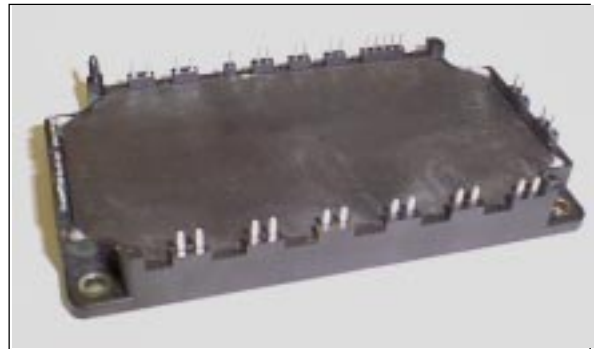


### PIM/Built-in converter with thyristor and brake (S series) 1200V / 50A / PIM



#### ■ Features

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

#### ■ Applications

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

#### ■ Maximum ratings and characteristics

● Absolute maximum ratings ( $T_c=25^\circ\text{C}$  unless without specified)

Item	Symbol	Condition	Rating	Unit	
Inverter	Collector-Emitter voltage	$V_{CES}$	1200	V	
	Gate-Emitter voltage	$V_{GES}$	$\pm 20$	V	
	Collector current	$I_c$	Continuous	$T_c=25^\circ\text{C}$ 75	A
				$T_c=80^\circ\text{C}$ 50	
		$I_{CP}$	1ms	$T_c=25^\circ\text{C}$ 150 $T_c=80^\circ\text{C}$ 100	A
		$-I_c$		50	A
Collector power dissipation	$P_c$	1 device	360	W	
Brake	Collector-Emitter voltage	$V_{CES}$	1200	V	
	Gate-Emitter voltage	$V_{GES}$	$\pm 20$	V	
	Collector current	$I_c$	Continuous	$T_c=25^\circ\text{C}$ 35 $T_c=80^\circ\text{C}$ 25	A
				$T_c=25^\circ\text{C}$ 70 $T_c=80^\circ\text{C}$ 50	A
		$I_{CP}$	1ms		
	Collector power dissipation	$P_c$	1 device	180	W
Repetitive peak reverse voltage(Diode)	$V_{RRM}$		1200	V	
Thyristor	Repetitive peak off-state voltage	$V_{DRM}$	1600	V	
	Repetitive peak reverse voltage	$V_{RRM}$	1600	V	
	Average on-state current	$I_{T(AV)}$	50Hz/60Hz sine wave 50	A	
	Surge On-state current (Non-Repetitive)	$I_{TSM}$	$T_j=125^\circ\text{C}$ , 10ms half sine wave 530	A	
Junction temperature	$T_{jw}$		125	$^\circ\text{C}$	
Converter	Repetitive peak reverse voltage	$V_{RRM}$	1600	V	
	Average output current	$I_b$	50Hz/60Hz sine wave 50	A	
	Surge current (Non-Repetitive)	$I_{FSM}$	$T_j=150^\circ\text{C}$ , 10ms 520	A	
	$I^2t$ (Non-Repetitive)	$I^2t$	half sine wave 1352	$\text{A}^2\text{s}$	
Junction temperature (except Thyristor)	$T_j$		+150	$^\circ\text{C}$	
Storage temperature	$T_{stg}$		-40 to +125	$^\circ\text{C}$	
Isolation between terminal and copper base *2 voltage between thermistor and others *3	$V_{iso}$	AC : 1 minute	AC 2500	V	
			AC 2500	V	
Mounting screw torque			1.7 *1	N·m	

\*1 Recommendable value : 1.3 to 1.7 N·m (M4)

\*2 All terminals should be connected together when isolation test will be done.

\*3 Terminal 8 and 9 should be connected together. Terminal 1 to 7 and 10 to 26 should be connected together and shorted to copper base.

● Electrical characteristics (T<sub>j</sub>=25°C unless otherwise specified)

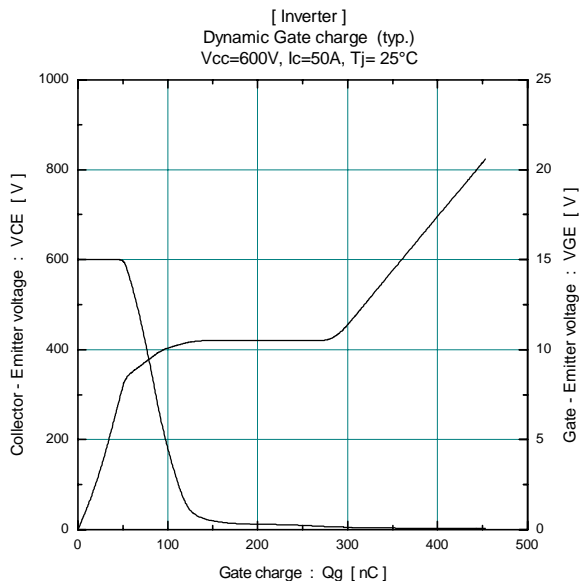
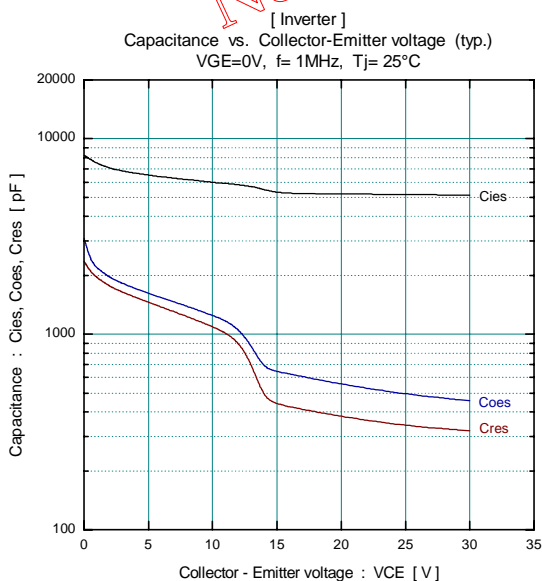
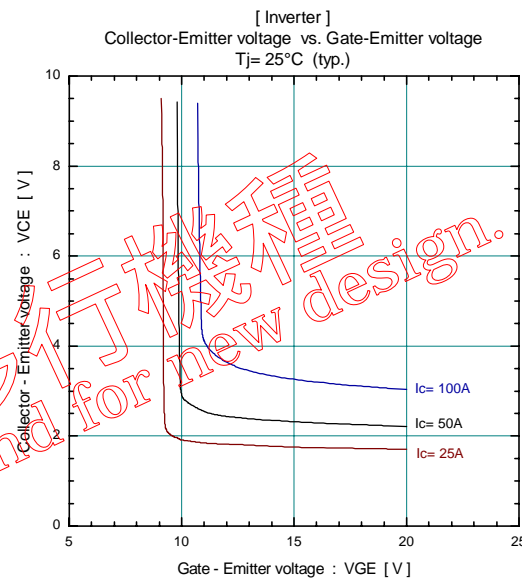
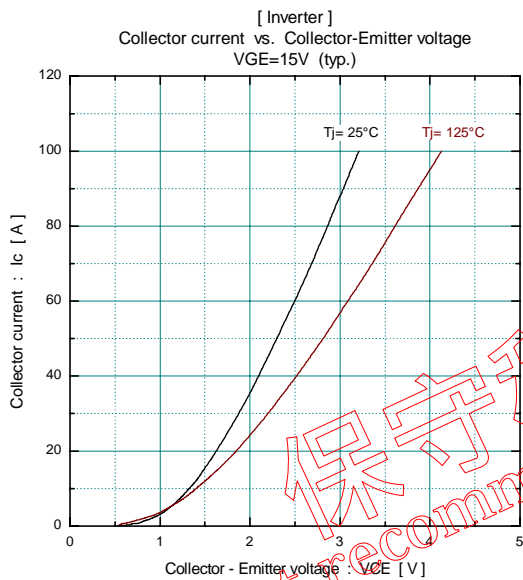
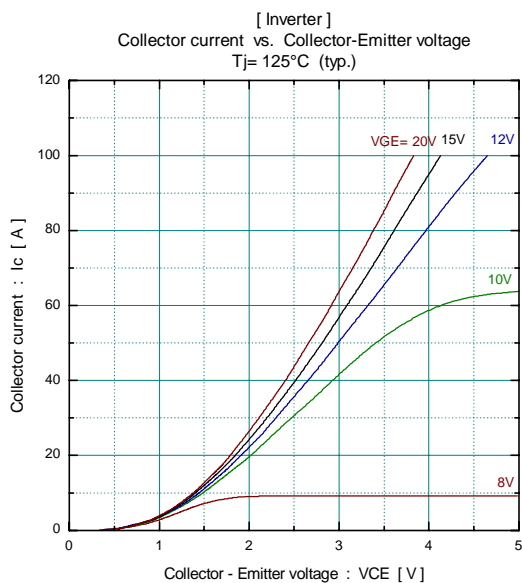
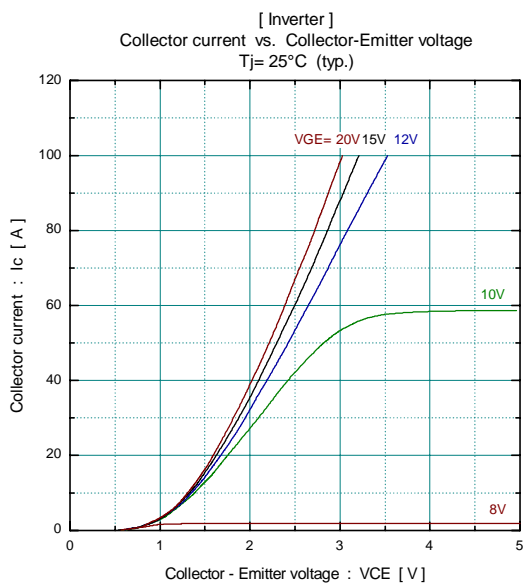
Item	Symbol	Condition	Characteristics			Unit			
			Min.	Typ.	Max.				
Inverter	Zero gate voltage collector current	ICES	V <sub>CE</sub> =1200V, V <sub>GE</sub> =0V			250	μA		
	Gate-Emitter leakage current	IGES	V <sub>CE</sub> =0V, V <sub>GE</sub> =±20V			200	nA		
	Gate-Emitter threshold voltage	V <sub>GE(th)</sub>	V <sub>CE</sub> =20V, I <sub>c</sub> =50mA			5.5	7.2	8.5	V
	Collector-Emitter saturation voltage	V <sub>CE(sat)</sub>	V <sub>GE</sub> =15V, I <sub>c</sub> =50A	chip	2.1		V		
				terminal	2.3			2.7	
	Input capacitance	C <sub>ies</sub>	V <sub>GE</sub> =0V, V <sub>CE</sub> =10V, f=1MHz			6000		μF	
	Turn-on time	ton	V <sub>CC</sub> =600V			0.35	1.2	μs	
		tr	I <sub>c</sub> =50A			0.25	0.6		
	Turn-off	toff	V <sub>GE</sub> =±15V			0.45	1.0	μs	
		tf	R <sub>G</sub> =24Ω			0.08	0.3		
Forward on voltage	V <sub>F</sub>	I <sub>F</sub> =50A	chip	2.3		V			
			terminal	2.5			3.3		
Reverse recovery time of FRD	t <sub>rr</sub>	I <sub>F</sub> =50A			350		ns		
Brake	Zero gate voltage collector current	ICES	V <sub>CEs</sub> =1200V, V <sub>GE</sub> =0V			250	μA		
	Gate-Emitter leakage current	IGES	V <sub>CE</sub> =0V, V <sub>GE</sub> =±20V			200	nA		
	Collector-Emitter saturation voltage	V <sub>CE(sat)</sub>	I <sub>c</sub> =25A, V <sub>GE</sub> =15V	chip	2.1		V		
				terminal	2.25			2.7	
	Turn-on time	ton	V <sub>CC</sub> =600V			0.35	1.2	μs	
		tr	I <sub>c</sub> =25A			0.25	0.6		
	Turn-off time	toff	V <sub>GE</sub> =±15V			0.45	1.0	μs	
		tf	R <sub>G</sub> =51Ω			0.08	0.3		
	Reverse current	I <sub>RRM</sub>	V <sub>R</sub> =1200V			250		μA	
	off-state current	I <sub>DM</sub>	V <sub>DM</sub> =1600V			1.0		mA	
Reverse current	I <sub>RRM</sub>	V <sub>RM</sub> =1600V			1.0		mA		
Thyristor	Gate trigger current	I <sub>GT</sub>	V <sub>D</sub> =6V, I <sub>T</sub> =1A			100		mA	
	Gate trigger voltage	V <sub>GT</sub>	V <sub>D</sub> =6V, I <sub>T</sub> =1A			2.5		V	
	On-state voltage	V <sub>TM</sub>	I <sub>TM</sub> =50A	chip	1.0		V		
terminal				1.1		1.15			
Converter	Forward on voltage	V <sub>FM</sub>	I <sub>F</sub> =50A	chip	1.1		V		
				terminal	1.2			1.5	
Reverse current	I <sub>RRM</sub>	V <sub>R</sub> =1600V			250		μA		
Thermistor	Resistance	R	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

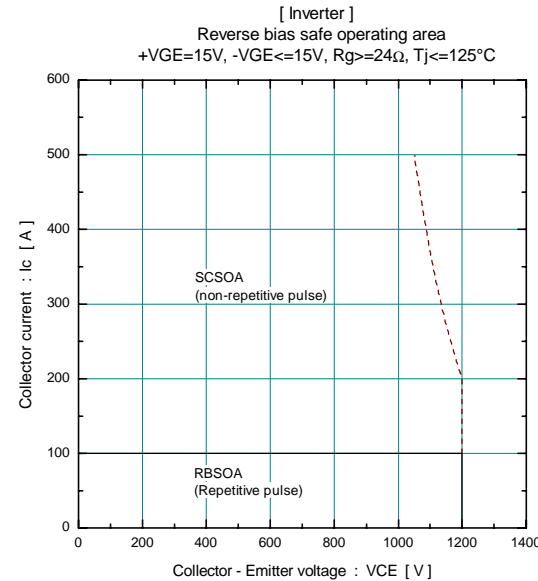
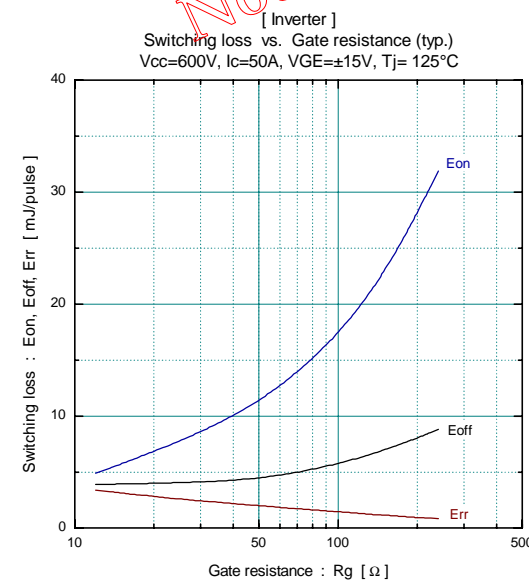
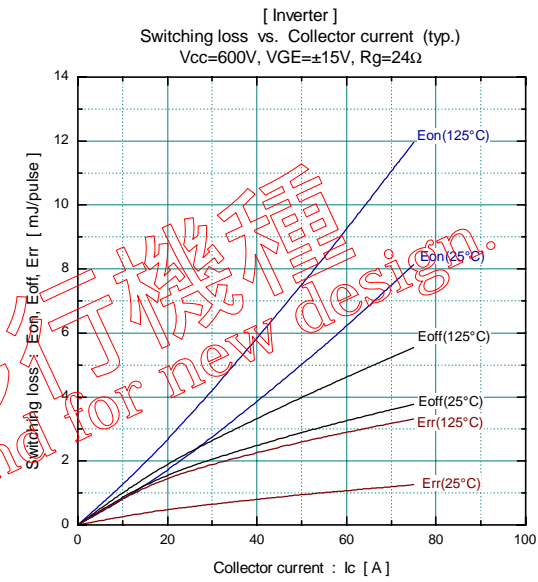
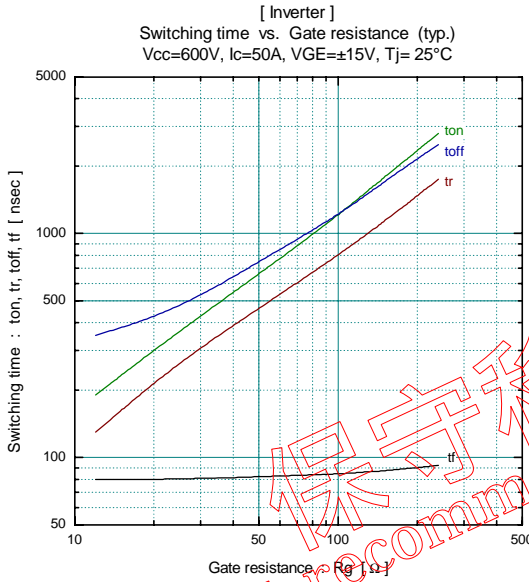
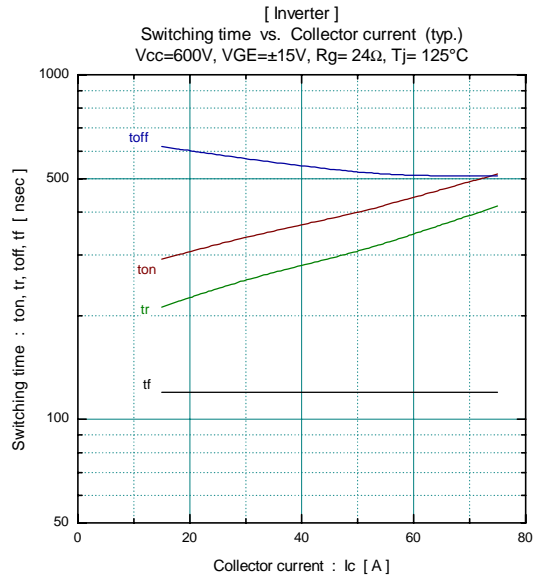
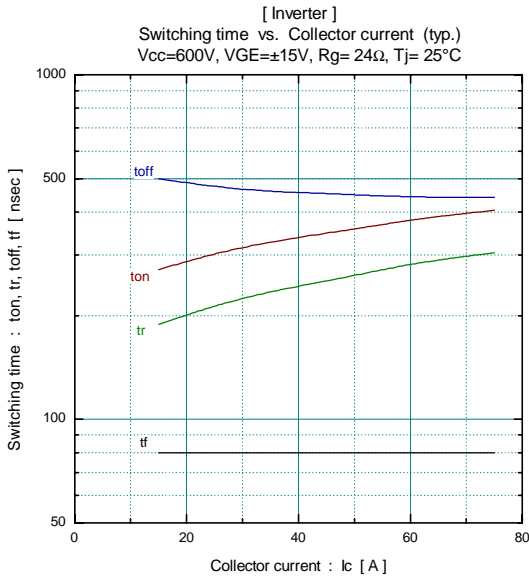
Item	Symbol	Condition	Characteristics			Unit
			Min.	Typ.	Max.	
Thermal resistance ( 1 device )	R <sub>th(j-c)</sub>	Inverter IGBT			0.35	°C/W
		Inverter FWD			0.75	
		Brake IGBT			0.69	
		Thyristor			0.56	
		Converter Diode			0.50	
Contact thermal resistance *	R <sub>th(c-f)</sub>	With thermal compound		0.05		

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

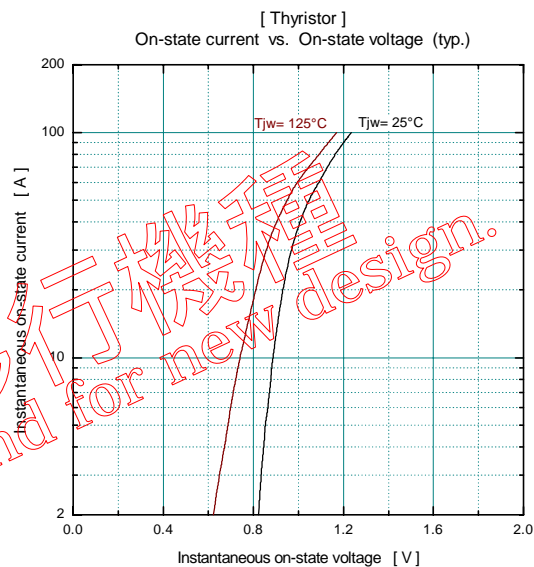
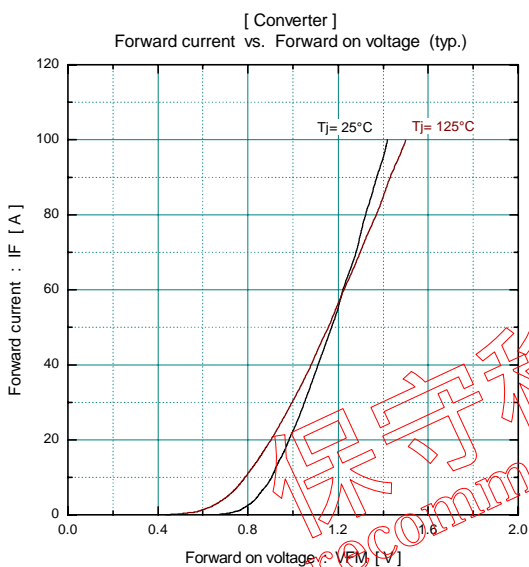
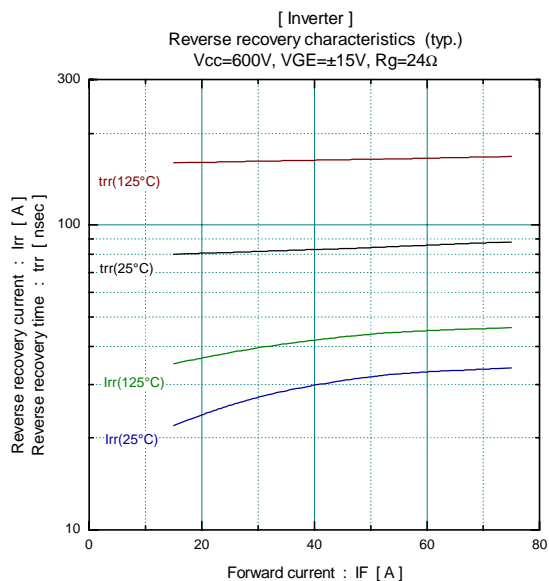
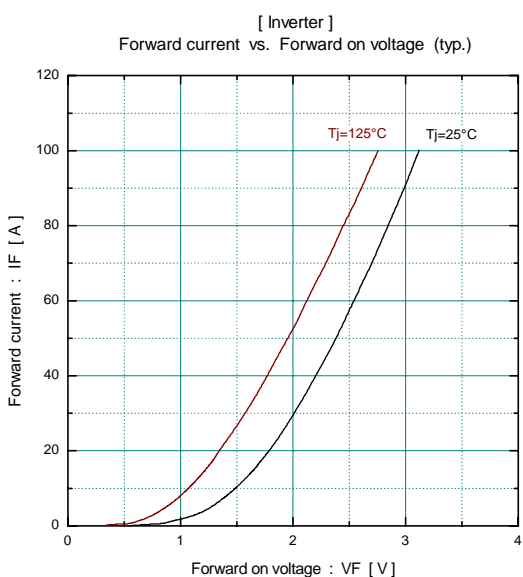
■ Characteristics (Representative)



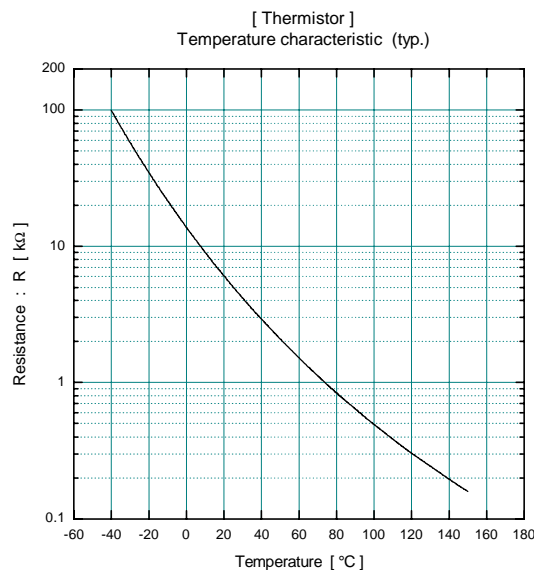
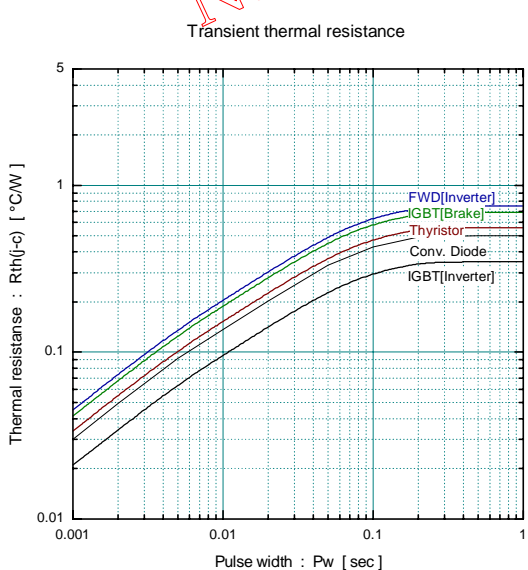
保守移行機種  
Not recommend for new design.

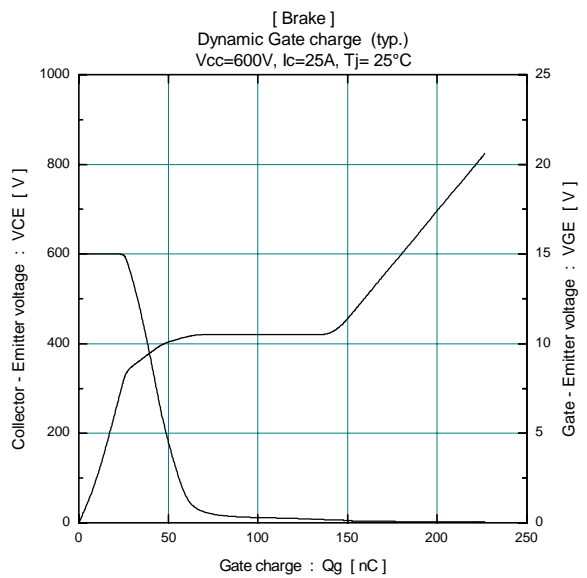
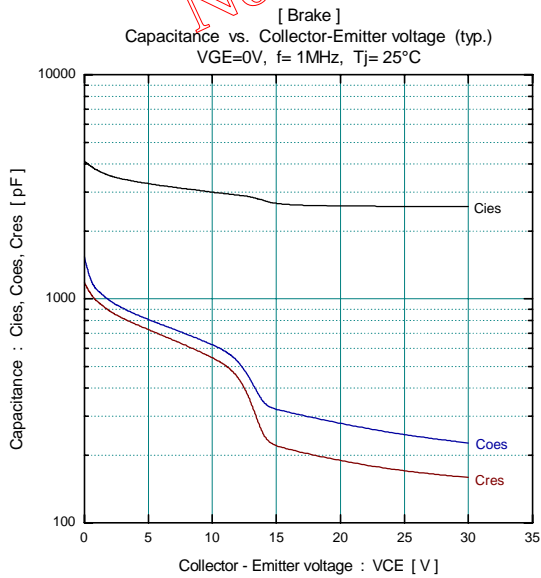
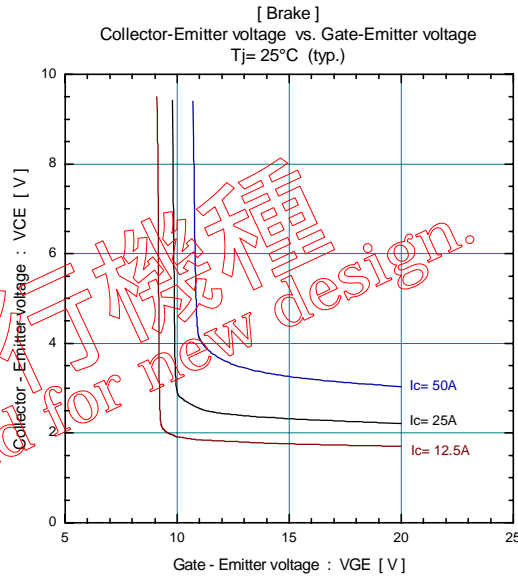
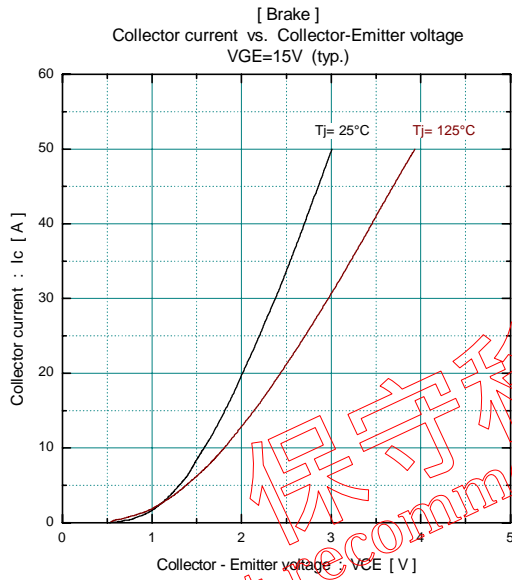
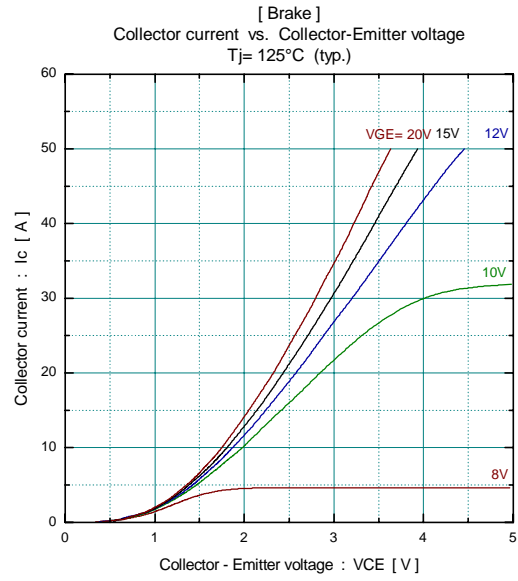
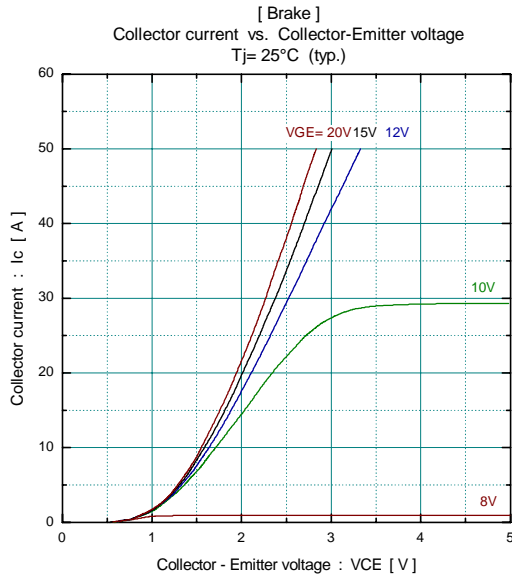


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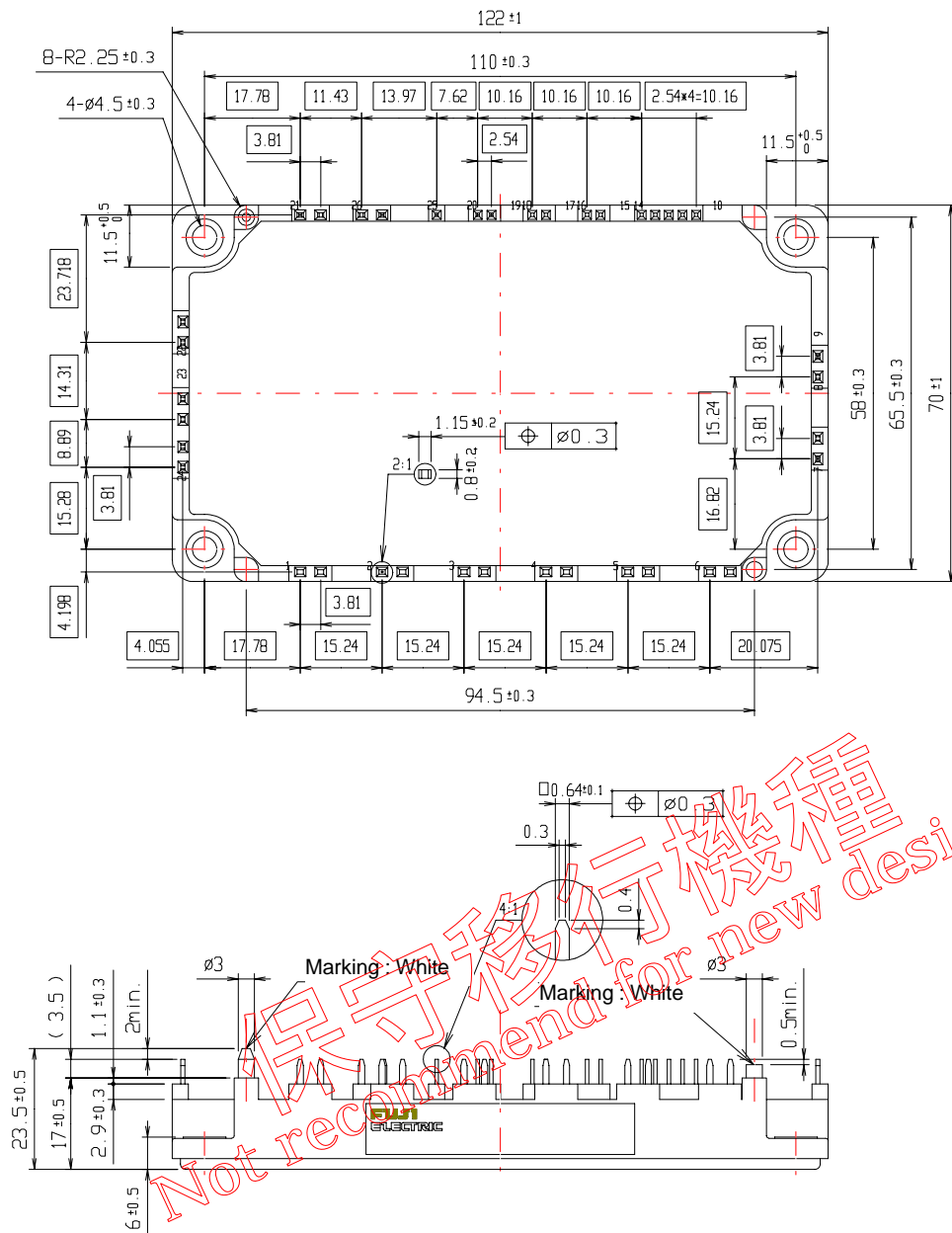
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Not recommend for new design.

Outline Drawings, mm



Equivalent Circuit Schematic

