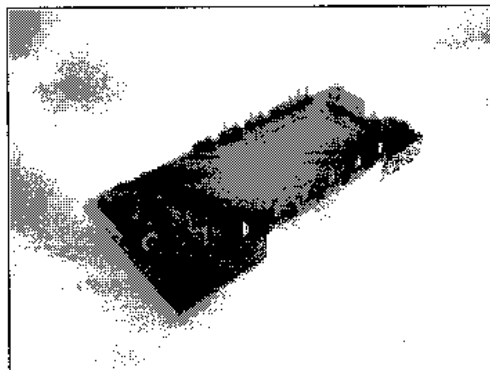


IGBT MODULE (S series) 1200V / 25A / PIM

■ Features

- Low $V_{CE(sat)}$
- Compact package
- P.C. board mount
- 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	35	A
				T _C =80°C	25	
		I _{CP}	1ms	T _C =25°C	70	A
				T _C =80°C	50	
		-I _C			25	A
Collector power dissipation	P _C	1 device		180	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	V _{RRM}			1200	V	
Converter	Repetitive peak reverse voltage	V _{RRM}		1600	V	
	Average output current	I _O		50Hz/60Hz sine wave	25	A
	Surge current (Non-Repetitive)	I _{FSM}		T _J =150°C, 10ms	260	A
	I _{RT} (Non-Repetitive)	P _T	half sine wave		338	A*s
Operating junction temperature		T _J			+150	°C
Storage temperature		T _{stg}			-40 to +125	°C
Isolation voltage	between terminal and copper base *2	V _{iso}	AC : 1 minute		AC 2500	V
	between thermistor and others *3				AC 2500	
Mounting screw torque					3.5 *1	N·m

*1 Recommendable value : 2.5 to 3.5 N·m (M5)

*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 24 should be connected together and shorted to copper base.

● Electrical characteristics (T_J=25°C unless otherwise specified)

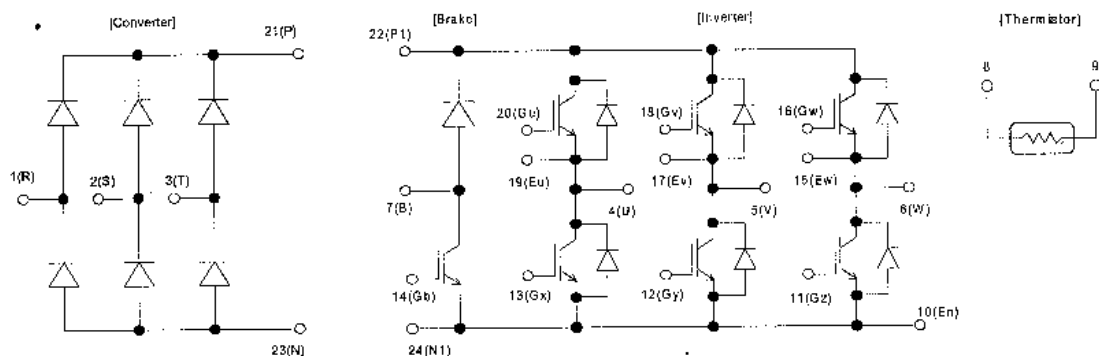
Item			Symbol	Condition	Characteristics			Unit
					Min.	Typ.	Max.	
Inverter	Zero gate voltage collector current	ICES	VCE=1200V, VGE=0V				1.0	mA
	Gate-Emitter leakage current	IGES	VCE=0V, VGE=±20V				0.2	μA
	Gate-Emitter threshold voltage	VGE(th)	VCE=20V, IC=25mA		5.5	7.2	8.5	V
	Collector-Emitter saturation voltage	VCE(sat)	VGE=15V, IC=25A	chip		2.1		V
				terminal		2.2	2.6	
	Input capacitance	Cies	VGE=0V, VCE=10V, f=1MHz			3000		pF
	Turn-on time	ton	VCC=600V			0.35	1.2	μs
		tr	IC=25A			0.25	0.6	
		tr(j)	VGE=±15V			0.1		
	Turn-off	toff	RG=51Ω			0.45	1.0	
		tr				0.08	0.3	
Forward on voltage	VF	IF=25A	chip		2.3		V	
			terminal		2.4	3.2		
Reverse recovery time of FRD	trr	IF=25A				0.35	μs	
Brake	Zero gate voltage collector current	ICES	VCE=1200V, VGE=0V				1.0	mA
	Gate-Emitter leakage current	IGES	VCE=0V, VGE=±20V				0.2	μA
	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	
		tr	RG=82Ω			0.08	0.3	
	Reverse current	IRRM	VR=1200V				1.0	mA
	Converter	Forward on voltage	VFM	IF=25A	chip		1.1	V
terminal						1.2	1.5	
	Reverse current	IRRM	VR=1600V				1.0	mA
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

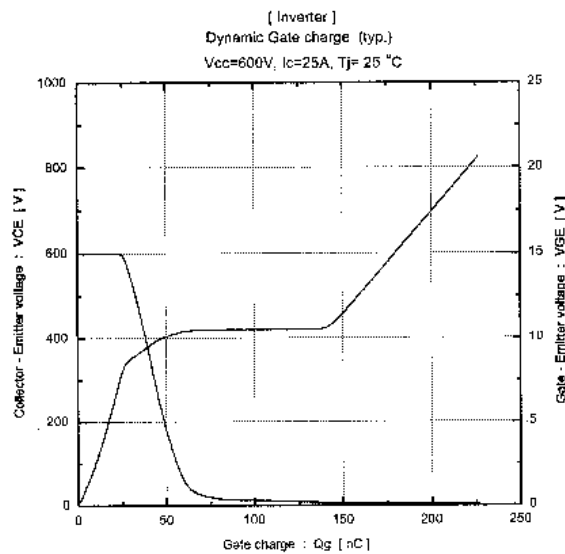
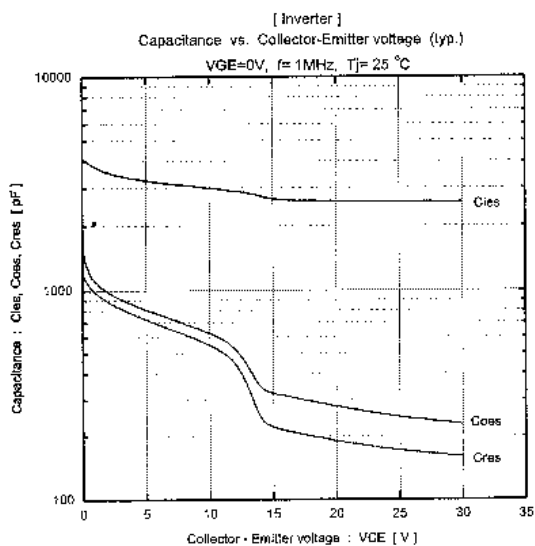
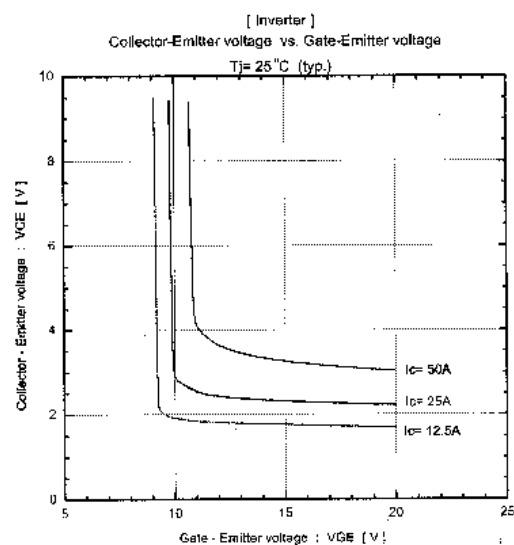
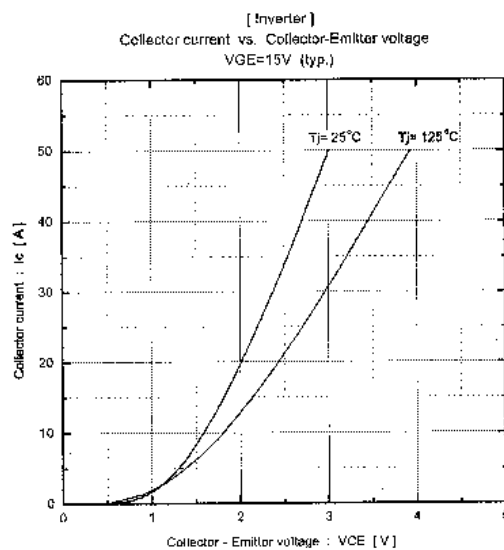
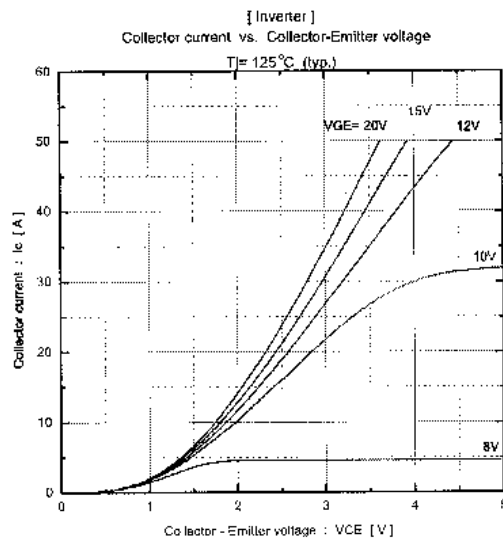
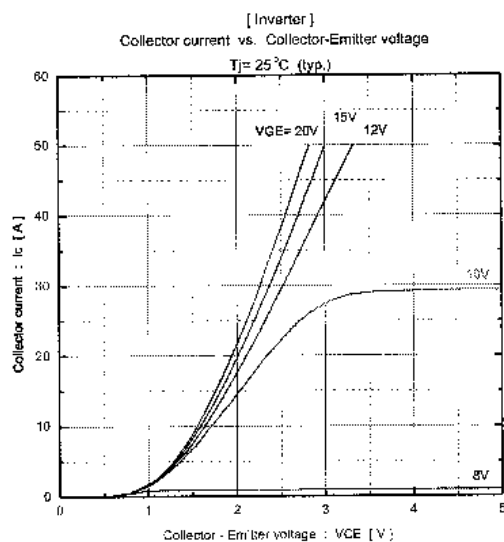
Item	Symbol	Condition	Characteristics			Unit
			Min.	Typ.	Max.	
Thermal resistance (1 device)	Rth(j-c)	Inverter IGBT			0.69	°C/W
		Inverter FWD			1.30	
		Brake IGBT			1.14	
		Converter Diode			0.90	
Contact thermal resistance *	Rth(c-f)	With thermal compound		0.05		

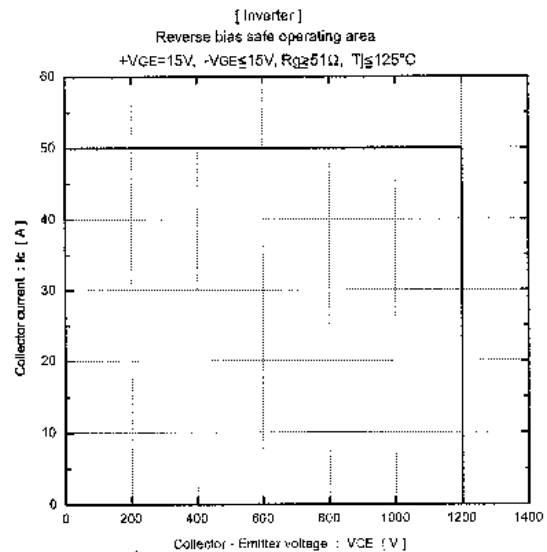
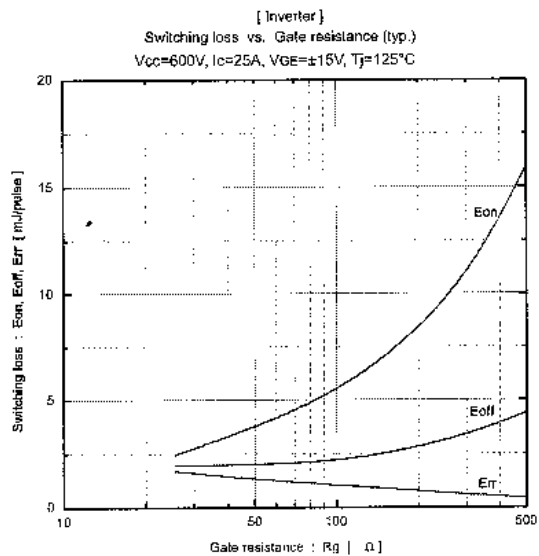
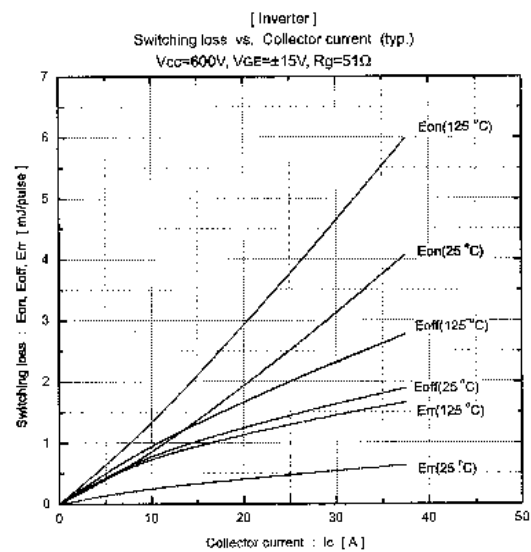
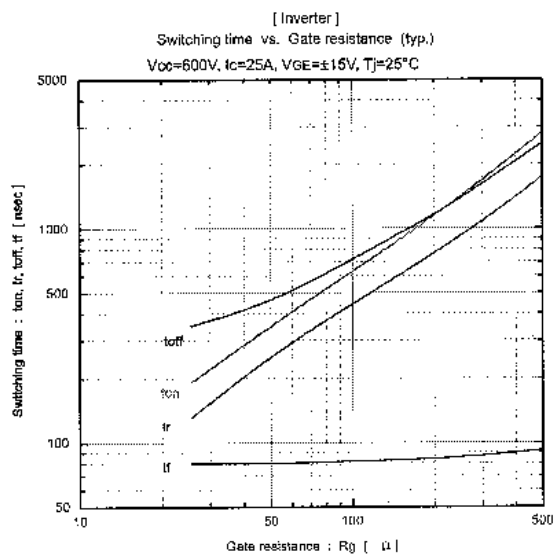
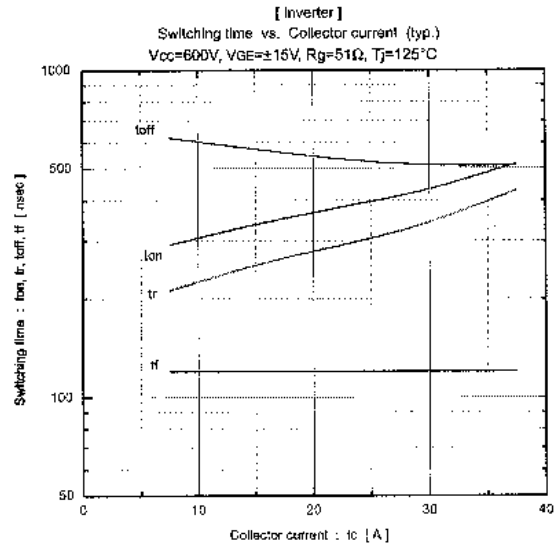
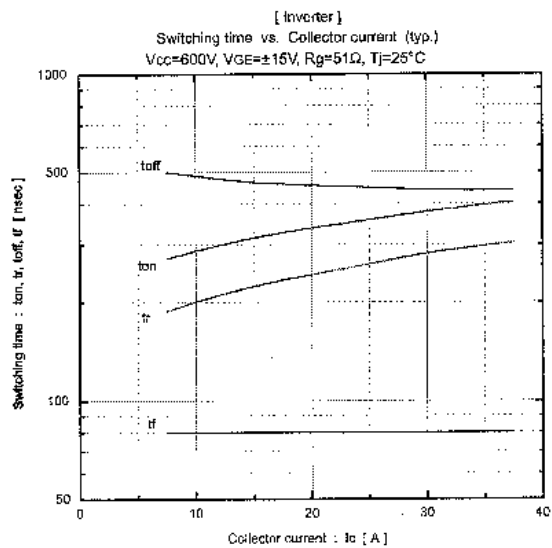
* This is the value which is defined mounting on the additional cooling fin with thermal compound

■ Equivalent Circuit Schematic

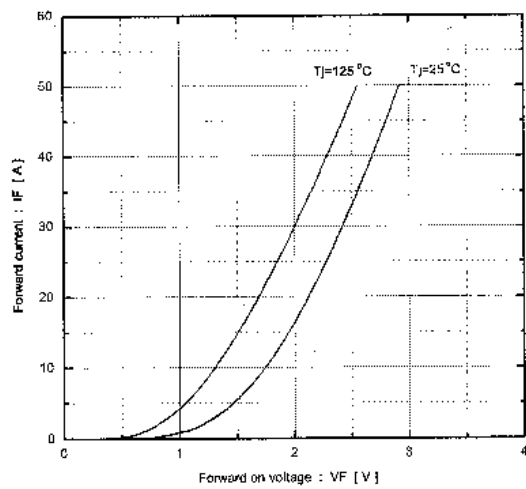


Characteristics (Representative)

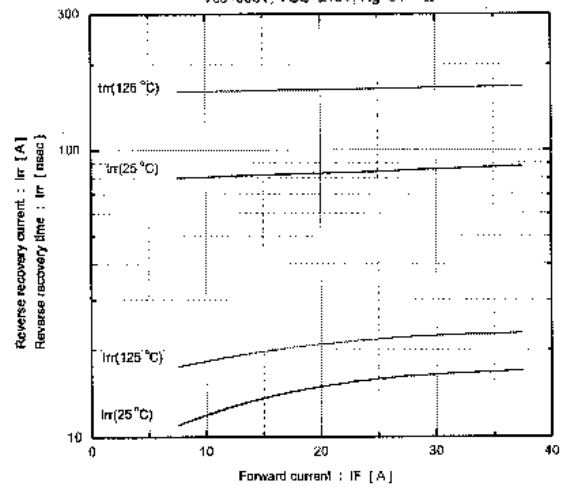




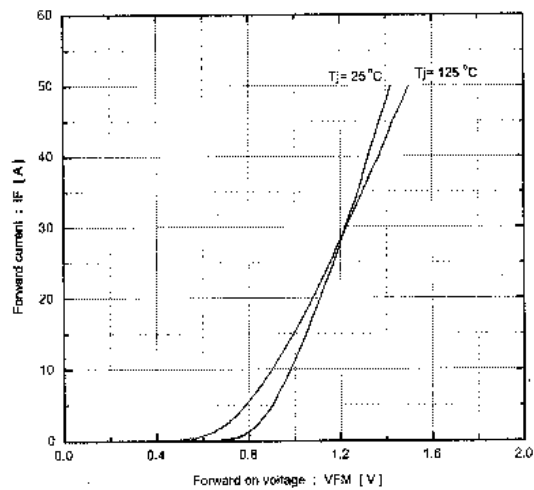
[Inverter]
Forward current vs. Forward on voltage (typ.)



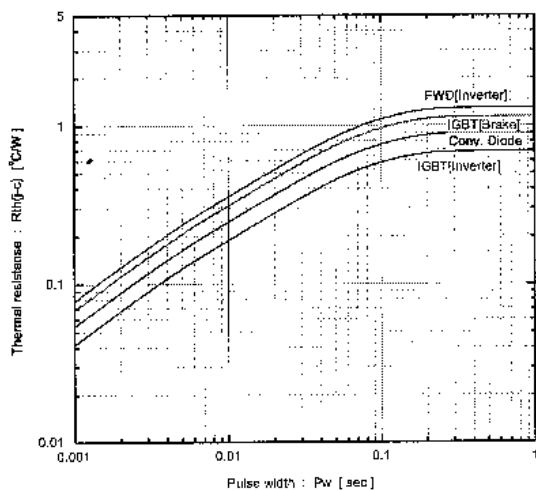
[Inverter]
Reverse recovery characteristics (typ.)
 $V_{CC} = 600\text{V}$, $V_{GE} = \pm 15\text{V}$, $R_g = 51\ \Omega$



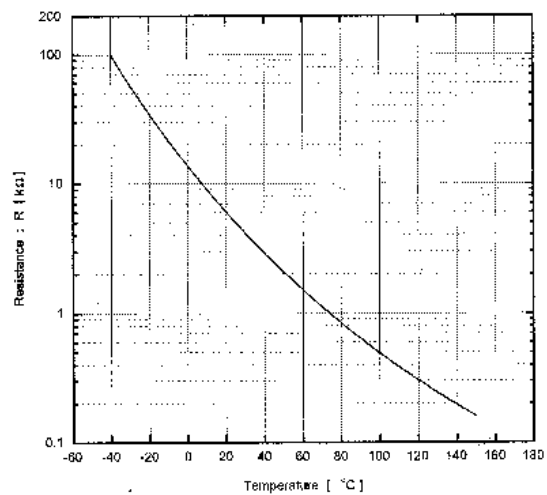
[Converter]
Forward current vs. Forward on voltage (typ.)

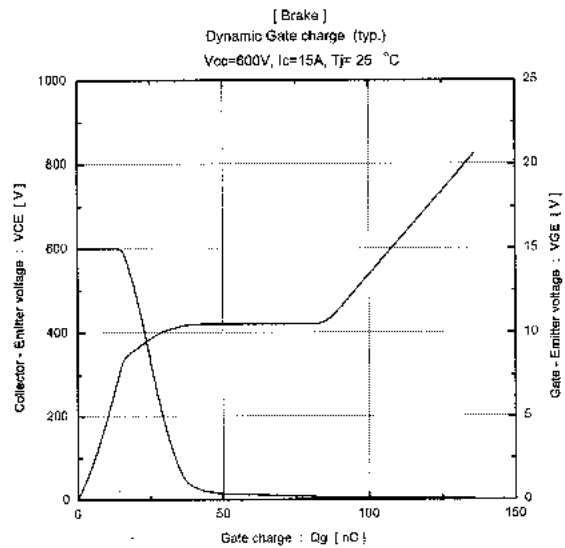
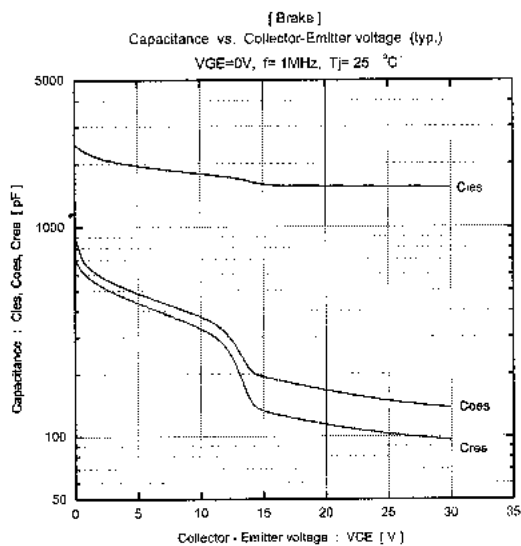
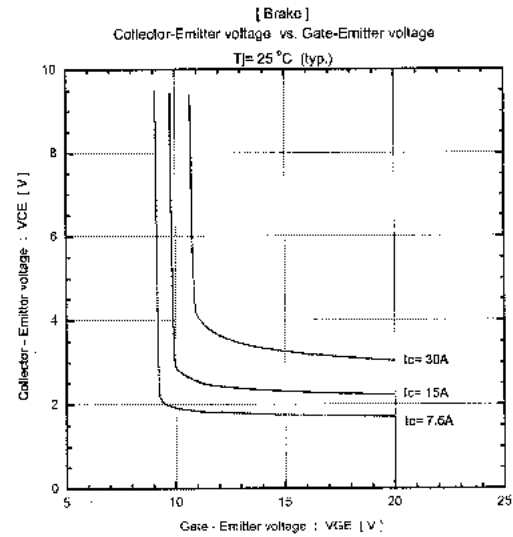
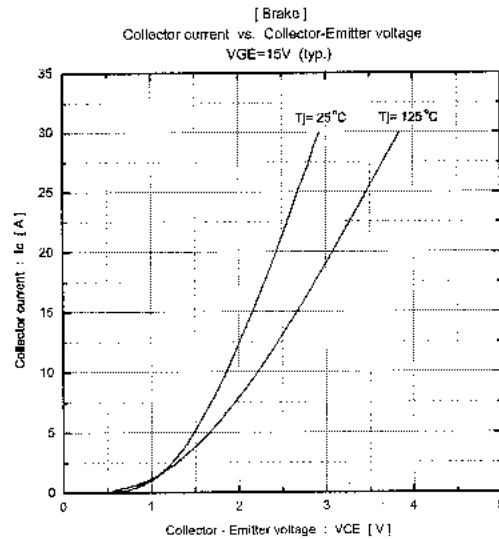
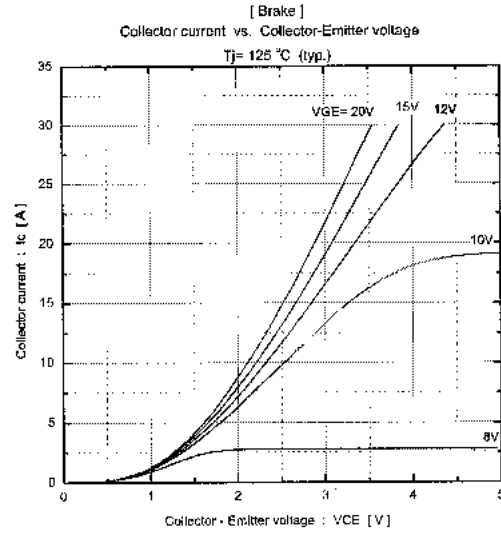
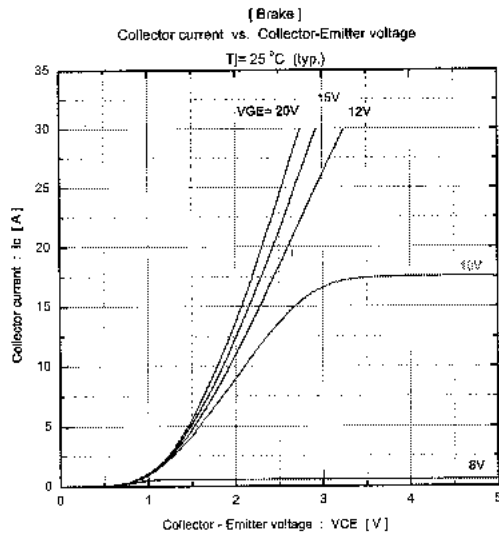


Transient thermal resistance



[Thermistor]
Temperature characteristic (typ.)





■ Outline Drawings, mm

