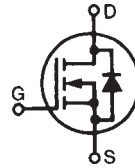


# PolarP2™

## Power MOSFET

# IXTQ480P2

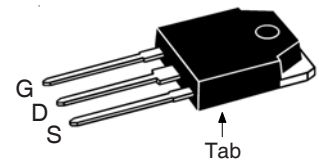
N-Channel Enhancement Mode  
Avalanche Rated  
Fast Intrinsic Diode



$$\begin{aligned} V_{DSS} &= 500V \\ I_{D25} &= 52A \\ R_{DS(on)} &\leq 120m\Omega \\ t_{rr(typ)} &= 400ns \end{aligned}$$

| Symbol     | Test Conditions  | Maximum Ratings |            |
|------------|--|-----------------|------------|
| $V_{DSS}$  | $T_J = 25^\circ C$ to $150^\circ C$                                | 500             | V          |
| $V_{DGR}$  | $T_J = 25^\circ C$ to $150^\circ C$ , $R_{GS} = 1M\Omega$          | 500             | V          |
| $V_{GSS}$  | Continuous   | $\pm 30$        | V          |
| $V_{GSM}$  | Transient  | $\pm 40$        | V          |
| $I_{D25}$  | $T_C = 25^\circ C$   | 52              | A          |
| $I_{DM}$   | $T_C = 25^\circ C$ , Pulse Width Limited by $T_{JM}$               | 150             | A          |
| $I_A$      | $T_C = 25^\circ C$   | 52              | A          |
| $E_{AS}$   | $T_C = 25^\circ C$   | 1.5             | J          |
| $dv/dt$    | $I_S \leq I_{DM}$ , $V_{DD} \leq V_{DSS}$ , $T_J \leq 150^\circ C$ | 10              | V/ns       |
| $P_D$      | $T_C = 25^\circ C$   | 960             | W          |
| $T_J$      |  | -55 ... +150    | $^\circ C$ |
| $T_{JM}$   |  | 150             | $^\circ C$ |
| $T_{stg}$  |  | -55 ... +150    | $^\circ C$ |
| $T_L$      | Maximum Lead Temperature for Soldering                             | 300             | $^\circ C$ |
| $T_{SOLD}$ | Plastic Body for 10s   | 260             | $^\circ C$ |
| $M_d$      | Mounting Torque  | 1.13/10         | Nm/lb.in.  |
| Weight     |  | 5.5             | g          |

### TO-3P



G = Gate      D = Drain  
S = Source    Tab = Drain

### Features

- Avalanche Rated
- Fast Intrinsic Diode
- Dynamic  $dv/dt$  Rated
- Low Package Inductance

### Advantages

- High Power Density
- Easy to Mount
- Space Savings

### Applications

- Switch-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.                    |
| $BV_{DSS}$   | $V_{GS} = 0V$ , $I_D = 250\mu A$                                      | 500                   |      | V                       |
| $V_{GS(th)}$ | $V_{DS} = V_{GS}$ , $I_D = 250\mu A$                                  | 3.0                   |      | 5.0 V                   |
| $I_{GSS}$    | $V_{GS} = \pm 30V$ , $V_{DS} = 0V$                                    |                       |      | $\pm 100$ nA            |
| $I_{DSS}$    | $V_{DS} = V_{DSS}$ , $V_{GS} = 0V$<br>$T_J = 125^\circ C$             |                       |      | 5 $\mu A$<br>50 $\mu A$ |
| $R_{DS(on)}$ | $V_{GS} = 10V$ , $I_D = 0.5 \cdot I_{D25}$ , Note 1                   |                       |      | 120 m $\Omega$          |

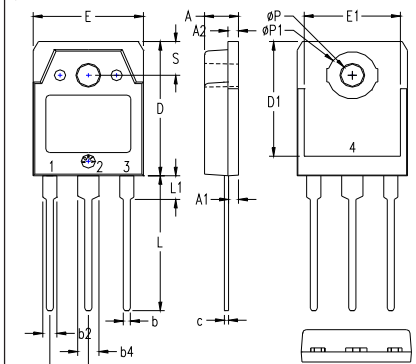
| Symbol       | Test Conditions<br>( $T_J = 25^\circ\text{C}$ Unless Otherwise Specified)  | Characteristic Values |      |                        |
|--------------|--|-----------------------|------|------------------------|
|              |  | Min.                  | Typ. | Max.                   |
| $g_{fs}$     | $V_{DS} = 20\text{V}$ , $I_D = 0.5 \cdot I_{D25}$ , Note 1   | 30                    | 48   | S                      |
| $C_{iss}$    | $V_{GS} = 0\text{V}$ , $V_{DS} = 25\text{V}$ , $f = 1\text{MHz}$   |                       | 6800 | pF                     |
| $C_{oss}$    |  |                       | 680  | pF                     |
| $C_{rss}$    |  |                       | 44   | pF                     |
| $t_{d(on)}$  | <b>Resistive Switching Times</b><br>$V_{GS} = 10\text{V}$ , $V_{DS} = 0.5 \cdot V_{DSS}$ , $I_D = 0.5 \cdot I_{D25}$<br>$R_G = 1\Omega$ (External) |                       | 22   | ns                     |
| $t_r$        |  |                       | 11   | ns                     |
| $t_{d(off)}$ |  |                       | 40   | ns                     |
| $t_f$        |  |                       | 8    | ns                     |
| $Q_{g(on)}$  | $V_{GS} = 10\text{V}$ , $V_{DS} = 0.5 \cdot V_{DSS}$ , $I_D = 0.5 \cdot I_{D25}$   |                       | 108  | nC                     |
| $Q_{gs}$     |  |                       | 37   | nC                     |
| $Q_{gd}$     |  |                       | 38   | nC                     |
| $R_{thJC}$   |  |                       | 0.25 | $0.13^\circ\text{C/W}$ |
| $R_{thCS}$   |  |                       |      | $^\circ\text{C/W}$     |

## Source-Drain Diode

| Symbol   | Test Conditions<br>( $T_J = 25^\circ\text{C}$ Unless Otherwise Specified)                             | Characteristic Values |      |       |
|----------|---|-----------------------|------|-------|
|          |   | Min.                  | Typ. | Max.  |
| $I_S$    | $V_{GS} = 0\text{V}$  |                       |      | 52 A  |
| $I_{SM}$ | Repetitive, Pulse Width Limited by $T_{JM}$   |                       |      | 204 A |
| $V_{SD}$ | $I_F = I_S$ , $V_{GS} = 0\text{V}$ , Note 1   |                       |      | 1.5 V |
| $t_{rr}$ | $I_F = 26\text{A}$ , $-di/dt = 100\text{A}/\mu\text{s}$<br>$V_R = 100\text{V}$ , $V_{GS} = 0\text{V}$ |                       | 400  | ns    |

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

## TO-3P (IXTQ) Outline



Pins: 1 - Gate 2 - Drain  
3 - Source 4 - Drain

| SYM | INCHES   |      | MILLIMETERS |       |
|-----|----------|------|-------------|-------|
|     | MIN      | MAX  | MIN         | MAX   |
| A   | .185     | .193 | 4.70        | 4.90  |
| A1  | .051     | .059 | 1.30        | 1.50  |
| A2  | .057     | .065 | 1.45        | 1.65  |
| b   | .035     | .045 | 0.90        | 1.15  |
| b2  | .075     | .087 | 1.90        | 2.20  |
| b4  | .114     | .126 | 2.90        | 3.20  |
| c   | .022     | .031 | 0.55        | 0.80  |
| D   | .780     | .791 | 19.80       | 20.10 |
| D1  | .665     | .677 | 16.90       | 17.20 |
| E   | .610     | .622 | 15.50       | 15.80 |
| E1  | .531     | .539 | 13.50       | 13.70 |
| e   | .215 BSC |      | 5.45 BSC    |       |
| L   | .779     | .795 | 19.80       | 20.20 |
| L1  | .134     | .142 | 3.40        | 3.60  |
| øP  | .126     | .134 | 3.20        | 3.40  |
| øP1 | .272     | .280 | 6.90        | 7.10  |
| S   | .193     | .201 | 4.90        | 5.10  |

All metal area are tin plated.

## PRELIMINARY TECHNICAL INFORMATION

The product presented herein is under development. The Technical Specifications offered are derived from a subjective evaluation of the design, based upon prior knowledge and experience, and constitute a "considered reflection" of the anticipated result. IXYS reserves the right to change limits, test conditions, and dimensions without notice.

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 |
|  | 4,860,072 | 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    |             |



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