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FAST Products	

FAST 74F640

Transceiver

Octal Bus Transceiver , 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
- Inverting version of 'F245
- Octal bidirectional bus interface
- 3-state buffer outputs sink 64mA and source 15mA

TYPE	TYPICAL PROPAGATION DELAY	TYPICAL SUPPLY CURRENT (TOTAL)
74F640	3.5ns	78mA

ORDERING INFORMATION

PACKAGES	COMMERCIAL RANGE $V_{CC} = 5V \pm 10\%$; $T_A = 0^\circ C$ to $+70^\circ C$
20-Pin Plastic DIP	N74F640N
20-Pin Plastic SOL	N74F640D

DESCRIPTION

The 74F640 is an octal transceiver featuring inverting 3-state bus compatible outputs in both transmit and receive directions. The B port outputs are capable of sinking 64mA and sourcing 15mA, providing very good capacitive drive characteristics. The device features an Output Enable ($\overline{OE}$) input for easy cascading and Transmit/Receive ($T/\overline{R}$) input for direction control. The 3-state outputs, B_0 - B_7 , have been designed to prevent output bus loading if the power is removed from the device.

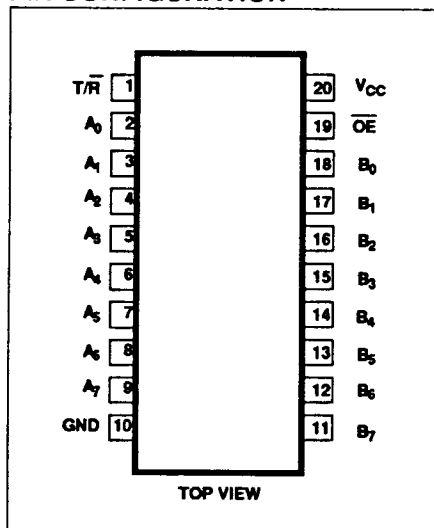
INPUT AND OUTPUT LOADING AND FAN-OUT TABLE

PINS	DESCRIPTION	74F(U.L.) HIGH/LOW	LOAD VALUE HIGH/LOW
A_0 - A_7 B_0 - B_7	Data inputs	3.5/0.115	70µA/70µA
$\overline{OE}$	Output enable input (active Low)	2.0/0.067	40µA/40µA
$T/\overline{R}$	Transmit/Receive input	2.0/0.067	40µA/40µA
A_0 - A_7	A port outputs	150/40	3.0mA/24mA
B_0 - B_7	B Port outputs	750/106.7	15mA/64mA

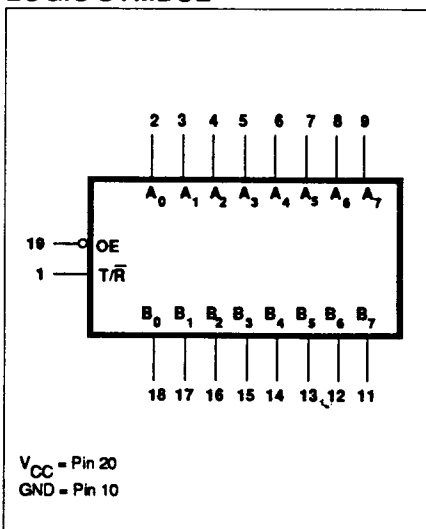
NOTE:

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

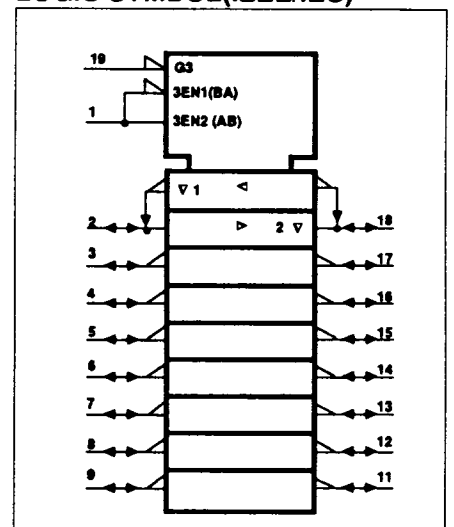
PIN CONFIGURATION



LOGIC SYMBOL



LOGIC SYMBOL (IEEE/IEC)



Transceiver

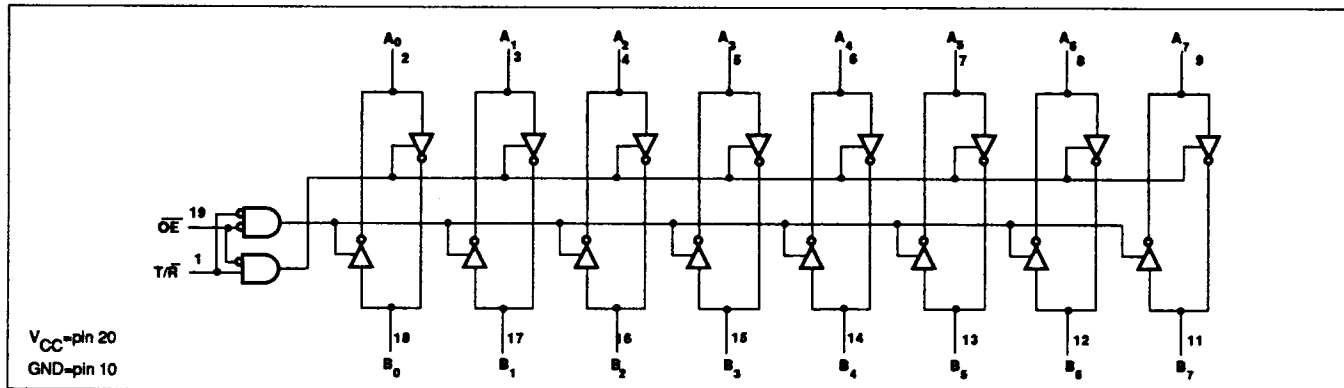
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FUNCTION TABLE

INPUTS		OUTPUTS
$\overline{OE}$	$T/\overline{R}$	
L	L	Bus B data to Bus $\overline{A}$
L	H	Bus A data to Bus $\overline{B}$
H	X	Z

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

LOGIC DIAGRAM



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	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_{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	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

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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} = MIN, V _{IL} = MAX, V _{IH} = MIN	I _{OH} =-3mA	±10%V _{CC}	2.4			V
		±5%V _{CC}			2.7	3.3		V	
		B ₀ -B ₇		I _{OH} =-15mA	±10%V _{CC}	2.0			V
					±5%V _{CC}	2.0			V
V _{OL}	Low-level output voltage	A ₀ -A ₇	V _{CC} = MIN, V _{IL} = MAX, V _{IH} = MIN	I _{OL} =24mA	±10%V _{CC}		0.35	0.50	V
					±5%V _{CC}		0.35	0.50	V
		B ₀ -B ₇		I _{OL} =MAX	±10%V _{CC}			0.55	V
					±5%V _{CC}		0.42	0.55	V
V _{IK}	Input clamp voltage		V _{CC} = MIN, I _I = I _{IK}				-0.73	-1.2	V
I _I	Input current at maximum input voltage	OE, T/R	V _{CC} = 0.0V, V _I = 7.0V					100	μA
		A ₀ -A ₇ , B ₀ -B ₇	V _{CC} = 5.5V, V _I =5.5V					1.0	mA
I _{IH}	High-level input current	OE, T/R only	V _{CC} = MAX, V _I = 2.7V					40	μA
I _{IL}	Low-level input current		V _{CC} = MAX, V _I = 0.5V					-40	μA
I _{OZH} +I _{IH}	Off state output current, High-level voltage applied		V _{CC} = MAX, V _I = 2.7V					70	μA
I _{OZL} +I _{IL}	Off state output current, Low-level voltage applied		V _{CC} = MAX, V _I = 0.5V					-70	μA
I _{OS}	Short circuit output current ³	A ₀ -A ₇	V _{CC} = MAX			-60		-150	mA
		B ₀ -B ₇				-100		-225	μA
I _{CC}	Supply current (total)	I _{CCH}	V _{CC} = MAX	T/R=A _n =4.5V, OE=GND			66	85	mA
		T/R=B _n =OE=GND			91	120	mA		
		T/R=B _n =GND, OE=4.5V			78	102	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.

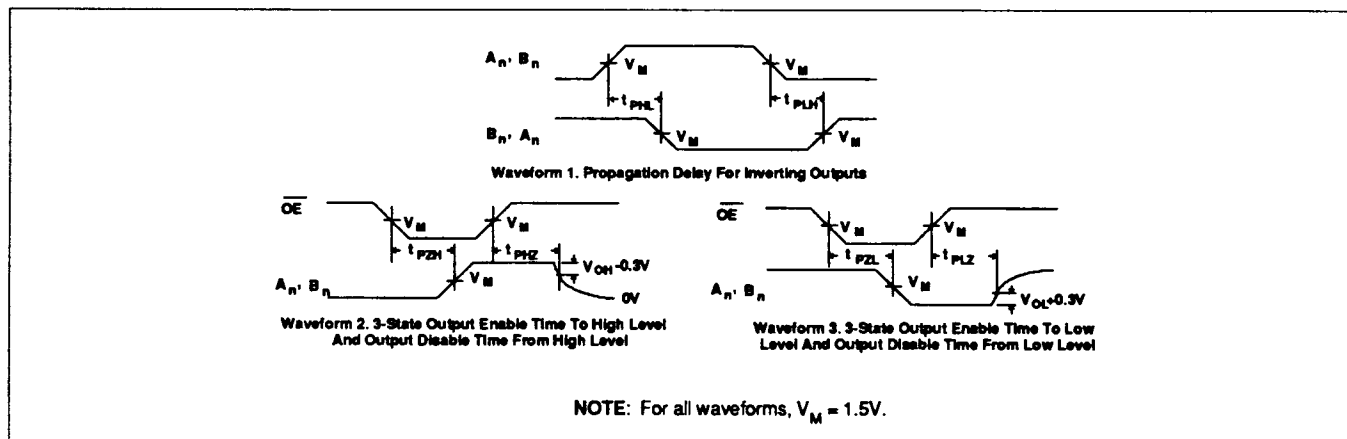
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AC ELECTRICAL CHARACTERISTICS

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 , B_n to A_n	Waveform 1	2.0 1.0	4.5 2.5	7.0 5.0	2.0 1.0	8.0 5.5	ns
t_{PZH} t_{PZL}	Output Enable time to High or Low level	Waveform 2 Waveform 3	5.5 5.5	6.5 7.0	10.5 10.5	5.0 5.0	12.0 11.0	ns
t_{PHZ} t_{PLZ}	Output Disable time from High or Low level	Waveform 2 Waveform 3	2.0 2.0	3.5 4.5	6.5 7.0	1.5 2.0	8.0 7.5	ns

AC WAVEFORMS



TEST CIRCUIT AND WAVEFORMS

