

54125/DM54125/DM74125 Quad TRI-STATE® Buffers

General Description

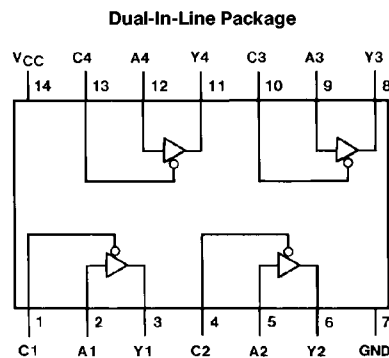
This device contains four independent gates each of which performs a non-inverting buffer function. The outputs have the TRI-STATE feature. When enabled, the outputs exhibit the low impedance characteristics of a standard TTL output with additional drive capability at the high Logic level to permit the driving of bus lines without external pull-up 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.

Features

- Alternate Military/Aerospace device (54125) is available. Contact a National Semiconductor Sales Office/Distributor for specifications.

Connection Diagram



TL/F/6540-1

Order Number 54125DMQB, 54125FMQB, DM54125J, DM54125W or DM74125N
See NS Package Number J14A, N14A or W14B

Function Table

$$Y = A$$

Inputs		Output
A	C	Y
L	L	L
H	L	H
X	H	Hi-Z

H = High Logic Level

L = Low Logic Level

X = Either Low or High Logic Level

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

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

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	
DM54 and 54	–55°C to +125°C
DM74	0°C to +70°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	DM54125			DM74125			Units
		Min	Nom	Max	Min	Nom	Max	
V _{CC}	Supply Voltage	4.5	5	5.5	4.75	5	5.25	V
V _{IH}	High Level Input Voltage	2			2			V
V _{IL}	Low Level Input Voltage			0.8			0.8	V
I _{OH}	High Level Output Current			–2			–5.2	mA
I _{OL}	Low Level Output Current			16			16	mA
T _A	Free Air Operating Temperature	–55		125	0		70	°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	3.3		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 = 5.5V			1	mA
I _{IH}	High Level Input Current	V _{CC} = Max, V _I = 2.4V			40	μA
I _{IL}	Low Level Input Current	V _{CC} = Max, V _I = 0.4V			–1.6	mA
I _{IzL}	Off-State Input Current with Low Level Input Voltage Applied	V _{CC} = Max, V _I = 0.4V			–40	μA
I _{OzH}	Off-State Output Current with High Level Output Voltage Applied	V _{CC} = Max, V _O = 2.4V 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 = 0.4V V _{IH} = Min, V _{IL} = Max			–40	μA
I _{OS}	Short Circuit Output Current	V _{CC} = Max (Note 2)	DM54 –30 DM74 –28		–70 –70	mA
I _{CC}	Supply Current	V _{CC} = Max (Note 3)		36	54	mA

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

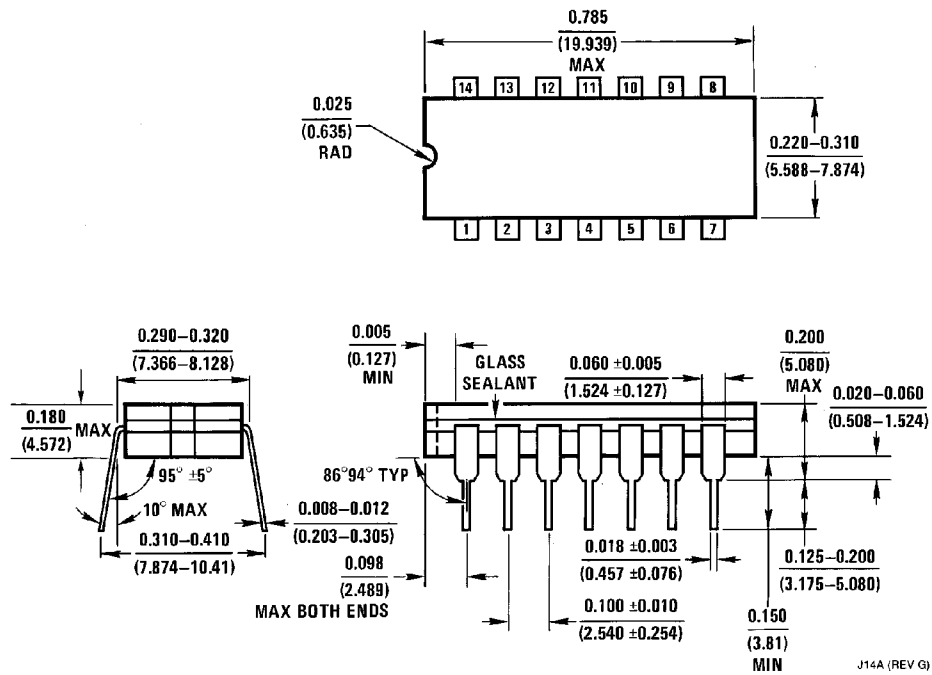
Note 2: Not more than one output should be shorted at a time.

Note 3: I_{CC} is measured with the output control (C) inputs at 4.5V, the data inputs grounded, and the outputs open.

Switching Characteristics at $V_{CC} = 5V$ and $T_A = 25^\circ C$ (See Section 1 for Test Waveforms and Output Load)

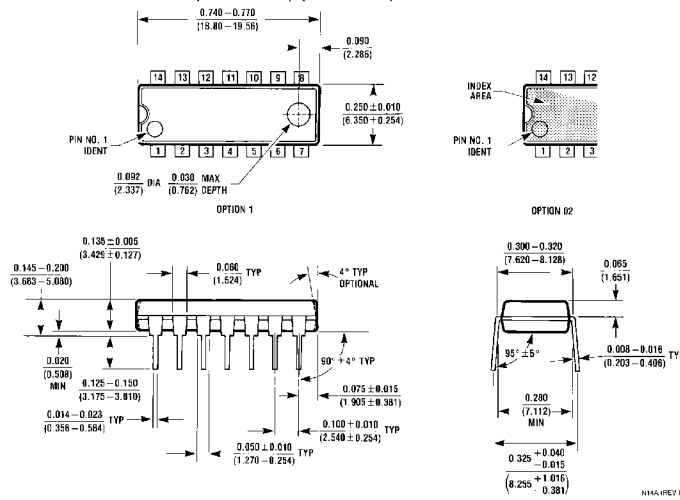
Symbol	Parameter	$R_L = 400\Omega$				Units
		$C_L = 5\text{ pF}$		$C_L = 50\text{ pF}$		
		Min	Max	Min	Max	
t_{PLH}	Propagation Delay Time Low to High Level Output				15	ns
t_{PHL}	Propagation Delay Time High to Low Level Output				18	ns
t_{PZH}	Output Enable Time to High Level Output				18	ns
t_{PZL}	Output Enable Time to Low Level Output				25	ns
t_{PHZ}	Output Disable Time from High Level Output		8			ns
t_{PLZ}	Output Disable Time from Low Level Output		14			ns

Physical Dimensions inches (millimeters)

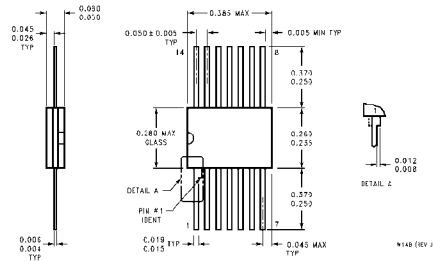


14-Lead Ceramic Dual-In-Line Package (J)
Order Number 54125DMQB or DM54125J
NS Package Number J14A

Physical Dimensions inches (millimeters) (Continued)



14-Lead Molded Dual-In-Line Package (N)
Order Number DM74125N
NS Package Number N14A



14-Lead Ceramic Flat Package (W)
Order Number 54125FMQB or DM54125W
NS Package Number W14B

LIFE SUPPORT POLICY

NATIONAL'S PRODUCTS ARE NOT AUTHORIZED FOR USE AS CRITICAL COMPONENTS IN LIFE SUPPORT DEVICES OR SYSTEMS WITHOUT THE EXPRESS WRITTEN APPROVAL OF THE PRESIDENT OF NATIONAL SEMICONDUCTOR CORPORATION. As used herein:

1. Life support devices or systems are devices or systems which, (a) are intended for surgical implant into the body, or (b) support or sustain life, and whose failure to perform, when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in a significant injury to the user.
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.

National Semiconductor Corporation
 1111 West Bardin Road
 Arlington, TX 76017
 Tel: 1(800) 272-9959
 Fax: 1(800) 737-7018

National Semiconductor Europe
 Fax: (+49) 0-180-530 85 86
 Email: cnjvge@tevm2.nsc.com
 Deutsch Tel: (+49) 0-180-530 85 85
 English Tel: (+49) 0-180-532 78 32
 Français Tel: (+49) 0-180-532 93 58
 Italiano Tel: (+49) 0-180-534 16 80

National Semiconductor Hong Kong Ltd.
 13th Floor, Straight Block,
 Ocean Centre, 5 Canton Rd.
 Tsimshatsui, Kowloon
 Hong Kong
 Tel: (852) 2737-1600
 Fax: (852) 2736-9960

National Semiconductor Japan Ltd.
 Tel: 81-043-299-2309
 Fax: 81-043-299-2408

National does not assume any responsibility for use of any circuitry described, no circuit patent licenses are implied and National reserves the right at any time without notice to change said circuitry and specifications.