



## Precision, CMOS Analog Switches

### General Description

The MAX317/MAX318/MAX319 are precision, CMOS, monolithic analog switches. The single-pole single-throw (SPST) MAX317 is normally closed (NC), the SPST MAX318 is normally open (NO), and the single-pole double-throw (SPDT) MAX319 has one normally open and one normally closed switch. All three parts offer low on resistance (less than  $35\Omega$ ), guaranteed to match within  $2\Omega$  between channels and to remain flat over the analog signal range ( $\Delta 3\Omega$  max). They also offer low leakage (less than  $250\text{pA}$  at  $+25^\circ\text{C}$  and less than  $6\text{nA}$  at  $+85^\circ\text{C}$ ) and fast switching (turn-on time less than  $175\text{ns}$  and turn-off time less than  $145\text{ns}$ ).

The MAX317/MAX318/MAX319 are fabricated with Maxim's new improved silicon-gate process. Design improvements guarantee extremely low charge injection ( $10\text{pC}$ ), low power consumption ( $35\mu\text{W}$ ), and electrostatic discharge (ESD) greater than  $\pm 2000\text{V}$ . The  $44\text{V}$  maximum breakdown voltage allows rail-to-rail analog signal handling capability.

### Applications

Sample-and-Hold Circuits  
Guidance and Control Systems  
Heads-Up Displays  
Test Equipment  
Military Radios  
Communications Systems  
Battery-Powered Systems  
PBX, PABX

### Features

- ♦ Low On Resistance  $< 20\Omega$  Typical ( $35\Omega$  Max)
- ♦ Guaranteed Matched On Resistance Between Channels  $< 2\Omega$
- ♦ Guaranteed Flat On Resistance over Analog Signal Range  $\Delta 3\Omega$  Max
- ♦ Guaranteed Charge Injection  $< 10\text{pC}$
- ♦ Guaranteed Off-Channel Leakage  $< 6\text{nA}$  at  $+85^\circ\text{C}$
- ♦ ESD Guaranteed  $> 2000\text{V}$  per Method 3015.7
- ♦ Single-Supply Operation ( $+10\text{V}$  to  $+30\text{V}$ )  
Bipolar-Supply Operation ( $\pm 4.5\text{V}$  to  $\pm 20\text{V}$ )
- ♦ TTL-/CMOS-Logic Compatible
- ♦ Rail-to-Rail Analog Signal Handling Capability

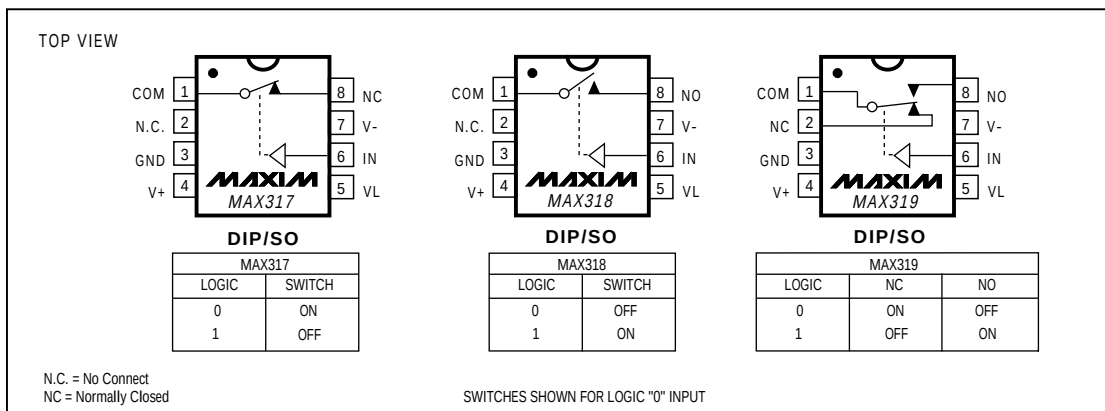
### Ordering Information

| PART      | TEMP. RANGE                                 | PIN-PACKAGE   |
|-----------|---------------------------------------------|---------------|
| MAX317CPA | $0^\circ\text{C}$ to $+70^\circ\text{C}$    | 8 Plastic DIP |
| MAX317CSA | $0^\circ\text{C}$ to $+70^\circ\text{C}$    | 8 SO          |
| MAX317CJA | $0^\circ\text{C}$ to $+70^\circ\text{C}$    | 8 Cerdip      |
| MAX317C/D | $0^\circ\text{C}$ to $+70^\circ\text{C}$    | Dice*         |
| MAX317EPA | $-40^\circ\text{C}$ to $+85^\circ\text{C}$  | 8 Plastic DIP |
| MAX317ESA | $-40^\circ\text{C}$ to $+85^\circ\text{C}$  | 8 SO          |
| MAX317EJA | $-40^\circ\text{C}$ to $+85^\circ\text{C}$  | 8 Cerdip      |
| MAX317MJA | $-55^\circ\text{C}$ to $+125^\circ\text{C}$ | 8 Cerdip      |

Ordering Information continued on last page.

\* Contact factory for dice specifications.

### Pin Configurations/Functional Diagrams/Truth Tables



Maxim Integrated Products 1

Call toll free 1-800-998-8800 for free samples or literature.

MAX317/MAX318/MAX319

## Precision, CMOS Analog Switches

### ABSOLUTE MAXIMUM RATINGS

Voltage Referenced to V-

|                                                                  |                                                                |
|------------------------------------------------------------------|----------------------------------------------------------------|
| V+                                                               | .....+44V                                                      |
| GND                                                              | .....+25V                                                      |
| V <sub>L</sub>                                                   | .....(GND - 0.3V) to (V+ + 0.3V)                               |
| I <sub>N</sub> , COM, NC, NO                                     | .....(V- - 2V) to (V+ + 2V) or 30mA,<br>whichever occurs first |
| Continuous Current (any terminal)                                | .....30mA                                                      |
| Peak Current, NC, NO, COM<br>(pulsed at 1ms, 10% duty cycle max) | .....100mA                                                     |
| ESD                                                              | .....±2000V                                                    |

Continuous Power Dissipation (T<sub>A</sub> = +70°C) (Note 1)

|                                            |                      |
|--------------------------------------------|----------------------|
| Plastic DIP (derate 9.09mW/°C above +70°C) | .....727mW           |
| SO (derate 5.88mW/°C above +70°C)          | .....471mW           |
| CERDIP (derate 8.00mW/°C above +70°C)      | .....640mW           |
| Operating Temperature Ranges:              |                      |
| MAX31_C_                                   | .....0°C to +70°C    |
| MAX31_E_                                   | .....-40°C to +85°C  |
| MAX31_MJA                                  | .....-55°C to +125°C |
| Storage Temperature Range                  | .....-55°C to +150°C |
| Lead Temperature (soldering, 10sec)        | .....+300°C          |

**Note 1:** All leads are soldered or welded to PC board.

Stresses beyond those listed under "Absolute Maximum Ratings" 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 operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

### ELECTRICAL CHARACTERISTICS — Dual Supplies

(V+ = 15V, V- = -15V, V<sub>L</sub> = 5V, GND = 0V, V<sub>INL</sub> = 0.8V, V<sub>INH</sub> = 2.4V, T<sub>A</sub> = T<sub>MIN</sub> to T<sub>MAX</sub>, unless otherwise noted.)

| PARAMETER                                        | SYMBOL                                                  | CONDITIONS                                                                                               |                   | TEMP.                                                 | MIN   | TYP<br>(Note 2) | MAX | UNITS |
|--------------------------------------------------|---------------------------------------------------------|----------------------------------------------------------------------------------------------------------|-------------------|-------------------------------------------------------|-------|-----------------|-----|-------|
| Analog-Signal Range                              | V <sub>COM</sub> ,<br>V <sub>NO</sub> , V <sub>NC</sub> | (Note 3)                                                                                                 |                   |                                                       | -15   |                 | 15  | V     |
| On Resistance                                    | R <sub>ON</sub>                                         | V <sub>COM</sub> = ±12.5V,<br>I <sub>(NC OR NO)</sub> = -10mA,<br>V+ = 13.5V, V- = -13.5V                |                   | T <sub>A</sub> = +25°C                                | C, E  |                 | 20  | 35    |
|                                                  |                                                         |                                                                                                          |                   |                                                       | M     |                 |     | 30    |
|                                                  |                                                         |                                                                                                          |                   | T <sub>A</sub> = T <sub>MIN</sub> to T <sub>MAX</sub> |       |                 |     | 45    |
| On Resistance Match<br>Between Channels (Note 4) | R <sub>ON</sub>                                         | I <sub>(NC OR NO)</sub> = -10mA,<br>V <sub>COM</sub> = 10V or -10V,<br>V+ = 15V, V- = -15V               |                   | T <sub>A</sub> = +25°C                                |       |                 |     | 2     |
|                                                  |                                                         |                                                                                                          |                   | T <sub>A</sub> = T <sub>MIN</sub> to T <sub>MAX</sub> |       |                 |     | 3     |
| On Resistance Flatness<br>(Note 4)               | R <sub>ON</sub>                                         | I <sub>(NC OR NO)</sub> = -10mA,<br>V <sub>COM</sub> = 5V or -5V,<br>V+ = 15V, V- = -15V                 |                   | T <sub>A</sub> = +25°C                                |       |                 |     | 3     |
|                                                  |                                                         |                                                                                                          |                   | T <sub>A</sub> = T <sub>MIN</sub> to T <sub>MAX</sub> |       |                 |     | 5     |
| NO or NC Off Leakage Current                     | I <sub>NC(OFF)</sub><br>or<br>I <sub>NO(OFF)</sub>      | V+ = 16.5V, V- = -16.5V,<br>V <sub>COM</sub> = ±15.5V,<br>V <sub>NC</sub> or V <sub>NO</sub> = ±15.5V    |                   | T <sub>A</sub> = +25°C                                | -0.25 |                 |     | 0.25  |
|                                                  |                                                         |                                                                                                          |                   | C, E                                                  | -6    |                 |     | 6     |
|                                                  |                                                         |                                                                                                          |                   | M                                                     | -20   |                 |     | 20    |
| COM Off Leakage Current                          | I <sub>COM(OFF)</sub>                                   | V+ = 16.5V,<br>V- = -16.5V,<br>V <sub>COM</sub> = ±15.5V,<br>V <sub>NC</sub> or V <sub>NO</sub> = ±15.5V | MAX317,<br>MAX318 | T <sub>A</sub> = +25°C                                | -0.25 | -0.1            |     | 0.25  |
|                                                  |                                                         |                                                                                                          |                   | C, E                                                  | -6    |                 |     | 6     |
|                                                  |                                                         |                                                                                                          |                   | M                                                     | -20   |                 |     | 20    |
|                                                  |                                                         |                                                                                                          | MAX319            | T <sub>A</sub> = +25°C                                | -0.75 | -0.1            |     | 0.75  |
|                                                  |                                                         |                                                                                                          |                   | C, E                                                  | -10   |                 |     | 10    |
|                                                  |                                                         |                                                                                                          |                   | M                                                     | -60   |                 |     | 60    |
| COM On Leakage Current                           | I <sub>COM(ON)</sub>                                    | V+ = 16.5V,<br>V- = -16.5V,<br>V <sub>NC</sub> or V <sub>NO</sub> = V <sub>D</sub> =<br>±15.5V           | MAX317,<br>MAX318 | T <sub>A</sub> = +25°C                                | -0.4  |                 |     | 0.4   |
|                                                  |                                                         |                                                                                                          |                   | C, E                                                  | -10   |                 |     | 10    |
|                                                  |                                                         |                                                                                                          |                   | M                                                     | -40   |                 |     | 40    |
|                                                  |                                                         |                                                                                                          | MAX319            | T <sub>A</sub> = +25°C                                | -0.75 |                 |     | 0.75  |
|                                                  |                                                         |                                                                                                          |                   | C, E                                                  | -10   |                 |     | 10    |
|                                                  |                                                         |                                                                                                          |                   | M                                                     | -60   |                 |     | 60    |

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## ELECTRICAL CHARACTERISTICS — Dual Supplies (continued)

(V+ = 15V, V- = -15V, VL = 5V, GND = 0V, VINL = 0.8V, VINH = 2.4V, TA = TMIN to TMAX, unless otherwise noted.)

| PARAMETER                                   | SYMBOL                | CONDITIONS                                                                     |                   | TEMP.                                                 | MIN  | TYP<br>(Note 2) | MAX | UNITS |
|---------------------------------------------|-----------------------|--------------------------------------------------------------------------------|-------------------|-------------------------------------------------------|------|-----------------|-----|-------|
| LOGIC INPUT                                 |                       |                                                                                |                   |                                                       |      |                 |     |       |
| Logic Input Current<br>(Input Voltage High) | I <sub>IH</sub>       | V <sub>IN</sub> = 2.4V                                                         |                   |                                                       | -0.5 | 0.005           | 0.5 | μA    |
| Logic Input Current<br>(Input Voltage Low)  | I <sub>IL</sub>       | V <sub>IN</sub> = 0.8V                                                         |                   |                                                       | -0.5 | 0.005           | 0.5 | μA    |
| DYNAMIC                                     |                       |                                                                                |                   |                                                       |      |                 |     |       |
| Turn-On Time                                | t <sub>ON</sub>       | MAX317, MAX318, Figure 2,<br>V <sub>COM</sub> = ±10V                           |                   | T <sub>A</sub> = +25°C                                | 100  |                 | 175 | ns    |
|                                             |                       |                                                                                |                   | T <sub>A</sub> = T <sub>MIN</sub> to T <sub>MAX</sub> | 250  |                 |     |       |
| Turn-Off Time                               | t <sub>OFF</sub>      | MAX317, MAX318, Figure 2,<br>V <sub>COM</sub> = ±10V                           |                   | T <sub>A</sub> = +25°C                                | 60   |                 | 145 | ns    |
|                                             |                       |                                                                                |                   | T <sub>A</sub> = T <sub>MIN</sub> to T <sub>MAX</sub> | 210  |                 |     |       |
| Transition Time                             | t <sub>TRANS</sub>    | MAX319, Figure 3,<br>V <sub>NO</sub> = ±10V, V <sub>NC</sub> = ±10V            |                   | T <sub>A</sub> = +25°C                                |      |                 | 175 | ns    |
|                                             |                       |                                                                                |                   | T <sub>A</sub> = T <sub>MIN</sub> to T <sub>MAX</sub> | 250  |                 |     |       |
| Break-Before-Make Interval                  | t <sub>D</sub>        | MAX319, Figure 4,<br>V <sub>NO</sub> = V <sub>NC</sub> = ±10V                  |                   | T <sub>A</sub> = +25°C                                | 5    | 13              |     | ns    |
| Charge Injection                            | Q                     | V <sub>GEN</sub> = 0V, Figure 5                                                |                   | T <sub>A</sub> = +25°C                                |      | 3               | 10  | pC    |
| Off Isolation (Note 5)                      | OIRR                  | R <sub>L</sub> = 50Ω, C <sub>L</sub> = 5pF,<br>f = 1MHz, Figure 7              |                   | T <sub>A</sub> = +25°C                                |      | 68              |     | dB    |
| Crosstalk (Note 6)                          |                       | R <sub>L</sub> = 50Ω, C <sub>L</sub> = 5pF,<br>f = 1MHz, Figure 8              |                   | T <sub>A</sub> = +25°C                                |      | 85              |     | dB    |
| COM Off Capacitance                         | C <sub>COM(OFF)</sub> | V <sub>COM</sub> = 0V, f = 1MHz, Figure 8                                      |                   | T <sub>A</sub> = +25°C                                |      | 8               |     | pF    |
| Off Capacitance NC or NO                    | C <sub>(OFF)</sub>    | V <sub>COM</sub> = 0V, f = 1MHz, Figure 8                                      |                   | T <sub>A</sub> = +25°C                                |      | 8               |     | pF    |
| Channel-On Capacitance<br>COM Terminal      | C <sub>COM(ON)</sub>  | V <sub>S</sub> = 0V, f = 1MHz,<br>Figure 9                                     | MAX317,<br>MAX318 | T <sub>A</sub> = +25°C                                |      | 30              |     | pF    |
|                                             |                       |                                                                                | MAX319            |                                                       |      | 35              |     |       |
| SUPPLY                                      |                       |                                                                                |                   |                                                       |      |                 |     |       |
| Positive Supply Current                     | I <sup>+</sup>        | V <sub>IN</sub> = 0V or 5V, V <sup>+</sup> = 16.5V,<br>V <sup>-</sup> = -16.5V |                   | T <sub>A</sub> = +25°C                                | -1   | 0.0001          | 1   | μA    |
|                                             |                       |                                                                                |                   | T <sub>A</sub> = T <sub>MIN</sub> to T <sub>MAX</sub> | -5   |                 | 5   |       |
| Negative Supply Current                     | I <sup>-</sup>        | V <sub>IN</sub> = 0V or 5V, V <sup>+</sup> = 16.5V,<br>V <sup>-</sup> = -16.5V |                   | T <sub>A</sub> = +25°C                                | -1   | -0.0001         | 1   | μA    |
|                                             |                       |                                                                                |                   | T <sub>A</sub> = T <sub>MIN</sub> to T <sub>MAX</sub> | -5   |                 | 5   |       |
| Logic Supply Current                        | I <sub>L</sub>        | V <sub>IN</sub> = 0V or 5V, V <sup>+</sup> = 16.5V,<br>V <sup>-</sup> = -16.5V |                   | T <sub>A</sub> = +25°C                                | -1   | 0.0001          | 1   | μA    |
|                                             |                       |                                                                                |                   | T <sub>A</sub> = T <sub>MIN</sub> to T <sub>MAX</sub> | -5   |                 | 5   |       |
| Ground Current                              | I <sub>GND</sub>      | V <sub>IN</sub> = 0V or 5V, V <sup>+</sup> = 16.5V,<br>V <sup>-</sup> = -16.5V |                   | T <sub>A</sub> = +25°C                                | -1   | -0.0001         | 1   | μA    |
|                                             |                       |                                                                                |                   | T <sub>A</sub> = T <sub>MIN</sub> to T <sub>MAX</sub> | -5   |                 | 5   |       |

MAX317/MAX318/MAX319

## Precision, CMOS Analog Switches

### ELECTRICAL CHARACTERISTICS — Single Supply

(V+ = 12V, V- = 0V, V<sub>L</sub> = 5V, GND = 0V, V<sub>INH</sub> = 2.4V, V<sub>INL</sub> = 0.8V, T<sub>A</sub> = +25°C, unless otherwise noted.)

| PARAMETER                       | SYMBOL                                                  | CONDITIONS                                                                                | MIN | TYP<br>(Note 2) | MAX | UNITS |
|---------------------------------|---------------------------------------------------------|-------------------------------------------------------------------------------------------|-----|-----------------|-----|-------|
| <b>SWITCH</b>                   |                                                         |                                                                                           |     |                 |     |       |
| Analog-Signal Range             | V <sub>COM</sub> ,<br>V <sub>NO</sub> , V <sub>NC</sub> | (Note 3)                                                                                  | 0   |                 | 12  | V     |
| Drain-Source On Resistance      | R <sub>(ON)</sub>                                       | I <sub>(NC or NO)</sub> = -10mA, V <sub>COM</sub> = 3.8V, V+ = 10.8V                      |     | 40              | 100 | Ω     |
| <b>DYNAMIC</b>                  |                                                         |                                                                                           |     |                 |     |       |
| Turn-On Time                    | t <sub>ON</sub>                                         | V <sub>COM</sub> = 8V, Figure 2                                                           |     | 110             |     | ns    |
| Turn-Off Time                   | t <sub>OFF</sub>                                        | V <sub>COM</sub> = 8V, Figure 2                                                           |     | 40              |     | ns    |
| Break-Before-Make<br>Time Delay | t <sub>D</sub>                                          | MAX319, R <sub>L</sub> = 1000Ω, C <sub>L</sub> = 35pF,<br>Figure 4                        |     | 60              |     | ns    |
| Charge Injection                | Q                                                       | C <sub>L</sub> = 10nF, V <sub>GEN</sub> = 0V, R <sub>GEN</sub> = 0V,<br>Figure 5          |     | 2               | 10  | pC    |
| <b>SUPPLY</b>                   |                                                         |                                                                                           |     |                 |     |       |
| Positive Supply Current         | I+                                                      | V+ = 13.2V, all channels on or off,<br>V <sub>IN</sub> = 0V or 5V, V <sub>L</sub> = 5.25V |     | 0.0001          |     | μA    |
| Negative Supply Current         | I-                                                      | V+ = 13.2V, all channels on or off,<br>V <sub>IN</sub> = 0V or 5V, V <sub>L</sub> = 5.25V |     | 0.0001          |     | μA    |
| Logic Supply Current            | I <sub>L</sub>                                          | V <sub>L</sub> = 5.25V, all channels on or off,<br>V <sub>IN</sub> = 0V or 5V             |     | 0.0001          |     | μA    |
| Ground Current                  | I <sub>GND</sub>                                        | V <sub>L</sub> = 5.25V, all channels on or off,<br>V <sub>IN</sub> = 0V or 5V             |     | -0.0001         |     | μA    |

**Note 2:** Typical values are for **design aid only**, not guaranteed, not subject to production testing.

**Note 3:** Guaranteed by design.

**Note 4:** On resistance match between channels and flatness are guaranteed only with bipolar-supply operation.

**Note 5:** Off Isolation =  $20\log_{10} \left( \frac{V_{COM}}{V_{NC} \text{ or } V_{NO}} \right)$ , V<sub>COM</sub> = output, V<sub>NC</sub> or V<sub>NO</sub> = input to off switch.

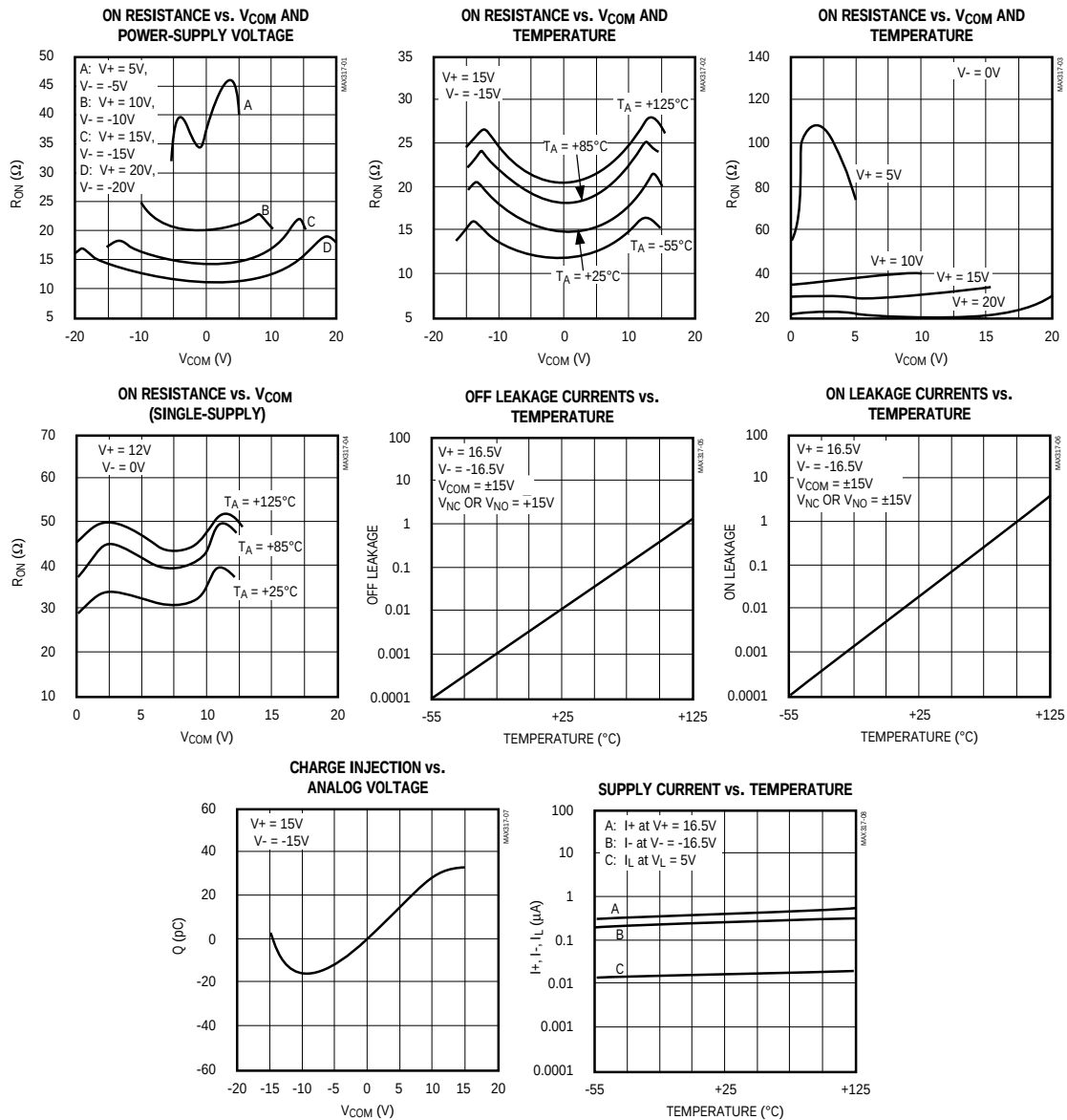
**Note 6:** Between any two switches.

# Precision, CMOS Analog Switches

## Typical Operating Characteristics

( $T_A = +25^\circ\text{C}$ , unless otherwise noted).

MAX317/MAX318/MAX319



## Precision, CMOS Analog Switches

### Pin Description

| PIN    |        |        | NAME | FUNCTION                               |
|--------|--------|--------|------|----------------------------------------|
| MAX317 | MAX318 | MAX319 |      |                                        |
| 1      | 1      | 1      | COM  | Analog-switch common terminal          |
| 2      | 2      | —      | N.C. | No connect — not internally connected  |
| —      | —      | 8      | NO   | Analog-switch normally open terminal   |
| 3      | 3      | 3      | GND  | Logic ground                           |
| 4      | 4      | 4      | V+   | Analog-signal positive supply input    |
| 5      | 5      | 5      | VL   | Logic-level positive supply input      |
| 6      | 6      | 6      | IN   | Logic-level input                      |
| 7      | 7      | 7      | V-   | Analog-signal negative supply input    |
| 8      | —      | 2      | NC   | Analog-switch normally closed terminal |
| —      | 8      | —      | NO   | Analog-switch normally open terminal   |

### Applications Information

#### Operation with Supply Voltages Other Than $\pm 15\text{V}$

The main limitation of supply voltages other than  $\pm 15\text{V}$  is analog signal range reduction. The MAX317/MAX318/MAX319 switches operate with bipolar supplies of  $\pm 5\text{V}$  to  $\pm 20\text{V}$ . Typical Operating Characteristics graphs show typical on resistance for  $\pm 15\text{V}$ ,  $\pm 10\text{V}$ , and  $\pm 5\text{V}$  supplies. Switching times increase by a factor of two or more for operation at  $\pm 5\text{V}$ . The MAX317/MAX318/MAX319 can operate from unipolar supplies of  $+10\text{V}$  to  $+30\text{V}$ . Both parts can also operate from unbalanced supplies such as  $+24\text{V}$  and  $-5\text{V}$ .

Connect V- to  $0\text{V}$  when operating with a single supply. This means that VL must be connected to  $+5\text{V}$  to be TTL compatible, or to V+ for CMOS logic input levels.

#### Overvoltage Protection

Proper power-supply sequencing is recommended for all CMOS devices. It is important not to exceed the absolute maximum ratings because stresses beyond the listed ratings may cause permanent damage to the devices. Always sequence V+ on first, followed by VL, V-, and logic inputs. If power-supply sequencing is not possible, protect the devices from overvoltage by

adding two small signal diodes in series with the supply pins (Figure 1). Adding the diodes reduces the analog signal range to  $1\text{V}$  below V+ and  $1\text{V}$  below V-, but low switch resistance and low leakage characteristics are unaffected. Device operation is unchanged, and the difference between V+ to V- should not exceed  $+44\text{V}$ .

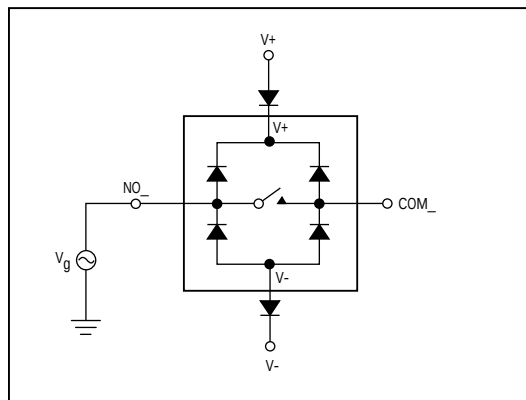


Figure 1. Overvoltage Protection Using Blocking Diodes

# Precision, CMOS Analog Switches

## Test Circuits/Timing Diagrams

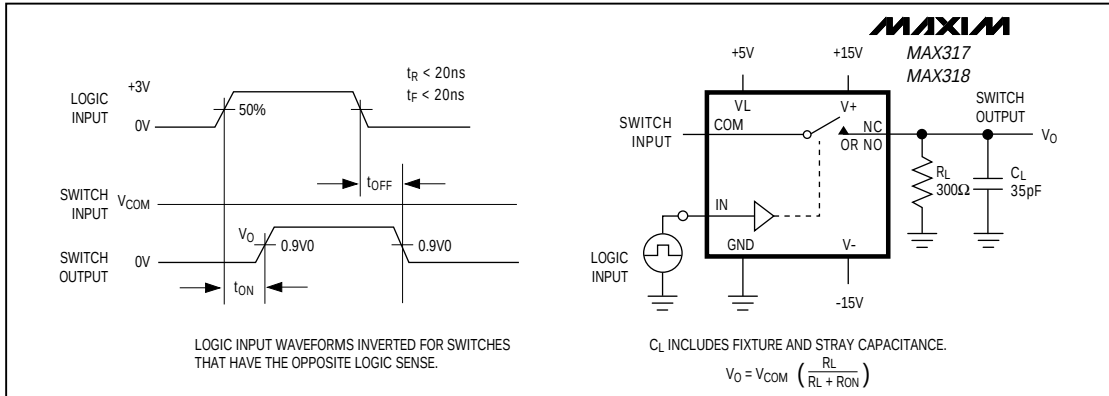


Figure 2. MAX317/MAX318 Switching-Time Test Circuit

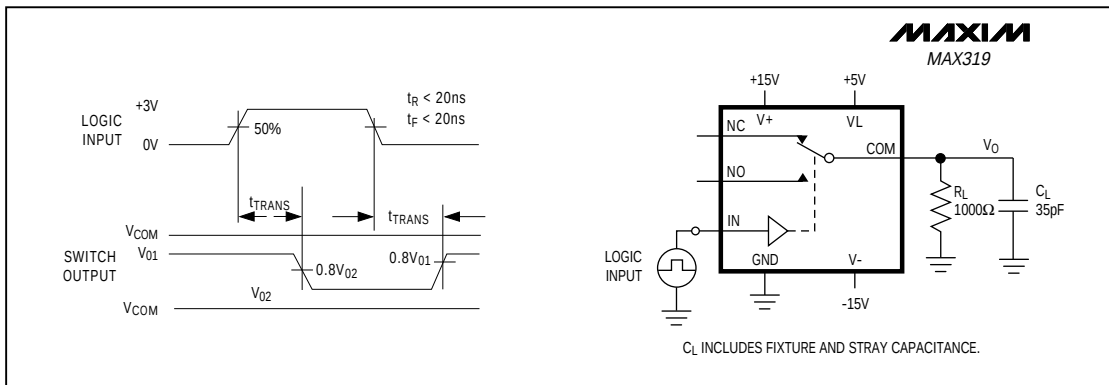


Figure 3. MAX319 Transition Time

MAX317/MAX318/MAX319

# Precision, CMOS Analog Switches

## Test Circuits/Timing Diagrams (continued)

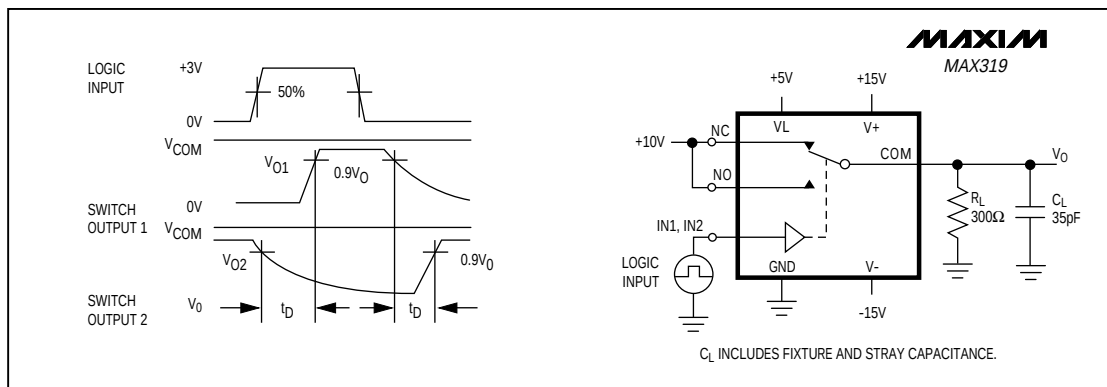


Figure 4. MAX319 Break-Before-Make Test Circuit

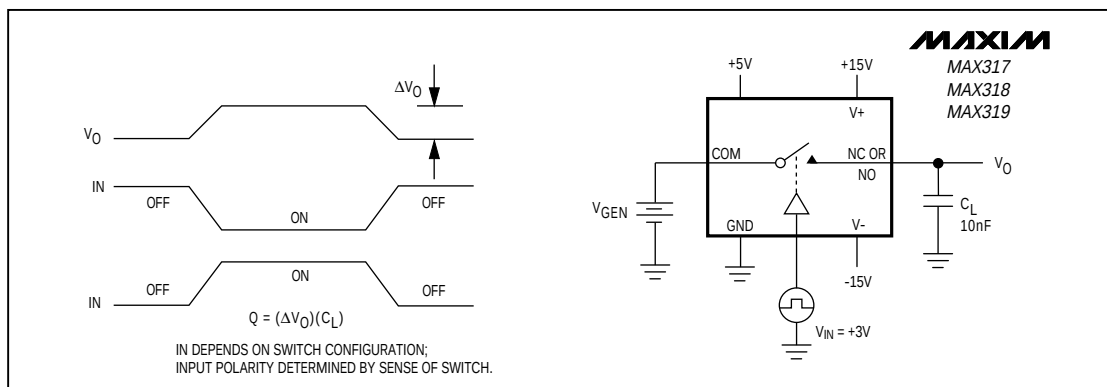


Figure 5. Charge-Injection Test Circuit



# Precision, CMOS Analog Switches

## Test Circuits/Timing Diagrams (continued)

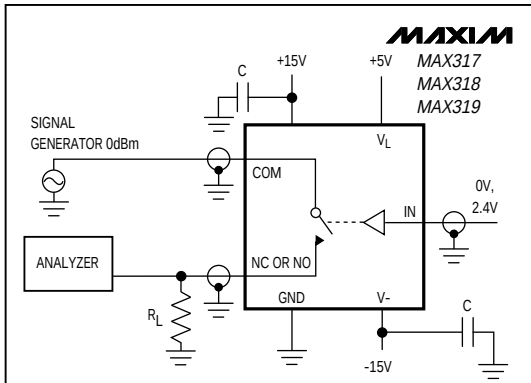


Figure 6. Off-Isolation Test Circuit

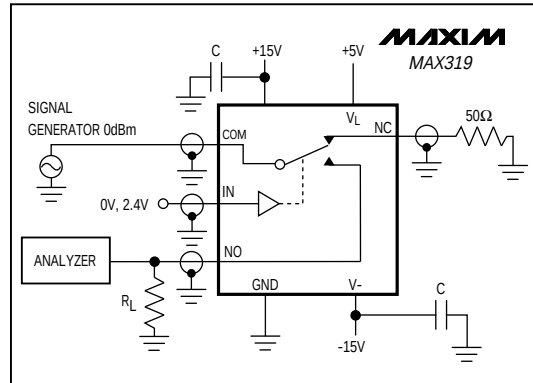


Figure 7. MAX319 Crosstalk Test Circuit

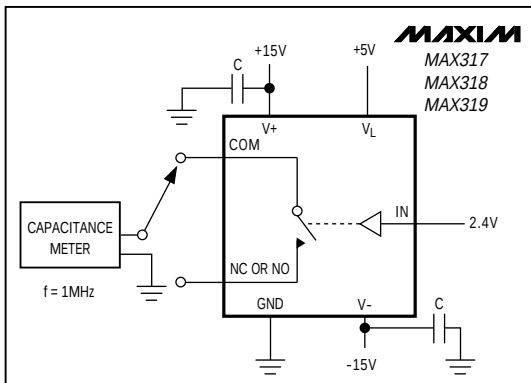


Figure 8. Channel-Off Capacitance Test Circuit

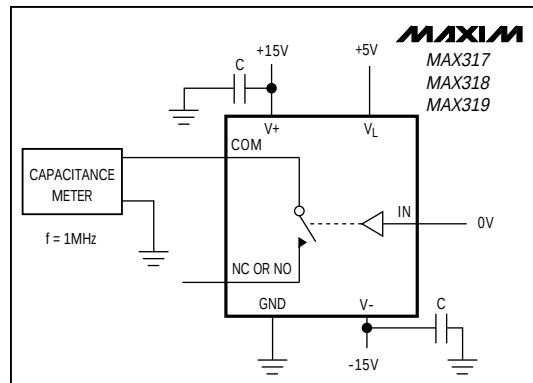


Figure 9. Channel-On Capacitance Test Circuit

MAX317/MAX318/MAX319

## Precision, CMOS Analog Switches

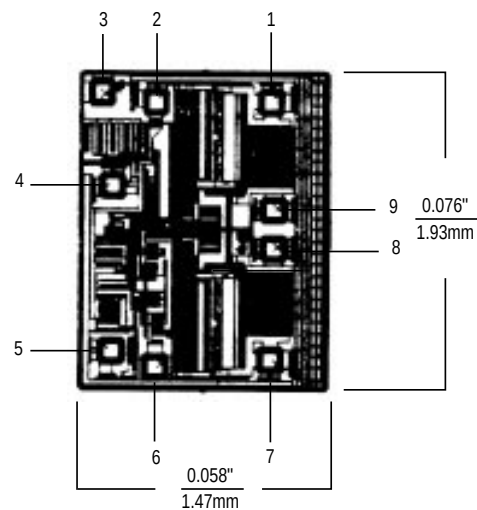
### Ordering Information (continued)

| PART             | TEMP. RANGE     | PIN-PACKAGE   |
|------------------|-----------------|---------------|
| <b>MAX318CPA</b> | 0°C to +70°C    | 8 Plastic DIP |
| MAX318CSA        | 0°C to +70°C    | 8 SO          |
| MAX318CJA        | 0°C to +70°C    | 8 CERDIP      |
| MAX318C/D        | 0°C to +70°C    | Dice*         |
| MAX318EPA        | -40°C to +85°C  | 8 Plastic DIP |
| MAX318ESA        | -40°C to +85°C  | 8 SO          |
| MAX318EJA        | -40°C to +85°C  | 8 CERDIP      |
| MAX318MJA        | -55°C to +125°C | 8 CERDIP**    |
| <b>MAX319CPA</b> | 0°C to +70°C    | 8 Plastic DIP |
| MAX319CSA        | 0°C to +70°C    | 8 SO          |
| MAX319CJA        | 0°C to +70°C    | 8 CERDIP      |
| MAX319C/D        | 0°C to +70°C    | Dice*         |
| MAX319EPA        | -40°C to +85°C  | 8 Plastic DIP |
| MAX319ESA        | -40°C to +85°C  | 8 SO          |
| MAX319EJA        | -40°C to +85°C  | 8 CERDIP      |
| MAX319MJA        | -55°C to +125°C | 8 CERDIP**    |

\* Contact factory for dice specifications.

\*\* Contact factory for availability and processing to MIL-STD-883.

### Chip Topography



TRANSISTOR COUNT: 32;

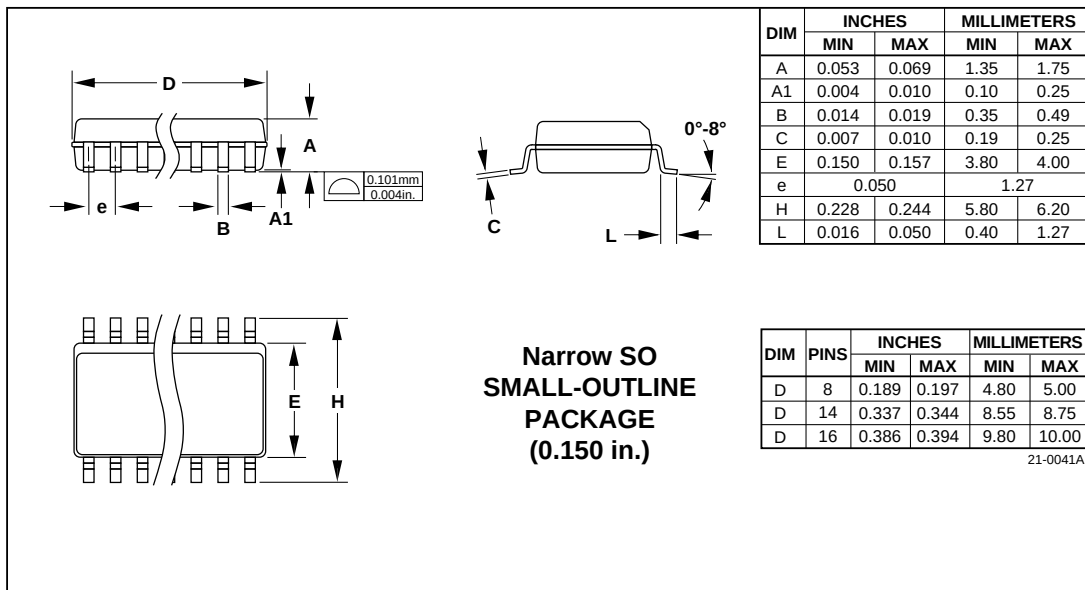
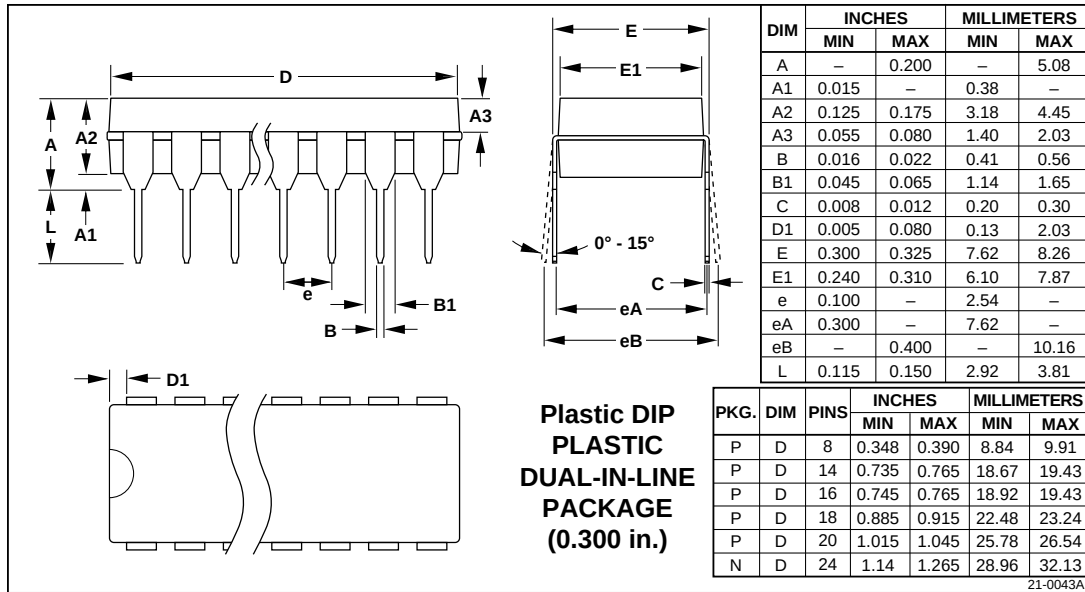
SUBSTRATE CONNECTED TO V+.

| DIE PAD | MAX317 | MAX318 | MAX319 |
|---------|--------|--------|--------|
| 1       | COM    | NC     | NC     |
| 2       | GND    | GND    | GND    |
| 3       | V+     | V+     | V+     |
| 4       | VL     | VL     | VL     |
| 5       | IN     | IN     | IN     |
| 6       | V-     | V-     | V-     |
| 7       | N.C.   | NO     | NO     |
| 8       | N.C.   | COM    | COM    |
| 9       | NC     | NC     | COM    |

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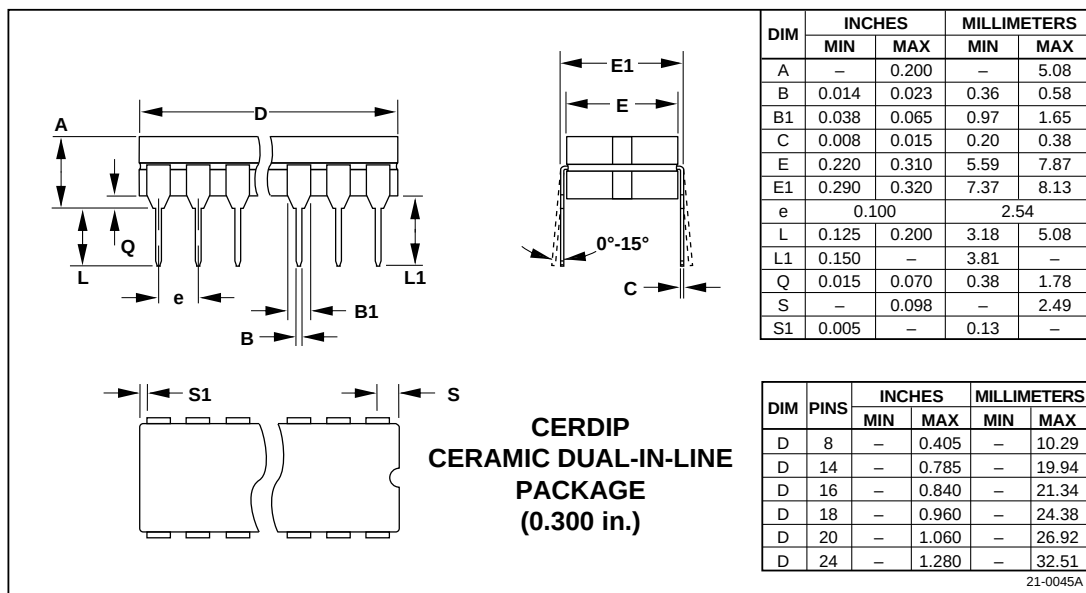
## Package Information

MAX317/MAX318/MAX319



# Precision, CMOS Analog Switches

## Package Information



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