IXYS

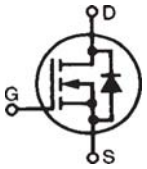
Advance Technical Information

High Voltage Power MOSFET

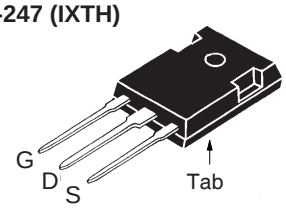
IXTH1R4N250P3

V_{DSS} = 2500V
I_{D25} = 1.4A
$R_{DS(on)}$ ≤ 28Ω

N-Channel Enhancement Mode
Fast Intrinsic Diode



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	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	1.4	A
I_{D110}	T_C = 110°C	1.0	A
I_{DM}	T_C = 25°C, Pulse Width Limited by T_{JM}	3.5	A
P_D	T_C = 25°C	195	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	1.13/10	Nm/lb.in
Weight		6	g

Features

- High Blocking Voltage
- Fast Intrinsic Diode
- Low Package Inductance

Advantages

- Easy to Mount
- Space Savings
- High Power Density

Applications

- High Voltage Power Supplies
- Capacitor Discharge Applications
- Pulse Circuits
- Laser and X-Ray Generation Systems

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}, V_{GS} = 0V			25	μA
	T_J = 125°C			250	μA
$R_{DS(on)}$	V_{GS} = 10V, I_D = 0.7A, Note 1			28	Ω

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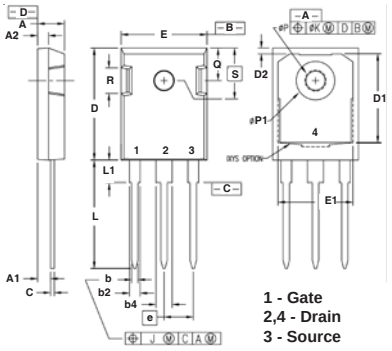
Symbol	Test Conditions (T_J = 25°C, Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.	
g_{fs}	V_{DS} = 60V, I_D = 0.7A, Note 1	0.55	0.90		S
C_{iss}	V_{GS} = 0V, V_{DS} = 25V, f = 1MHz		960		pF
C_{oss}			64		pF
C_{rss}			22		pF
$t_{d(on)}$	**Resistive Switching Times**		18		ns
t_r	V_{GS} = 10V, V_{DS} = 1250V, I_D = I_{D25}		24		ns
$t_{d(off)}$	R_G = 5Ω (External)		39		ns
t_f	Note 2		87		ns
$Q_{g(on)}$	V_{GS} = 10V, V_{DS} = 1250V, I_D = 0.5 • I_{D25}		33.0		nC
Q_{gs}			4.0		nC
Q_{gd}			18.5		nC
R_{thJC}				0.64	°C/W
R_{thCS}			0.21		°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			1.4	A
I_{SM}	Repetitive, Pulse Width Limited by T_{JM}			5.6	A
V_{SD}	I_F = I_S, V_{GS} = 0V, Note 1			1.5	V
t_{rr}	I_F = I_{D25}, -di/dt = 100A/μs		1.8		μs
Q_{RM}	V_R = 100V, V_{GS} = 0V		16.7		μC
I_{RM}			18.8		A

Notes: 1. Pulse test, t ≤ 300μs, duty cycle, d ≤ 2%.
2. Additional provisions for lead-to-lead voltage isolation are required at V_{DS} > 1200V.

TO-247 Outline



Dim.	Millimeter min	Millimeter max	Inches min	Inches max
A	4.70	5.30	0.185	0.209
A1	2.21	2.59	0.087	0.102
A2	1.50	2.49	0.059	0.098
b	0.99	1.40	0.039	0.055
b2	1.65	2.39	0.065	0.094
b4	2.59	3.43	0.102	0.135
c	0.38	0.89	0.015	0.035
D	20.79	21.45	0.819	0.845
D1	13.07	-	0.515	-
D2	0.51	1.35	0.020	0.053
E	15.48	16.24	0.610	0.640
E1	13.45	-	0.53	-
E2	4.31	5.48	0.170	0.216
e	5.45 BSC		0.215 BSC	
L	19.80	20.30	0.078	0.800
L1	-	4.49	-	0.177
Ø P	3.55	3.65	0.140	0.144
Ø P1	-	7.39	-	0.290
Q	5.38	6.19	0.212	0.244
S	6.14 BSC		0.242 BSC	

ADVANCE TECHNICAL INFORMATION

The product presented herein is under development. The Technical Specifications offered are derived from a subjective evaluation of the design, based upon prior knowledge and experience, and constitute a "considered reflection" of the anticipated result. IXYS reserves the right to change limits, test conditions, and dimensions without notice.

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

IXYS MOSFETs and IGBTs are covered by one or moreof the following U.S. patents: 4,835,592 4,860,072 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 = 25ºC

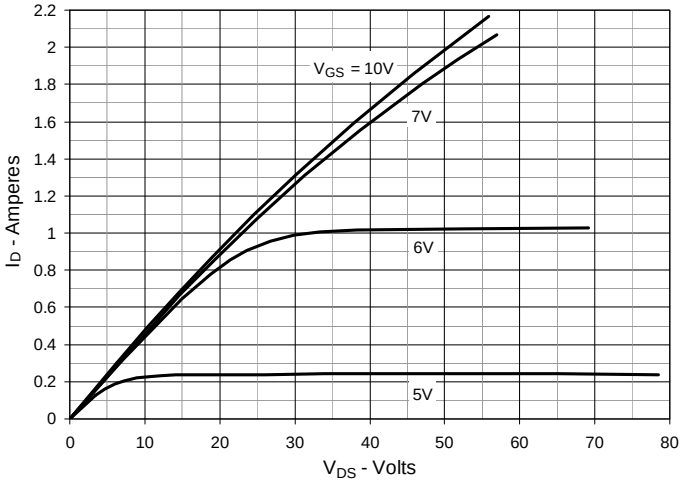


Fig. 2. Output Characteristics @ T_J = 125ºC

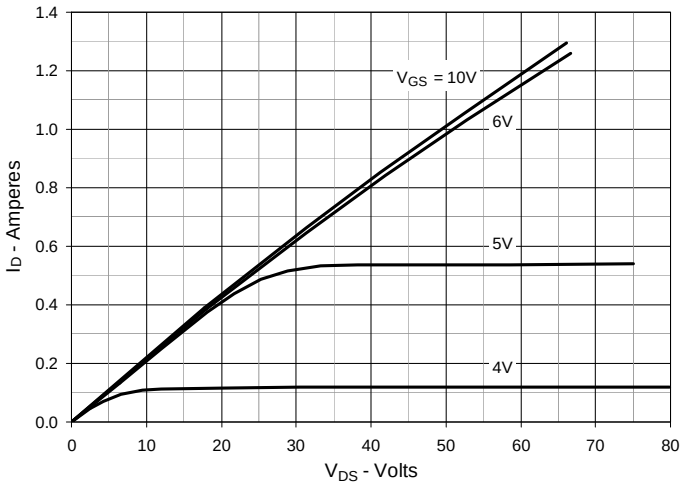


Fig. 3. $R_{DS(on)}$ Normalized to I_D = 0.7A Value vs. Junction Temperature

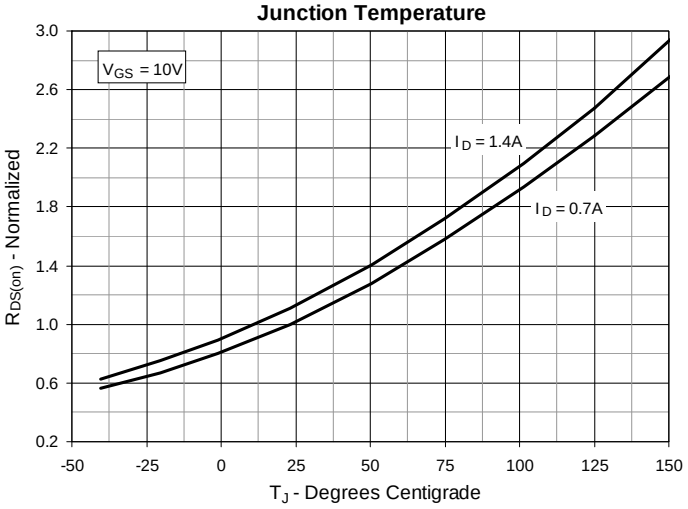


Fig. 4. $R_{DS(on)}$ Normalized to I_D = 0.7A Value vs. Drain Current

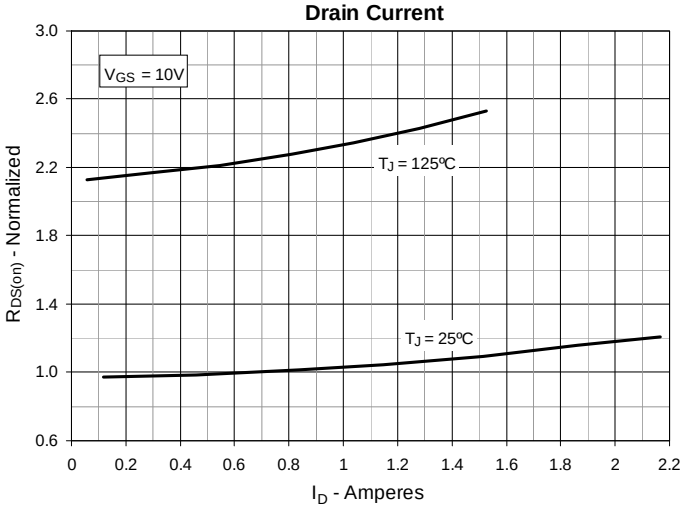


Fig. 5. Maximum Drain Current vs. Case Temperature

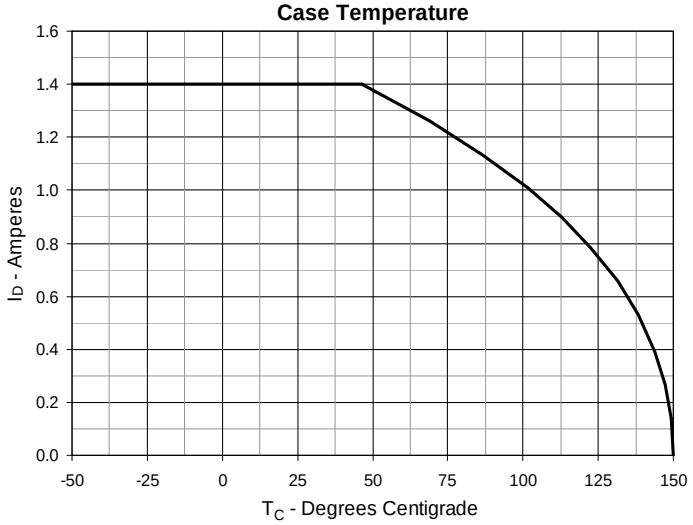
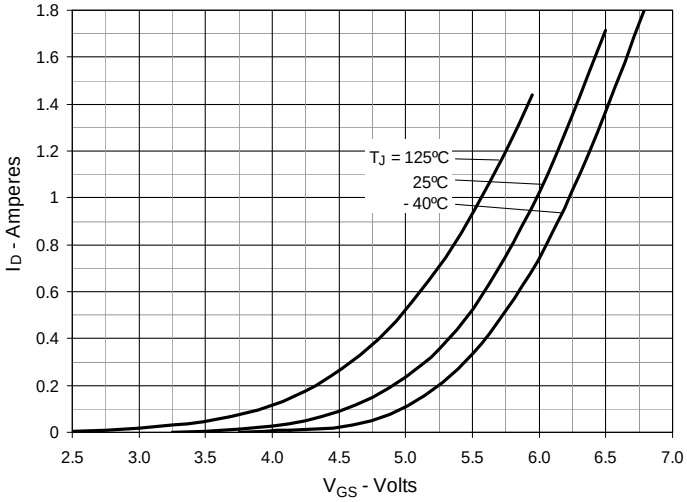


Fig. 6. Input Admittance



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Fig. 7. Transconductance

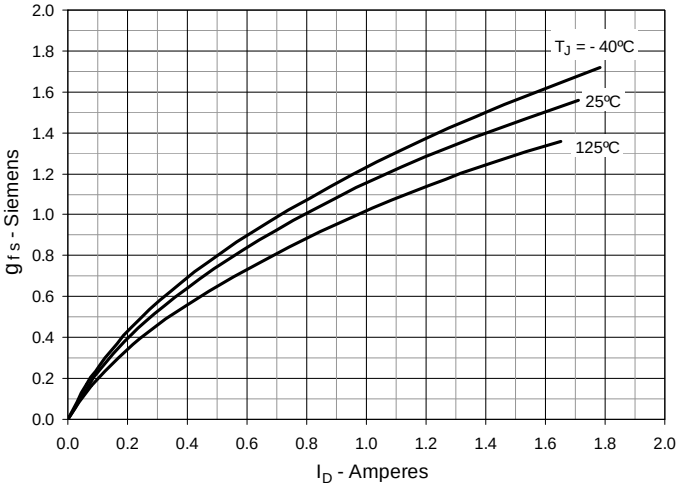


Fig. 8. Forward Voltage Drop of Intrinsic Diode

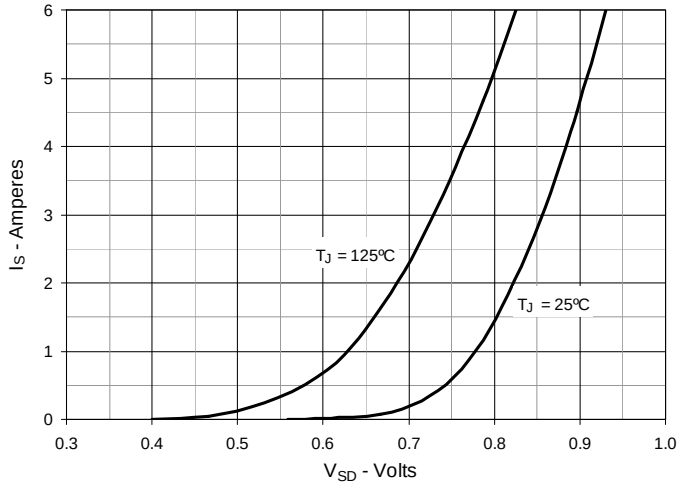


Fig. 9. Gate Charge

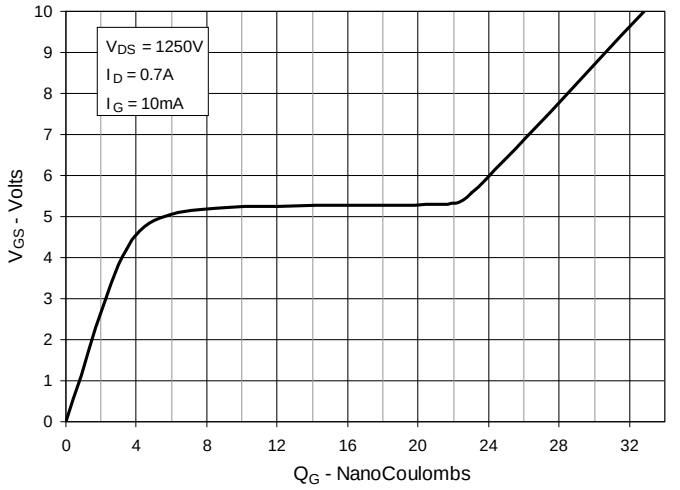


Fig. 10. Capacitance

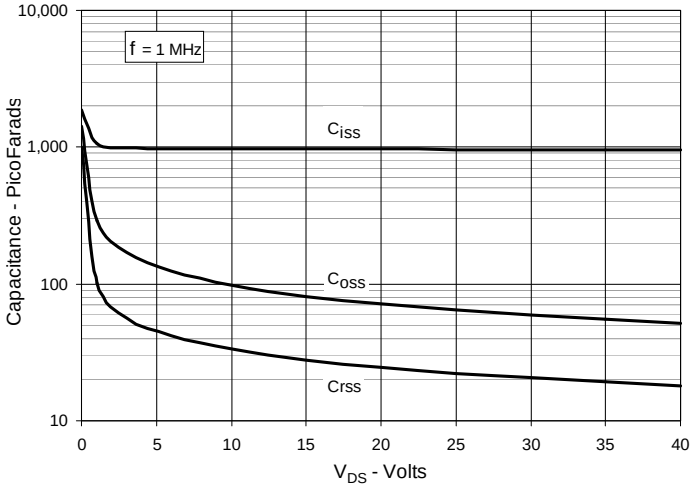
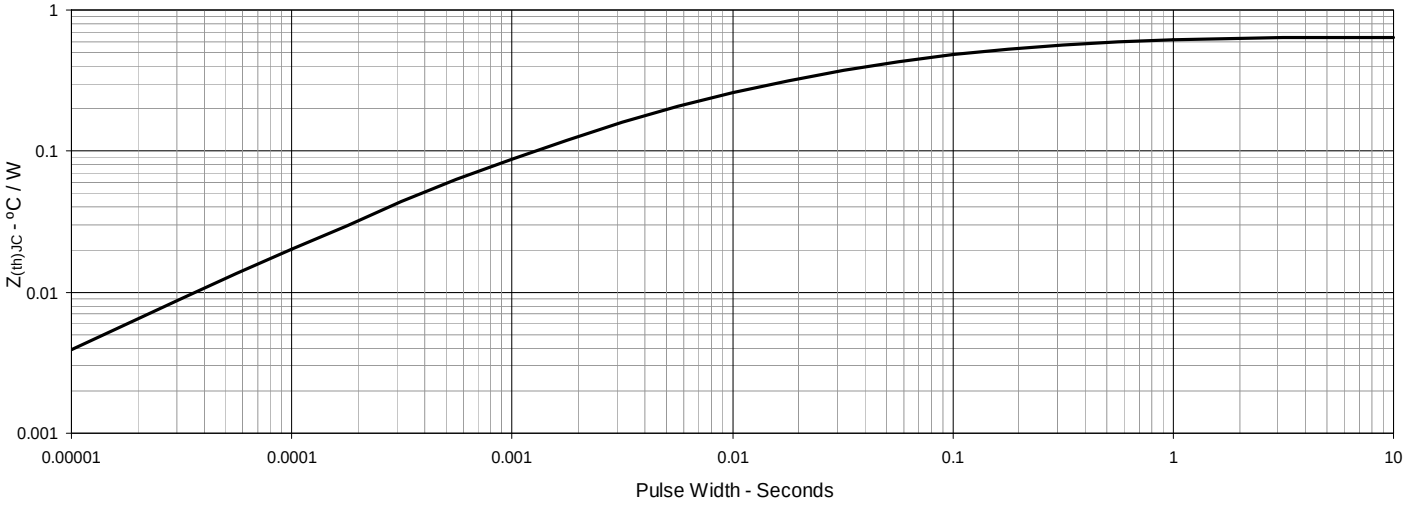


Fig. 11. Maximum Transient Thermal Impedance



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Fig. 12. Forward-Bias Safe Operating Area @ T_C = 25ºC

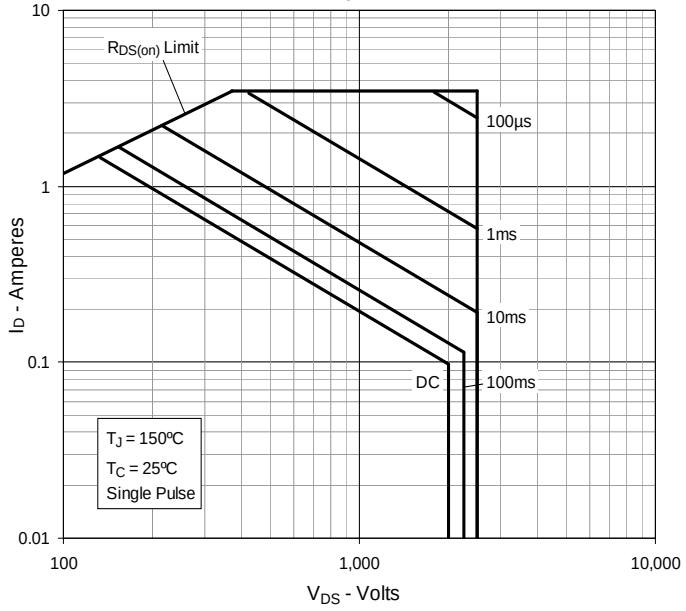
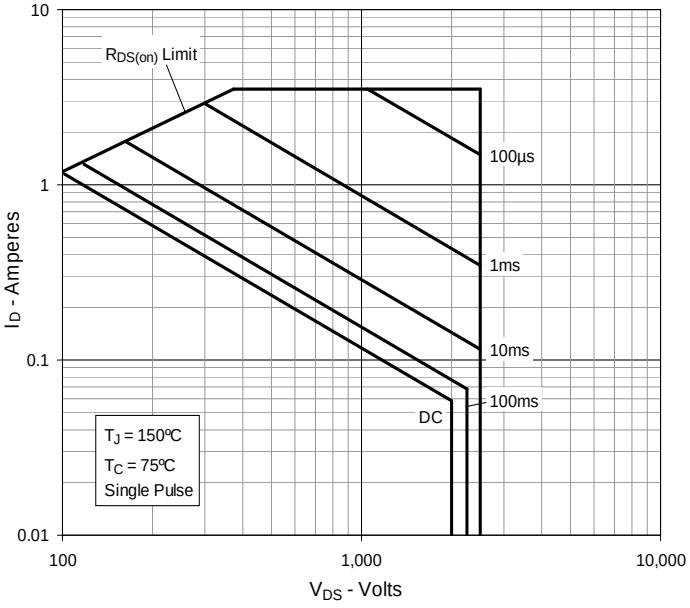


Fig. 13. Forward-Bias Safe Operating Area @ T_C = 75ºC



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