

X2-Class Power MOSFET

IXTY2N65X2
IXTP2N65X2

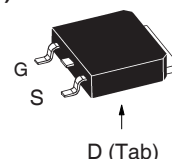
$$\begin{aligned} V_{DSS} &= 650V \\ I_{D25} &= 2A \\ R_{DS(on)} &\leq 2.3\Omega \end{aligned}$$

N-Channel Enhancement Mode

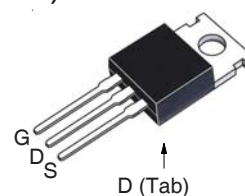


Symbol	Test Conditions	Maximum Ratings	
V_{DSS}	$T_J = 25^\circ\text{C}$ to 150°C	650	V
V_{DGR}	$T_J = 25^\circ\text{C}$ to 150°C , $R_{GS} = 1M\Omega$	650	V
V_{GSS}	Continuous	± 30	V
V_{GSM}	Transient	± 40	V
I_{D25}	$T_C = 25^\circ\text{C}$	2	A
I_{DM}	$T_C = 25^\circ\text{C}$, Pulse Width Limited by T_{JM}	4	A
I_A	$T_C = 25^\circ\text{C}$	1	A
E_{AS}	$T_C = 25^\circ\text{C}$	100	mJ
dv/dt	$I_S \leq I_{DM}$, $V_{DD} \leq V_{DSS}$, $T_J \leq 150^\circ\text{C}$	15	V/ns
P_D	$T_C = 25^\circ\text{C}$	55	W
T_J		-55 ... +150	$^\circ\text{C}$
T_{JM}		150	$^\circ\text{C}$
T_{stg}		-55 ... +150	$^\circ\text{C}$
T_L	Maximum Lead Temperature for Soldering	300	$^\circ\text{C}$
T_{SOLD}	1.6 mm (0.062in.) from Case for 10s	260	$^\circ\text{C}$
M_d	Mounting Torque (TO-220)	1.13 / 10	Nm/lb.in
Weight	TO-252	0.35	g
	TO-220	3.00	g

TO-252 (IXTY)



TO-220 (IXTP)



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

Features

- International Standard Packages
- Low Q_G
- Avalanche Rated
- Low Package Inductance

Advantages

- High Power Density
- Easy to Mount
- Space Savings

Applications

- Switch-Mode and Resonant-Mode Power Supplies
- DC-DC Converters
- PFC Circuits
- AC and DC Motor Drives
- Robotics and Servo Controls

Symbol	Test Conditions ($T_J = 25^\circ\text{C}$, Unless Otherwise Specified)	Characteristic Values		
		Min.	Typ.	Max.
BV_{DSS}	$V_{GS} = 0V$, $I_D = 250\mu A$	650		V
$V_{GS(th)}$	$V_{DS} = V_{GS}$, $I_D = 250\mu A$	3.0		5.0 V
I_{GSS}	$V_{GS} = \pm 30V$, $V_{DS} = 0V$			± 100 nA
I_{DSS}	$V_{DS} = V_{DSS}$, $V_{GS} = 0V$ $T_J = 125^\circ\text{C}$			5 μA 100 μA
$R_{DS(on)}$	$V_{GS} = 10V$, $I_D = 0.5 \cdot I_{D25}$, Note 1			2.3 Ω

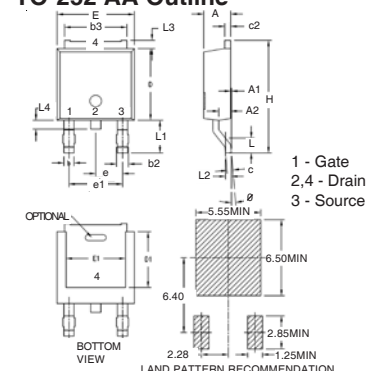
Symbol (T _J = 25°C, Unless Otherwise Specified)	Test Conditions	Characteristic Values		
		Min.	Typ.	Max
g_{fs}	V _{DS} = 10V, I _D = 0.5 • I _{D25} , Note 1	1.1	1.8	S
R_{GI}	Gate Input Resistance		14	Ω
C_{iss}	$\left. \begin{array}{l} \\ \\ \end{array} \right\} V_{GS} = 0V, V_{DS} = 25V, f = 1MHz$		180	pF
C_{oss}			129	pF
C_{rss}			0.7	pF
	Effective Output Capacitance			
C_{o(er)}	Energy related	$\left. \begin{array}{l} \\ \\ \end{array} \right\} \begin{array}{l} V_{GS} = 0V \\ V_{DS} = 0.8 \cdot V_{DSS} \end{array}$	22	pF
C_{o(tr)}	Time related		45	pF
t_{d(on)}	$\left. \begin{array}{l} \\ \\ \\ \end{array} \right\} \begin{array}{l} \textbf{Resistive Switching Times} \\ V_{GS} = 10V, V_{DS} = 0.5 \cdot V_{DSS}, I_D = 0.5 \cdot I_{D25} \\ R_G = 50\Omega \text{ (External)} \end{array}$		15	ns
t_r			19	ns
t_{d(off)}			20	ns
t_f			14	ns
Q_{g(on)}	$\left. \begin{array}{l} \\ \\ \end{array} \right\} V_{GS} = 10V, V_{DS} = 0.5 \cdot V_{DSS}, I_D = 0.5 \cdot I_{D25}$		4.3	nC
Q_{gs}			0.8	nC
Q_{gd}			2.1	nC
R_{thJC}	TO-220			2.27 °C/W
R_{thCS}			0.50	°C/W

Source-Drain Diode

Symbol (T _J = 25°C, Unless Otherwise Specified)		Characteristic Values			
		Min.	Typ.	Max	
I _S	V _{GS} = 0V			2	A
I _{SM}	Repetitive, pulse Width Limited by T _{JM}			8	A
V _{SD}	I _F = I _S , V _{GS} = 0V, Note 1			1.4	V
t _{rr}	} I _F = 1A, -di/dt = 100A/μs V _R = 100V		137		ns
Q _{RM}			508		nC
I _{RM}			7.4		A

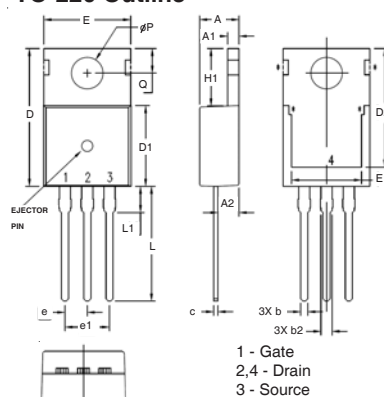
Note 1. Pulse test, $t \leq 300\mu s$, duty cycle, $d \leq 2\%$.

TO-252 AA Outline



SYM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.086	.094	2.19	2.38
A1	0	.005	0	0.12
A2	.038	.046	0.97	1.17
b	.025	.035	0.64	0.89
b2	.030	.045	0.76	1.14
b3	.200	.215	5.08	5.46
c	.018	.024	0.46	0.61
c2	.018	.023	0.46	0.58
D	.235	.245	5.97	6.22
D1	.180	.205	4.57	5.21
E	.250	.265	6.35	6.73
E1	.170	.205	4.32	5.21
e	.090 BSC		2.28 BSC	
e1	.180 BSC		4.57 BSC	
H	.370	.410	9.40	10.42
L	.055	.070	1.40	1.78
L1	.100	.115	2.54	2.92
L2	.020 BSC		0.50 BSC	
L3	.025	.040	0.64	1.02
L4	.025	.040	0.64	1.02
ø	0°	10°	0°	10°

TO-220 Outline



SYM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.169	.185	4.30	4.70
A1	.047	.055	1.20	1.40
A2	.079	.106	2.00	2.70
b	.024	.039	0.60	1.00
b2	.045	.057	1.15	1.45
c	.014	.026	0.35	0.65
D	.587	.626	14.90	15.90
D1	.335	.370	8.50	9.40
(D2)	.500	.531	12.70	13.50
E	.382	.406	9.70	10.30
(E1)	.283	.323	7.20	8.20
e	.100 BSC		2.54 BSC	
e1	.200 BSC		5.08 BSC	
H	.244	.268	6.20	6.80
L	.492	.547	12.50	13.90
L1	.110	.154	2.80	3.90
ØP	.134	.150	3.40	3.80
Q	.106	.126	2.70	3.20

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	6,404,065B1	6,683,344	6,727,585	7,005,734B2	7,157,338B2
	4,860,072	5,017,508	5,063,307	5,381,025	6,259,123B1	6,534,343	6,710,405B2	6,759,692	7,063,975B2	
	4,881,106	5,034,796	5,187,117	5,486,715	6,306,728B1	6,583,505	6,710,463	6,771,478B2	7,071,537	

Fig. 1. Output Characteristics @ $T_J = 25^\circ\text{C}$

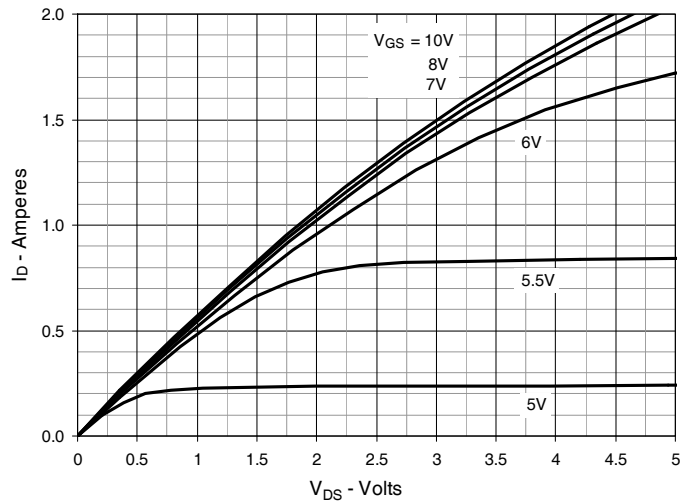


Fig. 2. Extended Output Characteristics @ $T_J = 25^\circ\text{C}$

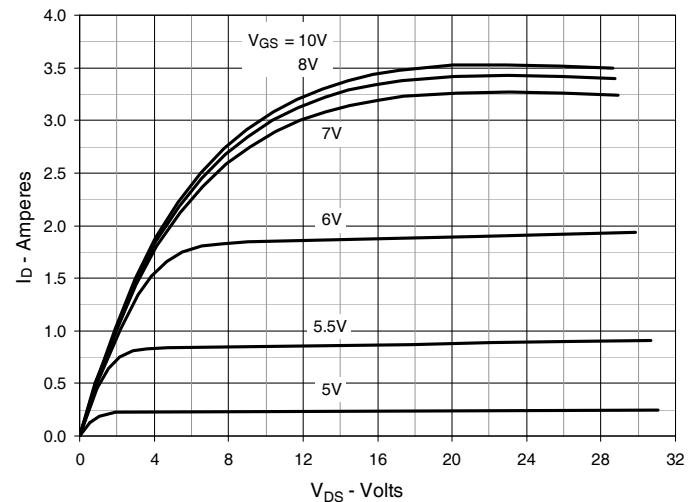


Fig. 3. Output Characteristics @ $T_J = 125^\circ\text{C}$

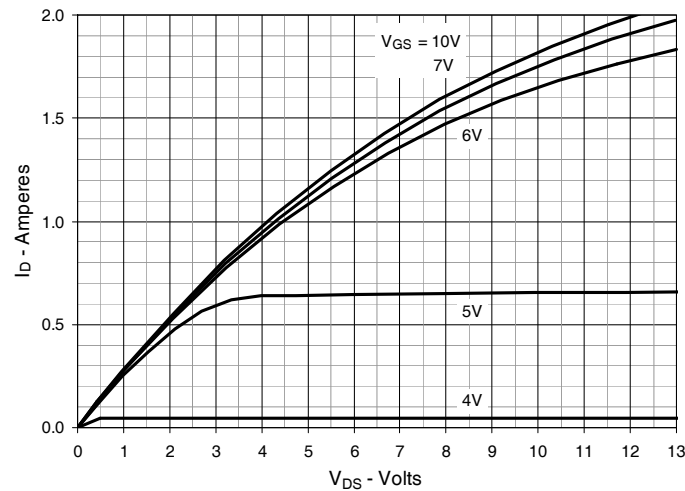


Fig. 4. $R_{DS(on)}$ Normalized to $I_D = 1\text{A}$ Value vs. Junction Temperature

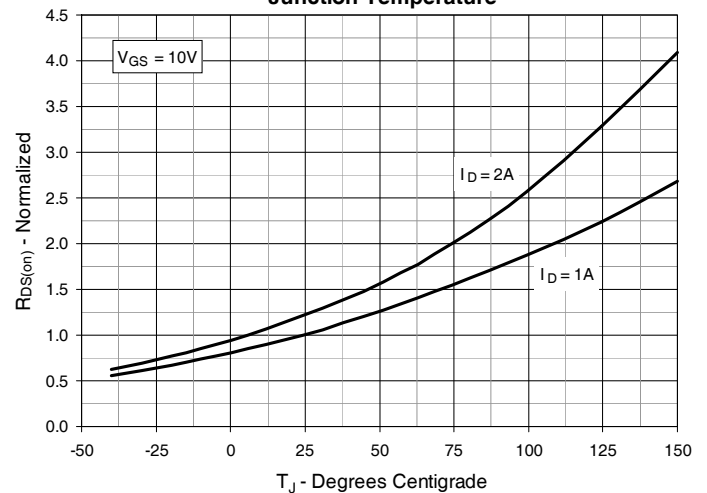


Fig. 5. $R_{DS(on)}$ Normalized to $I_D = 1\text{A}$ Value vs. Drain Current

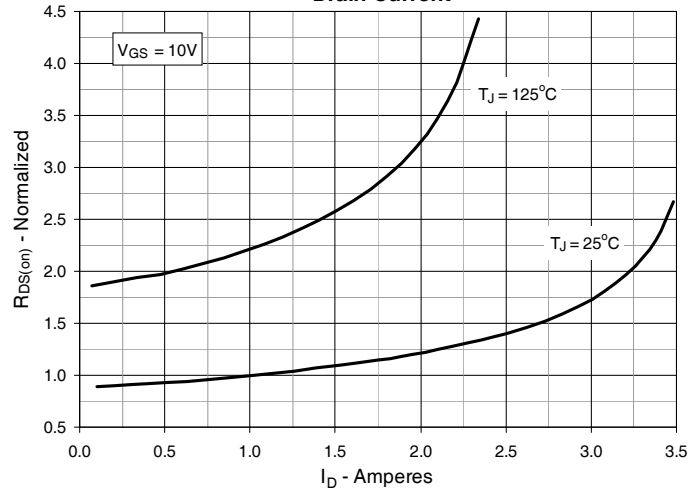


Fig. 6. Maximum Drain Current vs. Case Temperature

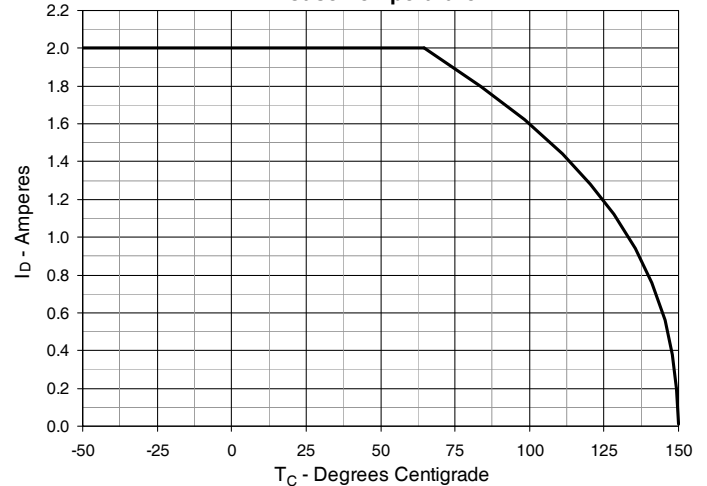


Fig. 7. Input Admittance

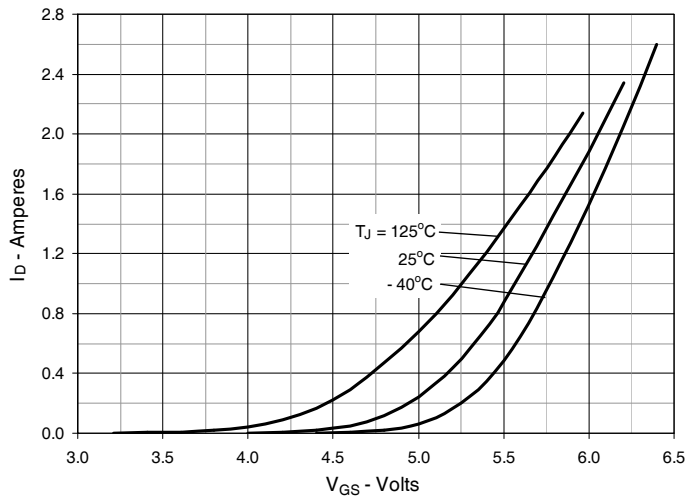


Fig. 8. Transconductance

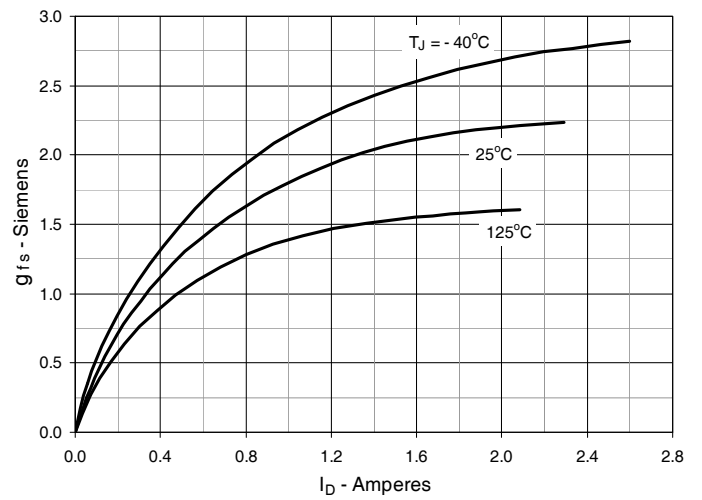


Fig. 9. Forward Voltage Drop of Intrinsic Diode

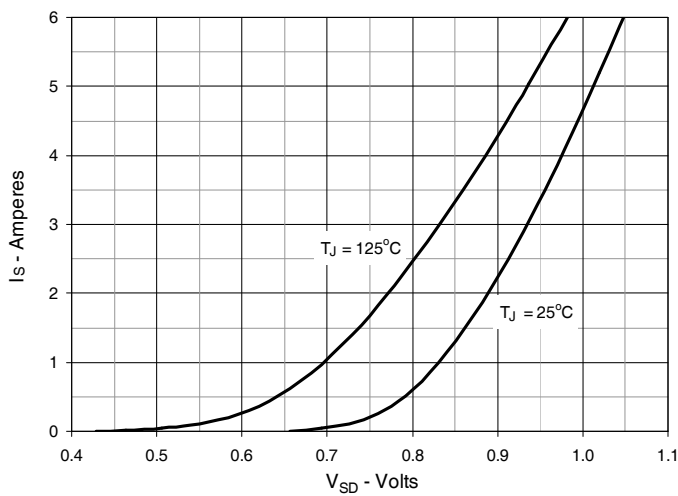


Fig. 10. Gate Charge

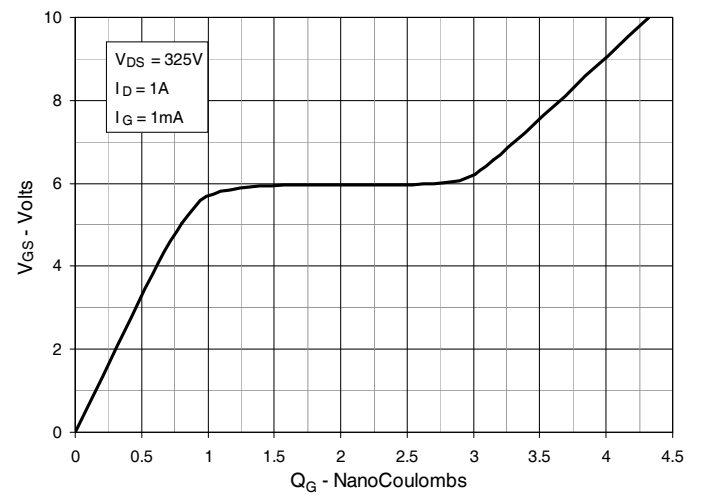


Fig. 11. Capacitance

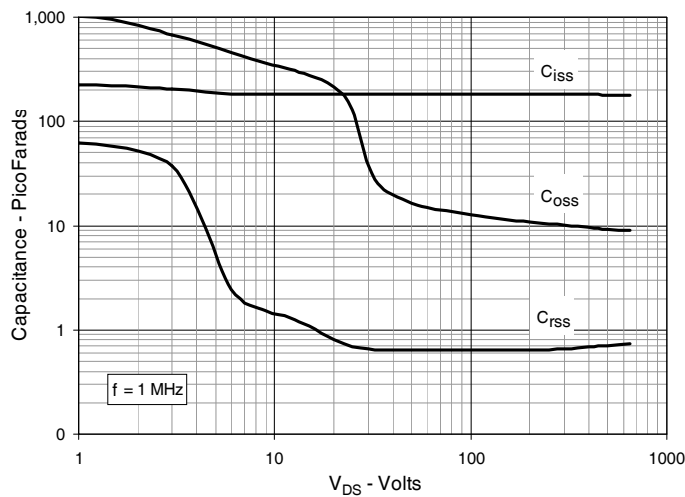


Fig. 12. Output Capacitance Stored Energy

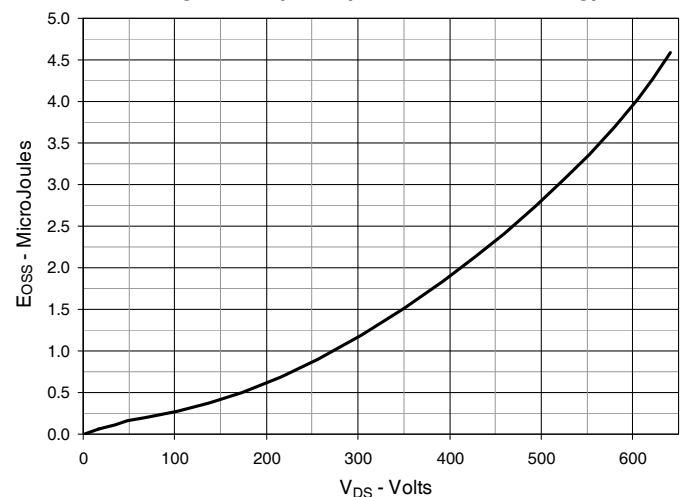


Fig. 13. Forward-Bias Safe Operating Area

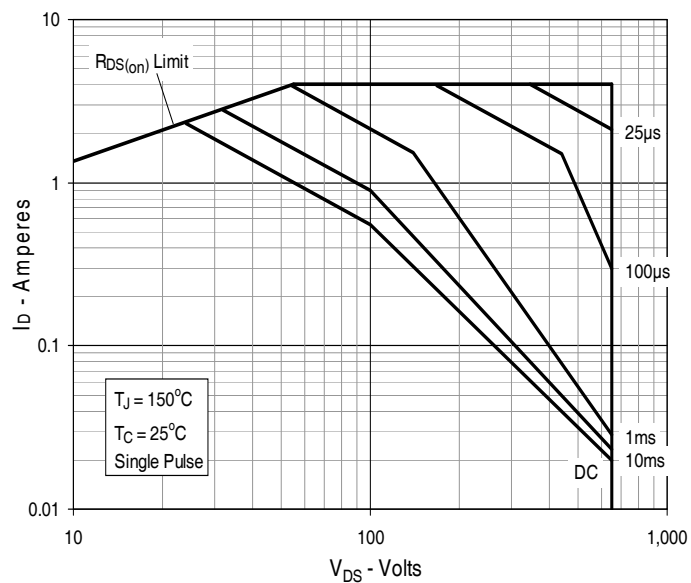
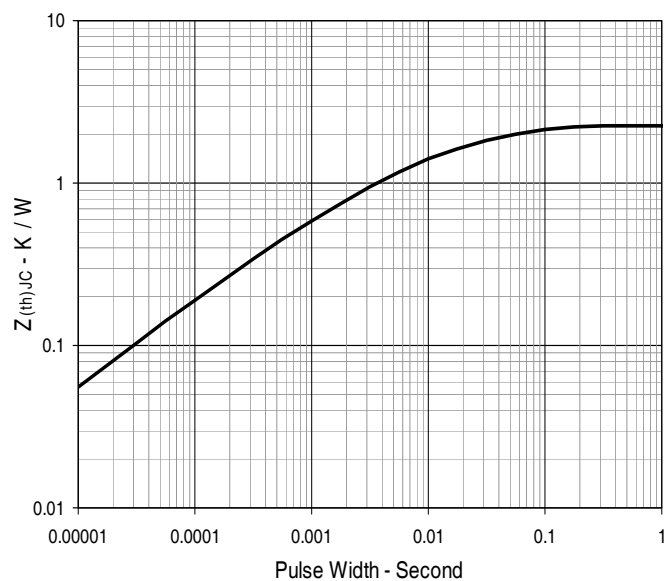


Fig. 14. Maximum Transient Thermal Impedance





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