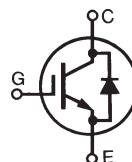


# High Voltage, High Gain BIMOSFET™

## IXBH2N250 IXBT2N250

### Monolithic Bipolar MOS Transistor



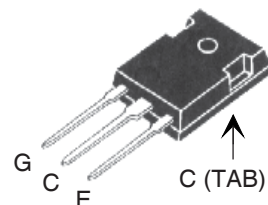
$$V_{CES} = 2500V$$

$$I_{C110} = 2A$$

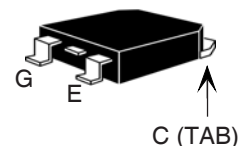
$$V_{CE(sat)} \leq 3.50V$$

Symbol	Test Conditions	Maximum Ratings	
$V_{CES}$	$T_C = 25^\circ C$ to $150^\circ C$	2500	V
$V_{CGR}$	$T_J = 25^\circ C$ to $150^\circ C$ , $R_{GE} = 1M\Omega$	2500	V
$V_{GES}$	Continuous	$\pm 20$	V
$V_{GEM}$	Transient	$\pm 30$	V
$I_{C25}$	$T_C = 25^\circ C$	5	A
$I_{C110}$	$T_C = 110^\circ C$	2	A
$I_{CM}$	$T_C = 25^\circ C$ , 1ms	13	A
<b>SSOA</b>	$V_{GE} = 15V$ , $T_{VJ} = 125^\circ C$ , $R_G = 47\Omega$	$I_{CM} = 6$	A
<b>(RBSOA)</b>	Clamped Inductive Load	$V_{CE} \leq 2000$	V
$P_C$	$T_C = 25^\circ C$	32	W
$T_J$		-55 ... +150	$^\circ C$
$T_{JM}$		150	$^\circ C$
$T_{stg}$		-55 ... +150	$^\circ C$
$T_L$	1.6mm (0.062 in.) from Case for 10s	300	$^\circ C$
$T_{SOLD}$	Plastic Body for 10 Seconds	260	$^\circ C$
$M_d$	Mounting Torque (TO-247)	1.13/10	Nm/lb.in.
<b>Weight</b>	TO-247	6	g
	TO-268	4	g

TO-247 (IXBH)



TO-268 (IXBT)



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

#### Features

- High Blocking Voltage
- Integrated Anti-parallel Diode
- International Standard Packages
- Low Conduction Losses

#### Advantages

- Low Gate Drive Requirement
- High Power Density

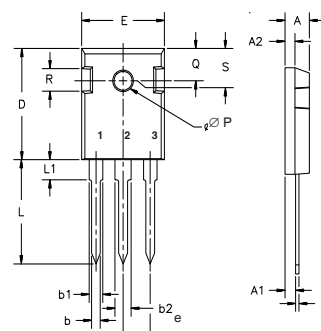
#### Applications

- Switched-Mode and Resonant-Mode Power Supplies
- Uninterruptible Power Supplies (UPS)
- Laser Generator
- Capacitor Discharge Circuit
- AC Switches

Symbol	Test Conditions ( $T_J = 25^\circ C$ , Unless Otherwise Specified)	Characteristic Values		
		Min.	Typ.	Max.
$BV_{CES}$	$I_C = 250\mu A$ , $V_{CE} = V_{GE}$	2500		V
$V_{GE(th)}$	$I_C = 250\mu A$ , $V_{CE} = V_{GE}$	3.0		5.5 V
$I_{CES}$	$V_{CE} = 0.8 \cdot V_{CES}$ , $V_{GE} = 0V$ $T_J = 125^\circ C$			10 $\mu A$ 100 $\mu A$
$I_{GES}$	$V_{CE} = 0V$ , $V_{GE} = \pm 20V$			$\pm 100$ nA
$V_{CE(sat)}$	$I_C = 2A$ , $V_{GE} = 15V$ , Note 1 $T_J = 125^\circ C$		3.15	V
			4.08	V

Symbol	Test Conditions ( $T_J = 25^\circ\text{C}$ , Unless Otherwise Specified)	Characteristic Values		
		Min.	Typ.	Max.
$g_{fs}$	$I_C = 2\text{A}, V_{CE} = 10\text{V}$ , Note 1	0.85	1.40	S
$C_{ies}$	$V_{CE} = 25\text{V}, V_{GE} = 0\text{V}, f = 1\text{MHz}$		145	pF
$C_{oes}$			8.7	pF
$C_{res}$			3.2	pF
$Q_g$	$I_C = 2\text{A}, V_{GE} = 15\text{V}, V_{CE} = 1\text{kV}$		10.6	nC
$Q_{ge}$			0.8	nC
$Q_{gc}$			6.2	nC
$t_{d(on)}$	<b>Resistive Switching times, <math>T_J = 25^\circ\text{C}</math></b> $I_C = 2\text{A}, V_{GE} = 15\text{V}$ $V_{CE} = 2\text{kV}, R_G = 47\Omega$		30	ns
$t_r$			180	ns
$t_{d(off)}$			70	ns
$t_f$			182	ns
$t_{d(on)}$	<b>Resistive Switching times, <math>T_J = 125^\circ\text{C}</math></b> $I_C = 2\text{A}, V_{GE} = 15\text{V}$ $V_{CE} = 2\text{kV}, R_G = 47\Omega$		30	ns
$t_r$			280	ns
$t_{d(off)}$			74	ns
$t_f$			178	ns
$R_{thJC}$			3.90	$^\circ\text{C/W}$
$R_{thCS}$		0.21		$^\circ\text{C/W}$

### TO-247 (IXBH) Outline



Terminals: 1 - Gate 2 - Drain  
3 - Source Tab - Drain

Dim.	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	4.7	5.3	.185	.209
A <sub>1</sub>	2.2	2.54	.087	.102
A <sub>2</sub>	2.2	2.6	.059	.098
b	1.0	1.4	.040	.055
b <sub>1</sub>	1.65	2.13	.065	.084
b <sub>2</sub>	2.87	3.12	.113	.123
C	.4	.8	.016	.031
D	20.80	21.46	.819	.845
E	15.75	16.26	.610	.640
e	5.20	5.72	0.205	0.225
L	19.81	20.32	.780	.800
L <sub>1</sub>		4.50		.177
∅P	3.55	3.65	.140	.144
Q	5.89	6.40	0.232	0.252
R	4.32	5.49	.170	.216
S	6.15	BSC	242	BSC

### Reverse Diode

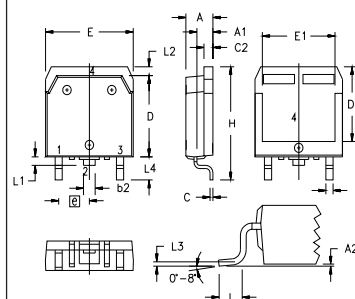
Symbol	Test Conditions ( $T_J = 25^\circ\text{C}$ , Unless Otherwise Specified)	Characteristic Values		
		Min.	Typ.	Max.
$V_F$	$I_F = 2\text{A}, V_{GE} = 0\text{V}$ , Note 1			2.4 V
$t_{rr}$	$I_F = 2\text{A}, V_{GE} = 0\text{V}, -di_F/dt = 100\text{A}/\mu\text{s}$ $V_R = 100\text{V}, V_{GE} = 0\text{V}$		0.92	$\mu\text{s}$
$I_{RM}$			9.80	A
$Q_{RM}$			4.50	$\mu\text{C}$

Note 1. Pulse test,  $t \leq 300\mu\text{s}$ , duty cycle,  $d \leq 2\%$ .

### 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.

### TO-268 (IXBT) Outline

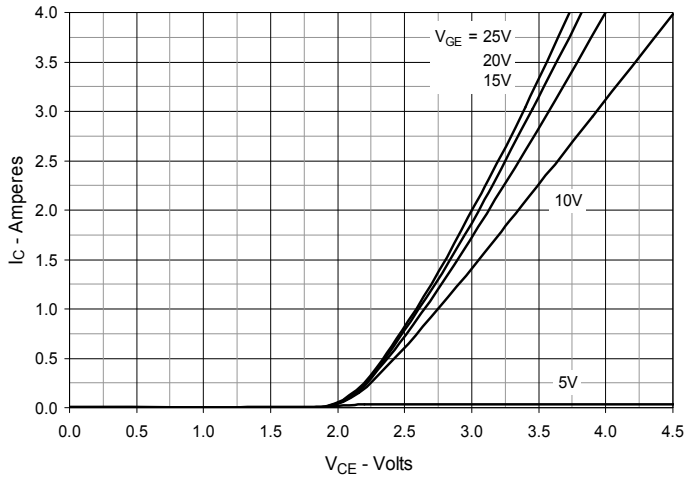


SYM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.193	.201	4.90	5.10
A1	.106	.114	2.70	2.90
A2	.001	.010	0.02	0.25
b	.045	.057	1.15	1.45
b2	.075	.083	1.90	2.10
C	.016	.026	0.40	0.65
C2	.057	.063	1.45	1.60
D	.543	.551	13.80	14.00
D1	.488	.500	12.40	12.70
E	.624	.632	15.85	16.05
E1	.524	.535	13.30	13.60
e	.215 BSC		5.45 BSC	
H	.736	.752	18.70	19.10
L	.094	.106	2.40	2.70
L1	.047	.055	1.20	1.40
L2	.039	.045	1.00	1.15
L3	.010 BSC		0.25 BSC	
L4	.150	.161	3.80	4.10

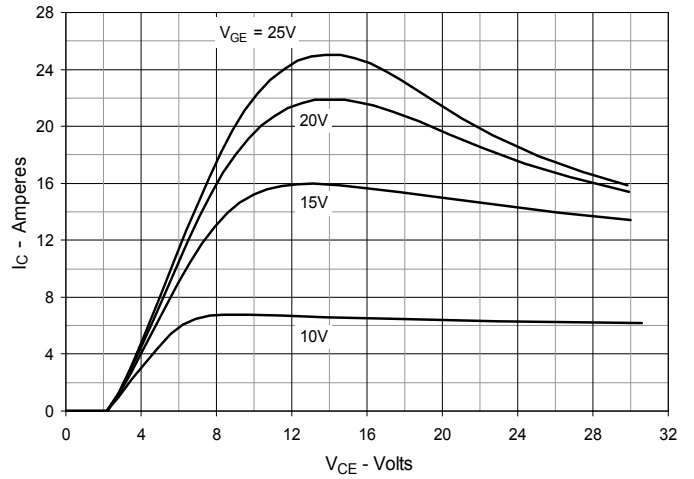
IXYS Reserves the Right to Change Limits, Test Conditions and Dimensions.

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 7,157,338B2  
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

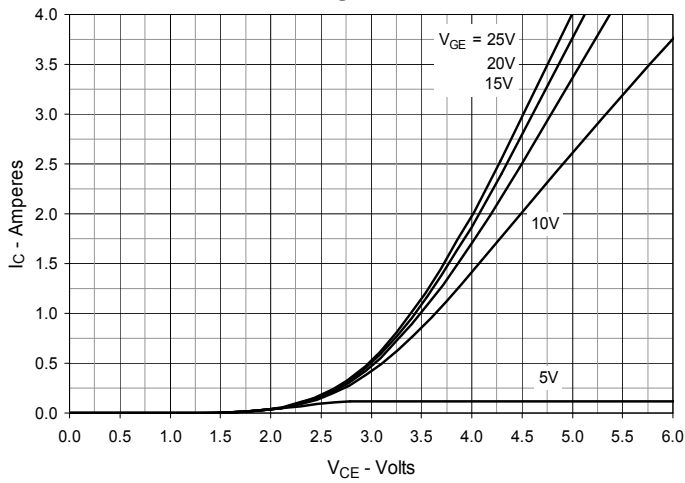
**Fig. 1. Output Characteristics @ 25°C**



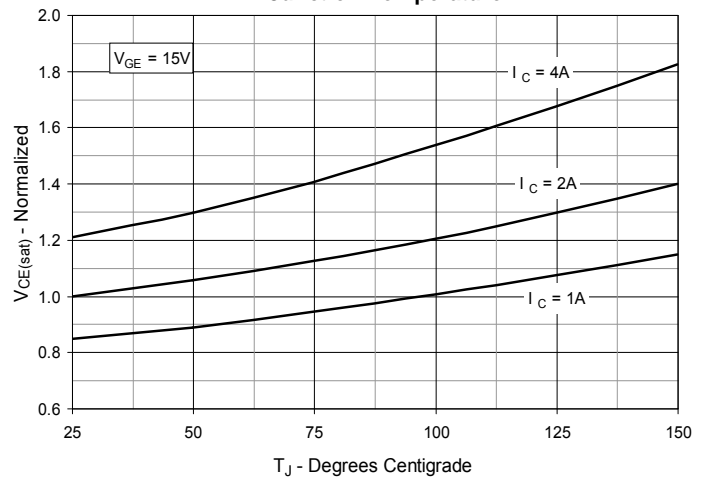
**Fig. 2. Extended Output Characteristics @ 25°C**



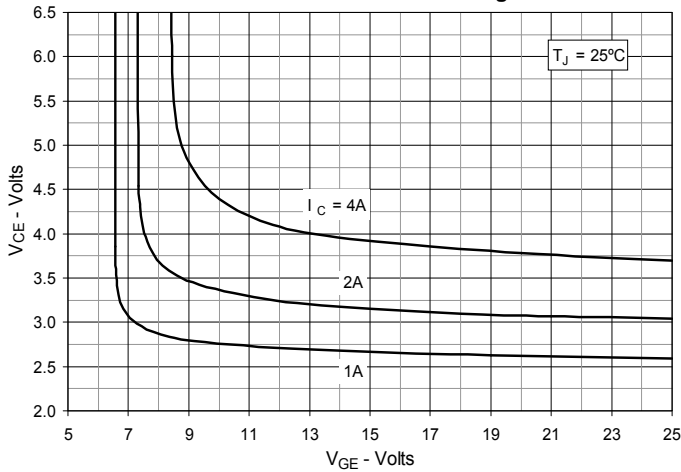
**Fig. 3. Output Characteristics @ 125°C**



**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**

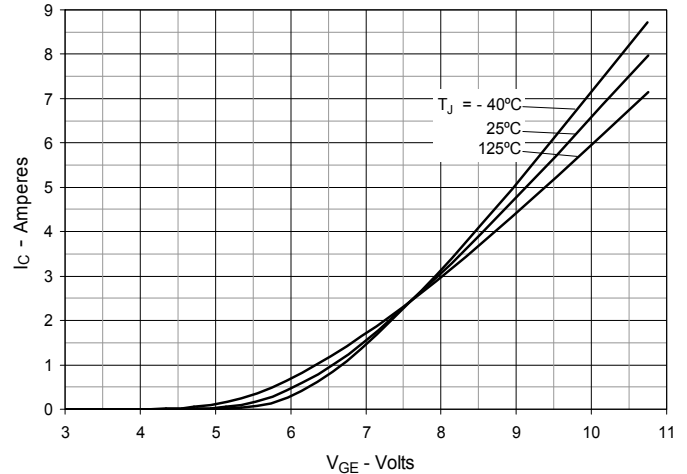


Fig. 7. Transconductance

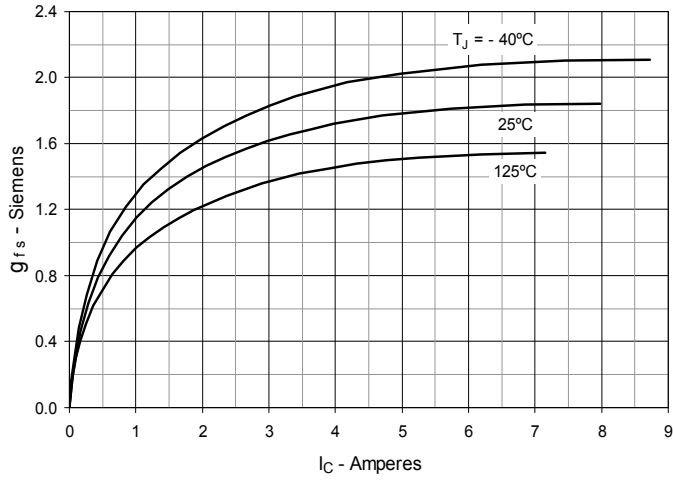


Fig. 8. Forward Voltage Drop of Intrinsic Diode

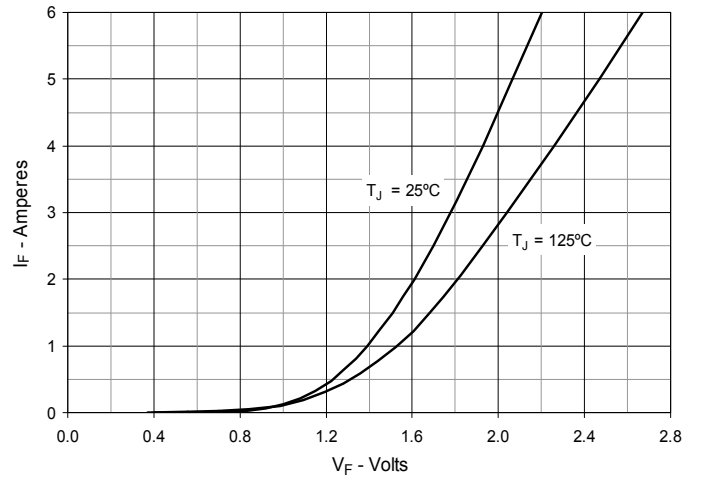


Fig. 9. Gate Charge

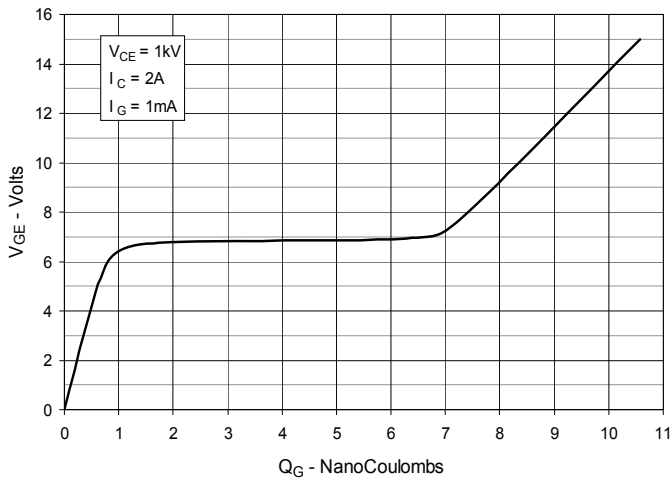


Fig. 10. Capacitance

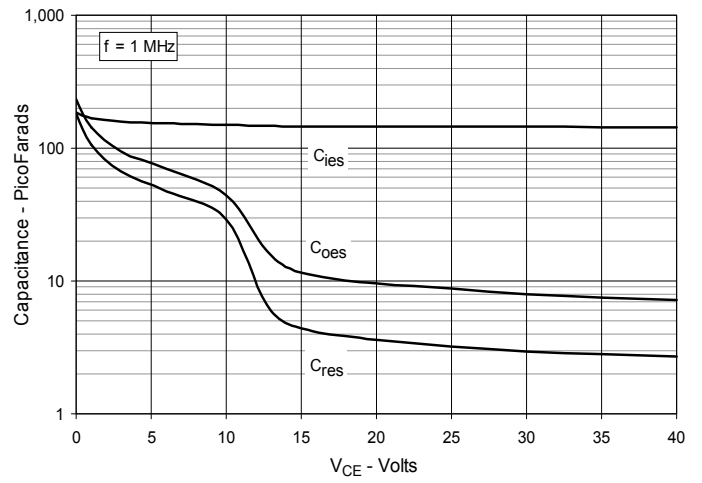


Fig. 11. Reverse-Bias Safe Operating Area

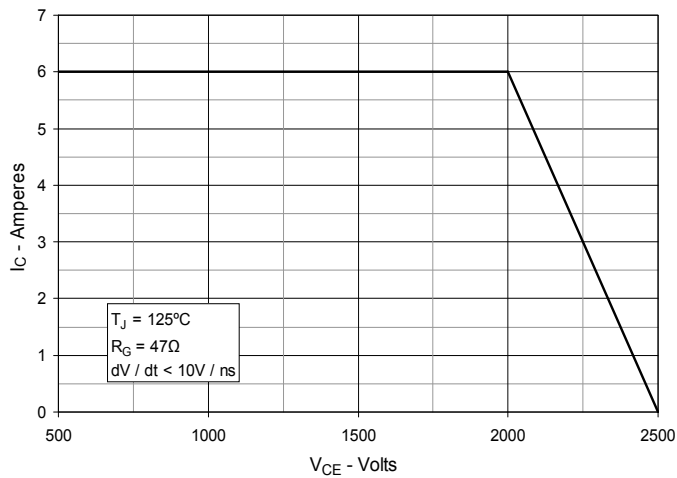
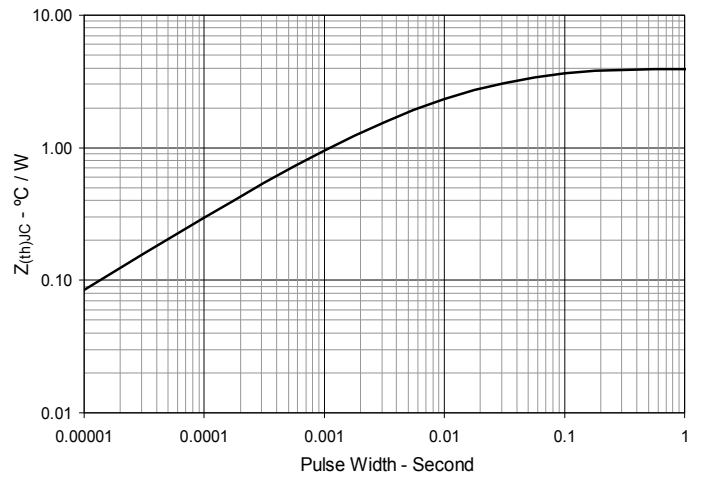
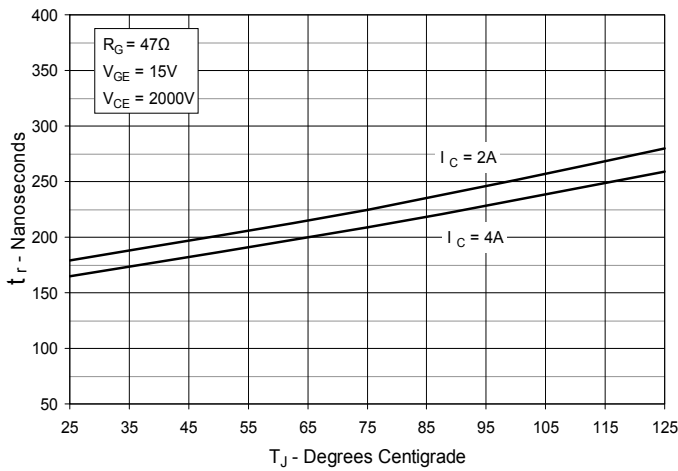


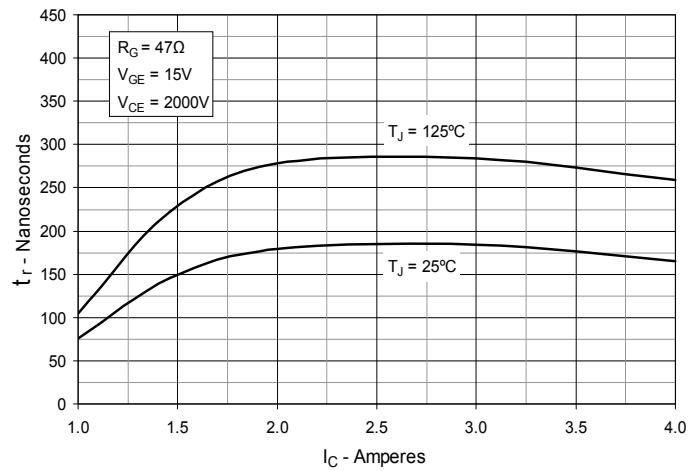
Fig. 12. Maximum Transient Thermal Impedance



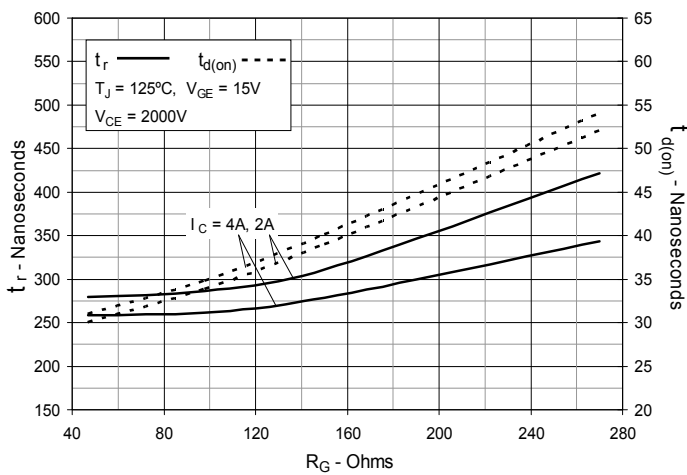
**Fig. 13. Resistive Turn-on  
Rise Time vs. Junction Temperature**



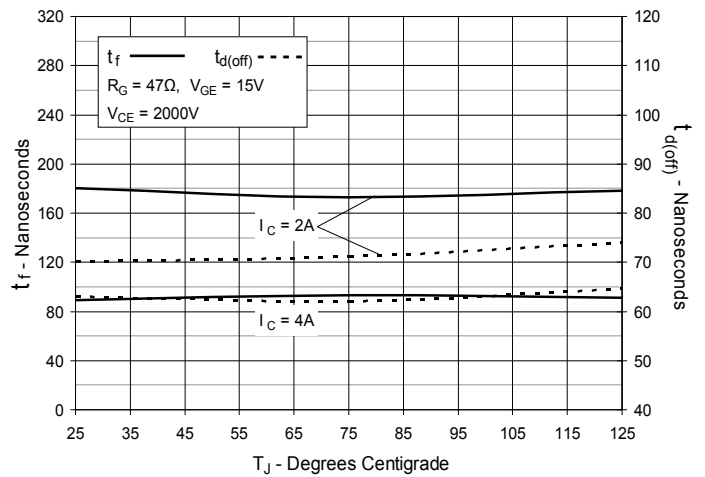
**Fig. 14. Resistive Turn-on  
Rise Time vs. Collector Current**



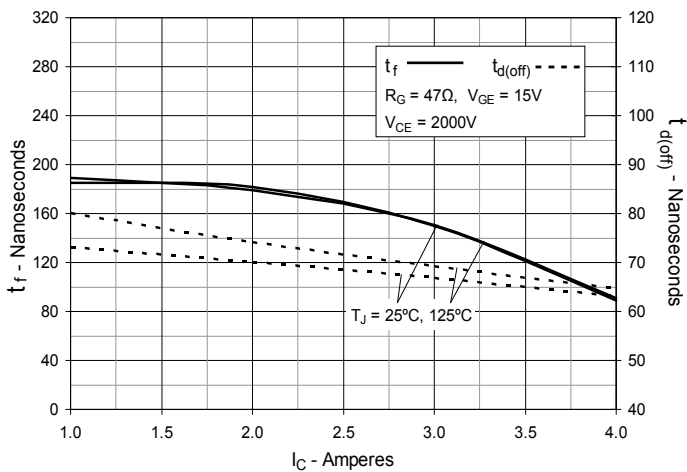
**Fig. 15. Resistive Turn-on  
Switching Times vs. Gate Resistance**



**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**

