

IGBT MODULE (U series) 600V / 30A / 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 ptherwise specified)

Item		Symbol	Condition	Rating	Unit
Inverter	Collector-Emitter voltage	V _{CES}		600	V
	Gate-Emitter voltage	V _{GES}		±20	V
	Collector current	I _C	Continuous	30	A
		I _{CP}	1ms	60	
		-I _C		30	
		-I _C pulse	1ms	60	
Collector power dissipation	P _C	1 device	133	W	
Brake	Collector-Emitter voltage	V _{CES}		600	V
	Gate-Emitter voltage	V _{GES}		±20	V
	Collector current	I _C	Continuous	20	A
		I _{CP}	1ms	40	A
	Collector power dissipation	P _C	1 device	104	W
	Repetitive peak reverse voltage	V _{RRM}		600	V
Converter	Repetitive peak reverse voltage	V _{RRM}		800	V
	Average output current	I _O	50Hz/60Hz sine wave	30	A
	Surge current (Non-Repetitive)	I _{FSM}	T _J =150°C, 10ms	210	A
	I ² t (Non-Repetitive)	P _t	half sine wave	221	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)

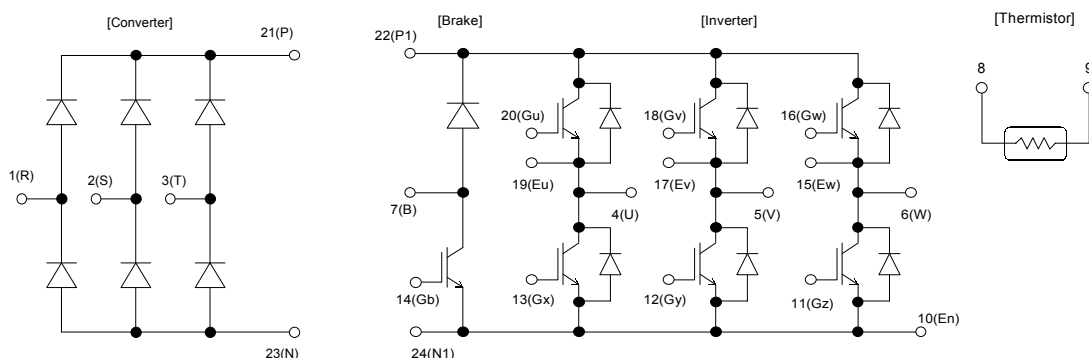
Item		Symbol	Condition		Characteristics			Unit
					Min.	Typ.	Max.	
Inverter	Zero gate voltage collector current	ICES	VCE=600V, VGE=0V				1.0	mA
	Gate-Emitter leakage current	IGES	VCE=0V, VGE=±20V				200	nA
	Gate-Emitter threshold voltage	VGE(th)	VCE=20V, Ic=30mA		6.2	6.7	7.7	V
	Collector-Emitter saturation voltage	VCE(sat) (terminal)	VGE=15V Ic=30A	Tj=25°C		2.10	2.40	V
				Tj=125°C		2.40		
		VCE(sat) (chip)		Tj=25°C		1.85		
				Tj=125°C		2.15		
	Input capacitance	Cies	VGE=0V, VCE=10V, f=1MHz			1.7		nF
	Turn-on time	ton	VCC=300V			0.36	1.20	μs
		tr	Ic=30A			0.20	0.60	
		tr(i)	VGE=±15V			0.05		
	Turn-off time	toff	RG=120Ω			0.45	1.20	
		tf				0.04	0.45	
	Forward on voltage	VF (terminal)	VGE=0V If=30A	Tj=25°C		2.10	2.65	V
				Tj=125°C		2.00		
		VF (chip)		Tj=25°C		1.85		
				Tj=125°C		1.75		
	Reverse recovery time	trr	If=30A				0.35	μs
Brake	Zero gate voltage collector current	ICES	VCE=600V, VGE=0V				1.0	mA
	Gate-Emitter leakage current	IGES	VCE=0V, VGE=±20V				200	nA
	Collector-Emitter saturation voltage	VCE(sat) (terminal)	Ic=20A VGE=15V	Tj=25°C		1.85	2.15	V
				Tj=125°C		2.15		
		VCE(sat) (chip)		Tj=25°C		1.70		
				Tj=125°C		2.00		
	Turn-on time	ton	VCC=300V			0.45	1.20	μs
		tr	Ic=20A			0.15	0.60	
	Turn-off time	toff	VGE=±15V			0.37	1.20	
		tf	RG=150Ω			0.04	0.45	
	Reverse current	IRRM	VR=600V				1.0	mA
Converter	Forward on voltage	VFM	If=30A	terminal		1.20	1.50	V
			VGE=0V	chip		1.10		
	Reverse current	IRRM	VR=800V				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

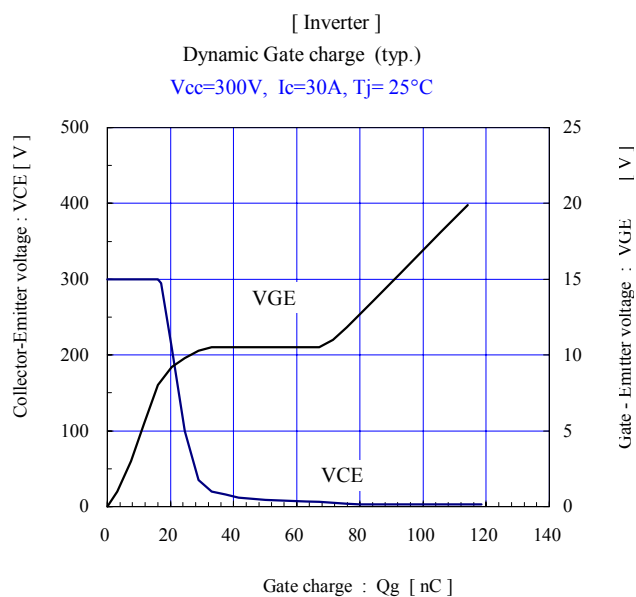
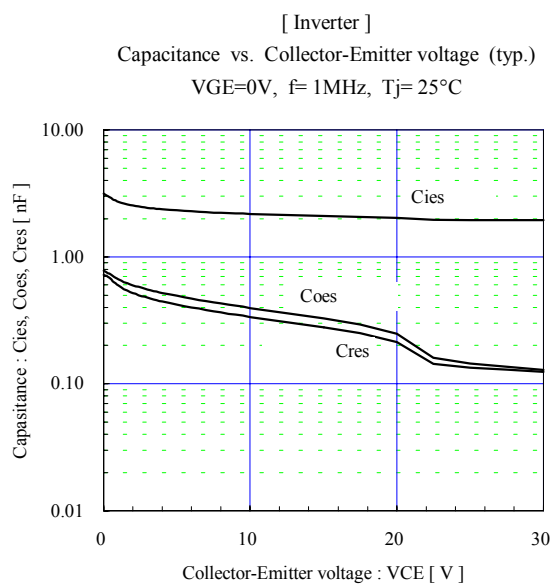
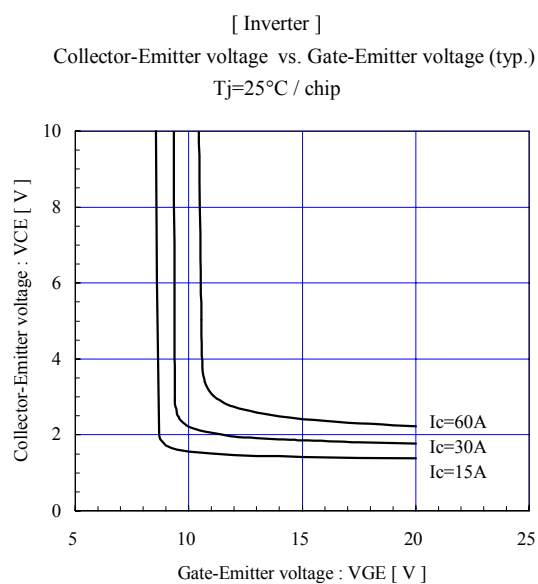
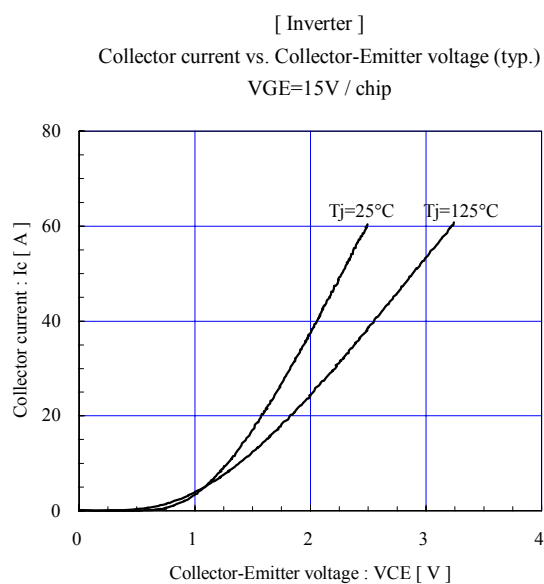
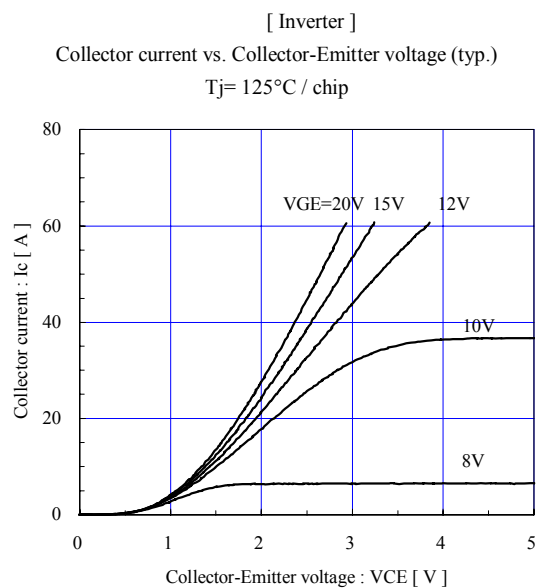
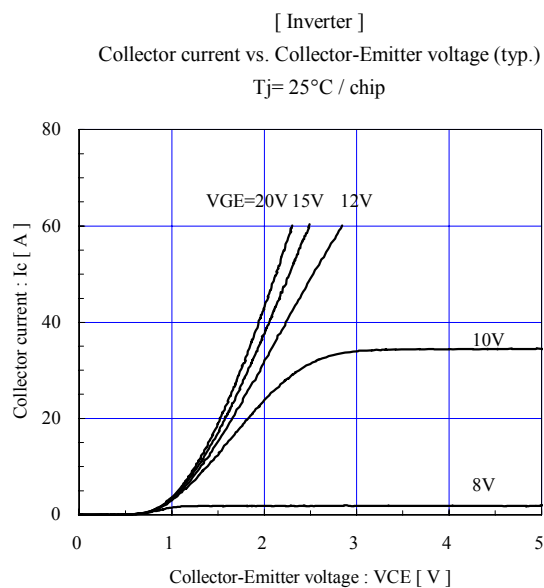
Item	Symbol	Condition	Characteristics			Unit
			Min.	Typ.	Max.	
Thermal resistance (1 device)	R _{th(j-c)}	Inverter IGBT			0.94	°C/W
		Inverter FWD			1.60	
		Brake IGBT			1.20	
		Converter Diode			1.20	
Contact thermal resistance *	R _{th(c-f)}	With thermal compound		0.05		

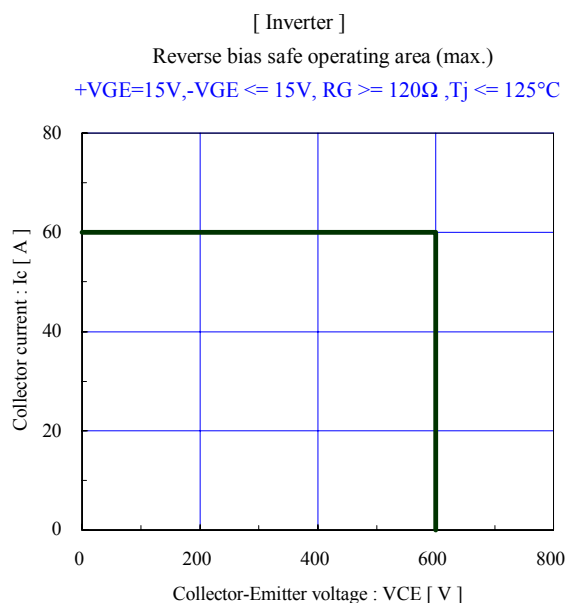
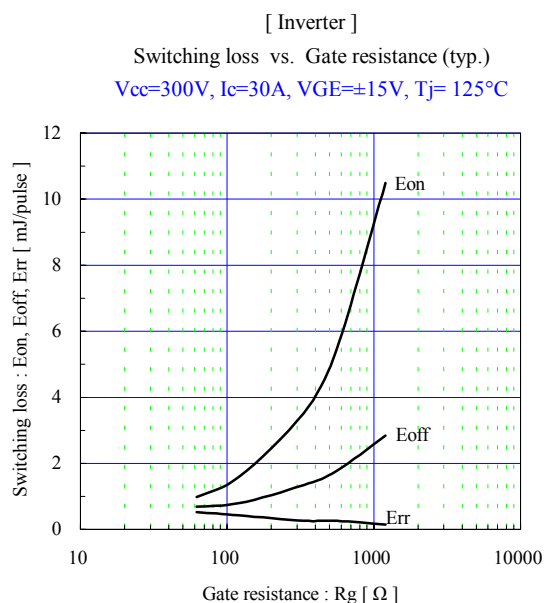
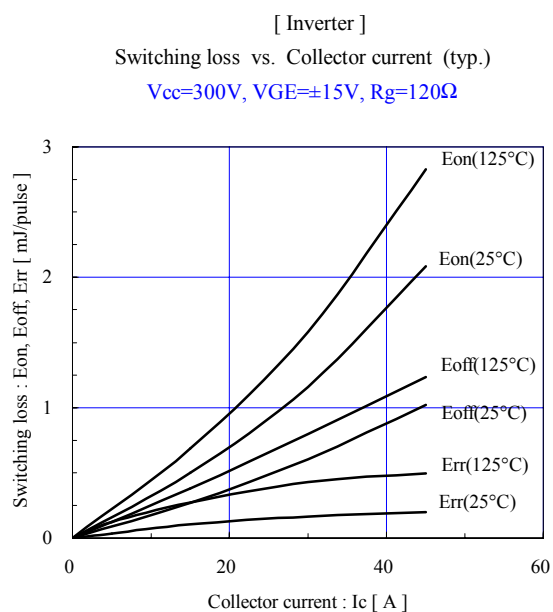
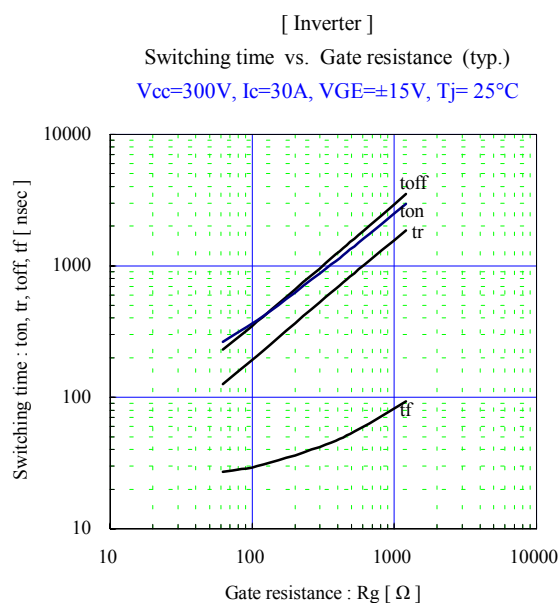
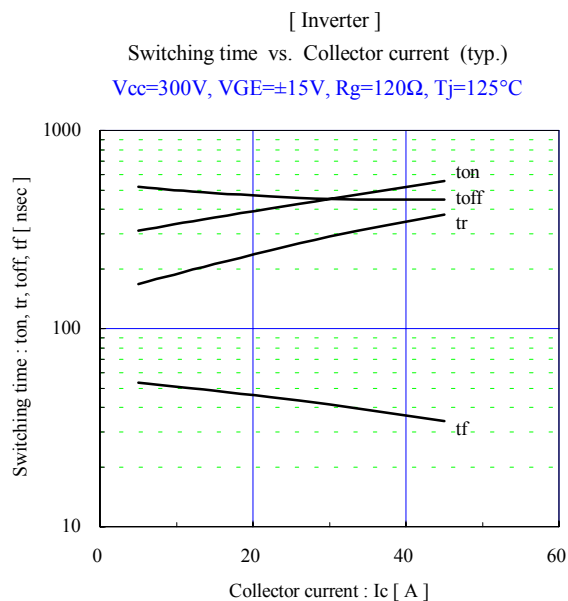
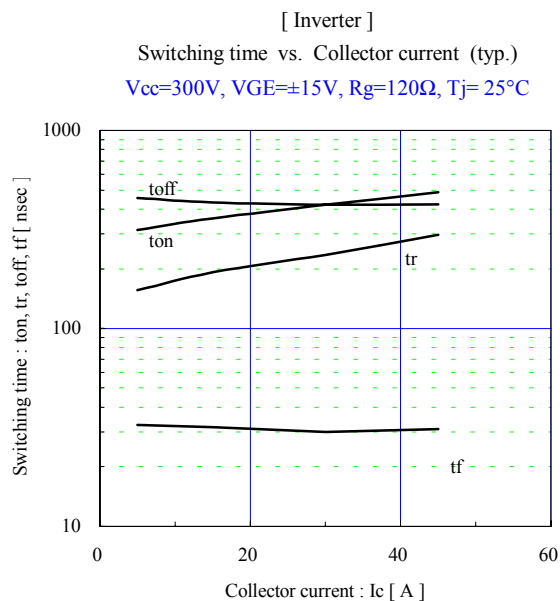
* This is the value which is defined mounting on the additional cooling fin with thermal compound

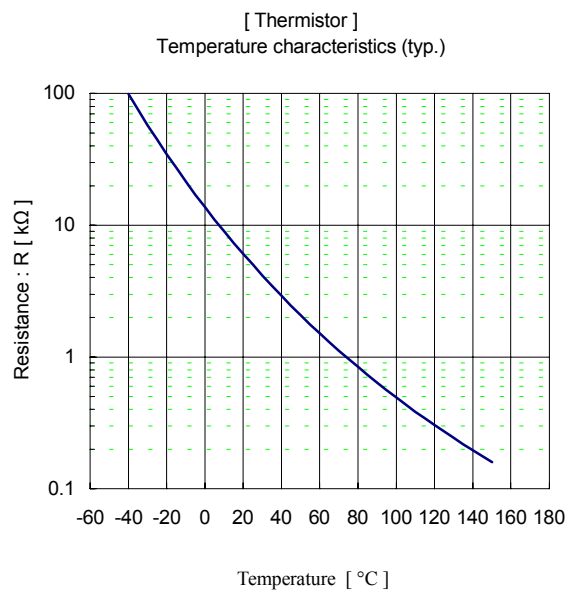
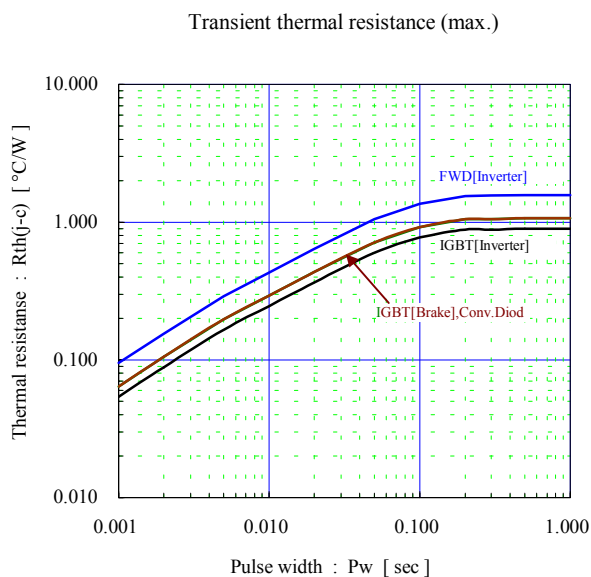
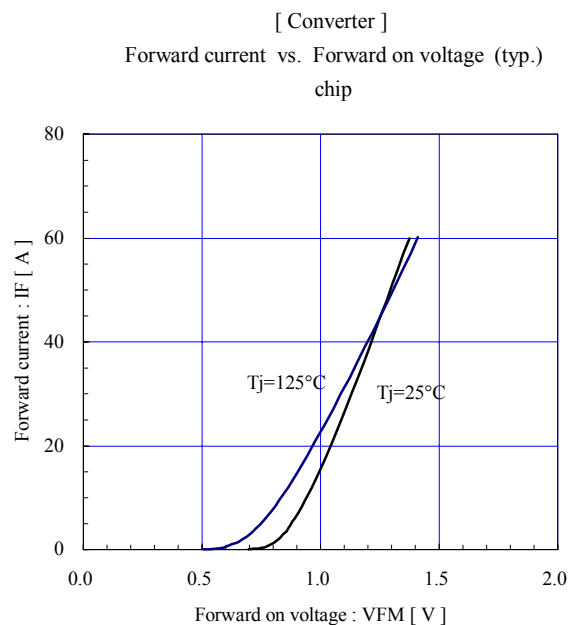
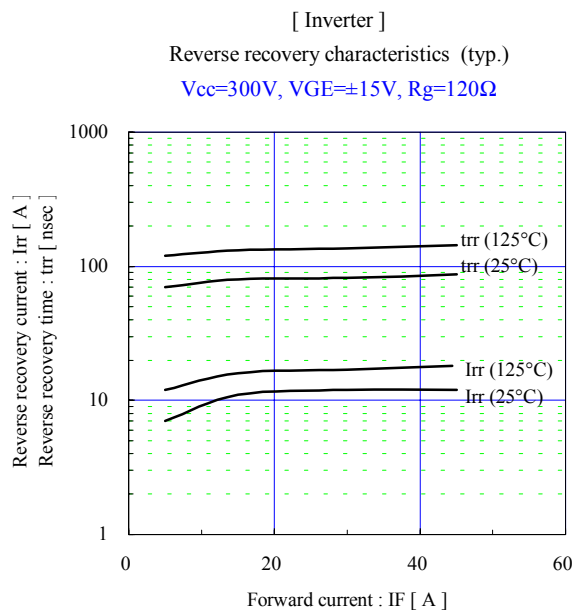
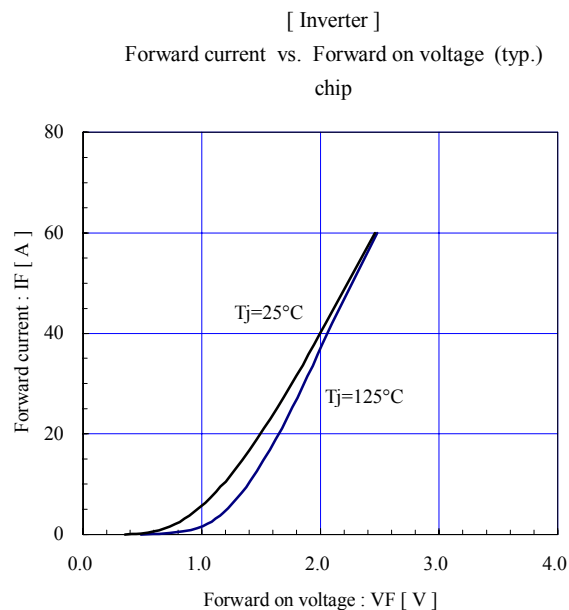
■ Equivalent Circuit Schematic

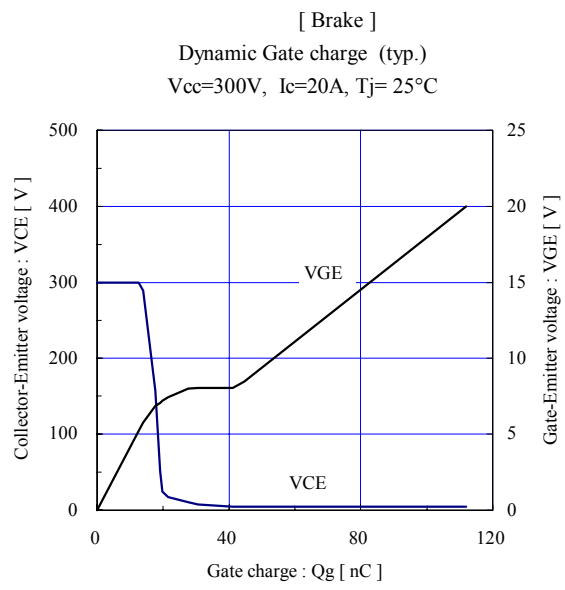
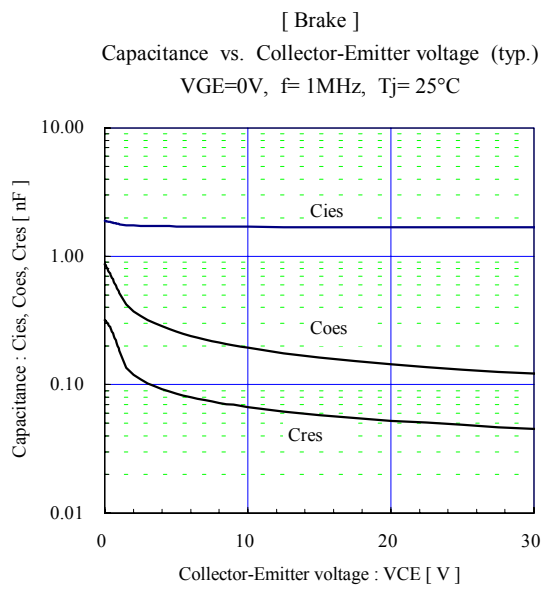
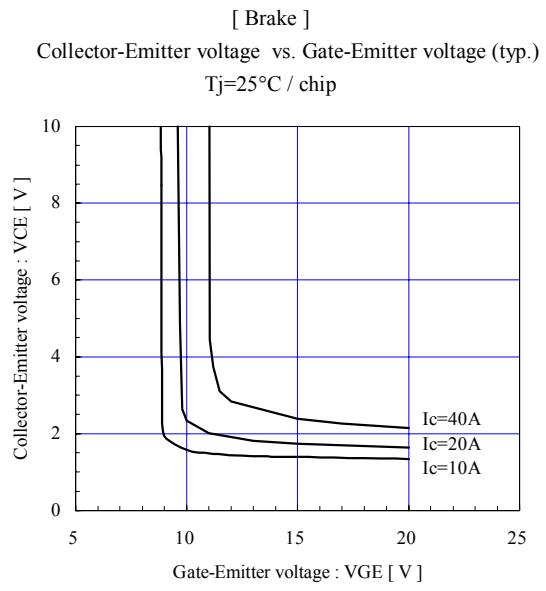
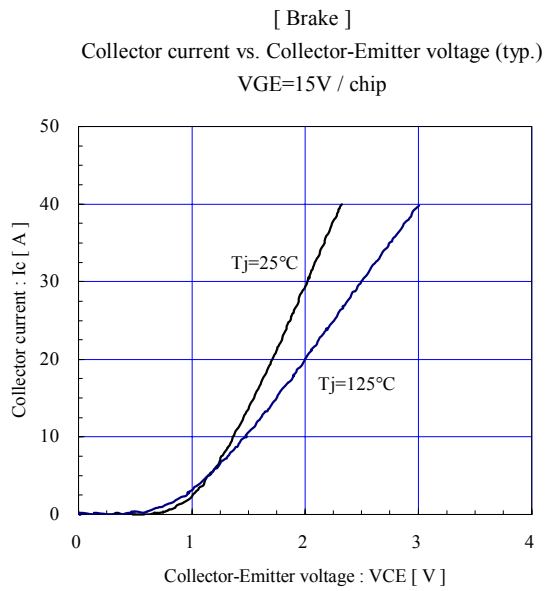
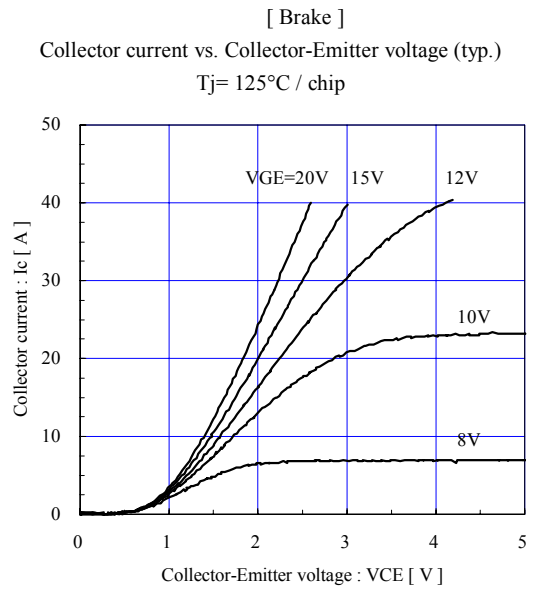
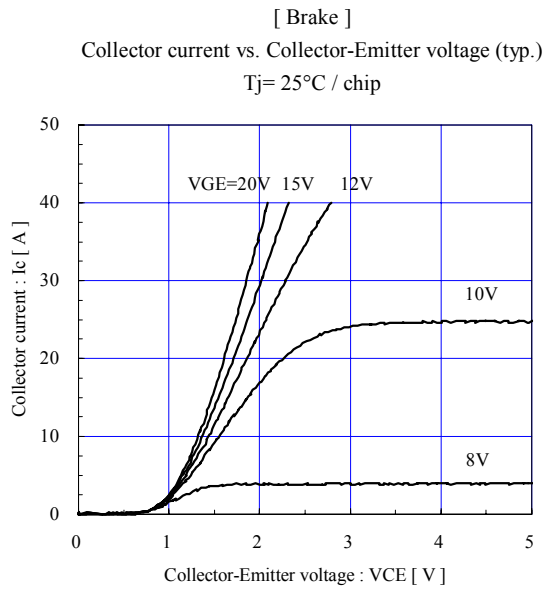


■ Characteristics (Representative)

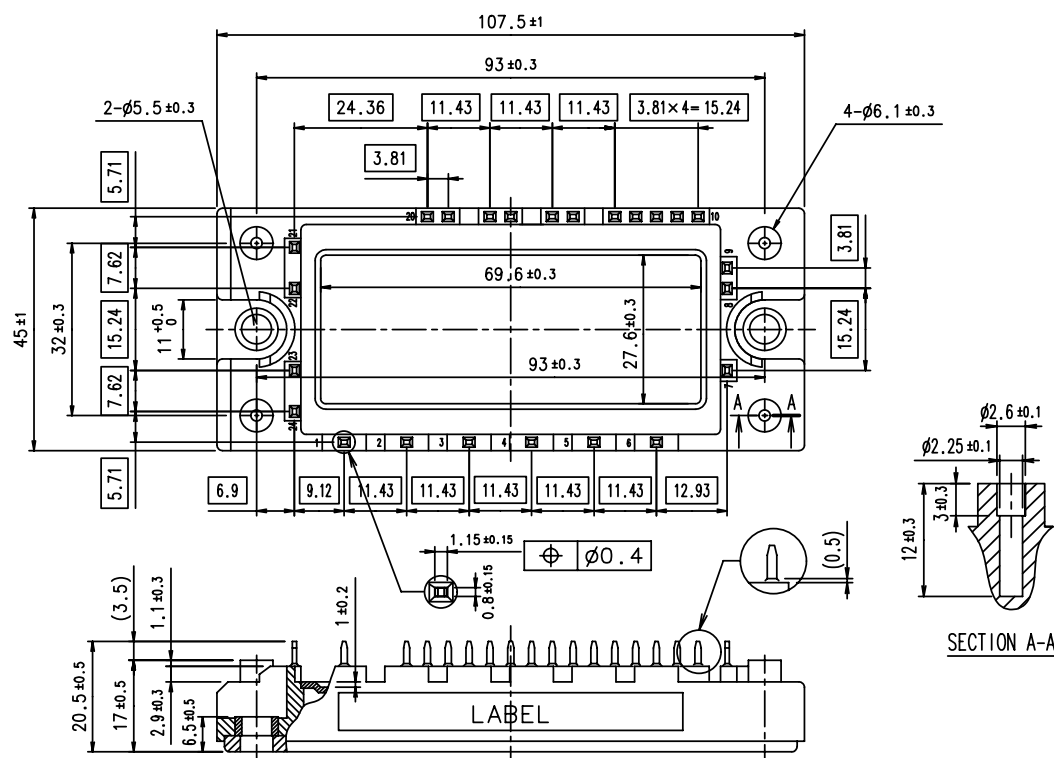








■ Outline Drawings, mm



 shows theoretical dimension.
 () shows reference dimension.