19-4793; Rev 6; 5/09

# Low-Voltage, Quad, SPST CMOS Analog Switches



## General Description

The MAX4610/MAX4611/MAX4612 are quad, low-voltage, single-pole/single-throw (SPST) analog switches. On-resistance (100Ω, max) is matched between switches to 4Ω, max and is flat (4Ω, max) over the specified signal range. Each switch handles V+ to GND analog signal levels. Maximum off-leakage current is only 1nA at $T_A$ = +25°C and 2nA at $T_A$ = +85°C.

The MAX4610 has four normally open (NO) switches, and the MAX4611 has four normally closed (NC) switches. The MAX4612 has two NO switches and two NC switches. These CMOS switches operate from a single +2V to +12V supply. All digital inputs have +0.8V and +2.4V logic thresholds, ensuring TTL/CMOS-logic compatibility when using a single +5V supply.

## Applications

Battery-Operated Equipment

Audio/Video Signal Routing

Low-Voltage Data-Acquisition Systems

Sample-and-Hold Circuits

Communication Circuits

## Features

- **Offered in Automotive Temperature Range (-40°C to +125°C)**
- **Guaranteed On-Resistance**
  **100Ω max (5V Supply)**
  **46Ω max (12V Supply)**
- **Guaranteed Match Between Channels (4Ω, max)**
- **Guaranteed Flatness Over Signal Range (18Ω, max)**
- **Off-Leakage Current Over Temperature < 2nA at $T_A$ = +85°C**
- **> 2kV ESD Protection per Method 3015.7**
- **Rail-to-Rail Signal Handling**
- **TTL/CMOS-Logic Compatible**

## Ordering Information

| PART | TEMP RANGE | PIN-PACKAGE |
|---|---|---|
| **MAX4610**CUD+ | 0°C to +70°C | 14 TSSOP |
| MAX4610CSD+ | 0°C to +70°C | 14 Narrow SO |
| MAX4610CPD+ | 0°C to +70°C | 14 Plastic DIP |
| MAX4610C/D+ | 0°C to +70°C | Dice* |
| MAX4610EGE+ | -40°C to +85°C | 16 QFN-EP** |
| MAX4610EUD+ | -40°C to +85°C | 14 TSSOP |
| MAX4610ESD+ | -40°C to +85°C | 14 Narrow SO |
| MAX4610EPD+ | -40°C to +85°C | 14 Plastic DIP |
| MAX4610ASD+ | -40°C to +125°C | 14 Narrow SO |

***Ordering Information continued at end of data sheet.***

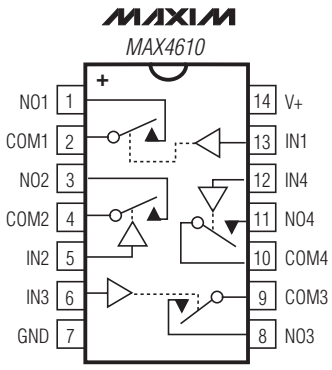
**Contact factory for dice specifications.*

***EP = Exposed pad.*

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

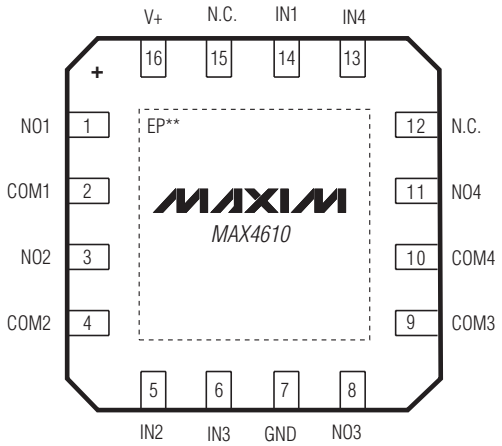
## Pin Configurations/Truth Tables

TOP VIEW




**TSSOP/SO/DIP**

| INPUT | SWITCH STATE |
|---|---|
| LOW | OFF |
| HIGH | ON |




**QFN**

**EP = EXPOSED PAD
CONNECT EP TO V+

*MAX4611/MAX4612 Pin Configurations/Truth Tables appear at end of data sheet.*



***For pricing, delivery, and ordering information, please contact Maxim Direct at 1-888-629-4642, or visit Maxim's website at www.maxim-ic.com.***

# Low-Voltage, Quad, SPST CMOS Analog Switches

## ABSOLUTE MAXIMUM RATINGS

(Voltages referenced to GND.)
V+ .....-0.3V to +13V
IN_, COM_, NO_, NC_ (Note 1).....-0.3V to (V+ + 0.3V)
Continuous Current (any terminal)
(pulsed at 1ms, 10% duty cycle) .....20mA
Peak Current (any terminal)
(pulsed at 1ms, 10% duty cycle) .....40mA
ESD per Method 3015.7.....> 2kV

Continuous Power Dissipation ($T_A$ = +70°C)
14-Pin TSSOP (derate 6.3mW/°C above +70°C) .....500mW
14-Pin Narrow SO (derate 8.00mW/°C above +70°C) ..640mW
14-Pin Plastic DIP (derate 10.00mW/°C above +70°C) ..800mW
16-Pin QFN (derate 18.5mW/°C above +70°C) .....1481mW
Operating Temperature Ranges
MAX461_C_ _ .....0°C to +70°C
MAX461_E_ _.....-40°C to +85°C
MAX461_A_ _ .....-40°C to +125°C
Storage Temperature Range .....-65°C to +160°C
Lead Temperature (soldering, 10s) .....+300°C

**Note 1:** Signals on NO_, NC_, COM_, or IN_ exceeding V+ or GND are clamped by internal diodes. Limit forward-diode current to maximum current rating.

*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—Single +5V Supply

(V+ = +5V ±10%, $V_{IN_H}$ = 2.4V, $V_{IN_L}$ = 0.8V, $T_A$ = $T_{MIN}$ to $T_{MAX}$, unless otherwise noted.)

| PARAMETER | SYMBOL | CONDITIONS | | MIN | TYP (Note 2) | MAX | UNITS |
|---|---|---|---|---|---|---|---|
| **ANALOG SWITCH** | | | | | | | |
| Analog Signal Range (Note 3) | $V_{COM_}$, $V_{NO_}$, $V_{NC_}$ | | | 0 | | V+ | V |
| On-Resistance | $R_{ON}$ | V+ = 4.5V, $I_{COM_}$ = 1mA, $V_{NO_}$ = $V_{NC_}$ = 3V | $T_A$ = +25°C | | 70 | 100 | Ω |
| | | | $T_A$ = $T_{MIN}$ to $T_{MAX}$ | | | 150 | |
| On-Resistance Match Between Channels (Note 4) | $\Delta R_{ON}$ | V+ = 4.5V, $I_{COM_}$ = 1mA, $V_{NO_}$ = $V_{NC_}$ = 3V | $T_A$ = +25°C | | 1.0 | 5 | Ω |
| | | | $T_A$ = $T_{MIN}$ to $T_{MAX}$ | | | 8 | |
| On-Resistance Flatness (Note 5) | $R_{FLAT(ON)}$ | V+ = 4.5V; $I_{COM_}$ = 1mA; $V_{NO_}$ = $V_{NC_}$ = 3V, 2V, 1V | $T_A$ = +25°C | | 12 | 22 | Ω |
| | | | $T_A$ = $T_{MIN}$ to $T_{MAX}$ | | | 28 | |
| NO_ or NC_ Off-Leakage Current (Note 6) | $I_{NO(OFF)}$ | V+ = 5.5V; $V_{COM_}$ = 1V, 4.5V; $V_{NO_}$ = 4.5V, 1V | $T_A$ = +25°C | -0.1 | | +0.1 | nA |
| | | | $T_A$ = -40°C to +85°C | -2 | | +2 | |
| | | | $T_A$ = -40°C to +125°C | -30 | | +30 | |
| COM_ Off-Leakage Current (Note 6) | $I_{COM(OFF)}$ | V+ = 5.5V; $V_{COM_}$ = 1V, 4.5V; $V_{NO_}$ = $V_{NC_}$ = 4.5V, 1V | $T_A$ = +25°C | -0.1 | | +0.1 | nA |
| | | | $T_A$ = -40°C to +85°C | -2 | | +2 | |
| | | | $T_A$ = -40°C to +125°C | -30 | | +30 | |
| COM_ On-Leakage Current (Note 6) | $I_{COM(ON)}$ | V+ = 5.5V; $V_{COM_}$ = 1V, 4.5V; $V_{NO_}$ = $V_{NC_}$ = 1V, 4.5V, or floating | $T_A$ = +25°C | -0.2 | | +0.2 | nA |
| | | | $T_A$ = -40°C to +85°C | -4 | | +4 | |
| | | | $T_A$ = -40°C to +125°C | -30 | | +30 | |

## ELECTRICAL CHARACTERISTICS—Single +5V Supply (continued)

(V+ = +5V ±10%, $V_{IN_H}$ = 2.4V, $V_{IN_L}$ = 0.8V, $T_A$ = $T_{MIN}$ to $T_{MAX}$, unless otherwise noted.)

| PARAMETER | SYMBOL | CONDITIONS | | MIN | TYP (Note 2) | MAX | UNITS |
|---|---|---|---|---|---|---|---|
| **LOGIC INPUT** | | | | | | | |
| Input Current with Input-Voltage High | $I_{IN_H}$ | $V_{IN_}$ = 2.4V, all others = 0.8V | | -0.1 | ±0.001 | +0.1 | µA |
| Input Current with Input-Voltage Low | $I_{IN_L}$ | $V_{IN_}$ = 0.8V, all others = 2.4V | | -0.1 | ±0.001 | +0.1 | µA |
| Input High Voltage | $V_{IN_H}$ | | | 2.4 | 1.5 | | V |
| Input Low Voltage | $V_{IN_L}$ | | | | 1.4 | 0.8 | V |
| **DYNAMIC** (Note 3) | | | | | | | |
| Turn-On Time | $t_{ON}$ | $V_{COM_}$ = 3V, Figure 2 | $T_A$ = +25°C | | 35 | 65 | ns |
| | | | $T_A$ = $T_{MIN}$ to $T_{MAX}$ | | | 90 | |
| Turn-Off Time | $t_{OFF}$ | $V_{COM_}$ = 3V, Figure 2 | $T_A$ = +25°C | | 15 | 28 | ns |
| | | | $T_A$ = $T_{MIN}$ to $T_{MAX}$ | | | 30 | |
| On-Channel Bandwidth | BW | Signal = 0dBm, Figure 4, 50Ω in and out | $T_A$ = +25°C | | 300 | | MHz |
| Charge Injection | $V_{CTE}$ | $C_L$ = 1.0nF, $V_{GEN}$ = 0, $R_{GEN}$ = 0, Figure 3 | $T_A$ = +25°C | | 1 | 5 | pC |
| Off-Isolation (Note 7) | $V_{ISO}$ | $R_L$ = 50Ω, $C_L$ = 5pF, f = 1MHz, Figure 4 | $T_A$ = +25°C | | -60 | | dB |
| Crosstalk (Note 8) | $V_{CT}$ | $R_L$ = 50Ω, $C_L$ = 5pF, f = 1MHz, Figure 5 | $T_A$ = +25°C | | -80 | | dB |
| NO_ or NC_ Capacitance | $C_{(OFF)}$ | f = 1MHz, Figure 6 | $T_A$ = +25°C | | 16 | | pF |
| COM_ Off-Capacitance | $C_{COM(OFF)}$ | f = 1MHz, Figure 6 | $T_A$ = +25°C | | 16 | | pF |
| COM_ On-Capacitance | $C_{COM(ON)}$ | f = 1MHz, Figure 6 | $T_A$ = +25°C | | 23 | | pF |
| Total Harmonic Distortion | THD | 600Ω IN and OUT, 20Hz to 20kHz, $2V_{P-P}$ | $T_A$ = +25°C | | 0.009 | | % |
| **SUPPLY** | | | | | | | |
| Power-Supply Range | | | | 2 | | 12 | V |
| Supply Current | I+ | $V_{IN}$ = 0 or V+, all switches on or off | | -1 | ±0.001 | +1 | µA |

# Low-Voltage, Quad, SPST CMOS Analog Switches

## ELECTRICAL CHARACTERISTICS—Single +3V Supply

(V+ = +3V, $V_{IN_H}$ = 2.4V, $V_{IN_L}$ = 0.5V, $T_A$ = $T_{MIN}$ to $T_{MAX}$, unless otherwise noted.)

| PARAMETER | SYMBOL | CONDITIONS | | MIN | TYP (Note 2) | MAX | UNITS |
|---|---|---|---|---|---|---|---|
| **ANALOG SWITCH** | | | | | | | |
| Analog Signal Range (Note 3) | $V_{COM_}$, $V_{NO_}$, $V_{NC_}$ | | | 0 | | V+ | V |
| On-Resistance | $R_{ON}$ | V+ = 2.7V, $I_{COM_}$ = 1mA, $V_{NO_}$ = $V_{NC_}$ = 1V | $T_A$ = +25°C | | 175 | 360 | Ω |
| | | | $T_A$ = $T_{MIN}$ to $T_{MAX}$ | | | 450 | |
| On-Resistance Match Between Channels (Note 4) | $\Delta R_{ON}$ | V+ = 2.7V, $I_{COM_}$ = 1mA, $V_{NO_}$ = $V_{NC_}$ = 1V | $T_A$ = +25°C | | 2 | 10 | Ω |
| | | | $T_A$ = $T_{MIN}$ to $T_{MAX}$ | | | 20 | |
| NO_ or NC_ Off-Leakage Current (Notes 3, 6) | $I_{NO(OFF)}$ | V+ = 3.6V, $V_{COM_}$ = 0.5V, 3V; $V_{NO_}$ = $V_{NC_}$ = 3V, 0.5V | $T_A$ = +25°C | -0.1 | | +0.1 | nA |
| | | | $T_A$ = -40°C to + 85°C | -2 | | +2 | |
| | | | $T_A$ = -40°C to + 125°C | -30 | | +30 | |
| COM_ Off-Leakage Current (Notes 3, 6) | $I_{COM(OFF)}$ | V+ = 3.6V, $V_{COM_}$ = 0.5V, 3V; $V_{NO_}$ = $V_{NC_}$ = 3V, 0.5V | $T_A$ =+25°C | -0.1 | | +0.1 | nA |
| | | | $T_A$ = -40°C to + 85°C | -2 | | +2 | |
| | | | $T_A$ = -40°C to + 125°C | -30 | | +30 | |
| COM_ On-Leakage Current (Notes 3, 6) | $I_{COM(ON)}$ | V+ = 3.6V, $V_{COM_}$ = 0.5V, 3V; $V_{NO_}$ = $V_{NC_}$ = 0.5V, 3V, or floating | $T_A$ = +25°C | -0.2 | | +0.2 | nA |
| | | | $T_A$ = -40°C to +85°C | -4 | | +4 | |
| | | | $T_A$ = -40°C to +125°C | -30 | | +30 | |
| **LOGIC INPUTS** | | | | | | | |
| Input High Voltage | $V_{IN_H}$ | | | 2.4 | 1.0 | | V |
| Input Low Voltage | $V_{IN_L}$ | | | | 1.0 | 0.5 | V |
| **DYNAMIC** (Note 3) | | | | | | | |
| Turn-On Time | $t_{ON}$ | $V_{COM_}$ = 1.5V, Figure 2 | $T_A$ = +25°C | | 50 | 100 | ns |
| | | | $T_A$ = -40°C to +85°C | | | 120 | |
| | | | $T_A$ = -40°C to +125°C | | | 140 | |
| Turn-Off Time | $t_{OFF}$ | $V_{COM_}$ = 1.5V, Figure 2 | $T_A$ = +25°C | | 30 | 47 | ns |
| | | | $T_A$ = $T_{MIN}$ to $T_{MAX}$ | | | 60 | |

## ELECTRICAL CHARACTERISTICS—Single +12V Supply

(V+ = +12V, $V_{IN_H}$ = 4V, $V_{IN_L}$ = 0.8V, $T_A$ = $T_{MIN}$ to $T_{MAX}$, unless otherwise noted.)

| PARAMETER | SYMBOL | CONDITIONS | | MIN | TYP (Note 2) | MAX | UNITS |
|---|---|---|---|---|---|---|---|
| **ANALOG SWITCH** | | | | | | | |
| Analog Signal Range (Note 3) | $V_{COM_}$, $V_{NO_}$, $V_{NC_}$, | | | 0 | | V+ | V |
| On-Resistance | $R_{ON}$ | V+ = 12V, $I_{COM}$ = 2mA, $V_{NO_}$ = $V_{NC_}$ = 10V | $T_A$ = +25°C | | 30 | 45 | Ω |
| | | | $T_A$ = $T_{MIN}$ to $T_{MAX}$ | | | 60 | |
| **LOGIC INPUTS** | | | | | | | |
| Input High Voltage | $V_{IN_H}$ | | | 4.0 | 2.8 | | V |
| Input Low Voltage | $V_{IN_L}$ | | | | 2.5 | 0.8 | V |
| **SUPPLY** | | | | | | | |
| Positive Supply Current | I+ | $V_{IN_}$ = 0 or V+, all switches on or off | | -1 | ±0.001 | +1 | µA |

**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:** $\Delta R_{ON}$ = $R_{ON}$ (max) - $R_{ON}$ (min).

**Note 5:** Flatness is defined as the difference between the maximum and minimum value of on-resistance as measured over the specified analog signal range.

**Note 6:** Leakage parameters are 100% tested at maximum-rated hot temperature and guaranteed by correlation at +25°C.

**Note 7:** Off-Isolation = $20\log_{10}$ ($V_{COM_}$ / $V_{NO_}$), $V_{COM_}$ = output, $V_{NO_}$ = input to off switch.

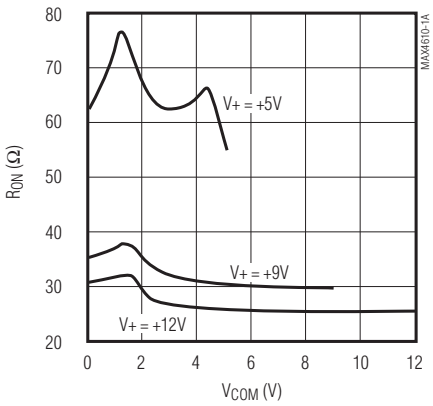
**Note 8:** Between any two switches.

# Low-Voltage, Quad, SPST CMOS Analog Switches

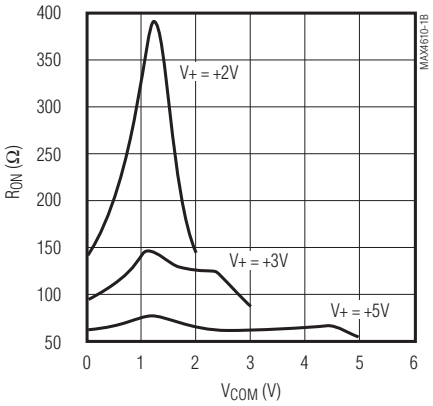
## Typical Operating Characteristics

($T_A$ = +25°C, unless otherwise noted.)

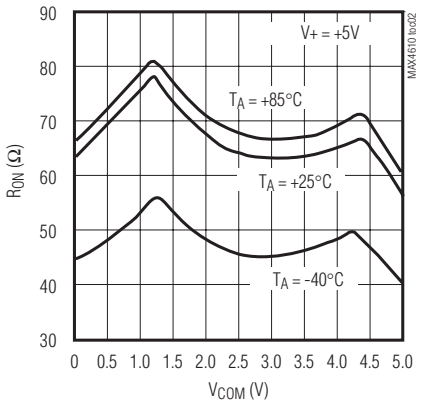
**ON-RESISTANCE vs. $V_{COM}$**



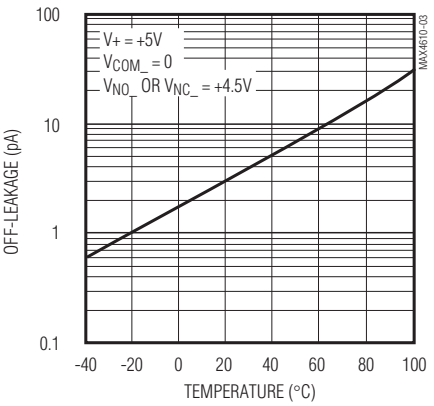

**ON-RESISTANCE vs. $V_{COM}$**



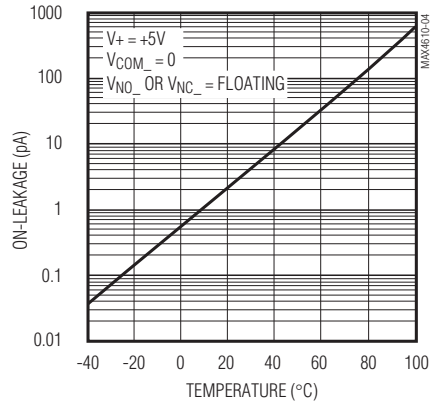

**ON-RESISTANCE vs. $V_{COM}$ AND TEMPERATURE**



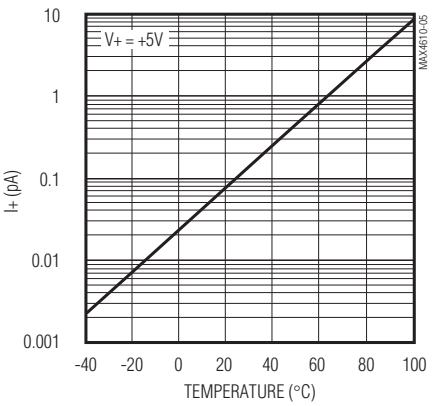

**OFF-LEAKAGE vs. TEMPERATURE**



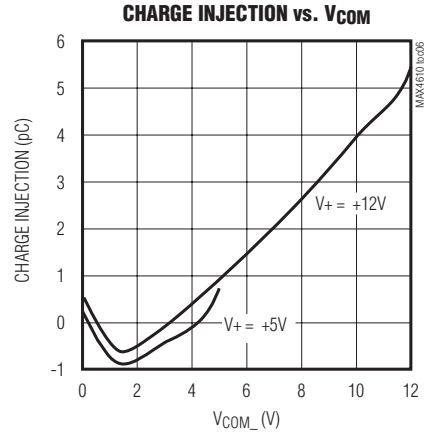

**ON-LEAKAGE vs. TEMPERATURE**



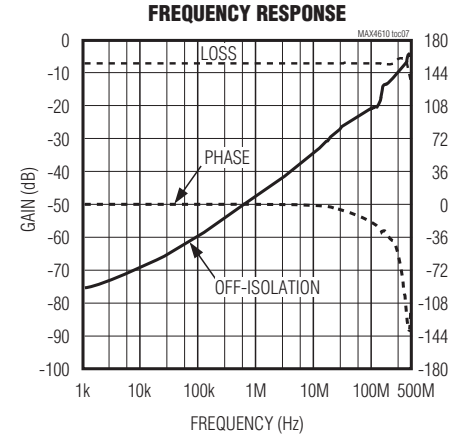

**SUPPLY CURRENT vs. TEMPERATURE**



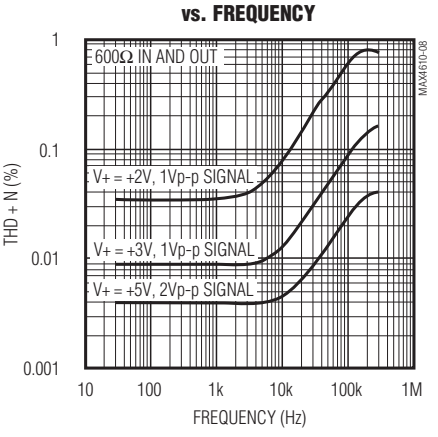

**CHARGE INJECTION vs. $V_{COM}$**




**FREQUENCY RESPONSE**




**TOTAL HARMONIC DISTORTION PLUS NOISE vs. FREQUENCY**



## Pin Description

| PIN | | | | | | NAME | FUNCTION |
|---|---|---|---|---|---|---|---|
| MAX4610 | | MAX4611 | | MAX4612 | | | |
| TSSOP/SO/ DIP | QFN | TSSOP/SO/DIP | QFN | TSSOP/SO/DIP | QFN | | |
| 1, 3, 8, 11 | 1, 3, 8, 11 | — | — | — | — | NO1–NO4 | Analog Switch Normally Open Terminals |
| — | — | 1, 3, 8, 11 | 1, 3, 8, 11 | — | — | NC1–NC4 | Analog Switch Normally Closed Terminals |
| — | — | — | — | 1, 8 | 1, 8 | NO1, NO3 | Analog Switch Normally Open Terminals |
| — | — | — | — | 3, 11 | 3, 11 | NC2, NC4 | Analog Switch Normally Closed Terminals |
| 2, 4, 9, 10 | 2, 4, 9, 10 | 2, 4, 9, 10 | 2, 4, 9, 10 | 2, 4, 9, 10 | 2, 4, 9, 10 | COM1–COM4 | Analog Switch Common Terminals |
| 13, 5, 6, 12 | 14, 5, 6, 13 | 13, 5, 6, 12 | 14, 5, 6, 13 | 13, 5, 6, 12 | 14, 5, 6, 13 | IN1–IN4 | Logic-Control Digital Input |
| 7 | 7 | 7 | 7 | 7 | 7 | GND | Ground. Connect to digital ground. |
| — | 12, 15 | — | 12, 15 | — | 12, 15 | N.C. | No Connection. Not internally connected. |
| 14 | 16 | 14 | 16 | 14 | 16 | V+ | Positive Analog and Digital-Supply Voltage Input. Internally connected to substrate. |
| — | — | — | — | — | — | EP | Exposed Pad (QFN only). Connect to V+. |

## Applications Information

### Power-Supply Sequencing and Overvoltage Protection

Do not exceed the absolute maximum ratings, because stresses beyond the listed ratings may cause permanent damage to the devices.

Proper power-supply sequencing is recommended for all CMOS devices. Always apply V+ before applying analog signals or logic inputs, especially if the analog or logic signals are not current limited. If this sequencing is not possible, and if the analog or logic inputs are not current limited to 20mA, add a small-signal diode (D1) as shown in Figure 1. If the analog signal can dip below GND, add D2. Adding protection diodes reduces the analog signal range to a diode drop (about 0.7V) below V+ (for D1), and to a diode drop above ground (for D2). Leakage is unaffected by adding the diodes. On-resistance increases by a small amount at low supply voltages. Maximum supply voltage (V+) must not exceed 13V.

Adding protection diodes causes the logic thresholds to be shifted relative to the power-supply rails. This can be significant when low supply voltages (+5V or less) are used. With a +5V supply, TTL compatibility is not guaranteed when protection diodes are added. Driving IN1 and IN2 all the way to the supply rails (i.e., to a diode drop higher than the V+ pin, or to a diode drop lower than the GND pin) is always acceptable.

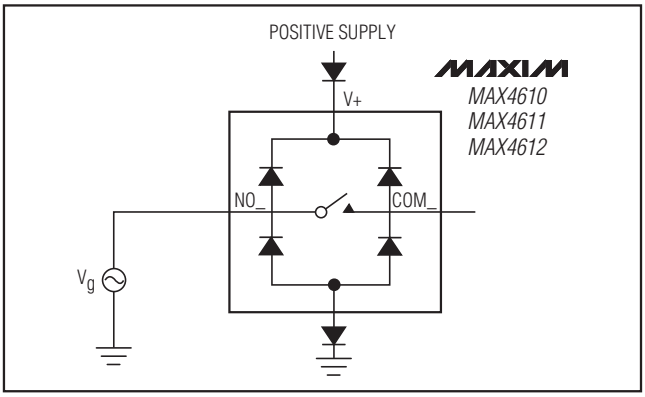



*Figure 1. Overvoltage Protection Using Two External Blocking Diodes*

# Low-Voltage, Quad, SPST CMOS Analog Switches

Protection diodes D1 and D2 also protect against some overvoltage situations. With Figure 1's circuit, if the supply voltage is below the absolute maximum rating, and if a fault voltage up to the absolute maximum rating is applied to an analog signal pin, no damage will result.

### Operating Considerations for High-Voltage Supply

The MAX4610/MAX4611/MAX4612 are pin-compatible with the industry-standard 74HC4066 and the MAX4066, and are optimized for +5V single-supply operation. The MAX4610 family is capable of +12V single-supply operation with some precautions. The absolute maximum rating for V+ is +13.2V (referenced to GND). When operating near this region, bypass V+ with a minimum 0.1µF capacitor to ground as close to the IC as possible.

**Caution: The absolute maximum V+ to V- differential voltage is 13.0V. Typical ±6V or 12V supplies with ±10% tolerances can be as high as 13.2V. This voltage can damage the MAX4610/MAX4611/MAX4612. Even ±5% tolerance supplies may have overshoot or noise spikes that exceed 13.0V.**

## Test Circuits/Timing Diagrams

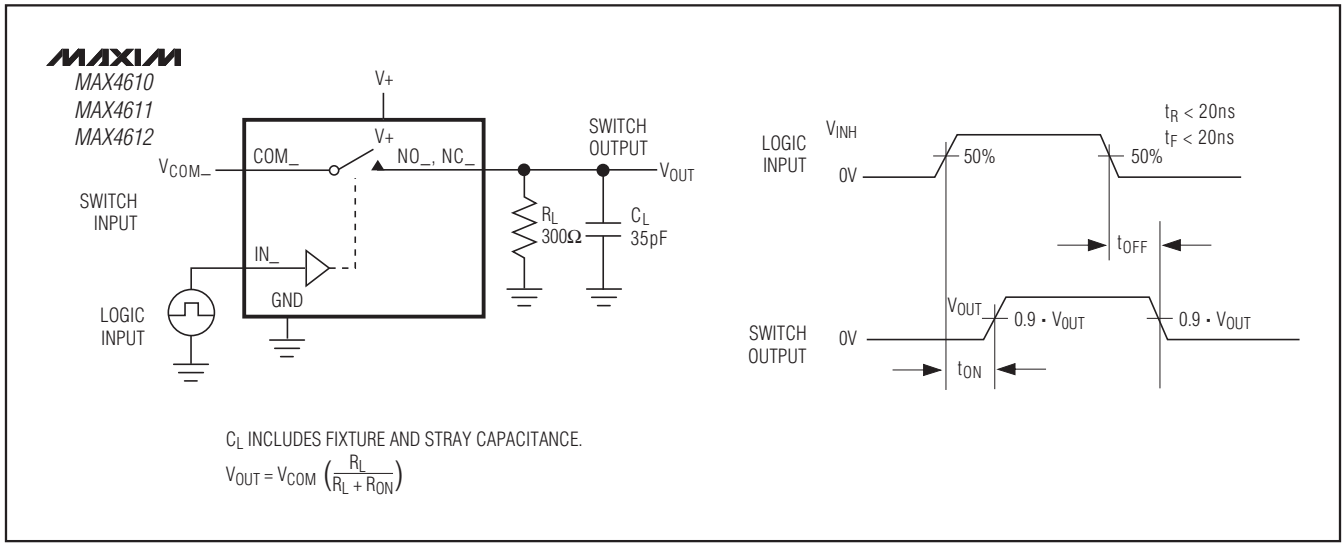



*Figure 2. Switching Time*

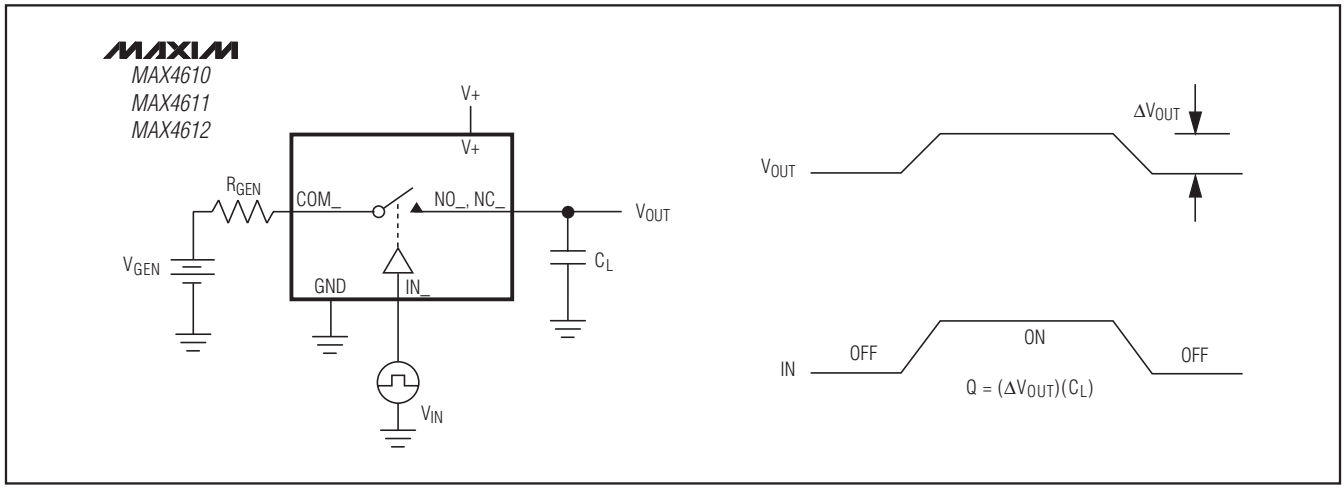



*Figure 3. Charge Injection*

## Test Circuits/Timing Diagrams (continued)

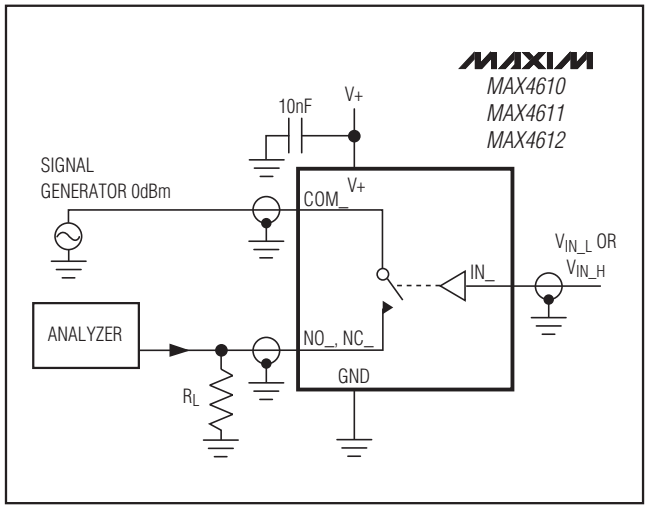



*Figure 4. Off-Isolation/On-Channel Bandwidth*

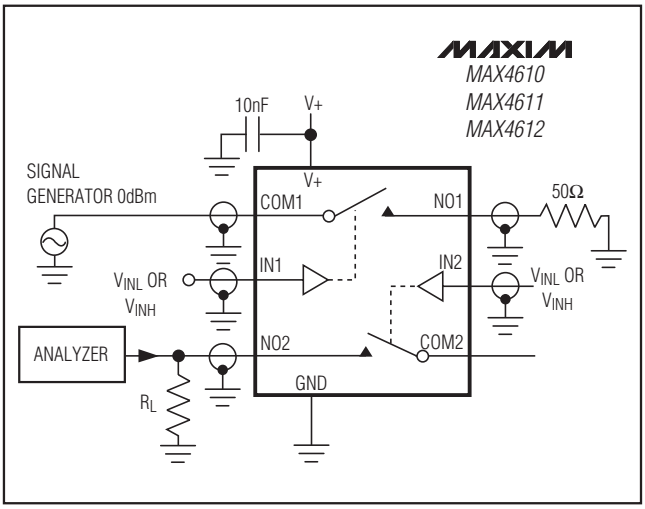



*Figure 5. Crosstalk*

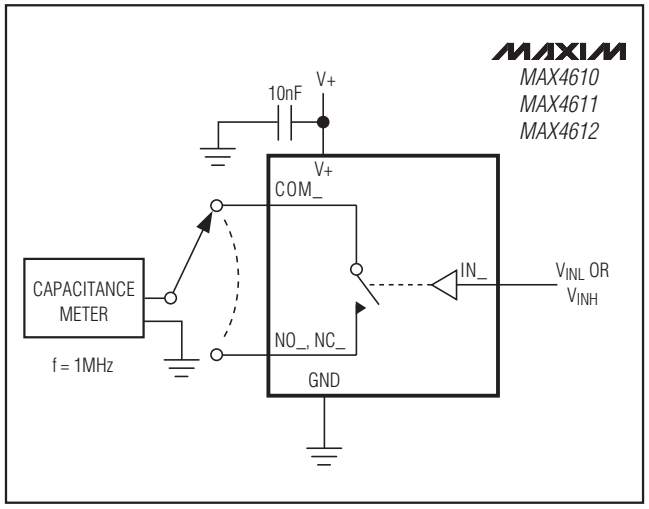



*Figure 6. Channel Off/On-Capacitance*

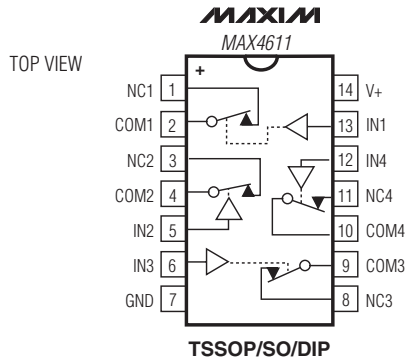
## Ordering Information (continued)

| PART | TEMP RANGE | PIN-PACKAGE |
|---|---|---|
| **MAX4611**CUD+ | 0°C to +70°C | 14 TSSOP |
| MAX4611CSD+ | 0°C to +70°C | 14 Narrow SO |
| MAX4611CPD+ | 0°C to +70°C | 14 Plastic DIP |
| MAX4611C/D+ | 0°C to +70°C | Dice* |
| MAX4611EGE+ | -40°C to +85°C | 16 QFN-EP** |
| MAX4611EUD+ | -40°C to +85°C | 14 TSSOP |
| MAX4611ESD+ | -40°C to +85°C | 14 Narrow SO |
| MAX4611EPD+ | -40°C to +85°C | 14 Plastic DIP |
| MAX4611AUD+ | -40°C to +85°C | 14 TSSOP |
| MAX4611ASD+ | -40°C to +85°C | 14 Narrow SO |
| **MAX4612**CUD+ | 0°C to +70°C | 14 TSSOP |
| MAX4612CSD+ | 0°C to +70°C | 14 Narrow SO |
| MAX4612CPD+ | 0°C to +70°C | 14 Plastic DIP |
| MAX4612C/D+ | 0°C to +70°C | Dice* |
| MAX4612EUD+ | -40°C to +85°C | 14 TSSOP |
| MAX4612ESD+ | -40°C to +85°C | 14 Narrow SO |
| MAX4612EGE+ | -40°C to +85°C | 16 QFN-EP** |
| MAX4612EPD+ | -40°C to +85°C | 14 Plastic DIP |
| MAX4612AUD+ | -40°C to +125°C | 14 TSSOP |
| MAX4612ASD+ | -40°C to +125°C | 14 Narrow SO |

**Contact factory for dice specifications.*
***EP = Exposed pad.*
*+Denotes a lead(Pb)-free/RoHS-compliant package.*

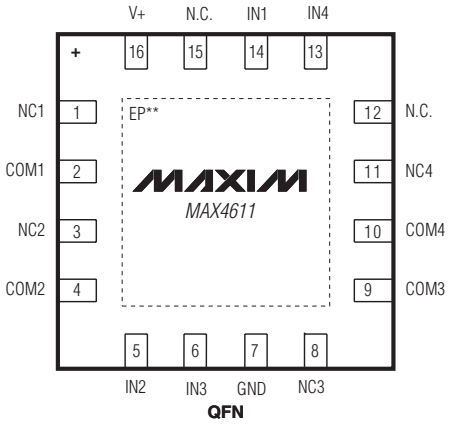
# Low-Voltage, Quad, SPST CMOS Analog Switches

## Pin Configurations/Truth Tables (continued)



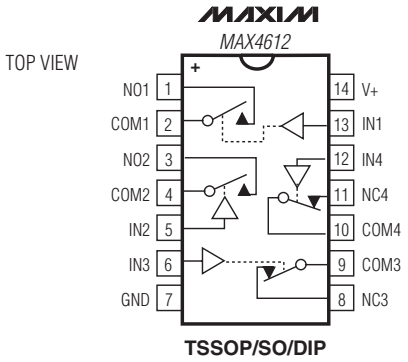

TSSOP/SO/DIP

| INPUT | SWITCH STATE |
|---|---|
| LOW | ON |
| HIGH | OFF |



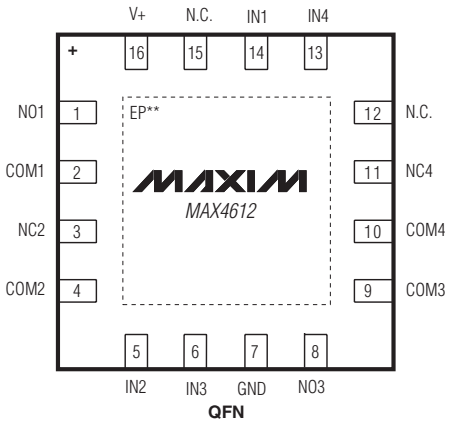

QFN

**EP = EXPOSED PAD, CONNECT EP TO V+




TSSOP/SO/DIP

| INPUT | NO1, NO2 | NC3, NC4 |
|---|---|---|
| LOW | OFF | ON |
| HIGH | ON | OFF |




QFN

**EP = EXPOSED PAD, CONNECT EP TO V+

## Package Information

For the latest package outline information, go to **www.maxim-ic.com/packages**.

| PACKAGE TYPE | PACKAGE CODE | DOCUMENT NO. |
|---|---|---|
| 14 TSSOP | U14+1 | 21-0066 |
| 14 Narrow SO | S14+2 | 21-0041 |
| 14 PDIP | P14+6 | 21-0043 |
| 16 QFN | G1644-1 | 21-0091 |

## Revision History

| REVISION NUMBER | REVISION DATE | DESCRIPTION | PAGES CHANGED |
|---|---|---|---|
| 0 | 1/99 | — | — |
| 6 | 5/09 | Added lead-free packaging and added changes to EC table | 1-4, 7, 9-13 |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