

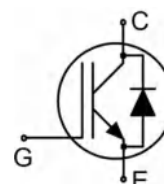
Features

- Low gate charge
- Trench FS Technology
- RoHS product



Applications

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



Absolute Ratings (T_C=25°C)

Parameter	Symbol	Value	Unit
Collector-Emmitter Voltage	V _{CES}	1200	V
*Collector Current-continuous	I _C T=25°C T=100°C	30	A
		15	A
Collector Current-pulse(note 1)	I _{CM}	45	A
Diode Continuous forward current	I _F T=25°C T=100°C	30	A
		15	
Diode Maximum Forward Current (Note 1)	I _{FM}	45	A
Gate-Emmitter Voltage	V _{GES}	±20	V
Power Dissipation(TO-247)	P _D T _C =25°C	238	W
Operating Temperature Range	T _J	-40~+175	°C
Storage Temperature Range	T _{STG}	-55~+150	°C
Maximum Lead Temperature for Soldering Purposes	T _L	300	°C

*Collector current limited by maximum Junction temperature

Electrical Characteristic(T_C=25°C unless otherwise noted)

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

Gate-body leakage current,reverse	I _{GESR}	V _{CE} =0V,V _{GE} =±20V	-	-	±150	nA
On-Characteristics						
Gate-Emmitter Threshold Voltage	V _{GE(th)}	V _{CE} =V _{GE} , I _c =250uA	4.5	-	6.5	V
Collector-Emmitter saturation Voltage	V _{CESAT}	V _{GE} =15V,I _c =15A, T _C =25°C	-	1.6	2.1	V
		T _C =125°C	-	1.9	-	V
		T _C =150°C	-	2.1	-	V
Dynamic Characteristics						
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	-	
Switching Characteristics						
Turn-On delay time	t _{d(on)}	V _{CE} =600V,I _c =15A, R _G =10Ω,Inductive load T _c =25°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
Anti-Paraller Diode Characteristics and Maximum Ratings						
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	-	283	-	ns
Reverse recovery charge	Q _{rr}	dl _F /dt=450A/us ⁴	-	1180	-	nC

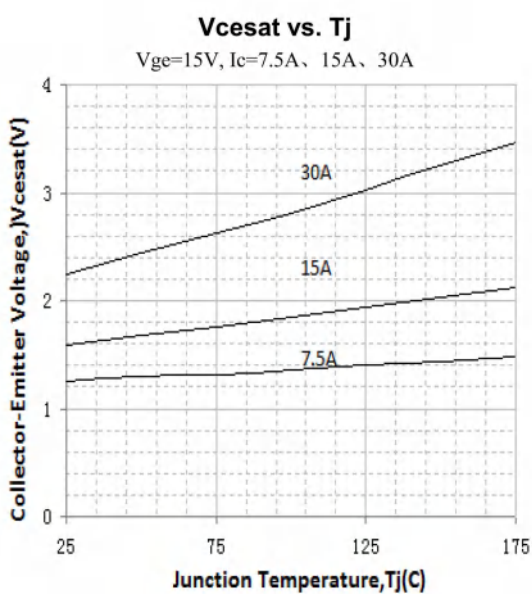
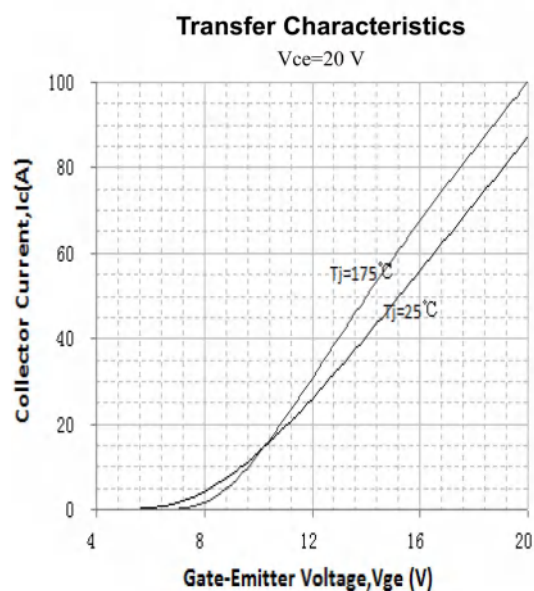
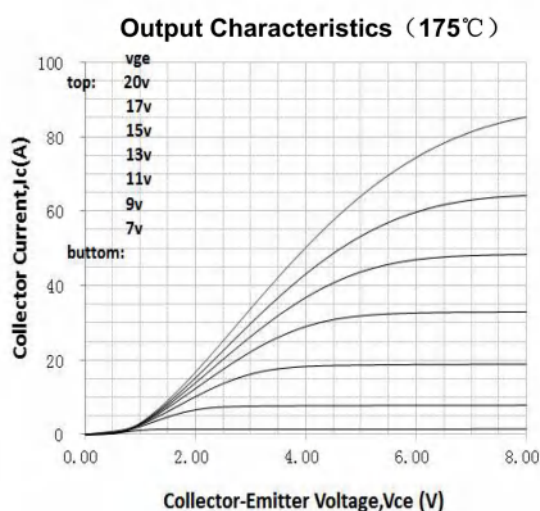
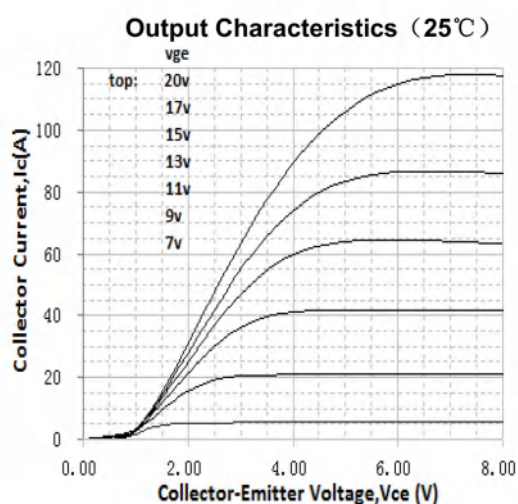
Thermal Characteristics

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:

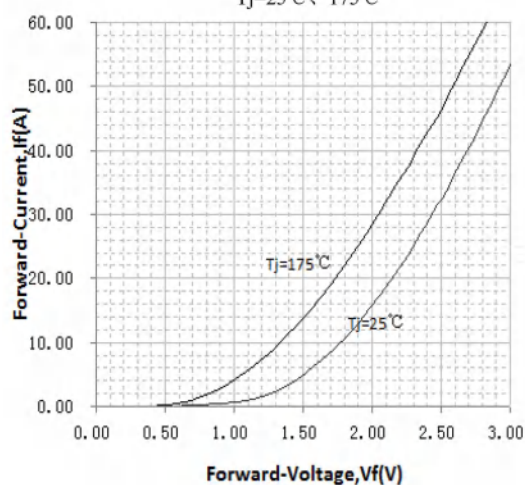
- 1: Pulse width limited by maximum junction temperature
- 2: Allowed number of short circuits: <1000; time between short circuits: >1s.
- 3: Pulse Test: Pulse Width $\leq 300\mu\text{s}$, Duty Cycle $\leq 2\%$
- 4: Essentially independent of operating temperature

Electrical Characteristics (curves)



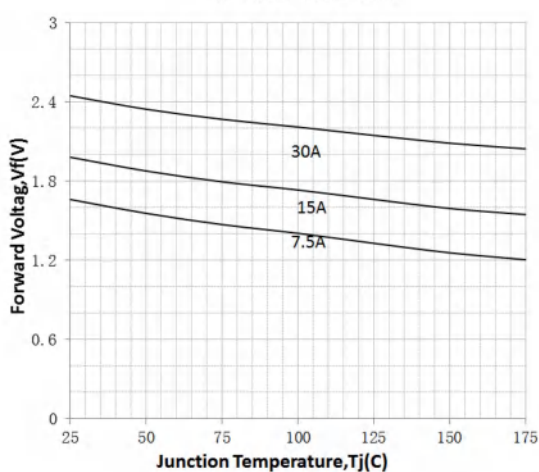
Diode Characteristic

$T_j=25^{\circ}\text{C}$ 、 175°C



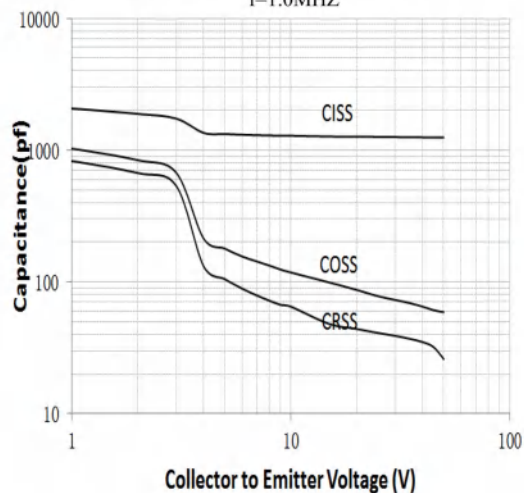
V_f vs. T_j

$I_c=7.5\text{A}$ 、 15A 、 30A



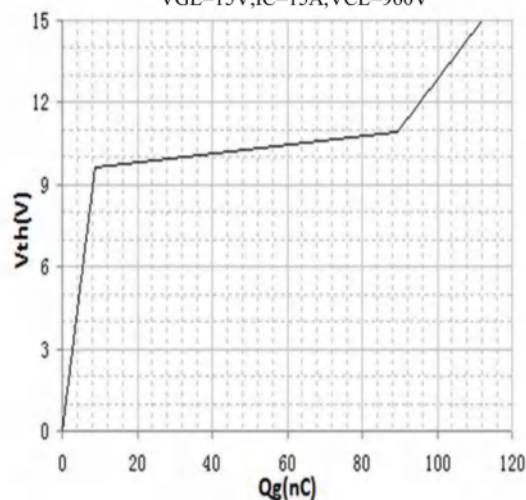
Capacitance Characteristic

$f=1.0\text{MHz}$



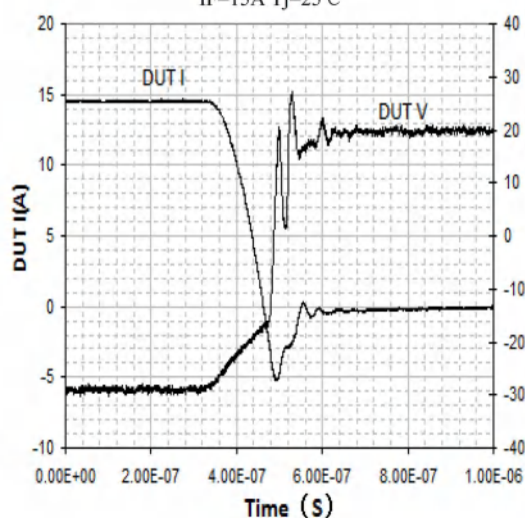
Gate Charge Characteristics

$V_{GE}=15\text{V}$ 、 $I_C=15\text{A}$ 、 $V_{CE}=960\text{V}$



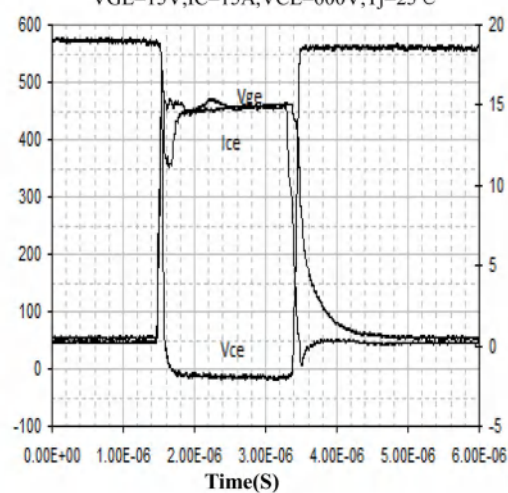
Diode Peak Reverse Recovery Current

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



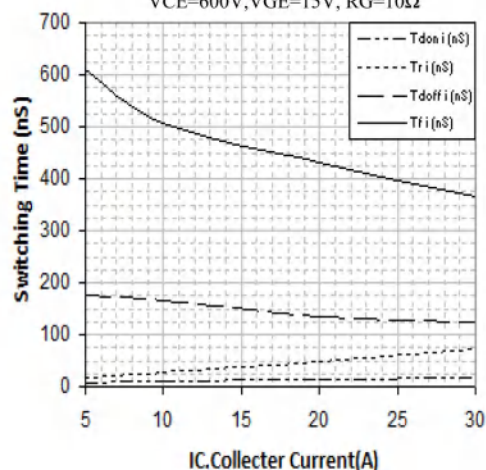
IGBT Switch

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



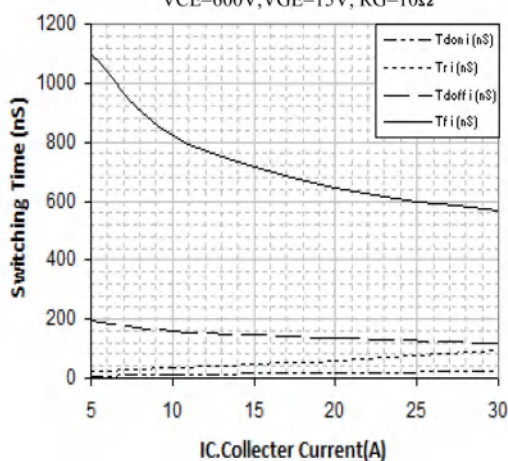
Switching Time vs. IC(25°C)

VCE=600V, VGE=15V, RG=10Ω



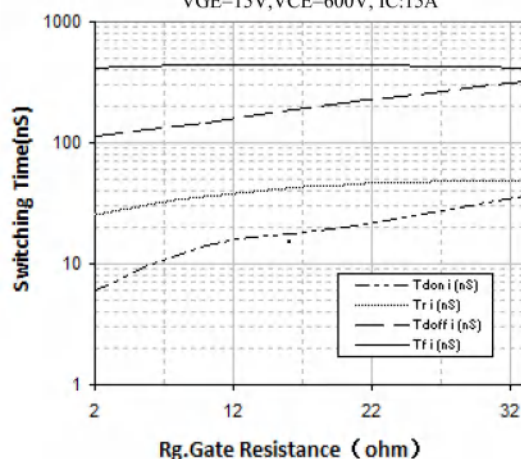
Switching Time vs. IC(175°C)

VCE=600V, VGE=15V, RG=10Ω



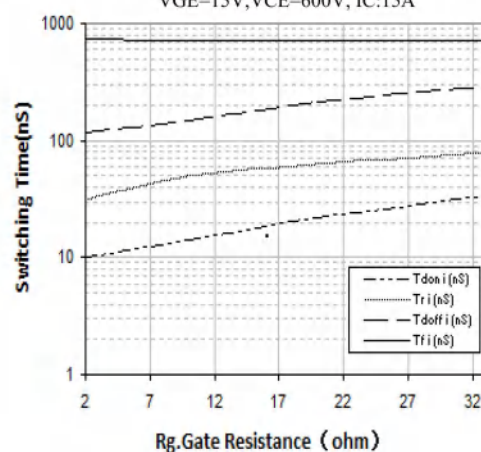
Switching Time vs. Rg(25°C)

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



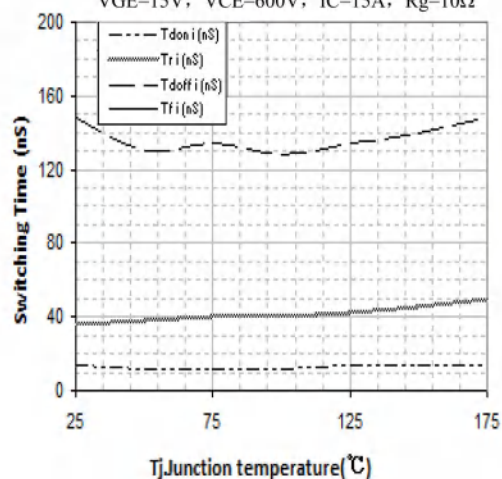
Switching Time vs. Rg(175°C)

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



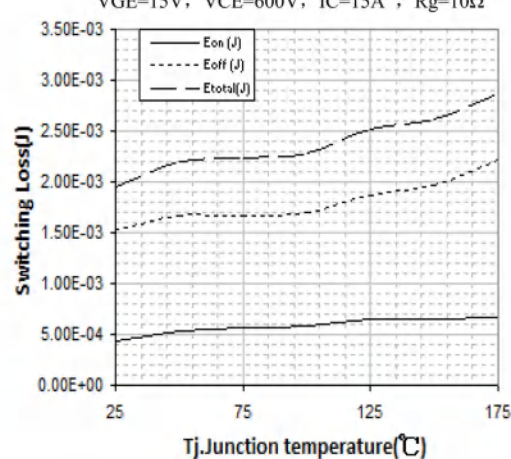
Switching Time vs. Tj

VGE=15V, VCE=600V, IC=15A, Rg=10Ω



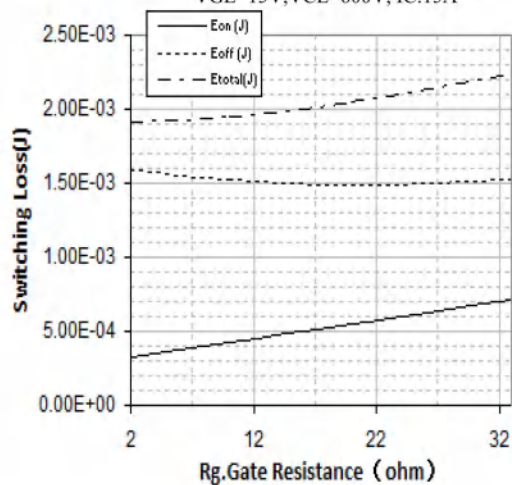
Switching Loss vs. Tj

VGE=15V, VCE=600V, IC=15A, Rg=10Ω



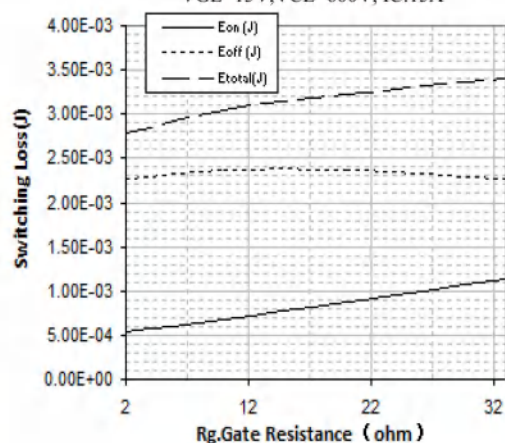
Switching Loss vs. $R_g(25^\circ\text{C})$

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



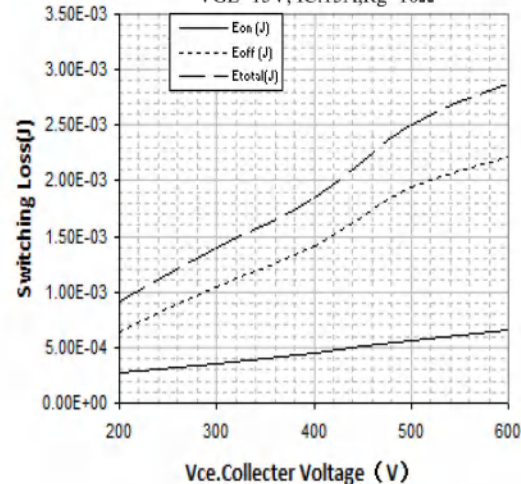
Switching Loss vs. $R_g(175^\circ\text{C})$

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



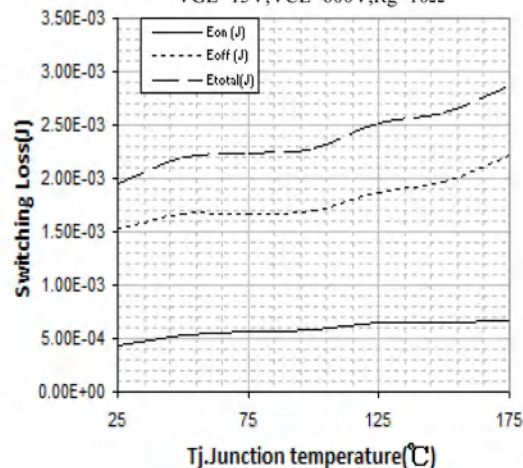
Switching Loss vs. VCE(175°C)

VGE=15V, IC:15A, Rg=10Ω



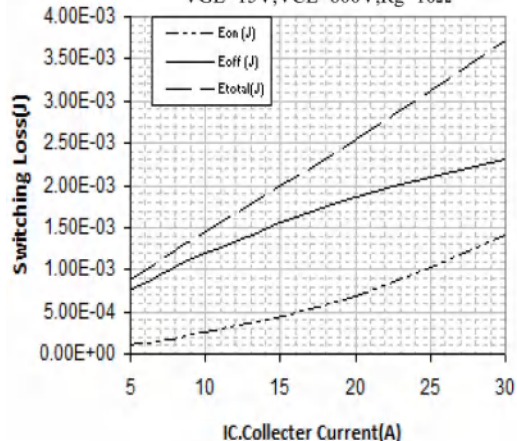
Switching Loss vs. Tj

VGE=15V, VCE=600V, Rg=10Ω



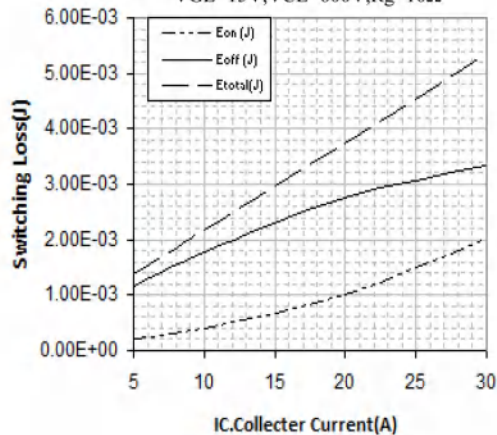
Switching Loss vs. IC(25°C)

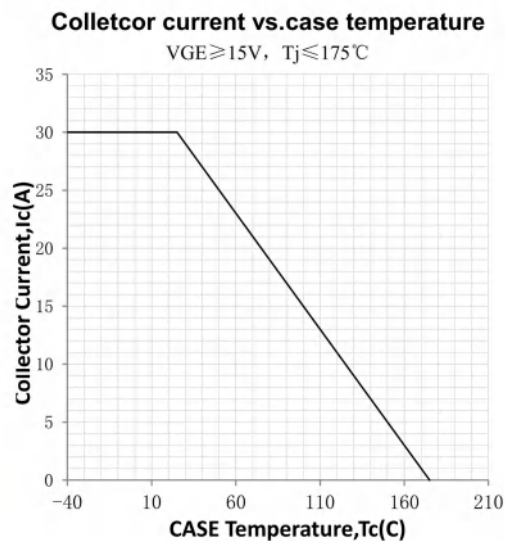
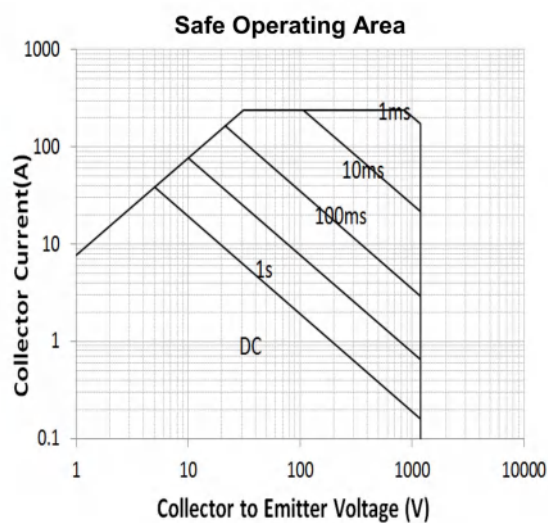
VGE=15V, VCE=600V, Rg=10Ω



Switching Loss vs. IC(175°C)

VGE=15V, VCE=600V, Rg=10Ω





Package Mechanical DATA

