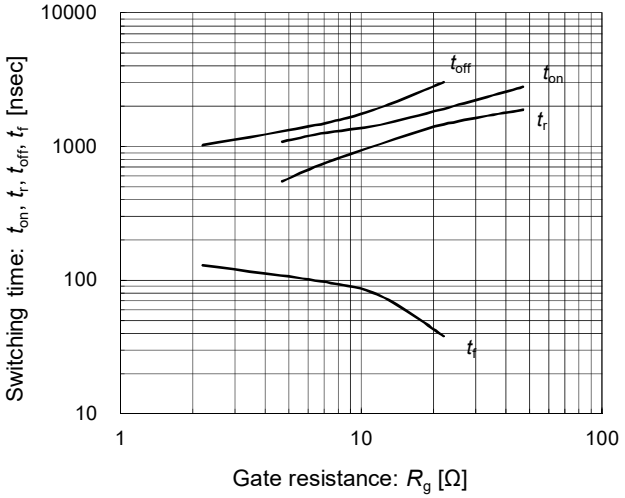
Switching time vs. Collector current (typ.)

V_{CC}=900V, V_{GE}=±15V, R_{g_on}=4.7Ω, R_{g_off}=2.4Ω, T_j=150°C



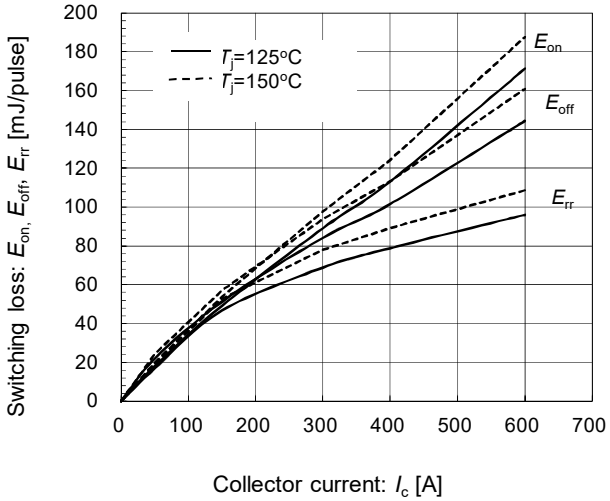
Switching time vs. Gate resistance (typ.)

V_{CC}=900V, I_C=300A, V_{GE}=±15V, T_j=125°C



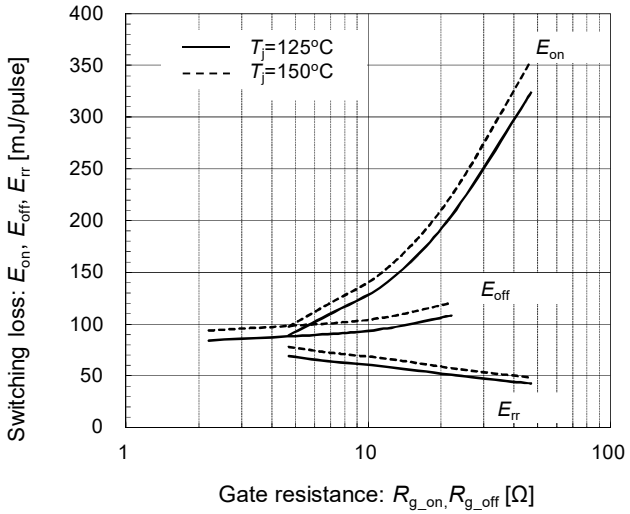
Switching loss vs. Collector current (typ.)

V_{CC}=900V, V_{GE}=±15V, R_{g_on}=4.7Ω, R_{g_off}=2.4Ω



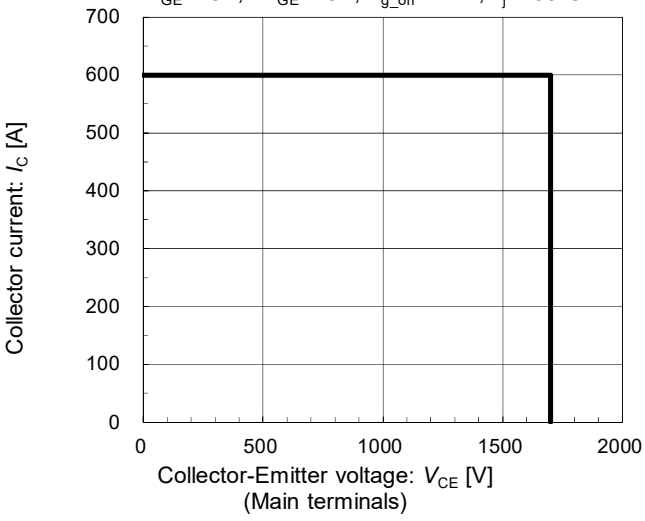
Switching loss vs. Gate resistance (typ.)

V_{CC}=900V, I_C=300A, V_{GE}=±15V, T_j=125,150°C



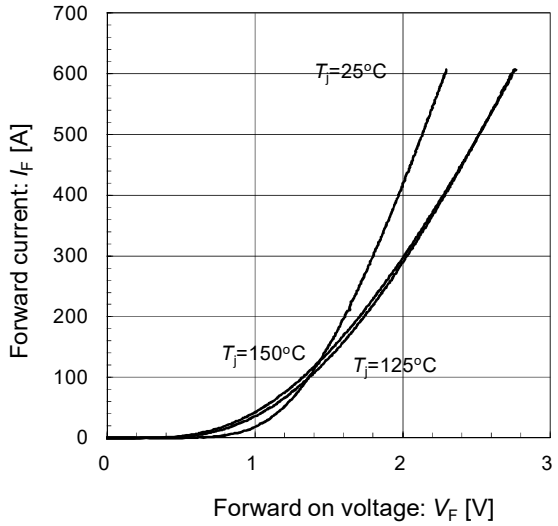
Reverse bias safe operating area (max.)

+V_{GE}=15V, -V_{GE}=15V, R_{g_off}=2.4Ω, T_j=150°C

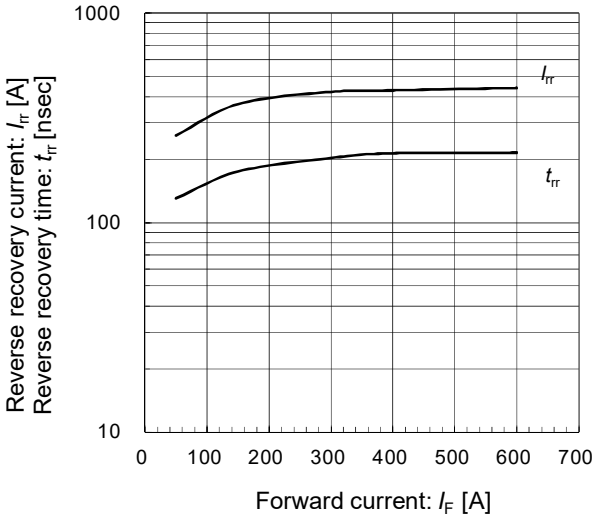


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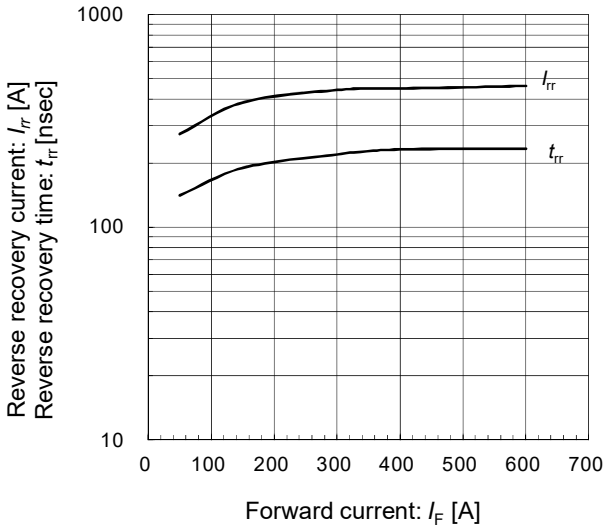
Forward current vs. Forward voltage (typ.)
chip



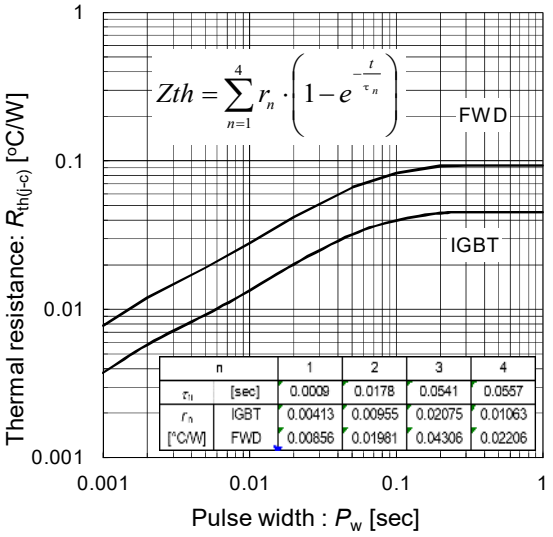
Reverse recovery characteristics (typ.)
V_{CC}=900V, V_{GE}=±15V, R_g=4.7Ω, T_j=125°C



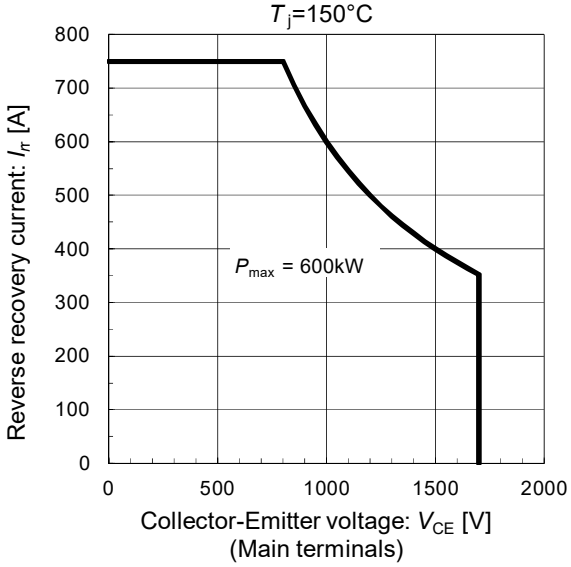
Reverse recovery characteristics (typ.)
V_{CC}=900V, V_{GE}=±15V, R_{g_on}=4.7Ω, T_j=150°C



Transient thermal resistance (max.)



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



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IGBT Modules

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