

ADG417* PRODUCT PAGE QUICK LINKS

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COMPARABLE PARTS

View a parametric search of comparable parts.

DOCUMENTATION

Application Notes

- AN-1313: Configuring the AD5422 to Combine Output Current and Output Voltage to a Single Output Pin

Data Sheet

- ADG417: LC²MOS Precision Mini-DIP Analog Switch Data Sheet

REFERENCE MATERIALS

Product Selection Guide

- Switches and Multiplexers Product Selection Guide

Technical Articles

- CMOS Switches Offer High Performance in Low Power, Wideband Applications
- Data-acquisition system uses fault protection
- Enhanced Multiplexing for MEMS Optical Cross Connects
- Temperature monitor measures three thermal zones

DESIGN RESOURCES

- ADG417 Material Declaration
- PCN-PDN Information
- Quality And Reliability
- Symbols and Footprints

DISCUSSIONS

View all ADG417 EngineerZone Discussions.

SAMPLE AND BUY

Visit the product page to see pricing options.

TECHNICAL SUPPORT

Submit a technical question or find your regional support number.

DOCUMENT FEEDBACK

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ADG417—SPECIFICATIONS

Dual Supply¹ ($V_{DD} = +15\text{ V} \pm 10\%$, $V_{SS} = -15\text{ V} \pm 10\%$, $V_L = +5\text{ V} \pm 10\%$, $GND = 0\text{ V}$, unless otherwise noted)

Parameter	B Version		T Version		Units	Test Conditions/Comments
	+25°C	−40°C to +85°C	+25°C	−55°C to +125°C		
ANALOG SWITCH						
Analogue Signal Range		V _{SS} to V _{DD}		V _{SS} to V _{DD}	V	
R _{ON}	25		25		Ω typ	V _D = ±12.5 V, I _S = −10 mA
	35	45	35	45	Ω max	V _{DD} = +13.5 V, V _{SS} = −13.5 V
LEAKAGE CURRENTS						
Source OFF Leakage I _S (OFF)	±0.1		±0.1		nA typ	V _{DD} = +16.5 V, V _{SS} = −16.5 V
	±0.25	±5	±0.25	±15	nA max	V _D = ±15.5 V, V _S = ∓15.5 V;
Drain OFF Leakage I _D (OFF)	±0.1		±0.1		nA typ	Test Circuit 2
	±0.25	±5	±0.25	±15	nA max	V _D = ±15.5 V, V _S = ∓15.5 V;
Channel ON Leakage I _D , I _S (ON)	±0.1		±0.1		nA typ	Test Circuit 2
	±0.4	±5	±0.4	±30	nA max	V _S = V _D = ±15.5 V;
						Test Circuit 3
DIGITAL INPUTS						
Input High Voltage, V _{INH}		2.4		2.4	V min	
Input Low Voltage, V _{INL}		0.8		0.8	V max	
Input Current						
I _{INL} or I _{INH}		±0.005		±0.005	μA typ	V _{IN} = V _{INL} or V _{INH}
		±0.5		±0.5	μA max	
DYNAMIC CHARACTERISTICS ²						
t _{ON}	100		100		ns typ	R _L = 300 Ω, C _L = 35 pF;
	160	200	145	200	ns max	V _S = ±10 V; Test Circuit 4
t _{OFF}	60		60		ns typ	R _L = 300 Ω, C _L = 35 pF;
	100	150	100	150	ns max	V _S = ±10 V; Test Circuit 4
Charge Injection	7		7		pC typ	V _S = 0 V, R _L = 0 Ω,
						C _L = 10 nF; Test Circuit 5
OFF Isolation	80		80		dB typ	R _L = 50 Ω, f = 1 MHz;
						Test Circuit 6
C _S (OFF)	6		6		pF typ	
C _D (OFF)	6		6		pF typ	
C _D , C _S (ON)	55		55		pF typ	
POWER REQUIREMENTS						
I _{DD}	0.0001		0.0001		μA typ	V _{DD} = +16.5 V, V _{SS} = −16.5 V
	1	2.5	1	2.5	μA max	V _{IN} = 0 V or 5 V
I _{SS}	0.0001		0.0001		μA typ	
	1	2.5	1	2.5	μA max	
I _L	0.0001		0.0001		μA typ	V _L = +5.5 V
	1	2.5	1	2.5	μA max	

NOTES

¹Temperature ranges are as follows: B Version: -40°C to $+85^\circ\text{C}$; T Version: -55°C to $+125^\circ\text{C}$.

²Guaranteed by design, not subject to production test.

Specifications subject to change without notice.

Single Supply¹ ($V_{DD} = +12\text{ V} \pm 10\%$, $V_{SS} = 0\text{ V}$, $V_L = +5\text{ V} \pm 10\%$, $GND = 0\text{ V}$, unless otherwise noted)

Parameter	B Version −40°C to		T Version −55°C to		Units	Test Conditions/Comments
	+25°C	+85°C	+25°C	+125°C		
ANALOG SWITCH						
Analog Signal Range		0 to V_{DD}		0 to V_{DD}	V	
R_{ON}	40	60	40	70	Ω typ Ω max	$V_D = +3\text{ V}$, $+8.5\text{ V}$, $I_S = -10\text{ mA}$ $V_{DD} = +10.8\text{ V}$
LEAKAGE CURRENT						
Source OFF Leakage I_S (OFF)	± 0.1 ± 0.25	± 5	± 0.1 ± 0.25	± 15	nA typ nA max	$V_{DD} = +13.2\text{ V}$ $V_D = 12.2\text{ V}/1\text{ V}$, $V_S = 1\text{ V}/12.2\text{ V}$; Test Circuit 2
Drain OFF Leakage I_D (OFF)	± 0.1 ± 0.25	± 5	± 0.1 ± 0.25	± 15	nA typ nA max	$V_D = 12.2\text{ V}/1\text{ V}$, $V_S = 1\text{ V}/12.2\text{ V}$; Test Circuit 2
Channel ON Leakage I_D , I_S (ON)	± 0.1 ± 0.4	± 5	± 0.1 ± 0.4	± 30	nA typ nA max	$V_S = V_D = 12.2\text{ V}/1\text{ V}$; Test Circuit 3
DIGITAL INPUTS						
Input High Voltage, V_{INH}		2.4		2.4	V min	
Input Low Voltage, V_{INL}		0.8		0.8	V max	
Input Current I_{INL} or I_{INH}		± 0.005 ± 0.5		± 0.005 ± 0.5	μA typ μA max	$V_{IN} = V_{INL}$ or V_{INH}
DYNAMIC CHARACTERISTICS ²						
t_{ON}	180	250	180	250	ns max	$R_L = 300\ \Omega$, $C_L = 35\text{ pF}$; $V_S = +8\text{ V}$; Test Circuit 4
t_{OFF}	85	110	85	110	ns max	$R_L = 300\ \Omega$, $C_L = 35\text{ pF}$; $V_S = +8\text{ V}$; Test Circuit 4
Charge Injection	11		11		pC typ	$V_S = 0\text{ V}$, $R_S = 0\ \Omega$, $C_L = 10\text{ nF}$; Test Circuit 5
OFF Isolation	80		80		dB typ	$R_L = 50\ \Omega$, $f = 1\text{ MHz}$; Test Circuit 6
C_S (OFF)	13		13		pF typ	
C_D (OFF)	13		13		pF typ	
C_D , C_S (ON)	65		65		pF typ	
POWER REQUIREMENTS						
I_{DD}	0.0001 1	2.5	0.0001 1	2.5	μA typ μA max	$V_{DD} = +13.2\text{ V}$ $V_{IN} = 0\text{ V}$ or 5 V
I_L	0.0001 1	2.5	0.0001 1	2.5	μA typ μA max	$V_L = +5.5\text{ V}$

NOTES

¹Temperature ranges are as follows: B Version: −40°C to +85°C; T Version: −55°C to +125°C.

²Guaranteed by design, not subject to production test.

Specifications subject to change without notice.

Table I. Truth Table

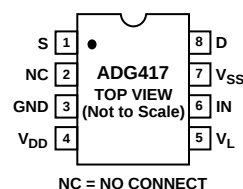
Logic	Switch Condition
0	ON
1	OFF

ORDERING GUIDE

Model	Temperature Range	Package Options*
ADG417BN	−40°C to +85°C	N-8
ADG417BR	−40°C to +85°C	SO-8

*N = Plastic DIP, SO = 0.15" Small Outline IC (SOIC).

PIN CONFIGURATION DIP/SOIC



NC = NO CONNECT

ADG417

ABSOLUTE MAXIMUM RATINGS¹

(T_A = +25°C unless otherwise noted)

V _{DD} to V _{SS}	+44 V
V _{DD} to GND	−0.3 V to +25 V
V _{SS} to GND	+0.3 V to −25 V
V _L to GND	−0.3 V to V _{DD} + 0.3 V
Analog, Digital Inputs ²	V _{SS} − 2 V to V _{DD} + 2 V or 30 mA, Whichever Occurs First
Continuous Current, S or D	30 mA
Peak Current, S or D (Pulsed at 1 ms, 10% Duty Cycle Max)	100 mA
Operating Temperature Range	
Industrial (B Version)	−40°C to +85°C
Extended (T Version)	−55°C to +125°C
Storage Temperature Range	−65°C to +150°C
Junction Temperature	150°C

Plastic Package, Power Dissipation	400 mW
θ _{JA} , Thermal Impedance	100°C/W
Lead Temperature, Soldering (10 sec)	+260°C
SOIC Package, Power Dissipation	400 mW
θ _{JA} , Thermal Impedance	155°C/W
Lead Temperature, Soldering	
Vapor Phase (60 sec)	+215°C
Infrared (15 sec)	+220°C

NOTES

¹Stresses above those listed under Absolute Maximum Ratings may cause permanent damage to the device. This is a stress rating only; functional operation of the device at these or any other conditions above those listed in the operational sections of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability. Only one absolute maximum rating may be applied at any one time.

²Overvoltages at IN, S or D will be clamped by internal diodes. Current should be limited to the maximum ratings given.

CAUTION

ESD (electrostatic discharge) sensitive device. Electrostatic charges as high as 4000 V readily accumulate on the human body and test equipment and can discharge without detection. Although the ADG417 features proprietary ESD protection circuitry, permanent damage may occur on devices subjected to high energy electrostatic discharges. Therefore, proper ESD precautions are recommended to avoid performance degradation or loss of functionality.



TERMINOLOGY

V _{DD}	Most positive power supply potential.
V _{SS}	Most negative power supply potential in dual supplies. In single supply applications, it may be connected to GND.
V _L	Logic power supply (+5 V).
GND	Ground (0 V) reference.
S	Source terminal. May be an input or an output.
D	Drain terminal. May be an input or an output.
IN	Logic control input.
R _{ON}	Ohmic resistance between D and S.
I _S (OFF)	Source leakage current with the switch "OFF."
I _D (OFF)	Drain leakage current with the switch "OFF."
I _D , I _S (ON)	Channel leakage current with the switch "ON."

V _D (V _S)	Analog voltage on terminals D, S.
C _S (OFF)	"OFF" switch source capacitance.
C _D (OFF)	"OFF" switch drain capacitance.
C _D , C _S (ON)	"ON" switch capacitance.
t _{ON}	Delay between applying the digital control input and the output switching on.
t _{OFF}	Delay between applying the digital control input and the output switching off.
V _{INL}	Maximum input voltage for logic "0."
V _{INH}	Minimum input voltage for logic "1."
I _{INL} (I _{INH})	Input current of the digital input.
Charge Injection	A measure of the glitch impulse transferred from the digital input to the analog output during switching.
Off Isolation	A measure of unwanted signal coupling through an "OFF" channel.
I _{DD}	Positive supply current.
I _{SS}	Negative supply current.
I _L	Logic supply current.

Typical Performance Characteristics—ADG417

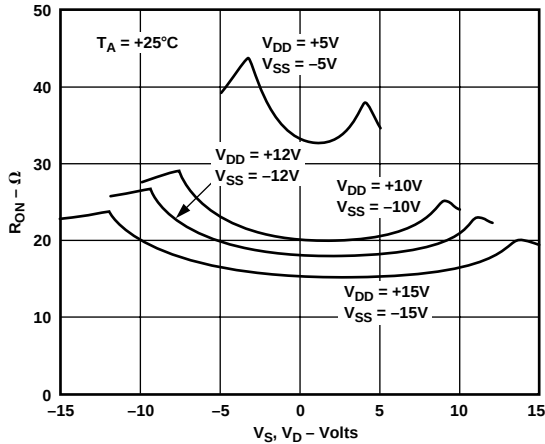


Figure 1. R_{ON} as a Function of V_D (V_S): Dual Supply Voltage

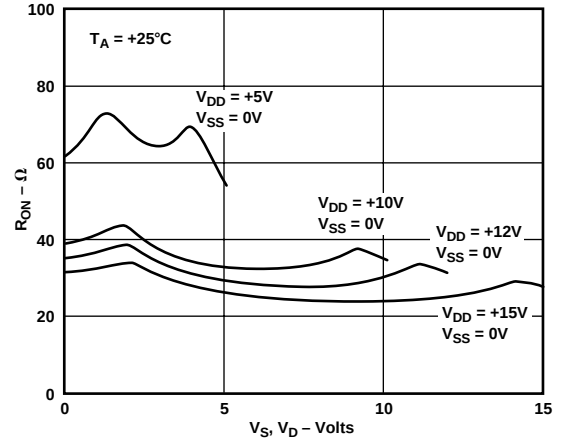


Figure 4. R_{ON} as a Function of V_D (V_S): Single Supply Voltage

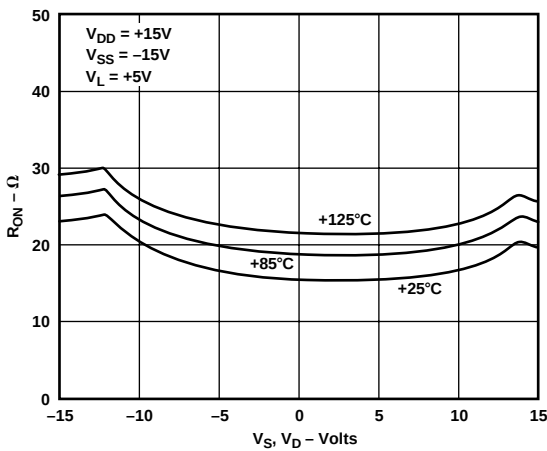


Figure 2. R_{ON} as a Function of V_D (V_S) for Different Temperatures

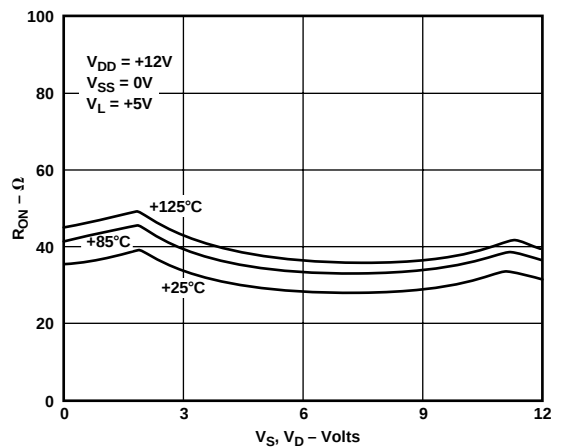


Figure 5. R_{ON} as a Function of V_D (V_S) for Different Temperatures

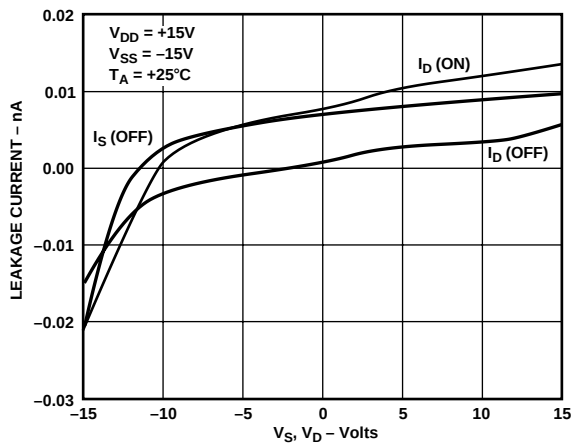


Figure 3. Leakage Currents as a Function of V_S (V_D)

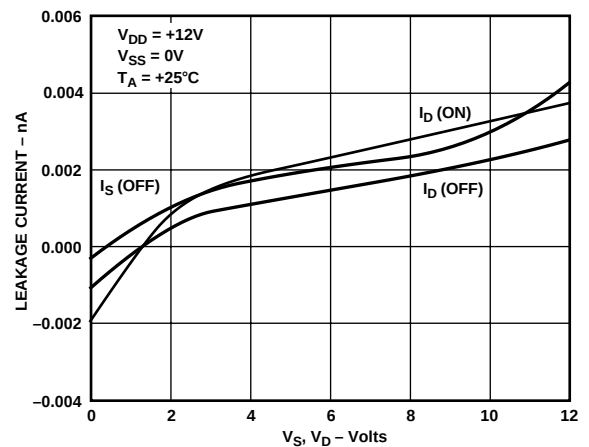


Figure 6. Leakage Currents as a Function of V_S (V_D)

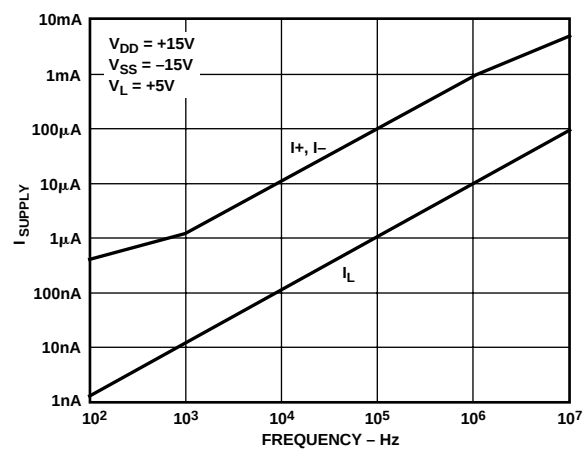


Figure 7. Supply Current vs. Input Switching Frequency

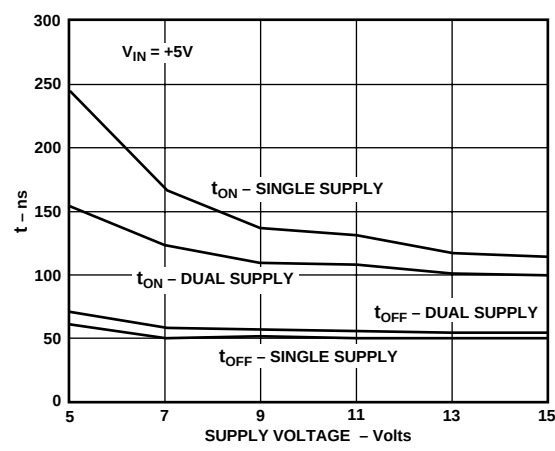
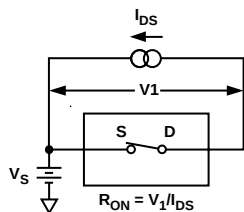
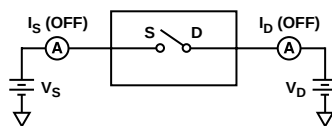


Figure 8. Switching Time vs. Power Supply

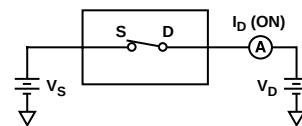
Test Circuits



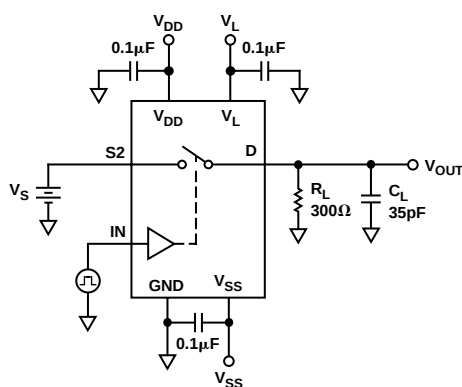
Test Circuit 1. On Resistance



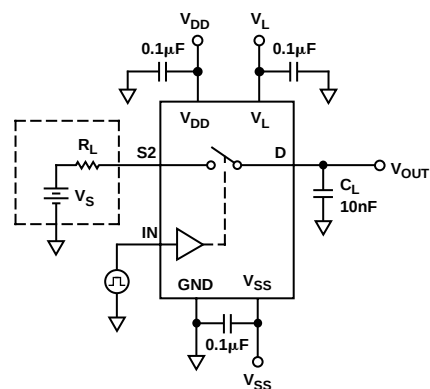
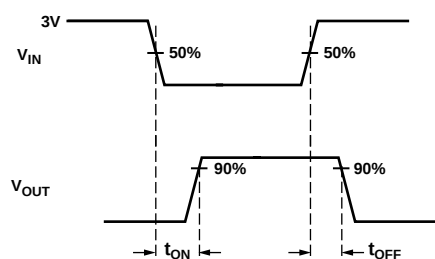
Test Circuit 2. Off Leakage



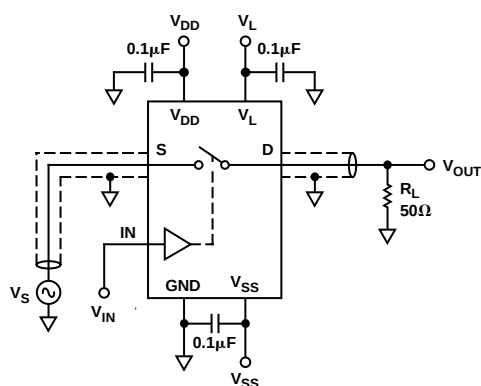
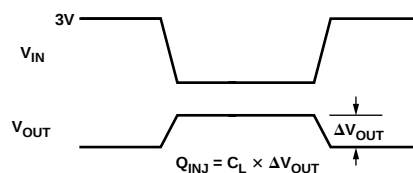
Test Circuit 3. On Leakage



Test Circuit 4. Switching Times



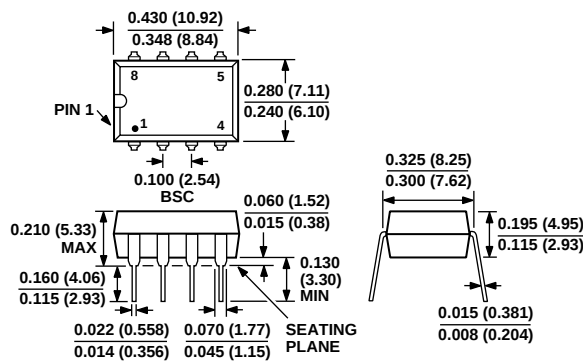
Test Circuit 5. Charge Injection



Test Circuit 6. Off Isolation

OUTLINE DIMENSIONS
Dimensions shown in inches and (mm).

8-Lead Plastic DIP (N-8)



8-Lead SOIC (SO-8)
(Narrow Body)

