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# MAXIM

## *Fast, Low-Voltage, 2.5Ω, SPST, CMOS Analog Switches*

### _____General Description

The MAX4645/MAX4646 single-pole, single-throw (SPST) analog switches feature a 2.5Ω typical on-resistance ($R_{ON}$) from a +5V supply. $R_{ON}$ is flat (0.4Ω max) over the specified signal range. Each switch can handle Rail-to-Rail® analog signals. Off-leakage current is 0.25nA max at +25°C. These analog switches are ideal in low-distortion applications and are the preferred solution over mechanical relays in automated test equipment or applications where current switching is required. They have low power requirements, require less board space, and are more reliable than mechanical relays.

These switches operate from a +1.8V to +5V single supply, making them ideal for use in battery-powered applications. The MAX4645/MAX4646 have fast switching speeds of 12ns turn-on time ($t_{ON}$) and 8ns turn-off time ($t_{OFF}$).

The MAX4645 is a normally open (NO) switch, and the MAX4646 is a normally closed (NC) switch. Both are available in 5-pin SOT23, 6-pin SOT23, and 8-pin μMAX packages.

### _____Applications

Battery-Powered Systems

Audio and Video Signal Routing

Low-Voltage Data-Acquisition Systems

Sample-and-Hold Circuits

Communications Circuits

Relay Replacement

### _____Features

♦ **+1.8V to +5V Single-Supply Operation**

♦ **Guaranteed $R_{ON}$**
   **2.5Ω max (5V supply)**
   **3.5Ω max (3V supply)**

♦ **1.8V Operation**
   **$R_{ON}$ 30Ω typ Over Temperature**
   **$t_{ON}$ 40ns typ, $t_{OFF}$ 20ns typ**

♦ **Low $R_{ON}$ Flatness: 0.4Ω max**

♦ **Guaranteed Low Leakage Currents**
   **±0.25nA at +25°C**

♦ **Rail-to-Rail Output Capability**

♦ **TTL/CMOS-Logic Compatible**

♦ **-75dB Off-Isolation at 1MHz**

♦ **Low Distortion: 0.014% typ**

### _____Ordering Information

| PART | TEMP RANGE | PIN-PACKAGE | TOP MARK |
|------|-----------|-------------|----------|
| **MAX4645**EUK-T | -40°C to +85°C | 5 SOT23-5 | ADOB |
| MAX4645EUT-T | -40°C to +85°C | 6 SOT23-6 | AAHL |
| MAX4645EUA | -40°C to +85°C | 8 μMAX | — |
| **MAX4646**EUK-T | -40°C to +85°C | 5 SOT23-5 | ADOC |
| MAX4646EUT-T | -40°C to +85°C | 6 SOT23-6 | AAHM |
| MAX4646EUA | -40°C to +85°C | 8 μMAX | — |

*Rail-to-Rail is a registered trademark of Nippon Motorola, Ltd.*

### _____Pin Configurations/Functional Diagrams/Truth Tables



TOP VIEW

SOT23-5 (MAX4645): COM 1, NO 2, GND 3, IN 4, V+ 5

SOT23-5 (MAX4646): COM 1, NC 2, GND 3, IN 4, V+ 5

PIN 5 — XYZA (5, 4 / 1, 2, 3)

NOTE: SOT23-5 PACKAGE HAS LETTERING NEAREST PIN 5.

*Pin Configurations/Functional Diagrams/Truth Tables continued at end of data sheet.*

| INPUT | SWITCH STATE | |
|-------|----------|----------|
| | **MAX4645** | **MAX4646** |
| 0 | OFF | ON |
| 1 | ON | OFF |

SWITCHES SHOWN FOR LOGIC 0 INPUT.

# MAXIM

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

# Fast, Low-Voltage, 2.5Ω, SPST, CMOS Analog Switches

## ABSOLUTE MAXIMUM RATINGS

V+, V$_{IN}$ to GND..........................................................-0.3 to +6V
COM, NO, NC to GND (Note 1)....................-0.3V to (V+ + 0.3V)
Continuous Current (any terminal)...................................±50mA
Peak Current COM, NO, NC
   (pulsed at 1ms 10% duty cycle)..............................±100mA

Continuous Power Dissipation (T$_A$ = +70°C)
   5-Pin SOT23 (derate 7.1mW/°C above+70°C)............571mW
   6-Pin SOT23 (derate 8.7mW/°C above +70°C)...........696mW
   8-Pin µMAX (derate 4.1mW/°C above+70°C) ............330mW
Operating Temperature Range ...........................-40°C to +85°C
Storage Temperature Range ..............................-65°C to +150°C
Lead Temperature (soldering, 10s) ................................+300°C

**Note 1:** Signals on NO, NC, or COM, exceeding V+ or GND are clamped by internal diodes. Limit forward 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+ = 4.5V to 5.5V, V$_{IH}$ = 2.4V, V$_{IL}$ = 0.8V, T$_A$ = T$_{MIN}$ to T$_{MAX}$, unless otherwise specified.) (Notes 2, 3)

| PARAMETER | SYMBOL | CONDITIONS | | MIN | TYP | MAX | UNITS |
|---|---|---|---|---|---|---|---|
| **ANALOG SWITCH** | | | | | | | |
| Input Voltage Range | V$_{COM}$, V$_{NO}$, V$_{NC}$ | | | 0 | | V+ | V |
| COM to NO or NC On-Resistance | R$_{ON}$ | I$_{COM}$ = 10mA, V$_{NO}$ or V$_{NC}$ = 0 to V+, V+ = 4.5V | T$_A$ = +25°C | | 1.5 | 2.5 | Ω |
| | | | T$_A$ = T$_{MIN}$ to T$_{MAX}$ | | | 3 | |
| On-Resistance Flatness (Note 4) | R$_{FLAT(ON)}$ | I$_{COM}$ = 10mA, V$_{NO}$ or V$_{NC}$ = 0 to V+, V+ = 4.5V | T$_A$ = +25°C | | 0.1 | 0.4 | Ω |
| | | | T$_A$ = T$_{MIN}$ to T$_{MAX}$ | | | 0.6 | |
| Off-Leakage Current (NO or NC) (Notes 5, 6) | I$_{NO(OFF)}$, I$_{NC(OFF)}$ | V$_{COM}$ = 1V, 4.5V; V$_{NO}$ or V$_{NC}$ = 4.5V, 1V; V+ = 5.5V | T$_A$ = +25°C | -0.25 | 0.01 | 0.25 | nA |
| | | | T$_A$ = T$_{MIN}$ to T$_{MAX}$ | -0.35 | | 0.35 | |
| COM Off-Leakage Current (Notes 5, 6) | I$_{COM(OFF)}$ | V$_{COM}$ = 1V, 4.5V; V$_{NO}$ or V$_{NC}$ = 4.5V, 1V; V+ = 5.5V | T$_A$ = +25°C | -0.25 | 0.01 | 0.25 | nA |
| | | | T$_A$ = T$_{MIN}$ to T$_{MAX}$ | -0.35 | | 0.35 | |
| COM On-Leakage Current (Notes 5, 6) | I$_{COM(ON)}$ | V+ = 5.5V; V$_{COM}$ = 4.5V, 1V; V$_{NO}$ or V$_{NC}$ = 4.5V, 1V, or floating | T$_A$ = +25°C | -0.25 | 0.01 | 0.25 | nA |
| | | | T$_A$ = T$_{MIN}$ to T$_{MAX}$ | -0.35 | | 0.35 | |
| **LOGIC INPUT** | | | | | | | |
| Input Logic High | V$_{IH}$ | | | 2.4 | | | V |
| Input Logic Low | V$_{IL}$ | | | | | 0.8 | V |
| Logic Input Current | I$_{IN}$ | V$_{IN\_}$ = 0.8V or 2.4V | | -0.1 | 0.005 | 0.1 | µA |
| **SWITCH DYNAMIC CHARACTERISTICS** | | | | | | | |
| Turn-On Time (Note 5) | t$_{ON}$ | V$_{NO}$, V$_{NC}$ = 3V, R$_L$ = 300Ω, C$_L$ = 35pF, Figure 2 | T$_A$ = +25°C | | 12 | 15 | ns |
| | | | T$_A$ = T$_{MIN}$ to T$_{MAX}$ | | | 18 | |
| Turn-Off Time (Note 5) | t$_{OFF}$ | V$_{NO}$, V$_{NC}$ = 3V, R$_L$ = 300Ω, C$_L$ = 35pF, Figure 2 | T$_A$ = +25°C | | 8 | 10 | ns |
| | | | T$_A$ = T$_{MIN}$ to T$_{MAX}$ | | | 12 | |

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# Fast, Low-Voltage, 2.5Ω, SPST, CMOS Analog Switches

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

(V+ = 4.5V to 5.5V, $V_{IH}$ = 2.4V, $V_{IL}$ = 0.8V, $T_A$ = $T_{MIN}$ to $T_{MAX}$, unless otherwise specified.) (Notes 2, 3)

| PARAMETER | SYMBOL | CONDITIONS | | MIN | TYP | MAX | UNITS |
|---|---|---|---|---|---|---|---|
| Charge Injection | Q | $V_{GEN}$ = 2V, $C_L$ = 1.0nF, $R_{GEN}$ = 0, Figure 3 | $T_A$ = +25°C | | 5 | | pC |
| NO or NC Capacitance | $C_{OFF}$ | $V_{NO}$ , $V_{NC}$ = GND, f = 1MHz, Figure 5 | $T_A$ = +25°C | | 17 | | pF |
| COM Off-Capacitance | $C_{COM}$ | $V_{COM}$ = GND, f = 1MHz, Figure 5 | $T_A$ = +25°C | | 17 | | pF |
| COM On-Capacitance | $C_{COM}$ | $V_{COM}$ = $V_{NO}$, $V_{NC}$ = GND f = 1MHz, Figure 5 | $T_A$ = +25°C | | 38 | | pF |
| Off-Isolation (Note 7) | $V_{ISO}$ | $V_{NO}$ = $V_{NC}$ = 1$V_{RMS}$, $R_L$ = 50Ω, $C_L$ = 5pF, f = 10MHz, Figure 4 | $T_A$ = +25°C | | -55 | | dB |
| | | $V_{NO}$ = $V_{NC}$ = 1$V_{RMS}$, $R_L$ = 50Ω, $C_L$ = 5pF, f = 1MHz, Figure 4 | $T_A$ = +25°C | | -75 | | dB |
| Total Harmonic Distortion | THD | $R_L$ = 600Ω, 5$V_{P-P}$, f = 20Hz to 20kHz | $T_A$ = +25°C | | 0.014 | | % |
| **POWER SUPPLY** | | | | | | | |
| Positive Supply Current | I+ | V+ = 5.5V, $V_{IN}$ = 0 or V+, all channels on or off | $T_A$ = +25°C | | 0.0001 | | μA |
| | | | $T_A$ = $T_{MIN}$ to $T_{MAX}$ | | | 1.0 | |

## ELECTRICAL CHARACTERISTICS—Single +3V Supply

(V+ = 2.7V to 3.3V, $V_{IH}$ = 2.0V, $V_{IL}$ = 0.4V, $T_A$ = $T_{MIN}$ to $T_{MAX}$, unless otherwise specified.) (Notes 2, 3)

| PARAMETER | SYMBOL | CONDITIONS | | MIN | TYP | MAX | UNITS |
|---|---|---|---|---|---|---|---|
| **ANALOG SWITCH** | | | | | | | |
| Input Voltage Range | $V_{COM}$, $V_{NO}$, $V_{NC}$ | | | 0 | | V+ | V |
| COM to NO or NC On-Resistance | $R_{ON}$ | $I_{COM}$ = 10mA, $V_{NO}$ or $V_{NC}$ = 0 to V+, V+ = 2.7V | $T_A$ = +25°C | | 2.5 | 3.5 | Ω |
| | | | $T_A$ = $T_{MIN}$ to $T_{MAX}$ | | | 4.5 | |
| On-Resistance Flatness (Note 4) | $R_{FLAT(ON)}$ | $I_{COM}$ = 10mA, $V_{NO}$ or $V_{NC}$ = 0 to V+, V+ = 2.7V | $T_A$ = +25°C | | 0.5 | 0.9 | Ω |
| | | | $T_A$ = $T_{MIN}$ to $T_{MAX}$ | | | 1 | |
| Off-Leakage Current (NO or NC) (Notes 5, 6) | $I_{NO(OFF)}$, $I_{NC(OFF)}$ | $V_{COM}$ = 1V, 3V; $V_{NO}$ or $V_{NC}$ = 3V, 1V; V+ = 3.3V | $T_A$ = +25°C | -0.25 | 0.01 | 0.25 | nA |
| | | | $T_A$ = $T_{MIN}$ to $T_{MAX}$ | -0.35 | | 0.35 | |
| COM Off-Leakage Current (Notes 5, 6) | $I_{COM(OFF)}$ | $V_{COM}$ = 1V, 3V; $V_{NO}$ or $V_{NC}$ = 3V, 1V; V+ = 3.3V | $T_A$ = +25°C | -0.25 | 0.01 | 0.25 | nA |
| | | | $T_A$ = $T_{MIN}$ to $T_{MAX}$ | -0.35 | | 0.35 | |
| COM On-Leakage Current (Notes 5, 6) | $I_{COM(ON)}$ | V+ = 3.3V; $V_{COM}$ = 1V, 3V; $V_{NO}$ or $V_{NC}$ = 1V, 3V or floating | $T_A$ = +25°C | -0.25 | 0.01 | 0.25 | nA |
| | | | $T_A$ = $T_{MIN}$ to $T_{MAX}$ | -0.35 | | 0.35 | |

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## ELECTRICAL CHARACTERISTICS—Single +3V Supply (continued)

(V+ = 2.7V to 3.3V, $V_{IH}$ = 2.0V, $V_{IL}$ = 0.4V, $T_A$ = $T_{MIN}$ to $T_{MAX}$, unless otherwise specified.) (Notes 2, 3)

| PARAMETER | SYMBOL | CONDITIONS | | MIN | TYP | MAX | UNITS |
|---|---|---|---|---|---|---|---|
| **LOGIC INPUT** | | | | | | | |
| Input Logic High | $V_{IH}$ | | | 2.0 | | | V |
| Input Logic Low | $V_{IL}$ | | | | | 0.4 | V |
| Logic Input Current | $I_{IN}$ | $V_{IN\_}$ = 0.4V or 2.0V | | -1 | 0.005 | 1 | µA |
| **SWITCH DYNAMIC CHARACTERISTICS** | | | | | | | |
| Turn-On Time (Note 5) | $t_{ON}$ | $V_{NO}$, $V_{NC}$ = 2.0V, $R_L$ = 300Ω, $C_L$ = 35pF, Figure 2 | $T_A$ = +25°C | | 12 | 15 | ns |
| | | | $T_A$ = $T_{MIN}$ to $T_{MAX}$ | | | 20 | |
| Turn-Off Time (Note 5) | $t_{OFF}$ | $V_{NO}$, $V_{NC}$ = 2.0V, $R_L$ = 300Ω, $C_L$ = 35pF, Figure 2 | $T_A$ = +25°C | | 8 | 10 | ns |
| | | | $T_A$ = $T_{MIN}$ to $T_{MAX}$ | | | 13 | |
| Charge Injection | Q | $V_{GEN}$ = 1.5V, $C_L$ = 1.0nF, $R_{GEN}$ = 0, Figure 3 | $T_A$ = +25°C | | 4 | | pC |
| NO or NC Capacitance | $C_{OFF}$ | $V_{NO}$, $V_{NC}$ = GND, f = 1MHz, Figure 5 | $T_A$ = +25°C | | 17 | | pF |
| COM Off-Capacitance | $C_{COM}$ | $V_{COM}$ = GND, f = 1MHz, Figure 5 | $T_A$ = +25°C | | 17 | | pF |
| COM On-Capacitance | $C_{COM}$ | $V_{COM}$ = $V_{NO}$, $V_{NC}$ = GND, f = 1MHz, Figure 5 | $T_A$ = +25°C | | 38 | | pF |
| Off-Isolation (Note 7) | $V_{ISO}$ | $V_{NO}$ = $V_{NC}$ = 1$V_{RMS}$, $R_L$ = 50Ω, $C_L$ = 5pF, f = 10MHz, Figure 4 | $T_A$ = +25°C | | -55 | | dB |
| | | $V_{NO}$ = $V_{NC}$ = 1$V_{RMS}$, $R_L$ = 50Ω, $C_L$ = 5pF, f = 1MHz, Figure 4 | $T_A$ = +25°C | | -75 | | |
| **POWER SUPPLY** | | | | | | | |
| Positive Supply Current | I+ | V+ = 3.3V, $V_{IN}$ = 0 or V+, all channels on or off | $T_A$ = +25°C | | 0.0001 | | µA |
| | | | $T_A$ = $T_{MIN}$ to $T_{MAX}$ | | | 1.0 | |

**Note 2:** The algebraic convention, where the most negative value is a minimum and the most positive value is a maximum, is used in this data sheet.
**Note 3:** SOT packages are 100% production tested at +25°C. Limits at the maximum rated temperature are guaranteed by correlation.
**Note 4:** Flatness is defined as the difference between the maximum and the minimum value of on-resistance as measured over the specified analog signal ranges.
**Note 5:** Guaranteed by design.
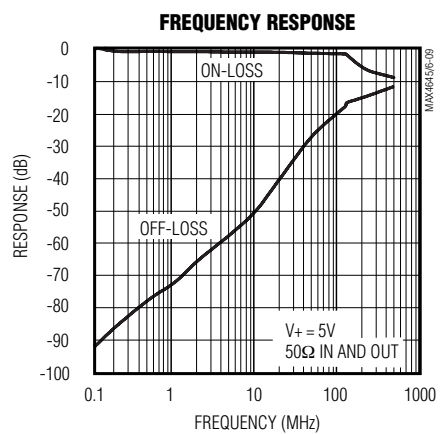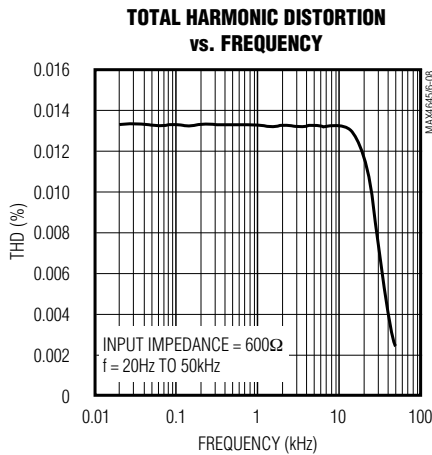**Note 6:** Leakage parameters are 100% tested at +85°C and guaranteed by correlation at +25°C.
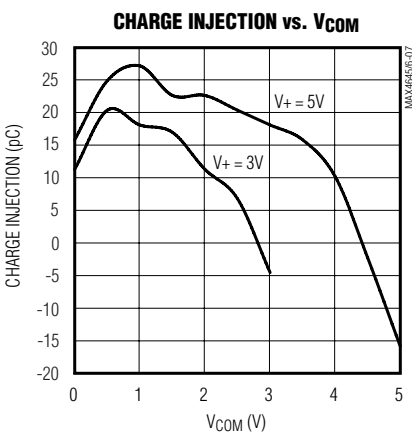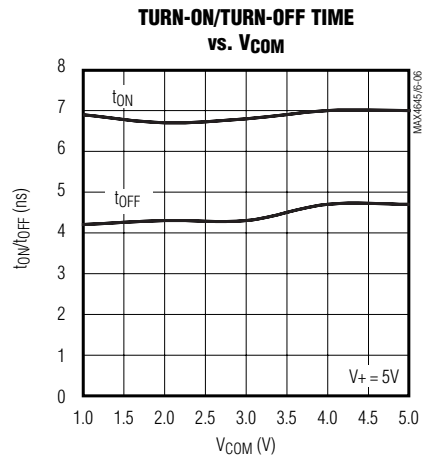**Note 7:** Off-Isolation = $20\log_{10}(V_{COM}/V_{NO})$, $V_{COM}$ = output, $V_{NO}$ = input to off switch.

**MAX4645/MAX4646**

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



ON-RESISTANCE vs. V_COM AND SUPPLY VOLTAGE



ON-RESISTANCE vs. V_COM AND TEMPERATURE



ON/OFF-LEAKAGE CURRENT vs. TEMPERATURE



SUPPLY CURRENT vs. SUPPLY VOLTAGE AND TEMPERATURE



TURN-ON/TURN-OFF TIME vs. TEMPERATURE



TURN-ON/TURN-OFF TIME vs. V_COM



CHARGE INJECTION vs. V_COM



TOTAL HARMONIC DISTORTION vs. FREQUENCY



FREQUENCY RESPONSE

**MAXIM**
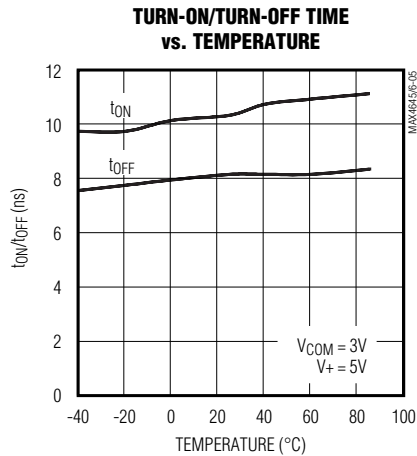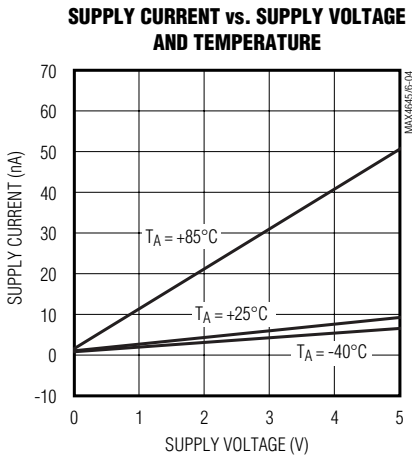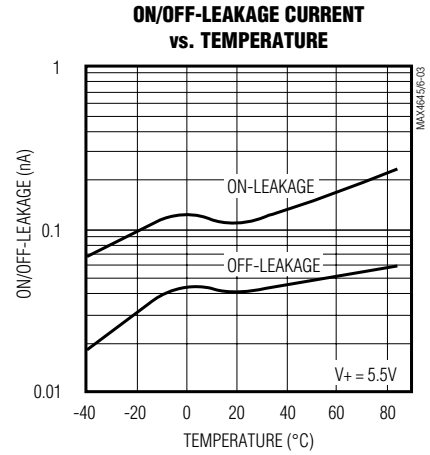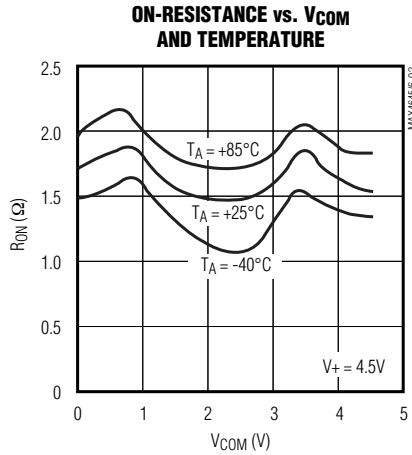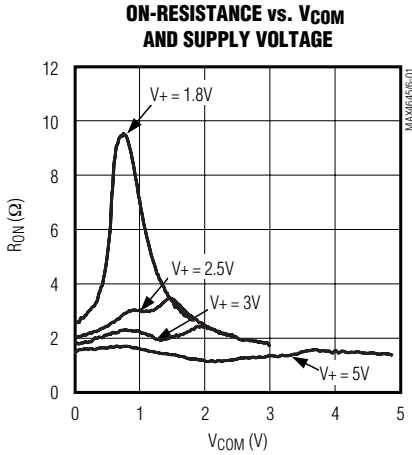
# Fast, Low-Voltage, 2.5Ω, SPST, CMOS Analog Switches

## Pin Description

| PIN | | | | | | NAME | FUNCTION |
|---|---|---|---|---|---|---|---|
| MAX4645 | | | MAX4646 | | | | |
| SOT23-5 | SOT23-6 | μMAX | SOT23-5 | SOT23-6 | μMAX | | |
| 1 | 1 | 1 | 1 | 1 | 1 | COM | Analog Switch Common Terminal |
| 2 | 2 | 8 | — | — | — | NO | Analog Switch Normally Open Terminal |
| — | — | — | 2 | 2 | 8 | NC | Analog Switch Normally Closed Terminal |
| 3 | 3 | 7 | 3 | 3 | 7 | GND | Ground |
| 4 | 4 | 6 | 4 | 4 | 6 | IN | Logic Control Input |
| — | 5 | 2, 3, 5 | — | 5 | 2, 3, 5 | N.C. | No Connection. Not internally connected. |
| 5 | 6 | 4 | 5 | 6 | 4 | V+ | Positive Supply Voltage |

## Detailed Description

The MAX4645/MAX4646 are low 2.5Ω max on-resistance (at V+ = 5V), low-voltage analog switches that operate from a +1.8V to +5.5V single supply. CMOS switch construction allows processing analog signals that are within the supply voltage range (GND to V+).

## Applications Information

Proper power-supply sequencing is recommended for all CMOS devices. Do not exceed the absolute maximum ratings because stresses beyond the listed ratings can cause permanent damage to the devices. Always sequence V+ on first, followed by the logic inputs, NO, or COM. If power-supply sequencing is not possible, add two small signal diodes (D1, D2) in series with the supply pins for overvoltage protection (Figure 1). Adding these diodes reduces the analog signal by one diode drop below V+ and one diode drop above GND, but does not affect the low switch resistance and low leakage characteristics of the device. Device operation is unchanged, and the difference between V+ and GND should not exceed 6V.

Although it is not required, power-supply bypassing improves noise margin and prevents switching noise from propagating from the V+ supply to other components. A 0.1μF capacitor, connected from V+ to GND, is adequate for most applications.
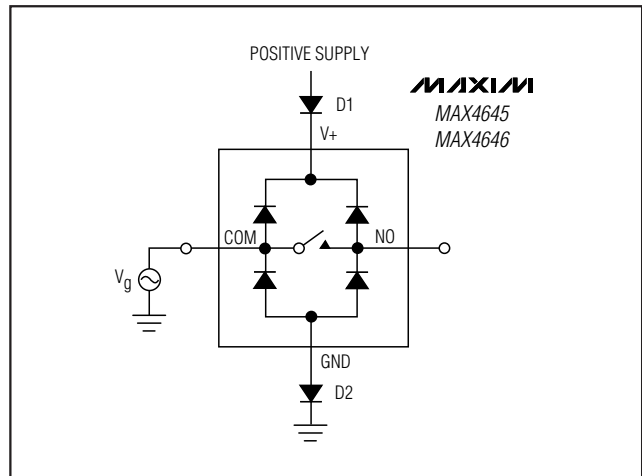


Figure 1. Overvoltage Protection Using Two External Blocking Diodes

**MAXIM**

## Test Circuits/Timing Diagrams

**MAXIM**
*MAX4645*
*MAX4646*

SWITCH INPUT $V_{COM}$ — COM ▲ NO — SWITCH OUTPUT $V_{OUT}$

V+
V+

IN

LOGIC INPUT

GND

$R_L$ 300Ω    $C_L$ 35pF

$C_L$ INCLUDES FIXTURE AND STRAY CAPACITANCE.

$$V_{OUT} = V_{COM} \left( \frac{R_L}{R_L + R_{ON}} \right)$$

LOGIC INPUT    V+    0    50%    $t_r < 5ns$    $t_f < 5ns$

$t_{OFF}$

SWITCH OUTPUT    $V_{OUT}$    0    $0.9 \times V_{OUT}$    $0.9 \times V_{OUT}$

$t_{ON}$

LOGIC INPUT WAVEFORMS INVERTED FOR SWITCHES
THAT HAVE THE OPPOSITE LOGIC SENSE.

*Figure 2. Switching Time*

**MAXIM**
*MAX4645*
*MAX4646*

V+
V+

$R_{GEN}$    COM    NO — $V_{OUT}$

$V_{GEN}$

GND    IN    $C_L$

$V_{IN}$

$V_{OUT}$    $\Delta V_{OUT}$

IN    OFF    ON    OFF

$$Q = (\Delta V_{OUT})(C_L)$$

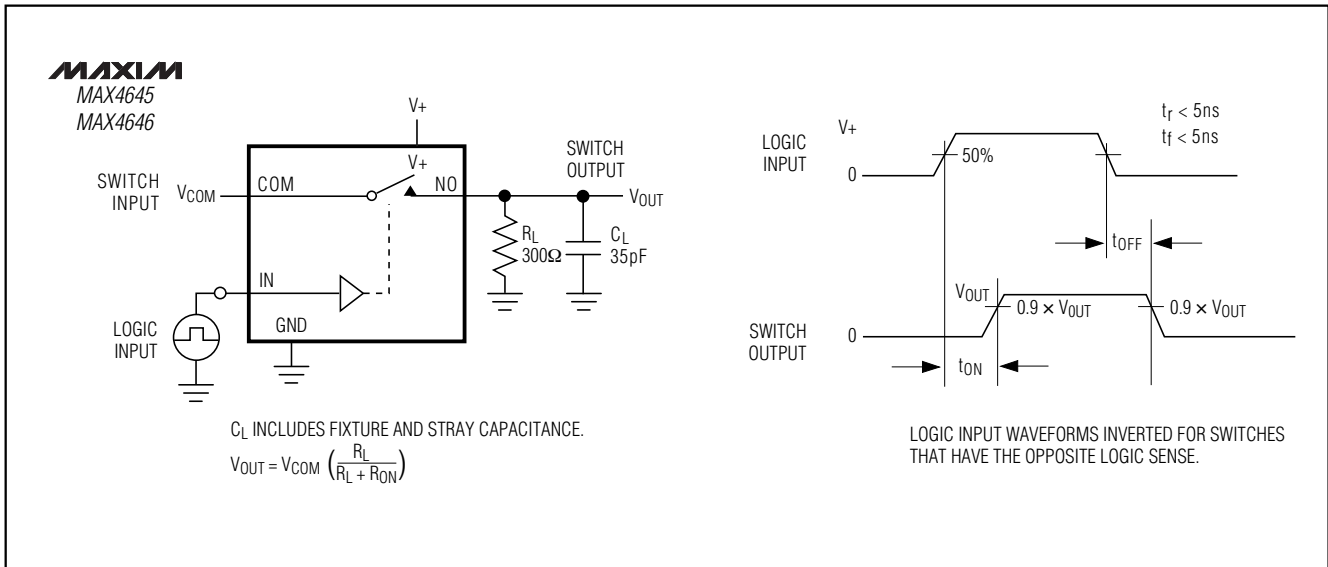*Figure 3. Charge Injection*

# Fast, Low-Voltage, 2.5Ω, SPST, CMOS Analog Switches

## Test Circuits/Timing Diagrams (continued)
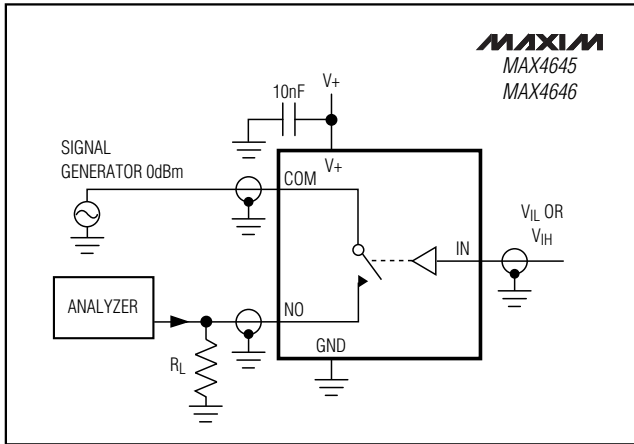


Figure 4. Off-Isolation/On-Channel Bandwidth
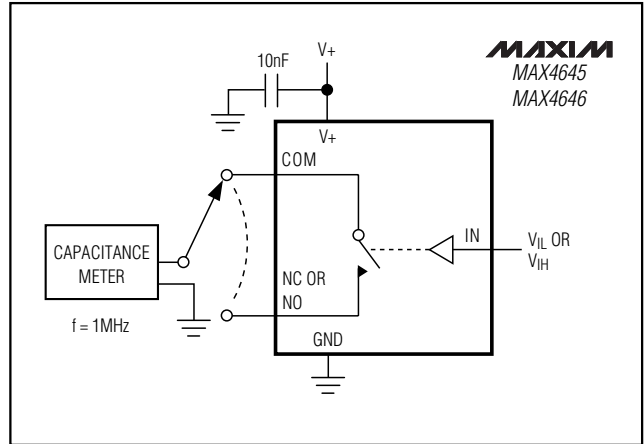


Figure 5. Channel Off/On-Capacitance

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



| INPUT | SWITCH STATE | |
|---|---|---|
| | MAX4645 | MAX4646 |
| 0 | OFF | ON |
| 1 | ON | OFF |

SWITCHES SHOWN FOR LOGIC 0 INPUT.

N.C. = NOT INTERNALLY CONNECTED

NOTE: SOT23-6 PACKAGE HAS LETTERING NEAREST PIN 6.

## Chip Information

TRANSISTOR COUNT: 50

## Package Information

(The package drawing(s) in this data sheet may not reflect the most current specifications. For the latest package outline information go to **www.maxim-ic.com/packages**.)

SOT-23 5L.EPS



TOP VIEW

SIDE VIEW

FRONT VIEW

| SYMBOL | MIN | MAX |
|--------|------|------|
| A | 0.90 | 1.45 |
| A1 | 0.00 | 0.15 |
| A2 | 0.90 | 1.30 |
| b | 0.35 | 0.50 |
| C | 0.08 | 0.20 |
| D | 2.80 | 3.00 |
| E | 2.60 | 3.00 |
| E1 | 1.50 | 1.75 |
| L | 0.35 | 0.60 |
| L1 | 0.60 REF | |
| e | 0.95 BSC. | |
| e1 | 1.90 BSC. | |
| α | 0° | 8° |

NOTES:
1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. FOOT LENGTH MEASURED AT INTERCEPT POINT BETWEEN DATUM A & LEAD SURFACE.
3. PACKAGE OUTLINE EXCLUSIVE OF MOLD FLASH & METAL BURR. MOLD FLASH, PROTRUSION OR METAL BURR SHOULD NOT EXCEED 0.25 MM.
4. PACKAGE OUTLINE INCLUSIVE OF SOLDER PLATING.
5. MEETS JEDEC MO178, VARIATION AA.
6. LEADS TO BE COPLANAR WITHIN 0.10 mm.
7. SOLDER THICKNESS MEASURED AT FLAT SECTION OF LEAD BETWEEN 0.08mm AND 0.15mm FROM LEAD TIP.

**DALLAS** SEMICONDUCTOR **/VI /IXI/VI**

PROPRIETARY INFORMATION

TITLE: PACKAGE OUTLINE, SOT-23, 5L

| APPROVAL | DOCUMENT CONTROL NO. | REV. | |
|----------|----------------------|------|------|
| | 21-0057 | E | 1/1 |

*MAX4645/MAX4646*

## Package Information (continued)

(The package drawing(s) in this data sheet may not reflect the most current specifications. For the latest package outline information go to **www.maxim-ic.com/packages**.)

6LSOT.EPS



| SYMBOL | MIN | MAX |
|--------|------|------|
| A | 0.90 | 1.45 |
| A1 | 0.00 | 0.15 |
| A2 | 0.90 | 1.30 |
| b | 0.35 | 0.50 |
| C | 0.08 | 0.20 |
| D | 2.80 | 3.00 |
| E | 2.60 | 3.00 |
| E1 | 1.50 | 1.75 |
| L | 0.35 | 0.60 |
| L1 | 0.60 | REF. |
| e1 | 1.90 | BSC. |
| e | 0.95 | BSC. |
| α | 0° | 10° |

NOTES:
1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. FOOT LENGTH MEASURED AT INTERCEPT POINT BETWEEN DATUM A & LEAD SURFACE.
3. PACKAGE OUTLINE EXCLUSIVE OF MOLD FLASH & METAL BURR. MOLD FLASH, PROTRUSION OR METAL BURR SHOULD NOT EXCEED 0.25 MM.
4. PACKAGE OUTLINE INCLUSIVE OF SOLDER PLATING.
5. PIN 1 IS LOWER LEFT PIN WHEN READING TOP MARK FROM LEFT TO RIGHT. (SEE EXAMPLE TOP MARK)
6. PIN 1 I.D. DOT IS 0.3 MM Ø MIN. LOCATED ABOVE PIN 1.
7. MEETS JEDEC MO178, VARIATION AB.
8. SOLDER THICKNESS MEASURED AT FLAT SECTION OF LEAD BETWEEN 0.08mm AND 0.15mm FROM LEADTIP.
9. LEAD TO BE COPLANAR WITHIN 0.1 MM.

**DALLAS** SEMICONDUCTOR /MAXIM

PROPRIETARY INFORMATION

TITLE: PACKAGE OUTLINE, SOT-23, 6L

| APPROVAL | DOCUMENT CONTROL NO. | REV. | |
|----------|----------------------|------|------|
| | 21-0058 | F | 1/1 |

/MAXIM
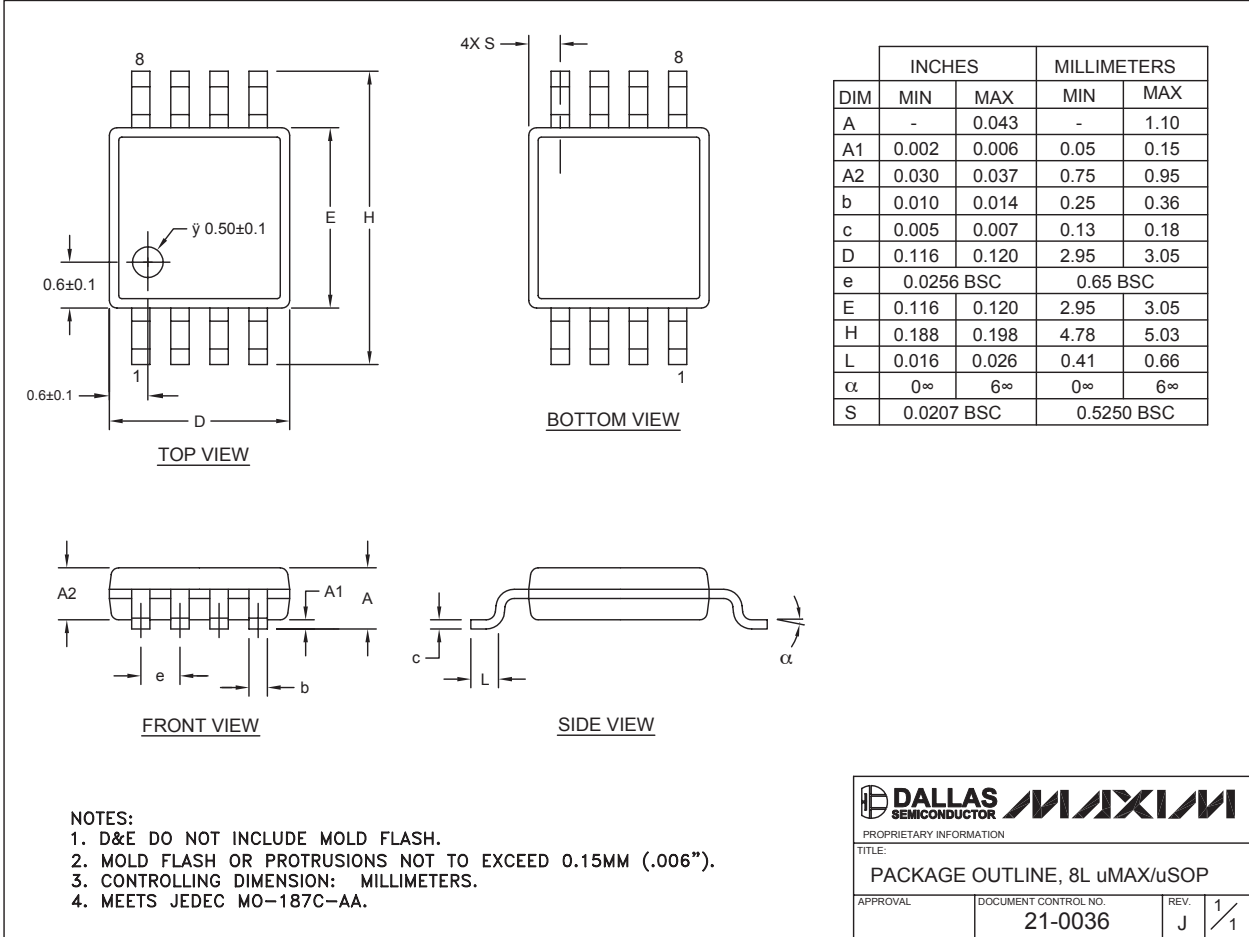
# Fast, Low-Voltage, 2.5Ω, SPST, CMOS Analog Switches

(The package drawing(s) in this data sheet may not reflect the most current specifications. For the latest package outline information go to **www.maxim-ic.com/packages**.)

8LUMAXD.EPS

| DIM | INCHES | | MILLIMETERS | |
|---|---|---|---|---|
| | MIN | MAX | MIN | MAX |
| A | - | 0.043 | - | 1.10 |
| A1 | 0.002 | 0.006 | 0.05 | 0.15 |
| A2 | 0.030 | 0.037 | 0.75 | 0.95 |
| b | 0.010 | 0.014 | 0.25 | 0.36 |
| c | 0.005 | 0.007 | 0.13 | 0.18 |
| D | 0.116 | 0.120 | 2.95 | 3.05 |
| e | 0.0256 BSC | | 0.65 BSC | |
| E | 0.116 | 0.120 | 2.95 | 3.05 |
| H | 0.188 | 0.198 | 4.78 | 5.03 |
| L | 0.016 | 0.026 | 0.41 | 0.66 |
| α | 0∞ | 6∞ | 0∞ | 6∞ |
| S | 0.0207 BSC | | 0.5250 BSC | |

TOP VIEW

BOTTOM VIEW

FRONT VIEW

SIDE VIEW

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

**DALLAS SEMICONDUCTOR** /VI/IXI/VI
PROPRIETARY INFORMATION

TITLE:
PACKAGE OUTLINE, 8L uMAX/uSOP

| APPROVAL | DOCUMENT CONTROL NO. | REV. | |
|---|---|---|---|
| | 21-0036 | J | 1/1 |

**Note:** The MAX4645/MAX4646 do not have an exposed paddle.