

IGBT MODULE (U series) 600V / 75A / 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}	600	V
	Gate-Emitter voltage	V_{GES}	± 20	V
	Collector current	I_C Continuous	75	A
		I_{CP} 1ms	150	
		$-I_C$	75	
		$-I_C$ pulse	150	
	Collector power dissipation	P_C 1 device	255	W
Brake	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	A
	Collector power dissipation	P_C 1 device	133	W
Converter	Repetitive peak reverse voltage	V_{RRM}	600	V
	Repetitive peak reverse voltage	V_{RRM}	800	V
	Average output current	I_o 50Hz/60Hz sine wave	75	A
	Surge current (Non-Repetitive)	I_{FSM} $T_j=150^\circ\text{C}$, 10ms	525	A
	I^2t (Non-Repetitive)	P^2t half sine wave	1378	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	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)

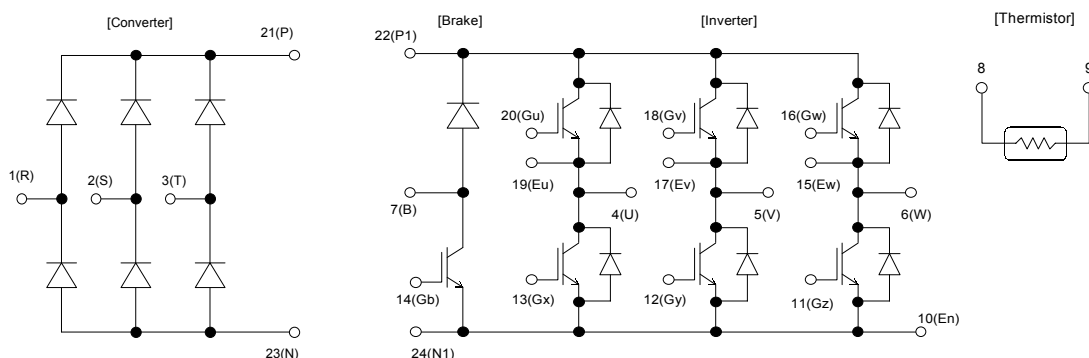
Item	Symbol	Condition	Characteristics			Unit
			Min.	Typ.	Max.	
Inverter	Zero gate voltage collector current	ICES	V _{CE} =600V, V _{GE} =0V		1.0	mA
	Gate-Emitter leakage current	IGES	V _{CE} =0V, V _{GE} =±20V		200	nA
	Gate-Emitter threshold voltage	V _{GE(th)}	V _{CE} =20V, I _C =75mA		6.2	V
	Collector-Emitter saturation voltage	V _{CE(sat)} (terminal) V _{CE(sat)} (chip)	V _{GE} =15V I _C =75A	T _j =25°C	2.20	V
				T _j =125°C	2.40	
				T _j =25°C	1.85	
				T _j =125°C	2.15	
	Input capacitance	C _{ies}	V _{GE} =0V, V _{CE} =10V, f=1MHz		5.4	nF
	Turn-on time	t _{on}	V _{CC} =300V		0.42	μs
		t _r	I _C =75A		0.24	
		t _{r(i)}	V _{GE} =±15V		0.05	
	Turn-off time	t _{off}	R _G =47Ω		0.42	μs
		t _f			0.03	
	Forward on voltage	V _F (terminal) V _F (chip)	V _{GE} =0V I _F =75A	T _j =25°C	1.95	V
				T _j =125°C	2.00	
				T _j =25°C	1.60	
				T _j =125°C	1.65	
Brake	Reverse recovery time	t _{rr}	I _F =75A		0.35	μs
	Zero gate voltage collector current	ICES	V _{CE} =600V, 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) V _{CE(sat)} (chip)	I _C =30A V _{GE} =15V	T _j =25°C	2.00	V
				T _j =125°C	2.30	
				T _j =25°C	1.85	
				T _j =125°C	2.15	
	Turn-on time	t _{on}	V _{CC} =300V		0.42	μs
		t _r	I _C =30A		0.24	
		t _{off}	V _{GE} =±15V		0.42	
	Turn-off time	t _f	R _G =120Ω		0.03	μs
					0.45	
	Reverse current	I _{RRM}	V _R =600V		1.0	mA
Converter	Forward on voltage	V _{FM}	I _F =75A	terminal	1.20	V
			V _{GE} =0V	chip	1.10	
	Reverse current	I _{RRM}	V _R =800V		1.0	mA
Thermistor	Resistance	R	T=25°C		5000	Ω
			T=100°C		465	
	B value	B	T=25/50°C		3305	K

● Thermal resistance Characteristics

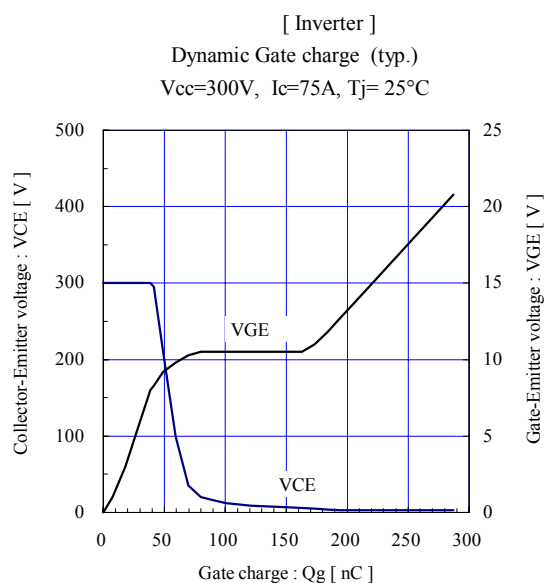
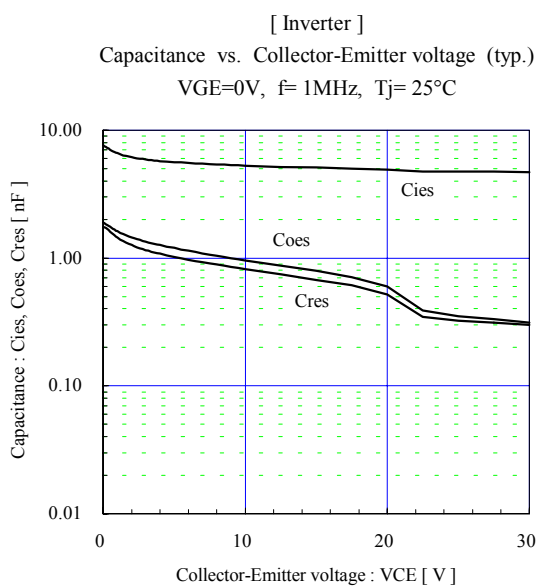
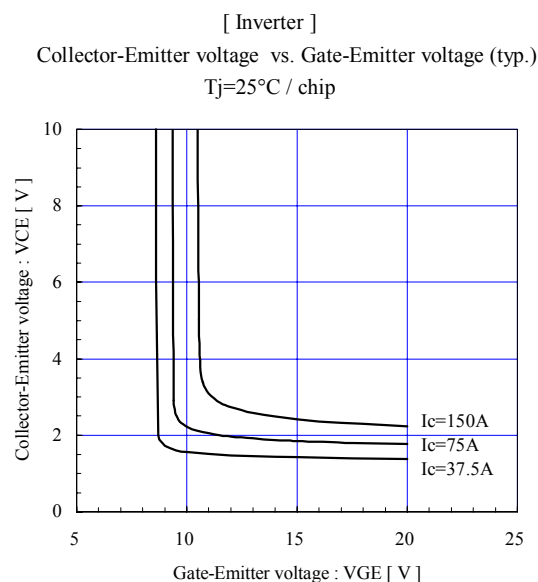
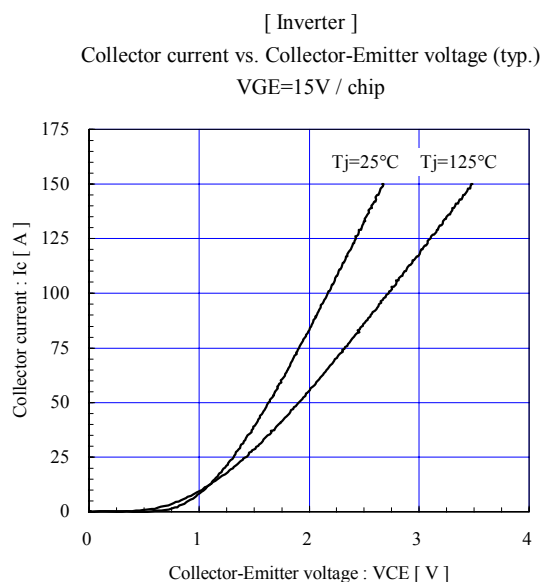
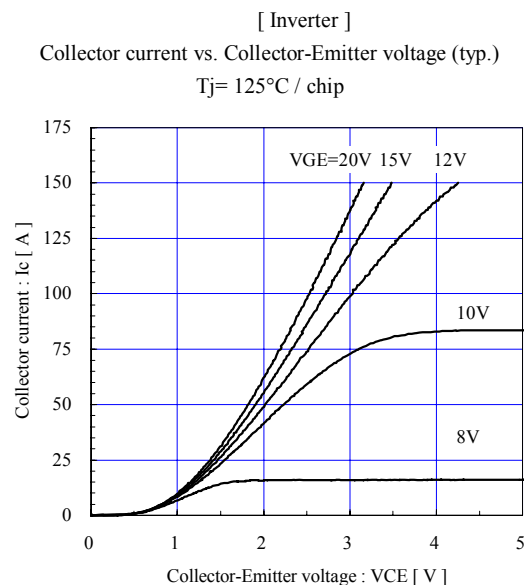
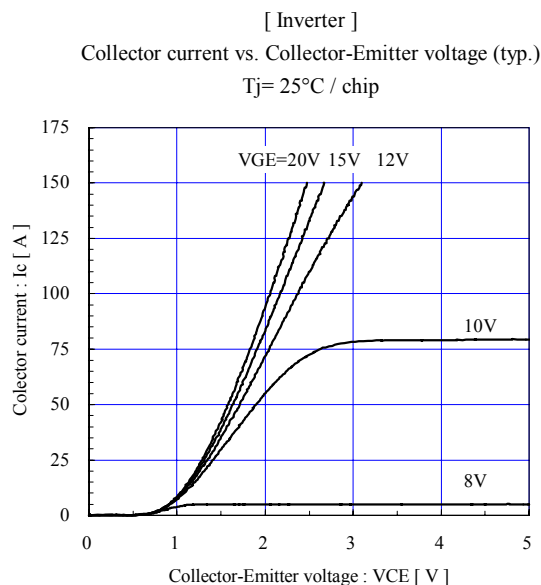
Item	Symbol	Condition	Characteristics			Unit
			Min.	Typ.	Max.	
Thermal resistance (1 device)	R _{th(j-c)}	Inverter IGBT	-	-	0.49	°C/W
		Inverter FWD	-	-	0.79	
		Brake IGBT	-	-	0.94	
		Converter Diode	-	-	0.66	
			-	-	-	
Contact thermal resistance *	R _{th(c-f)}	With thermal compound	-	0.05	-	

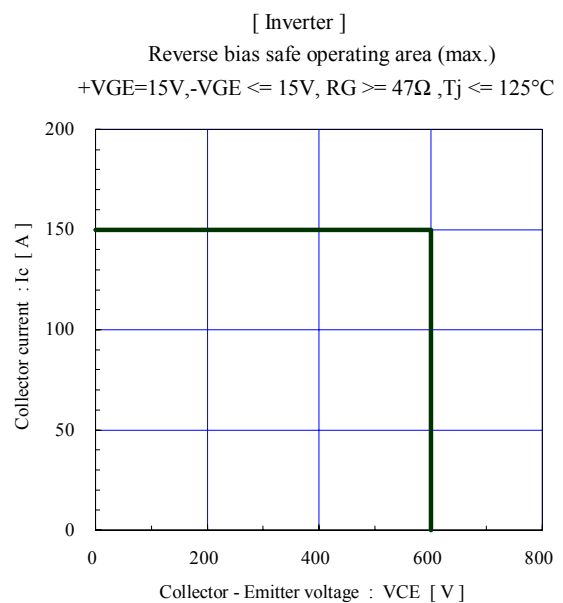
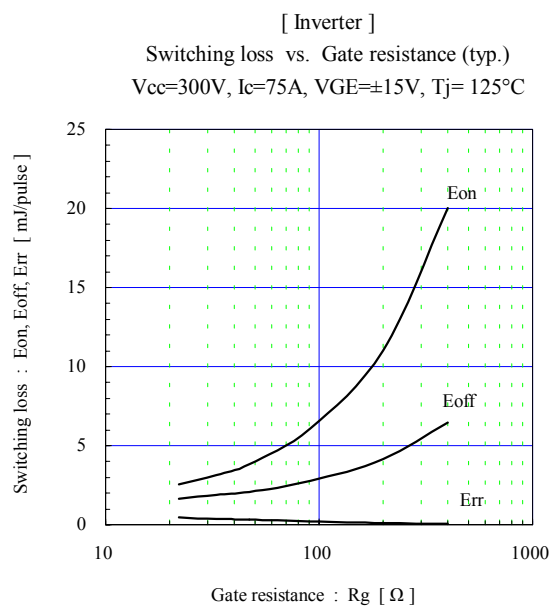
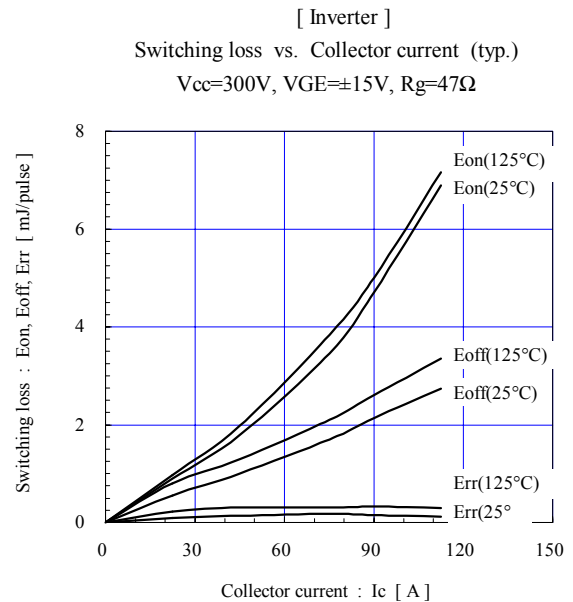
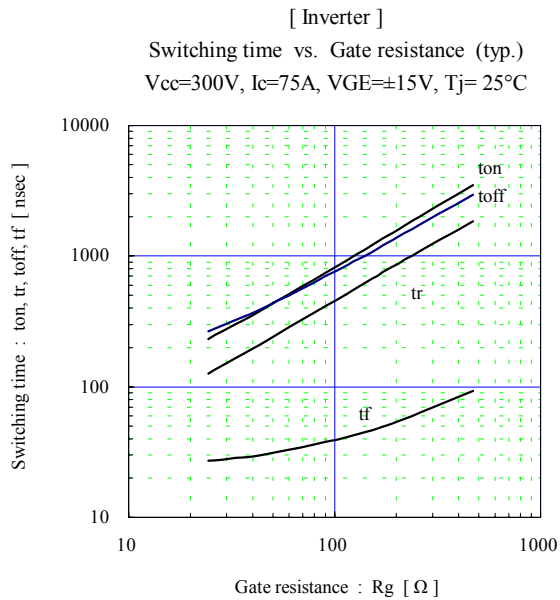
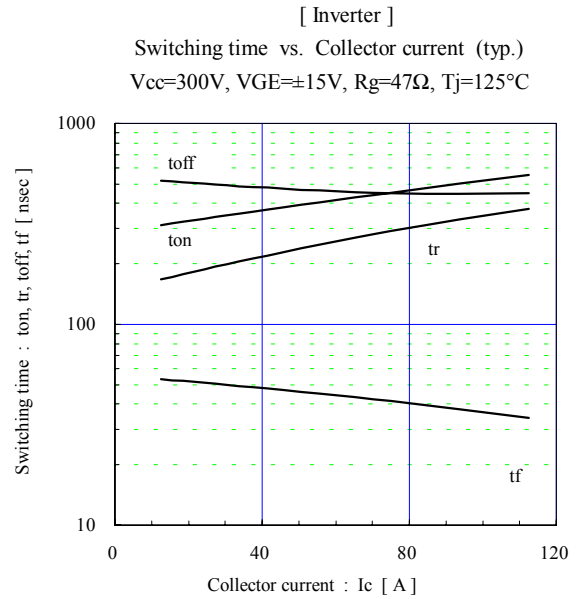
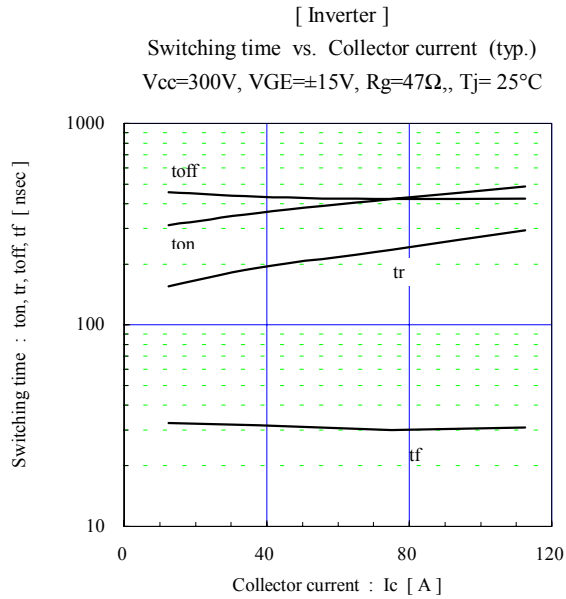
* This is the value which is defined mounting on the additional cooling fin with thermal compound

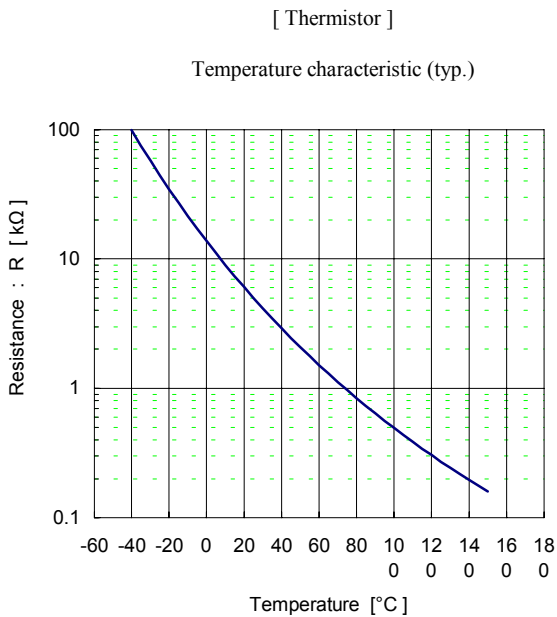
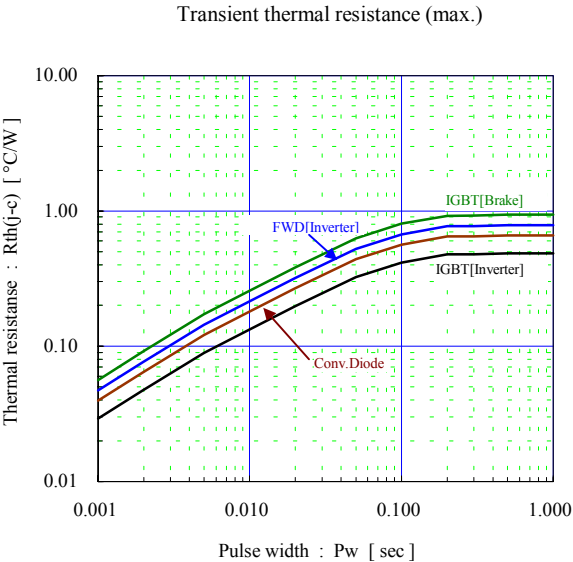
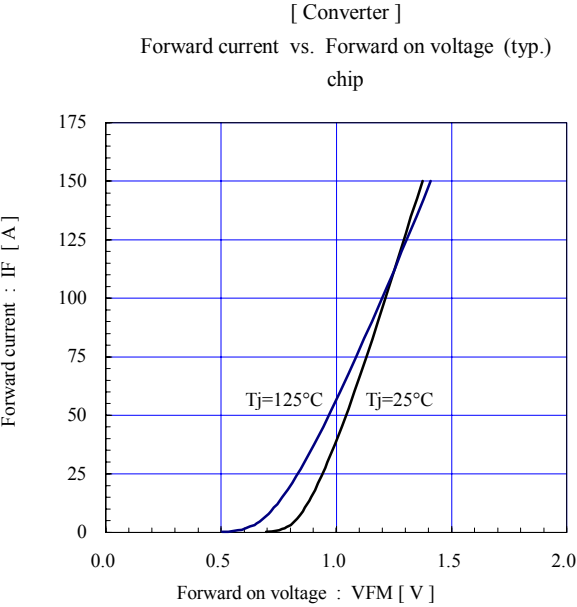
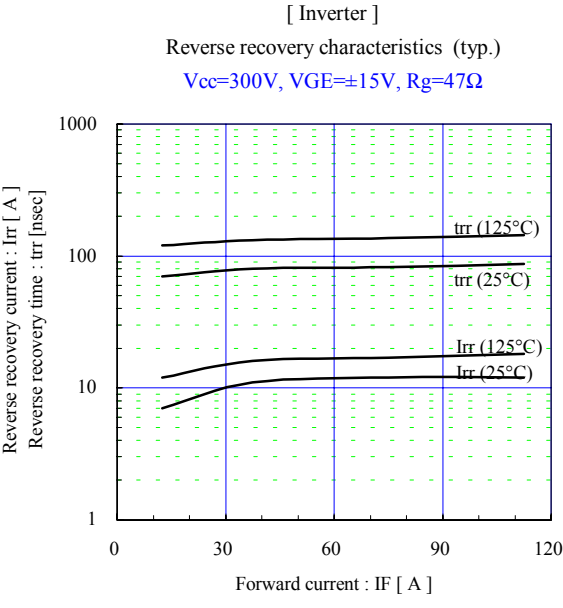
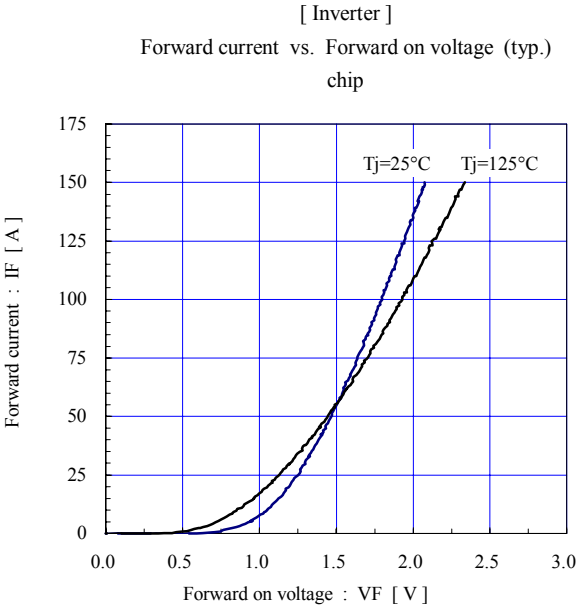
■ Equivalent Circuit Schematic



■ Characteristics (Representative)

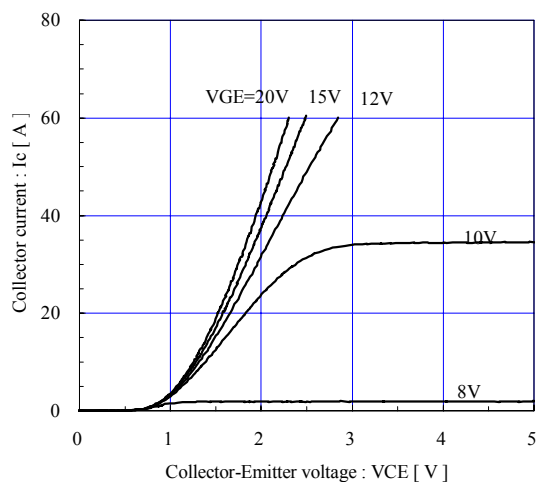






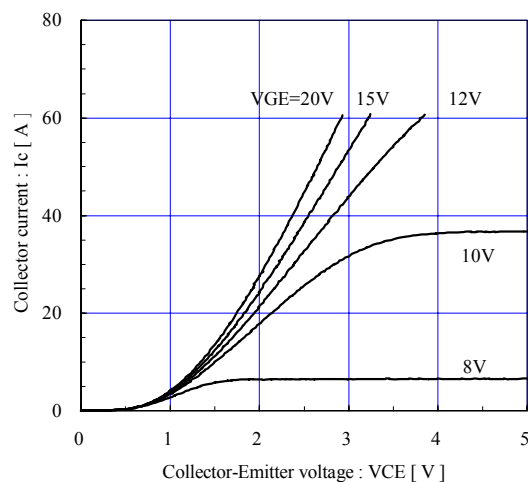
[Brake]

Collector current vs. Collector-Emmitter voltage (typ.)

 $T_j = 25^\circ\text{C}$ / chip

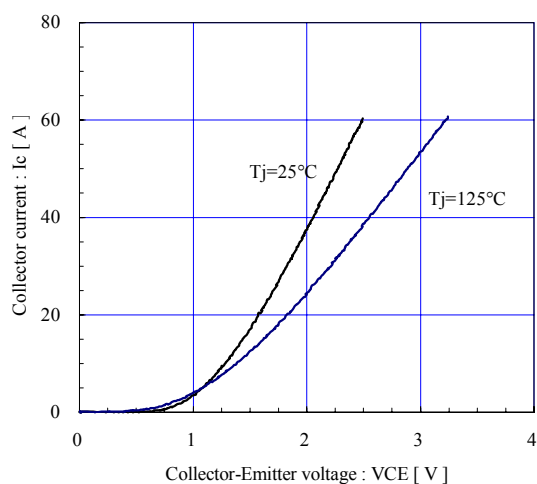
[Brake]

Collector current vs. Collector-Emmitter voltage (typ.)

 $T_j = 125^\circ\text{C}$ / chip

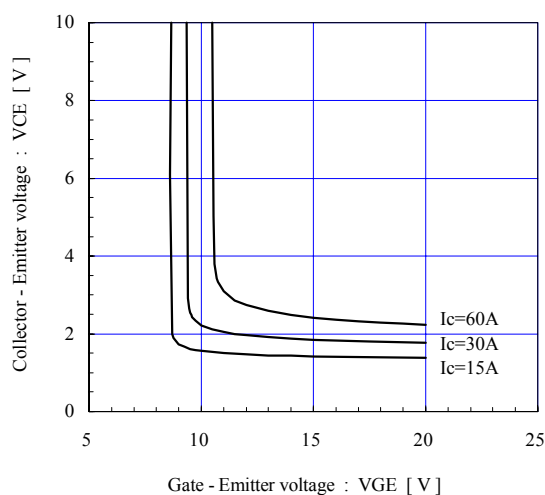
[Brake]

Collector current vs. Collector-Emmitter voltage (typ.)

 $V_{GE} = 15\text{V}$ / chip

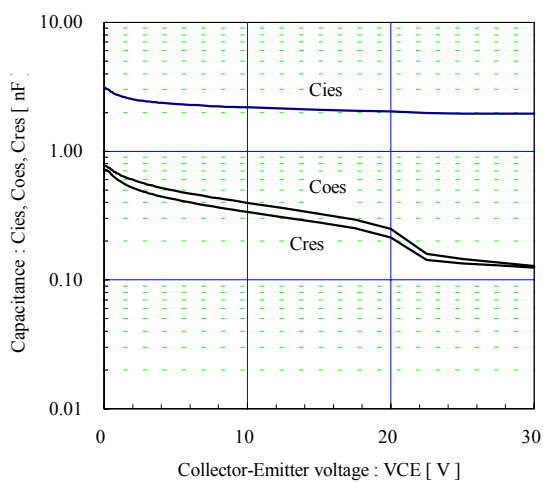
[Brake]

Collector-Emmitter voltage vs. Gate-Emmitter voltage (typ.)

 $T_j = 25^\circ\text{C}$ / chip

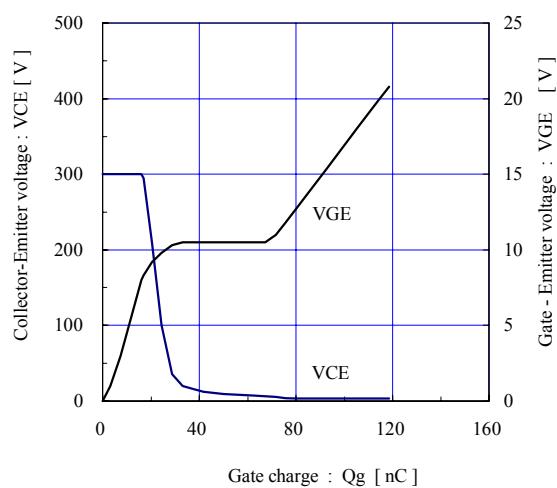
[Brake]

Capacitance vs. Collector-Emmitter voltage (typ.)

 $V_{GE} = 0\text{V}$, $f = 1\text{MHz}$, $T_j = 25^\circ\text{C}$ 

[Brake]

Dynamic Gate charge (typ.)

 $V_{cc} = 300\text{V}$, $I_c = 30\text{A}$, $T_j = 25^\circ\text{C}$ 

■ Outline Drawings, mm

