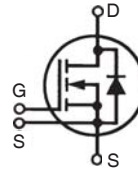


# X-Class HiPerFET™ Power MOSFET

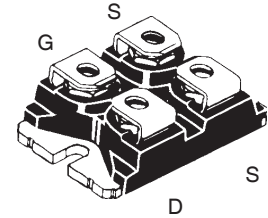
## IXFN74N100X

$$\begin{aligned} V_{DSS} &= 1000V \\ I_{D25} &= 74A \\ R_{DS(on)} &\leq 66m\Omega \end{aligned}$$

N-Channel Enhancement Mode  
Avalanche Rated



miniBLOC, SOT-227  
E153432



G = Gate  
S = Source  
D = Drain

| Symbol     | Test Conditions                                                          | Maximum Ratings                  |                      |
|------------|--------------------------------------------------------------------------|----------------------------------|----------------------|
| $V_{DSS}$  | $T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$                          | 1000                             | V                    |
| $V_{DGR}$  | $T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$ , $R_{GS} = 1M\Omega$    | 1000                             | V                    |
| $V_{GSS}$  | Continuous                                                               | $\pm 30$                         | V                    |
| $V_{GSM}$  | Transient                                                                | $\pm 40$                         | V                    |
| $I_{D25}$  | $T_C = 25^\circ\text{C}$                                                 | 74                               | A                    |
| $I_{DM}$   | $T_C = 25^\circ\text{C}$ , Pulse Width Limited by $T_{JM}$               | 150                              | A                    |
| $I_A$      | $T_C = 25^\circ\text{C}$                                                 | 37                               | A                    |
| $E_{AS}$   | $T_C = 25^\circ\text{C}$                                                 | 2                                | J                    |
| $P_D$      | $T_C = 25^\circ\text{C}$                                                 | 1170                             | W                    |
| $dv/dt$    | $I_S \leq I_{DM}$ , $V_{DD} \leq V_{DSS}$ , $T_J \leq 150^\circ\text{C}$ | 50                               | V/ns                 |
| $T_J$      |                                                                          | -55 ... +150                     | $^\circ\text{C}$     |
| $T_{JM}$   |                                                                          | 150                              | $^\circ\text{C}$     |
| $T_{stg}$  |                                                                          | -55 ... +150                     | $^\circ\text{C}$     |
| $V_{ISOL}$ | 50/60 Hz, RMS<br>$I_{ISOL} \leq 1\text{mA}$                              | $t = 1$ minute<br>$t = 1$ second | 2500 V~<br>3000 V~   |
| $M_d$      | Mounting Torque<br>Terminal Connection Torque                            | 1.5/13<br>1.3/11.5               | Nm/lb.in<br>Nm/lb.in |
| Weight     |                                                                          | 30                               | g                    |

### Features

- International Standard Package
- miniBLOC, with Aluminium Nitride Isolation
- Isolation Voltage 2500V~
- High Current Handling Capability
- Avalanche Rated
- Low  $R_{DS(on)}$

### Advantages

- High Power Density
- Easy to Mount
- Space Savings

### Applications

- Switch-Mode and Resonant-Mode Power Supplies
- DC-DC Converters
- PFC Circuits
- AC and DC Motor Drives
- Robotics and Servo Controls

| Symbol       | Test Conditions<br>( $T_J = 25^\circ\text{C}$ Unless Otherwise Specified) | Characteristic Values |      |                          |
|--------------|---------------------------------------------------------------------------|-----------------------|------|--------------------------|
|              |                                                                           | Min.                  | Typ. | Max.                     |
| $BV_{DSS}$   | $V_{GS} = 0V$ , $I_D = 3\text{mA}$                                        | 1000                  |      | V                        |
| $V_{GS(th)}$ | $V_{DS} = V_{GS}$ , $I_D = 8\text{mA}$                                    | 3.5                   |      | 5.5 V                    |
| $I_{GSS}$    | $V_{GS} = \pm 30V$ , $V_{DS} = 0V$                                        |                       |      | $\pm 200$ nA             |
| $I_{DSS}$    | $V_{DS} = V_{DSS}$ , $V_{GS} = 0V$<br>$T_J = 125^\circ\text{C}$           |                       |      | 50 $\mu\text{A}$<br>5 mA |
| $R_{DS(on)}$ | $V_{GS} = 10V$ , $I_D = 37A$ , Note 1                                     |                       |      | 66 m $\Omega$            |

| Symbol                              | Test Conditions<br>(T <sub>J</sub> = 25°C, Unless Otherwise Specified)                                                                                       | Characteristic Values                                            |      |            |
|-------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------|------|------------|
|                                     |                                                                                                                                                              | Min.                                                             | Typ. | Max        |
| <b>g<sub>fs</sub></b>               | V <sub>DS</sub> = 20V, I <sub>D</sub> = 37A, Note 1                                                                                                          | 30                                                               | 53   | S          |
| <b>R<sub>Gi</sub></b>               | Gate Input Resistance                                                                                                                                        |                                                                  | 0.56 | Ω          |
| <b>C<sub>iss</sub></b>              | V <sub>GS</sub> = 0V, V <sub>DS</sub> = 25V, f = 1MHz                                                                                                        |                                                                  | 17   | nF         |
| <b>C<sub>oss</sub></b>              |                                                                                                                                                              |                                                                  | 2450 | pF         |
| <b>C<sub>rss</sub></b>              |                                                                                                                                                              |                                                                  | 48   | pF         |
| <b>Effective Output Capacitance</b> |                                                                                                                                                              |                                                                  |      |            |
| <b>C<sub>o(er)</sub></b>            | Energy related                                                                                                                                               | V <sub>GS</sub> = 0V<br>V <sub>DS</sub> = 0.8 • V <sub>DSS</sub> | 400  | pF         |
| <b>C<sub>o(tr)</sub></b>            | Time related                                                                                                                                                 |                                                                  | 1900 | pF         |
| <b>t<sub>d(on)</sub></b>            | <b>Resistive Switching Times</b><br>V <sub>GS</sub> = 10V, V <sub>DS</sub> = 0.5 • V <sub>DSS</sub> , I <sub>D</sub> = 37A<br>R <sub>G</sub> = 1Ω (External) |                                                                  | 84   | ns         |
| <b>t<sub>r</sub></b>                |                                                                                                                                                              |                                                                  | 28   | ns         |
| <b>t<sub>d(off)</sub></b>           |                                                                                                                                                              |                                                                  | 184  | ns         |
| <b>t<sub>f</sub></b>                |                                                                                                                                                              |                                                                  | 28   | ns         |
| <b>Q<sub>g(on)</sub></b>            | V <sub>GS</sub> = 10V, V <sub>DS</sub> = 0.5 • V <sub>DSS</sub> , I <sub>D</sub> = 37A                                                                       |                                                                  | 425  | nC         |
| <b>Q<sub>gs</sub></b>               |                                                                                                                                                              |                                                                  | 124  | nC         |
| <b>Q<sub>gd</sub></b>               |                                                                                                                                                              |                                                                  | 230  | nC         |
| <b>R<sub>thJC</sub></b>             |                                                                                                                                                              |                                                                  |      | 0.107 °C/W |
| <b>R<sub>thCS</sub></b>             |                                                                                                                                                              |                                                                  | 0.05 | °C/W       |

### Source-Drain Diode

| Symbol   | Test Conditions<br>( $T_J = 25^\circ\text{C}$ , Unless Otherwise Specified)                           | Characteristic Values |      |               |
|----------|-------------------------------------------------------------------------------------------------------|-----------------------|------|---------------|
|          |                                                                                                       | Min.                  | Typ. | Max.          |
| $I_S$    | $V_{GS} = 0\text{V}$                                                                                  |                       |      | 74 A          |
| $I_{SM}$ | Repetitive, Pulse Width Limited by $T_{JM}$                                                           |                       |      | 296 A         |
| $V_{SD}$ | $I_F = I_S$ , $V_{GS} = 0\text{V}$ , Note 1                                                           |                       |      | 1.4 V         |
| $t_{rr}$ | $I_F = 37\text{A}$ , $-di/dt = 300\text{A}/\mu\text{s}$<br>$V_R = 100\text{V}$ , $V_{GS} = 0\text{V}$ |                       | 290  | ns            |
| $Q_{RM}$ |                                                                                                       |                       | 5.7  | $\mu\text{C}$ |
| $I_{RM}$ |                                                                                                       |                       | 39.0 | A             |

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

### ADVANCE TECHNICAL INFORMATION

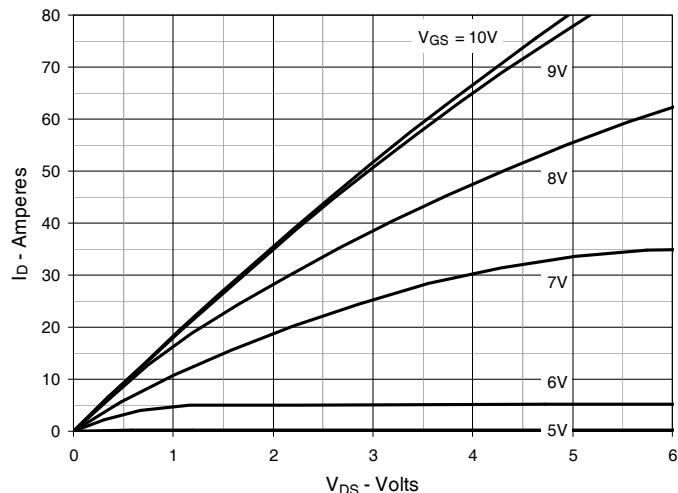
The product presented herein is under development. The Technical Specifications offered are derived from a subjective evaluation of the design, based upon prior knowledge and experience, and constitute a "considered reflection" of the anticipated result. IXYS reserves the right to change limits, test conditions, and dimensions without notice.

IXYS Reserves the Right to Change Limits, Test Conditions, and Dimensions.

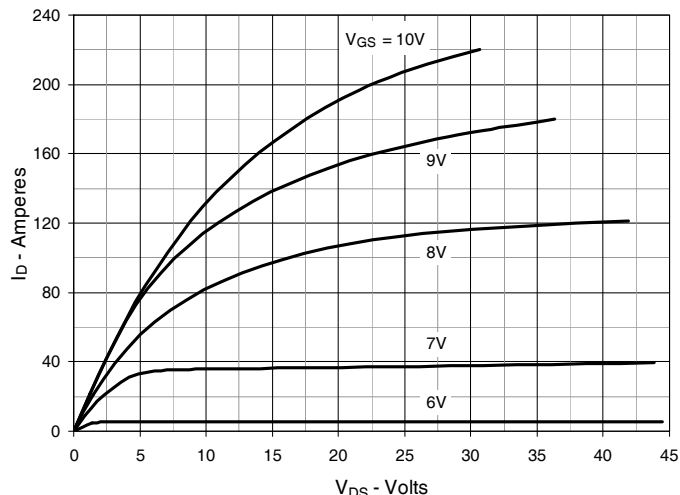
IXYS MOSFETs and IGBTs are covered by one or more of the following U.S. patents:

|           |           |           |           |              |              |              |              |              |             |
|-----------|-----------|-----------|-----------|--------------|--------------|--------------|--------------|--------------|-------------|
| 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    |             |

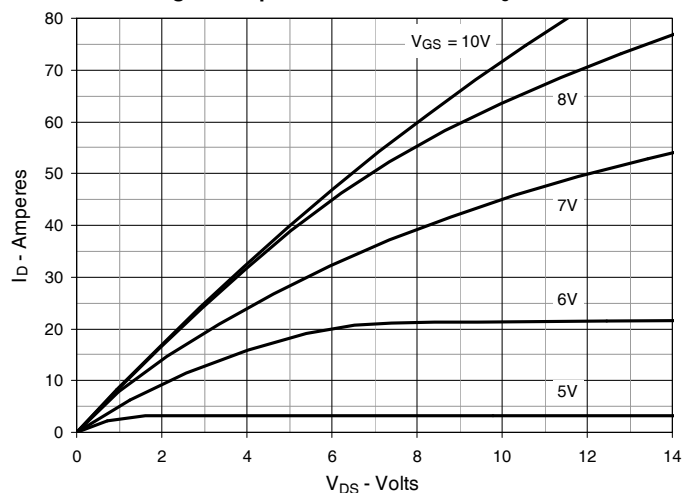
**Fig. 1. Output Characteristics @  $T_J = 25^\circ\text{C}$**



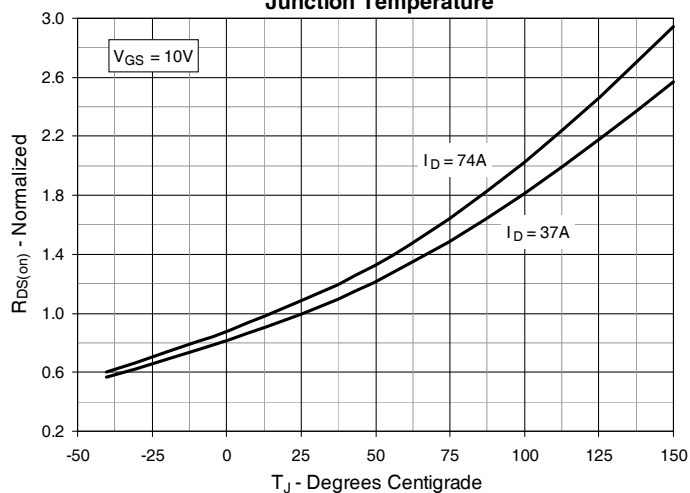
**Fig. 2. Extended Output Characteristics @  $T_J = 25^\circ\text{C}$**



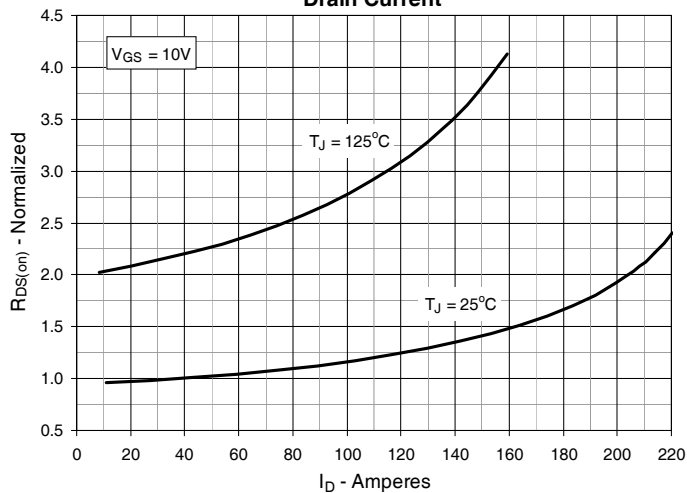
**Fig. 3. Output Characteristics @  $T_J = 125^\circ\text{C}$**



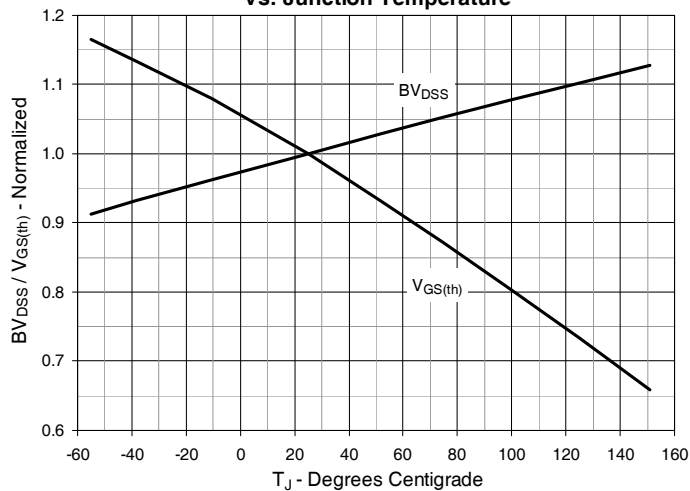
**Fig. 4.  $R_{DS(on)}$  Normalized to  $I_D = 37\text{A}$  Value vs. Junction Temperature**

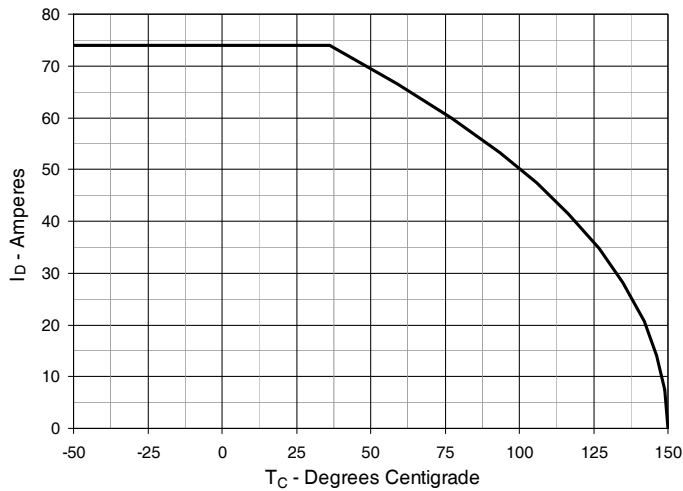
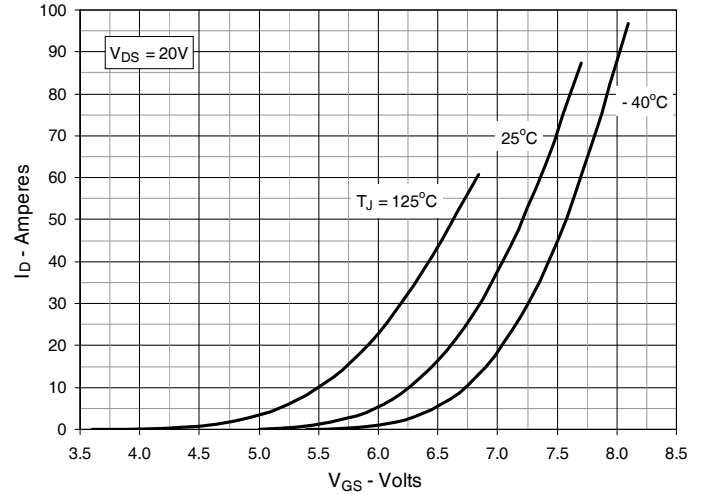
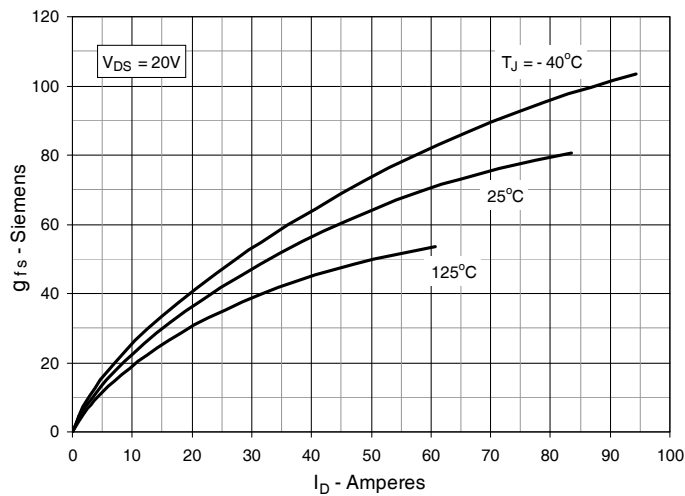
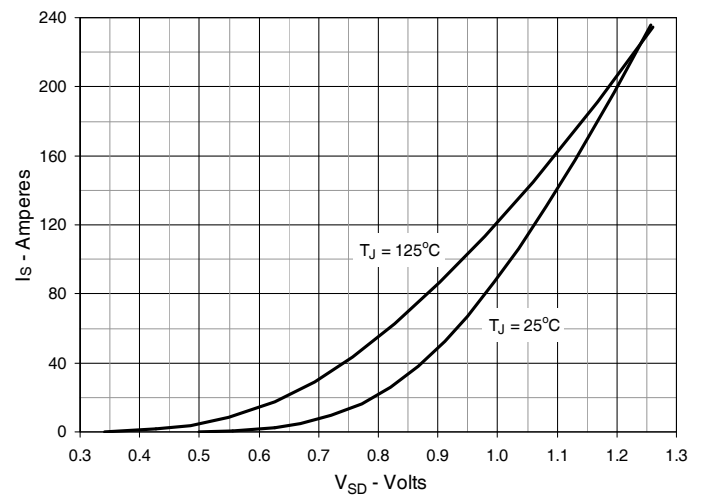
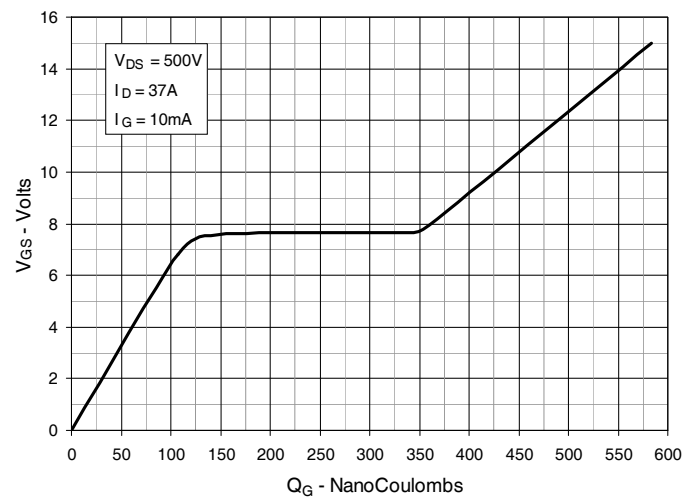
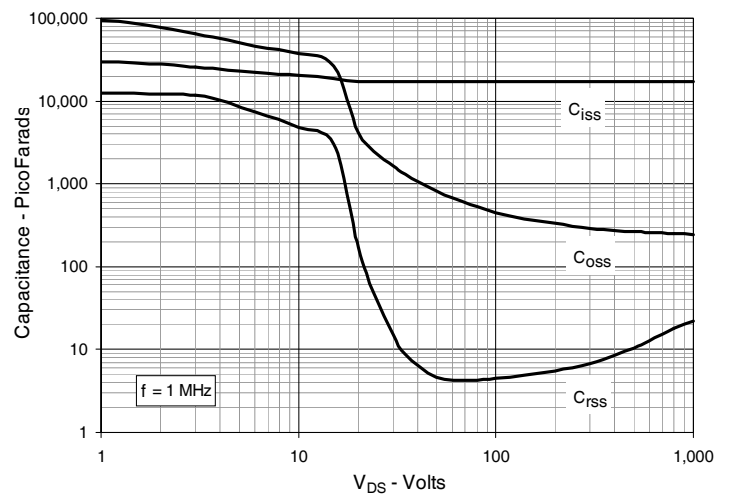


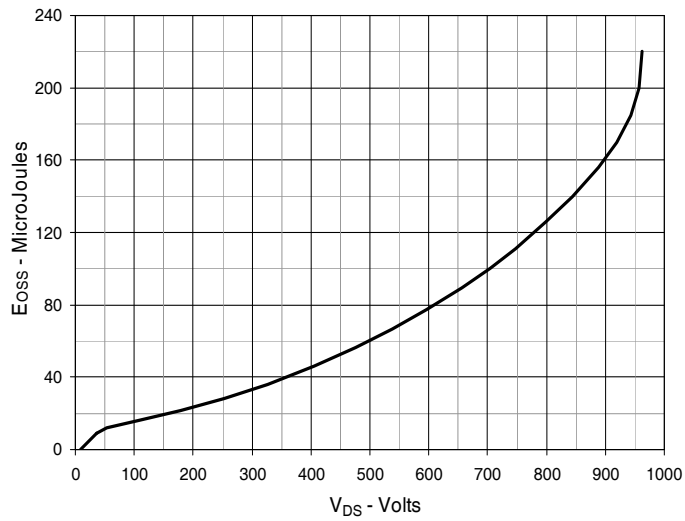
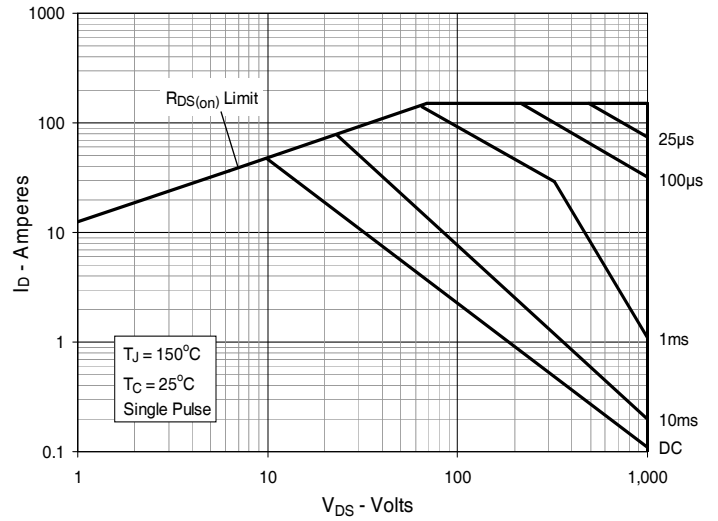
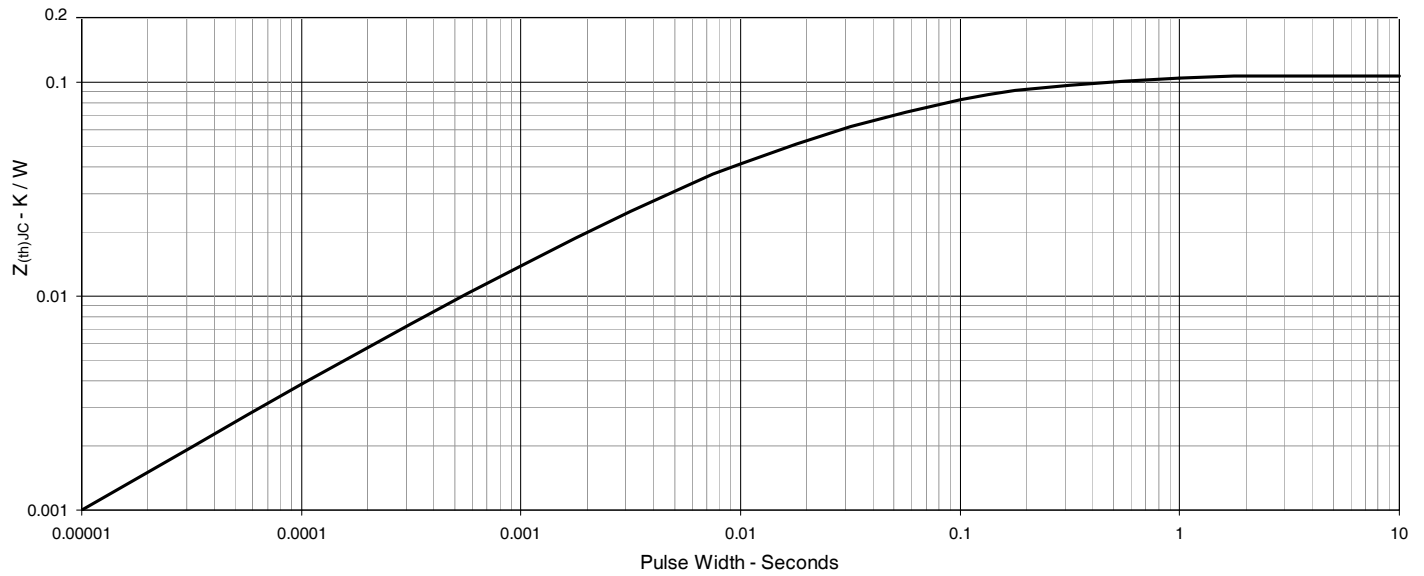
**Fig. 5.  $R_{DS(on)}$  Normalized to  $I_D = 37\text{A}$  Value vs. Drain Current**

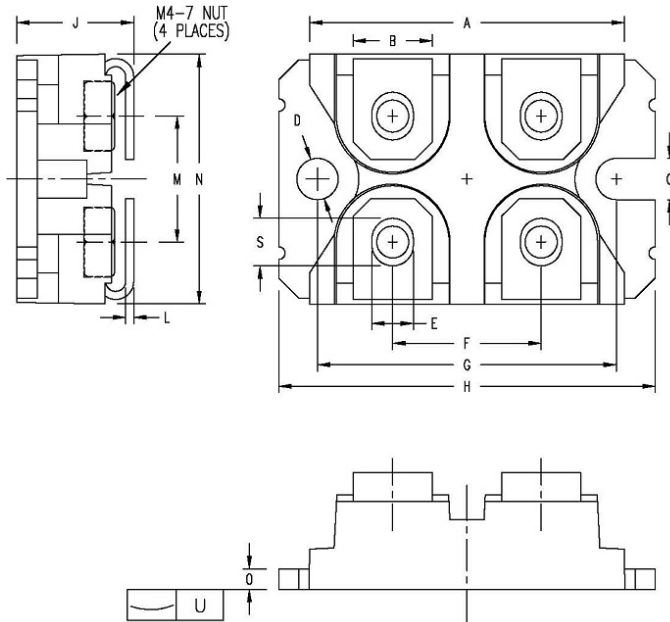


**Fig. 6. Normalized Breakdown & Threshold Voltages vs. Junction Temperature**



**Fig. 7. Maximum Drain Current vs. Case Temperature**

**Fig. 8. Input Admittance**

**Fig. 9. Transconductance**

**Fig. 10. Forward Voltage Drop of Intrinsic Diode**

**Fig. 11. Gate Charge**

**Fig. 12. Capacitance**


**Fig. 13. Output Capacitance Stored Energy**

**Fig. 14. Forward-Bias Safe Operating Area**

**Fig. 15. Maximum Transient Thermal Impedance**


**SOT-227 Outline**


| SYM | INCHES |       | MILLIMETERS |       |
|-----|--------|-------|-------------|-------|
|     | MIN    | MAX   | MIN         | MAX   |
| A   | 1.224  | 1.260 | 31.10       | 32.00 |
| B   | .303   | .327  | 7.70        | 8.30  |
| C   | .161   | .173  | 4.10        | 4.40  |
| D   | .161   | .173  | 4.10        | 4.40  |
| E   | .161   | .173  | 4.10        | 4.40  |
| F   | .587   | .598  | 14.90       | 15.20 |
| G   | 1.181  | 1.201 | 30.00       | 30.50 |
| H   | 1.488  | 1.508 | 37.80       | 38.30 |
| J   | .461   | .484  | 11.70       | 12.30 |
| L   | .030   | .033  | 0.75        | 0.85  |
| M   | .492   | .512  | 12.50       | 13.00 |
| N   | .984   | 1.004 | 25.00       | 25.50 |
| O   | .075   | .087  | 1.90        | 2.20  |
| S   | .181   | .193  | 4.60        | 4.90  |
| U   | .000   | .005  | 0.00        | 0.13  |

- NUT MATERIAL:  
STANDARD - Low carbon steel with Ni plating.  
OPTIONAL: - Brass Nut is available.  
PART NUMBER-BN
- ALL METAL SURFACE ARE PRE NI PLATED EXCEPT TRIM AREA.

