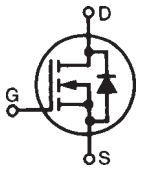
IXYS

Polar™ Power MOSFETs

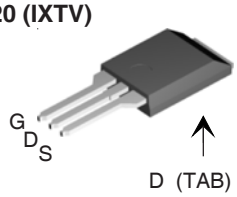
N-Channel Enhancement Mode
Avalanche Rated
Fast Intrinsic Diode

IXTV22N50P
IXTV22N50PS
IXTQ22N50P
IXTH22N50P

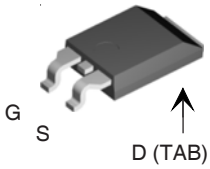


V_{DSS} = 500V
I_{D25} = 22A
$R_{DS(on)}$ ≤ 270mΩ
$t_{rr(typ)}$ = 400ns

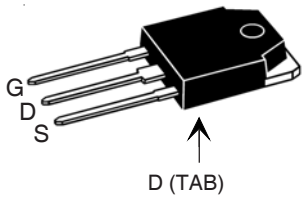
PLUS220 (IXTV)



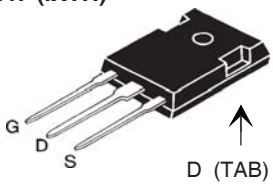
PLUS220SMD (IXTV_S)



TO-3P (IXTQ)



TO-247 (IXTH)



Symbol	Test Conditions	Maximum Ratings	
V_{DSS}	T_J = 25°C to 150°C	500	V
V_{DGR}	T_J = 25°C to 150°C, R_{GS} = 1MΩ	500	V
V_{GSS}	Continuous	± 30	V
V_{GSM}	Transient	± 40	V
I_{D25}	T_C = 25°C	22	A
I_{DM}	T_C = 25°C, Pulse Width Limited by T_{JM}	50	A
I_A	T_C = 25°C	22	A
E_{AS}	T_C = 25°C	750	mJ
dV/dt	$I_S \le I_{DM}$, $V_{DD} \le V_{DSS}$, $T_J \le 150°C$	10	V/ns
P_D	T_C = 25°C	350	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-247 & TO-3P)	1.13/10	Nm/lb.in.
F_C	Mounting Force (PLUS220)	11..65/2.5..14.6	N/lb.
Weight	PLUS220 types	4.0	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	500			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			50	μA
$R_{DS(on)}$	V_{GS} = 10V, $I_D = 0.5 \bullet I_{D25}$, Note 1			270	mΩ

G = Gate D = Drain
S = Source TAB = Drain

Features

- International Standard Packages
- Avalanche Rated
- Fast Intrinsic Diode
- Low Package Inductance

Advantages

- High Power Density
- Easy to Mount
- Space Savings

Applications

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

© 2009 IXYS CORPORATION, All Rights Reserved

Symbol	Test Conditions (T_J = 25°C Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.	
g_{fs}	V_{DS} = 20V, I_D = 0.5 • I_{D25}, Note 1	12	20		S
C_{iss}	V_{GS} = 0V, V_{DS} = 25V, f = 1MHz		2880		pF
C_{oss}			310		pF
C_{rss}			29		pF
$t_{d(on)}$	**Resistive Switching Times**		22		ns
t_r	V_{GS} = 10V, V_{DS} = 0.5 • V_{DSS}, I_D = 0.5 • I_{D25}		25		ns
$t_{d(off)}$	R_G = 10Ω (External)		72		ns
t_f			21		ns
$Q_{g(on)}$	V_{GS} = 10V, V_{DS} = 0.5 • V_{DSS}, I_D = 0.5 • I_{D25}		50		nC
Q_{gs}			16		nC
Q_{gd}			18		nC
R_{thJC}				0.35	°C/W
R_{thCS}	(TO-247, PLUS220 & TO-3P)		0.25		°C/W

Source-Drain Diode

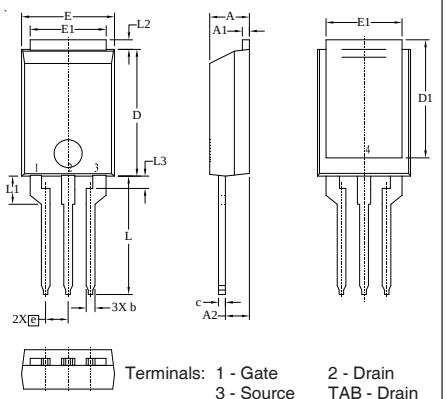
Symbol	Test Conditions (T_J = 25°C Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.	
I_S	V_{GS} = 0V			22	A
I_{SM}	Repetitive, Pulse Width Limited by T_{JM}			88	A
V_{SD}	I_F = I_S, V_{GS} = 0V, Note 1			1.5	V
t_{rr}	I_F = 22A, -di/dt = 100A/μs V_R = 100V, V_{GS} = 0V		400		ns

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 4,850,072 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

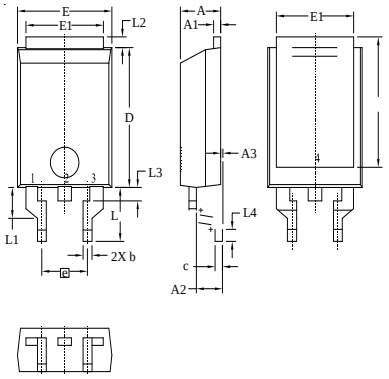
PLUS220 (IXTV) Outline



Terminals: 1 - Gate 2 - Drain
3 - Source TAB - Drain

SYM	INCHES		MILLIMETER	
	MIN	MAX	MIN	MAX
A	.169	.185	4.30	4.70
A1	.028	.035	0.70	0.90
A2	.098	.118	2.50	3.00
b	.035	.047	0.90	1.20
c	.028	.035	0.70	0.90
D	.551	.591	14.00	15.00
D1	.512	.539	13.00	13.70
E	.394	.433	10.00	11.00
E1	.331	.346	8.40	8.80
e	.100 BSC		2.54 BSC	
L	.512	.551	13.00	14.00
L1	.118	.138	3.00	3.50
L2	.035	.051	0.90	1.30
L3	.047	.059	1.20	1.50

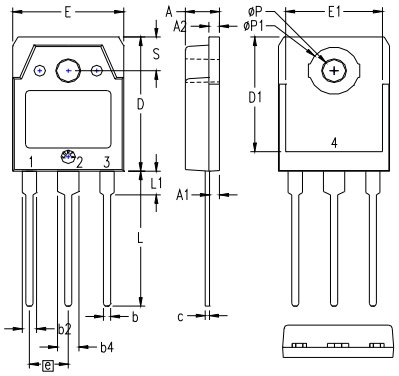
PLUS220SMD (IXTV_S) Outline



Terminals: 1 - Gate 2 - Drain
3 - Source TAB - Drain

SYM	INCHES		MILLIMETER	
	MIN	MAX	MIN	MAX
A	.169	.185	4.30	4.70
A1	.028	.035	0.70	0.90
A2	.098	.118	2.50	3.00
A3	.000	.010	0.00	0.25
b	.035	.047	0.90	1.20
c	.028	.035	0.70	0.90
D	.551	.591	14.00	15.00
D1	.512	.539	13.00	13.70
E	.394	.433	10.00	11.00
E1	.331	.346	8.40	8.80
e	.200BSC		5.08 BSC	
L	.209	.228	5.30	5.80
L1	.118	.138	3.00	3.50
L2	.035	.051	0.90	1.30
L3	.047	.059	1.20	1.50
L4	.039	.059	1.00	1.50

TO-3P (IXTQ) Outline

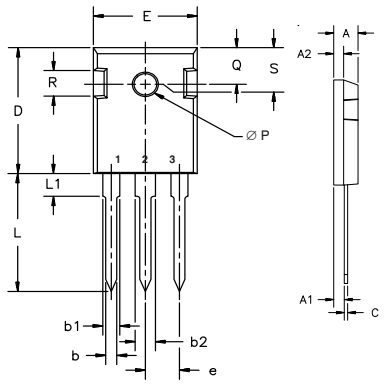


Pins: 1 - Gate 2 - Drain
3 - Source 4, TAB - Drain

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-247 (IXTH) Outline



Terminals: 1 - Gate 2 - Drain

Dim.	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	4.7	5.3	.185	.209
A_1	2.2	2.54	.087	.102
A_2	2.2	2.6	.059	.098
b	1.0	1.4	.040	.055
b_1	1.65	2.13	.065	.084
b_2	2.87	3.12	.113	.123
C	.4	.8	.016	.031
D	20.80	21.46	.819	.845
E	15.75	16.26	.610	.640
e	5.20	5.72	0.205	0.225
L	19.81	20.32	.780	.800
L1		4.50		.177
ØP	3.55	3.65	.140	.144
Q	5.89	6.40	0.232	0.252
R	4.32	5.49	.170	.216

© 2009 IXYS CORPORATION, All Rights Reserved

Fig. 1. Output Characteristics @ 25ºC

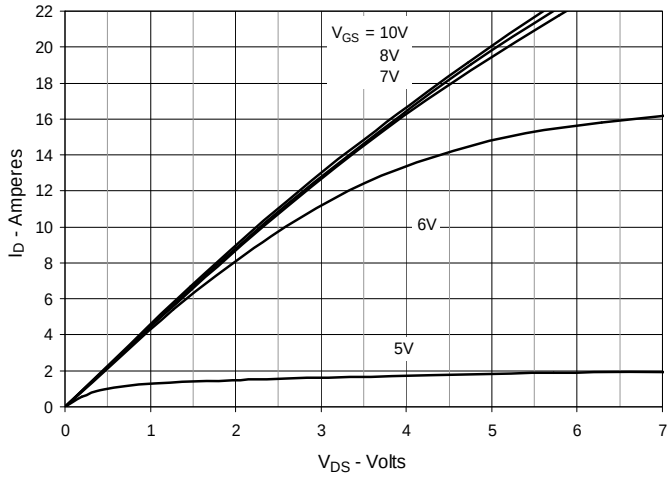


Fig. 2. Extended Output Characteristics @ 25ºC

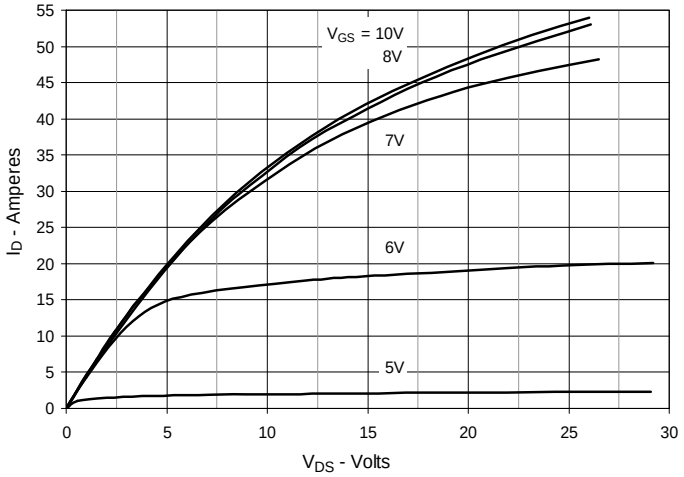


Fig. 3. Output Characteristics @ 125ºC

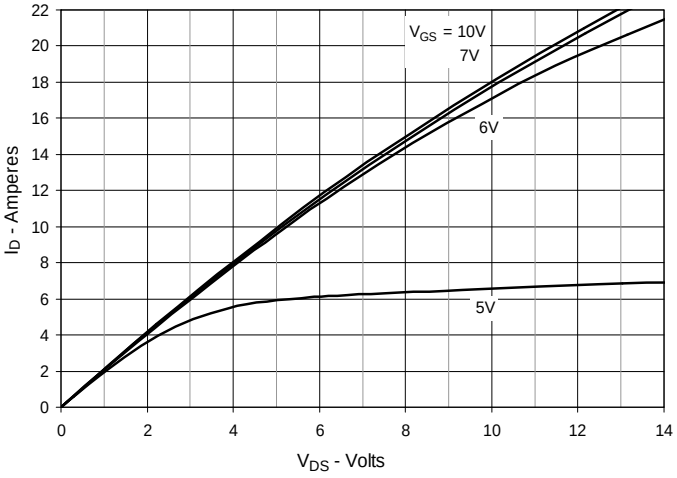


Fig. 4. $R_{DS(on)}$ Normalized to I_D = 11A Value vs. Junction Temperature

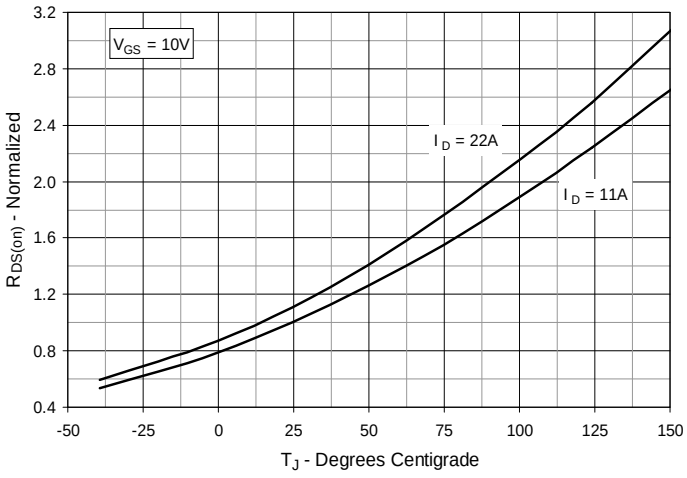


Fig. 5. $R_{DS(on)}$ Normalized to I_D = 11A Value vs. Drain Current

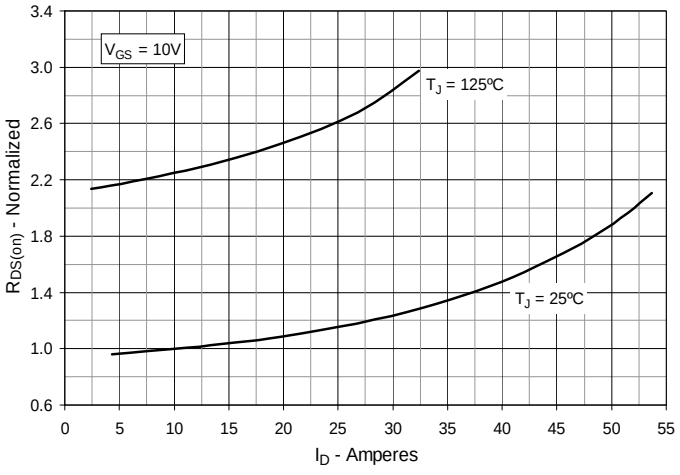
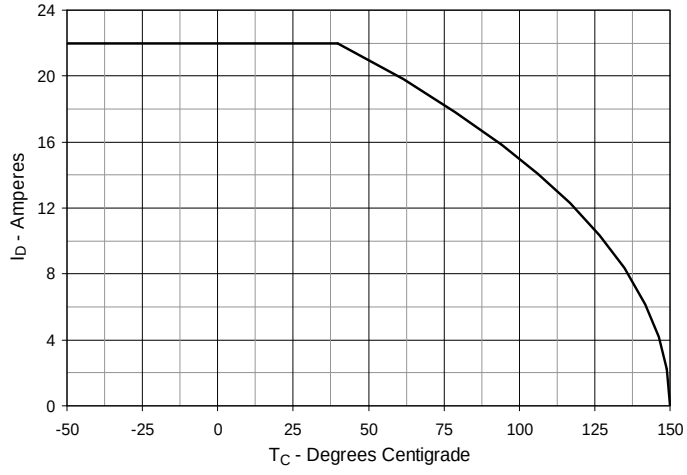


Fig. 6. Maximum Drain Current vs. Case Temperature



IXYS Reserves the Right to Change Limits, Test Conditions, and Dimensions.

Fig. 7. Input Admittance

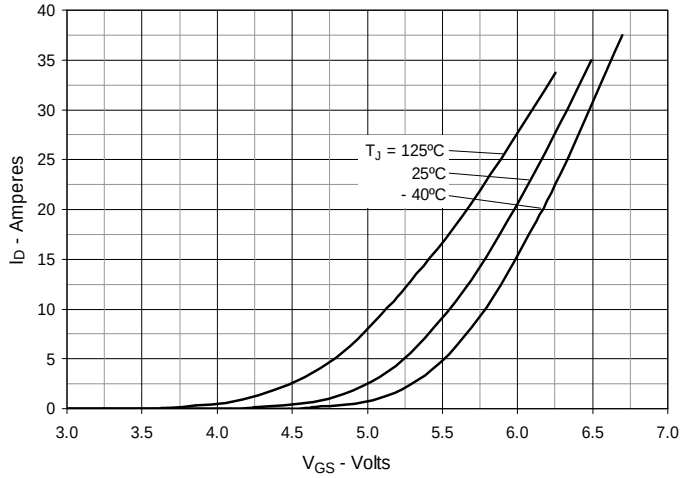


Fig. 8. Transconductance

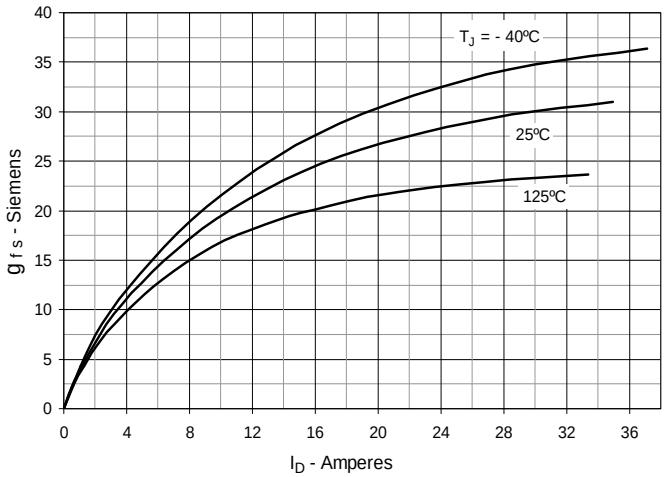


Fig. 9. Forward Voltage Drop of Intrinsic Diode

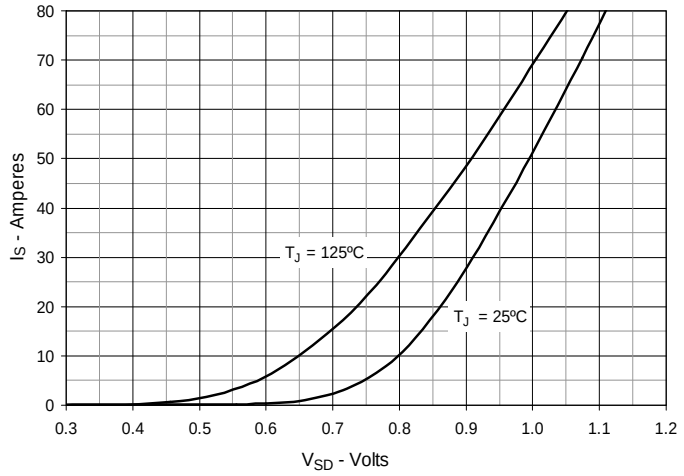


Fig. 10. Gate Charge

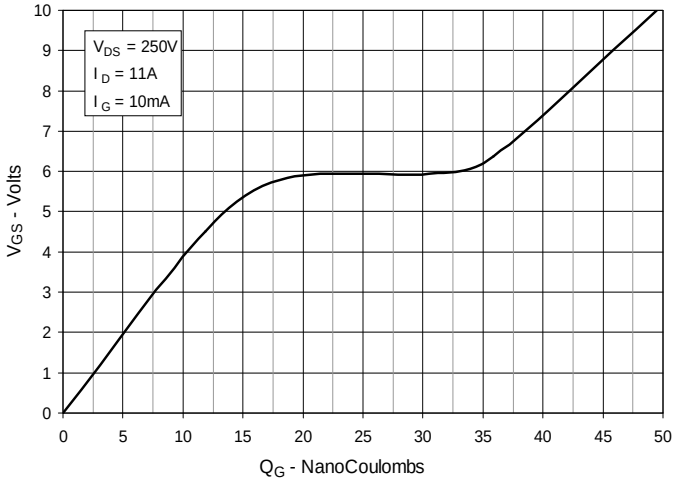


Fig. 11. Capacitance

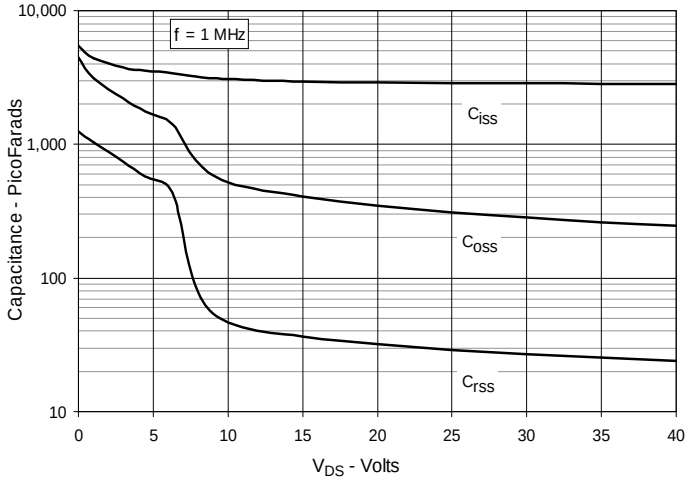
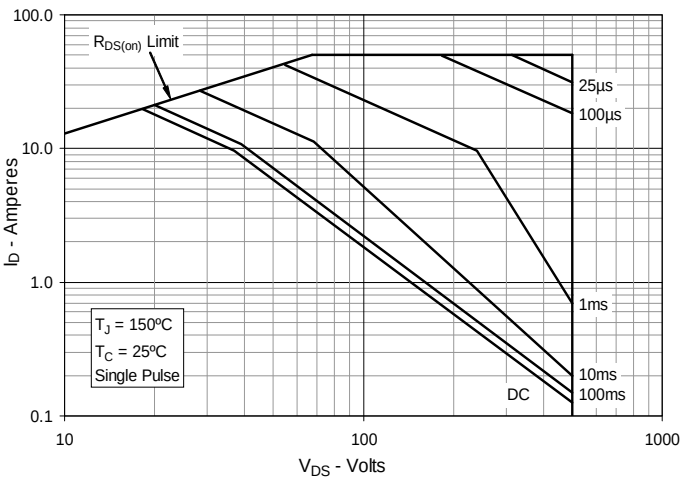
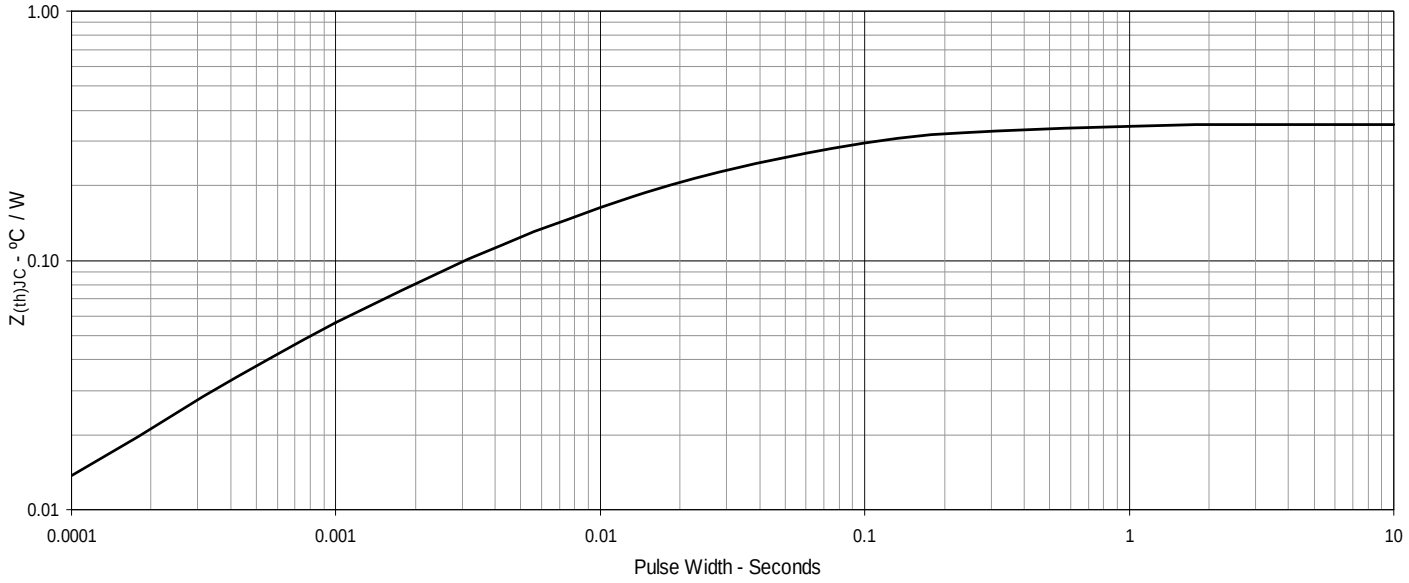


Fig. 12. Forward-Bias Safe Operating Area



© 2009 IXYS CORPORATION, All Rights Reserved

Fig. 13. Maximum Transient Thermal Impedance





Disclaimer Notice - Information furnished is believed to be accurate and reliable. However, users should independently evaluate the suitability of and test each product selected for their own applications. Littelfuse products are not designed for, and may not be used in, all applications. Read complete Disclaimer Notice at www.littelfuse.com/disclaimer-electronics.