

PCN 14_0066

ADG5233/ADG5234 Data Sheet Changes

Rev. B to Rev. C

This document highlights the performance differences between the Rev.B and Rev.C Transfer for the ADG5233 and ADG5234 Analog Multiplexers.

For full product information and changes to Typical Performance Characteristics plots please refer to the ADG5233/34 Rev.C data sheet.

1. HBM ESD

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

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

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

SPECIFICATION CHANGES FROM Rev. B to Rev. C

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. B			Rev. C			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 = ±10 V, I _S = -1 mA V _{DD} = +13.5 V, V _{SS} = -13.5 V V _S = ±10 V, I _S = -1 mA V _S = ±10 V, I _S = -1 mA
On Resistance, R _{ON}	160			160			Ω typ	
	200	250	280	200	250	280	Ω max	
On-Resistance Match Between Channels, ΔR _{ON}	3.5			3.5			Ω typ	
On-Resistance Flatness, R _{FLAT}	8	9	10	8	9	10	Ω max	
(ON)	38			38			Ω typ	
	50	65	70	50	65	70	Ω max	
LEAKAGE CURRENTS								
Source Off Leakage, I _S (Off)	±0.02			±0.02			nA typ	V _{DD} = +16.5 V, V _{SS} = -16.5 V V _S = ±10 V, V _D = ±10 V
	±0.1	±0.2	±0.4	±0.1	±0.2	±0.4	nA max	
Drain Off Leakage, I _D (Off)	±0.02			±0.02			nA typ	V _S = ±10 V, V _D = ±10 V
	±0.1	±0.2	±0.4	±0.1	±0.2	±0.4	nA max	
Channel On Leakage, I _D (On), I _S (On)	±0.08			±0.08			nA typ	± V _S = V _D = ±10 V
	±0.2	±0.3	±0.9	±0.2	±0.3	±0.9	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			3			μA max pF typ	
Dynamic Characteristics¹								
Transition Time, t _{TRANSITION}	170			125			ns typ	R _L = 300 Ω, C _L = 35 pF V _S = 10 V
	210	250	280	160	190	215	ns max	
t _{ON} (EN)	175			145			ns typ	R _L = 300 Ω, C _L = 35 pF V _S = 10 V
	215	255	290	175	210	240	ns max	
t _{OFF} (EN)	80			125			ns typ	R _L = 300 Ω, C _L = 35 pF V _S = 10 V
	100	115	125	155	170	180	ns max	
Break-Before-Make Time Delay, t _D	60			45			ns typ	R _L = 300 Ω, C _L = 35 pF V _{S1} = V _{S2} = 10 V
			30			25	ns min	
Charge Injection, Q _{INJ}	-0.6			0.4			pC typ	V _S = 0 V, R _S = 0 Ω, C _L = 1 nF
Off Isolation	-75			-76			dB typ	R _L = 50 Ω, C _L = 5 pF, f = 1 MHz
Channel-to-Channel Crosstalk	-80			-87			dB typ	R _L = 50 Ω, C _L = 5 pF, f = 1 MHz
-3 dB Bandwidth	205			355			MHz typ	R _L = 50 Ω, C _L = 5 pF, f = 1 MHz
Insertion Loss	-6.3			-6.4			dB typ	R _L = 50 Ω, C _L = 5 pF, f = 1 MHz
C _S (Off)	4.5			2.8			pF typ	V _S = 0 V, f = 1 MHz
C _D (Off)	10			9			pF typ	V _S = 0 V, f = 1 MHz
C _D (On), C _S (On)	15			13			pF typ	V _S = 0 V, f = 1 MHz
POWER REQUIREMENTS								
I _{DD}	45			45			μA typ	V _{DD} = +16.5 V, V _{SS} = -16.5 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}	±9/±22			±9/±22			V min/V max	GND = 0 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. B			Rev. C			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_{FLAT}	3.5			3.5			Ω typ	$V_S = \pm 15V$, $I_S = -1mA$
(ON)	8	9	10	8	9	10	Ω max	
	33			33			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)	± 0.02			± 0.02			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)	± 0.02			± 0.02			nA typ	$V_S = \pm 15V$, $V_D = \pm 15V$
	± 0.1	± 0.2	± 0.4	± 0.1	± 0.2	± 0.4	nA max	
Channel On Leakage, I_D (On), I_S (On)	± 0.08			± 0.08			nA typ	$\pm V_S = V_D = \pm 15V$
	± 0.2	± 0.3	± 0.9	± 0.2	± 0.3	± 0.9	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, $t_{TRANSITION}$	170			125			ns typ	$R_L = 300\Omega$, $C_L = 35pF$
	200	235	260	155	180	200	ns max	$V_S = 10V$
t_{ON} (EN)	165			145			ns typ	$R_L = 300\Omega$, $C_L = 35pF$
	200	240	265	170	200	220	ns max	$V_S = 10V$
t_{OFF} (EN)	80			125			ns typ	$R_L = 300\Omega$, $C_L = 35pF$
	95	105	115	155	160	170	ns max	$V_S = 10V$
Break-Before-Make Time Delay, t_D	50			40			ns typ	$R_L = 300\Omega$, $C_L = 35pF$
			30			20	ns min	$V_{S1} = V_{S2} = 10V$
Charge Injection, Q_{INJ}	0			0.7			pC typ	$V_S = 0V$, $R_S = 0\Omega$, $C_L = 1nF$
Off Isolation	-75			-76			dB typ	$R_L = 50\Omega$, $C_L = 5pF$, $f = 1MHz$
Channel-to-Channel Crosstalk	-80			-87			dB typ	$R_L = 50\Omega$, $C_L = 5pF$, $f = 1MHz$
-3 dB Bandwidth	210			370			MHz typ	$R_L = 50\Omega$, $C_L = 5pF$
Insertion Loss	-5.5			-5.6			dB typ	$R_L = 50\Omega$, $C_L = 5pF$, $f = 1MHz$
C_S (Off)	4.5			2.8			pF typ	$V_S = 0V$, $f = 1MHz$
C_D (Off)	10			9			pF typ	$V_S = 0V$, $f = 1MHz$
C_D (On), C_S (On)	15			13			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 = 0 V, unless otherwise noted.

Parameter	Rev. B			Rev. C			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}	360			360			Ω typ	$V_S = 0V$ to 10V, $I_S = -1$ mA
	500	610	700	500	610	700	Ω max	$V_{DD} = +10.8V$, $V_{SS} = 0$ V
On-Resistance Match Between Channels, ΔR_{ON}	5.5			5.5			Ω typ	$V_S = 0V$ to 10V, $I_S = -1$ mA
	20	21	22	20	21	22	Ω max	
On-Resistance Flatness, R_{FLAT} (ON)	170			170			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)	± 0.02			± 0.02			nA typ	$V_{DD} = 13.2V$, $V_{SS} = 0V$
	± 0.1	± 0.2	± 0.4	± 0.1	± 0.2	± 0.4	nA max	$V_S = 1V/10V$, $V_D = +10V/1V$
Drain Off Leakage, I_D (Off)	± 0.02			± 0.02			nA typ	$V_S = 1V/10V$, $V_D = +10V/1V$
	± 0.1	± 0.2	± 0.4	± 0.1	± 0.2	± 0.4	nA max	
Channel On Leakage, I_D (On), I_S (On)	± 0.08			± 0.08			nA typ	$\pm V_S = V_D = 1V/10V$
	± 0.2	± 0.3	± 0.9	± 0.2	± 0.3	± 0.9	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, $t_{TRANSITION}$	235			165			ns typ	$R_L = 300\Omega$, $C_L = 35$ pF
	295	365	410	215	260	300	ns max	$V_S = 8V$
t_{ON} (EN)	240			200			ns typ	$R_L = 300\Omega$, $C_L = 35$ pF
	305	380	430	245	305	350	ns max	$V_S = 8V$
t_{OFF} (EN)	70			130			ns typ	$R_L = 300\Omega$, $C_L = 35$ pF
	90	105	115	165	180	200	ns max	$V_S = 8V$
Break-Before-Make Time Delay, t_D	125			85			ns typ	$R_L = 300\Omega$, $C_L = 35$ pF
			65			45	ns min	$V_{S1} = V_{S2} = 8V$
Charge Injection, Q_{INJ}	0			0			pC typ	$V_S = 6V$, $R_S = 0\Omega$, $C_L = 1$ nF
Off Isolation	-75			-76			dB typ	$R_L = 50\Omega$, $C_L = 5$ pF, $f = 1$ MHz
Channel-to-Channel Crosstalk	-80			-87			dB typ	$R_L = 50\Omega$, $C_L = 5$ pF, $f = 1$ MHz
-3 dB Bandwidth	172			260			MHz typ	$R_L = 50\Omega$, $C_L = 5$ pF
Insertion Loss	-8.7			-9			dB typ	$R_L = 50\Omega$, $C_L = 5$ pF, $f = 1$ MHz
C_S (Off)	5			3			pF typ	$V_S = 0V$, $f = 1$ MHz
C_D (Off)	11			10			pF typ	$V_S = 0V$, $f = 1$ MHz
C_D (On), C_S (On)	16			14			pF typ	$V_S = 0V$, $f = 1$ MHz
POWER REQUIREMENTS								
I_{DD}	40			40			μA typ	$V_{DD} = 13.2$ Digital inputs = 0 V or V_{DD}
V_{DD}	50		65	50		65	μA max	
			9/40			9/40	V min/V max	GND = 0 V, $V_{SS} = 0V$

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.B			Rev. C			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}	140			140			Ω typ	$V_S = \pm 10V$, $I_S = -1$ mA
	170	215	245	170	215	245	Ω max	$V_{DD} = +13.5V$, $V_{SS} = -13.5V$
On-Resistance Match Between Channels, ΔR_{ON}	3.5			3.5			Ω typ	$V_S = \pm 10V$, $I_S = -1$ mA
	8	9	10	8	9	10	Ω max	
On-Resistance Flatness, R_{FLAT} (ON)	35			35			Ω typ	$V_S = \pm 10V$, $I_S = -1$ mA
	50	60	65	50	60	65	Ω max	
LEAKAGE CURRENTS								
Source Off Leakage, I_S (Off)	± 0.02			± 0.02			nA typ	$V_{DD} = +16.5V$, $V_{SS} = -16.5V$
	± 0.1	± 0.2	± 0.4	± 0.1	± 0.2	± 0.4	nA max	$V_S = \pm 10V$, $V_D = \pm 10V$
Drain Off Leakage, I_D (Off)	± 0.02			± 0.02			nA typ	$V_S = \pm 10V$, $V_D = \pm 10V$
	± 0.1	± 0.2	± 0.4	± 0.1	± 0.2	± 0.4	nA max	
Channel On Leakage, I_D (On), I_S (On)	± 0.08	± 0.2	± 0.4	± 0.08	± 0.2	± 0.4	nA typ	$\pm V_S = V_D = \pm 10V$
	± 0.2	± 0.3	± 0.9	± 0.2	± 0.3	± 0.9	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, $t_{TRANSITION}$	205			155			ns typ	$R_L = 300\Omega$, $C_L = 35$ pF
	255	275	290	200	215	230	ns max	$V_S = 10V$
t_{ON} (EN)	200			180			ns typ	$R_L = 300\Omega$, $C_L = 35$ pF
	240	265	290	215	235	250	ns max	$V_S = 10V$
t_{OFF} (EN)	85			150			ns typ	$R_L = 300\Omega$, $C_L = 35$ pF
	115	115	115	190	190	190	ns max	$V_S = 10V$
Break-Before-Make Time Delay, t_D	65			50			ns typ	$R_L = 300\Omega$, $C_L = 35$ pF
			35			25	ns min	$V_{S1} = V_{S2} = 10V$
Charge Injection, Q_{INJ}	-0.6			0.5			pC typ	$V_S = 0V$, $R_S = 0\Omega$, $C_L = 1$ nF
Off Isolation	-75			-76			dB typ	$R_L = 50\Omega$, $C_L = 5$ pF, $f = 1$ MHz
Channel-to-Channel Crosstalk	-80			-87			dB typ	$R_L = 50\Omega$, $C_L = 5$ pF, $f = 1$ MHz
-3 dB Bandwidth	190			275			MHz typ	$R_L = 50\Omega$, $C_L = 5$ pF
Insertion Loss	-5.9			-6.2			dB typ	$R_L = 50\Omega$, $C_L = 5$ pF, $f = 1$ MHz
C_S (Off)	4.5			2.8			pF typ	$V_S = 0V$, $f = 1$ MHz
C_D (Off)	10			9			pF typ	$V_S = 0V$, $f = 1$ MHz
C_D (On), C_S (On)	15			13			pF typ	$V_S = 0V$, $f = 1$ MHz
POWER REQUIREMENTS								
I_{DD}	80			80			μA typ	$V_{DD} = +16.5V$, $V_{SS} = -16.5V$
	100		130	100		130	μA max	Digital inputs = 0 V or V_{DD}
V_{DD}			Sep-40			Sep-40	V min/V max	GND = 0 V, $V_{SS} = 0V$

¹ Guaranteed by design, not subject to production test.

QUALIFICATION PLAN (TSSOP ONLY)			
TEST	SPECIFICATION	SAMPLE SIZE	RESULTS
High Temperature Operating Life (HTOL)*	JEDEC <i>JESD22-A108</i>	4 x 45 6 x 77	Pass Pass
Highly Accelerated Stress Test (HAST)*	JEDEC <i>JESD22-A110</i>	7 x 77 10 x 77	Pass
Temperature Cycle (TC)*	JEDEC <i>JESD22-A104</i>	10 x 77	Pass
Autoclave (AC)*	JEDEC <i>JESD22-A102</i>	10 x 77	Pass
High Temperature Storage Life (HTSL)	JEDEC <i>JESD22-A103</i>	4 x 45 2 x 45 3 x 77	Pass Pass Pass
Solder Heat Resistance (SHR)*	JEDEC/IPC <i>J-STD-020</i>	3 x 15	Pass
Latch-Up	JEDEC <i>JESD78</i>	3	Pass
Electrostatic Discharge <i>Human Body Model</i>	ESDA/JEDEC JS-001-2011	3/voltage	Pass __2.0KV
Electrostatic Discharge <i>Machine Model</i>	JESD22-A115	3/voltage	Pass __0.4KV
Electrostatic Discharge <i>Field-Induced Charged Device Model</i>	JEDEC <i>JESD22-C101</i>	3/voltage	Pass _1.25KV

*Preconditioned per JEDEC/IPC J-STD-020