



## Advanced Technical Information

# HiPerFET™

## Power MOSFETs

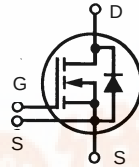
### Single Die MOSFET

N-Channel Enhancement Mode  
Avalanche Rated, High dv/dt, Low  $t_{rr}$

IXFN90N30

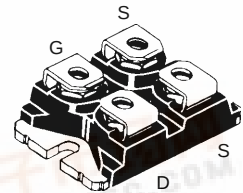
$$\begin{aligned} V_{DSS} &= 300 \text{ V} \\ I_{D25} &= 90 \text{ A} \\ R_{DS(on)} &= 33 \text{ m}\Omega \end{aligned}$$

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



| 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 $150^\circ\text{C}$ ; $R_{GS} = 1 \text{ M}\Omega$                                                          | 300             | V                |
| $V_{GS}$   | Continuous                                                                                                                              | $\pm 20$        | V                |
| $V_{GSM}$  | Transient                                                                                                                               | $\pm 30$        | V                |
| $I_{D25}$  | $T_C = 25^\circ\text{C}$                                                                                                                | 90              | A                |
| $I_{DM}$   | $T_C = 25^\circ\text{C}$ , pulse width limited by $T_{JM}$                                                                              | 360             | A                |
| $I_{AR}$   | $T_C = 25^\circ\text{C}$                                                                                                                | 90              | A                |
| $E_{AR}$   | $T_C = 25^\circ\text{C}$                                                                                                                | 64              | 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             |
| $P_D$      | $T_C = 25^\circ\text{C}$                                                                                                                | 560             | W                |
| $T_J$      |                                                                                                                                         | -55 ... +150    | $^\circ\text{C}$ |
| $T_{JM}$   |                                                                                                                                         | 150             | $^\circ\text{C}$ |
| $T_{stg}$  |                                                                                                                                         | -55 ... +150    | $^\circ\text{C}$ |
| $T_J$      | 1.6 mm (0.63 in) from case for 10 s                                                                                                     | -               | $^\circ\text{C}$ |
| $V_{ISOL}$ | 50/60 Hz, RMS $t = 1 \text{ min}$                                                                                                       | 2500            | V~               |
|            | $I_{ISOL} \leq 1 \text{ mA}$ $t = 1 \text{ s}$                                                                                          | 3000            | V~               |
| $M_d$      | Mounting torque                                                                                                                         | 1.5/13          | Nm/lb.in.        |
|            | Terminal connection torque                                                                                                              | 1.5/13          | Nm/lb.in.        |
| Weight     |                                                                                                                                         | 30              | g                |

miniBLOC, SOT-227 B (IXFN)  
E153432



G = Gate  
S = Source  
D = Drain  
TAB = Drain

Either Source terminal at miniBLOC can be used as Main or Kelvin Source

#### Features

- International standard package
- miniBLOC, with Aluminium nitride isolation
- Low  $R_{DS(on)}$  HDMOS™ process
- Rugged polysilicon gate cell structure
- Unclamped Inductive Switching (UIS) rated
- Low package inductance
- Fast intrinsic Rectifier

#### Applications

- DC-DC converters
- Battery chargers
- Switched-mode and resonant-mode power supplies
- DC choppers
- Temperature and lighting controls

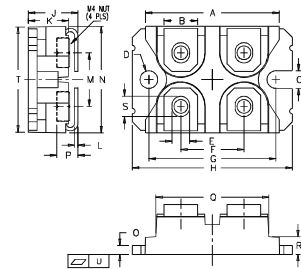
#### Advantages

- Easy to mount
- Space savings
- High power density

| Symbol       | Test Conditions                                                                                                       | Characteristic Values<br>( $T_J = 25^\circ\text{C}$ , unless otherwise specified) |      |                      |
|--------------|-----------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------|----------------------|
|              |                                                                                                                       | min.                                                                              | typ. | max.                 |
| $V_{DSS}$    | $V_{GS} = 0 \text{ V}$ , $I_D = 3 \text{ mA}$                                                                         | 300                                                                               |      | V                    |
| $V_{GH(th)}$ | $V_{DS} = V_{GS}$ , $I_D = 8 \text{ mA}$                                                                              | 2                                                                                 |      | V                    |
| $I_{GSS}$    | $V_{GS} = \pm 20 \text{ V}_{DC}$ , $V_{DS} = 0$                                                                       |                                                                                   |      | $\pm 100 \text{ nA}$ |
| $I_{DSS}$    | $V_{DS} = V_{DSS}$ , $T_J = 25^\circ\text{C}$                                                                         |                                                                                   |      | 100 $\mu\text{A}$    |
|              | $V_{GS} = 0 \text{ V}$ , $T_J = 125^\circ\text{C}$                                                                    |                                                                                   |      | 2 mA                 |
| $R_{DS(on)}$ | $V_{GS} = 10 \text{ V}$ , $I_D = 0.5 \cdot I_{D25}$<br>Pulse test, $t \leq 300 \mu\text{s}$ , duty cycle $d \leq 2\%$ |                                                                                   |      | 33 m $\Omega$        |

| Symbol                    | Test Conditions                                                                                                                                | Characteristic Values<br>(T <sub>j</sub> = 25°C, unless otherwise specified) |       |      |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------|-------|------|
|                           |                                                                                                                                                | min.                                                                         | typ.  | max. |
| <b>g<sub>fs</sub></b>     | V <sub>DS</sub> = 10 V; I <sub>D</sub> = 0.5 • I <sub>D25</sub> , pulse test                                                                   | 40                                                                           | 70    | S    |
| <b>C<sub>iss</sub></b>    | V <sub>GS</sub> = 0 V, V <sub>DS</sub> = 25 V, f = 1 MHz                                                                                       |                                                                              | 10000 | pF   |
| <b>C<sub>oss</sub></b>    |                                                                                                                                                |                                                                              | 1800  | pF   |
| <b>C<sub>rss</sub></b>    |                                                                                                                                                |                                                                              | 700   | pF   |
| <b>t<sub>d(on)</sub></b>  | V <sub>GS</sub> = 10 V, V <sub>DS</sub> = 0.5 • V <sub>DSS</sub> , I <sub>D</sub> = 0.5 • I <sub>D25</sub><br>R <sub>G</sub> = 1 Ω (External), |                                                                              | 42    | ns   |
| <b>t<sub>r</sub></b>      |                                                                                                                                                |                                                                              | 55    | ns   |
| <b>t<sub>d(off)</sub></b> |                                                                                                                                                |                                                                              | 100   | ns   |
| <b>t<sub>f</sub></b>      |                                                                                                                                                |                                                                              | 40    | ns   |
| <b>Q<sub>g(on)</sub></b>  | V <sub>GS</sub> = 10 V, V <sub>DS</sub> = 0.5 • V <sub>DSS</sub> , I <sub>D</sub> = 0.5 • I <sub>D25</sub>                                     |                                                                              | 360   | nC   |
| <b>Q<sub>gs</sub></b>     |                                                                                                                                                |                                                                              | 60    | nC   |
| <b>Q<sub>gd</sub></b>     |                                                                                                                                                |                                                                              | 180   | nC   |
| <b>R<sub>thJC</sub></b>   |                                                                                                                                                |                                                                              | 0.22  | K/W  |
| <b>R<sub>thCK</sub></b>   |                                                                                                                                                |                                                                              | 0.05  | K/W  |

## miniBLOC, SOT-227 B



M4 screws (4x) supplied

| Dim. | Millimeter<br>Min. | Max.  | Inches<br>Min. | Max.  |
|------|--------------------|-------|----------------|-------|
| A    | 31.50              | 31.88 | 1.240          | 1.255 |
| B    | 7.80               | 8.20  | 0.307          | 0.323 |
| C    | 4.09               | 4.29  | 0.161          | 0.169 |
| D    | 4.09               | 4.29  | 0.161          | 0.169 |
| E    | 4.09               | 4.29  | 0.161          | 0.169 |
| F    | 14.91              | 15.11 | 0.587          | 0.595 |
| G    | 30.12              | 30.30 | 1.186          | 1.193 |
| H    | 38.00              | 38.23 | 1.496          | 1.505 |
| J    | 11.68              | 12.22 | 0.460          | 0.481 |
| K    | 8.92               | 9.60  | 0.351          | 0.378 |
| L    | 0.76               | 0.84  | 0.030          | 0.033 |
| M    | 12.60              | 12.85 | 0.496          | 0.506 |
| N    | 25.15              | 25.42 | 0.990          | 1.001 |
| O    | 1.98               | 2.13  | 0.078          | 0.084 |
| P    | 4.95               | 5.97  | 0.195          | 0.235 |
| Q    | 26.54              | 26.90 | 1.045          | 1.059 |
| R    | 3.94               | 4.42  | 0.155          | 0.174 |
| S    | 4.72               | 4.85  | 0.186          | 0.191 |
| T    | 24.59              | 25.07 | 0.968          | 0.987 |
| U    | -0.05              | 0.1   | -0.002         | 0.004 |

| Source-Drain Diode    |                                                                                                        | Characteristic Values<br>(T <sub>j</sub> = 25°C, unless otherwise specified) |      |        |
|-----------------------|--------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------|------|--------|
| Symbol                | Test Conditions                                                                                        | min.                                                                         | typ. | max.   |
| <b>I<sub>S</sub></b>  | V <sub>GS</sub> = 0 V                                                                                  |                                                                              |      | 90 A   |
| <b>I<sub>SM</sub></b> | Repetitive;<br>pulse width limited by T <sub>JM</sub>                                                  |                                                                              |      | 360 A  |
| <b>V<sub>SD</sub></b> | I <sub>F</sub> = I <sub>S</sub> , V <sub>GS</sub> = 0 V,<br>Pulse test, t ≤ 300 μs, duty cycle d ≤ 2 % |                                                                              |      | 1.5 V  |
| <b>t<sub>rr</sub></b> | I <sub>F</sub> = 50A, -di/dt = 100 A/μs, V <sub>R</sub> = 100 V                                        |                                                                              |      | 250 ns |
| <b>Q<sub>RM</sub></b> |                                                                                                        | 1.4                                                                          |      | μC     |
| <b>I<sub>RM</sub></b> |                                                                                                        | 10                                                                           |      | A      |