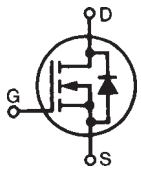
IXYS

Polar™ Power MOSFET IXFP12N50PM
HiPerFET™

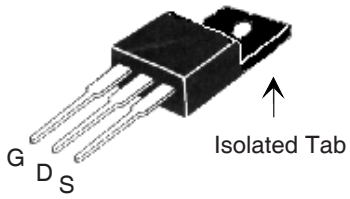
(Electrically Isolated Tab)

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

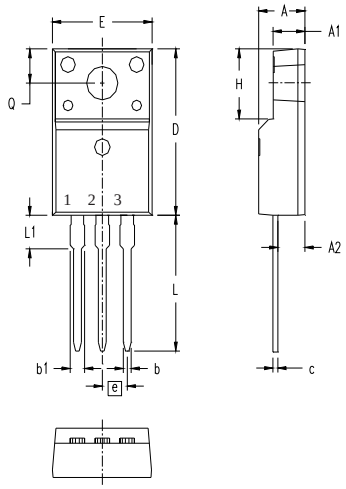
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Symbol	Test Conditions (T$_J$ = 25°C, unless otherwise specified)	Characteristic Values Min.	Typ.	Max.	
g_{fs}	V_{DS}= 10V, I_D = 6A, Note 1	7.5	13		S
C_{iss}	V_{GS} = 0V, V_{DS} = 25V, f = 1MHz		1830		pF
C_{oss}			182		pF
C_{rss}			16		pF
$t_{d(on)}$	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 %.

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

IXYS MOSFETs and IGBTs are covered by one or moreof 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

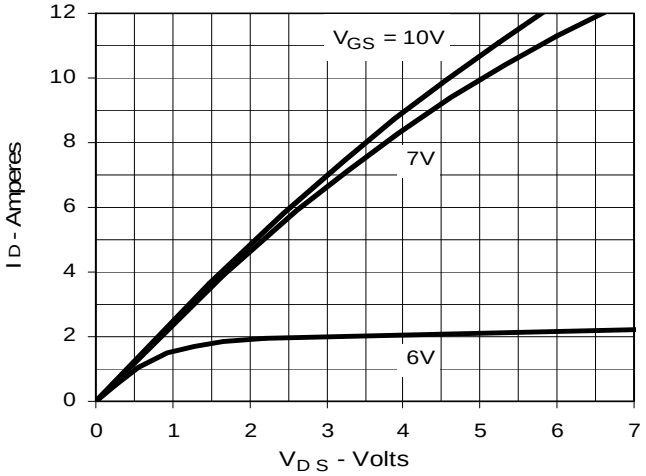


Fig. 2. Extended Output Characteristics @ 25ºC

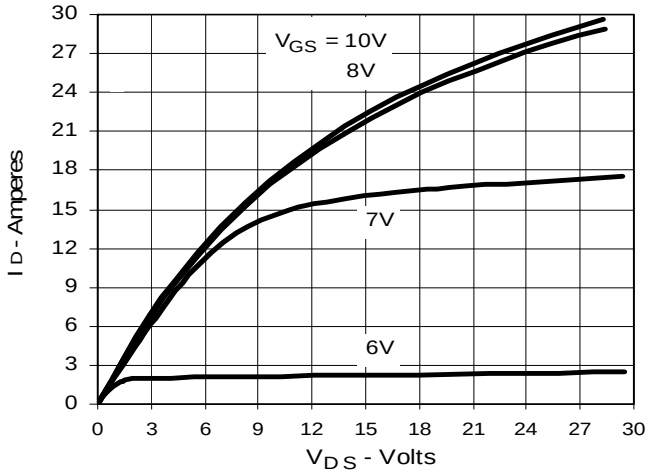


Fig. 3. Output Characteristics @ 125ºC

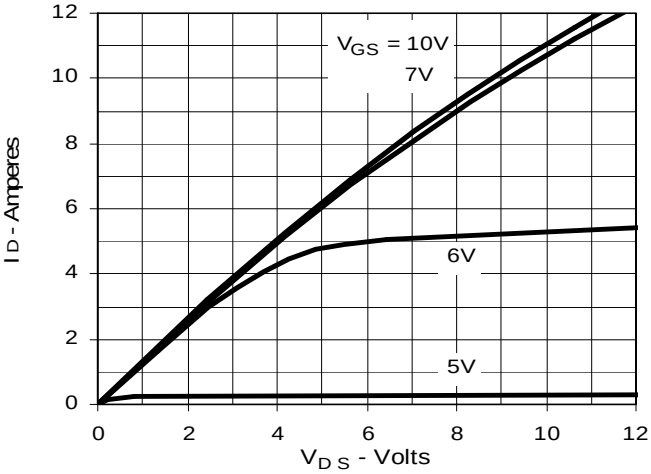


Fig. 4. $R_{DS(on)}$ Normalized to I_D = 6A Value vs. Junction Temperature

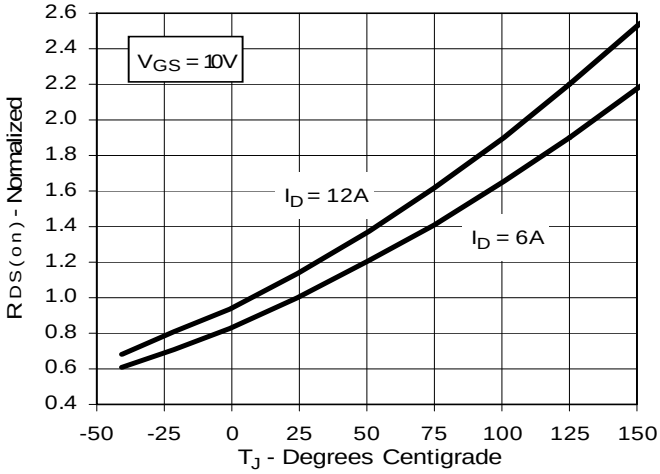


Fig. 5. $R_{DS(on)}$ Normalized to I_D = 6A Value vs. Drain Current

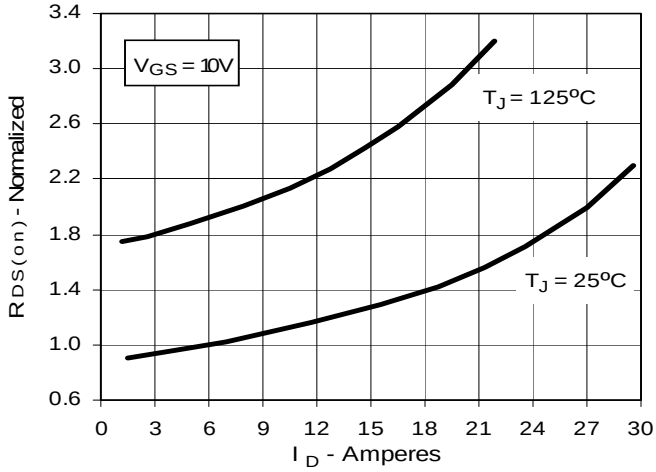
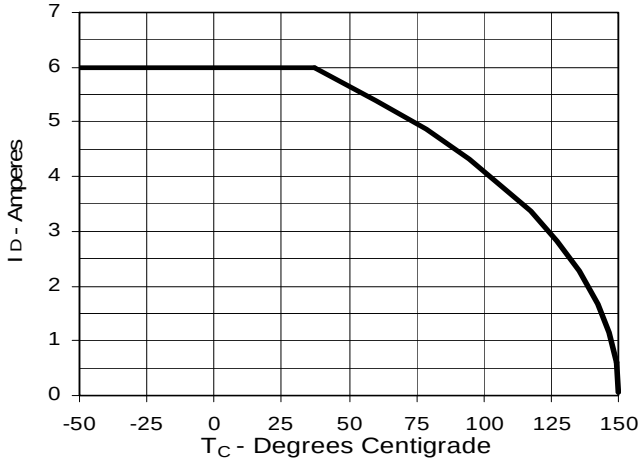


Fig. 6. Drain Current vs. Case Temperature



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Fig. 7. Input Admittance

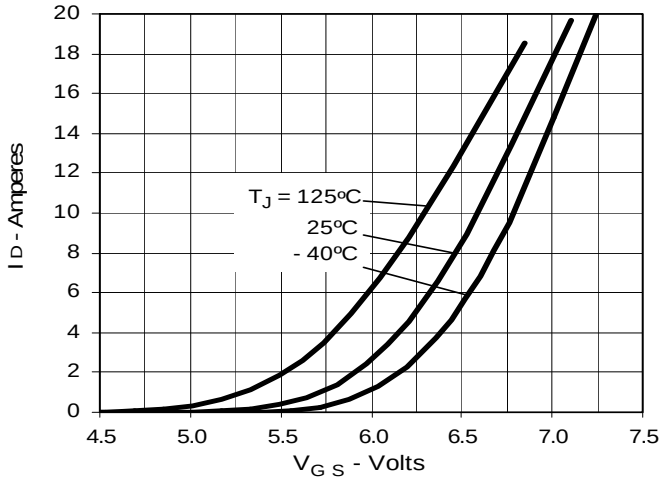


Fig. 8. Transconductance

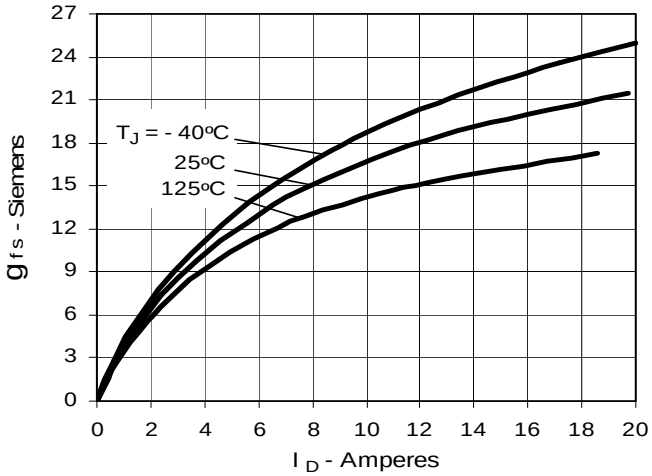


Fig. 9. Source Current vs. Source-To-Drain Voltage

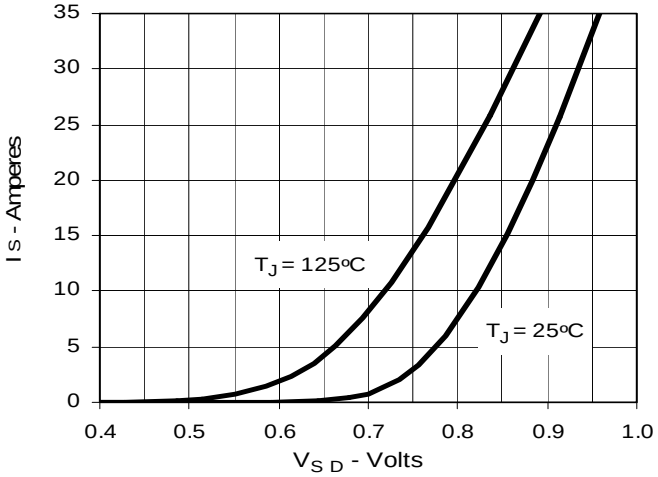


Fig. 10. Gate Charge

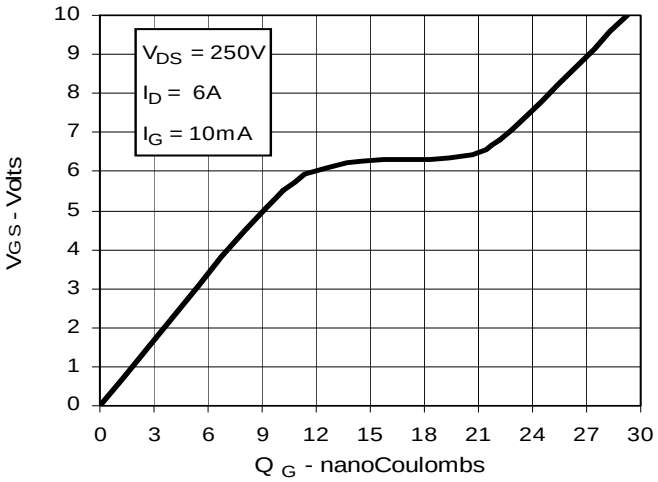


Fig. 11. Capacitance

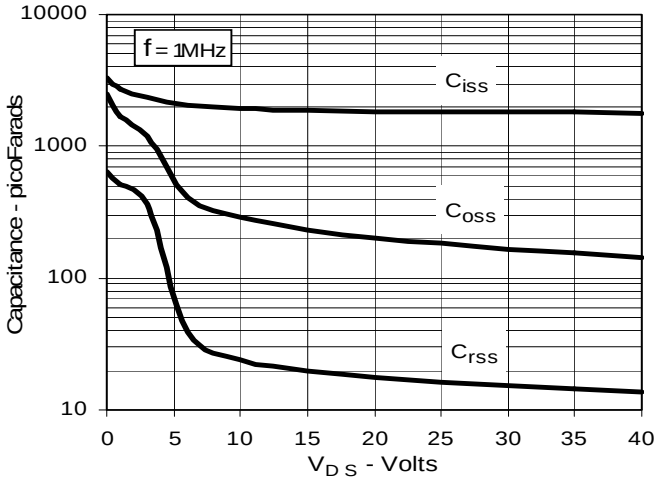
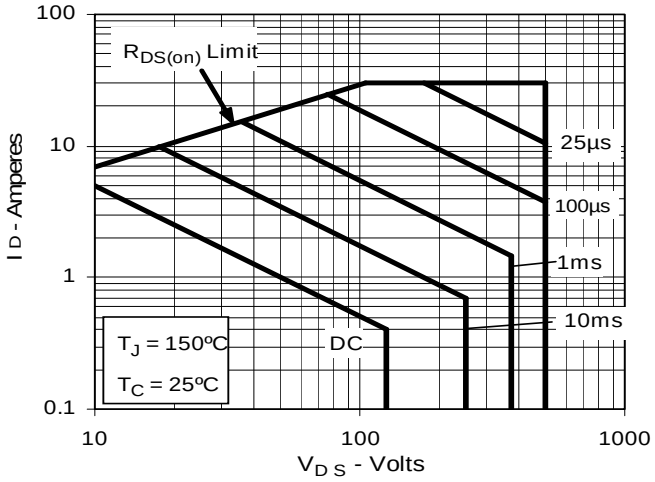
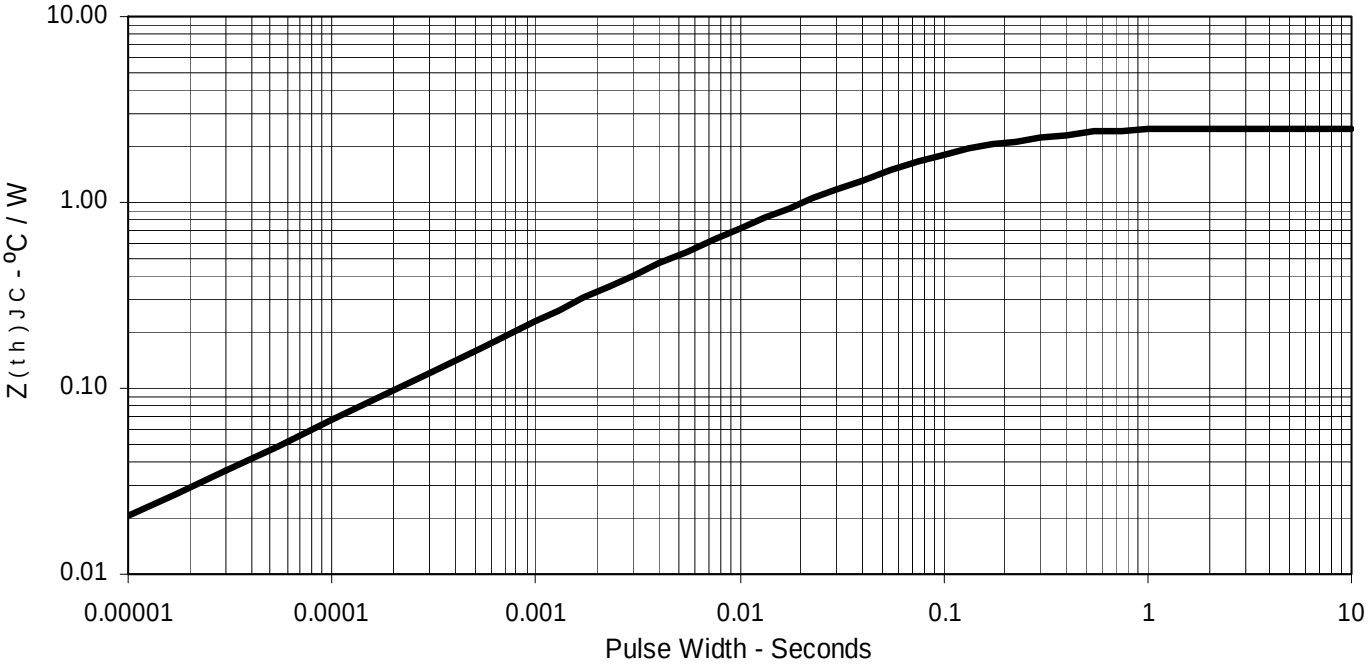


Fig. 12. Forward-Bias Safe Operating Area



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Fig. 13. Maximum Transient Thermal Impedance



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