

HiPerFET™ Power MOSFETs IXFL 39N90

ISOPLUS264™

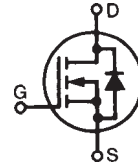
(Electrically Isolated Backside)

Single Die MOSFET

N-Channel Enhancement Mode

Avalanche Rated, High dv/dt, Low t_{rr}

Preliminary Data Sheet



$$V_{DSS} = 900 \text{ V}$$

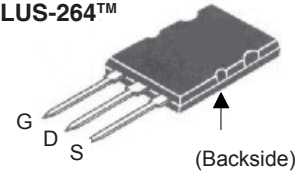
$$I_{D25} = 34 \text{ A}$$

$$R_{DS(on)} = 220 \text{ m}\Omega$$

$$t \leq \text{ns}$$

| Symbol | Test Conditions | Maximum Ratings | |
|---------------|---|-----------------|------------------|
| V_{DSS} | $T_J = 25^\circ\text{C}$ to 150°C | 900 | V |
| V_{DGR} | $T_J = 25^\circ\text{C}$ to 150°C ; $R_{GS} = 1 \text{ M}\Omega$ | 900 | V |
| V_{GS} | Continuous | ± 20 | V |
| V_{GSM} | Transient | ± 30 | V |
| I_{D25} | $T_C = 25^\circ\text{C}$, Chip capability | 34 | A |
| I_{DM} | $T_C = 25^\circ\text{C}$, Note 1 | 154 | A |
| I_{AR} | $T_C = 25^\circ\text{C}$ | 39 | A |
| E_{AR} | $T_C = 25^\circ\text{C}$ | 64 | mJ |
| E_{AS} | $T_C = 25^\circ\text{C}$ | 4 | J |
| dv/dt | $I_S \leq I_{DM}$, $di/dt \leq 100 \text{ A}/\mu\text{s}$, $V_{DD} \leq V_{DSS}$ $T_J \leq 150^\circ\text{C}$, $R_G = 2 \Omega$ | 5 | V/ns |
| P_D | $T_C = 25^\circ\text{C}$ | 580 | W |
| T_J | | -40 ... +150 | $^\circ\text{C}$ |
| T_{JM} | | 150 | $^\circ\text{C}$ |
| T_{stg} | | -40 ... +150 | $^\circ\text{C}$ |
| V_{ISOL} | 50/60 Hz, RMS $t = 1 \text{ min}$ $I_{ISOL} \leq 1 \text{ mA}$ $t = 1 \text{ s}$ | 2500 3000 | V~ V~ |
| Weight | | 8 | g |

ISOPLUS-264™



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)
- Low $R_{DS(on)}$ HDMOS™ process
- Rugged polysilicon gate cell structure
- Unclamped Inductive Switching (UIS) rated
- Fast intrinsic Rectifier

Applications

- DC-DC converters
- Battery chargers
- Switched-mode and resonant-mode power supplies
- DC choppers
- AC motor control

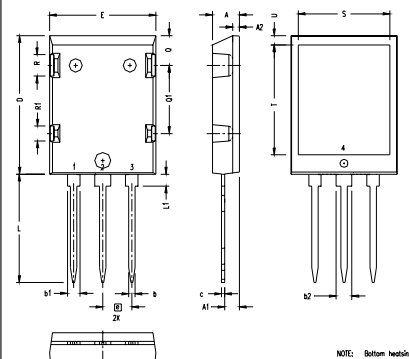
Advantages

- Easy assembly
- Space savings
- High power density

| Symbol | Test Conditions | Characteristic Values ($T_J = 25^\circ\text{C}$, unless otherwise specified) | | |
|--------------|---|---|------|---------------------------|
| | | min. | typ. | max. |
| V_{DSS} | $V_{GS} = 0 \text{ V}$, $I_D = 3 \text{ mA}$ | 900 | | V |
| $V_{GH(th)}$ | $V_{DS} = V_{GS}$, $I_D = 8 \text{ mA}$ | 2.5 | | V |
| I_{GSS} | $V_{GS} = \pm 20 \text{ V}_{DC}$, $V_{DS} = 0$ | | | ± 200 nA |
| I_{DSS} | $V_{DS} = V_{DSS}$, $T_J = 25^\circ\text{C}$ $V_{GS} = 0 \text{ V}$, $T_J = 125^\circ\text{C}$ | | | 100 μA 2 mA |
| $R_{DS(on)}$ | $V_{GS} = 10 \text{ V}$, $I_D = I_T$ Notes 2, 3 | | | 220 m Ω |

| Symbol | Test Conditions | Characteristic Values ($T_J = 25^\circ\text{C}$, unless otherwise specified) | | |
|--------------|--|---|-------|------|
| | | min. | typ. | max. |
| g_{fs} | $V_{DS} = 15\text{ V}; I_D = I_T$, Note 2 | 30 | 45 | S |
| C_{iss} | $V_{GS} = 0\text{ V}, V_{DS} = 25\text{ V}, f = 1\text{ MHz}$ | | 13400 | pF |
| C_{oss} | | | 1230 | pF |
| C_{rss} | | | 320 | pF |
| $t_{d(on)}$ | $V_{GS} = 10\text{ V}, V_{DS} = 0.5 \cdot V_{DSS}, I_D = I_T$ $R_G = 1\ \Omega$ (External), | | 45 | ns |
| t_r | | | 68 | ns |
| $t_{d(off)}$ | | | 125 | ns |
| t_f | | | 30 | ns |
| $Q_{g(on)}$ | $V_{GS} = 10\text{ V}, V_{DS} = 0.5 \cdot V_{DSS}, I_D = I_T$ | | 375 | nC |
| Q_{gs} | | | 75 | nC |
| Q_{gd} | | | 190 | nC |
| R_{thJC} | | | 0.22 | K/W |
| R_{thCK} | | 0.07 | | K/W |

ISOPLUS 264 OUTLINE



NOTE: Bottom heatsink

| SYM | INCHES | | MILLIMETERS | |
|-----|----------|-------|-------------|-------|
| | MIN | MAX | MIN | MAX |
| A | .190 | .205 | 4.83 | 5.21 |
| A1 | .102 | .118 | 2.59 | 3.00 |
| A2 | .046 | .055 | 1.17 | 1.40 |
| b | .045 | .055 | 1.14 | 1.40 |
| b1 | .087 | .102 | 2.21 | 2.59 |
| b2 | .111 | .126 | 2.82 | 3.20 |
| c | .020 | .029 | 0.51 | 0.74 |
| D | 1.020 | 1.040 | 25.91 | 26.42 |
| E | .770 | .799 | 19.56 | 20.29 |
| e | .215 BSC | | 5.46 BSC | |
| L | .780 | .820 | 19.81 | 20.83 |
| L1 | .080 | .102 | 2.03 | 2.59 |
| Q | .210 | .235 | 5.33 | 5.97 |
| Q1 | .490 | .513 | 12.45 | 13.03 |
| R | .150 | .180 | 3.81 | 4.57 |
| R1 | .100 | .130 | 2.54 | 3.30 |
| S | .668 | .690 | 16.97 | 17.53 |
| T | .801 | .821 | 20.34 | 20.85 |
| U | .065 | .080 | 1.65 | 2.03 |

NOTE: Bottom heatsink meets 2500Vrms isolation to the other pins.

| Symbol | Test Conditions | Characteristic Values ($T_J = 25^\circ\text{C}$, unless otherwise specified) | | |
|----------|--|---|------|---------------|
| | | min. | typ. | max. |
| I_s | $V_{GS} = 0\text{ V}$ | | | 39 A |
| I_{SM} | Repetitive; Note 1 | | | 154 A |
| V_{SD} | $I_F = I_s, V_{GS} = 0\text{ V}$, Note 2 | | | 1.3 V |
| t_{rr} | $I_F = 25\text{ A}, -di/dt = 100\text{ A}/\mu\text{s}, V_R = 100\text{ V}$ | | | 250 ns |
| Q_{RM} | | | 2 | μC |
| I_{RM} | | | 9 | A |

- Notes:
1. Pulse width limited by T_{JM} .
 2. Pulse test, $t \leq 300\text{ ms}$, duty cycle $d \leq 2\%$.
 3. I_T Test current: $I_T = 19.5\text{ A}$

Please see IXFN39N90 data sheet for characteristic curves.

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