

# HiPerFET™ Power MOSFETs IXFR 15N80Q

## ISOPLUS247™ Q Class

(Electrically Isolated Back Surface)

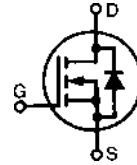
N-Channel Enhancement Mode  
Avalanche Rated, High dV/dt  
Low Gate Charge and Capacitances

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

$$I_{D25} = 13 \text{ A}$$

$$R_{DS(on)} = 0.60 \text{ } \Omega$$

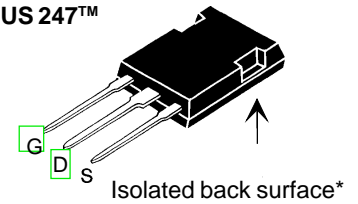
$$t_{rr} \leq 250 \text{ ns}$$



Preliminary data

| 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                |
| $I_{D25}$     | $T_C = 25^\circ\text{C}$   | 13              | A                |
| $I_{DM}$      | $T_C = 25^\circ\text{C}$ , Note 1  | 60              | A                |
| $I_{AR}$      | $T_C = 25^\circ\text{C}$   | 15              | A                |
| $E_{AR}$      | $T_C = 25^\circ\text{C}$   | 30              | mJ               |
| $E_{AS}$      | $T_C = 25^\circ\text{C}$   | 1.0             | J                |
| <b>dv/dt</b>  | $I_S \leq I_{DM}$ , $di/dt \leq 100 \text{ A}/\mu\text{s}$ , $V_{DD} \leq V_{DSS}$<br>$T_J \leq 150^\circ\text{C}$ , $R_G = 2 \text{ } \Omega$ | 5               | V/ns             |
| $P_D$         | $T_C = 25^\circ\text{C}$   | 250             | 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 (0.062 in.) from case for 10 s  | 300             | $^\circ\text{C}$ |
| $V_{ISOL}$    | 50/60 Hz, RMS $t = 1 \text{ min}$  | 2500            | V~               |
| <b>Weight</b> |  | 5               | g                |

ISOPLUS 247™



G = Gate      D = Drain  
S = Source

\* Patent pending

### Features

- Silicon chip on Direct-Copper-Bond substrate
- High power dissipation
- Isolated mounting surface
- 2500V electrical isolation
- Low drain to tab capacitance (<50pF)
- 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                        |
| $V_{GS(th)}$ | $V_{DS} = V_{GS}$ , $I_D = 4 \text{ mA}$                  | 2.0   |      | V                        |
| $I_{GSS}$    | $V_{GS} = \pm 20 \text{ V}$ , $V_{DS} = 0$                |   |      | $\pm 100 \text{ nA}$     |
| $I_{DSS}$    | $V_{DS} = V_{DSS}$ , $V_{GS} = 0 \text{ V}$               |   |      | 25 $\mu\text{A}$<br>1 mA |
| $R_{DS(on)}$ | $V_{GS} = 10 \text{ V}$ , $I_D = 7.5 \text{ A}$<br>Note 2 |   |      | 0.60 $\Omega$            |

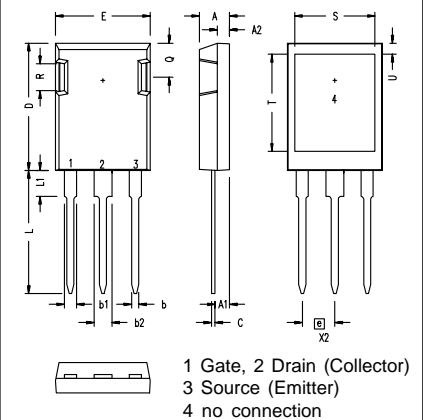
| Symbol       | Test Conditions   | Characteristic Values<br>( $T_J = 25^\circ\text{C}$ , unless otherwise specified) |      |      |
|--------------|---|---|------|------|
|              |   | min.  | typ. | max. |
| $g_{fs}$     | $V_{DS} = 10\text{ V}; I_D = 7.5\text{ A}$ Note 2   | 8   | 16   | S    |
| $C_{iss}$    | $V_{GS} = 0\text{ V}, V_{DS} = 25\text{ V}, f = 1\text{ MHz}$                                     |   | 4300 | pF   |
| $C_{oss}$    |   |   | 360  | pF   |
| $C_{rss}$    |   |   | 60   | pF   |
| $t_{d(on)}$  | $V_{GS} = 10\text{ V}, V_{DS} = 0.5 V_{DSS}, I_D = 7.5\text{ A}$<br>$R_G = 1\ \Omega$ (External), |   | 18   | ns   |
| $t_r$        |   |   | 27   | ns   |
| $t_{d(off)}$ |   |   | 53   | ns   |
| $t_f$        |   |   | 16   | ns   |
| $Q_{g(on)}$  | $V_{GS} = 10\text{ V}, V_{DS} = 0.5 V_{DSS}, I_D = 7.5\text{ A}$                                  |   | 90   | nC   |
| $Q_{gs}$     |   |   | 20   | nC   |
| $Q_{gd}$     |   |   | 30   | nC   |
| $R_{thJC}$   |   |   | 0.50 | K/W  |
| $R_{thCK}$   |   | 0.15  |      | K/W  |

### Source-Drain Diode

| Symbol   | Test Conditions  | Characteristic Values<br>( $T_J = 25^\circ\text{C}$ , unless otherwise specified) |      |               |
|----------|--|---|------|---------------|
|          |  | min.  | typ. | max.          |
| $I_S$    | $V_{GS} = 0\text{ V}$  |   |      | 15 A          |
| $I_{SM}$ | Repetitive, Note 1   |   |      | 60 A          |
| $V_{SD}$ | $I_F = I_S, 100\text{ A}, V_{GS} = 0\text{ V}$ , Note 2            |   |      | 1.5 V         |
| $t_{rr}$ | $I_F = I_S, -di/dt = 100\text{ A}/\mu\text{s}, V_R = 100\text{ V}$ |   |      | 250 ns        |
| $Q_{RM}$ |  |   | 0.8  | $\mu\text{C}$ |
| $I_{RM}$ |  |   | 7.5  | A             |

Note: 1. Pulse width limited by  $T_{JM}$   
2. Pulse test,  $t \leq 300\ \mu\text{s}$ , duty cycle  $d \leq 2\%$

### ISOPLUS 247 (IXFR) OUTLINE



| Dim.           | Millimeter |       | Inches   |      |
|----------------|------------|-------|----------|------|
|                | Min.       | Max.  | Min.     | Max. |
| A              | 4.83       | 5.21  | .190     | .205 |
| A <sub>1</sub> | 2.29       | 2.54  | .090     | .100 |
| A <sub>2</sub> | 1.91       | 2.16  | .075     | .085 |
| b              | 1.14       | 1.40  | .045     | .055 |
| b <sub>1</sub> | 1.91       | 2.13  | .075     | .084 |
| b <sub>2</sub> | 2.92       | 3.12  | .115     | .123 |
| C              | 0.61       | 0.80  | .024     | .031 |
| D              | 20.80      | 21.34 | .819     | .840 |
| E              | 15.75      | 16.13 | .620     | .635 |
| e              | 5.45 BSC   |       | .215 BSC |      |
| L              | 19.81      | 20.32 | .780     | .800 |
| L1             | 3.81       | 4.32  | .150     | .170 |
| Q              | 5.59       | 6.20  | .220     | .244 |
| R              | 4.32       | 4.83  | .170     | .190 |
| S              | 13.21      | 13.72 | .520     | .540 |
| T              | 15.75      | 16.26 | .620     | .640 |
| U              | 1.65       | 3.03  | .065     | .080 |