

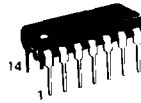
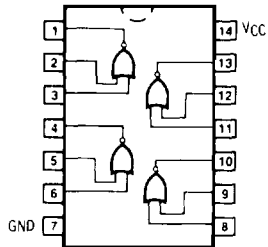


MOTOROLA

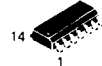
**MC74AC02
MC74ACT02**

Quad 2-Input NOR Gate

- Outputs Source/Sink 24 mA
- 'ACT02 Has TTL Compatible Inputs



**N SUFFIX
CASE 646-06
PLASTIC**



**D SUFFIX
CASE 751A-02
PLASTIC**

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	C

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

MC74AC02 • MC74ACT02

RECOMMENDED OPERATING CONDITIONS

Symbol	Parameter	Min	Typ	Max	Unit
V _{CC}	Supply Voltage	2.0	5.0	6.0	V
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		74ACT		Units	Conditions
			T _A = +25°C	T _A = -40°C to +85°C	T _A = -40°C to +85°C	T _A = -40°C to +85°C		
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			
V _{OL}	Maximum Low Level Output Voltage	3.0		2.56	2.46	V	*V _{IN} V _{IL} or V _{IH} 12 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			
V _{OL}	Maximum Low Level Output Voltage	3.0		0.36	0.44	V	*V _{IN} V _{IL} or V _{IH} 12 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}	†Minimum Dynamic Output Current	5.5			75	mA	V _{OHD} 3.85 V Min	
I _{CC}	Maximum Quiescent Supply Current	5.5		4.0	40	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}

5

MC74AC02 • MC74ACT02

DC CHARACTERISTICS

Symbol	Parameter	VCC (V)	74ACT		74ACT		Units	Conditions
			TA = +25°C		TA = -40°C to +85°C			
			Typ	Guaranteed Limits				
VIH	Minimum High Level Input Voltage	4.5	1.5	2.0	2.0	V	VOU _T = 0.1 V or VCC = 0.1 V	
		5.5	1.5	2.0	2.0			
VIL	Maximum Low Level Input Voltage	4.5	1.5	0.8	0.8	V	VOU _T = 0.1 V or VCC = 0.1 V	
		5.5	1.5	0.8	0.8			
VOH	Minimum High Level Output Voltage	4.5	4.49	4.4	4.4	V	IOU _T = 50 μA	
		5.5	5.49	5.4	5.4			
		4.5		3.86	3.76	V	*VIN = VIL or VIH 24 mA	
		5.5		4.86	4.76			
VOL	Maximum Low Level Output Voltage	4.5	0.001	0.1	0.1	V	IOU _T = 50 μA	
		5.5	0.001	0.1	0.1			
		4.5		0.36	0.44	V	*VIN = VIL or VIH 24 mA	
		5.5		0.36	0.44			
IIN	Maximum Input Leakage Current	5.5		±0.1	±1.0	μA	VI = VCC, GND	
ΔICCT	Additional Max. ICC Input	5.5	0.6		1.5	mA	VI = VCC = 2.1 V	
IOLD	†Minimum Dynamic Output Current	5.5			75	mA	VOLD = 1.65 V Max	
IOHD		5.5			75	mA	VOHD = 3.85 V Min	
ICC	Maximum Quiescent Supply Current	5.5		4.0	40	μA	VIN = VCC 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.

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

Symbol	Parameter	VCC* (V)	74AC			74AC		Units	Fig. No.
			TA = +25°C CL = 50 pF			TA = -40°C to +85°C CL = 50 pF			
			Min	Typ	Max	Min	Max		
tPLH	Propagation Delay	3.3	1.5	5.0	7.5	1.0	8.0	ns	3-5
		5.0	1.5	4.0	6.0	1.0	6.5		
tPHL	Propagation Delay	3.3	1.5	5.0	7.5	1.0	8.0	ns	3-5
		5.0	1.5	4.5	6.5	1.0	7.0		

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

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

Symbol	Parameter	VCC* (V)	74ACT			74ACT		Units	Fig. No.
			TA = +25°C CL = 50 pF			TA = -40°C to +85°C CL = 50 pF			
			Min	Typ	Max	Min	Max		
tPLH	Propagation Delay	5.0	1.5		8.5	1.0	9.0	ns	3-6
tPHL	Propagation Delay	5.0	1.5		9.5	1.0	10	ns	3-6

*Voltage Range 5.0 is 5.0 V ± 0.5 V

CAPACITANCE

Symbol	Parameter	Value Typ	Units	Test Conditions
CIN	Input Capacitance	4.5	pF	VCC = 5.0 V
CPD	Power Dissipation Capacitance	30	pF	VCC = 5.0 V

FACT DATA