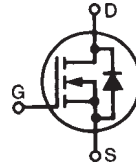


# High Voltage MOSFET

**IXTA 1N100**  
**IXTP 1N100**

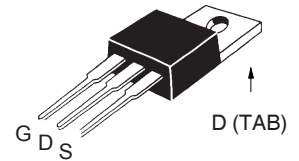
N-Channel Enhancement Mode  
Avalanche Energy Rated

$$\begin{aligned} V_{DSS} &= 1000 \text{ V} \\ I_{D25} &= 1.5 \text{ A} \\ R_{DS(on)} &= 11 \Omega \end{aligned}$$

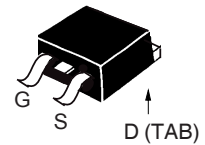


| Symbol                                                                          | Test Conditions                                                                                                                          | Maximum Ratings |                  |
|---------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|-----------------|------------------|
| $V_{DSS}$                                                                       | $T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$                                                                                          | 1000            | V                |
| $V_{DGR}$                                                                       | $T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$ ; $R_{GS} = 1 \text{ M}\Omega$                                                           | 1000            | V                |
| $V_{GS}$                                                                        | Continuous                                                                                                                               | $\pm 30$        | V                |
| $V_{GSM}$                                                                       | Transient                                                                                                                                | $\pm 40$        | V                |
| $I_{D25}$                                                                       | $T_C = 25^\circ\text{C}$                                                                                                                 | 1.5             | A                |
| $I_{DM}$                                                                        | $T_C = 25^\circ\text{C}$ , pulse width limited by $T_{JM}$                                                                               | 6               | A                |
| $I_{AR}$                                                                        |                                                                                                                                          | 1.5             | A                |
| $E_{AR}$                                                                        | $T_C = 25^\circ\text{C}$                                                                                                                 | 6               | mJ               |
| $E_{AS}$                                                                        | $T_C = 25^\circ\text{C}$                                                                                                                 | 200             | mJ               |
| $dv/dt$                                                                         | $I_S \leq I_{DM}$ , $di/dt \leq 100 \text{ A}/\mu\text{s}$ , $V_{DD} \leq V_{DSS}$ ,<br>$T_J \leq 150^\circ\text{C}$ , $R_G = 18 \Omega$ | 3               | V/ns             |
| $P_D$                                                                           | $T_C = 25^\circ\text{C}$                                                                                                                 | 54              | W                |
| $T_J$                                                                           |                                                                                                                                          | -55 ... +150    | $^\circ\text{C}$ |
| $T_{JM}$                                                                        |                                                                                                                                          | 150             | $^\circ\text{C}$ |
| $T_{stg}$                                                                       |                                                                                                                                          | -55 ... +150    | $^\circ\text{C}$ |
| $M_d$                                                                           | Mounting torque                                                                                                                          | 1.13/10         | Nm/lb.in.        |
| Weight                                                                          |                                                                                                                                          | 4               | g                |
| Maximum lead temperature for soldering<br>1.6 mm (0.062 in.) from case for 10 s |                                                                                                                                          | 300             | $^\circ\text{C}$ |

## TO-220AB (IXTP)



## TO-263 AA (IXTA)



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

## Features

- International standard packages
- High voltage, Low  $R_{DS(on)}$  HDMOS™ process
- Rugged polysilicon gate cell structure
- Fast switching times

## Applications

- Switch-mode and resonant-mode power supplies
- Flyback inverters
- DC choppers
- High frequency matching

## Advantages

- Space savings
- High power density

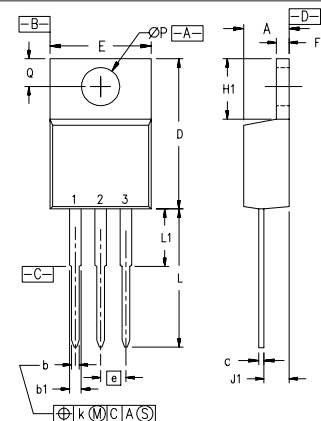
| Symbol       | Test Conditions                                                                                                    | Characteristic Values<br>( $T_J = 25^\circ\text{C}$ , unless otherwise specified) |      |                                       |
|--------------|--------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------|---------------------------------------|
|              |                                                                                                                    | min.                                                                              | typ. | max.                                  |
| $V_{DSS}$    | $V_{GS} = 0 \text{ V}$ , $I_D = 250 \mu\text{A}$                                                                   | 1000                                                                              |      | V                                     |
| $V_{GS(th)}$ | $V_{DS} = V_{GS}$ , $I_D = 25 \mu\text{A}$                                                                         | 2.5                                                                               |      | 4.5 V                                 |
| $I_{GSS}$    | $V_{GS} = \pm 30 \text{ V}_{DC}$ , $V_{DS} = 0$                                                                    |                                                                                   |      | $\pm 100 \text{ nA}$                  |
| $I_{DSS}$    | $V_{DS} = V_{DSS}$ , $V_{GS} = 0 \text{ V}$                                                                        |                                                                                   |      | 25 $\mu\text{A}$<br>500 $\mu\text{A}$ |
| $R_{DS(on)}$ | $V_{GS} = 10 \text{ V}$ , $I_D = 1.0 \text{ A}$<br>Pulse test, $t \leq 300 \mu\text{s}$ , duty cycle $d \leq 2 \%$ |                                                                                   |      | 11 $\Omega$                           |

| Symbol       | Test Conditions                                                                                       | Characteristic Values                               |      |         |
|--------------|-------------------------------------------------------------------------------------------------------|-----------------------------------------------------|------|---------|
|              |                                                                                                       | (T <sub>J</sub> = 25°C, unless otherwise specified) |      |         |
|              |                                                                                                       | min.                                                | typ. | max.    |
| $g_{fs}$     | $V_{DS} = 20\text{ V}; I_D = 1.0\text{ A}$ , pulse test                                               | 0.8                                                 | 1.5  | S       |
| $C_{iss}$    | $V_{GS} = 0\text{ V}, V_{DS} = 25\text{ V}, f = 1\text{ MHz}$                                         |                                                     | 400  | pF      |
| $C_{oss}$    |                                                                                                       |                                                     | 37   | pF      |
| $C_{rss}$    |                                                                                                       |                                                     | 13   | pF      |
| $t_{d(on)}$  | $V_{GS} = 10\text{ V}, V_{DS} = 0.5 \cdot V_{DSS}, I_D = 1\text{ A}$<br>$R_G = 18\Omega$ , (External) |                                                     | 18   | ns      |
| $t_r$        |                                                                                                       |                                                     | 19   | ns      |
| $t_{d(off)}$ |                                                                                                       |                                                     | 20   | ns      |
| $t_f$        |                                                                                                       |                                                     | 18   | ns      |
| $Q_{g(on)}$  | $V_{GS} = 10\text{ V}, V_{DS} = 0.5 \cdot V_{DSS}, I_D = 1\text{ A}$                                  |                                                     | 14.5 | nC      |
| $Q_{gs}$     |                                                                                                       |                                                     | 3.0  | nC      |
| $Q_{gd}$     |                                                                                                       |                                                     | 7.5  | nC      |
| $R_{thJC}$   |                                                                                                       |                                                     |      | 2.3 K/W |
| $R_{thCK}$   | (IXTP)                                                                                                |                                                     | 0.50 | K/W     |

## Source-Drain Diode

| Symbol   | Test Conditions                                                                                             | Characteristic Values                               |      |       |
|----------|-------------------------------------------------------------------------------------------------------------|-----------------------------------------------------|------|-------|
|          |                                                                                                             | (T <sub>J</sub> = 25°C, unless otherwise specified) |      |       |
|          |                                                                                                             | min.                                                | typ. | max.  |
| $I_S$    | $V_{GS} = 0\text{ V}$                                                                                       |                                                     |      | 1.5 A |
| $I_{SM}$ | Repetitive; pulse width limited by T <sub>JM</sub>                                                          |                                                     |      | 6 A   |
| $V_{SD}$ | $I_F = I_S, V_{GS} = 0\text{ V}$ ,<br>Pulse test, $t \leq 300\text{ }\mu\text{s}$ , duty cycle $d \leq 2\%$ |                                                     |      | 1.8 V |
| $t_{rr}$ | $I_F = I_S, -di/dt = 100\text{ A}/\mu\text{s}, V_R = 100\text{ V}$                                          |                                                     | 710  | ns    |

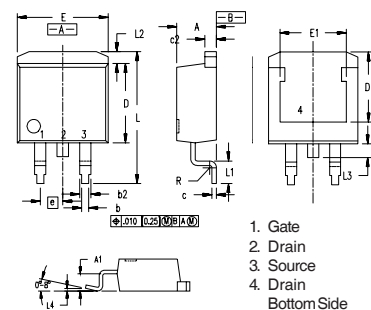
## TO-220 AD Dimensions



Pins: 1 - Gate  
2 - Drain  
3 - Source  
4 - Drain  
Bottom Side

| 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   | .580     | .630 | 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  |
| ØP  | .139     | .161 | 3.53        | 4.08  |
| Q   | .100     | .125 | 2.54        | 3.18  |

## TO-263 AA Outline



1. Gate  
2. Drain  
3. Source  
4. Drain  
Bottom Side

| Dim. | Millimeter |       | Inches |      |
|------|------------|-------|--------|------|
|      | Min.       | Max.  | Min.   | Max. |
| A    | 4.06       | 4.83  | .160   | .190 |
| A1   | 2.03       | 2.79  | .080   | .110 |
| b    | 0.51       | 0.99  | .020   | .039 |
| b2   | 1.14       | 1.40  | .045   | .055 |
| c    | 0.46       | 0.74  | .018   | .029 |
| c2   | 1.14       | 1.40  | .045   | .055 |
| D    | 8.64       | 9.65  | .340   | .380 |
| D1   | 7.11       | 8.13  | .280   | .320 |
| E    | 9.65       | 10.29 | .380   | .405 |
| E1   | 6.86       | 8.13  | .270   | .320 |
| e    | 2.54       | BSC   | .100   | BSC  |
| L    | 14.61      | 15.88 | .575   | .625 |
| L1   | 2.29       | 2.79  | .090   | .110 |
| L2   | 1.02       | 1.40  | .040   | .055 |
| L3   | 1.27       | 1.78  | .050   | .070 |
| L4   | 0          | 0.38  | 0      | .015 |
| R    | 0.46       | 0.74  | .018   | .029 |

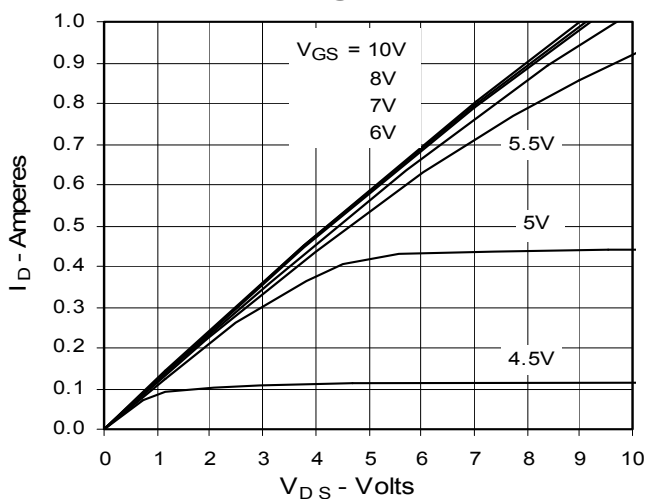
IXYS reserves the right to change limits, test conditions, and dimensions.

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

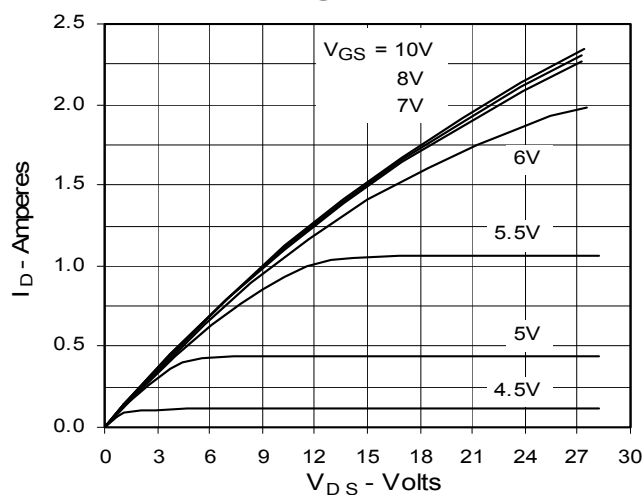
|           |           |           |           |              |              |
|-----------|-----------|-----------|-----------|--------------|--------------|
| 4,835,592 | 4,931,844 | 5,049,961 | 5,237,481 | 6,162,665    | 6,404,065 B1 |
| 4,850,072 | 5,017,508 | 5,063,307 | 5,381,025 | 6,259,123 B1 | 6,534,343    |
| 4,881,106 | 5,034,796 | 5,187,117 | 5,486,715 | 6,306,728 B1 | 6,583,505    |

|              |           |
|--------------|-----------|
| 6,683,344    | 6,727,585 |
| 6,710,405 B2 | 6,759,692 |
| 6,710,463    |           |

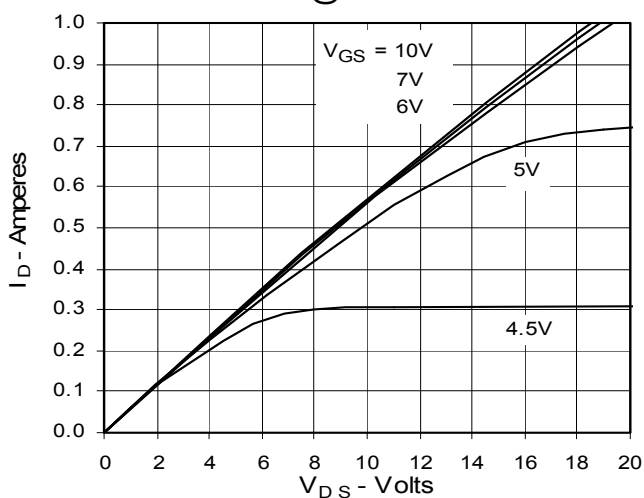
**Fig. 1. Output Characteristics**  
**@ 25°C**



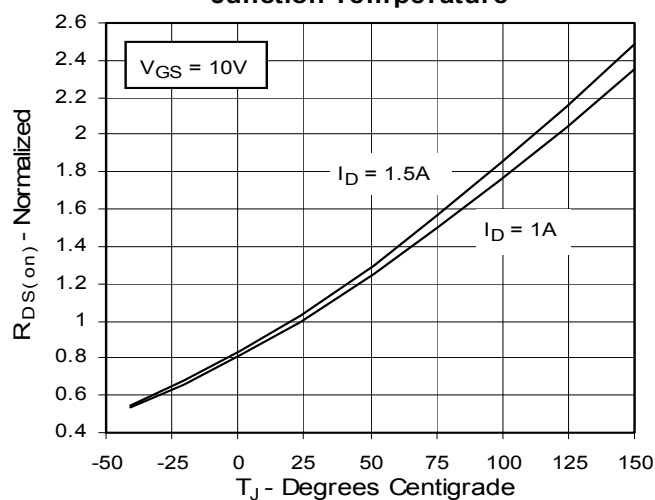
**Fig. 2. Extended Output Characteristics**  
**@ 25°C**



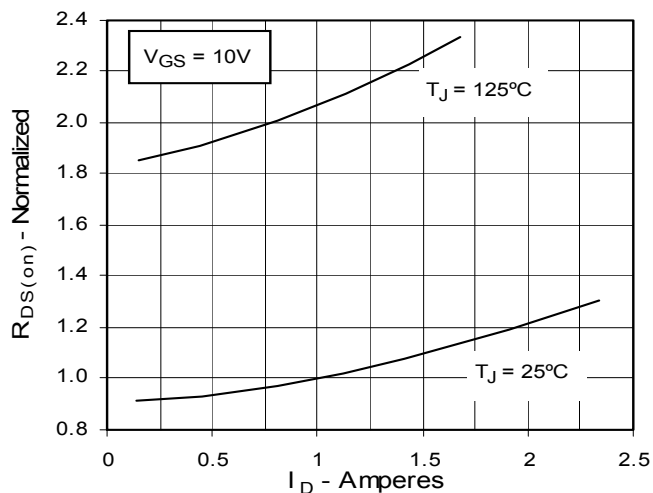
**Fig. 3. Output Characteristics**  
**@ 125°C**



**Fig. 4. Normalized  $R_{DS(on)}$  vs. Junction Temperature**



**Fig. 5. Normalized  $R_{DS(on)}$  vs.  $I_D$**



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

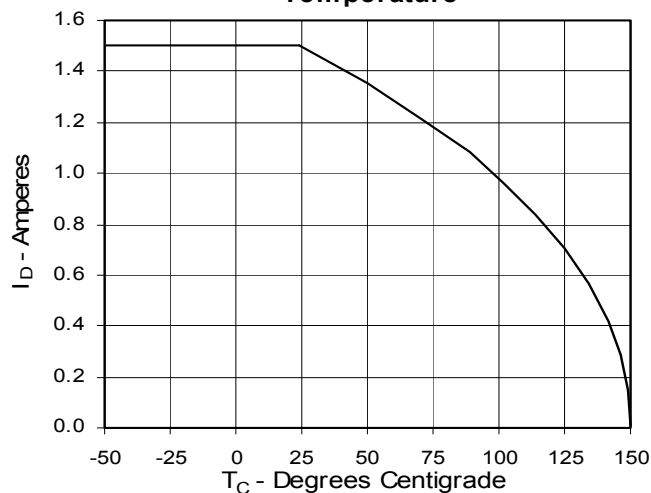


Fig. 7. Input Admittance

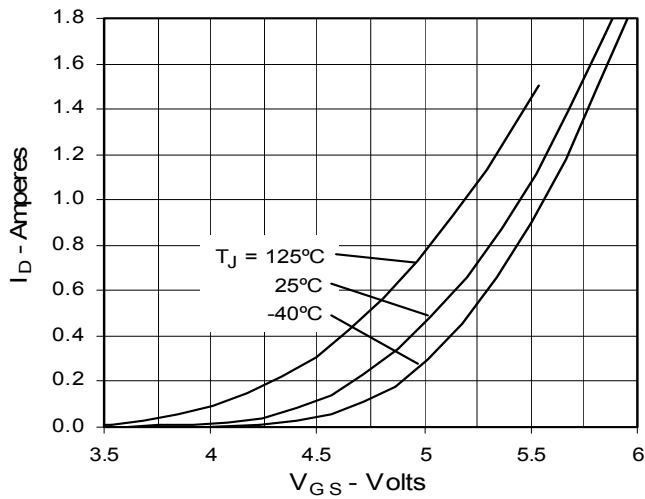


Fig. 8. Transconductance

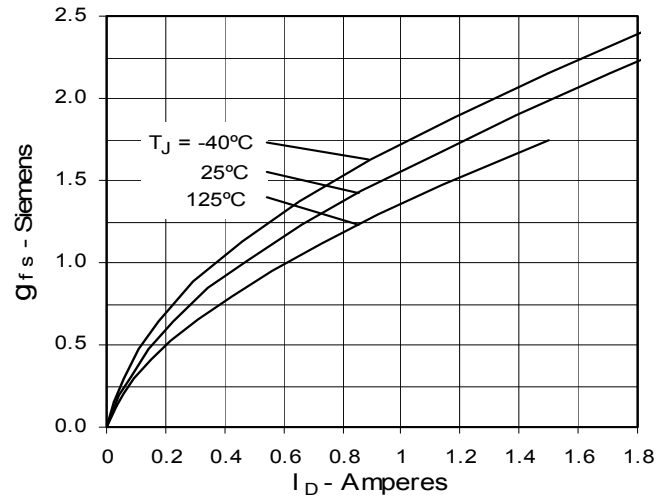


Fig. 9. Source Current vs. Source-To-Drain Voltage

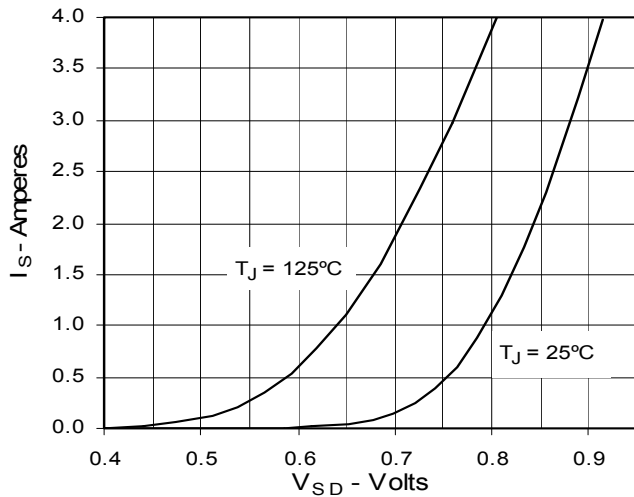


Fig. 10. Gate Charge

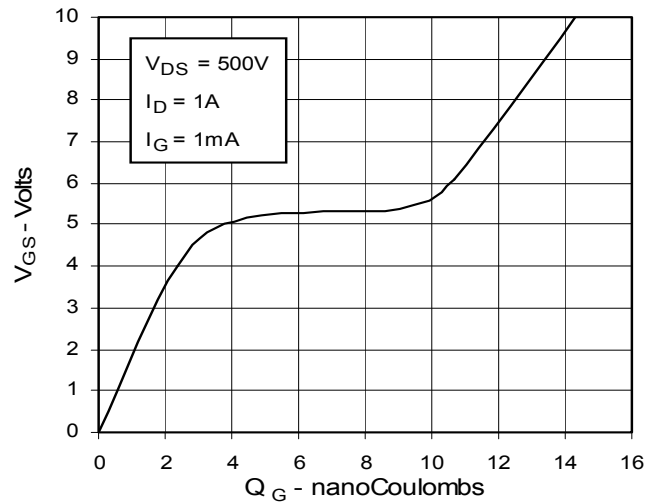


Fig. 11. Capacitance

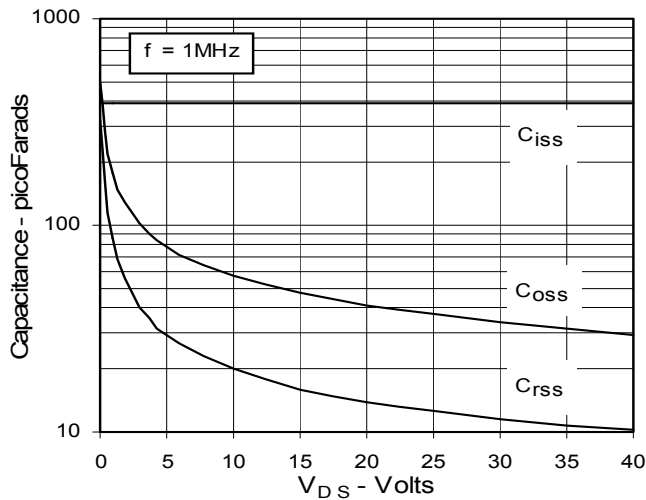
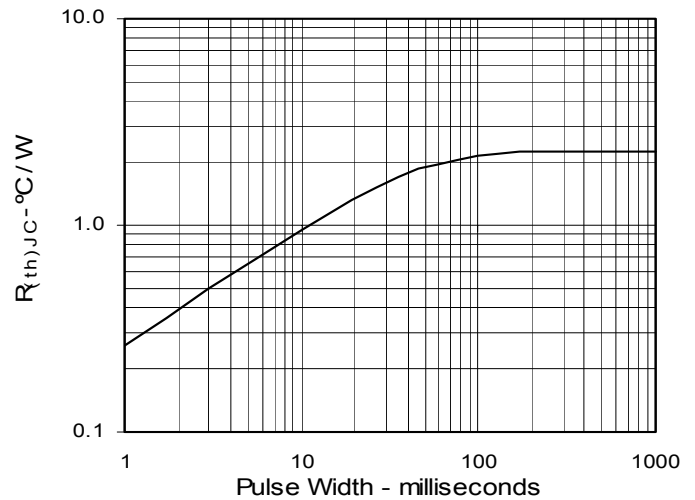


Fig. 13. Maximum Transient Thermal Resistance





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