IXYS

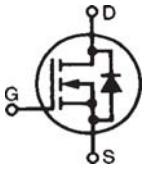
Advance Technical Information

High Voltage Power MOSFET

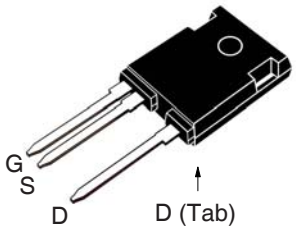
IXTH1R8N220P3HV

V_{DSS} = 2200V
I_{D25} = 1.8A
$R_{DS(on)}$ ≤ 21.5Ω

N-Channel Enhancement Mode



TO-247HV



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

Symbol	Test Conditions	Maximum Ratings	
V_{DSS}	T_J = 25°C to 150°C	2200	V
V_{DGR}	T_J = 25°C to 150°C, R_{GS} = 1MΩ	2200	V
V_{GSS}	Continuous	±20	V
V_{GSM}	Transient	±30	V
I_{D25}	T_C = 25°C	1.8	A
I_{D110}	T_C = 110°C	1.0	A
I_{DM}	T_C = 25°C, Pulse Width Limited by T_{JM}	4.0	A
P_D	T_C = 25°C	194	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

Symbol	Test Conditions (T_J = 25°C, Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.	
BV_{DSS}	V_{GS} = 0V, I_D = 250μA	2200			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			10	μA
	T_J = 125°C			200	μA
$R_{DS(on)}$	V_{GS} = 10V, I_D = 0.9A, Note 1			21.5	Ω

Features

- High Blocking Voltage
- High Voltage Package

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

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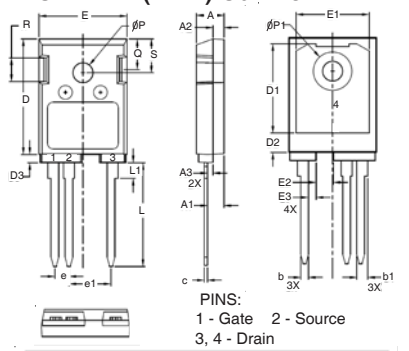
Symbol	Test Conditions (T_J = 25°C, Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.	
g_{fs}	V_{DS} = 60V, I_D = 0.9 A, Note 1	0.66	1.10		S
C_{iss}	V_{GS} = 0V, V_{DS} = 25V, f = 1MHz		965		pF
C_{oss}			68		pF
C_{rss}			23		pF
$t_{d(on)}$	**Resistive Switching Times**		11		ns
t_r	V_{GS} = 10V, V_{DS} = 50V, I_D = 1.8A		25		ns
$t_{d(off)}$	R_G = 10Ω (External)		35		ns
t_f			26		ns
$Q_{g(on)}$	V_{GS} = 10V, V_{DS} = 1.1kV, I_D = 0.5 • I_{D25}		31		nC
Q_{gs}			4		nC
Q_{gd}			17		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, Note1			1.8	A
I_{SM}	Repetitive, pulse Width Limited by T_{JM}			7.2	A
V_{SD}	I_F = I_S, V_{GS} = 0V, Note 1			1.5	V
t_{rr}	I_F = 1.8A, -di/dt = 100A/μs		1.3		μs
Q_{RM}	V_R = 100V		10.5		μC
I_{RM}			16.4		A

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

TO-247HV (IXTH) Outline



PINS:
1 - Gate 2 - Source
3, 4 - Drain

SYM	INCHES MIN	INCHES MAX	MILLIMETERS MIN	MILLIMETERS MAX
A	.193	.201	4.90	5.10
A1	.114	.122	2.90	3.10
A2	.075	.083	1.90	2.10
A3	.035	.043	0.90	1.10
b	.053	.059	1.35	1.50
b1	.075	.083	1.90	2.10
c	.022	.030	0.55	0.75
D	.819	.843	20.80	21.40
D1	.638	.646	16.20	16.40
D2	.134	.146	3.40	3.70
D3	.055	.063	1.40	1.60
E	.622	.638	15.80	16.20
E1	.520	.528	13.20	13.40
E2	.118	.126	3.00	3.20
E3	.051	.059	1.30	1.50
e	.100 BSC		2.54 BSC	
e1	.300 BSC		7.62 BSC	
L	.732	.748	18.60	19.00
L1	.106	.118	2.70	3.00
øP	.138	.142	3.50	3.60
øP1	.272	.280	6.90	7.10
Q	.216	.224	5.50	5.70
R	.165	.169	4.20	4.30
S	.240	.248	6.10	6.30

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

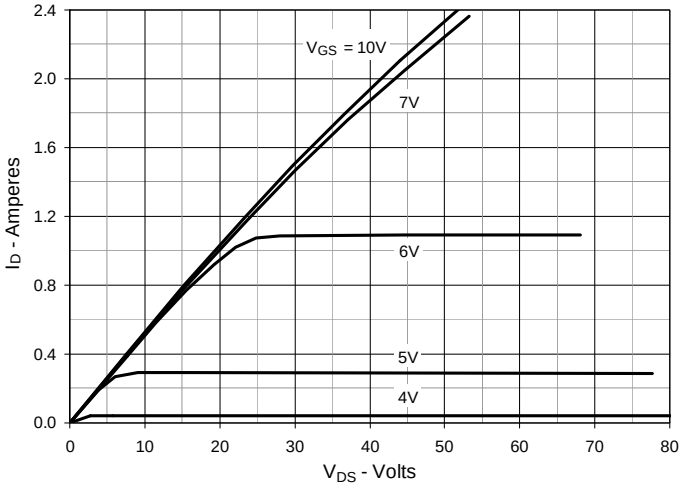


Fig. 2. Output Characteristics @ T_J = 125ºC

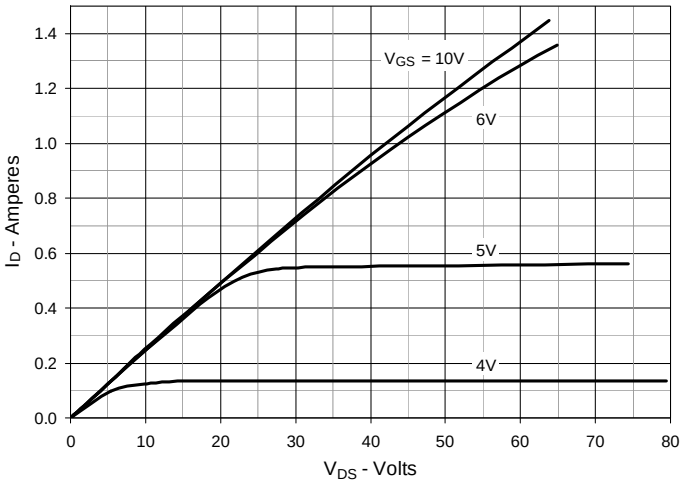


Fig. 3. $R_{DS(on)}$ Normalized to I_D = 0.9A Value vs. Junction Temperature

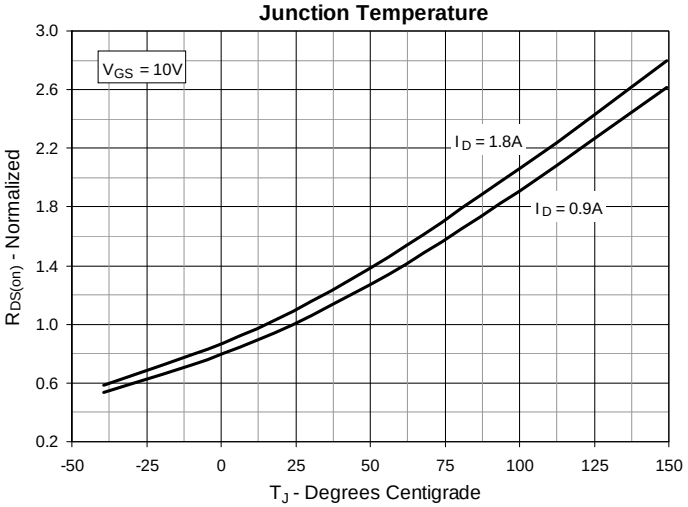


Fig. 4. $R_{DS(on)}$ Normalized to I_D = 0.9A Value vs. Drain Current

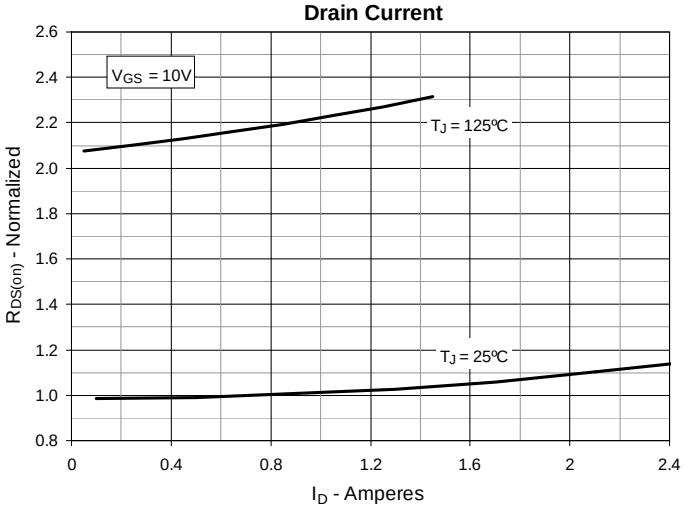


Fig. 5. Maximum Drain Current vs. Case Temperature

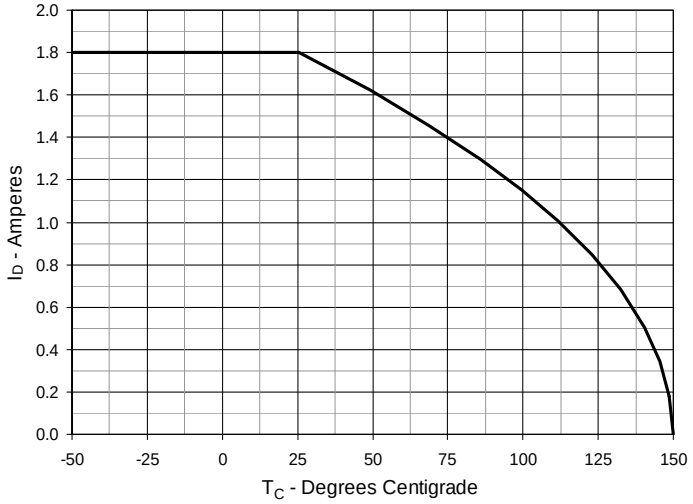
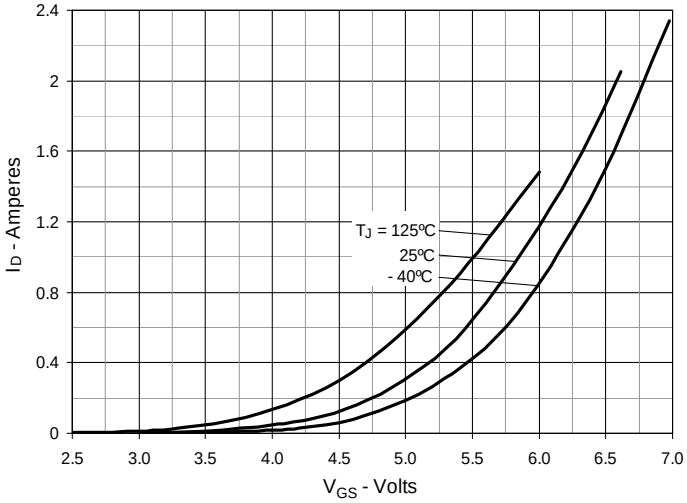


Fig. 6. Input Admittance



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Fig. 7. Transconductance

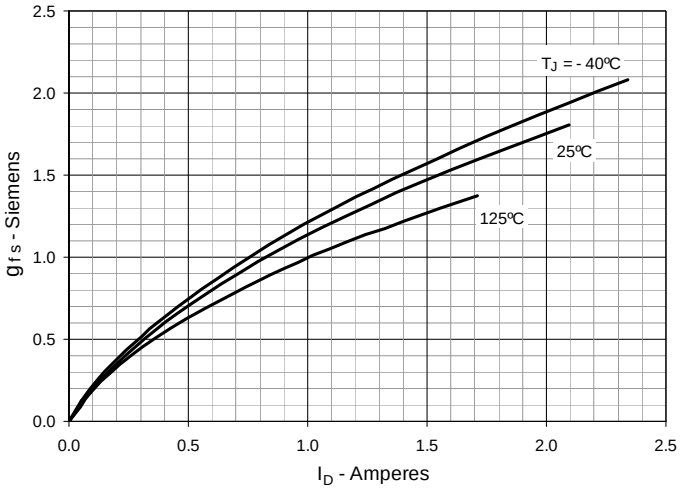


Fig. 8. Forward Voltage Drop of Intrinsic Diode

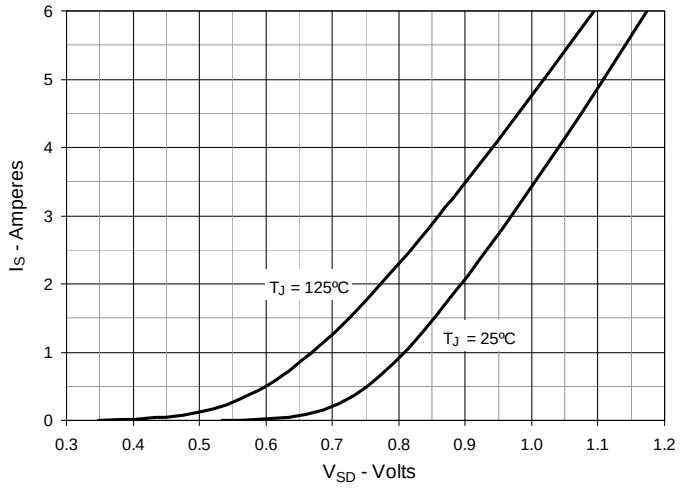


Fig. 9. Gate Charge

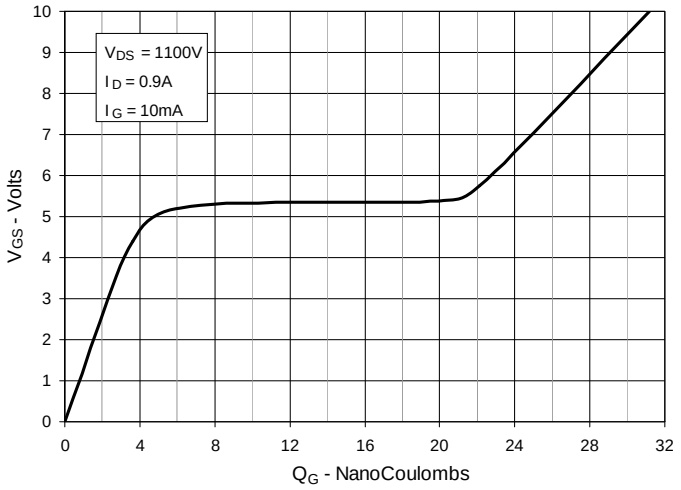


Fig. 10. Capacitance

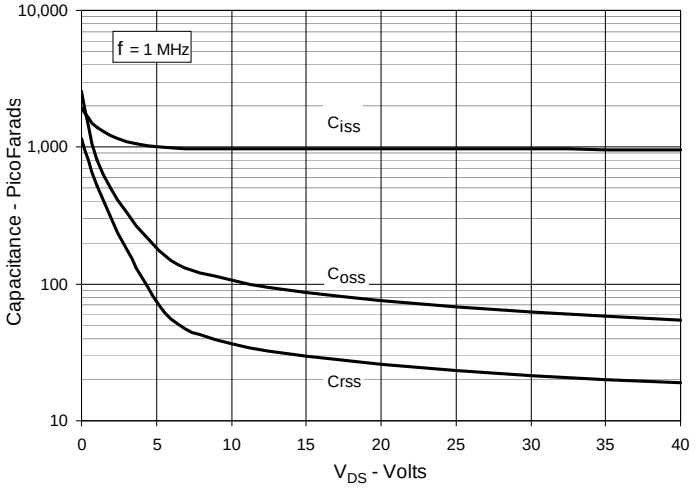
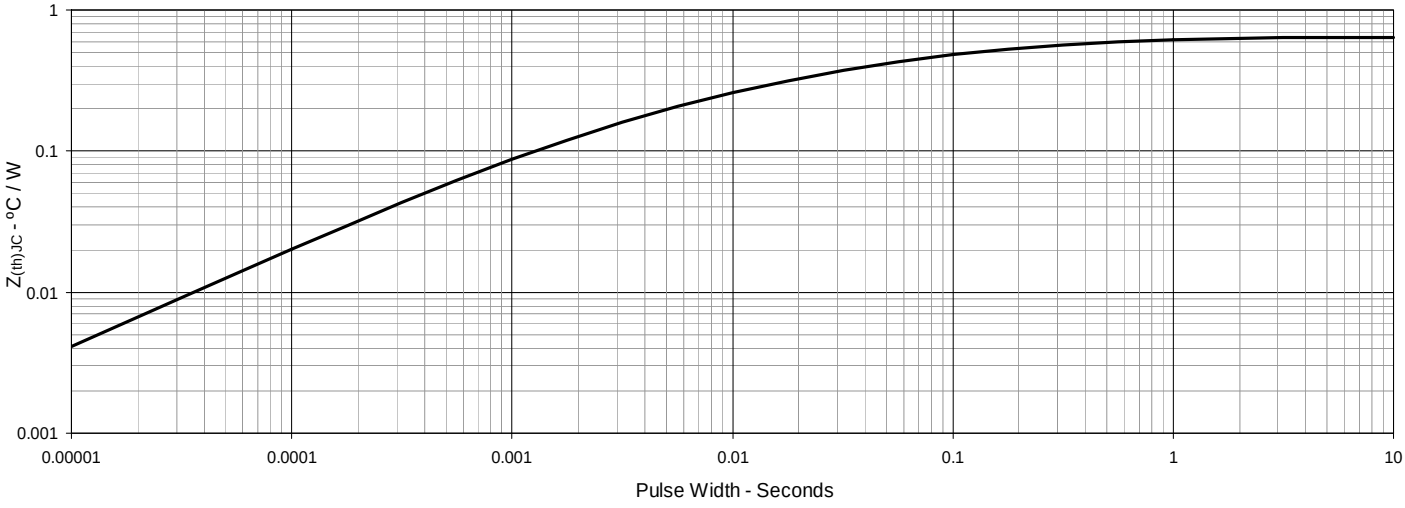


Fig. 11. Maximum Transient Thermal Impedance



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

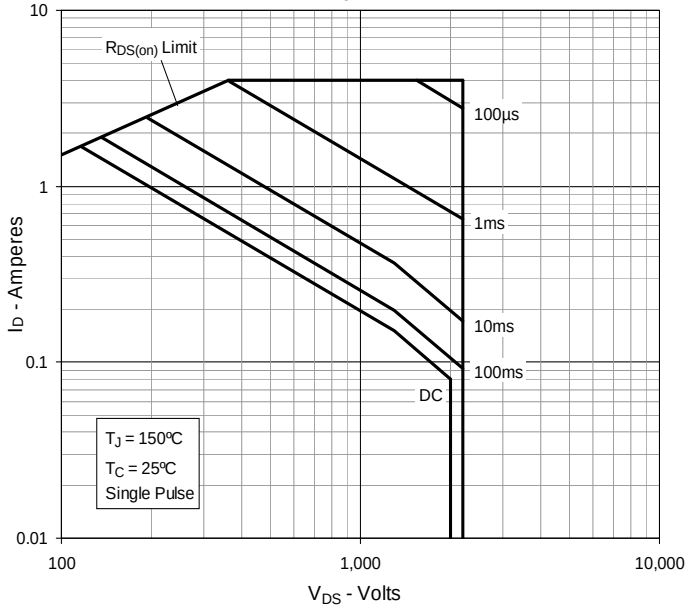
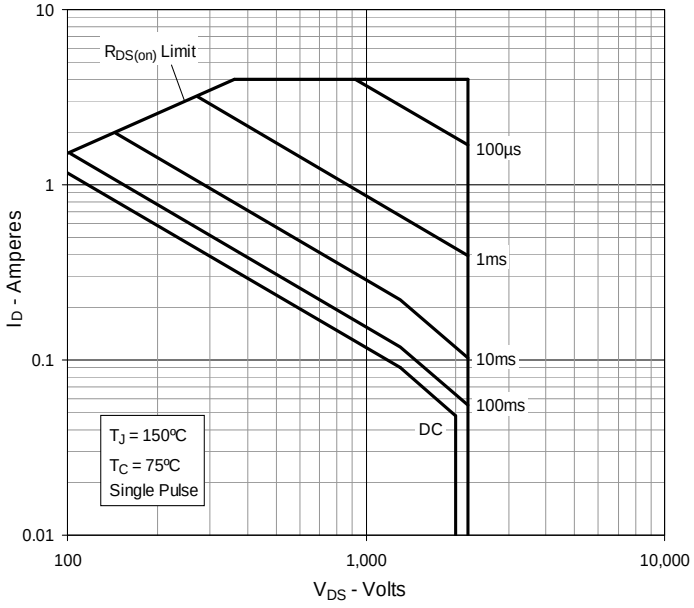


Fig. 13. Forward-Bias Safe Operating Area @ T_C = 75ºC



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