

**High Voltage
Power MOSFET**
**IXTT1N300P3HV
IXTH1N300P3HV**

$$V_{DSS} = 3000V$$

$$I_{D25} = 1.00A$$

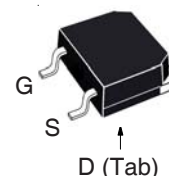
$$R_{DS(on)} \leq 50\Omega$$

N-Channel Enhancement Mode

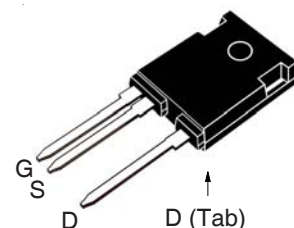


| Symbol | Test Conditions | Maximum Ratings | |
|---------------|---|-----------------|------------|
| V_{DSS} | $T_J = 25^\circ C$ to $150^\circ C$ | 3000 | V |
| V_{DGR} | $T_J = 25^\circ C$ to $150^\circ C$, $R_{GS} = 1M\Omega$ | 3000 | V |
| V_{GSS} | Continuous | ± 20 | V |
| V_{GSM} | Transient | ± 30 | V |
| I_{D25} | $T_C = 25^\circ C$ | 1.00 | A |
| I_{D110} | $T_C = 110^\circ C$ | 0.65 | A |
| I_{DM} | $T_C = 25^\circ C$, Pulse Width Limited by T_{JM} | 2.60 | A |
| P_D | $T_C = 25^\circ C$ | 195 | W |
| T_J | | - 55 ... +150 | $^\circ C$ |
| T_{JM} | | 150 | $^\circ C$ |
| T_{stg} | | - 55 ... +150 | $^\circ C$ |
| T_L | Maximum Lead Temperature for Soldering | 300 | $^\circ C$ |
| T_{SOLD} | 1.6 mm (0.062in.) from Case for 10s | 260 | $^\circ C$ |
| M_d | Mounting Torque (TO-247) | 1.13/10 | Nm/lb.in |
| Weight | TO-268HV | 4.0 | g |
| | TO-247HV | 6.0 | g |

TO-268HV (IXTT)



TO-247HV (IXTH)



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

Features

- High Blocking Voltage
- High Voltage Packages

Advantages

- Easy to Mount
- Space Savings
- High Power Density

Applications

- High Voltage Power Supplies
- Capacitor Discharge Applications
- Pulse Circuits
- Laser and X-Ray Generation Systems

| Symbol | Test Conditions ($T_J = 25^\circ C$, Unless Otherwise Specified) | Characteristic Values | | |
|--------------|---|-----------------------|------|---------------------------|
| | | Min. | Typ. | Max. |
| BV_{DSS} | $V_{GS} = 0V$, $I_D = 250\mu A$ | 3000 | | V |
| $V_{GS(th)}$ | $V_{DS} = V_{GS}$, $I_D = 250\mu A$ | 2.0 | | 4.0 V |
| I_{GSS} | $V_{GS} = \pm 20V$, $V_{DS} = 0V$ | | | ± 100 nA |
| I_{DSS} | $V_{DS} = 0.8 \cdot V_{DSS}$, $V_{GS} = 0V$ $T_J = 125^\circ C$ | | | 25 μA 250 μA |
| $R_{DS(on)}$ | $V_{GS} = 10V$, $I_D = 0.5A$, Note 1 | | | 50 Ω |

| Symbol | Test Conditions ($T_J = 25^\circ\text{C}$, Unless Otherwise Specified) | Characteristic Values | | |
|--------------|---|-----------------------|------|-------------------------|
| | | Min. | Typ. | Max. |
| g_{fs} | $V_{DS} = 50\text{V}$, $I_D = 0.5\text{A}$, Note 1 | 0.4 | 0.7 | S |
| C_{iss} | $V_{GS} = 0\text{V}$, $V_{DS} = 25\text{V}$, $f = 1\text{MHz}$ | | 895 | pF |
| C_{oss} | | | 48 | pF |
| C_{rss} | | | 17 | pF |
| $t_{d(on)}$ | Resistive Switching Times $V_{GS} = 10\text{V}$, $V_{DS} = 500\text{V}$, $I_D = 0.5 \cdot I_{D25}$ $R_G = 20\Omega$ (External) | | 22 | ns |
| t_r | | | 35 | ns |
| $t_{d(off)}$ | | | 78 | ns |
| t_f | | | 60 | ns |
| $Q_{g(on)}$ | $V_{GS} = 10\text{V}$, $V_{DS} = 1\text{kV}$, $I_D = 0.5 \cdot I_{D25}$ | | 30.6 | nC |
| Q_{gs} | | | 4.0 | nC |
| Q_{gd} | | | 15.7 | nC |
| R_{thJC} | TO-247HV | | | 0.64 $^\circ\text{C/W}$ |
| R_{thCS} | | | 0.21 | $^\circ\text{C/W}$ |

Source-Drain Diode

| Symbol | Test Conditions ($T_J = 25^\circ\text{C}$, Unless Otherwise Specified) | Characteristic Values | | |
|----------|--|-----------------------|------|---------------|
| | | Min. | Typ. | Max. |
| I_S | $V_{GS} = 0\text{V}$ | | | 1.0 A |
| I_{SM} | Repetitive, Pulse Width Limited by T_{JM} | | | 4.0 A |
| V_{SD} | $I_F = I_S$, $V_{GS} = 0\text{V}$, Note 1 | | | 1.5 V |
| t_{rr} | $I_F = 1\text{A}$, $-di/dt = 100\text{A}/\mu\text{s}$, $V_R = 100\text{V}$ | | 1.8 | μs |

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

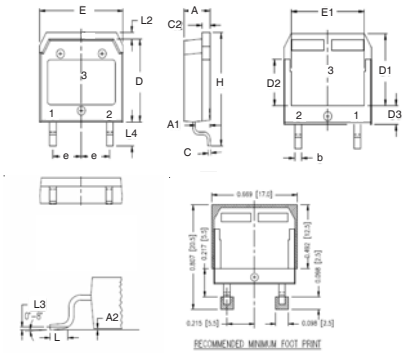
PRELIMINARY TECHNICAL INFORMATION

The product presented herein is under development. The Technical Specifications offered are derived from 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.

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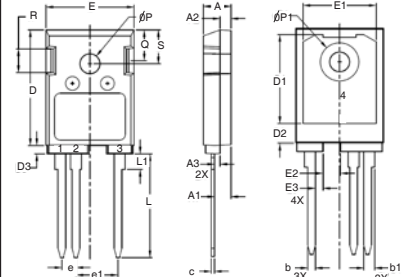
| | | | | | | | | | | |
|--|-----------|-----------|-----------|-----------|--------------|--------------|--------------|--------------|--------------|-------------|
| IXYS MOSFETs and IGBTs are covered by one or more of the following U.S. patents: | 4,835,592 | 4,931,844 | 5,049,961 | 5,237,481 | 6,162,665 | 6,404,065 B1 | 6,683,344 | 6,727,585 | 7,005,734 B2 | 7,157,338B2 |
| | 4,860,072 | 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-268HV Outline



| SYM | INCHES | | MILLIMETER | |
|-----|--------|------|------------|-------|
| | MIN | MAX | MIN | MAX |
| A | .193 | .201 | 4.90 | 5.10 |
| A1 | .106 | .114 | 2.70 | 2.90 |
| A2 | .001 | .010 | 0.02 | 0.25 |
| b | .045 | .057 | 1.15 | 1.45 |
| C | .016 | .026 | 0.40 | 0.65 |
| C2 | .057 | .063 | 1.45 | 1.60 |
| D | .543 | .551 | 13.80 | 14.00 |
| D1 | .465 | .476 | 11.80 | 12.10 |
| D2 | .295 | .307 | 7.50 | 7.80 |
| D3 | .114 | .126 | 2.90 | 3.20 |
| E | .624 | .632 | 15.85 | 16.05 |
| E1 | .524 | .535 | 13.30 | 13.60 |
| E | .215 | BSC | 5.45 | BSC |
| H | .736 | .752 | 18.70 | 19.10 |
| L | .067 | .079 | 1.70 | 2.00 |
| L2 | .039 | .045 | 1.00 | 1.15 |
| L3 | .010 | BSC | 0.25 | BSC |
| L4 | .150 | .161 | 3.80 | 4.10 |

TO-247HV Outline



PINS:
1 - Gate 2 - Source
3, 4 - Drain

| SYM | INCHES | | MILLIMETERS | |
|-----|--------|------|-------------|-------|
| | MIN | MAX | MIN | MAX |
| A | .193 | .201 | 4.90 | 5.10 |
| A1 | .114 | .122 | 2.90 | 3.10 |
| A2 | .075 | .083 | 1.90 | 2.10 |
| A3 | .035 | .043 | 0.90 | 1.10 |
| b | .053 | .059 | 1.35 | 1.50 |
| b1 | .075 | .083 | 1.90 | 2.10 |
| c | .022 | .030 | 0.55 | 0.75 |
| D | .819 | .843 | 20.80 | 21.40 |
| D1 | .638 | .646 | 16.20 | 16.40 |
| D2 | .134 | .146 | 3.40 | 3.70 |
| D3 | .055 | .063 | 1.40 | 1.60 |
| E | .622 | .638 | 15.80 | 16.20 |
| E1 | .520 | .528 | 13.20 | 13.40 |
| E2 | .118 | .126 | 3.00 | 3.20 |
| E3 | .051 | .059 | 1.30 | 1.50 |
| e | .100 | BSC | 2.54 | BSC |
| e1 | .300 | BSC | 7.62 | BSC |
| L | .732 | .748 | 18.60 | 19.00 |
| L1 | .106 | .118 | 2.70 | 3.00 |
| øP | .138 | .142 | 3.50 | 3.60 |
| øP1 | .272 | .280 | 6.90 | 7.10 |
| Q | .216 | .224 | 5.50 | 5.70 |
| R | .165 | .169 | 4.20 | 4.30 |
| S | .240 | .248 | 6.10 | 6.30 |

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

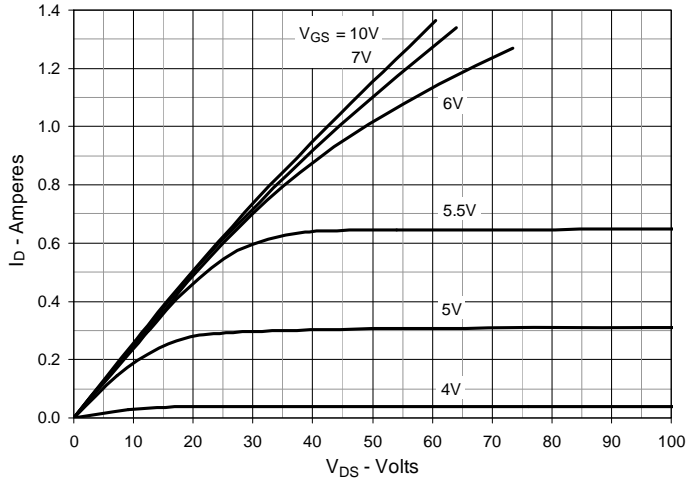


Fig. 2. Output Characteristics @ $T_J = 125^\circ\text{C}$

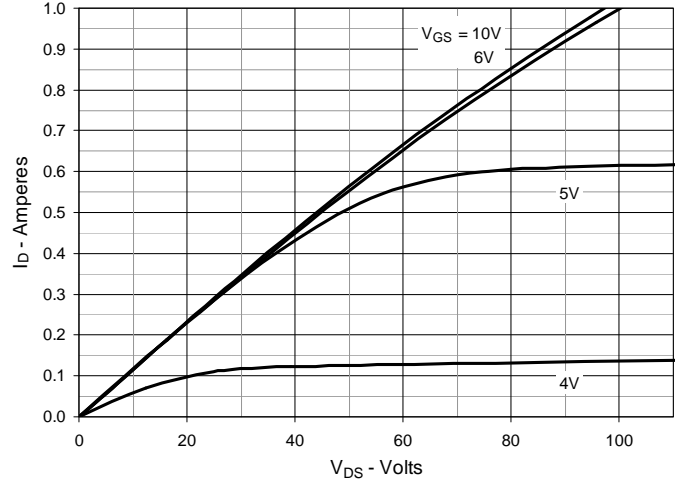


Fig. 3. $R_{DS(on)}$ Normalized to $I_D = 0.5\text{A}$ Value vs. Junction Temperature

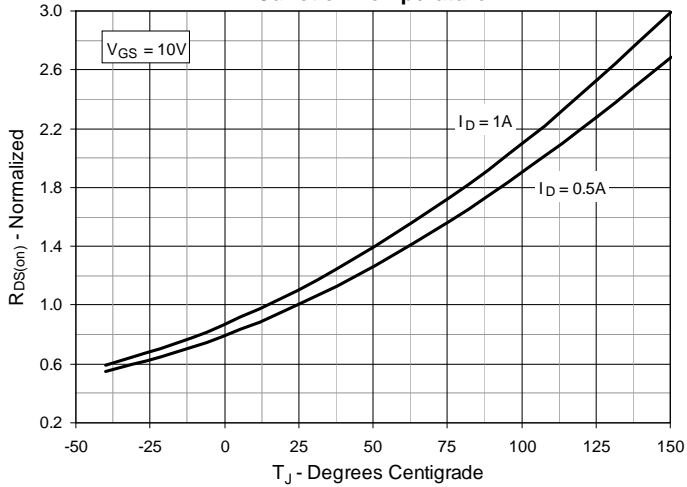


Fig. 4. $R_{DS(on)}$ Normalized to $I_D = 0.5\text{A}$ Value vs. Drain Current

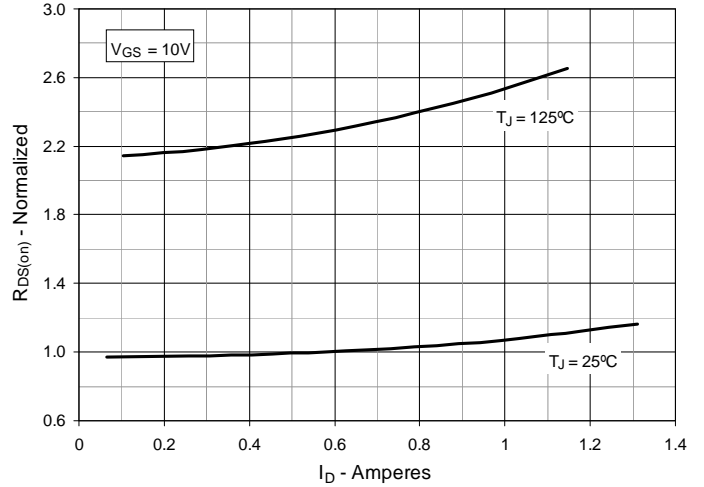


Fig. 5. Maximum Drain Current vs. Case Temperature

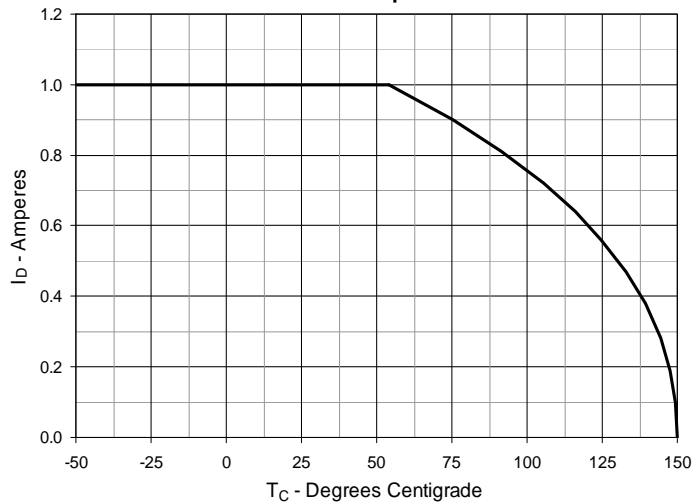


Fig. 6. Input Admittance

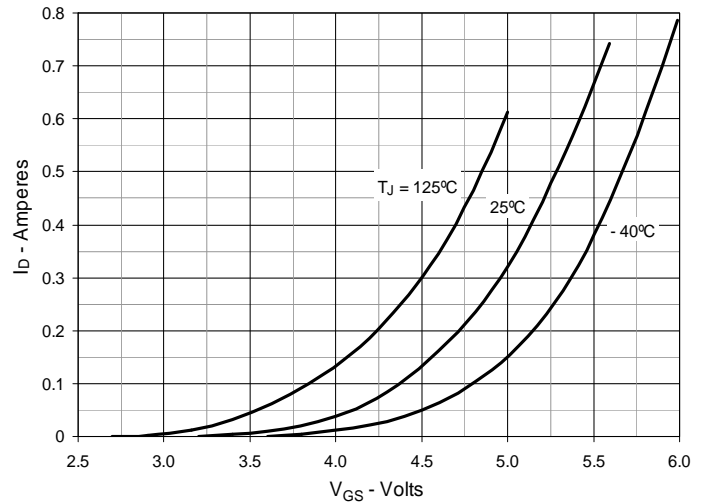


Fig. 7. Transconductance

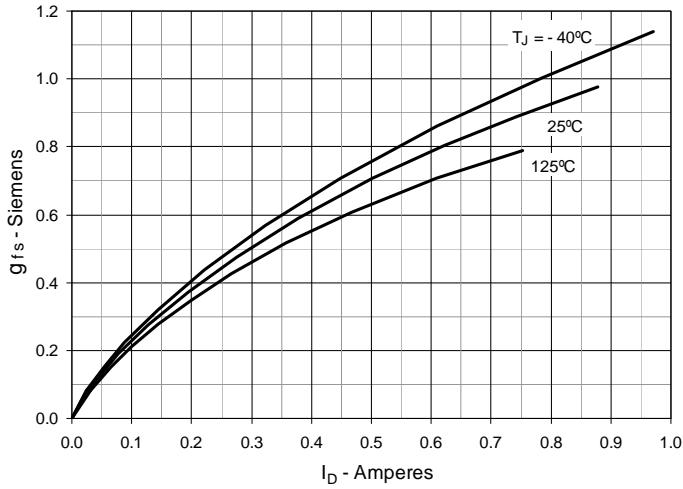


Fig. 8. Forward Voltage Drop of Intrinsic Diode

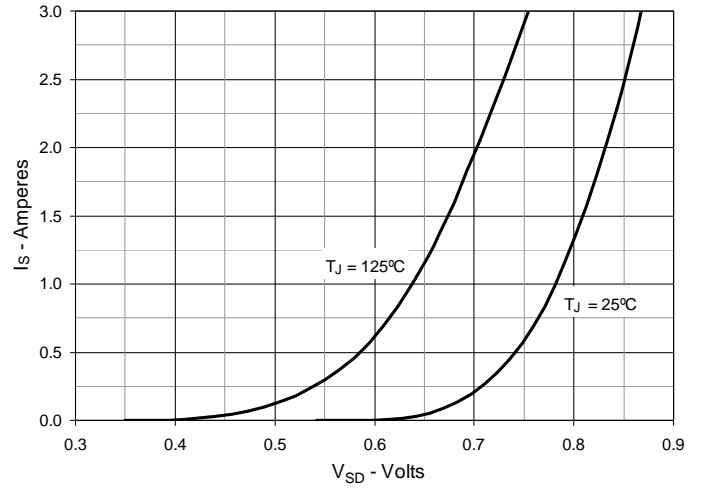


Fig. 9. Gate Charge

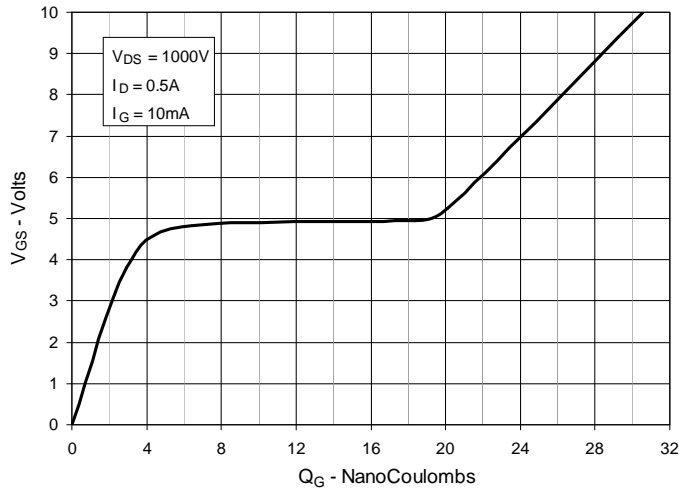


Fig. 10. Capacitance

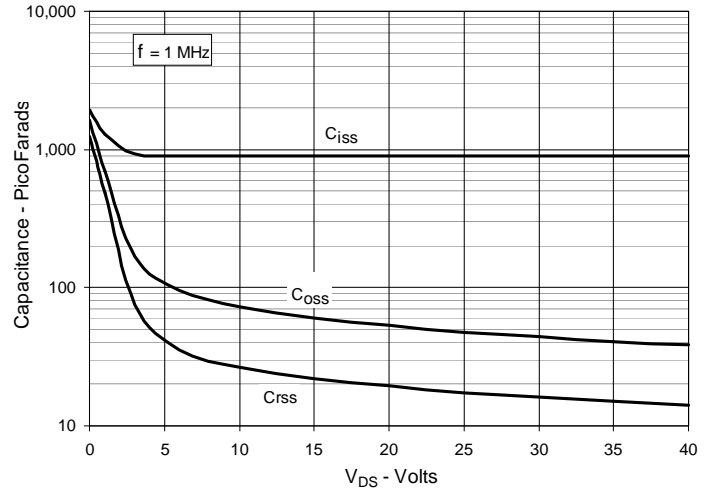


Fig. 11. Maximum Transient Thermal Impedance

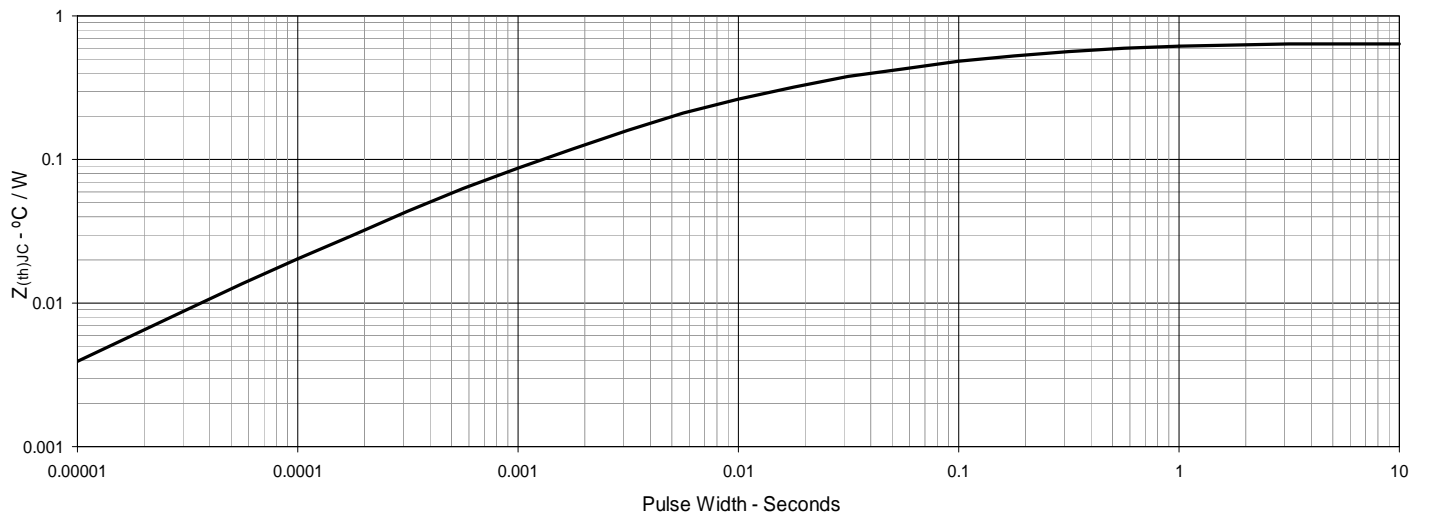


Fig. 12. Forward-Bias Safe Operating Area
@ $T_C = 25^\circ\text{C}$

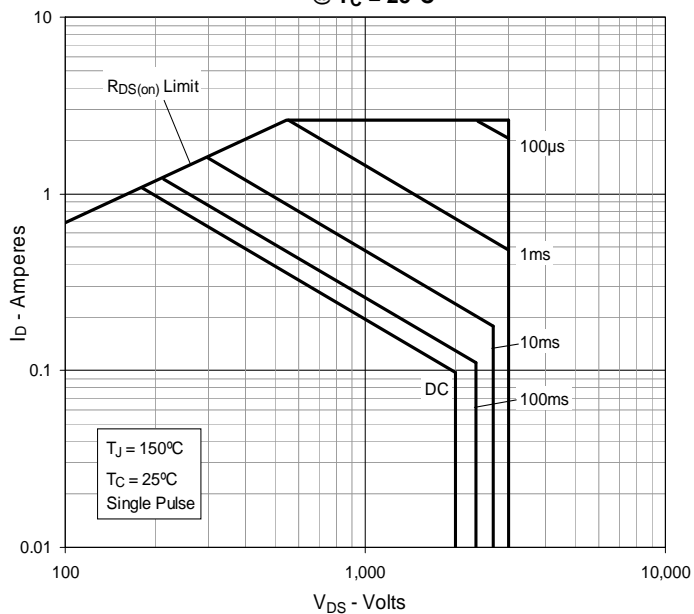
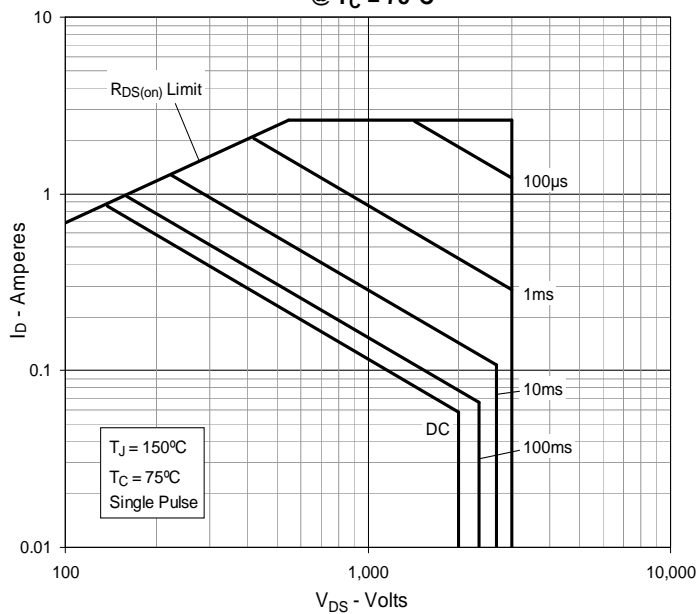


Fig. 13. Forward-Bias Safe Operating Area
@ $T_C = 75^\circ\text{C}$





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