

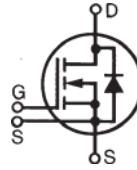
# HiPerFET™ Power MOSFET

Single Die MOSFET

IXFE 55N50  
IXFE 50N50

| $V_{DSS}$ | $I_{D25}$ | $R_{DS(on)}$ |
|-----------|-----------|--------------|
| 500 V     | 50 A      | 90 mΩ        |
| 500 V     | 47 A      | 100 mΩ       |

$t_{rr} \leq 250$  ns



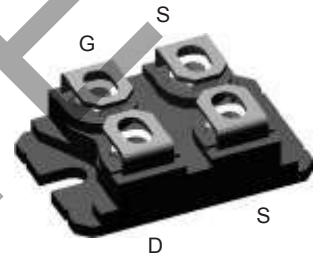
## Preliminary data sheet

### Symbol Test Conditions

### Maximum Ratings

|               |                                                                                                                                  |                                      |                  |
|---------------|----------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|------------------|
| $V_{DSS}$     | $T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$                                                                                  | 500                                  | V                |
| $V_{DGR}$     | $T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$ , $R_{GS} = 1\text{M}\Omega$                                                     | 500                                  | V                |
| $V_{GS}$      | Continuous                                                                                                                       | $\pm 20$                             | V                |
| $V_{GSM}$     | Transient                                                                                                                        | $\pm 30$                             | V                |
| $I_{D25}$     | $T_C = 25^\circ\text{C}$                                                                                                         | 55N50: 47<br>50N50: 50               | A                |
| $I_{DM}$      | $T_C = 25^\circ\text{C}$ ; Note 1                                                                                                | 55N50: 200<br>50N50: 220             | A                |
| $I_{AR}$      | $T_C = 25^\circ\text{C}$                                                                                                         | 55                                   | A                |
| $E_{AR}$      | $T_C = 25^\circ\text{C}$                                                                                                         | 60                                   | mJ               |
| $dv/dt$       | $I_S \leq I_{DM}$ , $di/dt \leq 100$ A/ $\mu\text{s}$ , $V_{DD} \leq V_{DSS}$<br>$T_J \leq 150^\circ\text{C}$ , $R_G = 2 \Omega$ | 5                                    | V/ns             |
| $P_D$         | $T_C = 25^\circ\text{C}$                                                                                                         | 500                                  | 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 $t = 1$ min<br>$I_{ISOL} \leq 1$ mA $t = 1$ s                                                                      | 2500<br>3000                         | V~<br>V~         |
| $M_d$         | Mounting torque<br>Terminal connection torque                                                                                    | 1.5/13 Nm/lb.in.<br>1.5/13 Nm/lb.in. |                  |
| <b>Weight</b> |                                                                                                                                  | 19                                   | g                |

### ISOPLUS 227™ (IXFE)



G = Gate  
S = Source

D = Drain

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

### Features

- Low cost direct-copper bonded aluminium package
- Encapsulating epoxy meets UL 94 V-0, flammability classification
- 2500V isolation
- Low drain to case capacitance
- Low  $R_{DS(on)}$  HDMOS™ process
- Rugged polysilicon gate cell structure
- Unclamped Inductive Switching (UIS) rated
- Low package inductance
- Fast intrinsic Rectifier
- Conforms to SOT-227B outline

### Applications

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

### Advantages

- Easy to mount
- Space savings
- High power density

### Symbol Test Conditions

( $T_J = 25^\circ\text{C}$ , unless otherwise specified)

### Characteristic Values

|              |                                        | Min.                    | Typ. | Max.                                                                            |
|--------------|----------------------------------------|-------------------------|------|---------------------------------------------------------------------------------|
| $V_{DSS}$    | $V_{GS} = 0$ V, $I_D = 1$ mA           | 500                     |      | V                                                                               |
| $V_{GS(th)}$ | $V_{DS} = V_{GS}$ , $I_D = 8$ mA       | 2.5                     |      | 4.5 V                                                                           |
| $I_{GSS}$    | $V_{GS} = \pm 20$ V, $V_{DS} = 0$ V    |                         |      | $\pm 200$ nA                                                                    |
| $I_{DSS}$    | $V_{DS} = V_{DSS}$<br>$V_{GS} = 0$ V   |                         |      | $T_J = 25^\circ\text{C}$ : 25 $\mu\text{A}$<br>$T_J = 125^\circ\text{C}$ : 2 mA |
| $R_{DS(on)}$ | $V_{GS} = 10$ V, $I_D = I_T$<br>Note 2 | 55N50: 90<br>50N50: 100 |      | mΩ                                                                              |

| Symbol                                        | Test Conditions                                                                                | Characteristic Values |      |      |
|-----------------------------------------------|------------------------------------------------------------------------------------------------|-----------------------|------|------|
|                                               |                                                                                                | Min.                  | Typ. | Max. |
| $g_{fs}$                                      | $V_{DS} = 10\text{ V}; I_D = I_T$ Note 2                                                       |                       | 45   | S    |
| $C_{iss}$                                     | $V_{GS} = 0\text{ V}, V_{DS} = 25\text{ V}, f = 1\text{ MHz}$                                  |                       | 9400 | pF   |
| $C_{oss}$                                     |                                                                                                |                       | 1200 | pF   |
| $C_{rss}$                                     |                                                                                                |                       | 460  | pF   |
| $t_{d(on)}$<br>$t_r$<br>$t_{d(off)}$<br>$t_f$ | $V_{GS} = 10\text{ V}, V_{DS} = 0.5 \cdot V_{DSS}, I_D = I_T$<br>$R_G = 1\ \Omega$ (External), |                       | 45   | ns   |
|                                               |                                                                                                |                       | 60   | ns   |
|                                               |                                                                                                |                       | 120  | ns   |
|                                               |                                                                                                |                       | 45   | ns   |
| $Q_{g(on)}$<br>$Q_{gs}$<br>$Q_{gd}$           | $V_{GS} = 10\text{ V}, V_{DS} = 0.5 \cdot V_{DSS}, I_D = I_T$                                  |                       | 330  | nC   |
|                                               |                                                                                                |                       | 55   | nC   |
|                                               |                                                                                                |                       | 185  | nC   |
| $R_{thJC}$<br>$R_{thCK}$                      |                                                                                                |                       | 0.25 | K/W  |
|                                               |                                                                                                |                       | 0.07 | K/W  |

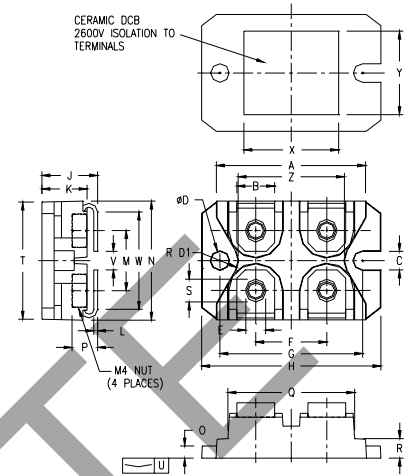
### Source-Drain Diode

( $T_J = 25^\circ\text{C}$ , unless otherwise specified)

| Symbol                           | Test Conditions                                                            | Characteristic Values |      |            |                     |
|----------------------------------|----------------------------------------------------------------------------|-----------------------|------|------------|---------------------|
|                                  |                                                                            | Min.                  | Typ. | Max.       |                     |
| $I_S$                            | $V_{GS} = 0$                                                               | 55N50<br>50N50        |      | 55<br>50   | A<br>A              |
| $I_{SM}$                         | Repetitive;<br>pulse width limited by $T_{JM}$                             | 55N50<br>50N50        |      | 220<br>200 | A<br>A              |
| $V_{SD}$                         | $I_F = I_S, V_{GS} = 0\text{ V}$ ,<br>Note 2                               |                       |      | 1.5        | V                   |
| $t_{rr}$<br>$Q_{RM}$<br>$I_{RM}$ | $I_F = 25\text{ A}, -di/dt = 100\text{ A}/\mu\text{s}, V_R = 100\text{ V}$ |                       | 1.0  | 250        | ns<br>$\mu\text{C}$ |
|                                  |                                                                            |                       | 10   |            | 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:  
IXFE55N50:  $I_T = 27.5\text{ A}$   
IXFE50N50:  $I_T = 25\text{ A}$

### 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 IXFN55N50 data sheet for characteristic curves.