2MBI200HJ-120-50

IGBT Modules

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

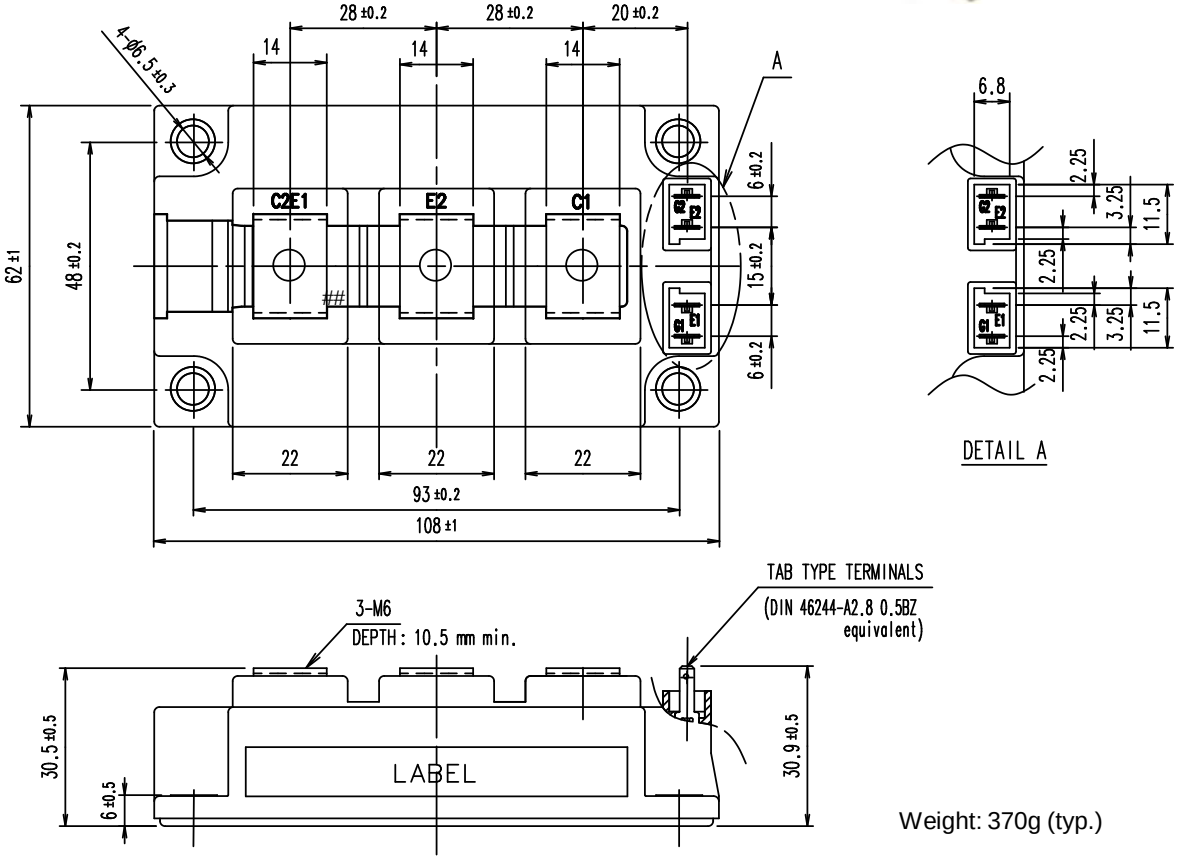
■ Features

High speed switching
Voltage drive
Low Inductance module structure

■ Applications

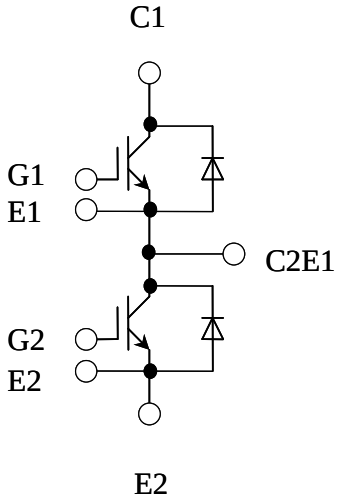
Soft-switching Application
Industrial machines,such as Welding machines

■ Outline drawing (Unit : mm)



Weight: 370g (typ.)

■ Equivalent Circuit



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■ 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	Tc=80°C	200	A
				Tc=25°C	275	
		I_C pulse	1ms		400	
		$-I_C$			400	
		$-I_C$ pulse	1ms		800	
Collector power dissipation		P_C	1 device		1385	W
Junction temperature		T_j			150	°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)

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

Items	Symbols	Conditions		Characteristics min.	Characteristics typ.	Characteristics max.	Units
Zero gate voltage Collector current	I_{CES}	VGE=0V, VCE=1200V		-	-	4.0	mA
Gate-Emitter leakage current	I_{GES}	VCE=0V, VGE=±20V		-	-	800	nA
Gate-Emitter threshold voltage	$V_{GE(th)}$	VCE=20V, Ic=200mA		5.7	6.2	6.7	V
Collector-Emitter saturation voltage	$V_{CE(sat)}$ (terminal)	VGE=15V, Ic=200A	T_j=25°C	-	3.60	3.90	V
			T_j=125°C	-	4.50	-	
	$V_{CE(sat)}$ (chip)	VGE=15V, Ic=200A	T_j=25°C	-	3.20	3.50	
			T_j=125°C	-	4.10	-	
Internal gate resistance	$R_{G(int)}$	-		-	0.8	-	Ω
Input capacitance	C_{ies}	V_{CE}=10V, V_{GE}=0V, f=1MHz		-	15.2	-	nF
Turn-on time	t_{on}	Vcc= 600V I_C= 200A V_{GE}= ±15V R_G= 4.7Ω T_j= 125°C L_s= 30nH		-	250	-	nsec
	t_r			-	180	-	
	$t_{r(i)}$			-	40	-	
Turn-off time	t_{off}			-	300	-	
	tf			-	50	-	
Forward on voltage	V_F (terminal)	VGE=0V, IF=300A	T_j=25°C	-	2.15	2.40	V
			T_j=125°C	-	2.30	-	
	V_F (chip)	VGE=0V, IF=300A	T_j=25°C	-	1.70	1.95	
			T_j=125°C	-	1.85	-	
Reverse recovery time	t_{rr}	IF=200A		-	130	-	nsec

5. Thermal resistance characteristics

Items	Symbols	Conditions	Characteristics min.	Characteristics typ.	Characteristics max.	Units
Thermal resistance (1device)	$R_{th(j-c)}$	IGBT	-	-	0.090	°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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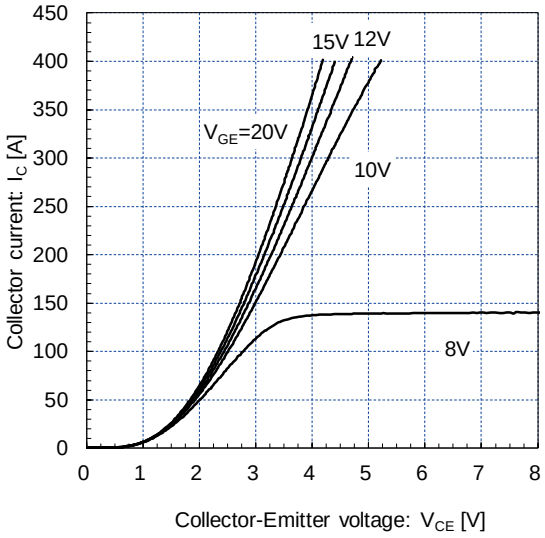
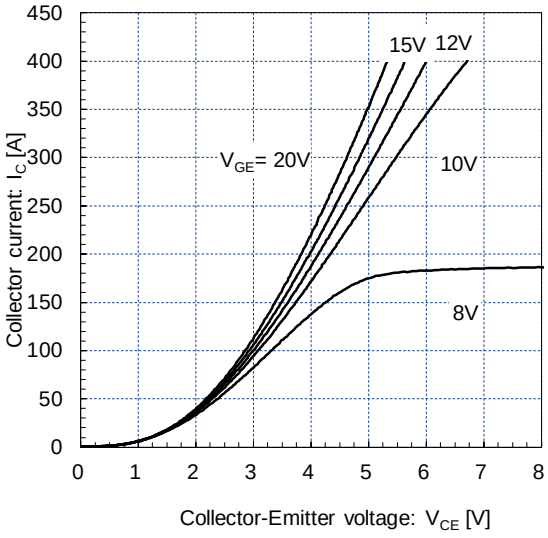
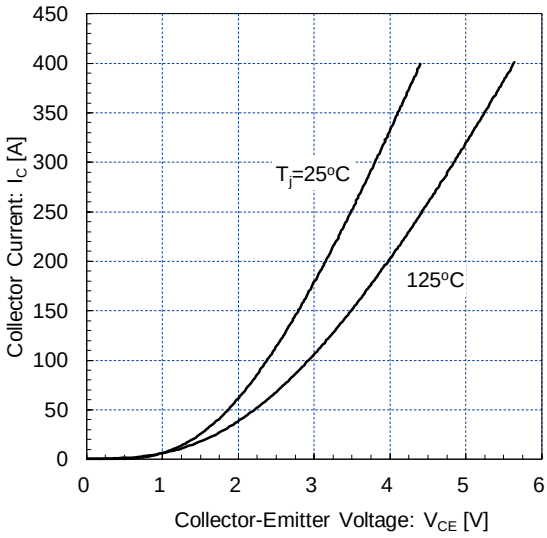
Collector current vs. Collector-Emitter voltage
T_j = 25°C / chip



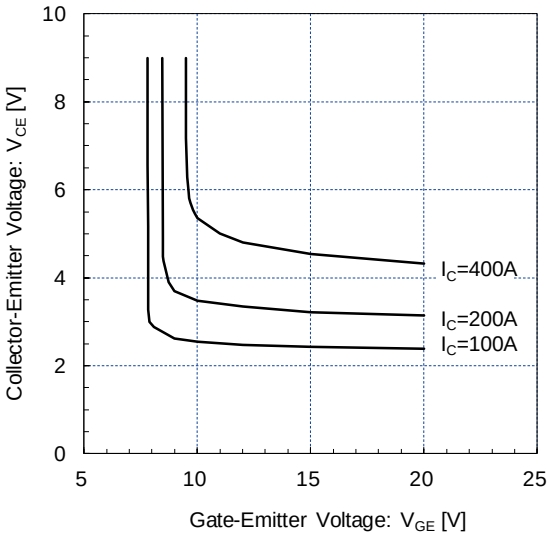
Collector current vs. Collector-Emitter voltage (typ.)
T_j = 125°C / chip



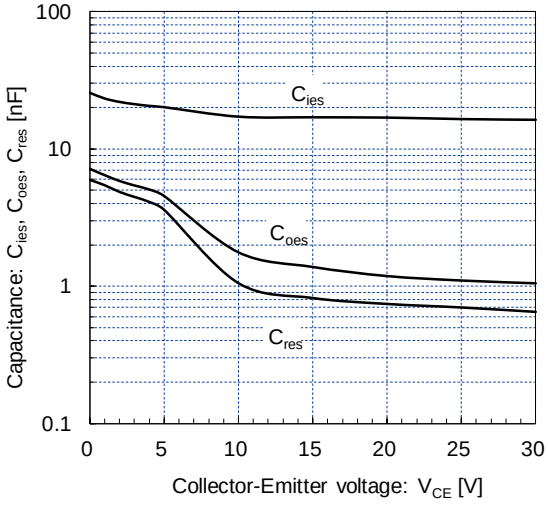
Collector current vs. Collector-Emitter voltage
V_{GE} = 15V / chip



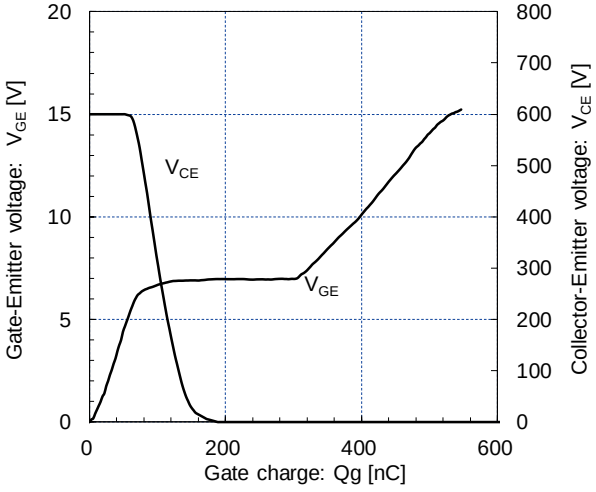
Collector-Emitter voltage vs. Gate-Emitter voltage
T_j = 25°C / chip



Capacitance vs. Collector-Emitter Voltage
V_{GE}= 0V, f= 1MHz, T_j= 25°C



Dynamic Gate Charge (typ.)
Vcc=600V, Ic=200A, Tj= 25°C



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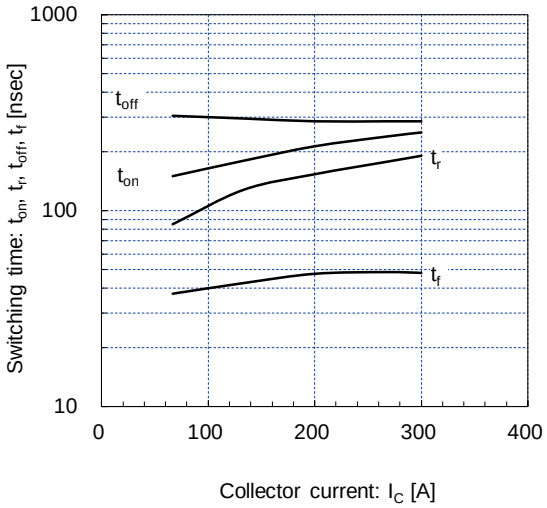
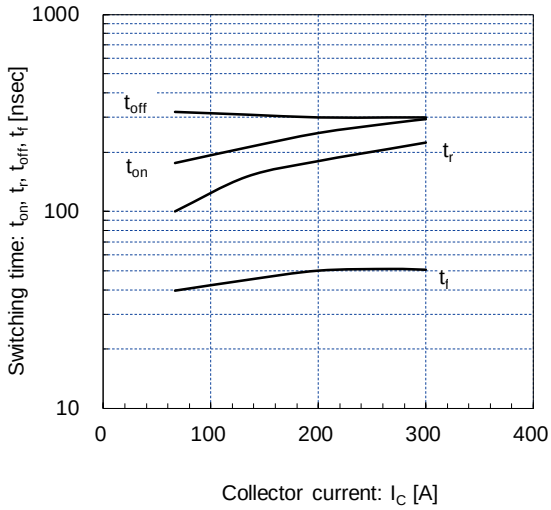
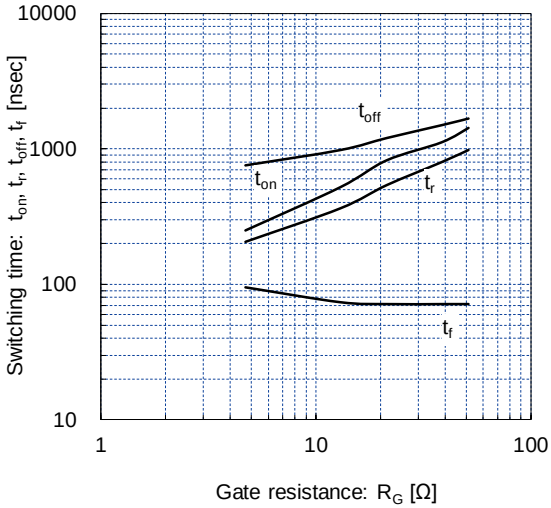
Switching time vs. Collector current (typ.)
Vcc=600V, VGE=±15V, Rg=4.7Ω, Tj=25°C



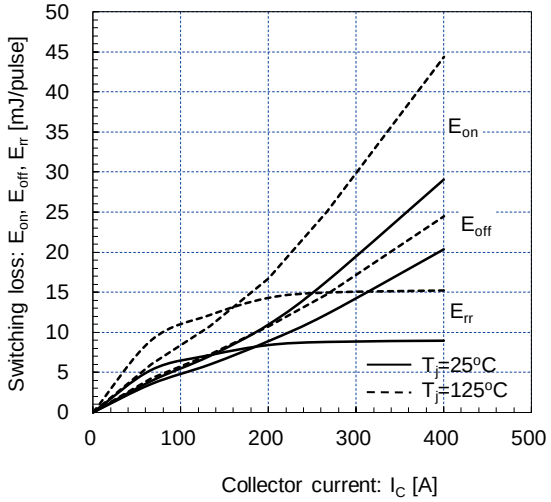
Switching time vs. Collector current (typ.)
Vcc=600V, VGE=±15V, Rg=4.7Ω, Tj=125°C



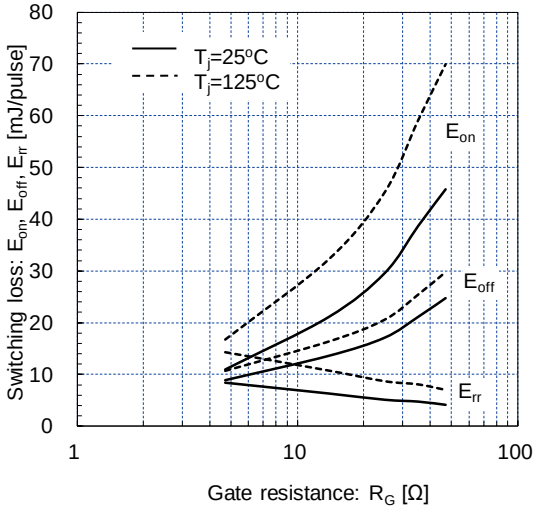
Switching time vs. Gate resistance (typ.)
Vcc=600V, Ic=200A, VGE=±15V, Tj=125°C



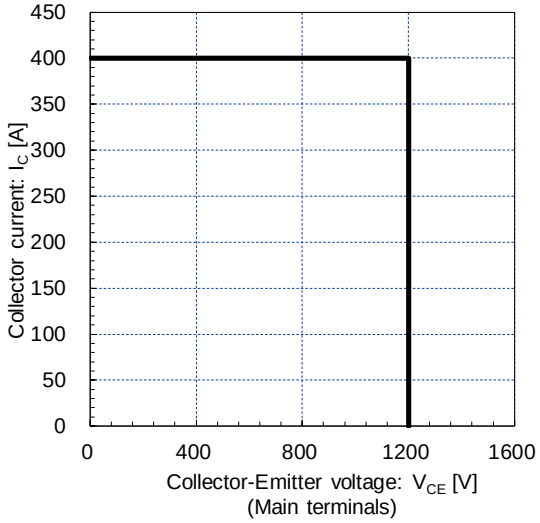
Switching loss vs. Collector current (typ.)
Vcc=600V, VGE=±15V, Rg=4.7Ω, Tj=25, 125°C



Switching loss vs. Gate resistance (typ.)
Vcc=600V, Ic=200A, VGE=±15V, Tj=25, 125°C



Reverse bias safe operating area (max.)
+VGE=15V, -VGE=15V, Rg=4.7Ω, Tj=125°C



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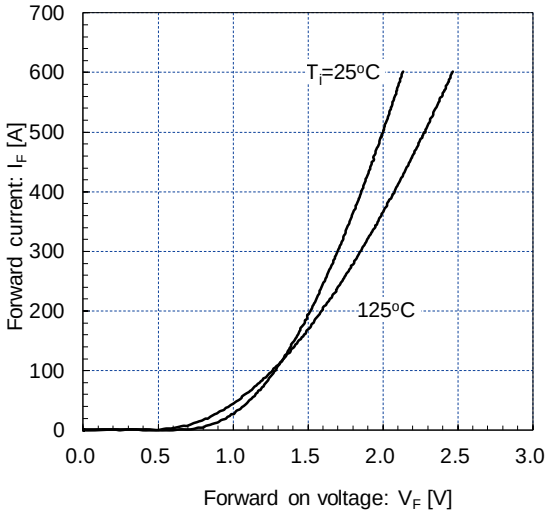
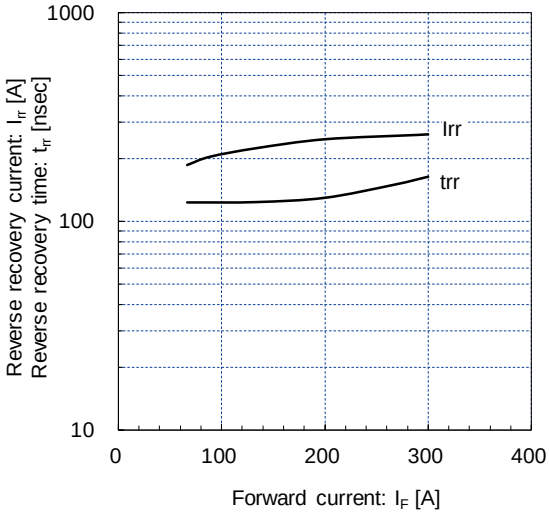
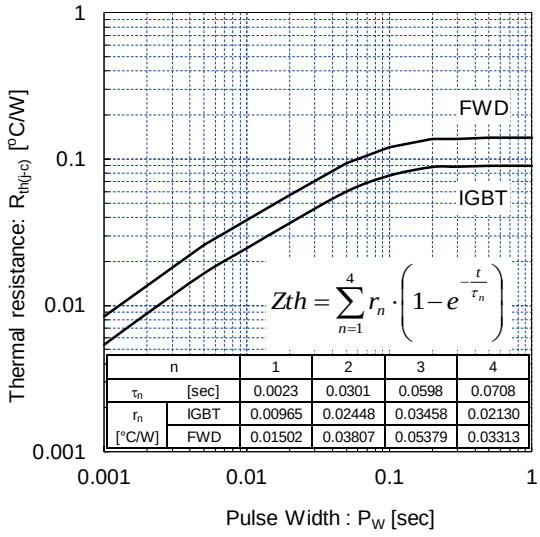
Forward current vs. Forward vltage (typ.)
chip



Reverse recovery characteristics (typ.)
Vcc=600V, VGE=±15V, Rg=4.7Ω, Tj=125°C



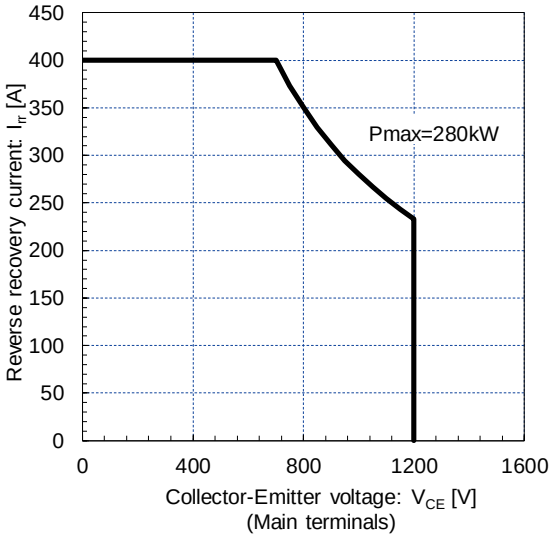
Transient thermal resistance (max.)



$$Zth = \sum_{n=1}^{4} r_n \cdot \left(1 - e^{-\frac{t}{\tau_n}}\right)$$

n		1	2	3	4
τ_n	[sec]	0.0023	0.0301	0.0598	0.0708
r_n [°C/W]	IGBT	0.00965	0.02448	0.03458	0.02130
	FWD	0.01502	0.03807	0.05379	0.03313

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



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