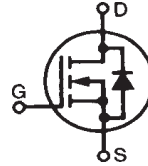


**Linear™ Power  
MOSFET w/ Extended  
FBSOA**

**IXTH12N100L**

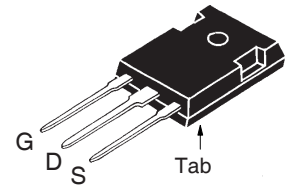
**V<sub>DSS</sub> = 1000V**  
**I<sub>D25</sub> = 12A**  
**R<sub>DS(on)</sub> ≤ 1.3Ω**

N-Channel Enhancement Mode  
Avalanche Rated



Symbol	Test Conditions	Maximum Ratings	
V <sub>DSS</sub>	T <sub>J</sub> = 25°C to 150°C	1000	V
V <sub>DGR</sub>	T <sub>J</sub> = 25°C to 150°C, R <sub>GS</sub> = 1MΩ	1000	V
V <sub>GSS</sub>	Continuous	±30	V
V <sub>GSM</sub>	Transient	±40	V
I <sub>D25</sub>	T <sub>C</sub> = 25°C	12	A
I <sub>DM</sub>	T <sub>C</sub> = 25°C, Pulse Width Limited by T <sub>JM</sub>	25	A
I <sub>A</sub>	T <sub>C</sub> = 25°C	12	A
E <sub>AS</sub>	T <sub>C</sub> = 25°C	1.5	J
P <sub>D</sub>	T <sub>C</sub> = 25°C	400	W
T <sub>J</sub>		-55...+150	°C
T <sub>JM</sub>		150	°C
T <sub>stg</sub>		-55...+150	°C
T <sub>L</sub>	1.6mm (0.063 in.) from Case for 10s	300	°C
T <sub>SOLD</sub>	Plastic Body for 10s	260	°C
M <sub>d</sub>	Mounting Torque	1.13/10	Nm/lb.in.
Weight		6	g

TO-247



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

**Features**

- International Standard Package
- Designed for Linear Operation
- Avalanche Rated
- Molding Epoxy Meets UL94 V-0 Flammability Classification

**Advantages**

- Easy to Mount
- Space Savings
- High Power Density

**Applications**

- Programmable Loads
- Current Regulators
- DC-DC Converters
- Battery Chargers
- DC Choppers
- Temperature and Lighting Controls

Symbol	Test Conditions (T <sub>J</sub> = 25°C, Unless Otherwise Specified)	Characteristic Values		
		Min.	Typ.	Max.
BV <sub>DSS</sub>	V <sub>GS</sub> = 0V, I <sub>D</sub> = 250μA	1000		V
V <sub>GS(th)</sub>	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250μA	3.5		5.5 V
I <sub>GSS</sub>	V <sub>GS</sub> = ±30V, V <sub>DS</sub> = 0V			±100 nA
I <sub>DSS</sub>	V <sub>DS</sub> = V <sub>DSS</sub> , V <sub>GS</sub> = 0V T <sub>J</sub> = 125°C			50 μA 500 μA
R <sub>DS(on)</sub>	V <sub>GS</sub> = 20V, I <sub>D</sub> = 0.5 • I <sub>DSS</sub> , Note 1			1.3 Ω

Symbol	Test Conditions ( $T_J = 25^\circ\text{C}$ , Unless Otherwise Specified)	Characteristic Values		
		Min.	Typ.	Max.
$g_{fs}$	$V_{DS} = 20\text{V}$ , $I_D = 0.5 \cdot I_{DSS}$ , Note 1	3.0	5.0	S
$C_{iss}$	$V_{GS} = 0\text{V}$ , $V_{DS} = 25\text{V}$ , $f = 1\text{MHz}$		2500	pF
$C_{oss}$			300	pF
$C_{rss}$			95	pF
$t_{d(on)}$	<b>Resistive Switching Times</b> $V_{GS} = 15\text{V}$ , $V_{DS} = 0.5 \cdot V_{DSS}$ , $I_D = 0.5 \cdot I_{DSS}$ $R_G = 4.7\Omega$ (External)		30	ns
$t_r$			55	ns
$t_{d(off)}$			110	ns
$t_f$			65	ns
$Q_{g(on)}$	$V_{GS} = 20\text{V}$ , $V_{DS} = 0.5 \cdot V_{DSS}$ , $I_D = 0.5 \cdot I_{DSS}$		155	nC
$Q_{gs}$			35	nC
$Q_{gd}$			55	nC
$R_{thJC}$			0.31	$^\circ\text{C/W}$
$R_{thCS}$		0.21		$^\circ\text{C/W}$

### Safe-Operating-Area Specification

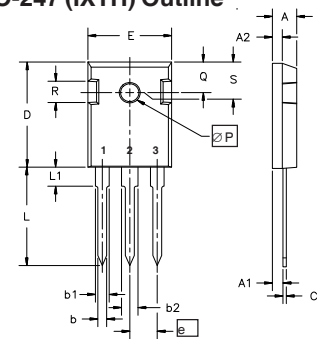
Symbol	Test Conditions	Characteristic Values		
		Min.	Typ.	Max.
SOA	$V_{DS} = 800\text{V}$ , $I_D = 0.25\text{A}$ , $T_C = 60^\circ\text{C}$	200		W

### Source-Drain Diode

Symbol	Test Conditions ( $T_J = 25^\circ\text{C}$ , Unless Otherwise Specified)	Characteristic Values		
		Min.	Typ.	Max.
$I_S$	$V_{GS} = 0\text{V}$			12 A
$I_{SM}$	Repetitive, Pulse Width Limited by $T_{JM}$			48 A
$V_{SD}$	$I_F = I_S$ , $V_{GS} = 0\text{V}$ , Note 1			1.5 V
$t_{rr}$	$I_F = I_S$ , $-di/dt = 100\text{A}/\mu\text{s}$ , $V_R = 100\text{V}$ , $V_{GS} = 0\text{V}$		1000	ns

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

### TO-247 (IXTH) Outline



Terminals: 1 - Gate 2 - Drain  
3 - Source

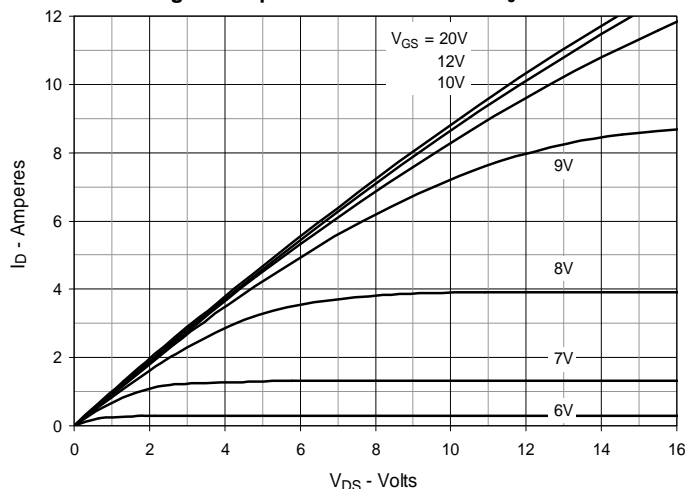
Dim.	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	4.7	5.3	.185	.209
A <sub>1</sub>	2.2	2.54	.087	.102
A <sub>2</sub>	2.2	2.6	.059	.098
b	1.0	1.4	.040	.055
b <sub>1</sub>	1.65	2.13	.065	.084
b <sub>2</sub>	2.87	3.12	.113	.123
C	.4	.8	.016	.031
D	20.80	21.46	.819	.845
E	15.75	16.26	.610	.640
e	5.20	5.72	0.205	0.225
L	19.81	20.32	.780	.800
L1		4.50		.177
∅P	3.55	3.65	.140	.144
Q	5.89	6.40	0.232	0.252
R	4.32	5.49	.170	.216
S	6.15	BSC	.242	BSC

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

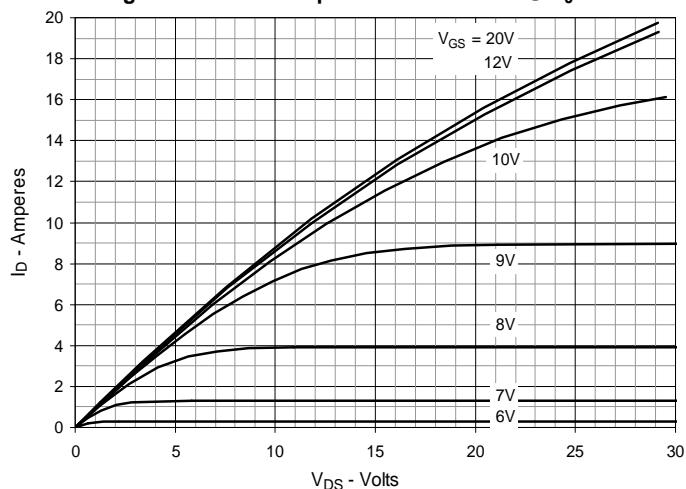
IXYS MOSFETs and IGBTs are covered by one or more of the following U.S. patents:

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	7,157,338 B2
4,850,072	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	

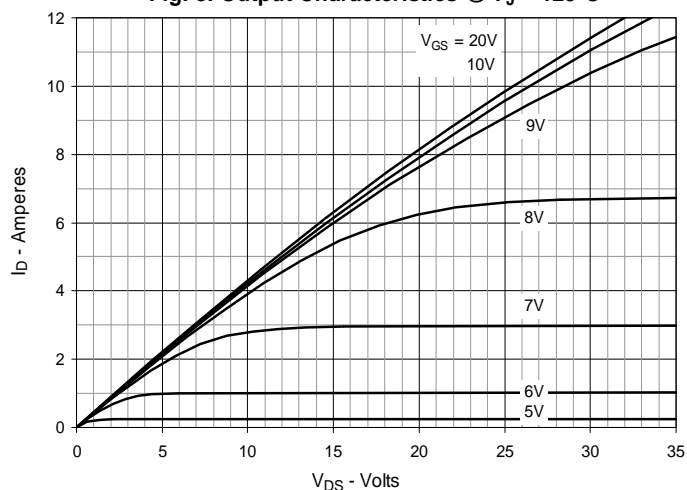
**Fig. 1. Output Characteristics @  $T_J = 25^\circ\text{C}$**



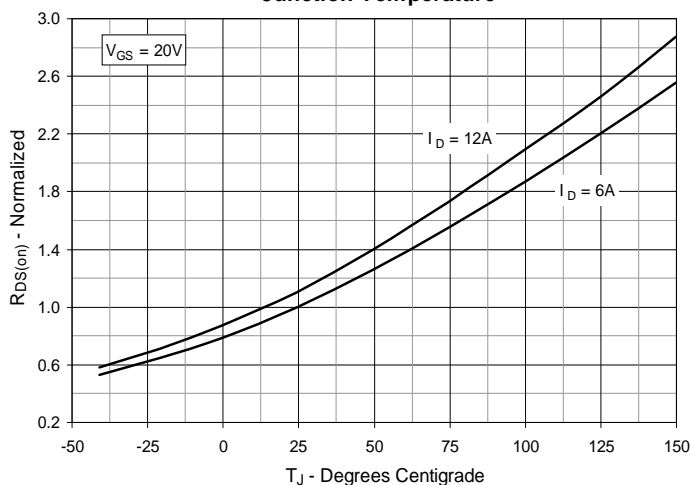
**Fig. 2. Extended Output Characteristics @  $T_J = 25^\circ\text{C}$**



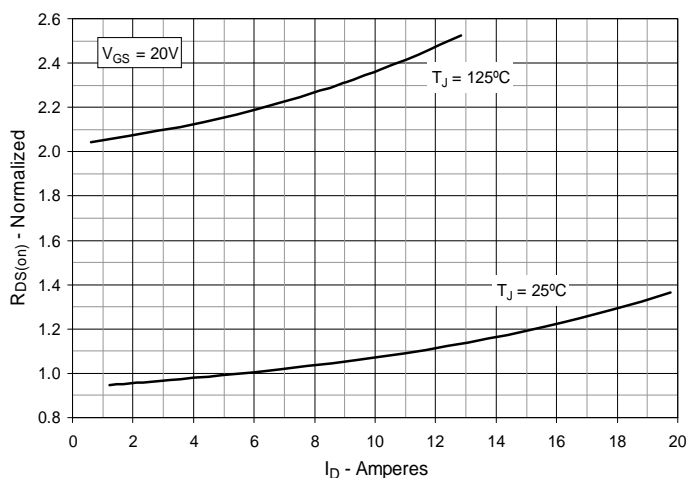
**Fig. 3. Output Characteristics @  $T_J = 125^\circ\text{C}$**



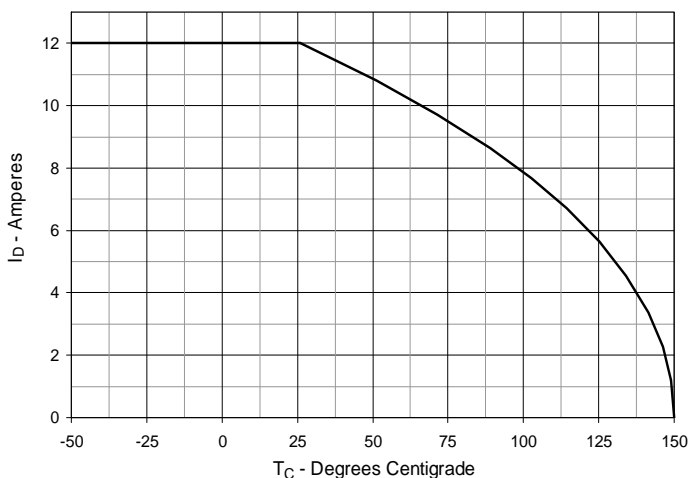
**Fig. 4.  $R_{DS(on)}$  Normalized to  $I_D = 6A$  Value vs. Junction Temperature**

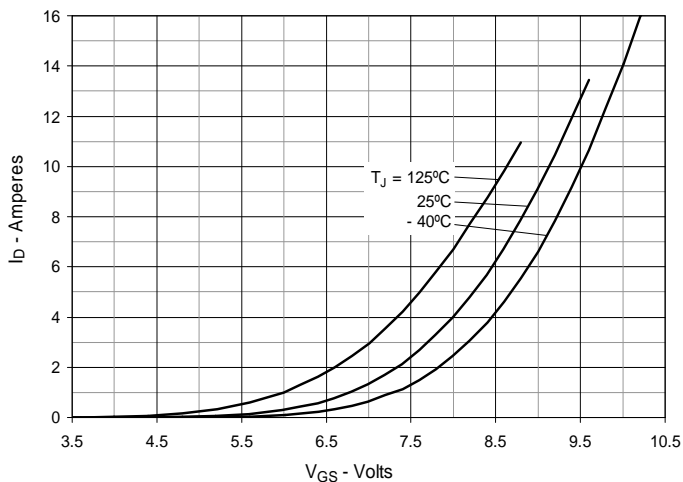
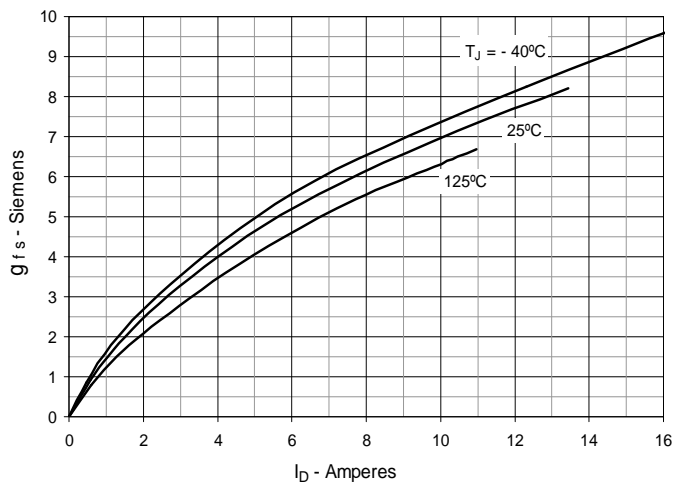
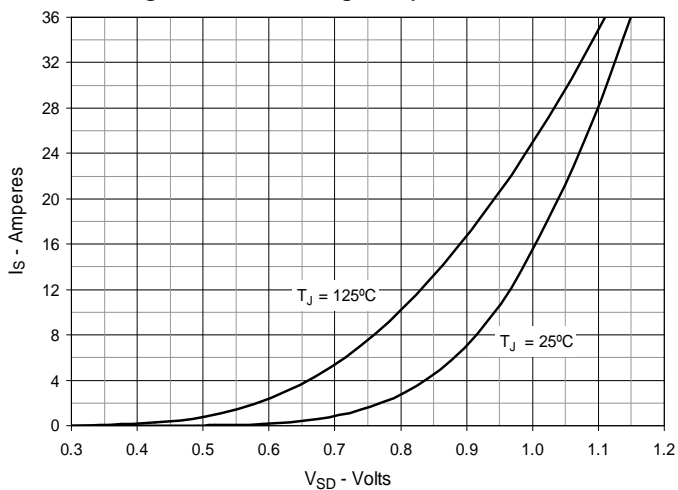
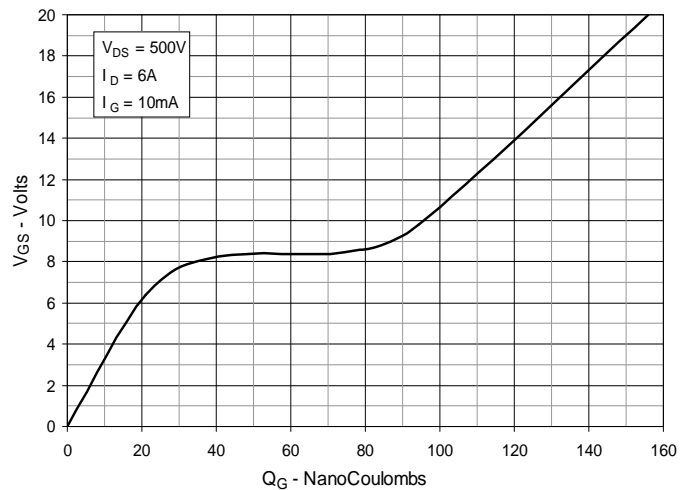
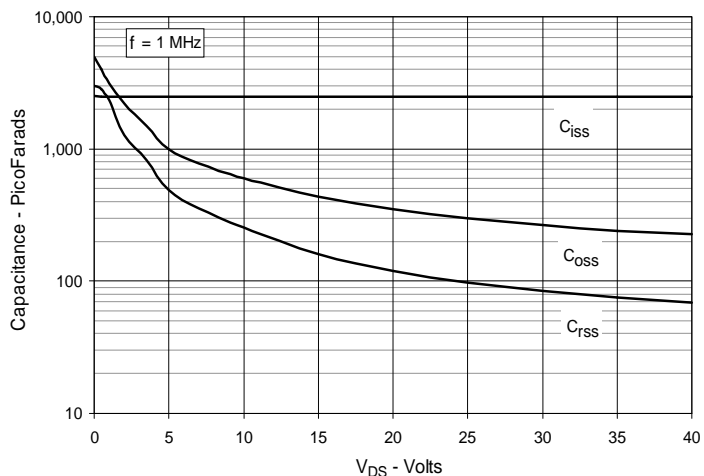
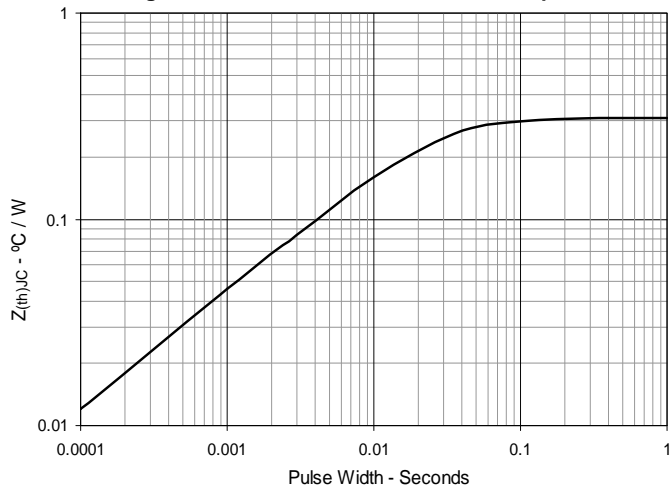


**Fig. 5.  $R_{DS(on)}$  Normalized to  $I_D = 6A$  Value vs. Drain Current**

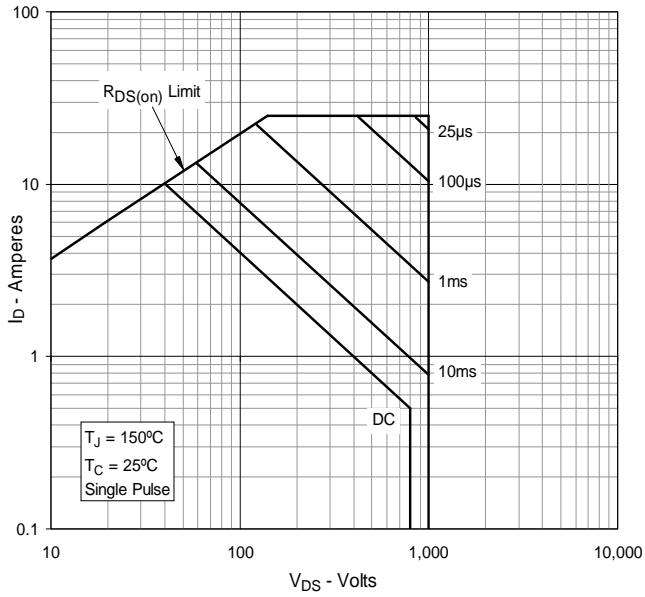


**Fig. 6. Maximum Drain Current vs. Case Temperature**



**Fig. 7. Input Admittance**

**Fig. 8. Transconductance**

**Fig. 9. Forward Voltage Drop of Intrinsic Diode**

**Fig. 10. Gate Charge**

**Fig. 11. Capacitance**

**Fig. 12. Maximum Transient Thermal Impedance**


**Fig. 13. Forward-Bias Safe Operating Area**  
 @  $T_C = 25^\circ\text{C}$



**Fig. 14. Forward-Bias Safe Operating Area**  
 @  $T_C = 60^\circ\text{C}$

