



U74AHC4066

CMOS IC

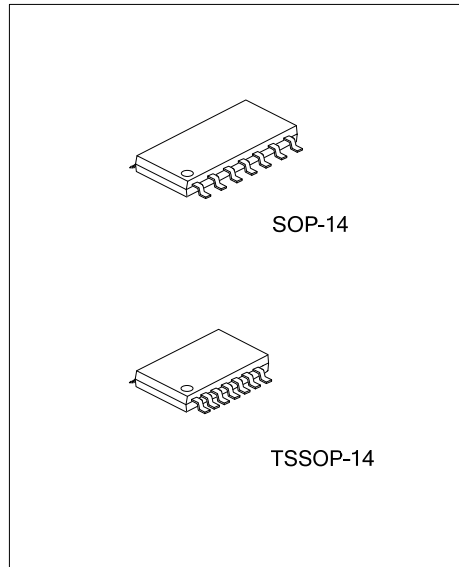
QUADRUPLE BILATERAL ANALOG SWITCH

DESCRIPTION

The **U74AHC4066** is a quadruple bilateral analog switch which has 4 channels.

FEATURES

- * Operate From 2V to 5.5V
- * Max t_{PD} of 7ns at 5 V
- * Low Power Dissipation: $I_{CC}=20\mu A(\text{Max})$
- * Low Input Current: $I_{I(L)}=1\mu A(\text{Max})$

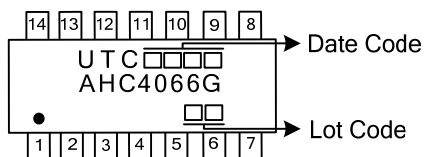


ORDERING INFORMATION

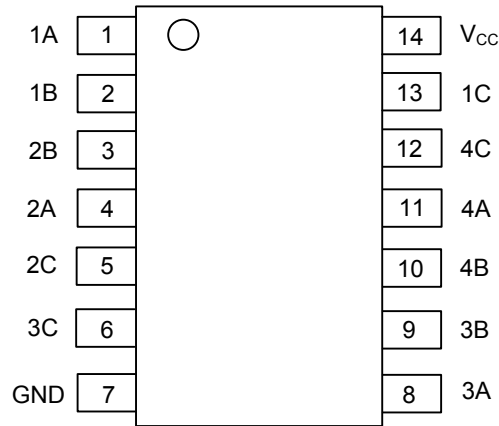
Ordering Number	Package	Packing
U74AHC4066G-S14-R	SOP-14	Tape Reel
U74AHC4066G-P14-R	TSSOP-14	Tape Reel

<p>U74AHC4066G-S14-R</p>	<p>(1) Packing Type (1) R: Tape Reel</p> <p>(2) Package Type (2) S14: SOP-14, P14: TSSOP-14</p> <p>(3) Green Package (3) G: Halogen Free and Lead Free</p>
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MARKING



■ PIN CONFIGURATION

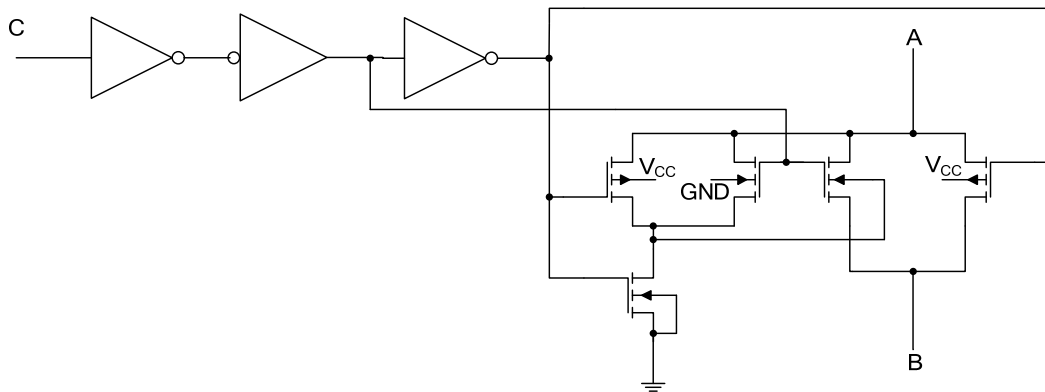


■ FUNCTION TABLE

INPUTS CONTROL (C)	SWITCH
H	ON
L	OFF

Note: H: HIGH voltage level;
L: LOW voltage level.

■ LOGIC DIAGRAM



One Of Four Switches

■ ABSOLUTE MAXIMUM RATING ($T_A=25^{\circ}\text{C}$, unless otherwise specified)

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	V_{CC}	-0.5 ~ +7	V
Input Voltage	V_{IN}	-0.5 ~ +7	V
Switch I/O Voltage	V_{IO}	-0.5 ~ $V_{CC} + 0.5$	V
V_{CC} or GND Current	I_{CC}	± 50	mA
Output Clamp Current	I_{OK}	± 50	mA
Input Clamp Current	I_{IK}	-20	mA
On-State Switch Current	I_T	± 25	mA
Operating Temperature	T_{OPR}	-40 ~ + 85	$^{\circ}\text{C}$
Storage Temperature	T_{STG}	-65 ~ + 150	$^{\circ}\text{C}$

Note: Absolute maximum ratings are those values beyond which the device could be permanently damaged.
 Absolute maximum ratings are stress ratings only and functional device operation is not implied.

■ THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	SOP-14	86	$^{\circ}\text{C}/\text{W}$
	TSSOP-14	113	$^{\circ}\text{C}/\text{W}$

Note: The package thermal impedance is calculated in accordance with JESD 51-7.

■ RECOMMENDED OPERATING CONDITIONS

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Supply Voltage	V_{CC}		2		5.5	V
High-Level Input Voltage	V_{IH}	$V_{CC}=2\text{V}$	1.5			V
		$V_{CC}=2.3\text{V to } 2.7\text{V}$	$V_{CC} \times 0.7$			
		$V_{CC}=3\text{V to } 3.6\text{V}$	$V_{CC} \times 0.7$			
		$V_{CC}=4.5\text{V to } 5.5\text{V}$	$V_{CC} \times 0.7$			
Low-Level Input Voltage	V_{IL}	$V_{CC}=2\text{V}$			0.5	V
		$V_{CC}=2.3\text{V to } 2.7\text{V}$			$V_{CC} \times 0.3$	
		$V_{CC}=3\text{V to } 3.6\text{V}$			$V_{CC} \times 0.3$	
		$V_{CC}=4.5\text{V to } 5.5\text{V}$			$V_{CC} \times 0.3$	
Input Voltage	V_{IN}		0		5.5	V
Output Voltage	V_{OUT}		0		V_{CC}	V
Input Transition Rise or Fall Rate	t_R / t_F	$V_{CC}=2.3\text{V to } 2.7\text{V}$			200	ns/V
		$V_{CC}=3\text{V to } 3.6\text{V}$			100	
		$V_{CC}=4.5\text{V to } 5.5\text{V}$			20	

■ ELECTRICAL CHARACTERISTICS (T_A=25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
On-state Switch Resistance	R _{ON}	I _T =-1mA, V _{IN} =GND or V _{CC} , V _C =V _{IH}	V _{CC} =2.3V	38	180	Ω
			V _{CC} =3V	29	150	
			V _{CC} =4.5V	21	75	
Peak On-state Resistance	R _{ON(P)}	I _T =-1mA, V _{IN} =GND to V _{CC} , V _C =V _{IH}	V _{CC} =2.3V	143	500	Ω
			V _{CC} =3V	57	180	
			V _{CC} =4.5V	31	100	
Difference In On-state Resistance Between Switches	ΔR _{ON}	I _T =-1mA, V _{IN} =GND to V _{CC} , V _C =V _{IH}	V _{CC} =2.3V	6	30	Ω
			V _{CC} =3V	3	20	
			V _{CC} =4.5V	2	15	
Control Input Current	I _{I(CTL)}	V _{CC} =0 to 5.5V, V _C =5.5V or GND		±0.1		μA
On-state Switch Leakage Current	I _{S(ON)}	V _{CC} =5.5V, V _{IN} =V _{CC} or GND, V _C =V _{IH}		±0.1		μA
Off-state Switch Leakage Current	I _{S(OFF)}	V _{CC} =5.5V, V _{IN} =V _{CC} and V _O =GND, or V _{IN} =GND and V _O =V _{CC} , V _C =V _{IL}		±0.1		μA
Quiescent Supply Current	I _Q	V _{CC} =5.5V, V _C =V _{CC} or GND			2	μA
Control Input Capacitance	C _{IC}			1.5		pF
Feed-through Capacitance	C _F			0.5		pF
Switch Input/Output Capacitance	C _{IO}			5.5		pF

■ SWITCHING CHARACTERISTICS (T_A=25°C, see test circuit and waveforms)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Propagation Delay Time, From A to B Or B to A	t _{PLH} /t _{PHL}	C _L =15pF	V _{CC} =2.5V±0.2V	1.2	10	ns
			V _{CC} =3.3V±0.3V	0.8	6	
			V _{CC} =5V±0.5V	0.3	4	
Propagation Delay Time, From A to B Or B to A	t _{PLH} /t _{PHL}	C _L =50pF	V _{CC} =2.5V±0.2V	2.6	12	ns
			V _{CC} =3.3V±0.3V	1.5	9	
			V _{CC} =5V±0.5V	0.6	6	
Switch Turn-on Time, From C to A or B	t _{PZL} /t _{PZH}	C _L =15pF	V _{CC} =2.5V±0.2V	3.3	15	ns
			V _{CC} =3.3V±0.3V	2.3	11	
			V _{CC} =5V±0.5V	1.6	7	
Switch Turn-on Time, From C to A or B	t _{PZL} /t _{PZH}	C _L =50pF	V _{CC} =2.5V±0.2V	4.2	25	ns
			V _{CC} =3.3V±0.3V	3	18	
			V _{CC} =5V±0.5V	2.1	12	
Switch Turn-off Time, From C to A or B	t _{PLZ} /t _{PHZ}	C _L =15pF	V _{CC} =2.5V±0.2V	6	15	ns
			V _{CC} =3.3V±0.3V	4.5	11	
			V _{CC} =5V±0.5V	3.2	7	
Switch Turn-off Time, From C to A or B	t _{PLZ} /t _{PHZ}	C _L =50pF	V _{CC} =2.5V±0.2V	9.6	25	ns
			V _{CC} =3.3V±0.3V	7.2	18	
			V _{CC} =5V±0.5V	5.1	12	

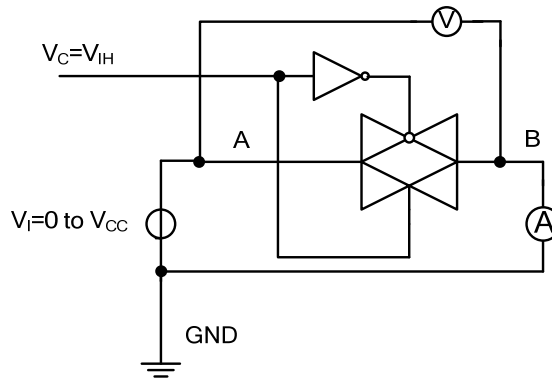
■ ANALOG SWITCHING CHARACTERISTICS (T_A=25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT	
Frequency Response (Switch On), From A to B Or B to A		C _L = 50pF, R _L = 600Ω, f _{IN} = 1MHz, 20log ₁₀ (V _O /V _I) = -3dB	V _{CC} = 2.3V		30		MHZ
			V _{CC} = 3V		35		
			V _{CC} = 4.5V		50		
Crosstalk (Between Any Switches), From A to B Or B to A		C _L = 50pF, R _L = 600Ω, f _{IN} = 1MHz	V _{CC} = 2.3V		-45		dB
			V _{CC} = 3V		-45		
			V _{CC} = 4.5V		-45		
Crosstalk (Control Input To Signal Output), From C to A or B		C _L = 50pF, R _L = 600Ω, f _{IN} = 1MHz	V _{CC} = 2.3V		15		mV
			V _{CC} = 3V		20		
			V _{CC} = 4.5V		50		
Feed-through Attenuation (Switch Off), From A to B Or B to A		C _L = 50pF, R _L = 600Ω, f _{IN} = 1MHz	V _{CC} = 2.3V		-40		dB
			V _{CC} = 3V		-40		
			V _{CC} = 4.5V		-40		
Sine-wave Distortion		C _L = 50pF, R _L = 10KΩ, f _{IN} = 1KHz	V _{CC} = 2.3V, V _I = 2 V _{P-P}		0.1		%
			V _{CC} = 3V, V _I = 2.5 V _{P-P}		0.1		
			V _{CC} = 4.5V, V _I = 4 V _{P-P}		0.1		

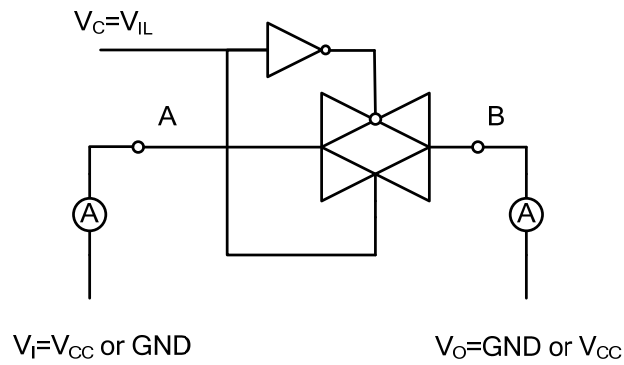
■ OPERATING CHARACTERISTICS (T_A=25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Power Dissipation Capacitance	C _{PD}	C _L = 50pF, f = 1MHz		4.5		pF

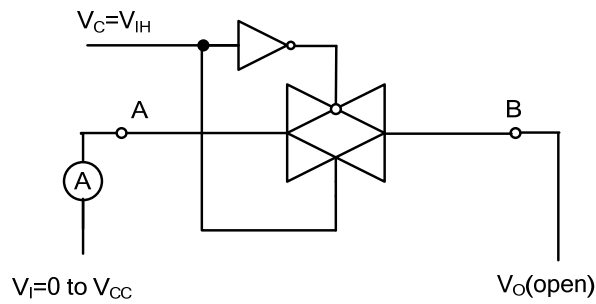
■ TEST CIRCUIT AND WAVEFORMS



Test circuit for measuring ON-state resistance R_{ON}

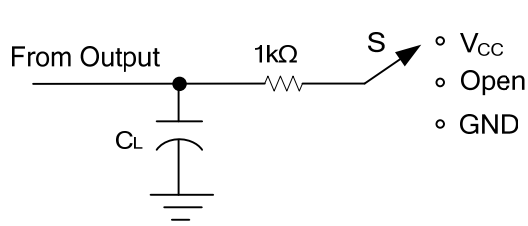


Test circuit for measuring OFF-state current



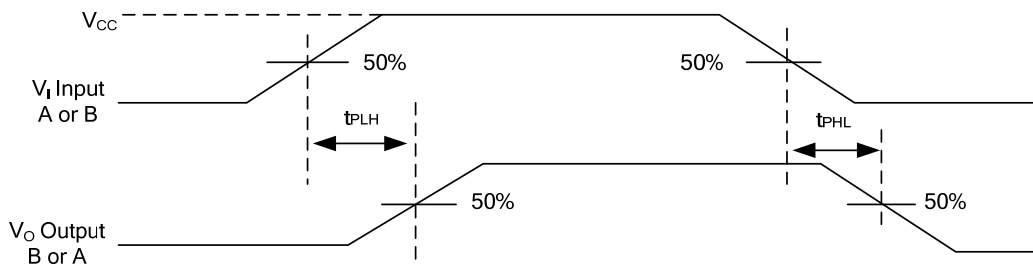
Test circuit for measuring ON-state current

■ TEST CIRCUIT AND WAVEFORMS(Cont.)

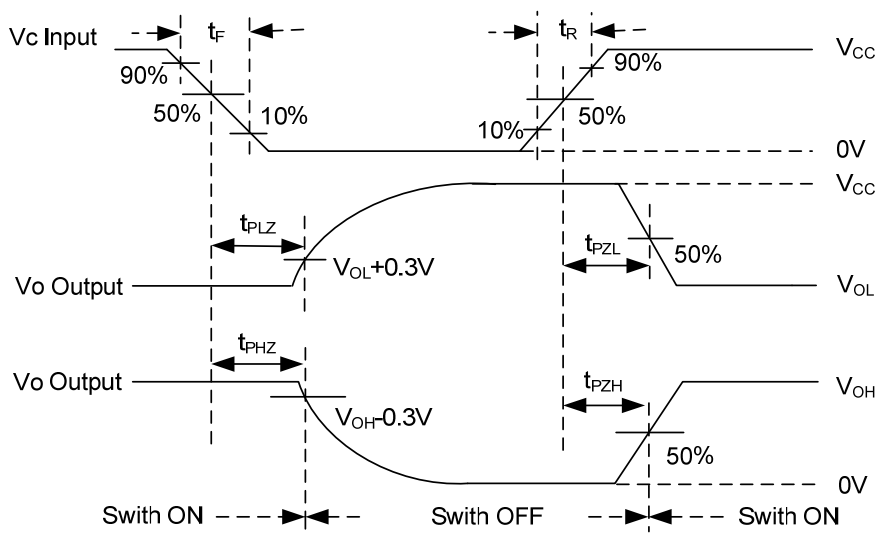


TEST	S	V _I
t_{PLH}/t_{PHL}	Open	Pulse
t_{PHZ}/t_{PZH}	GND	V _{CC}
t_{PLZ}/t_{PZL}	V _{CC}	GND

Test circuit for measuring propagation delay time, switching time



Waveforms showing the Input(V_i) to Output(V_o) propagation delays



Waveforms showing the turn-on and turn-off times

Note: C_L includes probe and jig capacitance.

All input pulses are supplied by generators having the following characteristics: PRR ≤ 1MHz, Z_o = 50Ω, tr ≤ 3ns, tf ≤ 3ns.

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