

7MBR50VJC120-53

IGBT Modules

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

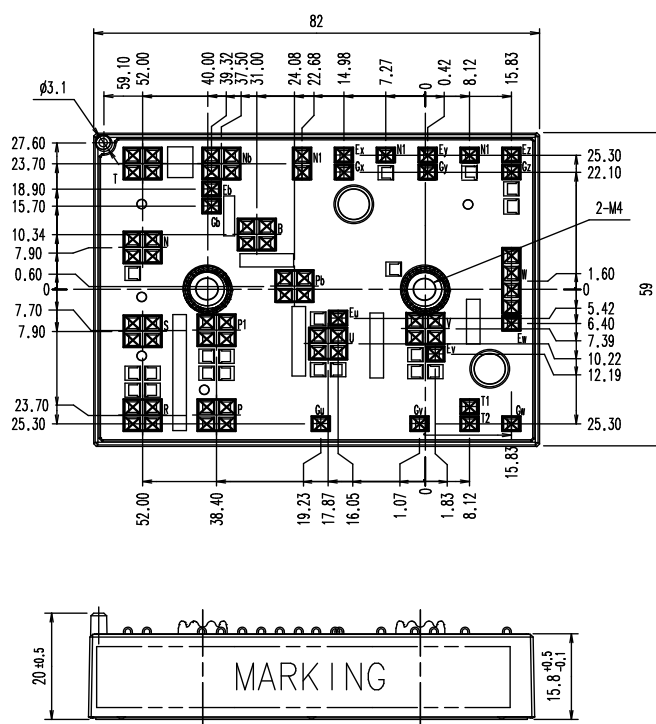
■ Features

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

■ Applications

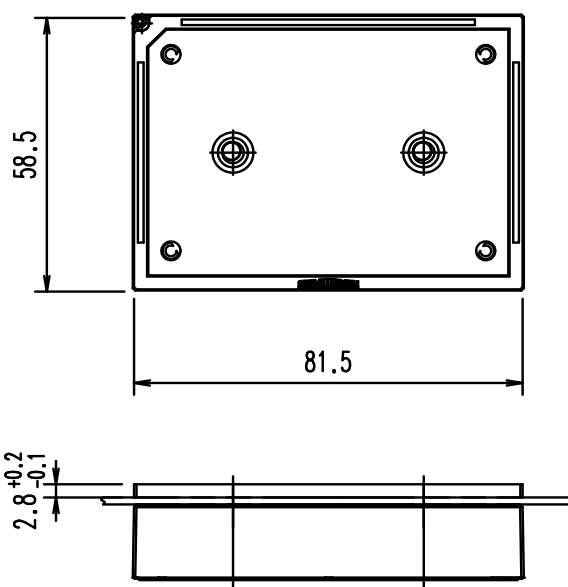
Inverter for Motor Drives
AC and DC Servo Drive Amplifier
Uninterruptible Power Supply

■ Outline drawing (Unit : mm)



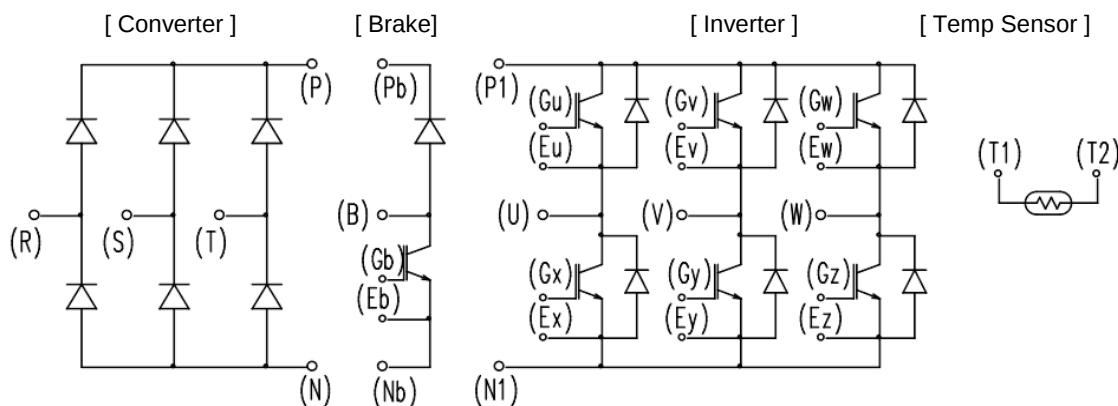
単位 / Unit : mm
公差 / tolerance : ISO 2768-f

SLIM LID USE



Weight: 95g (typ.)

■ Equivalent Circuit



7MBR50VJC120-53

IGBT Modules

■ 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°C	50	A
		I _{cp}	1ms	T _c =80°C	100	
		-I _c			50	
		-I _c pulse	1ms			
Brake	Collector-Emitter voltage	V _{CES}			1200	V
	Gate-Emitter voltage	V _{GES}			±20	V
	Collector current	I _c	Continuous	T _c =80°C	50	A
		I _{CP}	1ms	T _c =80°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°C		490	A
	I ² t (Non-Repetitive)	I ² t	half sine wave		1200	A ² s
	Surge current (Non-Repetitive)	I _{FSM}	10ms, T _j =25°C		700	A
	I ² t (Non-Repetitive)	I ² t	half sine wave		2400	A ² s
	Junction temperature		T _j	Inverter, Brake		175
		Converter		150		
Operating junciton 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	$V_{GE} = 0V$ $V_{CE} = 1200V$	-	-	1.0	mA
	Gate-Emitter leakage current	$V_{CE} = 0V$ $V_{GE} = \pm 20V$	-	-	200	nA
	Gate-Emitter threshold voltage	$V_{CE} = 20V$ $I_C = 50mA$	6.0	6.5	7.0	V
	Collector-Emitter saturation voltage	$V_{GE} = 15V$ $I_C = 50A$	$T_j = 25^\circ C$	2.10	2.55	V
			$T_j = 125^\circ C$	2.45	-	
			$T_j = 150^\circ C$	2.50	-	
		$V_{GE} = 15V$ $I_C = 50A$	$T_j = 25^\circ C$	1.85	2.30	
			$T_j = 125^\circ C$	2.20	-	
			$T_j = 150^\circ C$	2.25	-	
	Collector power disipation	Pc	1 device	210	-	W
	Internal gate resistance	Rg(int)	-	4	-	Ω
	Input capacitance	Cies	$V_{CE} = 10V, V_{GE} = 0V, f = 1MHz$	4.1	-	nF
	Turn-on time	$V_{CC} = 600V$ $I_C = 50A$ $V_{GE} = \pm 15V$ $R_G = 15 \Omega$	t_{on}	0.42	1.20	μs
			t_r	0.11	0.60	
			$t_{r(i)}$	0.04	-	
	Turn-off time		t_{off}	0.44	1.00	μs
			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	μs
Brake	Zero gate voltage collector current	$V_{GE} = 0V$ $V_{CE} = 1200V$	-	-	1.0	mA
	Gate-Emitter leakage current	$V_{CE} = 0V$ $V_{GE} = \pm 20V$	-	-	200	nA
	Collector-Emitter saturation voltage	$V_{GE} = 15V$ $I_C = 50A$	$T_j = 25^\circ C$	2.10	2.55	V
			$T_j = 125^\circ C$	2.45	-	
			$T_j = 150^\circ C$	2.50	-	
		$V_{GE} = 15V$ $I_C = 50A$	$T_j = 25^\circ C$	1.85	2.30	
			$T_j = 125^\circ C$	2.20	-	
			$T_j = 150^\circ C$	2.25	-	
	Collector power disipation	Pc	1 device	210	-	W
	Internal gate resistance	Rg(int)	-	4	-	Ω
	Turn-on time	$V_{CE} = 600V$ $I_C = 50A$ $V_{GE} = \pm 15V$ $R_G = 15 \Omega$	t_{on}	0.42	1.20	μs
			t_r	0.11	0.60	
	Turn-off time		t_{off}	0.44	1.00	μs
			t_f	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
				-	-	
Temperature Sensor	R	T = 25°C T = 100°C	Im=1mA	1000	-	Ω
			Im=1mA	1670	-	

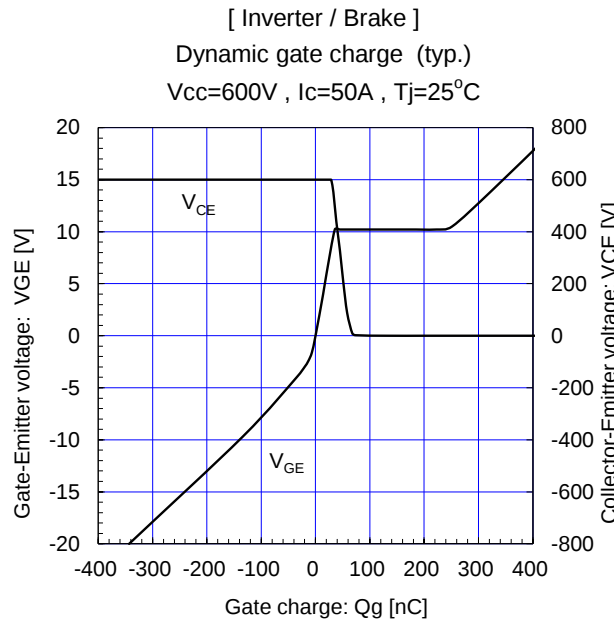
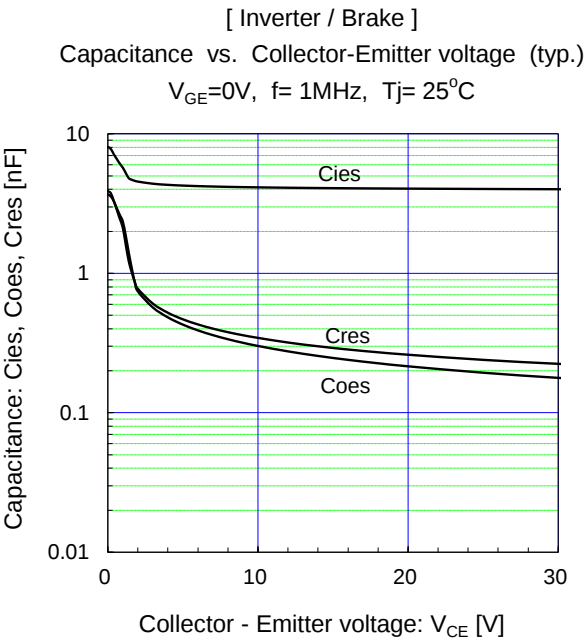
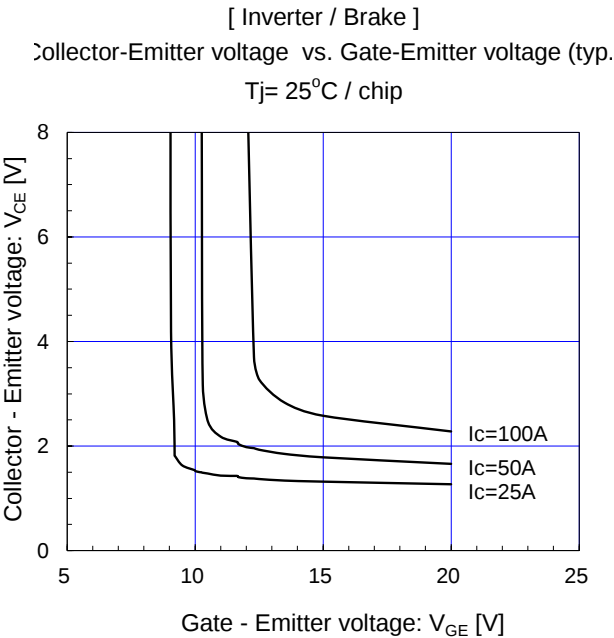
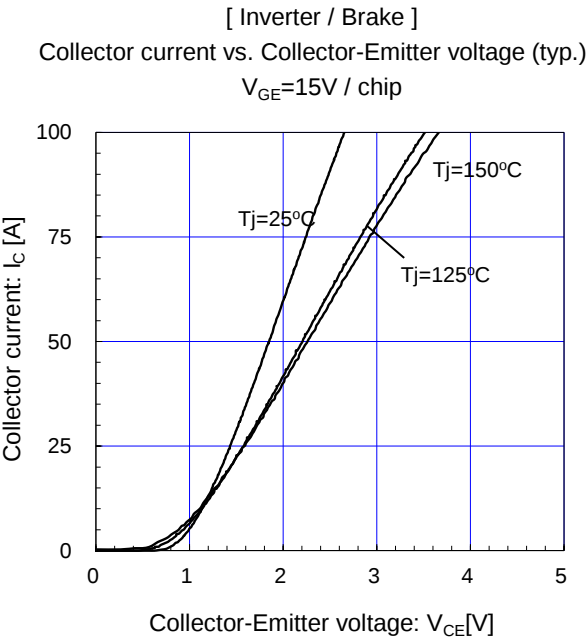
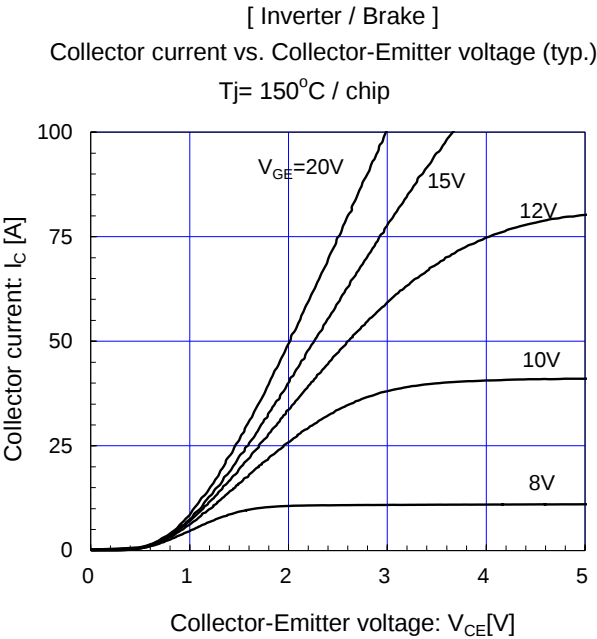
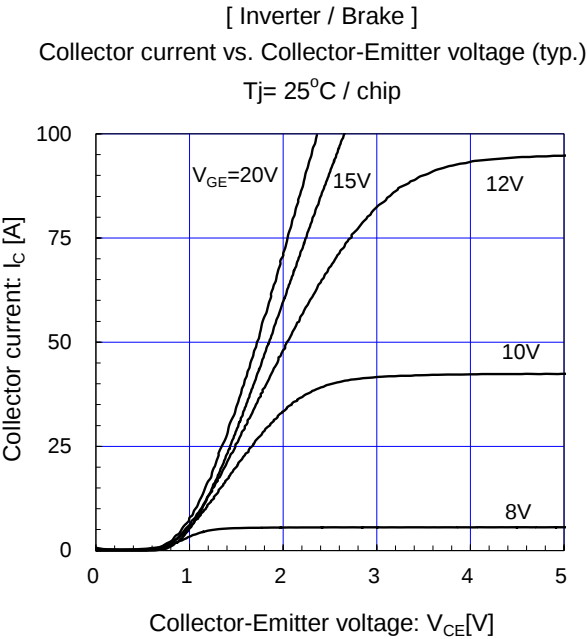
■ Thermal resistance characteristics

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	-	

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

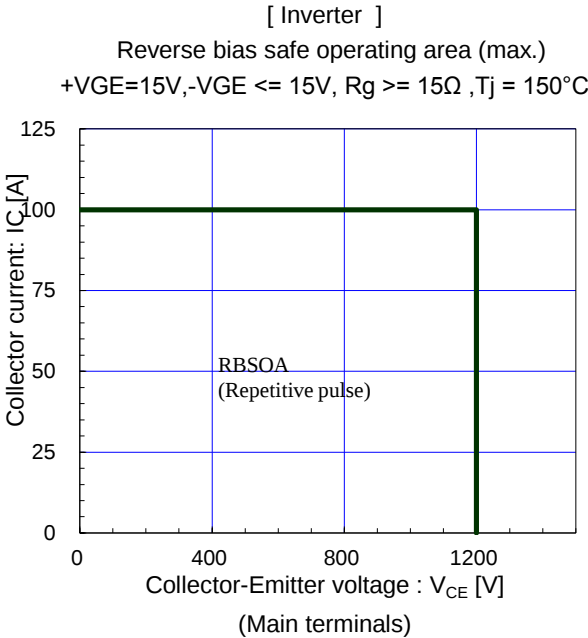
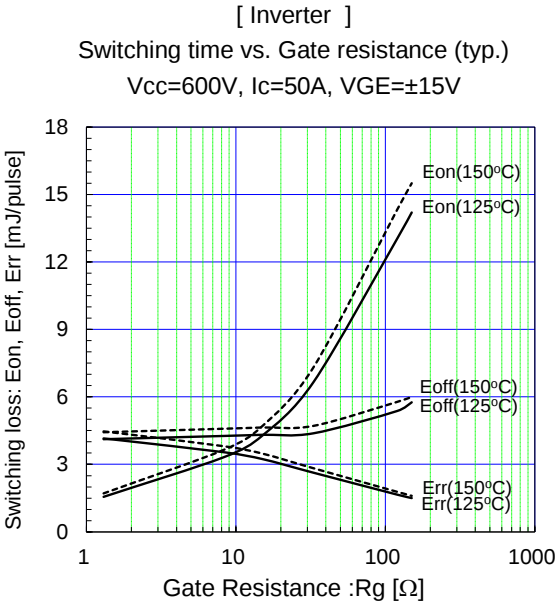
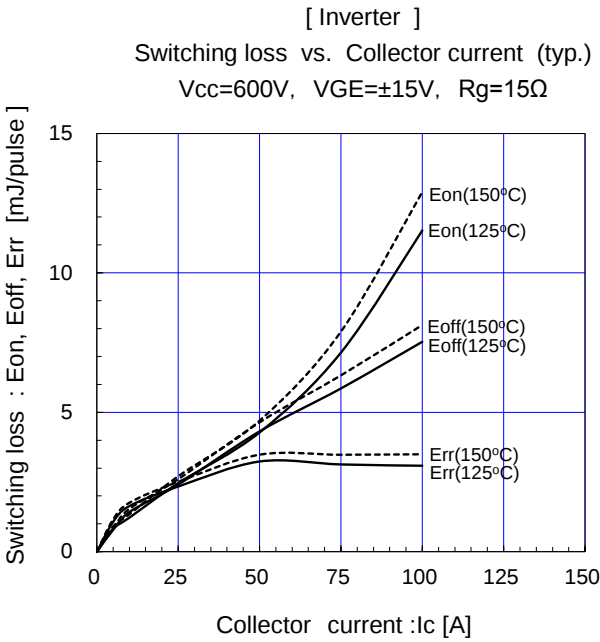
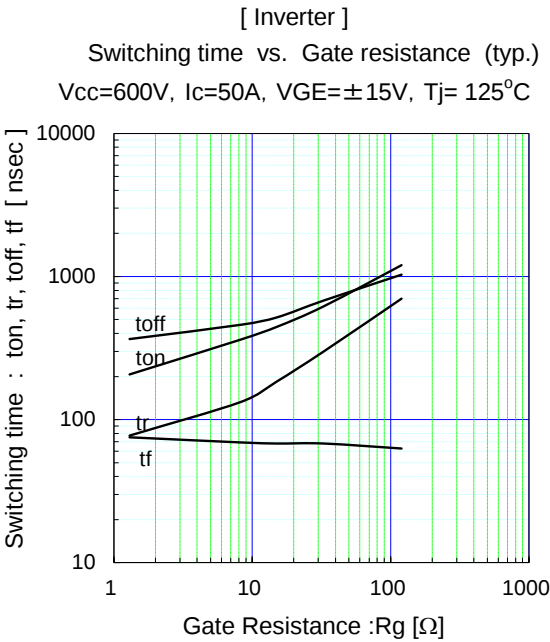
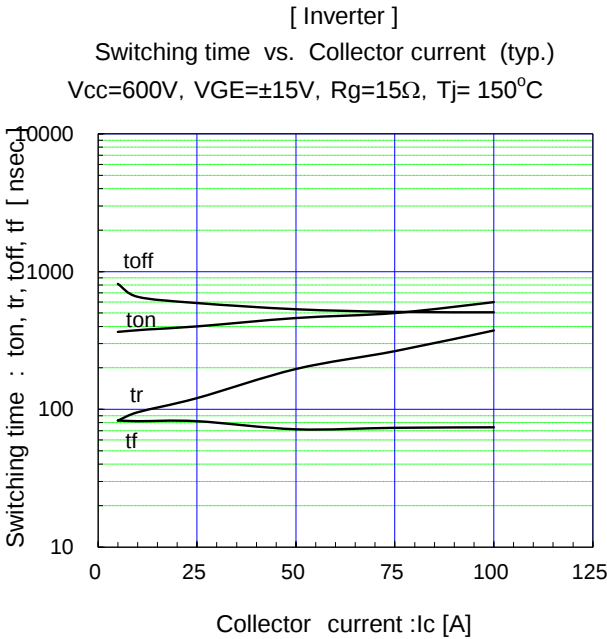
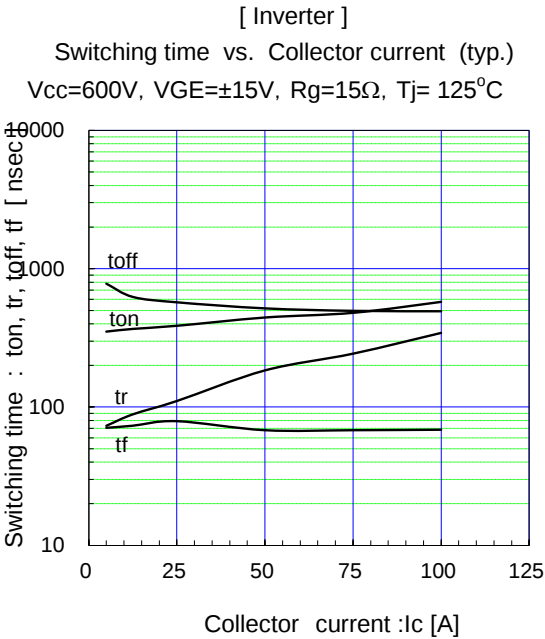
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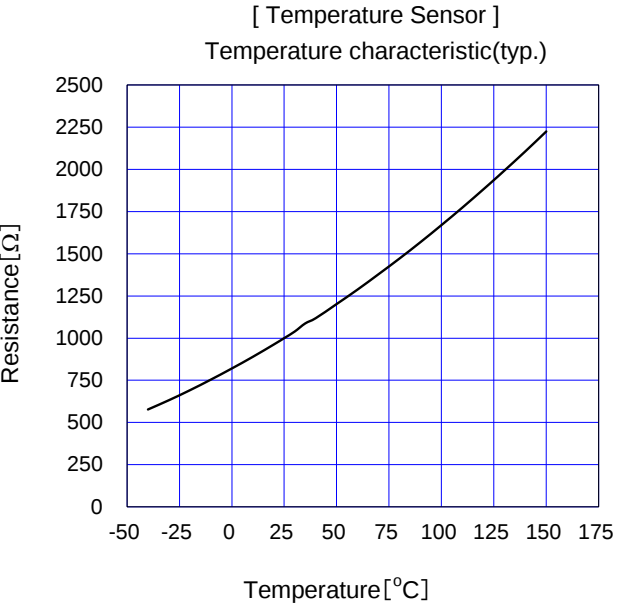
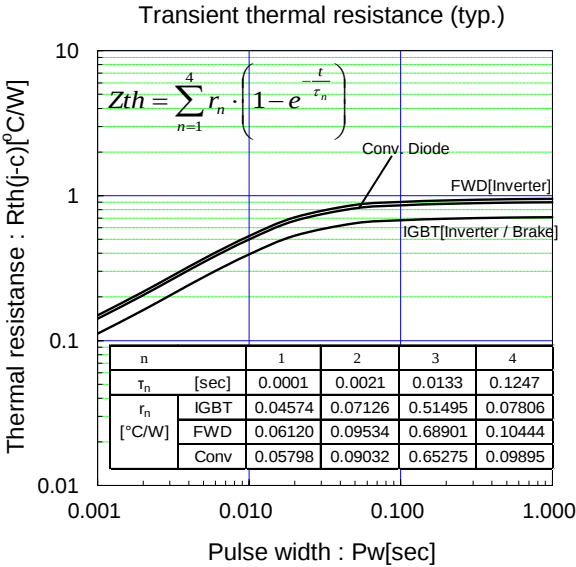
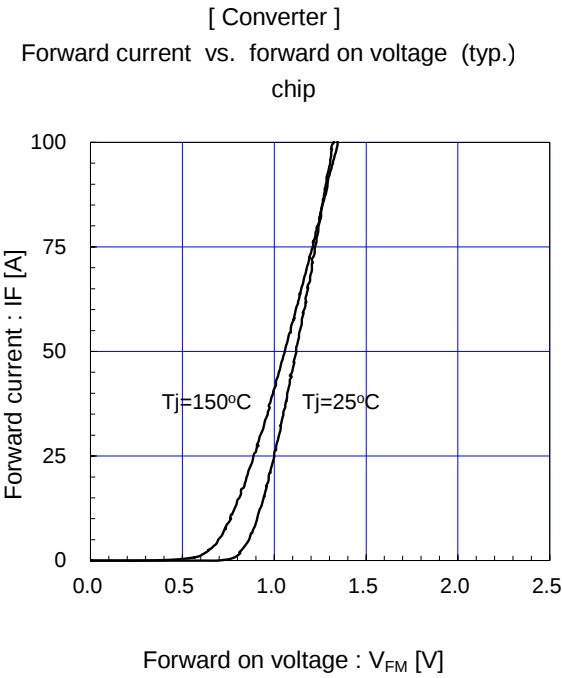
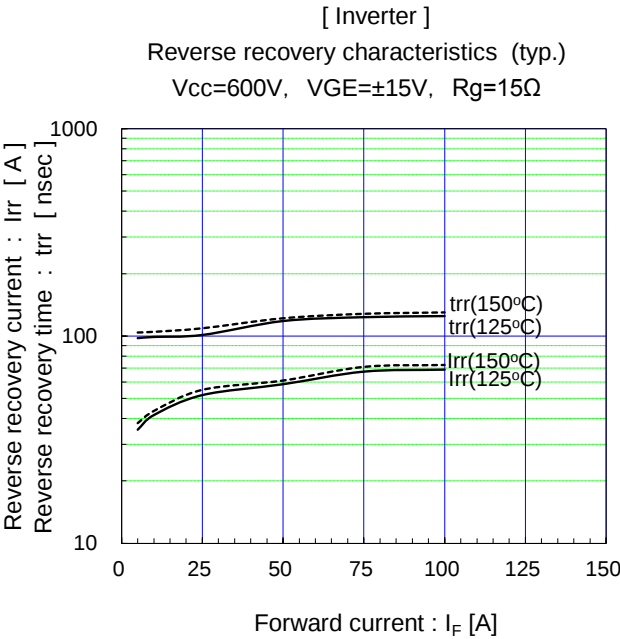
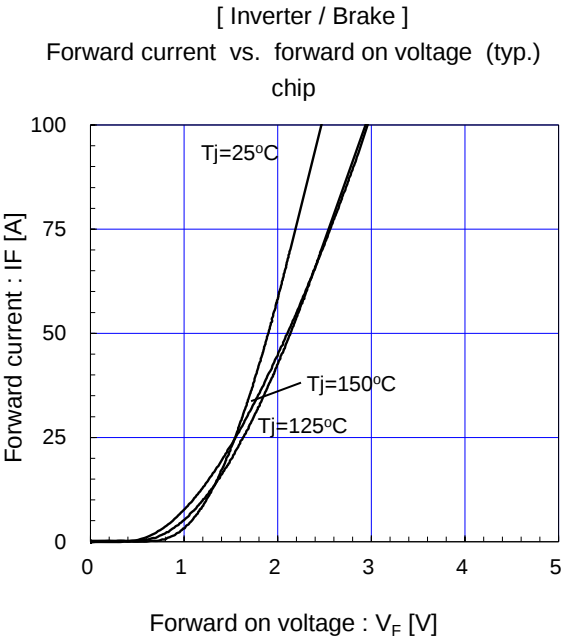
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