

High Voltage Power MOSFET

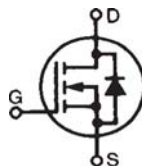
IXTH1R4N250P3

$$V_{DSS} = 2500V$$

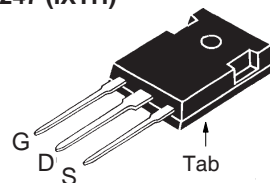
$$I_{D25} = 1.4A$$

$$R_{DS(on)} \leq 28\Omega$$

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}	$T_J = 25^\circ\text{C}$ to 150°C	2500	V
V_{DGR}	$T_J = 25^\circ\text{C}$ to 150°C , $R_{GS} = 1M\Omega$	2500	V
V_{GSS}	Continuous	± 20	V
V_{GSM}	Transient	± 30	V
I_{D25}	$T_C = 25^\circ\text{C}$	1.4	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}	3.5	A
P_D	$T_C = 25^\circ\text{C}$	195	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
- 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 ($T_J = 25^\circ\text{C}$, Unless Otherwise Specified)	Characteristic Values		
		Min.	Typ.	Max.
BV_{DSS}	$V_{GS} = 0V$, $I_D = 250\mu\text{A}$	2500		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}	$V_{DS} = 0.8 \cdot V_{DSS}$, $V_{GS} = 0V$ $T_J = 125^\circ\text{C}$			25 μA 250 μA
$R_{DS(on)}$	$V_{GS} = 10V$, $I_D = 0.7A$, Note 1			28 Ω

Symbol	Test Conditions ($T_J = 25^\circ\text{C}$, Unless Otherwise Specified)	Characteristic Values		
		Min.	Typ.	Max.
g_{fs}	$V_{DS} = 60\text{V}$, $I_D = 0.7\text{A}$, Note 1	0.55	0.90	S
C_{iss}	$V_{GS} = 0\text{V}$, $V_{DS} = 25\text{V}$, $f = 1\text{MHz}$		960	pF
C_{oss}			64	pF
C_{rss}			22	pF
$t_{d(on)}$	Resistive Switching Times $V_{GS} = 10\text{V}$, $V_{DS} = 1250\text{V}$, $I_D = I_{D25}$ $R_G = 5\Omega$ (External) Note 2		18	ns
t_r			24	ns
$t_{d(off)}$			39	ns
t_f			87	ns
$Q_{g(on)}$	$V_{GS} = 10\text{V}$, $V_{DS} = 1250\text{V}$, $I_D = 0.5 \cdot I_{D25}$		33.0	nC
Q_{gs}			4.0	nC
Q_{gd}			18.5	nC
R_{thJC}				0.64 $^\circ\text{C/W}$
R_{thCS}		0.21		$^\circ\text{C/W}$

Source-Drain Diode

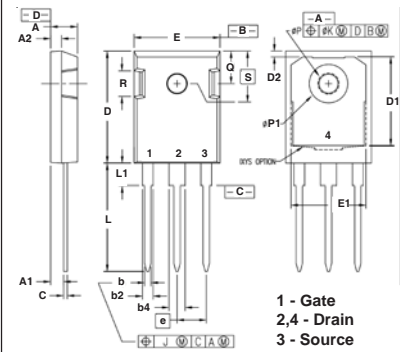
Symbol	Test Conditions ($T_J = 25^\circ\text{C}$ Unless Otherwise Specified)	Characteristic Values		
		Min.	Typ.	Max.
I_S	$V_{GS} = 0\text{V}$			1.4 A
I_{SM}	Repetitive, Pulse Width Limited by T_{JM}			5.6 A
V_{SD}	$I_F = I_S$, $V_{GS} = 0\text{V}$, Note 1			1.5 V
t_{rr}	$I_F = I_{D25}$, $-di/dt = 100\text{A}/\mu\text{s}$		1.8	μs
Q_{RM}			16.7	μC
I_{RM}		$V_R = 100\text{V}$, $V_{GS} = 0\text{V}$		18.8

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

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.

TO-247 Outline



Dim.	Millimeter		Inches	
	min	max	min	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	

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	

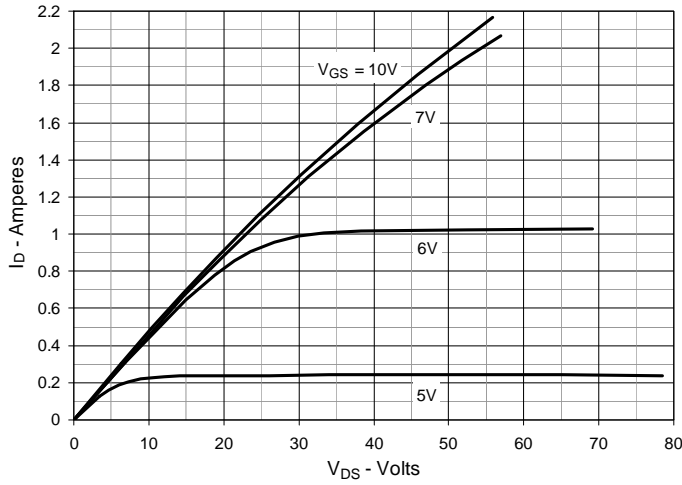
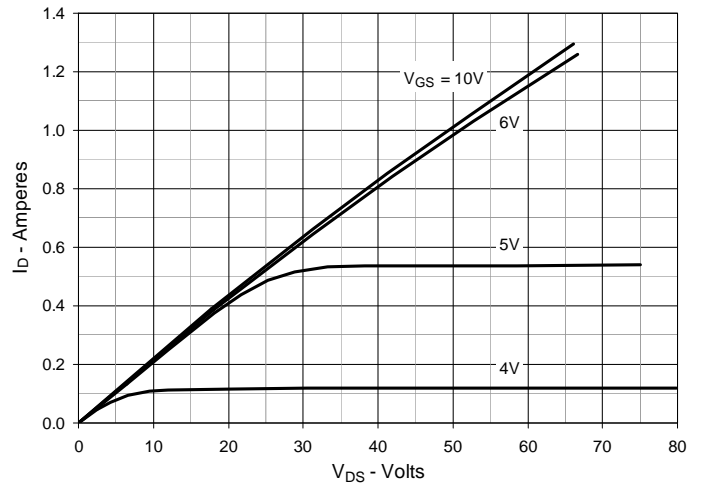
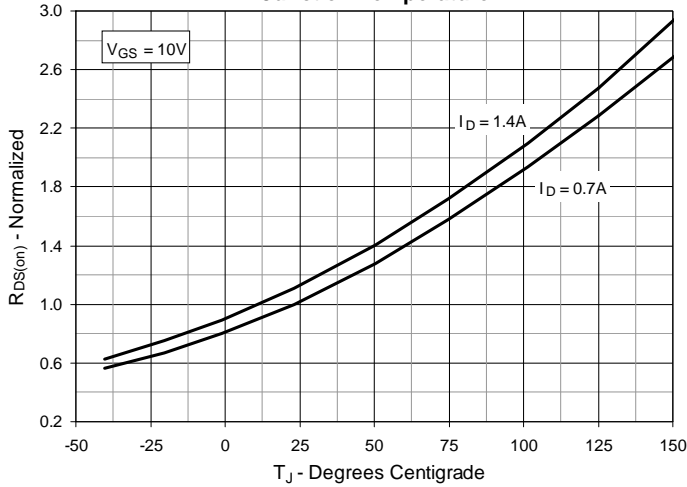
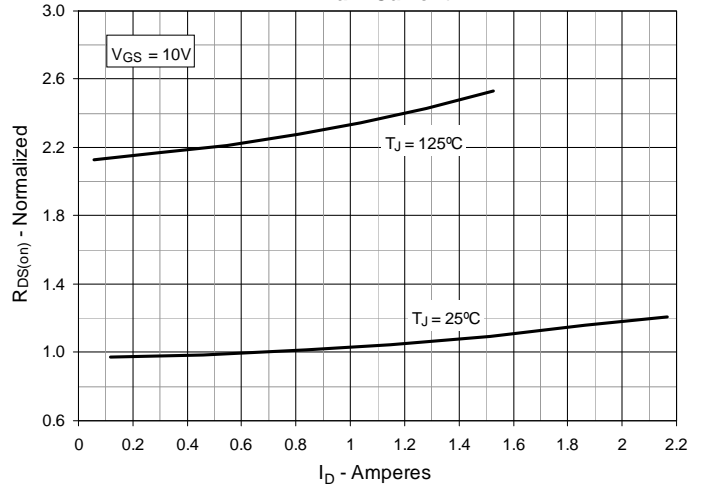
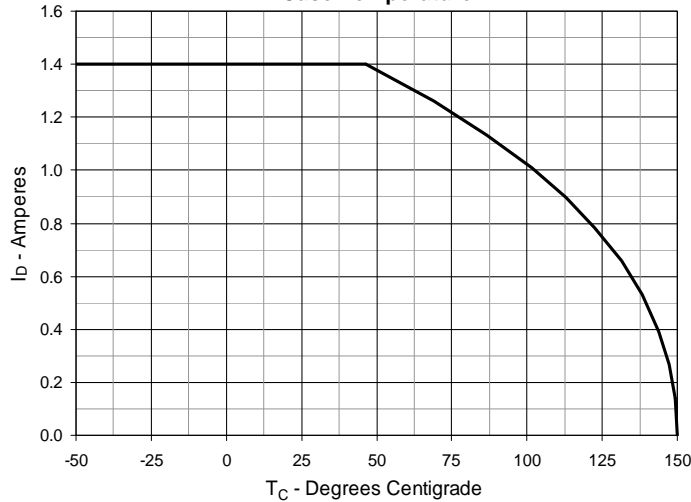
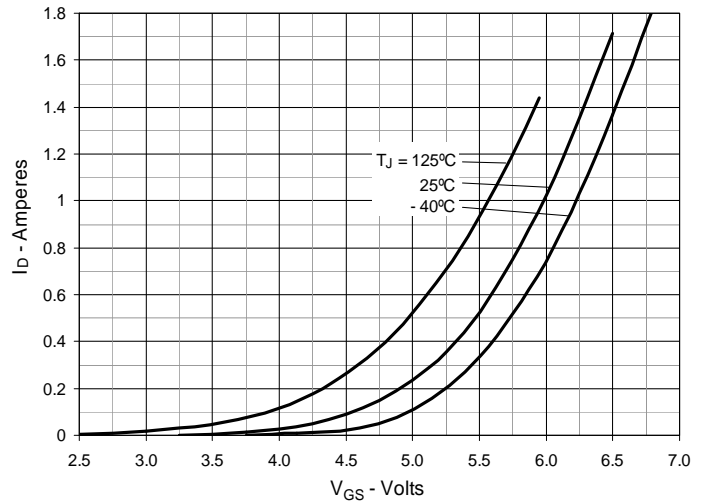
Fig. 1. Output Characteristics @ $T_J = 25^\circ\text{C}$

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

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

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

Fig. 5. Maximum Drain Current vs. Case Temperature

Fig. 6. Input Admittance


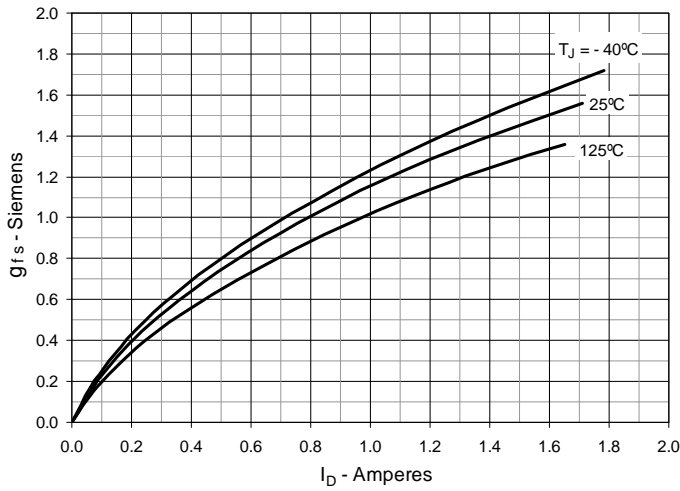
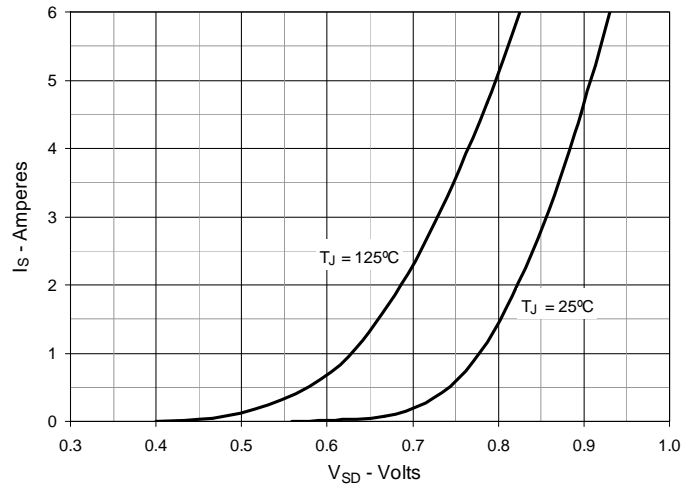
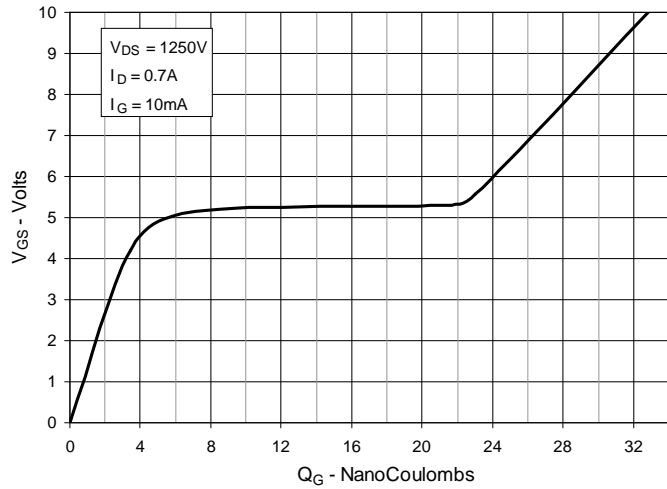
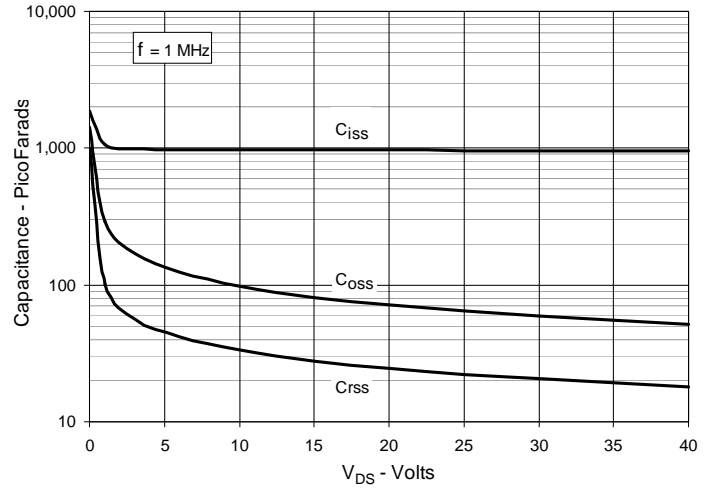
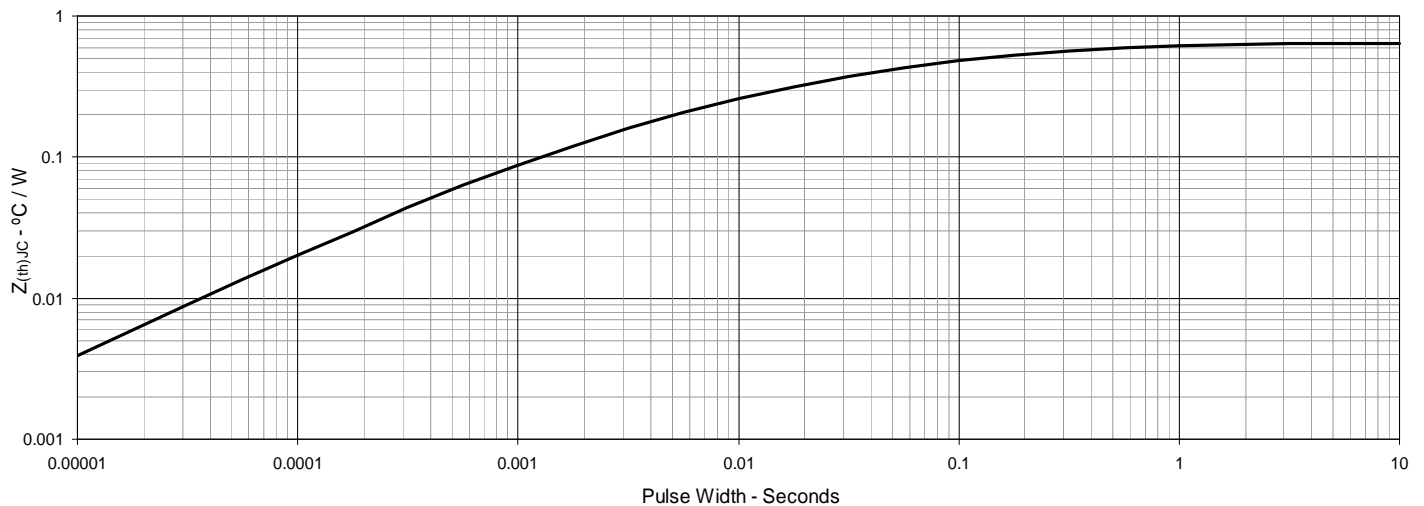
Fig. 7. Transconductance

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
@ $T_C = 25^\circ\text{C}$

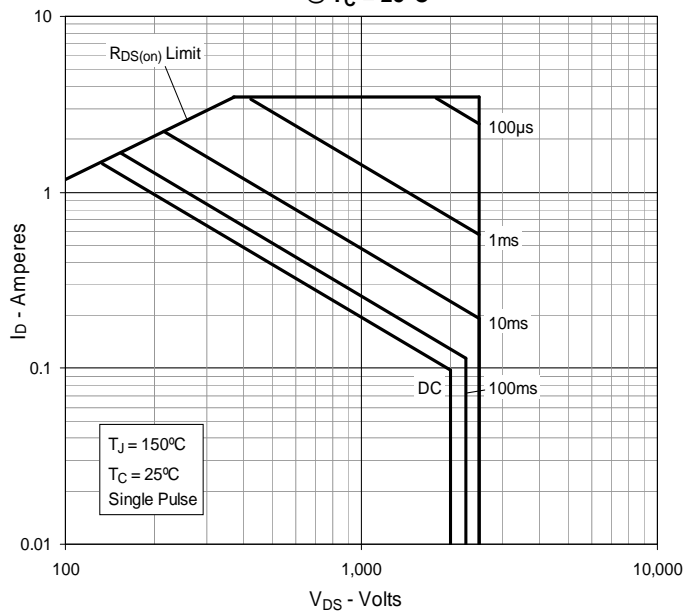
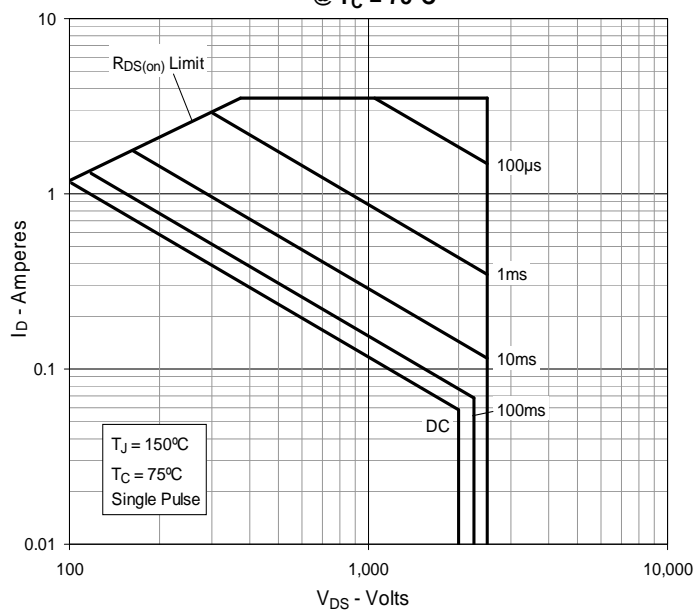


Fig. 13. Forward-Bias Safe Operating Area
@ $T_C = 75^\circ\text{C}$





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