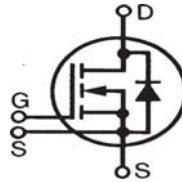


## Linear L2™ Power MOSFET w/Extended FBSOA

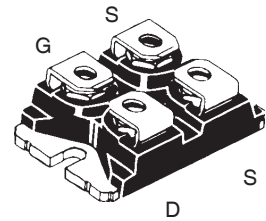
## IXTN110N20L2

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~               |
|            | $I_{ISOL} \leq 1\text{mA}$ $t = 1 \text{ Second}$                 | 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.                 |
| $BV_{DSS}$   | $V_{GS} = 0V, I_D = 1\text{mA}$                                             | 200                   |      | V                    |
| $V_{GS(th)}$ | $V_{DS} = V_{GS}, I_D = 3\text{mA}$                                         | 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 $\mu\text{A}$     |
|              |                                                                             |                       |      | 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

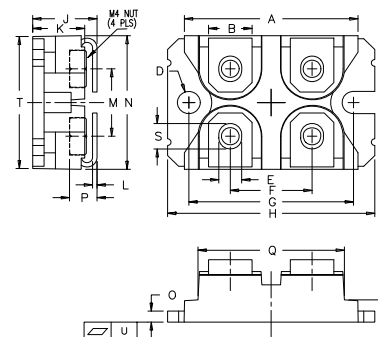
| Symbol | Test Conditions                                                                              | Characteristic Values |      |      |
|--------|----------------------------------------------------------------------------------------------|-----------------------|------|------|
|        |                                                                                              | 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   |

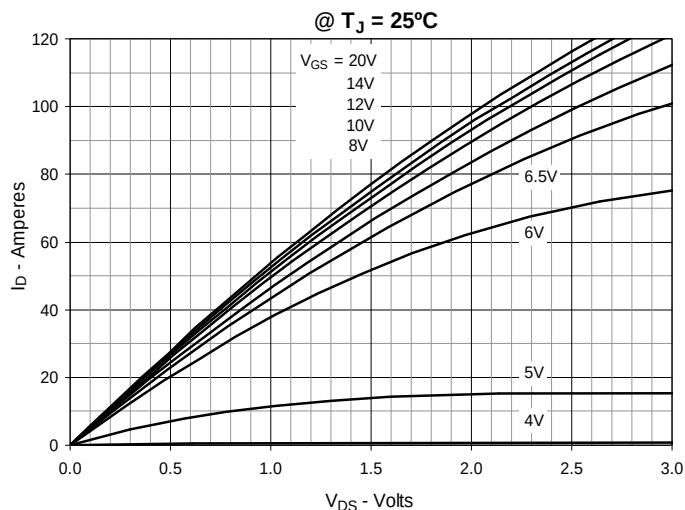
## ADVANCE TECHNICAL INFORMATION

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.

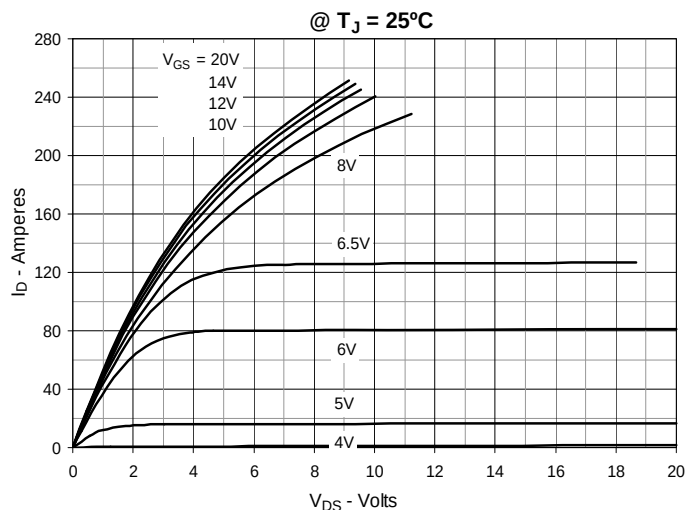
IXYS Reserves the Right to Change Limits, Test Conditions, and Dimensions.

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

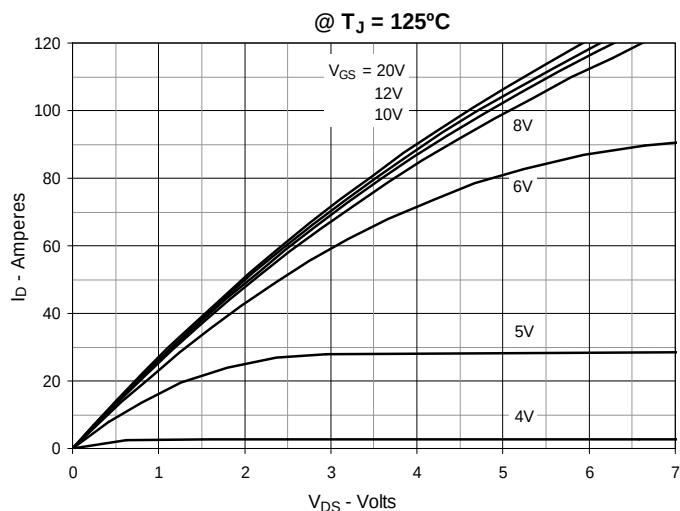
**Fig. 1. Output Characteristics**



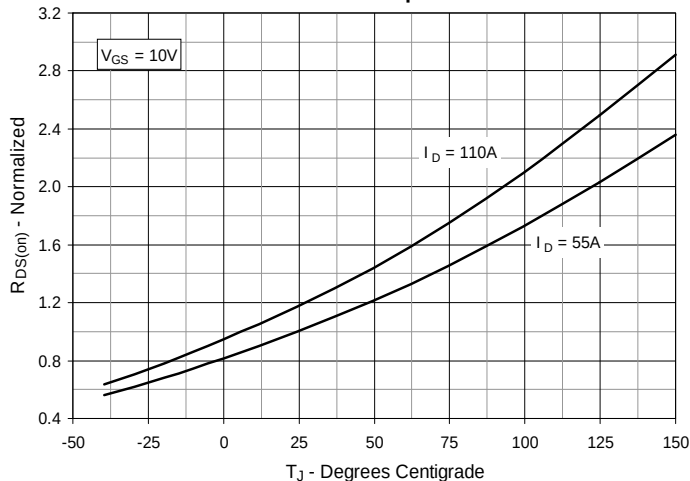
**Fig. 2. Extended Output Characteristics**



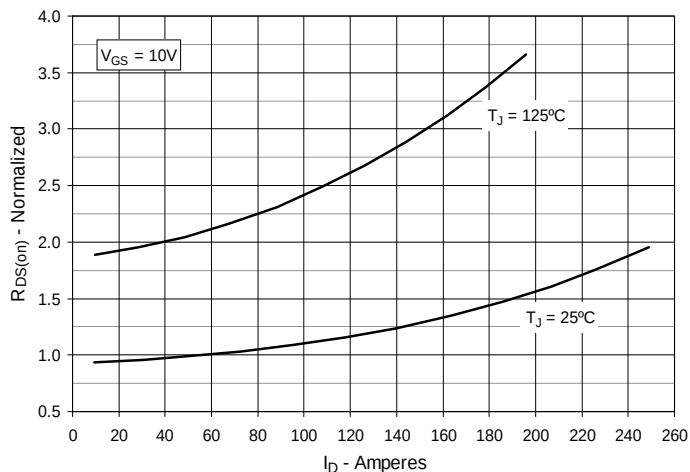
**Fig. 3. Output Characteristics**



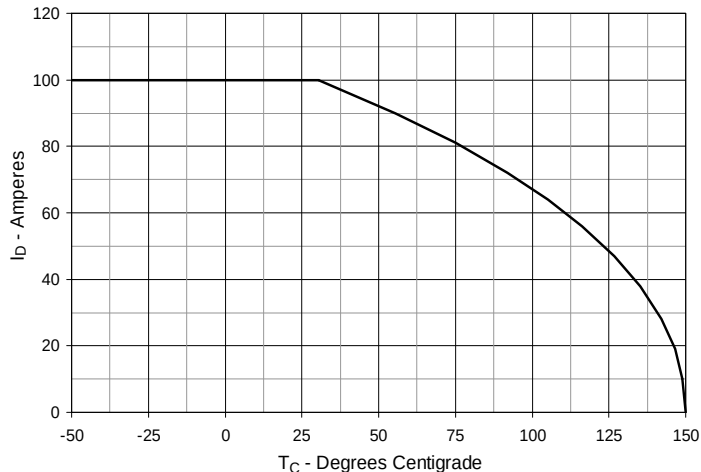
**Fig. 4.  $R_{DS(on)}$  Normalized to  $I_D = 55\text{A}$  Value vs. Junction Temperature**



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



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



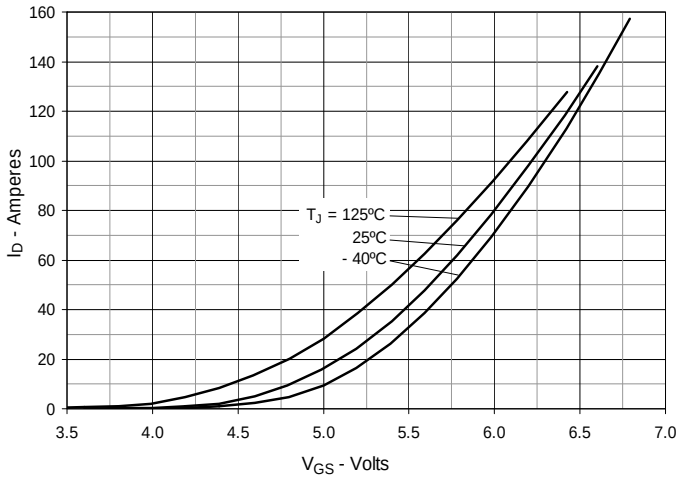
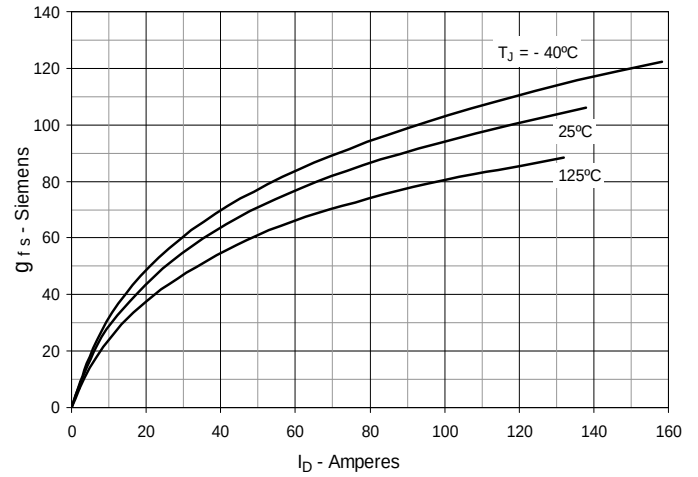
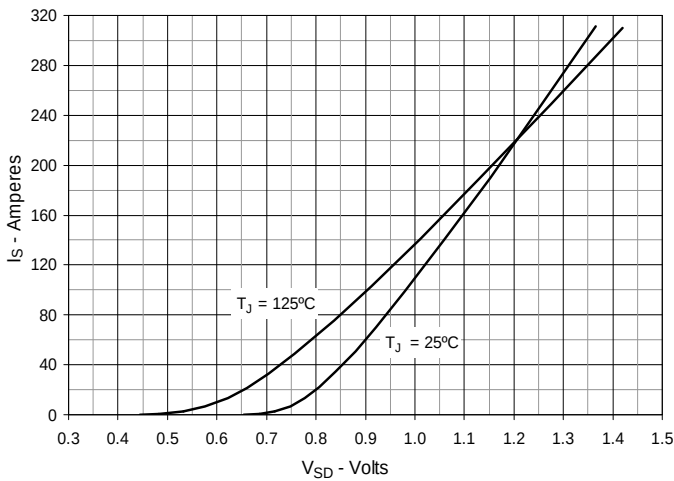
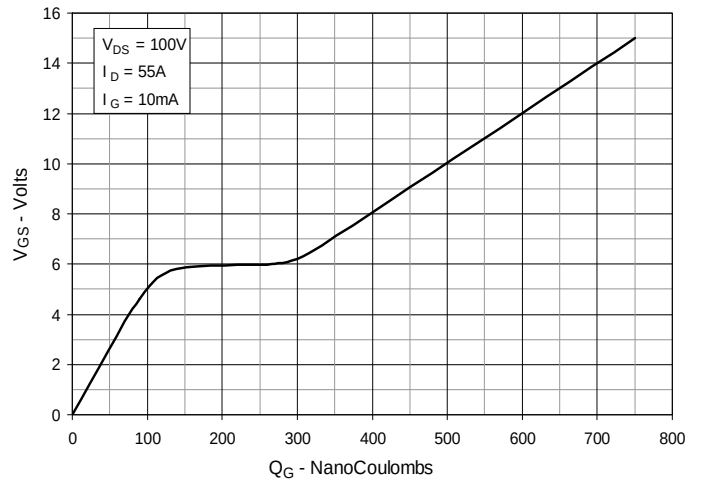
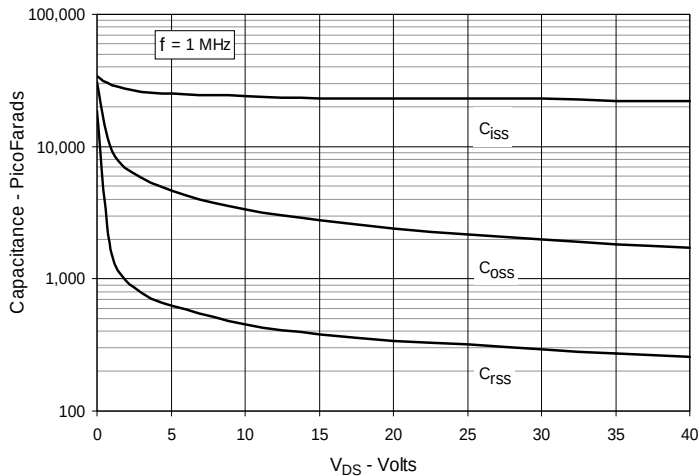
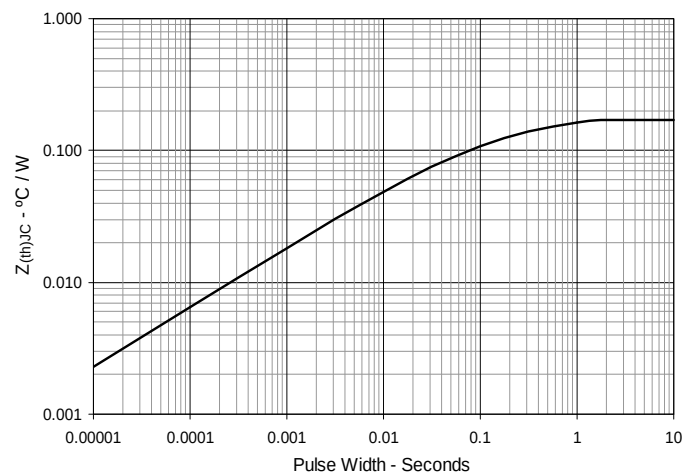
**Fig. 7. Input Admittance**

**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  
@  $T_C = 25^\circ\text{C}$

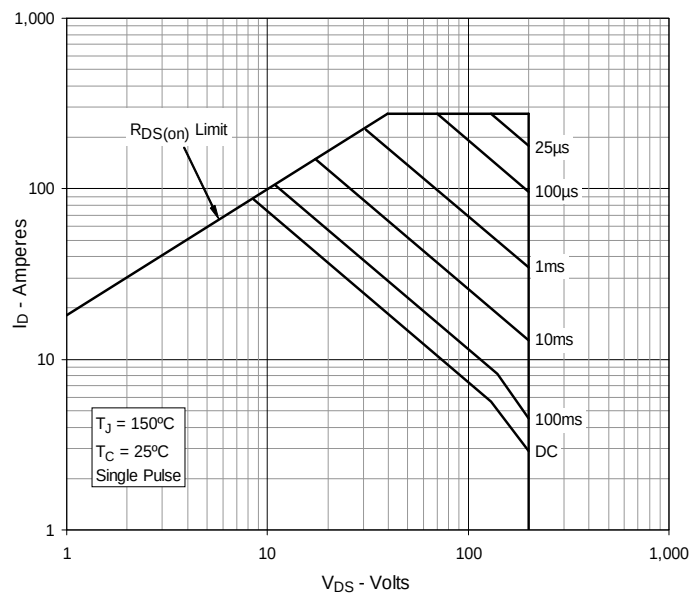
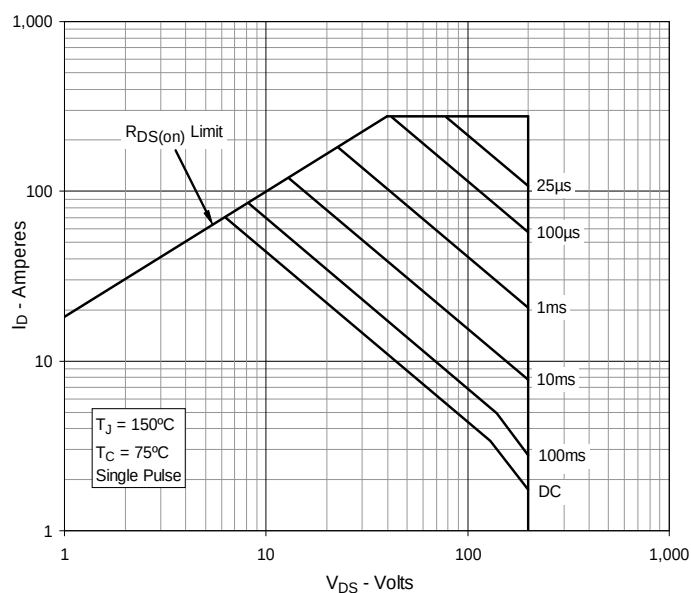


Fig. 14. Forward-Bias Safe Operating Area  
@  $T_C = 75^\circ\text{C}$





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