

## 9309/DM9309 Dual 4-Bit Data Selectors/Multiplexers

### General Description

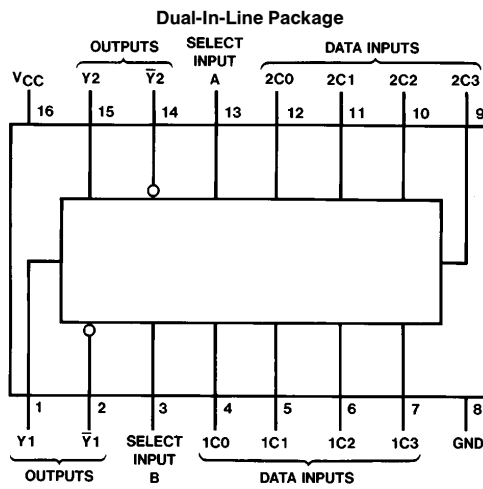
These data selectors/multiplexers contain inverter/drivers to supply full complementary, on-chip, binary decoded data selection.

The 9309/DM9309 contains two separate 4-bit multiplexers with complementary Y and  $\bar{Y}$  outputs; however, the two sections have common address select inputs.

### Features

- Complementary outputs
- Dual one-of-four data selectors

### Connection Diagram



TL/F/6602-1

Order Number 9309DMQB, 9309FMQB or DM9309N  
See NS Package Number J16A, N16E or W16A

### Function Table

Inputs						Outputs	
Select		Data				Y	$\bar{Y}$
B	A	C0	C1	C2	C3		
L	L	L	X	X	X	L	H
L	L	H	X	X	X	H	L
L	H	X	L	X	X	L	H
L	H	X	H	X	X	H	L
H	L	X	X	L	X	L	H
H	L	X	X	H	X	H	L
H	H	X	X	X	L	L	H
H	H	X	X	X	H	H	L

Select inputs A and B are common to both sections.  
H = High Level, L = Low Level, X = Don't Care.

## 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.

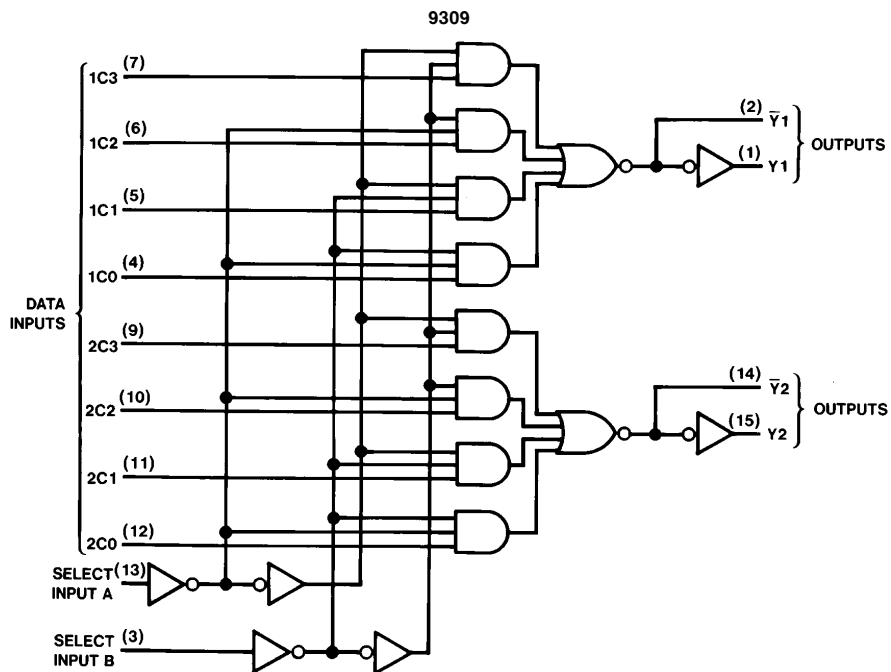
Note 2: Not more than one output should be shorted at a time.

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

**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	Select to Y		29		40	ns
$t_{PHL}$	Propagation Delay Time High to Low Level Output	Select to Y		27		36	ns
$t_{PLH}$	Propagation Delay Time Low to High Level Output	Select to $\bar{Y}$		21		24	ns
$t_{PHL}$	Propagation Delay Time High to Low Level Output	Select to $\bar{Y}$		21		29	ns
$t_{PLH}$	Propagation Delay Time Low to High Level Output	Data to Y		20		27	ns
$t_{PHL}$	Propagation Delay Time High to Low Level Output	Data to Y		21		34	ns
$t_{PLH}$	Propagation Delay Time Low to High Level Output	Data to $\bar{Y}$		12		21	ns
$t_{PHL}$	Propagation Delay Time High to Low Level Output	Data to $\bar{Y}$		13		13	ns

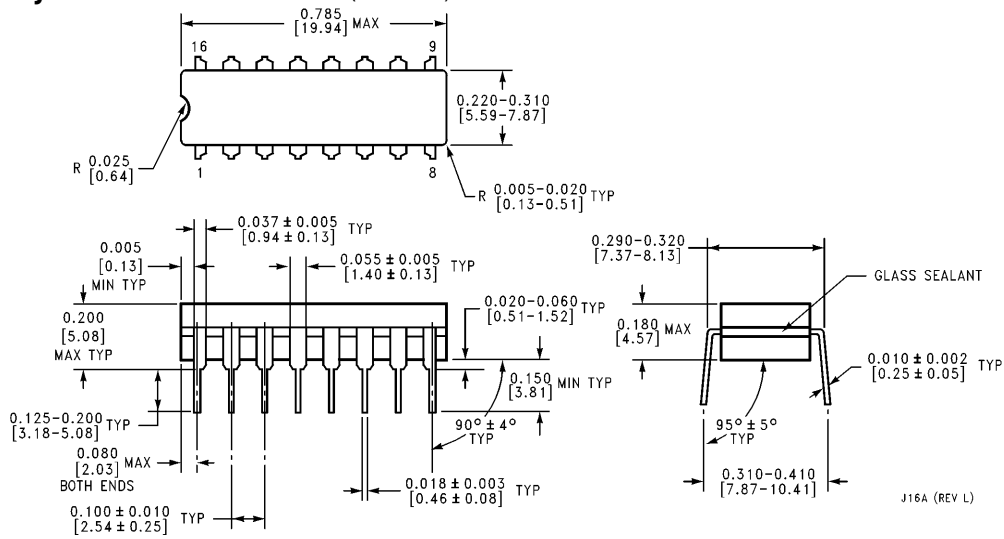
**Logic Diagram**



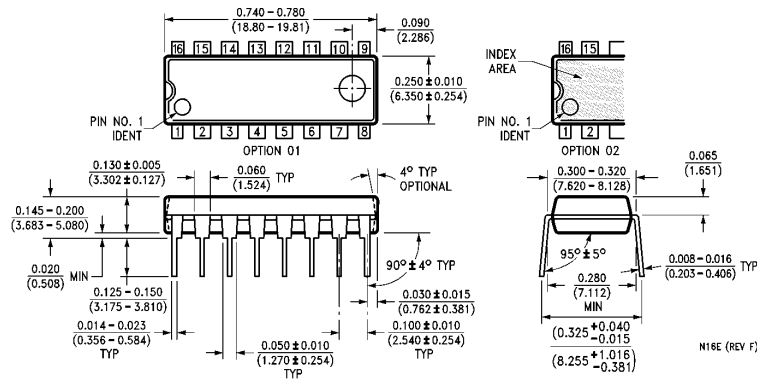
TL/F/6602-2



**Physical Dimensions** inches (millimeters)

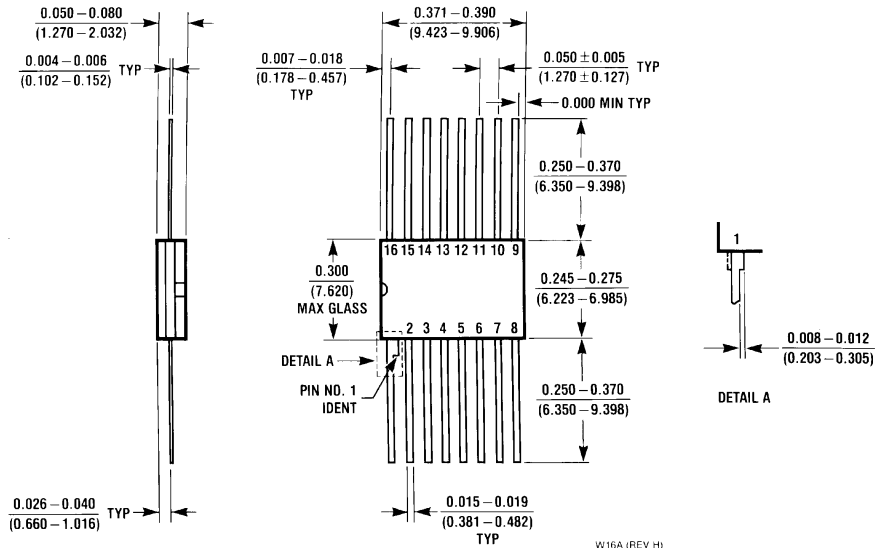


**16-Lead Ceramic Dual-In-Line Package (J)**  
Order Number 9309DMQB  
NS Package Number J16A



**16-Lead Molded Dual-In-Line Package (N)**  
Order Number DM9309N  
NS Package Number N16E

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



**16-Lead Ceramic Flat Package (W)**  
**Order Number 9309FMQB**  
**NS Package Number W16A**

W16A (REV. H)

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