

# High Voltage Power MOSFET

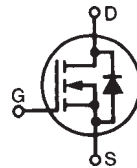
## IXTH1N250

$$V_{DSS} = 2500V$$

$$I_{D25} = 1.5A$$

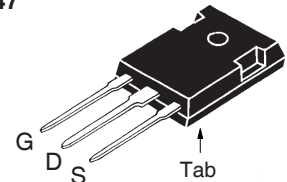
$$R_{DS(on)} \leq 40\Omega$$

N-Channel Enhancement Mode  
Fast Intrinsic Diode



Symbol	Test Conditions	Maximum Ratings	
$V_{DSS}$	$T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$	2500	V
$V_{DGR}$	$T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$ , $R_{GS} = 1M\Omega$	2500	V
$V_{GSS}$	Continuous	$\pm 20$	V
$V_{GSM}$	Transient	$\pm 30$	V
$I_{D25}$	$T_C = 25^\circ\text{C}$	1.5	A
$I_{DM}$	$T_C = 25^\circ\text{C}$ , Pulse Width Limited by $T_{JM}$	6	A
$P_D$	$T_C = 25^\circ\text{C}$	250	W
$T_J$		- 55 ... +150	$^\circ\text{C}$
$T_{JM}$		150	$^\circ\text{C}$
$T_{stg}$		- 55 ... +150	$^\circ\text{C}$
$T_L$	1.6mm (0.062 in.) From Case for 10s	300	$^\circ\text{C}$
$T_{SOLD}$	Plastic Body for 10s	260	$^\circ\text{C}$
$M_d$	Mounting Torque	1.13 / 10	Nm/lb.in.
<b>Weight</b>		6	g

TO-247



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

### Features

- International Standard Package
- Molding Epoxies Meet UL 94 V-0 Flammability Classification
- Fast Intrinsic Diode
- Low Package Inductance

### Advantages

- Easy to Mount
- Space Savings
- High Power Density

### Applications

- High Voltage Power Supplies
- Capacitor Discharge
- Pulse Circuits

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
$I_{GSS}$	$V_{GS} = \pm 20V$ , $V_{DS} = 0V$			$\pm 100$ nA
$I_{DSS}$	$V_{DS} = 0.8 \cdot V_{DSS}$ , $V_{GS} = 0V$ $T_J = 125^\circ\text{C}$		25	$\mu\text{A}$ $\mu\text{A}$
$R_{DS(on)}$	$V_{GS} = 10V$ , $I_D = 0.5 \cdot I_{D25}$ , Note 1			40 $\Omega$

Symbol	Test Conditions ( $T_J = 25^\circ\text{C}$ , Unless Otherwise Specified)	Characteristic Values		
		Min.	Typ.	Max.
$g_{fs}$	$V_{DS} = 50\text{V}$ , $I_D = 0.5\text{A}$ , Note 1	1.0	1.8	mS
$C_{iss}$	$V_{GS} = 0\text{V}$ , $V_{DS} = 25\text{V}$ , $f = 1\text{MHz}$		1660	pF
$C_{oss}$			77	pF
$C_{rss}$			23	pF
$t_{d(on)}$	<b>Resistive Switching Times</b> $V_{GS} = 10\text{V}$ , $V_{DS} = 0.5 \cdot V_{DSS}$ , $I_D = 1\text{A}$ $R_G = 5\Omega$ (External)		69	ns
$t_r$			25	ns
$t_{d(off)}$			132	ns
$t_f$			39	ns
$Q_{g(on)}$	$V_{GS} = 10\text{V}$ , $V_{DS} = 600\text{V}$ , $I_D = 0.5\text{A}$		41	nC
$Q_{gs}$			8	nC
$Q_{gd}$			16	nC
$R_{thJC}$			0.50	$^\circ\text{C/W}$
$R_{thCS}$		0.21		$^\circ\text{C/W}$

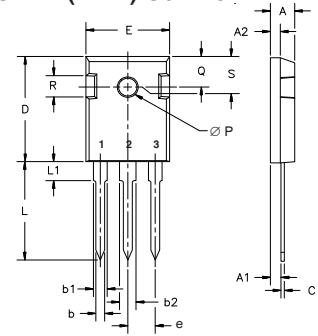
### Source-Drain Diode

Symbol	Test Conditions ( $T_J = 25^\circ\text{C}$ , Unless Otherwise Specified)	Characteristic Values		
		Min.	Typ.	Max.
$I_S$	$V_{GS} = 0\text{V}$			1.5 A
$I_{SM}$	Repetitive, Pulse Width Limited by $T_{JM}$			6 A
$V_{SD}$	$I_F = 1\text{A}$ , $V_{GS} = 0\text{V}$ , Note 1			1.5 V
$t_{rr}$	$I_F = 1\text{A}$ , $-di/dt = 100\text{A}/\mu\text{s}$ , $V_R = 200\text{V}$		2.5	$\mu\text{s}$

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

\*Additional provisions for lead to lead voltage isolation are required at  $V_{DS} > 1200\text{V}$ .

### TO-247 (IXTH) Outline



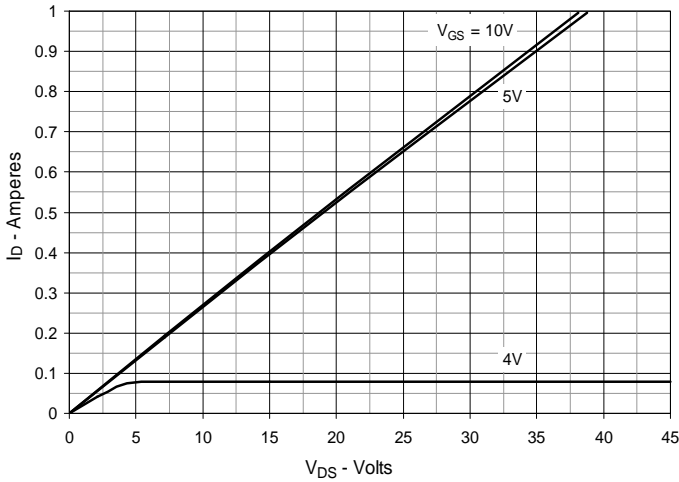
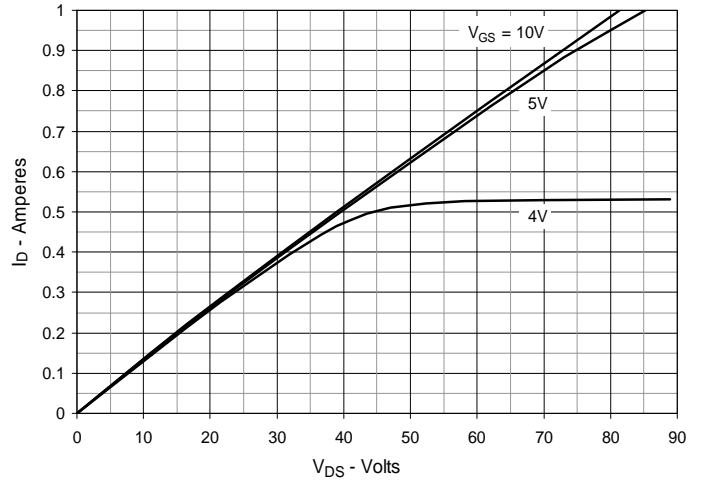
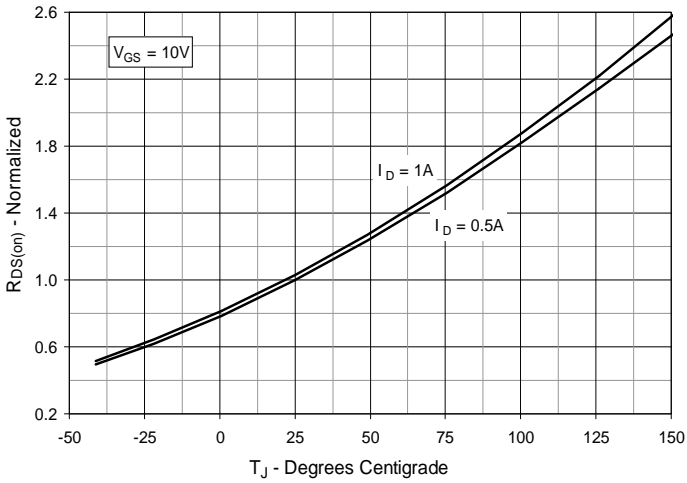
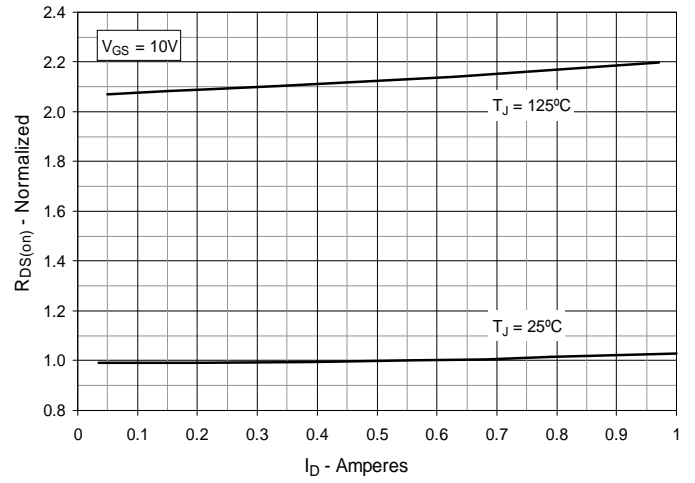
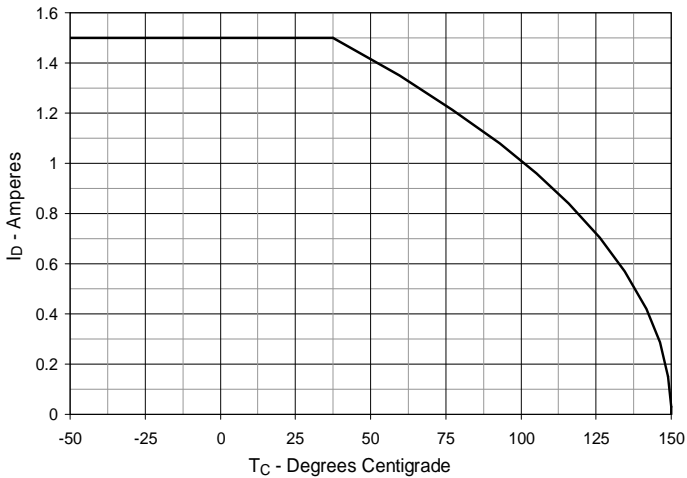
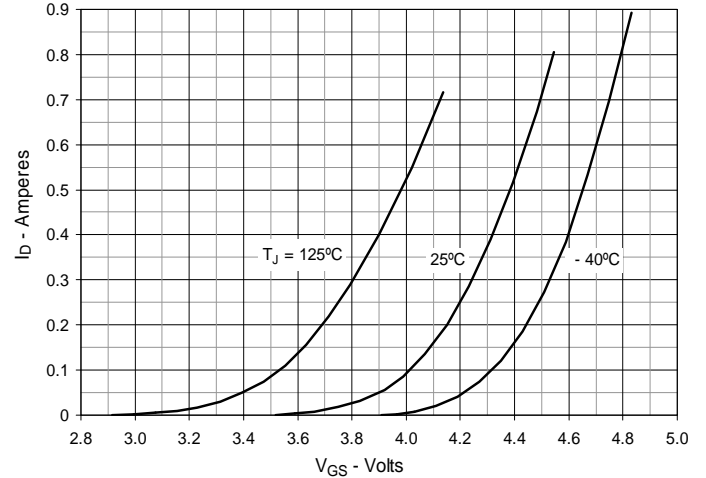
Terminals: 1 - Gate 2 - Drain  
3 - Source

Dim.	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	4.7	5.3	.185	.209
A <sub>1</sub>	2.2	2.54	.087	.102
A <sub>2</sub>	2.2	2.6	.059	.098
b	1.0	1.4	.040	.055
b <sub>1</sub>	1.65	2.13	.065	.084
b <sub>2</sub>	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
ØP	3.55	3.65	.140	.144
Q	5.89	6.40	0.232	0.252
R	4.32	5.49	.170	.216

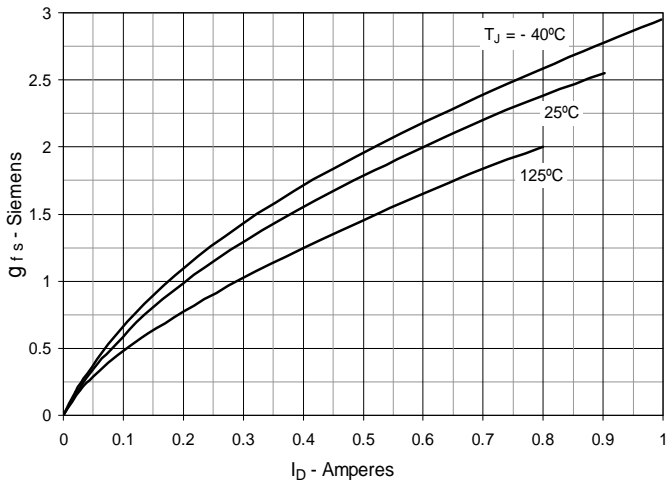
IXYS Reserves the Right to Change Limits, Test Conditions, and Dimensions.

IXYS MOSFETs and IGBTs are covered by one or more of the following U.S. patents:

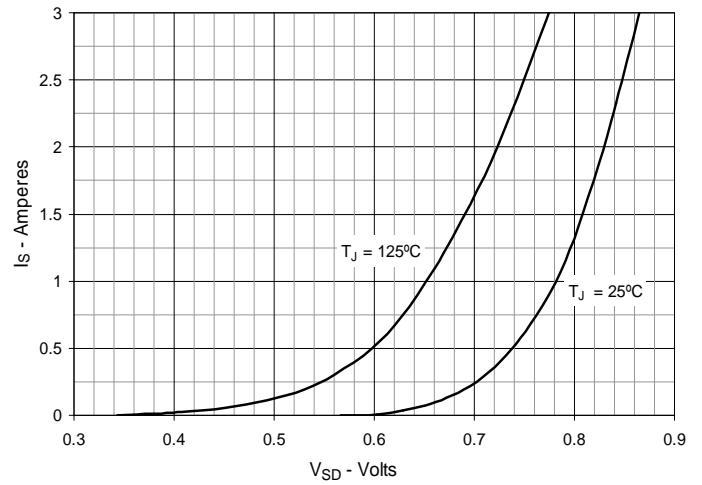
4,835,592	4,931,844	5,049,961	5,237,481	6,162,665	6,404,065 B1	6,683,344	6,727,585	7,005,734 B2	7,157,338B2
4,860,072	5,017,508	5,063,307	5,381,025	6,259,123 B1	6,534,343	6,710,405 B2	6,759,692	7,063,975 B2	
4,881,106	5,034,796	5,187,117	5,486,715	6,306,728 B1	6,583,505	6,710,463	6,771,478 B2	7,071,537	

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

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

**Fig. 4.  $R_{DS(on)}$  Normalized to  $I_D = 0.5\text{A}$  Value vs. Junction Temperature**

**Fig. 3.  $R_{DS(on)}$  Normalized to  $I_D = 0.5\text{A}$  Value vs. Drain Current**

**Fig. 5. Maximum Drain Current vs. Case Temperature**

**Fig. 6. Input Admittance**


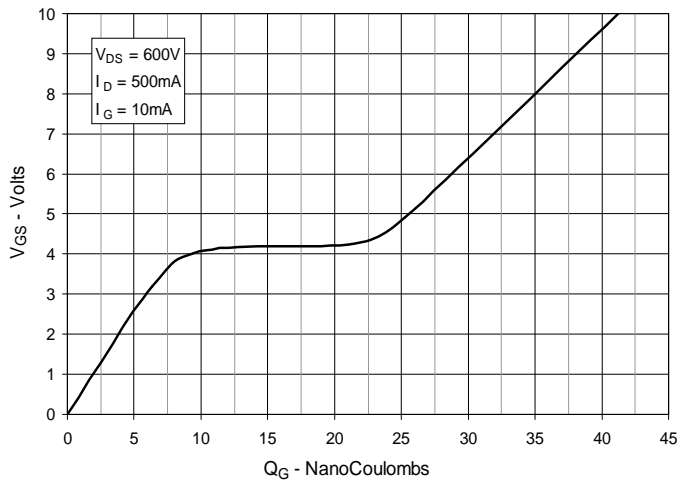
**Fig. 7. Transconductance**



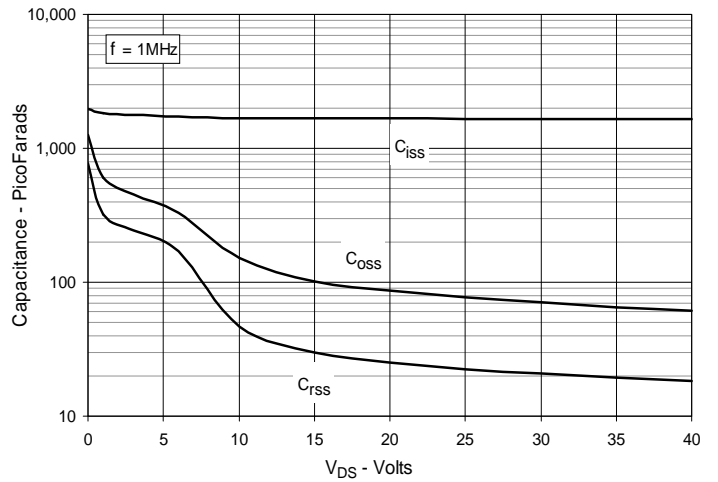
**Fig. 8. Forward Voltage Drop of Intrinsic Diode**



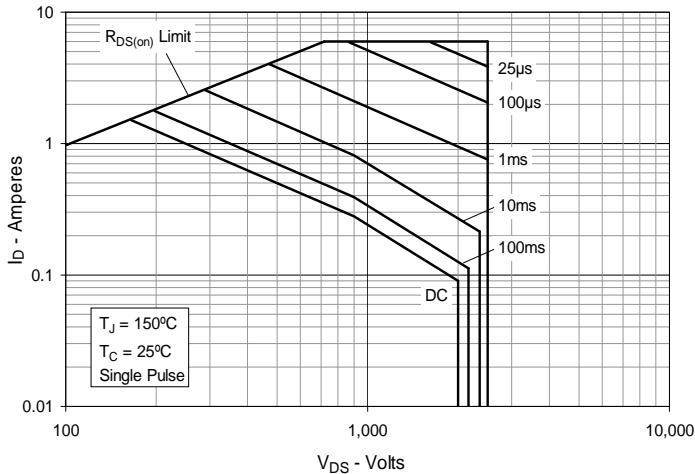
**Fig. 9. Gate Charge**



**Fig. 10. Capacitance**



**Fig. 11. Forward-Bias Safe Operating Area @  $T_C = 25^\circ\text{C}$**



**Fig. 12. Forward-Bias Safe Operating Area @  $T_C = 75^\circ\text{C}$**

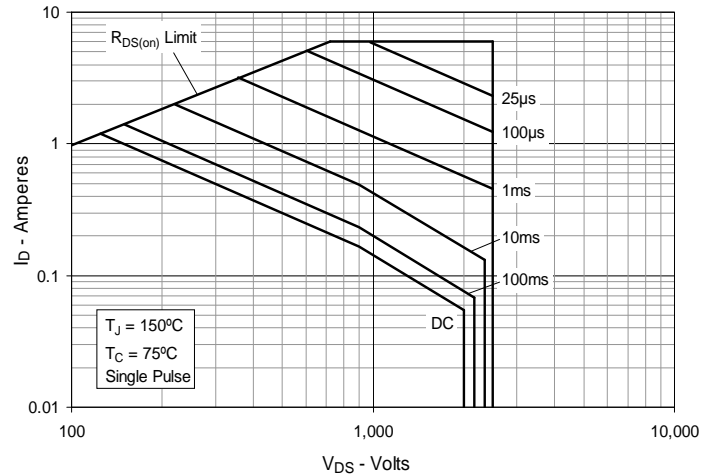


Fig. 13. Maximum Transient Thermal Impedance

