

High Voltage Power MOSFET

IXTH1R8N220P3HV

$$V_{DSS} = 2200V$$

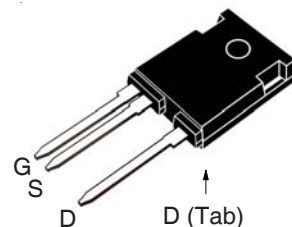
$$I_{D25} = 1.8A$$

$$R_{DS(on)} \leq 21.5\Omega$$

N-Channel Enhancement Mode



TO-247HV



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

Symbol	Test Conditions	Maximum Ratings	
V_{DSS}	$T_J = 25^\circ\text{C}$ to 150°C	2200	V
V_{DGR}	$T_J = 25^\circ\text{C}$ to 150°C , $R_{GS} = 1M\Omega$	2200	V
V_{GSS}	Continuous	± 20	V
V_{GSM}	Transient	± 30	V
I_{D25}	$T_C = 25^\circ\text{C}$	1.8	A
I_{D110}	$T_C = 110^\circ\text{C}$	1.0	A
I_{DM}	$T_C = 25^\circ\text{C}$, Pulse Width Limited by T_{JM}	4.0	A
P_D	$T_C = 25^\circ\text{C}$	194	W
T_J		- 55 ... +150	$^\circ\text{C}$
T_{JM}		150	$^\circ\text{C}$
T_{stg}		- 55 ... +150	$^\circ\text{C}$
T_L	Maximum Lead Temperature for Soldering	300	$^\circ\text{C}$
T_{SOLD}	1.6 mm (0.062in.) from Case for 10s	260	$^\circ\text{C}$
M_d	Mounting Torque	1.13/10	Nm/lb.in
Weight		6	g

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

Symbol	Test Conditions ($T_J = 25^\circ\text{C}$, Unless Otherwise Specified)	Characteristic Values		
		Min.	Typ.	Max.
BV_{DSS}	$V_{GS} = 0V$, $I_D = 250\mu\text{A}$	2200		V
$V_{GS(th)}$	$V_{DS} = V_{GS}$, $I_D = 250\mu\text{A}$	2.0		4.0 V
I_{GSS}	$V_{GS} = \pm 20V$, $V_{DS} = 0V$			± 100 nA
I_{DSS}	$V_{DS} = 0.8 \cdot V_{DSS}$, $V_{GS} = 0V$ $T_J = 125^\circ\text{C}$			10 μA 200 μA
$R_{DS(on)}$	$V_{GS} = 10V$, $I_D = 0.9A$, Note 1			21.5 Ω

Symbol	Test Conditions ($T_J = 25^\circ\text{C}$, Unless Otherwise Specified)	Characteristic Values		
		Min.	Typ.	Max.
g_{fs}	$V_{DS} = 60\text{V}$, $I_D = 0.9\text{A}$, Note 1	0.66	1.10	S
C_{iss}	$V_{GS} = 0\text{V}$, $V_{DS} = 25\text{V}$, $f = 1\text{MHz}$		965	pF
C_{oss}			68	pF
C_{rss}			23	pF
$t_{d(on)}$	Resistive Switching Times $V_{GS} = 10\text{V}$, $V_{DS} = 50\text{V}$, $I_D = 1.8\text{A}$ $R_G = 10\Omega$ (External)		11	ns
t_r			25	ns
$t_{d(off)}$			35	ns
t_f			26	ns
$Q_{g(on)}$	$V_{GS} = 10\text{V}$, $V_{DS} = 1.1\text{kV}$, $I_D = 0.5 \cdot I_{D25}$		31	nC
Q_{gs}			4	nC
Q_{gd}			17	nC
R_{thJC}		0.21	0.64	$^\circ\text{C/W}$
R_{thCS}			$^\circ\text{C/W}$	

TO-247HV (IXTH) Outline

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

SYM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	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
ϕP	.138	.142	3.50	3.60
$\phi P1$.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

Source-Drain Diode

Symbol	Test Conditions ($T_J = 25^\circ\text{C}$, Unless Otherwise Specified)	Characteristic Values		
		Min.	Typ.	Max
I_S	$V_{GS} = 0\text{V}$, Note 1			1.8 A
I_{SM}	Repetitive, pulse Width Limited by T_{JM}			7.2 A
V_{SD}	$I_F = I_S$, $V_{GS} = 0\text{V}$, Note 1			1.5 V
t_{rr}	$I_F = 1.8\text{A}$, $-di/dt = 100\text{A}/\mu\text{s}$ $V_R = 100\text{V}$		1.3	μs
Q_{RM}			10.5	μC
I_{RM}			16.4	A

Note: 1. Pulse test, $t \leq 300\mu\text{s}$, duty cycle, $d \leq 2\%$.

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 more of the following U.S. patents:	4,835,592	4,931,844	5,049,961	5,237,481	6,162,665	6,404,065 B1	6,683,344	6,727,585	7,005,734 B2	7,157,338B2
	4,860,072	5,017,508	5,063,307	5,381,025	6,259,123 B1	6,534,343	6,710,405 B2	6,759,692	7,063,975 B2	
	4,881,106	5,034,796	5,187,117	5,486,715	6,306,728 B1	6,583,505	6,710,463	6,771,478 B2	7,071,537	

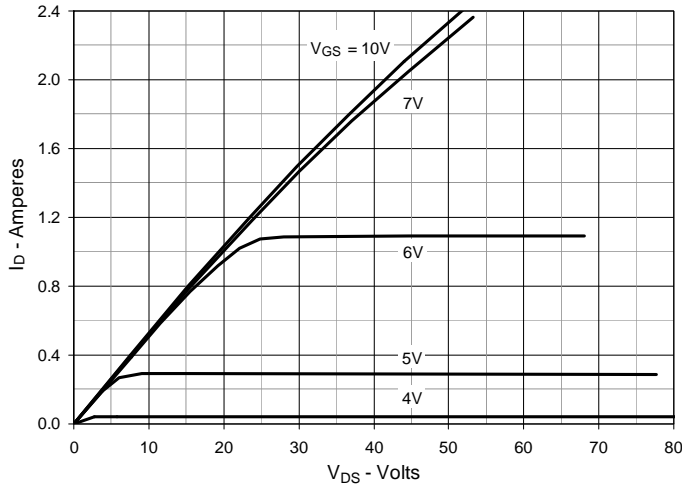
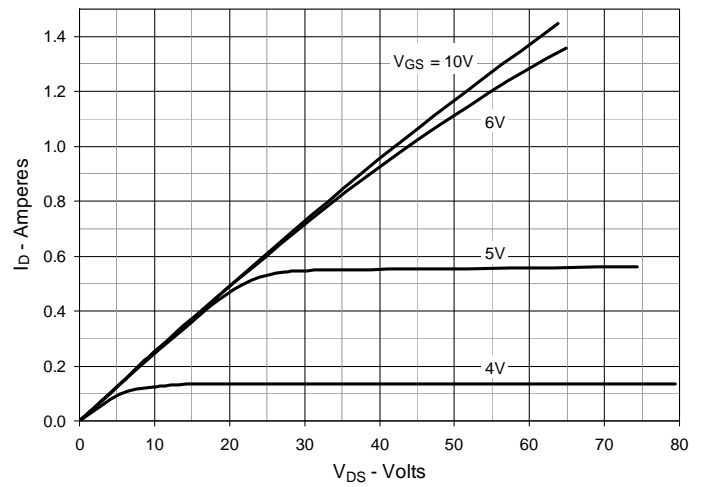
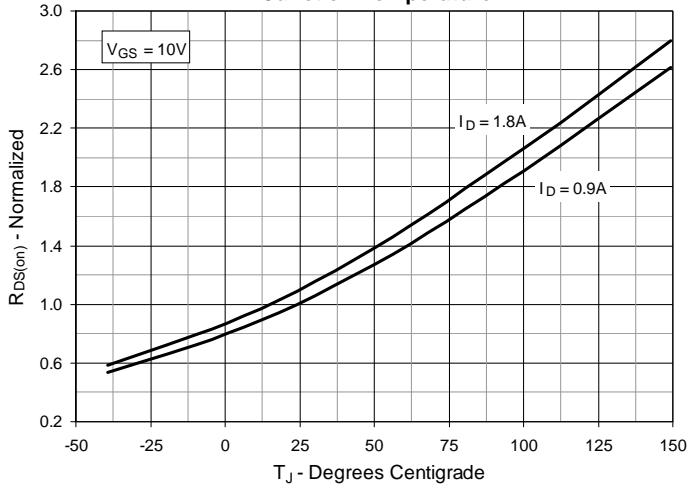
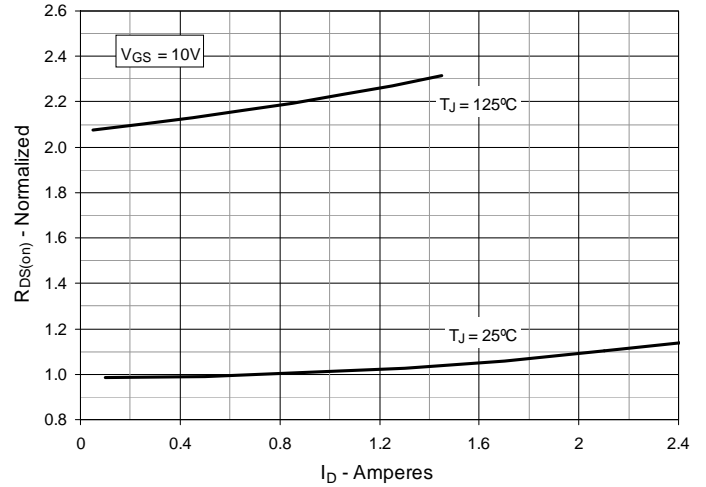
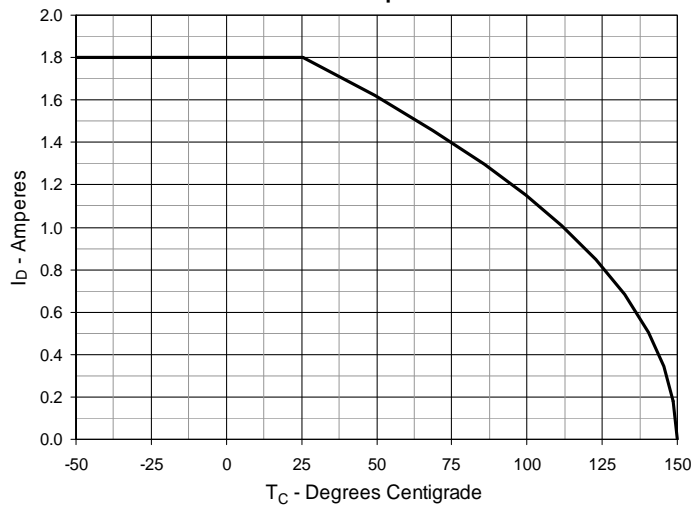
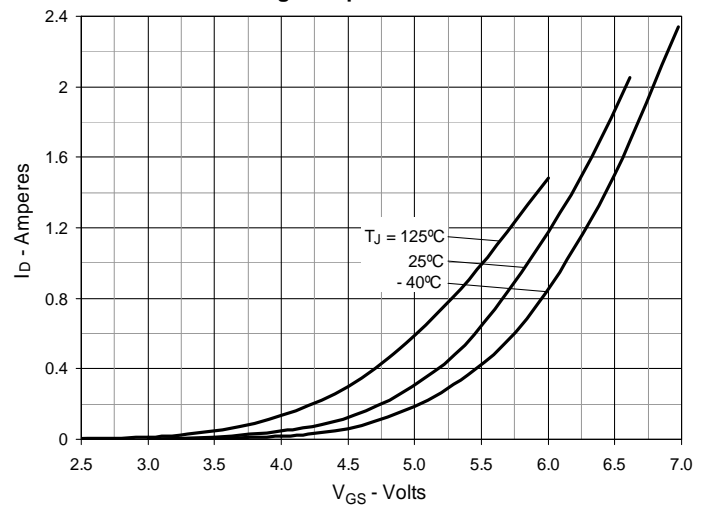
Fig. 1. Output Characteristics @ $T_J = 25^\circ\text{C}$

Fig. 2. Output Characteristics @ $T_J = 125^\circ\text{C}$

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

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

Fig. 5. Maximum Drain Current vs. Case Temperature

Fig. 6. Input Admittance


Fig. 7. Transconductance

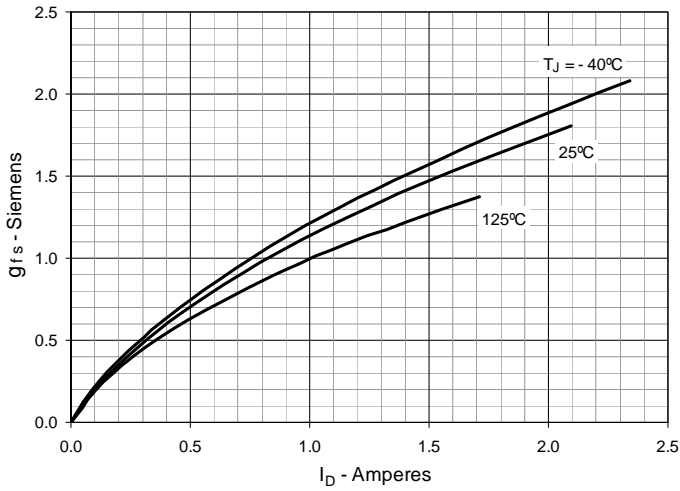


Fig. 8. Forward Voltage Drop of Intrinsic Diode

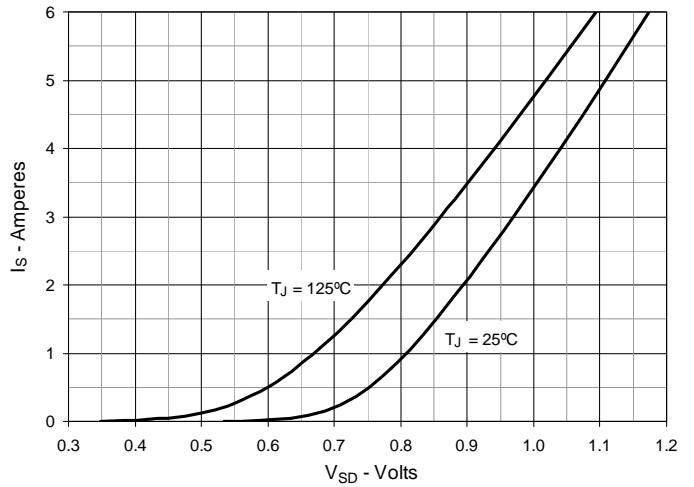


Fig. 9. Gate Charge

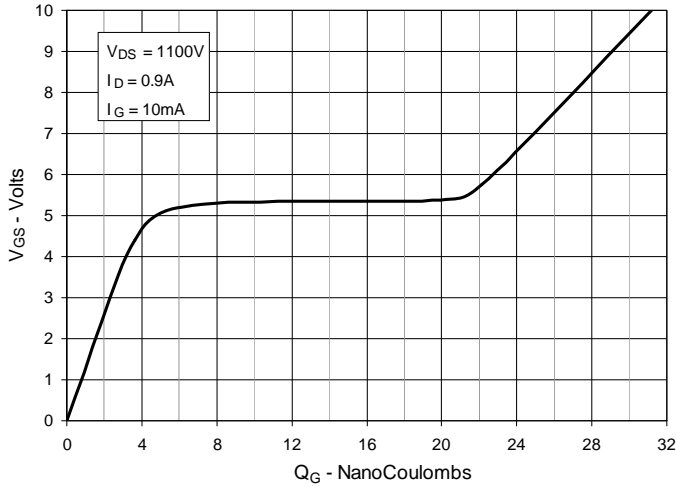


Fig. 10. Capacitance

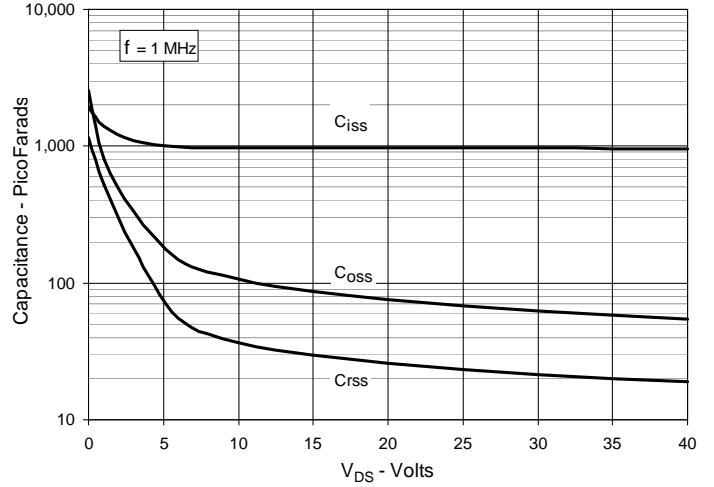


Fig. 11. Maximum Transient Thermal Impedance

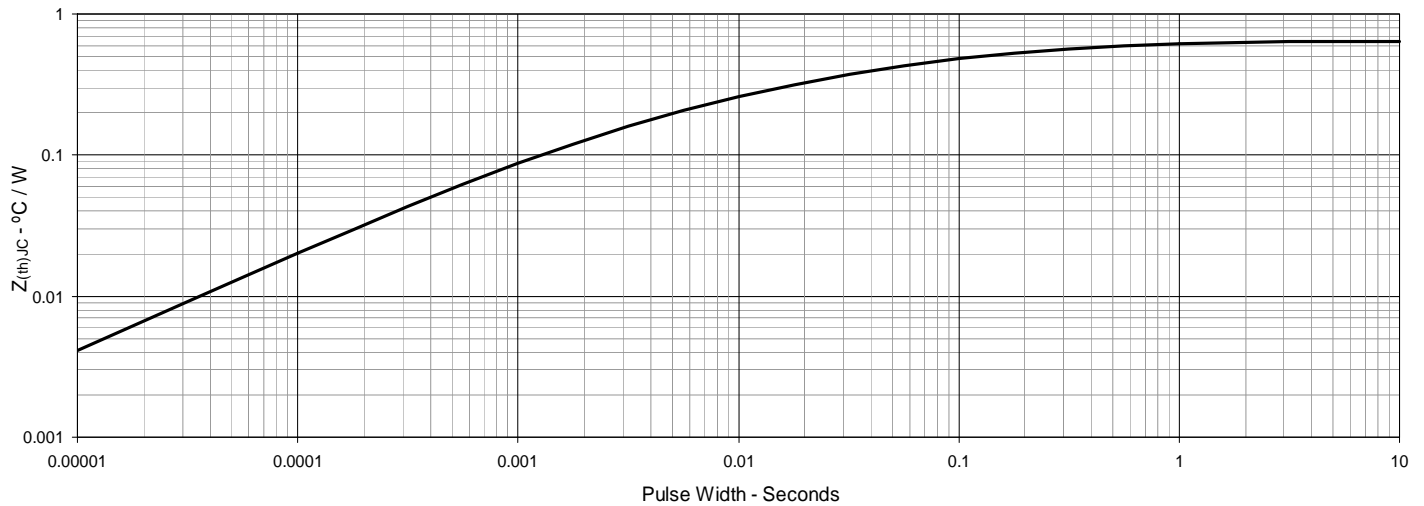


Fig. 12. Forward-Bias Safe Operating Area
@ $T_C = 25^\circ\text{C}$

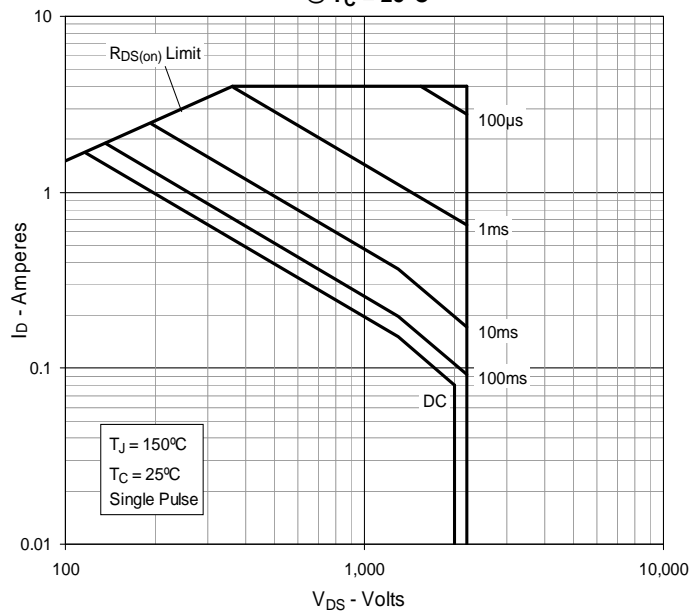
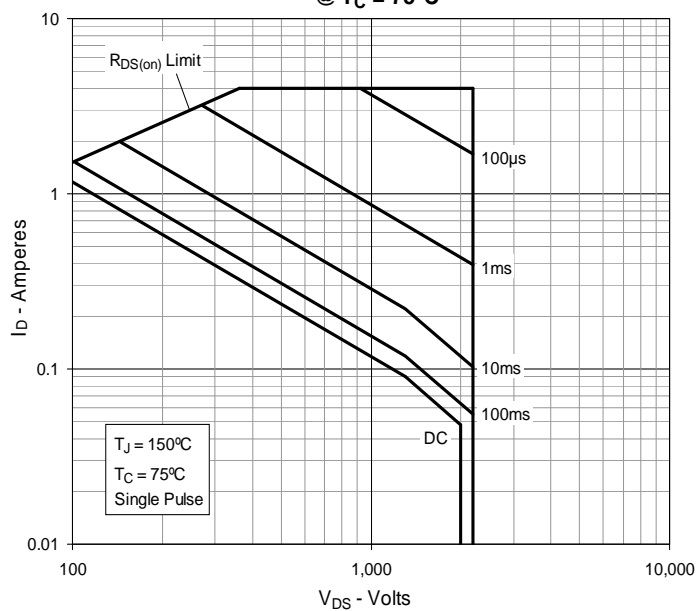


Fig. 13. Forward-Bias Safe Operating Area
@ $T_C = 75^\circ\text{C}$





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