

High Voltage HiPerFET Power MOSFET

IXFH 6N120

$$\begin{aligned} V_{DSS} &= 1200 \text{ V} \\ I_{D(\text{cont})} &= 6 \text{ A} \\ R_{DS(\text{on})} &= 2.6 \Omega \\ t_{rr} &\leq 300 \text{ ns} \end{aligned}$$

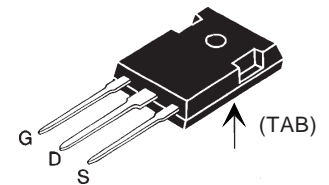
N-Channel Enhancement Mode
Avalanche Rated

Preliminary Data Sheet



| Symbol | Test Conditions | Maximum Ratings | |
|-----------|---|-----------------|------------------|
| V_{DSS} | $T_J = 25^\circ\text{C}$ to 150°C | 1200 | V |
| V_{DGR} | $T_J = 25^\circ\text{C}$ to 150°C ; $R_{GS} = 1 \text{ M}\Omega$ | 1200 | V |
| V_{GS} | Continuous | ± 20 | V |
| V_{GSM} | Transient | ± 30 | V |
| I_{D25} | $T_C = 25^\circ\text{C}$ | 6 | A |
| I_{DM} | $T_C = 25^\circ\text{C}$, pulse width limited by T_{JM} | 24 | A |
| I_{AR} | $T_C = 25^\circ\text{C}$ | 6 | A |
| E_{AR} | $T_C = 25^\circ\text{C}$ | 25 | mJ |
| E_{AS} | $T_C = 25^\circ\text{C}$ | 500 | mJ |
| dv/dt | $I_S \leq I_{DM}$, $di/dt \leq 100 \text{ A}/\mu\text{s}$, $V_{DD} \leq V_{DSS}$, $T_J \leq 150^\circ\text{C}$, $R_G = 2 \Omega$ | 10 | 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-247 AD | 6 | g |

TO-247 AD (IXTH)



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

Features

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

Advantages

- Easy to mount
- Space savings
- High power density

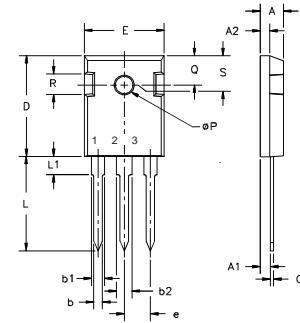
| Symbol | Test Conditions ($T_J = 25^\circ\text{C}$, unless otherwise specified) | Characteristic Values | | |
|---------------------|--|---------------------------|------|----------------------|
| | | Min. | Typ. | Max. |
| V_{DSS} | $V_{GS} = 0 \text{ V}$, $I_D = 250 \mu\text{A}$ | 1200 | | V |
| $V_{GS(\text{th})}$ | $V_{DS} = V_{GS}$, $I_D = 2.5 \text{ mA}$ | 3.0 | | V |
| I_{GSS} | $V_{GS} = \pm 20 \text{ V}_{DC}$, $V_{DS} = 0$ | | | $\pm 100 \text{ nA}$ |
| I_{DSS} | $V_{DS} = V_{DSS}$, $V_{GS} = 0 \text{ V}$ | $T_J = 25^\circ\text{C}$ | | 50 μA |
| | | $T_J = 125^\circ\text{C}$ | | 1500 μA |
| $R_{DS(\text{on})}$ | $V_{GS} = 10 \text{ V}$, $I_D = 0.5 I_{D25}$ Pulse test, $t \leq 300 \mu\text{s}$, duty cycle $d \leq 2 \%$ | | | 2.6 Ω |

| Symbol | Test Conditions | Characteristic Values | | |
|---------------------------|---|---|------|------|
| | | (T _J = 25°C, unless otherwise specified) | | |
| | | Min. | Typ. | Max. |
| g_{fs} | V _{DS} = 20 V; I _D = 0.5 I _{D25} , pulse test | 3 | 5 | S |
| C_{iss} | V _{GS} = 0 V, V _{DS} = 25 V, f = 1 MHz | | 1950 | pF |
| C_{oss} | | | 175 | pF |
| C_{rss} | | | 60 | pF |
| t_{d(on)} | V _{GS} = 10 V, V _{DS} = 0.5 V _{DSS} , I _D = 0.5 I _{D25} R _G = 4.7 Ω (External) | | 28 | ns |
| t_r | | | 33 | ns |
| t_{d(off)} | | | 42 | ns |
| t_f | | | 18 | ns |
| Q_{g(on)} | V _{GS} = 10 V, V _{DS} = 0.5 V _{DSS} , I _D = 0.5 I _{D25} | | 56 | nC |
| Q_{gs} | | | 13 | nC |
| Q_{gd} | | | 25 | nC |
| R_{thJC} | | | 0.42 | K/W |
| R_{thCK} | (TO-247) | | 0.21 | 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 | | | 6 A |
| I_{SM} | Repetitive | | | 24 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 = 6 A, di/dt ≤ 100 A/μs | | | 300 ns |
| Q_{RM} | | | 0.6 | uC |
| I_{RM} | | | 3.0 | A |

TO-247 AD 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 |
| ØP | 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 |

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

Fig. 1. Output Characteristics
@ 25 Deg. C

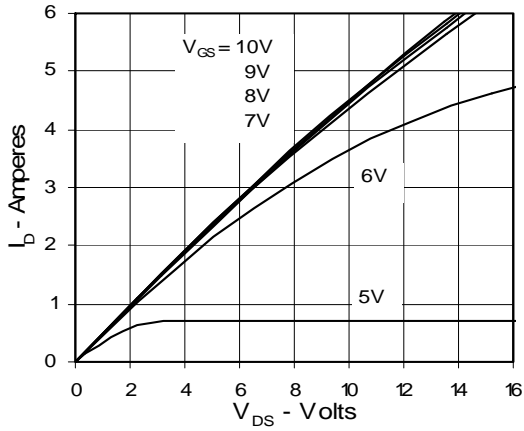


Fig. 2. Extended Output Characteristics
@ 25 deg. C

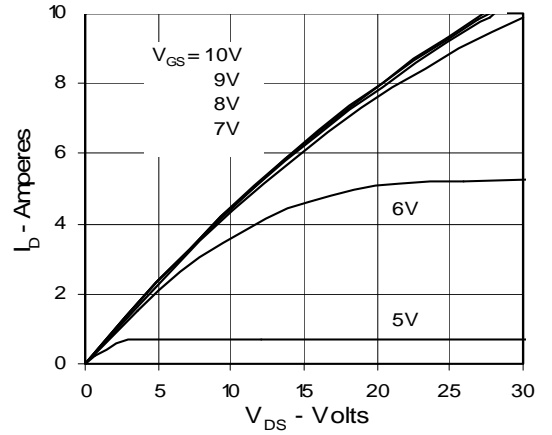


Fig. 3. Output Characteristics
@ 125 Deg. C

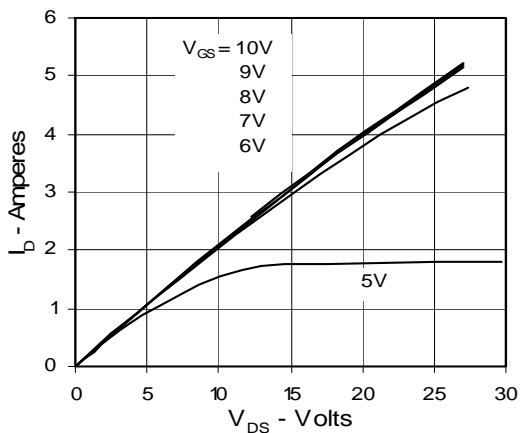


Fig. 4. $R_{DS(on)}$ Normalized to I_{D25} Value vs. Junction Temperature

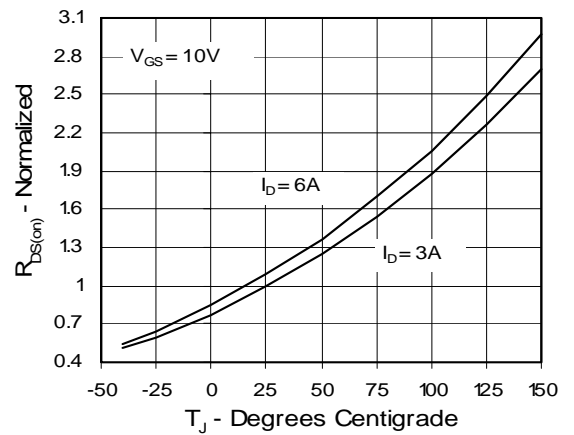


Fig. 5. $R_{DS(on)}$ Normalized to I_{D25} Value vs. I_D

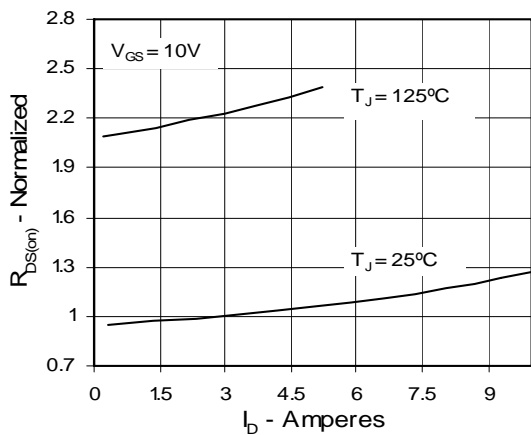


Fig. 6. Drain Current vs. Case Temperature

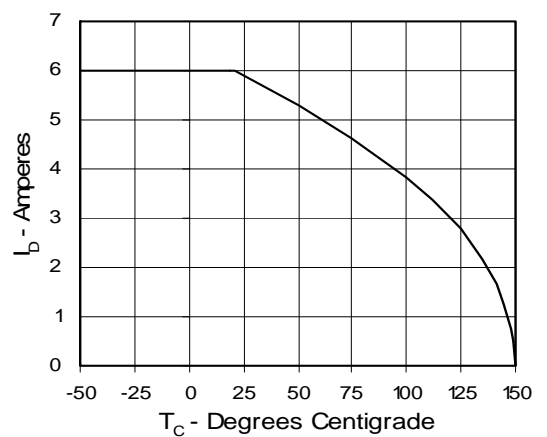


Fig. 7. Input Admittance

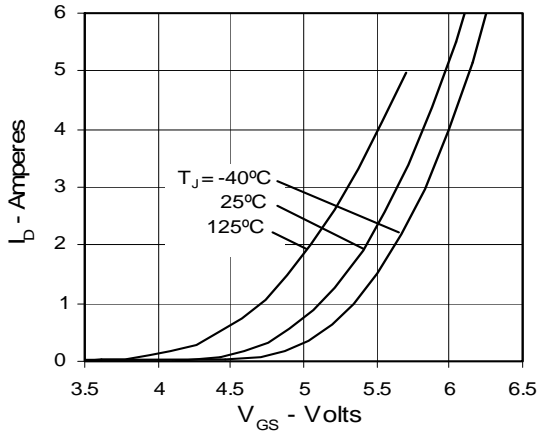


Fig. 8. Transconductance

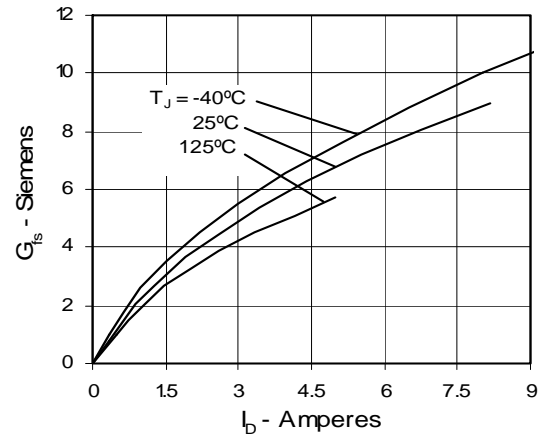


Fig. 9. Source Current vs. Source-To-Drain Voltage

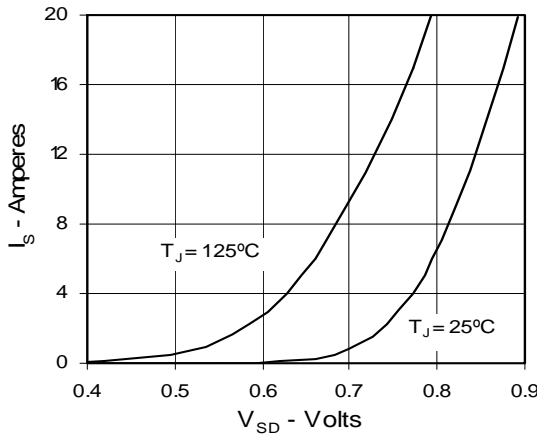


Fig. 10. Gate Charge

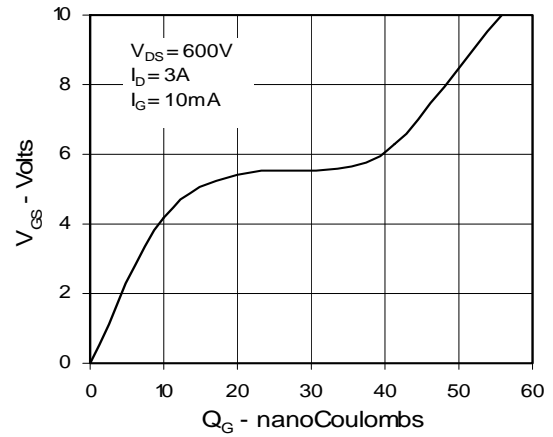


Fig. 11. Capacitance

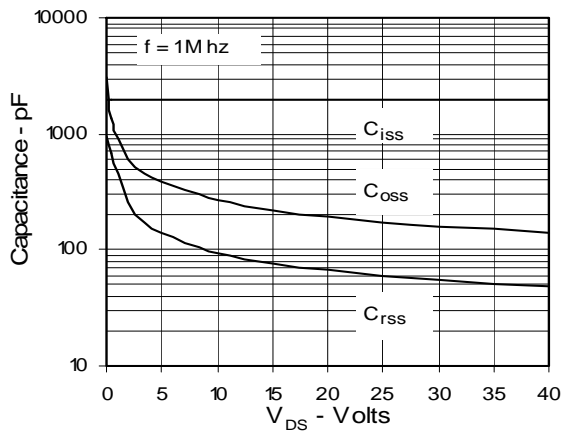
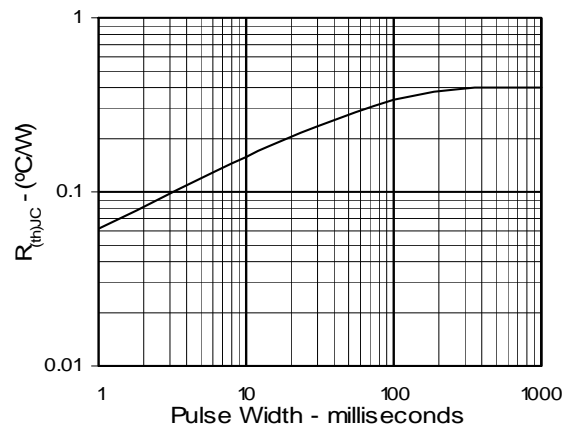


Fig. 12. Maximum Transient Thermal Resistance



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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



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