



Low Capacitance, 16- and 8-Channel ± 15 V/+12 V *i*CMOS™ Multiplexers

ADG1206/ADG1207

FEATURES

- <1 pC charge injection over full signal range
- 1.5 pF off capacitance
- 33 V supply range
- 120 Ω on resistance
- Fully specified at ± 15 V/+12 V
- 3 V logic-compatible inputs
- Rail-to-rail operation
- Break-before-make switching action
- 28-lead TSSOP and 32-lead, 5 mm \times 5 mm LFCSP_VQ

APPLICATIONS

- Audio and video routing
- Automatic test equipment
- Data acquisition systems
- Battery-powered systems
- Sample-and-hold systems
- Communication systems

GENERAL DESCRIPTION

The ADG1206 and ADG1207 are monolithic *i*CMOS analog multiplexers comprising sixteen single channels and eight differential channels, respectively. The ADG1206 switches one of sixteen inputs to a common output, as determined by the 4-bit binary address lines A0, A1, A2, and A3. The ADG1207 switches one of eight differential inputs to a common differential output, as determined by the 3-bit binary address lines A0, A1, and A2. An EN input on both devices is used to enable or disable the device. When disabled, all channels are switched off. When on, each channel conducts equally well in both directions and has an input signal range that extends to the supplies.

The *i*CMOS (industrial CMOS) modular manufacturing process combines high voltage CMOS (complementary metal-oxide semiconductor) and bipolar technologies. It enables the development of a wide range of high performance analog ICs capable of 33 V operation in a footprint that no other generation of high voltage parts has been able to achieve. Unlike analog ICs using conventional CMOS processes, *i*CMOS components can tolerate high supply voltages while providing increased performance, dramatically lower power consumption, and reduced package size.

FUNCTIONAL BLOCK DIAGRAMS

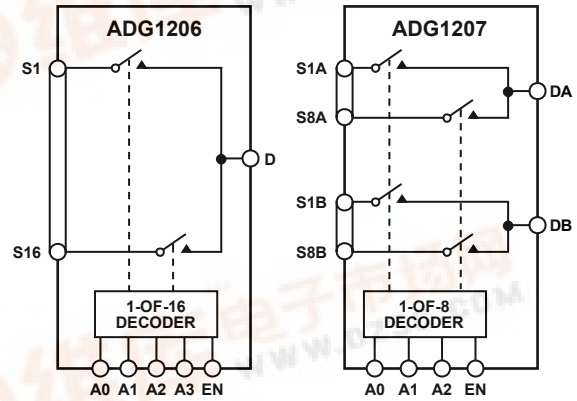


Figure 1.

The ultralow capacitance and exceptionally low charge injection of these multiplexers make them ideal solutions for data acquisition and sample-and-hold applications, where low glitch and fast settling are required. Figure 2 shows that there is minimum charge injection over the entire signal range of the device. *i*CMOS construction also ensures ultralow power dissipation, making the parts ideally suited for portable and battery-powered instruments.

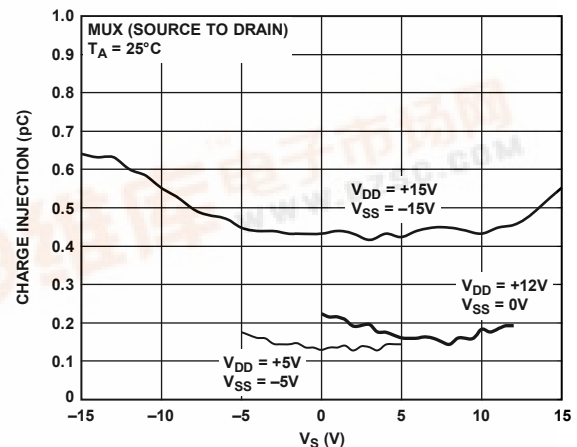


Figure 2. Source-to-Drain Charge Injection vs. Source Voltage



TABLE OF CONTENTS

| | | | |
|--------------------------------|---|--|----|
| Features | 1 | Absolute Maximum Ratings | 7 |
| Applications..... | 1 | ESD Caution..... | 7 |
| Functional Block Diagrams..... | 1 | Pin Configurations and Function Descriptions | 8 |
| General Description | 1 | Typical Performance Characteristics | 12 |
| Revision History | 2 | Terminology | 16 |
| Specifications..... | 3 | Test Circuits..... | 17 |
| Dual Supply | 3 | Outline Dimensions | 19 |
| Single Supply | 5 | Ordering Guide | 19 |

REVISION HISTORY

7/06—Revision 0: Initial Version

SPECIFICATIONS

DUAL SUPPLY

$V_{DD} = +15\text{ V} \pm 10\%$, $V_{SS} = -15\text{ V} \pm 10\%$, $GND = 0\text{ V}$, unless otherwise noted.¹

Table 1.

| Parameter | +25°C | -40°C to +85°C | -40°C to +125°C | Unit | Test Conditions/Comments |
|---|-------------|-------------------|----------------------|-------------------|---|
| ANALOG SWITCH | | | | | |
| Analog Signal Range | | | V_{SS} to V_{DD} | V | |
| On Resistance, R_{ON} | 120 | | | Ω typ | $V_S = \pm 10\text{ V}$, $I_S = -1\text{ mA}$; see Figure 28 |
| | 200 | 240 | 270 | Ω max | $V_{DD} = +13.5\text{ V}$, $V_{SS} = -13.5\text{ V}$ |
| On Resistance Match Between Channels, ΔR_{ON} | 3.5 | | | Ω typ | $V_S = \pm 10\text{ V}$, $I_S = -1\text{ mA}$ |
| | 6 | 10 | 12 | Ω max | |
| On Resistance Flatness, R_{FLAT} (On) | 20 | | | Ω typ | $V_S = -5\text{ V}, 0\text{ V}, +5\text{ V}$; $I_S = -1\text{ mA}$ |
| | 64 | 76 | 83 | Ω max | |
| LEAKAGE CURRENTS | | | | | |
| Source Off Leakage, I_S (Off) | ± 0.03 | | | nA typ | $V_D = \pm 10\text{ V}$, $V_S = \mp 10\text{ V}$; see Figure 29 |
| | ± 0.2 | ± 0.6 | ± 1 | nA max | |
| Drain Off Leakage, I_D (Off) | ± 0.05 | | | nA typ | $V_S = 1\text{ V}, 10\text{ V}$; $V_D = 10\text{ V}, 1\text{ V}$; see Figure 29 |
| | ± 0.2 | ± 0.6 | ± 2 | nA max | |
| Channel On Leakage, I_D, I_S (On) | ± 0.08 | | | nA typ | $V_S = V_D = \pm 10\text{ V}$; see Figure 30 |
| | ± 0.2 | ± 0.6 | ± 2 | nA max | |
| DIGITAL INPUTS | | | | | |
| Input High Voltage, V_{INH} | | | 2.0 | V min | |
| Input Low Voltage, V_{INL} | | | 0.8 | V max | |
| Input Current, I_{INL} or I_{INH} | ± 0.005 | | | μA typ | $V_{IN} = V_{INL}$ or V_{INH} |
| | | | ± 0.1 | μA max | |
| Digital Input Capacitance, C_{IN} | 2 | | | pF typ | |
| DYNAMIC CHARACTERISTICS² | | | | | |
| Transition Time, $t_{TRANSITION}$ | 80 | | | ns typ | $R_L = 300\ \Omega$, $C_L = 35\text{ pF}$ |
| | 130 | 165 | 185 | ns max | $V_S = 10\text{ V}$; see Figure 31 |
| t_{ON} (EN) | 75 | | | ns typ | $R_L = 300\ \Omega$, $C_L = 35\text{ pF}$ |
| | 95 | 105 | 115 | ns max | $V_S = 10\text{ V}$; see Figure 33 |
| t_{OFF} (EN) | 85 | | | ns typ | $R_L = 300\ \Omega$, $C_L = 35\text{ pF}$ |
| | 100 | 125 | 140 | ns max | $V_S = 10\text{ V}$; see Figure 33 |
| Break-Before-Make Time Delay, t_{BBM} | 20 | | | ns typ | $R_L = 300\ \Omega$, $C_L = 35\text{ pF}$ |
| | | | 10 | ns min | $V_{S1} = V_{S2} = 10\text{ V}$; see Figure 32 |
| Charge Injection | 0.5 | | | pC typ | $V_S = 0\text{ V}$, $R_S = 0\ \Omega$, $C_L = 1\text{ nF}$; see Figure 34 |
| Off Isolation | -85 | | | dB typ | $R_L = 50\ \Omega$, $C_L = 5\text{ pF}$, $f = 1\text{ MHz}$; see Figure 35 |
| Channel-to-Channel Crosstalk | -85 | | | dB typ | $R_L = 50\ \Omega$, $C_L = 5\text{ pF}$, $f = 1\text{ MHz}$; see Figure 37 |
| Total Harmonic Distortion + Noise | 0.15 | | | % typ | $R_L = 10\text{ k}\Omega$, 5 V rms , $f = 20\text{ Hz to } 20\text{ kHz}$; see Figure 38 |
| -3 dB Bandwidth ADG1206 | 280 | | | MHz typ | $R_L = 50\ \Omega$, $C_L = 5\text{ pF}$; see Figure 36 |
| -3 dB Bandwidth ADG1207 | 490 | | | MHz typ | $R_L = 50\ \Omega$, $C_L = 5\text{ pF}$; see Figure 36 |
| C_S (Off) | 1.5 | | | pF typ | $f = 1\text{ MHz}$, $V_S = 0\text{ V}$ |
| | 2 | | | pF max | $f = 1\text{ MHz}$, $V_S = 0\text{ V}$ |
| C_D (Off) ADG1206 | 11 | | | pF typ | $f = 1\text{ MHz}$, $V_S = 0\text{ V}$ |
| | 12 | | | pF max | $f = 1\text{ MHz}$, $V_S = 0\text{ V}$ |
| C_D (Off) ADG1207 | 7 | | | pF typ | $f = 1\text{ MHz}$, $V_S = 0\text{ V}$ |
| | 9 | | | pF max | $f = 1\text{ MHz}$, $V_S = 0\text{ V}$ |

ADG1206/ADG1207

| Parameter | +25°C | -40°C to | | Unit | Test Conditions/Comments |
|--|-------|----------|----------|------------------|---|
| | | +85°C | +125°C | | |
| C _D , C _S (On) ADG1206 | 13 | | | pF typ | f = 1 MHz, V _S = 0 V |
| | 15 | | | pF max | f = 1 MHz, V _S = 0 V |
| C _D , C _S (On) ADG1207 | 8 | | | pF typ | f = 1 MHz, V _S = 0 V |
| | 10 | | | pF max | f = 1 MHz, V _S = 0 V |
| POWER REQUIREMENTS | | | | | |
| I _{DD} | 0.002 | | 1.0 | μA typ μA max | V _{DD} = +16.5 V, V _{SS} = -16.5 V Digital inputs = 0 V or V _{DD} |
| I _{DD} | 260 | | 420 | μA typ μA max | Digital inputs = 5 V |
| I _{SS} | 0.002 | | 1.0 | μA typ μA max | Digital inputs = 0 V, 5 V, or V _{DD} |
| V _{DD} /V _{SS} | | | ±5/±16.5 | V min/max | GND = 0V |

¹ Temperature range for Y version is -40°C to +125°C.

² Guaranteed by design, not subject to production test.

SINGLE SUPPLY

$V_{DD} = 12\text{ V} \pm 10\%$, $V_{SS} = 0\text{ V}$, $GND = 0\text{ V}$, unless otherwise noted.¹

Table 2.

| Parameter | +25°C | -40°C to +85°C | -40°C to +125°C | Unit | Test Conditions/Comments |
|---|-------------|----------------|-----------------|-------------------|---|
| ANALOG SWITCH | | | | | |
| Analog Signal Range | | | 0 to V_{DD} | V | |
| On Resistance, R_{ON} | 300 | | | Ω typ | $V_S = 0\text{ V}$ to 10 V , $I_S = -1\text{ mA}$; see Figure 28 |
| | 475 | 567 | 625 | Ω max | $V_{DD} = 10.8\text{ V}$, $V_{SS} = 0\text{ V}$ |
| On Resistance Match Between Channels, ΔR_{ON} | 5 | | | Ω typ | $V_S = 0\text{ V}$ to 10 V , $I_S = -1\text{ mA}$ |
| On Resistance Flatness, R_{FLAT} (On) | 16 | 26 | 27 | Ω max | |
| | 60 | | | Ω typ | $V_S = 3\text{ V}$, 6 V , 9 V ; $I_S = -1\text{ mA}$ |
| LEAKAGE CURRENTS | | | | | |
| Source Off Leakage, I_S (Off) | ± 0.02 | | | nA typ | $V_{DD} = 13.2\text{ V}$ |
| | ± 0.2 | ± 0.6 | ± 1 | nA max | $V_S = 1\text{ V}/10\text{ V}$, $V_D = 10\text{ V}/1\text{ V}$; see Figure 29 |
| Drain Off Leakage, I_D (Off) | ± 0.05 | | | nA typ | |
| | ± 0.2 | ± 0.6 | ± 2 | nA max | $V_S = 1\text{ V}/10\text{ V}$, $V_D = 10\text{ V}/1\text{ V}$; see Figure 29 |
| Channel On Leakage, I_D , I_S (On) | ± 0.08 | | | nA typ | |
| | ± 0.2 | ± 0.6 | ± 2 | nA max | $V_S = V_D = 1\text{ V}$ or 10 V ; see Figure 30 |
| DIGITAL INPUTS | | | | | |
| Input High Voltage, V_{INH} | | | 2.0 | V min | |
| Input Low Voltage, V_{INL} | | | 0.8 | V max | |
| Input Current, I_{INL} or I_{INH} | ± 0.001 | | | μA typ | |
| | | | ± 0.1 | μA max | $V_{IN} = V_{INL}$ or V_{INH} |
| Digital Input Capacitance, C_{IN} | 3 | | | pF typ | |
| DYNAMIC CHARACTERISTICS² | | | | | |
| Transition Time, $t_{TRANSITION}$ | 100 | | | ns typ | $R_L = 300\ \Omega$, $C_L = 35\text{ pF}$ |
| | 140 | 175 | 200 | ns max | $V_S = 8\text{ V}$; see Figure 31 |
| t_{ON} (EN) | 80 | | | ns typ | $R_L = 300\ \Omega$, $C_L = 35\text{ pF}$ |
| | 100 | 120 | 130 | ns max | $V_S = 8\text{ V}$; see Figure 33 |
| t_{OFF} (EN) | 90 | | | ns typ | $R_L = 300\ \Omega$, $C_L = 35\text{ pF}$ |
| | 110 | 130 | 155 | ns max | $V_S = 8\text{ V}$; see Figure 33 |
| Break-Before-Make Time Delay, t_{BBM} | 25 | | | ns typ | $R_L = 300\ \Omega$, $C_L = 35\text{ pF}$ |
| | | | 15 | ns min | $V_{S1} = V_{S2} = 8\text{ V}$; see Figure 32 |
| Charge Injection | 0.2 | | | pC typ | $V_S = 6\text{ V}$, $R_S = 0\ \Omega$, $C_L = 1\text{ nF}$; see Figure 34 |
| Off Isolation | -85 | | | dB typ | $R_L = 50\ \Omega$, $C_L = 5\text{ pF}$, $f = 1\text{ MHz}$; see Figure 35 |
| Channel-to-Channel Crosstalk | -85 | | | dB typ | $R_L = 50\ \Omega$, $C_L = 5\text{ pF}$, $f = 1\text{ MHz}$; see Figure 37 |
| -3 dB Bandwidth ADG1206 | 185 | | | MHz typ | $R_L = 50\ \Omega$, $C_L = 5\text{ pF}$; see Figure 36 |
| -3 dB Bandwidth ADG1207 | 300 | | | MHz typ | $R_L = 50\ \Omega$, $C_L = 5\text{ pF}$; see Figure 36 |
| C_S (Off) | 1.5 | | | pF typ | $f = 1\text{ MHz}$, $V_S = 6\text{ V}$ |
| | 2 | | | pF max | $f = 1\text{ MHz}$, $V_S = 6\text{ V}$ |
| C_D (Off) ADG1206 | 13 | | | pF typ | $f = 1\text{ MHz}$, $V_S = 6\text{ V}$ |
| | 15 | | | pF max | $f = 1\text{ MHz}$, $V_S = 6\text{ V}$ |
| C_D (Off) ADG1207 | 9 | | | pF typ | $f = 1\text{ MHz}$, $V_S = 6\text{ V}$ |
| | 11 | | | pF max | $f = 1\text{ MHz}$, $V_S = 6\text{ V}$ |
| C_D , C_S (On) ADG1206 | 15 | | | pF typ | $f = 1\text{ MHz}$, $V_S = 6\text{ V}$ |
| | 17 | | | pF max | $f = 1\text{ MHz}$, $V_S = 6\text{ V}$ |
| C_D , C_S (On) ADG1207 | 10 | | | pF typ | $f = 1\text{ MHz}$, $V_S = 6\text{ V}$ |
| | 12 | | | pF max | $f = 1\text{ MHz}$, $V_S = 6\text{ V}$ |

ADG1206/ADG1207

| Parameter | +25°C | -40°C to +85°C | -40°C to +125°C | Unit | Test Conditions/Comments |
|--------------------|-------|----------------|-----------------|--|-----------------------------------|
| POWER REQUIREMENTS | | | | | $V_{DD} = 13.2\text{ V}$ |
| I_{DD} | 0.002 | | 1.0 | $\mu\text{A typ}$ $\mu\text{A max}$ | Digital inputs = 0 V or V_{DD} |
| I_{DD} | 260 | | 420 | $\mu\text{A typ}$ $\mu\text{A max}$ | Digital inputs = 5 |
| V_{DD} | | | 5/16.5 | V min/max | $V_{SS} = 0\text{ V}$, GND = 0 V |

¹ Temperature range for Y version is -40°C to $+125^{\circ}\text{C}$.

² Guaranteed by design, not subject to production test.

ABSOLUTE MAXIMUM RATINGS

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

Table 3.

| Parameter | Rating |
|---|--|
| V_{DD} to V_{SS} | 35 V |
| V_{DD} to GND | -0.3 V to +25 V |
| V_{SS} to GND | +0.3 V to -25 V |
| Analog, Digital Inputs ¹ | $V_{SS} - 0.3\text{ V}$ to $V_{DD} + 0.3\text{ V}$ or 30 mA, whichever occurs first |
| Continuous Current, S or D | 30 mA |
| Peak Current, S or D (Pulsed at 1 ms, 10% Duty Cycle Maximum) | 100 mA |
| Operating Temperature Ranges | |
| Industrial (Y Version) | -40°C to +125°C |
| Storage | -65°C to +150°C |
| Junction Temperature | 150°C |
| 28-Lead TSSOP | |
| θ_{JA} , Thermal Impedance | 97.9°C/W |
| θ_{JC} , Thermal Impedance | 14°C/W |
| 32-Lead LFCSP_VQ | |
| θ_{JA} , Thermal Impedance | 27.27°C/W |
| Reflow Soldering Peak Temperature (Pb-Free) | 260(+0/-5)°C |

¹ Overvoltages at A, EN, S, or D are clamped by internal diodes. Current should be limited to the maximum ratings given.

Stresses above those listed under Absolute Maximum Ratings may cause permanent damage to the device. This is a stress rating only; functional operation of the device at these or any other conditions above those indicated in the operational section of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

Only one absolute maximum rating may be applied at any one time.

ESD CAUTION

ESD (electrostatic discharge) sensitive device. Electrostatic charges as high as 4000 V readily accumulate on the human body and test equipment and can discharge without detection. Although this product features proprietary ESD protection circuitry, permanent damage may occur on devices subjected to high energy electrostatic discharges. Therefore, proper ESD precautions are recommended to avoid performance degradation or loss of functionality.



ADG1206/ADG1207

PIN CONFIGURATIONS AND FUNCTION DESCRIPTIONS

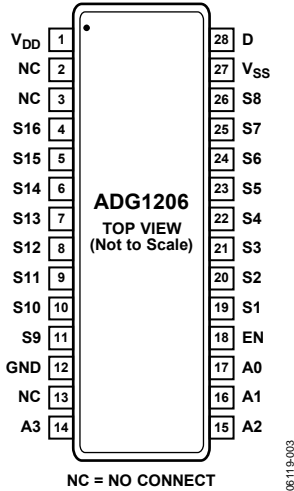


Figure 3. ADG1206 Pin Configuration—TSSOP

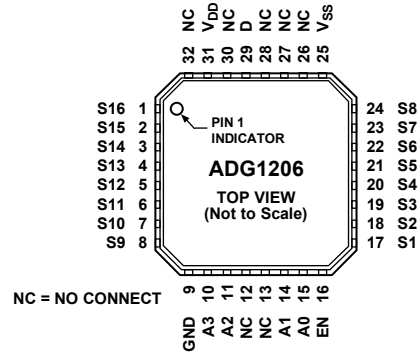


Figure 4. ADG1206 Pin Configuration—5 mm x 5 mm LFCSP_VQ, Exposed Pad Tied to Substrate, V_{SS}

Table 4. ADG1206 Pin Function Descriptions

| Pin Number | | Mnemonic | Description |
|------------|--------------------|-----------------|--|
| TSSOP | LFCSP_VQ | | |
| 1 | 31 | V _{DD} | Most Positive Power Supply Potential. |
| 2 | 12, 13 | NC | No Connect. |
| 3 | 26, 27, 28, 30, 32 | NC | No Connect. |
| 4 | 1 | S16 | Source Terminal 16. Can be an input or an output. |
| 5 | 2 | S15 | Source Terminal 15. Can be an input or an output. |
| 6 | 3 | S14 | Source Terminal 14. Can be an input or an output. |
| 7 | 4 | S13 | Source Terminal 13. Can be an input or an output. |
| 8 | 5 | S12 | Source Terminal 12. Can be an input or an output. |
| 9 | 6 | S11 | Source Terminal 11. Can be an input or an output. |
| 10 | 7 | S10 | Source Terminal 10. Can be an input or an output. |
| 11 | 8 | S9 | Source Terminal 9. Can be an input or an output. |
| 12 | 9 | GND | Ground (0 V) Reference. |
| 13 | – | NC | No Connect. |
| 14 | 10 | A3 | Logic Control Input. |
| 15 | 11 | A2 | Logic Control Input. |
| 16 | 14 | A1 | Logic Control Input. |
| 17 | 15 | A0 | Logic Control Input. |
| 18 | 16 | EN | Active High Digital Input. When this pin is low, the device is disabled and all switches are turned off. When this pin is high, the A _x logic inputs determine which switch is turned on. |
| 19 | 17 | S1 | Source Terminal 1. Can be an input or an output. |
| 20 | 18 | S2 | Source Terminal 2. Can be an input or an output. |
| 21 | 19 | S3 | Source Terminal 3. Can be an input or an output. |
| 22 | 20 | S4 | Source Terminal 4. Can be an input or an output. |
| 23 | 21 | S5 | Source Terminal 5. Can be an input or an output. |
| 24 | 22 | S6 | Source Terminal 6. Can be an input or an output. |
| 25 | 23 | S7 | Source Terminal 7. Can be an input or an output. |
| 26 | 24 | S8 | Source Terminal 8. Can be an input or an output. |
| 27 | 25 | V _{SS} | Most Negative Power Supply Potential. In single-supply applications, this pin can be connected to ground. |
| 28 | 29 | D | Drain Terminal. Can be an input or an output. |

Table 5. ADG1206 Truth Table

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

ADG1206/ADG1207

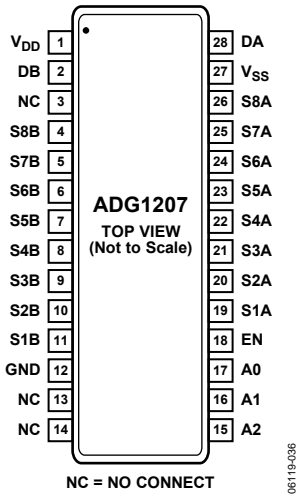


Figure 5. ADG1207 Pin Configuration—TSSOP

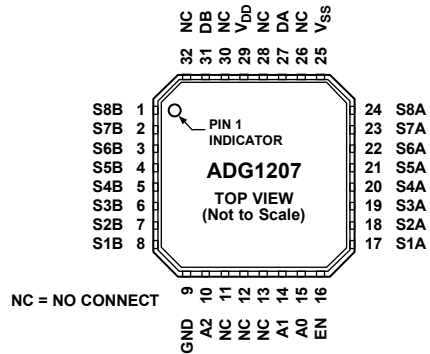


Figure 6. ADG1207 Pin Configuration—5 mm x 5 mm LFCSP_VQ Exposed Pad Tied to Substrate, V_{SS}

Table 6. ADG1207 Pin Function Descriptions

| Pin Number | | Mnemonic | Description |
|------------|----------------|-----------------|--|
| TSSOP | LFCSP_VQ | | |
| 1 | 29 | V _{DD} | Most Positive Power Supply Potential. |
| 2 | 31 | DB | Drain Terminal B. Can be an input or an output. |
| 3 | 11, 12, 13 | NC | No Connect. |
| 4 | 1 | S8B | Source Terminal 8B. Can be an input or an output. |
| 5 | 2 | S7B | Source Terminal 7B. Can be an input or an output. |
| 6 | 3 | S6B | Source Terminal 6B. Can be an input or an output. |
| 7 | 4 | S5B | Source Terminal 5B. Can be an input or an output. |
| 8 | 5 | S4B | Source Terminal 4B. Can be an input or an output. |
| 9 | 6 | S3B | Source Terminal 3B. Can be an input or an output. |
| 10 | 7 | S2B | Source Terminal 2B. Can be an input or an output. |
| 11 | 8 | S1B | Source Terminal 1B. Can be an input or an output. |
| 12 | 9 | GND | Ground (0V) Reference. |
| 13 | 26, 28, 30, 32 | NC | No Connect. |
| 14 | – | NC | No Connect. |
| 15 | 10 | A2 | Logic Control Input. |
| 16 | 14 | A1 | Logic Control Input. |
| 17 | 15 | A0 | Logic Control Input. |
| 18 | 16 | EN | Active High Digital Input. When this pin is low, the device is disabled and all switches are turned off. When this pin is high, the Ax logic inputs determine which switch is turned on. |
| 19 | 17 | S1A | Source Terminal 1A. Can be an input or an output. |
| 20 | 18 | S2A | Source Terminal 2A. Can be an input or an output. |
| 21 | 19 | S3A | Source Terminal 3A. Can be an input or an output. |
| 22 | 20 | S4A | Source Terminal 4A. Can be an input or an output. |
| 23 | 21 | S5A | Source Terminal 5A. Can be an input or an output. |
| 24 | 22 | S6A | Source Terminal 6A. Can be an input or an output. |
| 25 | 23 | S7A | Source Terminal 7A. Can be an input or an output. |
| 26 | 24 | S8A | Source Terminal 8A. Can be an input or an output. |
| 27 | 25 | V _{SS} | Most Negative Power Supply Potential. In single-supply applications, this pin can be connected to ground. |
| 28 | 27 | DA | Drain Terminal A. Can be an input or an output. |

Table 7. ADG1207 Truth Table

| A2 | A1 | A0 | EN | On Switch Pair |
|----|----|----|----|----------------|
| X | X | X | 0 | None |
| 0 | 0 | 0 | 1 | 1 |
| 0 | 0 | 1 | 1 | 2 |
| 0 | 1 | 0 | 1 | 3 |
| 0 | 1 | 1 | 1 | 4 |
| 1 | 0 | 0 | 1 | 5 |
| 1 | 0 | 1 | 1 | 6 |
| 1 | 1 | 0 | 1 | 7 |
| 1 | 1 | 1 | 1 | 8 |

TYPICAL PERFORMANCE CHARACTERISTICS

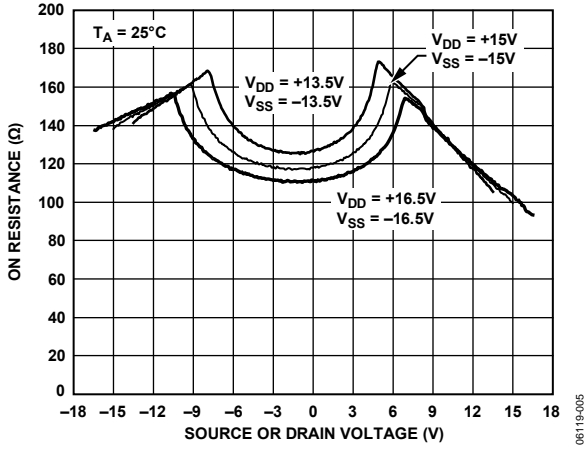


Figure 7. On Resistance as a Function of V_D (V_S) for Dual Supply

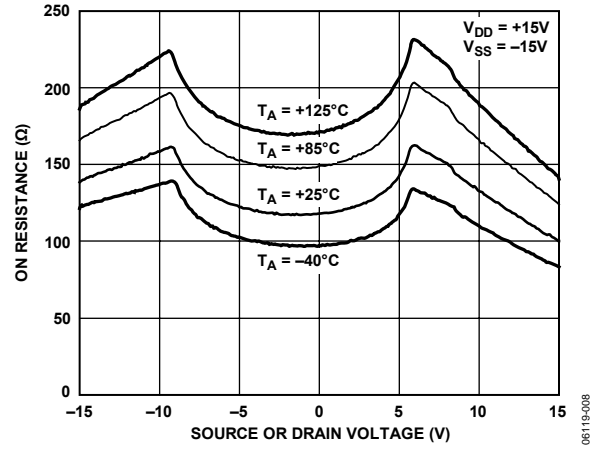


Figure 10. On Resistance as a Function of V_D (V_S) for Different Temperatures, Dual Supply

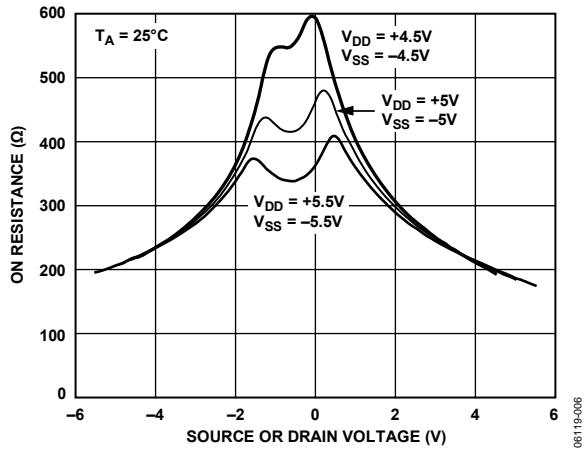


Figure 8. On Resistance as a Function of V_D (V_S) for Dual Supply

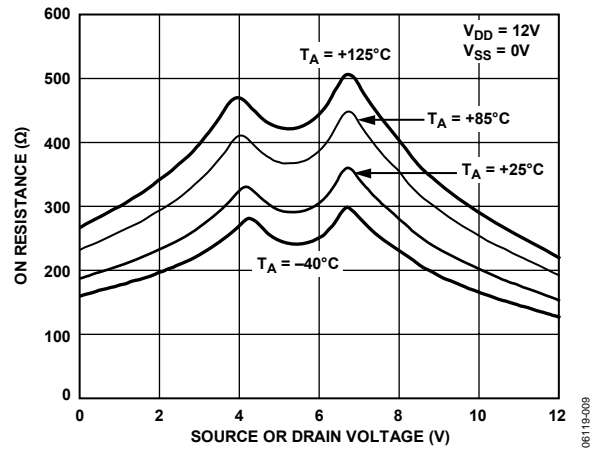


Figure 11. On Resistance as a Function of V_D (V_S) for Different Temperatures, Single Supply

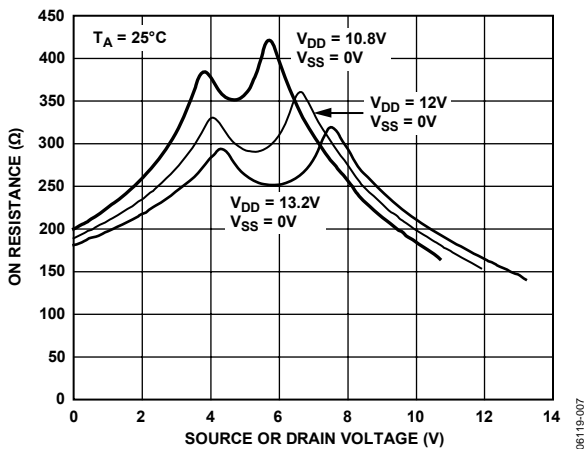


Figure 9. On Resistance as a Function of V_D (V_S) for Single Supply

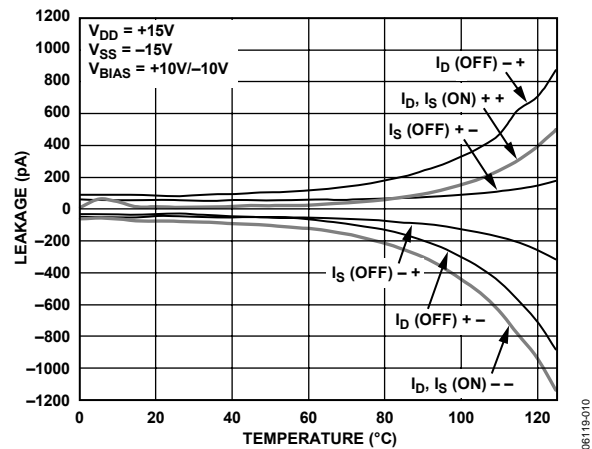


Figure 12. ADG1206 Leakage Currents as a Function of Temperature, Dual Supply

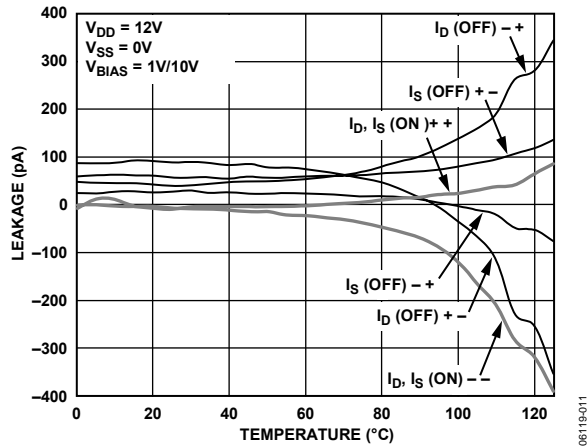


Figure 13. ADG1206 Leakage Currents as a Function of Temperature, Single Supply

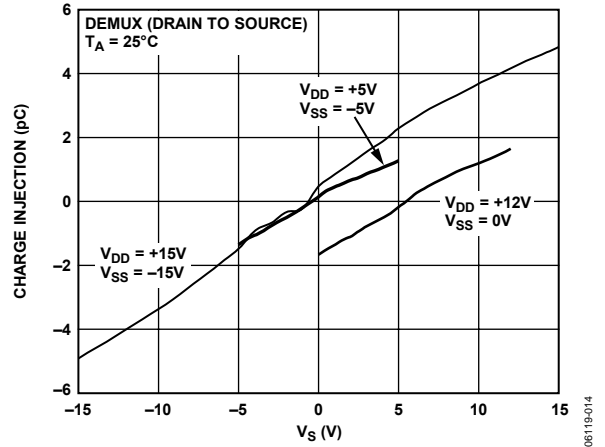


Figure 16. Drain-to-Source Charge Injection vs. Source Voltage

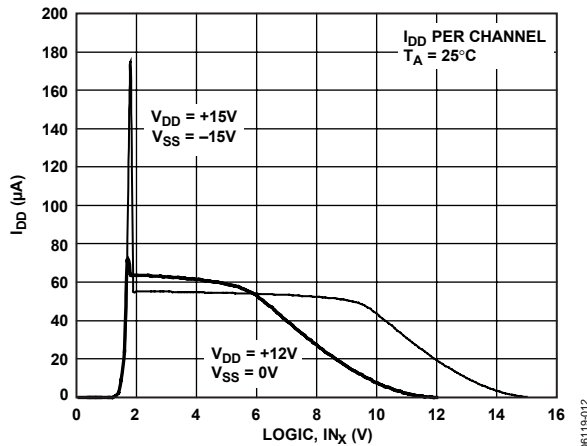


Figure 14. I_{DD} vs. Logic Level

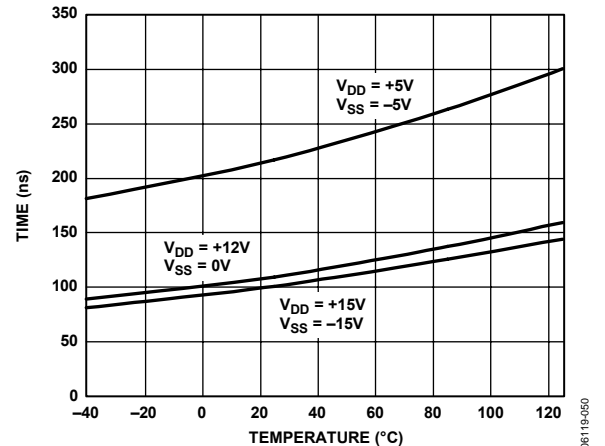


Figure 17. Transition Time vs. Temperature

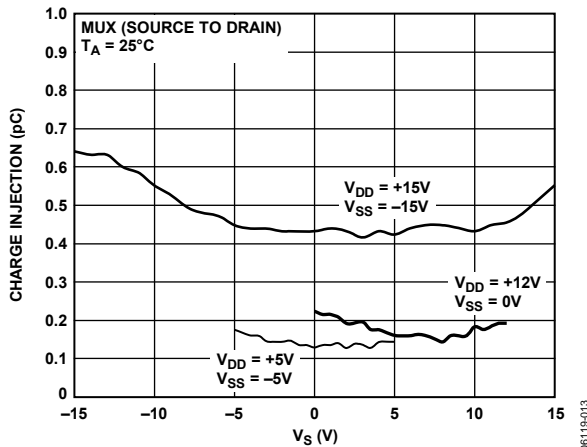


Figure 15. Source-to-Drain Charge Injection vs. Source Voltage

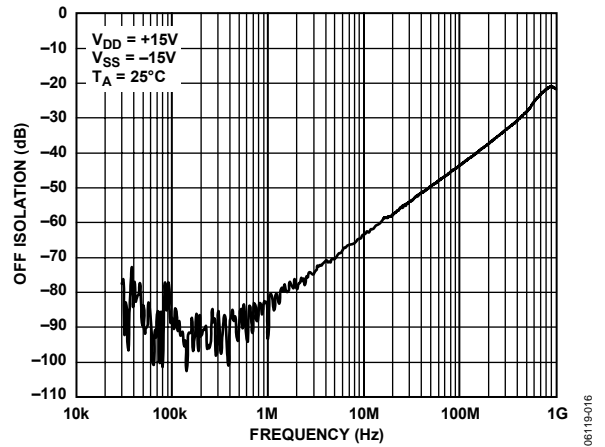


Figure 18. Off Isolation vs. Frequency

ADG1206/ADG1207

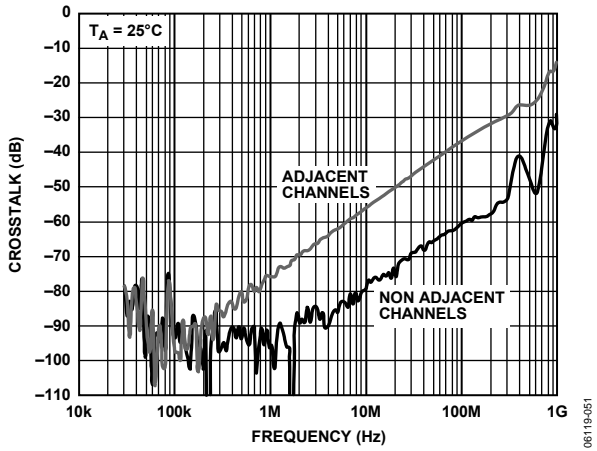


Figure 19. ADG1206 Crosstalk vs. Frequency

06119-051

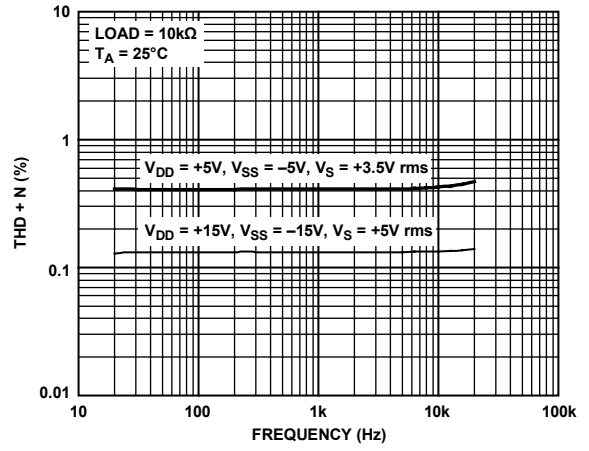


Figure 22. THD + N vs. Frequency

06119-020

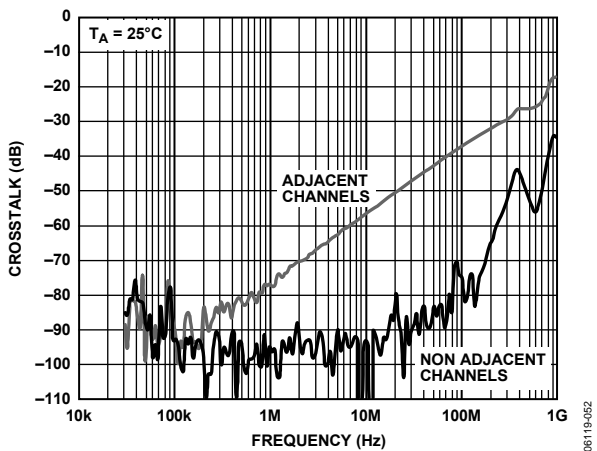


Figure 20. ADG1207 Crosstalk vs. Frequency

06119-052

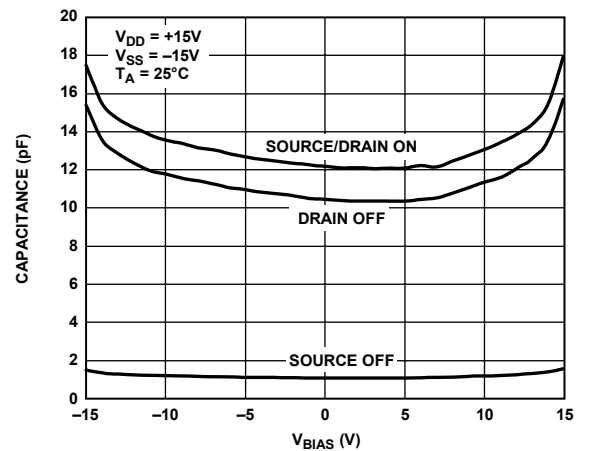


Figure 23. ADG1206 Capacitance vs. Source Voltage, ±15 V Dual Supply

06119-054

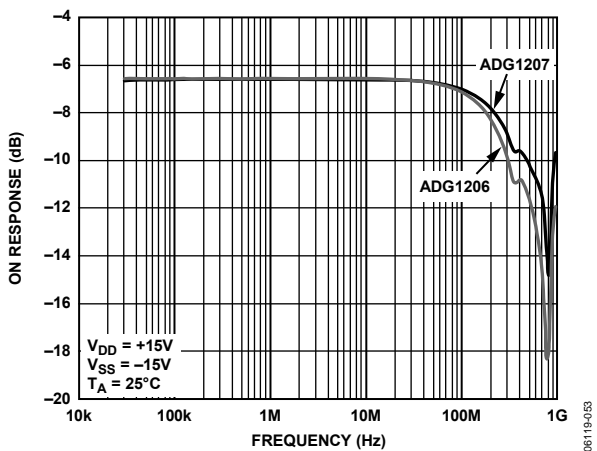


Figure 21. On Response vs. Frequency

06119-053

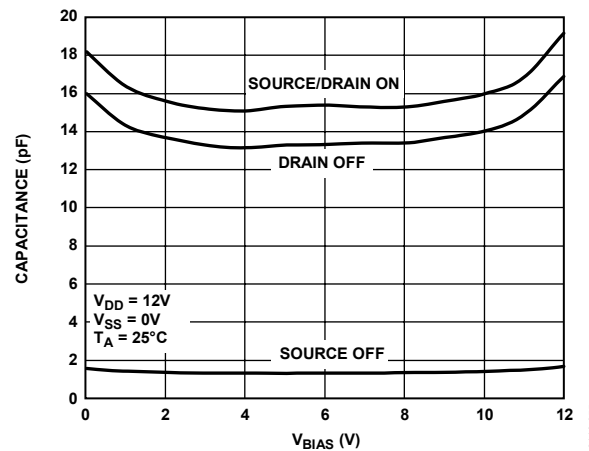


Figure 24. ADG1206 Capacitance vs. Source Voltage, 12 V Single Supply

06119-055

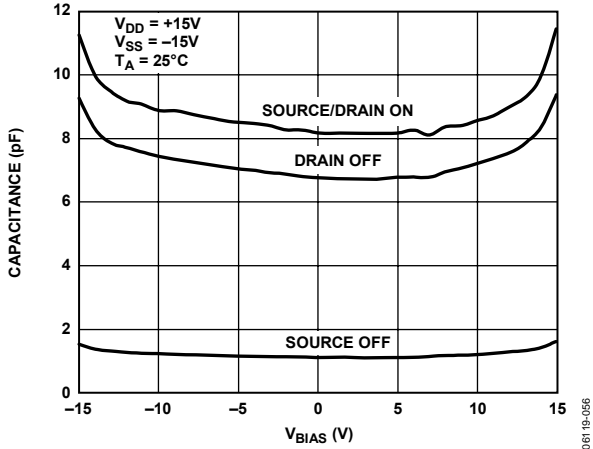


Figure 25. ADG1207 Capacitance vs. Source Voltage, ±15 V Dual Supply

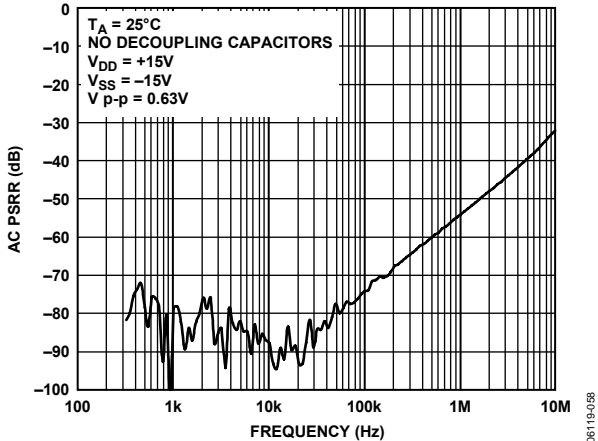


Figure 27. AC PSRR vs. Frequency

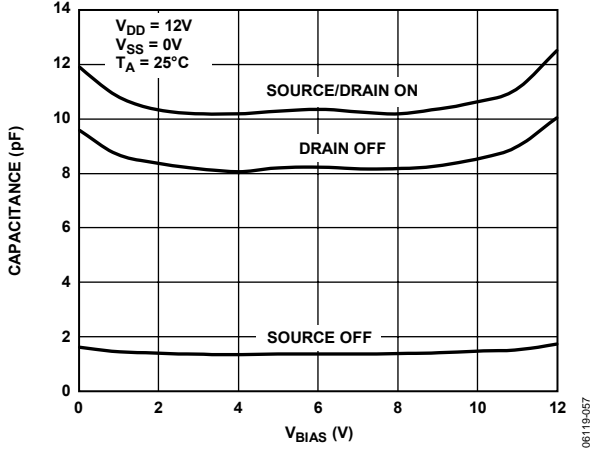


Figure 26. ADG1207 Capacitance vs. Source Voltage, 12 V Single Supply

TERMINOLOGY

R_{ON}

Ohmic resistance between D and S.

ΔR_{ON}

Difference between the R_{ON} of any two channels.

$R_{FLAT(ON)}$

Flatness is defined as the difference between the maximum and minimum value of on resistance as measured.

I_S (Off)

Source leakage current when the switch is off.

I_D (Off)

Drain leakage current when the switch is off.

I_D, I_S (On)

Channel leakage current when the switch is on.

V_D (V_S)

Analog voltage on Terminals D and S.

C_S (Off)

Channel input capacitance for the off condition.

C_D (Off)

Channel output capacitance for the off condition.

C_D, C_S (On)

On switch capacitance.

C_{IN}

Digital input capacitance.

t_{ON} (EN)

Delay time between the 50% and 90% points of the digital input and the switch on condition.

t_{OFF} (EN)

Delay time between the 50% and 90% points of the digital input and the switch off condition.

$t_{TRANSITION}$

Delay time between the 50% and 90% points of the digital inputs and the switch on condition when switching from one address state to another.

T_{BBM}

Off time measured between the 80% points of the switches when switching from one address state to another.

V_{INL}

Maximum input voltage for Logic 0.

V_{INH}

Minimum input voltage for Logic 1.

I_{INL} (I_{INH})

Input current of the digital input.

I_{DD}

Positive supply current.

I_{SS}

Negative supply current.

Off Isolation

A measure of unwanted signal coupling through an off channel.

Charge Injection

A measure of the glitch impulse transferred from the digital input to the analog output during switching.

Bandwidth

The frequency at which the output is attenuated by 3 dB.

On Response

The frequency response of the on switch.

THD + N

The ratio of the harmonic amplitude plus noise of the signal to the fundamental.

ACPSRR (AC Power Supply Rejection Ratio)

Measures the ability of a part to avoid coupling noise and spurious signals that appear on the supply voltage pin to the output of the switch. The dc voltage on the device is modulated by a sine wave of 0.62 V p-p. The ratio of the amplitude of signal on the output to the amplitude of the modulation is the ACPSRR.

TEST CIRCUITS

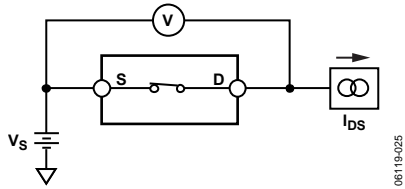


Figure 28. On Resistance

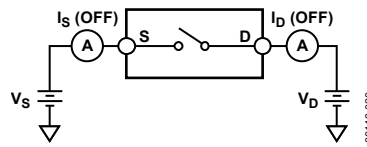


Figure 29. Off Leakage

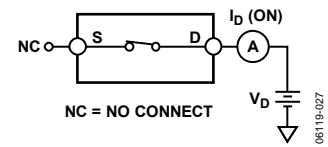


Figure 30. On Leakage

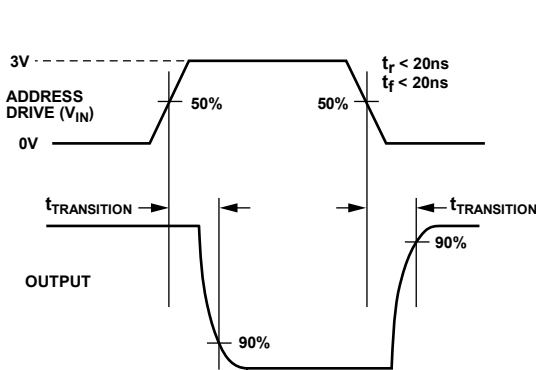
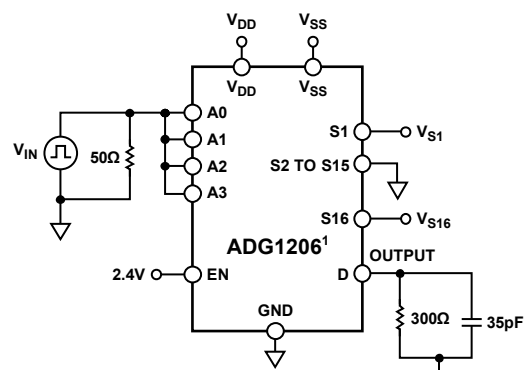


Figure 31. Address to Output Switching Times, $t_{\text{TRANSITION}}$



¹SIMILAR CONNECTION FOR ADG1207.

06119-026

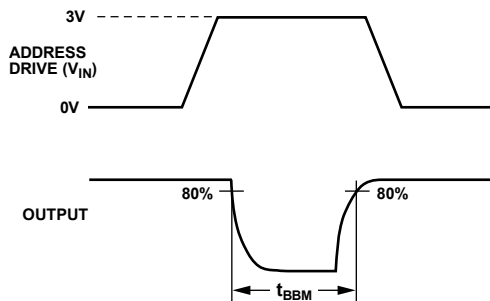
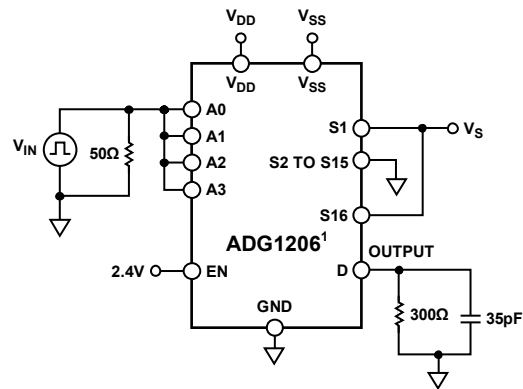


Figure 32. Break-Before-Make Delay, t_{BBM}



¹SIMILAR CONNECTION FOR ADG1207.

06119-029

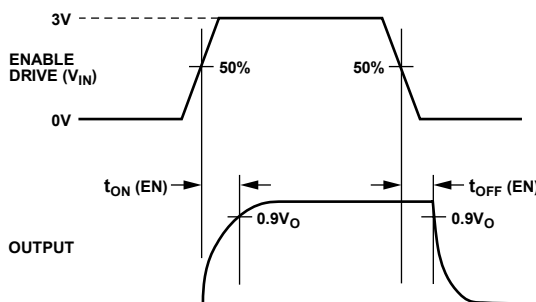
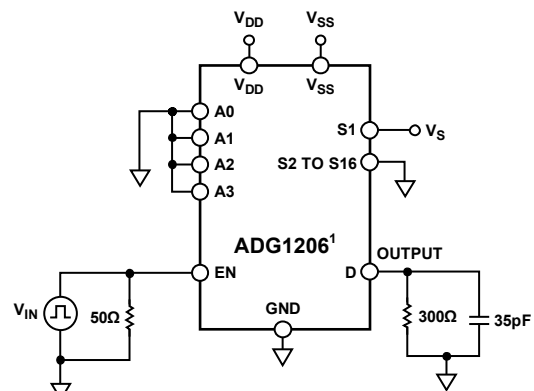


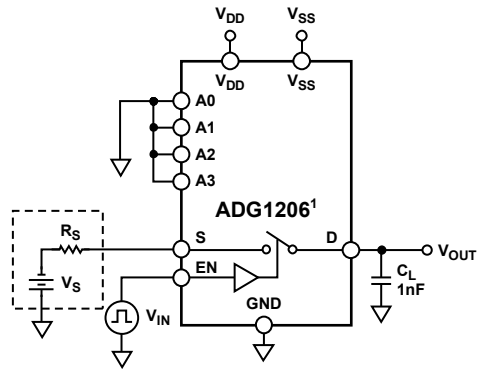
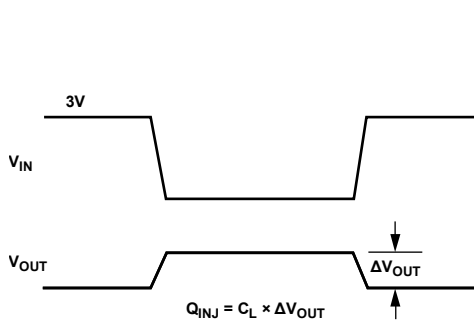
Figure 33. Enable Delay, $t_{\text{ON}}(\text{EN})$, $t_{\text{OFF}}(\text{EN})$



¹SIMILAR CONNECTION FOR ADG1207.

06119-030

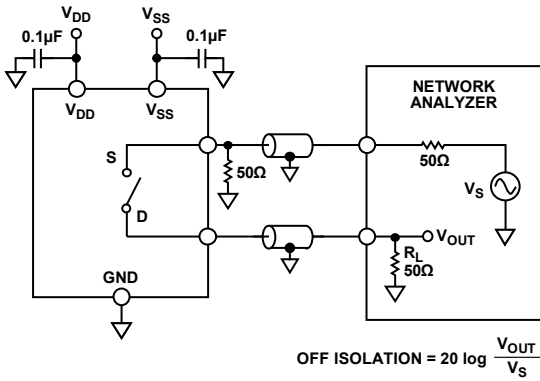
ADG1206/ADG1207



¹SIMILAR CONNECTION FOR ADG1207.

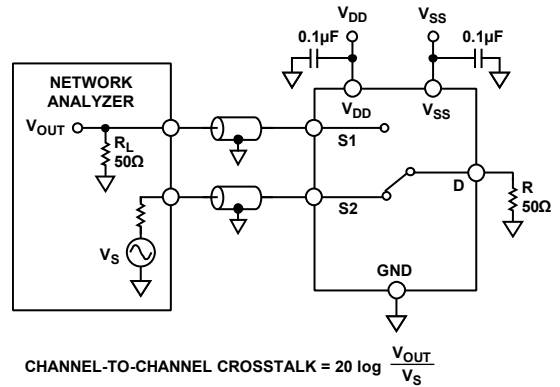
06119-031

Figure 34. Charge Injection



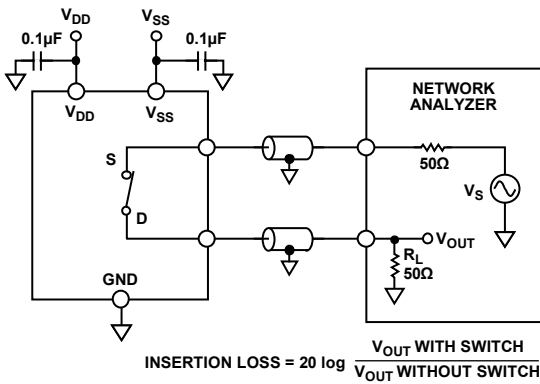
06119-032

Figure 35. Off Isolation



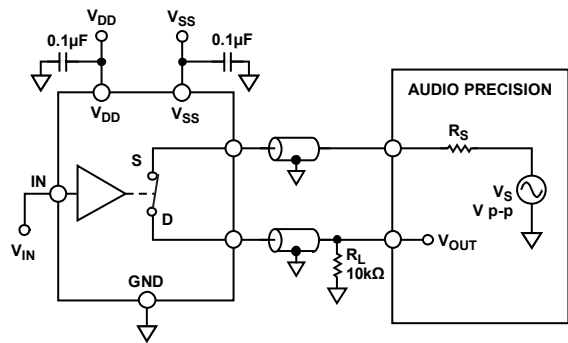
06119-034

Figure 37. Channel-to-Channel Crosstalk



06119-033

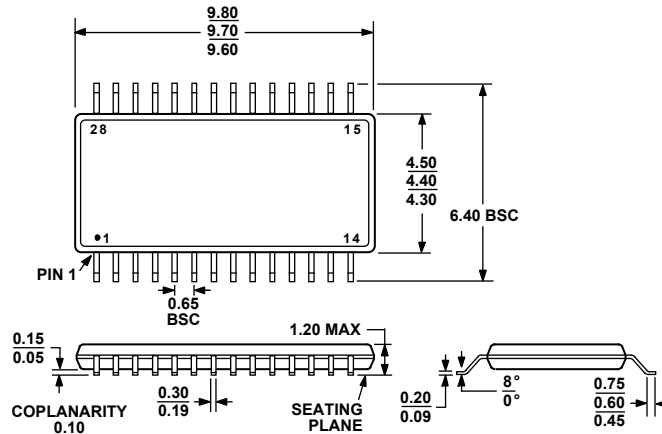
Figure 36. Bandwidth



06119-035

Figure 38. THD + Noise

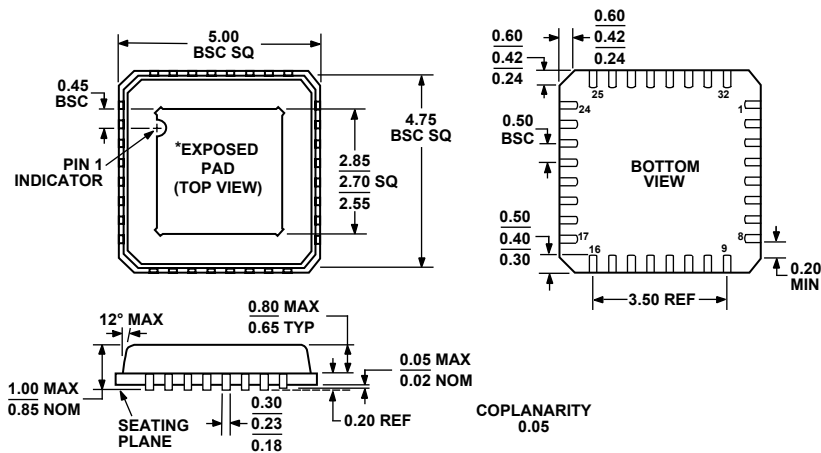
OUTLINE DIMENSIONS



COMPLIANT TO JEDEC STANDARDS MO-153-AE

Figure 39. 28-Lead Thin Shrink Small Outline Package [TSSOP] (RU-28)

Dimensions shown in millimeters



*COMPLIANT TO JEDEC STANDARDS MO-220 WITH EXCEPTION TO PADDLE ORIENTATION.

Figure 40. 32-Lead Lead Frame Chip Scale Package [LFCSP_VQ] 5 mm x 5 mm Body, Very Thin Quad (CP-32-2)

Dimensions shown in millimeters

ORDERING GUIDE

| Model | Temperature Range | Description | Package Option |
|--------------------------------|-------------------|---|----------------|
| ADG1206YRUZ ¹ | -40°C to +125°C | 28-Lead Thin Shrink Small Outline Package [TSSOP] | RU-28 |
| ADG1206YRUZ-REEL7 ¹ | -40°C to +125°C | 28-Lead Thin Shrink Small Outline Package [TSSOP] | RU-28 |
| ADG1206YCPZ-REEL7 ¹ | -40°C to +125°C | 32-Lead Lead Frame Chip Scale Package [LFCSP_VQ] | CP-32-2 |
| ADG1207YRUZ ¹ | -40°C to +125°C | 28-Lead Thin Shrink Small Outline Package [TSSOP] | RU-28 |
| ADG1207YRUZ-REEL7 ¹ | -40°C to +125°C | 28-Lead Thin Shrink Small Outline Package [TSSOP] | RU-28 |
| ADG1207YCPZ-REEL7 ¹ | -40°C to +125°C | 32-Lead Lead Frame Chip Scale Package [LFCSP_VQ] | CP-32-2 |

¹ Z = Pb-free part.

ADG1206/ADG1207

NOTES