⊔IXYS

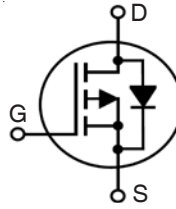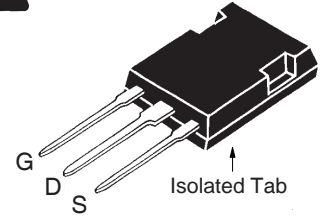## PolarP™ Power MOSFET

IXTR48P20P

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

P-Channel Enhancement Mode
Avalanche Rated

ISOPLUS247
®U 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_A	T_C = 25°C	- 48	A
E_{AS}	T_C = 25°C	2.5	J
dv/dt	I_S ≤ I_{DM}, V_{DD} ≤ V_{DSS}, T_J ≤ 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, 1 Minute	2500	V~
F_C	Mounting Force	20..120/4.5..27	N/lb.
Weight		5	g

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
- Fast Intrinsic Diode
- Low Drain-to-Tab Capacitance
- Low Package Inductance

Advantages

- Easy to Mount
- Space Savings
- High Power Density

Applications

- High-Side Switches
- Push-Pull Amplifiers
- DC Choppers
- Automatic Test Equipment
- Load-Switch Applications
- Fuel Injection Systems

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	- 2.0		- 4.0 V
I_{GSS}	V_{GS} = ±20V, V_{DS} = 0V			±100 nA
I_{DSS}	V_{DS} = V_{DSS}, V_{GS} = 0V			- 25 µA
	T_J = 125°C			- 200 µA
$R_{DS(on)}$	V_{GS} = -10V, I_D = - 24A, Note 1			93 mΩ

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}			5400	pF
C_{oss}	V_{GS} = 0V, V_{DS} = - 25V, f = 1MHz		1040	pF
C_{rss}			170	pF
$t_{d(on)}$	**Resistive Switching Times**		30	ns
t_r			46	ns
$t_{d(off)}$	V_{GS} = -10V, V_{DS} = 0.5 • V_{DSS}, I_D = - 24A		67	ns
t_f	R_G = 3Ω (External)		27	ns
$Q_{g(on)}$			103	nC
Q_{gs}	V_{GS} = -10V, V_{DS} = 0.5 • V_{DSS}, I_D = - 24A		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}			4.2	μC
I_{RM}	V_R = -100V, V_{GS} = 0V		- 32.2	A

ISOPLUS247 (IXTR) Outline

1 - Gate
2,4 - Drain
3 - Source
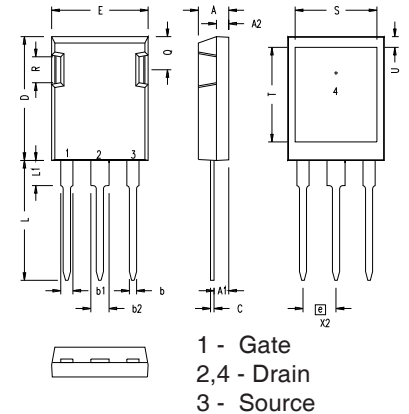
SYM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.190	.205	4.83	5.21
A1	.090	.100	2.29	2.54
A2	.075	.085	1.91	2.16
b	.045	.055	1.14	1.40
b1	.075	.084	1.91	2.13
b2	.115	.123	2.92	3.12
C	.024	.031	0.61	0.80
D	.819	.840	20.80	21.34
E	.620	.635	15.75	16.13
e	.215 BSC		5.45 BSC	
L	.780	.800	19.81	20.32
L1	.150	.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

Note   1: Pulse test, t ≤ 300μs, duty cycle, d ≤ 2%.
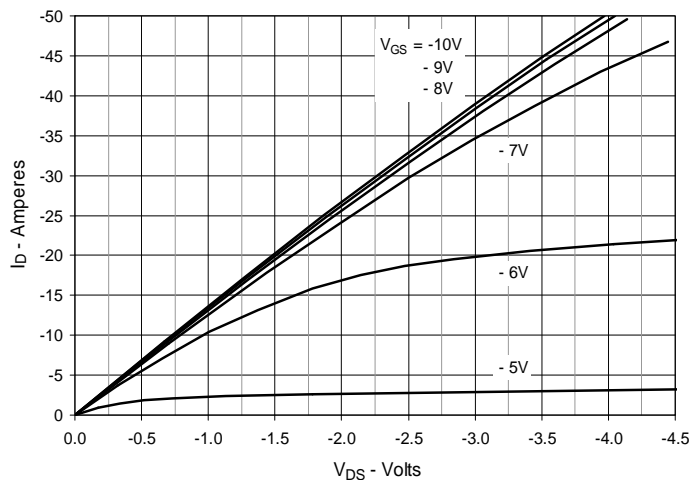
Fig. 1. Output Characteristics @ T_J = 25ºC

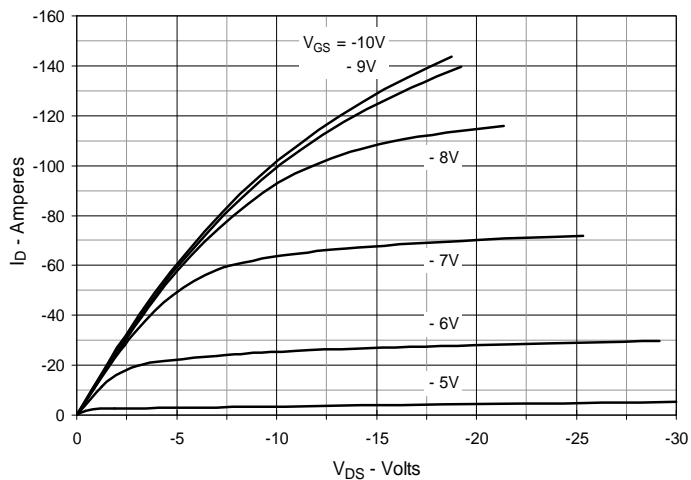### Fig. 2. Extended Output Characteristics @ T_J = 25ºC
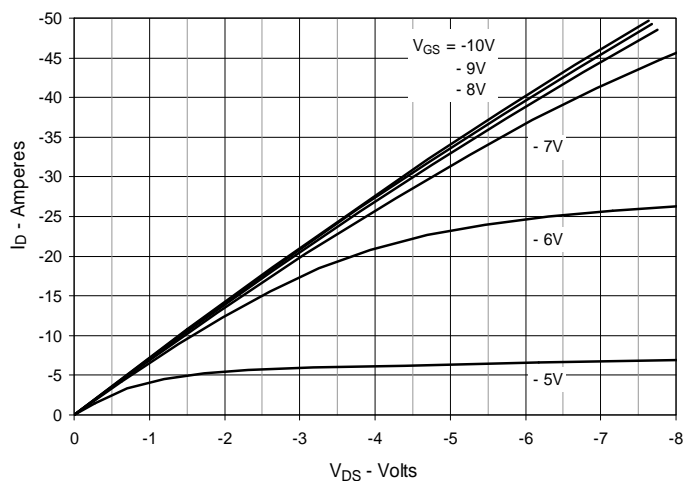

Fig. 3. Output Characteristics @ T_J = 125ºC

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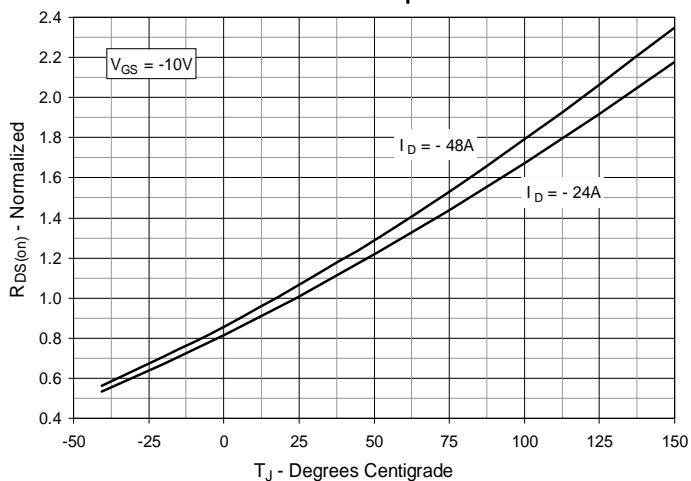

Fig. 5. $R_{DS(on)}$ Normalized to I_D = - 24A Value vs. Drain Current

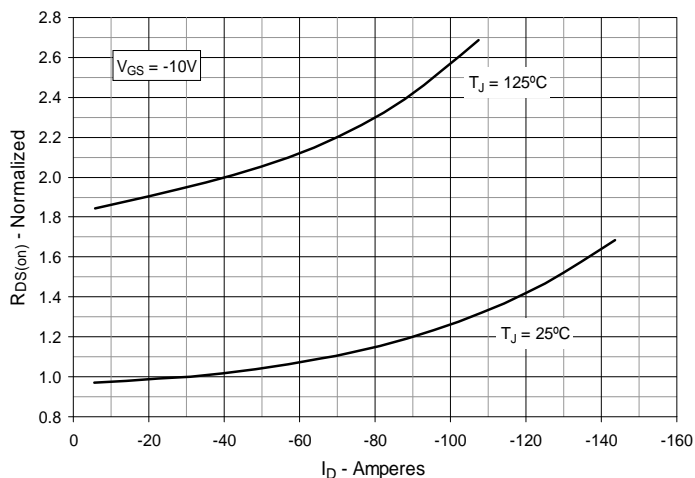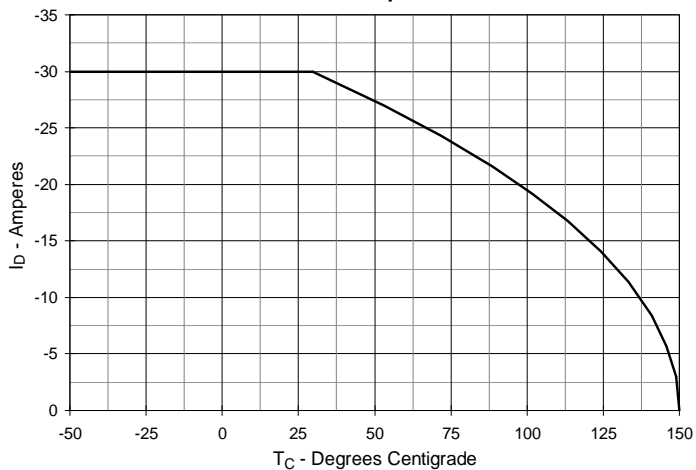### Fig. 6. Maximum Drain Current vs. Case Temperature
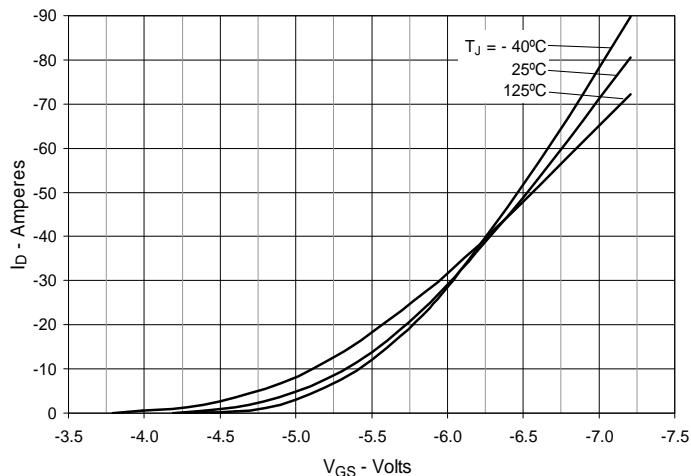
Fig. 7. Input Admittance

I_D - Amperes

T_J = - 40ºC
25ºC
125ºC

V_{GS} - Volts

Fig. 8. Transconductance

g_{fs} - Siemens

T_J = - 40ºC
25ºC
125ºC

I_D - Amperes
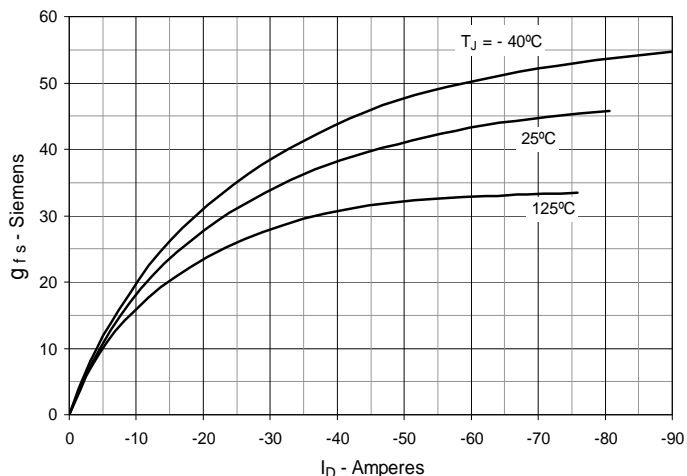
Fig. 9. Forward Voltage Drop of Intrinsic Diode

I_S - Amperes

T_J = 125ºC

T_J = 25ºC

V_{SD} - Volts

Fig. 10. Gate Charge

V_{GS} - Volts

V_{DS} = -100V
I_D = - 24A
I_G = -1mA

Q_G - NanoCoulombs

Fig. 11. Capacitance

Capacitance - PicoFarads

C_{iss}

C_{oss}

C_{rss}

f = 1 MHz

V_{DS} - Volts
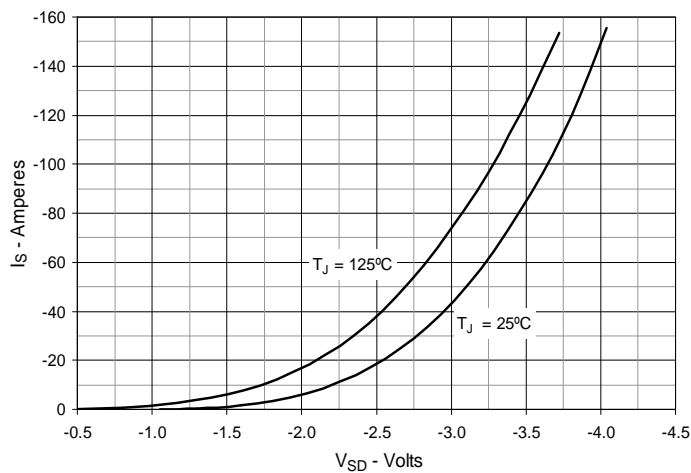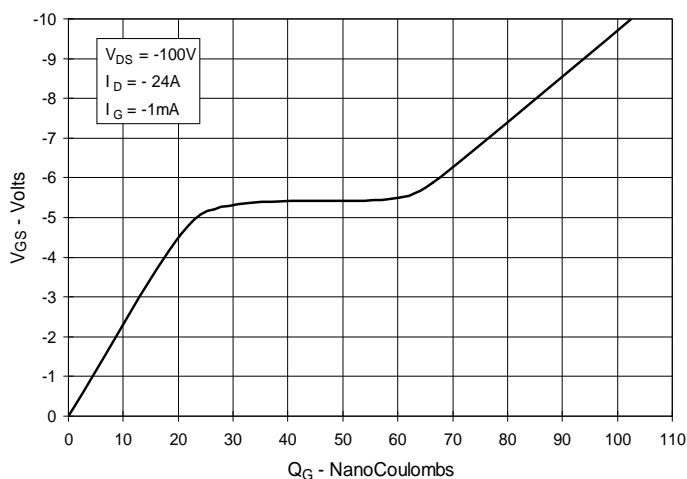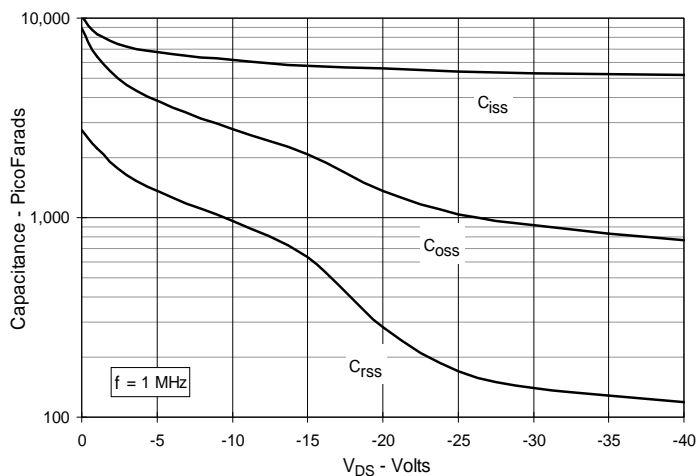
Fig. 12. Forward-Bias Safe Operating Area

I_D - Amperes

$R_{DS(on)}$ Limit

100µs
1ms
10ms
100ms
DC

T_J = 150ºC
T_C = 25ºC
Single Pulse

V_{DS} - Volts

IXYS Reserves the Right to Change Limits, Test Conditions, and Dimensions.
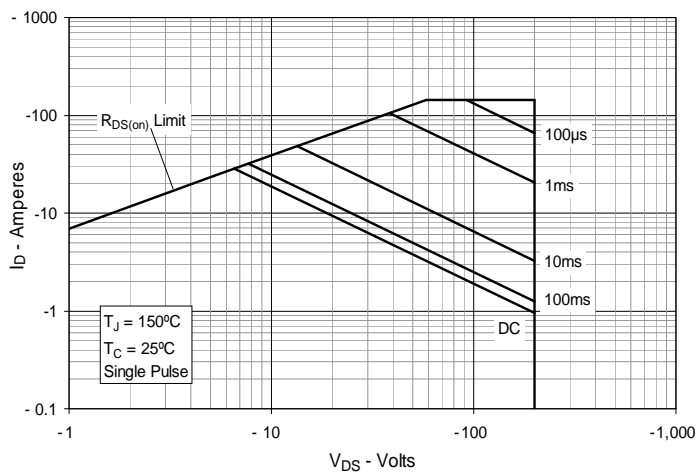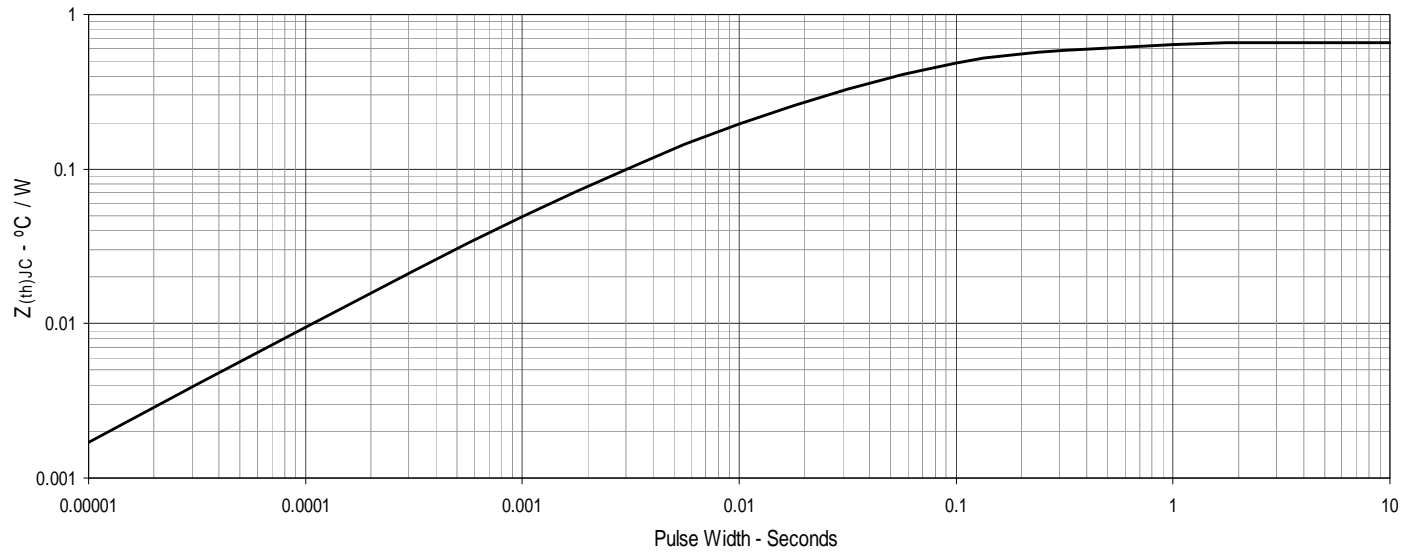
Fig. 13. Maximum Transient Thermal Impedance

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