

# HiPerFET™ Power MOSFETs

## ISOPLUS264™

(Electrically Isolated Backside)

IXFL 44N80

$$V_{DSS} = 800 \text{ V}$$

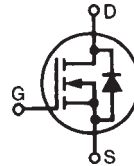
$$I_{D25} = 44 \text{ A}$$

$$R_{DS(on)} = 0.165 \text{ } \Omega$$

Single Die MOSFET

N-Channel Enhancement Mode

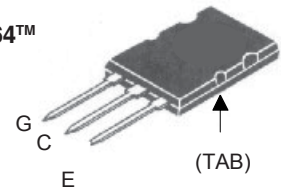
Avalanche Rated, High dv/dt, Low  $t_{rr}$



### Preliminary Data Sheet

| Symbol     | Test Conditions                                                                                                                                | Maximum Ratings |                  |
|------------|------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|------------------|
| $V_{DSS}$  | $T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$                                                                                                | 800             | V                |
| $V_{DGR}$  | $T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$ ; $R_{GS} = 1 \text{ M}\Omega$                                                                 | 800             | V                |
| $V_{GS}$   | Continuous                                                                                                                                     | $\pm 20$        | V                |
| $V_{GSM}$  | Transient                                                                                                                                      | $\pm 30$        | V                |
| $I_{D25}$  | $T_C = 25^\circ\text{C}$                                                                                                                       | 44              | A                |
| $I_{DM}$   | $T_C = 25^\circ\text{C}$ , Note 1                                                                                                              | 176             | A                |
| $I_{AR}$   | $T_C = 25^\circ\text{C}$                                                                                                                       | 44              | 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 $\leq 100 \text{ A}/\mu\text{s}$ , $V_{DD} \leq V_{DSS}$<br>$T_J \leq 150^\circ\text{C}$ , $R_G = 2 \text{ } \Omega$ | 5               | V/ns             |
| $P_D$      | $T_C = 25^\circ\text{C}$                                                                                                                       | 550             | W                |
| $T_J$      |                                                                                                                                                | -55 ... +150    | $^\circ\text{C}$ |
| $T_{JM}$   |                                                                                                                                                | 150             | $^\circ\text{C}$ |
| $T_{stg}$  |                                                                                                                                                | -55 ... +150    | $^\circ\text{C}$ |
| $T_L$      | 1.6 mm (0.063 in.) from case for 10 s                                                                                                          | 300             | $^\circ\text{C}$ |
| $V_{ISOL}$ | 50/60 Hz, RMS $t = 1 \text{ min}$<br>$I_{ISOL} \leq 1 \text{ mA}$ $t = 1 \text{ s}$                                                            | 2500<br>3000    | V~<br>V~         |
| Weight     |                                                                                                                                                | 5               | g                |

### ISOPLUS-264™



G = Gate      C = Collector  
E = Emitter    Tab = Collector

### 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<br>( $T_J = 25^\circ\text{C}$ , unless otherwise specified) |      |                           |
|--------------|-------------------------------------------------|-----------------------------------------------------------------------------------|------|---------------------------|
|              |                                                 | min.                                                                              | typ. | max.                      |
| $V_{DSS}$    | $V_{GS} = 0 \text{ V}$ , $I_D = 3 \text{ mA}$   | 800                                                                               |      | V                         |
| $V_{GS(th)}$ | $V_{DS} = V_{GS}$ , $I_D = 8 \text{ mA}$        | 2.0                                                                               |      | 4.0 V                     |
| $I_{GSS}$    | $V_{GS} = \pm 20 \text{ V}_{DC}$ , $V_{DS} = 0$ |                                                                                   |      | $\pm 100 \text{ nA}$      |
| $I_{DSS}$    | $V_{DS} = V_{DSS}$<br>$V_{GS} = 0 \text{ V}$    |                                                                                   |      | 100 $\mu\text{A}$<br>2 mA |
| $R_{DS(on)}$ | $V_{GS} = 10 \text{ V}$ , $I_D = I_T$<br>Note 1 |                                                                                   |      | 0.165 $\Omega$            |

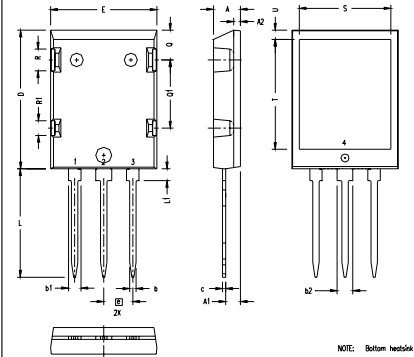
| Symbol       | Test Conditions                                                                               |        | Characteristic Values<br>( $T_J = 25^\circ\text{C}$ , unless otherwise specified) |       |           |
|--------------|-----------------------------------------------------------------------------------------------|--------|-----------------------------------------------------------------------------------|-------|-----------|
|              |                                                                                               |        | min.                                                                              | typ.  | max.      |
| $g_{fs}$     | $V_{DS} = 15\text{ V}; I_D = I_T$                                                             | Note 2 | 32                                                                                | 50    | S         |
| $C_{iss}$    | $V_{GS} = 0\text{ V}, V_{DS} = 25\text{ V}, f = 1\text{ MHz}$                                 |        |                                                                                   | 10000 | pF        |
| $C_{oss}$    |                                                                                               |        |                                                                                   | 1300  | pF        |
| $C_{rss}$    |                                                                                               |        |                                                                                   | 330   | pF        |
| $t_{d(on)}$  | $V_{GS} = 10\text{ V}, V_{DS} = 0.5 \cdot V_{DSS}, I_D = I_T$<br>$R_G = 1\ \Omega$ (External) |        |                                                                                   | 35    | ns        |
| $t_r$        |                                                                                               |        |                                                                                   | 48    | ns        |
| $t_{d(off)}$ |                                                                                               |        |                                                                                   | 100   | ns        |
| $t_f$        |                                                                                               |        |                                                                                   | 24    | ns        |
| $Q_{g(on)}$  | $V_{GS} = 10\text{ V}, V_{DS} = 0.5 \cdot V_{DSS}, I_D = I_T$                                 |        |                                                                                   | 380   | nC        |
| $Q_{gs}$     |                                                                                               |        |                                                                                   | 70    | nC        |
| $Q_{gd}$     |                                                                                               |        |                                                                                   | 170   | nC        |
| $R_{thJC}$   |                                                                                               |        |                                                                                   |       | 0.225 K/W |
| $R_{thCK}$   |                                                                                               |        | 0.05                                                                              |       | K/W       |

### Source-Drain Diode

| Symbol   | Test Conditions                                                    | Characteristic Values<br>( $T_J = 25^\circ\text{C}$ , unless otherwise specified) |      |               |
|----------|--------------------------------------------------------------------|-----------------------------------------------------------------------------------|------|---------------|
|          |                                                                    | min.                                                                              | typ. | max.          |
| $I_S$    | $V_{GS} = 0\text{ V}$                                              |                                                                                   |      | 44 A          |
| $I_{SM}$ | Repetitive;<br>pulse width limited by $T_{JM}$                     |                                                                                   |      | 176 A         |
| $V_{SD}$ | $I_F = I_S, V_{GS} = 0\text{ V}$ , Note 1                          |                                                                                   |      | 1.3 V         |
| $t_{rr}$ | $I_F = I_S, -di/dt = 100\text{ A}/\mu\text{s}, V_R = 100\text{ V}$ |                                                                                   |      | 250 ns        |
| $Q_{RM}$ |                                                                    |                                                                                   | 1.2  | $\mu\text{C}$ |
| $I_{RM}$ |                                                                    |                                                                                   | 8    | A             |

Note: 1. Pulse width limited by  $T_{JM}$   
 2. Pulse test,  $t \leq 300\ \mu\text{s}$ , duty cycle  $d \leq 2\%$   
 3. Test current  $I_T = 22\text{ A}$

### ISOPLUS 264 OUTLINE



| 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.