



## U74AHC164

CMOS IC

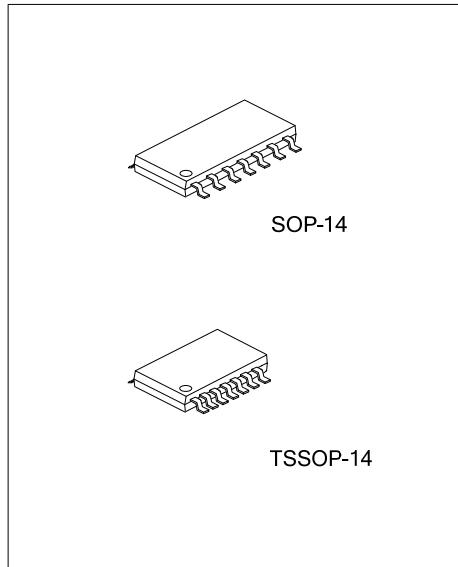
### 8-Bit Serial-In/Parallel-Out Shift Register

#### 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

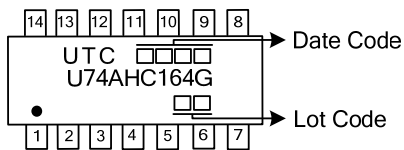


#### ORDERING INFORMATION

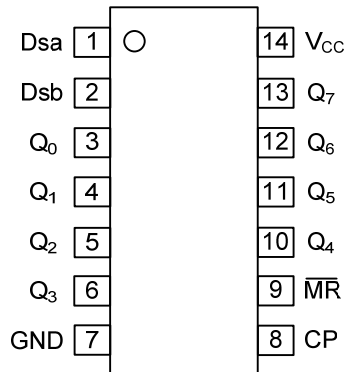
Ordering Number	Package	Packing
U74AHC164G-S14-R	SOP-14	Tape Reel
U74AHC164G-P14-R	TSSOP-14	Tape Reel

<p>U74AHC164G-S14-R</p> <p>(1)Packing Type</p> <p>(2)Package Type</p> <p>(3)Green Package</p>	<p>(1) R: Tape Reel</p> <p>(2) S14: SOP-14, P14: TSSOP-14</p> <p>(3) G: Halogen Free and Lead Free</p>
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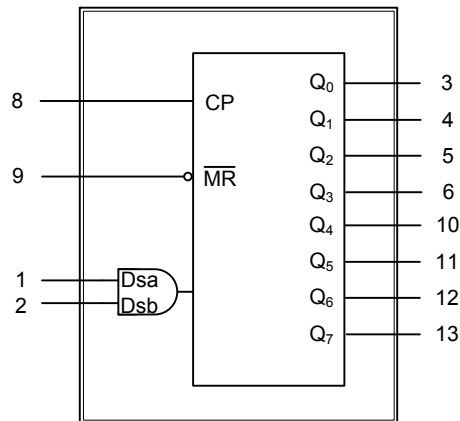
#### MARKING



■ PIN CONFIGURATION



■ FUNCTIONAL DIAGRAM

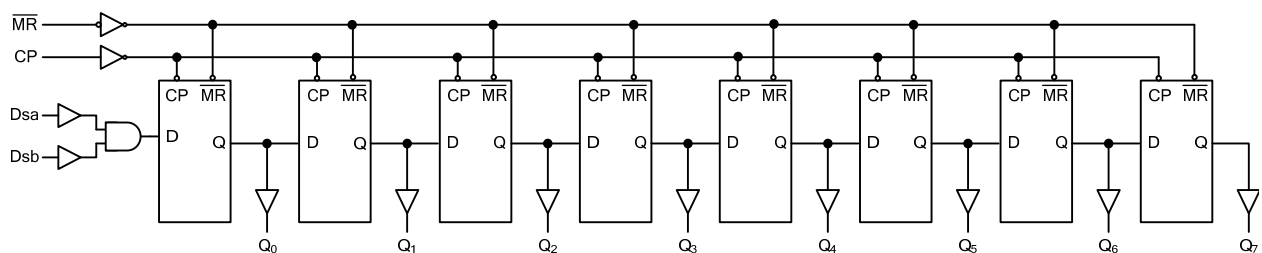


■ FUNCTION TABLE

INPUTS( $\overline{MR}$ )	INPUTS(CP)	INPUTS(Dsa)	INPUTS(Dsb)	OUTPUTS(Q <sub>0</sub> )	OUTPUTS(Q <sub>1</sub> ~Q <sub>7</sub> )
L	X	X	X	L	L~L
H	↑	L	L	L	Q <sub>0</sub> ~Q <sub>6</sub>
H	↑	L	H	L	Q <sub>0</sub> ~Q <sub>6</sub>
H	↑	H	L	L	Q <sub>0</sub> ~Q <sub>6</sub>
H	↑	H	H	H	Q <sub>0</sub> ~Q <sub>6</sub>

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	$t_R, t_F$	$V_{CC}=3.3\pm 0.3V$			100	ns/V
		$V_{CC}=5.0\pm 0.5V$			20	
Operating Temperature	$T_A$		-40		85	°C

## ■ STATIC CHARACTERISTICS ( $T_A=25^\circ C$ )

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	$V_{OH}$	$V_{CC}=2.0V, I_{OH}=-50\mu A$	1.9	2.0		V
		$V_{CC}=3.0V, I_{OH}=-50\mu A$	2.9	3.0		
		$V_{CC}=4.5V, I_{OH}=-50\mu A$	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	$V_{OL}$	$V_{CC}=2.0V, I_{OL}=50\mu A$		0	0.1	V
		$V_{CC}=3.0V, I_{OL}=50\mu A$		0	0.1	
		$V_{CC}=4.5V, I_{OL}=50\mu A$		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

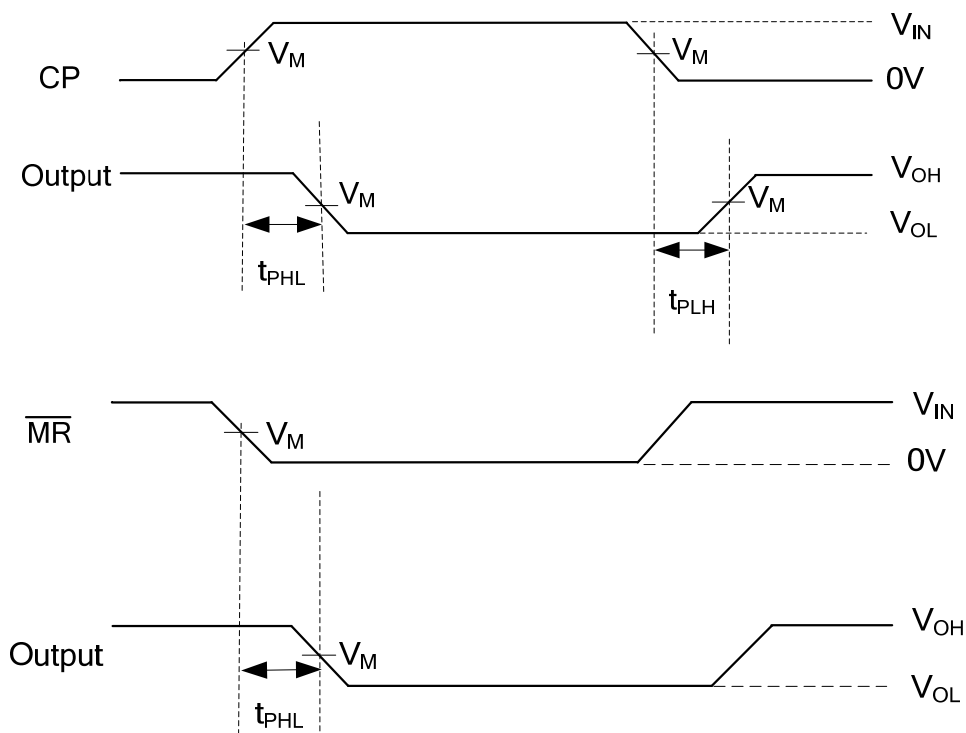
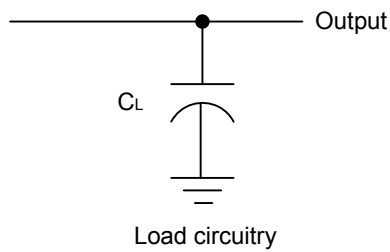
■ DYNAMIC CHARACTERISTICS (typical values at  $V_{CC}=3V$  or  $V_{CC}=5V$ )

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		MHz
		$V_{CC}=3.0V$ 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



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

Propagation delay waves

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