



# Improved, 16-Channel/Dual 8-Channel, CMOS Analog Multiplexers

## General Description

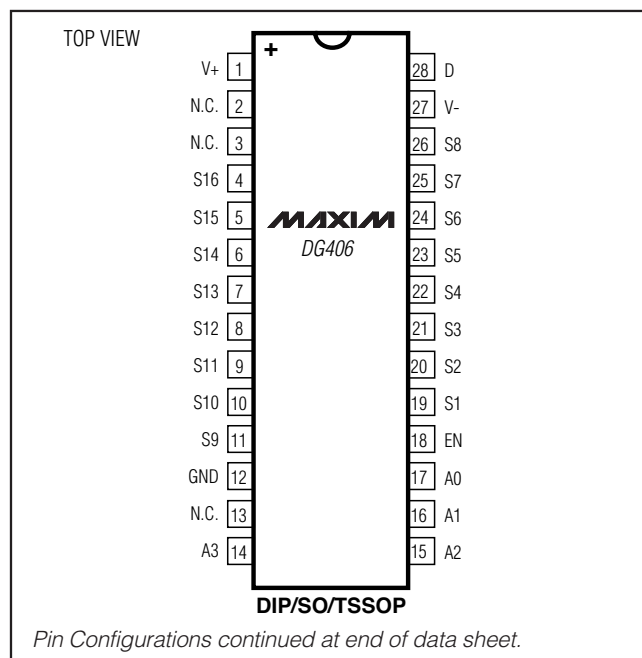
Maxim's redesigned DG406 and DG407 CMOS analog multiplexers now feature guaranteed matching between channels ( $8\Omega$ , max) and flatness over the specified signal range ( $9\Omega$ , max). These low on-resistance muxes ( $100\Omega$ , max) conduct equally well in either direction and feature guaranteed 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 DG406 is a 1 of 16 multiplexer/demultiplexer and the DG407 is a dual 8-channel multiplexer/demultiplexer. Both muxes operate with a  $+5\text{V}$  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 DG406 and DG407.

## Applications

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

## Pin Configurations



## Features

- ◆ Pin-Compatible Plug-In Upgrade for Industry Standard DG406/DG407
- ◆ 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

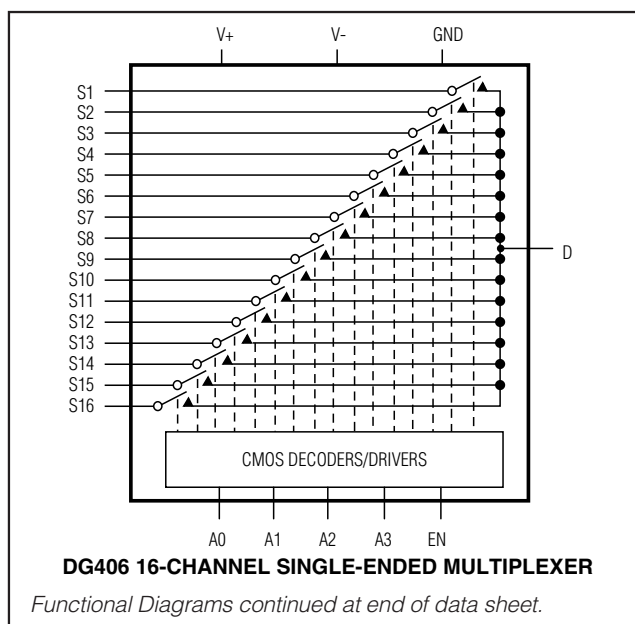
| PART      | TEMP RANGE                                  | PIN-PACKAGE    |
|-----------|---------------------------------------------|----------------|
| DG406CJ+  | $0^\circ\text{C}$ to $+70^\circ\text{C}$    | 28 Plastic DIP |
| DG406CWI+ | $0^\circ\text{C}$ to $+70^\circ\text{C}$    | 28 Wide SO     |
| DG406C/D  | $0^\circ\text{C}$ to $+70^\circ\text{C}$    | Dice*          |
| DG406DJ+  | $-40^\circ\text{C}$ to $+85^\circ\text{C}$  | 28 Plastic DIP |
| DG406EWI+ | $-40^\circ\text{C}$ to $+85^\circ\text{C}$  | 28 Wide SO     |
| DG406DN+  | $-40^\circ\text{C}$ to $+85^\circ\text{C}$  | 28 PLCC        |
| DG406AK+  | $-55^\circ\text{C}$ to $+125^\circ\text{C}$ | 28 CERDIP      |
| DG406EUI+ | $-40^\circ\text{C}$ to $+85^\circ\text{C}$  | 28 TSSOP       |

Ordering Information continued at end of data sheet.

\*Contact factory for dice specifications.

+Denotes a lead(Pb)-free/RoHS-compliant package.

## Functional Diagrams



# Improved, 16-Channel/Dual 8-Channel, CMOS Analog Multiplexers

## 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 or D (pulsed at 1ms, 10% duty cycle max) | .....100mA                                                   |
| Continuous Power Dissipation (T <sub>A</sub> = +70°C)    |                                                              |
| 28-Pin Plastic DIP (derate 9.09mW/°C above +70°C)        | ..727mW                                                      |
| 28-Pin Wide SO (derate 12.50mW/°C above +70°C)           | ...1000mW                                                    |
| 28-Pin PLCC (derate 10.53mW/°C above +70°C)              | .....842mW                                                   |

|                                                   |                      |
|---------------------------------------------------|----------------------|
| 28-Pin CERDIP (derate 16.67mW/°C above +70°C)     | ...1333mW            |
| 28-Pin TSSOP (derate 12.8mW/°C above +70°C)       | .....1025mW          |
| Operating Temperature Ranges                      |                      |
| DG406/DG407C_                                     | .....0°C to +70°C    |
| DG406/DG407D_                                     | .....-40°C to +85°C  |
| DG406/DG407AK                                     | .....-55°C to +125°C |
| Storage Temperature Range                         | .....-65°C to +150°C |
| Lead Temperature (excluding dice; soldering, 10s) | .....+300°C          |
| Soldering Temperature (reflow)                    |                      |
| Plastic DIP, Wide SO, TSSOP                       | .....+260°C          |
| PLCC                                              | .....+245°C          |
| CERDIP, Dice                                      | .....+240°C          |

**Note 1:** Signals on S<sub>-</sub>, D<sub>-</sub>, A0, A1, A2, A3, or EN 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, V<sub>GND</sub> = 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 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          | DG406                                                    | 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 | -40             |       | +40   |    |
|                                            |                                               |                                                                                   |                                                          |                                                          | A    | -200            |       | +200  |    |
|                                            |                                               | V <sub>D</sub> = +10V,<br>V <sub>S</sub> = ±10V,<br>V <sub>EN</sub> = 0V          | DG407                                                    | 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 | -20             |       | +20   |    |
|                                            |                                               |                                                                                   |                                                          |                                                          | A    | -100            |       | +100  |    |
| Drain-On Leakage Current<br>(Note 5)       | I <sub>D(ON)</sub><br>+<br>I <sub>S(ON)</sub> | V <sub>D</sub> = ±10V,<br>V <sub>S</sub> = ±10V,<br>sequence<br>each switch<br>on | DG406                                                    | 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 | -40             |       | +40   |    |
|                                            |                                               |                                                                                   |                                                          |                                                          | A    | -200            |       | +200  |    |
|                                            |                                               |                                                                                   | DG407                                                    | 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 | -20             |       | +20   |    |
|                                            |                                               |                                                                                   |                                                          |                                                          | A    | -100            |       | +100  |    |

# Improved, 16-Channel/Dual 8-Channel, CMOS Analog Multiplexers

## ELECTRICAL CHARACTERISTICS—Dual Supplies (continued)

(V<sub>+</sub> = 15V, V<sub>-</sub> = -15V, V<sub>GND</sub> = 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, V <sub>A</sub> = 0V                                                         |                                                       | -1.0                   |                 | +1.0 | μA    |
| SUPPLY                                |                                         |                                                                                                           |                                                       |                        |                 |      |       |
| Power-Supply Range                    |                                         |                                                                                                           |                                                       | ±4.5                   |                 | ±20  | V     |
| Positive Supply Current               | I+                                      | V <sub>EN</sub> = V <sub>A</sub> = 0V or 5.0V                                                             | 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, V <sub>A(ALL)</sub> = 0V                                                          | T <sub>A</sub> = +25°C                                | 0.075                  |                 | 0.5  | mA    |
|                                       |                                         |                                                                                                           | T <sub>A</sub> = T <sub>MIN</sub> to T <sub>MAX</sub> |                        |                 | 1    |       |
| Negative Supply Current               | I-                                      | V <sub>EN</sub> = 2.4V, V <sub>A(ALL)</sub> = 0V                                                          | 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                                | 110                    |                 | 300  | ns    |
|                                       |                                         |                                                                                                           | T <sub>A</sub> = T <sub>MIN</sub> to T <sub>MAX</sub> |                        |                 | 400  |       |
| 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                                | 130                    |                 | 200  | ns    |
|                                       |                                         |                                                                                                           | T <sub>A</sub> = T <sub>MIN</sub> to T <sub>MAX</sub> |                        |                 | 400  |       |
| Enable Turn-Off Time                  | t <sub>OFF(EN)</sub>                    | Figure 3                                                                                                  | T <sub>A</sub> = +25°C                                | 55                     |                 | 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, V <sub>S</sub> = 0V, 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, R <sub>L</sub> = 1kΩ, f = 100kHz, Figure 6                                          | T <sub>A</sub> = +25°C                                | -69                    |                 |      | dB    |
| Crosstalk Between Channels            | V <sub>CT</sub>                         | V <sub>EN</sub> = 2.4V, f = 100kHz, V <sub>GEN</sub> = 1V <sub>P-P</sub> , 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, V <sub>EN</sub> = V <sub>S</sub> = 0V, Figure 8                                                 | T <sub>A</sub> = +25°C                                | 8                      |                 |      | pF    |
| Drain-Off Capacitance                 | C <sub>D(OFF)</sub>                     | f = 1MHz, V <sub>EN</sub> = 0.8V, V <sub>D</sub> = 0V, Figure 8                                           | DG406                                                 | T <sub>A</sub> = +25°C | 130             |      | pF    |
|                                       |                                         |                                                                                                           | DG407                                                 |                        | 65              |      |       |
| Drain-Source On Capacitance           | C <sub>D(ON)</sub> + C <sub>S(ON)</sub> | f = 1MHz, V <sub>EN</sub> = 2.4V, V <sub>D</sub> = 0V, Figure 8                                           | DG406                                                 | T <sub>A</sub> = +25°C | 140             |      | pF    |
|                                       |                                         |                                                                                                           | DG407                                                 |                        | 70              |      |       |

DG406/DG407

# Improved, 16-Channel/Dual 8-Channel, CMOS Analog Multiplexers

## ELECTRICAL CHARACTERISTICS—Single Supply

(V<sub>+</sub> = 12V, V<sub>-</sub> = 0V, V<sub>GND</sub> = 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>S16</sub> = 0V,<br>V <sub>A</sub> = 0V,<br>Figure 2 | T <sub>A</sub> = +25°C |     | 130             | 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 |     | 105             | 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 |     | 80              | 300 | ns    |
| Charge Injection<br>(Note 3)     | Q                    | C <sub>L</sub> = 1.0nF,<br>V <sub>S1</sub> = 0V,<br>R <sub>S</sub> = 0Ω             | T <sub>A</sub> = +25°C |     | 2               | 10  | 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:** ΔRON = RON(MAX) - RON(MIN). 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.

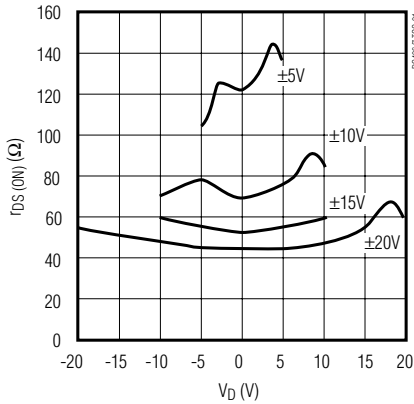
# Improved, 16-Channel/Dual 8-Channel, CMOS Analog Multiplexers

## Typical Operating Characteristics

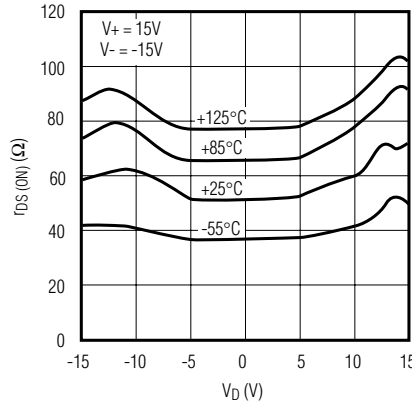
( $T_A = +25^\circ\text{C}$ , unless otherwise noted.)

DG406/DG407

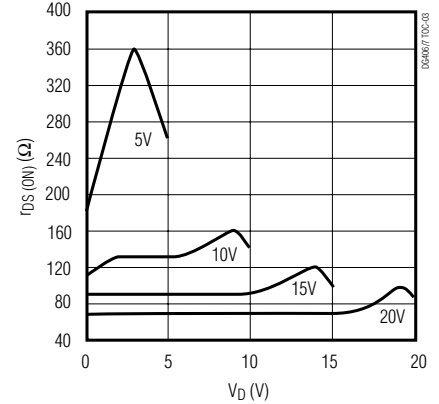
**ON-RESISTANCE vs.  $V_D$   
(DUAL SUPPLIES)**



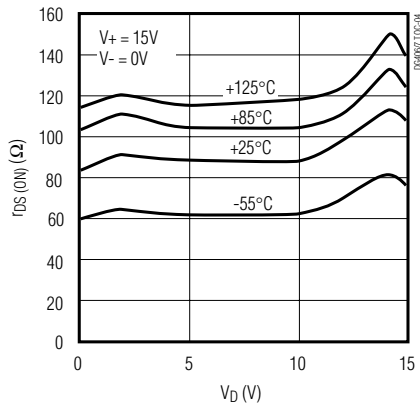
**ON-RESISTANCE vs.  $V_D$  AND  
TEMPERATURE (DUAL SUPPLIES)**



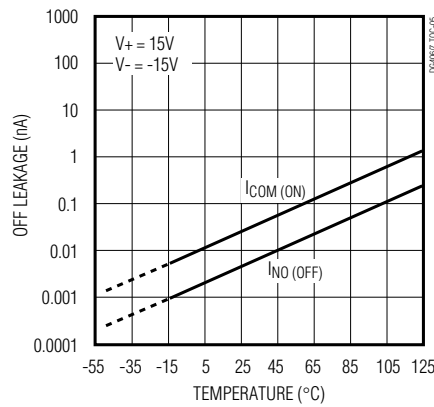
**ON-RESISTANCE vs.  $V_D$   
(SINGLE SUPPLY)**



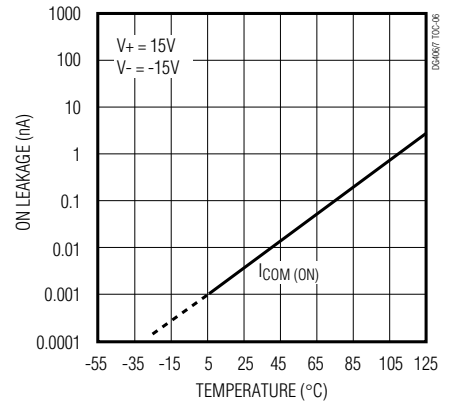
**ON-RESISTANCE vs.  $V_D$  AND  
TEMPERATURE (SINGLE SUPPLY)**



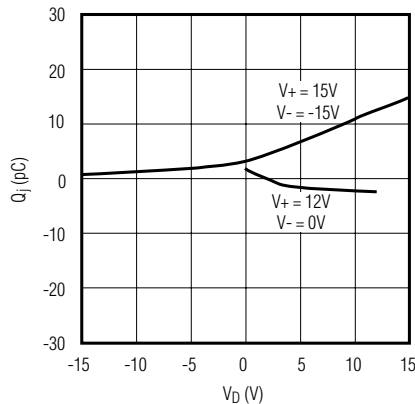
**OFF LEAKAGE vs. TEMPERATURE**



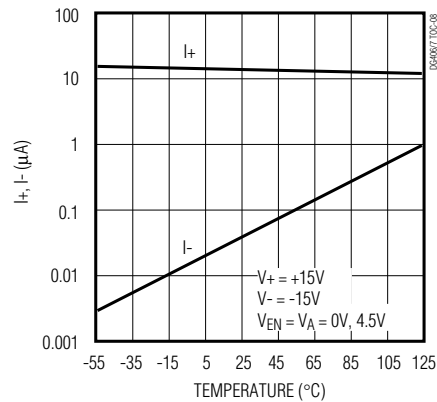
**ON LEAKAGE vs. TEMPERATURE**



**CHARGE INJECTION vs.  $V_D$**



**SUPPLY CURRENT vs. TEMPERATURE**



# Improved, 16-Channel/Dual 8-Channel, CMOS Analog Multiplexers

## Pin Descriptions

| DG406 PIN | NAME   | FUNCTION                                 |
|-----------|--------|------------------------------------------|
| 1         | V+     | Positive Supply Voltage Input            |
| 2, 3, 13  | N.C.   | No Connection. Not internally connected. |
| 4–11      | S16–S9 | Bidirectional Analog Inputs              |
| 12        | GND    | Ground                                   |
| 14–17     | A3–A0  | Address Inputs                           |
| 18        | EN     | Enable Inputs                            |
| 19–26     | S1–S8  | Bidirectional Analog Inputs              |
| 27        | V-     | Negative Supply Voltage Input            |
| 28        | D      | Bidirectional Output                     |

| DG407 PIN  | NAME       | FUNCTION                                 |
|------------|------------|------------------------------------------|
| 1          | V+         | Positive Supply Voltage Input            |
| 2          | DB         | Bidirectional Output B                   |
| 3, 13, 14  | N.C.       | No Connection. Not internally connected. |
| 4–11       | S8B–S1B    | Bidirectional Analog Inputs              |
| 12         | GND        | Ground                                   |
| 15, 16, 17 | A2, A1, A0 | Address Inputs                           |
| 18         | EN         | Enable Input                             |
| 19–26      | S1A–S8A    | Bidirectional Analog Inputs              |
| 27         | V-         | Negative Supply Voltage Input            |
| 28         | DA         | Bidirectional Output A                   |

## Applications Information

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

Using supply voltages other than  $\pm 15\text{V}$  reduces the analog signal range. The DG406/DG407 switches operate with  $\pm 4.5\text{V}$  to  $\pm 20\text{V}$  bipolar supplies or with a  $+5\text{V}$  to  $+30\text{V}$  single supply; connect V- to GND when operating with a single supply. Also, both device types can operate with unbalanced supplies such as  $+24\text{V}$  and  $-5\text{V}$ . The *Typical Operating Characteristics* graphs show typical on-resistance with  $20\text{V}$ ,  $15\text{V}$ ,  $10\text{V}$ , and  $5\text{V}$  supplies. (Switching times increase by a factor of two or more for operation at  $5\text{V}$ .)

### 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 and analog signals. 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  $1\text{V}$  above 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+ and V- should not exceed  $+44\text{V}$ .

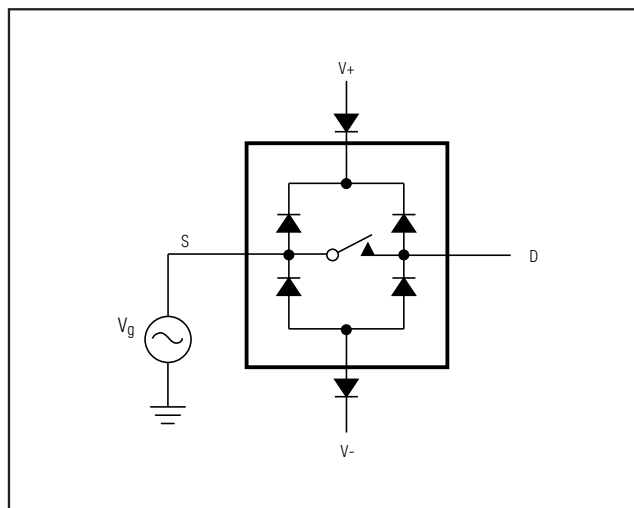


Figure 1. Overvoltage Protection Using External Blocking Diodes

# Improved, 16-Channel/Dual 8-Channel, CMOS Analog Multiplexers

## Test Circuits/Timing Diagrams

DG406/DG407

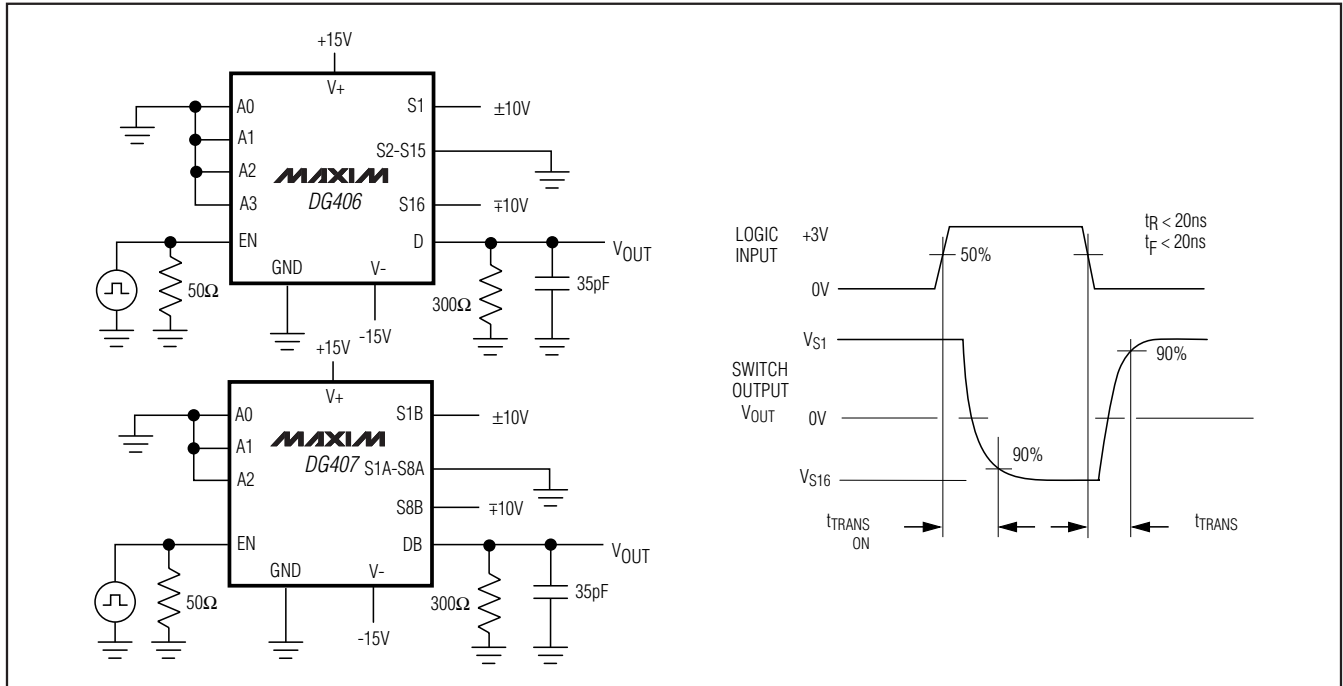


Figure 2. Transition Time

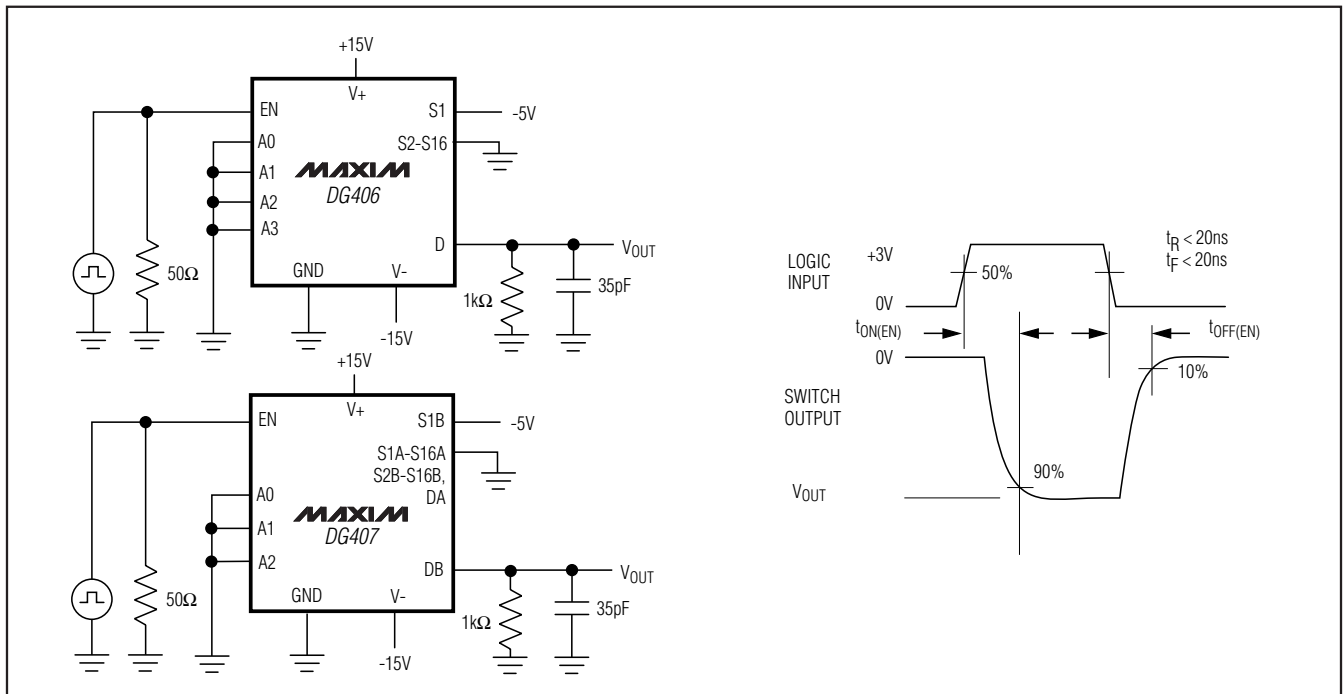


Figure 3. Enable Switching Time

# Improved, 16-Channel/Dual 8-Channel, CMOS Analog Multiplexers

## Test Circuits/Timing Diagrams (continued)

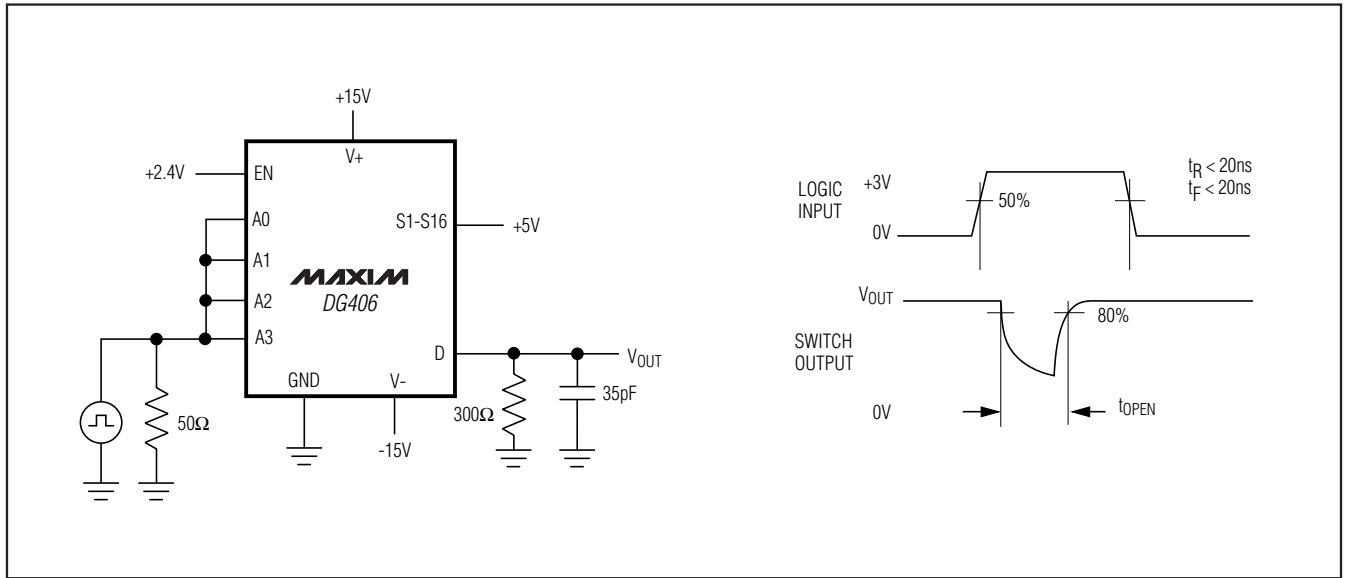


Figure 4. Break-Before-Make Interval

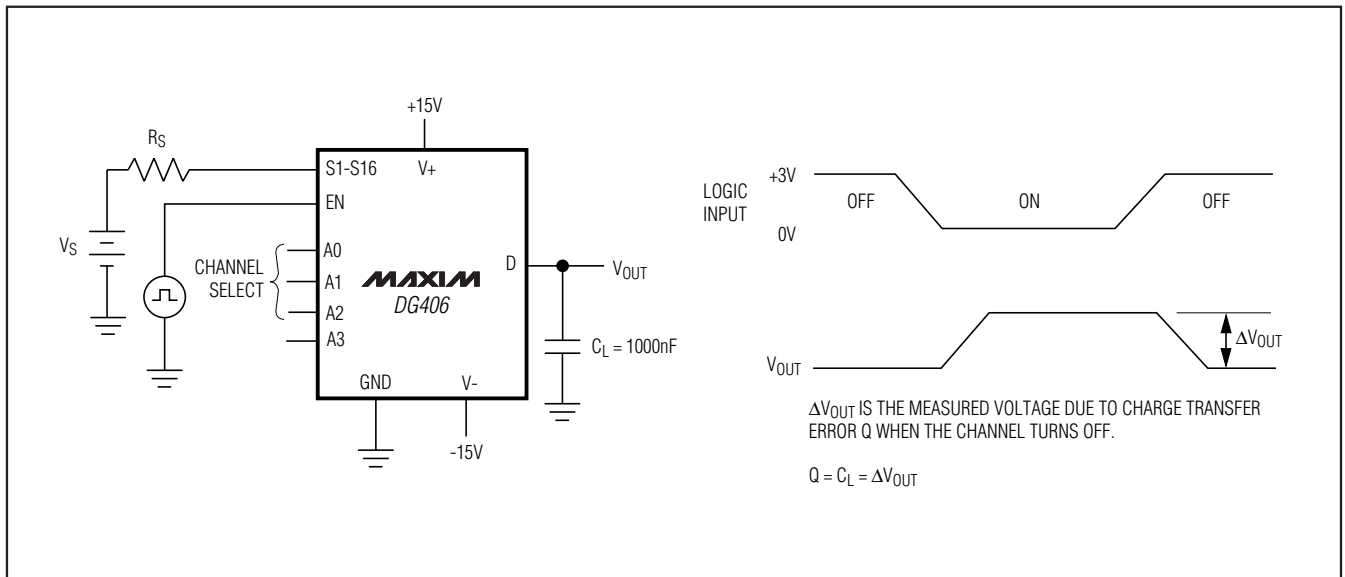
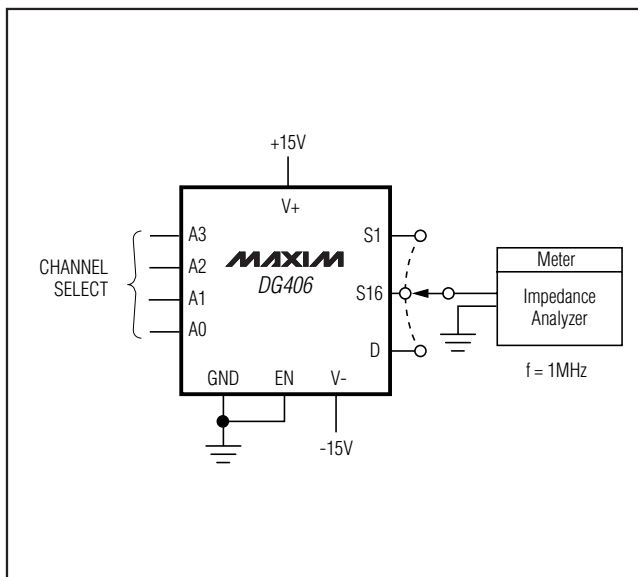
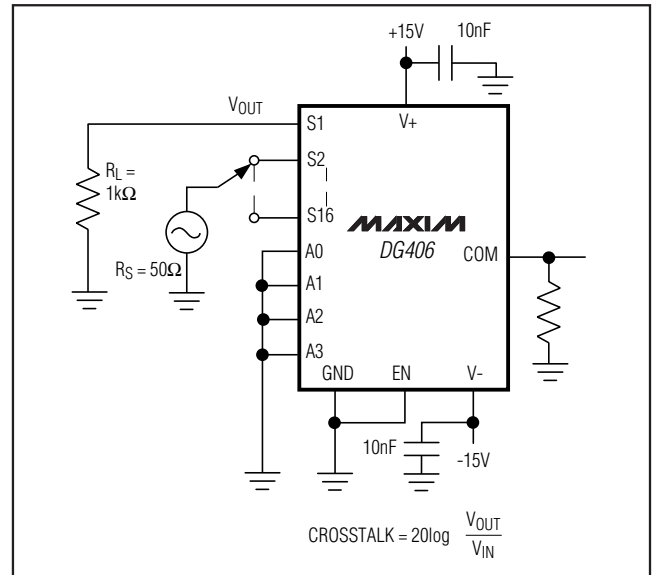
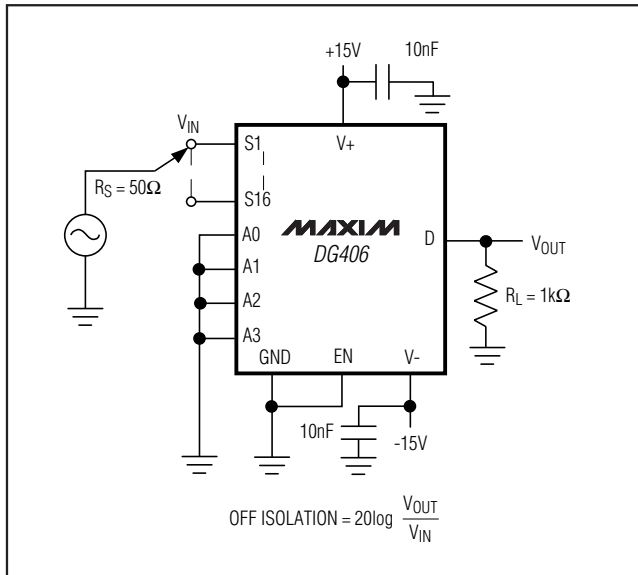


Figure 5. Charge Injection

# Improved, 16-Channel/Dual 8-Channel, CMOS Analog Multiplexers

## Test Circuits/Timing Diagrams (continued)

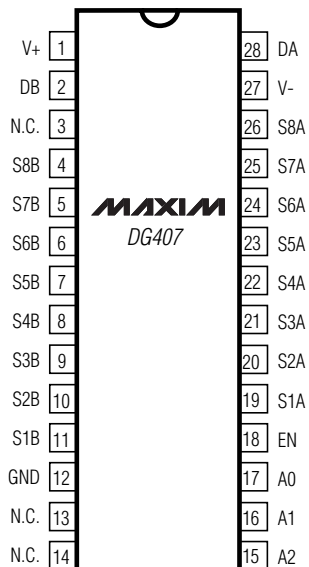
DG406/DG407



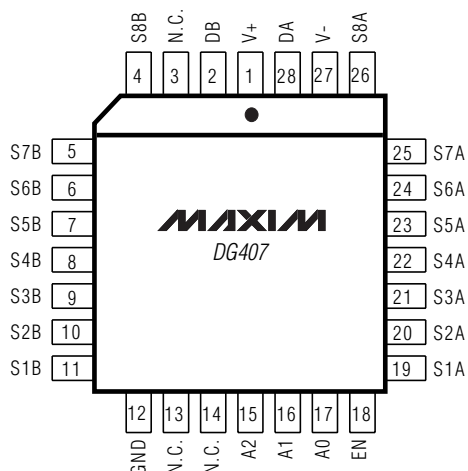
# Improved, 16-Channel/Dual 8-Channel, CMOS Analog Multiplexers

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

TOP VIEW



DIP/SO



PLCC

N.C. = NO INTERNAL CONNECTION

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

DG406

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

| 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         |

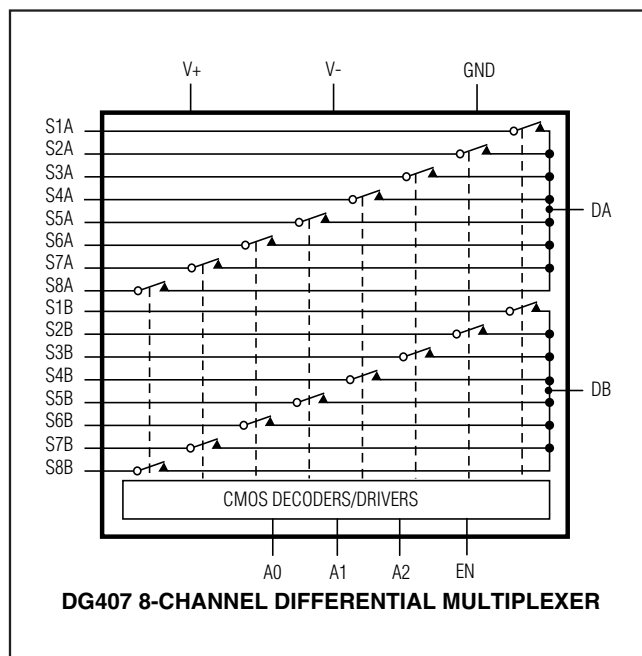
DG407

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

# Improved, 16-Channel/Dual 8-Channel, High-Performance, CMOS Analog Multiplexers

DG406/DG407

## Functional Diagrams (continued)



## Ordering Information (continued)

| PART      | TEMP RANGE      | PIN-PACKAGE    |
|-----------|-----------------|----------------|
| DG407CJ+  | 0°C to +70°C    | 28 Plastic DIP |
| DG407CWI+ | 0°C to +70°C    | 28 Wide SO     |
| DG407C/D+ | 0°C to +70°C    | Dice*          |
| DG407DJ+  | -40°C to +85°C  | 28 Plastic DIP |
| DG407EWI+ | -40°C to +85°C  | 28 Wide SO     |
| DG407DN+  | -40°C to +85°C  | 28 PLCC        |
| DG407AK   | -55°C to +125°C | 28 CERDIP      |
| DG407EUI+ | -40°C to +85°C  | 28 TSSOP       |

\*Contact factory for dice specifications.

+Denotes a lead(Pb)-free/RoHS-compliant package.

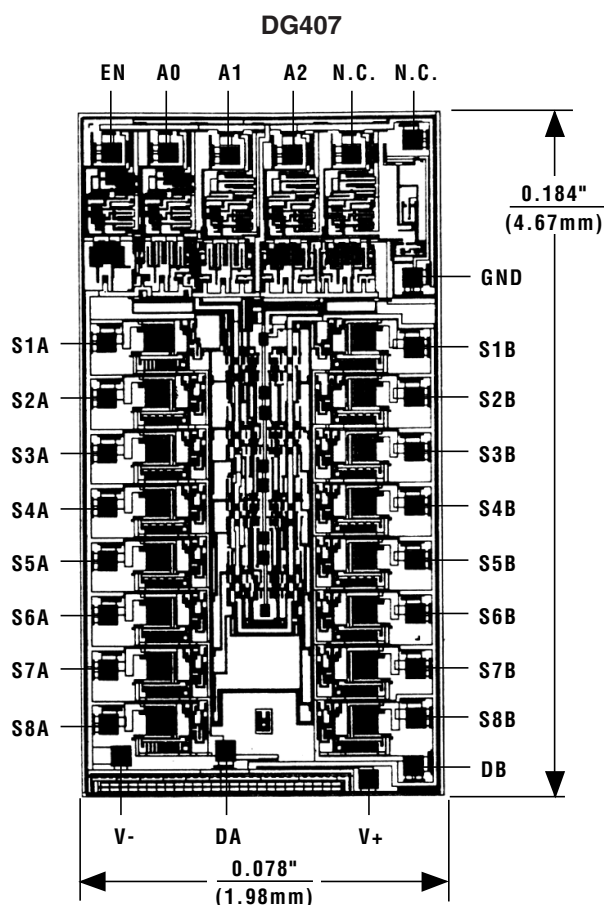
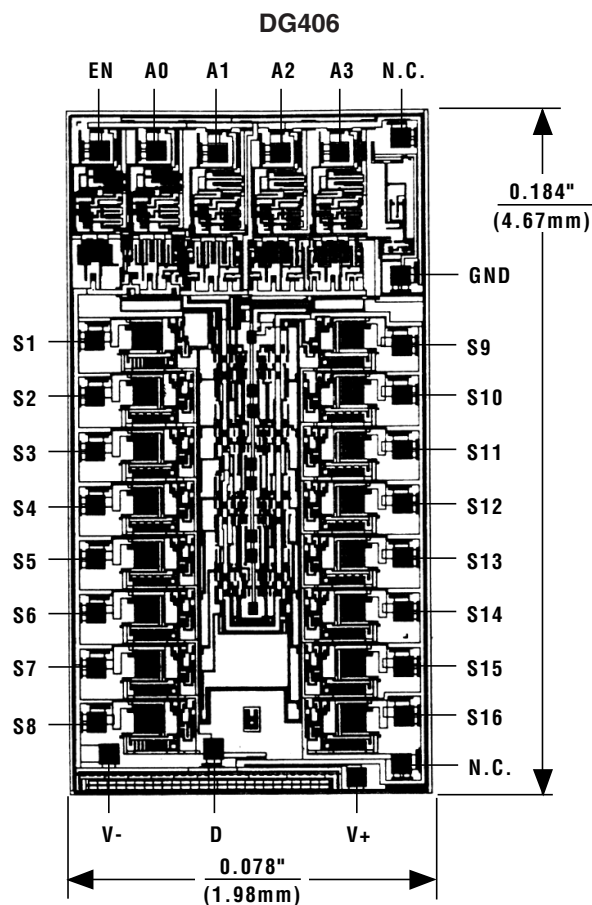
## Package Information

For the latest package outline information and land patterns, go to [www.maxim-ic.com/packages](http://www.maxim-ic.com/packages). Note that a "+", "#", or "-" in the package code indicates RoHS status only. Package drawings may show a different suffix character, but the drawing pertains to the package regardless of RoHS status.

| PACKAGE TYPE | PACKAGE CODE | DOCUMENT NO.            |
|--------------|--------------|-------------------------|
| 28 PDIP      | P28+3        | <a href="#">21-0044</a> |
| 28 Wide SO   | W28+6        | <a href="#">21-0042</a> |
| 28 PLCC      | Q28+4        | <a href="#">21-0049</a> |
| 28 TSSOP     | U28+2        | <a href="#">21-0066</a> |
| 28 CERDIP    | J28+2        | <a href="#">21-0046</a> |

# Improved, 16-Channel/Dual 8-Channel, CMOS Analog Multiplexers

## Chip Topographies



N.C. = NO INTERNAL CONNECTION

SUBSTRATE IS INTERNALLY CONNECTED TO V+

SUBSTRATE IS INTERNALLY CONNECTED TO V+

# Improved, 16-Channel/Dual 8-Channel, High-Performance, CMOS Analog Multiplexers

## Revision History

| REVISION<br>NUMBER | REVISION<br>DATE | DESCRIPTION                                                                              | PAGES<br>CHANGED |
|--------------------|------------------|------------------------------------------------------------------------------------------|------------------|
| 6                  | 3/10             | Updated the minimum limit of the single supply range.                                    | 1, 6             |
|                    |                  | Added the soldering temperature of all packages to the <i>Absolute Maximum Ratings</i> . | 2                |

DG406/DG407

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