

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	$T_c=25^\circ\text{C}$	50	A
				$T_c=80^\circ\text{C}$	35	
		I_{cP}	1ms	$T_c=25^\circ\text{C}$	100	
				$T_c=80^\circ\text{C}$	70	
	$-I_c$	Duty=70%	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	$T_c=25^\circ\text{C}$	25	A
				$T_c=80^\circ\text{C}$	15	
		I_{cP}	1ms	$T_c=25^\circ\text{C}$	50	
				$T_c=80^\circ\text{C}$	30	
	Collector power dissipation	P_c	1 device	115	W	
Repetitive peak reverse voltage	V_{RRM}		1200	V		
Converter	Repetitive peak reverse voltage	V_{RRM}	1600	V		
	Average output current	I_D	50Hz/60Hz sine wave	50	A	
	Surge current (Non-Repetitive)	I_{FSM}	$T_j=150^\circ\text{C}$, 10ms	260	A	
	I^2t (Non-Repetitive)	I^2t	half sine wave	338	A^2s	
	Operating junction temperature	T_j		+150	$^\circ\text{C}$	
Storage temperature	T_{stg}		-40 to +125	$^\circ\text{C}$		
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 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 (Tj=25°C unless otherwise specified)

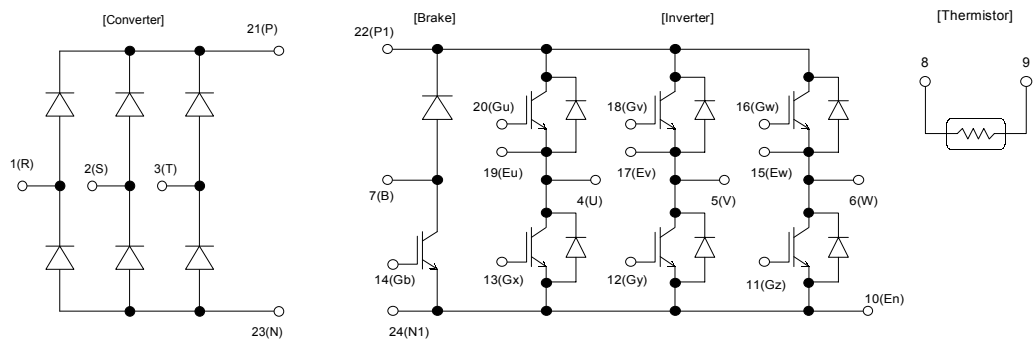
Item	Symbol	Condition	Characteristics			Unit			
			Min.	Typ.	Max.				
Inverter	Zero gate voltage collector current	ICES	VCE=1200V, VGE=0V			1.0	mA		
	Gate-Emitter leakage current	IGES	VCE=0V, VGE=±20V			200	nA		
	Gate-Emitter threshold voltage	VGE(th)	VCE=20V, Ic=50mA			4.5	6.5	8.5	V
	Collector-Emitter saturation voltage	VCE(sat) (terminal)	VGE=15V Ic=50A	Tj=25°C	2.40	2.80	V		
				Tj=125°C	2.75				
		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	2.40	2.80	V		
Tj=125°C				2.65					
VF (chip)		Tj=25°C	2.00	2.40					
		Tj=125°C	2.25						
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=25A VGE=15V	Tj=25°C	2.30	2.80	V		
				Tj=125°C	2.75				
		VCE(sat) (chip)	Tj=25°C	2.10	2.60				
			Tj=125°C	2.55					
	Turn-on time	ton	VCC=600V			0.53	1.20	µs	
		tr	Ic=25A			0.43	0.60		
	Turn-off time	toff	VGE=±15V			0.37	1.00		
		tf	RG= 68 Ω			0.07	0.30		
	Reverse current	IRRM	VR=1200V				1.0	mA	
	Converter	Forward on voltage	IF=50 A VGE=0V	terminal	1.55	1.90	V		
				chip	1.40				
	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

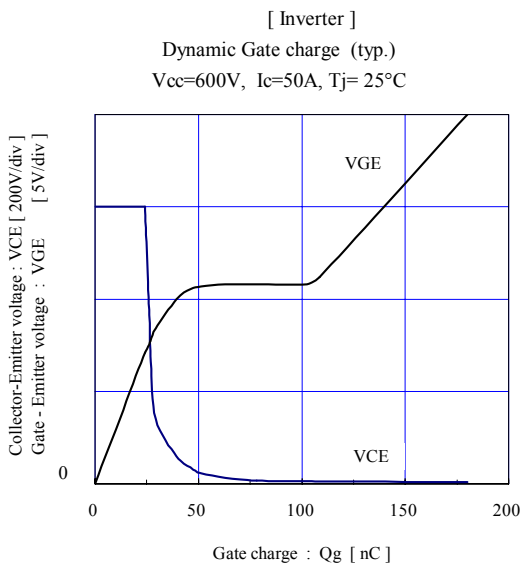
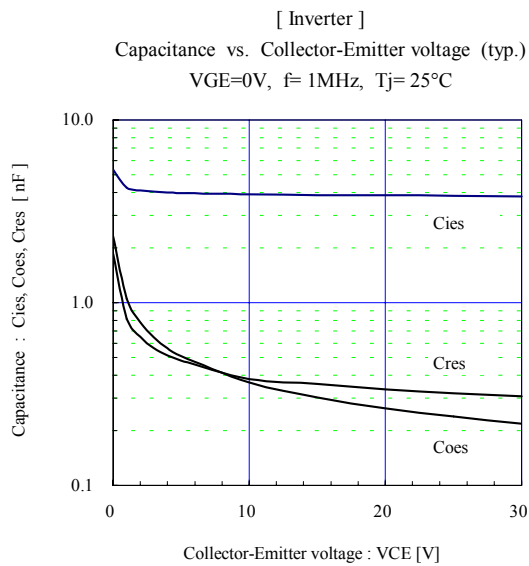
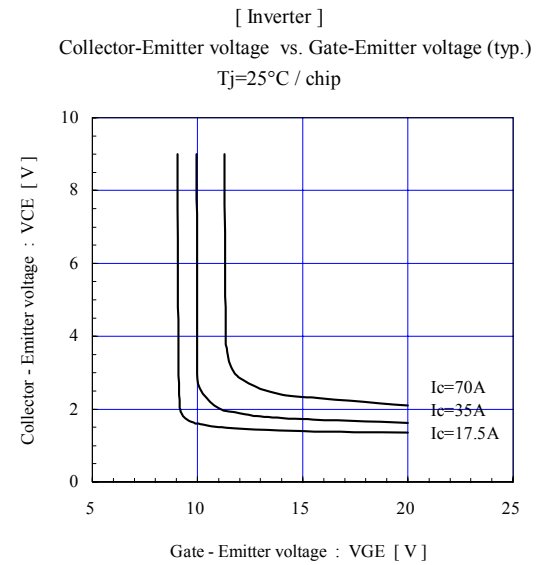
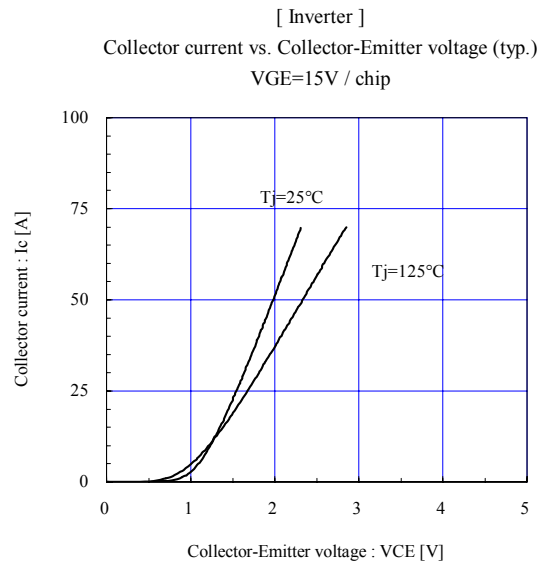
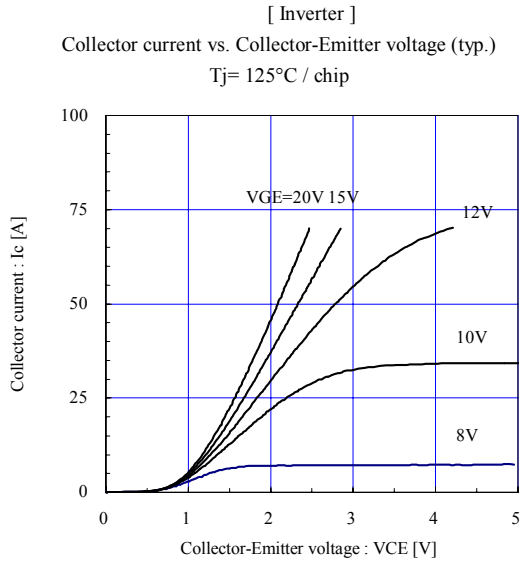
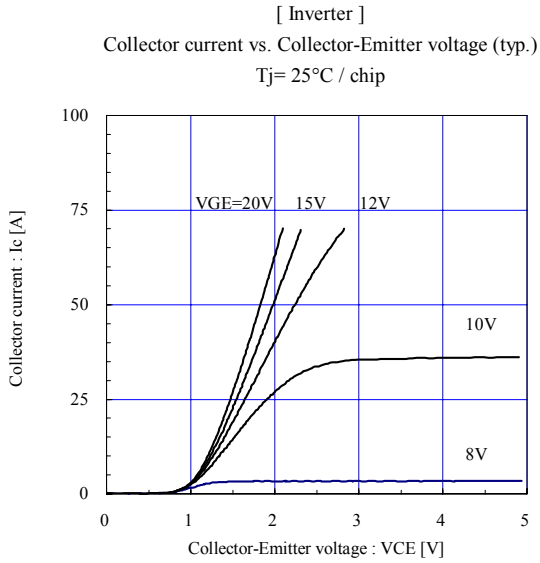
Item	Symbol	Condition	Characteristics			Unit
			Min.	Typ.	Max.	
Thermal resistance (1 device)	Rth(j-c)	Inverter IGBT			0.60	°C/W
		Inverter FWD			0.95	
		Brake IGBT			1.07	
		Converter Diode			0.90	
Contact thermal resistance *	Rth(c-f)	With thermal compound		0.05		

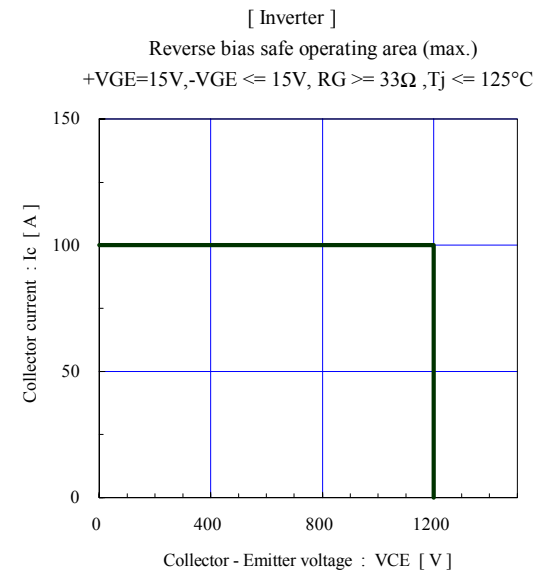
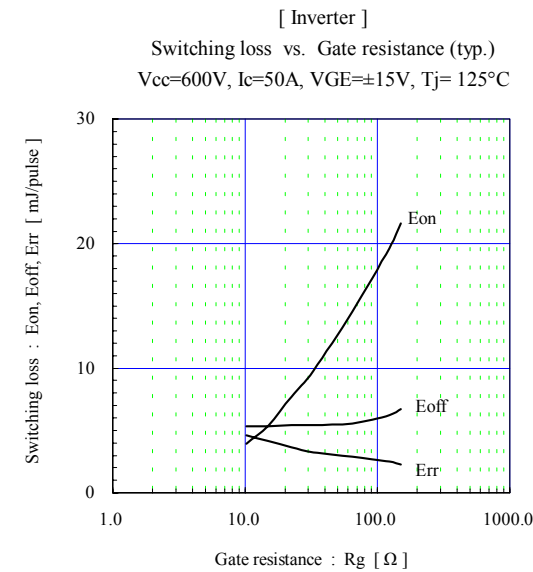
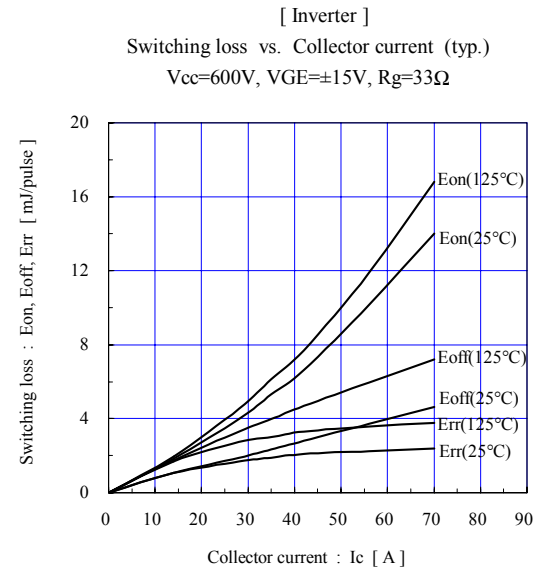
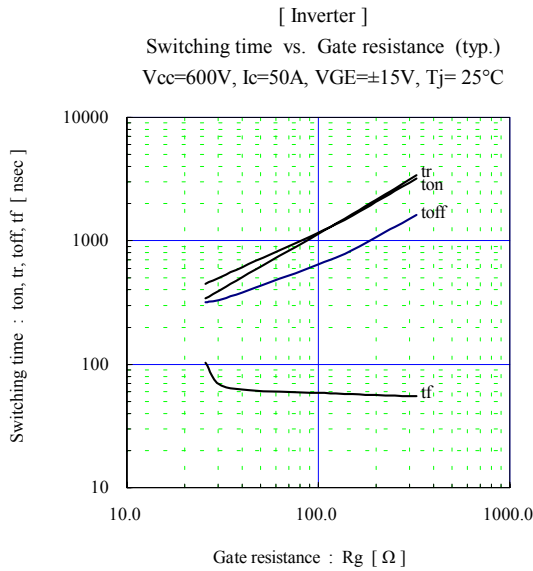
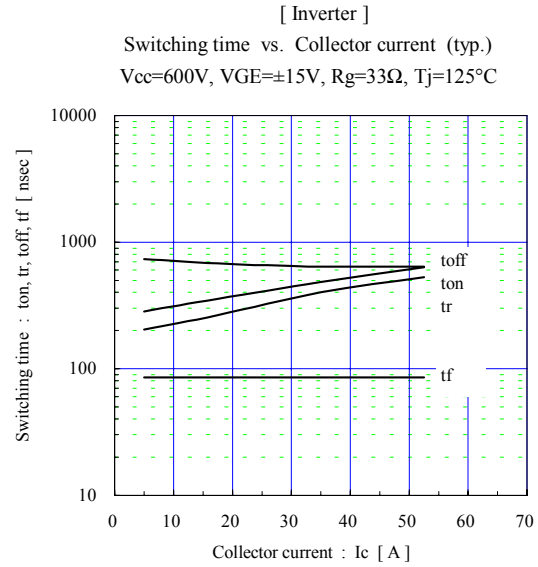
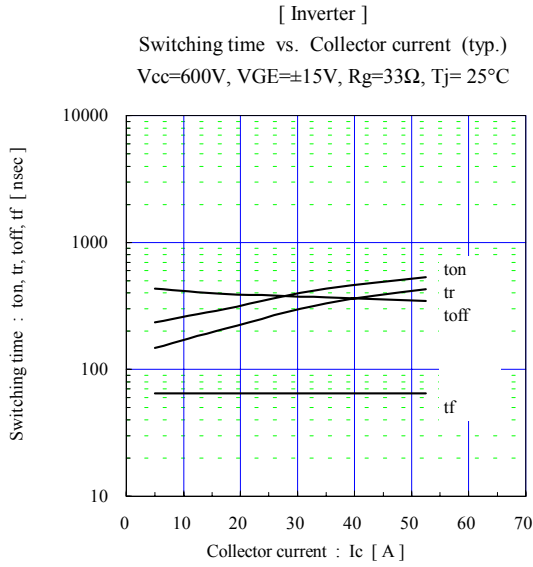
* This is the value which is defined mounting on the additional cooling fin with thermal compound

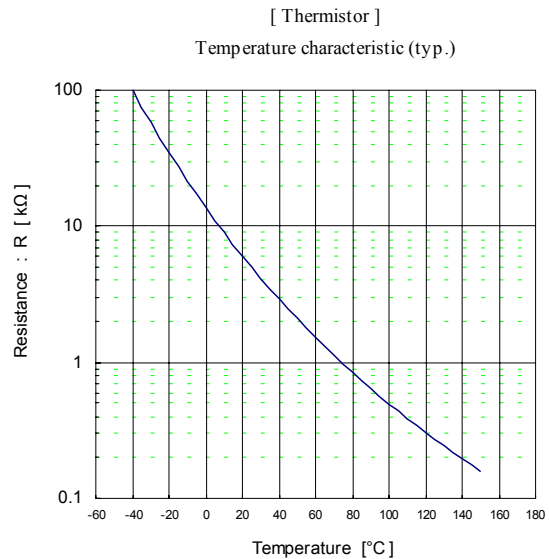
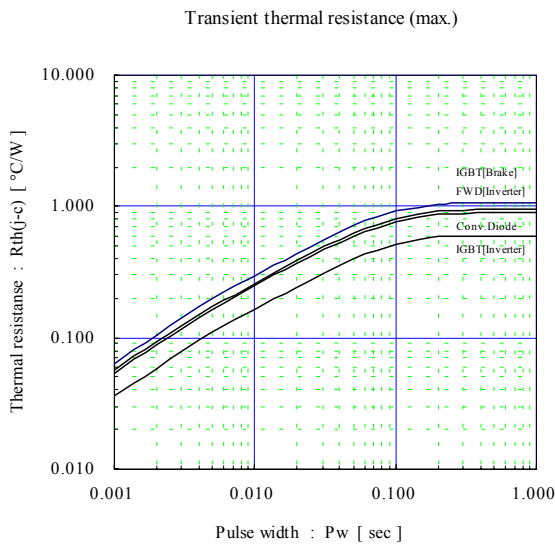
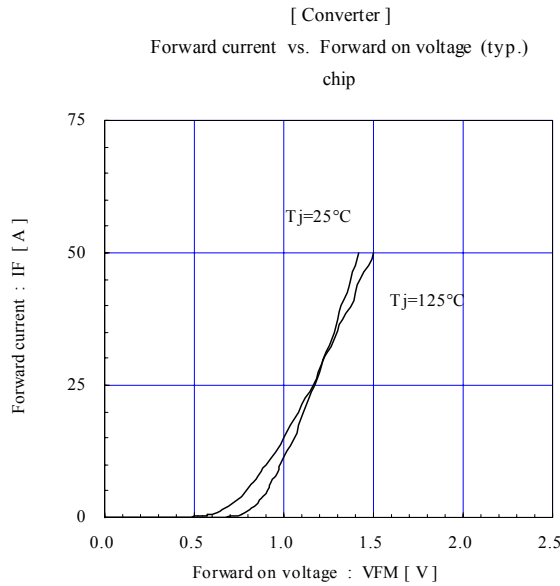
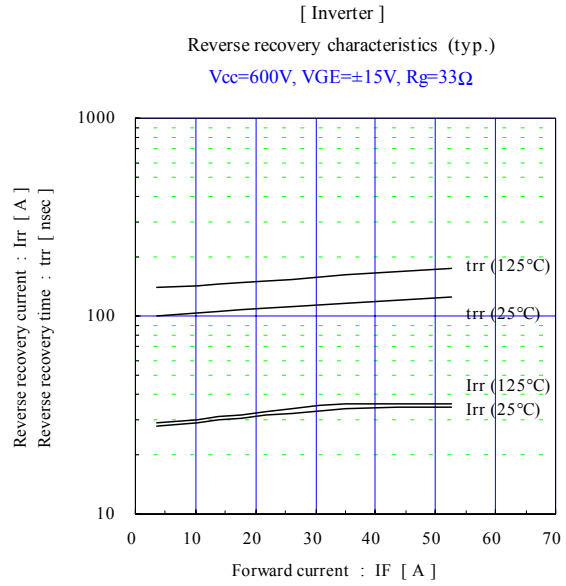
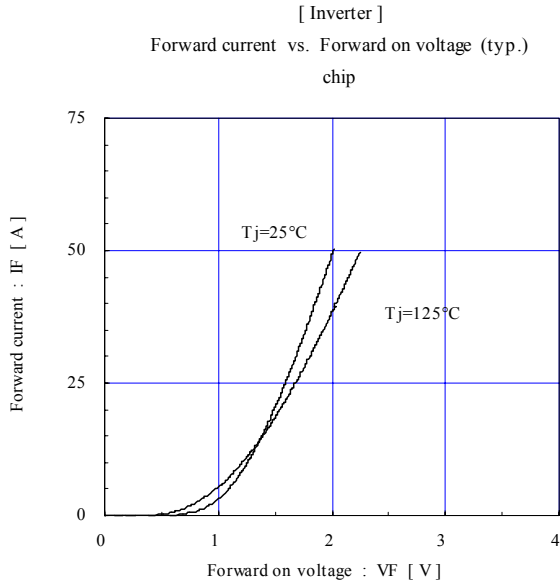
■ Equivalent Circuit Schematic

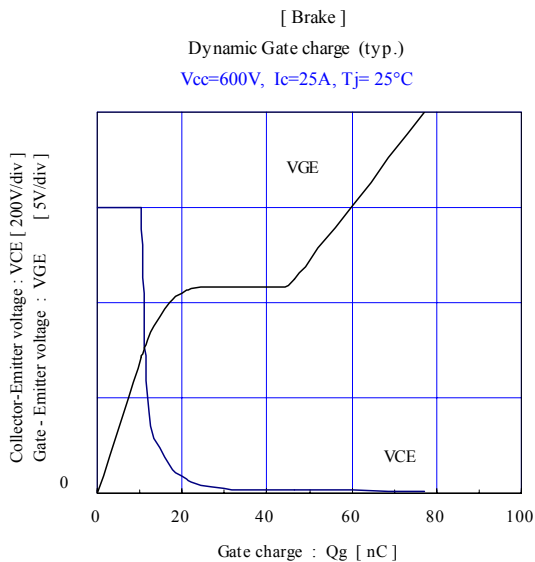
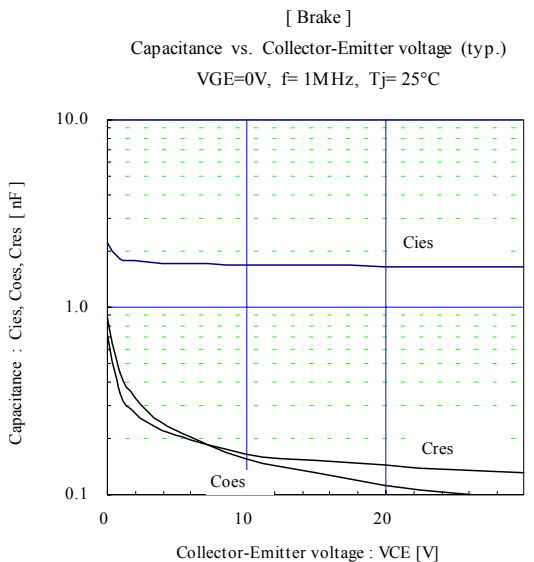
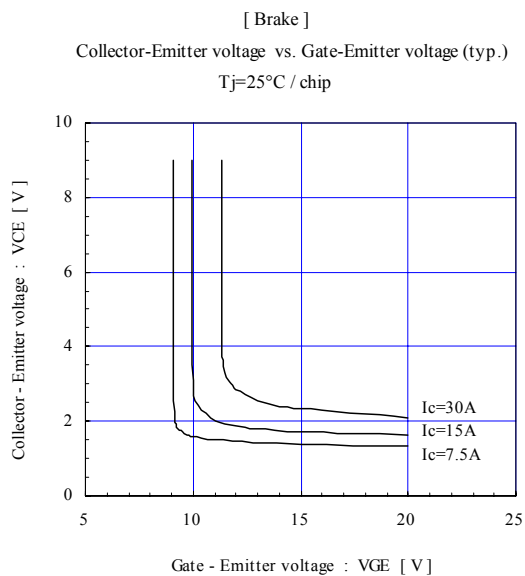
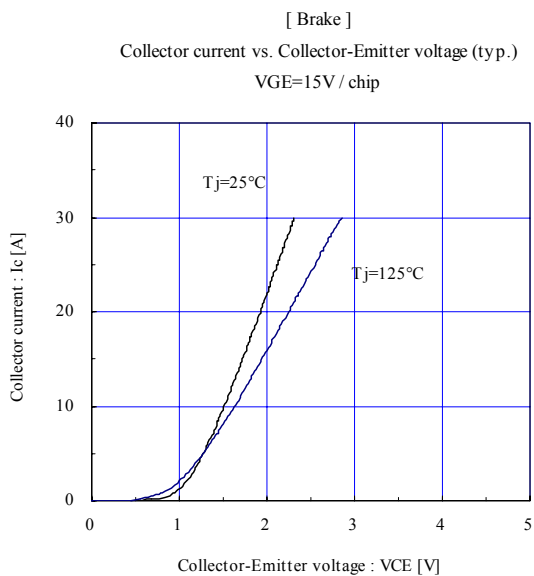
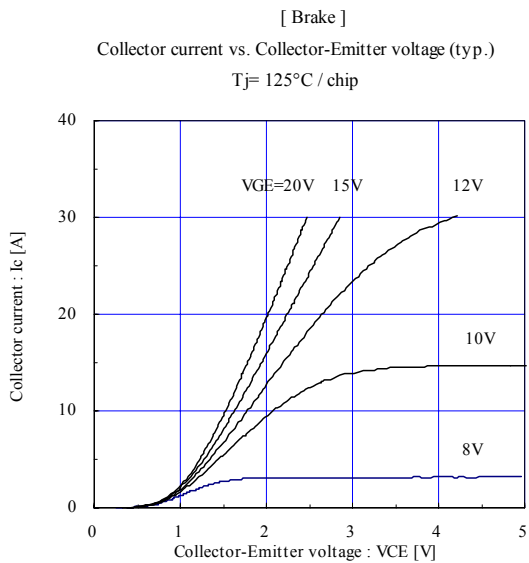
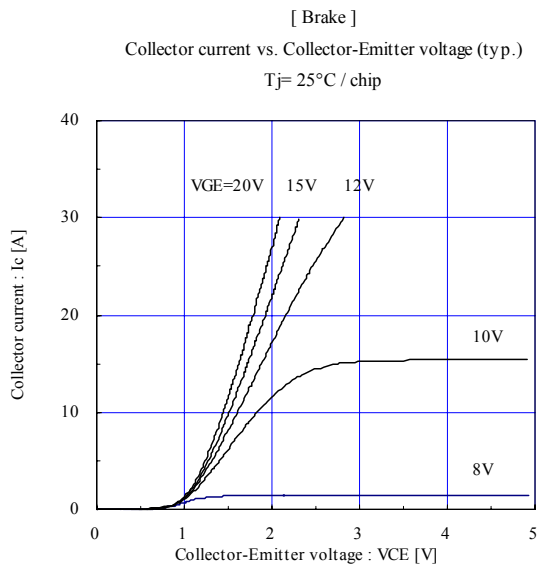


■ Characteristics (Representative)

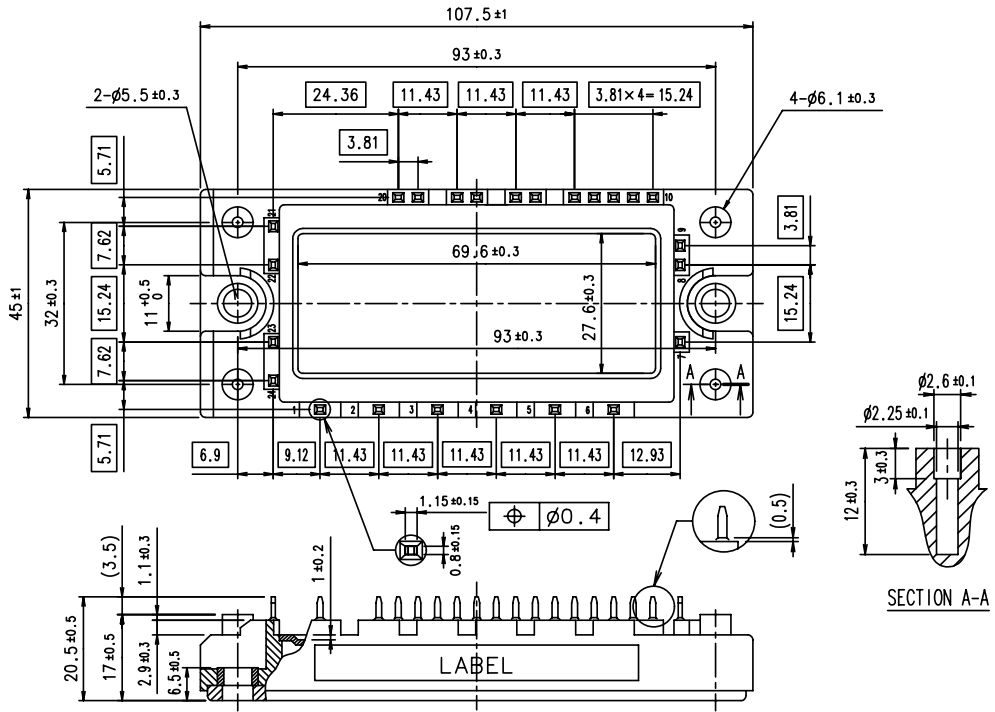








■ Outline Drawings, mm



□ shows theoretical dimension.
() shows reference dimension.