PCN 15_0160

ADG5233/ADG5234 Data Sheet Changes

Rev. C to Rev. D

This document highlights the performance changes from the Rev. C to the Rev. D data sheet 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. D data sheet.

1. HBM ESD

HBM ESD	Rev C	Rev D	
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. C to Rev. D

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

SPECIFICATION CHANGES FROM Rev. C to Rev. D

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

		Rev. C				F	Rev. D				
Parameter	25°C	−40°C to +85°C	−40°C to +125°C		25°C	−40°C +85°C	to	−40°C to +125°C		Unit	Test Conditions/ Comments
ANALOG SWITCH											
Analog Signal Range	160		V_{DD} to V_{SS}		160			V_{DD} to V_{SS}		V Ωtyp	$V_s = \pm 10 \text{ V, } I_s = -1 \text{ mA}$
On Resistance, Ron		250		200			250		200	''	$V_{DD} = +13.5 \text{ V}, V_{SS} =$
	200	250		280	200		250		280	Ω max	−13.5 V
On-Resistance Match Between	3.5	9		10	3.5		9		10	Ωtyp	$V_s = \pm 10 \text{ V}, I_s = -1 \text{ mA}$
Channels, ∆R _{ON} On-Resistance Flatness, R _{FLAT}	8 38	9		10	8 38		9		10	Ω max Ω typ	$V_S = \pm 10 \text{ V}, I_S = -1 \text{ mA}$
(ON)	50	65		70	50		65		70	Ω max	13 210 1/13
LEAKAGE CURRENTS											$V_{DD} = +16.5 \text{ V}, V_{SS} = -16.5 \text{ V}$
Source Off Leakage, ls (Off)	±0.02				±0.02					nA typ	$V_S = \pm 10 \text{ V}, V_D = \pm 10 \text{ V}$
, , , , , , , , , , , , , , , , , , ,	±0.1	±0.2	±0.4		±0.1	±0.2		±0.4		nA max	
Drain Off Leakage, I _D (Off)	±0.02				±0.02					nA typ	$V_S = \pm 10 \text{ V}, V_D = \pm 10 \text{ V}$
3,, 2, 0, 7	±0.1	±0.2	±0.4		±0.1	±0.2		±0.4		nA max	
Channel On Leakage, I _D (On), I _S (±0.08				±0.08					nA typ	$\pm V_S = V_D = \pm 10 \text{ V}$
On)	±0.2	±0.3	±0.9		±0.2	±0.3		±0.9		nA max	
DIGITAL INPUTS											
Input High Voltage, VINH				2 0.8					2	V min	
Input Low Voltage, V _{INL} Input Current, I _{INL} or I _{INH}	0.002			0.8	0.002				8.0	V max μΑ typ	$V_{IN} = V_{GND}$ or V_{DD}
input currently including	0.002		±0.1		0.002			±0.1		μA max	VIII VOIND OI VDD
Digital Input Capacitance, C _{IN}	3				3					pF typ	
Dynamic Characteristics ¹	170				125					ns typ	$R_L = 300 \Omega, C_L = 35 pF$
Transition Time, t _{TRANSITION}	210	250		280	160		190		215	ns max	$V_S = 10 \text{ V}$
ton (EN)	175				145					ns typ	$R_L = 300 \Omega$, $C_L = 35 pF$
	215 80	255		290	175 125		210		240	ns max ns typ	$V_S = 10 \text{ V}$ $R_L = 300 \Omega$, $C_L = 35 \text{ pF}$
t _{OFF} (EN)	100	115		125	155		170		180	ns max	$V_S = 10 \text{ V}$
Break-Before-Make Time Delay,	60				45					ns typ	$R_L = 300 \Omega$, $C_L = 35 pF$
t _D				30					25	ns min	$V_{S1} = V_{S2} = 10 \text{ V}$
Charge Injection, Q _{INJ}	-0.6				0.4					pC typ	$V_S = 0 \text{ V, } R_S = 0 \Omega, C_L = 1 \text{ nF}$
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	205				355					MHz typ	$R_L = 50 \Omega$, $C_L = 5 pF$
Insertion Loss	-6.3				-6.4					dB typ	$R_L = 50 \Omega, C_L = 5 pF, f$ = 1 MHz
C _s (Off)	4.5				2.8					pF typ	$V_S = 0 V, f = 1 MHz$
C_D (Off) C_D (On), C_S (On)	10 15				9 13					pF typ pF typ	$V_S = 0 V, f = 1 MHz$ $V_S = 0 V, f = 1 MHz$
	13				13					рг тур	$V_{DD} = +16.5 \text{ V, } V_{SS} =$
POWER REQUIREMENTS											–16.5 V
I _{DD}	45				45					μA typ	Digital inputs = 0 V or V_{DD}
טטו	55			70	55				70	μA max	עט ע
Iss	0.001				0.001					μA typ	Digital inputs = 0 V or V_{DD}
			.04.55	1				. 0 (. 22	1	μA max	
V_{DD}/V_{SS}			±9/±22					±9/±22		V min/V max	GND = 0 V

 $[\]ensuremath{^{\text{1}}}$ Guaranteed by design, not subject to production test.

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

		Rev. C				Rev. D				
Parameter	25°C	–40°C to +85°C	−40°C to +125°C		25°C	–40°C to +85°C	−40°C to +125°C		Unit	Test Conditions/ Comments
ANALOG SWITCH										
Analog Signal Range			V_{DD} to V_{SS}				V_{DD} to V_{SS}		V	
On Basistana an B	140				140				Ωtyp	$V_S = \pm 15 \text{ V, } I_S = -1 \text{ mA}$
On Resistance, R _{ON}	160	200		230	160	200		230	Ω max	$V_{DD} = +18 \text{ V}, V_{SS} = -18 \text{ V}$
On-Resistance Match Between	3.5				3.5				Ωtyp	$V_S = \pm 15 \text{ V, } I_S = -1 \text{ mA}$
Channels, ΔR _{ON}	8	9		10	8	9		10	Ωmax	·
On-Resistance Flatness, RFLAT	33				33				Ωtyp	$V_S = \pm 15 \text{ V, } I_S = -1 \text{ mA}$
(ON)	45	55		60	45	55		60	Ω max	.,
LEAKAGE CURRENTS										$V_{DD} = +22 \text{ V}, V_{SS} = -22 \text{ V}$
Source Off Leakage, ls (Off)	±0.02				±0.02				nA typ	$V_S = \pm 15 \text{ V}, V_D = \pm 15 \text{ V}$
Source Off Leakage, is (Off)	±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	$V_S = \pm 15 \text{ V}, V_D = \pm 15 \text{ V}$
	±0.1	±0.2	±0.4		±0.1	±0.2	±0.4		nA max	
Channel On Leakage, I_D (On), I_S (±0.08				±0.08				nA typ	$\pm V_S = V_D = \pm 15 V$
On)	±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		. 0.4		0.002		. 0.4		μA typ	$V_{IN} = V_{GND}$ or V_{DD}
Digital Innut Canaditance C	,		±0.1		2		±0.1		μA max	
Digital Input Capacitance, C _{IN} Dynamic Characteristics ¹	3				3				pF typ	
•	170				125				ns typ	$R_L = 300 \Omega, C_L = 35 pF$
Transition Time, transition	200	235		260	155	180		200	ns max	$V_S = 10 \text{ V}$
. (EN)	165				145				ns typ	$R_L = 300 \Omega$, $C_L = 35 pF$
t _{on} (EN)	200	240		265	170	200		220	ns max	$V_S = 10 \text{ V}$
t _{OFF} (EN)	80				125				ns typ	$R_L = 300 \Omega, C_L = 35 pF$
	95	105		115	155	160		170	ns max	$V_{S} = 10 \text{ V}$
Break-Before-Make Time Delay,	50			30	40			20	ns typ	$R_L = 300 \Omega, C_L = 35 pF$
$t_{\mathtt{D}}$				30				20	ns min	$V_{S1} = V_{S2} = 10 \text{ V}$ $V_S = 0 \text{ V}, R_S = 0 \Omega, C_L =$
Charge Injection, Q _{INJ}	0				0.7				pC typ	1 nF
Off Isolation	-75				-76				dB typ	$R_L = 50 \Omega, C_L = 5 pF, f$
On isolation	'				, ,				db typ	= 1 MHz
Channel-to-Channel Crosstalk	-80				-87				dB typ	$R_L = 50 \Omega, C_L = 5 pF, f$ = 1 MHz
−3 dB Bandwidth	210				370				MHz typ	$R_L = 50 \Omega, C_L = 5 pF$
Insertion Loss	-5.5				-5.6				dB typ	$R_L = 50 \Omega, C_L = 5 pF, f$ = 1 MHz
Cs (Off)	4.5				2.8				pF typ	$V_S = 0 \text{ V, } f = 1 \text{ MHz}$
C _D (Off)	10				9				pF typ	$V_S = 0 \text{ V, } f = 1 \text{ MHz}$
C_D (On), C_S (On)	15				13				pF typ	$V_S = 0 V, f = 1 MHz$
POWER REQUIREMENTS										$V_{DD} = +22 \text{ V}, V_{SS} = -22 \text{ V}$
	50				50				μΑ typ	Digital inputs = 0 V or
I _{DD}									' ''	V_{DD}
	70			110	70			110	μA max	Dinital invests 034
Iss	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 3. $V_{DD} = +12V \pm 10\%$, $V_{SS} = 0V$ GND = 0 V, unless otherwise noted.

		Rev. C –40°C to	−40°C to		Rev. D –40°C to	−40°C to		Test Conditions/
Parameter	25°C	+85°C	+125°C	25°C	+85°C	+125°C	Unit	Comments
ANALOG SWITCH Analog Signal Range			0 V to V _{DD}			0 V to V _{DD}	V	
3 3 3	360			360			Ωtyp	Vs = 0 V to 10V, ls = -1 mA
On Resistance, R _{ON}	500	610	700	500	610	700	Ω max	$V_{DD} = +10.8V, V_{SS} = 0$
On Davistan as Matal Datas			, •••			, 55		$V_{s} = 0 V \text{ to } 10V, I_{s} =$
On-Resistance Match Between Channels, ΔR _{ON}	5.5 20	21	22	5.5 20	21	22	Ω typ $Ω$ max	–1 mA
On-Resistance Flatness, R _{FLAT}	170	21	22	170	21	22	Ωtyp	$V_S = 0 V \text{ to } 10V, I_S =$
(ON)	280	335	370	280	335	370	Ω max	−1 mA
LEAKAGE CURRENTS								$V_{DD} = 13.2 \text{ V}, V_{SS} =$
	±0.02			±0.02			n A tun	$V_s = 1V/10V, V_D = 0$
Source Off Leakage, ls (Off)	±0.02	±0.2	±0.4	±0.02	±0.2	±0.4	nA typ nA max	+10 V/1V
	±0.02	20.2	_0.1	±0.02	_0.2	20.1	nA typ	$V_s = 1V/10V, V_D =$
Drain Off Leakage, l _D (Off)	±0.1	±0.2	±0.4	±0.1	±0.2	±0.4	nA max	+10 V/1V
Channel On Leakage, ID (On), Is (±0.08			±0.08			nA typ	$\pm V_S = V_D = 1 \text{ V}/10\text{V}$
On)	±0.2	±0.3	±0.9	±0.2	±0.3	±0.9	nA max	± V5 = VD = 1 V/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, l _{INL} or l _{INH}	0.002		±0.1	0.002		±0.1	μΑ typ μΑ max	$V_{IN} = V_{GND}$ or V_{DD}
Digital Input Capacitance, C _{IN} DYNAMIC CHARACTERISTICS ¹	3			3			pF typ	
	235			165			nc typ	$R_L = 300 \Omega$, $C_L = 35$
Transition Time, transition	295	365	410	215	260	300	ns typ ns max	pF V _S = 8 V
	240	303	410	200	200	300	ns typ	$R_L = 300 \Omega$, $C_L = 35$
t _{on} (EN)	305	380	430	245	305	350	ns max	pF V _S = 8 V
Δ (FNI)	70			130			ns typ	$R_L = 300 \Omega, C_L = 35$
t _{off} (EN)	90	105	115	165	180	200	ns max	pF $V_S = 8 V$
Break-Before-Make Time Delay,	125			85			ns typ	$R_L = 300 \Omega, C_L = 35$ pF
t_D			65			45	ns min	$V_{S1} = V_{S2} = 8 \text{ V}$
Charge Injection, Q _{INJ}	0			0			pC typ	$V_S = 6 \text{ V}, R_S = 0 \Omega, C_L$ = 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	$R_L = 50 \Omega$, $C_L = 5 pF$,
–3 dB Bandwidth	172			260			MHz typ	f = 1 MHz $R_L = 50 \Omega$, $C_L = 5 \text{ pF}$
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	$V_S = 0 V, f = 1 MHz$
C_D (Off) C_D (On), C_S (On)	11 16			10 14			pF typ pF typ	$V_S = 0 V, f = 1 MHz$ $V_S = 0 V, f = 1 MHz$
POWER REQUIREMENTS							, ,,	$V_{DD} = 13.2$
loo	40			40			μA typ	Digital inputs = 0 V or V_{DD}
V_{DD}	50		65 9/40	50		65 9/40	μΑ max V min/V max	GND = 0 V, Vss=0V
Guaranteed by design not subject			J/40	<u>I</u>		J/4U	v IIIIII/ v IIIdX	011D - 0 1, 122-01

 $_{\mbox{\scriptsize 1}}\,\mbox{\scriptsize Guaranteed}$ by design, not subject to production test.

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

	Rev. C				Rev. [)		
Parameter	25°C	−40°C to +85°C	–40°C to +125°C	25°C	–40°C to +85°C	–40°C to +125°C	Unit	Test Conditions/ Comments
ANALOG SWITCH			01/4-1/			0)/+-)/		
Analog Signal Range	1.10		0 V to V _{DD}	1.40		$0 V to V_{DD}$	V	$V_S = \pm 10 \text{ V, } I_S = -1$
On Resistance, Ron	140			140			Ωtyp	mA
on nesistance, non	170	215	245	170	215	245	Ω max	$V_{DD} = +13.5 \text{ V}, V_{SS} = -13.5 \text{ V}$
On-Resistance Match Between	3.5			3.5			Ωtyp	$V_S = \pm 10 \text{ V, } I_S = -1 \text{ mA}$
Channels, ΔR _{ON}	8	9	10	8	9	10	Ω max	
On-Resistance Flatness, R _{FLAT}	35			35			Ωtyp	$V_S = \pm 10 \text{ V, } I_S = -1 $ mA
(ON)	50	60	65	50	60	65	Ω max	
LEAKAGE CURRENTS								$V_{DD} = +16.5 \text{ V}, V_{SS} = -16.5 \text{ V}$
	±0.02			±0.02			n A tun	$V_S = \pm 10 \text{ V}, V_D =$
Source Off Leakage, Is (Off)	±0.02	±0.2	±0,4	±0.02	±0.2	±0.4	nA typ	±10 V
		±0.2	±0.4		±0.2	±0.4	nA max	$V_S = \pm 10 \text{ V}, V_D =$
Drain Off Leakage, l _D (Off)	±0.02			±0.02			nA typ	±10 V
Channel On Leakage, I _D (On), I _s (±0.1 ±0.08	±0.2	±0.4	±0.1 ±0.08	±0.2	±0.4	nA max nA typ	$\pm V_S = V_D = \pm 10 \text{ V}$
On)	±0.2	±0.3	±0.9	±0.2	±0.3	±0.9	nA max	± v 3 = v D = ± 10 v
DIGITAL INPUTS Input High Voltage, VINH			2	.		2	V min	
Input High Voltage, VINL			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}
Digital Input Capacitance, C _{IN}	3		±0.1	3		±0.1	μA max pF typ	
Dynamic Characteristics ¹				+			pi typ	
Transition Time, transition	205			155			ns typ	$R_L = 300 \Omega, C_L = 35$ pF
Transition Time, transition	255	275	290	200	215	230	ns max	$V_S = 10 \text{ V}$
(200			180			ns typ	$R_L = 300 \Omega, C_L = 35$
t _{on} (EN)	240	265	290	215	235	250	ns max	pF V _S = 10 V
	85	203	270	150	200	250	ns typ	$R_L = 300 \Omega, C_L = 35$
t _{OFF} (EN)	115	115	115		190	190	ns max	pF V _S = 10 V
Bussly Refere Make Times Relay		113	115		190	190		$R_L = 300 \Omega, C_L = 35$
Break-Before-Make Time Delay, t _D	65		2.5	50		25	ns typ	pF
			35			25	ns min	$V_{S1} = V_{S2} = 10 \text{ V}$ $V_S = 0 \text{ V}, R_S = 0 \Omega, C_L$
Charge Injection, Q _{INJ}	-0.6			0.5			pC typ	= 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	$R_L = 50 \Omega$, $C_L = 5 pF$, $f = 1 MHz$
Cs (Off)	4.5			2.8			pF typ	$V_S = 0 V, f = 1 MHz$
C _D (Off)	10 15			9 13			pF typ	$V_S = 0 \text{ V, } f = 1 \text{ MHz}$
C _D (On), C _S (On) POWER REQUIREMENTS	13			13			pF typ	$V_S = 0 \text{ V, } f = 1 \text{ MHz}$ $V_{DD} = +16.5 \text{ V, } V_{SS} =$
. J. J. H. H. G. H.				= =				-16.5 V Digital inputs = $0 V$
loo	80			80			μA typ	or V _{DD}
V_{DD}	100		9/40 130	100		130 9/40	μΑ max V min/V max	GND = 0 V, Vss=0V
Guaranteed by design not subject	<u> </u>	1	<i>J</i> / 10			2/ 10	7 mm/ v max	1 3110 - 0 1, 133-01

 $_{\mbox{\scriptsize 1}}$ Guaranteed by design, not subject to production test.