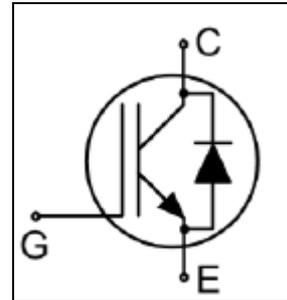
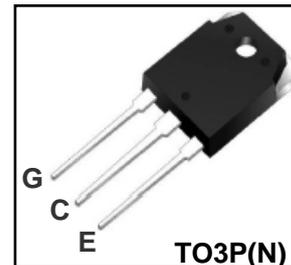


**Low Loss IGBT**
**Features**

- 15A, 1200V,  $V_{CE(sat)}$ (Typ.=2.4V)@ $I_C=15A$  &  $T_C=25^\circ C$
- low Gate charge(Typ.= 85nC)
- NPT Technology, Positive temperature coefficient
- Low EMI
- Pb-free lead plating; RoHS compliant


**Applications**

- ◆ General purpose inverter
- ◆ Frequency converters
- ◆ Induction Heating(IH)
- ◆ Uninterrupted Power Supply(UPS)


**Absolute Maximum Ratings( $T_C=25^\circ C$ )**

Symbol	Parameter		Value	Unit
$V_{CES}$	Collector-Emitter Voltage		1200	V
$I_C$	DC Collector Current	$T_C=25^\circ C$	30	A
		$T_C=100^\circ C$	15	A
$I_{CP}$	Collector pulse Current	$T_p$ limited by $T_J$	45	A
$V_{GES}$	Gate-Emitter Voltage		$\pm 20$	V
$t_{SC}$	Short circuit withstand time	$V_{GE}=10V, V_{CE} \leq 1200V, T_J \leq 150^\circ C$	10	$\mu s$
	Turn-off safe area	$V_{CE} \leq 1200V, T_J \leq 150^\circ C$	45	A
$P_D$	Total Dissipation		150	W
$T_J$	Operation Junction Temperature		-40 ~ 150	$^\circ C$
$T_{STG}$	Storage Temperature		-50 ~ 150	$^\circ C$
$T_L$	Maximum Lead Temperature for Soldering Purposes		300	$^\circ C$

**Thermal Characteristics**

Symbol	Parameter	Value			Unit
		Min	Typ	Max	
$R_{QJC}$	Thermal Resistance , Junction -to -Case	-	-	0.6	$^\circ C/W$
$R_{QJA}$	Thermal Resistance , Junction-to -Ambient	-	-	40	$^\circ C/W$

## Electrical Characteristics(Tc=25 °C)

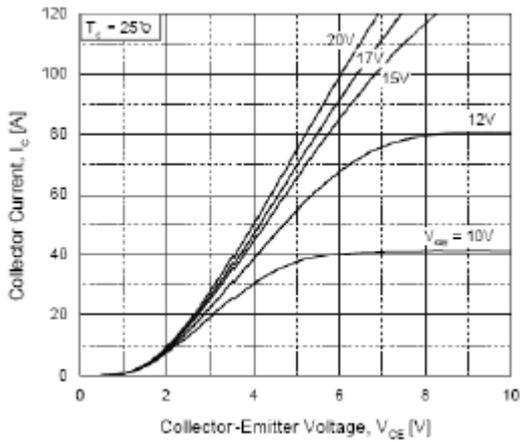
Characteristics	Symbol	Test Condition	Min	Typ	Max	Unit	
Gate-body leakage current	I <sub>GES</sub>	V <sub>GS</sub> =±30V,V <sub>CE</sub> =0V	-	-	±100	nA	
Collector-Emitter Breakdown Voltage	V <sub>(BR)CES</sub>	I <sub>C</sub> =0.5mA,V <sub>GE</sub> =0V	1200	-	-	V	
Collector-Emitter Saturation Voltage	V <sub>CE(sat)</sub>	I <sub>C</sub> =15A, V <sub>GE</sub> =15V		2.4	3.5	V	
			Tc=125 °C		2.8		-
			Tc=150 °C		3.0		-
Zero Gate Voltage Collector current	I <sub>CES</sub>	V <sub>CE</sub> =1200V, V <sub>GE</sub> =0V		-	0.2	mA	
			Tc=100 °C	-	-		2.0
			Tc=150 °C	-	-		2.5
Gate threshold voltage	V <sub>GE(th)</sub>	V <sub>CE</sub> =V <sub>GE</sub> ,I <sub>D</sub> =0.6mA	4.5	-	6.5	V	
Forward Transconductance	g <sub>fs</sub>	V <sub>CE</sub> =20V,I <sub>D</sub> =15A	-	10	-	S	
Short Collector Current	I <sub>C(SC)</sub>	V <sub>GE</sub> =15V, V <sub>CE</sub> =600, t <sub>sc</sub> <10µs	-	90	-	A	
Total Gate Charge	Q <sub>g</sub>	V <sub>CE</sub> =960V, I <sub>C</sub> =15A, V <sub>GE</sub> =15V	-	85	-	nC	
Input capacitance	C <sub>iss</sub>	V <sub>CE</sub> =25V, V <sub>GS</sub> =0V, f=1MHz	-	1700	2600	pF	
Reverse transfer capacitance	C <sub>rss</sub>		-	128	200		
Output capacitance	C <sub>oss</sub>		-	880	140		
Switching time	Turn-on delay time	T <sub>d(on)</sub>	V <sub>CE</sub> =600V, I <sub>C</sub> =15A R <sub>G</sub> =56Ω	-	25	-	ns
	Turn-on Rise time	t <sub>r</sub>		-	60	-	
	Turn-off delay time	T <sub>d(off)</sub>		-	20	-	
	Turn-off Fall time	t <sub>f</sub>		-	95	-	
Turn-on energy	E <sub>on</sub>	V <sub>CE</sub> =600V, I <sub>C</sub> =15A R <sub>G</sub> =56Ω	-	58	-	mJ	
Turn-off energy	E <sub>off</sub>		-	32	-		
Total switching energy	E <sub>total</sub>		-	26	-		

## Anti-Parallel Diode Characteristics (Ta=25 °C)

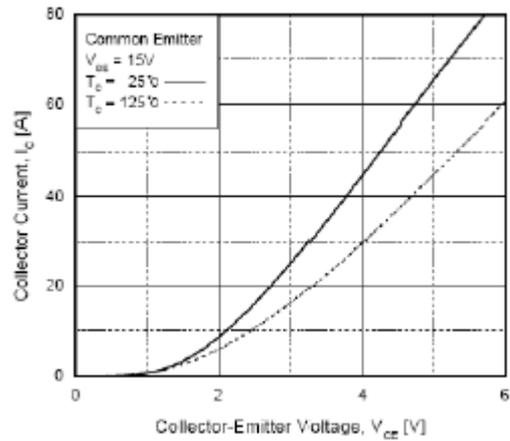
Characteristics	Symbol	Test Condition	Min	Type	Max	Unit
Forward voltage(diode)	V <sub>DSF</sub>	I <sub>S</sub> =15A,V <sub>GS</sub> =0V	-	-	-2.7	V
Reverse recovery time	t <sub>rr</sub>	I <sub>S</sub> =10A,V <sub>GS</sub> =0V, R=800V dI <sub>DR</sub> / dt =750 A / µs	-	150	-	ns
Reverse recovery charge	Q <sub>rr</sub>		-	1.2	-	µC

- Note 1.Repeativity rating :pulse width limited by junction temperature  
 2.Allowed number of short circuits:<1000; time  
 3.Pulse Test:Pulse Width≤300us,Duty Cycle≤2%  
 4. Essentially independent of operating temperature.

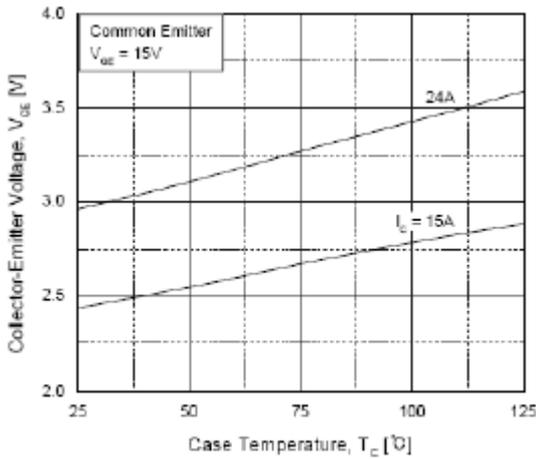
This transistor is an electrostatic sensitive device  
 Please handle with caution



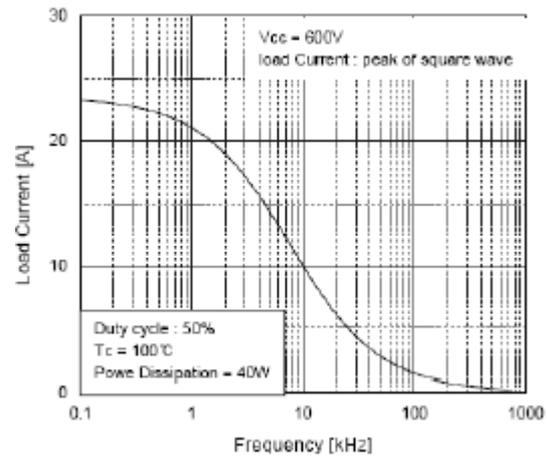
**Fig.1 Out Characteristics**



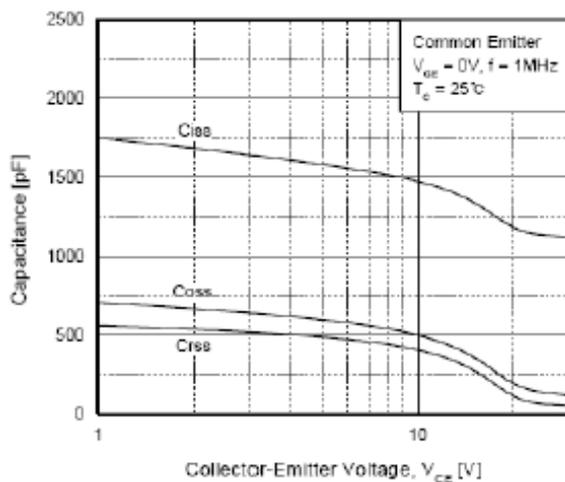
**Fig.2 Saturation Voltage Characteristics**



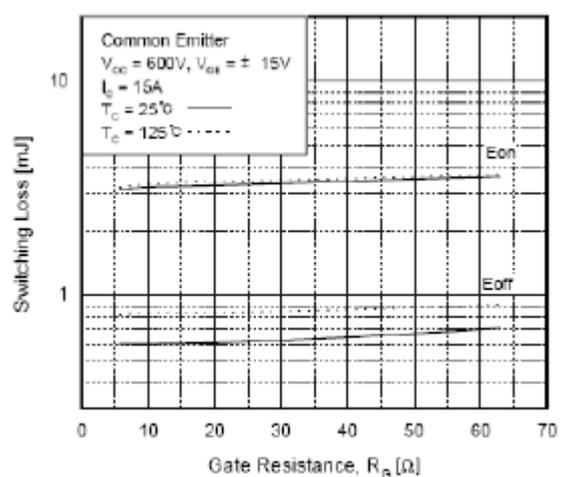
**Fig.3 Saturation Voltage vs Case Temperature**



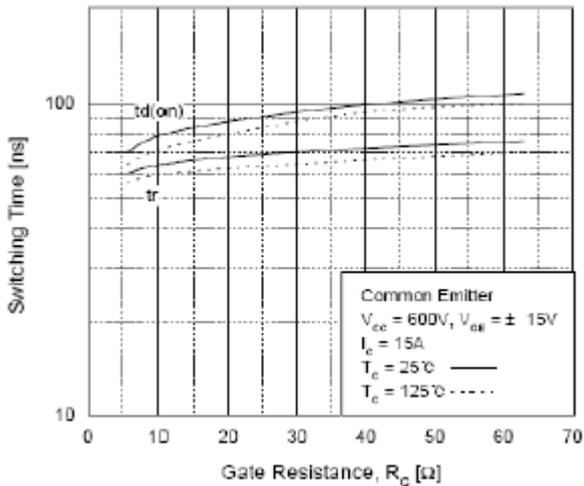
**Fig.4 Load Current vs Frequency**



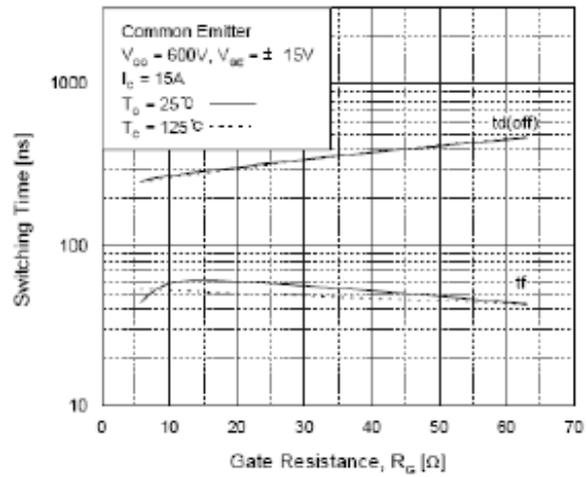
**Fig.5 Capacitance Characteristics**



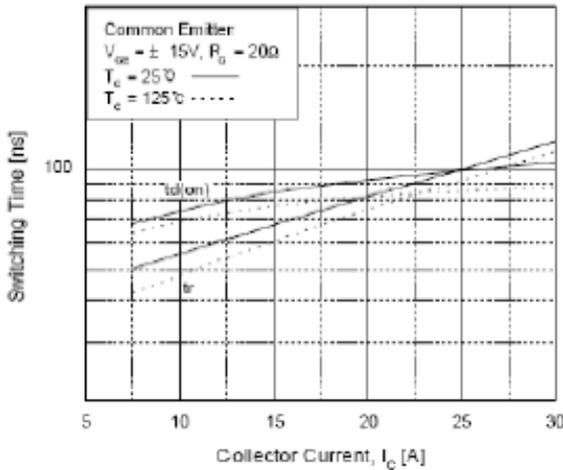
**Fig.6 Switching Loss vs Gate Resistance**



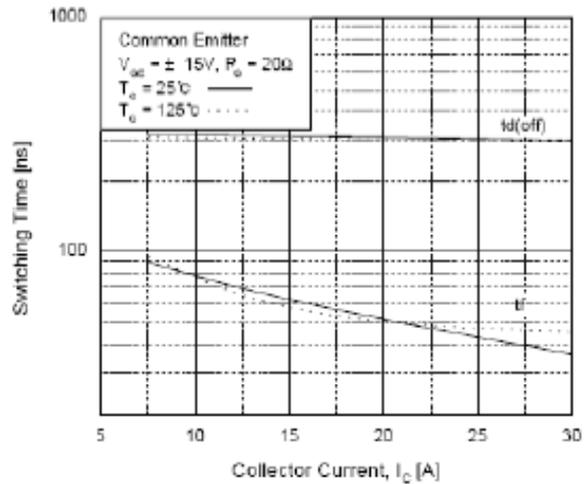
**Fig.7 Turn-on Characteristics vs Gate Resistance**



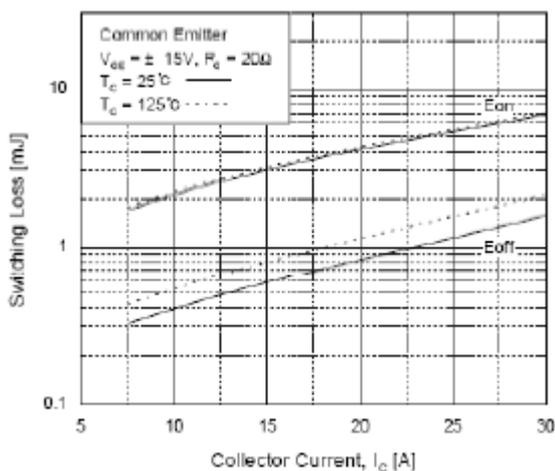
**Fig.8 Turn-off Characteristics vs Gate Resistance**



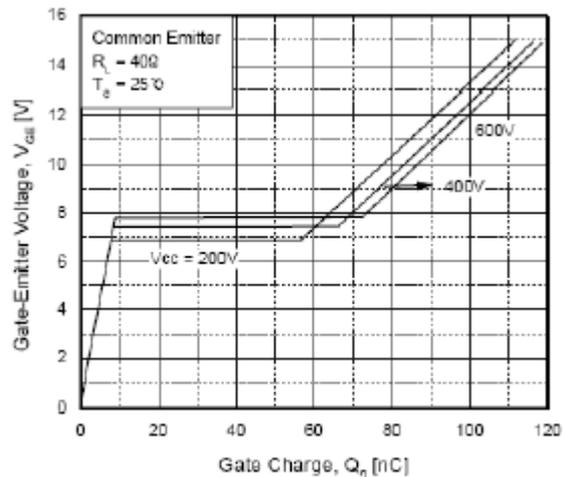
**Fig.9 Turn-on Characteristics vs Collector Current**



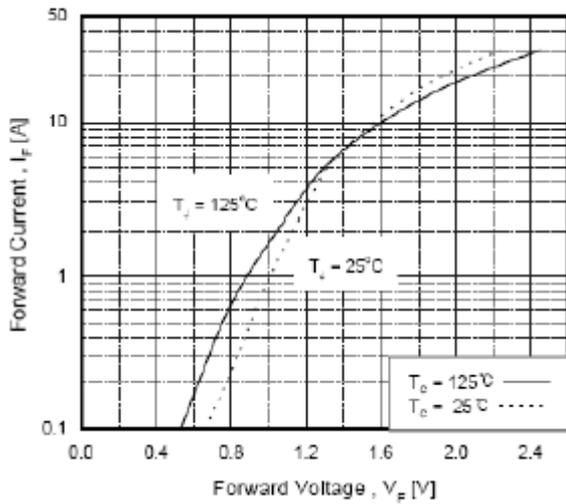
**Fig.10 Fig.9 Turn-off Characteristics vs Collector Current**



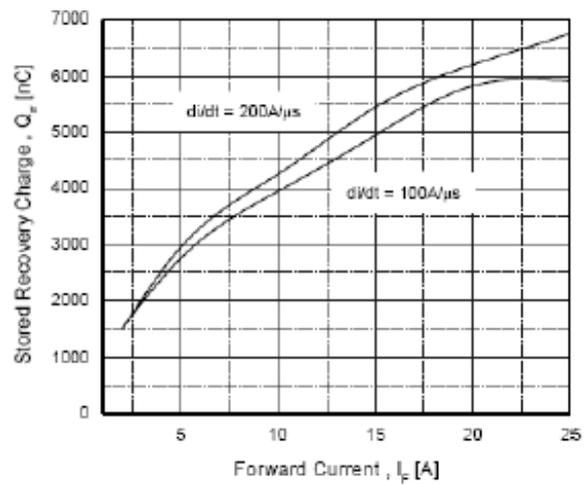
**Fig.11 Switching Loss vs Collector Current**



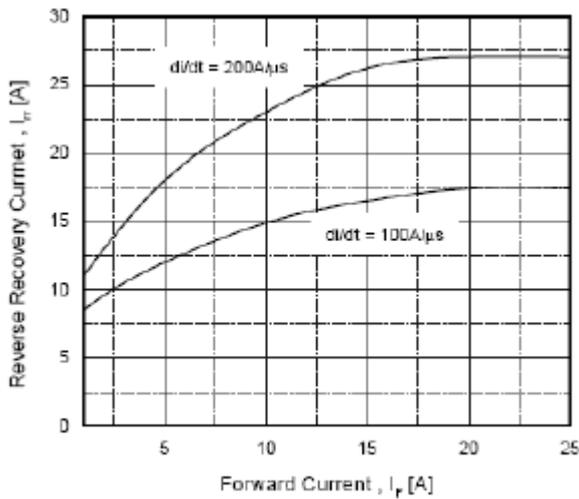
**Fig.12 Out Gate Charge Characteristics**



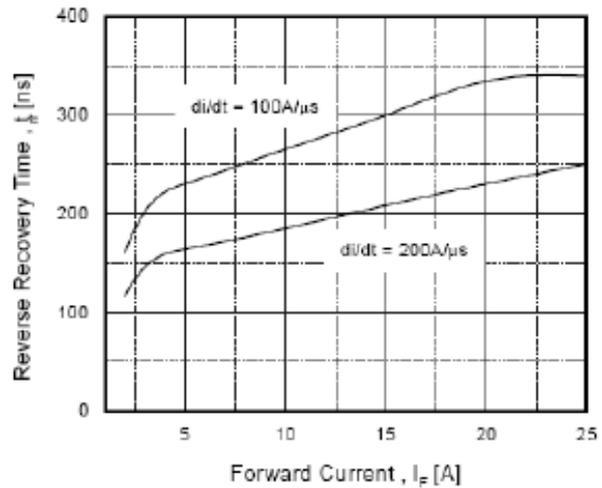
**Fig.13 Forward Characteristics**



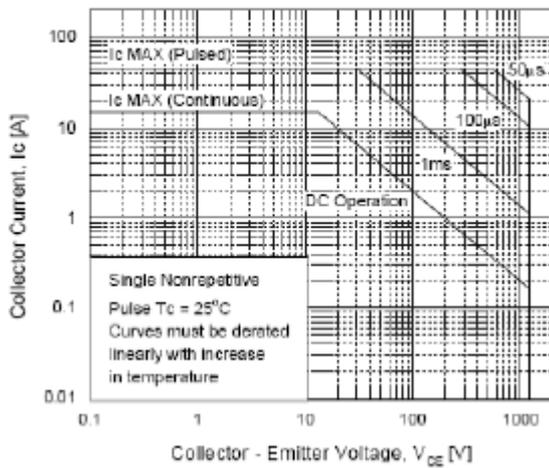
**Fig.13 Stored Characteristics**



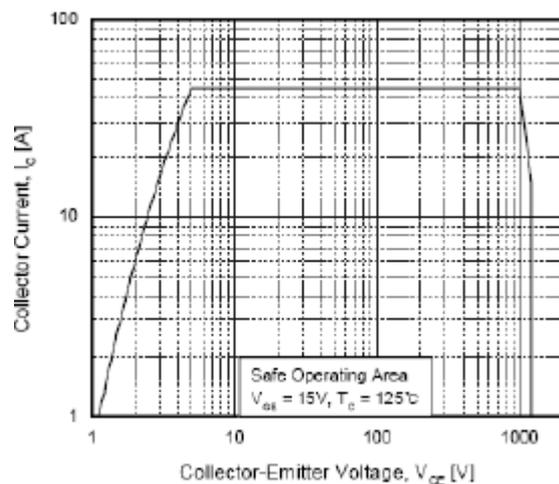
**Fig.15 Reverse Recovery Current Characteristics**



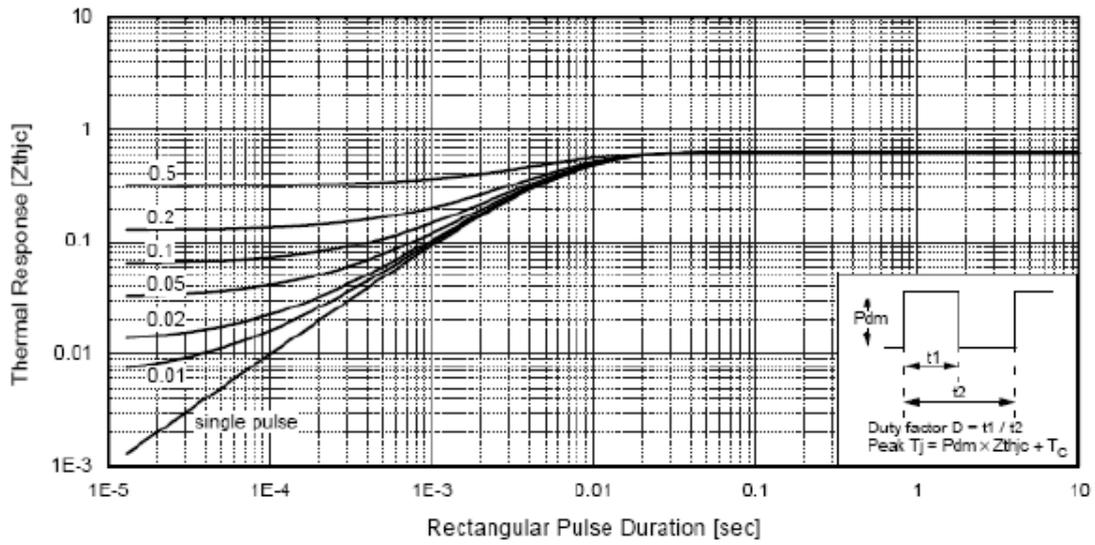
**Fig.16 Reverse Recovery Time Characteristics**



**Fig.17 Maximum Safe Operation Area**



**Fig.18 Turn-off Safe Operation Area**



**Fig.17 Maximum Safe Operation Area**

**TO-3PN Package Dimension**

