

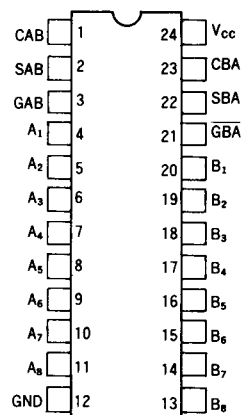
# HD74AC652/HD74ACT652 • Octal Transceivers/Registers with 3-State Output

## Description

This device consists of bus transceiver circuits, D-type flip-flops, and control circuitry arranged for multiplexed transmission of data directly from the data bus or from the internal storage registers. Enable  $\overline{GAB}$  and  $\overline{GBA}$  are provided to control the transceiver functions.  $SAB$  and  $SBA$  control pins are provided to select whether real-time or stored data is transferred. A low input level selects real-time data, and a high selects stored data. The following examples demonstrate the four fundamental bus-management functions that can be performed with the HD74AC652.

Data on the A or B data bus, or both, can be stored in the internal D flip-flops by low-to-high transition at the appropriate clock pins (CAB or CBA) regardless of the select or enable control pins. When  $SAB$  and  $SBA$  are in the real-time transfer mode, it is also possible to store data without using the internal D-type flip-flops by simultaneously enabling Enable  $\overline{GAB}$  and  $\overline{GBA}$ . In this configuration each output reinforces its input. Thus, when all other data sources to the two sets of bus lines are at high impedance, each set of bus lines will remain at its last state.

## Pin Assignment



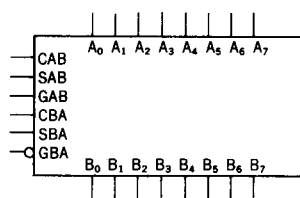
(Top View)

- Independent Registers for A and B Buses
- Multiplexed Real-Time and Stored Data Transfers
- 3-State Outputs
- 300 mil Slim Dual In-Line Package
- Outputs Source/Sink 24 mA
- HD74ACT652 have TTL-Compatible Inputs

## Pin Names

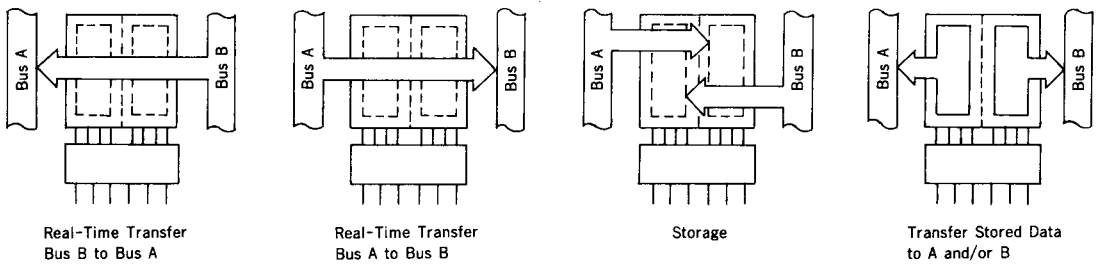
$A_0$ - $A_7$  Data Register A Inputs  
Data Register A Outputs  
 $B_0$ - $B_7$  Data Register B Inputs  
Data Register B Outputs  
CAB, CBA Clock Pulse Inputs  
 $SAB$ ,  $SBA$  Transmit/Receive Inputs  
 $\overline{GAB}$ ,  $\overline{GBA}$  Output Enable Inputs

## Logic Symbol

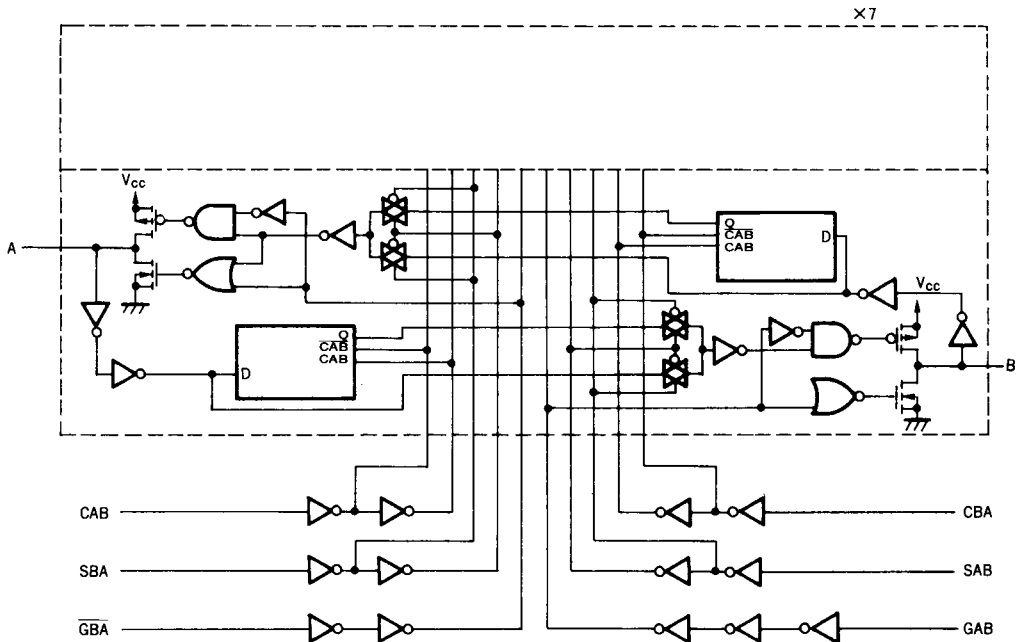


## Function Table

	Real-Time Transfer Bus B to Bus A	Real-Time Transfer Bus B to Bus A	Storage	Transfer Stored Data to A and/or B
CAB	X	X		L or H
SAB	X	L	X	H
GAB	L	H	L	H
CBA	X	X		L or H
SBA	L	X	X	H
$\overline{GBA}$	L	H	H	L



## Logic Diagram



## DC Characteristics (unless otherwise specified)

Symbol	Parameter	Max	Unit	Condition
$I_{CC}$	Maximum Quiescent Supply Current	80	$\mu A$	$V_{IN} = V_{CC}$ or Ground, $V_{CC} = 5.5 V$ , $T_a = \text{Worst Case}$
$I_{CC}$	Maximum Quiescent Supply Current	8.0	$\mu A$	$V_{IN} = V_{CC}$ or Ground, $V_{CC} = 5.5 V$ , $T_a = 25^\circ C$
$I_{CCR}$	Maximum Additional $I_{CC}$ /Input(HD74ACT652)	1.5	mA	$V_{IN} = V_{CC} - 2.1 V$ , $V_{CC} = 5.5 V$ , $T_a = \text{Worst Case}$

# HD74AC652/HD74ACT652

## AC Characteristics : HD74AC652

Symbol	Parameter	Vcc (V)	Ta = +25°C CL = 50pF			Ta = -40°C to +85°C CL = 50pF		Unit
			Min	Typ	Max	Min	Max	
t <sub>PLH</sub>	Propagation Delay Clock to Bus	3.3	1.0		18.0	1.0	20.5	ns
		5.0	1.0		13.0	1.0	14.5	
t <sub>PHL</sub>	Propagation Delay Clock to Bus	3.3	1.0		18.0	1.0	20.5	ns
		5.0	1.0		13.0	1.0	14.5	
t <sub>PLH</sub>	Propagation Delay Bus to Bus	3.3	1.0		14.0	1.0	15.5	ns
		5.0	1.0		10.0	1.0	11.0	
t <sub>PHL</sub>	Propagation Delay Bus to Bus	3.3	1.0		14.0	1.0	15.5	ns
		5.0	1.0		10.0	1.0	11.0	
t <sub>PLH</sub>	Propagation Delay SBA or SAB to An or Bn (with An or Bn HIGH or LOW)	3.3	1.0		14.0	1.0	14.5	ns
		5.0	1.0		10.0	1.0	10.5	
t <sub>PHL</sub>	Propagation Delay SBA or SAB to An or Bn (with An or Bn HIGH or LOW)	3.3	1.0		14.0	1.0	15.5	ns
		5.0	1.0		10.0	1.0	11.0	
t	Enable Time	3.3	1.0		14.0	1.0	15.5	ns
		5.0	1.0		10.0	1.0	11.0	
t	Enable Time	3.3	1.0		14.5	1.0	16.0	ns
		5.0	1.0		10.5	1.0	11.5	
t	Disable Time	3.3	1.0		17.5	1.0	19.5	ns
		5.0	1.0		12.5	1.0	14.0	
t	Disable Time	3.3	1.0		17.0	1.0	19.0	ns
		5.0	1.0		12.0	1.0	13.5	

\* Voltage Range 3.3 is 3.3V ± 0.3V

Voltage Range 5.0 is 5.0V ± 0.5V  
0.5V

## AC Operating Requirements: HD74AC652

Symbol	Parameter	Vcc,* (V)	Ta = +25°C CL = 50pF		Ta = -40°C to +85°C CL = 50pF		Unit
			Typ	Guaranteed Minimum			
t <sub>su</sub>	Setup Time, HIGH or LOW, Bus to Clock	3.3		5.0	5.5	ns	
		5.0		4.5	5.0		
t <sub>h</sub>	Hold Time, HIGH or LOW, Bus to Clock	3.3		1.5	1.5	ns	
		5.0		1.5	1.5		
t <sub>w</sub>	Clock Pulse Width HIGH or LOW	3.3		5.0	5.5	ns	
		5.0		4.5	5.0		

\* Voltage Range 3.3 is 3.3V ± 0.3V

Voltage Range 5.0 is 5.0V ± 0.5V

**AC Characteristics: HD74ACT652**

Symbol	Parameter	Vcc* (V)	Ta = +25°C CL = 50pF			Ta = -40°C to +85°C CL = 50pF		Unit
			Min	Typ	Max	Min	Max	
f <sub>max</sub>	Maximum Clock Frequency	5.0	70			60		MHz
t <sub>PLH</sub>	Propagation Delay Clock to Bus	5.0	1.0		14.5	1.0	16.0	ns
t <sub>PHL</sub>	Propagation Delay Clock to Bus	5.0	1.0		14.5	1.0	16.0	ns
t <sub>PLH</sub>	Propagation Delay Bus to Bus	5.0	1.0		11.0	1.0	12.5	ns
t <sub>PHL</sub>	Propagation Delay Bus to Bus	5.0	1.0		11.0	1.0	12.5	ns
t <sub>PLH</sub>	Propagation Delay SBA or SAB to An or Bn(An or Bn LOW)	5.0	1.0		11.5	1.0	12.5	ns
t <sub>PHL</sub>	Propagation Delay SBA or SAB to An or Bn(An or Bn LOW)	5.0	1.0		11.5	1.0	12.5	ns
t <sub>PLH</sub>	Propagation Delay SBA or SAB to An or Bn(An or Bn HIGH)	5.0	1.0		11.5	1.0	12.5	ns
t <sub>PHL</sub>	Propagation Delay SBA or SAB to An or Bn(An or Bn HIGH)	5.0	1.0		11.5	1.0	12.5	ns
t	Enable Time GAB or $\overline{\text{GBA}}$ to An or Bn	5.0	1.0		11.0	1.0	12.0	ns
t	Enable Time GAB or $\overline{\text{GBA}}$ to An or Bn	5.0	1.0		11.0	1.0	12.0	ns
t	Disable Time GAB or $\overline{\text{GBA}}$ to An or Bn	5.0	1.0		13.0	1.0	14.5	ns
t	Disable Time GAB or $\overline{\text{GBA}}$ to An or Bn	5.0	1.0		12.5	1.0	14.0	ns

\* Voltage Range 5.0 is 5.0V ± 0.5V

**AC Operating Requirements: HD74ACT652**

Symol	Parameter	Vcc* (V)	Ta = +25°C CL = 50pF		Ta = -40°C to +85°C CL = 50pF		Unit
			Typ	Guaranteed Minimum			
t <sub>SU</sub>	Setup Time Bus to Clock High or Low	5.0		7.0	8.0		ns
t <sub>H</sub>	Hold Time Bus to Clock High or Low	5.0		1.5	1.5		ns
t <sub>W</sub>	Clock Pulse width High or Low	5.0		7.0	8.0		ns

\* Voltage Range 5.0 is 5.0V ± 0.5V

**Capacitance**

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