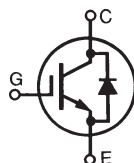


# High Voltage, High Gain BiMOSFET™

## IXBK55N300 IXBX55N300

### Monolithic Bipolar MOS Transistor



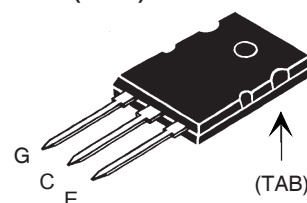
$$V_{CES} = 3000V$$

$$I_{C110} = 55A$$

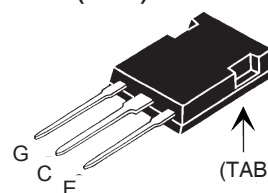
$$V_{CE(sat)} \leq 3.2V$$

Symbol	Test Conditions	Maximum Ratings	
$V_{CES}$	$T_J = 25^\circ C$ to $150^\circ C$	3000	V
$V_{CGR}$	$T_J = 25^\circ C$ to $150^\circ C$ , $R_{GE} = 1M\Omega$	3000	V
$V_{GES}$	Continuous	$\pm 25$	V
$V_{GEM}$	Transient	$\pm 35$	V
$I_{C25}$	$T_C = 25^\circ C$ ( Chip Capability )	130	A
$I_{LRMS}$	$T_C = 25^\circ C$ ( Lead RMS Limit )	120	A
$I_{C110}$	$T_C = 110^\circ C$	55	A
$I_{CM}$	$T_C = 25^\circ C$ , 1ms	430	A
<b>SSOA</b> <b>(RBSOA)</b>	$V_{GE} = 15V$ , $T_{VJ} = 125^\circ C$ , $R_G = 2\Omega$ Clamped Inductive Load	$I_{CM} = 110$ @ $0.8 \cdot V_{CES}$	A
<b><math>T_{SC}</math></b> <b>(SCSOA)</b>	$V_{GE} = 15V$ , $T_J = 125^\circ C$ , $R_G = 10\Omega$ , $V_{CE} = 1250V$ , Non-Repetitive	10	$\mu s$
$P_C$	$T_C = 25^\circ C$	625	W
$T_J$		-55 ... +150	$^\circ C$
$T_{JM}$		150	$^\circ C$
$T_{stg}$		-55 ... +150	$^\circ C$
$T_L$ $T_{SOLD}$	Maximum Lead Temperature for Soldering 1.6 mm (0.062 in.) from Case for 10	300 260	$^\circ C$ $^\circ C$
$M_d$ $F_C$	Mounting Torque (TO-264 ) Mounting Force (PLUS247 )	1.13/10 20..120/4.5..27	Nm/lb.in. N/lb.
<b>Weight</b>	TO-264 PLUS247	10 6	g g

TO-264 (IXBK)



PLUS247™ (IXBX)



G = Gate                      C = Collector  
E = Emitter                  TAB = Collector

#### Features

- High Blocking Voltage
- International Standard Packages
- Low Conduction Losses
- High Current Handling Capability
- MOS Gate Turn-On  
- Drive Simplicity

#### Applications

- Uninterruptible Power Supplies (UPS)
- Switched-Mode and Resonant-Mode Power Supplies
- Capacitor Discharge Circuits
- Laser Generators

#### Advantages

- Easy to Mount
- Space Savings
- High Power Density

Symbol	Test Conditions ( $T_J = 25^\circ C$ , Unless Otherwise Specified)	Characteristic Values		
		Min.	Typ.	Max.
$BV_{CES}$	$I_C = 1mA$ , $V_{GE} = 0V$	3000		V
$V_{GE(th)}$	$I_C = 4mA$ , $V_{CE} = V_{GE}$	3.0		5.0 V
$I_{CES}$	$V_{CE} = V_{CES}$ , $V_{GE} = 0V$ $T_J = 125^\circ C$			50 $\mu A$ 3 mA
$I_{GES}$	$V_{CE} = 0V$ , $V_{GE} = \pm 25V$			$\pm 200$ nA
$V_{CE(sat)}$	$I_C = 55A$ , $V_{GE} = 15V$ , Note 1 $T_J = 125^\circ C$	2.7 3.3	3.2	V V

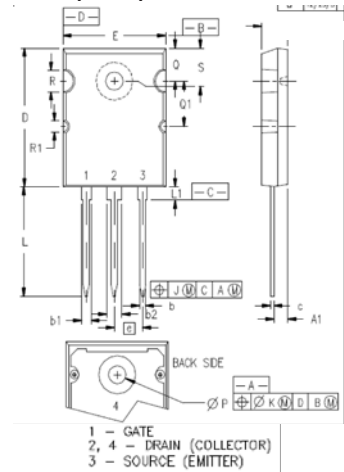
### Symbol Test Conditions

( $T_J = 25^\circ\text{C}$  Unless Otherwise Specified)

### Characteristic Values

		Min.	Typ.	Max.	
$g_{fs}$	$I_C = 55\text{A}, V_{CE} = 10\text{V}, \text{Note 1}$	32	50		S
$C_{ies}$	$V_{CE} = 25\text{V}, V_{GE} = 0\text{V}, f = 1\text{MHz}$		7300		pF
$C_{oes}$			275		pF
$C_{res}$			83		pF
$Q_g$	$I_C = 55\text{A}, V_{GE} = 15\text{V}, V_{CE} = 1000\text{V}$		335		nC
$Q_{ge}$			47		nC
$Q_{gc}$			130		nC
$t_{d(on)}$	<b>Resistive Switching Times, <math>T_J = 25^\circ\text{C}</math></b> $I_C = 110\text{A}, V_{GE} = 15\text{V}$ $V_{CE} = 1250\text{V}, R_G = 2\Omega$		54		ns
$t_r$			307		ns
$t_{d(off)}$			230		ns
$t_f$			268		ns
$t_{d(on)}$	<b>Resistive Switching Times, <math>T_J = 125^\circ\text{C}</math></b> $I_C = 110\text{A}, V_{GE} = 15\text{V}$ $V_{CE} = 1250\text{V}, R_G = 2\Omega$		52		ns
$t_r$			585		ns
$t_{d(off)}$			215		ns
$t_f$			260		ns
$R_{thJC}$				0.20	$^\circ\text{C/W}$
$R_{thCS}$			0.15		$^\circ\text{C/W}$

### TO-264 (IXBK) Outline



SYM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.185	.209	4.70	5.31
A1	.102	.118	2.59	3.00
b	.037	.055	0.94	1.40
b1	.087	.102	2.21	2.59
b2	.110	.126	2.79	3.20
c	.017	.029	0.43	0.74
D	1.007	1.047	25.58	26.59
E	.760	.799	19.30	20.29
e	.215BSC		5.46 BSC	
J	.000	.010	0.00	0.25
K	.000	.010	0.00	0.25
L	.779	.842	19.79	21.39
L1	.087	.102	2.21	2.59
ØP	.122	.138	3.10	3.51
Q	.240	.256	6.10	6.50
Q1	.330	.346	8.38	8.79
ØR	.155	.187	3.94	4.75
ØR1	.085	.093	2.16	2.36
S	.243	.253	6.17	6.43

### Reverse Diode

### Symbol Test Conditions

( $T_J = 25^\circ\text{C}$  Unless Otherwise Specified)

### Characteristic Values

		Min.	Typ.	Max	
$V_F$	$I_F = 55\text{A}, V_{GE} = 0\text{V}, \text{Note 1}$			2.5	V
$t_{rr}$	$I_F = 28\text{A}, V_{GE} = 0\text{V}, -di_F/dt = 100\text{A}/\mu\text{s}$		1.9		$\mu\text{s}$
$I_{RM}$		$V_R = 100\text{V}, V_{GE} = 0\text{V}$		54	

### Note

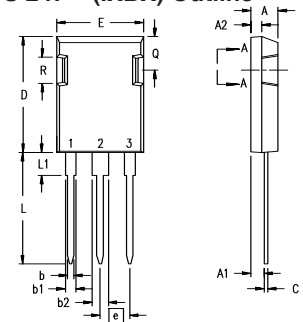
1: Pulse Test,  $t \leq 300\mu\text{s}$ , Duty Cycle,  $d \leq 2\%$ .

Additional provisions for lead-to-lead isolation are required at  $V_{CE} > 1200\text{V}$ .

### ADVANCE TECHNICAL INFORMATION

The product presented herein is under development. The Technical Specifications offered are derived from a subjective evaluation of the design, based upon prior knowledge and experience, and constitute a "considered reflection" of the anticipated result. IXYS reserves the right to change limits, test conditions, and dimensions without notice.

### PLUS 247™ (IXBX) Outline



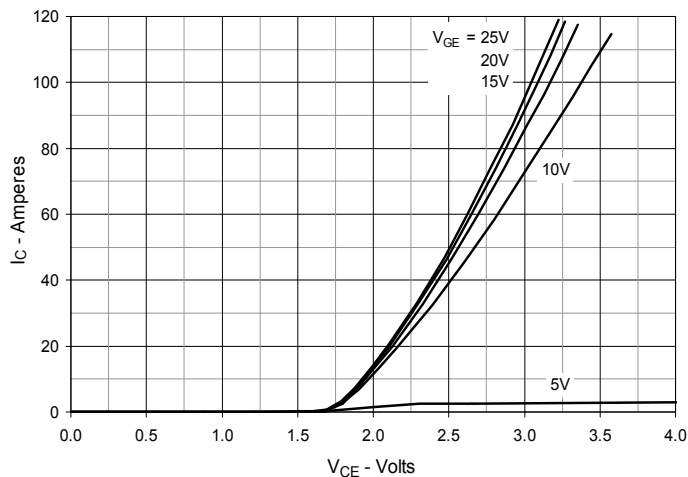
Terminals: 1 - Gate  
2 - Drain (Collector)  
3 - Source (Emitter)

Dim.	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	4.83	5.21	.190	.205
A <sub>1</sub>	2.29	2.54	.090	.100
A <sub>2</sub>	1.91	2.16	.075	.085
b	1.14	1.40	.045	.055
b <sub>1</sub>	1.91	2.13	.075	.084
b <sub>2</sub>	2.92	3.12	.115	.123
C	0.61	0.80	.024	.031
D	20.80	21.34	.819	.840
E	15.75	16.13	.620	.635
e	5.45 BSC		.215 BSC	
L	19.81	20.32	.780	.800
L1	3.81	4.32	.150	.170
Q	5.59	6.20	.220	0.244
R	4.32	4.83	.170	.190

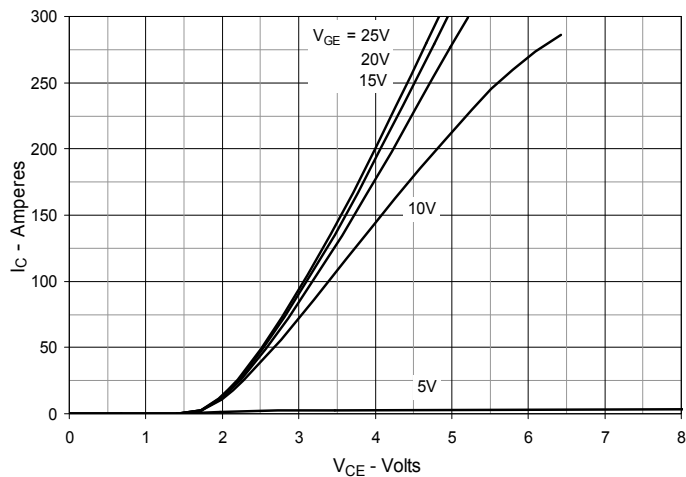
IXYS Reserves the Right to Change Limits, Test Conditions, and Dimensions.

IXYS MOSFETs and IGBTs are covered 4,835,592 4,931,844 5,049,961 5,237,481 6,162,665 6,404,065 B1 6,683,344 6,727,585 7,005,734 B2 7,157,338 B2  
by one or more of the following U.S. patents: 4,850,072 5,017,508 5,063,307 5,381,025 6,259,123 B1 6,534,343 6,710,405 B2 6,759,692 7,063,975 B2  
4,881,106 5,034,796 5,187,117 5,486,715 6,306,728 B1 6,583,505 6,710,463 6,771,478 B2 7,071,537

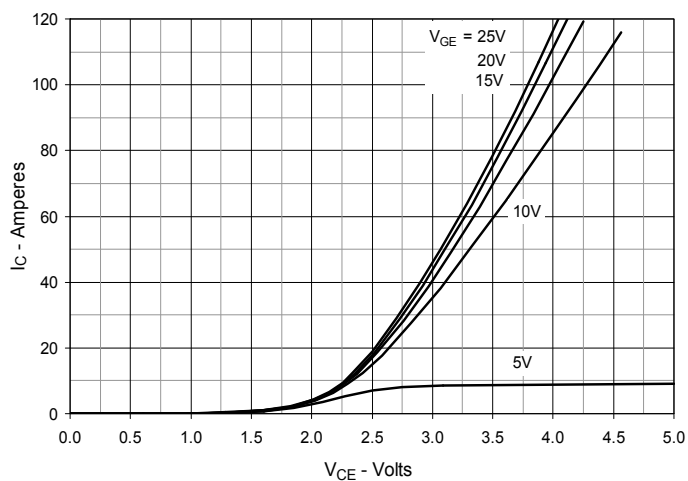
**Fig. 1. Output Characteristics @ 25°C**



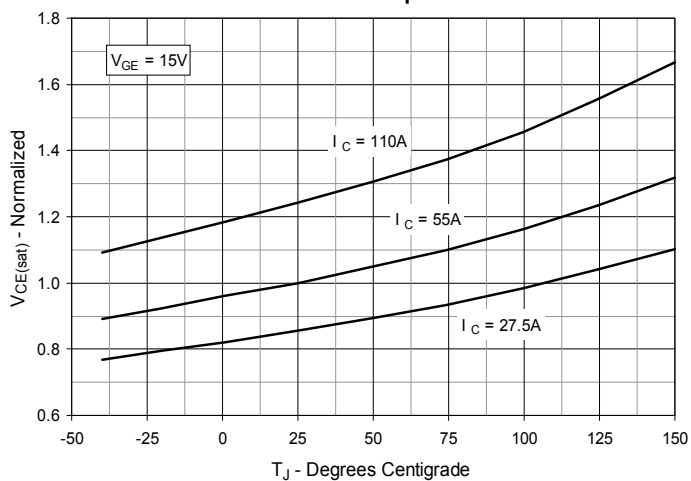
**Fig. 2. Extended Output Characteristics @ 25°C**



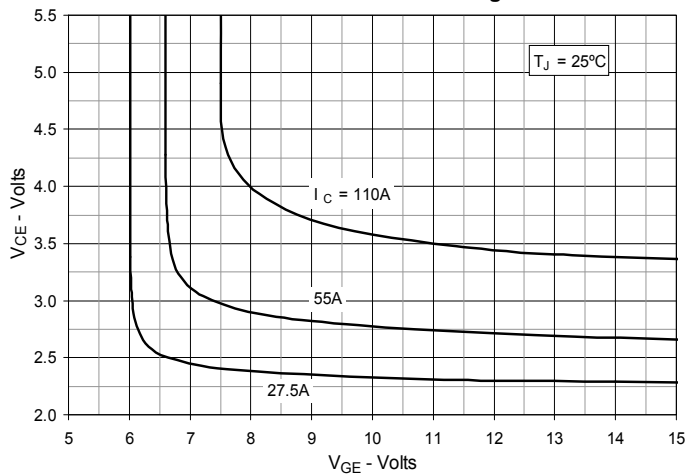
**Fig. 3. Output Characteristics @ 125°C**



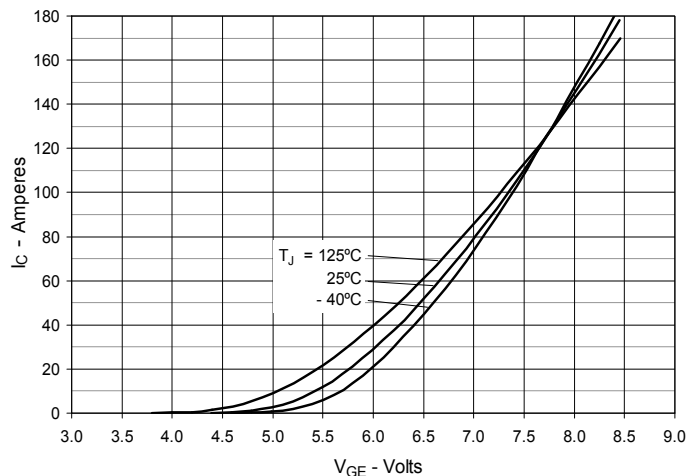
**Fig. 4. Dependence of  $V_{CE(sat)}$  on Junction Temperature**

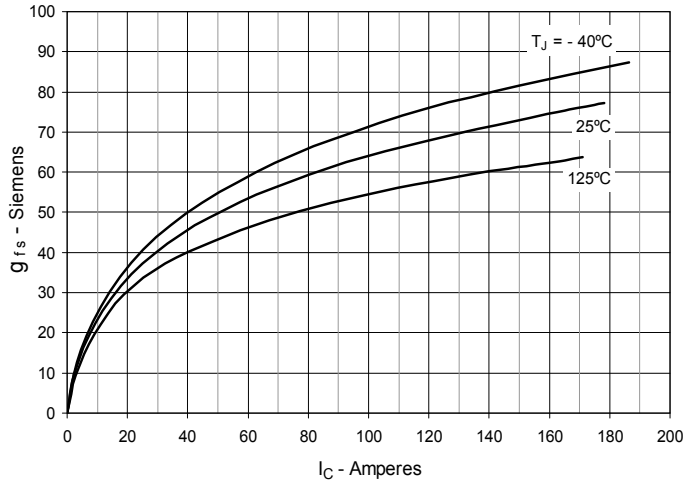
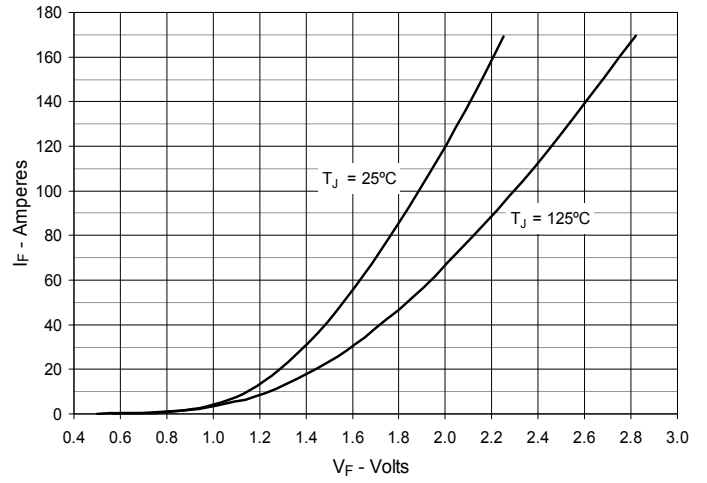
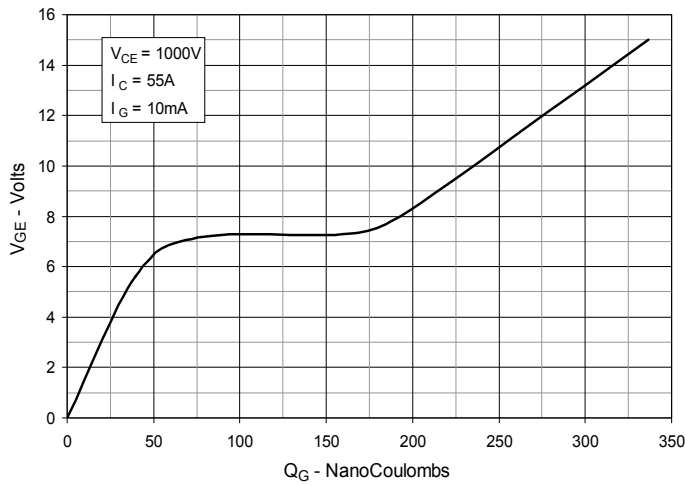
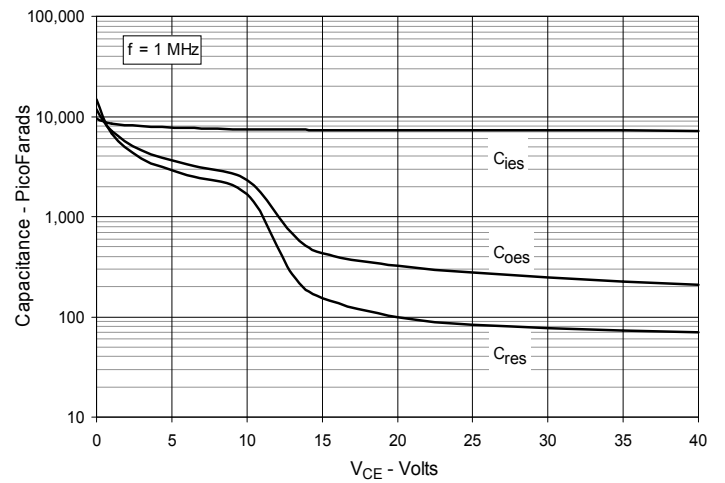
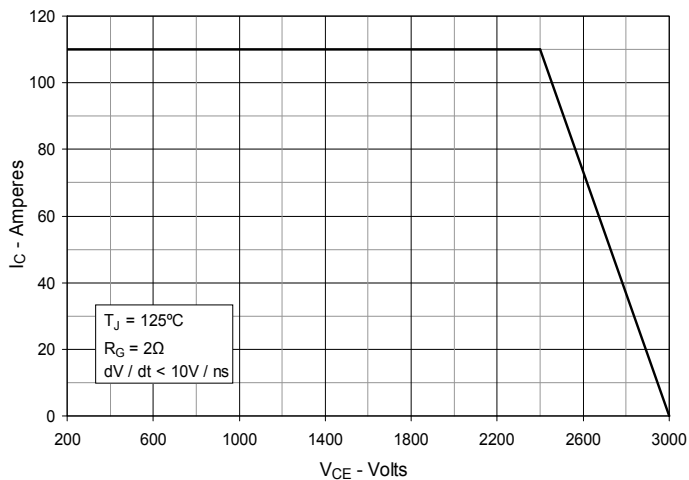
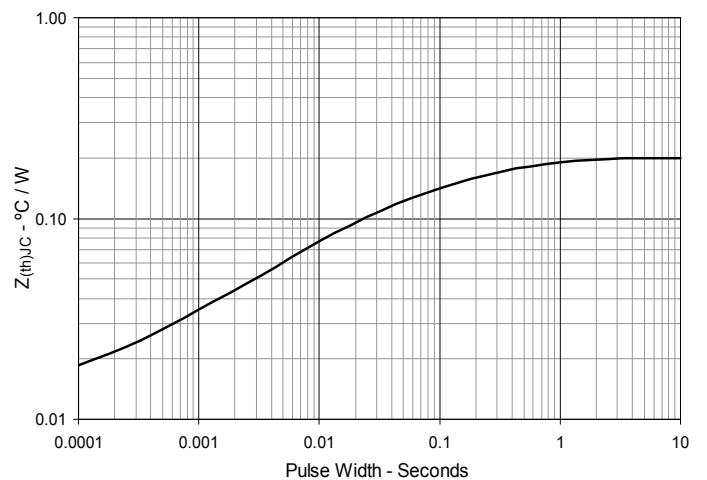


**Fig. 5. Collector-to-Emitter Voltage vs. Gate-to-Emitter Voltage**

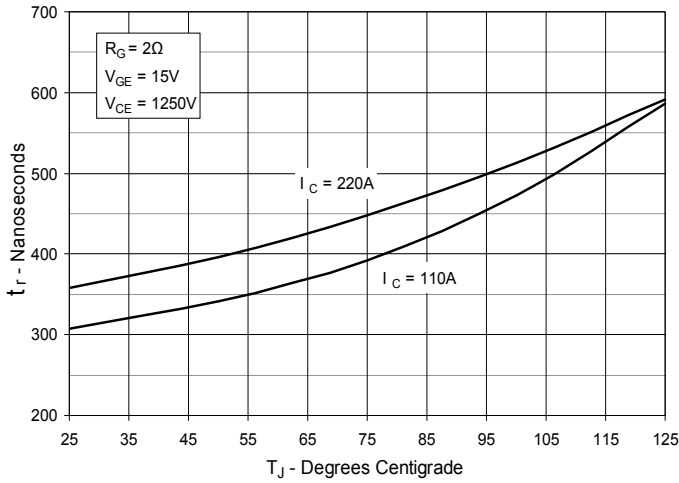


**Fig. 6. Input Admittance**

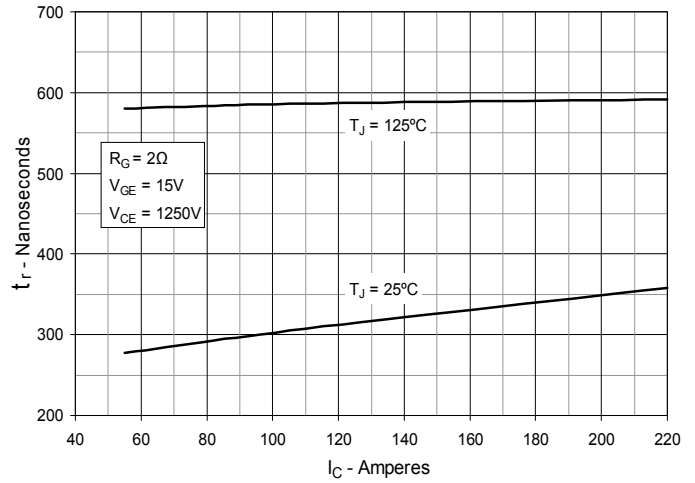


**Fig. 7. Transconductance**

**Fig. 8. Forward Voltage Drop of Intrinsic Diode**

**Fig. 9. Gate Charge**

**Fig. 10. Capacitance**

**Fig. 11. Reverse-Bias Safe Operating Area**

**Fig. 12. Maximum Transient Thermal Impedance**


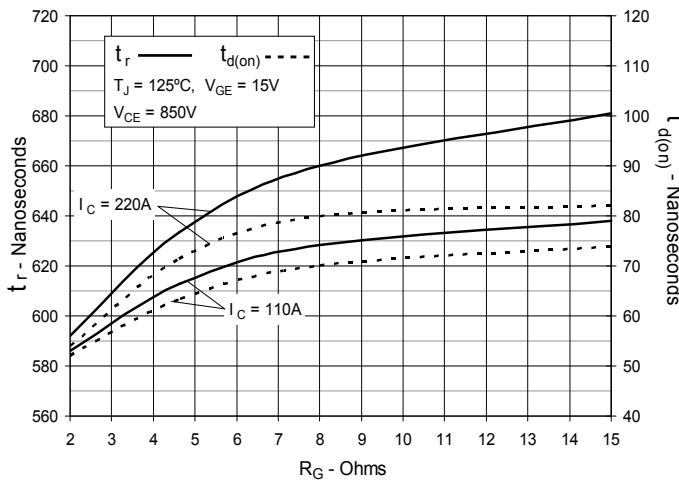
**Fig. 13. Resistive Turn-on  
Rise Time vs. Junction Temperature**



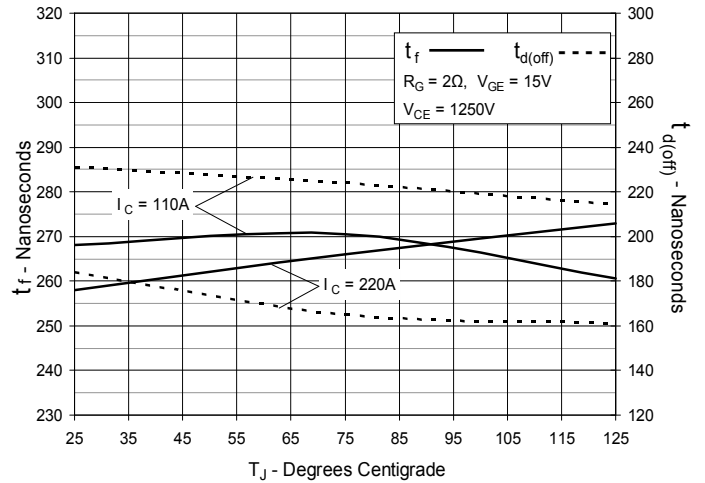
**Fig. 14. Resistive Turn-on  
Rise Time vs. Collector Current**



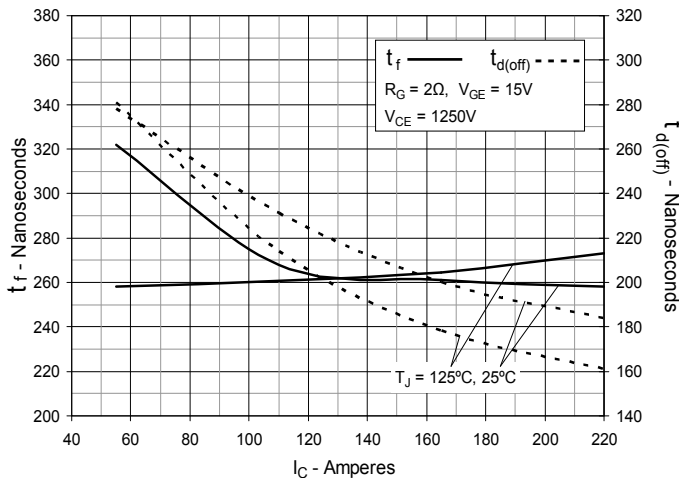
**Fig. 15. Resistive Turn-on  
Switching Times vs. Gate Resistance**



**Fig. 16. Resistive Turn-off  
Switching Times vs. Junction Temperature**



**Fig. 17. Resistive Turn-off  
Switching Times vs. Collector Current**



**Fig. 18. Resistive Turn-off  
Switching Times vs. Gate Resistance**

