IXYS

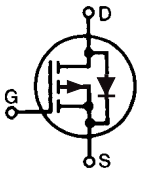
Preliminary Technical Information

PolarP™ Power MOSFET

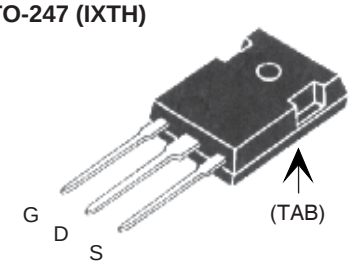
IXTH48P20P
IXTT48P20P

V_{DSS} = - 200V
I_{D25} = - 48A
$R_{DS(on)}$ ≤ 85mΩ

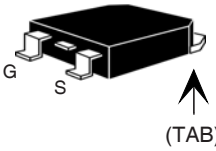
P-Channel Enhancement Mode
Avalanche Rated



TO-247 (IXTH)



TO-268 (IXTT)



G = Gate D = Drain
S = Source TAB = Drain

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	- 48	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	462	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
M_d	Mounting torque (TO-247, TO-3P)	1.13 / 10	Nm/lb.in.
F_C	Mounting force (PLUS220)	11..65 / 2.5..14.6	N/lb.
Weight	TO-247	6	g
	TO-268	5	g

Symbol	Test Conditions (T_J = 25°C, unless otherwise specified)	Characteristic Values Min.	Typ.	Max.	
BV_{DSS}	V_{GS} = 0V, I_D = - 250 μA	- 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, $I_D = 0.5 \bullet I_{D25}$, Note 1			85	mΩ

Features:

- International standard packages
- Avalanche Rated
- Rugged PolarP™ process
- Low package inductance
  - easy to drive and to protect

Applications:

- High side switching
- Push-pull amplifiers
- DC Choppers
- Current regulators
- Automatic test equipment

Advantages:

- Low gate charge results in simple drive requirement
- High power density
- Fast switching
- Easy to parallel

Symbol	Test Conditions (T_J = 25°C, unless otherwise specified)	Characteristic Values Min.	Typ.	Max.
g_{fs}	V_{DS} = -10V, I_D = 0.5 • I_{D25}, 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 = 0.5 • I_{D25}		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 = 0.5 • I_{D25}		103	nC
Q_{gs}			23	nC
Q_{gd}			40	nC
R_{thJC}				0.27 °C/W
R_{thCS}			0.21	°C/W

Source-Drain Diode

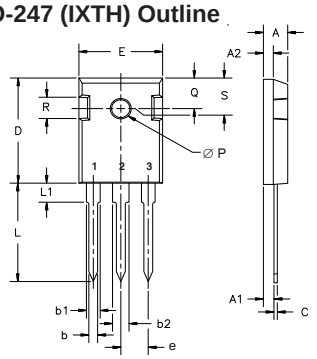
Symbol	Test Conditions (T_J = 25°C, unless otherwise specified)	Characteristic Values Min.	Typ.	Max.	
I_S	V_{GS} = 0V			- 48	A
I_{SM}	Repetitive, pulse width limited by T_{JM}			- 192	A
V_{SD}	I_F = - 24A, V_{GS} = 0V, Note 1			- 3.3	V
t_{rr}	I_F = - 24A, -di/dt = -100A/µs		260		ns
Q_{RM}	V_R = -100V,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

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

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.

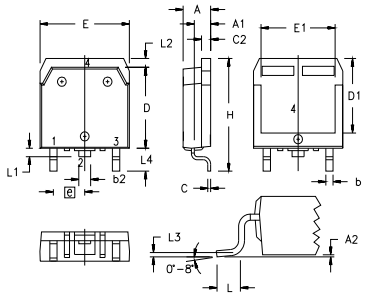
TO-247 (IXTH) Outline



Terminals: 1 - Gate 2 - Drain

Dim.	Millimeter Min.	Max.	Inches Min.	Max.
A	4.7	5.3	.185	.209
A_1	2.2	2.54	.087	.102
A_2	2.2	2.6	.059	.098
b	1.0	1.4	.040	.055
b_1	1.65	2.13	.065	.084
b_2	2.87	3.12	.113	.123
C	.4	.8	.016	.031
D	20.80	21.46	.819	.845
E	15.75	16.26	.610	.640
e	5.20	5.72	0.205	0.225
L	19.81	20.32	.780	.800
L1		4.50		.177
ØP	3.55	3.65	.140	.144
Q	5.89	6.40	0.232	0.252
R	4.32	5.49	.170	.216

TO-268 (IXTT) Outline



SYM	INCHES MIN	MAX	MILLIMETERS MIN	MAX
A	.193	.201	4.90	5.10
A1	.106	.114	2.70	2.90
A2	.001	.010	0.02	0.25
b	.045	.057	1.15	1.45
b2	.075	.083	1.90	2.10
C	.016	.026	0.40	0.65
C2	.057	.063	1.45	1.60
D	.543	.551	13.80	14.00
D1	.488	.500	12.40	12.70
E	.624	.632	15.85	16.05
E1	.524	.535	13.30	13.60
e	.215 BSC		5.45 BSC	
H	.736	.752	18.70	19.10
L	.094	.106	2.40	2.70
L1	.047	.055	1.20	1.40
L2	.039	.045	1.00	1.15
L3	.010 BSC		0.25 BSC	
L4	.150	.161	3.80	4.10

IXYS reserves the right to change limits, test conditions, and dimensions.

IXYS MOSFETs and IGBTs are covered by one or more of 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

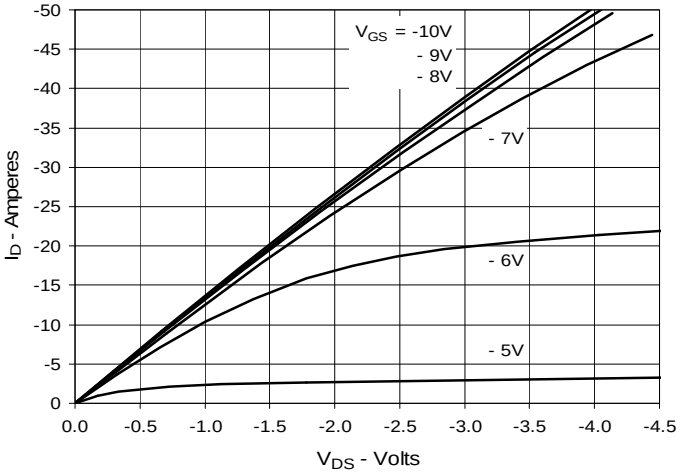


Fig. 2. Extended Output Characteristics @ 25ºC

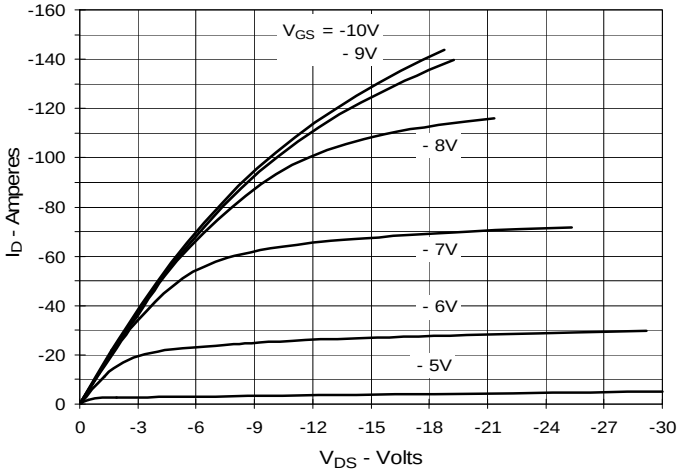


Fig. 3. Output Characteristics @ 125ºC

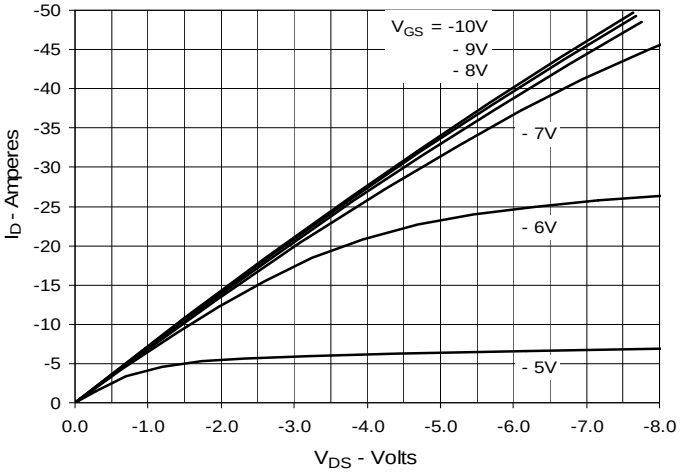


Fig. 4. $R_{DS(on)}$ Normalized to I_D = - 24A vs. Junction Temperature

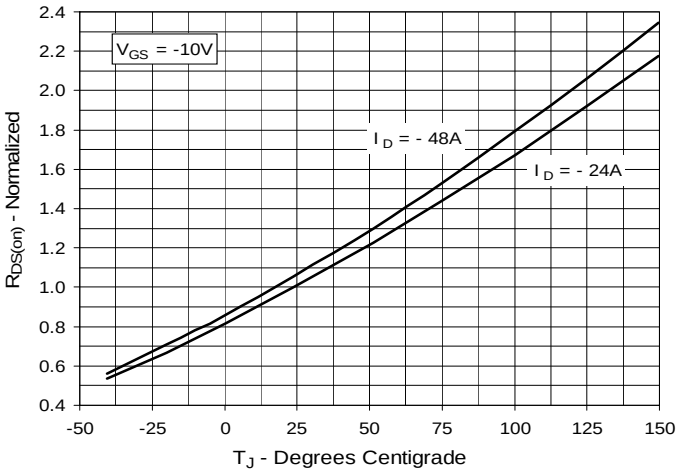


Fig. 5. $R_{DS(on)}$ Normalized to I_D = - 24A vs. Drain Current

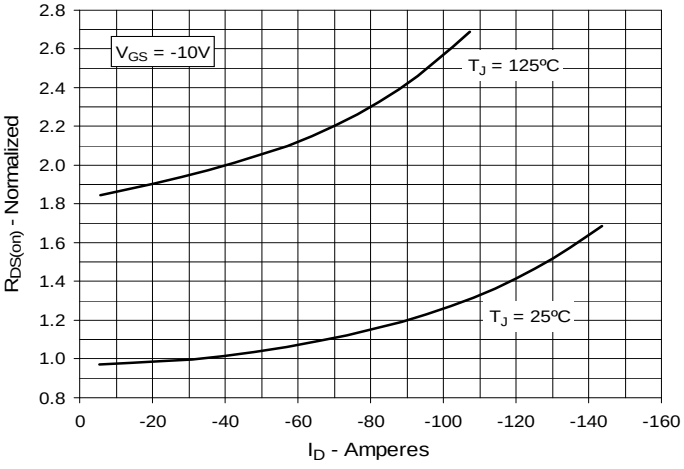


Fig. 6. Maximum Drain Current vs. Case Temperature

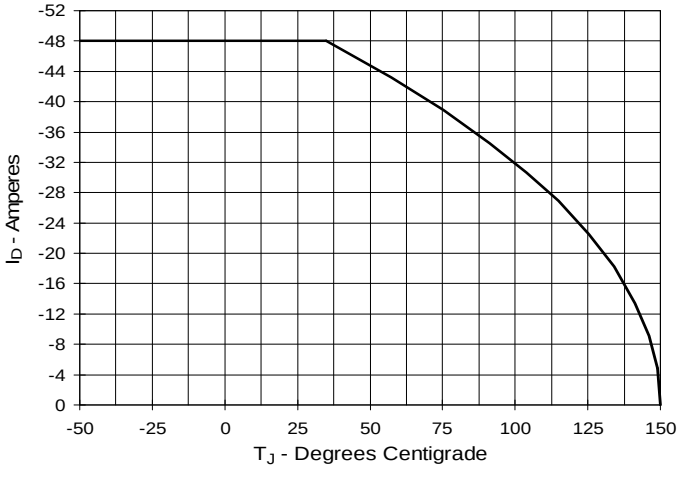


Fig. 7. Input Admittance

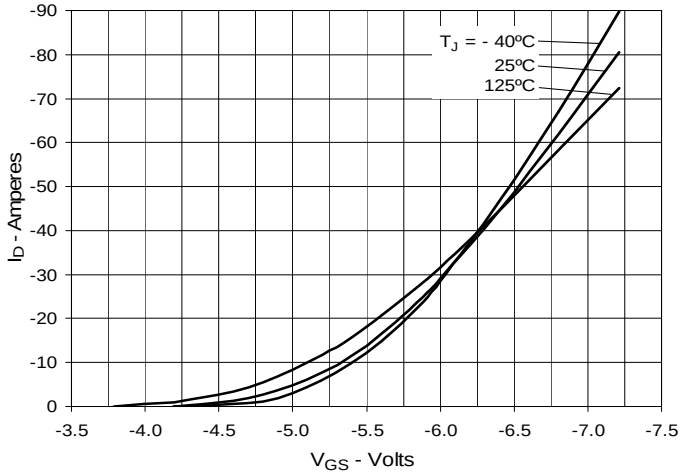


Fig. 8. Transconductance

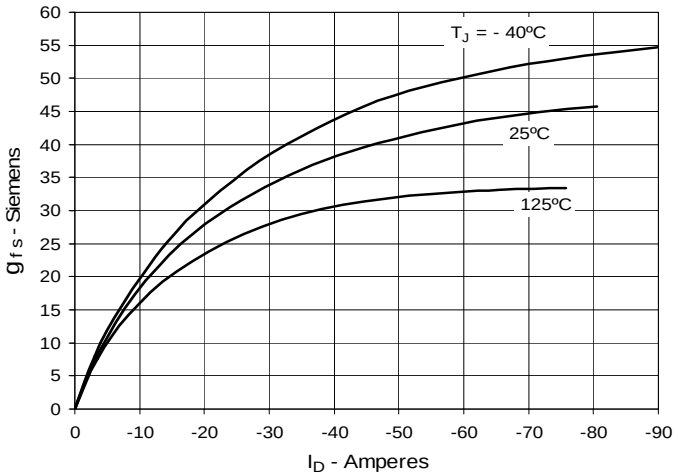


Fig. 9. Forward Voltage Drop of Intrinsic Diode

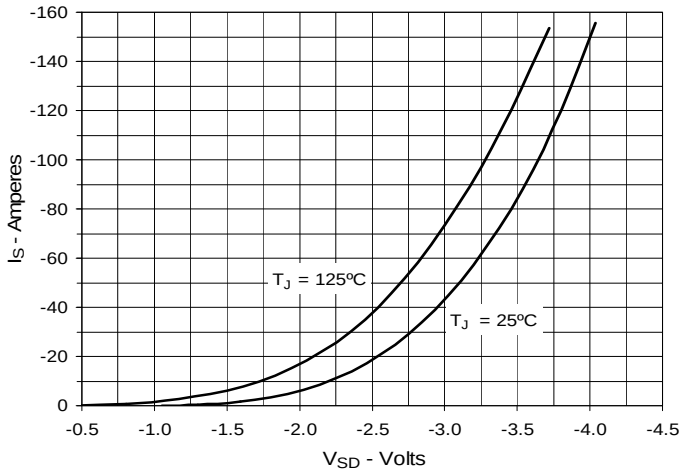


Fig. 10. Gate Charge

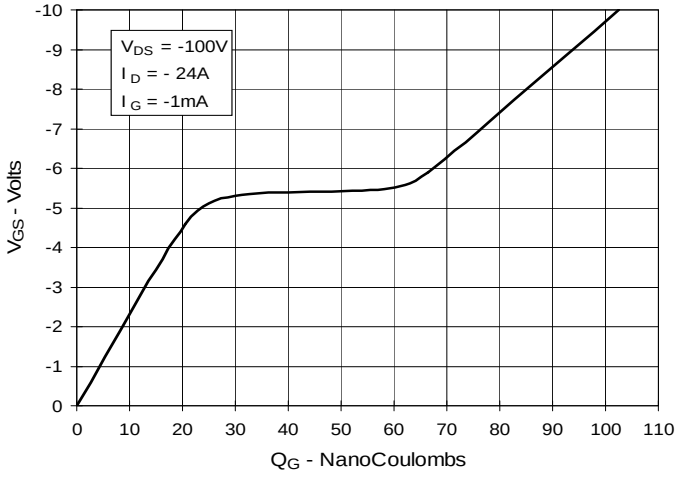


Fig. 11. Capacitance

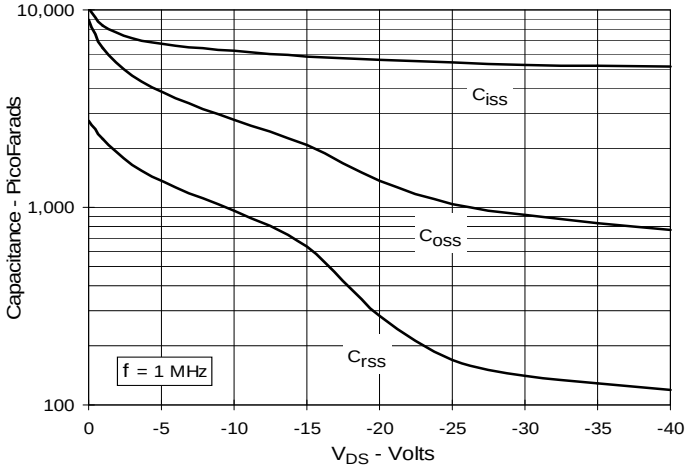


Fig. 12. Forward-Bias Safe Operating Area

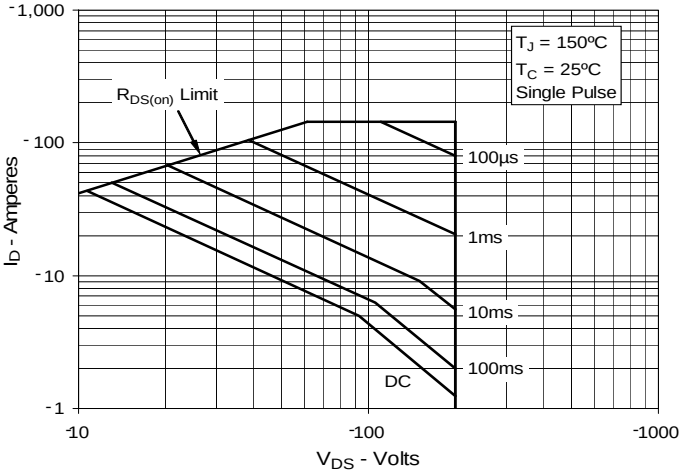


Fig. 13. Maximum Transient Thermal Impedance