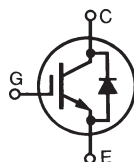


### High Voltage, High Gain BIMOSFET™ Monolithic Bipolar MOS Transistor

### IXBH32N300 IXBT32N300



$$V_{CES} = 3000V$$

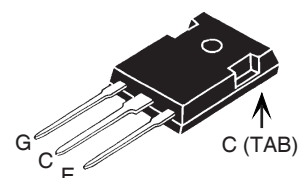
$$I_{C110} = 32A$$

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

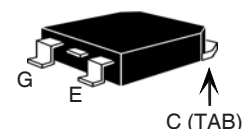
| Symbol                        | Test Conditions                                                                      | Maximum Ratings                      |            |
|-------------------------------|--------------------------------------------------------------------------------------|--------------------------------------|------------|
| $V_{CES}$                     | $T_C = 25^\circ C$ 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                                                                           | $\pm 20$                             | V          |
| $V_{GEM}$                     | Transient                                                                            | $\pm 30$                             | V          |
| $I_{C25}$                     | $T_C = 25^\circ C$                                                                   | 80                                   | A          |
| $I_{C110}$                    | $T_C = 110^\circ C$                                                                  | 32                                   | A          |
| $I_{CM}$                      | $T_C = 25^\circ C$ , 1ms                                                             | 280                                  | A          |
| <b>SSOA</b><br><b>(RBSOA)</b> | $V_{GE} = 15V$ , $T_{VJ} = 125^\circ C$ , $R_G = 10\Omega$<br>Clamped Inductive Load | $I_{CM} = 80$<br>$V_{CES} \leq 2400$ | A<br>V     |
| $P_C$                         | $T_C = 25^\circ C$                                                                   | 400                                  | 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          |

| Symbol        | Test Conditions                                                     | Characteristic Values |      |                    |
|---------------|---------------------------------------------------------------------|-----------------------|------|--------------------|
|               |                                                                     | Min.                  | Typ. | Max.               |
| $BV_{CES}$    | $I_C = 250\mu A$ , $V_{GE} = 0V$                                    | 3000                  |      | V                  |
| $V_{GE(th)}$  | $I_C = 250\mu A$ , $V_{CE} = V_{GE}$                                | 2.5                   |      | 5.0 V              |
| $I_{CES}$     | $V_{CE} = 0.8 \cdot V_{CES}$ , $V_{GE} = 0V$<br>$T_J = 125^\circ C$ |                       |      | 50 $\mu A$<br>2 mA |
| $I_{GES}$     | $V_{CE} = 0V$ , $V_{GE} = \pm 20V$                                  |                       |      | $\pm 100$ nA       |
| $V_{CE(sat)}$ | $I_C = 32A$ , $V_{GE} = 15V$ , Note 1<br>$T_J = 125^\circ C$        |                       | 2.8  | 3.2 V              |
|               |                                                                     |                       | 3.5  | V                  |

#### TO-247 (IXBH)



#### TO-268 (IXBT)



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

#### Features

- High Blocking Voltage
- 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 Generators
- Capacitor Discharge Circuits
- AC Switches

### Symbol Test Conditions

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

### Characteristic Values

|              |                                                                                                                                                             | Min. | Typ. | Max.                    |
|--------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|------|------|-------------------------|
| $g_{fs}$     | $I_C = 32\text{A}, V_{CE} = 10\text{V}, \text{Note 1}$                                                                                                      | 16   | 26   | S                       |
| $C_{ies}$    | $V_{CE} = 25\text{V}, V_{GE} = 0\text{V}, f = 1\text{MHz}$                                                                                                  |      | 3140 | pF                      |
| $C_{oes}$    |                                                                                                                                                             |      | 124  | pF                      |
| $C_{res}$    |                                                                                                                                                             |      | 40   | pF                      |
| $Q_g$        | $I_C = 32\text{A}, V_{GE} = 15\text{V}, V_{CE} = 1000\text{V}$                                                                                              |      | 142  | nC                      |
| $Q_{ge}$     |                                                                                                                                                             |      | 20   | nC                      |
| $Q_{gc}$     |                                                                                                                                                             |      | 57   | nC                      |
| $t_{d(on)}$  | <b>Resistive Switching Times, <math>T_J = 25^\circ\text{C}</math></b><br>$I_C = 32\text{A}, V_{GE} = 15\text{V}$<br>$V_{CE} = 1250\text{V}, R_G = 2\Omega$  |      | 50   | ns                      |
| $t_r$        |                                                                                                                                                             |      | 185  | ns                      |
| $t_{d(off)}$ |                                                                                                                                                             |      | 160  | ns                      |
| $t_f$        |                                                                                                                                                             |      | 720  | ns                      |
| $t_{d(on)}$  | <b>Resistive Switching Times, <math>T_J = 125^\circ\text{C}</math></b><br>$I_C = 32\text{A}, V_{GE} = 15\text{V}$<br>$V_{CE} = 1250\text{V}, R_G = 2\Omega$ |      | 58   | ns                      |
| $t_r$        |                                                                                                                                                             |      | 515  | ns                      |
| $t_{d(off)}$ |                                                                                                                                                             |      | 165  | ns                      |
| $t_f$        |                                                                                                                                                             |      | 630  | ns                      |
| $R_{thJC}$   | (TO-247)                                                                                                                                                    |      |      | 0.31 $^\circ\text{C/W}$ |
| $R_{thCS}$   |                                                                                                                                                             |      | 0.21 | $^\circ\text{C/W}$      |

### Reverse Diode

### Symbol Test Conditions

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

### Characteristic Values

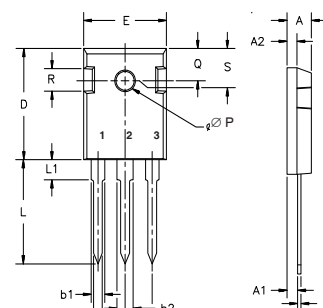
|          |                                                                                                                       | Min. | Typ. | Max.          |
|----------|-----------------------------------------------------------------------------------------------------------------------|------|------|---------------|
| $V_F$    | $I_F = 32\text{A}, V_{GE} = 0\text{V}$                                                                                |      |      | 2.1 V         |
| $t_{rr}$ | $I_F = 16\text{A}, V_{GE} = 0\text{V}, -di_F/dt = 100\text{A}/\mu\text{s}$<br>$V_R = 100\text{V}, V_{GE} = 0\text{V}$ |      | 1.5  | $\mu\text{s}$ |
| $I_{RM}$ |                                                                                                                       |      | 33   | A             |

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

### PRELIMINARY TECHNICAL INFORMATION

The product presented herein is under development. The Technical Specifications offered are derived from data gathered during objective characterizations of preliminary engineering lots; but also may yet contain some information supplied during a pre-production design evaluation. IXYS reserves the right to change limits, test conditions, and dimensions without notice.

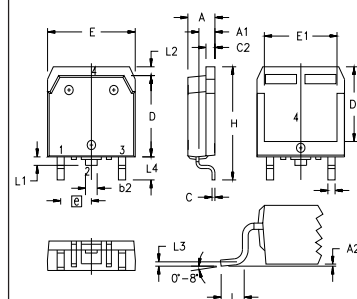
### TO-247 (IXBH) Outline



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  |
| L1             |            | 4.50  |        | .177  |
| ØP             | 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   |

### TO-268 (IXBT) Outline

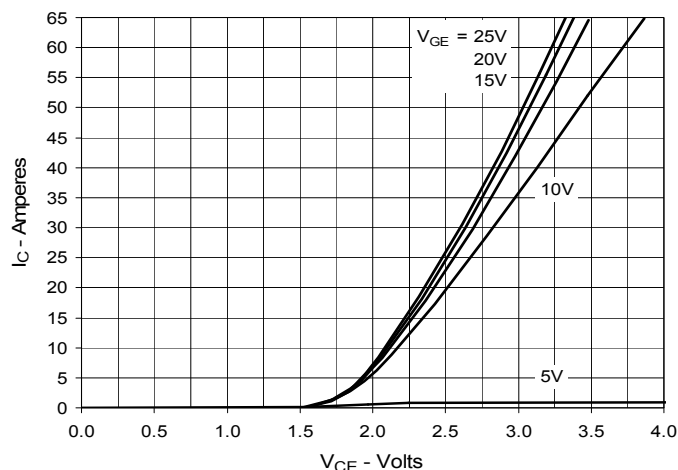


| SYM | INCHES   |      | MILLIMETERS |       |
|-----|----------|------|-------------|-------|
|     | MIN      | MAX  | MIN         | MAX   |
| A   | .193     | .201 | 4.90        | 5.10  |
| A1  | .106     | .114 | 2.70        | 2.90  |
| A2  | .001     | .010 | 0.02        | 0.25  |
| b   | .045     | .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  |

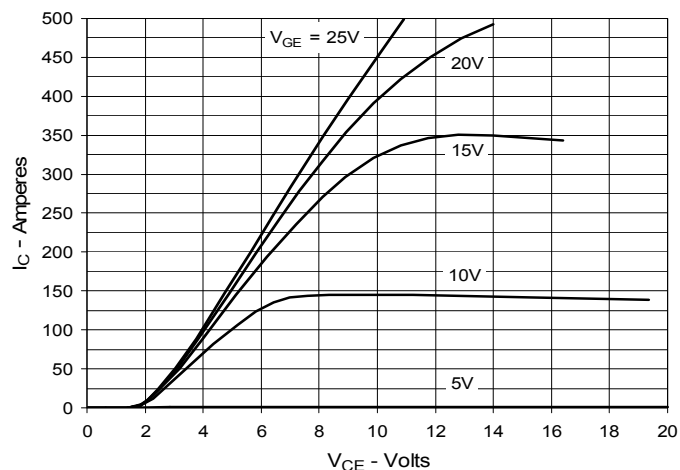
IXYS Reserves the Right to Change Limits, Test Conditions and Dimensions.

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

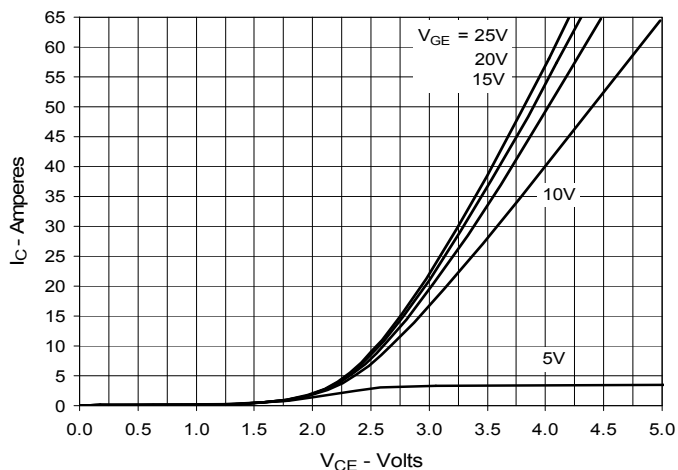
**Fig. 1. Output Characteristics**  
**@ 25°C**



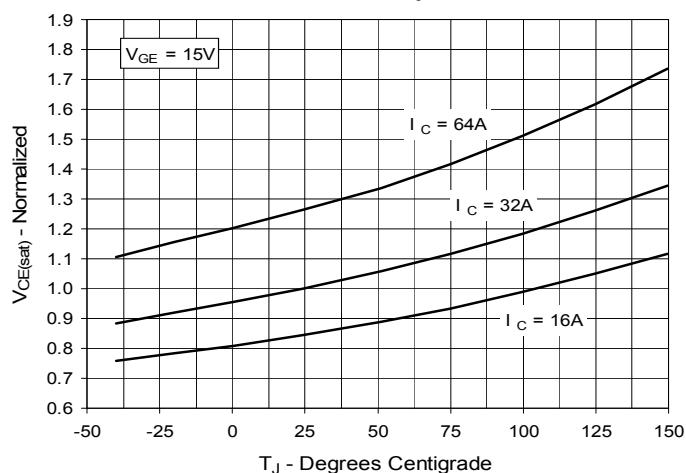
**Fig. 2. Extended Output Characteristics**  
**@ 25°C**



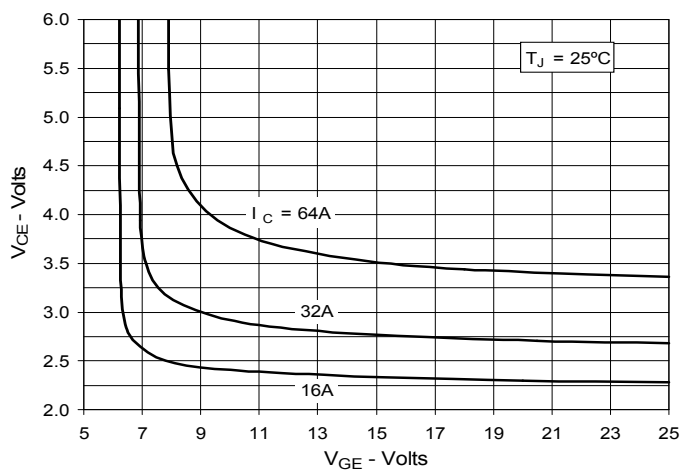
**Fig. 3. Output Characteristics**  
**@ 125°C**



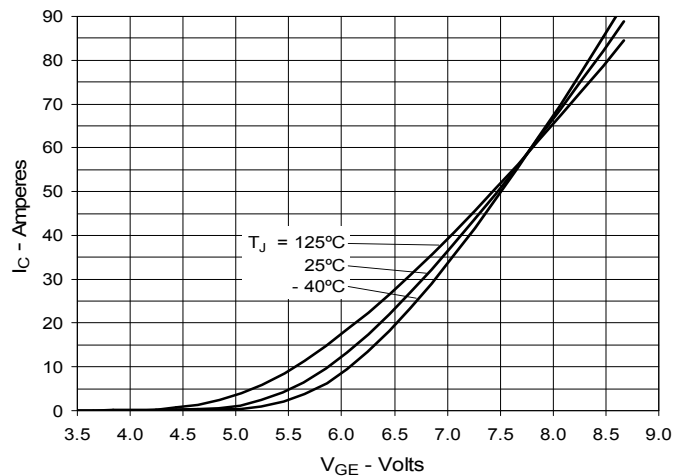
**Fig. 4. Dependence of  $V_{CE(sat)}$  on**  
**Junction Temperature**



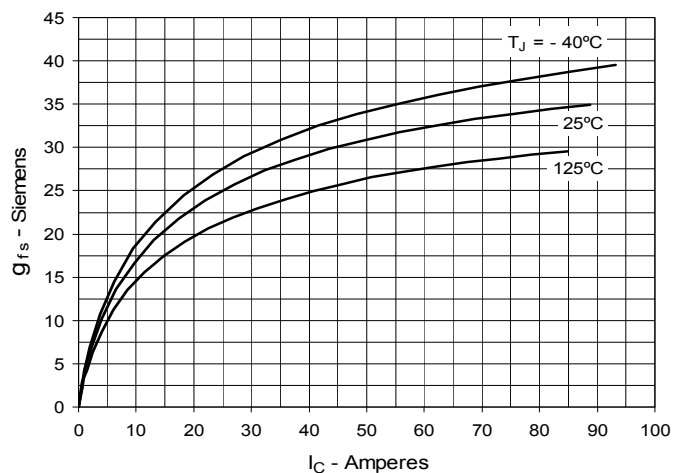
**Fig. 5. Collector-to-Emitter Voltage**  
**vs. Gate-to-Emitter Voltage**



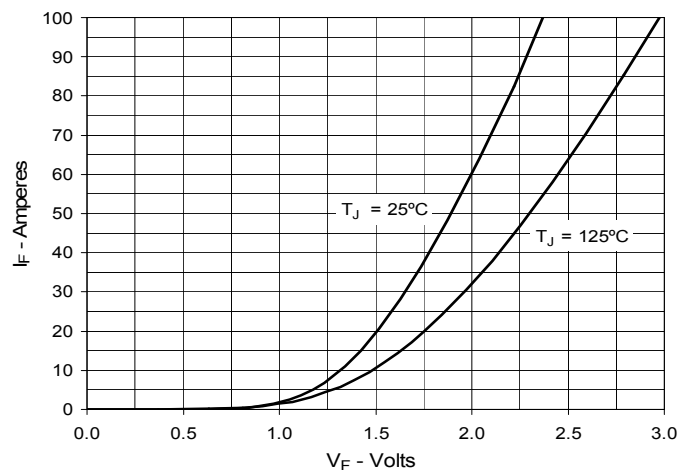
**Fig. 6. Input Admittance**



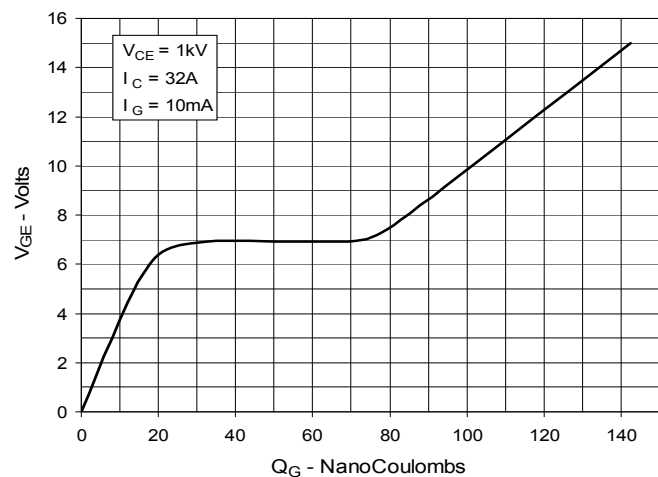
**Fig. 7. Transconductance**



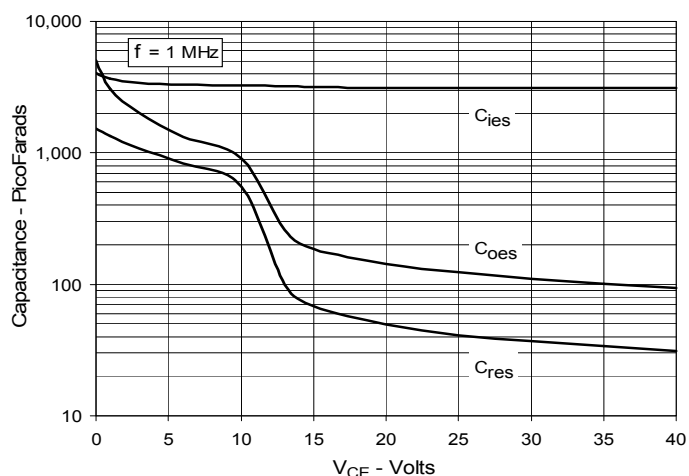
**Fig. 8. Forward Voltage Drop of Intrinsic Diode**



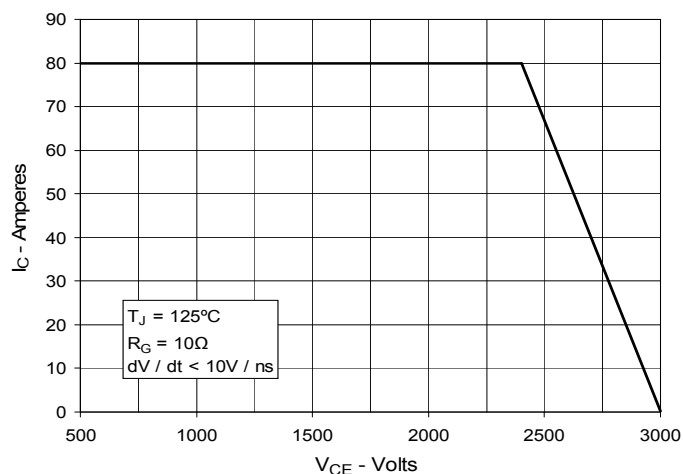
**Fig. 9. Gate Charge**



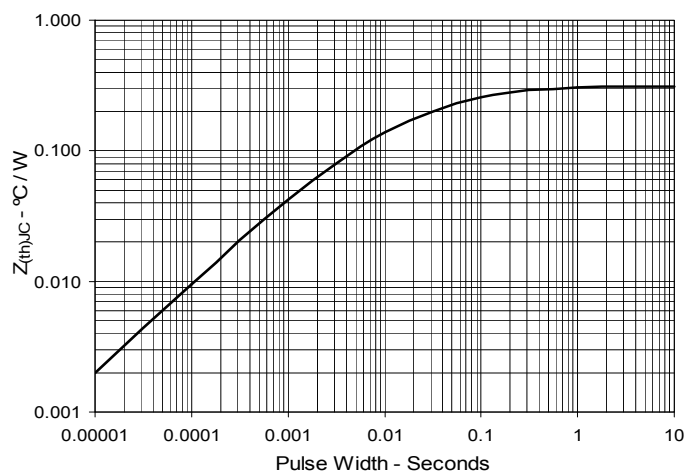
**Fig. 10. Capacitance**



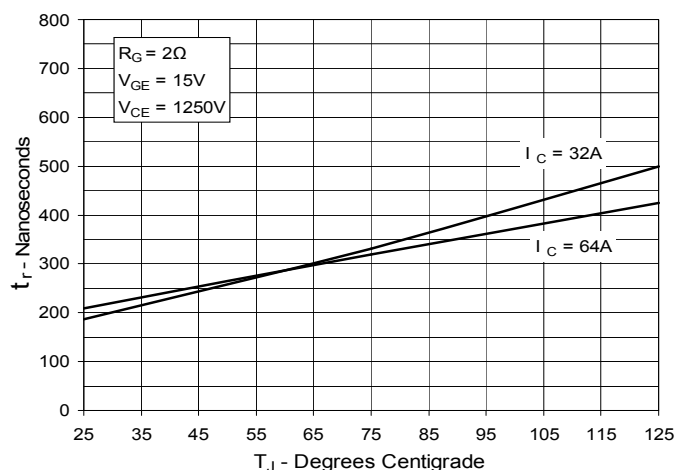
**Fig. 11. Reverse-Bias Safe Operating Area**



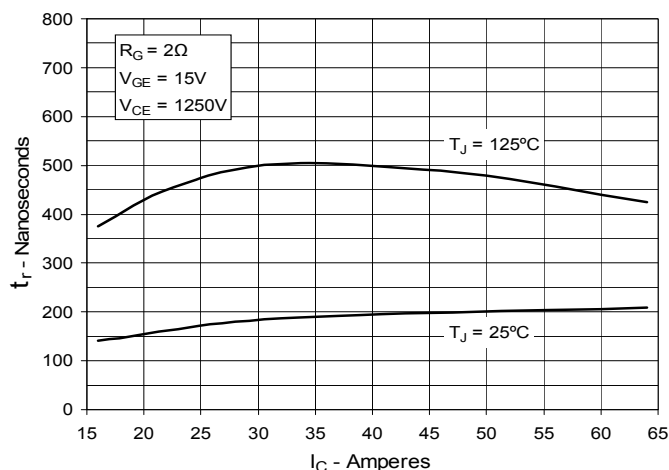
**Fig. 12. Maximum Transient Thermal Impedance**



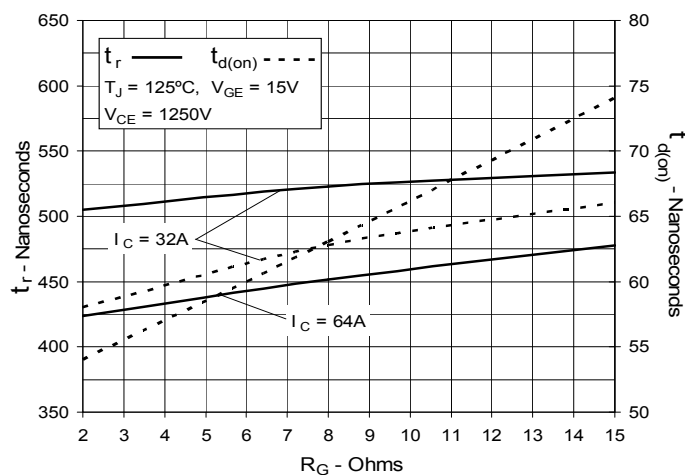
**Fig. 13. Resistive Turn-on  
Rise Time vs. Junction Temperature**



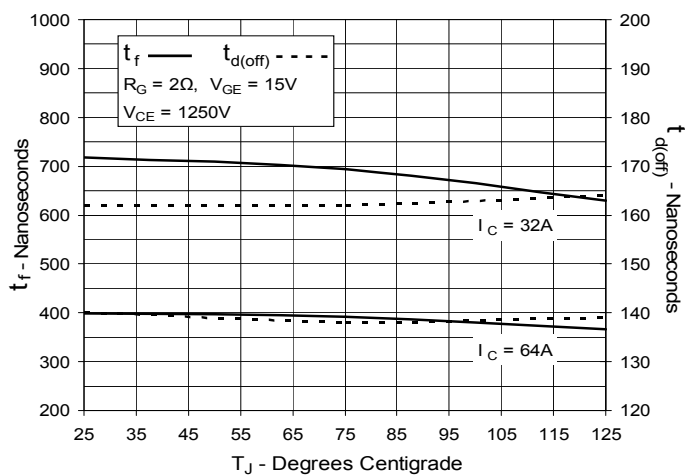
**Fig. 14. Resistive Turn-on  
Rise Time vs. Drain Current**



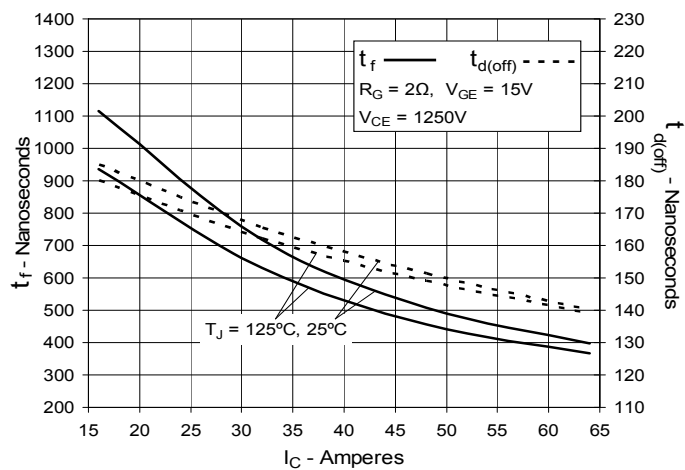
**Fig. 15. Resistive Turn-on  
Switching Times vs. Gate Resistance**



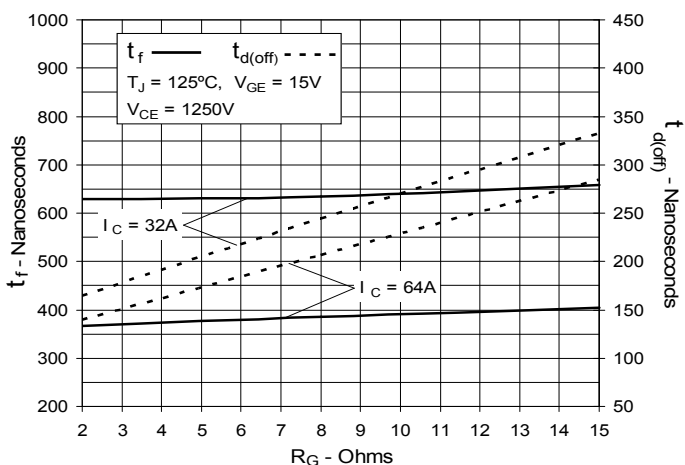
**Fig. 16. Resistive Turn-off  
Switching Times vs. Junction Temperature**



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



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





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