DESCRIPTION

The AD8424 is a matched dual power MOSFET driver designed for high-speed switching applications. Its advanced circuit architecture enables it to deliver peak currents up to 4A into capacitive loads as large as 1800pF, making it ideal for fast and efficient power switching.

A key feature of the AD8424 is its matched rise and fall delay times, which preserve input-to-output pulse widths. This helps minimize timing errors and clock skew, ensuring accurate signal integrity in high-speed digital systems.

The device incorporates non-overlapping drive techniques to reduce dynamic switching losses. It also offers high immunity to latch-up within its specified power and voltage ratings and can tolerate ground pin noise spikes of up to 5V without damage.

The inputs are compatible with TTL and CMOS logic levels across a wide input voltage range of 1.6V to 25V. Integrated 300mV hysteresis enhances noise immunity and allows reliable operation even with slow input signal transitions.

The AD8424 is available in SOP8 package, providing design flexibility across a variety of applications.

ORDERING INFORMATION

Package Type	Part Number	
SOP8 SPQ: 4,000pcs/Reel	M8	AD8424M8VR
Note	V: Halogen free Package R: Tape & Reel ; U: Tape & Tube	
AiT provides all RoHS products		

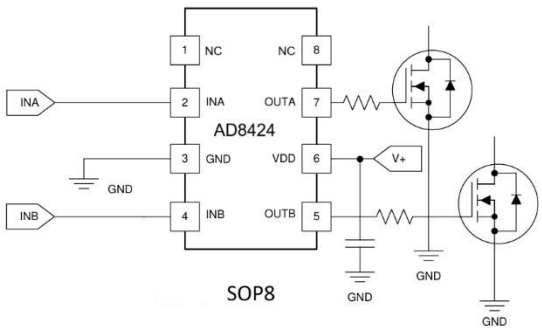
FEATURES

- High Peak Output Current: 4A
- Wide Supply Voltage Range: 4.5V to 25V
- High Capacitive Load Drive Capability: 1800pF in 12ns (typical)
- Short Propagation Delay: 36ns (typical)
- Matched Rise and Fall Times
- Low Output Impedance: 1.6Ω (typical)
- Low Quiescent Supply Current
- Over-Temperature Protection
- Under-Voltage Lockout (UVLO)
- Non-Overlapped Drive Technique
- Input Tolerance: Withstands negative transients up to 5V

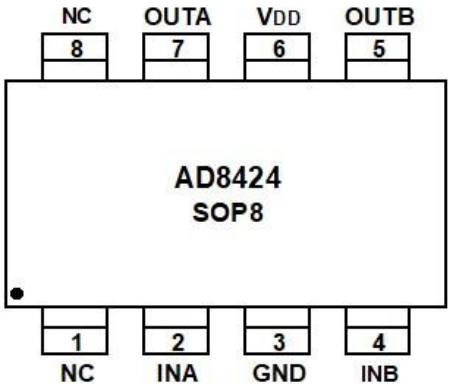
APPLICATION

- Switch Mode Power Supplies
- Power MOSFET Drivers
- Pulse Transformer Drivers
- Line Drivers
- CCD Driver
- Class D Switching Amplifier

TYPICAL APPLICATION



PIN DESCRIPTION



SOP8, M8

Top View

Pin# SOP8	Symbol	Function
1	NC	No Connection
2	INA	Input A
3	GND	Ground
4	INB	Input B
5	OUTB	Output of Channel B
6	V_{DD}	Power Supply
7	OUTA	Output of Channel A
8	NC	No Connection
-	PAD	Exposed Metal Pad of DFN package

ABSOLUTE MAXIMUM RATINGS

T_A = 25°C, unless otherwise specified.

Vs, DC Supply Voltage		26V
Package Thermal Resistance	SOP8	155℃/W
Operating Junction Temperature		-40℃~+125℃
Storage Temperature		-55℃ ~ +150℃
Maximum Input Voltage		GND-5V ~ V_{DD}+0.3V

Stresses above may cause permanent damage to the device. These are stress ratings only and functional operation of the device at these or any other conditions beyond those indicated in the Electrical Characteristics are not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

RECOMMENDED WORKING RANGE

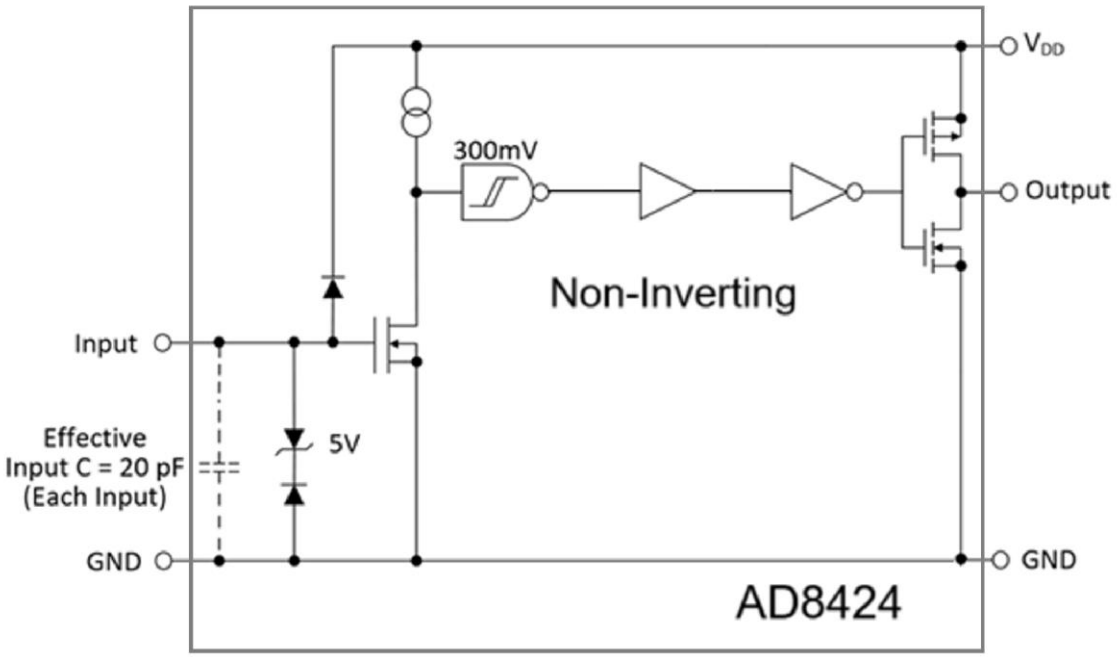
DC Supply Voltage	4.5~25V
INA, INB, Input Voltage	5V
Max Output Current	4A

ELECTRICAL CHARACTERISTICS

T_A = 25°C, V_{DD}=18V, unless otherwise specified

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
INPUT						
Input Signal High Threshold	V_{IH}	T_J=25°C, I_O=1mA	1.60	-	-	V
Input Signal Low Threshold	V_{IL}	12≤V_{IN}≤25V	-	-	0.70	V
Input Signal Hysteresis	V_{HYS}	1≤I_O=20mA	-	0.30	-	V
Input Current	I_{IN}	0V ≦ V_{IN} ≦ V_{DD}	-	-	±1	μA
OUTPUT						
High Output Voltage V_{OH}	V_{OH}	DC Test	V_{DD}-0.025	-	-	V
Low Output Voltage	V_{OL}	DC Test	-	-	0.025	V
Pull-Up Resistance	R_{OH}	Source Current=10mA	-	1.60	-	Ω
Pull-Down Resistance	R_{OL}	Sink Current= -10mA	-	1.50	-	Ω
Peak Output Current	I_{PK}	10V ≦ V_{DD} ≦18V	-	4.00	-	A
POWER SUPPLY						
Power Supply Current	I_{CC}	V_{INA}=V_{INB}=3V	-	0.90	-	mA
		V_{INA}=V_{INB}=0V	-	0.50	-	
Operating Voltage Range	V_{DD}	-	4.50	-	25	V
Under-Voltage Lockout ON Threshold	-	-	-	3.70	4.10	V
Under-Voltage Lockout Hysteresis	-	-	-	0.50	-	V
SWITCHING CHARACTERISTICS						
Rise Time	t_R	C_L=1800pF, See Figure 1	-	12	-	ns
Fall Time	t_F	C_L=1800pF, See Figure 1	-	12	-	
Turn-On Delay Time	t_{D1}	Non-Inverting Input	-	36	-	
		Inverting Input	-	35	-	
Turn-On Delay Time	t_{D2}	Non-Inverting Input	-	36	-	
		Inverting Input	-	35	-	
OVER-TEMPERATURE PROTECTION						
Thermal Shutdown Threshold	-	-	-	150	-	℃
Thermal Shutdown Threshold Hysteresis	-	-	-	25	-	℃

BLOCK DIAGRAM



DETAILED INFORMATION

FUNCTION TABLE

INA	INB	OUTA	OUTB
L	L	L	L
L	H	L	H
H	L	H	L
H	H	H	H

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. When the capacitive load is discharged, high peak current flows out of the Ground pin(s).

Output A and B

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

Supply Input (V_{DD})

The V_{DD} input is the bias supply for the MOSFET driver and is rated for 4.5V to 25V concerning the Ground pin. The V_{DD} 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 1.0μF is suggested.

Exposed Metal Pad

The exposed metal pad of the DFN-S package is electrically isolated (not internally connected to any potential). It may be connected to a ground plane or any other copper plane on the PCB to enhance thermal dissipation and improve overall heat removal from the package.

APPLICATION INFORMATION

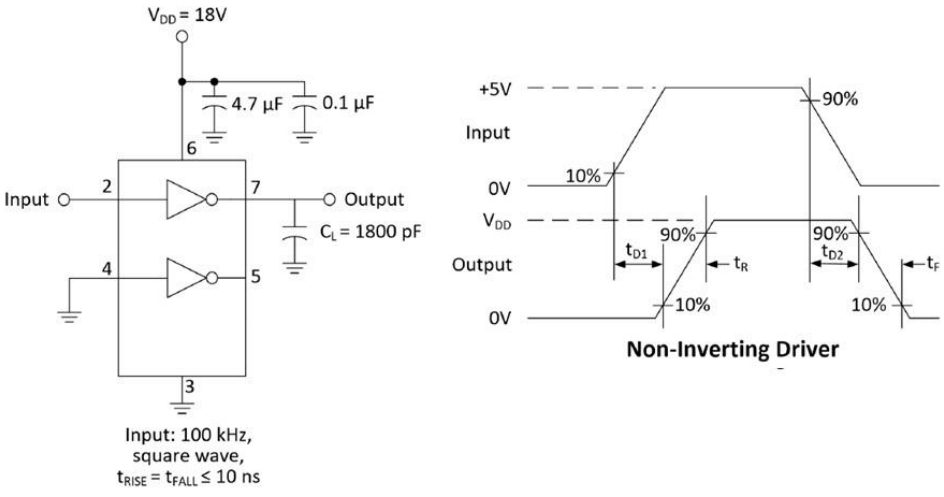
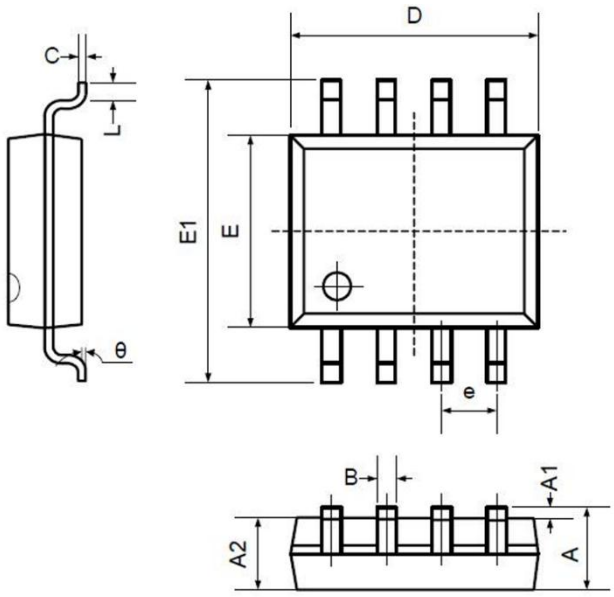


Figure 1. Switching Time Test Circuit

PACKAGE INFORMATION

Dimension in SOP8 (Unit: mm)



Symbol	Min.	Max.
A	1.350	1.750
A1	0.100	0.250
A2	1.350	1.550
B	0.330	0.510
C	0.190	0.250
D	4.780	5.000
E	3.800	4.000
E1	5.800	6.300
e	1.270 TYP.	
L	0.400	1.270
θ	0°	8°

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