

## 9312/DM9312 One of Eight Line Data Selectors/Multiplexers

### General Description

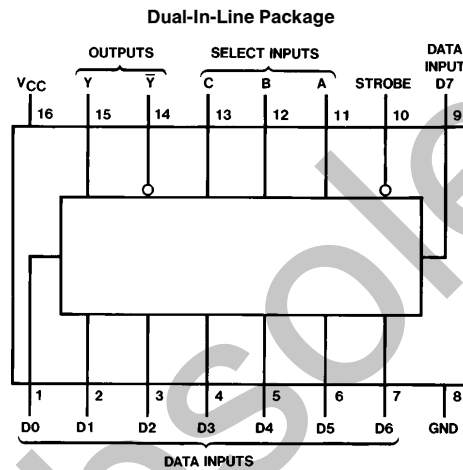
These data selectors/multiplexers contain inverter/drivers to supply full complementary, on-chip, binary decoded data selection.

The 9312 is a single 8-bit multiplexer with complementary outputs and a strobe control. When the strobe is low, the function is enabled. When a high logic level is applied to the strobe, the output is forced to the logic zero state regardless of the logic level of the data inputs.

### Features

- Selects one-of-eight data sources
- Performs parallel to serial conversion
- Strobe controlled outputs
- Complementary outputs

### Connection Diagram



TL/F/6605-1

Order Number 9312DMQB, 9312FMB or DM9312N  
See NS Package Number J16A, N16E or W16A

### Function Table

Inputs				Outputs	
Select			Strobe	Y	$\bar{Y}$
C	B	A	G		
X	X	X	H	L	H
L	L	L	L	D0	$\bar{D0}$
L	L	H	L	D1	$\bar{D1}$
L	H	L	L	D2	$\bar{D2}$
L	H	H	L	D3	$\bar{D3}$
H	L	L	L	D4	$\bar{D4}$
H	L	H	L	D5	$\bar{D5}$
H	H	L	L	D6	$\bar{D6}$
H	H	H	L	D7	$\bar{D7}$

H = High Level, L = Low Level, X = Don't Care.  
D0, D1 . . . D7 = The level of the respective D input.

## 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	
Military	−55°C to +125°C
Commercial	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	Military			Commercial			Units
		Min	Nom	Max	Min	Nom	Max	
V <sub>CC</sub>	Supply Voltage	4.5	5	5.5	4.75	5	5.25	V
V <sub>IH</sub>	High Level Input Voltage	2			2			V
V <sub>IL</sub>	Low Level Input Voltage			0.8			0.8	V
I <sub>OH</sub>	High Level Output Current			−0.8			−0.8	mA
I <sub>OL</sub>	Low Level Output Current			16			16	mA
T <sub>A</sub>	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 <sub>I</sub>	Input Clamp Voltage	V <sub>CC</sub> = Min, I <sub>I</sub> = −12 mA			−1.5	V
V <sub>OH</sub>	High Level Output Voltage	V <sub>CC</sub> = Min, I <sub>OH</sub> = Max V <sub>IL</sub> = Max, V <sub>IH</sub> = Min	2.4	3.4		V
V <sub>OL</sub>	Low Level Output Voltage	V <sub>CC</sub> = Min, I <sub>OL</sub> = Max V <sub>IH</sub> = Min, V <sub>IL</sub> = Max		0.2	0.4	V
I <sub>I</sub>	Input Current @ Max Input Voltage	V <sub>CC</sub> = Max, V <sub>I</sub> = 5.5V			1	mA
I <sub>IH</sub>	High Level Input Current	V <sub>CC</sub> = Max, V <sub>I</sub> = 2.4V			40	μA
I <sub>IL</sub>	Low Level Input Current	V <sub>CC</sub> = Max, V <sub>I</sub> = 0.4V			−1.6	mA
I <sub>OS</sub>	Short Circuit Output Current	V <sub>CC</sub> = Max (Note 2)				
		MIL	−20		−70	mA
		COM	−30		−85	
I <sub>CC</sub>	Supply Current	V <sub>CC</sub> = Max, (Note 3)		27	44	mA

Note 1: All typicals are at V<sub>CC</sub> = 5V, T<sub>A</sub> = 25°C.

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

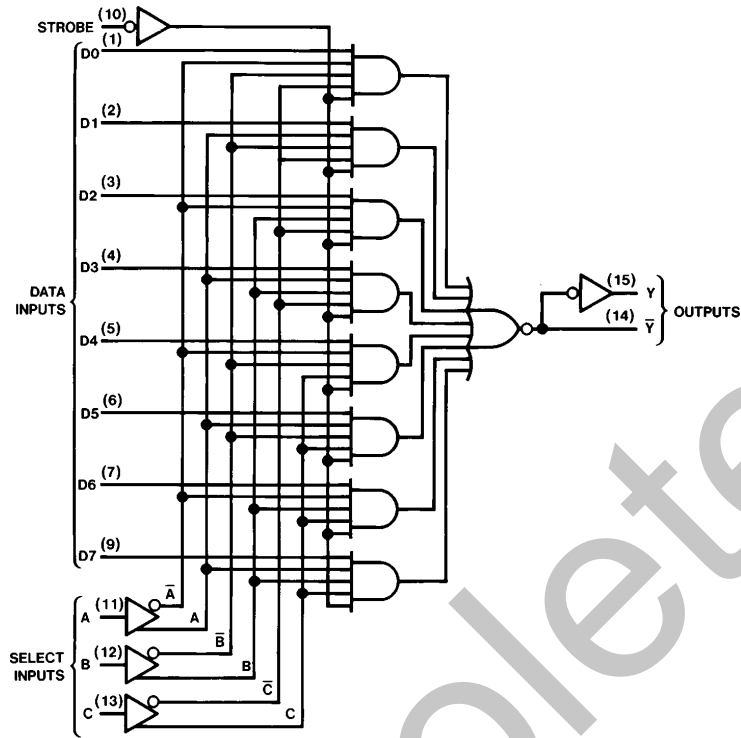
Note 3: I<sub>CC</sub> is measured with the STROBE and DATA SELECT inputs 4.5V and all other inputs and outputs open.

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

Symbol	Parameter	From (Input) To (Output)	Military		Commercial		Units
			$R_L = 400\Omega, C_L = 15\text{ pF}$				
			Min	Max	Min	Max	
$t_{PLH}$	Propagation Delay Time Low to High Level Output	Selectz to Y		34		33	ns
$t_{PHL}$	Propagation Delay Time High to Low Level Output	Select to Y		34		35	ns
$t_{PLH}$	Propagation Delay Time Low to High Level Output	Select to $\bar{Y}$		24		28	ns
$t_{PHL}$	Propagation Delay Time High to Low Level Output	Select to $\bar{Y}$		26		25	ns
$t_{PLH}$	Propagation Delay Time Low to High Level Output	Data to Y		24		23	ns
$t_{PHL}$	Propagation Delay Time High to Low Level Output	Data to Y		24		25	ns
$t_{PLH}$	Propagation Delay Time Low to High Level Output	Data to $\bar{Y}$		14		13	ns
$t_{PHL}$	Propagation Delay Time High to Low Level Output	Data to $\bar{Y}$		16		13	ns
$t_{PLH}$	Propagation Delay Time Low to High Level Output	Strobe to Y		30		33	ns
$t_{PHL}$	Propagation Delay Time High to Low Level Output	Strobe to Y		30		32	ns
$t_{PLH}$	Propagation Delay Time Low to High Level Output	Strobe to $\bar{Y}$		20		19	ns
$t_{PHL}$	Propagation Delay Time High to Low Level Output	Strobe to $\bar{Y}$		23		21	ns

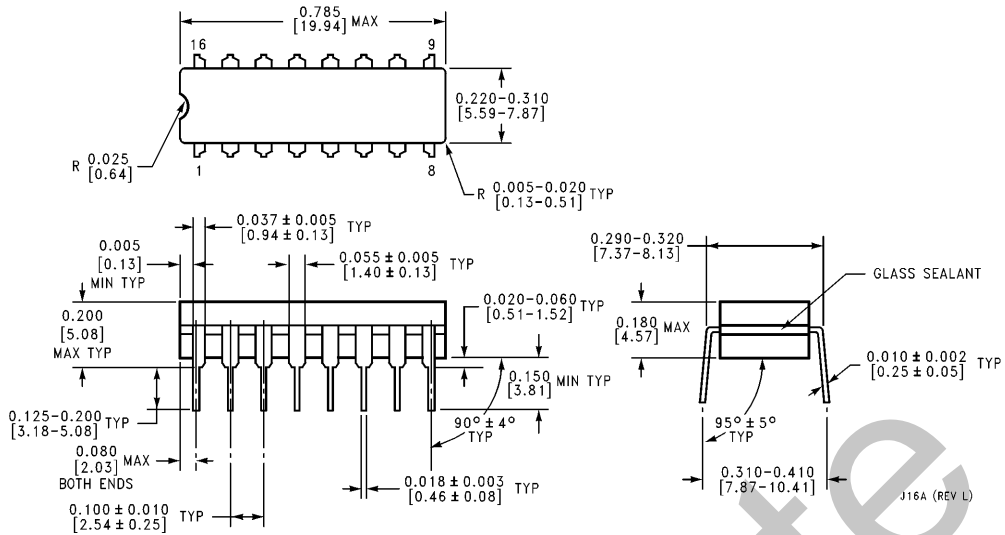
# Logic Diagram

9312

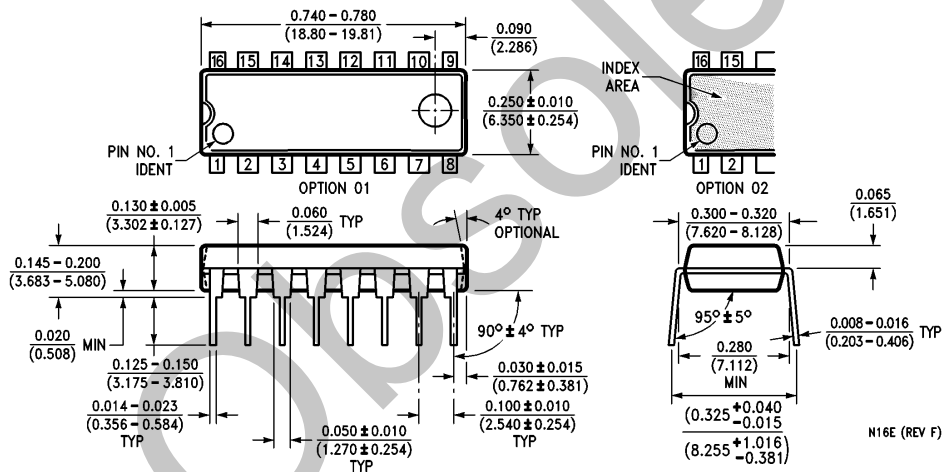


TL/F/6605-2

**Physical Dimensions** inches (millimeters)

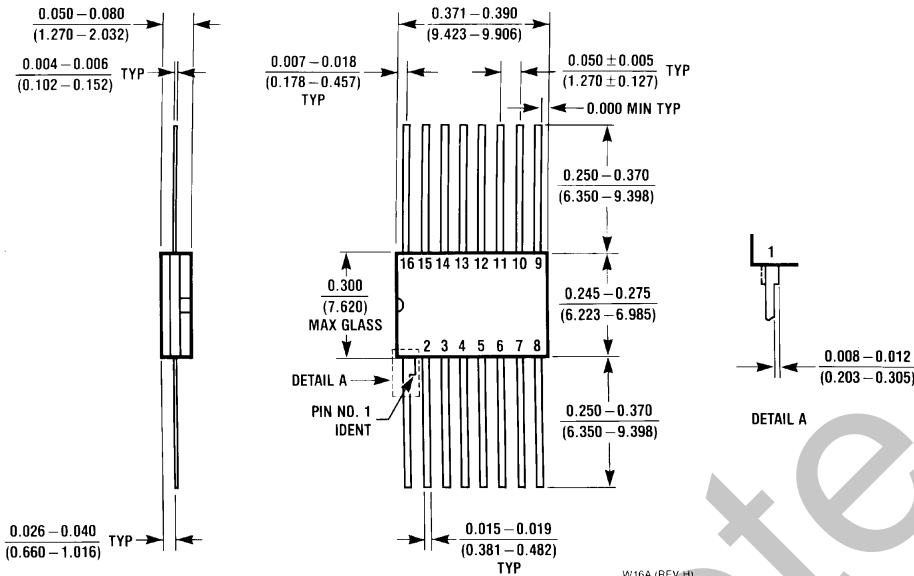


**16-Lead Ceramic Dual-In-Line Package (J)**  
**Order Number 9312DMBQ**  
**NS Package Number J16A**



**16-Lead Molded Dual-In-Line Package (N)**  
**Order Number DM9312N**  
**NS Package Number N16E**

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



**16-Lead Ceramic Flat Package (W)**  
**Order Number 9312FMQB**  
**NS Package Number W16A**

**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

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.