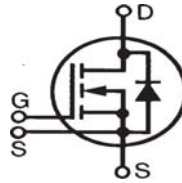


### Linear L2™ Power MOSFET w/Extended FBSOA

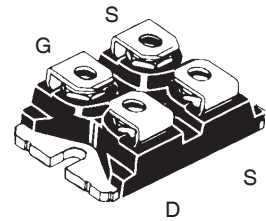
### IXTN110N20L2

N-Channel Enhancement Mode  
Guaranteed FBSOA  
Avalanche Rated



$$\begin{aligned} V_{DSS} &= 200V \\ I_{D25} &= 100A \\ R_{DS(on)} &\leq 24m\Omega \end{aligned}$$

miniBLOC, SOT-227  
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 |                  |
|------------|-------------------------------------------------------------------|-----------------|------------------|
| $V_{DSS}$  | $T_J = 25^\circ\text{C to } 150^\circ\text{C}$                    | 200             | V                |
| $V_{DGR}$  | $T_J = 25^\circ\text{C to } 150^\circ\text{C}, R_{GS} = 1M\Omega$ | 200             | V                |
| $V_{GSS}$  | Continuous                                                        | $\pm 20$        | V                |
| $V_{GSM}$  | Transient                                                         | $\pm 30$        | V                |
| $I_{D25}$  | $T_C = 25^\circ\text{C}$                                          | 100             | A                |
| $I_{DM}$   | $T_C = 25^\circ\text{C}$ , Pulse Width Limited by $T_{JM}$        | 275             | A                |
| $I_A$      | $T_C = 25^\circ\text{C}$                                          | 55              | A                |
| $E_{AS}$   | $T_C = 25^\circ\text{C}$                                          | 5               | J                |
| $P_D$      | $T_C = 25^\circ\text{C}$                                          | 735             | W                |
| $T_J$      |                                                                   | -55 ... +150    | $^\circ\text{C}$ |
| $T_{JM}$   |                                                                   | 150             | $^\circ\text{C}$ |
| $T_{stg}$  |                                                                   | -55 ... +150    | $^\circ\text{C}$ |
| $T_L$      | 1.6mm (0.062 in.) from Case for 10s                               | 300             | $^\circ\text{C}$ |
| $T_{SOLD}$ | Plastic Body for 10s                                              | 260             | $^\circ\text{C}$ |
| $V_{ISOL}$ | 50/60 Hz, RMS $t = 1 \text{ Minute}$                              | 2500            | V~               |
|            | $I_{ISOL} \leq 1mA$ $t = 1 \text{ Second}$                        | 3000            | V~               |
| $M_d$      | Mounting Torque                                                   | 1.5/13          | Nm/lb.in.        |
|            | Terminal Connection Torque                                        | 1.3/11.5        | Nm/lb.in.        |
| Weight     |                                                                   | 30              | g                |

#### Features

- Designed for Linear Operation
- International Standard Package
- Guaranteed FBSOA at  $75^\circ\text{C}$
- Avalanche Rated
- Molding Epoxy Meets UL94 V-0 Flammability Classification
- MiniBLOC with Aluminium Nitride Isolation

#### Applications

- Programmable Loads
- Current Regulators
- DC-DC Converters
- Battery Chargers
- DC Choppers
- Temperature and Lighting Controls

#### Advantages

- Easy to Mount
- Space Savings
- High Power Density

| Symbol       | Test Conditions<br>( $T_J = 25^\circ\text{C}$ , Unless Otherwise Specified) | Characteristic Values |      |                            |
|--------------|-----------------------------------------------------------------------------|-----------------------|------|----------------------------|
|              |                                                                             | Min.                  | Typ. | Max.                       |
| $BV_{DSS}$   | $V_{GS} = 0V, I_D = 1mA$                                                    | 200                   |      | V                          |
| $V_{GS(th)}$ | $V_{DS} = V_{GS}, I_D = 3mA$                                                | 2.0                   |      | 4.5 V                      |
| $I_{GSS}$    | $V_{GS} = \pm 20V, V_{DS} = 0V$                                             |                       |      | $\pm 200 \text{ nA}$       |
| $I_{DSS}$    | $V_{DS} = V_{DSS}, V_{GS} = 0V$<br>$T_J = 125^\circ\text{C}$                |                       |      | 50 $\mu\text{A}$<br>2.5 mA |
| $R_{DS(on)}$ | $V_{GS} = 10V, I_D = 55A$ , Note 1                                          |                       |      | 24 m $\Omega$              |

| Symbol       | Test Conditions<br>( $T_J = 25^{\circ}\text{C}$ , Unless Otherwise Specified)                                                               | Characteristic Values |      |                           |
|--------------|---------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|------|---------------------------|
|              |                                                                                                                                             | Min.                  | Typ. | Max.                      |
| $g_{fs}$     | $V_{DS} = 10\text{V}$ , $I_D = 55\text{A}$ , Note 1                                                                                         | 55                    | 75   | 95 S                      |
| $C_{iss}$    | $V_{GS} = 0\text{V}$ , $V_{DS} = 25\text{V}$ , $f = 1\text{MHz}$                                                                            |                       | 23   | nF                        |
| $C_{oss}$    |                                                                                                                                             |                       | 2160 | pF                        |
| $C_{rss}$    |                                                                                                                                             |                       | 320  | pF                        |
| $t_{d(on)}$  | <b>Resistive Switching Times</b><br>$V_{GS} = 10\text{V}$ , $V_{DS} = 0.5 \cdot V_{DSS}$ , $I_D = 55\text{A}$<br>$R_G = 1\Omega$ (External) |                       | 40   | ns                        |
| $t_r$        |                                                                                                                                             |                       | 100  | ns                        |
| $t_{d(off)}$ |                                                                                                                                             |                       | 33   | ns                        |
| $t_f$        |                                                                                                                                             |                       | 135  | ns                        |
| $Q_{g(on)}$  | $V_{GS} = 10\text{V}$ , $V_{DS} = 0.5 \cdot V_{DSS}$ , $I_D = 55\text{A}$                                                                   |                       | 500  | nC                        |
| $Q_{gs}$     |                                                                                                                                             |                       | 110  | nC                        |
| $Q_{gd}$     |                                                                                                                                             |                       | 182  | nC                        |
| $R_{thJC}$   |                                                                                                                                             |                       |      | 0.17 $^{\circ}\text{C/W}$ |
| $R_{thCS}$   |                                                                                                                                             |                       | 0.05 | $^{\circ}\text{C/W}$      |

## Safe-Operating-Area Specification

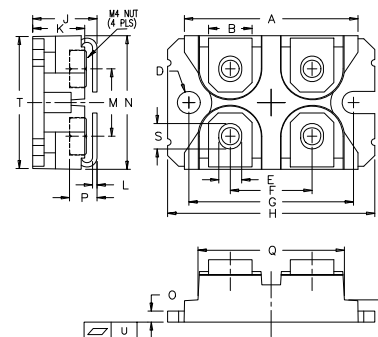
| Symbol | Test Conditions                                                                                | Characteristic Values |      |      |
|--------|------------------------------------------------------------------------------------------------|-----------------------|------|------|
|        |                                                                                                | Min.                  | Typ. | Max. |
| SOA    | $V_{DS} = 200\text{V}$ , $I_D = 1.75\text{A}$ , $T_C = 75^{\circ}\text{C}$ , $T_p = 3\text{s}$ | 350                   |      | W    |

## Source-Drain Diode

| Symbol   | Test Conditions<br>( $T_J = 25^{\circ}\text{C}$ , Unless Otherwise Specified)                           | Characteristic Values |      |               |
|----------|---------------------------------------------------------------------------------------------------------|-----------------------|------|---------------|
|          |                                                                                                         | Min.                  | Typ. | Max.          |
| $I_S$    | $V_{GS} = 0\text{V}$                                                                                    |                       |      | 110 A         |
| $I_{SM}$ | Repetitive, Pulse Width Limited by $T_{JM}$                                                             |                       |      | 440 A         |
| $V_{SD}$ | $I_F = 55\text{A}$ , $V_{GS} = 0\text{V}$ , Note 1                                                      |                       |      | 1.35 V        |
| $t_{rr}$ | $I_F = 55\text{A}$ , $-di/dt = 100\text{A}/\mu\text{s}$ ,<br>$V_R = 100\text{V}$ , $V_{GS} = 0\text{V}$ |                       | 420  | ns            |
| $I_{RM}$ |                                                                                                         |                       | 39   | A             |
| $Q_{RM}$ |                                                                                                         |                       | 8.3  | $\mu\text{C}$ |

Note 1. Pulse Test,  $t \leq 300\mu\text{s}$ ; Duty Cycle,  $d \leq 2\%$ .

## SOT-227B (IXTN) Outline



(M4 screws (4x) supplied)

| SYM | INCHES |       | MILLIMETERS |       |
|-----|--------|-------|-------------|-------|
|     | MIN    | MAX   | MIN         | MAX   |
| A   | 1.240  | 1.255 | 31.50       | 31.88 |
| B   | .307   | .323  | 7.80        | 8.20  |
| C   | .161   | .169  | 4.09        | 4.29  |
| D   | .161   | .169  | 4.09        | 4.29  |
| E   | .161   | .169  | 4.09        | 4.29  |
| F   | .587   | .595  | 14.91       | 15.11 |
| G   | 1.186  | 1.193 | 30.12       | 30.30 |
| H   | 1.496  | 1.505 | 38.00       | 38.23 |
| J   | .460   | .481  | 11.68       | 12.22 |
| K   | .351   | .378  | 8.92        | 9.60  |
| L   | .030   | .033  | 0.76        | 0.84  |
| M   | .496   | .506  | 12.60       | 12.85 |
| N   | .990   | 1.001 | 25.15       | 25.42 |
| O   | .078   | .084  | 1.98        | 2.13  |
| P   | .195   | .235  | 4.95        | 5.97  |
| Q   | 1.045  | 1.059 | 26.54       | 26.90 |
| R   | .155   | .174  | 3.94        | 4.42  |
| S   | .186   | .191  | 4.72        | 4.85  |
| T   | .968   | .987  | 24.59       | 25.07 |
| U   | -.002  | .004  | -0.05       | 0.1   |

## ADVANCE TECHNICAL INFORMATION

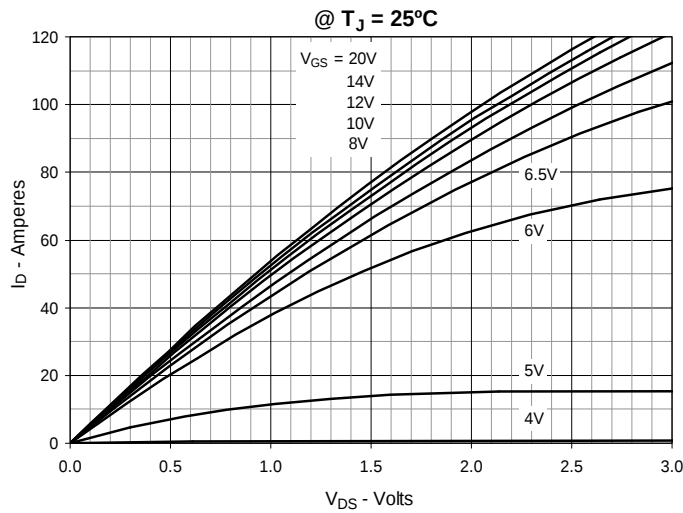
The product presented herein is under development. The Technical Specifications offered are derived from a subjective evaluation of the design, based upon prior knowledge and experience, and constitute a "considered reflection" of the anticipated result. IXYS reserves the right to change limits, test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

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

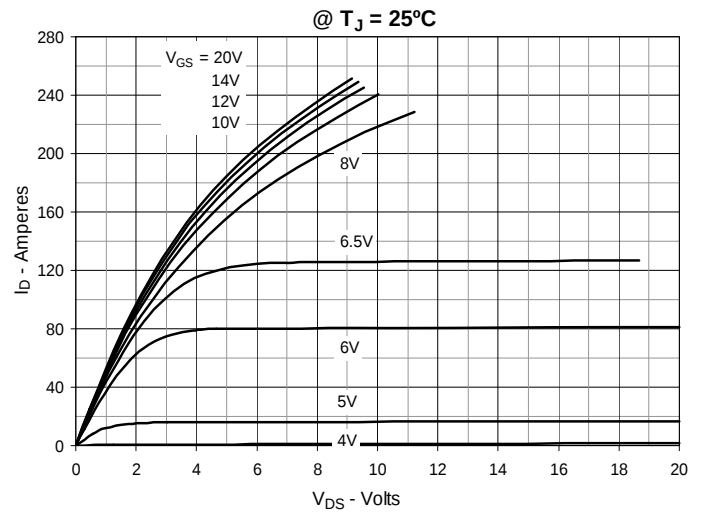
IXYS MOSFETs and IGBTs are covered by one or more of the following U.S. patents:

|           |           |           |           |              |              |              |              |              |              |
|-----------|-----------|-----------|-----------|--------------|--------------|--------------|--------------|--------------|--------------|
| 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 | 7,157,338 B2 |
| 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    |              |

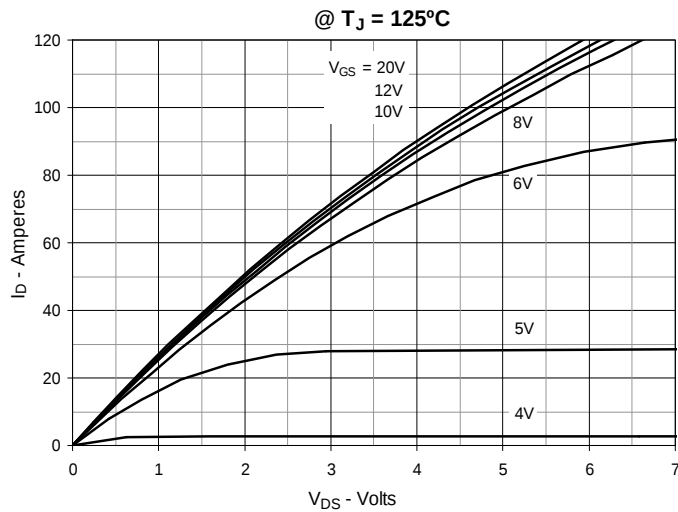
**Fig. 1. Output Characteristics**



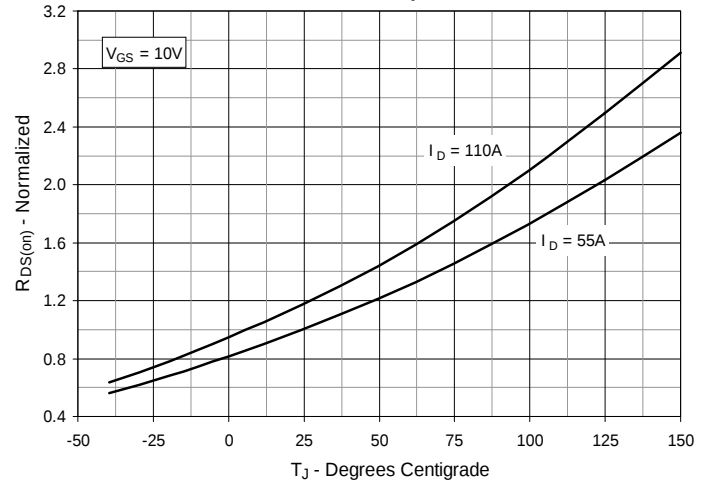
**Fig. 2. Extended Output Characteristics**



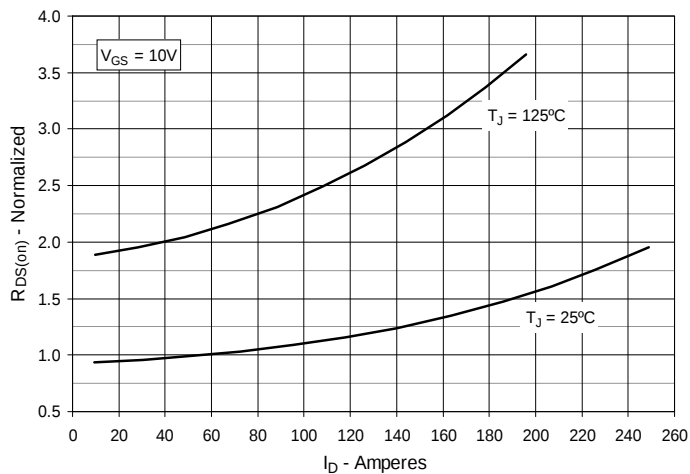
**Fig. 3. Output Characteristics**



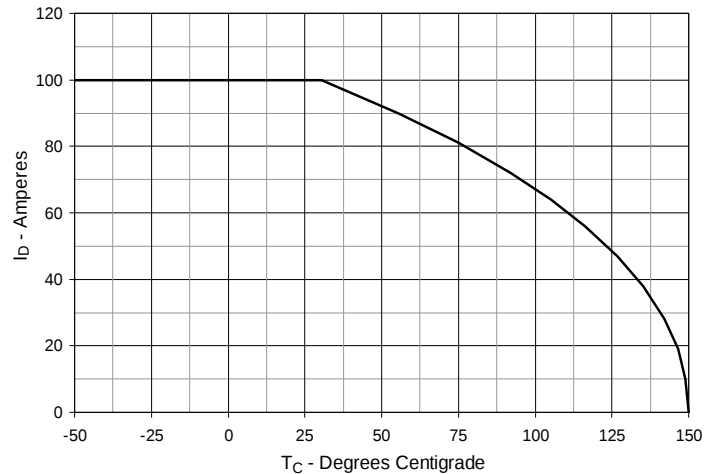
**Fig. 4.  $R_{DS(on)}$  Normalized to  $I_D = 55\text{A}$  Value vs. Junction Temperature**



**Fig. 5.  $R_{DS(on)}$  Normalized to  $I_D = 55\text{A}$  Value vs. Drain Current**



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



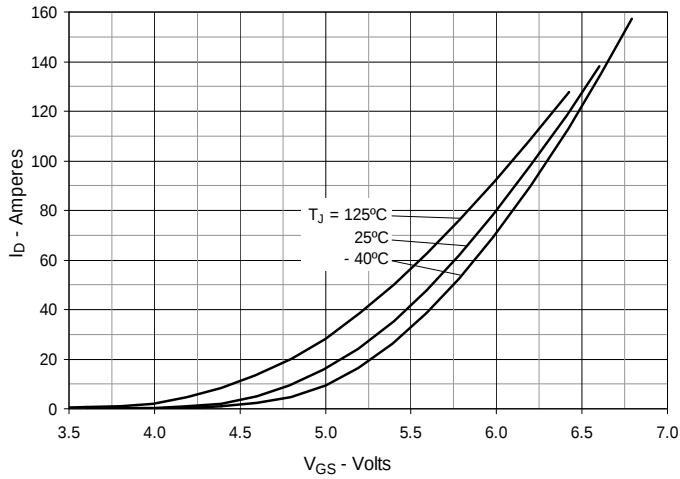
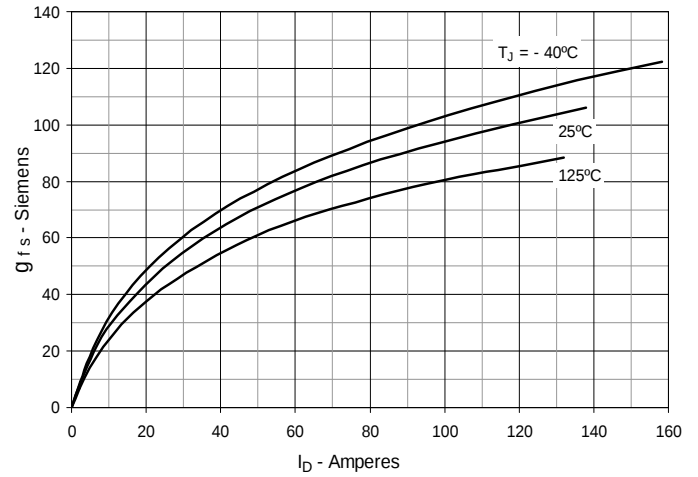
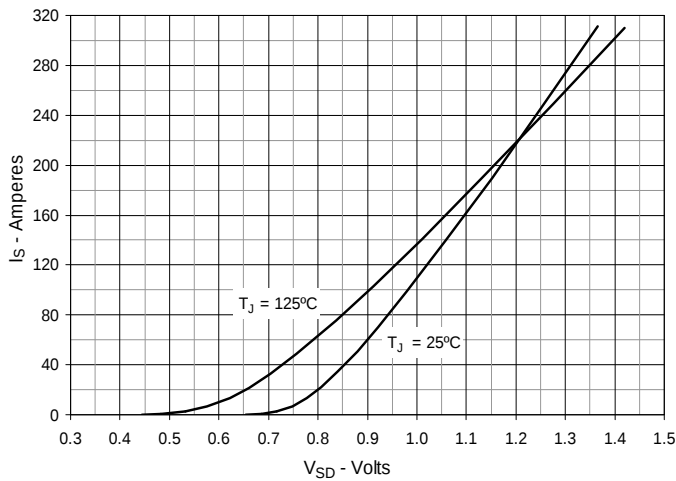
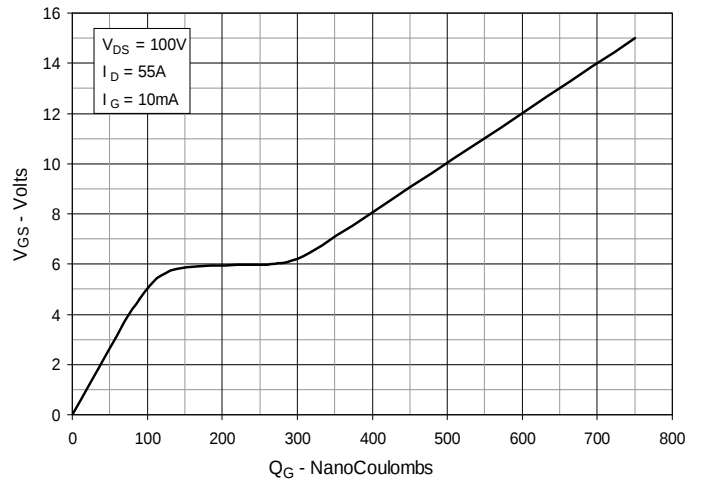
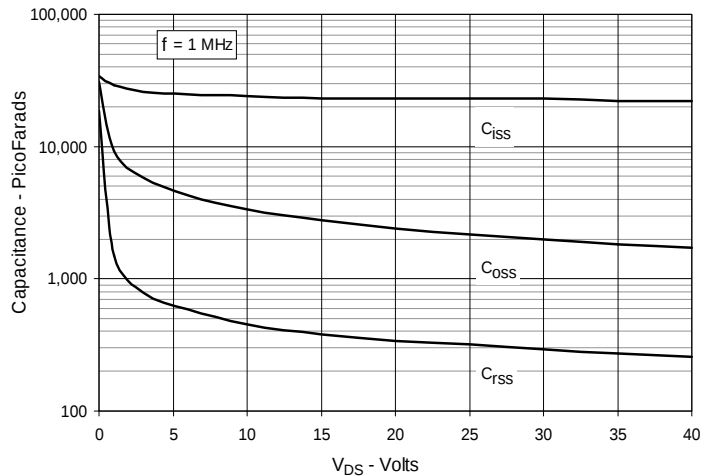
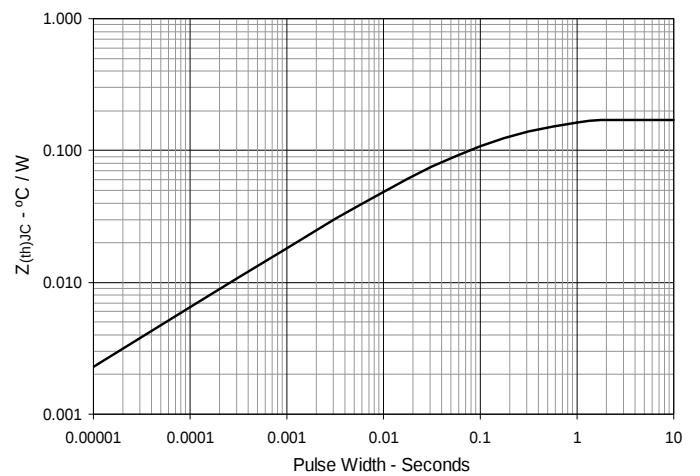
**Fig. 7. Input Admittance**

**Fig. 8. Transconductance**

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

**Fig. 10. Gate Charge**

**Fig. 11. Capacitance**

**Fig. 12. Maximum Transient Thermal Impedance**


Fig. 13. Forward-Bias Safe Operating Area  
@  $T_C = 25^\circ\text{C}$

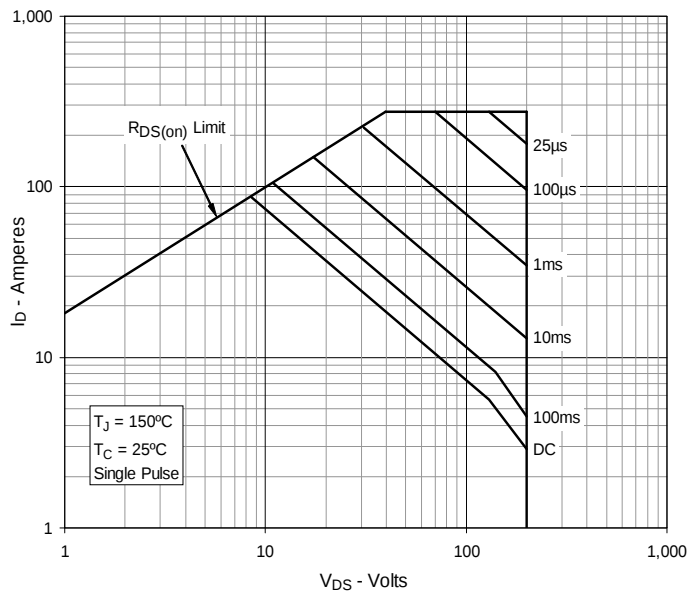
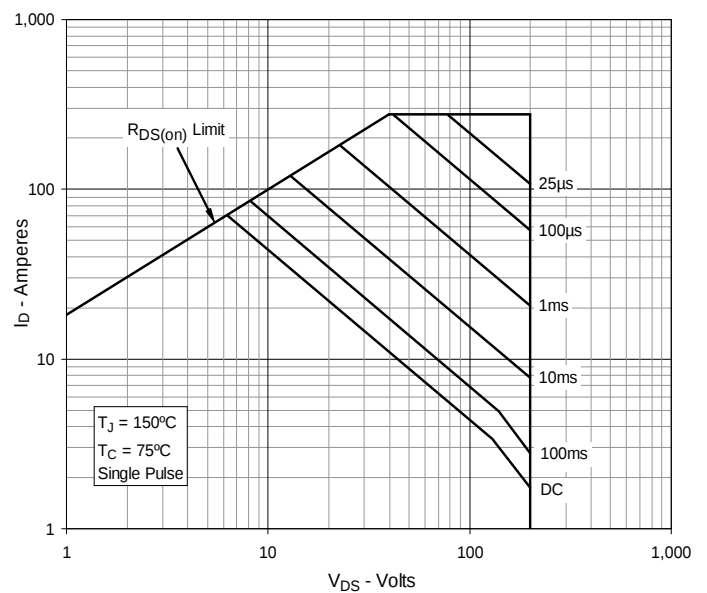


Fig. 14. Forward-Bias Safe Operating Area  
@  $T_C = 75^\circ\text{C}$





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