



## U74AHCT4066

CMOS IC

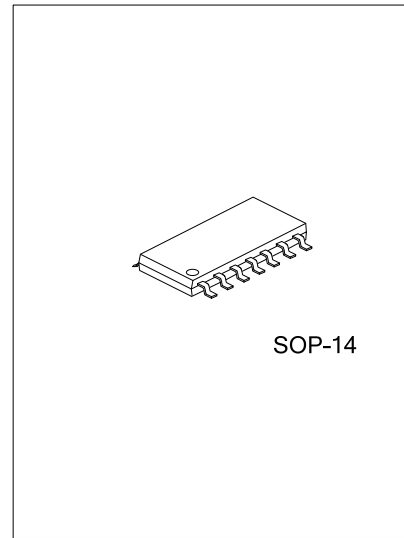
### QUADRUPLE BILATERAL ANALOG SWITCH

#### DESCRIPTION

The **U74AHCT4066** is a quadruple bilateral analog switch which has 4 channels.

#### FEATURES

- \* Inputs Are TTL-Voltage Compatible
- \* Max  $t_{PD}$  of 6ns at 5 V
- \* Low Power Dissipation:  $I_{CC}=2\mu A(\text{Max})$
- \* Low Input Current:  $I_{IN}=1\mu A(\text{Max})$

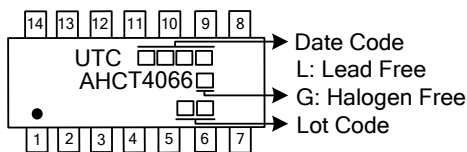


#### ORDERING INFORMATION

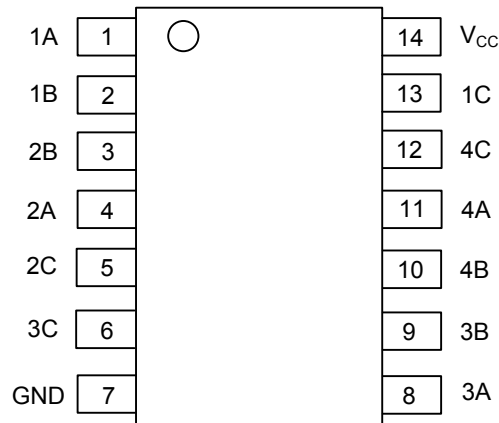
Ordering Number		Package	Packing
Lead Free	Halogen Free		
U74AHCT4066L-S14-R	U74AHCT4066G-S14-R	SOP-14	Tape Reel

<p>U74AHCT4066G-S14-R</p> <ul style="list-style-type: none"> <li>(1) Packing Type</li> <li>(2) Package Type</li> <li>(3) Green Package</li> </ul>	<ul style="list-style-type: none"> <li>(1) R: Tape Reel</li> <li>(2) S14: SOP-14</li> <li>(3) G: Halogen Free and Lead Free, L: Lead Free</li> </ul>
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#### MARKING



■ PIN CONFIGURATION

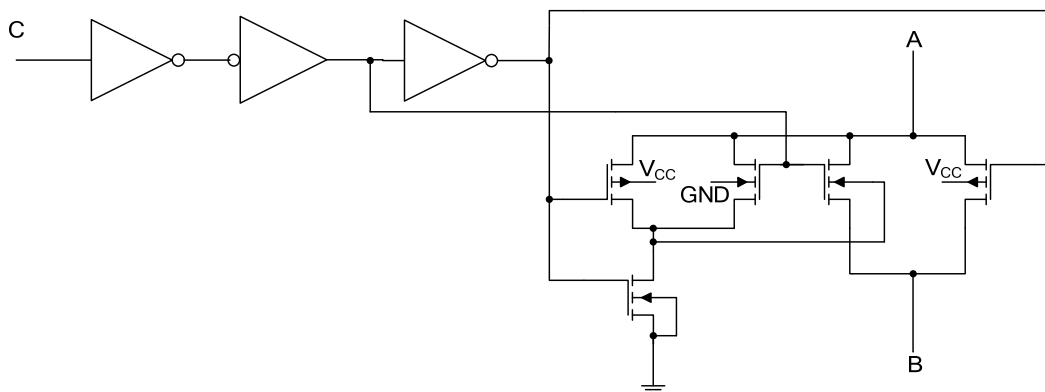


■ FUNCTION TABLE

INPUTS CONTROL (C)	SWITCH
H	ON
L	OFF

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

■ LOGIC DIAGRAM



One Of Four Switches

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■ ABSOLUTE MAXIMUM RATING (T<sub>A</sub>=25°C, unless otherwise specified)

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage Range	V <sub>CC</sub>	-0.5 ~ +7	V
Input Voltage Range	V <sub>C</sub>	-0.5 ~ +7	V
Switch I/O Voltage Range	V <sub>IO</sub>	-0.5 ~ V <sub>CC</sub> +0.5	V
V <sub>CC</sub> or GND Current	I <sub>CC</sub>	±50	mA
I/O Diode Current	I <sub>I/O</sub>	±50	mA
Control Input Clamp Current	I <sub>IK</sub>	-20	mA
On-state Switch Current	I <sub>T</sub>	±25	mA
Operating Temperature	T <sub>OPR</sub>	-40 ~ + 85	°C
Storage Temperature	T <sub>STG</sub>	-65 ~ + 150	°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	θ <sub>JA</sub>	86	°C/W

■ RECOMMENDED OPERATING CONDITIONS

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Supply Voltage	V <sub>CC</sub>		4.5		5.5	V
High-Level Input Voltage	V <sub>IH</sub>	V <sub>CC</sub> =4.5V to 5.5V	2			V
Low-Level Input Voltage	V <sub>IL</sub>	V <sub>CC</sub> =4.5V to 5.5V			0.8	V
Control Input Voltage	V <sub>C</sub>		0		5.5	V
Input/Output Voltage	V <sub>IO</sub>		0		V <sub>CC</sub>	V
Input Transition Rise or Fall Rate	t <sub>R</sub> / t <sub>F</sub>	V <sub>CC</sub> =4.5V to 5.5V	0		20	ns/V

■ ELECTRICAL CHARACTERISTICS (T<sub>A</sub>=25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
On-state Switch Resistance	R <sub>ON</sub>	V <sub>CC</sub> =4.5V, I <sub>T</sub> =-1mA, V <sub>IN</sub> =GND or V <sub>CC</sub> , V <sub>CC</sub> = V <sub>IH</sub>		21	75	Ω
Peak On-state Resistance	R <sub>ON(P)</sub>			31	100	Ω
Difference In On-state Resistance Between Switches	ΔR <sub>ON</sub>			2	15	Ω
Control Input Current	I <sub>I(CTL)</sub>	V <sub>CC</sub> =5.5V, V <sub>C</sub> = 5.5V or GND			±0.1	μA
On-state Switch Leakage Current	I <sub>S(ON)</sub>	V <sub>CC</sub> =5.5V, V <sub>I</sub> = V <sub>CC</sub> or GND, V <sub>C</sub> = V <sub>IH</sub>			±0.1	μA
Off-state Switch Leakage Current	I <sub>S(OFF)</sub>	V <sub>CC</sub> =5.5V, V <sub>I</sub> = V <sub>CC</sub> and V <sub>O</sub> =GND, or V <sub>I</sub> =GND and V <sub>O</sub> = V <sub>CC</sub> , V <sub>C</sub> = V <sub>IL</sub>			±0.1	μA
Quiescent Supply Current	I <sub>Q</sub>	V <sub>CC</sub> =5.5V, V <sub>C</sub> =V <sub>CC</sub> or GND			2	μA
Control Input Capacitance	C <sub>IC</sub>			1.5		pF
Feed-through Capacitance	C <sub>F</sub>			0.5		pF
Switch Input/Output Capacitance	C <sub>IO</sub>			5.5		pF

■ SWITCHING CHARACTERISTICS (T<sub>A</sub>=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 <sub>PLH</sub> /t <sub>PHL</sub>	V <sub>CC</sub> =5V±0.5V	C <sub>L</sub> =15pF		0.3	4	ns
			C <sub>L</sub> =50pF		0.6	6	ns
Switch Turn-on Time, From (C) to (A) or (B)	t <sub>PZL</sub> /t <sub>PZH</sub>		C <sub>L</sub> =15pF		1.6	7	ns
			C <sub>L</sub> =50pF		2.1	12	ns
Switch Turn-off Time, From (C) to (A) or (B)	t <sub>PLZ</sub> /t <sub>PHZ</sub>		C <sub>L</sub> =15pF		3.2	7	ns
			C <sub>L</sub> =50pF		5.1	12	ns

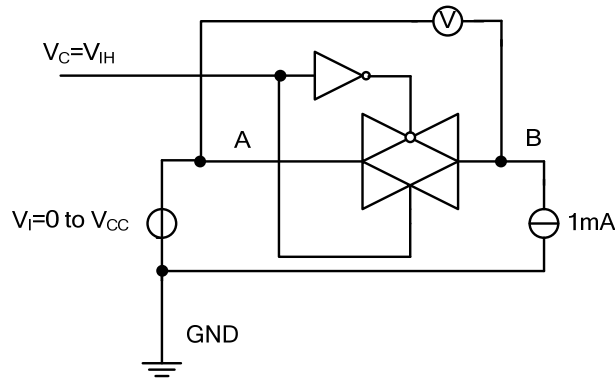
■ ANALOG SWITCHING CHARACTERISTICS (T<sub>A</sub>=25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT	
Frequency Response(Switch On), From A to B Or B to A		C <sub>L</sub> =50pF, R <sub>L</sub> =600Ω, f <sub>in</sub> =1MHz, 20log <sub>10</sub> (V <sub>O</sub> /V <sub>I</sub> )=-3dB		50		MHz	
Crosstalk(Between Any Switches), From A to B Or B to A		C <sub>L</sub> =50pF, R <sub>L</sub> =600Ω, f <sub>in</sub> =1MHz V <sub>CC</sub> =4.5V		-45		dB	
Crosstalk(Control Input To Signal Output), From C to A or B				50		mV	
Feed-Through Attenuation (Switch Off), From A to B Or B to A					-40		dB
Sine-Wave Distortion			C <sub>L</sub> =50pF, R <sub>L</sub> =10KΩ, f <sub>in</sub> =1KHz V <sub>CC</sub> =4.5V, V <sub>I</sub> =4 V <sub>P-P</sub>		0.1		%

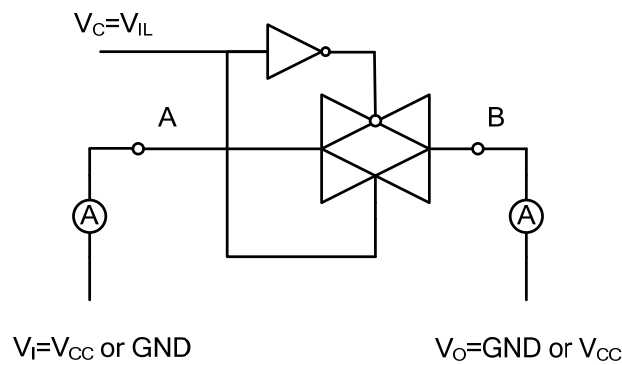
■ OPERATING CHARACTERISTICS (T<sub>A</sub>=25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Power Dissipation Capacitance	C <sub>PD</sub>	C <sub>L</sub> =50pF, f=1MHz		4.5		pF

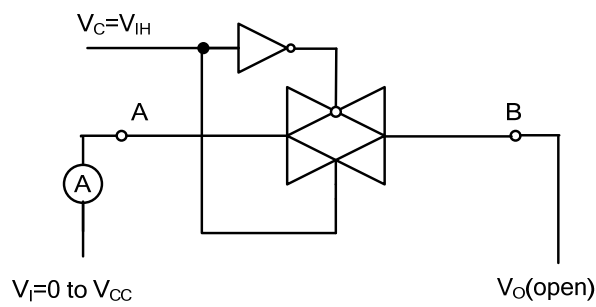
## ■ TEST CIRCUIT AND WAVEFORMS



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

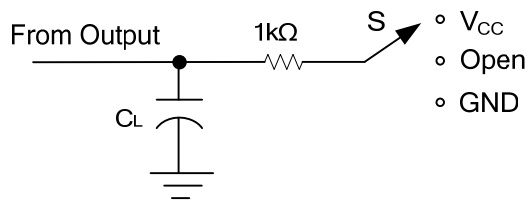


Test circuit for measuring OFF-state current



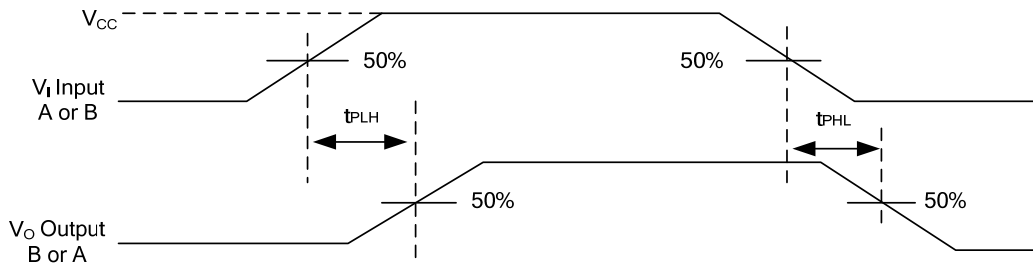
Test circuit for measuring ON-state current

## ■ TEST CIRCUIT AND WAVEFORMS(Cont.)

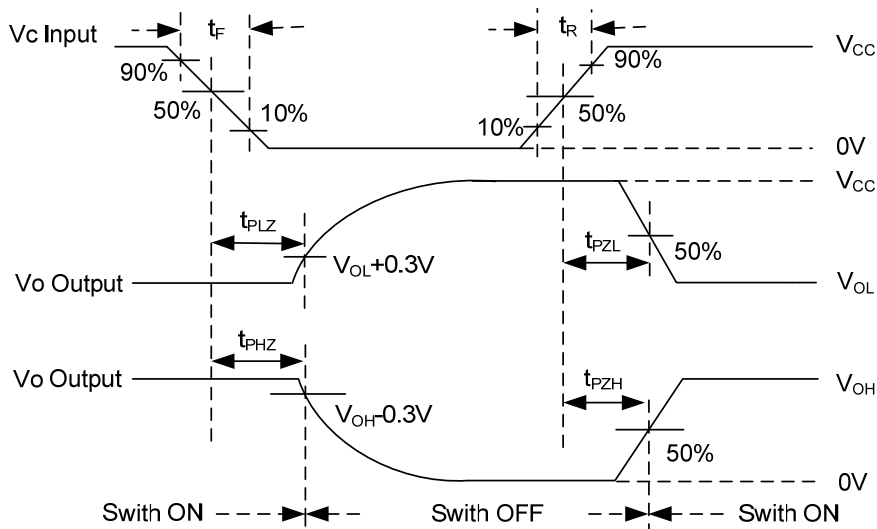


TEST	S	V <sub>i</sub>
t <sub>PLH</sub> /t <sub>PHL</sub>	Open	Pulse
t <sub>PHZ</sub> /t <sub>PZH</sub>	GND	V <sub>CC</sub>
t <sub>PLZ</sub> /t <sub>PZL</sub>	V <sub>CC</sub>	GND

Test circuit for measuring propagation delay time, switching time



Waveforms showing the Input(V<sub>i</sub>) to Output(V<sub>o</sub>) propagation delays



Waveforms showing the turn-on and turn-off times

Note: C<sub>L</sub> includes probe and jig capacitance.

All input pulses are supplied by generators having the following characteristics: PRR ≤ 1MHz, Z<sub>o</sub> = 50Ω, t<sub>r</sub> ≤ 3ns, t<sub>f</sub> ≤ 3ns.

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