

January 1995

# 54F/74F365 Hex Buffer/Driver with TRI-STATE® Outputs

## General Description

The 'F365 is a hex buffer and line driver designed to be employed as a memory and address driver, clock driver and bus-oriented transmitter/receiver.

## Features

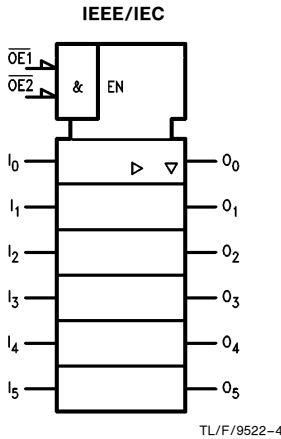
- TRI-STATE buffer outputs
- Outputs sink 64 mA
- Bus-oriented

Commercial	Military	Package Number	Package Description
74F365PC		N16E	16-Lead (0.300" Wide) Molded Dual-In-Line
	54F365DM (Note 2)	J16A	16-Lead Ceramic Dual-In-Line
74F365SC (Note 1)		M16A	16-Lead (0.150" Wide) Molded Small Outline, JEDEC
	54F365FM (Note 2)	W16A	16-Lead Cerpack
	54F365LM (Note 2)	E20A	20-Lead Ceramic Leadless Chip Carrier, Type C

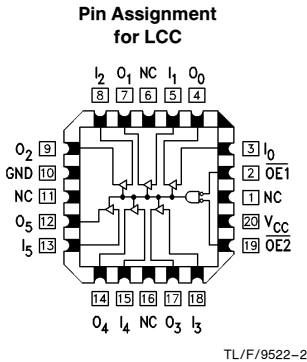
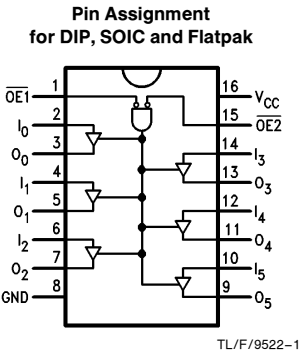
Note 1: Devices also available in 13" reel. Use suffix = SCX.

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

## Logic Symbol



## Connection Diagrams



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54F/74F365 Hex Buffer/Driver with TRI-STATE Outputs

## Unit Loading/Fan Out

Pin Names	Description	54F/74F	
		U.L. HIGH/LOW	Input $I_{IH}/I_{IL}$ Output $I_{OH}/I_{OL}$
$\overline{OE}_1, \overline{OE}_2$	Output Enable Input (Active LOW)	1.0/0.033	20 $\mu A$ /20 $\mu A$
$I_n$	Inputs	1.0/0.033	20 $\mu A$ /20 $\mu A$
$O_n$	Outputs	600/106.6 (80)	−12 mA/64 mA (48 mA)

Function Table

Inputs			Output
$\overline{OE}_1$	$\overline{OE}_2$	I	O
L	L	L	L
L	L	H	H
X	H	X	Z
H	X	X	Z

L = LOW Voltage Level  
 H = HIGH Voltage Level  
 X = Immaterial  
 Z = High Impedance

## Absolute Maximum Ratings (Note 1)

If Military/Aerospace specified devices are required, please contact the National Semiconductor Sales Office/Distributors for availability and specifications.

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 <sub>CC</sub> Pin Potential to Ground Pin	−0.5V to +7.0V
Input Voltage (Note 2)	−0.5V to +7.0V
Input Current (Note 2)	−30 mA to +5.0 mA
Voltage Applied to Output in HIGH State (with V <sub>CC</sub> = 0V)	
Standard Output	−0.5V to V <sub>CC</sub>
TRI-STATE Output	−0.5V to +5.5V

Current Applied to Output in LOW State (Max) twice the rated I<sub>OL</sub> (mA)

**Note 1:** 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 2:** Either voltage limit or current limit is sufficient to protect inputs.

## Recommended Operating Conditions

Free Air Ambient Temperature	
Military	−55°C to +125°C
Commercial	0°C to +70°C
Supply Voltage	
Military	+4.5V to +5.5V
Commercial	+4.5V to +5.5V

## DC Electrical Characteristics

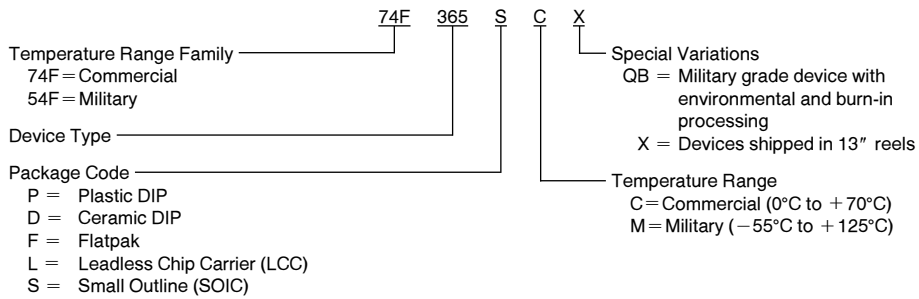
Symbol	Parameter	54F/74F			Units	V <sub>CC</sub>	Conditions
		Min	Typ	Max			
V <sub>IH</sub>	Input HIGH Voltage	2.0			V		Recognized as a HIGH Signal
V <sub>IL</sub>	Input LOW Voltage			0.8	V		Recognized as a LOW Signal
V <sub>CD</sub>	Input Clamp Diode Voltage			−1.2	V	Min	I <sub>IN</sub> = −18 mA
V <sub>OH</sub>	Output HIGH Voltage	54F 10% V <sub>CC</sub> 54F 10% V <sub>CC</sub> 74F 10% V <sub>CC</sub> 74F 10% V <sub>CC</sub> 74F 5% V <sub>CC</sub>	2.4 2.0 2.4 2.0 2.7		V	Min	I <sub>OH</sub> = −3 mA I <sub>OH</sub> = −12 mA I <sub>OH</sub> = −3 mA I <sub>OH</sub> = −15 mA I <sub>OH</sub> = −3 mA
V <sub>OL</sub>	Output LOW Voltage	54F 10% V <sub>CC</sub> 74F 10% V <sub>CC</sub>		0.55 0.55	V	Min	I <sub>OL</sub> = 48 mA I <sub>OL</sub> = 64 mA
I <sub>IH</sub>	Input HIGH Current			20	μA	Max	V <sub>IN</sub> = 2.7V
I <sub>BVI</sub>	Input HIGH Current Breakdown Test			100	μA	0.0	V <sub>IN</sub> = 7.0V
I <sub>IL</sub>	Input LOW Current			−20	μA	Max	V <sub>IN</sub> = 0.5V
I <sub>OZH</sub>	Output Leakage Current			50	μA	Max	V <sub>OUT</sub> = 2.7V
I <sub>OZL</sub>	Output Leakage Current			−50	μA	Max	V <sub>OUT</sub> = 0.5V
I <sub>OS</sub>	Output Short-Circuit Current	−100		−225	mA	Max	V <sub>OUT</sub> = 0V
I <sub>CEX</sub>	Output HIGH Leakage Current			250	μA	Max	V <sub>OUT</sub> = V <sub>CC</sub>
I <sub>ZZ</sub>	Bus Drainage Test			500	μA	0.0V	V <sub>OUT</sub> = 5.25V
I <sub>CCH</sub>	Power Supply Current		25	35	mA	Max	V <sub>O</sub> = HIGH
I <sub>CCL</sub>	Power Supply Current		44	62	mA	Max	V <sub>O</sub> = LOW
I <sub>CCZ</sub>	Power Supply Current		35	48	mA	Max	V <sub>O</sub> = HIGH Z

## AC Electrical Characteristics

Symbol	Parameter	74F			54F		74F		Units
		T <sub>A</sub> = +25°C V <sub>CC</sub> = +5.0V C <sub>L</sub> = 50 pF			T <sub>A</sub> , V <sub>CC</sub> = Mil C <sub>L</sub> = 50 pF		T <sub>A</sub> , V <sub>CC</sub> = Com C <sub>L</sub> = 50 pF		
		Min	Typ	Max	Min	Max	Min	Max	
t <sub>PLH</sub>	Propagation Delay I <sub>n</sub> to O <sub>n</sub>	2.5	4.6	6.5	2.0	7.0	2.0	7.0	ns
t <sub>PHL</sub>		2.5	4.9	7.0	2.0	7.0	2.0	7.5	
t <sub>PZH</sub>	Enable Time	2.5	5.1	9.5	2.0	8.5	2.5	10.0	ns
t <sub>PZL</sub>		2.5	5.7	9.0	2.0	8.5	2.5	9.5	
t <sub>PHZ</sub>	Disable Time	2.0	3.6	6.5	1.5	6.5	2.0	7.0	ns
t <sub>PLZ</sub>		2.0	4.4	6.5	1.5	9.0	2.0	7.0	

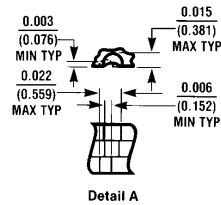
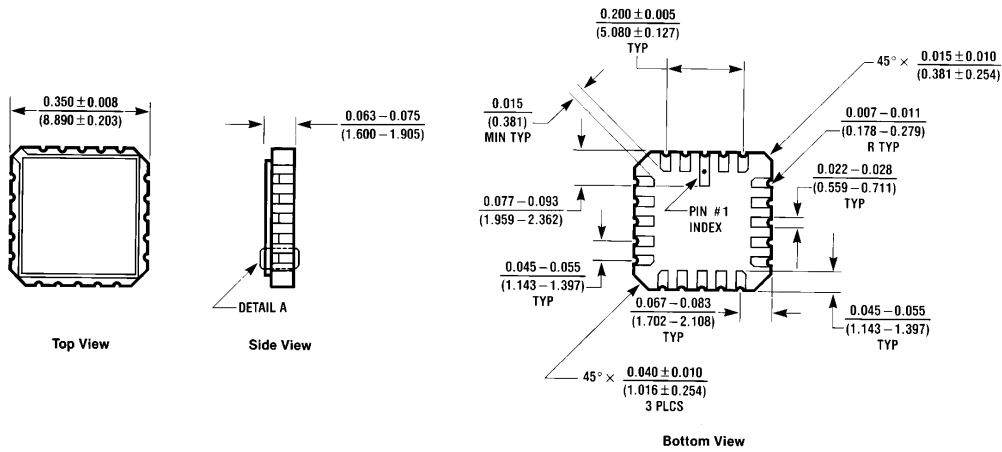
## Ordering Information

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



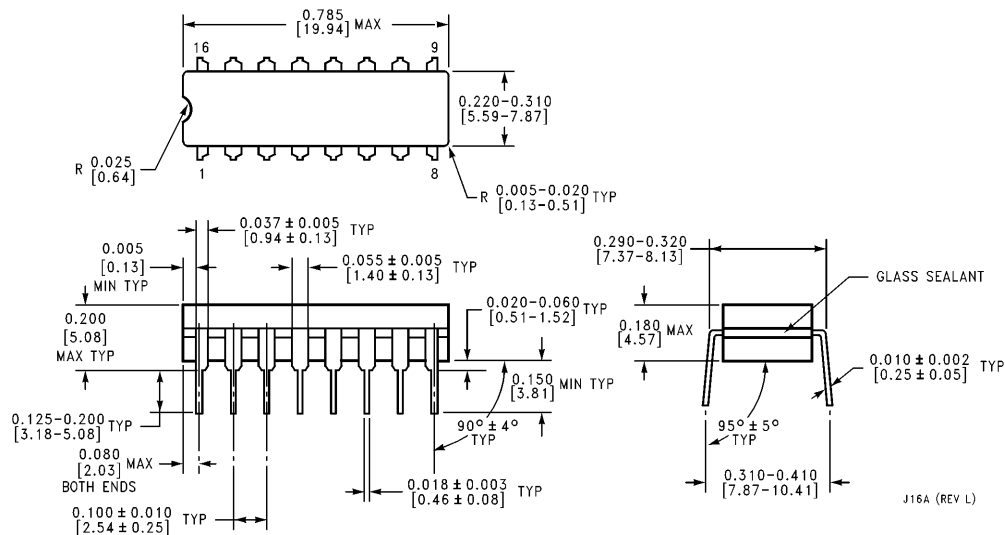


## Physical Dimensions inches (millimeters)



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

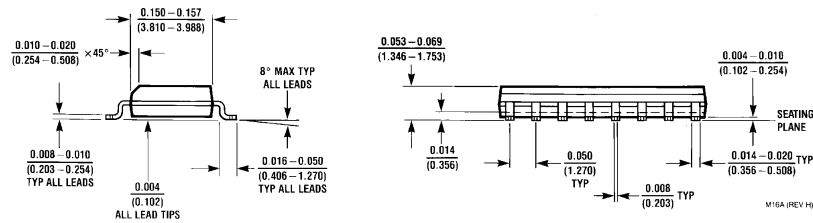
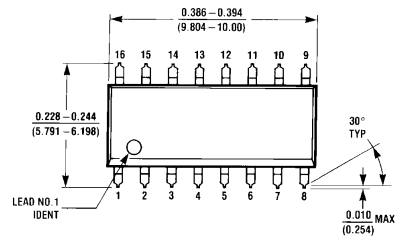
E20A (REV D)



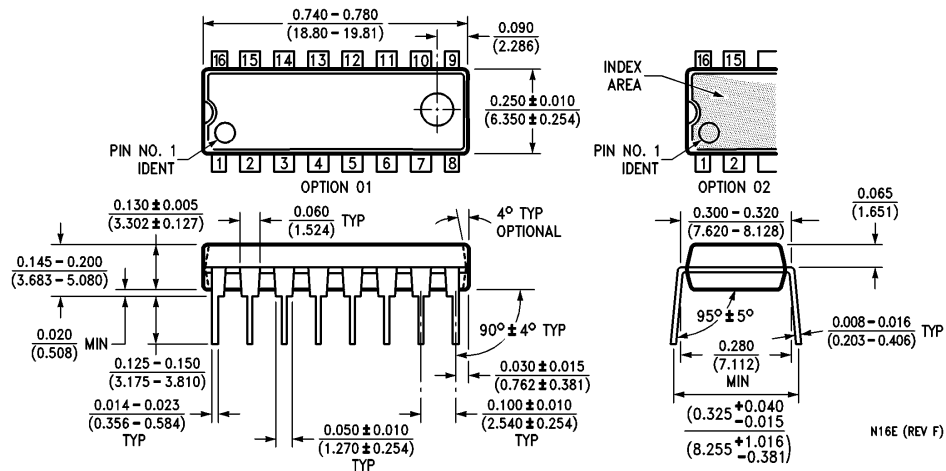
**16-Lead Ceramic Dual-In-Line Package (D)**  
**NS Package Number J16A**

J16A (REV L)

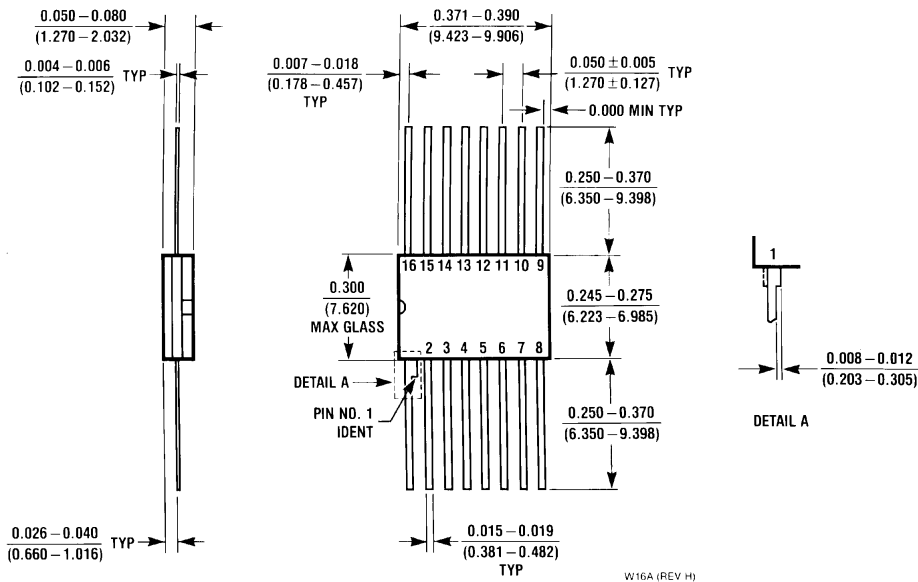
# Physical Dimensions inches (millimeters) (Continued)



**16-Lead (0.150" Wide) Molded Small Outline Package, JEDEC (S)  
NS Package Number M16A**



**16-Lead (0.300" Wide) Molded Dual-In-Line Package (P)  
NS Package Number N16E**

**Physical Dimensions** inches (millimeters) (Continued)

**16-Lead Ceramic Flatpak (F)**  
**NS Package Number W16A**

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