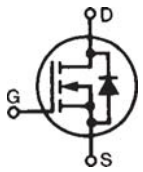
IXYS

Linear™ Power MOSFET w/ Extended FBSOA

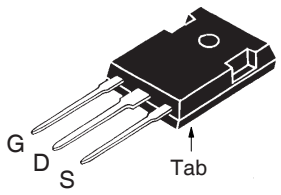
IXTH24N50L

V_{DSS} = 500V
I_{D25} = 24A
$R_{DS(on)}$ ≤ 300mΩ



N-Channel Enhancement Mode
Avalanche Rated

TO-247



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

Symbol	Test Conditions	Maximum Ratings	
V_{DSS}	T_J = 25°C to 150°C	500	V
V_{DGR}	T_J = 25°C to 150°C, R_{GS} = 1MΩ	500	V
V_{GSS}	Continuous	± 30	V
V_{GSM}	Transient	± 40	V
I_{D25}	T_C = 25°C	24	A
I_{DM}	T_C = 25°C, Pulse Width Limited by T_{JM}	50	A
I_A	T_C = 25°C	12	A
E_{AS}	T_C = 25°C	1.5	J
P_D	T_C = 25°C	400	W
T_J		-55 ... +150	°C
T_{JM}		150	°C
T_{stg}		-55 ... +150	°C
T_L	1.6mm (0.062in.) from Case for 10s	300	°C
T_{sold}	Plastic Body for 10 seconds	260	°C
M_d	Mounting Torque	1.13 / 10	Nm/lb.in.
Weight		6	g

Features

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

Advantages

- Easy to Mount
- Space Savings
- High Power Density

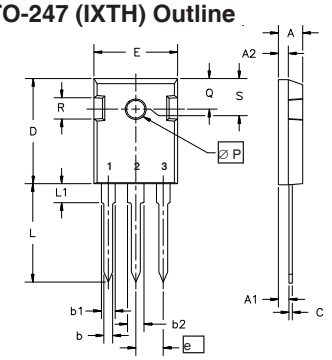
Applications

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

Symbol	Test Conditions (T_J = 25°C, Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.	
BV_{DSS}	V_{GS} = 0V, I_D = 250μA	500			V
$V_{GS(th)}$	$V_{DS} = V_{GS}$, I_D = 250μA	3.5		6.0	V
I_{GSS}	V_{GS} = ±30V, V_{DS} = 0V			±100	nA
I_{DSS}	$V_{DS} = V_{DSS}$, V_{GS} = 0V			50	μA
	T_J = 125°C			500	μA
$R_{DS(on)}$	V_{GS} = 20V, $I_D = 0.5 \bullet I_{D25}$, Note 1			300	mΩ

Symbol	Test Conditions (T_J = 25°C, Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.	
g_{fs}	V_{DS} = 20V, I_D = 0.5 • I_{D25}, Note 1	3	7	11	S
C_{iss}	V_{GS} = 0V, V_{DS} = 25V, f = 1MHz		2500		pF
C_{oss}			400		pF
C_{rss}			100		pF
$t_{d(on)}$	**Resistive Switching Times**		35		ns
t_r	V_{GS} = 15V, V_{DS} = 0.5 • V_{DSS}, I_D = 0.5 • I_{D25}		85		ns
$t_{d(off)}$	R_G = 4.7Ω (External)		110		ns
t_f			75		ns
$Q_{g(on)}$	V_{GS} = 20V, V_{DS} = 0.5 • V_{DSS}, I_D = 0.5 • I_{D25}		160		nC
Q_{gs}			30		nC
Q_{gd}			50		nC
R_{thJC}				0.31	°C/W
R_{thCS}			0.21		°C/W

TO-247 (IXTH) Outline



Terminals: 1 - Gate 2 - Drain
3 - Source

Dim.	Millimeter Min.	Max.	Inches Min.	Max.
A	4.7	5.3	.185	.209
A_1	2.2	2.54	.087	.102
A_2	2.2	2.6	.059	.098
b	1.0	1.4	.040	.055
b_1	1.65	2.13	.065	.084
b_2	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	

Safe-Operating-Area Specification

Symbol	Test Conditions	Characteristic Values Min.	Typ.	Max.	
SOA	V_{DS} = 400V, I_D = 0.5A, T_C = 60°C	200			W

Source-Drain Diode

Symbol	Test Conditions (T_J = 25°C, Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.	
I_S	V_{GS} = 0V			24	A
I_{SM}	Repetitive, Pulse Width Limited by T_{JM}			96	A
V_{SD}	I_F = I_S, V_{GS} = 0V, Note 1			1.5	V
t_{rr}	I_F = I_S, -di/dt = 100A/μs V_R = 100V, V_{GS} = 0V		500		ns

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

Fig. 1. Output Characteristics @ T_J = 25ºC

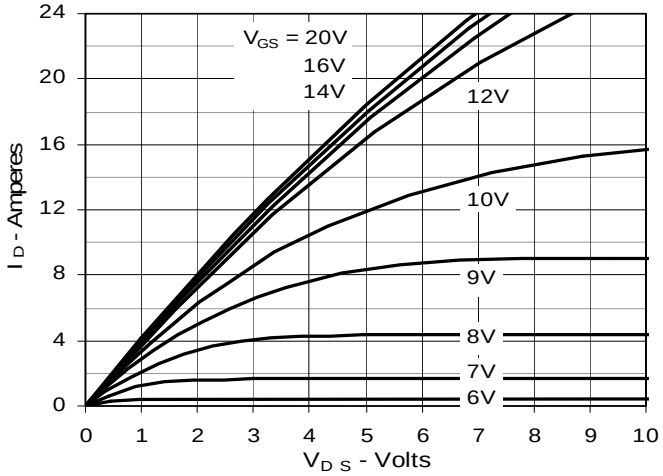


Fig. 2. Extended Output Characteristics @ T_J = 25ºC

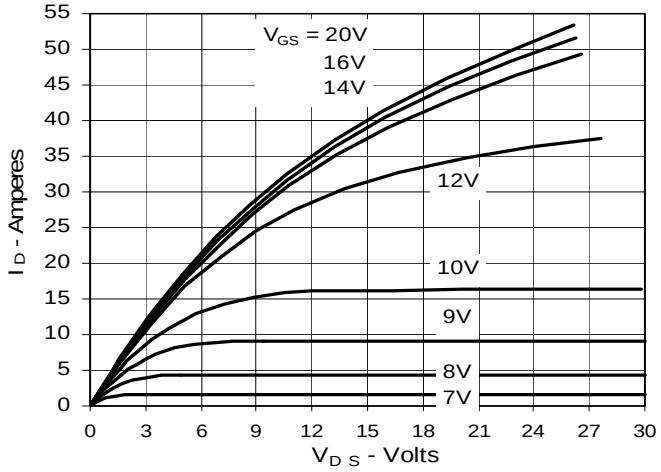


Fig. 3. Output Characteristics @ T_J = 125ºC

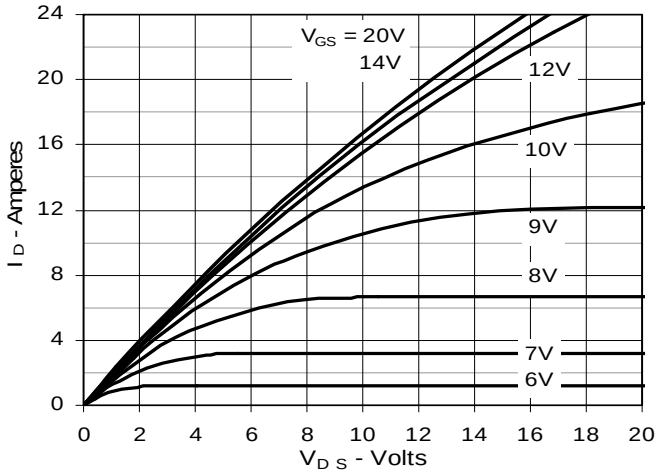


Fig. 4. $R_{DS(on)}$ Normalized to 0.5 I_{D25} Value vs. Junction Temperature

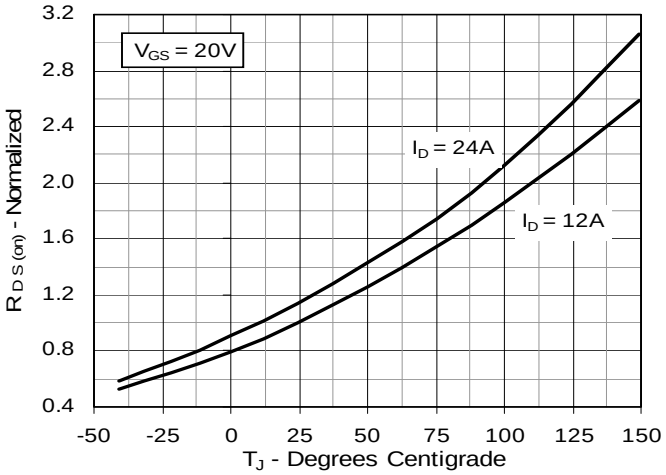


Fig. 5. $R_{DS(on)}$ Normalized to 0.5 I_{D25} Value vs. I_D

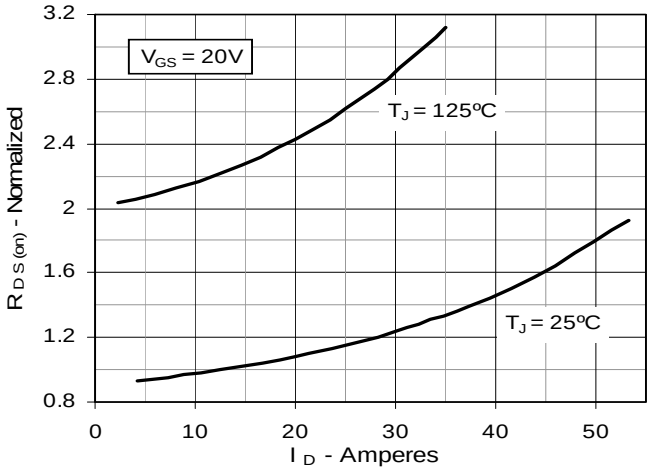


Fig. 6. Drain Current vs. Case Temperature

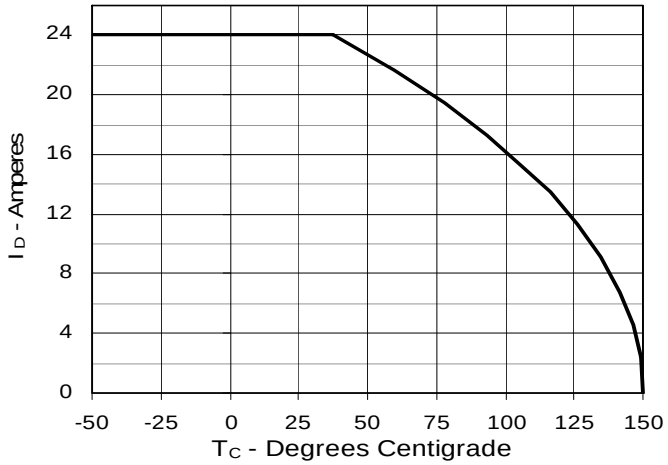


Fig. 7. Input Admittance

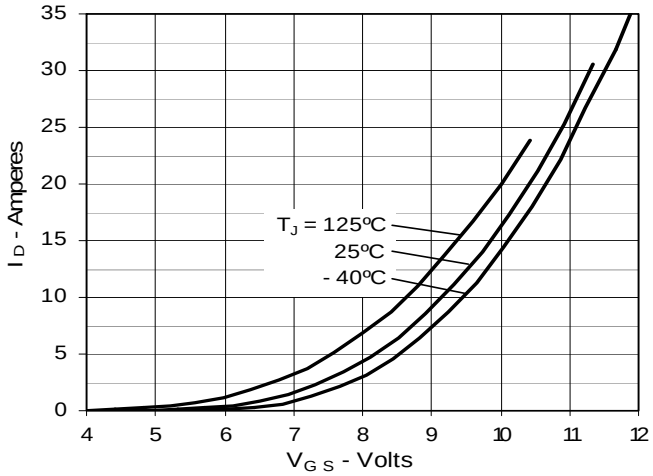


Fig. 8. Transconductance

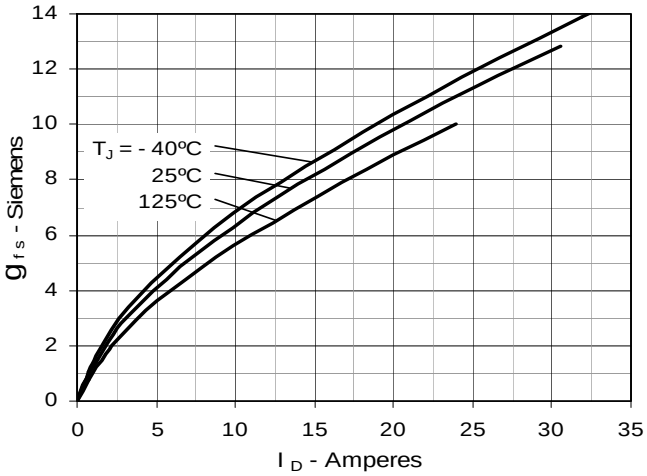


Fig. 9. Source Current vs. Source-To-Drain Voltage

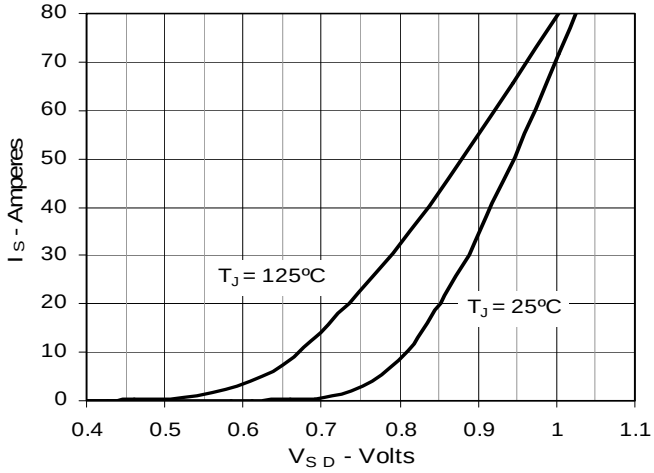


Fig. 10. Gate Charge

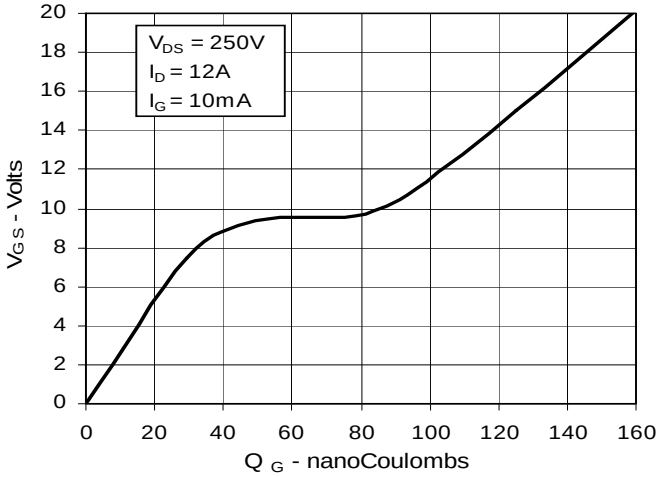


Fig. 11. Capacitance

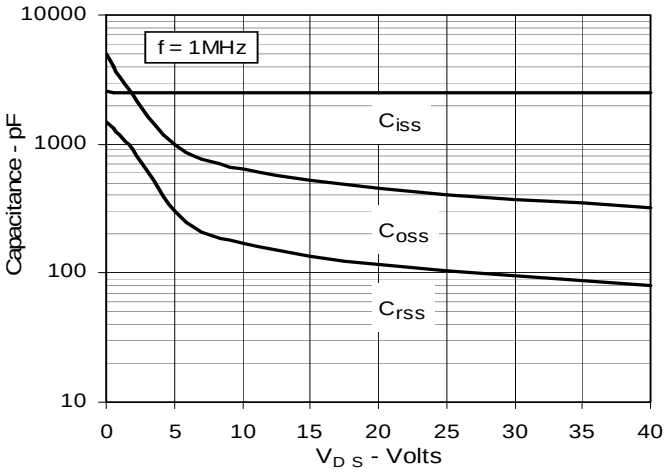


Fig. 12. Maximum Transient Thermal Impedance

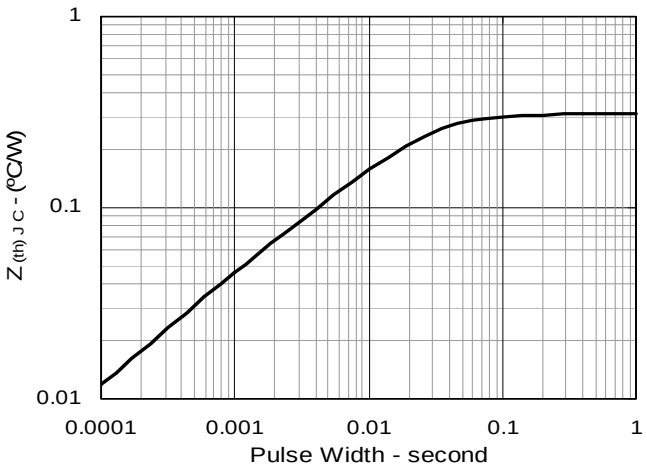


Fig. 13. Forward-Bias Safe Operating Area @ T_C = 25ºC

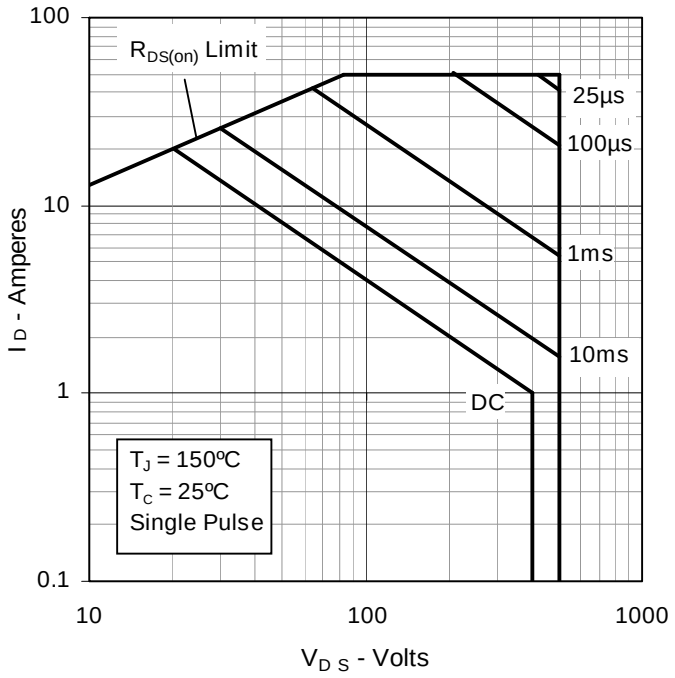


Fig. 14. Forward-Bias Safe Operating Area @ T_C = 60ºC