



Quad DPDT Audio/Data Switches in UCSP/QFN

MAX4758/MAX4759

General Description

The MAX4758/MAX4759 quad double-pole/double-throw (DPDT) analog switches operate from a single +1.8V to +5.5V supply. These switches feature low 0.5Ω on-resistance for audio switching and a low 25pF capacitance for data switching.

The MAX4758 has eight 0.5Ω on-resistance switches to switch audio signals. The MAX4759 has four 0.5Ω on-resistance switches to route audio signals and four 25pF capacitance switches to route data signals. The MAX4758/MAX4759 have four logic inputs to control the switches in pairs.

The MAX4758/MAX4759 are available in a small 36-pin (6mm x 6mm) thin QFN and 36-bump (3mm x 3mm) chip-scale package (UCSP™).

Applications

- | | |
|---------------------------|-------------------------|
| Speaker-Headset Switching | PDA's/Hand-Held Devices |
| Audio-Signal Routing | Notebook Computers |
| Cellular Phones | USB Signal Switching |

Features

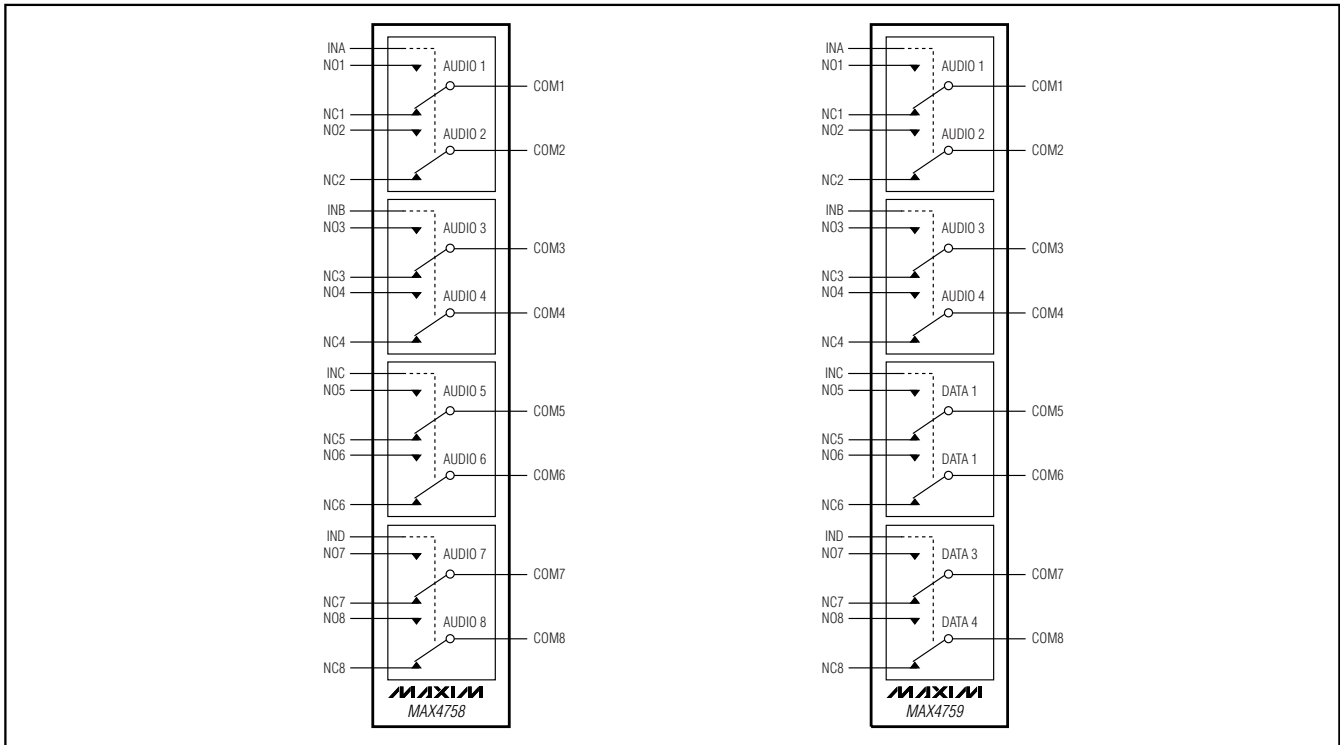
- ◆ Data and Audio Signal Routing
- ◆ Low On-Resistance (0.5Ω) Audio Switches
- ◆ 0.2Ω On-Resistance Flatness
- ◆ 0.1Ω Channel-to-Channel Matching
- ◆ Low-Capacitance (25pF) Data Switches (MAX4759)
- ◆ 0.2ns Skew (MAX4759)
- ◆ 0.03% THD
- ◆ +1.8V to +5.5V Supply Range
- ◆ Rail-to-Rail Signal Handling
- ◆ Tiny 36-Bump UCSP (3mm x 3mm)
- ◆ 36-Pin Thin QFN (6mm x 6mm)

Ordering Information

| PART | TEMP RANGE | PIN-PACKAGE |
|---------------|----------------|-------------------------|
| MAX4758EBX-T | -40°C to +85°C | 36 UCSP-36 |
| MAX4758ETX | -40°C to +85°C | 36 Thin QFN (6mm x 6mm) |
| MAX4759EBX-T* | -40°C to +85°C | 36 UCSP-36 |
| MAX4759ETX* | -40°C to +85°C | 36 Thin QFN (6mm x 6mm) |

*Future product—contact factory for availability.

Functional Diagrams



UCSP is a trademark of Maxim Integrated Products, Inc.

Pin Configurations/Truth Table appear at end of data sheet.



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.

Quad DPDT Audio/Data Switches in UCSP/QFN

ABSOLUTE MAXIMUM RATINGS

(All voltages referenced to GND.)

| | |
|--|--|
| V+, IN_ | -0.3V to +6V |
| COM_, NO_, NC_ (Note 1) | -0.3V to (V+ + 0.3V) |
| Continuous Current | |
| NO_, NC_, COM_ (MAX4758) | ±300mA |
| NO1–NO4, NC1–NC4, COM1–COM4 (MAX4759) | ±300mA |
| NO5–NO8, NC5–NC8, COM5–COM8 (MAX4759) | ±100mA |
| Peak Current NO_, NC_, COM_ (MAX4758) | |
| NO1–NO4, NC1–NC4, COM1–COM4 (MAX4759) | (pulsed at 1ms, 10% duty cycle) ±500mA |
| | (pulsed at 1ms, 50% duty cycle) ±400mA |
| Peak Current NO5–NO8, NC5–NC8, COM5–COM8 (MAX4759) | |
| | (pulsed at 1ms, 10% duty cycle) ±200mA |
| | (pulsed at 1ms, 50% duty cycle) ±300mA |

Continuous Power Dissipation (T_A = +70°C)

| | |
|--|-----------------|
| 36-Bump UCSP (derate 15.3mW/°C above +70°C) | 1221mW |
| 36-Pin Thin QFN (derate 26.3mW/°C above +70°C) | 2105mW |
| ESD per Method 3015.7 | ±2kV |
| Operating Temperature Range | -40°C to +85°C |
| Junction Temperature | +150°C |
| Storage Temperature Range | -65°C to +150°C |
| Lead Temperature (soldering, 10s) | +300°C |
| Bump Temperature (soldering) | |
| Infrared (15s) | +220°C |
| Vapor Phase (60s) | +215°C |

Note 1: Signals on NO_, NC_, COM_ 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

(V+ = +2.7V to +5.25V, T_A = -40°C to +85°C, unless otherwise noted. Typical values are at V+ = 3V, T_A = +25°C.) (Notes 2, 3)

| PARAMETER | SYMBOL | CONDITIONS | T _A | MIN | TYP | MAX | UNITS |
|---|---|--|--------------------------------------|--------------------------------------|-----|------|-------|
| ANALOG SWITCH | | | | | | | |
| Analog Signal Range | V _{COM_} , V _{NO_} , V _{NC_} | | T _{MIN} to T _{MAX} | 0 | | V+ | V |
| On-Resistance (Note 4) | R _{ON} | V+ = 2.7V, I _{COM_} = 10mA, V _{NC_} or V _{NO_} = 0 or V+ | MAX4758, MAX4759 (N_1–N_4) | +25°C | 0.5 | 0.85 | Ω |
| | | | | T _{MIN} to T _{MAX} | | 1.0 | |
| | | MAX4759 (N_5–N_8) | +25°C | 2.0 | 3.5 | | |
| | | | | T _{MIN} to T _{MAX} | | 4 | |
| On-Resistance Match Between Channels (Notes 4, 5) | ΔR _{ON} | V+ = 2.7V, I _{COM_} = 10mA, V _{NO_} or V _{NC_} = 1.5V | MAX4758, MAX4759 (N_1–N_4) | +25°C | 0.1 | 0.35 | Ω |
| | | | | T _{MIN} to T _{MAX} | | 0.55 | |
| | | MAX4759 (N_5–N_8) | +25°C | 0.2 | 0.4 | | |
| | | | | T _{MIN} to T _{MAX} | | 0.55 | |
| On-Resistance Flatness (Note 6) | R _{FLAT (ON)} | V+ = 2.7V, I _{COM_} = 10mA, V _{NC_} or V _{NO_} = 0 or V+ | MAX4758, MAX4759 (N_1–N_4) | +25°C | 0.2 | 0.45 | Ω |
| | | | | T _{MIN} to T _{MAX} | | 0.55 | |
| | | MAX4759 (N_5–N_8) | +25°C | 0.8 | 1.5 | | |
| | | | | T _{MIN} to T _{MAX} | | 1.8 | |
| NO_, NC_ Off-Leakage Current | I _{NO (OFF)} , I _{NC (OFF)} | V+ = 3.6V; V _{COM_} = 3.3V, 0.3V; V _{NO_} or V _{NC_} = 0.3V, 3.3V | +25°C | -5 | | +5 | nA |
| | | | T _{MIN} to T _{MAX} | -25 | | +25 | |
| COM_ On-Leakage Current | I _{COM (ON)} | V+ = 3.6V; V _{COM_} = 3.3V, 0.3V; V _{NO_} or V _{NC_} = 3.3V, 0.3V, or floating | +25°C | -5 | | +5 | nA |
| | | | T _{MIN} to T _{MAX} | -25 | | +25 | |
| DYNAMIC | | | | | | | |
| Turn-On Time | t _{ON} | V+ = 2.7V, V _{NO_} or V _{NC_} = 1.5V; R _L = 50Ω; C _L = 35pF, Figure 2 | +25°C | 45 | 140 | | ns |
| | | | T _{MIN} to T _{MAX} | | | 150 | |

Quad DPDT Audio/Data Switches in UCSP/QFN

MAX4758/MAX4759

ELECTRICAL CHARACTERISTICS (continued)

(V+ = +2.7V to +5.25V, T_A = -40°C to +85°C, unless otherwise noted. Typical values are at V+ = 3V, T_A = +25°C.) (Notes 2, 3)

| PARAMETER | SYMBOL | CONDITIONS | T _A | MIN | TYP | MAX | UNITS |
|----------------------------|--|--|--------------------------------------|---|------|------|-------|
| Turn-Off Time | t _{OFF} | V+ = 2.7V, V _{NO_} or V _{NC_} = 1.5V; R _L = 50Ω; C _L = 35pF, Figure 2 | +25°C | | 25 | 50 | ns |
| | | | T _{MIN} to T _{MAX} | | | 60 | |
| Break-Before-Make (Note 7) | t _{BBM} | V+ = 2.7V, V _{NO_} or V _{NC_} = 1.5V; R _L = 50Ω, C _L = 35pF, Figure 3 | +25°C | | 15 | | ns |
| | | | T _{MIN} to T _{MAX} | | 2 | | |
| Skew (Note 7) | t _{SKEW} | R _S = 39Ω, C _L = 50pF, MAX4759 (COM5–COM8), Figure 4 | +25°C | | 0.2 | 0.5 | ns |
| Charge Injection | Q | V _{GEN} = 0, R _{GEN} = 0, C _L = 1.0nF, Figure 5 | +25°C | MAX4758, MAX4759 (COM1–COM4) | | 40 | pC |
| | | | | MAX4759 (COM5–COM8) | | 15 | |
| On-Channel -3dB Bandwidth | BW | Signal = 0dBm, C _L = 5pF, R _L = 50Ω, MAX4758, MAX4759 (COM1–COM4) | +25°C | | 50 | | MHz |
| | | Signal = 0dBm, C _L = 5pF, R _L = 50Ω, MAX4759 (COM5–COM8) | +25°C | | 320 | | |
| Off-Isolation (Note 8) | V _{ISO} | C _L = 5pF, R _L = 50Ω, V _{COM_} = 1Vp-p, f = 100kHz, Figure 6 | +25°C | | -95 | | dB |
| Crosstalk (Note 9) | V _{CT} | C _L = 5pF, R _L = 50Ω, V _{COM_} = 1Vp-p, f = 100kHz, Figure 6 | +25°C | | -100 | | dB |
| Total Harmonic Distortion | THD | f = 20Hz to 20kHz, 1Vp-p | +25°C | MAX4758, MAX4759 (N ₁ –N ₄), R _L = 32Ω | | 0.03 | % |
| | | | +25°C | MAX4759 (N ₅ –N ₈), R _L = 600Ω | | 0.03 | |
| NO_, NC_ Off-Capacitance | C _{NO_(OFF)} , C _{NC_(OFF)} | V _{NO_} , V _{NC_} = GND, f = 1MHz, Figure 7 | +25°C | MAX4758, MAX4759 (N ₁ –N ₄) | | 102 | pF |
| | | | +25°C | MAX4759 (N ₅ –N ₈) | | 25 | |
| COM_ On-Capacitance | C _(ON) | V _{NO_} , V _{NC_} = GND, f = 1MHz, Figure 7 | +25°C | MAX4758, MAX4759 (COM1–COM4) | | 284 | pF |
| | | | +25°C | MAX4759 (COM5–COM8) | | 54 | |
| DIGITAL I/O (IN_) | | | | | | | |
| Input Logic High | V _{IH} | V+ = 2.7V to 3.6V | T _{MIN} to T _{MAX} | 1.4 | | | V |
| | | V+ = 3.6V to 5.5V | T _{MIN} to T _{MAX} | 2.0 | | | |
| Input Logic Low | V _{IL} | V+ = 2.7V to 3.6V | T _{MIN} to T _{MAX} | | 0.5 | | V |
| | | V+ = 3.6V to 5.5V | T _{MIN} to T _{MAX} | | 0.6 | | |
| Input Leakage Current | I _{IN} | V _{IN} = 0 or V+ | T _{MIN} to T _{MAX} | | | 1 | μA |

Quad DPDT Audio/Data Switches in UCSP/QFN

ELECTRICAL CHARACTERISTICS (continued)

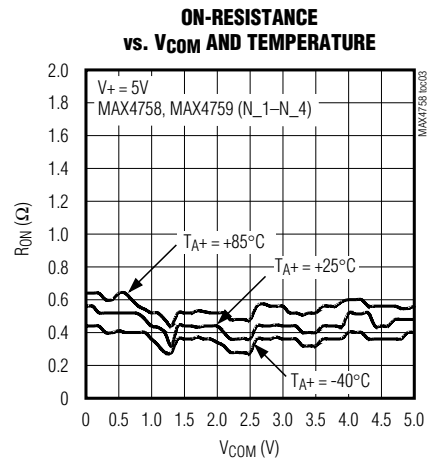
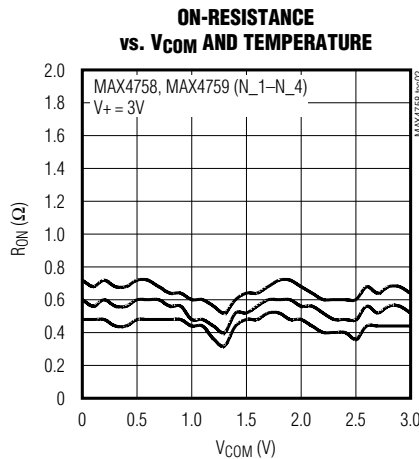
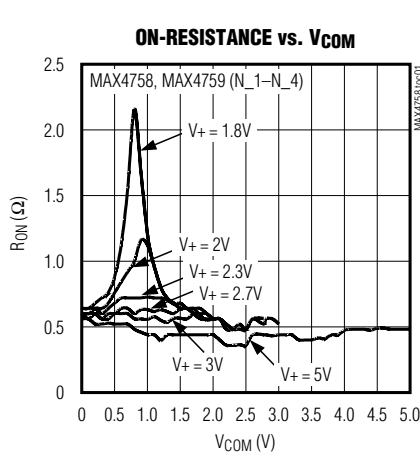
(V+ = +2.7V to +5.25V, T_A = -40°C to +85°C, unless otherwise noted. Typical values are at V+ = 3V, T_A = +25°C.) (Notes 2, 3)

| PARAMETER | SYMBOL | CONDITIONS | T _A | MIN | TYP | MAX | UNITS |
|-------------------------|--------|--|--------------------------------------|------|-----|-----|-------|
| POWER SUPPLY | | | | | | | |
| Power-Supply Range | V+ | | T _{MIN} to T _{MAX} | 1.8 | | 5.5 | V |
| Positive Supply Current | I+ | V+ = 5.5V, V _{IN-} = 0V or V+ | +25°C | 0.01 | | | μA |
| | | | T _{MIN} to T _{MAX} | | 1.0 | | |

- Note 2:** The algebraic convention is used in this data sheet; the most negative value is shown in the minimum column.
- Note 3:** UCSP packages are 100% tested at +25°C and limits across the full temperature range are guaranteed by correlation and design. Thin QFN parts are 100% tested at +85°C and limits across the full temperature range are guaranteed by correlation and design.
- Note 4:** R_{ON} and ΔR_{ON} matching specifications are guaranteed by design.
- Note 5:** ΔR_{ON} = R_{ON}(MAX) - R_{ON}(MIN).
- Note 6:** Flatness is defined as the difference between the maximum and minimum value of on-resistance as measured over the specified analog signal ranges.
- Note 7:** Guaranteed by design, not production tested.
- Note 8:** Off-isolation = 20log₁₀ [V_{COM-} / (V_{NO-} or V_{NC-})], V_{COM-} = output, V_{NO-} or V_{NC-} = input to off switch.
- Note 9:** Between any two switches.

Typical Operating Characteristics

(V+ = 3V, T_A = +25°C, unless otherwise noted.)

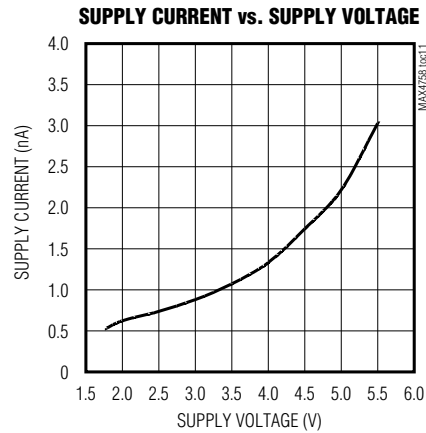
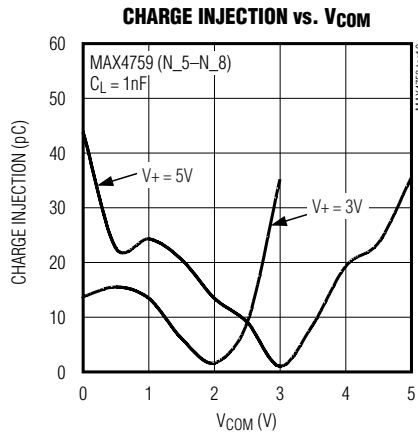
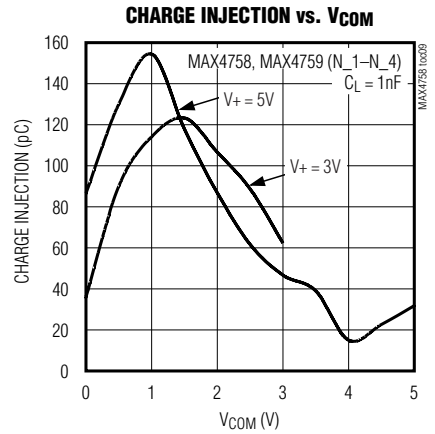
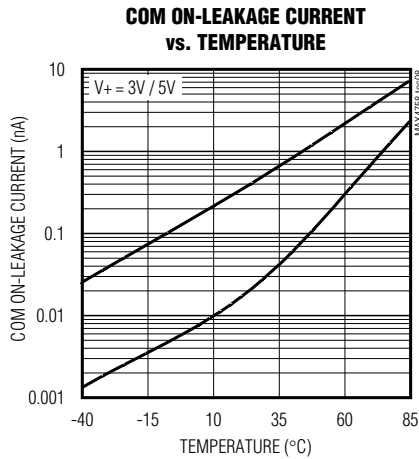
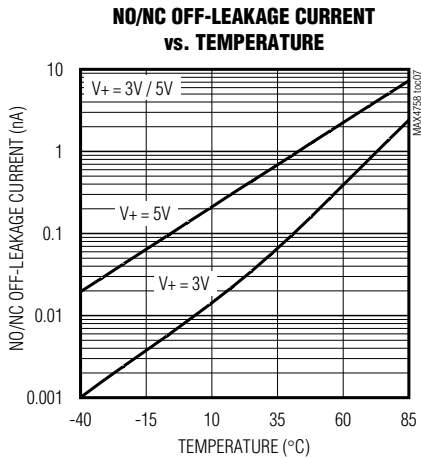
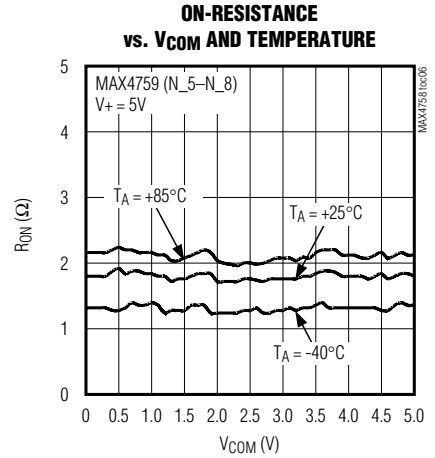
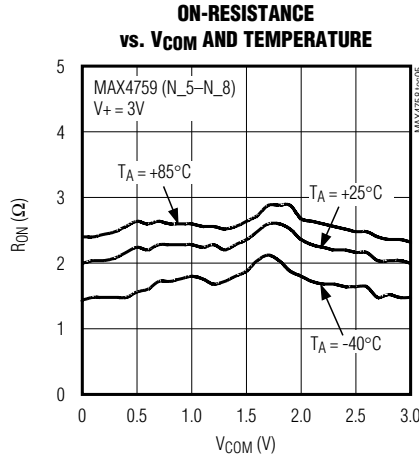
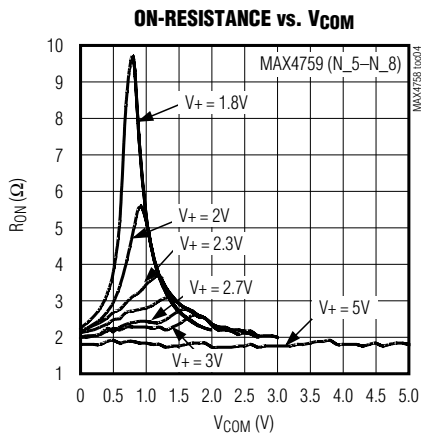


Quad DPDT Audio/Data Switches in UCSP/QFN

MAX4758/MAX4759

Typical Operating Characteristics (continued)

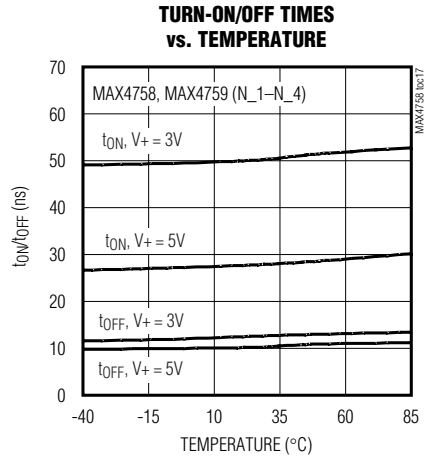
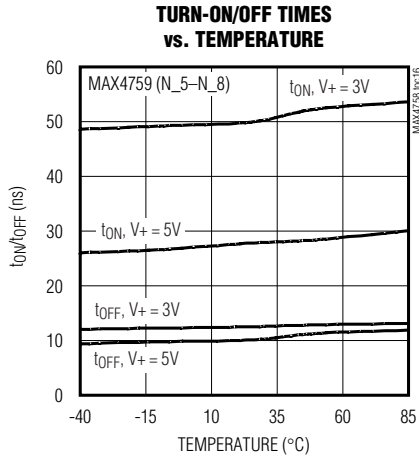
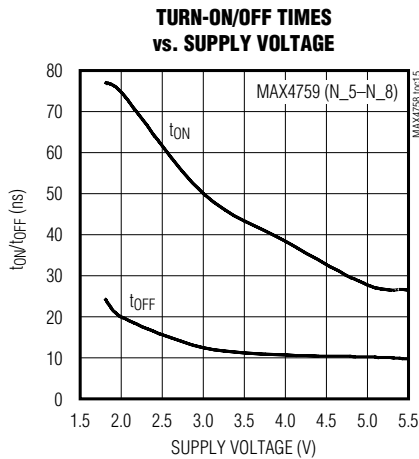
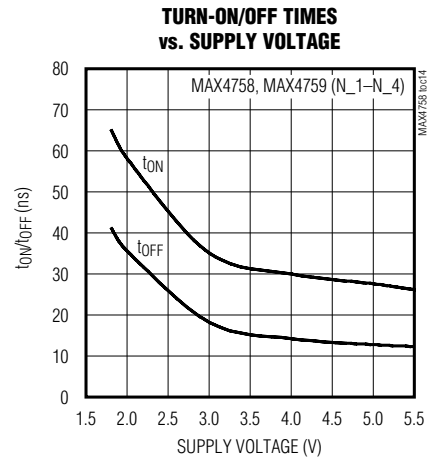
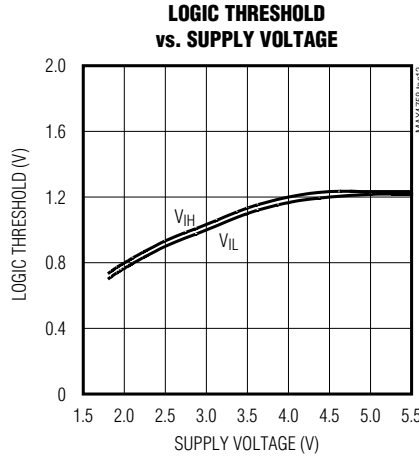
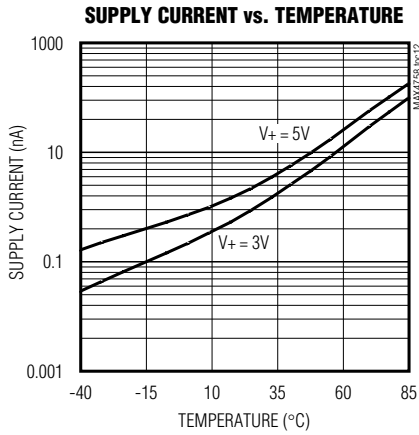
($V_+ = 3V$, $T_A = +25^\circ C$, unless otherwise noted.)



Quad DPDT Audio/Data Switches in UCSP/QFN

Typical Operating Characteristics (continued)

($V_+ = 3V$, $T_A = +25^\circ C$, unless otherwise noted.)

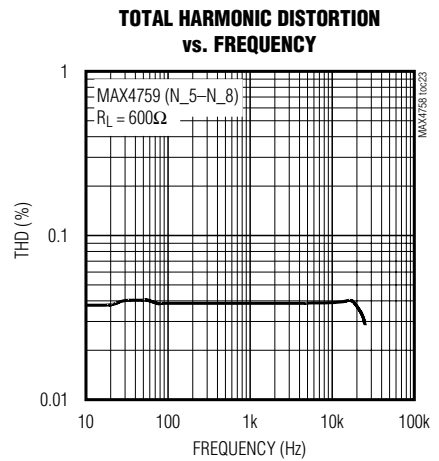
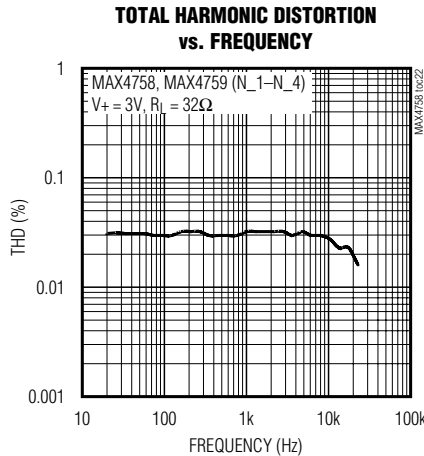
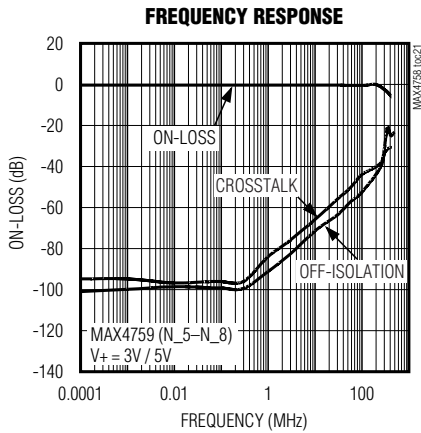
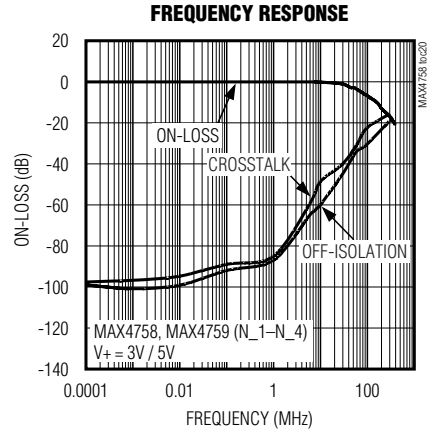
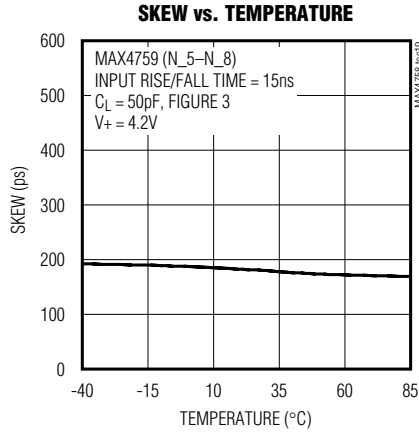
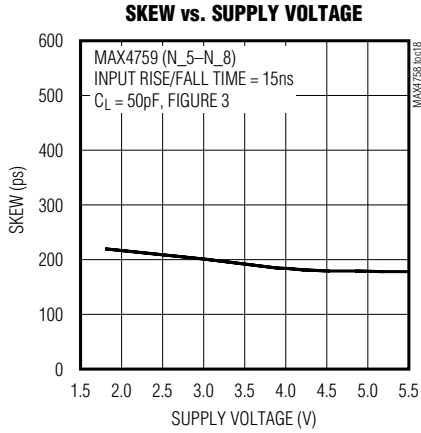


Quad DPDT Audio/Data Switches in UCSP/QFN

MAX4758/MAX4759

Typical Operating Characteristics (continued)

($V_+ = 3V$, $T_A = +25^\circ C$, unless otherwise noted.)



Quad DPDT Audio/Data Switches in UCSP/QFN

Pin Description

MAX4758/MAX4759

| PIN | | | | NAME | FUNCTION |
|------------------------------|--------|------------------------------|--------|-----------------|--|
| MAX4758 | | MAX4759 | | | |
| THIN QFN | UCSP | THIN QFN | UCSP | | |
| 1 | A1 | 1 | A1 | NC1 | Analog Switch 1, Normally Closed Terminal 1 |
| 2 | B2 | 2 | B2 | COM2 | Analog Switch 2, Common Terminal 2 |
| 3 | A2 | 3 | A2 | NC2 | Analog Switch 2, Normally Closed Terminal 2 |
| 4 | A3 | 4 | A3 | INA | Logic Control Digital Input for Switches 1 and 2 |
| 5 | C3, D4 | 5 | C3, D4 | V+ | Positive Supply Voltage |
| 6 | A4 | 6 | A4 | INB | Logic Control Digital Input for Switches 3 and 4 |
| 7 | A5 | 7 | A5 | NC3 | Analog Switch 3, Normally Closed Terminal 3 |
| 8 | B5 | 8 | B5 | COM3 | Analog Switch 3, Common Terminal 3 |
| 9 | A6 | 9 | A6 | NC4 | Analog Switch 4, Normally Closed Terminal 4 |
| 10 | B6 | 10 | B6 | COM4 | Analog Switch 4, Common Terminal 4 |
| 11, 14, 17, 29, 32, 35 | — | 11, 14, 17, 29, 32, 35 | — | N.C. | No Connection. Not internally connected. |
| 12 | C5 | 12 | C5 | NO3 | Analog Switch 3, Normally Open Terminal 3 |
| 13 | C6 | 13 | C6 | NO4 | Analog Switch 4, Normally Open Terminal 4 |
| 15 | D6 | 15 | D6 | NO8 | Analog Switch 8, Normally Open Terminal 8 |
| 16 | D5 | 16 | D5 | NO7 | Analog Switch 7, Normally Open Terminal 7 |
| 18 | E6 | 18 | E6 | COM8 | Analog Switch 8, Common Terminal 8 |
| 19 | F6 | 19 | F6 | NC8 | Analog Switch 8, Normally Closed Terminal 8 |
| 20 | E5 | 20 | E5 | COM7 | Analog Switch 7, Common Terminal 7 |
| 21 | F5 | 21 | F5 | NC7 | Analog Switch 7, Normally Closed Terminal 7 |
| 22 | F4 | 22 | F4 | IND | Logic Control Digital Input for Switches 7 and 8 |
| 23 | C4, D3 | 23 | C4, D3 | GND | Ground |
| 24 | F3 | 24 | F3 | INC | Logic Control Digital Input for Switches 5 and 6 |
| 25 | F2 | 25 | F2 | NC6 | Analog Switch 6, Normally Closed Terminal 2 |
| 26 | E2 | 26 | E2 | COM6 | Analog Switch 6, Common Terminal 6 |
| 27 | F1 | 27 | F1 | NC5 | Analog Switch 5, Normally Closed Terminal 5 |
| 28 | E1 | 28 | E1 | COM5 | Analog Switch 5, Common Terminal 5 |
| 30 | D2 | 30 | D2 | NO6 | Analog Switch 6, Normally Open Terminal 6 |
| 31 | D1 | 31 | D1 | NO5 | Analog Switch 5, Normally Open Terminal 5 |
| 33 | C1 | 33 | C1 | NO1 | Analog Switch 1, Normally Open Terminal 1 |
| 34 | C2 | 34 | C2 | NO2 | Analog Switch 2, Normally Open Terminal 2 |
| 36 | B1 | 36 | B1 | COM1 | Analog Switch 1, Common Terminal 1 |
| — | — | — | — | \overline{EN} | Output Enable, Active Low |
| EP | — | EP | — | EP | Exposed Pad. Connect to GND |

Quad DPDT Audio/Data Switches in UCSP/QFN

Detailed Description

The MAX4758/MAX4759 quad DPDT analog switches operate from a single +1.8V to +5.5V supply. These devices are fully specified for +3V applications.

The MAX4758/MAX4759 (switches 1–4) have a guaranteed 0.5Ω on-resistance, making them ideal for audio switching applications. The MAX4759 also includes four single-pole/double-throw (SPDT) switches (switches 5–8) that have a guaranteed 0.2Ω on-resistance, a low 25pF capacitance, 0.2ns change in skew making them ideal for either data or audio switching applications. These switches have four logic inputs to control two switches in pairs.

Applications Information

Digital Control Inputs

The MAX4758/MAX4759 logic inputs accept up to +5.5V regardless of the supply voltage. For example, with a +3.3V supply, IN_{-} can be driven low to GND and high to +5.5V, which allows mixed logic levels in a system. Driving the control logic inputs rail-to-rail also minimizes power consumption. For a +3V supply voltage, the logic thresholds are 0.5V (low) and 1.4V (high).

Analog Signal Levels

Analog signal inputs over the full voltage range (0V to V_{+}) are passed through the switch with minimal change in on-resistance (see the *Typical Operating Characteristics*). The switches are bidirectional so NO_{-} , NC_{-} , and COM_{-} can be either inputs or outputs.

Power-Supply Bypassing

Power-supply bypassing improves noise margin and prevents switching noise from propagating from the V_{+} supply to other components. A $0.1\mu\text{F}$ capacitor connected from V_{+} to GND is adequate for most applications.

Power-Supply Sequencing

CMOS devices require proper power-supply sequencing. Always apply V_{+} before the analog signals, espe-

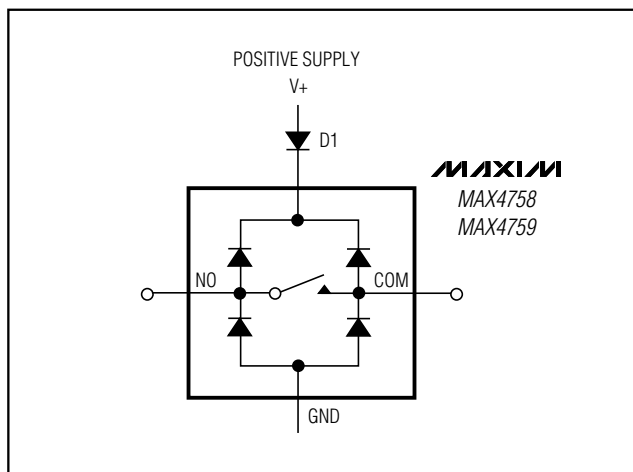


Figure 1. Overvoltage Protection Using an External Blocking Diode

cially if the input signal is not current limited. If sequencing is not possible, and the input signal is not current limited to less than 20mA, add a small-signal diode (Figure 1). Adding the diode reduces the analog range to a diode drop (0.7V) below V_{+} and increases the on-resistance slightly. The maximum supply voltage must not exceed +6V at any time.

UCSP Applications Information

For the latest application details on UCSP construction, dimensions, tape carrier information, PC board techniques, bump-pad layout, and recommended reflow temperature profile, as well as the latest information on reliability testing results, go to the Maxim website at www.maxim-ic.com/ucsp for the Application Note, "UCSP—A Wafer-Level Chip-Scale Package".

MAX4758/MAX4759

Quad DPDT Audio/Data Switches in UCSP/QFN

Timing Circuits/Timing Diagrams

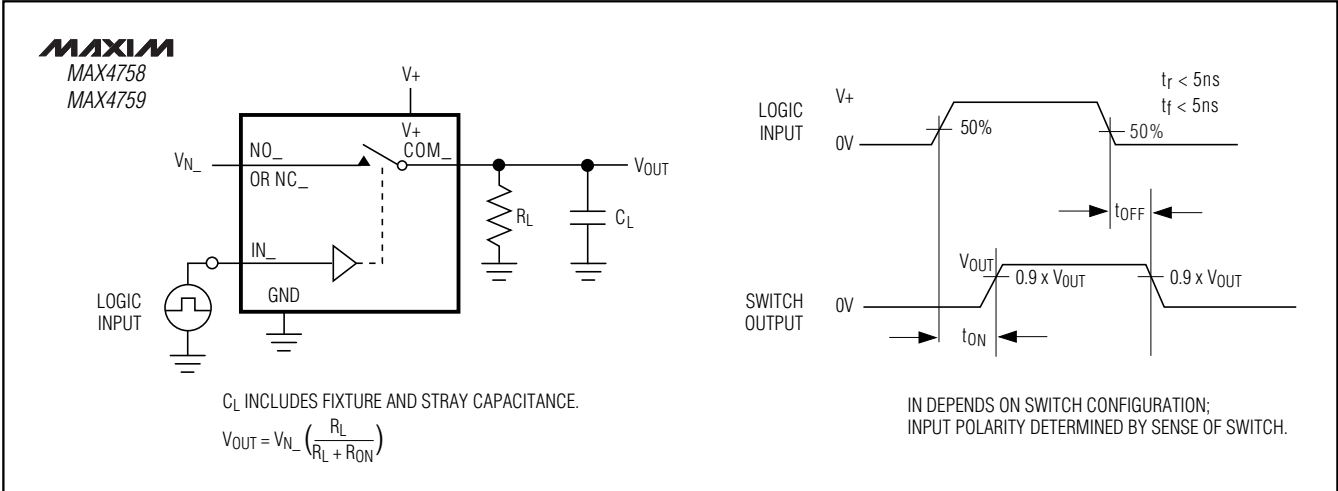


Figure 2. Switching Time

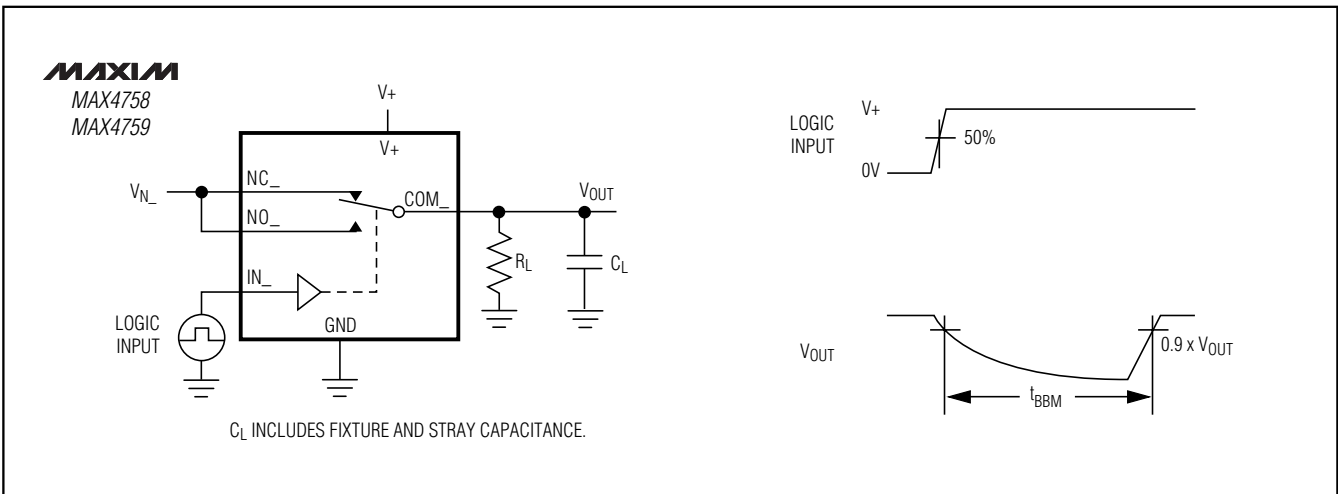


Figure 3. Break-Before-Make Interval

Quad DPDT Audio/Data Switches in UCSP/QFN

MAX4758/MAX4759

Timing Circuits/Timing Diagrams (continued)

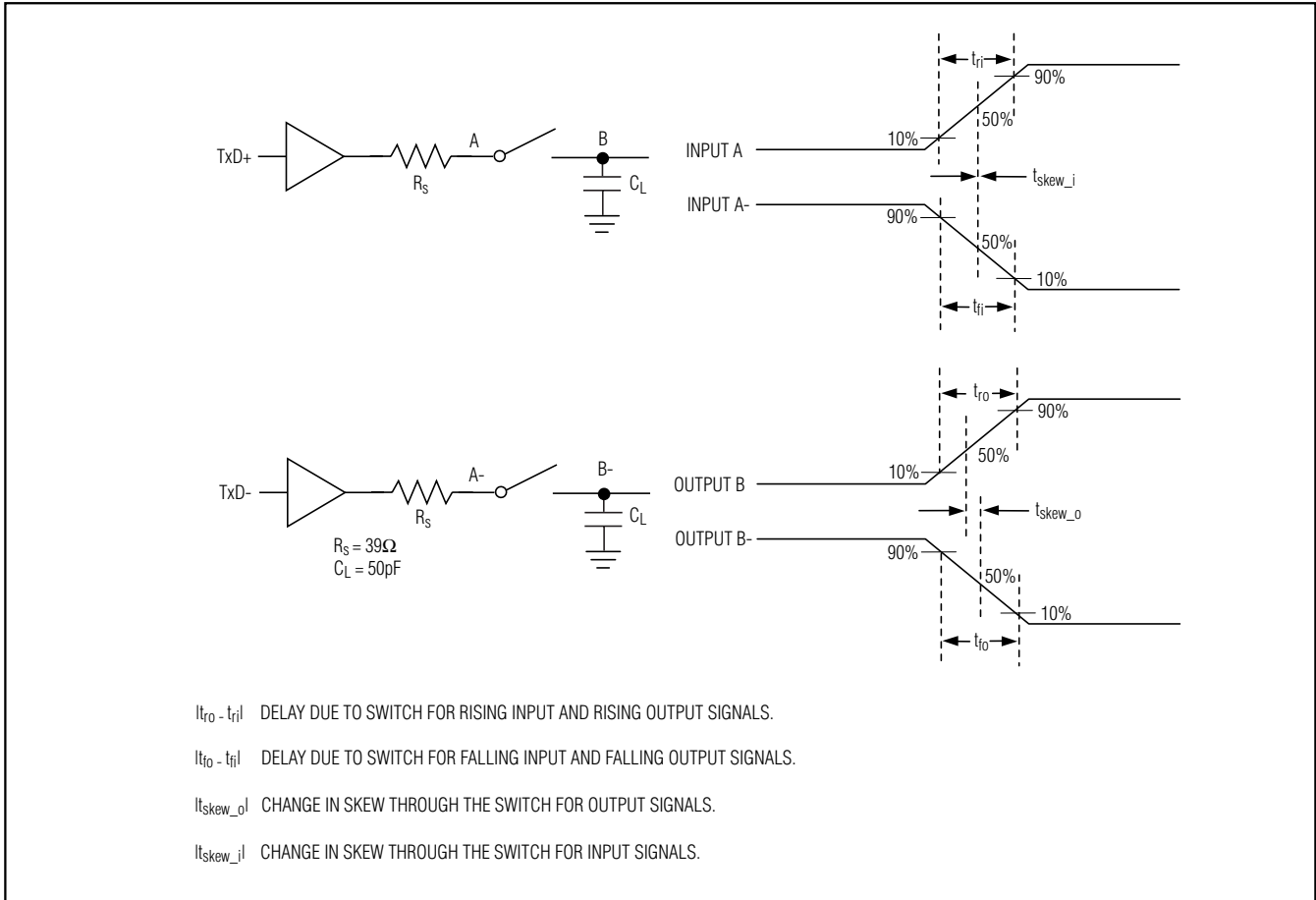


Figure 4. Input/Output Skew Timing Diagram

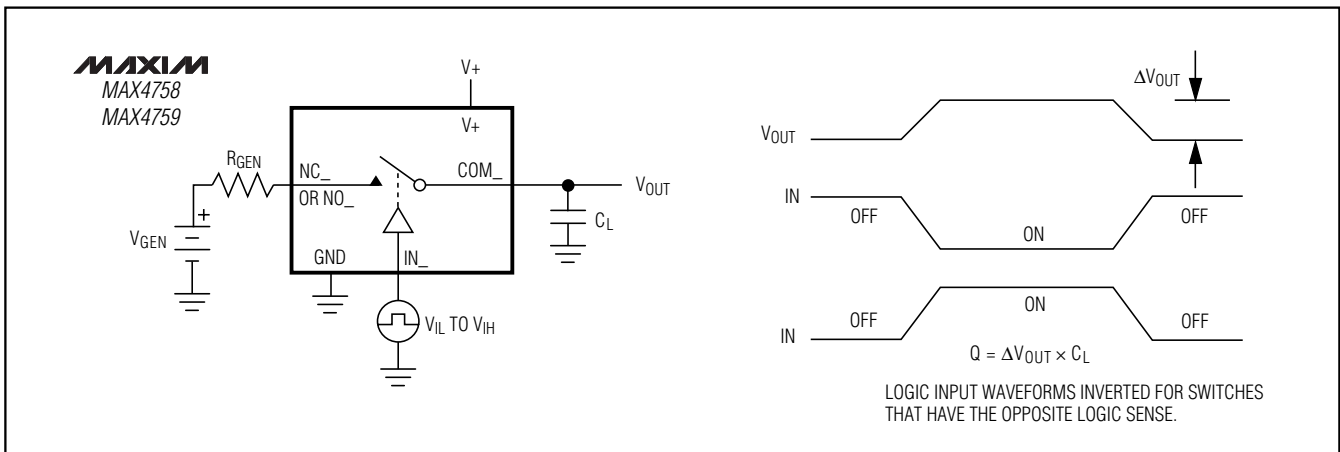


Figure 5. Charge Injection

Quad DPDT Audio/Data Switches in UCSP/QFN

Timing Circuits/Timing Diagrams (continued)

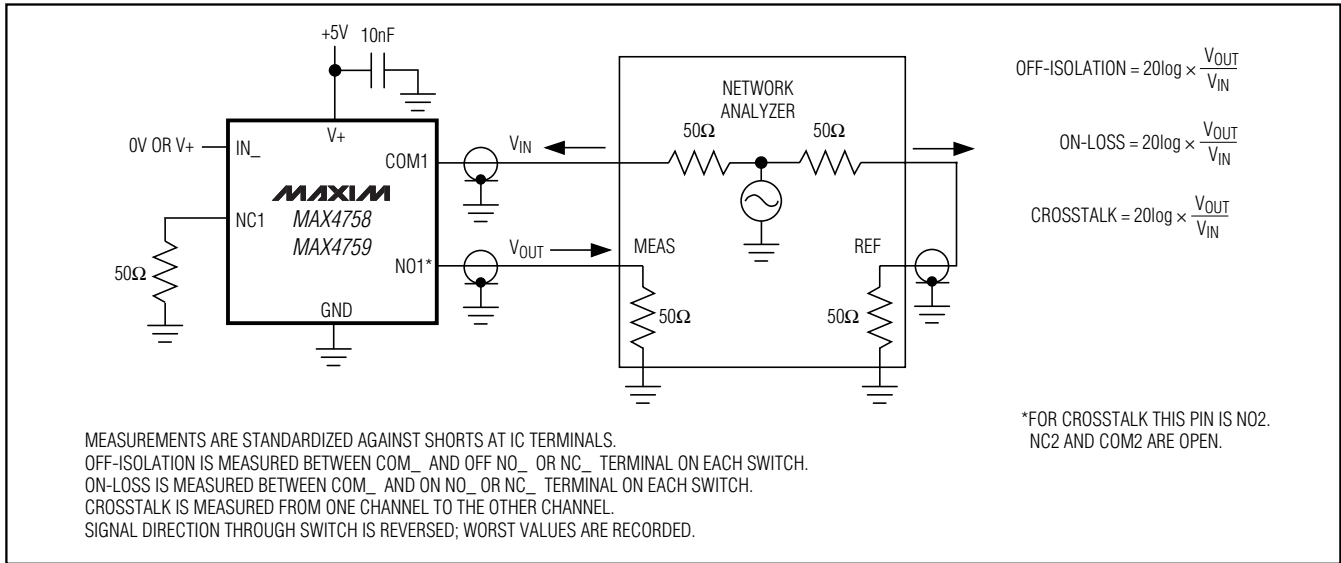


Figure 6. On-Loss, Off-Isolation, and Crosstalk

Typical Operating Circuit

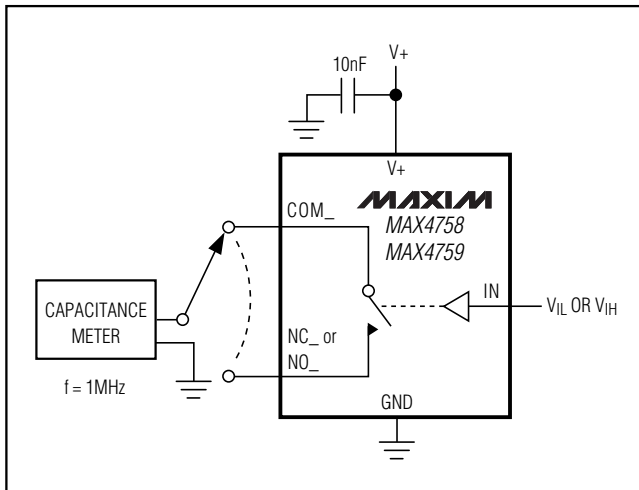
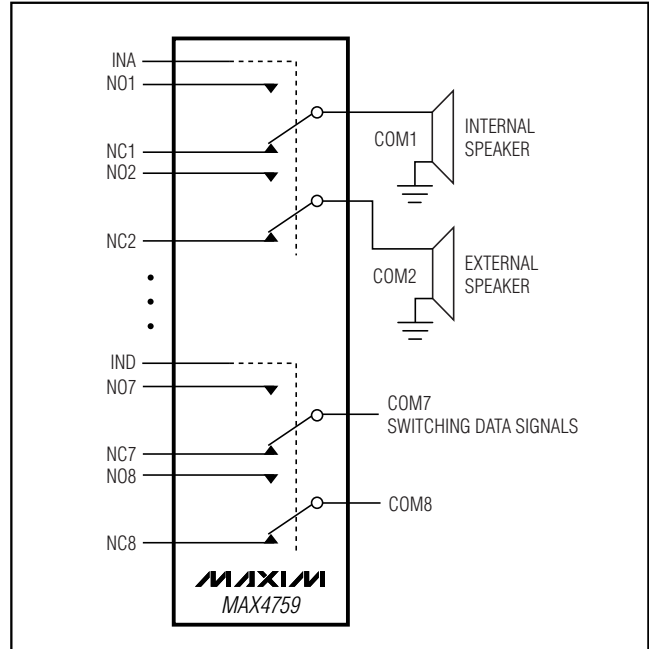


Figure 7. Channel On-/Off-Capacitance



Quad DPDT Audio/Data Switches in UCSP/QFN

Pin Configurations/Truth Tables

MAX4758/MAX4759

TOP VIEW

MAXIM
MAX4758/MAX4759

(BUMP SIDE DOWN)

UCSP
MAX4758/MAX4759

| INA | NO1/NO2 | NC1/NC2 |
|------|---------|---------|
| LOW | OFF | ON |
| HIGH | ON | OFF |
| INB | NO3/NO4 | NC3/NC4 |
| LOW | OFF | ON |
| HIGH | ON | OFF |
| INC | NO5/NO6 | NC5/NC6 |
| LOW | OFF | ON |
| HIGH | ON | OFF |
| IND | NO7/NO8 | NC7/NC8 |
| LOW | OFF | ON |
| HIGH | ON | OFF |

THIN QFN

NOTE: EXPOSED PADDLE CONNECTED TO GND OR FLOATING.

Chip Information

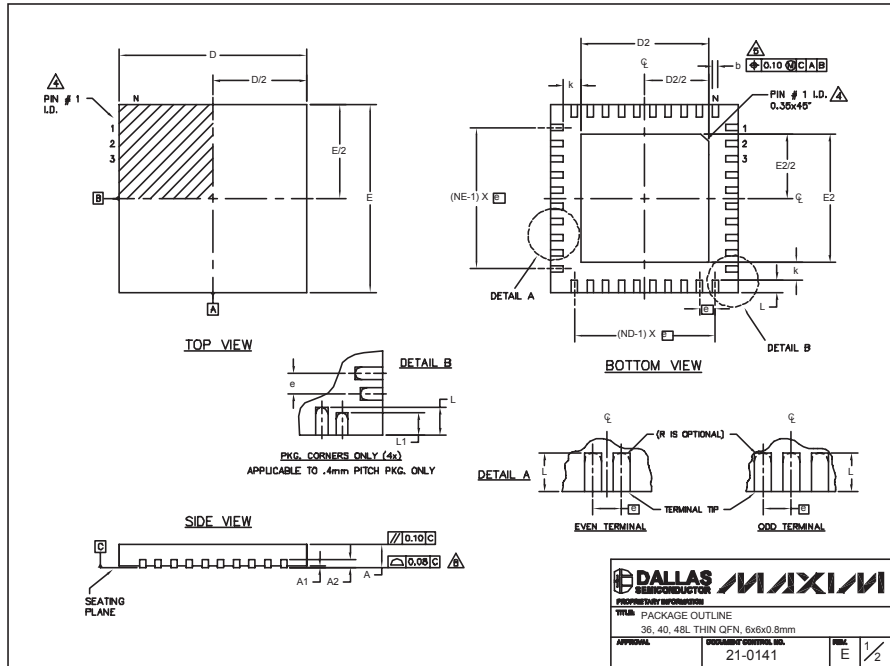
TRANSISTOR COUNT: 1432

PROCESS: CMOS

Quad DPDT Audio/Data Switches in UCSP/QFN

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.)



| COMMON DIMENSIONS | | | | | | | | | | |
|-------------------|-----------|------|------|-----------|------|------|-----------|------|------|------|
| PKG. | 36L 6x6 | | | 40L 6x6 | | | 48L 6x6 | | | |
| | SYMBOL | MIN. | NOM. | MAX. | MIN. | NOM. | MAX. | MIN. | NOM. | MAX. |
| A | 0.70 | 0.75 | 0.80 | 0.70 | 0.75 | 0.80 | 0.70 | 0.75 | 0.80 | |
| A1 | 0 | 0.02 | 0.05 | 0 | 0.02 | 0.05 | 0 | | | 0.05 |
| A2 | 0.20 REF. | | | 0.20 REF. | | | 0.20 REF. | | | |
| b | 0.20 | 0.25 | 0.30 | 0.20 | 0.25 | 0.30 | 0.15 | 0.20 | 0.25 | |
| D | 5.80 | 6.00 | 6.10 | 5.80 | 6.00 | 6.10 | 5.80 | 6.00 | 6.10 | |
| E | 5.80 | 6.00 | 6.10 | 5.80 | 6.00 | 6.10 | 5.80 | 6.00 | 6.10 | |
| e | 0.50 BSC. | | | 0.50 BSC. | | | 0.40 BSC. | | | |
| k | 0.25 | - | - | 0.25 | - | - | 0.25 | 0.35 | 0.45 | |
| L | 0.45 | 0.55 | 0.65 | 0.30 | 0.40 | 0.50 | 0.40 | 0.50 | 0.60 | |
| L1 | - | - | - | - | - | - | 0.30 | 0.40 | 0.50 | |
| N | 36 | | | 40 | | | 48 | | | |
| ND | 9 | | | 10 | | | 12 | | | |
| NE | 9 | | | 10 | | | 12 | | | |
| JEDEC | WJ4D-1 | | | WJ4D-2 | | | - | | | |

| PKG. CODES | EXPOSED PAD VARIATIONS | | | | | | DOWN BONDS ALLOWED |
|------------|------------------------|------|------|------|------|------|--------------------|
| | D2 | | | E2 | | | |
| | MIN. | NOM. | MAX. | MIN. | NOM. | MAX. | |
| T3666-1 | 3.60 | 3.70 | 3.80 | 3.60 | 3.70 | 3.80 | NO |
| T3666-2 | 3.60 | 3.70 | 3.80 | 3.60 | 3.70 | 3.80 | YES |
| T3666-3 | 3.60 | 3.70 | 3.80 | 3.60 | 3.70 | 3.80 | NO |
| T4066-1 | 4.00 | 4.10 | 4.20 | 4.00 | 4.10 | 4.20 | NO |
| T4066-2 | 4.00 | 4.10 | 4.20 | 4.00 | 4.10 | 4.20 | YES |
| T4066-3 | 4.00 | 4.10 | 4.20 | 4.00 | 4.10 | 4.20 | YES |
| T4066-4 | 4.00 | 4.10 | 4.20 | 4.00 | 4.10 | 4.20 | NO |
| T4066-5 | 4.00 | 4.10 | 4.20 | 4.00 | 4.10 | 4.20 | NO |
| T4866-1 | 4.20 | 4.30 | 4.40 | 4.20 | 4.30 | 4.40 | YES |

NOTES:

- DIMENSIONING & TOLERANCING CONFORM TO ASME Y14.5M-1994.
- ALL DIMENSIONS ARE IN MILLIMETERS. ANGLES ARE IN DEGREES.
- N IS THE TOTAL NUMBER OF TERMINALS.
- THE TERMINAL #1 IDENTIFIER AND TERMINAL NUMBERING CONVENTION SHALL CONFORM TO JESD 95-1 SFP-012. DETAILS OF TERMINAL #1 IDENTIFIER ARE OPTIONAL, BUT MUST BE LOCATED WITHIN THE ZONE INDICATED. THE TERMINAL #1 IDENTIFIER MAY BE EITHER A MOLD OR MARKED FEATURE.
- DIMENSION b APPLIES TO METALLIZED TERMINAL AND IS MEASURED BETWEEN 0.25 mm AND 0.30 mm FROM TERMINAL TIP.
- ND AND NE REFER TO THE NUMBER OF TERMINALS ON EACH D AND E SIDE RESPECTIVELY.
- DEPOPULATION IS POSSIBLE IN A SYMMETRICAL FASHION.
- COPLANARITY APPLIES TO THE EXPOSED HEAT SINK SLUG AS WELL AS THE TERMINALS.
- DRAWING CONFORMS TO JEDEC MO220, EXCEPT FOR 0.4mm LEAD PITCH PACKAGE T4866-1.
- WARPAGE SHALL NOT EXCEED 0.10 mm.

Quad DPDT Audio/Data Switches in UCSP/QFN

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.)

MAX4758/MAX4759

TOP VIEW

| COMMON DIMENSIONS | |
|-------------------|----------------|
| A | 0.62±0.05-0.08 |
| A1 | 0.29±0.02 |
| A2 | 0.33 REF. |
| b | ∅0.35±0.03 |
| D | 3.06±0.10 |
| D1 | 2.50 BASIC |
| E | 3.06±0.10 |
| E1 | 2.50 BASIC |
| e | 0.50 BASIC |
| SD | 0.25 BASIC |
| SE | 0.25 BASIC |

| PKG. CODE | DEPOPULATED SOLDER BALLS |
|-----------|--|
| B36-1 | NONE |
| B36-2 | B3, B4, E3, E4 |
| B36-3 | B4, B5, C3, C4, C5, D3, D4, D5, E4, E5 |

NOTES:

- ALL DIMENSIONS ARE IN MILLIMETERS.
- PRODUCT MARKING: NUMBER OF CHARACTERS AND LINES VARY PER PRODUCT.

SIDE VIEW

BOTTOM VIEW

| | | |
|-------------------------------------|---------------------------------|------------|
| | DALLAS SEMICONDUCTOR | MAXIM |
| PROPRIETARY INFORMATION | | |
| TITLE: PACKAGE OUTLINE, 6x6 UCSP | | |
| APPROVAL | DOCUMENT CONTROL NO. 21-0082 | REV. J 1/1 |

36L_UCSP.EPS

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