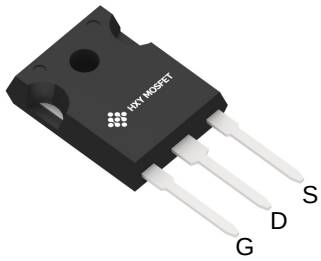
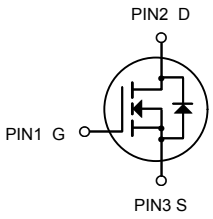
Description

The HXY14N50MPS uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 4.5V. This device is suitable for use as a Battery protection or in other Switching application.



TO-247S
(TO-247AC-3)



N-Channel MOSFET

General Features

V_{DS} = 500V I_D = 14A

$R_{DS(ON)}$ < 0.5Ω@ V_{GS}=10V

Application

Battery protection

Load switch

Uninterruptible power supply

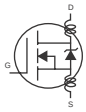
Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
HXY14N50MPS	TO-247S(TO-247AC-3)	IRFP450 XXXX	30

Absolute Maximum Ratings (Tc=25°C unles s otherwise noted)

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	500	V
V_{GS}	Gate-Source Voltage	±20	V
I_D@T_C=25℃	Continuous Drain Current, V_{GS} @ 10V	14	A
I_D@T_C=100℃	Continuous Drain Current, V_{GS} @ 10V	8.7	A
I_{DM}	Pulsed Drain Current	56	A
EAS	Single Pulse Avalanche Energy	760	mJ
I_{AS}	Avalanche Current	8.7	A
P_D@T_C=25℃	Total Power Dissipation	190	W
T_{STG}	Storage Temperature Range	-55 to 150	℃
T_J	Operating Junction Temperature Range	-55 to 150	℃
R_{thJA}	Maximum Junction-to-Ambient	40	℃/W
R_{thJC}	Maximum Junction-to-Case (Drain)	0.65	℃/W

Electrical Characteristics (T_A=25°C unless otherwise noted)

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static						
Drain-Source Breakdown Voltage	V_{DS}	V_{GS} = 0 V, I_D = 250 µA	500	-	-	V
V_{DS} Temperature Coefficient	$\Delta V_{DS}/T_J$	Reference to 25 °C, I_D = 1 mA	-	0.63	-	V/°C
Gate-Source Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250 µA	2.0	-	4.0	V
Gate-Source Leakage	I_{GSS}	V_{GS} = ± 20 V	-	-	± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 500 V, V_{GS} = 0 V	-	-	25	µA
		V_{DS} = 400 V, V_{GS} = 0 V, T_J = 125°C	-	-	250	
Drain-Source On-State Resistance	$R_{DS(on)}$	V_{GS} = 10 V, I_D = 8.4A[b]	-	0.43	0.5	Ω
Forward Transconductance	g_{fs}	V_{DS} = 50 V, I_D = 8.4 A[b]	9.3	-	-	S
Dynamic						
Input Capacitance	C_{iss}	V_{GS} = 0 V, V_{DS} = 25 V, f = 1.0 MHz, see fig. 5	-	2600	-	pF
Output Capacitance	C_{oss}		-	720	-	
Reverse Transfer Capacitance	C_{rss}		-	340	-	
Total Gate Charge	Q_g	V_{GS} = 10 V, I_D = 14 A, V_{DS} = 400 V, see fig. 6 and 13[b]	-	-	150	nC
Gate-Source Charge	Q_{gs}		-	-	20	
Gate-Drain Charge	Q_{gd}		-	-	80	
Turn-On Delay Time	$t_{d(on)}$	V_{DD} = 250 V, I_D = 14 A, R_G = 6.2 Ω, R_D = 17 Ω, see fig. 10[b]	-	17	-	ns
Rise Time	t_r		-	47	-	
Turn-Off Delay Time	$t_{d(off)}$		-	92	-	
Fall Time	t_f		-	44	-	
Internal Drain Inductance	L_D	Between lead, 6 mm (0.25") from package and center of die contact 	-	5.0	-	nH
Internal Source Inductance	L_S		-	13	-	
Drain-Source Body Diode Characteristics						
Continuous Source-Drain Diode Current	I_S	MOSFET symbol showing the integral reverse p - n junction diode 	-	-	14	A
Pulsed Diode Forward Current[a]	I_{SM}		-	-	56	
Body Diode Voltage	V_{SD}	T_J = 25 °C, I_S = 14 A, V_{GS} = 0 V[b]	-	-	1.4	V
Body Diode Reverse Recovery Time	t_{rr}	T_J = 25 °C, I_F = 14 A, dI/dt = 100 A/µs[b]	-	540	810	ns
Body Diode Reverse Recovery Charge	$_{rr}Q$		-	4.8	7.2	µC
Forward Turn-On Time	t_{on}	Intrinsic turn-on time is negligible (turn-on is dominated by L_S and L_D)				

Notes

a. Repetitive rating; pulse width limited by maximum junction temperature (see fig. 11).
b. Pulse width ≤ 300 µs; duty cycle ≤ 2 %.

Typical Characteristics Ta =25°C, unless otherwise noted

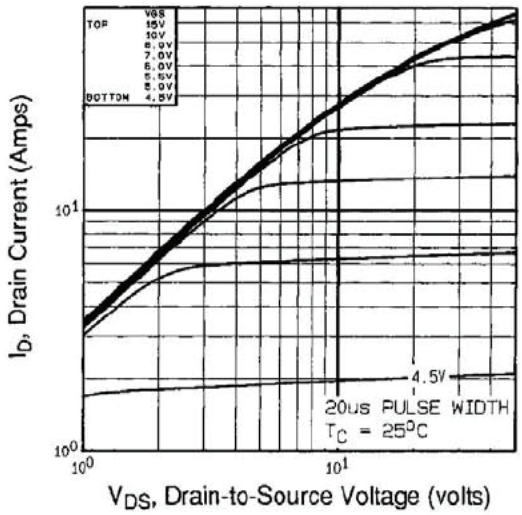


Fig. 1 - Typical Output Characteristics, T_C = 25 °C

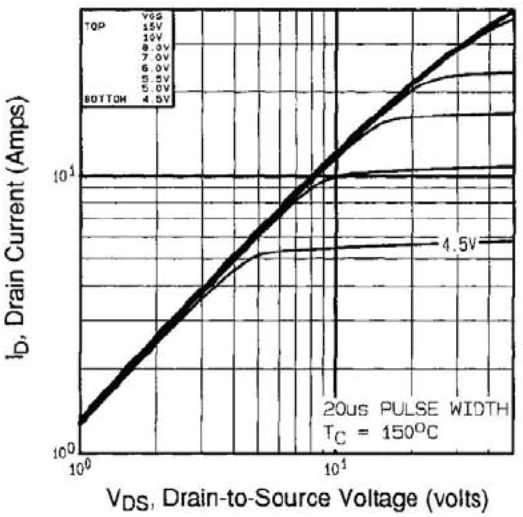


Fig. 2 - Typical Output Characteristics, T_C = 150 °C

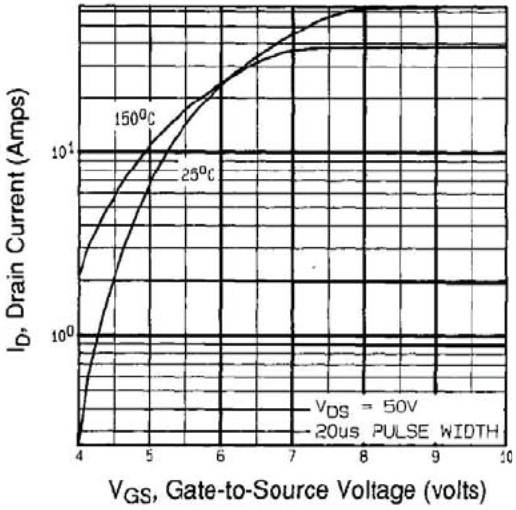


Fig. 3 - Typical Transfer Characteristics

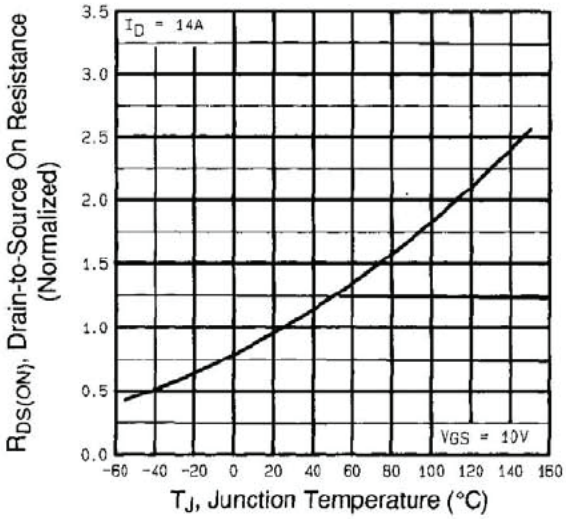


Fig. 4 - Normalized On-Resistance vs. Temperature

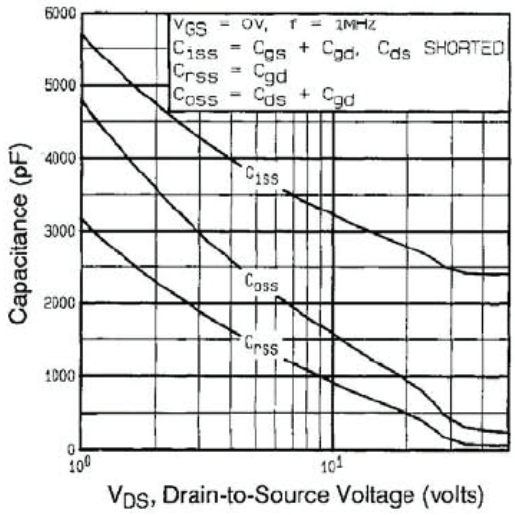


Fig. 5 - Typical Capacitance vs. Drain-to-Source Voltage

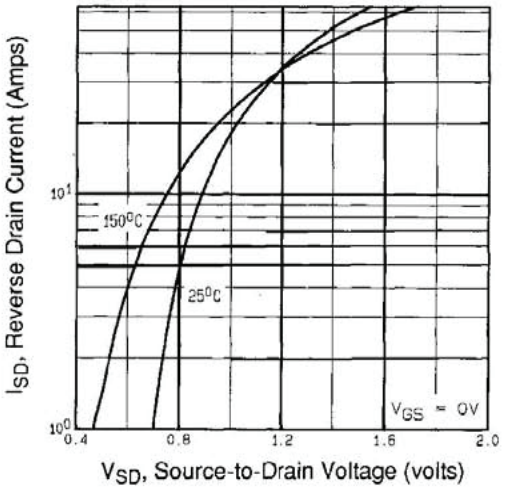


Fig. 7 - Typical Source-Drain Diode Forward Voltage

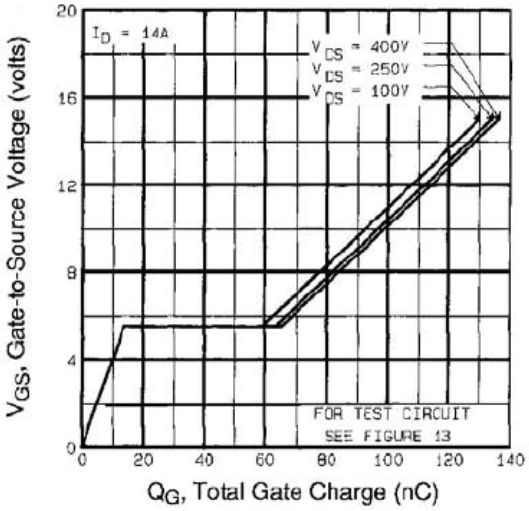


Fig. 6 - Typical Gate Charge vs. Gate-to-Source Voltage

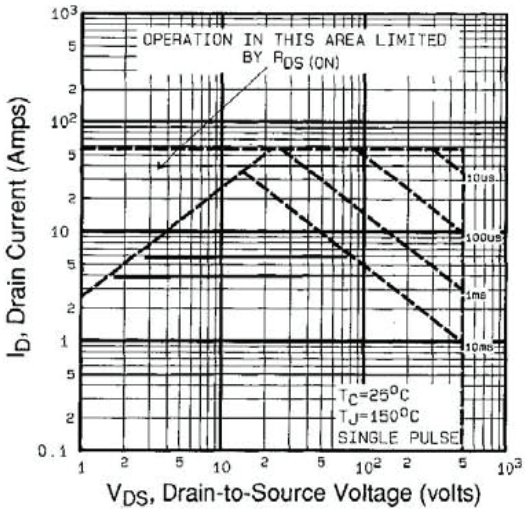


Fig. 8 - Maximum Safe Operating Area

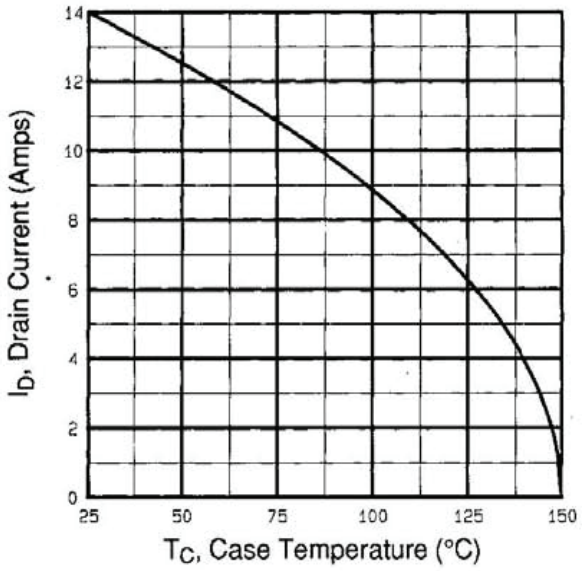


Fig. 9 - Maximum Drain Current vs. Case Temperature

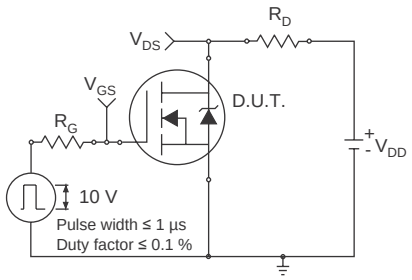


Fig. 10a - Switching Time Test Circuit

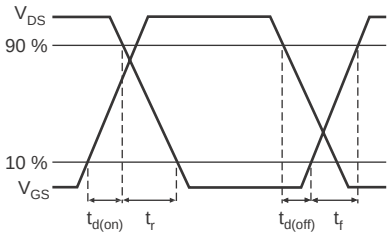


Fig. 10b - Switching Time Waveforms

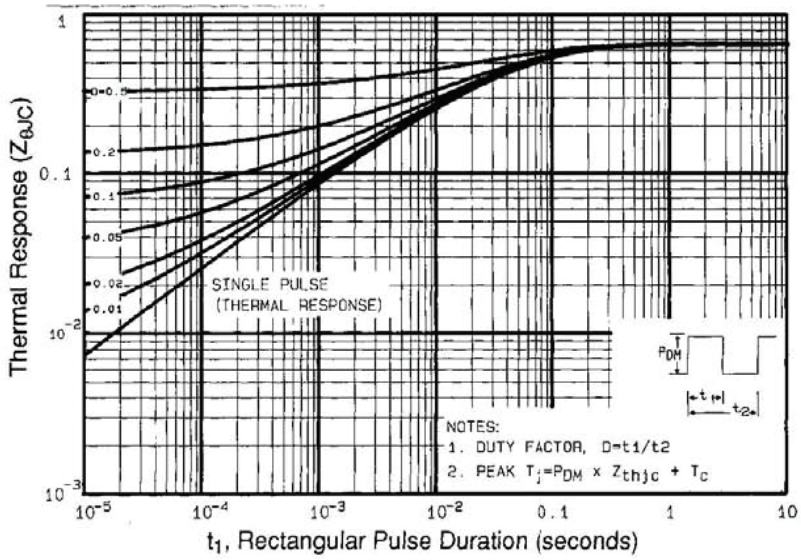


Fig. 11 - Maximum Effective Transient Thermal Impedance, Junction-to-Case

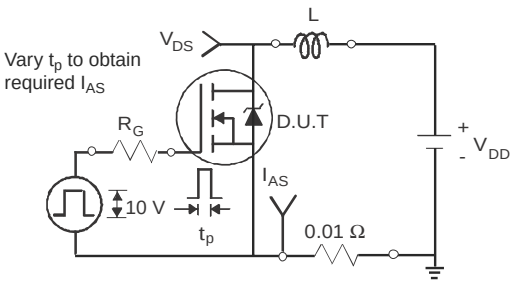


Fig. 12a - Unclamped Inductive Test Circuit

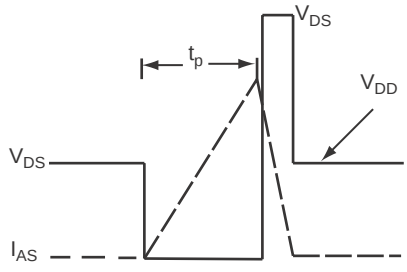


Fig. 12b - Unclamped Inductive Waveforms

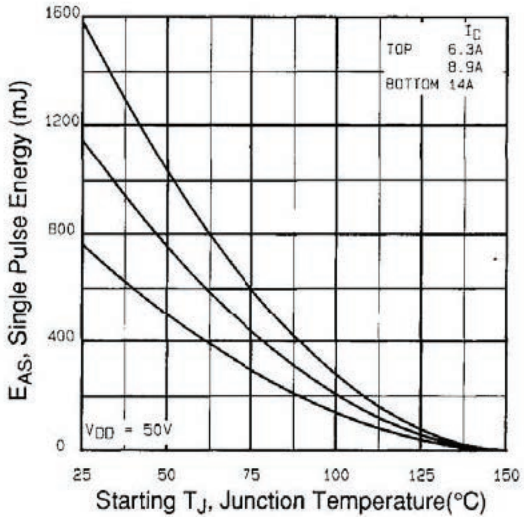


Fig. 12c - Maximum Avalanche Energy vs. Drain Current

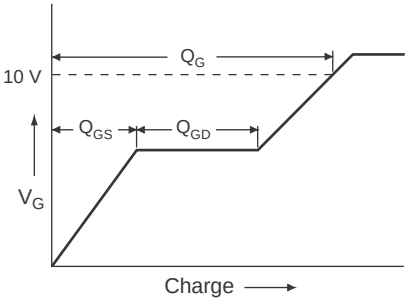


Fig. 13a - Basic Gate Charge Waveform

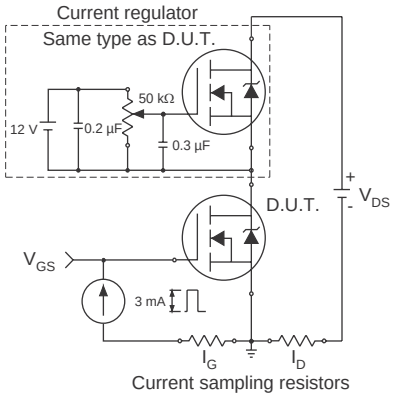
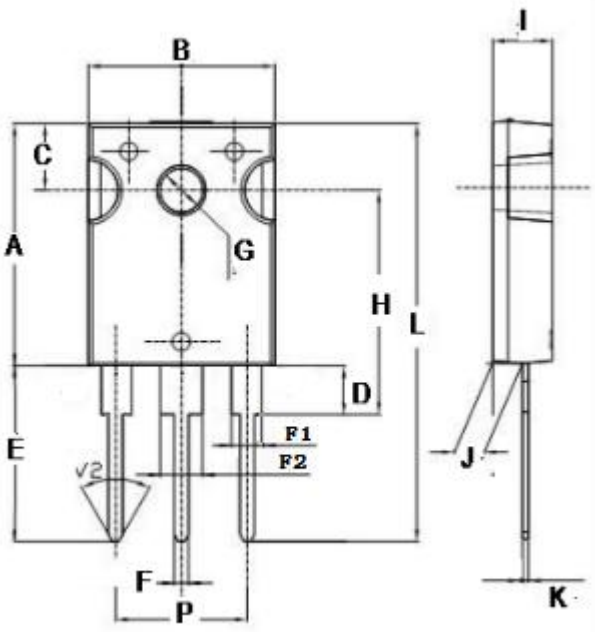


Fig. 13b - Gate Charge Test Circuit

TO-247S(TO-247AC-3) Package Information



Dim	Min	Max
A	20.0	22.0
B	15.5	16.0
C	5.7	6.3
D	4.0	4.4
E	19.0	21.0
F	1.1	1.3
G	3.5	3.8
H	18.3	20.2
I	4.9	5.2
J	2.3	2.5
K	0.55	0.65
L	39.0	42.0
P	10.7	10.9
F1	1.9	2.1
F2	2.9	3.1
mm		

Attention

■ Any and all HUA XUAN YANG ELECTRONICS products described or contained herein do not have specifications that can handle applications that require extremely high levels of reliability, such as life-support systems, aircraft's control systems, or other applications whose failure can be reasonably expected to result in serious physical and/or material damage. Consult with your HUA XUAN YANG ELECTRONICS representative nearest you before using any HUA XUAN YANG ELECTRONICS products described or contained herein in such applications.

■ HUA XUAN YANG ELECTRONICS assumes no responsibility for equipment failures that result from using products at values that exceed, even momentarily, rated values (such as maximum ratings, operating condition ranges, or other parameters) listed in products specifications of any and all HUA XUAN YANG ELECTRONICS products described or contained herein.

■ Specifications of any and all HUA XUAN YANG ELECTRONICS products described or contained herein stipulate the performance, characteristics, and functions of the described products in the independent state, and are not guarantees of the performance, characteristics, and functions of the described products as mounted in the customer's products or equipment. To verify symptoms and states that cannot be evaluated in an independent device, the customer should always evaluate and test devices mounted in the customer's products or equipment.

■ HUA XUAN YANG ELECTRONICS CO.,LTD. strives to supply high-quality high-reliability products. However, any and all semiconductor products fail with some probability. It is possible that these probabilistic failures could
give rise to accidents or events that could endanger human lives, that could give rise to smoke or fire, or that could cause damage to other property. When designing equipment, adopt safety measures so that these kinds of accidents or events cannot occur. Such measures include but are not limited to protective circuits and error prevention circuits for safe design, redundant design, and structural design.

■ In the event that any or all HUA XUAN YANG ELECTRONICS products(including technical data, services) described or contained herein are controlled under any of applicable local export control laws and regulations, such products must not be exported without obtaining the export license from the authorities concerned in accordance with the above law.

■ No part of this publication may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopying and recording, or any information storage or retrieval system, or otherwise, without the prior written permission of HUA XUAN YANG ELECTRONICS CO.,LTD.

■ Information (including circuit diagrams and circuit parameters) herein is for example only ; it is not guaranteed for volume production. HUA XUAN YANG ELECTRONICS believes information herein is accurate and reliable, but no guarantees are made or implied regarding its use or any infringements of intellectual property rights or other rights of third parties.

■ Any and all information described or contained herein are subject to change without notice due to product/technology improvement, etc. When designing equipment, refer to the "Delivery Specification" for the HUA XUAN YANG ELECTRONICS product that you intend to use.