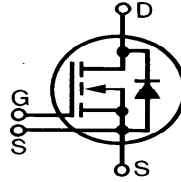


# Q3-Class HiperFET™ Power MOSFET

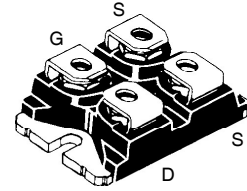
## IXFN32N100Q3

N-Channel Enhancement Mode  
Fast Intrinsic Rectifier



$$\begin{aligned} V_{DSS} &= 1000V \\ I_{D25} &= 28A \\ R_{DS(on)} &\leq 320m\Omega \\ t_{rr} &\leq 300ns \end{aligned}$$

miniBLOC  
E153432



G = Gate      D = Drain  
S = Source

Either Source Terminal S can be used as the Source Terminal or the Kelvin Source (Gate Return) Terminal.

| 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                      |
| $I_{D25}$  | $T_C = 25^\circ\text{C}$                                                 | 28                 | A                      |
| $I_{DM}$   | $T_C = 25^\circ\text{C}$ , Pulse Width Limited by $T_{JM}$               | 96                 | A                      |
| $I_A$      | $T_C = 25^\circ\text{C}$                                                 | 32                 | A                      |
| $E_{AS}$   | $T_C = 25^\circ\text{C}$                                                 | 2                  | J                      |
| $dv/dt$    | $I_S \leq I_{DM}$ , $V_{DD} \leq V_{DSS}$ , $T_J \leq 150^\circ\text{C}$ | 50                 | V/ns                   |
| $P_D$      | $T_C = 25^\circ\text{C}$                                                 | 780                | W                      |
| $T_J$      |                                                                          | -55 ... +150       | $^\circ\text{C}$       |
| $T_{JM}$   |                                                                          | 150                | $^\circ\text{C}$       |
| $T_{stg}$  |                                                                          | -55 ... +150       | $^\circ\text{C}$       |
| $V_{ISOL}$ | 50/60 Hz, RMS, $t = 1\text{minute}$                                      | 2500               | V~                     |
|            | $I_{ISOL} \leq 1\text{mA}$ , $t = 1\text{s}$                             | 3000               | V~                     |
| $M_d$      | Mounting Torque for Base Plate<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
- Low Intrinsic Gate Resistance
- miniBLOC with Aluminum Nitride Isolation
- Low Package Inductance
- Fast Intrinsic Rectifier
- Low  $R_{DS(on)}$  and  $Q_G$

### Advantages

- High Power Density
- Easy to Mount
- Space Savings

### Applications

- DC-DC Converters
- Battery Chargers
- Switch-Mode and Resonant-Mode Power Supplies
- DC Choppers
- Temperature and Lighting 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                   |      | 6.5 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>2 mA |
| $R_{DS(on)}$ | $V_{GS} = 10V$ , $I_D = 16A$ , Note 1                                     |                       |      | 320 m $\Omega$           |

| Symbol       | Test Conditions<br>( $T_J = 25^\circ\text{C}$ Unless Otherwise Specified)                                                             | Characteristic Values |      |                         |
|--------------|---------------------------------------------------------------------------------------------------------------------------------------|-----------------------|------|-------------------------|
|              |                                                                                                                                       | Min.                  | Typ. | Max.                    |
| $g_{fs}$     | $V_{DS} = 20\text{V}, I_D = 16\text{A}$ , Note 1                                                                                      | 20                    | 32   | S                       |
| $C_{iss}$    | $V_{GS} = 0\text{V}, V_{DS} = 25\text{V}, f = 1\text{MHz}$                                                                            |                       | 10.9 | nF                      |
| $C_{oss}$    |                                                                                                                                       |                       | 745  | pF                      |
| $C_{rss}$    |                                                                                                                                       |                       | 67   | pF                      |
| $R_{Gi}$     | Gate Input Resistance                                                                                                                 |                       | 0.20 | $\Omega$                |
| $t_{d(on)}$  | <b>Resistive Switching Times</b><br>$V_{GS} = 10\text{V}, V_{DS} = 0.5 \cdot V_{DSS}, I_D = 16\text{A}$<br>$R_G = 1\Omega$ (External) |                       | 45   | ns                      |
| $t_r$        |                                                                                                                                       |                       | 15   | ns                      |
| $t_{d(off)}$ |                                                                                                                                       |                       | 54   | ns                      |
| $t_f$        |                                                                                                                                       |                       | 12   | ns                      |
| $Q_{g(on)}$  | $V_{GS} = 10\text{V}, V_{DS} = 0.5 \cdot V_{DSS}, I_D = 16\text{A}$                                                                   |                       | 195  | nC                      |
| $Q_{gs}$     |                                                                                                                                       |                       | 60   | nC                      |
| $Q_{gd}$     |                                                                                                                                       |                       | 78   | nC                      |
| $R_{thJC}$   |                                                                                                                                       |                       |      | 0.16 $^\circ\text{C/W}$ |
| $R_{thCS}$   |                                                                                                                                       |                       | 0.05 | $^\circ\text{C/W}$      |

## Source-Drain Diode

| Symbol   | Test Conditions<br>( $T_J = 25^\circ\text{C}$ Unless Otherwise Specified)                       | Characteristic Values |      |               |
|----------|-------------------------------------------------------------------------------------------------|-----------------------|------|---------------|
|          |                                                                                                 | Min.                  | Typ. | Max.          |
| $I_S$    | $V_{GS} = 0\text{V}$                                                                            |                       |      | 32 A          |
| $I_{SM}$ | Repetitive, Pulse Width Limited by $T_{JM}$                                                     |                       |      | 128 A         |
| $V_{SD}$ | $I_F = I_S, V_{GS} = 0\text{V}$ , Note 1                                                        |                       |      | 1.4 V         |
| $t_{rr}$ | $I_F = 16\text{A}, -di/dt = 100\text{A}/\mu\text{s}$<br>$V_R = 100\text{V}, V_{GS} = 0\text{V}$ |                       |      | 300 ns        |
| $Q_{RM}$ |                                                                                                 |                       | 1.2  | $\mu\text{C}$ |
| $I_{RM}$ |                                                                                                 |                       | 12.3 | A             |

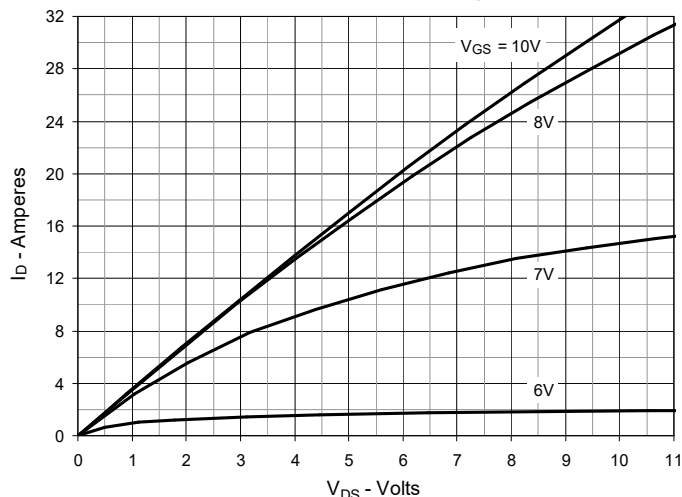
Note 1. Pulse test,  $t \leq 300\mu\text{s}$ , duty cycle,  $d \leq 2\%$ .

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

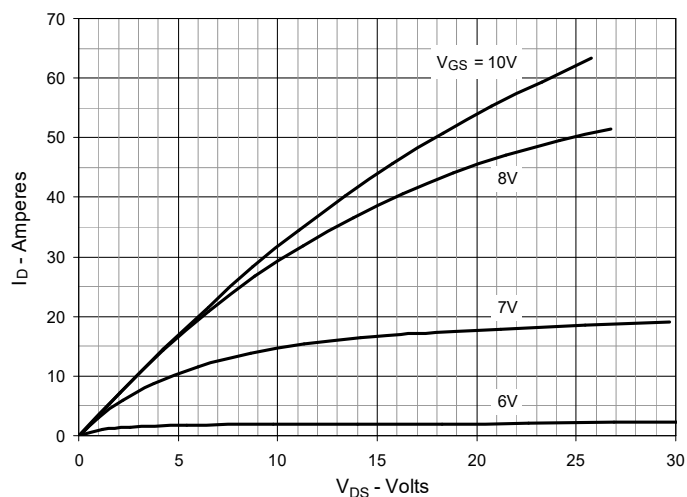
IXYS MOSFETs and IGBTs are covered by one or more of the following U.S. patents:

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

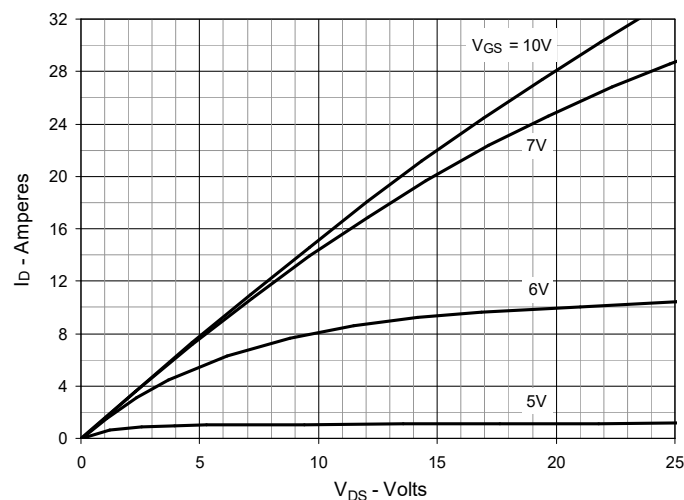
**Fig. 1. Output Characteristics @  $T_J = 25^\circ\text{C}$**



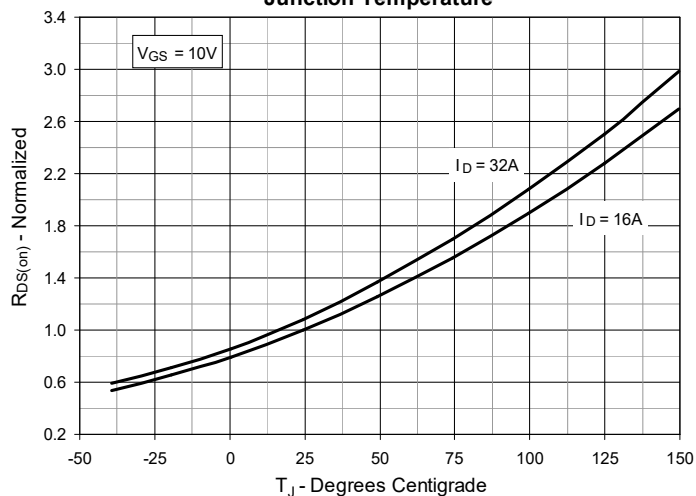
**Fig. 2. Extended Output Characteristics @  $T_J = 25^\circ\text{C}$**



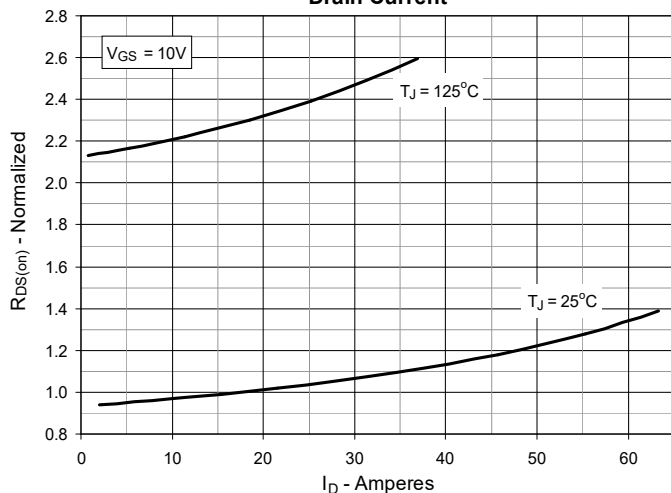
**Fig. 3. Output Characteristics @  $T_J = 125^\circ\text{C}$**



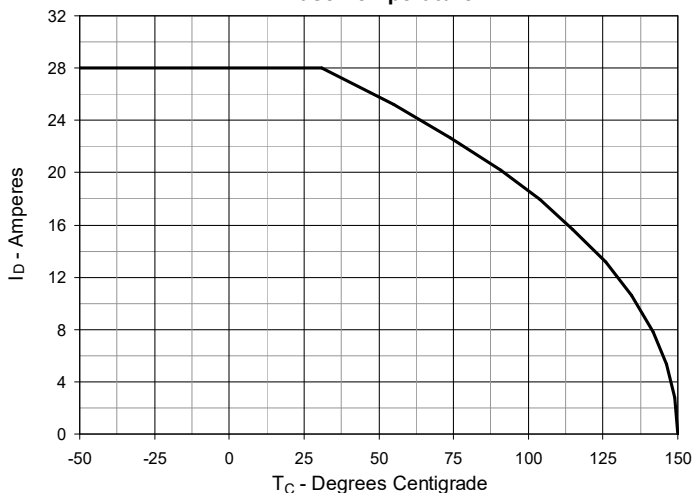
**Fig. 4.  $R_{DS(on)}$  Normalized to  $I_D = 16\text{A}$  Value vs. Junction Temperature**



**Fig. 5.  $R_{DS(on)}$  Normalized to  $I_D = 16\text{A}$  Value vs. Drain Current**



**Fig. 6. Maximum Drain Current vs. Case Temperature**



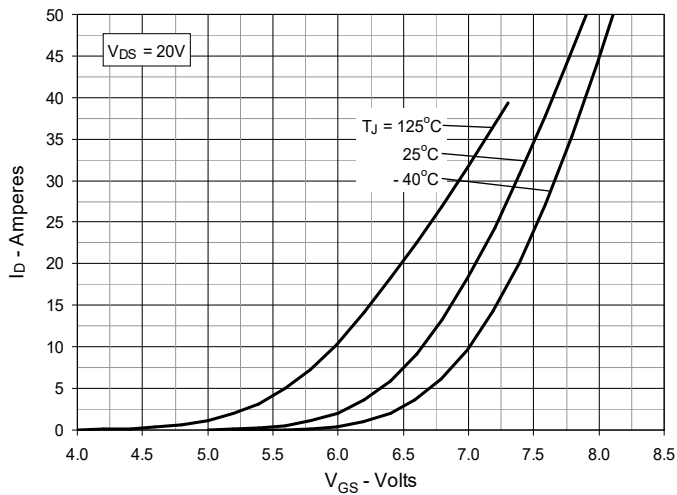
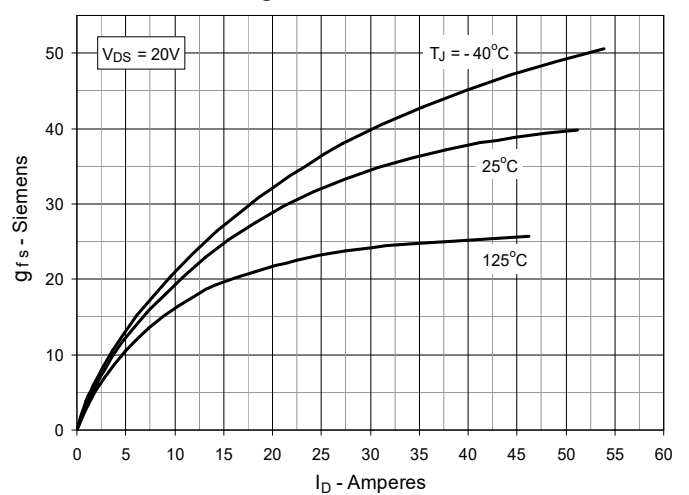
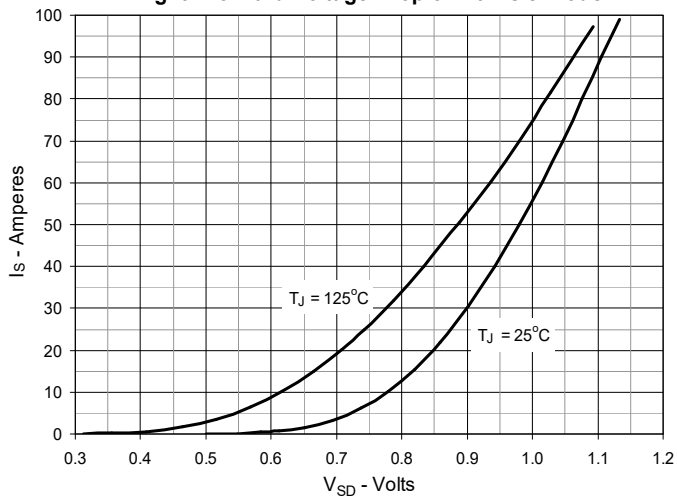
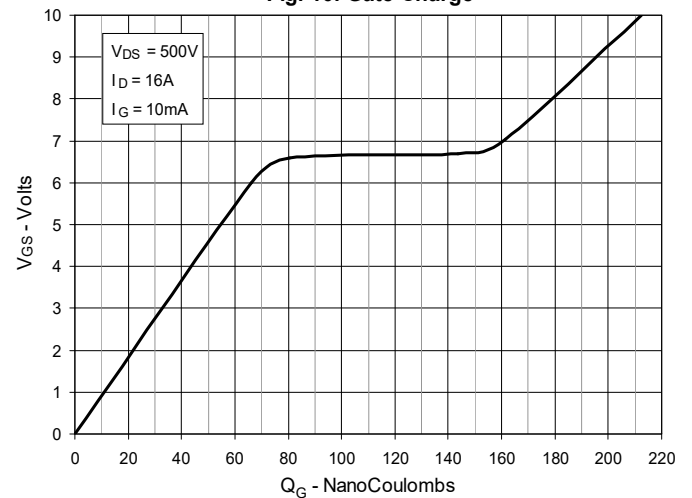
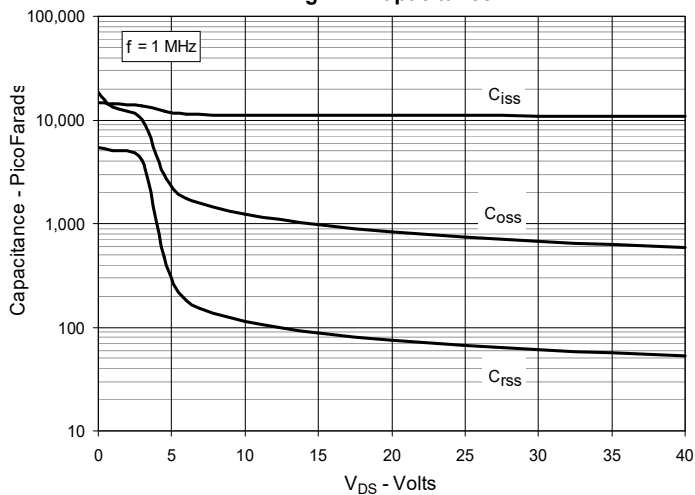
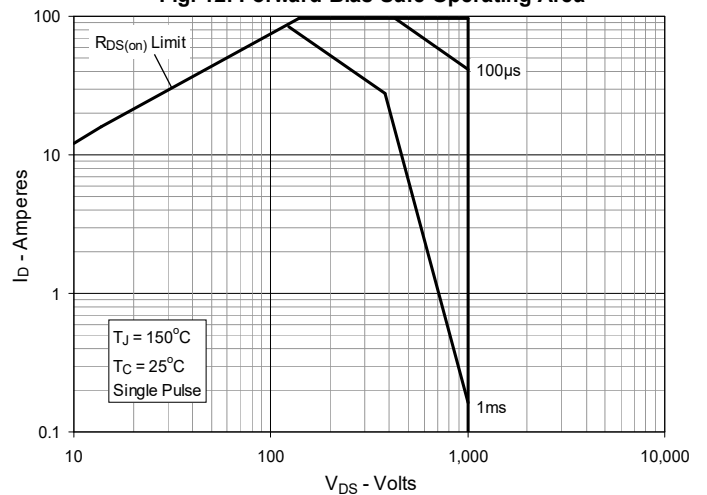
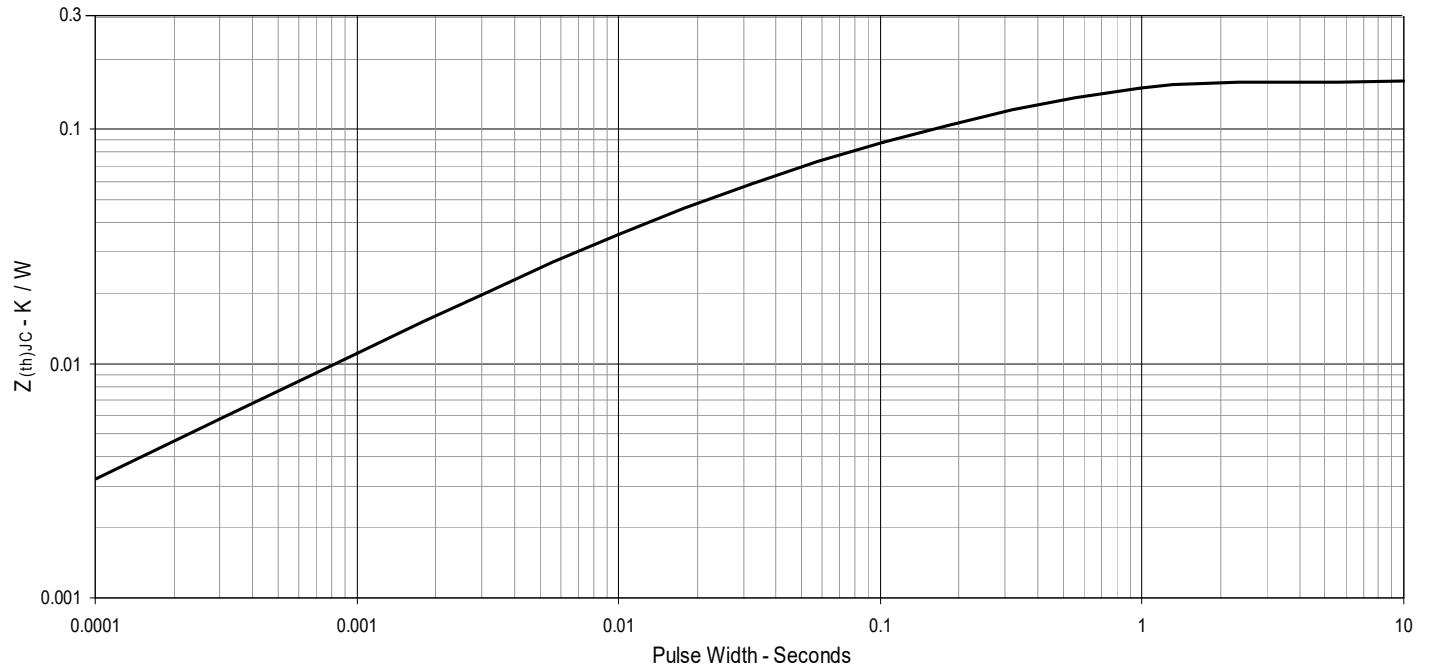
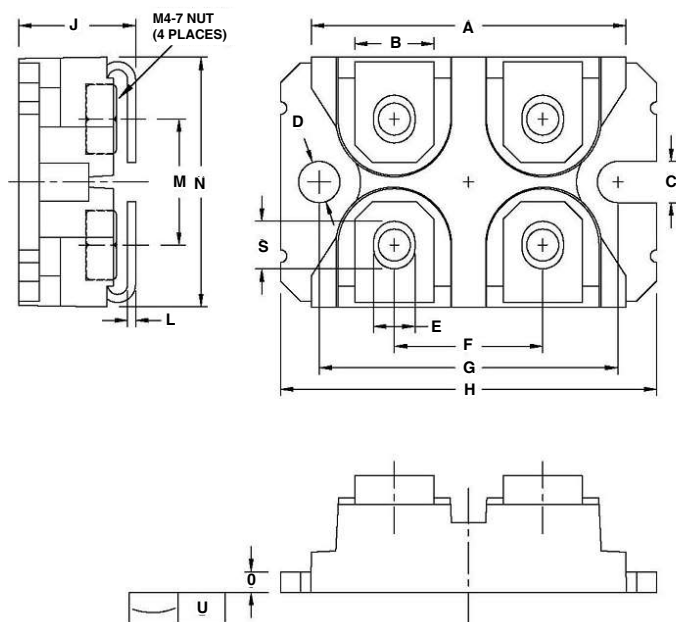
**Fig. 7. Input Admittance**

**Fig. 8. Transconductance**

**Fig. 9. Forward Voltage Drop of Intrinsic Diode**

**Fig. 10. Gate Charge**

**Fig. 11. Capacitance**

**Fig. 12. Forward-Bias Safe Operating Area**


Fig. 13. 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.

