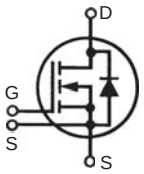
Linear Power MOSFET With Extended FBSOA

IXTN46N50L

N-Channel Enhancement Mode

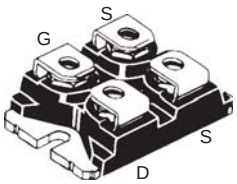
V_{DSS} = 500 V
I_{D25} = 46 A
$R_{DS(on)}$ ≤ 0.16 Ω



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} = 1 MΩ		500	V
V_{GS}	Continuous		±30	V
V_{GSM}	Transient		±40	V
I_{D25}	T_C = 25°C		46	A
I_{DM}	T_C = 25°C, pulse width limited by T_{JM}		100	A
I_{AR}	T_C = 25°C		46	A
E_{AR}	T_C = 25°C		60	mJ
E_{AS}	T_C = 25°C		1.5	J
P_D	T_C = 25°C		700	W
T_J			-55 to +150	°C
T_{JM}			150	°C
T_{stg}			-55 to +150	°C
V_{ISOL}	50/60 Hz, RMS,	T = 1 min	2500	V~
	I_{ISOL} ≤ 1 mA,	T = 1 s	3000	V~
M_d	Mounting torque for Base Plate		1.5/13	Nm/lb.in.
	Terminal connection torque		1.3/11.5	Nm/lb.in.
Weight			30	g

Symbol	Test Conditions		Characteristic Values (T_J = 25°C, unless otherwise specified) Min.	Typ.	Max.	
BV_{DSS}	V_{GS} = 0 V, I_D = 1 mA		500			V
$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250 μA		3		6	V
I_{GSS}	V_{GS} = ±30 V, V_{DS} = 0 V				±200	nA
I_{DSS}	V_{DS} = V_{DSS}	T_J = 25°C			50	μA
	V_{GS} = 0 V	T_J = 125°C			1	mA
$R_{DS(on)}$	V_{GS} = 20 V, I_D = 0.5 I_{D25} Note 1				0.16	Ω

miniBLOC, SOT-227 B (IXTN)
E153432



G = Gate D = Drain
S = Source

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

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Symbol	Test Conditions (T$_J$ = 25°C, unless otherwise specified)	Characteristic Values Min.	Typ.	Max.	
g_{fs}	V_{DS} = 10 V; I_D = 0.5 • I_{D25}, Note 1	7	10	13	S
C_{iss}	V_{GS} = 0 V, V_{DS} = 25 V, f = 1 MHz		7000		pF
C_{oss}			900		pF
C_{rss}			170		pF
$t_{d(on)}$	V_{GS} = 15 V, V_{DS} = 0.5 • V_{DSS}, I_D = 0.5 • I_{D25} R_G = 2 Ω (External),		40		ns
t_r			50		ns
$t_{d(off)}$			80		ns
t_f			42		ns
$Q_{g(on)}$	V_{GS} = 15 V, V_{DS} = 0.5 • V_{DSS}, I_D = 0.5 • I_{D25}		260		nC
Q_{gs}			85		nC
Q_{gd}			125		nC
R_{thJC}				0.18	°C/W
R_{thCS}			0.05		°C/W

Safe Operating Area Specification

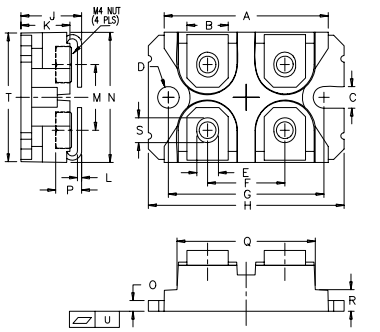
Symbol	Test Conditions	Min.	Typ.	Max.	
SOA	V_{DS} = 400 V, I_D = 0.6 A, T_C = 90°C	240			W

Source-Drain Diode

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

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

SOT-227B (IXTN) Outline



(M4 screws (4x) supplied)

SYM	INCHES MIN	INCHES MAX	MILLIMETERS MIN	MILLIMETERS 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 moreof the following U.S. patents: 4,835,592 4,850,072 4,881,106 4,931,844 5,017,508 5,034,796 5,049,961 5,063,307 5,187,117 5,237,481 5,381,025 5,486,715 6,162,665 6,259,123 B1 6,306,728 B1 6,404,065 B1 6,534,343 6,583,505 6,683,344 6,710,405 B2 6,710,463 6,727,585 6,759,692 6,771,478 B2 7,005,734 B2 7,063,975 B2 7,071,537 7,157,338B2

Fig. 1. Output Characteristics @ 25ºC

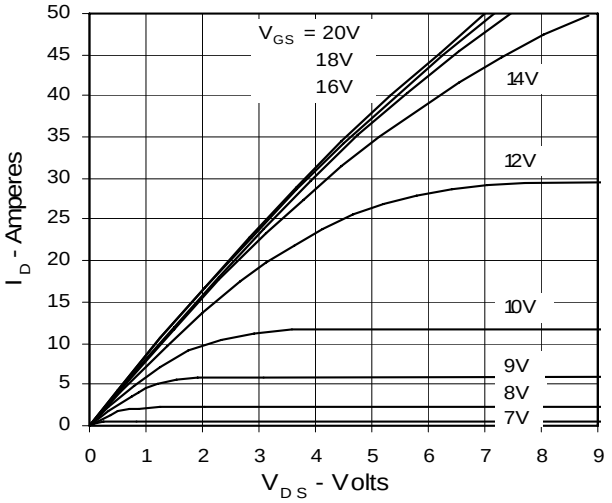


Fig. 2. Extended Output Characteristics @ 25ºC

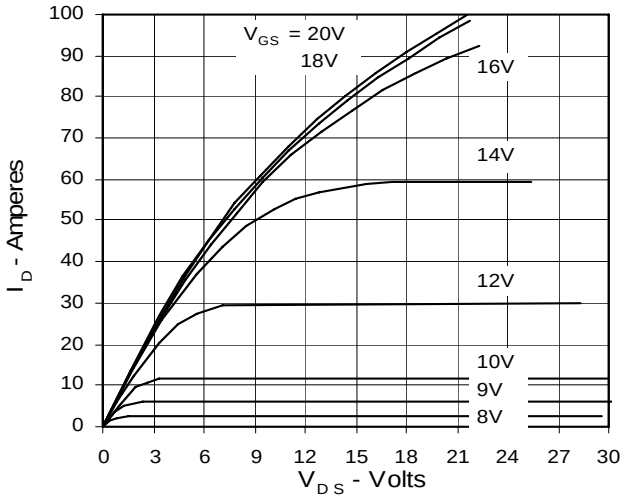


Fig. 3. Output Characteristics @ 125ºC

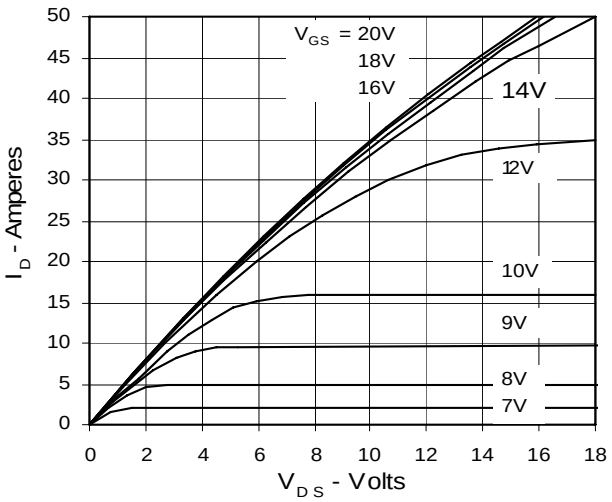


Fig. 4. $R_{DS(on)}$ Normalized to 0.5 I_{D25} Value vs. Junction Temperature

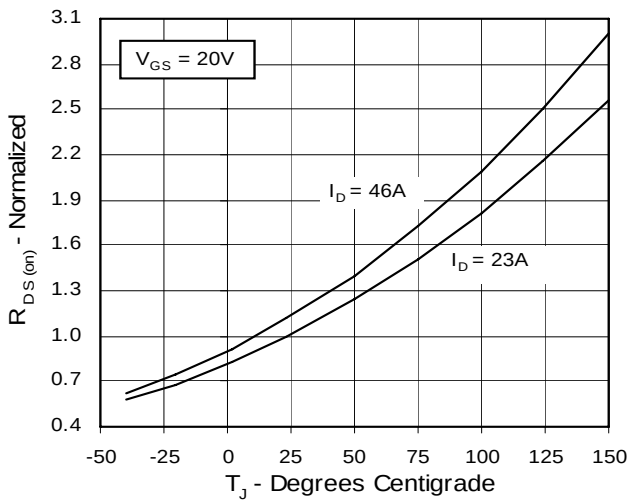


Fig. 5. $R_{DS(on)}$ Normalized to 0.5 I_{D25} Value vs. I_D

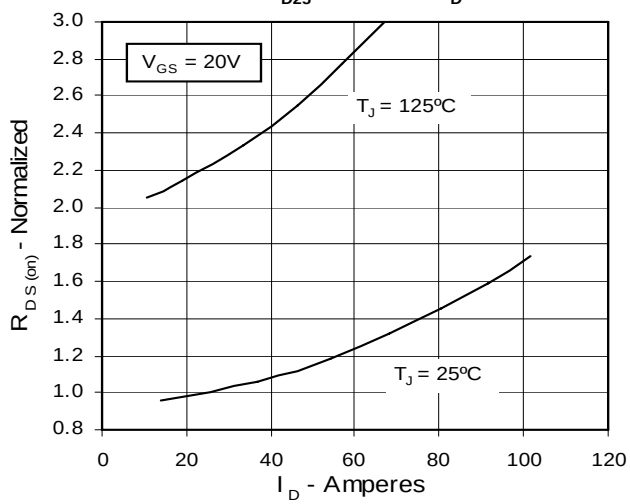
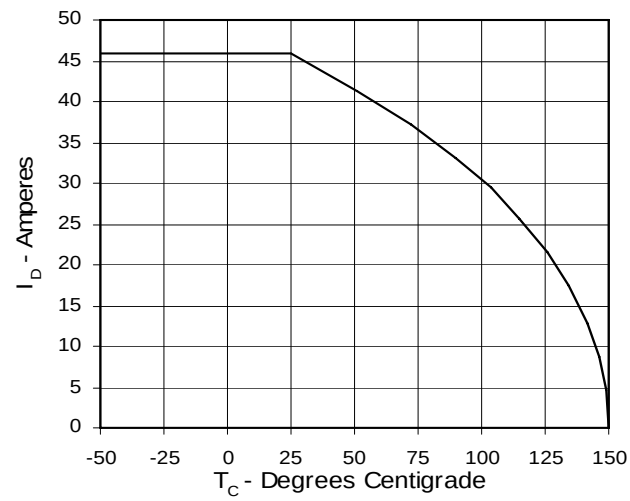


Fig. 6. Drain Current vs. Case Temperature



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Fig. 7. Input Admittance

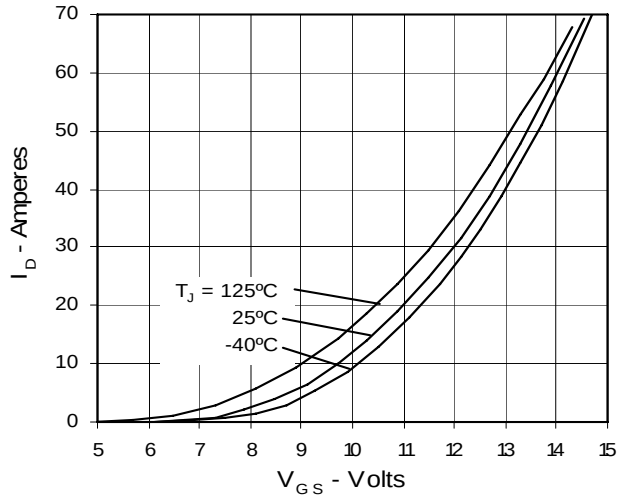


Fig. 8. Transconductance

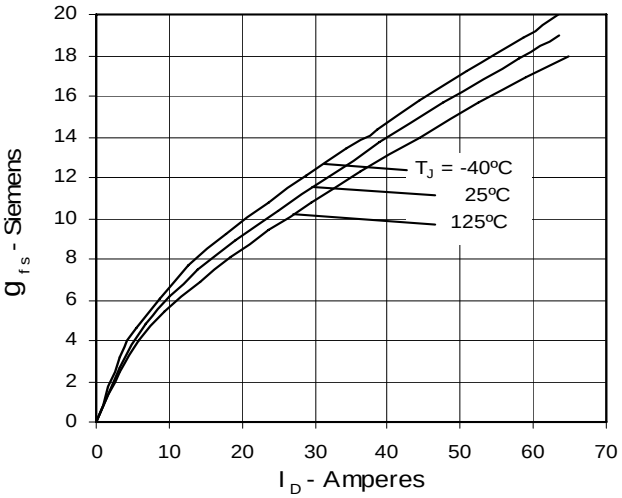


Fig. 9. Source Current vs. Source-To-Drain Voltage

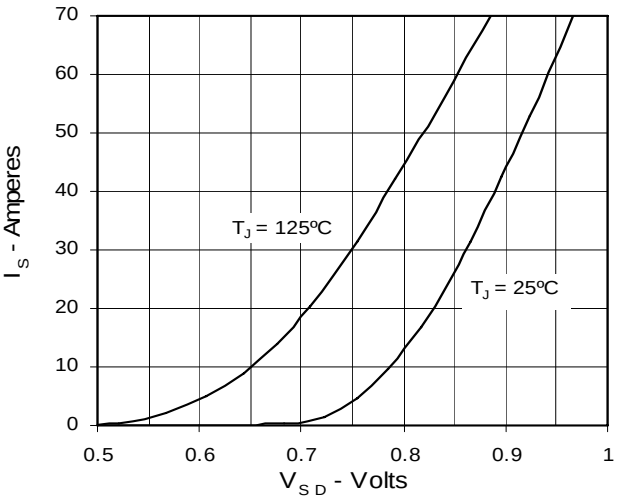


Fig. 10. Gate Charge

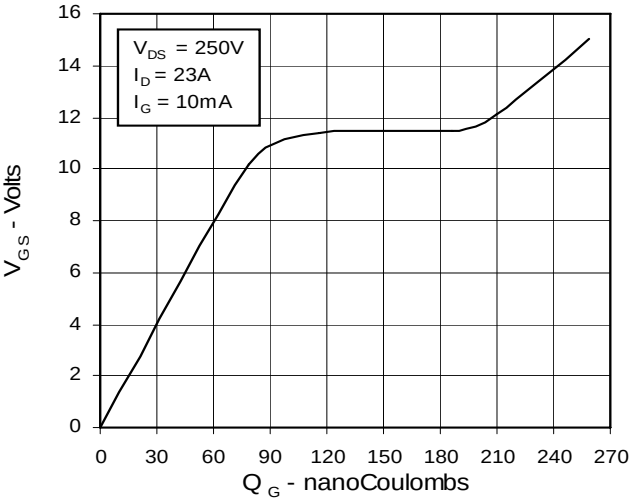
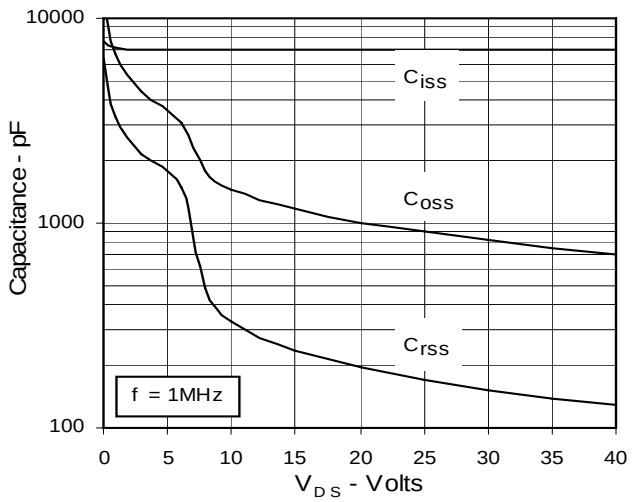


Fig. 11. Capacitance



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Fig. 12. Forward-Bias Safe Operating Area @ T_C = 25ºC

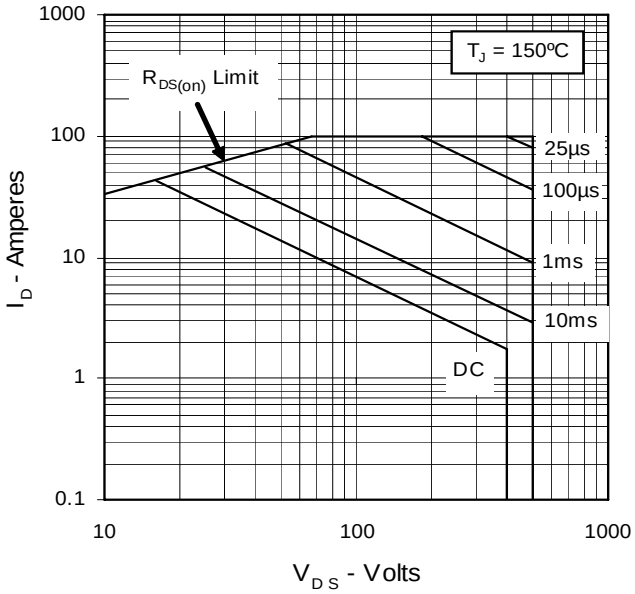


Fig. 13. Forward-Bias Safe Operating Area @ T_C = 90ºC

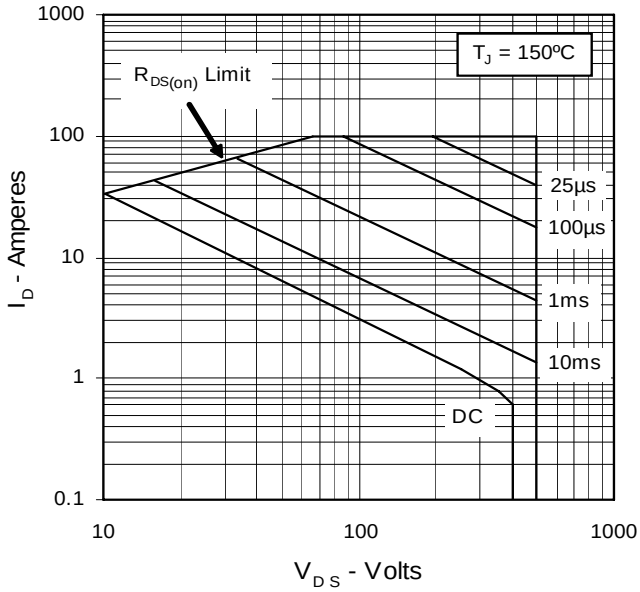
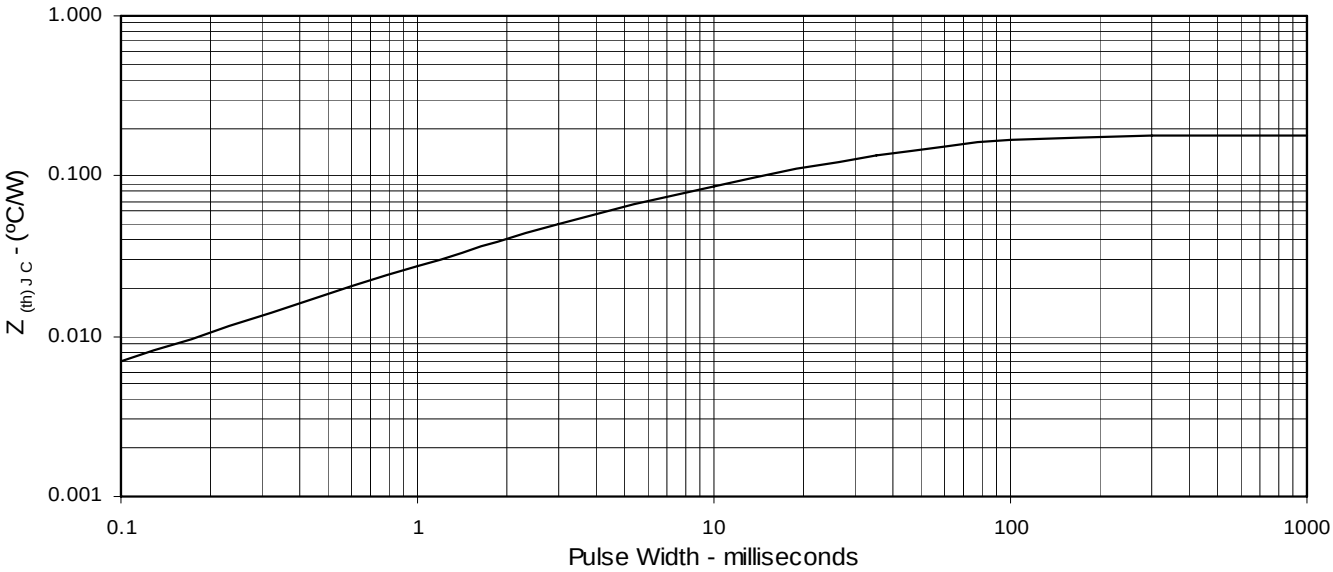


Fig. 14. Maximum Transient Thermal Impedance



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