

HD74AC674/HD74ACT674 • 16-Bit Serial/Parallel-In Serial-Out Shift Register

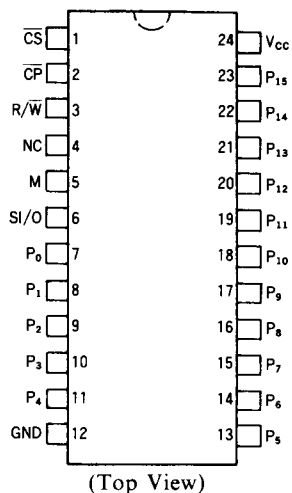
Description

The 'AC674 is a 16-bit shift register with serial and parallel load capability and serial output. A single pin serves alternately as an input for serial entry or as a 3-state serial output. In the serial-out mode the data recirculates in the register. Chip Select, Read/Write and Mode inputs provide control flexibility.

Features

- 16-Bit Serial I/O Shift Register
- 16-Bit Parallel-In, Serial-Out Converter
- Recirculating Serial Shifting
- Common Serial Shifting
- Output Source/Sink 24mA
- HD74ACT674 has TTL Compatible Inputs

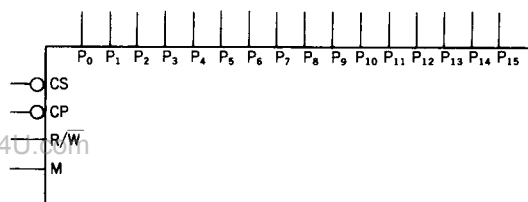
Pin Assignment



Pin Names

P_0 - P_{15}	Parallel Data Inputs
\overline{CS}	Chip-Select Input(Active LOW)
\overline{CP}	Clock Pules Input(Active LOW)
M	Mode select Input
R/\overline{W}	Read/Write Input
SI/O	3-State Serial Data Input or 3-State Serial Output

Logic Symbol



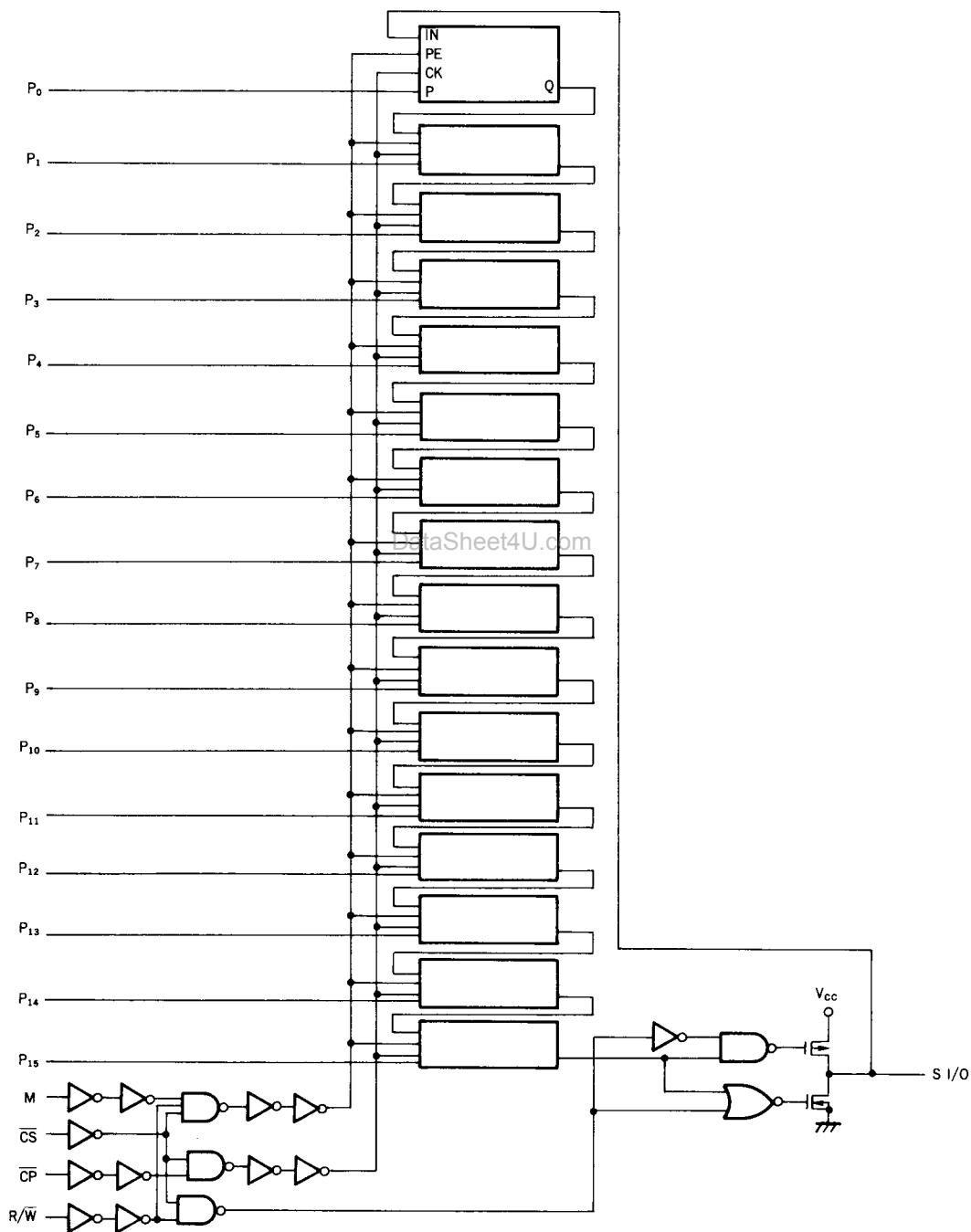
Function Table

Inputs				SI/O STATUS	Operation
\overline{CS}	R/\overline{W}	M	\overline{CP}		
H	X	X	X	High Z	Hold
L	L	X	$\overline{\text{L}}$	Data In	Serial Load
L	H	L	$\overline{\text{L}}$	Data Out	Serial Output with Recirculation
L	H	H	$\overline{\text{L}}$	Active	Parallel Load;No Shifting

H : High Voltage Level
L : Low Voltage Level
X : Immaterial
 $\overline{\text{L}}$: High-to-Low Transition

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Logic Diagram



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DC Characteristics(unless otherwise specified)

Symbol	Parameter	Max	Unit	Condition
I_{CC}	Maximum Quiescent Supply Current	80	μA	$V_{IN} = V_{CC}$ Ground, $V_{CC} = 5.5 V$, $T_a = \text{Worst Case}$
I_{CC}	Maximum Quiescent Supply Current	8.0	μA	$V_{IN} = V_{CC}$ Ground, $V_{CC} = 5.5 V$, $T_a = 25^\circ C$
I_{CCT}	Maximum Additional I_{CC} /Input (HD74ACT674)	1.5	mA	$V_{IN} = V_{CC} - 2.1 V$, $V_{CC} = 5.5 V$, $T_a = \text{Worst Case}$

AC Characteristics:HD74AC674

Symbol	Parameter	V_{CC}^* (V)	$T_a = +25^\circ C$ $C_L = 50pF$			$T_a = -40^\circ C \text{ to } +85^\circ C$ $C_L = 50pF$		Unit
			Min	Typ	Max	Min	Max	
f_{max}	Maximum Clock Frequency	3.3 5.0	60 85			50 70		MHz
t_{PLH}	Propagation Delay CP to SI/O	3.3 5.0	1.0 1.0	12.0 8.5	16.0 11.5	1.0 1.0	19.0 13.5	ns
t_{PHL}	Propagation Delay CP to SI/O	3.3 5.0	1.0 1.0	12.0 8.5	16.0 11.5	1.0 1.0	19.0 13.0	ns
t_{ZH}	Output Enable Time	3.3 5.0	1.0 1.0	7.0 5.5	11.5 8.0	1.0 1.0	13.5 9.0	ns
t_{ZL}	Output Enable Time	3.3 5.0	1.0 1.0	6.0 4.5	11.0 7.0	1.0 1.0	12.0 8.0	ns
t_{HZ}	Output Disable Time	3.3 5.0	1.0 1.0	8.0 6.5	12.0 9.0	1.0 1.0	13.5 10.0	ns
t_{LZ}	Output Disable Time	3.3 5.0	1.0 1.0	6.0 4.5	10.0 7.0	1.0 1.0	11.0 8.0	ns

* Voltage Range 3.3 is $3.3V \pm 0.3V$
Voltage Range 5.0 is $5.0V \pm 0.5V$

AC Operating Requirements:HD74AC674

Symbol	Parameter	V_{CC}^* (V)	$T_a = +25^\circ C$ $C_L = 50pF$		$T_a = 40^\circ C \text{ to } +85^\circ C$ $C_L = 50pF$		Unit
			Typ	Guaranteed Minimum			
t_{SU}	Setup Time, HIGH or LOW SI/O to CP	3.3 5.0	-2.0 1.0	3.0 2.0	3.0 2.5		ns
t_h	Hold Time, HIGH or LOW SI/O to CP	3.3 5.0	3.5 2.0	5.0 3.5	6.0 4.0		ns
t_{SU}	Setup Time, HIGH or LOW P_n to CP	3.3 5.0	-2.0 -1.0	3.0 2.0	3.0 2.5		ns
t_h	Hold Time, HIGH or LOW P_n to CP	3.3 5.0	3.5 2.0	5.0 3.5	6.0 4.0		ns
t_{SU}	Setup Time, HIGH or LOW M or R/W or CS to CP	3.3 5.0	1.0 1.5	4.0 3.0	4.5 3.0		ns
t_h	Hold Time, HIGH or LOW M or R/W or CS to CP	3.3 5.0	1.5 0.5	2.5 1.5	-2.5 1.5		ns
t_w	Pulse width	3.3 5.0	3.0 3.0	5.5 4.5	7.0 5.0		ns

* Voltage Range 3.3 is $3.3V \pm 0.3V$
Voltage Range 5.0 is $5.0V \pm 0.5V$

HD74AC674/HD74ACT674

AC Characteristics: HD74ACT674 Preliminary

Symbol	Parameter	V _{CC} * (V)	T _a = +25°C C _L = 50pF			T _a = -40°C to +85°C C _L = 50pF		Unit
			Min	Typ	Max	Min	Max	
f _{max}	Maximum Clock Frequency	5.0	70			60		MHz
t _{PLH}	Propagation Delay CP to SI/O	5.0	1.0		13.5	1.0	16.0	ns
t _{PHL}	Propagation Delay CP to SI/O	5.0	1.0		13.5	1.0	16.0	ns
t _{PZH}	Output Enable Time	5.0	1.0		10.0	1.0	11.0	ns
t _{PZL}	Output Enable Time	5.0	1.0		9.0	1.0	10.0	ns
t _{PHZ}	Output Disable Time	5.0	1.0		11.0	1.0	12.5	ns
t _{PLZ}	Output Disable Time	5.0	1.0		9.0	1.0	10.0	ns

* Voltage Range 5.0 is 5.0V ± 0.5V

AC Operating Requirements: HD74ACT674 Preliminary

Symbol	Parameter	V _{CC} * (V)	T _a = +25°C C _L = 50pF		T _a = -40°C to +85°C C _L = 50pF		Unit
			Typ	Guaranteed Minimum			
t _{SU}	Setup Time, HIGH or LOW SI/O to CP	5.0		3.0	3.5		ns
t _H	Hold Time, HIGH or LOW SI/O to CP	5.0		3.5	4.0		ns
t _{SU}	Setup Time, HIGH or LOW P _n to CP	5.0		3.0	3.5		ns
t _H	Hold Time, HIGH or LOW P _n to CP	5.0		4.0	4.5		ns
t _{SU}	Setup Time, HIGH or LOW M or R/W or CS to CP	5.0		3.5	4.0		ns
t _H	Hold Time, HIGH or LOW M or R/W or CS to CP	5.0		2.0	2.0		ns
t _w	Pulse Width	5.0		7.0	8.0		ns

* Voltage Range 5.0 is 5.0V ± 0.5V

Capacitance

Symbol	Parameter	Typ	Unit	Condition
C _{IN}	Input Capacitance	4.5	pF	V _{CC} = 5.5 V
C _{I/O}	Input/Output Capacitance	15.0	pF	V _{CC} = 5.5 V
C _{PD}	Power Dissipation Capacitance	5.0	pF	V _{CC} = 5.0 V