

HX4425-S/HX4425-P

3A Dual High-Speed Power MOSFET Driver

General Description

The HX4423/4424/4425 series is a highly reliable BiCMOS/DMOS buffer/driver/MOSFET driver, providing higher output current versions of HX4426/4427/4428 with improved features. These families are pin compatible, and the HX4423/4424/4425 drivers are specifically designed for use in more demanding electrical environments, providing reliable service under any conditions within the rated power and voltage range. They are capable of withstanding noise spikes of up to 5V on the ground pin, regardless of polarity. Compared to other CMOS or bipolar drivers, the HX4423/4424/4425 drivers are easier to use, more flexible to operate, and more forgiving. Their BiCMOS/DMOS structures consume minimal power and provide stable voltage fluctuations.

The HX4423/4424/4425 driver is primarily designed to drive power MOSFETs, and it is ideal for driving other loads such as capacitors, resistors, or inductors that require low impedance, peak current, and fast switching times. It can be used with heavy-duty clock lines, coaxial cables, or piezoelectric transducers. The only limitation is that the total power dissipated in the driver must be kept within the maximum power dissipation limit of the package.

For high power and narrow pulse applications, see the HX4123/4124/4125 series.

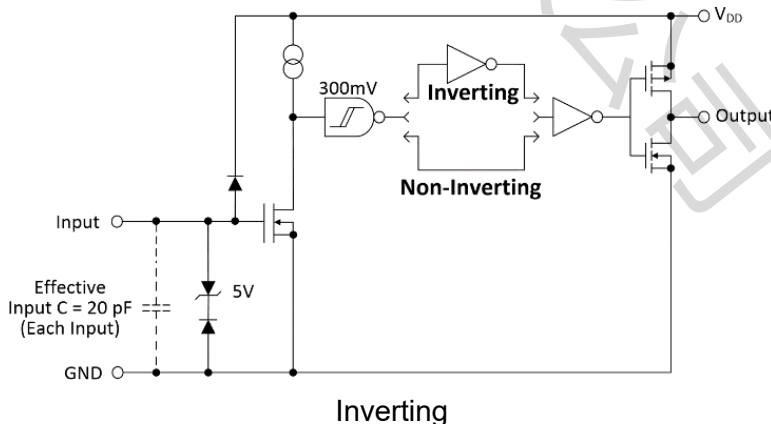
Features

- High Peak Output Current: 3A
- Wide Input Supply Voltage Operating Range: - 4.5V to 18V
- High Capacitive Load Drive Capability: - 1800 pF in 25 ns
- Short Delay Times: <40 ns (typ)
- Matched Rise/Fall Times
- Low Supply Current
 - With Logic '1' Input – 3.5 mA (Max)
 - With Logic '0' Input – 350 μ A (Max)
- Low Output Impedance: 3.5 Ω (typ)0
- Latch-Up Protected: Will Withstand 1.5A Reverse Current
- Logic Input Will Withstand Negative Swing Up To 5V
- ESD Protected: 4 kV
- Available in Green SOP8, DIP8 and DFN8 Packages

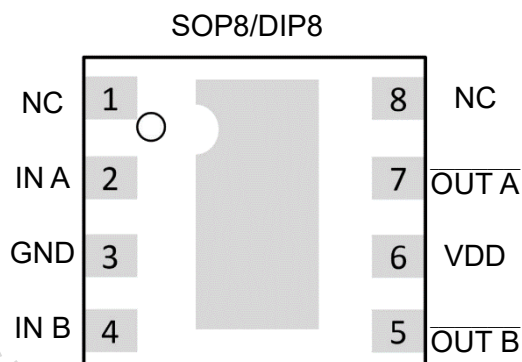
Applications

- Switch Mode Power Supplies
- Pulse Transformer Drive
- Line Drivers

Pin Configuration and Functions



Functional Block Diagram



Outputs out of phase with input

Pin Diagram

Function Tab			
INA	INB	OUT A	OUT B
L	L	H	H
L	H	H	L
H	L	L	H
H	H	L	L

Pin Descriptio		
Pin	Name	Description
1	NC	No connection
2	IN A	Input A
3	GND	Ground
4	In B	Input B
5	OUT B	Output of Channel B
6	VDD	Power Supply
7	OUT A	Output of Channel A
8	NC	No connection
-	PAD	Exposed Metal Pad of DFN package

Inputs A and B

MOSFET driver inputs A and B are high-impedance, TTL/CMOS compatible inputs. These inputs also have 300mV of hysteresis between the high and low thresholds that prevents output glitching even when the rise and fall time of the input signal is very slow.

Ground (GND)

Ground is the device return pin. The Ground pin(s) should have a low-impedance connection to the bias supply source return. High peak current flows out the Ground pin(s) when the capacitive load is being discharged.

Output A and B

MOSFET driver outputs A and B are low-impedance, CMOS push-pull style outputs. The pull-down and pullup devices are of equal strength, making the rise and fall times equivalent. Output A/B is held LOW if Input is unbiased or floating.

Supply Input (VDD)

The VDD input is the bias supply for the MOSFET driver and is rated for 4.5V to 25V with respect to the Ground pin. The VDD input should be bypassed with local ceramic capacitors. The value of these capacitors should be chosen based on the capacitive load that is being driven. A value of 1.0 μ F is suggested.

Exposed Metal Pad

The exposed metal pad of the DFN-S package is not internally connected to any potential. Therefore, this pad can be connected to a ground plane or other copper plane on a Printed Circuit Board (PCB), to aid in heat removal from the package.

Product Specification

Absolute Maximum Ratings ⁽¹⁾			
Parameter	Min	Max	Unit
DC supply voltage Vs		26	V
Operating junction temperature	-40	+125	°C
Storage temperature	-55	+150	°C
Maximum input voltage	GND-5	VDD+0.3	V

(1) Stresses exceeding the absolute maximum ratings may damage the device. The device may not function or be operable above the recommended operating conditions and stressing the parts to these levels is not recommended. In addition, extended exposure to stresses above the recommended operating conditions may affect device reliability. The absolute maximum ratings are stress ratings only.

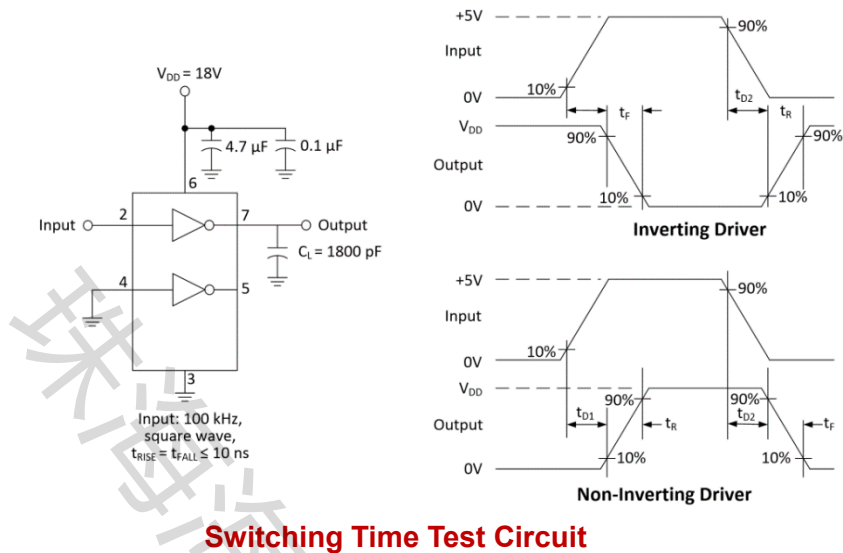
Thermal Data		
Parameter	Rating	Unit
Package Thermal Resistance	155(SOP8)	°C/W
	125(DIP8)	
	118(FDN8,2x2)	

Recommended Operating Conditions		
Parameter	Rating	Unit
DC Supply Voltage	4.5V ~ 25V	V
Operating ambient temperature	-40 to +125	°C

Electrical Characteristics(Typical values are tested at TA=25 oC, VDD=18V)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
INPUT						
Input Signal High Threshold	V _{IH}		1.6			V
Input Signal Low Threshold	V _{IL}				0.7	V
Input Signal Hysteresis	V _{HYS}			0.3		V
Input Current	I _{IN}	0V ≤ V _{IN} ≤ V _{DD}			±1	μA
OUTPUT						
High Output Voltage V _{OH}	V _{OH}	DC Test	V _{DD} -			V
Low Output Voltage	V _{OL}	DC Test			0.025	V
Pull-Up Resistance	R _{OH}	Source Current = 10mA		1.6		Ω
Pull-Down Resistance	R _{OL}	Sink Current = -10mA		1.5		Ω
Peak Output Current	I _{PK}	10V ≤ V _{DD} ≤ 18V		4.0		A
POWER SUPPLY						
Power Supply Current	I _{CC}	V _{INA} =V _{VINB} =3V		0.9		mA
		V _{INA} =V _{VINB} =0V		0.5		
Operating Voltage Range	V _{DD}		4.5		25	V
Under-Voltage Lockout ON				3.7	4.1	V
Under-Voltage Lockout				0.5		V
SWITCHING CHARACTERISTICS						
Rise Time	t _R	C _L =1800pF,		12		ns
Fall Time	t _F	C _L =1800pF,		12		ns
Turn-On Delay Time	t _{D1}	Non-inverting Input		36		ns
		Inverting Input		35		ns
Turn-On Delay Time	t _{D2}	Non-inverting Input		36		ns
		Inverting Input		35		ns
OVER-TEMPERATURE PROTECTION						
Thermal Shutdown Threshold				150		°C
Thermal Shutdown Threshold				25		°C

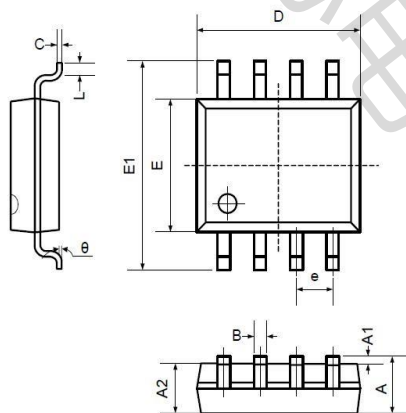
Application Informa



Switching Time Test Circuit

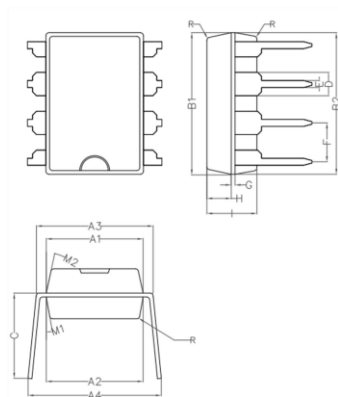
Package Information

SOP8 (Package Outline Dimensions)



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
B	0.330	0.510	0.013	0.020
C	0.190	0.250	0.007	0.010
D	4.780	5.000	0.188	0.197
E	3.800	4.000	0.150	0.157
E1	5.800	6.300	0.228	0.248
e	1.270TYP		0.050TYP	
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°

DIP8 (Package Outline Dimensions)



Symbol	Min	Non	Max
A1	6.28	6.33	6.38
A2	6.33	6.38	6.43
A3	7.52	7.62	7.72
A4	7.80	8.40	9.00
B1	9.15	9.20	9.25
B2	9.20	9.25	9.30
C		5.57	
D		1.52	
E	0.43	0.45	0.47
F		2.54	
G		0.25	
H	1.54	1.59	1.64
I	3.22	3.27	3.32
R		0.20	
M1	9°	10°	11°
M2	11°	12°	13°

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