

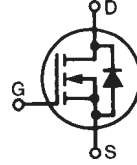
HiperFET™ Power MOSFETs

IXFK180N10 IXFX180N10

$V_{DSS} = 100V$
 $I_{D25} = 180A$
 $R_{DS(on)} \leq 8m\Omega$

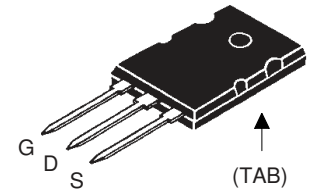
Single MOSFET Die

N-Channel Enhancement Mode
 Avalanche Rated
 Fast Intrinsic Diode

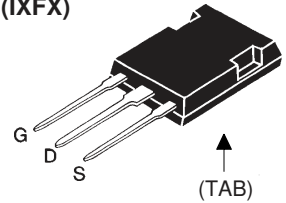


| Symbol | Test Conditions | Maximum Ratings | |
|---------------|--|----------------------------|--------------------|
| V_{DSS} | $T_J = 25^\circ C$ to $150^\circ C$ | 100 | V |
| V_{DGR} | $T_J = 25^\circ C$ to $150^\circ C$, $R_{GS} = 1M\Omega$ | 100 | V |
| V_{GSS} | Continuous | ± 20 | V |
| V_{GSM} | Transient | ± 30 | V |
| I_{D25} | $T_C = 25^\circ C$ (Chip Capability) | 180 | A |
| I_{LRMS} | Leads Current Limit, RMS | 160 | A |
| I_{DM} | $T_C = 25^\circ C$, Pulse Width Limited by T_{JM} | 720 | A |
| I_A | $T_C = 25^\circ C$ | 180 | A |
| E_{AS} | $T_C = 25^\circ C$ | 3 | J |
| dV/dt | $I_S \leq I_{DM}$, $V_{DD} \leq V_{DSS}$, $T_J \leq 150^\circ C$ | 5 | V/ns |
| P_D | $T_C = 25^\circ C$ | 560 | 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 Force (PLUS247) Mounting Torque (TO-264) | 20..120/4.5..27 1.13/10 | N/lb. Nm/lb.in. |
| Weight | PLUS247 TO-264 | 6 10 | g g |

TO-264 (IXFK)



PLUS247 (IXFX)



G = Gate D = Drain
 S = Source TAB = Drain

Features

- International Standard Packages
- High Current Handling Capability
- Avalanche Rated
- Low $R_{DS(on)}$ HDMOS™ Process
- Fast intrinsic diode
- Low Package Inductance

Advantages

- Easy to Mount
- Space Savings
- High Power Density

Applications

- DC-DC Converters
- Battery Chargers
- Switched-Mode and Resonant-Mode Power Supplies
- DC Choppers
- AC Motor Drives
- Temperature and Lighting Controls

| Symbol | Test Conditions ($T_J = 25^\circ C$, Unless Otherwise Specified) | Characteristic Values | | |
|--------------|---|-----------------------|------|---------------------|
| | | Min. | Typ. | Max. |
| BV_{DSS} | $V_{GS} = 0V$, $I_D = 3mA$ | 100 | | V |
| $V_{GS(th)}$ | $V_{DS} = V_{GS}$, $I_D = 8mA$ | 2.0 | | 4.0 V |
| I_{GSS} | $V_{GS} = \pm 20V$, $V_{DS} = 0V$ | | | ± 100 nA |
| I_{DSS} | $V_{DS} = V_{DSS}$ $V_{GS} = 0V$ $T_J = 125^\circ C$ | | | 100 μA 2 mA |
| $R_{DS(on)}$ | $V_{GS} = 10V$, $I_D = 0.5 \cdot I_{D25}$, Note 1 | | | 8 m Ω |

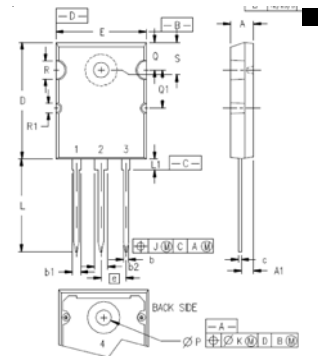
| Symbol | Test Conditions ($T_J = 25^\circ\text{C}$, Unless Otherwise Specified) | Characteristic Values | | |
|--------------|--|--|-------|--------------------|
| | | Min. | Typ. | Max. |
| g_{fs} | $V_{DS} = 10\text{V}$, $I_D = 60\text{A}$, Note 1 | 45 | 76 | S |
| C_{iss} | $V_{GS} = 0\text{V}$, $V_{DS} = 25\text{V}$, $f = 1\text{MHz}$ | | 10.90 | nF |
| C_{oss} | | | 3.55 | nF |
| C_{rss} | | | 1.94 | nF |
| $t_{d(on)}$ | Resistive Switching Times $V_{GS} = 10\text{V}$, $V_{DS} = 0.5 \cdot V_{DSS}$, $I_D = 0.5 \cdot I_{D25}$ $R_G = 1\Omega$ (External) | | 50 | ns |
| t_r | | | 90 | ns |
| $t_{d(off)}$ | | | 140 | ns |
| t_f | | | 65 | ns |
| $Q_{g(on)}$ | | $V_{GS} = 10\text{V}$, $V_{DS} = 0.5 \cdot V_{DSS}$, $I_D = 0.5 \cdot I_{D25}$ | | 390 |
| Q_{gs} | | | 55 | nC |
| Q_{gd} | | | 195 | nC |
| R_{thJC} | | | 0.22 | $^\circ\text{C/W}$ |
| R_{thCS} | | 0.15 | | $^\circ\text{C/W}$ |

Source-Drain Diode

| Symbol | Test Conditions ($T_J = 25^\circ\text{C}$, Unless Otherwise Specified) | Characteristic Values | | |
|----------|--|-----------------------|------|---------------|
| | | Min. | Typ. | Max. |
| I_S | $V_{GS} = 0\text{V}$ | | | 180 A |
| I_{SM} | Repetitive, Pulse Width Limited by T_{JM} | | | 720 A |
| V_{SD} | $I_F = 100\text{A}$, $V_{GS} = 0\text{V}$, Note 1 | | | 1.5 V |
| t_{rr} | $I_F = 90\text{A}$, $-di/dt = 100\text{A}/\mu\text{s}$ $V_R = 50\text{V}$, $V_{GS} = 0\text{V}$ | | 1.1 | 250 ns |
| Q_{RM} | | | | μC |
| I_{RM} | | | 13 | A |

Note 1: Pulse Test, $t \leq 300\mu\text{s}$; Duty Cycle, $d \leq 2\%$.

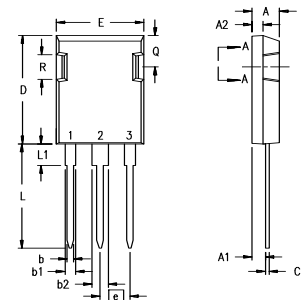
TO-264 (IXFK) Outline



1 - GATE
2, 4 - DRAIN (COLLECTOR)
3 - SOURCE (EMITTER)

| SYM | INCHES | | MILLIMETERS | |
|------------------|---------|-------|-------------|-------|
| | MIN | MAX | MIN | MAX |
| A | .185 | .209 | 4.70 | 5.31 |
| A1 | .102 | .118 | 2.59 | 3.00 |
| b | .037 | .055 | 0.94 | 1.40 |
| b1 | .087 | .102 | 2.21 | 2.59 |
| b2 | .110 | .126 | 2.79 | 3.20 |
| c | .017 | .029 | 0.43 | 0.74 |
| D | 1.007 | 1.047 | 25.58 | 26.59 |
| E | .760 | .799 | 19.30 | 20.29 |
| e | .215BSC | | 5.46 BSC | |
| J | .000 | .010 | 0.00 | 0.25 |
| K | .000 | .010 | 0.00 | 0.25 |
| L | .779 | .842 | 19.79 | 21.39 |
| L1 | .087 | .102 | 2.21 | 2.59 |
| $\varnothing P$ | .122 | .138 | 3.10 | 3.51 |
| Q | .240 | .256 | 6.10 | 6.50 |
| Q1 | .330 | .346 | 8.38 | 8.79 |
| $\varnothing R$ | .155 | .187 | 3.94 | 4.75 |
| $\varnothing R1$ | .085 | .093 | 2.16 | 2.36 |
| S | .243 | .253 | 6.17 | 6.43 |

PLUS 247™ (IXFX) 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 |
| A ₁ | 2.29 | 2.54 | .090 | .100 |
| A ₂ | 1.91 | 2.16 | .075 | .085 |
| b | 1.14 | 1.40 | .045 | .055 |
| b ₁ | 1.91 | 2.13 | .075 | .084 |
| b ₂ | 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 | 0.244 |
| R | 4.32 | 4.83 | .170 | .190 |

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

| | | | | | | | | | | |
|--|-----------|-----------|-----------|-----------|--------------|--------------|--------------|--------------|--------------|-------------|
| IXYS MOSFETs and IGBTs are covered 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 @ 25°C

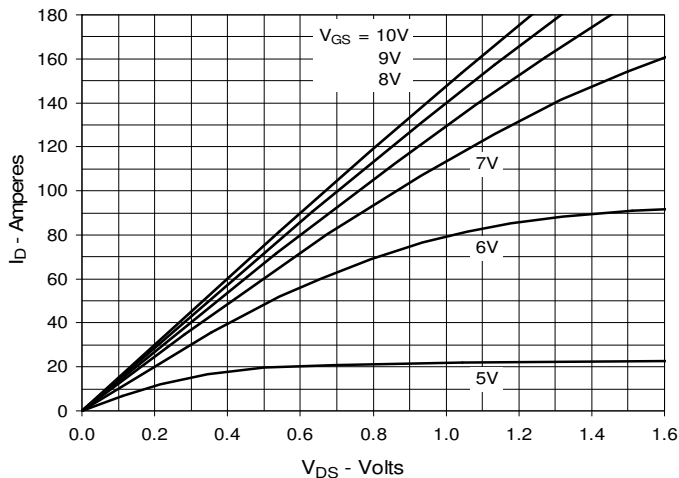


Fig. 2. Extended Output Characteristics @ 25°C

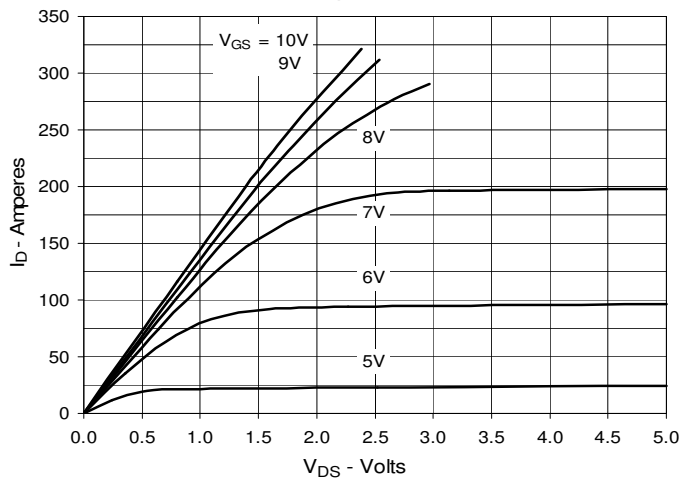


Fig. 3. Output Characteristics @ 125°C

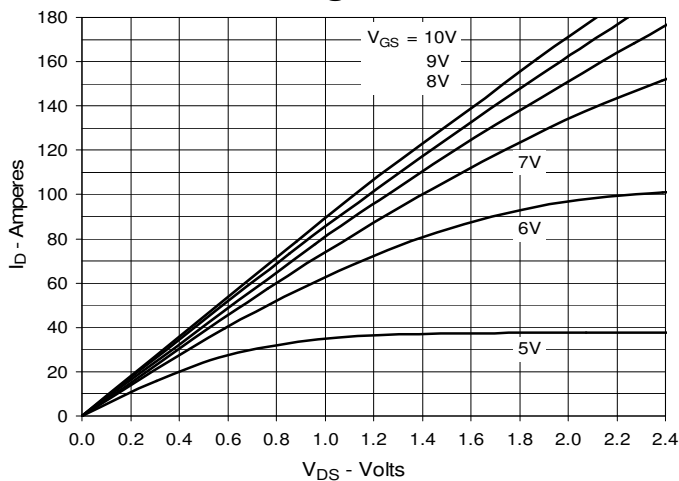


Fig. 4. $R_{DS(on)}$ Normalized to $I_D = 90\text{A}$ Value vs. Junction Temperature

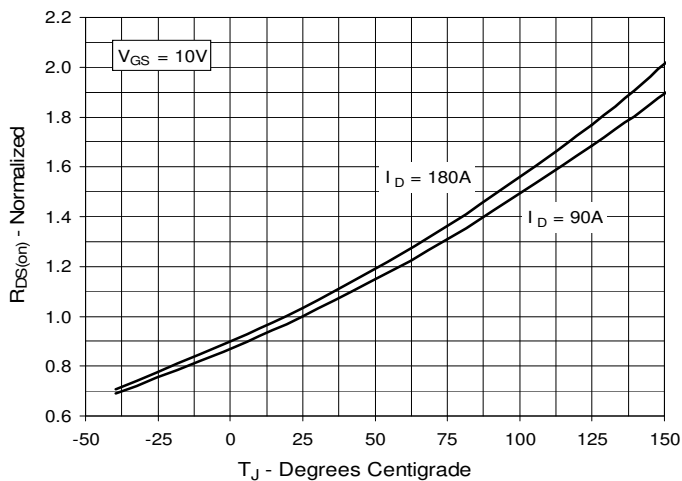


Fig. 5. $R_{DS(on)}$ Normalized to $I_D = 90\text{A}$ Value vs. Drain Current

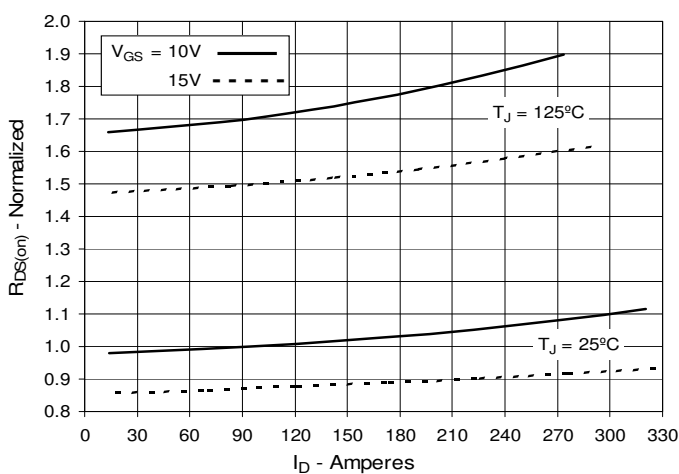


Fig. 6. Maximum Drain Current vs. Case Temperature

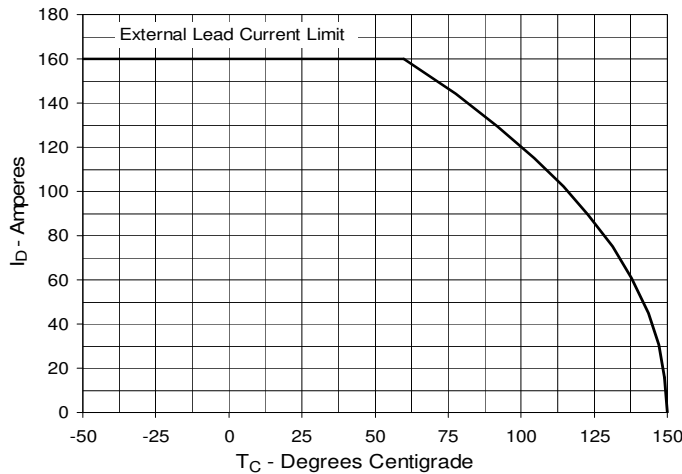


Fig. 7. Input Admittance

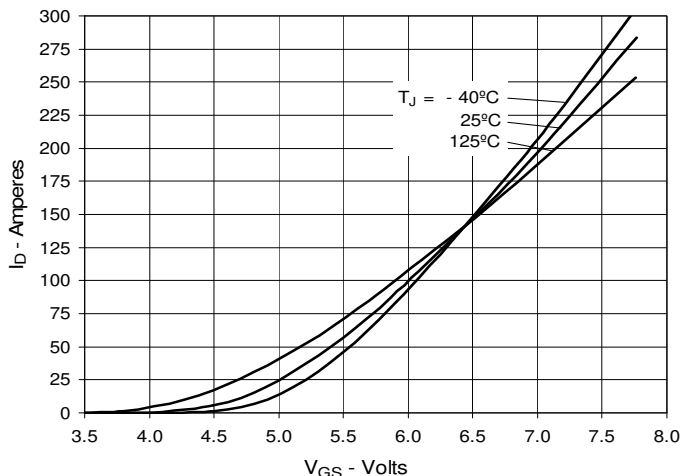


Fig. 8. Transconductance

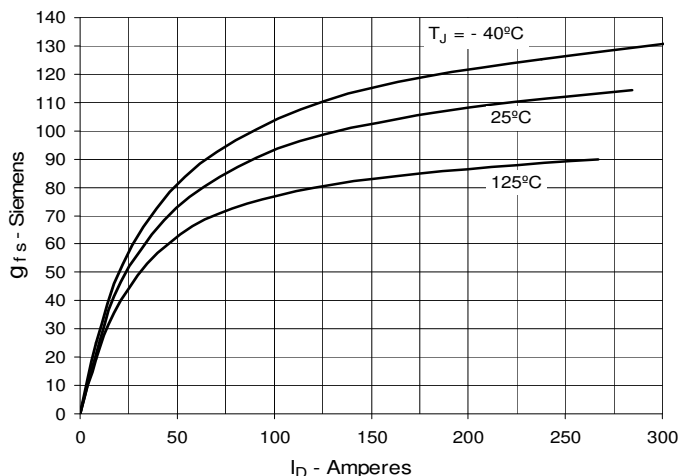


Fig. 9. Forward Voltage Drop of Intrinsic Diode

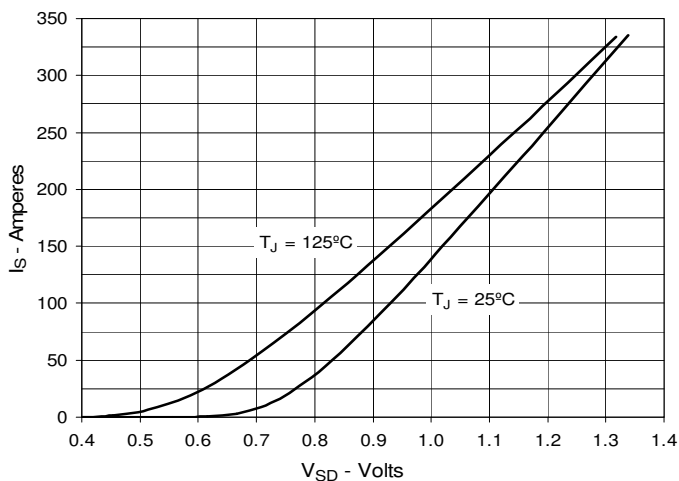


Fig. 10. Gate Charge

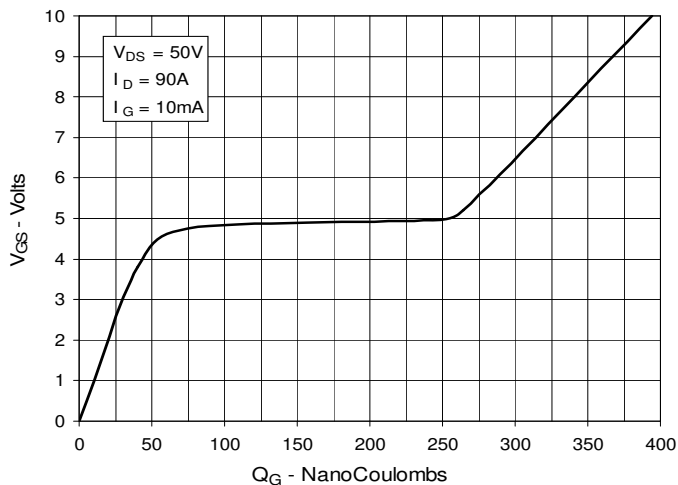


Fig. 11. Capacitance

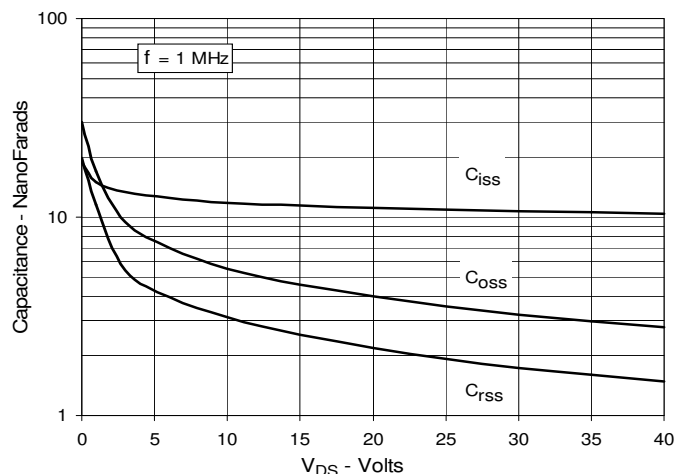


Fig. 12. Maximum Transient Thermal Impedance

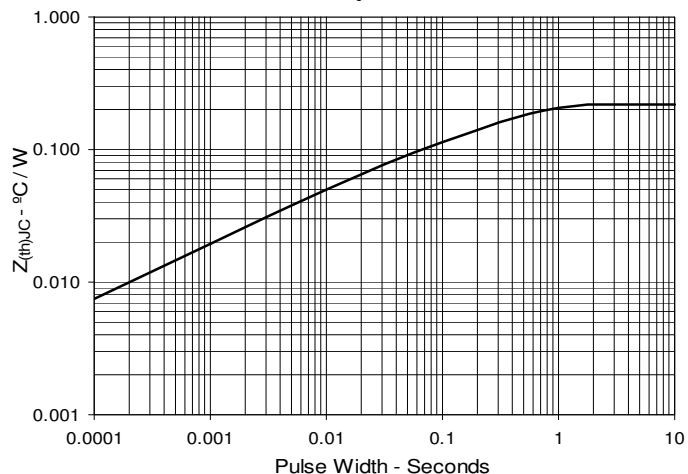


Fig. 13. Forward-Bias Safe Operating Area
@ $T_C = 25^\circ\text{C}$

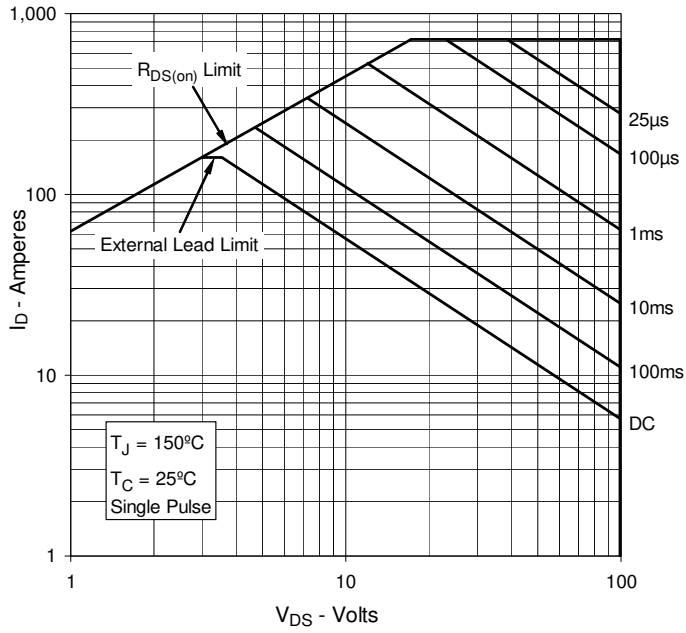
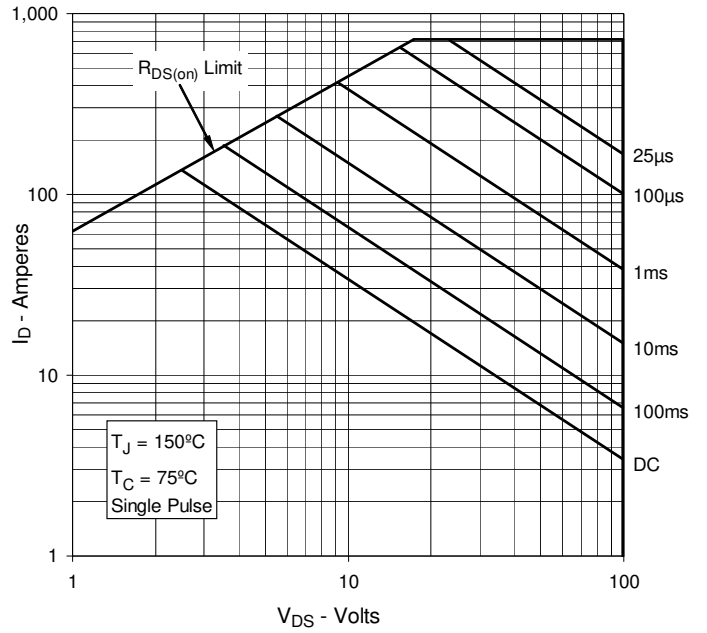


Fig. 14. Forward-Bias Safe Operating Area
@ $T_C = 75^\circ\text{C}$





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