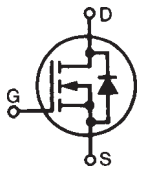
IXYS

Polar™ Power MOSFET IXFP12N50PM
HiPerFET™

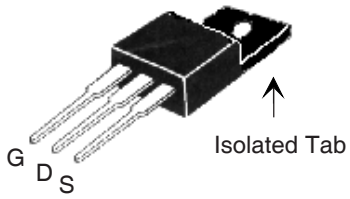
(Electrically Isolated Tab)

N-Channel Enhancement Mode
Avalanche Rated
Fast Intrinsic Diode



V_{DSS} = 500V
I_{D25} = 6A
$R_{DS(on)}$ ≤ 500mΩ
t_{rr} ≤ 300ns

OVERMOLDED TO-220 (IXFP...M) OUTLINE



G = Gate D = Drain
S = Source

Symbol	Test Conditions	Maximum Ratings	
V_{DSS}	T_J = 25°C to 150°C	500	V
V_{DGR}	T_J = 25°C to 150°C; R_{GS} = 1 MΩ	500	V
V_{GSS}	Continuous	± 30	V
V_{GSM}	Transient	± 40	V
I_{D25}	T_C = 25°C	6	A
I_{DM}	T_C = 25°C, pulse width limited by T_{JM}	30	A
I_A	T_C = 25°C	12	A
E_{AS}	T_C = 25°C	600	mJ
dv/dt	$I_S \le I_{DM}$, $V_{DD} \le V_{DSS}$, T_J =150°C	10	V/ns
P_D	T_C = 25°C	50	W
T_J		- 55 ... +150	°C
T_{JM}		150	°C
T_{stg}		- 55 ... +150	°C
T_L	1.6 mm (0.062 in.) from case for 10 s	300	°C
T_{SOLD}	Plastic body for 10 s	260	°C
M_d	Mounting torque	1.13/10	Nm/lb.in.
Weight		2.5	g

Features

- Plastic overmolded tab for electrical isolation
- International standard package
- Unclamped Inductive Switching (UIS) rated
- Low package inductance
  - easy to drive and to protect

Advantages

- Easy to mount
- Space savings

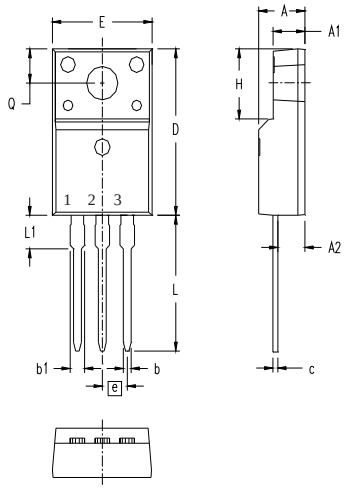
Symbol	Test Conditions (T_J = 25°C, unless otherwise specified)	Characteristic Values Min.	Typ.	Max.	
BV_{DSS}	V_{GS} = 0V, I_D = 250μA	500			V
$V_{GS(th)}$	$V_{DS} = V_{GS}$, I_D = 1mA	3.0		5.5	V
I_{GSS}	V_{GS} = ±30V, V_{DS} = 0V			±100	nA
I_{DSS}	$V_{DS} = V_{DSS}$			5	μA
	V_{GS} = 0V T_J = 125°C			250	μA
$R_{DS(on)}$	V_{GS} = 10V, I_D = 6A, Note 1			500	mΩ

Symbol	Test Conditions (T$_J$ = 25°C, unless otherwise specified)	Characteristic Values Min.	Typ.	Max.	
g_{fs}	V_{DS}= 10V, I_D = 6A, Note 1	7.5	13		S
C_{iss}	V_{GS} = 0V, V_{DS} = 25V, f = 1MHz		1830		pF
C_{oss}			182		pF
C_{rss}			16		pF
$t_{d(on)}$	V_{GS} = 10V, V_{DS} = 0.5 • V_{DSS}, I_D = 6A R_G = 10Ω (External)		22		ns
t_r			27		ns
$t_{d(off)}$			65		ns
t_f			20		ns
$Q_{g(on)}$	V_{GS}= 10V, V_{DS} = 0.5 • V_{DSS}, I_D = 6A		29		nC
Q_{gs}			11		nC
Q_{gd}			10		nC
R_{thJC}				2.5	°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			12	A
I_{SM}	Repetitive, pulse width limited by T_{JM}			48	A
V_{SD}	I_F = I_S, V_{GS} = 0V, Note 1			1.5	V
t_{rr}	I_F = 6A, -di/dt = 150A/μs, V_R = 100V, V_{GS} = 0V			300	ns
Q_{RM}			2.8		μC
I_{RM}			18.2		A

ISOLATED TO-220 (IXFP...M)



Terminals: 1 - Gate
2 - Drain (Collector)
3 - Source (Emitter)

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

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

Fig. 1. Output Characteristics @ 25ºC

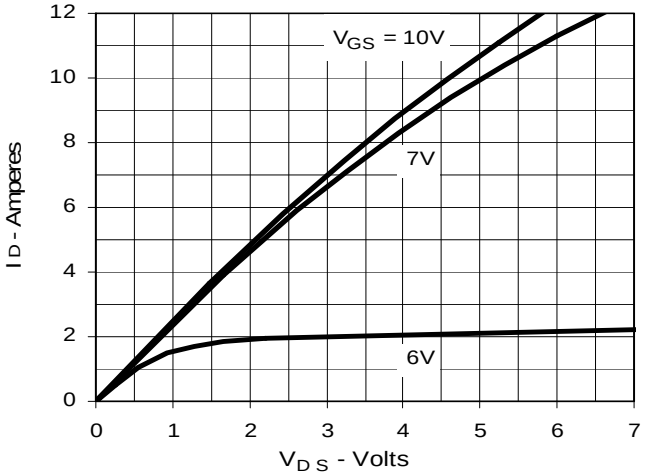


Fig. 2. Extended Output Characteristics @ 25ºC

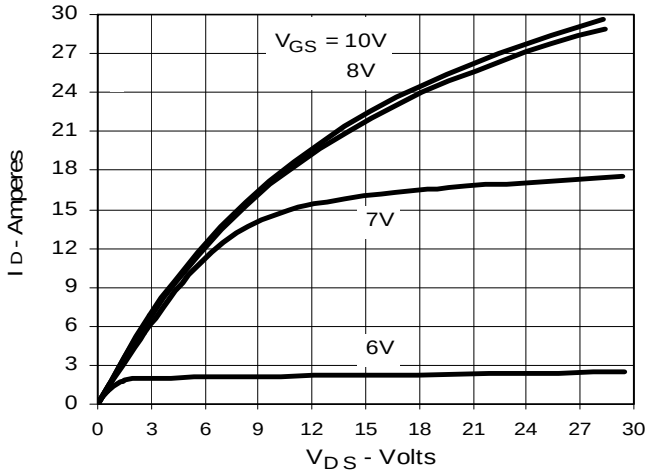


Fig. 3. Output Characteristics @ 125ºC

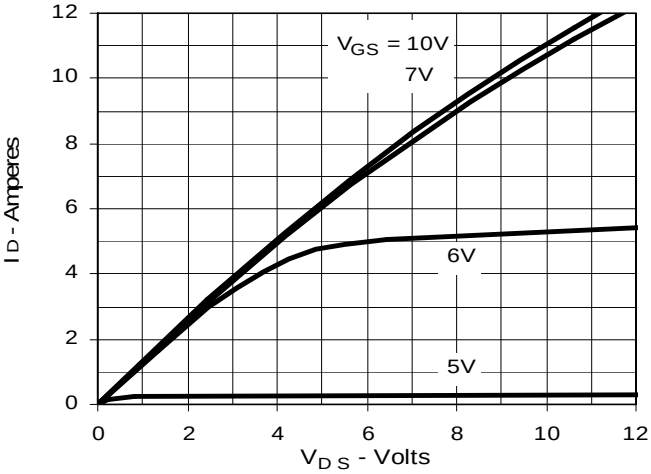


Fig. 4. $R_{DS(on)}$ Normalized to I_D = 6A Value vs. Junction Temperature

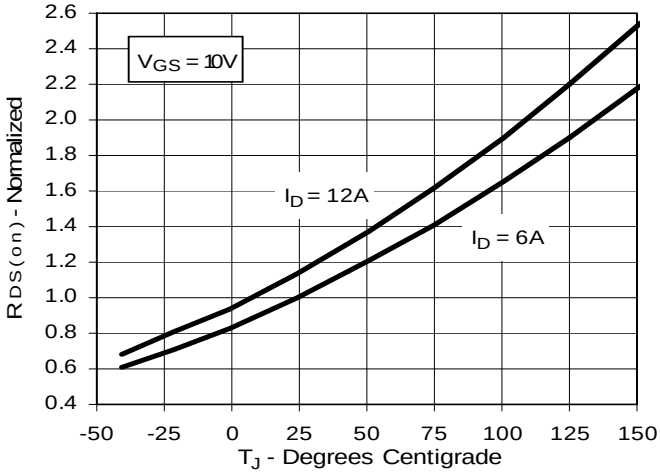


Fig. 5. $R_{DS(on)}$ Normalized to I_D = 6A Value vs. Drain Current

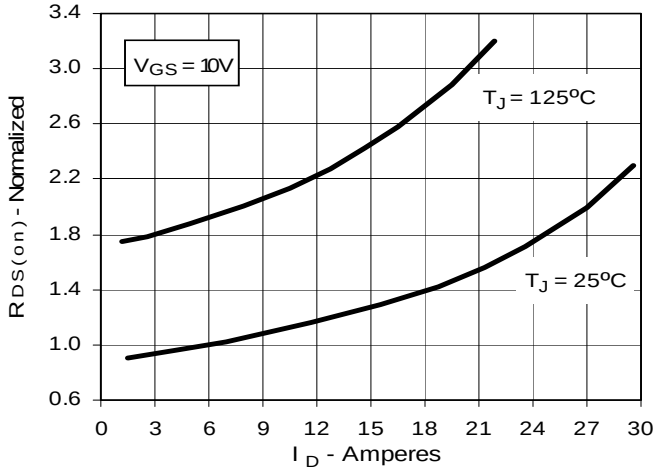


Fig. 6. Drain Current vs. Case Temperature

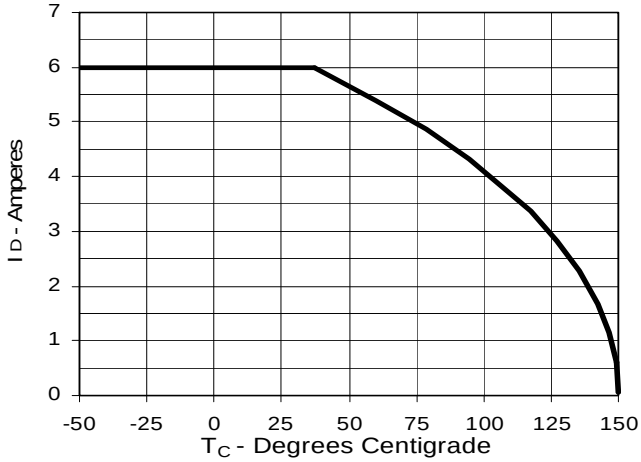


Fig. 7. Input Admittance

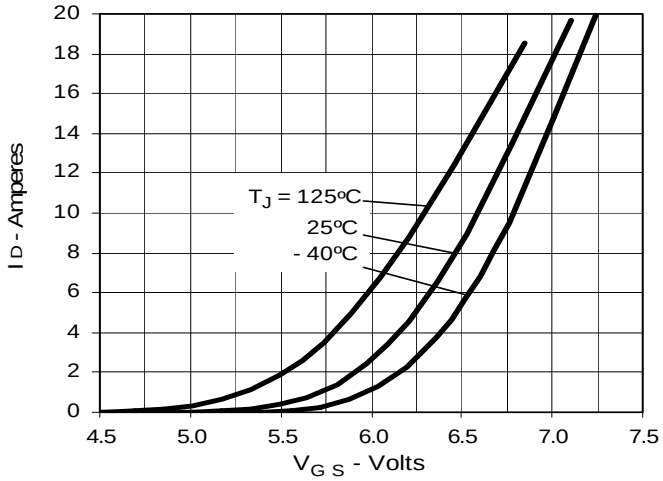


Fig. 8. Transconductance

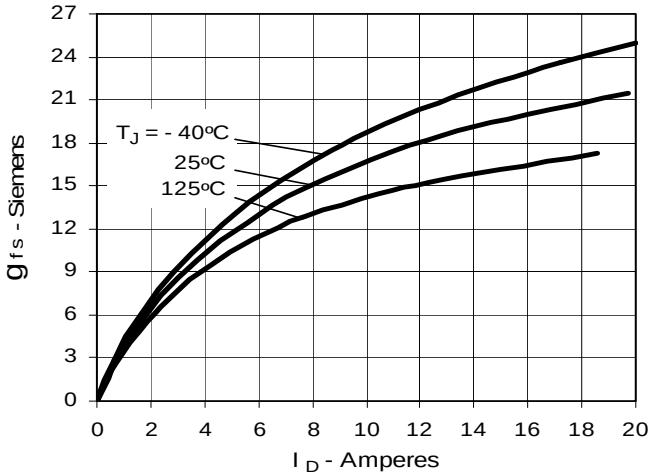


Fig. 9. Source Current vs. Source-To-Drain Voltage

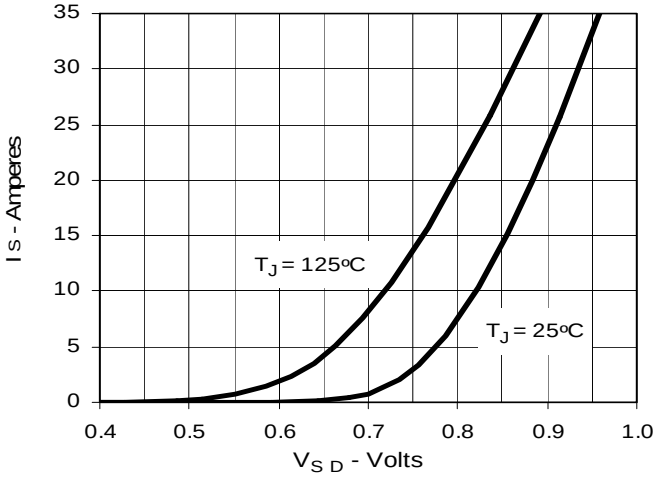


Fig. 10. Gate Charge

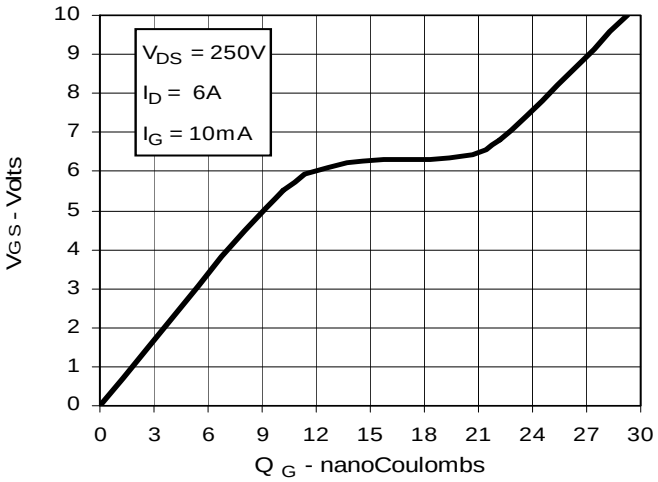


Fig. 11. Capacitance

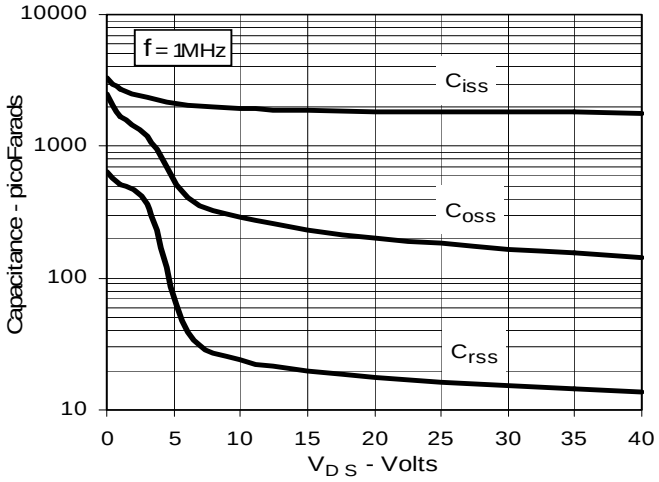


Fig. 12. Forward-Bias Safe Operating Area

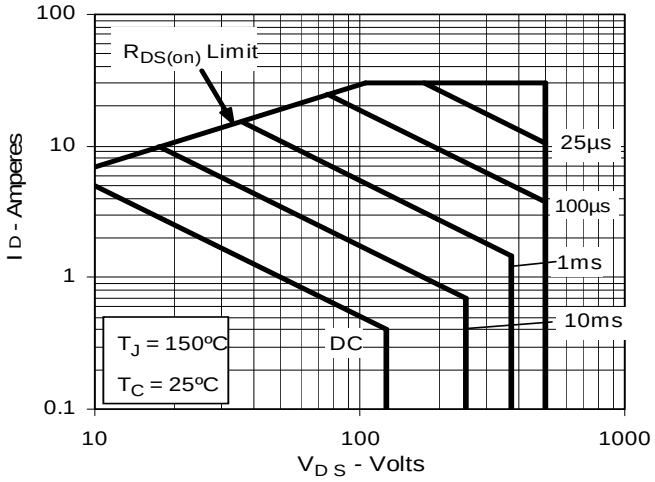


Fig. 13. Maximum Transient Thermal Impedance