

# PolarHV™ HiPerFET IXFR 32N80P

## Power MOSFET

### ISOPLUS247™

(Electrically Isolated Back Surface)

N-Channel Enhancement Mode  
Avalanche Rated  
Fast Intrinsic Diode



$$V_{DSS} = 800 \text{ V}$$

$$I_{D25} = 20 \text{ A}$$

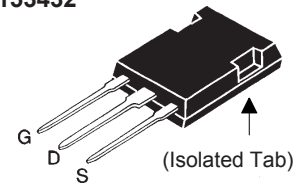
$$R_{DS(on)} \leq 290 \text{ m}\Omega$$

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

| Symbol        | Test Conditions   | Maximum Ratings |                  |
|---------------|---|-----------------|------------------|
| $V_{DSS}$     | $T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$   | 800             | V                |
| $V_{DGR}$     | $T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$ ; $R_{GS} = 1 \text{ M}\Omega$  | 800             | V                |
| $V_{GSS}$     | Continuous  | $\pm 30$        | V                |
| $V_{GSM}$     | Transient   | $\pm 40$        | V                |
| $I_{D25}$     | $T_C = 25^\circ\text{C}$  | 20              | A                |
| $I_{DM}$      | $T_C = 25^\circ\text{C}$ , pulse width limited by $T_{JM}$  | 70              | A                |
| $I_{AR}$      | $T_C = 25^\circ\text{C}$  | 16              | 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>$T_J \leq 150^\circ\text{C}$ , $R_G = 4 \Omega$ | 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             | $^\circ\text{C}$ |
| $F_C$         | Mounting force  | 20..120/4.5..26 | N/lb             |
| $V_{ISOL}$    | 50/60 Hz, RMS $t = 1$ minute  | 2500            | V~               |
| <b>Weight</b> |   | 5               | g                |

ISOPLUS247 (IXFR)

E153432



G = Gate      D = Drain  
S = Source

#### Features

- | Silicon chip on Direct-Copper-Bond substrate
- High power dissipation
- Isolated mounting surface
- 2500V electrical isolation
- | Low drain to tab capacitance (<30pF)
- | Low  $R_{DS(on)}$  HDMOS™ process
- | Rugged polysilicon gate cell structure
- | Rated for Unclamped Inductive Load Switching (UIS)
- | Fast intrinsic Rectifier

#### Applications

- | DC-DC converters
- | Battery chargers
- | Switched-mode and resonant-mode power supplies
- | DC choppers
- | AC motor control

#### Advantages

- | Easy assembly
- | Space savings
- | High power density

| Symbol       | Test Conditions<br>( $T_J = 25^\circ\text{C}$ , unless otherwise specified)                              | Characteristic Values |      |  |
|--------------|--|-----------------------|------|--|
|              |  | Min.                  | Typ. | Max.                                   |
| $BV_{DSS}$   | $V_{GS} = 0 \text{ V}$ , $I_D = 250 \mu\text{A}$   | 800                   |      | V                                      |
| $V_{GS(th)}$ | $V_{DS} = V_{GS}$ , $I_D = 8 \text{ mA}$   | 3.0                   |      | 5.0 V                                  |
| $I_{GSS}$    | $V_{GS} = \pm 30 \text{ V}_{DC}$ , $V_{DS} = 0$  |                       |      | $\pm 200 \text{ nA}$                   |
| $I_{DSS}$    | $V_{DS} = V_{DSS}$<br>$V_{GS} = 0 \text{ V}$<br>$T_J = 125^\circ\text{C}$                                |                       |      | 25 $\mu\text{A}$<br>1000 $\mu\text{A}$ |
| $R_{DS(on)}$ | $V_{GS} = 10 \text{ V}$ , $I_D = I_T$<br>Pulse test, $t \leq 300 \mu\text{s}$ , duty cycle $d \leq 2 \%$ |                       |      | 290 $\text{m}\Omega$                   |

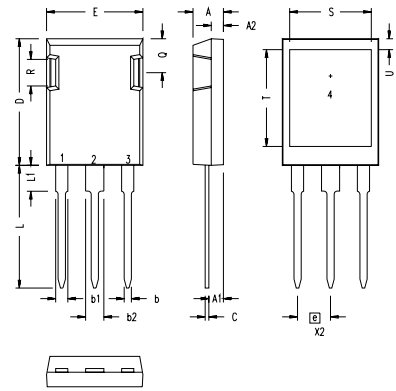
| Symbol       | Test Conditions   | Characteristic Values<br>( $T_J = 25^\circ\text{C}$ unless otherwise specified) |      |                    |
|--------------|---|---|------|--------------------|
|              |   | Min.  | Typ. | Max.               |
| $g_{fs}$     | $V_{DS} = 20\text{ V}; I_D = I_T$ , pulse test  | 23  | 38   | S                  |
| $C_{iss}$    | $V_{GS} = 0\text{ V}, V_{DS} = 25\text{ V}, f = 1\text{ MHz}$                                   |   | 8800 | pF                 |
| $C_{oss}$    |   |   | 700  | pF                 |
| $C_{rss}$    |   |   | 26   | pF                 |
| $t_{d(on)}$  | $V_{GS} = 10\text{ V}, V_{DS} = 0.5 V_{DSS}, I_D = 0.5 I_{D25}$<br>$R_G = 2\ \Omega$ (External) |   | 30   | ns                 |
| $t_r$        |   |   | 24   | ns                 |
| $t_{d(off)}$ |   |   | 85   | ns                 |
| $t_f$        |   |   | 24   | ns                 |
| $Q_{g(on)}$  | $V_{GS} = 10\text{ V}, V_{DS} = 0.5 V_{DSS}, I_D = I_T$   |   | 150  | nC                 |
| $Q_{gs}$     |   |   | 40   | nC                 |
| $Q_{gd}$     |   |   | 44   | nC                 |
| $R_{thJC}$   |   |   | 0.42 | $^\circ\text{C/W}$ |
| $R_{thCs}$   |   | 0.15  |      | $^\circ\text{C/W}$ |

### Source-Drain Diode

| Symbol   | Test Conditions   | Characteristic Values<br>( $T_J = 25^\circ\text{C}$ unless otherwise specified) |      |               |
|----------|---|---|------|---------------|
|          |   | Min.  | Typ. | Max.          |
| $I_S$    | $V_{GS} = 0\text{ V}$   |   |      | 32 A          |
| $I_{SM}$ | Repetitive  |   |      | 70 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>$V_R = 100\text{ V}$                        |   |      | 250 ns        |
| $Q_{RM}$ |   |   | 0.8  | $\mu\text{C}$ |
| $I_{RM}$ |   |   | 6.0  | A             |

Note: Test current  $I_T = 16\text{ A}$

### ISOPLUS 247 OUTLINE

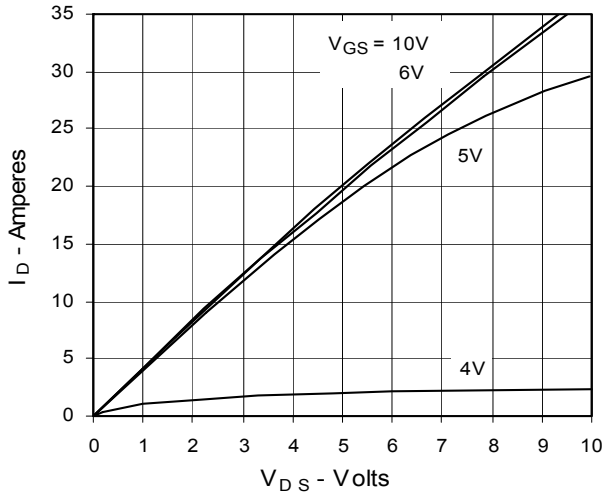


| SYM | INCHES   |      | MILLIMETERS |       |
|-----|----------|------|-------------|-------|
|     | MIN      | MAX  | MIN         | MAX   |
| A   | .190     | .205 | 4.83        | 5.21  |
| A1  | .090     | .100 | 2.29        | 2.54  |
| A2  | .075     | .085 | 1.91        | 2.16  |
| b   | .045     | .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  |

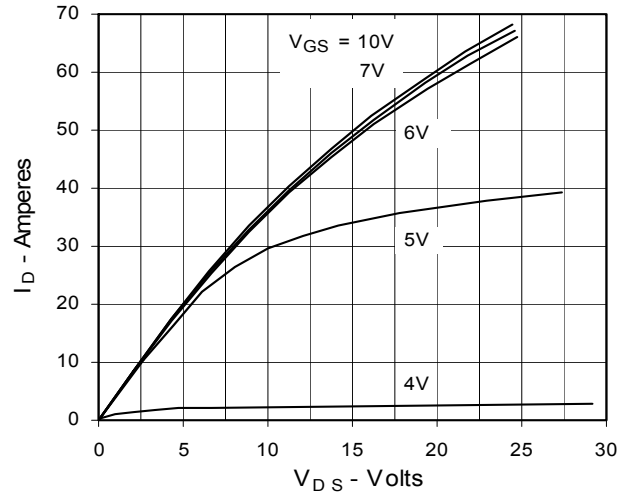
- 1 - GATE
- 2 - DRAIN (COLLECTOR)
- 3 - SOURCE (EMITTER)
- 4 - NO CONNECTION

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

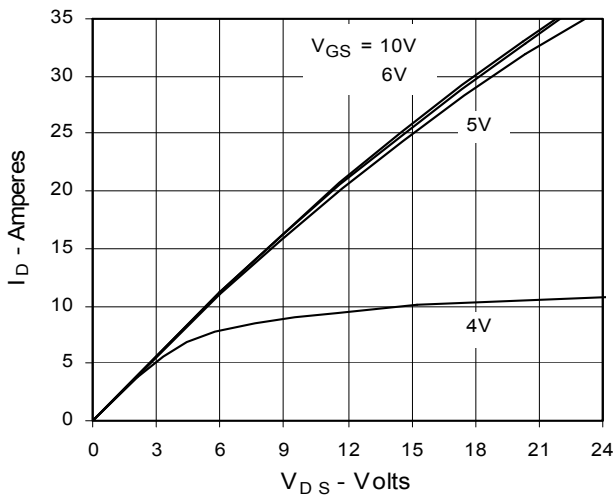
**Fig. 1. Output Characteristics**  
@ 25°C



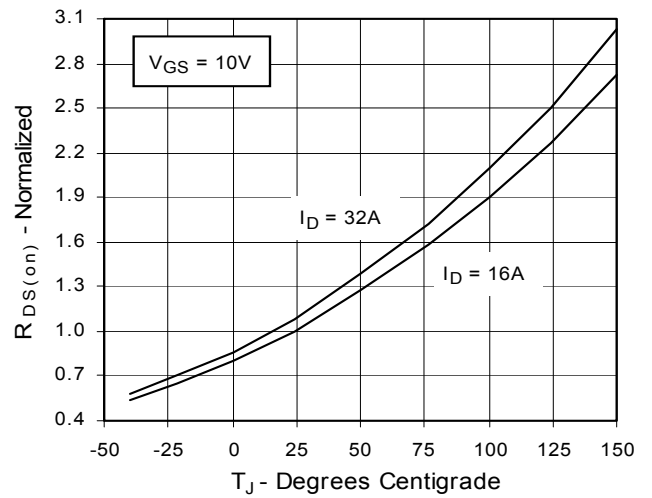
**Fig. 2. Extended Output Characteristics**  
@ 25°C



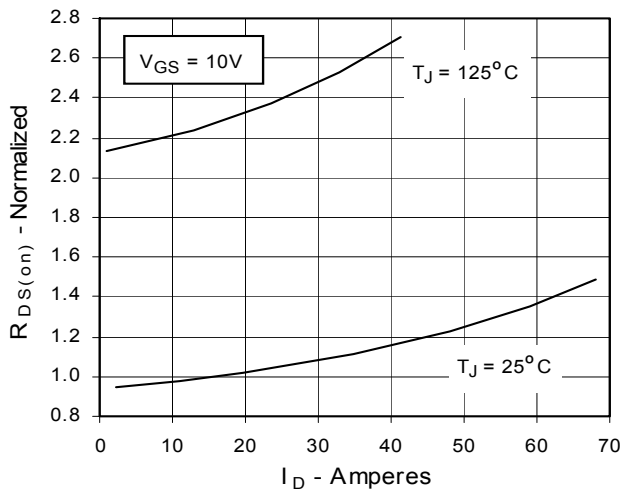
**Fig. 3. Output Characteristics**  
@ 125°C



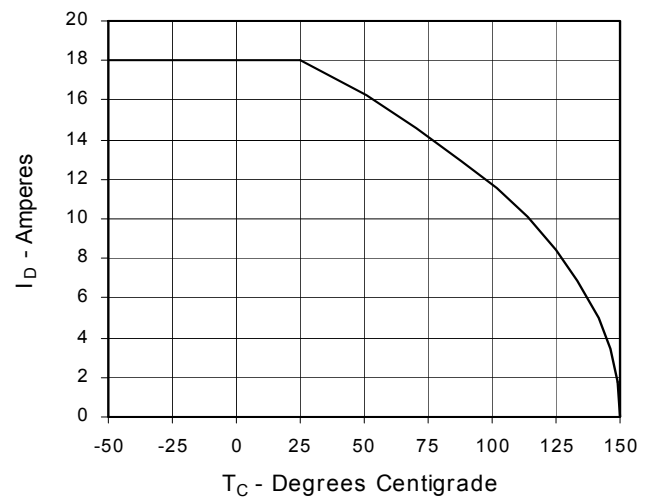
**Fig. 4.  $R_{DS(on)}$  Normalized to  $I_D = 16A$  Value vs. Junction Temperature**



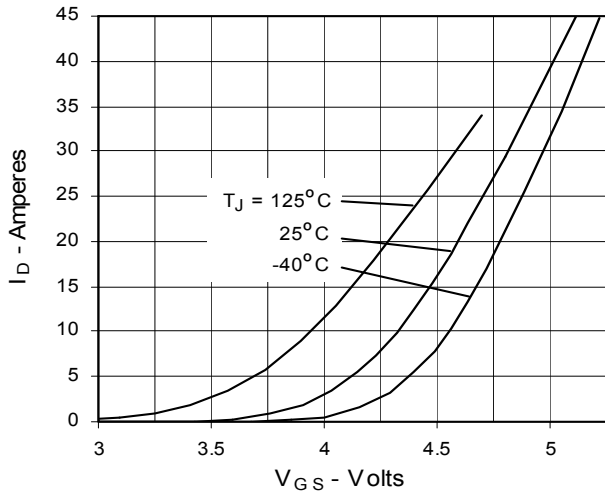
**Fig. 5.  $R_{DS(on)}$  Normalized to  $I_D = 16A$  Value vs. Drain Current**



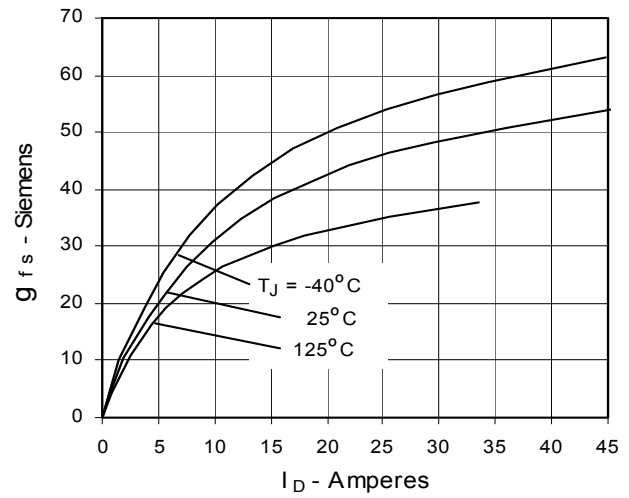
**Fig. 6. Drain Current vs. Case Temperature**



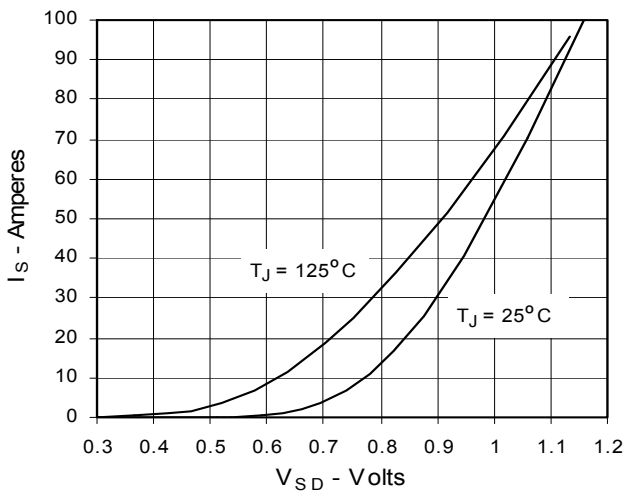
**Fig. 7. Input Admittance**



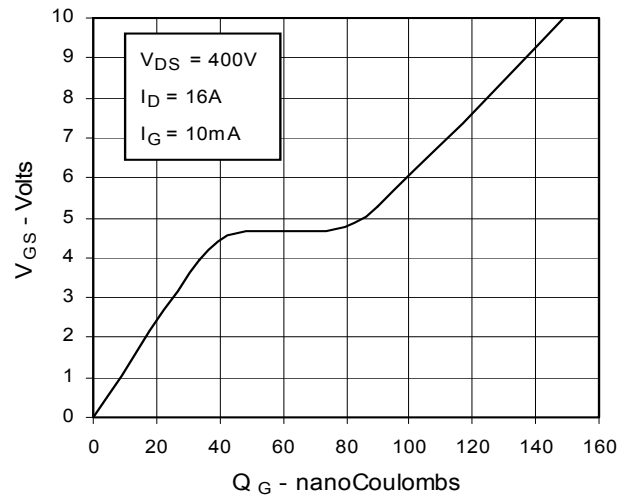
**Fig. 8. Transconductance**



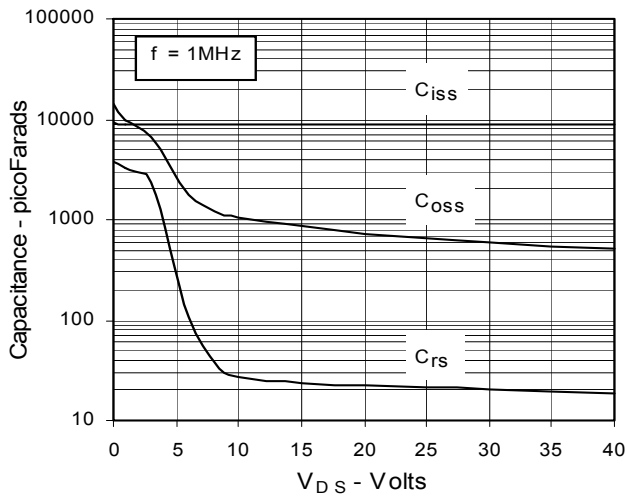
**Fig. 9. Source Current vs. Source-To-Drain Voltage**



**Fig. 10. Gate Charge**



**Fig. 11. Capacitance**



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

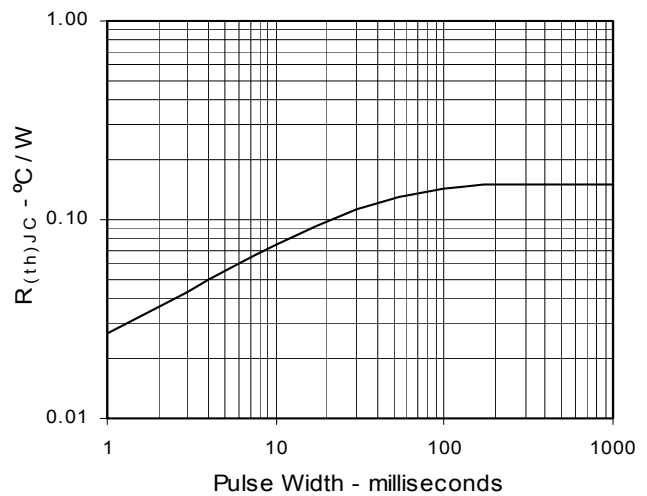


Fig. 13. Maximum Transient Thermal Resistance

