



# 35Ω, SPST/SPDT, +3V Logic-Compatible Analog Switches

DG417L/DG418L/DG419L

## General Description

The DG417L/DG418L/DG419L precision, CMOS analog switches feature low on-resistance ( $R_{ON} = 35\Omega$ ), guaranteed  $R_{ON}$  matching between switches ( $3\Omega$  max), and guaranteed  $R_{ON}$  flatness over the signal range ( $4\Omega$  max). These switches are +3V logic-compatible when powered from  $\pm 15V$  or  $\pm 12V$  supplies. The switches conduct equally well in either direction, and feature low charge injection and low power consumption. The DG417L/DG418L/DG419L also offer low off-leakage current over temperature (less than  $5nA$  at  $+85^\circ C$ ).

The DG417L/DG418L are single-pole/single-throw (SPST) switches. The DG417L is normally closed, and the DG418L is normally open. The DG419L is single-pole/double-throw (SPDT) with one normally closed switch and one normally open switch. Switching times are less than  $175ns$  for  $t_{ON}$  and less than  $185ns$  for  $t_{OFF}$ . These devices operate with a single  $+9V$  to  $+36V$  or bipolar  $\pm 4.5V$  to  $\pm 20V$  supplies.

The digital input has a  $+0.8V$  logic-low threshold and a  $+2.0V$  logic-high threshold, ensuring +3V TTL and CMOS-logic compatibility. The DG417L/DG418L/DG419L are available in a tiny 8-pin  $\mu MAX$ , 8-pin SO, or convenient 8-pin plastic DIP. All products are rated at the extended temperature range of  $-40^\circ C$  to  $+85^\circ C$ .

## Applications

- |                              |                          |
|------------------------------|--------------------------|
| Sample-and-Hold Circuits     | Communications Systems   |
| Test Equipment               | Battery-Operated Systems |
| Modems                       | Fax Machines             |
| Guidance and Control Systems | PBX, PABX                |
| Audio Signal Routing         | Military Radios          |

## Features

- ◆ +3V Logic-Compatible Digital Inputs  
 $V_{IH} = 2.0V$   
 $V_{IL} = 0.8V$
- ◆ Plug-In Upgrades for Industry-Standard  
DG417/DG418/DG419 and  
MAX317/MAX318/MAX319
- ◆ Power-Supply Sequencing-Free Operation
- ◆ Low On-Resistance ( $35\Omega$  max)
- ◆ Guaranteed Matched On-Resistance Between Channels ( $3\Omega$  max)
- ◆ Guaranteed On-Resistance Flatness ( $4\Omega$  max)
- ◆ Single-Supply Operation  $+9V$  to  $+36V$   
Dual-Supply Operation  $\pm 4.5V$  to  $\pm 20V$
- ◆ Guaranteed Off-Leakage Current Over Temperature ( $<5nA$  at  $+85^\circ C$ )
- ◆ Rail-to-Rail Analog Signal Handling Capability
- ◆ Tiny 8-Pin  $\mu MAX$  Package

## Ordering Information

| PART      | TEMP. RANGE                    | PIN-PACKAGE   |
|-----------|--------------------------------|---------------|
| DG417LEUA | $-40^\circ C$ to $+85^\circ C$ | 8 $\mu MAX$   |
| DG417LDY  | $-40^\circ C$ to $+85^\circ C$ | 8 SO          |
| DG417LDJ  | $-40^\circ C$ to $+85^\circ C$ | 8 Plastic DIP |

Ordering Information continued at end of data sheet.  
Rail-to-Rail is a registered trademark of Nippon Motorola, Inc.

## Pin Configurations/Functional Diagrams/Truth Tables

TOP VIEW

**DIP/SO/ $\mu MAX$**

| DG417L |        |
|--------|--------|
| LOGIC  | SWITCH |
| 0      | ON     |
| 1      | OFF    |

N.C. = NO CONNECT  
NC = NORMALLY CLOSED

**DIP/SO/ $\mu MAX$**

| DG418L |        |
|--------|--------|
| LOGIC  | SWITCH |
| 0      | OFF    |
| 1      | ON     |

SWITCHES SHOWN FOR LOGIC "0" INPUT

**DIP/SO/ $\mu MAX$**

| DG419L |     |     |
|--------|-----|-----|
| LOGIC  | NC  | NO  |
| 0      | ON  | OFF |
| 1      | OFF | ON  |



For pricing, delivery, and ordering information, please contact Maxim/Dallas Direct! at 1-888-629-4642, or visit Maxim's website at [www.maxim-ic.com](http://www.maxim-ic.com).

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## ABSOLUTE MAXIMUM RATINGS

Voltage referenced to V-

|  |                            |
|--|----------------------------|
| V+ .....   | 44V                        |
| GND .....  | 25V                        |
| IN .....   | -0.3V to +44V              |
| COM, NC, NO (Note 1) .....   | (V- - 0.3V) to (V+ + 0.3V) |
| Continuous Current (any terminal) (Note 1) .....                       | ±30mA                      |
| Peak Current, COM, NO, NC (pulsed at 1ms,<br>10% duty cycle max) ..... | ±100mA                     |

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

|   |                 |
|---|-----------------|
| 8-Pin μMAX (derate 4.5mW/°C above +70°C) .....        | 362mW           |
| 8-Pin SO (derate 5.9mW/°C above +70°C) .....          | 471mW           |
| 8-Pin Plastic DIP (derate 9.1mW/°C above +70°C) ..... | 727mW           |
| Operating Temperature Range .....                     | -40°C to +85°C  |
| Storage Temperature Range .....                       | -65°C to +150°C |
| Lead Temperature (soldering, 10s) .....               | +300°C          |

**Note 1:** Signals on COM, NO, or NC exceeding V+ or V- are clamped by internal diodes. Limit forward current to maximum current ratings.

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 ±15V Supplies

(V+ = +15V, V- = -15V, V<sub>IH</sub> = 2.0V, V<sub>IL</sub> = 0.8V, T<sub>A</sub> = T<sub>MIN</sub> to T<sub>MAX</sub>, unless otherwise noted. Typical values are at T<sub>A</sub> = +25°C.) (Notes 2, 3)

| PARAMETER   | SYMBOL  | CONDITIONS  | T <sub>A</sub>                       | MIN                                  | TYP   | MAX  | UNITS |    |
|---|---|---|--------------------------------------|--------------------------------------|-------|------|-------|----|
| <b>ANALOG SWITCH</b>  |   |   |                                      |                                      |       |      |       |    |
| Analog Signal Range   | V <sub>NO</sub> , V <sub>NC</sub><br>V <sub>COM</sub> |   |                                      | V-                                   |       | V+   | V     |    |
| On-Resistance   | R <sub>ON</sub>                                       | V+ = +13.5V, V- = -13.5V<br>I <sub>COM</sub> = 10mA<br>V <sub>NO</sub> or V <sub>NC</sub> = ±10V    | +25°C                                |                                      | 17    | 35   | Ω     |    |
|   |   |   | T <sub>MIN</sub> to T <sub>MAX</sub> |                                      |       | 45   |       |    |
| On-Resistance Matching<br>Between Channels<br>(DG419L only) | ΔR <sub>ON</sub>                                      | V+ = +15V, V- = -15V<br>I <sub>COM</sub> = 10mA<br>V <sub>NO</sub> or V <sub>NC</sub> = ±10V        | +25°C                                |                                      | 0.1   | 3    | Ω     |    |
|   |   |   | T <sub>MIN</sub> to T <sub>MAX</sub> |                                      |       | 4    |       |    |
| On-Resistance Flatness<br>(Note 4)                          | R <sub>FLAT</sub> (ON)                                | V+ = +15V, V- = -15V<br>I <sub>COM</sub> = 10mA<br>V <sub>NO</sub> or V <sub>NC</sub> = -5V, 0, +5V | +25°C                                |                                      | 0.5   | 4    | Ω     |    |
|   |   |   | T <sub>MIN</sub> to T <sub>MAX</sub> |                                      |       | 6    |       |    |
| NC or NO Off-Leakage Current<br>(Note 5)                    | I <sub>NC/NO(OFF)</sub>                               | V+ = +16.5V, V- = -16.5V<br>V <sub>COM</sub> = ±15.5V<br>V <sub>(NC or NO)</sub> = ∓15.5V           | +25°C                                | -0.25                                | 0.01  | 0.25 | nA    |    |
|   |   |   | T <sub>MIN</sub> to T <sub>MAX</sub> |                                      |       | 5    |       |    |
| COM Off-Leakage Current<br>(Note 5)                         | I <sub>COM(OFF)</sub>                                 | V+ = +16.5V<br>V- = -16.5V<br>V <sub>COM</sub> = ±15.5V<br>V <sub>(NC or NO)</sub> = ∓15.5V         | DG417L<br>DG418L                     | +25°C                                | -0.25 | 0.01 | 0.25  | nA |
|   |   |   |                                      | T <sub>MIN</sub> to T <sub>MAX</sub> |       |      | 5     |    |
| COM On-Leakage Current<br>(Note 5)                          | I <sub>COM(ON)</sub>                                  | V+ = +16.5V<br>V- = -16.5V<br>V <sub>COM</sub> = ±15.5V<br>V <sub>(NC or NO)</sub> = ±15.5V         | DG417L<br>DG418L                     | +25°C                                | -0.4  | 0.01 | 0.4   | nA |
|   |   |   |                                      | T <sub>MIN</sub> to T <sub>MAX</sub> |       |      | 10    |    |
|   |   |   | DG419L                               | +25°C                                | -0.75 |      | 0.75  |    |
|   |   |   |                                      | T <sub>MIN</sub> to T <sub>MAX</sub> |       |      | 10    |    |

# 35Ω, SPST/SPDT, +3V Logic-Compatible Analog Switches

**DG417L/DG418L/DG419L**

## ELECTRICAL CHARACTERISTICS—Dual ±15V Supplies (continued)

(V+ = +15V, V- = -15V, V<sub>IH</sub> = 2.0V, V<sub>IL</sub> = 0.8V, T<sub>A</sub> = T<sub>MIN</sub> to T<sub>MAX</sub>, unless otherwise noted. Typical values are at T<sub>A</sub> = +25°C.) (Notes 2, 3)

| PARAMETER                           | SYMBOL                                       | CONDITIONS   | T <sub>A</sub> | MIN                                  | TYP   | MAX | UNITS |
|-------------------------------------|--|--|----------------|--------------------------------------|-------|-----|-------|
| <b>DYNAMIC</b>                      |  |  |                |                                      |       |     |       |
| Turn-On Time                        | t <sub>ON</sub>                              | V <sub>NO</sub> or V <sub>NC</sub> = ±10V<br>R <sub>L</sub> = 300Ω<br>C <sub>L</sub> = 35pF<br>Figure 1        | DG417L         | +25°C                                | 110   | 175 | ns    |
|                                     |  |  | DG418L         | T <sub>MIN</sub> to T <sub>MAX</sub> |       | 250 |       |
| Turn-Off Time                       | t <sub>OFF</sub>                             | V <sub>NO</sub> or V <sub>NC</sub> = ±10V<br>R <sub>L</sub> = 300Ω<br>C <sub>L</sub> = 35pF<br>Figure 1        | DG417L         | +25°C                                | 105   | 185 | ns    |
|                                     |  |  | DG418L         | T <sub>MIN</sub> to T <sub>MAX</sub> |       | 210 |       |
| Transition Time                     | t <sub>TRANS</sub>                           | V <sub>NO</sub> = ±10V<br>V <sub>NC</sub> = ∓10V<br>R <sub>L</sub> = 300Ω<br>C <sub>L</sub> = 35pF<br>Figure 2 | DG419L         | +25°C                                | 105   | 185 | ns    |
|                                     |  |  |                | T <sub>MIN</sub> to T <sub>MAX</sub> |       | 250 |       |
| Break-Before-Make Delay<br>(Note 6) | t <sub>D</sub>                               | V <sub>NO</sub> or V <sub>NC</sub> = +10V<br>R <sub>L</sub> = 300Ω<br>C <sub>L</sub> = 35pF<br>Figure 3        | DG419L         | +25°C                                | 5     | 25  | ns    |
|                                     |  |  |                | T <sub>MIN</sub> to T <sub>MAX</sub> |       | 1   |       |
| Charge Injection                    | Q  | V <sub>GEN</sub> = 0, R <sub>GEN</sub> = 0,<br>C <sub>L</sub> = 1nF, Figure 4                                  |                |                                      | 15    |     | pC    |
| Off-Isolation (Note 7)              | V <sub>ISO</sub>                             | f = 1MHz, R <sub>L</sub> = 50Ω,<br>C <sub>L</sub> = 5pF,<br>Figure 5   |                |                                      | -90   |     | dB    |
| Crosstalk (Note 8)                  | V <sub>CT</sub>                              | f = 1MHz,<br>R <sub>L</sub> = 50Ω,<br>C <sub>L</sub> = 5pF,<br>Figure 6  | DG419L         |                                      |       | -86 | dB    |
| Total Harmonic Distortion           | THD  | f = 20Hz to 20kHz, 5Vp-p<br>R <sub>L</sub> = 600Ω  |                |                                      | 0.002 |     | %     |
| NO or NC Off-Capacitance            | C <sub>NO(OFF)</sub><br>C <sub>NC(OFF)</sub> | f = 1MHz, Figure 7   |                |                                      | 8     |     | pF    |
| COM Off-Capacitance                 | C <sub>COM(OFF)</sub>                        | f = 1MHz, Figure 7   |                |                                      | 8     |     | pF    |
| COM On-Capacitance                  | C <sub>COM(ON)</sub>                         | f = 1MHz,<br>Figure 8  | DG417L         |                                      |       | 30  | pF    |
|                                     |  |  | DG418L         |                                      |       |     |       |
|                                     |  |  | DG419L         |                                      |       | 35  |       |

# 35Ω, SPST/SPDT, +3V Logic-Compatible Analog Switches

## ELECTRICAL CHARACTERISTICS—Dual ±15V Supplies (continued)

(V+ = +15V, V- = -15V, V<sub>IH</sub> = 2.0V, V<sub>IL</sub> = 0.8V, T<sub>A</sub> = T<sub>MIN</sub> to T<sub>MAX</sub>, unless otherwise noted. Typical values are at T<sub>A</sub> = +25°C.) (Notes 2, 3)

| PARAMETER                                   | SYMBOL           | CONDITIONS   | T <sub>A</sub>                       | MIN  | TYP   | MAX | UNITS |
|---|------------------|--|--------------------------------------|------|-------|-----|-------|
| <b>DIGITAL I/O</b>                          |                  |  |                                      |      |       |     |       |
| Input Logic High Voltage                    | V <sub>IH</sub>  |  |                                      | 2.0  |       |     | V     |
| Input Logic Low Voltage                     | V <sub>IL</sub>  |  |                                      |      |       | 0.8 | V     |
| Logic Input Current<br>(Input Voltage Low)  | I <sub>INL</sub> | V <sub>IN</sub> = 0.8V   |                                      |      | 0.001 | 1   | μA    |
| Logic Input Current<br>(Input Voltage High) | I <sub>INH</sub> | V <sub>IN</sub> = 2.0V   |                                      |      | 0.001 | 1   | μA    |
| <b>POWER SUPPLY</b>                         |                  |  |                                      |      |       |     |       |
| Power-Supply Range                          | V <sub>S</sub>   | Dual supplies  |                                      | ±4.5 |       | ±20 | V     |
| Positive Supply Current                     | I <sub>+</sub>   | V <sub>+</sub> = +16.5V, V <sub>-</sub> = -16.5V,<br>V <sub>IN</sub> = 5V                    | +25°C                                |      | 26    | 75  | μA    |
|   |                  |  | T <sub>MIN</sub> to T <sub>MAX</sub> |      |       | 125 |       |
|   |                  | V <sub>+</sub> = +16.5V, V <sub>-</sub> = -16.5V,<br>V <sub>IN</sub> = 0 or V <sub>+</sub>   | +25°C                                |      | 0.01  | 1   |       |
| Negative Supply Current                     | I <sub>-</sub>   | V <sub>+</sub> = +16.5V, V <sub>-</sub> = -16.5V,<br>V <sub>IN</sub> = 0, 5V, V <sub>+</sub> | +25°C                                |      | 0.01  | 1   | μA    |
|   |                  |  | T <sub>MIN</sub> to T <sub>MAX</sub> |      |       | 10  |       |
| Ground Current                              | I <sub>GND</sub> | V <sub>+</sub> = +16.5V, V <sub>-</sub> = -16.5V,<br>V <sub>IN</sub> = 5V                    | +25°C                                |      | 26    | 75  | μA    |
|   |                  |  | T <sub>MIN</sub> to T <sub>MAX</sub> |      |       | 125 |       |
|   |                  | V <sub>+</sub> = +16.5V, V <sub>-</sub> = -16.5V,<br>V <sub>IN</sub> = 0 or V <sub>+</sub>   | +25°C                                |      | 0.01  | 1   |       |
|   |                  |  | T <sub>MIN</sub> to T <sub>MAX</sub> |      |       | 10  |       |

## ELECTRICAL CHARACTERISTICS—Single +12V Supply

(V<sub>+</sub> = +12V, V<sub>-</sub> = 0, V<sub>IH</sub> = 2.0V, V<sub>IL</sub> = 0.8V, T<sub>A</sub> = T<sub>MIN</sub> to T<sub>MAX</sub>, unless otherwise noted. Typical values are at T<sub>A</sub> = +25°C.) (Notes 2, 3)

| PARAMETER   | SYMBOL  | CONDITIONS  | T <sub>A</sub>                       | MIN            | TYP  | MAX            | UNITS |
|---|---|---|--------------------------------------|----------------|------|----------------|-------|
| <b>ANALOG SWITCH</b>  |   |   |                                      |                |      |                |       |
| Analog Signal Range   | V <sub>NO</sub> , V <sub>NC</sub><br>V <sub>COM</sub> |   |                                      | V <sub>-</sub> |      | V <sub>+</sub> | V     |
| On-Resistance   | R <sub>ON</sub>                                       | V <sub>+</sub> = +10.8V,<br>I <sub>COM</sub> = 10mA,<br>V <sub>NO</sub> or V <sub>NC</sub> = +3.8V    | +25°C                                |                | 31   | 100            | Ω     |
|   |   |   | T <sub>MIN</sub> to T <sub>MAX</sub> |                |      | 125            |       |
| On-Resistance Matching<br>Between Channels<br>(DG419L Only) | ΔR <sub>ON</sub>                                      | V <sub>+</sub> = +10.8V,<br>I <sub>COM</sub> = 10mA,<br>V <sub>NO</sub> or V <sub>NC</sub> = +3.8V    | +25°C                                |                | 0.05 | 4              | Ω     |
|   |   |   | T <sub>MIN</sub> to T <sub>MAX</sub> |                |      | 6              |       |
| On-Resistance Flatness<br>(Note 4)                          | R <sub>FLAT</sub> (ON)                                | V <sub>+</sub> = +12V,<br>I <sub>COM</sub> = 10mA<br>V <sub>NO</sub> or V <sub>NC</sub> = 2V, 6V, 10V | +25°C                                |                | 4    | 9              | Ω     |
|   |   |   | T <sub>MIN</sub> to T <sub>MAX</sub> |                |      | 13             |       |

# 35Ω, SPST/SPDT, +3V Logic-Compatible Analog Switches

**DG417L/DG418L/DG419L**

## ELECTRICAL CHARACTERISTICS—Single +12V Supply (continued)

(V+ = +12V, V- = 0, V<sub>IH</sub> = 2.0V, V<sub>IL</sub> = 0.8V, T<sub>A</sub> = T<sub>MIN</sub> to T<sub>MAX</sub>, unless otherwise noted. Typical values are at T<sub>A</sub> = +25°C.) (Notes 2, 3)

| PARAMETER                           | SYMBOL             | CONDITIONS   | T <sub>A</sub>   | MIN                                  | TYP  | MAX | UNITS |
|-------------------------------------|--------------------|--|------------------|--------------------------------------|------|-----|-------|
| <b>DYNAMIC</b>                      |                    |  |                  |                                      |      |     |       |
| Turn-On Time                        | t <sub>ON</sub>    | V <sub>NO</sub> or V <sub>NC</sub> = +10V<br>R <sub>L</sub> = 300Ω<br>C <sub>L</sub> = 35pF<br>Figure 1            | DG417L<br>DG418L | +25°C                                | 150  | 300 | ns    |
|                                     |                    |  |                  | T <sub>MIN</sub> to T <sub>MAX</sub> |      | 400 |       |
| Turn-Off Time                       | t <sub>OFF</sub>   | V <sub>NO</sub> or V <sub>NC</sub> = +10V<br>R <sub>L</sub> = 300Ω<br>C <sub>L</sub> = 35pF<br>Figure 1            | DG417L<br>DG418L | +25°C                                | 110  | 210 | ns    |
|                                     |                    |  |                  | T <sub>MIN</sub> to T <sub>MAX</sub> |      | 310 |       |
| Transition Time                     | t <sub>TRANS</sub> | V <sub>NO</sub> = 0, 10V<br>V <sub>NC</sub> = 10V, 0<br>R <sub>L</sub> = 300Ω<br>C <sub>L</sub> = 35pF<br>Figure 2 | DG419L           | +25°C                                | 150  | 300 | ns    |
|                                     |                    |  |                  | T <sub>MIN</sub> to T <sub>MAX</sub> |      | 400 |       |
| Break-Before-Make Delay<br>(Note 6) | t <sub>D</sub>     | V <sub>NO</sub> , V <sub>NC</sub> = +10V<br>R <sub>L</sub> = 300Ω<br>C <sub>L</sub> = 35pF<br>Figure 3             | DG419L           | +25°C                                | 5    | 30  | ns    |
|                                     |                    |  |                  | T <sub>MIN</sub> to T <sub>MAX</sub> | 1    |     |       |
| Charge Injection                    | Q                  | V <sub>GEN</sub> = 0, R <sub>GEN</sub> = 0,<br>C <sub>L</sub> = 1nF, Figure 4                                      |                  |                                      | 2.5  |     | pC    |
| <b>POWER SUPPLY</b>                 |                    |  |                  |                                      |      |     |       |
| Power-Supply Range                  | V <sub>S</sub>     | Single supply  |                  | 9                                    |      | 36  | V     |
| Positive Supply Current             | I <sub>+</sub>     | V <sub>+</sub> = +13.2V<br>V <sub>IN</sub> = 0 or V <sub>+</sub>   |                  | +25°C                                | 0.01 | 1   | μA    |
|                                     |                    |  |                  | T <sub>MIN</sub> to T <sub>MAX</sub> |      | 10  |       |
|                                     |                    | V <sub>+</sub> = +13.2V<br>V <sub>IN</sub> = 5V  |                  | +25°C                                | 15   | 60  |       |
|                                     |                    |  |                  | T <sub>MIN</sub> to T <sub>MAX</sub> |      | 110 |       |

**Note 2:** The algebraic convention is used in this data sheet; the most negative value is shown in the minimum column.

**Note 3:** -40°C specifications are guaranteed by design.

**Note 4:** Flatness is defined as the difference between the maximum and the minimum value of on-resistance as measured at the extremes of the specified analog range.

**Note 5:** Leakage parameters are 100% tested at maximum rated hot temperature and guaranteed by correlation at T<sub>A</sub> = +25°C.

**Note 6:** Guaranteed by design.

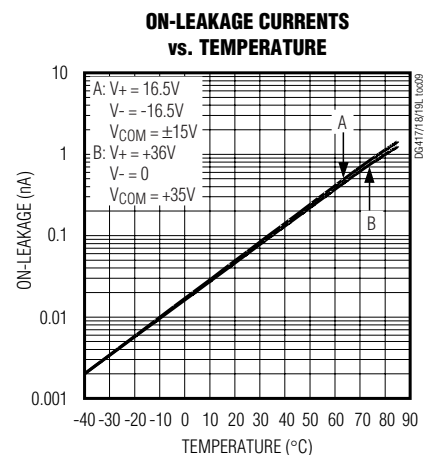
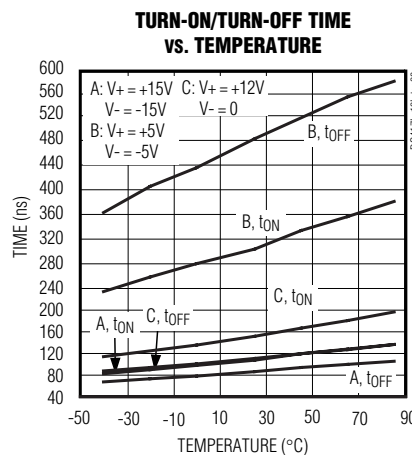
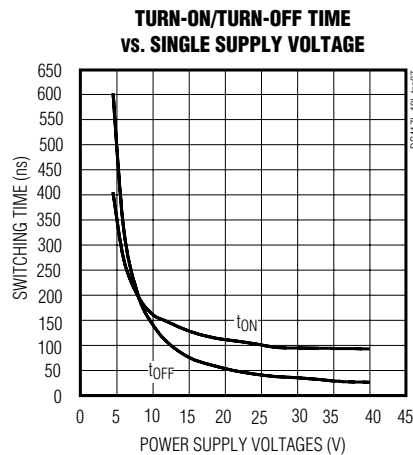
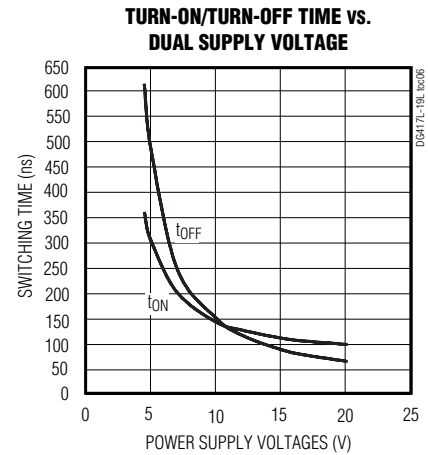
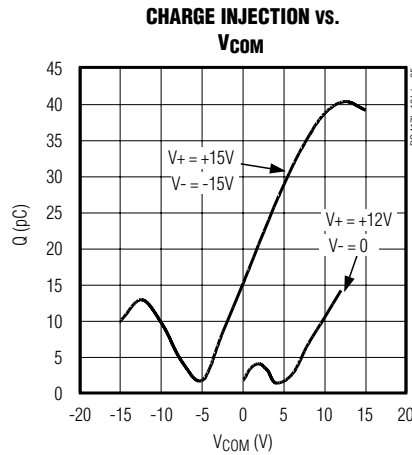
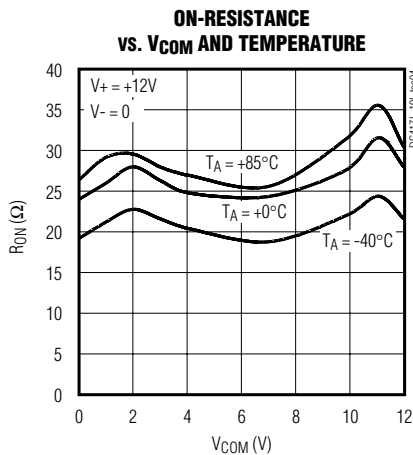
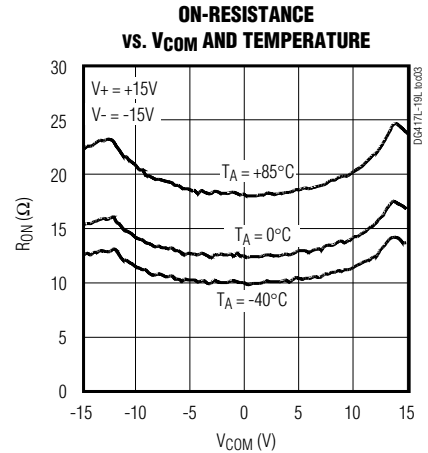
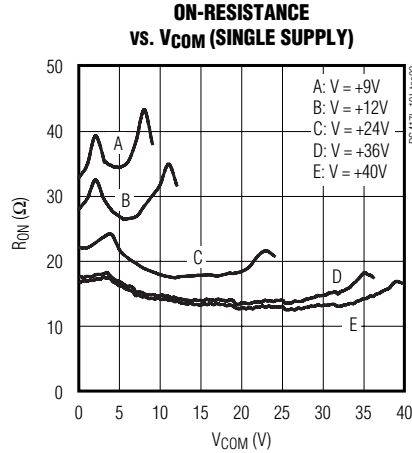
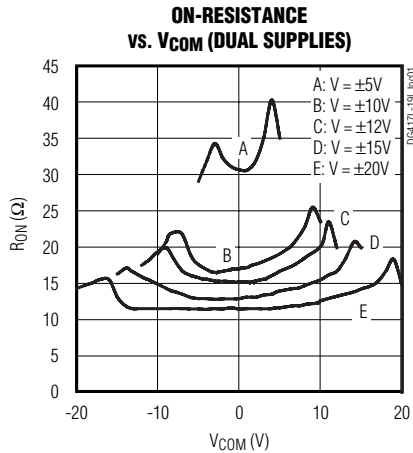
**Note 7:** Off-isolation = 20log<sub>10</sub> [V<sub>COM</sub> / (V<sub>NC</sub> or V<sub>NO</sub>)], V<sub>COM</sub> = output, V<sub>NC</sub> or V<sub>NO</sub> = input to off switch.

**Note 8:** Between Switches

# 35Ω, SPST/SPDT, +3V Logic-Compatible Analog Switches

## Typical Operating Characteristics

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

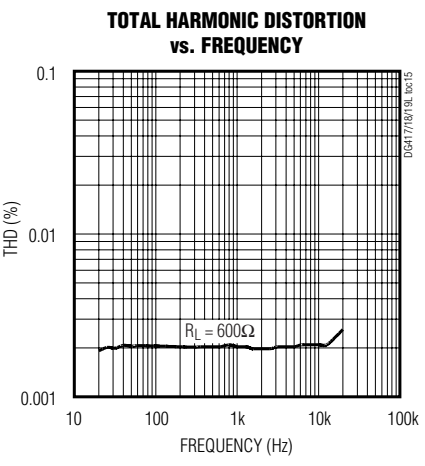
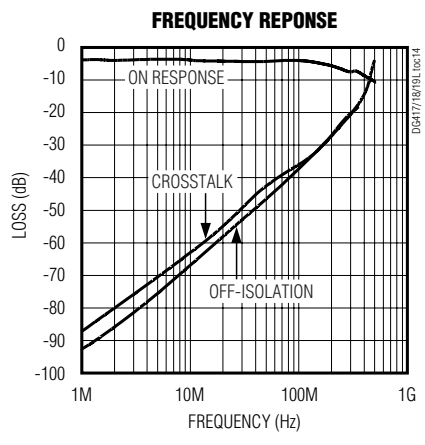
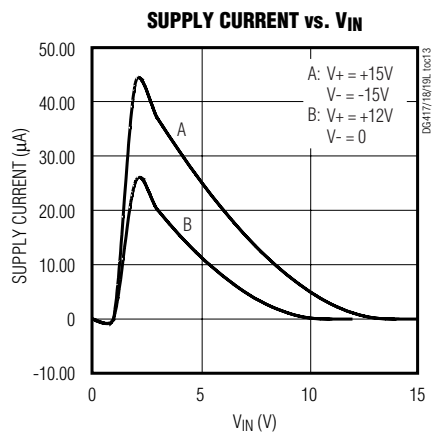
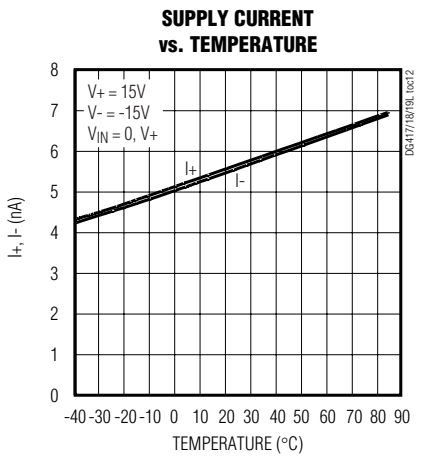
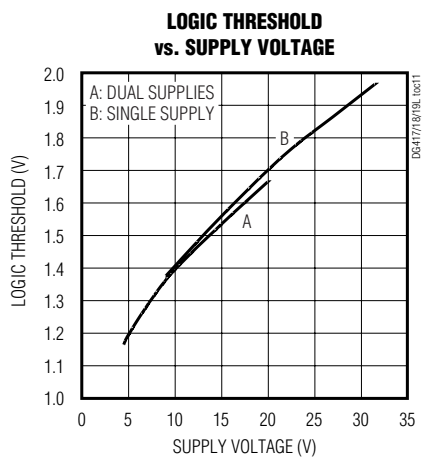
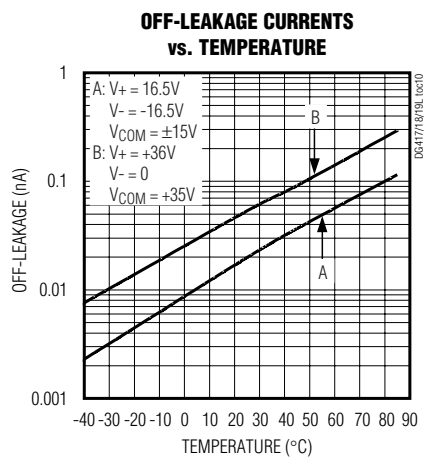


# 35Ω, SPST/SPDT, +3V Logic-Compatible Analog Switches

## Typical Operating Characteristics (continued)

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

DG417L/DG418L/DG419L



# 35Ω, SPST/SPDT, +3V Logic-Compatible Analog Switches

## Pin Description

| PIN    |        |        | NAME | FUNCTION                                 |
|--------|--------|--------|------|--|
| DG417L | DG418L | DG419L |      |  |
| 1      | 1      | 1      | COM  | Analog Switch Common Terminal            |
| 2, 5   | 2, 5   | 5      | N.C. | No Connection. Not internally connected. |
| 3      | 3      | 3      | GND  | Logic Ground                             |
| 4      | 4      | 4      | V+   | Analog Signal 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      | 8      | NO   | Analog Switch Normally Open Terminal     |

## Test Circuits/Timing Diagrams

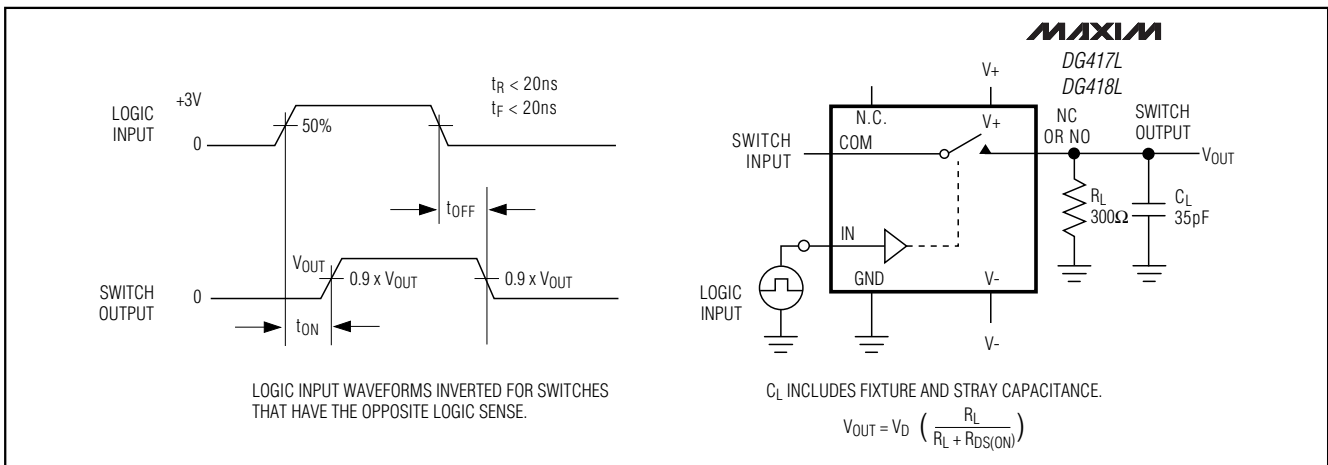


Figure 1. DG417L/DG418L Switching Time

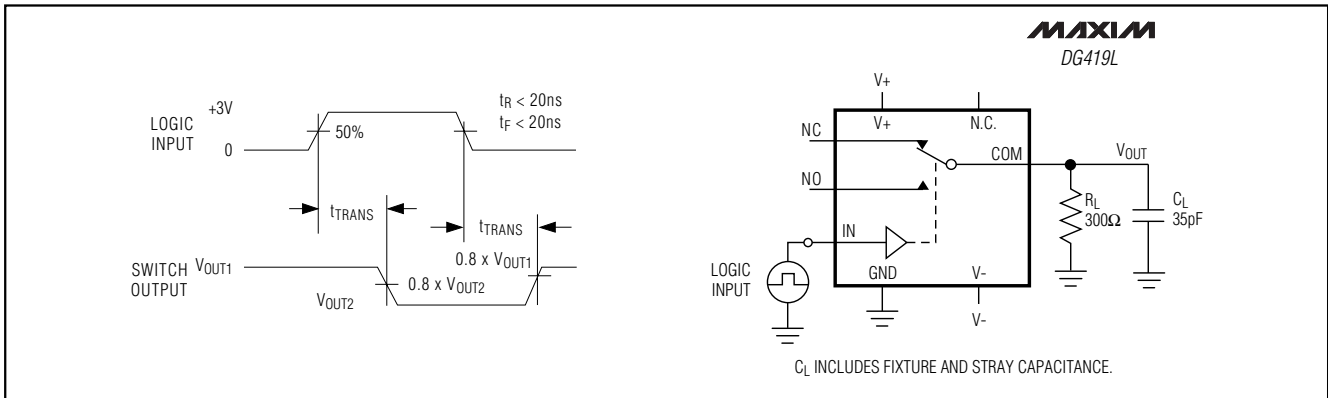


Figure 2. DG419L Transition Time



# 35Ω, SPST/SPDT, +3V Logic-Compatible Analog Switches

## Applications Information

### Power-Supply Sequencing-Free Operation

Most CMOS switches require specific power-supply sequencing in order to prevent device latchup. The older DG417/DG418/DG419 devices require a proper power-supply sequence of V+, V<sub>L</sub>, then V-. Otherwise,

it is necessary to add signal diodes to the circuit in order to prevent potential latchups. The new DG417L/DG418L/DG419L devices eliminate the need for a V<sub>L</sub> input and allow any power-up sequence. Do not exceed the absolute maximum ratings because stresses beyond the listed ratings may cause permanent damage to the devices.

## Test Circuits/Timing Diagrams (continued)

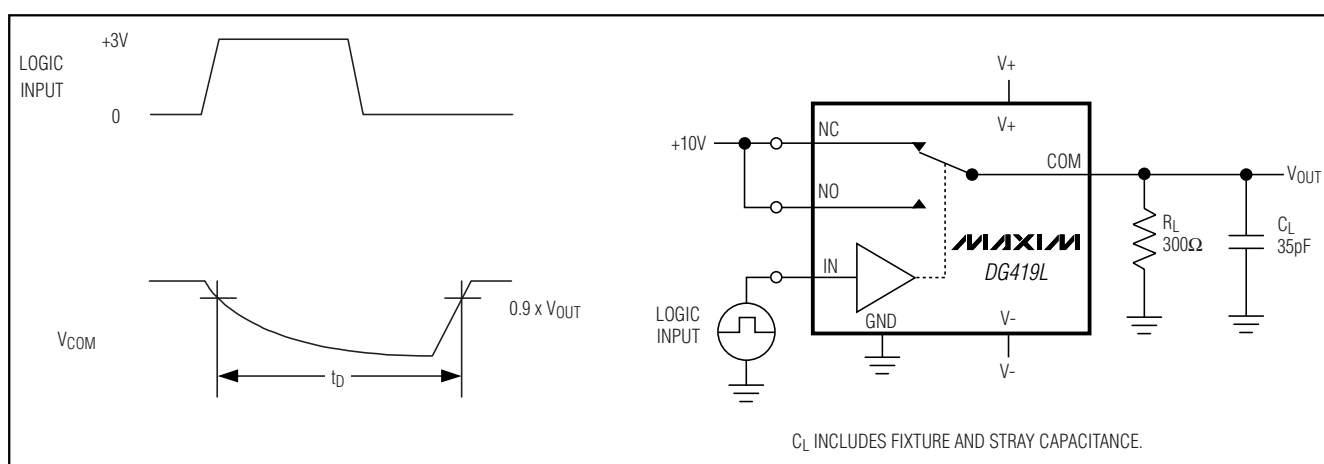


Figure 3. DG419L Break-Before-Make Interval

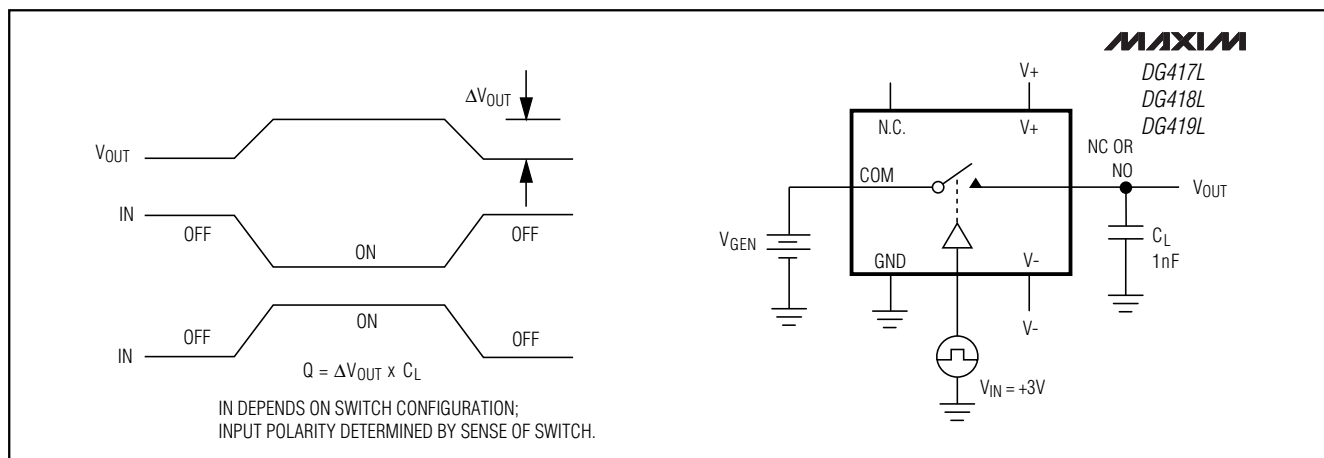


Figure 4. Charge Injection

# 35Ω, SPST/SPDT, +3V Logic-Compatible Analog Switches

## Test Circuits/Timing Diagrams (continued)

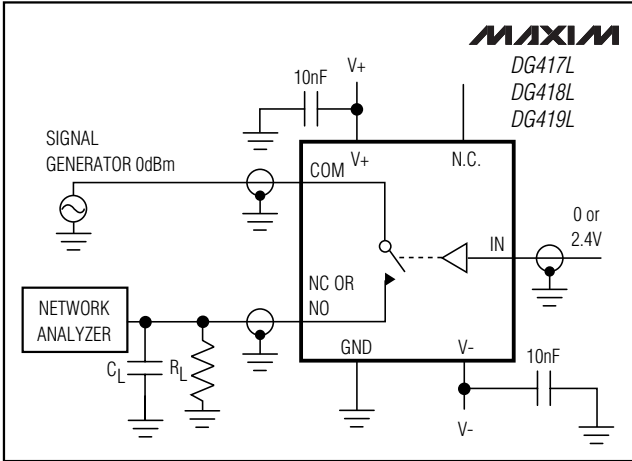


Figure 5. Off-Isolation

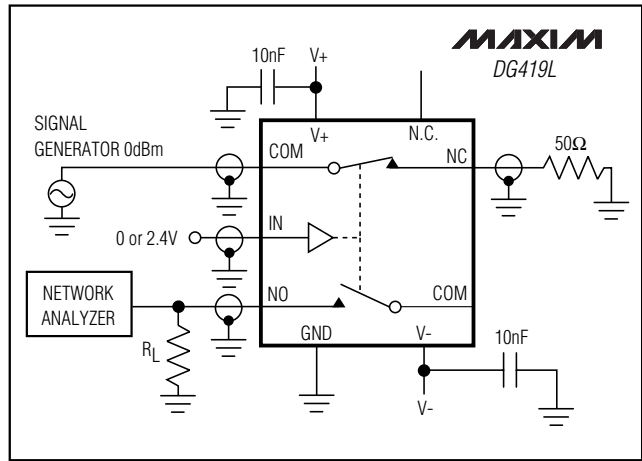


Figure 6. DG419L Crosstalk

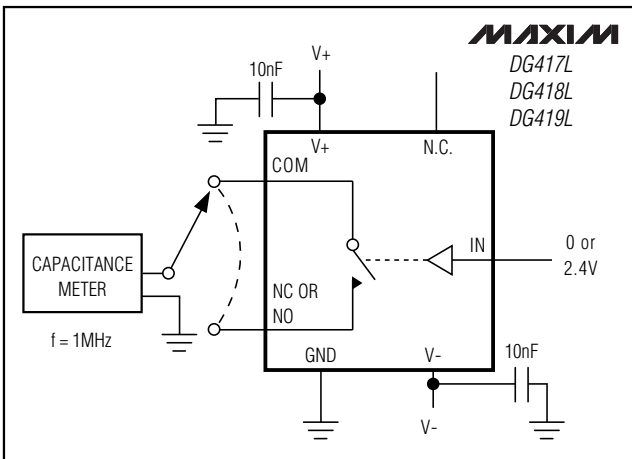


Figure 7. Channel Off-Capacitance

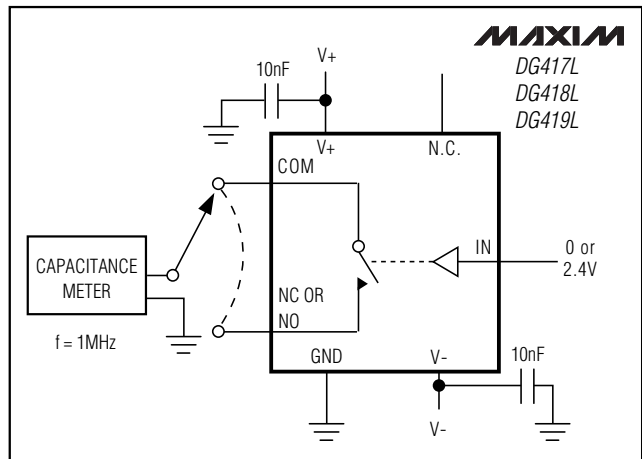


Figure 8. Channel On-Capacitance

### Ordering Information (continued)

| PART      | TEMP. RANGE    | PIN-PACKAGE   |
|-----------|----------------|---------------|
| DG418LEUA | -40°C to +85°C | 8 μMAX        |
| DG418LDY  | -40°C to +85°C | 8 SO          |
| DG418LDJ  | -40°C to +85°C | 8 Plastic DIP |
| DG419LEUA | -40°C to +85°C | 8 μMAX        |
| DG419LDY  | -40°C to +85°C | 8 SO          |
| DG419LDJ  | -40°C to +85°C | 8 Plastic DIP |

### Chip Information

TRANSISTOR COUNT: 40  
PROCESS: CMOS

# 35Ω, SPST/SPDT, +3V Logic-Compatible Analog Switches

## Package Information

DG417L/DG418L/DG419L

|    | INCHES |       | MILLIMETERS |      | JEDEC  |       |      |      |
|----|--------|-------|-------------|------|--------|-------|------|------|
|    | MIN    | MAX   | MIN         | MAX  | MIN    | MAX   | MIN  | MAX  |
| A  | 0.037  | 0.043 | 0.94        | 1.10 | ---    | 0.043 | ---  | 1.10 |
| A1 | 0.002  | 0.006 | 0.05        | 0.15 | 0.002  | 0.006 | 0.05 | 0.15 |
| B  | 0.010  | 0.014 | 0.25        | 0.36 | 0.010  | 0.016 | 0.25 | 0.40 |
| C  | 0.005  | 0.007 | 0.13        | 0.18 | 0.005  | 0.009 | 0.13 | 0.23 |
| D  | 0.116  | 0.120 | 2.95        | 3.05 | 0.114  | 0.122 | 2.9  | 3.1  |
| e  | 0.0256 | BSC   | 0.65        | BSC  | 0.0256 | BSC   | 0.64 | BSC  |
| E  | 0.116  | 0.120 | 2.95        | 3.05 | 0.114  | 0.122 | 2.9  | 3.1  |
| H  | 0.188  | 0.198 | 4.78        | 5.03 | 0.193  | BSC   | 4.9  | BSC  |
| L  | 0.016  | 0.026 | 0.41        | 0.66 | 0.016  | 0.027 | 0.40 | 0.70 |
| α  | 0°     | 6°    | 0°          | 6°   | 0°     | 6°    | 0°   | 6°   |
| S  | 0.0207 | BSC   | 0.5250      | BSC  |        |       |      |      |

NOTES:  
 1. D&E DO NOT INCLUDE MOLD FLASH.  
 2. MOLD FLASH OR PROTRUSIONS NOT TO EXCEED 0.15MM (.006").  
 3. CONTROLLING DIMENSION: MILLIMETERS.  
 4. MEETS JEDEC MO-187.

8LUMAXD.EPS

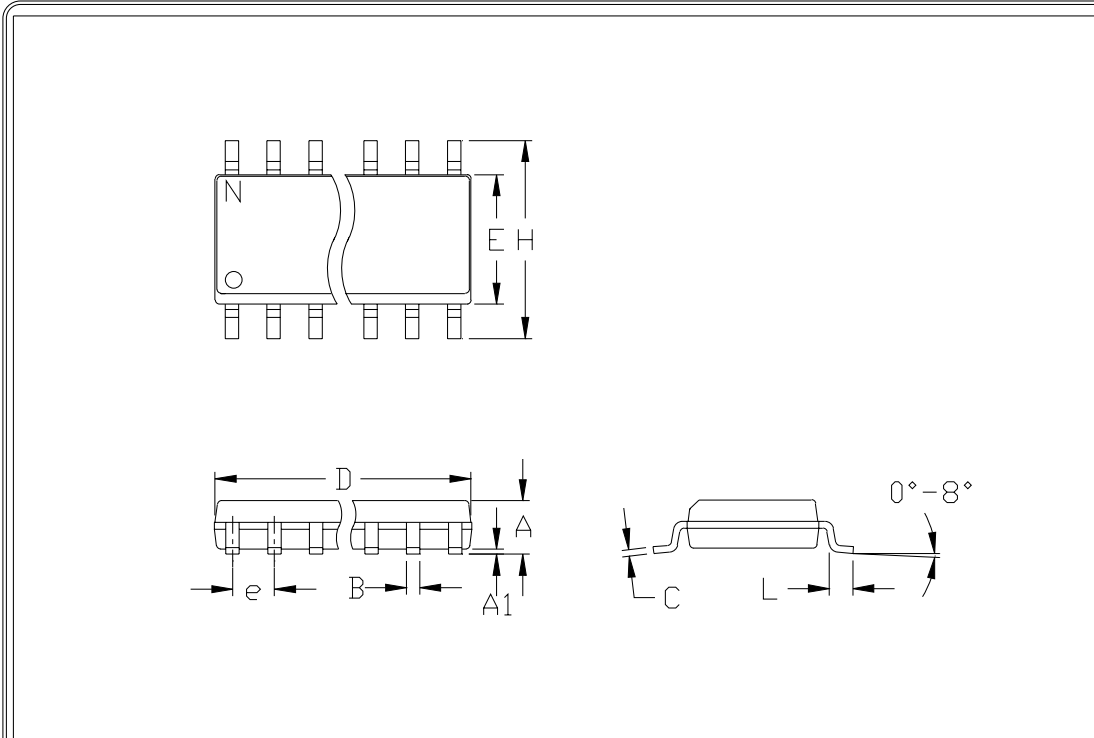
PROPRIETARY INFORMATION

TITLE:  
PACKAGE OUTLINE, 8L uMAX

|          |                                 |          |     |
|----------|---------------------------------|----------|-----|
| APPROVAL | DOCUMENT CONTROL NO.<br>21-0036 | REV<br>I | 1/1 |
|----------|---------------------------------|----------|-----|

# 35Ω, SPST/SPDT, +3V Logic-Compatible Analog Switches

## Package Information (continued)



|    | INCHES |       | MILLIMETERS |      |
|----|--------|-------|-------------|------|
|    | MIN    | MAX   | MIN         | MAX  |
| A  | 0.053  | 0.069 | 1.35        | 1.75 |
| A1 | 0.004  | 0.010 | 0.10        | 0.25 |
| B  | 0.014  | 0.019 | 0.35        | 0.49 |
| C  | 0.007  | 0.010 | 0.19        | 0.25 |
| e  | 0.050  |       | 1.27        |      |
| E  | 0.150  | 0.157 | 3.80        | 4.00 |
| H  | 0.228  | 0.244 | 5.80        | 6.20 |
| h  | 0.010  | 0.020 | 0.25        | 0.50 |
| L  | 0.016  | 0.050 | 0.40        | 1.27 |

|   | INCHES |       | MILLIMETERS |       | N  | MS012 |
|---|--------|-------|-------------|-------|----|-------|
|   | MIN    | MAX   | MIN         | MAX   |    |       |
| D | 0.189  | 0.197 | 4.80        | 5.00  | 8  | A     |
| D | 0.337  | 0.344 | 8.55        | 8.75  | 14 | B     |
| D | 0.386  | 0.394 | 9.80        | 10.00 | 16 | C     |

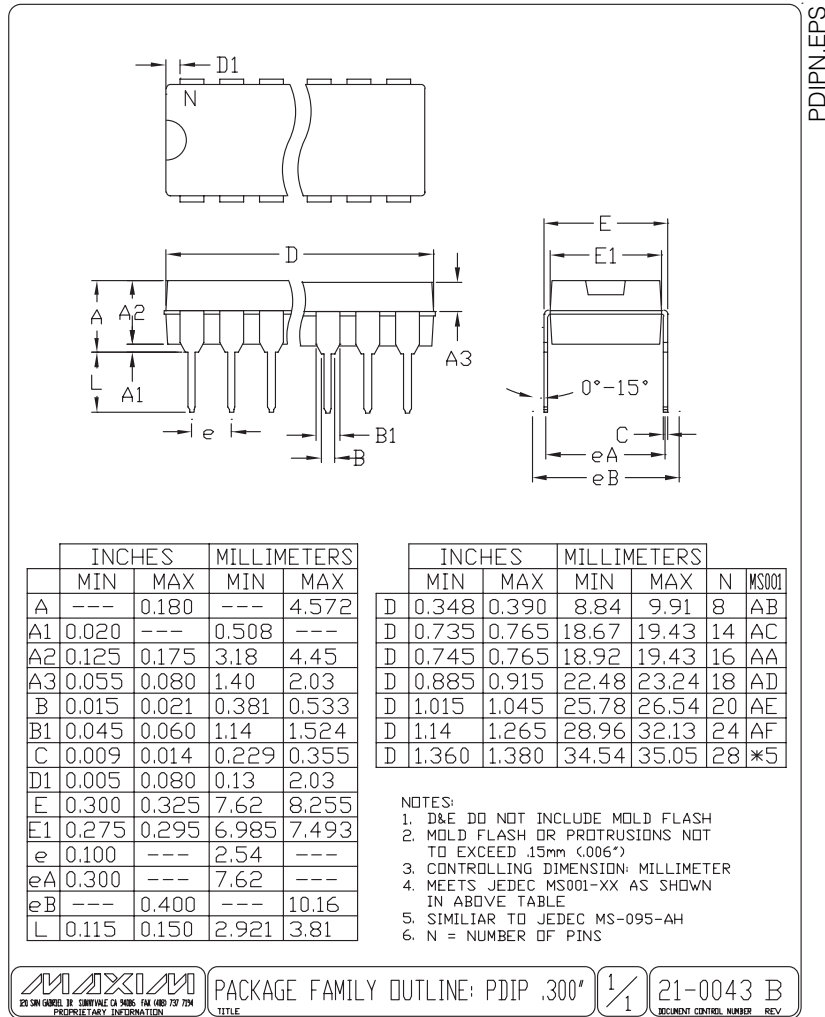
NOTES:

1. D&E DO NOT INCLUDE MOLD FLASH
2. MOLD FLASH OR PROTRUSIONS NOT TO EXCEED .15mm (.006")
3. LEADS TO BE COPLANAR WITHIN .102mm (.004")
4. CONTROLLING DIMENSION: MILLIMETER
5. MEETS JEDEC MS012-XX AS SHOWN IN ABOVE TABLE
6. N = NUMBER OF PINS

# 35Ω, SPST/SPDT, +3V Logic Compatible Analog Switches

## Package Information (continued)

DG417L/DG418L/DG419L



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