

# HiPerFET™ Power MOSFETs

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

**IXFH/IXFM 10 N90**  
**IXFH/IXFM 12 N90**  
**IXFH/IXFT 13 N90**



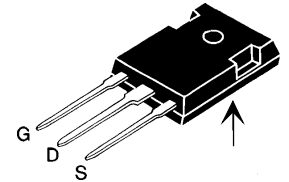
| $V_{DSS}$    | $I_{D25}$   | $R_{DS(on)}$                   |
|--------------|-------------|--------------------------------|
| <b>900 V</b> | <b>10 A</b> | <b>1.1 <math>\Omega</math></b> |
| <b>900 V</b> | <b>12 A</b> | <b>0.9 <math>\Omega</math></b> |
| <b>900 V</b> | <b>13 A</b> | <b>0.8 <math>\Omega</math></b> |

**$t_{rr} \leq 250$  ns**

| Symbol        | Test Conditions  | Maximum Ratings                     |                  |
|---------------|--|-------------------------------------|------------------|
| $V_{DSS}$     | $T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$  | 900                                 | V                |
| $V_{DGR}$     | $T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$ ; $R_{GS} = 1$ M $\Omega$  | 900                                 | V                |
| $V_{GS}$      | Continuous   | $\pm 20$                            | V                |
| $V_{GSM}$     | Transient  | $\pm 30$                            | V                |
| $I_{D25}$     | $T_C = 25^\circ\text{C}$   | 10N90: 10<br>12N90: 12<br>13N90: 13 | A                |
| $I_{DM}$      | $T_C = 25^\circ\text{C}$ ,<br>pulse width limited by $T_{JM}$  | 10N90: 40<br>12N90: 48<br>13N90: 52 | A                |
| $I_{AR}$      | $T_C = 25^\circ\text{C}$   | 10N90: 10<br>12N90: 12<br>13N90: 13 | A                |
| $E_{AR}$      | $T_C = 25^\circ\text{C}$   | 30                                  | mJ               |
| dv/dt         | $I_S \leq I_{DM}$ , di/dt $\leq 100$ A/ $\mu\text{s}$ , $V_{DD} \leq V_{DSS}$ ,<br>$T_J \leq 150^\circ\text{C}$ , $R_G = 2$ $\Omega$ | 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.        |
| <b>Weight</b> |  | TO-204 = 18 g, TO-247 = 6 g         |                  |

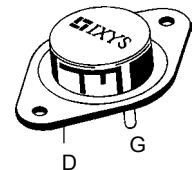
| Symbol       | Test Conditions  | Characteristic Values<br>( $T_J = 25^\circ\text{C}$ , unless otherwise specified) |      |                          |
|--------------|--|---|------|--------------------------|
|              |  | min.  | typ. | max.                     |
| $V_{DSS}$    | $V_{GS} = 0$ V, $I_D = 3$ mA   | 900   |      | V                        |
| $V_{GS(th)}$ | $V_{DS} = V_{GS}$ , $I_D = 4$ mA   | 2.0   |      | 4.5 V                    |
| $I_{GSS}$    | $V_{GS} = \pm 20$ V $_{DC}$ , $V_{DS} = 0$   |   |      | $\pm 100$ nA             |
| $I_{DSS}$    | $V_{DS} = V_{DSS}$ , $V_{GS} = 0$ V<br>$T_J = 25^\circ\text{C}$<br>$T_J = 125^\circ\text{C}$                   |   |      | 25 $\mu\text{A}$<br>1 mA |
| $R_{DS(on)}$ | $V_{GS} = 10$ V, $I_D = 0.5 \cdot I_{D25}$<br>Pulse test, $t \leq 300$ $\mu\text{s}$ , duty cycle $d \leq 2$ % | 10N90: 1.1<br>12N90: 0.9<br>13N90: 0.8  |      | $\Omega$                 |

TO-247 AD (IXFH)



(TAB)

TO-204 AA (IXFM)



TO-268 (IXFT)



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



Fig. 1. Output Characteristics

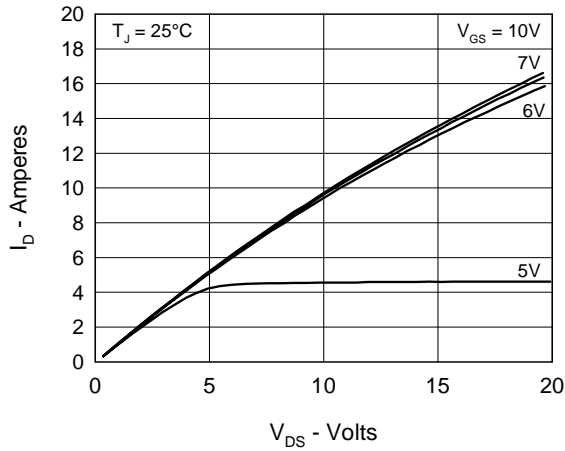


Fig. 2. Input Admittance

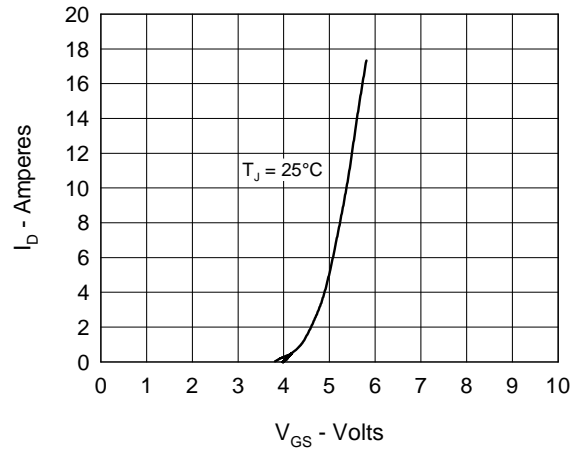


Fig. 3.  $R_{DS(on)}$  vs. Drain Current

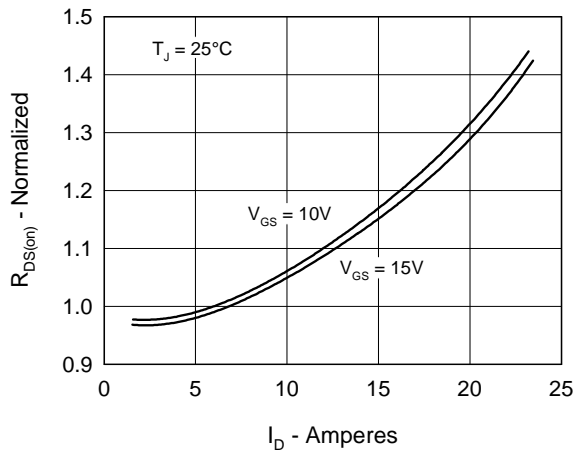


Fig. 4. Temperature Dependence of Drain to Source Resistance

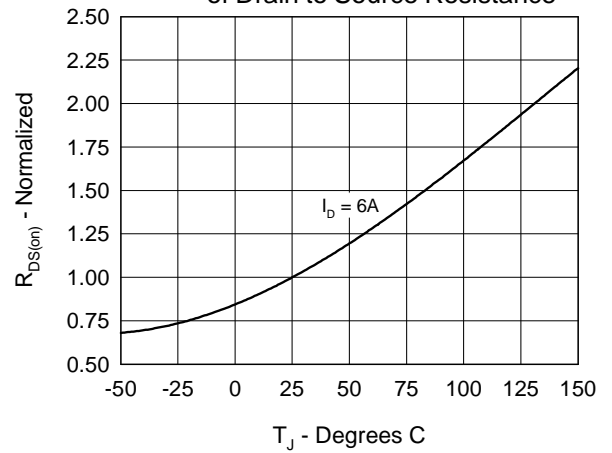


Fig. 5. Drain Current vs. Case Temperature

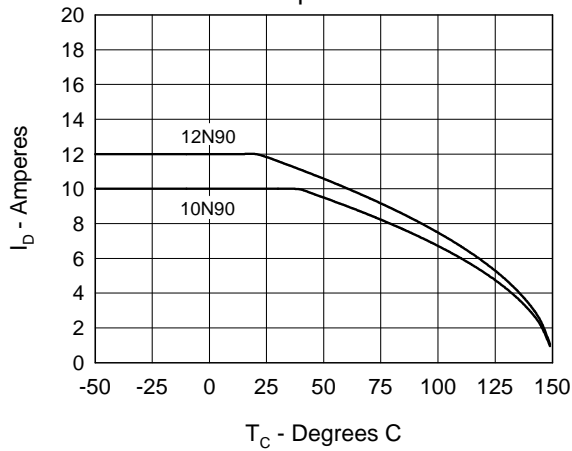


Fig. 6. Temperature Dependence of Breakdown and Threshold Voltage

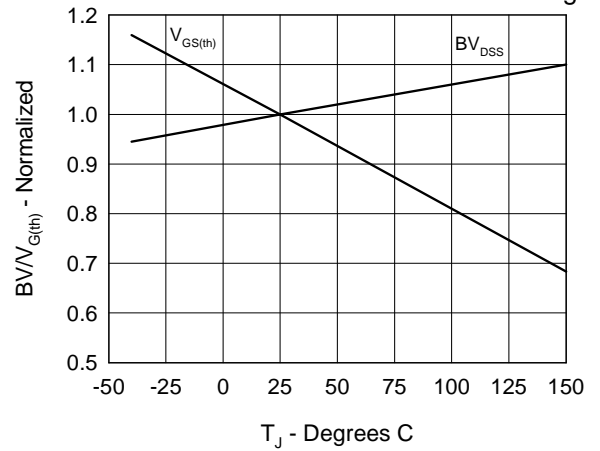


Fig.7. Gate Charge Characteristic Curve

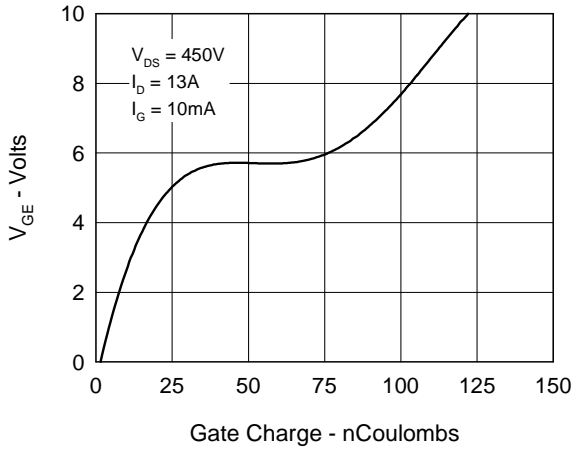


Fig.8. Capacitance Curves

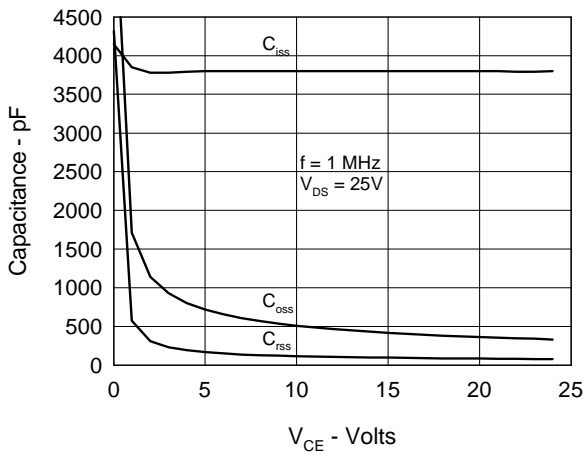


Fig.9. Source Current vs. Source to Drain Voltage

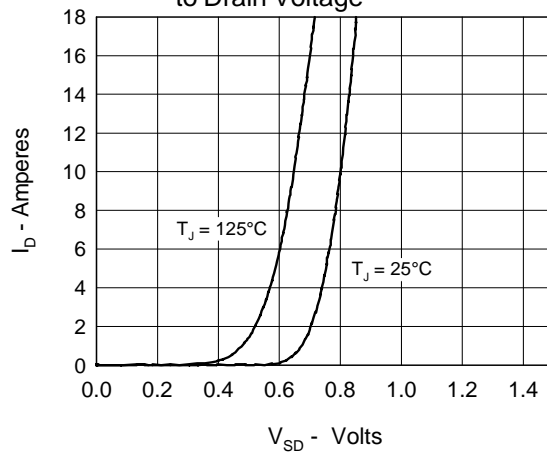
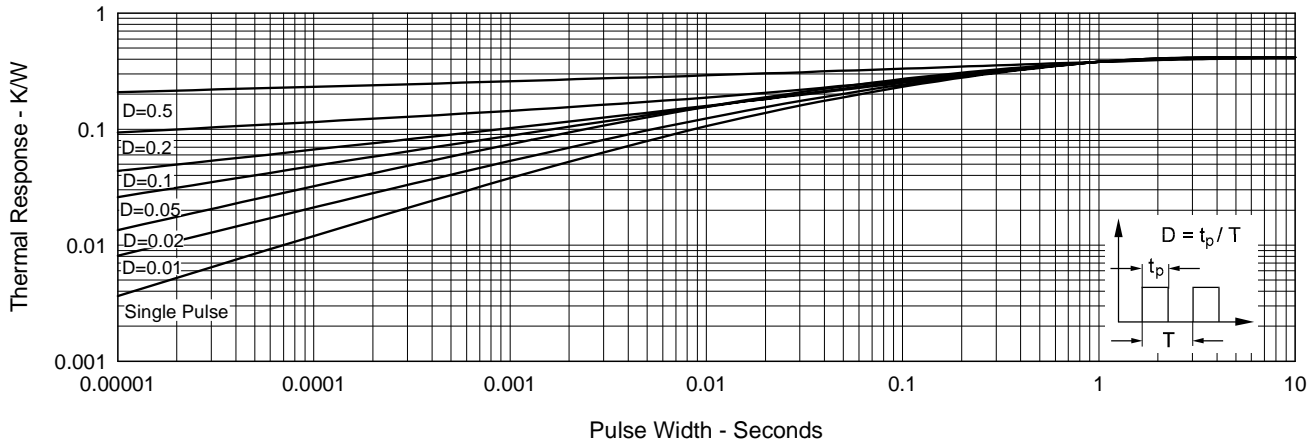


Fig.10. Transient Thermal Impedance



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