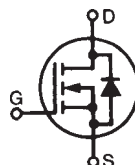


## TrenchT2™ GigaMOS™ Power MOSFET

### IXTK550N055T2 IXTX550N055T2

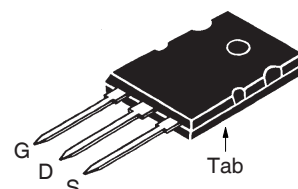
$$\begin{aligned} V_{DSS} &= 55V \\ I_{D25} &= 550A \\ R_{DS(on)} &\leq 1.6m\Omega \end{aligned}$$

N-Channel Enhancement Mode  
Avalanche Rated  
Fast Intrinsic Diode

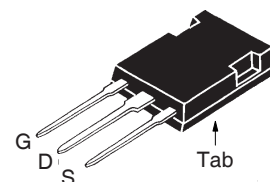


| Symbol        | Test Conditions                                                   | Maximum Ratings   |                  |
|---------------|-------------------------------------------------------------------|-------------------|------------------|
| $V_{DSS}$     | $T_J = 25^\circ\text{C to } 175^\circ\text{C}$                    | 55                | V                |
| $V_{DGR}$     | $T_J = 25^\circ\text{C to } 175^\circ\text{C}, R_{GS} = 1M\Omega$ | 55                | V                |
| $V_{GSS}$     | Continuous                                                        | $\pm 20$          | V                |
| $V_{GSM}$     | Transient                                                         | $\pm 30$          | V                |
| $I_{D25}$     | $T_C = 25^\circ\text{C}$ (Chip Capability)                        | 550               | A                |
| $I_{L(RMS)}$  | External Lead Current Limit                                       | 160               | A                |
| $I_{DM}$      | $T_C = 25^\circ\text{C}$ , Pulse Width Limited by $T_{JM}$        | 1375              | A                |
| $I_A$         | $T_C = 25^\circ\text{C}$                                          | 200               | A                |
| $E_{AS}$      | $T_C = 25^\circ\text{C}$                                          | 3                 | J                |
| $P_D$         | $T_C = 25^\circ\text{C}$                                          | 1250              | 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 (0.062 in.) from Case for 10s                               | 300               | $^\circ\text{C}$ |
| $T_{SOLD}$    | Plastic Body for 10s                                              | 260               | $^\circ\text{C}$ |
| $M_d$         | Mounting Torque (TO-264)                                          | 1.13/10           | Nm/lb.in.        |
| $F_C$         | Mounting Force (PLUS247)                                          | 20..120 / 4.5..27 | N/lb.            |
| <b>Weight</b> | TO-264                                                            | 10                | g                |
|               | PLUS247                                                           | 6                 | g                |

TO-264 (IXTK)



PLUS247 (IXTX)



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

### Features

- International Standard Packages
- 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>( $T_J = 25^\circ\text{C}$ Unless Otherwise Specified) | Characteristic Values |      |                    |
|--------------|---------------------------------------------------------------------------|-----------------------|------|--------------------|
|              |                                                                           | Min.                  | Typ. | Max.               |
| $BV_{DSS}$   | $V_{GS} = 0V, I_D = 250\mu A$                                             | 55                    |      | V                  |
| $V_{GS(th)}$ | $V_{DS} = V_{GS}, I_D = 250\mu A$                                         | 2.0                   |      | 4.0 V              |
| $I_{GSS}$    | $V_{GS} = \pm 20V, V_{DS} = 0V$                                           |                       |      | $\pm 200$ nA       |
| $I_{DSS}$    | $V_{DS} = V_{DSS}, V_{GS} = 0V$<br>$T_J = 150^\circ\text{C}$              |                       |      | 10 $\mu A$<br>1 mA |
| $R_{DS(on)}$ | $V_{GS} = 10V, I_D = 100A$ , Notes 1 & 2                                  |                       |      | 1.6 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                                                                                          | 90                    | 150  | S                  |
| $C_{iss}$    | $V_{GS} = 0\text{V}$ , $V_{DS} = 25\text{V}$ , $f = 1\text{MHz}$                                                                             |                       | 40   | nF                 |
| $C_{oss}$    |                                                                                                                                              |                       | 4970 | pF                 |
| $C_{rss}$    |                                                                                                                                              |                       | 1020 | 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) |                       | 45   | ns                 |
| $t_r$        |                                                                                                                                              |                       | 40   | ns                 |
| $t_{d(off)}$ |                                                                                                                                              |                       | 90   | ns                 |
| $t_f$        |                                                                                                                                              |                       | 230  | ns                 |
| $Q_{g(on)}$  | $V_{GS} = 10\text{V}$ , $V_{DS} = 0.5 \cdot V_{DSS}$ , $I_D = 0.5 \cdot I_{DSS}$                                                             |                       | 595  | nC                 |
| $Q_{gs}$     |                                                                                                                                              |                       | 150  | nC                 |
| $Q_{gd}$     |                                                                                                                                              |                       | 163  | nC                 |
| $R_{thJC}$   |                                                                                                                                              |                       | 0.15 | $^\circ\text{C/W}$ |
| $R_{thCS}$   |                                                                                                                                              |                       |      | $^\circ\text{C/W}$ |

### Source-Drain Diode

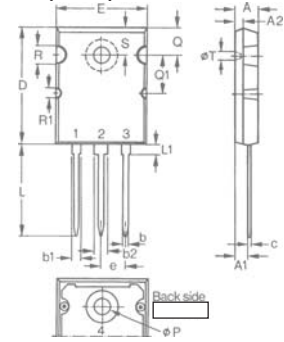
| Symbol   | Test Conditions<br>( $T_J = 25^\circ\text{C}$ , Unless Otherwise Specified)                              | Characteristic Values |      |        |
|----------|----------------------------------------------------------------------------------------------------------|-----------------------|------|--------|
|          |                                                                                                          | Min.                  | Typ. | Max.   |
| $I_S$    | $V_{GS} = 0\text{V}$                                                                                     |                       |      | 550 A  |
| $I_{SM}$ | Repetitive, Pulse Width Limited by $T_{JM}$                                                              |                       |      | 1700 A |
| $V_{SD}$ | $I_F = 100\text{A}$ , $V_{GS} = 0\text{V}$ , Note 1                                                      |                       |      | 1.2 V  |
| $t_{rr}$ | $I_F = 100\text{A}$ , $V_{GS} = 0\text{V}$<br>$-di/dt = 100\text{A}/\mu\text{s}$<br>$V_R = 27.5\text{V}$ |                       | 100  | ns     |
| $I_{RM}$ |                                                                                                          |                       | 5    | A      |
| $Q_{RM}$ |                                                                                                          |                       | 250  | nC     |

Notes: 1. Pulse test,  $t \leq 300\mu\text{s}$ , duty cycle,  $d \leq 2\%$ .  
2. Includes lead resistance.

### ADVANCE TECHNICAL INFORMATION

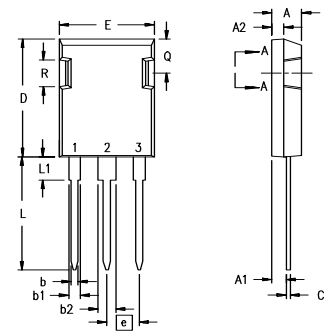
The product presented herein is under development. The Technical Specifications offered are derived from a subjective evaluation of the design, based upon prior knowledge and experience, and constitute a "considered reflection" of the anticipated result. IXYS reserves the right to change limits, test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

### TO-264 (IXTK) Outline



| Dim. | Millimeter |       | Inches   |       |
|------|------------|-------|----------|-------|
|      | Min.       | Max.  | Min.     | Max.  |
| A    | 4.82       | 5.13  | .190     | .202  |
| A1   | 2.54       | 2.89  | .100     | .114  |
| A2   | 2.00       | 2.10  | .079     | .083  |
| b    | 1.12       | 1.42  | .044     | .056  |
| b1   | 2.39       | 2.69  | .094     | .106  |
| b2   | 2.90       | 3.09  | .114     | .122  |
| c    | 0.53       | 0.83  | .021     | .033  |
| D    | 25.91      | 26.16 | 1.020    | 1.030 |
| E    | 19.81      | 19.96 | .780     | .786  |
| e    | 5.46 BSC   |       | .215 BSC |       |
| J    | 0.00       | 0.25  | .000     | .010  |
| K    | 0.00       | 0.25  | .000     | .010  |
| L    | 20.32      | 20.83 | .800     | .820  |
| L1   | 2.29       | 2.59  | .090     | .102  |
| P    | 3.17       | 3.66  | .125     | .144  |
| Q    | 6.07       | 6.27  | .239     | .247  |
| Q1   | 8.38       | 8.69  | .330     | .342  |
| R    | 3.81       | 4.32  | .150     | .170  |
| R1   | 1.78       | 2.29  | .070     | .090  |
| S    | 6.04       | 6.30  | .238     | .248  |
| T    | 1.57       | 1.83  | .062     | .072  |

### PLUS 247™ (IXTX) Outline



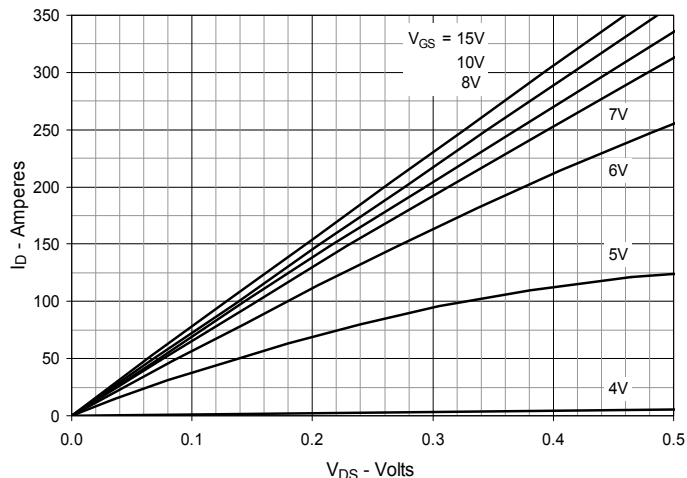
Terminals: 1 - Gate  
2 - Drain (Collector)  
3 - Source (Emitter)  
4 - Drain (Collector)

| Dim. | Millimeter |       | Inches   |      |
|------|------------|-------|----------|------|
|      | Min.       | Max.  | Min.     | Max. |
| A    | 4.83       | 5.21  | .190     | .205 |
| A1   | 2.29       | 2.54  | .090     | .100 |
| A2   | 1.91       | 2.16  | .075     | .085 |
| b    | 1.14       | 1.40  | .045     | .055 |
| b1   | 1.91       | 2.13  | .075     | .084 |
| b2   | 2.92       | 3.12  | .115     | .123 |
| C    | 0.61       | 0.80  | .024     | .031 |
| D    | 20.80      | 21.34 | .819     | .840 |
| E    | 15.75      | 16.13 | .620     | .635 |
| e    | 5.45 BSC   |       | .215 BSC |      |
| L    | 19.81      | 20.32 | .780     | .800 |
| L1   | 3.81       | 4.32  | .150     | .170 |
| Q    | 5.59       | 6.20  | .220     | .244 |
| R    | 4.32       | 4.83  | .170     | .190 |

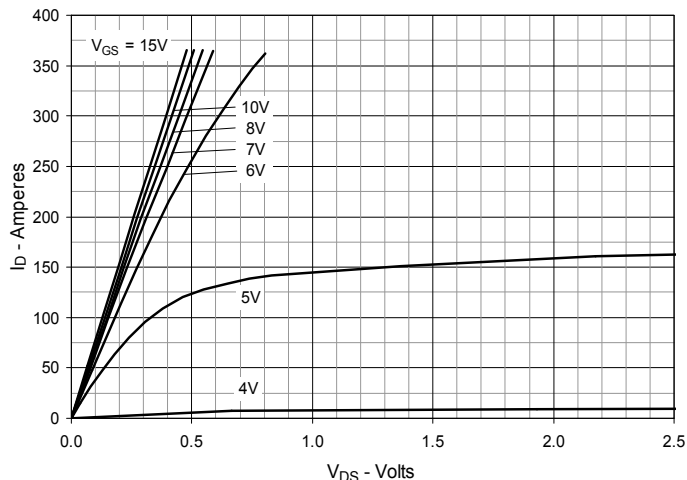
IXYS Reserves the Right to Change Limits, Test Conditions, and Dimensions.

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

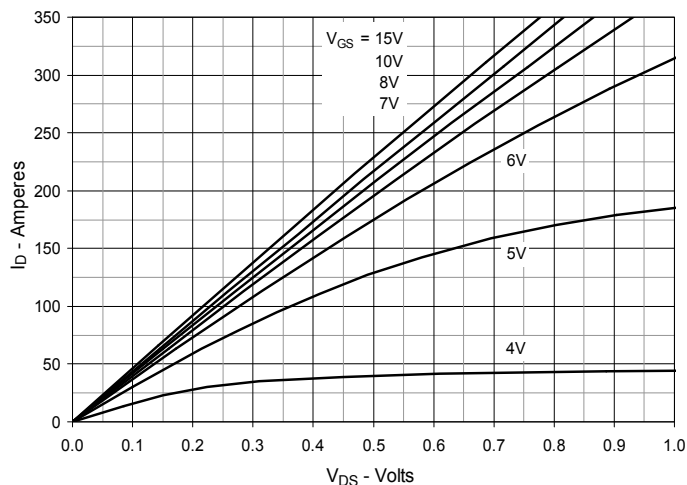
**Fig. 1. Output Characteristics @  $T_J = 25^\circ\text{C}$**



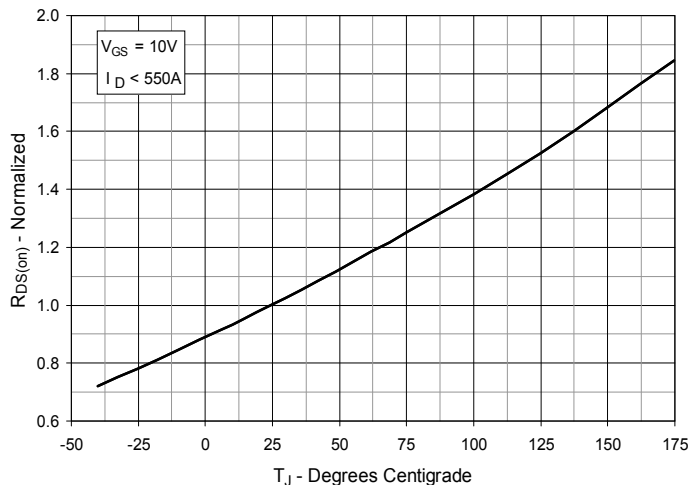
**Fig. 2. Extended Output Characteristics @  $T_J = 25^\circ\text{C}$**



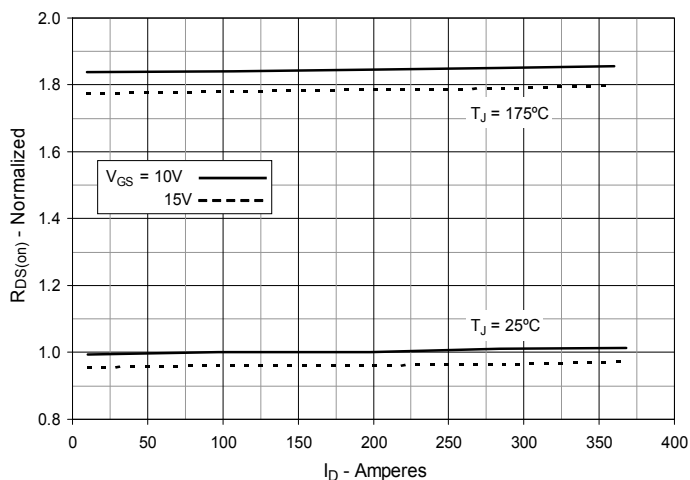
**Fig. 3. Output Characteristics @  $T_J = 150^\circ\text{C}$**



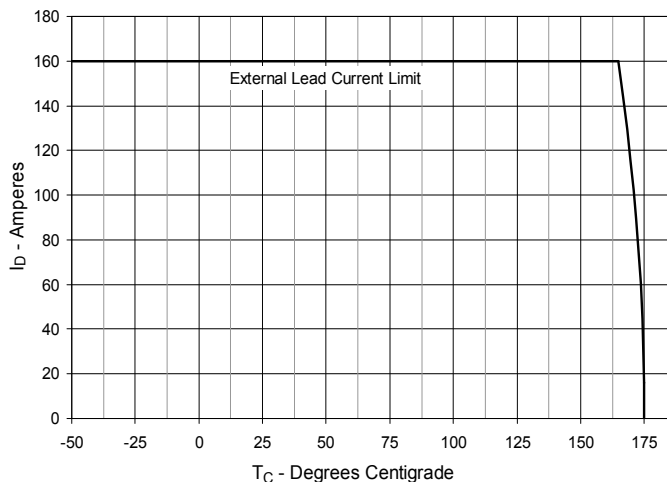
**Fig. 4. Normalized  $R_{DS(on)}$  vs. Junction Temperature**



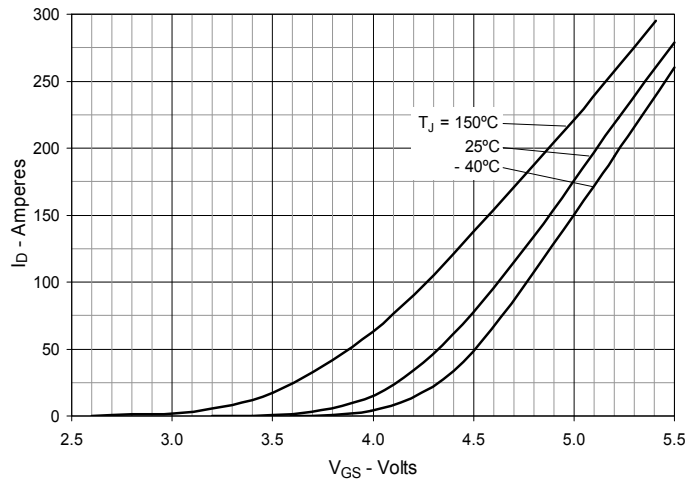
**Fig. 5. Normalized  $R_{DS(on)}$  vs. Drain Current**



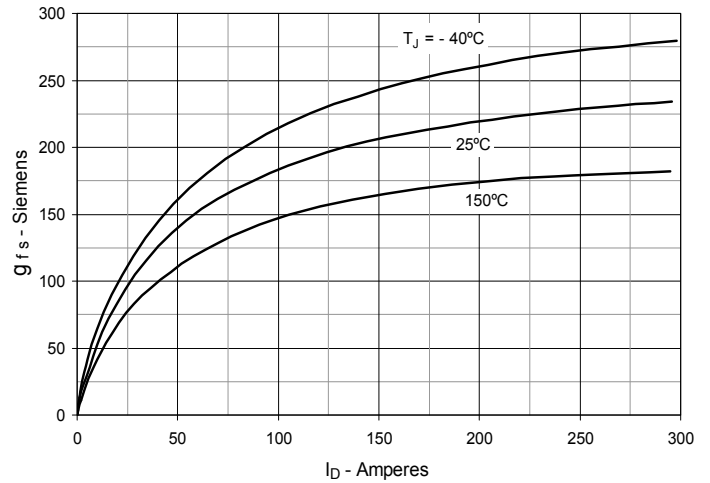
**Fig. 6. Drain Current vs. Case Temperature**



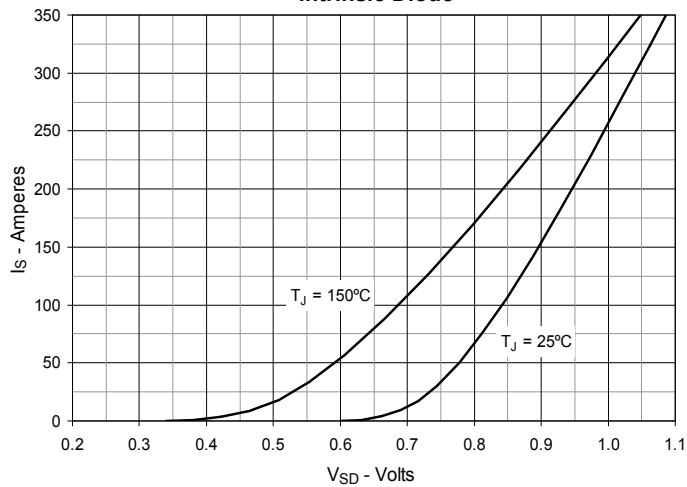
**Fig. 7. Input Admittance**



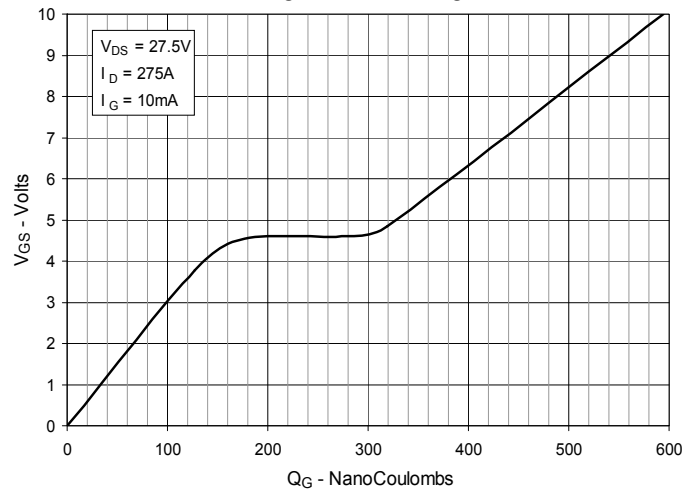
**Fig. 8. Transconductance**



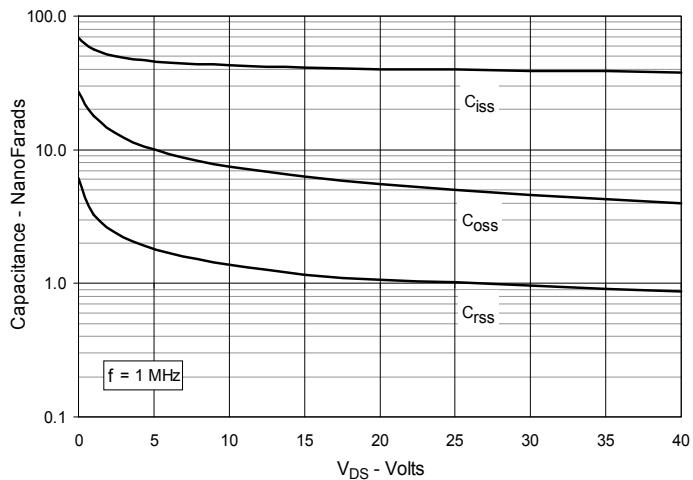
**Fig. 9. Forward Voltage Drop of Intrinsic Diode**



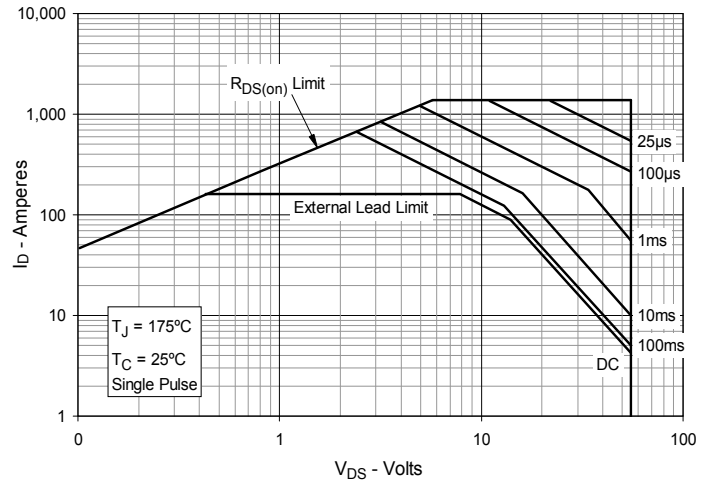
**Fig. 10. Gate Charge**



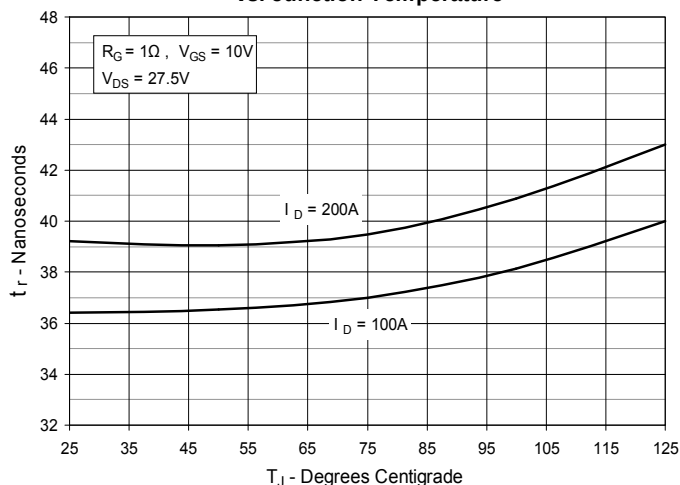
**Fig. 11. Capacitance**



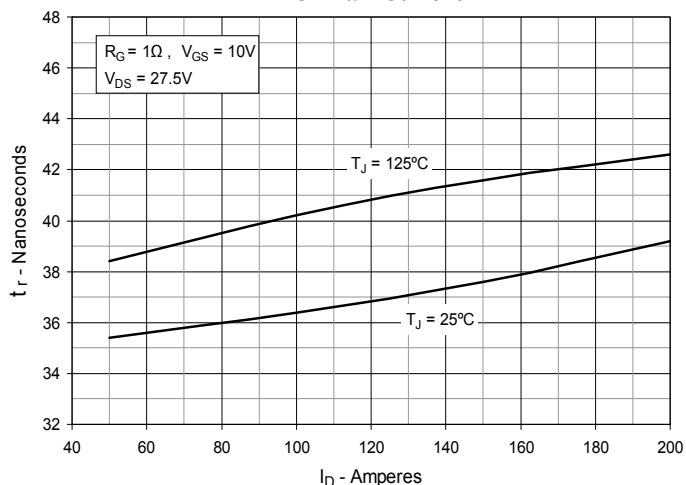
**Fig. 12. Forward-Bias Safe Operating Area**



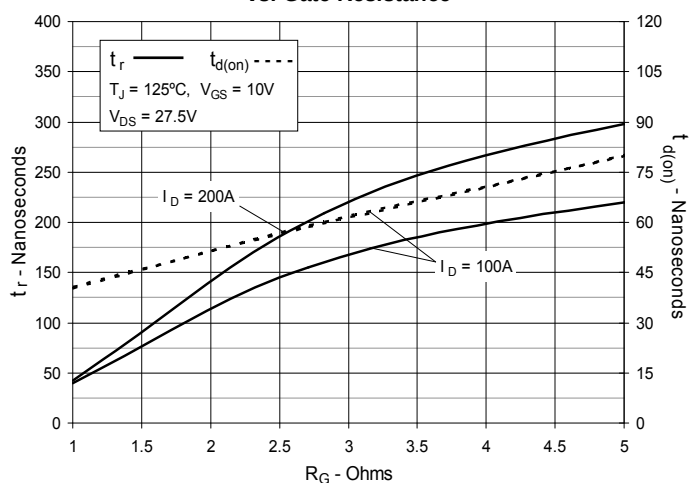
**Fig. 13. Resistive Turn-on Rise Time vs. Junction Temperature**



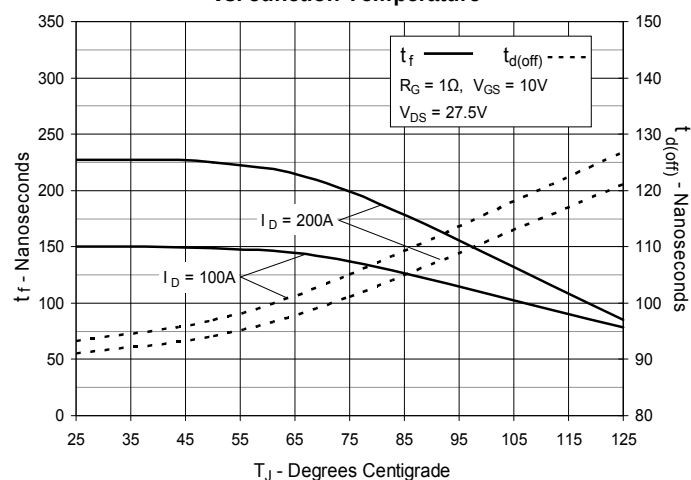
**Fig. 14. Resistive Turn-on Rise Time vs. Drain Current**



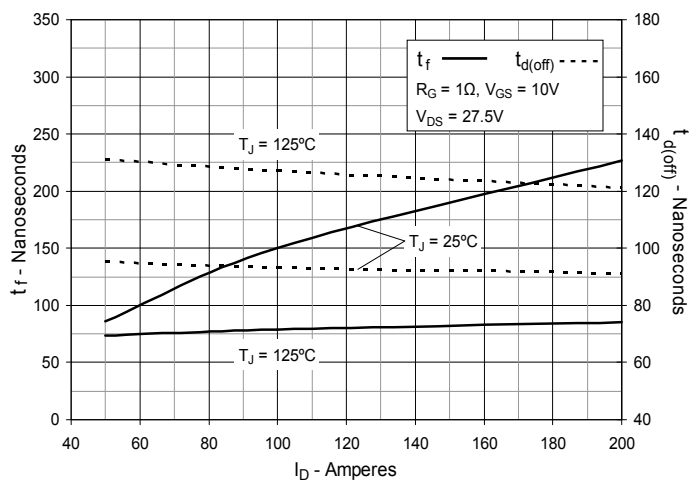
**Fig. 15. Resistive Turn-on Switching Times vs. Gate Resistance**



**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**

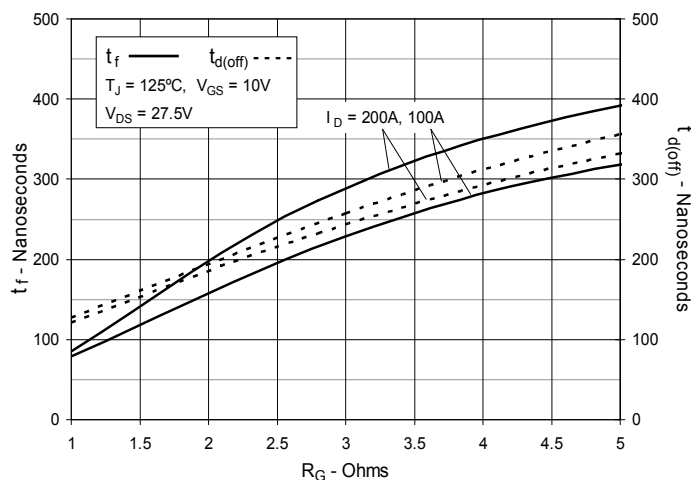
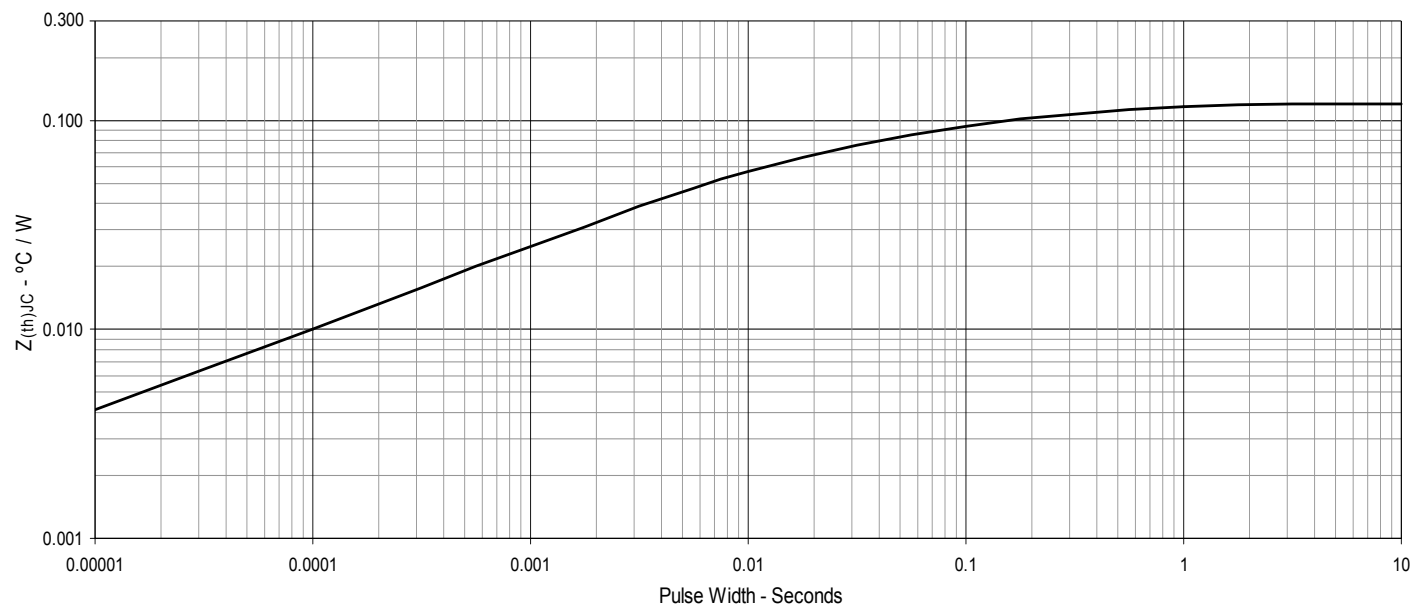


Fig. 19. Maximum Transient Thermal Impedance





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