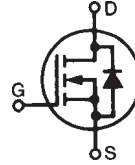


# Polar™ HiPerFET™ Power MOSFET

## IXFL100N50P

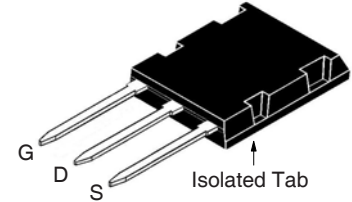
$V_{DSS} = 500V$   
 $I_{D25} = 68A$   
 $R_{DS(on)} \leq 52m\Omega$   
 $t_{rr} \leq 200ns$

(Electrically Isolated Tab)



N-Channel Enhancement Mode  
Avalanche Rated  
Fast Intrinsic Rectifier

ISOPLUS264



G = Gate    D = Drain  
S = Source

| Symbol        | Test Conditions  | Maximum Ratings |            |
|---------------|--|-----------------|------------|
| $V_{DSS}$     | $T_J = 25^\circ C$ to $150^\circ C$                                | 500             | V          |
| $V_{DGR}$     | $T_J = 25^\circ C$ to $150^\circ C$ , $R_{GS} = 1M\Omega$          | 500             | V          |
| $V_{GSS}$     | Continuous   | $\pm 30$        | V          |
| $V_{GSM}$     | Transient  | $\pm 40$        | V          |
| $I_{D25}$     | $T_C = 25^\circ C$   | 68              | A          |
| $I_{DM}$      | $T_C = 25^\circ C$ , Pulse Width Limited by $T_{JM}$               | 250             | A          |
| $I_A$         | $T_C = 25^\circ C$   | 100             | A          |
| $E_{AS}$      | $T_C = 25^\circ C$   | 5               | J          |
| $dv/dt$       | $I_S \leq I_{DM}$ , $V_{DD} \leq V_{DSS}$ , $T_J \leq 150^\circ C$ | 20              | V/ns       |
| $P_D$         | $T_C = 25^\circ C$   | 625             | W          |
| $T_J$         |  | -55 ... +150    | $^\circ C$ |
| $T_{JM}$      |  | 150             | $^\circ C$ |
| $T_{stg}$     |  | -55 ... +150    | $^\circ C$ |
| $T_L$         | Maximum Lead Temperature for Soldering                             | 300             | $^\circ C$ |
| $T_{SOLD}$    | Plastic Body for 10s   | 260             | $^\circ C$ |
| $F_C$         | Mounting Force   | 40..120 / 9..27 | N/lb.      |
| $V_{ISOL}$    | 50/60 Hz, RMS $t = 1$ min  | 2500            | V~         |
|               | $I_{ISOL} \leq 1$ mA $t = 1$ s                                     | 3000            | V~         |
| <b>Weight</b> |  | 8               | g          |

### Features

- Silicon Chip on Direct-Copper-Bond Substrate
  - High Power Dissipation
  - Isolated Mounting Surface
  - 2500V~ Electrical Isolation
- Avalanche Rated
- Low Package Inductance
- Fast Intrinsic Rectifier
- Low  $R_{DS(on)}$  and  $Q_G$

### Advantages

- Easy to Mount
- Space Savings

### Applications

- DC-DC Converters
- Battery Chargers
- Switch-Mode and Resonant-Mode Power Supplies
- AC Motor Control
- High Speed Power Switching Application

| Symbol       | Test Conditions<br>( $T_J = 25^\circ C$ Unless Otherwise Specified) | Characteristic Values |      |                    |
|--------------|---|-----------------------|------|--------------------|
|              |   | Min.                  | Typ. | Max.               |
| $BV_{DSS}$   | $V_{GS} = 0V$ , $I_D = 3mA$   | 500                   |      | V                  |
| $V_{GS(th)}$ | $V_{DS} = V_{GS}$ , $I_D = 8mA$                                     | 3.0                   |      | V                  |
| $I_{GSS}$    | $V_{GS} = \pm 30V$ , $V_{DS} = 0V$                                  |                       |      | $\pm 200$ nA       |
| $I_{DSS}$    | $V_{DS} = V_{DSS}$ , $V_{GS} = 0V$<br>$T_J = 125^\circ C$           |                       |      | 25 $\mu A$<br>2 mA |
| $R_{DS(on)}$ | $V_{GS} = 10V$ , $I_D = 50A$ , Note 1                               |                       |      | 52 m $\Omega$      |

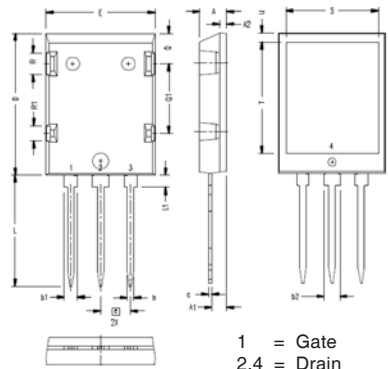
| Symbol       | Test Conditions<br>( $T_J = 25^\circ\text{C}$ Unless Otherwise Specified)   | Characteristic Values |      |                    |
|--------------|---|-----------------------|------|--------------------|
|              |   | Min.                  | Typ. | Max.               |
| $g_{fs}$     | $V_{DS} = 20\text{V}, I_D = 50\text{A}$ , Note 1  | 50                    | 80   | S                  |
| $C_{iss}$    | $V_{GS} = 0\text{V}, V_{DS} = 25\text{V}, f = 1\text{MHz}$  |                       | 20   | nF                 |
| $C_{oss}$    |   |                       | 1700 | pF                 |
| $C_{rss}$    |   |                       | 140  | pF                 |
| $t_{d(on)}$  | <b>Resistive Switching Times</b><br>$V_{GS} = 10\text{V}, V_{DS} = 0.5 \cdot V_{DSS}, I_D = 50\text{A}$<br>$R_G = 1\Omega$ (External) |                       | 36   | ns                 |
| $t_r$        |   |                       | 29   | ns                 |
| $t_{d(off)}$ |   |                       | 110  | ns                 |
| $t_f$        |   |                       | 26   | ns                 |
| $Q_{g(on)}$  | $V_{GS} = 10\text{V}, V_{DS} = 0.5 \cdot V_{DSS}, I_D = 50\text{A}$   |                       | 240  | nC                 |
| $Q_{gs}$     |   |                       | 96   | nC                 |
| $Q_{gd}$     |   |                       | 78   | nC                 |
| $R_{thJC}$   |   |                       | 0.20 | $^\circ\text{C/W}$ |
| $R_{thCS}$   |   | 0.15                  |      | $^\circ\text{C/W}$ |

### Source-Drain Diode

| Symbol   | Test Conditions<br>( $T_J = 25^\circ\text{C}$ Unless Otherwise Specified)                       | Characteristic Values |      |               |
|----------|---|-----------------------|------|---------------|
|          |   | Min.                  | Typ. | Max.          |
| $I_S$    | $V_{GS} = 0\text{V}$  |                       |      | 100 A         |
| $I_{SM}$ | Repetitive, Pulse Width Limited by $T_{JM}$   |                       |      | 250 A         |
| $V_{SD}$ | $I_F = I_S, V_{GS} = 0\text{V}$ , Note 1  |                       |      | 1.5 V         |
| $t_{rr}$ | $I_F = 25\text{A}, -di/dt = 100\text{A}/\mu\text{s}$<br>$V_R = 100\text{V}, V_{GS} = 0\text{V}$ |                       |      | 200 ns        |
| $Q_{RM}$ |   |                       | 0.6  | $\mu\text{C}$ |
| $I_{RM}$ |   |                       | 6.0  | A             |

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

### ISOPLUS264 (IXFL) OUTLINE



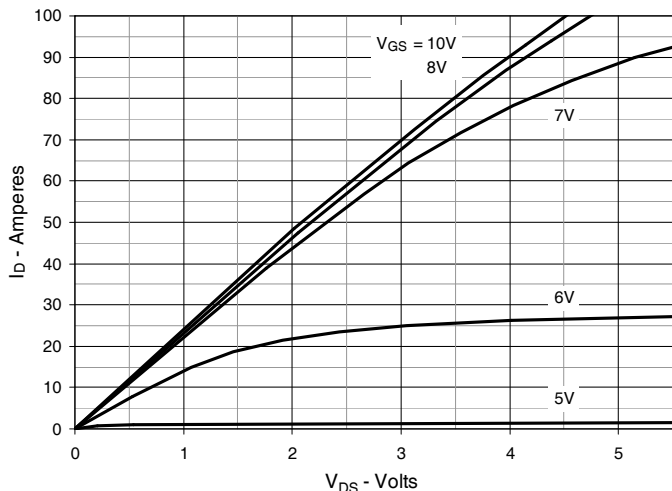
| SYM | INCHES   |       | MILLIMETERS |       |
|-----|----------|-------|-------------|-------|
|     | MIN      | MAX   | MIN         | MAX   |
| A   | .190     | .205  | 4.83        | 5.21  |
| A1  | .102     | .118  | 2.59        | 3.00  |
| A2  | .046     | .055  | 1.17        | 1.40  |
| b   | .045     | .055  | 1.14        | 1.40  |
| b1  | .087     | .102  | 2.21        | 2.59  |
| b2  | .111     | .126  | 2.82        | 3.20  |
| c   | .020     | .029  | 0.51        | 0.74  |
| D   | 1.020    | 1.040 | 25.91       | 26.42 |
| E   | .770     | .799  | 19.56       | 20.29 |
| e   | .215 BSC |       | 5.46 BSC    |       |
| L   | .780     | .820  | 19.81       | 20.83 |
| L1  | .080     | .102  | 2.03        | 2.59  |
| Q   | .210     | .235  | 5.33        | 5.97  |
| Q1  | .490     | .513  | 12.45       | 13.03 |
| R   | .150     | .180  | 3.81        | 4.57  |
| R1  | .100     | .130  | 2.54        | 3.30  |
| S   | .668     | .690  | 16.97       | 17.53 |
| T   | .801     | .821  | 20.34       | 20.85 |
| U   | .065     | .080  | 1.65        | 2.03  |

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

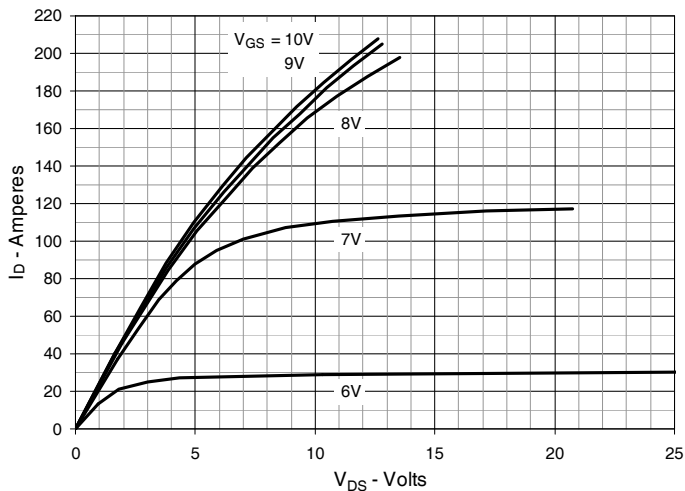
IXYS MOSFETs and IGBTs are covered by one or more of the following U.S. patents:

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

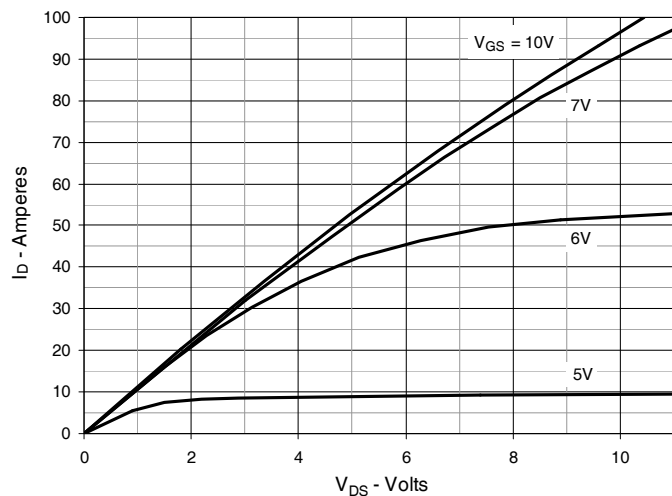
**Fig. 1. Output Characteristics @  $T_J = 25^\circ\text{C}$**



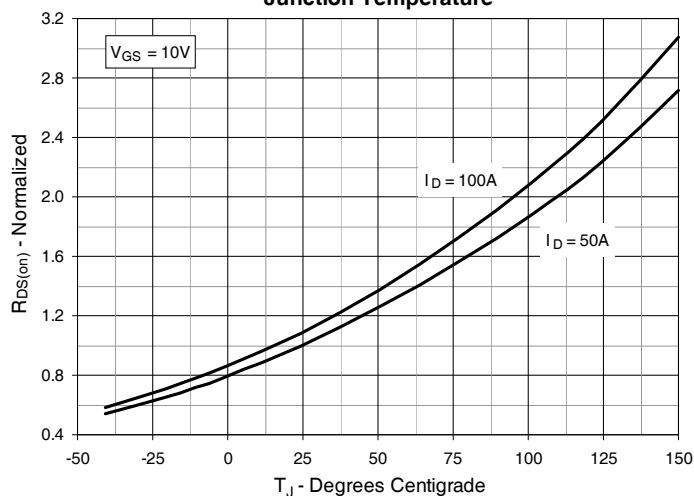
**Fig. 2. Extended Output Characteristics @  $T_J = 25^\circ\text{C}$**



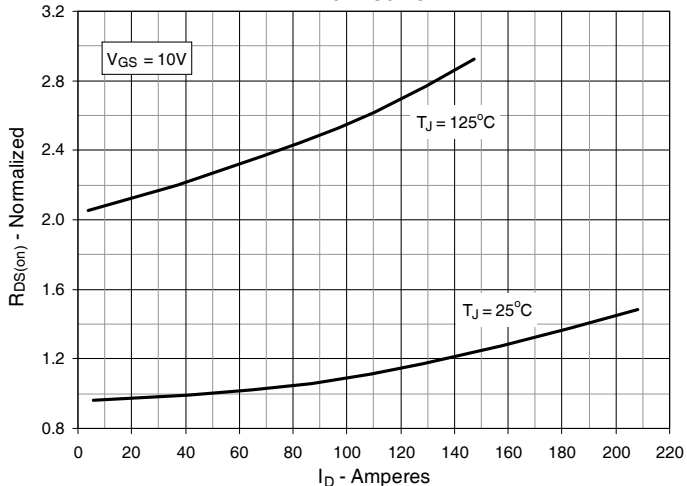
**Fig. 3. Output Characteristics @  $T_J = 125^\circ\text{C}$**



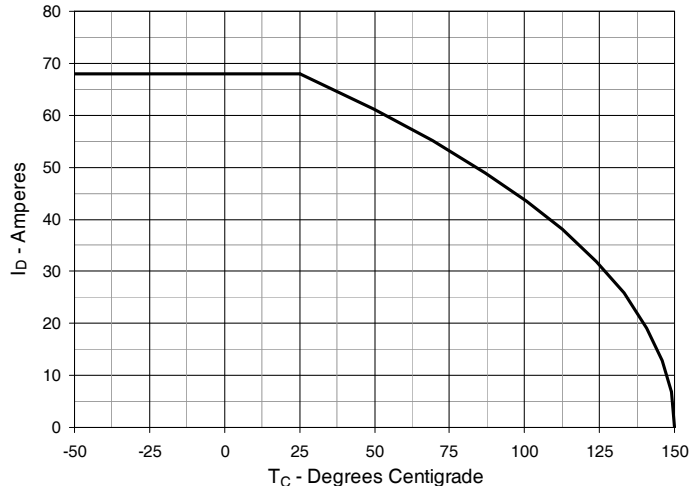
**Fig. 4.  $R_{DS(on)}$  Normalized to  $I_D = 50A$  Value vs. Junction Temperature**



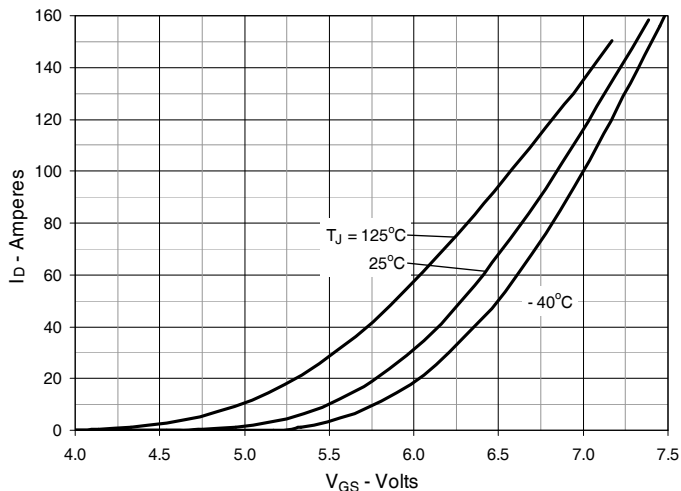
**Fig. 5.  $R_{DS(on)}$  Normalized to  $I_D = 50A$  Value vs. Drain Current**



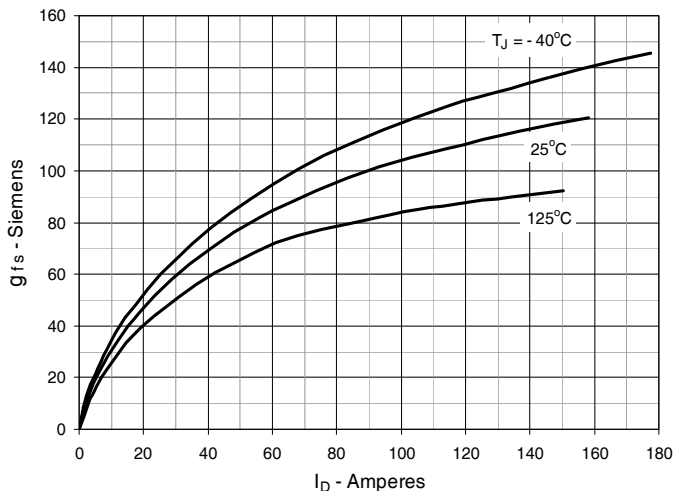
**Fig. 6. Maximum Drain Current vs. Case Temperature**



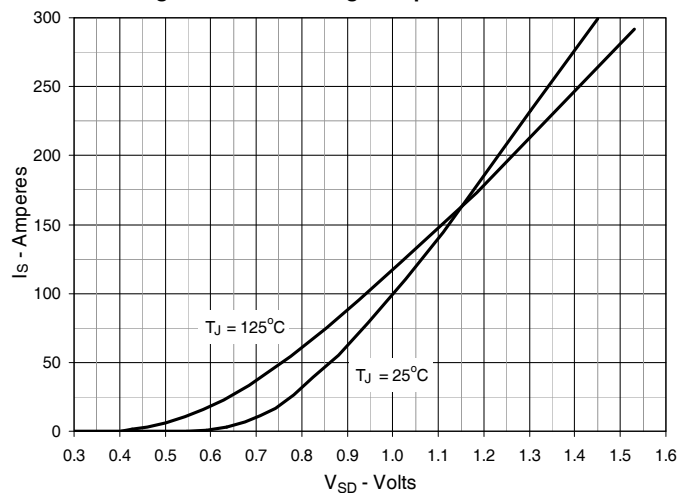
**Fig. 7. Input Admittance**



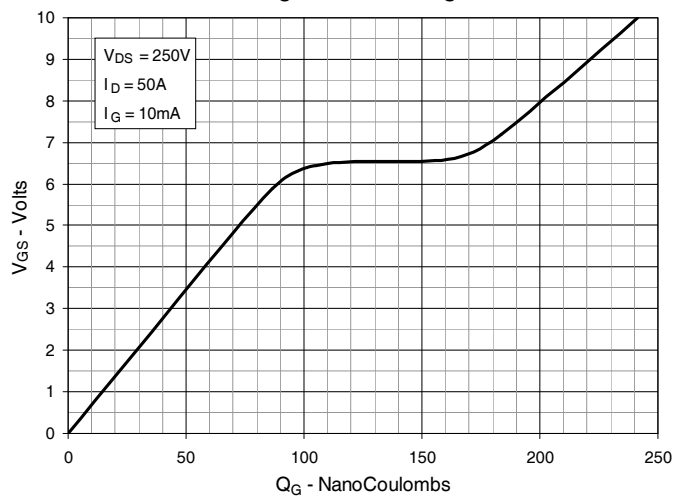
**Fig. 8. Transconductance**



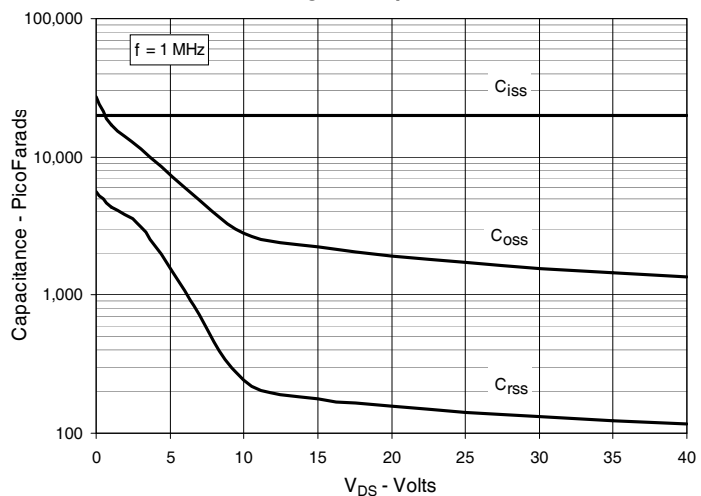
**Fig. 9. Forward Voltage Drop of Intrinsic Diode**



**Fig. 10. Gate Charge**



**Fig. 11. Capacitance**



**Fig. 12. Forward-Bias Safe Operating Area**

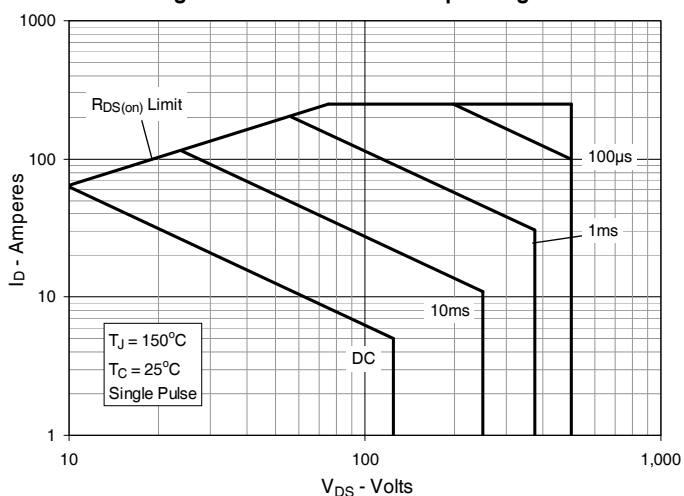
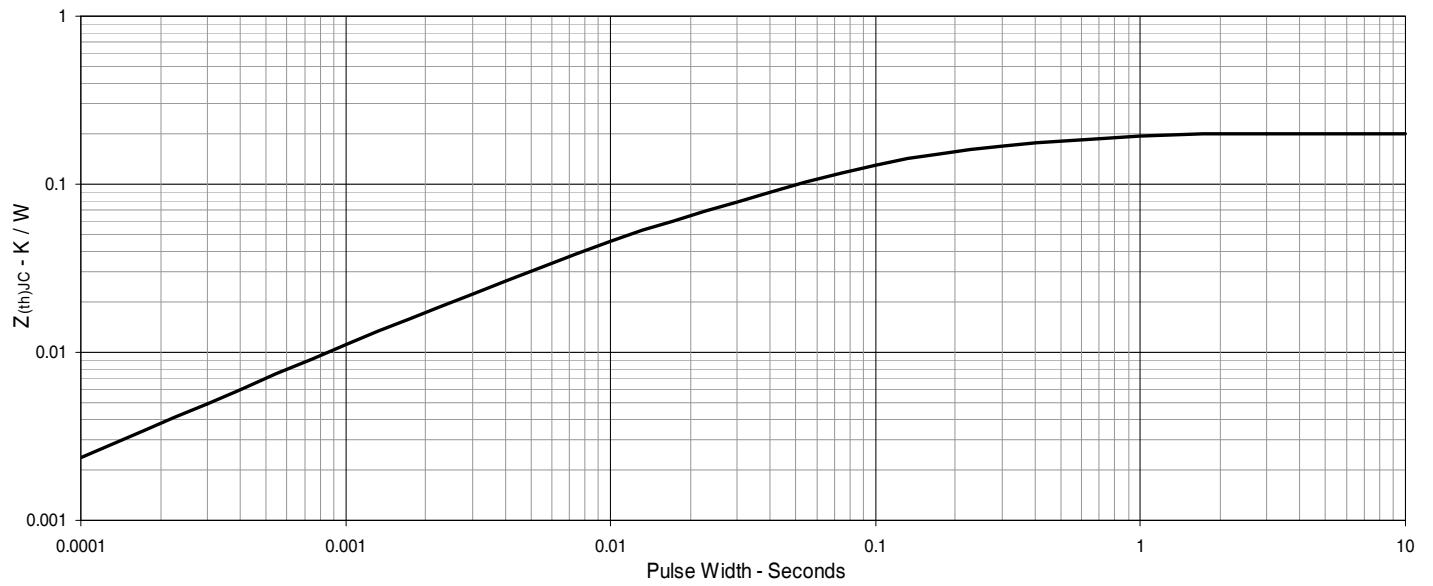


Fig. 13. Maximum Transient Thermal Impedance





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