

**TrenchT2™ GigaMOS™**  
**HiperFET™**  
**Power MOSFET**

**IXFN520N075T2**

$$V_{DSS} = 75V$$

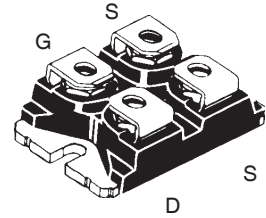
$$I_{D25} = 480A$$

$$R_{DS(on)} \leq 1.9m\Omega$$

N-Channel Enhancement Mode  
 Avalanche Rated  
 Fast Intrinsic Diode



miniBLOC, SOT-227  
 E153432



G = Gate      D = Drain  
 S = Source

Either Source Terminal S can be used as the Source Terminal or the Kelvin Source ( Gate Return ) Terminal.

| Symbol        | Test Conditions                                           | Maximum Ratings |            |
|---------------|-----------------------------------------------------------|-----------------|------------|
| $V_{DSS}$     | $T_J = 25^\circ C$ to $175^\circ C$                       | 75              | V          |
| $V_{DGR}$     | $T_J = 25^\circ C$ to $175^\circ C$ , $R_{GS} = 1M\Omega$ | 75              | V          |
| $V_{GSS}$     | Continuous                                                | $\pm 20$        | V          |
| $V_{GSM}$     | Transient                                                 | $\pm 30$        | V          |
| $I_{D25}$     | $T_C = 25^\circ C$ (Chip Capability)                      | 480             | A          |
| $I_{L(RMS)}$  | External Lead Current Limit                               | 200             | A          |
| $I_{DM}$      | $T_C = 25^\circ C$ , Pulse Width Limited by $T_{JM}$      | 1500            | A          |
| $I_A$         | $T_C = 25^\circ C$                                        | 200             | A          |
| $E_{AS}$      | $T_C = 25^\circ C$                                        | 3               | J          |
| $P_D$         | $T_C = 25^\circ C$                                        | 940             | W          |
| $T_J$         |                                                           | -55 ... +175    | $^\circ C$ |
| $T_{JM}$      |                                                           | 175             | $^\circ C$ |
| $T_{stg}$     |                                                           | -55 ... +175    | $^\circ C$ |
| $T_L$         | 1.6mm (0.062 in.) from Case for 10s                       | 300             | $^\circ C$ |
| $T_{SOLD}$    | Plastic Body for 10s                                      | 260             | $^\circ C$ |
| $V_{ISOL}$    | 50/60 Hz, RMS $t = 1$ minute                              | 2500            | V~         |
|               | $I_{ISOL} \leq 1mA$ $t = 1$ second                        | 3000            | V~         |
| $M_d$         | Mounting Torque                                           | 1.5/13          | Nm/lb.in.  |
|               | Terminal Connection Torque                                | 1.3/11.5        | Nm/lb.in.  |
| <b>Weight</b> |                                                           | 30              | g          |

### Features

- International Standard Package
- miniBLOC, with Aluminium Nitride Isolation
- $175^\circ C$  Operating Temperature
- Isolation Voltage 2500 V~
- High Current Handling Capability
- Fast Intrinsic Diode
- Avalanche Rated
- Low  $R_{DS(on)}$

### Advantages

- Easy to Mount
- Space Savings
- High Power Density

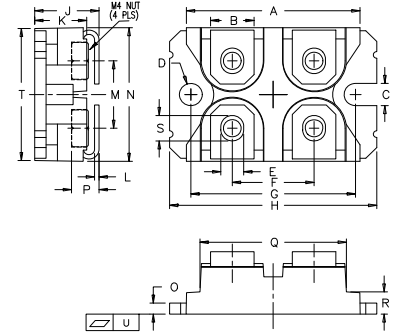
### Applications

- DC-DC Converters and Off-Line UPS
- Primary-Side Switch
- High Speed Power Switching Applications

| Symbol       | Test Conditions<br>( $T_J = 25^\circ C$ , Unless Otherwise Specified) | Characteristic Values |      |                    |
|--------------|-----------------------------------------------------------------------|-----------------------|------|--------------------|
|              |                                                                       | Min.                  | Typ. | Max.               |
| $BV_{DSS}$   | $V_{GS} = 0V$ , $I_D = 3mA$                                           | 75                    |      | V                  |
| $V_{GS(th)}$ | $V_{DS} = V_{GS}$ , $I_D = 8mA$                                       | 2.5                   |      | 5.0 V              |
| $I_{GSS}$    | $V_{GS} = \pm 20V$ , $V_{DS} = 0V$                                    |                       |      | $\pm 200$ nA       |
| $I_{DSS}$    | $V_{DS} = V_{DSS}$ , $V_{GS} = 0V$<br>$T_J = 150^\circ C$             |                       |      | 25 $\mu A$<br>2 mA |
| $R_{DS(on)}$ | $V_{GS} = 10V$ , $I_D = 100A$ , Note 1                                | 1.5                   | 1.9  | m $\Omega$         |

| Symbol       | Test Conditions<br>( $T_J = 25^\circ\text{C}$ , Unless Otherwise Specified)                                                            | Characteristic Values |      |                    |
|--------------|----------------------------------------------------------------------------------------------------------------------------------------|-----------------------|------|--------------------|
|              |                                                                                                                                        | Min.                  | Typ. | Max.               |
| $g_{fs}$     | $V_{DS} = 10\text{V}, I_D = 60\text{A}$ , Note 1                                                                                       | 65                    | 105  | S                  |
| $C_{iss}$    | $V_{GS} = 0\text{V}, V_{DS} = 25\text{V}, f = 1\text{MHz}$                                                                             |                       | 41   | nF                 |
| $C_{oss}$    |                                                                                                                                        |                       | 4150 | pF                 |
| $C_{rss}$    |                                                                                                                                        |                       | 530  | pF                 |
| $R_{Gi}$     | Gate Input Resistance                                                                                                                  |                       | 1.36 | $\Omega$           |
| $t_{d(on)}$  | <b>Resistive Switching Times</b><br>$V_{GS} = 10\text{V}, V_{DS} = 0.5 \cdot V_{DSS}, I_D = 200\text{A}$<br>$R_G = 1\Omega$ (External) |                       | 48   | ns                 |
| $t_r$        |                                                                                                                                        |                       | 36   | ns                 |
| $t_{d(off)}$ |                                                                                                                                        |                       | 80   | ns                 |
| $t_f$        |                                                                                                                                        |                       | 35   | ns                 |
| $Q_{g(on)}$  | $V_{GS} = 10\text{V}, V_{DS} = 0.5 \cdot V_{DSS}, I_D = 260\text{A}$                                                                   |                       | 545  | nC                 |
| $Q_{gs}$     |                                                                                                                                        |                       | 177  | nC                 |
| $Q_{gd}$     |                                                                                                                                        |                       | 135  | nC                 |
| $R_{thJC}$   |                                                                                                                                        |                       | 0.16 | $^\circ\text{C/W}$ |
| $R_{thCS}$   |                                                                                                                                        | 0.05                  |      | $^\circ\text{C/W}$ |

### SOT-227B (IXFN) Outline



(M4 screws (4x) supplied)

| SYM | INCHES |       | MILLIMETERS |       |
|-----|--------|-------|-------------|-------|
|     | MIN    | MAX   | MIN         | MAX   |
| A   | 1.240  | 1.255 | 31.50       | 31.88 |
| B   | .307   | .323  | 7.80        | 8.20  |
| C   | .161   | .169  | 4.09        | 4.29  |
| D   | .161   | .169  | 4.09        | 4.29  |
| E   | .161   | .169  | 4.09        | 4.29  |
| F   | .587   | .595  | 14.91       | 15.11 |
| G   | 1.186  | 1.193 | 30.12       | 30.30 |
| H   | 1.496  | 1.505 | 38.00       | 38.23 |
| J   | .460   | .481  | 11.68       | 12.22 |
| K   | .351   | .378  | 8.92        | 9.60  |
| L   | .030   | .033  | 0.76        | 0.84  |
| M   | .496   | .506  | 12.60       | 12.85 |
| N   | .990   | 1.001 | 25.15       | 25.42 |
| O   | .078   | .084  | 1.98        | 2.13  |
| P   | .195   | .235  | 4.95        | 5.97  |
| Q   | 1.045  | 1.059 | 26.54       | 26.90 |
| R   | .155   | .174  | 3.94        | 4.42  |
| S   | .186   | .191  | 4.72        | 4.85  |
| T   | .968   | .987  | 24.59       | 25.07 |
| U   | -.002  | .004  | -0.05       | 0.1   |

### Source-Drain Diode

| Symbol   | Test Conditions<br>( $T_J = 25^\circ\text{C}$ , Unless Otherwise Specified)                           | Characteristic Values |      |        |
|----------|-------------------------------------------------------------------------------------------------------|-----------------------|------|--------|
|          |                                                                                                       | Min.                  | Typ. | Max.   |
| $I_S$    | $V_{GS} = 0\text{V}$                                                                                  |                       |      | 520 A  |
| $I_{SM}$ | Repetitive, Pulse Width Limited by $T_{JM}$                                                           |                       |      | 1600 A |
| $V_{SD}$ | $I_F = 100\text{A}, V_{GS} = 0\text{V}$ , Note 1                                                      |                       |      | 1.25 V |
| $t_{rr}$ | $I_F = 150\text{A}, V_{GS} = 0\text{V}$<br>$-di/dt = 100\text{A}/\mu\text{s}$<br>$V_R = 37.5\text{V}$ |                       |      | 150 ns |
| $I_{RM}$ |                                                                                                       |                       | 7    | A      |
| $Q_{RM}$ |                                                                                                       |                       | 357  | nC     |

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

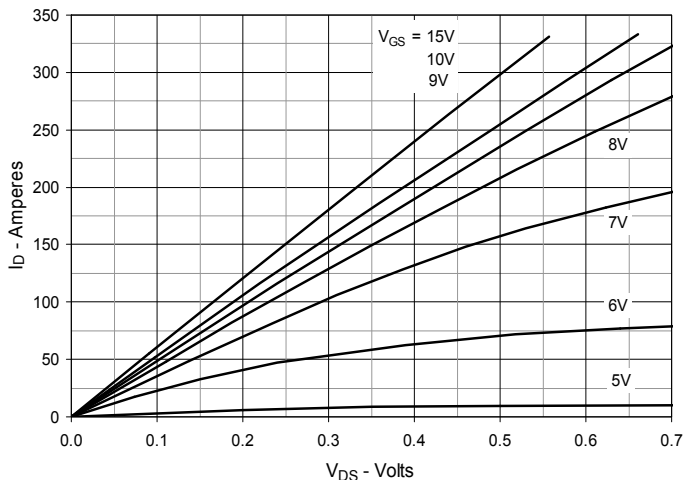
### PRELIMINARY TECHNICAL INFORMATION

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.

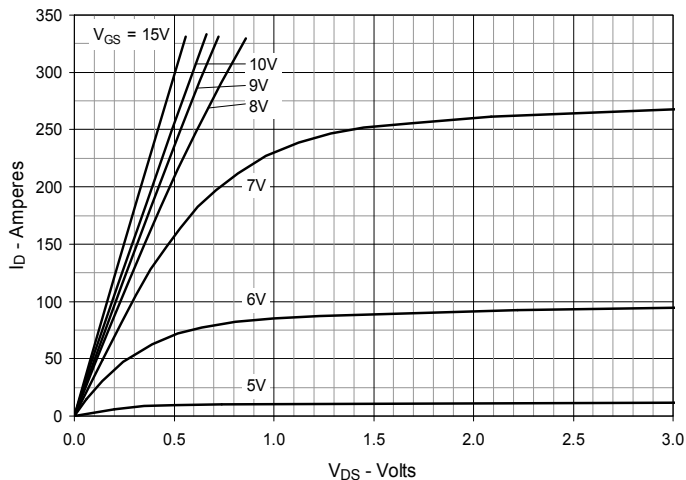
IXYS Reserves the Right to Change Limits, Test Conditions, and Dimensions.

|                                                                                  |           |           |           |           |              |              |              |              |              |             |
|----------------------------------------------------------------------------------|-----------|-----------|-----------|-----------|--------------|--------------|--------------|--------------|--------------|-------------|
| 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    |             |

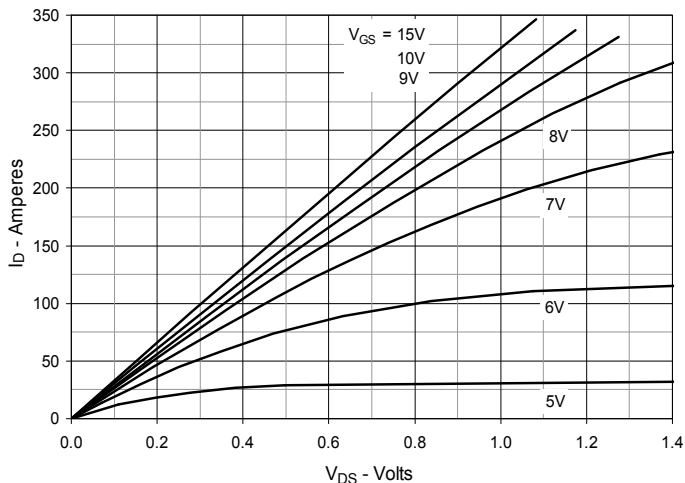
**Fig. 1. Output Characteristics @  $T_J = 25^\circ\text{C}$**



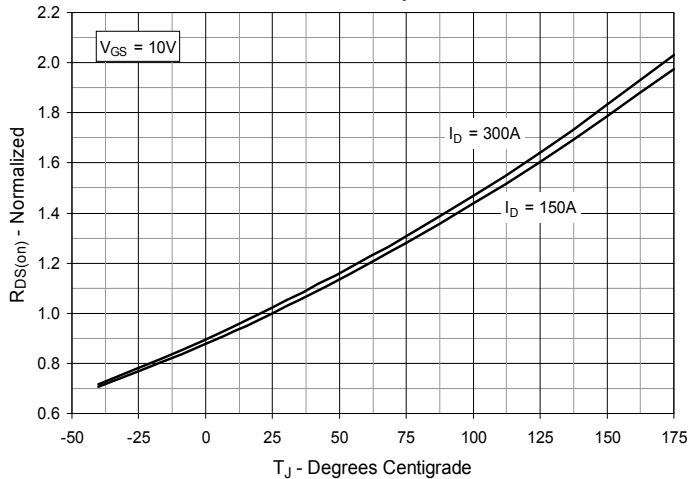
**Fig. 2. Extended Output Characteristics @  $T_J = 25^\circ\text{C}$**



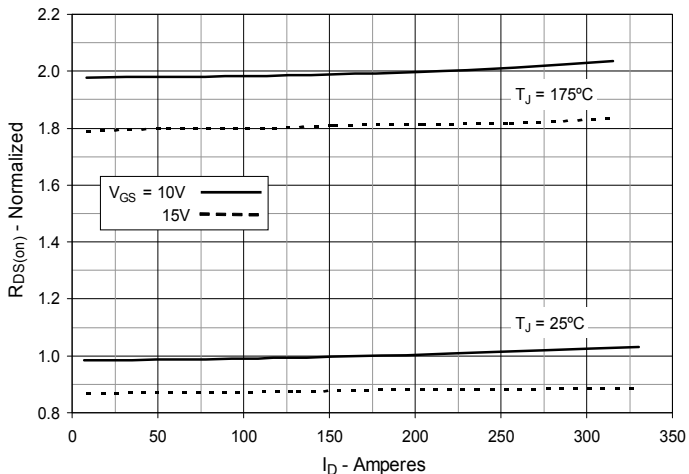
**Fig. 3. Output Characteristics @  $T_J = 150^\circ\text{C}$**



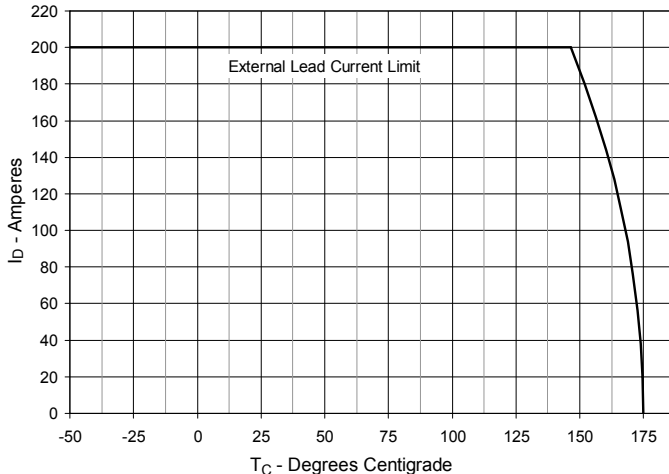
**Fig. 4.  $R_{DS(on)}$  Normalized to  $I_D = 150\text{A}$  Value vs. Junction Temperature**



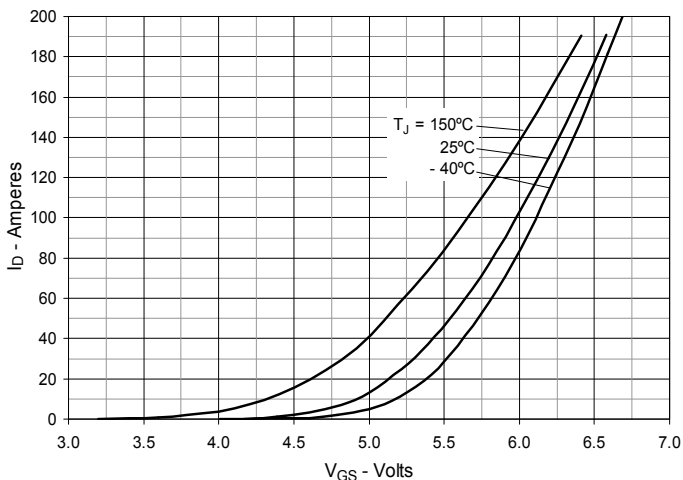
**Fig. 5.  $R_{DS(on)}$  Normalized to  $I_D = 150\text{A}$  Value vs. Drain Current**



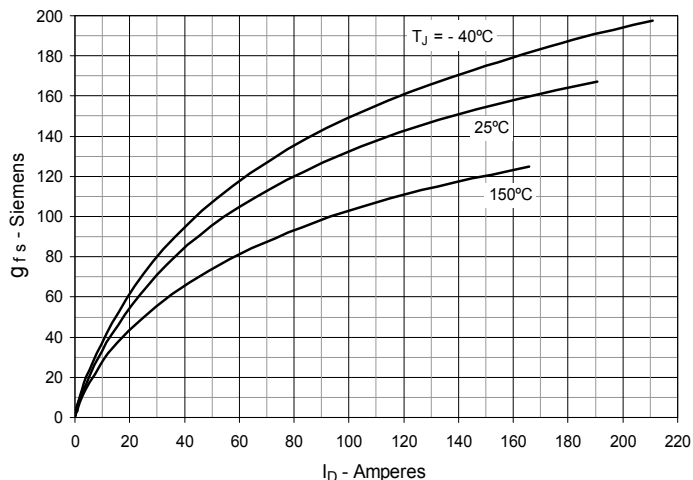
**Fig. 6. Drain Current vs. Case Temperature**



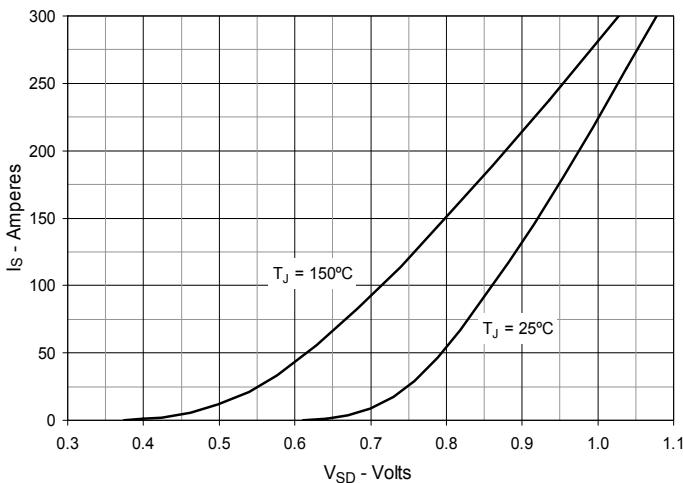
**Fig. 7. Input Admittance**



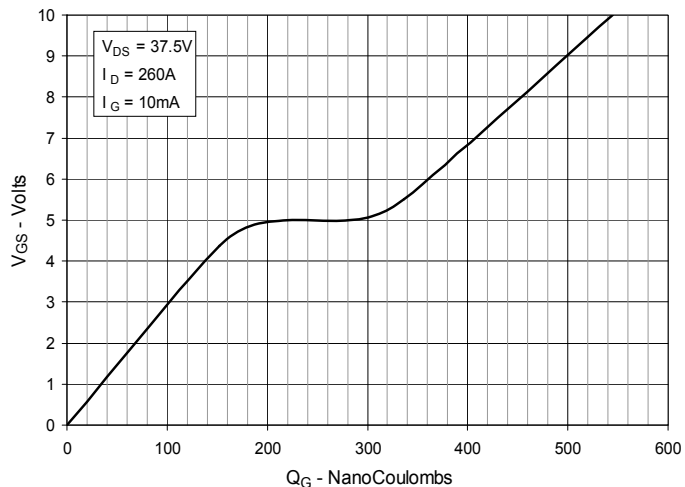
**Fig. 8. Transconductance**



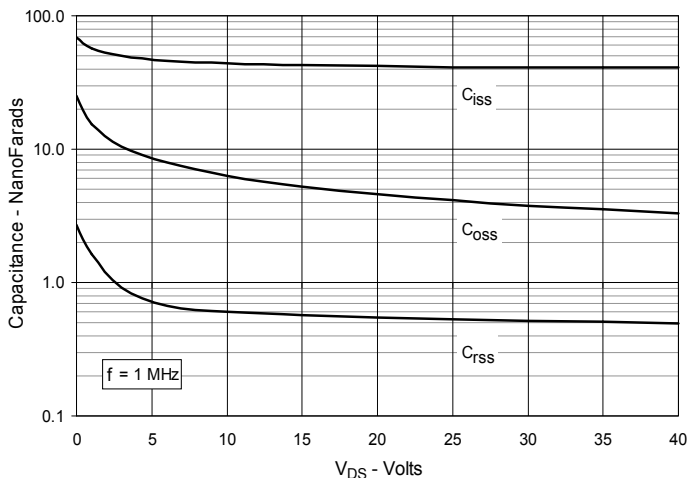
**Fig. 9. Forward Voltage Drop of Intrinsic Diode**



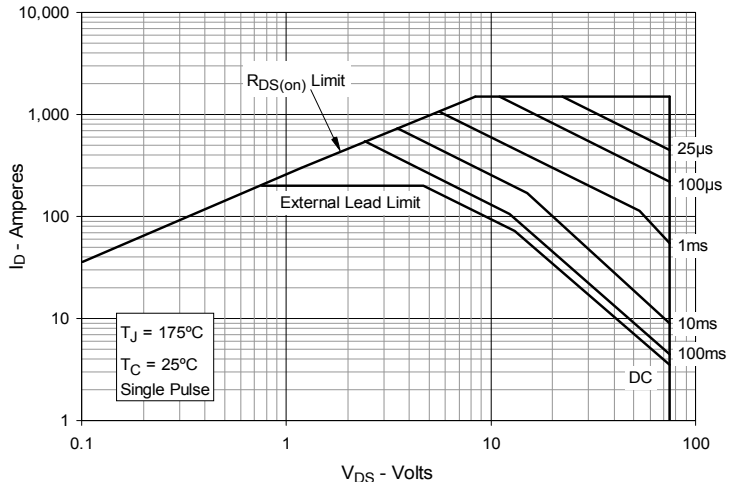
**Fig. 10. Gate Charge**



**Fig. 11. Capacitance**



**Fig. 12. Forward-Bias Safe Operating Area**



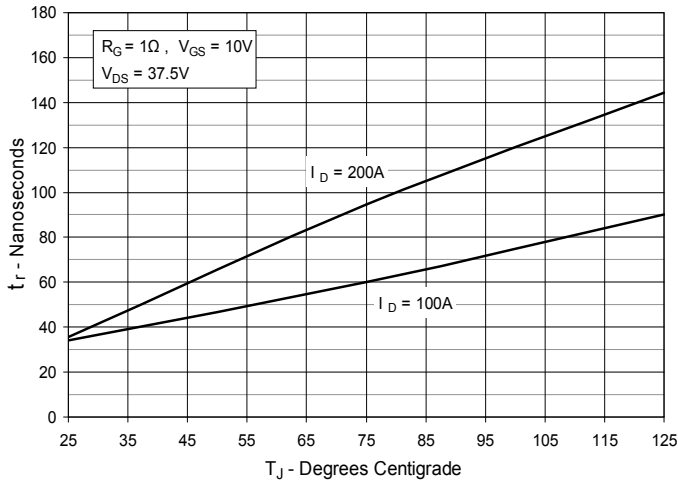
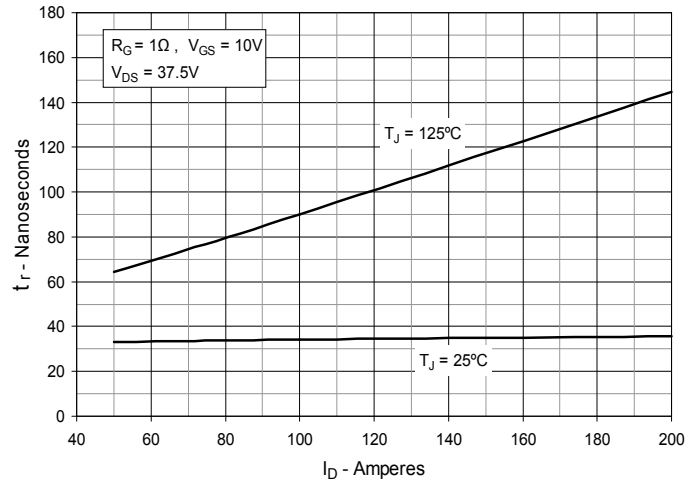
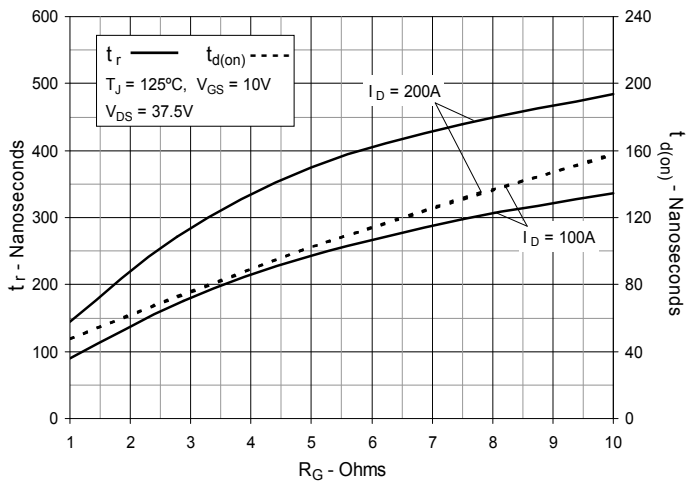
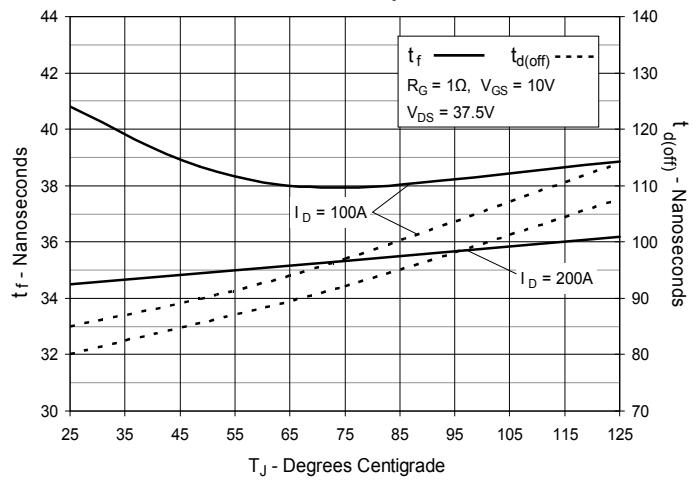
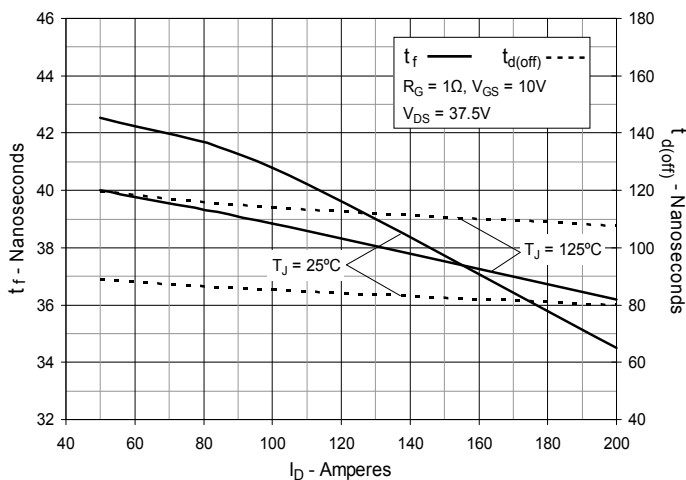
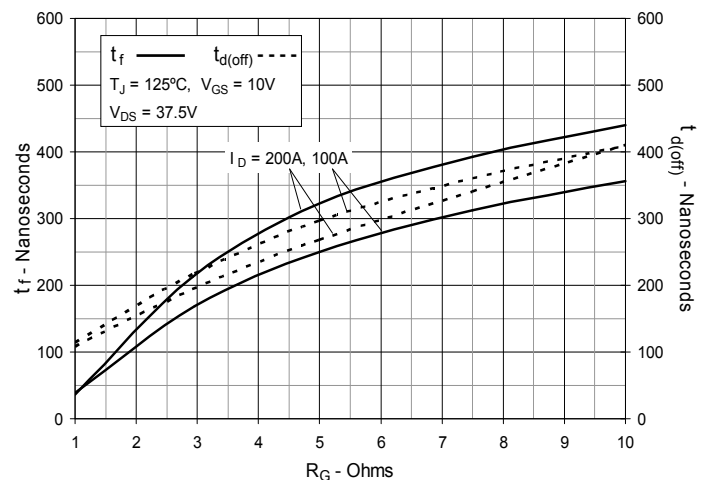
**Fig. 13. Resistive Turn-on Rise Time vs. Junction Temperature**

**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**


Fig. 19. Maximum Transient Thermal Impedance

