

HiPerFET™ Power MOSFETs

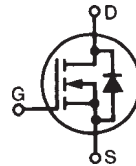
N-Channel Enhancement Mode
High dv/dt, Low t_{rr} , HDMOS™ Family

Preliminary data sheet

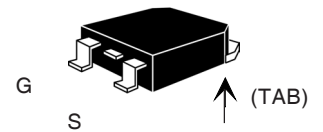
IXFT 10N100
IXFT12N100

| V_{DSS} | I_{D25} | $R_{DS(on)}$ |
|-----------|-----------|---------------|
| 1000 V | 10 A | 1.20 Ω |
| 1000 V | 12 A | 1.05 Ω |

$t_{rr} \leq 250$ ns



TO-268 Case Style



G = Gate,
S = Source,

TAB = Drain

| Symbol | Test Conditions | Maximum Ratings | |
|-----------|--|--------------------------|------------------|
| V_{DSS} | $T_J = 25^\circ\text{C}$ to 150°C | 1000 | V |
| V_{DGR} | $T_J = 25^\circ\text{C}$ to 150°C ; $R_{GS} = 1$ M Ω | 1000 | V |
| V_{GS} | Continuous | ± 20 | V |
| V_{GSM} | Transient | ± 30 | V |
| I_{D25} | $T_C = 25^\circ\text{C}$ | 10N100: 10 12N100: 12 | A |
| I_{DM} | $T_C = 25^\circ\text{C}$, pulse width limited by T_{JM} | 10N100: 40 12N100: 48 | A |
| I_{AR} | $T_C = 25^\circ\text{C}$ | 10N100: 10 12N100: 12 | A |
| E_{AR} | $T_C = 25^\circ\text{C}$ | 30 | mJ |
| dv/dt | $I_S \leq I_{DM}$, $di/dt \leq 100$ A/ μs , $V_{DD} \leq V_{DSS}$, $T_J \leq 150^\circ\text{C}$, $R_G = 2$ Ω | 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-268 = 6 g | |

Features

- International standard package
- 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

- Surface mountable, high power package
- Space savings
- High power density

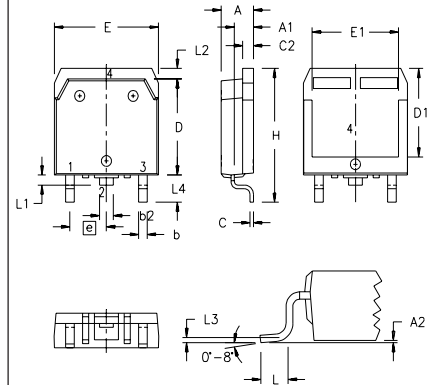
| Symbol | Test Conditions | Characteristic Values ($T_J = 25^\circ\text{C}$, unless otherwise specified) | | |
|--------------|--|---|------|--------------------------------|
| | | min. | typ. | max. |
| V_{DSS} | $V_{GS} = 0$ V, $I_D = 3$ mA | 1000 | | V |
| $V_{GS(th)}$ | $V_{DS} = V_{GS}$, $I_D = 4$ mA | 2.0 | | V |
| I_{GSS} | $V_{GS} = \pm 20$ V _{DC} , $V_{DS} = 0$ | | | ± 100 nA |
| I_{DSS} | $V_{DS} = 0.8 \cdot V_{DSS}$, $T_J = 25^\circ\text{C}$ $V_{GS} = 0$ V, $T_J = 125^\circ\text{C}$ | | | 250 μA 1 mA |
| $R_{DS(on)}$ | $V_{GS} = 10$ V, $I_D = 0.5 \cdot I_{D25}$ Pulse test, $t \leq 300$ μs , duty cycle $d \leq 2$ % | 10N100 12N100 | | 1.20 Ω 1.05 Ω |

| Symbol | Test Conditions | Characteristic Values | | | |
|---------------------------|--|---|------|------|----|
| | | (T _J = 25°C, unless otherwise specified) | | | |
| | | min. | typ. | max. | |
| g_{fs} | V _{DS} = 10 V; I _D = 0.5 • I _{D25} , pulse test | 6 | 10 | S | |
| C_{iss} | V _{GS} = 0 V, V _{DS} = 25 V, f = 1 MHz | | 4000 | pF | |
| C_{oss} | | | 310 | pF | |
| C_{rss} | | | 70 | pF | |
| t_{d(on)} | V _{GS} = 10 V, V _{DS} = 0.5 • V _{DSS} , I _D = 0.5 • I _{D25} R _G = 2 Ω (External), | | 21 | 50 | ns |
| t_r | | | 33 | 50 | ns |
| t_{d(off)} | | | 62 | 100 | ns |
| t_f | | | 32 | 50 | ns |
| Q_{g(on)} | V _{GS} = 10 V, V _{DS} = 0.5 • V _{DSS} , I _D = 0.5 • I _{D25} | | 122 | 155 | nC |
| Q_{gs} | | | 30 | 45 | nC |
| Q_{gd} | | | 50 | 80 | nC |
| R_{thJC} | | | 0.42 | K/W | |

Source-Drain Diode

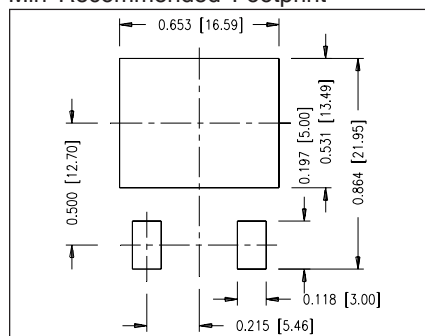
| Symbol | Test Conditions | Characteristic Values | | | |
|-----------------------|--|---|------|----------|--------|
| | | (T _J = 25°C, unless otherwise specified) | | | |
| | | min. | typ. | max. | |
| I_S | V _{GS} = 0 V | 10N100 12N100 | | 10 12 | A A |
| I_{SM} | Repetitive; pulse width limited by T _{JM} | 10N100 12N100 | | 40 48 | A A |
| V_{SD} | I _F = I _S , V _{GS} = 0 V, Pulse test, t ≤ 300 μs, duty cycle d ≤ 2 % | | | 1.5 | V |
| t_{rr} | I _F = I _S -di/dt = 100 A/μs, V _R = 100 V | T _J = 25°C | | 250 | ns |
| | | T _J = 125°C | | 400 | ns |
| Q_{RM} | | T _J = 25°C | 1 | | μC |
| | | T _J = 125°C | 2 | | μC |
| I_{RM} | | T _J = 25°C | 10 | A | |
| | | T _J = 125°C | 15 | A | |

TO-268 Outline



| SYM | INCHES | | MILLIMETERS | |
|-----|----------|------|-------------|-------|
| | MIN | MAX | MIN | MAX |
| A | .193 | .201 | 4.90 | 5.10 |
| A1 | .106 | .114 | 2.70 | 2.90 |
| A2 | .001 | .010 | 0.02 | 0.25 |
| b | .045 | .057 | 1.15 | 1.45 |
| b2 | .075 | .083 | 1.90 | 2.10 |
| C | .016 | .026 | 0.40 | 0.65 |
| C2 | .057 | .063 | 1.45 | 1.60 |
| D | .543 | .551 | 13.80 | 14.00 |
| D1 | .488 | .500 | 12.40 | 12.70 |
| E | .624 | .632 | 15.85 | 16.05 |
| E1 | .524 | .535 | 13.30 | 13.60 |
| e | .215 BSC | | 5.45 BSC | |
| H | .736 | .752 | 18.70 | 19.10 |
| L | .094 | .106 | 2.40 | 2.70 |
| L1 | .047 | .055 | 1.20 | 1.40 |
| L2 | .039 | .045 | 1.00 | 1.15 |
| L3 | .010 BSC | | 0.25 BSC | |
| L4 | .150 | .161 | 3.80 | 4.10 |

Min Recommended Footprint



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

Fig. 1. Output Characteristics

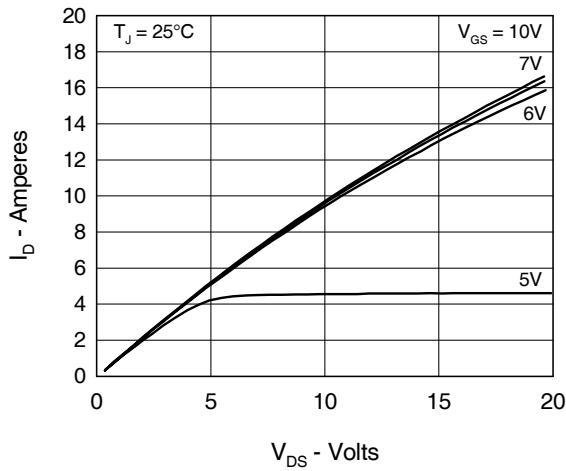


Fig. 2. Input Admittance

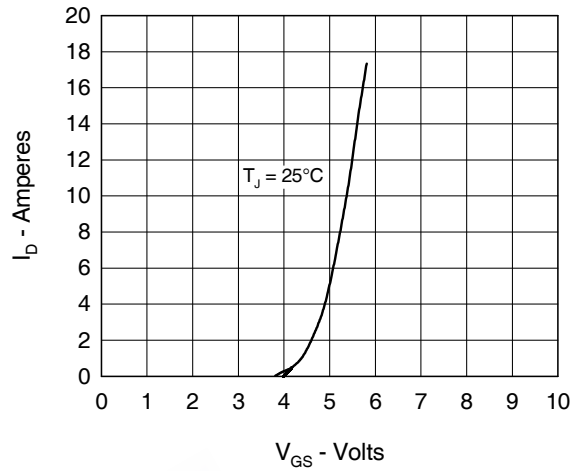


Fig. 3. $R_{DS(on)}$ vs. Drain Current

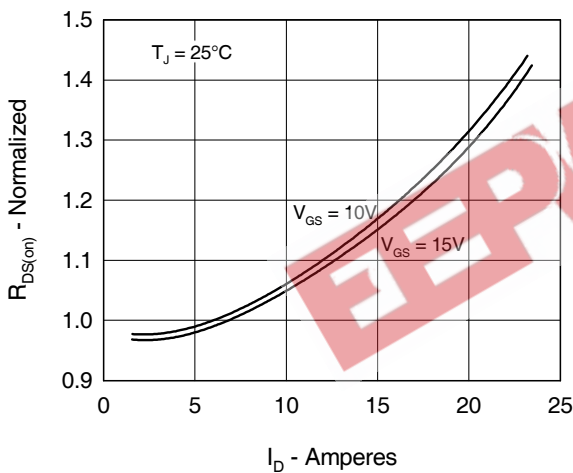


Fig. 4. Temperature Dependence of Drain to Source Resistance

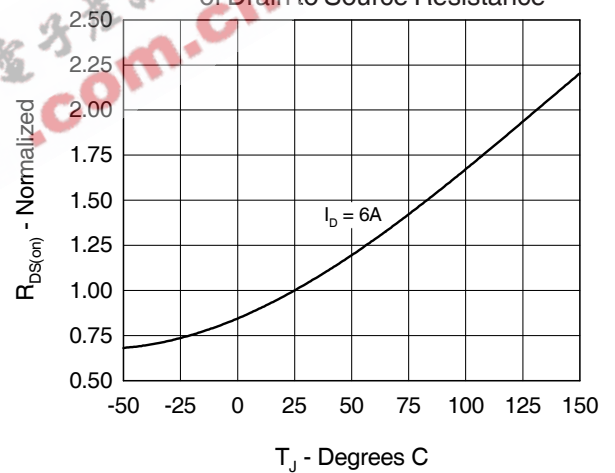


Fig. 5. Drain vs. Case Temperature

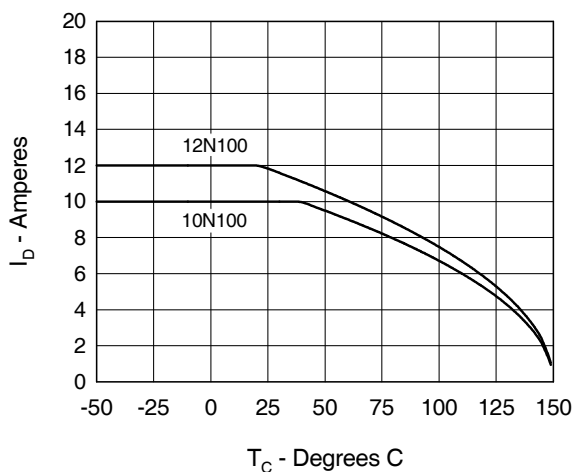


Fig. 6. Temperature Dependence of Breakdown and Threshold Voltage

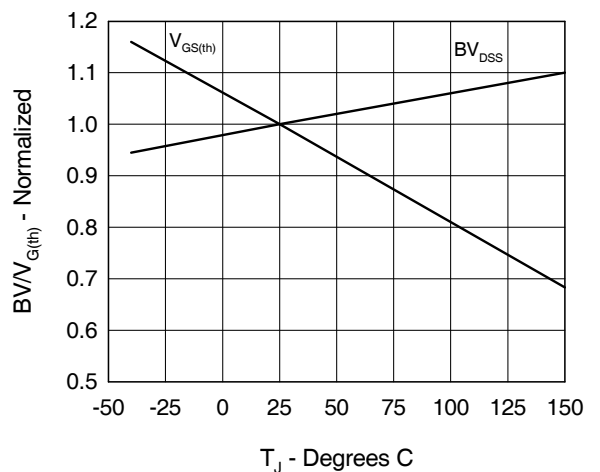


Fig. 7. Gate Charge Characteristic Curve

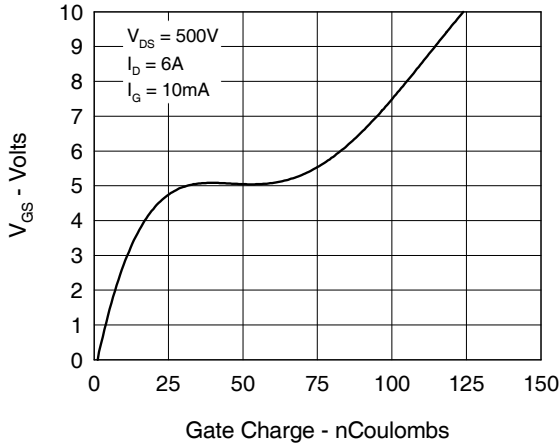


Fig. 8. Capacitance Curves

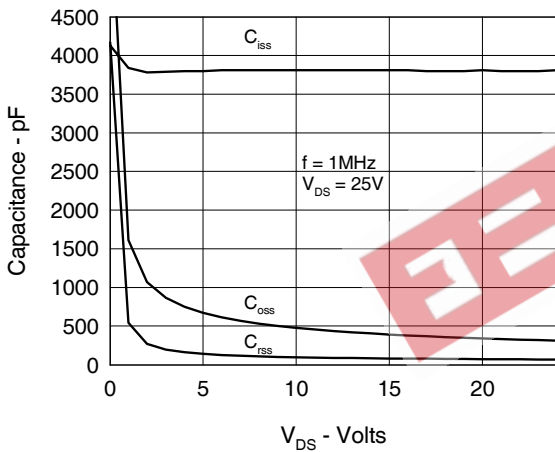


Fig. 9. Source Current vs. Source to Drain Voltage

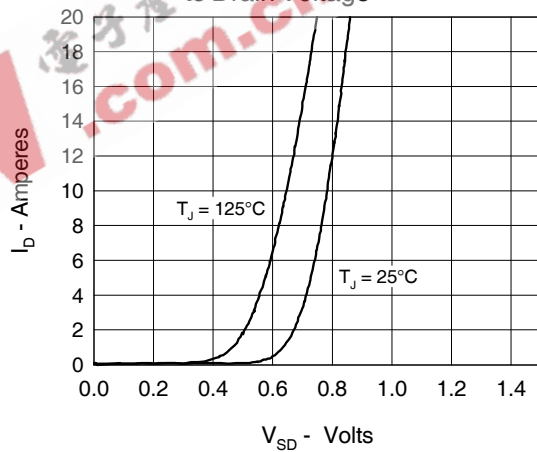
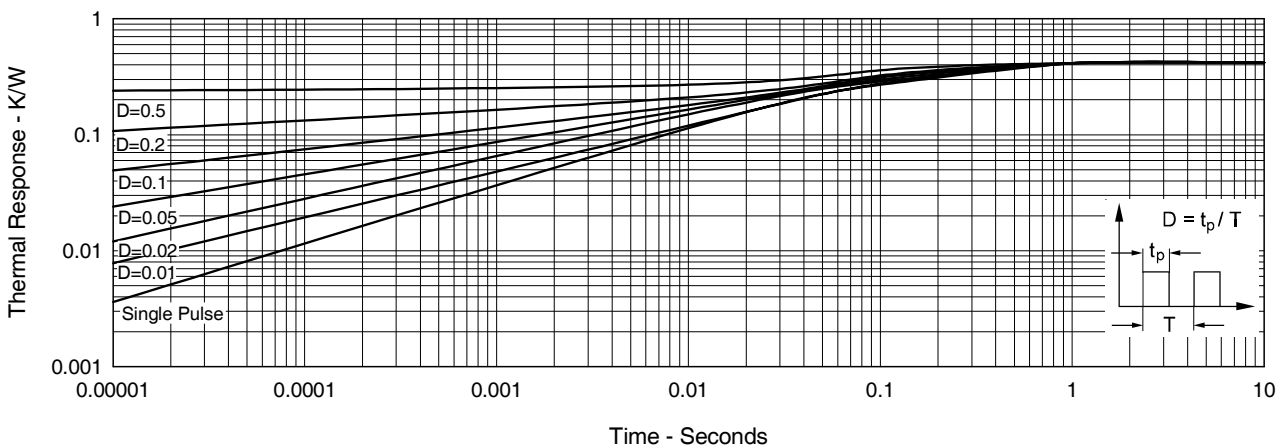


Fig.10.

Transient Thermal Impedance



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IXYS MOSFETs and IGBTs are covered by one or more of the following U.S. patents: 4,835,592 4,881,106 5,017,508 5,049,961 5,187,117 5,486,715 6,306,728B1 6,259,123B1 6,306,728B1 4,850,072 4,931,844 5,034,796 5,063,307 5,237,481 5,381,025 6,404,065B1 6,162,665 6,534,343 6,583,505