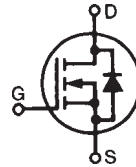


IXTH 12N120

Power MOSFET, Avalanche Rated
High Voltage

Preliminary Data Sheet



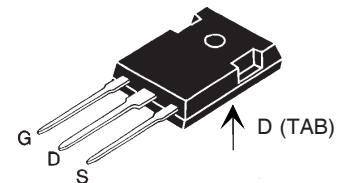
$$V_{DSS} = 1200 \text{ V}$$

$$I_{D(\text{cont})} = 12 \text{ A}$$

$$R_{DS(\text{on})} = 1.4 \text{ } \Omega$$

| Symbol | Test Conditions | Maximum Ratings | |
|---------------|---|-------------------|------------------|
| V_{DSS} | $T_J = 25^\circ\text{C to } 150^\circ\text{C}$ | 1200 | V |
| V_{DGR} | $T_J = 25^\circ\text{C to } 150^\circ\text{C}; R_{GS} = 1 \text{ M}\Omega$ | 1200 | V |
| V_{GS} | Continuous | ± 30 | V |
| V_{GSM} | Transient | ± 40 | V |
| I_{D25} | $T_C = 25^\circ\text{C}$ | 12 | A |
| I_{DM} | $T_C = 25^\circ\text{C}$, pulse width limited by T_{JM} | 48 | A |
| I_{AR} | | 12 | A |
| E_{AR} | $T_C = 25^\circ\text{C}$ | 30 | mJ |
| E_{AS} | $T_C = 25^\circ\text{C}$ | 1.0 | J |
| P_D | $T_C = 25^\circ\text{C}$ | 500 | W |
| T_J | | -55 ... +150 | $^\circ\text{C}$ |
| T_{JM} | | 150 | $^\circ\text{C}$ |
| T_{stg} | | -55 ... +150 | $^\circ\text{C}$ |
| M_d | Mounting torque | 1.13/10 Nm/lb.in. | |
| Weight | | 6 | g |
| | Maximum lead temperature for soldering 1.6 mm (0.062 in.) from case for 10 s | 300 | $^\circ\text{C}$ |

TO-247 AD



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

Features

- International standard package JEDEC TO-247 AD
- Low $R_{DS(\text{on})}$ HDMOS™ process
- Rugged polysilicon gate cell structure
- Fast switching times

Applications

- Switch-mode and resonant-mode power supplies
- Motor controls
- Uninterruptible Power Supplies (UPS)
- DC choppers

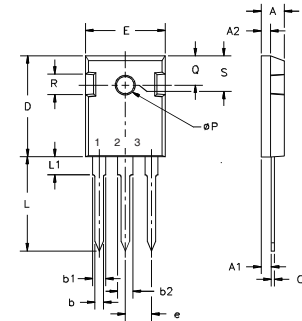
Advantages

- Easy to mount with 1 screw (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} | $V_{GS} = 0 \text{ V}, I_D = 1 \text{ mA}$ | 1200 | | V |
| $V_{GS(\text{th})}$ | $V_{DS} = V_{GS}, I_D = 250 \text{ } \mu\text{A}$ | 3 | | 5 V |
| I_{GSS} | $V_{GS} = \pm 30 \text{ V}_{DC}, V_{DS} = 0$ | | | $\pm 100 \text{ nA}$ |
| I_{DSS} | $V_{DS} = V_{DSS}$ $V_{GS} = 0 \text{ V}$ | $T_J = 25^\circ\text{C}$ | | 25 μA |
| | | $T_J = 125^\circ\text{C}$ | | 3 mA |
| $R_{DS(\text{on})}$ | $V_{GS} = 10 \text{ V}, I_D = 0.5 \cdot I_{D25}$ Pulse test, $t \leq 300 \text{ } \mu\text{s}$, duty cycle $d \leq 2 \%$ | | | 1.4 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 | 6 | 10 | S |
| C_{iss} | V _{GS} = 0 V, V _{DS} = 25 V, f = 1 MHz | | 3400 | pF |
| C_{oss} | | | 280 | pF |
| C_{rss} | | | 105 | pF |
| t_{d(on)} | V _{GS} = 10 V, V _{DS} = 0.5 • V _{DSS} , 0.5 I _{D25} R _G = 1.5 Ω (External) | | 24 | ns |
| t_r | | | 25 | ns |
| t_{d(off)} | | | 35 | ns |
| t_f | | | 17 | ns |
| Q_{g(on)} | V _{GS} = 10 V, V _{DS} = 0.5 • V _{DSS} , I _D = 0.5 I _{D25} | | 95 | nC |
| Q_{gs} | | | 22 | nC |
| Q_{gd} | | | 50 | nC |
| R_{thJC} | | | 0.25 | K/W |
| R_{thCK} | | 0.25 | | K/W |

| Symbol | Test Conditions | Characteristic Values | | |
|-----------------------|--|---|------|-------|
| | | (T _J = 25°C, unless otherwise specified) | | |
| | | min. | typ. | max. |
| I_s | V _{GS} = 0 V | | | 12 A |
| I_{SM} | Repetitive; pulse width limited by T _{JM} | | | 48 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 | | 850 | ns |

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.

IXYS MOSFETs and IGBTs are covered by one or more of the following U.S. patents:

| | | | | | | | | | |
|-----------|-----------|-----------|-----------|-----------|-----------|-------------|-------------|-------------|-----------|
| 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 |
| 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 | 6,683,344 |

Fig. 1. Output Characteristics @ 25°C

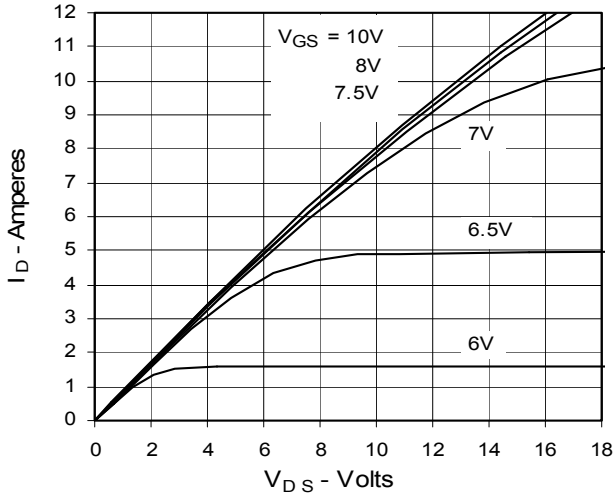


Fig. 2. Extended Output Characteristics @ 25°C

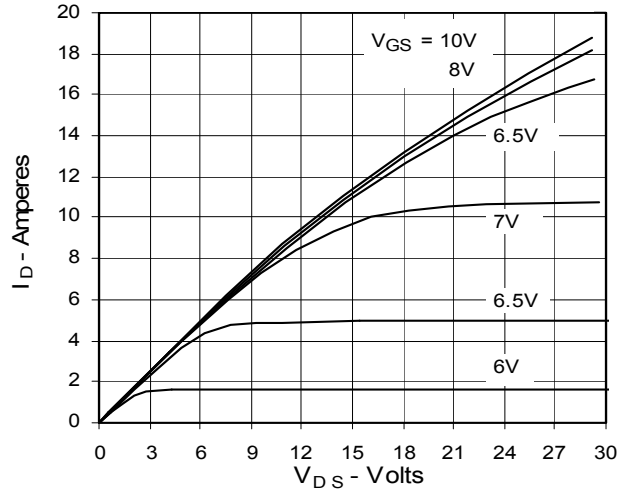


Fig. 3. Output Characteristics @ 125°C

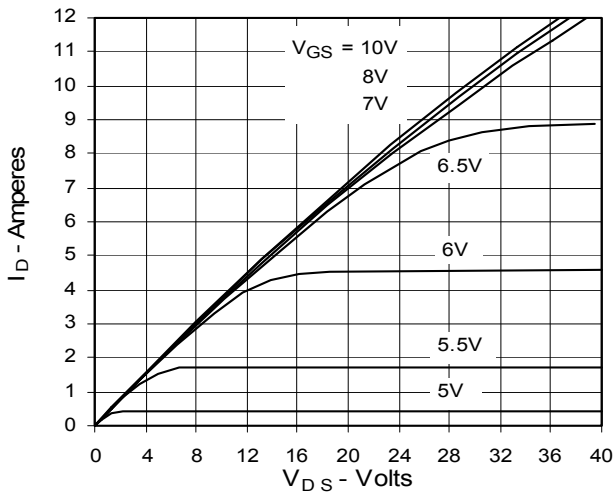


Fig. 4. $R_{DS(on)}$ Normalized to 0.5 I_{D25} Value vs. Junction Temperature

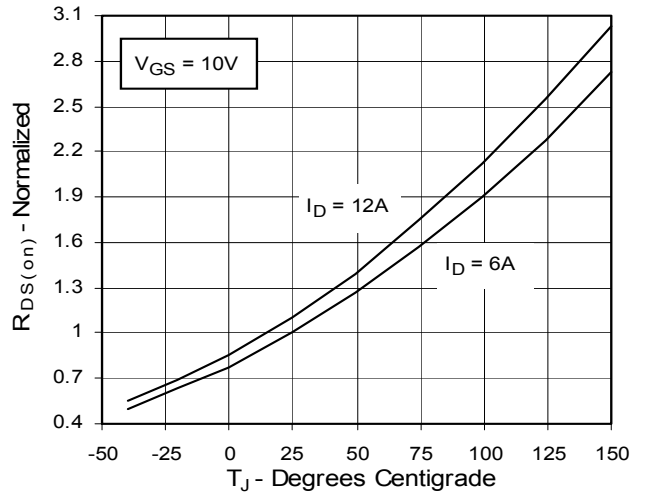


Fig. 5. $R_{DS(on)}$ Normalized to 0.5 I_{D25} Value vs. I_D

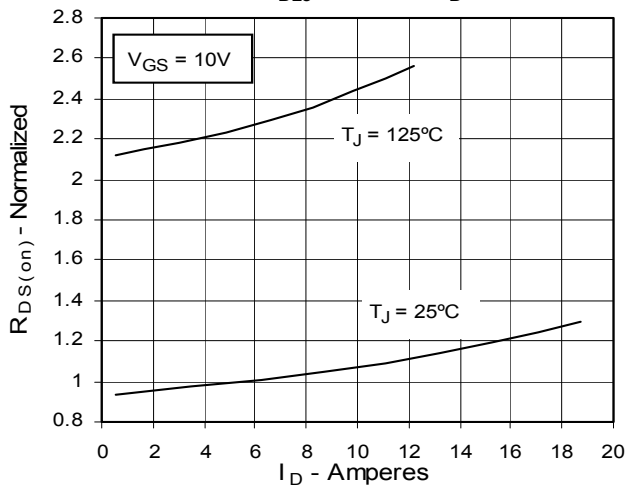


Fig. 6. Drain Current vs. Case Temperature

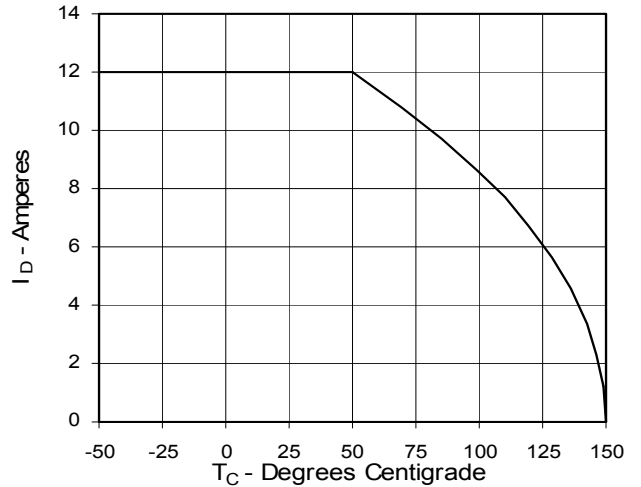


Fig. 7. Input Admittance

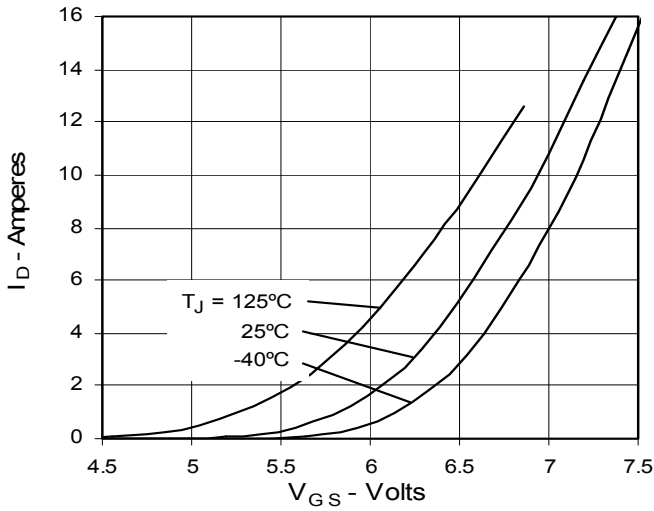


Fig. 8. Transconductance

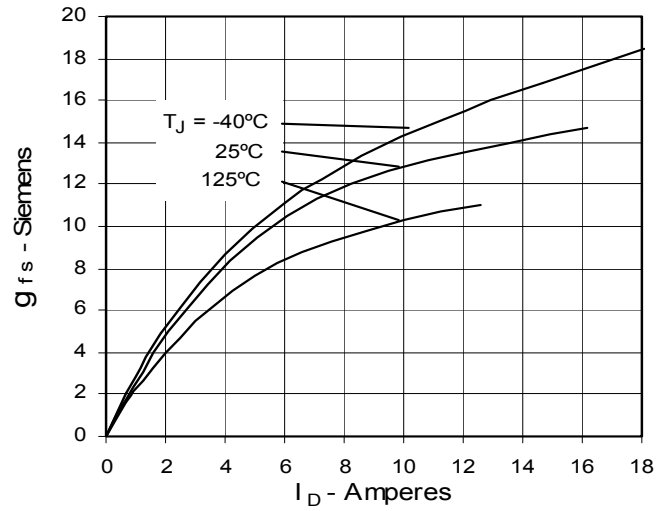


Fig. 9. Source Current vs. Source-To-Drain Voltage

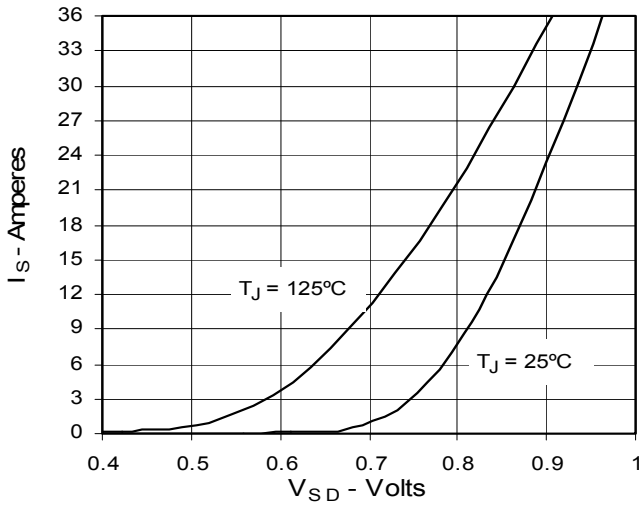


Fig. 10. Gate Charge

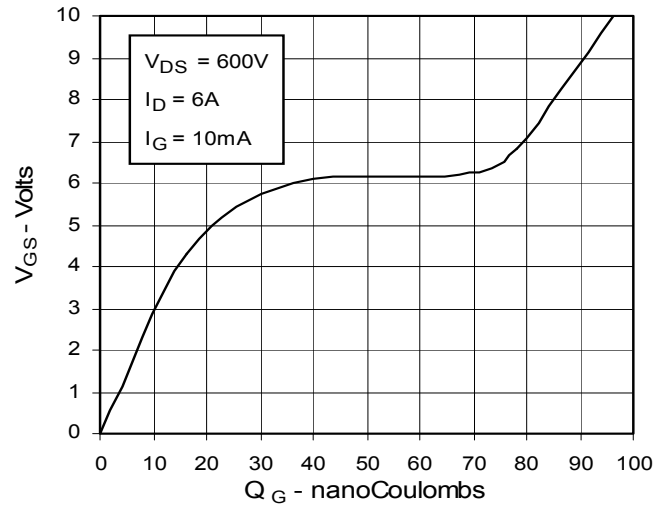


Fig. 11. Capacitance

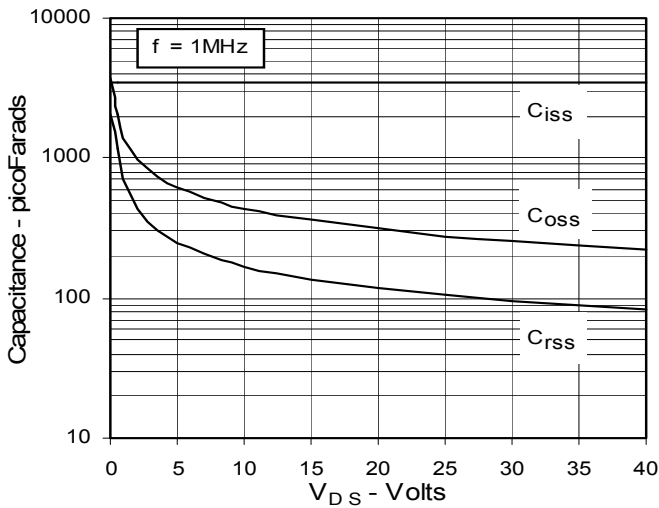


Fig. 12. Maximum Transient Thermal Resistance

