



# LC<sup>2</sup>MOS 8-/16-Channel High Performance Analog Multiplexers

## ADG406/ADG407/ADG426

### FEATURES

44 V Supply Maximum Ratings

V<sub>SS</sub> to V<sub>DD</sub> Analog Signal Range

Low On Resistance (80  $\Omega$  max)

Low Power

Fast Switching

t<sub>ON</sub> < 160 ns

t<sub>OFF</sub> < 150 ns

Break Before Make Switching Action

Plug-In Upgrade for

DG506A/ADG506A, DG507A/ADG507A,

DG526/ADG526A

ADG406/ADG407 are Plug-In Replacements for  
DG406/DG407

### APPLICATIONS

Audio and Video Routing

Automatic Test Equipment

Data Acquisition Systems

Battery Powered Systems

Sample Hold Systems

Communication Systems

Avionics

### GENERAL DESCRIPTION

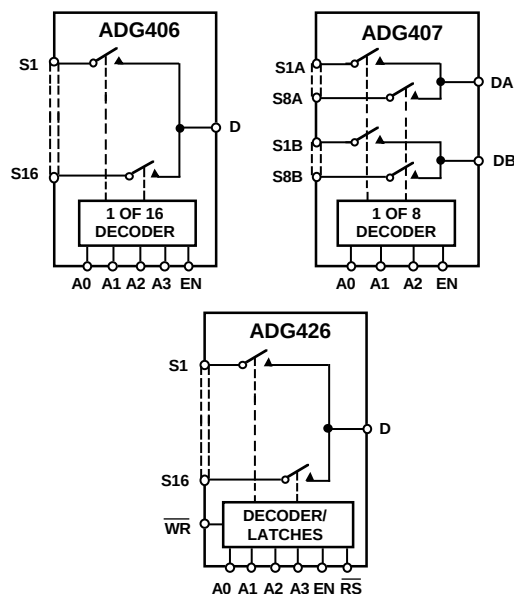
The ADG406, ADG407 and ADG426 are monolithic CMOS analog multiplexers. The ADG406 and ADG426 switch one of sixteen inputs to a common output as determined by the 4-bit binary address lines A0, A1, A2 and A3. The ADG426 has on-chip address and control latches that facilitate microprocessor interfacing. The ADG407 switches one of eight differential inputs to a common differential output as determined by the 3-bit binary address lines A0, A1 and A2. An EN input on all devices is used to enable or disable the device. When disabled, all channels are switched OFF.

The ADG406/ADG407/ADG426 are designed on an enhanced LC<sup>2</sup>MOS process that provides low power dissipation yet gives high switching speed and low on resistance. These features make the parts suitable for high speed data acquisition systems and audio signal switching. Low power dissipation makes the parts suitable for battery powered systems. Each channel conducts equally well in both directions when ON and has an input signal range which extends to the supplies. In the OFF condition, signal levels up to the supplies are blocked. All channels exhibit break before make switching action preventing momentary shorting when switching channels. Inherent in the design is low charge injection for minimum transients when switching the digital inputs.

### REV. 0

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### FUNCTIONAL BLOCK DIAGRAMS



### PRODUCT HIGHLIGHTS

1. Extended Signal Range  
The ADG406/ADG407/ADG426 are fabricated on an enhanced LC<sup>2</sup>MOS process giving an increased signal range which extends to the supply rails
2. Low Power Dissipation
3. Low R<sub>ON</sub>
4. Single/Dual Supply Operation
5. Single Supply Operation  
For applications where the analog signal is unipolar, the ADG406/ADG407/ADG426 can be operated from a single rail power supply. The parts are fully specified with a single +12 V power supply and will remain functional with single supplies as low as +5 V.

# ADG406/ADG407/ADG426—SPECIFICATIONS<sup>1</sup>

**DUAL SUPPLY** ( $V_{DD} = +15\text{ V} \pm 10\%$ ,  $V_{SS} = -15\text{ V} \pm 10\%$ ,  $GND = 0\text{ V}$ , unless otherwise noted)

| Parameter                                               | B Version |                                    | T Version |                                    | Units  | Test Conditions/Comments                                           |
|---------------------------------------------------------|-----------|------------------------------------|-----------|------------------------------------|--------|--------------------------------------------------------------------|
|                                                         | +25°C     | –40°C to +85°C                     | +25°C     | –55°C to +125°C                    |        |                                                                    |
| ANALOG SWITCH                                           |           |                                    |           |                                    |        |                                                                    |
| Analog Signal Range                                     |           | V <sub>SS</sub> to V <sub>DD</sub> |           | V <sub>SS</sub> to V <sub>DD</sub> | V      |                                                                    |
| R <sub>ON</sub>                                         | 50        |                                    | 50        |                                    | Ω typ  | V <sub>D</sub> = ±10 V, I <sub>S</sub> = –1 mA                     |
|                                                         | 80        | 125                                | 80        | 125                                | Ω max  | V <sub>DD</sub> = +13.5 V, V <sub>SS</sub> = –13.5 V               |
| R <sub>ON</sub> Match                                   | 4         |                                    | 4         |                                    | Ω typ  | V <sub>D</sub> = 0 V, I <sub>S</sub> = –1 mA                       |
| LEAKAGE CURRENTS                                        |           |                                    |           |                                    |        |                                                                    |
| Source OFF Leakage I <sub>S</sub> (OFF)                 | ±0.5      | ±20                                | ±0.5      | ±50                                | nA max | V <sub>DD</sub> = +16.5 V, V <sub>SS</sub> = –16.5 V               |
| Drain OFF Leakage I <sub>D</sub> (OFF)                  |           |                                    |           |                                    |        | V <sub>D</sub> = ±10 V, V <sub>S</sub> = ∓10 V, Test Circuit 2     |
| ADG406, ADG426                                          | ±1        | ±20                                | ±1        | ±200                               | nA max | V <sub>D</sub> = ±10 V, V <sub>S</sub> = ∓10 V;                    |
| ADG407                                                  | ±1        | ±20                                | ±1        | ±100                               | nA max | Test Circuit 3                                                     |
| Channel ON Leakage I <sub>D</sub> , I <sub>S</sub> (ON) |           |                                    |           |                                    |        | V <sub>S</sub> = V <sub>D</sub> = ±10 V;                           |
| ADG406, ADG426                                          | ±1        | ±20                                | ±1        | ±200                               | nA max | Test Circuit 4                                                     |
| ADG407                                                  | ±1        | ±20                                | ±1        | ±100                               | nA max |                                                                    |
| DIGITAL INPUTS                                          |           |                                    |           |                                    |        |                                                                    |
| Input High Voltage, V <sub>INH</sub>                    |           | 2.4                                |           | 2.4                                | V min  |                                                                    |
| Input Low Voltage, V <sub>INL</sub>                     |           | 0.8                                |           | 0.8                                | V max  |                                                                    |
| Input Current                                           |           |                                    |           |                                    |        |                                                                    |
| I <sub>INL</sub> or I <sub>INH</sub>                    |           | ±1                                 |           | ±1                                 | μA max | V <sub>IN</sub> = 0 or V <sub>DD</sub>                             |
| C <sub>IN</sub> , Digital Input Capacitance             | 8         |                                    | 8         |                                    | pF typ | f = 1 MHz                                                          |
| DYNAMIC CHARACTERISTICS <sup>2</sup>                    |           |                                    |           |                                    |        |                                                                    |
| t <sub>TRANSITION</sub>                                 | 120       |                                    | 120       |                                    | ns typ | R <sub>L</sub> = 300 Ω, C <sub>L</sub> = 35 pF;                    |
|                                                         | 150       | 250                                | 150       | 250                                | ns max | V <sub>1</sub> = ±10 V, V <sub>2</sub> = ∓10 V;                    |
|                                                         |           |                                    |           |                                    |        | Test Circuit 5                                                     |
| Break Before Make Delay, t <sub>OPEN</sub>              | 10        | 10                                 | 10        | 10                                 | ns min | R <sub>L</sub> = 300 Ω, C <sub>L</sub> = 35 pF;                    |
|                                                         |           |                                    |           |                                    |        | V <sub>S</sub> = +5 V, Test Circuit 6                              |
| t <sub>ON</sub> (EN, $\overline{WR}$ )                  | 120       | 175                                | 120       | 175                                | ns typ | R <sub>L</sub> = 300 Ω, C <sub>L</sub> = 35 pF;                    |
|                                                         | 160       | 225                                | 160       | 225                                | ns max | V <sub>S</sub> = +5 V, Test Circuit 7                              |
| t <sub>OFF</sub> (EN, $\overline{RS}$ )                 | 110       | 130                                | 110       | 130                                | ns typ | R <sub>L</sub> = 300 Ω, C <sub>L</sub> = 35 pF;                    |
|                                                         | 150       | 180                                | 150       | 180                                | ns max | V <sub>S</sub> = +5 V, Test Circuit 7                              |
| ADG426 Only                                             |           |                                    |           |                                    |        |                                                                    |
| t <sub>W</sub> , Write Pulse Width                      |           | 100                                |           | 100                                | ns min |                                                                    |
| t <sub>S</sub> , Address, Enable Setup Time             |           | 100                                |           | 100                                | ns min |                                                                    |
| t <sub>H</sub> , Address, Enable Hold Time              |           | 10                                 |           | 10                                 | ns min |                                                                    |
| t <sub>RS</sub> , Reset Pulse Width                     |           | 100                                |           | 100                                | ns min | V <sub>S</sub> = +5 V                                              |
| Charge Injection                                        | 8         |                                    | 8         |                                    | pC typ | V <sub>S</sub> = 0 V, R <sub>S</sub> = 0 Ω, C <sub>L</sub> = 1 nF; |
|                                                         |           |                                    |           |                                    |        | Test Circuit 10                                                    |
| OFF Isolation                                           | –75       |                                    | –75       |                                    | dB typ | R <sub>L</sub> = 1 kΩ, f = 100 kHz;                                |
|                                                         |           |                                    |           |                                    |        | V <sub>EN</sub> = 0 V, Test Circuit 11                             |
| Channel-to-Channel Crosstalk                            | 85        |                                    | 85        |                                    | dB typ | R <sub>L</sub> = 1 kΩ, f = 100 kHz, Test Circuit 12                |
| C <sub>S</sub> (OFF)                                    | 5         |                                    | 5         |                                    | pF typ | f = 1 MHz                                                          |
| C <sub>D</sub> (OFF)                                    |           |                                    |           |                                    |        | f = 1 MHz                                                          |
| ADG406, ADG426                                          | 50        |                                    | 50        |                                    | pF typ |                                                                    |
| ADG407                                                  | 25        |                                    | 25        |                                    | pF typ |                                                                    |
| C <sub>D</sub> , C <sub>S</sub> (ON)                    |           |                                    |           |                                    |        | f = 1 MHz                                                          |
| ADG406, ADG426                                          | 60        |                                    | 60        |                                    | pF typ |                                                                    |
| ADG407                                                  | 40        |                                    | 40        |                                    | pF typ |                                                                    |
| POWER REQUIREMENTS                                      |           |                                    |           |                                    |        |                                                                    |
| I <sub>DD</sub>                                         |           | 1                                  |           | 1                                  | μA typ | V <sub>DD</sub> = +16.5 V, V <sub>SS</sub> = –16.5 V               |
|                                                         |           | 5                                  |           | 5                                  | μA max | V <sub>IN</sub> = 0 V, V <sub>EN</sub> = 0 V                       |
| I <sub>SS</sub>                                         |           | 1                                  |           | 1                                  | μA typ |                                                                    |
|                                                         |           | 5                                  |           | 5                                  | μA max |                                                                    |
| I <sub>DD</sub>                                         | 100       |                                    | 100       |                                    | μA typ | V <sub>IN</sub> = 0 V, V <sub>EN</sub> = 2.4 V                     |
|                                                         | 200       | 500                                | 200       | 500                                | μA max |                                                                    |
| I <sub>SS</sub>                                         |           | 1                                  |           | 1                                  | μA typ |                                                                    |
|                                                         |           | 5                                  |           | 5                                  | μA max |                                                                    |

## NOTES

<sup>1</sup> Temperature ranges are as follows: B Versions: –40°C to +85°C; T Versions: –55°C to +125°C.

<sup>2</sup> Guaranteed by design, not subject to production test.

Specifications subject to change without notice.

**SINGLE SUPPLY** ( $V_{DD} = +12\text{ V} \pm 10\%$ ,  $V_{SS} = 0\text{ V}$ ,  $GND = 0\text{ V}$ , unless otherwise noted)

| Parameter                                               | B Version  |                      | T Version  |                      | Units            | Test Conditions/Comments                                                                                                 |
|---------------------------------------------------------|------------|----------------------|------------|----------------------|------------------|--------------------------------------------------------------------------------------------------------------------------|
|                                                         | +25°C      | −40°C to +85°C       | +25°C      | −55°C to +125°C      |                  |                                                                                                                          |
| ANALOG SWITCH                                           |            |                      |            |                      |                  |                                                                                                                          |
| Analog Signal Range                                     |            | 0 to V <sub>DD</sub> |            | 0 to V <sub>DD</sub> | V                |                                                                                                                          |
| R <sub>ON</sub>                                         | 90<br>125  | 200                  | 90<br>125  | 200                  | Ω typ<br>Ω max   | V <sub>D</sub> = +3 V, +8.5 V, I <sub>S</sub> = −1 mA;<br>V <sub>DD</sub> = +10.8 V                                      |
| LEAKAGE CURRENTS                                        |            |                      |            |                      |                  |                                                                                                                          |
| Source OFF Leakage I <sub>S</sub> (OFF)                 | ±0.5       | ±20                  | ±0.5       | ±50                  | nA max           | V <sub>DD</sub> = +13.2 V<br>V <sub>D</sub> = 8 V/0.1 V, V <sub>S</sub> = 0.1 V/8 V;<br>Test Circuit 2                   |
| Drain OFF Leakage I <sub>D</sub> (OFF)                  |            |                      |            |                      |                  | V <sub>D</sub> = 8 V/0.1 V, V <sub>S</sub> = 0.1 V/8 V;<br>Test Circuit 3                                                |
| ADG406, ADG426                                          | ±1         | ±20                  | ±1         | ±200                 | nA max           |                                                                                                                          |
| ADG407                                                  | ±1         | ±20                  | ±1         | ±100                 | nA max           |                                                                                                                          |
| Channel ON Leakage I <sub>D</sub> , I <sub>S</sub> (ON) |            |                      |            |                      |                  | V <sub>S</sub> = V <sub>D</sub> = 8 V/0.1 V, Test Circuit 4                                                              |
| ADG406, ADG426                                          | ±1         | ±20                  | ±1         | ±200                 | nA max           |                                                                                                                          |
| ADG407                                                  | ±1         | ±20                  | ±1         | ±100                 | nA max           |                                                                                                                          |
| DIGITAL INPUTS                                          |            |                      |            |                      |                  |                                                                                                                          |
| Input High Voltage, V <sub>INH</sub>                    |            | 2.4                  |            | 2.4                  | V min            |                                                                                                                          |
| Input Low Voltage, V <sub>INL</sub>                     |            | 0.8                  |            | 0.8                  | V max            |                                                                                                                          |
| Input Current                                           |            |                      |            |                      |                  |                                                                                                                          |
| I <sub>INL</sub> or I <sub>INH</sub>                    |            | ±1                   |            | ±1                   | μA max           | V <sub>IN</sub> = 0 or V <sub>DD</sub>                                                                                   |
| C <sub>IN</sub> , Digital Input Capacitance             | 8          |                      | 8          |                      | pF typ           | f = 1 MHz                                                                                                                |
| DYNAMIC CHARACTERISTICS <sup>2</sup>                    |            |                      |            |                      |                  |                                                                                                                          |
| t <sub>TRANSITION</sub>                                 | 180<br>220 | 350                  | 180<br>220 | 350                  | ns typ<br>ns max | R <sub>L</sub> = 300 Ω, C <sub>L</sub> = 35 pF;<br>V <sub>1</sub> = 8 V/0 V, V <sub>2</sub> = 0 V/8 V;<br>Test Circuit 5 |
| Break Before Make Delay, t <sub>OPEN</sub>              | 10         |                      | 10         |                      | ns typ           | R <sub>L</sub> = 300 Ω, C <sub>L</sub> = 35 pF;<br>V <sub>S</sub> = +5 V, Test Circuit 6                                 |
| t <sub>ON</sub> (EN, $\overline{WR}$ )                  | 180<br>240 | 350                  | 180<br>240 | 350                  | ns typ<br>ns max | R <sub>L</sub> = 300 Ω, C <sub>L</sub> = 35 pF;<br>V <sub>S</sub> = +5 V, Test Circuit 7                                 |
| t <sub>OFF</sub> (EN, $\overline{RS}$ )                 | 135<br>180 | 220                  | 135<br>180 | 220                  | ns typ<br>ns max | R <sub>L</sub> = 300 Ω, C <sub>L</sub> = 35 pF;<br>V <sub>S</sub> = +5 V, Test Circuit 7                                 |
| ADG426 Only                                             |            |                      |            |                      |                  |                                                                                                                          |
| t <sub>W</sub> , Write Pulse Width                      |            | 100                  |            | 100                  | ns min           | V <sub>S</sub> = +5 V                                                                                                    |
| t <sub>S</sub> , Address, Enable Setup Time             |            | 100                  |            | 100                  | ns min           | V <sub>S</sub> = 6 V, R <sub>S</sub> = 0 Ω, C <sub>L</sub> = 1 nF;<br>Test Circuit 10                                    |
| t <sub>H</sub> , Address, Enable Hold Time              |            | 10                   |            | 10                   | ns min           | R <sub>L</sub> = 1 kΩ, f = 100 kHz;<br>Test Circuit 11                                                                   |
| t <sub>RS</sub> , Reset Pulse Width                     |            | 100                  |            | 100                  | ns min           | R <sub>L</sub> = 1 kΩ, f = 100 kHz;<br>Test Circuit 12                                                                   |
| Charge Injection                                        | 5          |                      | 5          |                      | pC typ           | f = 1 MHz                                                                                                                |
| OFF Isolation                                           | −75        |                      | −75        |                      | dB typ           | f = 1 MHz                                                                                                                |
| Channel-to-Channel Crosstalk                            | 85         |                      | 85         |                      | dB typ           |                                                                                                                          |
| C <sub>S</sub> (OFF)                                    | 8          |                      | 8          |                      | pF typ           |                                                                                                                          |
| C <sub>D</sub> (OFF)                                    |            |                      |            |                      |                  |                                                                                                                          |
| ADG406, ADG426                                          | 80         |                      | 80         |                      | pF typ           |                                                                                                                          |
| ADG407                                                  | 40         |                      | 40         |                      | pF typ           |                                                                                                                          |
| C <sub>D</sub> , C <sub>S</sub> (ON)                    |            |                      |            |                      |                  | f = 1 MHz                                                                                                                |
| ADG406, ADG426                                          | 100        |                      | 100        |                      | pF typ           |                                                                                                                          |
| ADG407                                                  | 50         |                      | 50         |                      | pF typ           |                                                                                                                          |
| POWER REQUIREMENTS                                      |            |                      |            |                      |                  |                                                                                                                          |
| I <sub>DD</sub>                                         |            | 1<br>5               |            | 1<br>5               | μA typ<br>μA max | V <sub>DD</sub> = +13.2 V<br>V <sub>IN</sub> = 0 V, V <sub>EN</sub> = 0 V                                                |
| I <sub>DD</sub>                                         | 100<br>200 | 500                  | 100<br>200 | 500                  | μA typ<br>μA max | V <sub>IN</sub> = 0 V, V <sub>EN</sub> = 2.4 V                                                                           |

**NOTES**<sup>1</sup>Temperature ranges are as follows: B Versions: –40°C to +85°C; T Versions: –55°C to +125°C.<sup>2</sup>Guaranteed by design, not subject to production test.

Specifications subject to change without notice.

# ADG406/ADG407/ADG426

## ABSOLUTE MAXIMUM RATINGS<sup>1</sup>

(T<sub>A</sub> = +25°C unless otherwise noted)

|                                      |                                                                                    |
|--------------------------------------|------------------------------------------------------------------------------------|
| V <sub>DD</sub> to V <sub>SS</sub>   | +44 V                                                                              |
| V <sub>DD</sub> to GND               | −0.3 V to +25 V                                                                    |
| V <sub>SS</sub> to GND               | +0.3 V to −25 V                                                                    |
| Analog, Digital Inputs <sup>2</sup>  | V <sub>SS</sub> − 2 V to V <sub>DD</sub> + 2 V<br>or 20 mA, Whichever Occurs First |
| Continuous Current, S or D           | 20 mA                                                                              |
| Peak Current, S or D                 | 40 mA<br>(Pulsed at 1 ms, 10% Duty Cycle Max)                                      |
| Operating Temperature Range          |                                                                                    |
| Industrial (B Version)               | −40°C to +85°C                                                                     |
| Extended (T Version)                 | −55°C to +125°C                                                                    |
| Storage Temperature Range            | −65°C to +150°C                                                                    |
| Junction Temperature                 | +150°C                                                                             |
| Plastic Package                      |                                                                                    |
| θ <sub>JA</sub> , Thermal Impedance  | 75°C/W                                                                             |
| Lead Temperature, Soldering (10 sec) | +260°C                                                                             |
| PLCC Package                         |                                                                                    |
| θ <sub>JA</sub> , Thermal Impedance  | 80°C/W                                                                             |
| Lead Temperature, Soldering          |                                                                                    |
| Vapor Phase (60 sec)                 | +215°C                                                                             |
| Infrared (15 sec)                    | +220°C                                                                             |
| SSOP Package                         |                                                                                    |
| θ <sub>JA</sub> , Thermal Impedance  | 122°C/W                                                                            |
| Lead Temperature, Soldering          |                                                                                    |
| Vapor Phase (60 sec)                 | +215°C                                                                             |
| Infrared (15 sec)                    | +220°C                                                                             |

## NOTES

<sup>1</sup>Stresses above those listed under “Absolute Maximum Ratings” may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or any other conditions above those listed in the operational sections of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability. Only one absolute maximum rating may be applied at any one time.

<sup>2</sup>Overvoltages at A, S, D,  $\overline{WR}$  or  $\overline{RS}$  will be clamped by internal diodes. Current should be limited to the maximum ratings given.

## CAUTION

ESD (electrostatic discharge) sensitive device. Electrostatic charges as high as 4000 V readily accumulate on the human body and test equipment and can discharge without detection. Although these devices feature proprietary ESD protection circuitry, permanent damage may occur on devices subjected to high energy electrostatic discharges. Therefore, proper ESD precautions are recommended to avoid performance degradation or loss of functionality.

## ORDERING GUIDE

| Model     | Temperature Range | Package Option* |
|-----------|-------------------|-----------------|
| ADG406BN  | −40°C to +85°C    | N-28            |
| ADG406BP  | −40°C to +85°C    | P-28A           |
| ADG407BN  | −40°C to +85°C    | N-28            |
| ADG407BP  | −40°C to +85°C    | P-28A           |
| ADG426BN  | −40°C to +85°C    | N-28            |
| ADG426BRS | −40°C to +85°C    | RS-28           |

\*N = Plastic DIP, P = Plastic Leaded Chip Carrier (PLCC), RS = Shrink Small Outline Package (SSOP).



# ADG406/ADG407/ADG426

Table I. Truth Table (ADG406)

| A3 | A2 | A1 | A0 | EN | ON SWITCH |
|----|----|----|----|----|-----------|
| X  | X  | X  | X  | 0  | NONE      |
| 0  | 0  | 0  | 0  | 1  | 1         |
| 0  | 0  | 0  | 1  | 1  | 2         |
| 0  | 0  | 1  | 0  | 1  | 3         |
| 0  | 0  | 1  | 1  | 1  | 4         |
| 0  | 1  | 0  | 0  | 1  | 5         |
| 0  | 1  | 0  | 1  | 1  | 6         |
| 0  | 1  | 1  | 0  | 1  | 7         |
| 0  | 1  | 1  | 1  | 1  | 8         |
| 1  | 0  | 0  | 0  | 1  | 9         |
| 1  | 0  | 0  | 1  | 1  | 10        |
| 1  | 0  | 1  | 0  | 1  | 11        |
| 1  | 0  | 1  | 1  | 1  | 12        |
| 1  | 1  | 0  | 0  | 1  | 13        |
| 1  | 1  | 0  | 1  | 1  | 14        |
| 1  | 1  | 1  | 0  | 1  | 15        |
| 1  | 1  | 1  | 1  | 1  | 16        |

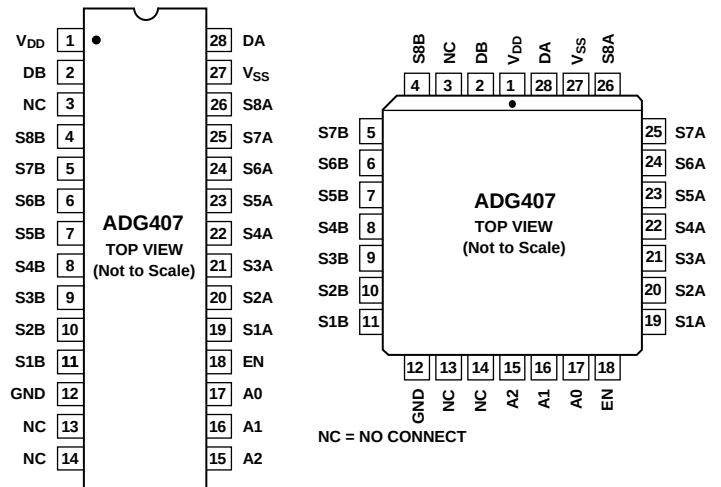
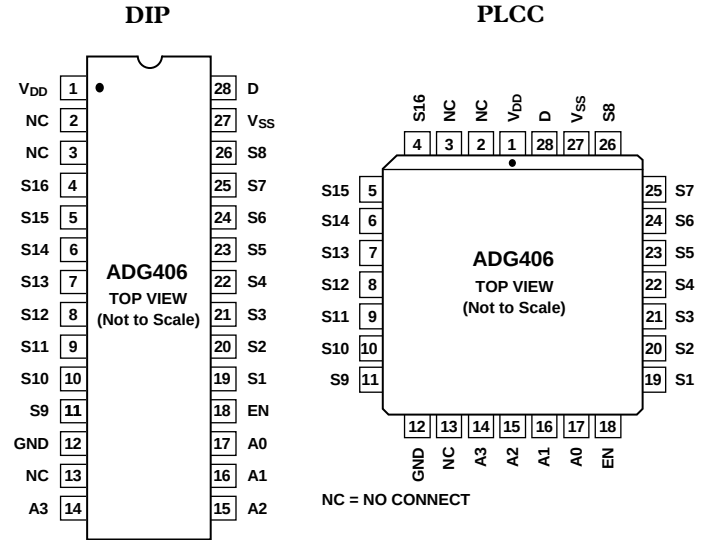
Table II. Truth Table (ADG407)

| A2 | A1 | A0 | EN | ON SWITCH PAIR |
|----|----|----|----|----------------|
| X  | X  | X  | 0  | NONE           |
| 0  | 0  | 0  | 1  | 1              |
| 0  | 0  | 1  | 1  | 2              |
| 0  | 1  | 0  | 1  | 3              |
| 0  | 1  | 1  | 1  | 4              |
| 1  | 0  | 0  | 1  | 5              |
| 1  | 0  | 1  | 1  | 6              |
| 1  | 1  | 0  | 1  | 7              |
| 1  | 1  | 1  | 1  | 8              |

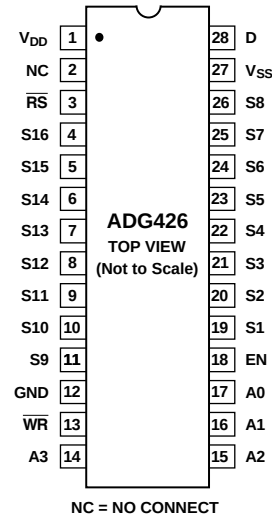
Table III. Truth Table (ADG426)

| A3 | A2 | A1 | A0 | EN | WR        | RS | ON SWITCH                                 |
|----|----|----|----|----|-----------|----|-------------------------------------------|
| X  | X  | X  | X  | X  | $\bar{1}$ | 1  | Retains Previous Switch Condition         |
| X  | X  | X  | X  | X  | X         | 0  | NONE (Address and Enable Latches Cleared) |
| X  | X  | X  | X  | 0  | 0         | 1  | NONE                                      |
| 0  | 0  | 0  | 0  | 1  | 0         | 1  | 1                                         |
| 0  | 0  | 0  | 1  | 1  | 0         | 1  | 2                                         |
| 0  | 0  | 1  | 0  | 1  | 0         | 1  | 3                                         |
| 0  | 0  | 1  | 1  | 1  | 0         | 1  | 4                                         |
| 0  | 1  | 0  | 0  | 1  | 0         | 1  | 5                                         |
| 0  | 1  | 0  | 1  | 1  | 0         | 1  | 6                                         |
| 0  | 1  | 1  | 0  | 1  | 0         | 1  | 7                                         |
| 0  | 1  | 1  | 1  | 1  | 0         | 1  | 8                                         |
| 1  | 0  | 0  | 0  | 1  | 0         | 1  | 9                                         |
| 1  | 0  | 0  | 1  | 1  | 0         | 1  | 10                                        |
| 1  | 0  | 1  | 0  | 1  | 0         | 1  | 11                                        |
| 1  | 0  | 1  | 1  | 1  | 0         | 1  | 12                                        |
| 1  | 1  | 0  | 0  | 1  | 0         | 1  | 13                                        |
| 1  | 1  | 0  | 1  | 1  | 0         | 1  | 14                                        |
| 1  | 1  | 1  | 0  | 1  | 0         | 1  | 15                                        |
| 1  | 1  | 1  | 1  | 1  | 0         | 1  | 16                                        |

## PIN CONFIGURATIONS



## PIN CONFIGURATION DIP/SSOP



# ADG406/ADG407/ADG426

## TIMING DIAGRAMS (ADG426)

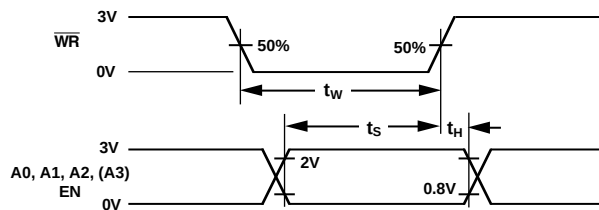


Figure 1.

Figure 1 shows the timing sequence for latching the switch address and enable inputs. The latches are level sensitive; therefore, while  $\overline{WR}$  is held low, the latches are transparent and the switches respond to the address and enable inputs. This input data is latched on the rising edge of  $\overline{WR}$ .

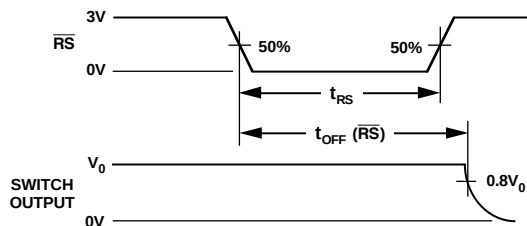


Figure 2.

Figure 2 shows the Reset Pulse Width,  $t_{RS}$ , and the Reset Turn Off Time,  $t_{OFF}(\overline{RS})$ .

Note: All digital input signals rise and fall times are measured from 10% to 90% of 3 V.  $t_R = t_F = 20$  ns.

## TERMINOLOGY

|                         |                                                                                                                                                 |
|-------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|
| $V_{DD}$                | Most positive power supply potential.                                                                                                           |
| $V_{SS}$                | Most negative power supply potential in dual supplies. In single supply applications, it may be connected to ground.                            |
| GND                     | Ground (0 V) reference.                                                                                                                         |
| $R_{ON}$                | Ohmic resistance between D and S.                                                                                                               |
| $R_{ON\ Match}$         | Difference between the $R_{ON}$ of any two channels.                                                                                            |
| $I_S$ (OFF)             | Source leakage current when the switch is off.                                                                                                  |
| $I_D$ (OFF)             | Drain leakage current when the switch is off.                                                                                                   |
| $I_D, I_S$ (ON)         | Channel leakage current when the switch is on.                                                                                                  |
| $V_D$ ( $V_S$ )         | Analog voltage on terminals D, S.                                                                                                               |
| $C_S$ (OFF)             | Channel input capacitance for "OFF" condition.                                                                                                  |
| $C_D$ (OFF)             | Channel output capacitance for "OFF" condition.                                                                                                 |
| $C_D, C_S$ (ON)         | "ON" switch capacitance.                                                                                                                        |
| $C_{IN}$                | Digital input capacitance.                                                                                                                      |
| $t_{ON}$ (EN)           | Delay time between the 50% and 90% points of the digital input and switch "ON" condition.                                                       |
| $t_{OFF}$ (EN)          | Delay time between the 50% and 90% points of the digital input and switch "OFF" condition.                                                      |
| $t_{TRANSITION}$        | Delay time between the 50% and 90% points of the digital inputs and the switch "ON" condition when switching from one address state to another. |
| $t_{OPEN}$              | "OFF" time measured between 80% points of both switches when switching from one address state to another.                                       |
| $V_{INL}$               | Maximum input voltage for logic "0."                                                                                                            |
| $V_{INH}$               | Minimum input voltage for logic "1."                                                                                                            |
| $I_{INL}$ ( $I_{INH}$ ) | Input current of the digital input.                                                                                                             |
| Crosstalk               | A measure of unwanted signal which is coupled through from one channel to another as a result of parasitic capacitance.                         |
| Off Isolation           | A measure of unwanted signal coupling through an "OFF" channel.                                                                                 |
| Charge Injection        | A measure of the glitch impulse transferred from the digital input to the analog output during switching.                                       |
| $I_{DD}$                | Positive supply current.                                                                                                                        |
| $I_{SS}$                | Negative supply current.                                                                                                                        |

## Typical Performance Graphs

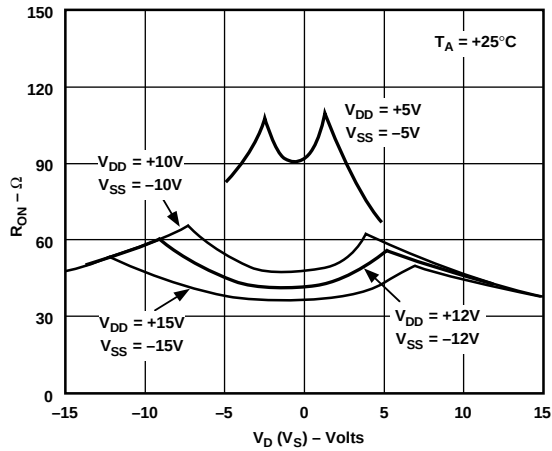


Figure 3.  $R_{ON}$  as a Function of  $V_D$  ( $V_S$ ): Dual Supplies

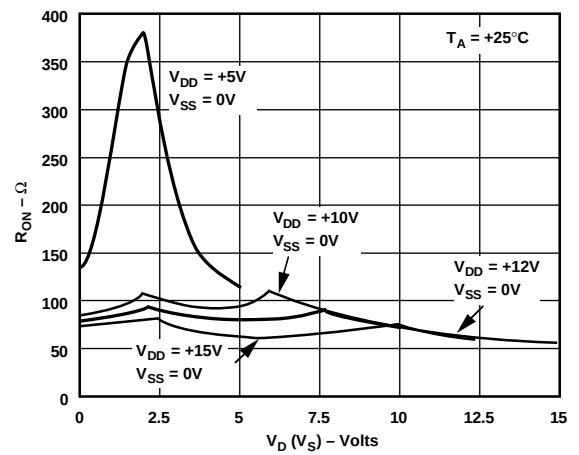


Figure 6.  $R_{ON}$  as a Function of  $V_D$  ( $V_S$ ): Single Supplies

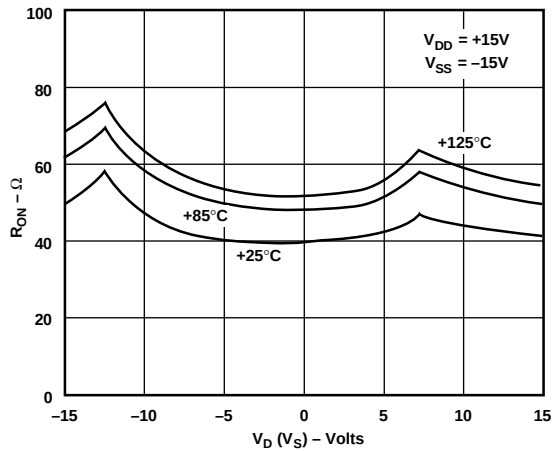


Figure 4.  $R_{ON}$  as a Function of  $V_D$  ( $V_S$ ) for Different Temperatures

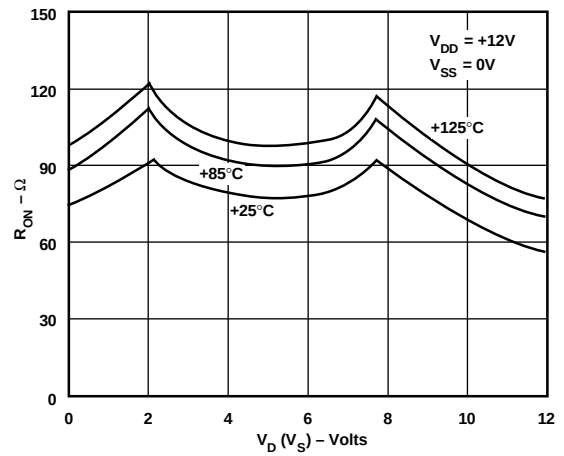


Figure 7.  $R_{ON}$  as a Function of  $V_D$  ( $V_S$ ) for Different Temperatures

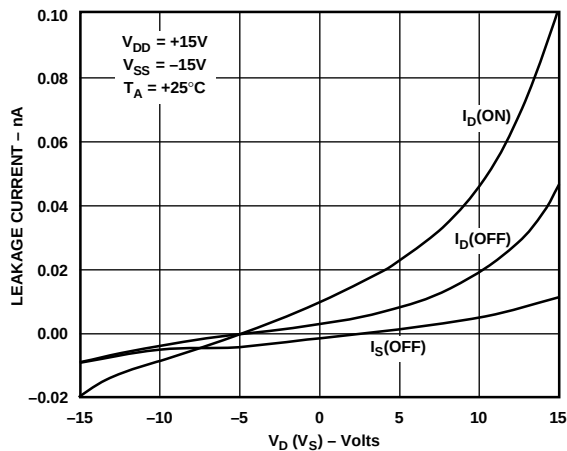


Figure 5. Leakage Currents as a Function of  $V_D$  ( $V_S$ )

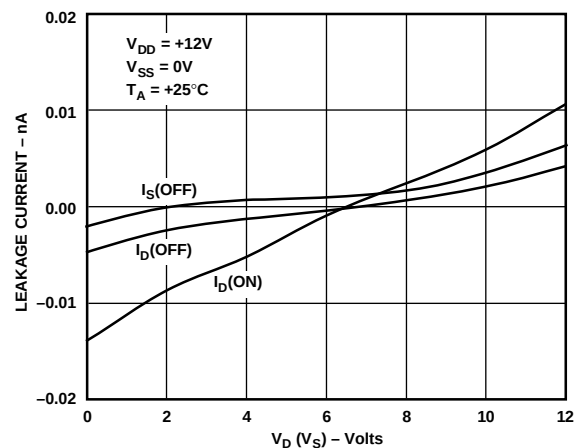


Figure 8. Leakage Currents as a Function of  $V_D$  ( $V_S$ )

# ADG406/ADG407/ADG426

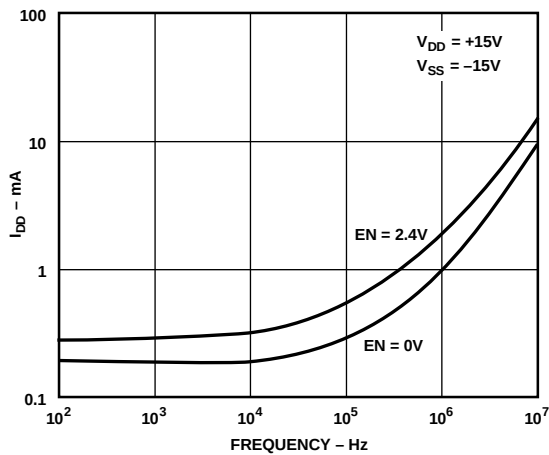


Figure 9. Positive Supply Current vs. Switching Frequency

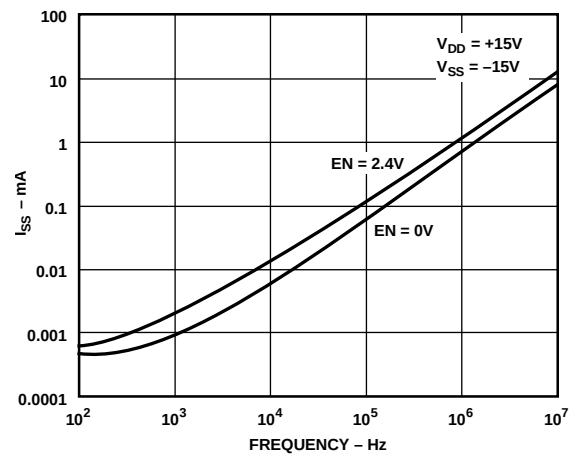


Figure 12. Negative Supply Current vs. Switching Frequency

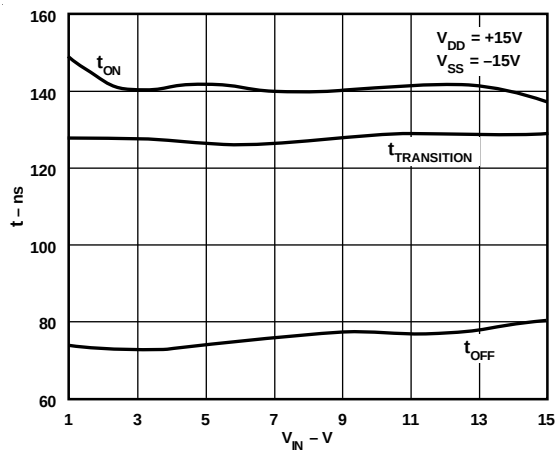


Figure 10. Switching Time vs.  $V_{IN}$  (Bipolar Supply)

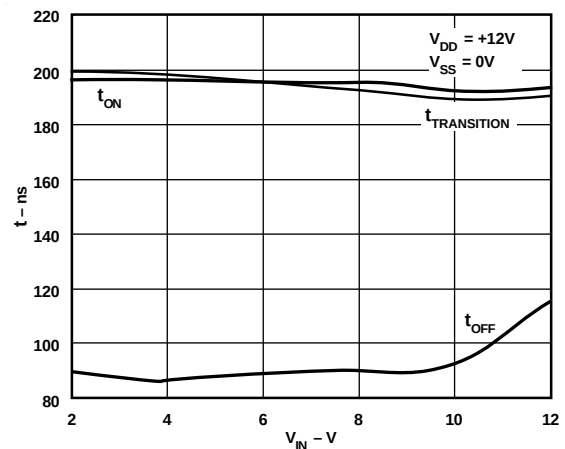


Figure 13. Switching Time vs.  $V_{IN}$  (Single Supply)

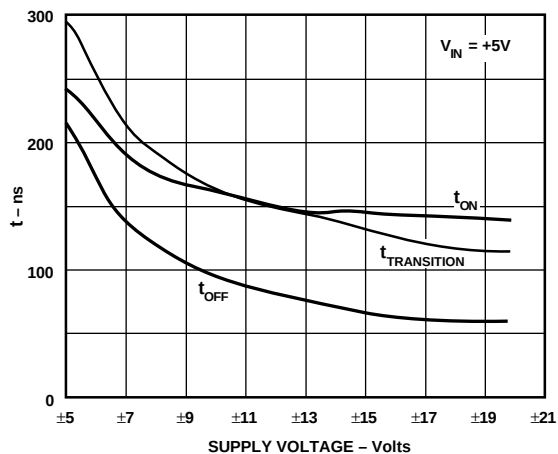


Figure 11. Switching Time vs. Bipolar Supply

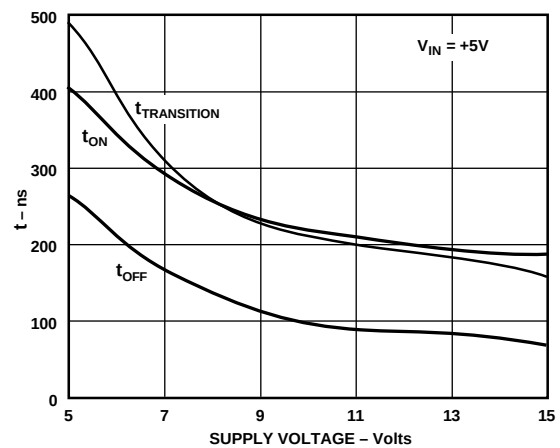


Figure 14. Switching Time vs. Single Supply



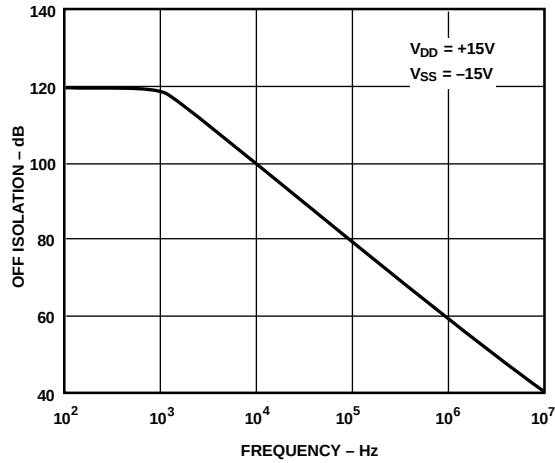


Figure 15. OFF Isolation vs. Frequency

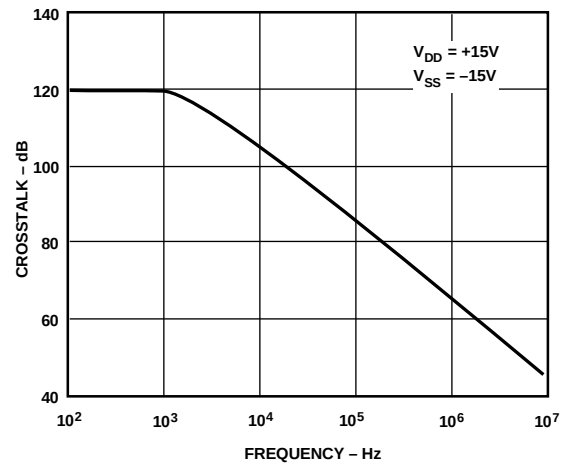
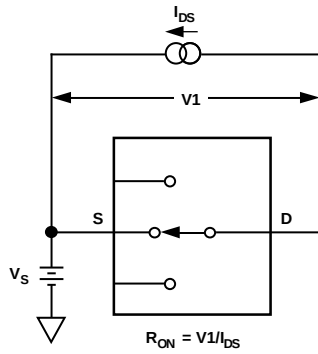
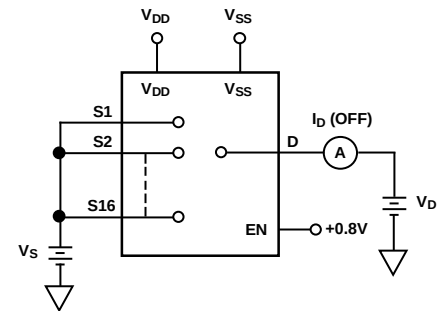


Figure 16. Crosstalk vs. Frequency

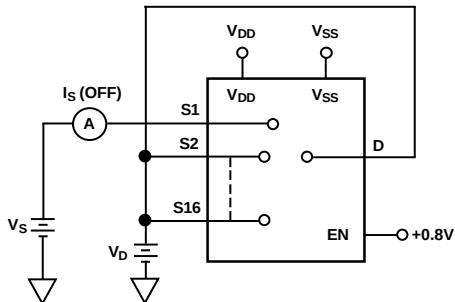
## Test Circuits



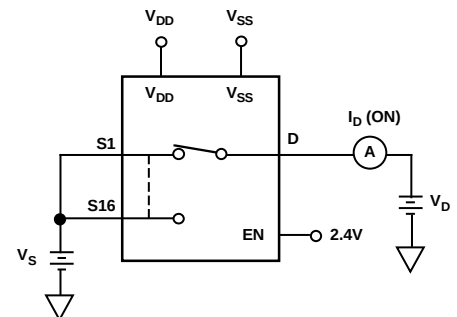
Test Circuit 1. On Resistance



Test Circuit 3.  $I_D$  (OFF)

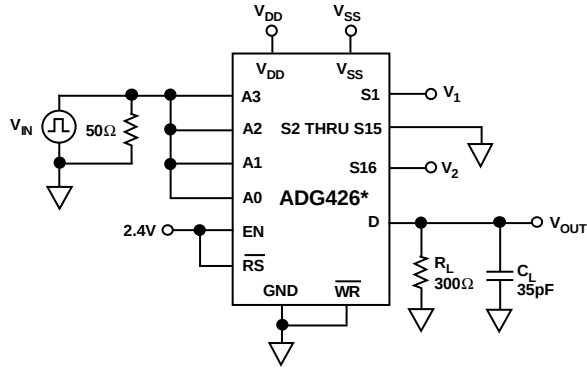


Test Circuit 2.  $I_S$  (OFF)

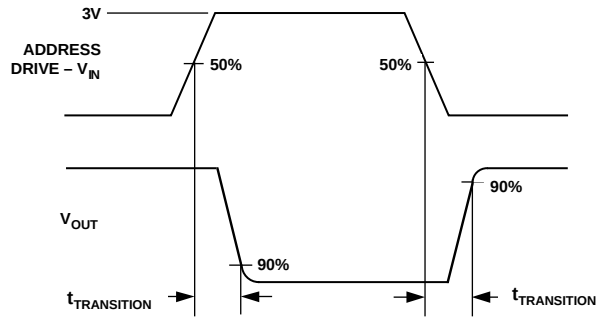


Test Circuit 4.  $I_D$  (ON)

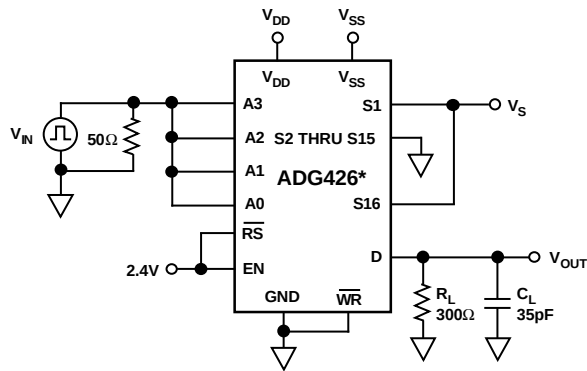
# ADG406/ADG407/ADG426



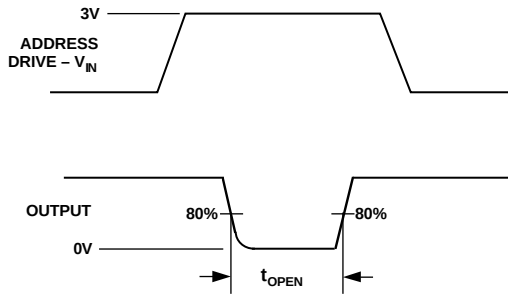
\*SIMILAR CONNECTION FOR ADG406/ADG407



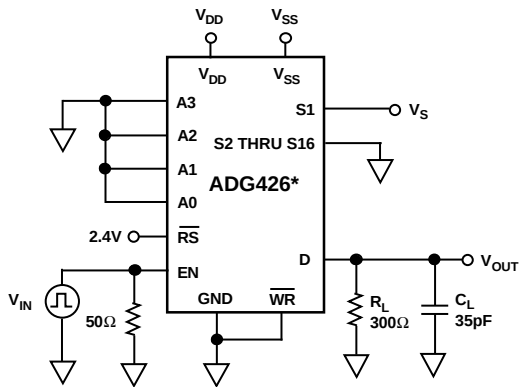
Test Circuit 5. Switching Time of Multiplexer,  $t_{\text{TRANSITION}}$



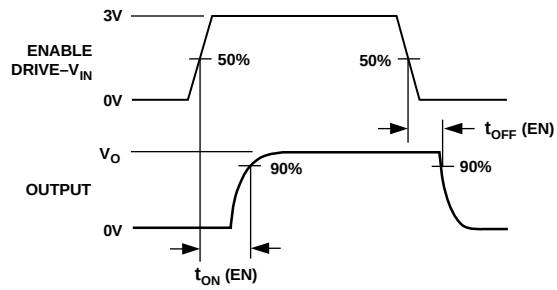
\*SIMILAR CONNECTION FOR ADG406/ADG407



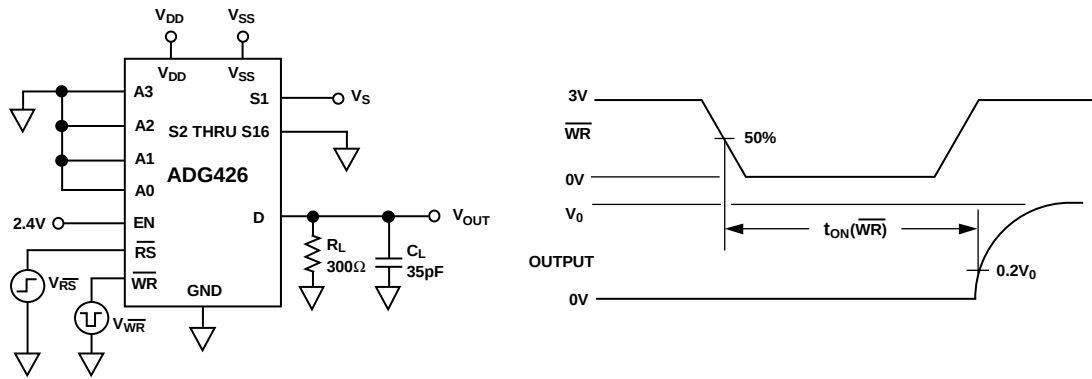
Test Circuit 6. Break-Before-Make Delay,  $t_{\text{OPEN}}$



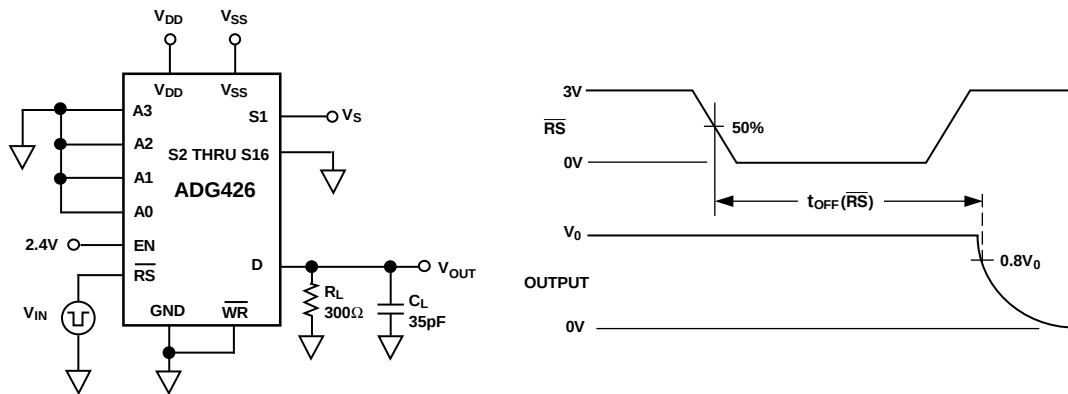
\*SIMILAR CONNECTION FOR ADG406/ADG407



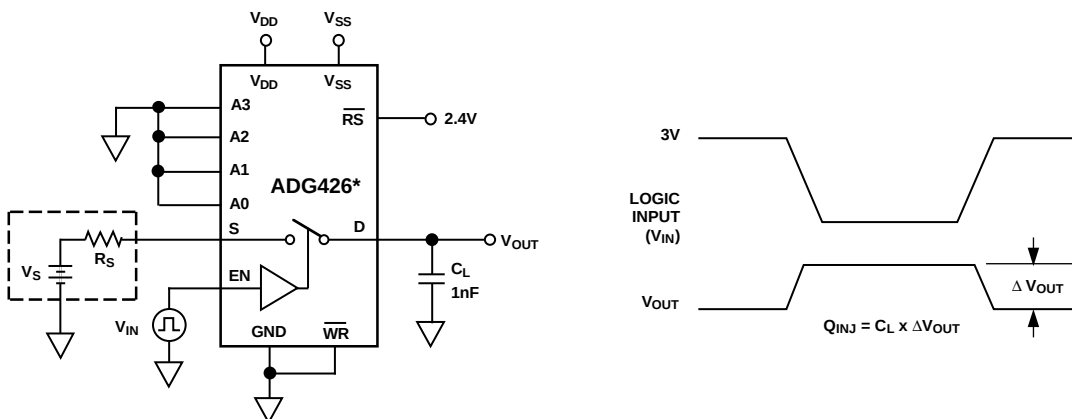
Test Circuit 7. Enable Delay,  $t_{\text{ON}}(\text{EN})$ ,  $t_{\text{OFF}}(\text{EN})$



Test Circuit 8. Write Turn-On Time,  $t_{ON}(\overline{WR})$



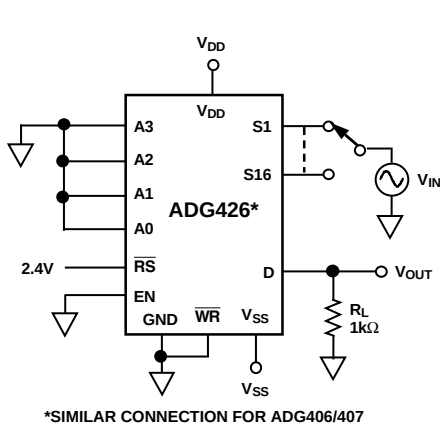
Test Circuit 9. Reset Turn-Off Time,  $t_{OFF}(\overline{RS})$



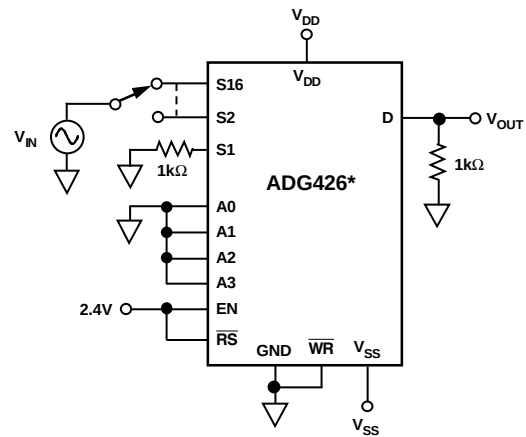
\*SIMILAR CONNECTION FOR ADG406/ADG407

Test Circuit 10. Charge Injection

# ADG406/ADG407/ADG426



Test Circuit 11. OFF Isolation

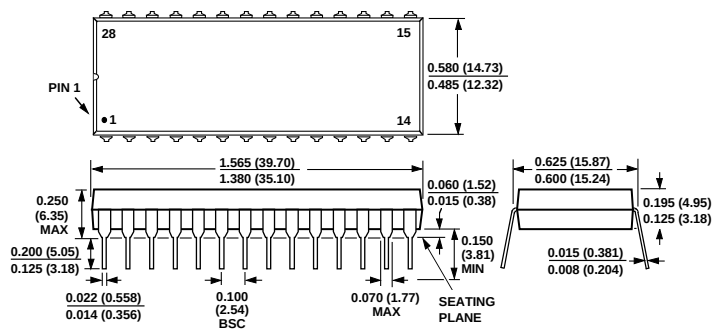


Test Circuit 12. Crosstalk

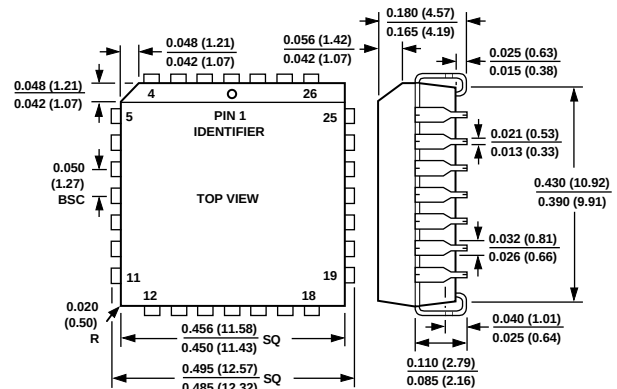
## OUTLINE DIMENSIONS

Dimensions shown in inches and (mm).

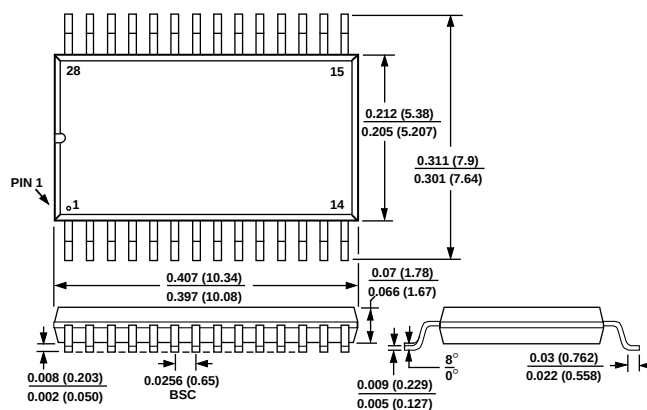
### 28-Pin Plastic (N-28)



### 28-Pin PLCC (P-28A)



### 28-Pin SSOP (RS-28)



1. LEAD NO. 1 IDENTIFIED BY A DOT.
2. LEADS WILL BE EITHER TIN PLATED OR SOLDER DIPPED IN ACCORDANCE WITH MIL-M-38510 REQUIREMENTS