

HiPerFET™ Power MOSFETs Q-Class

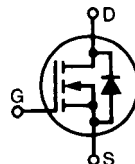
IXFH 4N100Q
IXFT 4N100Q

V_{DSS} = 1000 V
I_{D25} = 4 A
R_{DS(on)} = 3.0 Ω

t_{rr} ≤ 250 ns

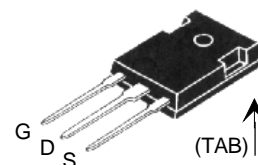
N-Channel Enhancement Mode
Avalanche Rated, Low Q_g, High dv/dt

Preliminary Data Sheet

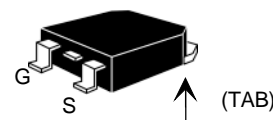


| Symbol | Test Conditions | Maximum Ratings | |
|--------------------|---|-----------------|-----------|
| V _{DSS} | T _J = 25°C to 150°C | 1000 | V |
| V _{DGR} | T _J = 25°C to 150°C; R _{GS} = 1 MΩ | 1000 | V |
| V _{GS} | Continuous | ±20 | V |
| V _{GS(M)} | Transient | ±30 | V |
| I _{D25} | T _C = 25°C | 4 | A |
| I _{DM} | T _C = 25°C, pulse width limited by T _{JM} | 16 | A |
| I _{AR} | T _C = 25°C | 4 | A |
| E _{AR} | T _C = 25°C | 20 | mJ |
| E _{AS} | | 700 | mJ |
| dv/dt | I _S ≤ I _{DM} , di/dt ≤ 100 A/μs, V _{DD} ≤ V _{DSS} , T _J ≤ 150°C, R _G = 2 Ω | 5 | V/ns |
| P _D | T _C = 25°C | 150 | W |
| T _J | | -55 to +150 | °C |
| T _{JM} | | 150 | °C |
| T _{stg} | | -55 to +150 | °C |
| T _L | 1.6 mm (0.063 in) from case for 10 s | 300 | °C |
| M _d | Mounting torque | 1.13/10 | Nm/lb.in. |
| Weight | TO-247 | 6 | g |
| | TO-268 | 4 | g |

TO-247 AD (IXFH)



TO-268 (D3) (IXFT)



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

Features

- IXYS advanced low Q_g process
- Low gate charge and capacitances
 - easier to drive
 - faster switching
- International standard packages
- Low R_{DS(on)}
- Unclamped Inductive Switching (UIS) rated
- Molding epoxies meet UL94 V-0 flammability classification

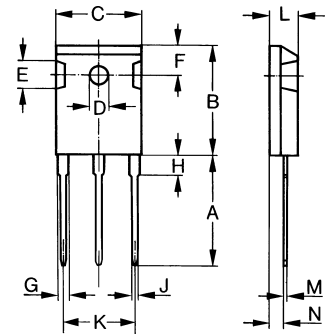
Advantages

- Easy to mount
- Space savings
- High power density

| Symbol | Test Conditions | Characteristic Values (T _J = 25°C, unless otherwise specified) | | |
|---------------------|---|--|------|---------|
| | | min. | typ. | max. |
| V _{DSS} | V _{GS} = 0 V, I _D = 1 mA | 1000 | | V |
| V _{GS(th)} | V _{DS} = V _{GS} , I _D = 1.5 mA | 3.0 | | V |
| I _{GSS} | V _{GS} = ±20 V _{DC} , V _{DS} = 0 | | | ±100 nA |
| I _{DSS} | V _{DS} = V _{DSS} V _{GS} = 0 V | T _J = 25°C | | 50 μA |
| | | T _J = 125°C | | 1 mA |
| R _{DS(on)} | V _{GS} = 10 V, I _D = 0.5 I _{D25} Pulse test, t ≤ 300 μs, duty cycle d ≤ 2 % | | | 3.0 Ω |

| Symbol | Test Conditions | Characteristic Values ($T_J = 25^\circ\text{C}$, unless otherwise specified) | | |
|--------------|--|---|------|---------|
| | | min. | typ. | max. |
| g_{fs} | $V_{DS} = 20\text{ V}; I_D = 0.5 \cdot I_{D25}$, pulse test | 1.5 | 2.5 | S |
| C_{iss} | $V_{GS} = 0\text{ V}, V_{DS} = 25\text{ V}, f = 1\text{ MHz}$ | | 1050 | pF |
| C_{oss} | | | 120 | pF |
| C_{rss} | | | 30 | pF |
| $t_{d(on)}$ | $V_{GS} = 10\text{ V}, V_{DS} = 0.5 \cdot V_{DSS}, I_D = 0.5 \cdot I_{D25}$ $R_G = 4.7\ \Omega$ (External), | | 17 | ns |
| t_r | | | 15 | ns |
| $t_{d(off)}$ | | | 32 | ns |
| t_f | | | 18 | ns |
| $Q_{g(on)}$ | $V_{GS} = 10\text{ V}, V_{DS} = 0.5 \cdot V_{DSS}, I_D = 0.5 \cdot I_{D25}$ | | 39 | nC |
| Q_{gs} | | | 9 | nC |
| Q_{gd} | | | 22 | nC |
| R_{thJC} | (TO-247) | | | 0.8 K/W |
| R_{thCK} | | | 0.25 | K/W |

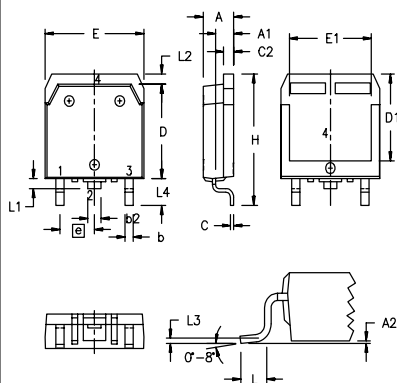
TO-247 AD (IXFH) Outline



| Dim. | Millimeter | | Inches | |
|------|------------|-------|--------|-------|
| | Min. | Max. | Min. | Max. |
| A | 19.81 | 20.32 | 0.780 | 0.800 |
| B | 20.80 | 21.46 | 0.819 | 0.845 |
| C | 15.75 | 16.26 | 0.610 | 0.640 |
| D | 3.55 | 3.65 | 0.140 | 0.144 |
| E | 4.32 | 5.49 | 0.170 | 0.216 |
| F | 5.4 | 6.2 | 0.212 | 0.244 |
| G | 1.65 | 2.13 | 0.065 | 0.084 |
| H | - | 4.5 | - | 0.177 |
| J | 1.0 | 1.4 | 0.040 | 0.055 |
| K | 10.8 | 11.0 | 0.426 | 0.433 |
| L | 4.7 | 5.3 | 0.185 | 0.209 |
| M | 0.4 | 0.8 | 0.016 | 0.031 |
| N | 1.5 | 2.49 | 0.087 | 0.102 |

| Symbol | Test Conditions | Characteristic Values ($T_J = 25^\circ\text{C}$, unless otherwise specified) | | |
|----------|---|---|------|---------------|
| | | min. | typ. | max. |
| I_S | $V_{GS} = 0\text{ V}$ | | | 4 A |
| I_{SM} | Repetitive; pulse width limited by T_{JM} | | | 16 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} | $I_F = I_S, -di/dt = 100\text{ A}/\mu\text{s}, V_R = 100\text{ V}$ | | 0.52 | 250 ns |
| Q_{RM} | | | 1.8 | μC |
| I_{RM} | | | | A |

TO-268AA (D³ PAK)



| Dim. | Millimeter | | Inches | |
|----------------|------------|-------|----------|------|
| | Min. | Max. | Min. | Max. |
| A | 4.9 | 5.1 | .193 | .201 |
| A ₁ | 2.7 | 2.9 | .106 | .114 |
| A ₂ | .02 | .25 | .001 | .010 |
| b | 1.15 | 1.45 | .045 | .057 |
| b ₂ | 1.9 | 2.1 | .75 | .83 |
| C | .4 | .65 | .016 | .026 |
| D | 13.80 | 14.00 | .543 | .551 |
| E | 15.85 | 16.05 | .624 | .632 |
| E ₁ | 13.3 | 13.6 | .524 | .535 |
| e | 5.45 BSC | | .215 BSC | |
| H | 18.70 | 19.10 | .736 | .752 |
| L | 2.40 | 2.70 | .094 | .106 |
| L ₁ | 1.20 | 1.40 | .047 | .055 |
| L ₂ | 1.00 | 1.15 | .039 | .045 |
| L ₃ | 0.25 BSC | | .010 BSC | |
| L ₄ | 3.80 | 4.10 | .150 | .161 |

Min. Recommended Footprint

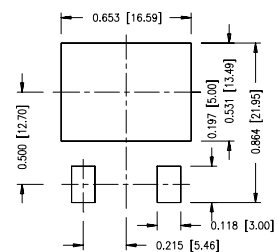


Figure 1. Output Characteristics at 25°C

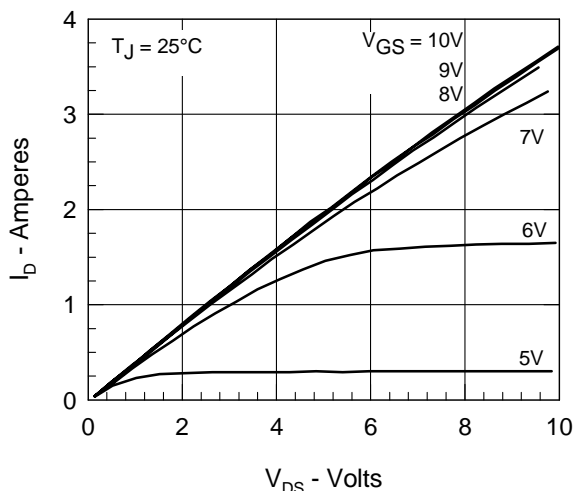


Figure 2. Extended Output Characteristics at 125°C

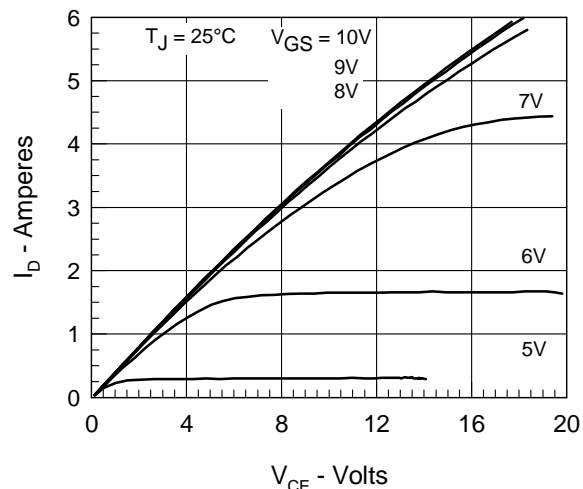


Figure 3. $R_{DS(on)}$ normalized to 0.5 I_{D25} value vs. I_D

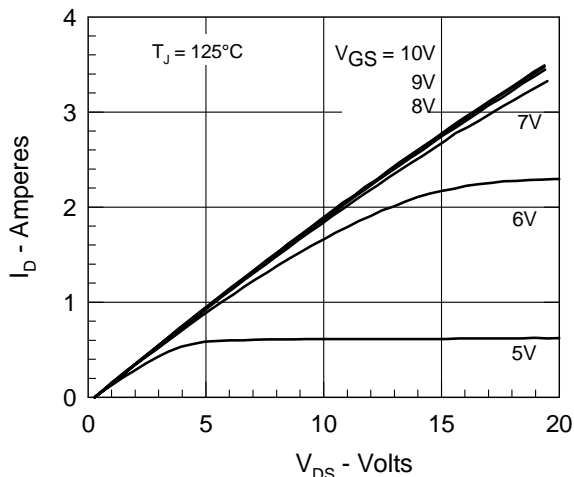


Figure 4. Admittance Curves

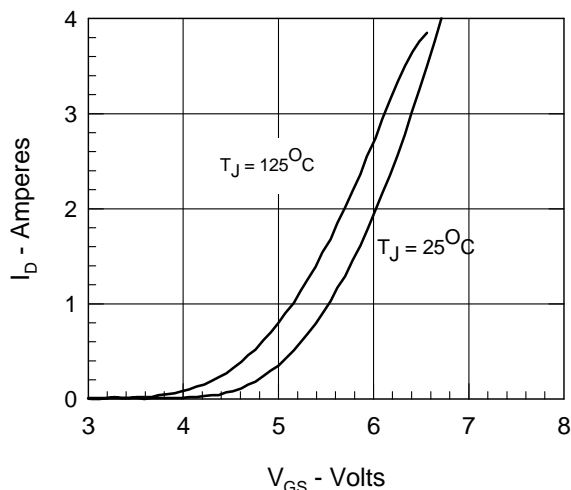


Figure 5. $R_{DS(on)}$ normalized to 0.5 I_{D25} value vs. I_D

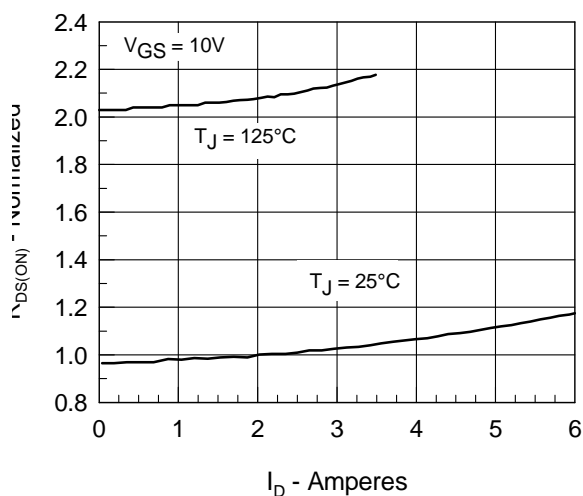


Figure 6. $R_{DS(on)}$ normalized to 0.5 I_{D25} value vs. T_J

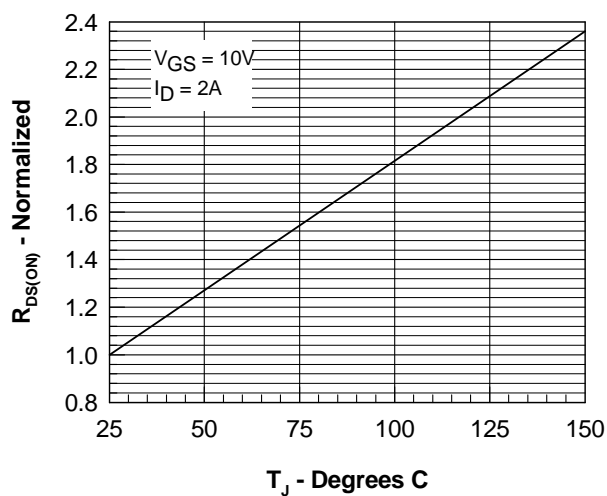


Figure 7. Gate Charge

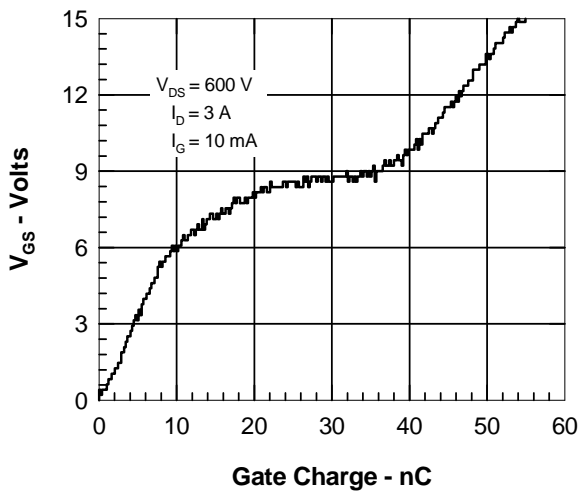


Figure 8. Capacitance Curves

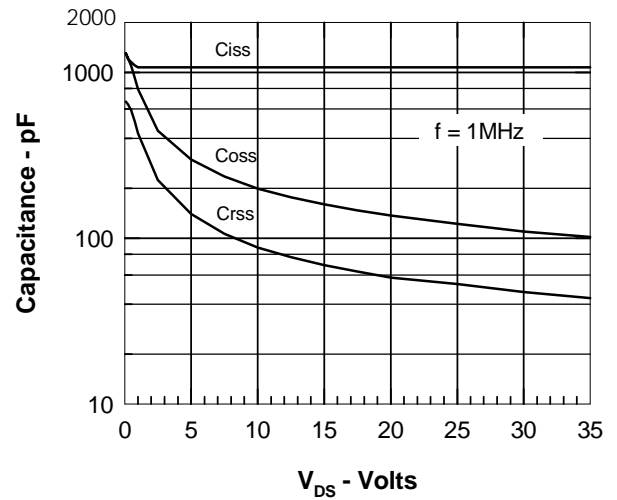


Figure 9. Forward Voltage Drop of the Intrinsic Diode

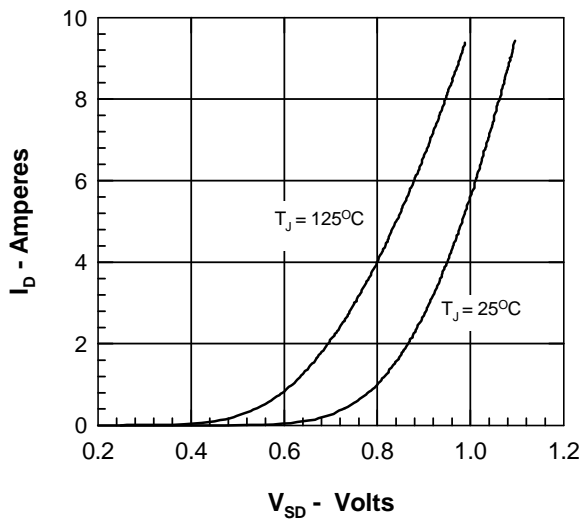


Figure 10. Drain Current vs. Case Temperature

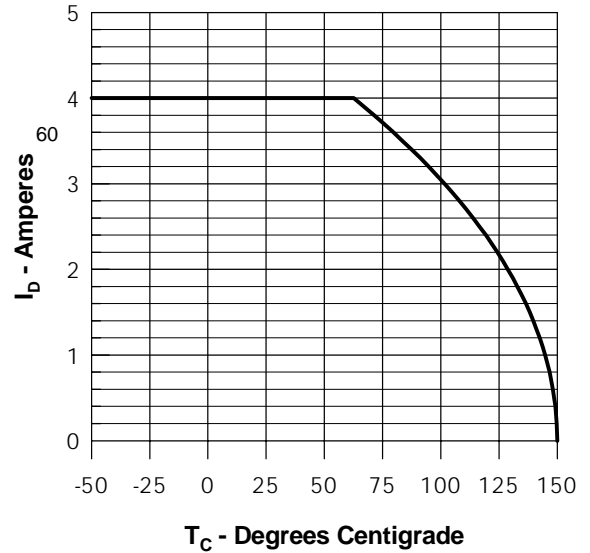
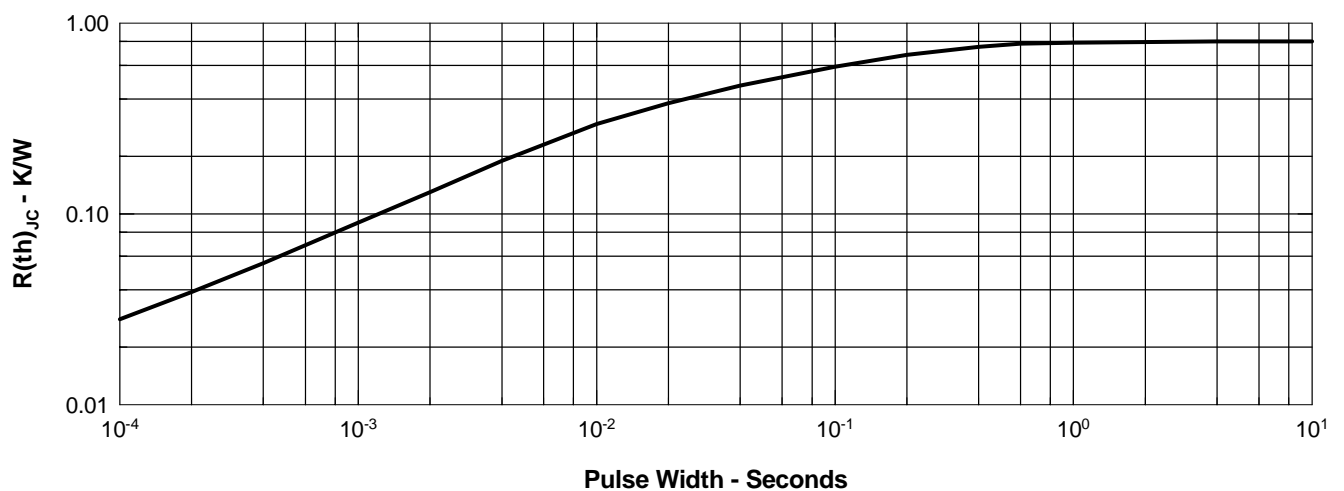


Figure 11. Transient Thermal Resistance





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