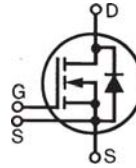


# HiPerFET™ Power MOSFETs Single Die MOSFET

## IXFN280N085

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



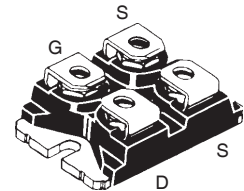
$$V_{DSS} = 85V$$

$$I_{D25} = 280A$$

$$R_{DS(on)} \leq 4.4m\Omega$$

| Symbol       | Test Conditions                                                    | Maximum Ratings    |                        |
|--------------|--------------------------------------------------------------------|--------------------|------------------------|
| $V_{DSS}$    | $T_J = 25^\circ C$ to $150^\circ C$                                | 85                 | V                      |
| $V_{DGR}$    | $T_J = 25^\circ C$ to $150^\circ C$ , $R_{GS} = 1M\Omega$          | 85                 | V                      |
| $V_{GSS}$    | Continuous                                                         | $\pm 20$           | V                      |
| $V_{GSM}$    | Transient                                                          | $\pm 30$           | V                      |
| $I_{D25}$    | $T_C = 25^\circ C$ , Chip capability                               | 280                | A                      |
| $I_{L(RMS)}$ | External Lead Current Limit                                        | 200                | A                      |
| $I_{DM}$     | $T_C = 25^\circ C$ , pulse width limited by $T_{JM}$               | 1120               | A                      |
| $I_A$        | $T_C = 25^\circ C$                                                 | 200                | A                      |
| $E_{AS}$     | $T_C = 25^\circ C$                                                 | 4                  | J                      |
| $dV/dt$      | $I_S \leq I_{DM}$ , $V_{DD} \leq V_{DSS}$ , $T_J \leq 150^\circ C$ | 5                  | V/ns                   |
| $P_d$        | $T_C = 25^\circ C$                                                 | 700                | W                      |
| $T_J$        |                                                                    | -55 ... +150       | $^\circ C$             |
| $T_{JM}$     |                                                                    | 150                | $^\circ C$             |
| $T_{stg}$    |                                                                    | -55 ... +150       | $^\circ C$             |
| $V_{ISOL}$   | 50/60 Hz, RMS $t = 1min$<br>$I_{ISOL} \leq 1mA$ $t = 1s$           | 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                      |

miniBLOC, SOT-227 B  
E153432



G = Gate  
S = Source  
D = 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
- Avalanche rated
- Guaranteed FBSOA
- Low package inductance
- Fast intrinsic Rectifier

### Advantages

- Easy to mount
- Space savings
- High power density

### Applications

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

| Symbol       | Test Conditions                                         | Characteristic Values<br>( $T_J = 25^\circ C$ , unless otherwise specified) |      |                     |
|--------------|---------------------------------------------------------|-----------------------------------------------------------------------------|------|---------------------|
|              |                                                         | Min.                                                                        | Typ. | Max.                |
| $BV_{DSS}$   | $V_{GS} = 0V$ , $I_D = 3mA$                             | 85                                                                          |      | V                   |
| $V_{GS(th)}$ | $V_{DS} = V_{GS}$ , $I_D = 8mA$                         | 2.0                                                                         |      | V                   |
| $I_{GSS}$    | $V_{GS} = \pm 20V$ , $V_{DS} = 0V$                      |                                                                             |      | $\pm 200$ nA        |
| $I_{DSS}$    | $V_{DS} = V_{DSS}$<br>$V_{GS} = 0V$ $T_J = 125^\circ C$ |                                                                             |      | 100 $\mu A$<br>2 mA |
| $R_{DS(on)}$ | $V_{GS} = 10V$ , $I_D = 100A$ , Note 1                  |                                                                             |      | 4.4 m $\Omega$      |

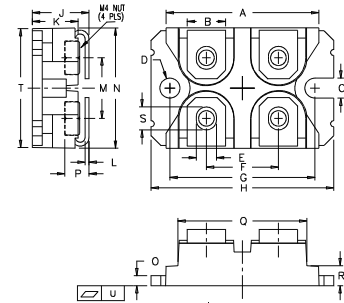
| Symbol       | Test Conditions<br>( $T_J = 25^\circ\text{C}$ , unless otherwise specified)                                                                 | Characteristic Values |      |                         |
|--------------|---------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|------|-------------------------|
|              |                                                                                                                                             | Min.                  | Typ. | Max.                    |
| $g_{fs}$     | $V_{DS} = 10\text{V}$ , $I_D = 60\text{A}$ , Note 1                                                                                         | 60                    | 100  | S                       |
| $C_{iss}$    | $V_{GS} = 0\text{V}$ , $V_{DS} = 25\text{V}$ , $f = 1\text{MHz}$                                                                            |                       | 19   | nF                      |
| $C_{oss}$    |                                                                                                                                             |                       | 6.4  | nF                      |
| $C_{rss}$    |                                                                                                                                             |                       | 3.2  | nF                      |
| $t_{d(on)}$  | <b>Resistive Switching Times</b><br>$V_{GS} = 10\text{V}$ , $V_{DS} = 0.5 \cdot V_{DSS}$ , $I_D = 60\text{A}$<br>$R_G = 1\Omega$ (External) |                       | 40   | ns                      |
| $t_r$        |                                                                                                                                             |                       | 150  | ns                      |
| $t_{d(off)}$ |                                                                                                                                             |                       | 112  | ns                      |
| $t_f$        |                                                                                                                                             |                       | 60   | ns                      |
| $Q_{g(on)}$  | $V_{GS} = 10\text{V}$ , $V_{DS} = 0.5 \cdot V_{DSS}$ , $I_D = 100\text{A}$                                                                  |                       | 580  | nC                      |
| $Q_{gs}$     |                                                                                                                                             |                       | 77   | nC                      |
| $Q_{gd}$     |                                                                                                                                             |                       | 280  | nC                      |
| $R_{thJC}$   |                                                                                                                                             |                       |      | 0.18 $^\circ\text{C/W}$ |
| $R_{thCS}$   |                                                                                                                                             |                       | 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.          |
| $I_S$    | $V_{GS} = 0\text{V}$                                                         |                       |      | 280 A         |
| $I_{SM}$ | Repetitive, pulse width limited by $T_{JM}$                                  |                       |      | 1120 A        |
| $V_{SD}$ | $I_F = 100\text{A}$ , $V_{GS} = 0\text{V}$ , Note 1                          |                       |      | 1.2 V         |
| $t_{rr}$ | $I_F = 50\text{A}$ , $-di/dt = 100\text{A}/\mu\text{s}$ , $V_R = 50\text{V}$ |                       |      | 200 ns        |
| $Q_{RM}$ |                                                                              |                       | 0.76 | $\mu\text{C}$ |
| $I_{RM}$ |                                                                              |                       | 8.00 | A             |

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

## miniBLOC, SOT-227 B



M4 screws (4x) supplied

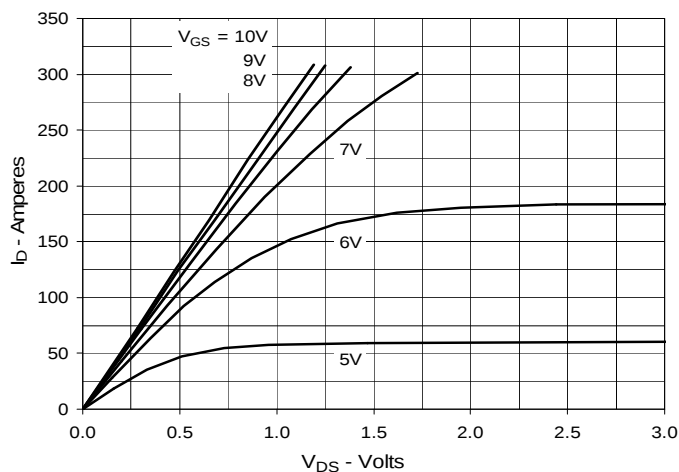
| Dim. | Millimeter |       | Inches |       |
|------|------------|-------|--------|-------|
|      | Min.       | Max.  | Min.   | Max.  |
| A    | 31.50      | 31.88 | 1.240  | 1.255 |
| B    | 7.80       | 8.20  | 0.307  | 0.323 |
| C    | 4.09       | 4.29  | 0.161  | 0.169 |
| D    | 4.09       | 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 |

IXYS reserves the right to change limits, test conditions, and dimensions.

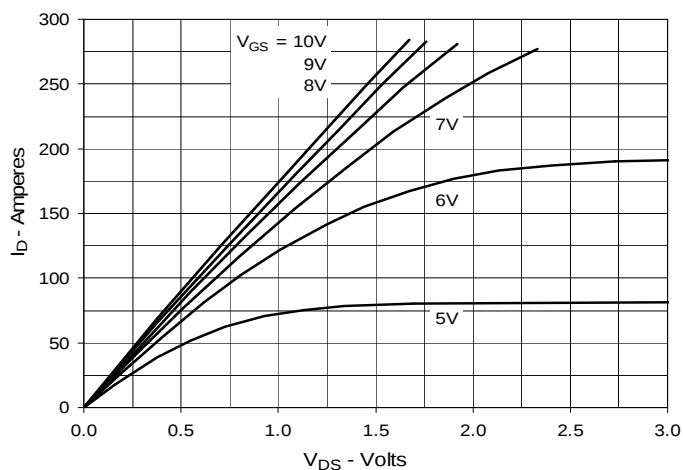
IXYS MOSFETs and IGBTs are covered by one or more of the following U.S. patents:

|           |           |           |           |              |              |              |              |              |             |
|-----------|-----------|-----------|-----------|--------------|--------------|--------------|--------------|--------------|-------------|
| 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 |
| 4,850,072 | 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    |             |

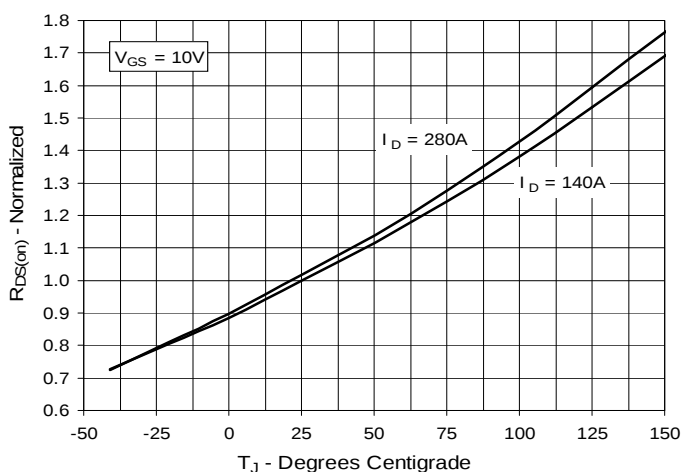
**Fig. 1. Extended Output Characteristics  
@ 25°C**



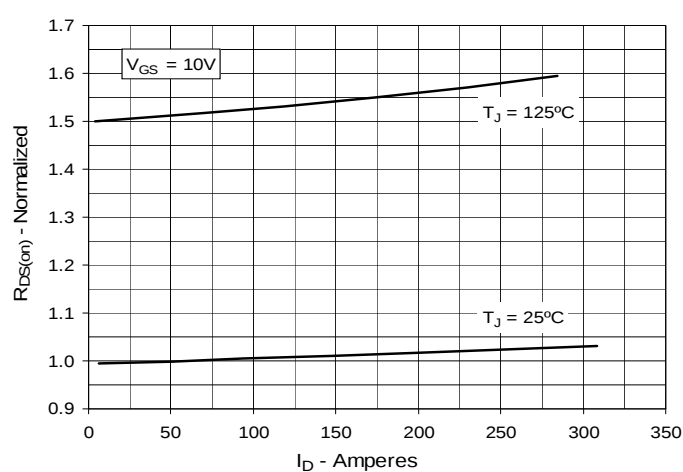
**Fig. 2. Output Characteristics  
@ 125°C**



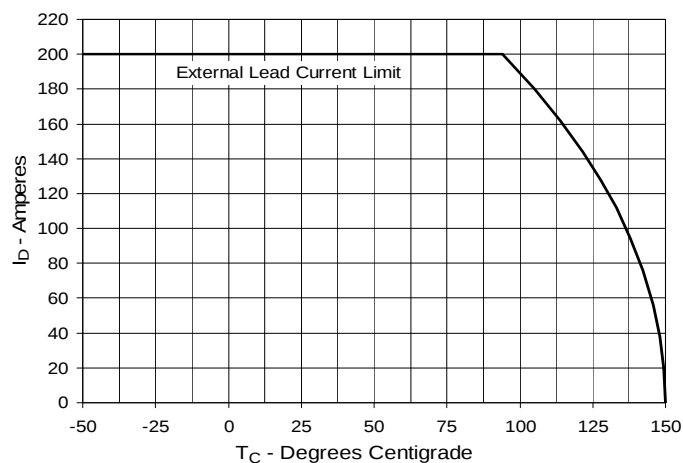
**Fig. 3.  $R_{DS(on)}$  Normalized to  $I_D = 140A$  Value  
vs. Junction Temperature**



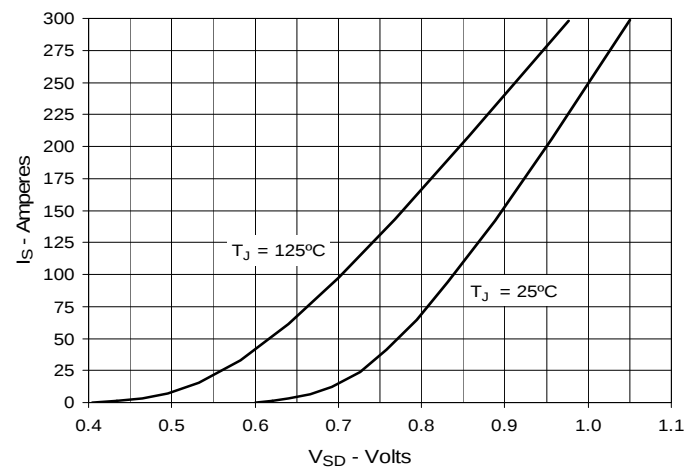
**Fig. 4.  $R_{DS(on)}$  Normalized to  $I_D = 140A$  Value  
vs. Drain Current**

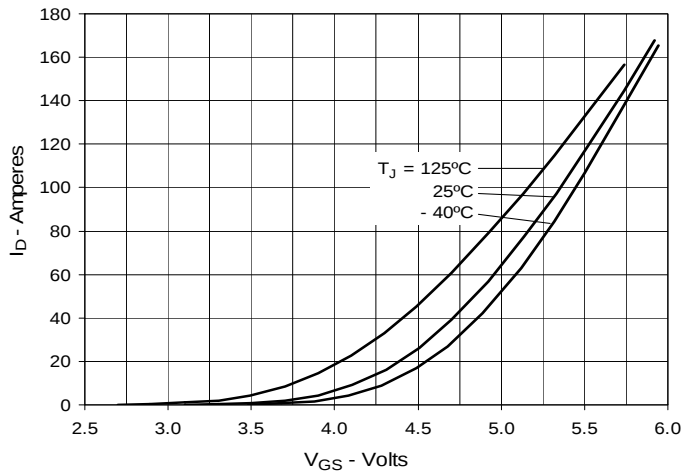
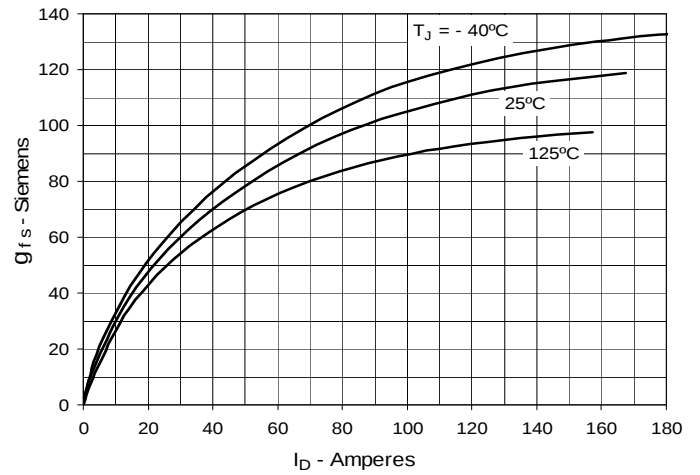
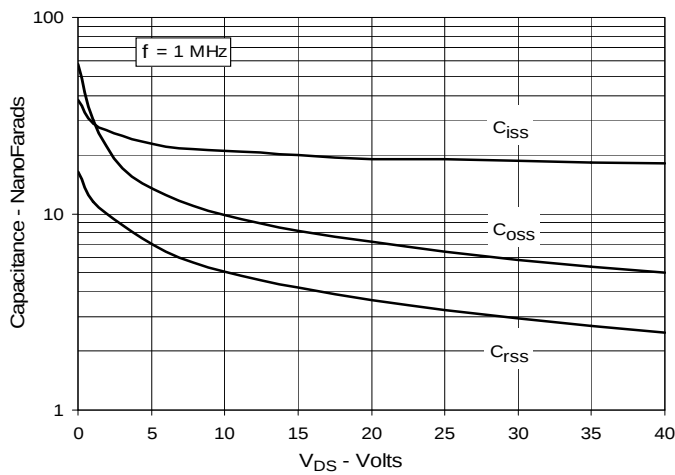
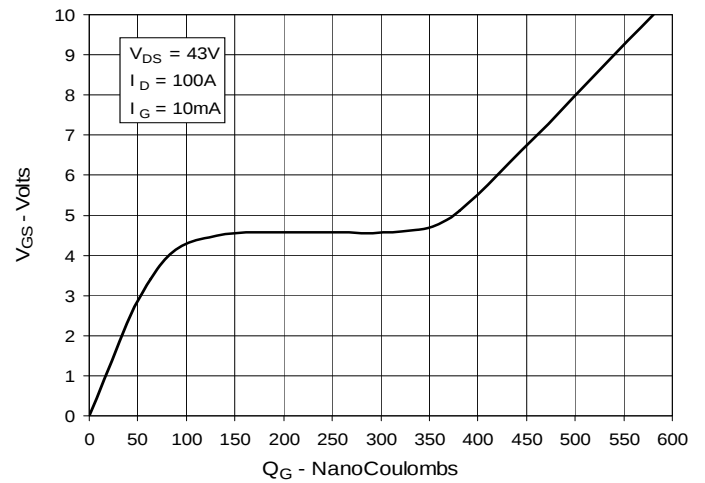
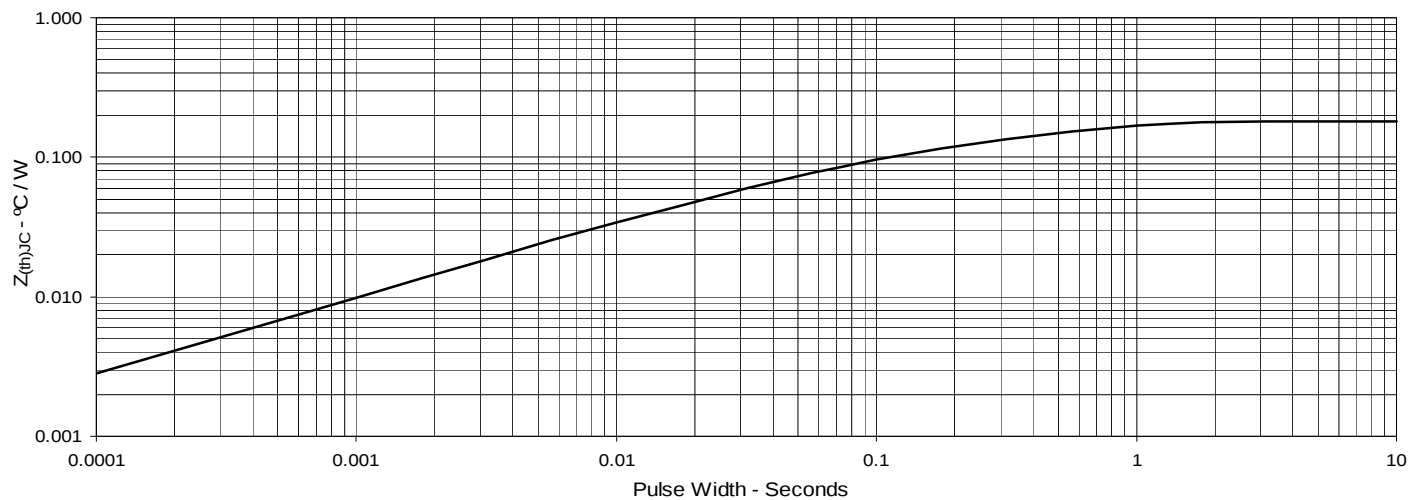


**Fig. 5. Maximum Drain Current vs.  
Case Temperature**

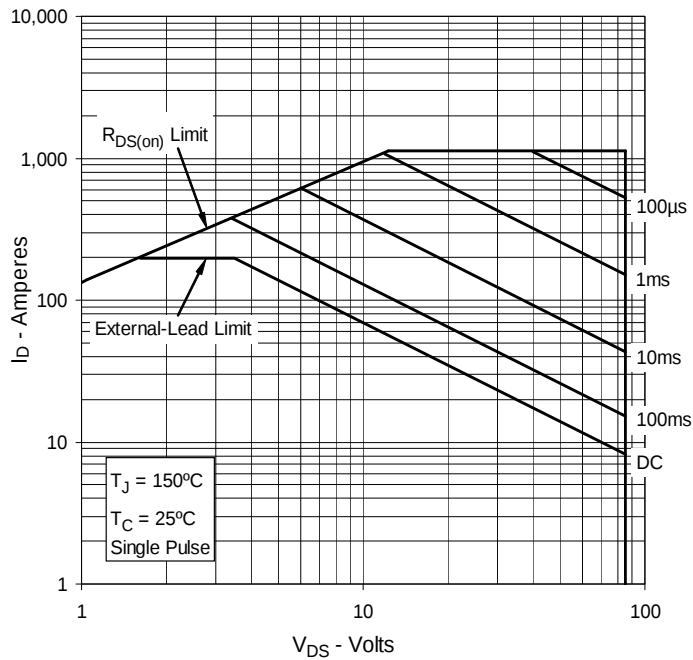


**Fig. 6. Forward Voltage Drop of  
Intrinsic Diode**

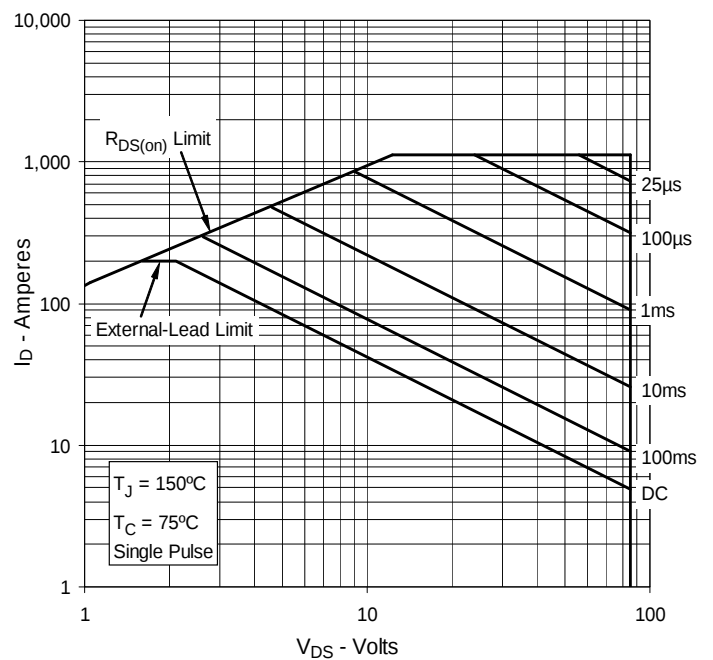


**Fig. 7. Input Admittance**

**Fig. 8. Transconductance**

**Fig. 9. Capacitance**

**Fig. 10. Gate Charge**

**Fig. 11. Maximum Transient Thermal Impedance**


**Fig. 12. Forward-Bias Safe Operating Area**  
@  $T_C = 25^\circ\text{C}$



**Fig. 13. Forward-Bias Safe Operating Area**  
@  $T_C = 75^\circ\text{C}$





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