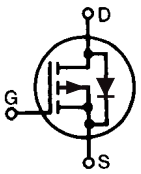
IXYS

Preliminary Technical Information

PolarP™ Power MOSFET

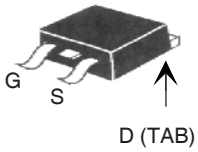
P-Channel Enhancement Mode
Avalanche Rated

IXTA36P15P
IXTP36P15P
IXTQ36P15P

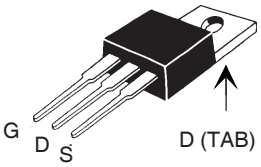


V_{DSS} = - 150V
I_{D25} = - 36A
$R_{DS(on)}$ ≤ 110mΩ

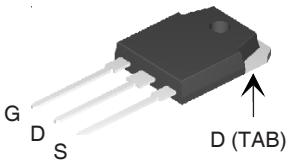
TO-263 (IXTA)



TO-220 (IXTP)



TO-3P (IXTQ)



Symbol	Test Conditions	Maximum Ratings	
V_{DSS}	T_J = 25°C to 150°C	- 150	V
V_{DGR}	T_J = 25°C to 150°C, R_{GS} = 1MΩ	- 150	V
V_{GSS}	Continuous	±20	V
V_{GSM}	Transient	±30	V
I_{D25}	T_C = 25°C	- 36	A
I_{DM}	T_C = 25°C, pulse width limited by T_{JM}	- 90	A
I_{AR}	T_C = 25°C	- 36	A
E_{AS}	T_C = 25°C	1.5	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	300	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-3P / TO-220)	1.13/10	Nm/lb.in.
Weight	TO-3P	5.5	g
	TO-220	3.0	g
	TO-263	2.5	g

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

Features:

- International standard packages
- Fast intrinsic diode
- Dynamic dV/dt Rated
- Avalanche Rated
- Rugged PolarP™ process
- Low Q_G and $R_{ds(on)}$ characterization
- Low Drain-to-Tab capacitance
- Low package inductance
  - easy to drive and to protect

Applications:

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

Advantages:

- Low gate charge results in simple drive requirement
- Improved Gate, Avalanche and dynamic dV/dt ruggedness
- High power density
- Fast switching
- Easy to parallel

Symbol	Test Conditions (T_J = 25°C, unless otherwise specified)	Characteristic Values Min.	Typ.	Max.	
BV_{DSS}	V_{GS} = 0V, I_D = - 250 μA	- 150			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}	$V_{DS} = V_{DSS}$			- 10	μA
	V_{GS} = 0V T_J = 125°C			- 250	μA
$R_{DS(on)}$	V_{GS} = -10V, $I_D = 0.5 \bullet I_{D25}$, Note 1			110	mΩ

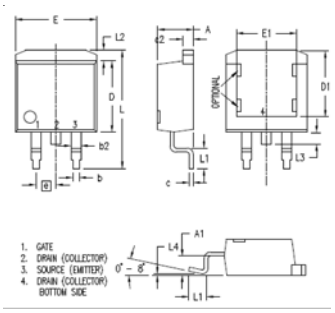
Symbol	Test Conditions (T_J = 25°C, unless otherwise specified)	Characteristic Values Min.	Typ.	Max.
g_{fs}	V_{DS} = -10V, I_D = 0.5 • I_{D25}, Note 1	11	19	S
C_{iss}	V_{GS} = 0V, V_{DS} = - 25V, f = 1MHz		3100	pF
C_{oss}			610	pF
C_{rss}			100	pF
$t_{d(on)}$	**Resistive Switching Times**		21	ns
t_r	V_{GS} = -10V, V_{DS} = 0.5 • V_{DSS}, I_D = 0.5 • I_{D25}		31	ns
$t_{d(off)}$	R_G = 3.3Ω (External)		36	ns
t_f			15	ns
$Q_{g(on)}$	V_{GS} = -10V, V_{DS} = 0.5 • V_{DSS}, I_D = 0.5 • I_{D25}		55	nC
Q_{gs}			20	nC
Q_{gd}			18	nC
R_{thJC}				0.42 °C/W
R_{thCS}	(TO-3P)		0.21	°C/W
	(TO-220)		0.50	°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			- 36 A
I_{SM}	Repetitive, pulse width limited by T_{JM}			- 140 A
V_{SD}	I_F = -18A, V_{GS} = 0V, Note 1			- 3.3 V
t_{rr}	I_F = -18A, -di/dt = -100A/μs		228	ns
Q_{RM}	V_R = - 75V, V_{GS} = 0V		2.0	μC
I_{RM}			-17.6	A

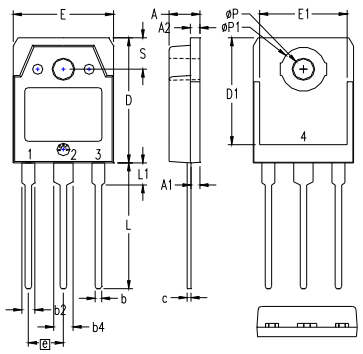
Note 1: Pulse test, t ≤ 300μs; duty cycle, d ≤ 2%.

TO-263 (IXTA)



SYM	INCHES MIN	INCHES MAX	MILLIMETERS MIN	MILLIMETERS MAX
A	.160	.190	4.06	4.83
A1	.080	.110	2.03	2.79
b	.020	.039	0.51	0.99
b2	.045	.055	1.14	1.40
c	.016	.029	0.40	0.74
c2	.045	.055	1.14	1.40
D	.340	.380	8.64	9.65
D1	.315	.350	8.00	8.89
E	.380	.410	9.65	10.41
E1	.245	.320	6.22	8.13
e	.100 BSC		2.54 BSC	
L	.575	.625	14.61	15.88
L1	.090	.110	2.29	2.79
L2	.040	.055	1.02	1.40
L3	.050	.070	1.27	1.78
L4	0	.005	0	0.13

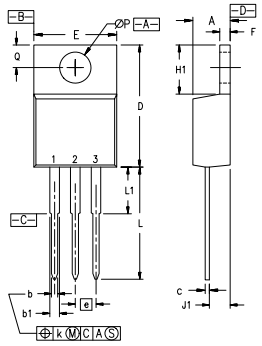
TO-3P (IXTQ) Outline



1 – GATE
2 – DRAIN (COLLECTOR)
3 – SOURCE (EMITTER)
4 – DRAIN (COLLECTOR)

SYM	INCHES MIN	INCHES MAX	MILLIMETERS MIN	MILLIMETERS MAX
A	.185	.193	4.70	4.90
A1	.051	.059	1.30	1.50
A2	.057	.065	1.45	1.65
b	.035	.045	0.90	1.15
b2	.075	.087	1.90	2.20
b4	.114	.126	2.90	3.20
c	.022	.031	0.55	0.80
D	.780	.799	19.80	20.30
D1	.665	.677	16.90	17.20
E	.610	.622	15.50	15.80
E1	.531	.539	13.50	13.70
e	.215 BSC		5.45 BSC	
L	.779	.795	19.80	20.20
L1	.134	.142	3.40	3.60
øP	.126	.134	3.20	3.40
øP1	.272	.280	6.90	7.10
S	.193	.201	4.90	5.10

TO-220 (IXTP) Outline



Pins: 1 - Gate 2 - Drain
3 - Source 4 - Drain

SYM	INCHES MIN	INCHES MAX	MILLIMETERS MIN	MILLIMETERS MAX
A	.170	.190	4.32	4.83
b	.025	.040	0.64	1.02
b1	.045	.065	1.15	1.65
c	.014	.022	0.35	0.56
D	.580	.630	14.73	16.00
E	.390	.420	9.91	10.66
e	.100 BSC		2.54 BSC	
F	.045	.055	1.14	1.40
H1	.230	.270	5.85	6.85
J1	.090	.110	2.29	2.79
k	0	.015	0	0.38
L	.500	.550	12.70	13.97
L1	.110	.230	2.79	5.84
ØP	.139	.161	3.53	4.08
Q	.100	.125	2.54	3.18

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.

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Fig. 1. Output Characteristics @ 25ºC

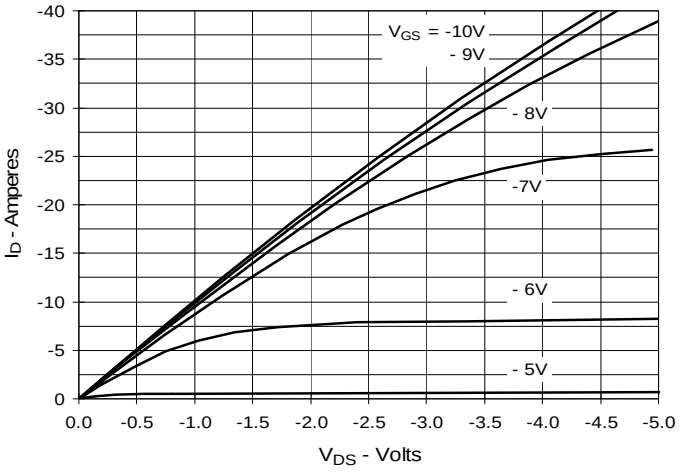

Fig. 2. Extended Output Characteristics @ 25ºC

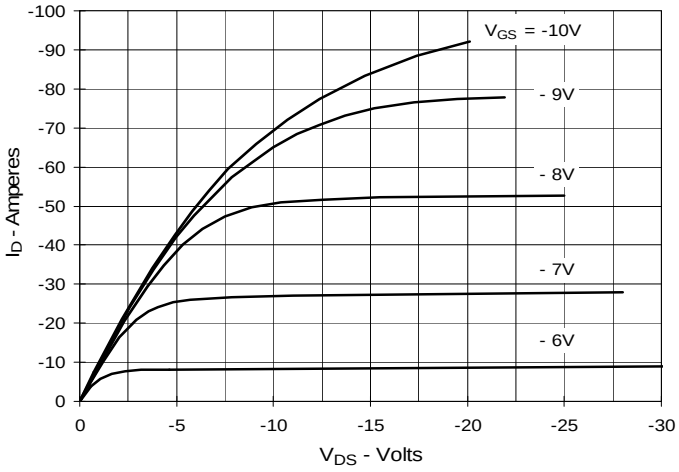

Fig. 3. Output Characteristics @ 125ºC

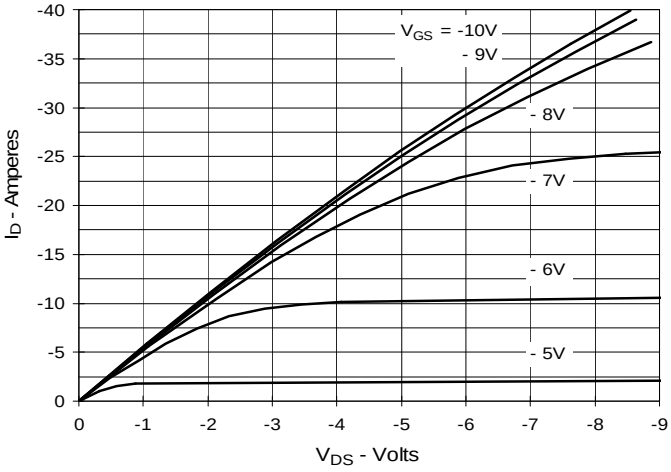

Fig. 4. $R_{DS(on)}$ Normalized to I_D = -18A vs. Junction Temperature

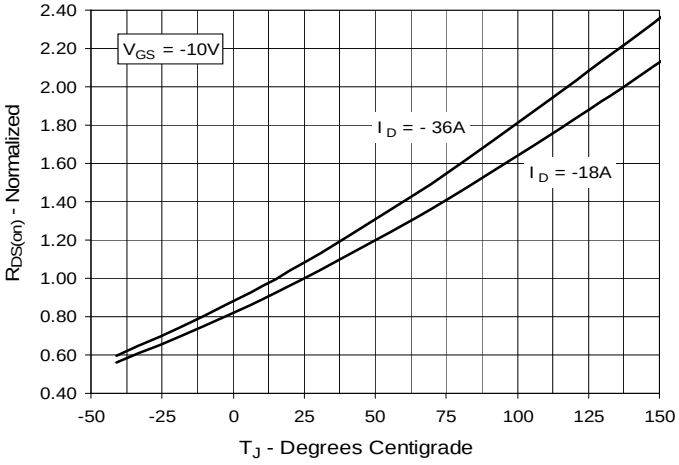

Fig. 5. $R_{DS(on)}$ Normalized to I_D = -18A vs. Drain Current

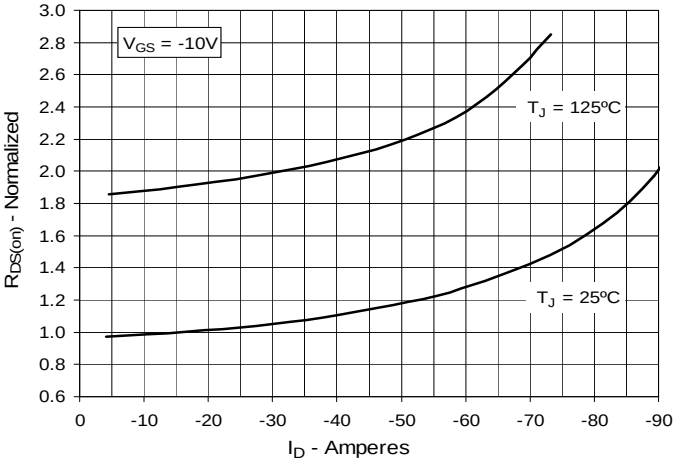

Fig. 6. Maximum Drain Current vs. Case Temperature

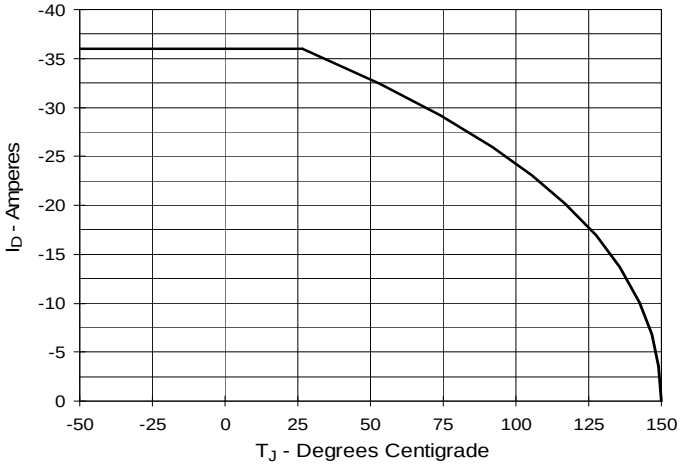

Fig. 7. Input Admittance

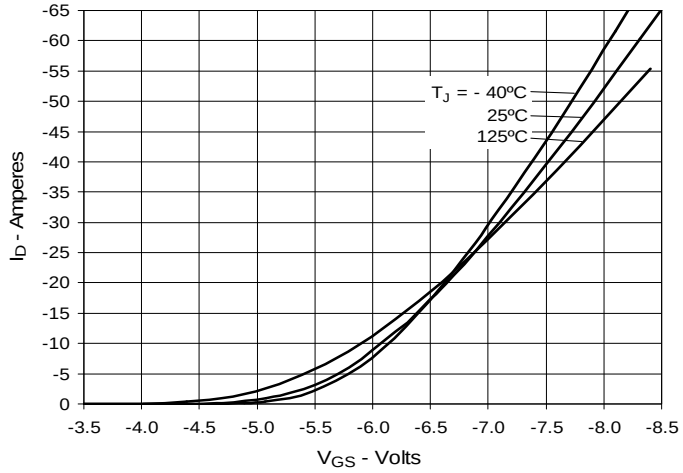

Fig. 8. Transconductance

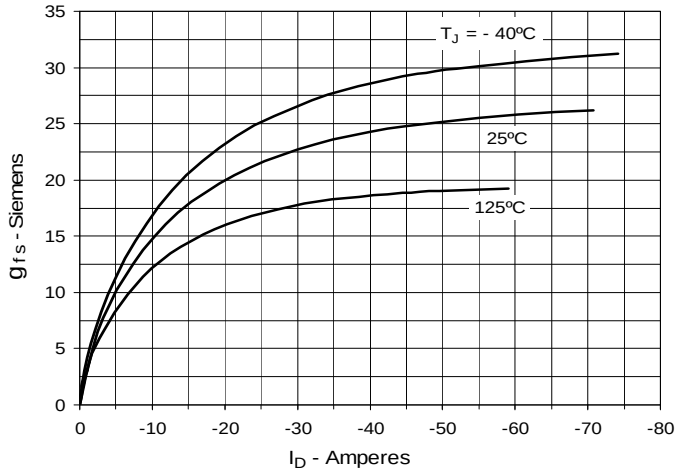

Fig. 9. Forward Voltage Drop of Intrinsic Diode

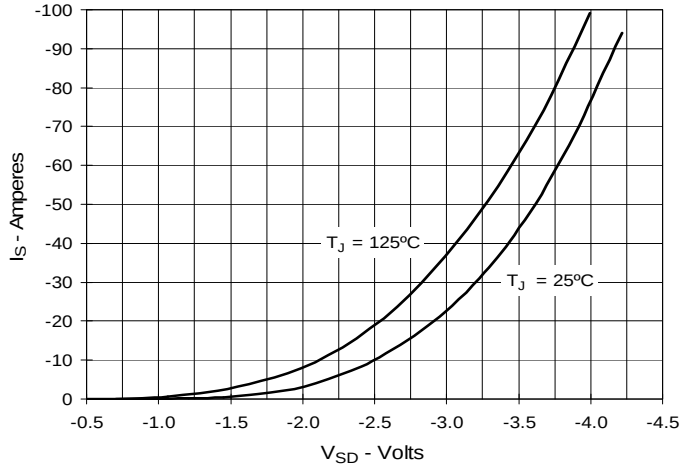

Fig. 10. Gate Charge

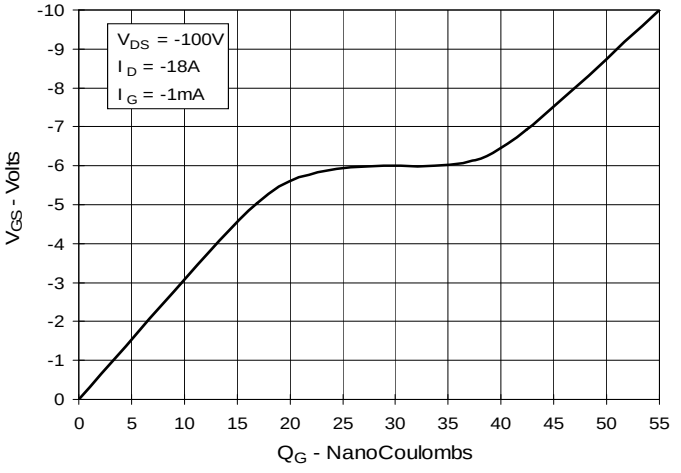

Fig. 11. Capacitance

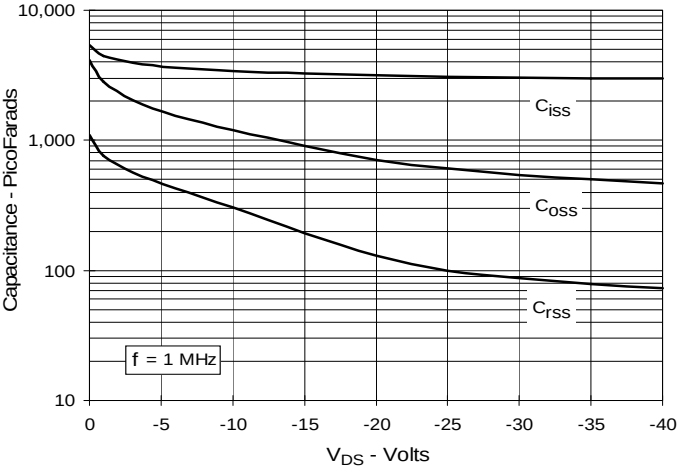

Fig. 12. Forward-Bias Safe Operating Area

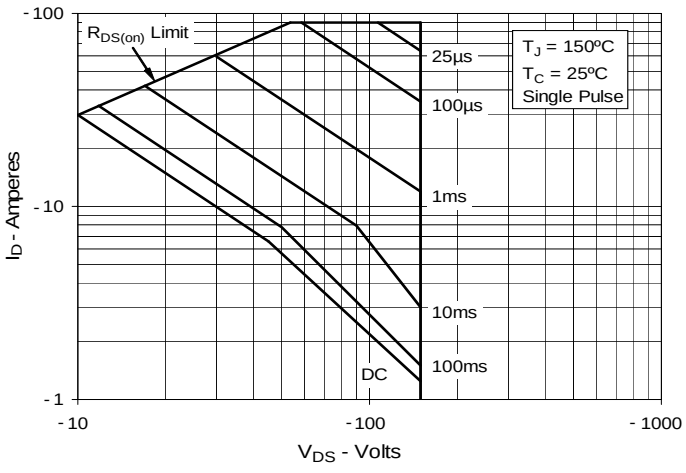

Fig. 13. Maximum Transient Thermal Impedance