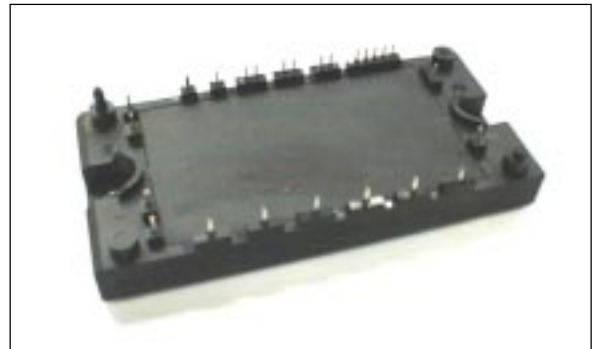


PIM/Built-in converter with thyristor and brake (S series) 1200V / 15A / PIM

■ 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	25	A
				T _C =80°C	15	
		I _{CP}	1ms	T _C =25°C	50	A
				T _C =80°C	30	
	-I _C	15		A		
Collector power dissipation	P _C	1 device		110	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	25	A
				T _C =80°C	15	
		I _{CP}	1ms	T _C =25°C	50	A
				T _C =80°C	30	
Collector power dissipation	P _C	1 device		110	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		15	A
	Surge On-state current (Non-Repetitive)	I _{TSM}	T _j =125°C, 10ms half sine wave		200	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		15	A
	Surge current (Non-Repetitive)	I _{FSM}	T _j =150°C, 10ms		155	A
	I ² t (Non-Repetitive)	I ² t	half sine wave		120	A²s
Junction temperature (except Thyristor)		T _j	+150		°C	
Storage temperature		T _{slg}	-40 to +125		°C	
Isolation between terminal and copper base *2		V _{iso}	AC : 1 minute	AC 2500	V	
voltage between thermistor and others *3				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)

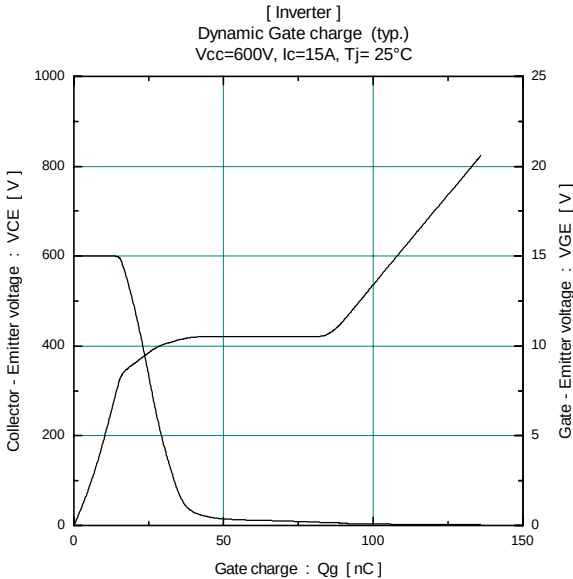
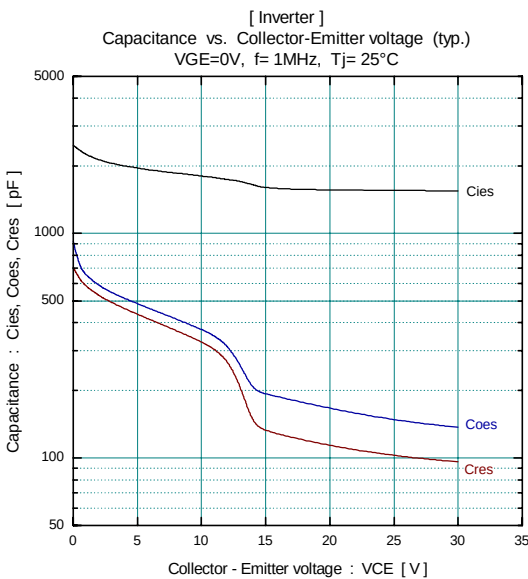
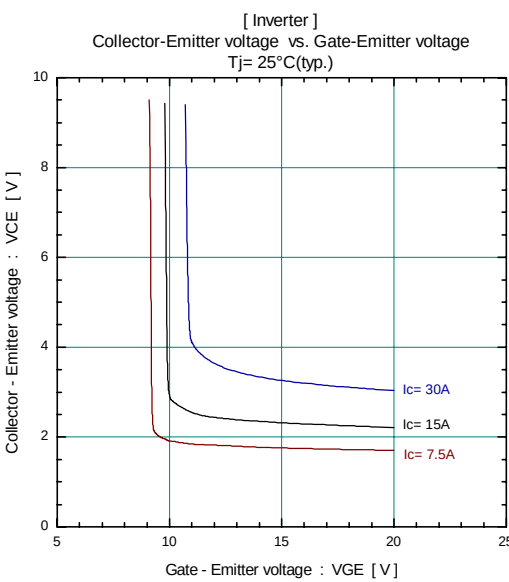
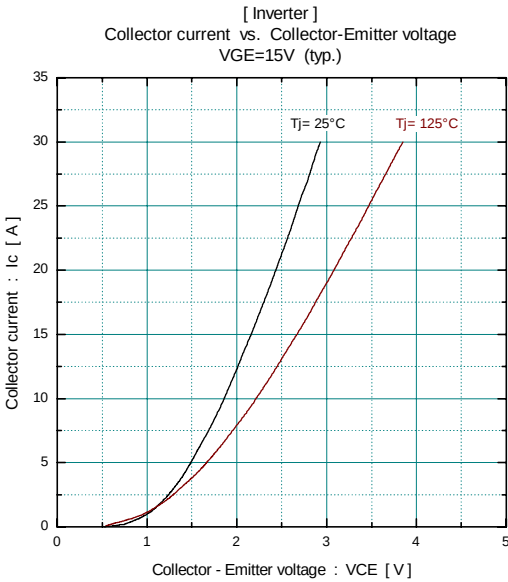
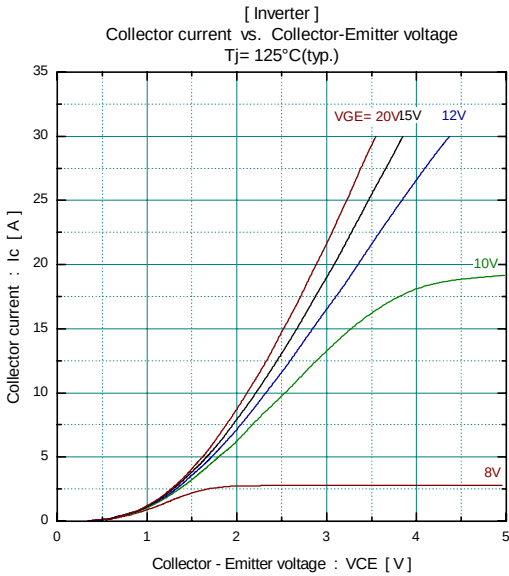
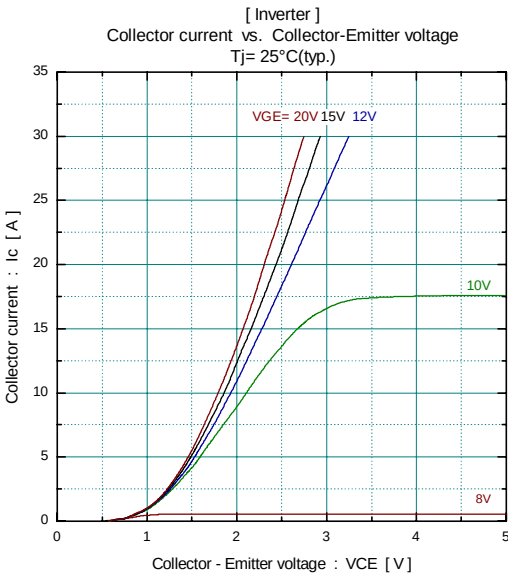
Item		Symbol	Condition		Characteristics			Unit
					Min.	Typ.	Max.	
Inverter	Zero gate voltage collector current	ICES	VCE=1200V, VGE=0V				75	μA
	Gate-Emitter leakage current	IGES	VCE=0V, VGE=±20V				200	nA
	Gate-Emitter threshold voltage	VGE(th)	VCE=20V, IC=15mA		5.5	7.2	8.5	V
	Collector-Emitter saturation voltage	VCE(sat)	VGE=15V, IC=15A	chip		2.1		V
				terminal		2.15	2.6	
	Input capacitance	Cies	VGE=0V, VCE=10V, f=1MHz			1800		pF
	Turn-on time	ton	VCC=600V IC=15A VGE=±15V RG=82Ω			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=15A	chip		2.3		V
				terminal		2.35	3.2	
Reverse recovery time of FRD	trr	IF=15A				350	ns	
Brake	Zero gate voltage collector current	ICES	VCES=1200V, VGE=0V				75	μA
	Gate-Emitter leakage current	IGES	VCE=0V, VGE=±20V				200	nA
	Collector-Emitter saturation voltage	VCE(sat)	IC=15A, VGE=15V	chip		2.1		V
				terminal		2.2	2.6	
	Turn-on time	ton	VCC=600V IC=15A VGE=±15V RG=82Ω			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				75	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=15A	chip		0.95	1.05	V
terminal					1.0			
Converter	Forward on voltage	VFM	IF=15A	chip		1.1		V
				terminal		1.2	1.5	
Thyristor	Reverse current	IRRM	VR=1600V				75	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

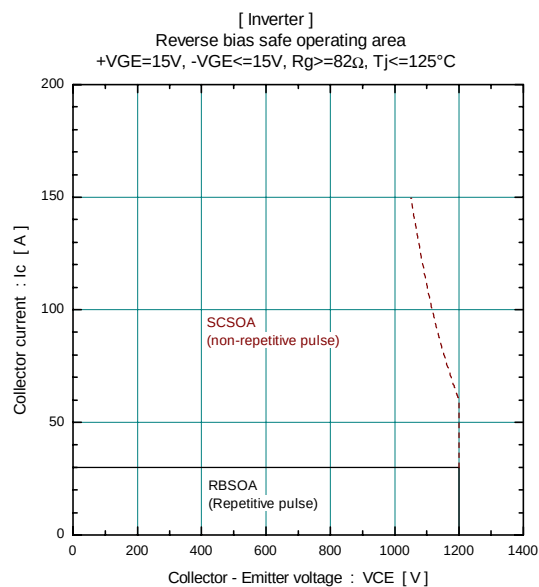
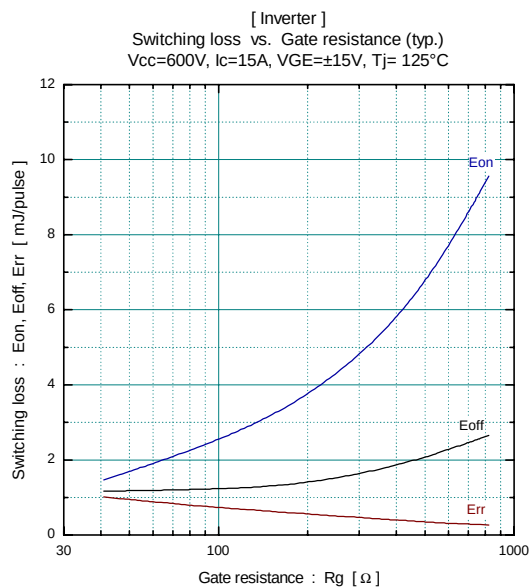
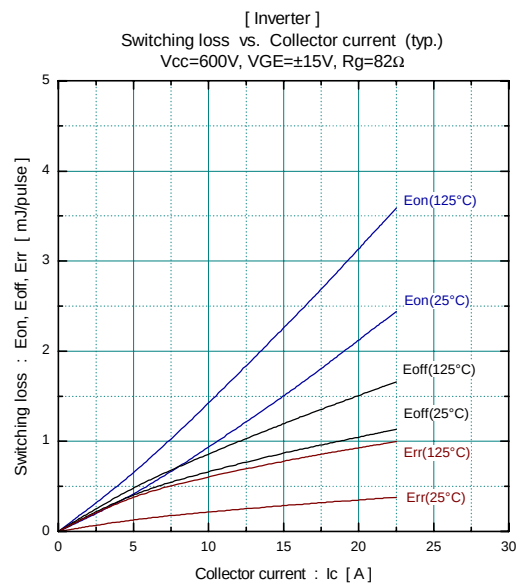
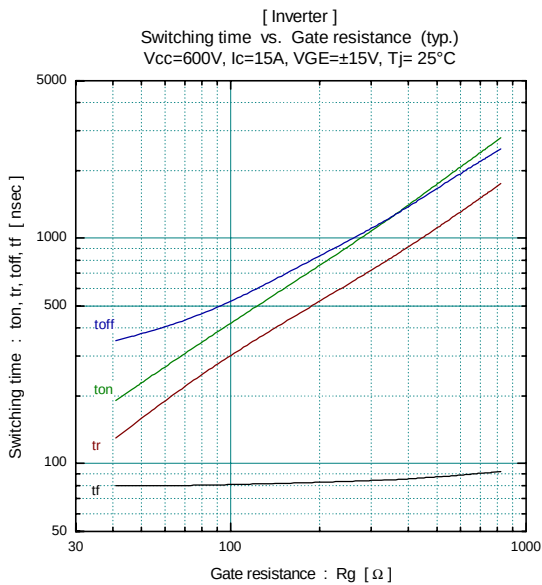
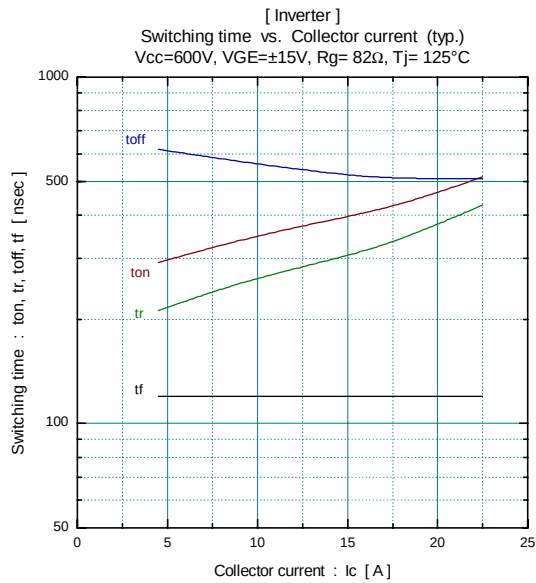
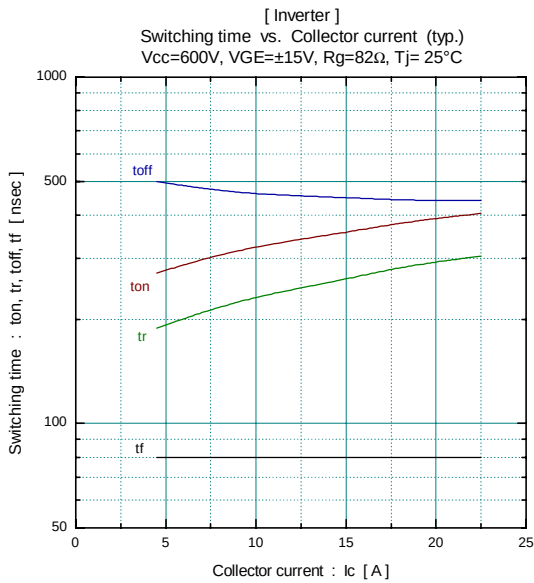
● Thermal resistance Characteristics

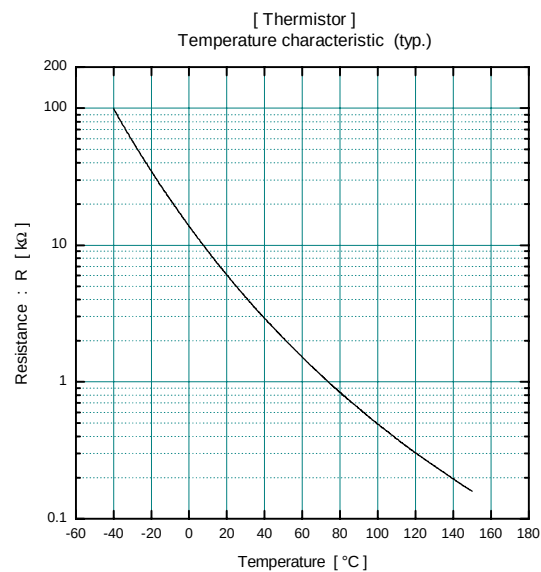
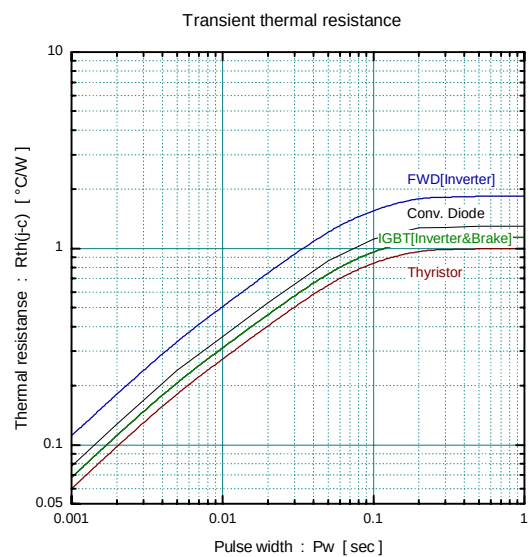
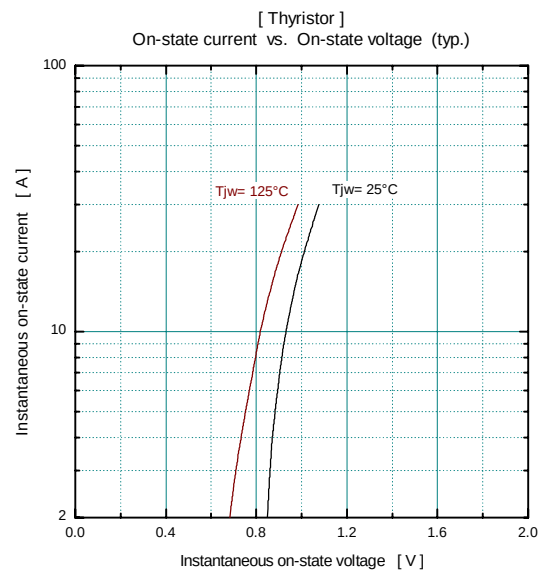
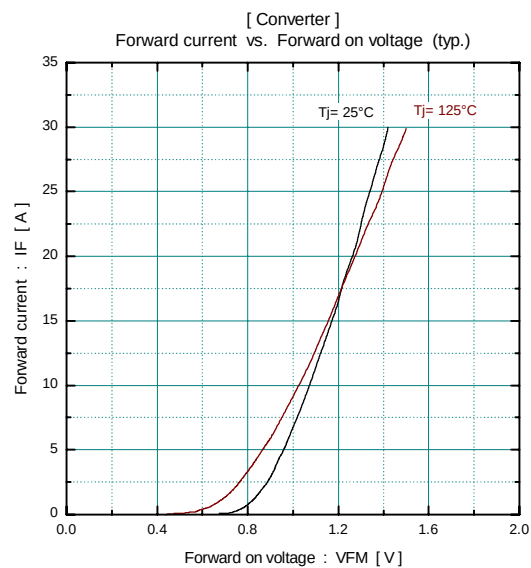
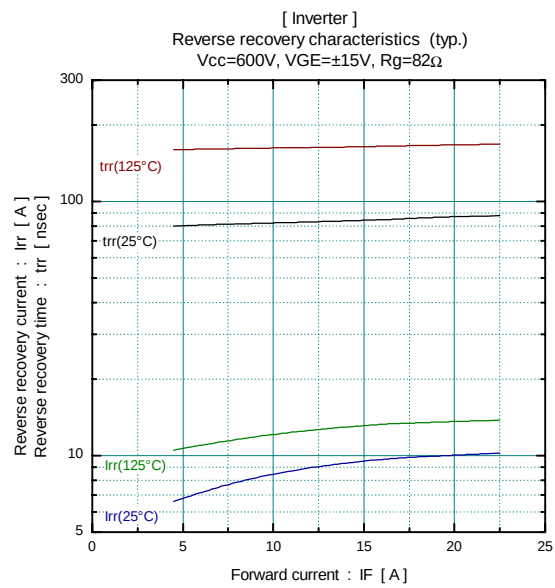
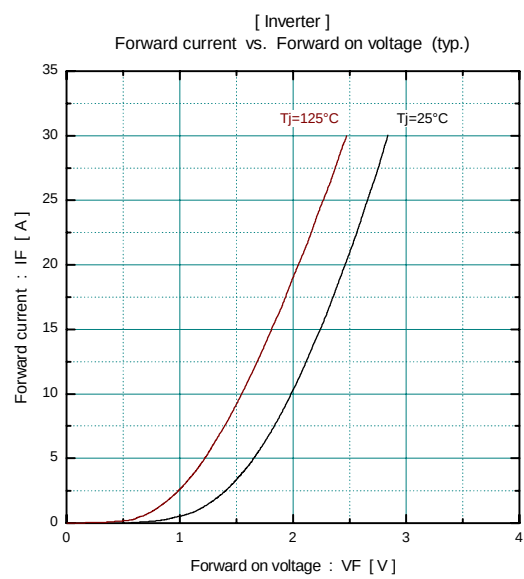
Item		Symbol	Condition	Characteristics			Unit
				Min.	Typ.	Max.	
Thermal resistance (1 device)		R _{th(j-c)}	Inverter IGBT			1.14	°C/W
			Inverter FWD			1.85	
			Brake IGBT			1.14	
			Thyristor			1.00	
			Converter Diode			1.30	
Contact thermal resistance *		R _{th(c-f)}	With thermal compound		0.05		

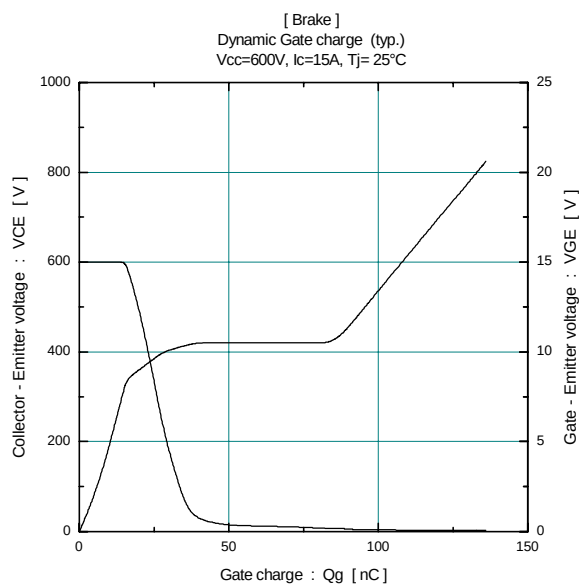
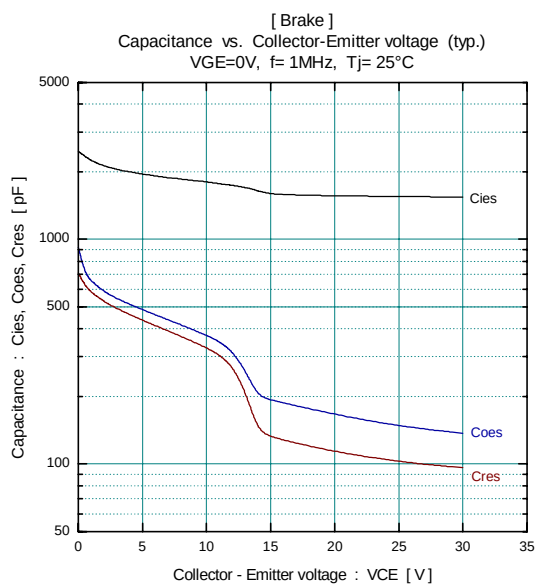
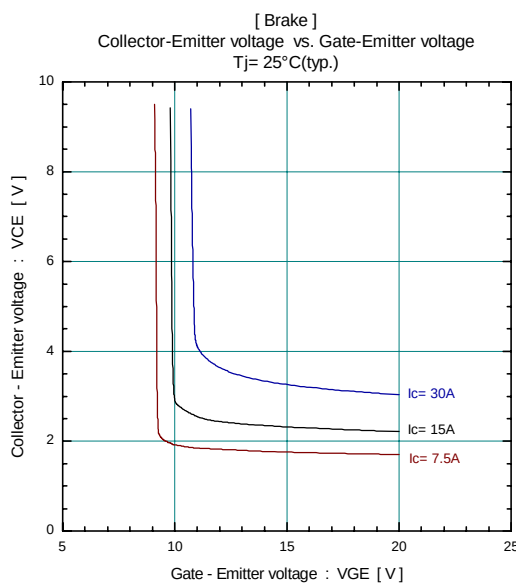
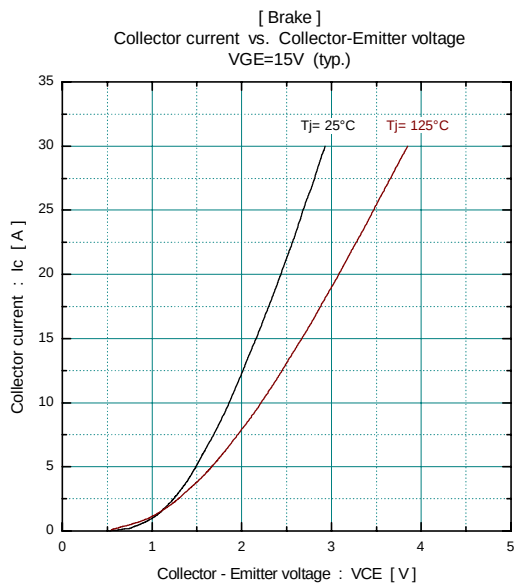
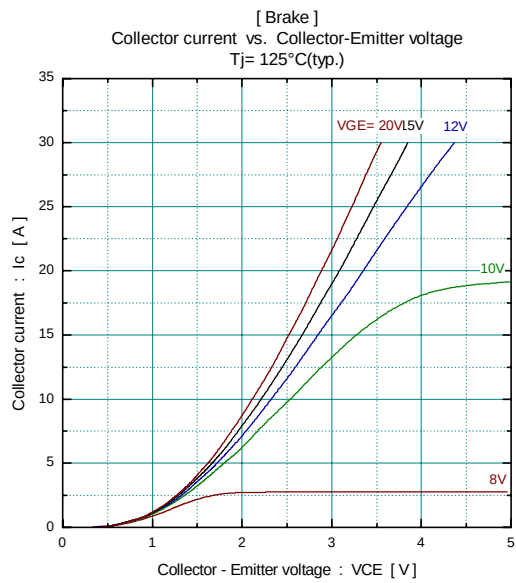
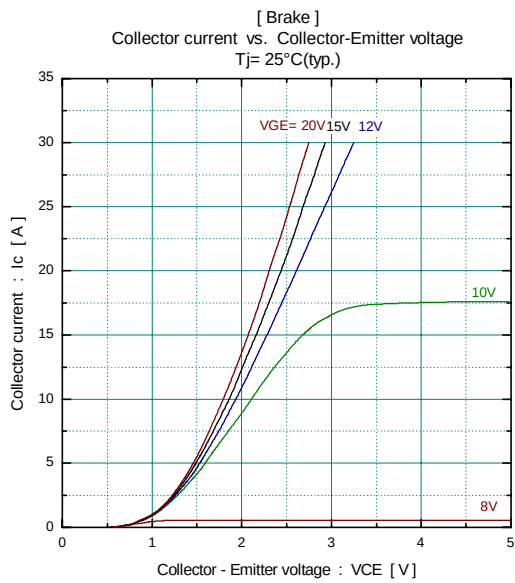
* This is the value which is defined mounting on the additional cooling fin with thermal compound

■ Characteristics (Representative)

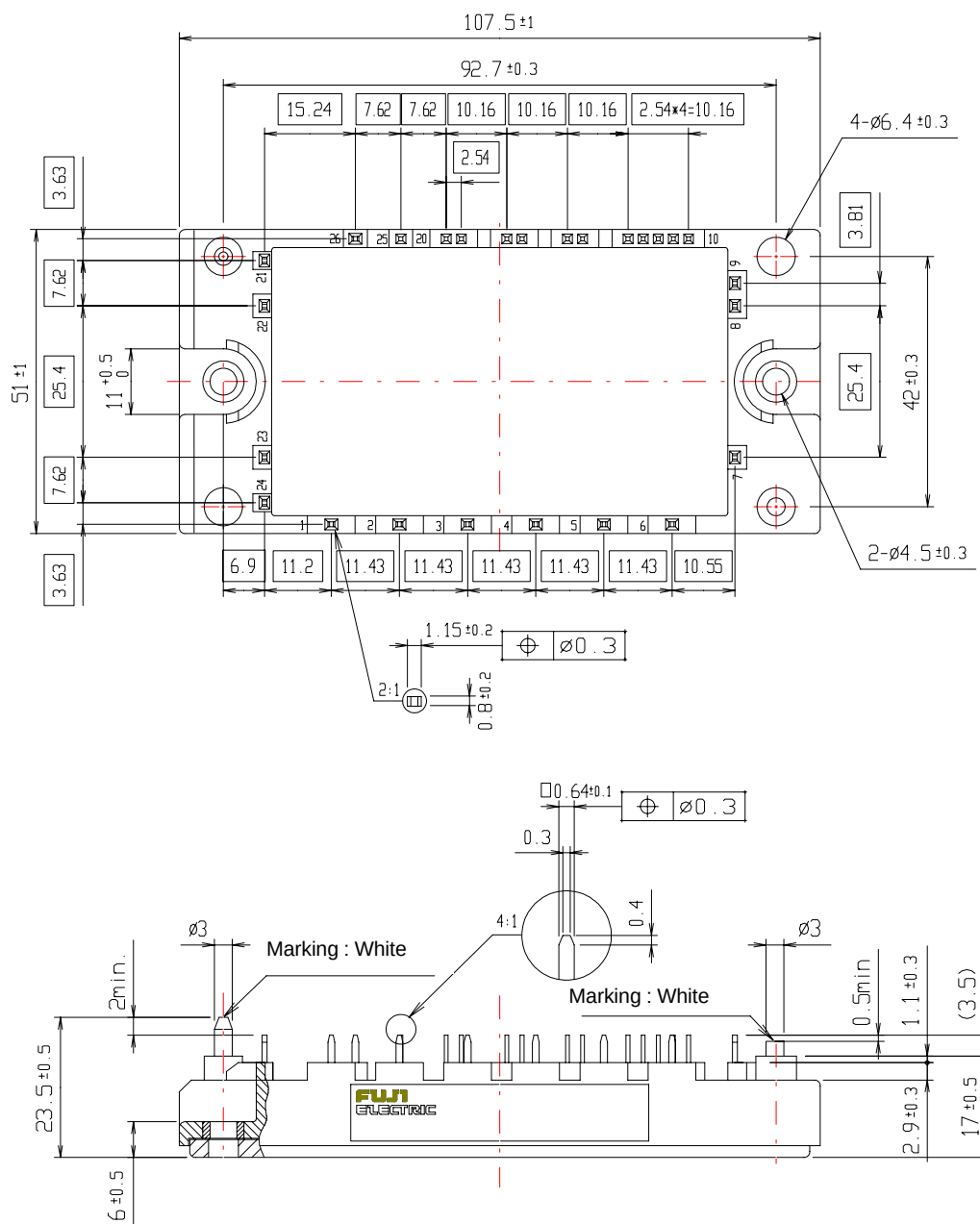








■ Outline Drawings, mm



■ Equivalent Circuit Schematic

