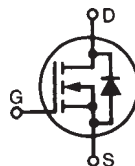


## HiPerFET™ Power MOSFET

(Electrically Isolated Tab)

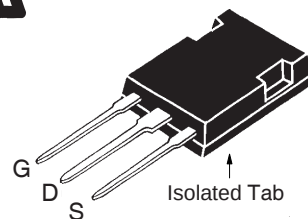
N-Channel Enhancement Mode  
Avalanche Rated  
Fast Intrinsic Rectifier

### IXFR90N30



$$\begin{aligned} V_{DSS} &= 300V \\ I_{D25} &= 75A \\ R_{DS(on)} &\leq 36m\Omega \\ t_{rr} &\leq 250ns \end{aligned}$$

ISOPLUS247  
E153432



G = Gate      D = Drain  
S = Source

| Symbol     | Test Conditions                                                          | Maximum Ratings |                  |
|------------|--------------------------------------------------------------------------|-----------------|------------------|
| $V_{DSS}$  | $T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$                          | 300             | V                |
| $V_{DGR}$  | $T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$ , $R_{GS} = 1M\Omega$    | 300             | V                |
| $V_{GSS}$  | Continuous                                                               | $\pm 20$        | V                |
| $V_{GSM}$  | Transient                                                                | $\pm 30$        | V                |
| $I_{D25}$  | $T_C = 25^\circ\text{C}$                                                 | 75              | A                |
| $I_{DM}$   | $T_C = 25^\circ\text{C}$ , Pulse Width Limited by $T_{JM}$               | 360             | A                |
| $I_A$      | $T_C = 25^\circ\text{C}$                                                 | 90              | A                |
| $E_{AS}$   | $T_C = 25^\circ\text{C}$                                                 | 3               | J                |
| $dv/dt$    | $I_S \leq I_{DM}$ , $V_{DD} \leq V_{DSS}$ , $T_J \leq 150^\circ\text{C}$ | 5               | V/ns             |
| $P_D$      | $T_C = 25^\circ\text{C}$                                                 | 417             | W                |
| $T_J$      |                                                                          | - 55 ... +150   | $^\circ\text{C}$ |
| $T_{JM}$   |                                                                          | 150             | $^\circ\text{C}$ |
| $T_{stg}$  |                                                                          | - 55 ... +150   | $^\circ\text{C}$ |
| $T_L$      | Maximum Lead Temperature for Soldering                                   | 300             | $^\circ\text{C}$ |
| $T_{SOLD}$ | Plastic Body for 10s                                                     | 260             | $^\circ\text{C}$ |
| $V_{ISOL}$ | 50/60 Hz, 1 Minute                                                       | 2500            | V~               |
| $F_C$      | Mounting Force                                                           | 20..120/4.5..27 | N/lb             |
| Weight     |                                                                          | 5               | g                |

### Features

- Silicon Chip on Direct-Copper Bond (DCB) Substrate
- Isolated Mounting Surface
- 2500V~ Electrical Isolation
- Avalanche Rated
- Fast Intrinsic Rectifier
- Low  $R_{DS(ON)}$  and  $Q_G$

### Advantages

- Easy to Mount
- Space Savings
- High Power Density

### Applications

- DC-DC Converters
- Battery Chargers
- Switch-Mode and Resonant-Mode Power Supplies
- DC Choppers
- AC & DC Motor Controls

| Symbol       | Test Conditions<br>( $T_J = 25^\circ\text{C}$ , Unless Otherwise Specified) | Characteristic Values |      |                     |
|--------------|-----------------------------------------------------------------------------|-----------------------|------|---------------------|
|              |                                                                             | Min.                  | Typ. | Max.                |
| $BV_{DSS}$   | $V_{GS} = 0V$ , $I_D = 250\mu A$                                            | 300                   |      | V                   |
| $V_{GS(th)}$ | $V_{DS} = V_{GS}$ , $I_D = 4mA$                                             | 2.0                   |      | 4.5 V               |
| $I_{GSS}$    | $V_{GS} = \pm 20V$ , $V_{DS} = 0V$                                          |                       |      | $\pm 100$ nA        |
| $I_{DSS}$    | $V_{DS} = V_{DSS}$ , $V_{GS} = 0V$<br>$T_J = 125^\circ\text{C}$             |                       |      | 100 $\mu A$<br>2 mA |
| $R_{DS(on)}$ | $V_{GS} = 10V$ , $I_D = 45A$ , Note 1                                       |                       |      | 36 m $\Omega$       |

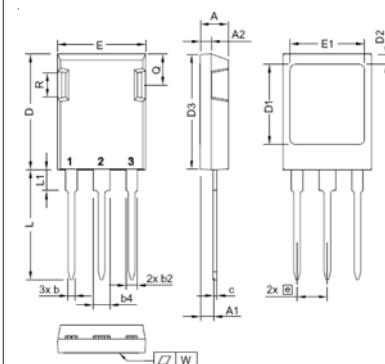
| Symbol       | Test Conditions<br>( $T_J = 25^{\circ}\text{C}$ , Unless Otherwise Specified)                                                               | Characteristic Values |      |                          |
|--------------|---------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|------|--------------------------|
|              |                                                                                                                                             | Min.                  | Typ. | Max.                     |
| $g_{fs}$     | $V_{DS} = 10\text{V}$ , $I_D = 45\text{A}$ , Note 1                                                                                         | 40                    | 70   | S                        |
| $C_{iss}$    | $V_{GS} = 0\text{V}$ , $V_{DS} = 25\text{V}$ , $f = 1\text{MHz}$                                                                            |                       | 10   | nF                       |
| $C_{oss}$    |                                                                                                                                             |                       | 1800 | pF                       |
| $C_{rss}$    |                                                                                                                                             |                       | 700  | pF                       |
| $t_{d(on)}$  | <b>Resistive Switching Times</b><br>$V_{GS} = 10\text{V}$ , $V_{DS} = 0.5 \cdot V_{DSS}$ , $I_D = 45\text{A}$<br>$R_G = 2\Omega$ (External) |                       | 42   | ns                       |
| $t_r$        |                                                                                                                                             |                       | 55   | ns                       |
| $t_{d(off)}$ |                                                                                                                                             |                       | 100  | ns                       |
| $t_f$        |                                                                                                                                             |                       | 40   | ns                       |
| $Q_{g(on)}$  | $V_{GS} = 10\text{V}$ , $V_{DS} = 0.5 \cdot V_{DSS}$ , $I_D = 45\text{A}$                                                                   |                       | 360  | nC                       |
| $Q_{gs}$     |                                                                                                                                             |                       | 60   | nC                       |
| $Q_{gd}$     |                                                                                                                                             |                       | 180  | nC                       |
| $R_{thJC}$   |                                                                                                                                             |                       |      | $0.30^{\circ}\text{C/W}$ |
| $R_{thCS}$   |                                                                                                                                             | 0.15                  |      | $^{\circ}\text{C/W}$     |

## Source-Drain Diode

| Symbol   | Test Conditions<br>( $T_J = 25^{\circ}\text{C}$ , Unless Otherwise Specified)                           | Characteristic Values |      |               |
|----------|---------------------------------------------------------------------------------------------------------|-----------------------|------|---------------|
|          |                                                                                                         | Min.                  | Typ. | Max.          |
| $I_S$    | $V_{GS} = 0\text{V}$                                                                                    |                       |      | 90 A          |
| $I_{SM}$ | Repetitive, Pulse Width Limited by $T_{JM}$                                                             |                       |      | 360 A         |
| $V_{SD}$ | $I_F = 45\text{A}$ , $V_{GS} = 0\text{V}$ , Note 1                                                      |                       |      | 1.5 V         |
| $t_{rr}$ | $I_F = 50\text{A}$ , $-di/dt = -100\text{A}/\mu\text{s}$<br>$V_R = -100\text{V}$ , $V_{GS} = 0\text{V}$ |                       |      | 250 ns        |
| $Q_{RM}$ |                                                                                                         | 1.4                   |      | $\mu\text{C}$ |
| $I_{RM}$ |                                                                                                         | 10                    |      | A             |

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

## ISOPLUS247 (IXFR) Outline



- 1 - Gate
- 2 - Drain
- 3 - Source

| Dim. | Millimeter |       | Inches    |       |
|------|------------|-------|-----------|-------|
|      | min        | max   | min       | max   |
| A    | 4.83       | 5.21  | 0.190     | 0.205 |
| A1   | 2.29       | 2.54  | 0.090     | 0.100 |
| A2   | 1.91       | 2.16  | 0.075     | 0.085 |
| b    | 1.14       | 1.40  | 0.045     | 0.055 |
| b2   | 1.91       | 2.20  | 0.075     | 0.087 |
| b4   | 2.92       | 3.24  | 0.115     | 0.128 |
| c    | 0.61       | 0.83  | 0.024     | 0.033 |
| D    | 20.80      | 21.34 | 0.819     | 0.840 |
| D1   | 15.75      | 16.26 | 0.620     | 0.640 |
| D2   | 1.65       | 2.15  | 0.065     | 0.085 |
| D3   | 20.30      | 20.70 | 0.799     | 0.815 |
| E    | 15.75      | 16.13 | 0.620     | 0.635 |
| E1   | 13.21      | 13.72 | 0.520     | 0.540 |
| e    | 5.45 BSC   |       | 0.215 BSC |       |
| L    | 19.81      | 20.60 | 0.780     | 0.811 |
| L1   | 3.81       | 4.38  | 0.150     | 0.172 |
| Q    | 5.59       | 6.20  | 0.220     | 0.244 |
| R    | 4.25       | 5.50  | 0.167     | 0.217 |
| W    | -          | 0.10  | -         | 0.004 |

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 | 4,931,844 | 5,049,961 | 5,237,481 | 6,162,665    | 6,404,065 B1 | 6,683,344    | 6,727,585    | 7,005,734 B2 | 7,157,338B2 |
| 4,860,072 | 5,017,508 | 5,063,307 | 5,381,025 | 6,259,123 B1 | 6,534,343    | 6,710,405 B2 | 6,759,692    | 7,063,975 B2 |             |
| 4,881,106 | 5,034,796 | 5,187,117 | 5,486,715 | 6,306,728 B1 | 6,583,505    | 6,710,463    | 6,771,478 B2 | 7,071,537    |             |



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