

### 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	$V_{GES}$		$\pm 20$	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	between terminal and copper base *2 between thermistor and others *3	$V_{iso}$	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			-	mA		
	Gate-Emitter leakage current	IGES	VCE=0V, VGE=±20V			-	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			-	0.40	1.20	µs
		tr	Ic=100A			-	0.22	0.60	
		tr(i)	VGE=±15V			-	0.16	-	
	Turn-off time	toff	Rg= 33 Ω			-	0.48	1.20	µs
		tf				-	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

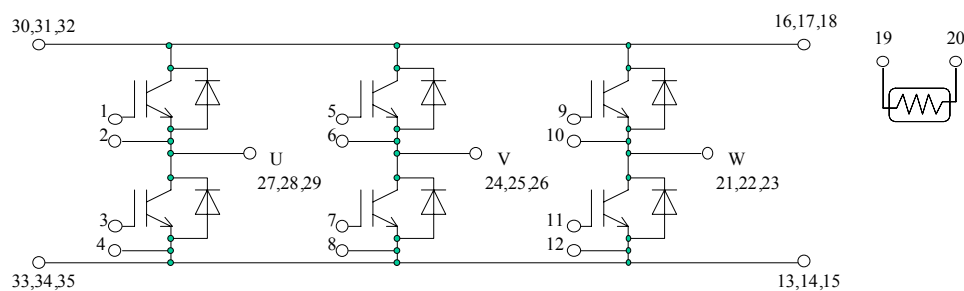
\* Biggest internal terminal resistance among arm.

● 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	-

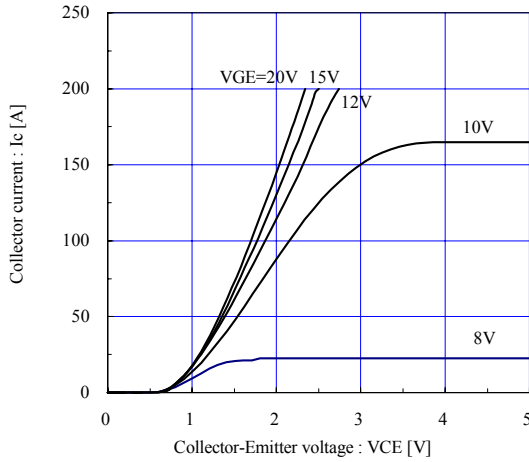
\* This is the value which is defined mounting on the additional cooling fin with thermal compound

■ Equivalent Circuit Schematic

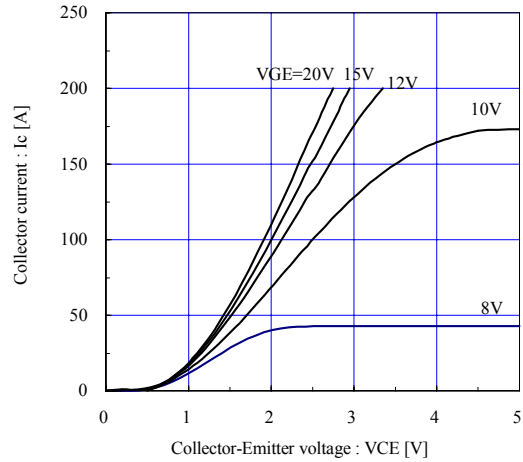


■ Characteristics (Representative)

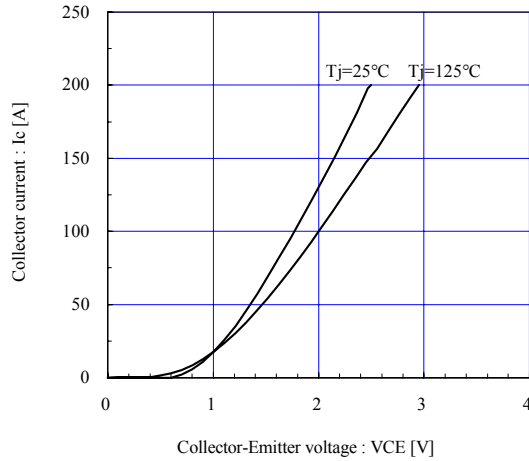
Collector current vs. Collector-Emittor voltage (typ.)  
Tj= 25°C / chip



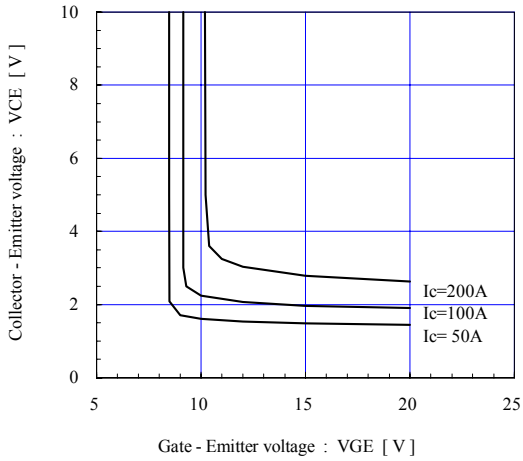
Collector current vs. Collector-Emittor voltage (typ.)  
Tj= 125°C / chip



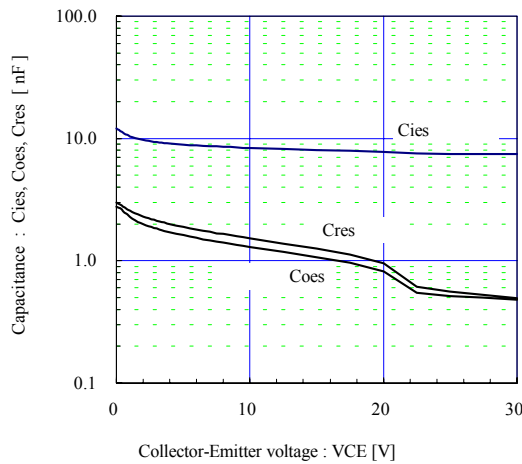
Collector current vs. Collector-Emittor voltage (typ.)  
VGE=15V / chip



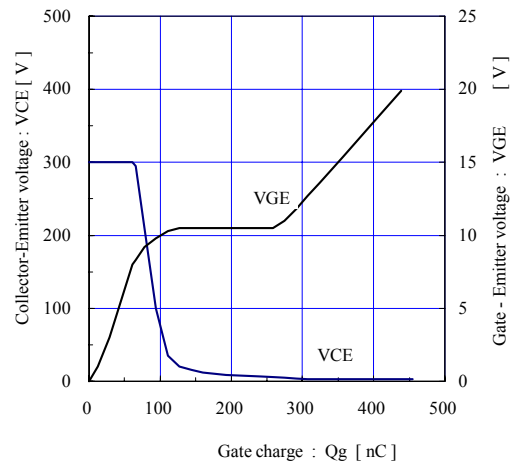
Collector-Emittor voltage vs. Gate-Emittor voltage (typ.)  
Tj=25°C / chip



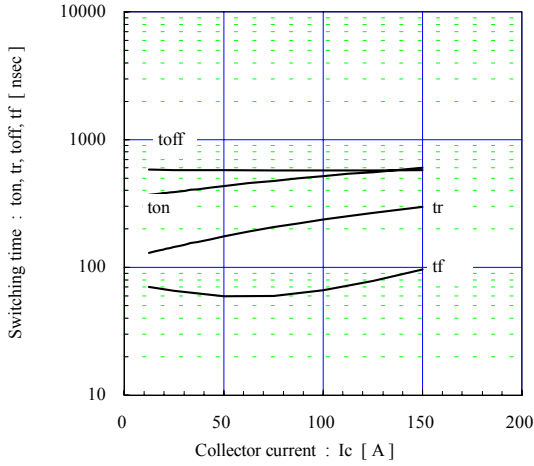
Capacitance vs. Collector-Emittor voltage (typ.)  
VGE=0V, f= 1MHz, Tj= 25°C



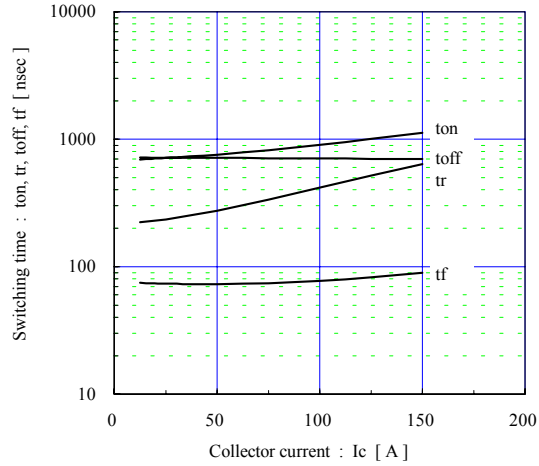
Dynamic Gate charge (typ.)  
Vcc=300V, Ic=100A, Tj= 25°C



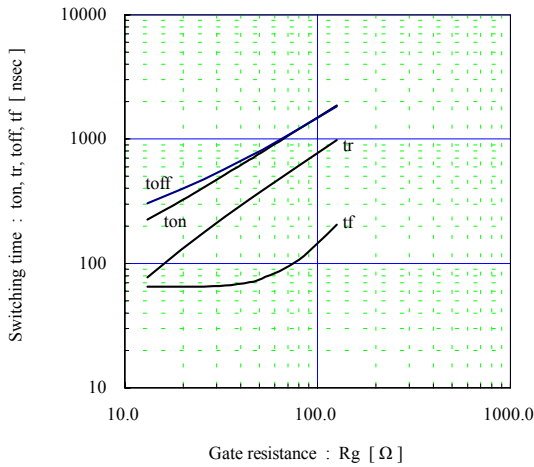
Switching time vs. Collector current (typ.)  
 $V_{cc}=300V, V_{GE}=\pm 15V, R_g=33\Omega, T_j=25^\circ C$



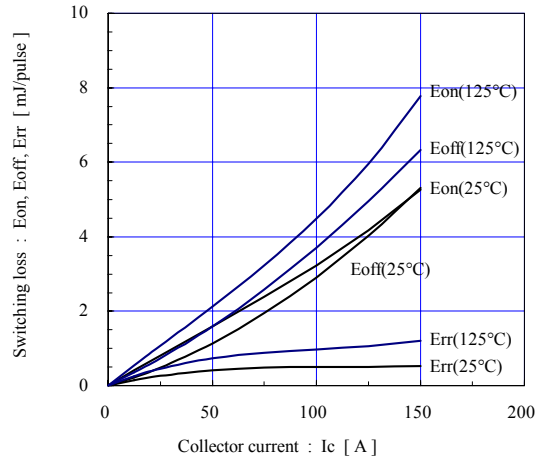
Switching time vs. Collector current (typ.)  
 $V_{cc}=300V, V_{GE}=\pm 15V, R_g=33\Omega, T_j=125^\circ C$



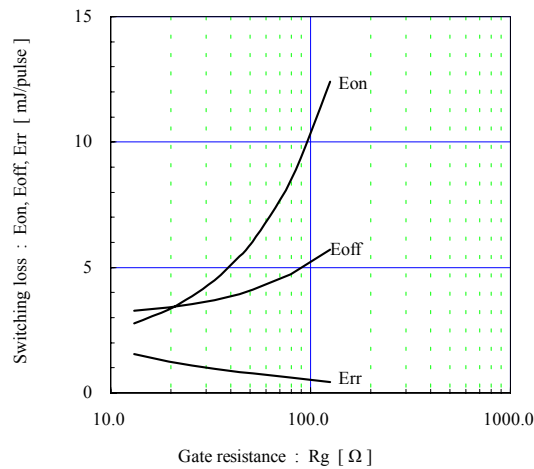
Switching time vs. Gate resistance (typ.)  
 $V_{cc}=300V, I_c=100A, V_{GE}=\pm 15V, T_j=25^\circ C$



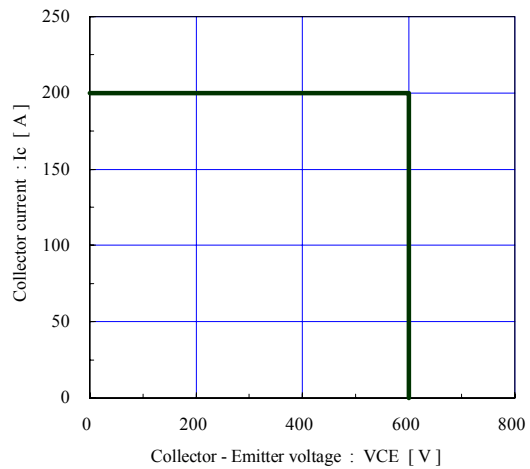
Switching loss vs. Collector current (typ.)  
 $V_{cc}=300V, V_{GE}=\pm 15V, R_g=33\Omega$



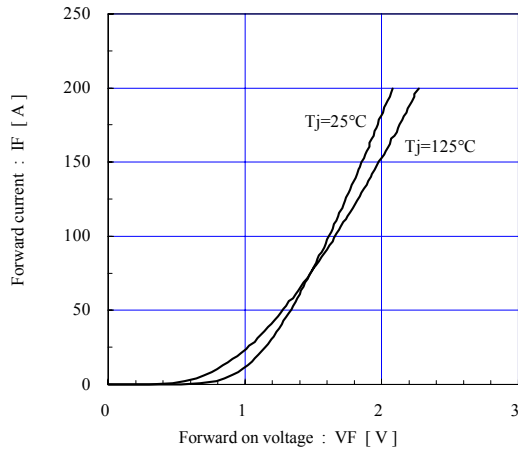
Switching loss vs. Gate resistance (typ.)  
 $V_{cc}=300V, I_c=100A, V_{GE}=\pm 15V, T_j=125^\circ C$



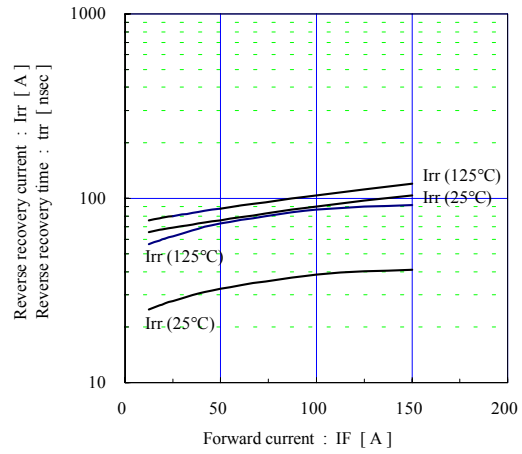
Reverse bias safe operating area (max.)  
 $+V_{GE}=15V, -V_{GE} \le 15V, R_g \ge 33\Omega, T_j \le 125^\circ C$



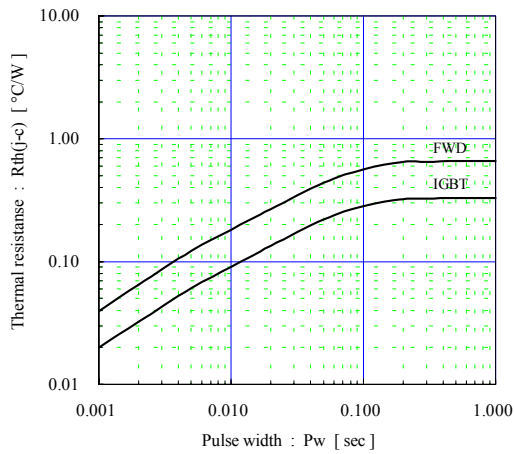
Forward current vs. Forward on voltage (typ.)  
chip



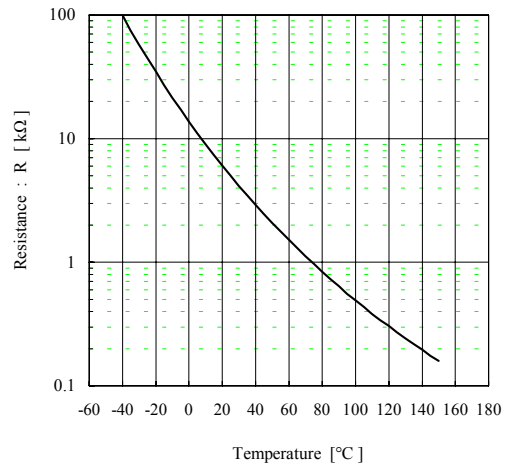
Reverse recovery characteristics (typ.)  
Vcc=300V, VGE=±15V, Rg=33Ω



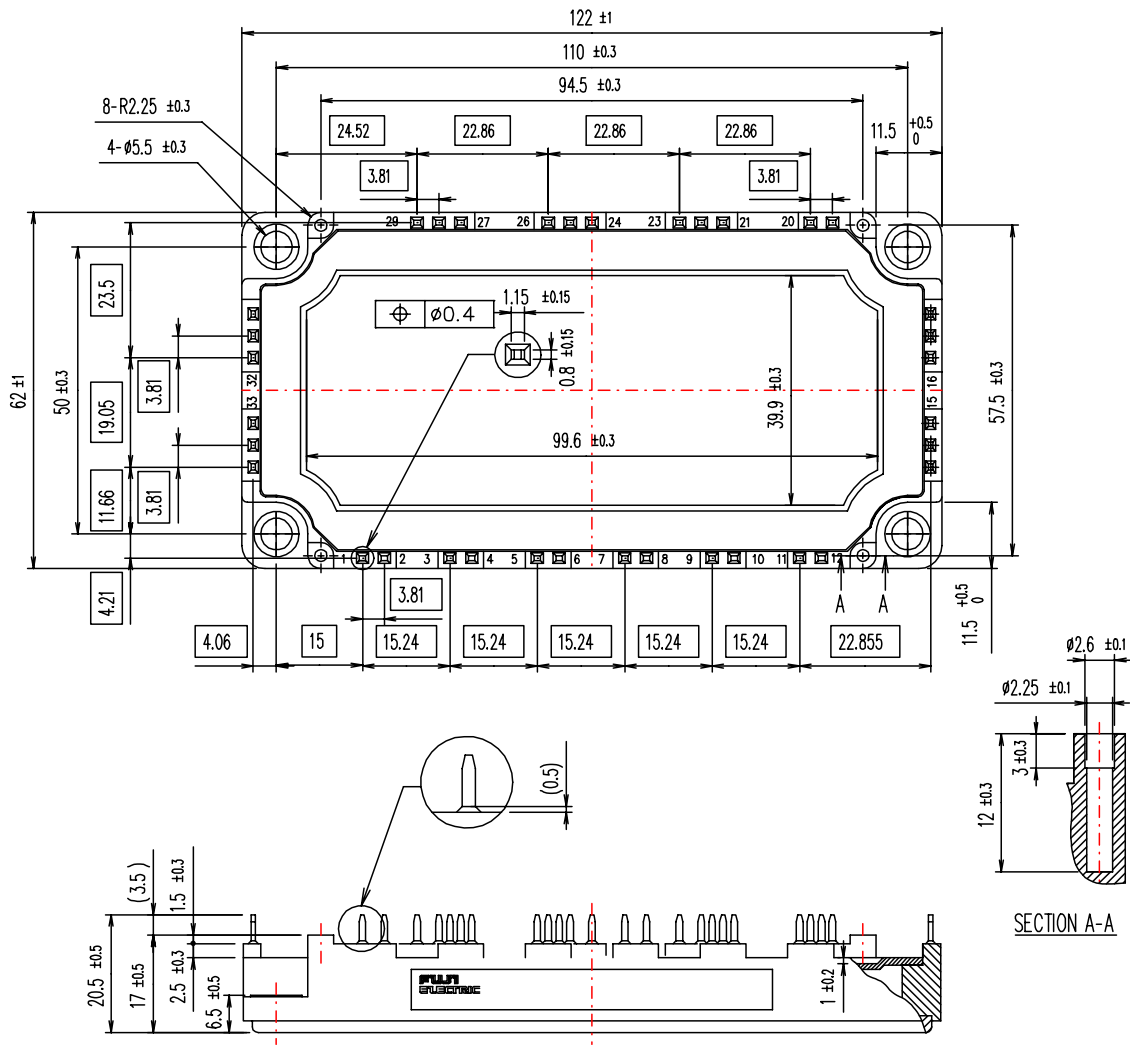
Transient thermal resistance (max.)



Temperature characteristic (typ.)



■ Outline Drawings, mm



□ shows theoretical dimension.

( ) shows reference dimension.