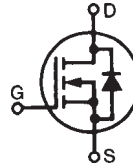


# PolarHV™ HiPerFET IXFR 36N60P

## Power MOSFET

(Electrically Isolated Back Surface)

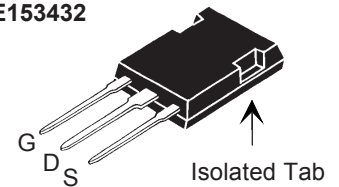
N-Channel Enhancement Mode  
Avalanche Rated  
Fast Intrinsic Diode



|              |   |     |    |
|--------------|---|-----|----|
| $V_{DSS}$    | = | 600 | V  |
| $I_{D25}$    | = | 20  | A  |
| $R_{DS(on)}$ | ≤ | 200 | mΩ |
| $t_{rr}$     | ≤ | 200 | ns |

| Symbol        | Test Conditions   | Maximum Ratings |                  |
|---------------|---|-----------------|------------------|
|               |   |                 |                  |
| $V_{DSS}$     | $T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$   | 600             | V                |
| $V_{DGR}$     | $T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$ ; $R_{GS} = 1\text{ M}\Omega$   | 600             | V                |
| $V_{GSS}$     | Continuous  | ±30             | V                |
| $V_{GSM}$     | Transient   | ±40             | V                |
| $I_{D25}$     | $T_C = 25^\circ\text{C}$  | 20              | A                |
| $I_{DM}$      | $T_C = 25^\circ\text{C}$ , pulse width limited by $T_{JM}$  | 80              | A                |
| $I_{AR}$      | $T_C = 25^\circ\text{C}$  | 36              | A                |
| $E_{AR}$      | $T_C = 25^\circ\text{C}$  | 50              | mJ               |
| $E_{AS}$      | $T_C = 25^\circ\text{C}$  | 1.5             | J                |
| $dv/dt$       | $I_S \leq I_{DM}$ , $di/dt \leq 100\text{ A}/\mu\text{s}$ , $V_{DD} \leq V_{DSS}$ ,<br>$T_J \leq 150^\circ\text{C}$ , $R_G = 2\ \Omega$ | 20              | V/ns             |
| $P_D$         | $T_C = 25^\circ\text{C}$  | 208             | $^\circ\text{C}$ |
| $T_J$         |   | -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             | $^\circ\text{C}$ |
| $T_{SOLD}$    | Plastic body for 10 s   | 260             | $^\circ\text{C}$ |
| $V_{ISOL}$    | 50/60 Hz, RMS, 1 minute   | 2500            | V~               |
| $F_C$         | Mounting force  | 20..120/4.6..27 | N/lb             |
| <b>Weight</b> |   | 5               | g                |

ISOPLUS247 (IXFR)  
E153432



G = Gate    D = Drain  
S = Source

### Features

- 1 Silicon chip on Direct-Copper-Bond substrate
  - High power dissipation
  - Isolated mounting surface
  - 2500V electrical isolation
- 1 International standard package
- 1 Fast recovery diode
- 1 Unclamped Inductive Switching (UIS) rated
- 1 Low package inductance
  - easy to drive and to protect

| Symbol       | Test Conditions  | Characteristic Values |      |                                       |
|--------------|--|-----------------------|------|---------------------------------------|
|              |  | Min.                  | Typ. | Max.                                  |
| $BV_{DSS}$   | $V_{GS} = 0\text{ V}$ , $I_D = 250\ \mu\text{A}$   | 600                   |      | V                                     |
| $V_{GS(th)}$ | $V_{DS} = V_{GS}$ , $I_D = 4\text{ mA}$  | 3.0                   |      | 5.0 V                                 |
| $I_{GSS}$    | $V_{GS} = \pm 30\text{ V}$ , $V_{DS} = 0\text{ V}$   |                       |      | ±100 nA                               |
| $I_{DSS}$    | $V_{DS} = V_{DSS}$<br>$V_{GS} = 0\text{ V}$<br>$T_J = 125^\circ\text{C}$   |                       |      | 25 $\mu\text{A}$<br>250 $\mu\text{A}$ |
| $R_{DS(on)}$ | $V_{GS} = 10\text{ V}$ , $I_D = I_T$ (note 1)<br>Pulse test, $t \leq 300\ \mu\text{s}$ , duty cycle $d \leq 2\%$ |                       |      | 200 mΩ                                |

### Advantages

- 1 Easy to mount
- 1 Space savings
- 1 High power density

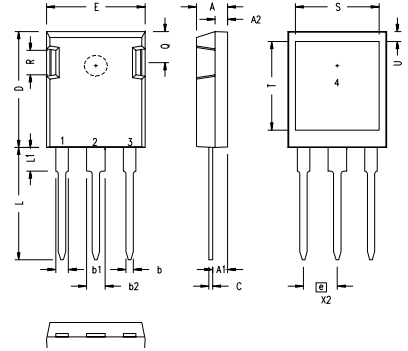
| Symbol       | Test Conditions   | Characteristic Values<br>( $T_J = 25^\circ\text{C}$ , unless otherwise specified) |      |                    |
|--------------|---|---|------|--------------------|
|              |   | Min.  | Typ. | Max.               |
| $g_{fs}$     | $V_{DS} = 20\text{ V}; I_D = I_T$ , pulse test  | 25  | 40   | S                  |
| $C_{iss}$    | $V_{GS} = 0\text{ V}, V_{DS} = 25\text{ V}, f = 1\text{ MHz}$                           |   | 5800 | pF                 |
| $C_{oss}$    |   |   | 570  | pF                 |
| $C_{rss}$    |   |   | 30   | pF                 |
| $t_{d(on)}$  | $V_{GS} = 10\text{ V}, V_{DS} = 0.5 V_{DSS}, I_D = I_T$<br>$R_G = 2\ \Omega$ (External) |   | 30   | ns                 |
| $t_r$        |   |   | 25   | ns                 |
| $t_{d(off)}$ |   |   | 80   | ns                 |
| $t_f$        |   |   | 22   | ns                 |
| $Q_{g(on)}$  | $V_{GS} = 10\text{ V}, V_{DS} = 0.5 V_{DSS}, I_D = I_T$                                 |   | 102  | nC                 |
| $Q_{gs}$     |   |   | 34   | nC                 |
| $Q_{gd}$     |   |   | 36   | nC                 |
| $R_{thJC}$   |   |   | 0.6  | $^\circ\text{C/W}$ |
| $R_{thCS}$   |   | 0.15  |      | $^\circ\text{C/W}$ |

Note 1: Test current  $I_T = 18\text{ A}$

### Source-Drain Diode

| Symbol   | Test Conditions   | Characteristic Values<br>( $T_J = 25^\circ\text{C}$ , unless otherwise specified) |      |               |
|----------|---|---|------|---------------|
|          |   | Min.  | Typ. | Max.          |
| $I_S$    | $V_{GS} = 0\text{ V}$   |   |      | 36 A          |
| $I_{SM}$ | Repetitive  |   |      | 80 A          |
| $V_{SD}$ | $I_F = I_S, V_{GS} = 0\text{ V}$ ,<br>Pulse test, $t \leq 300\ \mu\text{s}$ , duty cycle $d \leq 2\%$ |   |      | 1.5 V         |
| $t_{rr}$ | $I_F = 25\text{ A}, -di/dt = 100\text{ A}/\mu\text{s}$<br>$V_R = 100\text{ V}, V_{GS} = 0\text{ V}$   |   |      | 200 ns        |
| $Q_{RM}$ |   |   | 0.8  | $\mu\text{C}$ |
| $I_{RM}$ |   |   | 6.0  | A             |

### ISOPLUS247 (IXFR) Outline



| SYM | INCHES   |      | MILLIMETERS |       |
|-----|----------|------|-------------|-------|
|     | MIN      | MAX  | MIN         | MAX   |
| A   | .190     | .205 | 4.83        | 5.21  |
| A1  | .090     | .100 | 2.29        | 2.54  |
| A2  | .075     | .085 | 1.91        | 2.16  |
| b   | .045     | .055 | 1.14        | 1.40  |
| b1  | .075     | .084 | 1.91        | 2.13  |
| b2  | .115     | .123 | 2.92        | 3.12  |
| C   | .024     | .031 | 0.61        | 0.80  |
| D   | .819     | .840 | 20.80       | 21.34 |
| E   | .620     | .635 | 15.75       | 16.13 |
| e   | .215 BSC |      | 5.45 BSC    |       |
| L   | .780     | .800 | 19.81       | 20.32 |
| L1  | .150     | .170 | 3.81        | 4.32  |
| Q   | .220     | .244 | 5.59        | 6.20  |
| R   | .170     | .190 | 4.32        | 4.83  |
| S   | .520     | .540 | 13.21       | 13.72 |
| T   | .620     | .640 | 15.75       | 16.26 |
| U   | .065     | .080 | 1.65        | 2.03  |

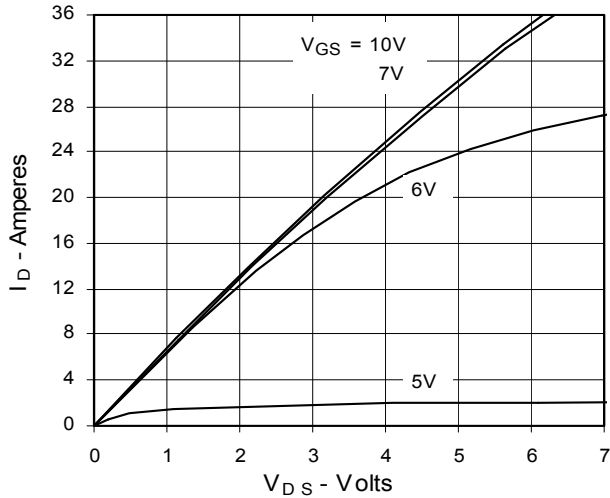
- 1 - GATE
- 2 - DRAIN (COLLECTOR)
- 3 - SOURCE (EMITTER)
- 4 - NO CONNECTION

NOTE: This drawing will meet all dimensions requirement of JEDEC outline TO-247AD except screw hole.

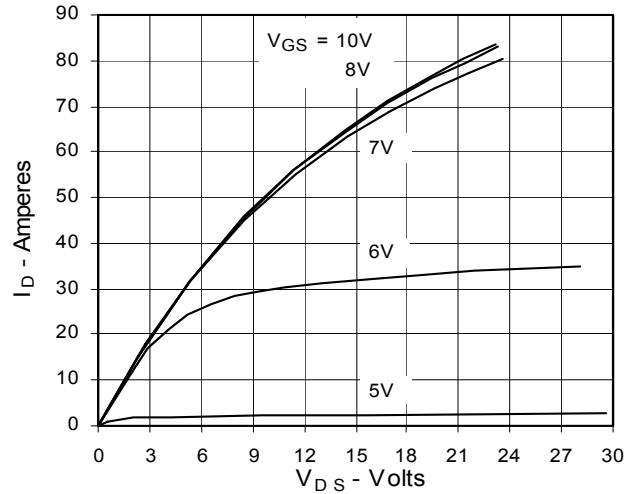
IXYS reserves the right to change limits, test conditions, and dimensions.

IXYS MOSFETs and IGBTs are covered by 4,835,592 4,931,844 5,049,961 5,237,481 6,162,665 6,404,065 B1 6,683,344 6,727,585  
one or more of the following U.S. patents: 4,850,072 5,017,508 5,063,307 5,381,025 6,259,123 B1 6,534,343 6,710,405B2 6,759,692  
4,881,106 5,034,796 5,187,117 5,486,715 6,306,728 B1 6,583,505 6,710,463 6,771,478 B2

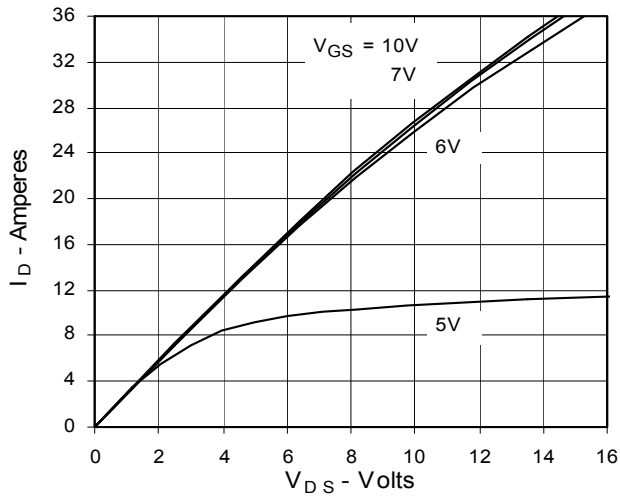
**Fig. 1. Output Characteristics @ 25°C**



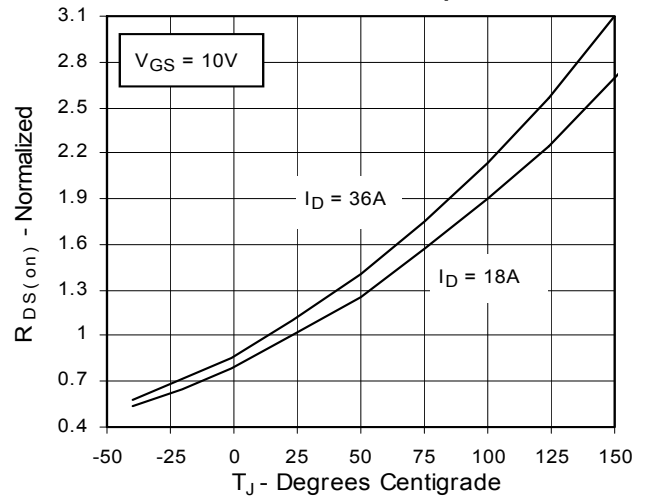
**Fig. 2. Extended Output Characteristics @ 25°C**



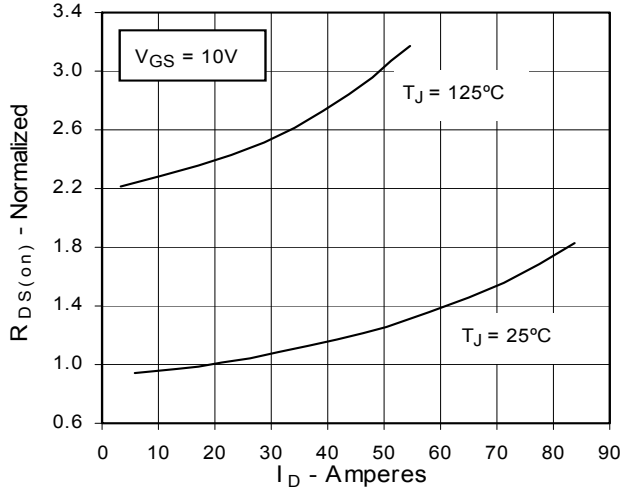
**Fig. 3. Output Characteristics @ 125°C**



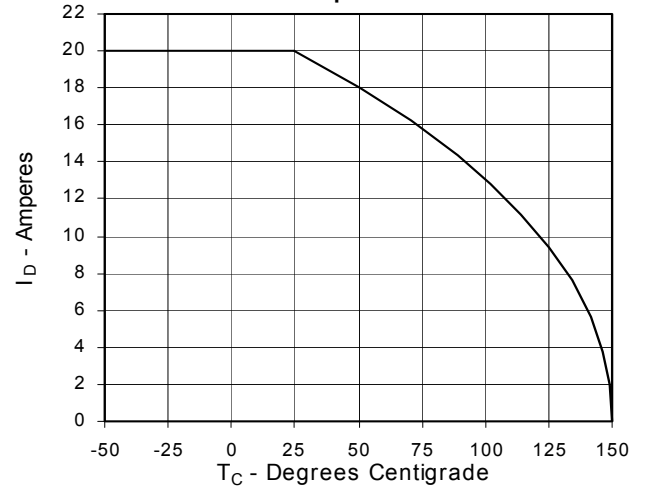
**Fig. 4.  $R_{DS(on)}$  Normalized to  $I_D = 18A$  Value vs. Junction Temperature**



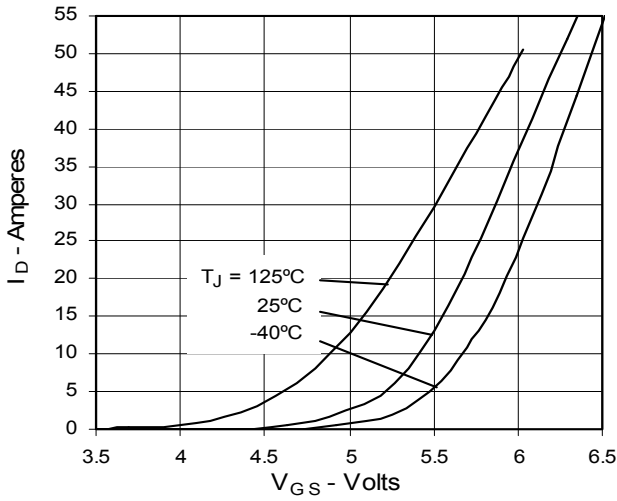
**Fig. 5.  $R_{DS(on)}$  Normalized to  $I_D = 18A$  Value vs.  $I_D$**



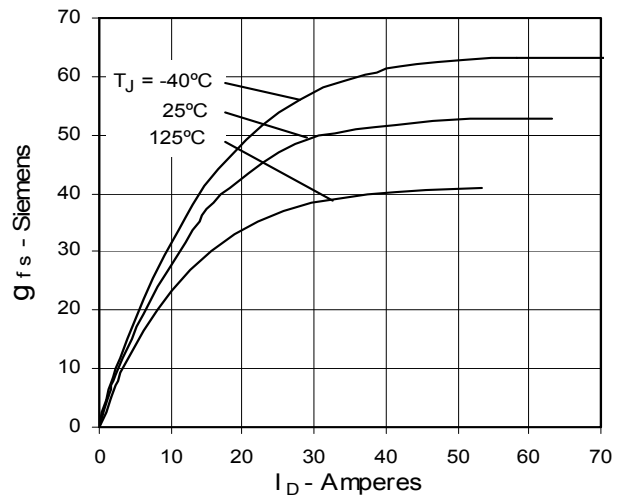
**Fig. 6. Drain Current vs. Case Temperature**



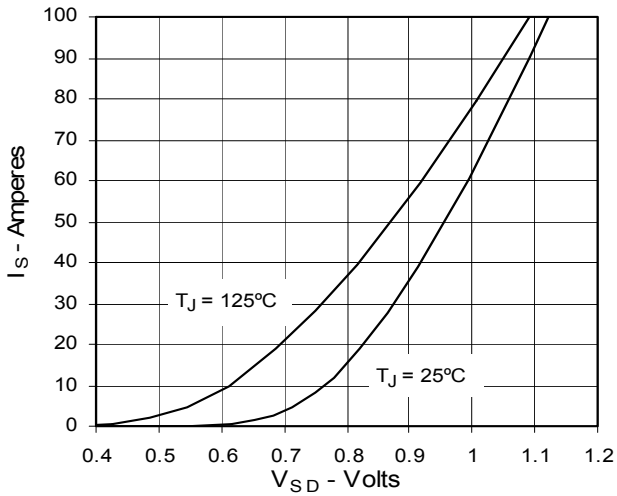
**Fig. 7. Input Admittance**



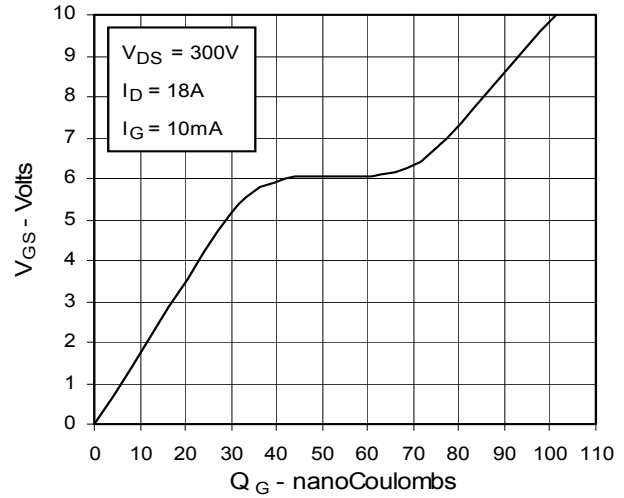
**Fig. 8. Transconductance**



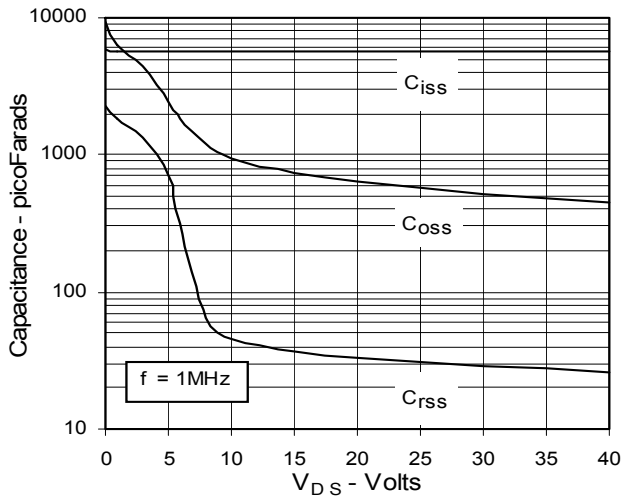
**Fig. 9. Source Current vs. Source-To-Drain Voltage**



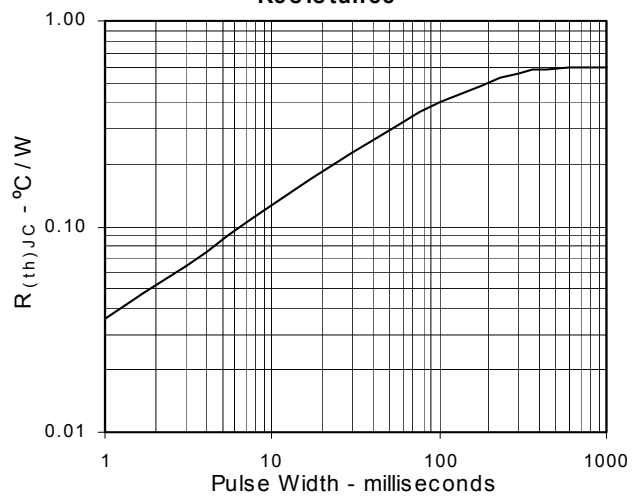
**Fig. 10. Gate Charge**



**Fig. 11. Capacitance**



**Fig. 12. Maximum Transient Thermal Resistance**





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