Chipsmall

Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

With the principle of "Quality Parts,Customers Priority,Honest Operation,and Considerate Service",our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

We are looking forward to setting up business relationship with you and hope to provide you with the best service and solution. Let us make a better world for our industry!

Contact us

FAIRCHILD

SEMICONDUCTOR ™

MM74C164
8-Bit Parallel-Out Serial Shift Register

General Description

The MM74C164 shift registers are a monolithic comple-mentary MOS (CMOS) integrated circuit constructed with N- and P-channel enhancement transistors. These 8-bit shift registers have gated serial inputs and clear. Each reg-ister bit is a D-type master/slave flip-flop. A high-level input enables the other input which will then determine the state of the flip-flop.

Data is serially shifted in and out of the 8-bit register during the positive going transition of clock pulse. Clear is inde-pendent of the clock and accomplished by a low level at the clear input. All inputs are protected against electrostatic effects.

Features

- Supply voltage range: 3V to 15V
- Tenth power TTL compatible: drive 2 LPTTL loads
- High noise immunity: 0.45 V_{CC} (typ.)
- Low power: 50 nW (typ.)
- Medium speed operation: 0.8 MHz (typ.) with 10V supply

Applications

- Data terminals
- Instrumentation
- Medical electronics
- Alarm systems
- Industrial electronics
- Remote metering
- Computers

Ordering Code:

Order Number	Package Number	Package Description
MM74C164M	M14A	14-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-012, 0.150" Narrow
MM74C164N	N14A	14-Lead Plastic Dual-In-Line Package (PDIP), JEDEC MS-001, 0.300" Wide

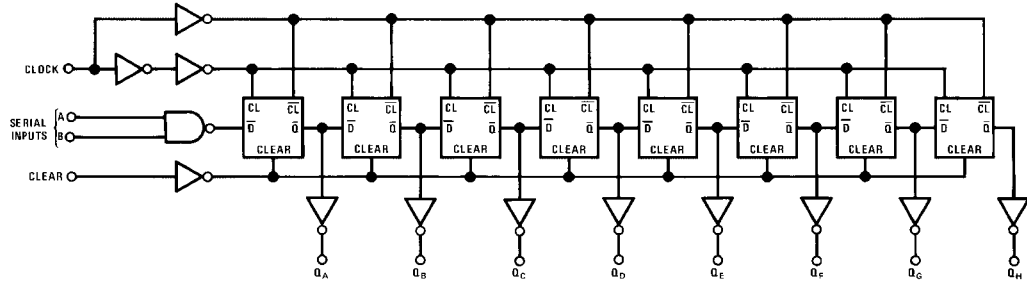## Connection Diagram

Top View
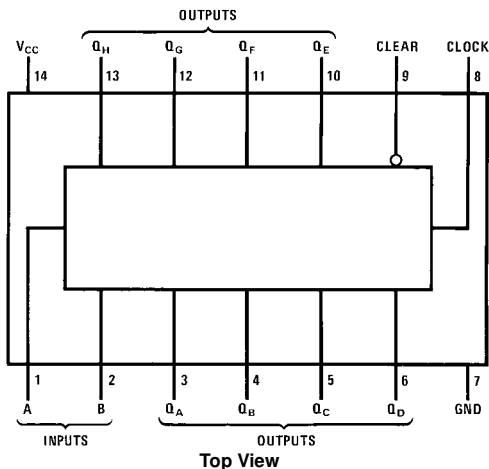
Truth Table

Serial Inputs A and B

Inputs		Output
t_n		t_{n+1}
A	B	Q_A
1	1	1
0	1	0
1	0	0
0	0	0

www.fairchildsemi.com

Block Diagram

Absolute Maximum Ratings(Note 1)

Voltage at Any Pin	−0.3V to V_{CC} + 0.3V
Operating Temperature Range	−55°C to +125°C
Storage Temperature Range	−65°C to +150°C
Absolute Maximum V_{CC}	18V
Power Dissipation (P_D)	
Dual-In-Line	700 mW
Small Outline	500 mW
Operating V_{CC} Range	3V to 15V
Lead Temperature	
(soldering, 10 seconds)	260°C

Note 1: "Absolute Maximum Ratings" are those values beyond which the safety of the device cannot be guaranteed. Except for "Operating Temperature Range" they are not meant to imply that the devices should be operated at these limits. The table of "Electrical Characteristics" provides conditions for actual device operation.

DC Electrical Characteristics

Min/Max limits apply across temperature range unless otherwise noted

Symbol	Parameter	Conditions	Min	Typ	Max	Units
CMOS TO CMOS						
$V_{IN(1)}$	Logical "1" Input Voltage	V_{CC} = 5V	3.5			V
		V_{CC} = 10V	8.0			
$V_{IN(0)}$	Logical "0" Input Voltage	V_{CC} = 5V			1.5	V
		V_{CC} = 10V			2.0	
$V_{OUT(1)}$	Logical "1" Output Voltage	V_{CC} = 5V, I_O = −10 μA	4.5			V
		V_{CC} = 10V, I_O = −10 μA	9.0			
$V_{OUT(0)}$	Logical "0" Output Voltage	V_{CC} = 5V, I_O = +10 μA			0.5	V
		V_{CC} = 10V, I_O = +10 μA			1.0	
$I_{IN(1)}$	Logical "1" Input Current	V_{CC} = 15V, V_{IN} = 15V		0.005	1.0	μA
$I_{IN(0)}$	Logical "0" Input Current	V_{CC} = 15V, V_{IN} = 0V	−1.0	−0.005		μA
I_{CC}	Supply Current	V_{CC} = 15V		0.05	300	μA
CMOS TO LPTTL INTERFACE						
$V_{IN(1)}$	Logical "1" Input Voltage	V_{CC} = 4.75V	V_{CC} − 1.5			V
$V_{IN(0)}$	Logical "0" Input Voltage	V_{CC} = 4.75V			0.8	V
$V_{OUT(1)}$	Logical "1" Output Voltage	V_{CC} = 4.75V, I_O = −360 μA	2.4			V
$V_{OUT(0)}$	Logical "0" Output Voltage	V_{CC} = 4.75V, I_O = 360 μA			0.4	V
OUTPUT DRIVE (See Family Characteristics Data Sheet) (Short Circuit Current)						
I_{SOURCE}	Output Source Current	V_{CC} = 5V, $V_{IN(0)}$ = 0V T_A = 25°C, V_{OUT} = 0V	−1.75			mA
I_{SOURCE}	Output Source Current	V_{CC} = 10V, $V_{IN(0)}$ = 0V T_A = 25°C, V_{OUT} = 0V	−8.0			mA
I_{SINK}	Output Sink Current	V_{CC} = 5V, $V_{IN(1)}$ = 5V T_A = 25°C, V_{OUT} = V_{CC}	1.75			mA
I_{SINK}	Output Sink Current	V_{CC} = 10V, $V_{IN(1)}$ = 10V T_A = 25°C, V_{OUT} = V_{CC}	8.0			mA

AC Electrical Characteristics (Note 2)

$T_A = 25°C$, $C_L = 50$ pF, unless otherwise noted

Symbol	Parameter	Conditions	Min	Typ	Max	Units
t_{pd1}	Propagation Delay Time to a Logical "0" or a Logical "1" from Clock to Q	$V_{CC} = 5V$		230	310	ns
		$V_{CC} = 10V$		90	120	
t_{pd0}	Propagation Delay Time to a Logical "0" from Clear to Q	$V_{CC} = 5V$		280	380	ns
		$V_{CC} = 10V$		110	150	
t_S	Time Prior to Clock Pulse that Data Must be Present	$V_{CC} = 5V$	200	110		ns
		$V_{CC} = 10V$	80	30		
t_H	Time After Clock Pulse that Data Must be Held	$V_{CC} = 5V$	0	0		ns
		$V_{CC} = 10V$	0	0		
f_{MAX}	Maximum Clock Frequency	$V_{CC} = 5V$	2.0	3		MHz
		$V_{CC} = 10V$	5.5	8		
t_W	Minimum Clear Pulse Width	$V_{CC} = 5V$		150	250	ns
		$V_{CC} = 10V$		55	90	
t_r, t_f	Maximum Clock Rise and Fall Time	$V_{CC} = 5V$	15			µs
		$V_{CC} = 10V$	5			
C_{IN}	Input Capacitance	Any Input (Note 3)		5		pF
C_{PD}	Power Dissipation Capacitance	(Note 4)		140		pF

Note 2: AC Parameters are guaranteed by DC correlated testing.

Note 3: Capacitance is guaranteed by periodic testing.

Note 4: C_{PD} determines the no load AC power consumption of any CMOS device. For complete explanation see Family Characteristics application note AN-90.

Typical Applications

74C Compatibility

Guaranteed Noise Margin as a Function of V_{CC}

4
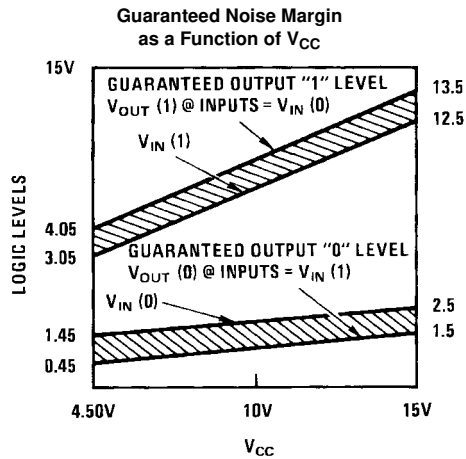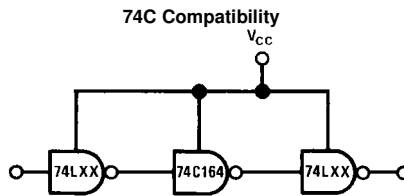
Logic Waveform
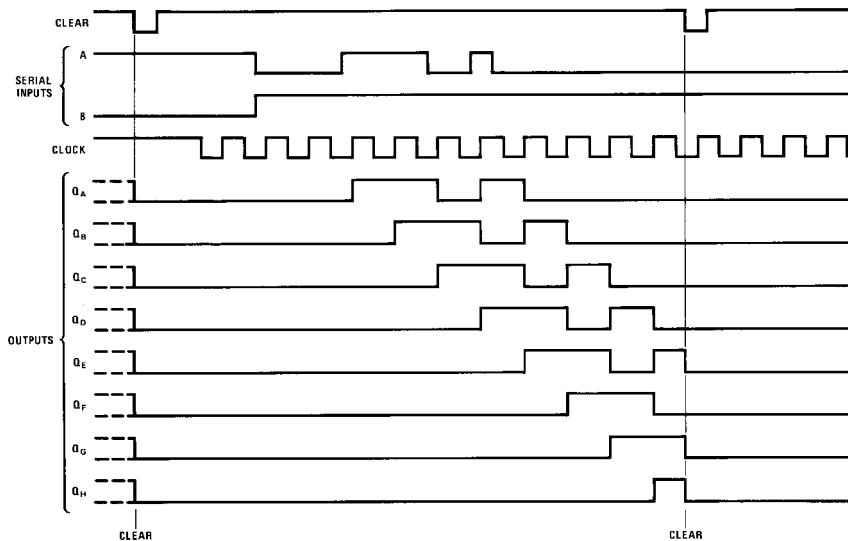
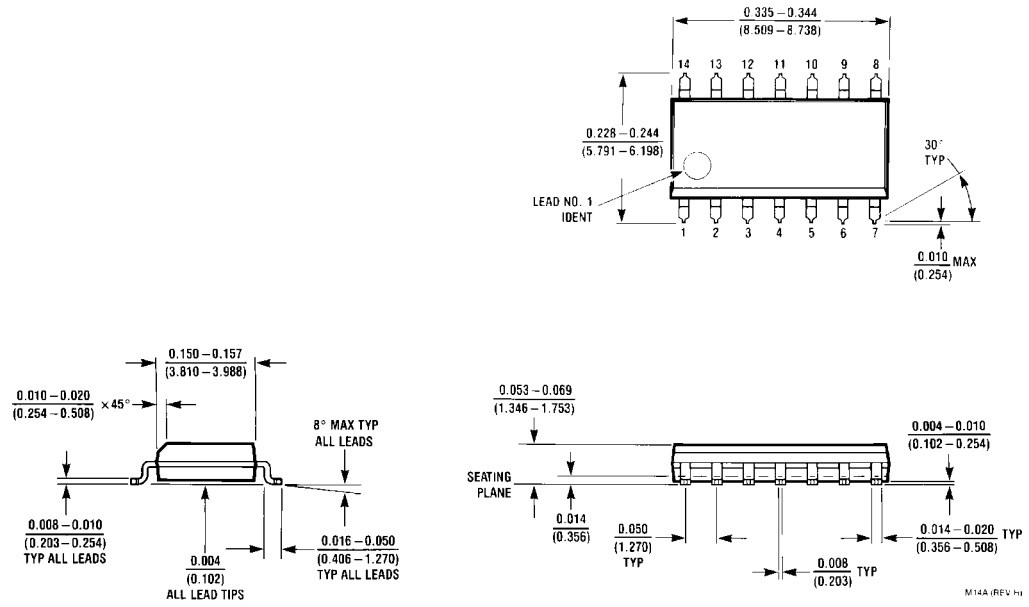## AC Test Circuit
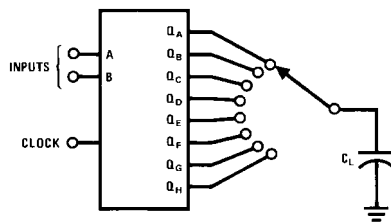
Switching Time Waveforms

CMOS to CMOS

TTL to CMOS
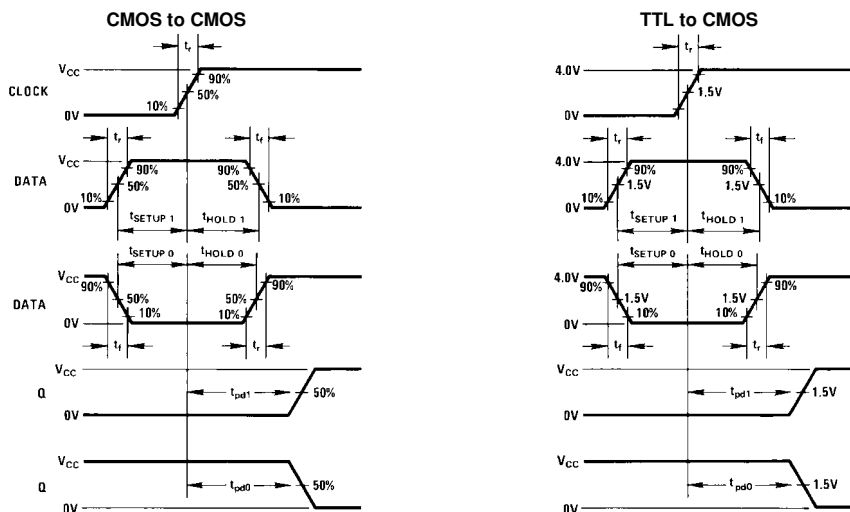
$t_r = t_f = 20$ ns

Physical Dimensions inches (millimeters) unless otherwise noted

14-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-012, 0.150" Narrow
Package Number M14A

Physical Dimensions inches (millimeters) unless otherwise noted (Continued)

OPTION 1

OPTION 02

N14A (REV F)

14-Lead Plastic Dual-In-Line Package (PDIP), JEDEC MS-001, 0.300" Wide
Package Number N14A

Fairchild does not assume any responsibility for use of any circuitry described, no circuit patent licenses are implied and Fairchild reserves the right at any time without notice to change said circuitry and specifications.

LIFE SUPPORT POLICY

FAIRCHILD'S PRODUCTS ARE NOT AUTHORIZED FOR USE AS CRITICAL COMPONENTS IN LIFE SUPPORT DEVICES OR SYSTEMS WITHOUT THE EXPRESS WRITTEN APPROVAL OF THE PRESIDENT OF FAIRCHILD SEMICONDUCTOR CORPORATION. As used herein:

1. Life support devices or systems are devices or systems which, (a) are intended for surgical implant into the body, or (b) support or sustain life, and (c) whose failure to perform when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in a significant injury to the user.

2. A critical component in any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

www.fairchildsemi.com