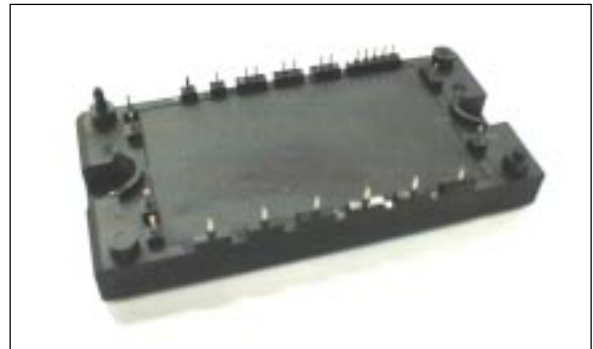


PIM/Built-in converter with thyristor and brake (S series) 600V / 20A / PIM



■ 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	20	A
		I_{CP} 1ms	40	A
		$-I_C$	20	A
	Collector power dissipation	P_C 1 device	69	W
Brake	Collector-Emitter voltage	V_{CES}	600	V
	Gate-Emitter voltage	V_{GES}	± 20	V
	Collector current	I_C Continuous	20	A
		I_{CP} 1ms	40	A
		P_C 1 device	69	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	20	A
	Surge On-state current (Non-Repetitive)	I_{TSM} $T_j=125^\circ\text{C}$, 10ms half sine wave	225	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	20	A
	Surge current (Non-Repetitive)	I_{FSM} $T_j=150^\circ\text{C}$, 10ms	140	A
	I^2t (Non-Repetitive)	I^2t half sine wave	98	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)

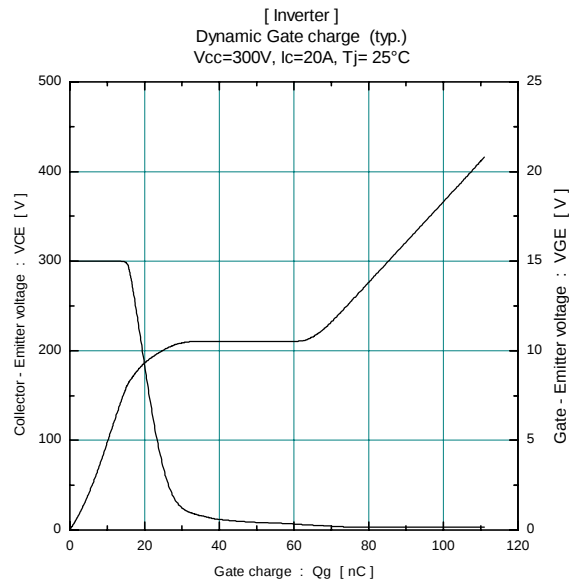
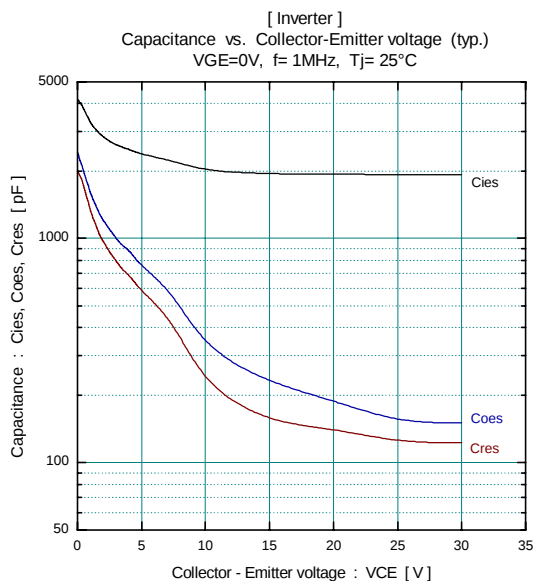
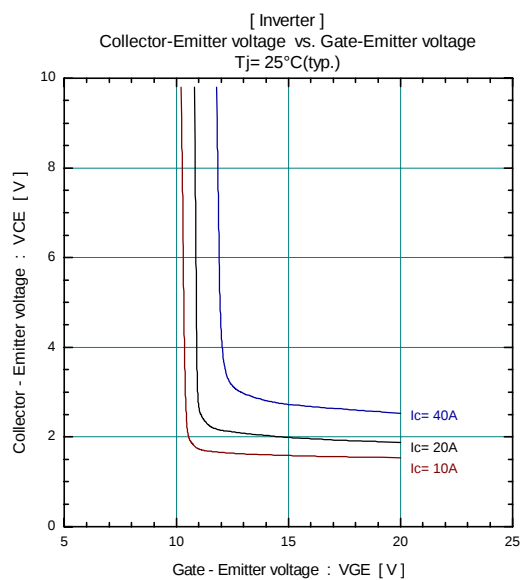
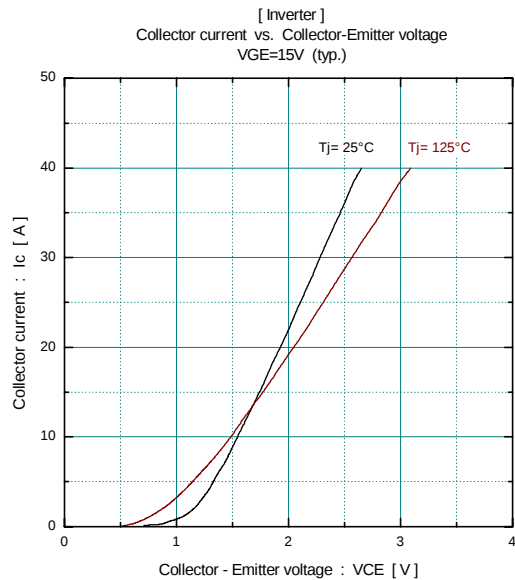
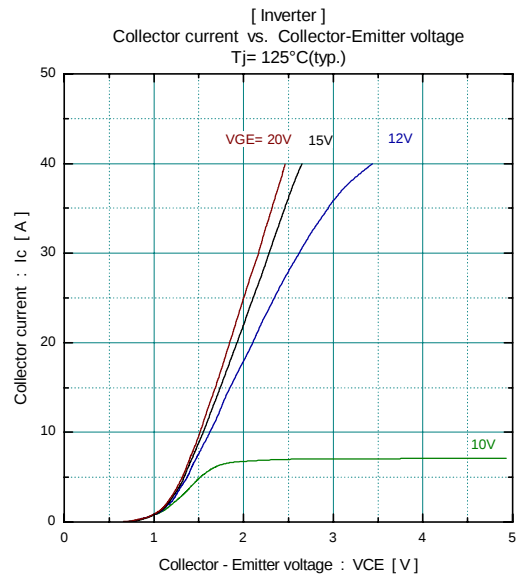
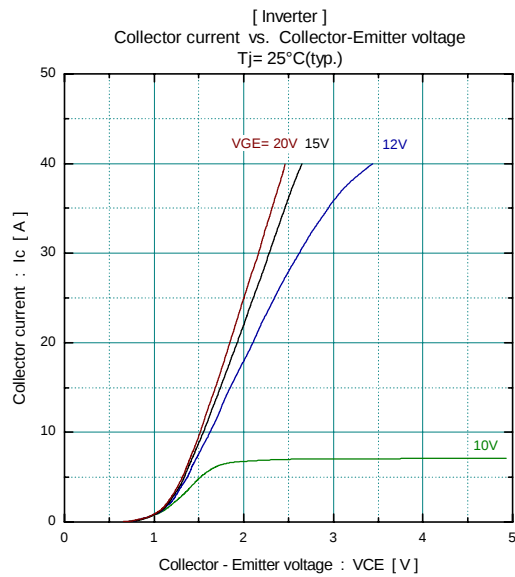
Item		Symbol	Condition		Characteristics			Unit	
					Min.	Typ.	Max.		
Inverter	Zero gate voltage collector current	ICES	VCE=600V, VGE=0V				50	μA	
	Gate-Emitter leakage current	IGES	VCE=0V, VGE=±20V				200	nA	
	Gate-Emitter threshold voltage	VGE(th)	VCE=20V, IC=20mA		5.5	7.8	8.5	V	
	Collector-Emitter saturation voltage	VCE(sat)	VGE=15V, IC=20A	chip		1.8		V	
				terminal		1.95	2.4		
	Input capacitance	Cies	VGE=0V, VCE=10V, f=1MHz			2000		pF	
	Turn-on time	ton	VCC=300V IC=20A			0.45	1.2	μs	
		tr				0.25	0.6		
	Turn-off	toff	VGE=±15V RG=120Ω			0.40	1.0		
		tr				0.05	0.35		
	Forward on voltage	VF	IF=20A	chip		1.8		V	
				terminal		1.95	2.6		
Reverse recovery time of FRD		trr	IF=20A				300	ns	
Brake	Zero gate voltage collector current	ICES	VCE=600V, VGE=0V				50	μA	
	Gate-Emitter leakage current	IGES	VCE=0V, VGE=±20V				200	nA	
	Collector-Emitter saturation voltage	VCE(sat)	IC=20A, VGE=15V	chip		1.8		V	
				terminal		1.95	2.4		
	Turn-on time	ton	VCC=300V IC=20A			0.45	1.2	μs	
		tr				0.25	0.6		
	Turn-off time	toff	VGE=±15V RG=120Ω			0.40	1.0		
		tr				0.05	0.35		
Reverse current		IRRM	VR=600V				50	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=20A	chip		1.2	1.55	V	
				terminal		1.3			
Converter	Forward on voltage	VFM	IF=20A	chip		1.1		V	
				terminal		1.2	1.5		
Thyristor	Reverse current		IRRM	VR=800V				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

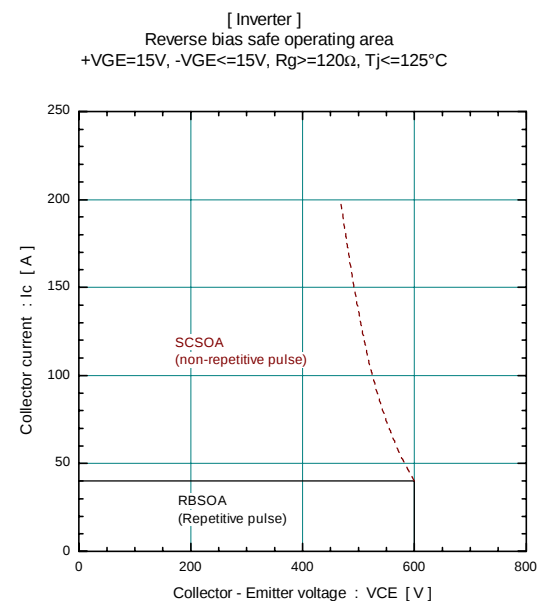
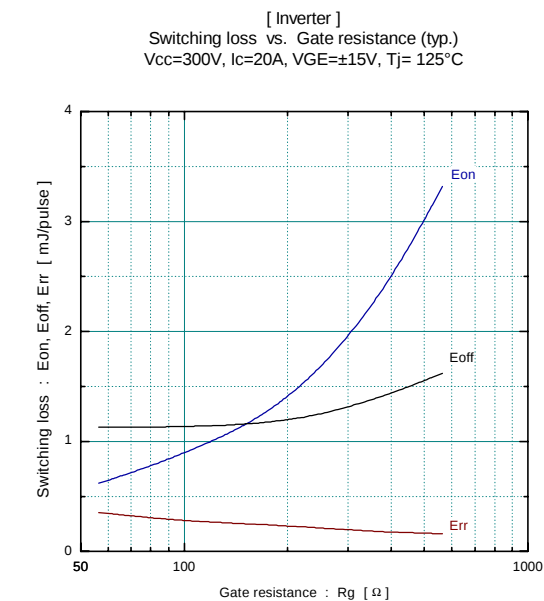
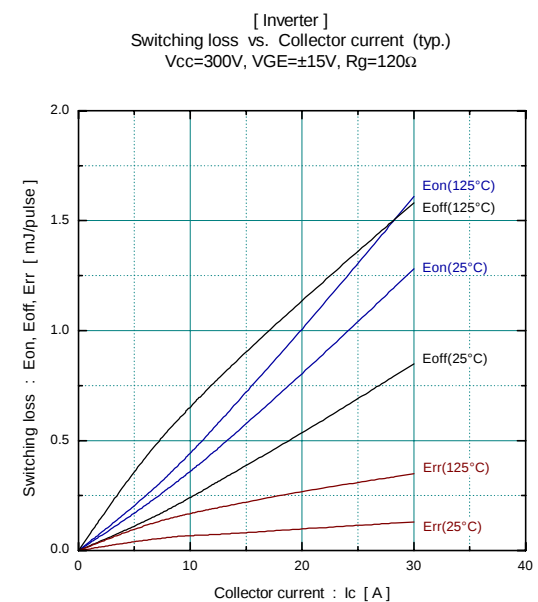
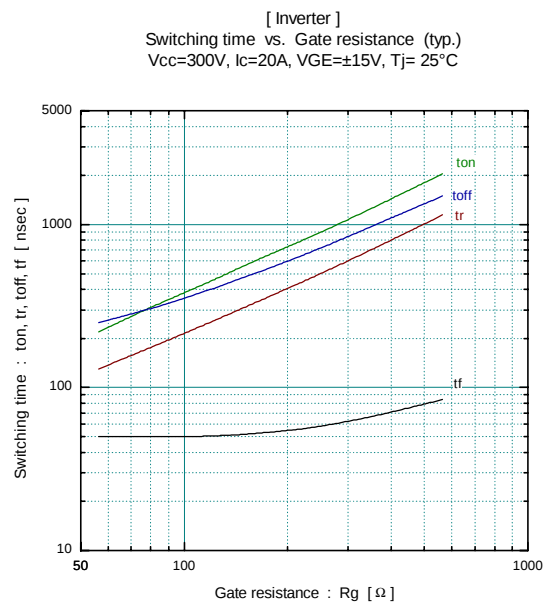
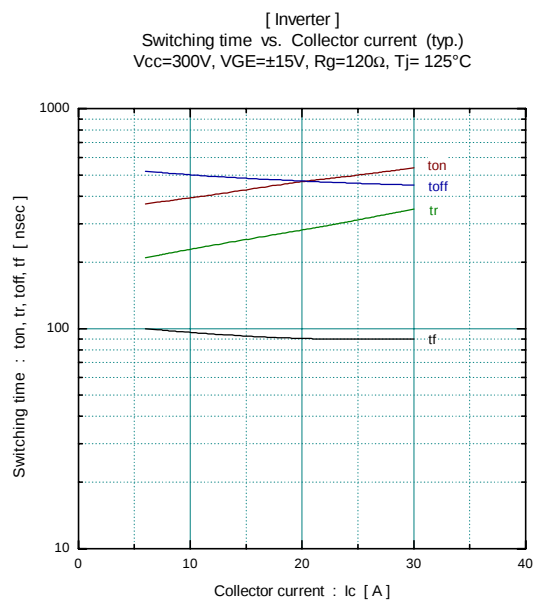
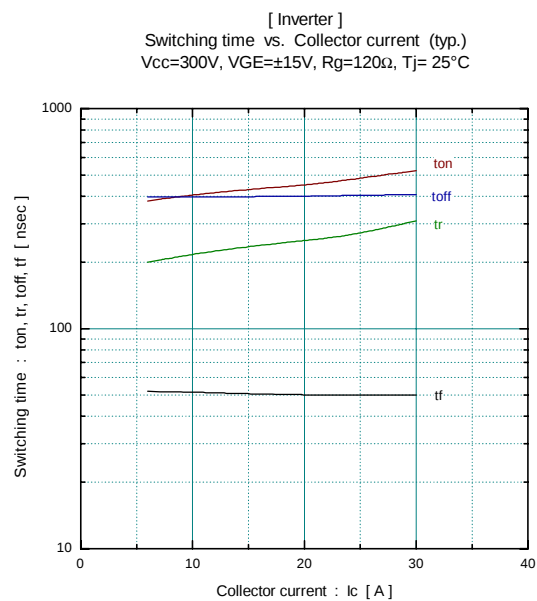
● Thermal resistance Characteristics

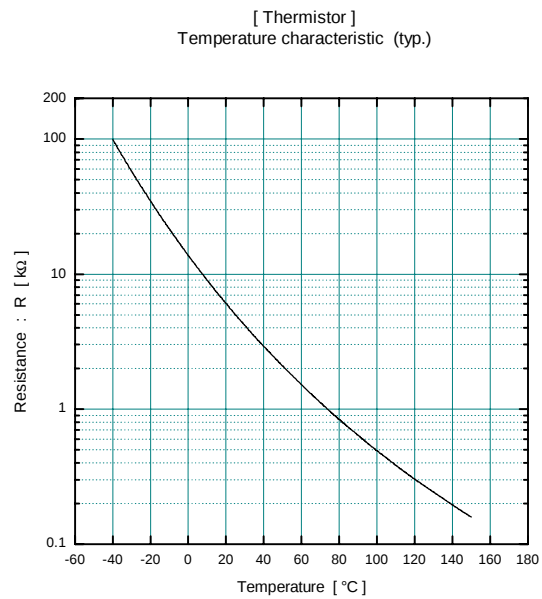
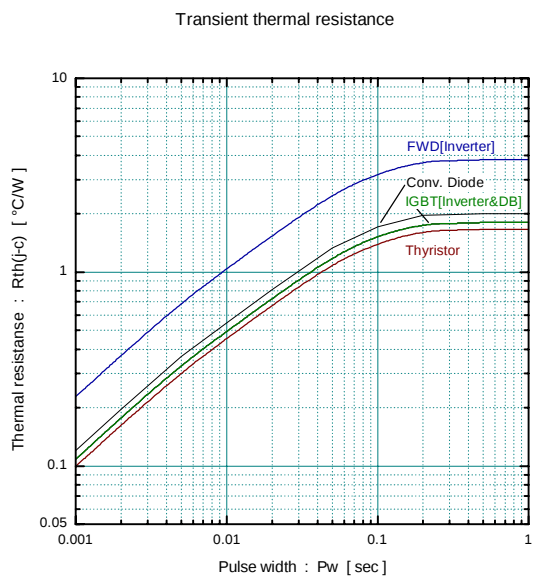
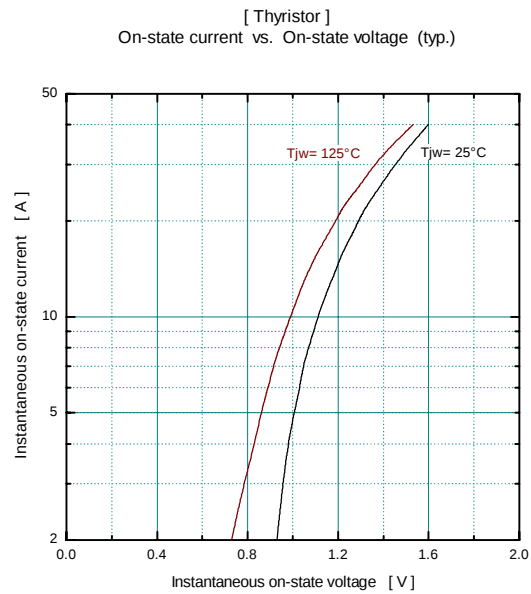
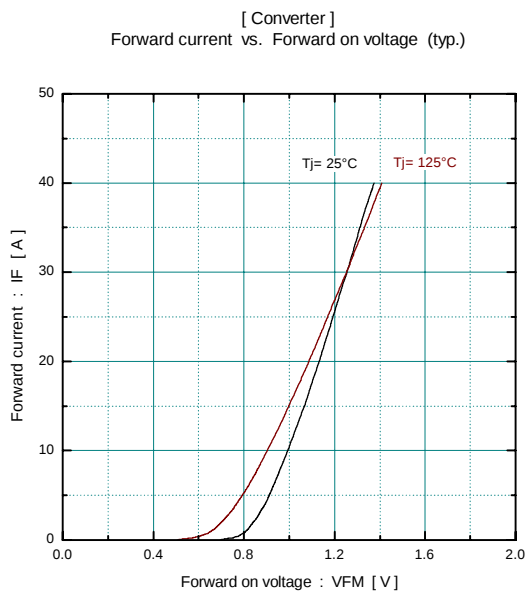
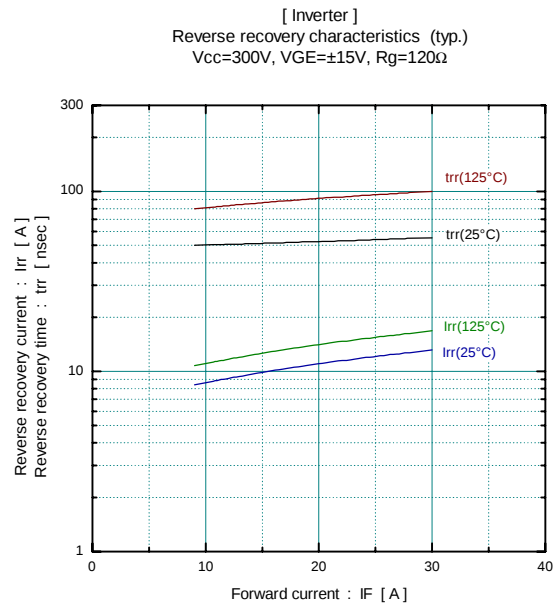
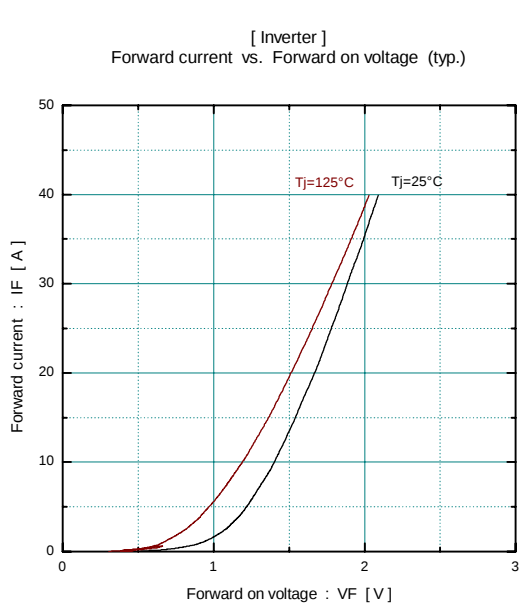
Item		Symbol	Condition	Characteristics			Unit
				Min.	Typ.	Max.	
Thermal resistance (1 device)		R _{th(j-c)}	Inverter IGBT			1.81	°C/W
			Inverter FWD			3.81	
			Brake IGBT			1.81	
			Thyristor			1.66	
			Converter Diode			2.00	
Contact thermal resistance *		R _{th(c-f)}	With thermal compound		0.05		

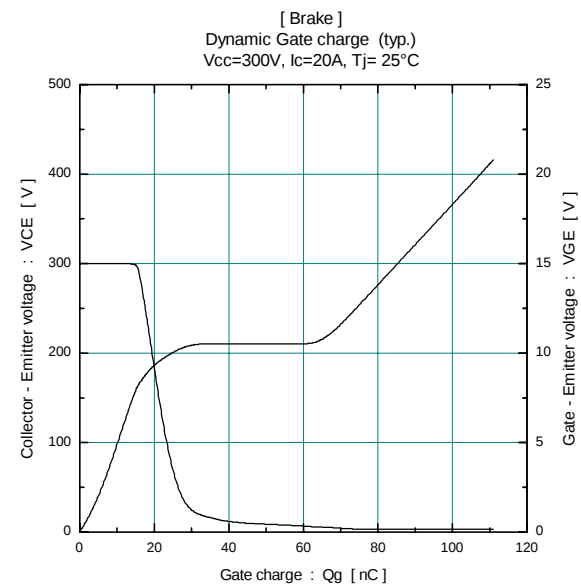
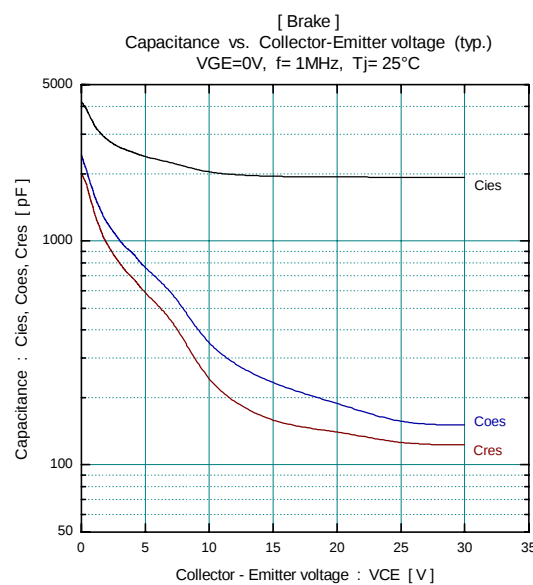
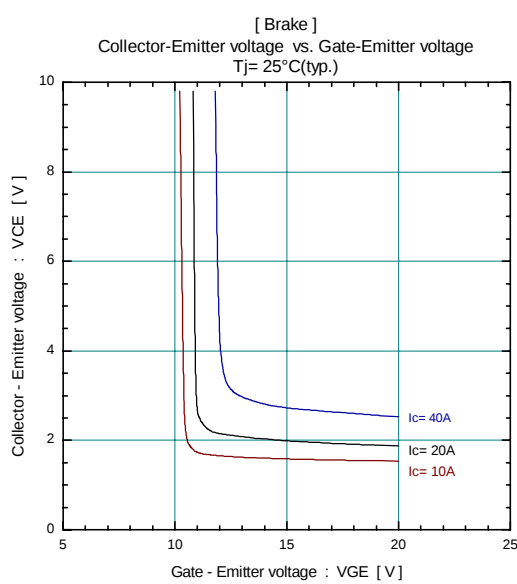
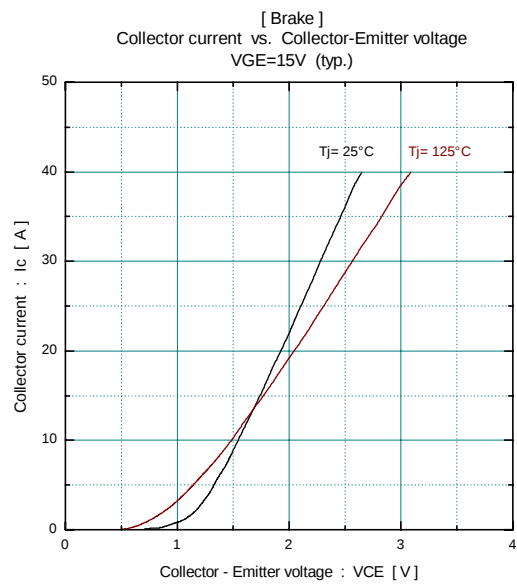
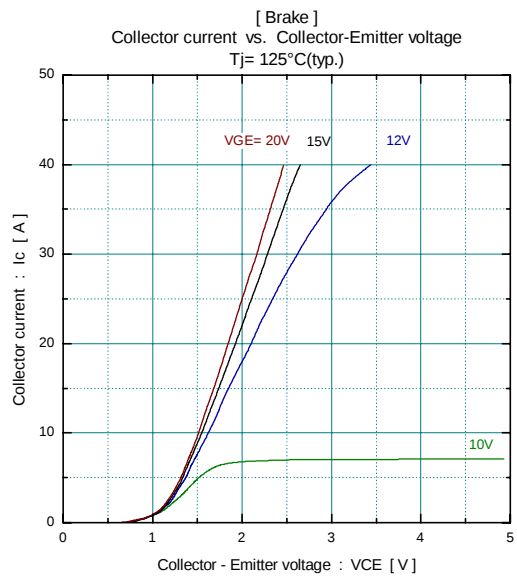
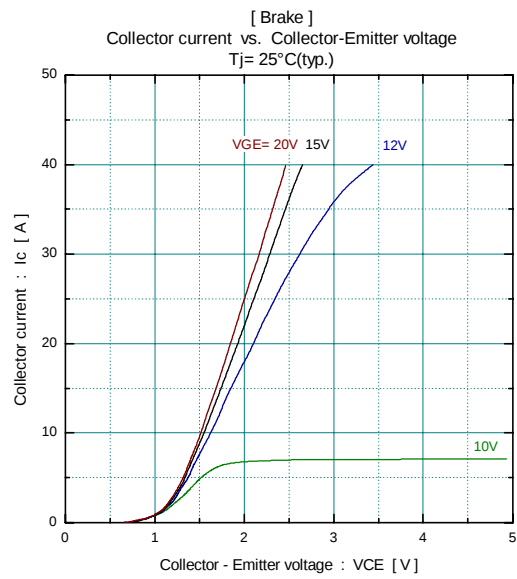
* This is the value which is defined mounting on the additional cooling fin with thermal compound

■ Characteristics (Representative)

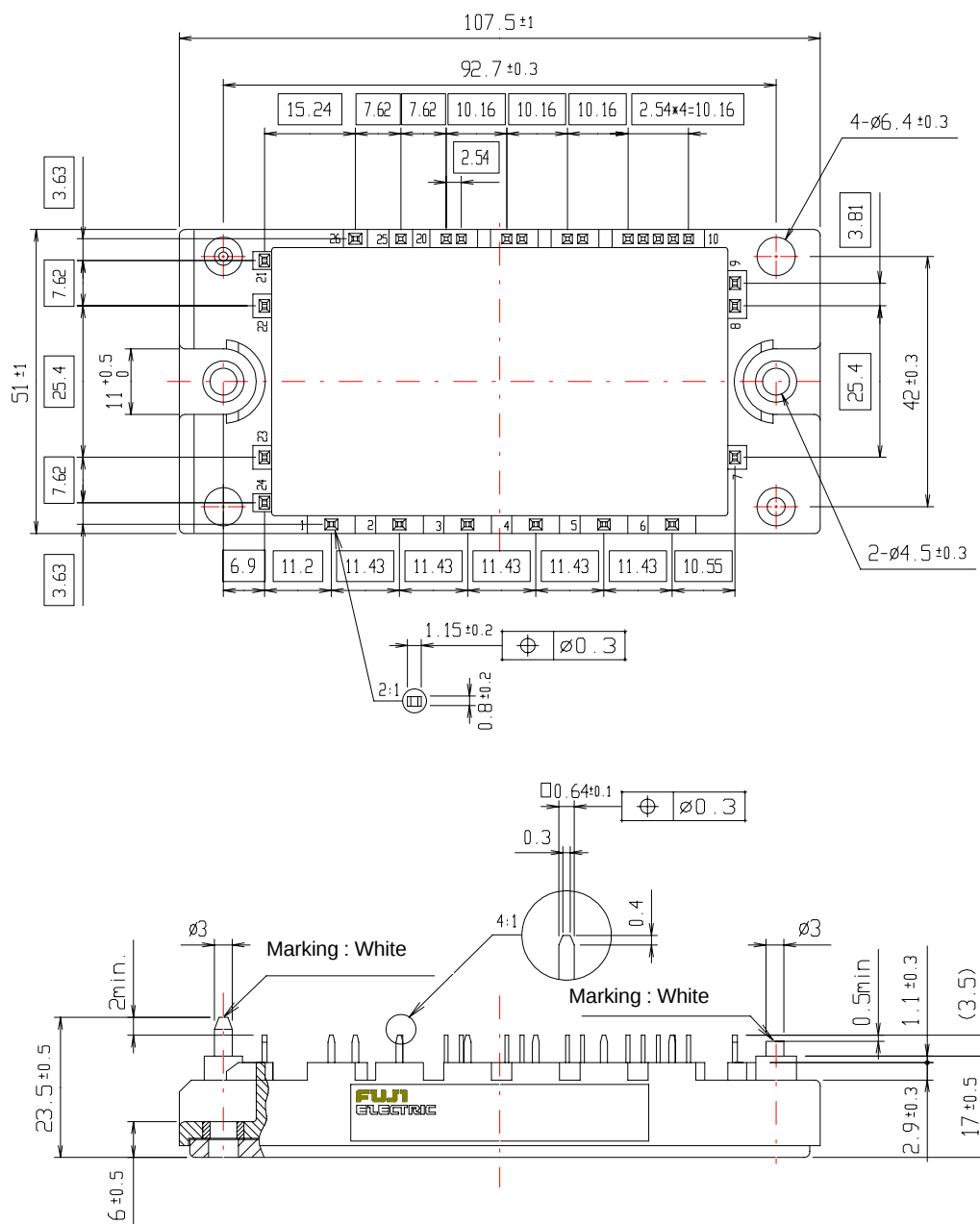








■ Outline Drawings, mm



■ Equivalent Circuit Schematic

