

June 1989

5404/DM5404/DM7404

Hex Inverting Gates

General Description

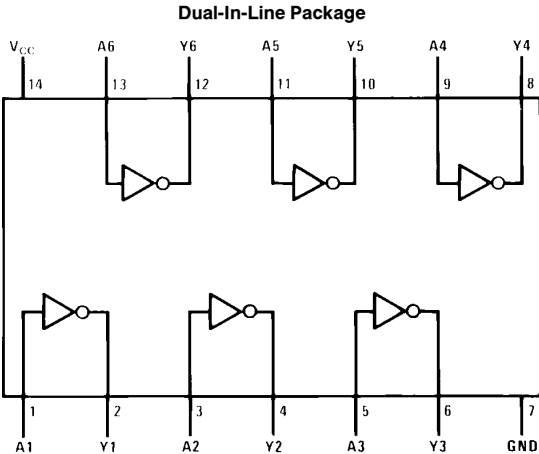
This device contains six independent gates each of which performs the logic INVERT function.

Features

- Alternate Military/Aerospace device (5404) is available. Contact a National Semiconductor Sales Office/Distributor for specifications.

Connection Diagram

Dual-In-Line Package



Order Number 5404DMQB, 5404FMQB, DM5404J, DM5404W, DM7404M or DM7404N
 See NS Package Number J14A, M14A, N14A or W14B

TL/F/6494-1

Function Table

$$Y = \overline{A}$$

Inputs	Output
A	Y
L	H
H	L

H = High Logic Level
 L = Low Logic Level

5404/DM5404/DM7404 Hex Inverting Gates

©1995 National Semiconductor Corporation

TL/F/6494

RRD-B30M105/Printed in U. S. A.

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	DM5404			DM7404			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			−0.4			−0.4	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	2.4	3.4		V
V _{OL}	Low Level Output Voltage	V _{CC} = Min, I _{OL} = Max V _{IH} = Min		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 _{OS}	Short Circuit Output Current	V _{CC} = Max (Note 2)	DM54 −20 DM74 −18		−55 −55	mA
I _{CCH}	Supply Current with Outputs High	V _{CC} = Max		6	12	mA
I _{CCL}	Supply Current with Outputs Low	V _{CC} = Max		18	33	mA

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

Symbol	Parameter	Conditions	Min	Max	Units
t _{PLH}	Propagation Delay Time Low to High Level Output	C _L = 15 pF R _L = 400Ω		22	ns
t _{PHL}	Propagation Delay Time High to Low Level Output			15	ns

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.

Physical Dimensions inches (millimeters)

0.785
(19.939)
MAX

0.025
(0.635)
RAD

0.220-0.310
(5.588-7.874)

14 13 12 11 10 9 8
1 2 3 4 5 6 7

0.290-0.320
(7.366-8.128)
MAX

0.180
(4.572)
MAX

95° ±5°
10° MAX
0.310-0.410
(7.874-10.41)

0.008-0.012
(0.203-0.305)
MAX BOTH ENDS

0.098
(2.489)

86°-94° TYP

0.005
(0.127)
MIN

GLASS
SEALANT

0.060 ±0.005
(1.524 ±0.127)

0.200
(5.080)
MAX

0.020-0.060
(0.508-1.524)

0.018 ±0.003
(0.457 ±0.076)

0.100 ±0.010
(2.540 ±0.254)

0.125-0.200
(3.175-5.080)

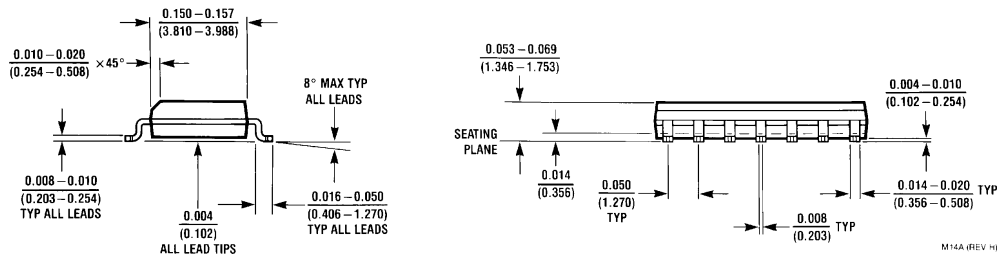
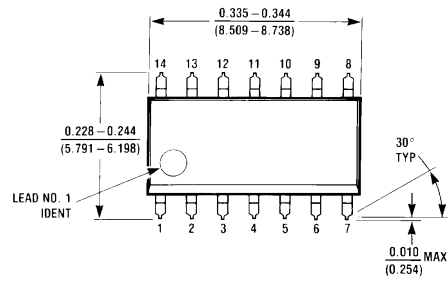
0.150
(3.81)
MIN

J14A (REV G)

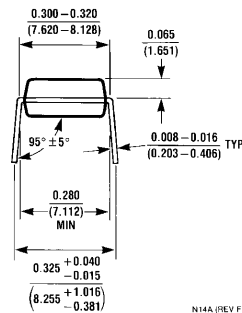
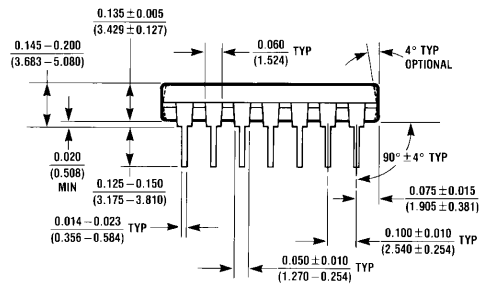
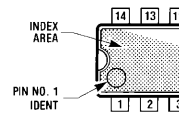
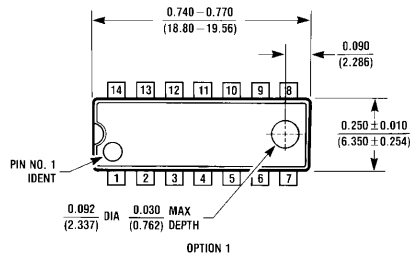
14-Lead Ceramic Dual-In-Line Package (J)
Order Number 5404DMQB or DM5404J
NS Package Number J14A



Physical Dimensions inches (millimeters) (Continued)

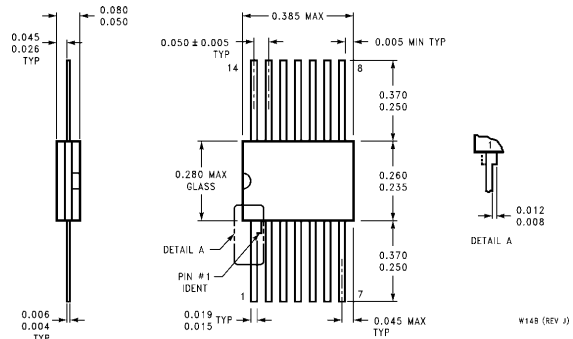


14-Lead Small Outline Molded Package (M)
Order Number DM7404M
NS Package Number M14A



14-Lead Molded Dual-In-Line Package (N)
Order Number DM7404N
NS Package Number N14A

Physical Dimensions inches (millimeters) (Continued)




14-Lead Ceramic Flat Package (W)
Order Number 5404FMQB or DM5404W
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: 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. 19th 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.