

Document No.	853-0379
ECN No.	96249
Date of issue	April 6, 1990
Status	Product Specification
FAST Products	

FAST 74F620, 74F623 Transceivers

74F620 Octal Bus Transceiver, Inverting (3-State)
74F623 Octal Bus Transceiver, Non-Inverting (3-State)

FEATURES

- High impedance NPN base inputs for reduced loading (70µA in High and Low states)
- Ideal for applications which require high output drive and minimal bus loading
- Octal bidirectional bus interface
- 3-state buffer outputs sink 64mA and source 15mA
- -'F620 Inverting
- 'F623 Non-Inverting

DESCRIPTION

The 74F620 is an octal bus transceiver featuring inverting 3-state bus-compatible outputs in both send and receive directions. The outputs are capable of sinking 64mA and sourcing up to 15mA, providing very good capacitive drive characteristics. The 74F623 is a non-inverting version of the 74F620. These octal bus transceivers are designed for asynchro-

TYPE	TYPICAL PROPAGATION DELAY	TYPICAL SUPPLY CURRENT (TOTAL)
74F620	3.5ns	80mA
74F623	4.5ns	105mA

ORDERING INFORMATION

PACKAGES	COMMERCIAL RANGE
	$V_{CC} = 5V \pm 10\%$; $T_A = 0^\circ C$ to $+70^\circ C$
20-Pin Plastic DIP	N74F620N, N74F623N
20-Pin Plastic SOL ¹	N74F620D, N74F623D

NOTE:

1. Thermal mounting techniques are recommended. See SMD Process Applications (page 17) for a discussion of thermal considerations for surface mounted device.

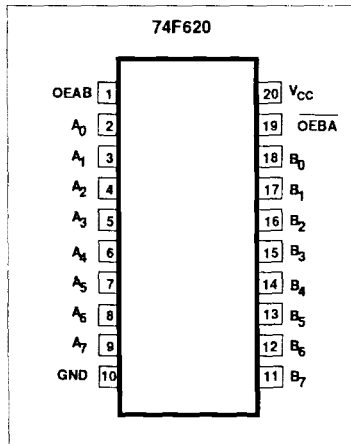
INPUT AND OUTPUT LOADING AND FAN-OUT TABLE

PINS	DESCRIPTION	74F(U.L.) HIGH/LOW	LOAD VALUE HIGH/LOW
A ₀ -A ₇ , B ₀ -B ₇	Data inputs	3.5/1.16	70µA/70µA
OEBA, OEAB	Output Enable inputs	1.0/0.033	20µA/20µA
A ₀ -A ₇	Data outputs	150/40	3mA/24mA
B ₀ -B ₇	Data outputs	750/106.7	15mA/64mA

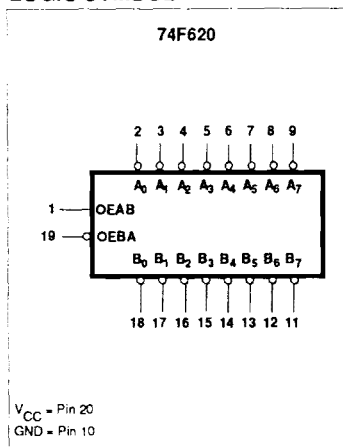
NOTE:

One (1.0) FAST Unit Load is defined as: 20µA in the High state and 0.6mA in the Low state.

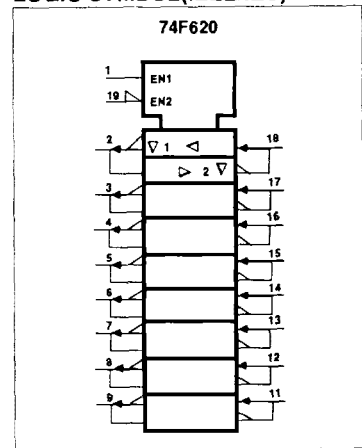
PIN CONFIGURATION



LOGIC SYMBOL



LOGIC SYMBOL (IEEE/IEC)



Transceivers

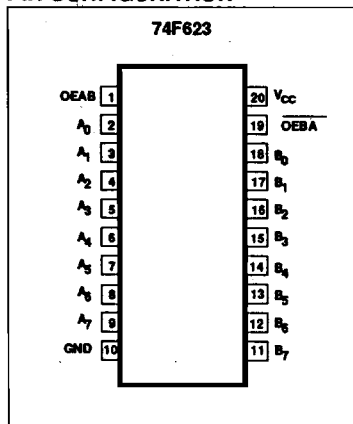
FAST 74F620, 74F623

nous two-way communication between data busses. The control function implementation allows for maximum flexibility in timing. These devices allow data transmission from the A bus to the B bus or from B bus to A bus, depending upon the logic levels at the Enable inputs

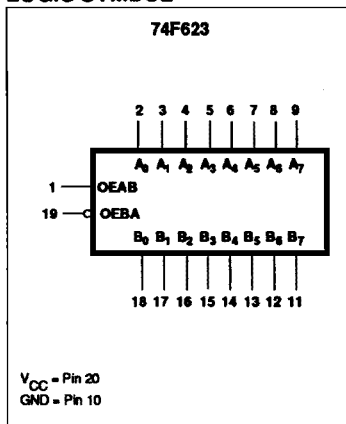
(\overline{OEBA} and OEAB). The Enable inputs can be used to disable the device so that the busses are effectively isolated. The dual-enable configuration gives the 'F620 and 'F623 the capability to store data by the simultaneous enabling of \overline{OEBA} and OEAB. Each output reinforces its input in

this transceiver configuration. Thus, when both control inputs are enabled and all other data sources to the two sets of the bus lines are at high impedance, both sets of bus lines (16 in all) will remain at their last states.

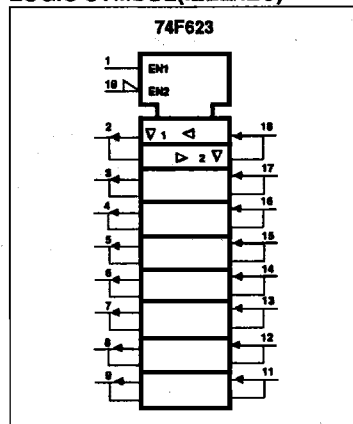
PIN CONFIGURATION



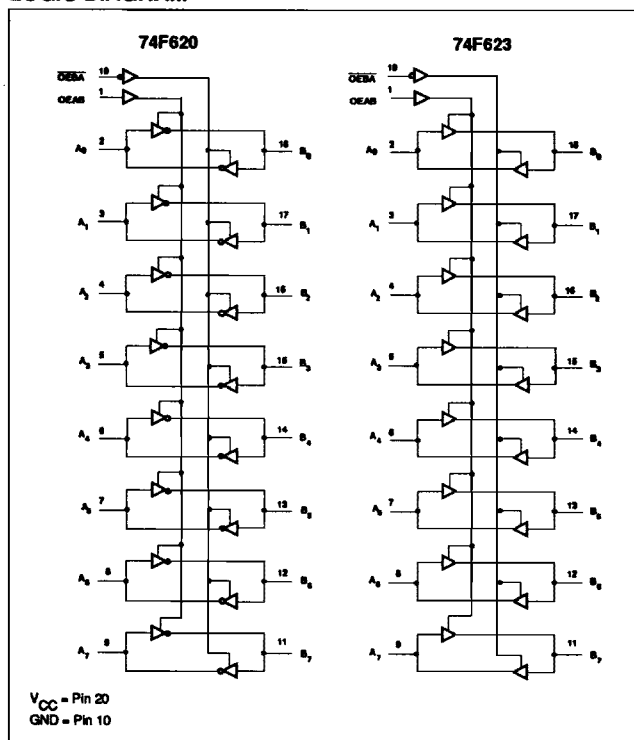
LOGIC SYMBOL



LOGIC SYMBOL (IEEE/IEC)



LOGIC DIAGRAM



FUNCTION TABLE

INPUTS		OPERATING MODES	
OEBA	OEAB	'F620	'F623
L	L	\overline{B} data to A bus	B data to A bus
H	H	\overline{A} data to B bus	A data to B bus
H	L	Z	Z
L	H	\overline{B} data to A bus \overline{A} data to B bus	B data to A bus A data to B bus

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

Transceivers

FAST 74F620, 74F623

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 +5.5	V	
I _{OUT}	Current applied to output in Low output state	A ₀ -A ₇	48	mA
		B ₀ -B ₇	128	mA
T _A	Operating free-air temperature range	0 to +70	°C	
T _{STG}	Storage temperature	-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 _H	High-level input voltage	2.0			V
V _L	Low-level input voltage			0.8	V
I _{IK}	Input clamp current			-18	mA
I _{OH}	High-level output current	A ₀ -A ₇		-3	mA
		B ₀ -B ₇		-15	mA
I _{OL}	Low-level output current	A ₀ -A ₇		24	mA
		B ₀ -B ₇		64	mA
T _A	Operating free-air temperature range	0		70	°C

Transceivers

FAST 74F620, 74F623

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

SYMBOL	PARAMETER		TEST CONDITIONS ¹			LIMITS			UNIT	
						Min	Typ ²	Max		
V_{OH}	High-level output voltage	A_0-A_7 B_0-B_7	$V_{CC} = \text{MIN},$ $V_{IL} = \text{MAX},$ $V_{IH} = \text{MIN}$	$I_{OH} = -3\text{mA}$	$\pm 10\%V_{CC}$	2.4			V	
					$\pm 5\%V_{CC}$	2.7	3.3	V		
		B_0-B_7		$I_{OH} = -15\text{mA}$	$\pm 10\%V_{CC}$	2.0		V		
					$\pm 5\%V_{CC}$	2.0		V		
V_{OL}	Low-level output voltage	A_0-A_7	$V_{CC} = \text{MIN},$ $V_{IL} = \text{MAX},$ $V_{IH} = \text{MIN}$	$I_{OL} = 24\text{mA}$	$\pm 10\%V_{CC}$		0.35	0.50	V	
					$\pm 5\%V_{CC}$		0.35	0.50	V	
		B_0-B_7		$I_{OL} = 48\text{mA}$	$\pm 10\%V_{CC}$		0.38	0.55	V	
					$\pm 5\%V_{CC}$		0.42	0.55	V	
V_{IK}	Input clamp voltage		$V_{CC} = \text{MIN}, I_1 = I_{IK}$				-0.73	-1.2	V	
I_1	Input current at maximum input voltage	$\overline{OEBA}, OEAB$	$V_{CC} = 0.0\text{V}, V_1 = 7.0\text{V}$					100	μA	
		Others	$V_{CC} = 5.5\text{V}, V_1 = 5.5\text{V}$					1	mA	
I_{IH}	High-level input current	$\overline{OEBA}, OEAB$	$V_{CC} = \text{MAX}, V_1 = 2.7\text{V}$					20	μA	
I_{IL}	Low-level input current	only	$V_{CC} = \text{MAX}, V_1 = 0.5\text{V}$					-20	μA	
$I_{OZH} + I_{IH}$	Off state output current, High-level voltage applied	A_0-A_7	$V_{CC} = \text{MAX}, V_1 = 2.7\text{V}$					70	μA	
$I_{OZL} + I_{IL}$	Off state output current, Low-level voltage applied	B_0-B_7	$V_{CC} = \text{MAX}, V_1 = 0.5\text{V}$					-70	μA	
I_{OS}	Short circuit output current ³	A_0-A_7	$V_{CC} = \text{MAX}$					-60	-150	mA
		B_0-B_7	$V_{CC} = \text{MAX}$					-100	-225	mA
I_{CC}	Supply current (total)	'F620	$V_{CC} = \text{MAX}$	$\overline{OEBA} = OEAB = 4.5\text{V}; A_0-A_7 = \text{GND}$		70	92	mA		
				$\overline{OEBA} = OEAB = 4.5\text{V}; A_0-A_7 = 4.5\text{V}$		84	110	mA		
				$OEAB = \text{GND}; \overline{OEBA} = A_0-A_7 = 4.5\text{V}$		84	110	mA		
		'F623		$\overline{OEBA} = OEAB = 4.5\text{V}; A_0-A_7 = 4.5\text{V}$		110	140	mA		
				$\overline{OEBA} = OEAB = 4.5\text{V}; A_0-A_7 = \text{GND}$		110	140	mA		
				$OEAB = \text{GND}; \overline{OEBA} = A_0-A_7 = 4.5\text{V}$		99	130	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 $V_{CC} = 5\text{V}, T_A = 25^\circ\text{C}$.
- Not more than one output should be shorted at a time. For testing I_{OS} , 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_{OS} tests should be performed last.

Transceivers

FAST 74F620, 74F623

AC CHARACTERISTICS for 'F620

SYMBOL	PARAMETER	TEST CONDITION	LIMITS					UNIT
			$T_A = +25^\circ\text{C}$ $V_{CC} = 5\text{V}$ $C_L = 50\text{pF}$ $R_L = 500\Omega$			$T_A = 0^\circ\text{C to } +70^\circ\text{C}$ $V_{CC} = 5\text{V} \pm 10\%$ $C_L = 50\text{pF}$ $R_L = 500\Omega$		
			Min	Typ	Max	Min	Max	
t_{PLH} t_{PHL}	Propagation delay A_n to B_n	Waveform 2	2.5 1.0	4.5 2.5	6.5 4.5	2.0 1.0	7.5 5.0	ns
t_{PLH} t_{PHL}	Propagation delay B_n to A_n	Waveform 2	2.5 1.0	4.5 2.5	6.5 4.5	2.0 1.0	7.5 5.0	ns
t_{PZH} t_{PZL}	Output Enable time to High or Low level, $\overline{\text{OEBA}}$ to A_n	Waveform 3 Waveform 4	3.0 4.0	7.5 7.5	10.5 10.5	2.5 3.5	11.5 11.5	ns
t_{PHZ} t_{PLZ}	Output Disable time to High or Low level, $\overline{\text{OEBA}}$ to A_n	Waveform 3 Waveform 4	2.5 2.0	4.5 4.5	7.5 7.0	2.0 1.5	8.0 7.5	ns
t_{PZH} t_{PZL}	Output Enable time to High or Low level, OEAB to B_n	Waveform 3 Waveform 4	4.5 4.5	7.5 7.5	10.5 10.0	4.0 4.0	11.5 11.0	ns
t_{PHZ} t_{PLZ}	Output Disable time to High or Low level, OEAB to B_n	Waveform 3 Waveform 4	3.0 4.0	6.5 6.5	9.5 9.5	2.5 3.5	10.5 10.5	ns

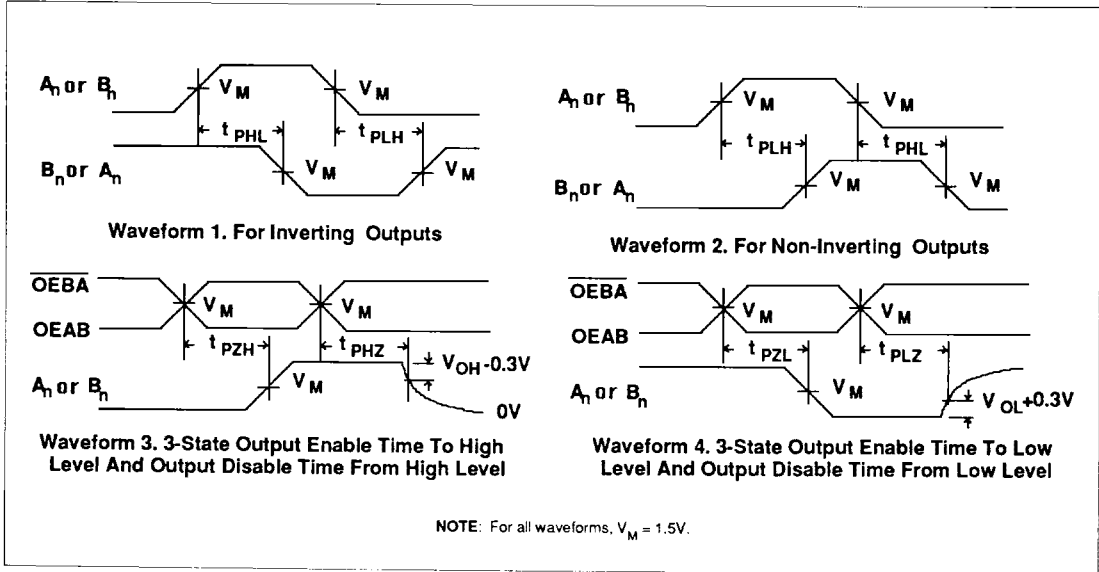
AC CHARACTERISTICS for 'F623

SYMBOL	PARAMETER	TEST CONDITION	LIMITS					UNIT
			$T_A = +25^\circ\text{C}$ $V_{CC} = 5\text{V}$ $C_L = 50\text{pF}$ $R_L = 500\Omega$			$T_A = 0^\circ\text{C to } +70^\circ\text{C}$ $V_{CC} = 5\text{V} \pm 10\%$ $C_L = 50\text{pF}$ $R_L = 500\Omega$		
			Min	Typ	Max	Min	Max	
t_{PLH} t_{PHL}	Propagation delay A_n to B_n	Waveform 1	2.0 3.0	4.0 5.0	5.5 7.0	2.0 2.5	6.5 7.5	ns
t_{PLH} t_{PHL}	Propagation delay B_n to A_n	Waveform 1	2.0 2.5	4.0 4.5	5.5 6.5	2.0 2.5	6.5 7.5	ns
t_{PZH} t_{PZL}	Output Enable time to High or Low level, $\overline{\text{OEBA}}$ to A_n	Waveform 3 Waveform 4	5.0 5.0	8.5 7.5	10.5 9.5	5.0 5.0	12.0 10.0	ns
t_{PHZ} t_{PLZ}	Output Disable time to High or Low level, $\overline{\text{OEBA}}$ to A_n	Waveform 3 Waveform 4	2.5 2.5	4.5 4.5	6.5 6.5	2.5 2.5	7.5 7.0	ns
t_{PZH} t_{PZL}	Output Enable time to High or Low level, OEAB to B_n	Waveform 3 Waveform 4	5.0 4.5	8.0 7.0	10.0 9.0	5.0 4.5	11.5 9.5	ns
t_{PHZ} t_{PLZ}	Output Disable time to High or Low level, OEAB to B_n	Waveform 3 Waveform 4	3.0 4.0	6.0 7.0	8.5 9.0	3.0 4.0	10.0 10.0	ns

Transceivers

FAST 74F620, 74F623

AC WAVEFORMS



TEST CIRCUIT AND WAVEFORMS

