⌐IXYS

Polar™ Power MOSFETs

IXTT52N30P
IXTQ52N30P

V_{DSS} = 300V
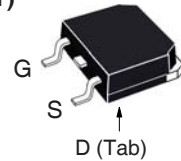I_{D25} = 52A
$R_{DS(on)}$ ≤ 73mΩ

N-Channel Enhancement Mode
Avalanche Rated

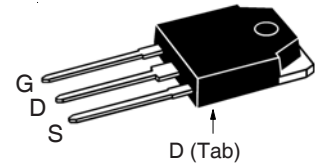**TO-268 (IXTT)**

G
S
D (Tab)

TO-3P (IXTQ)

G
D
S
D (Tab)

G = Gate   D   = Drain
S = Source   Tab = Drain

Symbol	Test Conditions	Maximum Ratings	
V_{DSS}	T_J = 25°C to 150°C	300	V
V_{DGR}	T_J = 25°C to 150°C, R_{GS} = 1MΩ	300	V
V_{GSS}	Continuous	± 20	V
V_{GSM}	Transient	± 30	V
I_{D25}	T_C = 25°C	52	A
I_{DM}	T_C = 25°C, Pulse Width Limited by T_{JM}	150	A
I_A	T_C = 25°C	52	A
E_{AS}	T_C = 25°C	1	J
dv/dt	I_S ≤ I_{DM}, V_{DD} ≤ V_{DSS}, T_J ≤ 150°C	10	V/ns
P_D	T_C = 25°C	400	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}	1.6 mm (0.062in.) from Case for 10s	260	°C
M_d	Mounting Torque (TO-3P)	1.13 / 10	Nm/lb.in
Weight	TO-286	4.0	g
	TO-3P	5.5	g

Features

- Fast Intrinsic Rectifier
- Avalanche Rated
- Low $R_{DS(ON)}$ and Q_G
- Low Package Inductance

Advantages

- High Power Density
- Easy to Mount
- Space Savings

Applications

- Switch-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)	Min.	Typ.	Max.	
BV_{DSS}	V_{GS} = 0V, I_D = 250µA	300			V
$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250µA	2.5		5.0	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			250	µA
$R_{DS(on)}$	V_{GS} = 10V, I_D = 0.5 • I_{D25}, Note 1			73	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	20	30		S
C_{iss}			3490		pF
C_{oss}	V_{GS} = 0V, V_{DS} = 25V, f = 1MHz		550		pF
C_{rss}			130		pF
$t_{d(on)}$	**Resistive Switching Times**		24		ns
t_r			22		ns
$t_{d(off)}$	V_{GS} = 10V, V_{DS} = 0.5 • V_{DSS}, I_D = 0.5 • I_{D25}		60		ns
t_f	R_G = 4Ω (External)		20		ns
$Q_{g(on)}$			110		nC
Q_{gs}	V_{GS} = 10V, V_{DS} = 0.5 • V_{DSS}, I_D = 0.5 • I_{D25}		25		nC
Q_{gd}			53		nC
R_{thJC}				0.31	°C/W
R_{thCS}	TO-3P		0.25		°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			52	A
I_{SM}	Repetitive, Pulse Width Limited by T_{JM}			150	A
V_{SD}	I_F = I_S, V_{GS} = 0V, Note 1			1.5	V
t_{rr}	I_F = 25A, -di/dt = 100A/μs		250		ns
Q_{RM}	V_R = 100V, V_{GS} = 0V		3.0		μC

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

TO-268 Outline
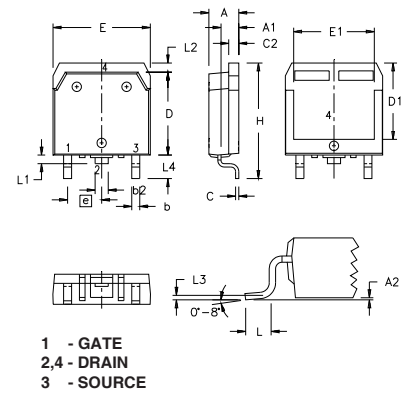
1 - GATE
2,4 - DRAIN
3 - SOURCE

SYM	INCHES		MILLIMETERS	
	MIN	MAX	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

TO-3P Outline
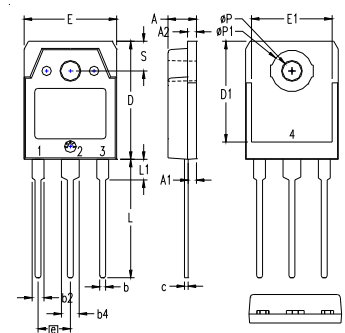
1 - GATE
2,4 - DRAIN
3 - SOURCE

SYM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	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

IXYS Reserves the Right to Change Limits, Test Conditions, and Dimensions.

Fig. 1. Output Characteristics @ T$_J$ = 25ºC

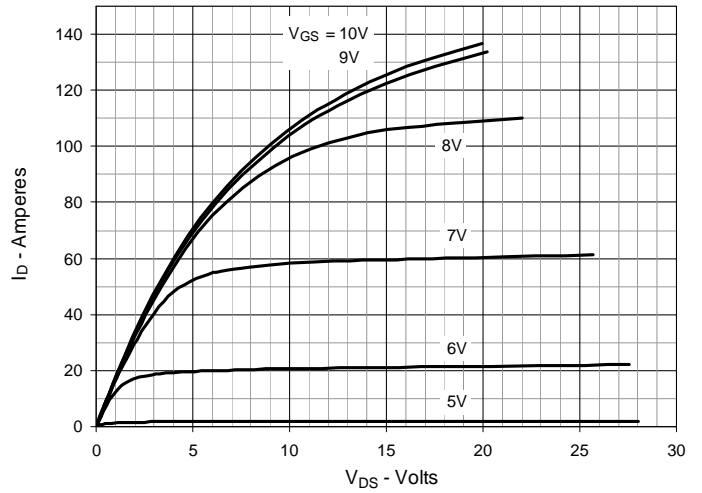**Fig. 2. Extended Output Characteristics @ T$_J$ = 25ºC**

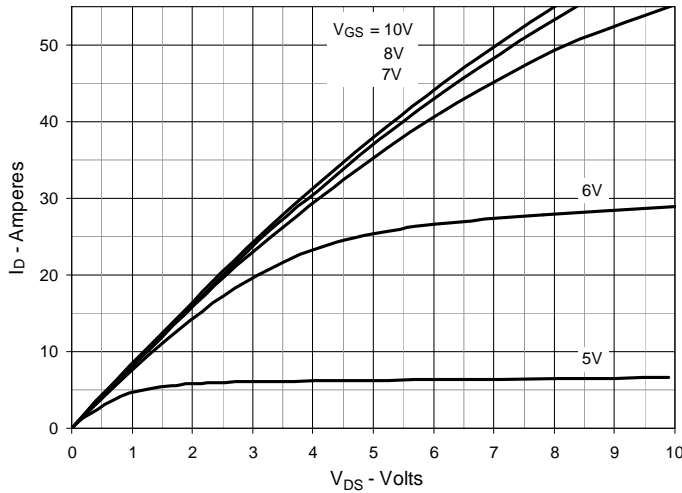**Fig. 3. Output Characteristics @ T$_J$ = 125ºC**

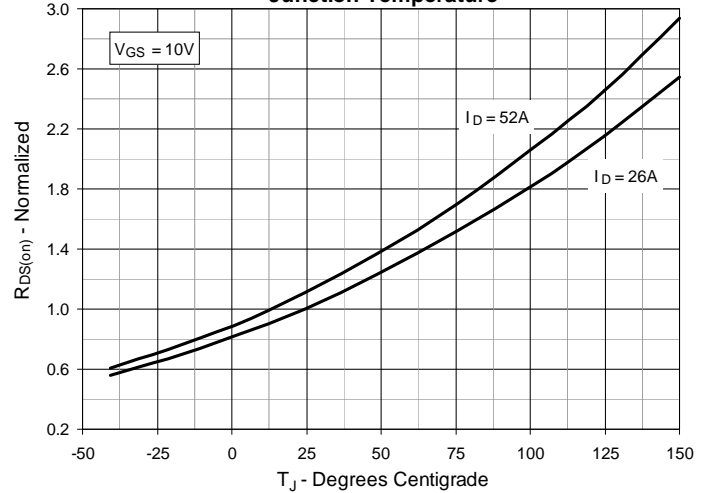**Fig. 4. R$_{DS(on)}$ Normalized to I$_D$ = 26A Value vs. Junction Temperature**

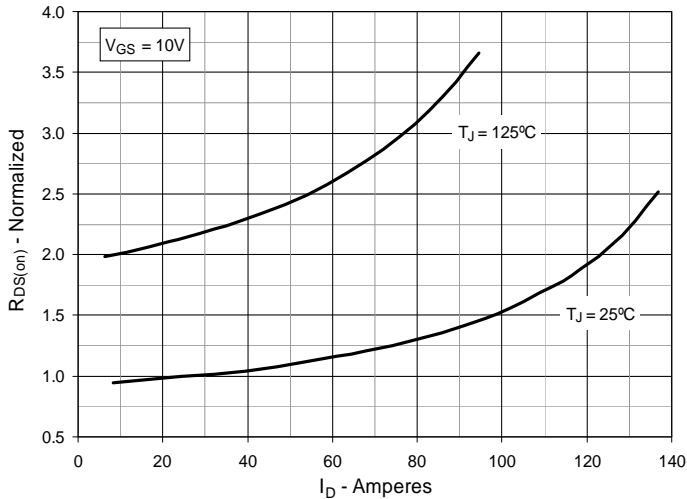**Fig. 5. R$_{DS(on)}$ Normalized to I$_D$ = 26A Value vs. Drain Current**

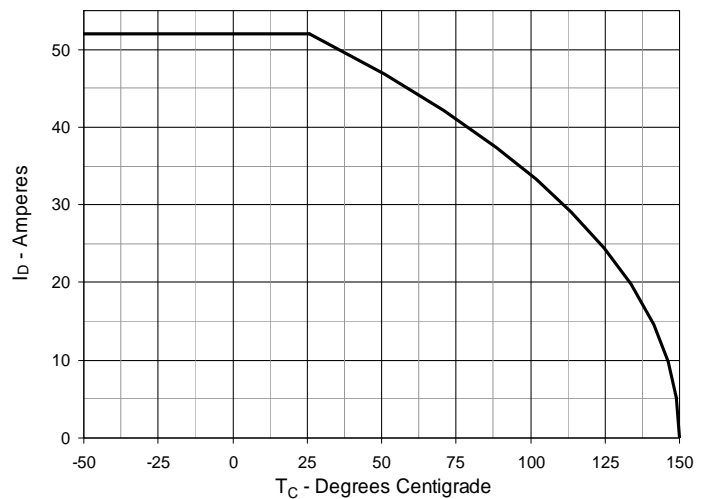**Fig. 6. Maximum Drain Current vs. Case Temperature**
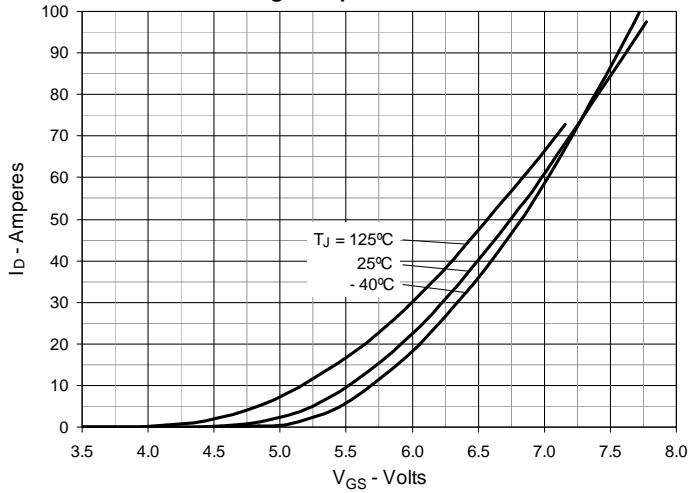
Fig. 7. Input Admittance

I_D - Amperes vs V_{GS} - Volts

T_J = 125°C
25°C
- 40°C

Fig. 8. Transconductance

g_{fs} - Siemens vs I_D - Amperes

T_J = - 40°C
25°C
125°C
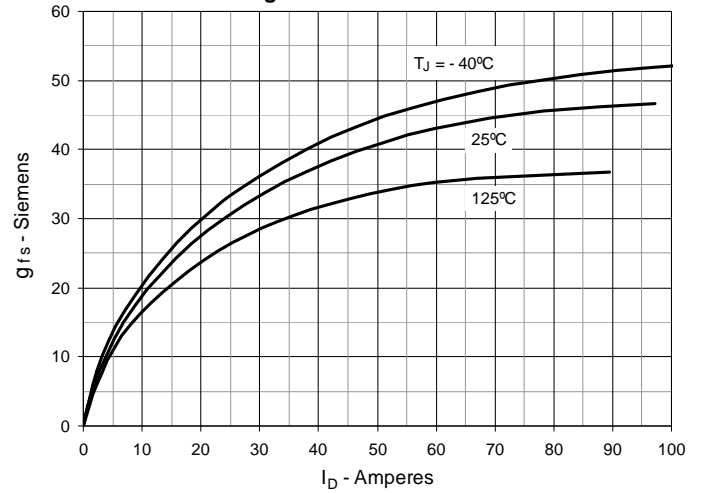
Fig. 9. Forward Voltage Drop of Intrinsic Diode

I_S - Amperes vs V_{SD} - Volts

T_J = 125°C T_J = 25°C

Fig. 10. Gate Charge

V_{GS} - Volts vs Q_G - NanoCoulombs

V_{DS} = 150V
I_D = 26A
I_G = 10mA

Fig. 11. Capacitance

Capacitance - PicoFarads vs V_{DS} - Volts

C_{iss}
C_{oss}
C_{rss}
f = 1 MHz
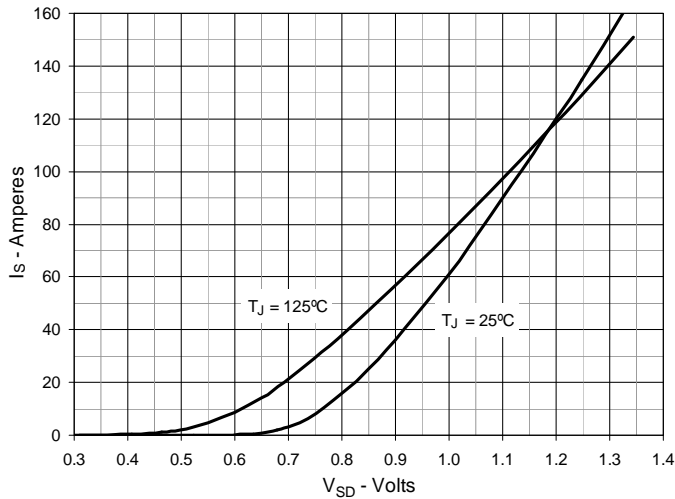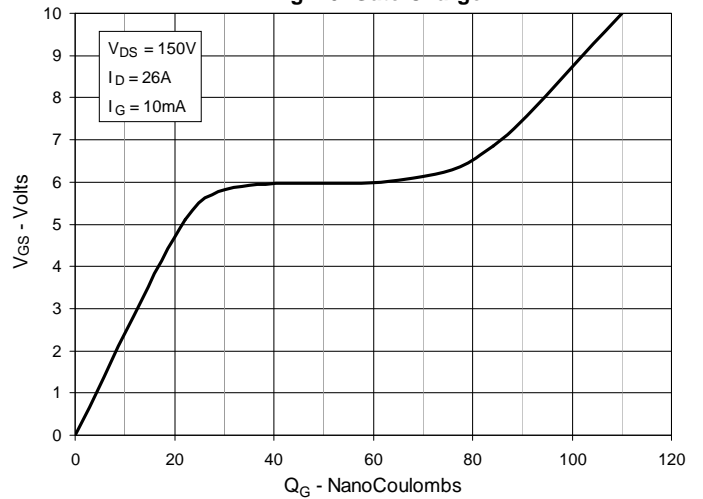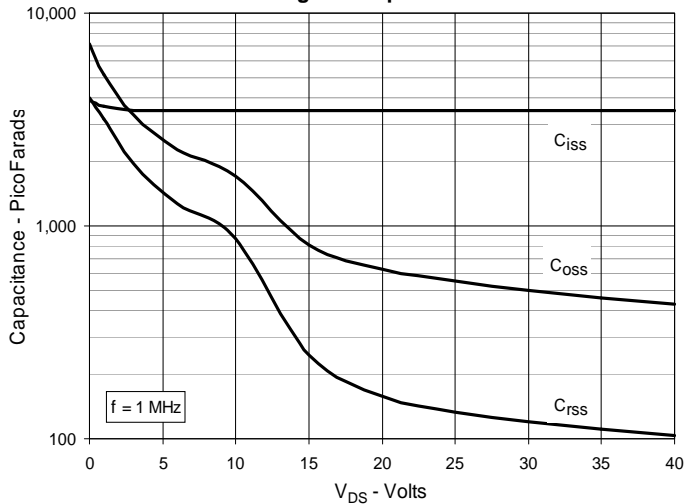
Fig. 12. Forward-Bias Safe Operating Area

I_D - Amperes vs V_{DS} - Volts

$R_{DS(on)}$ Limit
25µs
100µs
1ms
10ms
DC

T_J = 150°C
T_C = 25°C
Single Pulse

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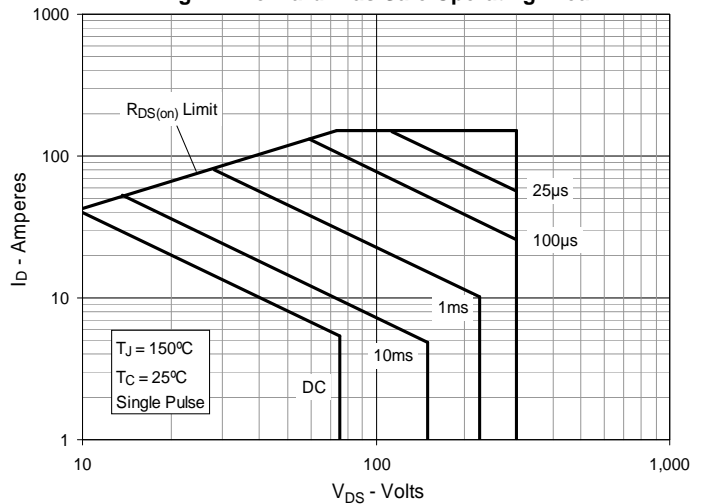
Fig. 13. Maximum Transient Thermal Impedance

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A **Littelfuse** Technology