



# Improved, 8-Channel/Dual 4-Channel, CMOS Analog Multiplexers

**DG408/DG409**

## General Description

Maxim's redesigned DG408 and DG409 CMOS analog multiplexers now feature guaranteed matching between channels ( $8\Omega$  max) and flatness over the specified signal range ( $9\Omega$  max). These low on-resistance muxes ( $100\Omega$  max) conduct equally well in either direction and feature guaranteed low charge injection ( $15\text{pC}$  max). In addition, these new muxes offer low input off-leakage current over temperature—less than  $5\text{nA}$  at  $+85^\circ\text{C}$ .

The DG408 is a 1-of-8 multiplexer/demultiplexer and the DG409 is a dual 4-channel multiplexer/demultiplexer. Both muxes operate with a  $+4.5\text{V}$  to  $+30\text{V}$  single supply and with  $\pm 4.5\text{V}$  to  $\pm 20\text{V}$  dual supplies. ESD protection is guaranteed to be greater than  $2000\text{V}$  per Method 3015.7 of MIL-STD-883. These improved muxes are pin-compatible plug-in upgrades for the industry standard DG408 and DG409.

## Applications

Sample-and-Hold Circuits  
Test Equipment  
Guidance and Control Systems  
Communications Systems  
Data-Acquisition Systems  
Audio Signal Routing

## Features

- ◆ Pin-Compatible Plug-In Upgrades for Industry Standard DG408/DG409
- ◆ Guaranteed Matching Between Channels,  $8\Omega$  Max
- ◆ Guaranteed On-Resistance Flatness,  $9\Omega$  Max
- ◆ Guaranteed Low Charge Injection,  $15\text{pC}$  Max
- ◆ Low On-Resistance,  $100\Omega$  Max
- ◆ Input Leakage,  $5\text{nA}$  Max at  $+85^\circ\text{C}$
- ◆ Low Power Consumption,  $1.25\text{mW}$  Max
- ◆ Rail-to-Rail Signal Handling
- ◆ Digital Input Controls TTL/CMOS Compatible
- ◆ ESD Protection  $>2000\text{V}$  per Method 3015.7

## Ordering Information

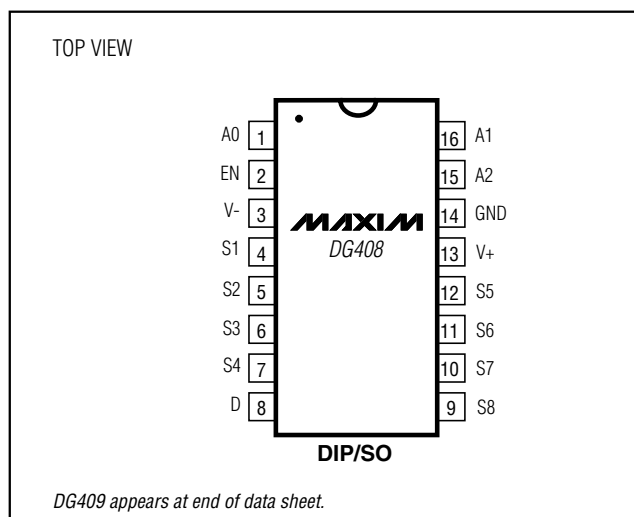
| PART     | TEMP. RANGE                                 | PIN-PACKAGE    |
|----------|---------------------------------------------|----------------|
| DG408CJ  | $0^\circ\text{C}$ to $+70^\circ\text{C}$    | 16 Plastic DIP |
| DG408CY  | $0^\circ\text{C}$ to $+70^\circ\text{C}$    | 16 Narrow SO   |
| DG408C/D | $0^\circ\text{C}$ to $+70^\circ\text{C}$    | Dice*          |
| DG408DJ  | $-40^\circ\text{C}$ to $+85^\circ\text{C}$  | 16 Plastic DIP |
| DG408DY  | $-40^\circ\text{C}$ to $+85^\circ\text{C}$  | 16 Narrow SO   |
| DG408DK  | $-40^\circ\text{C}$ to $+85^\circ\text{C}$  | 16 Cerdip      |
| DG408AK  | $-55^\circ\text{C}$ to $+125^\circ\text{C}$ | 16 Cerdip**    |

Ordering Information continued at end of data sheet.

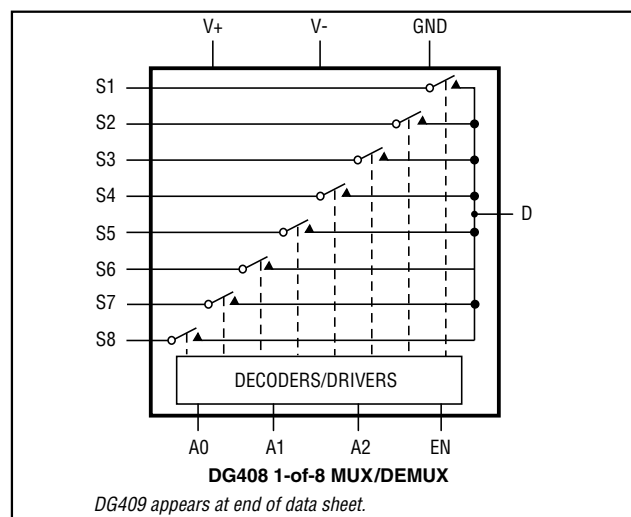
\* Contact factory for dice specifications.

\*\* Contact factory for availability.

## Pin Configurations



## Functional Diagrams



Maxim Integrated Products 1

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## ABSOLUTE MAXIMUM RATINGS

Voltage Referenced to V-

V+ .....-0.3V, 44V

GND .....-0.3V, 25V

Digital Inputs, S, D (Note 1).....(V- - 2V) to (V+ + 2V) or  
30mA, (whichever occurs first)

Continuous Current (any terminal).....30mA

Peak Current, S, D  
(pulsed at 1ms, 10% duty cycle max) .....100mA

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

Plastic DIP (derate 10.53mW/°C above +70°C) .....842mW

Narrow SO (derate 8.70mW/°C above +70°C) .....696mW

CERDIP (derate 10.00mW/°C above +70°C) .....800mW

Operating Temperature Ranges

DG408/DG409C .....0°C to +70°C

DG408/DG409D .....-40°C to +85°C

DG408/DG409AK .....-55°C to +125°C

Storage Temperature Range .....-65°C to +150°C

Lead Temperature (soldering, 10sec) .....+300°C

**Note 1:** Signals on S<sub>-</sub>, D<sub>-</sub>, EN, A0, A1, or A2 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 Supplies

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

| PARAMETER                                  | SYMBOL               | CONDITIONS                                                                        |                                                          |                                                          | MIN  | TYP<br>(Note 2) | MAX  | UNITS |    |
|--------------------------------------------|----------------------|-----------------------------------------------------------------------------------|----------------------------------------------------------|----------------------------------------------------------|------|-----------------|------|-------|----|
| SWITCH                                     |                      |                                                                                   |                                                          |                                                          |      |                 |      |       |    |
| Analog Signal Range                        | V <sub>ANALOG</sub>  | (Note 3)                                                                          |                                                          |                                                          | -15  |                 | 15   | V     |    |
| Drain-Source<br>On-Resistance              | r <sub>DS(ON)</sub>  | I <sub>S</sub> = -1.0mA,<br>V <sub>D</sub> = ±10V                                 | T <sub>A</sub> = +25°C                                   |                                                          | 60   |                 | 100  | Ω     |    |
|                                            |                      |                                                                                   | T <sub>A</sub> = T <sub>MIN</sub> to T <sub>MAX</sub>    |                                                          |      |                 | 125  |       |    |
| On-Resistance Matching<br>Between Channels | Δr <sub>DS(ON)</sub> | I <sub>S</sub> = -1.0mA,<br>V <sub>D</sub> = ±10V (Note 4)                        | T <sub>A</sub> = +25°C                                   |                                                          | 1.5  |                 | 8    | Ω     |    |
|                                            |                      |                                                                                   | T <sub>A</sub> = T <sub>MIN</sub> to T <sub>MAX</sub>    |                                                          |      |                 | 10   |       |    |
| On-Resistance Flatness                     | r <sub>FLAT</sub>    | I <sub>S</sub> = -1.0mA,<br>V <sub>D</sub> = ±5V or 0V                            | T <sub>A</sub> = +25°C                                   |                                                          | 1.8  |                 | 9    | Ω     |    |
|                                            |                      |                                                                                   | T <sub>A</sub> = T <sub>MIN</sub> to T <sub>MAX</sub>    |                                                          |      |                 | 12   |       |    |
| Source-Off Leakage Current<br>(Note 5)     | I <sub>S(OFF)</sub>  | V <sub>D</sub> = +10V,<br>V <sub>S</sub> = ±10V,<br>V <sub>EN</sub> = 0V          | T <sub>A</sub> = +25°C                                   |                                                          | -0.5 | 0.01            | 0.5  | nA    |    |
|                                            |                      |                                                                                   | T <sub>A</sub> = T <sub>MIN</sub><br>to T <sub>MAX</sub> | C, D                                                     | -5   |                 | 5    |       |    |
|                                            |                      |                                                                                   |                                                          | A                                                        |      | -50             |      |       | 50 |
| Drain-Off Leakage Current<br>(Note 5)      | I <sub>D(OFF)</sub>  | V <sub>D</sub> = ±10V,<br>V <sub>S</sub> = +10V,<br>V <sub>EN</sub> = 0V          | DG408                                                    | T <sub>A</sub> = +25°C                                   |      | -1              | 0.02 | 1     | nA |
|                                            |                      |                                                                                   |                                                          | T <sub>A</sub> = T <sub>MIN</sub><br>to T <sub>MAX</sub> | C, D | -10             |      | 10    |    |
|                                            |                      |                                                                                   |                                                          |                                                          | A    |                 | -100 |       |    |
|                                            |                      | V <sub>D</sub> = +10V,<br>V <sub>S</sub> = ±10V,<br>V <sub>EN</sub> = 0V          | DG409                                                    | T <sub>A</sub> = +25°C                                   |      | -1              | 0.02 | 1     |    |
|                                            |                      |                                                                                   |                                                          | T <sub>A</sub> = T <sub>MIN</sub><br>to T <sub>MAX</sub> | C, D | -5              |      | 5     |    |
|                                            |                      |                                                                                   |                                                          |                                                          | A    |                 | -50  |       |    |
| Drain-On Leakage Current<br>(Note 5)       | I <sub>D(ON)</sub>   | V <sub>D</sub> = ±10V,<br>V <sub>S</sub> = ±10V,<br>sequence<br>each switch<br>on | DG408                                                    | T <sub>A</sub> = +25°C                                   |      | -1              | 0.02 | 1     | nA |
|                                            |                      |                                                                                   |                                                          | T <sub>A</sub> = T <sub>MIN</sub><br>to T <sub>MAX</sub> | C, D | -20             |      | 20    |    |
|                                            |                      |                                                                                   |                                                          |                                                          | A    |                 | -100 |       |    |
|                                            |                      |                                                                                   | DG409                                                    | T <sub>A</sub> = +25°C                                   |      | -1              | 0.02 | 1     |    |
|                                            |                      |                                                                                   |                                                          | T <sub>A</sub> = T <sub>MIN</sub><br>to T <sub>MAX</sub> | C, D | -10             |      | 10    |    |
|                                            |                      |                                                                                   |                                                          |                                                          | A    |                 | -50  |       |    |

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DG408/DG409

## ELECTRICAL CHARACTERISTICS—Dual Supplies (continued)

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

| PARAMETER                             | SYMBOL                                        | CONDITIONS                                                                                            |                                                       | MIN                    | TYP<br>(Note 2) | MAX | UNITS |
|---------------------------------------|-----------------------------------------------|-------------------------------------------------------------------------------------------------------|-------------------------------------------------------|------------------------|-----------------|-----|-------|
| INPUT                                 |                                               |                                                                                                       |                                                       |                        |                 |     |       |
| Input Current with Input Voltage High | I <sub>AH</sub>                               | V <sub>A</sub> = 2.4V or 15V                                                                          |                                                       | -1.0                   |                 | 1.0 | μA    |
| Input Current with Input Voltage Low  | I <sub>AL</sub>                               | V <sub>EN</sub> = 0V or 2.4V,<br>V <sub>A</sub> = 0V                                                  |                                                       | -1.0                   |                 | 1.0 | μA    |
| SUPPLY                                |                                               |                                                                                                       |                                                       |                        |                 |     |       |
| Power-Supply Range                    |                                               |                                                                                                       |                                                       | ±4.5                   |                 | ±20 | V     |
| Positive Supply Current               | I <sub>+</sub>                                | V <sub>EN</sub> = V <sub>A</sub> = 0V or 4.5V                                                         | T <sub>A</sub> = +25°C                                | 16                     |                 | 30  | μA    |
|                                       |                                               |                                                                                                       | T <sub>A</sub> = T <sub>MIN</sub> to T <sub>MAX</sub> |                        |                 | 75  |       |
|                                       |                                               | V <sub>EN</sub> = 2.4V,<br>V <sub>A(ALL)</sub> = 0V or 2.4V                                           | T <sub>A</sub> = +25°C                                | 0.075                  |                 | 0.5 | mA    |
|                                       |                                               |                                                                                                       | T <sub>A</sub> = T <sub>MIN</sub> to T <sub>MAX</sub> |                        |                 | 2   |       |
| Negative Supply Current               | I <sub>-</sub>                                | V <sub>EN</sub> = 2.4V,<br>V <sub>A(ALL)</sub> = 0V or 2.4V                                           | T <sub>A</sub> = +25°C                                | -1                     |                 | 1   | μA    |
|                                       |                                               |                                                                                                       | T <sub>A</sub> = T <sub>MIN</sub> to T <sub>MAX</sub> | -10                    |                 | 10  |       |
| DYNAMIC                               |                                               |                                                                                                       |                                                       |                        |                 |     |       |
| Transition Time                       | t <sub>TRANS</sub>                            | Figure 2                                                                                              | T <sub>A</sub> = +25°C                                | 85                     |                 | 175 | ns    |
|                                       |                                               |                                                                                                       | T <sub>A</sub> = T <sub>MIN</sub> to T <sub>MAX</sub> |                        |                 | 250 |       |
| Break-Before-Make Interval            | t <sub>OPEN</sub>                             | Figure 4                                                                                              | T <sub>A</sub> = +25°C                                | 10                     |                 | 40  | ns    |
| Enable Turn-On Time                   | t <sub>ON(EN)</sub>                           | Figure 3                                                                                              | T <sub>A</sub> = +25°C                                | 85                     |                 | 150 | ns    |
|                                       |                                               |                                                                                                       | T <sub>A</sub> = T <sub>MIN</sub> to T <sub>MAX</sub> |                        |                 | 225 |       |
| Enable Turn-Off Time                  | t <sub>OFF(EN)</sub>                          | Figure 3                                                                                              | T <sub>A</sub> = +25°C                                |                        |                 | 150 | ns    |
|                                       |                                               |                                                                                                       | T <sub>A</sub> = T <sub>MIN</sub> to T <sub>MAX</sub> |                        |                 | 300 |       |
| Charge Injection (Note 3)             | Q                                             | C <sub>L</sub> = 1.0nF,<br>V <sub>S</sub> = 0V,<br>R <sub>S</sub> = 0Ω, Figure 5                      | T <sub>A</sub> = +25°C                                | 2                      |                 | 15  | pC    |
| Off Isolation (Note 6)                | V <sub>ISO</sub>                              | V <sub>EN</sub> = 0V,<br>R <sub>L</sub> = 1kΩ,<br>f = 100kHz, Figure 6                                | T <sub>A</sub> = +25°C                                | -75                    |                 |     | dB    |
| Crosstalk Between Input Channels      | V <sub>CT</sub>                               | V <sub>EN</sub> = 2.4V,<br>f = 100kHz,<br>V <sub>GEN</sub> = 1VP-P,<br>R <sub>L</sub> = 1kΩ, Figure 7 | T <sub>A</sub> = +25°C                                | -92                    |                 |     | dB    |
| Logic Input Capacitance               | C <sub>IN</sub>                               | f = 1MHz                                                                                              | T <sub>A</sub> = +25°C                                | 8                      |                 |     | pF    |
| Source-Off Capacitance                | C <sub>S(OFF)</sub>                           | f = 1MHz,<br>V <sub>EN</sub> = V <sub>S</sub> = 0V,<br>Figure 8                                       | T <sub>A</sub> = +25°C                                | 3                      |                 |     | pF    |
| Drain-Off Capacitance                 | C <sub>D(OFF)</sub>                           | f = 1MHz,<br>V <sub>EN</sub> = 0.8V<br>V <sub>D</sub> = 0V,<br>Figure 8                               | DG408<br>DG409                                        | T <sub>A</sub> = +25°C | 26              |     | pF    |
|                                       |                                               |                                                                                                       |                                                       |                        | 14              |     |       |
| Drain-On Capacitance                  | C <sub>D(ON)</sub><br>+<br>C <sub>S(ON)</sub> | f = 1MHz,<br>V <sub>EN</sub> = 2.4V<br>V <sub>D</sub> = 0V,<br>Figure 8                               | DG408<br>DG409                                        | T <sub>A</sub> = +25°C | 37              |     | pF    |
|                                       |                                               |                                                                                                       |                                                       |                        | 25              |     |       |

# Improved, 8-Channel/Dual 4-Channel, CMOS Analog Multiplexers

## ELECTRICAL CHARACTERISTICS—Single Supply

(V<sub>+</sub> = 12V, V<sub>-</sub> = 0V, GND = 0V, V<sub>AH</sub> = +2.4V, V<sub>AL</sub> = +0.8V, T<sub>A</sub> = T<sub>MIN</sub> to T<sub>MAX</sub>, unless otherwise noted.)

| PARAMETER                        | SYMBOL               | CONDITIONS                                                                         |                        | MIN | TYP<br>(Note 2) | MAX | UNITS |
|----------------------------------|----------------------|------------------------------------------------------------------------------------|------------------------|-----|-----------------|-----|-------|
| SWITCH                           |                      |                                                                                    |                        |     |                 |     |       |
| Analog Signal Range              | V <sub>ANALOG</sub>  | (Note 3)                                                                           |                        | 0   |                 | 12  | V     |
| Drain-Source On-Resistance       | r <sub>DS(ON)</sub>  | I <sub>S</sub> = -1.0mA<br>V <sub>D</sub> = 3V or 10V                              | T <sub>A</sub> = +25°C |     | 120             | 175 | Ω     |
| DYNAMIC                          |                      |                                                                                    |                        |     |                 |     |       |
| Transition Time<br>(Note 3)      | t <sub>TRANS</sub>   | V <sub>S1</sub> = 8V,<br>V <sub>S8</sub> = 0V,<br>V <sub>A</sub> = 0V,<br>Figure 2 | T <sub>A</sub> = +25°C |     | 115             | 450 | ns    |
| Enable Turn-On Time<br>(Note 3)  | t <sub>ON(EN)</sub>  | V <sub>AL</sub> = 0V,<br>V <sub>S1</sub> = 5V,<br>Figure 3                         | T <sub>A</sub> = +25°C |     | 100             | 600 | ns    |
| Enable Turn-Off Time<br>(Note 3) | t <sub>OFF(EN)</sub> | V <sub>AL</sub> = 0V,<br>V <sub>S1</sub> = 5V,<br>Figure 3                         | T <sub>A</sub> = +25°C |     | 75              | 300 | ns    |
| Charge Injection                 | Q                    | C <sub>L</sub> = 1.0nF,<br>V <sub>S</sub> = 0V,<br>R <sub>S</sub> = 0Ω             | T <sub>A</sub> = +25°C |     | 2               |     | pC    |

**Note 2:** The algebraic convention where the most negative value is a minimum and the most positive value a maximum is used in this data sheet.

**Note 3:** Guaranteed by design.

**Note 4:** ΔR<sub>ON</sub> = R<sub>ON(MAX)</sub> - R<sub>ON(MIN)</sub>. On-resistance match between channels and flatness are guaranteed only with specified voltages. Flatness is defined as the difference between the maximum and minimum value of on-resistance as measured at the extremes of the specified analog signal range.

**Note 5:** Leakage parameters are 100% tested at the maximum rated hot temperature and guaranteed by correlation at +25°C.

**Note 6:** Off isolation = 20log V<sub>D</sub>/V<sub>S</sub>, where V<sub>D</sub> = output and V<sub>S</sub> = input to off switch.

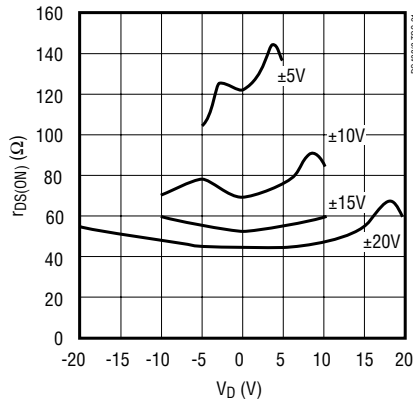
# Improved, 8-Channel/Dual 4-Channel, CMOS Analog Multiplexers

## Typical Operating Characteristics

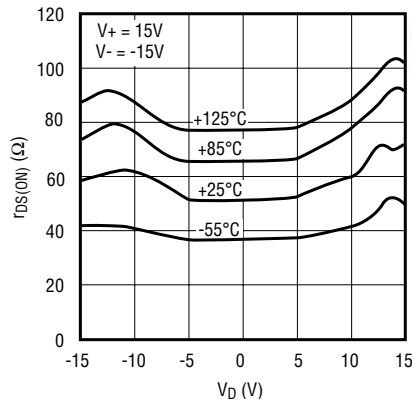
( $T_A = +25^\circ\text{C}$ , unless otherwise noted.)

DG408/DG409

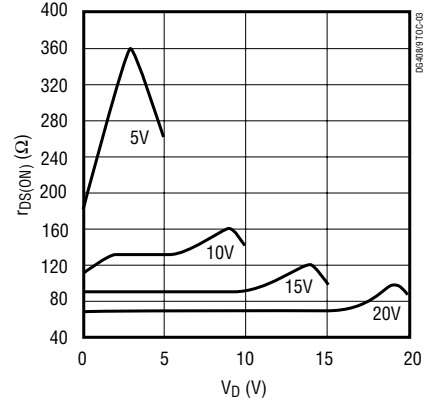
**ON-RESISTANCE vs.  $V_D$   
(DUAL SUPPLIES)**



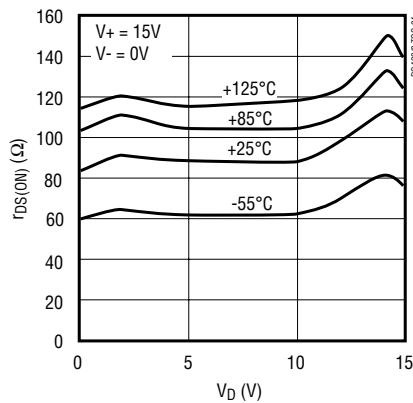
**ON-RESISTANCE vs.  $V_D$  AND  
TEMPERATURE (DUAL SUPPLIES)**



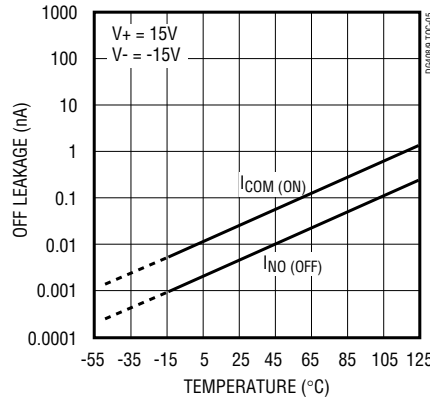
**ON-RESISTANCE vs.  $V_D$   
(SINGLE SUPPLY)**



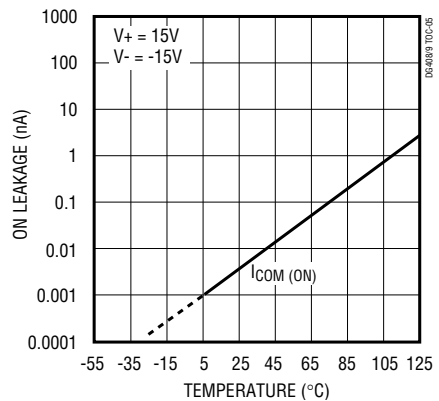
**ON-RESISTANCE vs.  $V_D$  AND  
TEMPERATURE (SINGLE SUPPLY)**



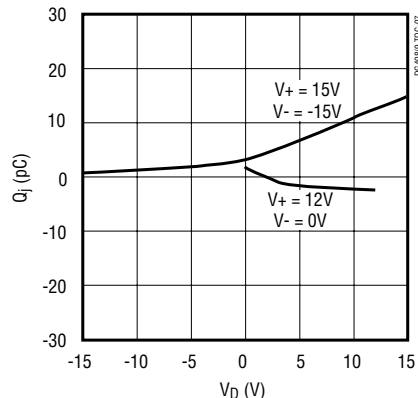
**OFF LEAKAGE vs. TEMPERATURE**



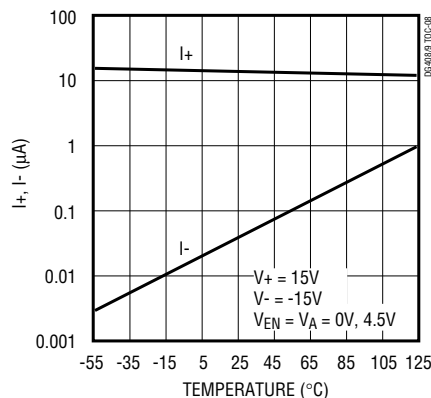
**ON LEAKAGE vs. TEMPERATURE**



**CHARGE INJECTION vs.  $V_D$**



**SUPPLY CURRENT vs. TEMPERATURE**



# Improved, 8-Channel/Dual 4-Channel, CMOS Analog Multiplexers

## Pin Description

| PIN       |       | NAME       | FUNCTION                      |
|-----------|-------|------------|-------------------------------|
| DG408     | DG409 |            |                               |
| 1, 15, 16 | —     | A0, A2, A1 | Address Inputs                |
| —         | 1, 16 | A0, A1     | Address Inputs                |
| 2         | 2     | EN         | Enable Input                  |
| 3         | 3     | V-         | Negative Supply Voltage Input |
| 4–7       | —     | S1–S4      | Bidirectional Analog Inputs   |
| —         | 4–7   | S1A–S4A    | Bidirectional Analog Inputs   |
| 8         | —     | D          | Bidirectional Analog Output   |
| —         | 8, 9  | DA, DB     | Bidirectional Analog Outputs  |
| 9–12      | —     | S8–S5      | Bidirectional Analog Inputs   |
| —         | 10–13 | S4B–S1B    | Bidirectional Analog Inputs   |
| 13        | 14    | V+         | Positive Supply Voltage Input |
| 14        | 15    | GND        | Ground                        |

## Applications Information

### Operation with Supply Voltages Other than 15V

Using supply voltages less than  $\pm 15\text{V}$  reduces the analog signal range. The DG408/DG409 switches operate with  $\pm 4.5\text{V}$  to  $\pm 20\text{V}$  bipolar supplies or with a  $+4.5\text{V}$  to  $+40\text{V}$  single supply. Connect V- to GND when operating with a single supply. Both device types can also operate with unbalanced supplies, such as  $+24\text{V}$  and  $-5\text{V}$ . The *Typical Operating Characteristics* graphs show typical on-resistance with 20V, 15V, 10V, and 5V supplies. (Switching times increase by a factor of two or more for operation at 5V.)

### Overvoltage Protection

Proper power-supply sequencing is recommended for all CMOS devices. Do not exceed the absolute maximum ratings, because stresses beyond the listed ratings may cause permanent damage to the devices. Always sequence V+ on first, then V-, followed by the logic inputs, S or D. If power-supply sequencing is not possible, add two small signal diodes in series with supply pins for overvoltage protection (Figure 1). Adding diodes reduces the analog signal range to 1V below V+ and 1V above V-, but does not affect the devices' low switch resistance and low leakage characteristics. Device operation is unchanged, and the difference between V+ and V- should not exceed  $+44\text{V}$ .

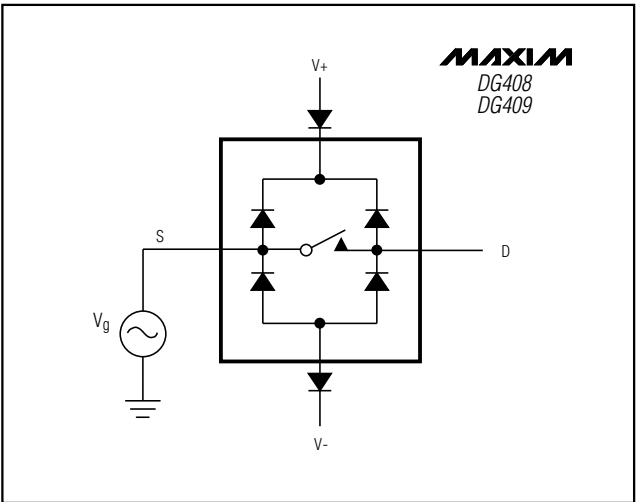


Figure 1. Overvoltage Protection Using External Blocking Diodes

# Improved, 8-Channel/Dual 4-Channel, CMOS Analog Multiplexers

## Test Circuits/Timing Diagrams

DG408/DG409

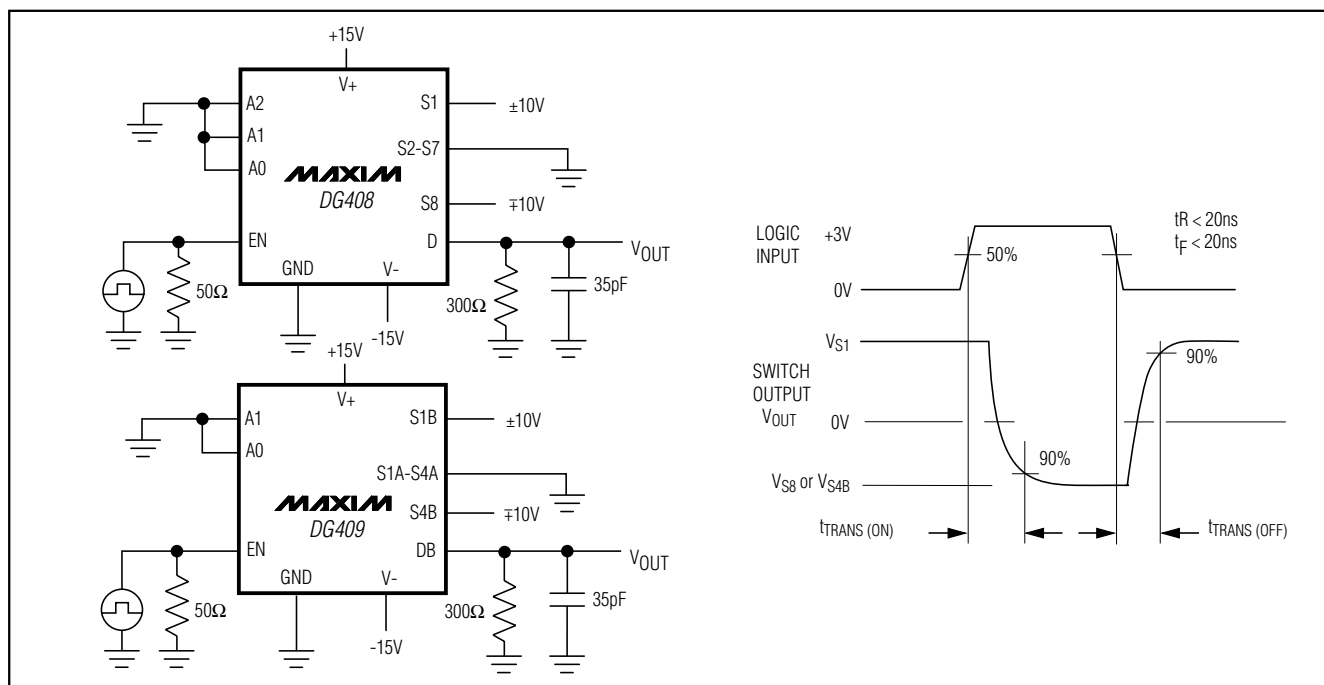


Figure 2. Transition Time

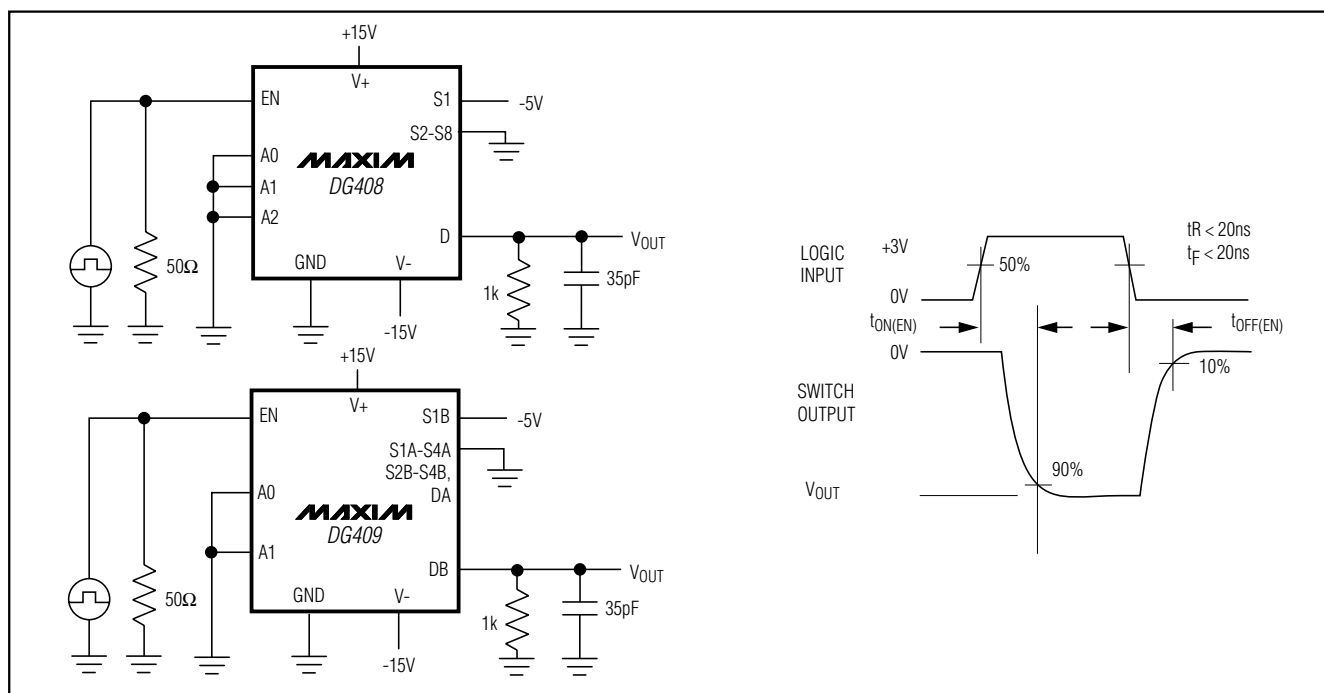


Figure 3. Enable Switching Time

# Improved, 8-Channel/Dual 4-Channel, CMOS Analog Multiplexers

## Test Circuits/Timing Diagrams (continued)

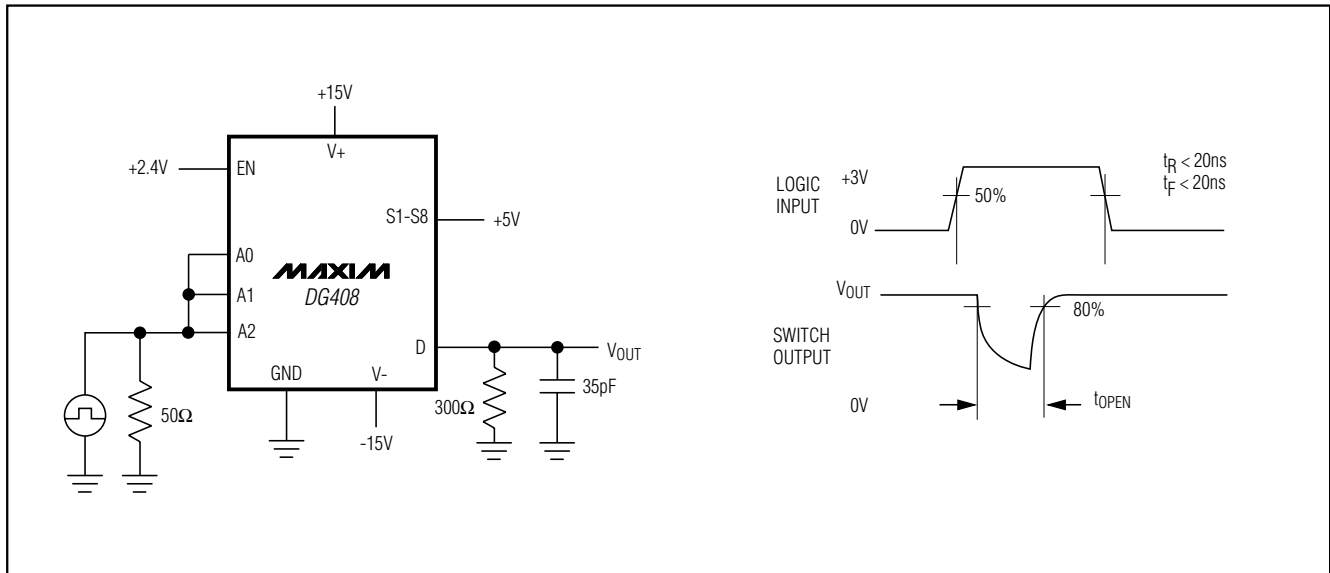


Figure 4. Break-Before-Make Interval

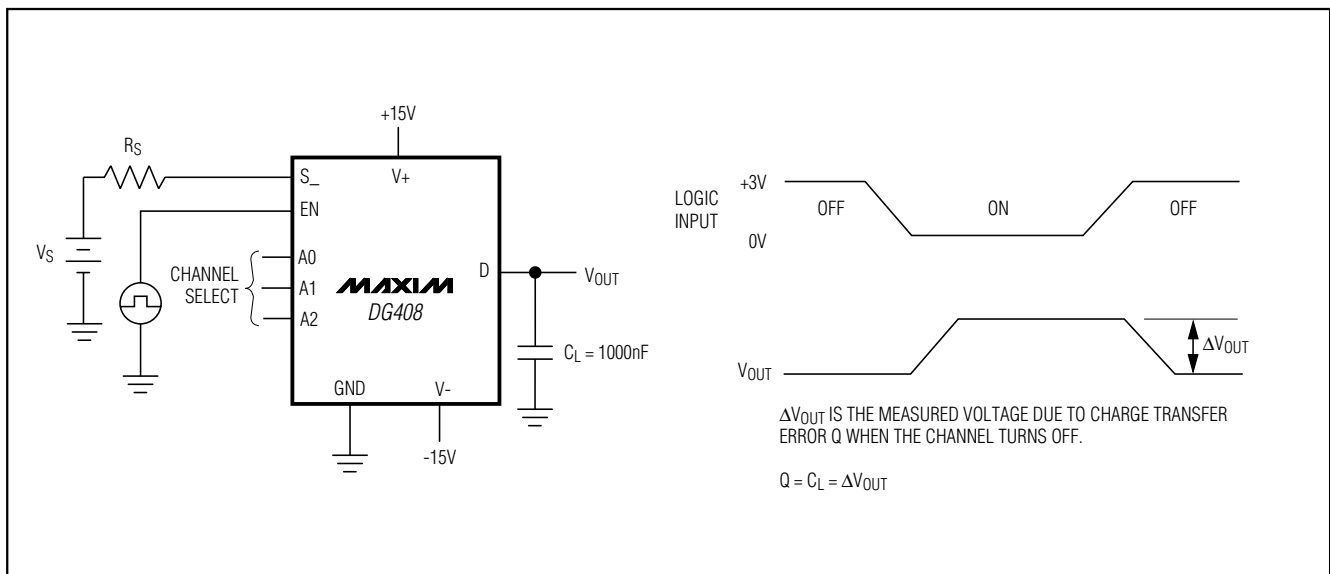


Figure 5. Charge Injection

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## Test Circuits/Timing Diagrams (continued)

DG408/DG409

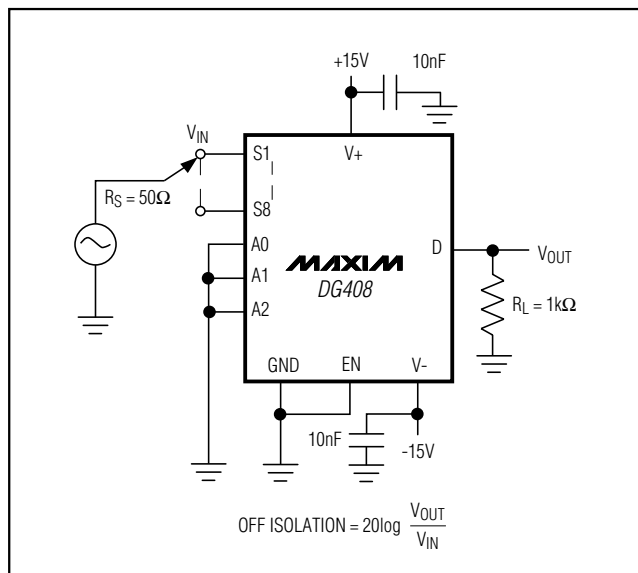


Figure 6. Off Isolation

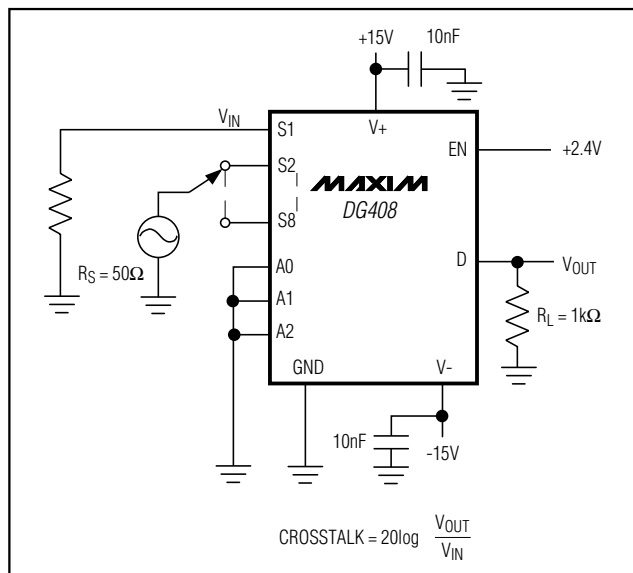


Figure 7. Crosstalk

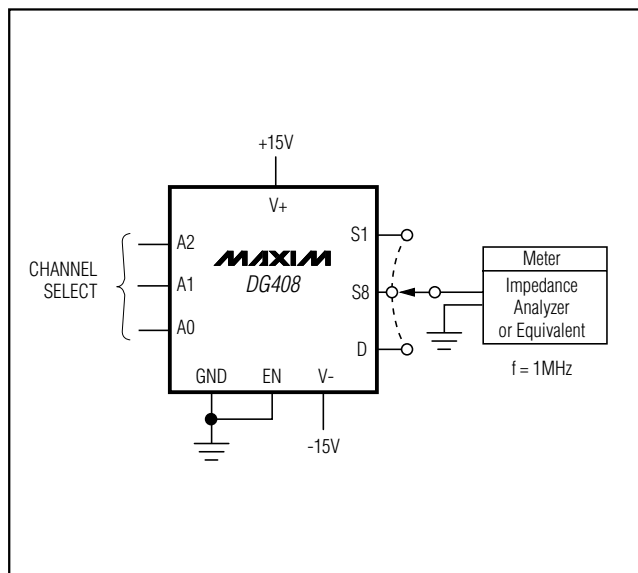
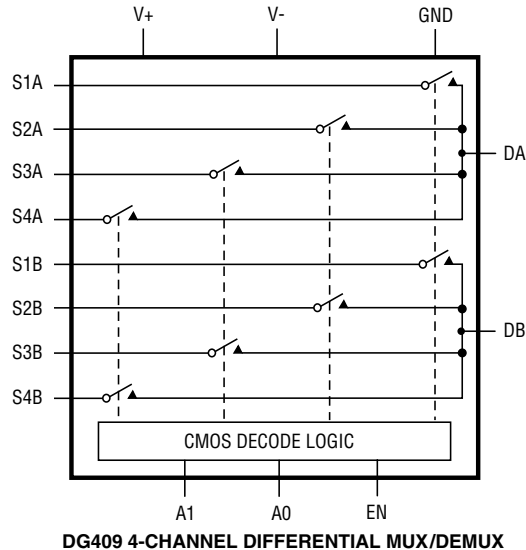
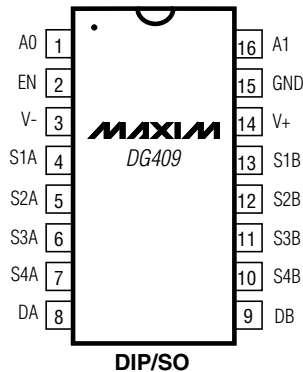


Figure 8. Source/Drain Capacitance

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## Pin Configurations/Functional Diagrams/Truth Tables (continued)

TOP VIEW



| A2 | A1 | A0 | EN | ON SWITCH |
|----|----|----|----|-----------|
| 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         |

DG408

LOGIC "0"  $V_{AL} \leq 0.8V$ , LOGIC "1"  $V_{AH} \geq 2.4V$

| A1 | A0 | EN | ON SWITCH |
|----|----|----|-----------|
| X  | X  | 0  | None      |
| 0  | 0  | 1  | 1         |
| 0  | 1  | 1  | 2         |
| 1  | 0  | 1  | 3         |
| 1  | 1  | 1  | 4         |

DG409

LOGIC "0"  $V_{AL} \leq 0.8V$ , LOGIC "1"  $V_{AH} \geq 2.4V$

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DG408/DG409

## Ordering Information (continued)

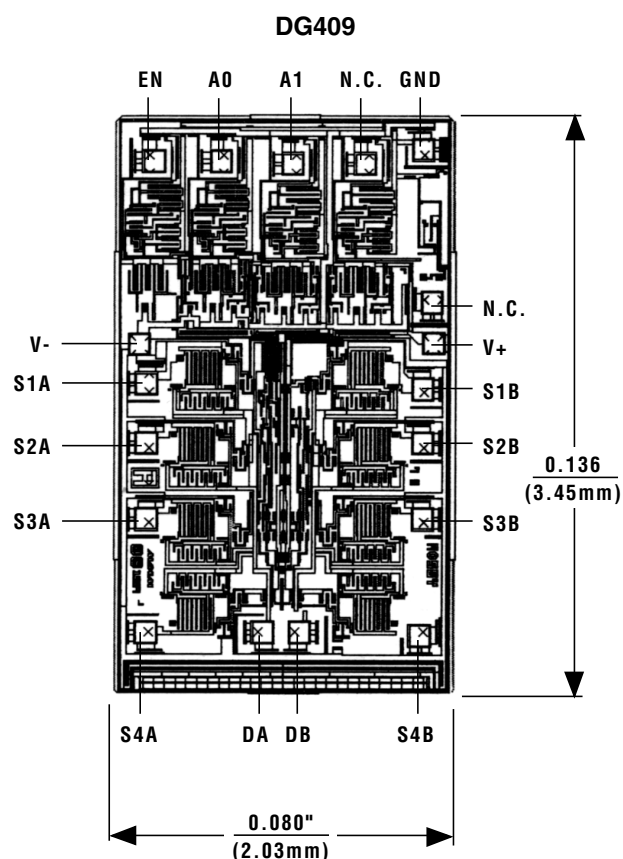
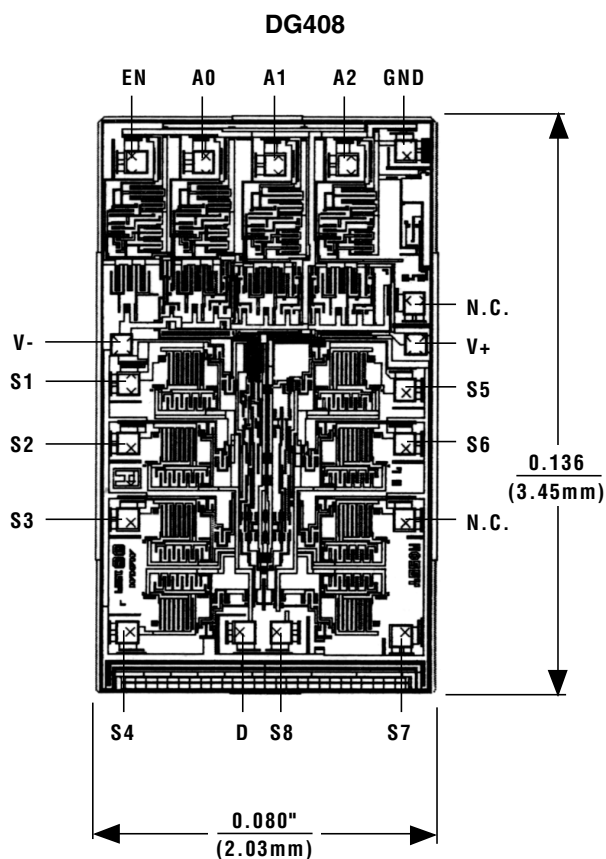
| PART     | TEMP. RANGE     | PIN-PACKAGE    |
|----------|-----------------|----------------|
| DG409CJ  | 0°C to +70°C    | 16 Plastic DIP |
| DG409CY  | 0°C to +70°C    | 16 Narrow SO   |
| DG409C/D | 0°C to +70°C    | Dice*          |
| DG409DJ  | -40°C to +85°C  | 16 Plastic DIP |
| DG409DY  | -40°C to +85°C  | 16 Narrow SO   |
| DG409DK  | -40°C to +85°C  | 16 CERDIP      |
| DG409AK  | -55°C to +125°C | 16 CERDIP**    |

\* Contact factory for dice specifications.

\*\* Contact factory for availability.

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## Chip Topographies



N.C. = NO INTERNAL CONNECTION

TRANSISTOR COUNT: 122  
SUBSTRATE CONNECTED TO V+

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SUBSTRATE CONNECTED TO V+

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