FAIRCHILD SEMICONDUCTOR™

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DM74LS298
Quad 2-Port Register Multiplexer with Storage

General Description

The DM74LS298 is a quad 2-port register. It is the logical equivalent of a quad 2-input multiplexer followed by a quad 4-bit edge-triggered register. A Common Select input selects between two 4-bit input ports (data sources). The selected data is transferred to the output register synchronous with the HIGH-to-LOW transition of the Clock input.

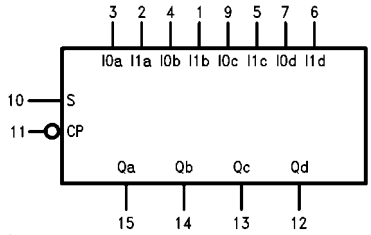
Features

- Select from two data sources
- Fully edge-triggered operation
- Typical power dissipation of 65 mW

Ordering Code:

Order Number	Package Number	Package Description
DM74LS298N	N16E	16-Lead Plastic Dual-In-Line Package (PDIP), JEDEC MS-001, 0.300 Wide

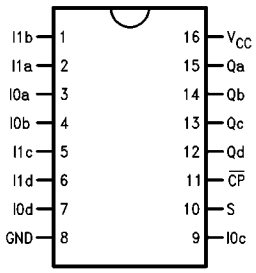
Logic Symbol



V_{CC} = Pin 16

GND = Pin 8

Connection Diagram



Pin Descriptions

Pin Names	Description
S	Common Select Inputs
$\overline{CP}$	Clock Pulse Input (Active Falling Edge)
$I0_a$, $I0_d$	Source 0 Data Inputs
$I1_a$, $I1_d$	Source 1 Data Inputs
Q_a, Q_d	Flip-Flip Outputs

Truth Table

Inputs			Output
S	**$I0_x$**	**$I1_x$**	**Q_x**
l	l	X	L
l	h	X	H
h	X	l	L
h	X	h	H

l = LOW Voltage Level one setup time prior to the HIGH-to-LOW clock transition.

h = HIGH Voltage Level one setup time prior to the HIGH-to-LOW clock transition.

H = HIGH Voltage Level

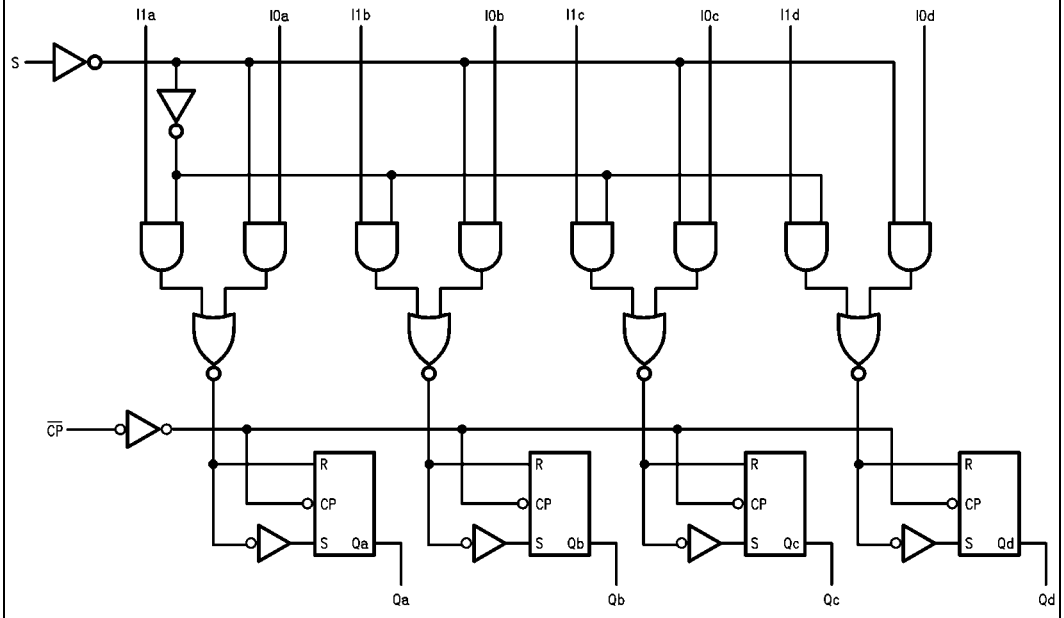
L = LOW Voltage Level

X = Immaterial

Functional Description

This device is a high speed quad 2-port register. It selects four bits of data from two sources (ports) under the control of a Common Select input (S). The selected data is transferred to the 4-bit output register synchronous with the HIGH-to-LOW transition of the Clock input ($\overline{CP}$). The 4-bit output register is fully edge-triggered. The Data inputs (I_{nx}) and Select input (S) need be stable only one setup time prior to the HIGH-to-LOW transition of the clock for predictable operation.

Logic Diagram



Absolute Maximum Ratings(Note 1)

Supply Voltage	7V
Input Voltage	7V
Operating Free Air Temperature Range	0°C to +70°C
Storage Temperature Range	−65°C to +150°C

Note 1: 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 tables 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	Min	Nom	Max	Units
V_{CC}	Supply Voltage	4.75	5	5.25	V
V_{IH}	HIGH Level Input Voltage	2			V
V_{IL}	LOW Level Input Voltage			0.8	V
I_{OH}	HIGH Level Output Current			−0.4	mA
I_{OL}	LOW Level Output Current			8	mA
T_A	Free Air Operating Temperature	0		70	°C
t_S (H)	Setup Time HIGH or LOW	25			ns
t_S (L)	S to $\overline{CP}$	25			
t_H (H)	Hold Time HIGH or LOW	0			ns
t_H (L)	S to $\overline{CP}$	0			
t_S (H)	Setup Time HIGH or LOW	15			ns
t_S (L)	$I0_x$ or $I1_x$ to $\overline{CP}$	15			
t_H (H)	Hold Time HIGH or LOW	5.0			ns
t_H (L)	$I0_x$ or $I1_x$ to $\overline{CP}$	5.0			
t_W (H)	$\overline{CP}$ Pulse Width HIGH or LOW	20			ns
t_W (L)		20			

Electrical Characteristics

over recommended operating free air temperature range (unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ (Note 2)	Max	Units
V_I	Input Clamp Voltage	V_{CC} = Min, I_I = −18 mA			−1.5	V
V_{OH}	HIGH Level Output Voltage	V_{CC} = Min, I_{OH} = Max, V_{IL} = Max	2.7	3.4		V
V_{OL}	LOW Level Output Voltage	V_{CC} = Min, I_{OL} = Max, V_{IH} = Min		0.35	0.5	V
		I_{OL} = 4 mA, V_{CC} = Min		0.25	0.4	
I_I	Input Current @ Max Input Voltage	V_{CC} = Max, V_I = 7V, V_I = 10V			0.1	mA
I_{IH}	HIGH Level Input Current	V_{CC} = Max, V_I = 2.7V			20	µA
I_{IL}	LOW Level Input Current	V_{CC} = Max, V_I = 0.4V			−0.4	mA
I_{OS}	Short Circuit Output Current	V_{CC} = Max (Note 3)	−20		−100	mA
I_{CC}	Supply Current	V_{CC} = Max, $I0_n$, $I1_n$, S = GND, $\overline{CP}$ = ⌐			21	mA

Note 2: All typicals are at V_{CC} = 5V, T_A = 25°C.

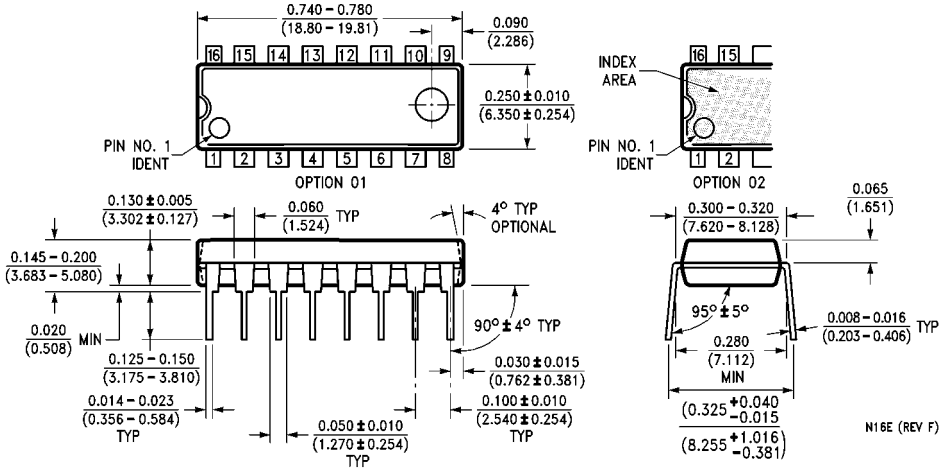
Note 3: Not more than one output should be shorted at a time, and the duration should not exceed one second.

Switching Characteristics

at V_{CC} = +5V and T_A = +25°C

Symbol	Parameter	R_L = 2 kΩ, C_L = 15 pF		Units
		Min	Max	
t_{PLH}	Propagation Delay Time LOW-to-HIGH Level Output $\overline{CP}$ to Q_n		25	ns
t_{PHL}	Propagation Delay Time HIGH-to-LOW Level Output $\overline{CP}$ to Q_n		25	ns

Physical Dimensions inches (millimeters) unless otherwise noted



16-Lead Plastic Dual-In-Line Package (PDIP), JEDEC MS-001, 0.300 Wide
Package Number N16E