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## Contact us

Tel: +86-755-8981 8866 Fax: +86-755-8427 6832
Email \& Skype: info@chipsmall.com Web: www.chipsmall.com Address: A1208, Overseas Decoration Building, \#122 Zhenhua RD., Futian, Shenzhen, China

## FEATURES

$6.5 \Omega$ (maximum) on resistance<br>$0.8 \Omega$ (maximum) on-resistance flatness<br>2.7 V to 5.5 V single supply<br>$\pm 2.7 \mathrm{~V}$ to $\pm 5.5 \mathrm{~V}$ dual supply<br>Rail-to-rail operation<br>8-lead SOT-23, 8-lead MSOP<br>Typical power consumption (<0.1 $\mu \mathrm{W}$ )<br>TTL-/CMOS-compatible inputs

## APPLICATIONS

Automatic test equipment
Power routing
Communication systems
Data acquisition systems
Sample-and-hold systems
Avionics
Relay replacement
Battery-powered systems

## GENERAL DESCRIPTION

The ADG619/ADG620 are monolithic, CMOS single-pole double-throw (SPDT) switches. Each switch conducts equally well in both directions when the device is on.

The ADG619/ADG620 offer a low on resistance of $4 \Omega$, which is matched to within $0.7 \Omega$ between channels. These switches also provide low power dissipation, yet result in high switching speeds. The ADG619 exhibits break-before-make switching action, thus preventing momentary shorting when switching channels. The ADG620 exhibits make-before-break action.

The ADG619/ADG620 are available in an 8-lead SOT-23 and an 8-lead MSOP.

FUNCTIONAL BLOCK DIAGRAM


NOTES 1. SWITCHES SHOWN FOR A LOGIC 1 INPUT.

Figure 1.

## PRODUCT HIGHLIGHTS

1. Low on resistance (Ron): $4 \Omega$ typical.
2. Dual $\pm 2.7 \mathrm{~V}$ to $\pm 5.5 \mathrm{~V}$ or single 2.7 V to 5.5 V supplies.
3. Low power dissipation.
4. Fast $\mathrm{t}_{\mathrm{on}} / \mathrm{t}_{\text {off }}$.
5. Tiny, 8-lead SOT-23 and 8-lead MSOP.

Table 1. Truth Table for the ADG619/ADG620

| IN | Switch S1 | Switch S2 |
| :--- | :--- | :--- |
| 0 | On | Off |
| 1 | Off | On |

[^0]
## ADG619/ADG620

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## SPECIFICATIONS

## DUAL SUPPLY

$\mathrm{V}_{\mathrm{DD}}=+5 \mathrm{~V} \pm 10 \%, \mathrm{~V}_{\mathrm{ss}}=-5 \mathrm{~V} \pm 10 \%, \mathrm{GND}=0 \mathrm{~V}$. All specifications $-40^{\circ} \mathrm{C}$ to $+85^{\circ} \mathrm{C}$, unless otherwise noted.
Table 2.

| Parameter | B Version ${ }^{1}$ |  | Unit | Test Conditions/Comments |
| :---: | :---: | :---: | :---: | :---: |
|  | $+25^{\circ} \mathrm{C}$ | $-40^{\circ} \mathrm{C}$ to $+85^{\circ} \mathrm{C}$ |  |  |
| ANALOG SWITCH |  |  |  |  |
| Analog Signal Range |  | $\mathrm{V}_{S S}$ to $\mathrm{V}_{\text {DD }}$ | V | $\mathrm{V}_{\mathrm{DD}}=+4.5 \mathrm{~V}, \mathrm{~V}_{\text {SS }}=-4.5 \mathrm{~V}$ |
| On Resistance (Ron) | 4 |  | $\Omega$ typ | $\mathrm{V}_{\mathrm{s}}= \pm 4.5 \mathrm{~V}$, los $=-10 \mathrm{~mA}$; see Figure 15 |
|  | 6.5 | 8.5 | $\Omega$ max |  |
| Ron Match Between Channels ( $\Delta$ Ron) | 0.7 |  | $\Omega$ typ | $\mathrm{V}_{\mathrm{s}}= \pm 4.5 \mathrm{~V}, \mathrm{los}=-10 \mathrm{~mA}$ |
|  | 1.1 | 1.35 | $\Omega$ max |  |
| On-Resistance Flatness (Rflat (on) | 0.7 | 0.8 | $\Omega \operatorname{typ}$ | $\mathrm{V}_{\mathrm{s}}= \pm 3.3 \mathrm{~V}, \mathrm{los}=-10 \mathrm{~mA}$ |
|  | 1.35 | 1.4 | $\Omega$ max |  |
| LEAKAGE CURRENTS Source Off Leakage, Is (Off) | $\pm 0.01$ |  |  | $\mathrm{V}_{\mathrm{DD}}=+5.5 \mathrm{~V}, \mathrm{~V}_{\text {SS }}=-5.5 \mathrm{~V}$ |
|  |  |  | $n A$ typ | $\mathrm{V}_{\mathrm{S}}= \pm 4.5 \mathrm{~V}, \mathrm{~V}_{\mathrm{D}}=\mp 4.5 \mathrm{~V}$; see Figure 16 |
|  | $\pm 0.25$ | $\pm 1$ | nA max | $\mathrm{V}_{\mathrm{S}}=\mathrm{V}_{\mathrm{D}}= \pm 4.5 \mathrm{~V}$; see Figure 17 |
| Channel On Leakage, lo, Is (On) | $\pm 0.01$ |  | nA typ |  |
|  | $\pm 0.25$ | $\pm 1$ | nA max |  |
| DIGITAL INPUTS | 0.005 |  |  | $\mathrm{V}_{\text {IN }}=\mathrm{V}_{\text {INL }}$ or $\mathrm{V}_{\text {INH }}$ |
| Input High Voltage, $\mathrm{V}_{\text {INH }}$ |  | 2.4 | $\checkmark$ min |  |
| Input Low Voltage, $\mathrm{V}_{\text {INL }}$ |  | 0.8 | $V$ max |  |
| Input Current, lins or linh |  | $\pm 0.1$ | $\mu A \operatorname{typ}$ |  |
|  |  |  | $\mu \mathrm{A}$ max |  |
| Digital Input Capacitance, $\mathrm{Cl}_{\text {IN }}$ | 2 |  | pF typ |  |
| DYNAMIC CHARACTERISTICS ${ }^{2}$ |  |  | ns typ |  |
| ADG619 |  |  |  |  |
| ton | 80 | 155 |  | $\mathrm{R}_{\mathrm{L}}=300 \Omega, \mathrm{C}_{\mathrm{L}}=35 \mathrm{pF}$ |
|  | 120 |  | ns max | $\mathrm{V}_{5}=3.3 \mathrm{~V}$; see Figure 18 |
| toff | 45 |  | ns typ | $\mathrm{RL}_{\mathrm{L}}=300 \Omega, \mathrm{C}_{\mathrm{L}}=35 \mathrm{pF}$ |
|  | 75 | 90 | ns max | $\mathrm{V}_{5}=3.3 \mathrm{~V}$; see Figure 18 |
| Break-Before-Make Time Delay, t $_{\text {BBM }}$ | 40 |  | ns typ | $\mathrm{R}_{\mathrm{L}}=300 \Omega, \mathrm{C}_{\mathrm{L}}=35 \mathrm{pF}$ |
|  |  | 10 | ns min | $\mathrm{V}_{\mathrm{s} 1}=\mathrm{V}_{\mathrm{s} 2}=3.3 \mathrm{~V}$; see Figure 19 |
| ADG620 |  |  |  |  |
| ton | 40 |  | ns typ | $\mathrm{R}_{\mathrm{L}}=300 \Omega, \mathrm{C}_{\mathrm{L}}=35 \mathrm{pF}$ |
|  | 65 | 85 | ns max | $\mathrm{V}_{\mathrm{s}}=3.3 \mathrm{~V}$; see Figure 18 |
| $\mathrm{t}_{\text {OFF }}$ | 200 |  | ns typ | $\mathrm{R}_{\mathrm{L}}=300 \Omega, \mathrm{C}_{\mathrm{L}}=35 \mathrm{pF}$ |
|  | 330 | 400 | ns max | $\mathrm{V}_{\mathrm{S}}=3.3 \mathrm{~V}$; see Figure 18 |
| Make-Before-Break Time Delay, $\mathrm{t}_{\text {MB }}$ | 160 | 10 | ns typ | $\mathrm{R}_{\mathrm{L}}=300 \Omega, \mathrm{C}_{\mathrm{L}}=35 \mathrm{pF}$ |
|  |  |  | ns min | $\mathrm{V}_{\mathrm{s}}=0 \mathrm{~V}$; see Figure 20 |
| Charge Injection | 110 |  | pC typ | $\mathrm{V}_{s}=0 \mathrm{~V}, \mathrm{R}_{s}=0 \Omega, \mathrm{C}_{\mathrm{L}}=1 \mathrm{nF}$; see Figure 21 |
| Off Isolation | -67 |  | dB typ | $\mathrm{R}_{\mathrm{L}}=50 \Omega, \mathrm{C}_{L}=5 \mathrm{pF}, \mathrm{f}=1 \mathrm{MHz}$; see Figure 22 |
| Channel-to-Channel Crosstalk | -67 |  | dB typ | $\mathrm{R}_{\mathrm{L}}=50 \Omega, C_{L}=5 \mathrm{pF}, \mathrm{f}=1 \mathrm{MHz}$; see Figure 23 |
| Bandwidth -3 dB | 190 |  | MHz typ | $\mathrm{R}_{\mathrm{L}}=50 \Omega, C_{L}=5 \mathrm{pF}$; see Figure 24 |
| $\mathrm{C}_{5}$ (Off) | 25 |  | pF typ | $\mathrm{f}=1 \mathrm{MHz}$ |
| $\mathrm{C}_{\mathrm{D}}, \mathrm{C}_{S}(\mathrm{On})$ | 95 |  | pF typ | $\mathrm{f}=1 \mathrm{MHz}$ |

## ADG619/ADG620

| Parameter | B Version ${ }^{1}$ |  | Unit | Test Conditions/Comments |
| :---: | :---: | :---: | :---: | :---: |
|  | $+25^{\circ} \mathrm{C}$ | $-40^{\circ} \mathrm{C}$ to $+85^{\circ} \mathrm{C}$ |  |  |
| POWER REQUIREMENTS |  |  |  | $\mathrm{V}_{\mathrm{DD}}=+5.5 \mathrm{~V}, \mathrm{~V}_{S S}=-5.5 \mathrm{~V}$ |
| ldo | 0.001 |  | $\mu \mathrm{A}$ typ | Digital inputs $=0 \mathrm{~V}$ or 5.5 V |
|  |  | 1.0 | $\mu \mathrm{A}$ max |  |
| Iss | 0.001 |  | $\mu \mathrm{A}$ typ | Digital inputs $=0 \mathrm{~V}$ or 5.5 V |
|  |  | 1.0 | $\mu \mathrm{A}$ max |  |

${ }^{1}$ Temperature range for B version is $-40^{\circ} \mathrm{C}$ to $+85^{\circ} \mathrm{C}$.
${ }^{2}$ Guaranteed by design, not subject to production test.

## SINGLE SUPPLY

$\mathrm{V}_{\mathrm{DD}}=5 \mathrm{~V} \pm 10 \%, \mathrm{~V}$ ss $=0 \mathrm{~V}, \mathrm{GND}=0 \mathrm{~V}$. All specifications $-40^{\circ} \mathrm{C}$ to $+85^{\circ} \mathrm{C}$, unless otherwise noted.

Table 3.

| Parameter | B Version ${ }^{1}$ |  | Unit | Test Conditions/Comments |
| :---: | :---: | :---: | :---: | :---: |
|  | $+25^{\circ} \mathrm{C}$ | $-40^{\circ} \mathrm{C}$ to $+85^{\circ} \mathrm{C}$ |  |  |
| ANALOG SWITCH <br> Analog Signal Range On Resistance (Ron) <br> Ron Match Between Channels ( $\Delta$ Ron) <br> On-Resistance Flatness (Rflat (on)) | $\begin{aligned} & 7 \\ & 10 \\ & 0.8 \\ & 1.1 \\ & 0.5 \end{aligned}$ | $\begin{aligned} & 0 \mathrm{~V} \text { to } \mathrm{V}_{\mathrm{DD}} \\ & 12.5 \\ & 1.3 \\ & 0.5 \\ & 1.2 \end{aligned}$ | V <br> $\Omega$ typ <br> $\Omega$ max <br> $\Omega$ typ <br> $\Omega$ max <br> $\Omega$ typ <br> $\Omega$ max | $\begin{aligned} & \mathrm{V}_{\mathrm{DD}}=4.5 \mathrm{~V}, \mathrm{~V}_{\mathrm{SS}}=0 \mathrm{~V} \\ & \mathrm{~V}_{\mathrm{S}}=0 \mathrm{~V} \text { to } 4.5 \mathrm{~V}, \operatorname{los}=-10 \mathrm{~mA} \text {; see Figure } 15 \\ & \mathrm{~V}_{\mathrm{S}}=0 \mathrm{~V} \text { to } 4.5 \mathrm{~V}, \mathrm{los}=-10 \mathrm{~mA} \\ & \mathrm{~V}_{\mathrm{S}}=1.5 \mathrm{~V} \text { to } 3.3 \mathrm{~V}, \mathrm{los}=-10 \mathrm{~mA} \end{aligned}$ |
| LEAKAGE CURRENTS <br> Source Off Leakage, Is (Off) <br> Channel On Leakage, $I_{D}, I_{S}(O n)$ | $\begin{aligned} & \pm 0.01 \\ & \pm 0.25 \\ & \pm 0.01 \\ & \pm 0.25 \end{aligned}$ | $\begin{aligned} & \pm 1 \\ & \pm 1 \end{aligned}$ | nA typ <br> nA max <br> nA typ <br> nA max | $\begin{aligned} & \mathrm{V}_{\mathrm{DD}}=5.5 \mathrm{~V} \\ & \mathrm{~V}_{\mathrm{S}}=1 \mathrm{~V} / 4.5 \mathrm{~V}, \mathrm{~V}_{\mathrm{D}}=4.5 \mathrm{~V} / 1 \mathrm{~V} \text {; see Figure } 16 \\ & \mathrm{~V}_{\mathrm{S}}=\mathrm{V}_{\mathrm{D}}=1 \mathrm{~V} / 4.5 \mathrm{~V} \text {; see Figure } 17 \end{aligned}$ |
| DIGITAL INPUTS Input High Voltage, $\mathrm{V}_{\text {INH }}$ Input Low Voltage, VinL Input Current, $\mathrm{I}_{\mathrm{INL}}$ or $\mathrm{I}_{\mathrm{NH}}$ <br> Digital Input Capacitance, CIN | $\begin{aligned} & 0.005 \\ & 2 \end{aligned}$ | $\begin{gathered} 2.4 \\ 0.8 \\ \\ \pm 0.1 \end{gathered}$ | $\vee$ min <br> $V$ max <br> $\mu \mathrm{A}$ typ <br> $\mu \mathrm{A}$ max <br> pF typ | $\mathrm{V}_{\text {IN }}=\mathrm{V}_{\text {INL }}$ or $\mathrm{V}_{\text {INH }}$ |
| DYNAMIC CHARACTERISTICS ${ }^{2}$ <br> ADG619 <br> ton <br> toff <br> Break-Before-Make Time Delay, tввм | $\begin{aligned} & 120 \\ & 220 \\ & 50 \\ & 75 \\ & 70 \end{aligned}$ | $\begin{aligned} & 280 \\ & 110 \\ & 10 \end{aligned}$ | ns typ ns max ns typ ns max ns typ ns min | $\begin{aligned} & \mathrm{R}_{\mathrm{L}}=300 \Omega, \mathrm{C}_{\mathrm{L}}=35 \mathrm{pF} \\ & \mathrm{~V}_{\mathrm{S}}=3.3 \mathrm{~V} \text {; see Figure } 18 \\ & \mathrm{R}_{\mathrm{L}}=300 \Omega, \mathrm{C}_{\mathrm{L}}=35 \mathrm{pF} \\ & \mathrm{~V}_{\mathrm{S}}=3.3 \mathrm{~V} \text {; see Figure } 18 \\ & \mathrm{R}_{\mathrm{L}}=300 \Omega, \mathrm{C}_{\mathrm{L}}=35 \mathrm{pF} \\ & \mathrm{~V}_{\mathrm{S} 1}=\mathrm{V}_{\mathrm{S} 2}=3.3 \mathrm{~V} \text {; see Figure } 19 \end{aligned}$ |
| ADG620 <br> ton <br> toff <br> Make-Before-Break Time Delay, $\mathrm{t}_{\text {MBB }}$ <br> Charge Injection Off Isolation <br> Channel-to-Channel Crosstalk <br> Bandwidth -3 dB <br> $\mathrm{C}_{\mathrm{s}}$ (OFF) <br> $\mathrm{C}_{\mathrm{D}}, \mathrm{C}_{\mathrm{S}}(\mathrm{ON})$ | $\begin{aligned} & 50 \\ & 85 \\ & 210 \\ & 340 \\ & 170 \\ & 6 \\ & -67 \\ & \\ & -67 \\ & \\ & 190 \\ & 25 \\ & 95 \end{aligned}$ | 110 <br> 420 <br> 10 | ns typ ns max ns typ ns max ns typ ns min pC typ dB typ dB typ <br> MHz typ pF typ pF typ | $\begin{aligned} & \mathrm{R}_{\mathrm{L}}=300 \Omega, \mathrm{C}_{\mathrm{L}}=35 \mathrm{pF} \\ & \mathrm{~V}_{\mathrm{S}}=3.3 \mathrm{~V} \text {; see Figure } 18 \\ & \mathrm{R}_{\mathrm{L}}=300 \Omega, \mathrm{C}_{\mathrm{L}}=35 \mathrm{pF} \\ & \mathrm{~V}_{\mathrm{S}}=3.3 \mathrm{~V} \text {; see Figure } 18 \\ & \mathrm{R}_{\mathrm{L}}=300 \Omega, \mathrm{C}_{\mathrm{L}}=35 \mathrm{pF} \\ & \mathrm{~V}_{\mathrm{S}}=3.3 \mathrm{~V} \text {; see Figure } 20 \\ & \mathrm{~V}_{\mathrm{S}}=0 \mathrm{~V}, \mathrm{R}_{\mathrm{S}}=0 \Omega, \mathrm{C}_{\mathrm{L}}=1 \mathrm{nF} \text {; see Figure } 21 \\ & \mathrm{R}_{\mathrm{L}}=50 \Omega, \mathrm{C}_{\mathrm{L}}=5 \mathrm{pF}, \mathrm{f}=1 \mathrm{MHz} \text {; see Figure } \\ & 22 \\ & \mathrm{R}_{\mathrm{L}}=50 \Omega, \mathrm{C}_{\mathrm{L}}=5 \mathrm{pF}, \mathrm{f}=1 \mathrm{MHz} \text {; see Figure } \\ & 23 \\ & \mathrm{R}_{\mathrm{L}}=50 \Omega, C_{\mathrm{L}}=5 \mathrm{pF} \text {; see Figure } 24 \\ & \mathrm{f}=1 \mathrm{MHz} \\ & \mathrm{f}=1 \mathrm{MHz} \end{aligned}$ |
| POWER REQUIREMENTS IdD | 0.001 | 1.0 | $\mu \mathrm{A}$ typ $\mu \mathrm{A}$ max | $\begin{aligned} & \hline \mathrm{V} D=5.5 \mathrm{~V} \\ & \text { Digital inputs }=0 \mathrm{~V} \text { or } 5.5 \mathrm{~V} \end{aligned}$ |

[^1]
## ADG619/ADG620

## ABSOLUTE MAXIMUM RATINGS

$\mathrm{T}_{\mathrm{A}}=25^{\circ} \mathrm{C}$, unless otherwise noted.

Table 4.

| Parameter | Rating |
| :---: | :---: |
| $\mathrm{V}_{\text {DD }}$ to $\mathrm{V}_{\text {SS }}$ | 13 V |
| $V_{\text {DD }}$ to GND | -0.3 V to +6.5 V |
| Vss to GND | +0.3 V to -6.5 V |
| Analog Inputs ${ }^{1}$ | $\mathrm{V}_{S S}-0.3 \mathrm{~V}$ to $\mathrm{V}_{\mathrm{DD}}+0.3 \mathrm{~V}$ |
| Digital Inputs ${ }^{1}$ | -0.3 V to $\mathrm{VDD}+0.3 \mathrm{~V}$ or 30 mA (whichever occurs first) |
| Peak Current, S or D | 100 mA (pulsed at 1 ms , $10 \%$ duty cycle maximum) |
| Continuous Current, S or D | 50 mA |
| Operating Temperature Range Industrial (B Version) | $-40^{\circ} \mathrm{C}$ to $+85^{\circ} \mathrm{C}$ |
| Storage Temperature Range | $-65^{\circ} \mathrm{C}$ to $+150^{\circ} \mathrm{C}$ |
| Junction Temperature | $150^{\circ} \mathrm{C}$ |
| MSOP |  |
| $\theta_{j A}$ Thermal Impedance | $206^{\circ} \mathrm{C} / \mathrm{W}$ |
| $\theta_{\mathrm{jc}}$ Thermal Impedance | $44^{\circ} \mathrm{C} / \mathrm{W}$ |
| SOT-23 |  |
| $\theta_{\mathrm{jA}}$ Thermal Impedance | $229.6^{\circ} \mathrm{C} / \mathrm{W}$ |
| $\theta_{\text {ıc }}$ Thermal Impedance | $91.99^{\circ} \mathrm{C} / \mathrm{W}$ |
| Lead Temperature, Soldering ( 10 sec ) | $300^{\circ} \mathrm{C}$ |
| IR Reflow, Peak Temperature | $220^{\circ} \mathrm{C}$ |

[^2]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 a time.

## ESD CAUTION

|  | ESD (electrostatic discharge) sensitive device. <br> Charged devices and circuit boards can discharge <br> without detection. Although this product features <br> patented or proprietary protection circuitry, damage <br> may occur on devices subjected to high energy ESD. <br> Therefore, proper ESD precautions should be taken to <br> avoid performance degradation or loss of functionality. |
| :--- | :--- |

## PIN CONFIGURATIONS AND FUNCTION DESCRIPTIONS



Table 5. Pin Function Descriptions

| Pin No. | Mnemonic | Description |
| :--- | :--- | :--- |
| 1 | D | Drain Terminal. Can be an input or output. |
| 2 | S1 | Source Terminal. Can be an input or output. |
| 3 | GND | Ground (0 V) Reference. |
| 4 | VDD | Most Positive Power Supply. |
| 5 | NC | No Connect. Not internally connected. |
| 6 | IN | Logic Control Input. |
| 7 | Voss | Mogative Power Supply. This pin is only used in dual-supply applications and should be tied to <br> ground in single-supply applications. |
| 8 | S2 | Source Terminal. Can be an input or output. |

## ADG619/ADG620

## TYPICAL PERFORMANCE CHARACTERISTICS



Figure 4. On Resistance vs. $V_{D}, V_{S}$ (Dual Supply)


Figure 5. On Resistance vs. VD, Vs (Single Supply)


Figure 6. On Resistance vs. $V_{D}, V_{s}$ for Different Temperatures (Dual Supply)


Figure 7. On Resistance vs. $V_{D}, V_{s}$ for Different Temperatures (Single Supply)


Figure 8. Leakage Currents vs. Temperature (Dual Supply)


Figure 9. Leakage Currents vs. Temperature (Single Supply)

## ADG619/ADG620



Figure 10. Charge Injection vs. Source Voltage


Figure 11. ton/toff Times vs. Temperatures


Figure 12. Off Isolation vs. Frequency


Figure 13. Crosstalk vs. Frequency


Figure 14. On Response vs. Frequency

## ADG619/ADG620

## TERMINOLOGY

$\mathrm{I}_{\mathrm{DD}}$
Positive supply current.
Iss
Negative supply current.
Ron
Ohmic resistance between D and $S$ terminals.

## $\Delta$ Ron

On resistance match between any two channels.
$\mathrm{R}_{\text {flat (on) }}$
Flatness is defined as the difference between the maximum and minimum value of on resistance as measured over the specified analog signal range.
$\mathrm{I}_{\mathrm{s}}$ (Off)
Source leakage current with the switch off.

## $\mathrm{I}_{\mathrm{D}}, \mathrm{I}_{\mathrm{s}}(\mathrm{On})$

Channel leakage current with the switch on.
$V_{D}, V_{s}$
Analog voltage on Terminal D and Terminal S.
$V_{\text {INL }}$
Maximum input voltage for Logic 0 .
$V_{\text {INH }}$
Minimum input voltage for Logic 1.
$\mathrm{I}_{\text {INL }}, \mathrm{I}_{\text {INH }}$
Input current of the digital input.
Cs (Off)
Off switch source capacitance.

## $\mathrm{C}_{\mathrm{D}}, \mathrm{C}_{\mathrm{s}}$ (On)

On switch capacitance.
ton
Delay between applying the digital control input and the output switching on.
toff
Delay between applying the digital control input and the output switching off.
$\mathbf{t}_{\text {MBB }}$
On time is measured between the $80 \%$ points of both switches, when switching from one address state to another.
t $_{\text {bвм }}$
Off time or on time is measured between the $90 \%$ points of both switches, when switching from one address state to another.

## Charge Injection

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

## Crosstalk

A measure of unwanted signal coupled through from one channel to another as a result of parasitic capacitance.

## Off Isolation

A measure of unwanted signal coupling through an off switch.

## Bandwidth

The frequency response of the on switch.

## Insertion Loss

The loss due to the on resistance of the switch.

## TEST CIRCUITS



Figure 15. On Resistance


Figure 16. Off Leakage


Figure 17. On Leakage


Figure 18. Switching Times


Figure 19. Break-Before-Make Time Delay, $t_{\text {BBM }}$ (ADG619 Only)


Figure 20. Make-Before-Break Time Delay, $t_{\text {MBB }}$ (ADG620 Only)


Figure 21. Charge Injection

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Figure 22. Off Isolation


CHANNEL-TO-CHANNEL CROSSTALK $=20 \log \frac{\mathrm{~V}_{\mathrm{OUT}}}{\mathrm{v}_{\mathrm{S}}}$
Figure 23. Channel-to-Channel Crosstalk


$$
\text { INSERTION LOSS }=20 \log \frac{\mathrm{~V}_{\text {OUT }} \text { WITH SWITCH }}{\mathrm{V}_{\mathrm{S}} \text { WITHOUT SWITCH }}
$$

Figure 24. Bandwidth

## OUTLINE DIMENSIONS



COMPLIANT TO JEDEC STANDARDS MO-187-AA
Figure 25. 8-Lead Mini Small Outline Package [MSOP] (RM-8)
Dimensions shown in millimeters


Figure 26. 8-Lead Small Outline Transistor Package [SOT-23] (RJ-8)
Dimensions shown in millimeters

## ADG619/ADG620

## ORDERING GUIDE

| Model | Temperature Range | Package Description | Package Option | Branding ${ }^{1}$ |
| :---: | :---: | :---: | :---: | :---: |
| ADG619BRM | $-40^{\circ} \mathrm{C}$ to $+85^{\circ} \mathrm{C}$ | 8-Lead Mini Small Outline Package (MSOP) | RM-8 | SVB |
| ADG619BRM-REEL | $-40^{\circ} \mathrm{C}$ to $+85^{\circ} \mathrm{C}$ | 8-Lead Mini Small Outline Package (MSOP) | RM-8 | SVB |
| ADG619BRM-REEL7 | $-40^{\circ} \mathrm{C}$ to $+85^{\circ} \mathrm{C}$ | 8-Lead Mini Small Outline Package (MSOP) | RM-8 | SVB |
| ADG619BRMZ ${ }^{2}$ | $-40^{\circ} \mathrm{C}$ to $+85^{\circ} \mathrm{C}$ | 8-Lead Mini Small Outline Package (MSOP) | RM-8 | SCC |
| ADG619BRMZ-REEL ${ }^{2}$ | $-40^{\circ} \mathrm{C}$ to $+85^{\circ} \mathrm{C}$ | 8-Lead Mini Small Outline Package (MSOP) | RM-8 | SCC |
| ADG619BRMZ-REEL7² | $-40^{\circ} \mathrm{C}$ to $+85^{\circ} \mathrm{C}$ | 8-Lead Mini Small Outline Package (MSOP) | RM-8 | SCC |
| ADG619BRT-REEL | $-40^{\circ} \mathrm{C}$ to $+85^{\circ} \mathrm{C}$ | 8-Lead Small Outline Transistor Package (SOT-23) | RJ-8 | SVB |
| ADG619BRT-REEL7 | $-40^{\circ} \mathrm{C}$ to $+85^{\circ} \mathrm{C}$ | 8-Lead Small Outline Transistor Package (SOT-23) | RJ-8 | SVB |
| ADG619BRT-500RL7 | $-40^{\circ} \mathrm{C}$ to $+85^{\circ} \mathrm{C}$ | 8-Lead Small Outline Transistor Package (SOT-23) | RJ-8 | SVB |
| ADG619BRTZ-REEL ${ }^{2}$ | $-40^{\circ} \mathrm{C}$ to $+85^{\circ} \mathrm{C}$ | 8-Lead Small Outline Transistor Package (SOT-23) | RJ-8 | SCC |
| ADG619BRTZ-REEL7² | $-40^{\circ} \mathrm{C}$ to $+85^{\circ} \mathrm{C}$ | 8-Lead Small Outline Transistor Package (SOT-23) | RJ-8 | SCC |
| ADG619BRTZ-500RL7 ${ }^{2}$ | $-40^{\circ} \mathrm{C}$ to $+85^{\circ} \mathrm{C}$ | 8-Lead Small Outline Transistor Package (SOT-23) | RJ-8 | SCC |
| ADG620BRM | $-40^{\circ} \mathrm{C}$ to $+85^{\circ} \mathrm{C}$ | 8-Lead Mini Small Outline Package (MSOP) | RM-8 | SWB |
| ADG620BRM-REEL | $-40^{\circ} \mathrm{C}$ to $+85^{\circ} \mathrm{C}$ | 8-Lead Mini Small Outline Package (MSOP) | RM-8 | SWB |
| ADG620BRM-REEL7 | $-40^{\circ} \mathrm{C}$ to $+85^{\circ} \mathrm{C}$ | 8-Lead Mini Small Outline Package (MSOP) | RM-8 | SWB |
| ADG620BRMZ ${ }^{2}$ | $-40^{\circ} \mathrm{C}$ to $+85^{\circ} \mathrm{C}$ | 8-Lead Mini Small Outline Package (MSOP) | RM-8 | S21 |
| ADG620BRT-REEL | $-40^{\circ} \mathrm{C}$ to $+85^{\circ} \mathrm{C}$ | 8-Lead Small Outline Transistor Package (SOT-23) | RJ-8 | SWB |
| ADG620BRT-REEL7 | $-40^{\circ} \mathrm{C}$ to $+85^{\circ} \mathrm{C}$ | 8-Lead Small Outline Transistor Package (SOT-23) | RJ-8 | SWB |
| ADG620BRTZ-REEL7 ${ }^{2}$ | $-40^{\circ} \mathrm{C}$ to $+85^{\circ} \mathrm{C}$ | 8-Lead Small Outline Transistor Package (SOT-23) | RJ-8 | S21 |

${ }^{1}$ Branding on SOT-23 and MSOP is limited to three characters due to space constraints.
${ }^{2} Z=$ RoHS Compliant Part.

NOTES

## ADG619/ADG620

## NOTES


[^0]:    Rev. C
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[^1]:    ${ }^{1}$ Temperature range for B version is $-40^{\circ} \mathrm{C}$ to $+85^{\circ} \mathrm{C}$.
    ${ }^{2}$ Guaranteed by design, not subject to production test.

[^2]:    ${ }^{1}$ Overvoltages at IN, S, or D are clamped by internal diodes. Current should be limited to the maximum ratings given.

