

PIM/Built-in converter with thyristor and brake (S series) 1200V / 10A / 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	Continuous	$T_c=25^\circ\text{C}$ 15	A
			$T_c=80^\circ\text{C}$ 10	
		1ms	$T_c=25^\circ\text{C}$ 30	A
			$T_c=80^\circ\text{C}$ 20	
	$-I_c$		10	A
Brake	Collector power dissipation	P_c	1 device 75	W
	Collector-Emitter voltage	V_{CES}	1200	V
	Gate-Emitter voltage	V_{GES}	± 20	V
	Collector current	Continuous	$T_c=25^\circ\text{C}$ 15	A
			$T_c=80^\circ\text{C}$ 10	
		1ms	$T_c=25^\circ\text{C}$ 30	A
			$T_c=80^\circ\text{C}$ 20	
	Collector power dissipation	P_c	1 device 75	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 10	A
	Surge on-state current (Non-Repetitive)	I_{TSM}	$T_j=125^\circ\text{C}$, 10ms half sine wave 145	A
	Junction temperature	T_{jw}	125	$^\circ\text{C}$
Converter	Repetitive peak reverse voltage	V_{RRM}	1600	V
	Average output current	I_o	50Hz/60Hz sine wave 10	A
	Surge current (Non-Repetitive)	I_{FSM}	$T_j=150^\circ\text{C}$, 10ms 105	A
	I^2t (Non-Repetitive)	I^2t	half sine wave 55	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		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)

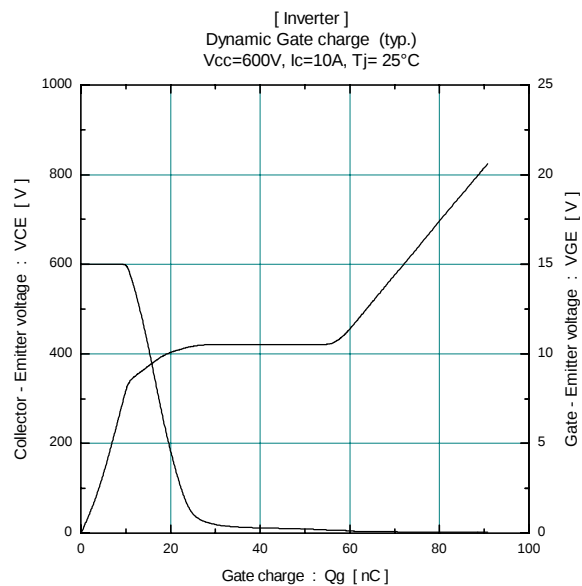
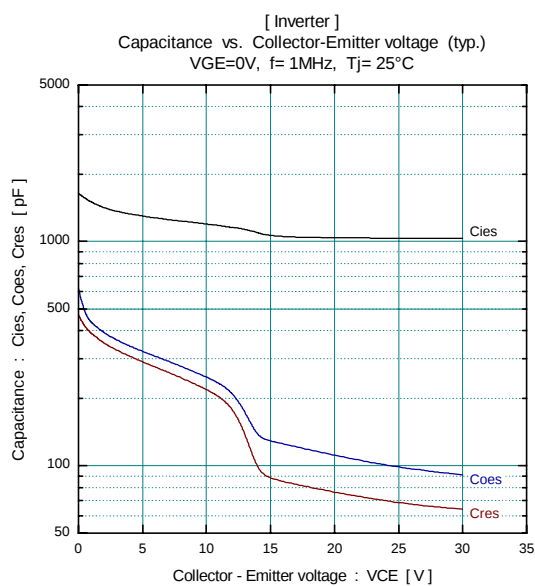
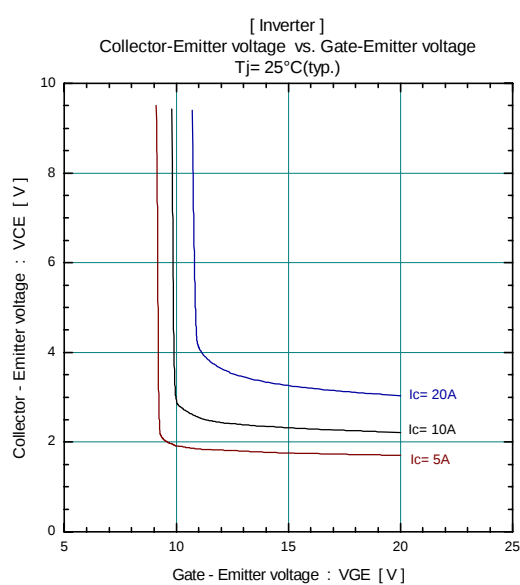
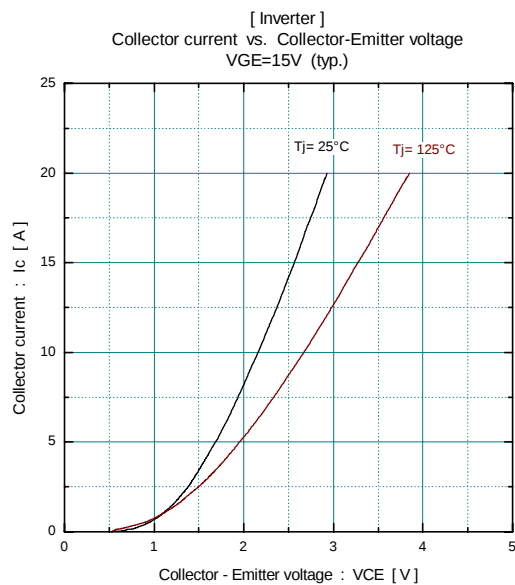
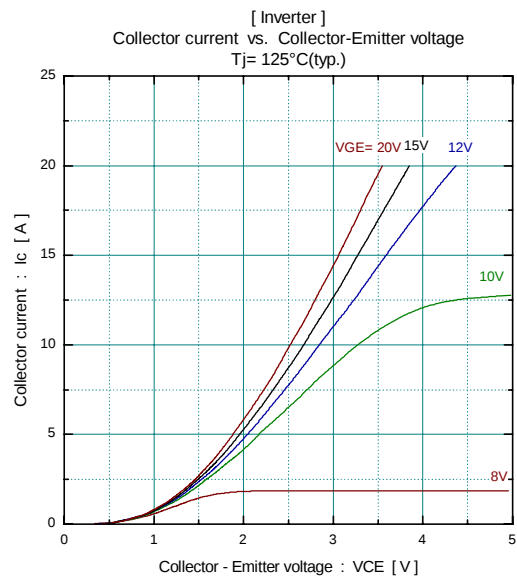
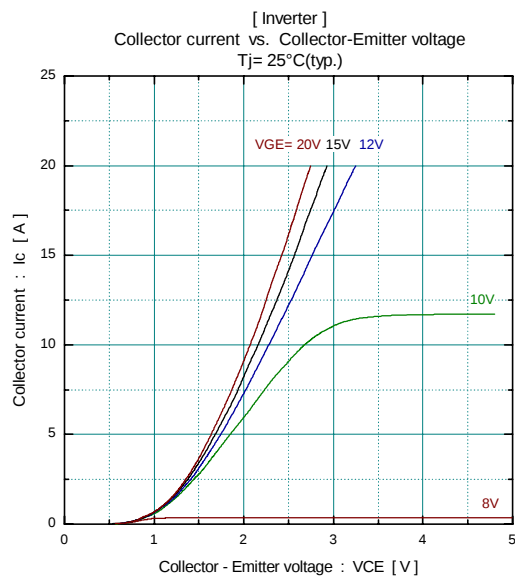
Item		Symbol	Condition	Characteristics			Unit
				Min.	Typ.	Max.	
Inverter	Zero gate voltage collector current	I _{CES}	V _{CE} =1200V, V _{GE} =0V			50	μA
	Gate-Emitter leakage current	I _{GES}	V _{CE} =0V, V _{GE} =±20V			200	nA
	Gate-Emitter threshold voltage	V _{GE(th)}	V _{CE} =20V, I _C =10mA	5.5	7.2	8.5	V
	Collector-Emitter saturation voltage	V _{CE(sat)}	V _{GE} =15V, I _C =10A	chip	2.1		V
				terminal	2.15	2.6	
	Input capacitance	C _{ies}	V _{GE} =0V, V _{CE} =10V, f=1MHz		1200		pF
	Turn-on time	t _{on}	V _{CC} =600V I _C =10A V _{GE} =±15V R _G =120Ω		0.35	1.2	μs
		t _r			0.25	0.6	
	Turn-off	t _{off}			0.45	1.0	
		t _f			0.08	0.3	
	Forward on voltage	V _F	I _F =10A	chip	2.3		V
				terminal	2.35	3.2	
Brake	Reverse recovery time of FRD	t _{rr}	I _F =10A			350	ns
	Zero gate voltage collector current	I _{CES}	V _{CE} =1200V, V _{GE} =0V			50	μA
	Gate-Emitter leakage current	I _{GES}	V _{CE} =0V, V _{GE} =±20V			200	nA
	Collector-Emitter saturation voltage	V _{CE(sat)}	I _C =10A, V _{GE} =15V	chip	2.1		V
				terminal	2.2	2.6	
	Turn-on time	t _{on}	V _{CC} =600V I _C =10A V _{GE} =±15V R _G =120Ω		0.35	1.2	μs
		t _r			0.25	0.6	
	Turn-off time	t _{off}			0.45	1.0	
		t _f			0.08	0.3	
	Reverse current	I _{RRM}	V _R =1200V			50	μA
	off-state current	I _{DM}	V _{DM} =1600V			1.0	mA
Thyristor	Reverse current	I _{RRM}	V _{RM} =1600V			1.0	mA
	Gate trigger current	I _{GT}	V _D =6V, I _T =1A			100	mA
	Gate trigger voltage	V _{GT}	V _D =6V, I _T =1A			2.5	V
	On-state voltage	V _{TM}	I _{TM} =10A	chip	0.92	1.0	V
				terminal	0.95		
Converter	Forward on voltage	V _{FM}	I _F =10A	chip	1.1		V
				terminal	1.2	1.5	
Thermistor	Reverse current	I _{RRM}	V _R =1600V			50	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

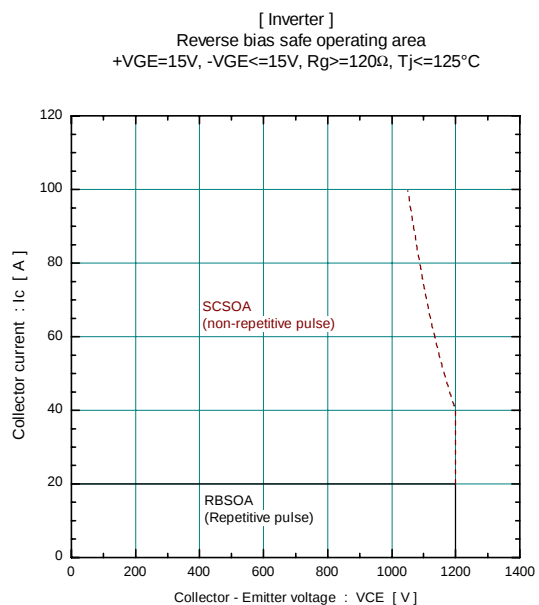
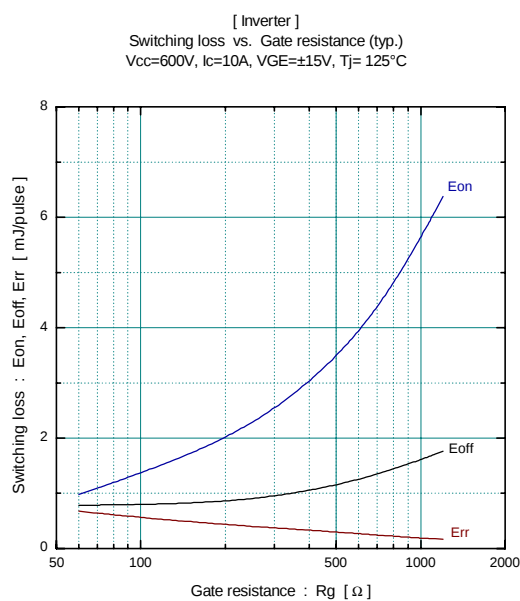
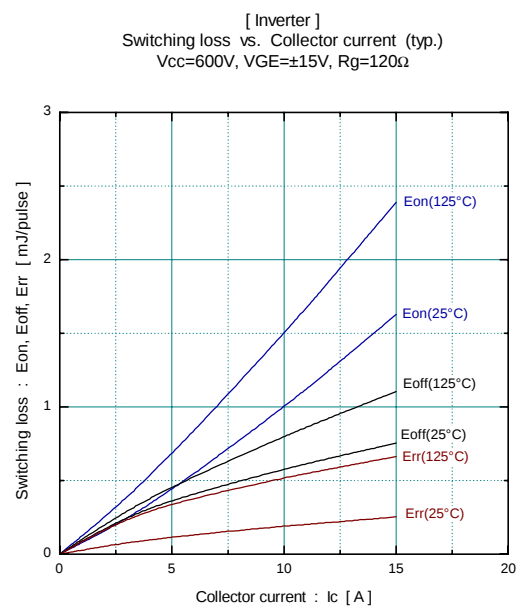
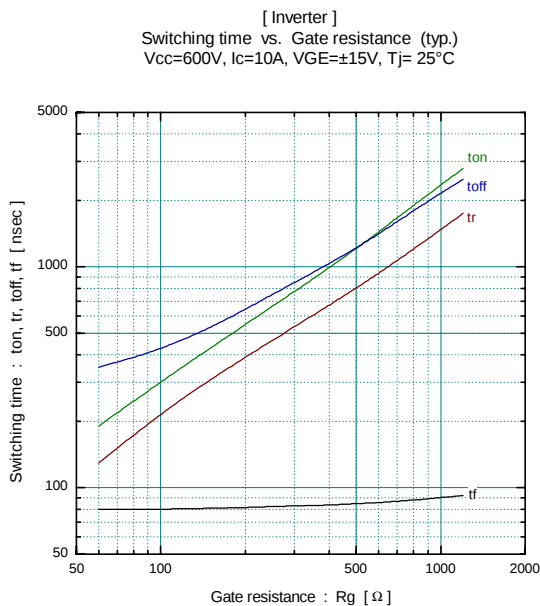
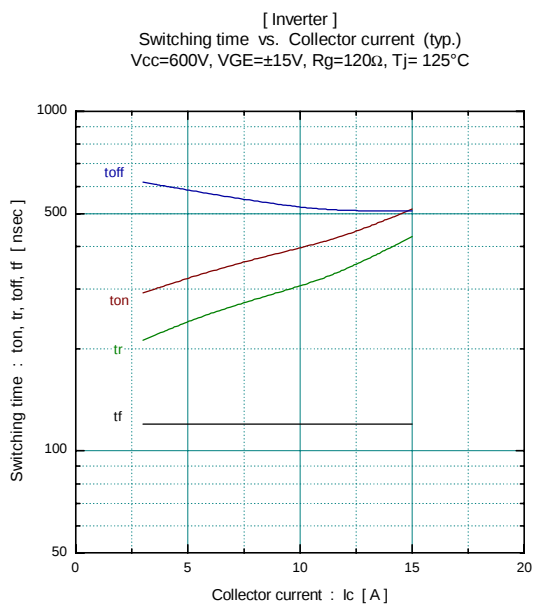
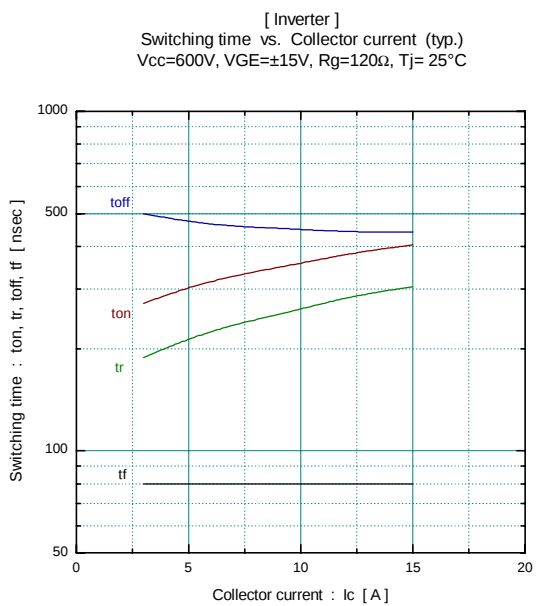
● Thermal resistance Characteristics

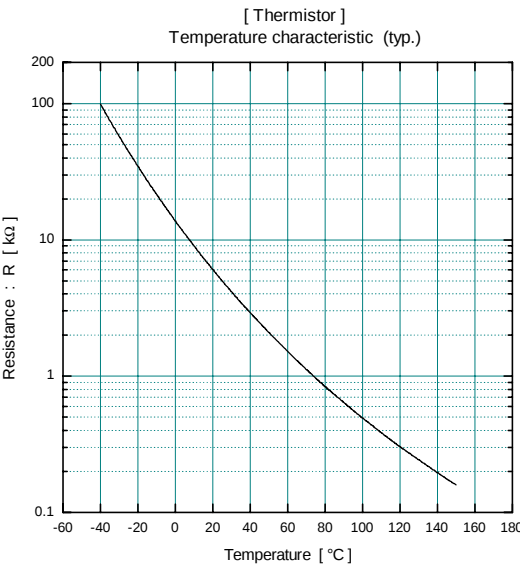
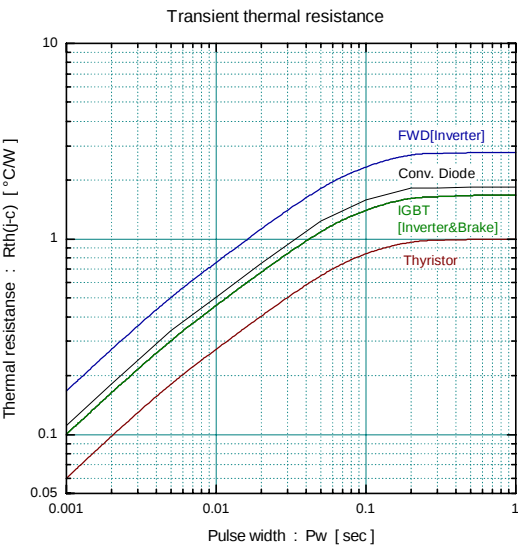
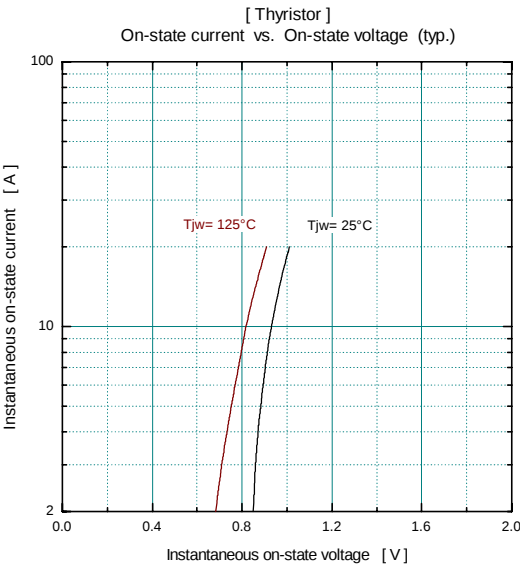
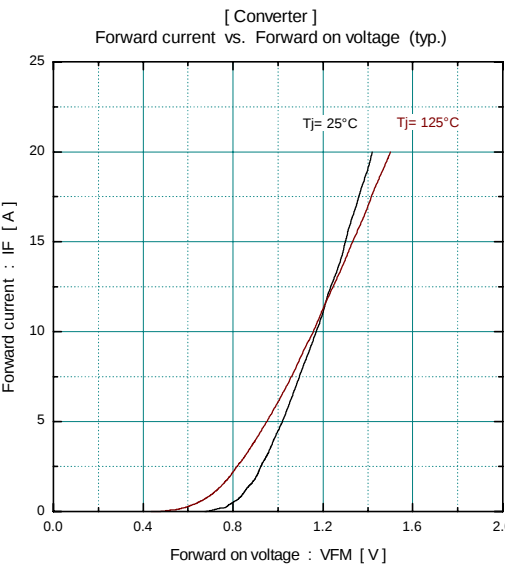
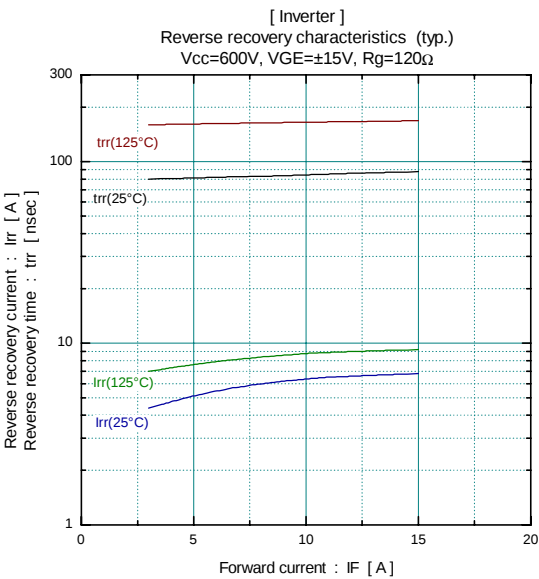
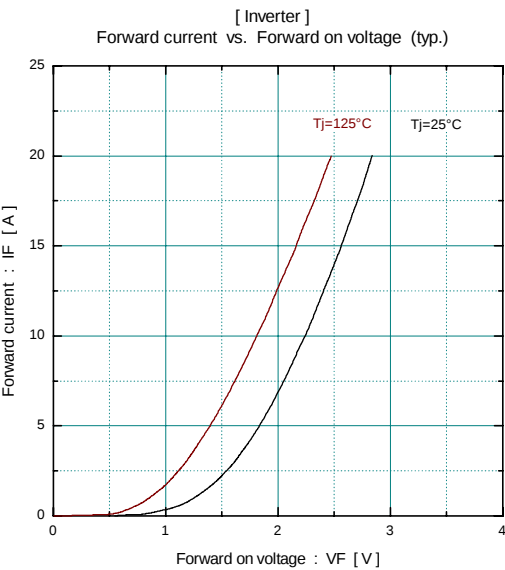
Item		Symbol	Condition	Characteristics			Unit
				Min.	Typ.	Max.	
Thermal resistance (1 device)		R _{th(j-c)}	Inverter IGBT			1.67	°C/W
			Inverter FWD			2.78	
			Brake IGBT			1.67	
			Thyristor			1.00	
			Converter Diode			1.85	
Contact thermal resistance *		R _{th(c-f)}	With thermal compound		0.05		

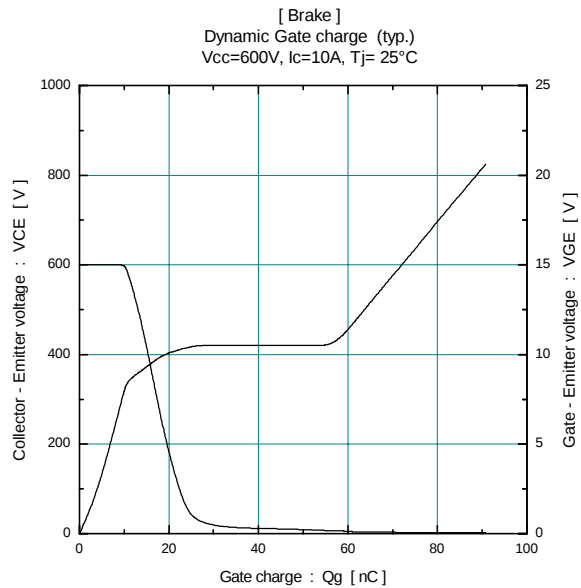
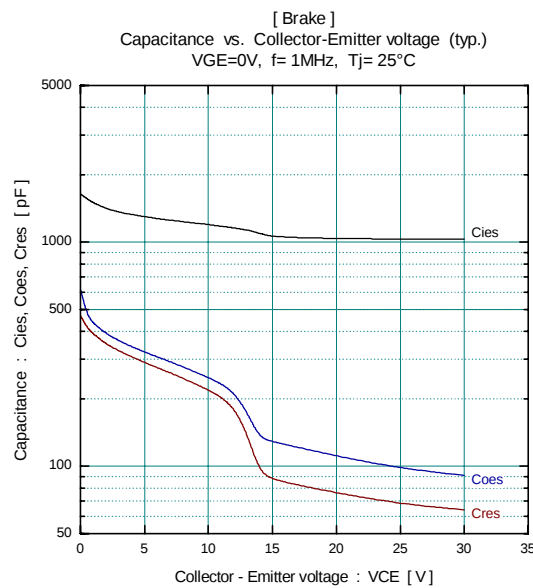
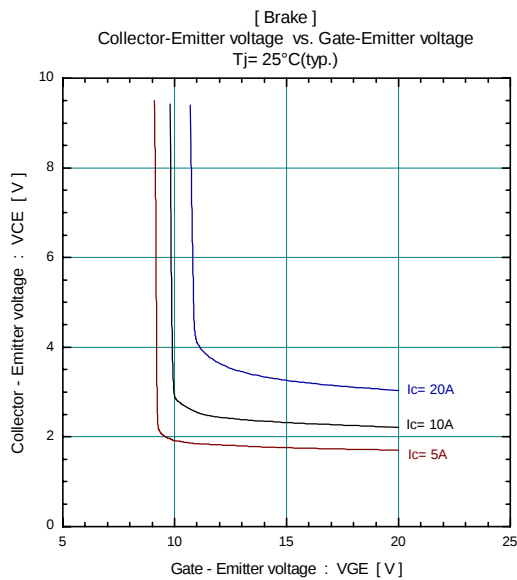
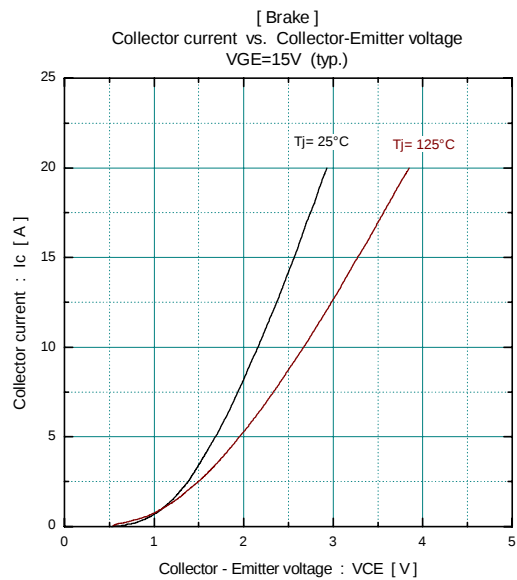
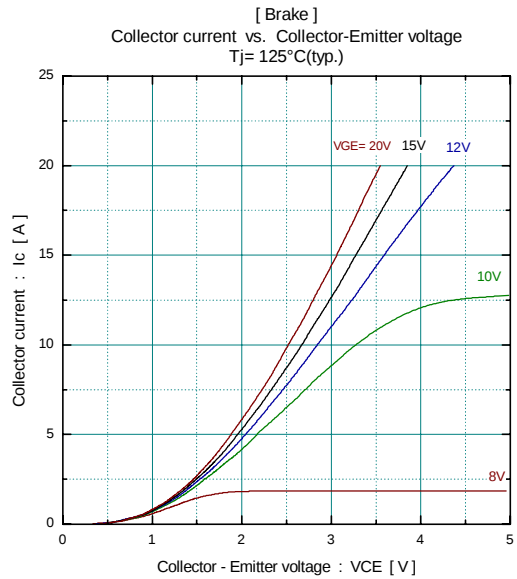
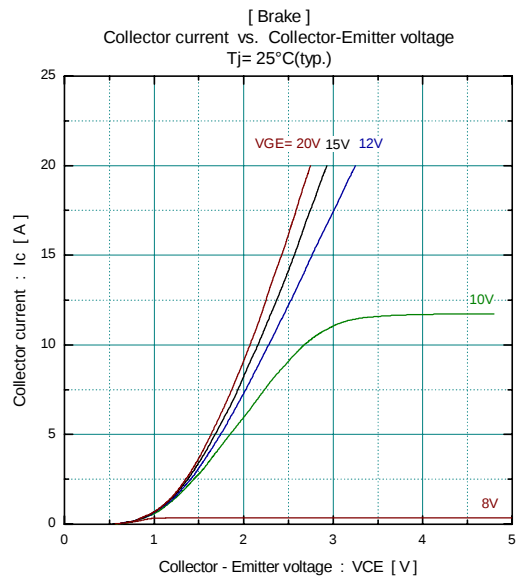
* This is the value which is defined mounting on the additional cooling fin with thermal compound

■ Characteristics (Representative)

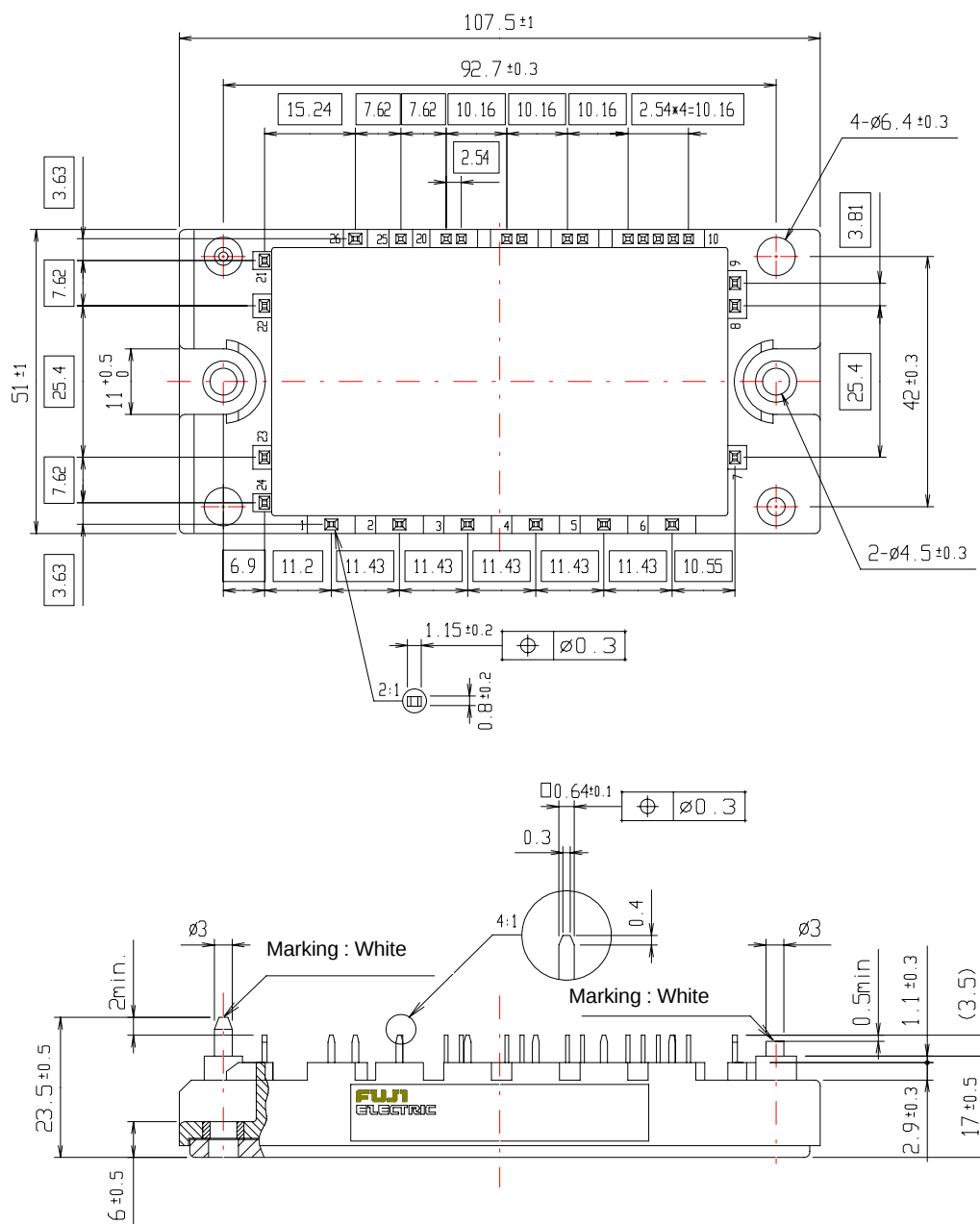








■ Outline Drawings, mm



■ Equivalent Circuit Schematic

