

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

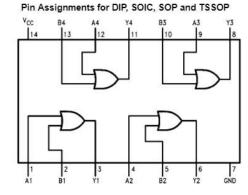
- TTL, LS pin-out and threshold compatible
- Fast switching: t_{PLH}, t_{PHL} = 10 ns (typ)
- Low power: 10 xW at DC
- High fan-out, 10 LS-TTL loads

Ordering Code:

Order Number Package Number		Package 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.

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



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)

 $\begin{array}{ll} \mbox{(Note 3)} & \mbox{600 mW} \\ \mbox{S.O. Package only} & \mbox{500 mW} \\ \mbox{Lead Temperature (T_L)} & \mbox{} \end{array}$

(Soldering 10 seconds) 260°C

Recommended Operating Conditions

	Min	Max	Units
Supply Voltage (V _{CC})	4.5	5.5	V
DC Input or Output Voltage			
(V _{IN} , V _{OUT})	0	Vcc	V
Operating Temperature Range (T _A)	-40	+85	°C
Input Rise or Fall Times			
(t_f, t_f)		500	ns

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

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 ± 10% (unless otherwise specified)

Symbol	Parameter	Conditions	T _A = 25°C		T _A = -40°C to +85°C	Units
			Тур	Guaranteed Limits		
V _{IH}	Minimum HIGH Level Input Voltage			2.0	2.0	V
V _{IL}	Maximum LOW Level Input Voltage			0.8	0.8	V
V _{OH}	Minimum HIGH Level Output Voltage	$V_{IN} = V_{IH} \text{ or } V_{IL}$ $ I_{OUT} = 20 \triangle A$	V _{cc}	V _{CC} - 0.1	V _{CC} - 0.1	V
	- M	I _{OUT} = 4.0 mA, V _{CC} = 4.5V	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
VoL	Maximum LOW Level	$V_{IN} = V_{IH}$				
	Voltage	I _{OUT} = 20 ∞A	0	0.1	0.1	V 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 Current	$V_{IN} = V_{CC}$ or GND, V_{IH} or V_{IL}		± 0.1	± 1.0	κA
Icc	Maximum Quiescent	V _{IN} = V _{CC} or GND		2.0	20	κA
	Supply Current	I _{OUT} = 0 ∞A				
	100000	V _{IN} = 2.4V or 0.5V (Note 4)		1.2	1.4	mΑ

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

AC Electrical Characteristics

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

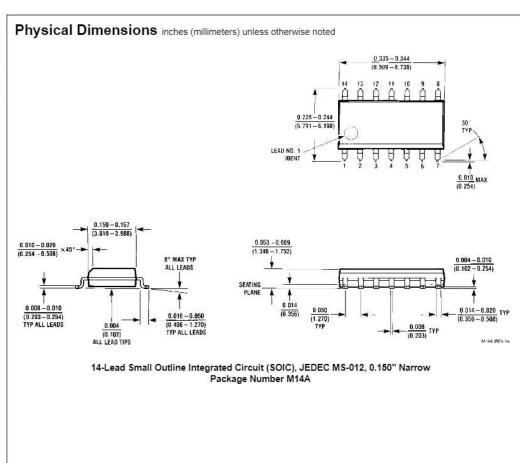
Symbol	Parameter	Conditions	Тур	Guaranteed Limit	Units
t _{PLH} , t _{PHL}	Maximum Propagation Delay		10		ns

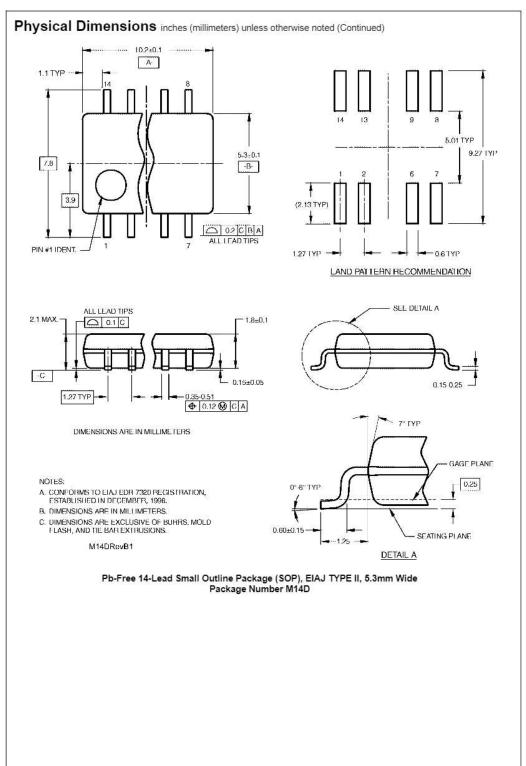
AC Electrical Characteristics

 V_{CC} = 5.0V \pm 10%, $t_{\rm f}$ = $t_{\rm f}$ = 6 ns, $C_{\rm L}$ = 15 pF (unless otherwise noted)

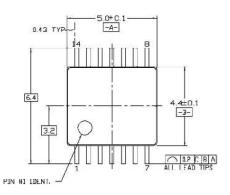
Symbol	Parameter	Conditions	T _A = 25°C		$T_A = -40^{\circ}\text{C to } +85^{\circ}\text{C}$	Units
	Parameter		Тур	Guaranteed Limits		
t _{PLH} , t _{PHL}	Maximum Propagation Delay		12	20	25	ns
t _{THL} , t _{TLH}	Maximum Output Rise & Fall Time		8	15	19	ns
C _{PD}	Power Dissipation Capacitance	(Note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

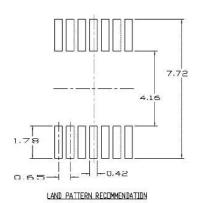
Note 5: C_{PD} determines the no load dynamic power consumption, $P_D = C_{PD} \ V_{CC} 2 \ f + I_{CC} \ V_{CC}$, and the no load dynamic current consumption, $I_S = C_{PD} \ V_{CC} f + I_{CC}$.

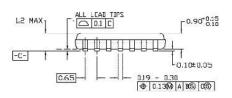


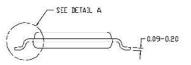


Physical Dimensions inches (millimeters) unless otherwise noted (Continued)







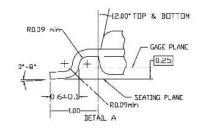


NOTES:

- A CONFORMS TO JEDEC REGISTRATION MO-153, VARIATION AB-REF NOTE 6, LATED 7/93

 B. DIMENSIONS ARE IN MILLIMETERS
 C. DIMENSIONS ARE EXCLUSIVE OF BURRS, MOLD FLASH, AND TIE BAR EXTRISIONS I 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 11 10 9 8 14 13 12 0.250 ± 0.010 (6.350 ± 0.254) PIN NO. 1 IDENT PIN NO. 1 IDENT 1 2 3 4 5 1 2 3 0.092 (2.337) DIA 0.030 MAX (0.762) DEPTH OPTION 1 OPTION 02 0.135 ± 0.005 $\frac{0.300 - 0.320}{(7.620 - 8.128)}$ (3.429 ± 0.127) 0.145 - 0.200 (3.683 - 5.080) 0.065 0.060 (1.524) TYP (1.651) ٠ 0.008-0.016 (0.203-0.406) TYP 0.020 (0.508) 8.125 - 0.150 (3.175 - 3.810) 0.075 ±0.015 (1.905 ±0.381) 0.280 $\frac{0.014-0.023}{(0.356-0.584)}\,\mathrm{TYP}$ (7.112) MIN 0.100 ± 0.010 (2.540 ± 0.254)

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

0.050 ± 0.010 (1.270 - 0.254) TYP

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0.325 + 0.040

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