IXYS

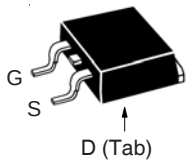
PolarP™ Power MOSFETs

P-Channel Enhancement Mode
Avalanche Rated

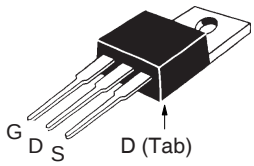
IXTA52P10P
IXTP52P10P
IXTQ52P10P
IXTH52P10P

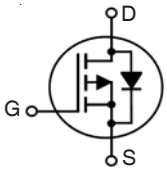
V_{DSS} = - 100V
I_{D25} = - 52A
$R_{DS(on)}$ ≤ 50mΩ

TO-263 AA (IXTA)

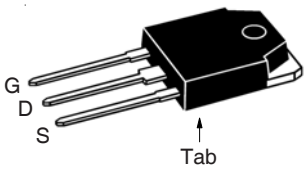


TO-220AB (IXTP)

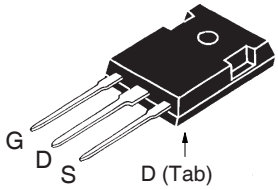




TO-3P (IXTQ)



TO-247 (IXTH)



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

Symbol	Test Conditions	Maximum Ratings	
V_{DSS}	T_J = 25°C to 150°C	-100	V
V_{DGR}	T_J = 25°C to 150°C, R_{GS} = 1MΩ	-100	V
V_{GSS}	Continuous	±20	V
V_{GSM}	Transient	±30	V
I_{D25}	T_C = 25°C	- 52	A
I_{DM}	T_C = 25°C, Pulse Width Limited by T_{JM}	-130	A
I_A	T_C = 25°C	- 52	A
E_{AS}	T_C = 25°C	1.5	J
dv/dt	I_S ≤ I_{DM}, V_{DD} ≤ V_{DSS}, T_J ≤ 150°C	10	V/ns
P_D	T_C = 25°C	300	W
T_J		-55 ... +150	°C
T_{JM}		150	°C
T_{stg}		-55 ... +150	°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,TO-247)	1.13/10	Nm/lb.in.
Weight	TO-263	2.5	g
	TO-220	3.0	g
	TO-3P	5.5	g
	TO-247	6.0	g

Symbol	Test Conditions (T_J = 25°C, Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.	
BV_{DSS}	V_{GS} = 0V, I_D = - 250μA	-100			V
$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = - 250μA	- 2.0		- 4.0	V
I_{GSS}	V_{GS} = ± 20V, V_{DS} = 0V			±100	nA
I_{DSS}	V_{DS} = V_{DSS}, V_{GS} = 0V			-10	μA
	T_J = 125°C			-150	μA
$R_{DS(on)}$	V_{GS} = -10V, I_D = 0.5 • I_{D25}, Note 1			50	mΩ

Features

- International Standard Packages
- Fast Intrinsic Diode
- Dynamic dv/dt Rated
- Avalanche Rated
- Rugged PolarP™ Process
- Low Q_G and $R_{ds(on)}$
- Low Drain-to-Tab Capacitance
- Low Package Inductance

Advantages

- Easy to Mount
- Space Savings
- High Power Density

Applications

- High-Side Switching
- Push-Pull Amplifiers
- DC Choppers
- Current Regulators
- Automatic Test Equipment

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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	20		S
C_{iss}	V_{GS} = 0V, V_{DS} = - 25V, f = 1MHz		2845		pF
C_{oss}			1015		pF
C_{rss}			275		pF
$t_{d(on)}$	**Resistive Switching Times** V_{GS} = -10V, V_{DS} = 0.5 • V_{DSS}, I_D = 0.5 • I_{D25} R_G = 3.3Ω (External)		22		ns
t_r			29		ns
$t_{d(off)}$			38		ns
t_f			22		ns
$Q_{g(on)}$	V_{GS} = -10V, V_{DS} = 0.5 • V_{DSS}, I_D = 0.5 • I_{D25}		60		nC
Q_{gs}			17		nC
Q_{gd}			23		nC
R_{thJC}				0.42	°C/W
R_{thCS}	(TO-3P)(TO-247)		0.21		°C/W
	(TO-220)		0.50		°C/W

Source-Drain Diode

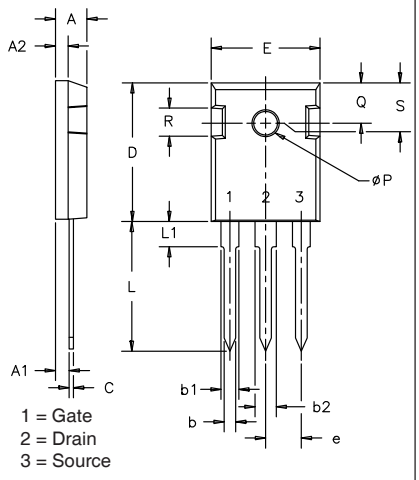
Symbol	Test Conditions (T_J = 25°C, Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.	
I_S	V_{GS} = 0V			- 52	A
I_{SM}	Repetitive, Pulse Width Limited by T_{JM}			- 200	A
V_{SD}	I_F = - 26A, V_{GS} = 0V, Note 1			- 3.5	V
t_{rr}	I_F = - 26A, -di/dt = -100A/µs V_R = - 50V, V_{GS} = 0V		120		ns
Q_{RM}			0.53		µC
I_{RM}			- 8.9		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 4,931,844 5,049,961 5,237,481 6,162,665 6,404,065 B1 6,683,344 6,727,585 7,005,734 B2 7,157,338B2 4,860,072 5,017,508 5,063,307 5,381,025 6,259,123 B1 6,534,343 6,710,405 B2 6,759,692 7,063,975 B2 4,881,106 5,034,796 5,187,117 5,486,715 6,306,728 B1 6,583,505 6,710,463 6,771,478 B2 7,071,537

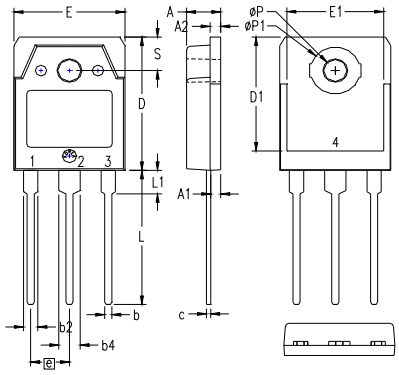
TO-247 Outline



1 = Gate
2 = Drain
3 = Source

SYM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.185	.209	4.7	5.3
A_1	.087	.102	2.2	2.54
A_2	.059	.098	2.2	2.6
b	.040	.055	1.0	1.4
b_1	.065	.084	1.65	2.13
b_2	.113	.123	2.87	3.12
C	.016	.031	.4	.8
D	.819	.845	20.80	21.46
E	.610	.640	15.75	16.26
e	.215 BSC		5.45 BSC	
L	.780	.800	19.81	20.32
L1		.177		4.50
øP	.140	.144	3.55	3.65
Q	.212	.244	5.4	6.2
R	.170	.216	4.32	5.49
S	.242 BSC		6.15 BSC	

TO-3P Outline

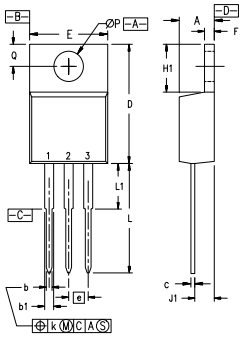


Pins: 1 - Gate 2,4 - Drain
3 - Source

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	.791	19.80	20.10
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

All metal area are tin plated.

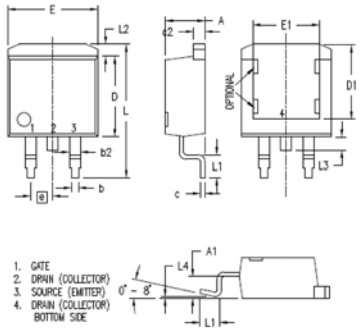
TO-220 Outline



Pins: 1 - Gate 2 - Drain
3 - Source

SYM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	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

TO-263 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

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Fig. 1. Output Characteristics @ T_J = 25ºC

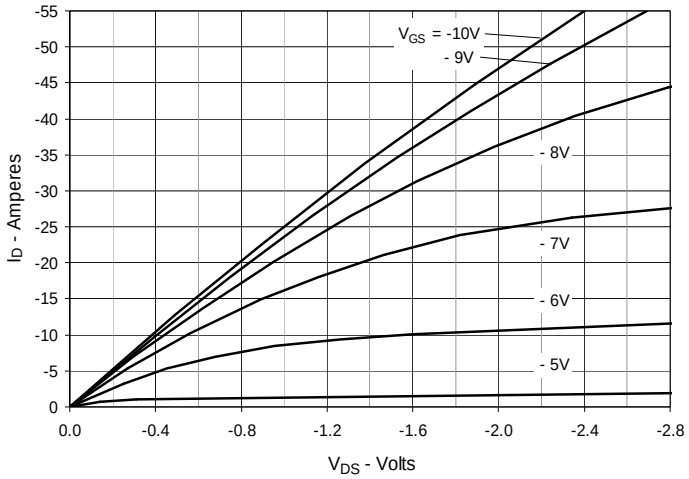

Fig. 2. Extended Output Characteristics @ T_J = 25ºC

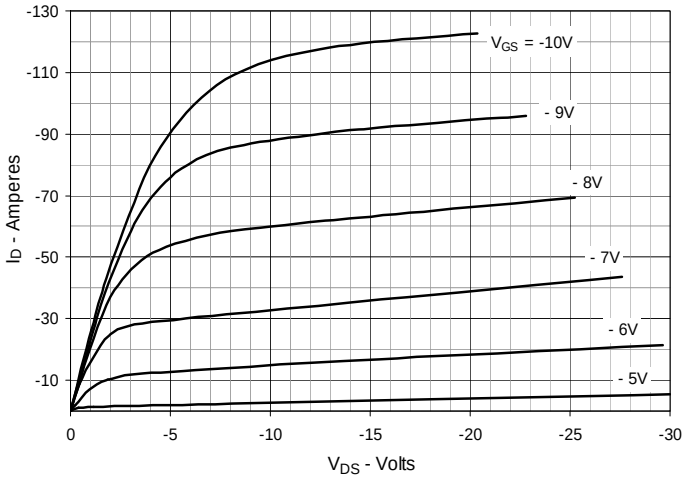

Fig. 3. Output Characteristics @ T_J = 125ºC

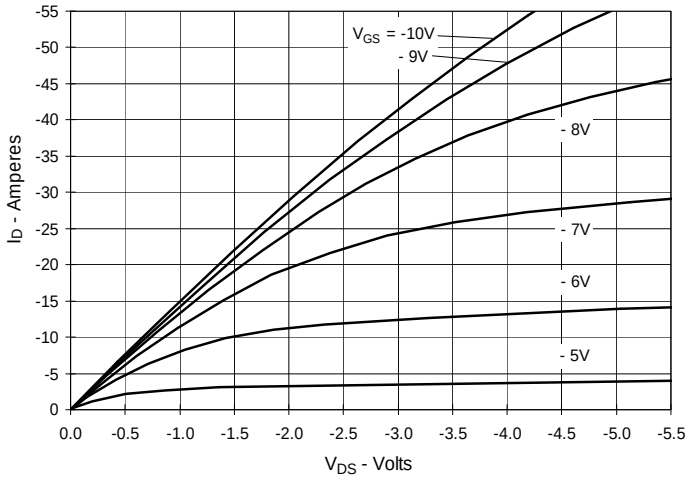

Fig. 4. $R_{DS(on)}$ Normalized to I_D = - 26A Value vs. Junction Temperature

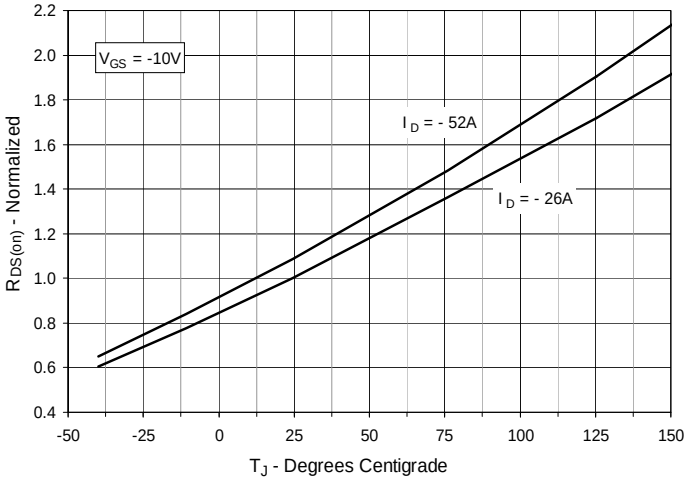

Fig. 5. $R_{DS(on)}$ Normalized to I_D = - 26A Value vs. Drain Current

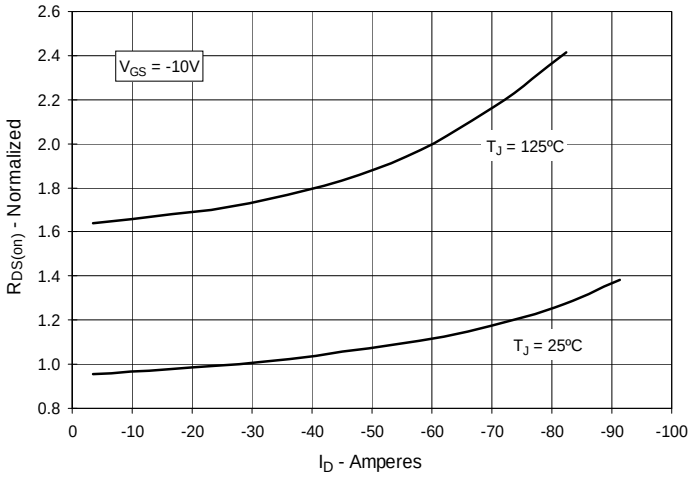

Fig. 6. Maximum Drain Current vs. Case Temperature

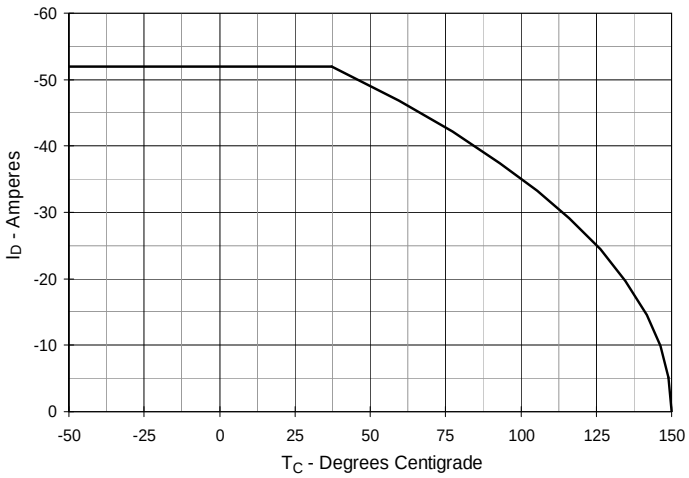

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Fig. 7. Input Admittance

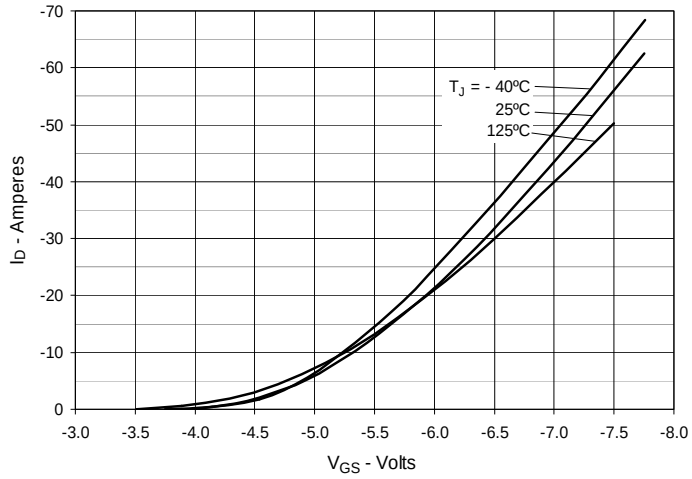

Fig. 8. Transconductance

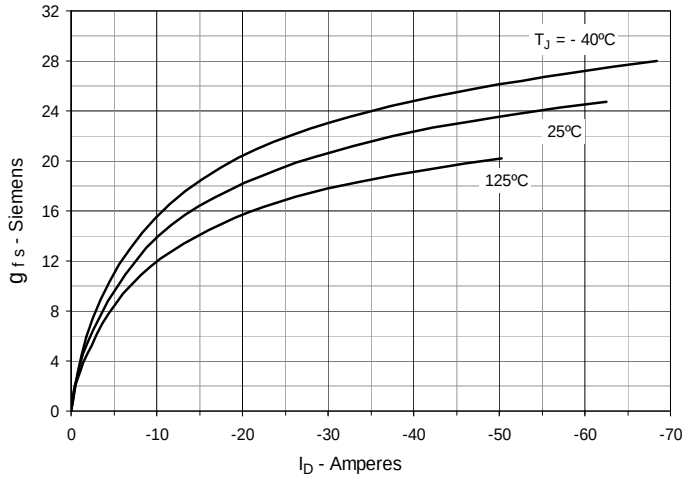

Fig. 9. Forward Voltage Drop of Intrinsic Diode

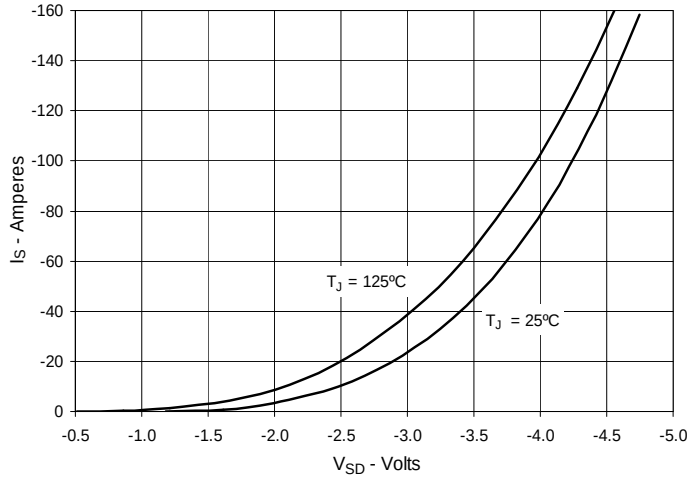

Fig. 10. Gate Charge

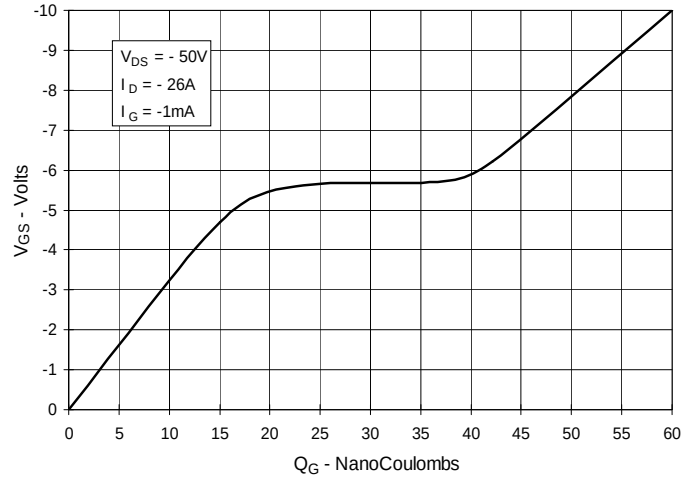

Fig. 11. Capacitance

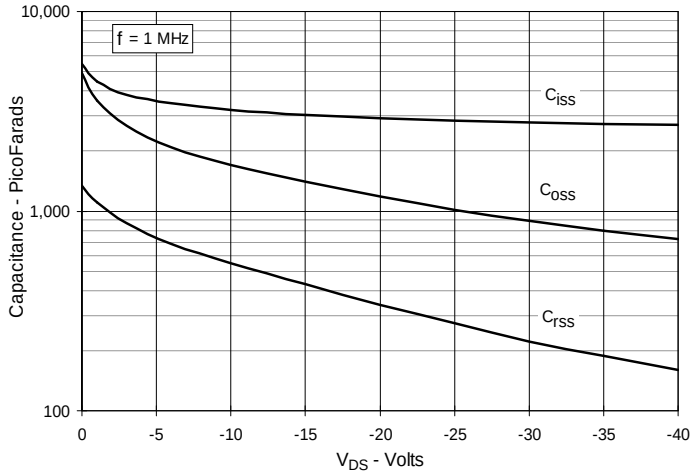

Fig. 12. Forward-Bias Safe Operating Area

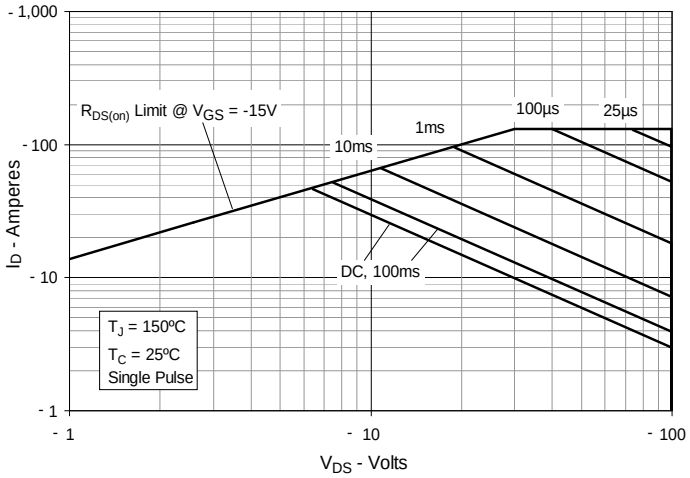

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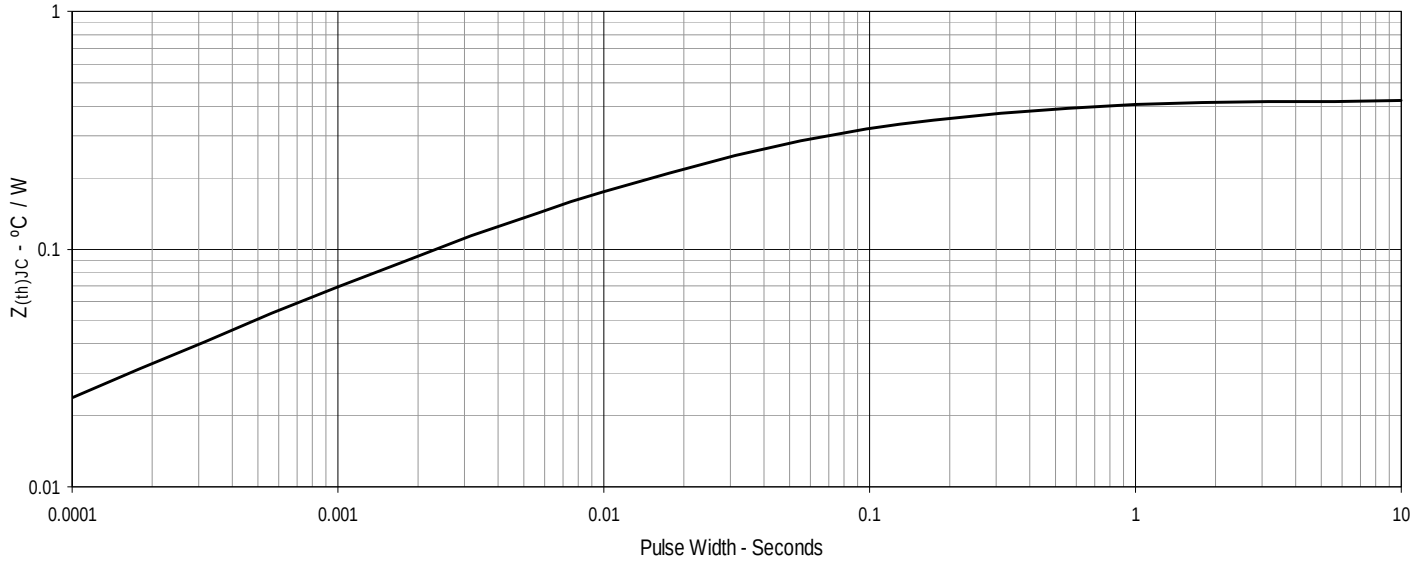
Fig. 13. Maximum Transient Thermal Impedance



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