

PCN 14_0067

ADG5208/ADG5209 and ADG5208 Data Sheet Changes

Rev. A to Rev. B

This document highlights the performance differences between the Rev.A and Rev.B data sheet for the ADG5208 and ADG5209 Analog Multiplexers.

For full product information and changes to Typical Performance Characteristics plots please refer to the ADG5208/09 Rev.B data sheet.

1. HBM ESD

HBM ESD	Rev A	Rev B
I/O Port to Supplies	4kV	8kV
I/O Port to I/O Port	1kV	2kV
All other pins	4kV	8kV

2. Datasheet specification changes from Rev. A to Rev. B

Tables 1 to 4 outline a datasheet specification comparison of Rev. A to Rev. B material. The changed specifications are highlighted in red font.

SPECIFICATION CHANGES FROM Rev. A to Rev. B

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

Parameter	Rev. A			Rev. B			Unit	Test Conditions/ Comments
	25°C	-40°C to +85°C	-40°C to +125°C	25°C	-40°C to +85°C	-40°C to +125°C		
ANALOG SWITCH								
Analog Signal Range	V_{DD} to V_{SS}			V_{DD} to V_{SS}			V	$V_S = \pm 10\text{ V}$, $I_S = -1\text{ mA}$ $V_{DD} = +13.5\text{ V}$, $V_{SS} = -13.5\text{ V}$ $V_S = \pm 10\text{ V}$, $I_S = -1\text{ mA}$ $V_S = \pm 10\text{ V}$, $I_S = -1\text{ mA}$
On Resistance, R_{ON}	160			160			Ω typ	
On-Resistance Match Between Channels, ΔR_{ON}	200	250	280	200	250	280	Ω max	
On-Resistance Flatness, $R_{FLAT(ON)}$	3.5			3.5			Ω typ	
	8	9	10	8	9	10	Ω max	
	40			40			Ω typ	$V_S = \pm 10\text{ V}$, $I_S = -1\text{ mA}$
	50	65	70	50	65	70	Ω max	
LEAKAGE CURRENTS								
Source Off Leakage, I_S (Off)	± 0.005			± 0.005			nA typ	$V_{DD} = +16.5\text{ V}$, $V_{SS} = -16.5\text{ V}$ $V_S = \pm 10\text{ V}$, $V_D = \pm 10\text{ V}$
	± 0.1	± 0.2	± 0.4	± 0.1	± 0.2	± 0.4	nA max	
Drain Off Leakage, I_D (Off)	± 0.005			± 0.005			nA typ	$V_S = \pm 10\text{ V}$, $V_D = \pm 10\text{ V}$
	± 0.1	± 0.4	± 1.4	± 0.1	± 0.4	± 1.4	nA max	
Channel On Leakage, I_D (On), I_S (On)	± 0.01			± 0.01			nA typ	$\pm V_S = V_D = \pm 10\text{ V}$
	± 0.2	± 0.5	± 1.4	± 0.2	± 0.5	± 1.4	nA max	
DIGITAL INPUTS								
Input High Voltage, V_{INH}			2			2	V min	$V_{IN} = V_{GND}$ or V_{DD}
Input Low Voltage, V_{INL}			0.8			0.8	V max	
Input Current, I_{INL} or I_{INH}	0.002			0.002			μA typ	
Digital Input Capacitance, C_{IN}	3		± 0.1	3		± 0.1	μA max pF typ	
Dynamic Characteristics¹								
Transition Time, $t_{TRANSITION}$	170			150			ns typ	$R_L = 300\ \Omega$, $C_L = 35\text{ pF}$ $V_S = 10\text{ V}$
	205	245	275	180	210	245	ns max	
t_{ON} (EN)	145			125			ns typ	$R_L = 300\ \Omega$, $C_L = 35\text{ pF}$ $V_S = 10\text{ V}$
	185	220	245	150	185	215	ns max	
t_{OFF} (EN)	120			160			ns typ	$R_L = 300\ \Omega$, $C_L = 35\text{ pF}$ $V_S = 10\text{ V}$
	145	165	180	185	210	230	ns max	
Break-Before-Make Time Delay, t_D	65			55			ns typ	$R_L = 300\ \Omega$, $C_L = 35\text{ pF}$ $V_{S1} = V_{S2} = 10\text{ V}$ $V_S = 0\text{ V}$, $R_S = 0\ \Omega$, $C_L = 1\text{ nF}$
Charge Injection, Q_{NJ}	0.4			0.2			ns min	
Off Isolation	-90			-86			pC typ	dB typ
Channel-to-Channel Crosstalk -3 dB Bandwidth	-90			-80			dB typ	
ADG5208	54			110			MHz typ	$R_L = 50\ \Omega$, $C_L = 5\text{ pF}$, $f = 1\text{ MHz}$
ADG5209	133			240			MHz typ	
Insertion Loss	-6.4			-6.4			dB typ	$R_L = 50\ \Omega$, $C_L = 5\text{ pF}$, $f = 1\text{ MHz}$ $V_S = 0\text{ V}$, $f = 1\text{ MHz}$
C_S (Off)	5.5			2.9			pF typ	
C_D (Off)							pF typ	$V_S = 0\text{ V}$, $f = 1\text{ MHz}$ $V_S = 0\text{ V}$, $f = 1\text{ MHz}$
ADG5208	52			34			pF typ	
ADG5209	26			17			pF typ	
C_D (On), C_S (On)							pF typ	$V_S = 0\text{ V}$, $f = 1\text{ MHz}$ $V_S = 0\text{ V}$, $f = 1\text{ MHz}$
ADG5208	58			37			pF typ	
ADG5209	31			21			pF typ	
POWER REQUIREMENTS								
I_{DD}	45			45			μA typ	$V_{DD} = +16.5\text{ V}$, $V_{SS} = -16.5\text{ V}$ Digital inputs = 0 V or V_{DD}
	55		70	55		70	μA max	
I_{SS}	0.001			0.001			μA typ	Digital inputs = 0 V or V_{DD}
			1			1	μA max	
V_{DD}/V_{SS}			$\pm 9/\pm 22$			$\pm 9/\pm 22$	V min/V max	$GND = 0\text{ V}$

¹ Guaranteed by design, not subject to production test.

Table 2. $V_{DD} = +20V \pm 10\%$, $V_{SS} = -20V \pm 10\%$, $GND = 0V$, unless otherwise noted.

Parameter	Rev. A			Rev. B			Unit	Test Conditions/ Comments
	25°C	-40°C to +85°C	-40°C to +125°C	25°C	-40°C to +85°C	-40°C to +125°C		
ANALOG SWITCH								
Analog Signal Range			V_{DD} to V_{SS}			V_{DD} to V_{SS}	V	
On Resistance, R_{ON}	140			140			Ω typ	$V_S = \pm 15V$, $I_S = -1mA$
On-Resistance Match Between Channels, ΔR_{ON}	160	200	230	160	200	230	Ω max	$V_{DD} = +18V$, $V_{SS} = -18V$
On-Resistance Flatness, $R_{RELAT(ON)}$	3.5			3.5			Ω typ	$V_S = \pm 15V$, $I_S = -1mA$
	8	9	10	8	9	10	Ω max	
	34			34			Ω typ	$V_S = \pm 15V$, $I_S = -1mA$
	45	55	60	45	55	60	Ω max	
LEAKAGE CURRENTS								
Source Off Leakage, I_S (Off)	± 0.005			± 0.005			nA typ	$V_{DD} = +22V$, $V_{SS} = -22V$
	± 0.1	± 0.2	± 0.4	± 0.1	± 0.2	± 0.4	nA max	$V_S = \pm 15V$, $V_D = \pm 15V$
Drain Off Leakage, I_D (Off)	± 0.005			± 0.005			nA typ	$V_S = \pm 15V$, $V_D = \pm 15V$
	± 0.1	± 0.4	± 1.4	± 0.1	± 0.4	± 1.4	nA max	
Channel On Leakage, I_D (On), I_S (On)	± 0.01			± 0.01			nA typ	$\pm V_S = V_D = \pm 15V$
	± 0.2	± 0.5	± 1.4	± 0.2	± 0.5	± 1.4	nA max	
DIGITAL INPUTS								
Input High Voltage, V_{INH}			2			2	V min	
Input Low Voltage, V_{INL}			0.8			0.8	V max	
Input Current, I_{INL} or I_{INH}	0.002			0.002			μA typ	$V_{IN} = V_{GND}$ or V_{DD}
			± 0.1			± 0.1	μA max	
Digital Input Capacitance, C_{IN}	3			3			pF typ	
DYNAMIC CHARACTERISTICS¹								
Transition Time, $t_{TRANSITION}$	160			140			ns typ	$R_L = 300\Omega$, $C_L = 35pF$
	195	225	255	170	195	220	ns max	$V_S = 10V$
t_{ON} (EN)	145			120			ns typ	$R_L = 300\Omega$, $C_L = 35pF$
	170	200	225	140	170	195	ns max	$V_S = 10V$
t_{OFF} (EN)	120			160			ns typ	$R_L = 300\Omega$, $C_L = 35pF$
	140	155	170	185	205	220	ns max	$V_S = 10V$
Break-Before-Make Time Delay, t_D	55			45			ns typ	$R_L = 300\Omega$, $C_L = 35pF$
			30			20	ns min	$V_{S1} = V_{S2} = 10V$
Charge Injection, Q_{INJ}	0.3			0.4			pC typ	$V_S = 0V$, $R_S = 0\Omega$, $C_L = 1nF$
Off Isolation	-90			-86			dB typ	$R_L = 50\Omega$, $C_L = 5pF$, $f = 1MHz$
Channel-to-Channel Crosstalk	-90			-80			dB typ	$R_L = 50\Omega$, $C_L = 5pF$, $f = 1MHz$
-3 dB Bandwidth							MHz typ	$R_L = 50\Omega$, $C_L = 5pF$
ADG5208	60			121			MHz typ	
ADG5209	130			255			MHz typ	
Insertion Loss	-5.6			-5.6			dB typ	$R_L = 50\Omega$, $C_L = 5pF$, $f = 1MHz$; see
C_S (Off)	5.5			2.8			pF typ	$V_S = 0V$, $f = 1MHz$
C_D (Off)							pF typ	
ADG5208	51			33			pF typ	$V_S = 0V$, $f = 1MHz$
ADG5209	26			17			pF typ	$V_S = 0V$, $f = 1MHz$
C_D (On), C_S (On)							pF typ	
ADG5208	57			36			pF typ	$V_S = 0V$, $f = 1MHz$
ADG5209	31			21			pF typ	$V_S = 0V$, $f = 1MHz$
POWER REQUIREMENTS								
I_{DD}	50			50			μA typ	$V_{DD} = +22V$, $V_{SS} = -22V$
	70		110	70		110	μA max	Digital inputs = 0V or V_{DD}
I_{SS}	0.001			0.001			μA typ	Digital inputs = 0V or V_{DD}
			1			1	μA max	
V_{DD}/V_{SS}			$\pm 9/\pm 22$			$\pm 9/\pm 22$	V min/V max	$GND = 0V$

¹ Guaranteed by design, not subject to production test.

Table 3. $V_{DD} = +12V \pm 10\%$, $V_{SS} = 0V$ $GND = 0V$, unless otherwise noted.

Parameter	Rev. A			Rev. B			Unit	Test Conditions/ Comments
	25°C	-40°C to +85°C	-40°C to +125°C	25°C	-40°C to +85°C	-40°C to +125°C		
ANALOG SWITCH								
Analog Signal Range	0 V to V_{DD}			0 V to V_{DD}			V	
On Resistance, R_{ON}	350			350			Ω typ	$V_S = 0V$ to $10V$, $I_S = -1$ mA
On-Resistance Match Between Channels, ΔR_{ON}	500	610	700	500	610	700	Ω max	$V_{DD} = +10.8V$, $V_{SS} = 0V$
On-Resistance Flatness, $R_{RELAT(ON)}$	5			5			Ω typ	$V_S = 0V$ to $10V$, $I_S = -1$ mA
	20	22	24	20	22	24	Ω max	
	160			160			Ω typ	$V_S = 0V$ to $10V$, $I_S = -1$ mA
	280	335	370	280	335	370	Ω max	
LEAKAGE CURRENTS								
Source Off Leakage, I_S (Off)	± 0.00 5			± 0.00 5			nA typ	$V_{DD} = 13.2V$, $V_{SS} = 0V$ $V_S = 1V/10V$, $V_D = +10V/1V$
Drain Off Leakage, I_D (Off)	± 0.1 ± 0.00 5	± 0.2	± 0.4	± 0.1 ± 0.00 5	± 0.2	± 0.4	nA max	
Channel On Leakage, I_D (On), I_S (On)	± 0.1 ± 0.01 ± 0.2	± 0.4 ± 0.5	± 1.4 ± 1.4	± 0.1 ± 0.01 ± 0.2	± 0.4 ± 0.5	± 1.4 ± 1.4	nA typ nA max	$V_S = 1V/10V$, $V_D = +10V/1V$ $\pm V_S = V_D = 1V/10V$
DIGITAL INPUTS								
Input High Voltage, V_{INH}			2			2	V min	
Input Low Voltage, V_{INL}			0.8			0.8	V max	
Input Current, I_{INL} or I_{INH}	0.002			0.002			μA typ μA max	$V_{IN} = V_{GND}$ or V_{DD}
Digital Input Capacitance, C_{IN}	3		± 0.1	3		± 0.1	pF typ	
DYNAMIC CHARACTERISTICS¹								
Transition Time, $t_{TRANSITION}$	210 270			200 250			ns typ ns max	$R_L = 300\Omega$, $C_L = 35$ pF $V_S = 8V$
t_{ON} (EN)	215 275	330	380	180 225	295	335	ns typ ns max	$R_L = 300\Omega$, $C_L = 35$ pF $V_S = 8V$
t_{OFF} (EN)	115 140	345	400	165 200	280	320	ns typ ns max	$R_L = 300\Omega$, $C_L = 35$ pF $V_S = 8V$
Break-Before-Make Time Delay, t_D	135	160	175	95	225	245	ns typ ns min	$R_L = 300\Omega$, $C_L = 35$ pF $V_{S1} = V_{S2} = 8V$
Charge Injection, Q_{INJ}	0.3			0.2			pC typ	$V_S = 6V$, $R_S = 0\Omega$, $C_L = 1$ nF
Off Isolation	-90			-86			dB typ	$R_L = 50\Omega$, $C_L = 5$ pF, $f = 1$ MHz
Channel-to-Channel Crosstalk -3 dB Bandwidth	-90			-80			dB typ	$R_L = 50\Omega$, $C_L = 5$ pF, $f = 1$ MHz
ADG5208	60			95			MHz typ	$R_L = 50\Omega$, $C_L = 5$ pF
ADG5209	120			180			MHz typ	
Insertion Loss	-8.8			-8.9			dB typ	$R_L = 50\Omega$, $C_L = 5$ pF, $f = 1$ MHz; see
C_S (Off)	6			3.3			pF typ	$V_S = 0V$, $f = 1$ MHz
C_D (Off)							pF typ	
ADG5208	56			38			pF typ	$V_S = 0V$, $f = 1$ MHz
ADG5209	28			19			pF typ	$V_S = 0V$, $f = 1$ MHz
C_D (On), C_S (On)							pF typ	
ADG5208	63			41			pF typ	$V_S = 0V$, $f = 1$ MHz
ADG5209	35			24			pF typ	$V_S = 0V$, $f = 1$ MHz
POWER REQUIREMENTS								
I_{DD}	40			40			μA typ	$V_{DD} = 13.2V$ Digital inputs = $0V$ or V_{DD}
	50		65	50		65	μA max	
V_{DD}		9/40			9/40		V min/V max	$GND = 0V$, $V_{SS} = 0V$

¹ Guaranteed by design, not subject to production test.

Table 4. $V_{DD} = +36V \pm 10\%$, $V_{SS} = 0V$ GND = 0 V, unless otherwise noted.

Parameter	Rev.A			Rev. B			Unit	Test Conditions/ Comments
	25°C	-40°C to +85°C	-40°C to +125°C	25°C	-40°C to +85°C	-40°C to +125°C		
ANALOG SWITCH								
Analog Signal Range	0 V to V_{DD}			0 V to V_{DD}			V	
On Resistance, R_{ON}	150			150			Ω typ	$V_S = \pm 10 V$, $I_S = -1$ mA
On-Resistance Match Between Channels, ΔR_{ON}	170	215	245	170	215	245	Ω max	$V_{DD} = +13.5 V$, $V_{SS} = -13.5 V$
On-Resistance Flatness, $R_{FLAT(ON)}$	3.5			3.5			Ω typ	$V_S = \pm 10 V$, $I_S = -1$ mA
	8	9	10	8	9	10	Ω max	
	35			35			Ω typ	$V_S = \pm 10 V$, $I_S = -1$ mA
	55	65	70	55	65	70	Ω max	
LEAKAGE CURRENTS								
Source Off Leakage, I_S (Off)	± 0.00 5			± 0.00 5			nA typ	$V_{DD} = +16.5 V$, $V_{SS} = -16.5 V$
	± 0.1	± 0.2	± 0.4	± 0.1	± 0.2	± 0.4	nA max	$V_S = \pm 10 V$, $V_D = \pm 10 V$
Drain Off Leakage, I_D (Off)	± 0.00 5			± 0.00 5			nA typ	$V_S = \pm 10 V$, $V_D = \pm 10 V$
	± 0.1	± 0.4	± 1.4	± 0.1	± 0.4	± 1.4	nA max	
Channel On Leakage, I_D (On), I_S (On)	± 0.01			± 0.01			nA typ	$V_S = V_D = \pm 10 V$;
	± 0.2	± 0.5	± 1.4	± 0.2	± 0.5	± 1.4	nA max	
DIGITAL INPUTS								
Input High Voltage, V_{INH}			2			2	V min	
Input Low Voltage, V_{INL}			0.8			0.8	V max	
Input Current, I_{INL} or I_{INH}	0.002			0.002			μA typ	$V_{IN} = V_{GND}$ or V_{DD}
		± 0.1			± 0.1		μA max	
Digital Input Capacitance, C_{IN}	3			3			pF typ	
DYNAMIC CHARACTERISTICS¹								
Transition Time, $t_{TRANSITION}$	185			170			ns typ	$R_L = 300 \Omega$, $C_L = 35$ pF
	230	245	259	205	225	235	ns max	$V_S = 10 V$
t_{ON} (EN)	170			150			ns typ	$R_L = 300 \Omega$, $C_L = 35$ pF
	210	230	255	180	195	215	ns max	$V_S = 10 V$
t_{OFF} (EN)	125			180			ns typ	$R_L = 300 \Omega$, $C_L = 35$ pF
	180	180	180	225	225	230	ns max	$V_S = 10 V$
Break-Before-Make Time Delay, t_D	70			55			ns typ	$R_L = 300 \Omega$, $C_L = 35$ pF
			35			25	ns min	$V_{S1} = V_{S2} = 10 V$
Charge Injection, Q_{INJ}	0.4			0.3			pC typ	$V_S = 0 V$, $R_S = 0 \Omega$, $C_L = 1$ nF
Off Isolation	-90			-86			dB typ	$R_L = 50 \Omega$, $C_L = 5$ pF, $f = 1$ MHz
Channel-to-Channel Crosstalk	-90			-80			dB typ	$R_L = 50 \Omega$, $C_L = 5$ pF, $f = 1$ MHz
-3 dB Bandwidth								$R_L = 50 \Omega$, $C_L = 5$ pF
ADG5208	65			105			MHz typ	
ADG5209	130			195			MHz typ	
Insertion Loss	-6			-6.2			dB typ	$R_L = 50 \Omega$, $C_L = 5$ pF, $f = 1$ MHz; see
C_S (Off)	5.5			2.7			pF typ	$V_S = 0 V$, $f = 1$ MHz
C_D (Off)								
ADG5208	51			32			pF typ	$V_S = 0 V$, $f = 1$ MHz
ADG5209	25			16			pF typ	$V_S = 0 V$, $f = 1$ MHz
C_D (On), C_S (On)								
ADG5208	57			35			pF typ	$V_S = 0 V$, $f = 1$ MHz
ADG5209	32			20			pF typ	$V_S = 0 V$, $f = 1$ MHz
POWER REQUIREMENTS								
I_{DD}	80			80			μA typ	$V_{DD} = +16.5 V$, $V_{SS} = -16.5 V$
	100		130	100		130	μA max	Digital inputs = 0 V or V_{DD}
V_{DD}		9/40			9/40		V min/V max	GND = 0 V, $V_{SS} = 0V$

¹ Guaranteed by design, not subject to production test.