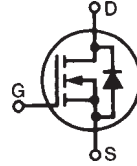


TrenchT4™
Power MOSFET
IXTA270N04T4
IXTA270N04T4-7

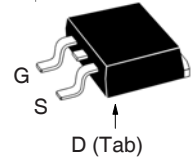
$$V_{DSS} = 40V$$

$$I_{D25} = 270A$$

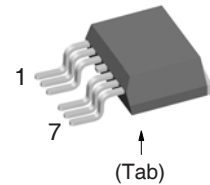
$$R_{DS(on)} \leq 2.2m\Omega$$

 N-Channel Enhancement Mode
 Avalanche Rated


TO-263 AA


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

TO-263 (7-Leads)


 Pins: 1 - Gate
 2, 3, 5, 6, 7 - Source
 4 (Tab) - Drain

| Symbol | Test Conditions | Maximum Ratings | |
|------------|---|-------------------|------------------|
| V_{DSS} | $T_J = 25^\circ\text{C}$ to 175°C | 40 | V |
| V_{DGR} | $T_J = 25^\circ\text{C}$ to 175°C , $R_{GS} = 1M\Omega$ | 40 | V |
| V_{GSM} | Transient | ± 15 | V |
| I_{D25} | $T_C = 25^\circ\text{C}$ | 270 | A |
| I_{LRMS} | Lead Current Limit, RMS | 160 | A |
| I_{DM} | $T_C = 25^\circ\text{C}$, Pulse Width Limited by T_{JM} | 800 | A |
| I_A | $T_C = 25^\circ\text{C}$ | 135 | A |
| E_{AS} | $T_C = 25^\circ\text{C}$ | 750 | mJ |
| I_A | $T_C = 25^\circ\text{C}$ | 270 | A |
| E_{AS} | $T_C = 25^\circ\text{C}$ | 350 | mJ |
| P_D | $T_C = 25^\circ\text{C}$ | 375 | W |
| T_J | | -55 ... +175 | $^\circ\text{C}$ |
| T_{JM} | | 175 | $^\circ\text{C}$ |
| T_{stg} | | -55 ... +175 | $^\circ\text{C}$ |
| T_L | Maximum Lead Temperature for Soldering | 300 | $^\circ\text{C}$ |
| T_{SOLD} | 1.6 mm (0.062in.) from Case for 10s | 260 | $^\circ\text{C}$ |
| F_C | Mounting Force (TO-263) | 10.65 / 2.2..14.6 | N/lb |
| Weight | TO-263 | 2.5 | g |
| | TO-263 (7Leads) | 3.0 | g |

Features

- International Standard Packages
- 175°C Operating Temperature
- High Current Handling Capability
- Avalanche Rated
- Low $R_{DS(on)}$

Advantages

- Easy to Mount
- Space Savings
- High Power Density

Applications

- Synchronous Buck Converters
- High Current Switching Power Supplies
- Battery Powered Electric Motors
- Resonant-Mode Power Supplies
- Electronics Ballast Application
- Class D Audio Amplifiers

| Symbol | Test Conditions ($T_J = 25^\circ\text{C}$ Unless Otherwise Specified) | Characteristic Values | | |
|--------------|---|-----------------------|------|-------------------|
| | | Min. | Typ. | Max. |
| BV_{DSS} | $V_{GS} = 0V$, $I_D = 250\mu\text{A}$ | 40 | | V |
| $V_{GS(th)}$ | $V_{DS} = V_{GS}$, $I_D = 250\mu\text{A}$ | 2.0 | | 4.0 V |
| I_{GSS} | $V_{GS} = \pm 15V$, $V_{DS} = 0V$ | | | ± 200 nA |
| I_{DSS} | $V_{DS} = V_{DSS}$, $V_{GS} = 0V$ $T_J = 150^\circ\text{C}$ | | | 5 μA |
| | | | | 750 μA |
| $R_{DS(on)}$ | $V_{GS} = 10V$, $I_D = 50A$, Note 1 | | | 2.2 m Ω |

| Symbol | Test Conditions ($T_J = 25^\circ\text{C}$, 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 |
| R_{Gi} | Gate Input Resistance | | 1.4 | Ω |
| C_{iss} | $V_{GS} = 0\text{V}$, $V_{DS} = 25\text{V}$, $f = 1\text{MHz}$ | | 9140 | pF |
| C_{oss} | | | 1450 | pF |
| C_{rss} | | | 980 | pF |
| $t_{d(on)}$ | Resistive Switching Times $V_{GS} = 10\text{V}$, $V_{DS} = 0.5 \cdot V_{DSS}$, $I_D = 135\text{A}$ $R_G = 2\Omega$ (External) | | 18 | ns |
| t_r | | | 28 | ns |
| $t_{d(off)}$ | | | 72 | ns |
| t_f | | | 23 | ns |
| $Q_{g(on)}$ | $V_{GS} = 10\text{V}$, $V_{DS} = 0.5 \cdot V_{DSS}$, $I_D = 0.5 \cdot I_{D25}$ | | 182 | nC |
| Q_{gs} | | | 45 | nC |
| Q_{gd} | | | 67 | nC |
| R_{thJC} | | | | 0.40 $^\circ\text{C/W}$ |

Source-Drain Diode

| Symbol | Test Conditions ($T_J = 25^\circ\text{C}$, Unless Otherwise Specified) | Characteristic Values | | |
|----------|--|-----------------------|------|--------|
| | | Min. | Typ. | Max. |
| I_S | $V_{GS} = 0\text{V}$ | | | 270 A |
| I_{SM} | Repetitive, Pulse width limited by T_{JM} | | | 1080 A |
| V_{SD} | $I_F = 100\text{A}$, $V_{GS} = 0\text{V}$, Note 1 | | | 1.4 V |
| t_{rr} | $I_F = 150\text{A}$, $V_{GS} = 0\text{V}$ $-di/dt = 100\text{A}/\mu\text{s}$ $V_R = 30\text{V}$ | | 48 | ns |
| I_{RM} | | | 1.8 | A |
| Q_{RM} | | | 43 | nC |

- Notes: 1. Pulse test, $t \leq 300\mu\text{s}$, duty cycle, $d \leq 2\%$.
 2. On through-hole packages, $R_{DS(on)}$ 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 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.

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: | 4,860,072 | 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 @ $T_J = 25^\circ\text{C}$

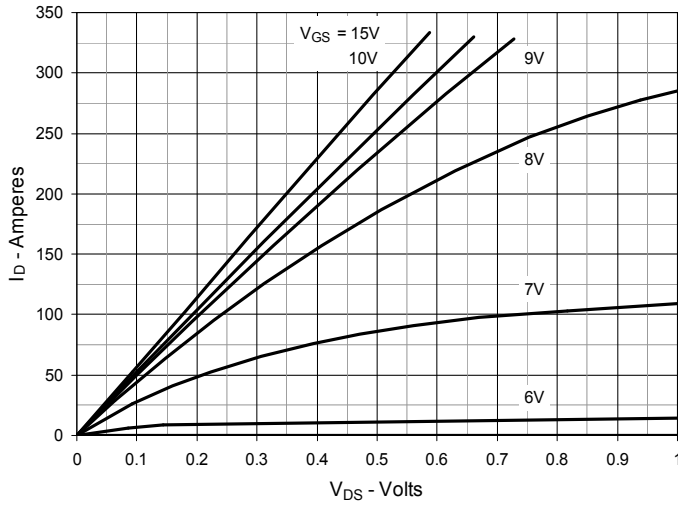


Fig. 2. Extended Output Characteristics @ $T_J = 25^\circ\text{C}$

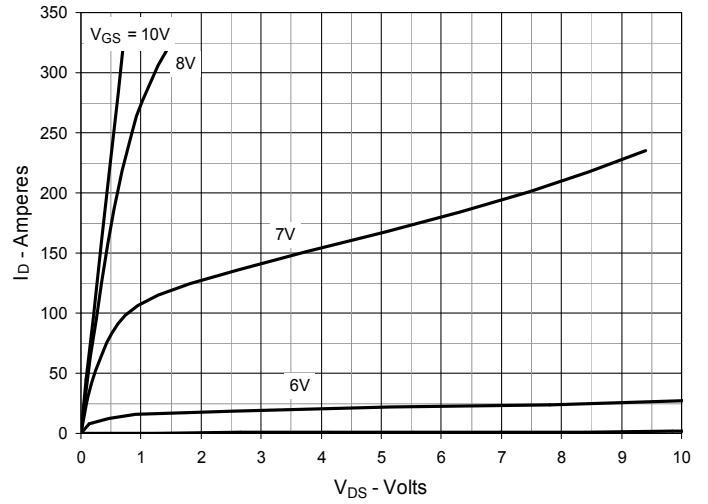


Fig. 3. Output Characteristics @ $T_J = 150^\circ\text{C}$

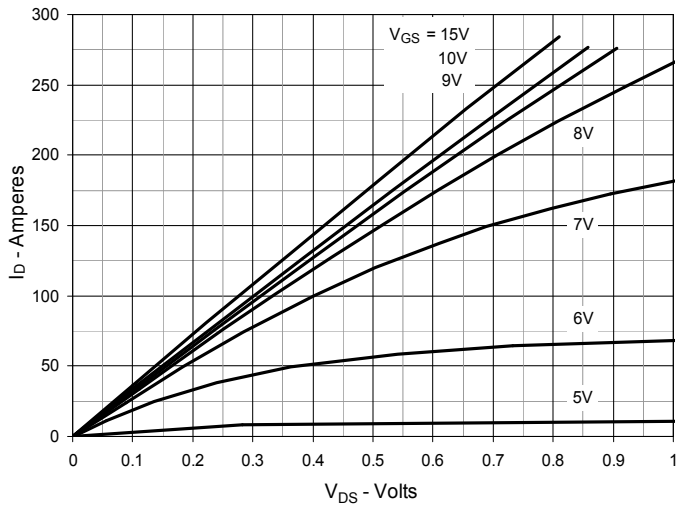


Fig. 4. Normalized $R_{DS(on)}$ to $I_D = 135\text{A}$ Value vs. Junction Temperature

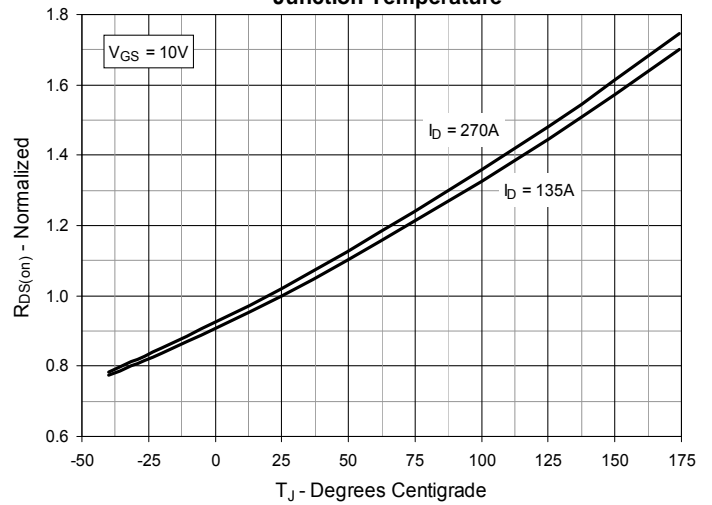


Fig. 5. Normalized $R_{DS(on)}$ to $I_D = 135\text{A}$ vs. Drain Current

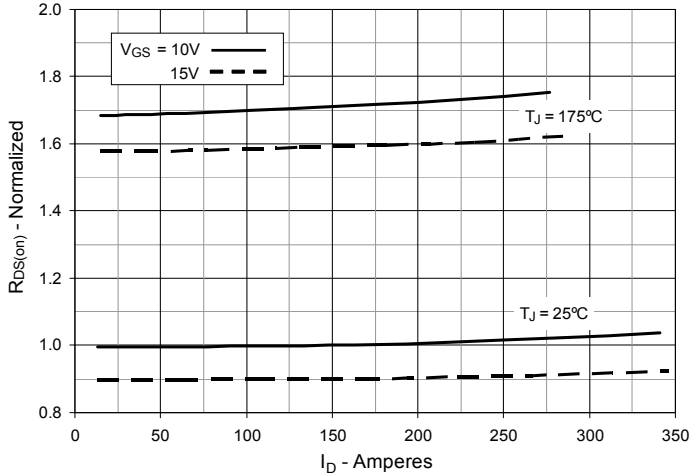


Fig. 6. Drain Current vs. Case Temperature

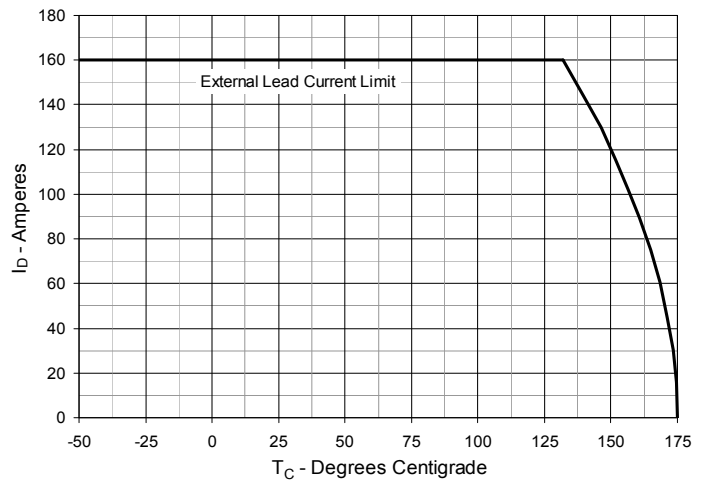


Fig. 7. Input Admittance

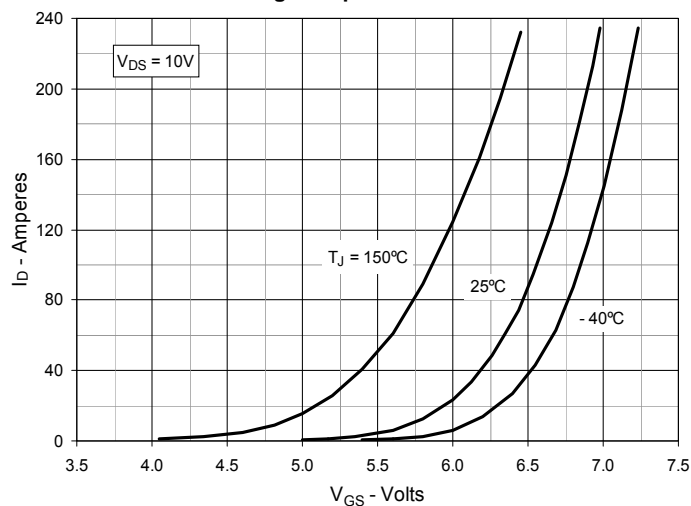


Fig. 8. Transconductance

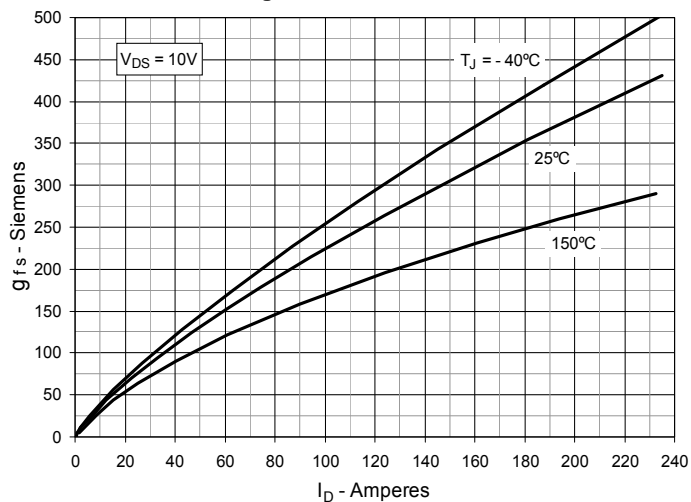


Fig. 9. Forward Voltage Drop of Intrinsic Diode

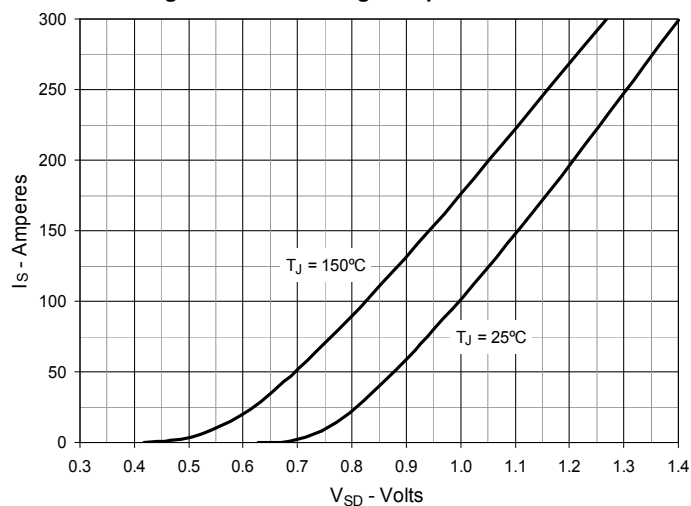


Fig. 10. Gate Charge

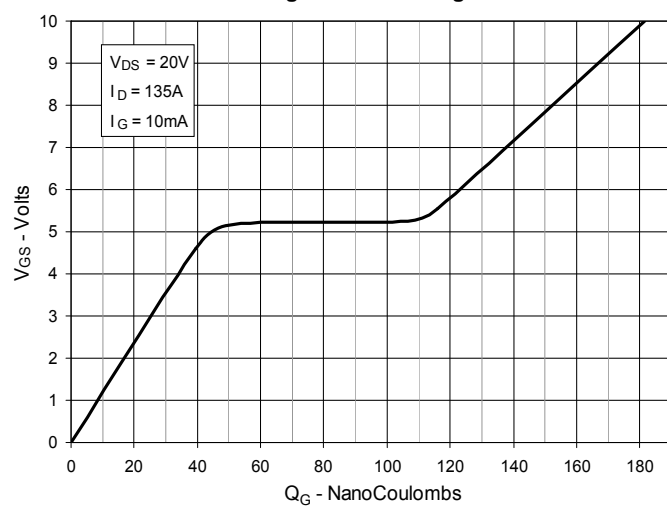


Fig. 11. Capacitance

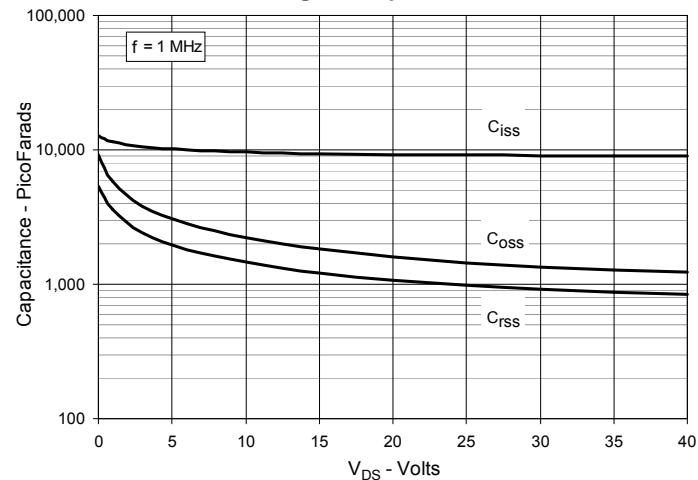


Fig. 12. Forward-Bias Safe Operating Area

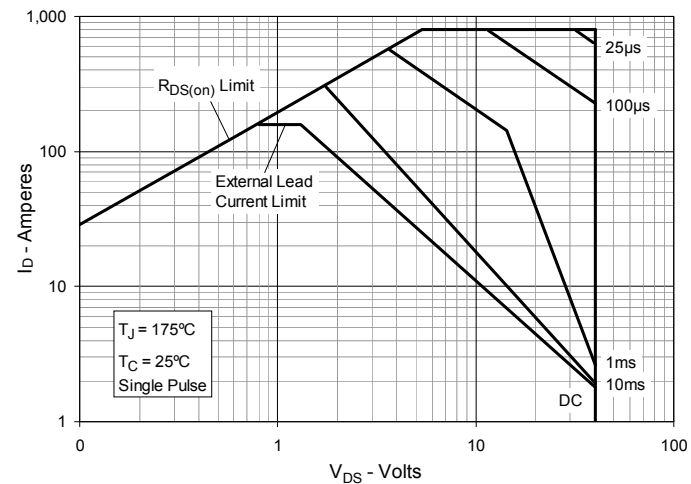


Fig. 13. Resistive Turn-on Rise Time vs. Junction Temperature

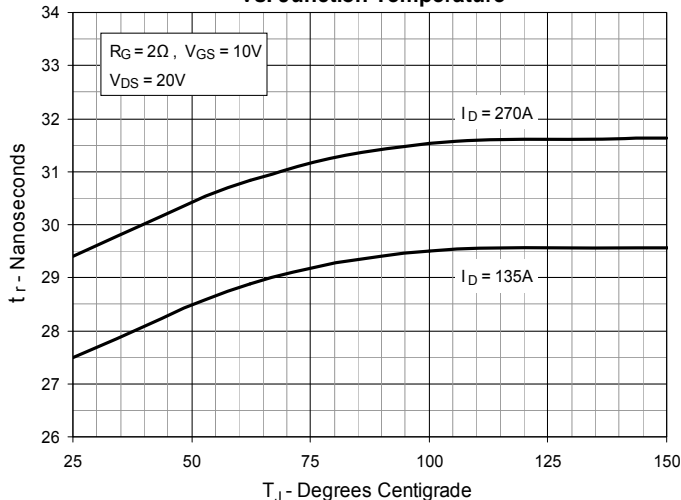


Fig. 14. Resistive Turn-on Rise Time vs. Drain Current

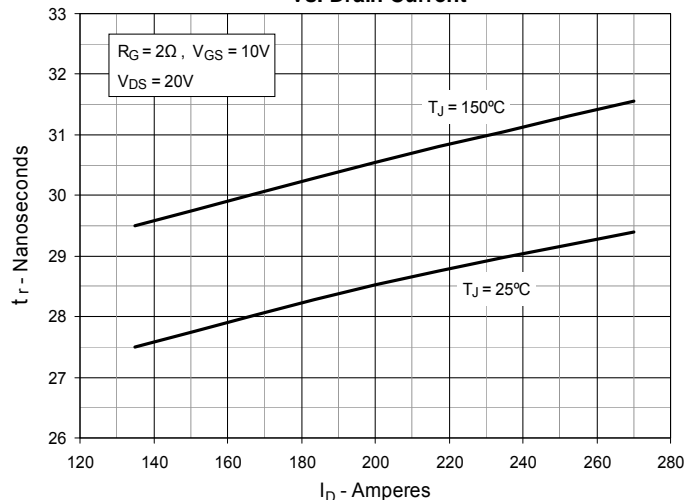


Fig. 15. Resistive Turn-on Switching Times vs. Gate Resistance

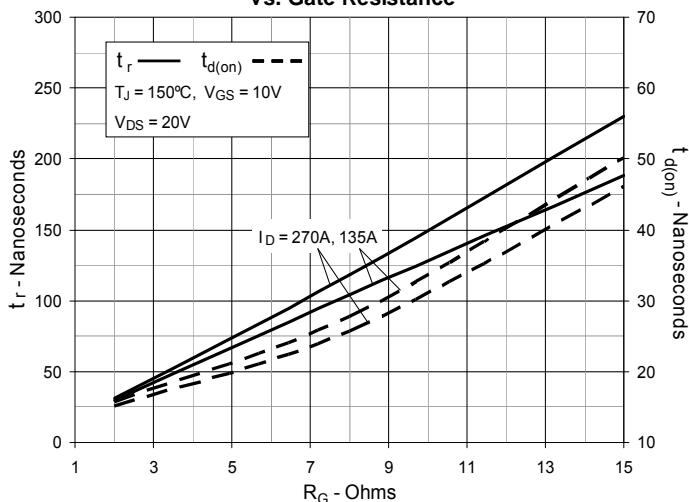


Fig. 16. Resistive Turn-off Switching Times vs. Junction Temperature

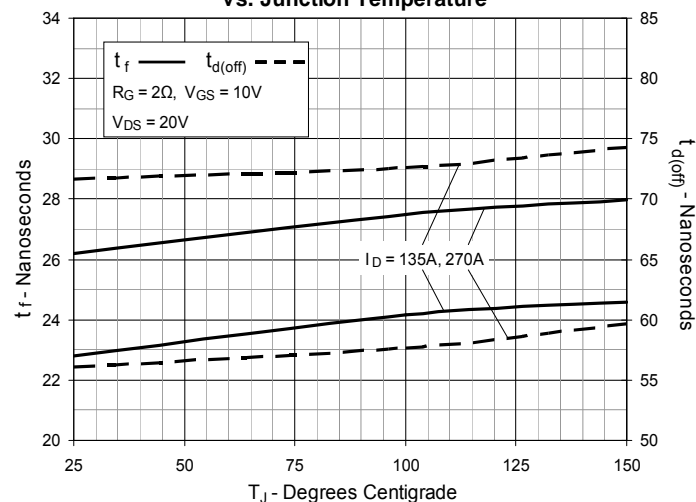


Fig. 17. Resistive Turn-off Switching Times vs. Drain Current

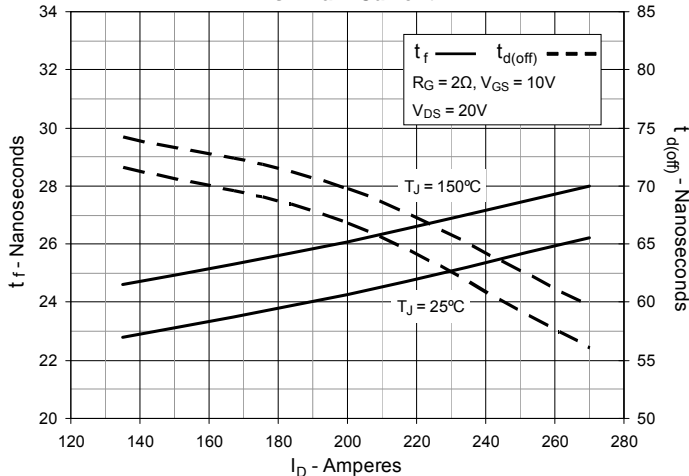


Fig. 18. Resistive Turn-off Switching Times vs. Gate Resistance

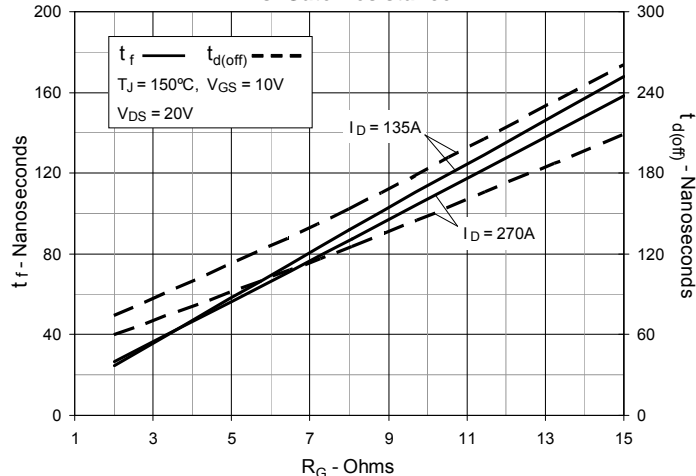
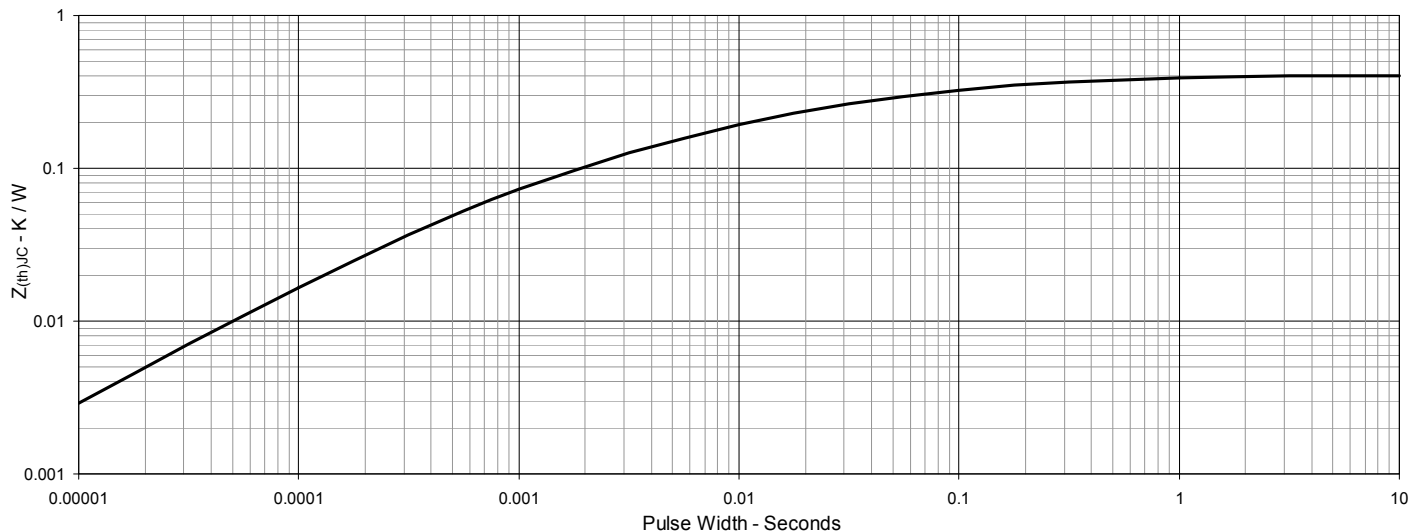
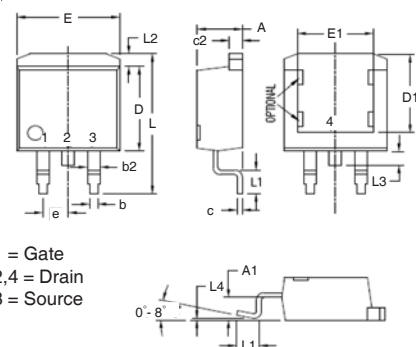


Fig. 19. Maximum Transient Thermal Impedance

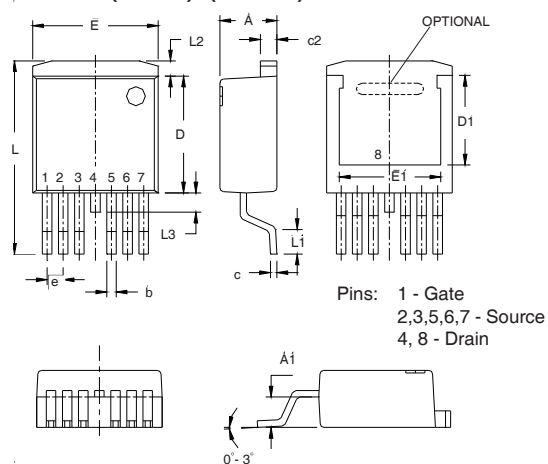


TO-263 (IXTA) Outline



| 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-263 (7-lead) (IXTA..7) Outline



| SYM | INCHES | | MILLIMETER | |
|-----|----------|------|------------|-------|
| | MIN | MAX | MIN | MAX |
| A | .170 | .185 | 4.30 | 4.70 |
| A1 | .085 | .104 | 2.15 | 2.65 |
| b | .026 | .035 | 0.65 | 0.90 |
| c | .016 | .024 | 0.40 | 0.60 |
| c2 | .049 | .055 | 1.25 | 1.40 |
| D | .355 | .370 | 9.00 | 9.40 |
| D1 | .272 | .280 | 6.90 | 7.10 |
| E | .386 | .402 | 9.80 | 10.20 |
| E1 | .311 | .319 | 7.90 | 8.10 |
| e | .050 BSC | | 1.27 BSC | |
| L | .591 | .614 | 15.00 | 15.60 |
| L1 | .091 | .110 | 2.30 | 2.80 |
| L2 | .039 | .059 | 1.00 | 1.50 |
| L3 | .000 | .059 | 0.00 | 1.50 |



Disclaimer Notice - Information furnished is believed to be accurate and reliable. However, users should independently evaluate the suitability of and test each product selected for their own applications. Littelfuse products are not designed for, and may not be used in, all applications. Read complete Disclaimer Notice at www.littelfuse.com/disclaimer-electronics.