

GigaMOS™
Power MOSFET
IXFK170N20T
IXFX170N20T

 N-Channel Enhancement Mode
 Avalanche Rated
 Fast Intrinsic Diode

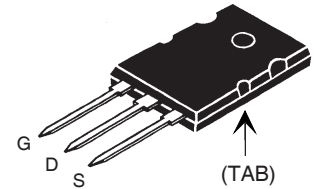

$$V_{DSS} = 200V$$

$$I_{D25} = 170A$$

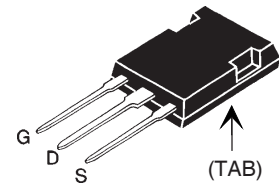
$$R_{DS(on)} \leq 11m\Omega$$

$$t_{rr} \leq 200ns$$

TO-264 (IXFK)



PLUS247 (IXFX)


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

| Symbol | Test Conditions | Maximum Ratings | |
|---------------|--|------------------|------------|
| V_{DSS} | $T_J = 25^\circ C$ to $175^\circ C$ | 200 | V |
| V_{DGR} | $T_J = 25^\circ C$ to $175^\circ C$, $R_{GS} = 1M\Omega$ | 200 | V |
| V_{GSS} | Continuous | ± 20 | V |
| V_{GSM} | Transient | ± 30 | V |
| I_{D25} | $T_C = 25^\circ C$ | 170 | A |
| $I_{L(RMS)}$ | External Lead Current Limit | 160 | A |
| I_{DM} | $T_C = 25^\circ C$, Pulse Width Limited by T_{JM} | 470 | A |
| I_A | $T_C = 25^\circ C$ | 40 | A |
| E_{AS} | $T_C = 25^\circ C$ | 3 | J |
| P_D | $T_C = 25^\circ C$ | 1150 | W |
| dV/dt | $I_S \leq I_{DM}$, $V_{DD} \leq V_{DSS}$, $T_J \leq 175^\circ C$ | 20 | V/ns |
| T_J | | -55 ... +175 | $^\circ C$ |
| T_{JM} | | 175 | $^\circ C$ |
| T_{stg} | | -55 ... +175 | $^\circ C$ |
| T_L | 1.6mm (0.062 in.) from Case for 10s | 300 | $^\circ C$ |
| T_{SOLD} | Plastic Body for 10s | 260 | $^\circ C$ |
| M_d | Mounting Torque (TO-264) | 1.13/10 | Nm/lb.in. |
| F_C | Mounting Force (PLUS247) | 20..120 /4.5..27 | N/lb. |
| Weight | TO-264 | 10 | g |
| | PLUS247 | 6 | g |

| Symbol | Test Conditions ($T_J = 25^\circ C$ Unless Otherwise Specified) | Characteristic Values | | |
|--------------|---|-----------------------|------|--------------------|
| | | Min. | Typ. | Max. |
| BV_{DSS} | $V_{GS} = 0V$, $I_D = 3mA$ | 200 | | V |
| $V_{GS(th)}$ | $V_{DS} = V_{GS}$, $I_D = 4mA$ | 2.5 | | 5.0 V |
| I_{GSS} | $V_{GS} = \pm 20V$, $V_{DS} = 0V$ | | | ± 200 nA |
| I_{DSS} | $V_{DS} = V_{DSS}$, $V_{GS} = 0V$ $T_J = 150^\circ C$ | | | 50 μA 3 mA |
| $R_{DS(on)}$ | $V_{GS} = 10V$, $I_D = 60A$, Note 1 | | | 11 m Ω |

Features

- International Standard Packages
- High Current Handling Capability
- Fast Intrinsic Diode
- Avalanche Rated
- Low $R_{DS(on)}$

Advantages

- Easy to Mount
- Space Savings
- High Power Density

Applications

- Synchronous Rectification
- DC-DC Converters
- Battery Chargers
- Switched-Mode and Resonant-Mode Power Supplies
- DC Choppers
- AC Motor Drives
- Uninterruptible Power Supplies
- High Speed Power Switching Applications

| Symbol | Test Conditions | Characteristic Values | | |
|--------------|---|-----------------------|------|---------------|
| | | Min. | Typ. | Max. |
| g_{fs} | $V_{DS} = 10V, I_D = 60A, \text{Note 1}$ | 85 | 140 | S |
| C_{iss} | $V_{GS} = 0V, V_{DS} = 25V, f = 1MHz$ | | 19.6 | nF |
| C_{oss} | | | 1870 | pF |
| C_{rss} | | | 135 | pF |
| $t_{d(on)}$ | Resistive Switching Times $V_{GS} = 10V, V_{DS} = 0.5 \cdot V_{DSS}, I_D = 0.5 \cdot I_{D25}$ $R_G = 1\Omega \text{ (External)}$ | | 33 | ns |
| t_r | | | 28 | ns |
| $t_{d(off)}$ | | | 80 | ns |
| t_f | | | 22 | ns |
| $Q_{g(on)}$ | $V_{GS} = 10V, V_{DS} = 0.5 \cdot V_{DSS}, I_D = 0.5 \cdot I_{D25}$ | | 265 | nC |
| Q_{gs} | | | 86 | nC |
| Q_{gd} | | | 67 | nC |
| R_{thJC} | | | 0.13 | $^{\circ}C/W$ |
| R_{thCS} | | 0.15 | | $^{\circ}C/W$ |

Source-Drain Diode

| Symbol | Test Conditions | Characteristic Values | | |
|----------|--|-----------------------|------|---------|
| | | Min. | Typ. | Max. |
| I_S | $V_{GS} = 0V$ | | | 170 A |
| I_{SM} | Repetitive, Pulse Width Limited by T_{JM} | | | 680 A |
| V_{SD} | $I_F = 60A, V_{GS} = 0V, \text{Note 1}$ | | | 1.3 V |
| t_{rr} | $I_F = 80A, -di/dt = 100A/\mu s$ $V_R = 75V, V_{GS} = 0V$ | | | 200 ns |
| Q_{RM} | | | 0.59 | μC |
| I_{RM} | | | 9.80 | A |

Note 1: Pulse Test, $t \leq 300\mu s$; Duty Cycle, $d \leq 2\%$.

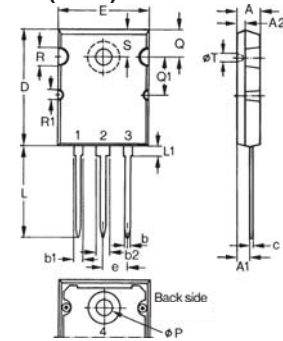
ADVANCE TECHNICAL INFORMATION

The product presented herein is under development. The Technical Specifications offered are derived from a subjective evaluation of the design, based upon prior knowledge and experience, and constitute a "considered reflection" of the anticipated result. IXYS reserves the right to change limits, test conditions, and dimensions without notice.

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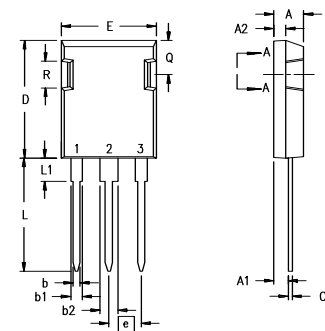
IXYS MOSFETs and IGBTs are covered 4,835,592 4,931,844 5,049,961 5,237,481 6,162,665 6,404,065 B1 6,683,344 6,727,585 7,005,734 B2 7,157,338B2
by one or more of the following U.S. patents: 4,850,072 5,017,508 5,063,307 5,381,025 6,259,123 B1 6,534,343 6,710,405 B2 6,759,692 7,063,975 B2
4,881,106 5,034,796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

TO-264 (IXFK) Outline



| Dim. | Millimeter | | Inches | |
|------|------------|-------|----------|-------|
| | Min. | Max. | Min. | Max. |
| A | 4.82 | 5.13 | .190 | .202 |
| A1 | 2.54 | 2.89 | .100 | .114 |
| A2 | 2.00 | 2.10 | .079 | .083 |
| b | 1.12 | 1.42 | .044 | .056 |
| b1 | 2.39 | 2.69 | .094 | .106 |
| b2 | 2.90 | 3.09 | .114 | .122 |
| c | 0.53 | 0.83 | .021 | .033 |
| D | 25.91 | 26.16 | 1.020 | 1.030 |
| E | 19.81 | 19.96 | .780 | .786 |
| e | 5.46 BSC | | .215 BSC | |
| J | 0.00 | 0.25 | .000 | .010 |
| K | 0.00 | 0.25 | .000 | .010 |
| L | 20.32 | 20.83 | .800 | .820 |
| L1 | 2.29 | 2.59 | .090 | .102 |
| P | 3.17 | 3.66 | .125 | .144 |
| Q | 6.07 | 6.27 | .239 | .247 |
| Q1 | 8.38 | 8.69 | .330 | .342 |
| R | 3.81 | 4.32 | .150 | .170 |
| R1 | 1.78 | 2.29 | .070 | .090 |
| S | 6.04 | 6.30 | .238 | .248 |
| T | 1.57 | 1.83 | .062 | .072 |

PLUS 247™ (IXFX) Outline



Terminals: 1 - Gate
2 - Drain (Collector)
3 - Source (Emitter)
4 - Drain (Collector)

| Dim. | Millimeter | | Inches | |
|----------------|------------|-------|----------|-------|
| | Min. | Max. | Min. | Max. |
| A | 4.83 | 5.21 | .190 | .205 |
| A ₁ | 2.29 | 2.54 | .090 | .100 |
| A ₂ | 1.91 | 2.16 | .075 | .085 |
| b | 1.14 | 1.40 | .045 | .055 |
| b ₁ | 1.91 | 2.13 | .075 | .084 |
| b ₂ | 2.92 | 3.12 | .115 | .123 |
| C | 0.61 | 0.80 | .024 | .031 |
| D | 20.80 | 21.34 | .819 | .840 |
| E | 15.75 | 16.13 | .620 | .635 |
| e | 5.45 BSC | | .215 BSC | |
| L | 19.81 | 20.32 | .780 | .800 |
| L1 | 3.81 | 4.32 | .150 | .170 |
| Q | 5.59 | 6.20 | .220 | 0.244 |
| R | 4.32 | 4.83 | .170 | .190 |

Fig. 1. Output Characteristics @ 25°C

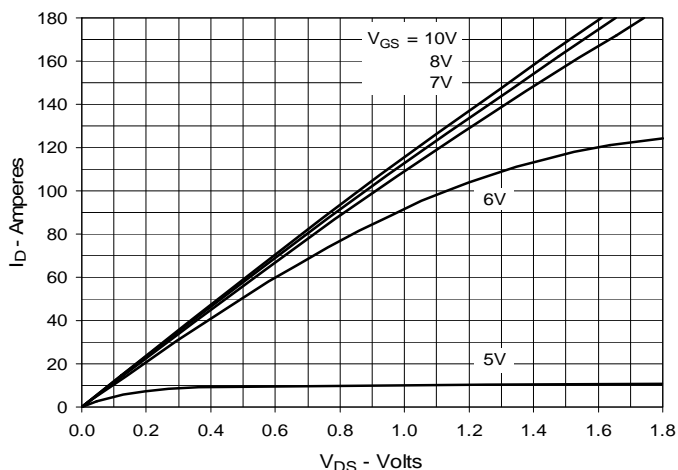


Fig. 2. Extended Output Characteristics @ 25°C

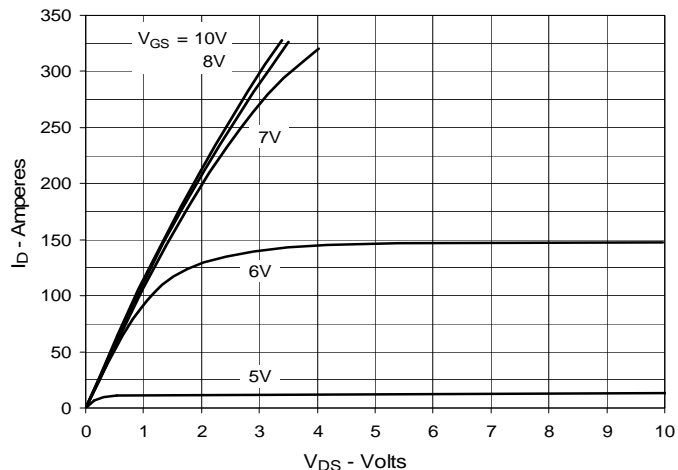


Fig. 3. Output Characteristics @ 150°C

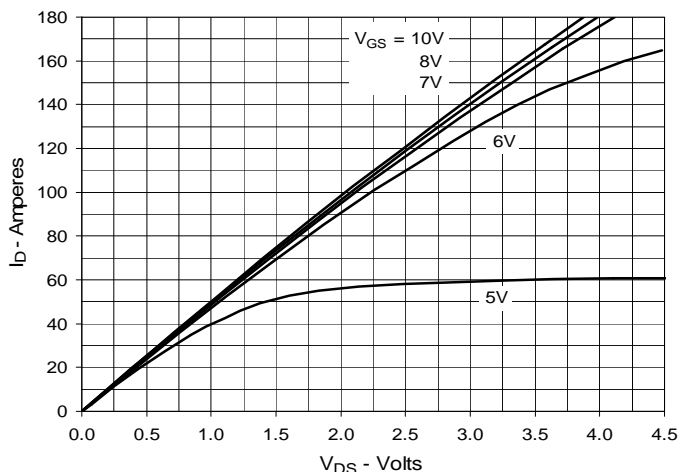


Fig. 4. $R_{DS(on)}$ Normalized to $I_D = 85A$ Value vs. Junction Temperature

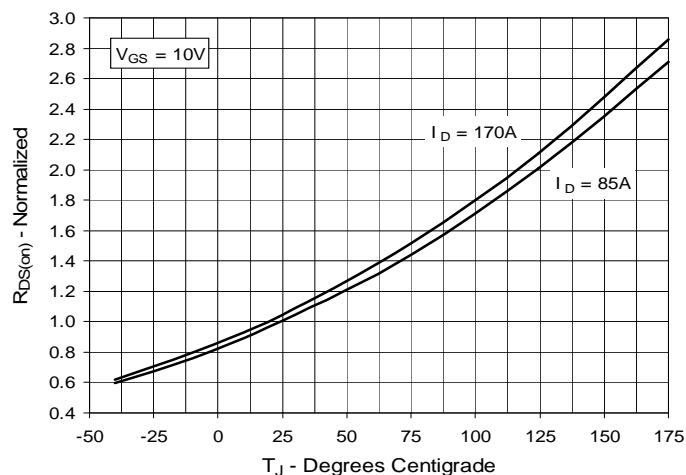


Fig. 5. $R_{DS(on)}$ Normalized to $I_D = 85A$ Value vs. Drain Current

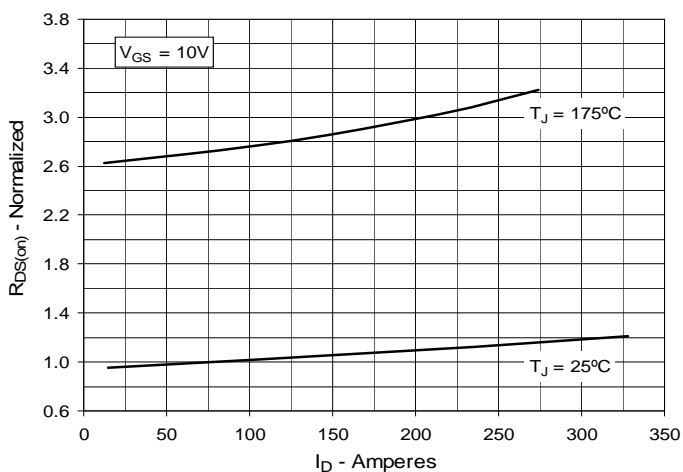


Fig. 6. Drain Current vs. Case Temperature

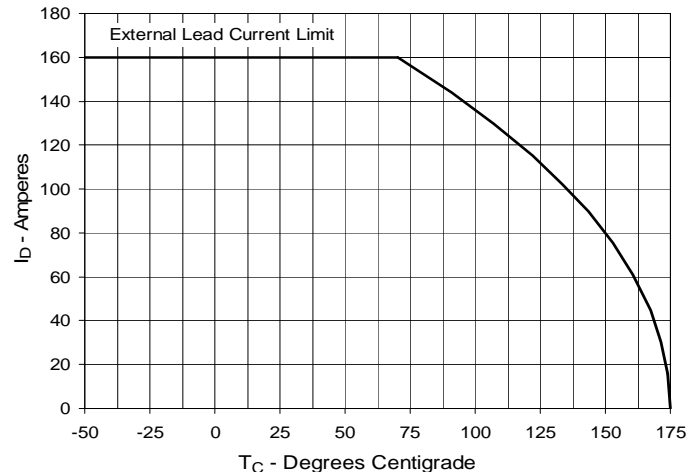


Fig. 7. Input Admittance

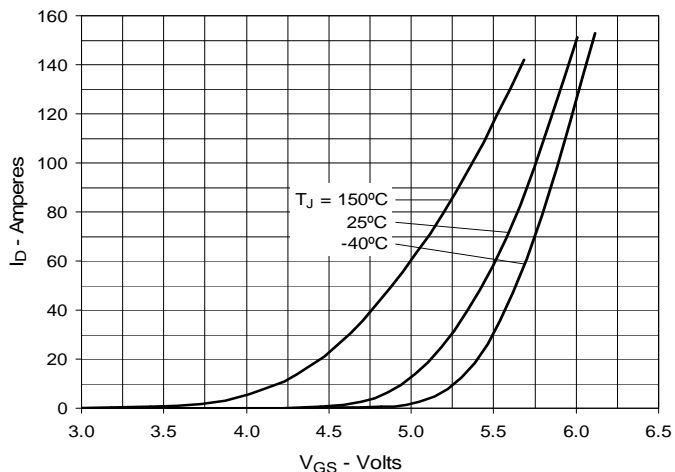


Fig. 8. Transconductance

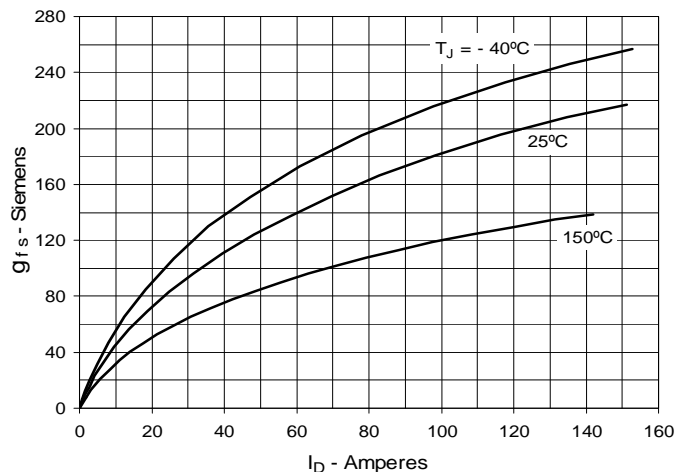


Fig. 9. Forward Voltage Drop of Intrinsic Diode

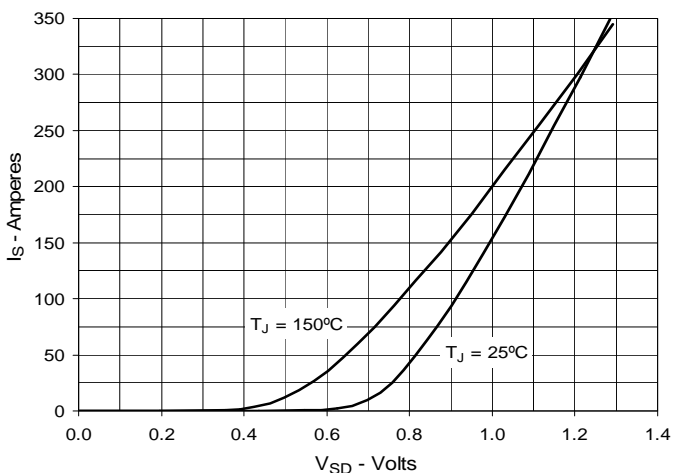


Fig. 10. Gate Charge

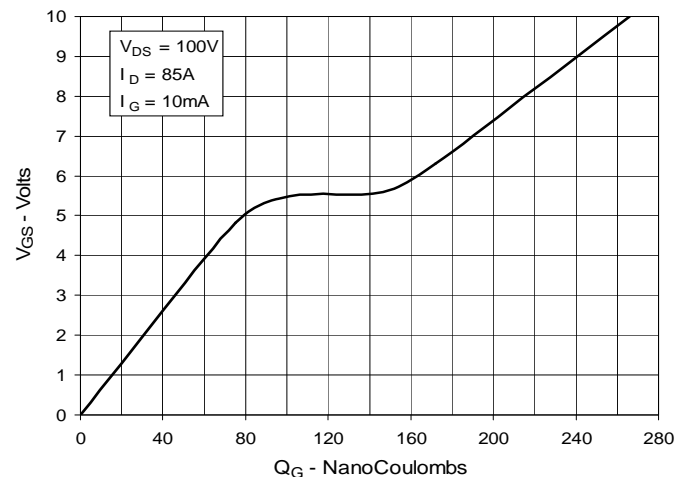


Fig. 11. Capacitance

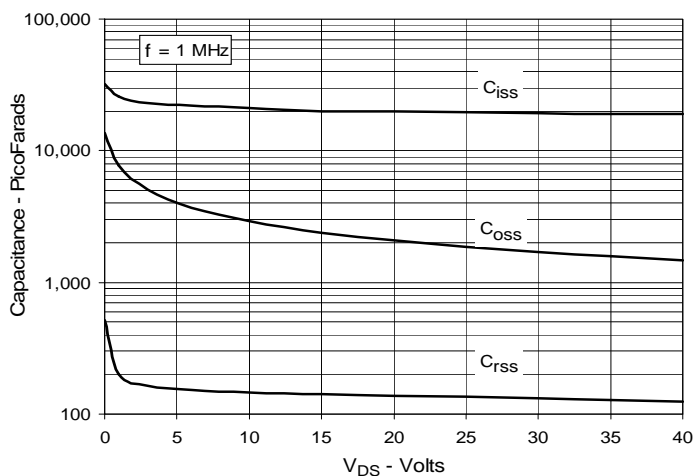


Fig. 12. Forward-Bias Safe Operating Area

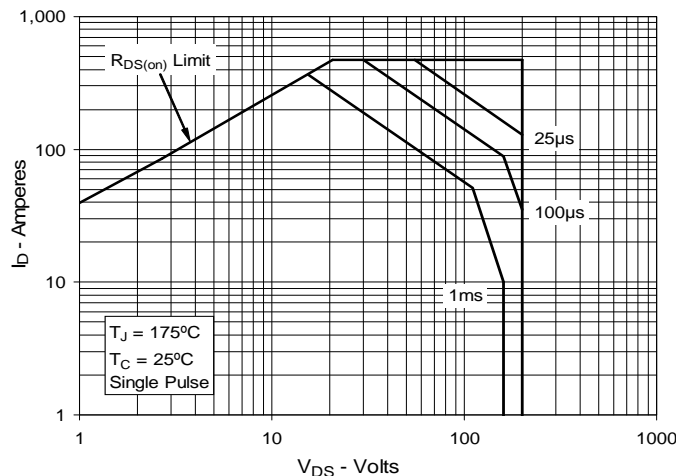
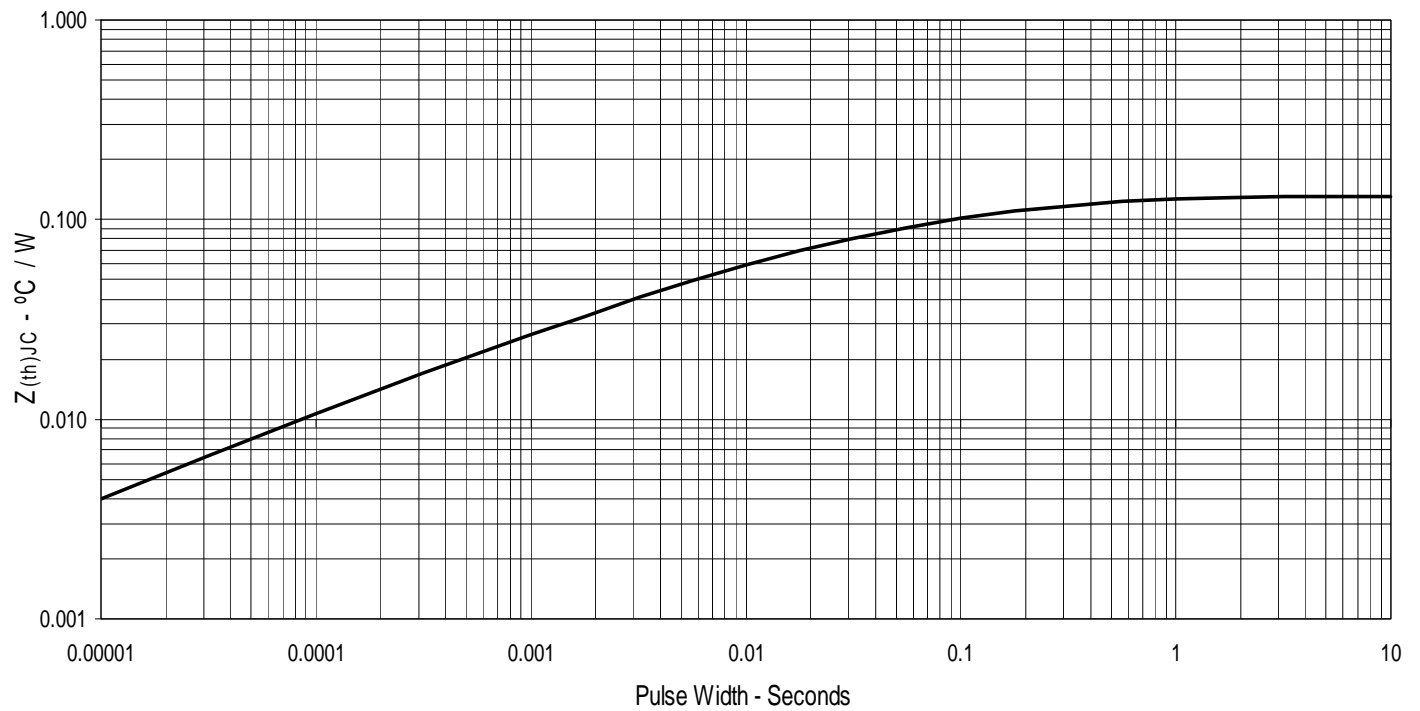


Fig. 13. Maximum Transient Thermal Impedance





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