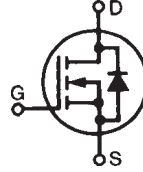


# PolarHV™ HiperFET Power MOSFET

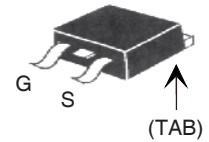
**IXFA14N60P**  
**IXFP14N60P**  
**IXFH14N60P**

N-Channel Enhancement Mode  
Avalanche Rated  
Fast Intrinsic Diode

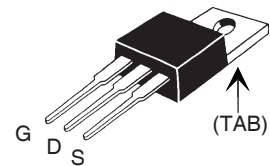


$V_{DSS} = 600V$   
 $I_{D25} = 14A$   
 $R_{DS(on)} \leq 550m\Omega$   
 $t_{rr} \leq 200ns$

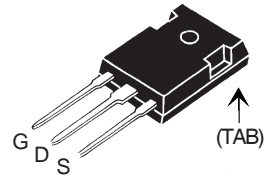
TO-263



TO-220



TO-247



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

Symbol	Test Conditions	Maximum Ratings	
$V_{DSS}$	$T_J = 25^\circ C$ to $150^\circ C$	600	V
$V_{DGR}$	$T_J = 25^\circ C$ to $150^\circ C$ $R_{GS} = 1M\Omega$	600	V
$V_{GSS}$	Continuous	$\pm 30$	V
$V_{GSM}$	Transient	$\pm 40$	V
$I_{D25}$	$T_C = 25^\circ C$	14	A
$I_{DM}$	$T_C = 25^\circ C$ , pulse width limited by $T_{JM}$	42	A
$I_A$	$T_C = 25^\circ C$	14	A
$E_{AS}$	$T_C = 25^\circ C$	900	mJ
$dV/dt$	$I_S \leq I_{DM}$ , $V_{DD} \leq V_{DSS}$ , $T_J \leq 150^\circ C$	10	V/ns
$P_D$	$T_C = 25^\circ C$	300	W
$T_J$		-55 ... +150	$^\circ C$
$T_{JM}$		150	$^\circ C$
$T_{stg}$		-55 ... +150	$^\circ C$
$T_L$	1.6mm (0.062 in.) from case for 10s	300	$^\circ C$
$T_{SOLD}$	Plastic body for 10 seconds	260	$^\circ C$
$M_d$	Mounting Torque (TO-220 & TO-247)	1.13 / 10	Nmlb.in.
$F_c$	Mounting Force (TO-263)	10..65 / 2.2..14.6	N/lb.
Weight	TO-263	2.5	g
	TO-220	3.0	g
	TO-247	6.0	g

Symbol	Test Conditions ( $T_J = 25^\circ C$ unless otherwise specified)	Characteristic Values		
		Min.	Typ.	Max.
$BV_{DSS}$	$V_{GS} = 0V$ , $I_D = 250\mu A$	600		V
$V_{GS(th)}$	$V_{DS} = V_{GS}$ , $I_D = 2.5mA$	3.0		5.5 V
$I_{GSS}$	$V_{GS} = \pm 30V$ , $V_{DS} = 0V$			$\pm 100$ nA
$I_{DSS}$	$V_{DS} = V_{DSS}$			5 $\mu A$
	$V_{GS} = 0V$ $T_J = 125^\circ C$			500 $\mu A$
$R_{DS(on)}$	$V_{GS} = 10V$ , $I_D = 0.5 \cdot I_{D25}$ , Note 1	450	550	m $\Omega$

## Features

- International standard packages
- Avalanche rated

## Advantages

- Easy to mount
- Space savings
- High power density

## Applications:

- Switched-mode and resonant-mode power supplies
- DC-DC Converters
- Laser Drivers
- AC and DC motor drives
- Robotics and servo controls

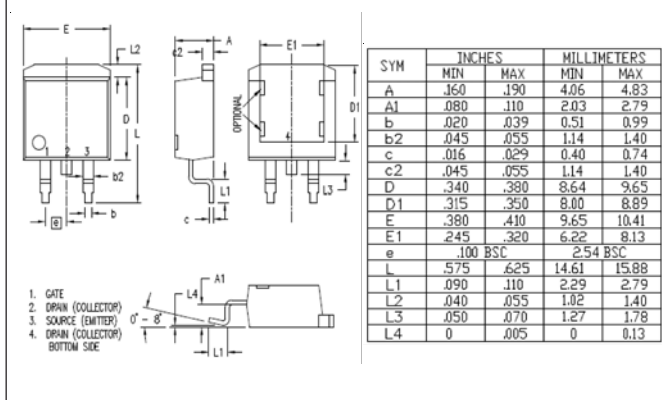
Symbol	Test Conditions (T <sub>J</sub> = 25°C unless otherwise specified)	Characteristic Values		
		Min.	Typ.	Max.
<b>g<sub>fs</sub></b>	V <sub>DS</sub> = 20V, I <sub>D</sub> = 0.5 • I <sub>D25</sub> , Note 1	7	13	S
<b>C<sub>iss</sub></b>	V <sub>GS</sub> = 0V, V <sub>DS</sub> = 25V, f = 1MHz		2500	pF
<b>C<sub>oss</sub></b>			215	pF
<b>C<sub>rss</sub></b>			13	pF
<b>t<sub>d(on)</sub></b>	<b>Resistive Switching Times</b> V <sub>GS</sub> = 10V, V <sub>DS</sub> = 0.5 • V <sub>DSS</sub> , I <sub>D</sub> = 0.5 • I <sub>D25</sub> R <sub>G</sub> = 10Ω (External)		23	ns
<b>t<sub>r</sub></b>			27	ns
<b>t<sub>d(off)</sub></b>			70	ns
<b>t<sub>f</sub></b>			26	ns
<b>Q<sub>g(on)</sub></b>			V <sub>GS</sub> = 10V, V <sub>DS</sub> = 0.5 • V <sub>DSS</sub> , I <sub>D</sub> = 0.5 • I <sub>D25</sub>	36
<b>Q<sub>gs</sub></b>	16	nC		
<b>Q<sub>gd</sub></b>	12	nC		
<b>R<sub>thJC</sub></b>	(TO-220) (TO-247)	0.50	0.42	°C/W
<b>R<sub>thCH</sub></b>			°C/W	
		0.21	°C/W	

### Source-Drain Diode

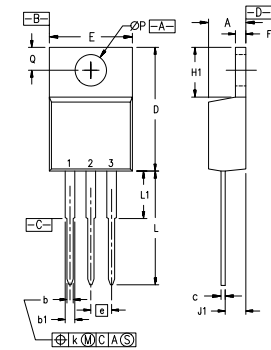
Symbol	Test Conditions (T <sub>J</sub> = 25°C unless otherwise specified)	Characteristic Values		
		Min.	Typ.	Max.
<b>I<sub>S</sub></b>	V <sub>GS</sub> = 0V			14 A
<b>I<sub>SM</sub></b>	Repetitive, pulse width limited by T <sub>JM</sub>			42 A
<b>V<sub>SD</sub></b>	I <sub>F</sub> = I <sub>S</sub> , V <sub>GS</sub> = 0V, Note 1			1.5 V
<b>t<sub>rr</sub></b>	I <sub>F</sub> = 14A, -di/dt = 100A/μs V <sub>R</sub> = 100V, V <sub>GS</sub> = 0V			200 ns
<b>I<sub>RM</sub></b>				6.0 A
<b>Q<sub>RM</sub></b>				0.6 nC

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

### TO-263 (IXFA) Outline



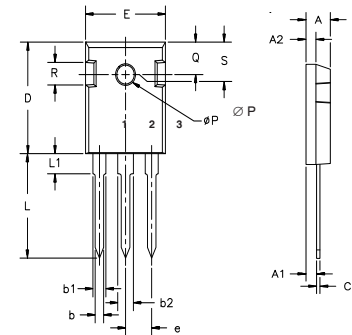
### TO-220 (IXFP) Outline



Pins: 1 - Gate 2 - Drain

SYM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	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
∅P	.139	.161	3.53	4.08
Q	.100	.125	2.54	3.18

### TO-247 (IXFH) Outline



Terminals: 1 - Gate 2 - Drain  
3 - Source

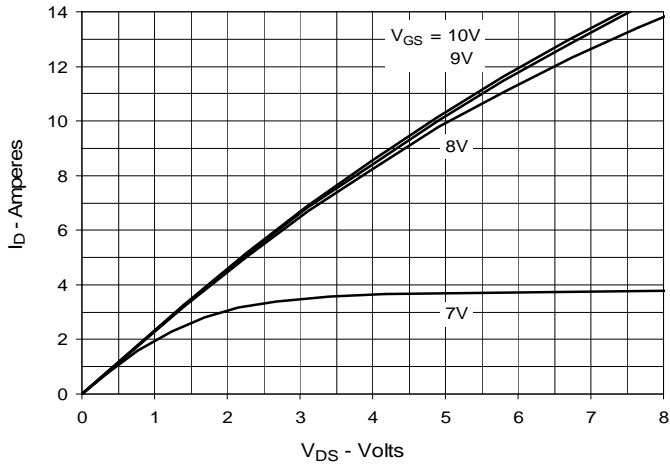
Dim.	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	4.7	5.3	.185	.209
A <sub>1</sub>	2.2	2.54	.087	.102
A <sub>2</sub>	2.2	2.6	.059	.098
b	1.0	1.4	.040	.055
b <sub>1</sub>	1.65	2.13	.065	.084
b <sub>2</sub>	2.87	3.12	.113	.123
C	.4	.8	.016	.031
D	20.80	21.46	.819	.845
E	15.75	16.26	.610	.640
e	5.20	5.72	0.205	0.225
L	19.81	20.32	.780	.800
L <sub>1</sub>		4.50		.177
∅P	3.55	3.65	.140	.144
Q	5.89	6.40	0.232	0.252
R	4.32	5.49	.170	.216
S	6.15	BSC	242	BSC

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

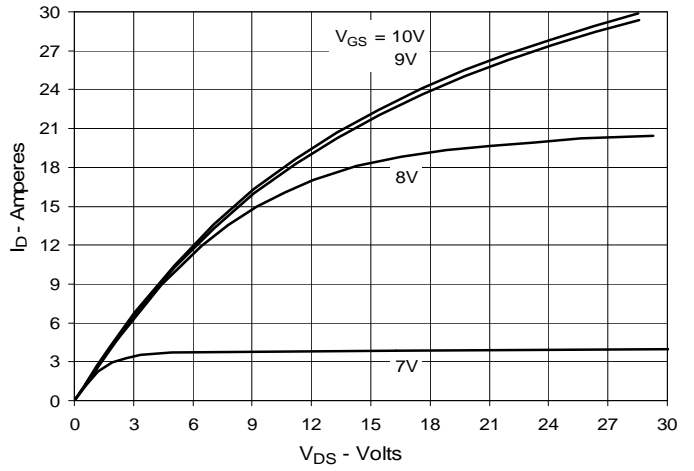
IXYS MOSFETs and IGBTs are covered by one or more of the following U.S. patents:

4,835,592	4,931,844	5,049,961	5,237,481	6,162,665	6,404,065 B1	6,683,344	6,727,585	7,005,734 B2	7,157,338B2
4,850,072	5,017,508	5,063,307	5,381,225	6,259,123 B1	6,534,343	6,710,405 B2	6,759,692	7,063,975 B2	
4,881,106	5,034,796	5,187,117	5,486,715	6,306,728 B1	6,583,505	6,710,463	6,771,478 B2	7,071,537	

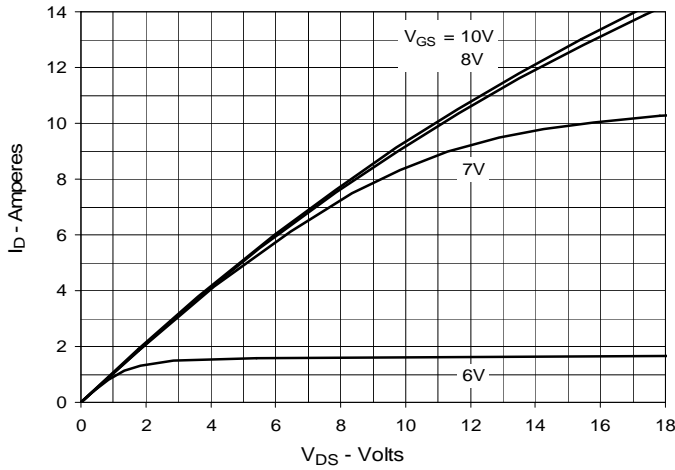
**Fig. 1. Output Characteristics @ 25°C**



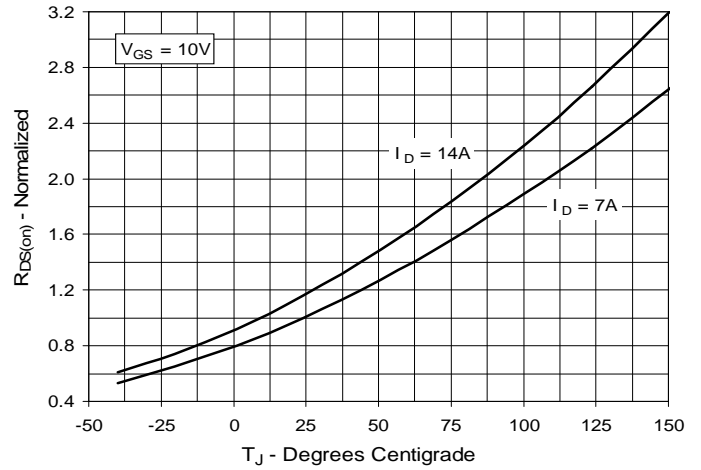
**Fig. 2. Extended Output Characteristics @ 25°C**



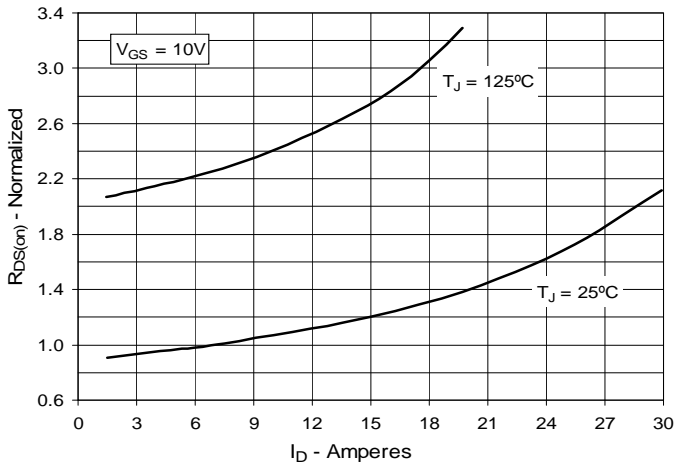
**Fig. 3. Output Characteristics @ 125°C**



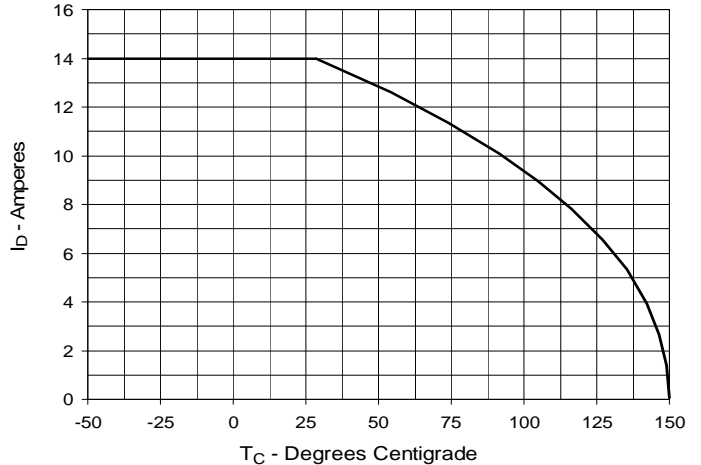
**Fig. 4.  $R_{DS(on)}$  Normalized to  $I_D = 7A$  Value vs. Junction Temperature**



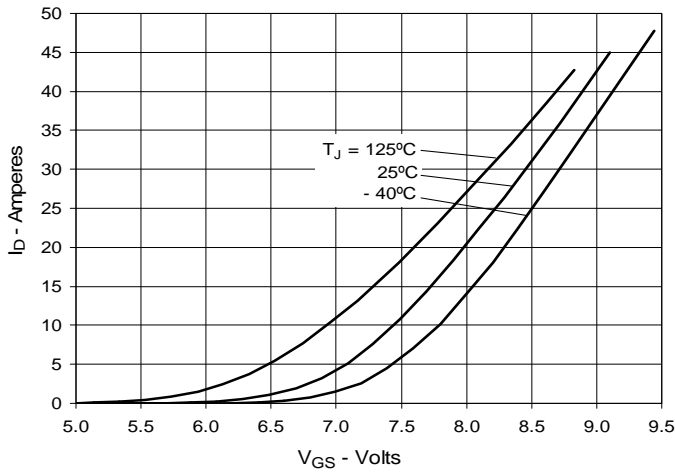
**Fig. 5.  $R_{DS(on)}$  Normalized to  $I_D = 7A$  Value vs. Drain Current**



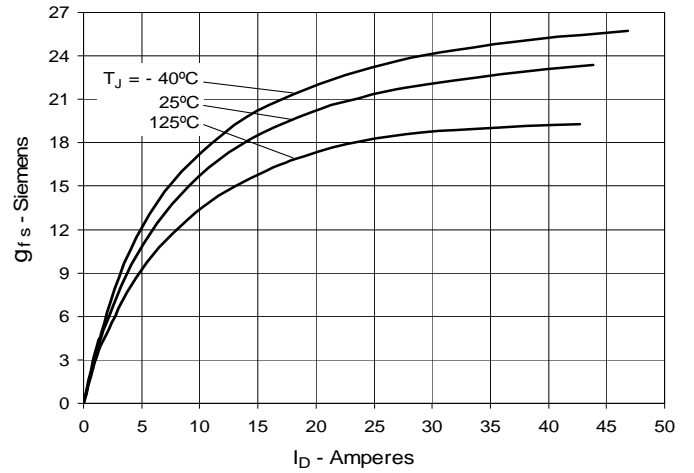
**Fig. 6. Maximum Drain Current vs. Case Temperature**



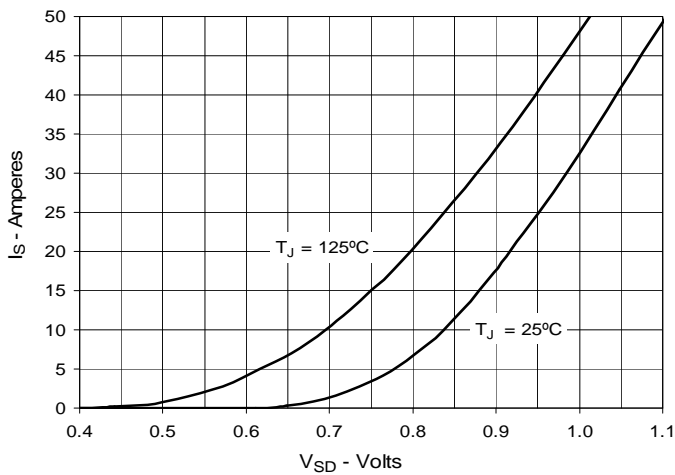
**Fig. 7. Input Admittance**



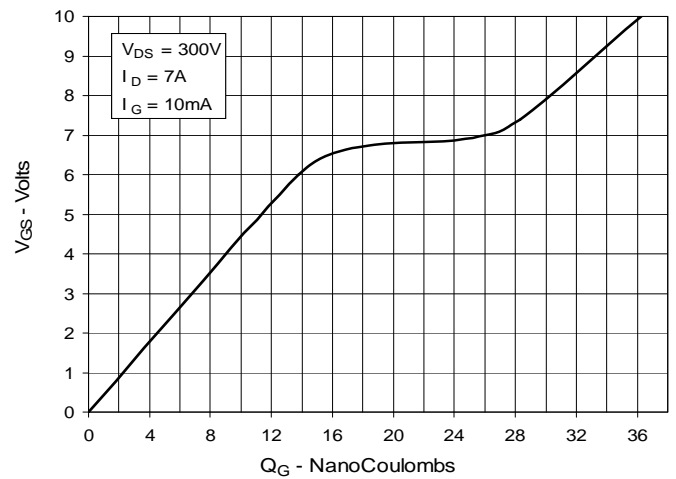
**Fig. 8. Transconductance**



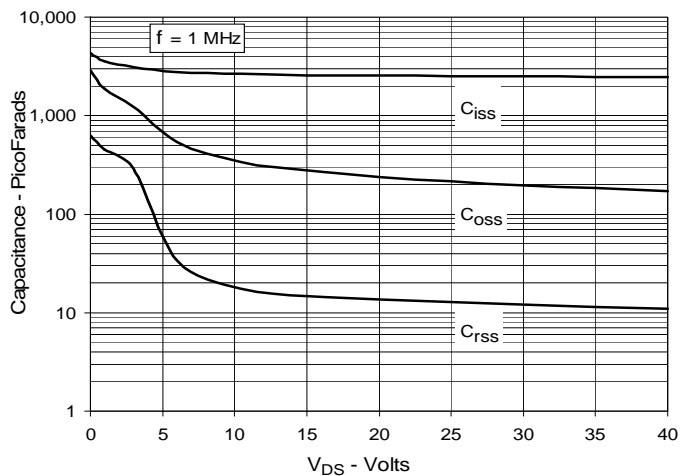
**Fig. 9. Forward Voltage Drop of Intrinsic Diode**



**Fig. 10. Gate Charge**



**Fig. 11. Capacitance**



**Fig. 12. Forward-Bias Safe Operating Area**

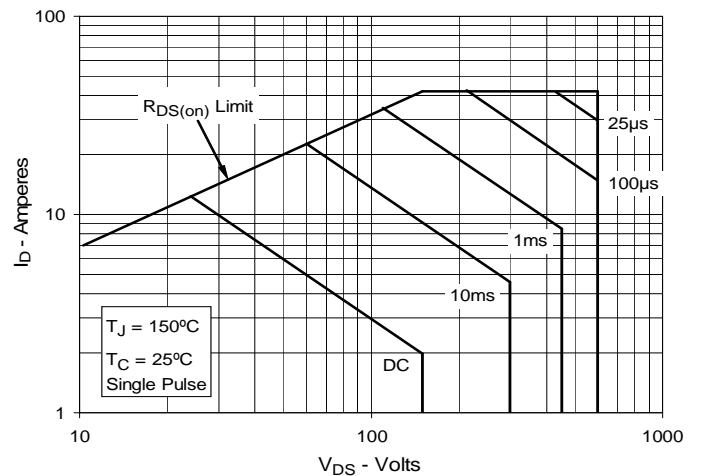


Fig. 13. Maximum Transient Thermal Impedance

