

IGBT MODULE (U series) 600V / 100A



■ Features

- Low $V_{CE(sat)}$
- Compact Package
- P.C. Board Mount Module

■ 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
Collector-Emitter voltage	V_{CES}		600	V
Gate-Emitter voltage	V_{GES}		± 20	V
Collector current	I_c	Continuous	100	A
	I_{cP}	1ms	200	
	$-I_c$		100	
	$-I_c$ pulse		200	
Collector power dissipation	P_c	1 device	380	W
Operating junction temperature	T_j		+150	$^{\circ}\text{C}$
Storage temperature	T_{stg}		-40 to +125	$^{\circ}\text{C}$
Isolation voltage	V_{iso}	AC : 1 minute	AC 2500	V
			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 (Tj=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=100mA		6.2	6.7	7.7	V
	Collector-Emitter saturation voltage	VCE(sat) (terminal)	VGE=15V Ic=100A	Tj=25°C	-	2.20	2.50	V
				Tj=125°C	-	2.35	-	
		VCE(sat) (chip)		Tj=25°C	-	1.85	-	
				Tj=125°C	-	2.00	-	
	Input capacitance	Cies	VGE=0V, VCE=10V, f=1MHz		-	8.4	-	nF
	Turn-on time	ton	VCC=300V Ic=100A VGE=±15V		-	0.40	1.20	μs
		tr			-	0.22	0.60	
		tr(i)			-	0.16	-	
	Turn-off time	toff	RG= 33 Ω		-	0.48	1.20	
		tr			-	0.07	0.45	
	Forward on voltage	VF (terminal)	VGE= 0 V IF=100A	Tj=25°C	-	1.95	2.30	V
				Tj=125°C	-	2.00	-	
		VF (chip)		Tj=25°C	-	1.60	-	
				Tj=125°C	-	1.65	-	
Reverse recovery time	trr	IF=100A		-	-	0.35	μs	
Lead resistance, terminal-chip *	R lead			-	3.4	-	mΩ	
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	

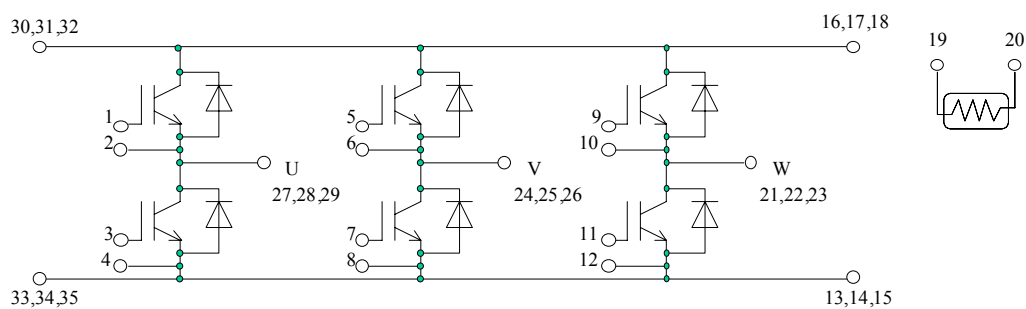
* Biggest internal terminal resistance among arm.

● Thermal resistance Characteristics

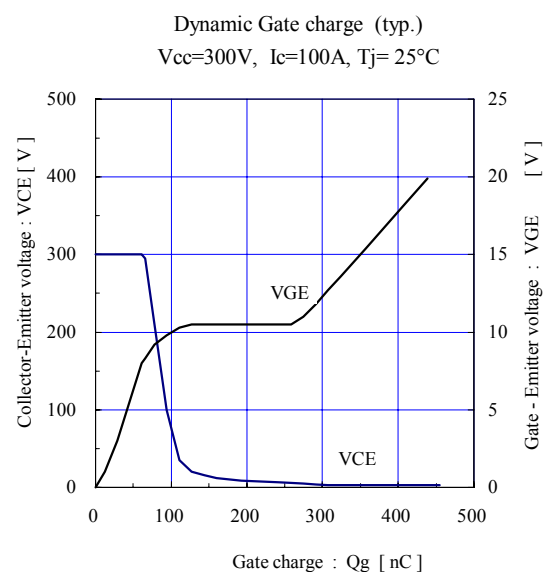
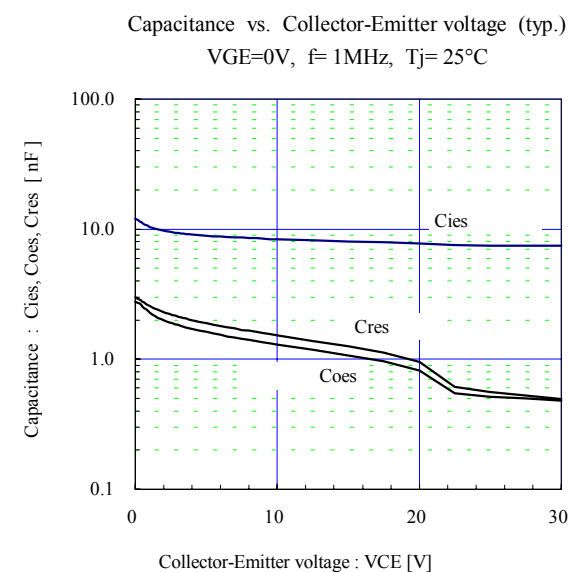
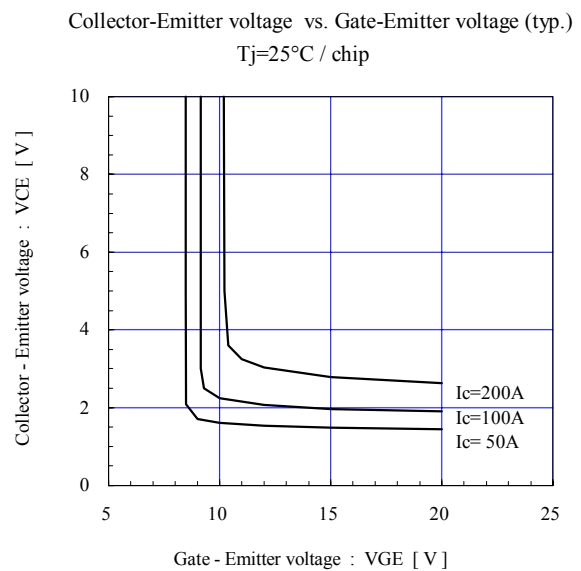
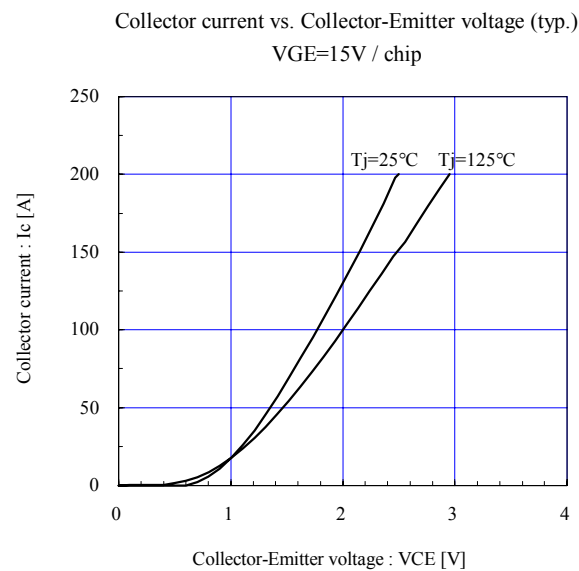
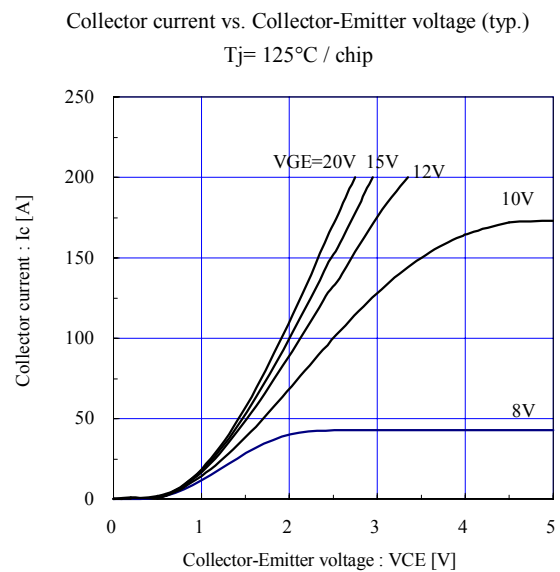
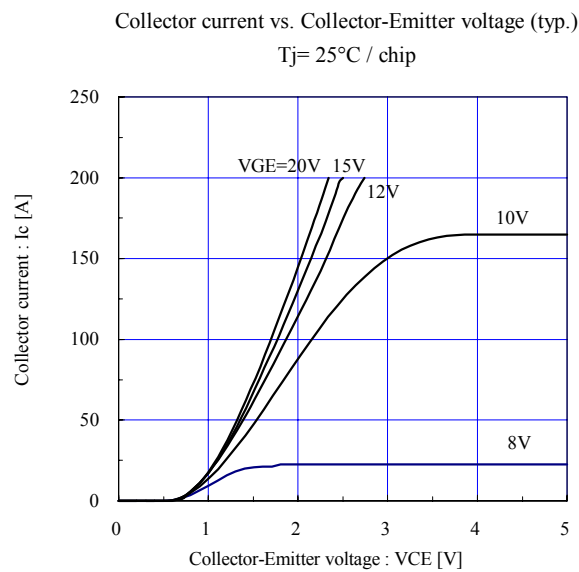
Item	Symbol	Condition	Characteristics			Unit
			Min.	Typ.	Max.	
Thermal resistance (1 device)	Rth(j-c)	IGBT	-	-	0.33	°C/W
		FWD	-	-	0.66	
Contact thermal resistance *	Rth(c-f)	With thermal compound	-	0.05	-	

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

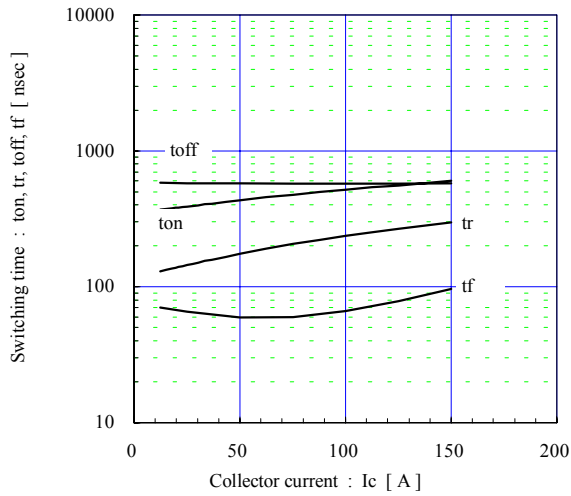
■ Equivalent Circuit Schematic



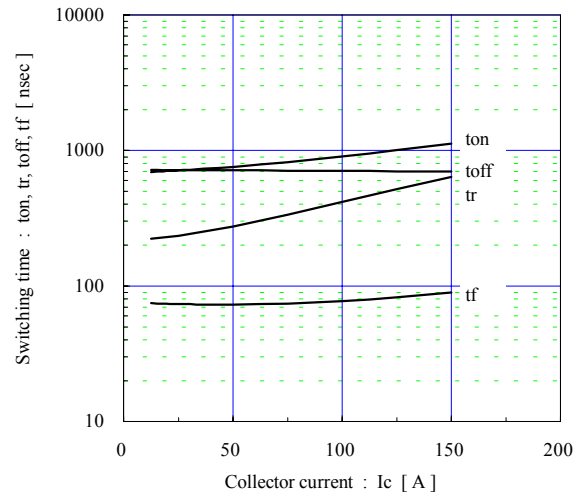
■ Characteristics (Representative)



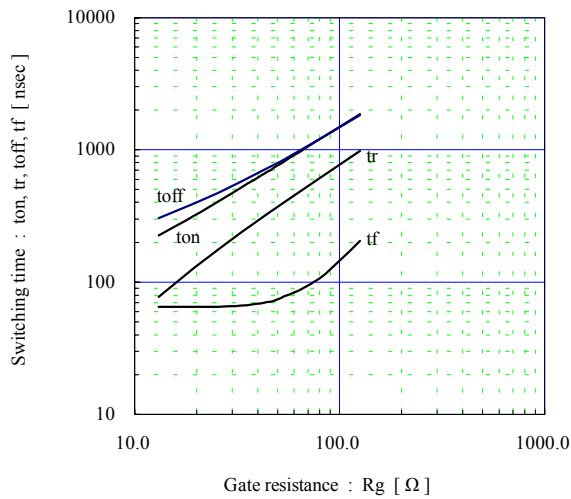
Switching time vs. Collector current (typ.)
 $V_{cc}=300V$, $V_{GE}=\pm 15V$, $R_g=33\Omega$, $T_j=25^\circ C$



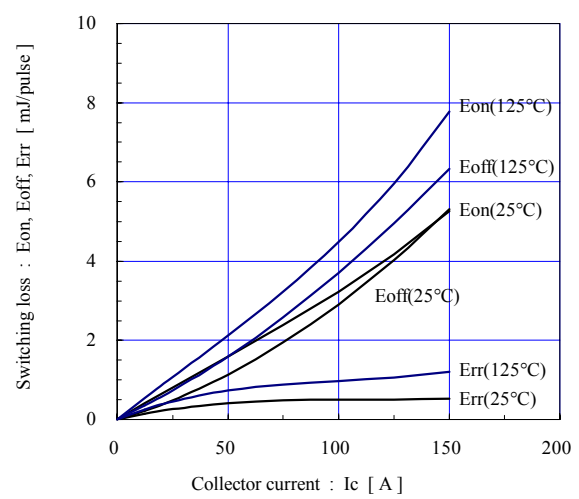
Switching time vs. Collector current (typ.)
 $V_{cc}=300V$, $V_{GE}=\pm 15V$, $R_g=33\Omega$, $T_j=125^\circ C$



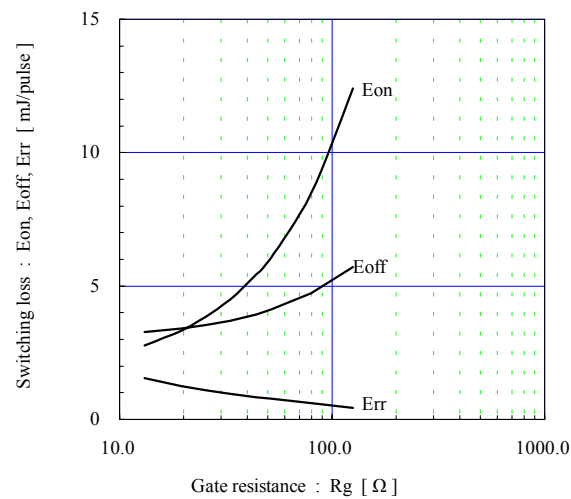
Switching time vs. Gate resistance (typ.)
 $V_{cc}=300V$, $I_c=100A$, $V_{GE}=\pm 15V$, $T_j=25^\circ C$



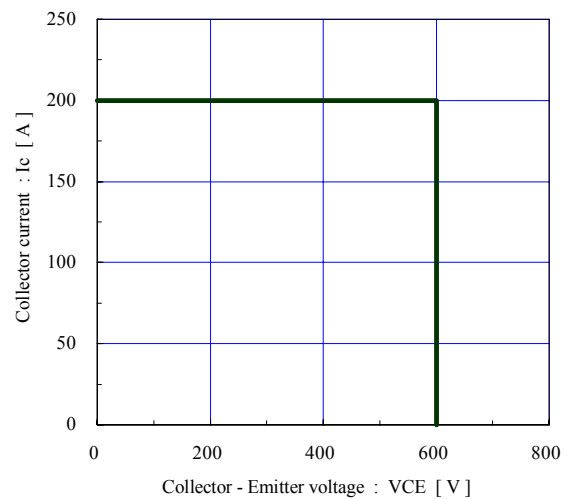
Switching loss vs. Collector current (typ.)
 $V_{cc}=300V$, $V_{GE}=\pm 15V$, $R_g=33\Omega$



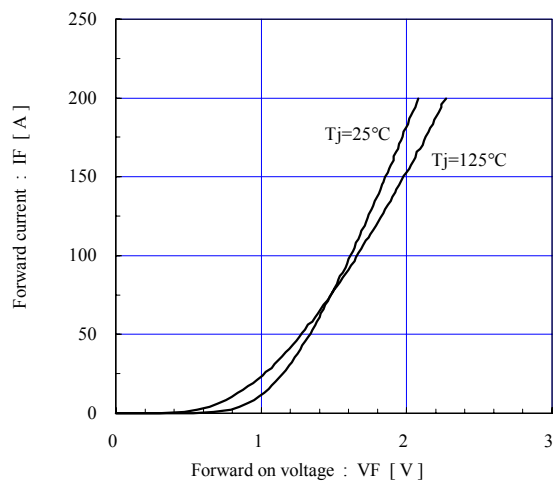
Switching loss vs. Gate resistance (typ.)
 $V_{cc}=300V$, $I_c=100A$, $V_{GE}=\pm 15V$, $T_j=125^\circ C$



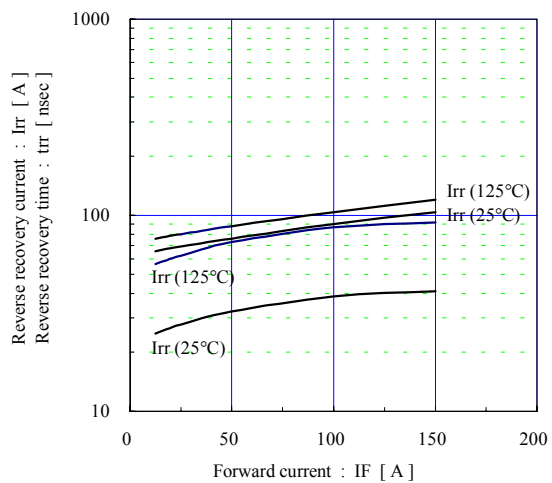
Reverse bias safe operating area (max.)
 $+V_{GE}=15V, -V_{GE} \leq 15V, R_g \geq 33\Omega, T_j \leq 125^\circ C$



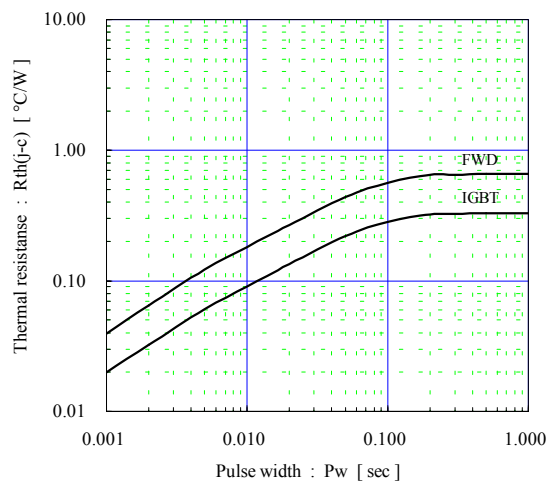
Forward current vs. Forward on voltage (typ.)
chip



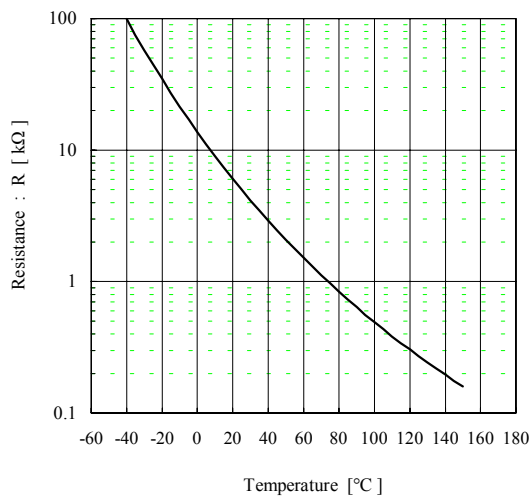
Reverse recovery characteristics (typ.)
 $V_{CC}=300\text{V}$, $V_{GE}=\pm 15\text{V}$, $R_g=33\Omega$



Transient thermal resistance (max.)



Temperature characteristic (typ.)



Technical drawing of a PCB layout, showing top and side views with dimensions and callouts.

Top View Dimensions:

- Overall width: 122 ± 1
- Overall height: 62 ± 1
- Inner width: 94.5 ± 0.3
- Inner height: 57.5 ± 0.3
- Top edge dimensions (from left to right): 24.52 , 22.86 , 22.86 , 22.86 , 11.5
- Bottom edge dimensions (from left to right): 4.06 , 15 , 15.24 , 15.24 , 15.24 , 15.24 , 15.24 , 22.855
- Left edge dimensions (from top to bottom): 23.5 , 19.05 , 11.66 , 4.21
- Right edge dimensions (from top to bottom): 11.5 , 57.5 ± 0.3 , 11.5
- Internal dimensions (from left to right): 3.81 , 26 , 24 , 23 , 21 , 20
- Internal dimensions (from top to bottom): 3.81 , 3.81 , 3.81 , 3.81
- Internal dimensions (from left to right): 1.15 ± 0.15 , 0.8 ± 0.15
- Internal dimensions (from top to bottom): 99.6 ± 0.3 , 39.9 ± 0.3

Callouts:

- $8-R2.25 \pm 0.3$
- $4-\phi 5.5 \pm 0.3$
- $\phi 0.4$
- $\phi 2.6 \pm 0.1$
- $\phi 2.25 \pm 0.1$
- 3 ± 0.3
- 12 ± 0.3
- 1 ± 0.2

Section A-A:

Section A-A shows the profile of the PCB, indicating a thickness of 12 ± 0.3 and a width of 3 ± 0.3 . The profile is defined by a dashed line.

() shows reference dimension.