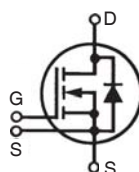


# X-Class HiPerFET™ Power MOSFET

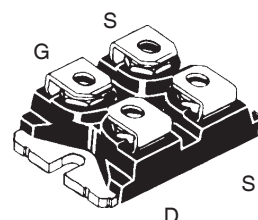
## IXFN52N100X

N-Channel Enhancement Mode  
Avalanche Rated



$$\begin{aligned} V_{DSS} &= 1000V \\ I_{D25} &= 44A \\ R_{DS(on)} &\leq 125m\Omega \end{aligned}$$

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                    |
| $I_{D25}$  | $T_C = 25^\circ\text{C}$                                                 | 44                 | A                    |
| $I_{DM}$   | $T_C = 25^\circ\text{C}$ , Pulse Width Limited by $T_{JM}$               | 100                | A                    |
| $I_A$      | $T_C = 25^\circ\text{C}$                                                 | 10                 | A                    |
| $E_{AS}$   | $T_C = 25^\circ\text{C}$                                                 | 3                  | J                    |
| $P_D$      | $T_C = 25^\circ\text{C}$                                                 | 830                | 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 $t = 1$ minute<br>$I_{ISOL} \leq 1mA$ $t = 1$ second       | 2500<br>3000       | V~<br>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 2500 V~
- Low  $Q_G$
- Avalanche Rated
- Low Package Inductance

### Advantages

- High Power Density
- Easy to Mount
- Space Savings

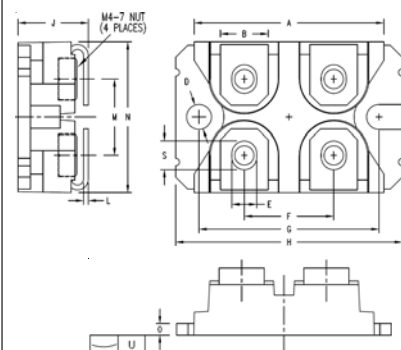
### Applications

- 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.                     |
| $BV_{DSS}$   | $V_{GS} = 0V$ , $I_D = 1mA$                                               | 1000                  |      | V                        |
| $V_{GS(th)}$ | $V_{DS} = V_{GS}$ , $I_D = 4mA$                                           | 3.5                   |      | 6.0 V                    |
| $I_{GSS}$    | $V_{GS} = \pm 30V$ , $V_{DS} = 0V$                                        |                       |      | $\pm 100$ nA             |
| $I_{DSS}$    | $V_{DS} = V_{DSS}$ , $V_{GS} = 0V$<br>$T_J = 125^\circ\text{C}$           |                       |      | 50 $\mu\text{A}$<br>5 mA |
| $R_{DS(on)}$ | $V_{GS} = 10V$ , $I_D = 26A$ , Note 1                                     |                       |      | 125 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> = 26A, Note 1                                                                                                              | 23                                                                 | 37   | S         |
| <b>R<sub>Gi</sub></b>               | Gate Input Resistance                                                                                                                                            |                                                                    | 0.5  | Ω         |
| <b>C<sub>iss</sub></b>              | } V <sub>GS</sub> = 0V, V <sub>DS</sub> = 25V, f = 1MHz                                                                                                          |                                                                    | 6725 | pF        |
| <b>C<sub>oss</sub></b>              |                                                                                                                                                                  |                                                                    | 1620 | pF        |
| <b>C<sub>rss</sub></b>              |                                                                                                                                                                  |                                                                    | 123  | 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> | 220  | pF        |
| <b>C<sub>o(tr)</sub></b>            | Time related                                                                                                                                                     |                                                                    | 1070 | pF        |
| <b>t<sub>d(on)</sub></b>            | <b>Resistive Switching Times</b><br><br>V <sub>GS</sub> = 10V, V <sub>DS</sub> = 0.5 • V <sub>DSS</sub> , I <sub>D</sub> = 26A<br>R <sub>G</sub> = 1Ω (External) |                                                                    | 34   | ns        |
| <b>t<sub>r</sub></b>                |                                                                                                                                                                  |                                                                    | 13   | ns        |
| <b>t<sub>d(off)</sub></b>           |                                                                                                                                                                  |                                                                    | 107  | ns        |
| <b>t<sub>f</sub></b>                |                                                                                                                                                                  |                                                                    | 9    | 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> = 26A                                                                         |                                                                    | 245  | nC        |
| <b>Q<sub>gs</sub></b>               |                                                                                                                                                                  |                                                                    | 53   | nC        |
| <b>Q<sub>gd</sub></b>               |                                                                                                                                                                  |                                                                    | 125  | nC        |
| <b>R<sub>thJC</sub></b>             |                                                                                                                                                                  |                                                                    |      | 0.15 °C/W |
| <b>R<sub>thCS</sub></b>             |                                                                                                                                                                  |                                                                    | 0.10 | °C/W      |

SOT-227B miniBLOC (IXFN)



| 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  |

## Source-Drain Diode

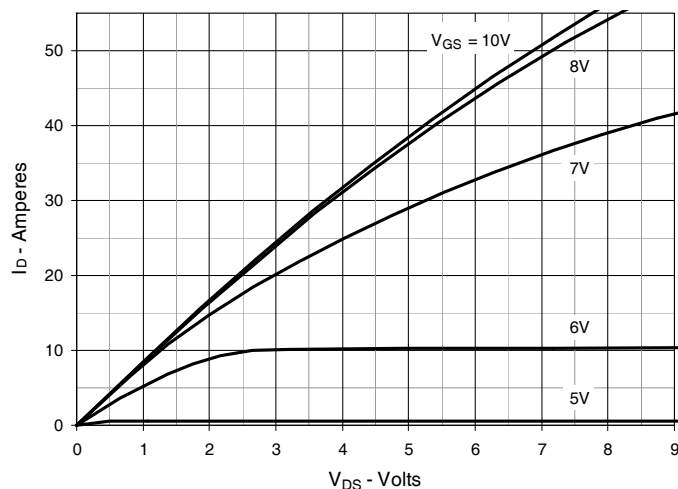
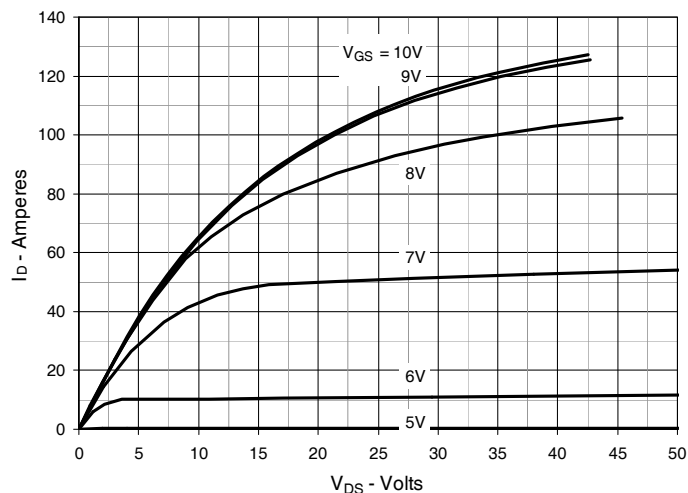
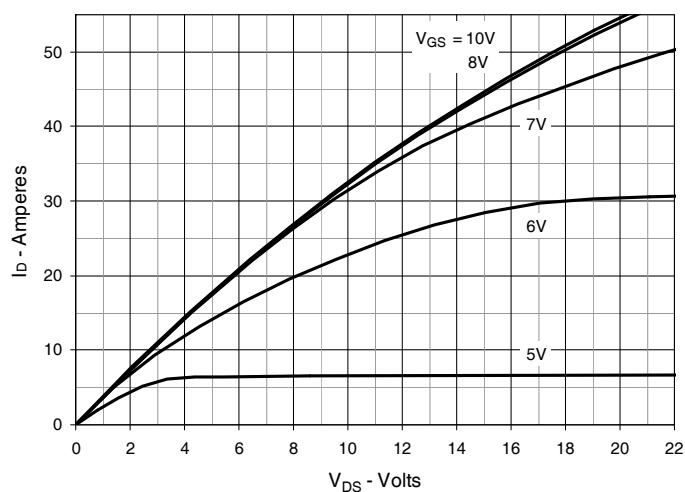
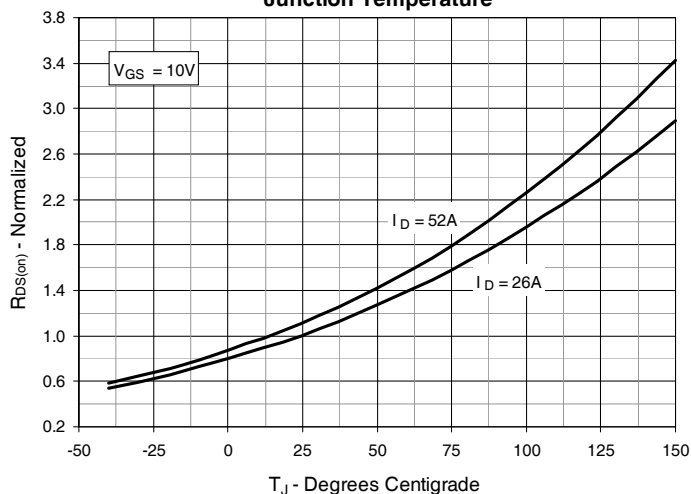
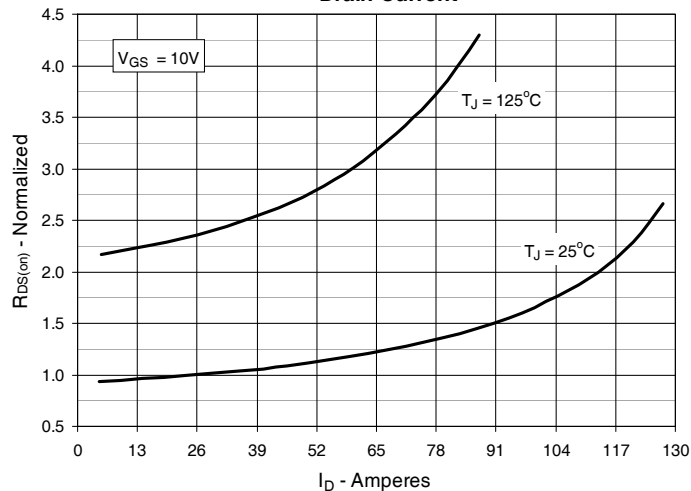
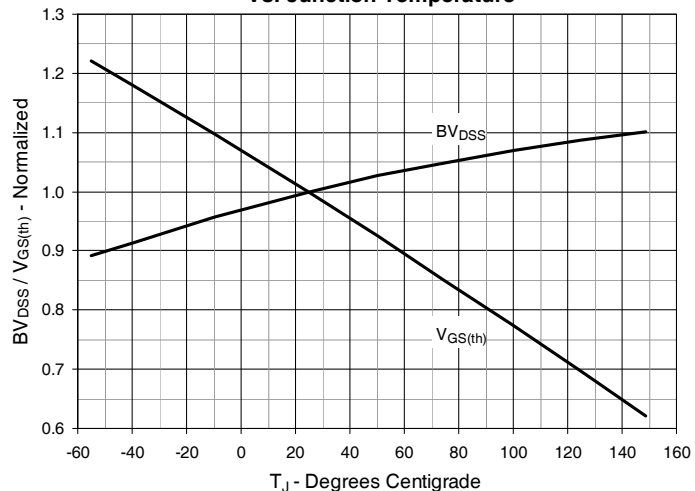
| Symbol   | Test Conditions<br>( $T_J = 25^\circ\text{C}$ , Unless Otherwise Specified)                           | Characteristic Values |      |               |
|----------|-------------------------------------------------------------------------------------------------------|-----------------------|------|---------------|
|          |                                                                                                       | Min.                  | Typ. | Max.          |
| $I_S$    | $V_{GS} = 0\text{V}$                                                                                  |                       |      | 52 A          |
| $I_{SM}$ | Repetitive, Pulse Width Limited by $T_{JM}$                                                           |                       |      | 208 A         |
| $V_{SD}$ | $I_F = I_S$ , $V_{GS} = 0\text{V}$ , Note 1                                                           |                       |      | 1.4 V         |
| $t_{rr}$ | $I_F = 26\text{A}$ , $-di/dt = 100\text{A}/\mu\text{s}$<br>$V_R = 100\text{V}$ , $V_{GS} = 0\text{V}$ |                       | 260  | ns            |
| $Q_{RM}$ |                                                                                                       |                       | 2.7  | $\mu\text{C}$ |
| $I_{RM}$ |                                                                                                       |                       | 20.8 | A             |

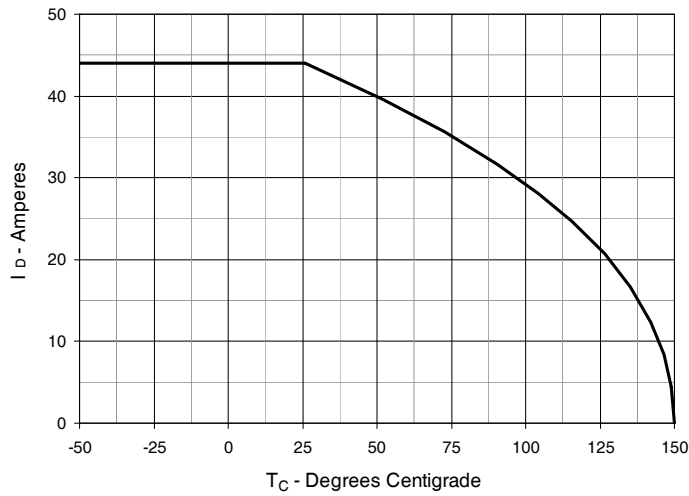
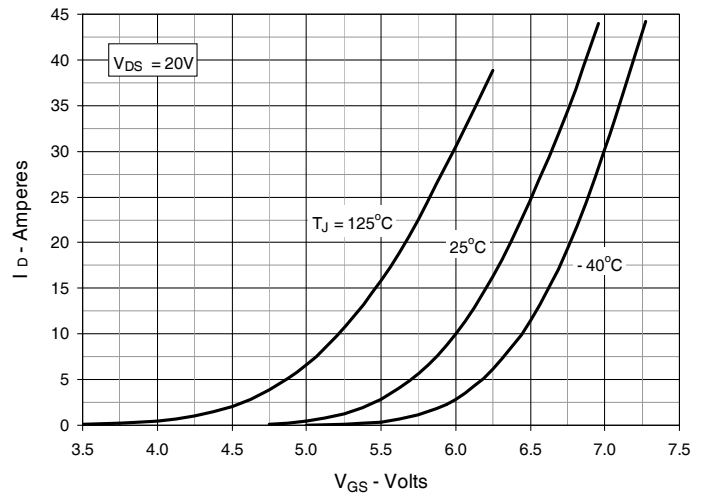
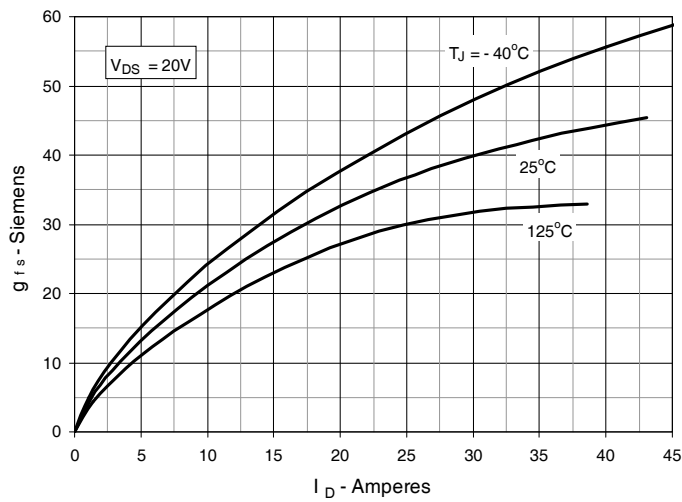
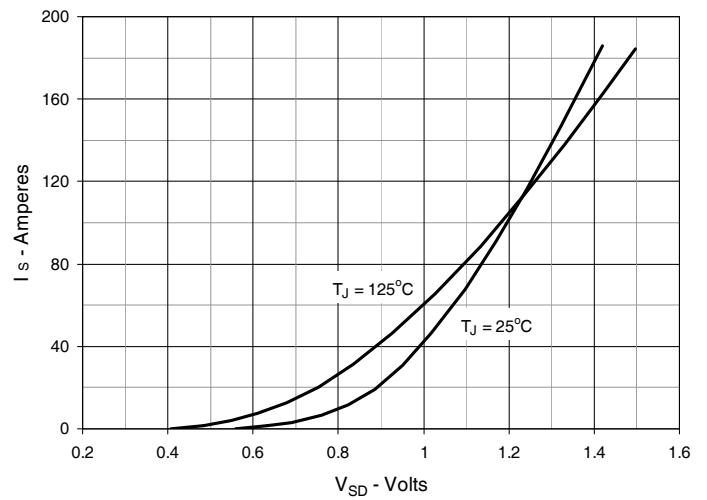
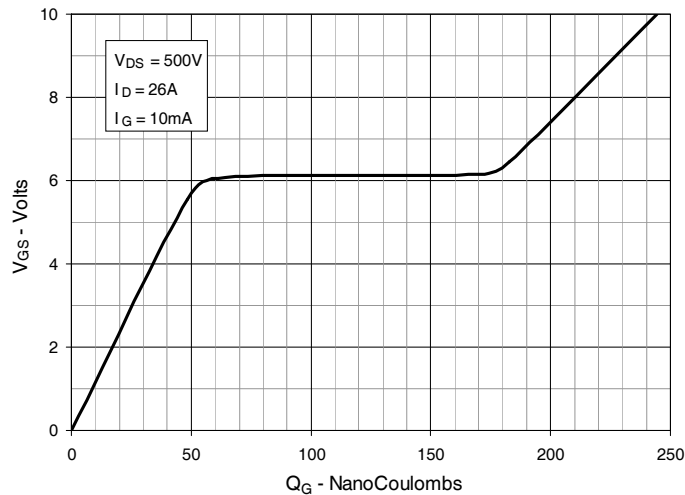
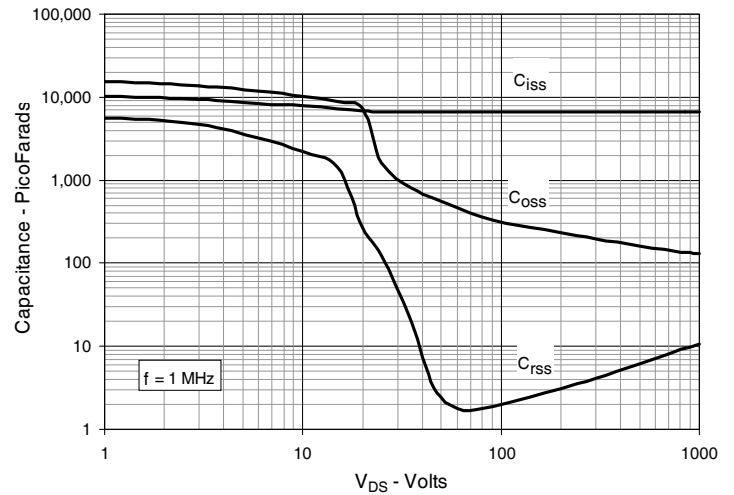
Note 1. Pulse test,  $t \leq 300\mu\text{s}$ , duty cycle,  $d \leq 2\%$ .

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

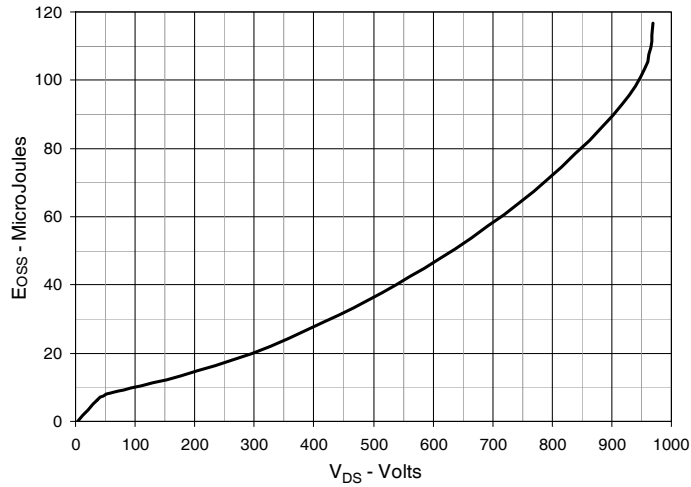
IXYS MOSFETs and IGBTs are covered by one or more of the following U.S. patents:

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

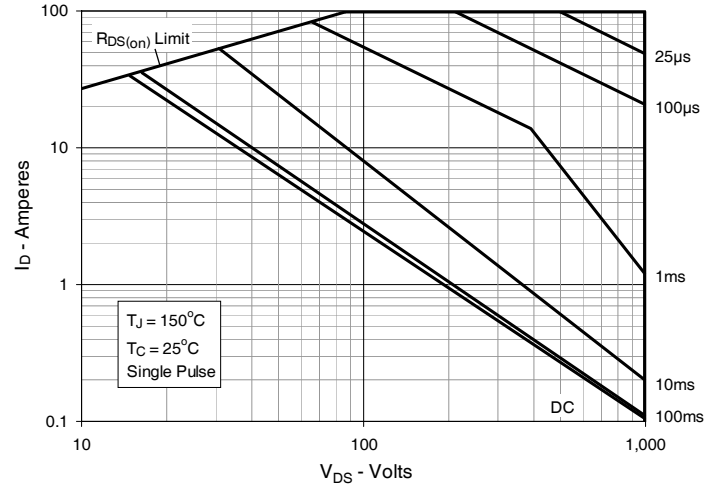
**Fig. 1. Output Characteristics @  $T_J = 25^\circ\text{C}$** 

**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  $I_D = 26\text{A}$  Value vs. Junction Temperature**

**Fig. 5.  $R_{DS(on)}$  Normalized to  $I_D = 26\text{A}$  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**

