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# AS1747, AS1748, AS1749, AS1750

## Low-Voltage, Dual SPDT, Audio Clickless Switches with Negative Rail Capability

## 1 General Description

The SPDT (single-pole/double-throw) switches AS1747, AS1748, AS1749 and AS1750 allow signals below ground to pass through without distortion. These analog switches are ideal for switching audio signals, due to their supply voltage from +1.8V to +5.5V and their low 0.4Ω on-resistance.

An included comparator offers the AS1748 and AS1750 with headphone detection or mute/send key function.

To reduce click-and-pop sounds when switching between pre-charged points the AS1749 and AS1750 have an internal shunt switch. This shunt switch automatically discharges any capacitance at the NO and NC connection points.

This SPDT switch is available in space-saving 10-pin TDFN 3x3 packages and operate over the -40ºC to +85ºC extended temperature range.

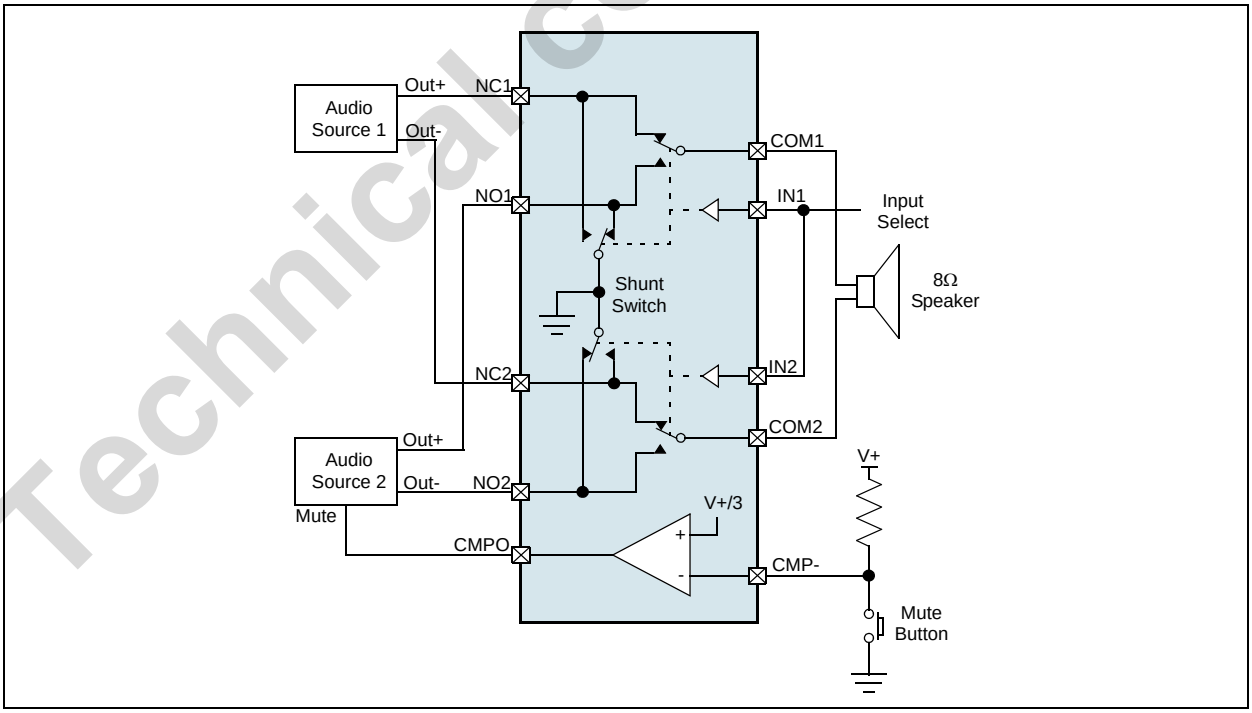
## 2 Key Features

- Distortion -Free Negative Signal Throughput Down to $V_{CC}$ - 5.5V
- Comparator for Headphone or Mute Detection (AS1748/AS1750)
- Internal Shunt Resistor Reduces Click/Pop (AS1749/AS1750)
- Low On-Resistance ($R_{ON}$) 0.4Ω at +2.7V Supply
- 0.25Ω On-Resistance Flatness
- 0.03Ω On-Resistance Matching
- +1.8V to +5.5V Supply Voltage
- -90dB Crosstalk (100kHz)
- -65dB Off-Isolation (100kHz)
- 0.01% Total Harmonic Distortion
- Available in 10-pin TDFN 3x3, 16-pin TQFN 3x3, and 12-Bump WL-CSP Packages

## 3 Applications

The device is ideal for cell phones, PDAs and hand-held devices, notebook computers and MP3 players.

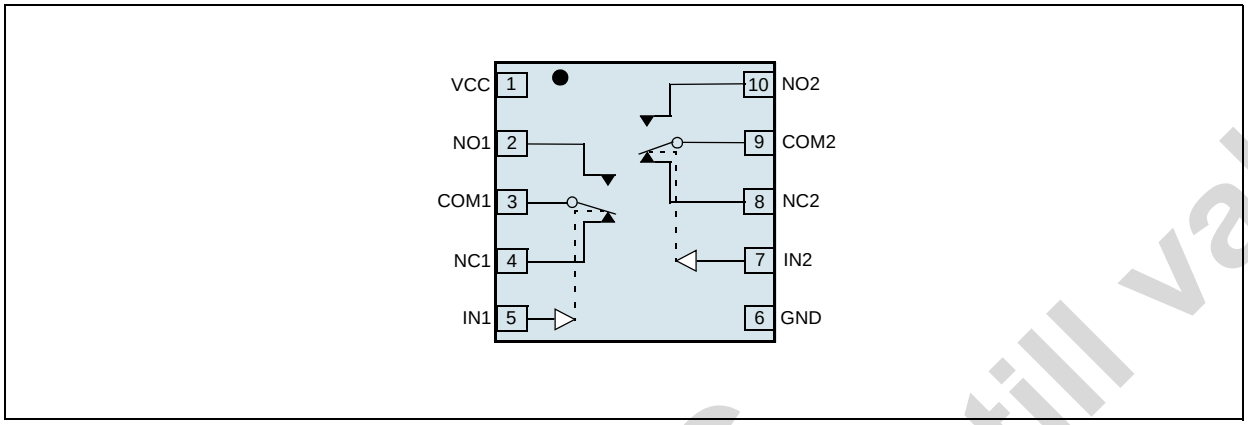
*Figure 1. Typical Operating Circuit*



# 4 Pinout

## Pin Assignment

*Figure 2. Pin Assignments (Top View) for AS1747/AS1749*



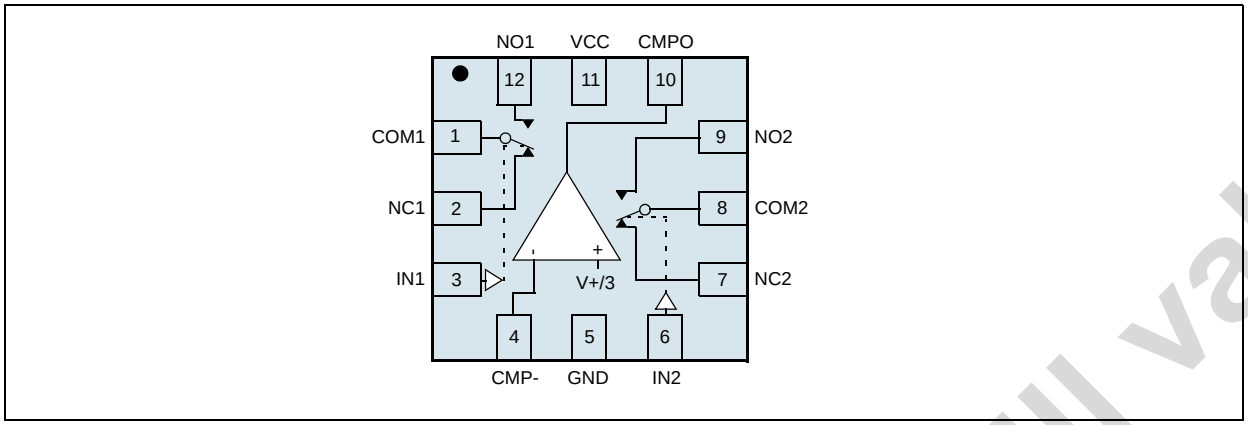

## Pin Description

*Table 1. Pin Description for AS1747/AS1749*

| Pin Name | TDFN | Description |
|---|---|---|
| VCC | 1 | Positive-Supply Voltage Input |
| NO1 | 2 | Analog Switch 1 - Normally Open Terminal |
| COM1 | 3 | Analog Switch 1 - Common Terminal |
| NC1 | 4 | Analog Switch 1 - Normally Closed Terminal |
| IN1 | 5 | Digital Control Input for Analog Switch 1. A logic LOW on IN1 connects COM1 to NC1 and a logic HIGH connects COM1 to NO1. |
| GND | 6 | Ground |
| IN2 | 7 | Digital Control Input for Analog Switch 2. A logic LOW on IN2 connects COM2 to NC2 and a logic HIGH connects COM2 to N02. |
| NC2 | 8 | Analog Switch 2 - Normally Closed Terminal |
| COM2 | 9 | Analog Switch 2 - Common Terminal |
| NO2 | 10 | Analog Switch 2 - Normally Open Terminal |
| EP | EP (TDFN only) | Exposed pad for TDFN package. Connect to GND. |

## Pin Assignment

*Figure 3. Pin Assignments (Top View) for AS1748/AS1750*




## Pin Description

*Table 2. Pin Description for AS1748/AS1750*

| Pin Name | TQFN | Description |
|---|---|---|
| COM1 | 1 | Analog Switch 1 - Common Terminal |
| NC1 | 2 | Analog Switch 1 - Normally Closed Terminal |
| IN1 | 3 | Digital Control Input for Analog Switch 1. A logic LOW on IN1 connects COM1 to NC1 and a logic HIGH connects COM1 to NO1. |
| CMP- | 4 | Comparator Inverting Input |
| GND | 5 | Ground |
| IN2 | 6 | Digital Control Input for Analog Switch 2. A logic LOW on IN2 connects COM2 to NC2 and a logic HIGH connects COM2 to NO2. |
| NC2 | 7 | Analog Switch 2 - Normally Closed Terminal |
| COM2 | 8 | Analog Switch 2 - Common Terminal |
| NO2 | 9 | Analog Switch 2 - Normally Open Terminal |
| CMPO | 10 | Comparator Output |
| VCC | 11 | Positive-Supply Voltage Input |
| NO1 | 12 | Analog Switch 1 - Normally Open Terminal |
| EP | EP | Exposed pad. Connect to GND. |

# 5 Absolute Maximum Ratings

Stresses beyond those listed in Table 3 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 Electrical Characteristics on page 5 is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

*Table 3. Absolute Maximum Ratings*

| Parameter | Min | Max | Units | Comments |
|---|---|---|---|---|
| VCC, IN_, CMP- | -0.3 | +6.0 | V | |
| COM_, NO_, NC_ | VCC - 6 | VCC + 0.3 | V | |
| CMPO | 0.3 | VCC + 0.3 | V | |
| Closed-Switch Continuous Current COM_, NO_, NC_ | | ±150 | mA | |
| Open-Switch Continuous Current NO_, NC_ (AS1749/AS1750) | | ±30 | mA | |
| Peak Current COM_, NO_, NC_ (pulsed at 1ms, 10% duty cycle) | | ±400 | mA | |
| **Continuous Power Dissipation ($T_A$ = +70ºC)** | | | | |
| 10-pin TDFN 3x3 (derate 24.4mW/ºC above +70ºC) | | 1951 | mW | |
| 12-Bump WL-CSP (AS1747/AS1749) (derate 5.6mW/ºC above +70ºC) | | 449 | mW | |
| 12-Bump WL-CSP (AS1748/AS1750) (derate 6.5mW/ºC above +70ºC) | | 519 | mW | |
| 16-pin TQFN 3x3 (derate 16.9mW/ºC above +70ºC) | | 1349 | mW | |
| ESD | | 2 | kV | *HBM MIL-Std. 883E 3015.7* methods |
| Latchup Immunity | -200 | +200 | mA | @25°C, *JEDEC 78* |
| Operating Temperature Range | -40 | +85 | ºC | |
| Junction Temperature | | +150 | ºC | |
| Storage Temperature Range | -65 | +150 | ºC | |
| Package Body Temperature | | +260 | ºC | The reflow peak soldering temperature (body temperature) specified is in accordance with *IPC/JEDEC J-STD-020D "Moisture/Reflow Sensitivity Classification for Non-Hermetic Solid State Surface Mount Devices".* The lead finish for Pb-free leaded packages is matte tin (100% Sn). |

# 6 Electrical Characteristics

$V_{CC}$ = +2.7V to +5.5V, $T_A$ = -40ºC to +85ºC, unless otherwise specified. Typical values are at $V_{CC}$ = +3.0V, $T_A$ = +25ºC, unless otherwise specified.

*Table 4. Electrical Characteristics*

| Symbol | Parameter | Condition | | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|---|
| **Analog Switch** | | | | | | | |
| $V_{NO\_}$ $V_{NC\_}$ $V_{COM\_}$ | Analog Signal Range | | | $V_{CC}$ - 5.5 | | $V_{CC}$ | V |
| $R_{ON(NC)}$ $R_{ON(NO)}$ | On-Resistance | $V_{CC}$ = 2.7V; $V_{NC\_}$ or $V_{NO\_}$ = $V_{CC}$ - 5.5V, -1V, 0V, 1V, 2V, $V_{CC}$; $I_{COM\_}$ = 100mA | $T_A$ = +25ºC | | 0.4 | 0.85 | Ω |
| | | | $T_A$ = $T_{MIN}$ to $T_{MAX}$ | | | 0.95 | |
| $\Delta R_{ON}$ | On-Resistance Match Between Channels | $V_{CC}$ = 2.7V, $V_{NC\_}$ or $V_{NO\_}$ = 0V, $I_{COM}$ = 100mA | $T_A$ = +25ºC | | 0.03 | 0.1 | Ω |
| | | | $T_A$ = $T_{MIN}$ to $T_{MAX}$ | | | 0.15 | |
| $R_{FLAT(NC)}$ | On-Resistance Flatness | $V_{CC}$ = 2.7V; $V_{NC\_}$ or $V_{NC}$ = -1V, 0V, 1V, 2V, $V_{CC}$; $I_{COM\_}$ = 100mA | $T_A$ = +25ºC | | 0.25 | 0.4 | Ω |
| | | | $T_A$ = $T_{MIN}$ to $T_{MAX}$ | | | 0.45 | |
| $R_{SH}$ | Shunt Switch Resistance | AS1749/AS1750 only, $I_{NO\_}$ or $I_{NC\_}$ = 10mA, $V_{CC}$ = 2.7V | $T_A$ = $T_{MIN}$ to $T_{MAX}$ | | 25 | 50 | Ω |
| $I_{NO\_(OFF)}$ $I_{NC\_(OFF)}$ | NO_, NC_ Off-Leakage Current | AS1747/AS1748 only, $V_{CC}$ = 2.7V, switch open; $V_{NC\_}$ or $V_{NO\_}$ = -2.5V, +2.5V; $V_{COM\_}$ = +2.5V, -2.5V | $T_A$ = +25ºC | -10 | | +10 | nA |
| | | | $T_A$ = $T_{MIN}$ to $T_{MAX}$ | -200 | | +200 | |
| $I_{COM\_(ON)}$ | COM_ On-Leakage Current | $V_{CC}$ = 2.7V, switch closed; $V_{NC\_}$ or $V_{NO\_}$ = -2.5V, +2.5V; or floating; $V_{COM\_}$ = -2.5V, +2.5V, or floating | $T_A$ = +25ºC | -10 | | +10 | nA |
| | | | $T_A$ = $T_{MIN}$ to $T_{MAX}$ | -200 | | +200 | |
| **Dynamic Characteristics** | | | | | | | |
| $t_{ON}$ | Turn-On Time[1] | $V_{NO}$ = 2.5V; for NO_, $V_{IN\_}$ = 0V to $V_{CC}$; for NC_, $V_{IN\_}$ = $V_{CC}$ to 0V; $R_L$ = 300Ω, $C_L$ = 35pF, Figure 19 | $T_A$ = +25ºC | | 200 | 400 | ns |
| | | | $T_A$ = $T_{MIN}$ to $T_{MAX}$ | | | 400 | |
| $t_{OFF}$ | Turn-Off Time[1] | $V_{NC}$ = 2.5V; for NO_, $V_{IN\_}$ = $V_{CC}$ to 0V; for NC_, $V_{IN\_}$ = 0V to $V_{CC}$; $R_L$ = 300Ω, $C_L$ = 35pF, Figure 19 | $T_A$ = +25ºC | | 50 | 200 | ns |
| | | | $T_A$ = $T_{MIN}$ to $T_{MAX}$ | | | 200 | |
| $t_D$ | Break-Before-Make Time Delay | $V_{N\_}$ = 2.5V, for NO_, $V_{IN\_}$ = $V_{CC}$ to 0V; for NC_, $V_{IN\_}$ = 0V to $V_{CC}$; $R_L$ = 300Ω, $C_L$ = 35pF, Figure 20 | | | 200 | | ns |
| Q | Charge Injection | $V_{COM\_}$ = 0V, $R_S$ = 0Ω, $C_L$ = 1.0nF, Figure 21 | | | 2 | | pC |
| $V_{ISO}$ | Off-Isolation | $V_{CC}$ = 5V, f = 100kHz, $V_{COM\_}$ = $1V_{RMS}$, $R_L$ = 50Ω, $C_L$ = 5pF, Figure 22 | | | -65 | | dB |
| $V_{CT}$ | Crosstalk | $V_{CC}$ = 5V, f = 100kHz, $V_{COM\_}$ = $1V_{RMS}$, $R_L$ = 50Ω, $C_L$ = 5pF, Figure 22 | | | -90 | | dB |
| PSRR | Power-Supply Rejection Ratio | f = 10kHz, $V_{COM\_}$ = $1V_{RMS}$, $R_L$ = 50Ω, $C_L$ = 5pF | | | 70 | | dB |
| BW | On-Channel-3dB Bandwidth | $V_{CC}$ = 5V, Signal = 0dBm, $R_L$ = 50Ω, $C_L$ = 5pF, Figure 22 | | | 31 | | MHz |

*Table 4. Electrical Characteristics (Continued)*

| Symbol | Parameter | Condition | | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|---|
| THD | Total Harmonic Distortion | f = 20Hz to 20kHz, $V_{COM\_}$ = 0.5$V_{P-P}$, DC Bias = 0, $R_L$ = 32Ω | | | 0.01 | | % |
| $C_{NO\_(Off)}$ $C_{NC\_(Off)}$ | NO_, NC_ Off-Capacitance | f = 1MHz, $V_{COM\_}$ = 0.5$V_{P-P}$, DC Bias = 0 | | | 63 | | pF |
| $C_{COM\_(ON)}$ | COM On-Capacitance | f = 1MHz, $V_{COM\_}$ = 0.5$V_{P-P}$, DC Bias = 0 | | | 196 | | pF |
| **Digital I/O (IN_)** | | | | | | | |
| $V_{IH}$ | Input Logic High Voltage | $V_{CC}$ = 2.7V to 3.6V | | 1.4 | | | V |
| | | $V_{CC}$ = 4.2V to 5.5V | | 2.0 | | | |
| $V_{IL}$ | Input Logic Low Voltage | $V_{CC}$ = 2.7V to 3.6V | | | | 0.5 | V |
| | | $V_{CC}$ = 4.2V to 5.5V | | | | 0.8 | |
| $I_{IN}$ | Input Leakage Current | $V_{IN\_}$ = 0V to $V_{CC}$, $V_{CC}$ = 5.5V | | -1 | | +1 | µA |
| **Comparator** (AS1748/AS1750) | | | | | | | |
| | Comparator Threshold | | | | $V_{CC}$/3 | | V |
| | Comparator Output High Voltage | $I_{SOURCE}$ = 1mA | | $V_{CC}$ - 0.45V | | | V |
| | Comparator Output Low Voltage | $I_{SINK}$ = 1mA | | | | 0.4V | V |
| | Comparator Input Leakage Current | $V_{CMP-}$ = 0 to 2.7V | | -50 | | +50 | nA |
| | Comparator Switching Time | $V_{CC}$ = 2.7V, $V_{CMP-}$ = 0V to $V_{CC}$, from 50% of $V_{CMP-}$ to 50% of $V_{CMPO}$ | | | 0.3 | 0.4 | µs |
| **Power Supply** | | | | | | | |
| $V_{CC}$ | Power-Supply Range | | | 1.8 | | 5.5 | V |
| $I_{CC}$ | Supply Current | $V_{CC}$ = 5.5V, $V_{IN\_}$ = 0V or $V_{CC}$ | AS1747/AS1749 | | 0.01 | 1 | µA |
| | | | AS1748/AS1750 | | 5 | 10 | |

1. Guaranteed by design

**Note:** All limits are guaranteed. The parameters with min and max values are guaranteed with production tests or SQC (Statistical Quality Control) methods.

# 7 Typical Operating Characteristics

$V_{CC}$ = 3.0V, $T_A$ = +25ºC (unless otherwise specified).

*Figure 4. ON-Resistance vs. VCOM*

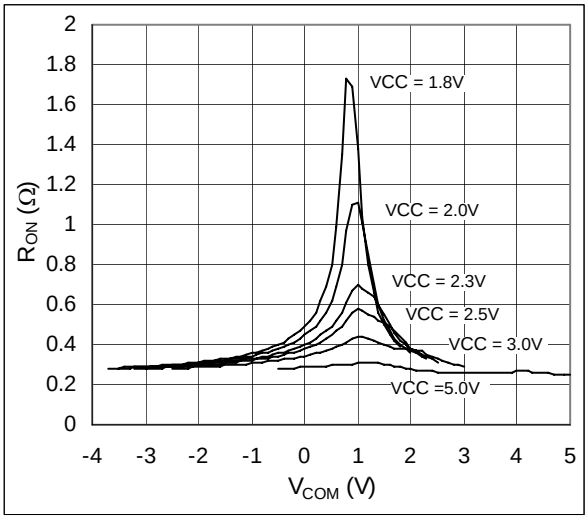



*Figure 5. ON Resistance vs. VCOM; VCC=3.0V*

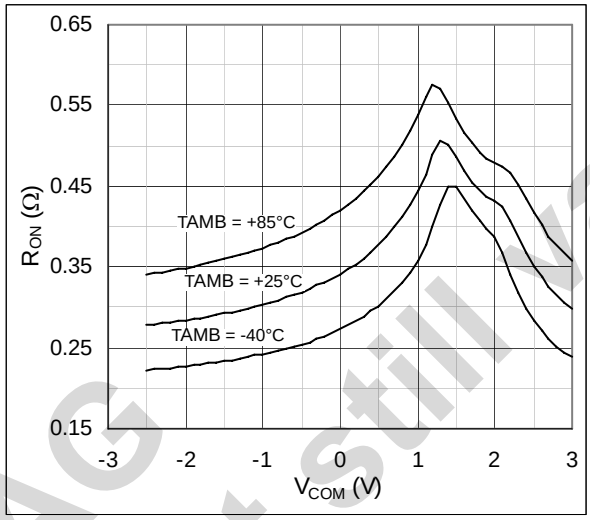



*Figure 6. ON Resistance vs. VCOM; VCC=5.0V*

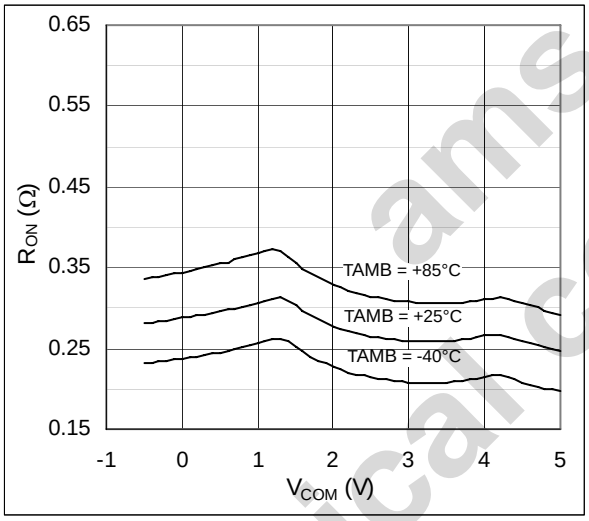



*Figure 7. ICC vs. VCC; AS1747/AS1749*

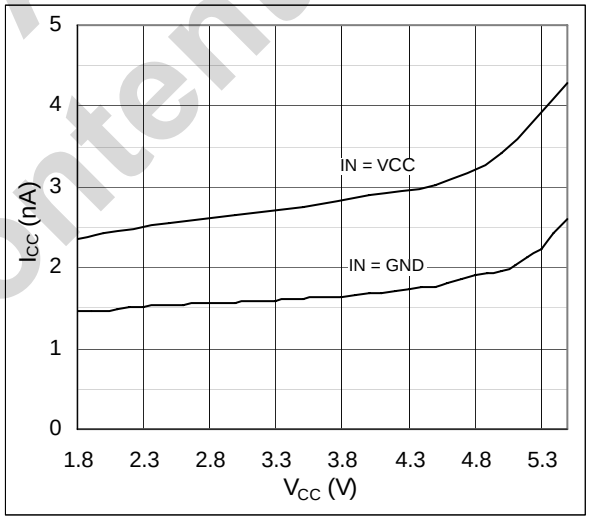



*Figure 8. ICC vs. VCC; AS1748/AS1750*

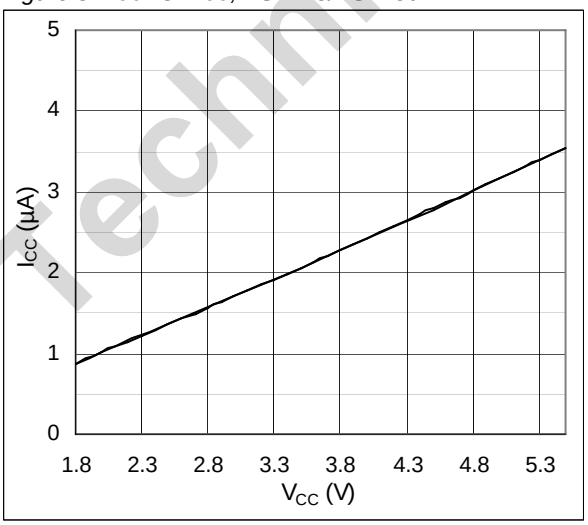



*Figure 9. Turn-ON/OFF Times vs. VCC*

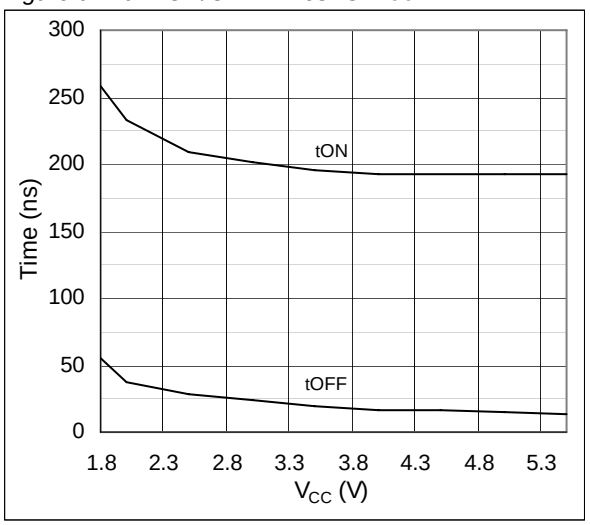


*Figure 10. Turn-ON/OFF vs. Temperature; $V_{CC}$ = 3V*

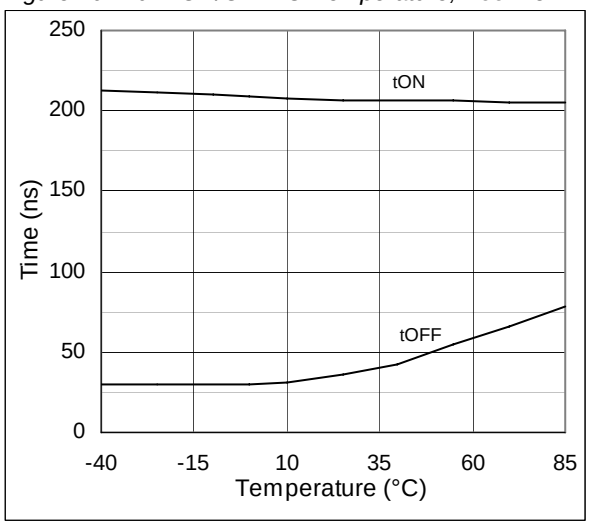



*Figure 11. Logic Threshold Voltage vs. $V_{CC}$*

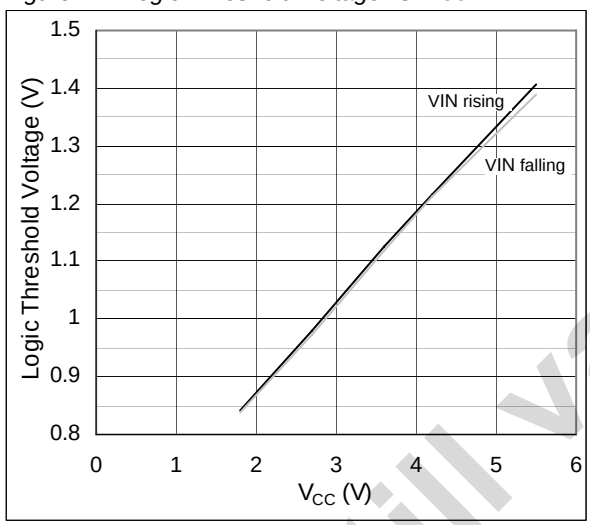



*Figure 12. Charge Injection vs. $V_{COM}$; $C_{LOAD}$ = 1nF*

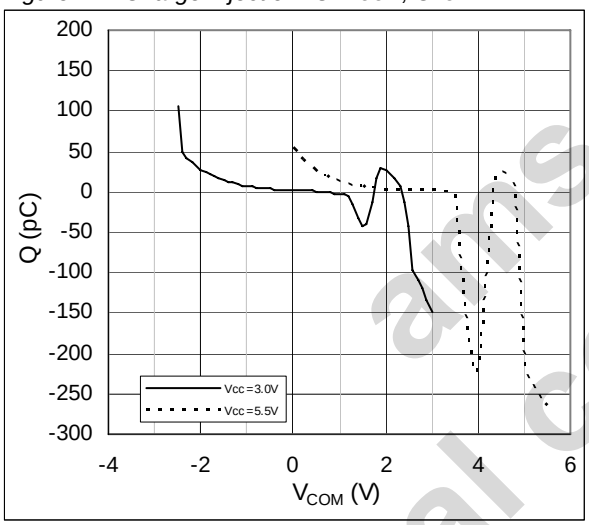



*Figure 13. Leakage Current vs. Temperature*

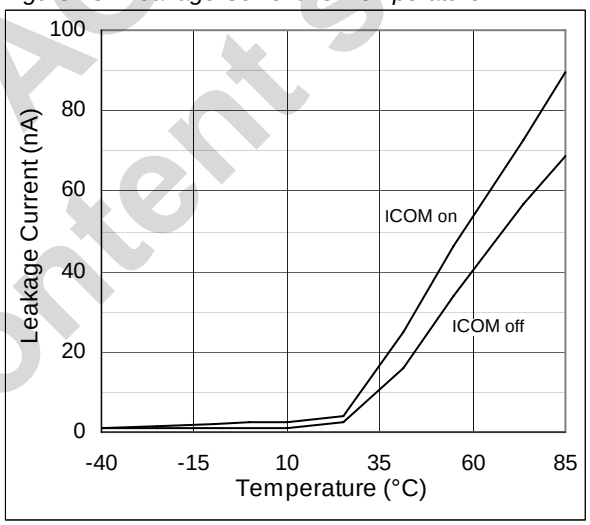



*Figure 14. Frequency Response*

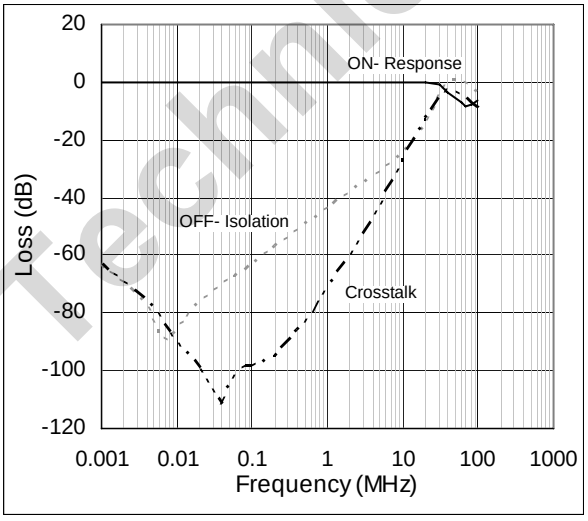



*Figure 15. Total Harmonic Distortion vs. Frequency*

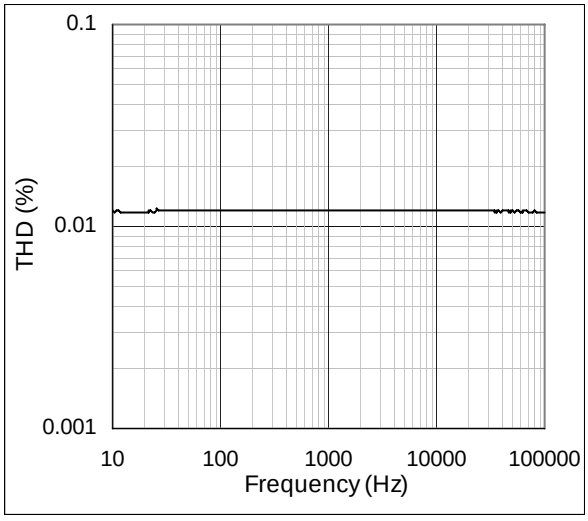


*Figure 16. Comparator Threshold vs. Temperature; VCC = 3.0V*

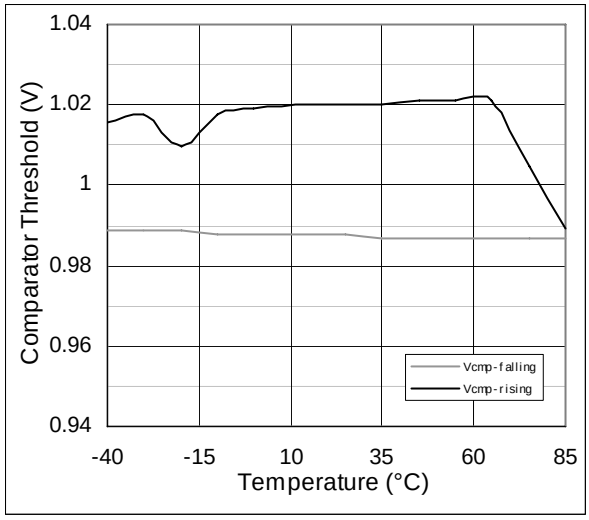



*Figure 17. Comparator Threshold vs. Temperature; VCC = 5.0V*

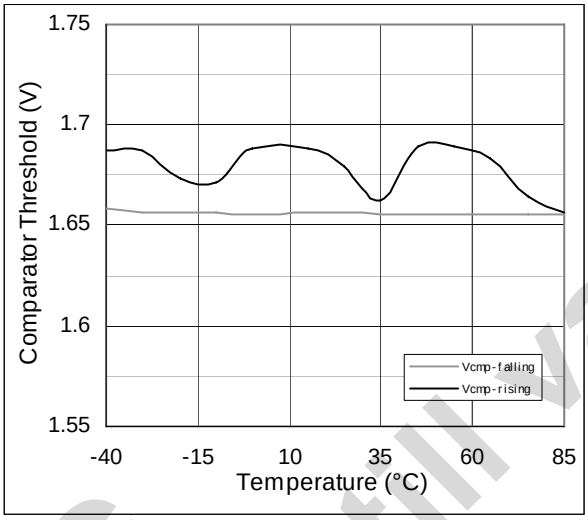
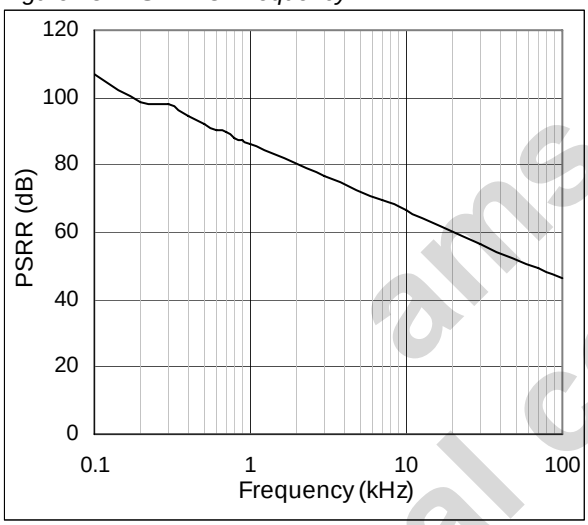



*Figure 18. PSRR vs. Frequency*



# 8 Detailed Description

The AS1747– AS1750 are operating from a +1.8V to +5.5V supply and feature a negative signal capability that allows signals below ground to pass through without distortion. A break-before-make switching and a low on-resistance are also included in this analog dual SPDT switches. The device is fully specified for a 3.0V application.

A headphone or mute detection is included in the AS1748 and AS1750. This function is realized with a comparator which has an internally generated thresh-hold of about 1/3 of Vcc. To reduce click-and-pop sounds when switching between precharged points the AS1749 and AS1750 have an internal shunt switch. This shunt switch automatically discharges any capacitance at the NO and NC connection points.

# 9 Application Information

## Digital Control Inputs

The logic inputs of the AS1747– AS1750 accept up to +5.5V independent of the supply voltage. Due to this a mixing of the logic levels in a system is possible. For example, with a +3.3V supply, IN_ can be driven low to GND and high to +5.5V. For a +1.8V supply voltage, the logic levels are 0.5V (low) and 1.4V (high); for a +5V supply voltage, the logic levels are 0.8V (low) and 2.0V (high).

## Analog Signal Levels

The change of the on-resistance of the AS1747– AS1750 is very little for analog input signals over the whole supply voltage range. The switches are bi-directional, so the NO_, NC_, and COM_ pins can be either inputs or outputs.

The AS1747– AS1750 pass signals as low as Vcc - 5.5V, including signals below ground with minimal distortion.

## Comparator (AS1748[1]/AS1750)

To implement a mute and headphone function, a comparator is included in the AS1748 and AS1750. The negative terminal of this comparator is connected to the outside (via pin CMP-) while the positive terminal is internally set to Vcc/3. The output of the comparator (CMPO) is logic high when the negative terminal (CMP-) is below the threshold. CMPO is logic low when CMP- is higher than Vcc/3.

Headphone audio signals are typical biased to Vcc/2 so a comparator threshold of Vcc/3 is sufficient for the headphone detection.

## Shunt Switch (AS1749[1]/AS1750)

Due to the switching between audio sources, audible click-and-pop sounds occur. To reduce this sounds a 100Ω shunt switch is implemented in the AS1749 and AS1750. This shunt switch automatically discharges any capacitance at the NC_ or NO_ terminals when they are unconnected to COM_.

Audible clicks and pops are caused when a step DC voltage is switched into the speaker. By automatically discharging the side that is not connected, any residual DC voltage is removed, thereby reducing the clicks and pops.

## Power-Supply Sequencing and Overvoltage Protection

**Caution:** Stresses beyond the listed absolute maximum ratings in Table 3 on page 4 may cause permanent damage to the device. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

Proper power-supply sequencing is recommended for all CMOS devices. Always apply Vcc before applying analog signals, especially if the analog signal is not current-limited.

1. on request

# 10 Timing Diagrams

*Figure 19. Switching Time*

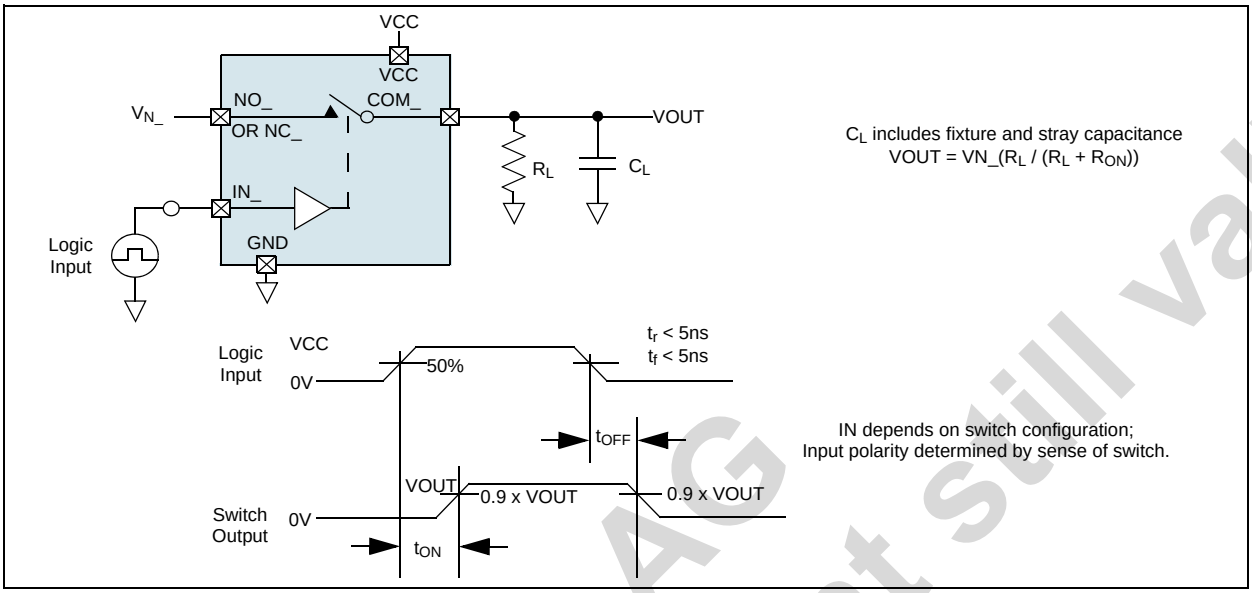



*Figure 20. Break-Before-Make Interval*

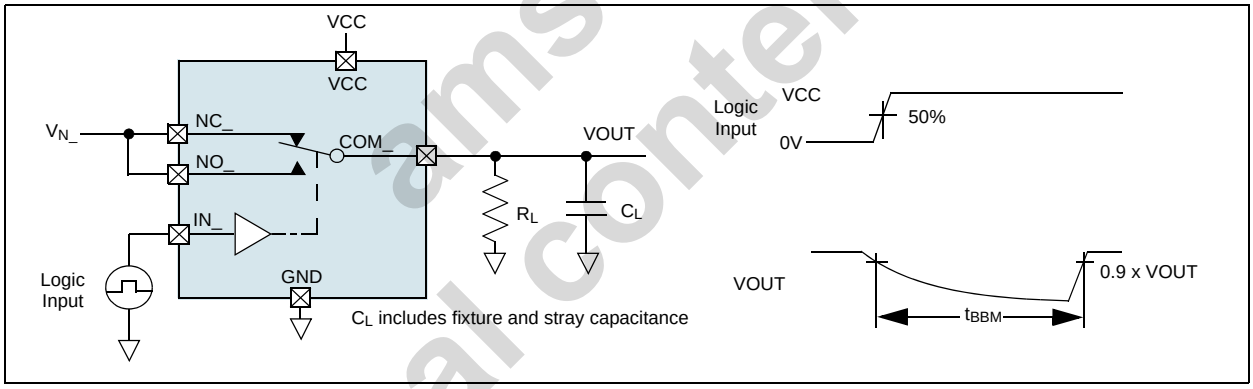



*Figure 21. Charge Injection*

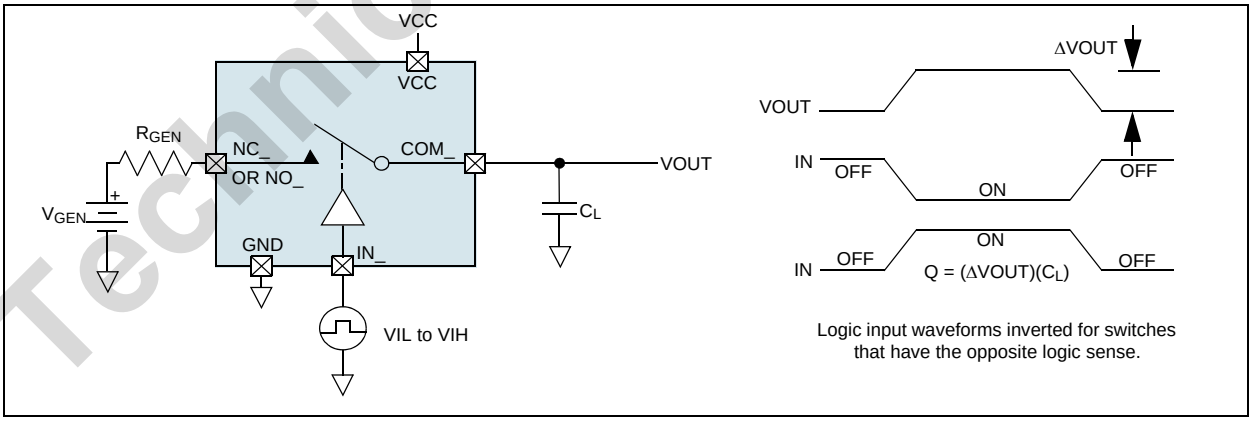
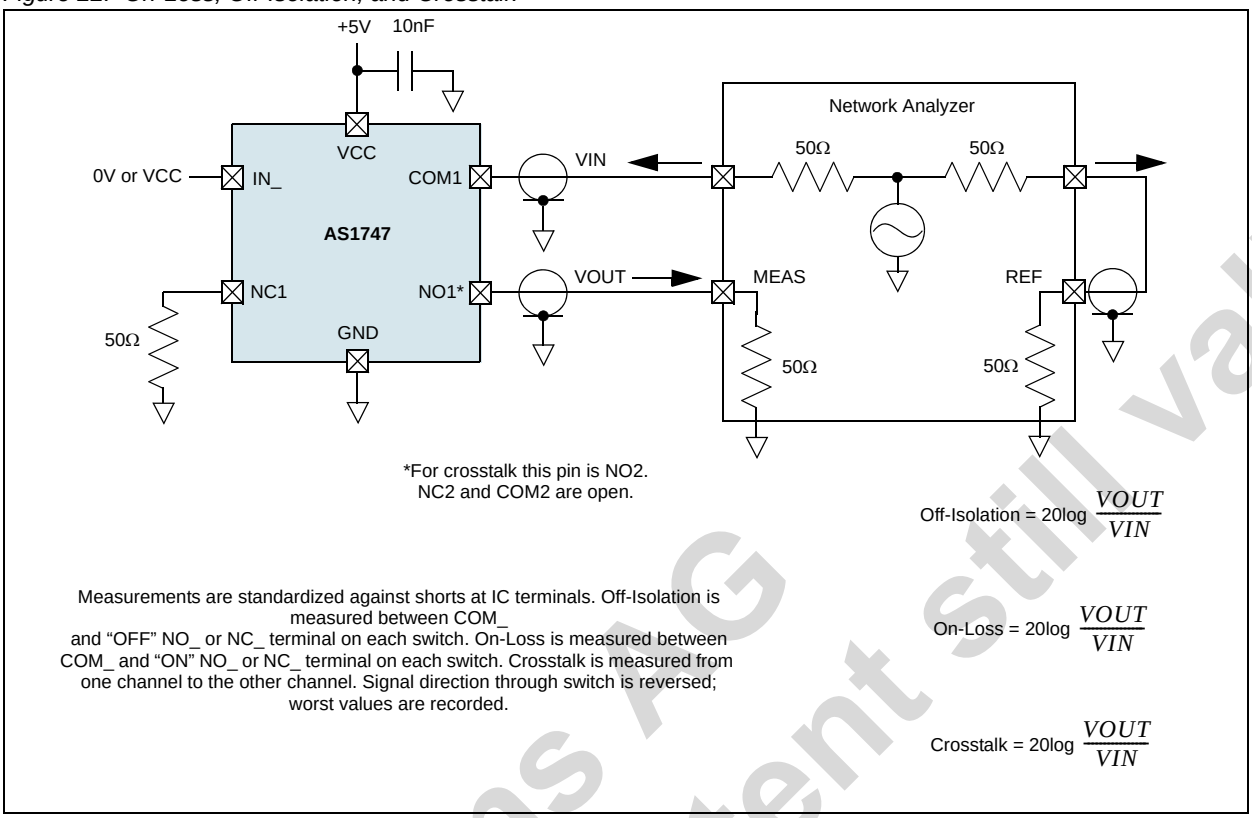


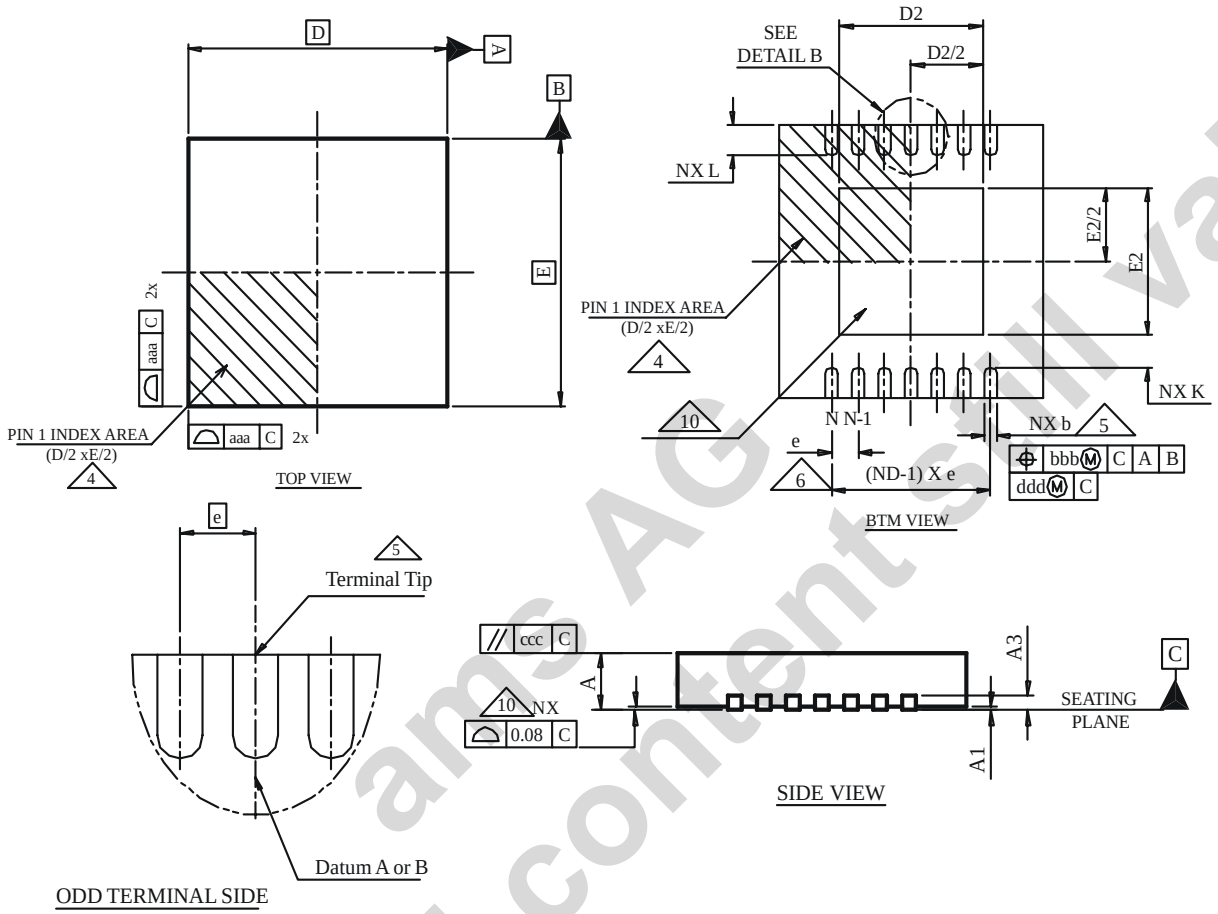
*Figure 22. On-Loss, Off-Isolation, and Crosstalk*



# 11 Package Drawings and Markings

The devices are available in 10-pin TDFN 3x3, 16-pin TQFN 3x3 package.

*Figure 23. 10-pin TDFN 3x3 Package Dimensions*



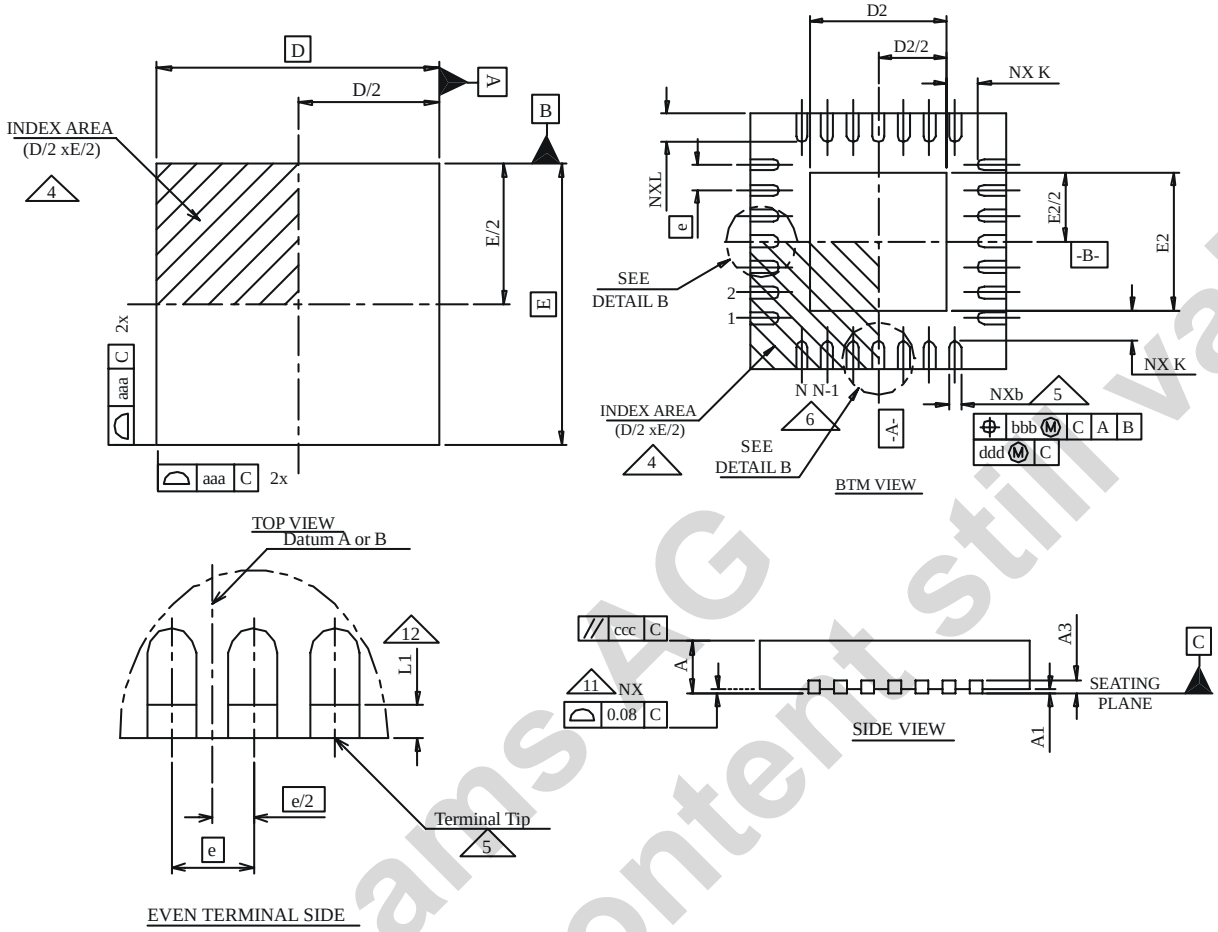

| Symbol | Min | Nom | Max | Notes |
|---|---|---|---|---|
| A | 0.70 | 0.75 | 0.80 | |
| A1 | 0.00 | 0.02 | 0.05 | |
| A3 | | 0.20 REF | | |
| θ | 0º | --- | 14º | |
| aaa | | 0.15 | | |
| bbb | | 0.10 | | |
| ccc | | 0.10 | | |
| ddd | | 0.05 | | |
| eee | | 0.08 | | |
| ggg | | 0.10 | | |

| Symbol | Min | Nom | Max | Notes |
|---|---|---|---|---|
| D BSC | | 3.00 | | |
| E BSC | | 3.00 | | |
| D2 | 2.20 | --- | 2.70 | |
| E2 | 1.40 | --- | 1.75 | |
| L | 0.30 | 0.40 | 0.50 | |
| K | 0.20 | --- | --- | |
| b | 0.18 | 0.25 | 0.30 | |
| e | | 0.50 | | |
| N | 10 | N | 10 | |
| ND | 5 | ND | 5 | |

**Notes:**

1. All dimensions are in millimeters, angle is in degrees.
2. N is the total number of terminals.
3. ND refers to the maximum number of terminals on D side.

*Figure 24. 16-pin TQFN 3x3 Package Dimensions*




| Symbol | Min | Nom | Max | Notes |
|---|---|---|---|---|
| A | 0.70 | 0.75 | 0.80 | |
| A1 | 0.00 | 0.02 | 0.05 | |
| A3 | | 0.20 REF | | |
| L1 | 0.03 | --- | 0.15 | |
| b | 0.18 | 0.25 | 0.30 | |
| e | | 0.50 | | |
| aaa | | 0.15 | | |
| bbb | | 0.10 | | |
| ccc | | 0.10 | | |
| ddd | | 0.05 | | |

| Symbol | Min | Nom | Max | Notes |
|---|---|---|---|---|
| K | 0.20 | 1.45 | --- | |
| D BSC | | 3.00 | | |
| E BSC | | 3.00 | | |
| D2 | 1.30 | 1.45 | 1.55 | |
| E2 | 1.30 | 0.40 | 1.55 | |
| L | 0.30 | 0.40 | 0.50 | |
| N | | 16 | | |
| ND | | 4 | | |
| NE | | 4 | | |

# 12 Ordering Information

The devices are available as the standard products shown in Table 5.

*Table 5. Ordering Information*

| Ordering Code | Marking | Description | Delivery Form | Package |
|---|---|---|---|---|
| AS1747-BTDT | ASPV | Dual 0.6Ohm SPDT, Audio Clickless Switch with Negative Rail Capability | Tape and Reel | 10-pin TDFN 3x3 |
| AS1747-BTDR* | ASPV | Dual 0.6Ohm SPDT, Audio Clickless Switch with Negative Rail Capability | Tray | 10-pin TDFN 3x3 |
| AS1747-BWLT* | ASPV | Dual 0.6Ohm SPDT, Audio Clickless Switch with Negative Rail Capability | Tape and Reel | 10-Bump WL-CSP |
| AS1748-BQFT* | ASPW | Dual 0.6Ohm SPDT, Audio Clickless Switch with Negative Rail Capability, with Comparator | Tape and Reel | 16-pin TQFN 3x3 |
| AS1748-BQFR* | ASPW | Dual 0.6Ohm SPDT, Audio Clickless Switch with Negative Rail Capability, with Comparator | Tray | 16-pin TQFN 3x3 |
| AS1748-BWLT* | ASPW | Dual 0.6Ohm SPDT, Audio Clickless Switch with Negative Rail Capability, with Comparator | Tape and Reel | 12-Bump WL-CSP |
| AS1749-BTDT* | ASPX | Dual 0.6Ohm SPDT, Audio Clickless Switch with Negative Rail Capability, with Internal Shunt | Tape and Reel | 10-pin TDFN 3x3 |
| AS1749-BTDR* | ASPX | Dual 0.6Ohm SPDT, Audio Clickless Switch with Negative Rail Capability, with Internal Shunt | Tray | 10-pin TDFN 3x3 |
| AS1749-BWLT* | ASPX | Dual 0.6Ohm SPDT, Audio Clickless Switch with Negative Rail Capability, with Internal Shunt | Tape and Reel | 10-Bump WL-CSP |
| AS1750-BQFT | ASPY | Dual 0.6Ohm SPDT, Audio Clickless Switch with Negative Rail Capability, with Comparator & Internal Shunt | Tape and Reel | 16-pin TQFN 3x3 |
| AS1750-BQFR* | ASPY | Dual 0.6Ohm SPDT, Audio Clickless Switch with Negative Rail Capability, with Comparator & Internal Shunt | Tray | 16-pin TQFN 3x3 |
| AS1750-BWLT* | ASPY | Dual 0.6Ohm SPDT, Audio Clickless Switch with Negative Rail Capability, with Comparator & Internal Shunt | Tape and Reel | 12-Bump WL-CSP |

* on request

**Note:** All products are RoHS compliant and Pb-free.
Buy our products or get free samples online at ICdirect: http://www.austriamicrosystems.com/ICdirect

For further information and requests, please contact us mailto:sales@austriamicrosystems.com
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