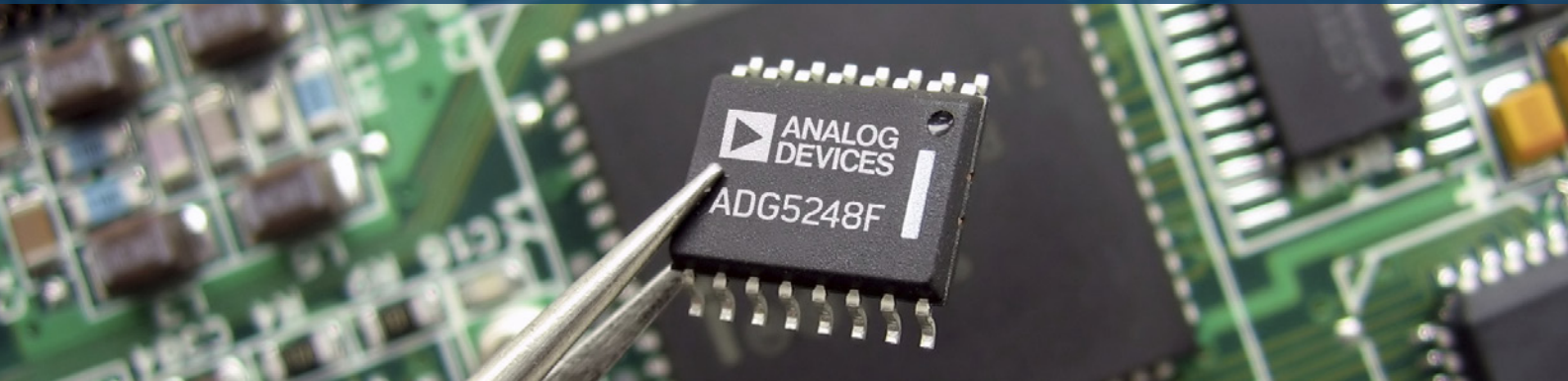


SWITCHES AND MULTIPLEXERS PORTFOLIO



Analog Devices offers a large range of switches and multiplexers covering single to multiple switch elements with various signal ranges, and in a variety of packages to best suit customer application needs. Switches can be classified into families when choosing them based on supply voltage, precision, robustness, and overvoltage fault detection and protection. The following families of parts are available:

ADGS5412/ADGS5414, ADGS1612, ADGS1412/ADGS1408/ADGS1409, ADGS1212/ADGS1208/ADGS1209 (New)

- ▶ SPI interface with digital error detection
- ▶ Three modes of operation: daisy-chain, addressable mode with CRC error detection, and round robin mode
- ▶ Industry-standard SPI mode 0 and 3 interface
- ▶ Break-before-make functionality enables switches to be configured as multiplexers

ADG52xxF (New)

- ▶ Overvoltage detection and protection; optimized for low leakage and Q_{INJ}
- ▶ ± 55 V OVP in power-on and power-off states, high ESD, latch-up immune
- ▶ Operational up to ± 22 V dual supply and 44 V single supply

ADG54xxF (New)

- ▶ Overvoltage detection and protection, optimized for low R_{ON} and R_{ON} flatness
- ▶ ± 55 V OVP in power-on and power-off states, high ESD, latch-up immune
- ▶ Operational up to ± 22 V dual supply and 44 V single supply

ADG52xx

- ▶ Latch-up immune under all conditions, high ESD, lowest leakage at temperature in ± 15 V class
- ▶ Operational up to ± 22 V dual supply and +40 V single supply
- ▶ Optimized for robustness and precision operation

ADG54xx

- ▶ Latch-up immune under all conditions, highest ESD in the ± 15 V class
- ▶ Operational up to ± 22 V dual supply and 40 V single supply
- ▶ Optimized for robustness and precision operation

ADG14xx

- ▶ Lowest R_{ON} in ± 15 V class; minimum distortion and high continuous current
- ▶ Minimum $1 \Omega R_{ON}$, $0.2 \Omega R_{ON}$ flatness

ADG12xx

- ▶ Lowest Q_{INJ} and capacitance in ± 15 V class
- ▶ < 1 pC Q_{INJ} , 2 pF off capacitance

ADG13xx

- ▶ ± 15 V R_{ON} and Q_{INJ} optimized
- ▶ Optimized for standard performance applications

ADG2xx/ADG4xx/ADG5xx

- ▶ ± 15 V and ± 5 V
- ▶ Low R_{ON}
- ▶ Low Q_{INJ} and capacitance
- ▶ ADG4xxF/ADG5xxF: ± 15 V with overvoltage protection from -40 V to $+55$ V

ADG46xx

- ▶ ± 5 V power-off protection with overvoltage protection: -5.5 V to $+16$ V
- ▶ Optimized for robustness and protection

ADG16xx

- ▶ Lowest R_{ON} in ± 5 V class; minimum distortion and high continuous current
- ▶ Minimum $1 \Omega R_{ON}$, $0.2 \Omega R_{ON}$ flatness

ADG6xx

- ▶ ± 5 V low R_{ON} and low Q_{INJ}
- ▶ $R_{ON} = 2 \Omega$ to 85Ω , $Q_{INJ} = 0.5$ pC to 50 pC

ADG8xx

- ▶ < 5.5 V ultralow R_{ON} and minimum distortion and high continuous current
- ▶ $R_{ON} = 0.25 \Omega$ to 0.8Ω , 0.05Ω to $0.17 \Omega R_{ON}$ flatness

ADG7xx

- ▶ < 5.5 V low R_{ON}
- ▶ $R_{ON} = 2.2 \Omega$ to 15Ω , $Q_{INJ} = 2$ pC to 14 pC

ADG9xx

- ▶ Low voltage dc to high frequency RF
- ▶ -3 dB BW = 2.5 GHz to 4.5 GHz

ADG3xxx

- ▶ Low voltage level translators/bus switches
- ▶ Unidirectional and bidirectional digital

ADG21xx

- ▶ Unbuffered crosspoint switches
- ▶ Dual- and single supply I²C controlled

Enhanced Product and Automotive Parts

- ▶ Please contact ADI technical support and sales for details

High Temperature Parts (New)

- ▶ Guaranteed specifications for -55°C to $+210^\circ\text{C}$

Part Number	Configuration	Specifications				Characterization Voltages (V_{nom})						Interface	Packaging		Price @ 1k (\$U.S.)	
		R_{on} Typ (Ω)	On Leakage Typ (nA)	Q_{in} Typ (pC)	BW (MHz)	Single			Dual				LFCSP			
						3.3	5	12	36	± 5	± 15			± 20		
SPI+ Interface with Digital Error Detection																
ADGS1412 New	SPST $\times 4$	1.5	0.15	20	170									SPI+		4.37
ADGS5412 New	SPST $\times 4$	9.8	0.1		167									SPI+		3.58
ADGS1212 New	SPST $\times 4$	120	0.02											SPI+		
ADGS1612 New	SPST $\times 4$	1.7	0.15											SPI+		
ADGS5414 New	SPST $\times 8$	13.5	0.1		200									SPI+		
ADGS1208/ADGS1209 New	8:1/diff 4:1 mux	120	0.2		550									SPI+		
ADGS1408/ADGS1409 New	8:1/diff 4:1 mux	4	0.1											SPI+		

Part Number	Configuration	HBM ESD Level (kV)	Specifications					Characterization Voltages (V_{nom})				Interface	Packaging		Price @ 1k (\$U.S.)	
			R_{on} Typ (Ω)	R_{on} Flatness (Ω)	On Leakage Typ (nA)	Q_{in} Typ (pC)	BW (MHz)	Single		Dual			TSSOP	LFCSP		
								12	36	± 15	± 20					
Overvoltage Detection and Protection: -55 V OVP to +55 V OVP																
ADG5412F/ADG5413F	SPST $\times 4$	5.5	10	0.6	0.3	680	270						Parallel	EP		3.96
ADG5412BF/ADG5413BF	SPST $\times 4$	3	10	0.6	0.3	680	270						Parallel			3.96
ADG5436F New	SPDT $\times 2$	6	10	0.6	0.3	654	108						Parallel			3.86
ADG5243F New	SPDT $\times 3$	3.5	270	7	0.3	0.8	350						Parallel			4.10
ADG5404F	4:1 mux	5	10	0.6	0.3	680	108						Parallel			3.86
ADG5208F/ADG5209F New	8:1/diff 4:1 mux	3.5	250	6.5	0.3	0.4	190/290						Parallel			4.21
ADG5248F/ADG5249F New	8:1/diff 4:1 mux	3.5	250	6.5	0.3	0.8	190/320						Parallel			4.55
Channel Overvoltage Detection and Protection: -55 V OVP to +55 V OVP																
ADG5462F New	Channel protector $\times 4$	4	10	0.6	0.3	N/A	318									3.86

Part Number	Configuration	Specifications					Characterization Voltages (V_{nom})				Interface	Packaging						Price @ 1k (\$U.S.)		
		R_{on} Typ (Ω)	R_{on} Flatness (Ω)	On Leakage Typ (nA)	Q_{in} Typ (pC)	BW (MHz)	Single		Dual			TSSOP	LFCSP	DIP	SOIC	PLCC	SSOP		SOT/SOT-8	MSOP
							5	12	± 5	± 15										
Overvoltage Protection: -40 V OVP to +40 V OVP																				
ADG438F/ADG439F	8:1/diff 4:1 mux	270		0.01	4														3.68	
ADG508F/ADG509F	8:1/diff 4:1 mux	270		0.04	4														3.31	
ADG528F	8:1 mux	300		0.04	4														4.26	
Channel Overvoltage Protection: -40 V OVP to +40 V OVP																				
ADG465	Channel protector $\times 1$	80		0.2															0.84	
ADG467	Channel protector $\times 8$	62		0.2		21													2.75	
Overvoltage Protection: -5.5 V OVP to +16 V OVP																				
ADG4612/ADG4613	SPST $\times 4$	5.2	1.4	10	225	293													1.84	

Part Number	Configuration	HBM ESD Level I/O Port to I/O Port (kV)	HBM ESD Level—All Other Pins (kV)	Specifications				Characterization Voltages (V_{nom})				Interface	Packaging			Price @ 1k (\$U.S.)	
				R_{on} Typ (Ω)	On Leakage Typ (nA)	Q_{in} Typ (pC)	BW (MHz)	Single		Dual			TSSOP	LFCSP	MSOP		
								12	36	± 15	± 20						
± 15 V Latch-Up Immune and High ESD																	
ADG5401	SPST $\times 1$	8	8	6.5	0.2	220	170							Parallel			1.60
ADG5421/ADG5423	SPST $\times 2$	8	8	13.5	0.1	240	250							Parallel			1.85
ADG5412/ADG5413	SPST $\times 4$	8	8	9.8	0.1	240	167							Parallel			2.18
ADG5212/ADG5213	SPST $\times 4$	2.5	2.5	160	0.02	0.07	435							Parallel			2.18
ADG5419	SPDT $\times 1$	8	8	13.5	0.1	130	190							Parallel			1.71
ADG5436	SPDT $\times 2$	8	8	9.8	0.1	200	102							Parallel			2.26
ADG5236	SPDT $\times 2$	2	2	160	0.02	0.6	266							Parallel			2.26
ADG5433	SPDT $\times 3$	8	8	13.5	0.1	130	145							Parallel			2.15
ADG5233	SPDT $\times 3$	1.5	8	160	0.08	0.6	205							Parallel			2.15

Note: Gray text indicates a vintage switch that is in production. Not recommended for new designs; **EP:** Enhanced product switch available in addition to standard switch for specific package; **SPI+:** SPI device, which has multiple modes of operation. See Interface section for further details.

Part Number	Configuration	HBM ESD Level I/O Port to I/O Port (kV)	HBM ESD Level—All Other Pins (kV)	Specifications				Characterization Voltages (V_{DDM})				Interface	Packaging			Price @ 1k (\$U.S.)
				R_{on} Typ (Ω)	On Leakage Typ (nA)	Q_{in} Typ (pC)	BW (MHz)	Single		Dual			TSSOP	LFCSOP	MSOP	
								12	36	± 15	± 20					
<i>± 15 V Latch-Up Immune and High ESD Continued</i>																
ADG5434	SPDT $\times 4$	8	8	13.5	0.1	130	145	•	•	•	•	Parallel	•	•		3.04
ADG5234	SPDT $\times 4$	1.5	8	160	0.08	0.6	205	•	•	•	•	Parallel	•	•		3.04
ADG5404	4:1 mux	8	8	9.8	0.1	220	53	•	•	•	•	Parallel	•	•		2.26
ADG5204	4:1 mux	2	2	160	0.02	0.6	136	•	•	•	•	Parallel	•	•		2.26
ADG5408/ADG5409	8:1/diff 4:1 mux	8	8	13.5	0.1	115	50	•	•	•	•	Parallel	•	EP		2.41
ADG5208/ADG5209	8:1/diff 4:1 mux	2	8	160	0.01	0.4	54/133	•	•	•	•	Parallel	EP	•		2.41
ADG5206/ADG5207	16:1/diff 8:1 mux	1	8	155	0.02	0.35	60/140	•	•	•	•	Parallel	•	•		4.40

Part Number	Configuration	Specifications				Characterization Voltages (V_{DDM})				Interface	Packaging							Price @ 1k (\$U.S.)	
		R_{on} Typ (Ω)	On Leakage Typ (nA)	Q_{in} Typ (pC)	BW (MHz)	Single		Dual			TSSOP	LFCSOP	DIP	SOIC	SOT	MSOP	DIE		Other
						5	12	± 5	± 15										
<i>± 15 V Analog</i>																			
ADG1401/ADG1402	SPST $\times 1$	1	0.2	12	120	•	•	•	•	Parallel		•					1.44		
ADG417	SPST $\times 1$	25	0.1	7		•	•	•	•	Parallel			•	•			1.03		
ADG1201	SPST $\times 1$	120	0.04	0.8	660	•	•	•	•	Parallel			•				1.01		
ADG1421/ADG1422/ADG1423	SPST $\times 2$	2.1	0.2	5	180	•	•	•	•	Parallel		•					1.62		
ADG1221/ADG1222/ADG1223	SPST $\times 2$	120	0.01	0.1	960	•	•	•	•	Parallel				•			1.27		
ADG1411/ADG1412/ADG1413	SPST $\times 4$	1.5	0.15	20	170	•	•	•	•	Parallel	•	•					2.66		
ADG451/ADG452/ADG453	SPST $\times 4$	4	0.04	20		•	•	•	•	Parallel	•		•	•			1.97		
ADG431/ADG432/ADG433	SPST $\times 4$	17	0.1	5		•	•	•	•	Parallel			•	•			2.18		
ADG411/ADG412/ADG413	SPST $\times 4$	25	0.1	5		•	•	•	•	Parallel	•		•	•			1.97		
ADG201HS	SPST $\times 4$	30	0.1	10		•	•	•	•	Parallel			•	•		PLCC	3.30		
ADG441/ADG442/ADG444	SPST $\times 4$	40	0.08	1		•	•	•	•	Parallel			•	•			0.76		
ADG201A/ADG202A	SPST $\times 4$	60	0.5	20		•	•	•	•	Parallel			•	EP		PLCC	1.64		
ADG221	SPST $\times 4$	60	0.5	20		•	•	•	•	Parallel			•	•		PLCC	1.81		
ADG211A/ADG212A	SPST $\times 4$	115	0.5	20		•	•	•	•	Parallel			•	•		PLCC	1.41		
ADG1211/ADG1212/ADG1213	SPST $\times 4$	120	0.02	0.3	1000	•	•	•	•	Parallel	EP	•					1.94		
ADG1311/ADG1312/ADG1313	SPST $\times 4$	130	10	2	600	•	•	•	•	Parallel	•		•				1.05		
ADG1414	SPST $\times 8$	9.5	0.1	10	256	•	•	•	•	SPI	•	•					3.14		
ADG1419	SPDT $\times 1$	2.1	0.2	16	135	•	•	•	•	Parallel		•					1.52		
ADG419	SPDT $\times 1$	25	0.4			•	•	•	•	Parallel			•	•	EP	CerDIP	1.30		
ADG1219	SPDT $\times 1$	120	0.02	0.1	520	•	•	•	•	Parallel			•				1.51		
ADG1436	SPDT $\times 2$	1.5	0.1	20	110	•	•	•	•	Parallel	•	•					2.83		
ADG436	SPDT $\times 2$	12	0.05	10		•	•	•	•	Parallel			•	•			2.57		
ADG1236	SPDT $\times 2$	120	0.02	1	1000	•	•	•	•	Parallel	•	•					1.94		
ADG1433/ADG1434	SPDT $\times 3$ /SPDT $\times 4$	4	0.05	50	200	•	•	•	•	Parallel	•	•					2.55		
ADG333A	SPDT $\times 4$	20	0.1	2		•	•	•	•	Parallel			•	•		SSOP	2.76		
ADG1233/ADG1234	SPDT $\times 3$ /SPDT $\times 4$	120	0.02	0.5	900	•	•	•	•	Parallel	•	•					2.30		
ADG1334	SPDT $\times 4$	130	10	2	700	•	•	•	•	Parallel						SSOP	1.62		
ADG1404	4:1 mux	1.5	0.1	20	55	•	•	•	•	Parallel	•	•					2.83		
ADG1204	4:1 mux	120	0.02	0.7	800	•	•	•	•	Parallel	•	•					2.07		
ADG1408/ADG1409	8:1/diff 4:1 mux	4	0.1	50	60/115	•	•	•	•	Parallel	EP	•					3.00		
ADG1438/ADG1439	8:1/diff 4:1 mux	9.5	0.1	4	82/130	•	•	•	•	SPI	•	•					2.96		
ADG408/ADG409	8:1/diff 4:1 mux	40	1	20		•	•	•	•	Parallel	•		•	•			2.51		
ADG428	8:1 mux	60	1	4		•	•	•	•	Parallel			•	•		PLCC	3.47		
ADG1208/ADG1209	8:1/diff 4:1 mux	120	0.02	0.4	550	•	•	•	•	Parallel	•	•					2.38		
ADG1308/ADG1309	8:1/diff 4:1 mux	130	1	2	500	•	•	•	•	Parallel	•	•					1.47		
ADG508A/ADG509A	8:1/diff 4:1 mux	280	0.04	4		•	•	•	•	Parallel			•	•		PLCC, CerDIP, LCC	2.47		
ADG528A	8:1 mux	280	0.04	4		•	•	•	•	Parallel			•	•		PLCC, CerDIP	3.87		
ADG1406/ADG1407	16:1/diff 8:1 mux	9.5	0.05	10	60/110	•	•	•	•	Parallel	•	•					4.81		
ADG406/ADG407	16:1/diff 8:1 mux	50	1	8		•	•	•	•	Parallel			•			PLCC	5.61		
ADG426	16:1 mux	50	1	8		•	•	•	•	Parallel			•			SSOP	5.42		
ADG1206/ADG1207	16:1/diff 8:1 mux	120	0.08	0.5	280/490	•	•	•	•	Parallel	•	•					4.36		
ADG506A/ADG507A	16:1/diff 8:1 mux	280	0.04	4		•	•	•	•	Parallel	•		•	•		PLCC, CerDIP, LCC	5.47		
ADG526A/ADG527A	16:1/diff 8:1 mux	280	0.04	4		•	•	•	•	Parallel			•	•		PLCC, CerDIP	6.86		

Note: Gray text indicates a vintage switch that is in production. Not recommended for new designs; **EP:** Enhanced product switch available in addition to standard switch for specific package; **SPI-:** SPI device, which has multiple modes of operation. See Interface section for further details.

Part Number	Configuration	Specifications				Characterization Voltages (V_{nom})						Interface	Packaging						Price @ 1k (\$U.S.)	
		R_{on} Typ (Ω)	On Leakage Typ (nA)	Q_{in} Typ (pC)	BW (MHz)	Single			Dual				TSSOP	LFCSOP	DIP	SOT	MSOP	DIE		Other
						2 to 12	2.7 to 5.5	3.3 to 16	± 2 to ± 6	± 2.7 to ± 5.5	± 3.3 to ± 8									
± 5 V Analog																				
ADG601/ADG602	SPST $\times 1$	2	0.01	250	180		•				•				•	•	•		0.90	
ADG621	SPST $\times 2$	4	0.01	110	230		•				•					•			1.04	
ADG1611/ADG1612/ADG1613	SPST $\times 4$	1	0.2	140	42		•	•			•								1.75	
ADG511/ADG512/ADG513	SPST $\times 4$	30	0.05	11			•				•			•				CerDIP, SOIC	2.47	
ADG611/ADG612/ADG613	SPST $\times 4$	85	0.01	0.5	680		•				•			EP					1.47	
ADG619	SPDT $\times 1$	4	0.01	110	190		•				•				EP	•			0.95	
ADG1636	SPDT $\times 2$	1	0.3	130	25		•	•			•								1.83	
ADG636	SPDT $\times 2$	85	0.01	1.2	610		•				•								1.84	
ADG1633	SPDT $\times 3$	4.5	0.02	12.5	103		•	•			•								1.72	
ADG633	SPDT $\times 3$	52	0.005	2	580	•			•		•								0.86	
ADG1634	SPDT $\times 4$	4.5	0.02	12.5	103		•				•								2.35	
ADG1604	4:1 mux	1	0.2	140	15		•				•								1.83	
ADG604	4:1 mux	85	0.01	1	280		•				•								1.84	
ADG608/ADG609	8:1/diff 4:1 mux	22	0.05	6			•				•							SOIC	1.98	
ADG1608/ADG1609	8:1/diff 4:1 mux	4.5	0.03	24	40/71		•				•								1.98	
ADG658/ADG659	8:1/diff 4:1 mux	45	0.005	2	160	•			•		•							QSOP	1.65	
ADG1606/ADG1607	16:1/diff 8:1 mux	4.5	0.1	27	21/37		•				•								3.20	

Part Number	Configuration	Specifications				Characterization Voltages (V_{nom})	Interface	Packaging			Price @ 1k (\$U.S.)
		Off Isolation	Insertion Loss	Power (dBm)	-3 dB BW (MHz)	Single		TSSOP	LFCSOP	MSOP	
Low Voltage, DC to High Frequency RF											
ADG901/ADG902	SPST $\times 1$	37 dB (1 GHz)	0.8 dB (1 GHz)	17	4500	1.65 to 2.75	Parallel		EP	•	1.20
ADG918/ADG919	SPDT $\times 1$	37 dB (1 GHz)	0.8 dB (1 GHz)	17	4000	1.65 to 2.75	Parallel		•	•	1.26
ADG936/ADG936-R	SPDT $\times 2$	36 dB (1 GHz)	0.9 dB (1 GHz)	16	4000	1.65 to 2.75	Parallel	•	•		1.78
ADG904/ADG904-R	4:1 mux	37 dB (1 GHz)	1.1 dB (1 GHz)	16	2500	1.65 to 2.75	Parallel	•	EP		1.73

Part Number	Configuration	Specifications				Characterization Voltages (V_{nom})		Interface	Packaging		Price @ 1k (\$U.S.)
		R_{on}	On Leakage Typ (nA)	Q_{in} Typ (pC)	BW (MHz)	Single	Dual		TSSOP	LFCSOP	
						12	± 5				
Unbuffered Analog Crosspoint Arrays											
ADG2128	8 \times 12 array	30	0.03	3.5	300	•	•	I ² C	•	6.25	
ADG2188	8 \times 8 array	30	0.03	3.5	300	•	•	I ² C	•	4.26	

Part Number	Configuration	Specifications				Characterization Voltages (V_{nom})						Level Translation	Packaging							Price @ 1k (\$U.S.)	
		R_{on} Typ (Ω)	Propagation Delay Max (ps)	Bus Enable Typ (ns)	Data Rate (Mbps)	Single				Dual			TSSOP	LFCSOP	SOT/SOT-8	MSOP	QSOP	DIE	WLCSOP		SC70
						1.15 to 5.5	1.65 to 3.6	2.3 to 3.6	3.3 to 5.0	0 to -24.2	10.8 to 35										
Bus Switches																					
ADG3241	1-bit bidirectional	4.5	225	3.2	1500		•					Down							•	0.54	
ADG3242	2-bit bidirectional	4.5	225	3.2	1500		•					Down		•				•		0.70	
ADG3243	2-bit bidirectional	4.5	225	3.2	1500		•					Down		•						0.69	
ADG3245	8-bit bidirectional	4.5	225	3.2	1244		•					Down	•	•						0.83	
ADG3246	10-bit bidirectional	4.5	225	3.2	1244		•					Down	•	•						0.88	
ADG3247	16-bit bidirectional	4.5	225	3.2	1244		•					Down	•	•						1.39	
ADG3248	1-bit 2:1 bidirectional	4.5	225	3.2	1244		•					Down							•	0.70	
ADG3257	4-bit 2:1 bidirectional	2	100	5	933		•		•			Down				•				0.70	
Level Translators																					
ADG3231	1-bit unidirectional	N/A	4000	N/A			•					Up/down			•					0.54	
ADG3233	1-bit bypass unidirectional	N/A	3500	4			•					Up/down			•	•				0.68	
ADG3123	8-bit CMOS to HV unidirectional	N/A	8000		0.2					•	•	Up	•							2.33	
ADG3301	1-bit bidirectional	N/A	5000	1000	50	•						Up/down							•	0.47	
ADG3304	4-bit bidirectional	N/A	5000	1000	50	•						Up/down	EP	•					•	0.97	
ADG3300	8-bit bidirectional	N/A	5000	1000	50	•						Up/down	•							1.62	
ADG3308/ADG3308-1	8-bit bidirectional	N/A	5000	1000	50	•						Up/down	•	•					•	1.62	

Note: EP: Enhanced product switch available in addition to standard switch for specific package; SPI-: SPI device, which has multiple modes of operation. See Interface section for further details.

Part Number	Configuration	Specifications				Characterization Voltages (V _{nom})				Interface	Packaging							Price @ 1k (\$U.S.)	
		R _{on} Typ (Ω)	On Leakage Typ (nA)	Q _{on} Typ (pC)	BW (MHz)	Single			Dual		TSSOP	LFCSOP	SOIC	SOT	MSOP	WLCSP	SC70		Other
						1.65 to 3.6	2.7 to 5.5	1.8 to 5.5	±2.5										
<5.5 V Analog																			
ADG801/ADG802	SPST ×1	0.25	0.01	50	12					Parallel								0.91	
ADG841/ADG842	SPST ×1	0.28	0.2	200	21	•				Parallel						•		0.71	
ADG701/ADG702/ADG701L/ADG702L	SPST ×1	2	0.01	5	200					Parallel						•		0.61	
ADG741/ADG742	SPST ×1	2	0.01	5	200					Parallel						•		0.66	
ADG751	SPST ×1	15	0.01	1	300					Parallel						•		1.06	
ADG821/ADG822/ADG823	SPST ×2	0.5	0.01	15	24					Parallel						•		1.21	
ADG721/ADG722/ADG723	SPST ×2	2.5	0.01	2	200					Parallel		•				•		0.66	
ADG811/ADG812	SPST ×4	0.5	0.2	30	90	•				Parallel	•							1.49	
ADG711/ADG712/ADG713	SPST ×4	2.5	0.01	3	200					Parallel	•					•		0.91	
ADG781/ADG782/ADG783	SPST ×4	2.5	0.01	3	200					Parallel			•					1.06	
ADG714	SPST ×8	2.5	0.01	3	155		•			SPI	•							1.77	
ADG715	SPST ×8	2.5	0.01	3	155		•			FC	•							2.07	
ADG819	SPDT ×1	0.5	0.01	20	17			•		Parallel						•		0.94	
ADG839	SPDT ×1	0.35	0.2	70	25	•				Parallel							•	0.77	
ADG849	SPDT ×1	0.5	0.04	50	38					Parallel							•	0.65	
ADG852	SPDT ×1	0.8	0.03	30	100					Parallel		•						0.61	
ADG719	SPDT ×1	2.5	0.01		200					Parallel				EP		•		0.69	
ADG749	SPDT ×1	2.5	0.01		200					Parallel							•	0.71	
ADG779	SPDT ×1	2.5	0.01	2	200					Parallel							•	0.65	
ADG752	SPDT ×1	15	0.01		250					Parallel						•		1.17	
ADG884	SPDT ×2	0.28	0.2	125	18					Parallel		•				•		0.91	
ADG824	SPDT ×2	0.5	0.2	27	90	•				Parallel		•						0.80	
ADG836/ADG836L	SPDT ×2	0.5	0.2	40	57	•				Parallel		•				•		1.21	
ADG854	SPDT ×2	0.8	0.03	30	100					Parallel		•						0.91	
ADG736/ADG736L	SPDT ×2	2.5	0.01		200					Parallel						•		0.91	
ADG787	SPDT ×2	2.5	0.05	14	145					Parallel		•				•		0.93	
ADG772	SPDT ×2	6.7	0.2	0.5	630	•				Parallel		•						0.81	
ADG733	SPDT ×3	2.5	0.01	3	160					Parallel	•							1.30	
ADG786	SPDT ×3	2.5	0.01	3	160					Parallel		•						1.30	
ADG858	SPDT ×4	0.58	0.01	45	70					Parallel		•						1.27	
ADG774	SPDT ×4	2.2	0.01	7	240					Parallel						•		1.77	
ADG784	SPDT ×4	2.2	0.01	10	240					Parallel		•						1.72	
ADG774A	SPDT ×4	2.2	0.001	6	400					Parallel		•						1.84	
ADG734	SPDT ×4	2.5	0.01	3	160					Parallel	•							1.37	
ADG788	SPDT ×4	2.5	0.01	3	160					Parallel		•						1.37	
ADG794	SPDT ×4	5	0.001	6	300			•		Parallel								0.66	
ADG888	DPDT ×2	0.4	0.2	70	29					Parallel	•	•				•		1.62	
ADG804	4:1 mux	0.5	0.1	28	33	•				Parallel						•		1.21	
ADG704	4:1 mux	2.5	0.01	3	200					Parallel						•		0.96	
ADG728/ADG729	8:1/diff 4:1 mux	2.5	0.01	3	65/100			•		FC	•							1.90	
ADG738/ADG739	8:1/diff 4:1 mux	2.5	0.01	3	65/100			•		SPI	•							1.62	
ADG708/ADG709	8:1/diff 4:1 mux	3	0.01	3	55					Parallel	•							1.27	
ADG758/ADG759	8:1/diff 4:1 mux	3	0.01	3	55					Parallel		•						1.27	
ADG706/ADG707	16:1/diff 8:1 mux	2.5	0.01	5	25/36					Parallel	•							2.58	
ADG726/ADG732	32:1/diff-dual 16:1 mux	4	0.05	5	34/18					Parallel		•						4.56	
ADG725/ADG731	32:1/diff-dual 16:1 mux	4	0.05	5	34/18					SPI		•						4.65	

Part Number	Configuration	Temperature Range	Specifications				Characterization Voltages (V _{nom})						Interface	Packaging		Price @ 1k (\$U.S.)			
			R _{on} Max (Ω)	On Leakage Max (nA)	Q _{on} (pC)	BW (MHz)	Single				Dual			Ceramic Flatpack	Ceramic Flatpack RFG ¹				
							3	5	12	36	±2.5	±15					±20		
High Temperature																			
ADG798 New	8:1 mux	-55°C to +210°C	10	2600	3	55	•	•			•	•	•	•	•	•	•	•	95.00
ADG5298 New	8:1 mux	-55°C to +210°C	400	70	0.2	110					•	•	•	•	•	•	•	•	123.50

Note: EP: Enhanced product switch available in addition to standard switch for specific package; SPI+: SPI device, which has multiple modes of operation. See Interface section for further details.

Choosing the Correct Switch or Multiplexer for Your Application

Supply voltage, configuration, specifications, robustness level, and package are the key requirements in choosing the correct switch/mux for your application. As an individual switch cannot be optimized in all respects, Analog Devices offers a large and varied selection of options that cover differing supply voltages and configurations, high performance, and industry-leading package sizes.

Supply Voltage

Depending on the supply voltage that you require, ADI can offer you a number of high performance switches and multiplexers that suit your application. Low voltage switches can offer performance advantages over higher voltage switches. High voltage switches are optimized when using the maximum signal range, but are also specified for use at lower voltages. ADI offers a varied range of supply voltages from:

- ▶ ± 15 V
- ▶ ± 5 V
- ▶ Low voltage (up to 5 V)
- ▶ Single- and dual-supply options

If, for example, you are using a 5 V power supply in your circuit and require a switch, then the best switch to choose would be one of our low voltage (<5 V) switches and not one of our high voltage (± 15 V) parts. Likewise, if you require high voltage operation, then the ± 15 V will be optimized for operation at these voltages and the performance will degrade as the voltage is reduced.

Specifications

Parameter	Definition	Indicator
Supply Voltage	Voltage of the analog switch circuit	Must be bigger than signal amplitude
R_{on} (On Resistance)	Resistance of the closed switch path	Lower is better
On Leakage	Leakage currents into/out of a switch channel	Lower is better
Q_{inj} (Charge Injection)	Disturbance to signal from control input	Lower is better
BW (Bandwidth)	Frequency range of the switch in the on state where the switch attenuates the input signal by 3 dB	Higher is better
Off Isolation	Transfer function of the switch when in the off state	Higher is better
Insertion Loss	Transfer function of the switch when in the on state	Lower is better
Power	Maximum signal power the switch can pass in the on state	Higher is better
Propagation Delay	Time required for signal to travel through switch	Lower is better
Bus Enable	Time required to enable or disable the bus switch	Lower is better
Data Rate	Speed of data that the switch/mux can handle	Higher is better

Interface

What interface do you require?

- ▶ I²C: 2-wire digital interface; SCL (clock) and SDA (data)
- ▶ SPI: 3-wire serial interface; FSYNC, DATA, SCLK
- ▶ SPI+: SPI interface with digital error detection and additional features
- ▶ Parallel: simple digital interface; logic high/low on the pin dictates the state of the switch
- ▶ SPI and I²C offer the advantage of reducing the number of digital pins required when using switches/muxes of large array size

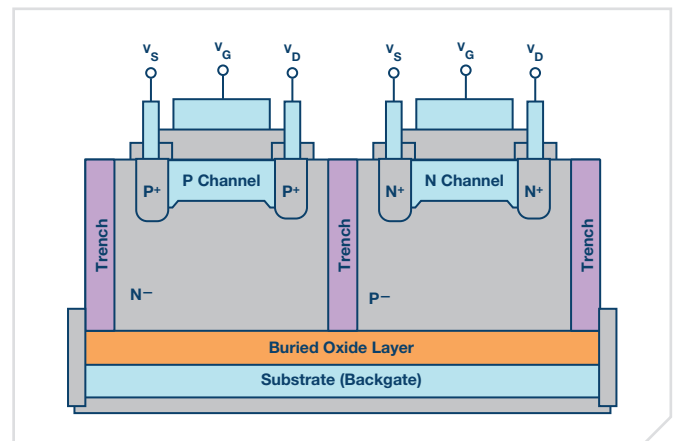
SPI+ switches use the industry-standard SPI mode 0 and 3 interface and add features such as digital error detection, as well as daisy-chain and burst mode. Robust error detection features include CRC error detection, invalid read/write address detection, and SCLK count error detection. SPI+ switches incorporate break-before-make functionality so switches can be externally wired as multiplexer solutions.

Robustness Feature Set

Do you require a switch/mux optimized for robustness with overvoltage detection capabilities, overvoltage protection up to ± 55 V, latch-up immunity, and power-off protection (with overvoltage)? Then ADI has the product to meet your needs.

Analog Devices offers a range of switches that guarantee latch-up immunity in harsh environment, industrial applications operating up to ± 22 V. Using ADI's trench isolation process, these devices are immune to latch-up, which is an undesirable high current state that persists until the power supply is turned off, and can lead to device failure.

Overvoltage detection means the parts offer a digital indicator to signal the presence of an overvoltage condition, thereby enabling the channel in fault to be avoided or corrective action to be taken. The overvoltage detection feature enables flexible fault limits and user-definable fault modes. Overvoltage protection means the switch is guaranteed to withstand specified voltages on the analog inputs that exceed the supplies. For overvoltage conditions, the switch is guaranteed to be in a high impedance state protecting downstream analog components. Power-off protection means the device is guaranteed in a high impedance off state with no power supplies present. Optimized for robustness and protection, the overvoltage protection and detection family also offers high performance in industry-leading small packages.

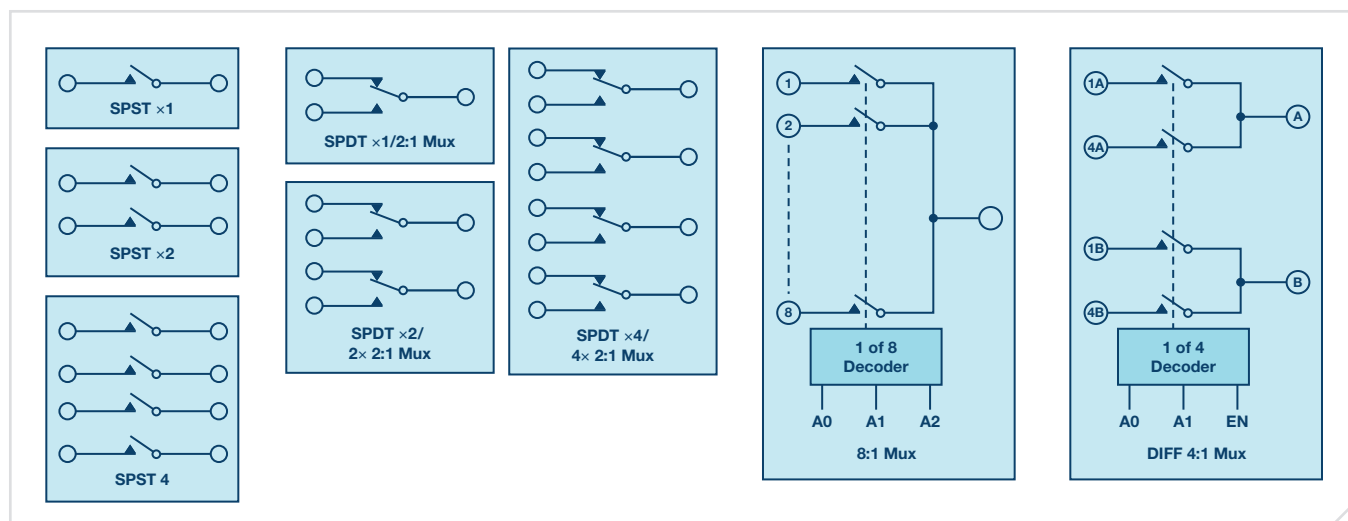


Trench isolation of NMOS and PMOS transistors.

Configuration

Do you need a switch or a multiplexer? For a switch, do you need an SPST (single-pole, single throw) or an SPDT (single-pole, double throw)? How many channels do you need? Do you need a bus switch or level translator (for digital signals)?

Common Switch and Multiplexer Configurations



Package

All ADI switches are offered in a number of different package options, offering, in some cases, up to 75% savings on board space vs. the nearest competitor. Details of these package types and information on package sizes can be seen on the back page of this guide.

Examples of Some of the Package Types Available

Package	Lead Count Options	Example Body Size (mm)	Example Board Area (mm ²)	Example Pitch (mm)	Package Code
TSSOP	14/16/20/24/28/38	5.0 × 4.4 × 0.65 (14-lead)	32 (14-lead)	0.65 (14-lead)	RU-X ²
MSOP	8/10	3.0 × 3.0 × 1.1 (8-lead)	14.7 (8-lead)	0.65 (8-lead)	RM-X ²
LFCSP	8/10/12/16/20/24/32/40/48	3.0 × 3.0 × 0.9 (8-lead)	9 (8-lead)	0.65 (8-lead)	CP-X ²
SOT-23	5/6/8	2.9 × 1.6 × 1.175 (5-lead)	8.12 (5-lead)	0.95 (5-lead)	RT/RJ-X ²
SC70	5/6	1.25 × 2.0 × 0.65 (5-lead)	4.2 (5-lead)	0.65 (5-lead)	KS-X ²
Mini LFCSP	10/16	1.3 × 1.6 × 0.6 (10-lead)	2.08 (10-lead)	0.4 (10-lead)	CP-X ²
WLCSP ¹	5/6/10/12/16	0.9 × 1.29 × 0.5 (5-ball)	1.16 (5-ball)	0.5 (5-ball)	CB-X ²

¹Dimensions dependent by part.
²X denotes number of leads.

Technical Support and Sales

Applications engineers are available by phone or email to discuss any queries with regard to any of our switches. Details can be found on our website analog.com. Samples are available for all our switches and can be requested through your local ADI representative.

Do you require enhanced product features (typically used for military/aerospace applications) or automotive qualified (AECQ-100) parts? Please contact ADI technical support and sales for details.

For more information on ADI switches and multiplexers, visit our website at analog.com/switch-mux.

Lineage Table

Looking for a part recommended for new designs, a robust switch, or a switch that has overvoltage protection and detection? Use the lineage tables below to select an alternative switch using your current switch. Use the *i*CMOS alternative table to select a switch with industry-leading performance in a very small form factor. If robustness is key, use the latch-up immune and overvoltage protection and detection alternative tables.

*i*CMOS Switch Alternative

Update a vintage switch to an *i*CMOS switch using the *i*CMOS alternative lineage table. *i*CMOS switches are available in TSSOP and ultrasmall LFCSP packages, enabling up to a 75% space savings compared to industry-standard solutions.



- ▶ ADG12xx: Switches and multiplexers that offer groundbreaking low capacitance per channel, as well as the industry's lowest, most stable charge injection performance, over the full signal range, with only 1.5 pF off capacitance and >1 pC charge injection.
- ▶ ADG14xx: The ADG14xx family of ±15 V switches and multiplexers has the industry best low on resistance (5 Ω max) and excellent on-resistance flatness (0.5 Ω).

Latch-Up Immune and High ESD Alternative

Utilize the latch-up immune alternative table to transition from an *i*CMOS switch to a latch-up immune switch. The latch-up immune switches are pin for pin compatible with *i*CMOS switches.

Combine the *i*CMOS alternative along with the latch-up immune alternative table to transition from a vintage switch to a latch-up immune switch.

- ▶ ADG54xx: Latch-up immune, low R_{ON} , high ESD protected switches and multiplexers.
- ▶ ADG52xx: Latch-up immune, low Q_{INJ} , low leakage switches and multiplexers.

Overvoltage Protection and Detection Alternative

Use the overvoltage protection and detection alternative table to transition from *i*CMOS, latch-up immune, or a previous overvoltage protection switch to the new overvoltage protection and detection family. The overvoltage protection and detection family devices are latch-up immune.

- ▶ ADG54xxF: Overvoltage protection and detection switches and multiplexers with high ESD protection, optimized for low R_{ON} .
- ▶ ADG52xxF: Overvoltage protection and detection switches and multiplexers with high ESD protection, optimized for low Q_{INJ} and low capacitance.

*i*CMOS Alternative

Vintage Switch	<i>i</i> CMOS Switch
ADG201A/ADG202A	ADG1211/ADG1212
ADG211A/ADG212A	ADG1211/ADG1212
ADG221/ADG222	ADG1411/ADG1412
ADG406/ADG407	ADG1406/ADG1407
ADG408/ADG409	ADG1408/ADG1409
ADG411	ADG1411
ADG412	ADG1412
ADG413	ADG1413
ADG417	ADG1401
ADG417	ADG1402
ADG419	ADG1419
ADG426	ADG1406
ADG428	ADG1408
ADG431/ADG432	ADG1411/ADG1412
ADG433	ADG1413
ADG436	ADG1436
ADG441/ADG442	ADG1211/ADG1212
ADG444	ADG1213
ADG451	ADG1411
ADG452	ADG1412
ADG453	ADG1413
ADG506A/ADG507A	ADG1206/ADG1207
ADG508A	ADG1208
ADG509A	ADG1209
ADG526A	ADG1206
ADG527A	ADG1207
ADG528A	ADG1208
ADG529A	ADG1209

Latch-Up Immune and High ESD Alternative

<i>i</i> CMOS/Vintage Switch	Latch-Up Immune Switch
ADG1204	ADG5204
ADG1206	ADG5206
ADG1207	ADG5207
ADG1208	ADG5208
ADG1209	ADG5209
ADG1212	ADG5212
ADG1213	ADG5213
ADG1233	ADG5233
ADG1234	ADG5234
ADG1236	ADG5236
ADG1401	ADG5401
ADG1402	ADG5401
ADG1404	ADG5404
ADG1408	ADG5408
ADG1409	ADG5409
ADG1411/ADG1412	ADG5412
ADG1413	ADG5413
ADG1421	ADG5421
ADG1423	ADG5423
ADG1433	ADG5433
ADG1434	ADG5434
ADG1436	ADG5436

Overvoltage Protection and Detection Alternatives

Switch Family	Part Number	New Overvoltage Protection and Detection Switch	
<i>i</i> CMOS	ADG1208	ADG5208F/ADG5248F	
	ADG1209	ADG5209F/ADG5249F	
	ADG1233	ADG5243F	
	ADG1404	ADG5404F	
	ADG1411	ADG5412F/ADG5412BF	
	ADG1412	ADG5412F/ADG5412BF	
	ADG1413	ADG5413F/ADG5413BF	
	ADG1436	ADG5436F	
	Latch-Up Immune	ADG5208	ADG5208F/ADG5248F
		ADG5209	ADG5209F/ADG5249F
ADG5233		ADG5243F	
ADG5404		ADG5404F	
ADG5412		ADG5412F/ADG5412BF	
ADG5413		ADG5413F/ADG5413BF	
ADG5436		ADG5436F	
Previous Overvoltage Protection		ADG438F	ADG5208F/ADG5248F
		ADG439F	ADG5209F/ADG5249F
		ADG4612	ADG5412F/ADG5412BF
	ADG4613	ADG5413F/ADG5413BF	
	ADG465	ADG5462F	
	ADG467	ADG5462F	
	ADG508F	ADG5208F/ADG5248F	
	ADG509F	ADG5209F/ADG5249F	
	ADG528F	ADG5208F/ADG5248F	

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