

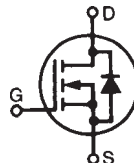
# PolarHV™ Power MOSFET ISOPLUS220™

## IXTC 26N50P

$$\begin{aligned} V_{DSS} &= 500 \text{ V} \\ I_{D25} &= 15 \text{ A} \\ R_{DS(on)} &\leq 260 \text{ m}\Omega \end{aligned}$$

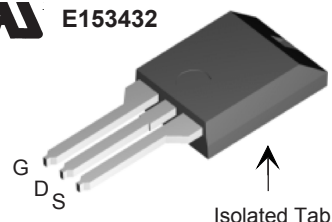
(Electrically Isolated Tab)

N-Channel Enhancement Mode  
Avalanche Rated



| Symbol     | Test Conditions                                                                                                                         | Maximum Ratings |                  |
|------------|-----------------------------------------------------------------------------------------------------------------------------------------|-----------------|------------------|
| $V_{DSS}$  | $T_J = 25^\circ\text{C to } 150^\circ\text{C}$                                                                                          | 500             | V                |
| $V_{DGR}$  | $T_J = 25^\circ\text{C to } 150^\circ\text{C}; R_{GS} = 1 \text{ M}\Omega$                                                              | 500             | V                |
| $V_{GS}$   | Continuous                                                                                                                              | $\pm 30$        | V                |
| $V_{GSM}$  | Transient                                                                                                                               | $\pm 40$        | V                |
| $I_{D25}$  | $T_C = 25^\circ\text{C}$                                                                                                                | 15              | A                |
| $I_{DM}$   | $T_C = 25^\circ\text{C}$ , pulse width limited by $T_{JM}$                                                                              | 78              | A                |
| $I_{AR}$   | $T_C = 25^\circ\text{C}$                                                                                                                | 26              | A                |
| $E_{AR}$   | $T_C = 25^\circ\text{C}$                                                                                                                | 40              | mJ               |
| $E_{AS}$   | $T_C = 25^\circ\text{C}$                                                                                                                | 1.0             | 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             |
| $P_D$      | $T_C = 25^\circ\text{C}$                                                                                                                | 130             | 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             | $^\circ\text{C}$ |
| $V_{ISOL}$ | 50/60 Hz, RMS, $t = 1$ , leads-to-tab                                                                                                   | 2500            | V~               |
| $F_C$      | Mounting Force                                                                                                                          | 11..65/2.5..15  | N/lb             |
| Weight     |                                                                                                                                         | 2               | g                |

ISOPLUS220™ (IXTC)  
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)

### 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

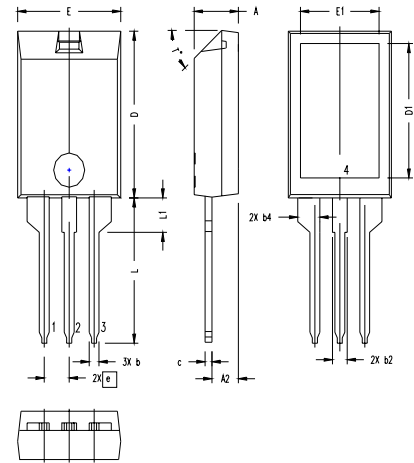
| Symbol       | Test Conditions<br>( $T_J = 25^\circ\text{C}$ , unless otherwise specified)                                       | Characteristic Values |      |                                       |
|--------------|-------------------------------------------------------------------------------------------------------------------|-----------------------|------|---------------------------------------|
|              |                                                                                                                   | Min.                  | Typ. | Max.                                  |
| $BV_{DSS}$   | $V_{GS} = 0 \text{ V}$ , $I_D = 250 \mu\text{A}$                                                                  | 500                   |      | V                                     |
| $V_{GS(th)}$ | $V_{DS} = V_{GS}$ , $I_D = 250 \mu\text{A}$                                                                       | 3.0                   |      | 5.5 V                                 |
| $I_{GSS}$    | $V_{GS} = \pm 30 \text{ V}_{DC}$ , $V_{DS} = 0$                                                                   |                       |      | $\pm 100 \text{ nA}$                  |
| $I_{DSS}$    | $V_{DS} = V_{DSS}$<br>$V_{GS} = 0 \text{ V}$<br>$T_J = 125^\circ\text{C}$                                         |                       |      | 25 $\mu\text{A}$<br>250 $\mu\text{A}$ |
| $R_{DS(on)}$ | $V_{GS} = 10 \text{ V}$ , $I_D = 13 \text{ A}$<br>Pulse test, $t \leq 300 \mu\text{s}$ , duty cycle $d \leq 2 \%$ |                       |      | 260 $\text{m}\Omega$                  |

| Symbol       | Test Conditions                                                                                       | Characteristic Values<br>( $T_J = 25^\circ\text{C}$ , unless otherwise specified) |           |      |
|--------------|-------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------|------|
|              |                                                                                                       | Min.                                                                              | Typ.      | Max. |
| $g_{fs}$     | $V_{DS} = 10\text{ V}$ ; $I_D = 13\text{ A}$ , pulse test                                             | 20                                                                                | 28        | S    |
| $C_{iss}$    | $V_{GS} = 0\text{ V}$ , $V_{DS} = 25\text{ V}$ , $f = 1\text{ MHz}$                                   |                                                                                   | 3600      | pF   |
| $C_{oss}$    |                                                                                                       |                                                                                   | 380       | pF   |
| $C_{rss}$    |                                                                                                       |                                                                                   | 48        | pF   |
| $t_{d(on)}$  | $V_{GS} = 10\text{ V}$ , $V_{DS} = 0.5 V_{DSS}$ , $I_D = 13\text{ A}$<br>$R_G = 4\ \Omega$ (External) |                                                                                   | 20        | ns   |
| $t_r$        |                                                                                                       |                                                                                   | 25        | ns   |
| $t_{d(off)}$ |                                                                                                       |                                                                                   | 58        | ns   |
| $t_f$        |                                                                                                       |                                                                                   | 20        | ns   |
| $Q_{g(on)}$  | $V_{GS} = 10\text{ V}$ , $V_{DS} = 0.5 V_{DSS}$ , $I_D = 13\text{ A}$                                 |                                                                                   | 65        | nC   |
| $Q_{gs}$     |                                                                                                       |                                                                                   | 20        | nC   |
| $Q_{gd}$     |                                                                                                       |                                                                                   | 20        | nC   |
| $R_{thJC}$   |                                                                                                       | 0.21                                                                              | 0.95° C/W |      |
| $R_{thCS}$   |                                                                                                       |                                                                                   | ° C/W     |      |

## Source-Drain Diode

| Symbol   | Test Conditions                                                                                            | Characteristic Values<br>( $T_J = 25^\circ\text{C}$ , unless otherwise specified) |      |               |
|----------|------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------|---------------|
|          |                                                                                                            | Min.                                                                              | Typ. | Max.          |
| $I_S$    | $V_{GS} = 0\text{ V}$                                                                                      |                                                                                   |      | 15 A          |
| $I_{SM}$ | Repetitive                                                                                                 |                                                                                   |      | 78 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         |
| $t_{rr}$ | $I_F = 25\text{ A}$<br>$-di/dt = 100\text{ A}/\mu\text{s}$<br>$V_R = 100\text{ V}$ , $V_{GS} = 0\text{ V}$ |                                                                                   | 400  | ns            |
| $Q_{RM}$ |                                                                                                            |                                                                                   | 5.0  | $\mu\text{C}$ |

## ISOPLUS220 Outline



| 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* |

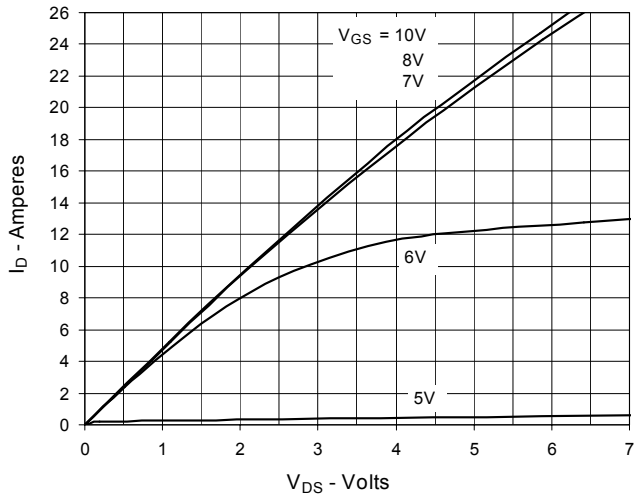
## NOTE:

- Bottom heatsink (Pin 4) is electrically isolated from Pin 1, 2, or 3.
- This drawing will meet dimensional requirement of JEDEC SS Product Outline 10-273 except D and D1 dimension.

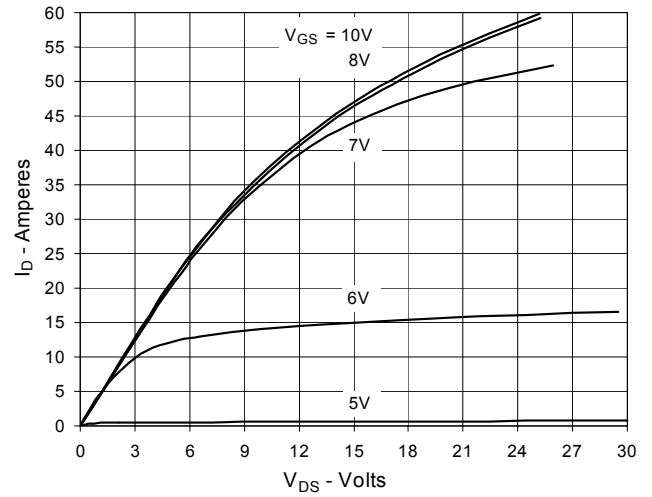
IXYS reserves the right to change limits, test conditions, and dimensions.

|                                                                                  |           |           |           |           |              |              |              |              |
|----------------------------------------------------------------------------------|-----------|-----------|-----------|-----------|--------------|--------------|--------------|--------------|
| 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    |
|                                                                                  | 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    |
|                                                                                  | 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 |

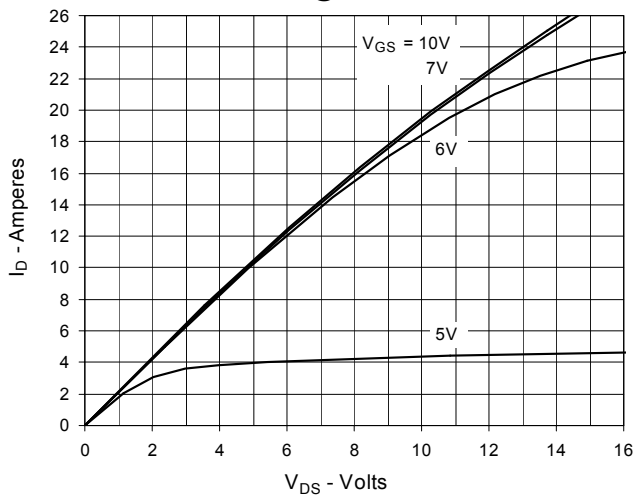
**Fig. 1. Output Characteristics  
@ 25°C**



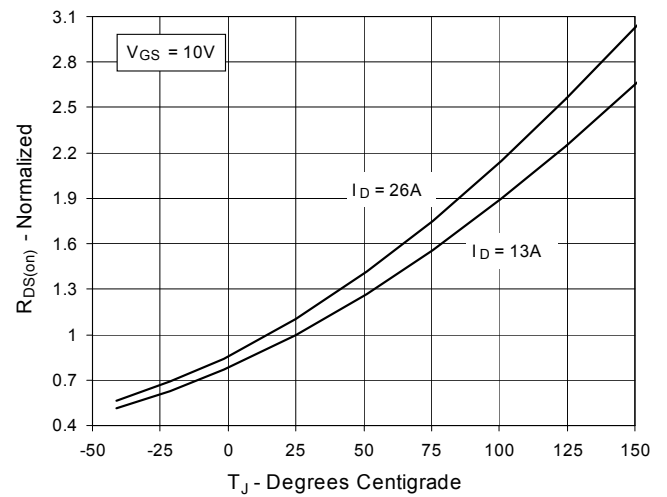
**Fig. 2. Extended Output Characteristics  
@ 25°C**



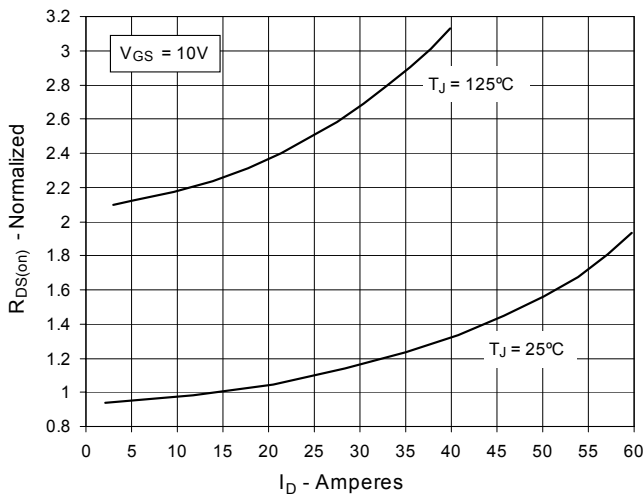
**Fig. 3. Output Characteristics  
@ 125°C**



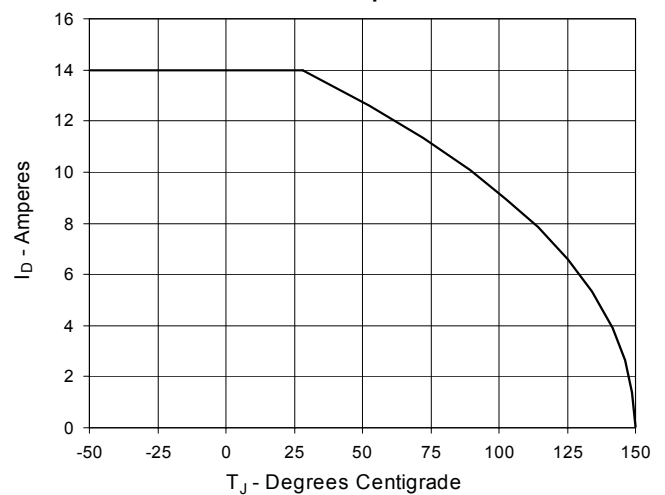
**Fig. 4.  $R_{DS(on)}$  Normalized to  $I_D = 13A$  Value  
vs. Junction Temperature**



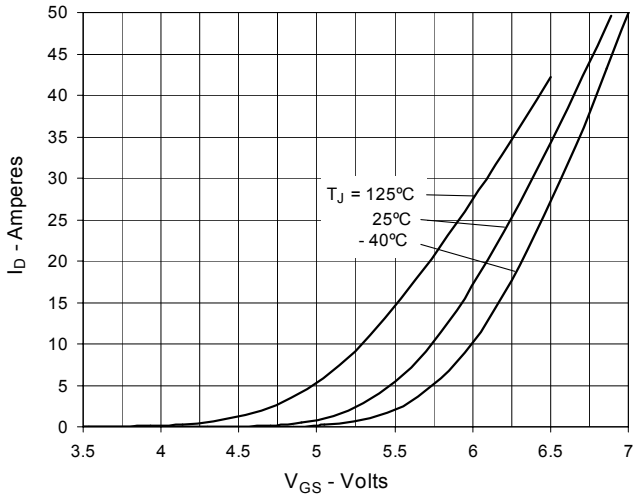
**Fig. 5.  $R_{DS(on)}$  Normalized to  $I_D = 13A$  Value  
vs. Drain Current**



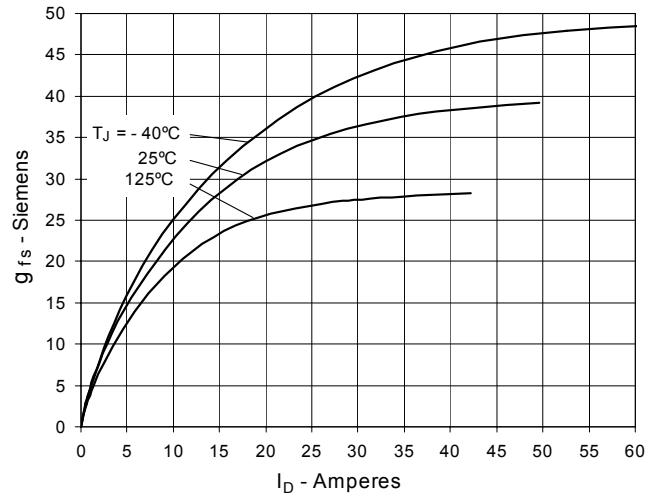
**Fig. 6. Maximum Drain Current vs.  
Case Temperature**



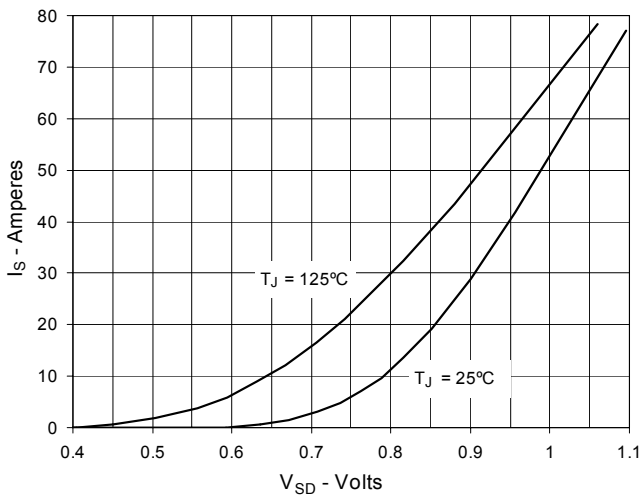
**Fig. 7. Input Admittance**



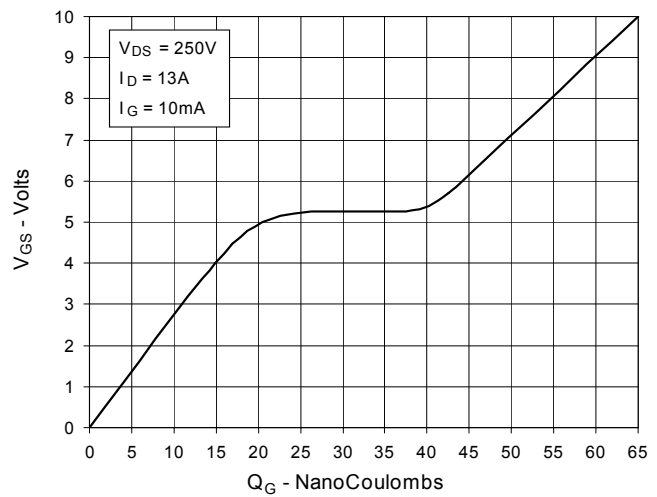
**Fig. 8. Transconductance**



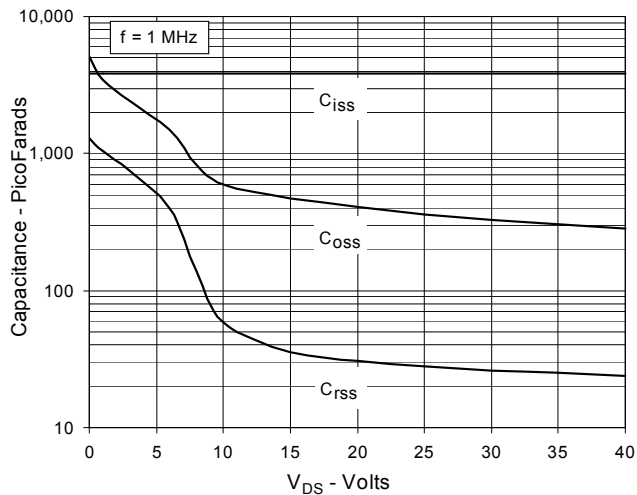
**Fig. 9. Forward Voltage Drop of Intrinsic Diode**



**Fig. 10. Gate Charge**



**Fig. 11. Capacitance**



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

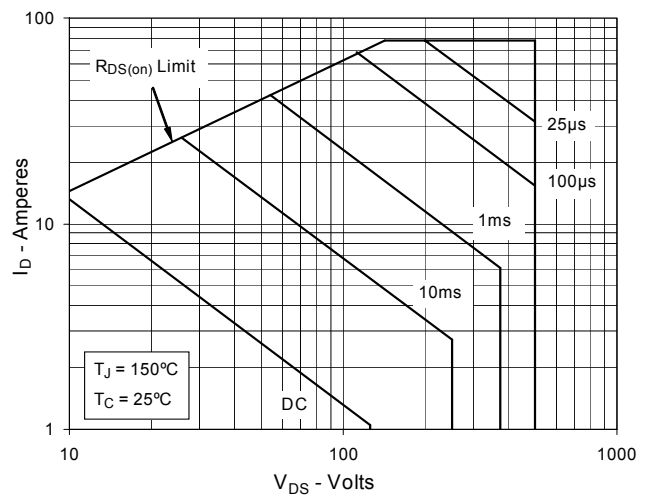


Fig. 13. Maximum Transient Thermal Resistance

