

IGBT MODULE (U series) 1200V / 50A / PIM



■ Features

- Low $V_{CE(sat)}$
- Compact Package
- P.C. Board Mount Module
- Converter Diode Bridge Dynamic Brake Circuit

■ Applications

- Inverter for Motoe Drive
- AC and DC Servo Drive Amplifier
- Uninterruptible Power Supply

■ Maximum ratings and characteristics

● Absolute maximum ratings ($T_c=25^\circ\text{C}$ unless otherwise 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	50	A
				T _C =80°C	35	
		I _{CP}	1ms	T _C =25°C	100	
				T _C =80°C	70	
		-I _C			50	
	-I _C pulse	1ms		100		
Collector power dissipation		P _C	1 device	205	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	35	A
				T _C =80°C	25	
		I _{CP}	1ms	T _C =25°C	70	
				T _C =80°C	50	
	Collector power dissipation		P _C	1 device	160	W
Repetitive peak reverse voltage		V _{R_{RRM}}		1200	V	
Converter	Repetitive peak reverse voltage		V _{R_{RRM}}		1600	V
	Average output current		I _O		50	A
	Surge current (Non-Repetitive)		I _{FSM}		520	A
	I ² t (Non-Repetitive)		P _t		1352	A ² s
Operating junction temperature		T _J		+150	°C	
Storage temperature		T _{slg}		-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	V
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 Two thermistor terminals should be connected together, each other terminals should be connected together and shorted to base plate when isolation test will be done.

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

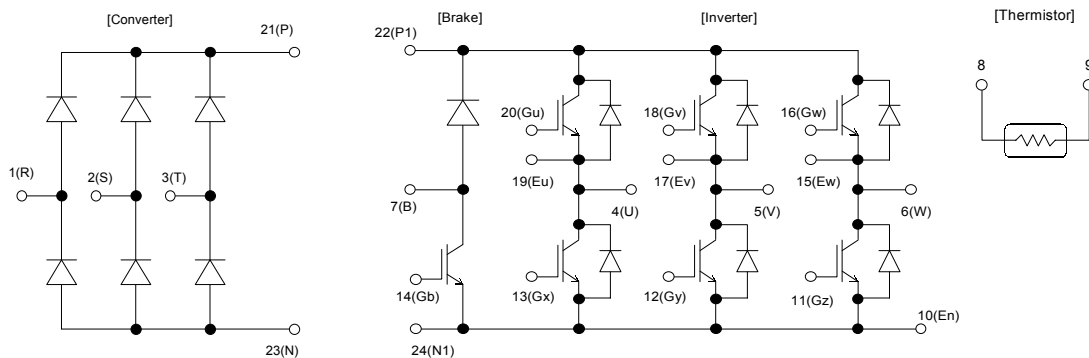
Item		Symbol	Condition		Characteristics			Unit	
					Min.	Typ.	Max.		
Inverter	Zero gate voltage collector current	ICES	VCE=1200V, VGE=0V		-	-	1.0	mA	
	Gate-Emitter leakage current	IGES	VCE=0V, VGE=±20V		-	-	200	nA	
	Gate-Emitter threshold voltage	VGE(th)	VCE=20V, Ic=50mA		4.5	6.5	8.5	V	
	Collector-Emitter saturation voltage	VCE(sat) (terminal)	VGE=15V Ic=50A	Tj=25°C	-	2.25	2.65	V	
				Tj=125°C	-	2.60	-		
		VCE(sat) (chip)		Tj=25°C	-	2.00	2.40		
				Tj=125°C	-	2.35	-		
	Input capacitance	Cies	VGE=0V, VCE=10V, f=1MHz		-	4	-	nF	
	Turn-on time	ton	VCC=600V		-	0.53	1.20	µs	
		tr	Ic=50A		-	0.43	0.60		
		tr(i)	VGE=±15V		-	0.03	-		
	Turn-off time	toff	RG= 33 Ω		-	0.37	1.00		
		tf			-	0.07	0.30		
	Forward on voltage	VF (terminal)	VGE= 0 V If=50A	Tj=25°C	-	2.05	2.35	V	
				Tj=125°C	-	2.20	-		
		VF (chip)		Tj=25°C	-	1.80	2.10		
				Tj=125°C	-	1.95	-		
Reverse recovery time	trr	If=50A		-	-	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		-	-	200	nA	
	Collector-Emitter saturation voltage	VCE(sat) (terminal)	Ic=35A VGE=15V	Tj=25°C	-	2.20	2.65	V	
				Tj=125°C	-	2.55	-		
		VCE(sat) (chip)		Tj=25°C	-	1.95	2.40		
				Tj=125°C	-	2.30	-		
	Turn-on time	ton	VCC=600V		-	0.53	1.20	µs	
		tr	Ic=35A		-	0.43	0.60		
	Turn-off time	toff	VGE=±15V		-	0.37	1.00		
		tf	RG= 43 Ω		-	0.07	0.30		
	Reverse current	IRRM	VR=1200V		-	-	1.0	mA	
	Converter	Forward on voltage	VFM	If=50A	terminal	-	1.20	1.50	V
				VGE=0V	chip	-	1.10	-	
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

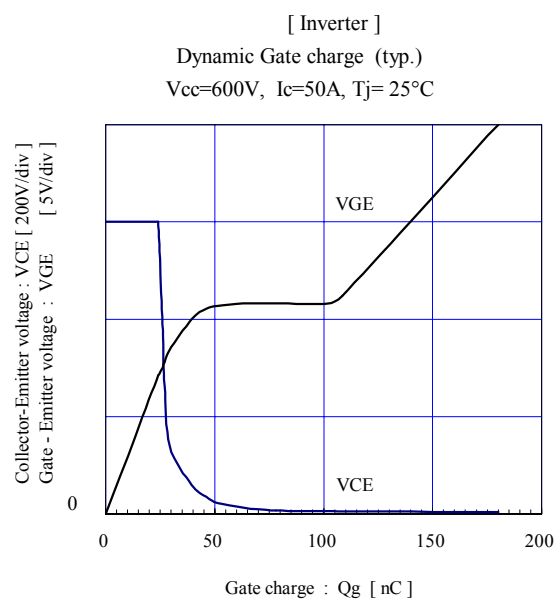
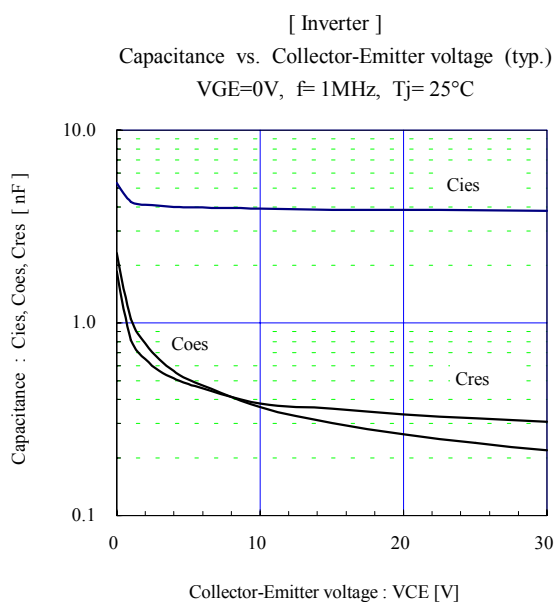
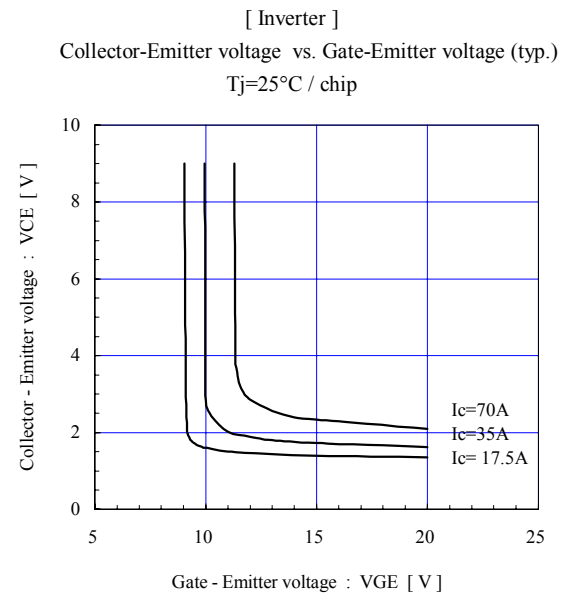
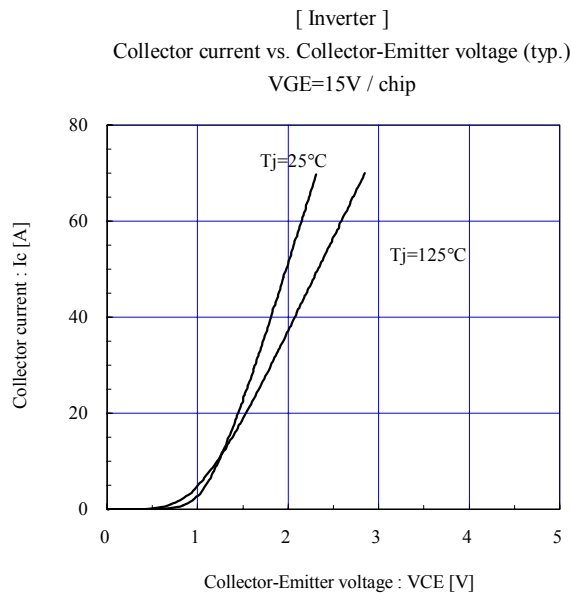
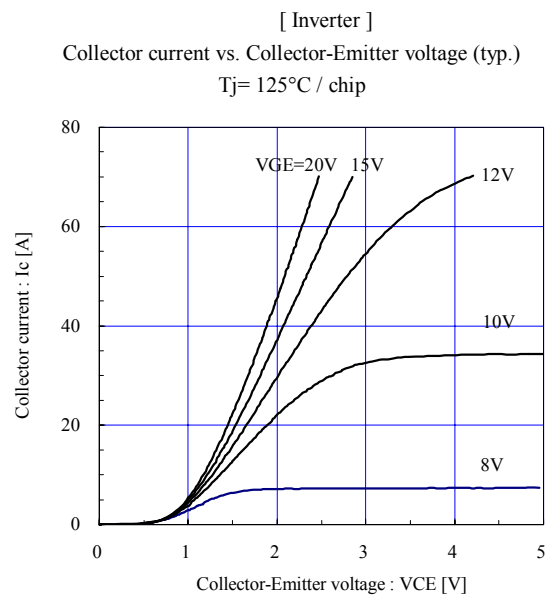
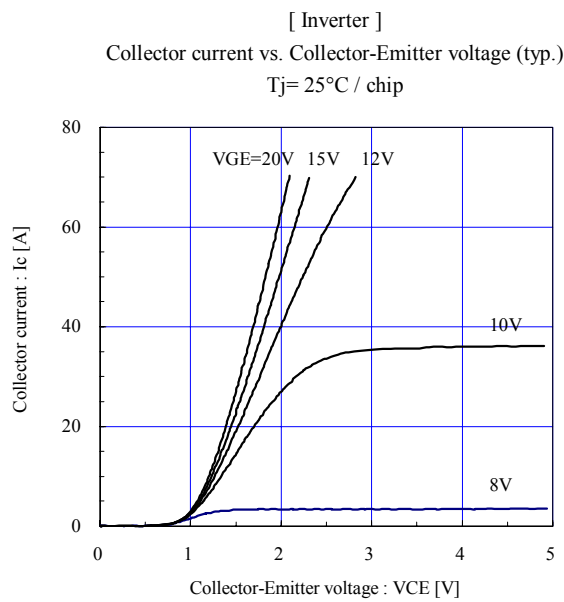
Item	Symbol	Condition	Characteristics			Unit
			Min.	Typ.	Max.	
Thermal resistance (1 device)	R _{th(j-c)}	Inverter IGBT	-	-	0.60	°C/W
		Inverter FWD	-	-	0.88	
		Brake IGBT	-	-	0.76	
		Converter Diode	-	-	0.50	
			-	-	-	
Contact thermal resistance *	R _{th(c-f)}	With thermal compound	-	0.05	-	

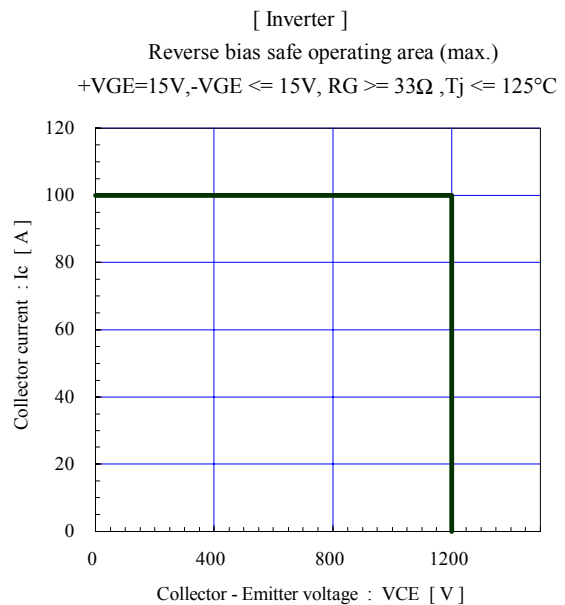
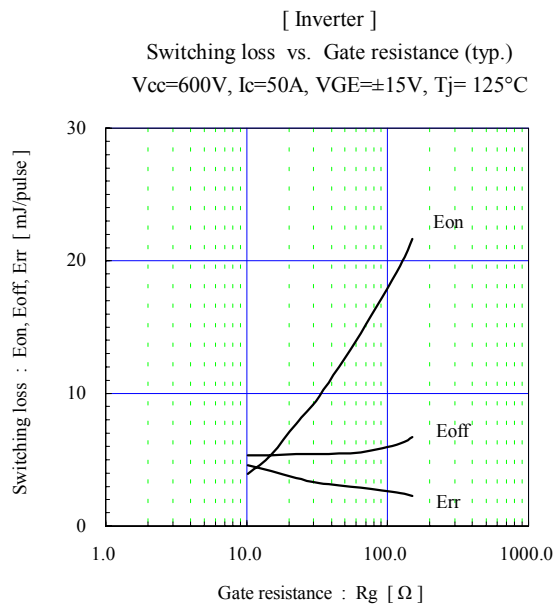
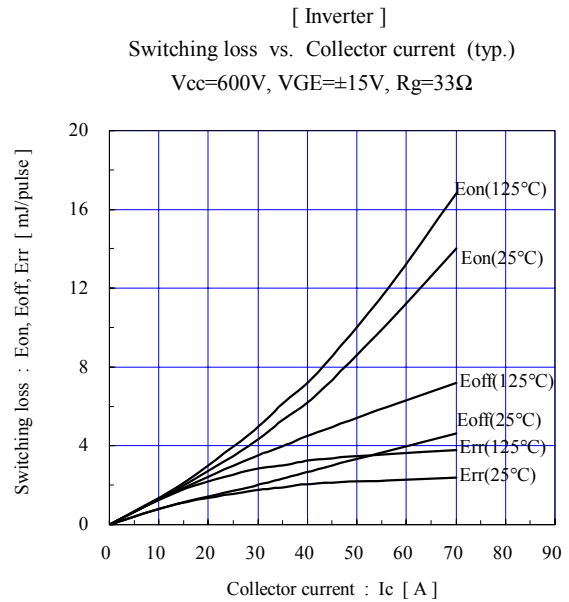
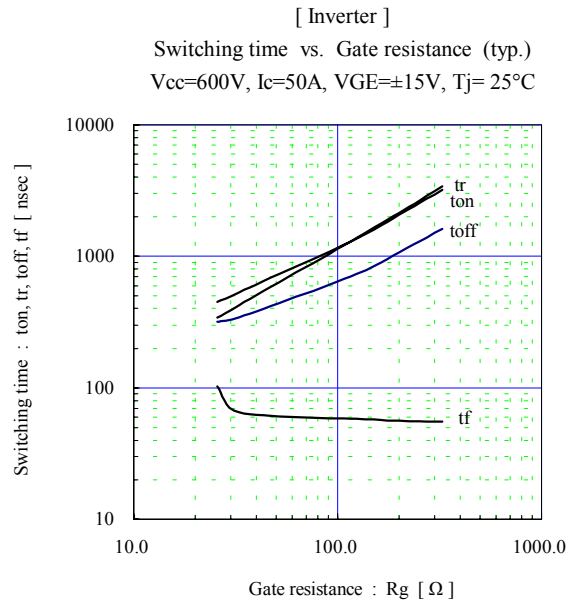
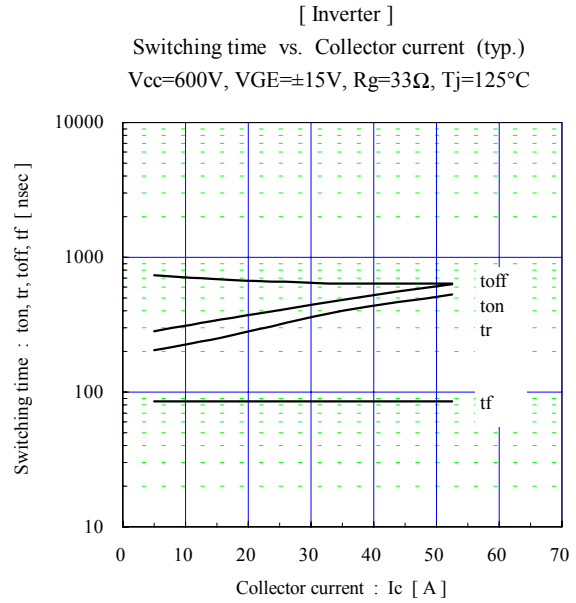
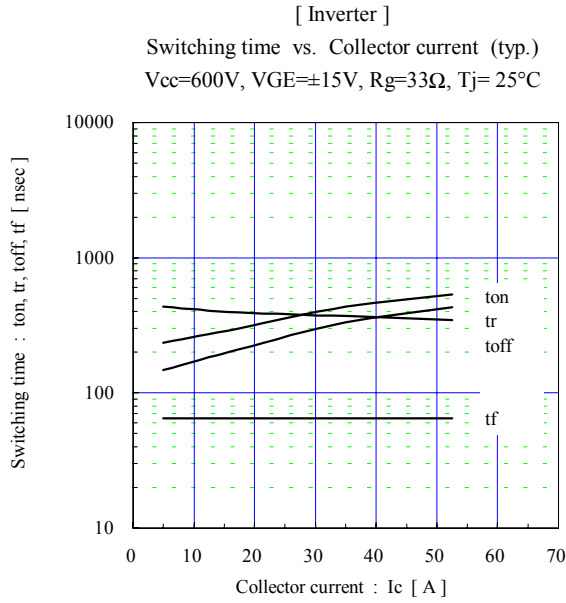
* This is the value which is defined mounting on the additional cooling fin with thermal compound

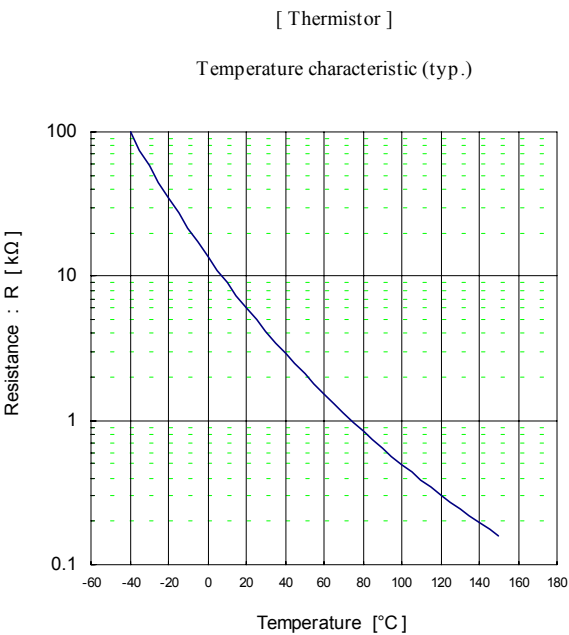
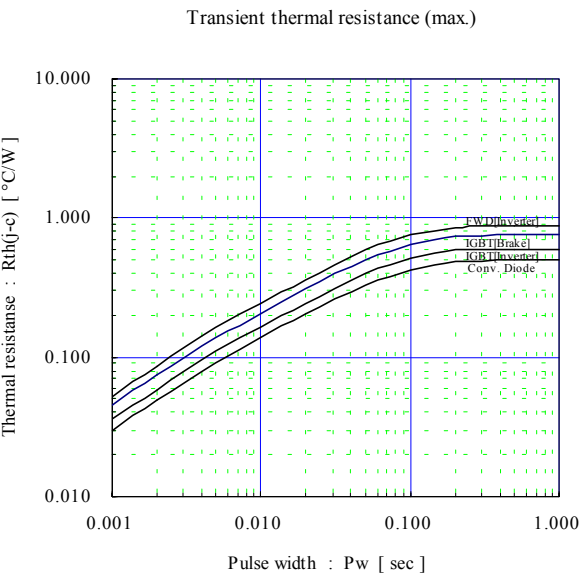
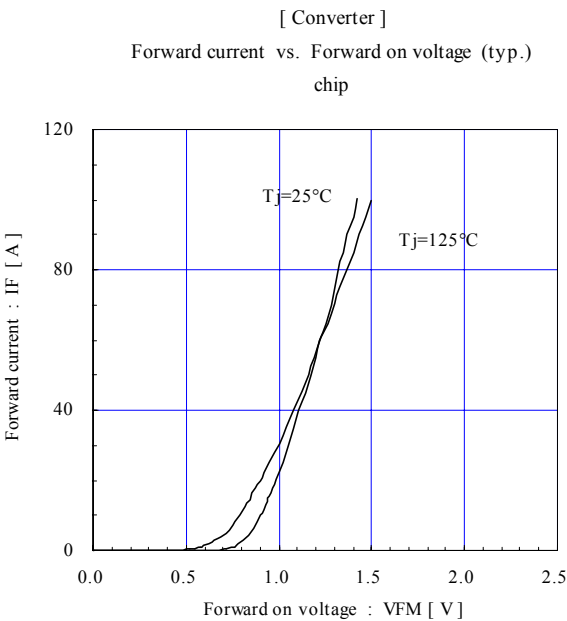
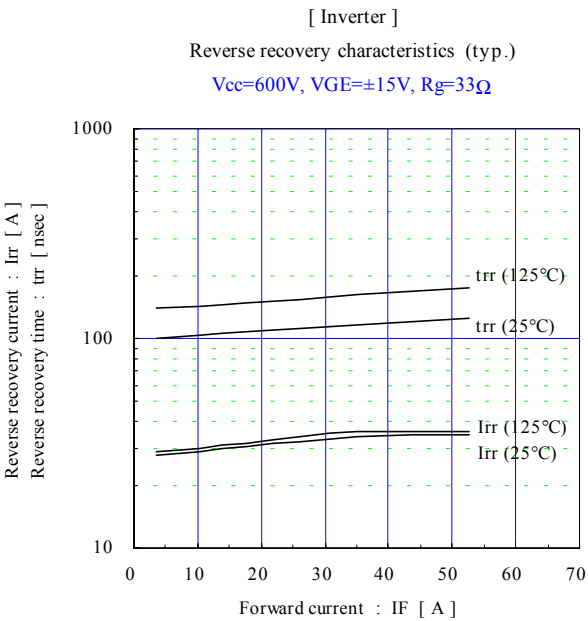
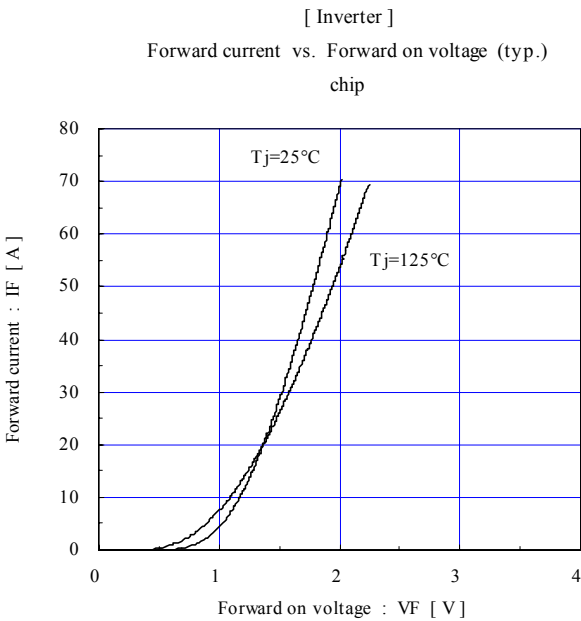
■ Equivalent Circuit Schematic

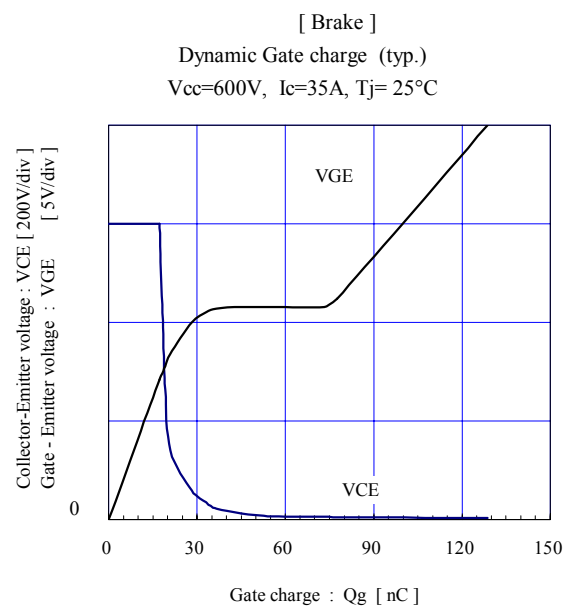
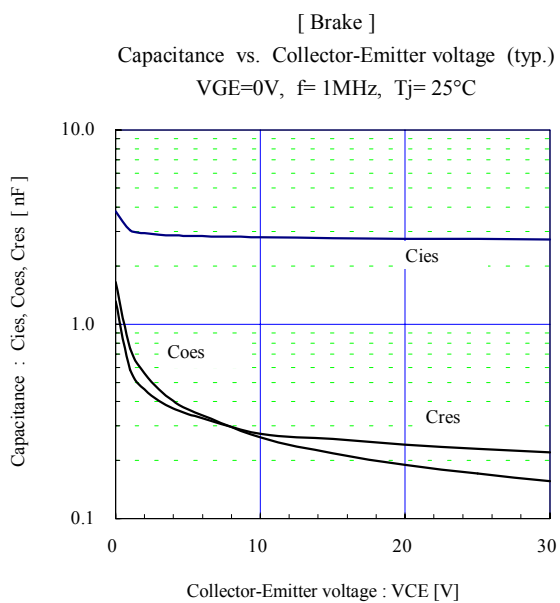
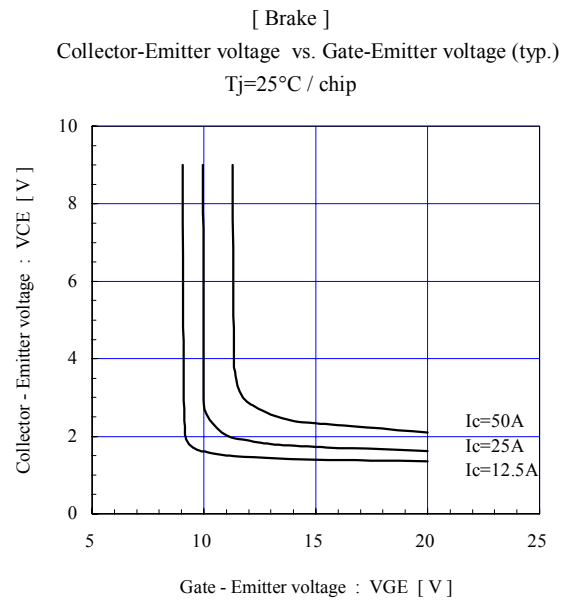
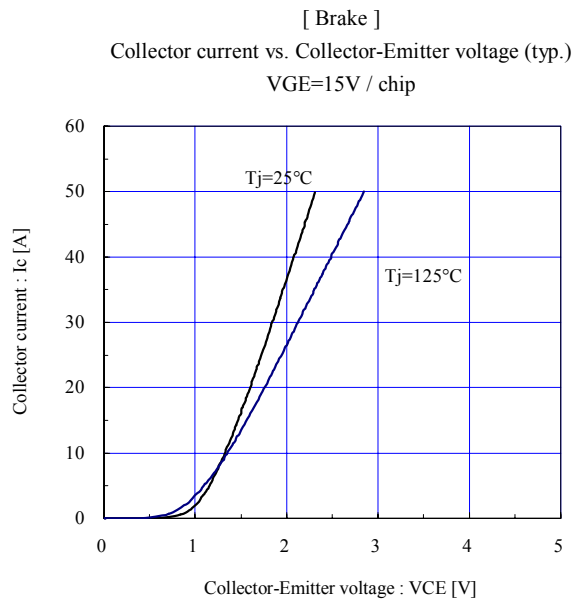
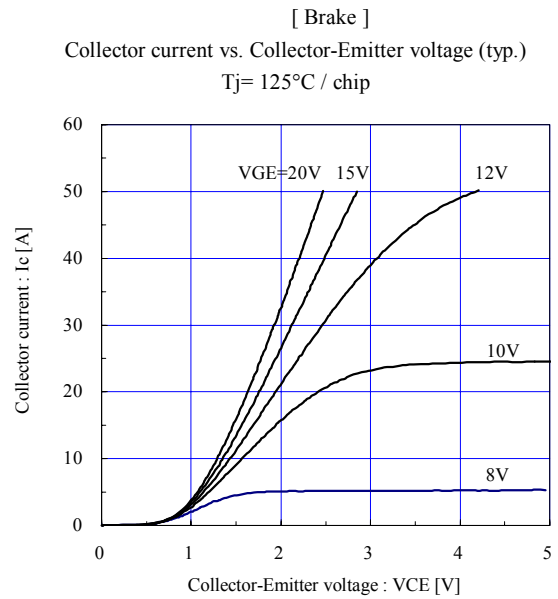
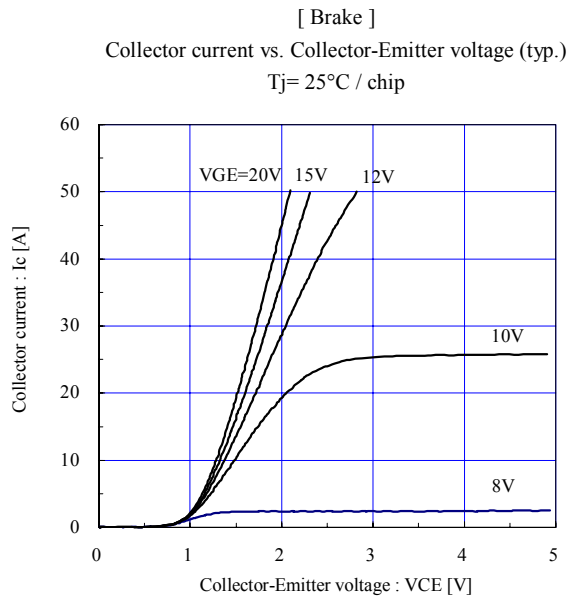


■ Characteristics (Representative)









■ Outline Drawings, mm

