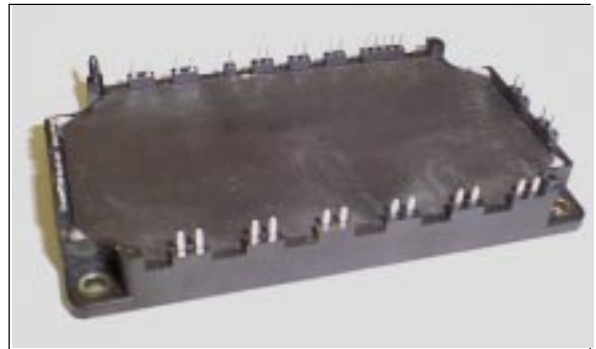


PIM/Built-in converter with thyristor and brake (S series) 1200V / 35A / PIM



■ 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}		±20	V	
	Collector current	I _C	Continuous	T _C =25°C	50	A
				T _C =80°C	35	
		I _{CP}	1ms	T _C =25°C	100	A
				T _C =80°C	70	
		-I _C		35	A	
Collector power dissipation	P _C	1 device		240	W	
Brake	Collector-Emitter voltage	V _{CES}		1200	V	
	Gate-Emitter voltage	V _{GES}		±20	V	
	Collector current	I _C	Continuous	T _C =25°C	35	A
				T _C =80°C	25	
		I _{CP}	1ms	T _C =25°C	70	A
				T _C =80°C	50	
	Collector power dissipation	P _C	1 device		180	W
Thyristor	Repetitive peak reverse voltage(Diode)	V _{RRM}		1200	V	
	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	35	A	
	Surge On-state current (Non-Repetitive)	I _{TSM}	T _J =125°C, 10ms half sine wave	390	A	
	Junction temperature	T _{JW}		125	°C	
	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}	T _J =150°C, 10ms	360	A	
I ² t (Non-Repetitive)		I ² t	half sine wave	648	A ² s	
Junction temperature (except Thyristor)		T _J		+150	°C	
Storage temperature		T _{stg}		-40 to +125	°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_j=25°C unless otherwise specified)

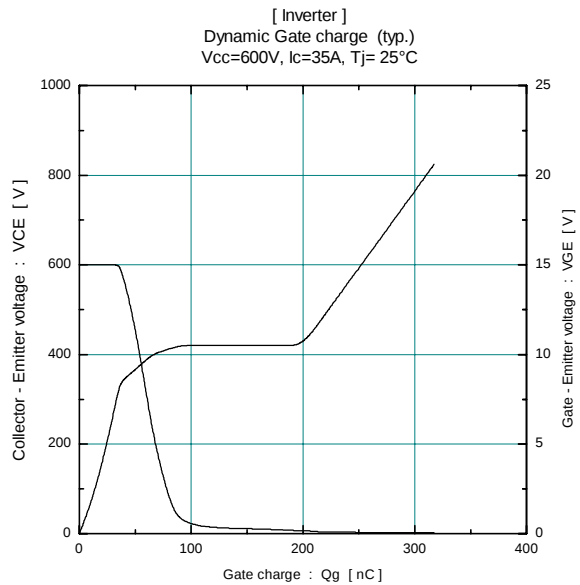
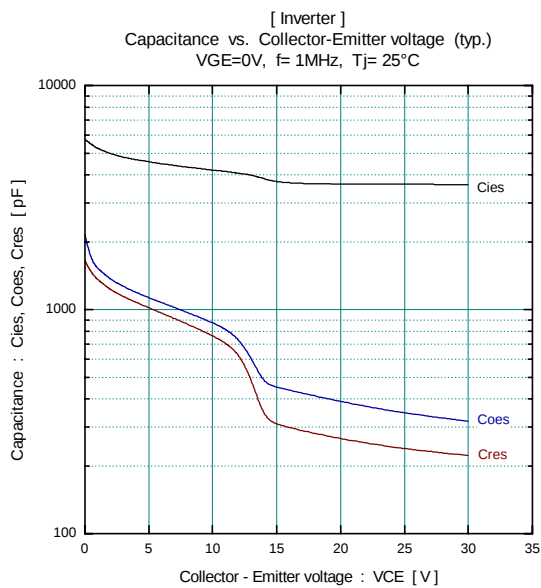
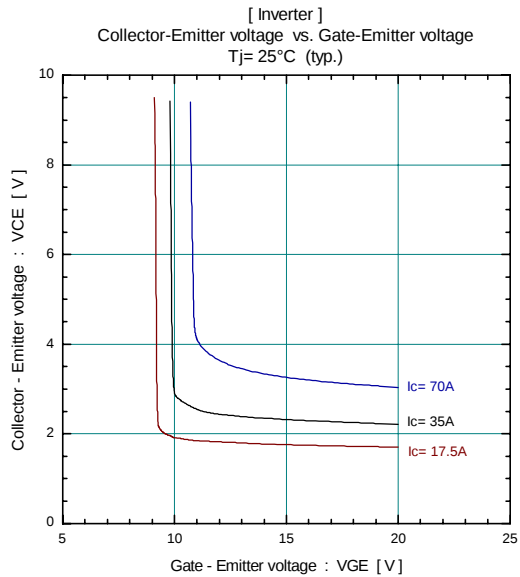
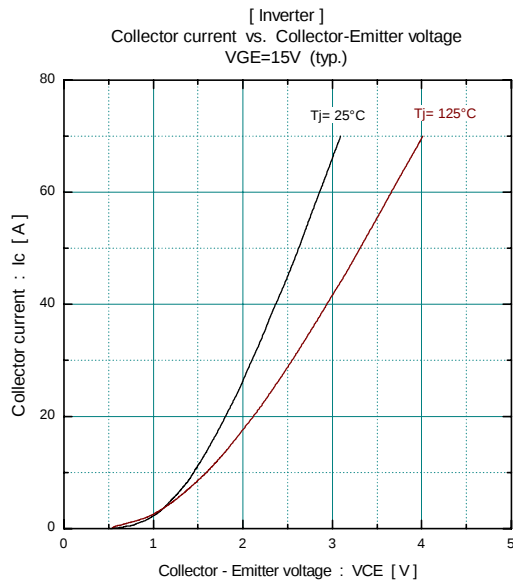
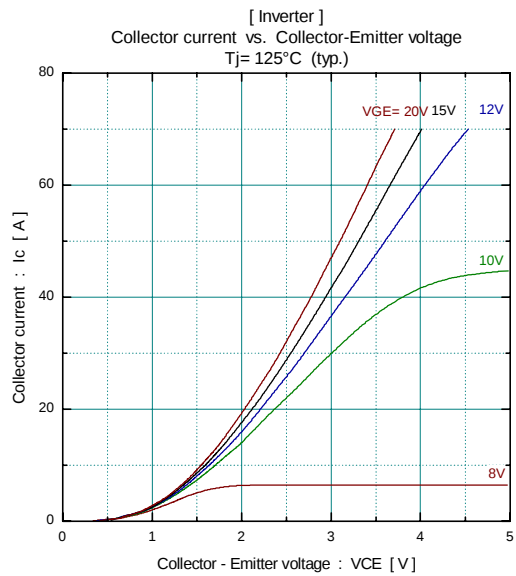
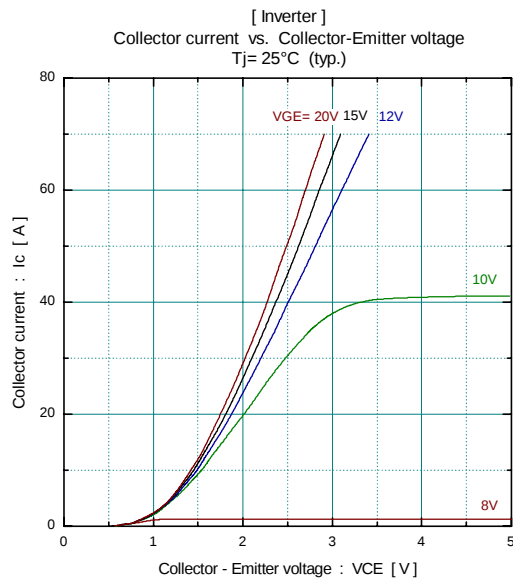
Item		Symbol	Condition		Characteristics			Unit
					Min.	Typ.	Max.	
Inverter	Zero gate voltage collector current	ICES	VCE=1200V, VGE=0V				200	μA
	Gate-Emitter leakage current	IGES	VCE=0V, VGE=±20V				200	nA
	Gate-Emitter threshold voltage	VGE(th)	VCE=20V, IC=35mA		5.5	7.2	8.5	V
	Collector-Emitter saturation voltage	VCE(sat)	VGE=15V, IC=35A	chip		2.1		V
				terminal		2.25	2.7	
	Input capacitance	Cies	VGE=0V, VCE=10V, f=1MHz			4200		pF
	Turn-on time	ton	VCC=600V IC=35A VGE=±15V RG=33Ω			0.35	1.2	μs
		tr				0.25	0.6	
	Turn-off	toff				0.45	1.0	
		tf				0.08	0.3	
	Forward on voltage	VF	IF=35A	chip		2.3		V
				terminal		2.45	3.3	
Reverse recovery time of FRD	trr	IF=35A				350	ns	
Brake	Zero gate voltage collector current	ICES	VCE=1200V, VGE=0V				200	μA
	Gate-Emitter leakage current	IGES	VCE=0V, VGE=±20V				200	nA
	Collector-Emitter saturation voltage	VCE(sat)	IC=25A, VGE=15V	chip		2.1		V
				terminal		2.25	2.7	
	Turn-on time	ton	VCC=600V IC=25A VGE=±15V RG=51Ω			0.35	1.2	μs
		tr				0.25	0.6	
	Turn-off time	toff				0.45	1.0	
		tf				0.08	0.3	
	Reverse current	IRRM	VR=1200V				200	μA
off-state current	IDM	VDM=1600V				1.0	mA	
Thyristor	Reverse current	IRRM	VRM=1600V				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=35A	chip		1.1	1.2	V
				terminal		1.2		
Converter	Forward on voltage	VFM	IF=35A	chip		1.1		V
				terminal		1.2	1.5	
Thyristor	Reverse current	IRRM	VR=1600V				200	μA
	Resistance	R	T=25°C			5000		Ω
			T=100°C		465	495	520	
	B value	B	T=25/50°C		3305	3375	3450	K

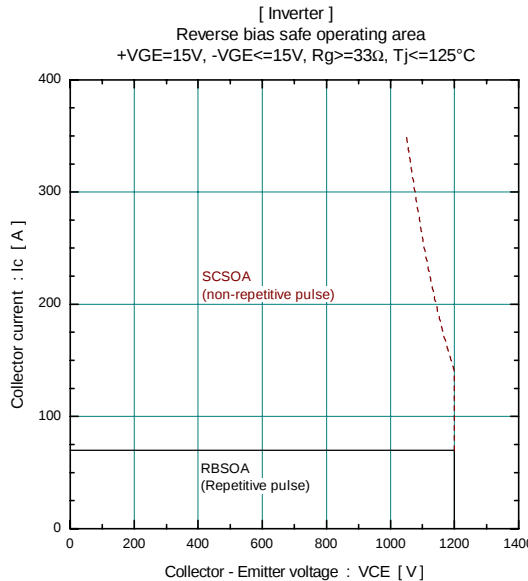
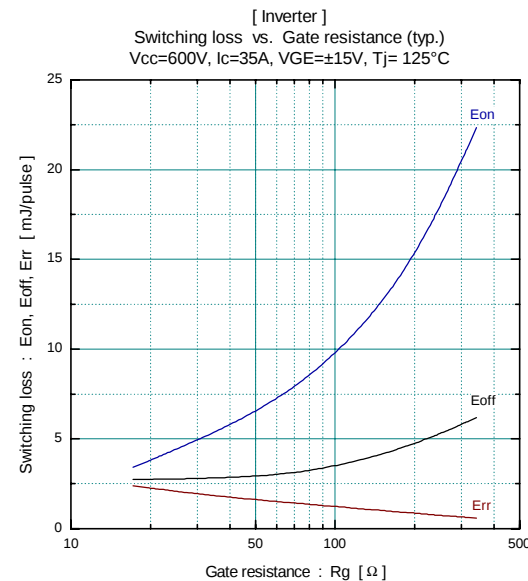
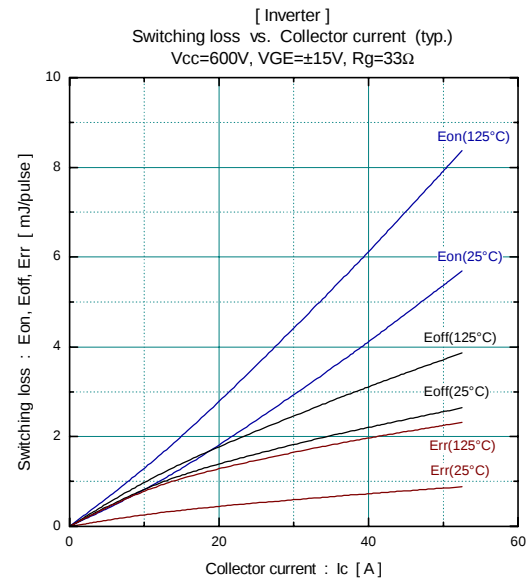
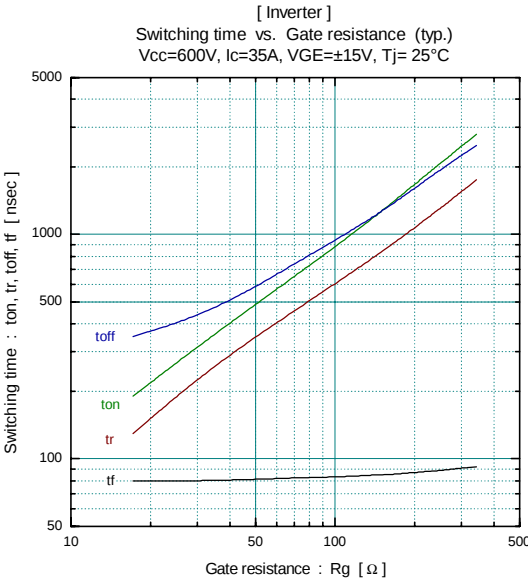
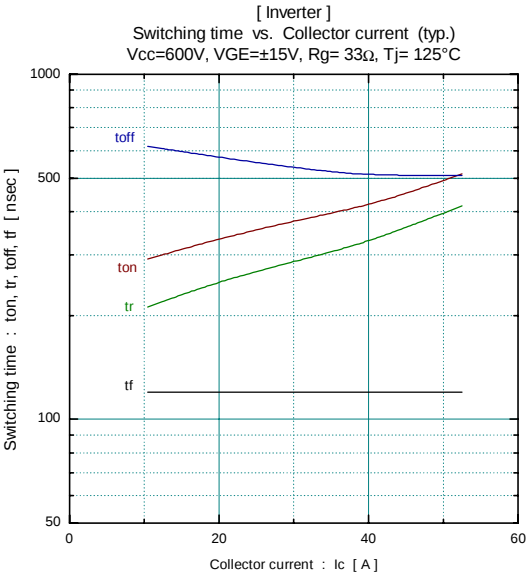
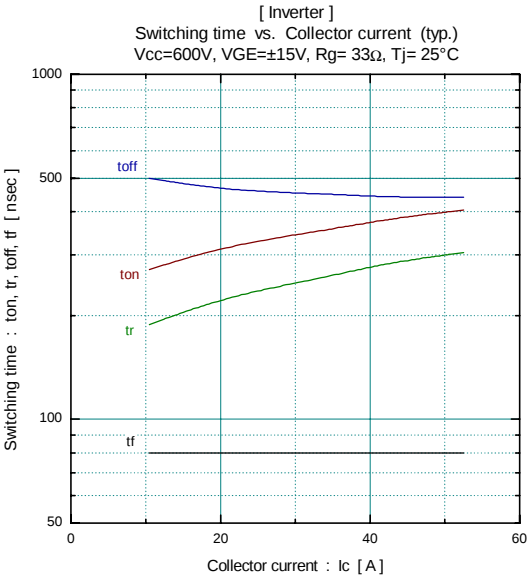
● Thermal resistance Characteristics

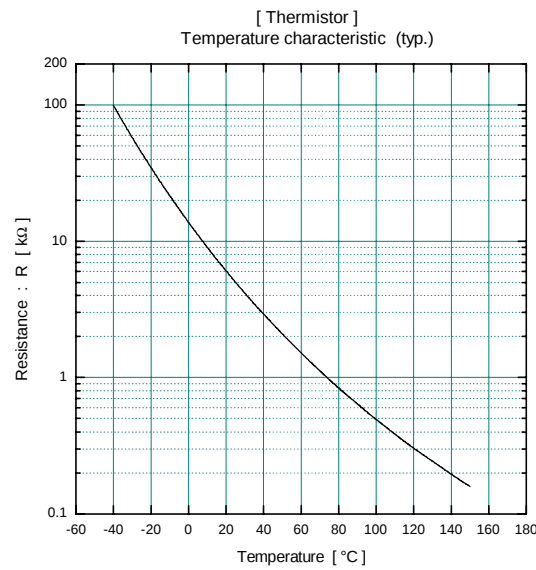
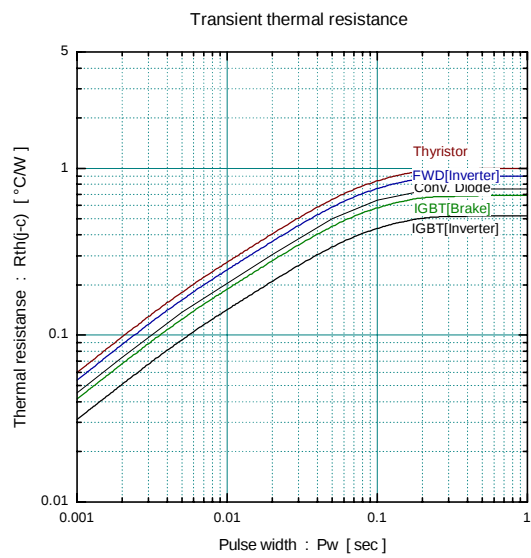
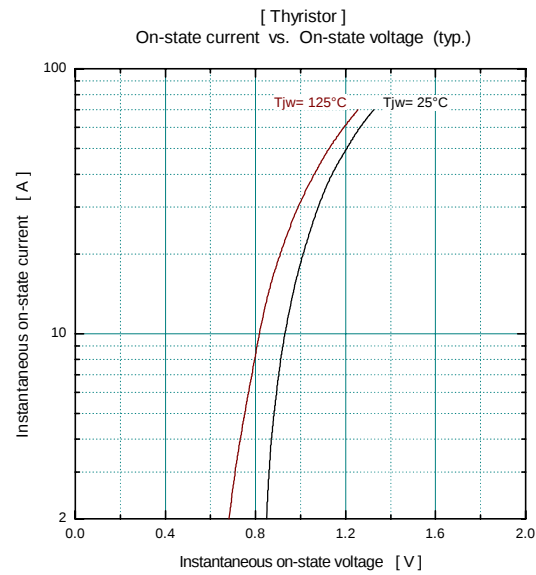
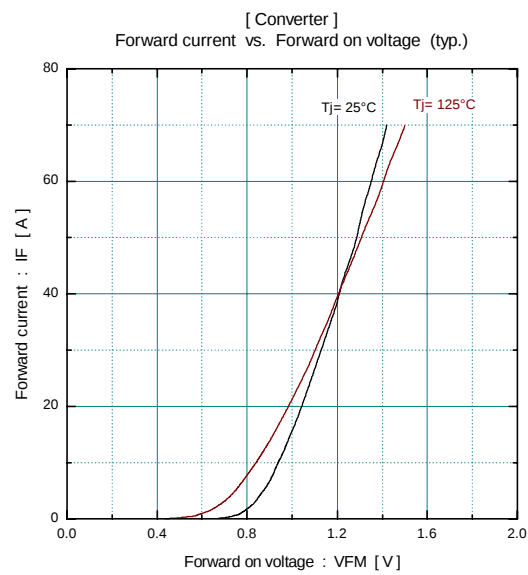
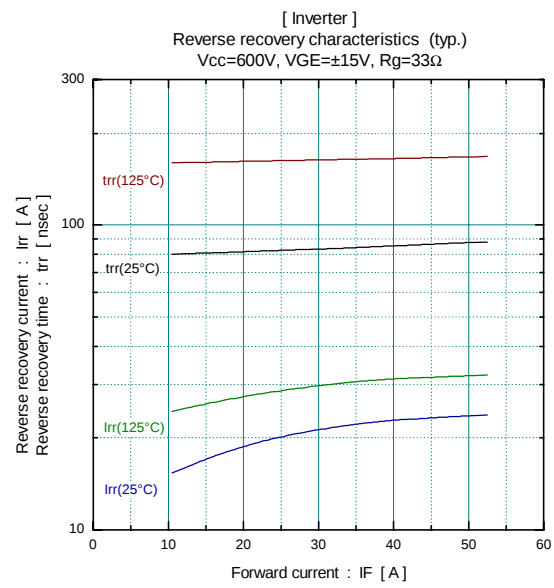
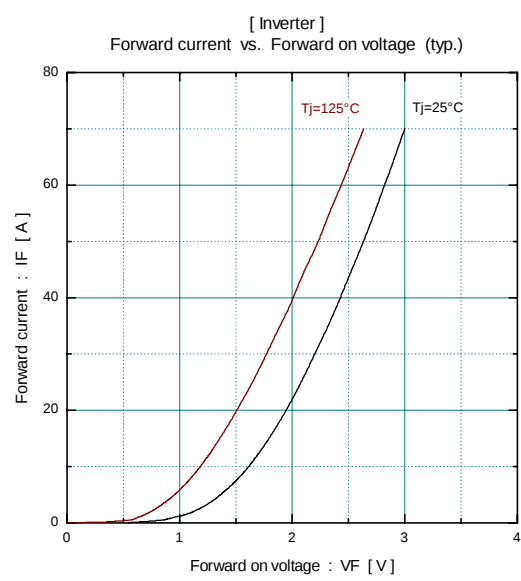
Item		Symbol	Condition	Characteristics			Unit
				Min.	Typ.	Max.	
Thermal resistance (1 device)		R _{th(j-c)}	Inverter IGBT			0.52	°C/W
			Inverter FWD			0.90	
			Brake IGBT			0.69	
			Thyristor			1.00	
			Converter Diode			0.75	
Contact thermal resistance *		R _{th(c-f)}	With thermal compound		0.05		

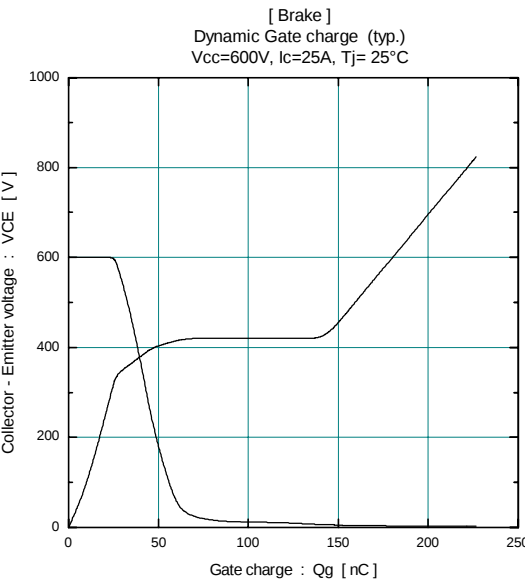
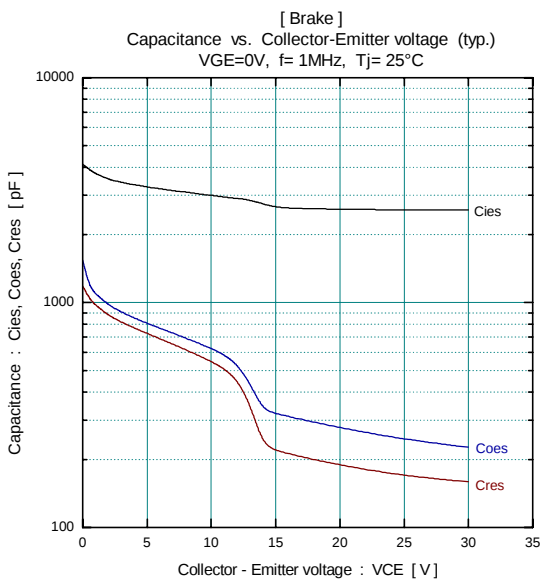
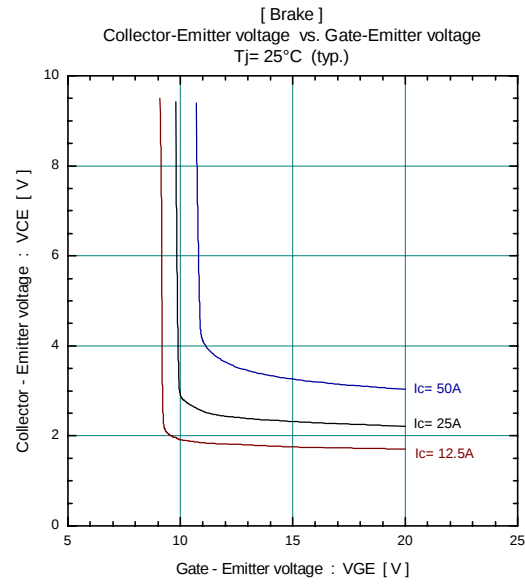
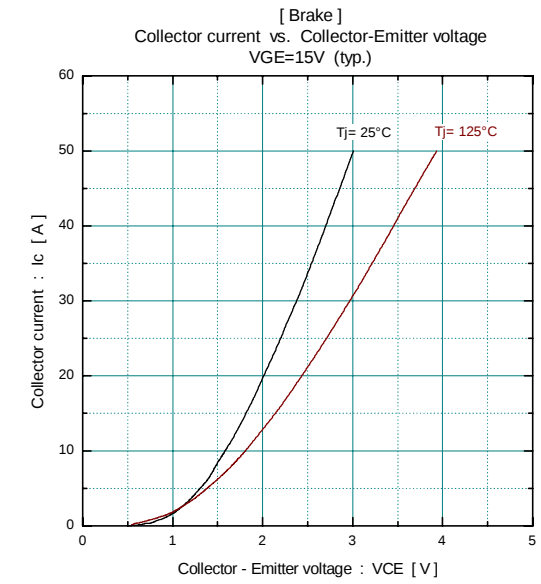
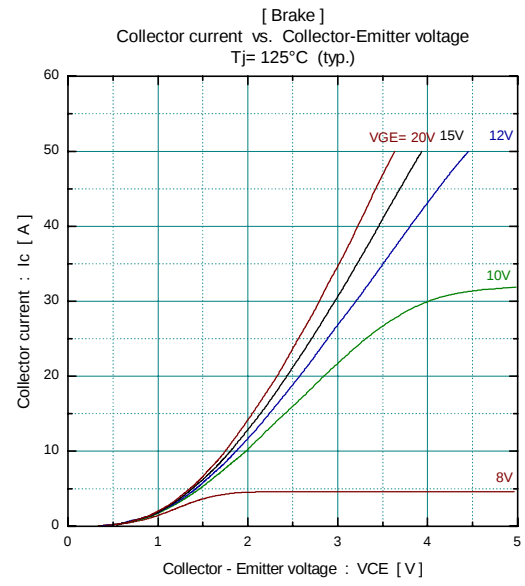
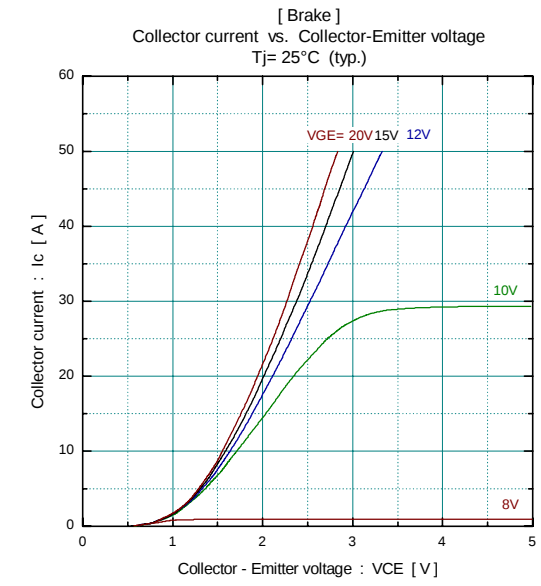
* This is the value which is defined mounting on the additional cooling fin with thermal compound

■ Characteristics (Representative)

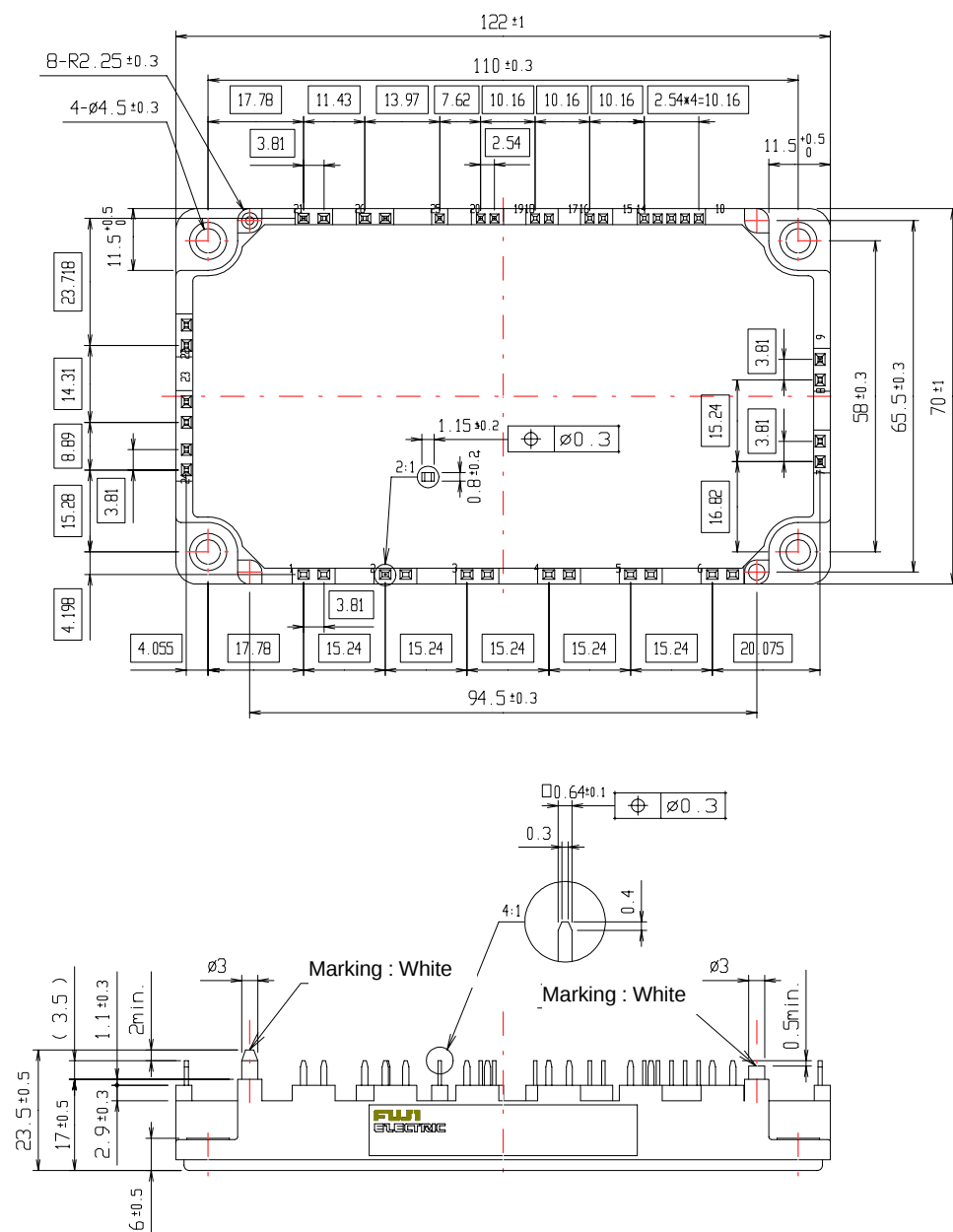








■ Outline Drawings, mm



■ Equivalent Circuit Schematic

