

# 7MBR50VJC120-50

IGBT Modules

**Power Module (V series)**  
**1200V / 50A / PIM**

■ **Features**

- LOW  $V_{CE(sat)}$
- Compact Package
- P.C.Board Mount Module
- Converter Diode Bridge Dynamic Brake Circuit
- RoHS compliant product

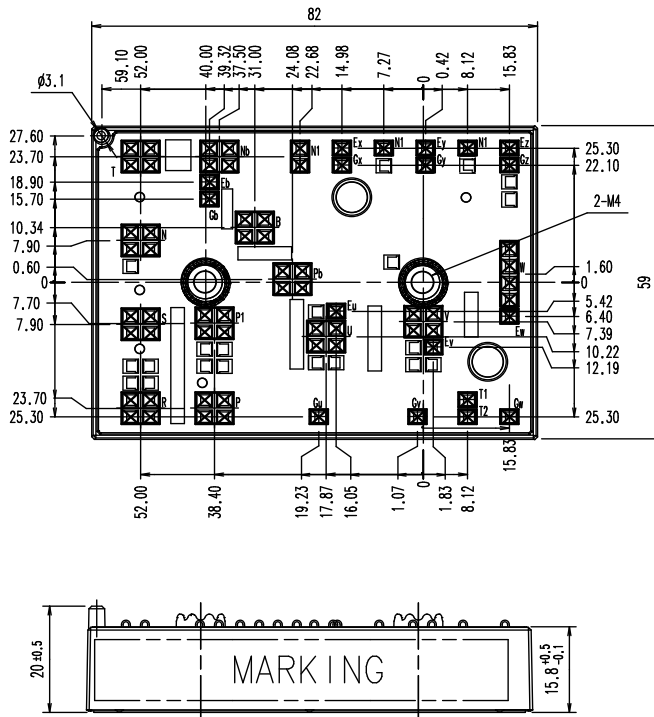
■ **Applications**

- Inverter for Motor Drives
- AC and DC Servo Drive Amplifier
- Uninterruptible Power Supply

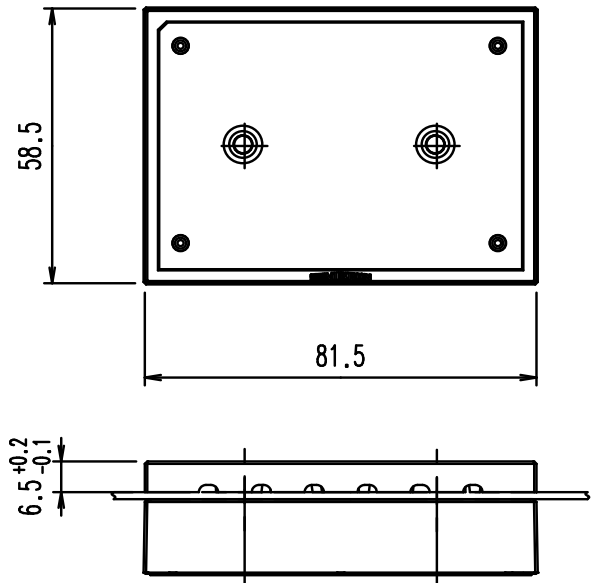
■ **Outline drawing ( Unit : mm )**



単位 / Unit : mm  
 公差 / tolerance : ISO 2768-f

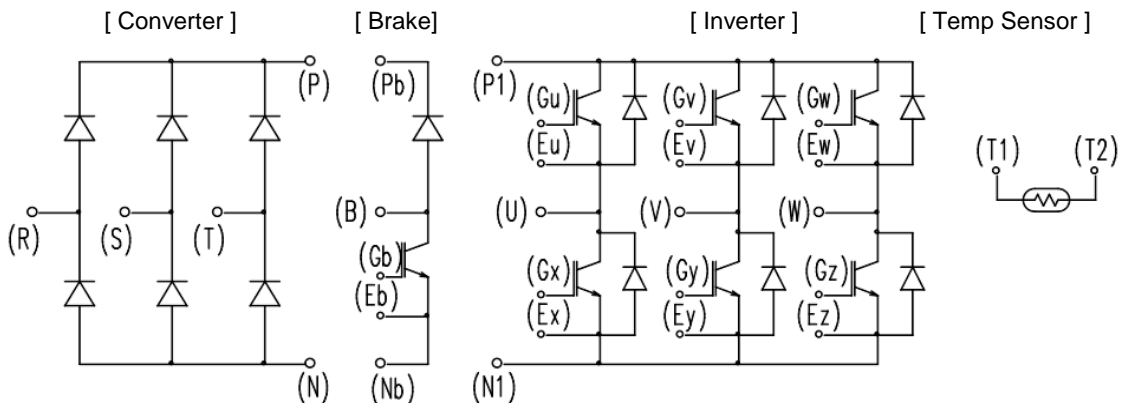


**STANDARD LID USE**



Weight: 95g (typ.)

■ **Equivalent Circuit**



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**■ Absolute Maximum ratings ( at Tc= 25°C unless otherwise specified )**

Items		Symbols	Conditions		Maximum ratings	Units
Inverter	Collector-Emitter voltage	$V_{CES}$			1200	V
	Gate-Emitter voltage	$V_{GES}$			$\pm 20$	V
	Collector current	$I_C$	Continuous	$T_C=100^\circ\text{C}$	50	A
		$I_{CP}$	1ms	$T_C=80^\circ\text{C}$	100	
$-I_C$				50		
	$-I_C$ pulse	1ms			100	
Brake	Collector-Emitter voltage	$V_{CES}$			1200	V
	Gate-Emitter voltage	$V_{GES}$			$\pm 20$	V
	Collector current	$I_C$	Continuous	$T_C=80^\circ\text{C}$	50	A
		$I_{CP}$	1ms	$T_C=80^\circ\text{C}$	100	
	Repetitive peak reverse voltage (Diode)	$V_{RRM}$			1200	V
Converter	Repetitive peak reverse voltage	$V_{RRM}$			1600	V
	Average output current	$I_O$	50Hz/60Hz, sine wave		50	A
	Surge current (Non-Repetitive)	$I_{FSM}$	10ms, $T_J=150^\circ\text{C}$		490	A
	$I^2t$ (Non-Repetitive)	$I^2t$	half sine wave		1200	A <sup>2</sup> s
	Surge current (Non-Repetitive)	$I_{FSM}$	10ms, $T_J=25^\circ\text{C}$		700	A
	$I^2t$ (Non-Repetitive)	$I^2t$	half sine wave		2400	A <sup>2</sup> s
Junction temperature		$T_J$	Inverter, Brake		175	°C
			Converter		150	
Operating junction temperature (under switching conditions)		$T_{Jop}$	Inverter, Brake		150	
			Converter		150	
Case temperature		$T_C$			125	
Storage temperature		$T_{stg}$			-40~+125	
Isolation voltage	between terminal and DCB Backside (*1) between temperature sensor and others (*2)	$V_{iso}$	AC : 1min.		2500	VAC
Screw torque	Mounting (*3)	-	M4		2.5	N m

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

(\*2) Two temp sensor terminals should be connected together, other terminals should be connected together and shorted to DCB Backside during the test.

(\*3) Recommendable value : 2.0-2.5 Nm (M4)

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**IGBT Modules**
**■ Electrical characteristics ( at Tj= 25°C unless otherwise specified)**

Items	Symbols	Conditions	Characteristics			Units		
			min.	typ.	max.			
Inverter	Zero gate voltage collector current	$I_{CES}$	$V_{GE} = 0V$ $V_{CE} = 1200V$	-	-	1.0	mA	
	Gate-Emitter leakage current	$I_{GES}$	$V_{CE} = 0V$ $V_{GE} = \pm 20V$	-	-	200	nA	
	Gate-Emitter threshold voltage	$V_{GE(th)}$	$V_{CE} = 20V$ $I_C = 50mA$	6.0	6.5	7.0	V	
	Collector-Emitter saturation voltage	$V_{CE(sat)}$ (terminal)	$V_{GE} = 15V$ $I_C = 50A$	$T_j = 25^\circ C$	-	2.10	2.55	V
				$T_j = 125^\circ C$	-	2.45	-	
				$T_j = 150^\circ C$	-	2.50	-	
		$V_{CE(sat)}$ (chip)	$V_{GE} = 15V$ $I_C = 50A$	$T_j = 25^\circ C$	-	1.85	2.30	
				$T_j = 125^\circ C$	-	2.20	-	
				$T_j = 150^\circ C$	-	2.25	-	
	Collector power disipation	$P_c$	1 device	-	210	-	W	
	Internal gate resistance	$R_{g(int)}$	-	-	4	-	$\Omega$	
	Input capacitance	$C_{ies}$	$V_{CE} = 10V, V_{GE} = 0V, f = 1MHz$	-	4.1	-	nF	
	Turn-on time	$t_{on}$	$V_{CC} = 600V$ $I_C = 50A$	-	0.42	1.20	$\mu s$	
		$t_r$		-	0.11	0.60		
		$t_r(i)$		$V_{GE} = \pm 15V$	-	0.04		-
Turn-off time	$t_{off}$	$R_G = 15 \Omega$	-	0.44	1.00	$\mu s$		
	$t_f$		-	0.06	0.30			
Forward on voltage	$V_F$ (terminal)	$I_F = 50A$	$T_j = 25^\circ C$	-	2.15	2.60	V	
			$T_j = 125^\circ C$	-	2.40	-		
			$T_j = 150^\circ C$	-	2.35	-		
	$V_F$ (chip)	$I_F = 50A$	$T_j = 25^\circ C$	-	1.90	2.35		
			$T_j = 125^\circ C$	-	2.15	-		
		$T_j = 150^\circ C$	-	2.10	-			
Reverse recovery time	$t_{rr}$	$I_F = 50A$	-	-	0.35	$\mu s$		
Brake	Zero gate voltage collector current	$I_{CES}$	$V_{GE} = 0V$ $V_{CE} = 1200V$	-	-	1.0	mA	
	Gate-Emitter leakage current	$I_{GES}$	$V_{CE} = 0V$ $V_{GE} = \pm 20V$	-	-	200	nA	
	Collector-Emitter saturation voltage	$V_{CE(sat)}$ (terminal)	$V_{GE} = 15V$ $I_C = 50A$	$T_j = 25^\circ C$	-	2.10	2.55	V
				$T_j = 125^\circ C$	-	2.45	-	
				$T_j = 150^\circ C$	-	2.50	-	
		$V_{CE(sat)}$ (chip)	$V_{GE} = 15V$ $I_C = 50A$	$T_j = 25^\circ C$	-	1.85	2.30	
				$T_j = 125^\circ C$	-	2.20	-	
				$T_j = 150^\circ C$	-	2.25	-	
	Collector power disipation	$P_c$	1 device	-	210	-	W	
	Internal gate resistance	$R_{g(int)}$	-	-	4	-	$\Omega$	
	Turn-on time	$t_{on}$	$V_{CE} = 600V$ $I_C = 50A$	-	0.42	1.20	$\mu s$	
		$t_r$		-	0.11	0.60		
	Turn-off time	$t_{off}$	$V_{GE} = \pm 15V$ $R_G = 15 \Omega$	-	0.44	1.00	$\mu s$	
		$t_f$		-	0.06	0.30		
	Reverse current	$I_{RRM}$	$V_R = 1200V$	-	-	1.0	mA	
Forward on voltage	$V_{FM}$	$I_F = 50A$	terminal	-	1.35	-	V	
			chip	-	1.10	-		
Reverse current	$I_{RRM}$	$V_R = 1600V$	-	-	1.0	mA		
Temperature Sensor	R	$T = 25^\circ C$	$I_m = 1mA$	-	1000	-	$\Omega$	
		$T = 100^\circ C$	$I_m = 1mA$	-	1670	-		

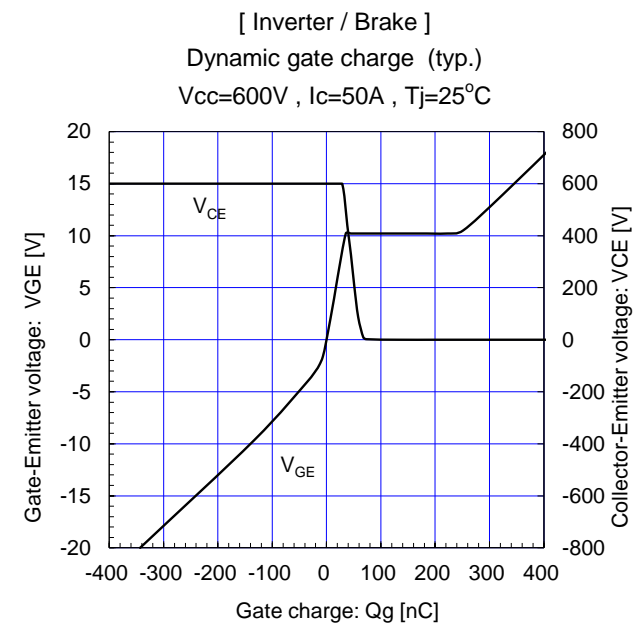
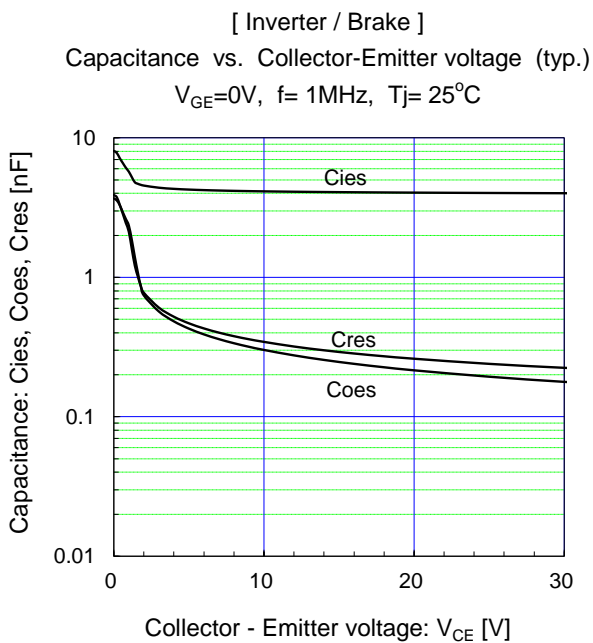
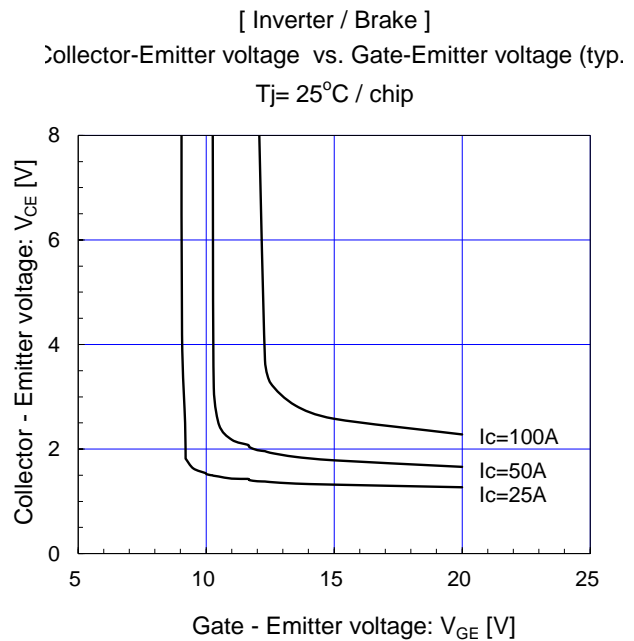
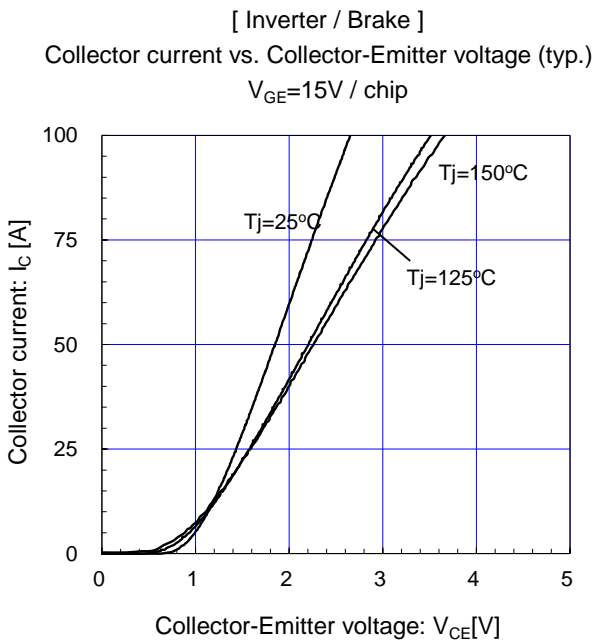
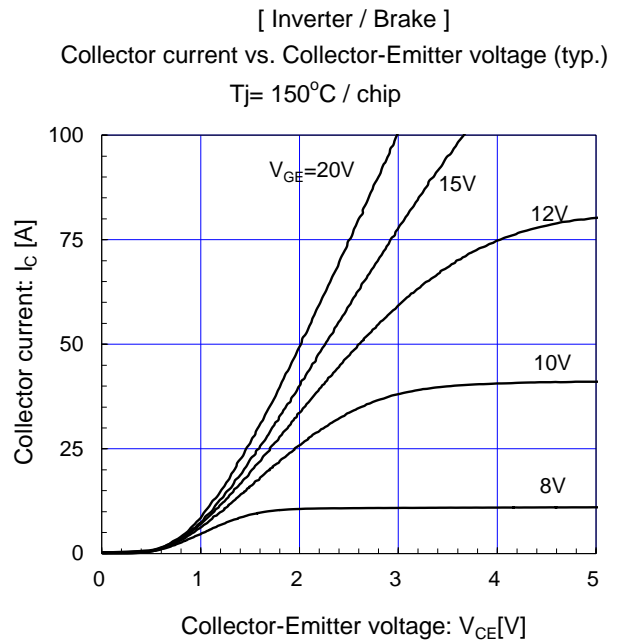
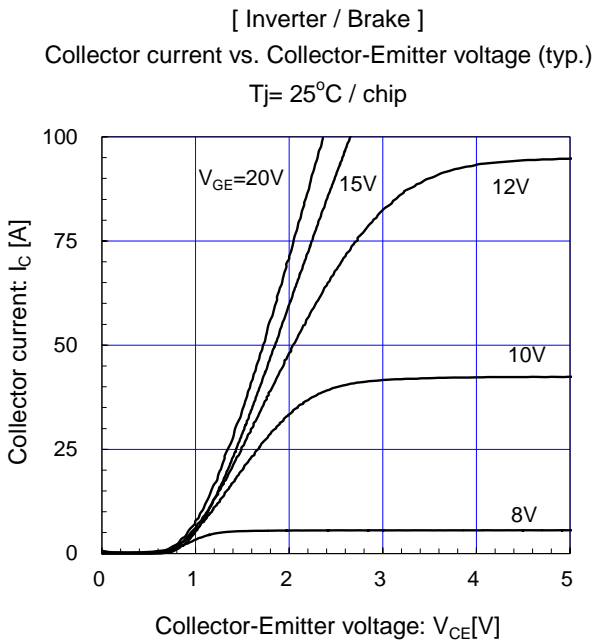
**■ Thermal resistance characteristics**

Items	Symbols	Conditions	Characteristics			Units
			min.	typ.	max.	
Thermal resistance(1device)	$R_{th(j-c)}$	Inverter / Brake IGBT	-	0.71	-	$^\circ C/W$
		Inverter FWD	-	0.95	-	
		Converter Diode	-	0.90	-	
Contact thermal resistance (1device) (*4)	$R_{th(c-f)}$	with Thermal Compound	-	0.05	-	

(\*4) This is the value which is defined mounting on the additional cooling fin with thermal compound.

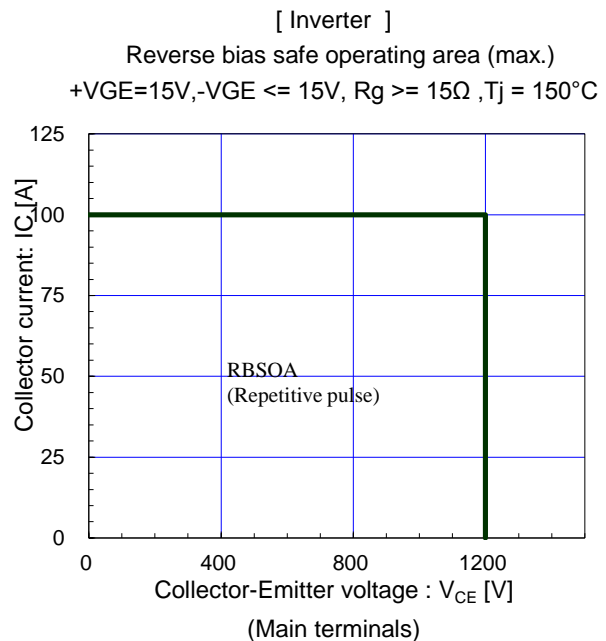
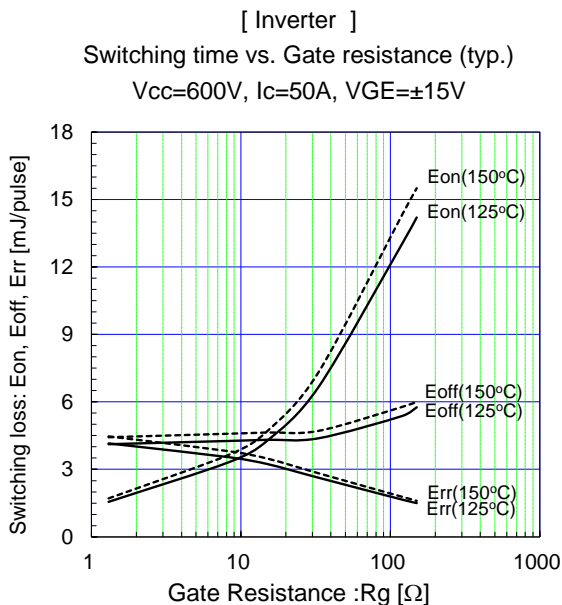
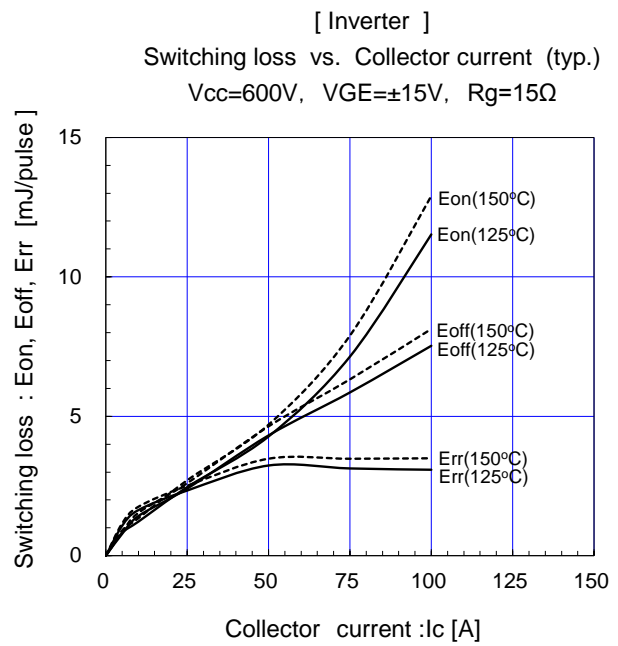
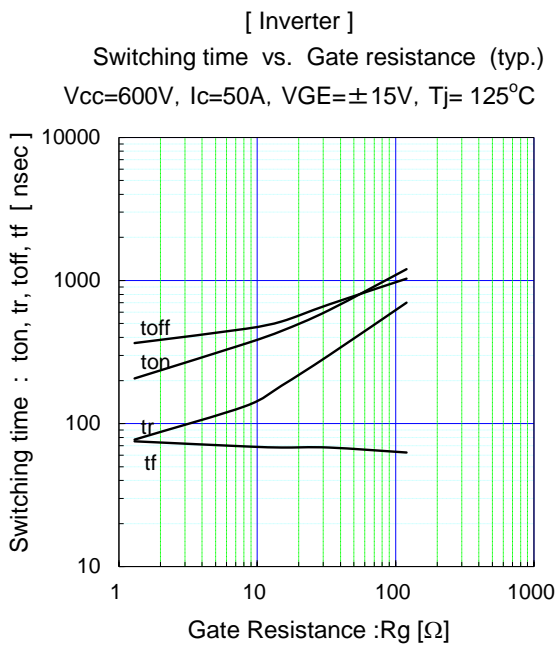
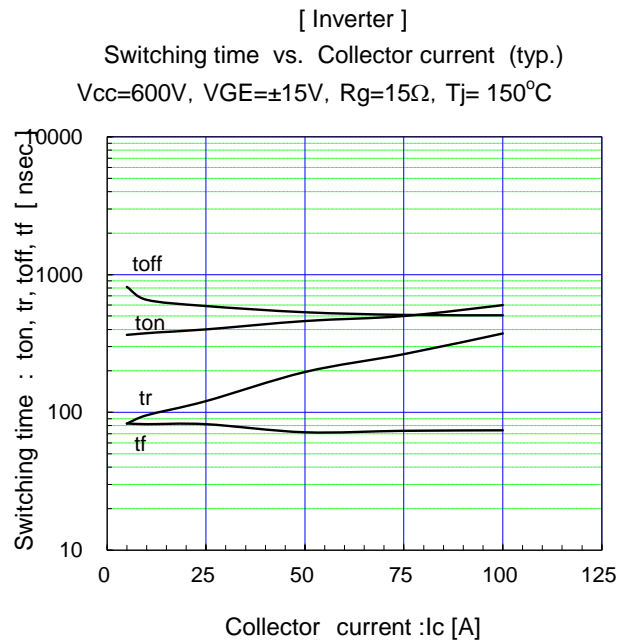
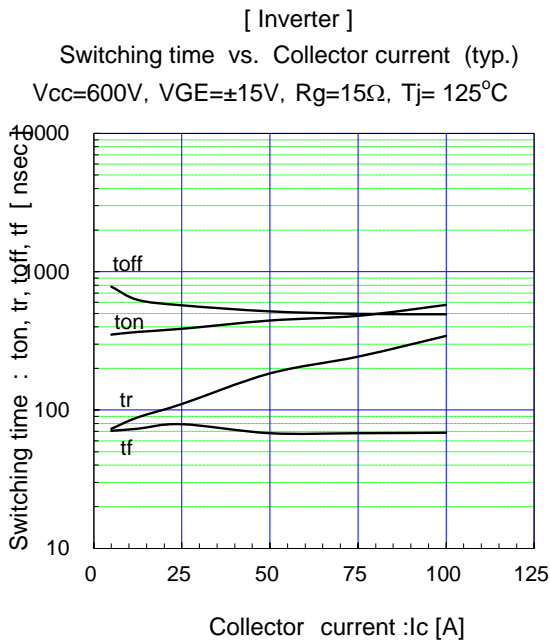
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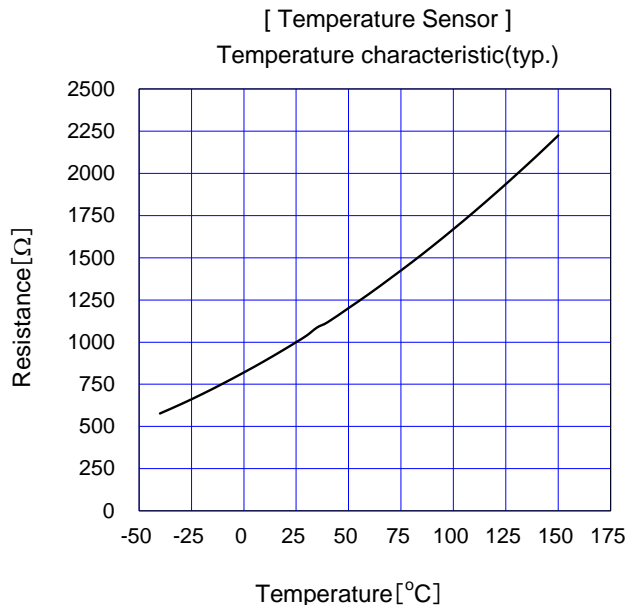
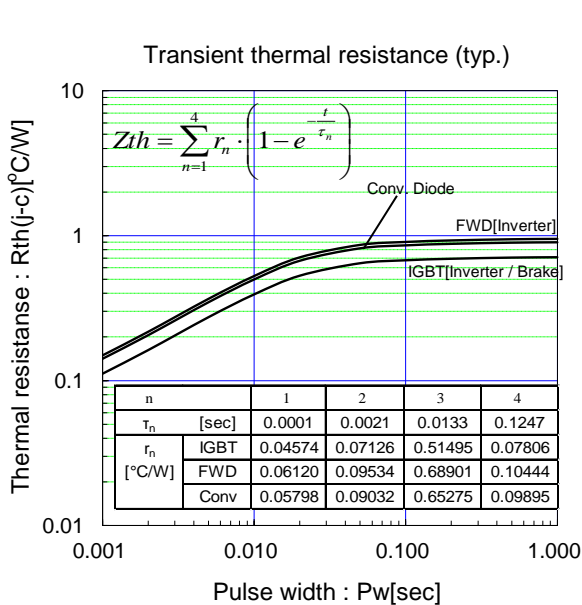
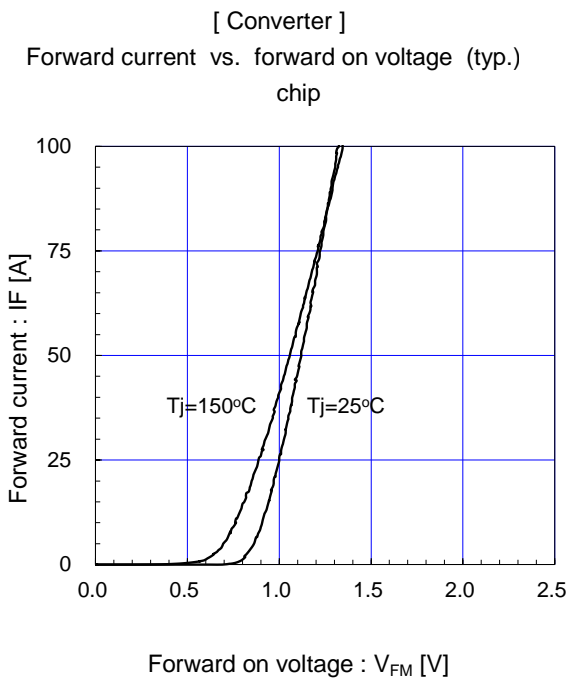
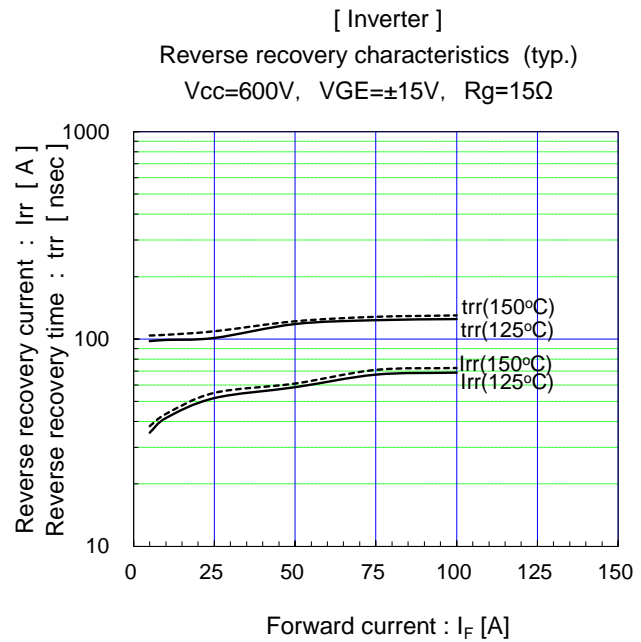
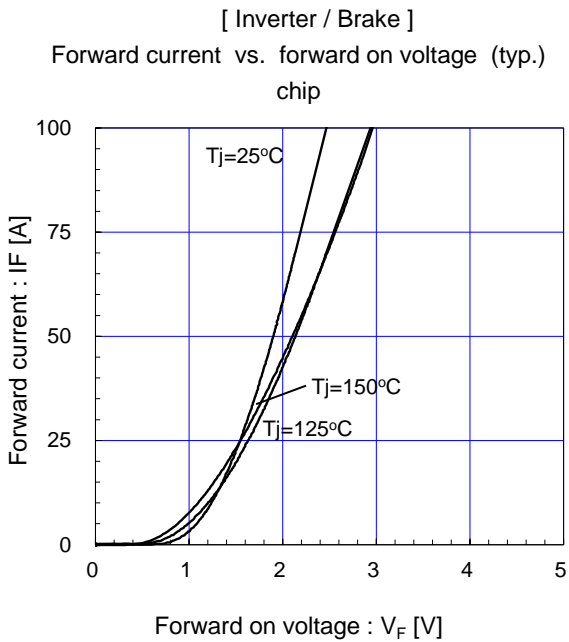
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5 マウンティングインストラクション	<a href="http://www.fujielectric.co.jp/products/semiconductor/model/igbt/mounting/">www.fujielectric.co.jp/products/semiconductor/model/igbt/mounting/</a>
6 IGBT 損失シミュレーションソフト	<a href="http://www.fujielectric.co.jp/products/semiconductor/model/igbt/simulation/">www.fujielectric.co.jp/products/semiconductor/model/igbt/simulation/</a>
7 AT-NPC 3-Level 損失シミュレーションソフト	<a href="http://www.fujielectric.co.jp/products/semiconductor/model/igbt/simulation_3level/">www.fujielectric.co.jp/products/semiconductor/model/igbt/simulation_3level/</a>
8 富士電機技報	<a href="http://www.fujielectric.co.jp/products/semiconductor/journal/">www.fujielectric.co.jp/products/semiconductor/journal/</a>
9 製品のお問い合わせ	<a href="http://www.fujielectric.co.jp/products/semiconductor/contact/">www.fujielectric.co.jp/products/semiconductor/contact/</a>
10 改廃のお知らせ	<a href="http://www.fujielectric.co.jp/products/semiconductor/discontinued/">www.fujielectric.co.jp/products/semiconductor/discontinued/</a>

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1 Semiconductors General Catalog	<a href="http://www.fujielectric.com/products/semiconductor/catalog/">www.fujielectric.com/products/semiconductor/catalog/</a>
2 Product Information	<a href="http://www.fujielectric.com/products/semiconductor/model/">www.fujielectric.com/products/semiconductor/model/</a>
3 Application Manuals	<a href="http://www.fujielectric.com/products/semiconductor/model/igbt/application/">www.fujielectric.com/products/semiconductor/model/igbt/application/</a>
4 Technical Documents	<a href="http://www.fujielectric.com/products/semiconductor/model/igbt/technical/">www.fujielectric.com/products/semiconductor/model/igbt/technical/</a>
5 Mounting Instructions	<a href="http://www.fujielectric.com/products/semiconductor/model/igbt/mounting/">www.fujielectric.com/products/semiconductor/model/igbt/mounting/</a>
6 IGBT Loss Simulation Software	<a href="http://www.fujielectric.com/products/semiconductor/model/igbt/simulation/">www.fujielectric.com/products/semiconductor/model/igbt/simulation/</a>
7 AT-NPC 3-Level Loss Simulation Software	<a href="http://www.fujielectric.com/products/semiconductor/model/igbt/simulation_3level/">www.fujielectric.com/products/semiconductor/model/igbt/simulation_3level/</a>
8 Fuji Electric Journal	<a href="http://www.fujielectric.com/products/semiconductor/journal/">www.fujielectric.com/products/semiconductor/journal/</a>
9 Contact	<a href="http://www.fujielectric.com/products/semiconductor/contact/">www.fujielectric.com/products/semiconductor/contact/</a>
10 Revised and discontinued product information	<a href="http://www.fujielectric.com/products/semiconductor/discontinued/">www.fujielectric.com/products/semiconductor/discontinued/</a>

### 中国

1 半导体综合目录	<a href="http://www.fujielectric.com.cn/products/semiconductor/catalog/">www.fujielectric.com.cn/products/semiconductor/catalog/</a>
2 产品信息	<a href="http://www.fujielectric.com.cn/products/semiconductor/model/">www.fujielectric.com.cn/products/semiconductor/model/</a>
3 应用手册	<a href="http://www.fujielectric.com.cn/products/semiconductor/model/igbt/application/">www.fujielectric.com.cn/products/semiconductor/model/igbt/application/</a>
4 技术资料	<a href="http://www.fujielectric.com.cn/products/semiconductor/model/igbt/technical/">www.fujielectric.com.cn/products/semiconductor/model/igbt/technical/</a>
5 安装说明书	<a href="http://www.fujielectric.com.cn/products/semiconductor/model/igbt/mounting/">www.fujielectric.com.cn/products/semiconductor/model/igbt/mounting/</a>
6 IGBT 损耗模拟软件	<a href="http://www.fujielectric.com.cn/products/semiconductor/model/igbt/simulation/">www.fujielectric.com.cn/products/semiconductor/model/igbt/simulation/</a>
7 AT-NPC 3-Level 损耗模拟软件	<a href="http://www.fujielectric.com.cn/products/semiconductor/model/igbt/simulation_3level/">www.fujielectric.com.cn/products/semiconductor/model/igbt/simulation_3level/</a>
8 富士电机技报	<a href="http://www.fujielectric.com.cn/products/semiconductor/journal/">www.fujielectric.com.cn/products/semiconductor/journal/</a>
9 产品咨询	<a href="http://www.fujielectric.com.cn/products/semiconductor/contact/">www.fujielectric.com.cn/products/semiconductor/contact/</a>
10 产品更改和停产信息	<a href="http://www.fujielectric.com.cn/products/semiconductor/discontinued/">www.fujielectric.com.cn/products/semiconductor/discontinued/</a>