

7MBR50VJC120-50

IGBT Modules

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

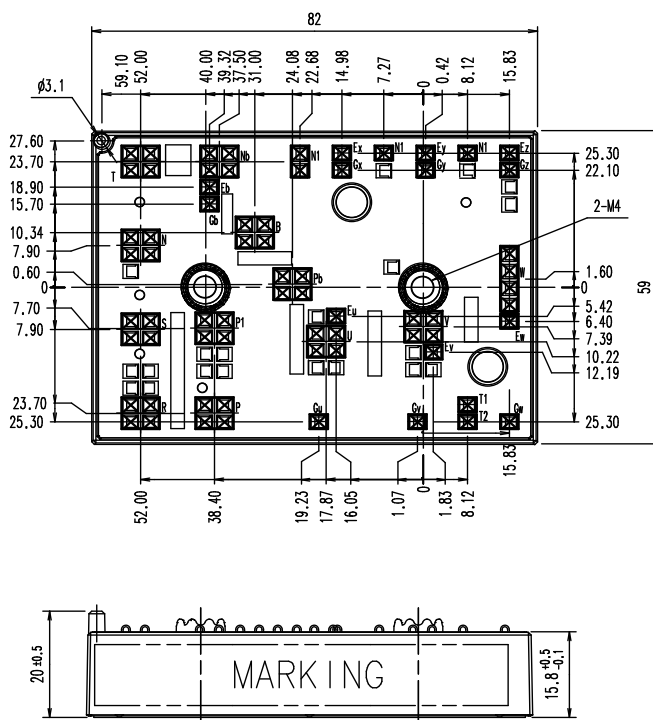
■ Features

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

■ Applications

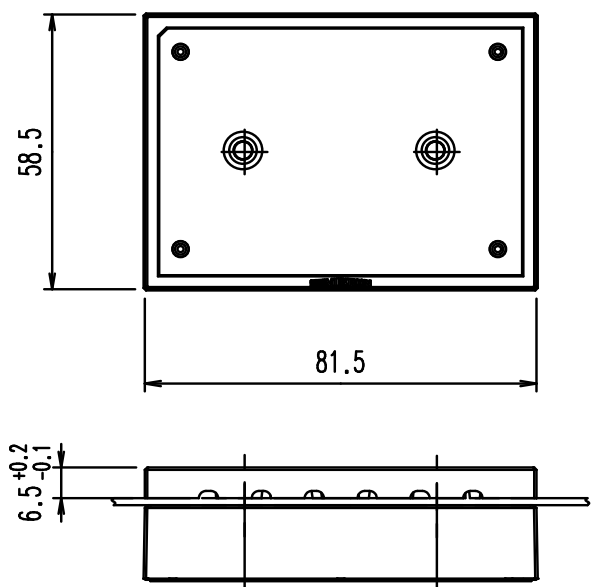
Inverter for Motor Drives
AC and DC Servo Drive Amplifier
Uninterruptible Power Supply

■ Outline drawing (Unit : mm)



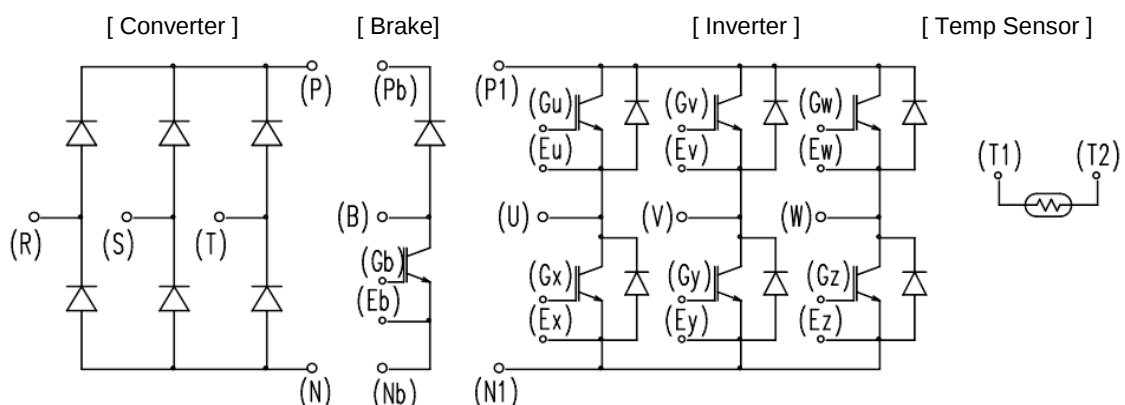
単位 / Unit : mm
公差 / tolerance : ISO 2768-f

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}			± 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}			± 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^2s
	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^2s
	Junction temperature	T_J	Inverter, Brake		175	$^{\circ}\text{C}$
			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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■ 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} = ±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	Tj= 25°C	-	2.10	2.55	V
			I _C = 50A	Tj=125°C	-	2.45	-	
				Tj=150°C	-	2.50	-	
		V _{CE(sat)} (chip)	V _{GE} = 15V	Tj= 25°C	-	1.85	2.30	
			I _C = 50A	Tj=125°C	-	2.20	-	
			Tj=150°C	-	2.25	-		
	Collector power disipation	P _c	1 device		-	210	-	W
	Internal gate resistance	R _{g(int)}	-		-	4	-	Ω
	Input capacitance	C _{ies}	V _{CE} =10V,V _{GE} =0V,f=1MHz		-	4.1	-	nF
	Turn-on time	ton	V _{CC} = 600V		-	0.42	1.20	μs
		tr	I _C = 50A		-	0.11	0.60	
		tr (i)	V _{GE} = ±15V		-	0.04	-	
	Turn-off time	toff	R _G = 15 Ω		-	0.44	1.00	μs
		tf			-	0.06	0.30	
Forward on voltage	V _F (terminal)	I _F = 50A	Tj= 25°C	-	2.15	2.60	V	
			Tj=125°C	-	2.40	-		
			Tj=150°C	-	2.35	-		
	V _F (chip)	I _F = 50A	Tj= 25°C	-	1.90	2.35		
			Tj=125°C	-	2.15	-		
		Tj=150°C	-	2.10	-			
Reverse recovery time	trr	I _F = 50A		-	-	0.35	μs	
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} = ±20V		-	-	200	nA
	Collector-Emitter saturation voltage	V _{CE(sat)} (terminal)	V _{GE} = 15V	Tj= 25°C	-	2.10	2.55	V
			I _C = 50A	Tj=125°C	-	2.45	-	
				Tj=150°C	-	2.50	-	
		V _{CE(sat)} (chip)	V _{GE} = 15V	Tj= 25°C	-	1.85	2.30	
			I _C = 50A	Tj=125°C	-	2.20	-	
			Tj=150°C	-	2.25	-		
	Collector power disipation	P _c	1 device		-	210	-	W
	Internal gate resistance	R _{g(int)}	-		-	4	-	Ω
	Turn-on time	ton	V _{CE} = 600V		-	0.42	1.20	μs
		tr	I _C = 50A		-	0.11	0.60	
	Turn-off time	toff	V _{GE} = ±15V		-	0.44	1.00	μs
		tf	R _G = 15 Ω		-	0.06	0.30	
Converter	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	-	
Temperature Sensor	Reverse current	I _{RRM}	V _R = 1600V		-	-	1.0	mA
					-	-	-	Ω
Temperature Sensor	R	T = 25°C Im=1mA		-	1000	-	Ω	
		T = 100°C Im=1mA		-	1670	-		

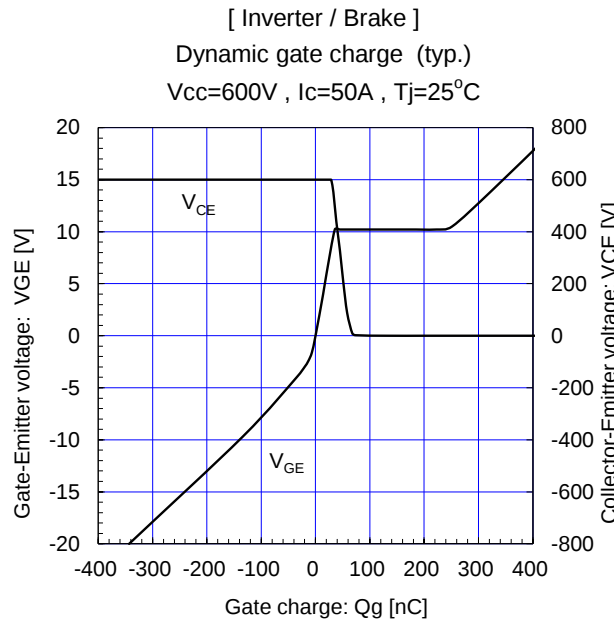
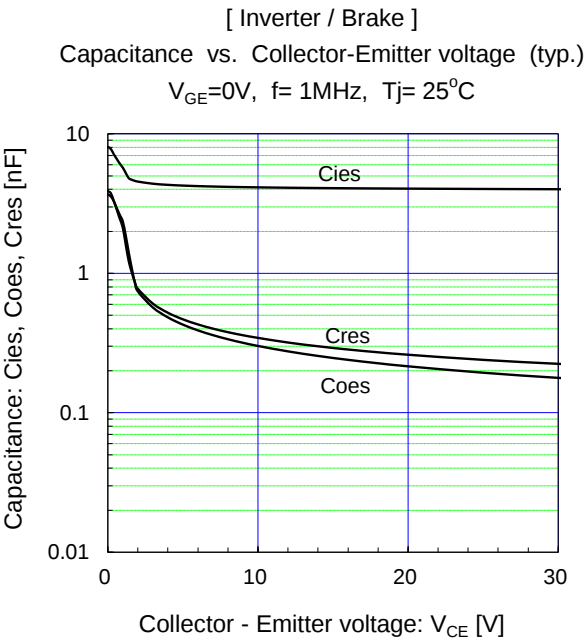
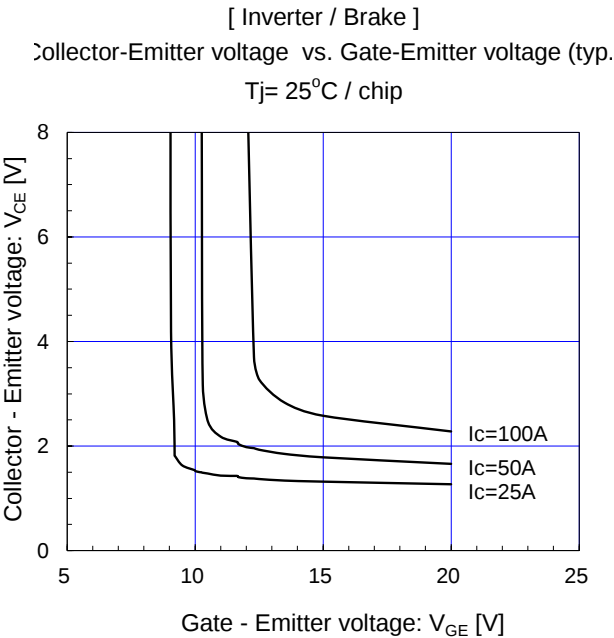
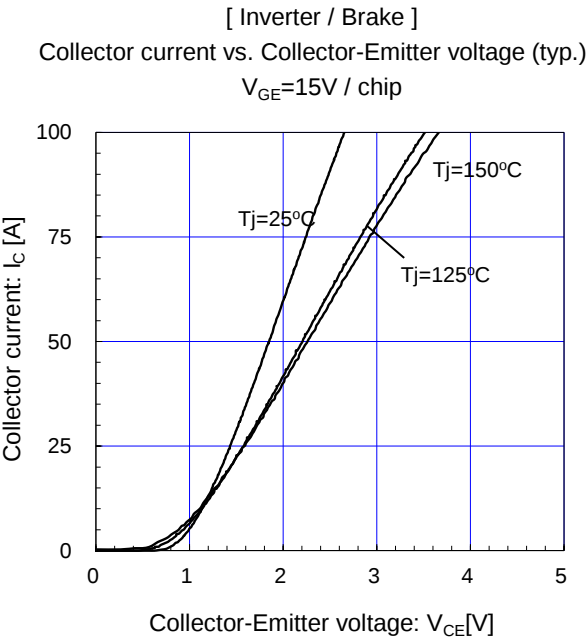
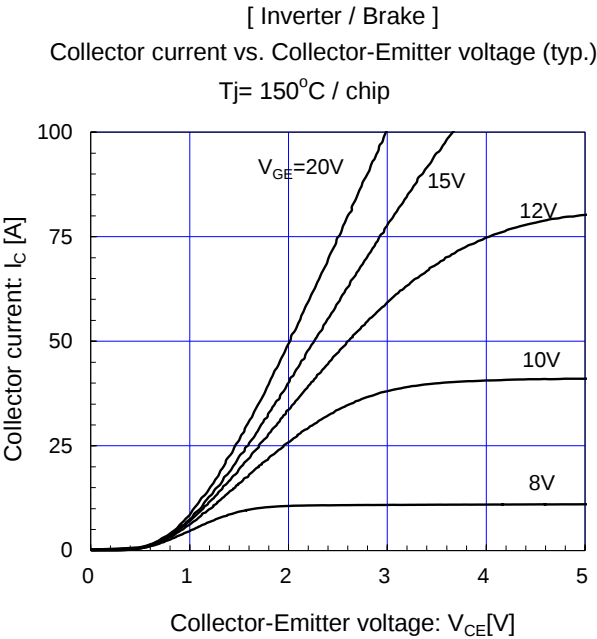
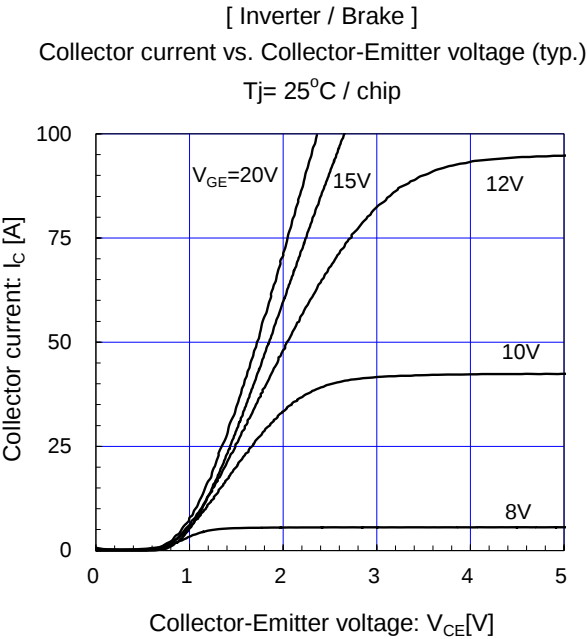
■ Thermal resistance characteristics

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

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

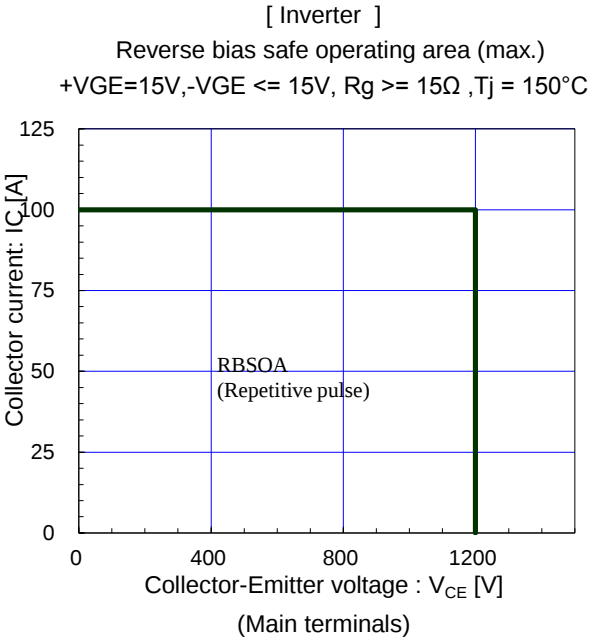
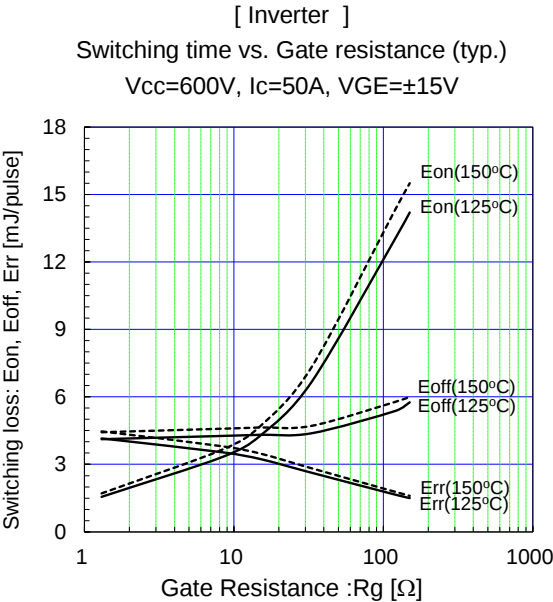
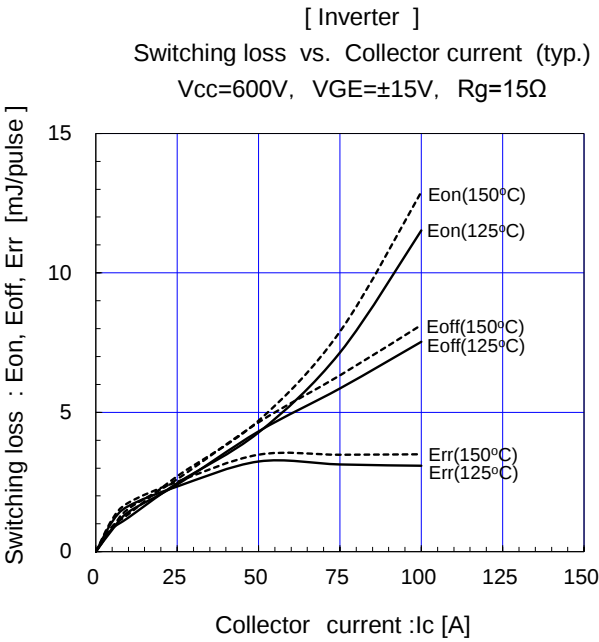
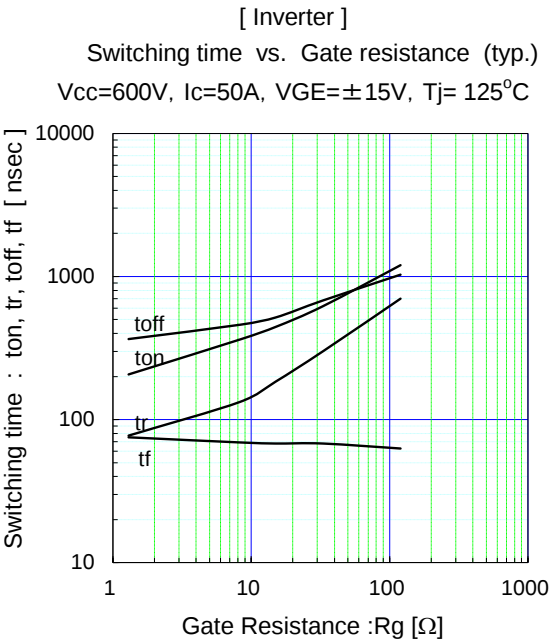
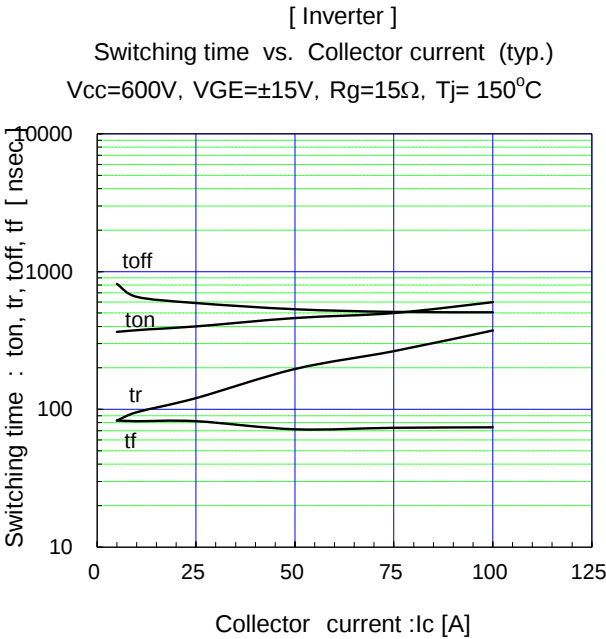
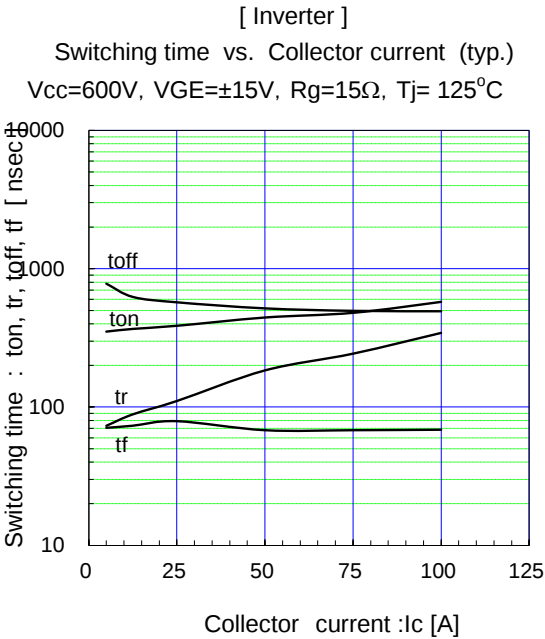
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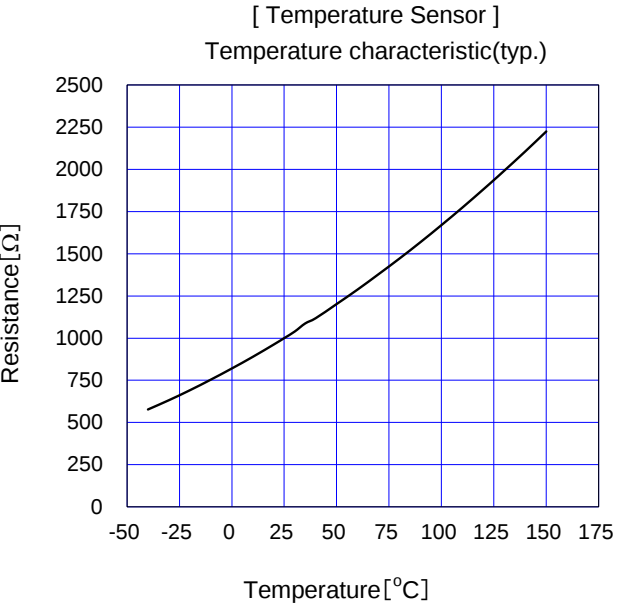
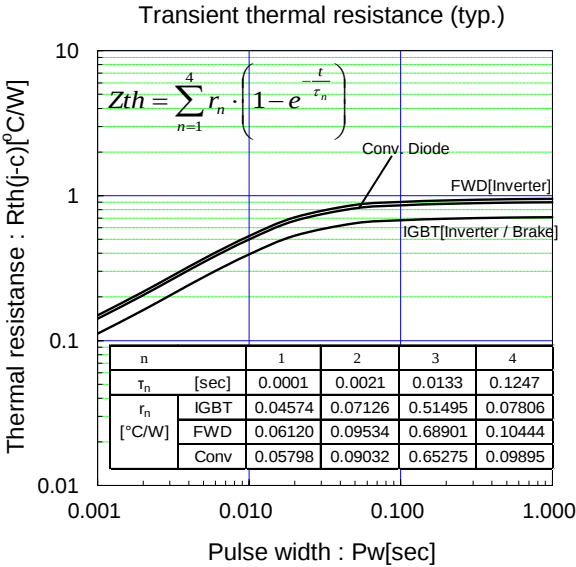
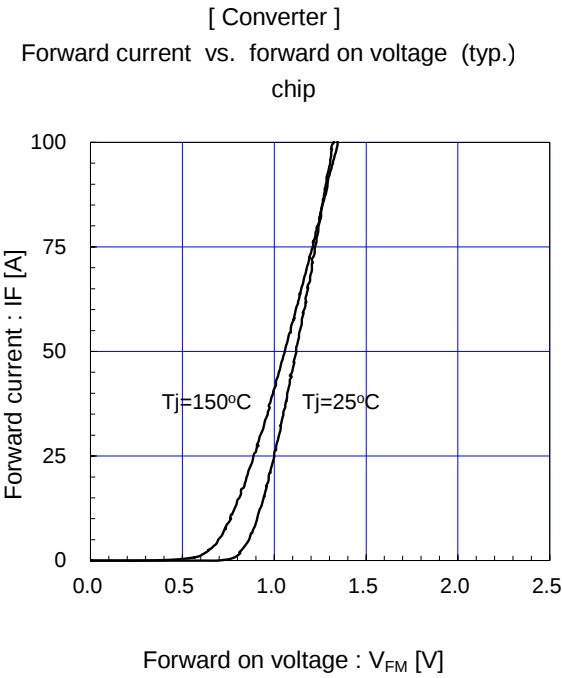
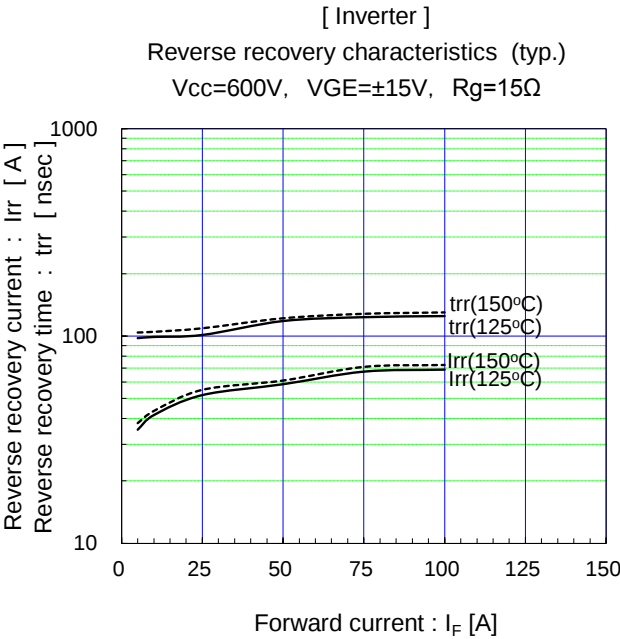
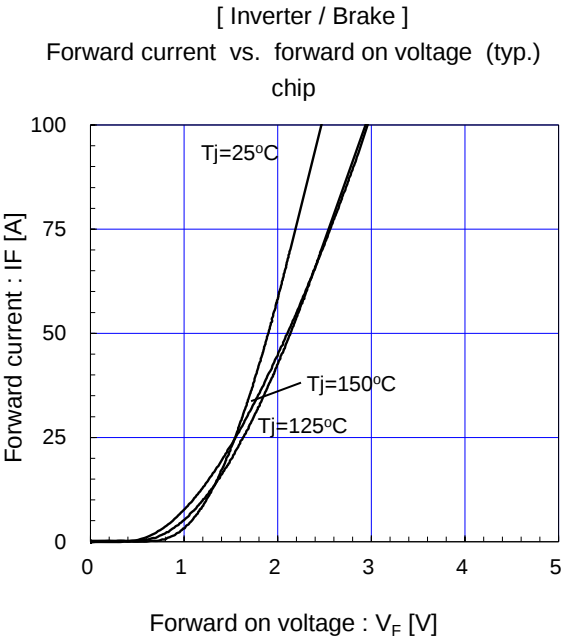
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