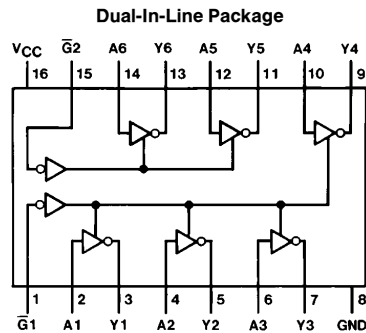**𝑵 𝒂 𝒕 𝒊 𝒐 𝒏 𝒂 𝒍** *S e m i c o n d u c t o r*

DM54368 Hex TRI-STATE® Inverting Buffers

General Description

This device contains six independent gates each of which performs an inverting buffer function. The outputs have the TRI-STATE feature. When enabled, the outputs exhibit the low impedance characteristics of a standard TTL output with additional drive capability to permit the driving of bus lines without external resistors. When disabled, both the output transistors are turned off presenting a high-impedance state to the bus line. Thus the output will act neither as a significant load nor as a driver. To minimize the possibility that two outputs will attempt to take a common bus to opposite logic levels, the disable time is shorter than the enable time of the outputs.

Connection Diagram

Dual-In-Line Package

TL/F/6573–1

Order Number DM54368J or DM54368W
See NS Package Number J16A or W16A

Function Table

$Y = \overline{A}$

Inputs		Output
$\overline{G}$	A	Y
L	L	H
L	H	L
H	X	Hi-Z

H = High Logic Level

L = Low Logic Level

X = Either Low or High Logic Level

Hi-Z = TRI-STATE (Outputs are disabled)

Absolute Maximum Ratings (Note)

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

Supply Voltage	7V
Input Voltage	5.5V
Operating Free Air Temperature Range	$-55°C$ to $+125°C$
Storage Temperature Range	$-65°C$ to $+150°C$

Note: *The ''Absolute Maximum Ratings'' are those values beyond which the safety of the device cannot be guaranteed. The device should not be operated at these limits. The parametric values defined in the ''Electrical Characteristics'' table are not guaranteed at the absolute maximum ratings. The ''Recommended Operating Conditions'' table will define the conditions for actual device operation.*

Recommended Operating Conditions

Symbol	Parameter	DM54368			Units
		Min	Nom	Max	
V_{CC}	Supply Voltage	4.5	5	5.5	V
V_{IH}	High Level Input Voltage	2			V
V_{IL}	Low Level Input Voltage			0.8	V
I_{OH}	High Level Output Current			-2	mA
I_{OL}	Low Level Output Current			32	mA
T_A	Free Air Operating Temperature	-55		125	°C

Electrical Characteristics over recommended operating free air temperature range (unless otherwise noted)

Symbol	Parameter	Conditions		Min	Typ (Note 1)	Max	Units
V_I	Input Clamp Voltage	$V_{CC} = $ Min, $I_I = -12$ mA				-1.5	V
V_{OH}	High Level Output Voltage	$V_{CC} = $ Min, $I_{OH} = $ Max $V_{IL} = $ Max, $V_{IH} = $ Min		2.4	3.1		V
V_{OL}	Low Level Output Voltage	$V_{CC} = $ Min, $I_{OL} = $ Max $V_{IH} = $ Min, $V_{IL} = $ Max			0.2	0.4	V
I_I	Input Current @ Max Input Voltage	$V_{CC} = $ Max, $V_I = 5.5$V				1	mA
I_{IH}	High Level Input Current	$V_{CC} = $ Max, $V_I = 2.4$V				40	µA
I_{IL}	Low Level Input Current	$V_{CC} = $ Max $V_I = 0.5$V (Note 4)	A			-40	mA
		$V_{CC} = $ Max $V_I = 0.4$V (Note 5)	A			-1.6	
		$V_{CC} = $ Max $V_I = 0.4$V	$\overline{G}$			-1.6	
I_{OZH}	Off-State Output Current with High Level Output Voltage Applied	$V_{CC} = $ Max, $V_O = 2.4$V $V_{IH} = $ Min, $V_{IL} = $ Max				40	µA
I_{OZL}	Off-State Output Current with Low Level Output Voltage Applied	$V_{CC} = $ Max, $V_O = 0.4$V $V_{IH} = $ Min, $V_{IL} = $ Max				-40	µA
I_{OS}	Short Circuit Output Current	$V_{CC} = $ Max (Note 2)		-40		-115	mA
I_{CC}	Supply Current	$V_{CC} = $ Max (Note 3)			59	77	mA

Note 1: All typicals are at $V_{CC} = 5$V, $T_A = 25°C$.

Note 2: Not more than one output should be shorted at a time.

Note 3: I_{CC} is measured with the data inputs grounded, and the output controls at 4.5V.

Note 4: Both $\overline{G}$ inputs are at 2V.

Note 5: Both $\overline{G}$ inputs are at 0.4V.

Switching Characteristics

at $V_{CC} = 5V$ and $T_A = 25°C$ (See Section 1 for Test Waveforms and Output Load)

| Symbol | Parameter | $R_L = 400\Omega$ | | | | Units |
| | | $C_L = 5\text{ pF}$ | | $C_L = 50\text{ pF}$ | | |
		Min	Max	Min	Max	
t_{PLH}	Propagation Delay Time Low to High Level Output				17	ns
t_{PHL}	Propagation Delay Time High to Low Level Output				16	ns
t_{PZH}	Output Enable Time to High Level Output				35	ns
t_{PZL}	Output Enable Time to Low Level Output				37	ns
t_{PHZ}	Output Disable Time from High Level Output		11			ns
t_{PLZ}	Output Disable Time from Low Level Output		27			ns

Physical Dimensions inches (millimeters)
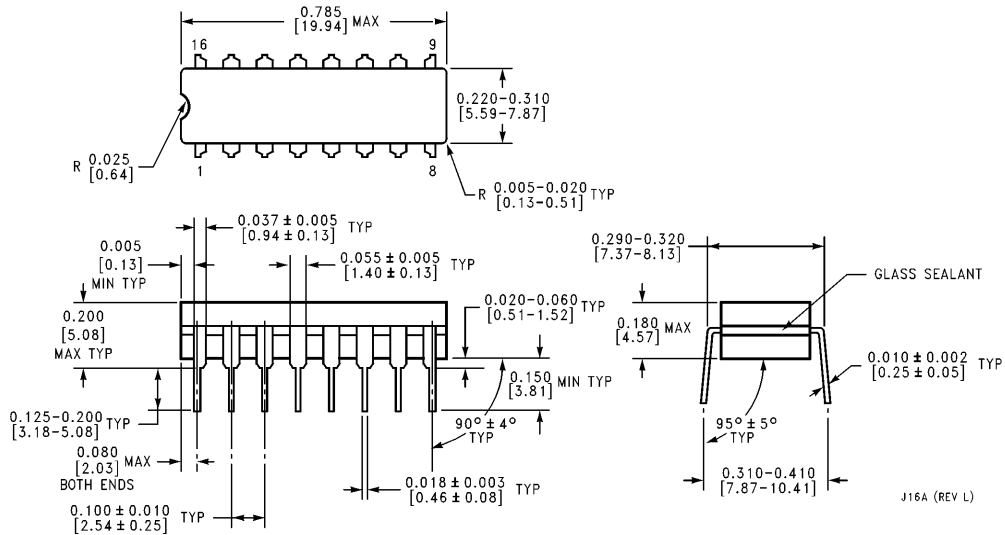
16-Lead Ceramic Dual-In-Line Package (J)
Order Number DM54368J
NS Package Number J16A

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Physical Dimensions inches (millimeters) (Continued)
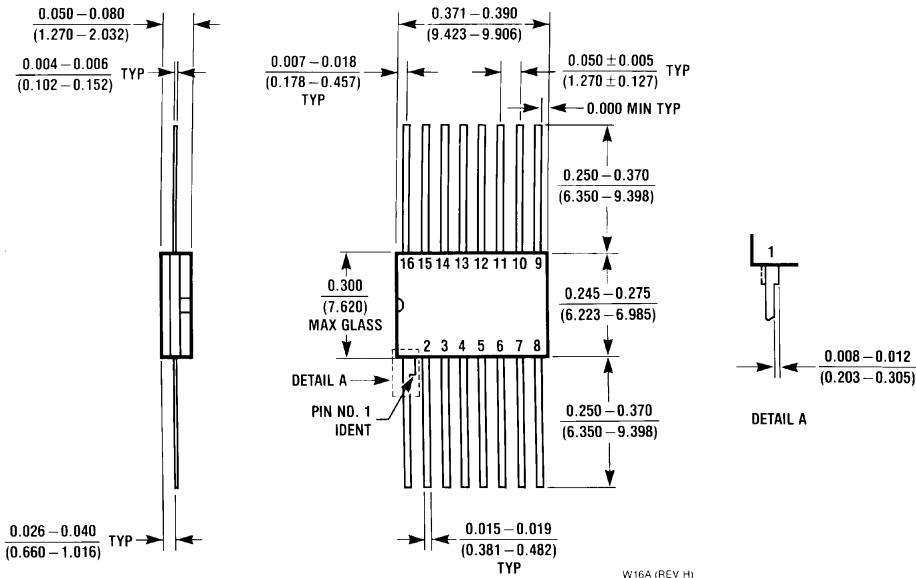
16-Lead Ceramic Flat Package (W)
Order Number DM54368W
NS Package Number W16A

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2. A critical component is any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.