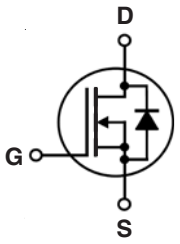
IXYS

Depletion Mode MOSFET

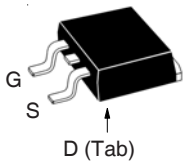
IXTA3N50D2
IXTP3N50D2

V_{DSX} = 500V
$I_{D(on)}$ ≥ 3A
$R_{DS(on)}$ ≤ 1.5Ω

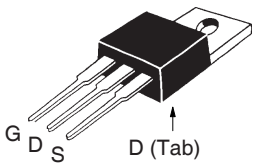
N-Channel



TO-263 AA (IXTA)



TO-220AB (IXTP)



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

Symbol	Test Conditions	Maximum Ratings	
V_{DSX}	T_J = 25°C to 150°C	500	V
V_{GSX}	Continuous	±20	V
V_{GSM}	Transient	±30	V
P_D	T_C = 25°C	125	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}	1.6 mm (0.062in.) from Case for 10s	260	°C
M_d	Mounting Torque (TO-220)	1.13 / 10	Nm/lb.in
Weight	TO-263	2.5	g
	TO-220	3.0	g

Symbol	Test Conditions (T_J = 25°C, Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.	
BV_{DSX}	V_{GS} = - 5V, I_D = 250μA	500			V
$V_{GS(off)}$	V_{DS} = 25V, I_D = 250μA	- 2.0		- 4.5	V
I_{GSX}	V_{GS} = ±20V, V_{DS} = 0V			±100	nA
$I_{DSX(off)}$	V_{DS} = V_{DSX}, V_{GS} = - 5V			5	μA
	T_J = 125°C			50	μA
$R_{DS(on)}$	V_{GS} = 0V, I_D = 1.5A, Note 1			1.5	Ω
$I_{D(on)}$	V_{GS} = 0V, V_{DS} = 25V, Note 1	3			A

Features

- Normally ON Mode
- International Standard Packages
- Molding Epoxies Meet UL 94 V-0 Flammability Classification

Advantages

- Easy to Mount
- Space Savings
- High Power Density

Applications

- Audio Amplifiers
- Start-up Circuits
- Protection Circuits
- Ramp Generators
- Current Regulators
- Active Loads

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Symbol	Test Conditions (T_J = 25°C, Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.
g_{fs}	V_{DS} = 30V, I_D = 1.5A, Note 1	1.3	2.1	S
C_{iss}	V_{GS} = -10V, V_{DS} = 25V, f = 1MHz		1070	pF
C_{oss}			102	pF
C_{rss}			24	pF
$t_{d(on)}$	**Resistive Switching Times**		27	ns
t_r	V_{GS} = ± 5V, V_{DS} = 250V, I_D = 1.5A		71	ns
$t_{d(off)}$	R_G = 3.3Ω (External)		56	ns
t_f			42	ns
$Q_{g(on)}$	V_{GS} = 5V, V_{DS} = 250V, I_D = 1.5A		40	nC
Q_{gs}			5	nC
Q_{gd}			20	nC
R_{thJC}				1.00 °C/W
R_{thCS}	TO-220		0.50	°C/W

Safe-Operating-Area Specification

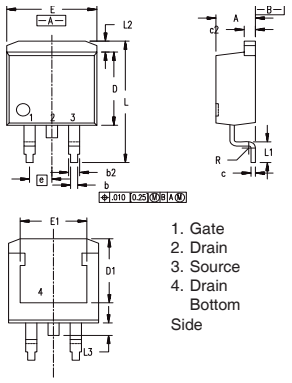
Symbol	Test Conditions	Characteristic Values Min.	Typ.	Max.
SOA	V_{DS} = 400V, I_D = 0.19A, T_C = 75°C, Tp = 5s	75		W

Source-Drain Diode

Symbol	Test Conditions (T_J = 25°C, Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.
V_{SD}	I_F = 3A, V_{GS} = -10V, Note 1		0.8	1.3 V
t_{rr}	I_F = 3A, -di/dt = 100A/μs		340	ns
I_{RM}	V_R = 100V, V_{GS} = -10V		10.9	A
Q_{RM}			1.86	μC

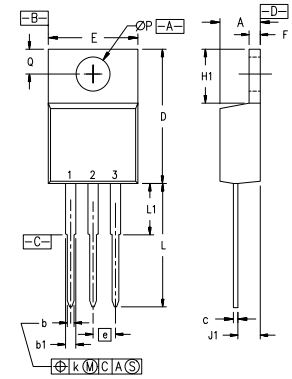
Note 1. Pulse test, t ≤ 300μs, duty cycle, d ≤ 2%.

TO-263 (IXTA) Outline



Dim.	Millimeter Min.	Max.	Inches Min.	Max.
A	4.06	4.83	.160	.190
b	0.51	0.99	.020	.039
b2	1.14	1.40	.045	.055
c	0.40	0.74	.016	.029
c2	1.14	1.40	.045	.055
D	8.64	9.65	.340	.380
D1	8.00	8.89	.280	.320
E	9.65	10.41	.380	.405
E1	6.22	8.13	.270	.320
e	2.54	BSC	.100	BSC
L	14.61	15.88	.575	.625
L1	2.29	2.79	.090	.110
L2	1.02	1.40	.040	.055
L3	1.27	1.78	.050	.070
L4	0	0.13	0	.005

TO-220 (IXTP) Outline



SYM	INCHES MIN	MAX	MILLIMETERS 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

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IXYS MOSFETs and IGBTs are covered by one or more of the following U.S. patents: 4,835,592 4,850,072 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

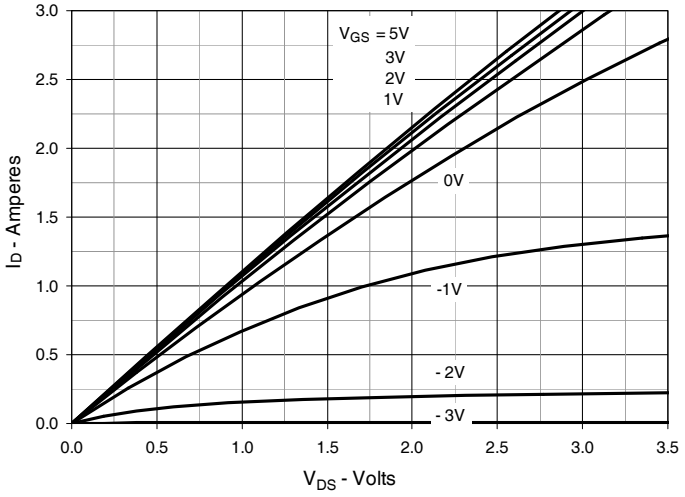


Fig. 2. Extended Output Characteristics @ T_J = 25°C

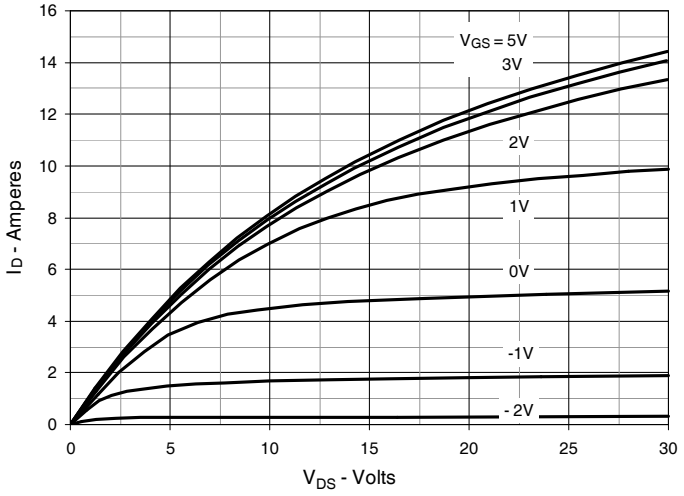


Fig. 3. Output Characteristics @ T_J = 125°C

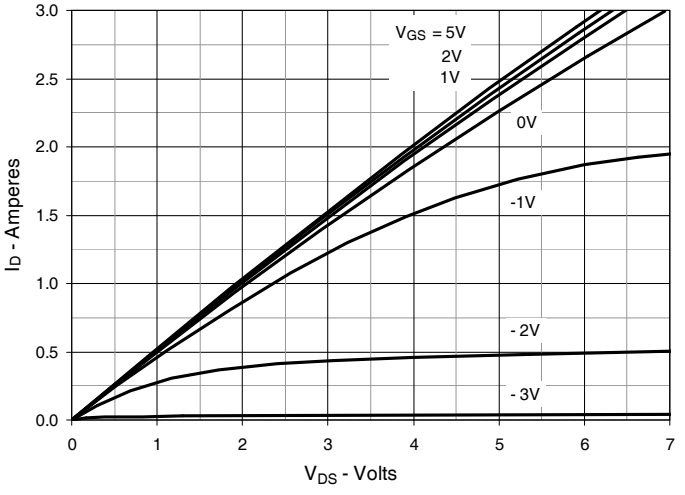


Fig. 4. Drain Current @ T_J = 25°C

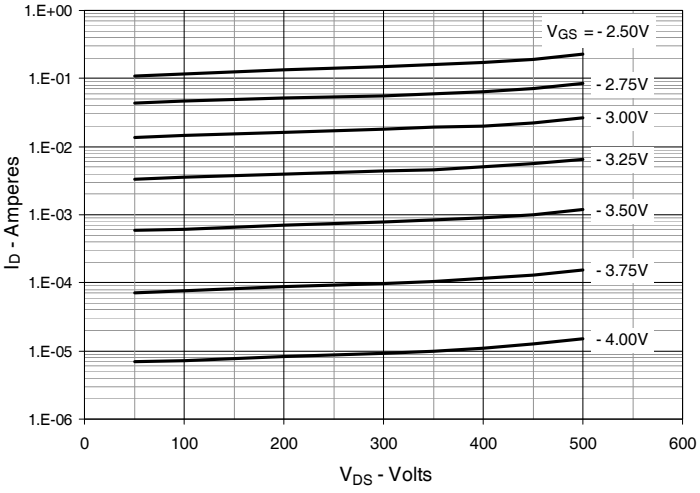


Fig. 5. Drain Current @ T_J = 100°C

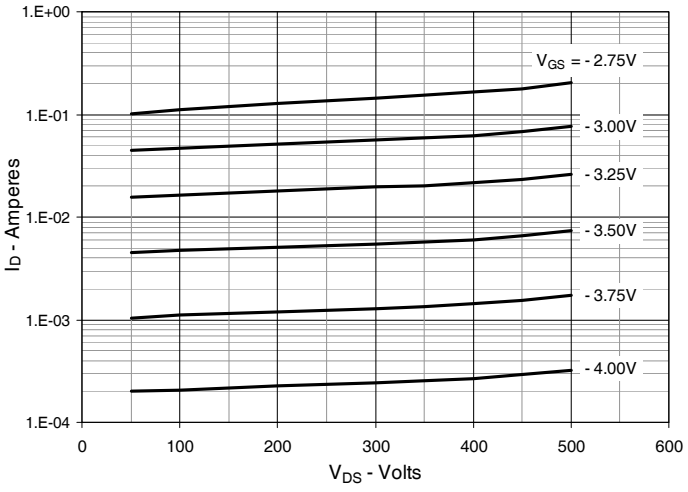
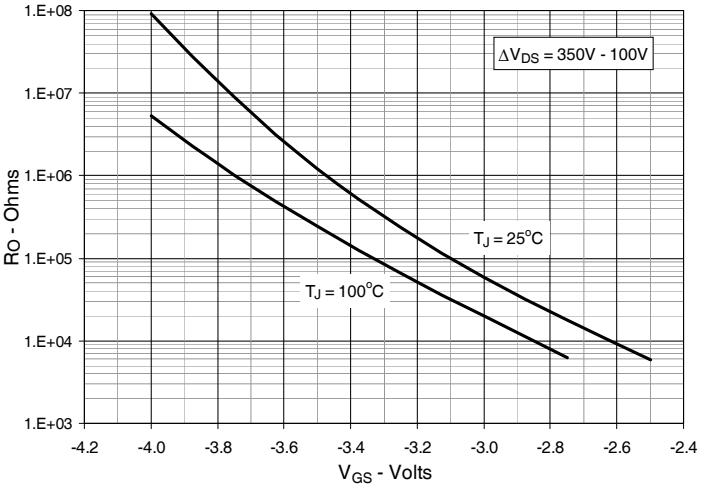


Fig. 6. Dynamic Resistance vs. Gate Voltage



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Fig. 7. Normalized $R_{DS(on)}$ vs. Junction Temperature

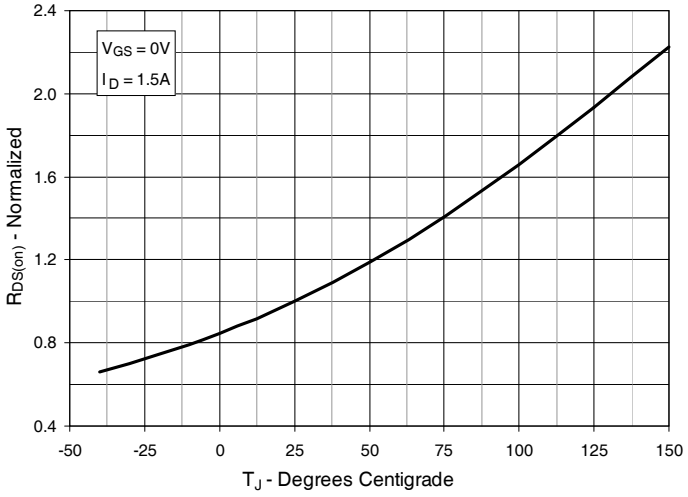


Fig. 8. $R_{DS(on)}$ Normalized to I_D = 1.5A Value vs. Drain Current

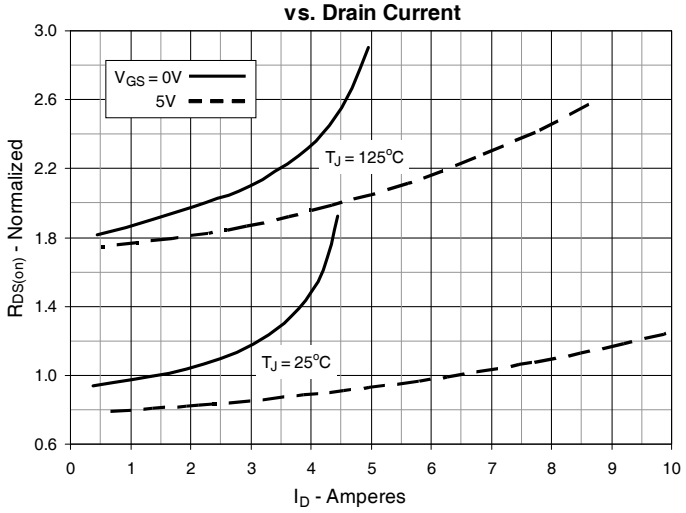


Fig. 9. Input Admittance

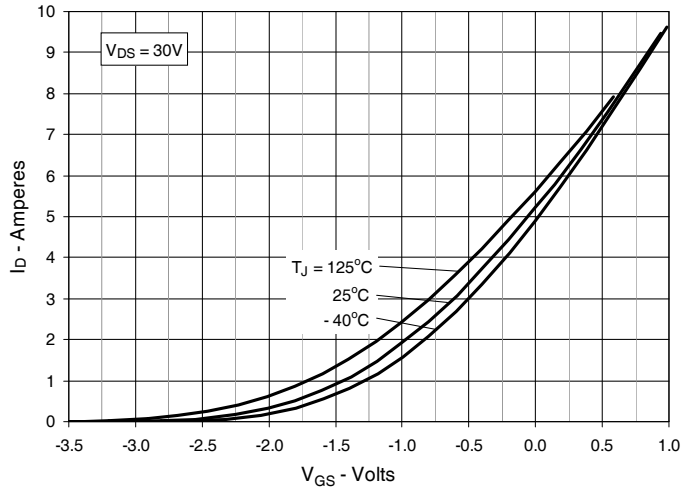


Fig. 10. Transconductance

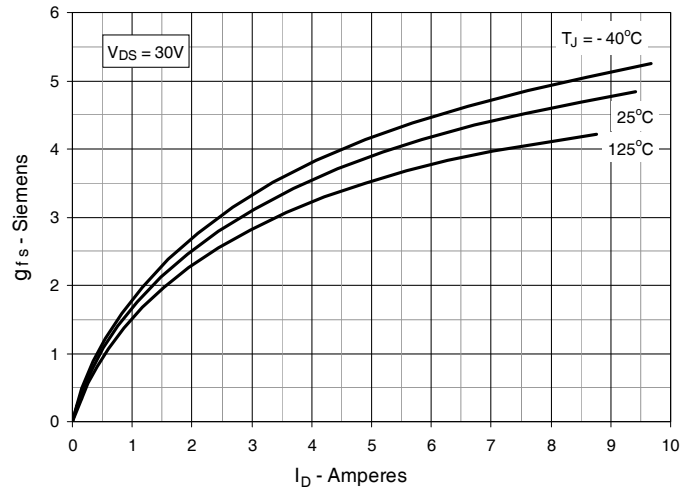


Fig. 11. Breakdown and Threshold Voltages vs. Junction Temperature

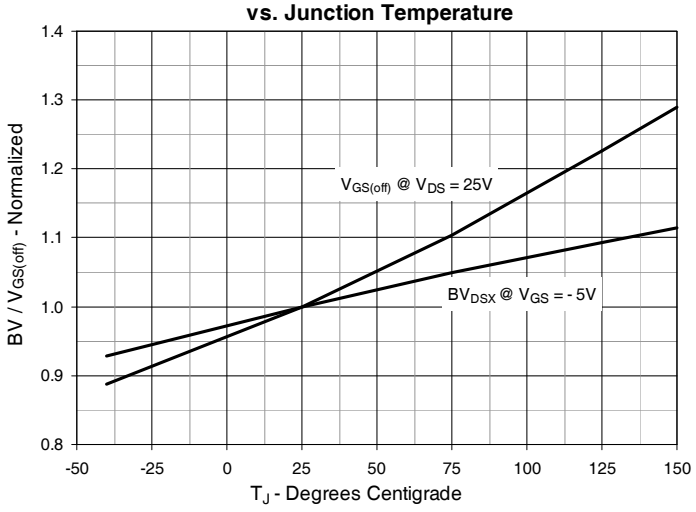
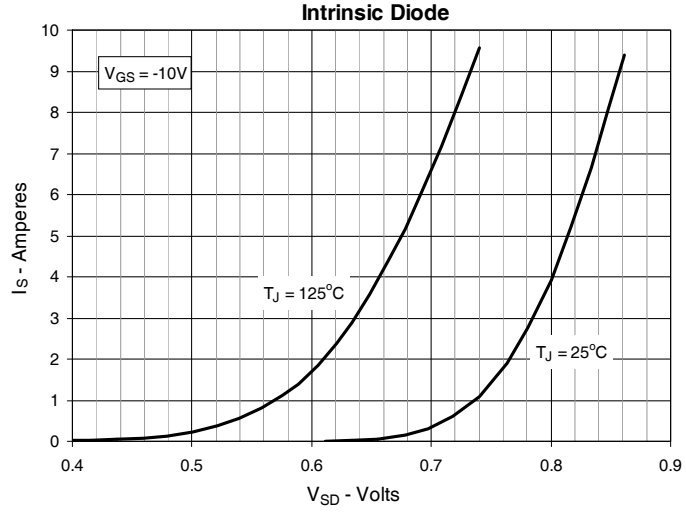


Fig. 12. Forward Voltage Drop of Intrinsic Diode



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Fig. 13. Capacitance

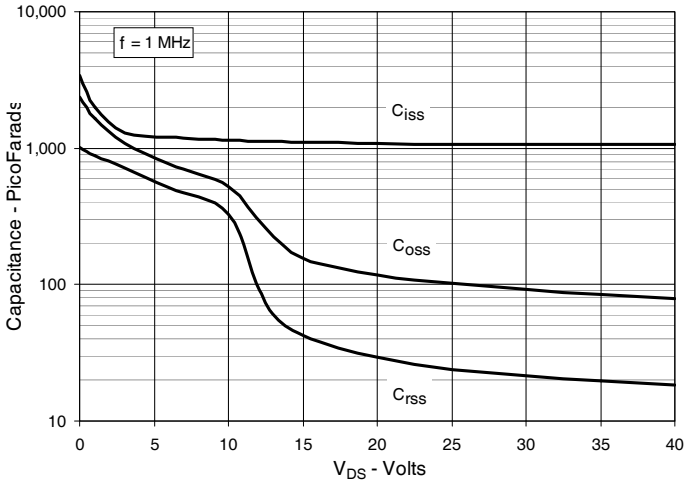


Fig. 14. Gate Charge

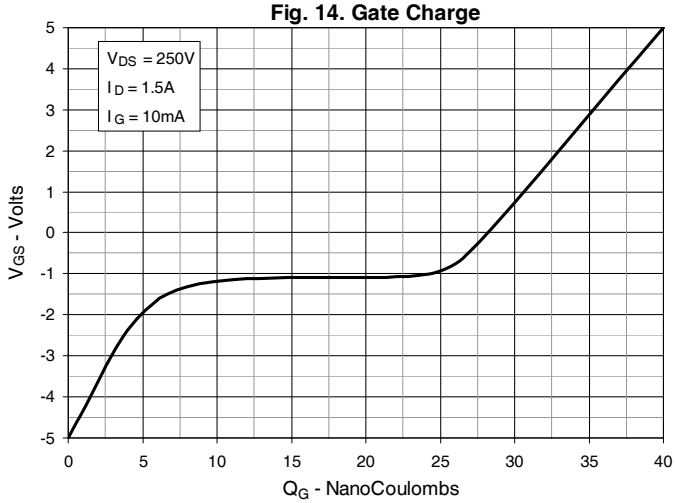


Fig. 15. Forward-Bias Safe Operating Area @ T_C = 25°C

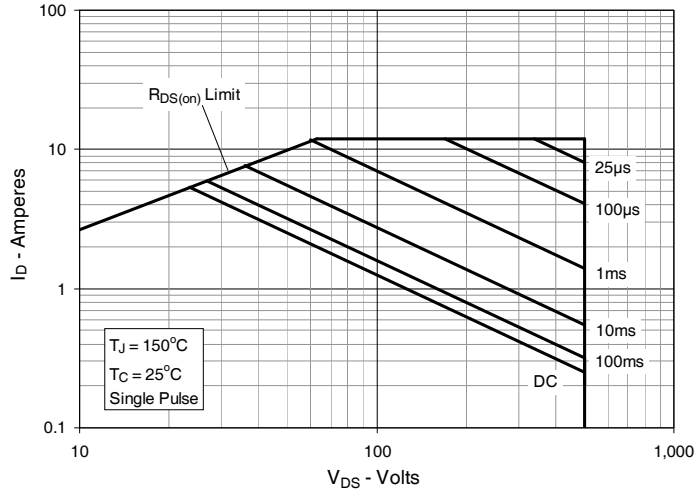


Fig. 16. Forward-Bias Safe Operating Area @ T_C = 75°C

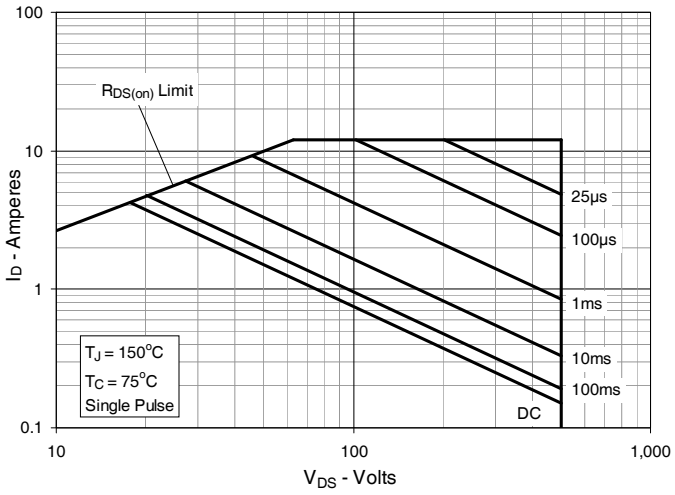
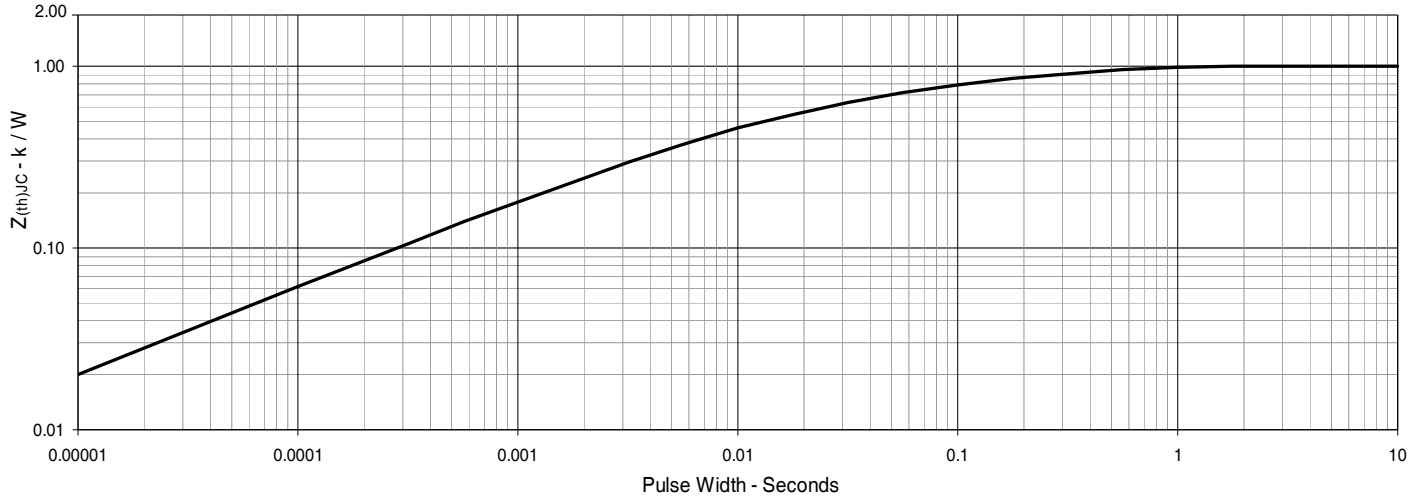


Fig. 17. Maximum Transient Thermal Impedance



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