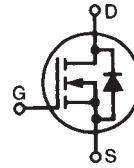


# PolarHT™ HiPerFET IXFN 180N15P

## Power MOSFET

N-Channel Enhancement Mode  
Avalanche Rated  
Fast Intrinsic Diode



$$V_{DSS} = 150 \text{ V}$$

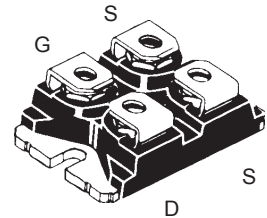
$$I_{D25} = 150 \text{ A}$$

$$R_{DS(on)} \leq 11 \text{ m}\Omega$$

$$t_{rr} \leq 200 \text{ ns}$$

| Symbol        | Test Conditions   | Maximum Ratings |                  |
|---------------|---|-----------------|------------------|
| $V_{DSS}$     | $T_J = 25^\circ\text{C}$ to $175^\circ\text{C}$   | 150             | V                |
| $V_{DGR}$     | $T_J = 25^\circ\text{C}$ to $175^\circ\text{C}$ ; $R_{GS} = 1 \text{ M}\Omega$  | 150             | V                |
| $V_{DSS}$     | Continuous  | $\pm 20$        | V                |
| $V_{GSM}$     | Transient   | $\pm 30$        | V                |
| $I_{D25}$     | $T_C = 25^\circ\text{C}$  | 150             | A                |
| $I_{D(RMS)}$  | External lead current limit   | 100             | A                |
| $I_{DM}$      | $T_C = 25^\circ\text{C}$ , pulse width limited by $T_{JM}$  | 380             | A                |
| $I_{AR}$      | $T_C = 25^\circ\text{C}$  | 60              | A                |
| $E_{AR}$      | $T_C = 25^\circ\text{C}$  | 100             | mJ               |
| $E_{AS}$      | $T_C = 25^\circ\text{C}$  | 4               | 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             |
| $P_D$         | $T_C = 25^\circ\text{C}$  | 680             | W                |
| $T_J$         |   | -55 ... +175    | $^\circ\text{C}$ |
| $T_{JM}$      |   | 175             | $^\circ\text{C}$ |
| $T_{stg}$     |   | -55 ... +150    | $^\circ\text{C}$ |
| $M_d$         | Mounting torque   | 1.5/13          | Nm/lb.in.        |
|               | Terminal connection torque (M4)   | 1.5/13          | Nm/lb.in.        |
| $V_{ISOL}$    | 50/60 Hz $t = 1 \text{ min}$  | 2500            | V~               |
|               | $I_{ISOL} \leq 1 \text{ mA}$ $t = 1 \text{ s}$  | 3000            | V~               |
| $T_L$         | 1.6 mm (0.062 in.) from case for 10 s   | 300             | $^\circ\text{C}$ |
| <b>Weight</b> |   | 30              | g                |

miniBLOC, SOT-227 B (IXFN)  
E153432



G = Gate      D = Drain  
S = Source

Either Source terminal S can be used as the Source terminal or the Kelvin Source (gate return) terminal.

### Features

- International standard package
- Encapsulating epoxy meets UL 94 V-0, flammability classification
- miniBLOC with Aluminium nitride isolation
- † Fast recovery diode
- † Unclamped Inductive Switching (UIS) rated
- † Low package inductance
  - easy to drive and to protect

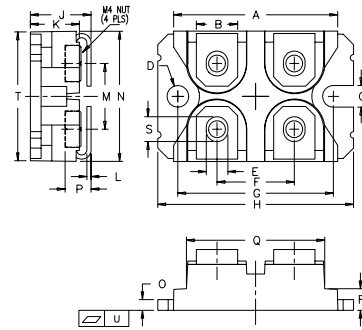
### Advantages

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

| Symbol       | Test Conditions<br>( $T_J = 25^\circ\text{C}$ , unless otherwise specified)                                       | Characteristic Values |      |                                       |
|--------------|---|-----------------------|------|---------------------------------------|
|              |   | Min.                  | Typ. | Max.                                  |
| $V_{DSS}$    | $V_{GS} = 0 \text{ V}$ , $I_D = 250 \mu\text{A}$  | 150                   |      | V                                     |
| $V_{GS(th)}$ | $V_{DS} = V_{GS}$ , $I_D = 4 \text{ mA}$  | 2.5                   |      | 5.0 V                                 |
| $I_{GSS}$    | $V_{GS} = \pm 20 \text{ V}_{DC}$ , $V_{DS} = 0$   |                       |      | $\pm 100 \text{ nA}$                  |
| $I_{DSS}$    | $V_{DS} = V_{DSS}$ , $V_{GS} = 0 \text{ V}$<br>$T_J = 150^\circ\text{C}$  |                       |      | 25 $\mu\text{A}$<br>500 $\mu\text{A}$ |
| $R_{DS(on)}$ | $V_{GS} = 10 \text{ V}$ , $I_D = 90 \text{ A}$<br>Pulse test, $t \leq 300 \mu\text{s}$ , duty cycle $d \leq 2 \%$ |                       |      | 11 $\text{m}\Omega$                   |

| Symbol                    | Test Conditions   | Characteristic Values                               |      |          |
|---------------------------|---|---|------|----------|
|                           |   | (T <sub>J</sub> = 25°C, unless otherwise specified) |      |          |
|                           |   | Min.  | Typ. | Max.     |
| <b>g<sub>fs</sub></b>     | V <sub>DS</sub> = 10 V; I <sub>D</sub> = 90 A, pulse test   | 55  | 86   | S        |
| <b>C<sub>iss</sub></b>    | V <sub>GS</sub> = 0 V, V <sub>DS</sub> = 25 V, f = 1 MHz  |   | 7000 | pF       |
| <b>C<sub>oss</sub></b>    |   |   | 2250 | pF       |
| <b>C<sub>rss</sub></b>    |   |   | 515  | pF       |
| <b>t<sub>d(on)</sub></b>  | V <sub>GS</sub> = 10 V, V <sub>DS</sub> = 0.5 V <sub>DSS</sub> , I <sub>D</sub> = 90 A<br>R <sub>G</sub> = 3.3 Ω (External) |   | 30   | ns       |
| <b>t<sub>r</sub></b>      |   |   | 32   | ns       |
| <b>t<sub>d(off)</sub></b> |   |   | 150  | ns       |
| <b>t<sub>f</sub></b>      |   |   | 36   | ns       |
| <b>Q<sub>g(on)</sub></b>  | V <sub>GS</sub> = 10 V, V <sub>DS</sub> = 0.5 V <sub>DSS</sub> , I <sub>D</sub> = 90 A                                      |   | 240  | nC       |
| <b>Q<sub>gs</sub></b>     |   |   | 55   | nC       |
| <b>Q<sub>gd</sub></b>     |   |   | 140  | nC       |
| <b>R<sub>thJC</sub></b>   |   |   |      | 0.22° CW |
| <b>R<sub>thCS</sub></b>   |   | 0.05  |      | ° C/W    |

| Symbol                | Test Conditions  | Characteristic Values                               |      |        |
|-----------------------|--|---|------|--------|
|                       |  | (T <sub>J</sub> = 25°C, unless otherwise specified) |      |        |
|                       |  | Min.  | typ. | Max.   |
| <b>I<sub>S</sub></b>  | V <sub>GS</sub> = 0 V  |   |      | 180 A  |
| <b>I<sub>SM</sub></b> | Repetitive   |   |      | 380 A  |
| <b>V<sub>SD</sub></b> | I <sub>F</sub> = I <sub>S</sub> , V <sub>GS</sub> = 0 V,<br>Pulse test, t ≤ 300 μs, duty cycle d ≤ 2 % |   |      | 1.5 V  |
| <b>t<sub>rr</sub></b> | I <sub>F</sub> = 25 A<br>-di/dt = 100 A/μs<br>V <sub>R</sub> = 100 V, V <sub>GS</sub> = 0 V            |   |      | 200 ns |
| <b>Q<sub>RM</sub></b> |  |   | 0.6  | μC     |
| <b>I<sub>RM</sub></b> |  |   | 6    | A      |

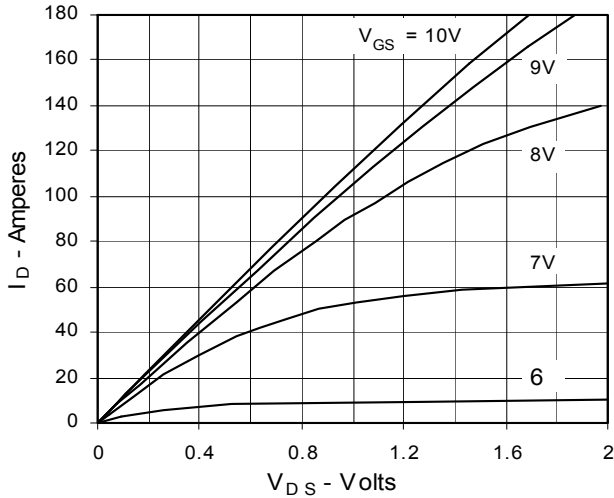
**SOT-227B Outline**


| SYM | INCHES |       | MILLIMETERS |       |
|-----|--------|-------|-------------|-------|
|     | MIN    | MAX   | MIN         | MAX   |
| A   | 1.240  | 1.255 | 31.50       | 31.88 |
| B   | .307   | .323  | 7.80        | 8.20  |
| C   | .161   | .169  | 4.09        | 4.29  |
| D   | .161   | .169  | 4.09        | 4.29  |
| E   | .161   | .169  | 4.09        | 4.29  |
| F   | .587   | .595  | 14.91       | 15.11 |
| G   | 1.186  | 1.193 | 30.12       | 30.30 |
| H   | 1.496  | 1.505 | 38.00       | 38.23 |
| J   | .460   | .481  | 11.68       | 12.22 |
| K   | .351   | .378  | 8.92        | 9.60  |
| L   | .030   | .033  | 0.76        | 0.84  |
| M   | .496   | .506  | 12.60       | 12.85 |
| N   | .990   | 1.001 | 25.15       | 25.42 |
| O   | .078   | .084  | 1.98        | 2.13  |
| P   | .195   | .235  | 4.95        | 5.97  |
| Q   | 1.045  | 1.059 | 26.54       | 26.90 |
| R   | .155   | .174  | 3.94        | 4.42  |
| S   | .186   | .191  | 4.72        | 4.85  |
| T   | .968   | .987  | 24.59       | 25.07 |
| U   | -.002  | .004  | -0.05       | 0.1   |

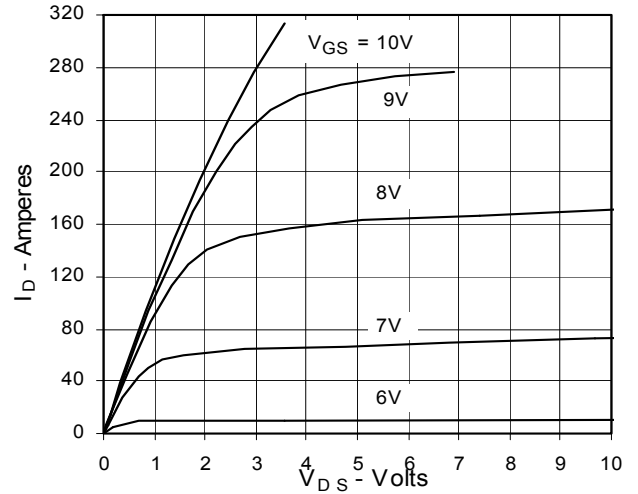
IXYS reserves the right to change limits, test conditions, and dimensions.

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

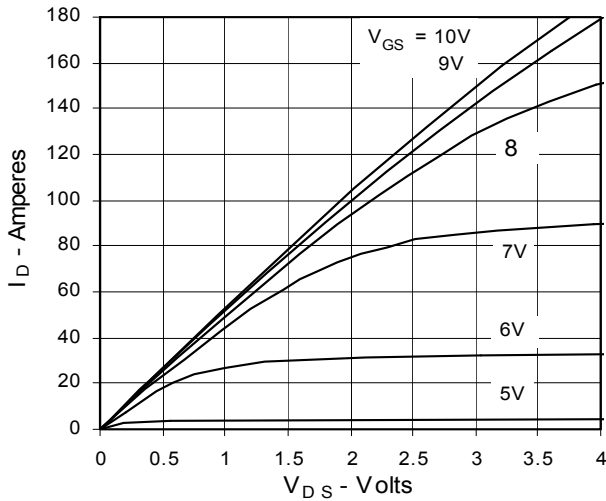
**Fig. 1. Output Characteristics @ 25°C**



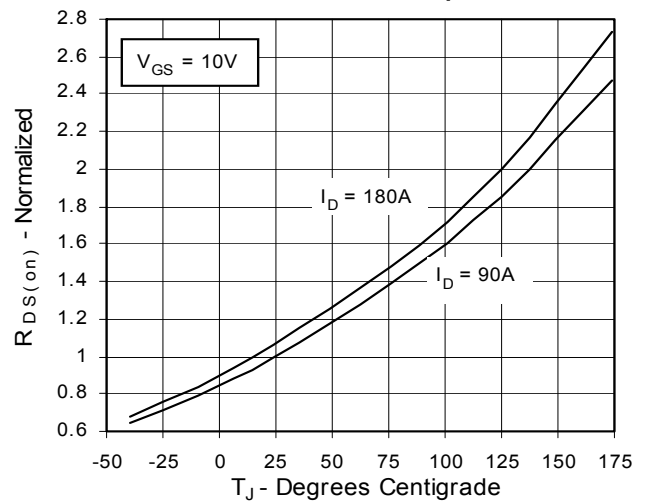
**Fig. 2. Extended Output Characteristics @ 25°C**



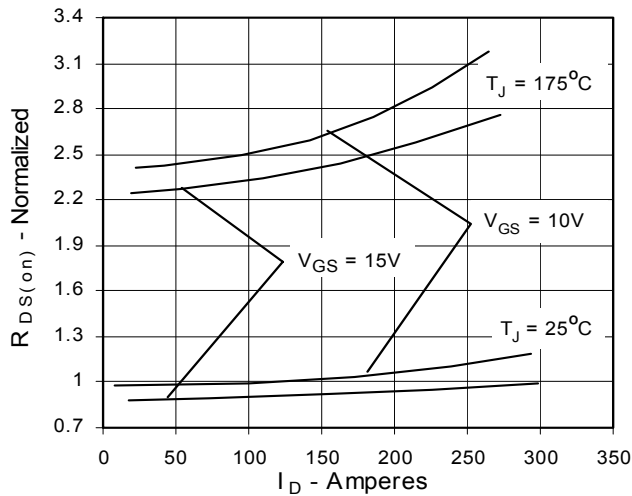
**Fig. 3. Output Characteristics @ 150°C**



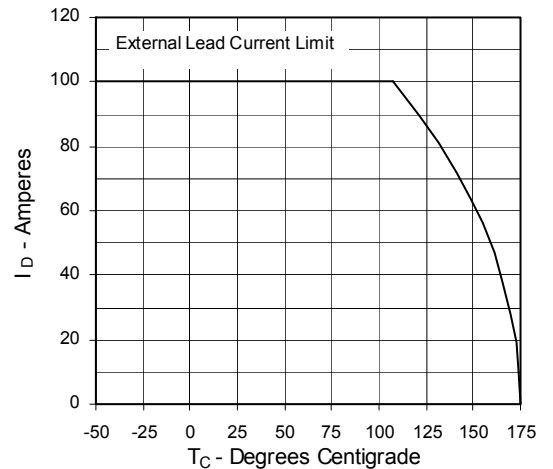
**Fig. 4.  $R_{DS(on)}$  Normalized to  $I_D = 90A$  Value vs. Junction Temperature**



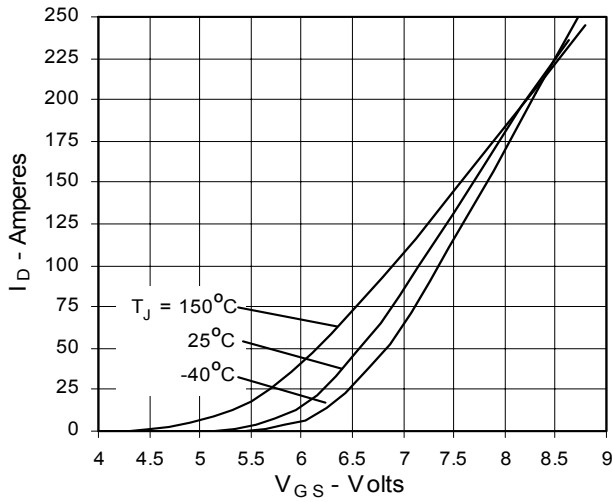
**Fig. 5.  $R_{DS(on)}$  Normalized to  $I_D = 90A$  Value vs. Drain Current**



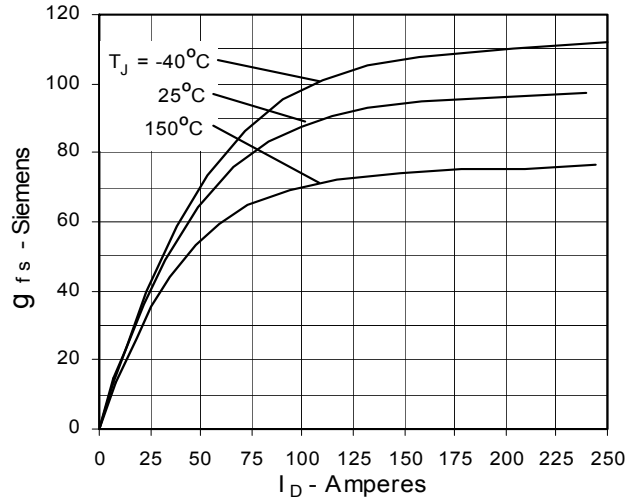
**Fig. 6. Drain Current vs. Case Temperature**



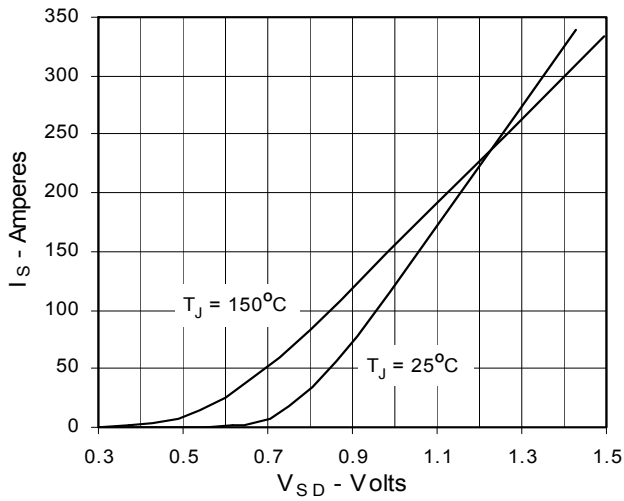
**Fig. 7. Input Admittance**



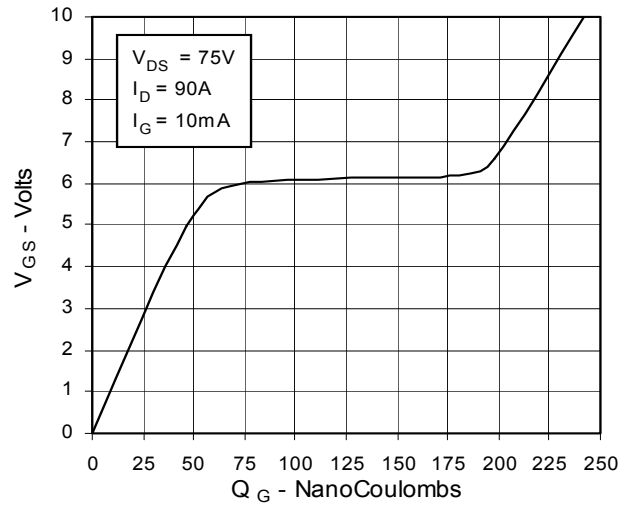
**Fig. 8. Transconductance**



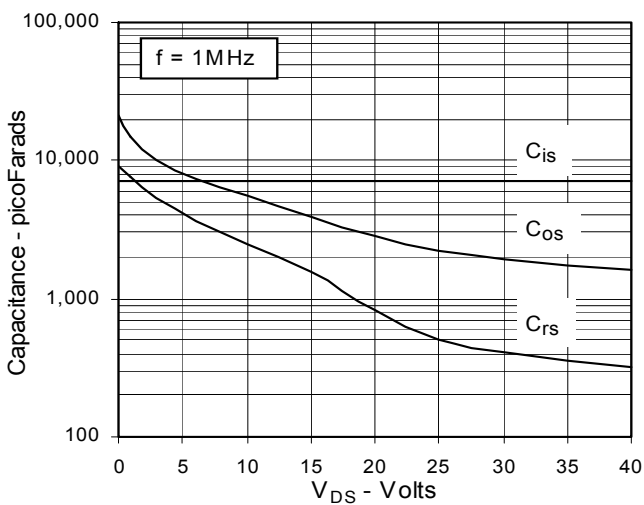
**Fig. 9. Source Current vs. Source-To-Drain Voltage**



**Fig. 10. Gate Charge**



**Fig. 11. Capacitance**



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

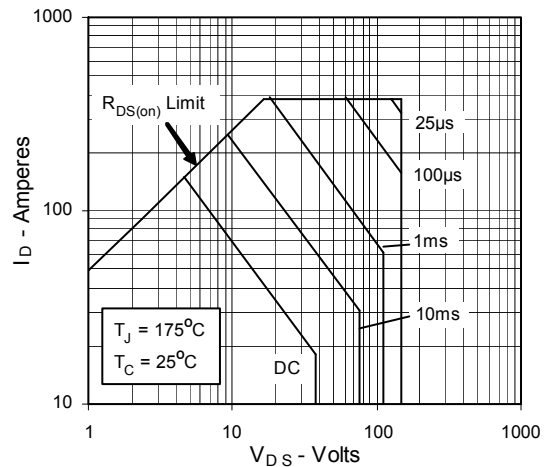


Fig. 13. Maximum Transient Thermal Resistance

