

# HiPerFET™ Power MOSFETs IXFR 180N085

## ISOPLUS247™

(Electrically Isolated Back Surface)

$$V_{DSS} = 85 \text{ V}$$

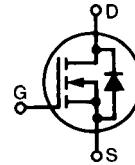
$$I_{D25} = 180 \text{ A}$$

$$R_{DS(on)} = 7 \text{ m}\Omega$$

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

Single MOSFET Die

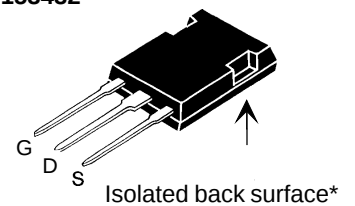
Preliminary data sheet



| Symbol       | Test Conditions                                                                                                                       | Maximum Ratings |                  |
|--------------|---------------------------------------------------------------------------------------------------------------------------------------|-----------------|------------------|
| $V_{DSS}$    | $T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$                                                                                       | 85              | V                |
| $V_{DGR}$    | $T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$ ; $R_{GS} = 1 \text{ M}\Omega$                                                        | 85              | V                |
| $V_{GS}$     | Continuous                                                                                                                            | $\pm 20$        | V                |
| $V_{GSM}$    | Transient                                                                                                                             | $\pm 30$        | V                |
| $I_{D25}$    | $T_C = 25^\circ\text{C}$ (MOSFET chip capability)                                                                                     | 180             | A                |
| $I_{D(RMS)}$ | External lead current limit                                                                                                           | 76              | A                |
| $I_{DM}$     | $T_C = 25^\circ\text{C}$ , Note 1                                                                                                     | 720             | A                |
| $I_{AR}$     | $T_C = 25^\circ\text{C}$                                                                                                              | 180             | A                |
| $E_{AR}$     | $T_C = 25^\circ\text{C}$                                                                                                              | 60              | mJ               |
| $E_{AS}$     | $T_C = 25^\circ\text{C}$                                                                                                              | 3               | 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             |
| $P_D$        | $T_C = 25^\circ\text{C}$                                                                                                              | 400             | 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 $t = 1 \text{ min}$                                                                                                     | 2500            | V~               |
| Weight       |                                                                                                                                       | 5               | g                |

ISOPLUS 247™

 E153432



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(<25pF)
- 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.                      |
| $V_{DSS}$    | $V_{GS} = 0 \text{ V}$ , $I_D = 3 \text{ mA}$           | 85                                                                                |      | V                         |
| $V_{GS(th)}$ | $V_{DS} = V_{GS}$ , $I_D = 8 \text{ mA}$                | 2.0                                                                               |      | 4.0 V                     |
| $I_{GSS}$    | $V_{GS} = \pm 20 \text{ V}$ , $V_{DS} = 0$              |                                                                                   |      | $\pm 100 \text{ nA}$      |
| $I_{DS}$     | $V_{DS} = V_{DSS}$<br>$V_{GS} = 0 \text{ V}$            |                                                                                   |      | 100 $\mu\text{A}$<br>2 mA |
| $R_{DS(on)}$ | $V_{GS} = 10 \text{ V}$ , $I_D = 0.5 I_{D25}$<br>Note 1 |                                                                                   |      | 7 m $\Omega$              |

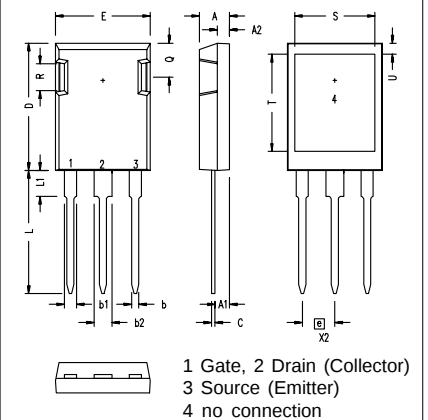
| Symbol       | Test Conditions                                                                                       |        | Characteristic Values<br>( $T_J = 25^\circ\text{C}$ , unless otherwise specified) |      |      |
|--------------|-------------------------------------------------------------------------------------------------------|--------|-----------------------------------------------------------------------------------|------|------|
|              |                                                                                                       |        | min.                                                                              | typ. | max. |
| $g_{fs}$     | $V_{DS} = 10\text{ V}; I_D = 60\text{ A}$                                                             | Note 2 | 55                                                                                | 90   | S    |
| $C_{iss}$    | $V_{GS} = 0\text{ V}, V_{DS} = 25\text{ V}, f = 1\text{ MHz}$                                         |        |                                                                                   | 9100 | pF   |
| $C_{oss}$    |                                                                                                       |        |                                                                                   | 4000 | pF   |
| $C_{rss}$    |                                                                                                       |        |                                                                                   | 2000 | pF   |
| $t_{d(on)}$  | $V_{GS} = 10\text{ V}, V_{DS} = 0.5 \cdot V_{DSS}, I_D = 0.5 I_{D25}$<br>$R_G = 1\ \Omega$ (External) |        |                                                                                   | 65   | ns   |
| $t_r$        |                                                                                                       |        |                                                                                   | 90   | ns   |
| $t_{d(off)}$ |                                                                                                       |        |                                                                                   | 140  | ns   |
| $t_f$        |                                                                                                       |        |                                                                                   | 55   | ns   |
| $Q_{g(on)}$  | $V_{GS} = 10\text{ V}, V_{DS} = 0.5 \cdot V_{DSS}, I_D = 0.5 I_{D25}$                                 |        |                                                                                   | 320  | nC   |
| $Q_{gs}$     |                                                                                                       |        |                                                                                   | 65   | nC   |
| $Q_{gd}$     |                                                                                                       |        |                                                                                   | 170  | nC   |
| $R_{thJC}$   |                                                                                                       |        |                                                                                   | 0.30 | 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.          |
| $I_S$    | $V_{GS} = 0\text{ V}$                                                     |  |                                                                                   |      | 180 A         |
| $I_{SM}$ | Repetitive;<br>pulse width limited by $T_{JM}$                            |  |                                                                                   |      | 720 A         |
| $V_{SD}$ | $I_F = 100\text{ A}, V_{GS} = 0\text{ V}$ , Note 1                        |  |                                                                                   |      | 1.3 V         |
| $t_{rr}$ | $I_F = 50\text{ A}, -di/dt = 100\text{ A}/\mu\text{s}, V_R = 50\text{ V}$ |  |                                                                                   | 1.2  | 250 ns        |
| $Q_{RM}$ |                                                                           |  |                                                                                   |      | $\mu\text{C}$ |
| $I_{RM}$ |                                                                           |  |                                                                                   |      | 10 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 |



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