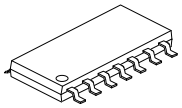
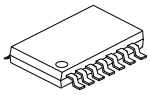
U74HC4066

CMOS IC

QUAD BILATERAL SWITCHES



SOP-14



TSSOP-14

■ DESCRIPTION

The UTC **U74HC4066** consists of four independent analog switches. Each switch has an Enable input (nE) which is active HIGH to decide the switch status.

■ FEATURES

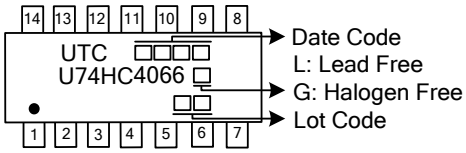
* Operation voltage range: 2~10V
* Very low "ON" resistance: V_{CC}=4.5V, 50Ω
  V_{CC} =6V, 45Ω
  V_{CC} =9V, 35Ω

■ ORDERING INFORMATION

Ordering Number		Package	Packing
Lead Free	Halogen Free		
U74HC4066L-S14-R	U74HC4066G-S14-R	SOP-14	Tape Reel
U74HC4066L-P14-R	U74HC4066G-P14-R	TSSOP-14	Tape Reel

U74HC4066G-S14-R (1) Packing Type (2) Package Type (3) Green Package	 (1) R: Tape Reel (2) S14: SOP-14, P14: TSSOP-14 (3) G: Halogen Free and Lead Free, L: Lead Free

■ MARKING



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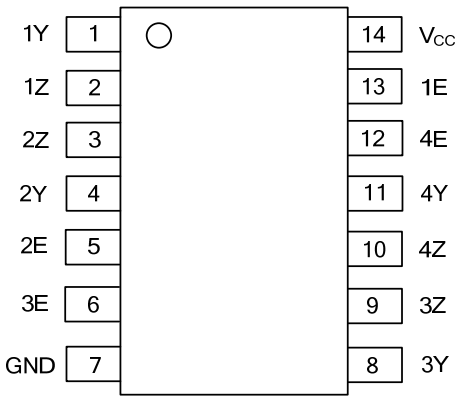
■ PIN CONFIGURATION

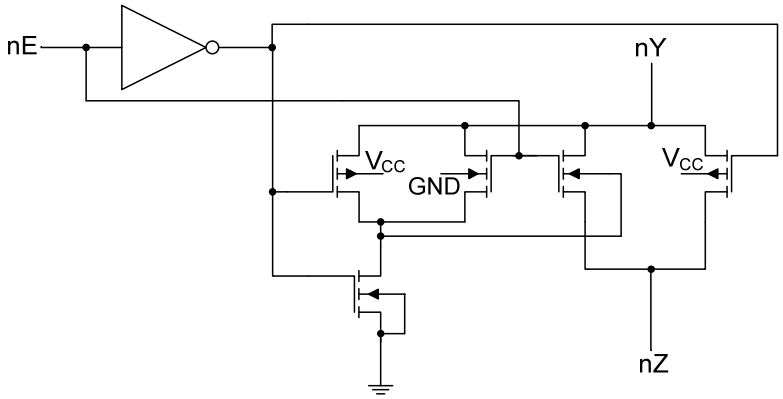


■ FUNCTION TABLE

INPUTS(nE)	SWITCH
H	ON
L	OFF

Note: H: High voltage level; L: Low voltage level.

■ LOGIC DIAGRAM



■ ABSOLUTE MAXIMUM RATING (T_A=25°C,unless otherwise specified)

PARAMETER		SYMBOL	RATINGS	UNIT
Supply Voltage		V_{CC}	-0.5 ~ +11	V
Input Diode Current		I_{IK}	±20	mA
Switch Diode Current		I_{SK}	±20	mA
Switch Current		I_S	±25	mA
V_{CC} or GND Current		I_{CC}	±50	mA
Power Dissipation		P_D	500	mW
Derate above 70°C	SOP-14		8	mW/K
Derate above 60°C	TSSOP-14		5.5	mW/K
Storage Temperature		T_{STG}	-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.

■ RECOMMENDED OPERATING CONDITIONS

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Supply Voltage	V_{CC}		2.0	5.0	10.0	V
Input Voltage	V_{IN}		GND		V_{CC}	V
Switch Voltage	V_S		GND		V_{CC}	V
Input Transition Rise or Fall Rate	t_R, t_F	V_{CC} =2.0V		6	1000	ns
		V_{CC} =4.5V			500	ns
		V_{CC} =6.0V			400	ns
		V_{CC} =10.0V			250	ns
Operating Temperature	T_A		-40		85	°C

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

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
High-Level Input Voltage		V_{IH}	V_{CC}=2.0V	1.5			V
			V_{CC}=4.5V	3.15			V
			V_{CC}=6.0V	4.2			V
			V_{CC}=9.0V	6.3			V
Low-Level Input Voltage		V_{IL}	V_{CC}=2.0V			0.50	V
			V_{CC}=4.5V			1.35	V
			V_{CC}=6.0V			1.80	V
			V_{CC}=9.0V			2.70	V
Input Leakage Current		$I_{I(LEAK)}$	V_{CC}=6V,V_{IN}=V_{CC} or GND			±1.0	μA
			V_{CC}=10V,V_{IN}=V_{CC} or GND			±2.0	μA
current per channel	OFF-state	I_S	V_{CC}=10V, V_{IN}=V_{IH} or V_{IL}, V_S=V_{CC}-GND			±1.0	μA
	ON-state					±1.0	μA
Quiescent Supply Current		I_Q	V_{CC}=6V , V_{IN}=V_{IS}=V_{OS}=V_{CC} or GND			20	μA
			V_{CC}=10V , V_{IN}=V_{IS}=V_{OS}=V_{CC} or GND			40	μA
ON-resistance	Peak	R_{ON}	V_{CC}=4.5V, I_S=1mA, V_{IN}=V_{IH} or V_{IL}, V_{IS}=V_{CC} to GND		54	118	Ω
			V_{CC}=6.0V, I_S=1mA, V_{IN}=V_{IH} or V_{IL}, V_{IS}=V_{CC} to GND		42	105	Ω
			V_{CC}=9.0V, I_S=1mA, V_{IN}=V_{IH} or V_{IL}, V_{IS}=V_{CC} to GND		32	88	Ω
			V_{CC}=2.0V, I_S=100μA, V_{IN}=V_{IH} or V_{IL}, V_{IS}=GND		80		Ω
	Rail		V_{CC}=4.5V, I_S=1mA, V_{IN}=V_{IH} or V_{IL}, V_{IS}=GND		35	95	Ω
			V_{CC}=6.0V, I_S=1mA, V_{IN}=V_{IH} or V_{IL}, V_{IS}=GND		27	82	Ω
			V_{CC}=9.0V, I_S=1mA, V_{IN}=V_{IH} or V_{IL}, V_{IS}=GND		20	70	Ω
			V_{CC}=2.0V, I_S=100μA, V_{IN}=V_{IH} or V_{IL}, V_{IS}=V_{CC}		100		Ω
			V_{CC}=4.5V, I_S=1mA, V_{IN}=V_{IH} or V_{IL}, V_{IS}=V_{CC}		42	106	Ω
			V_{CC}=6.0V, I_S=1mA, V_{IN}=V_{IH} or V_{IL}, V_{IS}=V_{CC}		35	94	Ω
			V_{CC}=9.0V, I_S=1mA, V_{IN}=V_{IH} or V_{IL}, V_{IS}=V_{CC}		27	78	Ω
Maximum variation of ON-resistance between any two channels		$\triangle R_{ON}$	V_{CC}=4.5V, V_{IN}=V_{IH} or V_{IL}, V_{IS}=V_{CC} to GND		5		Ω
			V_{CC}=6.0V, V_{IN}=V_{IH} or V_{IL}, V_{IS}=V_{CC} to GND		4		Ω
			V_{CC}=9.0V, V_{IN}=V_{IH} or V_{IL}, V_{IS}=V_{CC} to GND		3		Ω

■ DYNAMIC CHARACTERISTICS (T_A=25℃, GND=0V; t_R=t_F=6ns; C_L=50pF)

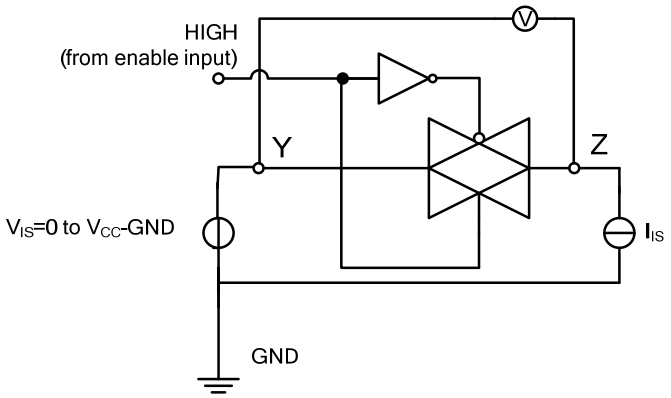
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Propagation Delay From V_{IS} to V_{OS}	t_{PHL}/t_{PLH}	V_{CC}=2.0V, R_L=∞		8	75	ns
		V_{CC}=4.5V, R_L=∞		3	15	ns
		V_{CC}=6.0V, R_L=∞		2	13	ns
		V_{CC}=9.0V, R_L=∞		2	10	ns
Turn-ON Time from nE to V_{OS}	t_{PZH}/t_{PZL}	V_{CC}=2.0V, R_L=1KΩ		36	125	ns
		V_{CC}=4.5V, R_L=1KΩ		13	25	ns
		V_{CC}=6.0V, R_L=1KΩ		10	21	ns
		V_{CC}=9.0V, R_L=1KΩ		8	16	ns
Turn-OFF Time from nE to V_{OS}	t_{PHZ}/t_{PLZ}	V_{CC}=2.0V, R_L=1KΩ		44	190	ns
		V_{CC}=4.5V, R_L=1KΩ		16	38	ns
		V_{CC}=6.0V, R_L=1KΩ		13	33	ns
		V_{CC}=9.0V, R_L=1KΩ		16	26	ns
Sine-Wave Distortion	THD	V_{CC}=4.5V, $V_{IS(P-P)}$=4V, f=1kHz, R_L=10k		0.04		%
		V_{CC}=9V, $V_{IS(P-P)}$=8V, f=1kHz, R_L=10k		0.02		%
		V_{CC}=4.5V, $V_{IS(P-P)}$=4V, f=10kHz, R_L=10k		0.12		%
		V_{CC}=9V, $V_{IS(P-P)}$=8V, f=10kHz, R_L=10k		0.06		%
Switch OFF Signal Feed-Through (Note 1)	α_{OFF}	V_{CC}=4.5V, R_L=600Ω, f=1MHz		-50		dB
		V_{CC}=9V, R_L=600Ω, f=1MHz		-50		dB
Crosstalk Between any two Switches (Note 1)	$\alpha_{CT(S)}$	V_{CC}=4.5V, R_L=600Ω, f=1MHz		-60		dB
		V_{CC}=9V, R_L=600Ω, f=1MHz		-60		dB
Crosstalk Voltage Between any input to any Switch (Peak-to-Peak Value)	$V_{(P-P)}$	V_{CC}=4.5V, R_L=600Ω, f=1MHz		110		mV
		V_{CC}=9V, R_L=600Ω, f=1MHz		220		mV
Minimum Frequency Response(-3dB) (Note 2)	f_{MAX}	V_{CC}=4.5V, R_L=50Ω, C_L=10pF		180		MHz
		V_{CC}=9V, R_L=50Ω, C_L=10pF		200		MHz
maximum switch capacitance	C_S			8		pF

Note 1. Adjust input voltage V_{IS} is 0dbm level (0dbm=1mW into 600Ω)

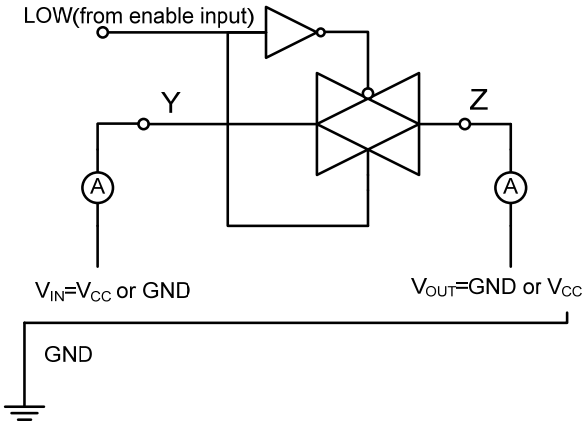
2. Adjust input voltage V_{IS} is 0dbm level at V_{OS} for 1MHz (0dbm=1mW into 50Ω)

■ TEST CIRCUIT AND WAVEFORMS

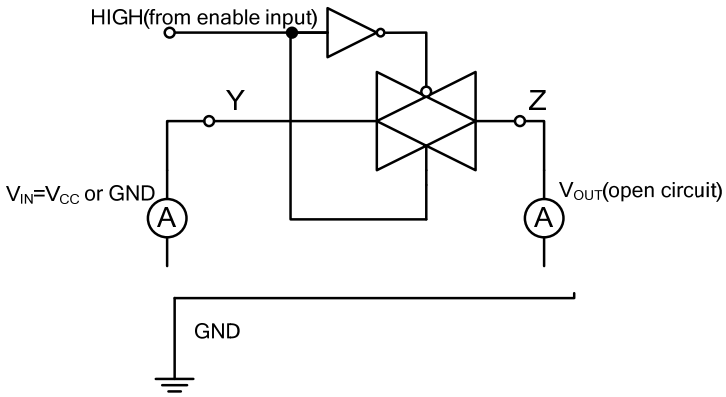
Test circuit for measuring ON-resistance (Ron)



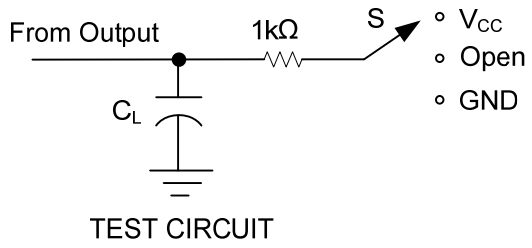
Test circuit for measuring OFF-state current



Test circuit for measuring ON-state current

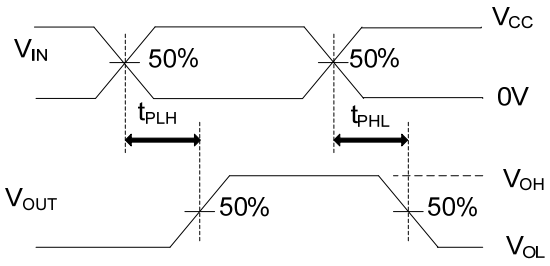


■ TEST CIRCUIT AND WAVEFORMS(Cont.)

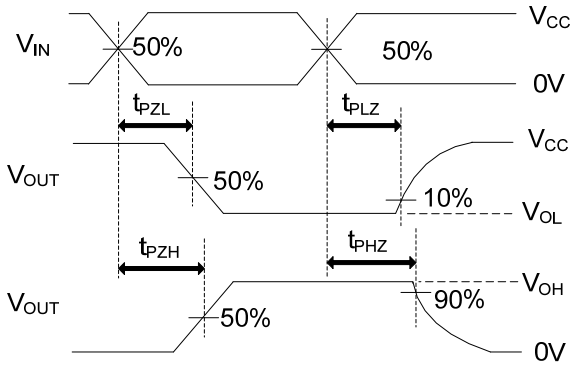


TEST CIRCUIT

	S	V_{IN}
t_{PLH}/t_{PHL}	OPEN	
t_{PHZ}/t_{PZH}	GND	V_{CC}
t_{PLZ}/t_{PZL}	V_{CC}	GND



PROPAGATION DELAY TIMES



ENABLE AND DISABLE TIMES

Note: 1. C_L includes probe and jig capacitance.
Note: 2.PRR ≤1MHz, Zo = 50Ω, t_R ≤6ns, t_F ≤6ns.

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