ALPHA SEMICONDUCTOR
Excellence in Analog Power Products

AS4420/AS4429

6A, High Speed MOSFET Drivers

FEATURES

- Latch Up Protected >1.5A
- Logic Input Swing Negative 5V
- ESD 4kV
- Matched Rise And Fall Times 20ns
- Reverse Output Current
- High Peak Output Current..... 6A Peak
- Wide Operating Range..... 4.5V to 18V
- High Capacitive Load Drive..... 10,000pF
- Short Delay Time..... 20ns Typ
- Logic High Input, Any Voltage..... 2.4V to V_{DD}
- Low Supply Current With Logic..... "1" Input 450µA
- Output Voltage Swing to Within 25mV of Ground or V_{DD}
- Pin Out Same as AS429

APPLICATIONS

- Motor Controls
- Switch-Mode Power Supplies
- Pulse Transformer Driver
- Class D Switching Amplifiers

PRODUCT DESCRIPTION

The ALPHA Semiconductor AS4420 and AS4429 family operates over 4.5V to 18V, can withstand high current peaking of 6A and have matched rise and fall times under 25ns. The product has been designed utilizing ALPHA Semiconductor's rugged CMOS process with protection for latch up and ESD. The product is available in inverting (AS4429) and noninverting (AS4420) configurations.

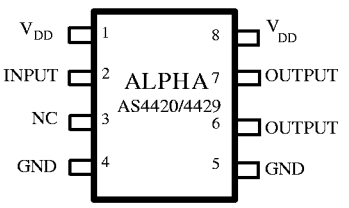
ORDERING INFORMATION

Part Number	Package Type	Logic
AS4420XS	8-Pin SOIC	Noninverting
AS4420XU	5-Pin TO-220	Noninverting
AS4420XP	8-Pin PDIP	Noninverting
AS4429XS	8-Pin SOIC	Inverting
AS4429XU	5-Pin TO-220	Inverting
AS4429XP	8-Pin PDIP	Inverting

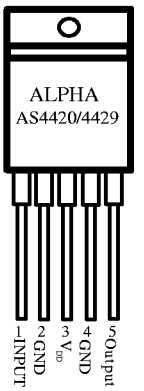
X= I Industrial; C Commercial; M Military

PIN CONNECTIONS

8–Pin Surface Mount/PDIP



Top View



TO-220
Front View

ABSOLUTE MAXIMUM RATINGS

Supply Voltage ..... +20V
Input Voltage..... -5V to >V_{DD}
Input Current (V_{IN} > V_{DD})..... 50mA
Power Dissipation, $T_A \leq 25^o$
PDIP 1W
SOIC..... 500mW
5-Pin TO-220 ..... 1.5W
Power Dissipation, $T_C \leq 25^oC$
5-Pin TO-220 ..... 12.5W
Derating Factors (To Ambient)
PDIP ..... 8mW/°C
SOIC..... 4mW/°C
5-Pin TO-220 ..... 12mW/°C

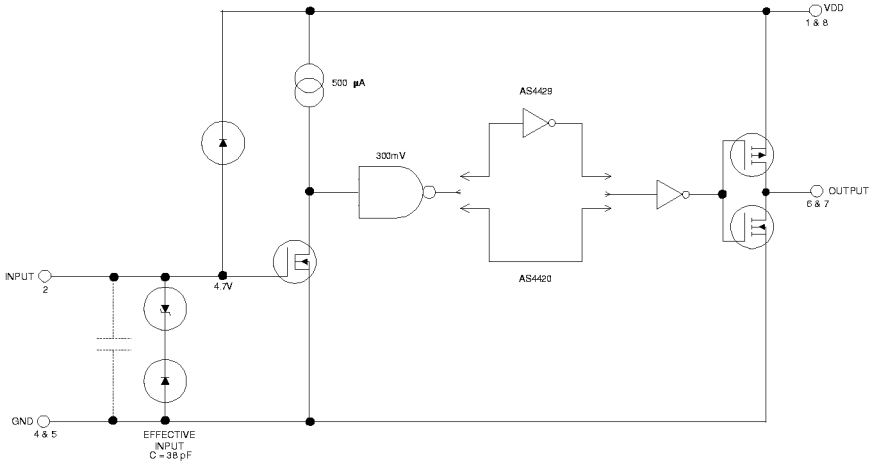
Thermal Impedances (To Case)
5-Pin T0-220 $R_{\theta J-A}$ ..... 10°C/W
Storage Temperature Range..... -55°C to +150°C
Operating Temperature (Chip) ..... +150°C
Operating Temperature Range (Ambient)
C Version ..... 0°C to +70°C
I Version ..... -40°C to +85°C
Lead Temperature (Soldering, 10 sec) +300°C

ELECTRICAL CHARACTERISTICS:

T_A = +25°C with 4.5V ≤ V_{DD} ≤ 18V, unless otherwise specified.

Parameter	Conditions	Min	Typ	Max	Units
INPUT					
Logic 1 High Input Voltage		2.4	1.8		V
Logic 0 Low Input Voltage			1.3	0.8	V
Input Voltage Range		-5		V_{DD}+0.3	
Input Current	0V ≤ V_{IN} ≤ V_{DD}	-10		10	µA
OUTPUT					
High Output Voltage	See Figure 1	V_{DD}-0.025			V
Low Output Voltage	See Figure 1			.025	V
Output Resistance, High	I_{OUT} = 10mA, V_{DD} = 18V		2.1	2.8	Ω
Output Resistance, Low	I_{OUT} = 10mA, V_{DD} = 18V		1.5	2.5	Ω
Peak Output Current	V_{DD} = 18V (See Figure 5)		6		A
Latch-Up Protection Withstand Reverse Current	Duty Cycle ≤ 2% t ≤ 300µA	>1.5			A
SWITCHING TIME (Note 1)					
Rise Time	Figure 1, C_L = 2500pF		25	35	ns
Fall Time	Figure 1, C_L = 2500pF		25	35	ns
Delay Time	Figure 1		20	40	ns
Delay Time	Figure 1		20	40	ns
POWER SUPPLY					
Power Supply Current	V_{IN} = 3V V_{IN} = 0V		1 55	1.5 150	mA µA
Operating Input Voltage		4.5		18	V

BLOCK DIAGRAM



ELECTRICAL CHARACTERISTICS: Measured over operating temperature range with $4.5V \le V_{DD} \le 18V$, unless otherwise specified.

Parameter	Conditions	Min	Typ	Max	Units
INPUT					
Logic 1 High Input Voltage		2.4			V
Logic 0 Low Input Voltage				0.8	V
Input Voltage Range		-5		V_{DD}+0.3	V
Input Current	$0V \le V_{IN} \le V_S$	-10		10	µA
OUTPUT					
High Output Voltage	See Figure 1	V_{DD}-0.025			V
Low Output Voltage	See Figure 1			.025	V
Output Resistance, High	I_{OUT} = 10mA, V_{DD} = 18V		3	5	Ω
Output Resistance, Low	I_{OUT} = 10mA, V_{DD} = 18V		2.3	5	Ω
SWITCHING TIME (Note 1)					
Rise Time	Figure 1, C_L = 2500pF		35	60	ns
Fall Time	Figure 1, C_L = 2500pF		34	60	ns
Delay Time	Figure 1		20	50	ns
Delay Time	Figure 1		20	50	ns
POWER SUPPLY					
Power Supply Current	V_{IN} = 3V V_{in} = 0V		1 60	3 400	mA µA
Operating Input Voltage		4.5		18	V

Note: 1. Switching times guaranteed by design.

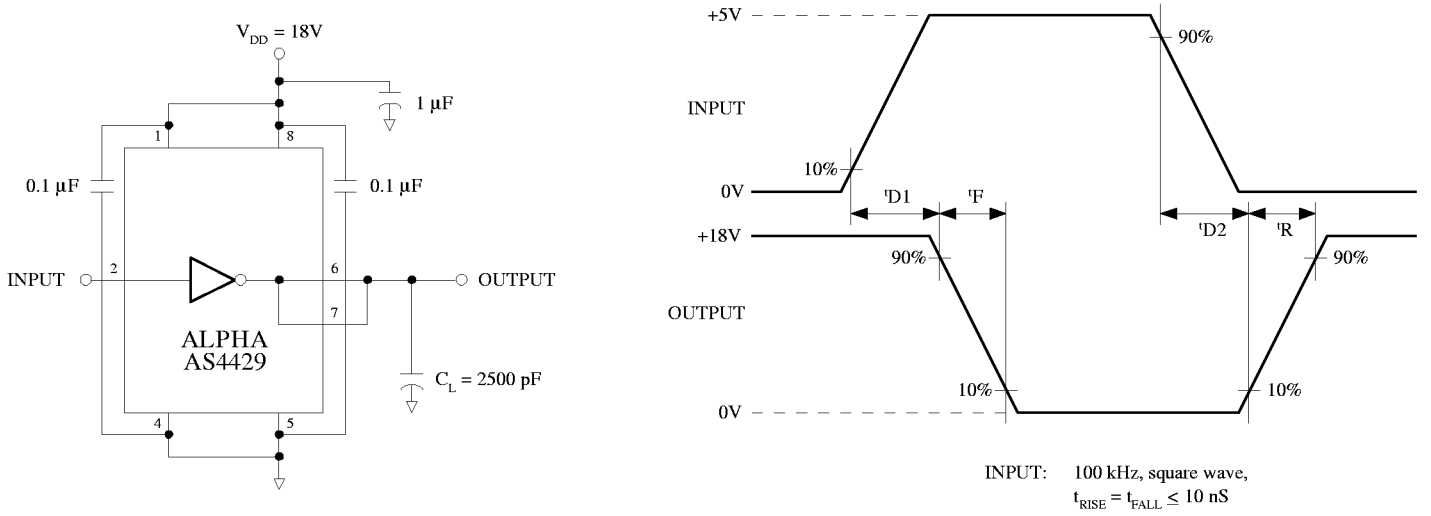
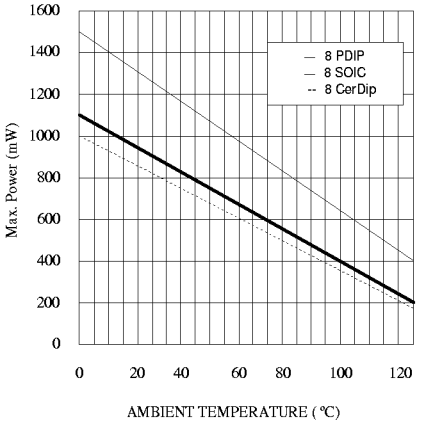


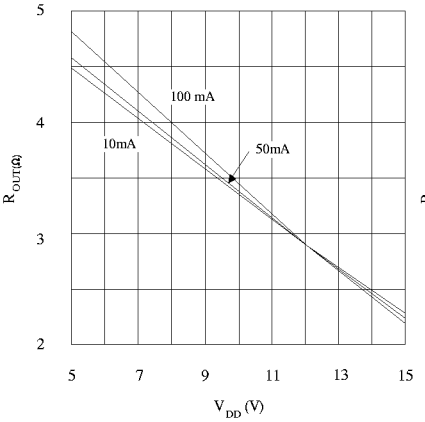
Figure 1. Switching Time Test Circuit

TYPICAL CHARACTERISTICS

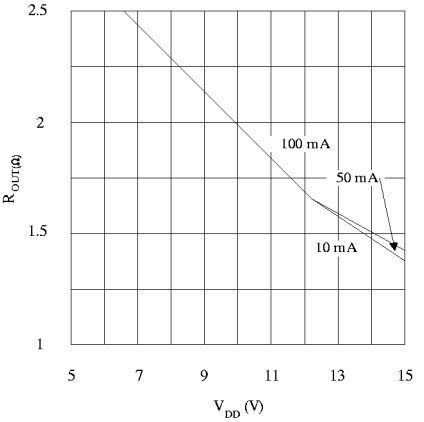
Thermal Derating Curve



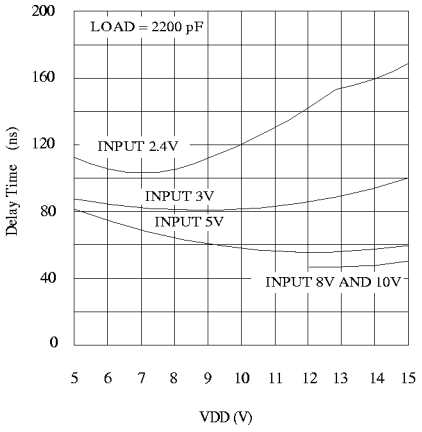
High-State Output Resistance



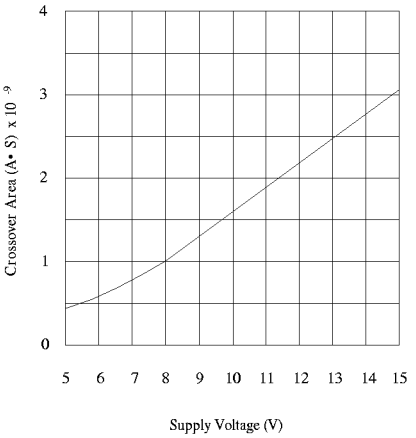
Low-State Output Resistance



Effect of Input Amplitude on Propagation Delay

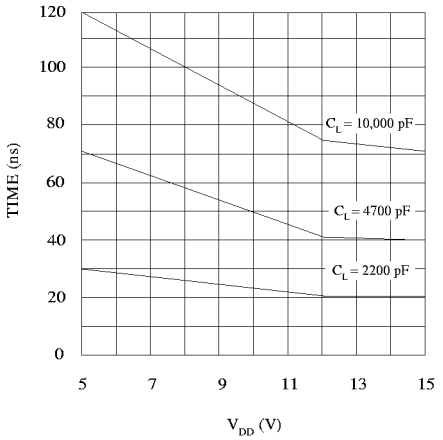


Total nA• S Crossover

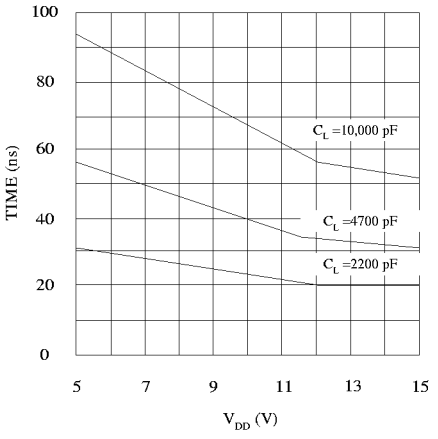


TYPICAL CHARACTERISTICS *(Cont.)*

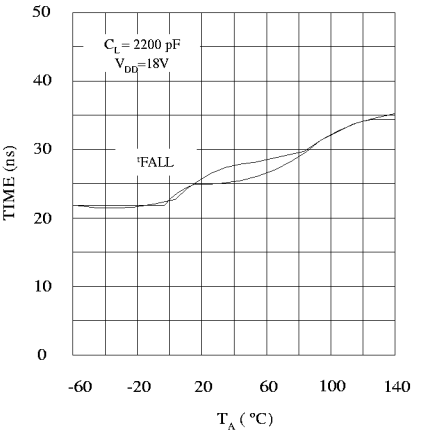
Rise Time vs Supply Voltage



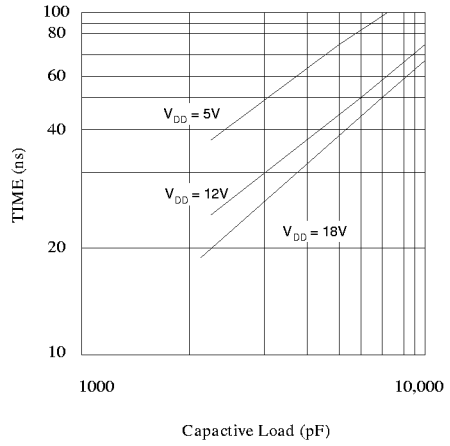
Fall Time vs Supply Voltage



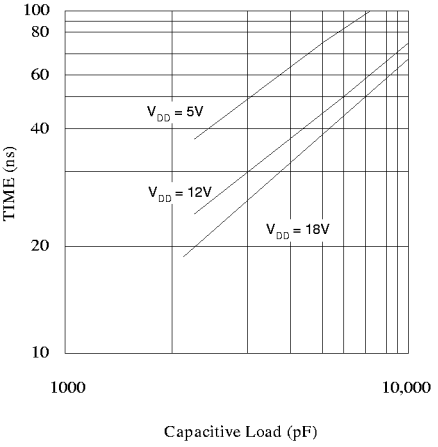
Rise and Fall Times vs Temperature



Rise Time vs Capacitive Load



Total nA• S Crossover



Propagation Delay Time vs Supply Voltage

