

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 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 μ W at DC
- High fan-out, 10 LS-TTL loads

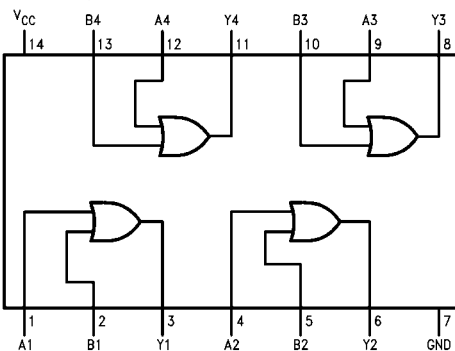
Ordering Code:

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

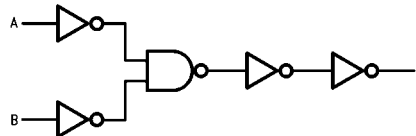
Devices also available in Tape and Reel. Specify by appending suffix the letter "X" to the ordering code.
Pb-Free package per JEDEC J-STD-020B.

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)	
(Note 3)	600 mW
S.O. Package only	500 mW
Lead Temperature (T_L)	
(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	V_{CC}	V
Operating Temperature Range (T_A)	-40	+85	°C
Input Rise or Fall Times (t_r, 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** $V_{CC} = 5V \pm 10\%$ (unless otherwise specified)

Symbol	Parameter	Conditions	$T_A = 25^\circ\text{C}$		$T_A = -40^\circ\text{C to } +85^\circ\text{C}$	Units	
			Typ	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	$V_{IN} = V_{IH}$ or V_{IL}		V_{CC}	$V_{CC} - 0.1$	V	
		$ I_{OUT} = 20 \mu\text{A}$		4.2	3.98	$V_{CC} - 0.1$	V
		$ I_{OUT} = 4.0 \text{ mA}, V_{CC} = 4.5V$ $ I_{OUT} = 4.8 \text{ mA}, V_{CC} = 5.5V$		5.2	4.98	4.84	V
V_{OL}	Maximum LOW Level Voltage	$V_{IN} = V_{IH}$		0	0.1	V	
		$ I_{OUT} = 20 \mu\text{A}$		0.2	0.26	0.33	V
		$ I_{OUT} = 4.0 \text{ mA}, V_{CC} = 4.5V$ $ I_{OUT} = 4.8 \text{ mA}, V_{CC} = 5.5V$		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	μA	
I_{CC}	Maximum Quiescent Supply Current	$V_{IN} = V_{CC}$ or GND $I_{OUT} = 0 \mu\text{A}$		2.0	20	μA	
		$V_{IN} = 2.4V$ 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

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

Symbol	Parameter	Conditions	Typ	Guaranteed Limit	Units
t_{PLH} , t_{PHL}	Maximum Propagation Delay		10		ns

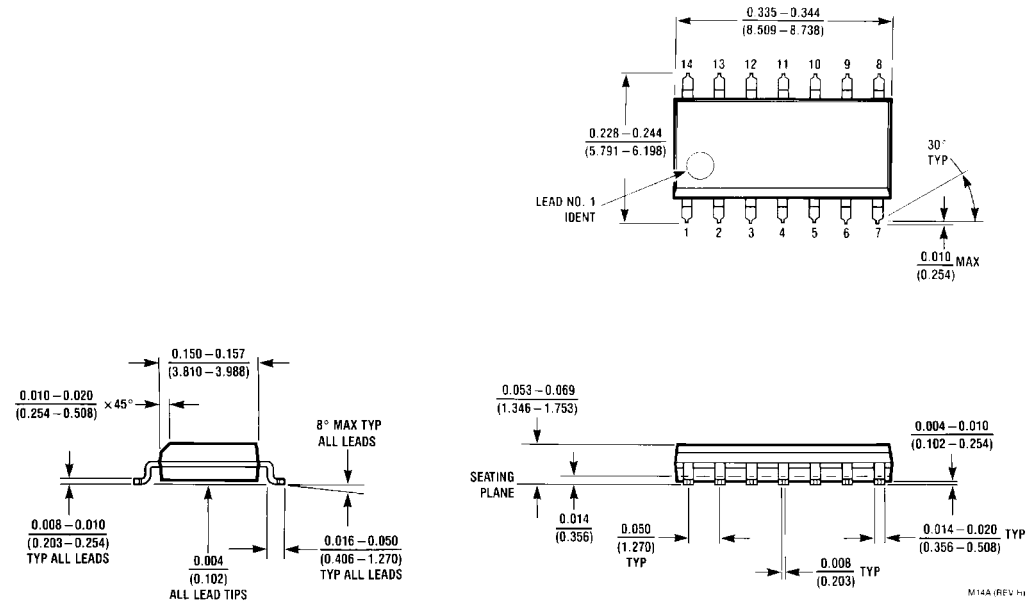
AC Electrical Characteristics

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

Symbol	Parameter	Conditions	$T_A = 25^\circ\text{C}$		$T_A = -40^\circ\text{C to } +85^\circ\text{C}$	Units
			Typ	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

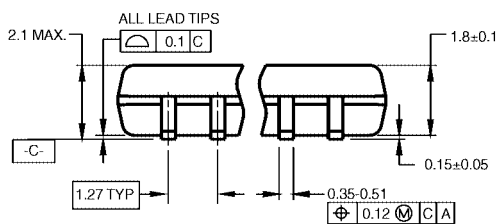
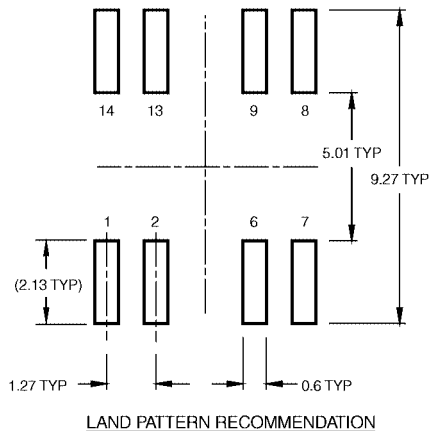
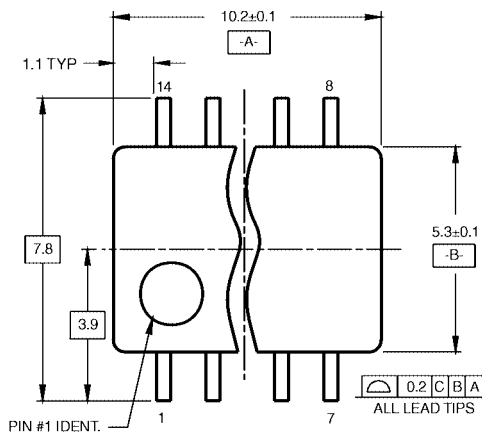
Note 5: C_{PD} determines the no load dynamic power consumption, $P_D = C_{PD} V_{CC}^2 f + I_{CC} V_{CC}$, and the no load dynamic current consumption, $I_S = C_{PD} V_{CC} f + I_{CC}$.

Physical Dimensions inches (millimeters) unless otherwise noted

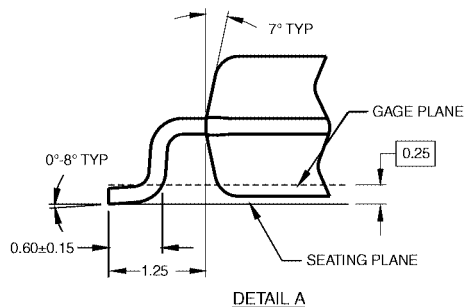
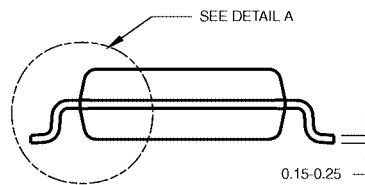


14-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-012, 0.150" Narrow Package Number M14A

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



DIMENSIONS ARE IN MILLIMETERS

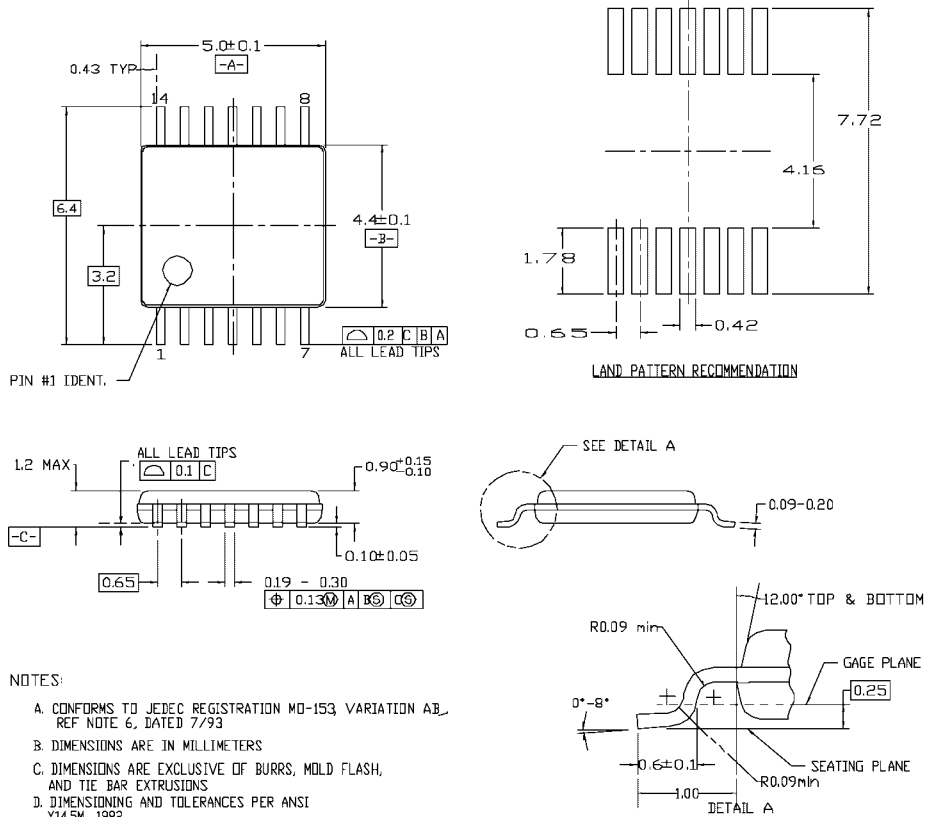


- NOTES:
- A. CONFORMS TO EIAJ EDR-7320 REGISTRATION, ESTABLISHED IN DECEMBER, 1998.
 - B. DIMENSIONS ARE IN MILLIMETERS.
 - C. DIMENSIONS ARE EXCLUSIVE OF BURRS, MOLD FLASH, AND TIE BAR EXTRUSIONS.

M14DRevB1

Pb-Free 14-Lead Small Outline Package (SOP), EIAJ TYPE II, 5.3mm Wide Package Number M14D

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

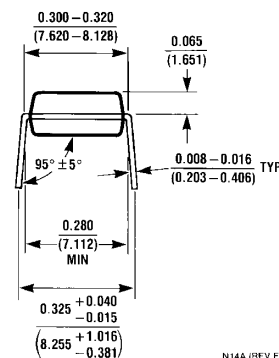
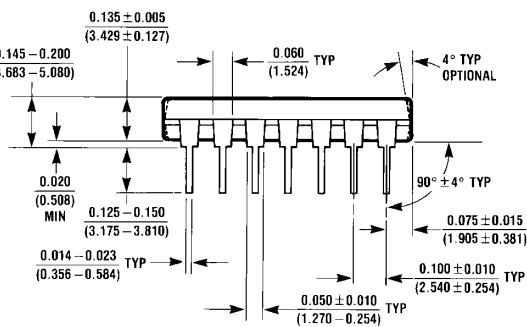
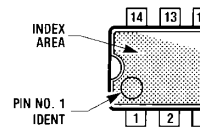
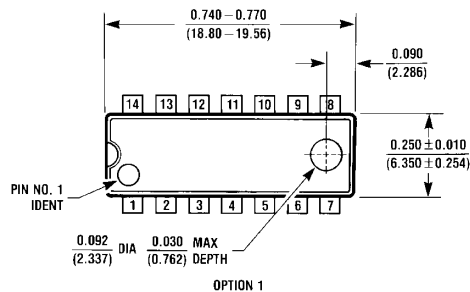


- NOTES:
- A. CONFORMS TO JEDEC REGISTRATION MO-153 VARIATION AB, REF NOTE 6, DATED 7/93
 - B. DIMENSIONS ARE IN MILLIMETERS
 - C. DIMENSIONS ARE EXCLUSIVE OF BURRS, MOLD FLASH, AND TIE BAR EXTRUSIONS
 - D. DIMENSIONING AND TOLERANCES PER ANSI Y14.5M, 1982

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)



N14A (REV F)

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

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