



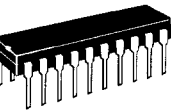
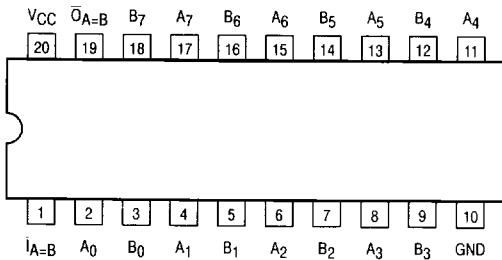
MOTOROLA

**MC74AC521
MC74ACT521**

8-Bit Identity Comparator

The MC74AC521/74ACT521 is an expandable 8-bit comparator. It compares two words of up to eight bits each and provides a LOW output when the two words match bit for bit. The expansion input $\bar{I}_{A=B}$ also serves as an active LOW enable input.

- Compares Two 8-Bit Words in 6.5 ns Typ
- Expandable to Any Word Length
- 20-Pin Package
- Outputs Source/Sink 24 mA
- 'ACT521 has TTL-Compatible Inputs



N SUFFIX
CASE 738-03
PLASTIC



DW SUFFIX
CASE 751D-04
PLASTIC

5

PIN NAMES

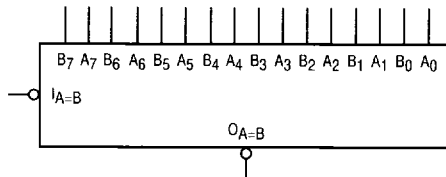
- A_0 – A_7 Word A Inputs
- B_0 – B_7 Word B Inputs
- $\bar{I}_{A=B}$ Expansion or Enable Input
- $\bar{O}_{A=B}$ Identity Output

TRUTH TABLE

Inputs		Outputs
$\bar{I}_{A=B}$	A, B	$\bar{O}_{A=B}$
L	$A = B^*$	L
L	$A \neq B$	H
H	$A = B^*$	H
H	$A \neq B$	H

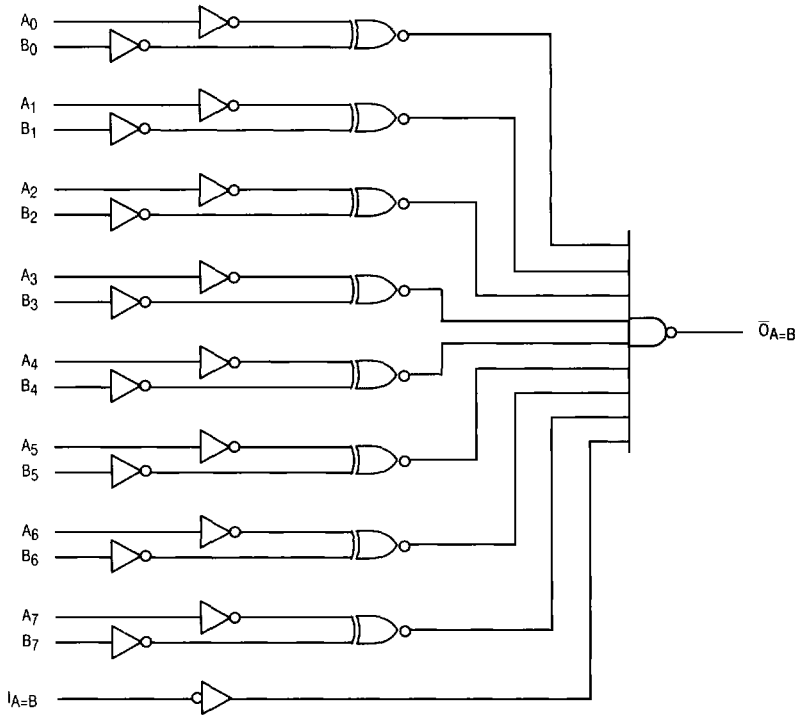
H = HIGH Voltage Level
L = LOW Voltage Level
* $A_0=B_0, A_1=B_1, A_2=B_2, \text{etc.}$

LOGIC SYMBOL



MC74AC521 • MC74ACT521

LOGIC DIAGRAM



Please note that this diagram is provided only for the understanding of logic operations and should not be used to estimate propagation delays.

MAXIMUM RATINGS*

Symbol	Parameter	Value	Unit
V_{CC}	DC Supply Voltage (Referenced to GND)	-0.5 to +7.0	V
V_{in}	DC Input Voltage (Referenced to GND)	-0.5 to $V_{CC} + 0.5$	V
V_{out}	DC Output Voltage (Referenced to GND)	-0.5 to $V_{CC} + 0.5$	V
I_{in}	DC Input Current, per Pin	± 20	mA
I_{out}	DC Output Sink/Source Current, per Pin	± 50	mA
I_{CC}	DC V_{CC} or GND Current per Output Pin	± 50	mA
T_{stg}	Storage Temperature	-65 to +150	$^{\circ}C$

* Maximum Ratings are those values beyond which damage to the device may occur. Functional operation should be restricted to the Recommended Operating Conditions.

MC74AC521 • MC74ACT521

RECOMMENDED OPERATING CONDITIONS

Symbol	Parameter	Min	Typ	Max	Unit	
V _{CC}	Supply Voltage	'AC	2.0	5.0	6.0	V
		'ACT	4.5	5.0	5.5	
V _{in} , V _{out}	DC Input Voltage, Output Voltage (Ref. to GND)	0		V _{CC}	V	
t _r , t _f	Input Rise and Fall Time (Note 1) 'AC Devices except Schmitt Inputs	V _{CC} @ 3.0 V		150		ns/V
		V _{CC} @ 4.5 V		40		
		V _{CC} @ 5.5 V		25		
t _r , t _f	Input Rise and Fall Time (Note 2) 'ACT Devices except Schmitt Inputs	V _{CC} @ 4.5 V		10		ns/V
		V _{CC} @ 5.5 V		8.0		
T _J	Junction Temperature (PDIP)			140	°C	
T _A	Operating Ambient Temperature Range	-40	25	85	°C	
I _{OH}	Output Current — High			-24	mA	
I _{OL}	Output Current — Low			24	mA	

1. V_{in} from 30% to 70% V_{CC}; see individual Data Sheets for devices that differ from the typical input rise and fall times.

2. V_{in} from 0.8 V to 2.0 V; see individual Data Sheets for devices that differ from the typical input rise and fall times.

DC CHARACTERISTICS

Symbol	Parameter	V _{CC} (V)	74AC		74AC	Unit	Conditions
			T _A = +25°C		T _A = -40°C to +85°C		
			Typ	Guaranteed Limits			
V _{IH}	Minimum High Level Input Voltage	3.0	1.5	2.1	2.1	V	V _{OUT} = 0.1 V or V _{CC} - 0.1 V
		4.5	2.25	3.15	3.15		
		5.5	2.75	3.85	3.85		
V _{IL}	Maximum Low Level Input Voltage	3.0	1.5	0.9	0.9	V	V _{OUT} = 0.1 V or V _{CC} - 0.1 V
		4.5	2.25	1.35	1.35		
		5.5	2.75	1.65	1.65		
V _{OH}	Minimum High Level Output Voltage	3.0	2.99	2.9	2.9	V	I _{OUT} = -50 μA
		4.5	4.49	4.4	4.4		
		5.5	5.49	5.4	5.4		
		3.0		2.56	2.46	V	*V _{IN} = V _{IL} or V _{IH} -12 mA I _{OH} -24 mA -24 mA
		4.5		3.86	3.76		
5.5		4.86	4.76				
V _{OL}	Maximum Low Level Output Voltage	3.0	0.002	0.1	0.1	V	I _{OUT} = 50 μA
		4.5	0.001	0.1	0.1		
		5.5	0.001	0.1	0.1		
		3.0		0.36	0.44	V	*V _{IN} = V _{IL} or V _{IH} 12 mA I _{OL} 24 mA 24 mA
		4.5		0.36	0.44		
5.5		0.36	0.44				
I _{IN}	Maximum Input Leakage Current	5.5		±0.1	±1.0	μA	V _I = V _{CC} , GND
I _{OLD}	†Minimum Dynamic Output Current	5.5			75	mA	V _{OLD} = 1.65 V Max
I _{OHD}		5.5			-75	mA	V _{OHD} = 3.85 V Min
I _{CC}	Maximum Quiescent Supply Current	5.5		8.0	80	μA	V _{IN} = V _{CC} or GND

* All outputs loaded; thresholds on input associated with output under test.

† Maximum test duration 2.0 ms, one output loaded at a time.

Note: I_{IN} and I_{CC} @ 3.0 V are guaranteed to be less than or equal to the respective limit @ 5.5 V V_{CC}.

MC74AC521 • MC74ACT521

AC CHARACTERISTICS (For Figures and Waveforms — See Section 3)

Symbol	Parameter	V _{CC} * (V)	74AC			74AC		Unit	Fig. No.
			T _A = +25°C C _L = 50 pF			T _A = -40°C to +85°C C _L = 50 pF			
			Min	Typ	Max	Min	Max		
t _{PLH}	Propagation Delay A _n or B _n to $\bar{O}_{A=B}$	3.3 5.0	3.5 2.5		11 8.0	3.0 2.0	12 9.0	ns	3-6
t _{PHL}	Propagation Delay A _n or B _n to $\bar{O}_{A=B}$	3.3 5.0	4.5 3.0		11.5 8.5	3.5 2.5	12.5 9.0	ns	3-6
t _{PLH}	Propagation Delay $\bar{I}_{A=B}$ to $\bar{O}_{A=B}$	3.3 5.0	3.0 2.5		8.0 6.0	2.5 2.0	9.0 7.0	ns	3-6
t _{PHL}	Propagation Delay $\bar{I}_{A=B}$ to $\bar{O}_{A=B}$	3.3 5.0	3.0 2.0		8.0 6.0	2.5 2.0	9.0 7.0	ns	3-6

* Voltage Range 3.3 V is 3.3 V ±0.3 V
Voltage Range 5.0 V is 5.0 V ±0.5 V.

DC CHARACTERISTICS

Symbol	Parameter	V _{CC} (V)	74ACT		74ACT		Unit	Conditions
			T _A = +25°C		T _A = -40°C to +85°C			
			Typ	Guaranteed Limits				
V _{IH}	Minimum High Level Input Voltage	4.5 5.5	1.5 1.5	2.0 2.0	2.0 2.0	V	V _{OUT} = 0.1 V or V _{CC} - 0.1 V	
V _{IL}	Maximum Low Level Input Voltage	4.5 5.5	1.5 1.5	0.8 0.8	0.8 0.8	V	V _{OUT} = 0.1 V or V _{CC} - 0.1 V	
V _{OH}	Minimum High Level Output Voltage	4.5 5.5	4.49 5.49	4.4 5.4	4.4 5.4	V	I _{OUT} = -50 μA	
		4.5 5.5		3.86 4.86	3.76 4.76	V	*V _{IN} = V _{IL} or V _{IH} -24 mA -24 mA	
V _{OL}	Maximum Low Level Output Voltage	4.5 5.5	0.001 0.001	0.1 0.1	0.1 0.1	V	I _{OUT} = 50 μA	
		4.5 5.5		0.36 0.36	0.44 0.44	V	*V _{IN} = V _{IL} or V _{IH} 24 mA 24 mA	
I _{IN}	Maximum Input Leakage Current	5.5		±0.1	±1.0	μA	V _I = V _{CC} , GND	
ΔI _{CC} T	Additional Max. I _{CC} /Input	5.5	0.6		1.5	mA	V _I = V _{CC} - 2.1 V	
I _{OLD}	†Minimum Dynamic Output Current	5.5			75	mA	V _{OLD} = 1.65 V Max	
I _{OHD}		5.5			-75	mA	V _{OHD} = 3.85 V Min	
I _{CC}	Maximum Quiescent Supply Current	5.5		8.0	80	μA	V _{IN} = V _{CC} or GND	

* All outputs loaded; thresholds on input associated with output under test.
† Maximum test duration 2.0 ms, one output loaded at a time

MC74AC521 • MC74ACT521

AC CHARACTERISTICS (For Figures and Waveforms — See Section 3)

Symbol	Parameter	V _{CC} * (V)	74ACT			74ACT		Unit	Fig. No.
			T _A = +25°C C _L = 50 pF			T _A = -40°C to +85°C C _L = 50 pF			
			Min	Typ	Max	Min	Max		
t _{PLH}	Propagation Delay A _n or B _n to $\bar{O}_{A=B}$	5.0	3.0		9.0	2.5	9.5	ns	3-6
t _{PHL}	Propagation Delay A _n or B _n to $\bar{O}_{A=B}$	5.0	3.0		10	2.5	11	ns	3-6
t _{PLH}	Propagation Delay $\bar{I}_{A=B}$ to $\bar{O}_{A=B}$	5.0	2.0		6.5	2.0	7.0	ns	3-6
t _{PHL}	Propagation Delay $\bar{I}_{A=B}$ to $\bar{O}_{A=B}$	5.0	2.5		7.5	2.0	8.0	ns	3-6

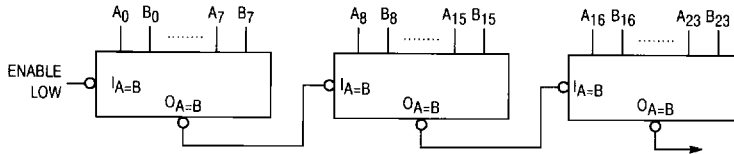
* Voltage Range 5.0 V is 5.0 V ± 0.5 V.

CAPACITANCE

Symbol	Parameter	Value Typ	Unit	Test Conditions
C _{IN}	Input Capacitance	4.5	pF	V _{CC} = 5.0 V
C _{PD}	Power Dissipation Capacitance	40	pF	V _{CC} = 5.0 V

APPLICATIONS

RIPPLE EXPANSION



PARALLEL EXPANSION

