

IGBT MODULE (U series) 1200V / 35A / 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	35	A
				T _C =80°C	25	
		I _{CP}	1ms	T _C =25°C	70	
				T _C =80°C	50	
		-I _C		35		
-I _C pulse	1ms	70				
Collector power dissipation	P _C	1 device		160	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	
				T _C =80°C	30	
	Collector power dissipation	P _C	1 device		115	W
Repetitive peak reverse voltage	V _{R_{RRM}}			1200	V	
Repetitive peak reverse voltage	V _{R_{RRM}}			1600	V	
Converter	Average output current	I _O	50Hz/60Hz sine wave		35	A
	Surge current (Non-Repetitive)	I _{FSM}	T _J =150°C, 10ms		260	A
	I ² t (Non-Repetitive)	P _t	half sine wave		338	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	
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)

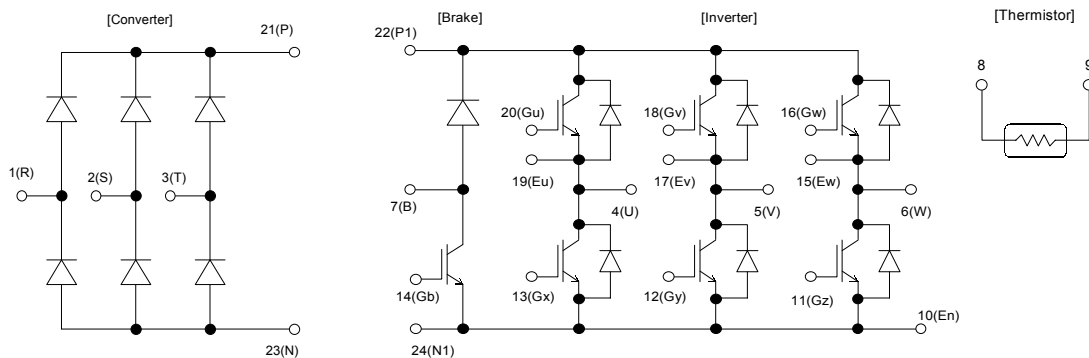
Item	Symbol	Condition	Characteristics			Unit
			Min.	Typ.	Max.	
Inverter	Zero gate voltage collector current	ICES	V _{CE} =1200V, V _{GE} =0V		1.0	mA
	Gate-Emitter leakage current	IGES	V _{CE} =0V, V _{GE} =±20V		200	nA
	Gate-Emitter threshold voltage	V _{GE(th)}	V _{CE} =20V, I _C =35mA		8.5	V
	Collector-Emitter saturation voltage	V _{CE(sat)} (terminal) I _C =35A	T _j =25°C	2.25	2.70	V
			T _j =125°C	2.60	-	
			T _j =25°C	1.95	2.40	
			T _j =125°C	2.30	-	
	Input capacitance	C _{ies}	V _{GE} =0V, V _{CE} =10V, f=1MHz		3	nF
	Turn-on time	t _{on}	V _{CC} =600V		0.53	μs
		t _r	I _C =35A		0.43	
		t _{r(i)}	V _{GE} =±15V		0.03	
	Turn-off time	t _{off}	R _G = 43 Ω		0.37	1.00
		t _f			0.07	
Brake	Forward on voltage	V _F (terminal) I _F =35A	T _j =25°C	2.05	2.40	V
			T _j =125°C	2.20	-	
			T _j =25°C	1.75	2.10	
			T _j =125°C	1.90	-	
	Reverse recovery time	t _{rr}	I _F =35A		0.35	μs
	Zero gate voltage collector current	ICES	V _{CE} =1200V, V _{GE} =0V		1.0	mA
	Gate-Emitter leakage current	IGES	V _{CE} =0V, V _{GE} =±20V		200	nA
	Collector-Emitter saturation voltage	V _{CE(sat)} (terminal) I _C =25A V _{GE} =15V	T _j =25°C	2.40	2.90	V
			T _j =125°C	2.85	-	
			T _j =25°C	2.10	2.60	
			T _j =125°C	2.55	-	
	Turn-on time	t _{on}	V _{CC} =600V		0.53	μs
		t _r	I _C =25A		0.43	
		t _{r(i)}	V _{GE} =±15V		0.03	
	Turn-off time	t _{off}	R _G = 68 Ω		0.37	1.00
		t _f			0.07	
Converter	Reverse current	I _{RRM}	V _R =1200V		1.0	mA
	Forward on voltage	V _{FM}	I _F =35 A	terminal	1.35	V
			V _{GE} =0V	chip	1.25	
Thermistor	Reverse current	I _{RRM}	V _R =1600V		1.0	mA
	Resistance	R	T=25°C		5000	Ω
			T=100°C		465	
Thermistor	B value	B	T=25/50°C		3305	K
					3375	

● Thermal resistance Characteristics

Item	Symbol	Condition	Characteristics			Unit
			Min.	Typ.	Max.	
Thermal resistance (1 device)	R _{th(j-c)}	Inverter IGBT	-	-	0.76	°C/W
		Inverter FWD	-	-	1.19	
		Brake IGBT	-	-	1.07	
		Converter Diode	-	-	0.90	
		With thermal compound	-	0.05	-	
Contact thermal resistance *	R _{th(c-f)}	With thermal compound	-	0.05	-	

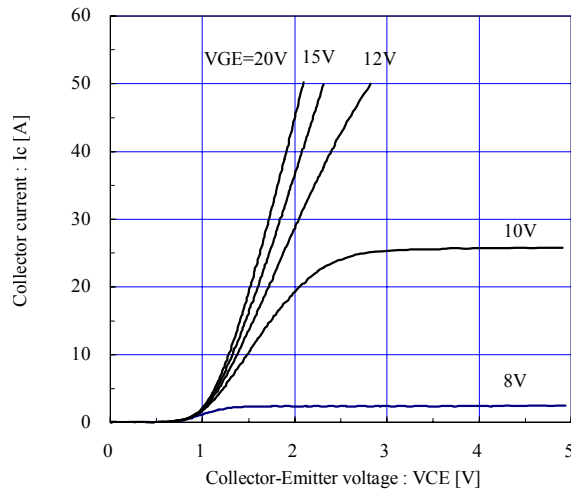
* This is the value which is defined mounting on the additional cooling fin with thermal compound

■ Equivalent Circuit Schematic

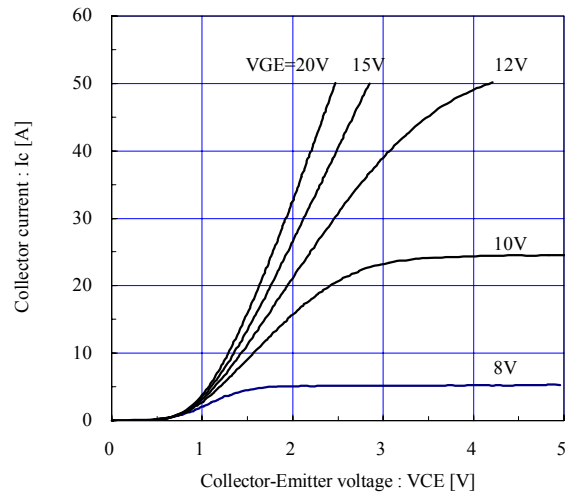


■ Characteristics (Representative)

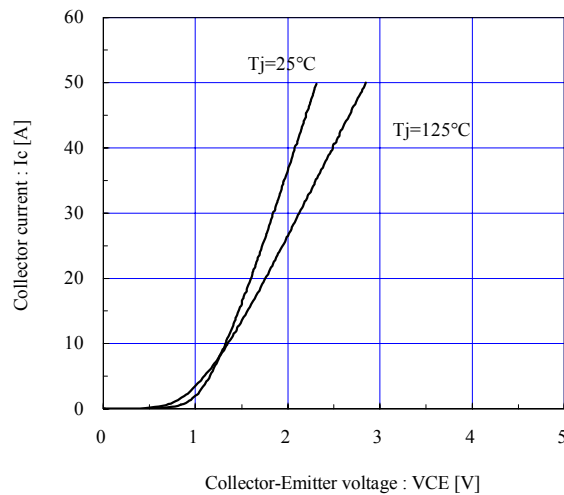
[Inverter]
Collector current vs. Collector-Emitter voltage (typ.)
 $T_j = 25^\circ\text{C}$ / chip



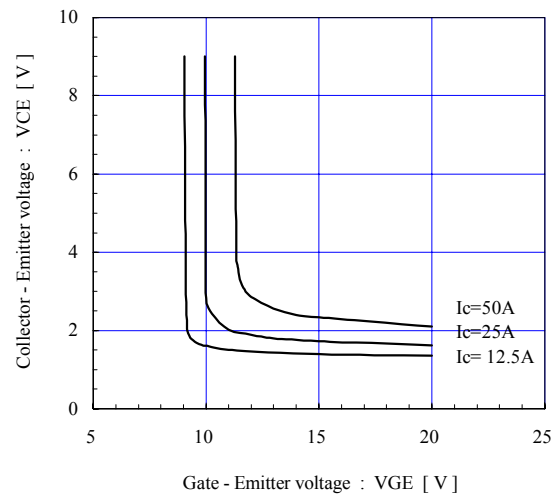
[Inverter]
Collector current vs. Collector-Emitter voltage (typ.)
 $T_j = 125^\circ\text{C}$ / chip



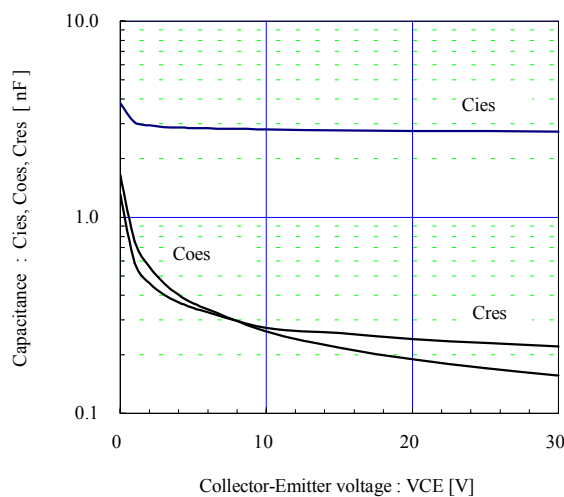
[Inverter]
Collector current vs. Collector-Emitter voltage (typ.)
 $V_{GE} = 15\text{V}$ / chip



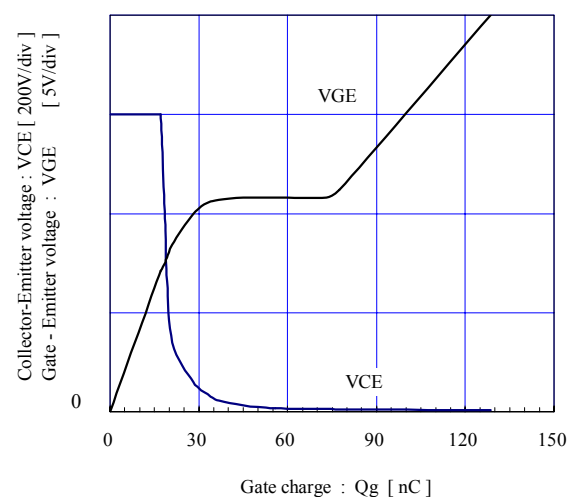
[Inverter]
Collector-Emitter voltage vs. Gate-Emitter voltage (typ.)
 $T_j = 25^\circ\text{C}$ / chip

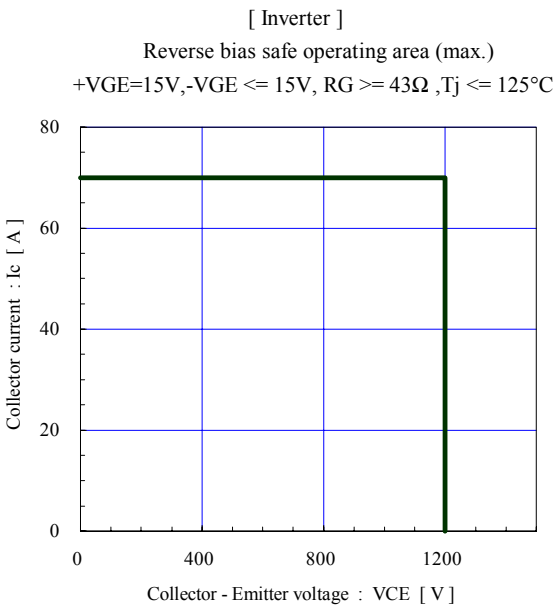
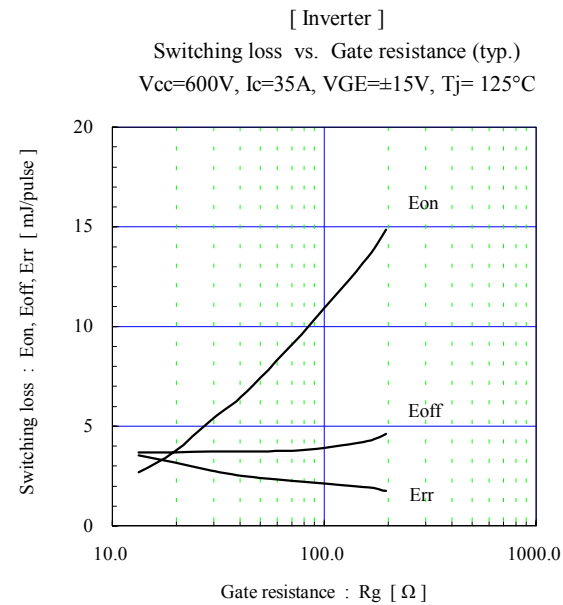
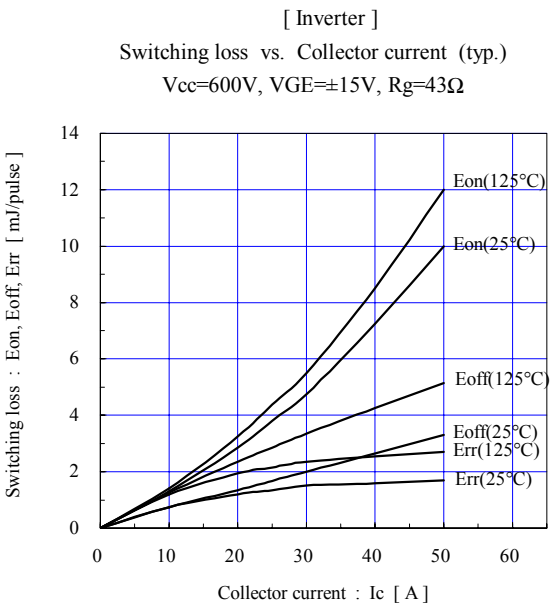
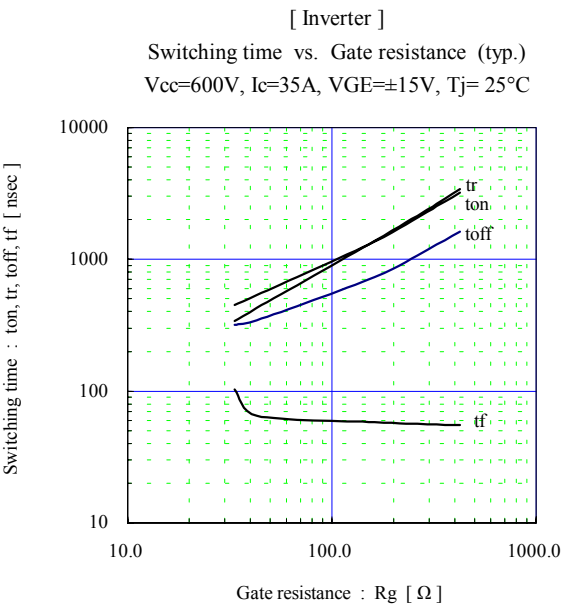
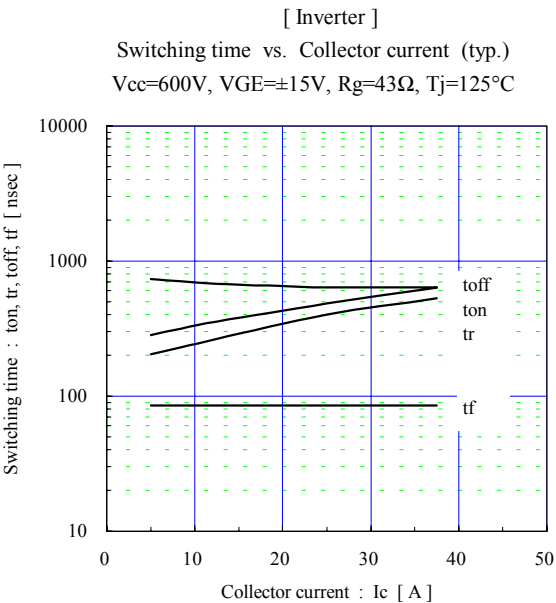
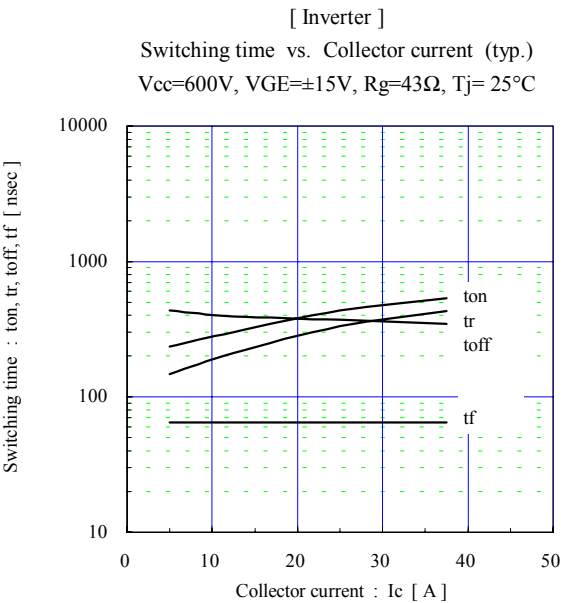


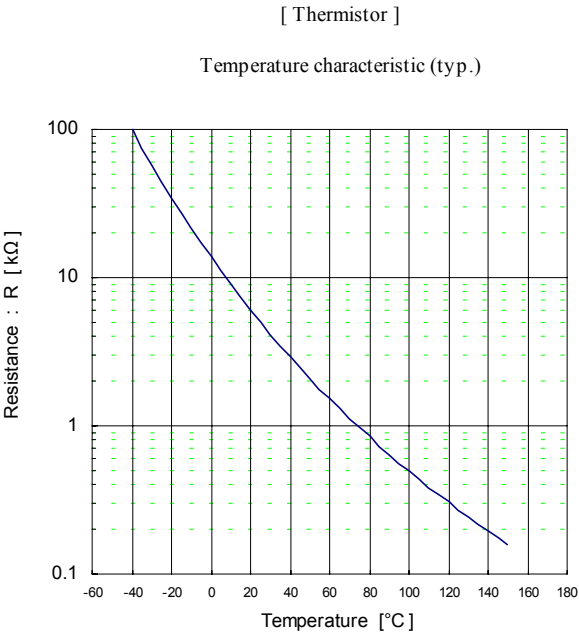
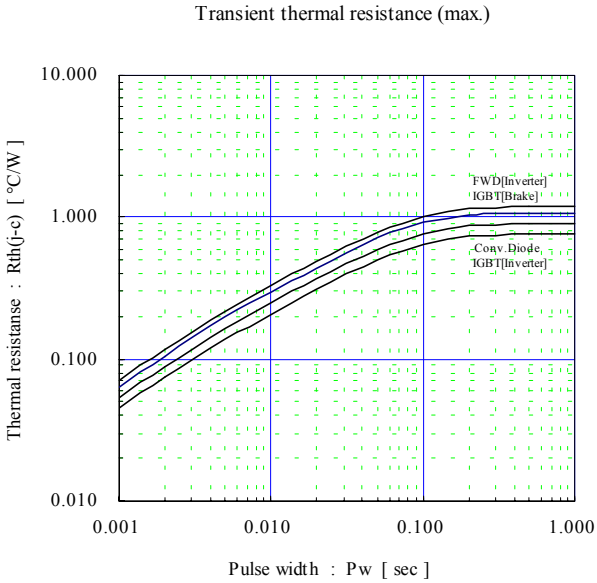
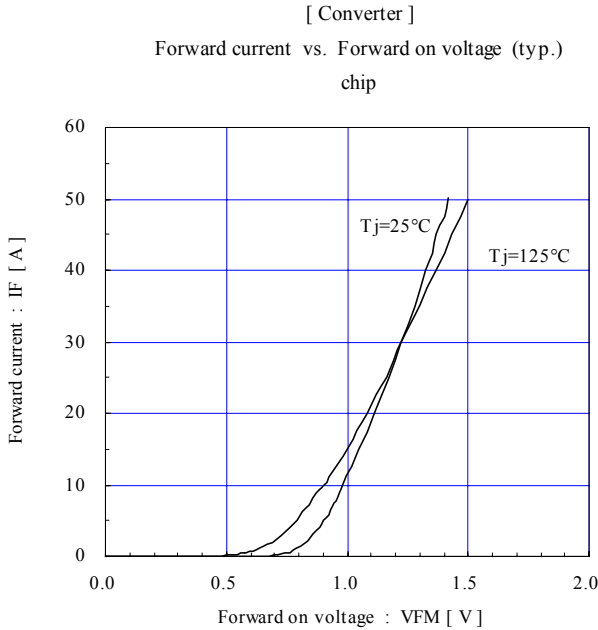
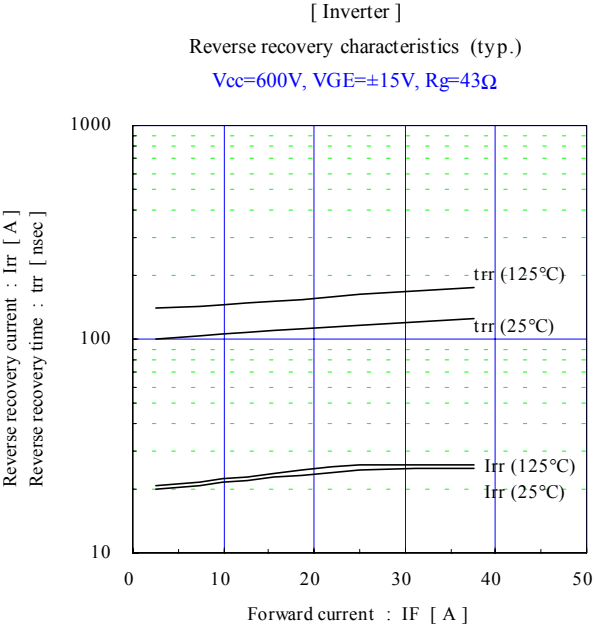
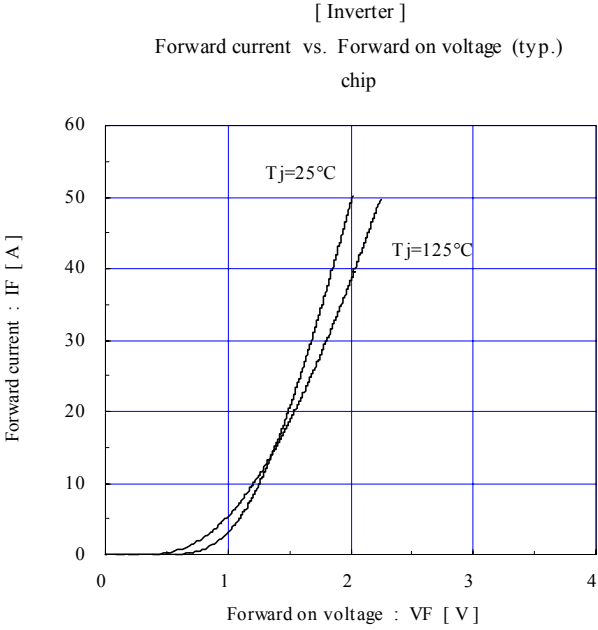
[Inverter]
Capacitance vs. Collector-Emitter voltage (typ.)
 $V_{GE} = 0\text{V}$, $f = 1\text{MHz}$, $T_j = 25^\circ\text{C}$

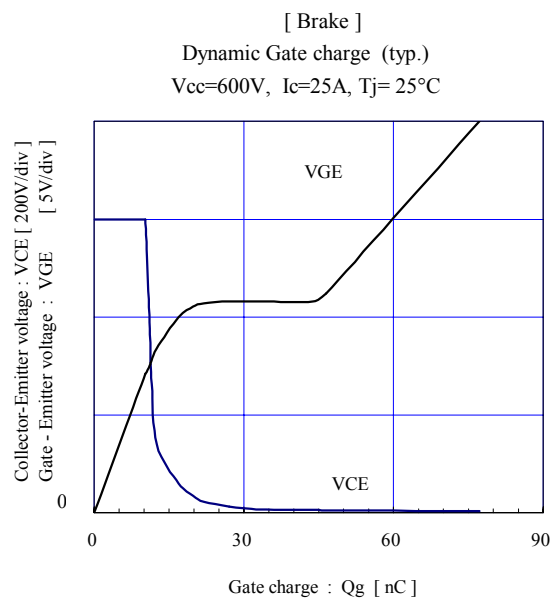
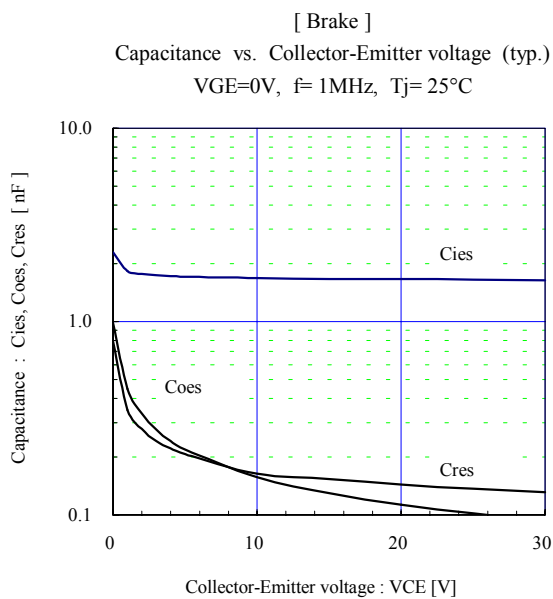
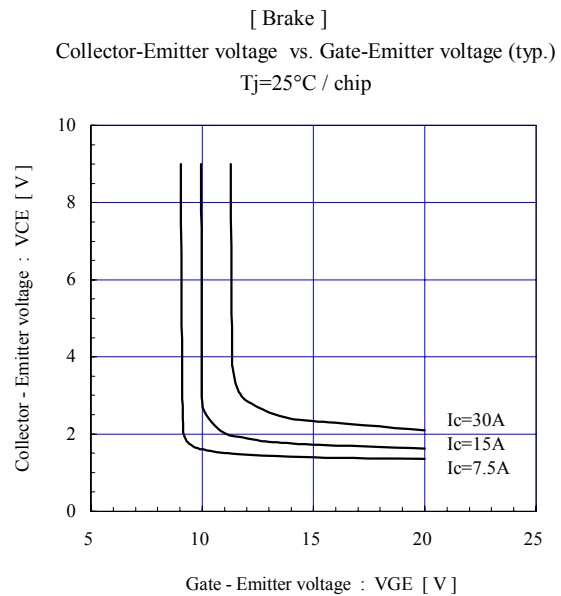
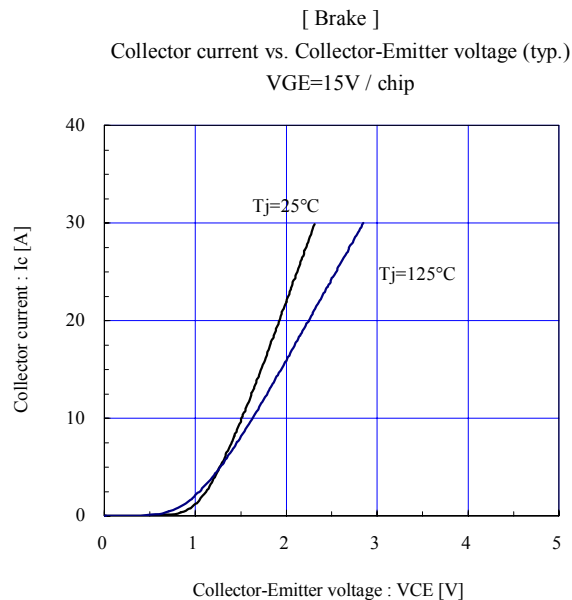
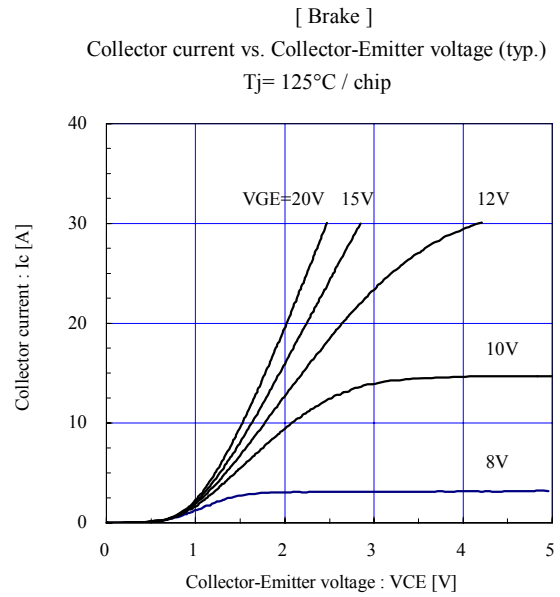
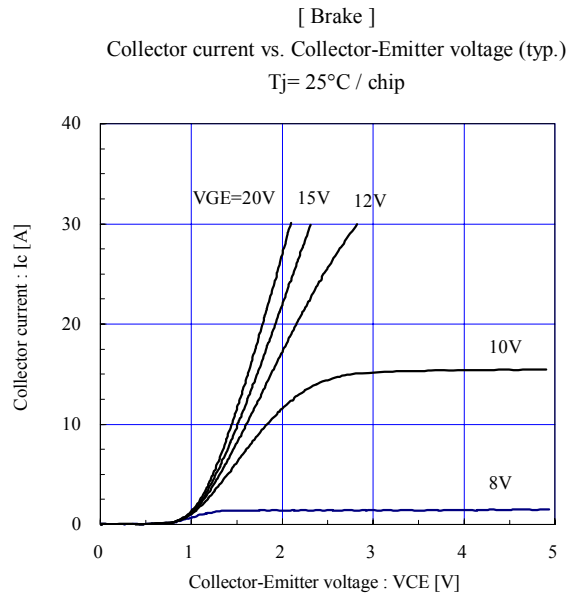


[Inverter]
Dynamic Gate charge (typ.)
 $V_{cc} = 600\text{V}$, $I_c = 35\text{A}$, $T_j = 25^\circ\text{C}$

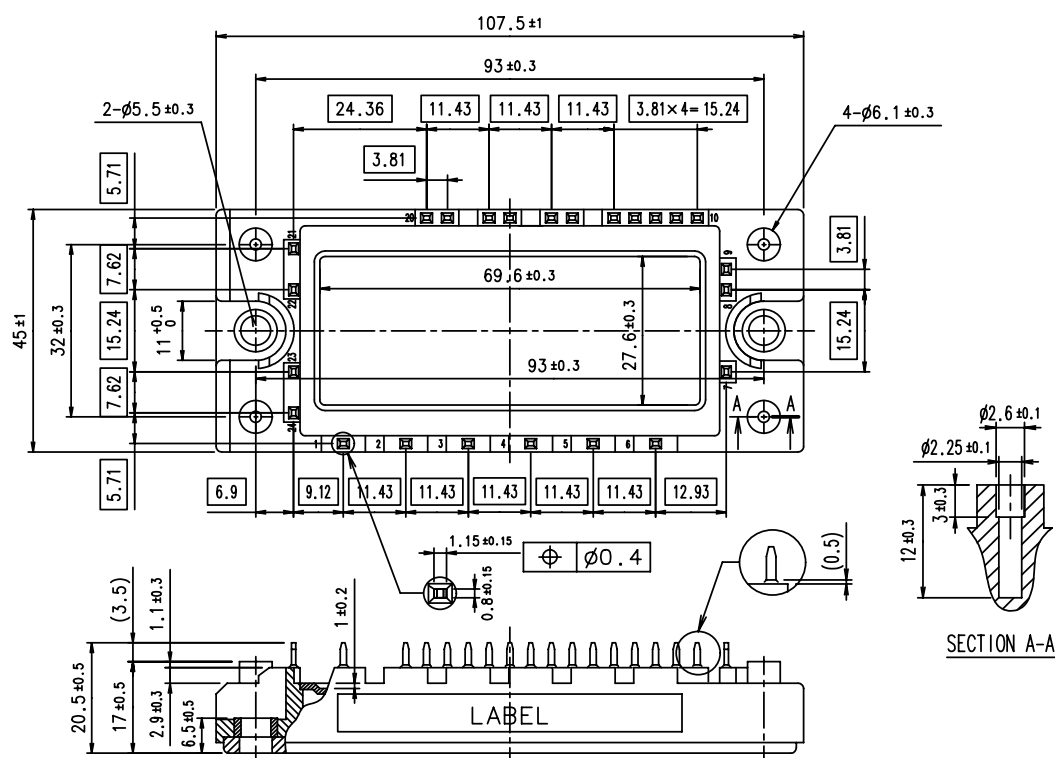








■ Outline Drawings, mm



shows theoretical dimension.
 () shows reference dimension.