

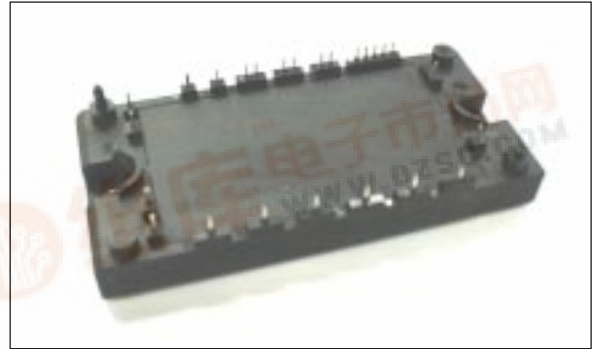
7MBR15SC120

IGBT Modules

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	$T_c=25^{\circ}\text{C}$ $T_c=80^{\circ}\text{C}$	25 15
			1ms	$T_c=25^{\circ}\text{C}$ $T_c=80^{\circ}\text{C}$	50 30
		$-I_c$			15
		Collector power dissipation	P_C	1 device	110
Brake	Collector-Emitter voltage	V_{CES}	1200	V	
	Gate-Emitter voltage	V_{GES}	± 20	V	
	Collector current	I_c	Continuous	$T_c=25^{\circ}\text{C}$ $T_c=80^{\circ}\text{C}$	25 15
			1ms	$T_c=25^{\circ}\text{C}$ $T_c=80^{\circ}\text{C}$	50 30
		P_C		1 device	110
		Repetitive peak reverse voltage(Diode)	V_{RRM}		1200
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}	$T_j=125^{\circ}\text{C}$, 10ms half sine wave	200	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	15	A
Surge current (Non-Repetitive)		I_{FSM}	$T_j=150^{\circ}\text{C}$, 10ms	155	A
I^2t (Non-Repetitive)		P^2t	half sine wave	120	A^2s
Junction temperature (except Thyristor)	T_j		+150	$^{\circ}\text{C}$	
Storage temperature	T_{sg}		-40 to +125	$^{\circ}\text{C}$	
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 (Tj=25°C unless otherwise specified)

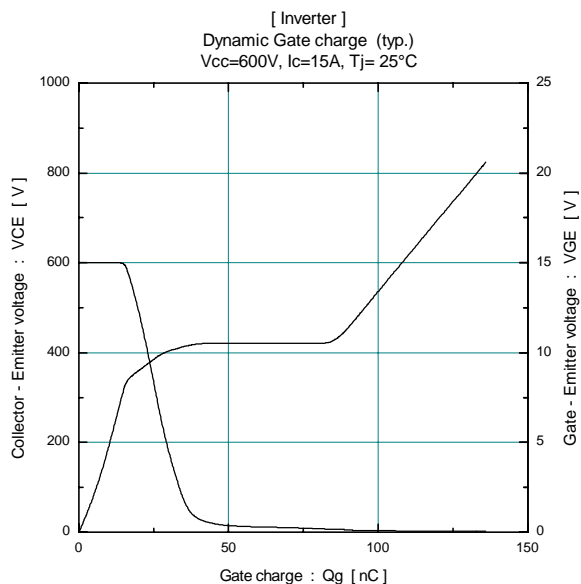
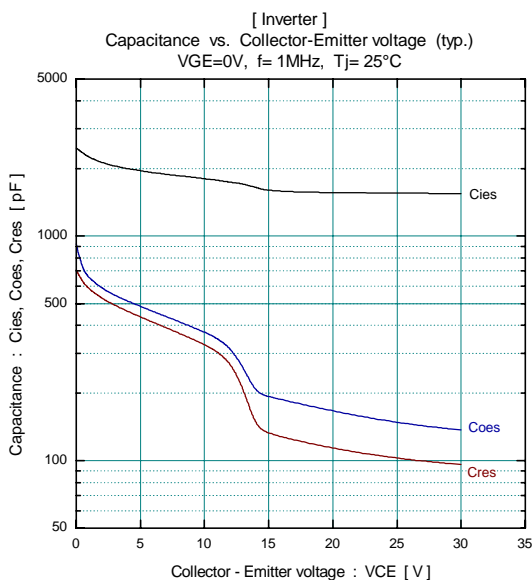
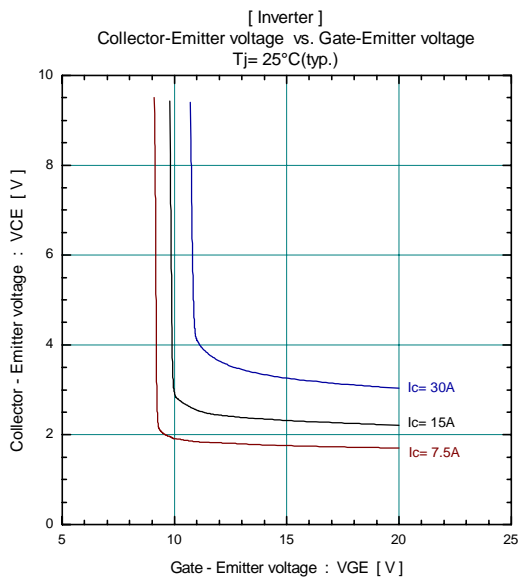
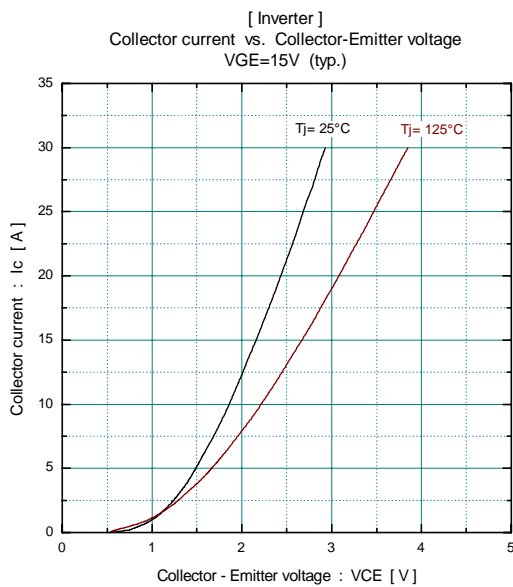
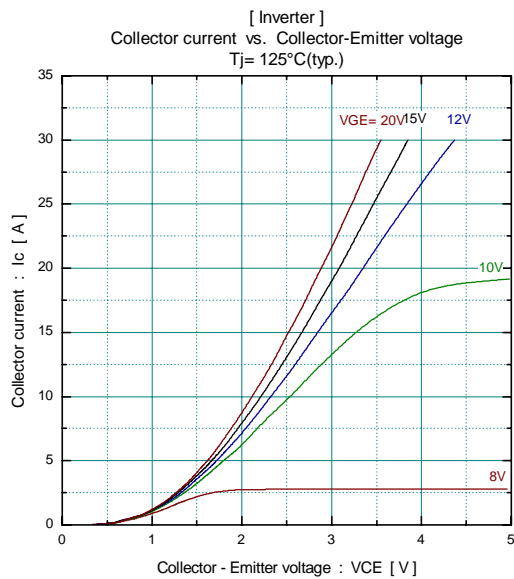
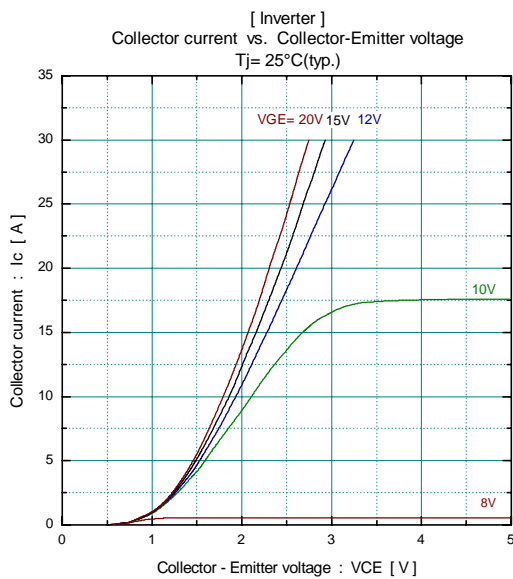
Item	Symbol	Condition	Characteristics			Unit		
			Min.	Typ.	Max.			
Inverter	Zero gate voltage collector current	ICES	VCE=1200V, VGE=0V		75	μA		
	Gate-Emitter leakage current	IGES	VCE=0V, VGE=±20V		200	nA		
	Gate-Emitter threshold voltage	VGE(th)	VCE=20V, IC=15mA		5.5	7.2	8.5	V
	Collector-Emitter saturation 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		0.35	1.2	μs	
		tr	IC=15A		0.25	0.6		
	Turn-off	toff	VGE=±15V		0.45	1.0		
		tf	RG=82Ω		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	VCE=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		0.35	1.2	μs	
		tr	IC=15A		0.25	0.6		
	Turn-off time	toff	VGE=±15V		0.45	1.0		
		tf	RG=82Ω		0.08	0.3		
	Reverse current	IRRM	VR=1200V			75	μA	
	off-state current	IDM	VDM=1600V			1.0	mA	
Reverse current	IRRM	VRM=1600V			1.0	mA		
Thyristor	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	
Thermistor	Resistance	R	T=25°C		5000	Ω		
			T=100°C		465		495	520
	B value	B	T=25/50°C		3305	3375	3450	K

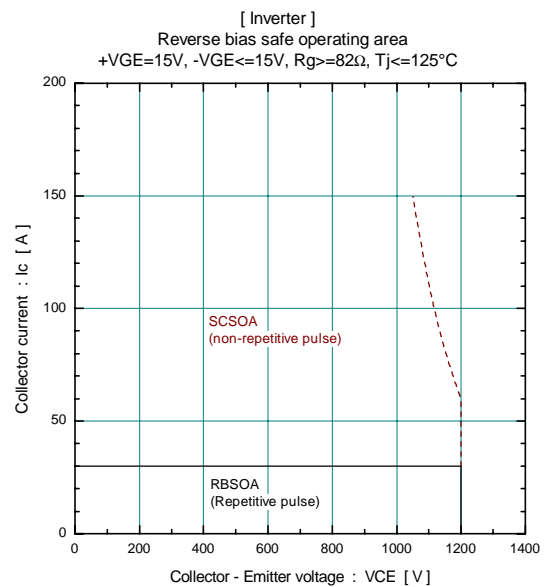
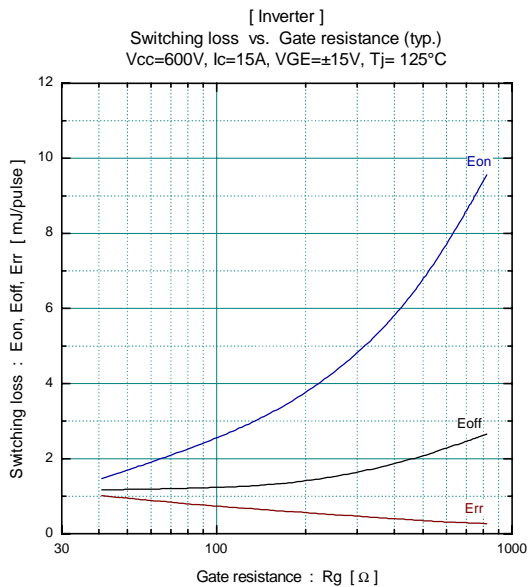
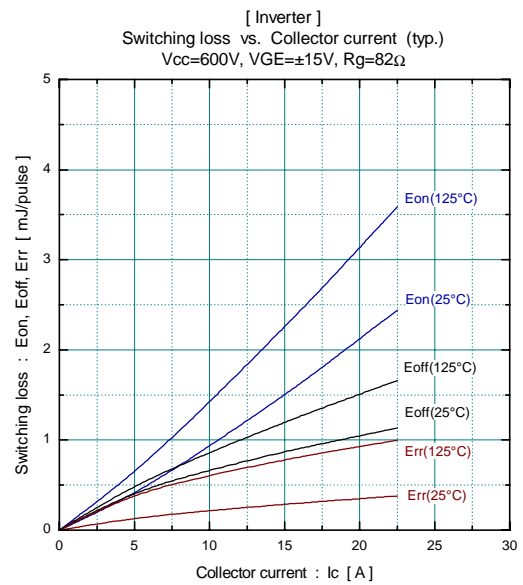
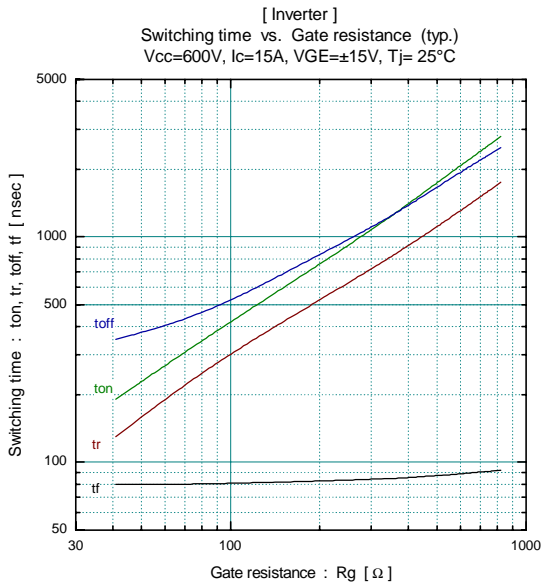
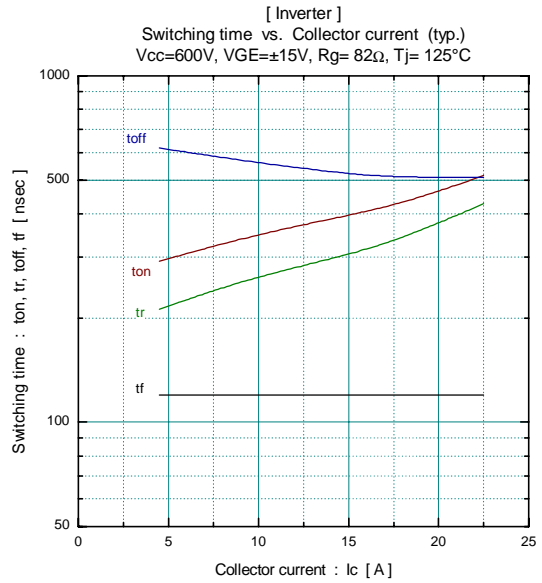
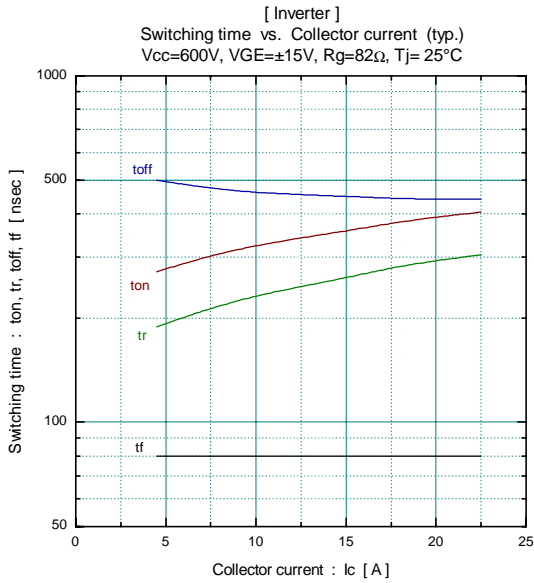
● Thermal resistance Characteristics

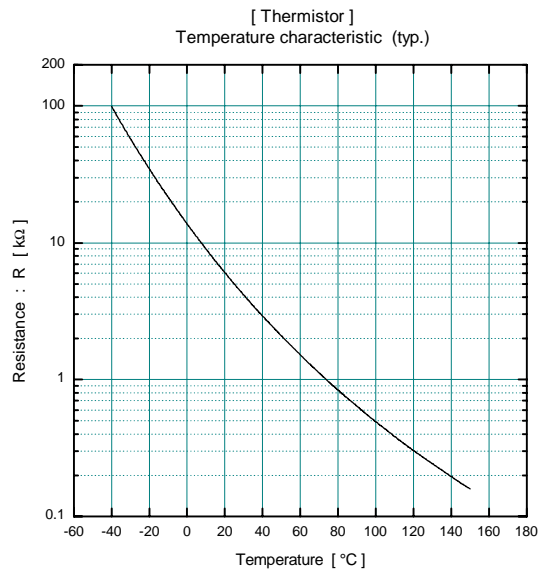
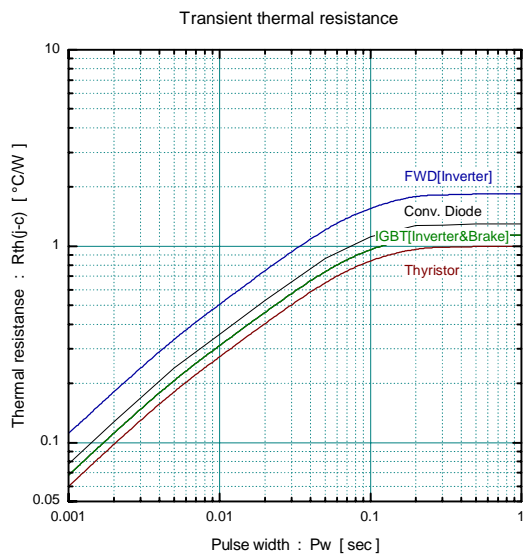
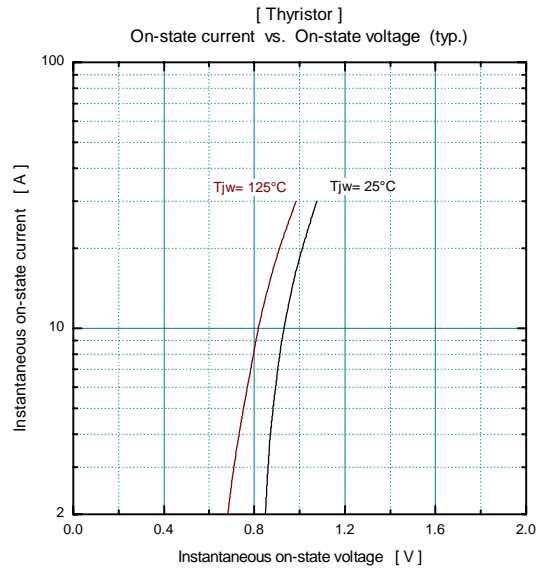
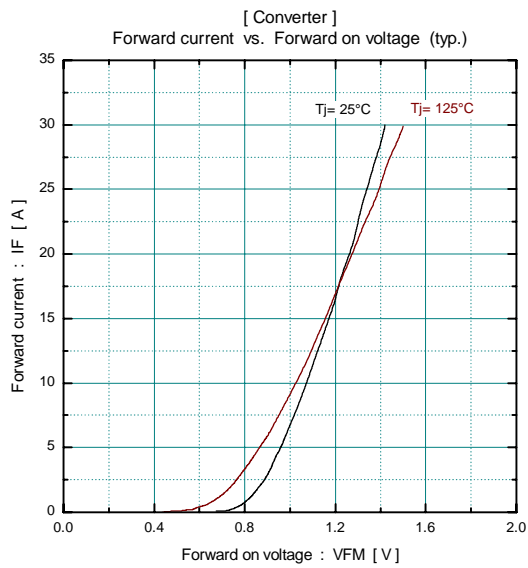
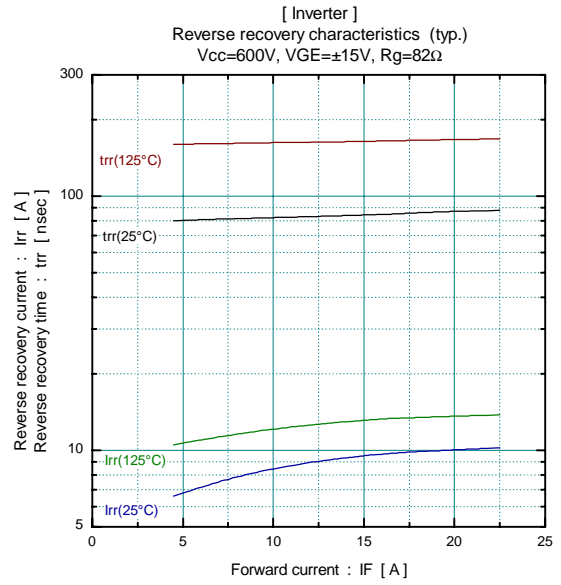
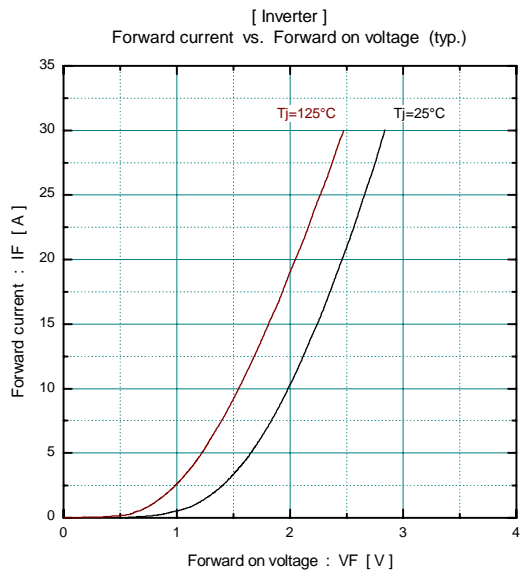
Item	Symbol	Condition	Characteristics			Unit
			Min.	Typ.	Max.	
Thermal resistance (1 device)	Rth(j-c)	Inverter IGBT			1.14	°C/W
		Inverter FWD			1.85	
		Brake IGBT			1.14	
		Thyristor			1.00	
		Converter Diode			1.30	
Contact thermal resistance *	Rth(c-f)	With thermal compound		0.05		

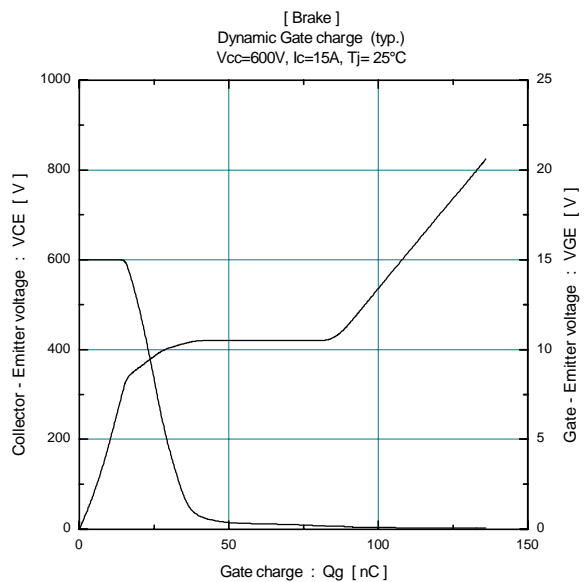
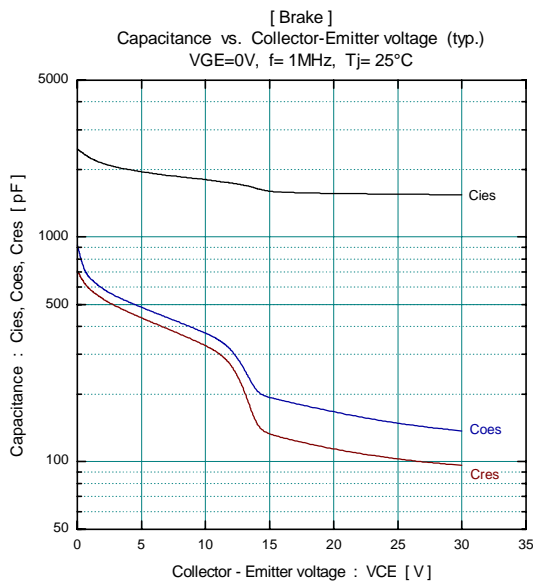
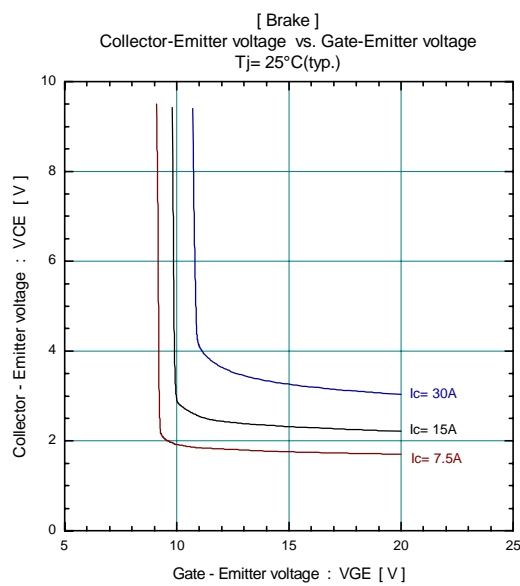
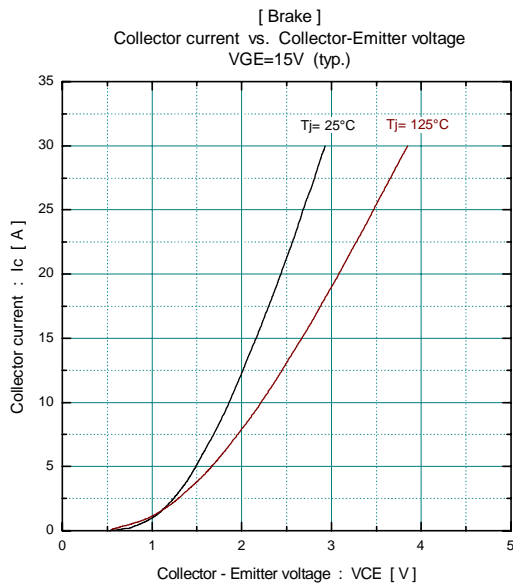
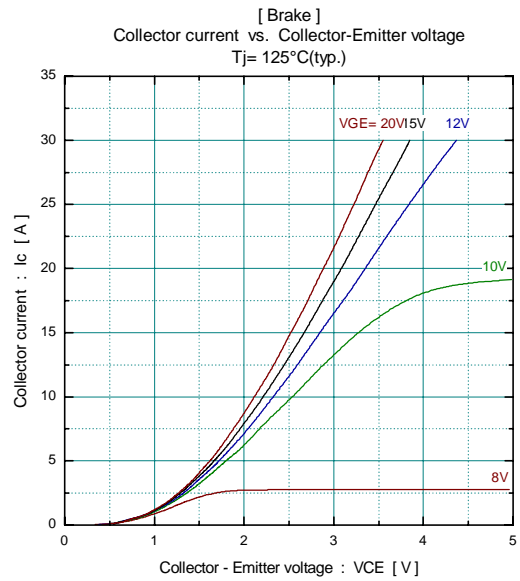
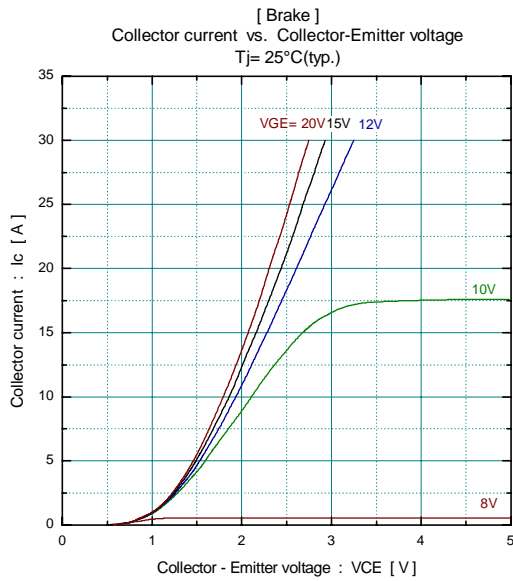
* This is the value which is defined mounting on the additional cooling fin with thermal compound

■ Characteristics (Representative)

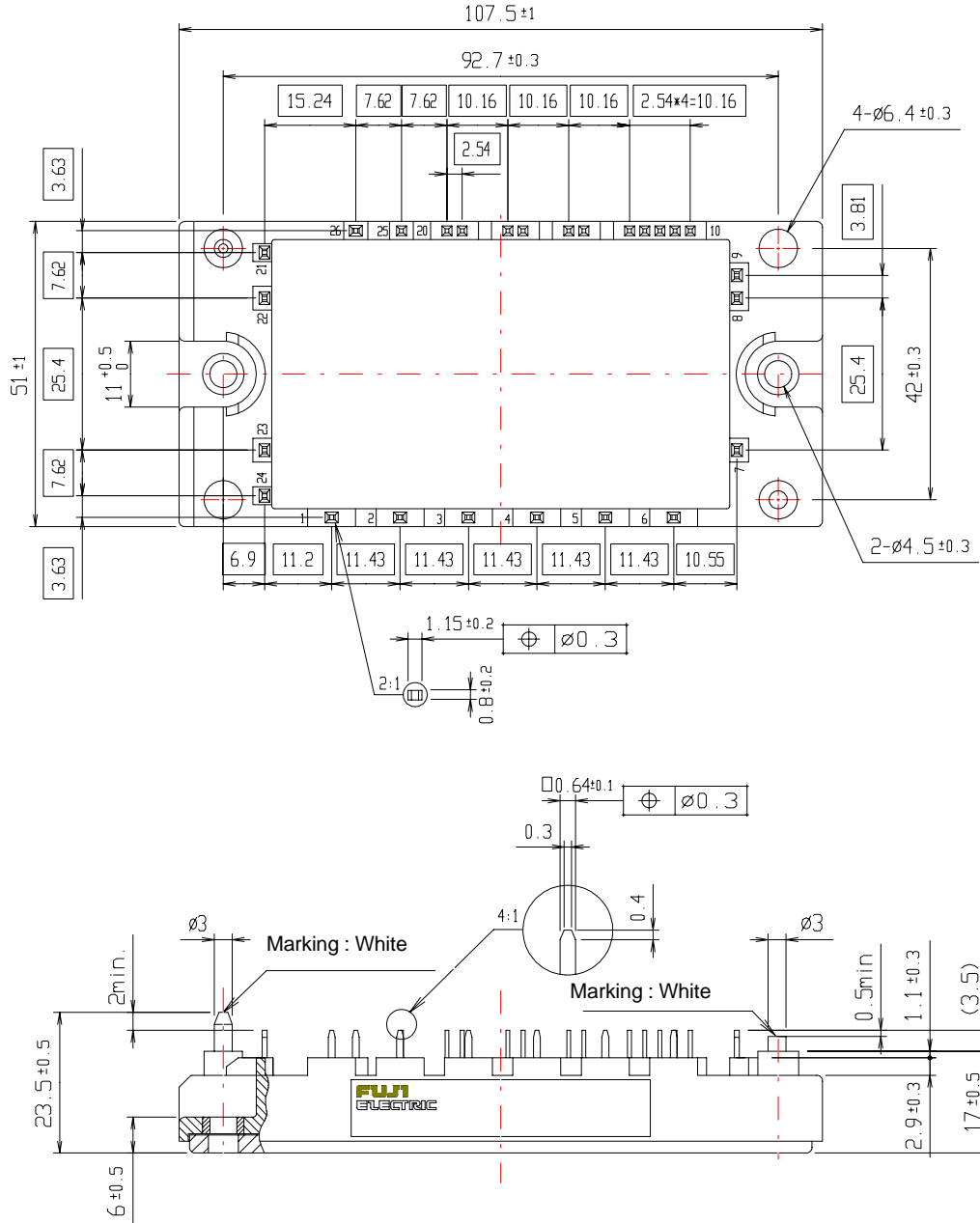








Outline Drawings, mm



Equivalent Circuit Schematic

