IXYS

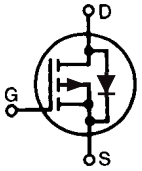
Preliminary Technical Information

PolarP™ Power MOSFET

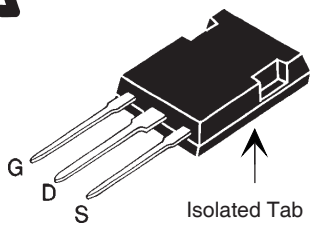
IXTR48P20P

V_{DSS} = - 200V
I_{D25} = - 30A
$R_{DS(on)}$ ≤ 93mΩ

P-Channel Enhancement Mode
Avalanche Rated



ISOPLUS247 (IXTR)
E153432



G = Gate D = Drain
S = Source

Symbol	Test Conditions		Maximum Ratings	
V_{DSS}	T_J = 25°C to 150°C		- 200	V
V_{DGR}	T_J = 25°C to 150°C, R_{GS} = 1MΩ		- 200	V
V_{GSS}	Continuous		±20	V
V_{GSM}	Transient		±30	V
I_{D25}	T_C = 25°C		- 30	A
I_{DM}	T_C = 25°C, pulse width limited by T_{JM}		-144	A
I_{AR}	T_C = 25°C		- 48	A
E_{AS}	T_C = 25°C		2.5	J
dV/dt	$I_S \le I_{DM}$, $V_{DD} \le V_{DSS}$, $T_J \le 150°C$		10	V/ns
P_D	T_C = 25°C		190	W
T_J			-55 ... +150	°C
T_{JM}			150	°C
T_{stg}			-55 ... +150	°C
T_L	1.6mm (0.062 in.) from case for 10s		300	°C
T_{SOLD}	Plastic body for 10s		260	°C
V_{ISOL}	50/60 Hz, RMS	t = 1min	2500	V~
	$I_{ISOL} \le$ 1mA	t = 1s	3000	V~
M_d	Mounting force		20..120 / 4.5..27	N/lb.
Weight			5	g

Symbol	Test Conditions (T_J = 25°C, unless otherwise specified)		Characteristic Values Min.	Typ.	Max.	
BV_{DSS}	V_{GS} = 0V, I_D = - 250μA		- 200			V
$V_{GS(th)}$	$V_{DS} = V_{GS}$, I_D = - 250μA		- 2.5		- 4.5	V
I_{GSS}	V_{GS} = ±20V, V_{DS} = 0V				±100	nA
I_{DSS}	$V_{DS} = V_{DSS}$				- 25	μA
	V_{GS} = 0V	T_J = 125°C			- 200	μA
$R_{DS(on)}$	V_{GS} = -10V, I_D = - 24A, Note 1				93	mΩ

Features

- Silicon chip on Direct-Copper Bond (DCB) substrate
  - UL recognized package
  - Isolated mounting surface
  - 2500V electrical isolation
- Avalanche rated
- The rugged PolarP™ process
- Low Q_G
- Low Drain-to-Tab capacitance
- Low package inductance
  - easy to drive and to protect

Applications

- High side switching
- Push-pull amplifiers
- DC Choppers
- Automatic test equipment
- Load-Switch Application
- Fuel Injection Systems

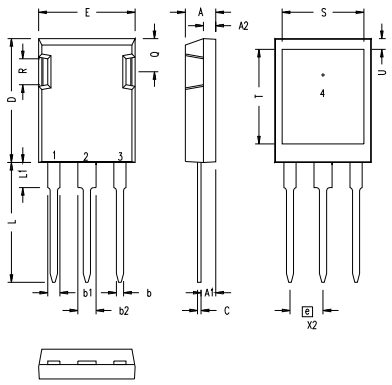
Symbol	Test Conditions (T_J = 25°C, unless otherwise specified)	Characteristic Values Min.	Typ.	Max.	
g_{fs}	V_{DS} = -10V, I_D = - 24A, Note 1	19	32		S
C_{iss}	V_{GS} = 0V, V_{DS} = - 25V, f = 1MHz		5400		pF
C_{oss}			1040		pF
C_{rss}			170		pF
$t_{d(on)}$	**Resistive Switching Times**		30		ns
t_r	V_{GS} = -10V, V_{DS} = 0.5 • V_{DSS}, I_D = - 24A		46		ns
$t_{d(off)}$	R_G = 3Ω (External)		67		ns
t_f			27		ns
$Q_{g(on)}$	V_{GS} = -10V, V_{DS} = 0.5 • V_{DSS}, I_D = - 24A		103		nC
Q_{gs}			23		nC
Q_{gd}			40		nC
R_{thJC}				0.66	°C/W
R_{thCS}			0.15		°C/W

Source-Drain Diode

Symbol	Test Conditions (T_J = 25°C, unless otherwise specified)	Characteristic Values Min.	Typ.	Max.	
I_S	V_{GS} = 0V			- 48	A
I_{SM}	Repetitive, pulse width limited by T_{JM}			-192	A
V_{SD}	I_F = - 24A, V_{GS} = 0V, Note 1			- 3.3	V
t_{rr}	I_F = - 24A, -di/dt = -150A/μs		260		ns
Q_{RM}	V_R = -100V, V_{GS} = 0V		4.2		μC
I_{RM}			- 32.2		A

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

ISOPLUS247 (IXTR) 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

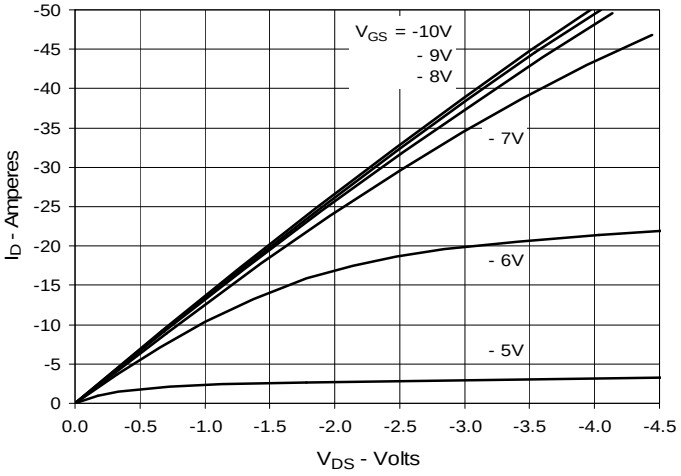


Fig. 2. Extended Output Characteristics @ 25ºC

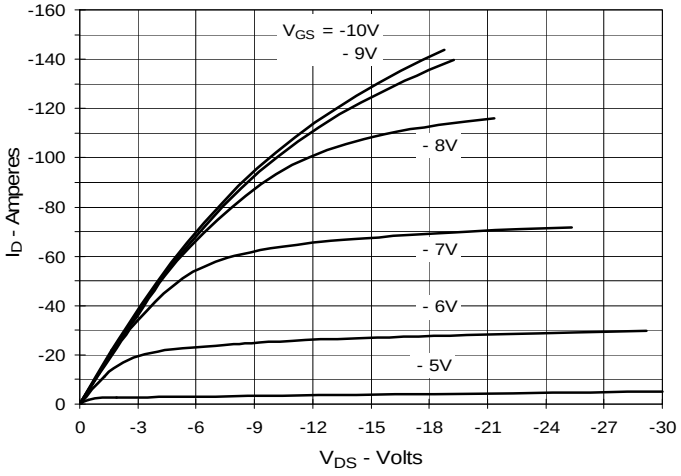


Fig. 3. Output Characteristics @ 125ºC

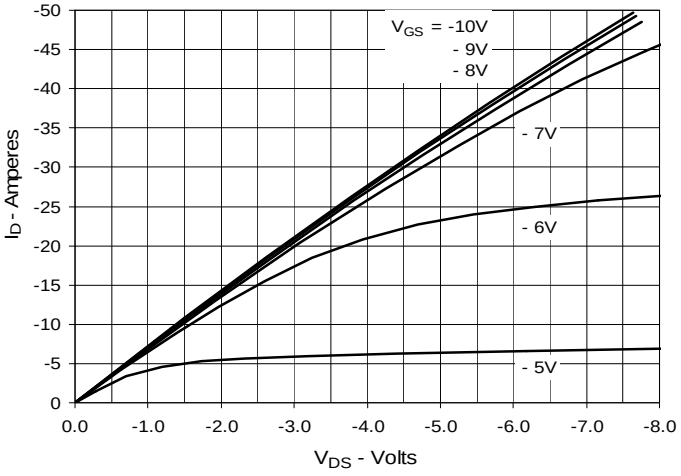


Fig. 4. $R_{DS(on)}$ Normalized to I_D = - 24A vs. Junction Temperature

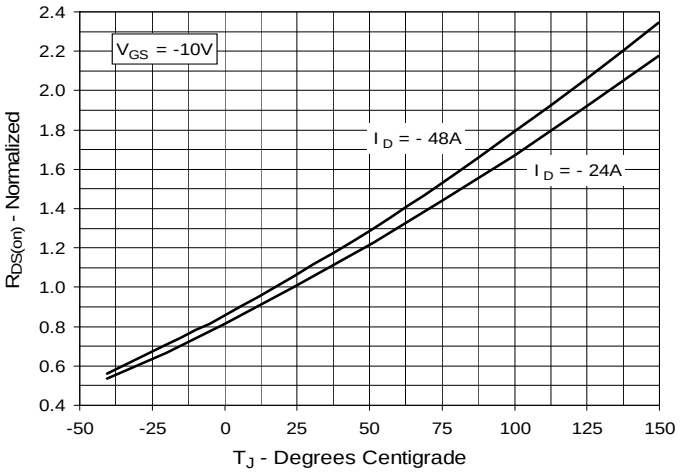


Fig. 5. $R_{DS(on)}$ Normalized to I_D = - 24A vs. Drain Current

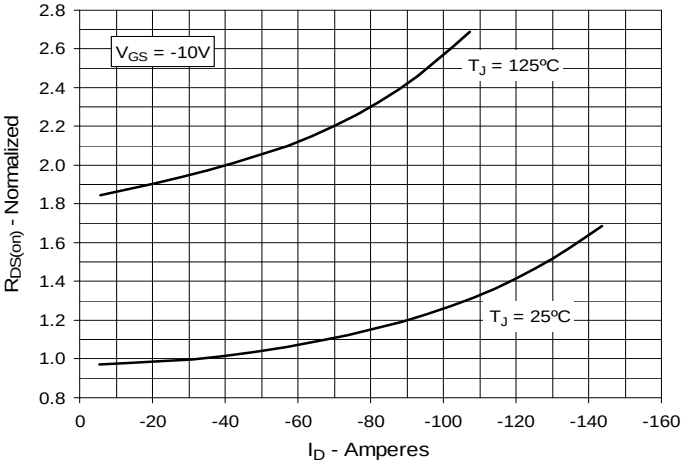


Fig. 6. Maximum Drain Current vs. Case Temperature

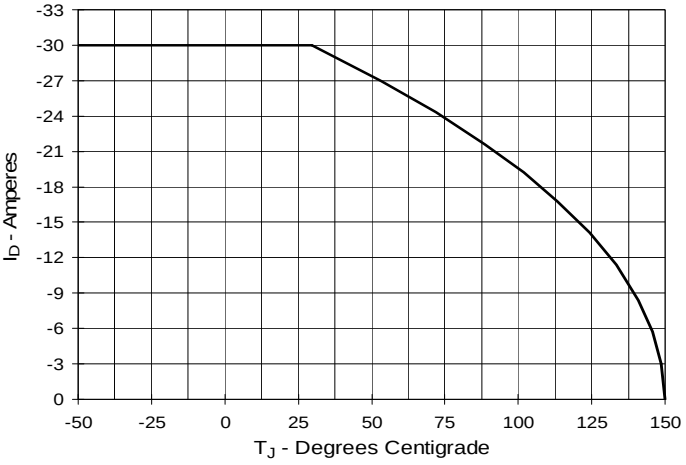


Fig. 7. Input Admittance

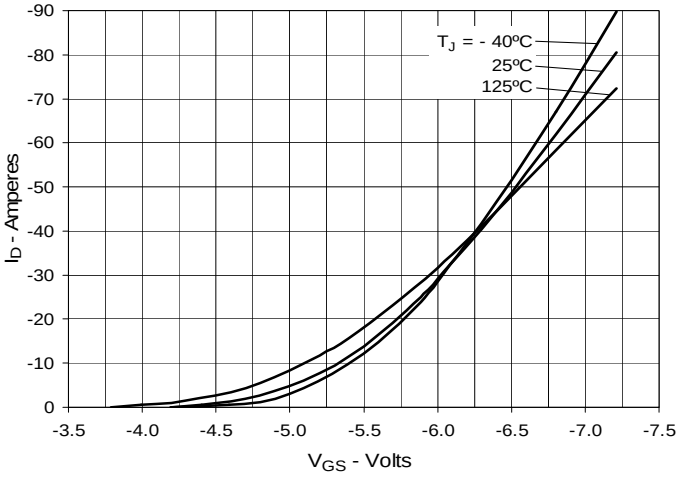


Fig. 8. Transconductance

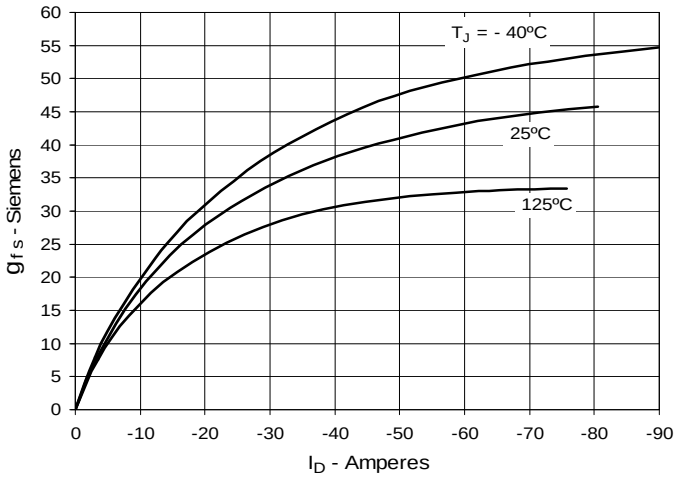


Fig. 9. Forward Voltage Drop of Intrinsic Diode

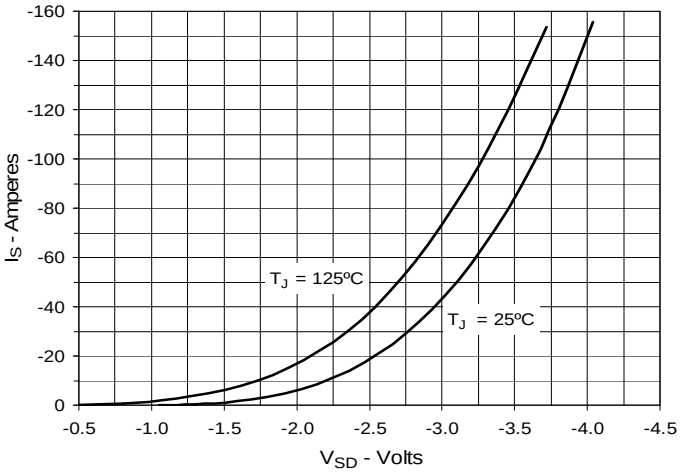


Fig. 10. Gate Charge

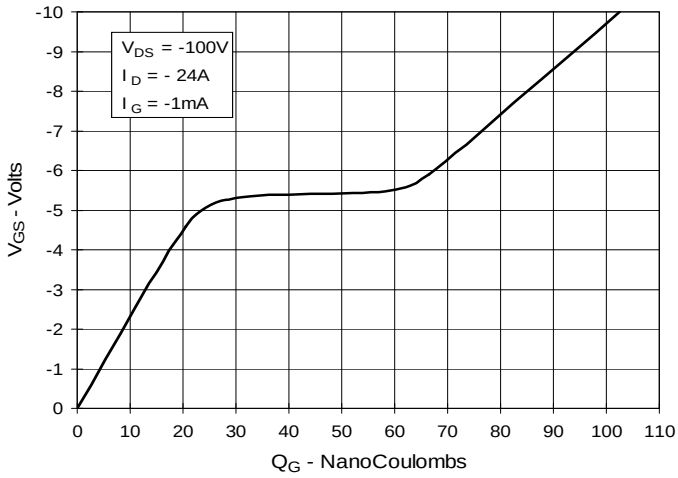


Fig. 11. Capacitance

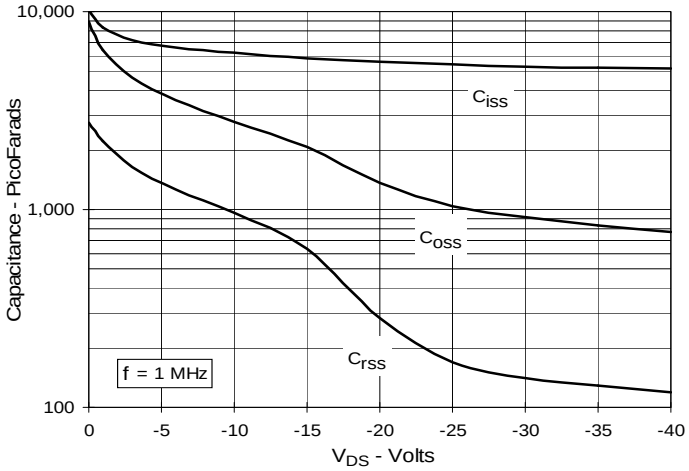


Fig. 12. Forward-Bias Safe Operating Area

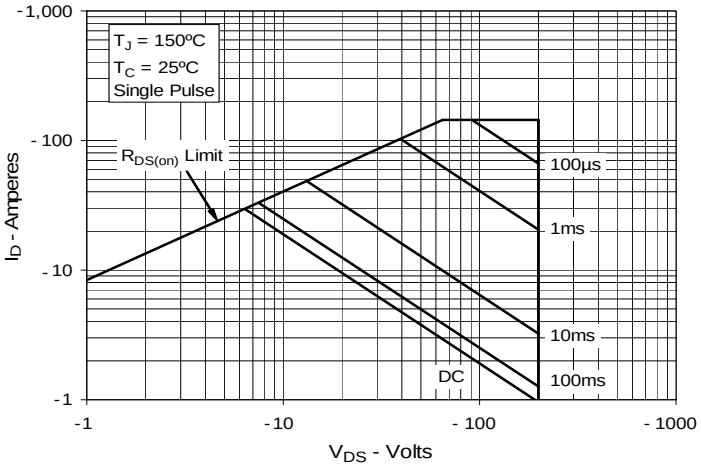


Fig. 13. Maximum Transient Thermal Impedance