

Dual octal latch (3-State)

74F604

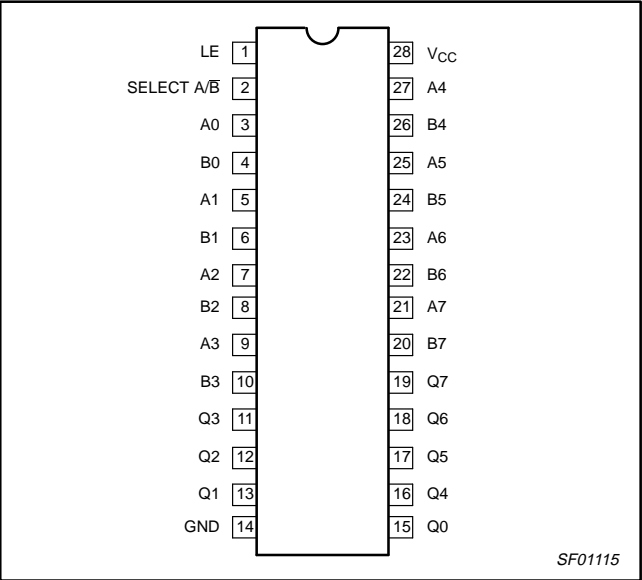
FEATURES

- High impedance NPN base inputs for reduced loading (20µA in High and Low states)
- Stores 16-bit-wide Data inputs, multiplexed 8-bit outputs
- 3-State outputs
- Power supply current 75mA typical

DESCRIPTION

The 74F604 multiplexed latch is ideal for storing data from two input buses, A or B, and providing data from either the A or B latches to the output bus. Organized as 8-bit A and B latches, the latch outputs are connected by pairs to eight 2-input multiplexers. A Select (SELECT A/B) input determines whether the A or B latch contents are multiplexed to the eight 3-State outputs. Data entered from the B inputs are selected when SELECT A/B is Low; data from the A inputs are selected when SELECT A/B is High. Data enters the latches when the Latch Enable ( $\overline{LE}$ ) input is Low and is latched on the  $\overline{LE}$  rising edge. The outputs are enabled when  $\overline{LE}$  is High and disabled when  $\overline{LE}$  is Low.

PIN CONFIGURATION



TYPE	TYPICAL PROPAGATION DELAY	TYPICAL SUPPLY CURRENT (TOTAL)
74F604	7.5ns	75mA

ORDERING INFORMATION

DESCRIPTION	COMMERCIAL RANGE $V_{CC} = 5V \pm 10\%$ , $T_{amb} = 0^{\circ}C$ to $+70^{\circ}C$
28-pin plastic DIP	N74F604N
28-pin plastic SOL	N74F604D

INPUT AND OUTPUT LOADING AND FAN-OUT TABLE

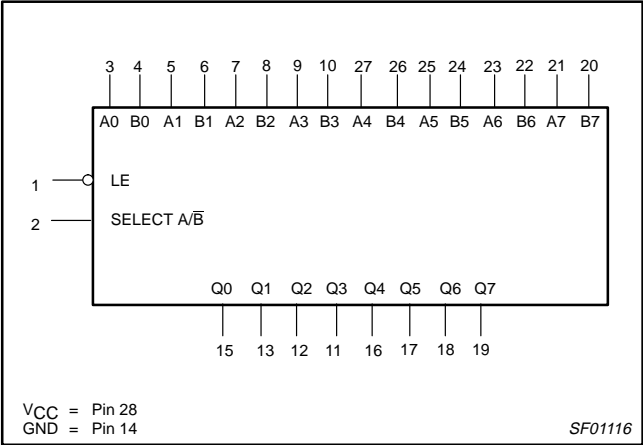
PINS	DESCRIPTION	74F (U.L.) HIGH/LOW	LOAD VALUE HIGH/LOW
A0–A7, B0–B7	Data inputs	1.0/0.033	20µA/20µA
SELECT A/B	Select input	1.0/0.033	20µA/20µA
$\overline{LE}$	Latch Enable input (active Low)	1.0/0.033	20µA/20µA
Q0–Q7	Data outputs	150/40	3mA/24mA

**NOTE:**  
One (1.0) FAST unit load is defined as: 20µA in the High state and 0.6mA in the Low state.

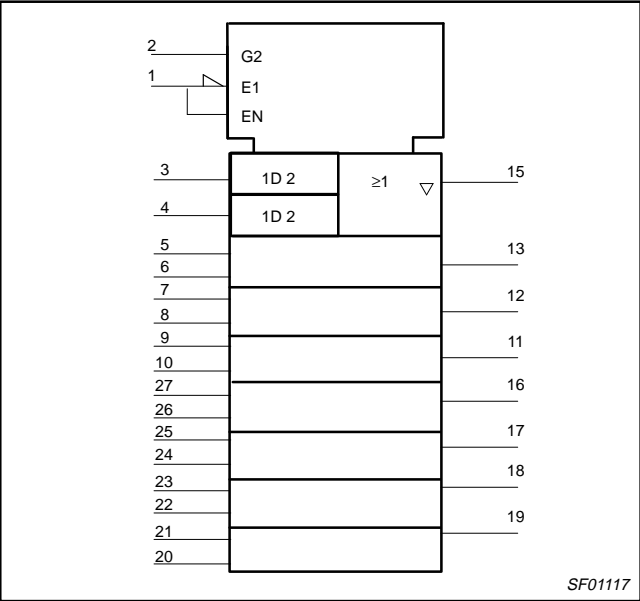
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74F604

LOGIC SYMBOL



IEC/IEEE SYMBOL (IEEE/IEC)



FUNCTION TABLE

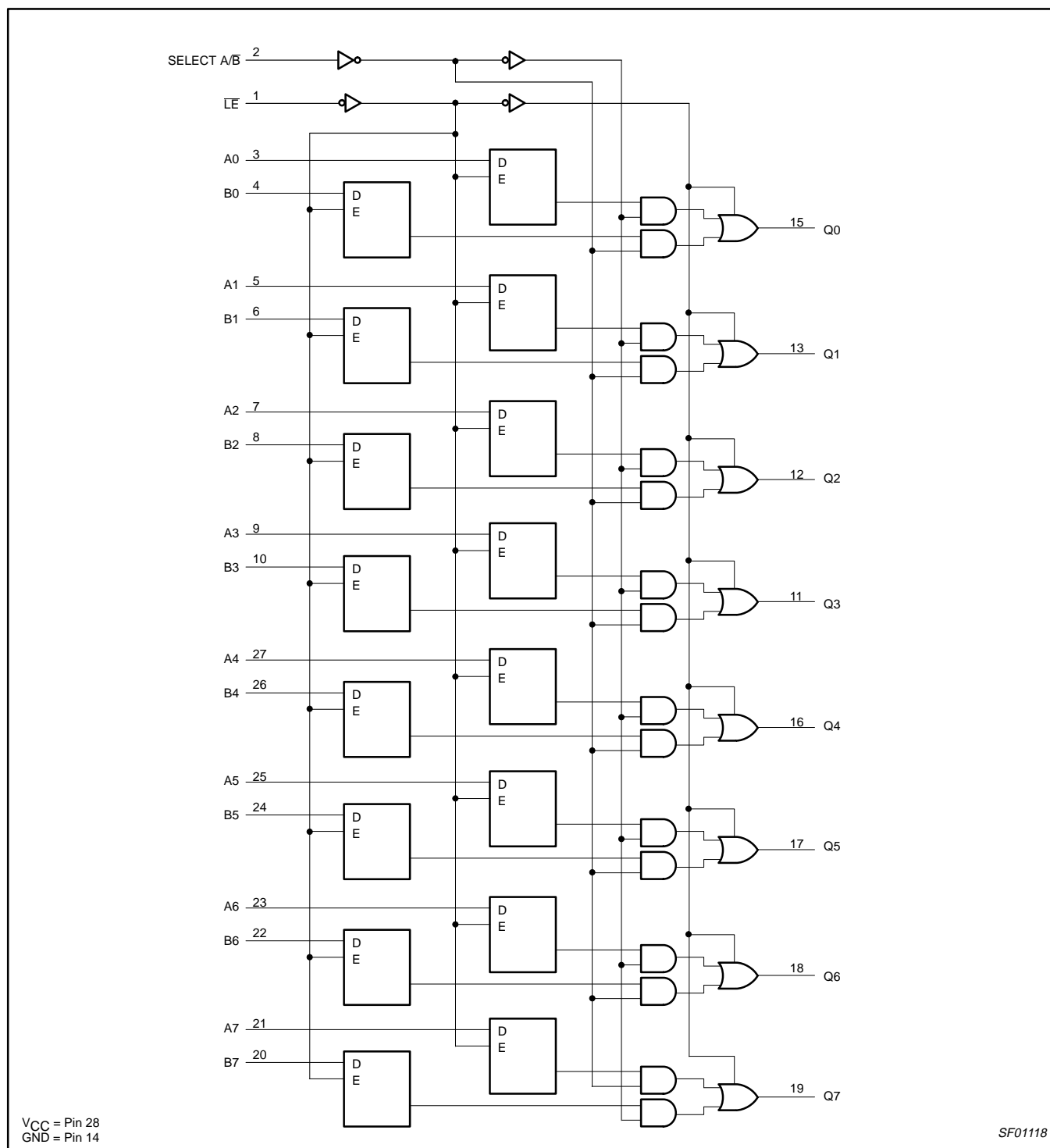
INPUTS				OUTPUTS
A0–A7	B0–B7	SELECT A/B	$\overline{LE}$	Q0–Q7
A data	B data	L	↑	B data
A data	B data	H	↑	B data
X	X	X	L	Z
X	X	L	H	B latched data
X	X	H	H	A latched data

H = High voltage level  
L = Low voltage level  
X = Don't care  
Z = High impedance "off" state  
↑ = Low-to-High clock transition

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74F604

## LOGIC DIAGRAM



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74F604

**ABSOLUTE MAXIMUM RATINGS**

(Operation beyond the limits set forth in this table may impair the useful life of the device.

Unless otherwise noted these limits are over the operating free-air temperature range.)

SYMBOL	PARAMETER	RATING	UNIT
$V_{CC}$	Supply voltage	−0.5 to +7.0	V
$V_{IN}$	Input voltage	−0.5 to +7.0	V
$I_{IN}$	Input current	−30 to +5	mA
$V_{OUT}$	Voltage applied to output in High output state	−0.5 to + $V_{CC}$	V
$I_{OUT}$	Current applied to output in Low output state	48	mA
$T_{amb}$	Operating free-air temperature range	0 to +70	°C
$T_{stg}$	Storage temperature range	−65 to +150	°C

**RECOMMENDED OPERATING CONDITIONS**

SYMBOL	PARAMETER	LIMITS			UNIT
		MIN	NOM	MAX	
$V_{CC}$	Supply voltage	4.5	5.0	5.5	V
$V_{IH}$	High-level input voltage	2.0			V
$V_{IL}$	Low-level input voltage			0.8	V
$I_{IK}$	Input clamp current			−18	mA
$I_{OH}$	High-level output current			−3	mA
$I_{OL}$	Low-level output current			24	mA
$T_{amb}$	Operating free-air temperature range	0		70	°C

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74F604

## DC ELECTRICAL CHARACTERISTICS

(Over recommended operating free-air temperature range unless otherwise noted.)

SYMBOL	PARAMETER	TEST CONDITIONS <sup>1</sup>		LIMITS			UNIT
				MIN	TYP <sup>2</sup>	MAX	
V <sub>OH</sub>	High-level output voltage	V <sub>CC</sub> = MIN, V <sub>IL</sub> = MAX, V <sub>IH</sub> = MIN, I <sub>OH</sub> = MAX	±10%V <sub>CC</sub>	2.4			V
			±5%V <sub>CC</sub>	2.7	3.4		V
V <sub>OL</sub>	Low-level output voltage	V <sub>CC</sub> = MIN, V <sub>IL</sub> = MAX, V <sub>IH</sub> = MIN, I <sub>OL</sub> = MAX	±10%V <sub>CC</sub>		0.35	0.50	V
			±5%V <sub>CC</sub>		0.35	0.50	V
V <sub>IK</sub>	Input clamp voltage	V <sub>CC</sub> = MIN, I <sub>I</sub> = I <sub>IK</sub>			-0.73	-1.2	V
I <sub>I</sub>	Input current at maximum input voltage	V <sub>CC</sub> = 0.0V, V <sub>I</sub> = 7.0V				100	μA
I <sub>IH</sub>	High-level input current	V <sub>CC</sub> = MAX, V <sub>I</sub> = 2.7V				20	μA
I <sub>IL</sub>	Low-level input current	V <sub>CC</sub> = MAX, V <sub>I</sub> = 0.5V				-20	μA
I <sub>OZH</sub>	Off state output current, High-level voltage applied	V <sub>CC</sub> = MAX, V <sub>O</sub> = 2.7V				50	μA
I <sub>OZL</sub>	Off state output current, Low-level voltage applied	V <sub>CC</sub> = MAX, V <sub>O</sub> = 0.5V				-50	μA
I <sub>OS</sub>	Short-circuit output current <sup>3</sup>	V <sub>CC</sub> = MAX		-60		-150	mA
I <sub>CC</sub>	Supply current (total)	I <sub>CC</sub> H	An, Bn, SELECT A/B = 4.5V, $\overline{\text{LE}}$ = ↑		60	82	mA
		I <sub>CC</sub> L	An, Bn, SELECT A/B=GND, $\overline{\text{LE}}$ = ↑		75	100	mA
		I <sub>CC</sub> Z	An, Bn, SELECT A/B = GND, $\overline{\text{LE}}$ = GND		75	100	mA

## NOTES:

- For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions for the applicable type.
- All typical values are at V<sub>CC</sub> = 5V, T<sub>amb</sub> = 25°C.
- Not more than one output should be shorted at a time. For testing I<sub>OS</sub>, the use of high-speed test apparatus and/or sample-and-hold techniques are preferable in order to minimize internal heating and more accurately reflect operational values. Otherwise, prolonged shorting of a High output may raise the chip temperature well above normal and thereby cause invalid readings in other parameter tests. In any sequence of parameter tests, I<sub>OS</sub> tests should be performed last.

## AC ELECTRICAL CHARACTERISTICS

SYMBOL	PARAMETER	TEST CONDITION	LIMITS					UNIT
			$V_{CC} = +5V$ $T_{amb} = +25^{\circ}C$ $C_L = 50pF, R_L = 500\Omega$			$V_{CC} = +5V \pm 10\%$ $T_{amb} = 0^{\circ}C \text{ to } +70^{\circ}C$ $C_L = 50pF, R_L = 500\Omega$		
			MIN	TYP	MAX	MIN	MAX	
t <sub>PLH</sub> t <sub>PHL</sub>	Propagation delay SELECT A/B to Qn (B latch)	Waveform 1	5.0 6.0	7.0 8.5	9.0 10.5	4.5 5.5	10.0 11.5	ns
t <sub>PLH</sub> t <sub>PHL</sub>	Propagation delay SELECT A/B to Qn (A latch)	Waveform 2	6.0 4.0	8.0 6.5	10.0 8.5	5.5 3.5	11.5 9.0	ns
t <sub>PZH</sub> t <sub>PZL</sub>	Output Enable time to High or Low level	Waveform 4 Waveform 5	5.0 5.0	7.5 7.5	9.5 9.5	4.5 4.5	10.5 11.0	ns
t <sub>PHZ</sub> t <sub>PLZ</sub>	Output Disable time from High or Low level	Waveform 4 Waveform 5	5.0 5.0	7.0 7.0	9.5 9.5	4.5 4.5	11.0 11.0	ns

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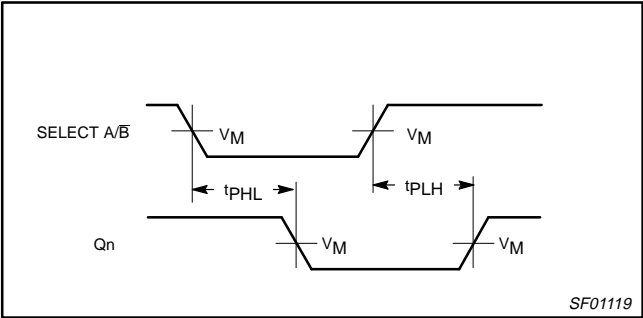
74F604

AC SETUP REQUIREMENTS

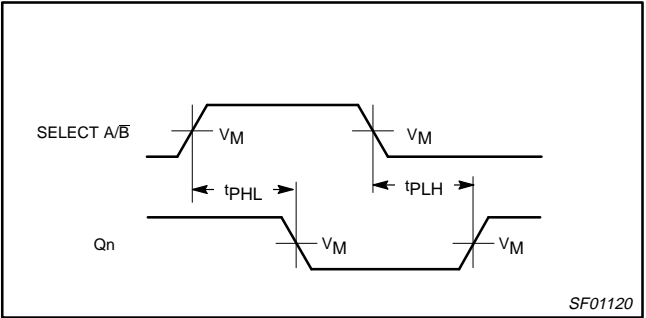
SYMBOL	PARAMETER	TEST CONDITION	LIMITS					UNIT
			V <sub>CC</sub> = +5V T <sub>amb</sub> = +25°C C <sub>L</sub> = 50pF, R <sub>L</sub> = 500Ω			V <sub>CC</sub> = +5V ± 10% T <sub>amb</sub> = 0°C to +70°C C <sub>L</sub> = 50pF, R <sub>L</sub> = 500Ω		
			MIN	TYP	MAX	MIN	MAX	
t <sub>s</sub> (H) t <sub>s</sub> (L)	Setup time, High or Low An, Bn to LE	Waveform 3	1.0 2.0			2.0 3.0		ns
t <sub>h</sub> (H) t <sub>h</sub> (L)	Hold time, High or Low An, Bn to LE	Waveform 3	0 1.0			0 1.5		ns
t <sub>W</sub> (L)	LE Pulse width, Low	Waveform 3	5.0			6.0		ns

AC WAVEFORMS

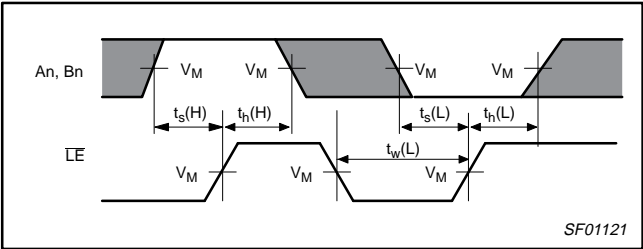
For all waveforms,  $V_M = 1.5V$ .  
The shaded areas indicate when the input is permitted to change for predictable output performance.



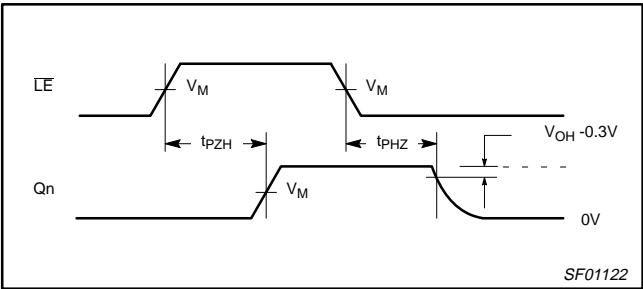
Waveform 1. Propagation Delay, SELECT A/B To Output  
(B latched data=Low.  $\overline{LE}$ =H)



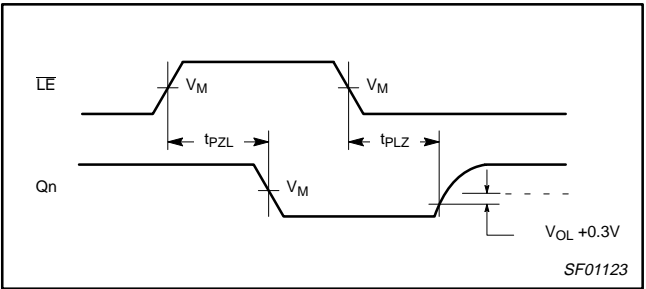
Waveform 2. Propagation Delay, SELECT A/B To Output  
(A latched data=Low.  $\overline{LE}$ =H)



Waveform 3. Data Setup and Hold Times,  
Latch Enable Pulse Width



Waveform 4. 3-State Output Enable Time to High Level and  
Output Disable Time from High Level



Waveform 5. 3-State Output Enable Time to Low Level and  
Output Disable Time from Low Level

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TEST CIRCUIT AND WAVEFORMS

