WINSOURCE ELECTRONICS

THE DATASHEET OF

IXFN170N65X2

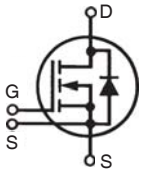
IXYS

X2-Class HiPerFET™ Power MOSFET

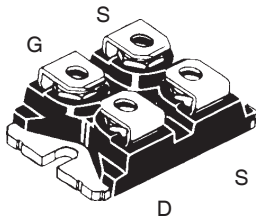
IXFN170N65X2

V_{DSS} = 650V
I_{D25} = 170A
$R_{DS(on)}$ ≤ 13mΩ

N-Channel Enhancement Mode
Avalanche Rated
Fast Intrinsic Diode



miniBLOC, SOT-227
E153432



G = Gate D = Drain
S = Source

Symbol	Test Conditions		Maximum Ratings	
V_{DSS}	T_J = 25°C to 150°C		650	V
V_{DGR}	T_J = 25°C to 150°C, R_{GS} = 1MΩ		650	V
V_{GSS}	Continuous		± 30	V
V_{GSM}	Transient		± 40	V
I_{D25}	T_C = 25°C		170	A
I_{DM}	T_C = 25°C, Pulse Width Limited by T_{JM}		340	A
I_A	T_C = 25°C		15	A
E_{AS}	T_C = 25°C		5	J
P_D	T_C = 25°C		1170	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
V_{ISOL}	50/60 Hz, RMS	t = 1 minute	2500	V~
	$I_{ISOL} \le$ 1mA	t = 1 second	3000	V~
M_d	Mounting Torque		1.5/13	Nm/lb.in
	Terminal Connection Torque		1.3/11.5	Nm/lb.in
Weight			30	g

Symbol	Test Conditions (T_J = 25°C Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.	
BV_{DSS}	V_{GS} = 0V, I_D = 3mA	650			V
$V_{GS(th)}$	$V_{DS} = V_{GS}$, I_D = 8mA	3.5		5.0	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, $I_D = 0.5 \bullet I_{D25}$, Note 1			13	mΩ

Features

- International Standard Package
- miniBLOC, with Aluminium Nitride Isolation
- Isolation Voltage 2500 V~
- High Current Handling Capability
- Fast Intrinsic Diode
- Avalanche Rated
- Low $R_{DS(on)}$

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

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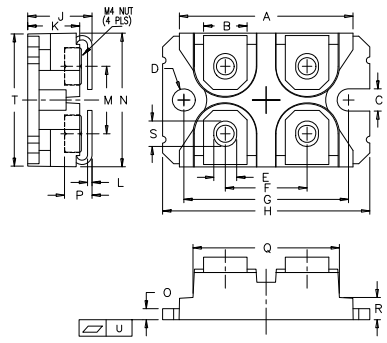
Symbol	Test Conditions (T_J = 25°C, Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max
g_{fs}	V_{DS} = 10V, I_D = 60A, Note 1	55	90	S
R_{Gi}	Gate Input Resistance		0.56	Ω
C_{iss}	V_{GS} = 0V, V_{DS} = 25V, f = 1MHz		27.0	nF
C_{oss}			15.8	nF
C_{rss}			12.4	pF
	Effective Output Capacitance			
$C_{o(er)}$	Energy related; V_{GS} = 0V, V_{DS} = 0.8 • V_{DSS}		780	pF
$C_{o(tr)}$	Time related; V_{GS} = 0V, V_{DS} = 0.8 • V_{DSS}		3400	pF
$t_{d(on)}$	**Resistive Switching Times**		60	ns
t_r	V_{GS} = 10V, V_{DS} = 0.5 • V_{DSS}, I_D = 0.5 • I_{D25}		15	ns
$t_{d(off)}$	R_G = 1Ω (External)		133	ns
t_f			6	ns
$Q_{g(on)}$	V_{GS} = 10V, V_{DS} = 0.5 • V_{DSS}, I_D = 0.5 • I_{D25}		434	nC
Q_{gs}			166	nC
Q_{gd}			137	nC
R_{thJC}				0.107 °C/W
R_{thCS}			0.05	°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			170	A
I_{SM}	Repetitive, Pulse Width Limited by T_{JM}			680	A
V_{SD}	I_F = 100A, V_{GS} = 0V, Note 1			1.4	V
t_{rr}	I_F = 85A, -di/dt = 100A/μs		270		ns
Q_{RM}	V_R = 100V, V_{GS} = 0V		3.1		μC
I_{RM}			22.6		A

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

SOT-227B (IXFN) Outline



(M4 screws (4x) supplied)

SYM	INCHES MIN	INCHES MAX	MILLIMETERS MIN	MILLIMETERS MAX
A	1.240	1.255	31.50	31.88
B	.307	.323	7.80	8.20
C	.161	.169	4.09	4.29
D	.161	.169	4.09	4.29
E	.161	.169	4.09	4.29
F	.587	.595	14.91	15.11
G	1.186	1.193	30.12	30.30
H	1.496	1.505	38.00	38.23
J	.460	.481	11.68	12.22
K	.351	.378	8.92	9.60
L	.030	.033	0.76	0.84
M	.496	.506	12.60	12.85
N	.990	1.001	25.15	25.42
O	.078	.084	1.98	2.13
P	.195	.235	4.95	5.97
Q	1.045	1.059	26.54	26.90
R	.155	.174	3.94	4.42
S	.186	.191	4.72	4.85
T	.968	.987	24.59	25.07
U	-.002	.004	-0.05	0.1

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 = 25ºC

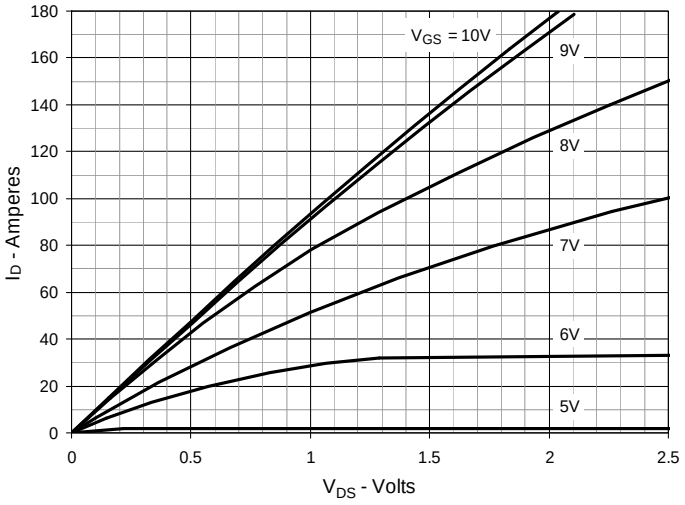


Fig. 2. Extended Output Characteristics @ T_J = 25ºC

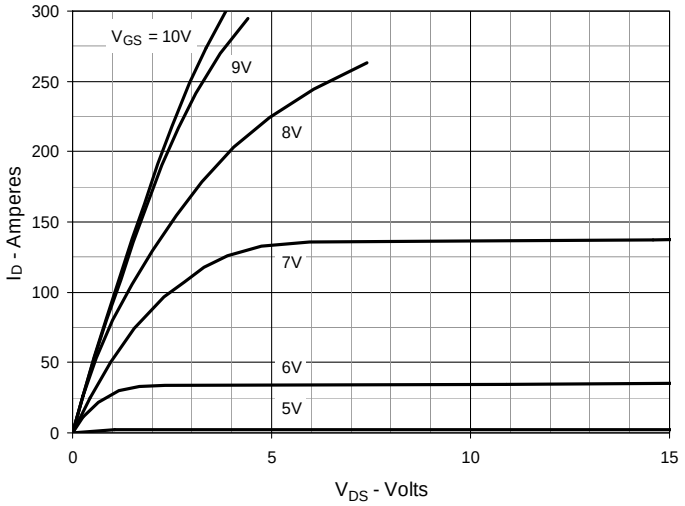


Fig. 3. Output Characteristics @ T_J = 125ºC

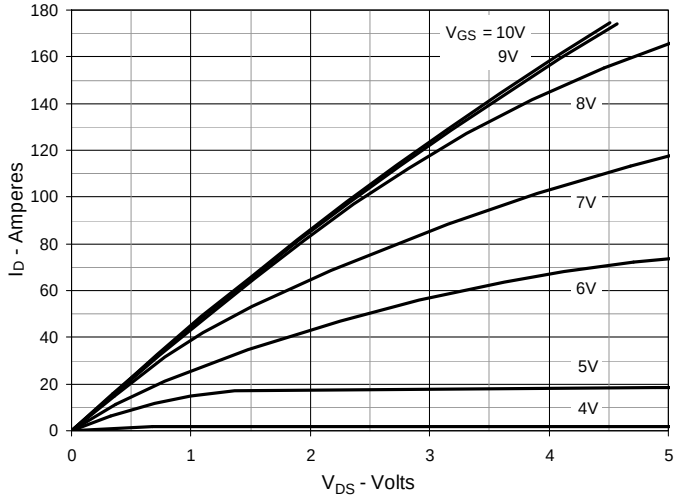


Fig. 4. $R_{DS(on)}$ Normalized to I_D = 85A Value vs. Junction Temperature

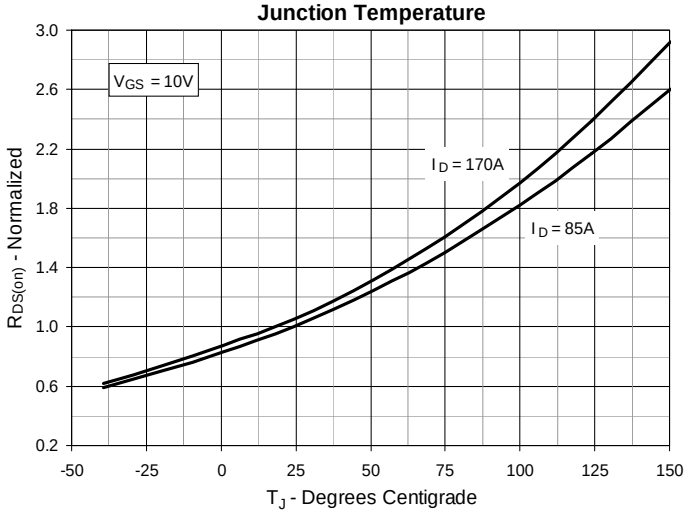


Fig. 5. $R_{DS(on)}$ Normalized to I_D = 85A Value vs. Drain Current

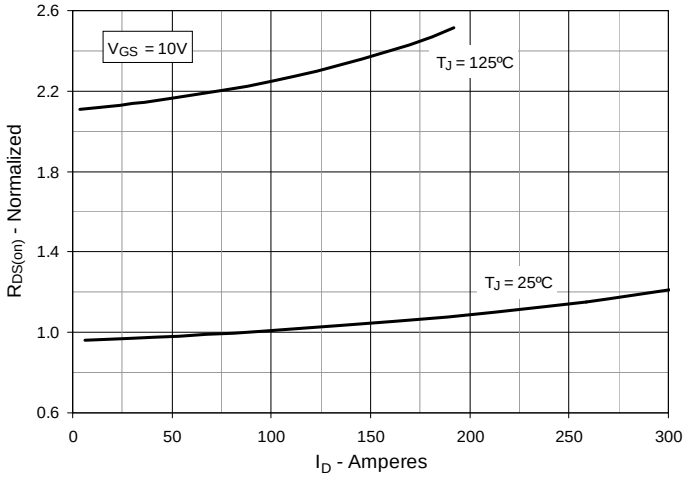
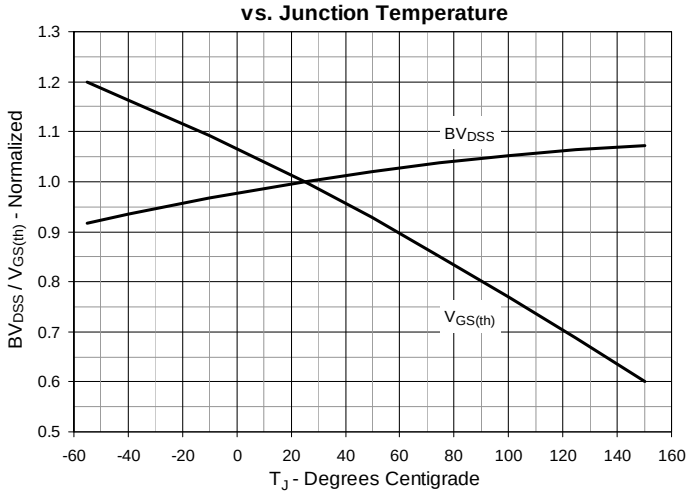


Fig. 6. Normalized Breakdown & Threshold Voltages vs. Junction Temperature



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Fig. 7. Maximum Drain Current vs. Case Temperature

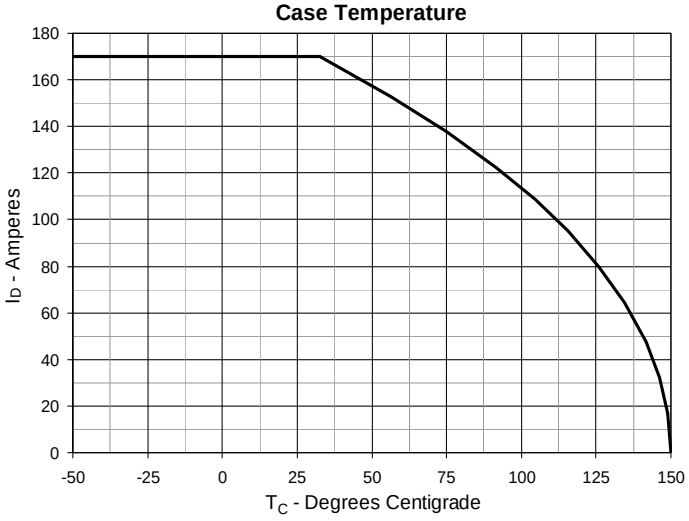


Fig. 8. Input Admittance

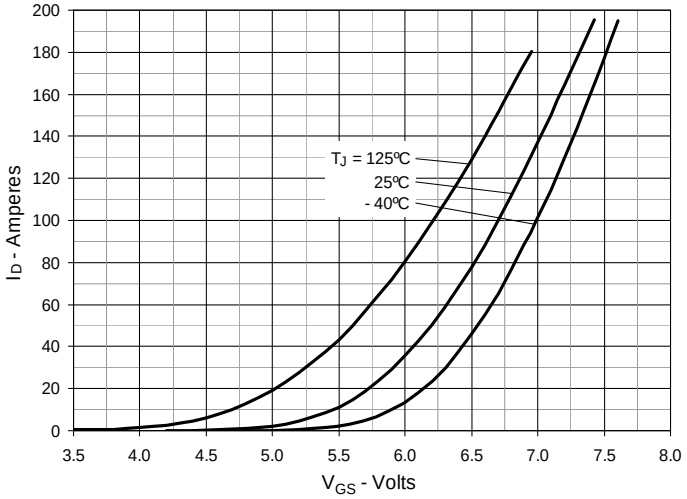


Fig. 9. Transconductance

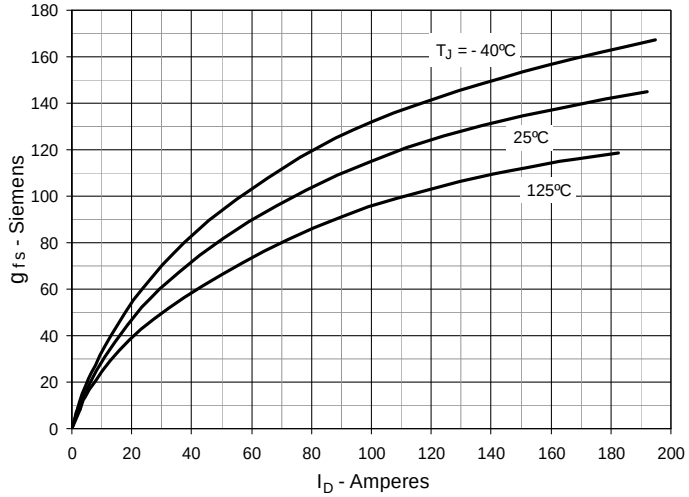


Fig. 10. Forward Voltage Drop of Intrinsic Diode

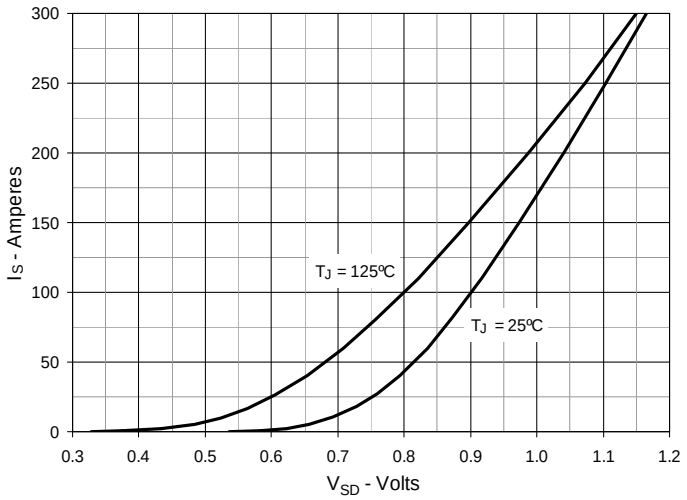


Fig. 11. Gate Charge

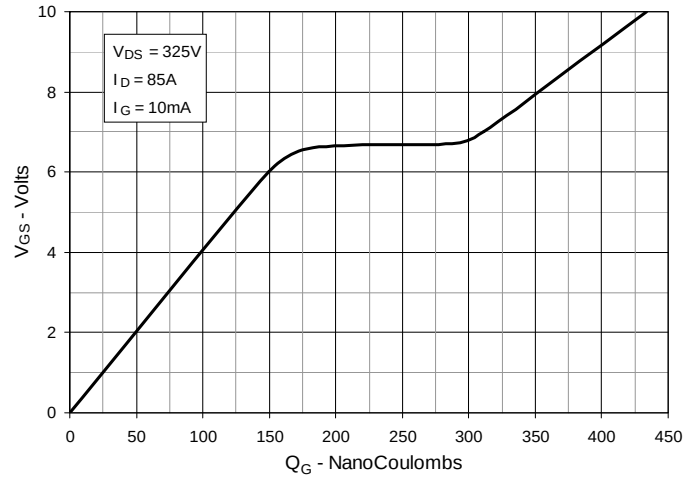
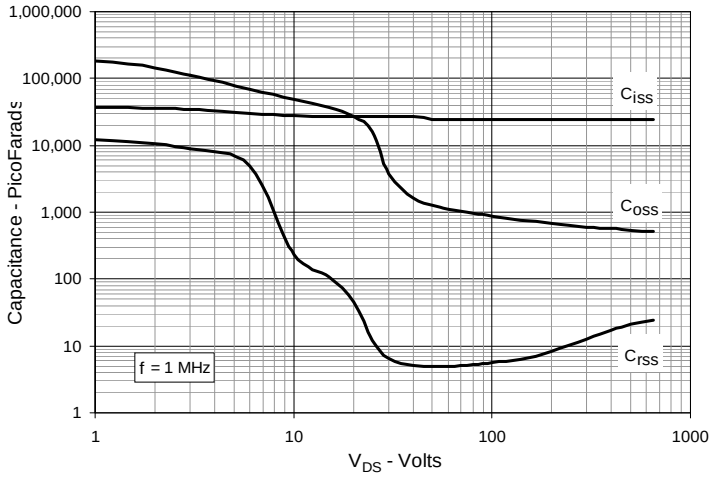


Fig. 12. Capacitance



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Fig. 13. Output Capacitance Stored Energy

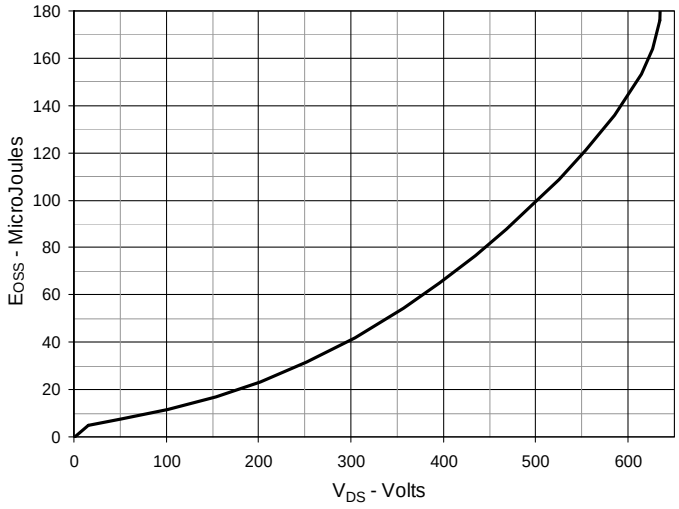


Fig. 14. Forward-Bias Safe Operating Area

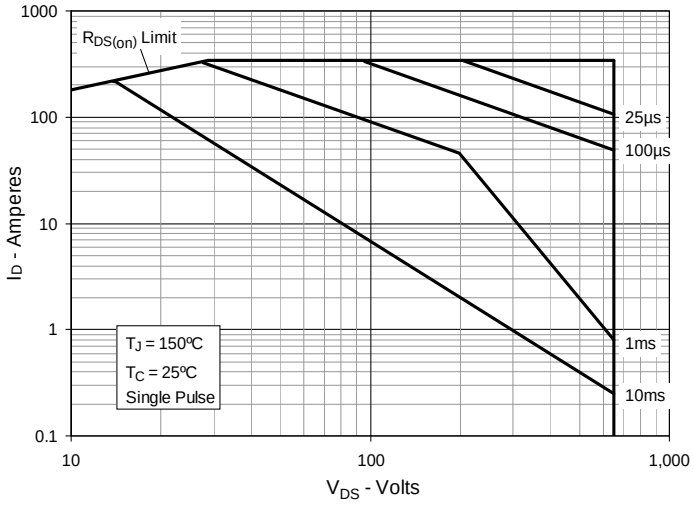
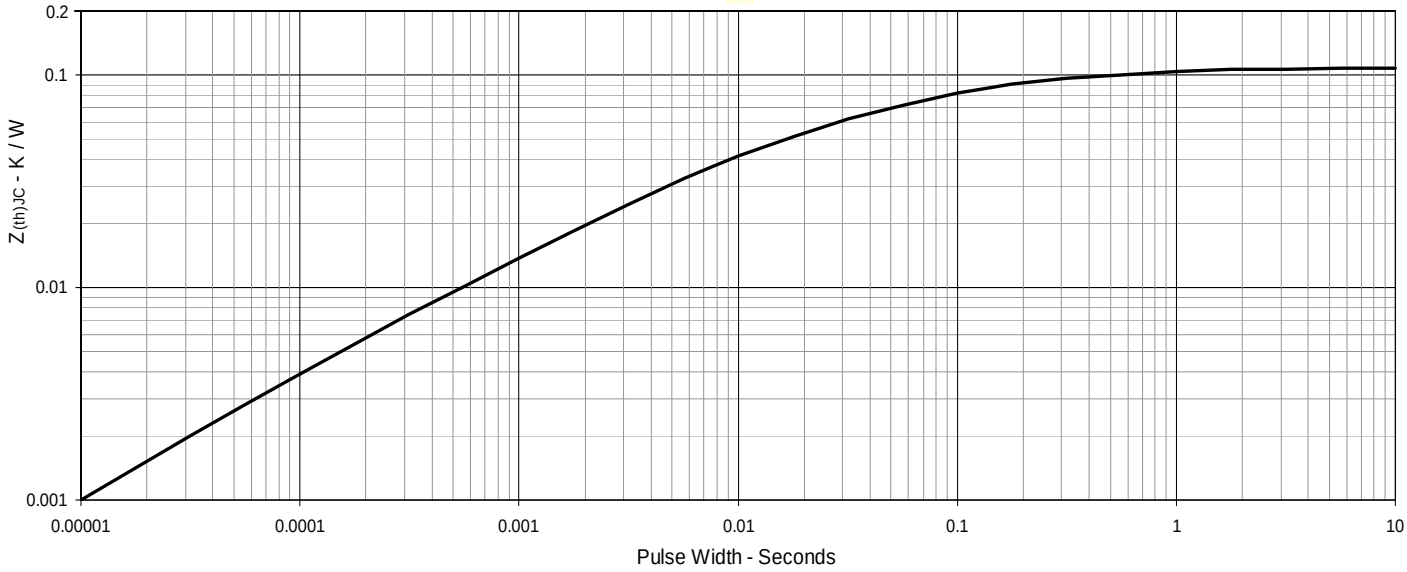


Fig. 15. Maximum Transient Thermal Impedance



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