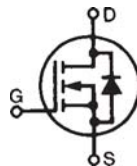


## TrenchMV™ Power MOSFET

## IXTA80N10T IXTP80N10T

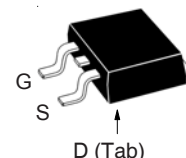
$$\begin{aligned} V_{DSS} &= 100V \\ I_{D25} &= 80A \\ R_{DS(on)} &\leq 14m\Omega \end{aligned}$$

N-Channel Enhancement Mode  
Avalanche Rated  
Fast Intrinsic Diode

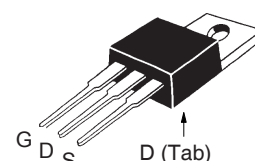


| Symbol     | Test Conditions                                                          | Maximum Ratings |                  |
|------------|--------------------------------------------------------------------------|-----------------|------------------|
| $V_{DSS}$  | $T_J = 25^\circ\text{C}$ to $175^\circ\text{C}$                          | 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                |
| $I_{D25}$  | $T_C = 25^\circ\text{C}$                                                 | 80              | A                |
| $I_{DM}$   | $T_C = 25^\circ\text{C}$ , Pulse Width Limited by $T_{JM}$               | 220             | A                |
| $I_A$      | $T_C = 25^\circ\text{C}$                                                 | 25              | A                |
| $E_{AS}$   | $T_C = 25^\circ\text{C}$                                                 | 400             | mJ               |
| $P_D$      | $T_C = 25^\circ\text{C}$                                                 | 230             | W                |
| $dV/dt$    | $I_S \leq I_{DM}$ , $V_{DD} \leq V_{DSS}$ , $T_J \leq 175^\circ\text{C}$ | 10              | V/ns             |
| $T_J$      |                                                                          | -55 ... +175    | $^\circ\text{C}$ |
| $T_{JM}$   |                                                                          | 175             | $^\circ\text{C}$ |
| $T_{stg}$  |                                                                          | -55 ... +175    | $^\circ\text{C}$ |
| $T_L$      | 1.6mm (0.062 in.) from Case for 10s                                      | 300             | $^\circ\text{C}$ |
| $T_{SOLD}$ | Plastic Body for 10s                                                     | 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                |

TO-263 AA (IXTA)



TO-220AB (IXTP)



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

### Features

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

### Advantages

- Easy to Mount
- Space Savings
- High Power Density

### Applications

- Automotive
  - Motor Drives
  - DC/DC Conversion
  - 42V Power Bus
  - ABS Systems
- DC/DC Converters and Off-Line UPS
- Primary Switch for 24V and 48V Systems
- High Current Switching Applications
- Distributed Power Architectures and VRMs
- Electronic Valve Train Systems

| Symbol       | Test Conditions<br>( $T_J = 25^\circ\text{C}$ Unless Otherwise Specified) | Characteristic Values |      |                          |
|--------------|---------------------------------------------------------------------------|-----------------------|------|--------------------------|
|              |                                                                           | Min.                  | Typ. | Max.                     |
| $BV_{DSS}$   | $V_{GS} = 0V$ , $I_D = 250\mu A$                                          | 105                   |      | V                        |
| $V_{GS(th)}$ | $V_{DS} = V_{GS}$ , $I_D = 100\mu A$                                      | 2.5                   |      | 5.0 V                    |
| $I_{GSS}$    | $V_{GS} = \pm 20V$ , $V_{DS} = 0V$                                        |                       |      | $\pm 200$ nA             |
| $I_{DSS}$    | $V_{DS} = 105V$ , $V_{GS} = 0V$<br>$T_J = 150^\circ\text{C}$              |                       |      | 5 $\mu A$<br>150 $\mu A$ |
| $R_{DS(on)}$ | $V_{GS} = 10V$ , $I_D = 25A$ , Note 1 & 2                                 |                       |      | 14 m $\Omega$            |

| Symbol<br>(T <sub>J</sub> = 25°C Unless Otherwise Specified) | Test Conditions                                                                                                                                               | Characteristic Values |      |      |
|--------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|------|------|
|                                                              |                                                                                                                                                               | Min.                  | Typ. | Max. |
| <b>g<sub>fs</sub></b>                                        | V <sub>DS</sub> = 10V, I <sub>D</sub> = 0.5 • I <sub>D25</sub> , Note 1                                                                                       | 33                    | 55   | S    |
| <b>C<sub>iss</sub></b>                                       | V <sub>GS</sub> = 0V, V <sub>DS</sub> = 25V, f = 1MHz                                                                                                         |                       | 3040 | pF   |
| <b>C<sub>oss</sub></b>                                       |                                                                                                                                                               |                       | 420  | pF   |
| <b>C<sub>rss</sub></b>                                       |                                                                                                                                                               |                       | 90   | pF   |
| <b>t<sub>d(on)</sub></b>                                     | <b>Resistive Switching Times</b><br>V <sub>GS</sub> = 10V, V <sub>DS</sub> = 0.5 • V <sub>DSS</sub> , I <sub>D</sub> = 10A<br>R <sub>G</sub> = 15Ω (External) |                       | 31   | ns   |
| <b>t<sub>r</sub></b>                                         |                                                                                                                                                               |                       | 54   | ns   |
| <b>t<sub>d(off)</sub></b>                                    |                                                                                                                                                               |                       | 40   | ns   |
| <b>t<sub>f</sub></b>                                         |                                                                                                                                                               |                       | 48   | ns   |
| <b>Q<sub>g(on)</sub></b>                                     | V <sub>GS</sub> = 10V, V <sub>DS</sub> = 0.5 • V <sub>DSS</sub> , I <sub>D</sub> = 25A                                                                        |                       | 60   | nC   |
| <b>Q<sub>gs</sub></b>                                        |                                                                                                                                                               |                       | 21   | nC   |
| <b>Q<sub>gd</sub></b>                                        |                                                                                                                                                               |                       | 15   | nC   |
| <b>R<sub>thJC</sub></b>                                      |                                                                                                                                                               |                       | 0.65 | °C/W |
| <b>R<sub>thCS</sub></b>                                      |                                                                                                                                                               |                       |      | °C/W |

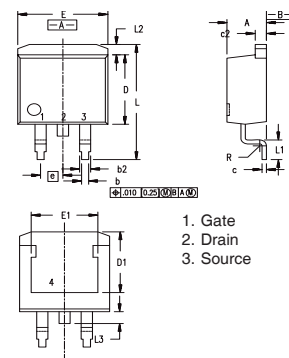
### Source-Drain Diode

| Symbol<br>(T <sub>J</sub> = 25°C, Unless Otherwise Specified) | Test Conditions                                                                      | Characteristic Values |      |      |
|---------------------------------------------------------------|--------------------------------------------------------------------------------------|-----------------------|------|------|
|                                                               |                                                                                      | Min.                  | Typ. | Max. |
| I <sub>S</sub>                                                | V <sub>GS</sub> = 0V                                                                 |                       |      | 80   |
| I <sub>SM</sub>                                               | Repetitive, Pulse Width Limited by T <sub>JM</sub>                                   |                       |      | 220  |
| V <sub>SD</sub>                                               | I <sub>F</sub> = 25A, V <sub>GS</sub> = 0V, Note 1                                   |                       |      | 1.1  |
| t <sub>rr</sub>                                               | I <sub>F</sub> = 25A, -di/dt = 100A/μs<br>V <sub>R</sub> = 50V, V <sub>GS</sub> = 0V |                       | 100  |      |

Notes

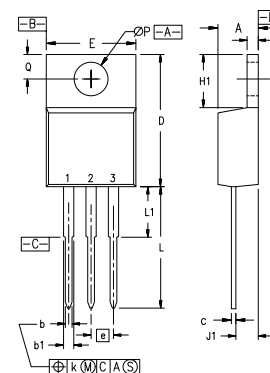
1. Pulse test,  $t \leq 300\mu s$ , duty cycle,  $d \leq 2\%$ .
2. On through-hole packages  $R_{DS(on)}$  Kelvin test contact location must be 5 mm or less from the package body.

## TO-263 (IXTA) Outline



| Dim. | Millimeter |       | Inches |      |
|------|------------|-------|--------|------|
|      | Min.       | Max.  | Min.   | Max. |
| A    | 4.06       | 4.83  | .160   | .190 |
| b    | 0.51       | 0.99  | .020   | .039 |
| b2   | 1.14       | 1.40  | .045   | .055 |
|      | 0.40       | 0.74  | .016   | .029 |
| c2   | 1.14       | 1.40  | .045   | .055 |
| D    | 8.64       | 9.65  | .340   | .380 |
| D1   | 8.00       | 8.89  | .280   | .320 |
| E    | 9.65       | 10.41 | .380   | .405 |
| E1   | 6.22       | 8.13  | .270   | .320 |
| e    | 2.54       | BSC   | .100   | BSC  |
| L    | 14.61      | 15.88 | .575   | .625 |
| L1   | 2.29       | 2.79  | .090   | .110 |
| L2   | 1.02       | 1.40  | .040   | .055 |
| L3   | 1.27       | 1.78  | .050   | .070 |
| L4   | 0          | 0.13  | 0      | .005 |

## TO-220 (IXTP) Outline



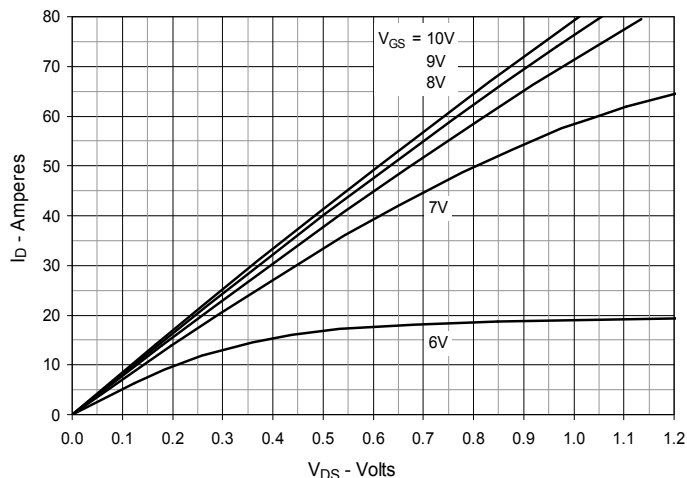
Pins:    1 - Gate            2 - Drain  
             3 - Source        4 - Drain

| SYM | INCHES   |      | MILLIMETERS |       |
|-----|----------|------|-------------|-------|
|     | MIN      | MAX  | MIN         | MAX   |
| A   | .170     | .190 | 4.32        | 4.83  |
| b   | .025     | .040 | 0.64        | 1.02  |
| b1  | .045     | .065 | 1.15        | 1.65  |
| c   | .014     | .022 | 0.35        | 0.56  |
| D   | .580     | .630 | 14.73       | 16.00 |
| E   | .390     | .420 | 9.91        | 10.66 |
| e   | .100 BSC |      | 2.54 BSC    |       |
| F   | .045     | .055 | 1.14        | 1.40  |
| H1  | .230     | .270 | 5.85        | 6.85  |
| J1  | .090     | .110 | 2.29        | 2.79  |
| k   | 0        | .015 | 0           | 0.38  |
| L   | .500     | .550 | 12.70       | 13.97 |
| L1  | .110     | .230 | 2.79        | 5.84  |
| ØP  | .139     | .161 | 3.53        | 4.08  |
| O   | .100     | .125 | 2.54        | 3.18  |

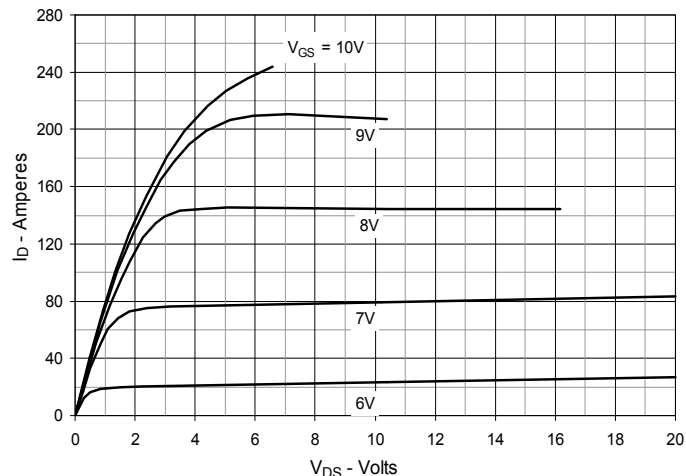
IXYS Reserves the Right to Change Limits, Test Conditions, and Dimensions.

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

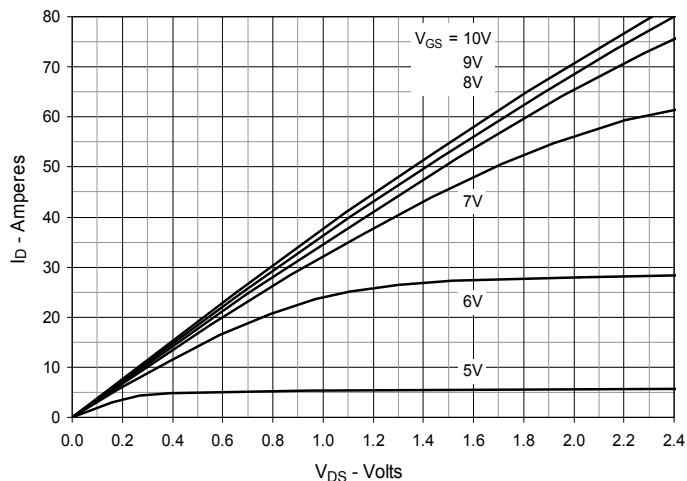
**Fig. 1. Output Characteristics @  $T_J = 25^\circ\text{C}$**



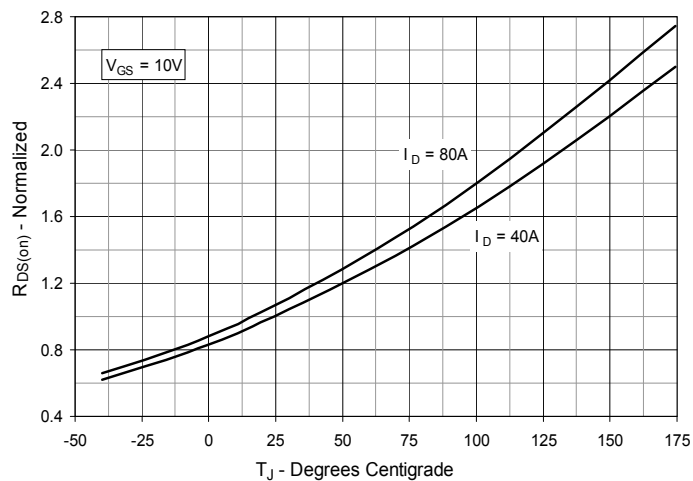
**Fig. 2. Extended Output Characteristics @  $T_J = 25^\circ\text{C}$**



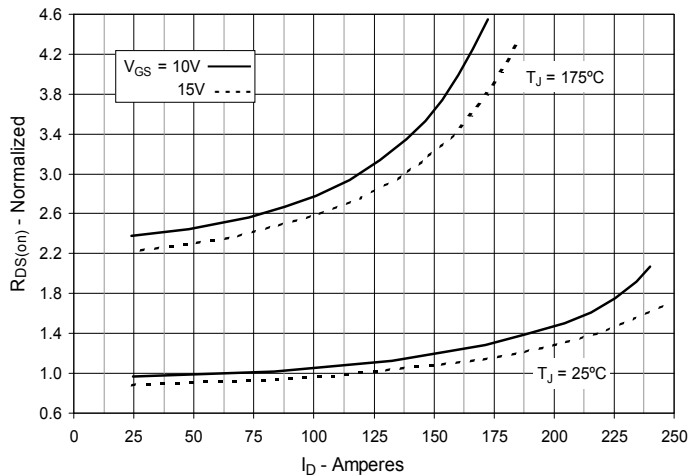
**Fig. 3. Output Characteristics @  $T_J = 150^\circ\text{C}$**



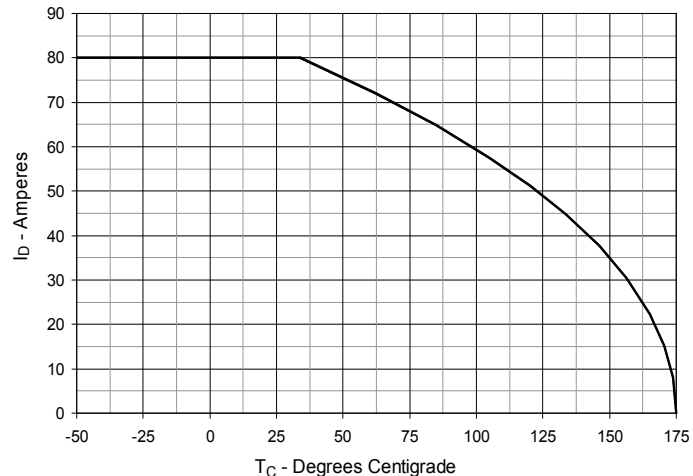
**Fig. 4.  $R_{DS(on)}$  Normalized to  $I_D = 40\text{A}$  Value vs. Junction Temperature**



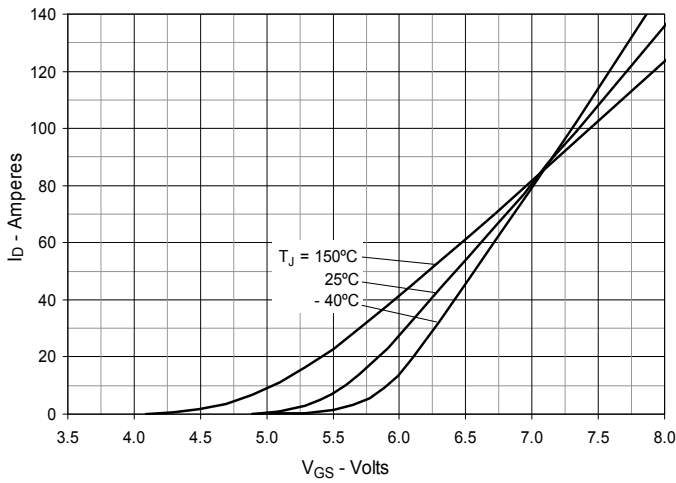
**Fig. 5.  $R_{DS(on)}$  Normalized to  $I_D = 40\text{A}$  Value vs. Drain Current**



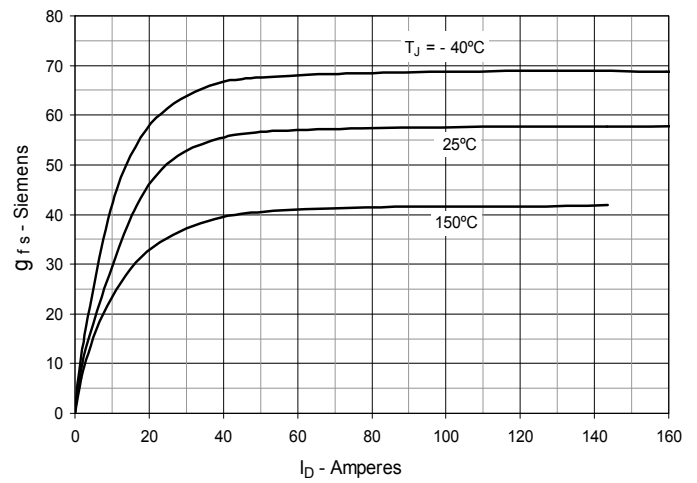
**Fig. 6. Drain Current vs. Case Temperature**



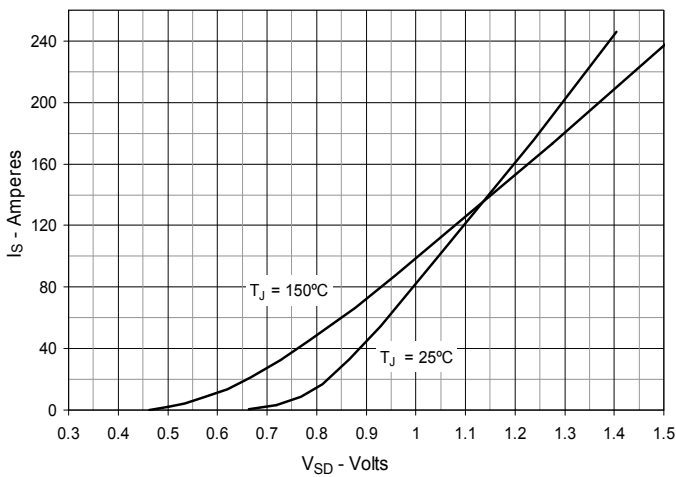
**Fig. 7. Input Admittance**



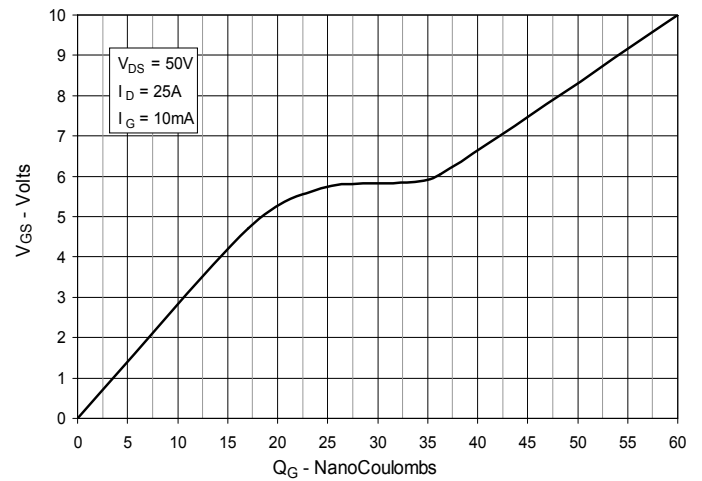
**Fig. 8. Transconductance**



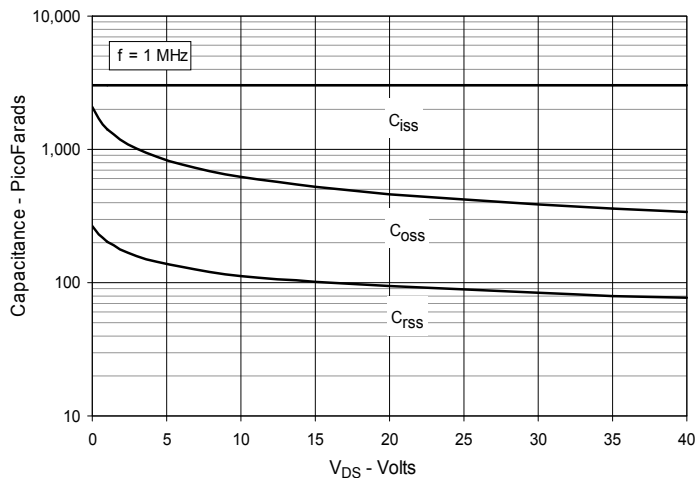
**Fig. 9. Forward Voltage Drop of Intrinsic Diode**



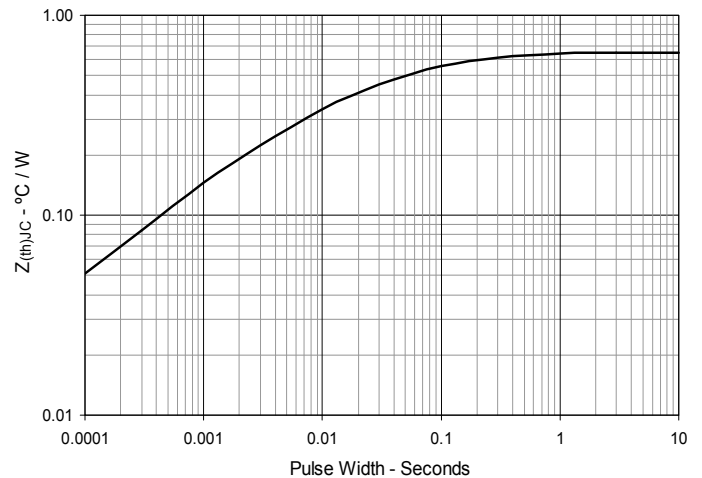
**Fig. 10. Gate Charge**



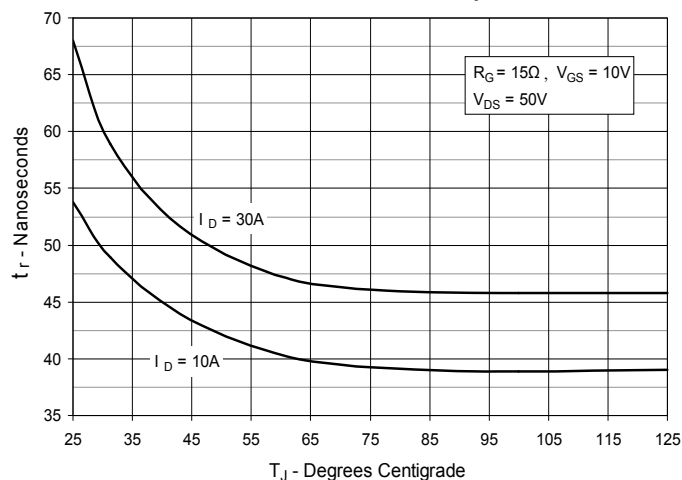
**Fig. 11. Capacitance**



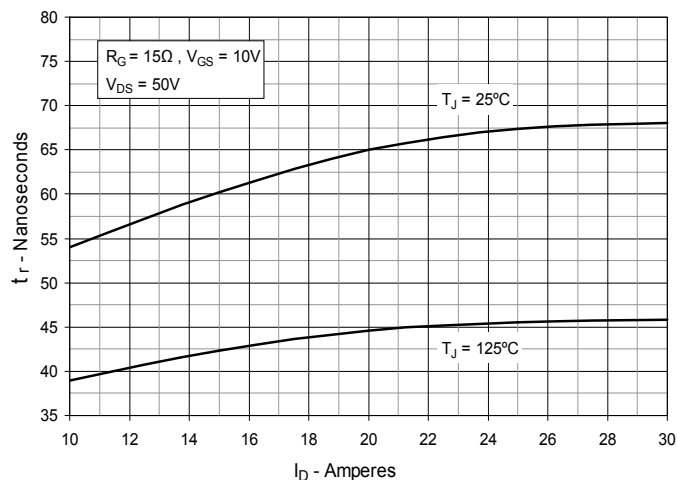
**Fig. 12. Maximum Transient Thermal Impedance**



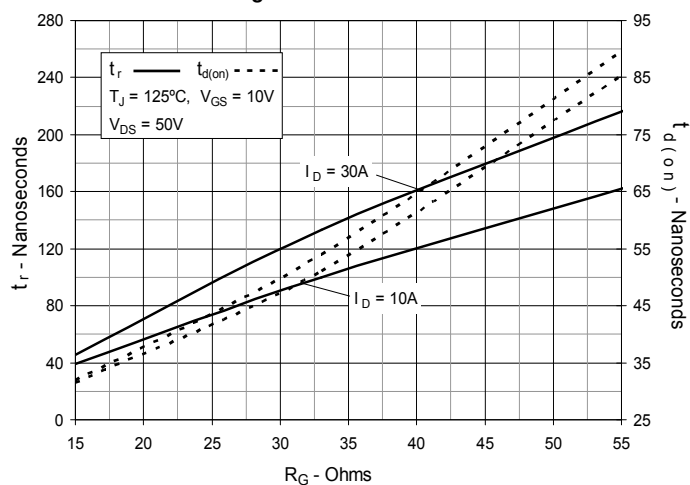
**Fig. 13. Resistive Turn-on**  
**Rise Time vs. Junction Temperature**



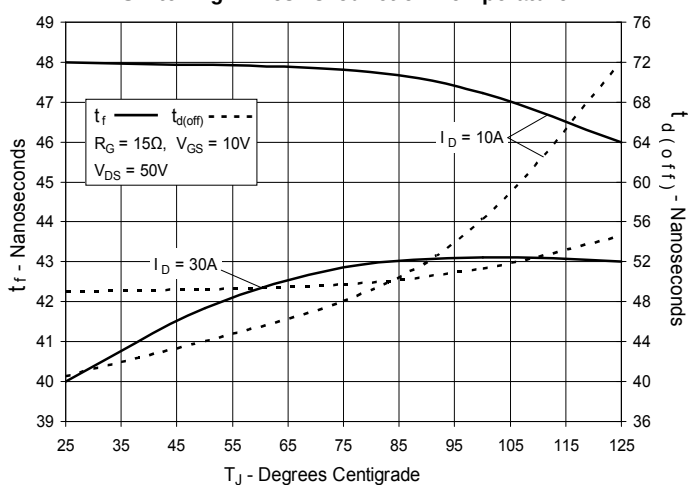
**Fig. 14. Resistive Turn-on**  
**Rise Time vs. Drain Current**



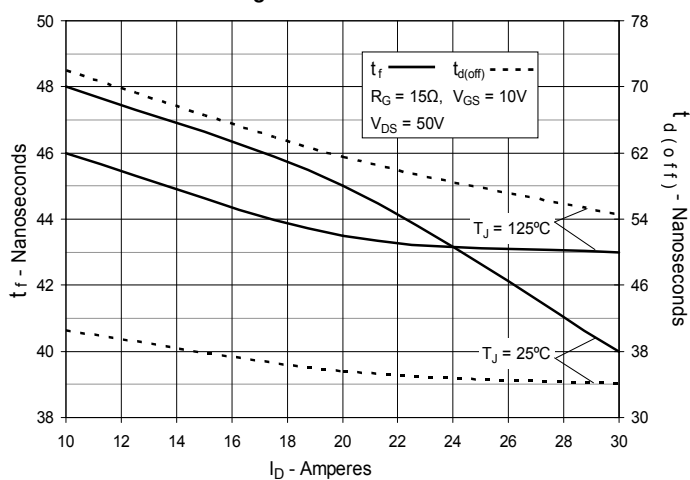
**Fig. 15. Resistive Turn-on**  
**Switching Times vs. Gate Resistance**



**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**

