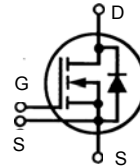


HiPerFET™ Power MOSFETs Single Die MOSFET

N-Channel Enhancement Mode
Avalanche Rated, High dv/dt, Low t_{rr}

Preliminary Data

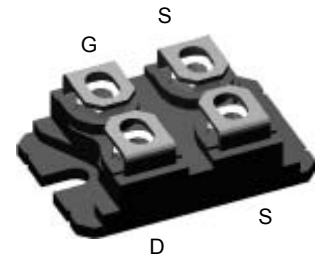
IXFE 39N90



$$\begin{aligned} V_{DSS} &= 900 \text{ V} \\ I_{D25} &= 34 \text{ A} \\ R_{DS(on)} &= 220 \text{ m}\Omega \\ t &\leq \text{ns} \end{aligned}$$

| 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~ |
| M_d | Mounting torque Terminal connection torque | 1.5/13 | Nm/lb.in. Nm/lb.in. |

ISOPLUS 227™ (IXFE)



G = Gate
S = Source
D = Drain

Either Source terminal at miniBLOC can be used as Main or Kelvin Source

Features

- Conforms to SOT-227B outline
- Low $R_{DS(on)}$ HDMOS™ process
- Rugged polysilicon gate cell structure
- Unclamped Inductive Switching (UIS) rated
- Low package inductance
- Fast intrinsic Rectifier

Applications

- DC-DC converters
- Battery chargers
- Switched-mode and resonant-mode power supplies
- DC choppers
- Temperature and lighting controls

Advantages

- Low cost
- Easy to mount
- Space savings
- High power density

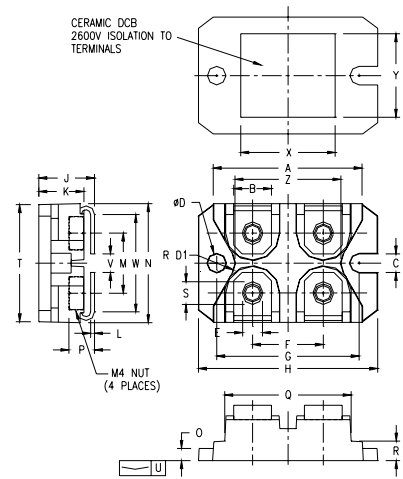
| Symbol | Test Conditions | Characteristic Values ($T_J = 25^\circ\text{C}$, unless otherwise specified) | | |
|--------------|---|---|------|---------------------------|
| | | min. | typ. | max. |
| V_{DSS} | $V_{GS} = 0 \text{ V}$, $I_D = 3 \text{ mA}$ | 900 | | V |
| $V_{GH(th)}$ | $V_{DS} = V_{GS}$, $I_D = 8 \text{ mA}$ | 2.5 | | V |
| I_{GSS} | $V_{GS} = \pm 20 \text{ V}_{DC}$, $V_{DS} = 0$ | | | $\pm 200 \text{ nA}$ |
| 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 |

| Source-Drain Diode | | Characteristic Values ($T_j = 25^\circ\text{C}$, unless otherwise specified) | | |
|--------------------|--|---|------|---------------|
| Symbol | Test Conditions | 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: $I_T = 19.5\text{ A}$

ISOPLUS-227 B



| SYM | INCHES | | MILLIMETERS | |
|-----|--------|-------|-------------|-------|
| | MIN | MAX | MIN | MAX |
| A | 1.240 | 1.270 | 31.50 | 32.26 |
| B | .310 | .330 | 7.87 | 8.38 |
| C | .155 | .165 | 3.94 | 4.19 |
| D | .155 | .165 | 3.94 | 4.19 |
| D1 | .150 | .157 | 3.81 | 3.98 |
| E | .160 | .168 | 4.06 | 4.27 |
| F | .587 | .595 | 14.91 | 15.11 |
| G | 1.186 | 1.193 | 30.12 | 30.30 |
| H | 1.489 | 1.505 | 37.80 | 38.23 |
| J | .465 | .481 | 11.81 | 12.22 |
| K | .370 | .380 | 9.40 | 9.65 |
| L | .030 | .033 | 0.76 | 0.84 |
| M | .496 | .506 | 12.60 | 12.85 |
| N | .990 | 1.001 | 25.15 | 25.42 |
| O | .100 | .105 | 2.54 | 2.67 |
| P | .195 | .235 | 4.95 | 5.97 |
| Q | 1.045 | 1.059 | 26.54 | 26.90 |
| R | .160 | .170 | 4.06 | 4.32 |
| S | .186 | .191 | 4.72 | 4.85 |
| T | .968 | .987 | 24.59 | 25.07 |
| U | -.001 | .002 | -0.03 | 0.05 |
| V | .130 | .160 | 3.30 | 4.06 |
| W | .780 | .830 | 19.81 | 21.08 |
| X | .770 | .810 | 19.56 | 20.57 |
| Y | .680 | .720 | 17.27 | 18.29 |
| Z | .885 | .892 | 22.48 | 22.66 |

Please see IXFN39N90 data sheet for characteristic curves.