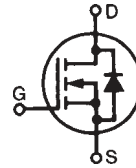


# High Voltage Power MOSFET

(Electrically Isolated Tab)

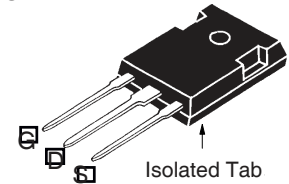
N-Channel Enhancement Mode  
Avalanche Rated  
Fast Intrinsic Diode

## IXTJ6N150



$V_{DSS} = 1500V$   
 $I_{D25} = 3A$   
 $R_{DS(on)} \leq 3.85\Omega$

ISO TO-247™



G = Gate      D = Drain  
S = Source

| Symbol        | Test Conditions                                                    | Maximum Ratings |            |
|---------------|--------------------------------------------------------------------|-----------------|------------|
| $V_{DSS}$     | $T_J = 25^\circ C$ to $150^\circ C$                                | 1500            | V          |
| $V_{DGR}$     | $T_J = 25^\circ C$ to $150^\circ C$ , $R_{GS} = 1M\Omega$          | 1500            | V          |
| $V_{GSS}$     | Continuous                                                         | $\pm 30$        | V          |
| $V_{GSM}$     | Transient                                                          | $\pm 40$        | V          |
| $I_{D25}$     | $T_C = 25^\circ C$                                                 | 3               | A          |
| $I_{DM}$      | $T_C = 25^\circ C$ , Pulse Width Limited by $T_{JM}$               | 24              | A          |
| $I_A$         | $T_C = 25^\circ C$                                                 | 3               | A          |
| $E_{AS}$      | $T_C = 25^\circ C$                                                 | 500             | mJ         |
| $dv/dt$       | $I_S \leq I_{DM}$ , $V_{DD} \leq V_{DSS}$ , $T_J \leq 150^\circ C$ | 5               | V/ns       |
| $P_D$         | $T_C = 25^\circ C$                                                 | 125             | 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 Torque                                                    | 1.13 / 10       | Nm/lb.in   |
| $V_{ISOL}$    | 50/60 Hz, RM, t = 1 min                                            | 2500            | V~         |
| <b>Weight</b> |                                                                    | 5               | g          |

### Features

- Silicon Chip on Direct-Copper Bond (DCB) Substrate
- Isolated Mounting Surface
- 2500V~ Electrical Isolation
- Fast Intrinsic Diode
- Avalanche Rated
- Molding Epoxies meet UL 94 V-0 Flammability Classification

### Advantages

- Easy to Mount
- Space Savings
- High Power Density

### Applications

- High Voltage Power Supplies
- Capacitor Discharge Applications
- Pulse Circuits

| Symbol       | Test Conditions<br>( $T_J = 25^\circ C$ , Unless Otherwise Specified) | Characteristic Values |      |                           |
|--------------|-----------------------------------------------------------------------|-----------------------|------|---------------------------|
|              |                                                                       | Min.                  | Typ. | Max.                      |
| $BV_{DSS}$   | $V_{GS} = 0V$ , $I_D = 250\mu A$                                      | 1500                  |      | V                         |
| $V_{GS(th)}$ | $V_{DS} = V_{GS}$ , $I_D = 250\mu A$                                  | 2.5                   |      | 5.0 V                     |
| $I_{GSS}$    | $V_{GS} = \pm 30V$ , $V_{DS} = 0V$                                    |                       |      | $\pm 100$ nA              |
| $I_{DSS}$    | $V_{DS} = V_{DSS}$ , $V_{GS} = 0V$<br>$T_J = 125^\circ C$             |                       |      | 25 $\mu A$<br>250 $\mu A$ |
| $R_{DS(on)}$ | $V_{GS} = 10V$ , $I_D = 3A$ , Note 1                                  |                       |      | 3.85 $\Omega$             |

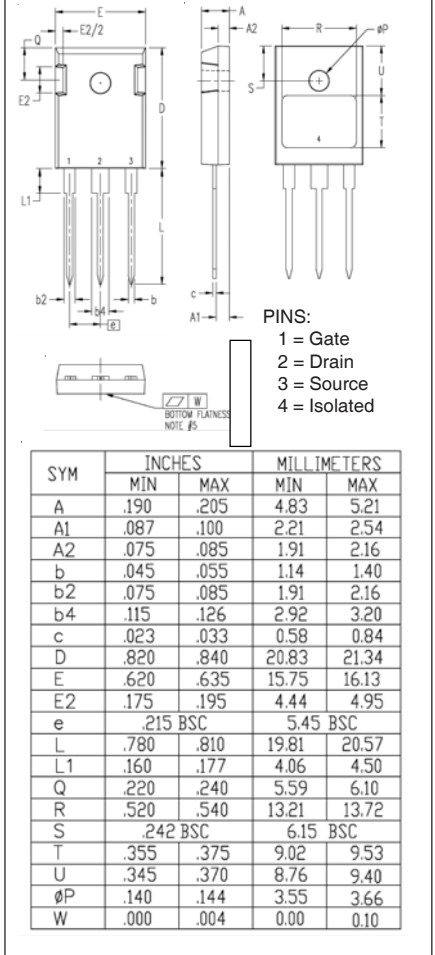
| Symbol       | Test Conditions<br>( $T_J = 25^\circ\text{C}$ , Unless Otherwise Specified)                                                                | Characteristic Values |      |                    |
|--------------|--------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|------|--------------------|
|              |                                                                                                                                            | Min.                  | Typ. | Max.               |
| $g_{fs}$     | $V_{DS} = 20\text{V}$ , $I_D = 3\text{A}$ , Note 1                                                                                         | 4.0                   | 6.5  | S                  |
| $C_{iss}$    | $V_{GS} = 0\text{V}$ , $V_{DS} = 25\text{V}$ , $f = 1\text{MHz}$                                                                           |                       | 2230 | pF                 |
| $C_{oss}$    |                                                                                                                                            |                       | 170  | pF                 |
| $C_{rss}$    |                                                                                                                                            |                       | 64   | pF                 |
| $t_{d(on)}$  | <b>Resistive Switching Times</b><br>$V_{GS} = 10\text{V}$ , $V_{DS} = 0.5 \cdot V_{DSS}$ , $I_D = 3\text{A}$<br>$R_G = 3\Omega$ (External) |                       | 22   | ns                 |
| $t_r$        |                                                                                                                                            |                       | 20   | ns                 |
| $t_{d(off)}$ |                                                                                                                                            |                       | 50   | ns                 |
| $t_f$        |                                                                                                                                            |                       | 38   | ns                 |
| $Q_{g(on)}$  | $V_{GS} = 10\text{V}$ , $V_{DS} = 0.5 \cdot V_{DSS}$ , $I_D = 3\text{A}$                                                                   |                       | 67   | nC                 |
| $Q_{gs}$     |                                                                                                                                            |                       | 12   | nC                 |
| $Q_{gd}$     |                                                                                                                                            |                       | 36   | nC                 |
| $R_{thJC}$   |                                                                                                                                            |                       | 1.0  | $^\circ\text{C/W}$ |
| $R_{thCS}$   |                                                                                                                                            | 0.30                  |      | $^\circ\text{C/W}$ |

### Source-Drain Diode

| Symbol   | Test Conditions<br>( $T_J = 25^\circ\text{C}$ , Unless Otherwise Specified) | Characteristic Values |      |               |
|----------|-----------------------------------------------------------------------------|-----------------------|------|---------------|
|          |                                                                             | Min.                  | Typ. | Max.          |
| $I_s$    | $V_{GS} = 0\text{V}$                                                        |                       |      | 6 A           |
| $I_{SM}$ | Repetitive, Pulse Width Limited by $T_{JM}$                                 |                       |      | 24 A          |
| $V_{SD}$ | $I_F = 6\text{A}$ , $V_{GS} = 0\text{V}$ , Note 1                           |                       |      | 1.3 V         |
| $t_{rr}$ | $I_F = 3\text{A}$ , $-di/dt = 100\text{A}/\mu\text{s}$                      |                       | 1.5  | $\mu\text{s}$ |
| $I_{RM}$ |                                                                             |                       | 12   | A             |
| $Q_{RM}$ | $V_R = 100\text{V}$ , $V_{GS} = 0\text{V}$                                  |                       | 9    | $\mu\text{C}$ |

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

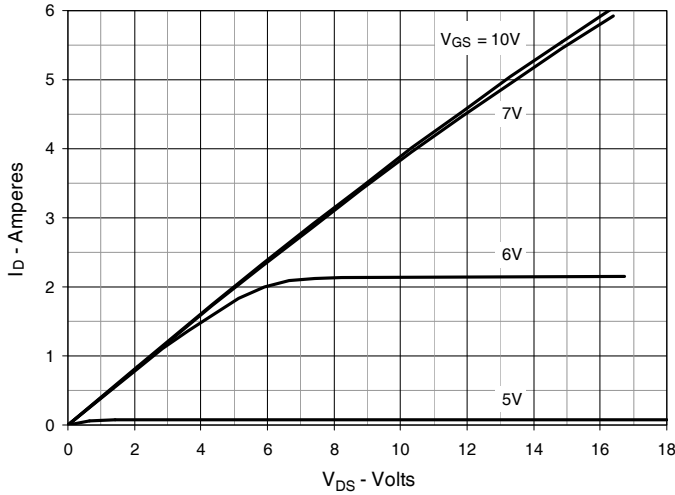
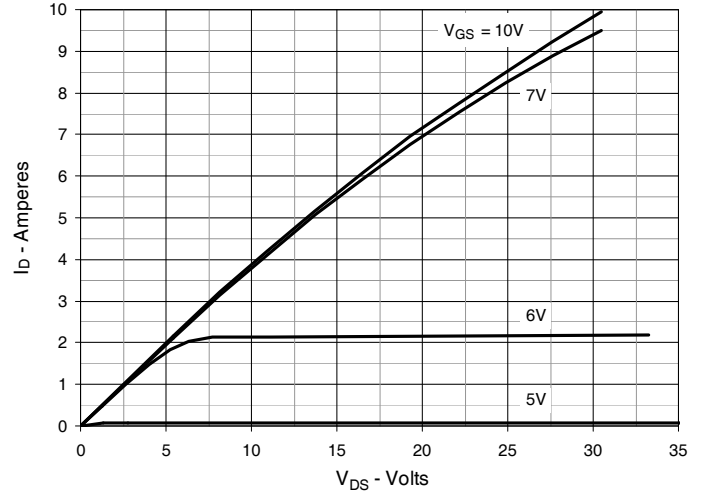
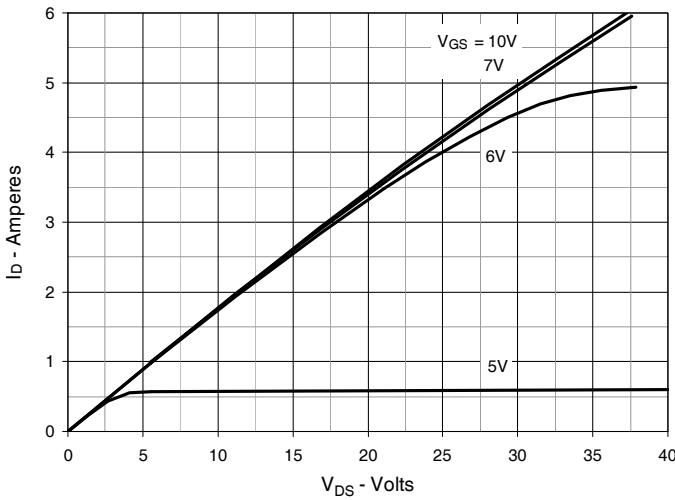
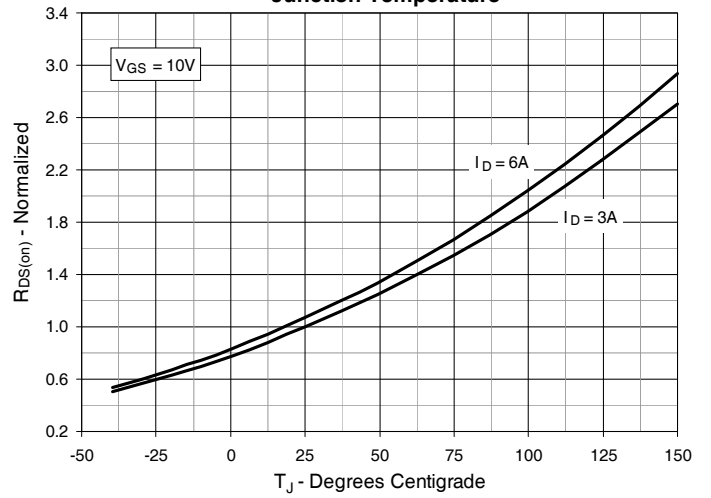
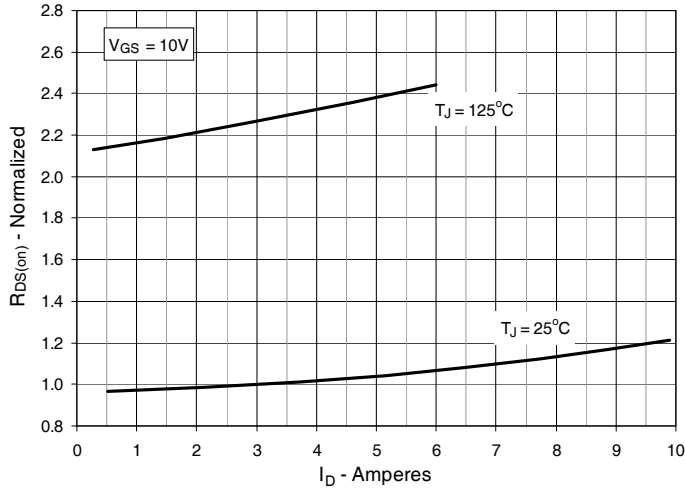
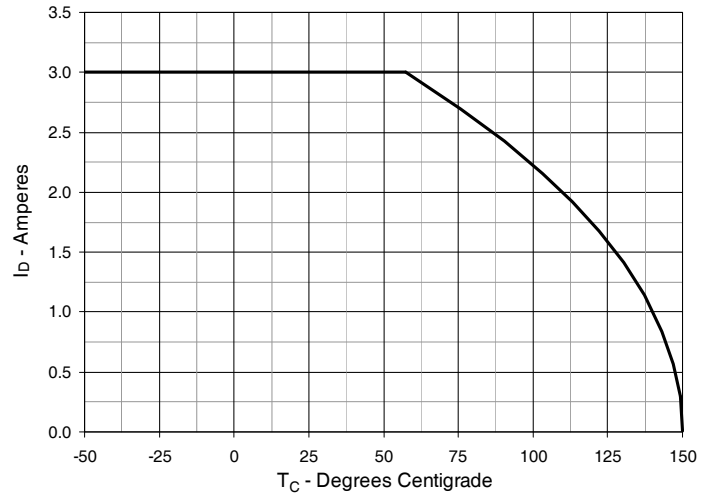
### ISO TO-247 (IXTJ) OUTLINE



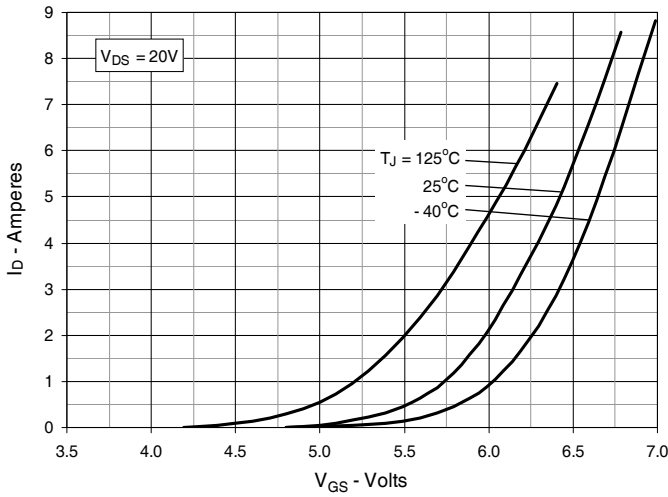
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IXYS MOSFETs and IGBTs are covered by one or more of the following U.S. patents:

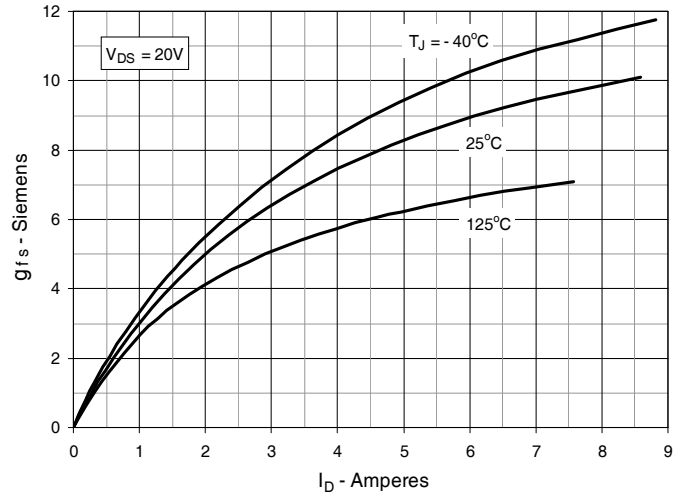
|           |           |           |           |              |              |              |              |              |             |
|-----------|-----------|-----------|-----------|--------------|--------------|--------------|--------------|--------------|-------------|
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| 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  $I_D = 3\text{A}$  Value vs. Junction Temperature**

**Fig. 5.  $R_{DS(on)}$  Normalized to  $I_D = 3\text{A}$  Value vs. Drain Current**

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


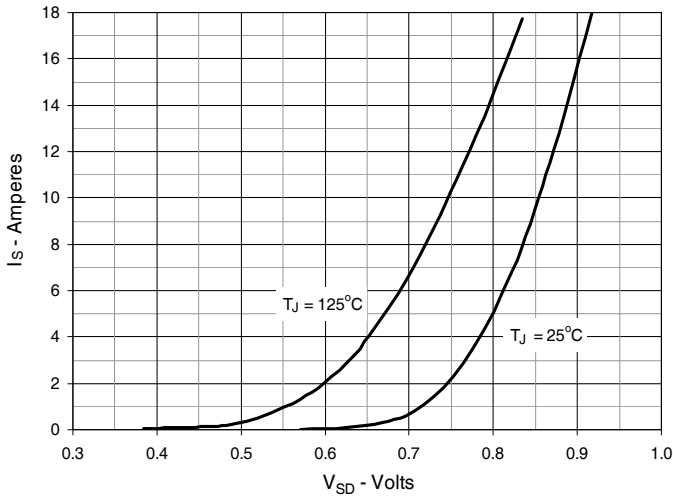
**Fig. 7. Input Admittance**



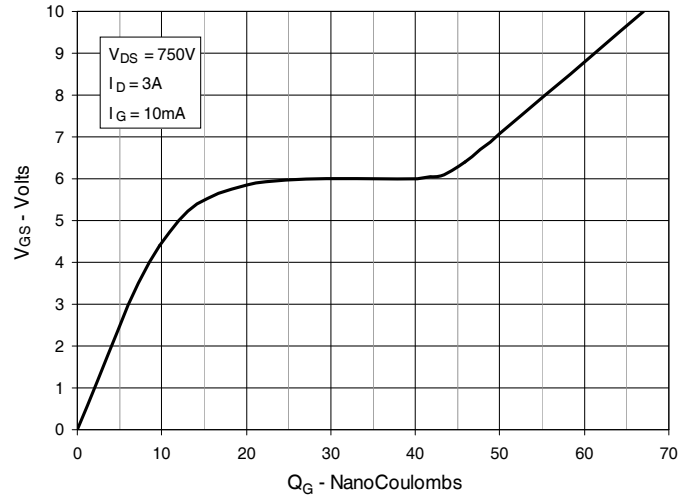
**Fig. 8. Transconductance**



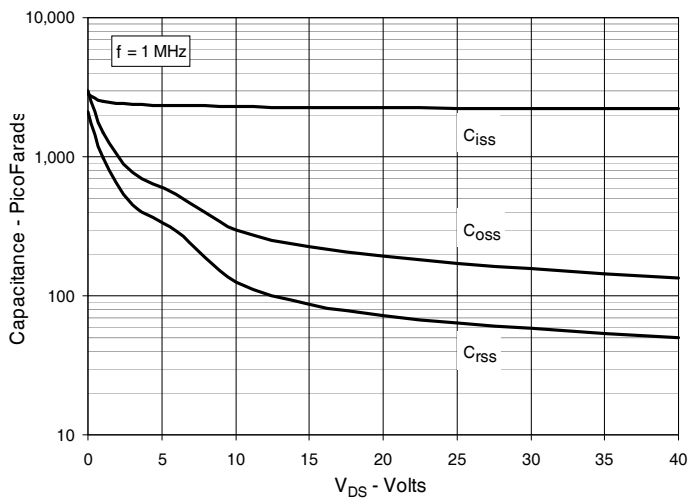
**Fig. 9. Forward Voltage Drop of Intrinsic Diode**



**Fig. 10. Gate Charge**



**Fig. 11. Capacitance**



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

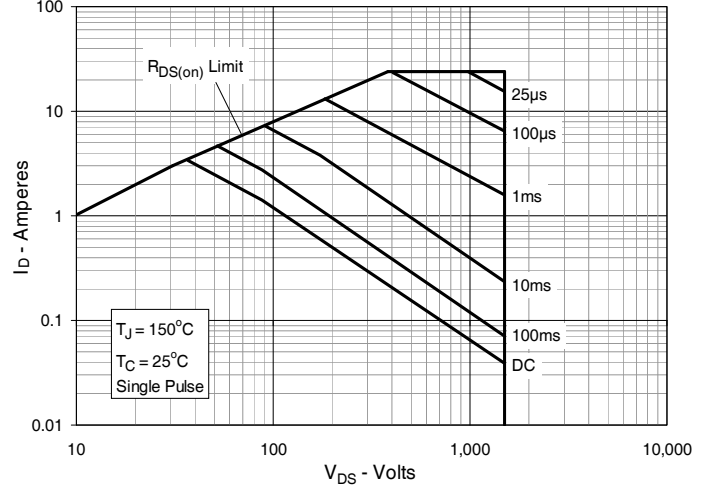
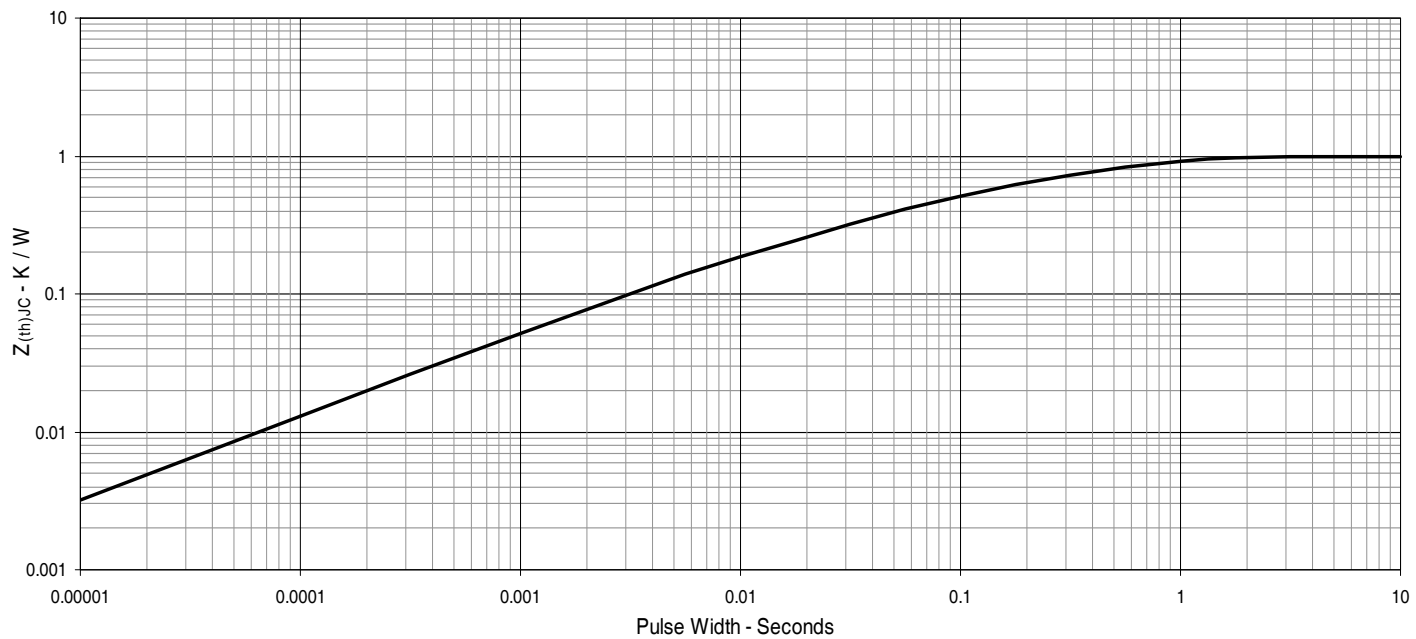


Fig. 13. Maximum Transient Thermal Impedance





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