

# HiPerFET™

## ISOPLUS 220™ MOSFET

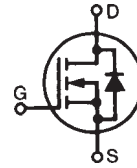
### Q-Class

### Electrically Isolated Back Surface

IXFC 15N80Q

$V_{DSS} = 800 \text{ V}$   
 $I_{D25} = 13 \text{ A}$   
 $R_{DS(on)} = 0.65 \Omega$   
 $t_{rr} \leq 250 \text{ ns}$

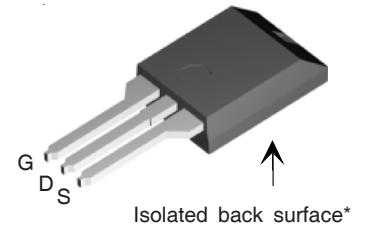
N-Channel Enhancement Mode  
 Avalanche Rated, High dv/dt, Low  $Q_g$



| 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                |
| $I_{DM}$   | $T_C = 25^\circ\text{C}$ , pulse width limited by $T_{JM}$                                                                              | 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                |
| $dv/dt$    | $I_S \leq I_{DM}$ , $di/dt \leq 100 \text{ A}/\mu\text{s}$ , $V_{DD} \leq V_{DSS}$ ,<br>$T_J \leq 150^\circ\text{C}$ , $R_G = 2 \Omega$ | 10                 | V/ns             |
| $P_D$      | $T_C = 25^\circ\text{C}$                                                                                                                | 230                | W                |
| $T_J$      |                                                                                                                                         | -40 ... +150       | $^\circ\text{C}$ |
| $T_{JM}$   |                                                                                                                                         | 150                | $^\circ\text{C}$ |
| $T_{stg}$  |                                                                                                                                         | -40 ... +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 $t = 1 \text{ min}$ leads to tab                                                                                          | 2500               | V                |
| $F_C$      | mounting force with clip                                                                                                                | 11...65 / 2.5...15 | N/lb             |
| Weight     |                                                                                                                                         | 2                  | g                |

| Symbol       | Test Conditions<br>( $T_J = 25^\circ\text{C}$ , unless otherwise specified)                                      | Characteristic Values |      |                          |
|--------------|------------------------------------------------------------------------------------------------------------------|-----------------------|------|--------------------------|
|              |                                                                                                                  | 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                   |      | 4.5 V                    |
| $I_{GSS}$    | $V_{GS} = \pm 20 \text{ V}_{DC}$ , $V_{DS} = 0$                                                                  |                       |      | $\pm 100 \text{ nA}$     |
| $I_{DSS}$    | $V_{DS} = V_{DSS}$ , $T_J = 25^\circ\text{C}$<br>$V_{GS} = 0 \text{ V}$ , $T_J = 125^\circ\text{C}$              |                       |      | 25 $\mu\text{A}$<br>1 mA |
| $R_{DS(on)}$ | $V_{GS} = 10 \text{ V}$ , $I_D = 0.5 I_{D25}$<br>Pulse test, $t \leq 300 \mu\text{s}$ , duty cycle $d \leq 2 \%$ |                       |      | 0.65 $\Omega$            |

ISOPLUS220™



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 (<35pF)
- Low  $R_{DS(on)}$
- 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: no screws or isolation foils required
- Space savings
- High power density

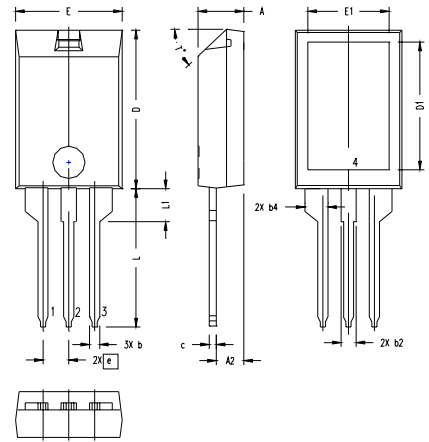
See IXFH15N80Q data sheet for characteristic curves

| Symbol       | Test Conditions                                                                                   | Characteristic Values<br>( $T_J = 25^\circ\text{C}$ , unless otherwise specified) |      |          |
|--------------|---------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------|----------|
|              |                                                                                                   | Min.                                                                              | Typ. | Max.     |
| $g_{fs}$     | $V_{DS} = 10\text{ V}; I_D = 0.5 I_{D25}$ , pulse test                                            | 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       |
| $t_{d(on)}$  | $V_{GS} = 10\text{ V}, V_{DS} = 0.5 V_{DSS}, I_D = 0.5 I_{D25}$<br>$R_G = 1.5\ \Omega$ (External) |                                                                                   | 18   | ns       |
| $t_r$        |                                                                                                   |                                                                                   | 27   | ns       |
| $t_{d(off)}$ |                                                                                                   |                                                                                   | 53   | ns       |
| $t_f$        |                                                                                                   |                                                                                   | 16   | ns       |
| $Q_{g(on)}$  | $V_{GS} = 10\text{ V}, V_{DS} = 0.5 V_{DSS}, I_D = 0.5 I_{D25}$                                   |                                                                                   | 90   | nC       |
| $Q_{gs}$     |                                                                                                   |                                                                                   | 20   | nC       |
| $Q_{gd}$     |                                                                                                   |                                                                                   | 30   | nC       |
| $R_{thJC}$   | (TO-247)                                                                                          |                                                                                   | 0.25 | 0.54 K/W |
| $R_{thCK}$   |                                                                                                   |                                                                                   |      | 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;                                                                                           |                                                                                   |      | 60 A          |
| $V_{SD}$ | $I_F = I_S, V_{GS} = 0\text{ V}$ ,<br>Pulse test, $t \leq 300\ \mu\text{s}$ , duty cycle $d \leq 2\%$ |                                                                                   |      | 1.5 V         |
| $t_{rr}$ | $I_F = I_S - di/dt = 100\text{ A}/\mu\text{s}, V_R = 100\text{ V}$                                    |                                                                                   | 0.85 | 250 ns        |
| $Q_{RM}$ |                                                                                                       |                                                                                   |      | $\mu\text{C}$ |
| $I_{RM}$ |                                                                                                       |                                                                                   |      | A             |

## ISOPLUS220 Outline



| SYM | INCHES |       | MILLIMETERS |       |
|-----|--------|-------|-------------|-------|
|     | MIN    | MAX   | MIN         | MAX   |
| A   | .157   | .197  | 4.00        | 5.00  |
| A2  | .098   | .118  | 2.50        | 3.00  |
| b   | .035   | .051  | 0.90        | 1.30  |
| b2  | .049   | .065  | 1.25        | 1.65  |
| b4  | .093   | .100  | 2.35        | 2.55  |
| c   | .028   | .039  | 0.70        | 1.00  |
| D   | .591   | .630  | 15.00       | 16.00 |
| D1  | .472   | .512  | 12.00       | 13.00 |
| E   | .394   | .433  | 10.00       | 11.00 |
| E1  | .295   | .335  | 7.50        | 8.50  |
| e   | .100   | BASIC | 2.55        | BASIC |
| L   | .512   | .571  | 13.00       | 14.50 |
| L1  | .118   | .138  | 3.00        | 3.50  |
| T*  |        |       | 42.5°       | 47.5° |

### NOTE:

1. Bottom heatsink (Pin 4) is electrically isolated from Pin 1, 2, or 3.
2. This drawing will meet dimensional requirement of JEDEC SS Product Outline 10-273 except D and D1 dimension.