

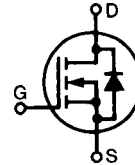
# HiPerFET™ MOSFET ISOPLUS220™

Electrically Isolated Back Surface

N-Channel Enhancement Mode  
High dv/dt, Low  $t_{rr}$ , HDMOS™ Family

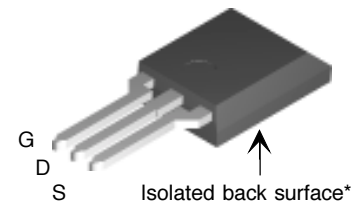
IXFC 80N08  
IXFC 80N085

| $V_{DSS}$ | $I_{D25}$ | $R_{DS(on)}$ |
|-----------|-----------|--------------|
| 80 V      | 80 A      | 9 mΩ         |
| 85 V      | 80 A      | 9 mΩ         |



| Symbol       | Test Conditions   | Maximum Ratings |                               |
|--------------|---|-----------------|-------------------------------|
| $V_{DSS}$    | $T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$   | 80N08           | 80 V                          |
| $V_{DGR}$    | $T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$ ; $R_{GS} = 1\text{ M}\Omega$   | 80N085          | 85 V                          |
| $V_{GS}$     | Continuous  |                 | $\pm 20$ V                    |
| $V_{GSM}$    | Transient   |                 | $\pm 30$ V                    |
| $I_{D25}$    | $T_C = 25^\circ\text{C}$  |                 | 80 A                          |
| $I_{L(RMS)}$ | Lead current limit  |                 | 80 A                          |
| $I_{DM}$     | $T_C = 25^\circ\text{C}$ , pulse width limited by $T_{JM}$  |                 | 75 A                          |
| $I_{AR}$     | $T_C = 25^\circ\text{C}$  |                 | 320 A                         |
| $E_{AR}$     | $T_C = 25^\circ\text{C}$  |                 | 30 mJ                         |
| $E_{AS}$     |   |                 | 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>$T_J \leq 150^\circ\text{C}$ , $R_G = 2\ \Omega$ |                 | 5 V/ns                        |
| $P_D$        | $T_C = 25^\circ\text{C}$  |                 | 230 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 $^\circ\text{C}$          |
| $F_C$        | Mounting force  |                 | 11..65/2.4..11 Nm/lb          |
| $V_{ISOL}$   | 50/60 Hz, RMS $t = 1$ minute leads-to-tab   |                 | 2500 V~                       |
| Weight       |   |                 | 2 g                           |

## ISOPLUS220™



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 (<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
- Low collector capacitance to ground (low EMI)

| Symbol       | Test Conditions                                    | Characteristic Values<br>( $T_J = 25^\circ\text{C}$ , unless otherwise specified) |      |                          |
|--------------|--|---|------|--------------------------|
|              |  | min.  | typ. | max.                     |
| $V_{DSS}$    | $V_{GS} = 0\text{ V}$ , $I_D = 250\ \mu\text{A}$   | 80N08 80<br>80N085 85   |      | V                        |
| $V_{GS(th)}$ | $V_{DS} = V_{GS}$ , $I_D = 4\text{ mA}$            | 2.0   |      | 4.0 V                    |
| $I_{GSS}$    | $V_{GS} = \pm 20\text{ V}_{DC}$ , $V_{DS} = 0$     |   |      | $\pm 100\text{ nA}$      |
| $I_{DSS}$    | $V_{DS} = V_{DSS}$ , $V_{GS} = 0\text{ V}$         | $T_J = 25^\circ\text{C}$<br>$T_J = 125^\circ\text{C}$                             |      | 50 $\mu\text{A}$<br>1 mA |
| $R_{DS(on)}$ | $V_{GS} = 10\text{ V}$ , $I_D = I_T$<br>Notes 1, 2 |   |      | 9 mΩ                     |

| Symbol       | Test Conditions   | Characteristic Values<br>( $T_J = 25^\circ\text{C}$ , unless otherwise specified) |      |      |
|--------------|---|---|------|------|
|              |   | min.  | typ. | max. |
| $g_{fs}$     | $V_{DS} = 10\text{ V}$ ; $I_D = I_T$ Notes 1, 2   | 35  | 55   | S    |
| $C_{iss}$    | $V_{GS} = 0\text{ V}$ , $V_{DS} = 25\text{ V}$ , $f = 1\text{ MHz}$                                       |   | 4800 | pF   |
| $C_{oss}$    |   |   | 1675 | pF   |
| $C_{rss}$    |   |   | 590  | pF   |
| $t_{d(on)}$  | $V_{GS} = 10\text{ V}$ , $V_{DS} = 0.5 V_{DSS}$ ,<br>$I_D = 0.5 I_{D25}$ , $R_G = 2.5\ \Omega$ (External) |   | 50   | ns   |
| $t_r$        |   |   | 75   | ns   |
| $t_{d(off)}$ |   |   | 95   | ns   |
| $t_f$        |   |   | 31   | ns   |
| $Q_{g(on)}$  | $V_{GS} = 10\text{ V}$ , $V_{DS} = 0.5 V_{DSS}$ , $I_D = I_T$<br>Notes 2                                  |   | 180  | nC   |
| $Q_{gs}$     |   |   | 42   | nC   |
| $Q_{gd}$     |   |   | 75   | nC   |
| $R_{thJC}$   |   |   | 0.54 | K/W  |
| $R_{thCK}$   |   | 0.25  |      | K/W  |

| Symbol   | Test Conditions   | Characteristic Values<br>( $T_J = 25^\circ\text{C}$ , unless otherwise specified) |      |               |
|----------|---|---|------|---------------|
|          |   | min.  | typ. | max.          |
| $I_S$    | $V_{GS} = 0\text{ V}$   |   |      | 80 A          |
| $I_{SM}$ | Repetitive; pulse width limited by $T_{JM}$   |   |      | 320 A         |
| $V_{SD}$ | $I_F = I_S$ , $V_{GS} = 0\text{ V}$ ,<br>Note 1                                     |   |      | 1.5 V         |
| $t_{rr}$ | $I_F = 25\text{ A}$<br>$-di/dt = 100\text{ A}/\mu\text{s}$ ,<br>$V_R = 50\text{ V}$ |   |      | 200 ns        |
| $Q_{RM}$ |   |   | 0.5  | $\mu\text{C}$ |
| $I_{RM}$ |   |   | 6    | A             |

Note: 1. Pulse test,  $t \leq 300\ \mu\text{s}$ , duty cycle  $d \leq 2\%$   
 2.  $I_T = 40\text{ A}$

**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  |
| L4  | .039       | .059 | 1.00        | 1.50  |
| T*  |            |      | 42.5°       | 47.5° |

Note: All terminals are solder plated.  
 1 - Gate  
 2 - Drain  
 3 - Source

IXYS reserves the right to change limits, test conditions, and dimensions.

IXYS MOSFETS and IGBTs are covered by one or more of the following U.S. patents: 4,835,592 4,881,106 5,017,508 5,049,961 5,187,117 5,486,715  
 4,850,072 4,931,844 5,034,796 5,063,307 5,237,481 5,381,025