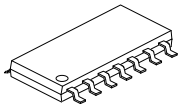
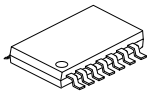
U74AHC164

CMOS IC

8-Bit Serial-In/Parallel-Out Shift Register



SOP-14



TSSOP-14

■ DESCRIPTION

The **U74AHC164** is an 8-bit serial-in/parallel-out shift register. The logical AND of the Dsa and Dsb enters into Q0 and shifts one place to right on each LOW-to-HIGH transition of the clock (CP). A low level on the master reser ($\overline{MR}$)input clears all the register asynchronously and force all output LOW.

■ FEATURES

* Operate From 2V to 5.5V
* Schmitt on all inputs
* Balanced propagation delays

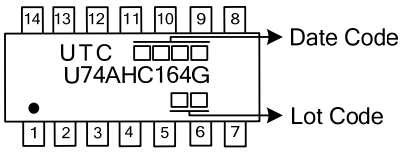
■ ORDERING INFORMATION

Ordering Number	Package	Packing
U74AHC164G-S14-R	SOP-14	Tape Reel
U74AHC164G-P14-R	TSSOP-14	Tape Reel

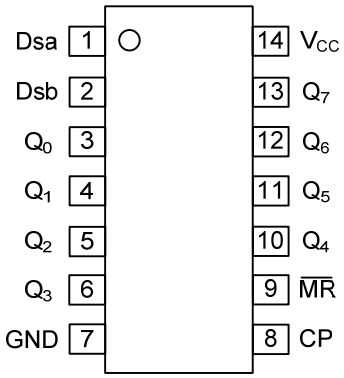
U74AHC164G-S14-R
(1)Packing Type
(2)Package Type
(3)Green Package

(1) R: Tape Reel
(2) S14: SOP-14, P14: TSSOP-14
(3) G: Halogen Free and Lead Free

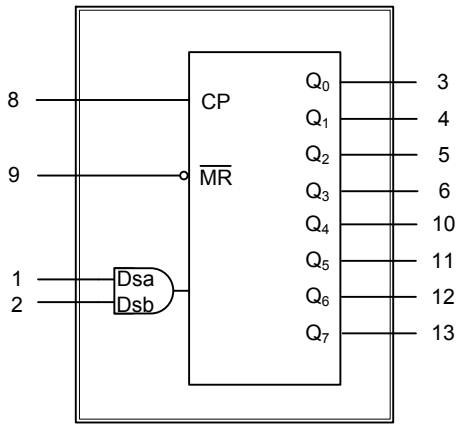
■ MARKING



■ PIN CONFIGURATION



■ FUNCTIONAL DIAGRAM

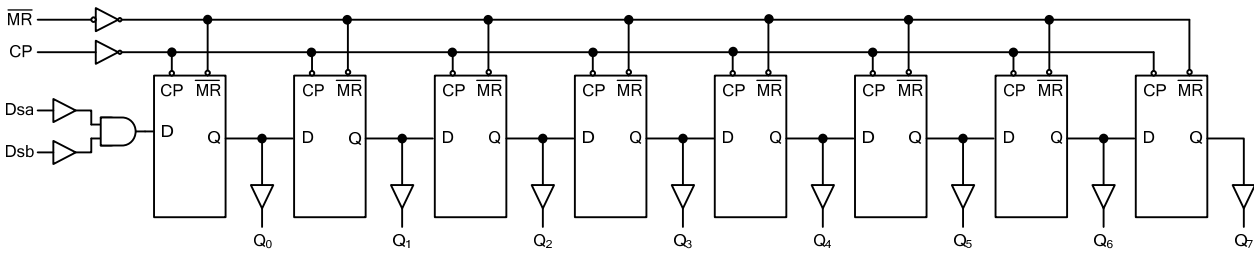


■ FUNCTION TABLE

INPUTS($\overline{MR}$)	INPUTS(CP)	INPUTS(Dsa)	INPUTS(Dsb)	OUTPUTS(Q_0)	OUTPUTS(Q_1~Q_7)
L	X	X	X	L	L~L
H	↑	L	L	L	Q0~Q6
H	↑	L	H	L	Q0~Q6
H	↑	H	L	L	Q0~Q6
H	↑	H	H	H	Q0~Q6

Note: H: HIGH voltage level; L: LOW voltage level; ↑: LOW-to-HIGH transition; ×: don't care.

■ LOGIC DIAGRAM (POSITIVE LOGIC)



■ ABSOLUTE MAXIMUM RATING

PARAMETER		SYMBOL	RATINGS	UNIT
Supply Voltage		V_{CC}	-0.5~7	V
Input Voltage		V_{IN}	-0.5~ 7	V
Input Clamp Current		I_{IK}	-20	mA
Output Clamp Current		I_{OK}	±20	mA
Output Current		I_{OUT}	±25	mA
Vcc or GND Current		I_{CC}	±75	mA
Power Dissipation	SOP-14	P_D	500	mW
	TSSOP-14		450	
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	CONDITIONS	MIN	TYP	MAX	UNIT
Supply Voltage	V_{CC}		2	5	5.5	V
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}=3.3±0.3V			100	ns/V
		V_{CC}=5.0±0.5V			20	
Operating Temperature	T_A		-40		85	°C

■ STATIC CHARACTERISTICS (T_A=25°C)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
High-Level Input Voltage	V_{IH}	V_{CC}=2.0V	1.5			V
		V_{CC}=3.0V	2.1			
		V_{CC}=5.5V	3.85			
Low-Level Input Voltage	V_{IL}	V_{CC}=2.0V			0.5	V
		V_{CC}=3.0V			0.9	
		V_{CC}=5.5V			1.65	
High-Level Output Voltage	V_{OH}	V_{CC}=2.0V, I_{OH}=-50μA	1.9	2.0		V
		V_{CC}=3.0V, I_{OH}=-50μA	2.9	3.0		
		V_{CC}=4.5V, I_{OH}=-50μA	4.4	4.5		
		V_{CC}=3.0V, I_{OH}=-4mA	2.58			
		V_{CC}=4.5V, I_{OH}=-8mA	3.94			
Low-Level Output Voltage	V_{OL}	V_{CC}=2.0V, I_{OL}=50μA		0	0.1	V
		V_{CC}=3.0V, I_{OL}=50μA		0	0.1	
		V_{CC}=4.5V, I_{OL}=50μA		0	0.1	
		V_{CC}=3.0V, I_{OL}=4mA			0.36	
		V_{CC}=4.5V, I_{OL}=8mA			0.36	
Input Leakage Current	$I_{I(LEAK)}$	V_{CC}=5.5V, V_{IN}=5.5V or GND			0.1	μA
Output OFF-State Current	I_{OZ}	V_{CC}=5.5V, V_{IN}=5.5V or GND			±0.25	uA
Quiescent Supply Current	I_Q	V_{CC}=5.5V, V_{IN}=5.5V or GND, I_{OUT}=0			4	uA
Input Capacitance	C_I	V_{IN}=V_{CC} or GND		3	10	pF

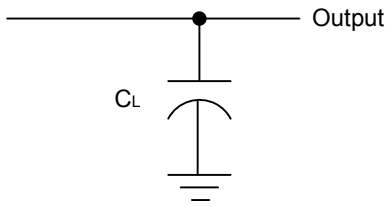
■ DYNAMIC CHARACTERISTICS (typical values at V_{CC}=3V or V_{CC}=5V)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Propagation Delay from Input (CP) to Output(Qn)	t_{PHL}/t_{PLH}	V_{CC}=3.0V to 3.6V, C_L=15pF		6.5	12.8	ns
		V_{CC}=3.0V to 3.6V, C_L=50pF		9.3	16.3	
		V_{CC}=4.5V to 5.5V, C_L=15pF		4.5	9	
		V_{CC}=4.5V to 5.5V, C_L=50pF		6.4	11	
Propagation Delay from Input ($\overline{MR}$) to Output(Qn)	t_{PHL}	V_{CC}=3.0V to 3.6V, C_L=15pF		5.3	12.8	ns
		V_{CC}=3.0V to 3.6V, C_L=50pF		7.6	16.3	
		V_{CC}=4.5V to 5.5V, C_L=15pF		4	8.6	
		V_{CC}=4.5V to 5.5V, C_L=50pF		5.8	10.6	
Maximum CP frequency	f_{MAX}	V_{CC}=3.0V to 3.6V, C_L=15pF	80	125		MH_Z
		V_{CC}=3.0V to 3.6V, C_L=50pF	50	75		
		V_{CC}=4.5V to 5.5V, C_L=15pF	125	175		
		V_{CC}=4.5V to 5.5V, C_L=50pF	85	115		

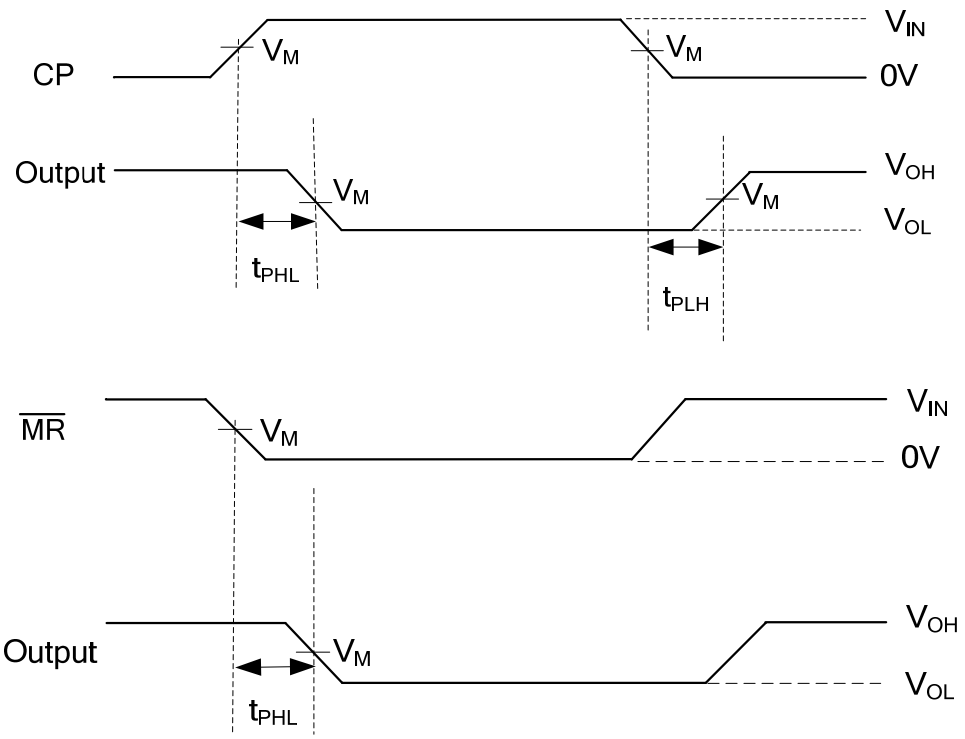
■ OPERATING CHARACTERISTICS

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Power Dissipation Capacitance	Cpd	f=1MHz, C_L=50pF		48		pF

■ TEST CIRCUIT AND WAVEFORMS



Load circuitry



Note: V_{IN}=V_{CC} , V_M=50%V_{CC}

Propagation delay waves