Rochester Electronics

Datasheet

PART NUMBER

54F00BCA-ROCA

Rochester Electronics Manufactured Components

Rochester branded components are manufactured using either die/wafers purchased from the original suppliers or Rochester wafers recreated from the original IP. All re-creations are done with the approval of the Original Component Manufacturer. (OCM)

Parts are tested using original factory test programs or Rochester developed test solutions to guarantee product meets or exceeds the OCM data sheet.

Quality Overview

- ISO-9001
- AS9120 certification
- Qualified Manufacturers List (QML) MIL-PRF-38535
    - Class Q Military
    - Class V Space Level

Qualified Suppliers List of Distributors (QSLD)

- Rochester is a critical supplier to DLA and meets all industry and DLA standards.

Rochester Electronics, LLC is committed to supplying products that satisfy customer expectations for quality and are equal to those originally supplied by industry manufacturers.

The original manufacturer's datasheet accompanying this document reflects the performance and specifications of the Rochester manufactured version of this device. Rochester Electronics guarantees the performance of its semiconductor products to the original OCM specifications. 'Typical' values are for reference purposes only. Certain minimum or maximum ratings may be based on product characterization, design, simulation, or sample testing.

December 1994

National Semiconductor

54F/74F00
Quad 2-Input NAND Gate

General Description

This device contains four independent gates, each of which performs the logic NAND function.

Features

- Guaranteed 4000V minimum ESD protection

Ordering Code: See Section 0

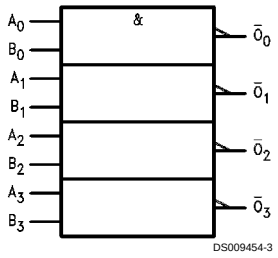
Commercial	Military	Package Number	Package Description
74F00PC		N14A	14-Lead (0.300" Wide) Molded Dual-In-Line
	54F00DM (Note 2)	J14A	14-Lead Ceramic Dual-In-Line
74F00SC (Note 1)		M14A	14-Lead (0.150" Wide) Molded Small Outline, JEDEC
74F00SJ (Note 1)		M14D	14-Lead (0.300" Wide) Molded Small Outline, EIAJ
	54F00FM (Note 2)	W14B	14-Lead Cerpack
	54F00LM (Note 2)	E20A	20-Lead Ceramic Leadless Chip Carrier, Type C

Note 1: Devices also available in 13" reel. Use suffix = SCX and SJX.

Note 2: Military grade device with environmental and burn-in processing. Use suffix = DMQB, FMQB and LMQB.

Logic Symbol

IEEE/IEC



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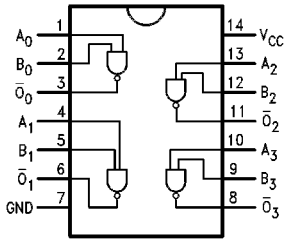
Connection Diagrams

Pin Assignment for DIP, SOIC and Flatpak



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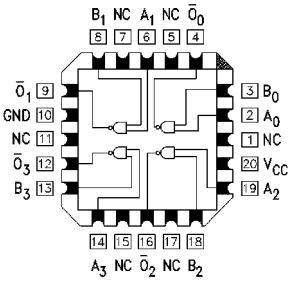
Pin Assignment for LCC



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TRI-STATE® is a registered trademark of National Semiconductor Corporation.

Unit Loading/Fan Out

See Section 0 for U.L. definitions

DSXXX

Pin Names	Description	54F/74F	
		U.L. HIGH/LOW	Input I_{IH}/I_{IL} Output I_{OH}/I_{OL}
A_n, B_n	Inputs	1.0/1.0	20 µA/−0.6 mA
$\overline{O}_n$	Outputs	50/33.3	−1 mA/20 mA

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Absolute Maximum Ratings (Note 3)

Storage Temperature	−65˚C to +150˚C
Ambient Temperature under Bias	−55˚C to +125˚C
Junction Temperature under Bias	−55˚C to +175˚C
Plastic	−55˚C to +150˚C
V_{CC} Pin Potential to Ground Pin	−0.5V to +7.0V
Input Voltage (Note 4)	−0.5V to +7.0V
Input Current (Note 4)	−30 mA to +5.0 mA
Voltage Applied to Output in HIGH State (with V_{CC} = 0V)	
Standard Output	−0.5V to V_{CC}
TRI-STATE® Output	−0.5V to +5.5V
Current Applied to Output in LOW State (Max)	twice the rated I_{OL} (mA)
ESD Last Passing Voltage (Min)	4000V

Recommended Operating Conditions

Free Air Ambient Temperature	
Commercial	0˚C to +70˚C
Supply Voltage	
Commercial	+4.5V to +5.5V

Note 3: Absolute maximum ratings are values beyond which the device may be damaged or have its useful life impaired. Functional operation under these conditions is not implied.

Note 4: Either voltage limit or current limit is sufficient to protect inputs.

DC Electrical Characteristics

Symbol	Parameter		54F/74F Min	54F/74F Typ	54F/74F Max	Units	V_{CC}	Conditions
V_{IH}	Input HIGH Voltage		2.0			V		Recognized as a HIGH Signal
V_{IL}	Input LOW Voltage				0.8	V		Recognized as a LOW Signal
V_{CD}	Input Clamp Diode Voltage				−1.2	V	Min	I_{IN} = −18 mA
V_{OH}	Output HIGH Voltage	54F 10% V_{CC}	2.5			V	Min	I_{OH} = −1 mA
		74F 10% V_{CC}	2.5					I_{OH} = −1 mA
		74F 5% V_{CC}	2.7					I_{OH} = −1 mA
V_{OL}	Output LOW Voltage	54F 10% V_{CC}			0.5	V	Min	I_{OL} = 20 mA
		74F 10% V_{CC}			0.5			I_{OL} = 20 mA
I_{IH}	Input HIGH Current	54F			20.0	µA	Max	V_{IN} = 2.7V
		74F			5.0			
I_{BVI}	Input HIGH Current Breakdown Test	54F			100	µA	Max	V_{IN} = 7.0V
		74F			7.0			
I_{CEX}	Output HIGH Leakage Current	54F			250	µA	Max	V_{OUT} = V_{CC}
		74F			50			
V_{ID}	Input Leakage Test	74F	4.75			V	0.0	I_{ID} = 1.9 µA All other pins grounded
I_{OD}	Output Leakage Circuit Current	74F			3.75	µA	0.0	V_{IOD} = 150 mV All other pins grounded
I_{IL}	Input LOW Current				−0.6	mA	Max	V_{IN} = 0.5V
I_{OS}	Output Short-Circuit Current		−60		−150	mA	Max	V_{OUT} = 0V
I_{CCH}	Power Supply Current			1.9	2.8	mA	Max	V_O = HIGH
I_{CCL}	Power Supply Current			6.8	10.2	mA	Max	V_O = LOW

AC Electrical Characteristics

See Section 0 for Waveforms and Load Configurations

Symbol	Parameter	74F T_A = +25˚C, V_{CC} = +5.0V, C_L = 50 pF Min	Typ	Max	54F T_A, V_{CC} = Mil, C_L = 50 pF Min	Max	74F T_A, V_{CC} = Com, C_L = 50 pF Min	Max	Units	Fig. No.
t_{PLH}	Propagation Delay	2.4	3.7	5.0	2.0	7.0	2.4	6.0	ns	⧫⧫-⧫⧫
t_{PHL}	A_n, B_n to $\overline{O}_n$	1.5	3.2	4.3	1.5	6.5	1.5	5.3		

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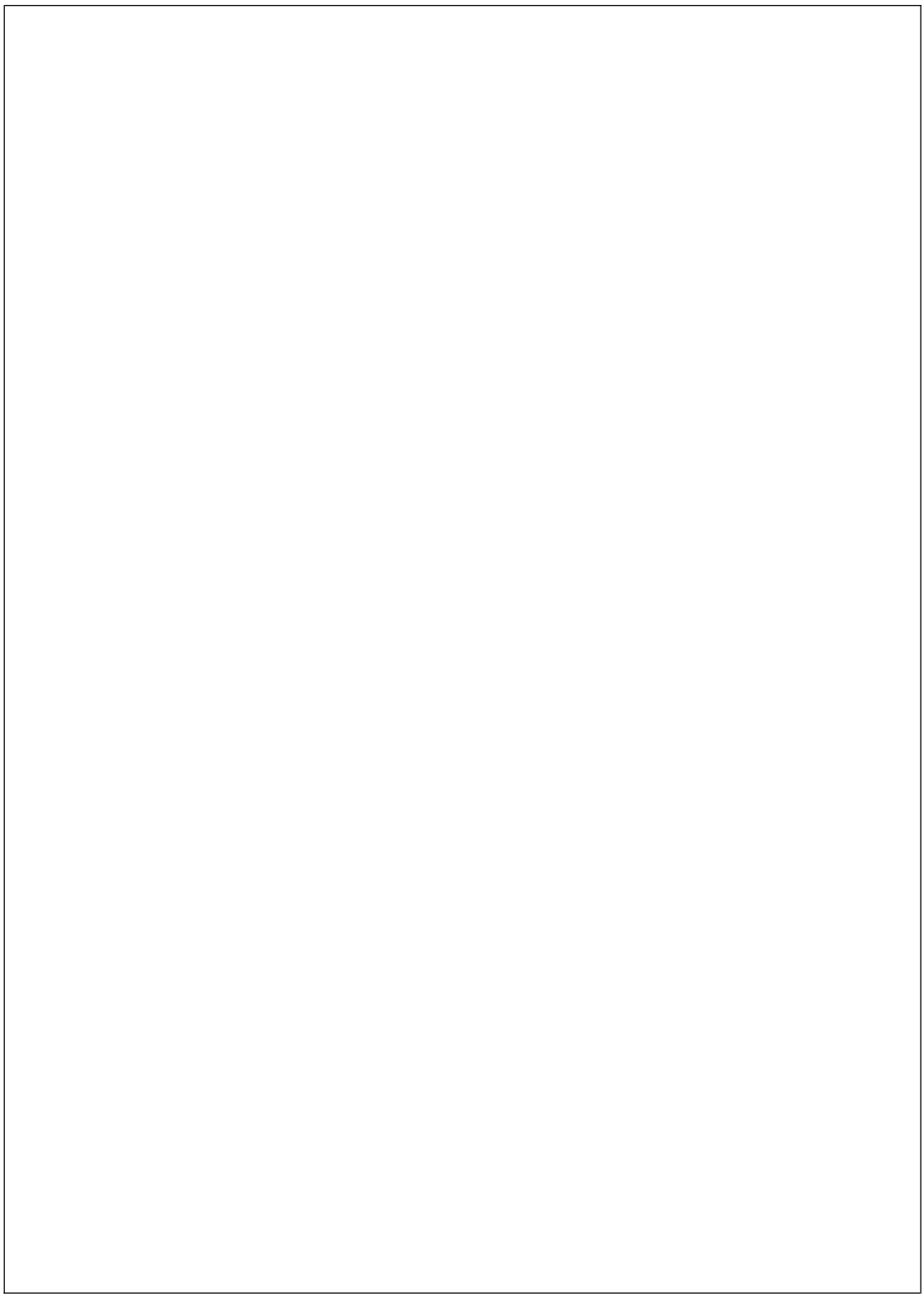
Book Extract End



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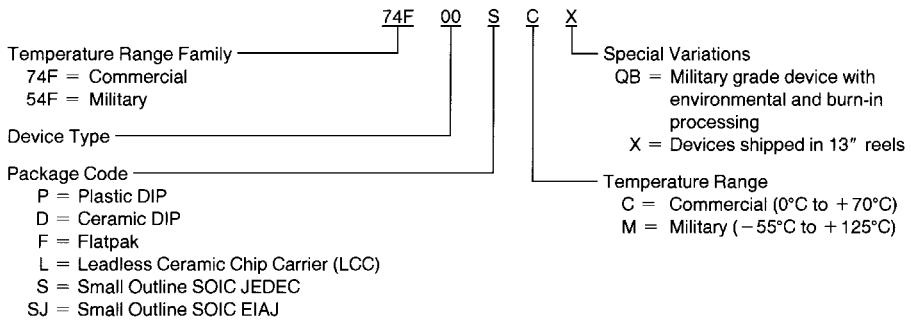
Ordering Information

The device number is used to form part of a simplified purchasing code where the package type and temperature range are defined as follows:



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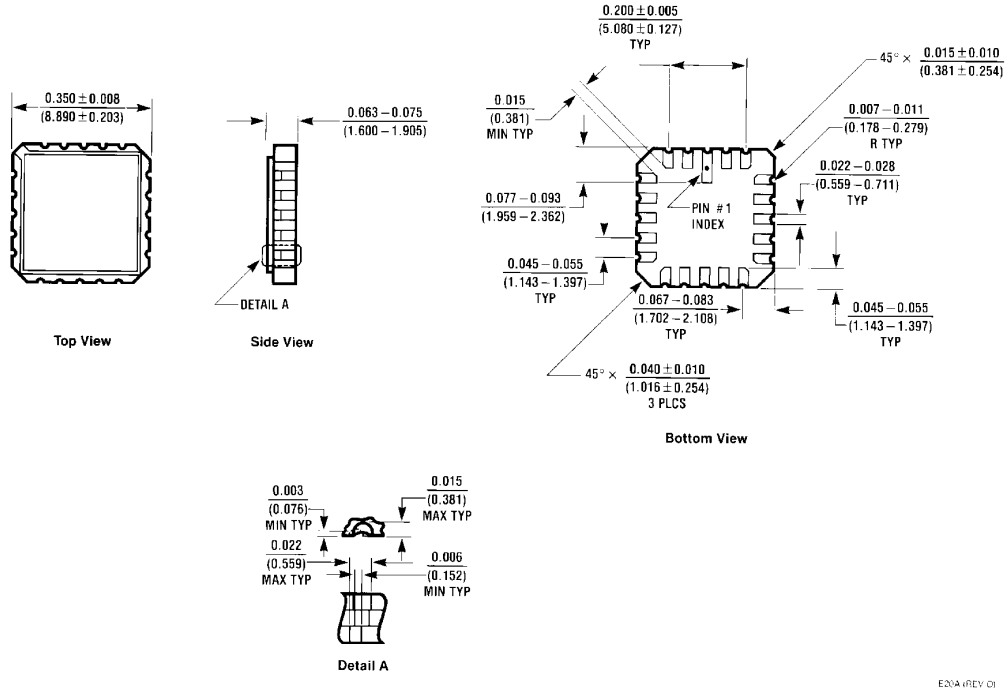
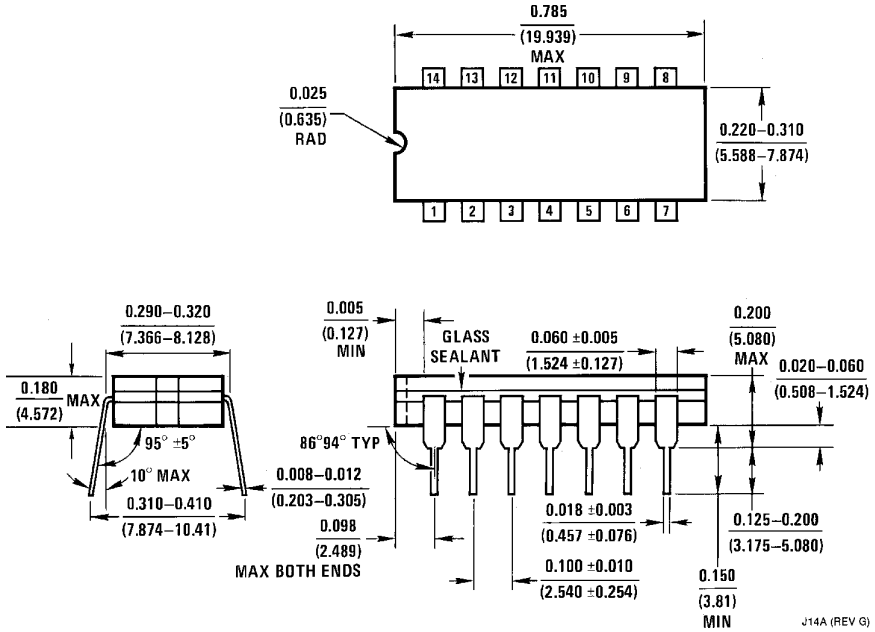
Physical Dimensions inches (millimeters) unless otherwise noted

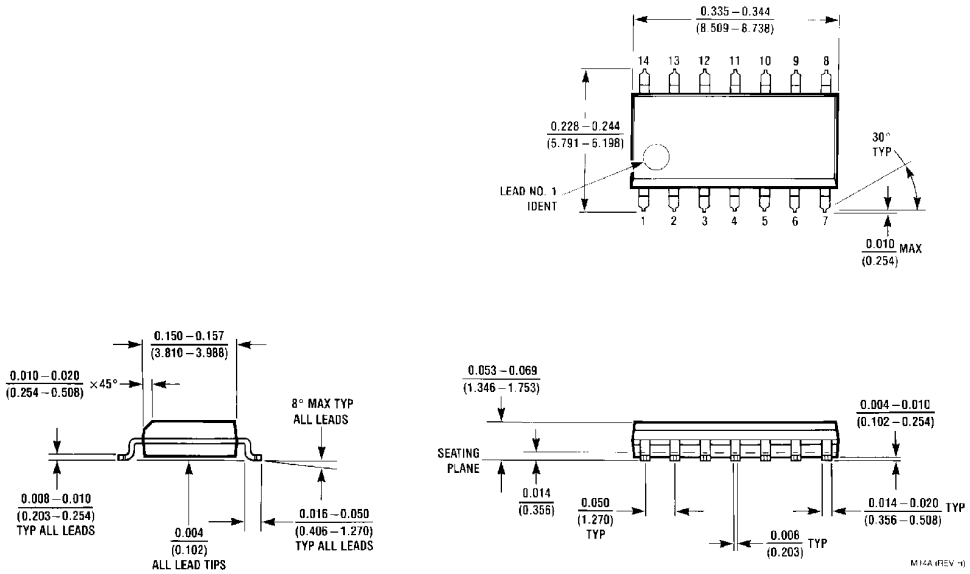


20-Lead Ceramic Leadless Chip Carrier (L)
NS Package Number E20A

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

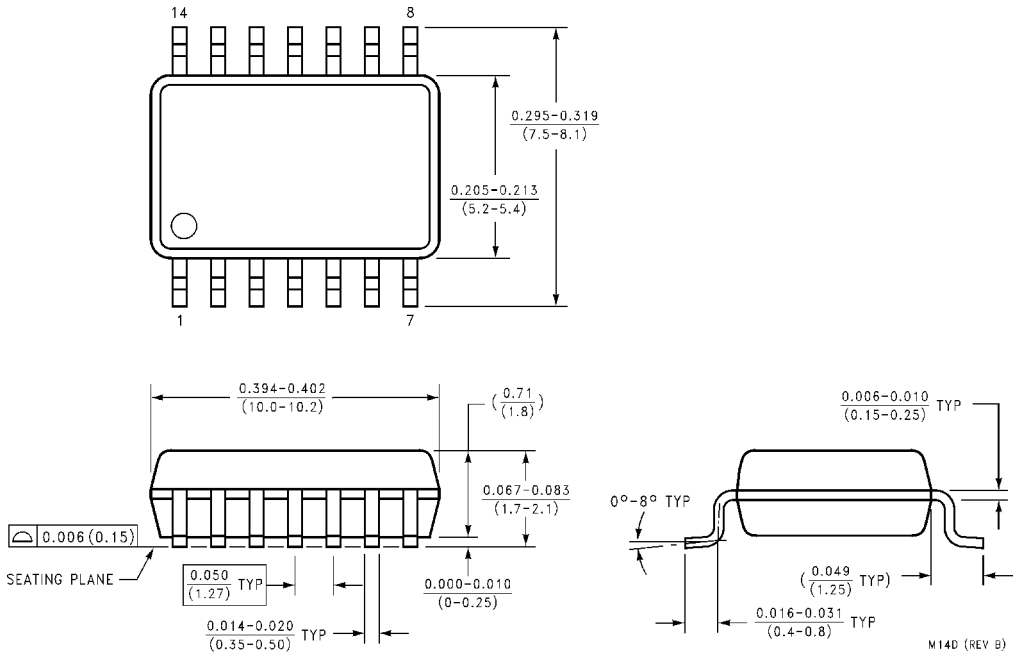


14-Lead Ceramic Dual-In-Line Package (D)
NS Package Number J14A

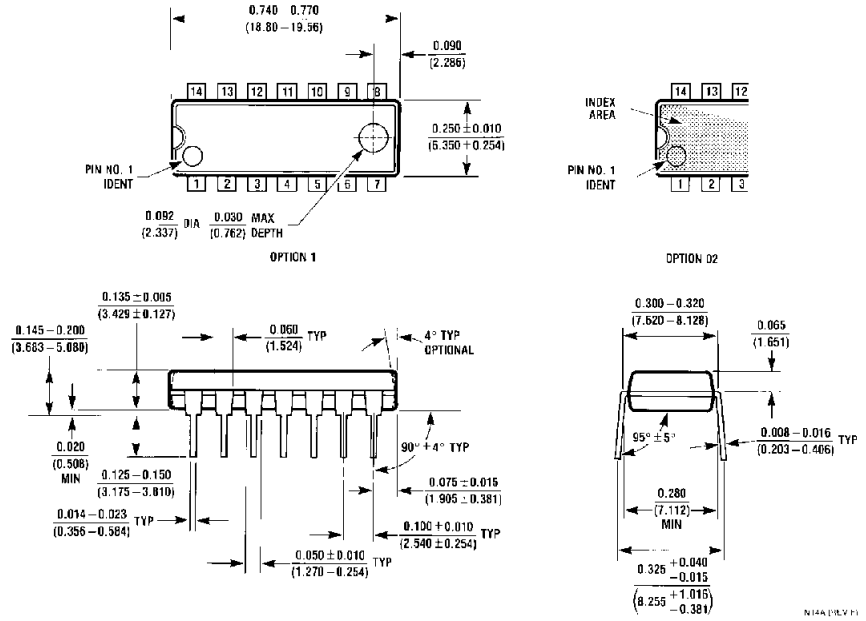


14-Lead (0.150" Wide) Molded Small Outline Package, JEDEC (S)
NS Package Number M14A

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

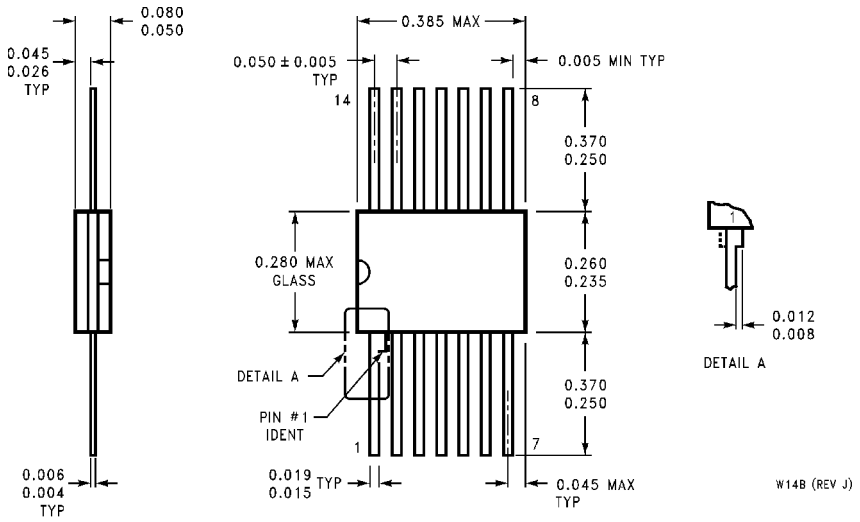


14-Lead (0.300" Wide) Molded Small Outline Package, EIAJ (SJ)
NS Package Number M14D



14-Lead (0.300" Wide) Molded Dual-In-Line Package (P)
NS Package Number N14A

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



14-Lead Ceramic Flatpak (F)
NS Package Number W14B

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