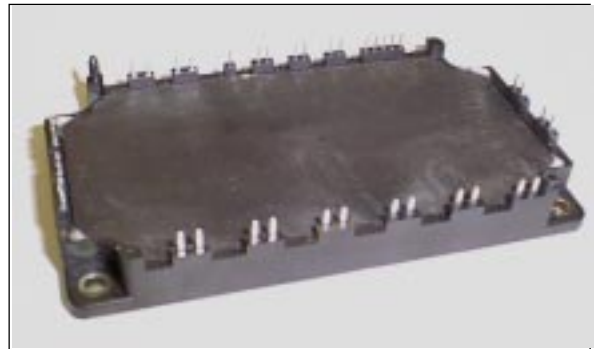


PIM/Built-in converter with thyristor and brake (S series) 600V / 100A / PIM



■ 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}	600	V	
	Gate-Emitter voltage	V_{GES}	± 20	V	
	Collector current	I_C	Continuous	100	A
		I_{CP}	1ms	200	A
		$-I_C$		100	A
Collector power dissipation	P_C	1 device	400	W	
Brake	Collector-Emitter voltage	V_{CES}	600	V	
	Gate-Emitter voltage	V_{GES}	± 20	V	
	Collector current	I_C	Continuous	50	A
		I_{CP}	1ms	100	A
	Collector power dissipation	P_C	1 device	200	W
Thyristor	Repetitive peak reverse voltage(Diode)	V_{RRM}	600	V	
	Repetitive peak off-state voltage	V_{DRM}	800	V	
	Repetitive peak reverse voltage	V_{RRM}	800	V	
	Average on-state current	$I_{T(AV)}$	50Hz/60Hz sine wave	100	A
	Surge On-state current (Non-Repetitive)	I_{TSM}	$T_j=125^\circ\text{C}$, 10ms half sine wave	1050	A
Junction temperature	T_{jw}		125	$^\circ\text{C}$	
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}	$T_j=150^\circ\text{C}$, 10ms	700	A
	I^2t (Non-Repetitive)	I^2t	half sine wave	2450	A^2s
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	Nm	

*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 (Tj=25°C unless otherwise specified)

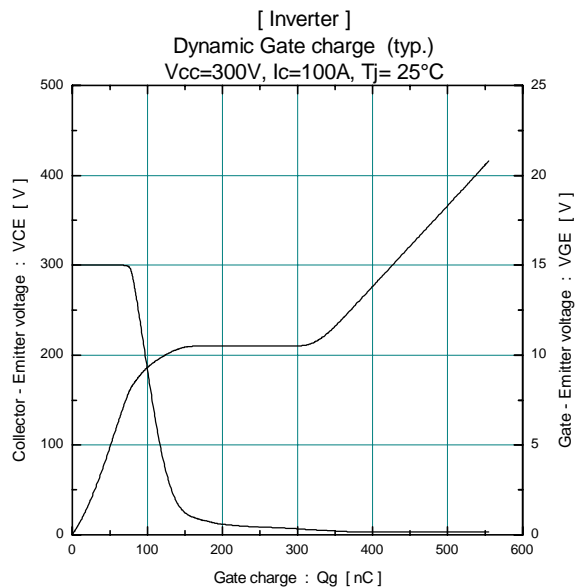
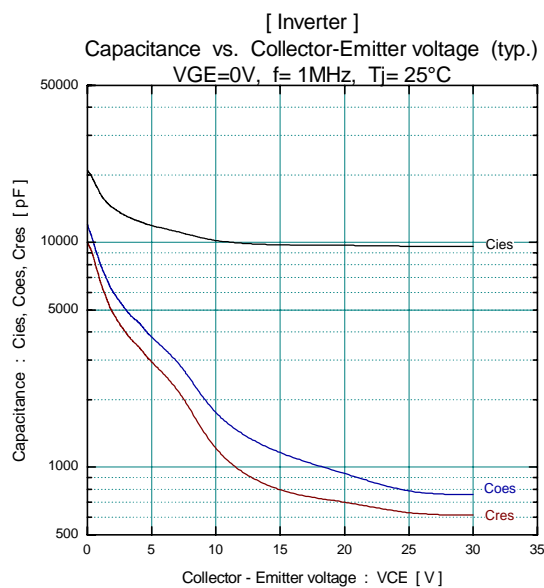
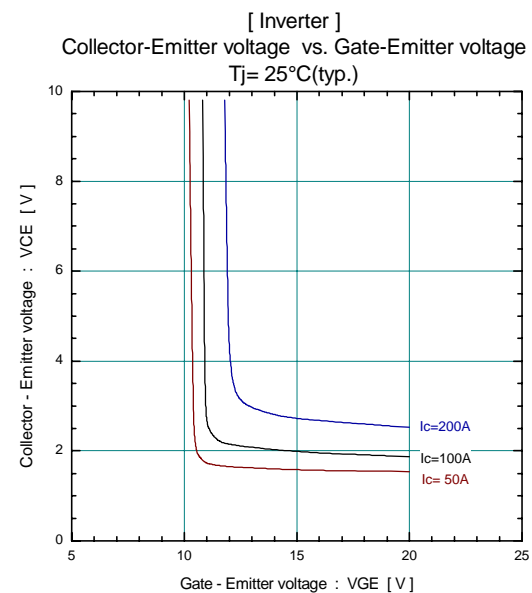
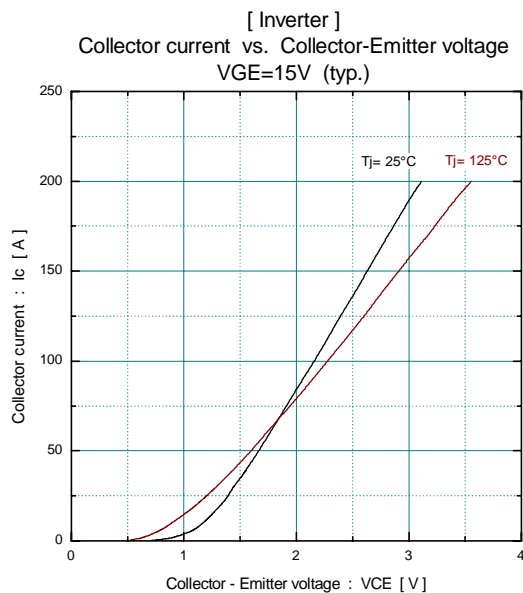
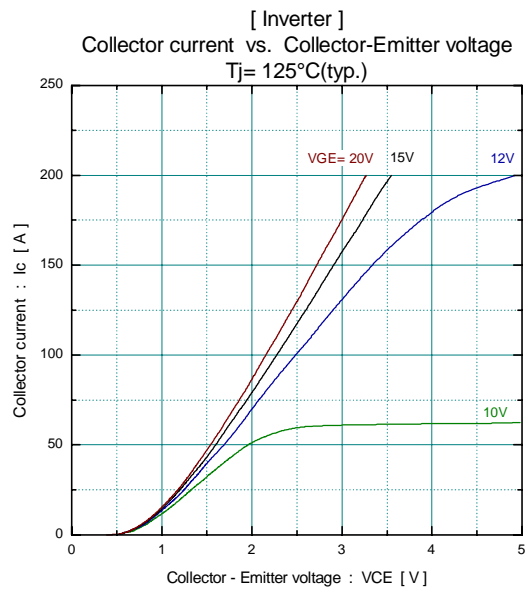
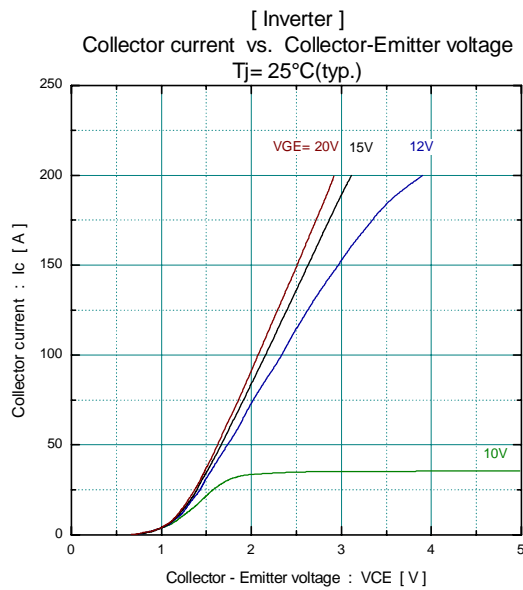
Item	Symbol	Condition	Characteristics			Unit			
			Min.	Typ.	Max.				
Inverter	Zero gate voltage collector current	ICES	VCE=600V, VGE=0V			250	μA		
	Gate-Emitter leakage current	IGES	VCE=0V, VGE=±20V			200	nA		
	Gate-Emitter threshold voltage	VGE(th)	VCE=20V, IC=100mA			5.5	7.8	8.5	V
	Collector-Emitter saturation voltage	VCE(sat)	VGE=15V, IC=100A	chip	1.8		V		
				terminal	2.15			2.6	
	Input capacitance	Cies	VGE=0V, VCE=10V, f=1MHz			10000		pF	
	Turn-on time	ton	VCC=300V			0.45	1.2	μs	
		tr	IC=100A			0.25	0.6		
	Turn-off	toff	VGE=±15V			0.40	1.0		
		tf	RG=24Ω			0.05	0.35		
Forward on voltage	VF	IF=100A	chip	1.6		V			
			terminal	1.95			2.7		
Reverse recovery time of FRD	trr	IF=100A			300		ns		
Brake	Zero gate voltage collector current	ICES	VCE=600V, VGE=0V			250	μA		
	Gate-Emitter leakage current	IGES	VCE=0V, VGE=±20V			200	nA		
	Collector-Emitter saturation voltage	VCE(sat)	IC=50A, VGE=15V	chip	1.8		V		
				terminal	2.05			2.6	
	Turn-on time	ton	VCC=300V			0.45	1.2	μs	
		tr	IC=50A			0.25	0.6		
	Turn-off time	toff	VGE=±15V			0.40	1.0		
		tf	RG=51Ω			0.05	0.35		
	Reverse current	IRRM	VR=600V			250		μA	
	off-state current	IDM	VDM=800V			1.0		mA	
Thyristor	Reverse current	IRRM	VRM=800V			1.0		mA	
	Gate trigger current	IGT	VD=6V, IT=1A			100		mA	
	Gate trigger voltage	VGT	VD=6V, IT=1A			2.5		V	
	On-state voltage	VTM	ITM=100A	chip	1.0		V		
				terminal	1.15				
Converter	Forward on voltage	VFM	IF=100A	chip	1.1		V		
				terminal	1.2			1.5	
	Reverse current	IRRM	VR=800V			250		μA	
Thyristor	Resistance	R	T=25°C			5000		Ω	
			T=100°C			465	495		520
	B value	B	T=25/50°C			3305	3375	3450	K

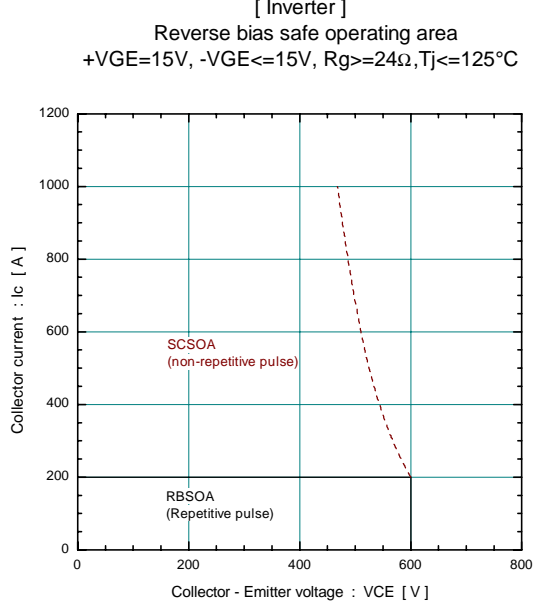
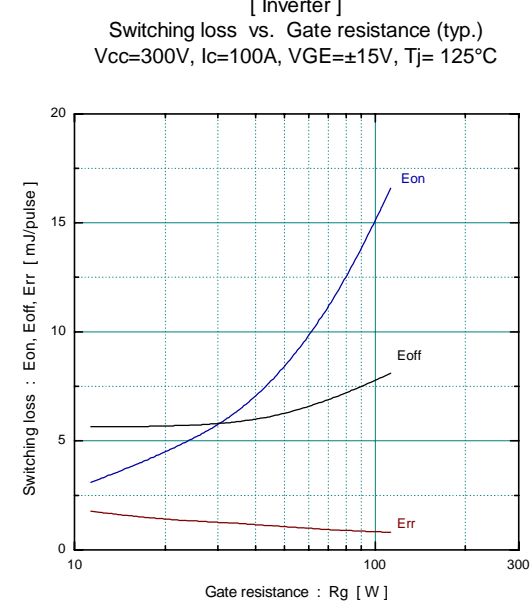
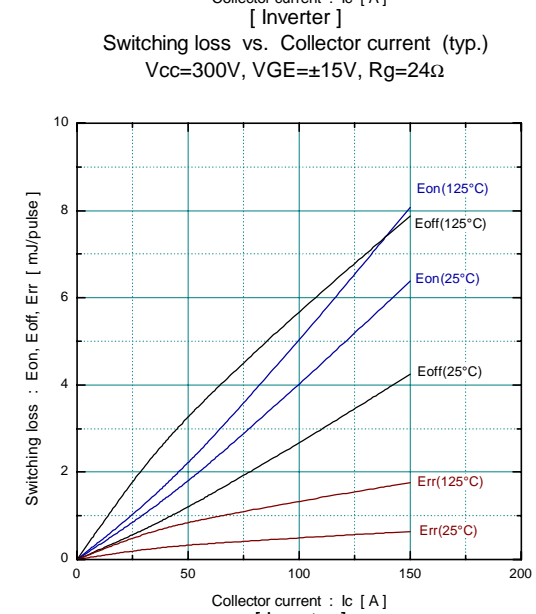
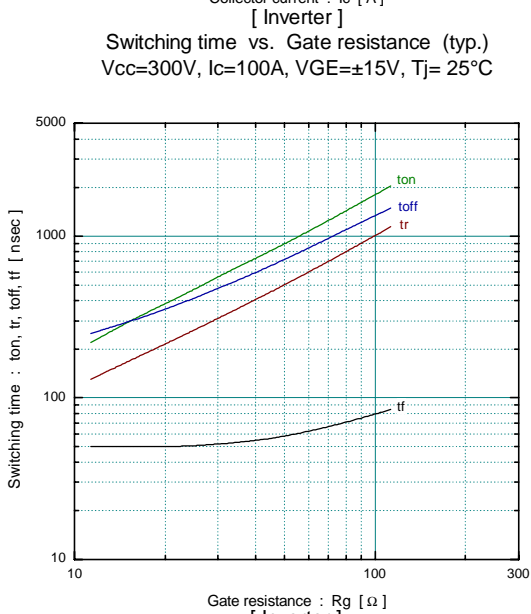
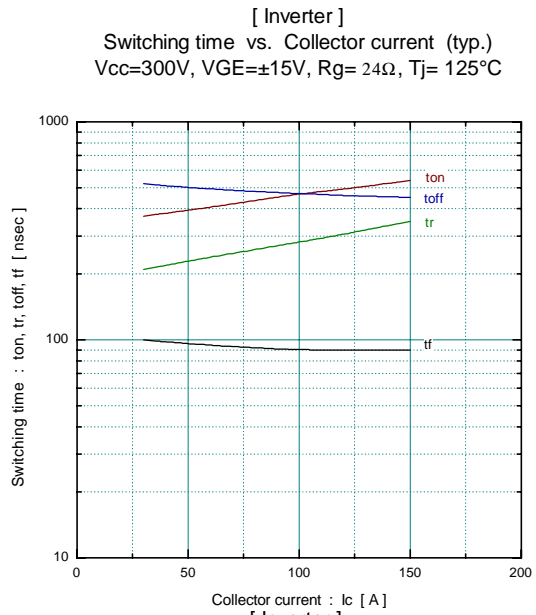
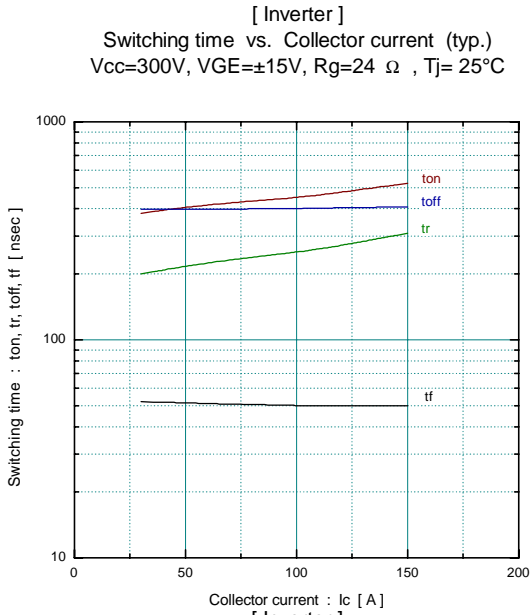
● Thermal resistance Characteristics

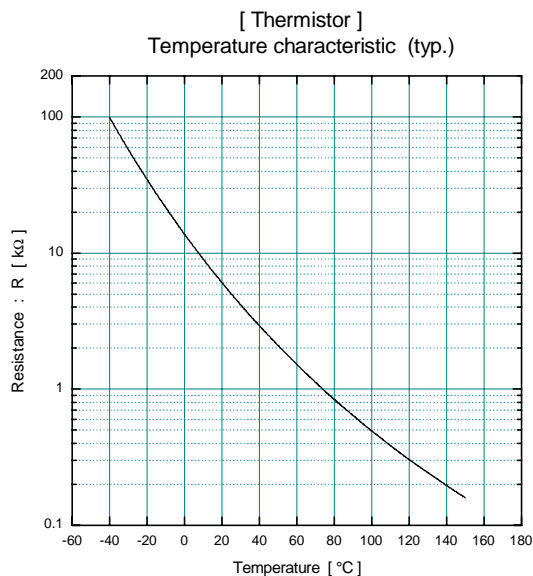
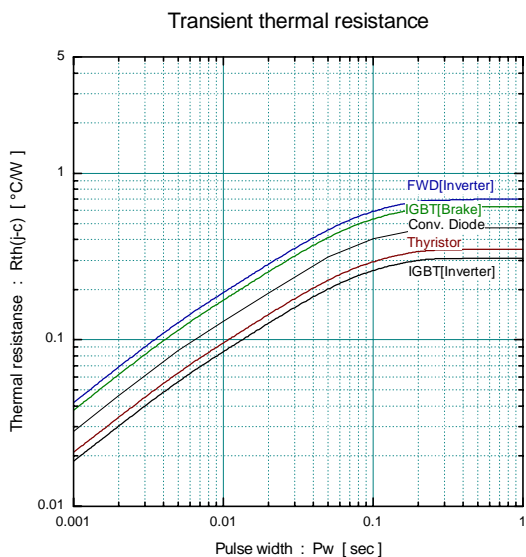
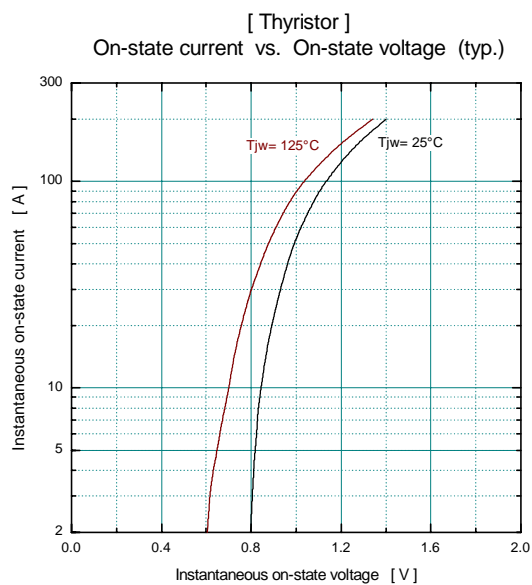
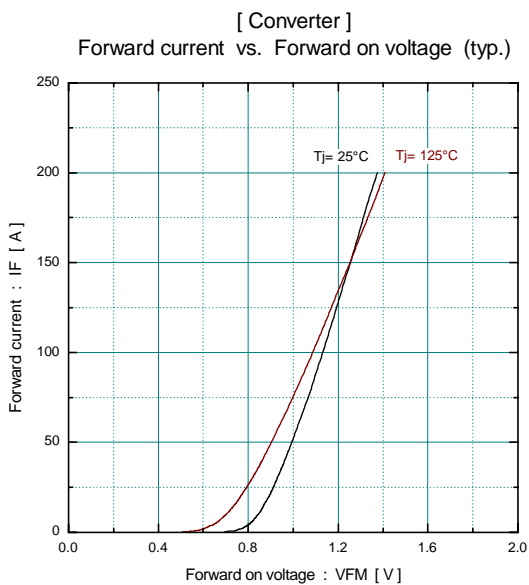
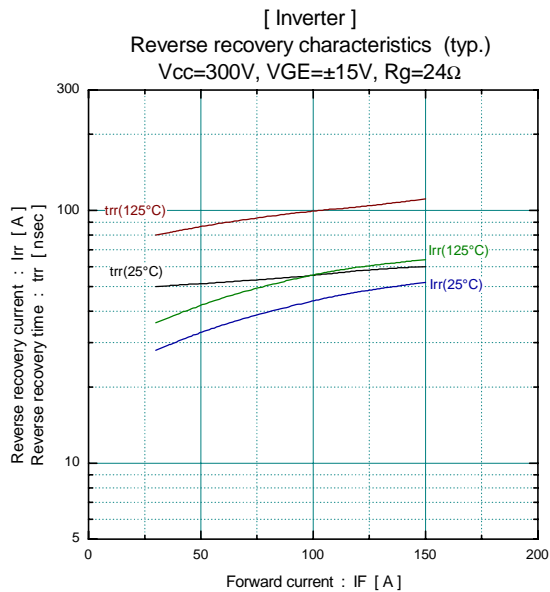
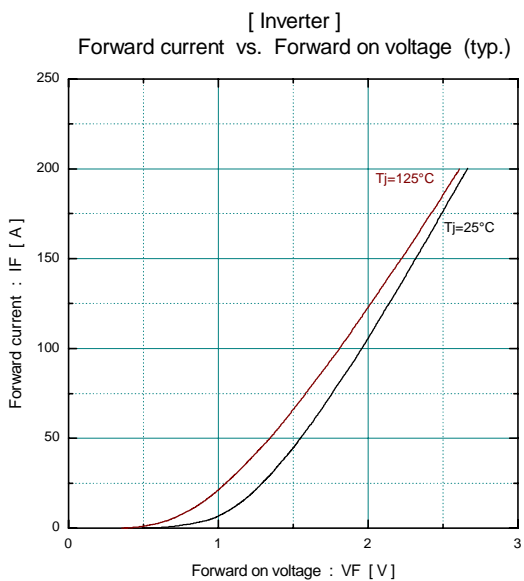
Item	Symbol	Condition	Characteristics			Unit	
			Min.	Typ.	Max.		
Thermal resistance (1 device)	Rth(j-c)	Inverter IGBT			0.31		°C/W
		Inverter FWD			0.70		
		Brake IGBT			0.63		
		Thyristor			0.35		
		Converter Diode			0.47		
Contact thermal resistance *	Rth(c-f)	With thermal compound			0.05		

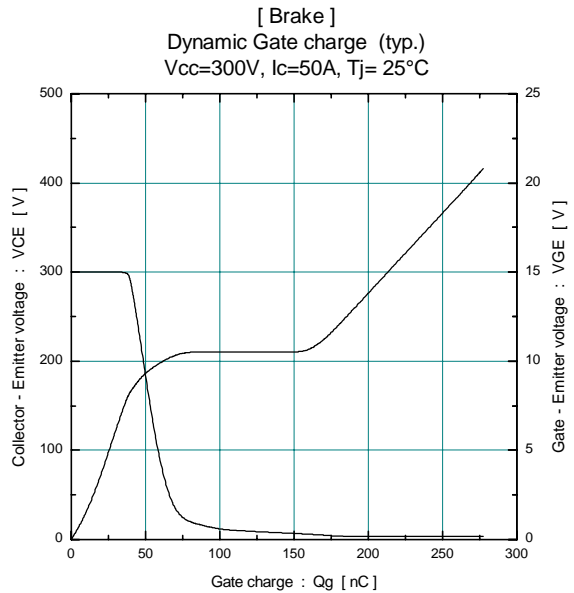
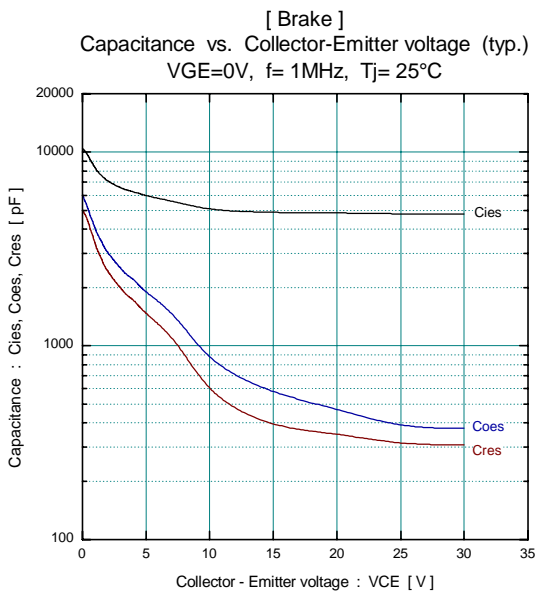
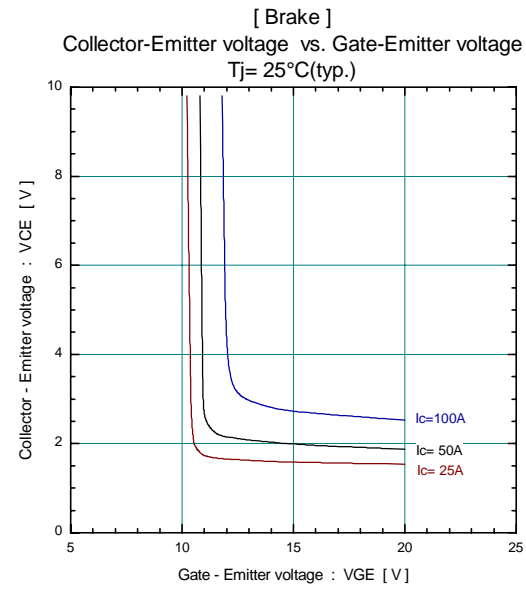
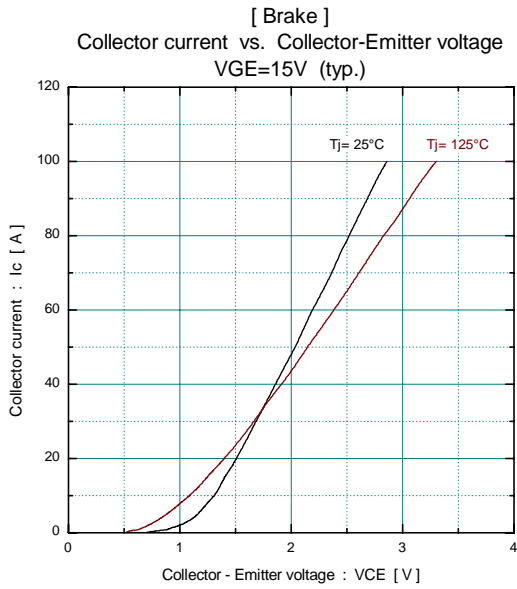
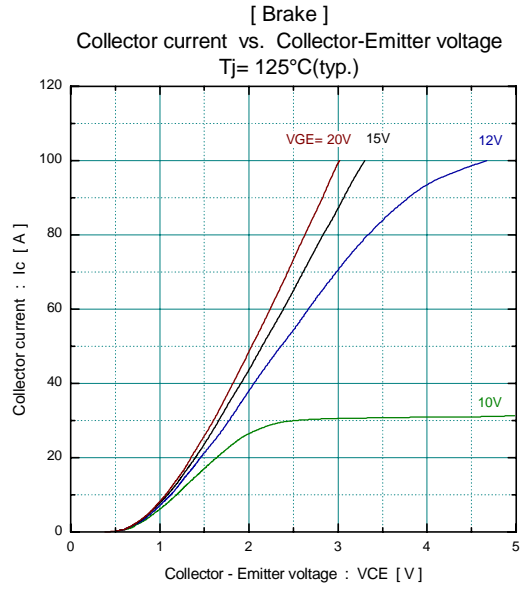
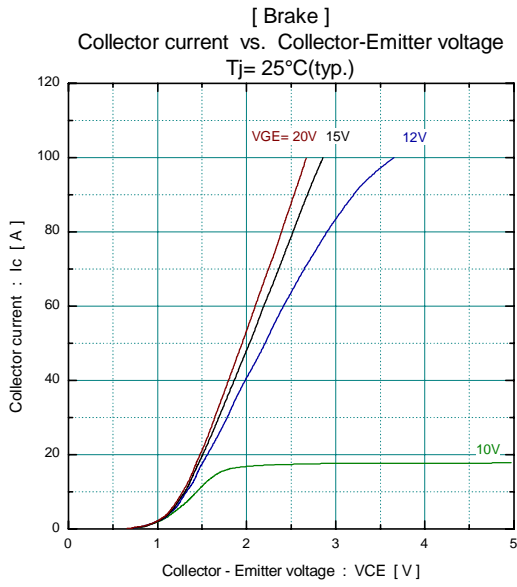
* This is the value which is defined mounting on the additional cooling fin with thermal compound

■ Characteristics (Representative)

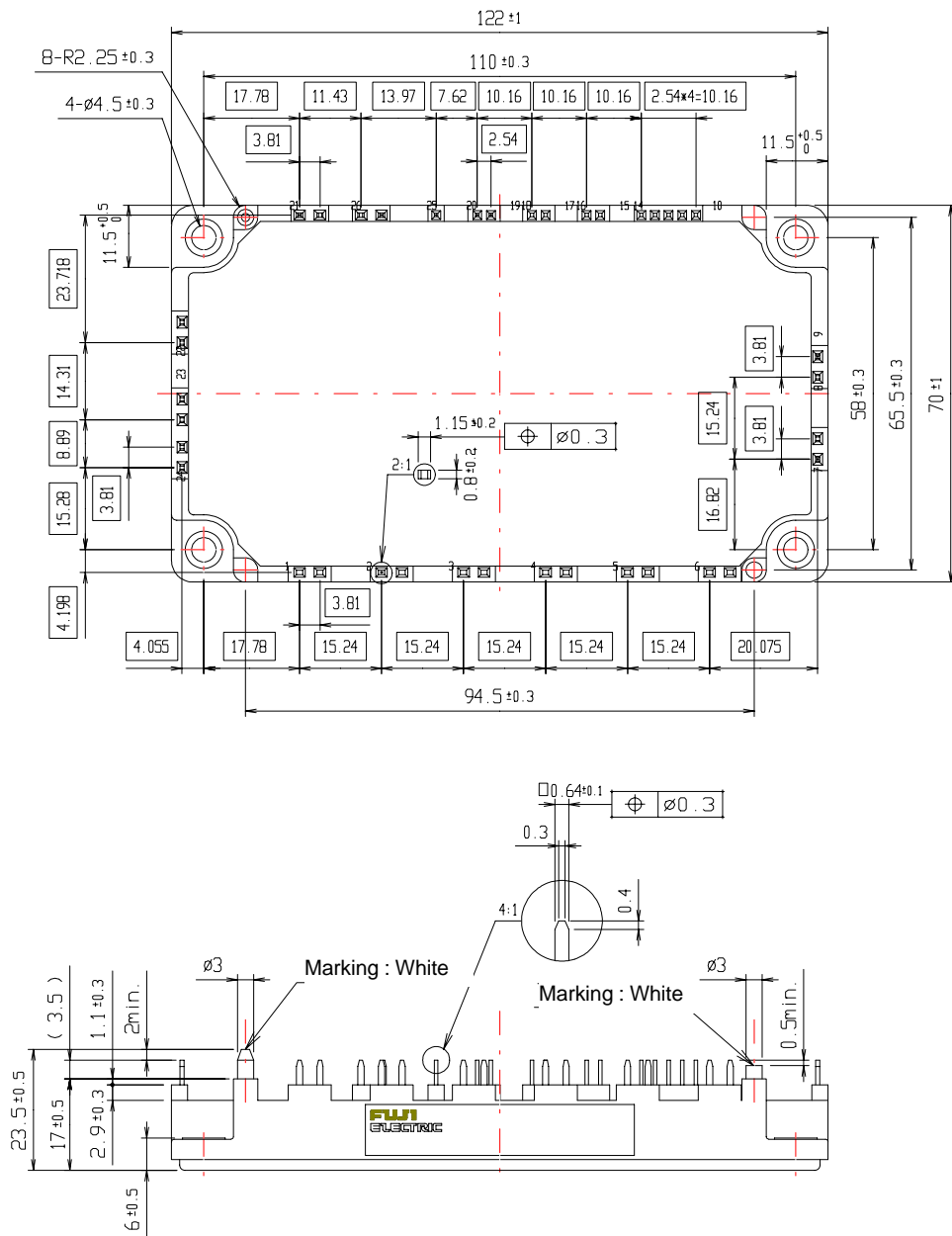








■ Outline Drawings, mm



■ Equivalent Circuit Schematic

