



Switches & Multiplexers – Cheat Sheet Document

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Switch Notes – Analog & Specialty Switches

ADI's analog switches pass analog signals such as - audio data, ultrasonic imaging data.

- The switches are available in low and high voltage ranges.
- Have low on-resistance, low capacitance, low leakage current.
- Useful in applications for low-pass filter and amplifier gain adjustment selection.

ADI's specialty switches provide solutions for LAN, PCI Express® (PCIe) & USB systems.

- Supports Beyond-The-Rails system design applications.
- Have high BW from DC to 34 GHz (MEMS).

The ADI switch portfolio assists system designers' applications in achieving

- Decreased signal distortion & insertion loss.
- Excellent isolation & low crosstalk.

Supported temp range

- -40°C to +85° C /+ 125° C
- -55°C to +210° C

Analog Switch Family



Low RON: <(0.5-15)Ω

Low Leakage: <0.1nA

Low Capacitance: <35pF

Low Voltage
(<5 V, ±2.5 V)

CONFIG/PKG

ADG8xx ^(21G, 31P) 1:1 SPST/ 2:1 SPDT 2:1 DPDT/4:1 MUX TSSOP/LFCSP/SC70 WLCSP/SOT23/MSOP	MAX47xx ^(33G, 41P) 1:1 SPST/ 2:1 SPDT Mini-SO/LFCSP/SC70	ADG7xx ^(49G, 76P) 1:1 SPST/ 2:1 SPDT 4/8/16/32:1 - MUX TSSOP/LFCSP/SC70 QSOP/SOIC/WLCSP SOT23/MSOP/TQFP	MAX47xx ^(33G, 41P) 1:1 SPST/ 2:1 SPDT Mini-SO/LFCSP/SC70	ADG7xx ^(49G, 76P) 1:1 SPST/ 2:1 SPDT 4/8/16/32:1 - MUX TSSOP/LFCSP/SC70 QSOP/SOIC/WLCSP SOT23/MSOP/TQFP	ADG9xx ^(9G, 11P) 1:1 SPST/ 2:1 SPDT 4:1 MUX TSSOP/LFCSP/MSOP (RF Focused)
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Med. Voltage
(5 V, ±5 V)

High Voltage
(12 V, ±15 V)

CONFIG/PKG

ADG14xx ^(22G, 42P) ADGS14xx ^(3G, 3P) ADGSx414D ^(2G, 2P) Dual/Quad/Octal - SPST SPDT/Dual-SPDT/SPI - I/F TSSOP/LFCSP/LGA	ADG16xx ^(12G, 23P) ADG24xx ^(1G, 1P) ADG64xx ^(1G, 1P) ADGS16xx ^(1G, 1P) 2:1 SPDT/Quad-SPST 4/8:1 - MUX TSSOP/LFCSP	ADG12xx ^(18G, 29P) 1:1 SPST/ 2:1 SPDT 4/8/16:1 - MUX TSSOP/LFCSP SOT23/MSOP	MAX3xx ^(62G, 145P) 1:1 SPST/ 2:1 SPDT 2/4/8/16:1 - MUX QSOP/CERDIP/SOIC PDIP/N-SOIC/uMAX	ADG6xx ^(13G, 27P) ADG12xx ^(18G, 29P) ADGS12xx ^(3G, 3P) SPST/SPDT MUX/SPI-I/F TSSOP/LFCSP SOT23/MSOP	ADG4xx ^(24G, 53P) MAX3xx ^(66G, 145P) ADG2xxA ^(2G, 10P) 1:1 SPST/2:1 SPDT/ 2/4/8:1 - MUX TSSOP/LFCSP SOT23/MSOP
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Legend: ADG8xx^(21G, 31P) means 21 generics & 31 package options available in the family. Slide shows 499 pkg options available.

Analog Switch Family – Contd...



Low RON: <(0.5-15)Ω

Low Leakage: <0.1nA

Low Capacitance: <35pF

High Voltage
+ Robust
(36 V, ±22 V)

CONFIG/PKG

ADG54xx^(12G, 24P)
ADGS54xx^(1G, 2P)

SPST/ Dual-SPST/SPDT
Quad -SPST/SPDT

TSSOP/LFCSP/MSOP
Latch Up Immune

ADG52xx^(10G, 22P)

SPST/SPDT

TSSOP/LFCSP
Latch Up Immune

ADG52xx^(10G, 22P)

SPST/SPDT

TSSOP/LFCSP
Latch Up Immune

High Voltage
+ Fault
(36 V, ±22 V)

CONFIG/PKG

ADG54xxF/BF^(8G, 14P)

1:1 SPST/ 2:1 SPDT
4:1 MUX

TSSOP/LFCSP

MAX45xx^(17G, 26P)

1:1 SPST/ 2:1 SPDT
2/4/8:1 - MUX

N-SOIC/SSOP/SOT23
uMAX/PDIP/CERDIP
Wide-SO

ADG52xxF^(6G, 10P)

2:1 SPDT
2/4/8:1 - MUX

TSSOP/LFCSP

MAX3xxF^(3G, 4P)

SPST

N-SOIC/PDIP

ADG52xxF^(6G, 10P)

2:1 SPDT
2/4/8:1 - MUX

TSSOP/LFCSP

MAX3xxF^(3G, 4P)

SPST

N-SOIC/PDIP

Slide shows 102 pkg options available.

Specialty Switch Family

Higher Bandwidth (DC – 34 GHz MEMS)

Beyond-The-Rails
(BTR)
MAX147xx
(16pkg)

- Switches analog signals up to ± 25 V with a single 3.0 V to 5.5 V supply
- Low Ron 1.5 Ω

USB 1.1, 2.0/LAN
MAX49xx, MAX47xx
(6 Generics -USB)
ADG772, ADG787
MAX48xx
(5 Generics - USB)

- up to ± 15 kV ESD
- Single +3.0 V to +3.6 V Supply
- On-Capacitance (C_{ON}): 8pF (typ)
- Bandwidth (650MHz – 1GHz)

PCIE
MAX4928A/B
MAX4888A/B
MAX4889A/B

- 2.5/5.0/8.0 Gbps data rates
- Superior return loss -10dB (typ.) at 5.0 GHz
- 3.0 V to 3.6 V Supply

MEMS
ADGM10xx
ADGM11xx
ADGM13xx
(7 Generics)

- Lowest loss switching
- 20x Smaller, 30x Faster
- 100x longer Cycle Lifetime

Switches considered shows 58 pkg options available.

Specialty Switch Family – Contd..



Enhanced Products (EP)

ADG6xx, ADG7xx (5 V, ± 5 V)
ADG4xx, ADG4xxF
ADG54xx, ADG54xxF
ADG52xx, ADG333A
(± 15 V operation)

- Latch up immune
- ADG798 & ADG5298 available in (-55°C to +210°C)
- Low capacitance
- ADG798 RON 10 Ω (max)
- Fast switching speeds

Level Translators

ADG32xx (12pkg)
ADG33xx (5 Generics)

- 3.3 V to 2.5 V, 2.5 V to 1.8 V Voltage translation
- 4.5 Ω RON typ. value
- High data rates of 1.2 Gbps available
- High switching speeds, low power dissipation

Automotive (AEC - Q100)

ADG708, ADG711, ADG728,
ADG736, ADG738, ADG658/9,
ADG5412, ADG5433,
ADG1411

- USB 2.0 switching in vehicles
- KL30/KL15 vehicle switching applications
- Low capacitance
- Low RON – less signal distortion

Crosspoint

ADG21xx (3 pkg) MAX14xxx
(4pkg)

- SPI / I2C controlled
- 1 Ω RON, 5 V or ± 2.5 V operation for MAX14724
- 35 Ω RON, 12 V or ± 5 V operation for ADG21xx

Switches considered shows 30 pkg options available.

Analog Switches & Multiplexers – Naming Convention

4 → Low On Resistance

2 → Low Capacitance, Q_{INJ} , and Leakage

5 → Latch-Up Proof

7 → Low Voltage

8 → Low Voltage, Sub-1 Ω On Resistance

EP → Enhanced Product (Mil-Aero)

ADG**4**12

ADG**2**12

ADG**S**5412

ADG**5412F**

ADG**7**12

ADG**8**12

ADG**9**18

ADG**1634L**

ADG**1436-EP**

ADG**M**1144

S → SPI Interface

F → Overvoltage Fault Protection

9 → RF Switches

L → Low Logic Control (1.2 V/1.8 V logic)

M → MEMS Switch (DC – 18 GHz) Operation

Switch Benchmark Parameters – Leading Switch



Benchmark Parameter	< 5.5 V Single Supply		± 5 V Dual Supply		±15 V Dual Supply		± 22 V Dual Supply	
RON - OnResistance	ADG801	0.25 Ω	ADG1611	1.0 Ω	ADG2412	0.5 Ω	ADG6412	0.5 Ω
Leakage @ +85° C	ADG774A	250 pA	ADG636	250 pA	ADG5212	250 pA	ADG5212	250 pA
Charge Injection - QiNJ	ADG772	0.5 pC	ADG611	-0.5 pC	ADG5212	0.07 pC	ADG5212	0.07 pC
RON x COFF Product	ADG774A	1.98 pF. Ω	ADG1611	5 pF. Ω	ADG1401	1.6 pF.Ω	ADG5412F	5 pF. Ω
Fast Speed	ADG774A	6 ns	ADG611	45 ns	ADG1204	70 ns	ADG5209	120 ns
Bandwidth	ADG772	630 MHz	ADG611	680 MHz	ADG1212	1 GHz	ADG5212	460 MHz
Off -Isolation	ADG779	-87 dB	ADG633	-90 dB	ADG508F	-93 dB	ADG5206	-90 dB
Continuous Current - 1 Ch. @ +25° C	ADG801	400 mA	ADGS1612	566 mA	ADG2412	847 mA	ADG6412	847 mA
Lowest Power Supply	ADG841	1.65 V	ADG611	2.7 V	ADG14xx	10.8 V ±4.5 V	ADG54xxF ADG52xxF	12 V ±5 V
Widest Power Supply	ADG7xx	5.5 V ±2.5 V	ADG16xx	13.2 V ±5.5 V	ADG54xxF ADG52xxF	39.6 V ±22 V	ADG54xxF ADG52xxF	39.6 V ±22 V
Power Consumption - IDD	ADG7xx ADG8xx	1 nA typ	ADG16xx	1 nA	ADG413	100 pA	ADG54xxF ADG52xxF	50 uA
Absolute Footprint	ADG772	1.33 mm x 1.6 mm (LFCSP)	ADG619	1.33 mm x 1.6 mm (SOT-23)	ADG1201	2.9 mm x 2.8 mm (SOT-23)	ADG5401	2.9 mm x 3.0 mm (LFCSP)
Density - Switch Area/Channel	ADG888 (Dual DPDT)	4 mm ² /8 (WLCSP)	ADG1608 (8:1 Mux)	9 mm ² /8 (LFCSP)	ADG5206 (16:1 Mux)	25 mm ² /16 (LFCSP)	ADG5206 (16:1 Mux)	25 mm ² /16 (LFCSP)

AHEAD OF WHAT'S POSSIBLE

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