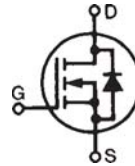


Linear Power MOSFET IXTH24N50L With Extended FBSOA

N-Channel Enhancement Mode



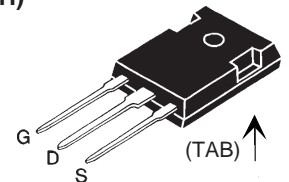
$$V_{DSS} = 500 \text{ V}$$

$$I_{D25} = 24 \text{ A}$$

$$R_{DS(on)} \leq 0.30 \text{ } \Omega$$

Symbol	Test Conditions	Maximum Ratings	
V_{DSS}	$T_J = 25^\circ\text{C}$ to 150°C	500	V
V_{DGR}	$T_J = 25^\circ\text{C}$ to 150°C ; $R_{GS} = 1 \text{ M}\Omega$	500	V
V_{GS}	Continuous	± 30	V
V_{GSM}	Transient	± 40	V
I_{D25}	$T_C = 25^\circ\text{C}$	24	A
I_{DM}	$T_C = 25^\circ\text{C}$, pulse width limited by T_{JM}	50	A
I_{AR}	$T_C = 25^\circ\text{C}$	12	A
E_{AR}	$T_C = 25^\circ\text{C}$	30	mJ
E_{AS}		1.5	J
P_D	$T_C = 25^\circ\text{C}$	400	W
T_J		-55 to +150	$^\circ\text{C}$
T_{JM}		150	$^\circ\text{C}$
T_{stg}		-55 to +150	$^\circ\text{C}$
T_L	1.6 mm (0.063 in) from case for 10 s	300	$^\circ\text{C}$
T_{SOLD}	Plastic body for 10 s	260	$^\circ\text{C}$
M_d	Mounting torque	0.9/7.9	Nm/lb.in.
Weight	TO-247	6	g

TO-247 (IXTH)



G = Gate D = Drain
S = Source TAB = Drain

Features

- Designed for linear operation
- International standard package
- Unclamped Inductive switching (UIS) rated
- Molding epoxies meet UL 94 V-0 flammability classification

Applications

- Programmable loads
- Current regulators
- DC-DC converters
- Battery chargers
- DC choppers
- Temperature and lighting controls

Advantages

- Easy to mount
- Space savings
- High power density

Symbol	Test Conditions	Characteristic Values ($T_J = 25^\circ\text{C}$, unless otherwise specified)		
		Min.	Typ.	Max.
BV_{DSS}	$V_{GS} = 0 \text{ V}$, $I_D = 250 \text{ } \mu\text{A}$	500		V
$V_{GS(th)}$	$V_{DS} = V_{GS}$, $I_D = 250 \text{ } \mu\text{A}$	3		V
I_{GSS}	$V_{GS} = \pm 30 \text{ V}$, $V_{DS} = 0 \text{ V}$			$\pm 100 \text{ nA}$
I_{DSS}	$V_{DS} = V_{DSS}$ $V_{GS} = 0 \text{ V}$	$T_J = 25^\circ\text{C}$		50 μA
		$T_J = 125^\circ\text{C}$		500 μA
$R_{DS(on)}$	$V_{GS} = 20 \text{ V}$, $I_D = 0.5 I_{D25}$ Note 1			0.30 Ω

Symbol	Test Conditions	Characteristic Values			
		Min.	Typ.	Max.	
g_{fs}	$V_{DS} = 10\text{ V}; I_D = 0.5 \cdot I_{D25}$, Note 1	3	7	11	S
C_{iss}	$V_{GS} = 0\text{ V}, V_{DS} = 25\text{ V}, f = 1\text{ MHz}$		2500		pF
C_{oss}			400		pF
C_{rss}			100		pF
$t_{d(on)}$	$V_{GS} = 15\text{ V}, V_{DS} = 0.5 \cdot V_{DSS}, I_D = 0.5 \cdot I_{D25}$ $R_G = 4.7\ \Omega$ (External),		35		ns
t_r			85		ns
$t_{d(off)}$			110		ns
t_f			75		ns
$Q_{g(on)}$	$V_{GS} = 20\text{ V}, V_{DS} = 0.5 \cdot V_{DSS}, I_D = 0.5 \cdot I_{D25}$		160		nC
Q_{gs}			30		nC
Q_{gd}			50		nC
R_{thJC}				0.31	$^{\circ}\text{C/W}$
R_{thCS}		0.25			$^{\circ}\text{C/W}$

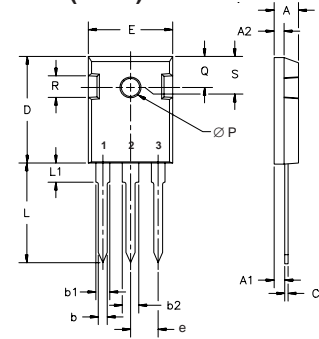
Safe Operating Area Specification

Symbol	Test Conditions	Min.	Typ.	Max.
SOA	$V_{DS} = 400\text{ V}, I_D = 0.5\text{ A}, T_C = 60^{\circ}\text{C}$	200		W

Source-Drain Diode

Symbol	Test Conditions	Characteristic Values			
		Min.	Typ.	Max.	
I_S	$V_{GS} = 0\text{ V}$			24	A
I_{SM}	Repetitive; pulse width limited by T_{JM}			96	A
V_{SD}	$I_F = I_S, V_{GS} = 0\text{ V}$, Note 1			1.5	V
t_{rr}	$I_F = I_S, -di/dt = 100\text{ A}/\mu\text{s}, V_R = 100\text{ V}$		500		ns

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

TO-247 (IXGH) Outline


Terminals: 1 - Gate
3 - Source
2 - Drain
Tab - Drain

Dim.	Millimeter		Inches	
	Min.	Max.	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
ØP	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

PRELIMINARY TECHNICAL INFORMATION

The product presented herein is under development. The Technical Specifications offered are derived from data gathered during objective characterizations of preliminary engineering lots; but also may yet contain some information supplied during a pre-production design evaluation. IXYS reserves the right to change limits, test conditions, and dimensions without notice.

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IXYS MOSFETs and IGBTs are covered 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
by one or more of the following U.S. patents: 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 @ 25°C

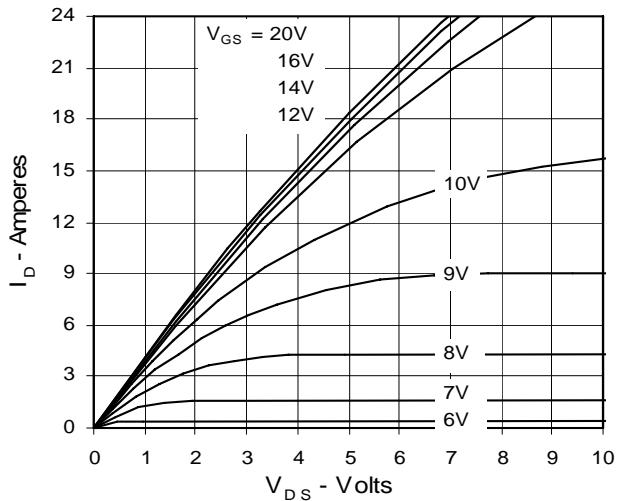


Fig. 2. Extended Output Characteristics @ 25°C

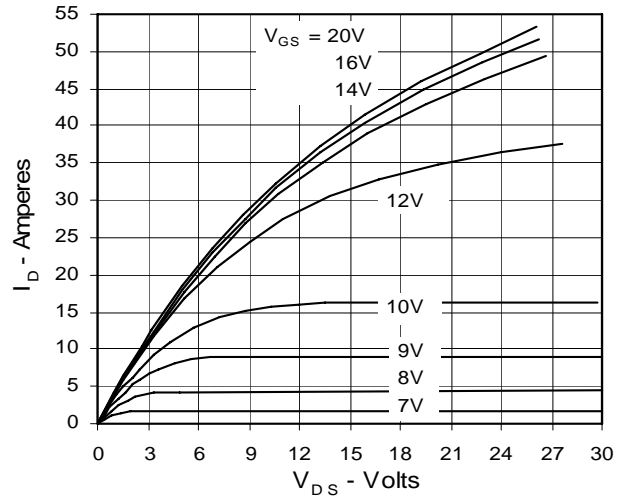


Fig. 3. Output Characteristics @ 125°C

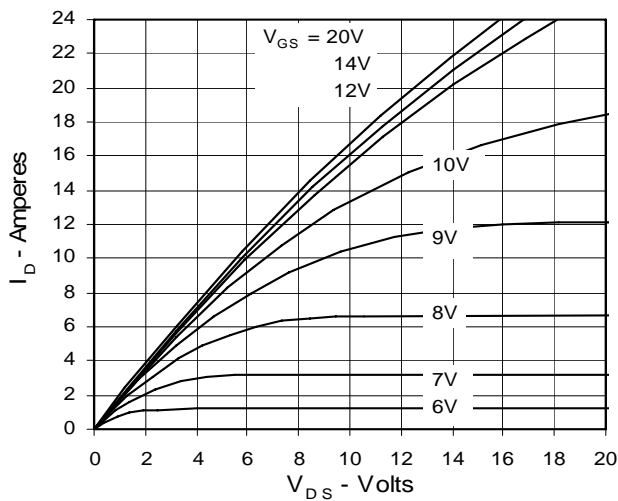


Fig. 4. $R_{DS(on)}$ Normalized to 0.5 I_{D25} Value vs. Junction Temperature

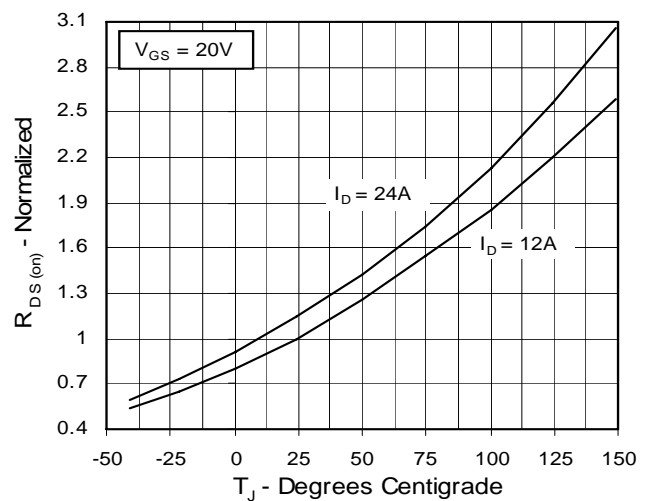


Fig. 5. $R_{DS(on)}$ Normalized to 0.5 I_{D25} Value vs. I_D

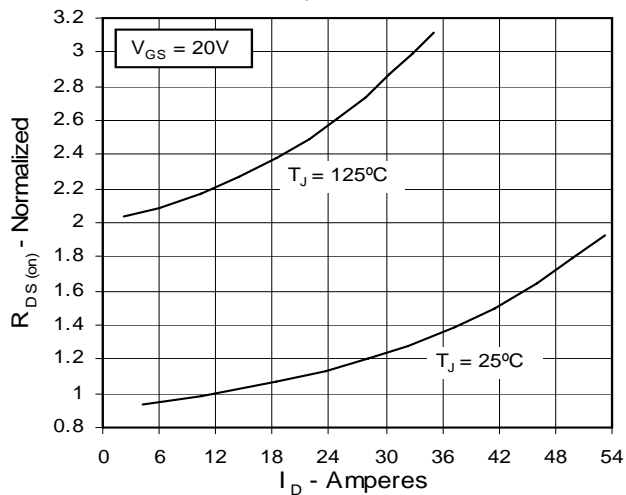


Fig. 6. Drain Current vs. Case Temperature

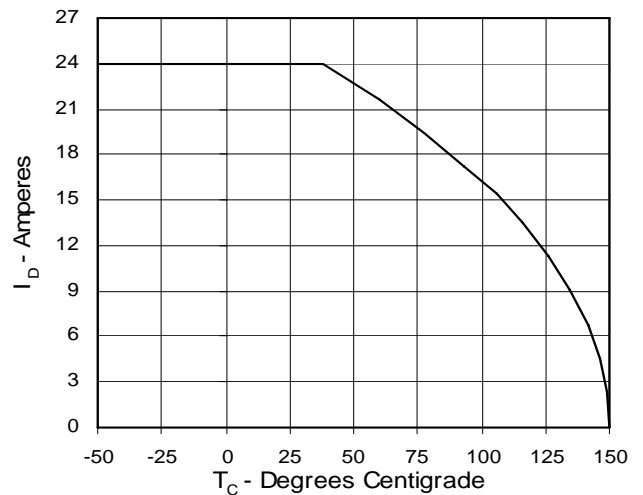


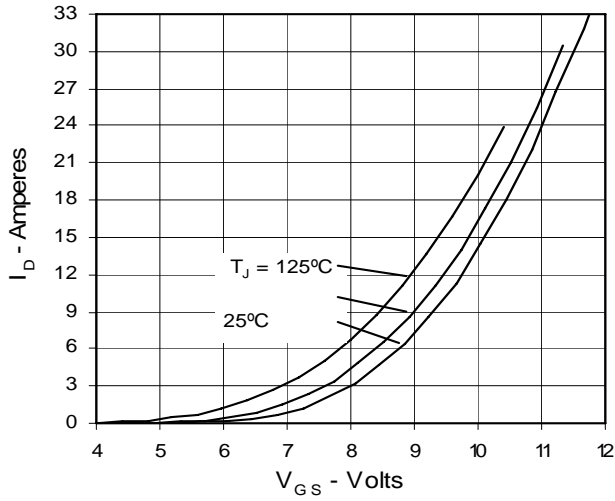
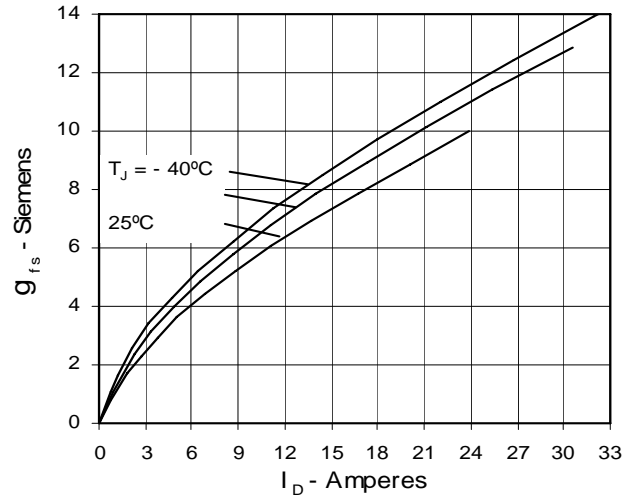
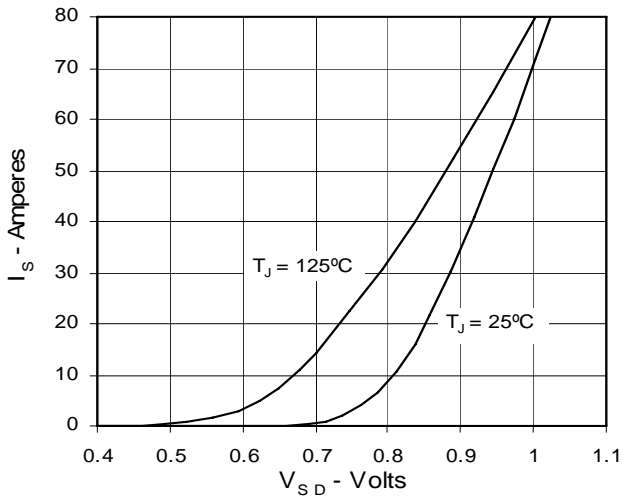
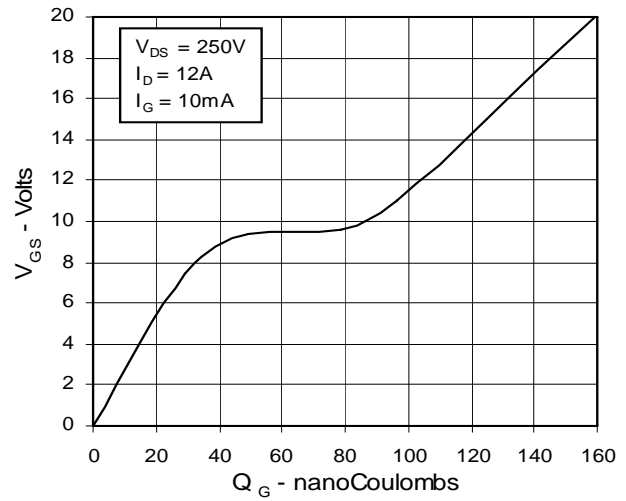
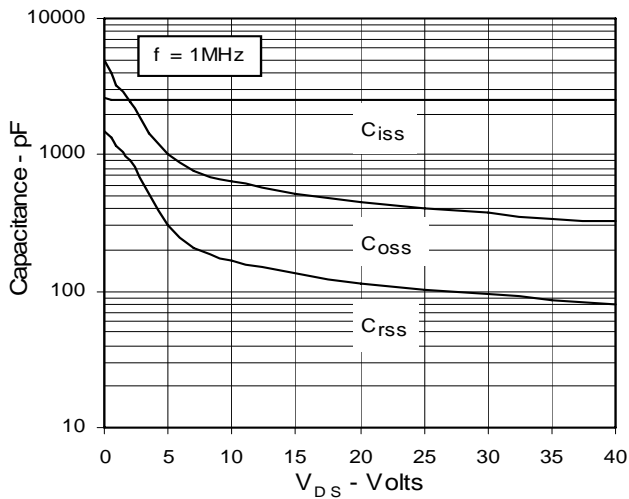
Fig. 7. Input Admittance

Fig. 8. Transconductance

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

Fig. 10. Gate Charge

Fig. 11. Capacitance


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

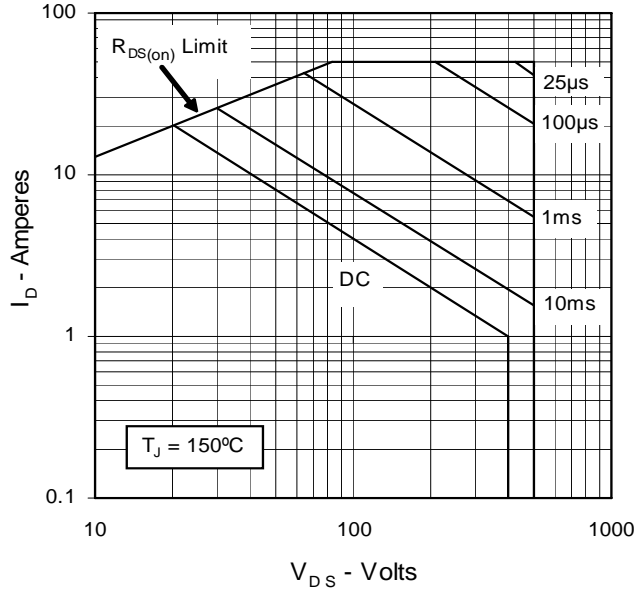


Fig. 13. Forward-Bias Safe Operating Area @ $T_C = 60^\circ\text{C}$

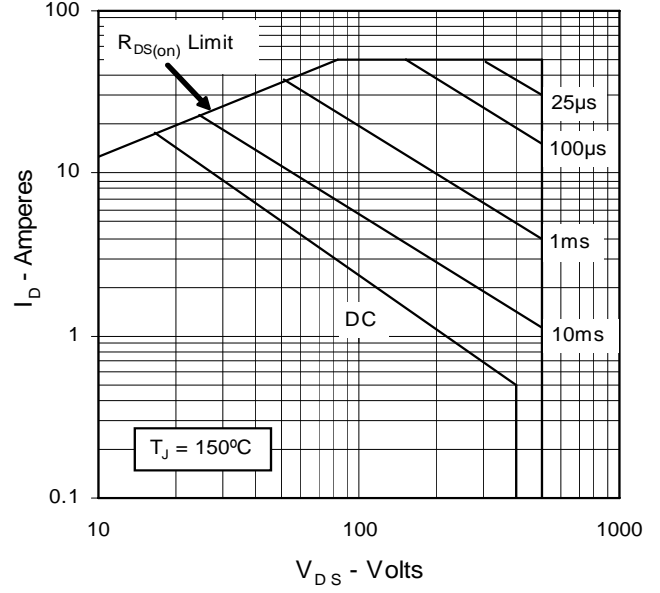


Fig. 14. Maximum Transient Thermal Impedance

