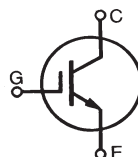


### High Voltage IGBTs

### IXGH2N250

### IXGT2N250

### for Capacitor Discharge Applications



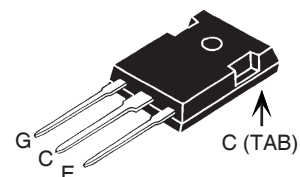
$$V_{CES} = 2500V$$

$$I_{C110} = 2A$$

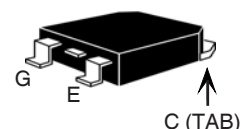
$$V_{CE(sat)} \leq 3.1V$$

| 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          |
| $I_{C25}$  | $T_C = 25^\circ C$                                         | 5.5                | A          |
| $I_{C110}$ | $T_C = 110^\circ C$                                        | 2.0                | A          |
| $I_{CM}$   | $T_C = 25^\circ C$ , 1ms                                   | 13.5               | A          |
| SSOA       | $V_{GE} = 15V$ , $T_{VJ} = 125^\circ C$ , $R_G = 50\Omega$ | $I_{CM} = 6$       | A          |
| (RBSOA)    | 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.  |
| Weight     | TO-247                                                     | 6                  | g          |
|            | TO-268                                                     | 4                  | g          |

TO-247 (IXGH)



TO-268 (IXGT)



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

### Features

- Optimized for Low Conduction and Switching Losses
- International Standard Packages

### Advantages

- High Power Density
- Low Gate Drive Requirement

### Applications

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

| Symbol        | Test Conditions                                                     | Characteristic Values |            |                           |
|---------------|---------------------------------------------------------------------|-----------------------|------------|---------------------------|
|               |                                                                     | Min.                  | Typ.       | Max.                      |
| $BV_{CES}$    | $I_C = 250\mu A$ , $V_{GE} = 0V$                                    | 2500                  |            | V                         |
| $V_{GE(th)}$  | $I_C = 250\mu A$ , $V_{CE} = V_{GE}$                                | 3.0                   |            | 5.5 V                     |
| $I_{CES}$     | $V_{CE} = 0.8 \cdot V_{CES}$ , $V_{GE} = 0V$<br>$T_J = 125^\circ C$ |                       |            | 10 $\mu A$<br>100 $\mu A$ |
| $I_{GES}$     | $V_{CE} = 0V$ , $V_{GE} = \pm 20V$                                  |                       |            | $\pm 100$ nA              |
| $V_{CE(sat)}$ | $I_C = I_{C110}$ , $V_{GE} = 15V$ , Note 1<br>$T_J = 125^\circ C$   |                       | 2.6<br>3.1 | 3.1 V<br>V                |

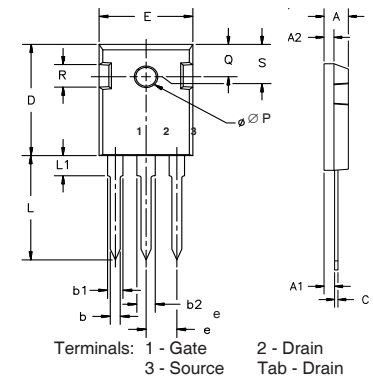
| Symbol       | Test Conditions<br>( $T_J = 25^\circ\text{C}$ , Unless Otherwise Specified)                                                                                | Characteristic Values |      |                        |
|--------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|------|------------------------|
|              |                                                                                                                                                            | Min.                  | Typ. | Max.                   |
| $g_{fs}$     | $I_C = I_{C110}, V_{CE} = 10\text{V}$ , Note 1                                                                                                             | 0.7                   | 1.2  | S                      |
| $C_{ies}$    | $V_{CE} = 25\text{V}, V_{GE} = 0\text{V}, f = 1\text{MHz}$                                                                                                 |                       | 144  | pF                     |
| $C_{oes}$    |                                                                                                                                                            |                       | 8.7  | pF                     |
| $C_{res}$    |                                                                                                                                                            |                       | 3.2  | pF                     |
| $Q_g$        | $I_C = I_{C110}, V_{GE} = 15\text{V}, V_{CE} = 1000\text{V}$                                                                                               |                       | 10.5 | nC                     |
| $Q_{ge}$     |                                                                                                                                                            |                       | 6.4  | nC                     |
| $Q_{gc}$     |                                                                                                                                                            |                       | 1.0  | nC                     |
| $t_{d(on)}$  | <b>Resistive Switching times, <math>T_J = 25^\circ\text{C}</math></b><br>$I_C = I_{C110}, V_{GE} = 15\text{V}$<br>$V_{CE} = 1800\text{V}, R_G = 50\Omega$  |                       | 22   | ns                     |
| $t_r$        |                                                                                                                                                            |                       | 74   | ns                     |
| $t_{d(off)}$ |                                                                                                                                                            |                       | 70   | ns                     |
| $t_f$        |                                                                                                                                                            |                       | 100  | ns                     |
| $t_{d(on)}$  | <b>Resistive Switching times, <math>T_J = 125^\circ\text{C}</math></b><br>$I_C = I_{C110}, V_{GE} = 15\text{V}$<br>$V_{CE} = 1800\text{V}, R_G = 50\Omega$ |                       | 26   | ns                     |
| $t_r$        |                                                                                                                                                            |                       | 89   | ns                     |
| $t_{d(off)}$ |                                                                                                                                                            |                       | 74   | ns                     |
| $t_f$        |                                                                                                                                                            |                       | 204  | ns                     |
| $R_{thJC}$   | (TO-247)                                                                                                                                                   |                       |      | 3.9 $^\circ\text{C/W}$ |
| $R_{thCK}$   |                                                                                                                                                            | 0.21                  |      | $^\circ\text{C/W}$     |

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

## ADVANCE TECHNICAL INFORMATION

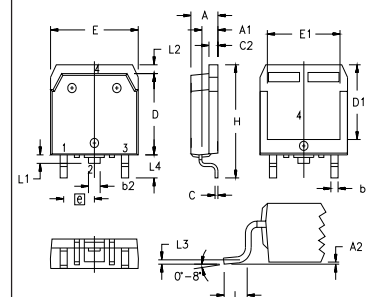
The product presented herein is under development. The Technical Specifications offered are derived from a subjective evaluation of the design, based upon prior knowledge and experience, and constitute a "considered reflection" of the anticipated result. IXYS reserves the right to change limits, test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

## TO-247 (IXGH) Outline



| 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  |
| 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 (IXGT) Outline

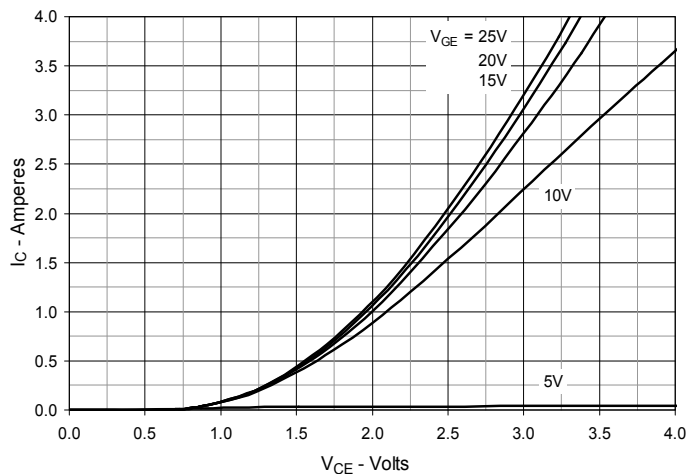


| SYM            | INCHES   |      | MILLIMETERS |       |
|----------------|----------|------|-------------|-------|
|                | MIN      | MAX  | MIN         | MAX   |
| A              | .193     | .201 | 4.90        | 5.10  |
| A <sub>1</sub> | .106     | .114 | 2.70        | 2.90  |
| A <sub>2</sub> | .001     | .010 | 0.02        | 0.25  |
| b              | .045     | .057 | 1.15        | 1.45  |
| b <sub>2</sub> | .075     | .083 | 1.90        | 2.10  |
| C              | .016     | .026 | 0.40        | 0.65  |
| C <sub>2</sub> | .057     | .063 | 1.45        | 1.60  |
| D              | .543     | .551 | 13.80       | 14.00 |
| D <sub>1</sub> | .488     | .500 | 12.40       | 12.70 |
| E              | .624     | .632 | 15.85       | 16.05 |
| E <sub>1</sub> | .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  |
| L <sub>1</sub> | .047     | .055 | 1.20        | 1.40  |
| L <sub>2</sub> | .039     | .045 | 1.00        | 1.15  |
| L <sub>3</sub> | .010 BSC |      | 0.25 BSC    |       |
| L <sub>4</sub> | .150     | .161 | 3.80        | 4.10  |

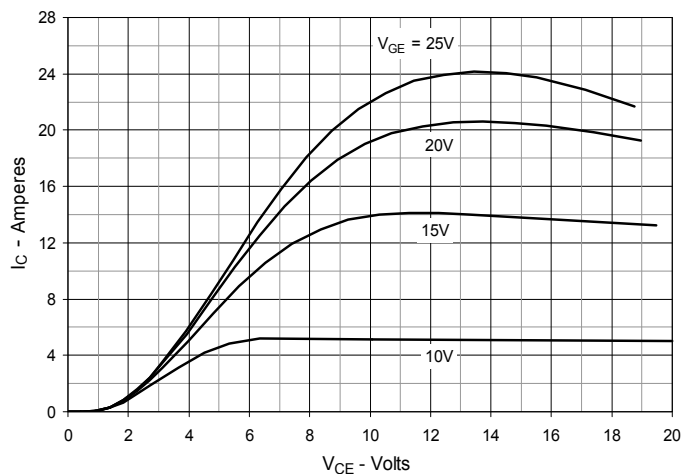
IXYS Reserves the Right to Change Limits, Test Conditions and Dimensions.

|                                                                                  |           |           |           |           |              |              |              |              |              |             |
|----------------------------------------------------------------------------------|-----------|-----------|-----------|-----------|--------------|--------------|--------------|--------------|--------------|-------------|
| IXYS MOSFETs and IGBTs are covered by one or more of the following U.S. patents: | 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 |
|                                                                                  | 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    |             |

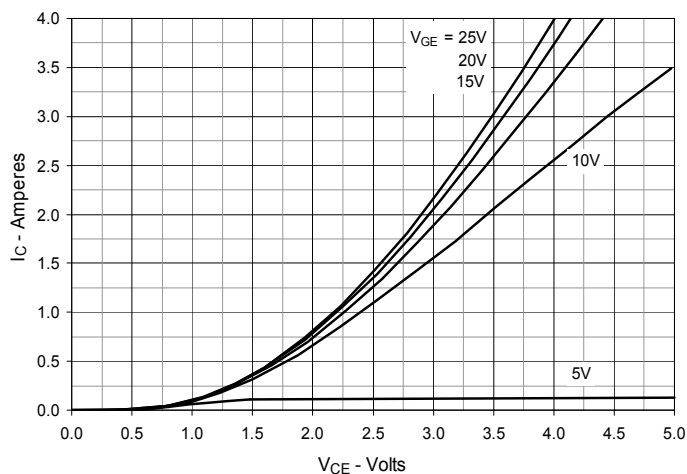
**Fig. 1. Output Characteristics  
@ 25°C**



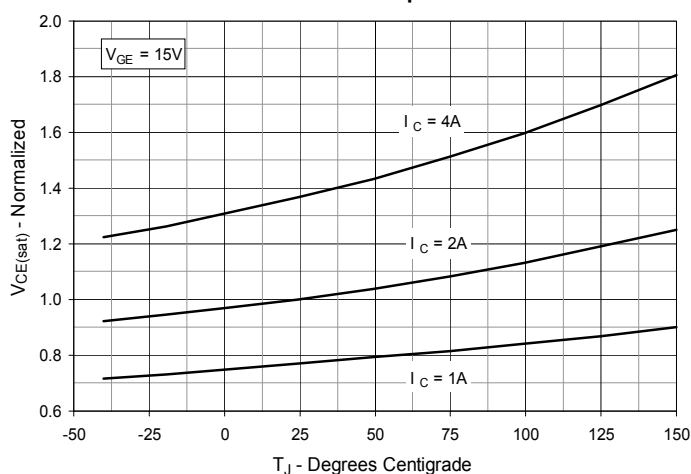
**Fig. 2. Extended Output Characteristics  
@ 25°C**



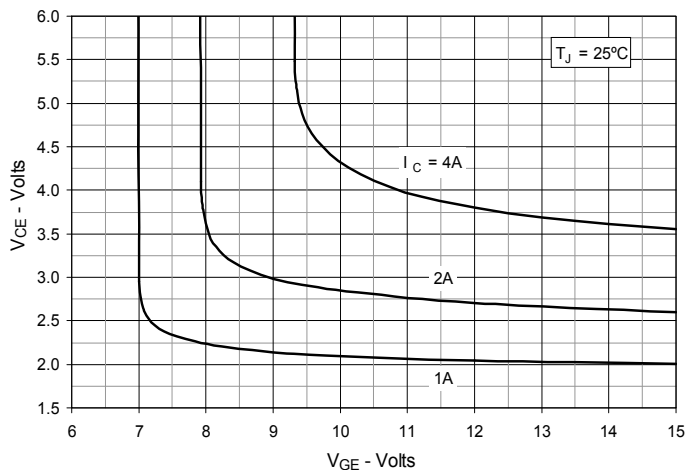
**Fig. 3. Output Characteristics  
@ 125°C**



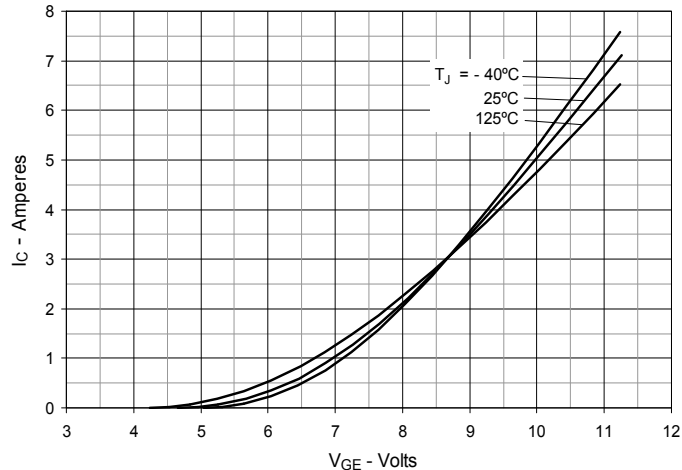
**Fig. 4. Dependence of  $V_{CE(sat)}$  on  
Junction Temperature**



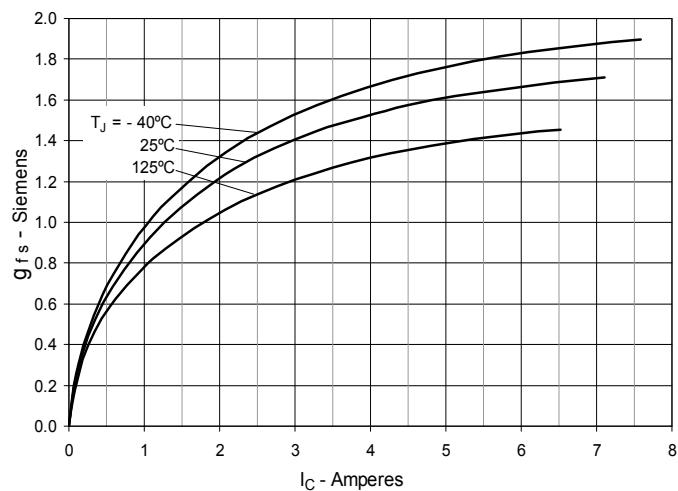
**Fig. 5. Collector-to-Emitter Voltage  
vs. Gate-to-Emitter Voltage**



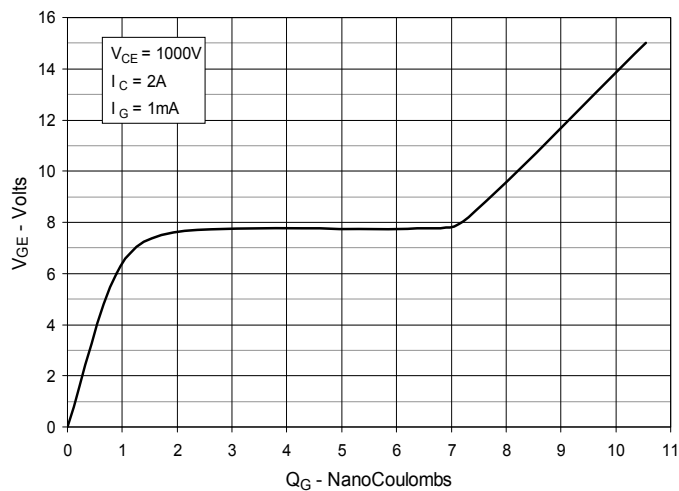
**Fig. 6. Input Admittance**



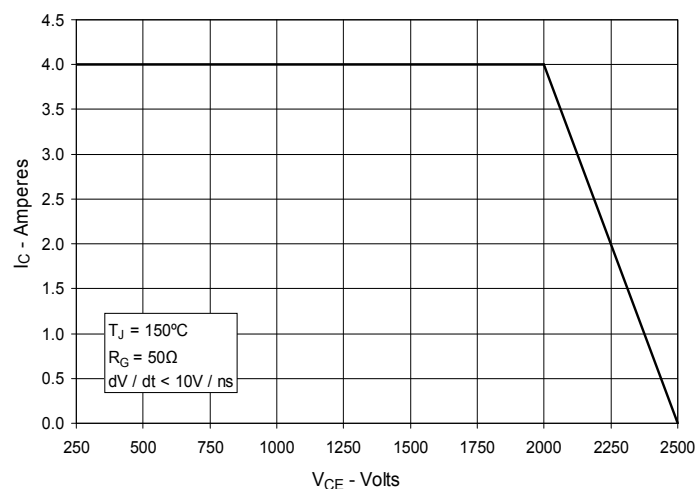
**Fig. 7. Transconductance**



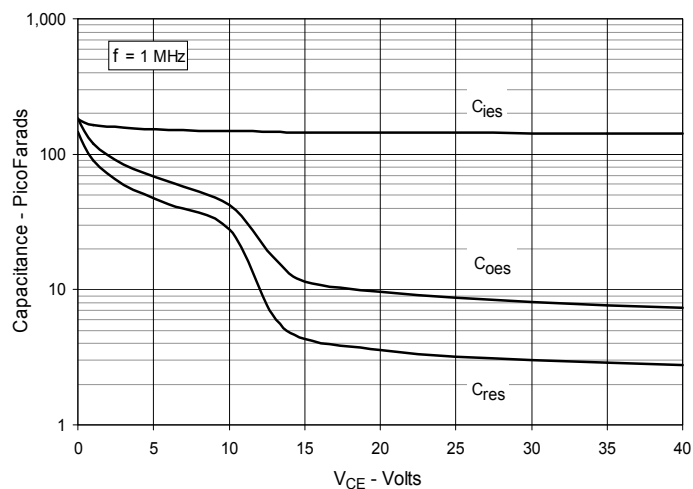
**Fig. 8. Gate Charge**



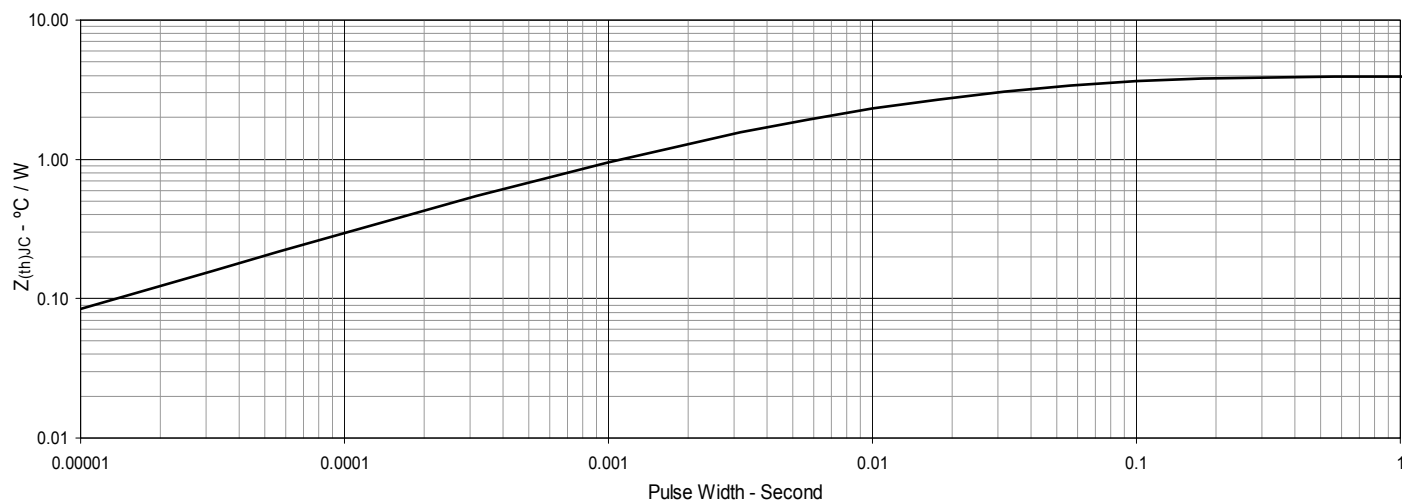
**Fig. 9. Reverse-Bias Safe Operating Area**



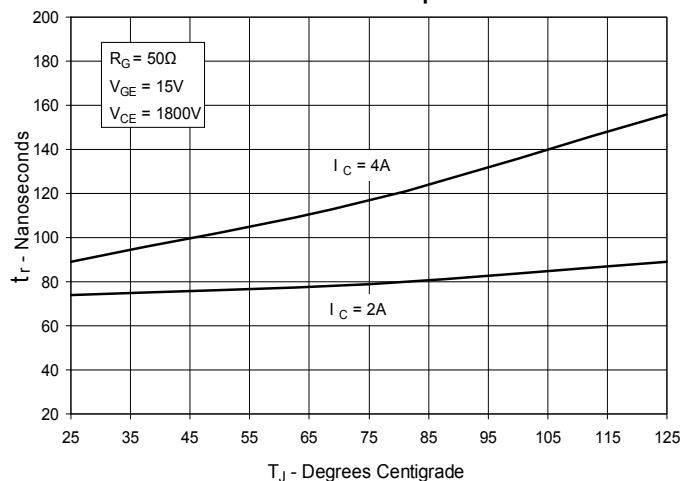
**Fig. 10. Capacitance**



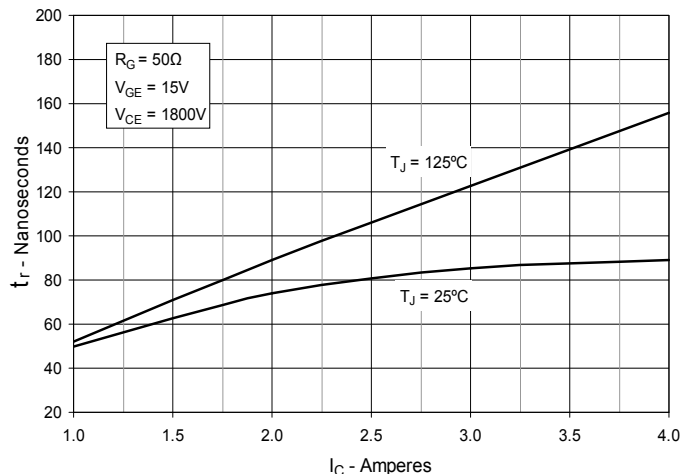
**Fig. 11. Maximum Transient Thermal Impedance**



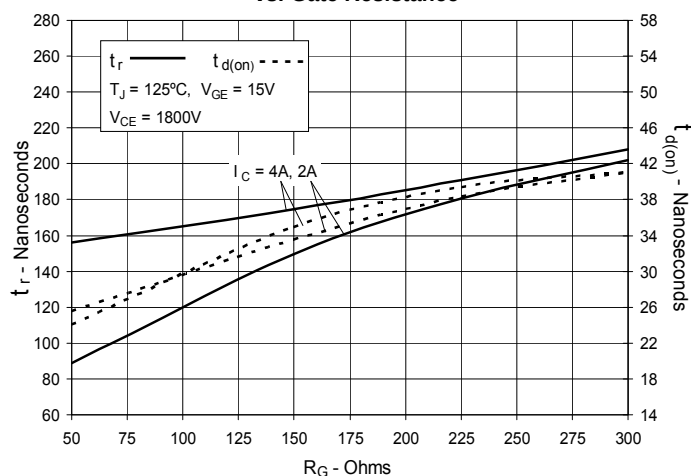
**Fig. 12. Resistive Turn-on Rise Time vs. Junction Temperature**



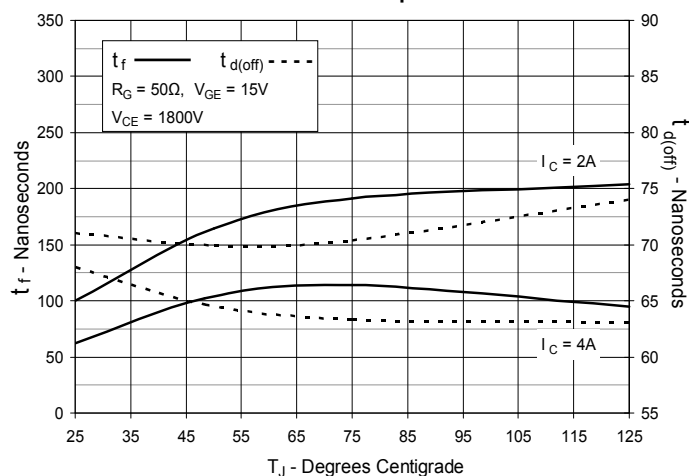
**Fig. 13. Resistive Turn-on Rise Time vs. Collector Current**



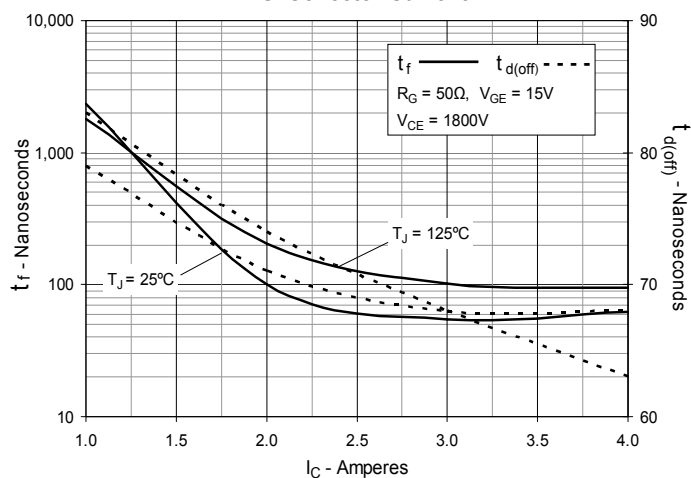
**Fig. 14. Resistive Turn-on Switching Times vs. Gate Resistance**



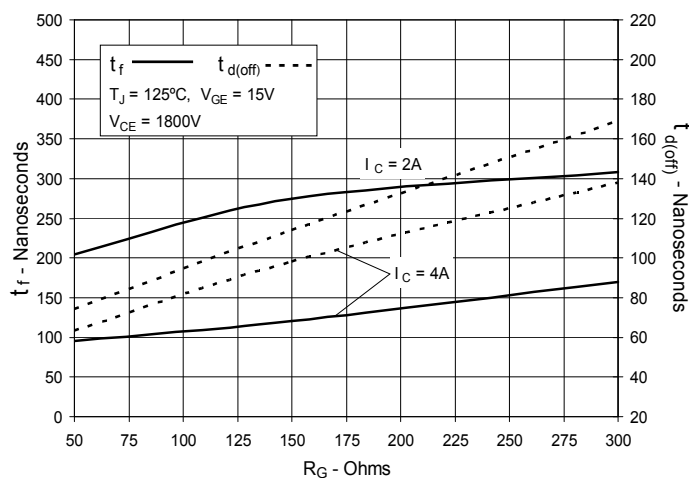
**Fig. 15. Resistive Turn-off Switching Times vs. Junction Temperature**



**Fig. 16. Resistive Turn-off Switching Times vs. Collector Current**



**Fig. 17. Resistive Turn-off Switching Times vs. Gate Resistance**





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