



U74AHC164

CMOS IC

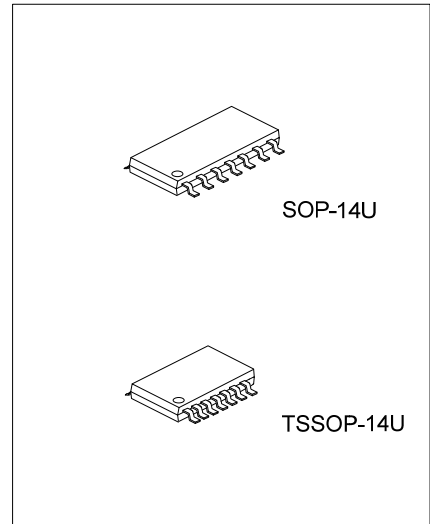
8-BIT SERIAL-PARALLEL-OUT SHIFT REGISTER

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

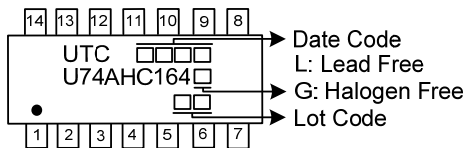


ORDERING INFORMATION

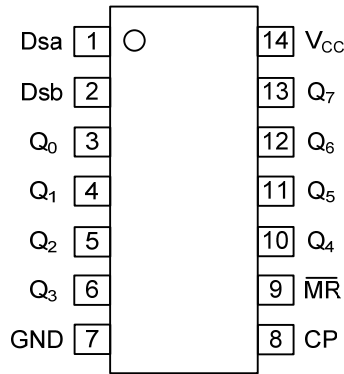
Ordering Number		Package	Packing
Lead Free	Halogen Free		
U74AHC164L-UEA-R	U74AHC164G-UEA-R	SOP-14U	Tape Reel
U74AHC164L-UEB-R	U74AHC164G-UEB-R	TSSOP-14U	Tape Reel

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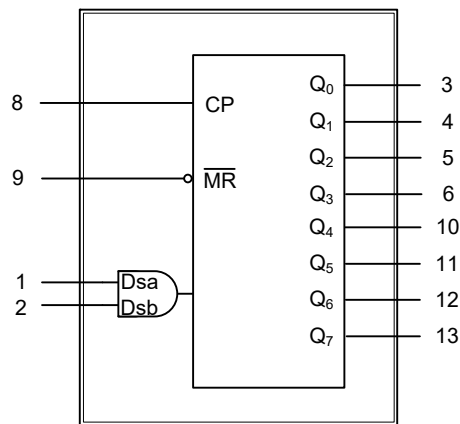
MARKING



■ PIN CONFIGURATION



■ FUNCTIONAL DIAGRAM

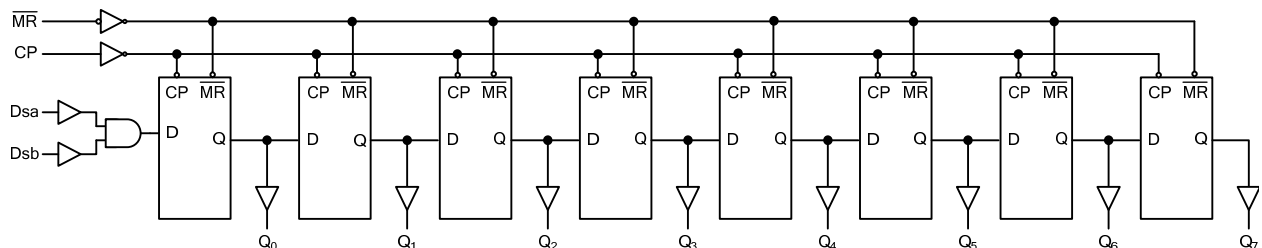


■ FUNCTION TABLE

INPUT				OUTPUT	
\overline{MR}	CP	DSA	DSB	Q0	Q1 to Q7
L	X	X	X	L	L to L
H	L	X	X	Q0	Q1 to Q7
H	↑	L	L	L	Q0 to Q6
H	↑	L	H	L	Q0 to Q6
H	↑	H	L	L	Q0 to Q6
H	↑	H	H	H	Q0 to Q6

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

■ LOGIC DIAGRAM (POSITIVE LOGIC)



■ ABSOLUTE MAXIMUM RATING (Unless otherwise specified)

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
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 (Unless otherwise specified)

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	$\Delta t/\Delta V$	$V_{CC}=3.3\pm 0.3V$			100	ns/V
		$V_{CC}=5.0\pm 0.5V$			20	
Operating Temperature	T_A		-40		+125	°C

■ THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	SOP-14U	125	°C/W
	TSSOP-14U	150	°C/W

■ STATIC CHARACTERISTICS (Unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
High-Level Input Voltage	V_{IH}	$V_{CC}=2.0V$	1.5			V
		$V_{CC}=3.0V$	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
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 $V_{CC}=5V$, unless otherwise specified)

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		

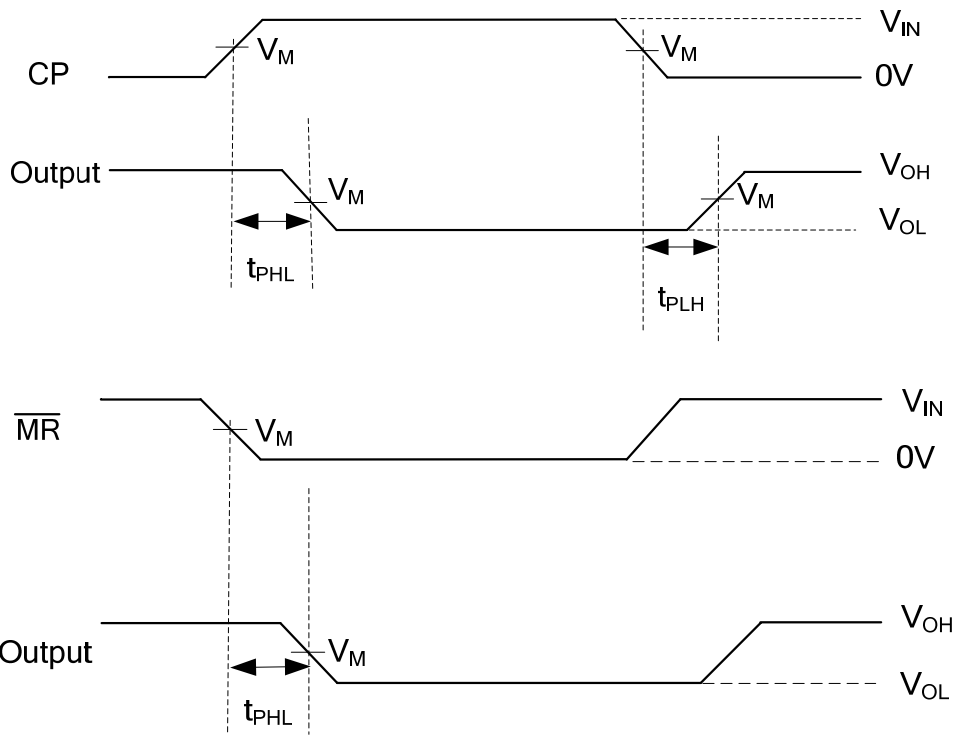
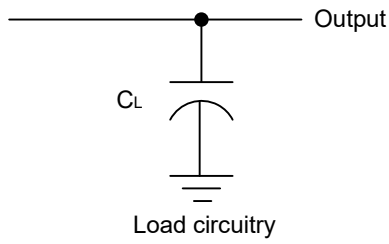
■ OPERATING CHARACTERISTICS (Unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Power Dissipation Capacitance	C_{PD}	$f=1MHz$, $C_L=50pF$		48		pF

■ TIMING REQUIREMENTS

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Setup time (DSA,DSB to CP)	t_{SU}	$V_{CC}=3.0V$ to $3.6V$	8			ns
		$V_{CC}=4.5V$ to $5.5V$	7			ns
Hold time (DSA,DSB to CP)	t_h	$V_{CC}=3.0V$ to $3.6V$	6			ns
		$V_{CC}=4.5V$ to $5.5V$	7			ns

■ TEST CIRCUIT AND WAVEFORMS



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

Propagation delay waves

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