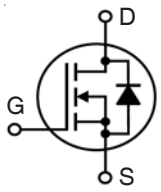
IXYS

X-Class HiPerFET™ Power MOSFET

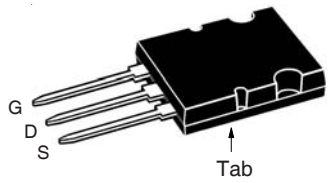
IXFB90N85X

V_{DSS} = 850V
I_{D25} = 90A
$R_{DS(on)}$ ≤ 41mΩ

N-Channel Enhancement Mode
Avalanche Rated
Fast Intrinsic Diode



PLUS264™



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

Symbol	Test Conditions	Maximum Ratings	
V_{DSS}	T_J = 25°C to 150°C	850	V
V_{DGR}	T_J = 25°C to 150°C, R_{GS} = 1MΩ	850	V
V_{GSS}	Continuous	± 30	V
V_{GSM}	Transient	± 40	V
I_{D25}	T_C = 25°C	90	A
I_{DM}	T_C = 25°C, Pulse Width Limited by T_{JM}	180	A
I_A	T_C = 25°C	45	A
E_{AS}	T_C = 25°C	4	J
P_D	T_C = 25°C	1785	W
dv/dt	$I_S \le I_{DM}$, $V_{DD} \le V_{DSS}$, $T_J \le 150°C$	50	V/ns
T_J		-55 ... +150	°C
T_{JM}		150	°C
T_{stg}		-55 ... +150	°C
T_L	Maximum Lead Temperature for Soldering	300	°C
T_{SOLD}	1.6 mm (0.062in.) from Case for 10s	260	°C
F_C	Mounting Force	30..120 / 6.7..27	N/lb
Weight		10	g

Features

- 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°C Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.	
BV_{DSS}	V_{GS} = 0V, I_D = 3mA	850			V
$V_{GS(th)}$	$V_{DS} = V_{GS}$, I_D = 8mA	3.5		5.5	V
I_{GSS}	V_{GS} = ± 30V, V_{DS} = 0V			± 200	nA
I_{DSS}	$V_{DS} = V_{DSS}$, V_{GS} = 0V			50	μA
	T_J = 125°C			5	mA
$R_{DS(on)}$	V_{GS} = 10V, I_D = 0.5 • I_{D25}, Note 1			41	mΩ

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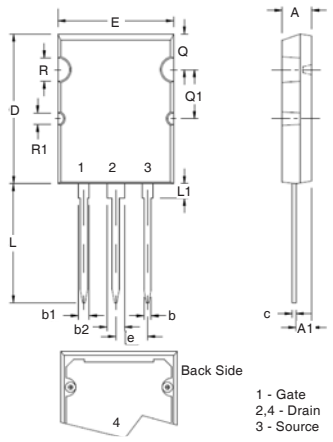
Symbol	Test Conditions (T_J = 25°C, Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max	
g_{fs}	V_{DS} = 10V, I_D = 45A, Note 1	37	62		S
R_{Gi}	Gate Input Resistance		0.60		Ω
C_{iss}	V_{GS} = 0V, V_{DS} = 25V, f = 1MHz		13.3		nF
C_{oss}			13.0		nF
C_{rss}			220		pF
	Effective Output Capacitance				
$C_{o(er)}$	Energy related; V_{GS} = 0V, V_{DS} = 0.8 • V_{DSS}		395		pF
$C_{o(tr)}$	Time related; V_{GS} = 0V, V_{DS} = 0.8 • V_{DSS}		1820		pF
$t_{d(on)}$	**Resistive Switching Times**		50		ns
t_r	V_{GS} = 10V, V_{DS} = 0.5 • V_{DSS}, I_D = 45A		20		ns
$t_{d(off)}$	R_G = 1Ω (External)		126		ns
t_f			8		ns
$Q_{g(on)}$	V_{GS} = 10V, V_{DS} = 0.5 • V_{DSS}, I_D = 45A		340		nC
Q_{gs}			78		nC
Q_{gd}			190		nC
R_{thJC}				0.07	°C/W
R_{thCS}			0.13		°C/W

PLUS264™ (IXFB) Outline



SYM	INCHES MIN	INCHES MAX	MILLIMETERS MIN	MILLIMETERS 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	
L	.779	.842	19.79	21.39
L1	.087	.102	2.21	2.59
Q	.240	.256	6.10	6.50
Q1	.330	.346	8.38	8.79
ØR	.155	.187	3.94	4.75
ØR1	.085	.093	2.16	2.36

Source-Drain Diode

Symbol	Test Conditions (T_J = 25°C, Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.	
I_S	V_{GS} = 0V			90	A
I_{SM}	Repetitive, Pulse Width Limited by T_{JM}			360	A
V_{SD}	I_F = I_S, V_{GS} = 0V, Note 1			1.4	V
t_{rr}	I_F = 45A, -di/dt = 200A/μs		250		ns
Q_{RM}	V_R = 100V, V_{GS} = 0V		5.3		μC
I_{RM}			42.0		A

Note 1. Pulse test, t ≤ 300μs, duty cycle, d ≤ 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 4,860,072 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 @ T_J = 25°C

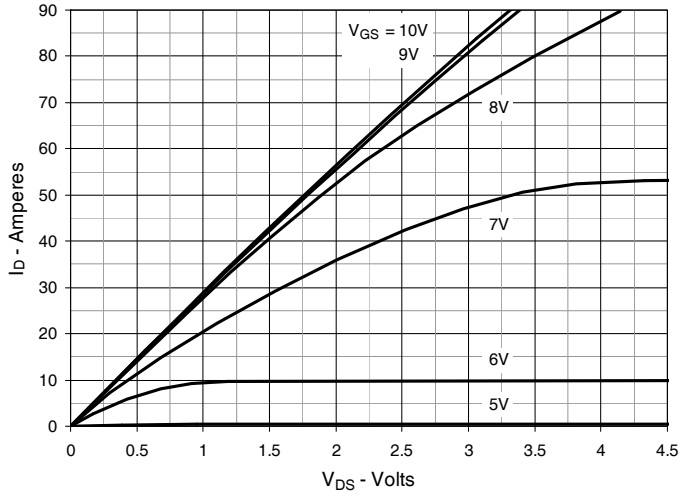


Fig. 2. Extended Output Characteristics @ T_J = 25°C

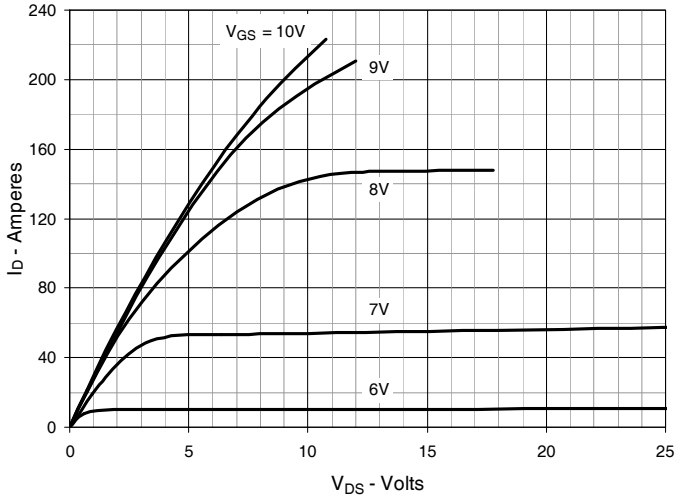


Fig. 3. Output Characteristics @ T_J = 125°C

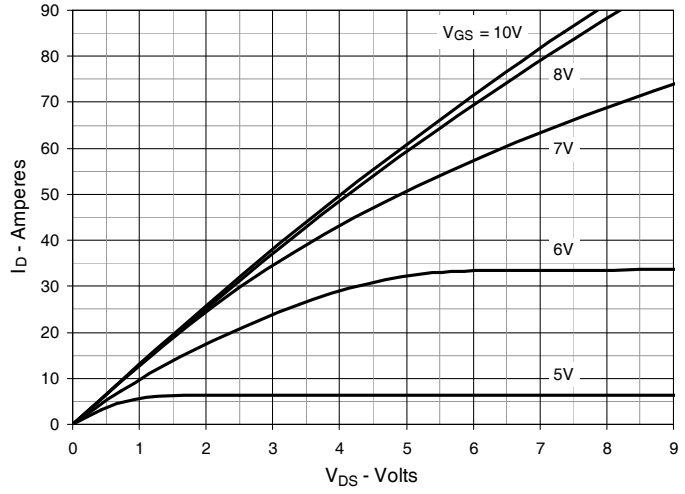


Fig. 4. $R_{DS(on)}$ Normalized to I_D = 45A Value vs. Junction Temperature

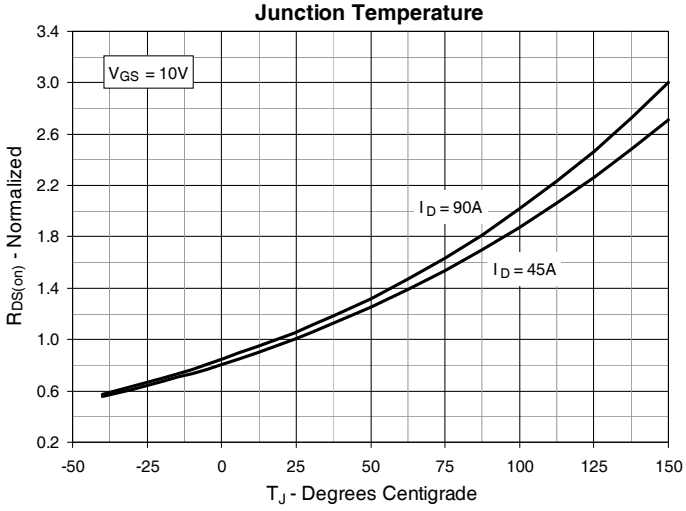


Fig. 5. $R_{DS(on)}$ Normalized to I_D = 45A Value vs. Drain Current

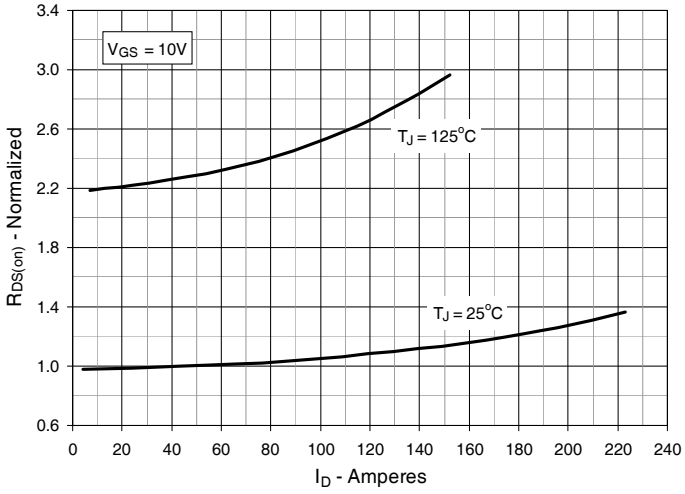


Fig. 6. Normalized Breakdown & Threshold Voltages vs. Junction Temperature

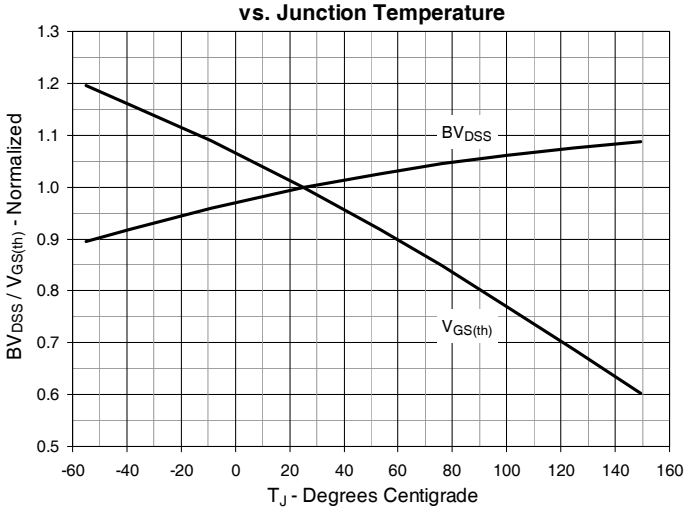


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Fig. 7. Maximum Drain Current vs. Case Temperature

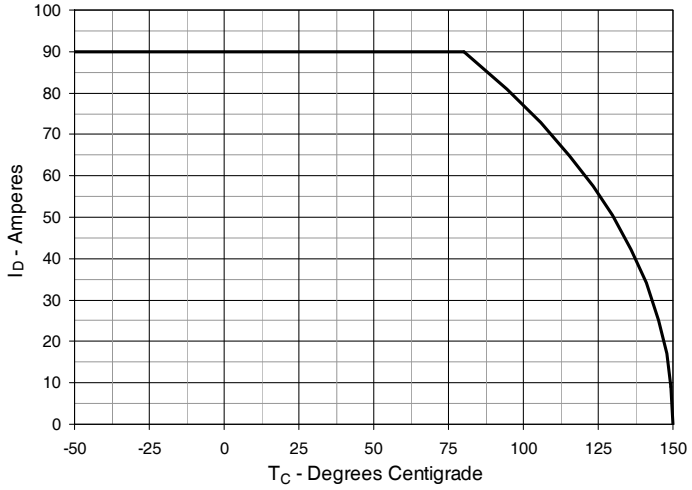

Fig. 8. Input Admittance

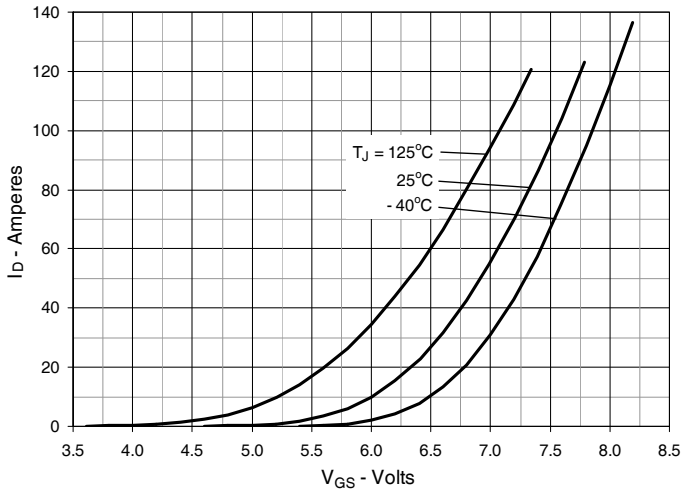

Fig. 9. Transconductance

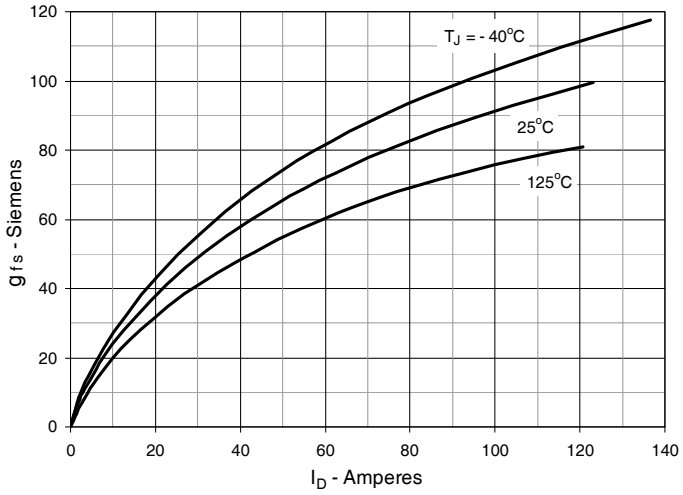

Fig. 10. Forward Voltage Drop of Intrinsic Diode

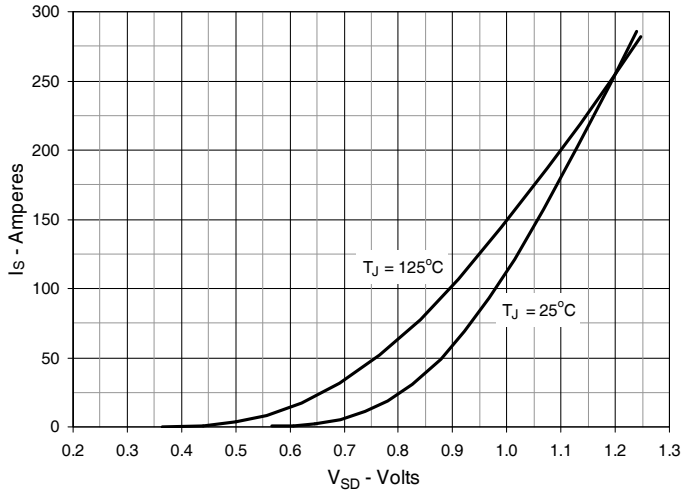

Fig. 11. Gate Charge

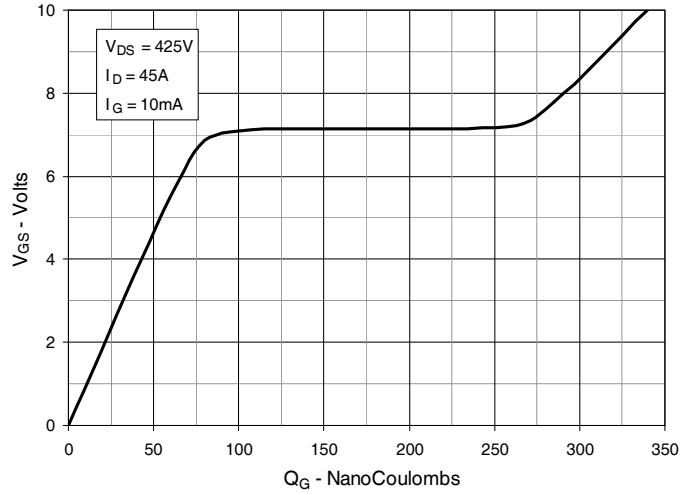

Fig. 12. Capacitance

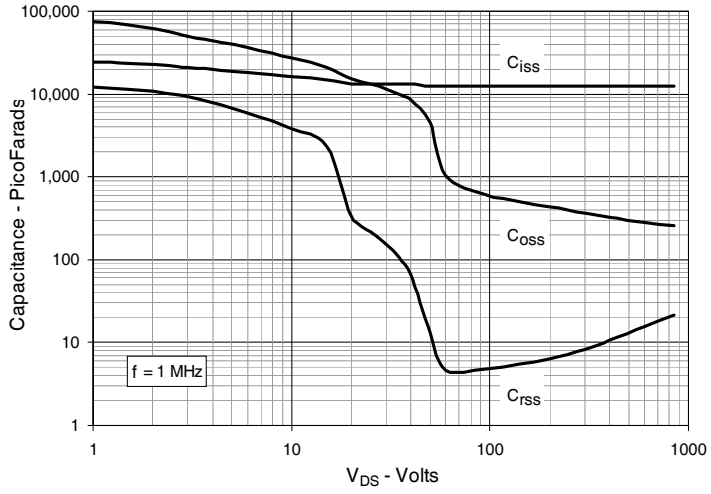

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Fig. 13. Output Capacitance Stored Energy

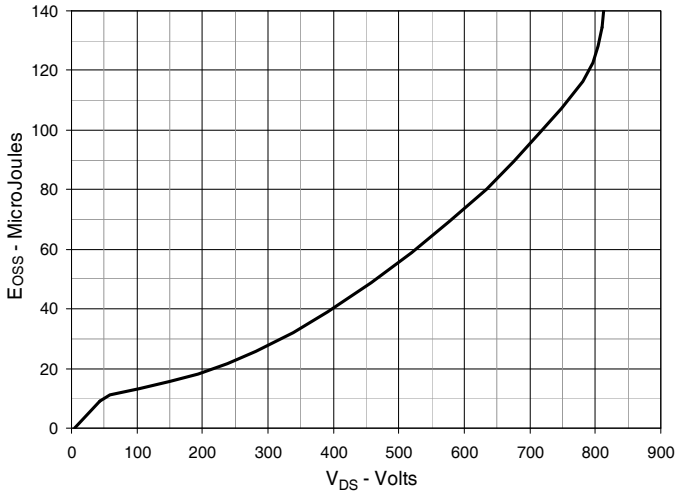


Fig. 14. Forward-Bias Safe Operating Area

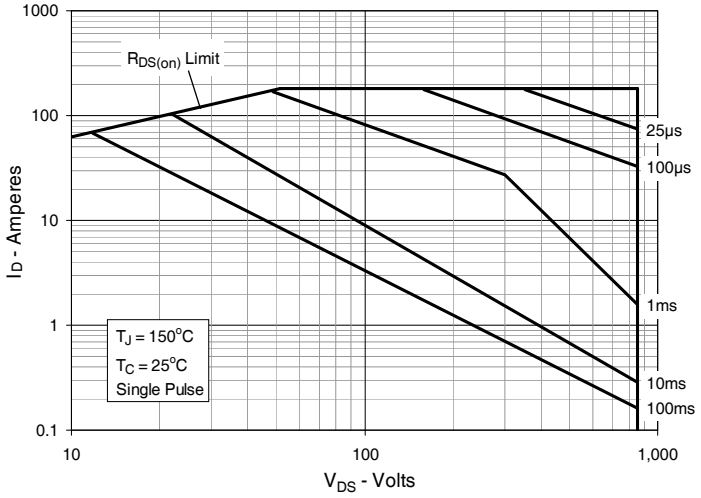
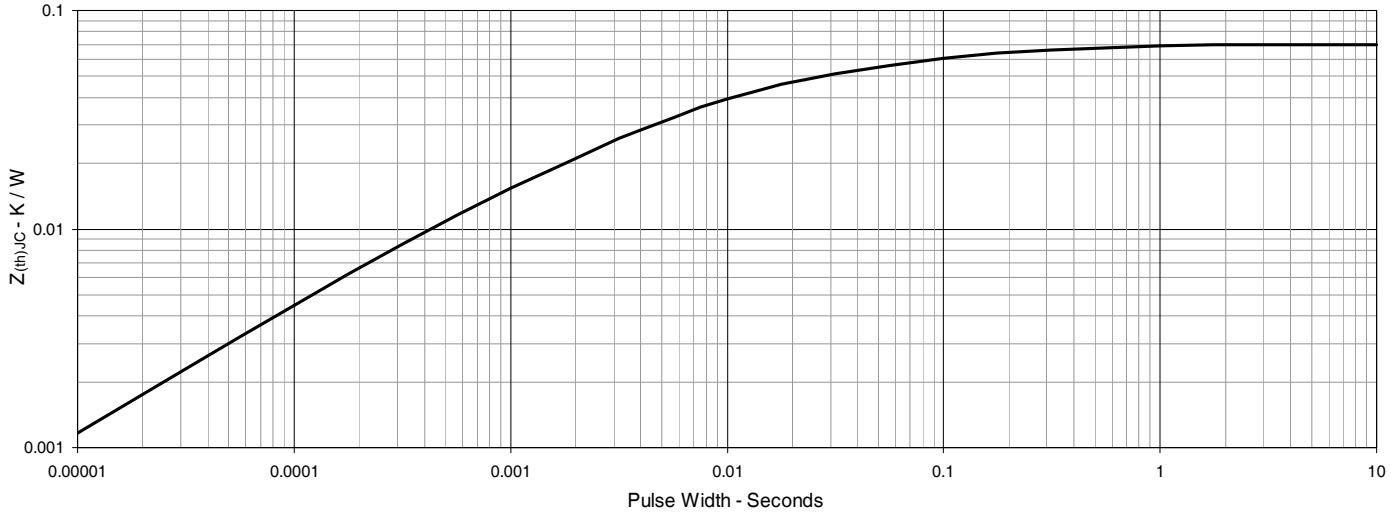


Fig. 15. Maximum Transient Thermal Impedance



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