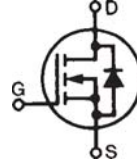


**Depletion Mode
MOSFET**
**IXTH16N50D2
IXTT16N50D2**

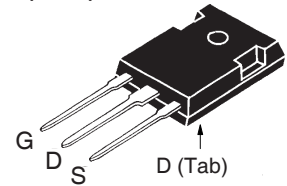
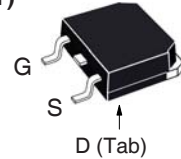
$$V_{DSX} = 500V$$

$$I_{D(on)} \geq 16A$$

$$R_{DS(on)} \leq 240m\Omega$$

N-Channel


| Symbol | Test Conditions | Maximum Ratings | |
|---------------|---|-----------------|------------|
| V_{DSX} | $T_J = 25^\circ C$ to $150^\circ C$ | 500 | V |
| V_{DGX} | $T_J = 25^\circ C$ to $150^\circ C$, $R_{GS} = 1M\Omega$ | 500 | V |
| V_{GSX} | Continuous | ± 20 | V |
| V_{GSM} | Transient | ± 30 | V |
| P_D | $T_C = 25^\circ C$ | 695 | W |
| T_J | | - 55 ... +150 | $^\circ C$ |
| T_{JM} | | 150 | $^\circ C$ |
| T_{stg} | | - 55 ... +150 | $^\circ C$ |
| T_L | 1.6mm (0.062 in.) from Case for 10s | 300 | $^\circ C$ |
| T_{SOLD} | Plastic Body for 10s | 260 | $^\circ C$ |
| M_d | Mounting Torque (TO-247) | 1.13 / 10 | Nm/lb.in. |
| Weight | TO-247 | 6 | g |
| | TO-268 | 4 | g |

TO-247 (IXTH)

TO-268 (IXTT)


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

| Symbol | Test Conditions ($T_J = 25^\circ C$, Unless Otherwise Specified) | Characteristic Values | | |
|----------------|---|-----------------------|------|---------------------------|
| | | Min. | Typ. | Max. |
| BV_{DSX} | $V_{GS} = -5V$, $I_D = 250\mu A$ | 500 | | V |
| $V_{GS(off)}$ | $V_{DS} = 25V$, $I_D = 4mA$ | - 2.0 | | V |
| I_{GSX} | $V_{GS} = \pm 20V$, $V_{DS} = 0V$ | | | ± 100 nA |
| $I_{DSX(off)}$ | $V_{DS} = V_{DSX}$, $V_{GS} = -5V$ $T_J = 125^\circ C$ | | | 10 μA 150 μA |
| $R_{DS(on)}$ | $V_{GS} = 0V$, $I_D = 8A$, Note 1 | | | 240 m Ω |
| $I_{D(on)}$ | $V_{GS} = 0V$, $V_{DS} = 25V$, Note 1 | 16 | | A |

Features

- Normally ON Mode
- International Standard Packages
- Molding Epoxies Meet UL94V-0 Flammability Classification

Advantages

- Easy to Mount
- Space Savings
- High Power Density

Applications

- Audio Amplifiers
- Start-up Circuits
- Protection Circuits
- Ramp Generators
- Current Regulators
- Active Loads

| Symbol | Test Conditions ($T_J = 25^\circ\text{C}$, Unless Otherwise Specified) | Characteristic Values | | |
|--------------|---|-----------------------|------|--------------------|
| | | Min. | Typ. | Max. |
| g_{fs} | $V_{DS} = 30\text{V}$, $I_D = 8\text{A}$, Note 1 | 7 | 12 | S |
| C_{iss} | $V_{GS} = -10\text{V}$, $V_{DS} = 25\text{V}$, $f = 1\text{MHz}$ | | 5250 | pF |
| C_{oss} | | | 515 | pF |
| C_{rss} | | | 130 | pF |
| $t_{d(on)}$ | Resistive Switching Times $V_{GS} = \pm 5\text{V}$, $V_{DS} = 250\text{V}$, $I_D = 8\text{A}$ $R_G = 3.3\Omega$ (External) | | 50 | ns |
| t_r | | | 173 | ns |
| $t_{d(off)}$ | | | 203 | ns |
| t_f | | | 220 | ns |
| $Q_{g(on)}$ | $V_{GS} = \pm 5\text{V}$, $V_{DS} = 250\text{V}$, $I_D = 8\text{A}$ | | 199 | nC |
| Q_{gs} | | | 18 | nC |
| Q_{gd} | | | 100 | nC |
| R_{thJC} | | | 0.18 | $^\circ\text{C/W}$ |
| R_{thCS} | | 0.21 | | $^\circ\text{C/W}$ |

Safe-Operating-Area Specification

| Symbol | Test Conditions | Characteristic Values | | |
|--------|---|-----------------------|------|------|
| | | Min. | Typ. | Max. |
| SOA | $V_{DS} = 500\text{V}$, $I_D = 0.5\text{A}$, $T_C = 75^\circ\text{C}$, $t_p = 5\text{s}$ | 250 | | W |

Source-Drain Diode

| Symbol | Test Conditions ($T_J = 25^\circ\text{C}$, Unless Otherwise Specified) | Characteristic Values | | |
|----------|--|-----------------------|------|---------------|
| | | Min. | Typ. | Max. |
| V_{SD} | $I_F = 16\text{A}$, $V_{GS} = -10\text{V}$, Note 1 | | 0.8 | 1.3 V |
| t_{rr} | $I_F = 8\text{A}$, $-di/dt = 100\text{A}/\mu\text{s}$ $V_R = 100\text{V}$, $V_{GS} = -10\text{V}$ | | 695 | ns |
| I_{RM} | | | 20 | A |
| Q_{RM} | | | 7 | μC |

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

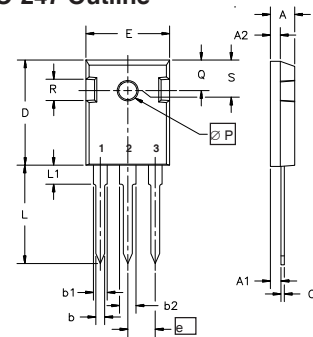
PRELIMINARY TECHNICAL INFORMATION

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 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

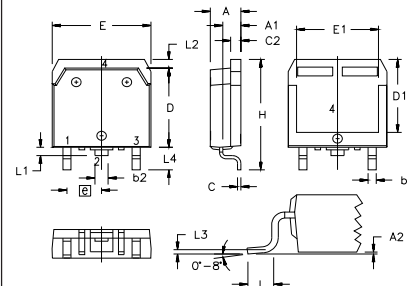
TO-247 Outline



Terminals: 1 - Gate 2 - Drain
3 - Source

| Dim. | Millimeter | | Inches | |
|----------------|------------|-------|--------|-------|
| | Min. | Max. | Min. | Max. |
| A | 4.7 | 5.3 | .185 | .209 |
| A ₁ | 2.2 | 2.54 | .087 | .102 |
| A ₂ | 2.2 | 2.6 | .059 | .098 |
| b | 1.0 | 1.4 | .040 | .055 |
| b ₁ | 1.65 | 2.13 | .065 | .084 |
| b ₂ | 2.87 | 3.12 | .113 | .123 |
| C | .4 | .8 | .016 | .031 |
| D | 20.80 | 21.46 | .819 | .845 |
| E | 15.75 | 16.26 | .610 | .640 |
| e | 5.20 | 5.72 | 0.205 | 0.225 |
| L | 19.81 | 20.32 | .780 | .800 |
| L ₁ | | 4.50 | | .177 |
| ∅P | 3.55 | 3.65 | .140 | .144 |
| Q | 5.89 | 6.40 | 0.232 | 0.252 |
| R | 4.32 | 5.49 | .170 | .216 |
| S | 6.15 | BSC | .242 | BSC |

TO-268 Outline



Terminals: 1 - Gate 2 - Drain
3 - Source Tab - Drain

| SYM | INCHES | | MILLIMETERS | |
|----------------|--------|------|-------------|-------|
| | MIN | MAX | MIN | MAX |
| A | .193 | .201 | 4.90 | 5.10 |
| A ₁ | .106 | .114 | 2.70 | 2.90 |
| A ₂ | .001 | .010 | 0.02 | 0.25 |
| b | .045 | .057 | 1.15 | 1.45 |
| b ₂ | .075 | .083 | 1.90 | 2.10 |
| C | .016 | .026 | 0.40 | 0.65 |
| C ₂ | .057 | .063 | 1.45 | 1.60 |
| D | .543 | .551 | 13.80 | 14.00 |
| D ₁ | .488 | .500 | 12.40 | 12.70 |
| E | .624 | .632 | 15.85 | 16.05 |
| E ₁ | .524 | .535 | 13.30 | 13.60 |
| e | .215 | BSC | 5.45 | BSC |
| H | .736 | .752 | 18.70 | 19.10 |
| L | .094 | .106 | 2.40 | 2.70 |
| L ₁ | .047 | .055 | 1.20 | 1.40 |
| L ₂ | .039 | .045 | 1.00 | 1.15 |
| L ₃ | .010 | BSC | 0.25 | BSC |
| L ₄ | .150 | .161 | 3.80 | 4.10 |

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

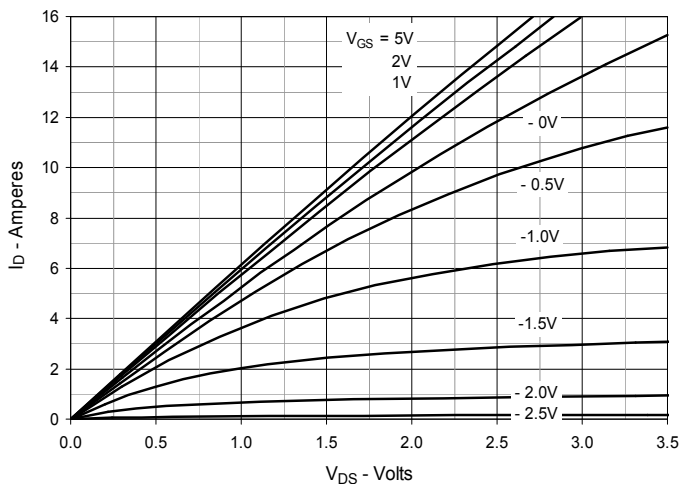


Fig. 2. Extended Output Characteristics @ $T_J = 25^\circ\text{C}$

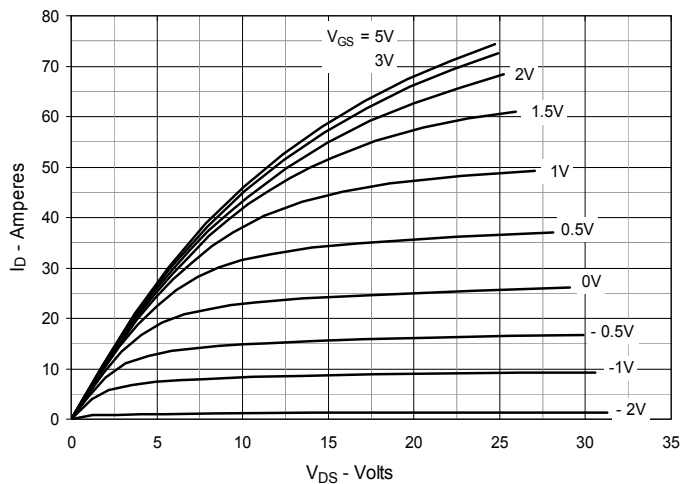


Fig. 3. Output Characteristics @ $T_J = 125^\circ\text{C}$

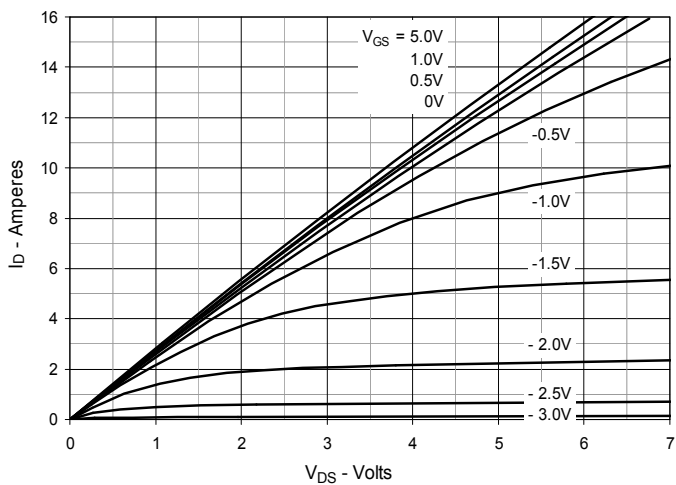


Fig. 4. Drain Current @ $T_J = 25^\circ\text{C}$

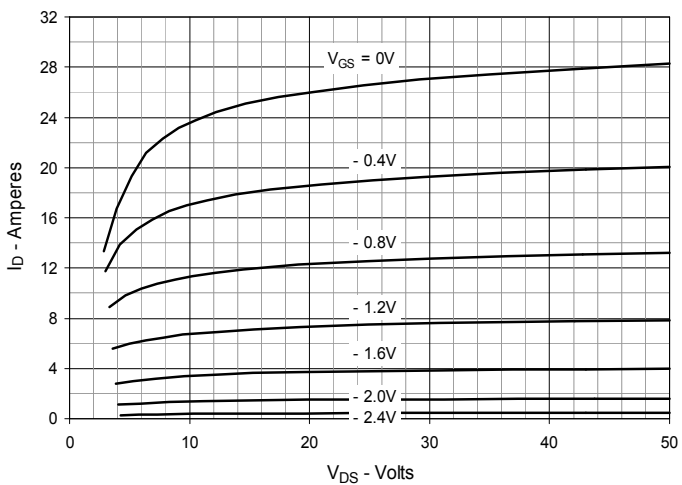


Fig. 5. Drain Current @ $T_J = 100^\circ\text{C}$

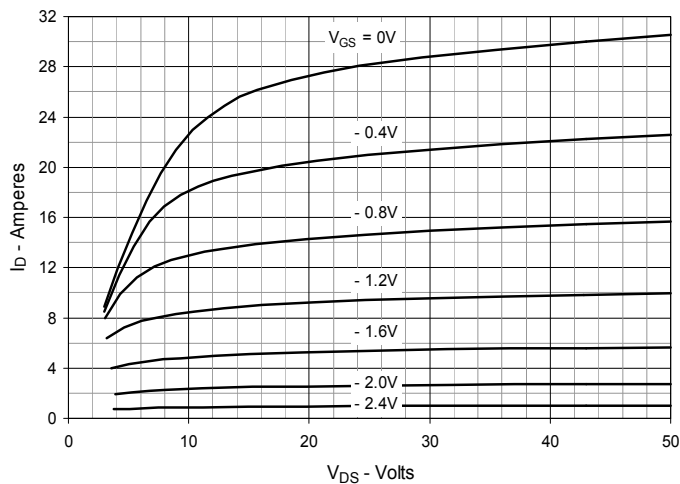


Fig. 6. Dynamic Resistance vs. Gate Voltage

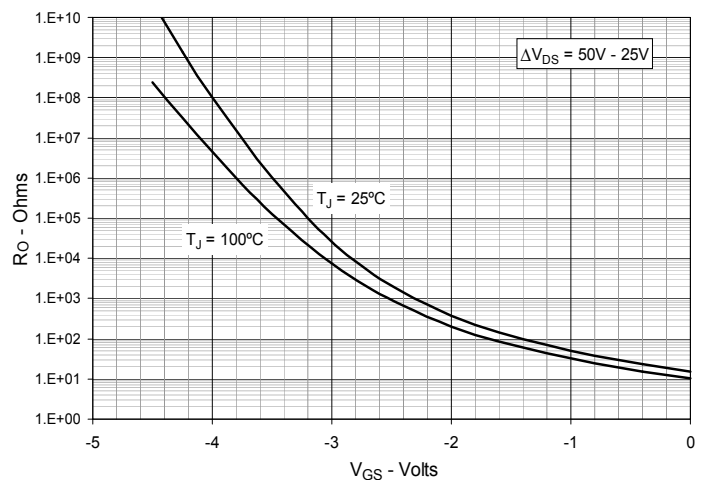


Fig. 7. Normalized $R_{DS(on)}$ vs. Junction Temperature

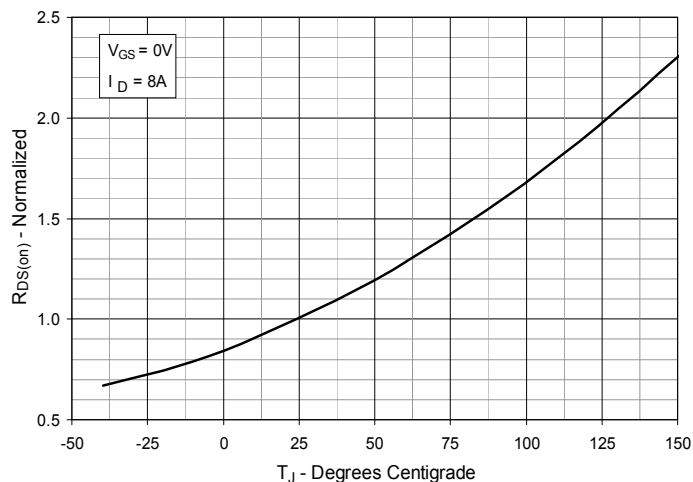


Fig. 8. $R_{DS(on)}$ Normalized to $I_D = 8A$ Value vs. Drain Current

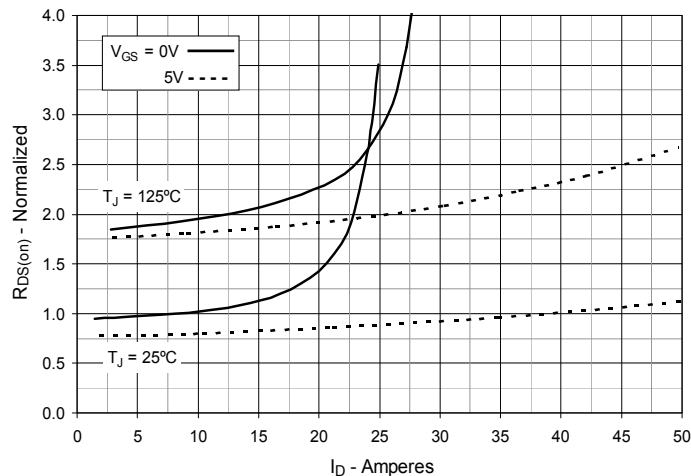


Fig. 9. Input Admittance

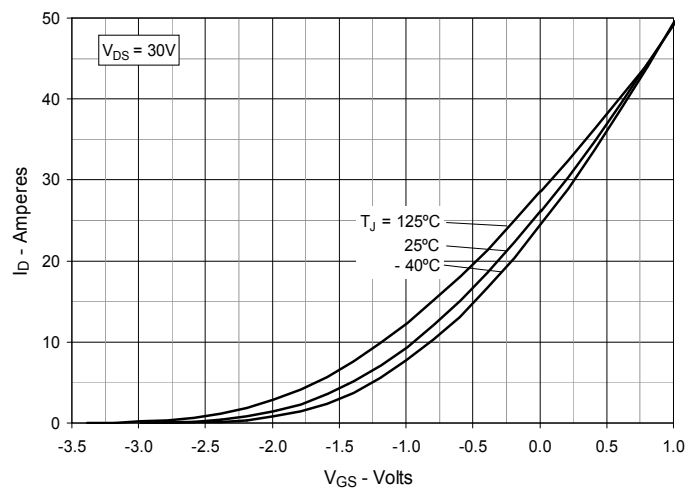


Fig. 10. Transconductance

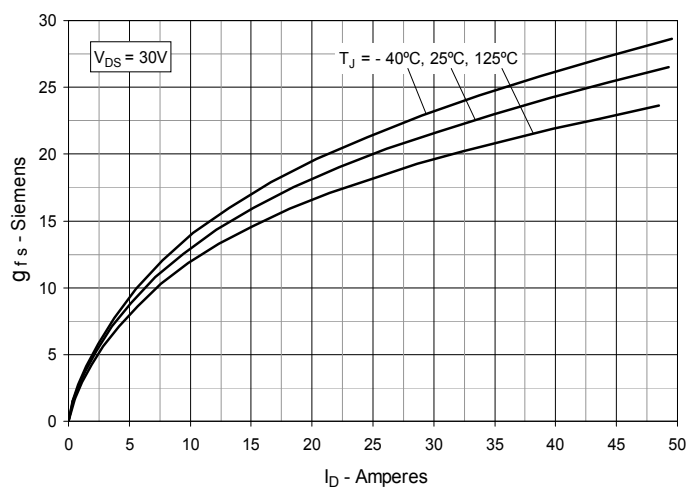


Fig. 11. Breakdown and Threshold Voltages vs. Junction Temperature

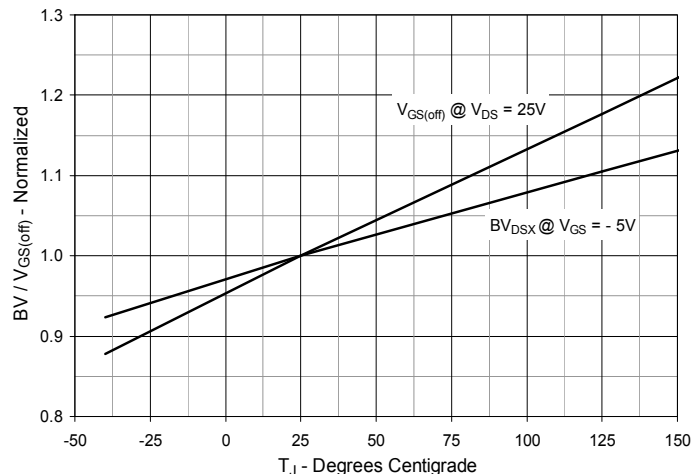


Fig. 12. Forward Voltage Drop of Intrinsic Diode

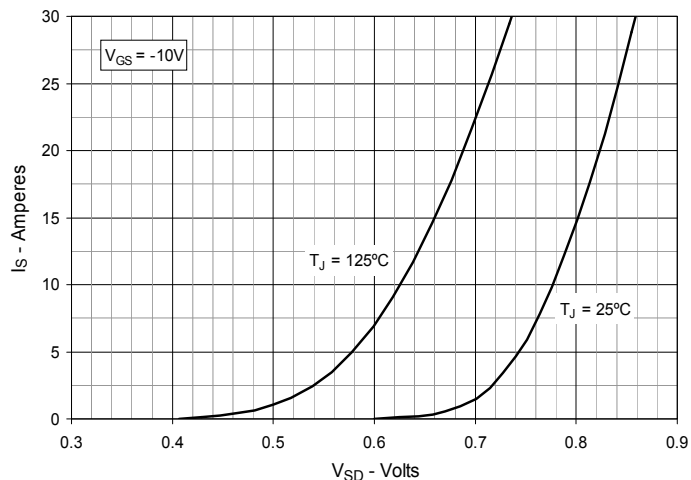


Fig. 13. Capacitance

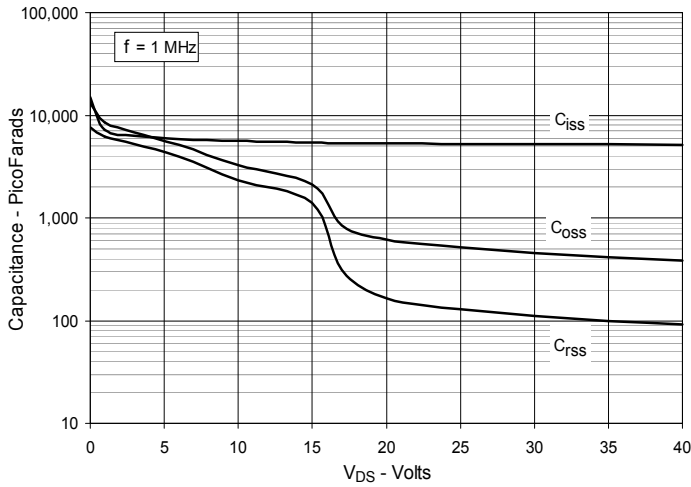
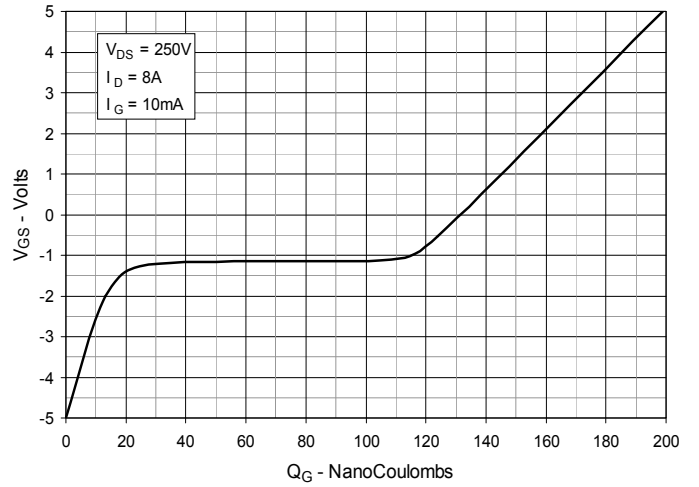
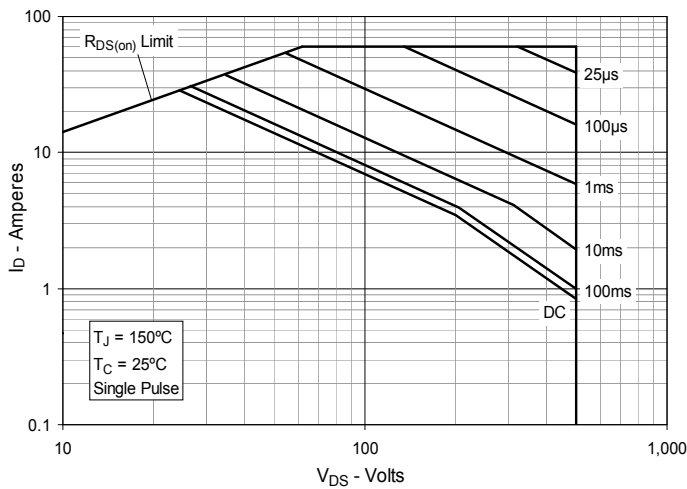


Fig. 14. Gate Charge



**Fig. 15. Forward-Bias Safe Operating Area
@ T_C = 25°C**



**Fig. 16. Forward-Bias Safe Operating Area
@ T_C = 75°C**

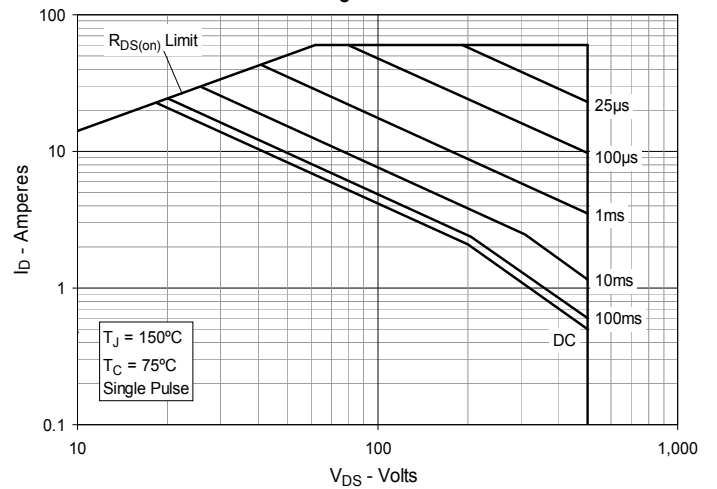


Fig. 17. Maximum Transient Thermal Impedance

