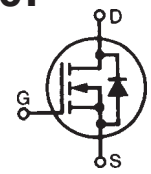
IXYS

PolarHT™ Power MOSFET

IXTA50N20P
IXTP50N20P
IXTQ50N20P

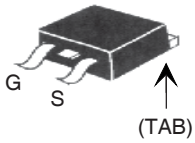
V_{DSS} = 200V
I_{D25} = 50A
$R_{DS(on)}$ ≤ 60mΩ

N-Channel Enhancement Mode
Avalanche Rated

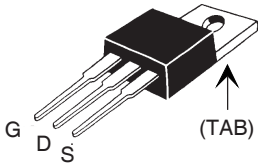


Symbol	Test Conditions	Maximum Ratings	
V_{DSS}	T_J = 25°C to 175°C	200	V
V_{DGR}	T_J = 25°C to 175°C, R_{GS} = 1MΩ	200	V
V_{GSS}	Continuous	±20	V
V_{GSM}	Transient	±30	V
I_{D25}	T_C = 25°C	50	A
I_{DM}	T_C = 25°C, pulse width limited by T_{JM}	120	A
I_A	T_C = 25°C	50	A
E_{AS}	T_C = 25°C	1	J
dV/dt	$I_S \le I_{DM}$, $V_{DD} \le V_{DSS}$, $T_J \le 175°C$	10	V/ns
P_D	T_C = 25°C	360	W
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 (TO-3P,TO-220)	1.13/10	Nm/lb.in.
Weight	TO-263	2.5	g
	TO-220	3.0	g
	TO-3P	5.5	g

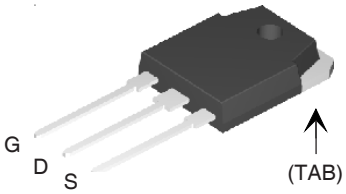
TO-263 (IXTA)



TO-220 (IXTP)



TO-3P (IXTQ)



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

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 = 250μA	2.5		5.0	V
I_{GSS}	V_{GS} = ±20V, V_{DS} = 0V			±100	nA
I_{DSS}	$V_{DS} = V_{DSS}$			25	μA
	V_{GS} = 0V T_J = 150°C			250	μA
$R_{DS(on)}$	V_{GS} = 10V, $I_D = 0.5 \bullet I_{D25}$, Note 1			60	mΩ

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

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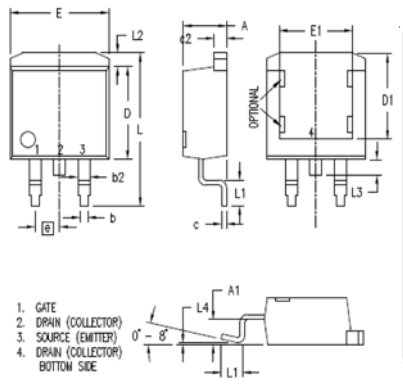
Symbol	Test Conditions (T_J = 25°C, unless otherwise specified)	Characteristic Values Min.	Typ.	Max.	
g_{fs}	V_{DS} = 10V, I_D = 0.5 • I_{D25}, Note 1	12	23		S
C_{iss}	V_{GS} = 0V, V_{DS} = 25V, f = 1MHz		2720		pF
C_{oss}			490		pF
C_{rss}			105		pF
$t_{d(on)}$	**Resistive Switching Times**		26		ns
t_r	V_{GS} = 10V, V_{DS} = 0.5 • V_{DSS}, I_D = 0.5 • I_{D25}		35		ns
$t_{d(off)}$	R_G = 10Ω (External)		70		ns
t_f			30		ns
$Q_{g(on)}$	V_{GS} = 10V, V_{DS} = 0.5 • V_{DSS}, I_D = 0.5 • I_{D25}		70		nC
Q_{gs}			17		nC
Q_{gd}			37		nC
R_{thJC}				0.42	°C/W
R_{thCS}	(TO-3P)		0.21		°C/W
	(TO-220)		0.25		°C/W

Source-Drain Diode

Symbol	Test Conditions (T_J = 25°C, unless otherwise specified)	Characteristic Values Min.	Typ.	Max.	
I_S	V_{GS} = 0V			50	A
I_{SM}	Repetitive, pulse width limited by T_{JM}			120	A
V_{SD}	I_F = 50A, V_{GS} = 0V, Note 1			1.5	V
t_{rr}	I_F = 25A, -di/dt = 100A/μs		150		ns
Q_{RM}	V_R = 100V, V_{GS} = 0V		2.0		μC

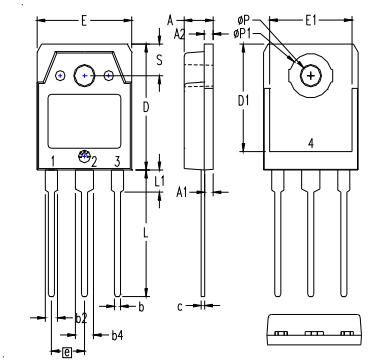
Note 1: Pulse test, t ≤ 300μs; duty cycle, d ≤ 2%.

TO-263 (IXTA) Outline



SYM	INCHES MIN	INCHES MAX	MILLIMETERS MIN	MILLIMETERS MAX
A	.160	.190	4.06	4.83
A1	.080	.110	2.03	2.79
b	.020	.039	0.51	0.99
b2	.045	.055	1.14	1.40
c	.016	.029	0.40	0.74
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

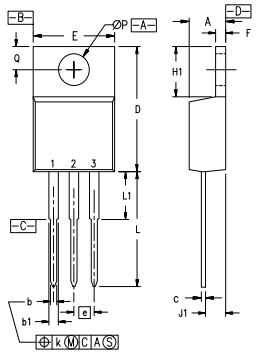
TO-3P (IXTQ) Outline



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

SYM	INCHES MIN	INCHES MAX	MILLIMETERS MIN	MILLIMETERS 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
øP	.126	.134	3.20	3.40
øP1	.272	.280	6.90	7.10
S	.193	.201	4.90	5.10

TO-220 (IXTP) Outline



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

SYM	INCHES MIN	INCHES MAX	MILLIMETERS MIN	MILLIMETERS 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

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 4,850,072 4,881,106 4,931,844 5,017,508 5,034,796 5,049,961 5,063,307 5,187,117 5,237,481 5,381,025 5,486,715 6,162,665 6,259,123 B1 6,306,728 B1 6,404,065 B1 6,534,343 6,583,505 6,683,344 6,710,405 B2 6,710,463 6,727,585 6,759,692 6,771,478 B2 7,005,734 B2 7,063,975 B2 7,071,537 7,157,338B2

Fig. 1. Output Characteristics @ 25ºC

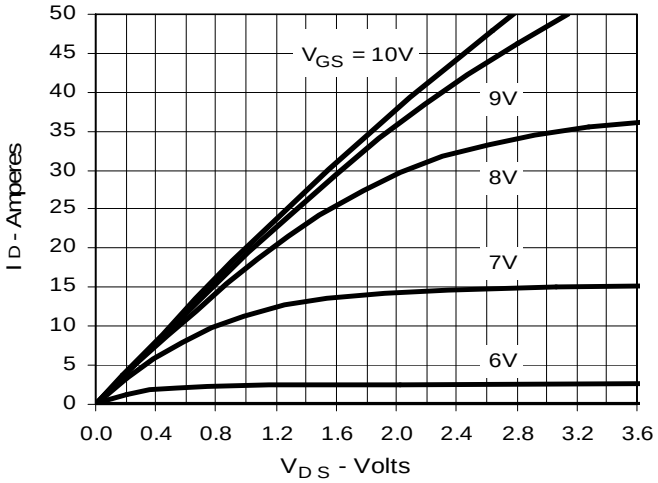


Fig. 2. Extended Output Characteristics @ 25ºC

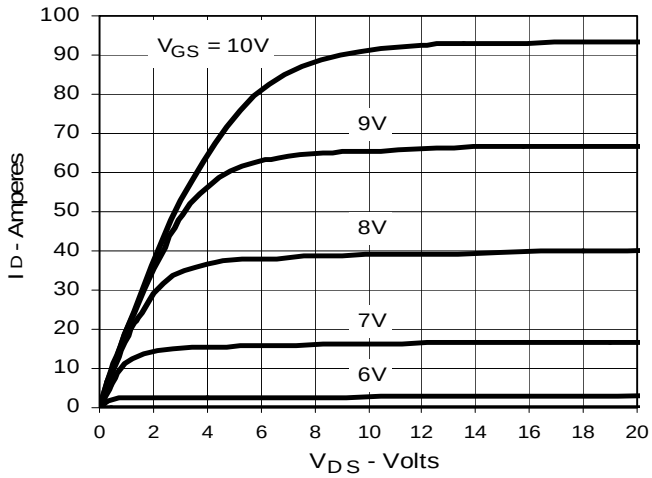


Fig. 3. Output Characteristics @ 150ºC

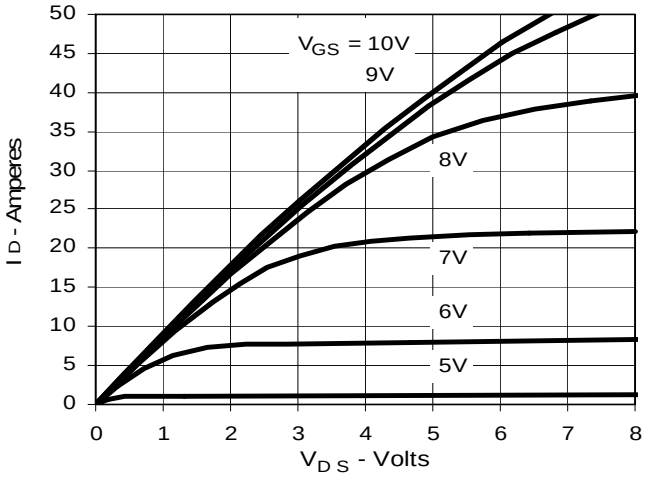


Fig. 4. $R_{DS(on)}$ Normalized to I_D = 25A Value vs. Junction Temperature

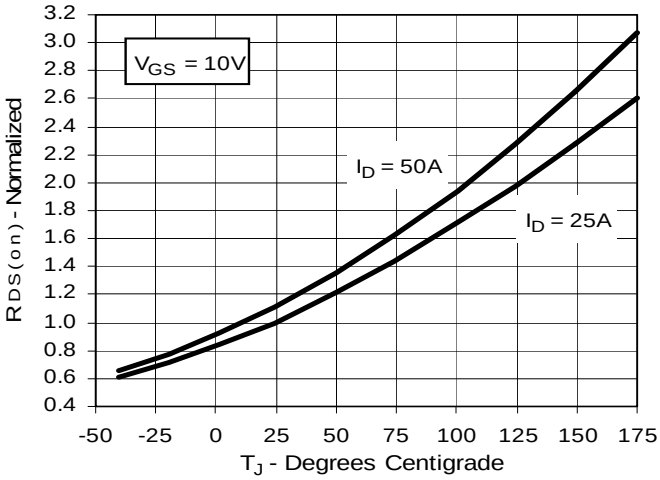


Fig. 5. $R_{DS(on)}$ Normalized to I_D = 25A Value vs. Drain Current

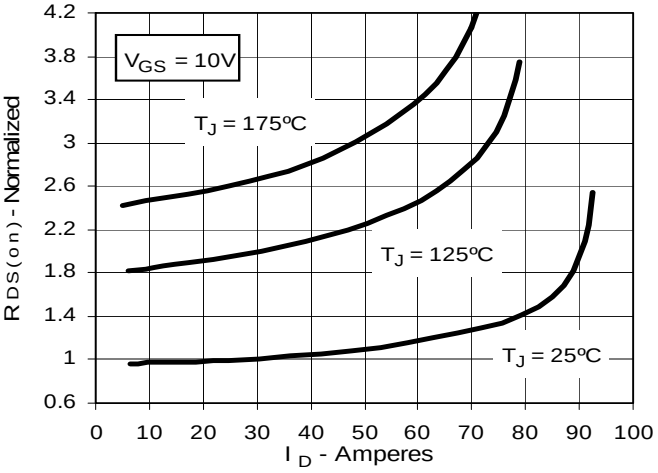


Fig. 6. Drain Current vs. Case Temperature

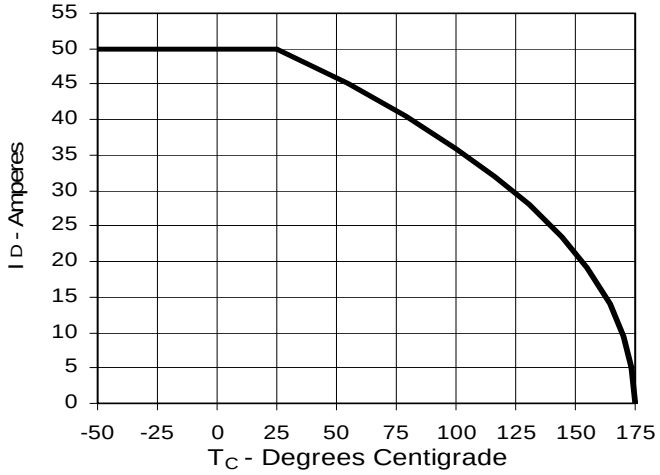


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Fig. 7. Input Admittance

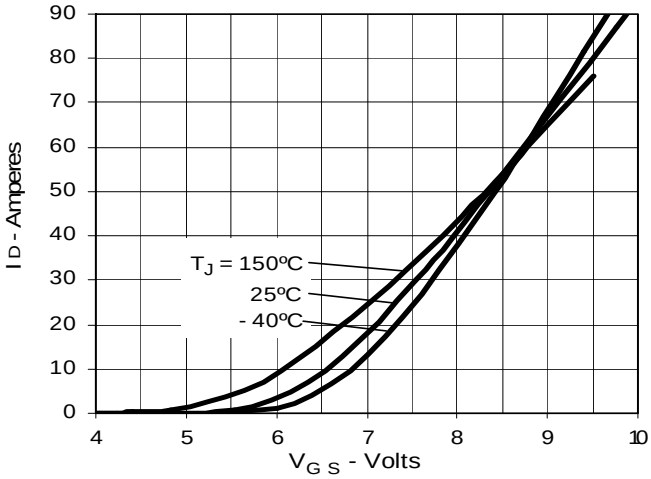

Fig. 8. Transconductance

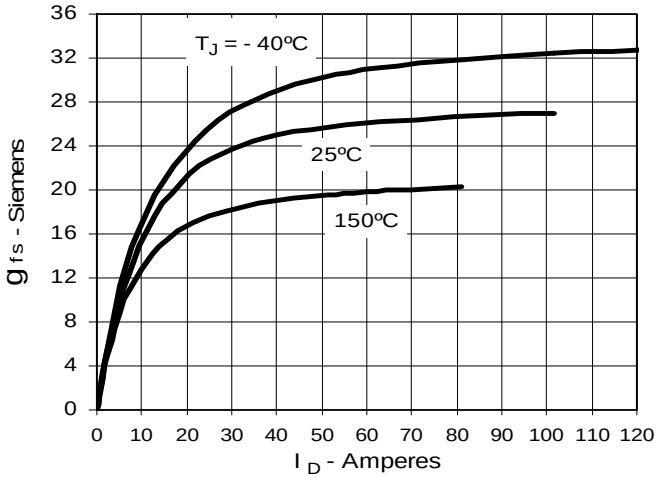

Fig. 9. Source Current vs. Source-To-Drain Voltage

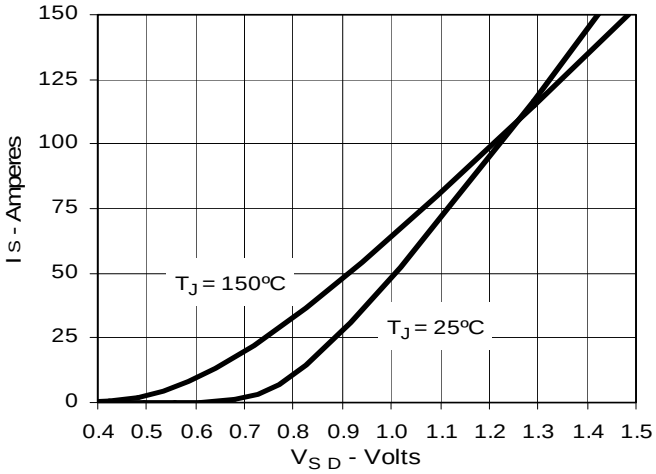

Fig. 10. Gate Charge

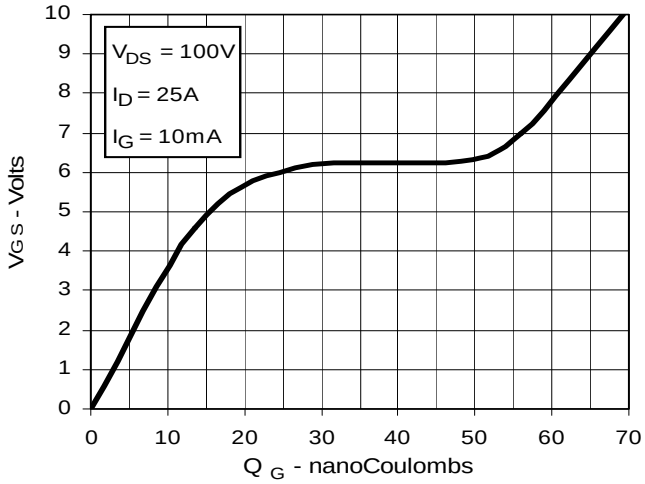

Fig. 11. Capacitance

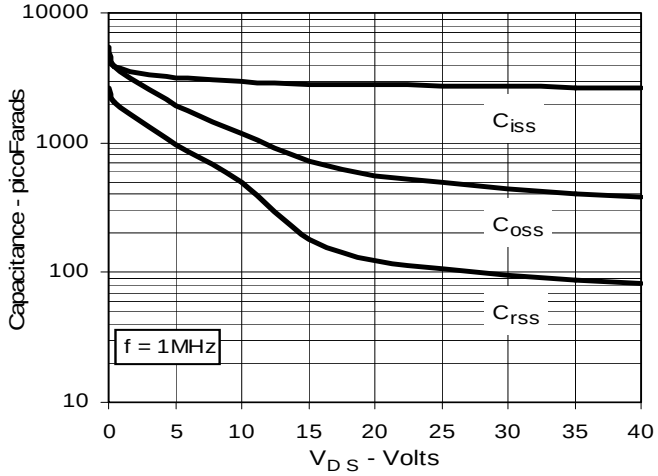

Fig. 12. Forward-Bias Safe Operating Area

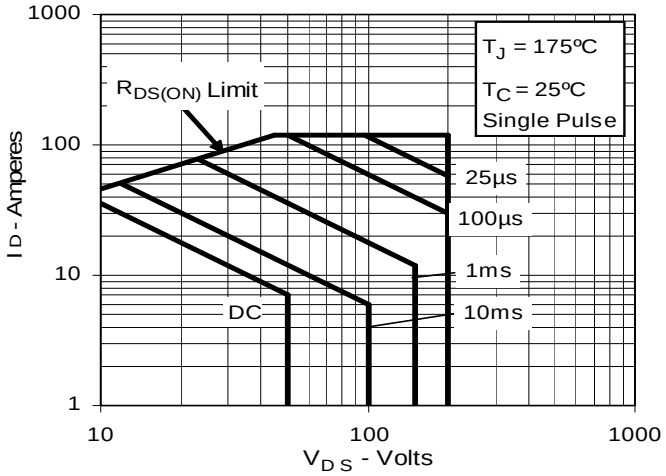

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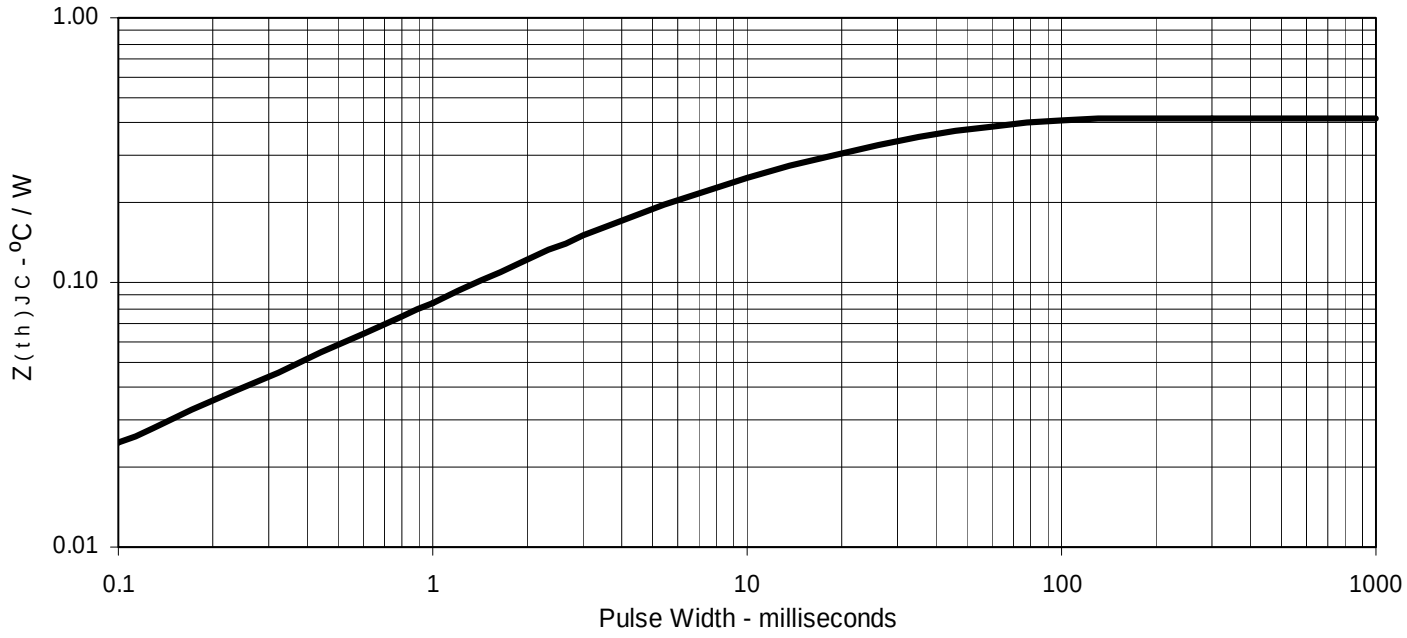
Fig. 13. Maximum Transient Thermal Impedance



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