National Semiconductor

PRELIMINARY
August 1989

DM54ALS5620/DM74ALS5620 Octal TRI-STATE® Transceivers

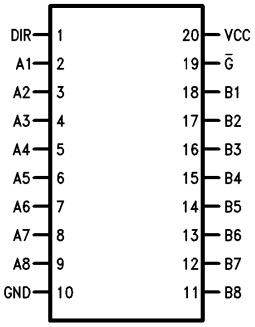
General Description

This octal bus transceiver is designed to have the performance of the 'ALS620 device with the addition of hystersis on the inputs. The input hystersis provides improved noise margin. Data is transmitted either from the A bus to the B bus or the B bus to the A bus depending on the logic level of the directon control input (DIR). The device can be disabled via the enable input (G) which causes the outputs to enter the high impedance mode so the busses are effectively isolated.

Features

- Advanced oxide-isolated, ion implanted Schottky TTL process
- Switching specification guaranteed over the full temperature and V_{CC} range
- PNP inputs to reduce input loading
- Hystersis on the inputs to improve noise rejection

Connection Diagram



TL/F/9166–1

Order Number DM54ALS5620J or DM74ALS5620WM, N
See NS Package Number J20A, M20B or N20A

Function Table

Control Inputs		Operation
$\overline{G}$BA	GAB	
L	X	$\overline{B}$ Data to A Bus
X	H	$\overline{A}$ Data to B Bus
H	L	High Impedance

L = Low Logic Level, H = High Logic Level
X = Don't Care (Either Low or High Logic Level)

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

This document contains information on a product under development. NSC reserves the right to change or discontinue this product without notice.

Absolute Maximum Ratings

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

Supply Voltage	7V
Input Voltage	
Control Inputs	7V
I/O Ports	5.5V
Operating Free Air Temperature Range	
DM54ALS	−55°C to +125°C
DM74ALS	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	DM54ALS5620			DM74ALS5620			Units
		Min	Nom	Max	Min	Nom	Max	
V_{CC}	Supply Voltage	4.5	5	5.5	4.5	5	5.5	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			−12			−15	mA
I_{OL}	Low Level Output Current			12			24	mA
T_A	Operating Free Air Temperature Range	−55		125	0		70	°C

Electrical Characteristics over recommended free air temperature range

Symbol	Parameter	Test Conditions		DM54ALS5620			DM74ALS5620			Units
				Min	Typ	Max	Min	Typ	Max	
V_{IC}	Input Clamp Voltage	V_{CC} = Min, I_I = −18 mA				−1.5			−1.5	V
HYS	Input Hystersis ($V_{T+} - V_{T-}$)	V_{CC} = Min		0.2			0.2			V
V_{OH}	High Level Output Voltage	V_{CC} = 4.5V to 5.5V	I_{OH} = −0.4 mA	V_{CC} − 2			V_{CC} − 2			V
		V_{CC} = Min	I_{OH} = −3 mA	2.4	3.2		2.4	3.2		
			I_{OH} = Max	2			2			
V_{OL}	Low Level Output Voltage	V_{CC} = Min	I_{OL} = 12 mA		0.25	0.4		0.25	0.4	V
			I_{OL} = 24 mA					0.35	0.5	
I_I	Input Current @ Max Input Voltage	V_{CC} = Max	I/O Ports, V_I = 5.5V			100			100	μA
			Control Inputs, V_I = 7V			100			100	
I_{IH}	High Level Input Current	V_{CC} = Max, V_I = 2.7V (Note 1)				20			20	μA
I_{IL}	Low Level Input Current	V_{CC} = Max, V_I = 0.4V (Note 1)				−100			−100	μA
I_O	Output Drive Current	V_{CC} = Max, V_O = 2.25V		−30		−112	−30		−112	mA
I_{CC}	Supply Current	V_{CC} = Max	Outputs High		24	39		24	34	mA
			Outputs Low		25	49		31	44	
			Outputs Disabled		27	52		33	47	

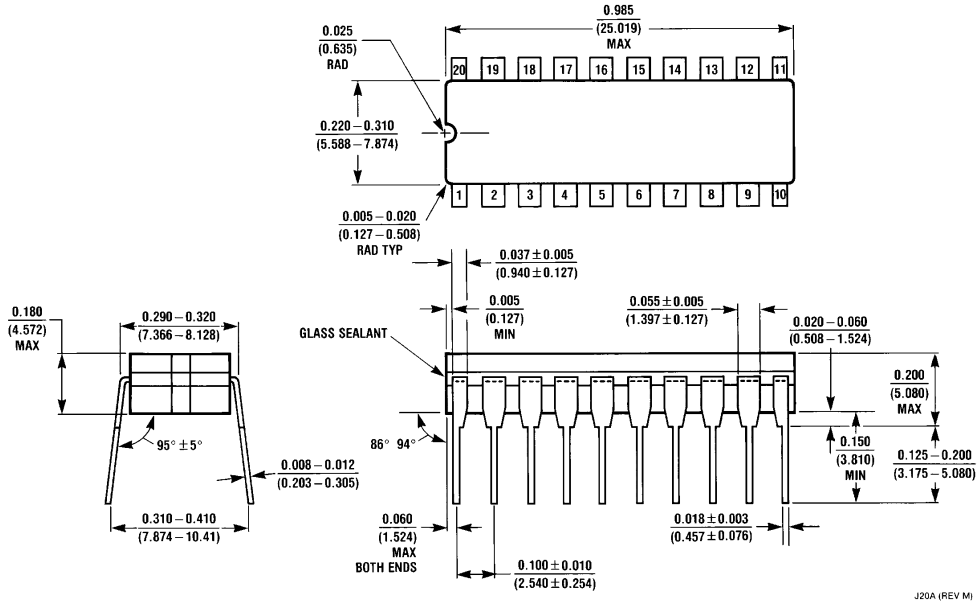
Note 1: For I/O ports, I_{IH} and I_{IL} parameters include the TRI-STATE output currents (I_{OZL} and I_{OZH}).

Switching Characteristics over recommended operating free air temperature range

Symbol	Parameter	Conditions	From (Input) To (Output)	DM54ALS5620		DM74ALS5620		Units
				Min	Max	Min	Max	
t_{PLH}	Propagation Delay Time Low to High Level Output	V_{CC} = 4.5V to 5.5V, $R_1 = R_2 = 500\Omega$, C_L = 50 pF (Note 1)	A or B to B or A	2	12	2	10	ns
t_{PHL}	Propagation Delay Time High to Low Level Output		A or B to B or A	2	12	2	10	ns
t_{PZH}	Output Enable Time to High Level Output		$\overline{G}$BA or GBA to A or B	3	23	3	17	ns
t_{PZL}	Output Enable Time to Low Level Output		$\overline{G}$BA or GBA to A or B	5	31	4	25	ns
t_{PHZ}	Output Disable Time from High Level Output		$\overline{G}$BA or GBA to A or B	2	14	3	12	ns
t_{PLZ}	Output DisableTime from Low Level Output		$\overline{G}$BA or GBA to A or B	3	22	4	18	ns

Note 1: See Section 5 for test waveforms and output load.

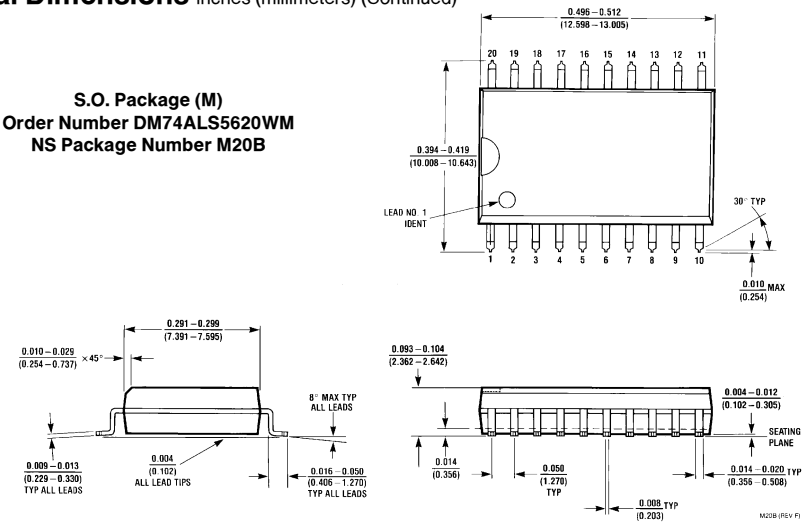
Physical Dimensions inches (millimeters)

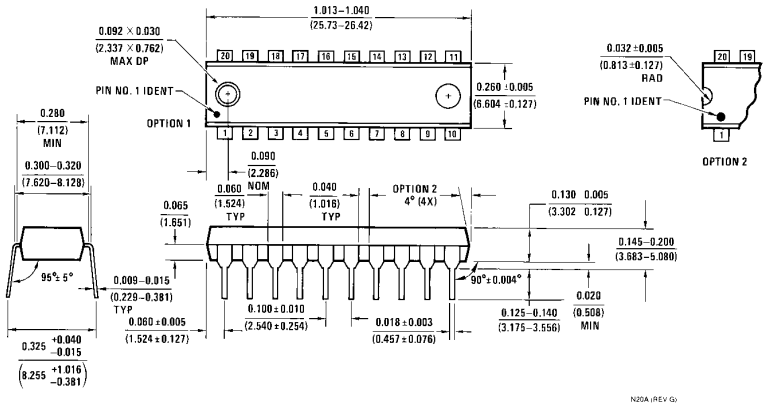


Ceramic Dual-In-Line Package (J)
Order Number DM54ALS5620J
NS Package Number J20A

Physical Dimensions inches (millimeters) (Continued)

S.O. Package (M)
Order Number DM74ALS5620WM
NS Package Number M20B





Molded Dual-In-Line Package (N)
Order Number DM74ALS5620N
NS Package Number N20A

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: cnjwge@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