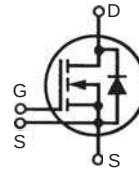


Linear Power MOSFET IXTN46N50L

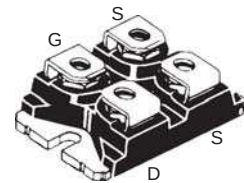
With Extended FBSOA

N-Channel Enhancement Mode



$$\begin{aligned} V_{DSS} &= 500 \text{ V} \\ I_{D25} &= 46 \text{ A} \\ R_{DS(on)} &\leq 0.16 \text{ } \Omega \end{aligned}$$

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}	$T_C = 25^\circ\text{C}$	46 A
I_{DM}	$T_C = 25^\circ\text{C}$, pulse width limited by T_{JM}	100 A
I_{AR}	$T_C = 25^\circ\text{C}$	46 A
E_{AR}	$T_C = 25^\circ\text{C}$	60 mJ
E_{AS}	$T_C = 25^\circ\text{C}$	1.5 J
P_D	$T_C = 25^\circ\text{C}$	700 W
T_J		-55 to +150 $^\circ\text{C}$
T_{JM}		150 $^\circ\text{C}$
T_{stg}		-55 to +150 $^\circ\text{C}$
V_{ISOL}	50/60 Hz, RMS, $I_{ISOL} \leq 1 \text{ mA}$, $T = 1 \text{ min}$ $T = 1 \text{ s}$	2500 V~ 3000 V~
M_d	Mounting torque for Base Plate Terminal connection torque	1.5/13 Nm/lb.in. 1.3/11.5 Nm/lb.in.
Weight		30 g

miniBLOC, SOT-227 B (IXTN)
E153432

G = Gate
S = Source
D = Drain

Either Source terminal S can be used as the Source terminal or the Kelvin Source (gate return) terminal.

Features

- Designed for linear operation
- International standard package
- Molding epoxy meets UL94 V-0 flammability classification
- miniBLOC with Aluminium nitride isolation

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}	$V_{GS} = 0 \text{ V}$, $I_D = 1 \text{ mA}$	500 V
$V_{GS(th)}$	$V_{DS} = V_{GS}$, $I_D = 250 \text{ } \mu\text{A}$	3 V
I_{GSS}	$V_{GS} = \pm 30 \text{ V}$, $V_{DS} = 0 \text{ V}$	± 200 nA
I_{DSS}	$V_{DS} = V_{DSS}$, $V_{GS} = 0 \text{ V}$ $T_J = 25^\circ\text{C}$ $T_J = 125^\circ\text{C}$	50 μA 1 mA
$R_{DS(on)}$	$V_{GS} = 20 \text{ V}$, $I_D = 0.5 I_{D25}$ Note 1	0.16 Ω

Symbol	Test Conditions	Characteristic Values ($T_J = 25^\circ\text{C}$, unless otherwise specified)		
		Min.	Typ.	Max.
g_{fs}	$V_{DS} = 10\text{ V}; I_D = 0.5 \cdot I_{D25}$, Note 1	7	10	13
C_{iss}	$V_{GS} = 0\text{ V}, V_{DS} = 25\text{ V}, f = 1\text{ MHz}$		7000	pF
C_{oss}			900	pF
C_{rss}			170	pF
$t_{d(on)}$	$V_{GS} = 15\text{ V}, V_{DS} = 0.5 \cdot V_{DSS}, I_D = 0.5 \cdot I_{D25}$ $R_G = 2\ \Omega$ (External),		40	ns
t_r			50	ns
$t_{d(off)}$			80	ns
t_f			42	ns
$Q_{g(on)}$	$V_{GS} = 15\text{ V}, V_{DS} = 0.5 \cdot V_{DSS}, I_D = 0.5 \cdot I_{D25}$		260	nC
Q_{gs}			85	nC
Q_{gd}			125	nC
R_{thJC}			0.18	$^\circ\text{C/W}$
R_{thCS}				$^\circ\text{C/W}$

Safe Operating Area Specification

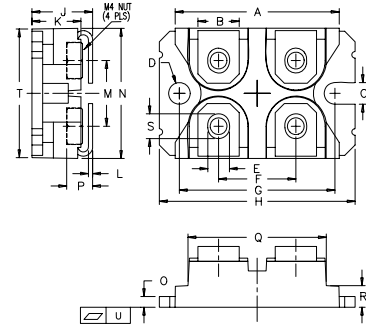
Symbol	Test Conditions	Min.	Typ.	Max.
SOA	$V_{DS} = 400\text{ V}, I_D = 0.6\text{ A}, T_C = 90^\circ\text{C}$	240		W

Source-Drain Diode

Symbol	Test Conditions	Characteristic Values ($T_J = 25^\circ\text{C}$, unless otherwise specified)		
		Min.	Typ.	Max.
I_S	$V_{GS} = 0\text{ V}$			46
I_{SM}	Repetitive; pulse width limited by T_{JM}			100
V_{SD}	$I_F = I_S, V_{GS} = 0\text{ V}$, Note 1			1.5
t_{rr}	$I_F = I_S, -dt/dt = 100\text{ A}/\mu\text{s}, V_R = 100\text{ V}$	600		ns

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

SOT-227B (IXTN) Outline



(M4 screws (4x) supplied)

SYM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	1.240	1.255	31.50	31.88
B	.307	.323	7.80	8.20
C	.161	.169	4.09	4.29
D	.161	.169	4.09	4.29
E	.161	.169	4.09	4.29
F	.587	.595	14.91	15.11
G	1.186	1.193	30.12	30.30
H	1.496	1.505	38.00	38.23
J	.460	.481	11.68	12.22
K	.351	.378	8.92	9.60
L	.030	.033	0.76	0.84
M	.496	.506	12.60	12.85
N	.990	1.001	25.15	25.42
O	.078	.084	1.98	2.13
P	.195	.235	4.95	5.97
Q	1.045	1.059	26.54	26.90
R	.155	.174	3.94	4.42
S	.186	.191	4.72	4.85
T	.968	.987	24.59	25.07
U	-.002	.004	-0.05	0.1

PRELIMINARY TECHNICAL INFORMATION

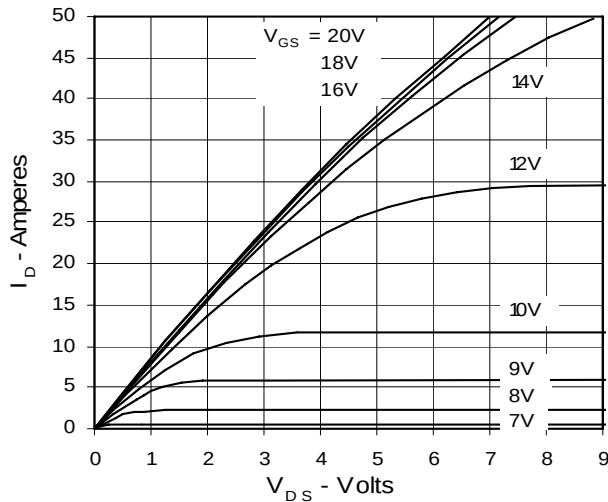
The product presented herein is under development. The Technical Specifications offered are derived from data gathered during objective characterizations of preliminary engineering lots; but also may yet contain some information supplied during a pre-production design evaluation. IXYS reserves the right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

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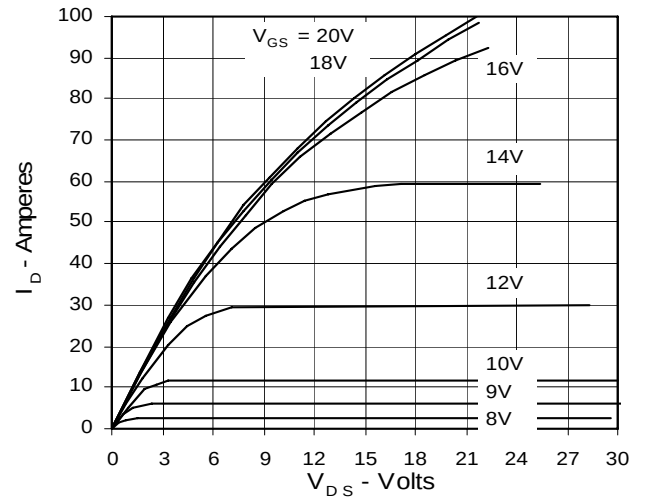
IXYS MOSFETs and IGBTs are covered by one or more of the following U.S. patents:

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	

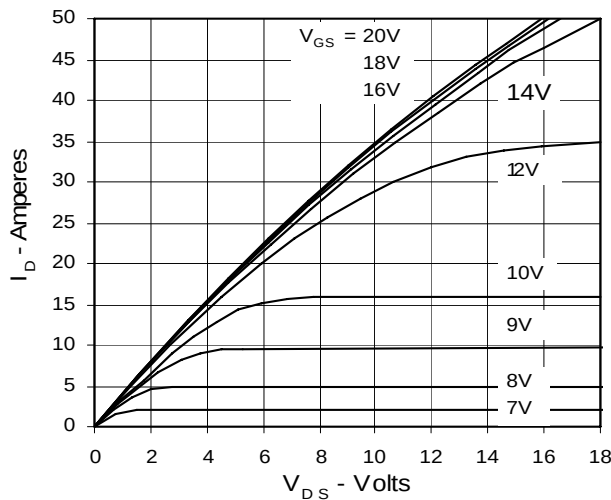
**Fig. 1. Output Characteristics
@ 25°C**



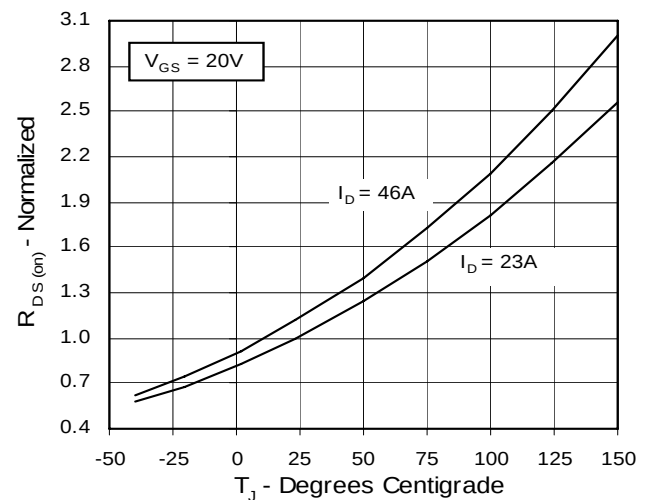
**Fig. 2. Extended Output Characteristics
@ 25°C**



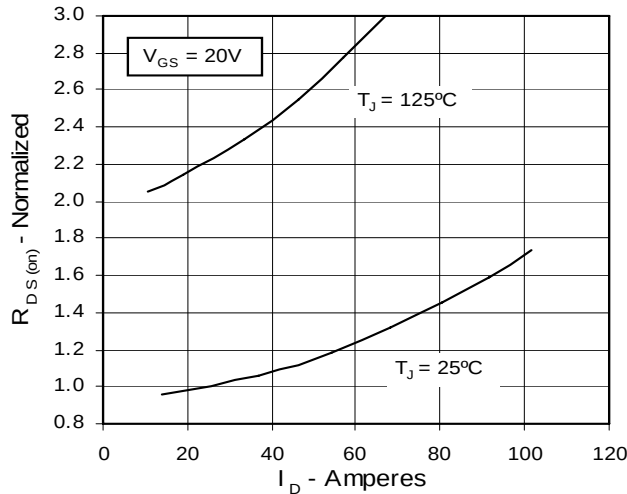
**Fig. 3. Output Characteristics
@ 125°C**



**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**

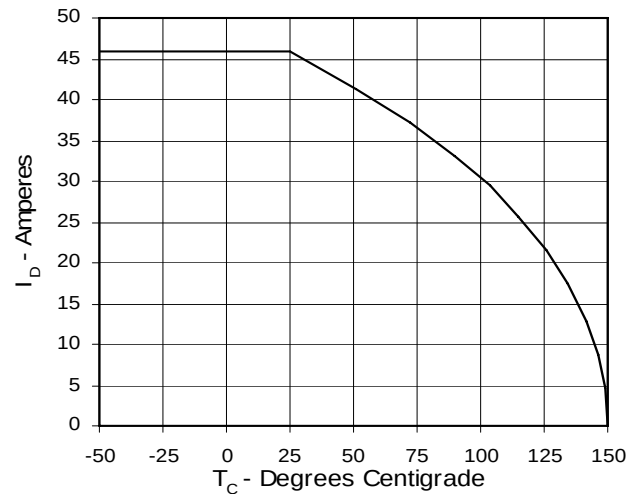


Fig. 7. Input Admittance

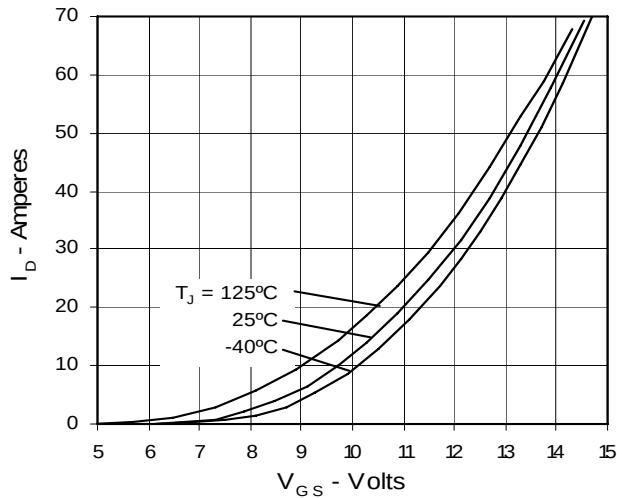


Fig. 8. Transconductance

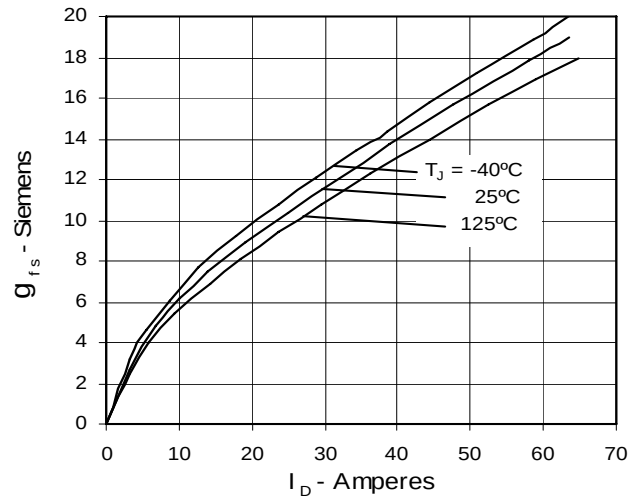


Fig. 9. Source Current vs. Source-To-Drain Voltage

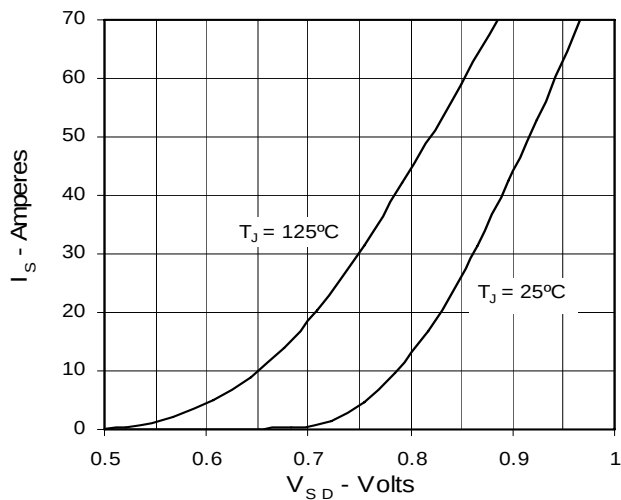


Fig. 10. Gate Charge

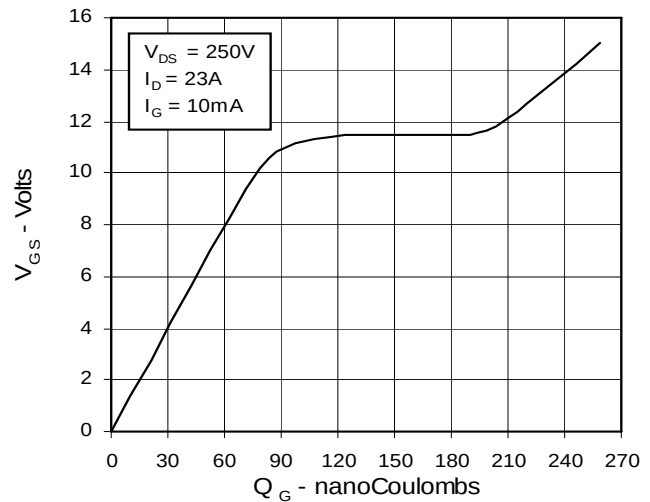


Fig. 11. Capacitance

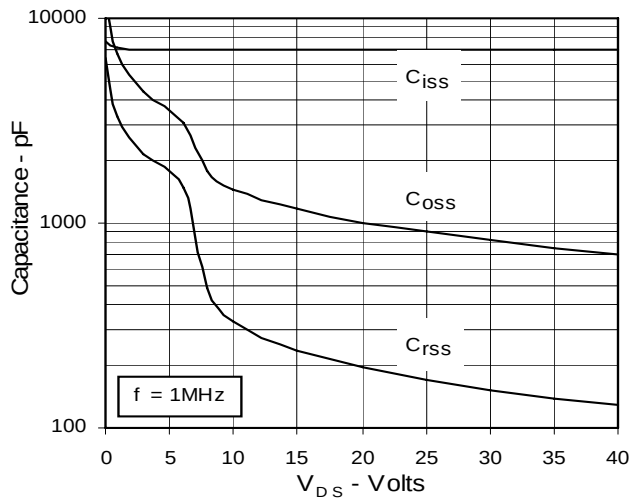


Fig. 12. Forward-Bias Safe Operating Area @ $T_C = 25^\circ\text{C}$

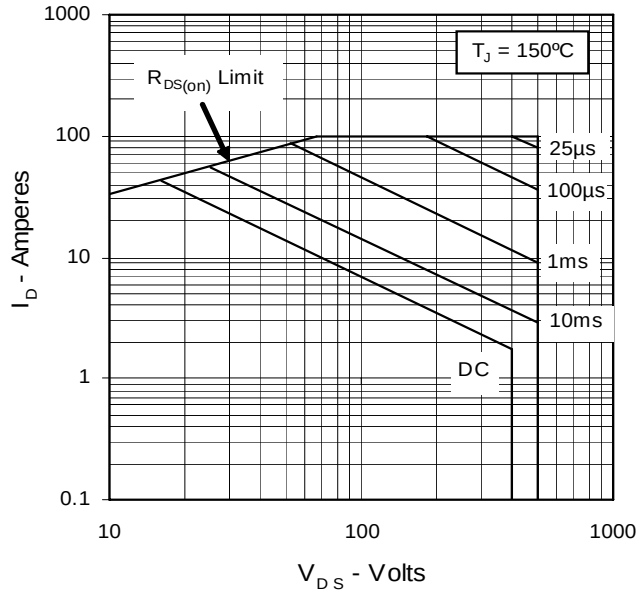


Fig. 13. Forward-Bias Safe Operating Area @ $T_C = 90^\circ\text{C}$

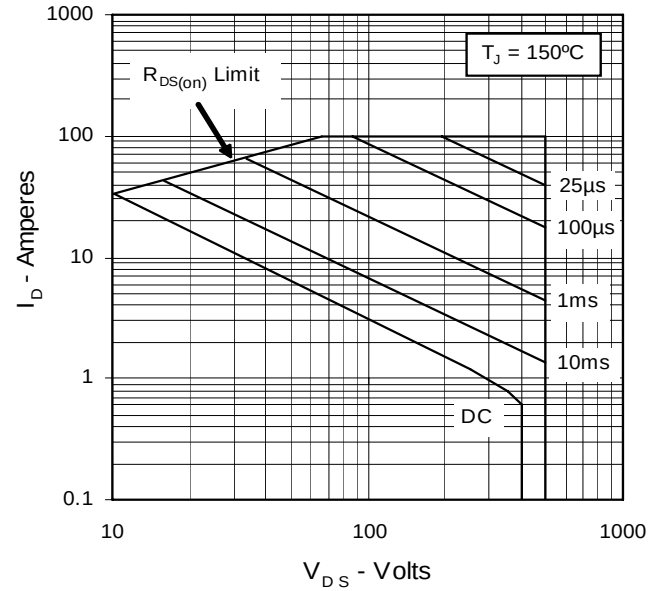


Fig. 14. Maximum Transient Thermal Impedance

