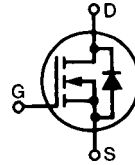


HiPerFET™ Power MOSFETs

IXFH/IXFM35N30
IXFH40N30
IXFM40N30

N-Channel Enhancement Mode
High dv/dt, Low t_{rr} , HDMOS™ Family

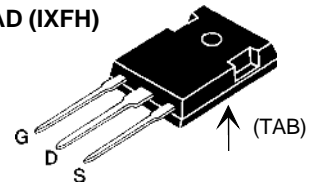


| V_{DSS} | I_{D25} | $R_{DS(on)}$ |
|-----------|-----------|--------------|
| 300 V | 35 A | 100 mΩ |
| 300 V | 40 A | 85 mΩ |
| 300 V | 40 A | 88 mΩ |

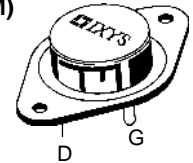
$t_{rr} \leq 200$ ns

| Symbol | Test Conditions | Maximum Ratings | |
|-----------|---|-----------------------------|------------------|
| V_{DSS} | $T_J = 25^\circ\text{C}$ to 150°C | 300 | V |
| V_{DGR} | $T_J = 25^\circ\text{C}$ to 150°C ; $R_{GS} = 1\text{ M}\Omega$ | 300 | V |
| V_{GS} | Continuous | ± 20 | V |
| V_{GSM} | Transient | ± 30 | V |
| I_{D25} | $T_C = 25^\circ\text{C}$ | 35N30 | 35 A |
| | | 40N30 | 40 A |
| I_{DM} | $T_C = 25^\circ\text{C}$, pulse width limited by T_{JM} | 35N30 | 140 A |
| | | 40N30 | 160 A |
| I_{AR} | $T_C = 25^\circ\text{C}$ | 35N30 | 35 A |
| | | 40N30 | 40 A |
| E_{AR} | $T_C = 25^\circ\text{C}$ | 30 | mJ |
| dv/dt | $I_S \leq I_{DM}$, $di/dt \leq 100\text{ A}/\mu\text{s}$, $V_{DD} \leq V_{DSS}$, $T_J \leq 150^\circ\text{C}$, $R_G = 2\ \Omega$ | 5 | V/ns |
| P_D | $T_C = 25^\circ\text{C}$ | 300 | W |
| T_J | | -55 ... +150 | $^\circ\text{C}$ |
| T_{JM} | | 150 | $^\circ\text{C}$ |
| T_{stg} | | -55 ... +150 | $^\circ\text{C}$ |
| T_L | 1.6 mm (0.062 in.) from case for 10 s | 300 | $^\circ\text{C}$ |
| M_d | Mounting torque | 1.13/10 | Nm/lb.in. |
| Weight | | TO-204 = 18 g, TO-247 = 6 g | |

TO-247 AD (IXFH)



TO-204 AE (IXFM)



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

Features

- International standard packages
- Low $R_{DS(on)}$ HDMOS™ process
- Rugged polysilicon gate cell structure
- Unclamped Inductive Switching (UIS) rated
- Low package inductance
 - easy to drive and to protect
- Fast intrinsic Rectifier

Applications

- DC-DC converters
- Synchronous rectification
- Battery chargers
- Switched-mode and resonant-mode power supplies
- DC choppers
- AC motor control
- Temperature and lighting controls
- Low voltage relays

Advantages

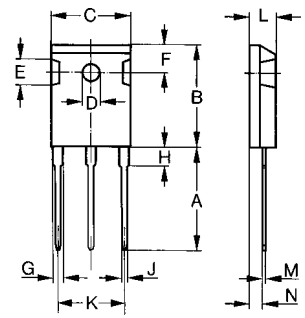
- Easy to mount with 1 screw (TO-247) (isolated mounting screw hole)
- Space savings
- High power density

| Symbol | Test Conditions | Characteristic Values ($T_J = 25^\circ\text{C}$, unless otherwise specified) | | |
|--------------|---|---|------|---------------------|
| | | min. | typ. | max. |
| V_{DSS} | $V_{GS} = 0\text{ V}$, $I_D = 250\ \mu\text{A}$ | 300 | | V |
| $V_{GS(th)}$ | $V_{DS} = V_{GS}$, $I_D = 4\text{ mA}$ | 2 | | V |
| I_{GSS} | $V_{GS} = \pm 20\text{ V}_{DC}$, $V_{DS} = 0$ | | | $\pm 100\text{ nA}$ |
| I_{DSS} | $V_{DS} = 0.8 \cdot V_{DSS}$, $V_{GS} = 0\text{ V}$ | $T_J = 25^\circ\text{C}$ | | 200 μA |
| | | $T_J = 125^\circ\text{C}$ | | 1 mA |
| $R_{DS(on)}$ | $V_{GS} = 10\text{ V}$, $I_D = 0.5 I_{D25}$ | 35N30 | | 0.100 Ω |
| | | FH40N30 | | 0.085 Ω |
| | | FM40N30 | | 0.088 Ω |
| | | Pulse test, $t \leq 300\ \mu\text{s}$, duty cycle $d \leq 2\%$ | | |

| 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 | 22 | 25 | S | |
| C_{iss} | $V_{GS} = 0\text{ V}, V_{DS} = 25\text{ V}, f = 1\text{ MHz}$ | | 4800 | pF | |
| C_{oss} | | | 745 | pF | |
| C_{rss} | | | 280 | pF | |
| $t_{d(on)}$ | $V_{GS} = 10\text{ V}, V_{DS} = 0.5 \cdot V_{DSS}, I_D = 0.5 I_{D25}$ $R_G = 2\ \Omega$ (External) | | 20 | 30 | ns |
| t_r | | | 60 | 90 | ns |
| $t_{d(off)}$ | | | 75 | 100 | ns |
| t_f | | | 45 | 90 | ns |
| $Q_{g(on)}$ | $V_{GS} = 10\text{ V}, V_{DS} = 0.5 \cdot V_{DSS}, I_D = 0.5 I_{D25}$ | | 177 | 200 | nC |
| Q_{gs} | | | 28 | 50 | nC |
| Q_{gd} | | | 78 | 105 | nC |
| R_{thJC} | | | | 0.42 | K/W |
| R_{thCK} | | | 0.25 | | K/W |

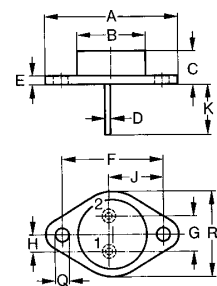
| Symbol | Test Conditions | Characteristic Values ($T_J = 25^\circ\text{C}$, unless otherwise specified) | | | |
|----------|---|---|------|------------|----------|
| | | min. | typ. | max. | |
| I_S | $V_{GS} = 0\text{ V}$ | 35N30 40N30 | | 35 40 | A A |
| I_{SM} | Repetitive; pulse width limited by T_{JM} | 35N30 40N30 | | 140 160 | A 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} | $I_F = I_S, -di/dt = 100\text{ A}/\mu\text{s}$, $V_R = 100\text{ V}$ | $T_J = 25^\circ\text{C}$ $T_J = 125^\circ\text{C}$ | | 200 350 | ns ns |

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 |

TO-204 AE (IXFM) Outline



| Dim. | Millimeter | | Inches | |
|------|------------|-------|--------|-------|
| | Min. | Max. | Min. | Max. |
| A | 38.61 | 39.12 | 1.520 | 1.540 |
| B | - | 22.22 | - | 0.875 |
| C | 6.40 | 11.40 | 0.252 | 0.449 |
| D | 1.45 | 1.60 | 0.057 | 0.063 |
| E | 1.52 | 3.43 | 0.060 | 0.135 |
| F | 30.15 | BSC | 1.187 | BSC |
| G | 10.67 | 11.17 | 0.420 | 0.440 |
| H | 5.21 | 5.71 | 0.205 | 0.225 |
| J | 16.64 | 17.14 | 0.655 | 0.675 |
| K | 11.18 | 12.19 | 0.440 | 0.480 |
| Q | 3.84 | 4.19 | 0.151 | 0.165 |
| R | 25.16 | 26.66 | 0.991 | 1.050 |

Fig.1. Output Characteristics

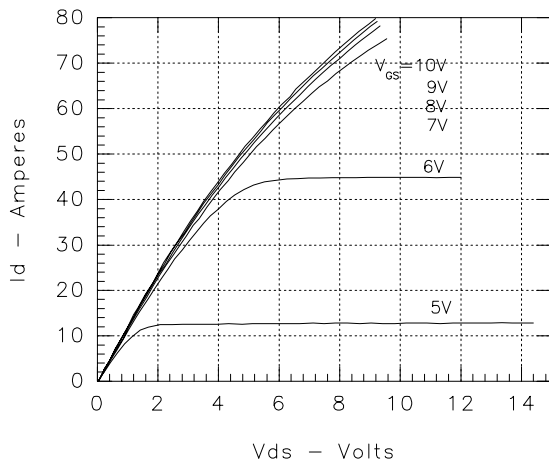


Fig. 2. Input Admittance

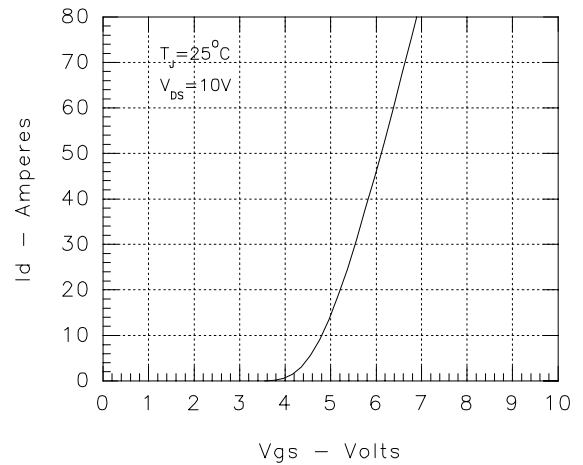


Fig. 3. Rds(on) vs. Drain Current

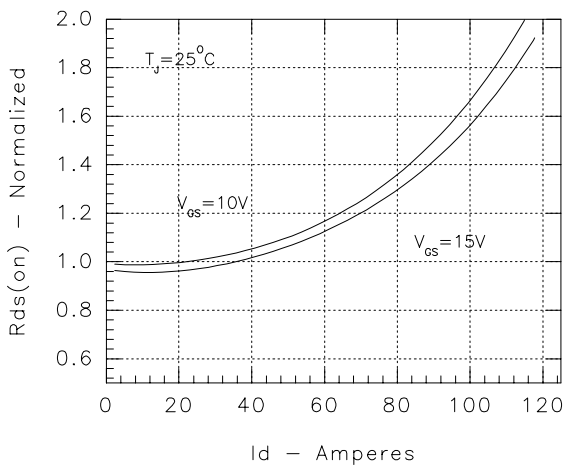


Fig. 4. Temperature Dependence of Drain to Source Resistance

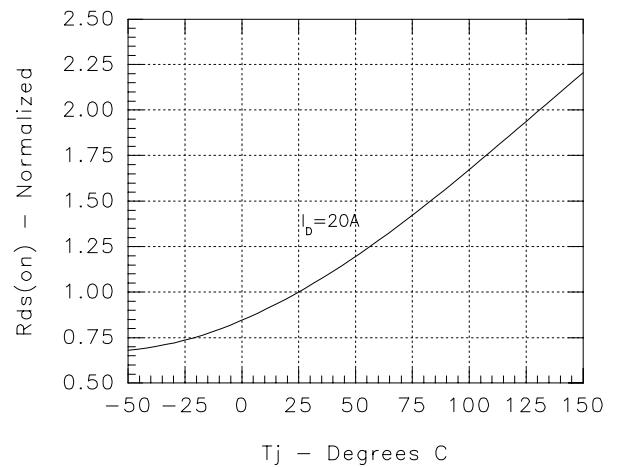


Fig. 5. Drain Current vs. Case Temperature

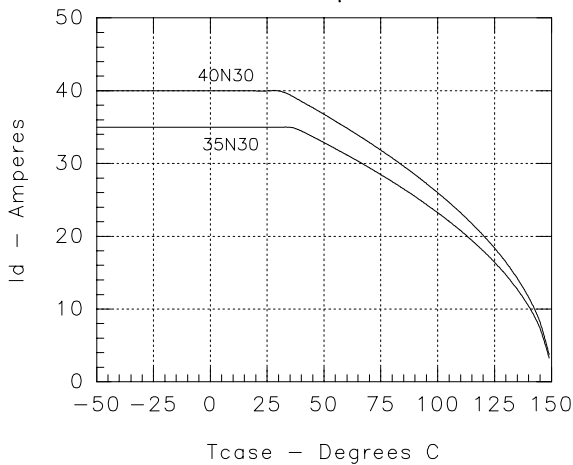


Fig. 6. Temperature Dependence of Breakdown Voltage and Threshold Voltage

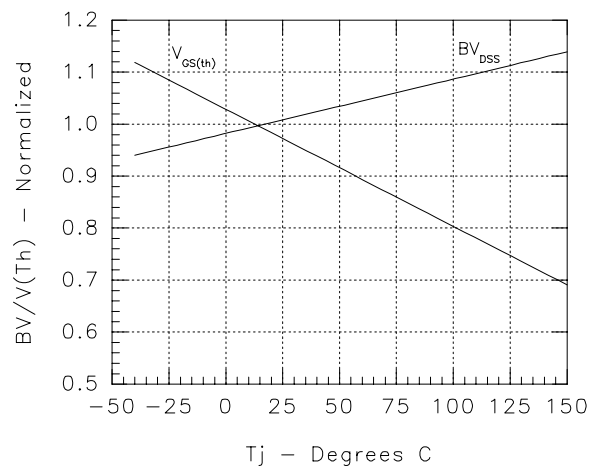


Fig.7 Gate Charge Characteristic Curve

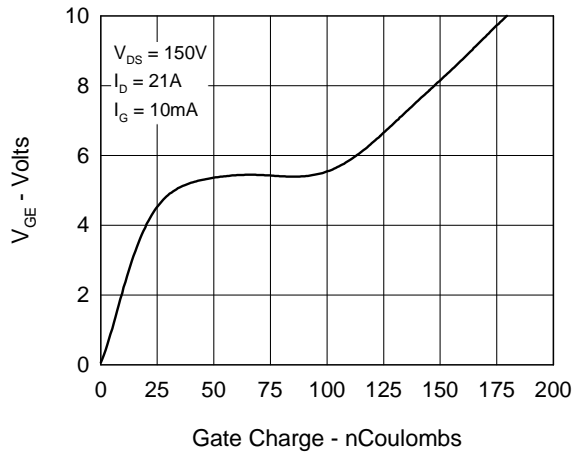


Fig.8 Forward Bias Safe Operating Area

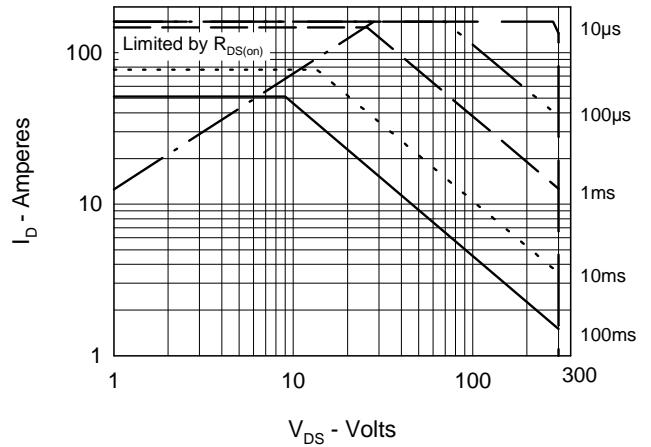


Fig.9 Capacitance Curves

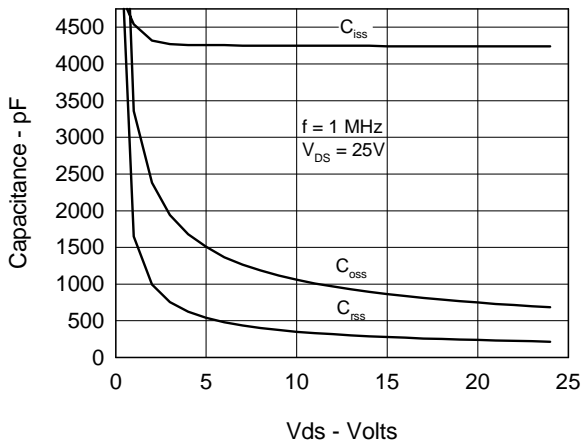


Fig.10 Source Current vs. Source

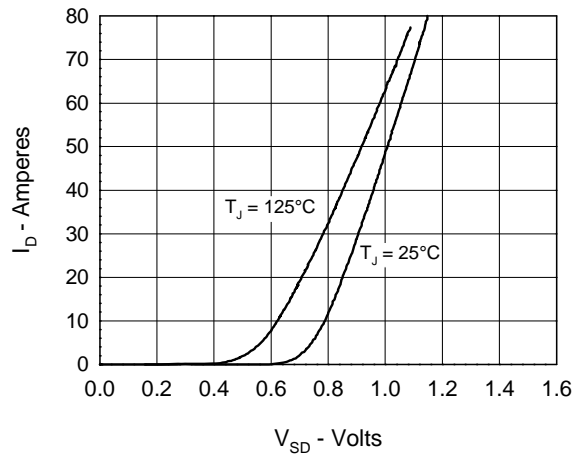


Fig.11 Transient Thermal Impedance

