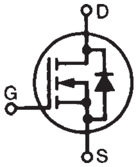
IXYS

Polar^{TM} Power MOSFET

IXTA14N60P
IXTP14N60P
IXTQ14N60P

V_{DSS} = 600V
I_{D25} = 14A
$R_{DS(on)} \leq$ 550mΩ

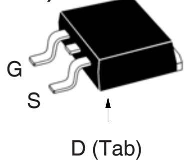
Enhancement Mode
Avalanche Rated



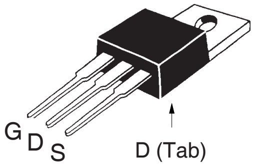
Symbol	Test Conditions	Maximum Ratings	
V_{DSS}	T_J = 25°C to 150°C	600	V
V_{DGR}	T_J = 25°C to 150°C, R_{GS} = 1MΩ	600	V
V_{GSS}	Continuous	±30	V
V_{GSM}	Transient	±40	V
I_{D25}	T_C = 25°C	14	A
I_{DM}	T_C = 25°C, pulse width limited by T_{JM}	42	A
I_A	T_C = 25°C	14	A
E_{AS}	T_C = 25°C	900	mJ
P_D	T_C = 25°C	300	W
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}	Plastic Body for 10s	260	°C
M_d	Mounting torque (TO-220 &TO-3P)	1.13/10	Nm/lb.in.
Weight	TO-263	2.5	g
	TO-220	3.0	g
	TO-3P	5.5	g

Symbol (T_J = 25°C, unless otherwise specified)	Test Conditions	Characteristic Values Min.	 Typ.	 Max.	
BV_{DSS}	V_{GS} = 0V, I_D = 250µA	600			V
$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250µA	3.0		5.5	V
I_{GSS}	V_{GS} = ± 30V, V_{DS} = 0V			±100	nA
I_{DSS}	V_{DS} = V_{DSS}, V_{GS} = 0V			5	µA
	T_J = 125°C			100	µA
$R_{DS(on)}$	V_{GS} = 10V, I_D = 0.5 • I_{D25}, Note 1		450	550	mΩ

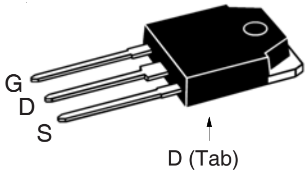
TO-263 AA (IXTA)



TO-220AB (IXTP)



TO-3P (IXTQ)



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

Features

- International Standard Packages
- Fast Intrinsic Rectifier
- Avalanche Rated
- Low $R_{DS(ON)}$ and Q_G
- Low Package Inductance

Advantages

- High Power Density
- Easy to Mount
- Space Savings

Applications

- Switch-Mode and Resonant-Mode Power Supplies
- DC-DC Converters
- Laser Drivers
- AC and DC Motor Drives
- Robotics and Servo Controls

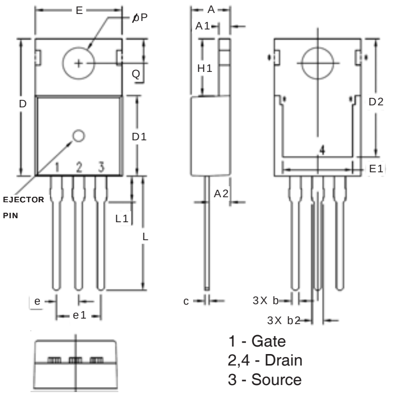
Symbol	Test Conditions ($T_J = 25°C$, unless otherwise specified)	Characteristic Values Min.	Typ.	Max.	
g_{fs}	$V_{DS} = 20V$, $I_D = 0.5 \bullet I_{D25}$, Note 1	7	13		S
C_{iss}	$V_{GS} = 0V$, $V_{DS} = 25V$, f = 1MHz		2500		pF
C_{oss}			215		pF
C_{rss}			13		pF
$t_{d(on)}$	**Resistive Switching Times** $V_{GS} = 10V$, $V_{DS} = 0.5 \bullet V_{DSS}$, $I_D = 0.5 \bullet I_{D25}$ $R_G = 10\Omega$ (External)		23		ns
t_r			27		ns
$t_{d(off)}$			70		ns
t_f			26		ns
$Q_{g(on)}$	$V_{GS} = 10V$, $V_{DS} = 0.5 \bullet V_{DSS}$, $I_D = 0.5 \bullet I_{D25}$		36		nC
Q_{gs}			16		nC
Q_{gd}			12		nC
R_{thJC}				0.42	°C/W
R_{thCS}	(TO-220) (TO-3P		0.50 0.25		°C/W °C/W

Source-Drain Diode

Symbol	Test Conditions ($T_J = 25°C$, unless otherwise specified)	Characteristic Values Min.	Typ.	Max.	
I_S	$V_{GS} = 0V$			14	A
I_{SM}	Repetitive, pulse width limited by T_{JM}			42	A
V_{SD}	$I_F = I_S$, $V_{GS} = 0V$, Note 1			1.5	V
t_{rr}	$I_F = 14A$, $-di/dt = 100A/\mu s$ $V_R = 100V$, $V_{GS} = 0V$		500		ns

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

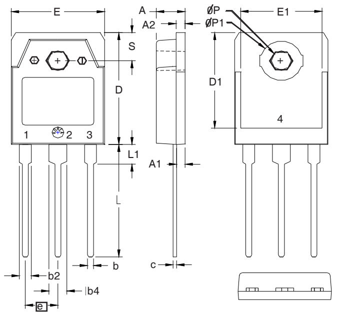
TO-220 Outline



1 - Gate
2,4 - Drain
3 - Source

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	
H1	.244	.268	6.20	6.80
L	.492	.547	12.50	13.90
L1	.110	.154	2.80	3.90
∅P	.134	.150	3.40	3.80
Q	.106	.126	2.70	3.20

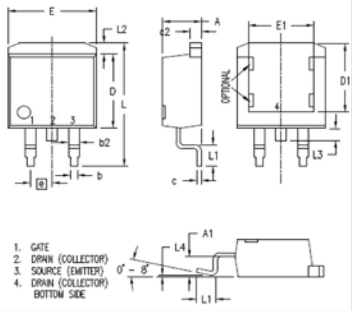
TO-3P Outline



PINS: 1 - Gate
2, 4 - Drain
3 - Source

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
øP	.126	.134	3.20	3.40
øP1	.272	.280	6.90	7.10
S	.193	.201	4.90	5.10

TO-263 (IXTA) Outline



SYM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	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

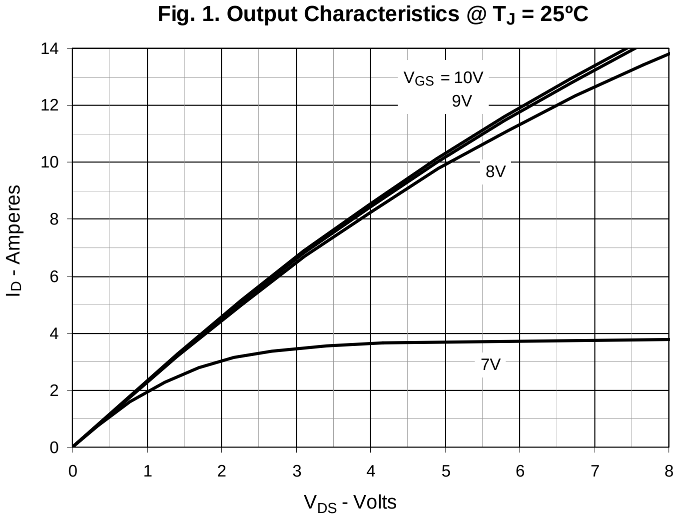


Fig. 1. Output Characteristics @ T_J = 25ºC
V_{GS} = 10V
9V
8V
7V
I_D - Amperes
V_{DS} - Volts
0
2
4
6
8
10
12
14
0
1
2
3
4
5
6
7
8

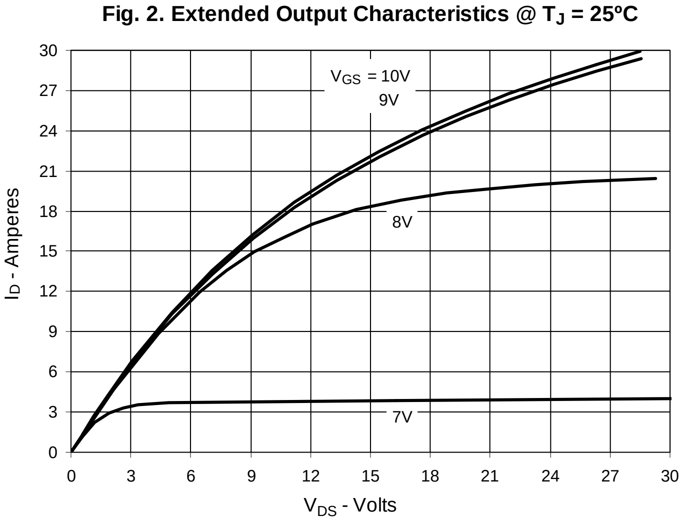


Fig. 2. Extended Output Characteristics @ T_J = 25ºC
V_{GS} = 10V
9V
8V
7V
I_D - Amperes
V_{DS} - Volts
0
3
6
9
12
15
18
21
24
27
30

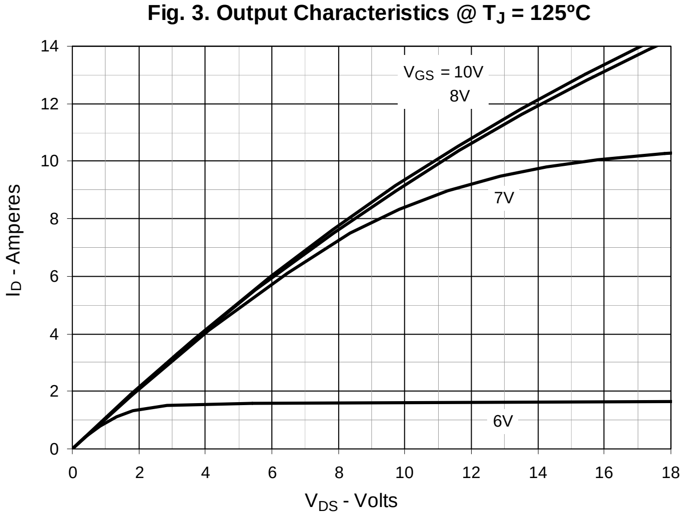


Fig. 3. Output Characteristics @ T_J = 125ºC
V_{GS} = 10V
8V
7V
6V
I_D - Amperes
V_{DS} - Volts
0
2
4
6
8
10
12
14
16
18

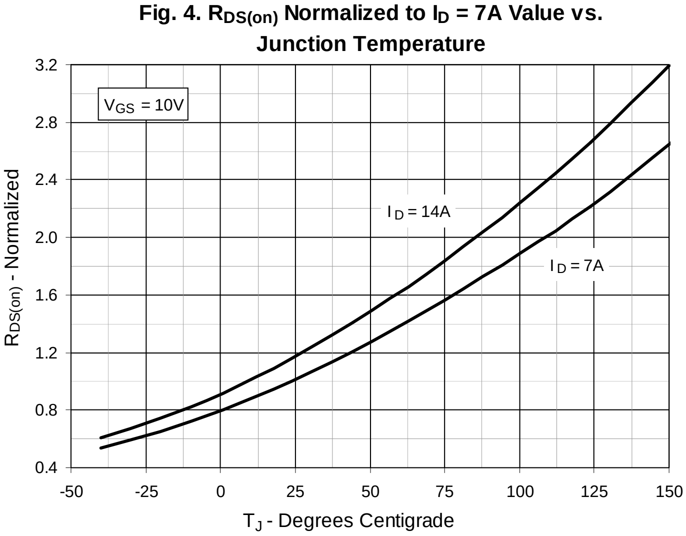


Fig. 4. $R_{DS(on)}$ Normalized to I_D = 7A Value vs. Junction Temperature
V_{GS} = 10V
I_D = 14A
I_D = 7A
$R_{DS(on)}$ - Normalized
T_J - Degrees Centigrade
0.4
0.8
1.2
1.6
2.0
2.4
2.8
3.2
-50
-25
0
25
50
75
100
125
150

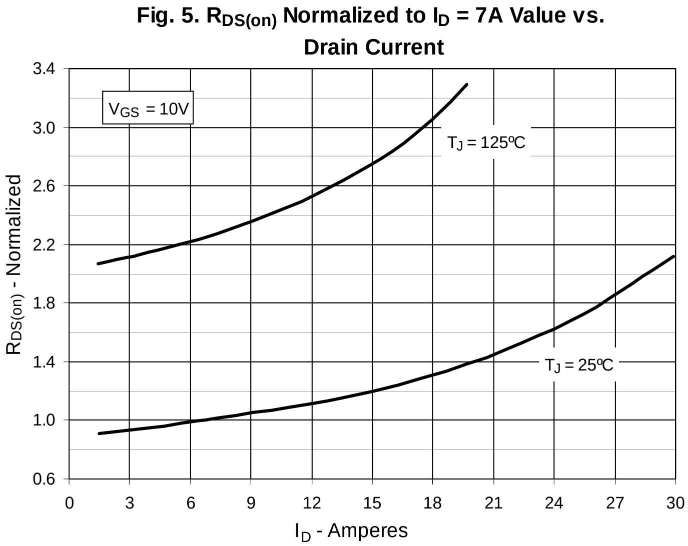


Fig. 5. $R_{DS(on)}$ Normalized to I_D = 7A Value vs. Drain Current
V_{GS} = 10V
T_J = 125ºC
T_J = 25ºC
$R_{DS(on)}$ - Normalized
I_D - Amperes
0.6
1.0
1.4
1.8
2.2
2.6
3.0
3.4
0
3
6
9
12
15
18
21
24
27
30

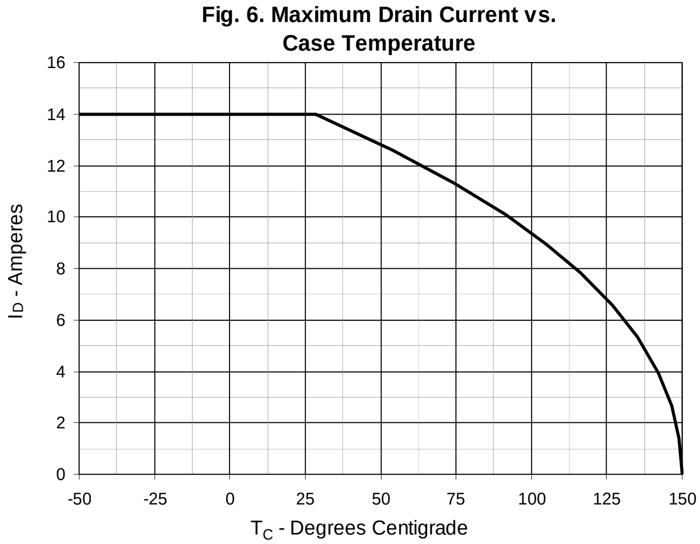


Fig. 6. Maximum Drain Current vs. Case Temperature
I_D - Amperes
T_C - Degrees Centigrade
0
2
4
6
8
10
12
14
16
-50
-25
0
25
50
75
100
125
150

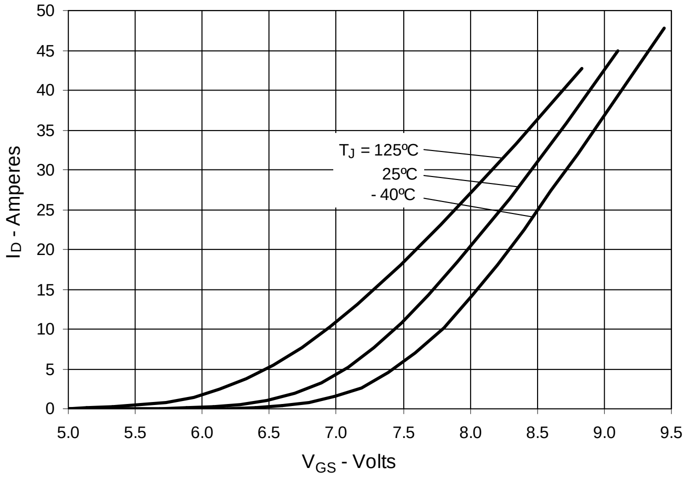


Fig. 7. Input Admittance

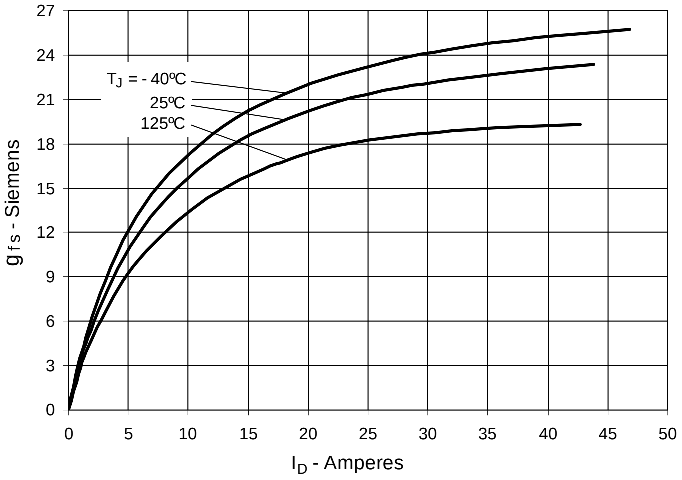


Fig. 8. Transconductance

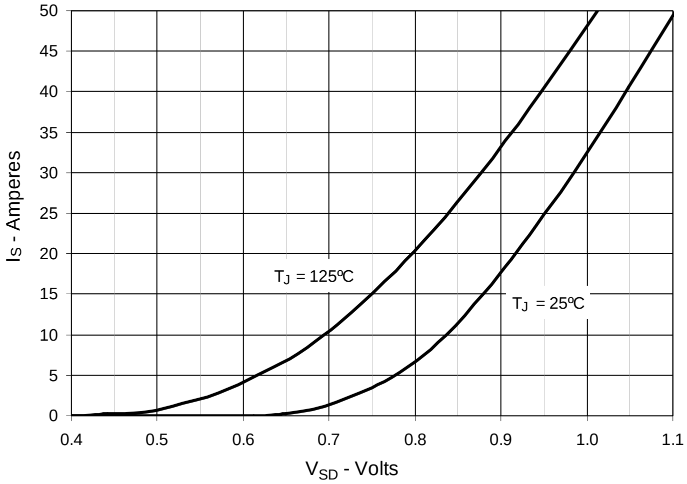


Fig. 9. Forward Voltage Drop of Intrinsic Diode

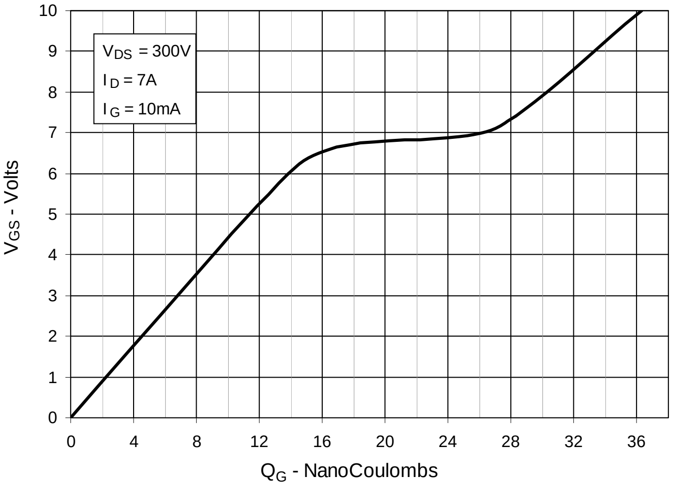


Fig. 10. Gate Charge

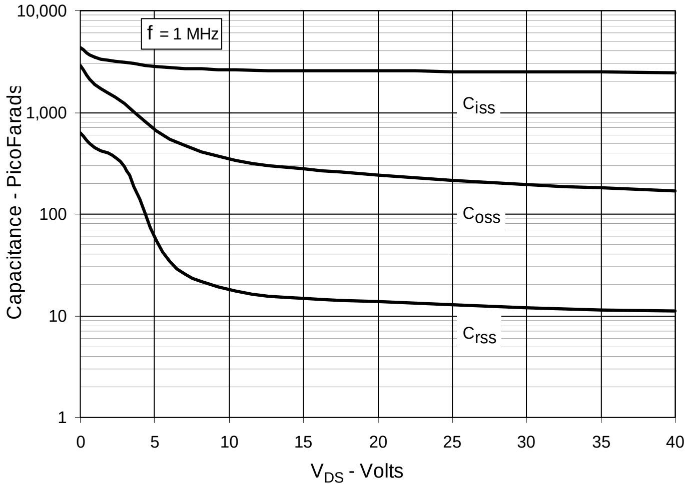


Fig. 11. Capacitance

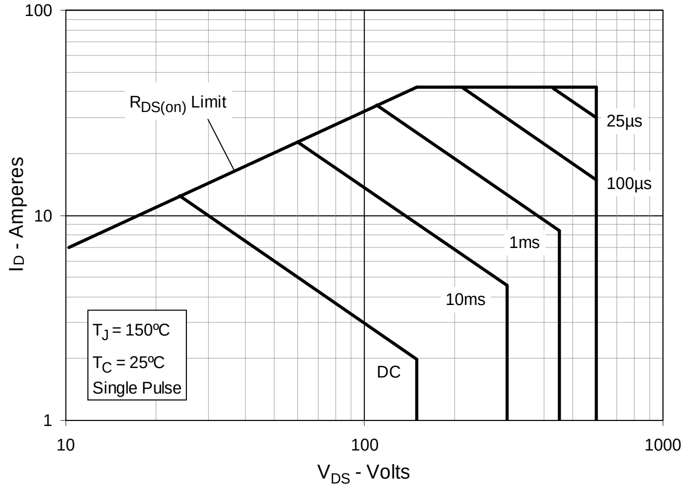
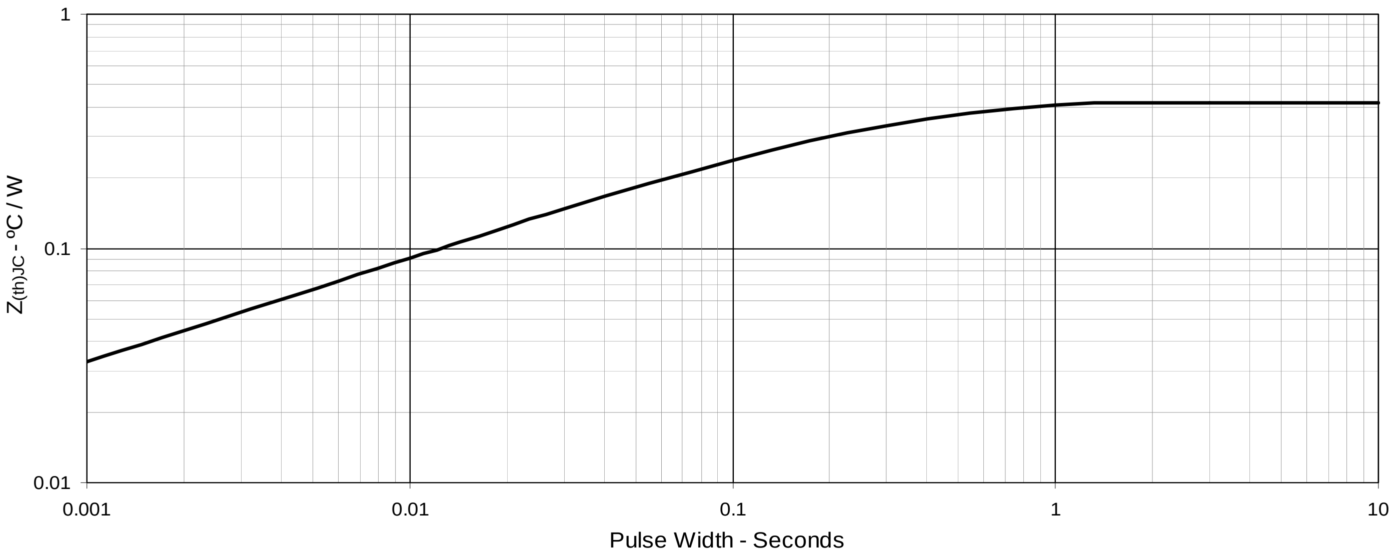


Fig. 12. Forward-Bias Safe Operating Area

Fig. 13. Maximum Transient Thermal Impedance



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