IXYS

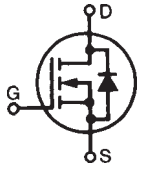
Preliminary Technical Information

High Voltage Power MOSFET

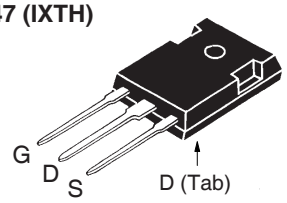
IXTH02N250
IXTV02N250S

V_{DSS} = 2500V
I_{D25} = 200mA
$R_{DS(on)}$ ≤ 450Ω

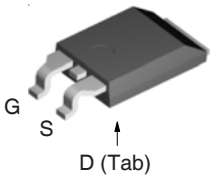
N-Channel Enhancement Mode
Avalanche Rated
Fast Intrinsic Diode



TO-247 (IXTH)



PLUS220SMD (IXTV_S)



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

Symbol	Test Conditions	Maximum Ratings	
V_{DSS}	T_J = 25°C to 150°C	2500	V
V_{DGR}	T_J = 25°C to 150°C, R_{GS} = 1MΩ	2500	V
V_{GSS}	Continuous	±20	V
V_{GSM}	Transient	±30	V
I_{D25}	T_C = 25°C	200	mA
I_{DM}	T_C = 25°C, Pulse Width Limited by T_{JM}	400	mA
P_D	T_C = 25°C	57	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	1.13 / 10	Nm/lb.in
F_C	Mounting Force	11..65 / 25..14.6	N/lb.
Weight	PLUS220	4	g
	TO-247	6	g

Symbol	Test Conditions (T_J = 25°C, Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.	
BV_{DSS}	V_{GS} = 0V, I_D = 250μA	2500			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} = 0.8 • V_{DSS}			5	μA
	T_J = 125°C			50	μA
$R_{DS(on)}$	V_{GS} = 10V, I_D = 50mA, Note 1			450	Ω

Features

- Avalanche Rated
- Fast Intrinsic Diode
- Low Package Inductance

Advantages

- Easy to Mount
- Space Savings

Applications

- High Voltage Power Supplies
- Capacitor Discharge
- Pulse Circuits

Symbol	Test Conditions (T_J = 25°C, Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.	
g_{fs}	V_{DS} = 100V, I_D = 0.5 • I_{D25}, Note 1	88	145		mS
C_{iss}	V_{GS} = 0V, V_{DS} = 25V, f = 1MHz		120		pF
C_{oss}			9		pF
C_{rss}			3		pF
$t_{d(on)}$	**Resistive Switching Times**		19		ns
t_r	V_{GS} = 10V, V_{DS} = 0.5 • V_{DSS}, I_D = 0.5 • I_{D25}		19		ns
$t_{d(off)}$	R_G = 100Ω (External)		32		ns
t_f			33		ns
$Q_{g(on)}$	V_{GS} = 10V, V_{DS} = 0.5 • V_{DSS}, I_D = 0.5 • I_{D25}		6.6		nC
Q_{gs}			0.4		nC
Q_{gd}			4.9		nC
R_{thJC}				2.2	°C/W
R_{thCS}			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			200	mA
I_{SM}	Repetitive, Pulse Width Limited by T_{JM}			800	mA
V_{SD}	I_F = 100mA, V_{GS} = 0V, Note 1			2.5	V
t_{rr}	I_F = 200mA, -di/dt = 50A/μs, V_R = 100V		1.5		μs

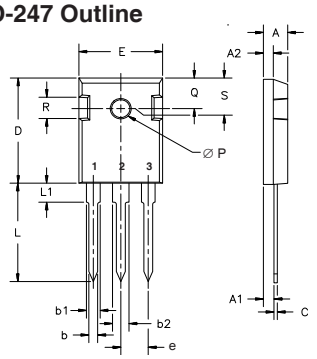
Note 1. Pulse test, t ≤ 300μs, duty cycle, d ≤ 2%.

*Additional provisions for lead to lead voltage isolation are required at V_{DS} > 1200V.

PRELIMINARY TECHNICAL INFORMATION

The product presented herein is under development. The Technical Specifications offered are derived from data gathered during objective characterizations of preliminary engineering lots; but also may yet contain some information supplied during a pre-production design evaluation. IXYS reserves the right to change limits, test conditions, and dimensions without notice.

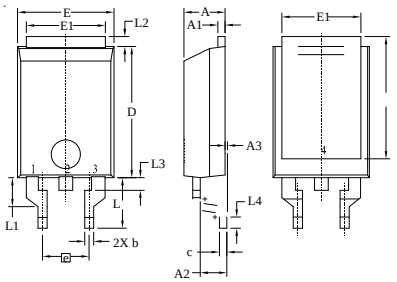
TO-247 Outline

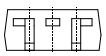


Terminals: 1 - Gate 2 - Drain
3 - Source Tab - Drain

Dim.	Millimeter Min.	Max.	Inches 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

PLUS220SMD Outline





1. Gate 2. Drain
3. Source 4. Drain

SYM	INCHES MIN	MAX	MILLIMETER 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
b1	.080	.095	2.03	2.41
b2	.054	.064	1.37	1.63
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	.045	.053	1.25	1.35
L4	.039	.059	1.00	1.50

Fig. 1. Output Characteristics @ T_J = 25ºC

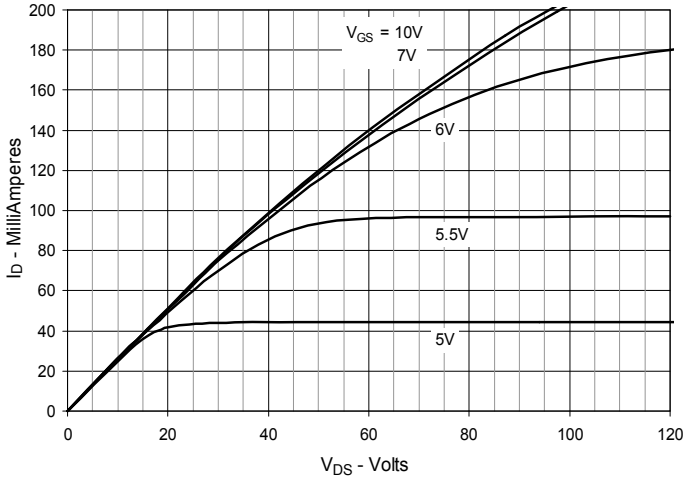


Fig. 2. Extended Output Characteristics @ T_J = 25ºC

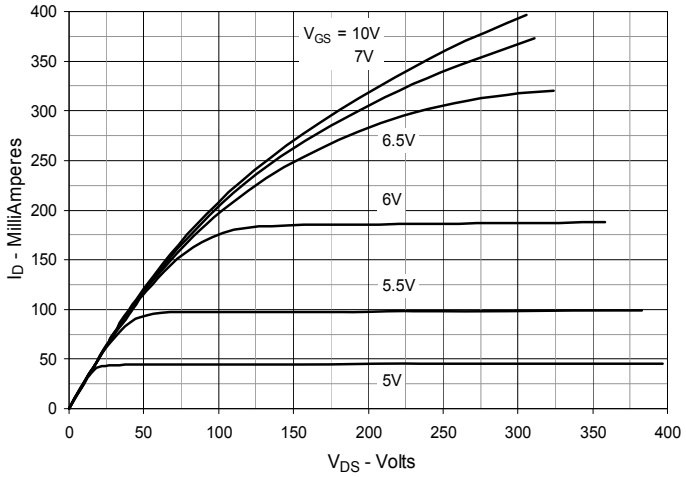


Fig. 3. Output Characteristics @ T_J = 125ºC

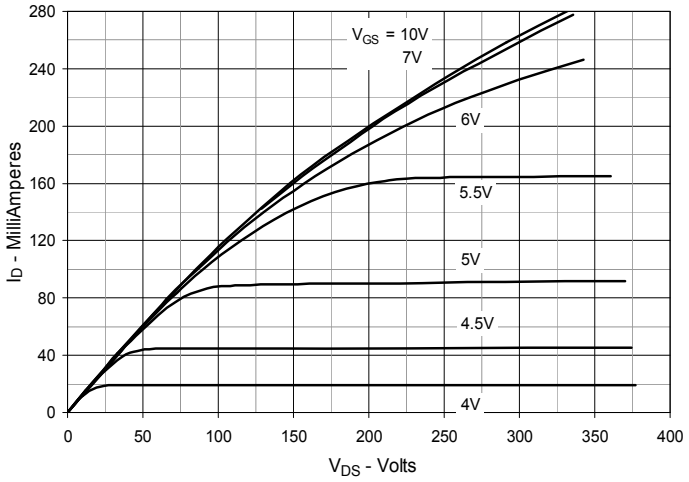


Fig. 4. $R_{DS(on)}$ Normalized to I_D = 100mA Value vs. Junction Temperature

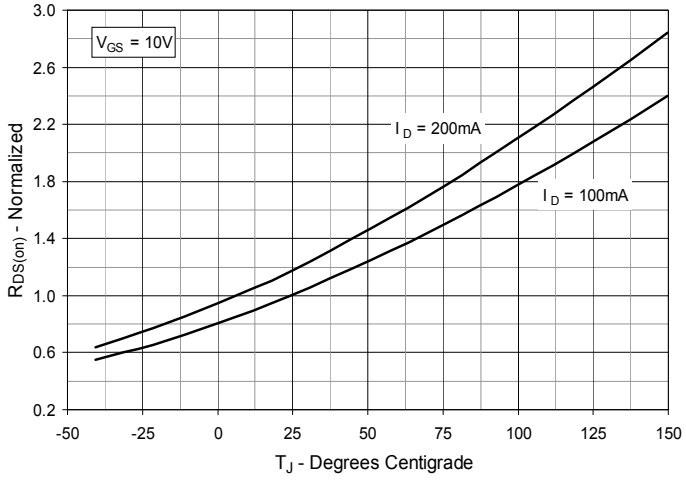


Fig. 5. $R_{DS(on)}$ Normalized to I_D = 100mA Value vs. Drain Current

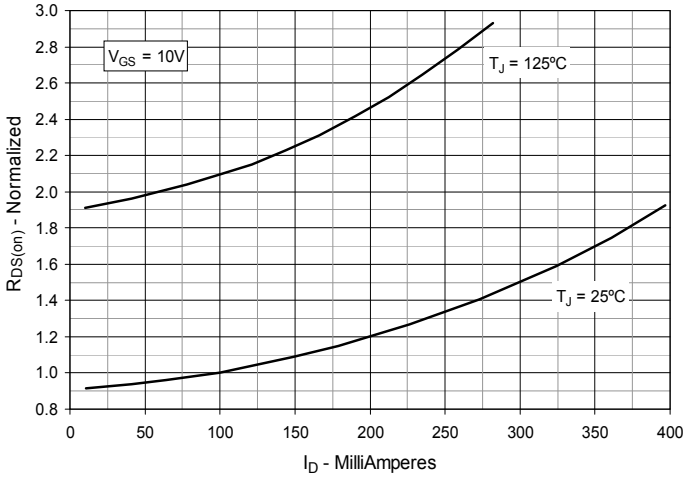


Fig. 6. Maximum Drain Current vs. Case Temperature

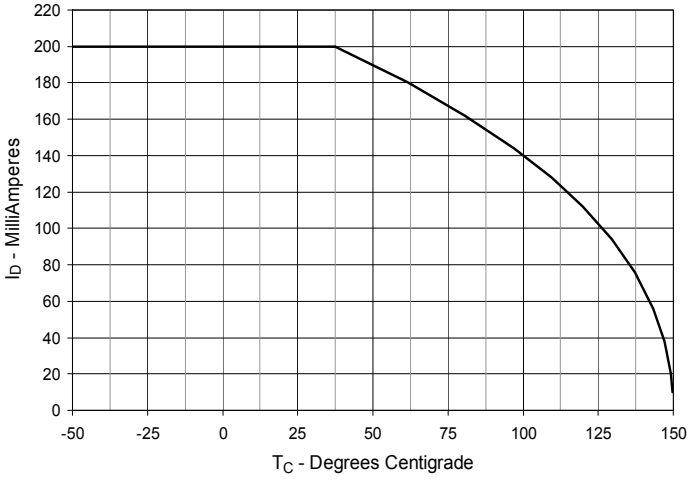


Fig. 7. Input Admittance

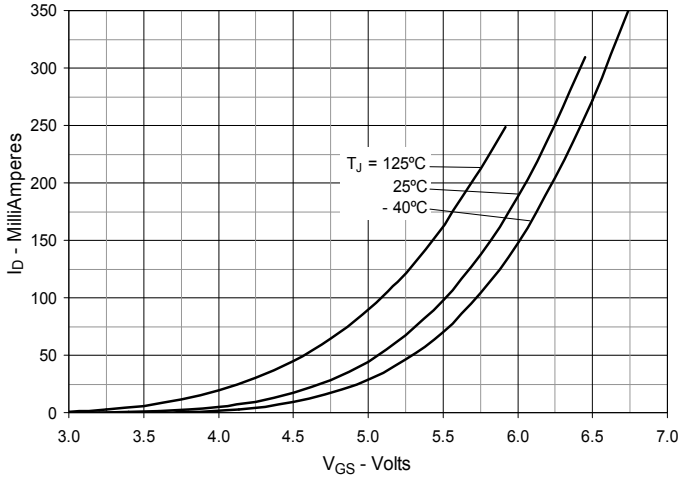


Fig. 8. Transconductance

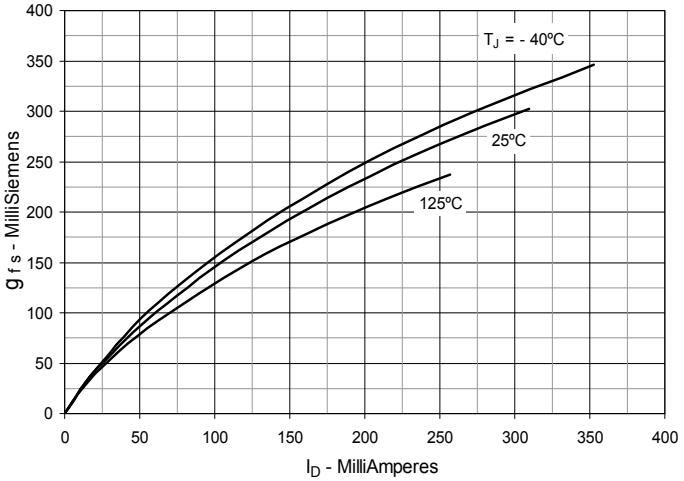


Fig. 9. Forward Voltage Drop of Intrinsic Diode

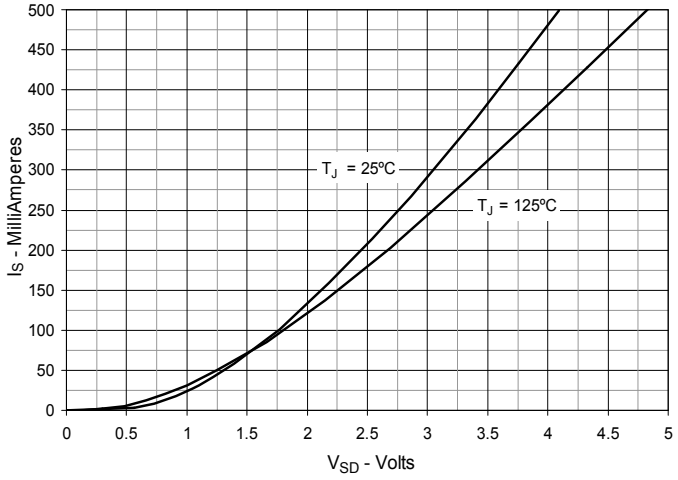


Fig. 10. Gate Charge

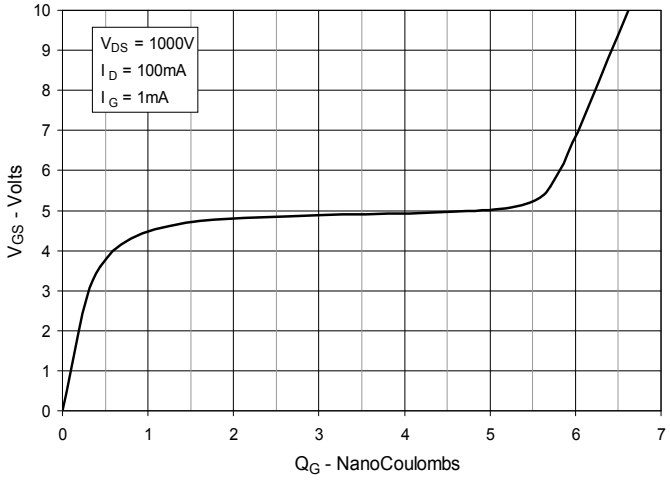


Fig. 11. Capacitance

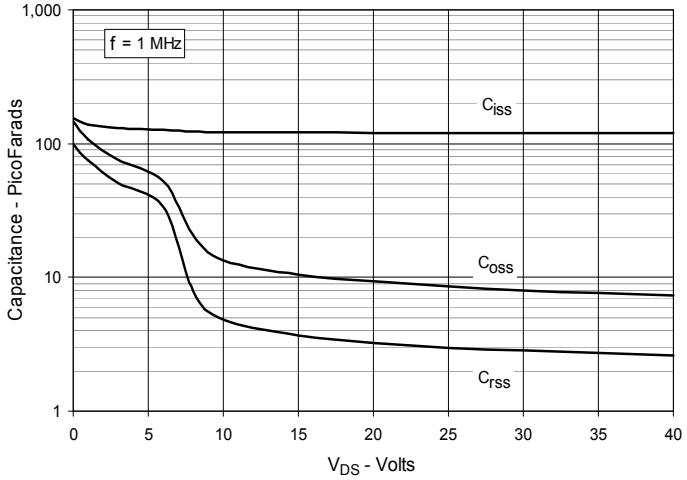


Fig. 12. Maximum Transient Thermal Impedance

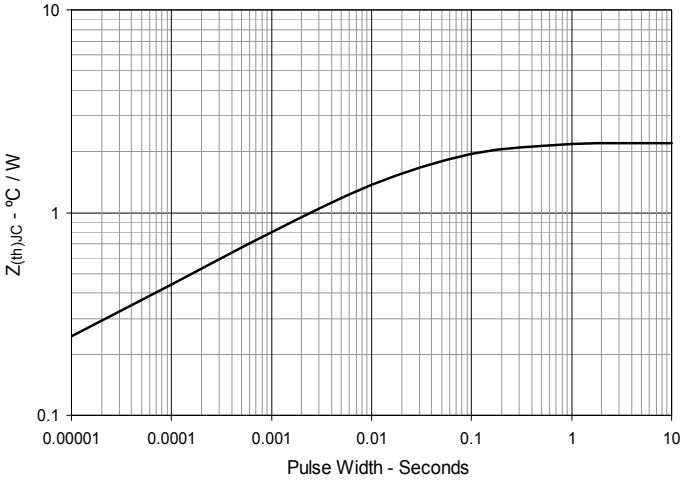


Fig. 13. Forward-Bias Safe Operating Area @ T_C = 25ºC

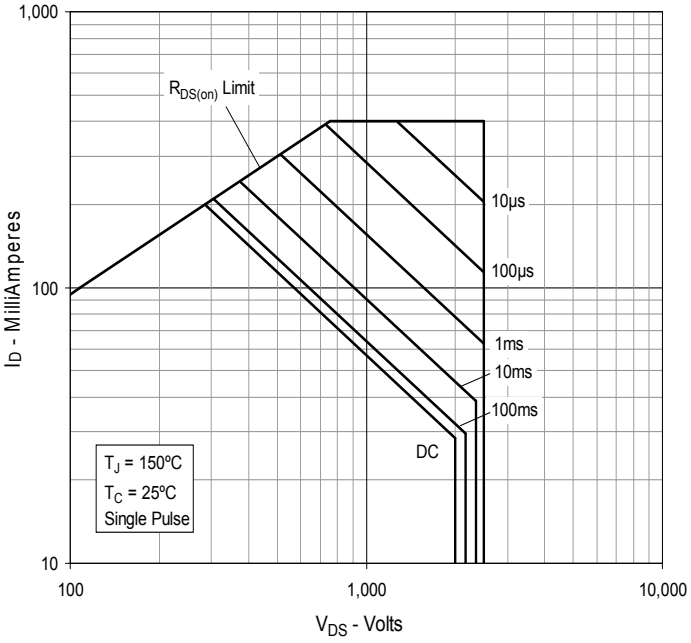


Fig. 14. Forward-Bias Safe Operating Area @ T_C = 75ºC