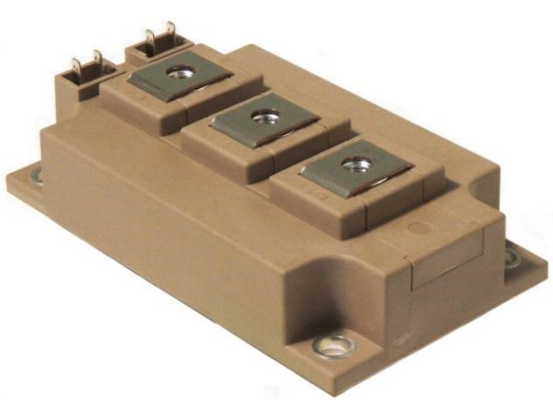
2MBI450VH-120-50

IGBT Modules

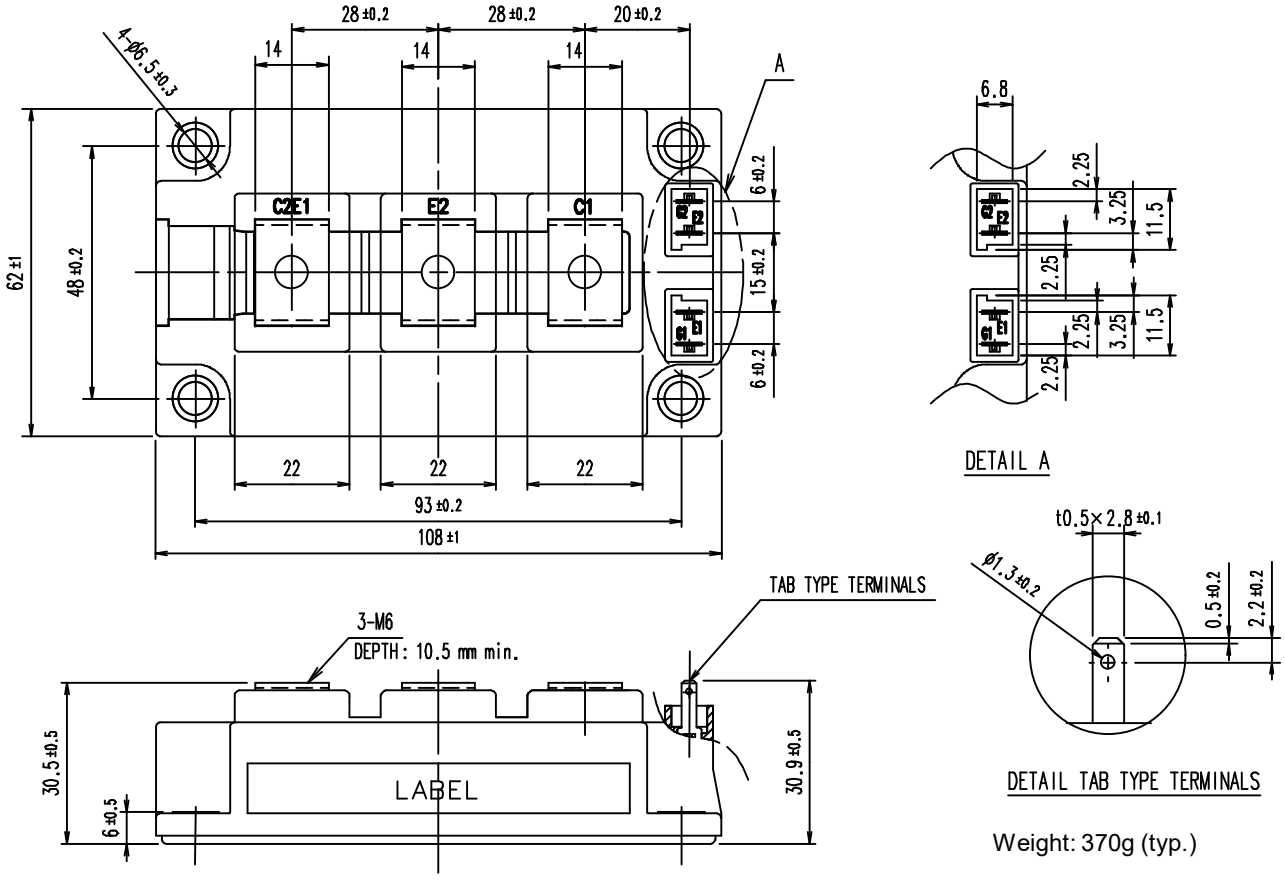
Power Module (V series)
1200V / 450A / 2-in-1 package



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

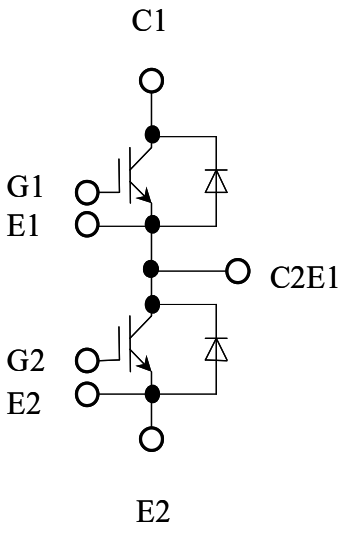
■ Applications
AC-switch for UPS,PCS and etc.

■ Outline drawing (Unit : mm)



Weight: 370g (typ.)

■ Equivalent circuit



■ Absolute maximum ratings (at T_C= 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	T_C=100°C	450	A
				T_C=25°C	520	
		I_C pulse	1ms		900	
		$-I_C$			450	
		$-I_C$ pulse	1ms		900	
Collector power dissipation		P_C	1 device		2400	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) shown 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.

Items	Symbols	Conditions		Characteristics min.	Characteristics typ.	Characteristics max.	Units
Zero gate voltage collector current	I_{CES}	V_{GE}=0V,V_{CE}=1200V		-	-	2.0	mA
Gate-Emitter leakage current	I_{GES}	V_{CE}=0V,V_{GE}=±20V		-	-	400	nA
Gate-Emitter threshold voltage	$V_{GE(th)}$	V_{CE}=20V,I_C=450mA		6.0	6.5	7.0	V
Collector-Emitter saturation voltage	$V_{CE(sat)}$ (terminal)	V_{GE}=15V,I_C=450A	T_j=25°C	-	2.10	2.45	V
			T_j=125°C	-	2.45	-	
			T_j=150°C	-	2.50	-	
	$V_{CE(sat)}$ (chip)	V_{GE}=15V,I_C=450A	T_j=25°C	-	1.80	2.15	
			T_j=125°C	-	2.15	-	
			T_j=150°C	-	2.20	-	
Internal gate resistance	$R_{g(int)}$	-		-	1.9	-	Ω
Input capacitance	C_{ies}	V_{CE}=10V, V_{GE}=0V, f=1MHz		-	36.4	-	nF
Turn-on time	t_{on}	V_{CC}=600V,I_C=450A,V_{GE}=±15V, R_g=1Ω,T_j=150°C、L_s=30nH		-	600	-	nsec
	t_r			-	200	-	
	$t_{r(i)}$			-	50	-	
Turn-off time	t_{off}			-	800	-	
	t_f			-	80	-	
Forward on voltage	V_F (terminal)	V_{GE}=0V,I_F=450A	T_j=25°C	-	1.95	2.40	V
			T_j=125°C	-	2.15	-	
			T_j=150°C	-	2.10	-	
	V_F (chip)	V_{GE}=0V,I_F=450A	T_j=25°C	-	1.70	2.15	
			T_j=125°C	-	1.90	-	
			T_j=150°C	-	1.85	-	
Reverse recovery time	t_{rr}	I_F=450A		-	150	-	nsec

■ Thermal resistance characteristics

Items	Symbols	Conditions	Characteristics min.	Characteristics typ.	Characteristics max.	Units
Thermal resistance (1device)	$R_{th(j-c)}$	IGBT	-	-	0.062	°C/W
		FWD	-	-	0.110	
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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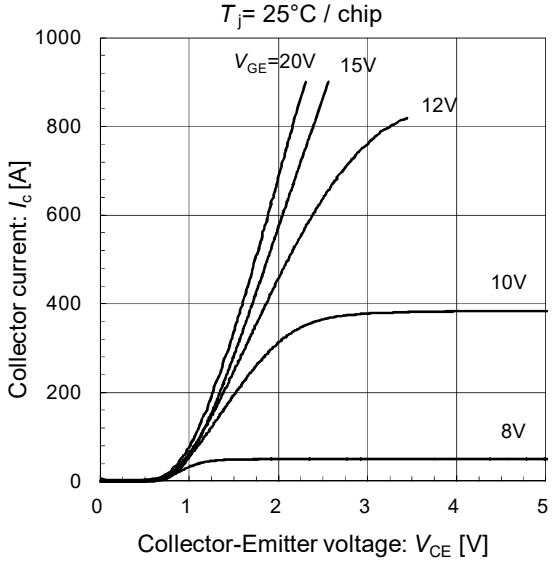
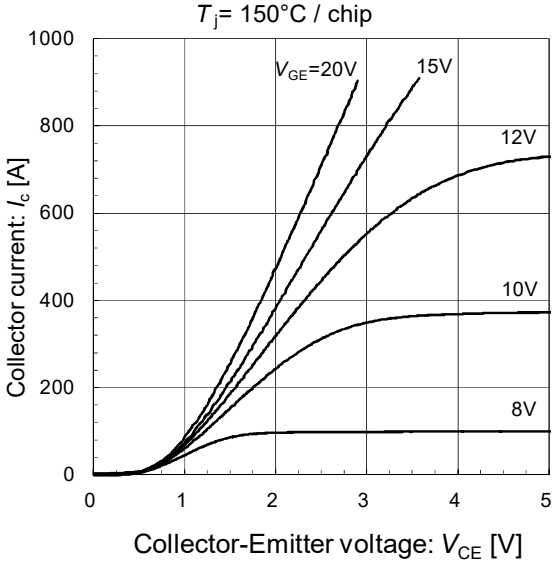
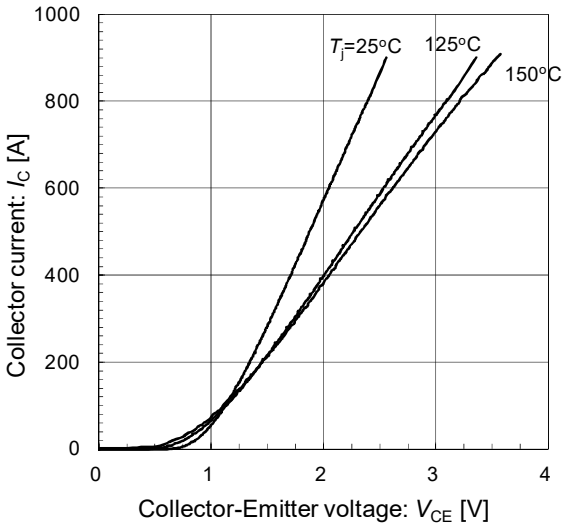
Collector current vs. Collector-Emitter voltage (typ.)
T_j= 25°C / chip



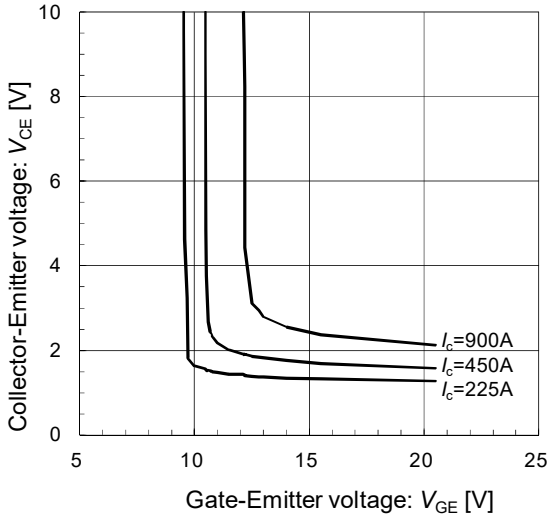
Collector current vs. Collector-Emitter voltage (typ.)
T_j= 150°C / chip



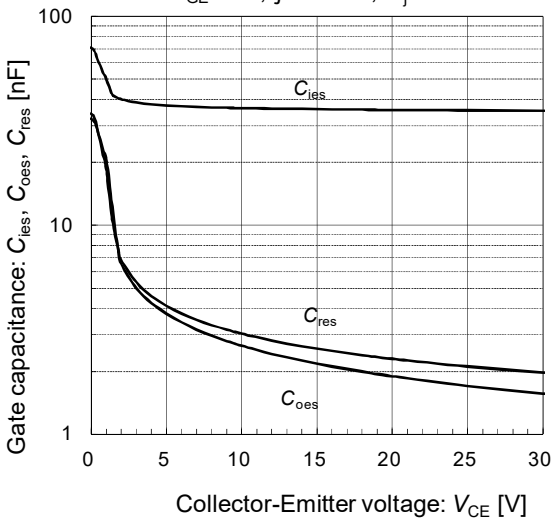
Collector current vs. Collector-Emitter voltage (typ.)
V_{GE}= 15V / chip



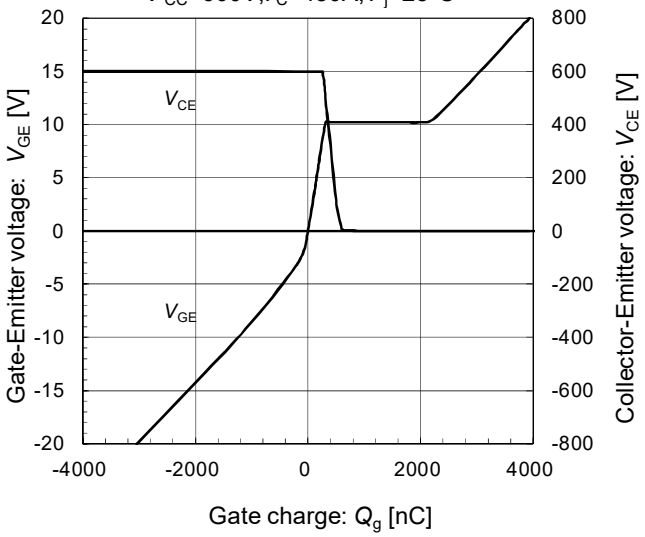
Collector-Emitter voltage vs. Gate-Emitter voltage (typ.)
T_j= 25°C / chip



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



Dynamic gate charge (typ.)
V_{CC}=600V, I_C=450A, T_j=25°C



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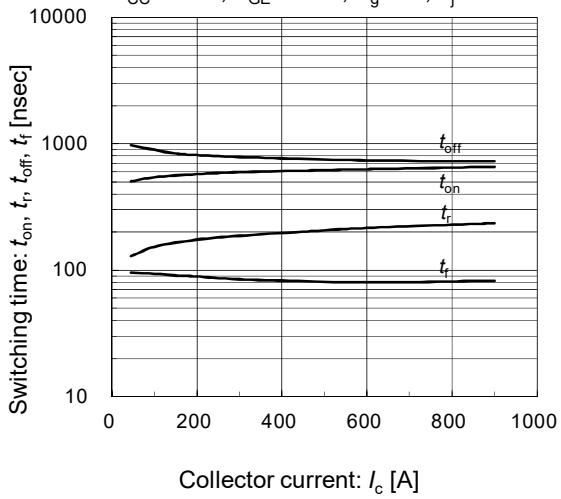
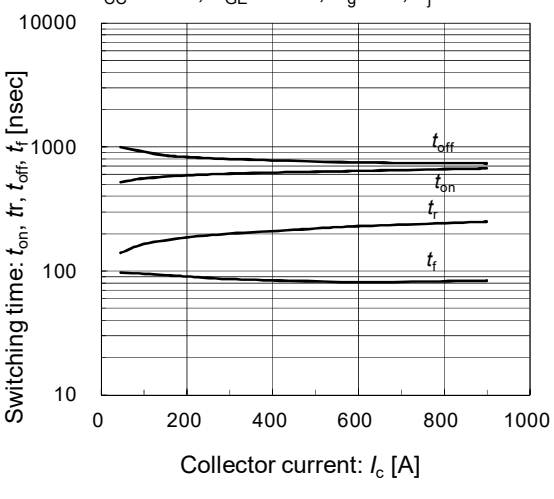
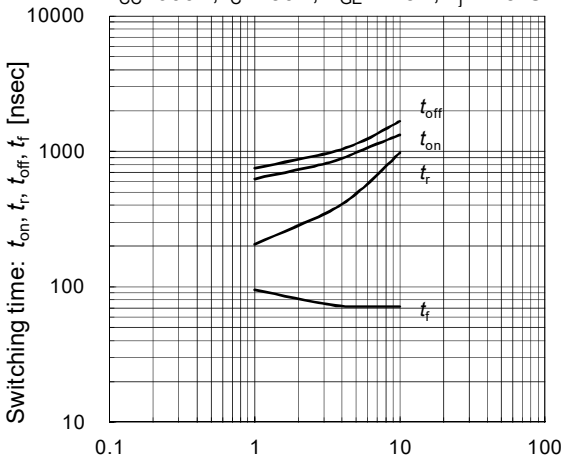
Switching time vs. Collector current (typ.)
V_{CC}=600V, V_{GE}=±15V, R_g=1Ω, T_j=125°C



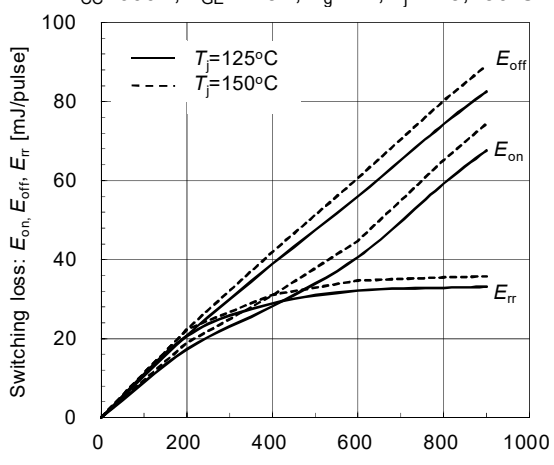
Switching time vs. Collector current (typ.)
V_{CC}=600V, V_{GE}=±15V, R_g=1Ω, T_j=150°C



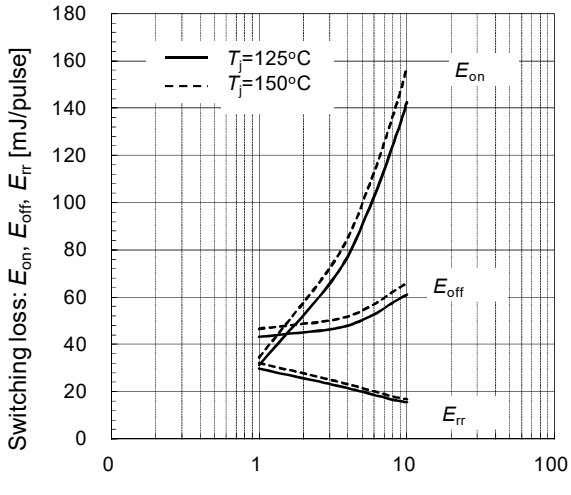
Switching time vs. Gate resistance (typ.)
V_{CC}=600V, I_C=450A, V_{GE}=±15V, T_j=125°C



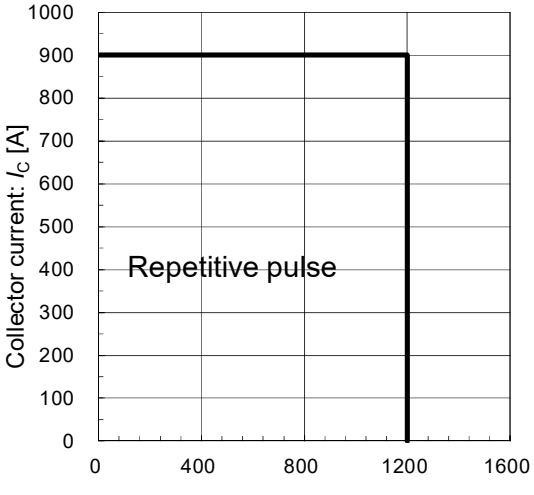
Switching loss vs. Collector current (typ.)
V_{CC}=600V, V_{GE}=±15V, R_g=1Ω, T_j=125,150°C



Switching loss vs. Gate resistance (typ.)
V_{CC}=600V, I_C=450A, V_{GE}=±15V, T_j=125,150°C



Reverse bias safe operating area (max.)
+V_{GE}=15V, -V_{GE}=-15V, R_g=ΩT$_j$=150°C



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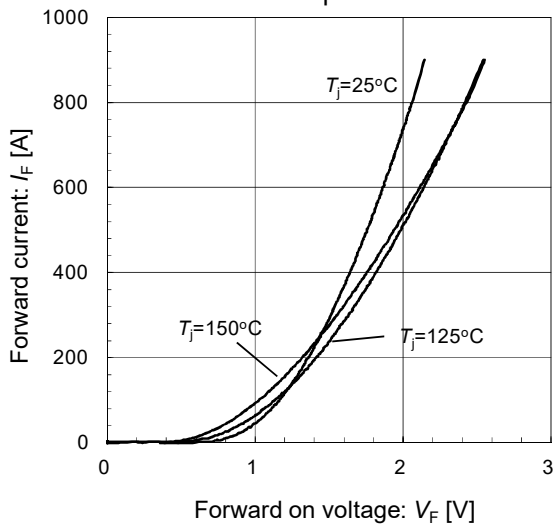
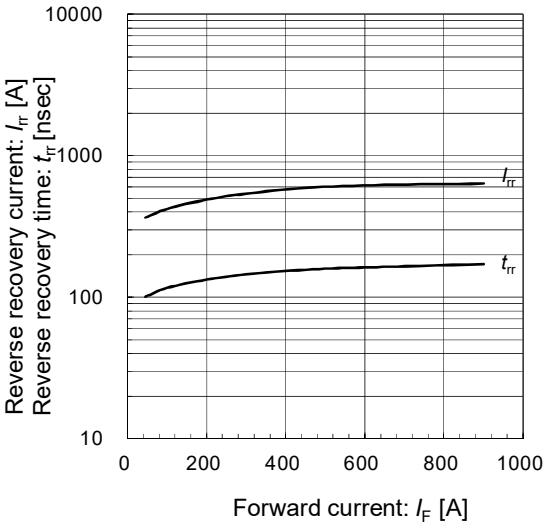
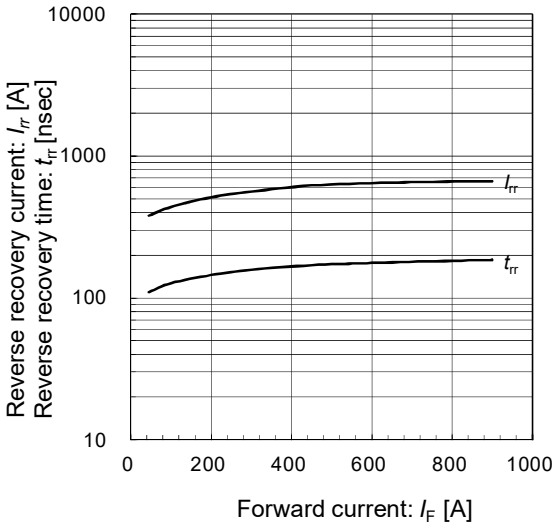
Forward current vs. Forward voltage (typ.)
chip



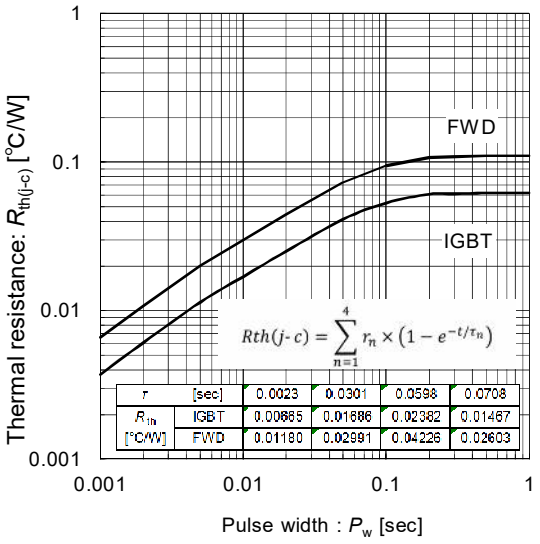
Reverse recovery characteristics (typ.)
V_{CC}=600V, V_{GE}=±15V, R_g=1Ω, T_j=125°C



Reverse recovery characteristics (typ.)
V_{CC}=600V, V_{GE}=±15V, R_g=1Ω, T_j=150°C

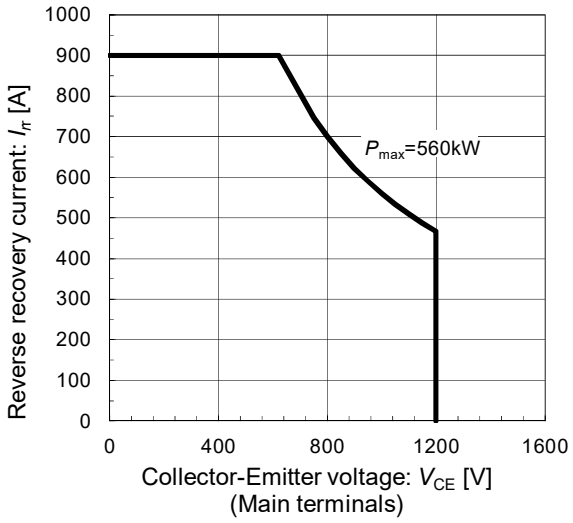


Transient thermal resistance (max.)



τ	[sec]	0.0023	0.0301	0.0598	0.0708
R_{th} [°C/W]	IGBT	0.00865	0.01686	0.02382	0.01467
	FWD	0.01180	0.02991	0.04226	0.02603

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



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