IXYS

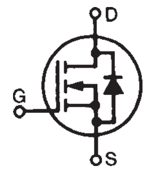
Preliminary Technical Information

High Voltage Power MOSFET w/ Extended FBSOA

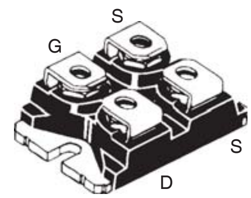
IXTN5N250

V_{DSS} = 2500V
I_{D25} = 5A
$R_{DS(on)}$ ≤ 8.8Ω

N-Channel Enhancement Mode
Avalanche Rated
Guaranteed FBSOA



miniBLOC
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.

Symbol	Test Conditions	Maximum Ratings	
V_{DSS}	T_J = 25°C to 150°C	2500	V
V_{DGR}	T_J = 25°C to 150°C, R_{GS} = 1MΩ	2500	V
V_{GSS}	Continuous	±30	V
V_{GSM}	Transient	±40	V
I_{D25}	T_C = 25°C	5	A
I_{DM}	T_C = 25°C, Pulse Width Limited by T_{JM}	20	A
I_A	T_C = 25°C	2.5	A
E_{AS}	T_C = 25°C	2.5	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 = 1minute	2500	V~
	I_{ISOL} ≤ 1mA, t = 1s	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 (T_J = 25°C, Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.	
BV_{DSS}	V_{GS} = 0V, I_D = 1mA	2500			V
$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 1mA	2.0		5.0	V
I_{GSS}	V_{GS} = ±30V, V_{DS} = 0V			±200	nA
I_{DSS}	V_{DS} = 2kV, V_{GS} = 0V			50	μA
	T_J = 125°C			4	mA
$R_{DS(on)}$	V_{GS} = 10V, I_D = 0.5 • I_{D25}, Note 1			8.8	Ω

Features

- International Standard Package
- Molding Epoxies Meet UL94 V-0 Flammability Classification
- Guaranteed FBSOA at 75°C
- miniBLOC with Aluminum Nitride Isolation
- Low Package Inductance

Advantages

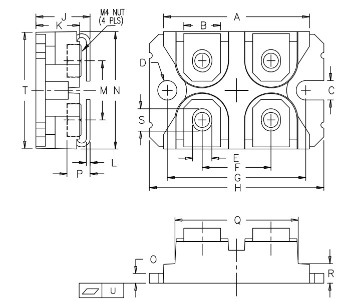
- Easy to Mount
- Space Savings
- High Power Density

Applications

- High Voltage Power Supplies
- Capacitor Discharge
- Pulse Circuits

Symbol	Test Conditions (T_J = 25°C, Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.	
g_{fs}	V_{DS} = 50V, I_D = 0.5 • I_{D25}, Note 1	3.0	4.5	6.0	S
C_{iss}	V_{GS} = 0V, V_{DS} = 25V, f = 1MHz		8560		pF
C_{oss}			315		pF
C_{rss}			90		pF
$t_{d(on)}$	**Resistive Switching Times** V_{GS} = 10V, V_{DS} = 0.5 • V_{DSS}, I_D = 0.5 • I_{D25} R_G = 1Ω (External)		33		ns
t_r			20		ns
$t_{d(off)}$			90		ns
t_f			44		ns
$Q_{g(on)}$	V_{GS} = 10V, V_{DS} = 1000V, I_D = 0.5 • I_{D25}		200		nC
Q_{gs}			28		nC
Q_{gd}			70		nC
R_{thJC}				0.18	°C/W
R_{thCS}			0.05		°C/W

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

Safe Operating Area Specification

Symbol	Test Conditions	Characteristic Values Min.	Typ.	Max.	
SOA	V_{DS} = 2000V, I_D = 0.11A, T_C = 75°C, tp = 3s	220			W

Source-Drain Diode

Symbol	Test Conditions (T_J = 25°C, Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.	
I_S	V_{GS} = 0V			5	A
I_{SM}	Repetitive, Pulse Width Limited by T_{JM}			20	A
V_{SD}	I_F = I_S, V_{GS} = 0V, Note 1			1.5	V
t_{rr}	I_F = 2.5A, -di/dt = 100A/μs, V_R = 100V		1.2		μs

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

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.

Fig. 1. Output Characteristics @ T_J = 25ºC

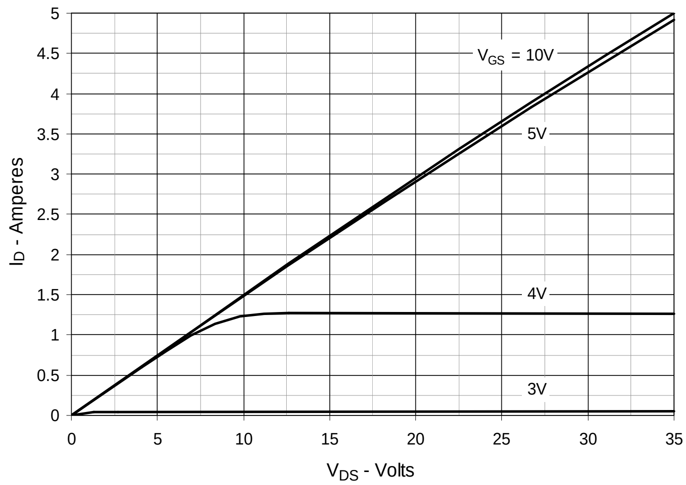


Fig. 2. Output Characteristics @ T_J = 125ºC

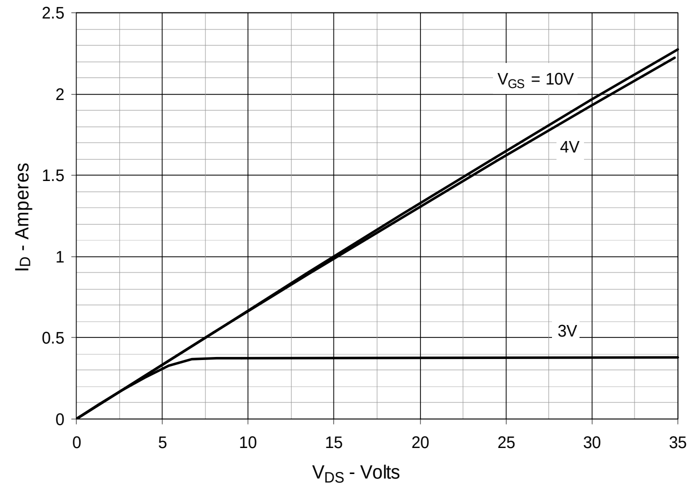


Fig. 3. $R_{DS(on)}$ Normalized to I_D = 2.5A Value vs. Junction Temperature

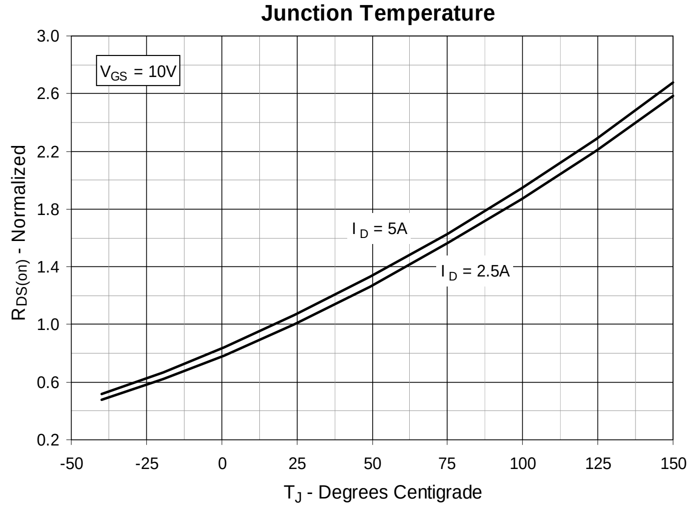


Fig. 4. $R_{DS(on)}$ Normalized to I_D = 2.5A Value vs. Drain Current

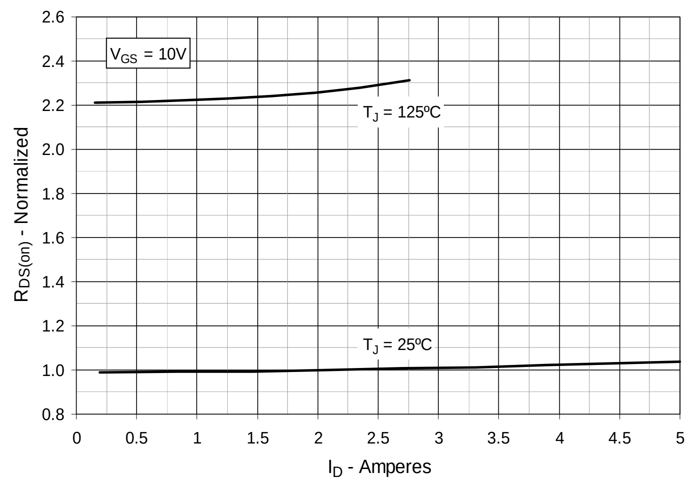


Fig. 5. Maximum Drain Current vs. Case Temperature

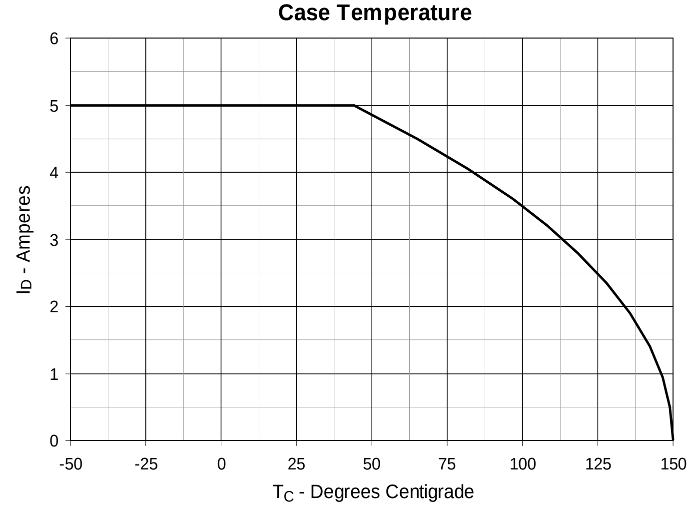


Fig. 6. Input Admittance

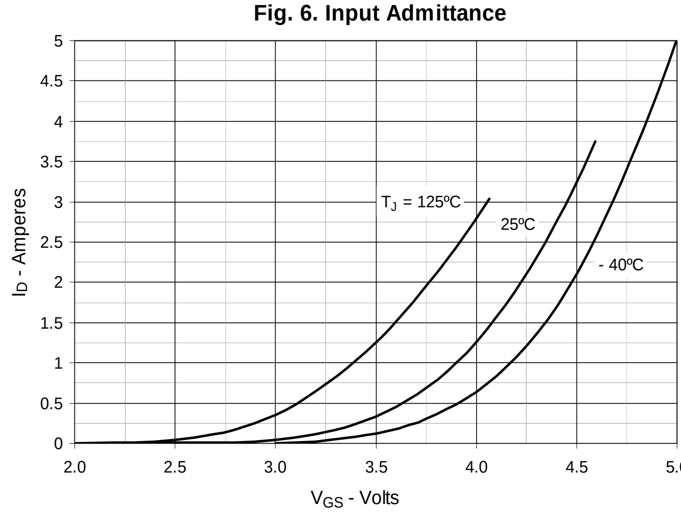


Fig. 7. Transconductance

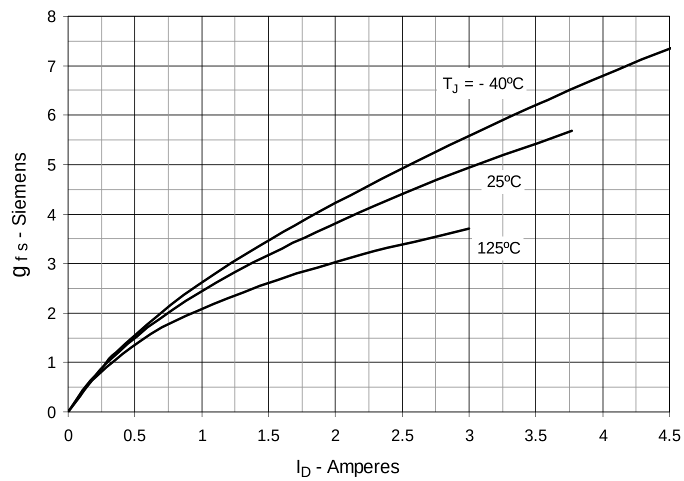


Fig. 8. Forward Voltage Drop of Intrinsic Diode

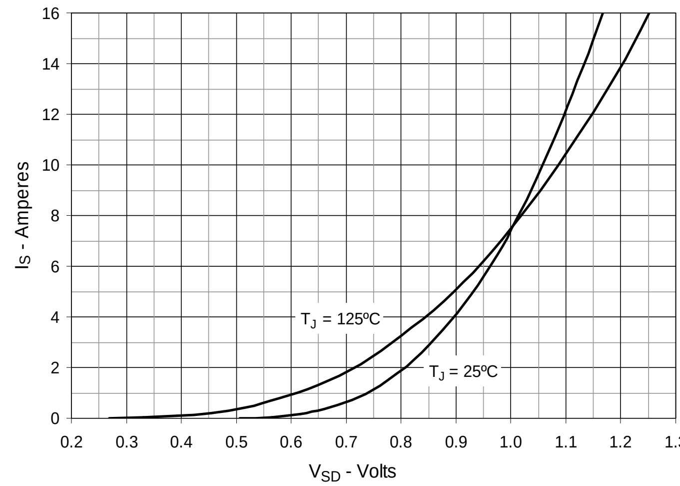


Fig. 9. Gate Charge

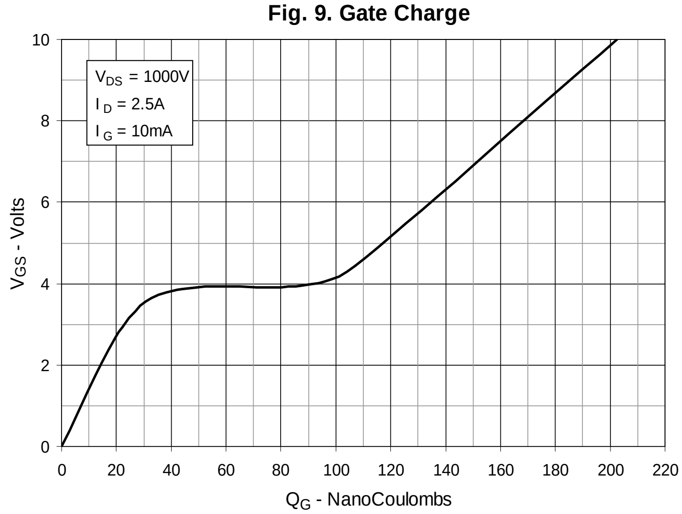


Fig. 10. Capacitance

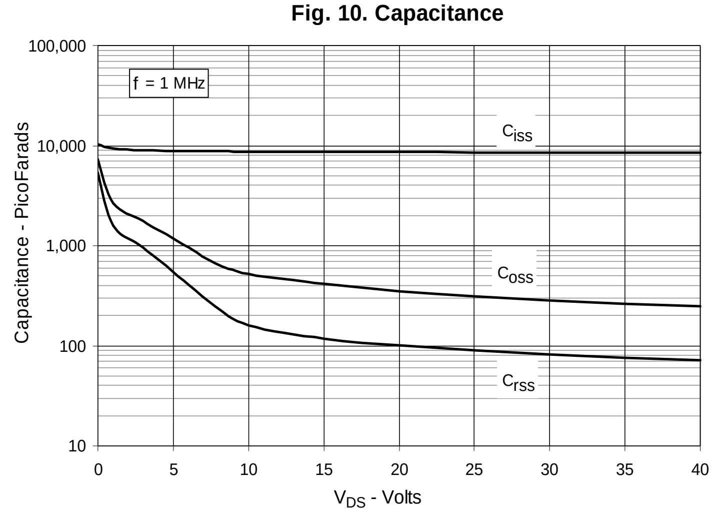


Fig. 11. Forward-Bias Safe Operating Area
@ T_C = 25ºC

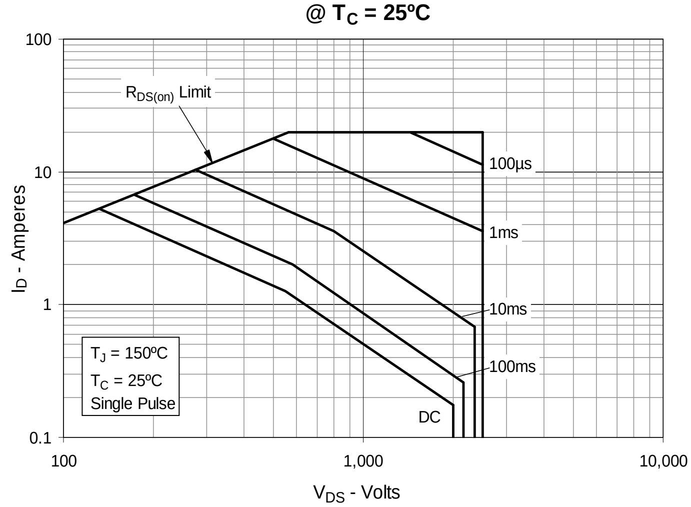
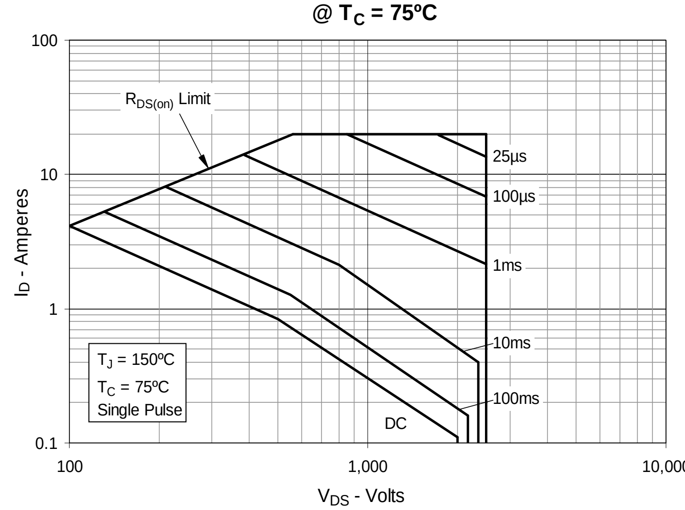


Fig. 12. Forward-Bias Safe Operating Area
@ T_C = 75ºC



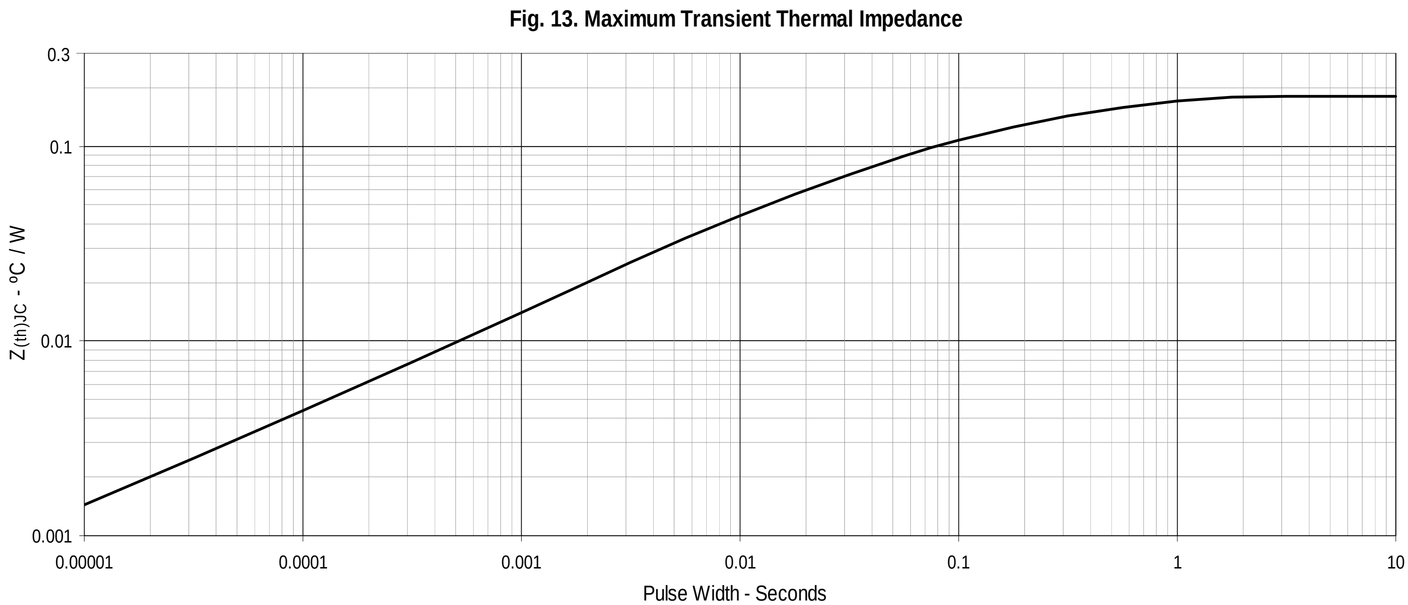


Fig. 13. Maximum Transient Thermal Impedance
0.3
0.1
0.01
0.001
Z(th)JC - ºC / W
0.00001
0.0001
0.001
0.01
0.1
1
10
Pulse Width - Seconds