

# PolarHV™

## Power MOSFET

(Electrically Isolated Tab)

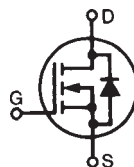
### IXTP 10N60PM

$$V_{DSS} = 600 \text{ V}$$

$$I_{D25} = 5 \text{ A}$$

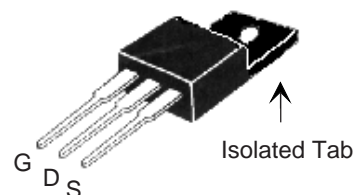
$$R_{DS(on)} \leq 740 \text{ m}\Omega$$

N-Channel Enhancement Mode  
Avalanche Rated



| Symbol        | Test Conditions  | Maximum Ratings |                  |
|---------------|--|-----------------|------------------|
| $V_{DSS}$     | $T_J = 25^\circ\text{C}$ to $175^\circ\text{C}$  | 600             | V                |
| $V_{DGR}$     | $T_J = 25^\circ\text{C}$ to $175^\circ\text{C}$ ; $R_{GS} = 1 \text{ M}\Omega$   | 600             | V                |
| $V_{GS}$      | Continuous   | $\pm 30$        | V                |
| $V_{GSM}$     | Transient  | $\pm 40$        | V                |
| $I_{D25}$     | $T_C = 25^\circ\text{C}$   | 5               | A                |
| $I_{DM}$      | $T_C = 25^\circ\text{C}$ , pulse width limited by $T_{JM}$   | 30              | A                |
| $I_{AR}$      | $T_C = 25^\circ\text{C}$   | 10              | A                |
| $E_{AR}$      | $T_C = 25^\circ\text{C}$   | 20              | mJ               |
| $E_{AS}$      | $T_C = 25^\circ\text{C}$   | 500             | mJ               |
| $dv/dt$       | $I_S \leq I_{DM}$ , $di/dt \leq 100 \text{ A}/\mu\text{s}$ , $V_{DD} \leq V_{DSS}$ ,<br>$T_J \leq 150^\circ\text{C}$ , $R_G = 10 \Omega$ | 10              | V/ns             |
| $P_D$         | $T_C = 25^\circ\text{C}$   | 50              | 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             | $^\circ\text{C}$ |
| $T_{SOLD}$    | Plastic body for 10 s  | 260             | $^\circ\text{C}$ |
| $M_d$         | Mounting torque  | 1.13/10         | Nm/lb.in.        |
| <b>Weight</b> |  | 4               | g                |

#### OVERMOLDED TO-220 (IXTP...M) OUTLINE



G = Gate      D = Drain  
S = Source

#### Features

- Plastic overmolded tab for electrical isolation
- International standard package
- Unclamped Inductive Switching (UIS) rated
- Low package inductance  
- easy to drive and to protect

#### Advantages

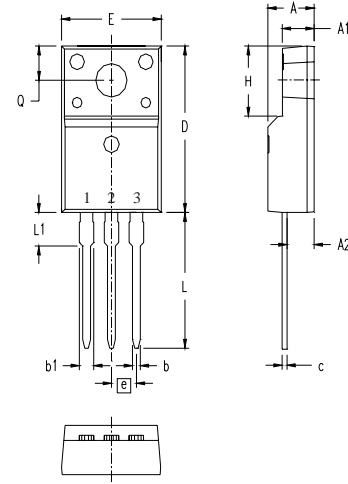
- Easy to mount
- Space savings
- High power density

| Symbol       | Test Conditions<br>( $T_J = 25^\circ\text{C}$ , unless otherwise specified)                                     | Characteristic Values |      |                                     |
|--------------|---|-----------------------|------|-------------------------------------|
|              |   | Min.                  | Typ. | Max.                                |
| $BV_{DSS}$   | $V_{GS} = 0 \text{ V}$ , $I_D = 250 \mu\text{A}$  | 600                   |      | V                                   |
| $V_{GS(th)}$ | $V_{DS} = V_{GS}$ , $I_D = 100 \mu\text{A}$   | 3.0                   |      | 5.0 V                               |
| $I_{GSS}$    | $V_{GS} = \pm 30 \text{ V}_{DC}$ , $V_{DS} = 0$   |                       |      | $\pm 100 \text{ nA}$                |
| $I_{DSS}$    | $V_{DS} = V_{DSS}$ ,<br>$V_{GS} = 0 \text{ V}$ , $T_J = 125^\circ\text{C}$                                      |                       |      | 5 $\mu\text{A}$<br>50 $\mu\text{A}$ |
| $R_{DS(on)}$ | $V_{GS} = 10 \text{ V}$ , $I_D = 5 \text{ A}$<br>Pulse test, $t \leq 300 \mu\text{s}$ , duty cycle $d \leq 2\%$ |                       |      | 740 $\text{m}\Omega$                |

| Symbol       | Test Conditions  | Characteristic Values<br>( $T_J = 25^\circ\text{C}$ , unless otherwise specified) |      |                        |
|--------------|--|---|------|------------------------|
|              |  | Min.  | Typ. | Max.                   |
| $g_{fs}$     | $V_{DS} = 10\text{ V}$ ; $I_D = 5\text{ A}$ , pulse test   | 6   | 11   | S                      |
| $C_{iss}$    | $V_{GS} = 0\text{ V}$ , $V_{DS} = 25\text{ V}$ , $f = 1\text{ MHz}$                                    |   | 1610 | pF                     |
| $C_{oss}$    |  |   | 165  | pF                     |
| $C_{rss}$    |  |   | 14   | pF                     |
| $t_{d(on)}$  | $V_{GS} = 10\text{ V}$ , $V_{DS} = 0.5 V_{DSS}$ , $I_D = 10\text{ A}$<br>$R_G = 10\ \Omega$ (External) |   | 20   | ns                     |
| $t_r$        |  |   | 24   | ns                     |
| $t_{d(off)}$ |  |   | 55   | ns                     |
| $t_f$        |  |   | 18   | ns                     |
| $Q_{g(on)}$  | $V_{GS} = 10\text{ V}$ , $V_{DS} = 0.5 V_{DSS}$ , $I_D = 5\text{ A}$                                   |   | 32   | nC                     |
| $Q_{gs}$     |  |   | 11   | nC                     |
| $Q_{gd}$     |  |   | 10   | nC                     |
| $R_{thJS}$   |  |   |      | 2.5 $^\circ\text{C/W}$ |

**Source-Drain Diode**

| Symbol   | Test Conditions  | Characteristic Values<br>( $T_J = 25^\circ\text{C}$ , unless otherwise specified) |      |       |
|----------|--|---|------|-------|
|          |  | Min.  | Typ. | Max.  |
| $I_S$    | $V_{GS} = 0\text{ V}$  |   |      | 10 A  |
| $I_{SM}$ | Repetitive   |   |      | 30 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 |
| $t_{rr}$ | $I_F = 9\text{ A}$ , $-di/dt = 100\text{ A}/\mu\text{s}$<br>$V_R = 100\text{ V}$                         |   | 500  | ns    |

**ISOLATED TO-220 (IXTP...M)**


Terminals: 1 - Gate  
2 - Drain (Collector)  
3 - Source (Emitter)

| SYM             | INCHES   |      | MILLIMETERS |       |
|-----------------|----------|------|-------------|-------|
|                 | MIN      | MAX  | MIN         | MAX   |
| A               | .177     | .193 | 4.50        | 4.90  |
| A1              | .092     | .108 | 2.34        | 2.74  |
| A2              | .101     | .117 | 2.56        | 2.96  |
| b               | .028     | .035 | 0.70        | 0.90  |
| b1              | .050     | .058 | 1.27        | 1.47  |
| c               | .018     | .024 | 0.45        | 0.60  |
| D               | .617     | .633 | 15.67       | 16.07 |
| E               | .392     | .408 | 9.96        | 10.36 |
| e               | .100 BSC |      | 2.54 BSC    |       |
| H               | .255     | .271 | 6.48        | 6.88  |
| L               | .499     | .523 | 12.68       | 13.28 |
| L1              | .119     | .135 | 3.03        | 3.43  |
| $\varnothing P$ | .121     | .129 | 3.08        | 3.28  |
| Q               | .126     | .134 | 3.20        | 3.40  |

**PRELIMINARY TECHNICAL INFORMATION**

The product presented herein is under development. The Technical Specifications offered are derived from data gathered during objective characterizations of preliminary engineering lots; but also may yet contain some information supplied during a pre-production design evaluation. IXYS reserves the right to change limits, test conditions, and dimensions without notice.

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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  
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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