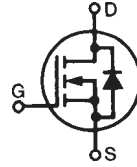


**Polar™ HiPerFET™
Power MOSFET**

**IXFH120N20P
IXFK120N20P**

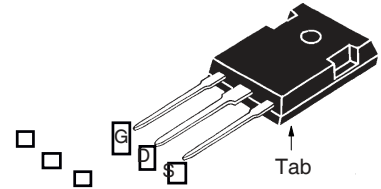
V_{DSS} = 200V
I_{D25} = 120A
R_{DS(on)} ≤ 22mΩ
t_{rr} ≤ 200ns

N-Channel Enhancement Mode
 Avalanche Rated
 Fast Intrinsic Diode

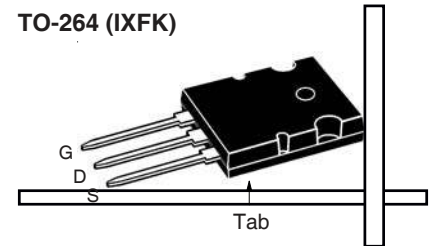


| Symbol | Test Conditions | Maximum Ratings | |
|-------------------|--|-----------------|-----------|
| V _{DSS} | T _J = 25°C to 175°C | 200 | V |
| V _{DGR} | T _J = 25°C to 175°C, R _{GS} = 1MΩ | 200 | V |
| V _{GSS} | Continuous | ± 20 | V |
| V _{GSM} | Transient | ± 30 | V |
| I _{D25} | T _C = 25°C | 120 | A |
| I _{LRMS} | Lead Current Limit, RMS | 75 | A |
| I _{DM} | T _C = 25°C, Pulse Width Limited by T _{JM} | 300 | A |
| I _A | T _C = 25°C | 60 | A |
| E _{AS} | T _C = 25°C | 2 | J |
| P _D | T _C = 25°C | 714 | W |
| dV/dt | I _S ≤ I _{DM} , V _{DD} ≤ V _{DSS} , T _J ≤ 175°C | 10 | V/ns |
| T _J | | -55 ... +175 | °C |
| T _{JM} | | 175 | °C |
| T _{stg} | | -55 ... +175 | °C |
| T _L | 1.6mm (0.062 in.) from Case for 10s | 300 | °C |
| T _{SOLD} | Plastic Body for 10s | 260 | °C |
| M _d | Mounting Torque | 1.13/10 | Nm/lb.in. |
| Weight | TO-247 | 6 | g |
| | TO-264 | 10 | g |

TO-247 (IXFH)



TO-264 (IXFK)



G = Gate D = Drain
 S = Source Tab = Drain

Features

- International Standard Packages
- Avalanche Rated
- Fast Intrinsic Diode
- Low Q_G
- Low R_{DS(on)}
- Low Drain-to-Tab Capacitance
- Low Package Inductance

Advantages

- Easy to Mount
- Space Savings

Applications

- DC-DC Converters
- Battery Chargers
- Switch-Mode and Resonant-Mode Power Supplies
- DC Choppers
- AC and DC Motor Drives
- Uninterrupted Power Supplies
- High Speed Power Switching Applications

| Symbol | Test Conditions (T _J = 25°C Unless Otherwise Specified) | Characteristic Values | | |
|---------------------|---|-----------------------|------|-----------------|
| | | Min. | Typ. | Max. |
| BV _{DSS} | V _{GS} = 0V, I _D = 250μA | 200 | | V |
| V _{GS(th)} | V _{DS} = V _{GS} , I _D = 4mA | 2.5 | | 5.0 V |
| I _{GSS} | V _{GS} = ± 20V, V _{DS} = 0V | | | ± 200 nA |
| I _{DSS} | V _{DS} = V _{DSS} , V _{GS} = 0V T _J = 150°C | | | 25 μA 500 μA |
| R _{DS(on)} | V _{GS} = 10V, I _D = 0.5 • I _{D25} , Note 1 | | | 22 mΩ |

| Symbol | Test Conditions | Characteristic Values | | |
|--------------|---|-----------------------|------|-----------|
| | | Min. | Typ. | Max. |
| g_{fs} | $V_{DS} = 10V, I_D = 0.5 \cdot I_{D25}$, Note 1 | 40 | 63 | S |
| C_{iss} | $V_{GS} = 0V, V_{DS} = 25V, f = 1MHz$ | | 6000 | pF |
| C_{oss} | | | 1300 | pF |
| C_{rss} | | | 265 | pF |
| $t_{d(on)}$ | Resistive Switching Times $V_{GS} = 10V, V_{DS} = 0.5 \cdot V_{DSS}, I_D = 0.5 \cdot I_{D25}$ $R_G = 3.3\Omega$ (External) | | 30 | ns |
| t_r | | | 35 | ns |
| $t_{d(off)}$ | | | 100 | ns |
| t_f | | | 31 | ns |
| $Q_{g(on)}$ | $V_{GS} = 10V, V_{DS} = 0.5 \cdot V_{DSS}, I_D = 0.5 \cdot I_{D25}$ | | 152 | nC |
| Q_{gs} | | | 40 | nC |
| Q_{gd} | | | 75 | nC |
| R_{thJC} | | | | 0.21 °C/W |
| R_{thCS} | TO-247 | | 0.21 | °C/W |
| | TO-264 | | 0.15 | °C/W |

Source-Drain Diode

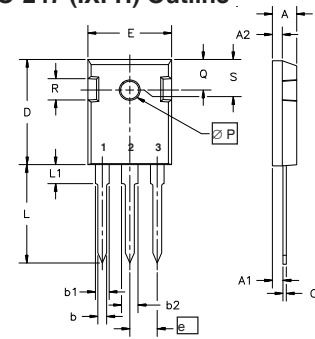
| Symbol | Test Conditions | Characteristic Values | | |
|----------|---|-----------------------|------|---------|
| | | Min. | Typ. | Max. |
| I_S | $V_{GS} = 0V$ | | | 120 A |
| I_{SM} | Repetitive, Pulse Width Limited by T_{JM} | | | 300 A |
| V_{SD} | $I_F = I_S, V_{GS} = 0V$, Note 1 | | | 1.5 V |
| t_{rr} | $I_F = 25A, -di/dt = 100A/\mu s$ $V_R = 100V, V_{GS} = 0V$ | | 100 | 200 ns |
| Q_{RM} | | | 0.4 | μC |
| I_{RM} | | | 6.0 | A |

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

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 |
| | 4,850,072 | 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 | |

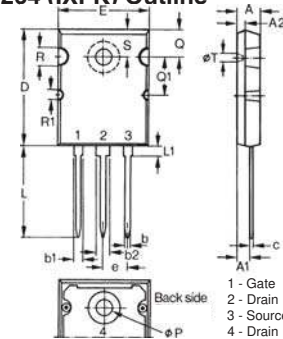
TO-247 (IXFH) Outline



Terminals: 1 - Gate
2 - Drain
3 - Source

| Dim. | Millimeter | | Inches | |
|----------------|------------|-------|--------|-------|
| | Min. | Max. | Min. | Max. |
| A | 4.7 | 5.3 | .185 | .209 |
| A ₁ | 2.2 | 2.54 | .087 | .102 |
| A ₂ | 2.2 | 2.6 | .059 | .098 |
| b | 1.0 | 1.4 | .040 | .055 |
| b ₁ | 1.65 | 2.13 | .065 | .084 |
| b ₂ | 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 |
| ∅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-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 |

Fig. 1. Output Characteristics
@ 25°C

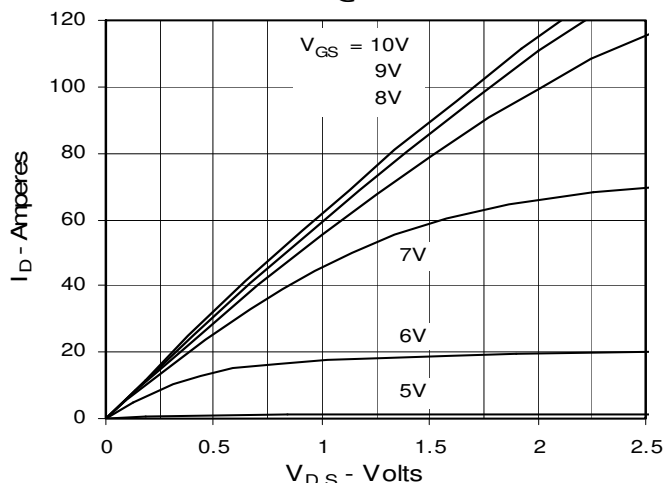


Fig. 2. Extended Output Characteristics
@ 25°C

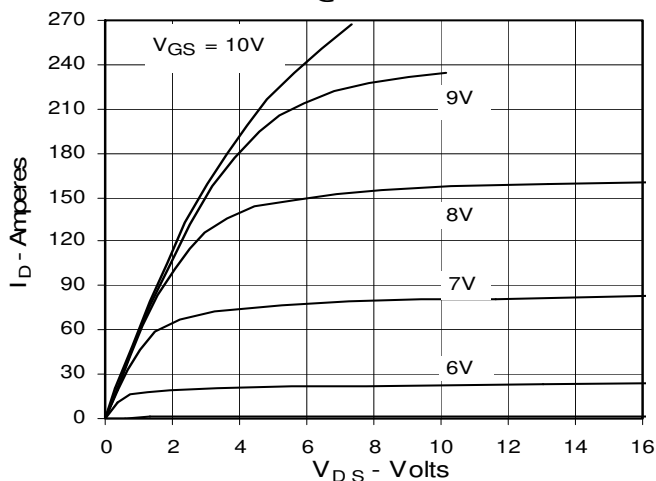


Fig. 3. Output Characteristics
@ 150°C

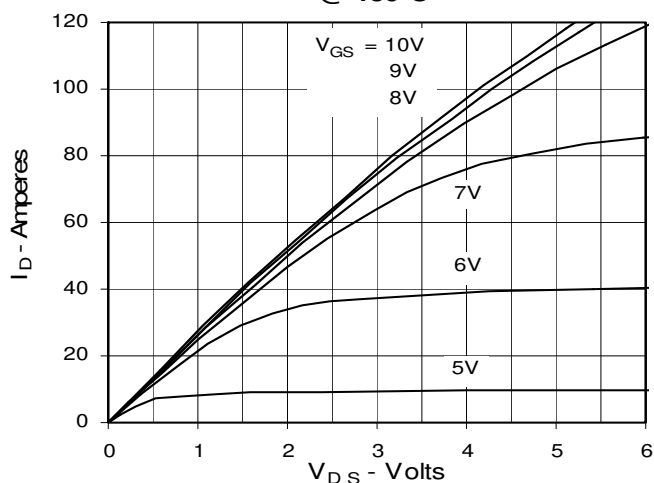


Fig. 4. $R_{DS(on)}$ Normalized to 0.5 I_{D25} Value vs. Junction Temperature

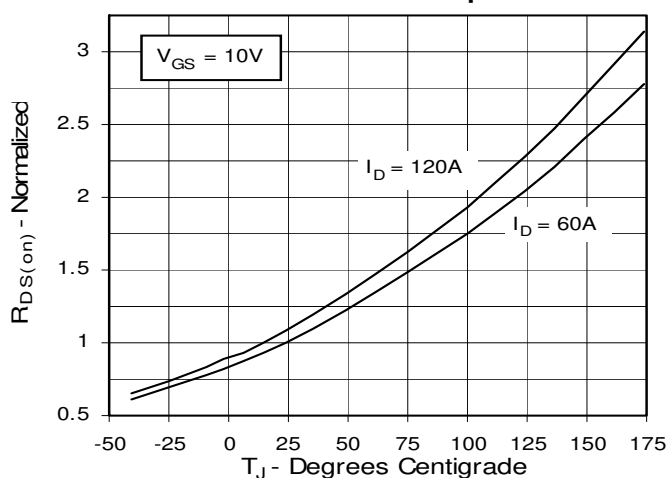


Fig. 5. $R_{DS(on)}$ Normalized to 0.5 I_{D25} Value vs. Drain Current

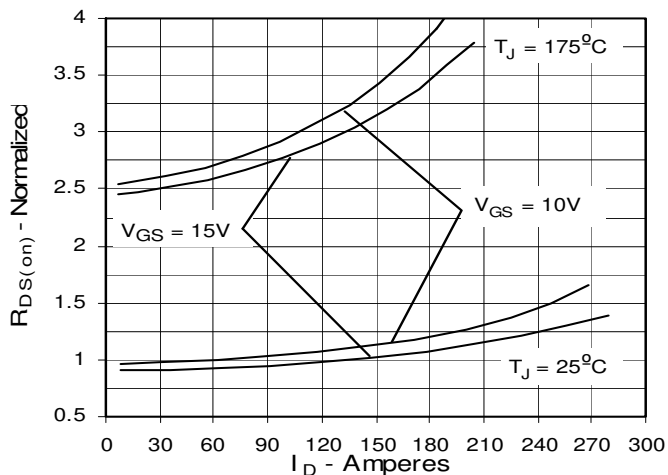


Fig. 6. Drain Current vs. Case Temperature

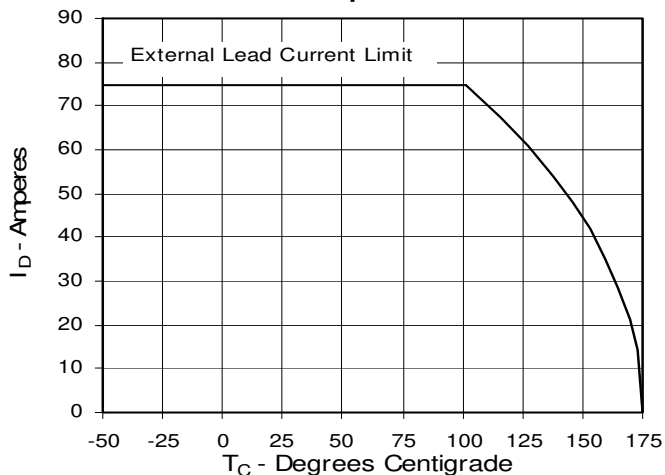


Fig. 7. Input Admittance

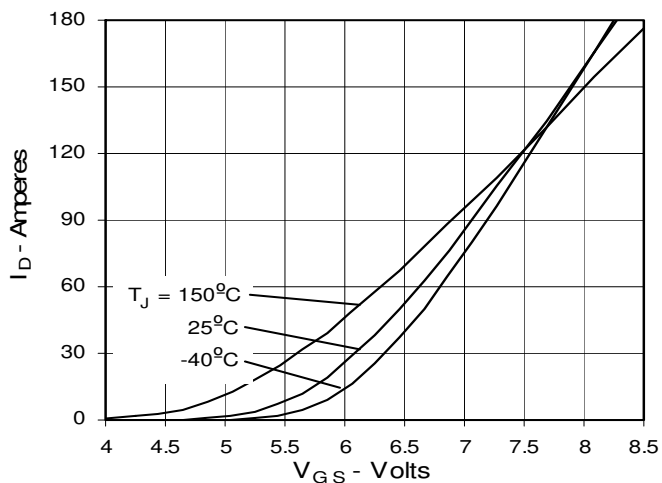


Fig. 8. Transconductance

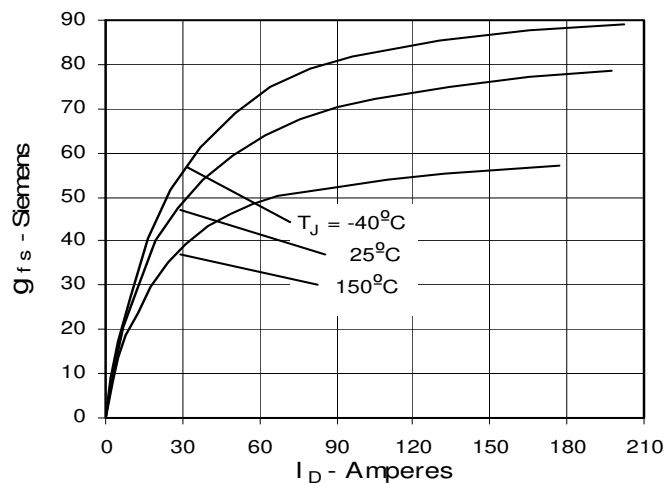


Fig. 9. Source Current vs. Source-To-Drain Voltage

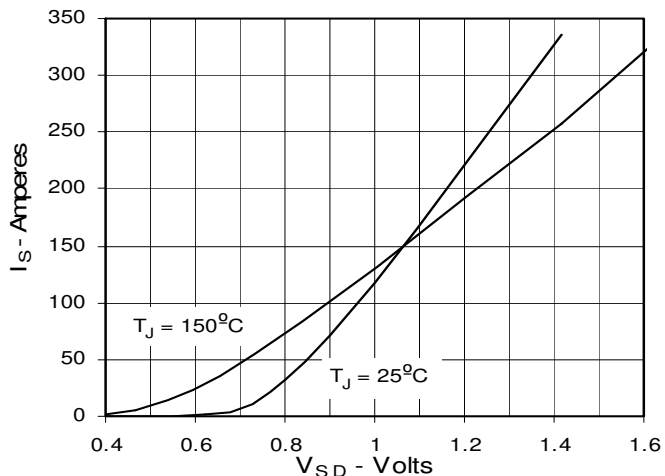


Fig. 10. Gate Charge

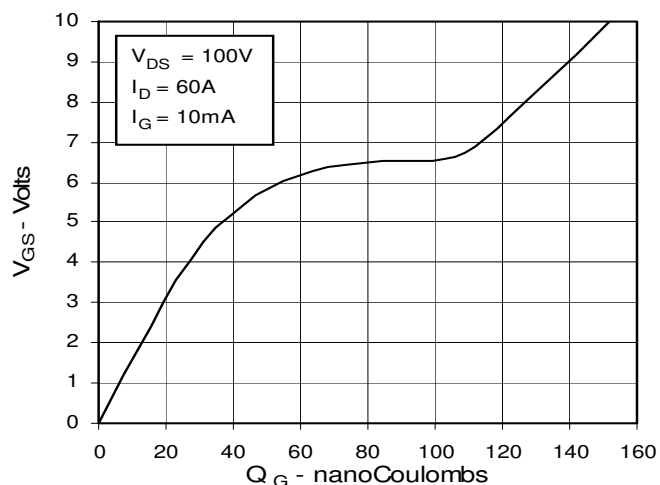


Fig. 11. Capacitance

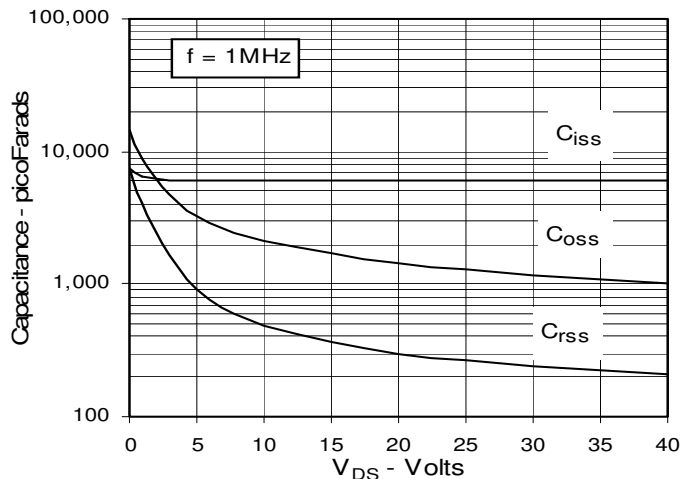


Fig. 12. Forward-Bias Safe Operating Area

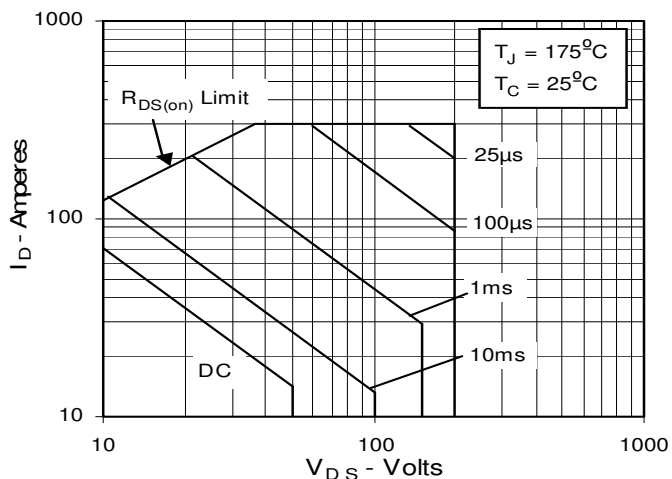
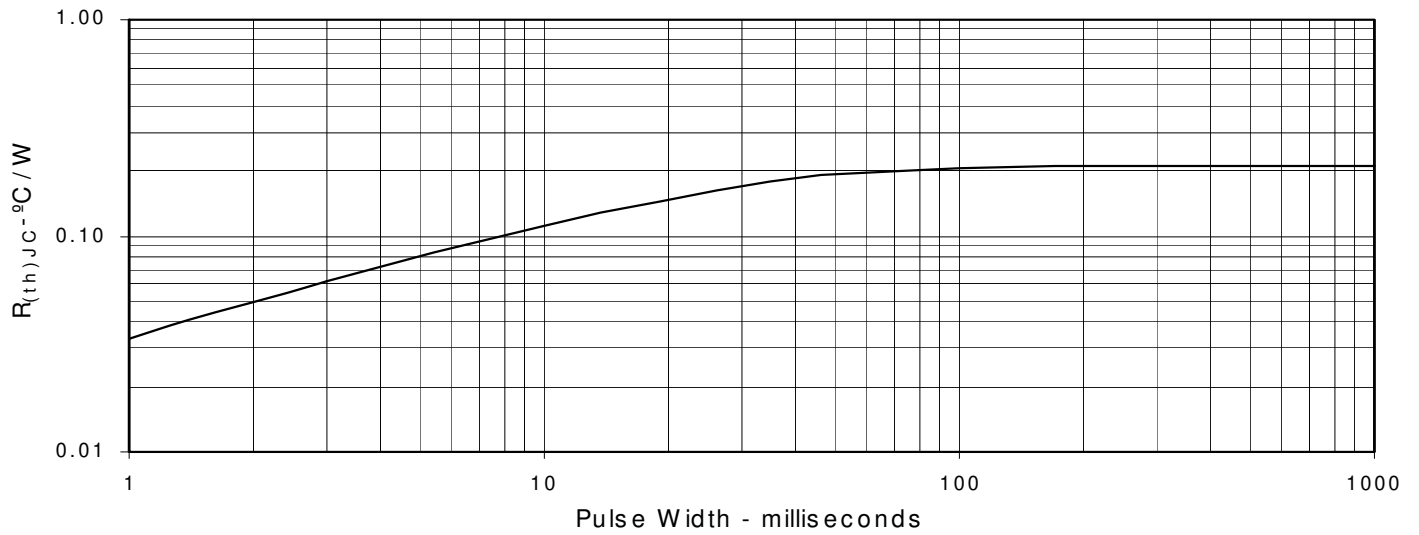


Fig. 13. Maximum Transient Thermal Resistance





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