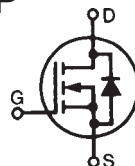


Polar™ Power MOSFET
HiPerFET™
IXFA5N100P
IXFH5N100P
IXFP5N100P

 N-Channel Enhancement Mode
 Avalanche Rated
 Fast Intrinsic Diode


$$V_{DSS} = 1000V$$

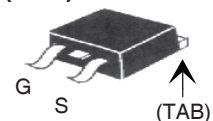
$$I_{D25} = 5A$$

$$R_{DS(on)} \leq 2.8\Omega$$

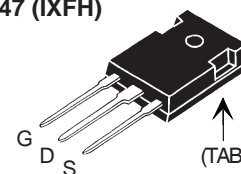
| Symbol | Test Conditions | Maximum Ratings | |
|---------------|--|-----------------|------------|
| V_{DSS} | $T_J = 25^\circ C$ to $150^\circ C$ | 1000 | V |
| V_{DGR} | $T_J = 25^\circ C$ to $150^\circ C$, $R_{GS} = 1M\Omega$ | 1000 | V |
| V_{GSS} | Continuous | ± 30 | V |
| V_{GSM} | Transient | ± 40 | V |
| I_{D25} | $T_C = 25^\circ C$ | 5 | A |
| I_{DM} | $T_C = 25^\circ C$, pulse width limited by T_{JM} | 10 | A |
| I_A | $T_C = 25^\circ C$ | 5 | A |
| E_{AS} | $T_C = 25^\circ C$ | 300 | mJ |
| dV/dt | $I_S \leq I_{DM}$, $V_{DD} \leq V_{DSS}$, $T_J \leq 150^\circ C$ | 10 | V/ns |
| P_D | $T_C = 25^\circ C$ | 250 | W |
| T_J | | -55 ... +150 | $^\circ C$ |
| T_{JM} | | 150 | $^\circ C$ |
| T_{stg} | | -55 ... +150 | $^\circ C$ |
| T_L | 1.6mm (0.062) from case for 10s | 300 | $^\circ C$ |
| T_{SOLD} | Plastic body for 10s | 260 | $^\circ C$ |
| M_d | Mounting torque (TO-220, TO-247) | 1.13 / 10 | Nm/lb.in. |
| Weight | TO-263 | 2.5 | g |
| | TO-220 | 3.0 | g |
| | TO-247 | 6.0 | g |

| Symbol | Test Conditions ($T_J = 25^\circ C$, unless otherwise specified) | Characteristic Values | | |
|--------------|---|-----------------------|------|--------------|
| | | Min. | Typ. | Max. |
| BV_{DSS} | $V_{GS} = 0V$, $I_D = 250\mu A$ | 1000 | | V |
| $V_{GS(th)}$ | $V_{DS} = V_{GS}$, $I_D = 250\mu A$ | 3.0 | | 6.0 V |
| I_{GSS} | $V_{GS} = \pm 30V$, $V_{DS} = 0V$ | | | ± 100 nA |
| I_{DSS} | $V_{DS} = V_{DSS}$ | | | 10 μA |
| | $V_{GS} = 0V$ $T_J = 125^\circ C$ | | | 750 μA |
| $R_{DS(on)}$ | $V_{GS} = 10V$, $I_D = 0.5 \cdot I_{D25}$, Note 1 | | | 2.8 Ω |

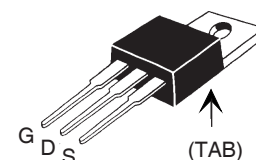
TO-263 (IXFA)



TO-247 (IXFH)



TO-220 (IXFP)


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

Features

- International standard packages
- Dynamic dv/dt Rating
- Avalanche Rated
- Low $R_{DS(ON)}$, rugged Polar™ process
- Low Q_G
- Low Drain-to-Tab capacitance
- Low package inductance

Advantages

- Easy to mount
- Space savings

Applications:

- DC-DC converters
- Battery chargers
- Switched-mode and resonant-mode power supplies
- Uninterrupted power supplies
- AC motor control
- High speed power switching applications

| Symbol | Test Conditions ($T_J = 25^\circ\text{C}$, unless otherwise specified) | Characteristic Values | | |
|--------------|--|-----------------------|------|-------------------------|
| | | Min. | Typ. | Max |
| g_{fs} | $V_{DS} = 20\text{V}$, $I_D = 0.5 \cdot I_{D25}$, Note 1 | 2.4 | 4.0 | S |
| R_{Gi} | Gate input resistance | | 1.6 | Ω |
| C_{iss} | $V_{GS} = 0\text{V}$, $V_{DS} = 25\text{V}$, $f = 1\text{MHz}$ | | 1830 | pF |
| C_{oss} | | | 113 | pF |
| C_{rss} | | | 20 | pF |
| $t_{d(on)}$ | Resistive Switching Times $V_{GS} = 10\text{V}$, $V_{DS} = 0.5 \cdot V_{DSS}$, $I_D = 0.5 \cdot I_{D25}$ $R_G = 5\Omega$ (External) | | 12 | ns |
| t_r | | | 13 | ns |
| $t_{d(off)}$ | | | 30 | ns |
| t_f | | | 37 | ns |
| $Q_{g(on)}$ | $V_{GS} = 10\text{V}$, $V_{DS} = 0.5 \cdot V_{DSS}$, $I_D = 0.5 \cdot I_{D25}$ | | 33.4 | nC |
| Q_{gs} | | | 10.6 | nC |
| Q_{gd} | | | 14.4 | nC |
| R_{thJC} | | | | 0.50 $^\circ\text{C/W}$ |
| R_{thCS} | (TO-220) | | 0.50 | $^\circ\text{C/W}$ |
| R_{thCS} | (TO-247) | | 0.25 | $^\circ\text{C/W}$ |

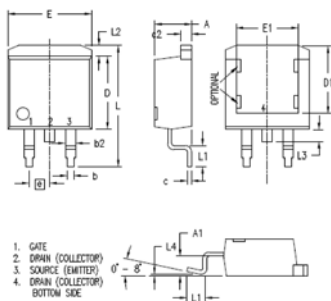
Source-Drain Diode

Characteristic Values
($T_J = 25^\circ\text{C}$, unless otherwise specified)

| Symbol | Test Conditions | Min. | Typ. | Max. |
|----------|---|------|------|---------------|
| I_S | $V_{GS} = 0\text{V}$ | | | 5 A |
| I_{SM} | Repetitive, pulse width limited by T_{JM} | | | 20 A |
| V_{SD} | $I_F = I_S$, $V_{GS} = 0\text{V}$, Note 1 | | | 1.3 V |
| t_{rr} | $I_F = 5\text{A}$, $V_{GS} = 0\text{V}$ $-di/dt = 100\text{A}/\mu\text{s}$ $V_R = 100\text{V}$ | | | 200 ns |
| I_{RM} | | | 7.4 | A |
| Q_{RM} | | | 0.43 | μC |

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

TO-263 (IXFA) Outline



| SYM | INCHES | | MILLIMETERS | |
|-----|----------|------|-------------|-------|
| | MIN | MAX | MIN | MAX |
| A | .160 | .190 | 4.06 | 4.83 |
| A1 | .080 | .110 | 2.03 | 2.79 |
| b | .020 | .039 | 0.51 | 0.99 |
| b1 | .045 | .055 | 1.14 | 1.40 |
| b2 | .045 | .055 | 1.14 | 1.40 |
| c | .016 | .029 | 0.40 | 0.74 |
| c1 | .045 | .055 | 1.14 | 1.40 |
| c2 | .045 | .055 | 1.14 | 1.40 |
| D | .340 | .380 | 8.64 | 9.65 |
| D1 | .315 | .350 | 8.00 | 8.89 |
| E | .380 | .410 | 9.65 | 10.41 |
| E1 | .245 | .320 | 6.22 | 8.13 |
| e | .100 BSC | | 2.54 BSC | |
| L | .575 | .625 | 14.61 | 15.88 |
| L1 | .090 | .110 | 2.29 | 2.79 |
| L2 | .040 | .055 | 1.02 | 1.40 |
| L3 | .050 | .070 | 1.27 | 1.78 |
| L4 | 0 | .005 | 0 | 0.13 |

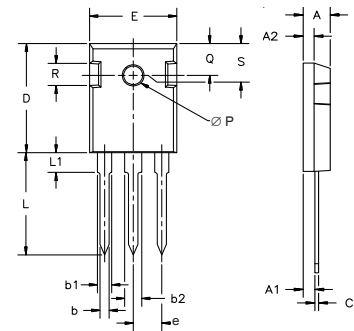
PRELIMINARY TECHNICAL INFORMATION

The product presented herein is under development. The Technical Specifications offered are derived from data gathered during objective characterizations of preliminary engineering lots; but also may yet contain some information supplied during a pre-production design evaluation. IXYS reserves the right to change limits, test conditions, and dimensions without notice.

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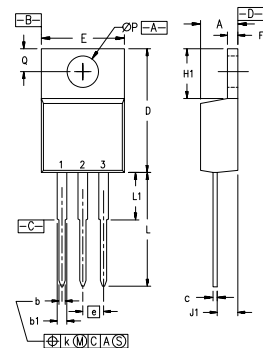
| | | | | | | | | | | |
|--|-----------|-----------|-----------|-----------|-------------|-------------|-------------|-------------|-------------|-------------|
| IXYS MOSFETs and IGBTs are covered by one or more of the following U.S. patents: | 4,835,592 | 4,931,844 | 5,049,961 | 5,237,481 | 6,162,665 | 6,404,065B1 | 6,683,344 | 6,727,585 | 7,005,734B2 | 7,157,338B2 |
| | 4,850,072 | 5,017,508 | 5,063,307 | 5,381,025 | 6,259,123B1 | 6,534,343 | 6,710,405B2 | 6,759,692 | 7,063,975B2 | |
| | 4,881,106 | 5,034,796 | 5,187,117 | 5,486,715 | 6,306,728B1 | 6,583,505 | 6,710,463 | 6,771,478B2 | 7,071,537 | |

TO-247 (IXFH) Outline



| Dim. | Millimeter | | Inches | |
|-----------------|------------|-------|--------|-------|
| | Min. | Max. | Min. | Max. |
| A | 4.7 | 5.3 | .185 | .209 |
| A1 | 2.2 | 2.54 | .087 | .102 |
| A2 | 2.2 | 2.6 | .059 | .098 |
| b | 1.0 | 1.4 | .040 | .055 |
| b1 | 1.65 | 2.13 | .065 | .084 |
| b2 | 2.87 | 3.12 | .113 | .123 |
| C | .4 | .8 | .016 | .031 |
| D | 20.80 | 21.46 | .819 | .845 |
| E | 15.75 | 16.26 | .610 | .640 |
| e | 5.20 | 5.72 | 0.205 | 0.225 |
| L | 19.81 | 20.32 | .780 | .800 |
| L1 | | 4.50 | | .177 |
| $\varnothing P$ | 3.55 | 3.65 | .140 | .144 |
| Q | 5.89 | 6.40 | 0.232 | 0.252 |
| R | 4.32 | 5.49 | .170 | .216 |
| S | 6.15 | BSC | 242 | BSC |

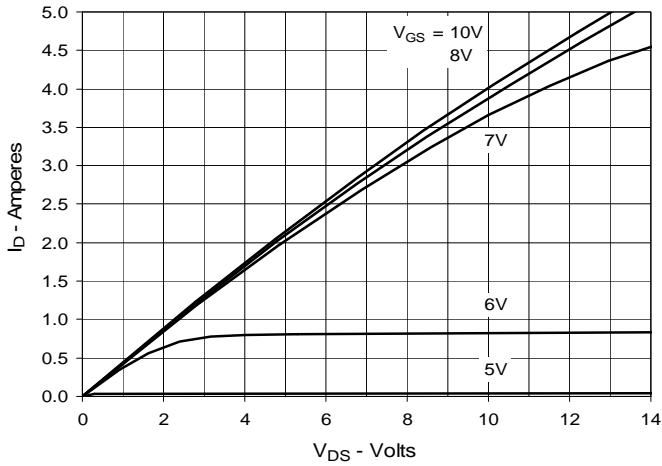
TO-220 (IXFP) Outline



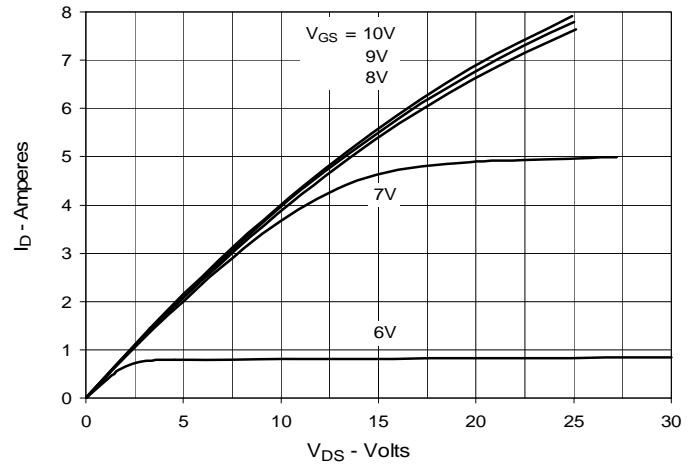
Pins: 1 - Gate 2 - Drain

| SYM | INCHES | | MILLIMETERS | |
|-----------------|----------|------|-------------|-------|
| | MIN | MAX | MIN | MAX |
| A | .170 | .190 | 4.32 | 4.83 |
| b | .025 | .040 | 0.64 | 1.02 |
| b1 | .045 | .065 | 1.15 | 1.65 |
| c | .014 | .022 | 0.35 | 0.56 |
| D | 5.80 | 6.30 | 14.73 | 16.00 |
| E | .390 | .420 | 9.91 | 10.66 |
| e | .100 BSC | | 2.54 BSC | |
| F | .045 | .055 | 1.14 | 1.40 |
| H1 | .230 | .270 | 5.85 | 6.85 |
| J1 | .090 | .110 | 2.29 | 2.79 |
| k | 0 | .015 | 0 | 0.38 |
| L | .500 | .550 | 12.70 | 13.97 |
| L1 | .110 | .230 | 2.79 | 5.84 |
| $\varnothing P$ | .139 | .161 | 3.53 | 4.08 |
| Q | .100 | .125 | 2.54 | 3.18 |

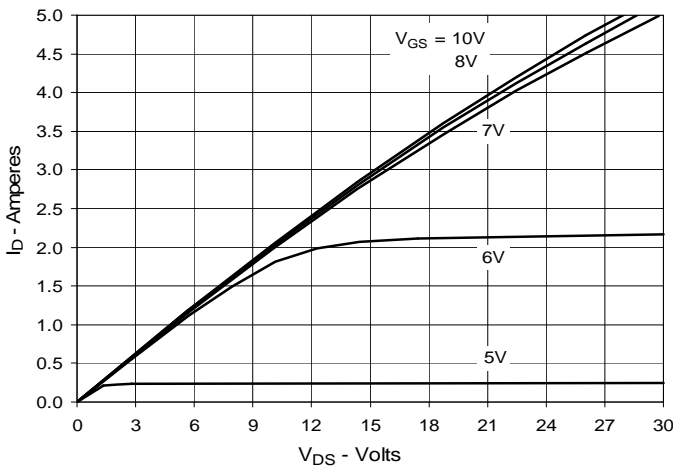
**Fig. 1. Output Characteristics
@ 25°C**



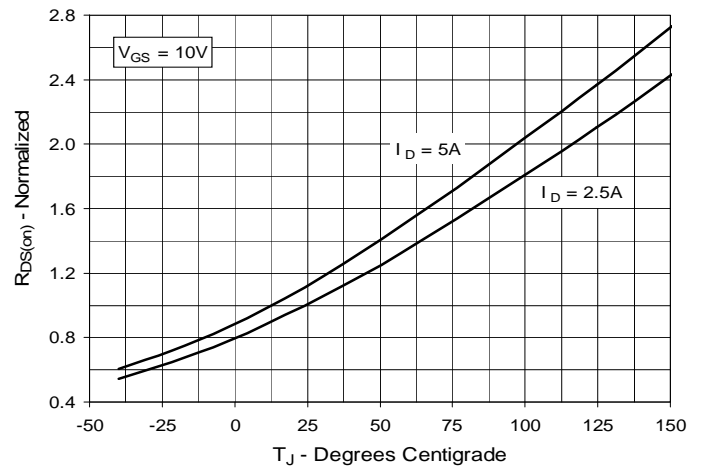
**Fig. 2. Extended Output Characteristics
@ 25°C**



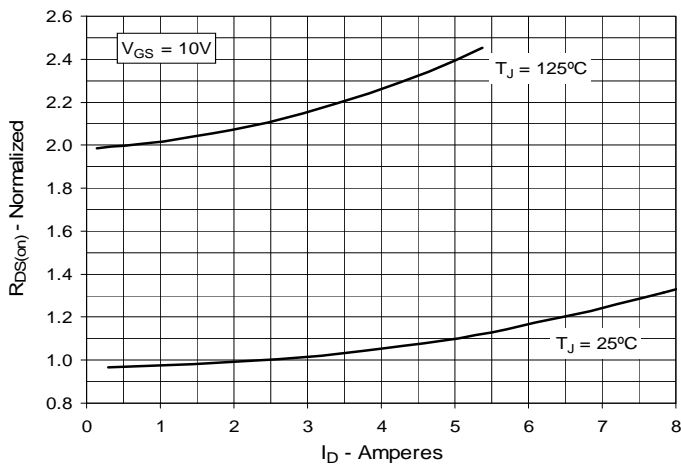
**Fig. 3. Output Characteristics
@ 125°C**



**Fig. 4. $R_{DS(on)}$ Normalized to $I_D = 2.5A$ Value
vs. Junction Temperature**



**Fig. 5. $R_{DS(on)}$ Normalized to $I_D = 2.5A$ Value
vs. Drain Current**



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

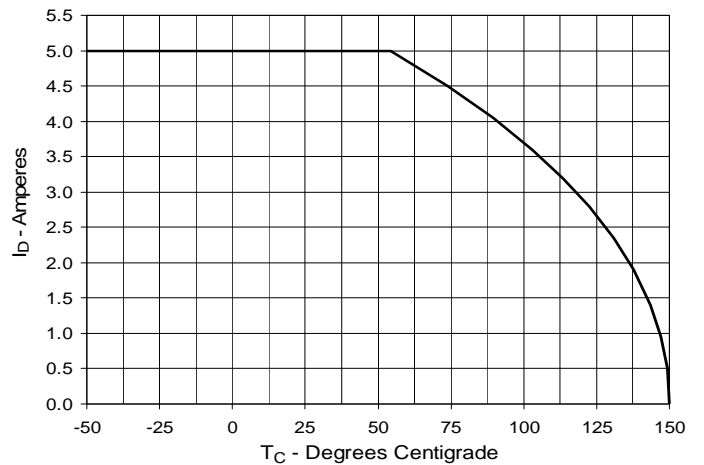


Fig. 7. Input Admittance

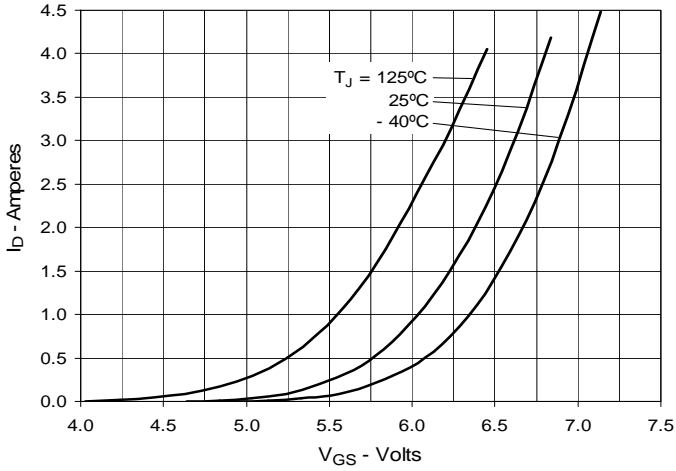


Fig. 8. Transconductance

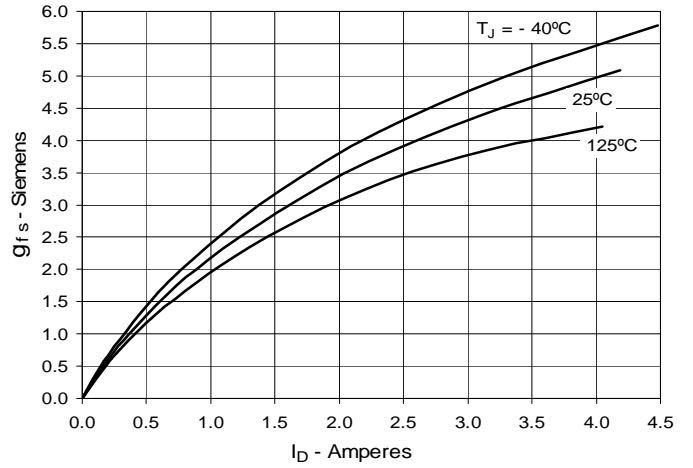


Fig. 9. Forward Voltage Drop of Intrinsic Diode

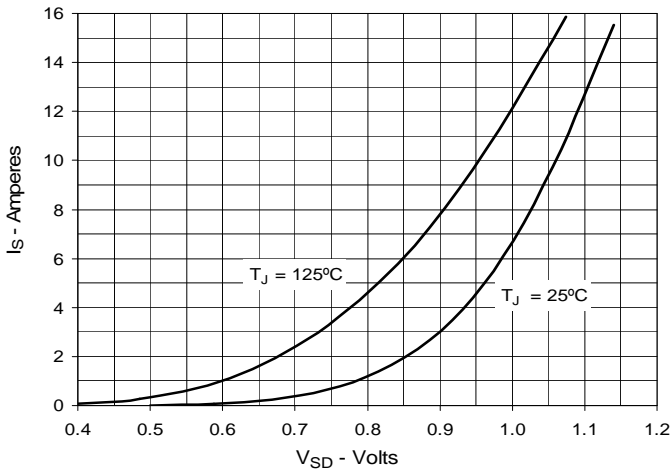


Fig. 10. Gate Charge

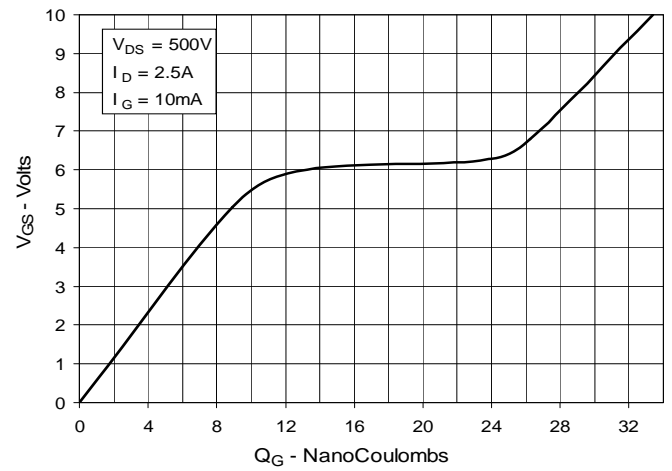


Fig. 11. Capacitance

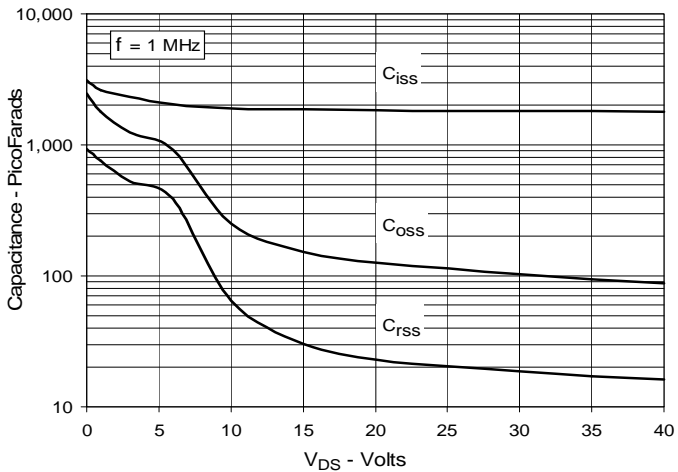
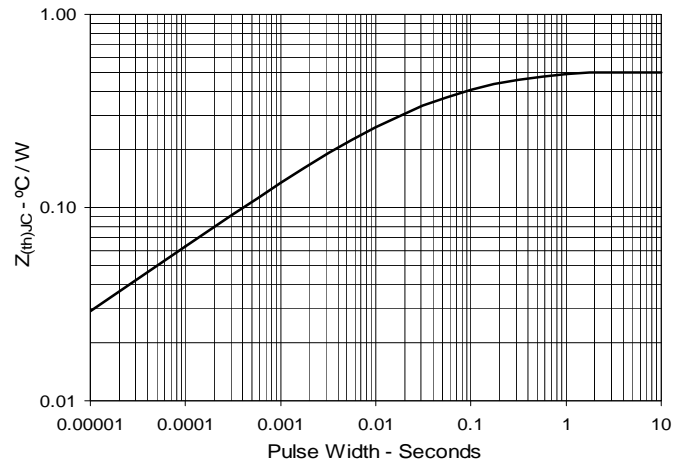


Fig. 12. Maximum Transient Thermal Impedance





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