IXYS

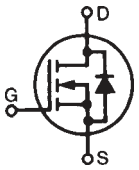
Polar™ Power MOSFET

IXTP50N20PM

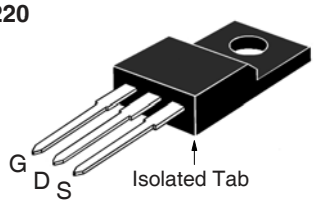
V_{DSS} = 200V
I_{D25} = 50A
$R_{DS(on)}$ ≤ 60mΩ

(Electrically Isolated Tab)

N-Channel Enhancement Mode



OVERMOLDED TO-220



G = Gate D = Drain
S = Source

Symbol	Test Conditions	Maximum Ratings	
V_{DSS}	T_J = 25°C to 175°C	200	V
V_{DGR}	T_J = 25°C to 175°C, R_{GS} = 1MΩ	200	V
V_{GSS}	Continuous	±20	V
V_{GSM}	Transient	±30	V
I_{D25}	T_C = 25°C, Limited by T_{JM}	50	A
I_{DM}	T_C = 25°C, Pulse Width Limited by T_{JM}	120	A
I_A	T_C = 25°C	50	A
E_{AS}	T_C = 25°C	1	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	90	W
T_J		-55 ... +175	°C
T_{JM}		175	°C
T_{stg}		-55 ... +175	°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	1.13 / 10	Nm/lb.in
Weight		3	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		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 = 150°C			250	μA
$R_{DS(on)}$	V_{GS} = 10V, I_D = 25A, Note 1			60	mΩ

Features

- Plastic Overmolded Tab for Electrical Isolation
- International Standard Package
- Avalanche Rated
- Fast Intrinsic Diode
- Low Package Inductance

Advantages

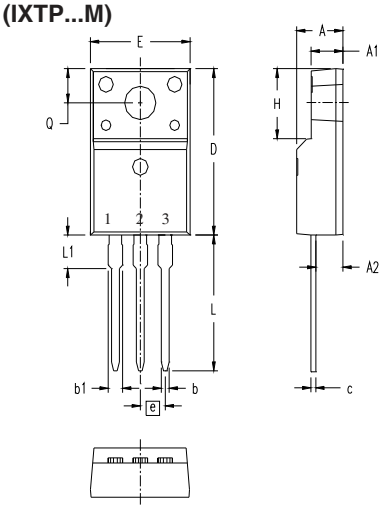
- High Power Density
- Easy to Mount
- Space Savings

Applications

- Switched-Mode and Resonant-Mode Power Supplies
- DC-DC Converters
- AC and DC Motor Drives
- Robotics and Servo Controls
- Battery Chargers
- Uninterrupted Power Supplies
- High Speed Power Swicthing Applications

Symbol	Test Conditions (T_J = 25°C, Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max	
g_{fs}	V_{DS} = 10V, I_D = 25A, Note 1	12	23		S
C_{iss}	V_{GS} = 0V, V_{DS} = 25V, f = 1MHz		2720		pF
C_{oss}			490		pF
C_{rss}			105		pF
$t_{d(on)}$	**Resistive Switching Times**		26		ns
t_r	V_{GS} = 10V, V_{DS} = 0.5 • V_{DSS}, I_D = 25A		35		ns
$t_{d(off)}$	R_G =10Ω (External)		70		ns
t_f			30		ns
$Q_{g(on)}$	V_{GS} = 10V, V_{DS} = 0.5 • V_{DSS}, I_D = 25A		70		nC
Q_{gs}			17		nC
Q_{gd}			37		nC
R_{thJC}				1.66	°C/W
R_{thCS}			0.50		°C/W

OVERMOLDED TO-220 (IXTP...M)



Terminals: 1 - Gate
2 - Drain
3 - Source

SYM	INCHES MIN	INCHES MAX	MILLIMETERS MIN	MILLIMETERS MAX
A	.177	.193	4.50	4.90
A1	.092	.108	2.34	2.74
A2	.101	.117	2.56	2.96
b	.028	.035	0.70	0.90
b1	.050	.058	1.27	1.47
c	.018	.024	0.45	0.60
D	.617	.633	15.67	16.07
E	.392	.408	9.96	10.36
e	.100 BSC		2.54 BSC	
H	.255	.271	6.48	6.88
L	.499	.523	12.68	13.28
L1	.119	.135	3.03	3.43
ØP	.121	.129	3.08	3.28
Q	.126	.134	3.20	3.40

Source-Drain Diode

Symbol	Test Conditions (T_J = 25°C, Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max	
I_S	V_{GS} = 0V			50	A
I_{SM}	Repetitive, Pulse Width Limited by T_{JM}			200	A
V_{SD}	I_F = I_S, V_{GS} = 0V, Note 1			1.5	V
t_{rr}	I_F = 25A, -di/dt = 100A/µs		150		ns
Q_{RM}	V_R = 100V		2		µC

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

Fig. 1. Output Characteristics @ $T_J = 25^oC$

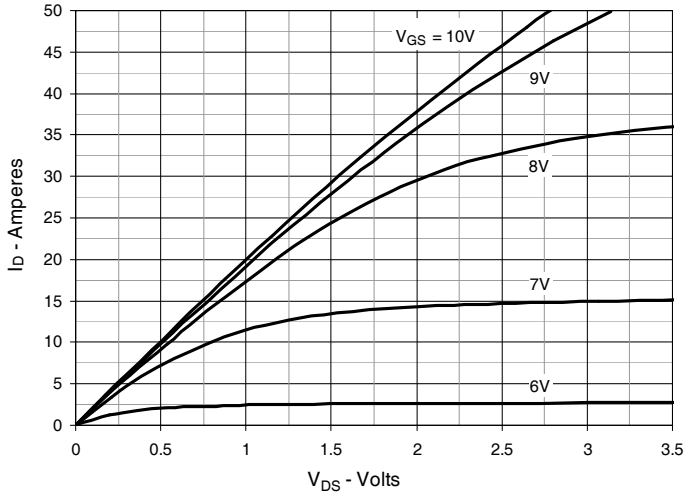


Fig. 2. Extended Output Characteristics @ $T_J = 25^oC$

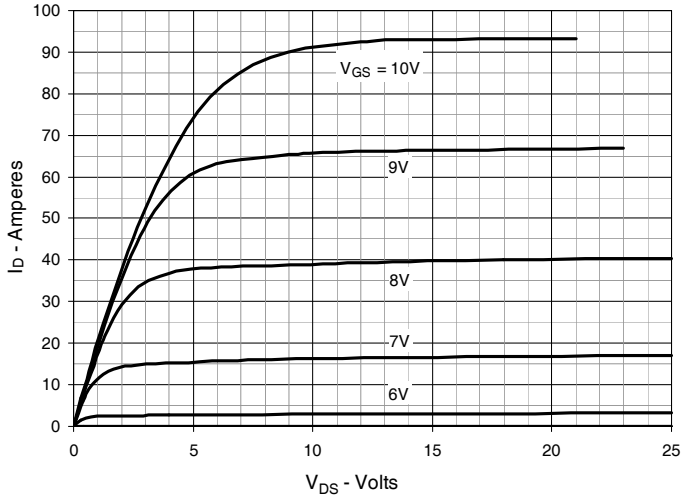


Fig. 3. Output Characteristics @ $T_J = 150^oC$

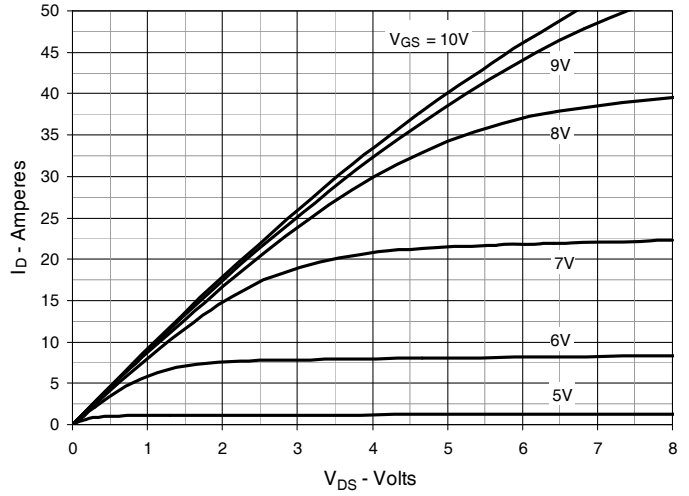


Fig. 4. $R_{DS(on)}$ Normalized to $I_D = 25A$ Value vs. Junction Temperature

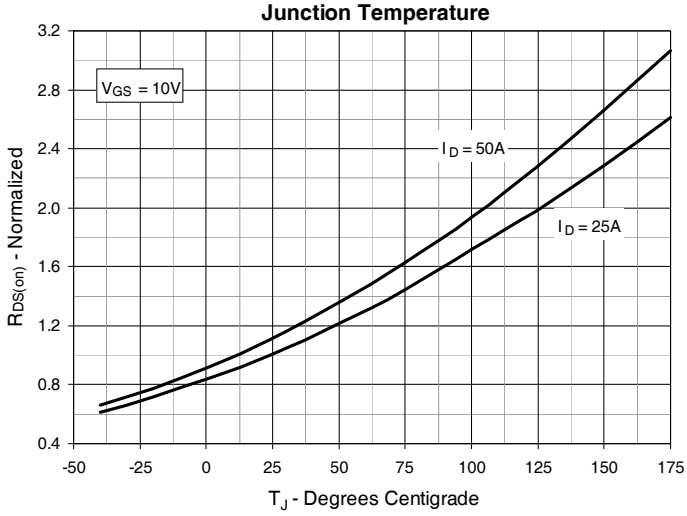


Fig. 5. $R_{DS(on)}$ Normalized to $I_D = 25A$ Value vs. Drain Current

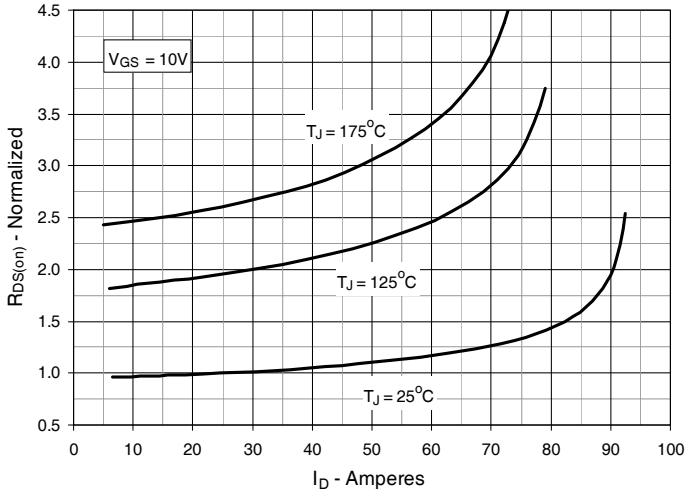


Fig. 6. Input Admittance

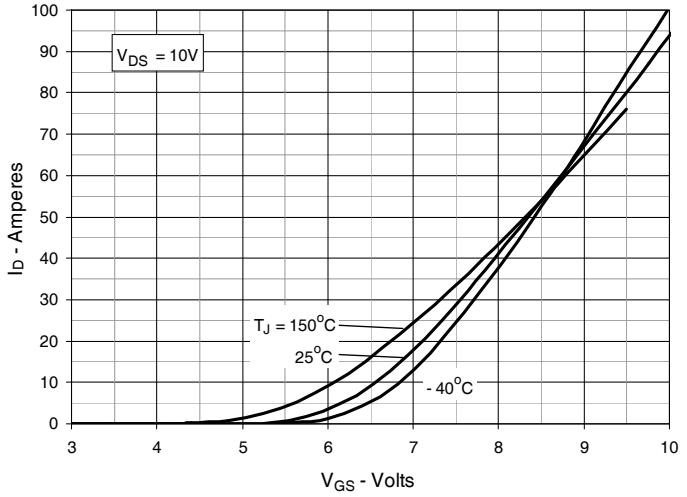


Fig. 7. Transconductance

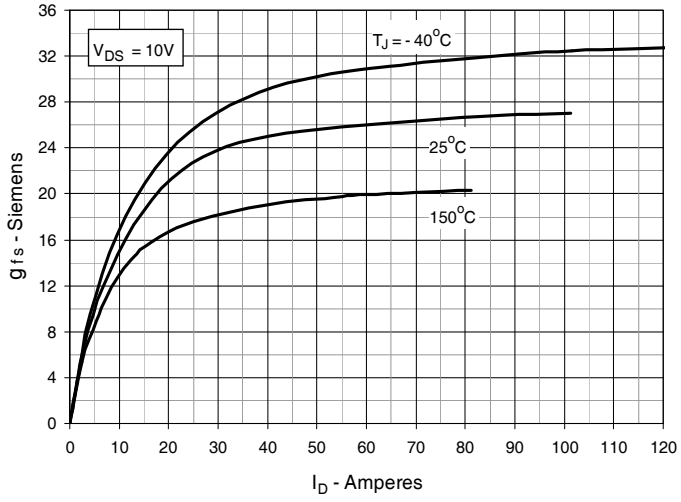


Fig. 8. Forward Voltage Drop of Intrinsic Diode

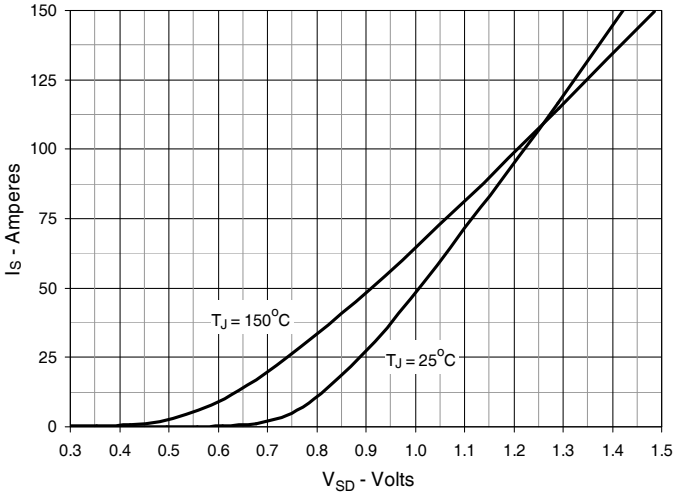


Fig. 9. Gate Charge

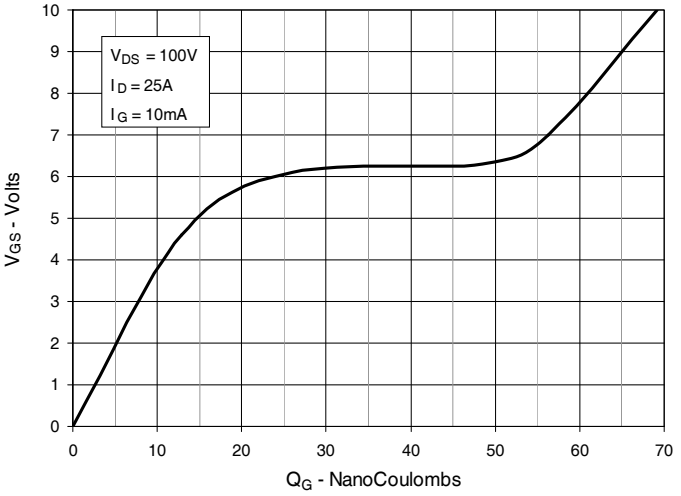


Fig. 10. Capacitance

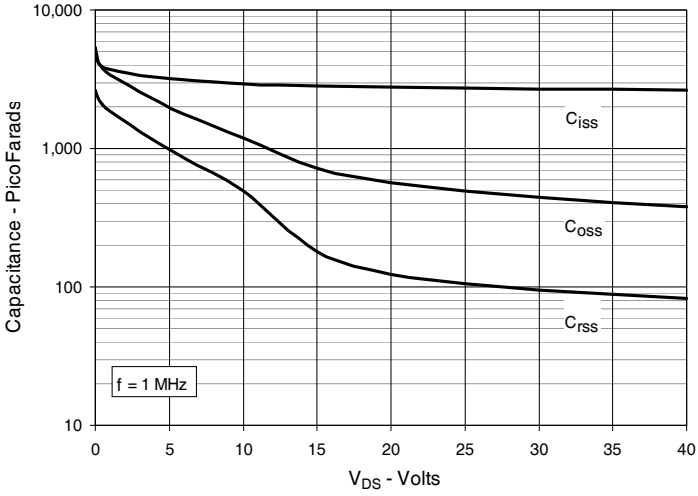


Fig. 11. Forward-Bias Safe Operating Area

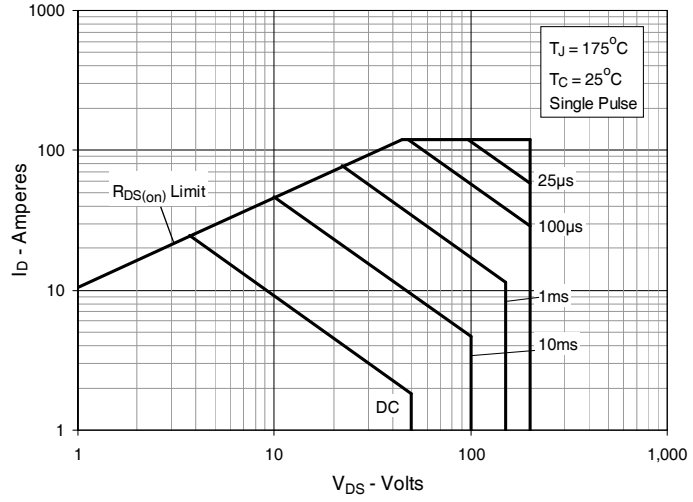


Fig. 12. Maximum Transient Thermal Impedance