

# PolarHT™ Power MOSFET

**IXTK 100N25P**  
**IXTQ 100N25P**  
**IXTT 100N25P**

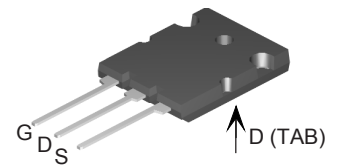
**V<sub>DSS</sub> = 250 V**  
**I<sub>D25</sub> = 100 A**  
**R<sub>DS(on)</sub> ≤ 27 mΩ**

N-Channel Enhancement Mode  
Avalanche Rated

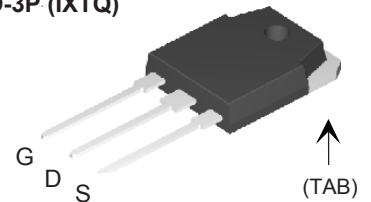


Symbol	Test Conditions	Maximum Ratings	
V <sub>DSS</sub>	T <sub>J</sub> = 25° C to 150° C	250	V
V <sub>DGR</sub>	T <sub>J</sub> = 25° C to 150° C; R <sub>GS</sub> = 1 MΩ	250	V
V <sub>GSS</sub>	Continuous	±20	V
V <sub>GSM</sub>	Transient	±30	V
I <sub>D25</sub>	T <sub>C</sub> = 25° C	100	A
I <sub>D(RMS)</sub>	External lead current limit	75	A
I <sub>DM</sub>	T <sub>C</sub> = 25° C, pulse width limited by T <sub>JM</sub>	250	A
I <sub>AR</sub>	T <sub>C</sub> = 25° C	60	A
E <sub>AR</sub>	T <sub>C</sub> = 25° C	60	mJ
E <sub>AS</sub>	T <sub>C</sub> = 25° C	2.0	J
dv/dt	I <sub>S</sub> ≤ I <sub>DM</sub> , di/dt ≤ 100 A/μs, V <sub>DD</sub> ≤ V <sub>DSS</sub> , T <sub>J</sub> ≤ 150° C, R <sub>G</sub> = 4 Ω	10	V/ns
P <sub>D</sub>	T <sub>C</sub> = 25° C	600	W
T <sub>J</sub>		-55 ... +150	°C
T <sub>JM</sub>		150	°C
T <sub>stg</sub>		-55 ... +150	°C
T <sub>L</sub>	1.6 mm (0.062 in.) from case for 10 s	300	°C
T <sub>SOLD</sub>	Plastic body for 10 s	260	°C
M <sub>d</sub>	Mounting torque	1.13/10	Nm/lb.in.
Weight	TO-3P	5.5	g
	TO-264	10	g
	TO-268	5.0	g

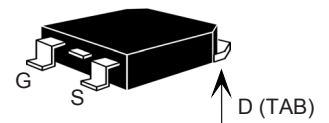
TO-264 (IXTK)



TO-3P (IXTQ)



TO-268 (IXTT)



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

## Features

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

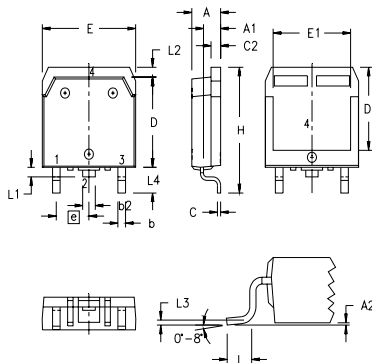
## Advantages

- † Easy to mount
- † Space savings
- † High power density

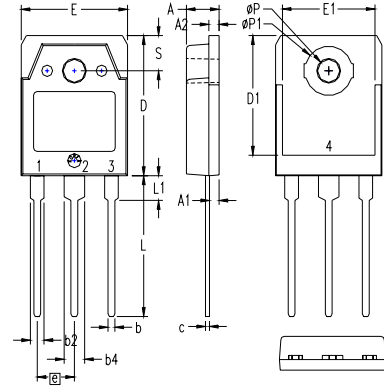
Symbol	Test Conditions (T <sub>J</sub> = 25° C, unless otherwise specified)	Characteristic Values		
		Min.	Typ.	Max.
BV <sub>DSS</sub>	V <sub>GS</sub> = 0 V, I <sub>D</sub> = 250 μA	250		V
V <sub>GS(th)</sub>	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250 μA	2.5		5.0 V
I <sub>GSS</sub>	V <sub>GS</sub> = ±20 V <sub>DC</sub> , V <sub>DS</sub> = 0			±100 nA
I <sub>DSS</sub>	V <sub>DS</sub> = V <sub>DSS</sub> V <sub>GS</sub> = 0 V      T <sub>J</sub> = 125° C			25 μA
				250 μA
R <sub>DS(on)</sub>	V <sub>GS</sub> = 10 V, I <sub>D</sub> = 0.5 I <sub>D25</sub> Pulse test, t ≤ 300 μs, duty cycle d ≤ 2 %			27 mΩ

Symbol	Test Conditions	Characteristic Values ( $T_J = 25^\circ\text{C}$ , unless otherwise specified)		
		Min.	Typ.	Max.
$g_{fs}$	$V_{DS} = 10\text{ V}$ ; $I_D = 0.5 I_{D25}$ , pulse test	40	56	S
$C_{iss}$	$V_{GS} = 0\text{ V}$ , $V_{DS} = 25\text{ V}$ , $f = 1\text{ MHz}$		6300	pF
$C_{oss}$			1150	pF
$C_{rss}$			240	pF
$t_{d(on)}$	$V_{GS} = 10\text{ V}$ , $V_{DS} = 0.5 V_{DSS}$ , $I_D = I_{D25}$ $R_G = 3.3\ \Omega$ (External)		25	ns
$t_r$			26	ns
$t_{d(off)}$			100	ns
$t_f$			28	ns
$Q_{g(on)}$	$V_{GS} = 10\text{ V}$ , $V_{DS} = 0.5 V_{DSS}$ , $I_D = 0.5 I_{D25}$		185	nC
$Q_{gs}$			43	nC
$Q_{gd}$			91	nC
$R_{thJC}$				$0.21^\circ\text{C/W}$
$R_{thCS}$	TO-3P		0.21	$^\circ\text{C/W}$
$R_{thCS}$	TO-264		0.15	$^\circ\text{C/W}$

Symbol	Test Conditions	Characteristic Values ( $T_J = 25^\circ\text{C}$ , unless otherwise specified)		
		Min.	Typ.	Max.
$I_s$	$V_{GS} = 0\text{ V}$			100 A
$I_{SM}$	Repetitive			250 A
$V_{SD}$	$I_F = I_s$ , $V_{GS} = 0\text{ V}$ , Pulse test, $t \leq 300\ \mu\text{s}$ , duty cycle $d \leq 2\%$			1.5 V
$t_{rr}$	$I_F = 25\text{ A}$ , $-di/dt = 100\text{ A}/\mu\text{s}$ $V_R = 100\text{ V}$ , $V_{GS} = 0\text{ V}$		200	ns
$Q_{RM}$			3.0	$\mu\text{C}$

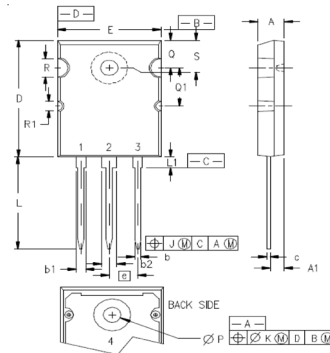
**TO-268 (IXTT) Outline**


SYM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.193	.201	4.90	5.10
A1	.106	.114	2.70	2.90
A2	.001	.010	0.02	0.25
b	.045	.057	1.15	1.45
b2	.075	.083	1.90	2.10
C	.016	.026	0.40	0.65
C2	.057	.063	1.45	1.60
D	.543	.551	13.80	14.00
D1	.488	.500	12.40	12.70
E	.624	.632	15.85	16.05
E1	.524	.535	13.30	13.60
e	.215 BSC		5.45 BSC	
H	.736	.752	18.70	19.10
L	.094	.106	2.40	2.70
L1	.047	.055	1.20	1.40
L2	.039	.045	1.00	1.15
L3	.010 BSC		0.25 BSC	
L4	.150	.161	3.80	4.10

**TO-3P (IXTQ) Outline**


- 1 - GATE
- 2 - DRAIN (COLLECTOR)
- 3 - SOURCE (EMITTER)
- 4 - DRAIN (COLLECTOR)

SYM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.185	.193	4.70	4.90
A1	.051	.059	1.30	1.50
A2	.057	.065	1.45	1.65
b	.035	.045	0.90	1.15
b2	.075	.087	1.90	2.20
b4	.114	.126	2.90	3.20
c	.022	.031	0.55	0.80
D	.780	.799	19.80	20.30
D1	.665	.677	16.90	17.20
E	.610	.622	15.50	15.80
E1	.531	.539	13.50	13.70
e	.215 BSC		5.45 BSC	
L	.779	.795	19.80	20.20
L1	.134	.142	3.40	3.60
$\phi P$	.126	.134	3.20	3.40
$\phi P1$	.272	.280	6.90	7.10
S	.193	.201	4.90	5.10

**TO-264 (IXTK) Outline**


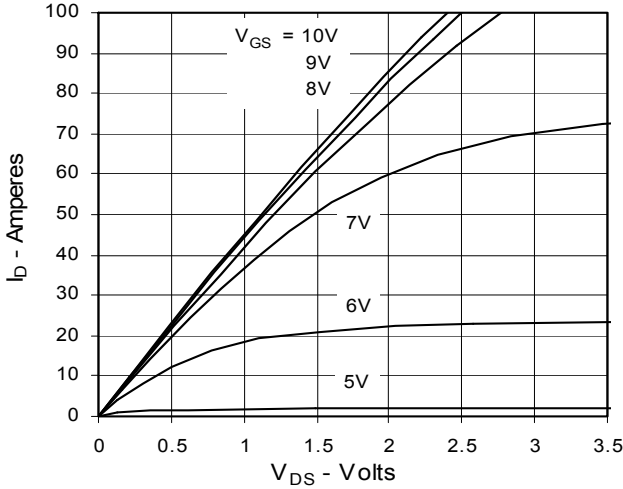
- 1 - GATE
- 2, 4 - DRAIN (COLLECTOR)
- 3 - SOURCE (EMITTER)

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	
J	.000	.010	0.00	0.25
K	.000	.010	0.00	0.25
L	.779	.842	19.79	21.39
L1	.087	.102	2.21	2.59
$\phi P$	.122	.138	3.10	3.51
Q	.240	.256	6.10	6.50
Q1	.330	.346	8.38	8.79
$\phi R$	.155	.187	3.94	4.75
$\phi R1$	.085	.093	2.16	2.36
S	.243	.253	6.17	6.43

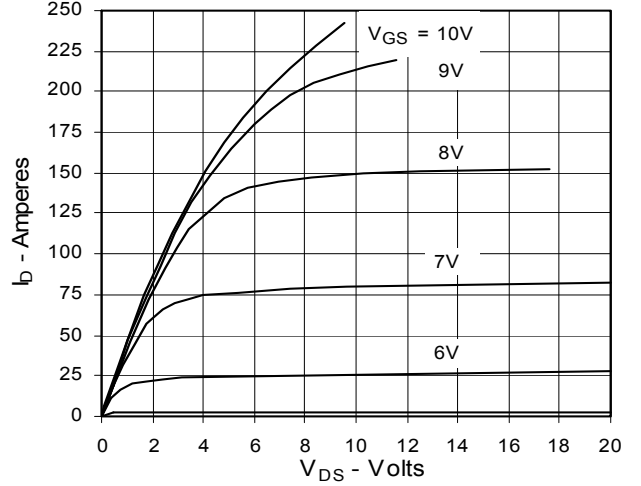
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4,881,106 5,034,796 5,187,117 5,486,715 6,306,728 B1 6,583,505 6,710,463 6,771,478 B2

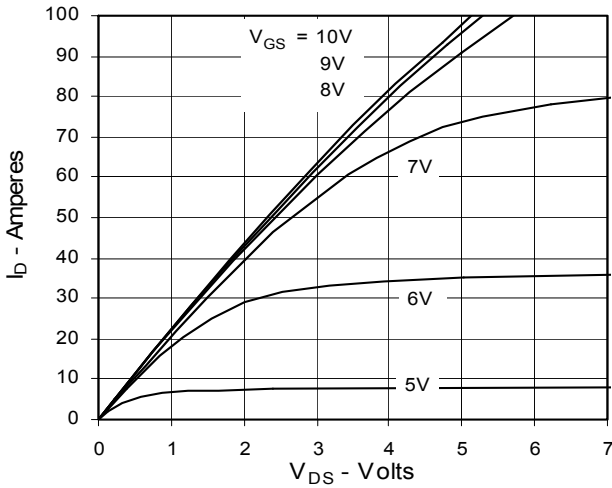
**Fig. 1. Output Characteristics  
@ 25°C**



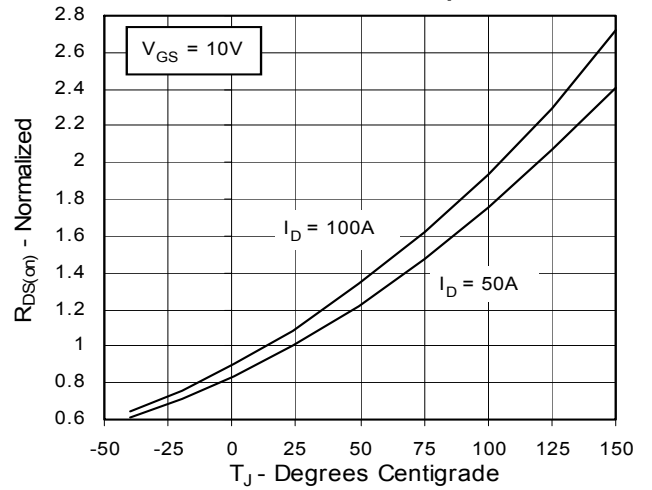
**Fig. 2. Extended Output Characteristics  
@ 25°C**



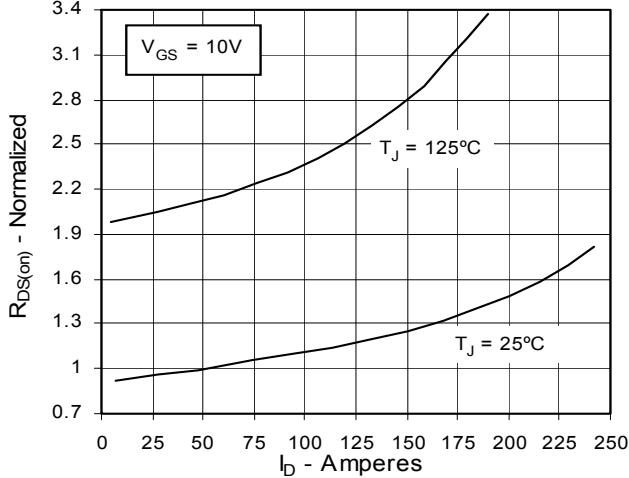
**Fig. 3. Output Characteristics  
@ 125°C**



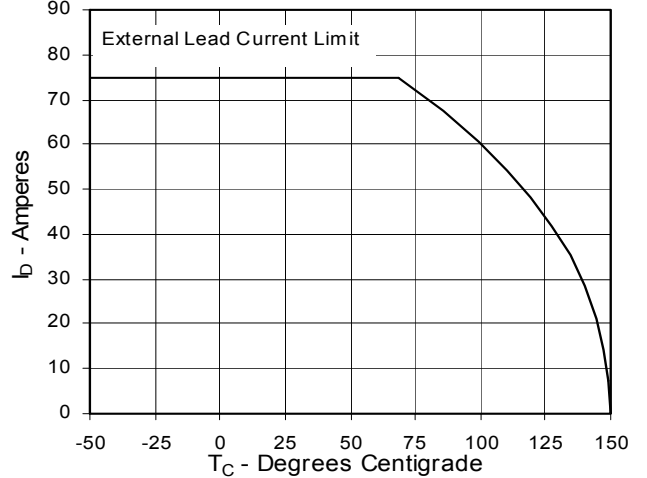
**Fig. 4.  $R_{DS(on)}$  Normalized to 0.5  $I_{D25}$   
Value vs. Junction Temperature**



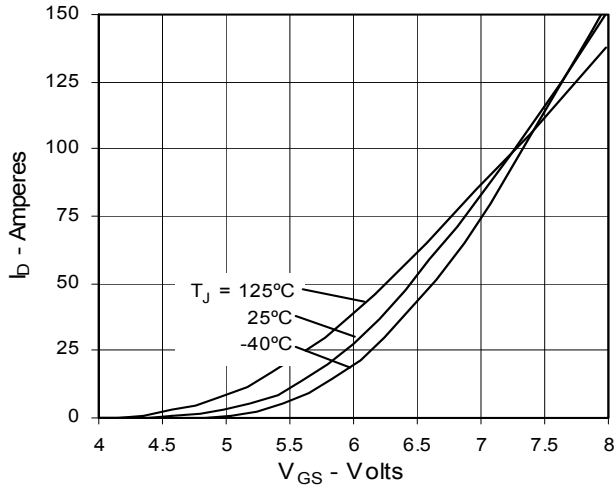
**Fig. 5.  $R_{DS(on)}$  Normalized to  
0.5  $I_{D25}$  Value vs.  $I_D$**



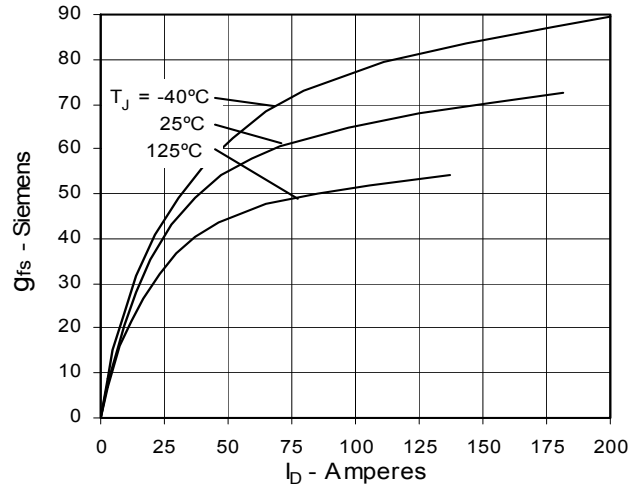
**Fig. 6. Drain Current vs. Case  
Temperature**



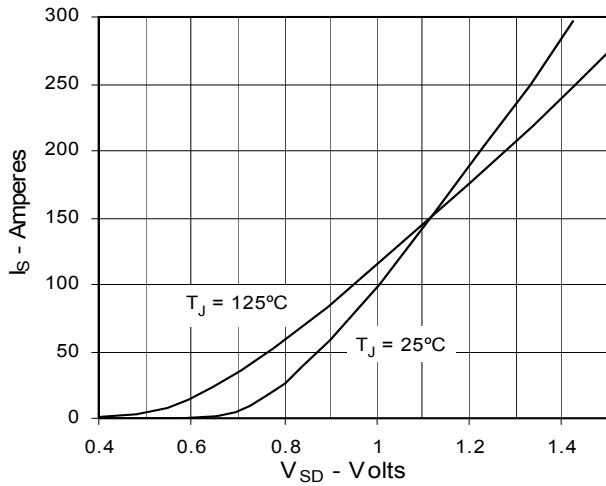
**Fig. 7. Input Admittance**



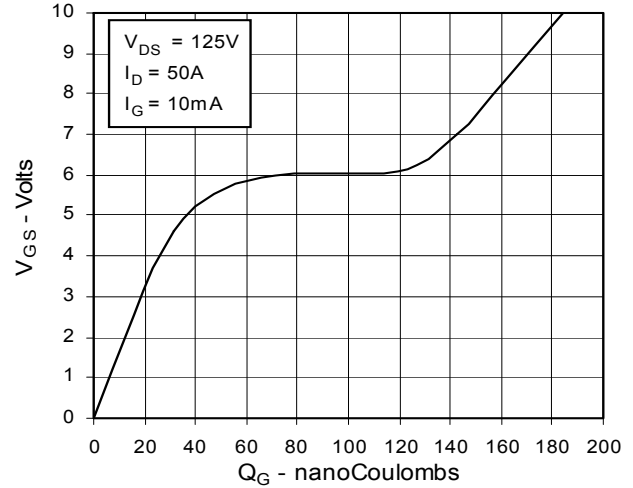
**Fig. 8. Transconductance**



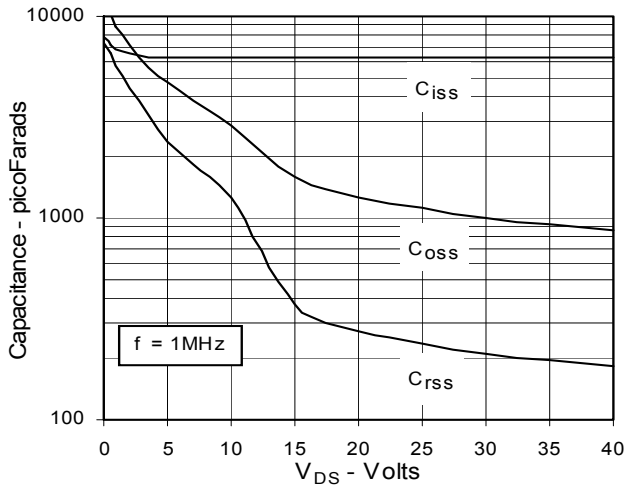
**Fig. 9. Source Current vs. Source-To-Drain Voltage**



**Fig. 10. Gate Charge**



**Fig. 11. Capacitance**



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

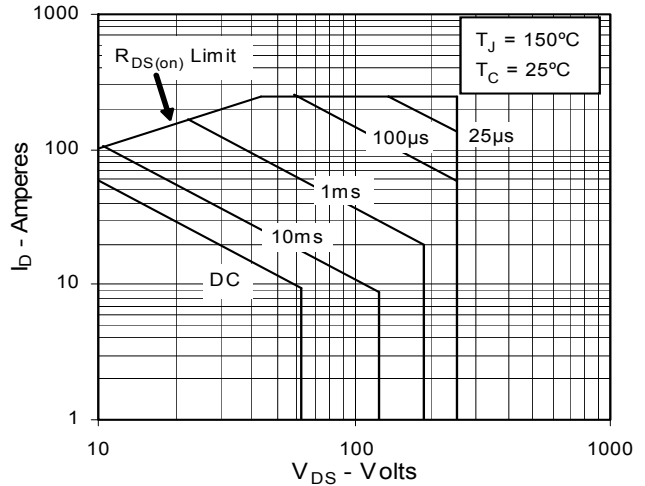
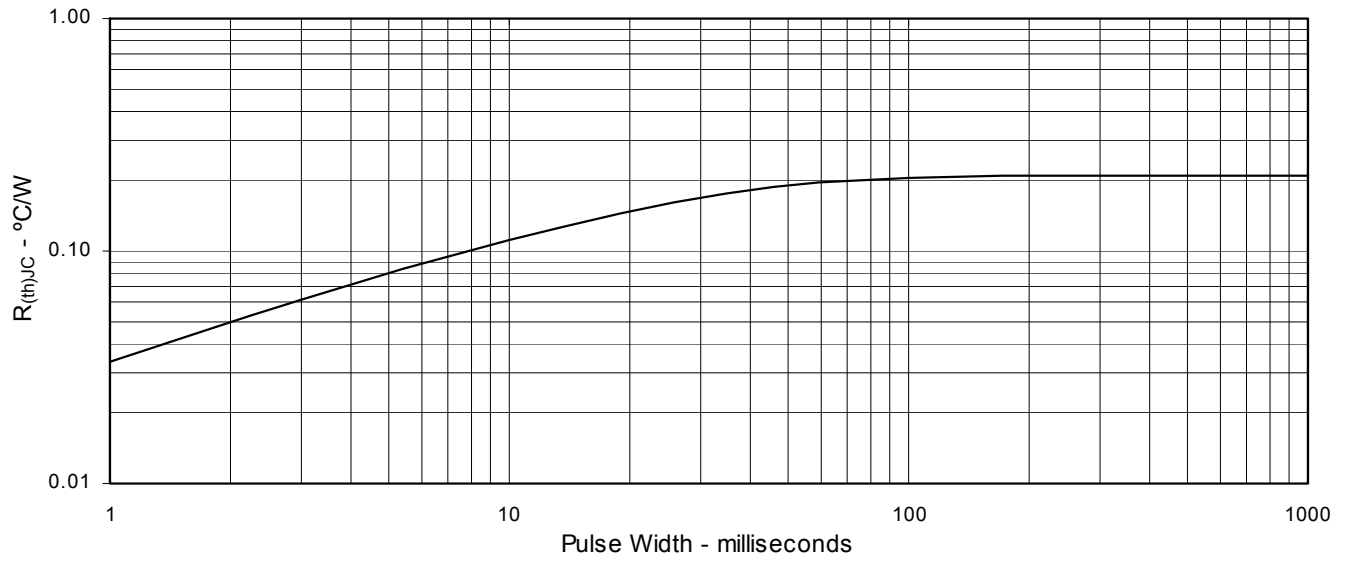


Fig. 13. Maximum Transient Thermal Resistance





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