

PolarP™ Power MOSFET

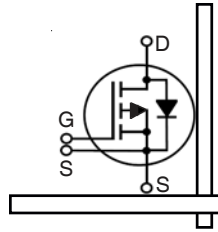
IXTN170P10P

$$V_{DSS} = -100V$$

$$I_{D25} = -170A$$

$$R_{DS(on)} \leq 14m\Omega$$

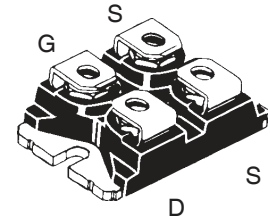
P-Channel Enhancement Mode
Avalanche Rated



miniBLOC, SOT-227
E153432



| Symbol | Test Conditions | Maximum Ratings | | |
|---------------|--|-----------------|------------|----|
| | | Value | Unit | |
| V_{DSS} | $T_J = 25^\circ C$ to $150^\circ C$ | -100 | V | |
| V_{DGR} | $T_J = 25^\circ C$ to $150^\circ C$, $R_{GS} = 1M\Omega$ | -100 | V | |
| V_{GSS} | Continuous | ± 20 | V | |
| V_{GSM} | Transient | ± 30 | V | |
| I_{D25} | $T_C = 25^\circ C$ | -170 | A | |
| I_{DM} | $T_C = 25^\circ C$, Pulse Width Limited by T_{JM} | - 510 | A | |
| I_A | $T_C = 25^\circ C$ | -170 | A | |
| E_{AS} | $T_C = 25^\circ C$ | 3.5 | J | |
| dv/dt | $I_S \leq I_{DM}$, $V_{DD} \leq V_{DSS}$, $T_J \leq 150^\circ C$ | 10 | V/ns | |
| P_D | $T_C = 25^\circ C$ | 890 | 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 = 1 minute | 2500 | V~ |
| | $I_{ISOL} \leq 1mA$ | 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 ($T_J = 25^\circ C$, Unless Otherwise Specified) | Characteristic Values | | |
|--------------|---|-----------------------|------|---------------|
| | | Min. | Typ. | Max. |
| BV_{DSS} | $V_{GS} = 0V$, $I_D = -250\mu A$ | -100 | | V |
| $V_{GS(th)}$ | $V_{DS} = V_{GS}$, $I_D = -1mA$ | - 2.0 | | - 4.0 V |
| I_{GSS} | $V_{GS} = \pm 20V$, $V_{DS} = 0V$ | | | ± 100 nA |
| I_{DSS} | $V_{DS} = V_{DSS}$, $V_{GS} = 0V$ $T_J = 125^\circ C$ | | | - 50 μA |
| | | | | - 250 μA |
| $R_{DS(on)}$ | $V_{GS} = -10V$, $I_D = 0.5 \cdot I_{D25}$, Note 1 | | | 14 $m\Omega$ |

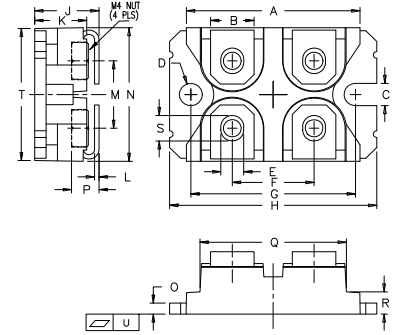
| Symbol | Test Conditions ($T_J = 25^\circ\text{C}$, Unless Otherwise Specified) | Characteristic Values | | |
|--------------|---|-----------------------|------|-------------------------|
| | | Min. | Typ. | Max. |
| g_{fs} | $V_{DS} = -10\text{V}$, $I_D = 0.5 \cdot I_{D25}$, Note 1 | 35 | 58 | S |
| C_{iss} | $V_{GS} = 0\text{V}$, $V_{DS} = -25\text{V}$, $f = 1\text{MHz}$ | | 12.6 | nF |
| C_{oss} | | | 4190 | pF |
| C_{rss} | | | 930 | pF |
| $t_{d(on)}$ | Resistive Switching Times $V_{GS} = -10\text{V}$, $V_{DS} = 0.5 \cdot V_{DSS}$, $I_D = 0.5 \cdot I_{D25}$ $R_G = 1\Omega$ (External) | | 32 | ns |
| t_r | | | 75 | ns |
| $t_{d(off)}$ | | | 82 | ns |
| t_f | | | 45 | ns |
| $Q_{g(on)}$ | $V_{GS} = -10\text{V}$, $V_{DS} = 0.5 \cdot V_{DSS}$, $I_D = 0.5 \cdot I_{D25}$ | | 240 | nC |
| Q_{gs} | | | 45 | nC |
| Q_{gd} | | | 120 | nC |
| R_{thJC} | | | | 0.14 $^\circ\text{C/W}$ |
| R_{thCS} | | 0.05 | | $^\circ\text{C/W}$ |

Source-Drain Diode

| Symbol | Test Conditions ($T_J = 25^\circ\text{C}$, Unless Otherwise Specified) | Characteristic Values | | |
|----------|---|-----------------------|-------|---------------|
| | | Min. | Typ. | Max. |
| I_S | $V_{GS} = 0\text{V}$ | | | -170 A |
| I_{SM} | Repetitive, Pulse Width Limited by T_{JM} | | | - 680 A |
| V_{SD} | $I_F = -85\text{A}$, $V_{GS} = 0\text{V}$, Note 1 | | | - 3.3 V |
| t_{rr} | $I_F = -85\text{A}$, $-di/dt = -100\text{A}/\mu\text{s}$ $V_R = -50\text{V}$, $V_{GS} = 0\text{V}$ | | 176 | ns |
| Q_{RM} | | | 1.25 | μC |
| I_{RM} | | | -14.2 | A |

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 |

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 | |

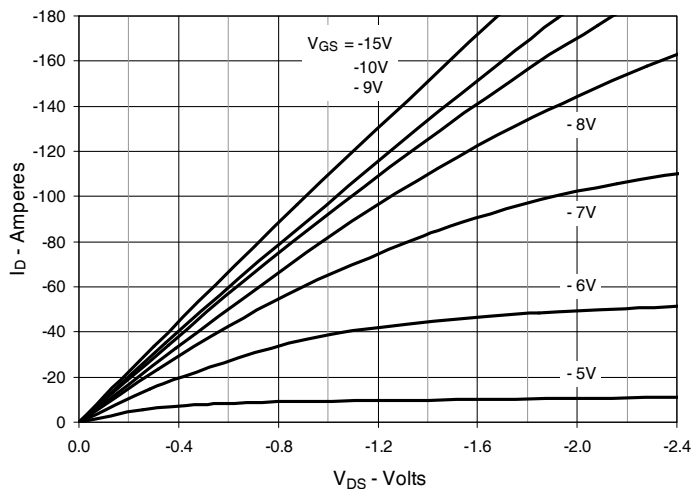
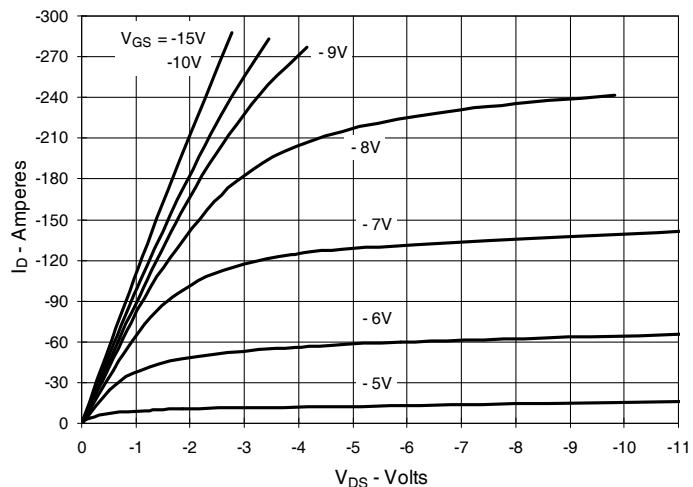
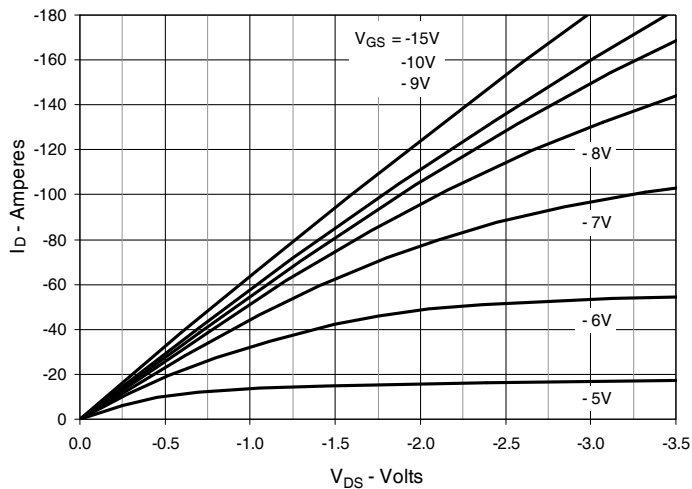
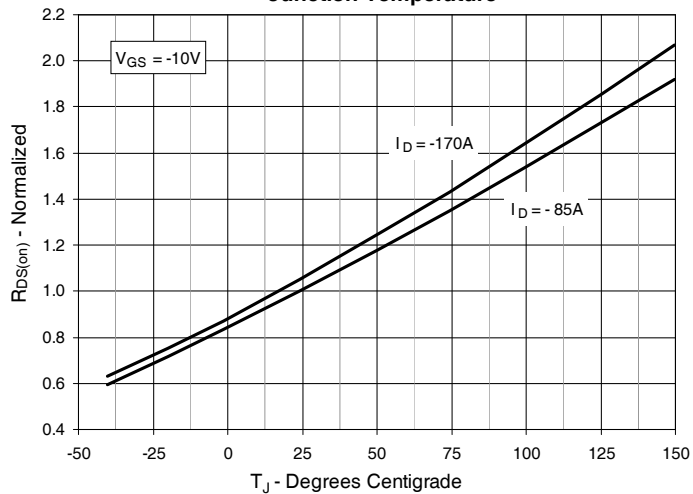
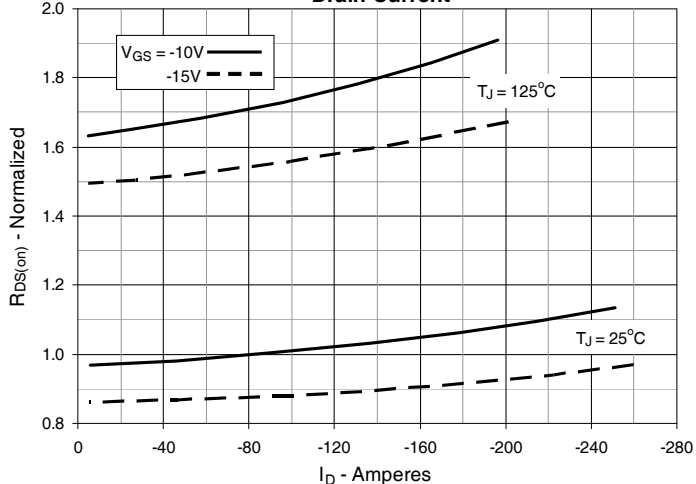
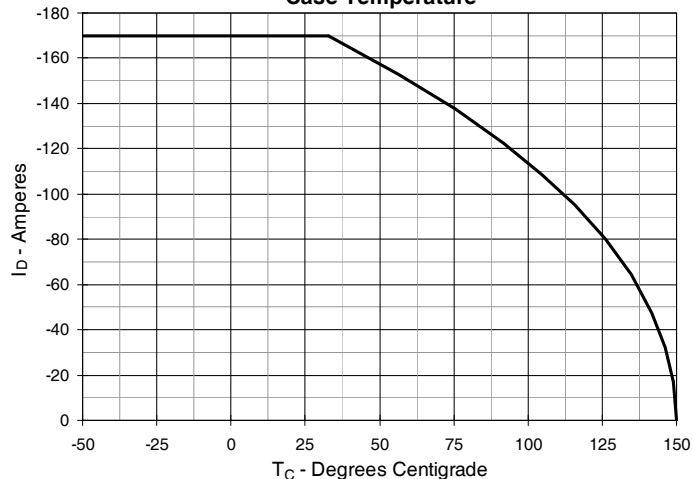
Fig. 1. Output Characteristics @ $T_J = 25^\circ\text{C}$

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

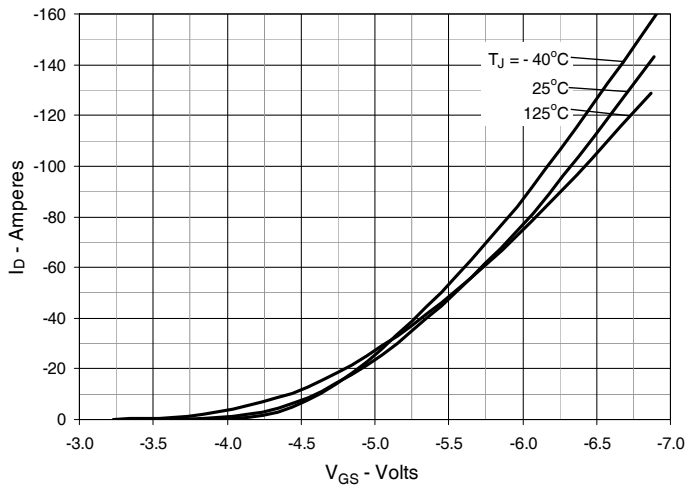


Fig. 8. Transconductance

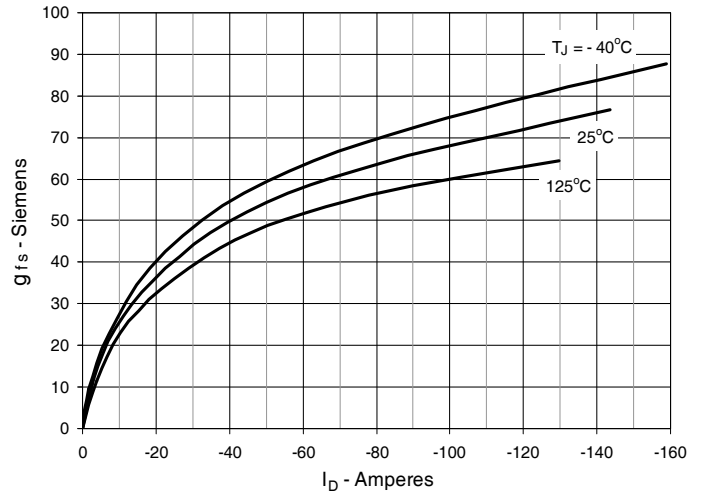


Fig. 9. Forward Voltage Drop of Intrinsic Diode

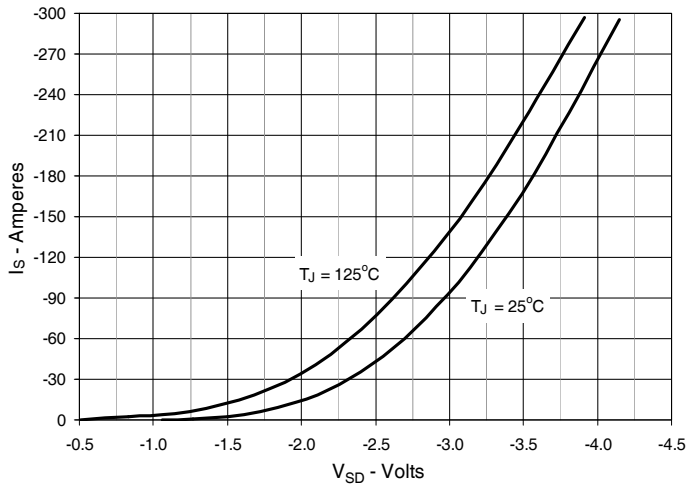


Fig. 10. Gate Charge

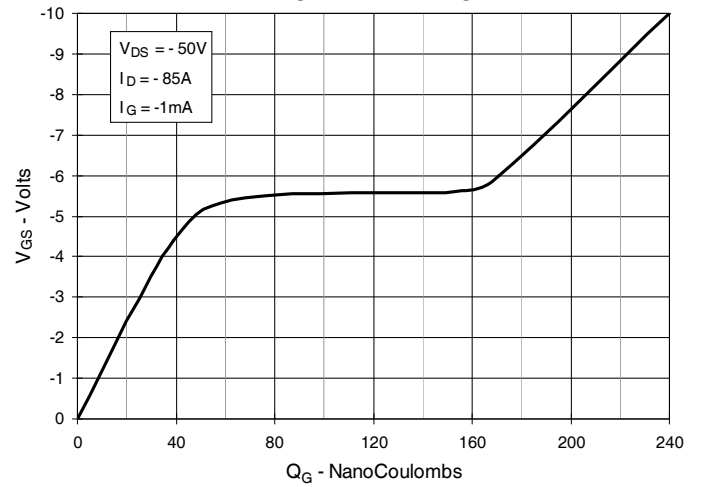


Fig. 11. Capacitance

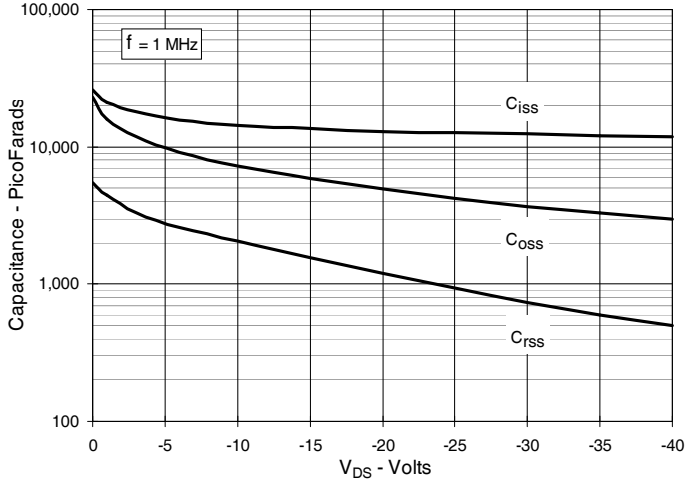


Fig. 12. Forward-Bias Safe Operating Area

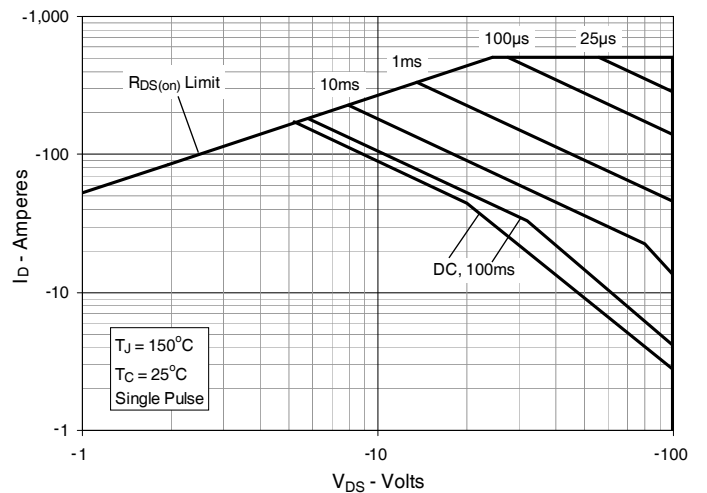
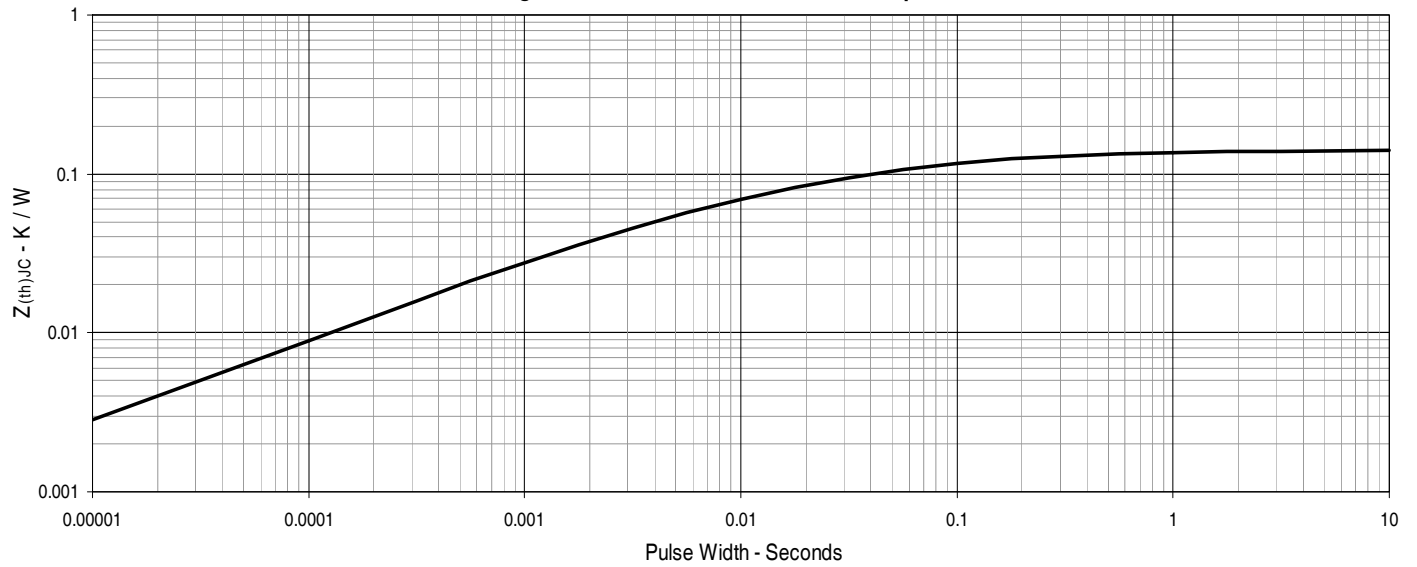


Fig. 13. Maximum Transient Thermal Impedance





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