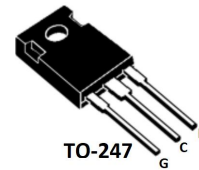


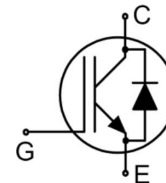
### Features

- Low gate charge
- Trench FS Technology
- RoHS product



### Applications

- General purpose inverters
- Induction heating(IH)
- UPS



### Absolute Ratings (T<sub>c</sub>=25°C)

Parameter	Symbol	Value	Unit
Collector-Emmitter Voltage	V <sub>CES</sub>	1200	V
*Collector Current-continuous	I <sub>c</sub> T=25°C T=100°C	30	A
		15	A
Collector Current-pulse(note 1)	I <sub>CM</sub>	45	A
Diode Continuous forward current	I <sub>F</sub> T=25°C T=100°C	30	A
		15	
Diode Maximum Forward Current (Note 1)	I <sub>FM</sub>	45	A
Gate-Emmitter Voltage	V <sub>GES</sub>	±20	V
Power Dissipation(TO-247)	P <sub>D</sub> T <sub>C</sub> =25°C	238	W
Operating Temperature Range	T <sub>J</sub>	-40~+175	°C
Storage Temperature Range	T <sub>STG</sub>	-55~+150	°C
Maximum Lead Temperature for Soldering Purposes	T <sub>L</sub>	300	°C

\*Collector current limited by maximum Junction temperature

### Electrical Characteristic(T<sub>C</sub>=25°C unless otherwise noted )

Parameter	Symbol	Tests conditions	Min	Typ	Max	Units
<b>Off-Characteristics</b>						
Collector-Emmitter Voltage	BV <sub>CES</sub>	I <sub>C</sub> =250μA, V <sub>GE</sub> =0V	1200	-	-	V
Zero Gate Voltage Collector Current	I <sub>CES</sub>	V <sub>CE</sub> =1200V, V <sub>GE</sub> =0V, T <sub>C</sub> =25°C	-	-	100	uA
		T <sub>C</sub> =100°C	-	-	2	mA

Gate-body leakage current,reverse	$I_{GESR}$	$V_{CE}=0V, V_{GE}=\pm 20V$	-	-	$\pm 150$	nA
<b>On-Characteristics</b>						
Gate-Emmitter Threshold Voltage	$V_{GE(th)}$	$V_{CE}=V_{GE}, I_c=250\mu A$	4.5	-	6.5	V
Collector-Emmitter saturation Voltage	$V_{CESAT}$	$V_{GE}=15V, I_c=15A, T_c=25^\circ C$	-	1.6	2.1	V
		$T_c=125^\circ C$	-	1.9	-	V
		$T_c=150^\circ C$	-	2.1	-	V
<b>Dynamic Characteristics</b>						
Input capacitance	$C_{ies}$	$V_{CE}=25V, V_{GE}=0V, f=1.0MHz,$	-	1260	-	pF
Output capacitance	$C_{oes}$		-	78	-	pF
Reverse transfer capacitance	$C_{res}$		-	41	-	pF
Total Gate Charge	$Q_g$	$V_{CC}=960V, I_c=15A, V_{GE}=15V^{3,4}$	-	112	-	nC
Gate to emitter charge	$Q_{ge}$		-	8.8	-	
Gate to collector charge	$Q_{gc}$		-	80.7	-	
<b>Switching Characteristics</b>						
Turn-On delay time	$t_d(on)$	$V_{CE}=600V, I_c=15A, R_G=10\Omega, Inductive load T_c=25^\circ C$	-	10	-	ns
Turn-On rise time	$t_r$		-	34	-	ns
Turn-off delay time	$t_d(off)$		-	52	-	ns
Turn-off Fall time	$t_f$		-	174	-	ns
Turn-on energy	$E_{on}$		-	0.38	-	mJ
Turn-off energy	$E_{off}$		-	0.67	-	mJ
Total switching Energy	$E_{tot}$		-	1.05	-	mJ
<b>Anti-Paraller Diode Characteristics and Maximum Ratings</b>						
Diode Forward Voltage	$V_F$	$V_{GE}=0V, I_F=15A.$	-	1.85	2.2	V
Diode Reverse recovery time	$t_{rr}$	$V_{GE}=0V, V_R=600V, I_F=15A, dl_F/dt=450A/us^4$	-	283	-	ns
Reverse recovery charge	$Q_{rr}$		-	1180	-	nC

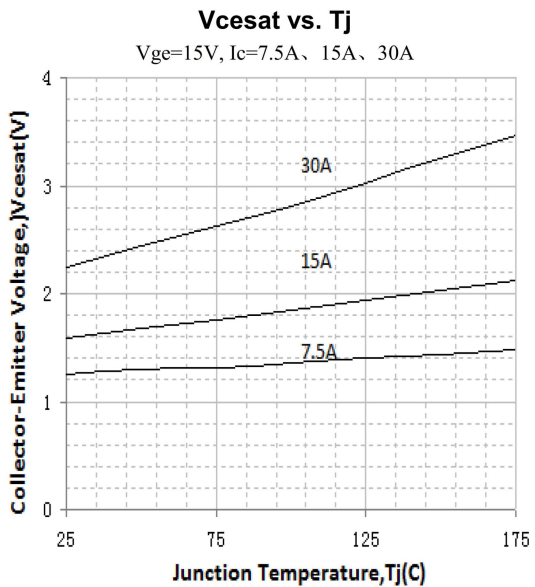
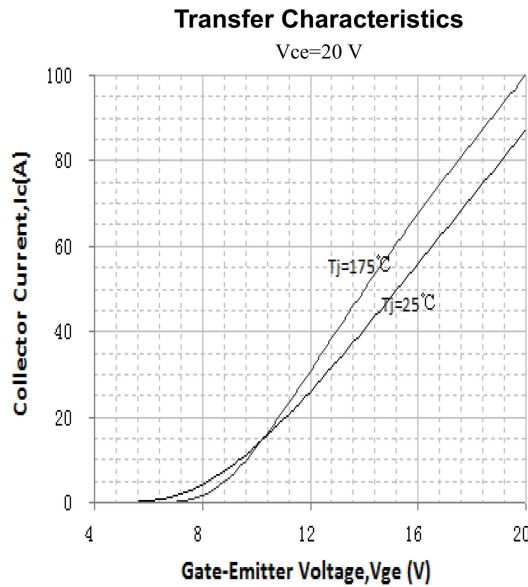
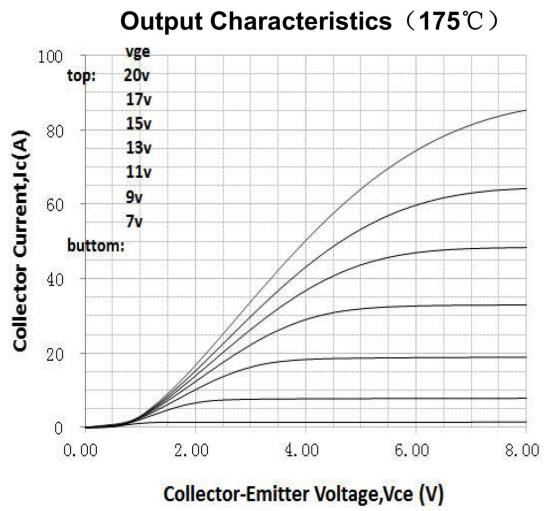
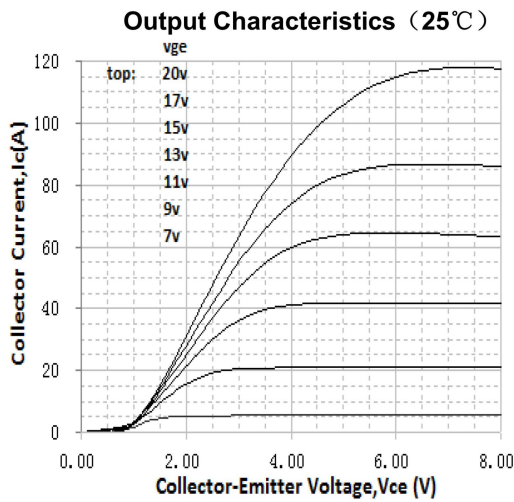
### Thermal Characteristics

Symbol	Parameter	Type	Units
$R_{th j-c}$	Thermal Resistance, Junction to case	0.63	$^\circ C/W$
$R_{th j-a}$	Thermal Resistance, Junction to Ambient	40	$^\circ C/W$

**Notes:**

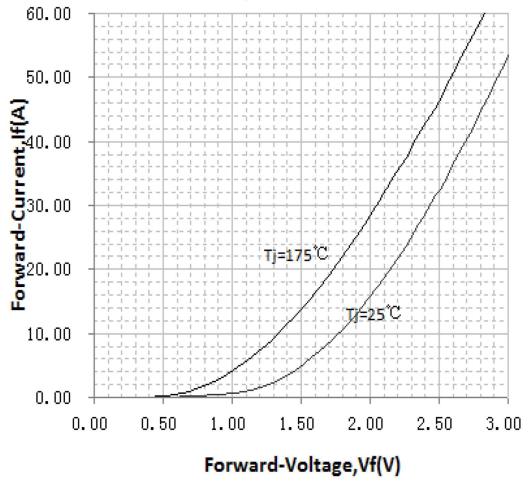
- 1: Pulse width limited by maximum junction temperature
- 2: Allowed number of short circuits: <1000; time between short circuits: >1s.
- 3: Pulse Test: Pulse Width  $\leq 300\mu\text{s}$ , Duty Cycle  $\leq 2\%$
- 4: Essentially independent of operating temperature

### Electrical Characteristics (curves)



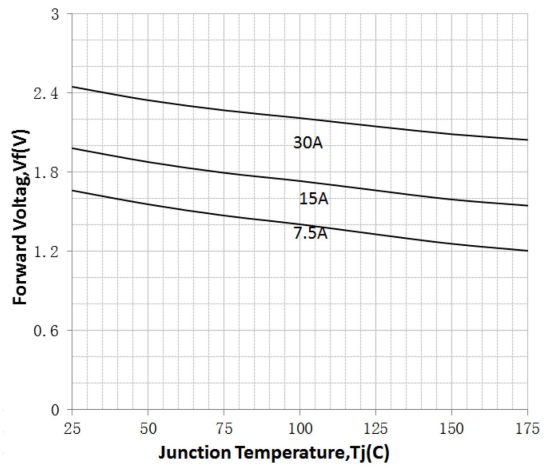
### Diode Characteristic

$T_j=25^\circ\text{C}, 175^\circ\text{C}$



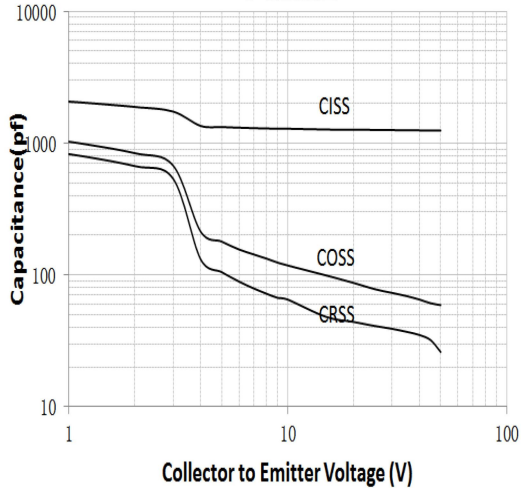
### $V_f$ vs. $T_j$

$I_c=7.5\text{A}, 15\text{A}, 30\text{A}$



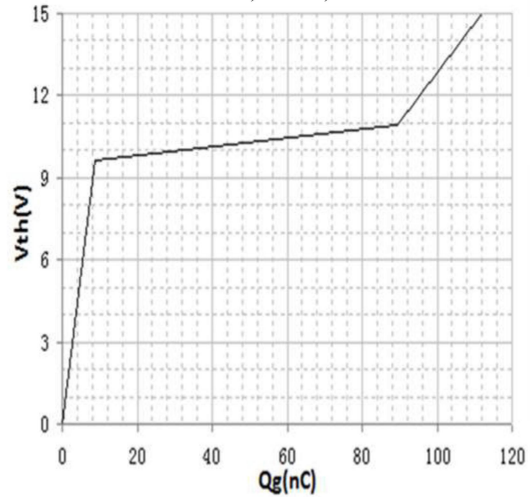
### Capacitance Characteristic

$f=1.0\text{MHz}$



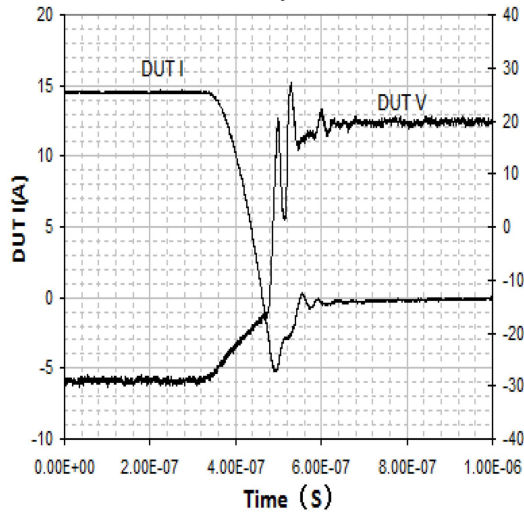
### Gate Charge Characteristics

$V_{GE}=15\text{V}, I_c=15\text{A}, V_{CE}=960\text{V}$



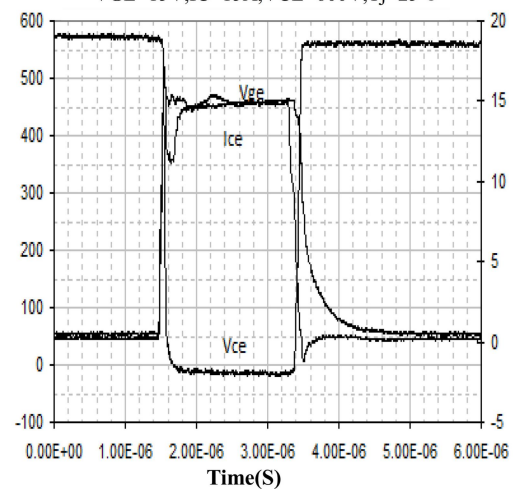
### Diode Peak Reverse Recovery Current

$I_F=15\text{A}, T_j=25^\circ\text{C}$



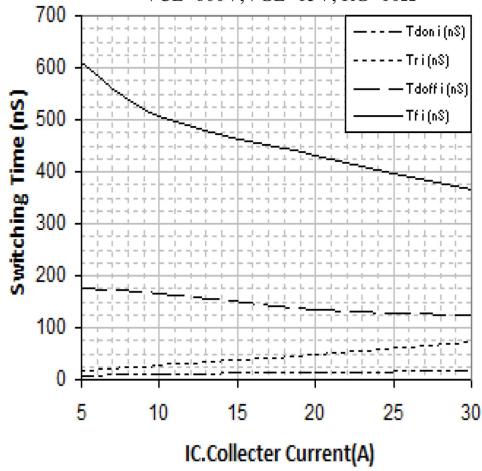
### IGBT Switch

$V_{GE}=15\text{V}, I_c=15\text{A}, V_{CE}=600\text{V}, T_j=25^\circ\text{C}$



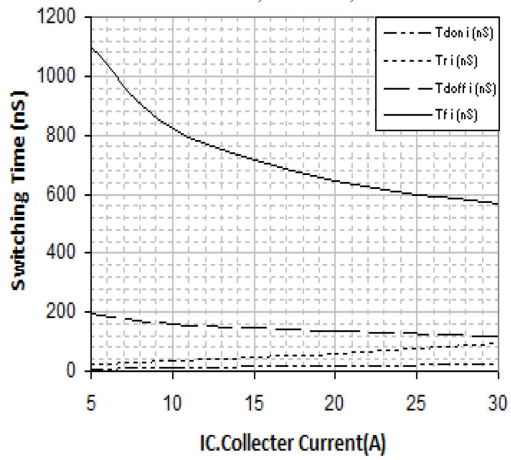
**Switching Time vs. IC(25°C)**

VCE=600V, VGE=15V, RG=10Ω



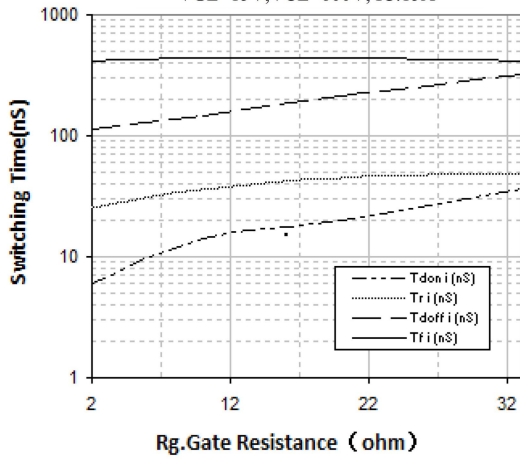
**Switching Time vs. IC(175°C)**

VCE=600V, VGE=15V, RG=10Ω



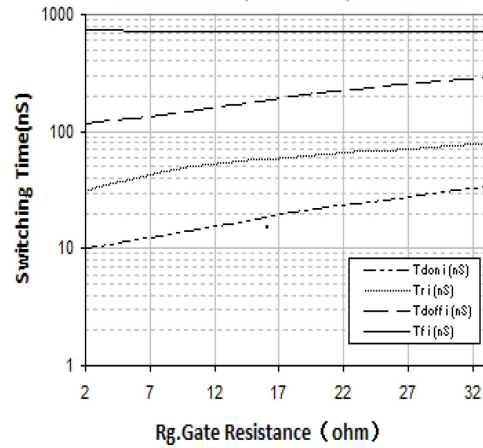
**Switching Time vs. Rg(25°C)**

VGE=15V, VCE=600V, IC=15A



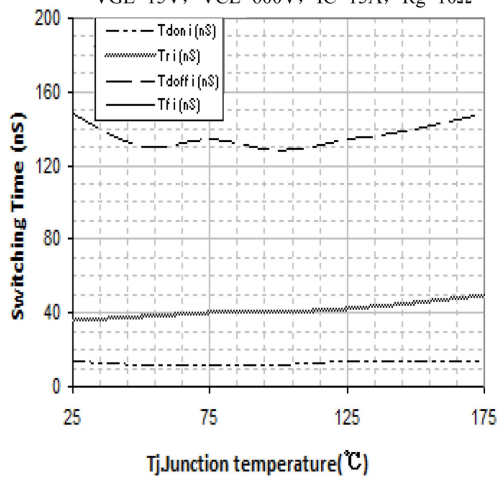
**Switching Time vs. Rg(175°C)**

VGE=15V, VCE=600V, IC=15A



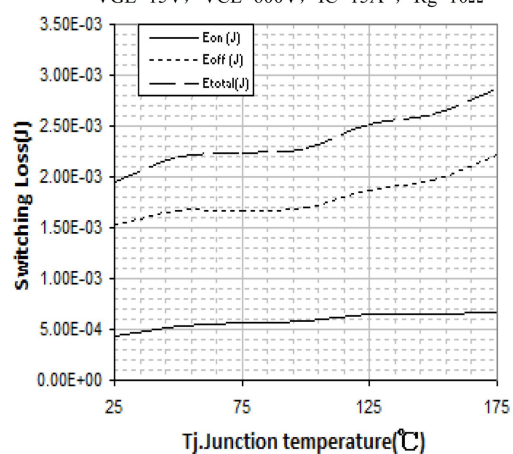
**Switching Time vs. Tj**

VGE=15V, VCE=600V, IC=15A, Rg=10Ω



**Switching Loss vs. Tj**

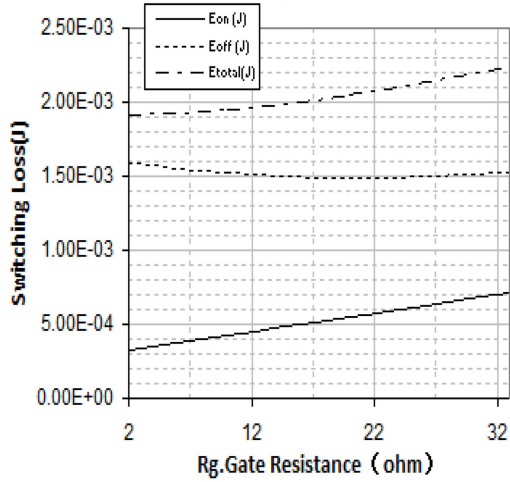
VGE=15V, VCE=600V, IC=15A, Rg=10Ω





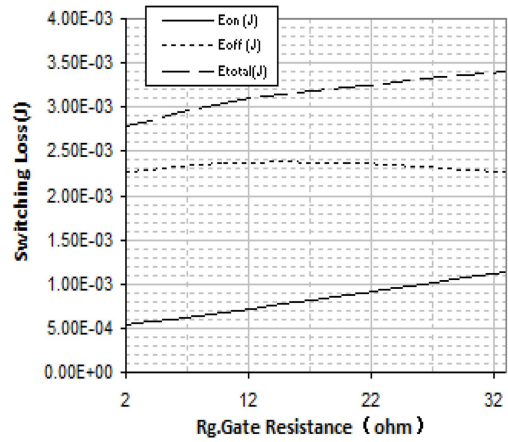
**Switching Loss vs. Rg(25°C)**

VGE=15V, VCE=600V, IC:15A



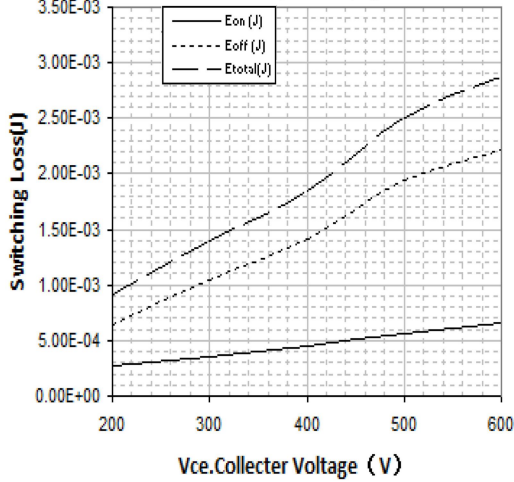
**Switching Loss vs. Rg(175°C)**

VGE=15V, VCE=600V, IC:15A



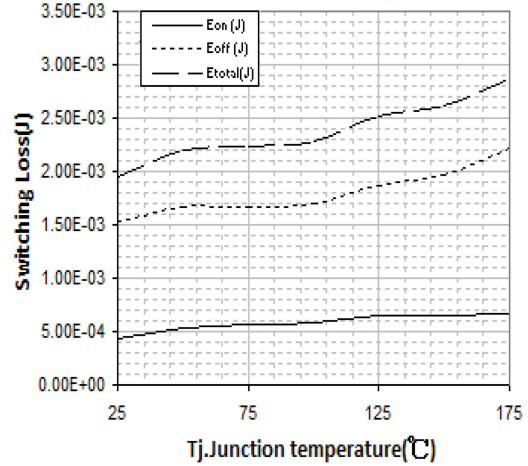
**Switching Loss vs. VCE(175°C)**

VGE=15V, IC:15A, Rg=10Ω



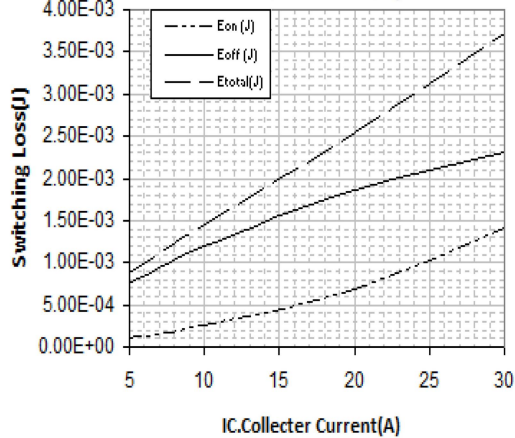
**Switching Loss vs. Tj**

VGE=15V, VCE=600V, Rg=10Ω



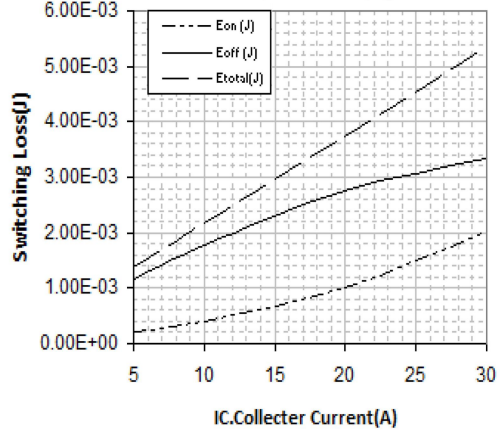
**Switching Loss vs. IC(25°C)**

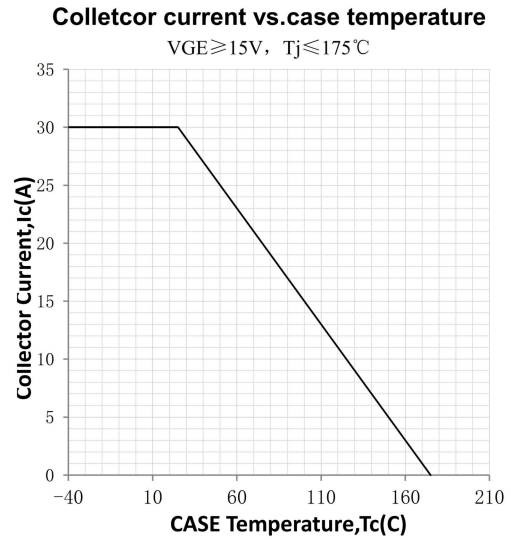
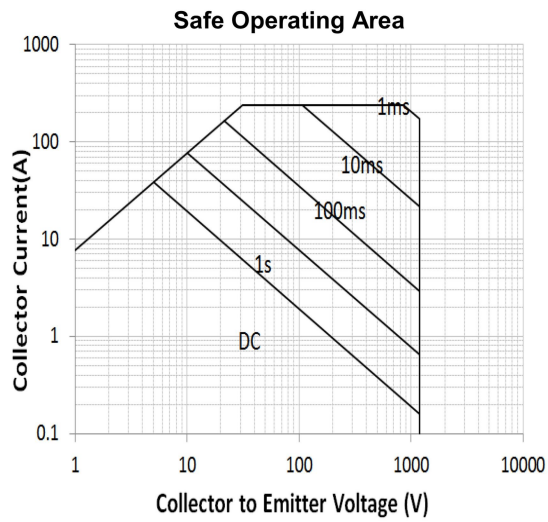
VGE=15V, VCE=600V, Rg=10Ω



**Switching Loss vs. IC(175°C)**

VGE=15V, VCE=600V, Rg=10Ω





### Package Mechanical DATA

