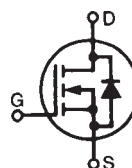


# PolarHV™ HiPerFET IXFB 100N50P

## Power MOSFET

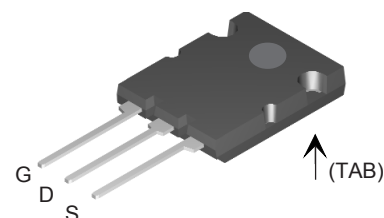
N-Channel Enhancement Mode  
Avalanche Rated  
Fast Intrinsic Diode

$$\begin{aligned} V_{DSS} &= 500 \text{ V} \\ I_{D25} &= 100 \text{ A} \\ R_{DS(on)} &\leq 49 \text{ m}\Omega \\ t_{rr} &\leq 200 \text{ ns} \end{aligned}$$



| Symbol     | Test Conditions                                                                                                                         | Maximum Ratings   |                  |
|------------|-----------------------------------------------------------------------------------------------------------------------------------------|-------------------|------------------|
| $V_{DSS}$  | $T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$                                                                                         | 500               | V                |
| $V_{DGR}$  | $T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$ ; $R_{GS} = 1 \text{ M}\Omega$                                                          | 500               | V                |
| $V_{GSS}$  | Continuous                                                                                                                              | $\pm 30$          | V                |
| $V_{GSM}$  | Transient                                                                                                                               | $\pm 40$          | V                |
| $I_{D25}$  | $T_C = 25^\circ\text{C}$                                                                                                                | 100               | A                |
| $I_{DRMS}$ | External lead current limit                                                                                                             | 75                | A                |
| $I_{DM}$   | $T_C = 25^\circ\text{C}$ , pulse width limited by $T_{JM}$                                                                              | 250               | A                |
| $I_{AR}$   | $T_C = 25^\circ\text{C}$                                                                                                                | 100               | A                |
| $E_{AR}$   | $T_C = 25^\circ\text{C}$                                                                                                                | 100               | mJ               |
| $E_{AS}$   | $T_C = 25^\circ\text{C}$                                                                                                                | 5                 | J                |
| $dv/dt$    | $I_S \leq I_{DM}$ , $di/dt \leq 100 \text{ A}/\mu\text{s}$ , $V_{DD} \leq V_{DSS}$ ,<br>$T_J \leq 150^\circ\text{C}$ , $R_G = 2 \Omega$ | 20                | V/ns             |
| $P_D$      | $T_C = 25^\circ\text{C}$                                                                                                                | 1250              | W                |
| $T_J$      |                                                                                                                                         | -55 ... +150      | $^\circ\text{C}$ |
| $T_{JM}$   |                                                                                                                                         | 150               | $^\circ\text{C}$ |
| $T_{stg}$  |                                                                                                                                         | -55 ... +150      | $^\circ\text{C}$ |
| $T_L$      | 1.6 mm (0.062 in.) from case for 10 s                                                                                                   | 300               | $^\circ\text{C}$ |
| $T_{SOLD}$ | Plastic body for 10 s                                                                                                                   | 260               | $^\circ\text{C}$ |
| $F_C$      | Mounting force                                                                                                                          | 30..120/7.5...2.7 | N/lb             |
| Weight     |                                                                                                                                         | 10                | g                |

### PLUS264™ (IXFB)



G = Gate      D = Drain  
S = Source      TAB = Drain

### Features

- International standard packages
- Fast recovery diode
- Unclamped Inductive Switching (UIS) rated
- Low package inductance
- easy to drive and to protect

### Advantages

- Plus 264™ package for clip or spring
- Space savings
- High power density

| Symbol       | Test Conditions<br>( $T_J = 25^\circ\text{C}$ , unless otherwise specified) | Characteristic Values |      |                                        |
|--------------|-----------------------------------------------------------------------------|-----------------------|------|----------------------------------------|
|              |                                                                             | Min.                  | Typ. | Max.                                   |
| $BV_{DSS}$   | $V_{GS} = 0 \text{ V}$ , $I_D = 3 \text{ mA}$                               | 500                   |      | V                                      |
| $V_{GS(th)}$ | $V_{DS} = V_{GS}$ , $I_D = 8 \text{ mA}$                                    | 3.0                   |      | 5.0 V                                  |
| $I_{GSS}$    | $V_{GS} = \pm 30 \text{ V}_{DC}$ , $V_{DS} = 0$                             |                       |      | $\pm 200 \text{ nA}$                   |
| $I_{DSS}$    | $V_{DS} = V_{DSS}$<br>$V_{GS} = 0 \text{ V}$<br>$T_J = 125^\circ\text{C}$   |                       |      | 25 $\mu\text{A}$<br>2000 $\mu\text{A}$ |
| $R_{DS(on)}$ | $V_{GS} = 10 \text{ V}$ , $I_D = 0.5 I_{D25}$ , Note 1                      |                       |      | 49 m $\Omega$                          |

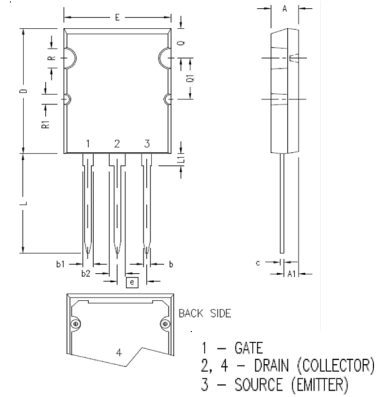
| Symbol       | Test Conditions                                                                                 | Characteristic Values<br>( $T_J = 25^\circ\text{C}$ , unless otherwise specified) |      |                          |
|--------------|-------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------|--------------------------|
|              |                                                                                                 | Min.                                                                              | Typ. | Max.                     |
| $g_{fs}$     | $V_{DS} = 20\text{ V}; I_D = 0.5 I_{D25}$ , 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                       |
| $t_{d(on)}$  | $V_{GS} = 10\text{ V}, V_{DS} = 0.5 V_{DSS}, I_D = 0.5 I_{D25}$<br>$R_G = 1\ \Omega$ (External) |                                                                                   | 36   | ns                       |
| $t_r$        |                                                                                                 |                                                                                   | 29   | ns                       |
| $t_{d(off)}$ |                                                                                                 |                                                                                   | 110  | ns                       |
| $t_f$        |                                                                                                 |                                                                                   | 26   | ns                       |
| $Q_{g(on)}$  | $V_{GS} = 10\text{ V}, V_{DS} = 0.5 V_{DSS}, I_D = 0.5 I_{D25}$                                 |                                                                                   | 240  | nC                       |
| $Q_{gs}$     |                                                                                                 |                                                                                   | 96   | nC                       |
| $Q_{gd}$     |                                                                                                 |                                                                                   | 78   | nC                       |
| $R_{thJC}$   |                                                                                                 |                                                                                   | 0.13 | $0.10\ ^\circ\text{C/W}$ |
| $R_{thCS}$   |                                                                                                 |                                                                                   |      | $^\circ\text{C/W}$       |

**Source-Drain Diode**

| Symbol   | Test Conditions                                                                | Characteristic Values<br>( $T_J = 25^\circ\text{C}$ , unless otherwise specified) |      |                   |
|----------|--------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------|-------------------|
|          |                                                                                | Min.                                                                              | Typ. | Max.              |
| $I_S$    | $V_{GS} = 0\text{ V}$                                                          |                                                                                   |      | 100 A             |
| $I_{SM}$ | Repetitive                                                                     |                                                                                   |      | 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>$V_R = 100\text{ V}$ |                                                                                   |      | 200 ns            |
| $Q_{RM}$ |                                                                                |                                                                                   |      | 0.6 $\mu\text{C}$ |
| $I_{RM}$ |                                                                                |                                                                                   |      | 6.0 A             |

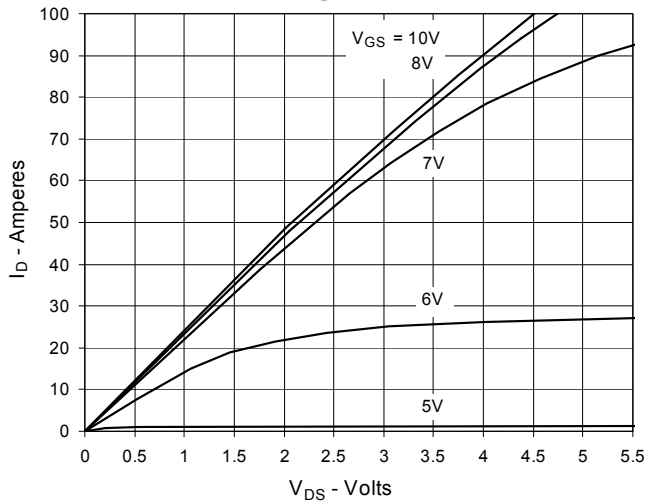
**Notes:**

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

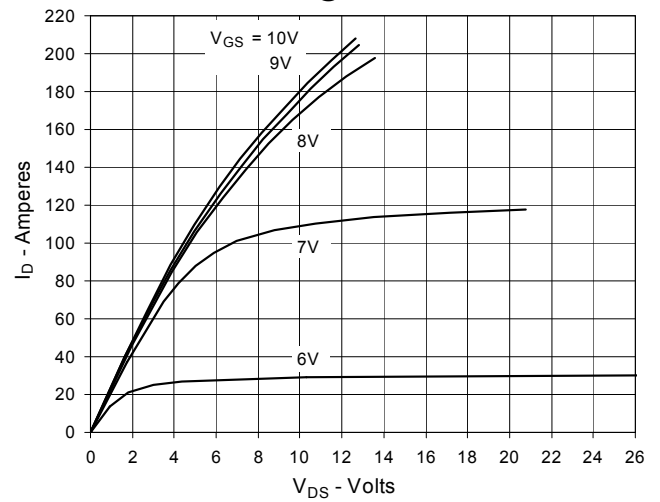
**PLUS264™ (IXFB) Outline**


| SYM | INCHES   |       | MILLIMETERS |       |
|-----|----------|-------|-------------|-------|
|     | MIN      | MAX   | MIN         | MAX   |
| A   | .185     | .209  | 4.70        | 5.31  |
| A1  | .102     | .118  | 2.59        | 3.00  |
| b   | .037     | .055  | 0.94        | 1.40  |
| b1  | .087     | .102  | 2.21        | 2.59  |
| b2  | .110     | .126  | 2.79        | 3.20  |
| c   | .017     | .029  | 0.43        | 0.74  |
| D   | 1.007    | 1.047 | 25.58       | 26.59 |
| E   | .760     | .799  | 19.30       | 20.29 |
| e   | .215 BSC |       | 5.46 BSC    |       |
| L   | .779     | .842  | 19.79       | 21.39 |
| L1  | .087     | .102  | 2.21        | 2.59  |
| Q   | .240     | .256  | 6.10        | 6.50  |
| Q1  | .330     | .346  | 8.38        | 8.79  |
| ØR  | .155     | .187  | 3.94        | 4.75  |
| ØR1 | .085     | .093  | 2.16        | 2.36  |

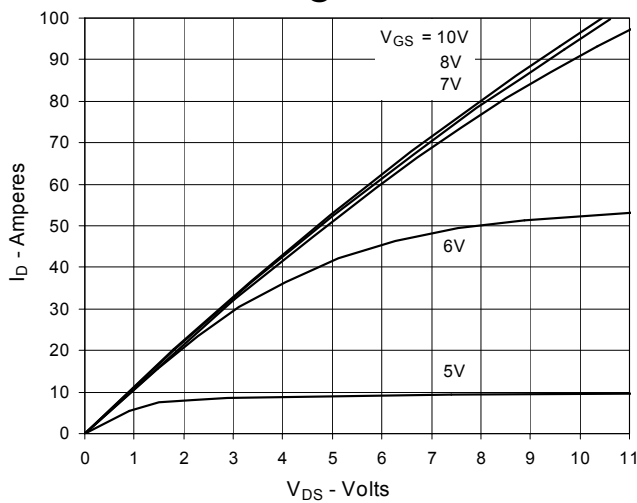
**Fig. 1. Output Characteristics  
@ 25°C**



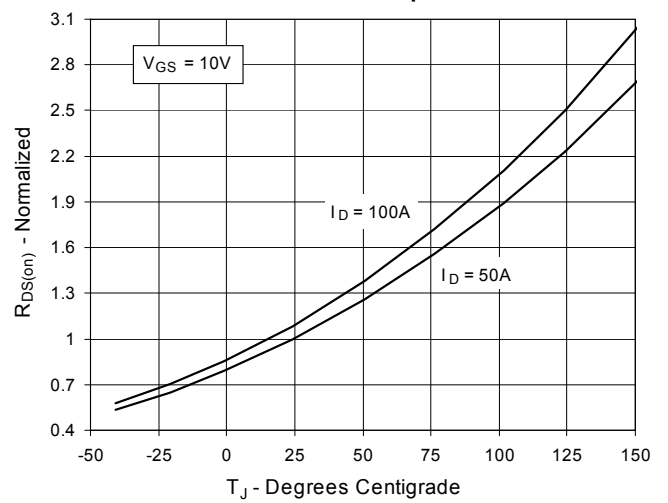
**Fig. 2. Extended Output Characteristics  
@ 25°C**



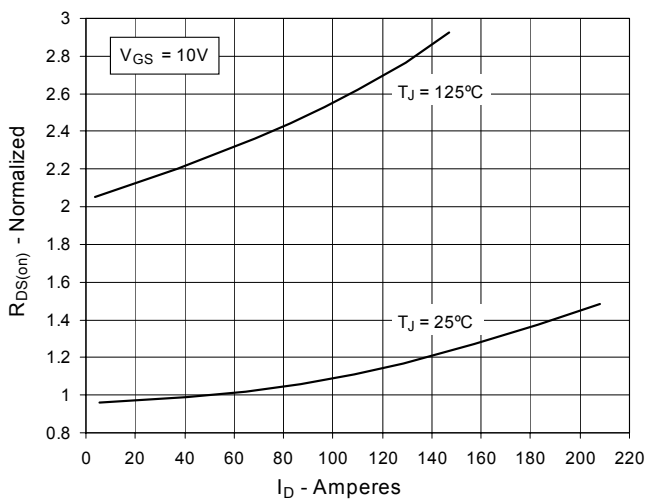
**Fig. 3. Output Characteristics  
@ 125°C**



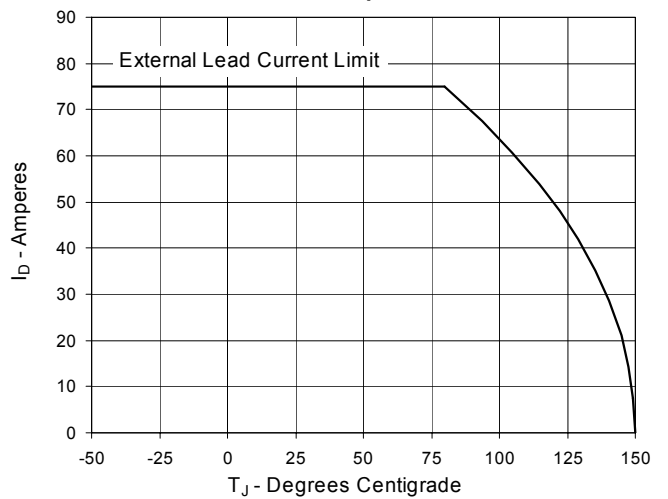
**Fig. 4.  $R_{DS(on)}$  Normalized to  $I_D = 50A$  Value  
vs. Junction Temperature**



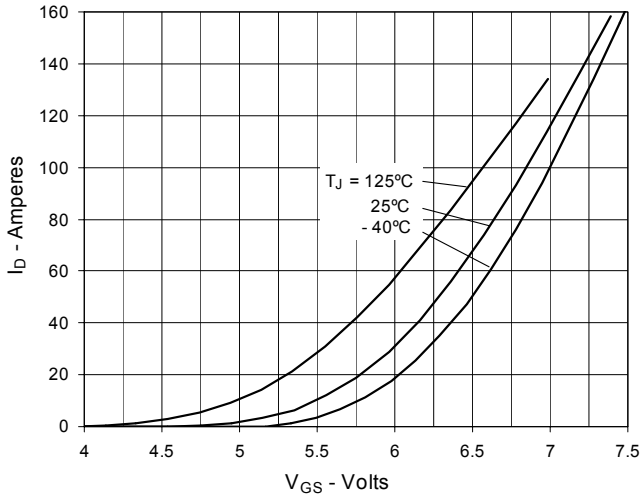
**Fig. 5.  $R_{DS(on)}$  Normalized to  $I_D = 50A$  Value  
vs. Drain Current**



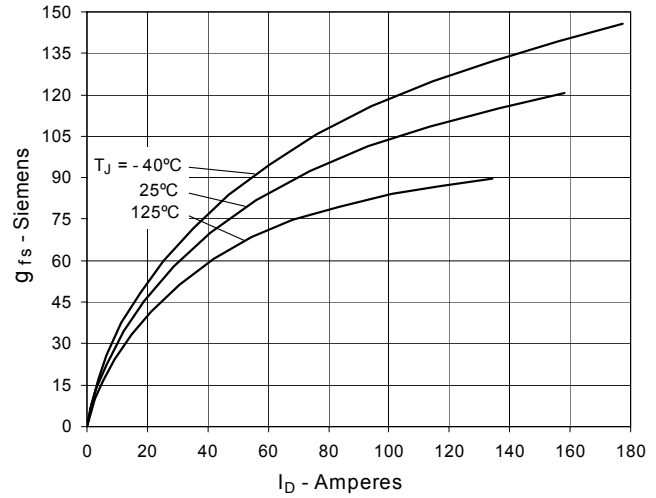
**Fig. 6. Maximum Drain Current vs.  
Case Temperature**



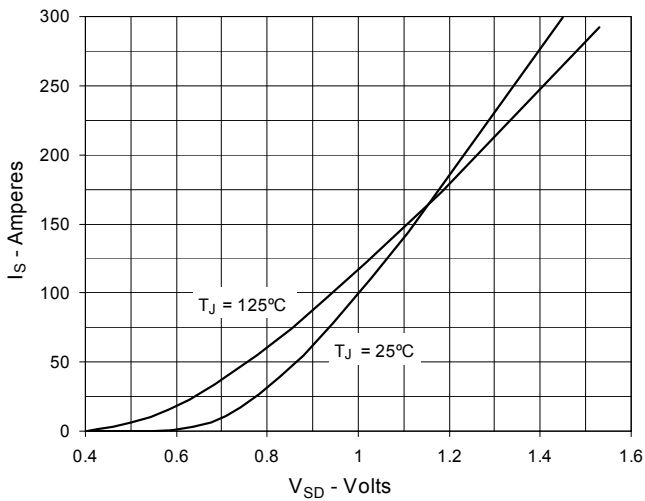
**Fig. 7. Input Admittance**



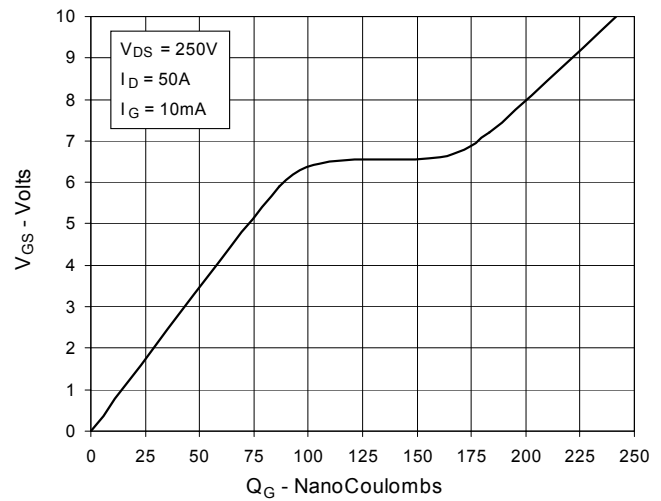
**Fig. 8. Transconductance**



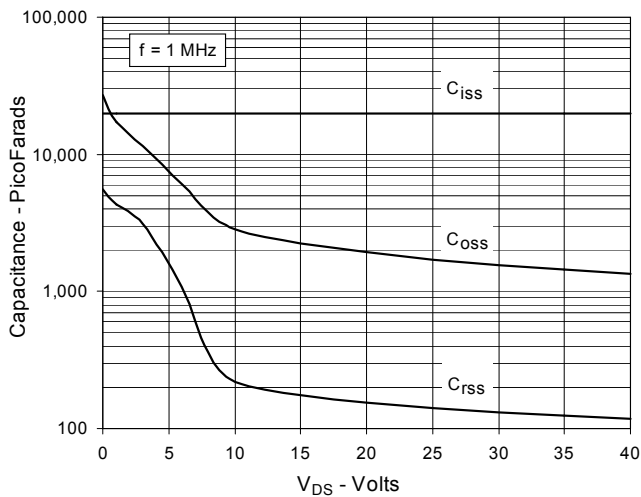
**Fig. 9. Forward Voltage Drop of Intrinsic Diode**



**Fig. 10. Gate Charge**



**Fig. 11. Capacitance**



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

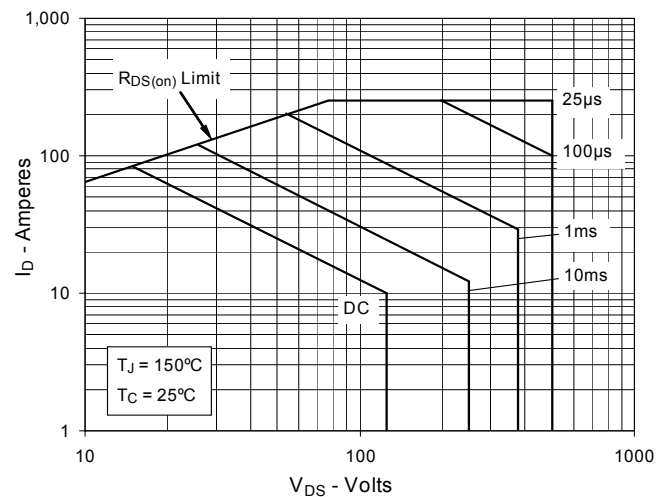
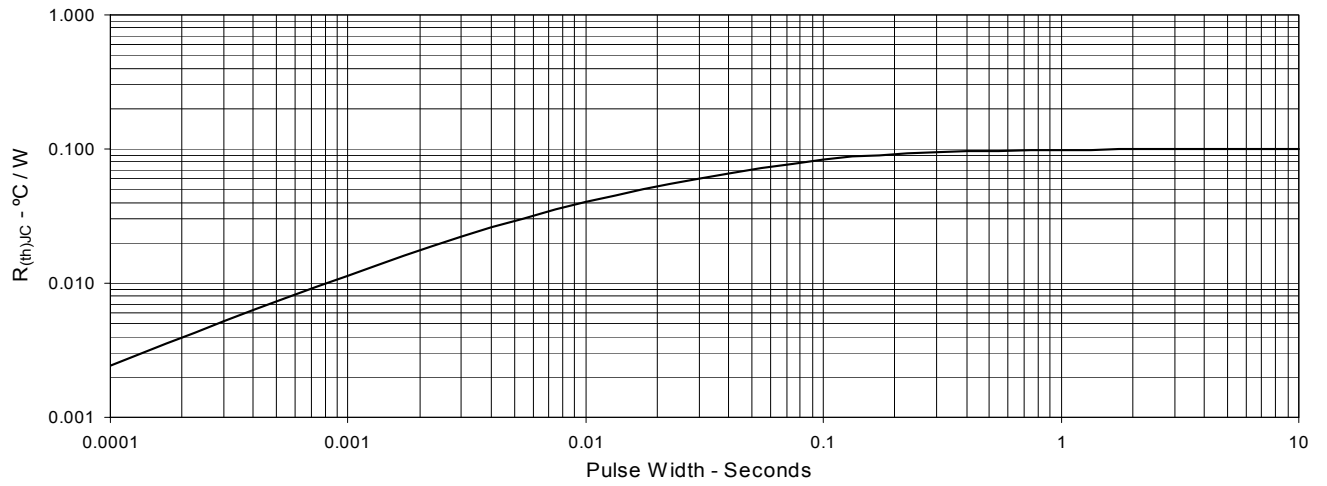


Fig. 13. Maximum Transient Thermal Resistance



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