

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

### General Description

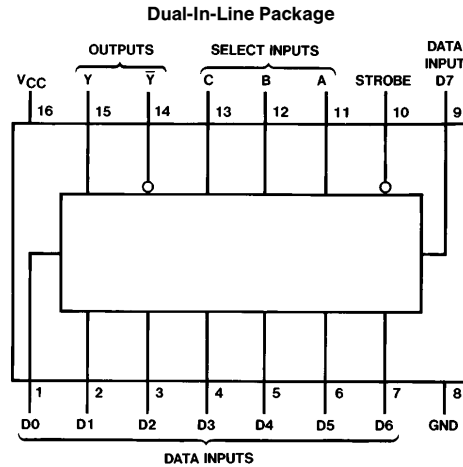
These data selectors/multiplexers contain inverter/drivers to supply full complementary, on-chip, binary decoded data selection.

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, 9312FMQB 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<br>(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<br>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<br>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<br>(Note 2)                                                            | MIL<br>−20<br>COM<br>−30 |                 | −70<br>−85 | mA    |
| 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.

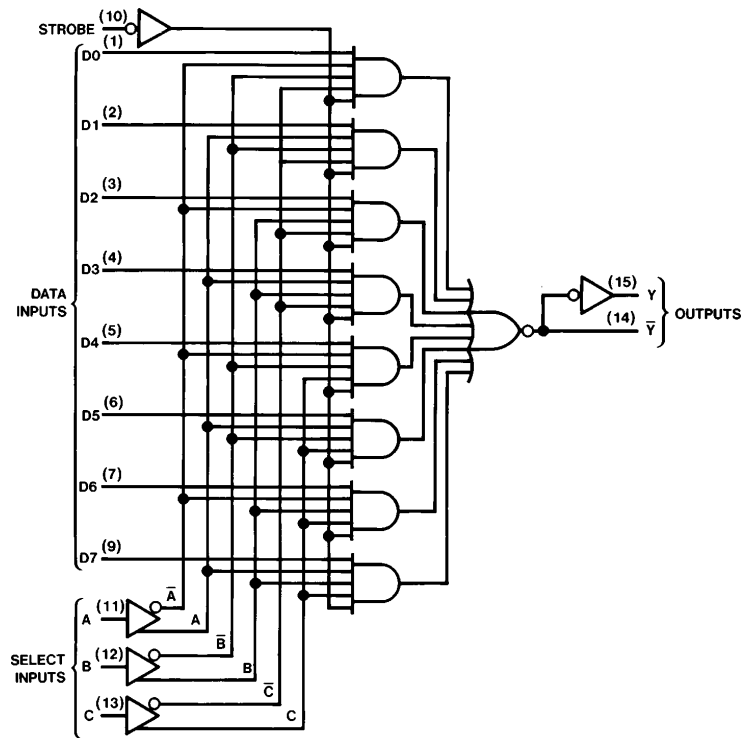
Note 3: I<sub>CC</sub> is measured with the STROBE and DATA SELECT inputs 4.5V and all other inputs and outputs open.

# 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)<br>To (Output) | Military                                      |     | Commercial |     | Units |
|------------------|----------------------------------------------------|-----------------------------|-----------------------------------------------|-----|------------|-----|-------|
|                  |                                                    |                             | R <sub>L</sub> = 400Ω, C <sub>L</sub> = 15 pF |     |            |     |       |
|                  |                                                    |                             | Min                                           | Max | Min        | Max |       |
| t <sub>PLH</sub> | Propagation Delay Time<br>Low to High Level Output | Selectz<br>to Y             |                                               | 34  |            | 33  | ns    |
| t <sub>PHL</sub> | Propagation Delay Time<br>High to Low Level Output | Select<br>to Y              |                                               | 34  |            | 35  | ns    |
| t <sub>PLH</sub> | Propagation Delay Time<br>Low to High Level Output | Select<br>to $\bar{Y}$      |                                               | 24  |            | 28  | ns    |
| t <sub>PHL</sub> | Propagation Delay Time<br>High to Low Level Output | Select<br>to $\bar{Y}$      |                                               | 26  |            | 25  | ns    |
| t <sub>PLH</sub> | Propagation Delay Time<br>Low to High Level Output | Data<br>to Y                |                                               | 24  |            | 23  | ns    |
| t <sub>PHL</sub> | Propagation Delay Time<br>High to Low Level Output | Data<br>to Y                |                                               | 24  |            | 25  | ns    |
| t <sub>PLH</sub> | Propagation Delay Time<br>Low to High Level Output | Data<br>to $\bar{Y}$        |                                               | 14  |            | 13  | ns    |
| t <sub>PHL</sub> | Propagation Delay Time<br>High to Low Level Output | Data<br>to $\bar{Y}$        |                                               | 16  |            | 13  | ns    |
| t <sub>PLH</sub> | Propagation Delay Time<br>Low to High Level Output | Strobe<br>to Y              |                                               | 30  |            | 33  | ns    |
| t <sub>PHL</sub> | Propagation Delay Time<br>High to Low Level Output | Strobe<br>to Y              |                                               | 30  |            | 32  | ns    |
| t <sub>PLH</sub> | Propagation Delay Time<br>Low to High Level Output | Strobe<br>to $\bar{Y}$      |                                               | 20  |            | 19  | ns    |
| t <sub>PHL</sub> | Propagation Delay Time<br>High to Low Level Output | Strobe<br>to $\bar{Y}$      |                                               | 23  |            | 21  | ns    |

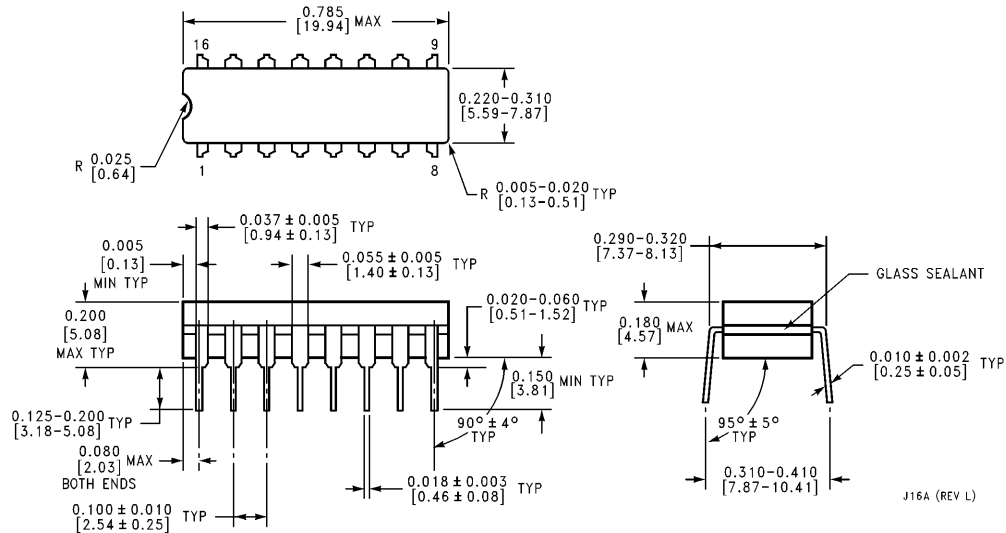
# Logic Diagram

9312

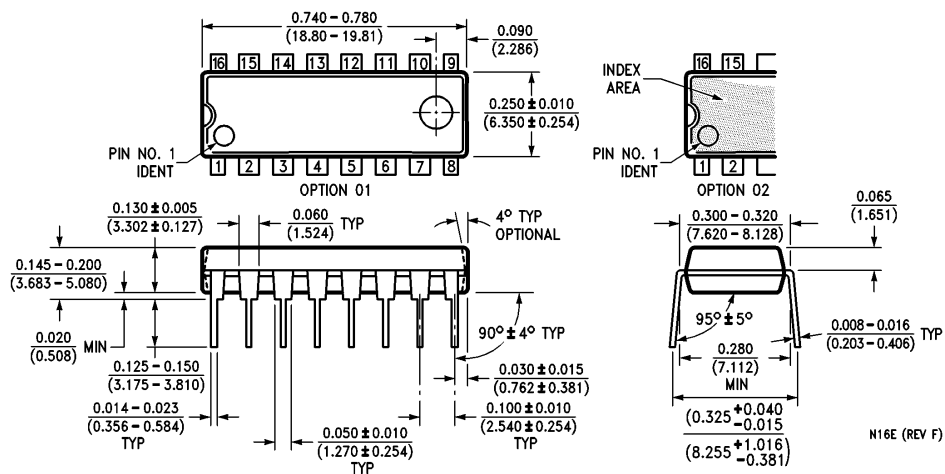


TL/F/6605-2

## Physical Dimensions inches (millimeters)

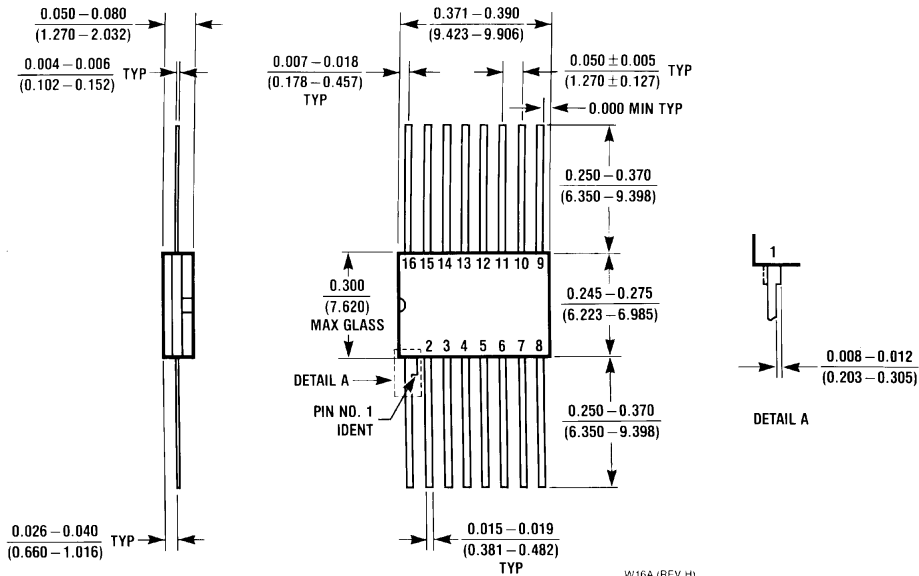


**16-Lead Ceramic Dual-In-Line Package (J)**  
Order Number 9312DMBQ  
NS Package Number J16A



**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**

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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.



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