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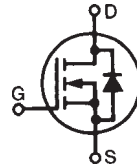


## PolarHV™ HiPerFET Power MOSFET

## IXFC14N60P

(Electrically Isolated Back Surface)

N-Channel Enhancement Mode  
Avalanche Rated  
Fast Intrinsic Diode

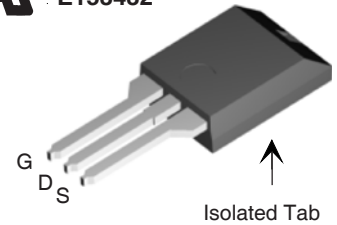


$$\begin{aligned} V_{DSS} &= 600V \\ I_{D25} &= 8A \\ R_{DS(on)} &\leq 630m\Omega \\ t_{rr} &\leq 200ns \end{aligned}$$

| Symbol        | Test Conditions  | Maximum Ratings    |            |
|---------------|--|--------------------|------------|
| $V_{DSS}$     | $T_J = 25^\circ C$ to $150^\circ C$                                | 600                | V          |
| $V_{DGR}$     | $T_J = 25^\circ C$ to $150^\circ C$ , $R_{GS} = 1M\Omega$          | 600                | V          |
| $V_{GSS}$     | Continuous   | $\pm 30$           | V          |
| $V_{GSM}$     | Transient  | $\pm 40$           | V          |
| $I_{D25}$     | $T_C = 25^\circ C$   | 8                  | A          |
| $I_{DM}$      | $T_C = 25^\circ C$ , pulse width limited by $T_{JM}$               | 42                 | A          |
| $I_A$         | $T_C = 25^\circ C$   | 14                 | A          |
| $E_{AS}$      | $T_C = 25^\circ C$   | 900                | mJ         |
| $dV/dt$       | $I_S \leq I_{DM}$ , $V_{DD} \leq V_{DSS}$ , $T_J \leq 150^\circ C$ | 10                 | V/ns       |
| $P_D$         | $T_C = 25^\circ C$   | 125                | W          |
| $T_J$         |  | -55 ... +150       | $^\circ C$ |
| $T_{JM}$      |  | 150                | $^\circ C$ |
| $T_{stg}$     |  | -55 ... +150       | $^\circ C$ |
| $T_L$         | 1.6mm (0.062 in.) from case for 10s                                | 300                | $^\circ C$ |
| $T_{SOLD}$    | Plastic body for 10s   | 260                | $^\circ C$ |
| $V_{ISOL}$    | 50/60 Hz, RMS  | $t = 1min$ 2500    | V~         |
|               | $I_{ISOL} \leq 1mA$  | $t = 1s$ 3000      | V~         |
| $M_d$         | Mounting force   | 11..66 / 2.5..14.6 | N/lb.      |
| <b>Weight</b> |  | 2                  | g          |

ISOPLUS 220™

E153432



G = Gate      D = Drain  
S = Source

### Features

- UL recognized package
- Silicon chip on Direct-Copper-Bond substrate
  - High power dissipation
  - Isolated mounting surface
  - 2500V electrical isolation
- Avalanche rated
- Fast intrinsic diode

### Advantages

- Easy to mount
- Space savings
- High power density

### Applications:

- Switched-mode and resonant-mode power supplies
- DC-DC Converters
- Laser Drivers
- AC and DC motor drives
- Robotics and servo controls

| Symbol       | Test Conditions<br>( $T_J = 25^\circ C$ , unless otherwise specified) | Characteristic Values |      |                          |
|--------------|---|-----------------------|------|--------------------------|
|              |   | Min.                  | Typ. | Max.                     |
| $BV_{DSS}$   | $V_{GS} = 0V$ , $I_D = 250\mu A$                                      | 600                   |      | V                        |
| $V_{GS(th)}$ | $V_{DS} = V_{GS}$ , $I_D = 2.5mA$                                     | 3.0                   |      | 5.5 V                    |
| $I_{GSS}$    | $V_{GS} = \pm 30V$ , $V_{DS} = 0V$                                    |                       |      | $\pm 100$ nA             |
| $I_{DSS}$    | $V_{DS} = V_{DSS}$<br>$V_{GS} = 0V$<br>$T_J = 125^\circ C$            |                       |      | 5 $\mu A$<br>500 $\mu A$ |
| $R_{DS(on)}$ | $V_{GS} = 10V$ , $I_D = 7A$ , Note 1                                  |                       |      | 630 $m\Omega$            |

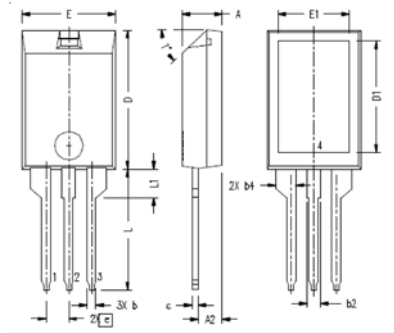
| Symbol       | Test Conditions<br>( $T_J = 25^\circ\text{C}$ , unless otherwise specified)   | Characteristic Values |      |                    |
|--------------|---|-----------------------|------|--------------------|
|              |   | Min.                  | Typ. | Max.               |
| $g_{fs}$     | $V_{DS} = 20\text{V}$ , $I_D = 7\text{A}$ , Note 1  | 7                     | 13   | S                  |
| $C_{iss}$    | $V_{GS} = 0\text{V}$ , $V_{DS} = 25\text{V}$ , $f = 1\text{MHz}$  |                       | 2500 | pF                 |
| $C_{oss}$    |   |                       | 215  | pF                 |
| $C_{rss}$    |   |                       | 13   | pF                 |
| $t_{d(on)}$  | <b>Resistive Switching Times</b><br>$V_{GS} = 10\text{V}$ , $V_{DS} = 0.5 \cdot V_{DSS}$ , $I_D = 7\text{A}$<br>$R_G = 10\Omega$ (External) |                       | 23   | ns                 |
| $t_r$        |   |                       | 27   | ns                 |
| $t_{d(off)}$ |   |                       | 70   | ns                 |
| $t_f$        |   |                       | 26   | ns                 |
| $Q_{g(on)}$  | $V_{GS} = 10\text{V}$ , $V_{DS} = 0.5 \cdot V_{DSS}$ , $I_D = 7\text{A}$  |                       | 36   | nC                 |
| $Q_{gs}$     |   |                       | 16   | nC                 |
| $Q_{gd}$     |   |                       | 12   | nC                 |
| $R_{thJC}$   |   |                       | 1.00 | $^\circ\text{C/W}$ |
| $R_{thCS}$   |   | 0.21                  |      | $^\circ\text{C/W}$ |

### Source-Drain Diode

| Symbol   | Test Conditions<br>( $T_J = 25^\circ\text{C}$ , unless otherwise specified)                           | Characteristic Values |      |        |
|----------|---|-----------------------|------|--------|
|          |   | Min.                  | Typ. | Max.   |
| $I_S$    | $V_{GS} = 0\text{V}$  |                       |      | 14 A   |
| $I_{SM}$ | Repetitive, pulse width limited by $T_{JM}$   |                       |      | 42 A   |
| $V_{SD}$ | $I_F = I_S$ , $V_{GS} = 0\text{V}$ , Note 1   |                       |      | 1.5 V  |
| $t_{rr}$ | $I_F = 14\text{A}$ , $-di/dt = 100\text{A}/\mu\text{s}$<br>$V_R = 100\text{V}$ , $V_{GS} = 0\text{V}$ |                       |      | 200 ns |
| $Q_{RM}$ |   |                       | 6.0  | nC     |
| $I_{RM}$ |   |                       | 0.6  | A      |

Note 1: Pulse test,  $t \leq 300\mu\text{s}$ ; duty cycle,  $d \leq 2\%$ .

### ISOPLUS220™ (IXFC) Outline



Note:  
Bottom heatsink (Pin 4) is electrically isolated from Pin 1, 2, or 3.

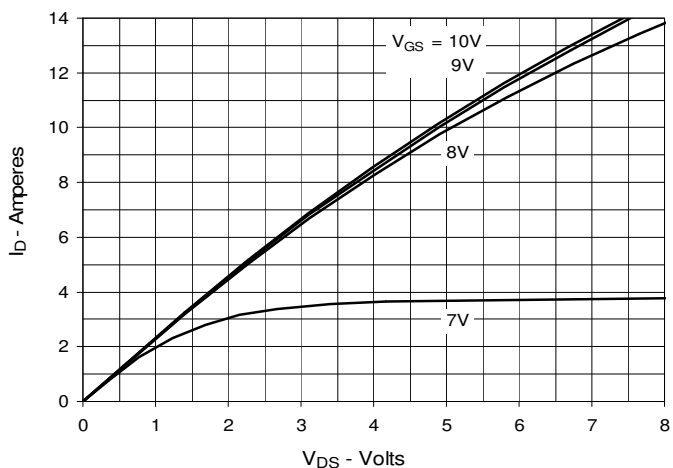
| SYM | INCHES     |      | MILLIMETERS |       |
|-----|------------|------|-------------|-------|
|     | MIN        | MAX  | MIN         | MAX   |
| A   | .157       | .197 | 4.00        | 5.00  |
| A2  | .098       | .118 | 2.50        | 3.00  |
| b   | .035       | .051 | 0.90        | 1.30  |
| b2  | .049       | .065 | 1.25        | 1.65  |
| b4  | .093       | .100 | 2.35        | 2.55  |
| c   | .028       | .039 | 0.70        | 1.00  |
| D   | .591       | .630 | 15.00       | 16.00 |
| D1  | .472       | .512 | 12.00       | 13.00 |
| E   | .394       | .433 | 10.00       | 11.00 |
| E1  | .295       | .335 | 7.50        | 8.50  |
| e   | .100 BASIC |      | 2.55 BASIC  |       |
| L   | .512       | .571 | 13.00       | 14.50 |
| L1  | .118       | .138 | 3.00        | 3.50  |
| T*  |            |      | 42.5*       | 47.5* |

Ref: IXYS CO 0177 R0

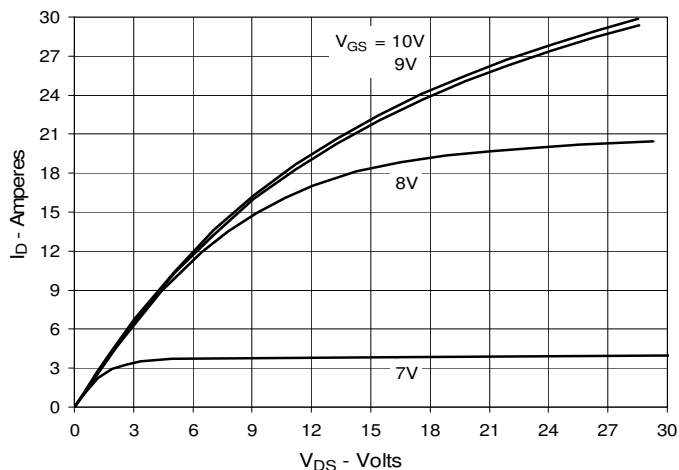
IXYS reserves the right to change limits, test conditions, and dimensions.

|  |           |           |           |           |              |              |              |              |              |             |
|--|-----------|-----------|-----------|-----------|--------------|--------------|--------------|--------------|--------------|-------------|
| IXYS MOSFETs and IGBTs are covered by one or more of the following U.S. patents: | 4,835,592 | 4,931,844 | 5,049,961 | 5,237,481 | 6,162,665    | 6,404,065 B1 | 6,683,344    | 6,727,585    | 7,005,734 B2 | 7,157,338B2 |
|  | 4,850,072 | 5,017,508 | 5,063,307 | 5,381,025 | 6,259,123 B1 | 6,534,343    | 6,710,405 B2 | 6,759,692    | 7,063,975 B2 |             |
|  | 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 | 7,071,537    |             |

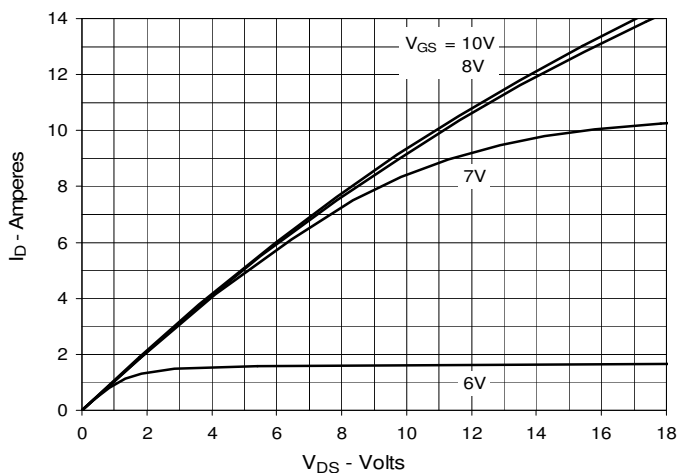
**Fig. 1. Output Characteristics @ 25°C**



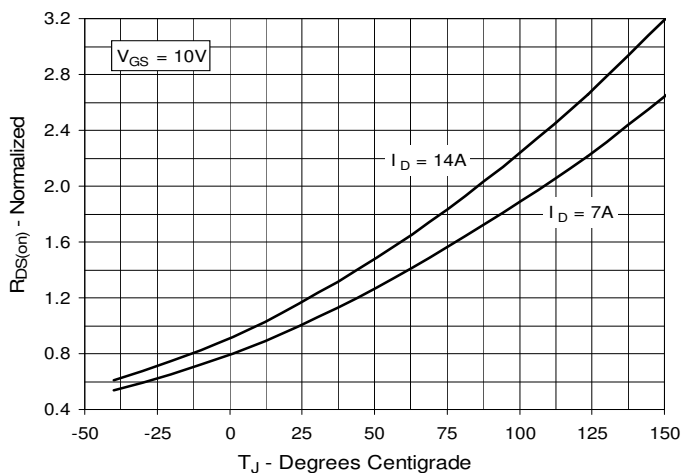
**Fig. 2. Extended Output Characteristics @ 25°C**



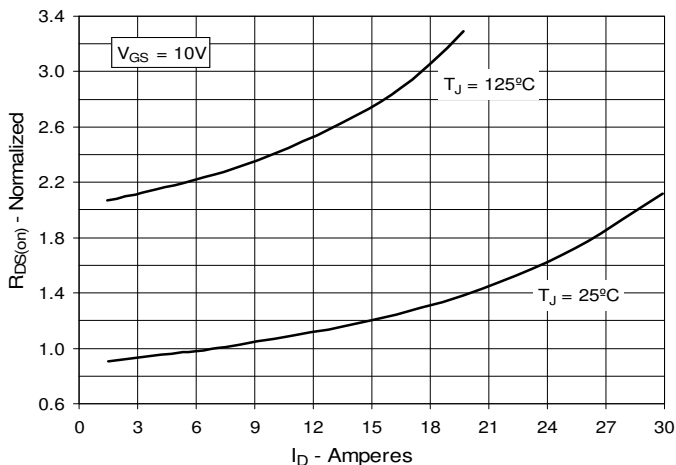
**Fig. 3. Output Characteristics @ 125°C**



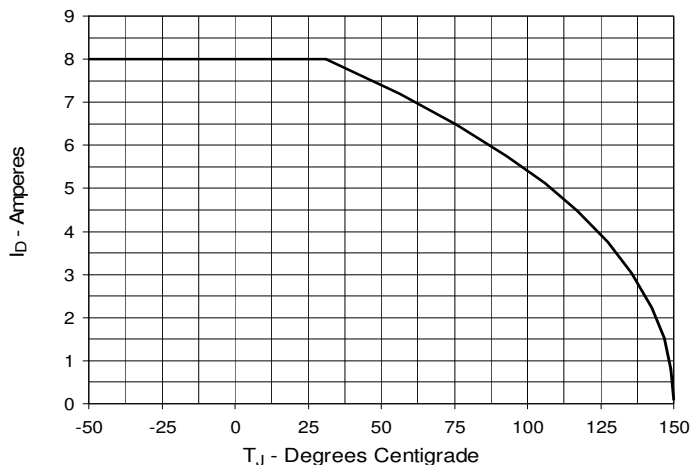
**Fig. 4.  $R_{DS(on)}$  Normalized to  $I_D = 7A$  Value vs. Junction Temperature**



**Fig. 5.  $R_{DS(on)}$  Normalized to  $I_D = 7A$  Value vs. Drain Current**



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



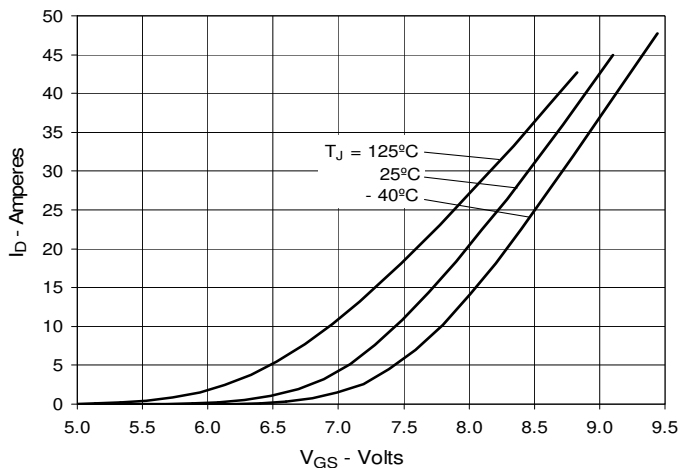
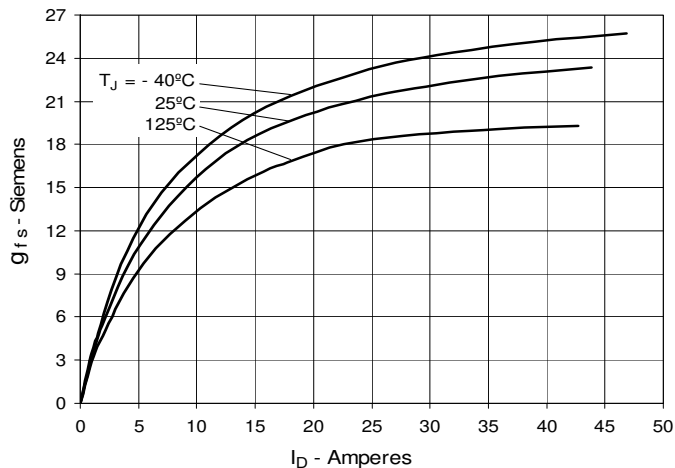
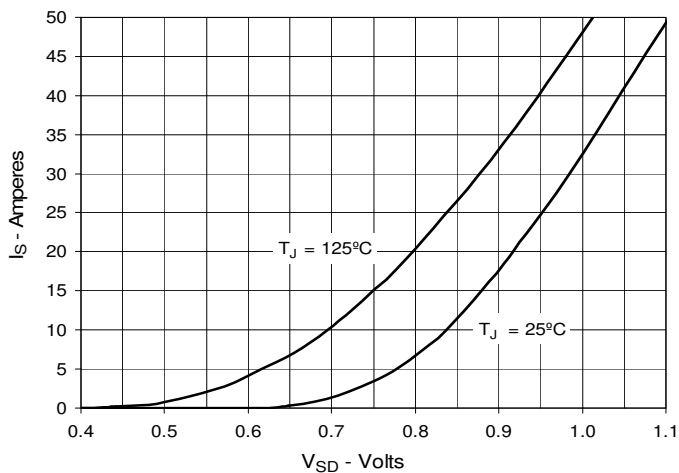
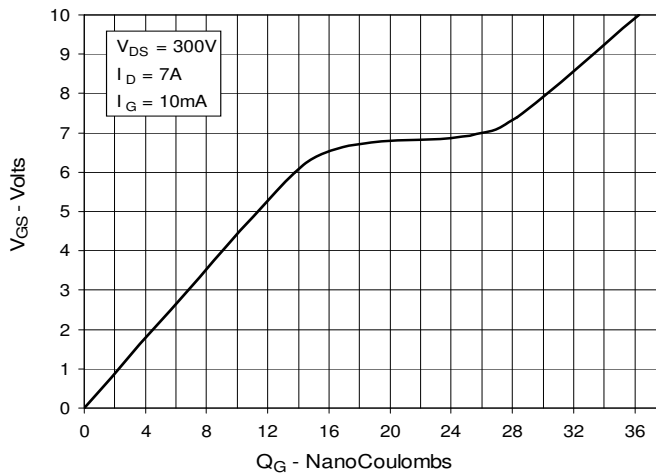
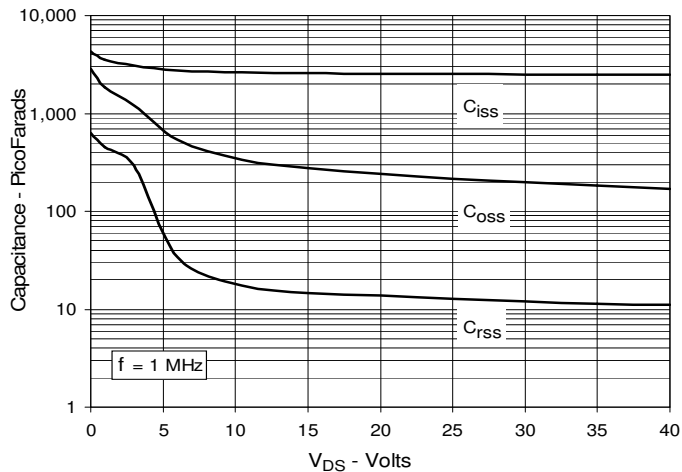
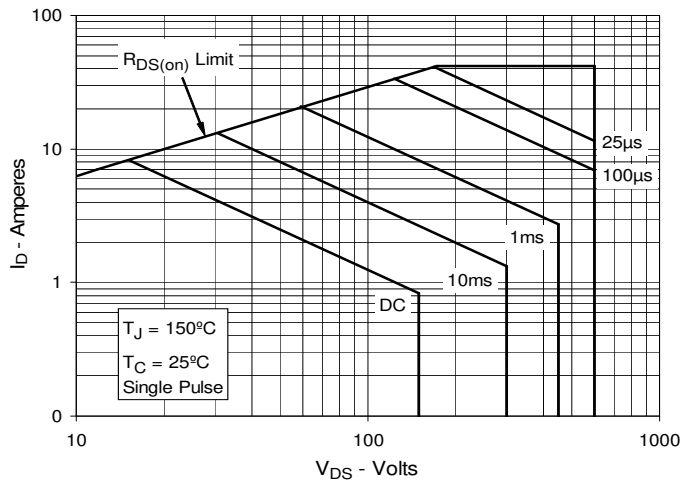
**Fig. 7. Input Admittance**

**Fig. 8. Transconductance**

**Fig. 9. Forward Voltage Drop of Intrinsic Diode**

**Fig. 10. Gate Charge**

**Fig. 11. Capacitance**

**Fig. 12. Forward-Bias Safe Operating Area**


Fig. 13. Maximum Transient Thermal Impedance

