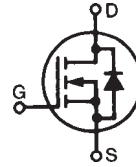


### TrenchT2™ HiperFET™ Power MOSFET

**IXFA180N10T2**  
**IXFP180N10T2**

$$\begin{aligned} V_{DSS} &= 100V \\ I_{D25} &= 180A \\ R_{DS(on)} &\leq 6m\Omega \end{aligned}$$

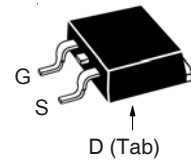
N-Channel Enhancement Mode  
Avalanche Rated  
Fast Intrinsic Rectifier



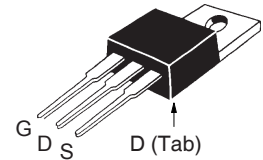
| Symbol     | Test Conditions                                                          | Maximum Ratings |                  |
|------------|--------------------------------------------------------------------------|-----------------|------------------|
| $V_{DSS}$  | $T_J = 25^\circ\text{C}$ to $175^\circ\text{C}$                          | 100             | V                |
| $V_{DGR}$  | $T_J = 25^\circ\text{C}$ to $175^\circ\text{C}$ , $R_{GS} = 1M\Omega$    | 100             | V                |
| $V_{GSS}$  | Continuous                                                               | $\pm 20$        | V                |
| $V_{GSM}$  | Transient                                                                | $\pm 30$        | V                |
| $I_{D25}$  | $T_C = 25^\circ\text{C}$ (Chip Capability)                               | 180             | A                |
| $I_{LRMS}$ | Lead Current Limit, RMS                                                  | 120             | A                |
| $I_{DM}$   | $T_C = 25^\circ\text{C}$ , Pulse Width Limited by $T_{JM}$               | 450             | A                |
| $I_A$      | $T_C = 25^\circ\text{C}$                                                 | 90              | A                |
| $E_{AS}$   | $T_C = 25^\circ\text{C}$                                                 | 750             | mJ               |
| $dv/dt$    | $I_S \leq I_{DM}$ , $V_{DD} \leq V_{DSS}$ , $T_J \leq 175^\circ\text{C}$ | 15              | V/ns             |
| $P_D$      | $T_C = 25^\circ\text{C}$                                                 | 480             | W                |
| $T_J$      |                                                                          | -55 ... +175    | $^\circ\text{C}$ |
| $T_{JM}$   |                                                                          | 175             | $^\circ\text{C}$ |
| $T_{stg}$  |                                                                          | -55 ... +175    | $^\circ\text{C}$ |
| $T_L$      | 1.6mm (0.062in.) from Case for 10s                                       | 300             | $^\circ\text{C}$ |
| $T_{sold}$ | Plastic Body for 10 Seconds                                              | 260             | $^\circ\text{C}$ |
| $M_d$      | Mounting Torque (TO-220)                                                 | 1.13 / 10       | Nm/lb.in.        |
| Weight     | TO-263                                                                   | 2.5             | g                |
|            | TO-220                                                                   | 3.0             | g                |

| Symbol       | Test Conditions<br>( $T_J = 25^\circ\text{C}$ Unless Otherwise Specified) | Characteristic Values |      |              |
|--------------|---------------------------------------------------------------------------|-----------------------|------|--------------|
|              |                                                                           | Min.                  | Typ. | Max.         |
| $BV_{DSS}$   | $V_{GS} = 0V$ , $I_D = 250\mu A$                                          | 100                   |      | V            |
| $V_{GS(th)}$ | $V_{DS} = V_{GS}$ , $I_D = 250\mu A$                                      | 2.0                   |      | V            |
| $I_{GSS}$    | $V_{GS} = \pm 20V$ , $V_{DS} = 0V$                                        |                       |      | $\pm 100$ nA |
| $I_{DSS}$    | $V_{DS} = V_{DSS}$ , $V_{GS} = 0V$<br>$T_J = 150^\circ\text{C}$           |                       |      | 10 $\mu A$   |
|              |                                                                           |                       |      | 750 $\mu A$  |
| $R_{DS(on)}$ | $V_{GS} = 10V$ , $I_D = 50A$ , Notes 1, 2                                 |                       |      | 6 m $\Omega$ |

#### TO-263 AA (IXFA)



#### TO-220AB (IXFP)



G = Gate      D = Drain  
S = Source    Tab = Drain

#### Features

- International Standard Packages
- Avalanche Rated
- $175^\circ\text{C}$  Operating Temperature
- High Current Handling Capability
- Fast Intrinsic Rectifier
- Low  $R_{DS(on)}$

#### Advantages

- Easy to Mount
- Space Savings
- High Power Density

#### Applications

- DC-DC Converters
- Battery Chargers
- Switch-Mode and Resonant-Mode Power Supplies
- DC Choppers
- AC Motor Drives
- Uninterruptible Power Supplies
- High Speed Power Switching Applications

| 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                                                                                                | 50                    | 88   | S                       |
| $C_{iss}$    | $V_{GS} = 0\text{V}$ , $V_{DS} = 25\text{V}$ , $f = 1\text{MHz}$                                                                                   |                       | 10.5 | nF                      |
| $C_{oss}$    |                                                                                                                                                    |                       | 945  | pF                      |
| $C_{rss}$    |                                                                                                                                                    |                       | 100  | pF                      |
| $t_{d(on)}$  | <b>Resistive Switching Times</b><br>$V_{GS} = 10\text{V}$ , $V_{DS} = 0.5 \cdot V_{DSS}$ , $I_D = 0.5 \cdot I_{D25}$<br>$R_G = 2\Omega$ (External) |                       | 21   | ns                      |
| $t_r$        |                                                                                                                                                    |                       | 37   | ns                      |
| $t_{d(off)}$ |                                                                                                                                                    |                       | 34   | ns                      |
| $t_f$        |                                                                                                                                                    |                       | 13   | ns                      |
| $Q_{g(on)}$  | $V_{GS} = 10\text{V}$ , $V_{DS} = 0.5 \cdot V_{DSS}$ , $I_D = 0.5 \cdot I_{D25}$                                                                   |                       | 185  | nC                      |
| $Q_{gs}$     |                                                                                                                                                    |                       | 48   | nC                      |
| $Q_{gd}$     |                                                                                                                                                    |                       | 52   | nC                      |
| $R_{thJC}$   | TO-220                                                                                                                                             |                       |      | 0.31 $^\circ\text{C/W}$ |
| $R_{thCH}$   |                                                                                                                                                    | 0.50                  |      | $^\circ\text{C/W}$      |

### Source-Drain Diode

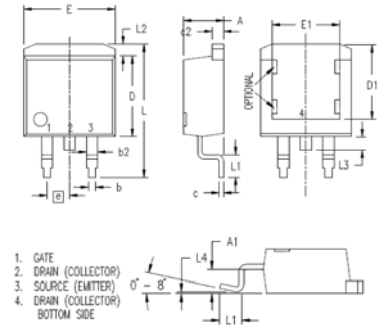
| Symbol   | Test Conditions<br>( $T_J = 25^\circ\text{C}$ , Unless Otherwise Specified)                                         | Characteristic Values |      |       |
|----------|---------------------------------------------------------------------------------------------------------------------|-----------------------|------|-------|
|          |                                                                                                                     | Min.                  | Typ. | Max.  |
| $I_S$    | $V_{GS} = 0\text{V}$                                                                                                |                       |      | 180 A |
| $I_{SM}$ | Repetitive, Pulse Width Limited by $T_{JM}$                                                                         |                       |      | 720 A |
| $V_{SD}$ | $I_F = 100\text{A}$ , $V_{GS} = 0\text{V}$ , Note 1                                                                 |                       |      | 1.3 V |
| $t_{rr}$ | $I_F = 0.5 \cdot I_{D25}$ , $V_{GS} = 0\text{V}$<br>$-di/dt = 100\text{A}/\mu\text{s}$<br>$V_R = 0.5 \cdot V_{DSS}$ |                       | 66   | ns    |
| $I_{RM}$ |                                                                                                                     |                       | 5.8  | A     |
| $Q_{RM}$ |                                                                                                                     |                       | 190  | nC    |

- Notes: 1. Pulse test,  $t \leq 300\mu\text{s}$ , duty cycle,  $d \leq 2\%$ .  
2. On through-hole package,  $R_{DS(on)}$  Kelvin test contact location must be 5mm or less from the package body.

### PRELIMINARY TECHNICAL INFORMATION

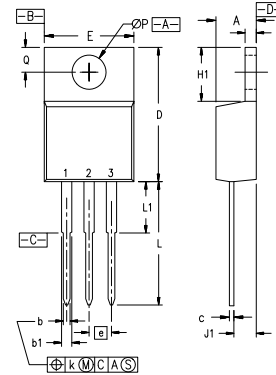
The product presented herein is under development. The Technical Specifications offered are derived from data gathered during objective characterizations of preliminary engineering lots; but also may yet contain some information supplied during a pre-production design evaluation. IXYS reserves the right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

### TO-263 Outline

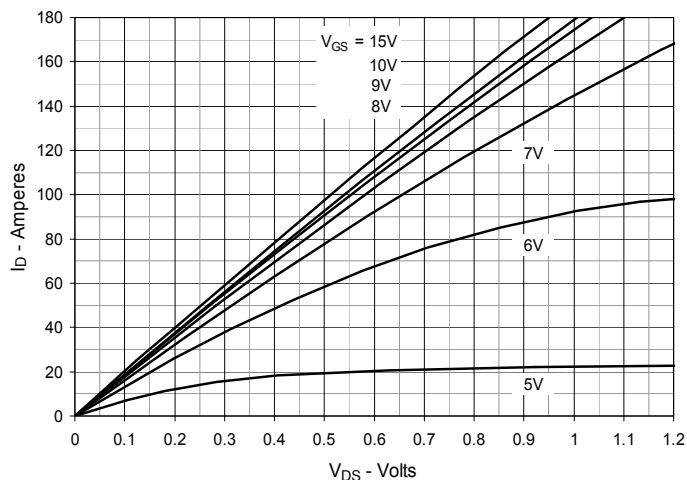


| SYM | INCHES   |      | MILLIMETERS |       |
|-----|----------|------|-------------|-------|
|     | MIN      | MAX  | MIN         | MAX   |
| A   | .160     | .190 | 4.06        | 4.83  |
| A1  | .080     | .110 | 2.03        | 2.79  |
| b   | .020     | .039 | 0.51        | 0.99  |
| b2  | .045     | .055 | 1.14        | 1.40  |
| c   | .016     | .029 | 0.40        | 0.74  |
| c2  | .045     | .055 | 1.14        | 1.40  |
| D   | .340     | .380 | 8.64        | 9.65  |
| D1  | .315     | .350 | 8.00        | 8.89  |
| E   | .380     | .410 | 9.65        | 10.41 |
| E1  | .245     | .320 | 6.22        | 8.13  |
| e   | .100 BSC |      | 2.54 BSC    |       |
| L   | .575     | .625 | 14.61       | 15.88 |
| L1  | .090     | .110 | 2.29        | 2.79  |
| L2  | .040     | .055 | 1.02        | 1.40  |
| L3  | .050     | .070 | 1.27        | 1.78  |
| L4  | 0        | .005 | 0           | 0.13  |

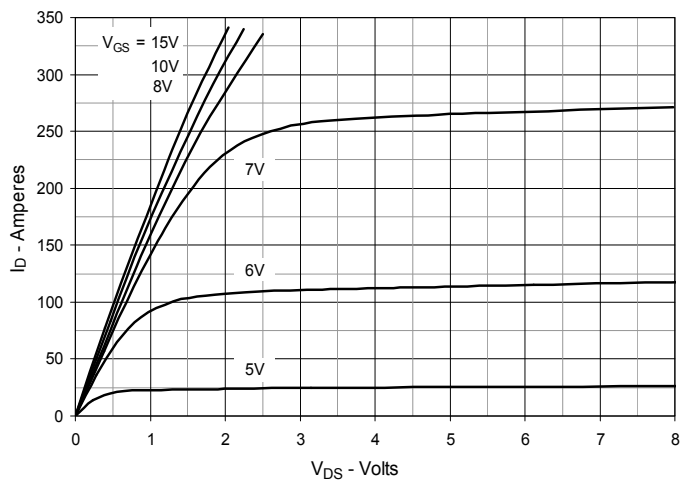
### TO-220 Outline



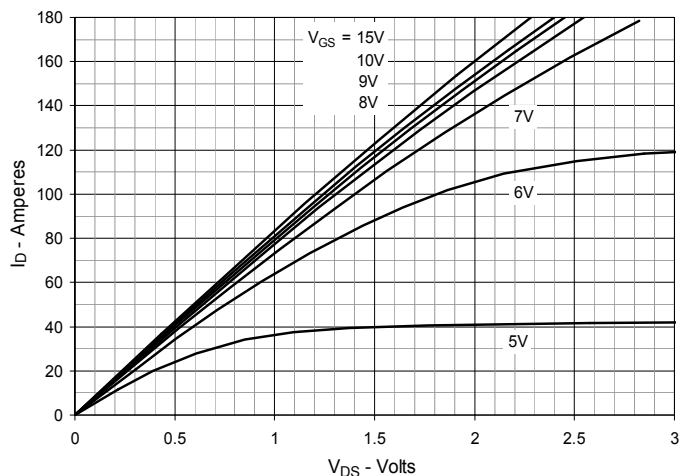
**Fig. 1. Output Characteristics @  $T_J = 25^\circ\text{C}$**



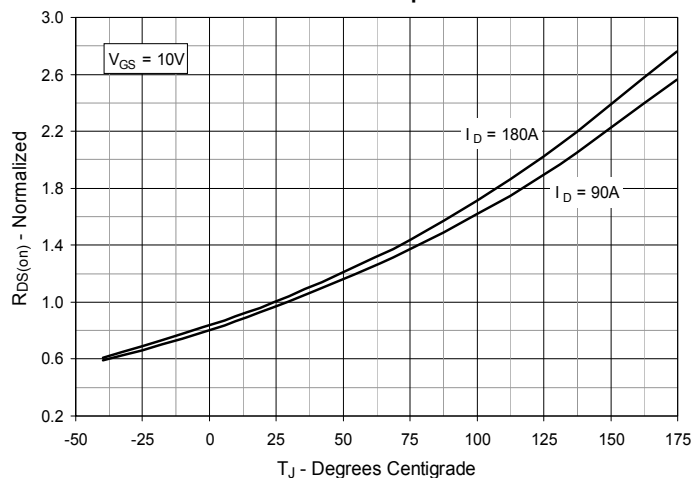
**Fig. 2. Extended Output Characteristics @  $T_J = 25^\circ\text{C}$**



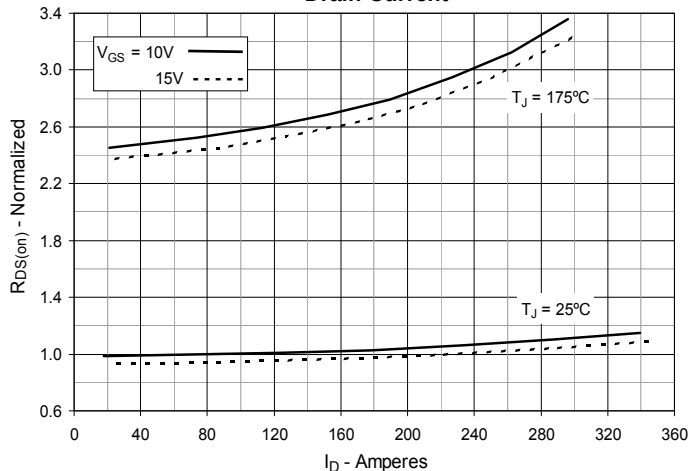
**Fig. 3. Output Characteristics @  $T_J = 150^\circ\text{C}$**



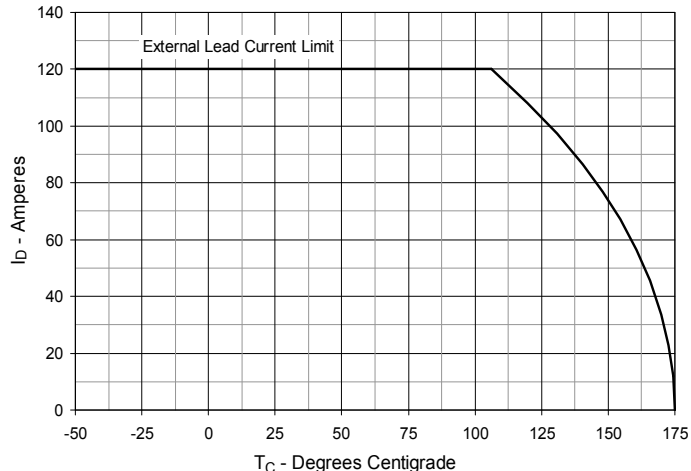
**Fig. 4.  $R_{DS(on)}$  Normalized to  $I_D = 90\text{A}$  Value vs. Junction Temperature**



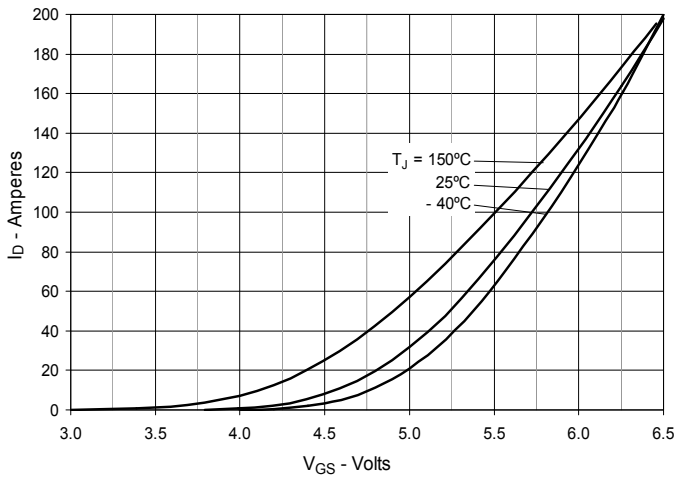
**Fig. 5.  $R_{DS(on)}$  Normalized to  $I_D = 90\text{A}$  Value vs. Drain Current**



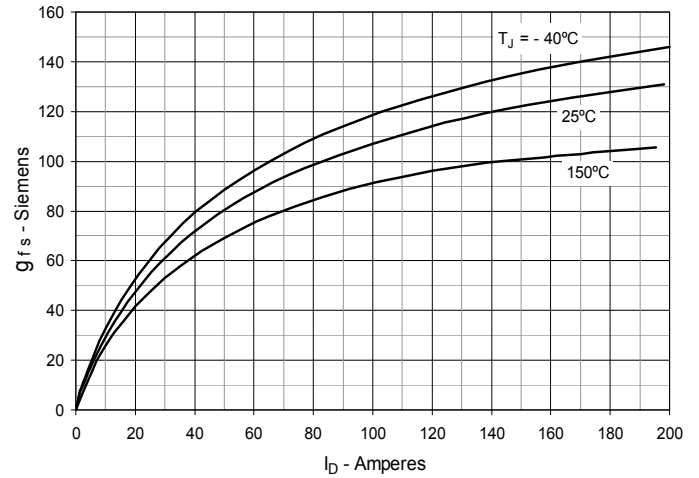
**Fig. 6. Drain Current vs. Case Temperature**



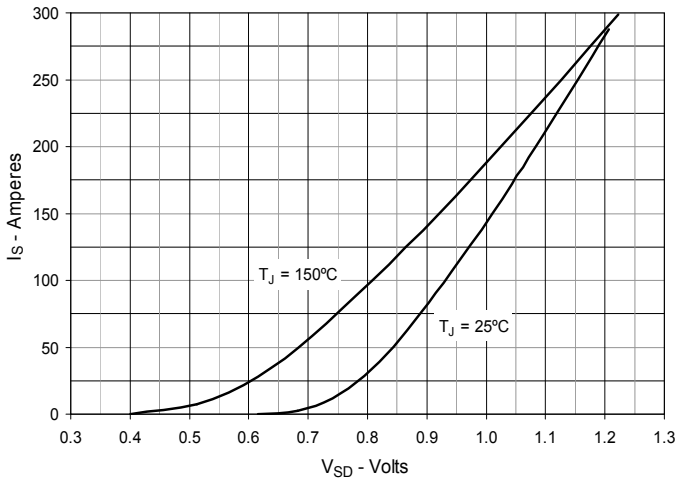
**Fig. 7. Input Admittance**



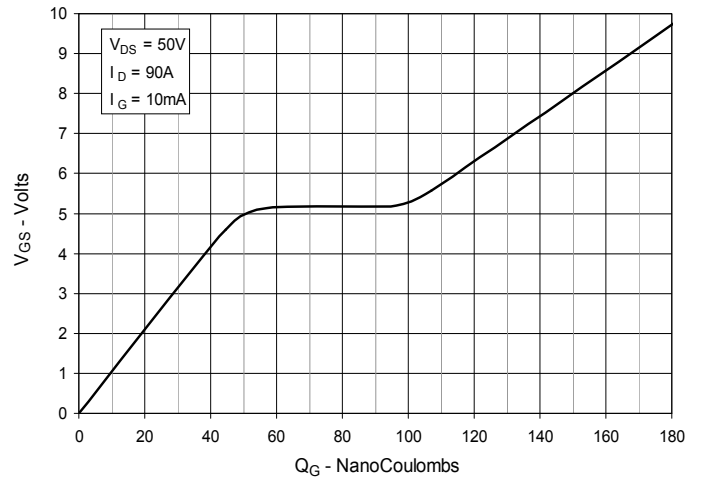
**Fig. 8. Transconductance**



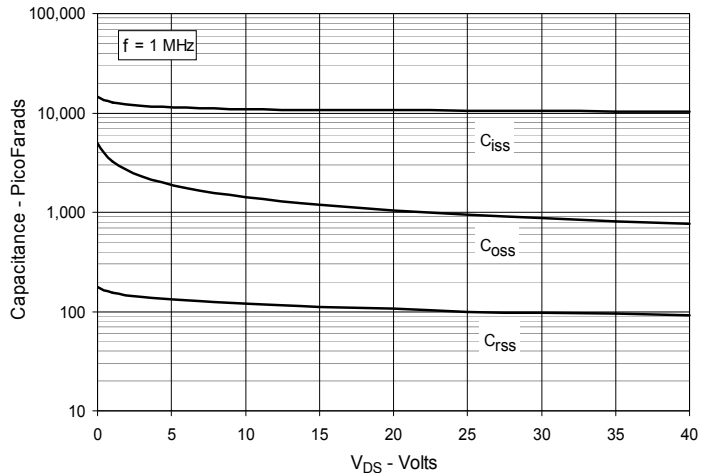
**Fig. 9. Forward Voltage Drop of Intrinsic Diode**



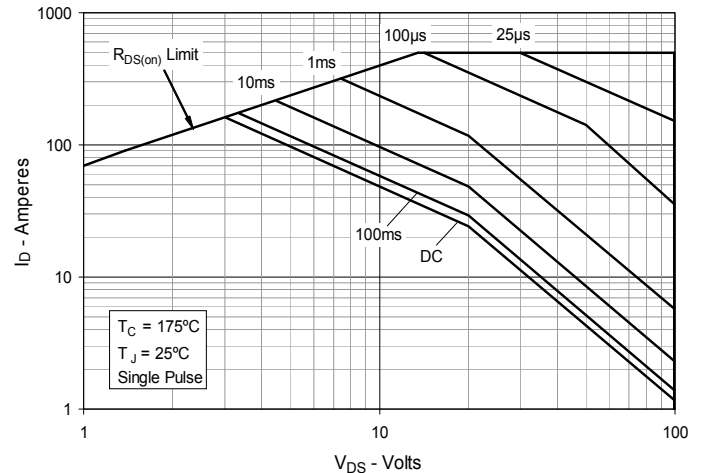
**Fig. 10. Gate Charge**



**Fig. 11. Capacitance**



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



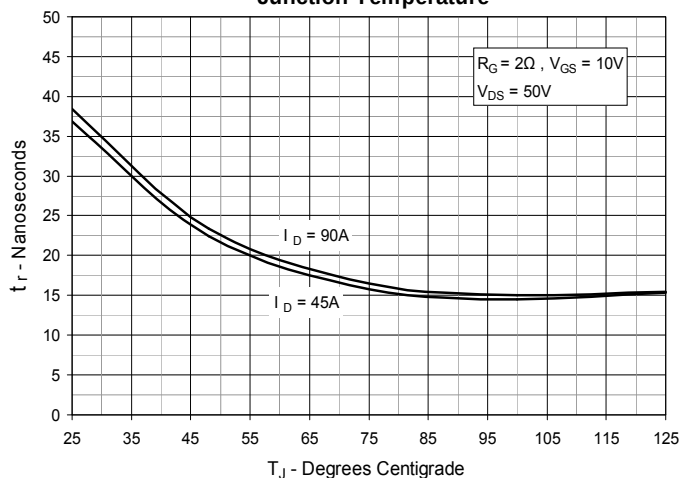
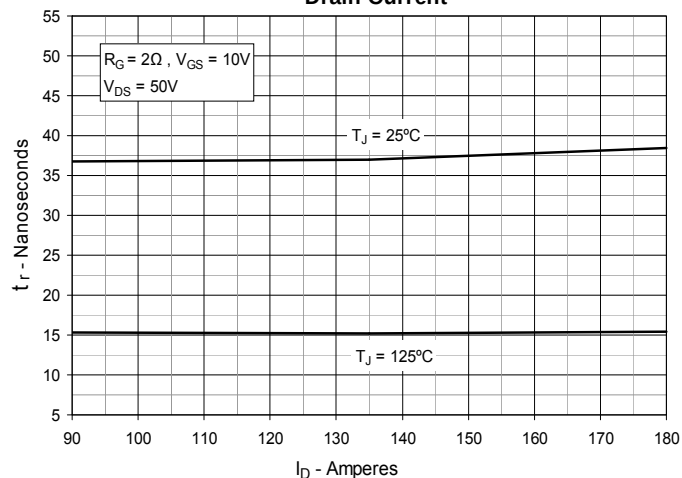
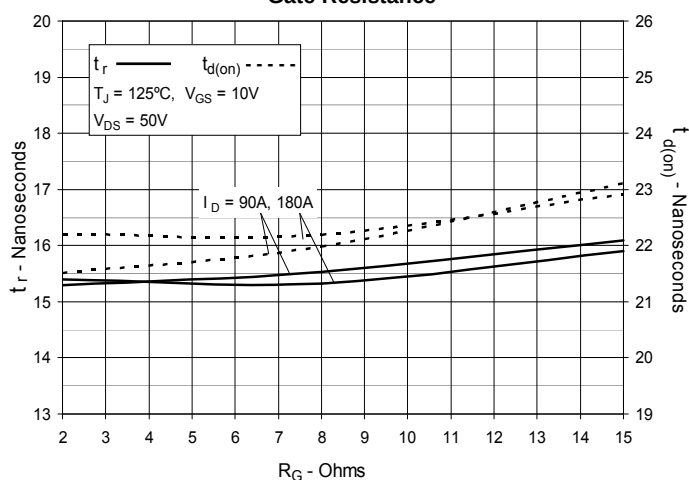
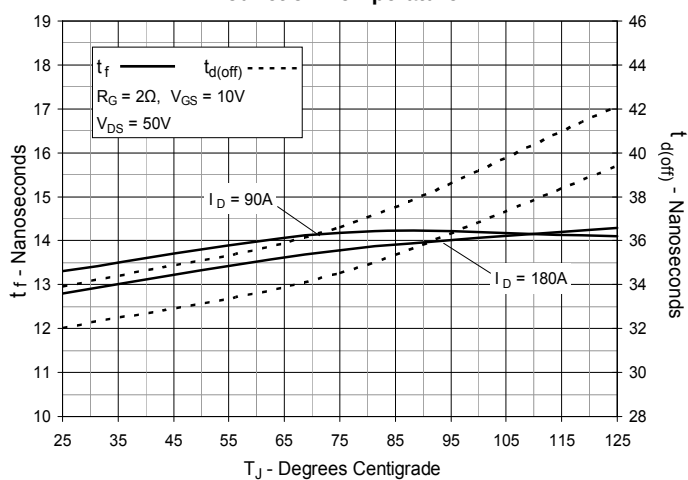
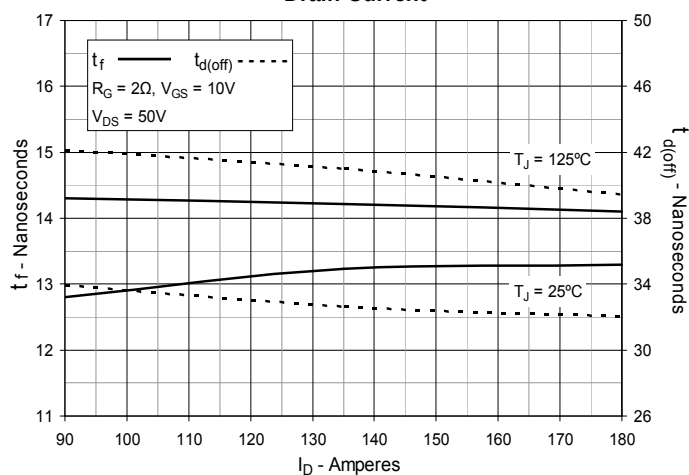
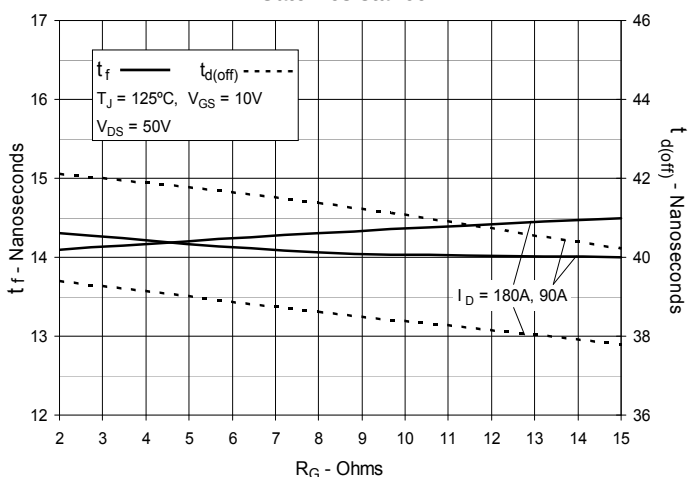
**Fig. 13. Resistive Turn-on Rise Time vs. Junction Temperature**

**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

