

7MBR100VR060-50

IGBT Modules

IGBT MODULE (V series) 600V / 100A / 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 Drive
- AC and DC Servo Drive Amplifier
- Uninterruptible Power Supply



■ Maximum Ratings and Characteristics

● Absolute Maximum Ratings (at $T_c=25^\circ\text{C}$ unless otherwise specified)

Items	Symbols	Conditions	Maximum ratings	Units	
Inverter	Collector-Emitter voltage	V_{CES}	600	V	
	Gate-Emitter voltage	V_{GES}	± 20	V	
	Collector current	I_c	Continuous $T_c=80^\circ\text{C}$	100	A
		I_{cp}	1ms $T_c=80^\circ\text{C}$	200	
		$-I_c$		100	
$-I_c$ pulse		1ms	200		
Collector power dissipation	P_c	1 device	335	W	
Brake	Collector-Emitter voltage	V_{CES}	600	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	
	Collector power dissipation	P_c	1 device	215	W
Repetitive peak reverse voltage (Diode)	V_{RRM}		600	V	
Converter	Repetitive peak reverse voltage	V_{RRM}	800	V	
	Average output current	I_o	50Hz/60Hz, sine wave	100	A
	Surge current (Non-Repetitive)	I_{FSM}	10ms, $T_j=150^\circ\text{C}$	700	A
	I^2t (Non-Repetitive)	I^2t	half sine wave	2450	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 copper base (*1) between thermistor and others (*2)	V_{iso}	AC : 1min.	2500	VAC
Screw torque	Mounting (*3)	-	M5	3.5	N m

Note *1: All terminals should be connected together during the test.

Note *2: Two thermistor terminals should be connected together, other terminals should be connected together and shorted to base plate during the test.

Note *3: Recommendable value : 2.5-3.5 Nm (M5)

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

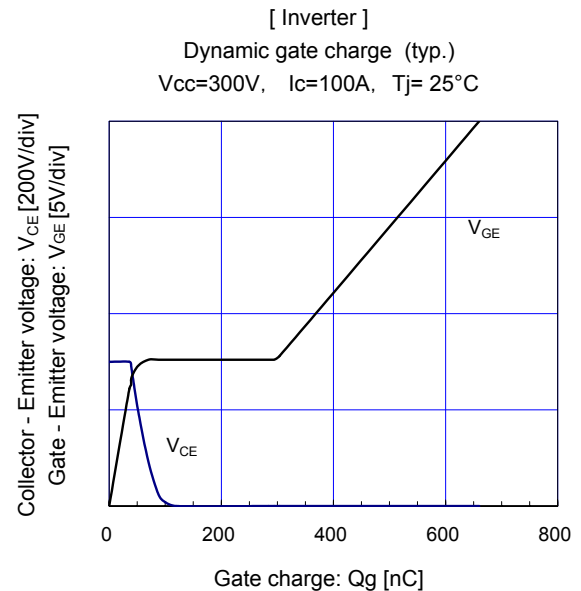
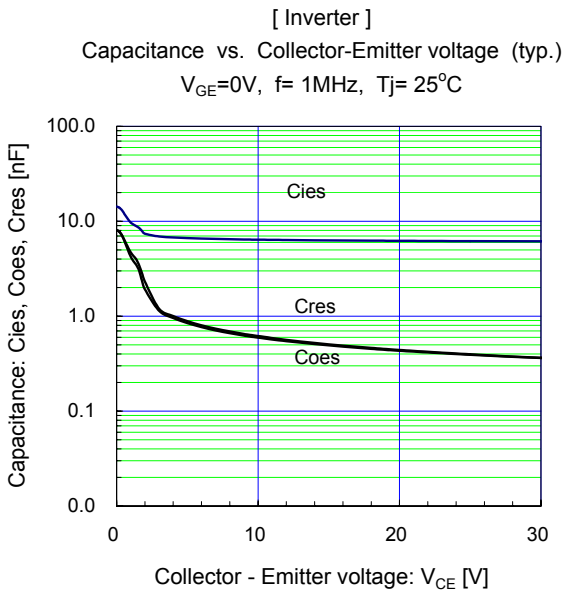
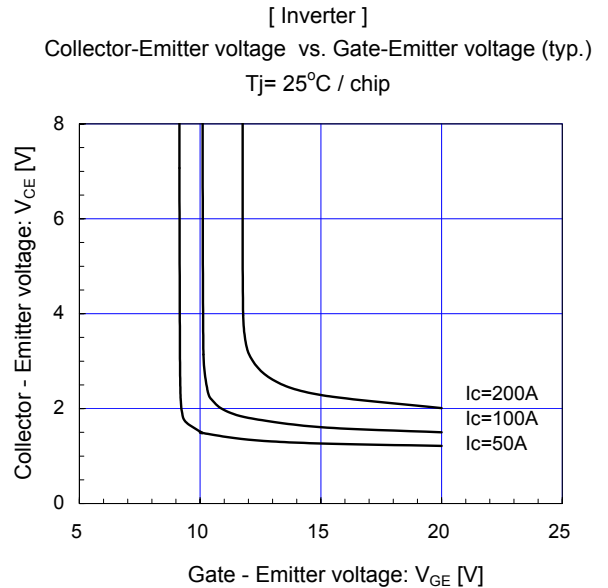
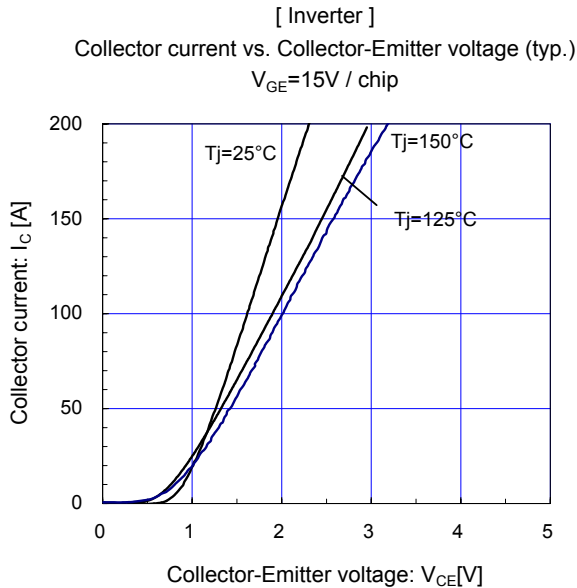
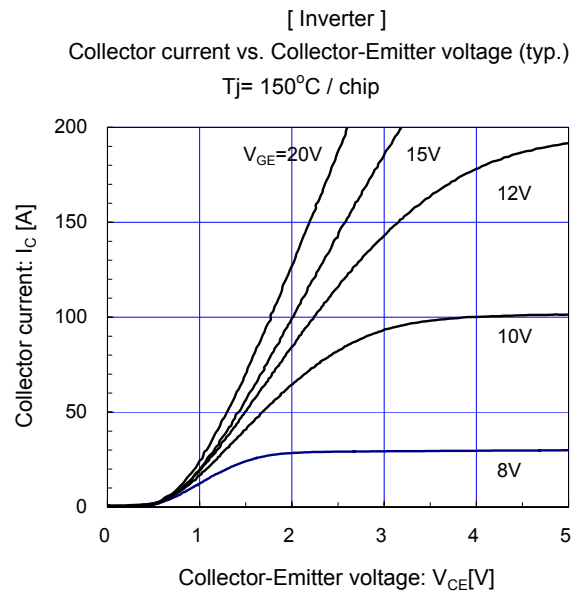
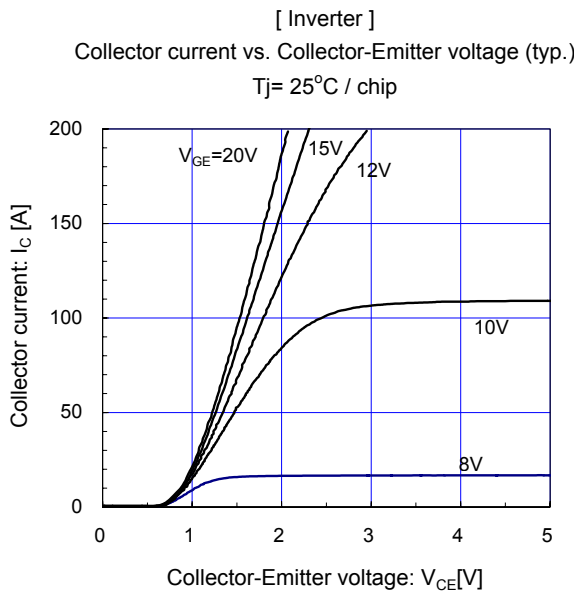
Items	Symbols	Conditions	Characteristics			Units		
			min.	typ.	max.			
Inverter	Zero gate voltage collector current	I _{CEs}	V _{GE} = 0V, V _{CE} = 600V	-	-	1.0	mA	
	Gate-Emitter leakage current	I _{GES}	V _{GE} = 0V, V _{CE} = ±20V	-	-	200	nA	
	Gate-Emitter threshold voltage	V _{GE(th)}	V _{CE} = 20V, I _c = 100mA	6.2	6.7	7.2	V	
	Collector-Emitter saturation voltage	V _{CE(sat)} (terminal)	V _{GE} = 15V I _c = 100A	T _j = 25°C	-	2.10	2.55	V
				T _j = 125°C	-	2.40	-	
				T _j = 150°C	-	2.50	-	
		V _{CE(sat)} (chip)	V _{GE} = 15V I _c = 100A	T _j = 25°C	-	1.60	2.05	
				T _j = 125°C	-	1.90	-	
	T _j = 150°C	-	2.00	-				
	Input capacitance	C _{ies}	V _{CE} = 10V, V _{GE} = 0V, f = 1MHz	-	6.4	-	nF	
	Turn-on time	ton	V _{CC} = 300V I _c = 100A V _{GE} = +15 / -15V	-	0.36	1.20	μs	
		tr		-	0.25	0.60		
		tr(i)		-	0.07	-		
	Turn-off time	toff	R _G = 13Ω	-	0.52	1.20	μs	
		tf		-	0.03	0.45		
Forward on voltage	V _F (terminal)	I _F = 100A	T _j = 25°C	-	2.10	2.55	V	
			T _j = 125°C	-	2.00	-		
			T _j = 150°C	-	2.00	-		
	V _F (chip)	I _F = 100A	T _j = 25°C	-	1.60	2.05		
			T _j = 125°C	-	1.50	-		
T _j = 150°C	-	1.47	-					
Reverse recovery time	trr	I _F = 100A	-	-	0.35	μs		
Brake	Zero gate voltage collector current	I _{CEs}	V _{GE} = 0V V _{CE} = 600V	-	-	1.0	mA	
	Gate-Emitter leakage current	I _{GES}	V _{CE} = 0V V _{GE} = +20 / -20V	-	-	200	nA	
	Collector-Emitter saturation voltage	V _{CE(sat)} (terminal)	V _{GE} = 15V I _c = 50A	T _j = 25°C	-	1.85	2.30	V
				T _j = 125°C	-	2.15	-	
				T _j = 150°C	-	2.25	-	
		V _{CE(sat)} (chip)	V _{GE} = 15V I _c = 50A	T _j = 25°C	-	1.60	2.05	
				T _j = 125°C	-	1.90	-	
	T _j = 150°C	-	2.00	-				
	Turn-on time	ton	V _{CE} = 300V I _c = 50A	-	0.36	1.20	μs	
		tr		-	0.25	0.60		
Turn-off time	toff	V _{GE} = +15 / -15V R _G = 43Ω	-	0.52	1.20	μs		
	tf		-	0.03	0.45			
Reverse current	I _{RRM}	V _R = 600V	-	-	1.00	mA		
Converter	Forward on voltage	I _F = 100A	terminal	-	1.75	2.20	V	
			chip	-	1.25	-		
Reverse current	I _{RRM}	V _R = 800V	-	-	1.0	mA		
Thermistor	Resistance	T = 25°C	-	5000	-	Ω		
		T = 100°C	465	495	520			
B value	B	T = 25 / 50°C	3305	3375	3450	K		

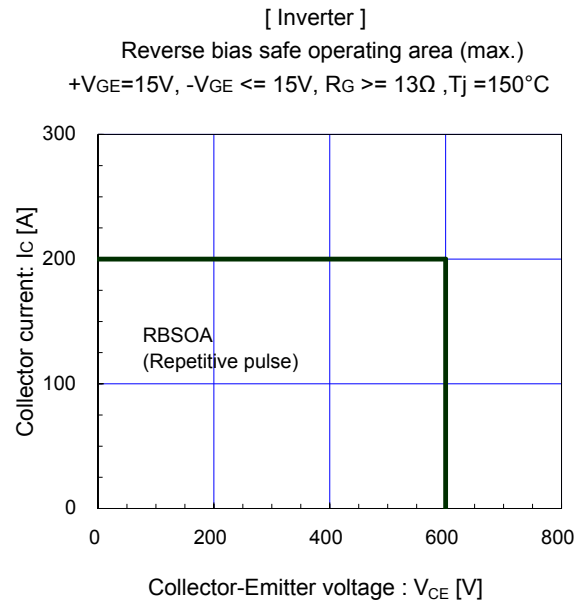
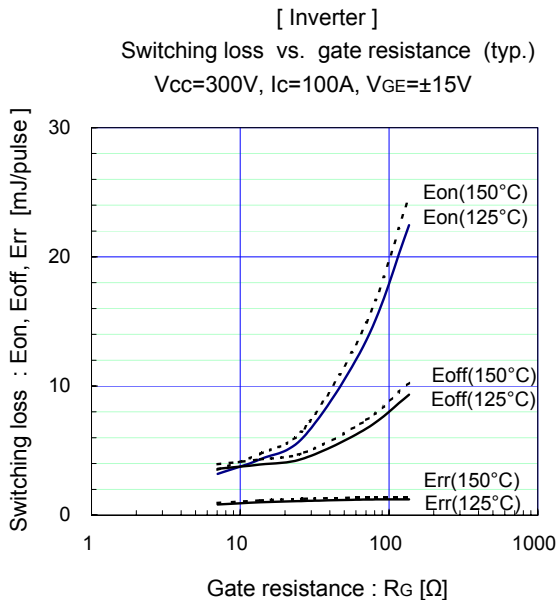
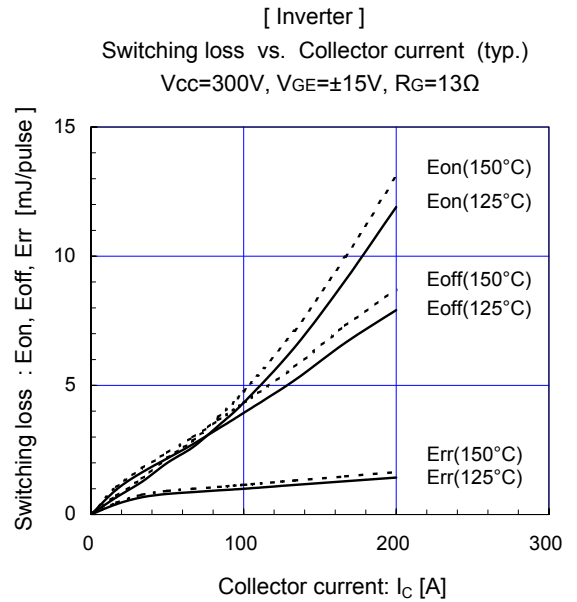
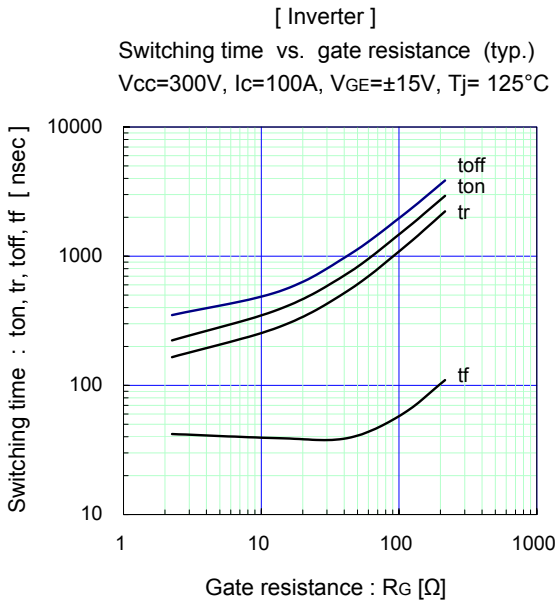
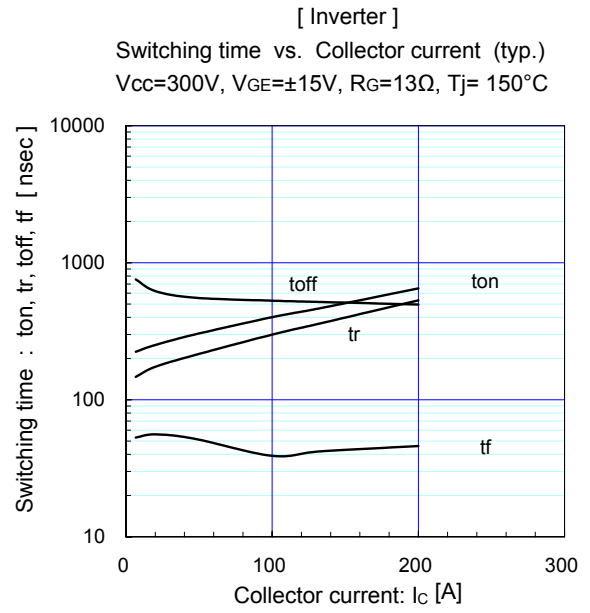
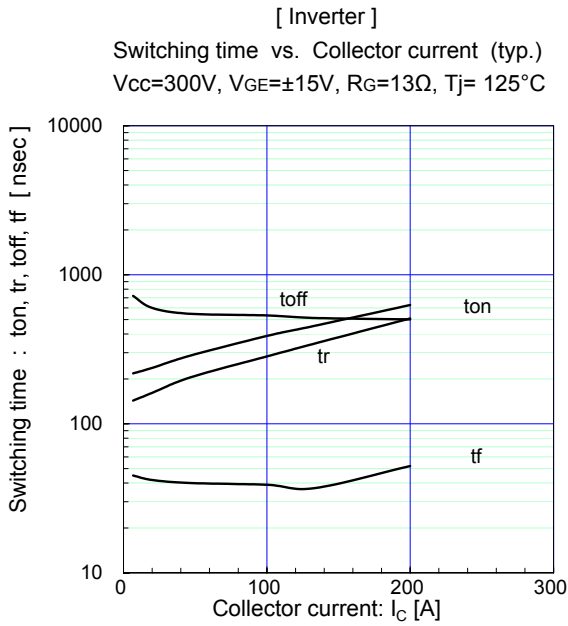
● Thermal resistance characteristics

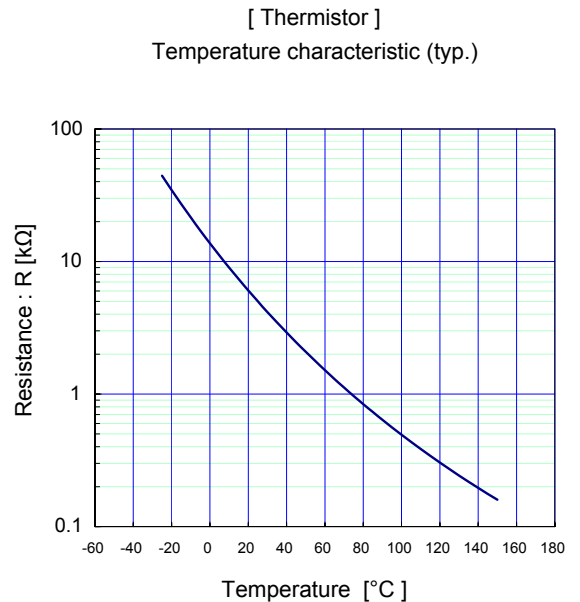
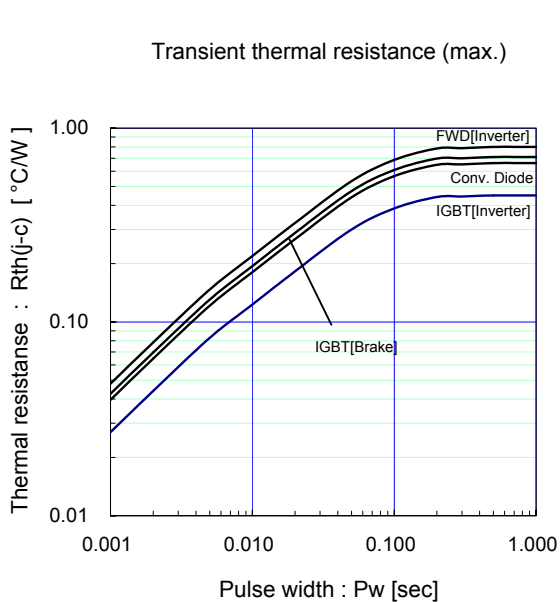
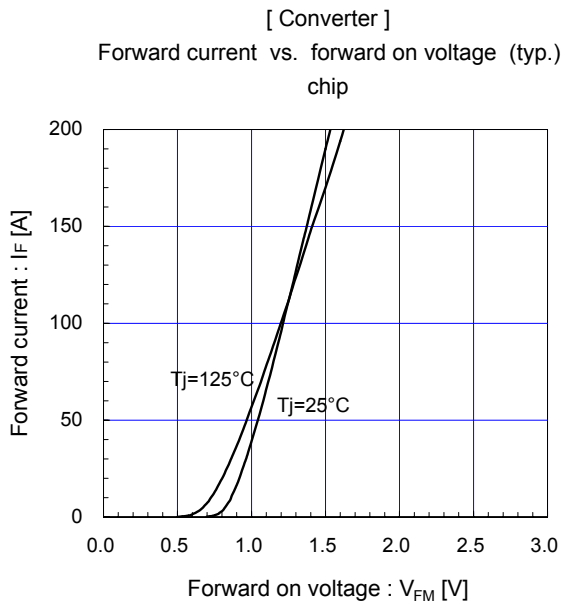
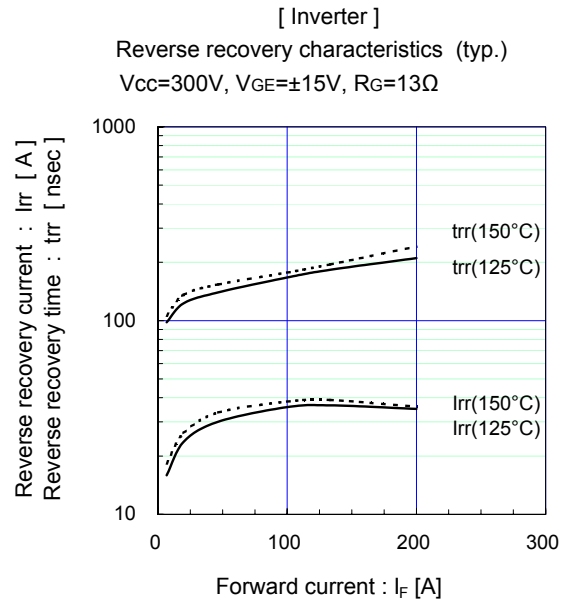
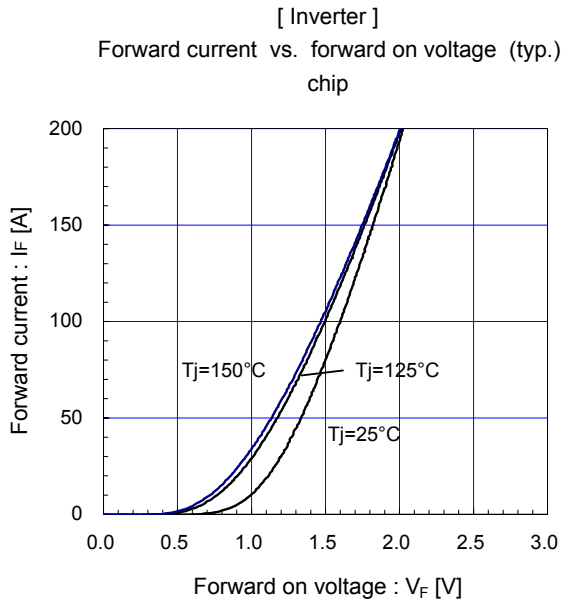
Items	Symbols	Conditions	Characteristics			Units
			min.	typ.	max.	
Thermal resistance (1device)	R _{th(j-c)}	Inverter IGBT	-	-	0.45	°C/W
		Inverter FWD	-	-	0.80	
		Brake IGBT	-	-	0.71	
		Converter Diode	-	-	0.66	
Contact thermal resistance (1device) (*4)	R _{th(c-f)}	with Thermal Compound	-	0.05	-	

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

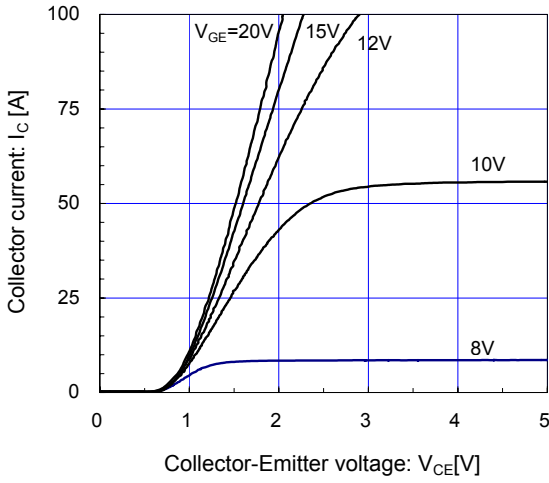
■ Characteristics (Representative)



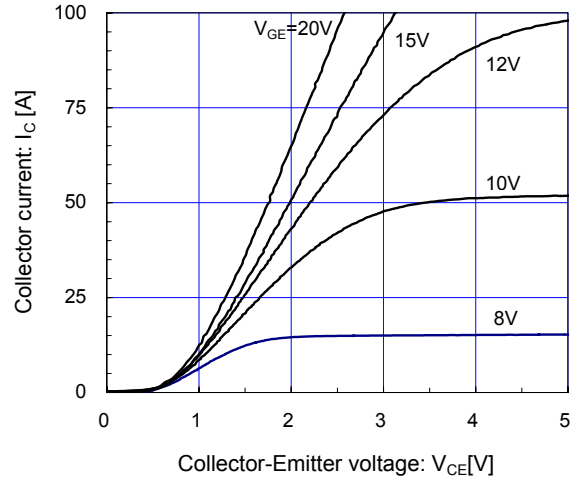




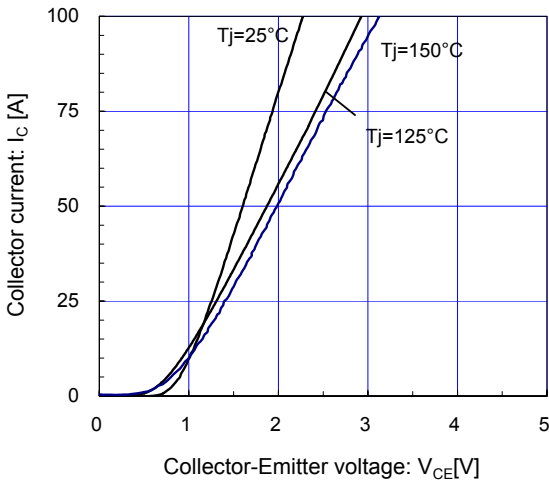
[Brake]
Collector current vs. Collector-Emittor voltage (typ.)
Tj= 25°C / chip



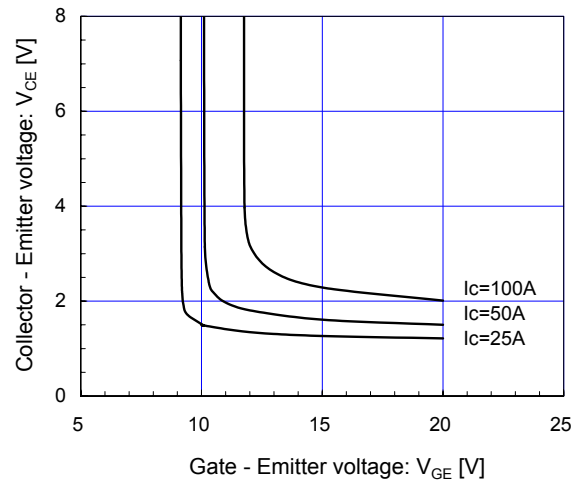
[Brake]
Collector current vs. Collector-Emittor voltage (typ.)
Tj= 150°C / chip



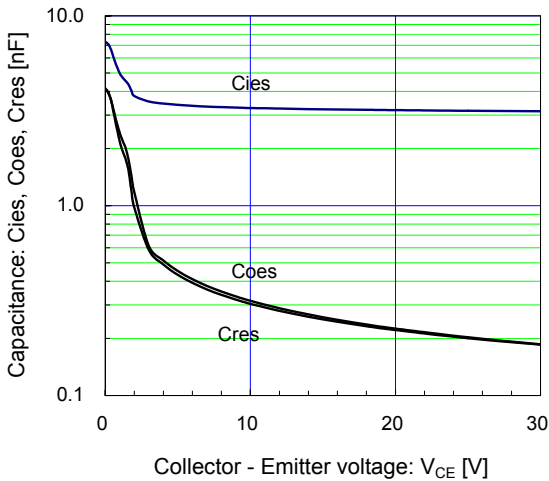
[Brake]
Collector current vs. Collector-Emittor voltage (typ.)
VGE=15V / chip



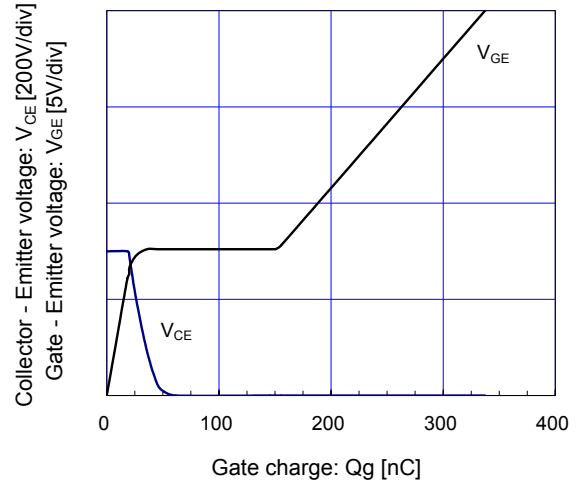
[Brake]
Collector-Emittor voltage vs. Gate-Emittor voltage (typ.)
Tj= 25°C / chip



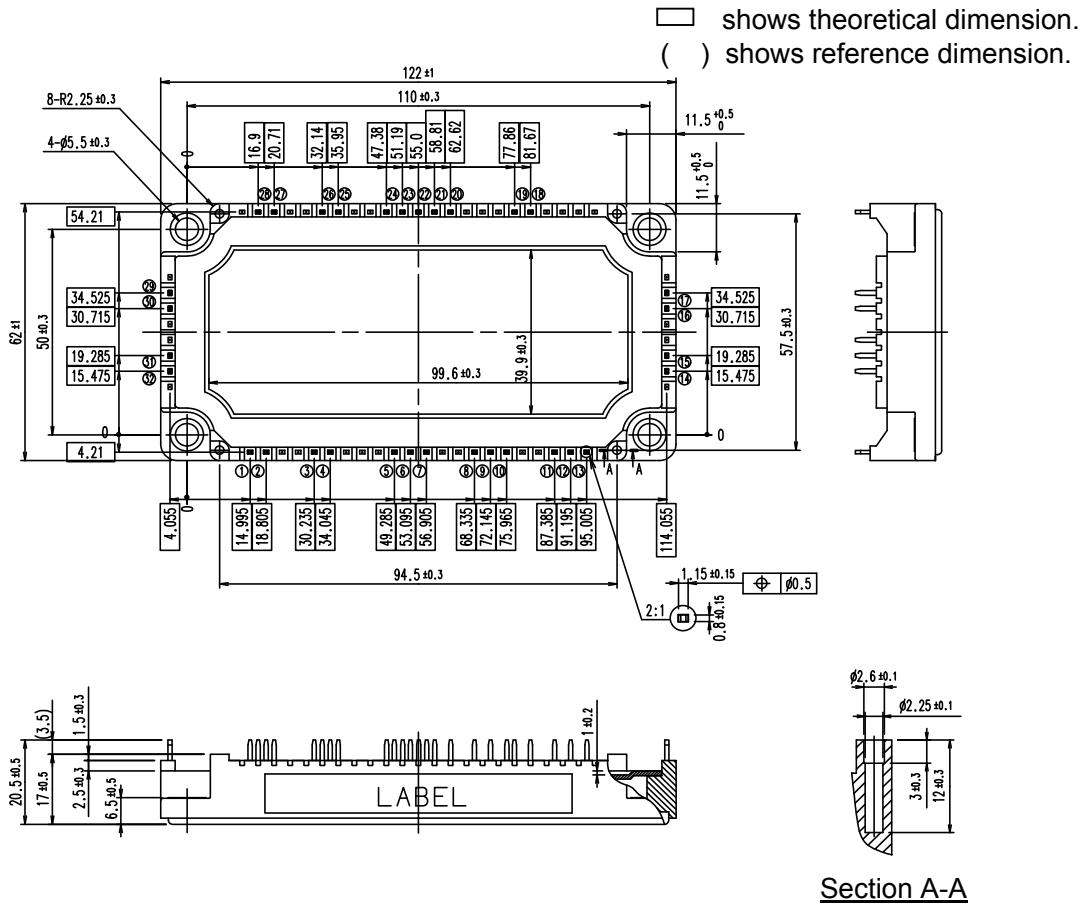
[Brake]
Capacitance vs. Collector-Emittor voltage (typ.)
VGE=0V, f= 1MHz, Tj= 25°C



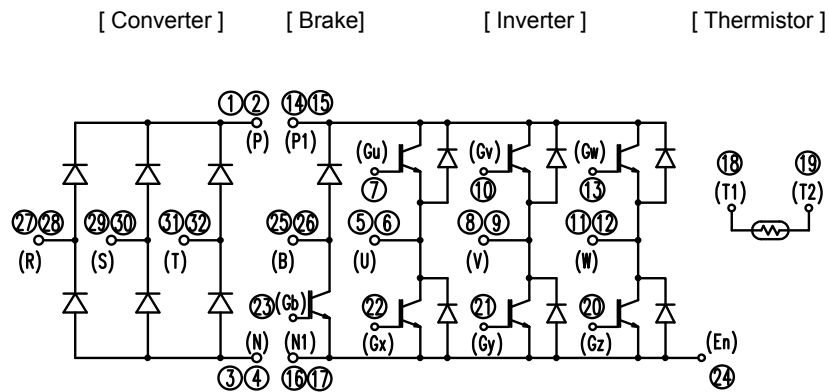
[Brake]
Dynamic gate charge (typ.)
Vcc=300V, Ic=50A, Tj= 25°C



■ Outline Drawings, mm



■ Equivalent Circuit Schematic



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