

7MBR35VJB120A-50

IGBT Modules

Power Module (V series)
1200V / 35A / PIM

■ **Features**

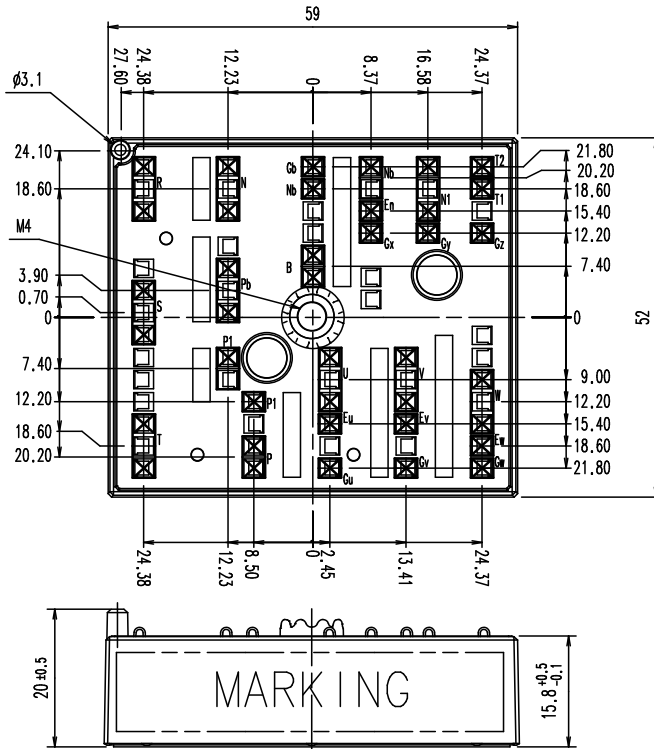
- Low $V_{CE(sat)}$
- Compact Package
- P.C.Board Mount Module
- Converter Diode Bridge Dynamic Brake Circuit
- RoHS compliant product

■ **Applications**

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

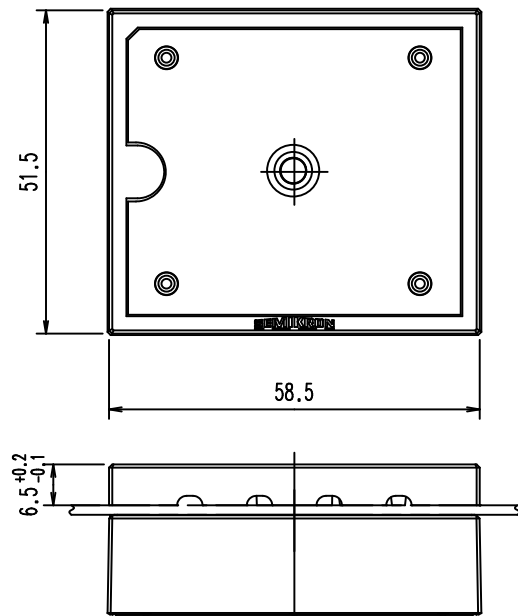


■ **Outline drawing (Unit : mm)**



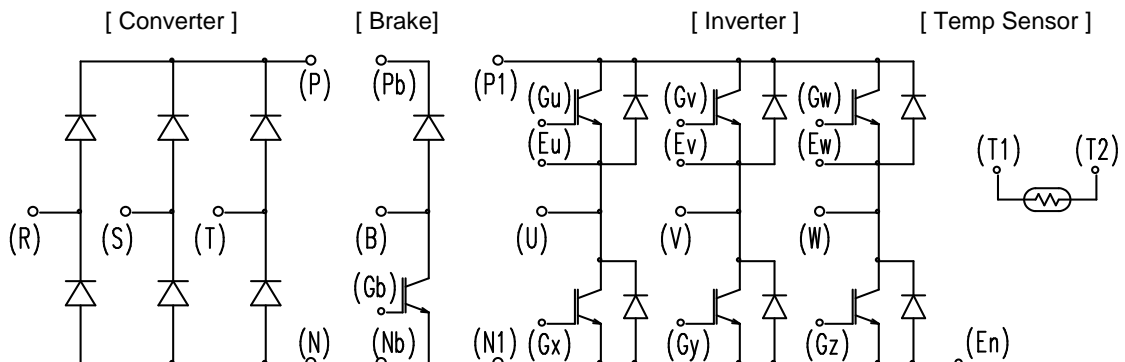
単位 / Unit : mm
 公差 / tolerance: ISO 2768-f

STANDARD LID USE



Weight: 65g (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	$T_C=100^\circ C$	35	A	
		I_{CP}	1ms	$T_C=80^\circ C$	70		
		$-I_C$			35		
$-I_C$ pulse		1ms			70		
Brake	Collector-Emitter voltage	V_{CES}			1200	V	
	Gate-Emitter voltage	V_{GES}			± 20	V	
	Collector current	I_C	Continuous	$T_C=80^\circ C$	35	A	
		I_{CP}	1ms	$T_C=80^\circ C$	70		
	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	35	A	
	Surge current (Non-Repetitive)	I_{FSM}	10ms, $T_j=150^\circ C$		490	A	
	I^2t (Non-Repetitive)	I^2t	half sine wave		1200	A ² s	
	Surge current (Non-Repetitive)	I_{FSM}	10ms, $T_j=25^\circ C$		700	A	
	I^2t (Non-Repetitive)	I^2t	half sine wave		2400	A ² 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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■ 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	$V_{GE(th)}$	$V_{CE} = 20V$ $I_C = 35mA$	6.0	6.5	7.0	V	
	Collector-Emitter saturation voltage	$V_{CE(sat)}$ (terminal)	$V_{GE} = 15V$ $I_C = 35A$	$T_j = 25^\circ C$	-	2.05	2.50	V
				$T_j = 125^\circ C$	-	2.40	-	
				$T_j = 150^\circ C$	-	2.45	-	
		$V_{CE(sat)}$ (chip)	$V_{GE} = 15V$ $I_C = 35A$	$T_j = 25^\circ C$	-	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	-	150	-	W	
	Internal gate resistance	$R_{g(int)}$	-	-	0	-	Ω	
	Input capacitance	C_{ies}	$V_{CE} = 10V, V_{GE} = 0V, f = 1MHz$	-	2.9	-	nF	
	Turn-on time	t_{on}	$V_{CC} = 600V$ $I_C = 35A$	-	0.16	1.20	μs	
		t_r	$V_{GE} = \pm 15V$	-	0.11	0.60		
		$t_r(i)$	$R_G = 18 \Omega$	-	0.02	-		
Turn-off time	t_{off}		-	0.36	1.00	μs		
	t_f		-	0.04	0.30			
Forward on voltage	V_F (terminal)	$I_F = 35A$	$T_j = 25^\circ C$	-	2.10	2.55	V	
			$T_j = 125^\circ C$	-	2.30	-		
			$T_j = 150^\circ C$	-	2.30	-		
	V_F (chip)	$I_F = 35A$	$T_j = 25^\circ C$	-	1.90	2.35		
			$T_j = 125^\circ C$	-	2.10	-		
		$T_j = 150^\circ C$	-	2.10	-			
Reverse recovery time	t_{rr}	$I_F = 35A$	-	-	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}	$V_{CE} = 0V$ $V_{GE} = \pm 20V$	-	-	200	nA	
	Collector-Emitter saturation voltage	$V_{CE(sat)}$ (terminal)	$V_{GE} = 15V$ $I_C = 35A$	$T_j = 25^\circ C$	-	2.05	2.50	V
				$T_j = 125^\circ C$	-	2.40	-	
				$T_j = 150^\circ C$	-	2.45	-	
		$V_{CE(sat)}$ (chip)	$V_{GE} = 15V$ $I_C = 35A$	$T_j = 25^\circ C$	-	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	-	150	-	W	
	Internal gate resistance	$R_{g(int)}$	-	-	0	-	Ω	
	Turn-on time	t_{on}	$V_{CE} = 600V$ $I_C = 35A$	-	0.16	1.20	μs	
		t_r	$V_{GE} = +15/-15V$	-	0.11	0.60		
	Turn-off time	t_{off}	$R_G = 18 \Omega$	-	0.36	1.00	μs	
		t_f		-	0.04	0.30		
	Reverse current	I_{RRM}	$V_R = 1200V$	-	-	1.0	mA	
Forward on voltage	V_{FM}	$I_F = 35A$	terminal	-	1.25	-	V	
			chip	-	1.05	-		
Reverse current	I_{RRM}	$V_R = 1600V$	-	-	1.0	mA		
Temperature Sensor	R	$T = 25^\circ C$	$I_m = 1mA$	-	1000	-	Ω	
		$T = 100^\circ C$	$I_m = 1mA$	-	1670	-		

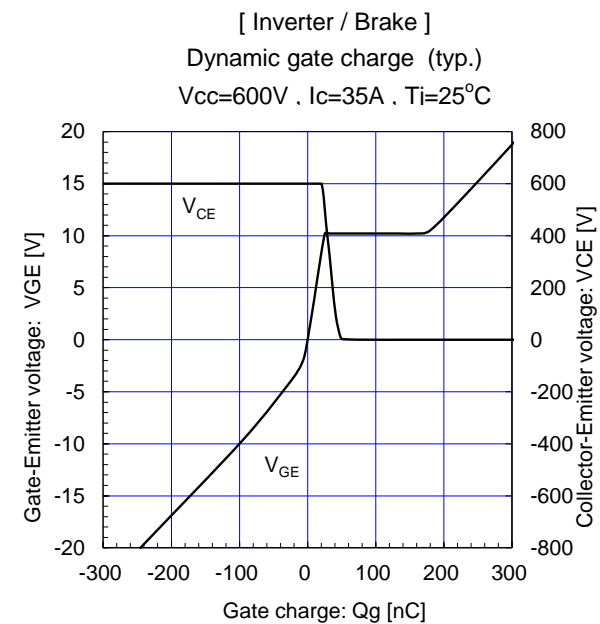
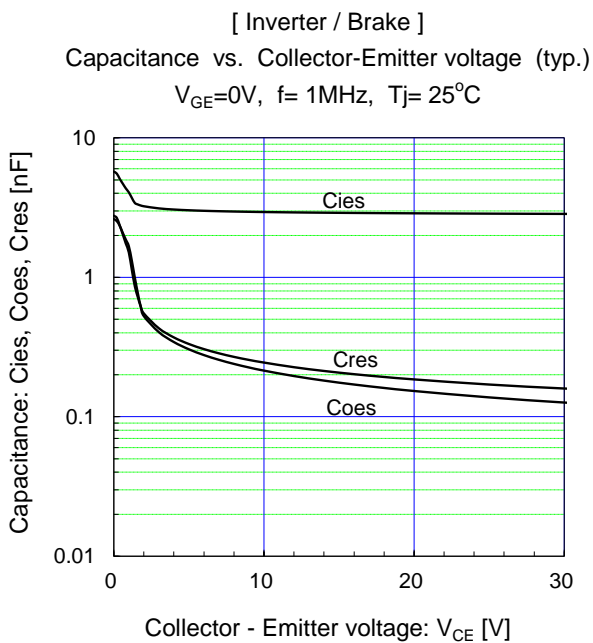
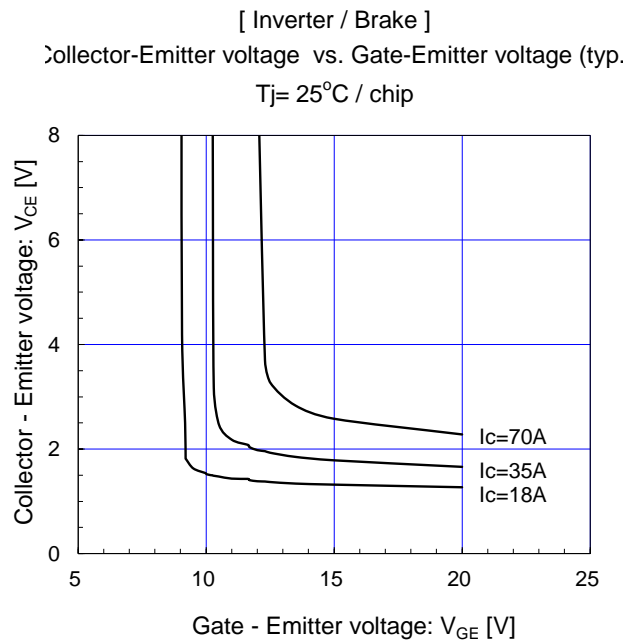
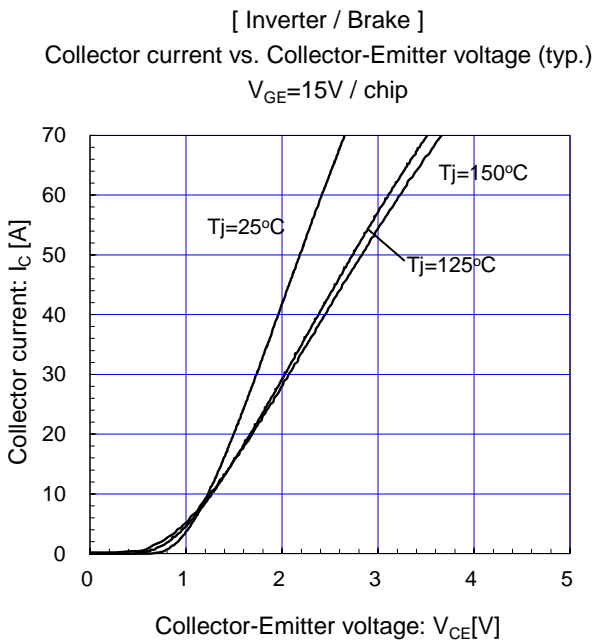
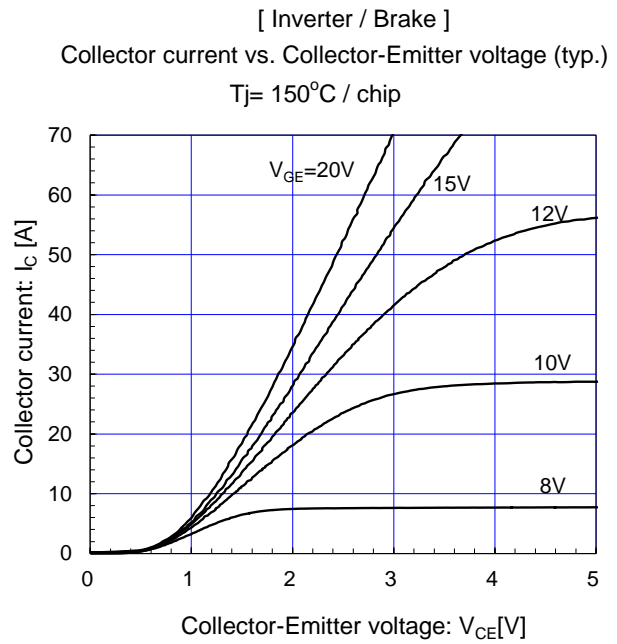
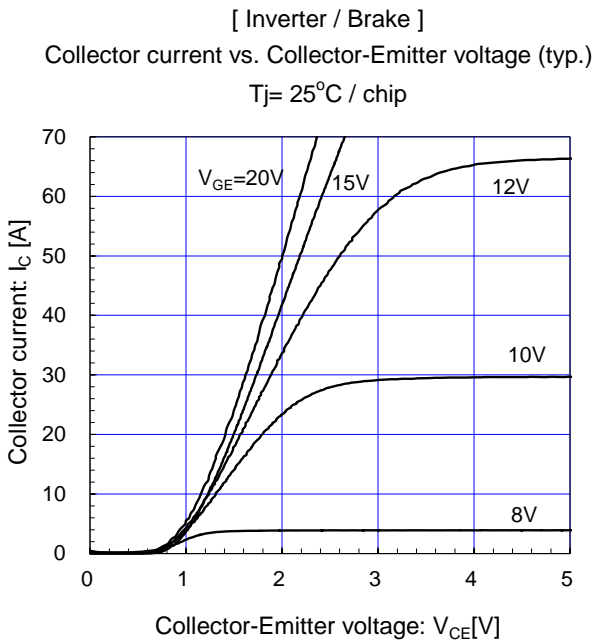
■ Thermal resistance characteristics

Items	Symbols	Conditions	Characteristics			Units
			min.	typ.	max.	
Thermal resistance(1device)	$R_{th(j-c)}$	Inverter / Brake IGBT	-	1.00	-	$^\circ C/W$
		Inverter FWD	-	1.20	-	
		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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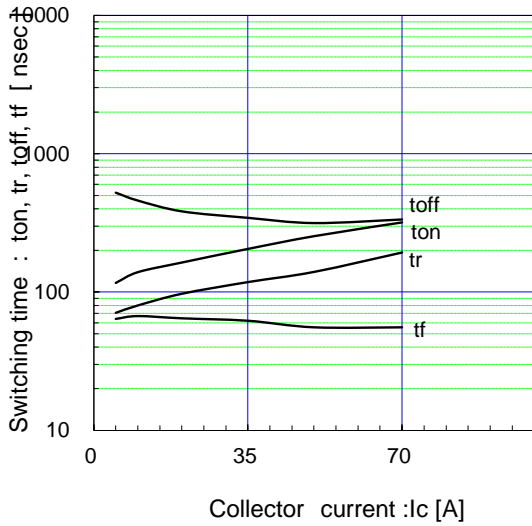
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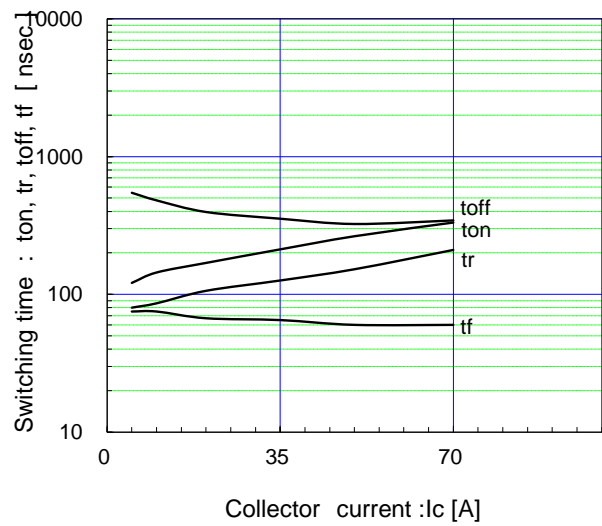
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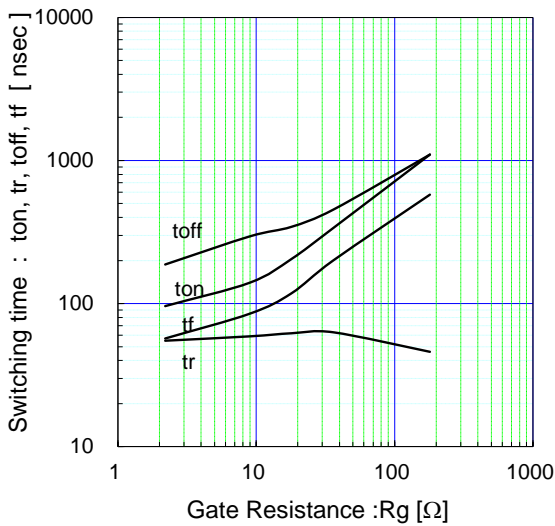
[Inverter]
Switching time vs. Collector current (typ.)
V_{cc}=600V, V_{GE}=±15V, R_g=18Ω, T_j= 125°C



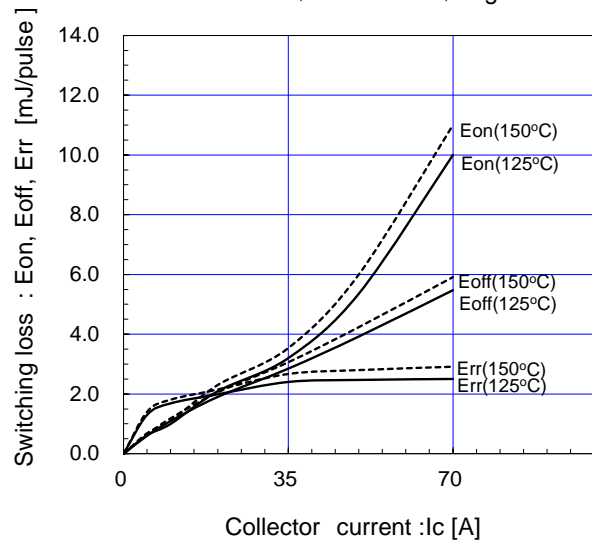
[Inverter]
Switching time vs. Collector current (typ.)
V_{cc}=600V, V_{GE}=±15V, R_g=18Ω, T_j= 150°C



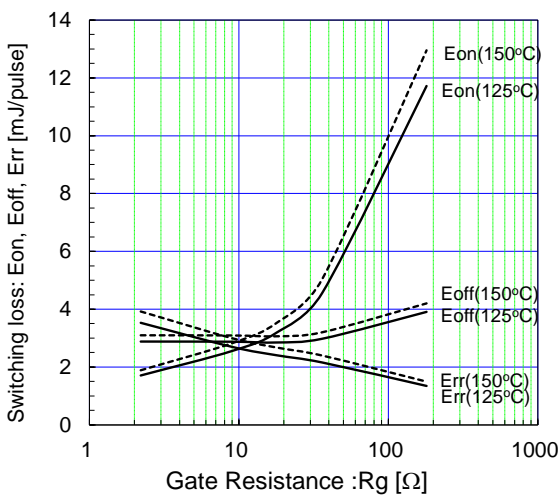
[Inverter]
Switching time vs. Gate resistance (typ.)
V_{cc}=600V, I_c=35A, V_{GE}=±15V, T_j= 125°C



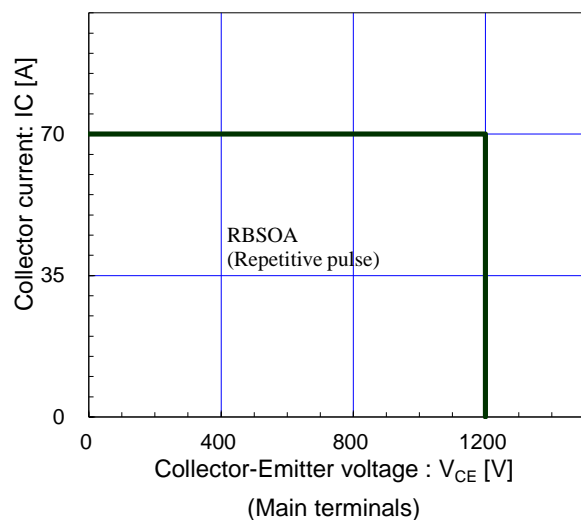
[Inverter]
Switching loss vs. Collector current (typ.)
V_{cc}=600V, V_{GE}=±15V, R_g=18Ω



[Inverter]
Switching time vs. Gate resistance (typ.)
V_{cc}=600V, I_c=35A, V_{GE}=±15V

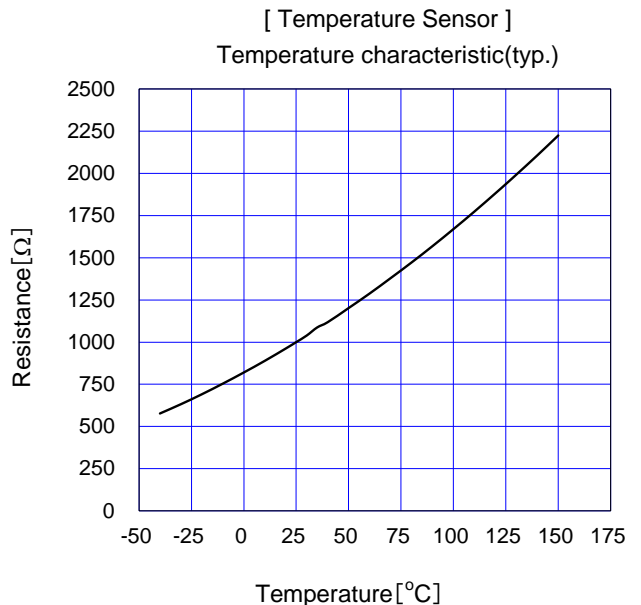
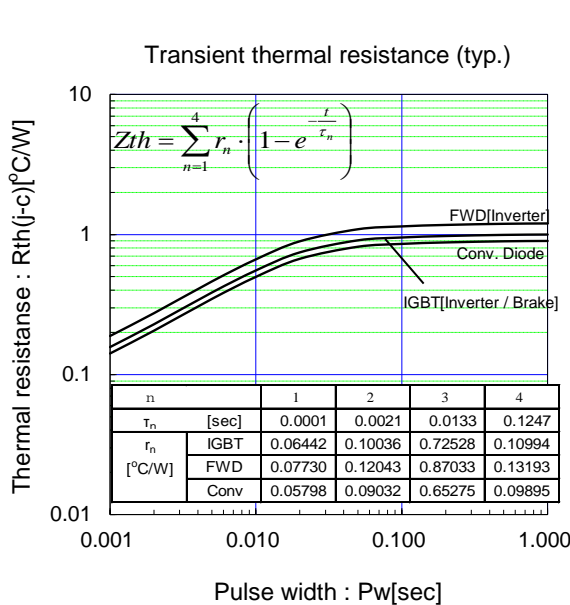
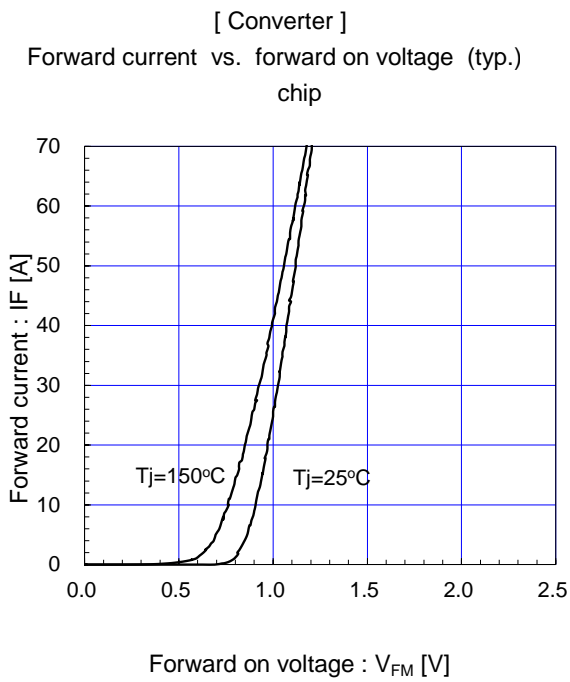
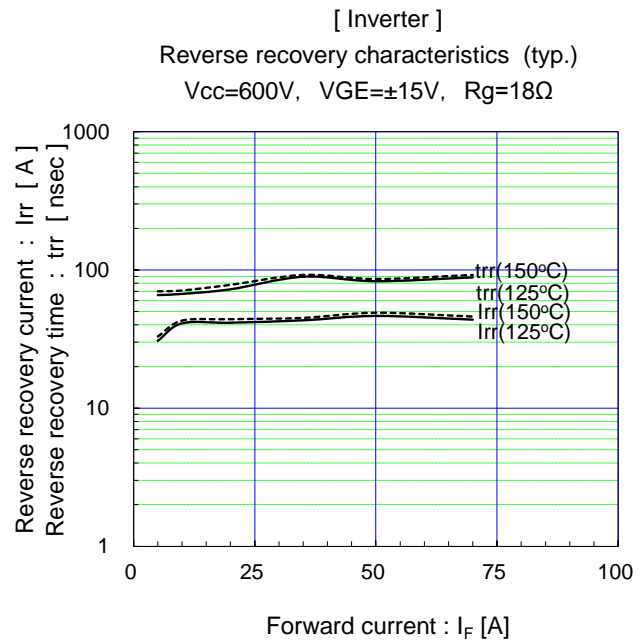
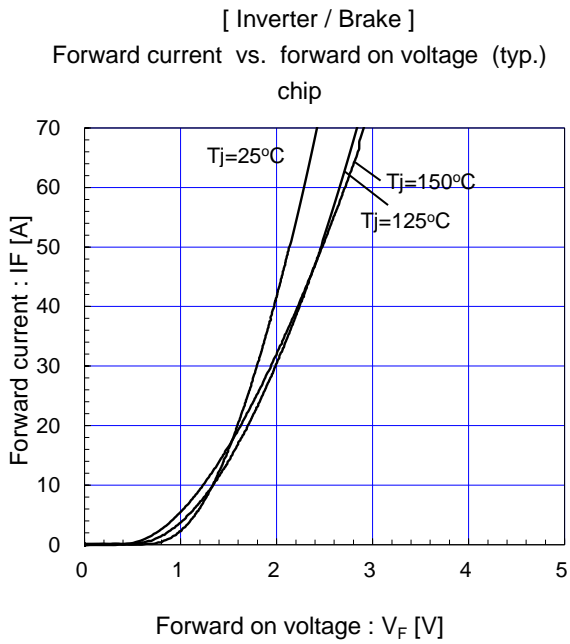


[Inverter]
Reverse bias safe operating area (max.)
+V_{GE}=15V, -V_{GE} ≤ 15V, R_g ≥ 18Ω, T_j = 150°C



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