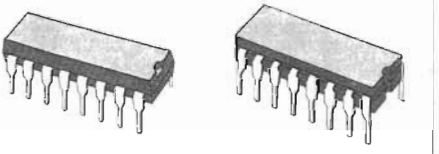
SGS-THOMSON MICROELECTRONICS

T74LS298

QUAD 2-PORT REGISTER (QUAD 2-INPUT MULTIPLEXER WITH STORAGE)

- SELECT FROM TWO DATA SOURCES
- FULLY EDGE-TRIGGERED OPERATION
- TYPICAL POWER DISSIPATION OF 65 mW
- INPUT CLAMP DIODES LIMIT HIGH SPEED TERMINATION EFFECTS
- FULLY TTL AND CMOS COMPATIBLE

LS298 is fabricated with the Schottky barrier diode process for high speed and is completely compatible with all TTL families.



B1 (Plastic Package)

D1 (Ceramic Package)

M1 (Micro Package)

C1 (Plastic Chip Carrier)

ORDER CODES :

T74LS298 D1 T74LS298 C1
T74LS298 B1 T74LS298 M1

DESCRIPTION

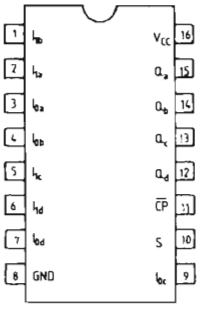
The T74LS298 is a Quad 2-Port Register. It is the logical equivalent of a quad 2-input multiplexer followed by a quad 4-bit edge-triggered register. A Common Select input selects between two 4-bit input ports (data sources). The selected data is transferred to the output register synchronously with the HIGH to LOW transition of the Clock input. The

PIN NAMES

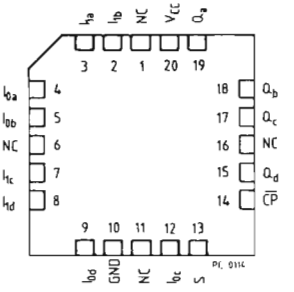
$\overline{S}$	COMMON SELECT INPUT
$\overline{CP}$	CLOCK (active LOW going edge) INPUT
$I_{0a\text{-}0b}$	DATA INPUTS FROM SOURCES 0
$I_{1a\text{-}1b}$	DATA INPUTS FROM SOURCES 1
Q_a-Q_b	REGISTER OUTPUTS

PIN CONNECTION (top view)

DUAL IN LINE

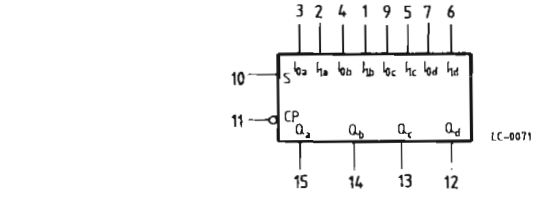


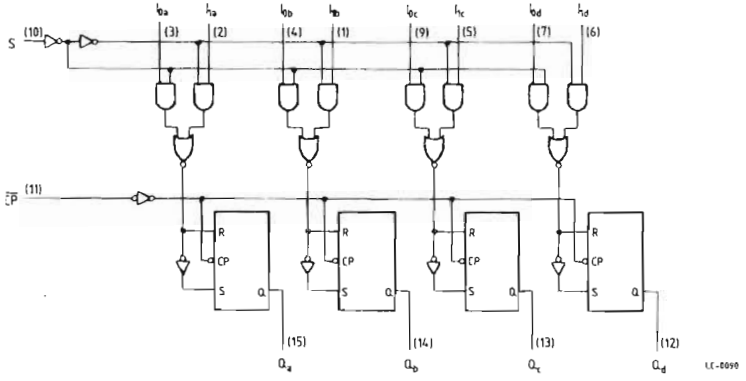
CHIP CARRIER



NC = No internal Connection

LOGIC SYMBOL AND LOGIC DIAGRAM





V_{CC} = Pin 16
GND = Pin 8
( ) = Pin numbers

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V_{CC}	Supply Voltage	– 0.5 to 7	V
V_I	Input Voltage, Applied to Input	– 0.5 to 15	V
V_O	Output Voltage, Applied to Output	– 0.5 to 10	V
I_I	Input Current, into Inputs	– 30 to 5	mA
I_O	Output Current, into Outputs	50	mA

Stresses in excess of those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or any other conditions in excess of those indicated in the operational sections of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

GUARANTEED OPERATING RANGE

Part Numbers	Supply Voltage			Temperature
	Min.	Typ.	Max.	
T74LS298XX	4.75 V	5.0 V	5.25 V	0 °C to + 70 °C

XX = Package type.

TRUTH TABLE - PRESENT OUTPUT STATES AND MODE SELECTION

TRUTH TABLE

Inputs			Output
S	I_0	I_1	Q
l	l	X	L
l	h	X	H
h	X	l	L
h	X	h	H

L = LOW Voltage Level
H = HIGH Voltage Level
X = Don't Care
l = LOW Voltage Level one set-up time prior to the LOW to HIGH clock transition.
h = HIGH Voltage Level one set-up time prior to the LOW to HIGH clock transition.

FUNCTIONAL DESCRIPTION

The LS298 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 (CP). The 4-bit output register is fully edge-triggered. The Data inputs (I) and Select input (S) must be stable only one set-up time prior to the HIGH to LOW transition of the clock for predectable operation.

DC CHARACTERISTICS OVER OPERATING TEMPERATURE RANGE

Symbol	Parameter	Limits			Test Condition (note 1)		Unit
		Min.	Typ. (*)	Max.			
V_{IH}	Input HIGH Voltage	2.0			Guaranteed Input HIGH Treshold Voltage for All Inputs		V
V_{IL}	Input LOW Voltage			0.8	Guaranteed Input LOW Treshold Voltage for All Inputs		V
V_{CD}	Input Clamp Diode Voltage		- 0.65	- 1.5	V_{CC} = MIN, I_{IN} = -18 mA		V
V_{OH}	Output HIGH Voltage	2.7	3.4		V_{CC} = MIN, I_{OH} = - 400 µA V_{IN} = V_{IH} or V_{IL} per Truth Table		V
V_{OL}	Output LOW Voltage		0.25	0.4	I_{OL} = 4.0 mA	V_{CC} = MIN, V_{IN} = V_{IH} or V_{IL} per Truth Table	V
			0.35	0.5	I_{OL} = 8.0 mA		V
I_{IH}	Input HIGH Current		1.0	20 0.1	V_{CC} = MAX, V_{IN} = 2.7 V V_{CC} = MAX, V_{IN} = 7.0 V		µA mA
I_{IL}	Input LOW Current			- 0.4	V_{CC} = MAX, V_{IN} = 0.4 V		mA
I_{OS}	Output Short Circuit Current (note 2)	- 20		- 100	V_{CC} = MAX, V_{OUT} = 0 V		mA
I_{CC}	Power Supply Current		13	21	V_{CC} = MAX		mA

Notes : 1. Conditions for testing, not shown in the table are chosen to guarantee operation under "worst case" conditions.
2. Not more than one output should be shorted at a time.
(*) Typical values are at V_{CC} = 5.0 V, T_A = 25 °C.

AC CHARACTERISTICS : T_A = 25 °C

Symbol	Parameter	Limits			Test Conditions		Unit
		Min.	Typ.	Max.			
t_{PLH}	Propagation Delay, Clock to Output		18	27	Fig. 1	V_{CC} = 5.0 V C_L = 15 pF	ns
t_{PHL}	Propagation Delay, Clock to Output		21	32	Fig. 1		ns

DEFINITION OF TERMS :

SET-UP TIME (t_s - is defined as the minimum time required for the correct logic level to be present at the logic input prior to the clock transition from LOW to HIGH in order to be recognized and transferred to the outputs.

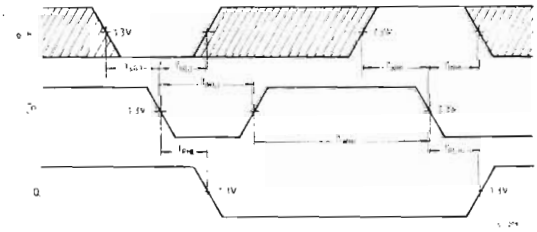
HOLD TIME (t_h) - is defined as the minimum time following the clock transition from LOW to HIGH that the logic level must be maintained at the input in order to ensure continued recognition. A negative HOLD TIME indicates that the correct logic level may be released prior to the clock transition from LOW to HIGH and still be recognized.

AC SET-UP REQUIREMENTS : T_A = 25 °C

Symbol	Parameter	Limits			Test Conditions		Unit
		Min.	Typ.	Max.			
$t_{W}(H)$	Clock Pulse Width (HIGH)	20	11		Fig. 1	V_{CC} = 5.0 V	ns
$t_{W}(L)$	Clock Pulse Width (LOW) (HIGH or LOW)	20	11				ns
t_{s}(data)	Set-up Time, Data to Clock	15	10		Fig. 1		ns
t_{h}(data)	Hold Time, Data to Clock	5.0	1				ns
t_{s}(S)	Set-up Time, Select to Clock	25	20		Fig. 2		ns
t_{h}(S)	Hold Time, Select to Clock	0	− 2				ns

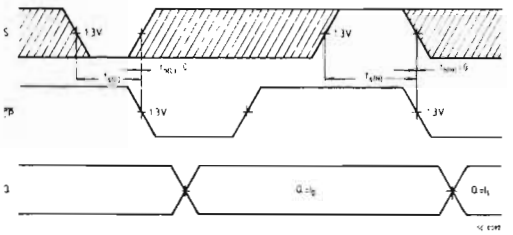
AC WAVEFORMS

Figure 1.



The shaded areas indicate when the input is permitted to change for predictable output performance.

Figure 2.



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