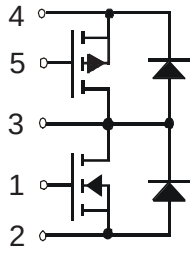
IXYS

Preliminary Technical Information

# Polar™ P & N-Channel Power MOSFET Common Drain Topology

# FMP26-02P

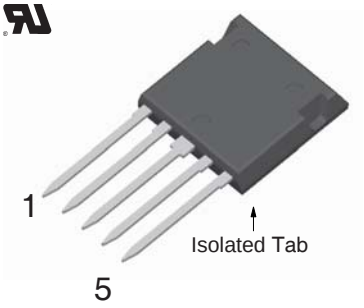
**(Electrically Isolated Tab)**




| | P CH. | N CH. |
|---|---|---|
| $V_{DSS}$ | - 200V | 200V |
| $I_{D25}$ | - 17A | 26A |
| $R_{DS(on)}$ | 170mΩ | 60mΩ |
| $t_{rr(typ)}$ | 240ns | 150ns |

| Symbol | Test Conditions | Maximum Ratings | |
|---|---|---|---|
| $T_J$ | | -55 ... +150 | °C |
| $T_{JM}$ | | 150 | °C |
| $T_{stg}$ | | -55 ... +150 | °C |
| $V_{ISOLD}$ | 50/60$H_Z$, RMS, t = 1min, Leads-to-Tab | 2500 | ~V |
| $T_L$ | 1.6mm (0.062 in.) from Case for 10s | 300 | °C |
| $T_{SOLD}$ | Plastic Body for 10s | 260 | °C |
| $F_C$ | Mounting Force | 20..120 / 4.5..27 | N/lb. |

**ISOPLUS i4-Pak™**




| Symbol | Test Conditions | Characteristic Values Min. | Typ. | Max. | |
|---|---|---|---|---|---|
| $C_P$ | Coupling Capacitance Between Shorted Pins and Mounting Tab in the Case | | 40 | | pF |
| $d_S$, $d_A$ | Pin - Pin | 1.7 | | | mm |
| $d_S$, $d_A$ | Pin - Backside Metal | 5.5 | | | mm |
| **Weight** | | | 9 | | g |

## P - CHANNEL

| Symbol | Test Conditions | Maximum Ratings | |
|---|---|---|---|
| $V_{DSS}$ | $T_J$ = 25°C to 150°C | - 200 | V |
| $V_{DGR}$ | $T_J$ = 25°C to 150°C, $R_{GS}$ = 1MΩ | - 200 | V |
| $V_{GSS}$ | Continuous | ± 20 | V |
| $V_{GSM}$ | Transient | ± 30 | V |
| $I_{D25}$ | $T_C$ = 25°C | -17 | A |
| $I_{DM}$ | $T_C$ = 25°C, Pulse Width Limited by $T_{JM}$ | - 70 | A |
| $I_A$ | $T_C$ = 25°C | - 26 | A |
| $E_{AS}$ | $T_C$ = 25°C | 1.5 | J |
| $P_D$ | $T_C$ = 25°C | 125 | W |

### Features

- Silicon Chip on Direct-Copper Bond (DCB) Substrate
  - UL Recognized Package
  - Isolated Mounting Surface
  - 2500V~ Electrical Isolation
- Avalanche Rated
- Low $Q_G$
- Low Drain-to-Tab Capacitance
- Low Package Inductance

### Advantages

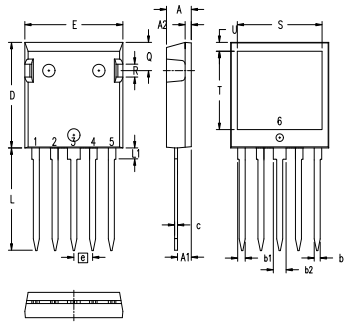
- Low Gate Drive Requirement
- High Power Density
- Low Drain to Ground Capacitance
- Fast Switching

### Applications

- DC and AC Motor Drives
- Class AB Audio Amplifiers
- Multi-Phase DC to DC Converters
- Industrial Battery Chargers
- Switching Power Supplies

| Symbol | Test Conditions ($T_J$ = 25°C Unless Otherwise Specified) | Characteristic Values Min. | Typ. | Max. | |
|---|---|---|---|---|---|
| $BV_{DSS}$ | $V_{GS}$ = 0V, $I_D$ = - 250μA | - 200 | | | V |
| $V_{GS(th)}$ | $V_{DS} = V_{GS}$, $I_D$ = - 250μA | - 2.5 | | - 4.5 | V |
| $I_{GSS}$ | $V_{GS}$ = ±20 V, $V_{DS}$ = 0V | | | ± 100 | nA |
| $I_{DSS}$ | $V_{DS} = V_{DSS}$, $V_{GS}$ = 0V | | | -10 | μA |
| | $T_J$ = 125°C | | | - 150 | μA |
| $R_{DS(on)}$ | $V_{GS}$ = -10V, $I_D$ = -13A, Note 1 | | | 170 | mΩ |
| $g_{fs}$ | $V_{DS}$ = -10V, $I_D$ = -13A, Note 1 | 10 | 17 | | S |
| $C_{iss}$ | $V_{GS}$ = 0V, $V_{DS}$ = - 25 V, f = 1 MHz | | 2740 | | pF |
| $C_{oss}$ | | | 540 | | pF |
| $C_{rss}$ | | | 100 | | pF |
| $t_{d(on)}$ | **Resistive Switching Times** | | 18 | | ns |
| $t_r$ | $V_{GS}$ = -10V, $V_{DS}$ = 0.5 • $V_{DSS}$, $I_D$ = -13A | | 33 | | ns |
| $t_{d(off)}$ | $R_G$ = 3.3Ω (External) | | 46 | | ns |
| $t_f$ | | | 21 | | ns |
| $Q_{g(on)}$ | $V_{GS}$= -10V, $V_{DS}$ = 0.5 • $V_{DSS}$, $I_D$ = -13A | | 56 | | nC |
| $Q_{gs}$ | | | 18 | | nC |
| $Q_{gd}$ | | | 20 | | nC |
| $R_{thJC}$ | | | | 1.0 | °C/W |
| $R_{thCS}$ | | | 0.15 | | °C/W |

**ISOPLUS i4-Pak™ Outline**




NOTE: Bottom heatsink meets 3000 Volts AC 1 sec isolation to the other pins.

| SYM | INCHES MIN | INCHES MAX | MILLIMETERS MIN | MILLIMETERS MAX |
|---|---|---|---|---|
| A | .190 | .205 | 4.83 | 5.21 |
| A1 | .102 | .118 | 2.59 | 3.00 |
| A2 | .046 | .085 | 1.17 | 2.16 |
| b | .045 | .055 | 1.14 | 1.40 |
| b1 | .058 | .068 | 1.47 | 1.73 |
| b2 | .100 | .110 | 2.54 | 2.79 |
| C | .020 | .029 | 0.51 | 0.74 |
| D | .819 | .840 | 20.80 | 21.34 |
| E | .770 | .799 | 19.56 | 20.29 |
| e | .150 BSC | | 3.81 BSC | |
| L | .780 | .840 | 19.81 | 21.34 |
| L1 | .083 | .102 | 2.11 | 2.59 |
| Q | .210 | .244 | 5.33 | 6.20 |
| R | .100 | .180 | 2.54 | 4.57 |
| S | .660 | .690 | 16.76 | 17.53 |
| T | .590 | .620 | 14.99 | 15.75 |
| U | .065 | .080 | 1.65 | 2.03 |

Ref: IXYS CO 0077 R0

**Source-Drain Diode**

| Symbol | Test Conditions ($T_J$ = 25°C Unless Otherwise Specified) | Characteristic Values Min. | Typ. | Max. | |
|---|---|---|---|---|---|
| $I_S$ | $V_{GS}$ = 0V | | | -17 | A |
| $I_{SM}$ | Repetitive, Pulse Width Limited by $T_{JM}$ | | | -104 | A |
| $V_{SD}$ | $I_F$ = -13A, $V_{GS}$ = 0V, Note 1 | | | - 3.2 | V |
| $t_{rr}$ | $I_F$ = -13A, di/dt = 100A/μs | | 240 | | ns |
| $Q_{RM}$ | $V_R$ = -100V, $V_{GS}$ = 0V | | 2.2 | | μC |
| $I_{RM}$ | | | -18 | | A |

IXYS Reserves the Right to Change Limits, Test Conditions, and Dimensions.

## N - CHANNEL

| Symbol | Test Conditions | Maximum Ratings | |
|---|---|---|---|
| $V_{DSS}$ | $T_J$ = 25°C to 150°C | 200 | V |
| $V_{DGR}$ | $T_J$ = 25°C to 150°C, $R_{GS}$ = 1MΩ | 200 | V |
| $V_{GSS}$ | Continuous | ± 20 | V |
| $V_{GSM}$ | Transient | ± 30 | V |
| $I_{D25}$ | $T_C$ = 25°C | 26 | A |
| $I_{DM}$ | $T_C$ = 25°C, Pulse Width Limited by $T_{JM}$ | 120 | A |
| $I_A$ | $T_C$ = 25°C | 50 | A |
| $E_{AS}$ | $T_C$ = 25°C | 1 | J |
| $P_D$ | $T_C$ = 25°C | 125 | W |

| Symbol | Test Conditions ($T_J$ = 25°C Unless Otherwise Specified) | Characteristic Values Min. | Typ. | Max. | |
|---|---|---|---|---|---|
| $BV_{DSS}$ | $V_{GS}$ = 0V, $I_D$ = 250μA | 200 | | | V |
| $V_{GS(th)}$ | $V_{DS}$ = $V_{GS}$, $I_D$ = 250μA | 2.5 | | 5.0 | V |
| $I_{GSS}$ | $V_{GS}$ = ±20 V, $V_{DS}$ = 0V | | | ± 100 | nA |
| $I_{DSS}$ | $V_{DS}$ = $V_{DSS}$, $V_{GS}$ = 0V | | | 25 | μA |
| | $T_J$ = 150°C | | | 250 | μA |
| $R_{DS(on)}$ | $V_{GS}$ = 10V, $I_D$ = 25A, (Note 1) | | | 60 | mΩ |
| $g_{fs}$ | $V_{DS}$ = 10V, $I_D$ = 25A, (Note 1) | 12 | 23 | | S |
| $C_{iss}$ | $V_{GS}$ = 0V, $V_{DS}$ = 25V, f = 1 MHz | | 2720 | | pF |
| $C_{oss}$ | | | 490 | | pF |
| $C_{rss}$ | | | 105 | | pF |
| $t_{d(on)}$ | **Resistive Switching Times** | | 26 | | ns |
| $t_r$ | $V_{GS}$ = 10V, $V_{DS}$ = 0.5 • $V_{DSS}$, $I_D$ = 25A | | 35 | | ns |
| $t_{d(off)}$ | $R_G$ = 10Ω (External) | | 70 | | ns |
| $t_f$ | | | 30 | | ns |
| $Q_{g(on)}$ | $V_{GS}$= 10V, $V_{DS}$ = 0.5 • $V_{DSS}$, $I_D$ = 25A | | 70 | | nC |
| $Q_{gs}$ | | | 17 | | nC |
| $Q_{gd}$ | | | 37 | | nC |
| $R_{thJC}$ | | | | 1.0 | °C/W |
| $R_{thCS}$ | | | 0.15 | | °C/W |

**Source-Drain Diode**

| Symbol | Test Conditions ($T_J$ = 25°C Unless Otherwise Specified) | Characteristic Values Min. | Typ. | Max. | |
|---|---|---|---|---|---|
| $I_S$ | $V_{GS}$ = 0V | | | 26 | A |
| $I_{SM}$ | Repetitive, Pulse Width Limited by $T_{JM}$ | | | 120 | A |
| $V_{SD}$ | $I_F$ = 50A, $V_{GS}$ = 0V, Note 1 | | | 1.5 | V |
| $t_{rr}$ | $I_F$ = 25A, -di/dt = 100A/μs | | 150 | | ns |
| $Q_{RM}$ | $V_R$ = 100V, $V_{GS}$ = 0V | | 2.0 | | μC |

Note 1: Pulse test, t ≤ 300μs, duty cycle, d ≤ 2 %.

**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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