



DESCRIPTION

The AG1416 is single-channel power MOSFET drivers designed for high-speed switching applications. Their unique circuit architecture enables high-speed operation and provides peak output currents of up to 1.5A when driving a 1000pF capacitive load.

The matched rise and fall propagation delays help preserve input-to-output pulse width, minimizing timing errors and reducing clock skew. Dynamic switching losses are further reduced through a non-overlapping output drive architecture.

The AG1416 is highly resistant to latch-up within their specified operating voltage and power ratings. In addition, they are immune to ground noise transients of up to $\pm 5V$, preventing damage caused by noise spikes on the ground pin

The AG1416 is available in SOT-25 package.

ORDERING INFORMATION

Package Type	Part Number	
SOT-25 SPQ: 3,000pcs/Reel	E5	AG1416E5R
		AG1416E5VR
Note	V: Halogen free Package R: Tape & Reel	
AiT provides all RoHS products		

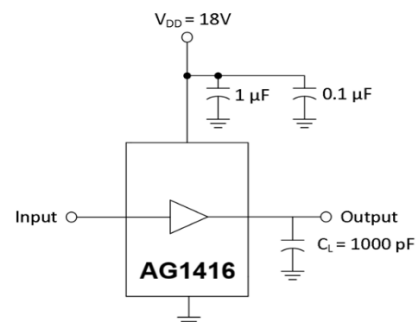
FEATURES

- High Peak Output Current: 1.5A
- Wide Supply Voltage Operating Range: 4.5V to 25V
- High Capacitive Load Drive Capability 1000pF in 11ns (typical)
- Short Delay Times: 35ns (typical)
- Matched Rise/Fall Times
- Low Output Impedance
- Low Supply Current
- Over-temperature Protection
- Under-voltage Lockout
- Non-overlapped Drive Tech
- ESD Protected: 2.0kV
- Input withstands negative inputs up to 5V

APPLICATION

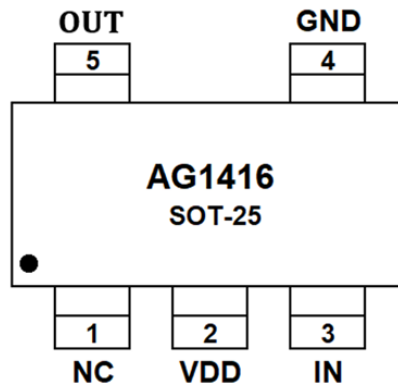
- Switch Mode Power Supplies
- Power MOSFET Drivers
- Pulse Transformer Drivers
- Line Drivers
- CCD Driver
- Class D Switching Amplifiers
- Level Translator

SIMPLIFIED SCHEMATIC





PIN DESCRIPTION



SOT-25, E5

Top View

PIN#	Symbol	Function
1	NC	No connection
2	VDD	Power Supply
3	IN	Control Input
4	GND	Ground
5	OUT	Output

**Input (IN)**

The IN pin is a high-impedance, TTL/CMOS-compatible logic input. It incorporates approximately 300mV of hysteresis between the input high and low threshold voltages to prevent output glitches, even when the input signal has slow rise and fall times.

Ground (GND)

The GND pin is the ground return for the device. It should be connected to the bias supply return through a low-impedance path. High peak currents flow through the GND pin during discharge of the capacitive load; therefore, proper PCB layout with a low-impedance ground connection is recommended.

Output (OUT)

The OUT pin is a low-impedance CMOS push-pull output designed to drive power MOSFET gates. The pull-up and pull-down output stages provide matched drive strength, resulting in symmetrical rise and fall times for improved switching performance.

Supply Input (VDD)

The V_{DD} pin provides the bias supply for the MOSFET driver and operates over a supply voltage range of 4.5V to 25V with respect to the GND pin. To ensure stable operation, the V_{DD} pin should be bypassed to GND with a local ceramic capacitor placed as close to the device as possible. The bypass capacitor value should be selected according to the capacitive load being driven; a 1.0μF ceramic capacitor is recommended for most applications.

ABSOLUTE MAXIMUM RATINGS

over operating free-air temperature range (unless otherwise noted) ⁽¹⁾ ⁽²⁾

V _s , DC Supply Voltage	26V
Package Thermal Resistance	SOT-25 190°C/W
T _J , Operating Junction Temperature	-40°C ~ +125°C
Operating Ambient Temperature	-40°C ~ +85°C
T _{STG} , Storage Temperature	-55°C ~ +150°C
Maximum input voltage	GND-5V ~ VDD+0.3V
Peak output current	2A

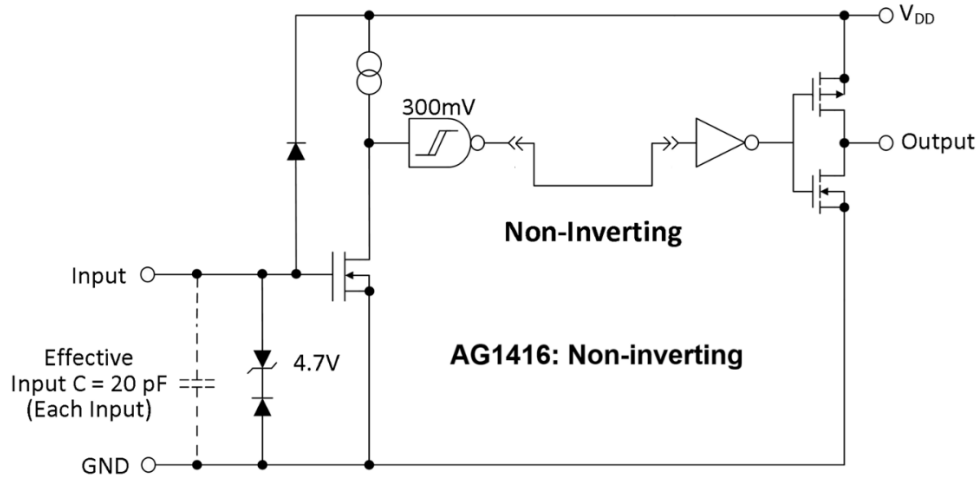
Stresses above may cause permanent damage to the device. These are stress ratings only and functional operation of the device at these or any other conditions beyond those indicated in the Electrical Characteristics are not implied. Exposure to absolute maximum rating conditions for extended periods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

**ELECTRICAL CHARACTERISTICS**Typical values are tested at $T_A=25^{\circ}\text{C}$, $V_{DD}=18\text{V}$

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Units
INPUT						
Input Signal High Threshold	V _{IH}	-	1.8	-	-	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						
Pull-Up Resistance	R _{OH}	I _{SOURCE} =5mA	-	2	-	Ω
Pull-Down Resistance	R _{OL}	I _{SINK} =5mA	-	2	-	Ω
Peak Output Current	I _{PK}	Source Current, f=1kHz CL=1000pF	-	1.5	-	A
		Sink Current, f=1kHz CL=1000pF	-	-1.5	-	
Continuous Output Current	I _{DC}	Source / Sink Current	-	±200	-	mA
POWER SUPPLY						
Operating Voltage Range	V _{DD}	-	4.5	-	25	V
Under-Voltage Lockout ON Threshold	-	-	-	3.6	4	V
Under-Voltage Lockout Hysteresis	-		-	0.5	-	V
Power Supply Current	I _{CC}	V _{INA} =V _{INB} =3V	-	0.6	-	mA
		V _{INA} =V _{INB} =0V	-	0.4	-	
SWITCHING CHARACTERISTICS						
Rise Time	t _R	CL =1000pF, See Fig 1.	-	11	-	ns
Fall Time	t _F	CL =1000pF, See Fig 1.	-	11	-	ns
Turn-On Delay Time	t _{D1}	Non-inverting Input	-	34	-	ns
Turn-Off Delay Time	t _{D2}	Non-inverting Input	-	34	-	ns
OVER-TEMPERATURE PROTECTION						
Thermal Shutdown Threshold	-	-	-	150	-	°C
Thermal Shutdown Threshold Hysteresis	-	-	-	25	-	°C



BLOCK DIAGRAM



FUNCTION TABLE

IN	OUT
L	L
H	H

H=High Voltage Level

L=Low Voltage Level

APPLICATION INFORMATION

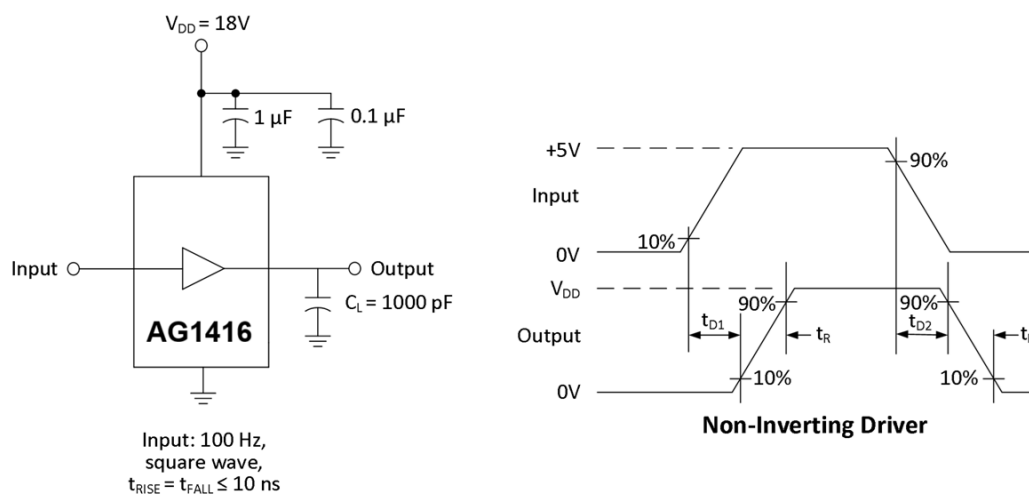
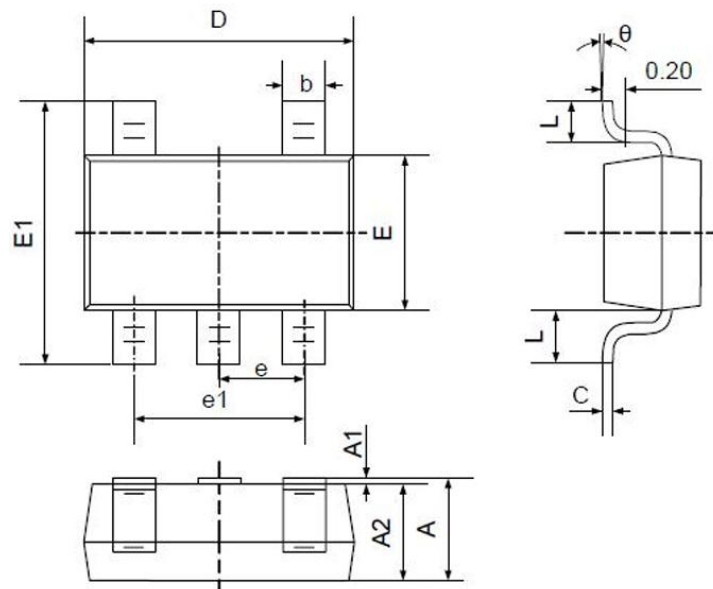


Fig 1. AG1416 Switching Time Test Circuit

**PACKAGE INFORMATION**

Dimension in SOT-25 (Unit: mm)



Symbol	Millimeters	
	Min	Max
A	1.050	1.250
A1	0.000	0.100
A2	1.050	1.150
b	0.300	0.400
c	0.100	0.200
D	2.820	3.020
E	1.500	1.700
E1	2.650	2.950
e	0.950 BSC.	
e1	1.800	2.000
L	0.700 REF.	
L1	0.300	0.600
θ	0°	8°

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