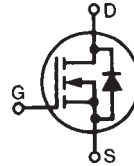


PolarHT™ HiPerFET Power MOSFET

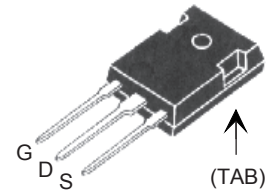
IXFH 96N15P
IXFV 96N15P
IXFV 96N15PS

$V_{DSS} = 150 \text{ V}$
 $I_{D25} = 96 \text{ A}$
 $R_{DS(on)} \leq 24 \text{ m}\Omega$
 $t_{rr} \leq 200 \text{ ns}$

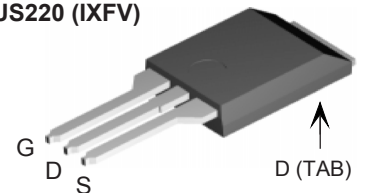
N-Channel Enhancement Mode
Avalanche Energy Rated
Fast Intrinsic Diode



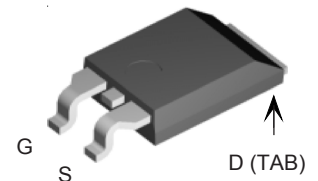
TO-247 (IXFH)



PLUS220 (IXFV)



PLUS220SMD (IXFV__S)



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

| Symbol | Test Conditions | Maximum Ratings | |
|---------------|---|------------------|------------------|
| V_{DSS} | $T_J = 25^\circ\text{C to } 175^\circ\text{C}$ | 150 | V |
| V_{DGR} | $T_J = 25^\circ\text{C to } 175^\circ\text{C}; R_{GS} = 1 \text{ M}\Omega$ | 150 | V |
| V_{GS} | Continuous | ± 20 | V |
| V_{GSM} | Transient | ± 30 | V |
| I_{D25} | $T_C = 25^\circ\text{C}$ | 96 | A |
| $I_{D(RMS)}$ | External lead current limit | 75 | A |
| I_{DM} | $T_C = 25^\circ\text{C}$, pulse width limited by T_{JM} | 250 | A |
| I_{AR} | $T_C = 25^\circ\text{C}$ | 60 | A |
| E_{AR} | $T_C = 25^\circ\text{C}$ | 40 | mJ |
| E_{AS} | $T_C = 25^\circ\text{C}$ | 1.0 | J |
| dv/dt | $I_S \leq I_{DM}$, $di/dt \leq 100 \text{ A}/\mu\text{s}$, $V_{DD} \leq V_{DSS}$, $T_J \leq 175^\circ\text{C}$, $R_G = 4 \Omega$ | 10 | V/ns |
| P_D | $T_C = 25^\circ\text{C}$ | 480 | W |
| T_J | | -55 ... +175 | $^\circ\text{C}$ |
| T_{JM} | | 175 | $^\circ\text{C}$ |
| T_{stg} | | -55 ... +150 | $^\circ\text{C}$ |
| T_L | 1.6 mm (0.062 in.) from case for 10 s | 300 | $^\circ\text{C}$ |
| T_{SOLD} | Plastic body for 10s | 260 | $^\circ\text{C}$ |
| F_C | Mounting force (PLUS220) | 11...65/2.4...11 | N/lb |
| M_d | Mounting torque (TO-247) | 1.13/10 | Nm/lb.in. |
| Weight | TO-247 | 6 | g |
| | PLUS220 | 4 | g |

Features

- † International standard packages
- † Unclamped Inductive Switching (UIS) rated
- † Low package inductance
 - easy to drive and to protect

Advantages

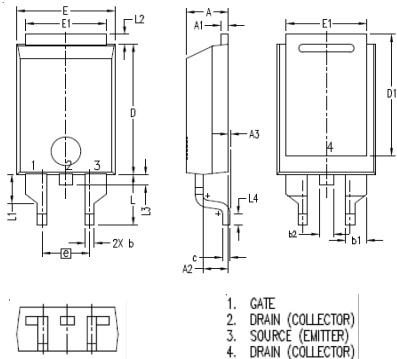
- † Easy to mount
- † Space savings
- † High power density

| Symbol | Test Conditions ($T_J = 25^\circ\text{C}$, unless otherwise specified) | Characteristic Values | | |
|--------------|---|-----------------------|------|--|
| | | Min. | Typ. | Max. |
| BV_{DSS} | $V_{GS} = 0 \text{ V}$, $I_D = 250 \mu\text{A}$ | 150 | | V |
| $V_{GS(th)}$ | $V_{DS} = V_{GS}$, $I_D = 4 \text{ mA}$ | 3.0 | | 5.0 V |
| I_{GSS} | $V_{GS} = \pm 20 \text{ V}_{DC}$, $V_{DS} = 0$ | | | $\pm 100 \text{ nA}$ |
| I_{DSS} | $V_{DS} = V_{DSS}$ $V_{GS} = 0 \text{ V}$ | | | 25 μA 1000 μA |
| $R_{DS(on)}$ | $V_{GS} = 10 \text{ V}$, $I_D = 0.5 I_{D25}$ Pulse test, $t \leq 300 \mu\text{s}$, duty cycle $d \leq 2\%$ | | | 24 $\text{m}\Omega$ |

| Symbol | Test Conditions | Characteristic Values ($T_J = 25^\circ\text{C}$, unless otherwise specified) | | |
|--------------|---|---|------|------------------------|
| | | Min. | Typ. | Max. |
| g_{fs} | $V_{DS} = 10\text{ V}$; $I_D = 0.5 I_{D25}$, pulse test | 35 | 45 | S |
| C_{iss} | $V_{GS} = 0\text{ V}$, $V_{DS} = 25\text{ V}$, $f = 1\text{ MHz}$ | | 3500 | pF |
| C_{oss} | | | 1000 | pF |
| C_{rss} | | | 280 | pF |
| $t_{d(on)}$ | $V_{GS} = 10\text{ V}$, $V_{DS} = 0.5 V_{DSS}$, $I_D = 60\text{ A}$ $R_G = 4\ \Omega$ (External) | | 30 | ns |
| t_r | | | 33 | ns |
| $t_{d(off)}$ | | | 66 | ns |
| t_f | | | 18 | ns |
| $Q_{g(on)}$ | $V_{GS} = 10\text{ V}$, $V_{DS} = 0.5 V_{DSS}$, $I_D = 0.5 I_{D25}$ | | 110 | nC |
| Q_{gs} | | | 26 | nC |
| Q_{gd} | | | 59 | nC |
| R_{thJC} | (TO-247, PLUS220) | | | 0.31°C/W |
| R_{thCS} | | 0.21 | | $^\circ\text{C/W}$ |

| Symbol | Test Conditions | Characteristic Values ($T_J = 25^\circ\text{C}$, unless otherwise specified) | | |
|----------|--|---|------|--------|
| | | Min. | Typ. | Max. |
| I_S | $V_{GS} = 0\text{ V}$ | | | 96 A |
| I_{SM} | Repetitive | | | 250 A |
| V_{SD} | $I_F = I_S$, $V_{GS} = 0\text{ V}$, Pulse test, $t \leq 300\ \mu\text{s}$, duty cycle $d \leq 2\%$ | | | 1.5 V |
| t_{rr} | $I_F = 25\text{ A}$, $-di/dt = 100\text{ A}/\mu\text{s}$ | | | 200 ns |
| Q_{RM} | | $V_R = 100\text{ V}$, $V_{GS} = 0\text{ V}$ | | 600 |
| I_{RM} | | | 6 | A |

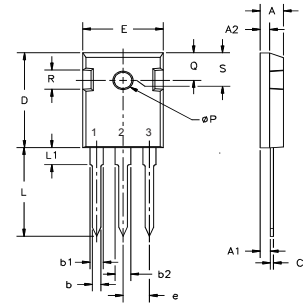
PLUS220SMD (IXFV__S) Outline



| SYM | INCHES | | MILLIMETER | |
|-----|----------|------|------------|-------|
| | MIN | MAX | MIN | MAX |
| A | .169 | .185 | 4.30 | 4.70 |
| A1 | .028 | .035 | 0.70 | 0.90 |
| A2 | .098 | .118 | 2.50 | 3.00 |
| A3 | .000 | .010 | 0.00 | 0.25 |
| b | .035 | .047 | 0.90 | 1.20 |
| b1 | .080 | .095 | 2.03 | 2.41 |
| b2 | .054 | .064 | 1.37 | 1.63 |
| c | .028 | .035 | 0.70 | 0.90 |
| D | .551 | .591 | 14.00 | 15.00 |
| D1 | .512 | .539 | 13.00 | 13.70 |
| E | .394 | .433 | 10.00 | 11.00 |
| E1 | .331 | .346 | 8.40 | 8.80 |
| e | .200 BSC | | 5.08 BSC | |
| L | .209 | .228 | 5.30 | 5.80 |
| L1 | .118 | .138 | 3.00 | 3.50 |
| L2 | .035 | .051 | 0.90 | 1.30 |
| L3 | .047 | .059 | 1.20 | 1.50 |
| L4 | .039 | .059 | 1.00 | 1.50 |

1. GATE
2. DRAIN (COLLECTOR)
3. SOURCE (EMITTER)
4. DRAIN (COLLECTOR)

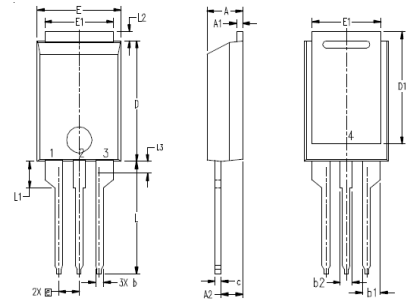
TO-247 (IXFH) Outline



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

| 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 |
| L1 | 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 |

PLUS220 (IXFV) Outline



1. GATE
2. DRAIN (COLLECTOR)
3. SOURCE (EMITTER)
4. DRAIN (COLLECTOR)

| SYM | INCHES | | MILLIMETER | |
|-----|----------|------|------------|-------|
| | MIN | MAX | MIN | MAX |
| A | .169 | .185 | 4.30 | 4.70 |
| A1 | .028 | .035 | 0.70 | 0.90 |
| A2 | .098 | .118 | 2.50 | 3.00 |
| b | .035 | .047 | 0.90 | 1.20 |
| b1 | .080 | .095 | 2.03 | 2.41 |
| b2 | .054 | .064 | 1.37 | 1.63 |
| c | .028 | .035 | 0.70 | 0.90 |
| D | .551 | .591 | 14.00 | 15.00 |
| D1 | .512 | .539 | 13.00 | 13.70 |
| E | .394 | .433 | 10.00 | 11.00 |
| E1 | .331 | .346 | 8.40 | 8.80 |
| e | .100 BSC | | 2.54 BSC | |
| L | .512 | .551 | 13.00 | 14.00 |
| L1 | .118 | .138 | 3.00 | 3.50 |
| L2 | .035 | .051 | 0.90 | 1.30 |
| L3 | .047 | .059 | 1.20 | 1.50 |

IXYS reserves the right to change limits, test conditions, and dimensions.

IXYS MOSFETs and IGBTs are covered by 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
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
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

Fig. 1. Output Characteristics
@ 25°C

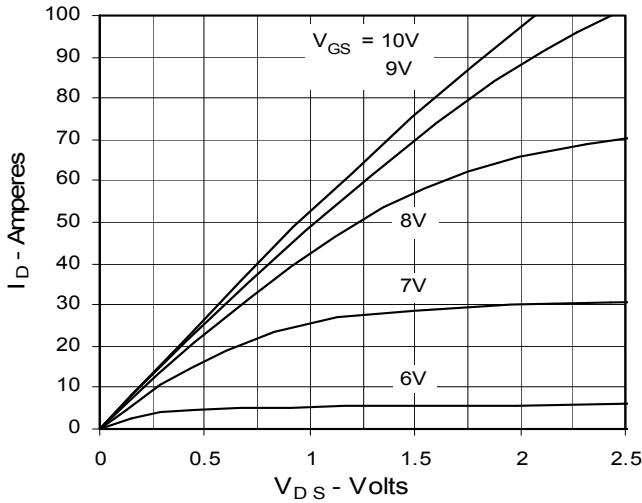


Fig. 2. Extended Output Characteristics
@ 25°C

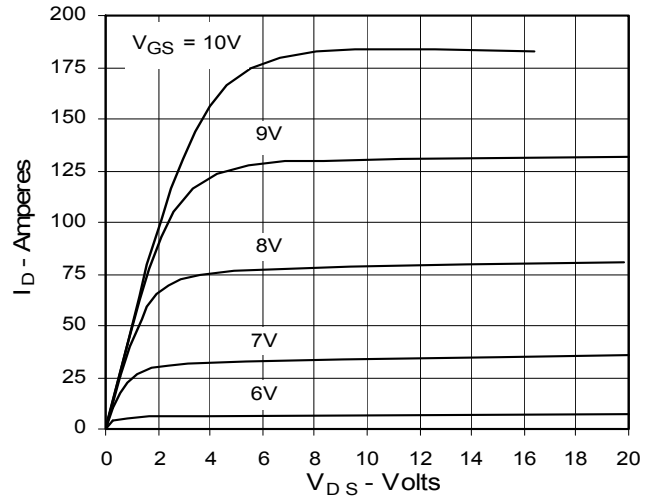


Fig. 3. Output Characteristics
@ 150°C

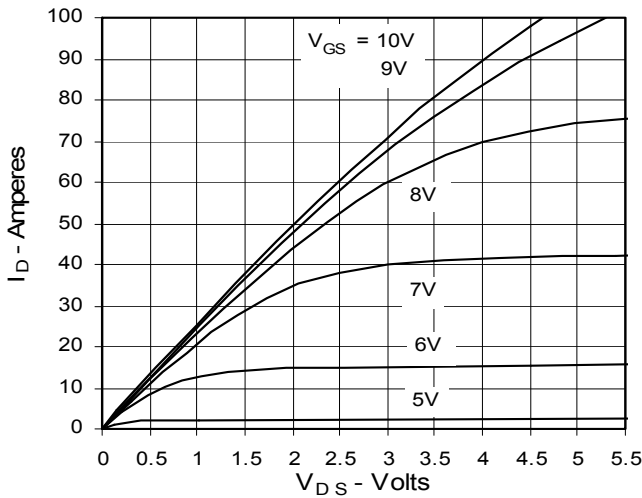


Fig. 4. $R_{DS(on)}$ Normalized to 0.5 I_{D25} Value vs. Junction Temperature

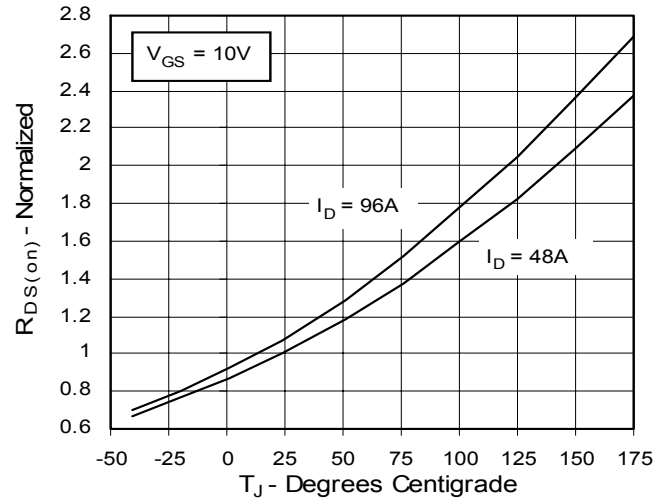


Fig. 5. $R_{DS(on)}$ Normalized to 0.5 I_{D25} Value vs. I_D

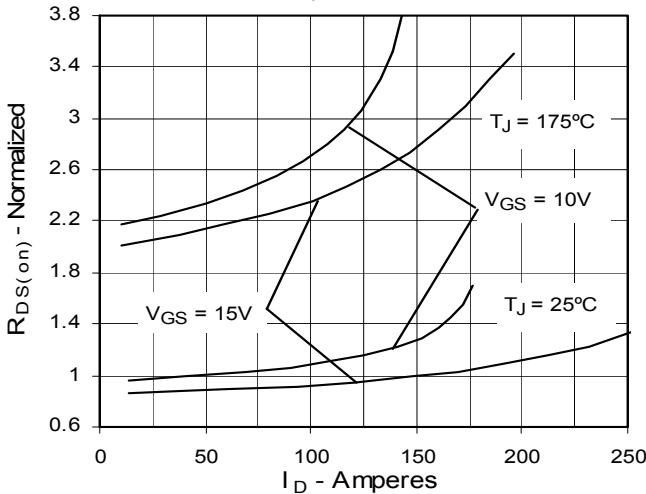


Fig. 6. Drain Current vs. Case Temperature

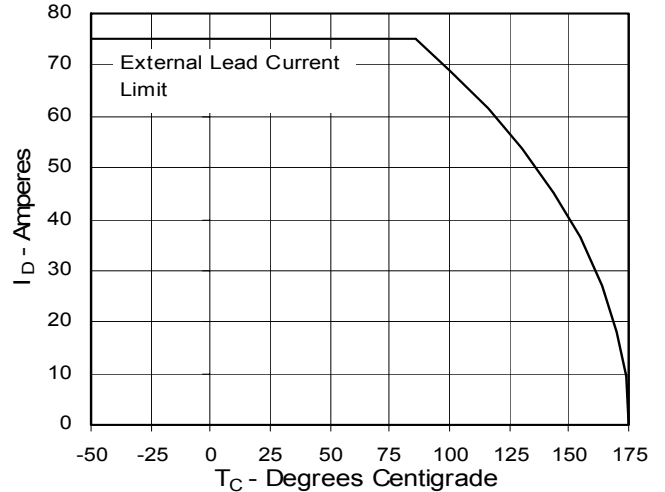


Fig. 7. Input Admittance

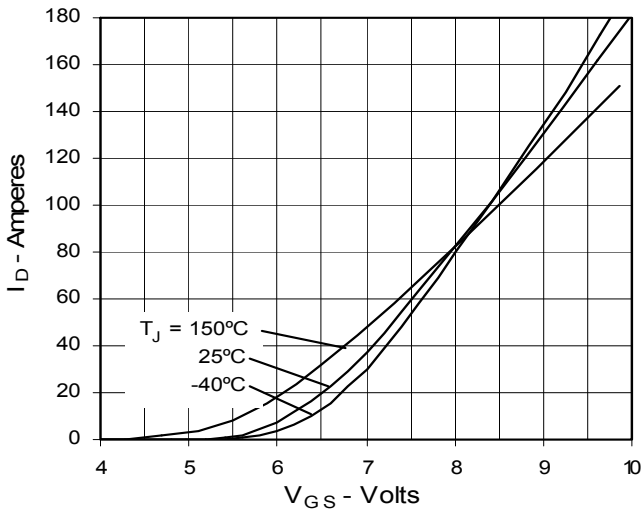


Fig. 8. Transconductance

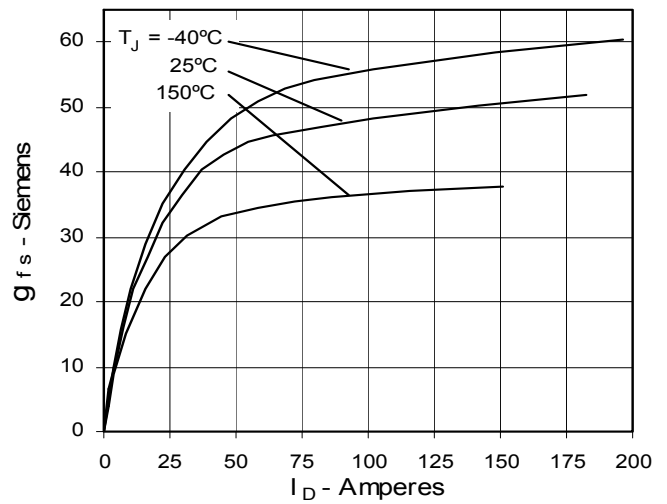


Fig. 9. Source Current vs. Source-To-Drain Voltage

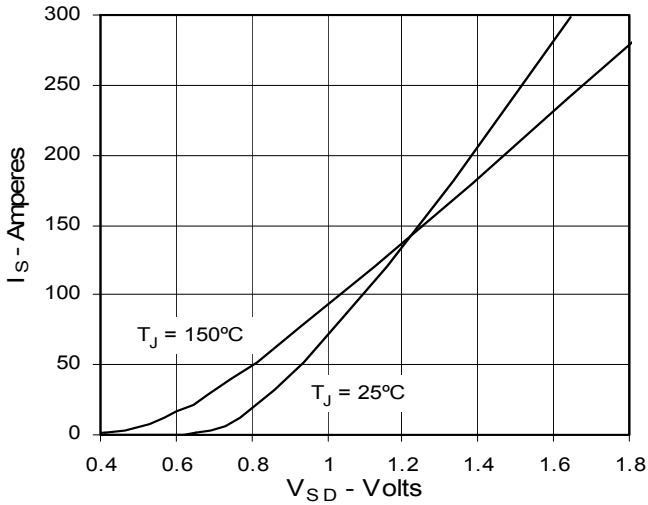


Fig. 10. Gate Charge

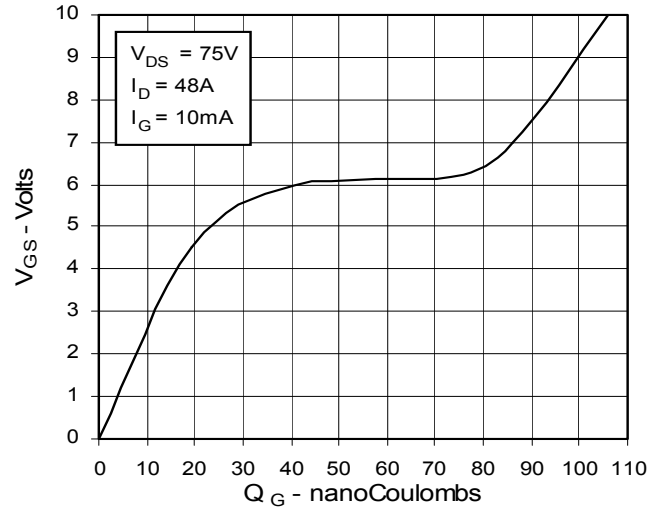


Fig. 11. Capacitance

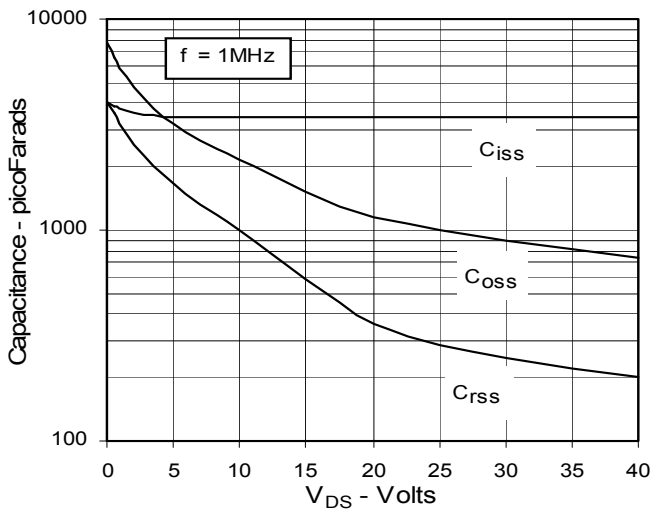


Fig. 12. Forward-Bias Safe Operating Area

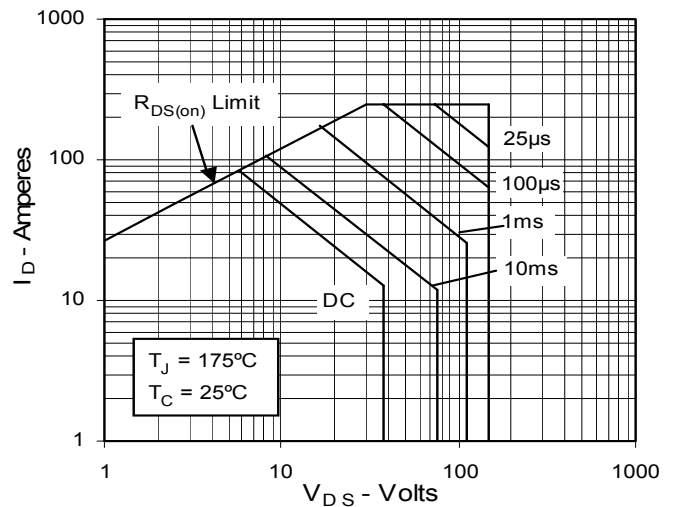


Fig. 13. Maximum Transient Thermal Resistance

