IXYS

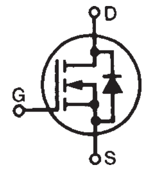
Preliminary Technical Information

Polar™ Power MOSFET HiPerFET™

IXFR24N90P

V_{DSS} = 900V
I_{D25} = 13A
$R_{DS(on)}$ ≤ 460mΩ
t_{rr} ≤ 300ns

N-Channel Enhancement Mode
Avalanche Rated
Fast Intrinsic Diode



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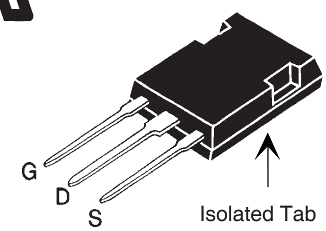


G = Gate D = Drain
S = Source

Symbol	Test Conditions	Maximum Ratings	
V_{DSS}	T_J = 25°C to 150°C	900	V
V_{DGR}	T_J = 25°C to 150°C, R_{GS} = 1MΩ	900	V
V_{GSS}	Continuous	± 30	V
V_{GSM}	Transient	± 40	V
I_{D25}	T_C = 25°C	13	A
I_{DM}	T_C = 25°C, pulse width limited by T_{JM}	48	A
I_A	T_C = 25°C	12	A
E_{AS}	T_C = 25°C	1	J
dV/dt	$I_S \le I_{DM}$, $V_{DD} \le V_{DSS}$, $T_J \le$ 150°C	15	V/ns
P_D	T_C = 25°C	230	W
T_J		-55 ... +150	°C
T_{JM}		150	°C
T_{stg}		-55 ... +150	°C
T_L	Maximum lead temperature for soldering	300	°C
T_{SOLD}	Plastic body for 10s	260	°C
V_{ISOL}	50/60 Hz, RMS, 1 minute	2500	V~
F_C	Mounting force	20..120/4.5..27	N/lb.
Weight		5	g

Fearures

- Silicon chip on Direct-Copper Bond (DCB) substrate
- Isolated mounting surface
- 2500V electrical isolation
- Fast intrinsic diode
- Avalanche rated
- Low package inductance

Advantages

- Low gate drive requirement
- High power density

Applications:

- Switched-mode and resonant-mode power supplies
- DC-DC Converters
- Laser Drivers
- AC and DC motor drives
- Robotics and servo controls

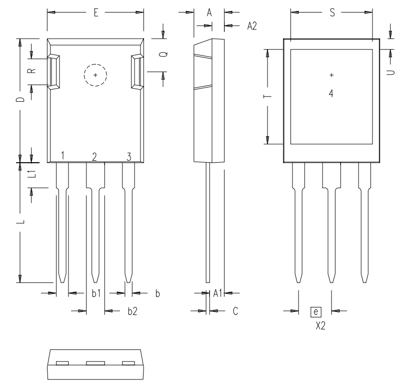
Symbol	Test Conditions (T_J = 25°C, unless otherwise specified)	Characteristic Values Min.	Typ.	Max.	
BV_{DSS}	V_{GS} = 0V, I_D = 1mA	900			V
$V_{GS(th)}$	$V_{DS} = V_{GS}$, I_D = 1mA	3.5		6.5	V
I_{GSS}	V_{GS} = ± 30V, V_{DS} = 0V			± 200	nA
I_{DSS}	$V_{DS} = V_{DSS}$ V_{GS} = 0V T_J = 125°C			25 2	µA mA
$R_{DS(on)}$	V_{GS} = 10V, I_D = 12A, Note 1			460	mΩ

Symbol	Test Conditions (T$_J$ = 25°C unless otherwise specified)	Characteristic Values Min.	Typ.	Max.
g_{fs}	V_{DS} = 20V, I_D = 12A, Note 1	10	16	S
R_{Gi}	Gate input resistance		1.1	Ω
C_{iss}	V_{GS} = 0V, V_{DS} = 25V, f = 1MHz		7200	pF
C_{oss}			490	pF
C_{rss}			60	pF
$t_{d(on)}$	**Resistive Switching Times**		46	ns
t_r	V_{GS} = 10V, V_{DS} = 0.5 • V_{DSS}, I_D = 12A		40	ns
$t_{d(off)}$	R_G = 1Ω (External)		68	ns
t_f			38	ns
$Q_{g(on)}$	V_{GS} = 10V, V_{DS} = 0.5 • V_{DSS}, I_D = 12A		130	nC
Q_{gs}			50	nC
Q_{gd}			58	nC
R_{thJC}				0.54 °C/W
R_{thCS}			0.15	°C/W

Source-Drain Diode (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 = 12A, -di/dt = 100A/μs			300 ns
Q_{RM}	V_R = 100V, V_{GS} = 0V		1.1	μC
I_{RM}			11	A

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

ISOPLUS247 (IXFR) Outline



SYM	INCHES MIN	INCHES MAX	MILLIMETERS MIN	MILLIMETERS MAX
A	.190	.205	4.83	5.21
A1	.090	.100	2.29	2.54
A2	.075	.085	1.91	2.16
b	.045	.055	1.14	1.40
b1	.075	.084	1.91	2.13
b2	.115	.123	2.92	3.12
C	.024	.031	0.61	0.80
D	.819	.840	20.80	21.34
E	.620	.635	15.75	16.13
e	.215 BSC		5.45 BSC	
L	.780	.800	19.81	20.32
L1	.150	.170	3.81	4.32
Q	.220	.244	5.59	6.20
R	.170	.190	4.32	4.83
S	.520	.540	13.21	13.72
T	.620	.640	15.75	16.26
U	.065	.080	1.65	2.03

1 - GATE
2 - DRAIN (COLLECTOR)
3 - SOURCE (EMITTER)
4 - NO CONNECTION

NOTE: This drawing will meet all dimensions requirement of JEDEC outline TO-247AD except screw hole.

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 @ 25ºC

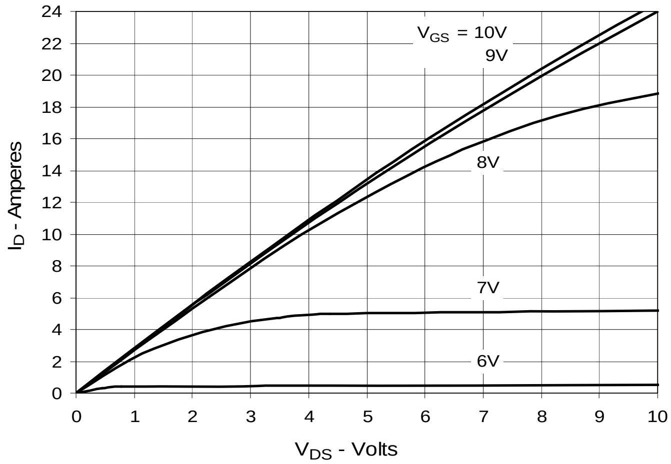


Fig. 2. Extended Output Characteristics @ 25ºC

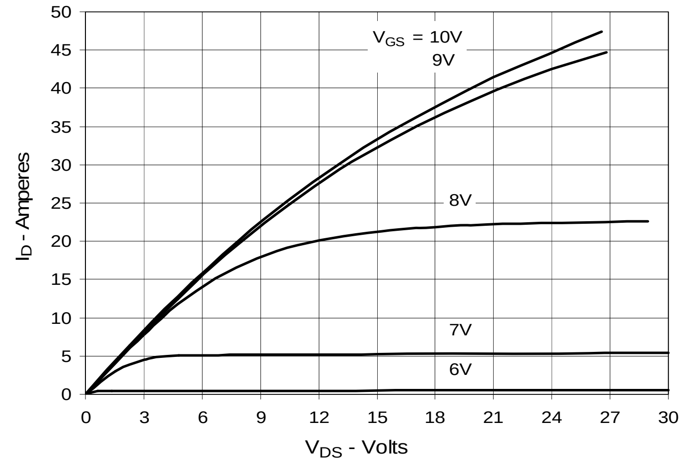


Fig. 3. Output Characteristics @ 125ºC

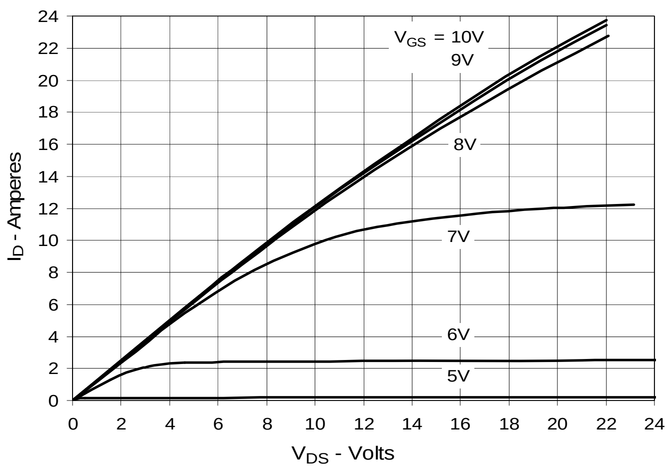


Fig. 4. $R_{DS(on)}$ Normalized to I_D = 12A Value vs. Junction Temperature

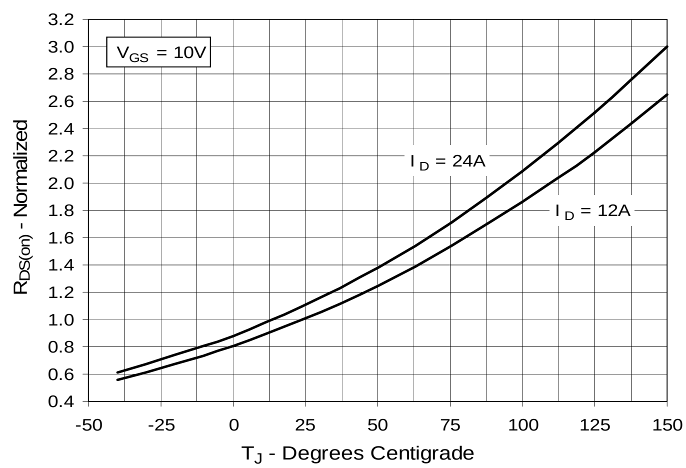


Fig. 5. $R_{DS(on)}$ Normalized to I_D = 12A Value vs. Drain Current

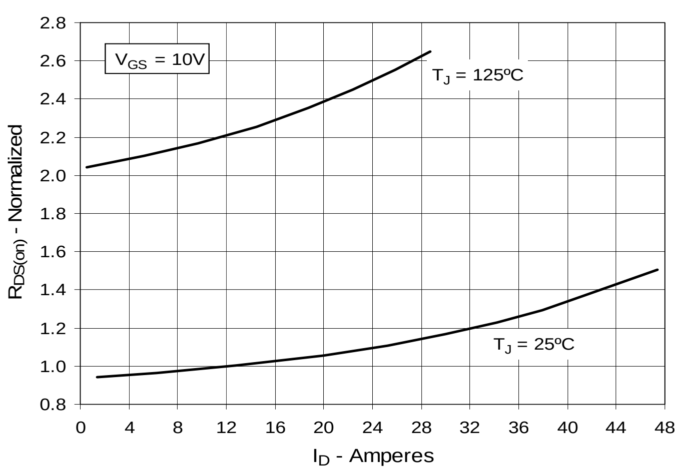
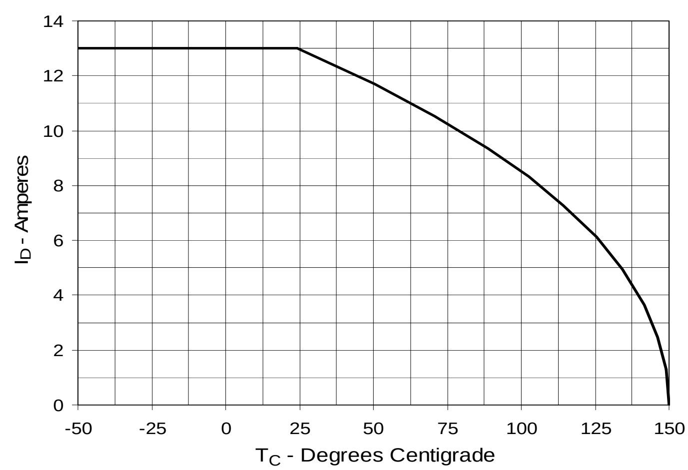
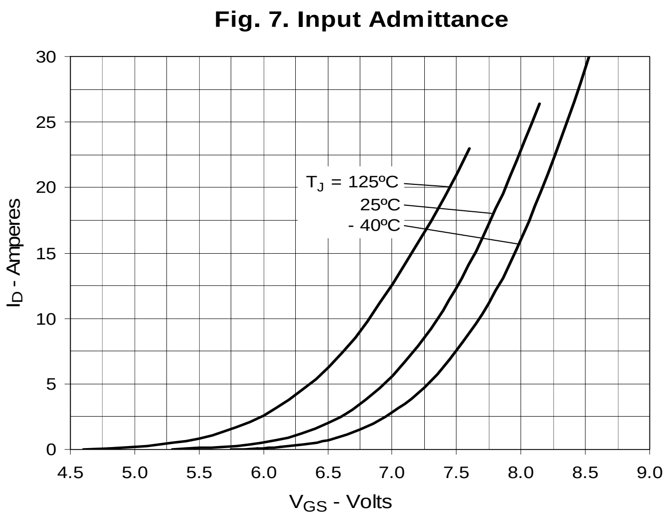
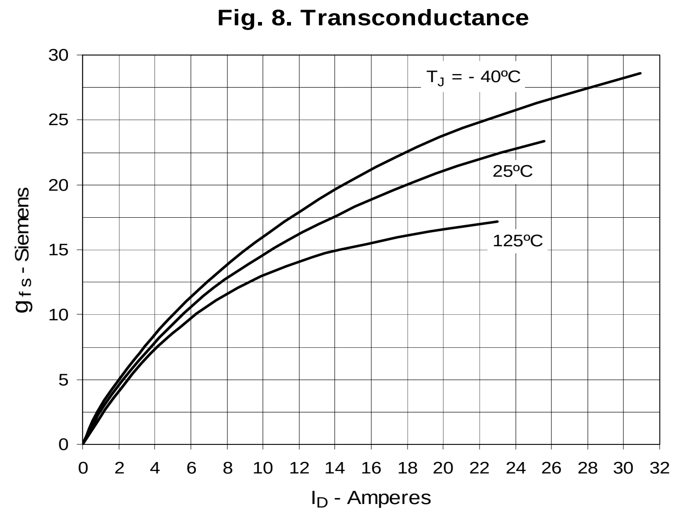
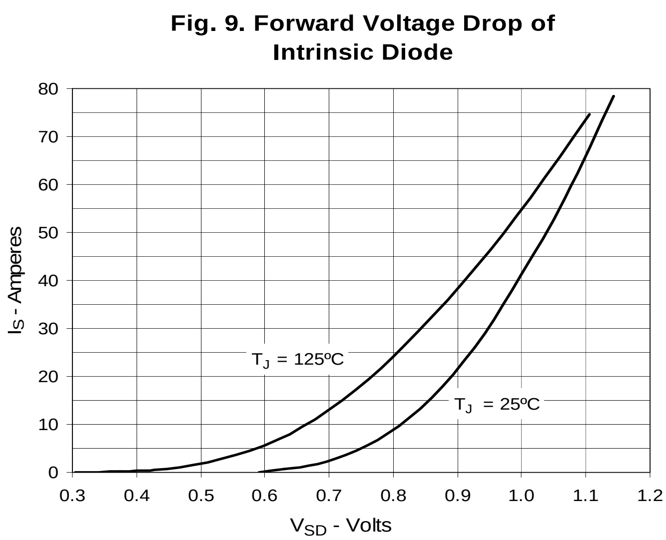


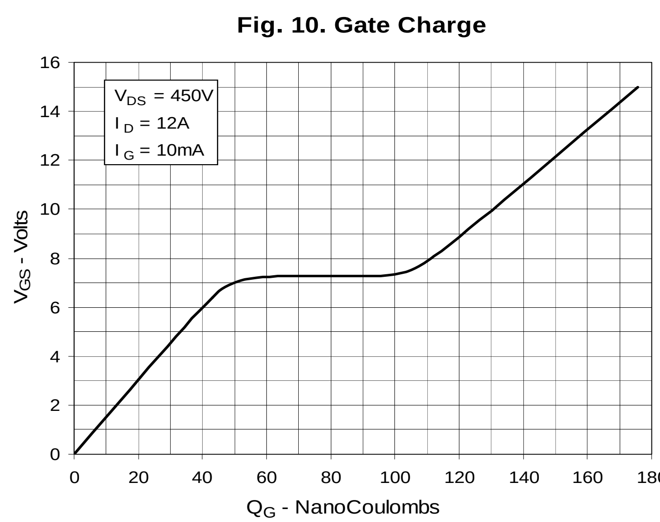
Fig. 6. Maximum Drain Current vs. Case Temperature

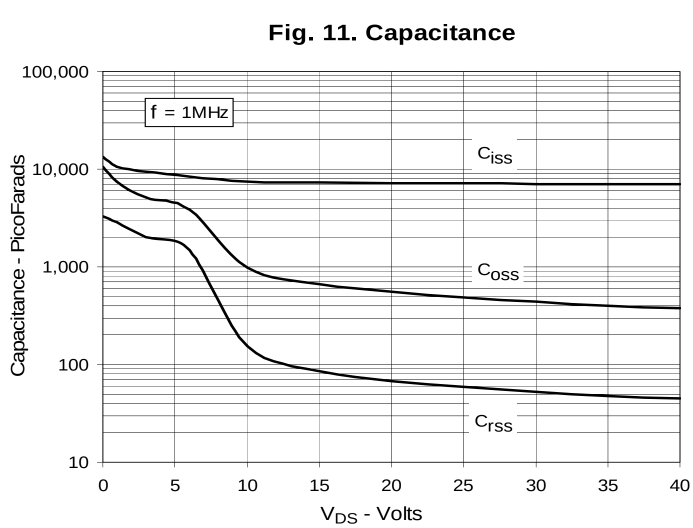


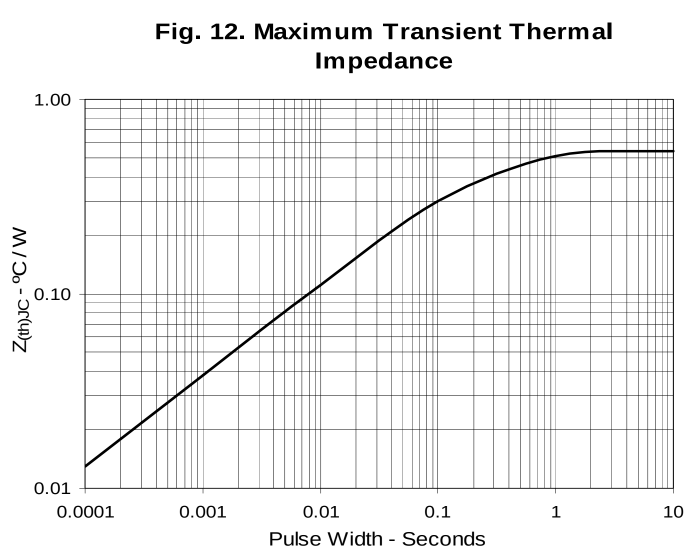












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