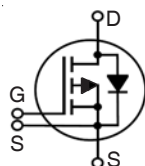


## PolarP™ Power MOSFET

## IXTN170P10P

$$\begin{aligned} V_{DSS} &= -100V \\ I_{D25} &= -170A \\ R_{DS(on)} &\leq 12m\Omega \end{aligned}$$

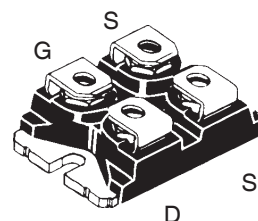
P-Channel Enhancement Mode  
Avalanche Rated



miniBLOC, SOT-227  
E153432



| Symbol     | Test Conditions                                                          | Maximum Ratings |                  |
|------------|--------------------------------------------------------------------------|-----------------|------------------|
| $V_{DSS}$  | $T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$                          | -100            | V                |
| $V_{DGR}$  | $T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$ , $R_{GS} = 1M\Omega$    | -100            | V                |
| $V_{GSS}$  | Continuous                                                               | $\pm 20$        | V                |
| $V_{GSM}$  | Transient                                                                | $\pm 30$        | V                |
| $I_{D25}$  | $T_C = 25^\circ\text{C}$                                                 | -170            | A                |
| $I_{DM}$   | $T_C = 25^\circ\text{C}$ , Pulse Width Limited by $T_{JM}$               | - 510           | A                |
| $I_A$      | $T_C = 25^\circ\text{C}$                                                 | -170            | A                |
| $E_{AS}$   | $T_C = 25^\circ\text{C}$                                                 | 3.5             | J                |
| $dv/dt$    | $I_S \leq I_{DM}$ , $V_{DD} \leq V_{DSS}$ , $T_J \leq 150^\circ\text{C}$ | 10              | V/ns             |
| $P_D$      | $T_C = 25^\circ\text{C}$                                                 | 890             | 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 minute    | 2500 V~          |
|            | $I_{ISOL} \leq 1\text{mA}$                                               | t = 1 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                |



G = Gate      D = Drain  
S = Source

Either Source Terminal at miniBLOC can be used as Main or Kelvin Source.

### Features

- International Standard Package
- miniBLOC, with Aluminium Nitride Isolation
- Rugged PolarP™ Process
- High Current Handling Capability
- Fast Intrinsic Diode
- Avalanche Rated
- Low Package Inductance

### Advantages

- Easy to Mount
- Space Savings
- High Power Density

### Applications

- High-Side Switches
- Push Pull Amplifiers
- DC Choppers
- Automatic Test Equipment
- Current Regulators

| Symbol       | Test Conditions<br>( $T_J = 25^\circ\text{C}$ , Unless Otherwise Specified) | Characteristic Values |      |                     |
|--------------|-----------------------------------------------------------------------------|-----------------------|------|---------------------|
|              |                                                                             | Min.                  | Typ. | Max.                |
| $BV_{DSS}$   | $V_{GS} = 0V$ , $I_D = -250\mu\text{A}$                                     | -100                  |      | V                   |
| $V_{GS(th)}$ | $V_{DS} = V_{GS}$ , $I_D = -1\text{mA}$                                     | - 2.0                 |      | V                   |
| $I_{GSS}$    | $V_{GS} = \pm 20V$ , $V_{DS} = 0V$                                          |                       |      | $\pm 100$ nA        |
| $I_{DSS}$    | $V_{DS} = V_{DSS}$ , $V_{GS} = 0V$<br>$T_J = 125^\circ\text{C}$             |                       |      | - 50 $\mu\text{A}$  |
|              |                                                                             |                       |      | - 250 $\mu\text{A}$ |
| $R_{DS(on)}$ | $V_{GS} = -10V$ , $I_D = 0.5 \cdot I_{D25}$ , Note 1                        |                       |      | 12 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> = -10V, I <sub>D</sub> = 0.5 • I <sub>D25</sub> , Note 1                                                                                                         | 35                    | 58   | S         |
| <b>C<sub>iss</sub></b>    | V <sub>GS</sub> = 0V, V <sub>DS</sub> = -25V, f = 1MHz                                                                                                                           |                       | 12.6 | nF        |
| <b>C<sub>oss</sub></b>    |                                                                                                                                                                                  |                       | 4190 | pF        |
| <b>C<sub>rss</sub></b>    |                                                                                                                                                                                  |                       | 930  | pF        |
| <b>t<sub>d(on)</sub></b>  | <b>Resistive Switching Times</b><br>V <sub>GS</sub> = -10V, V <sub>DS</sub> = 0.5 • V <sub>DSS</sub> , I <sub>D</sub> = 0.5 • I <sub>D25</sub><br>R <sub>G</sub> = 1Ω (External) |                       | 32   | ns        |
| <b>t<sub>r</sub></b>      |                                                                                                                                                                                  |                       | 75   | ns        |
| <b>t<sub>d(off)</sub></b> |                                                                                                                                                                                  |                       | 82   | ns        |
| <b>t<sub>f</sub></b>      |                                                                                                                                                                                  |                       | 45   | 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> = 0.5 • I <sub>D25</sub>                                                                       |                       | 240  | nC        |
| <b>Q<sub>gs</sub></b>     |                                                                                                                                                                                  |                       | 45   | nC        |
| <b>Q<sub>gd</sub></b>     |                                                                                                                                                                                  |                       | 120  | nC        |
| <b>R<sub>thJC</sub></b>   |                                                                                                                                                                                  | 0.05                  |      | 0.14 °C/W |
| <b>R<sub>thCS</sub></b>   |                                                                                                                                                                                  |                       |      | °C/W      |

## Source-Drain Diode

| Symbol                | Test Conditions<br>(T <sub>J</sub> = 25°C, Unless Otherwise Specified)                    | Characteristic Values |       |         |
|-----------------------|-------------------------------------------------------------------------------------------|-----------------------|-------|---------|
|                       |                                                                                           | Min.                  | Typ.  | Max.    |
| <b>I<sub>S</sub></b>  | V <sub>GS</sub> = 0V                                                                      |                       |       | -170 A  |
| <b>I<sub>SM</sub></b> | Repetitive, Pulse Width Limited by T <sub>JM</sub>                                        |                       |       | - 680 A |
| <b>V<sub>SD</sub></b> | I <sub>F</sub> = - 85A, V <sub>GS</sub> = 0V, Note 1                                      |                       |       | - 3.3 V |
| <b>t<sub>rr</sub></b> | I <sub>F</sub> = - 85A, -di/dt = -100A/μs<br>V <sub>R</sub> = - 50V, V <sub>GS</sub> = 0V |                       | 176   | ns      |
| <b>Q<sub>RM</sub></b> |                                                                                           |                       | 1.25  | μC      |
| <b>I<sub>RM</sub></b> |                                                                                           |                       | -14.2 | A       |

Note 1: Pulse test, t ≤ 300μs, duty cycle, d ≤ 2%.

## SOT-227B (IXTN) Outline

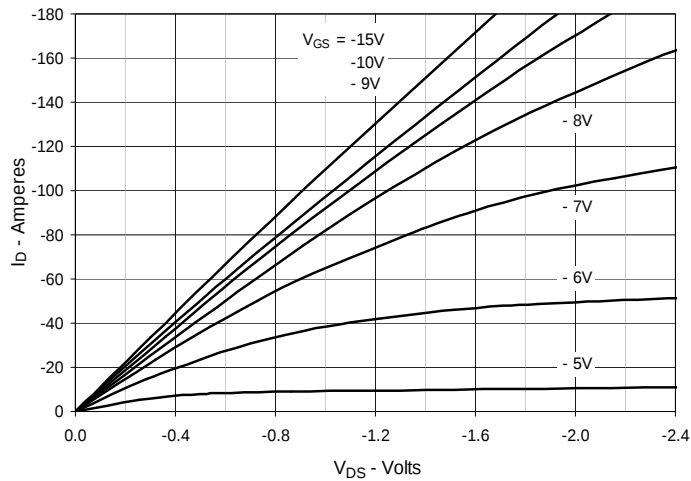
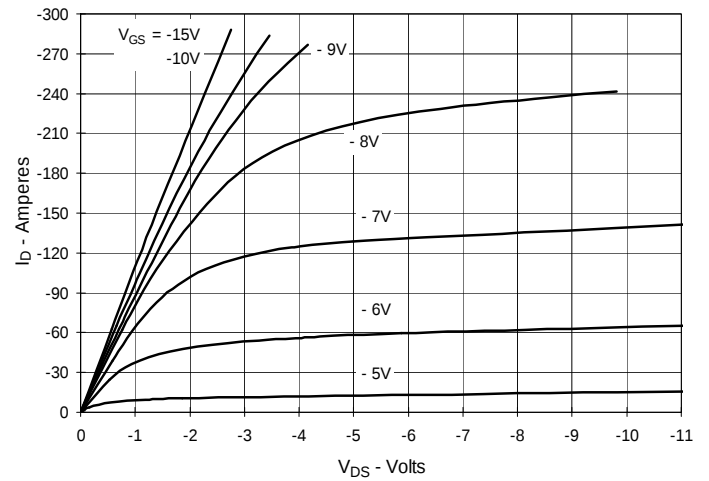
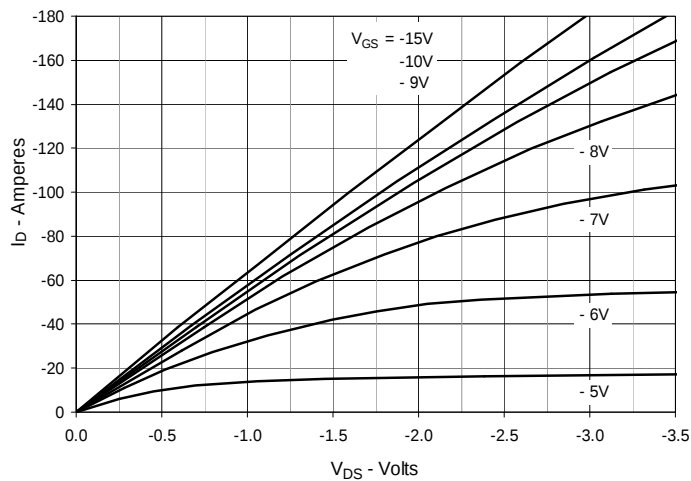
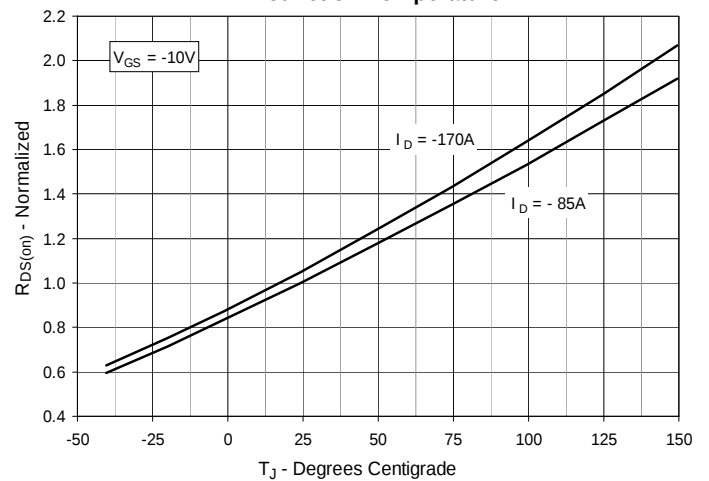
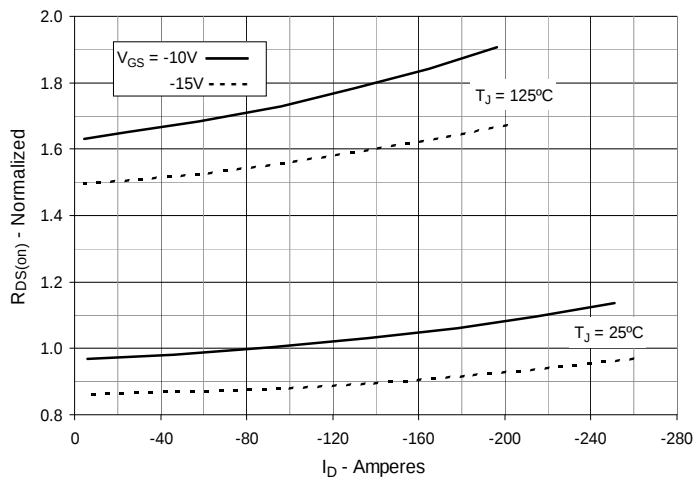
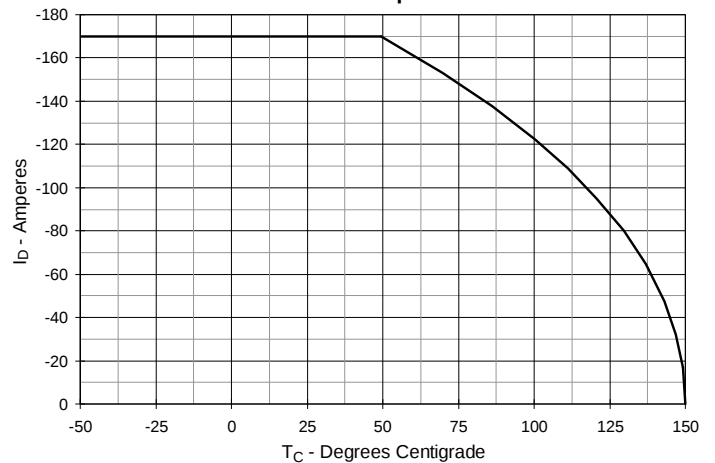


(M4 screws (4x) supplied)

| 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   |

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  $I_D = -85\text{A}$  Value vs. Junction Temperature**

**Fig. 5.  $R_{DS(on)}$  Normalized to  $I_D = -85\text{A}$  Value vs. Drain Current**

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


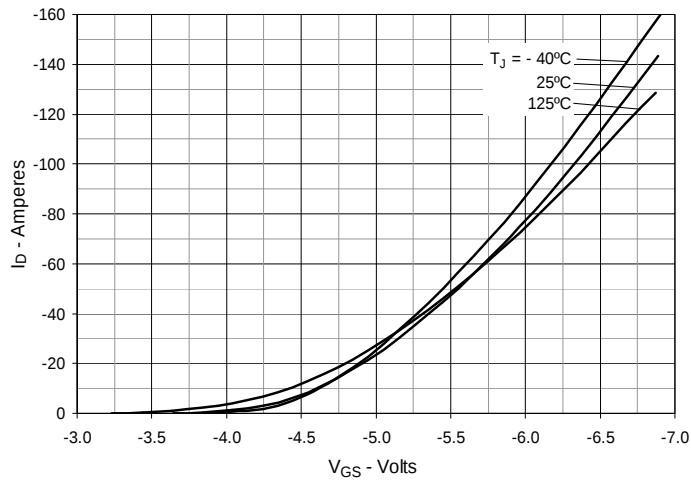
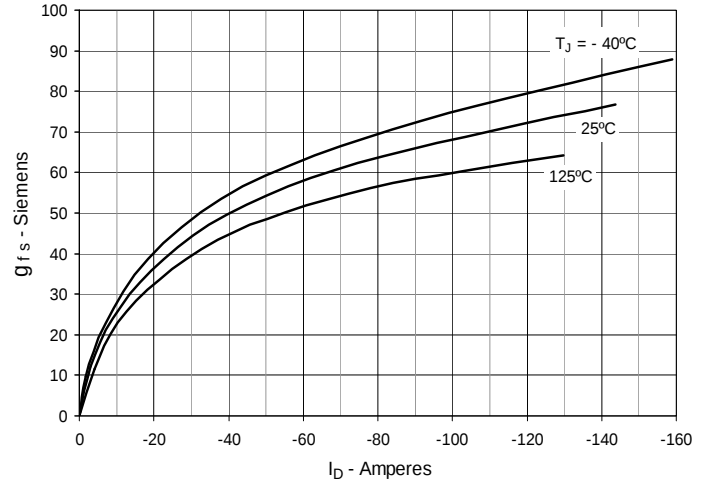
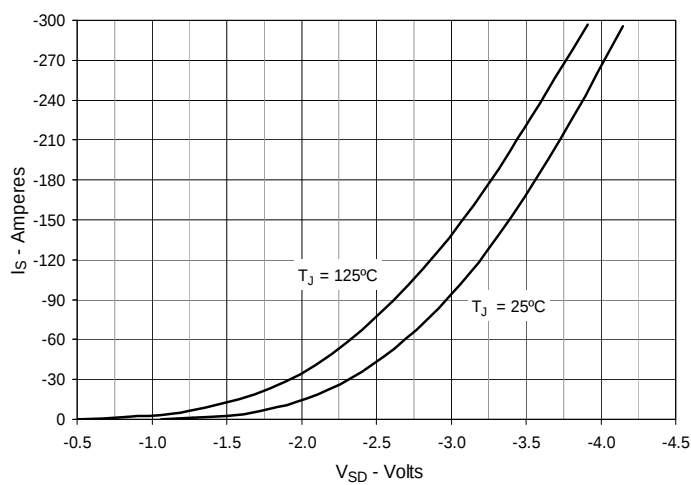
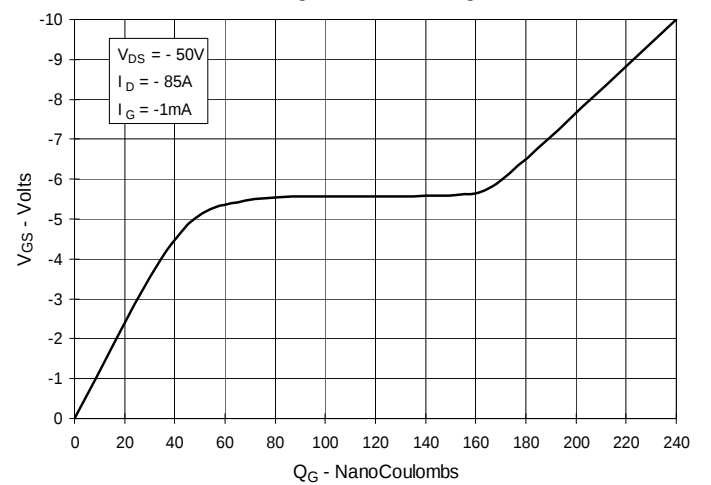
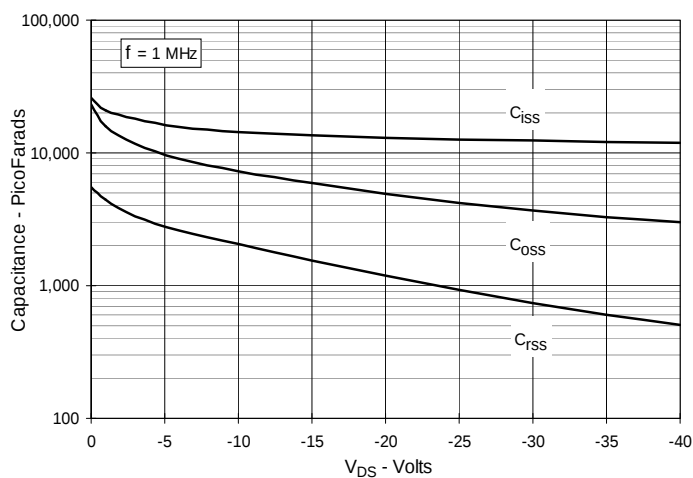
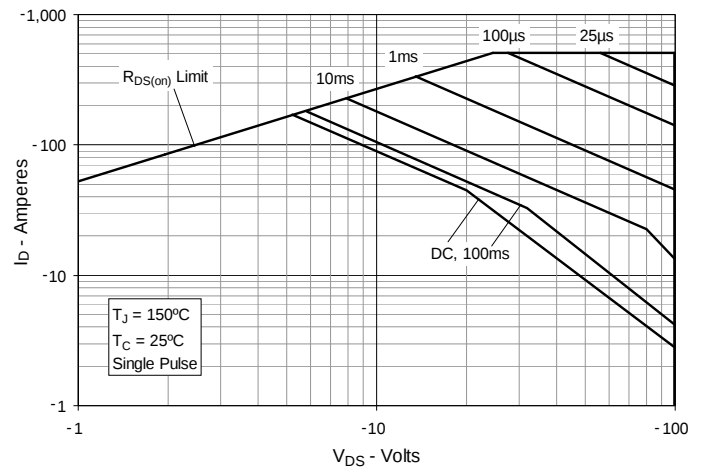
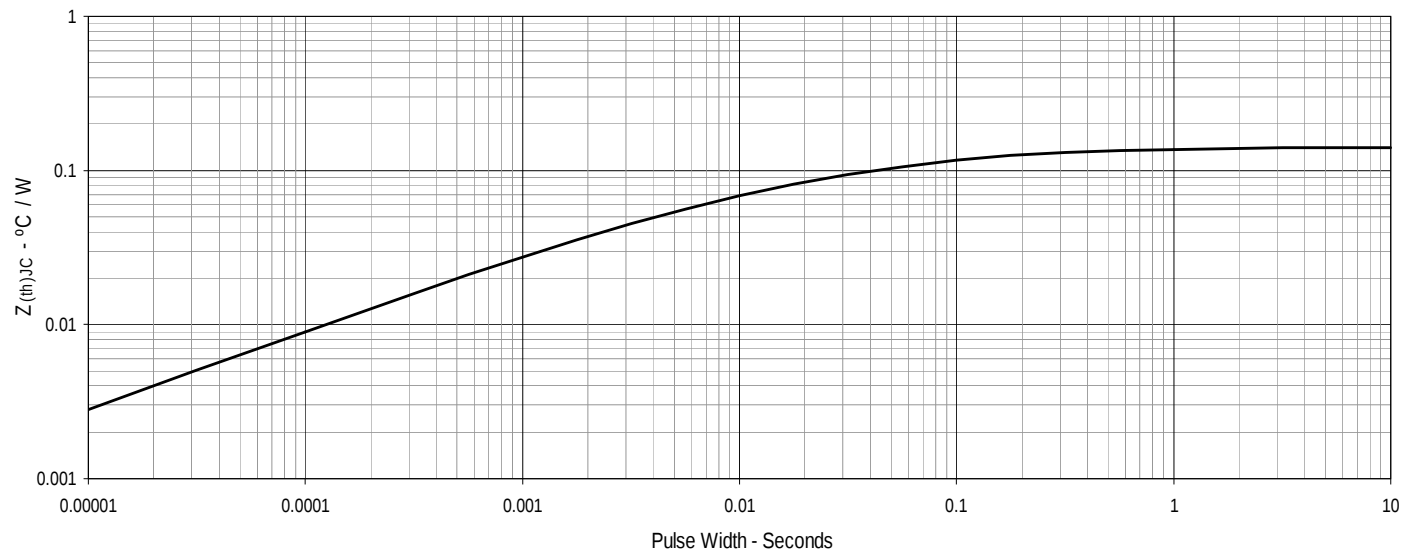
**Fig. 7. Input Admittance**

**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



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