⌐IXYS

High Voltage Power MOSFETs
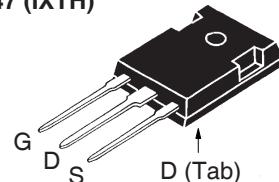
IXTH02N250
IXTV02N250S

V_{DSS} = 2500V
I_{D25} = 200mA
$R_{DS(on)}$ ≤ 450Ω
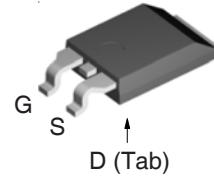
N-Channel Enhancement Mode
Fast Intrinsic Diode

**TO-247 (IXTH)**

G
D S
D (Tab)

PLUS220SMD (IXTV_S)

G
S
D (Tab)

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}	600	mA
P_D	T_C = 25°C	83	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-247)	1.13 / 10	Nm/lb.in
F_C	Mounting Force (PLUS220)	11..65 / 25..14.6	N/lb.
Weight	TO-247	6	g
	PLUS220	4	g

Symbol	Test Conditions (T_J = 25°C, Unless Otherwise Specified)	Min.	Typ.	Max.	
BV_{DSS}	V_{GS} = 0V, I_D = 250µA	2500			V
$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250µA	2.5		4.5	V
I_{GSS}	V_{GS} = ±20V, V_{DS} = 0V			±100	nA
I_{DSS}	V_{DS} = 0.8 • V_{DSS}, V_{GS} = 0V			5	µA
	T_J = 125°C			500	µA
$R_{DS(on)}$	V_{GS} = 10V, I_D = 50mA, Note 1			450	Ω

Features

• Fast Intrinsic Diode
• Low Package Inductance

Advantages

• Easy to Mount
• Space Savings

Applications

• High Voltage Power Supplies
• Capacitor Discharge
• Pulse Circuits

IXYS

Symbol	Test Conditions	Characteristic Values		
(T_J = 25°C, Unless Otherwise Specified)		Min.	Typ.	Max.
g_{fs}	V_{DS} = 100V, I_D = 0.5 • I_{D25}, Note 1	88	145	mS
C_{iss}			116	pF
C_{oss}	V_{GS} = 0V, V_{DS} = 25V, f = 1MHz		8	pF
C_{rss}			3	pF
$t_{d(on)}$	**Resistive Switching Times**		19	ns
t_r			19	ns
$t_{d(off)}$	V_{GS} = 10V, V_{DS} = 0.5 • V_{DSS}, I_D = 0.5 • I_{D25}		32	ns
t_f	R_G = 100Ω (External)		33	ns
$Q_{g(on)}$			7.4	nC
Q_{gs}	V_{GS} = 10V, V_{DS} = 0.5 • V_{DSS}, I_D = 0.5 • I_{D25}		0.7	nC
Q_{gd}			5.3	nC
R_{thJC}				1.5 °C/W
R_{thCS}			0.25	°C/W
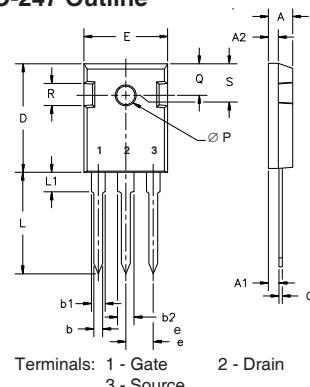
Source-Drain Diode

Symbol	Test Conditions	Characteristic Values		
(T_J = 25°C, Unless Otherwise Specified)		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			2.0 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%.
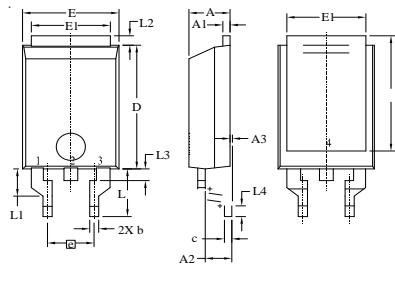
*Additional provisions for lead to lead voltage isolation are required at V_{DS} > 1200V.

TO-247 Outline

Terminals: 1 - Gate   2 - Drain
3 - Source

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
∅P	3.55	3.65	.140	.144
Q	5.89	6.40	0.232	0.252
R	4.32	5.49	.170	.216
S	6.15 BSC		242 BSC	

PLUS220SMD Outline
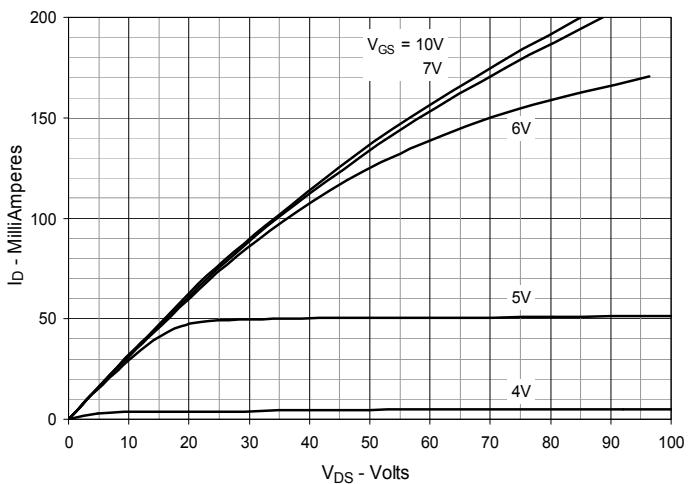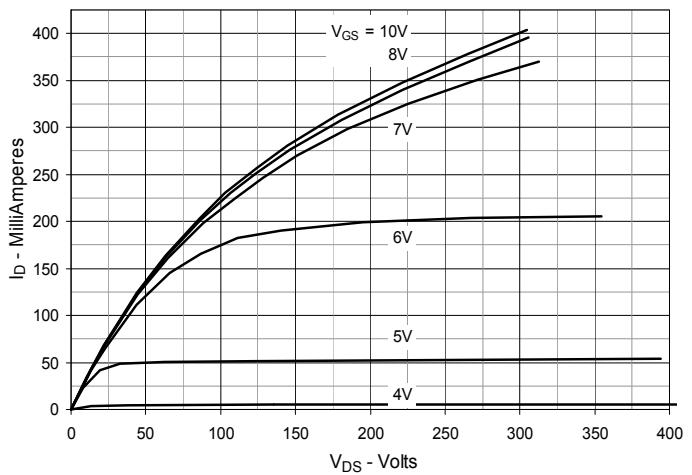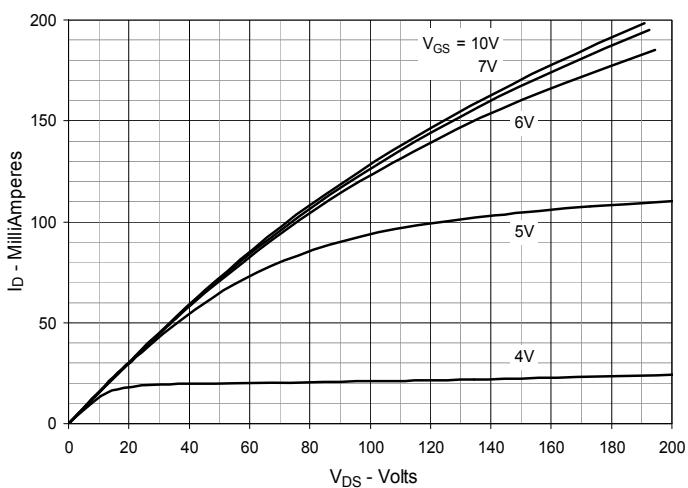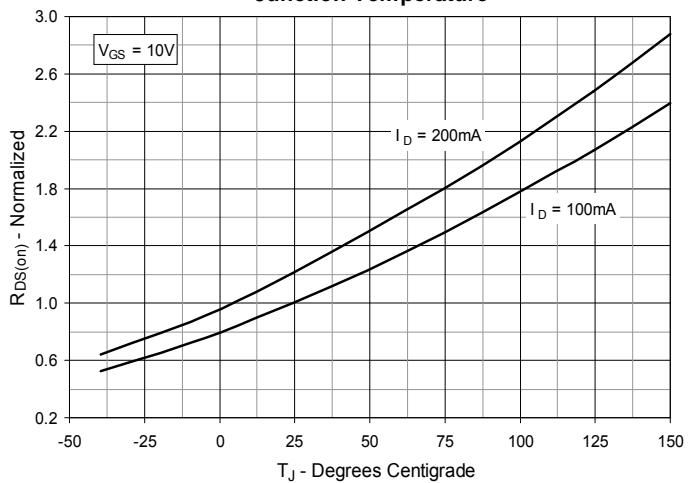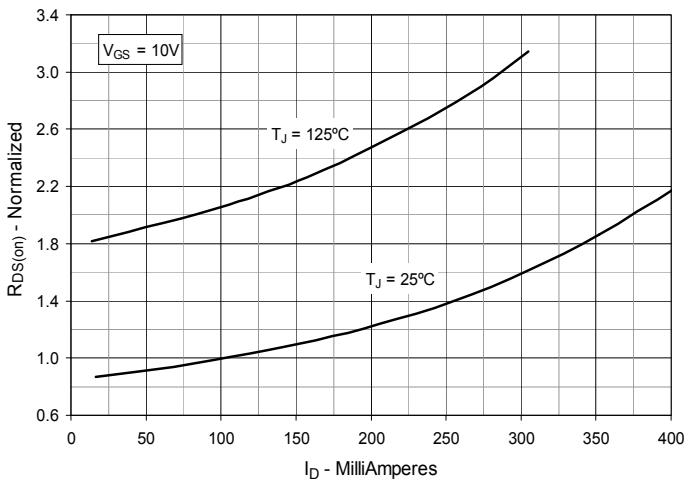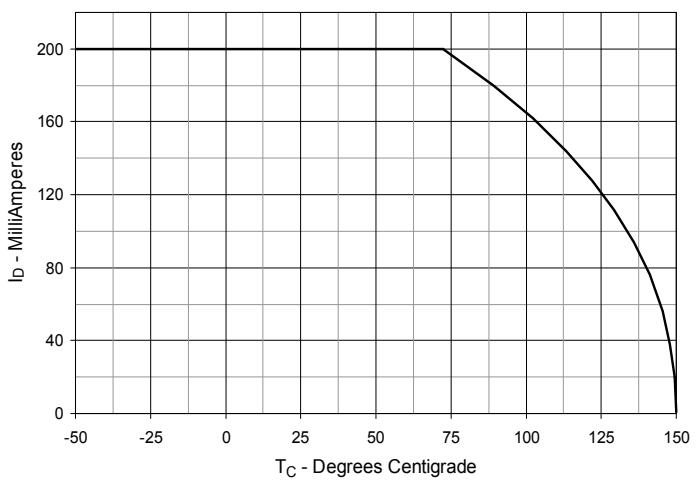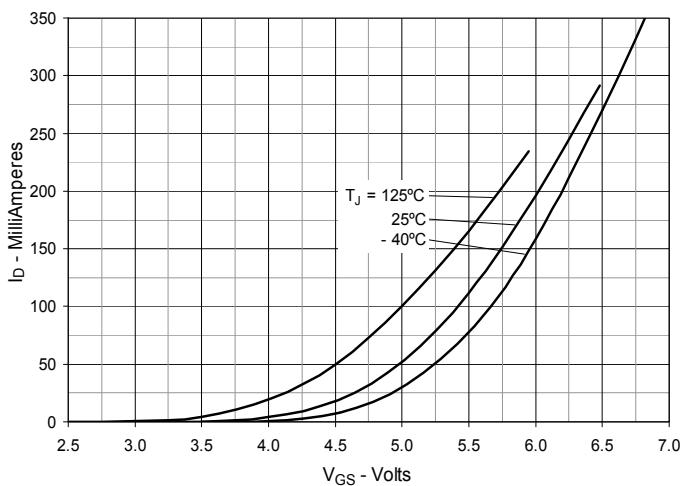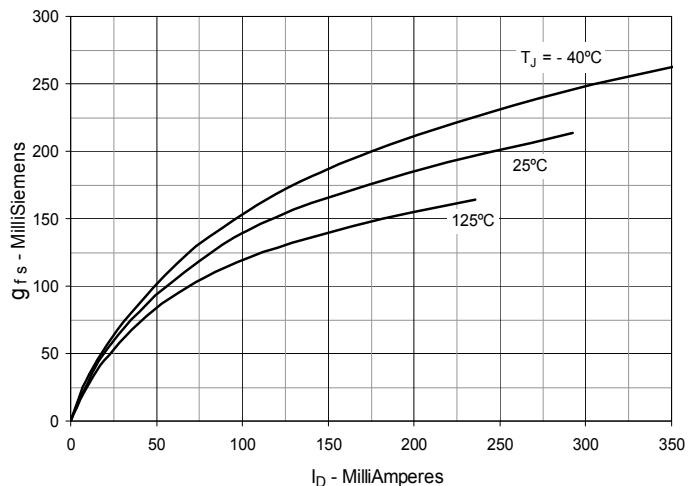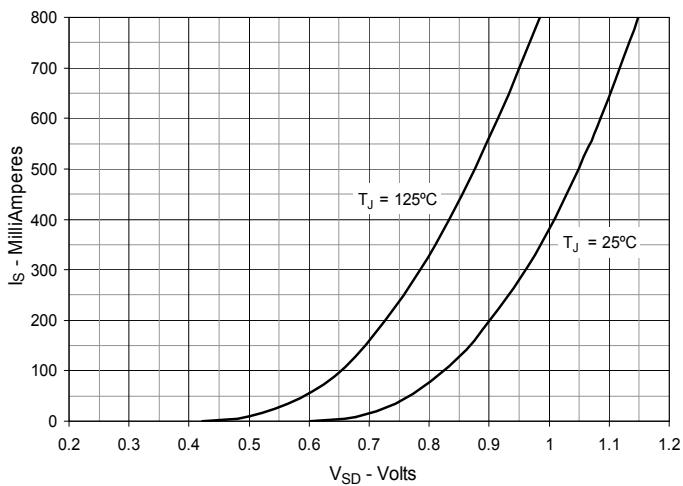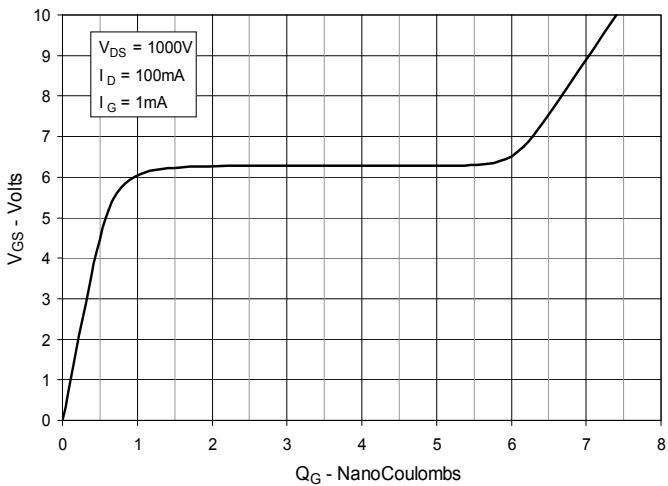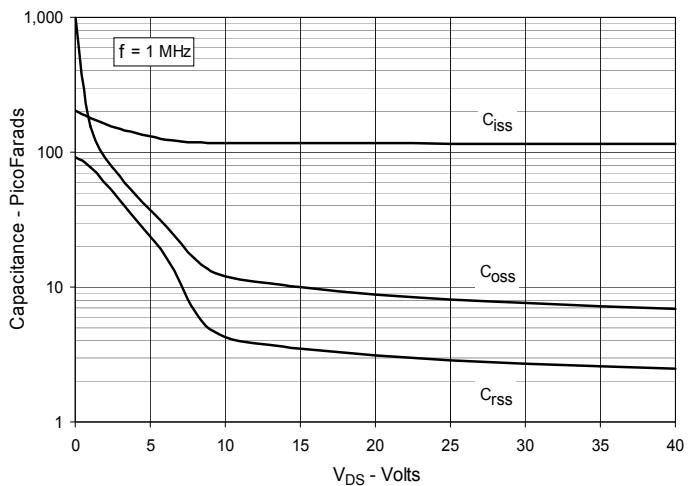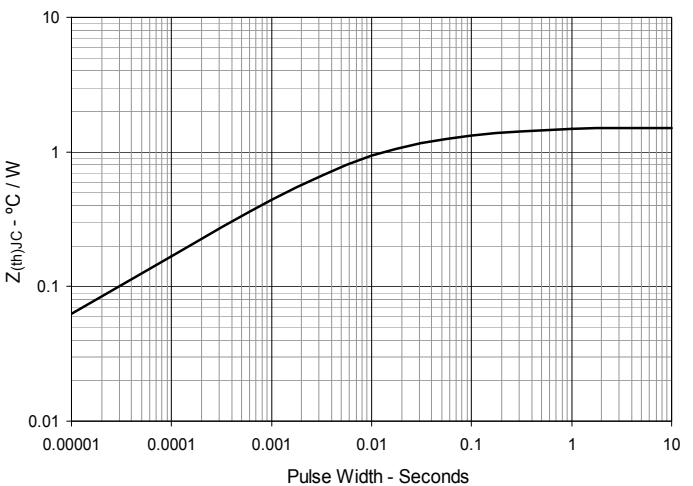
1. Gate   2. Drain
3. Source   4. Drain

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
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

IXYS Reserves the Right to Change Limits, Test Conditions, and Dimensions.
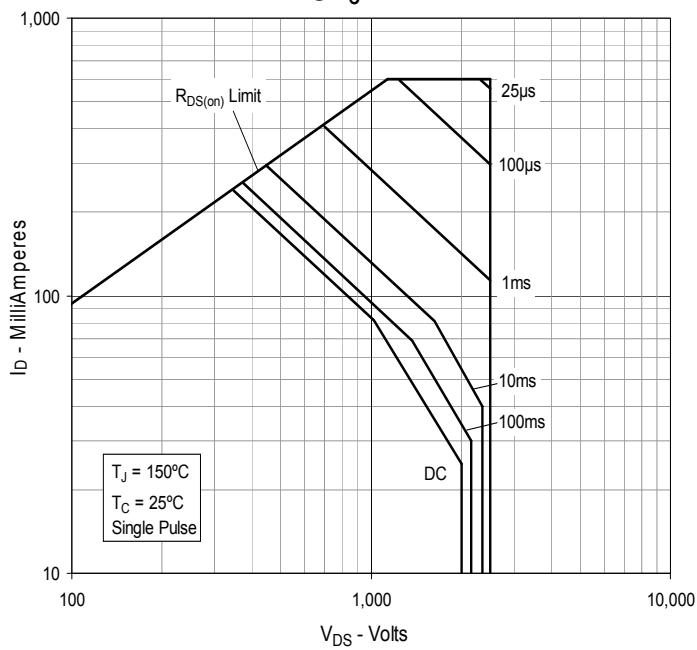
Fig. 1. Output Characteristics @ T$_J$ = 25⁰C


Fig. 2. Extended Output Characteristics @ T$_J$ = 25⁰C


Fig. 3. Output Characteristics @ T$_J$ = 125⁰C

**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

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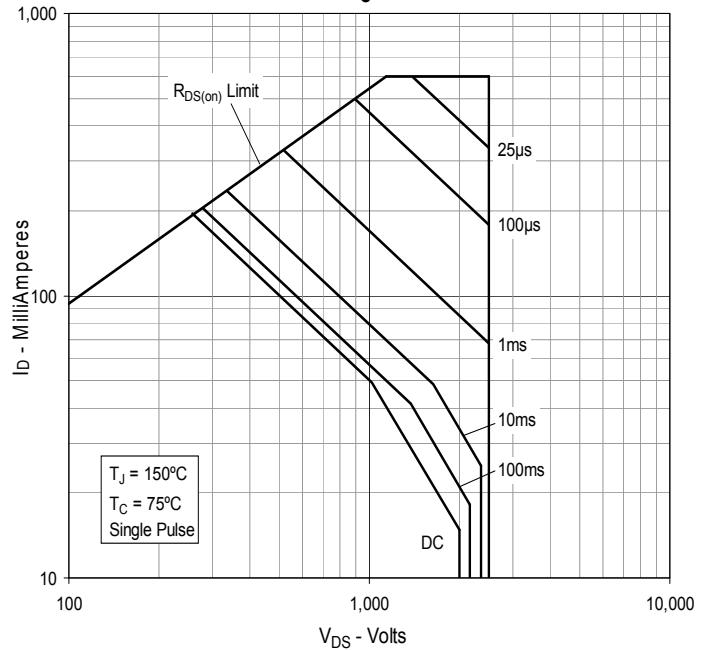
Fig. 13. Forward-Bias Safe Operating Area

@ T$_C$ = 25ºC

Fig. 14. Forward-Bias Safe Operating Area

@ T$_C$ = 75ºC

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