

October 1987 Revised January 2005

MM74HCT32 Quad 2-Input OR Gate

General Description

The MM74HCT32 is a logic function fabricated by using advanced silicon-gate CMOS technology, which provides the inherent benefits of CMOS—low quiescent power and wide power supply range. This device is input and output characteristic and pin-out compatible with standard 74LS logic families. All inputs are protected from static discharge damage by internal diodes to $\rm V_{CC}$ and ground.

MM74HCT devices are intended to interface between TTL and NMOS components and standard CMOS devices. These parts are also plug-in replacements for LS-TTL devices and can be used to reduce power consumption in existing designs.

Features

- TTL, LS pin-out and threshold compatible
- Fast switching: t_{PLH}, t_{PHL} = 10 ns (typ)
- Low power: 10 µW at DC
- High fan-out, 10 LS-TTL loads

Ordering Code:

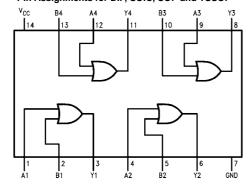
Order Number	Package	Package Description		
	Number	rackage Description		
MM74HCT32M	M14A.	14-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-012, 0.150" Narrow		
MM74HCT32MX-NL	M14A	Pb-Free 14-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-012, 0.150" Narrow		
MM74HCT32SJ	M14D	Pb-Free 14-Lead Small Outline Package (SOP), EIAJ TYPE II, 5.3mm Wide		
MM74HCT32MTC	MTC14	14-Lead Thin Shrink Small Outline Package (TSSOP), JEDEC MO-153, 4.4mm Wide		
MM74HCT32N	N14A	14-Lead Plastic Dual-In-Line Package (PDIP), JEDEC MS-001, 0.300" Wide		

Devices also available in Tape and Reel. Specify by appending suffix the letter "X" to the ordering code.

Pb-Free package per JEDEC J-STD-020B.

Connection Diagram

Pin Assignments for DIP, SOIC, SOP and TSSOP



Logic Diagram

Absolute Maximum Ratings(Note 1)

(Note 2)

Supply Voltage (V _{CC})	-0.5 to +7.0V
DC Input Voltage (V _{IN})	-1.5 to V_{CC} +1.5V
DC Output Voltage (V _{OUT})	-0.5 to V_{CC} +0.5V
Clamp Diode Current (I _{IK} , I _{OK})	±20 mA
DC Output Current, per pin (I _{OUT})	±25 mA
DC V_{CC} or GND Current, per pin (I_{CC})	±50 mA
Storage Temperature Range (T _{STG})	-65°C to +150°C
Power Dissipation (P _D)	
(NI=4= O)	

(Note 3) 600 mW S.O. Package only 500 mW

Lead Temperature (T_L) (Soldering 10 seconds)

260°C

Note 1: Absolute Maximum Ratings are those values beyond which damage to the device may occur.

Min

4.5

0

-40

Units

V

V

٥С

ns

Max

5.5

 V_{CC}

+85

Recommended Operating

Conditions

Supply Voltage (V_{CC})

 (V_{IN}, V_{OUT})

DC Input or Output Voltage

Input Rise or Fall Times

Operating Temperature Range (T_A)

Note 2: Unless otherwise specified all voltages are referenced to ground. Note 3: Power Dissipation temperature derating — plastic "N" package: –12 mW/°C from 65°C to 85°C.

DC Electrical Characteristics

 $V_{CC} = 5V \pm 10\%$ (unless otherwise specified)

Symbol	Parameter	Conditions	T _A = 25°C		$T_A = -40^{\circ}C \text{ to } +85^{\circ}C$	Units
			Typ Gua		anteed Limits	
V _{IH}	Minimum HIGH Level			2.0	2.0	V
	Input Voltage					
V _{IL}	Maximum LOW Level			0.8	0.8	V
	Input Voltage					
V _{OH}	Minimum HIGH Level	$V_{IN} = V_{IH}$ or V_{IL}				
	Output Voltage	$ I_{OUT} = 20 \mu A$	V_{CC}	$V_{CC} - 0.1$	V _{CC} - 0.1	V
		$ I_{OUT} = 4.0 \text{ mA}, V_{CC} = 4.5 \text{V}$	4.2	3.98	3.84	V
		$ I_{OUT} = 4.8 \text{ mA}, V_{CC} = 5.5 \text{V}$	5.2	4.98	4.84	V
V _{OL}	Maximum LOW Level	$V_{IN} = V_{IH}$				
	Voltage	$ I_{OUT} = 20 \mu A$	0	0.1	0.1	V
		$ I_{OUT} = 4.0 \text{ mA}, V_{CC} = 4.5 \text{V}$	0.2	0.26	0.33	V
		$ I_{OUT} = 4.8 \text{ mA}, V_{CC} = 5.5 \text{V}$	0.2	0.26	0.33	V
I _{IN}	Maximum Input	$V_{IN} = V_{CC}$ or GND, V_{IH} or V_{IL}		± 0.1	± 1.0	μΑ
	Current					
I _{CC}	Maximum Quiescent	$V_{IN} = V_{CC}$ or GND		2.0	20	μΑ
	Supply Current	$I_{OUT} = 0 \mu A$				
		V _{IN} = 2.4V or 0.5V (Note 4)		1.2	1.4	mA

Note 4: This is measured per input with all other inputs held at V_{CC} or ground.

AC Electrical Characteristics

 $\text{V}_{CC} = 5.0 \text{V}, \, t_{\text{f}} = t_{\text{f}} = 6 \, \, \text{ns}, \, C_L = 15 \, \, \text{pF}, \, T_A = 25 C^{\circ}$ (unless otherwise noted)

Symbol	Parameter	Conditions	Тур	Guaranteed Limit	Units
t _{PLH} , t _{PHL}	Maximum Propagation Delay		10		ns

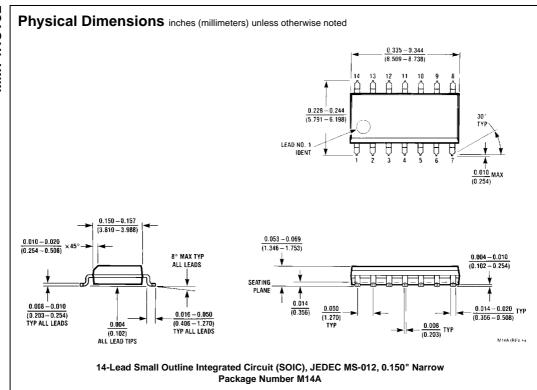
AC Electrical Characteristics

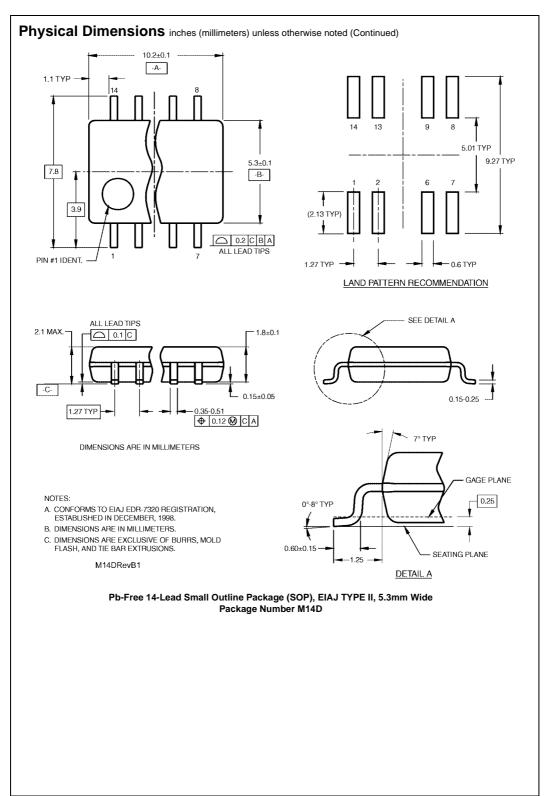
 $V_{CC} = 5.0V \pm 10\%$, $t_r = t_f = 6$ ns, $C_L = 15$ pF (unless otherwise noted)

Symbol	Parameter	Conditions	T _A = 25°C		$T_A = -40^{\circ}C$ to $+85^{\circ}C$	Units
			Тур	Guai	ranteed Limits	Oilito
t _{PLH} , t _{PHL}	Maximum Propagation Delay		12	20	25	ns
t _{THL} , t _{TLH}	Maximum Output Rise & Fall Time		8	15	19	ns
C _{PD}	Power Dissipation Capacitance	(Note 5)	48			pF
C _{IN}	Input Capacitance		5	10	10	pF

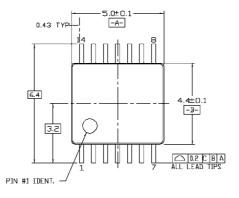
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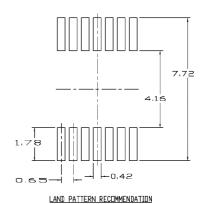
Note 5: C_{PD} determines the no load dynamic power consumption, P_D = C_{PD} V_{CC}2 f+I_{CC} V_{CC}, and the no load dynamic current consumption, I_S = C_{PD} V_{CC} f+I_{CC}.

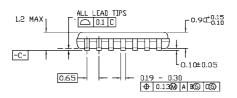


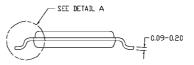


Physical Dimensions inches (millimeters) unless otherwise noted (Continued)





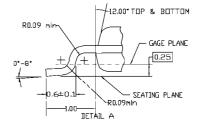




NOTES:

- A CONFORMS TO JEDEC REGISTRATION MO-153, VARIATION AB-REF NOTE 6, DATED 7/93 B. DIMENSIONS ARE IN MILLIMETERS
- D. DIMENSIONS ARE EXCLUSIVE OF BURRS, MOLD FLASH, AND TIE BAR EXTRUSIONS
 D. DIMENSIONING AND TOLERANCES PER ANSI Y14.5M, 1982

MTC14revD



14-Lead Thin Shrink Small Outline Package (TSSOP), JEDEC MO-153, 4.4mm Wide Package Number MTC14

Physical Dimensions inches (millimeters) unless otherwise noted (Continued) 0.740 - 0.770 (18.80 - 19.56)(2.286) 14 13 12 14 13 12 11 10 9 8 INDEX AREA 0.250 ± 0.010 (6.350 ± 0.254) PIN NO. 1 IDENT 1 2 3 4 5 6 7 1 2 3 $\frac{0.092}{(2.337)}$ DIA $\frac{0.030}{(0.762)}$ MAX OPTION 1 OPTION 02 $\frac{0.135 \pm 0.005}{(3.429 \pm 0.127)}$ 0.300 - 0.320(7.620 - 8.128) 0.065 0.145 - 0.2000.060 4° TYP Optional (3.683 - 5.080)(1.524) ¥ 95° ±5° $\frac{0.008 - 0.016}{(0.203 - 0.406)} \text{ TYP}$ ก ก่อก 0.125 - 0.150(3.175 - 3.810) $\frac{0.075 \pm 0.015}{(1.905 \pm 0.381)}$ 0.280 0.014 - 0.023 TYP (7.112)-MIN $\frac{0.100 \pm 0.010}{(2.540 \pm 0.254)} \text{ TYP}$

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

 $\frac{0.050 \pm 0.010}{(1.270 - 0.254)} \text{ TYP}$

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