

PIM/Built-in converter with thyristor and brake (S series) 600V / 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}	600	V
	Gate-Emitter voltage	V_{GES}	± 20	V
	Collector current	I_C Continuous	50	A
		I_{CP} 1ms	100	A
		$-I_C$	50	A
	Collector power dissipation	P_C 1 device	200	W
Brake	Collector-Emitter voltage	V_{CES}	600	V
	Gate-Emitter voltage	V_{GES}	± 20	V
	Collector current	I_C Continuous	30	A
		I_{CP} 1ms	60	A
		P_C 1 device	120	W
	Repetitive peak reverse voltage(Diode)	V_{RRM}	600	V
Thyristor	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	50	A
	Surge On-state current (Non-Repetitive)	I_{TSM} $T_j=125^\circ\text{C}$, 10ms half sine wave	563	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	50	A
	Surge current (Non-Repetitive)	I_{FSM} $T_j=150^\circ\text{C}$, 10ms	525	A
	I^2t (Non-Repetitive)	I^2t half sine wave	1378	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)

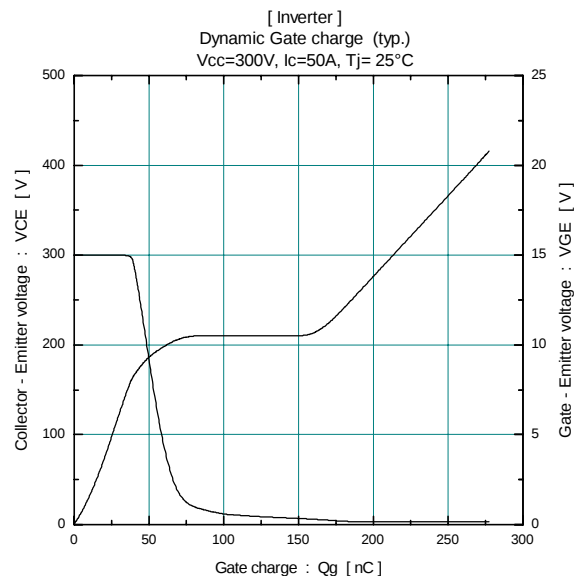
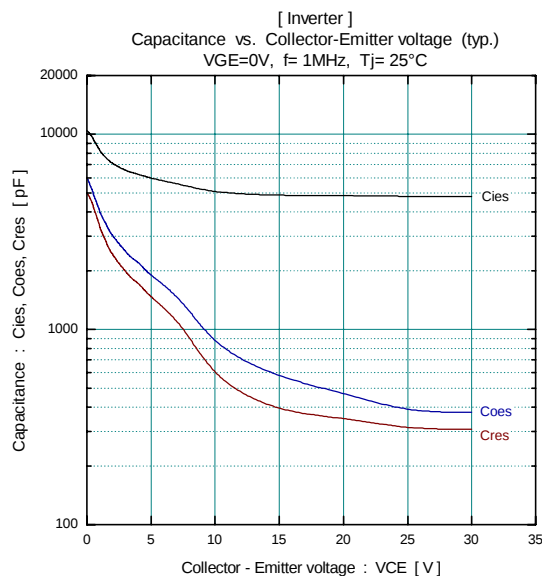
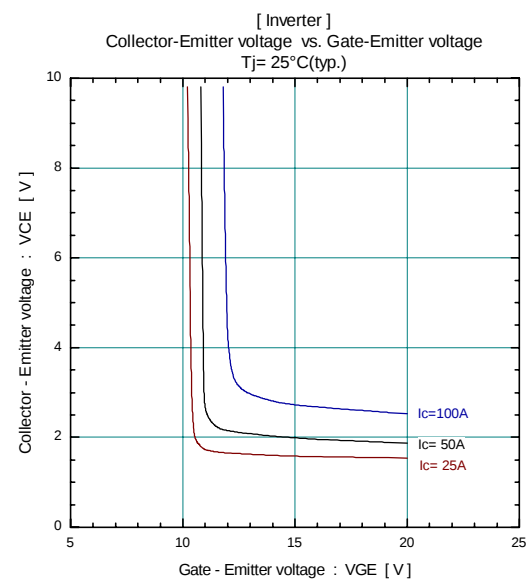
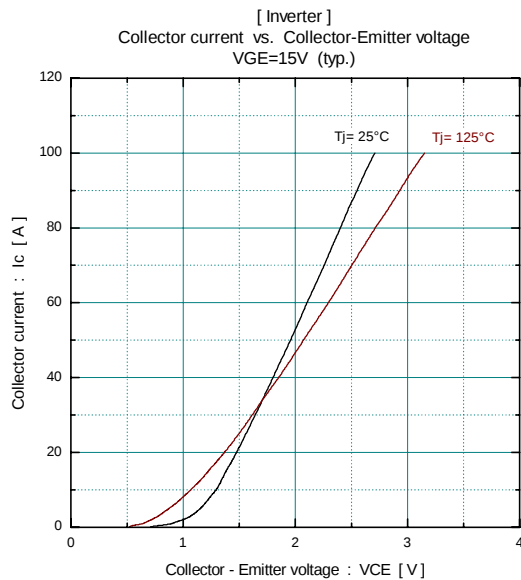
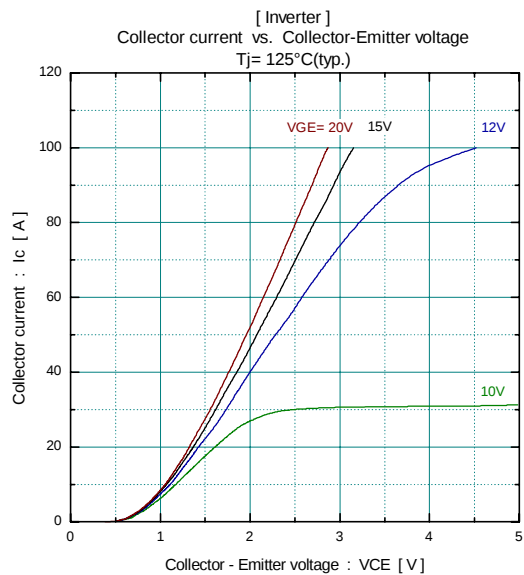
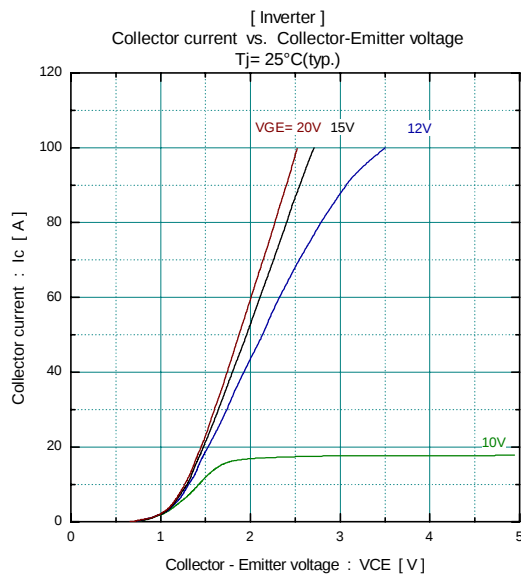
Item		Symbol	Condition	Characteristics			Unit
				Min.	Typ.	Max.	
Inverter	Zero gate voltage collector current	I _{CES}	V _{CE} =600V, V _{GE} =0V			150	μA
	Gate-Emitter leakage current	I _{GES}	V _{CE} =0V, V _{GE} =±20V			200	nA
	Gate-Emitter threshold voltage	V _{GE(th)}	V _{CE} =20V, I _C =50mA	5.5	7.8	8.5	V
	Collector-Emitter saturation voltage	V _{CE(sat)}	V _{GE} =15V, I _C =50A	chip	1.8		V
				terminal	1.95	2.4	
	Input capacitance	C _{ies}	V _{GE} =0V, V _{CE} =10V, f=1MHz		5000		pF
	Turn-on time	t _{on}	V _{CC} =300V I _C =50A V _{GE} =±15V R _G =51Ω		0.45	1.2	μs
		t _r			0.25	0.6	
	Turn-off	t _{off}			0.40	1.0	
		t _f			0.05	0.35	
	Forward on voltage	V _F	I _F =50A	chip	1.75		V
				terminal	1.9	2.6	
Brake	Reverse recovery time of FRD	t _{rr}	I _F =50A			300	ns
	Zero gate voltage collector current	I _{CES}	V _{CE} =600V, V _{GE} =0V			150	μA
	Gate-Emitter leakage current	I _{GES}	V _{CE} =0V, V _{GE} =±20V			200	nA
	Collector-Emitter saturation voltage	V _{CE(sat)}	I _C =30A, V _{GE} =15V	chip	1.8		V
				terminal	1.95	2.4	
	Turn-on time	t _{on}	V _{CC} =300V I _C =30A V _{GE} =±15V R _G =82Ω		0.45	1.2	μs
		t _r			0.25	0.6	
	Turn-off time	t _{off}			0.40	1.0	
		t _f			0.05	0.35	
	Reverse current	I _{RRM}	V _R =600V			150	μA
	off-state current	I _{DM}	V _{DM} =800V			1.0	mA
Thyristor	Reverse current	I _{RRM}	V _{RM} =800V			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} =50A	chip	1.1	1.3	V
				terminal	1.2		
Converter	Forward on voltage	V _{FM}	I _F =50A	chip	1.1		V
				terminal	1.2	1.5	
Thyristor	Reverse current	I _{RRM}	V _R =800V			150	μA
	Resistance	R	T=25°C		5000		Ω
			T=100°C	465	495	520	
	B value	B	T=25/50°C	3305	3375	3450	

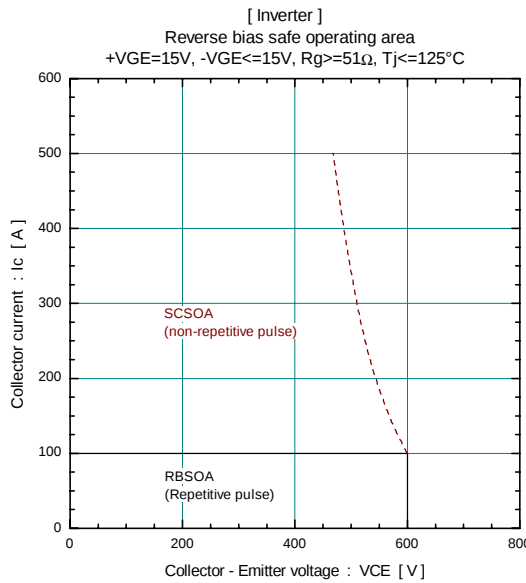
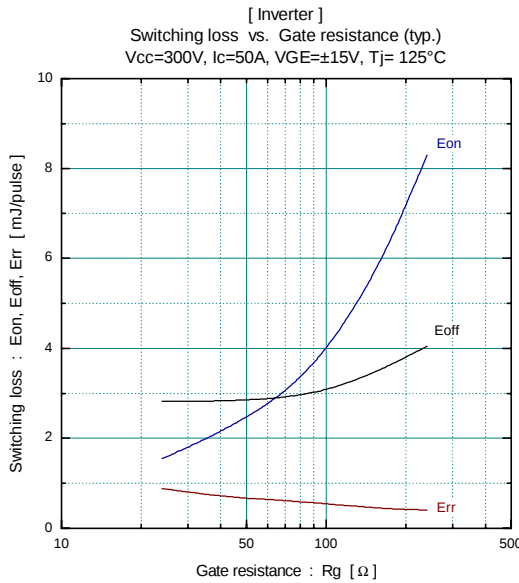
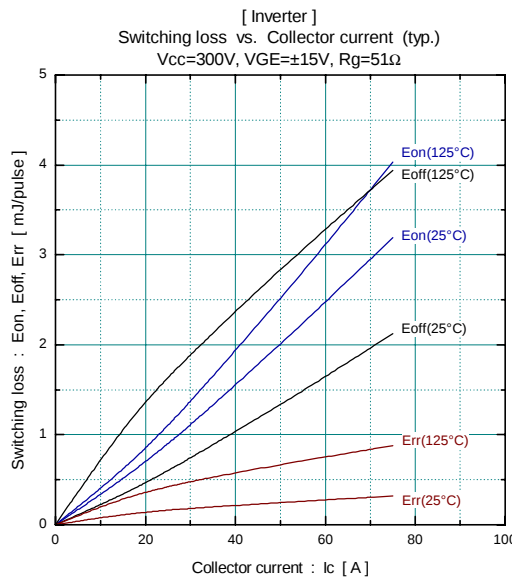
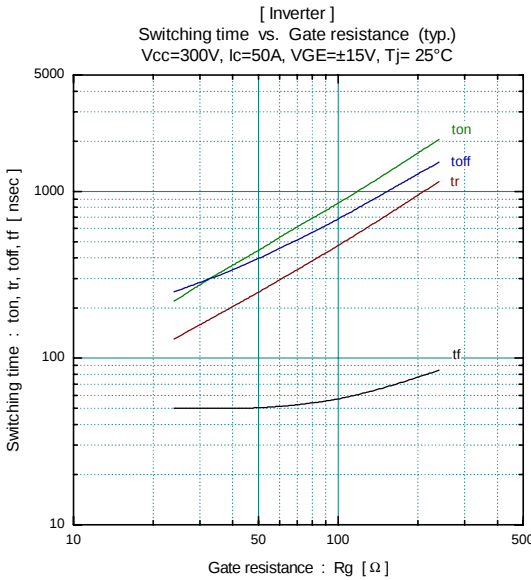
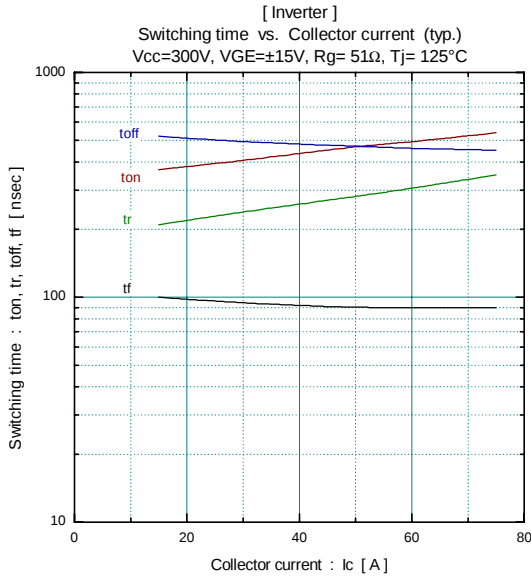
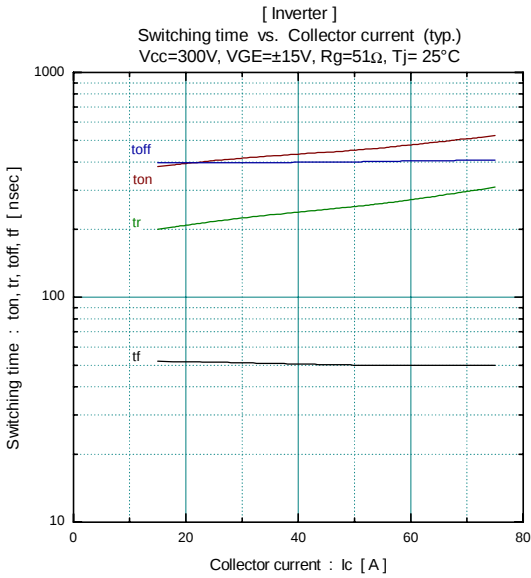
● Thermal resistance Characteristics

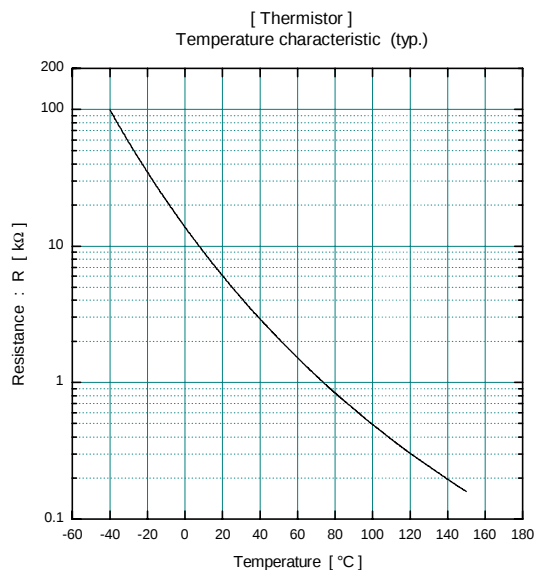
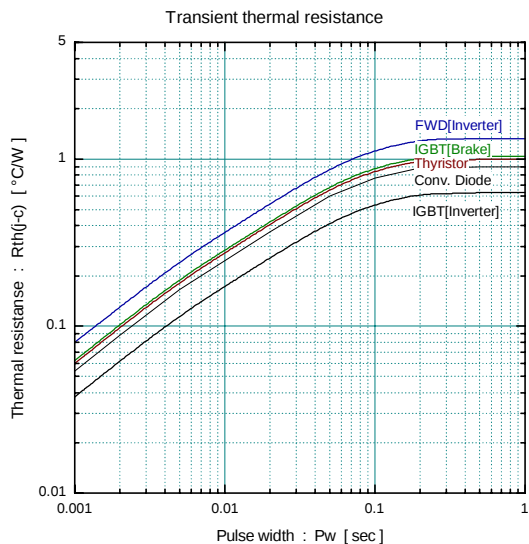
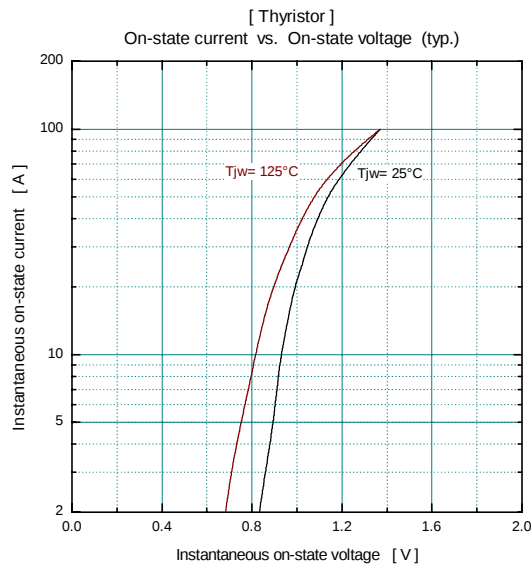
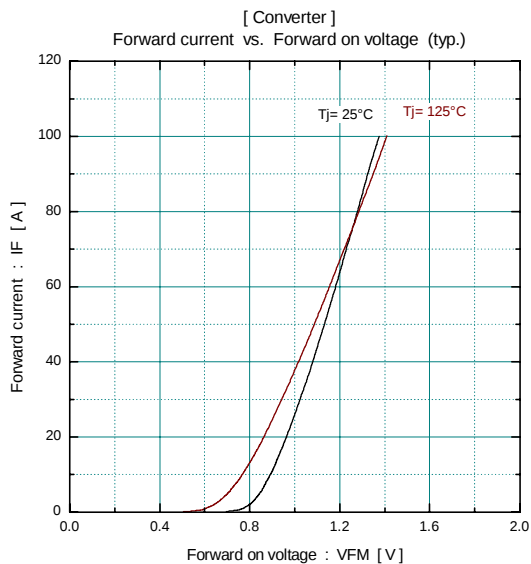
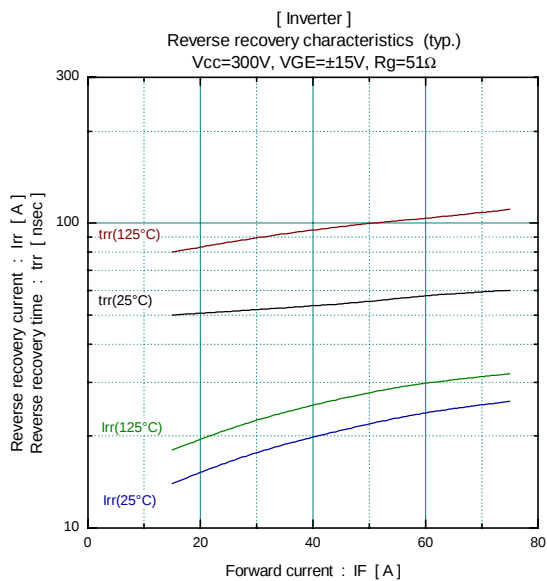
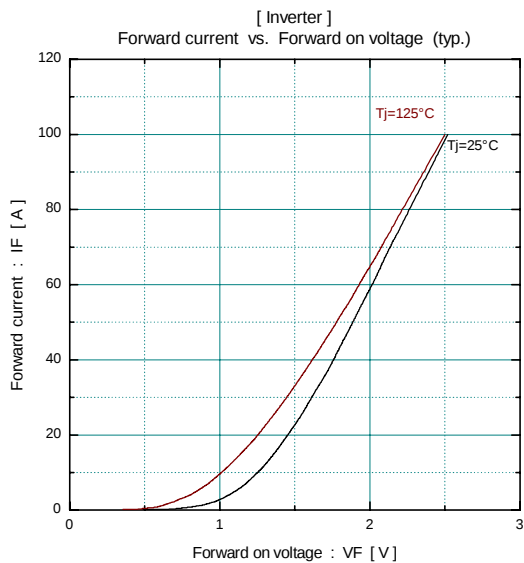
Item		Symbol	Condition	Characteristics			Unit
				Min.	Typ.	Max.	
Thermal resistance (1 device)		R _{th(j-c)}	Inverter IGBT			0.63	°C/W
			Inverter FWD			1.33	
			Brake IGBT			1.04	
			Thyristor			1.00	
			Converter Diode			0.90	
Contact thermal resistance *		R _{th(c-f)}	With thermal compound		0.05		

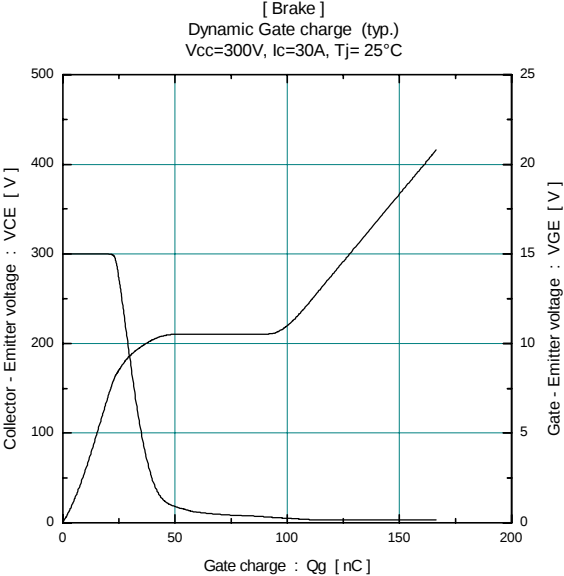
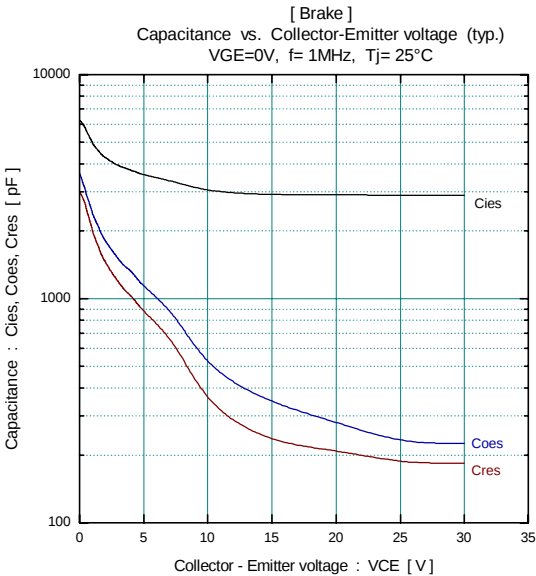
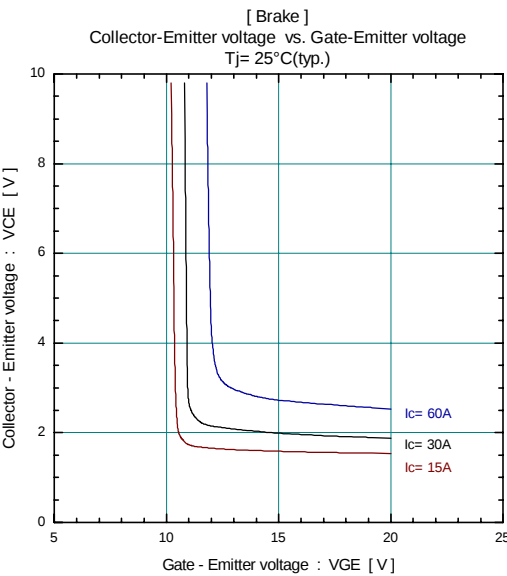
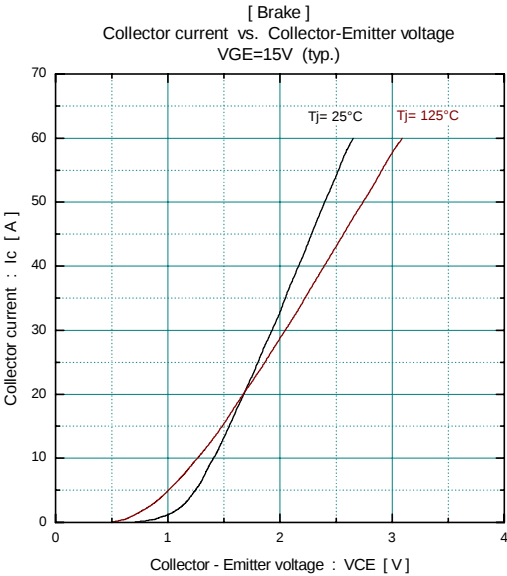
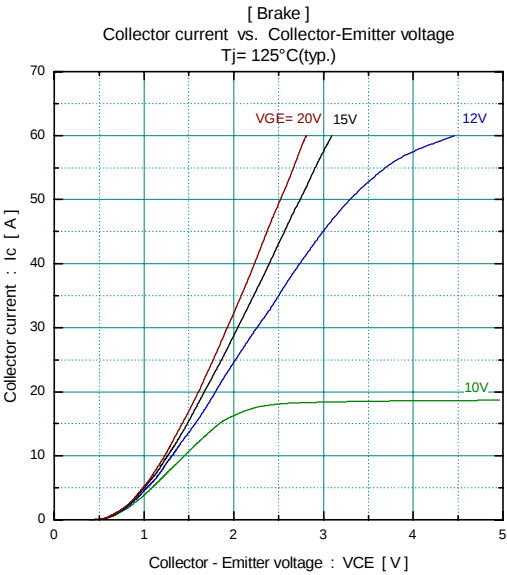
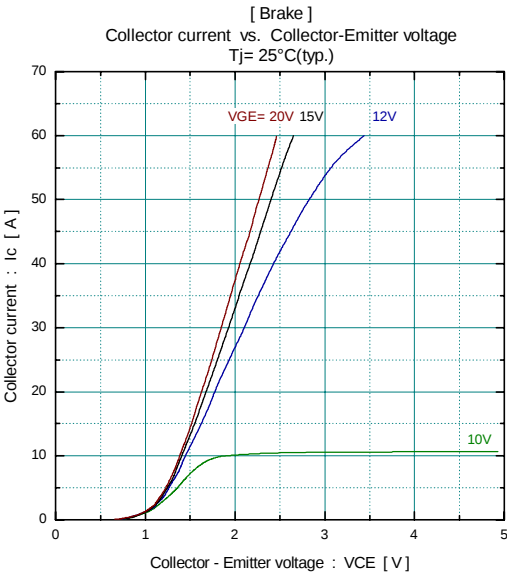
* This is the value which is defined mounting on the additional cooling fin with thermal compound

■ Characteristics (Representative)

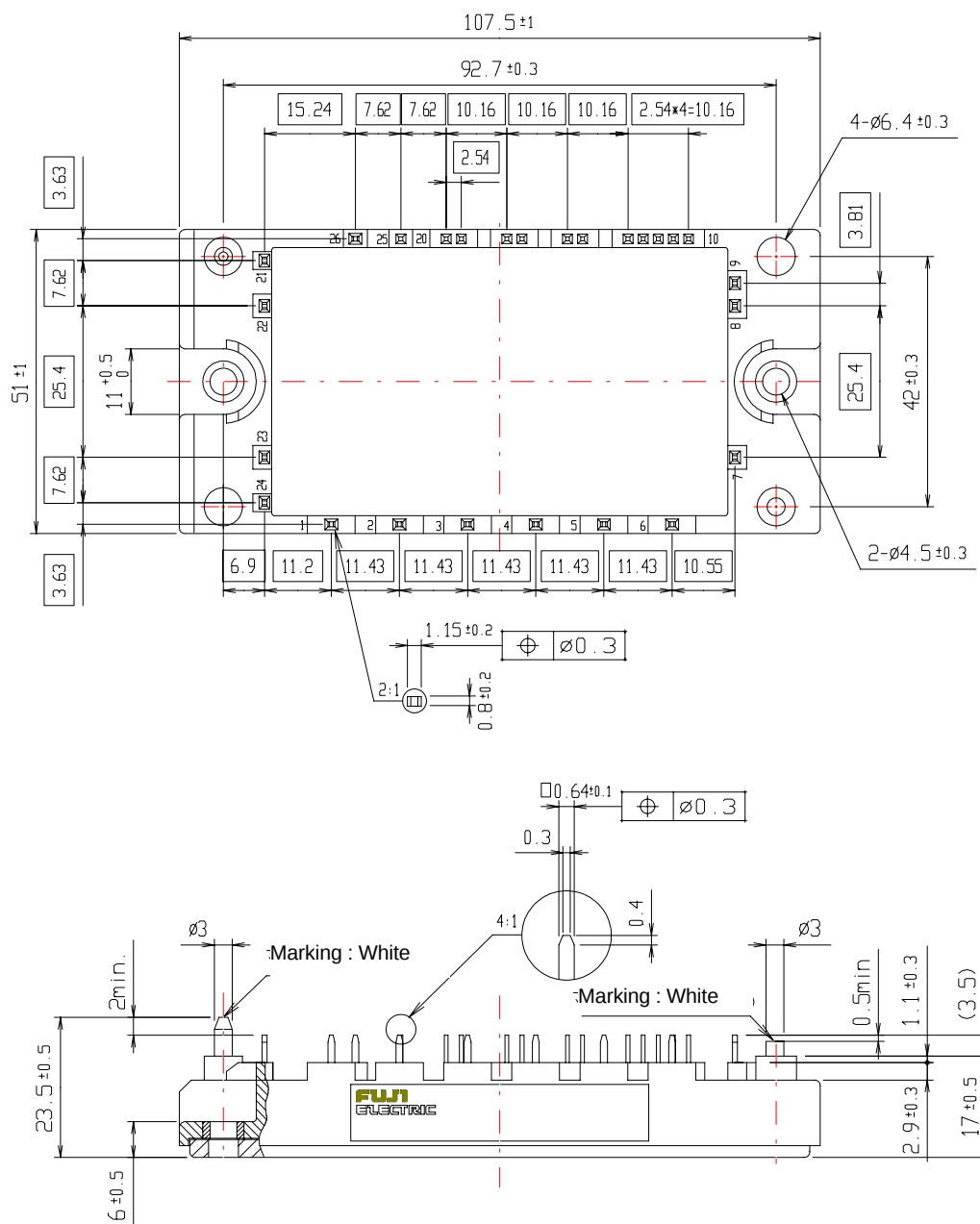








■ Outline Drawings, mm



■ Equivalent Circuit Schematic

