

# HiPerFET™ Power MOSFETs

IXFK100N10  
IXFN150N10

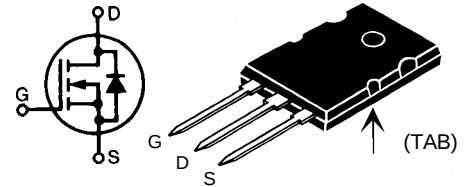
N-Channel Enhancement Mode  
Avalanche Rated, High dv/dt, Low  $t_{rr}$

| $V_{DSS}$ | $I_{D25}$ | $R_{DS(on)}$ |
|-----------|-----------|--------------|
| 100 V     | 100 A     | 12 mΩ        |
| 100 V     | 150 A     | 12 mΩ        |

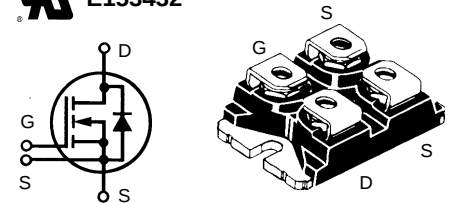
$$t_{rr} \leq 200 \text{ ns}$$

| Symbol     | Test Conditions                                                                                                                         | Maximum Ratings |                  |                        |
|------------|-----------------------------------------------------------------------------------------------------------------------------------------|-----------------|------------------|------------------------|
|            |                                                                                                                                         | IXFK            | IXFN             |                        |
| $V_{DSS}$  | $T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$                                                                                         | 100             | 100              | V                      |
| $V_{DGR}$  | $T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$ ; $R_{GS} = 1 \text{ M}\Omega$                                                          | 100             | 100              | V                      |
| $V_{GS}$   | Continuous                                                                                                                              | $\pm 20$        | $\pm 20$         | V                      |
| $V_{GSM}$  | Transient                                                                                                                               | $\pm 30$        | $\pm 30$         | V                      |
| $I_{D25}$  | $T_C = 25^\circ\text{C}$                                                                                                                | 100 ①           | 150              | A                      |
| $I_{D120}$ | $T_C = 120^\circ\text{C}$ , limited by external leads                                                                                   | 76              | -                | A                      |
| $I_{DM}$   | $T_C = 25^\circ\text{C}$ , pulse width limited by $T_{JM}$                                                                              | 560             | 560              | A                      |
| $I_{AR}$   | $T_C = 25^\circ\text{C}$                                                                                                                | 75              | 75               | A                      |
| $E_{AR}$   | $T_C = 25^\circ\text{C}$                                                                                                                | 30              | 30               | mJ                     |
| 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               | 5                | V/ns                   |
| $P_D$      | $T_C = 25^\circ\text{C}$                                                                                                                | 500             | 520              | 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 $t = 1 \text{ min}$<br>$I_{ISOL} \leq 1 \text{ mA}$ $t = 1 \text{ s}$                                                     | -               | 2500<br>3000     | V~<br>V~               |
| $M_d$      | Mounting torque<br>Terminal connection torque                                                                                           | 0.9/6<br>-      | 1.5/13<br>1.5/13 | Nm/lb.in.<br>Nm/lb.in. |
| Weight     |                                                                                                                                         | 10              | 30               | g                      |

TO-264 AA (IXFK)



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 packages
- JEDEC TO-264 AA, epoxy meet UL 94 V-0, flammability classification
- 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
- Synchronous rectification
- Battery chargers
- Switched-mode and resonant-mode power supplies
- DC choppers
- Temperature and lighting controls
- Low voltage relays

## Advantages

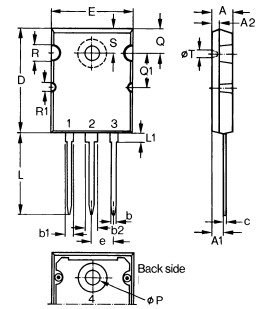
- Easy to mount
- Space savings
- High power density

| Symbol       | Test Conditions                                                                                                   | Characteristic Values<br>( $T_J = 25^\circ\text{C}$ , unless otherwise specified) |      |                           |
|--------------|-------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------|---------------------------|
|              |                                                                                                                   | min.                                                                              | typ. | max.                      |
| $V_{DSS}$    | $V_{GS} = 0 \text{ V}$ , $I_D = 1 \text{ mA}$                                                                     | 100                                                                               |      | V                         |
| $V_{GH(th)}$ | $V_{DS} = V_{GS}$ , $I_D = 8 \text{ mA}$                                                                          | 2                                                                                 |      | V                         |
| $I_{GSS}$    | $V_{GS} = \pm 20 \text{ V}$ , $V_{DS} = 0$                                                                        |                                                                                   |      | $\pm 200$ nA              |
| $I_{DSS}$    | $V_{DS} = 0.8 \cdot V_{DSS}$ , $T_J = 25^\circ\text{C}$<br>$V_{GS} = 0 \text{ V}$ , $T_J = 125^\circ\text{C}$     |                                                                                   |      | 400 $\mu\text{A}$<br>2 mA |
| $R_{DS(on)}$ | $V_{GS} = 10 \text{ V}$ , $I_D = 75 \text{ A}$<br>Pulse test, $t \leq 300 \mu\text{s}$ , duty cycle $d \leq 2 \%$ |                                                                                   |      | 12 mΩ                     |

| Symbol       | Test Conditions                                                                                        | Characteristic Values<br>( $T_J = 25^\circ\text{C}$ , unless otherwise specified) |      |      |
|--------------|--------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------|------|
|              |                                                                                                        | min.                                                                              | typ. | max. |
| $g_{fs}$     | $V_{DS} = 10\text{ V}; I_D = 50\text{ A}$ , pulse test                                                 |                                                                                   | 80   | S    |
| $C_{iss}$    | $V_{GS} = 0\text{ V}, V_{DS} = 25\text{ V}, f = 1\text{ MHz}$                                          |                                                                                   | 9000 | pF   |
| $C_{oss}$    |                                                                                                        |                                                                                   | 3200 | pF   |
| $C_{rss}$    |                                                                                                        |                                                                                   | 1800 | pF   |
| $t_{d(on)}$  | $V_{GS} = 10\text{ V}, V_{DS} = 0.5 \cdot V_{DSS}, I_D = 75\text{ A}$<br>$R_G = 1\ \Omega$ (External), |                                                                                   | 30   | ns   |
| $t_r$        |                                                                                                        |                                                                                   | 60   | ns   |
| $t_{d(off)}$ |                                                                                                        |                                                                                   | 100  | ns   |
| $t_f$        |                                                                                                        |                                                                                   | 60   | ns   |
| $Q_{g(on)}$  | $V_{GS} = 10\text{ V}, V_{DS} = 0.5 \cdot V_{DSS}, I_D = 75\text{ A}$                                  |                                                                                   | 360  | nC   |
| $Q_{gs}$     |                                                                                                        |                                                                                   | 75   | nC   |
| $Q_{gd}$     |                                                                                                        |                                                                                   | 180  | nC   |
| $R_{thJC}$   | TO-264 AA                                                                                              |                                                                                   | 0.25 | K/W  |
| $R_{thCK}$   | TO-264 AA                                                                                              |                                                                                   | 0.15 | K/W  |
| $R_{thJC}$   | miniBLOC, SOT-227 B                                                                                    |                                                                                   | 0.24 | K/W  |
| $R_{thCK}$   | miniBLOC, SOT-227 B                                                                                    |                                                                                   | 0.05 | K/W  |

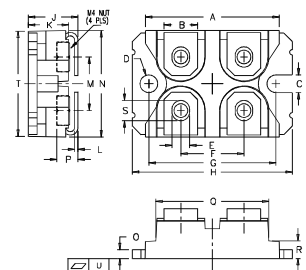
| Symbol   | Test Conditions                                                                                                | Characteristic Values<br>( $T_J = 25^\circ\text{C}$ , unless otherwise specified) |      |                |
|----------|----------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------|----------------|
|          |                                                                                                                | min.                                                                              | typ. | max.           |
| $I_S$    | $V_{GS} = 0\text{ V}$                                                                                          | IXFK 100<br>IXFN 150                                                              |      | 100 A<br>150 A |
| $I_{SM}$ | Repetitive;<br>pulse width limited by $T_{JM}$                                                                 | IXFK 100<br>IXFN 150                                                              |      | 400 A<br>600 A |
| $V_{SD}$ | $I_F = 100\text{ A}, V_{GS} = 0\text{ V}$ ,<br>Pulse test, $t \leq 300\ \mu\text{s}$ , duty cycle $d \leq 2\%$ |                                                                                   |      | 1.75 V         |
| $t_{rr}$ | $I_F = 25\text{ A}$<br>$-di/dt = 100\text{ A}/\mu\text{s}$ ,<br>$V_R = 50\text{ V}$                            |                                                                                   | 150  | 200 ns         |
| $Q_{RM}$ |                                                                                                                |                                                                                   | 0.6  | $\mu\text{C}$  |
| $I_{RM}$ |                                                                                                                |                                                                                   | 8    | A              |

### TO-264 AA Outline



| Dim. | Millimeter |       | Inches |       |
|------|------------|-------|--------|-------|
|      | Min.       | Max.  | Min.   | Max.  |
| A    | 4.82       | 5.13  | .190   | .202  |
| A1   | 2.54       | 2.89  | .100   | .114  |
| A2   | 2.00       | 2.10  | .079   | .083  |
| b    | 1.12       | 1.42  | .044   | .056  |
| b1   | 2.39       | 2.69  | .094   | .106  |
| b2   | 2.90       | 3.09  | .114   | .122  |
| c    | 0.53       | 0.83  | .021   | .033  |
| D    | 25.91      | 26.16 | 1.020  | 1.030 |
| E    | 19.81      | 19.96 | .780   | .786  |
| e    | 5.46       | BSC   | .215   | BSC   |
| J    | 0.00       | 0.25  | .000   | .010  |
| K    | 0.00       | 0.25  | .000   | .010  |
| L    | 20.32      | 20.83 | .800   | .820  |
| L1   | 2.29       | 2.59  | .090   | .102  |
| P    | 3.17       | 3.66  | .125   | .144  |
| Q    | 6.07       | 6.27  | .239   | .247  |
| Q1   | 8.38       | 8.69  | .330   | .342  |
| R    | 3.81       | 4.32  | .150   | .170  |
| R1   | 1.78       | 2.29  | .070   | .090  |
| S    | 6.04       | 6.30  | .238   | .248  |
| T    | 1.57       | 1.83  | .062   | .072  |

### miniBLOC, SOT-227 B



M4 screws (4x) supplied

| Dim. | Millimeter |       | Inches |       |
|------|------------|-------|--------|-------|
|      | Min.       | Max.  | 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 |

Fig. 1 Output Characteristics

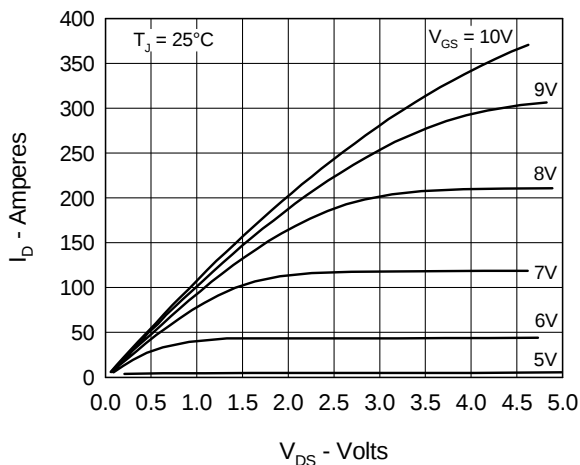


Fig. 2 Input Admittance

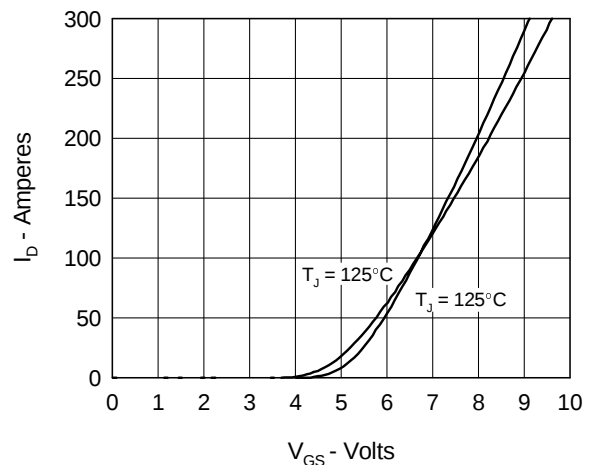


Fig. 3  $R_{DS(on)}$  vs. Drain Current

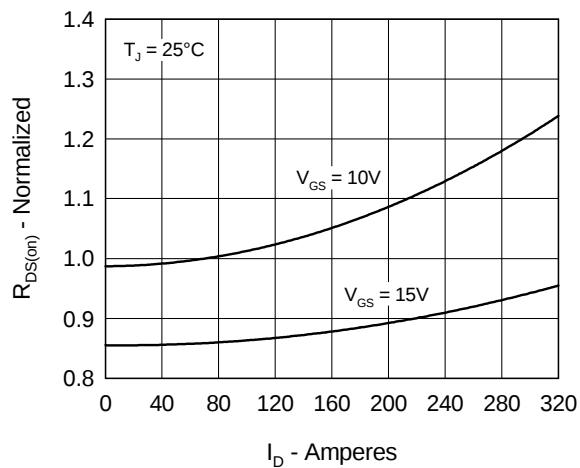


Fig. 4 Temperature Dependence of Drain to Source Resistance

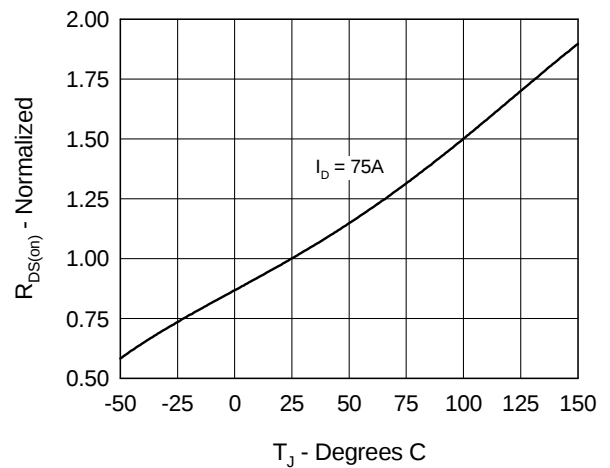


Fig. 5 Drain Current vs. Case Temperature

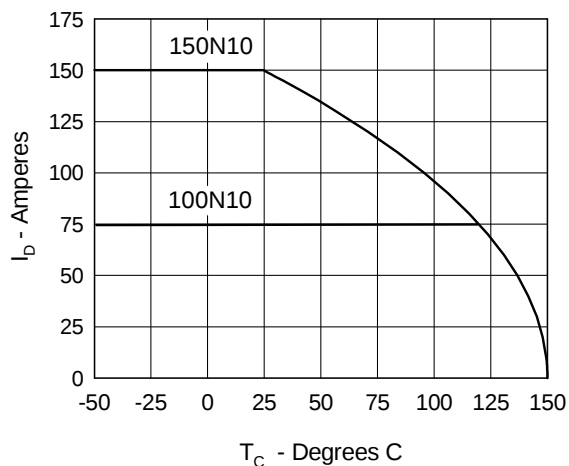


Fig. 6 Temperature Dependence of Breakdown and Threshold Voltage

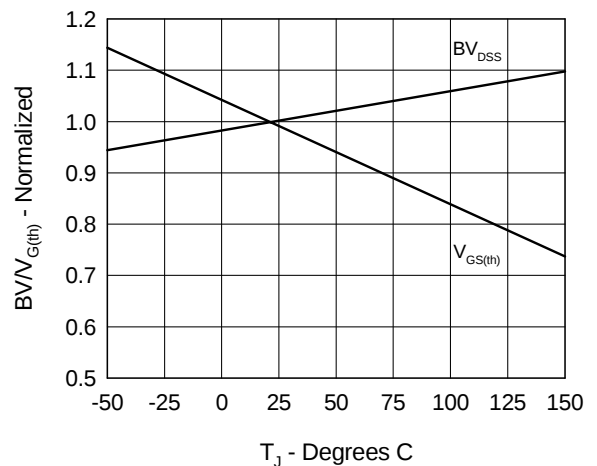


Fig.7 Gate Charge Characteristic Curve

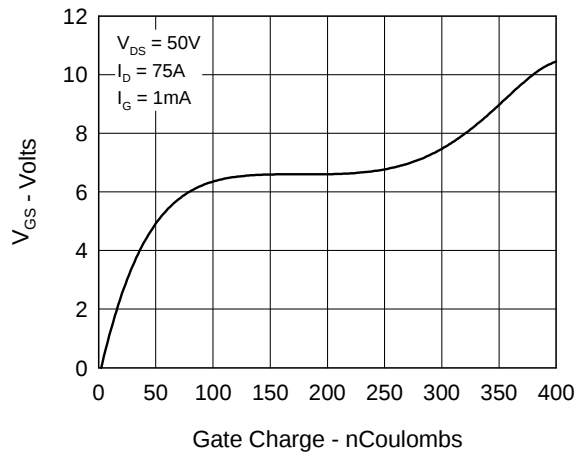


Fig.8 Capacitance Curves

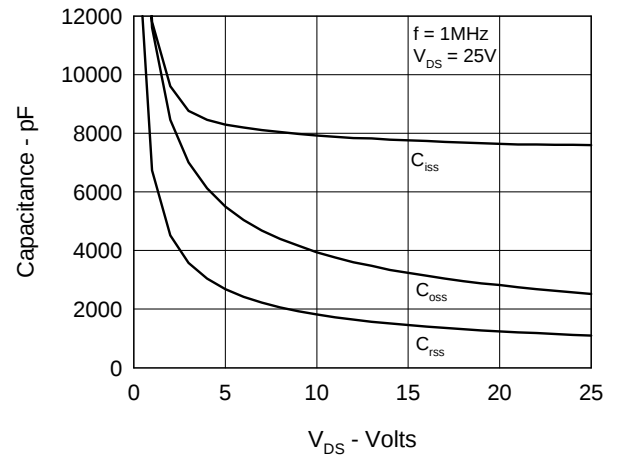


Fig.9 Source Current vs. Source to Drain Voltage

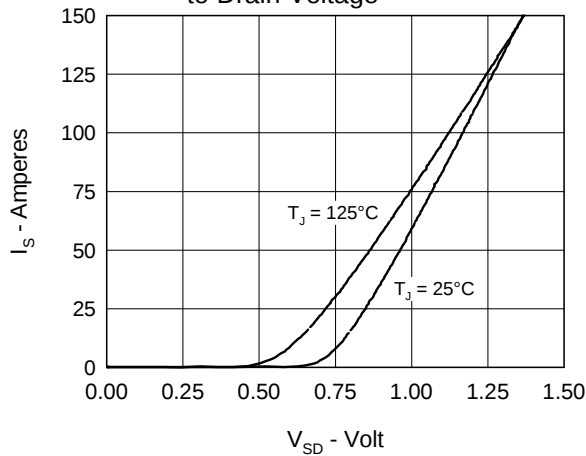


Fig.10 Transient Thermal Impedance

