

74F640 • 74F645 Octal Bus Transceiver with 3-STATE Outputs

General Description

These devices are octal bus transceivers designed for asynchronous two-way data flow between the A and B busses. Both busses are capable of sinking 64 mA, have 3-STATE outputs, and a common output enable pin. The direction of data flow is determined by the transmit/receive (T/\bar{R}) input. The 'F645 is a high speed/low power version of the 'F245. The 'F640 is an inverting option of the 'F645.

- Outputs sink 64 mA
- Transmit/receive (T/\bar{R}) input controls the direction of data flow
- Guaranteed 4000V minimum ESD protection
- 'F645 is a lower power, faster version of the 'F245
- 'F640 is an inverting option of the 'F645

Features

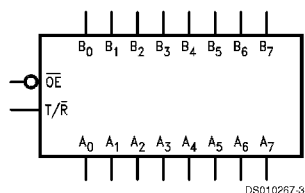
- Designed for asynchronous two-way data flow between busses

Ordering Code:

Commercial	Package Number	Package Description
74F640PC	N20A	20-Lead (0.300" Wide) Molded Dual-In-Line
74F640SC (Note 1)	M20B	20-Lead (0.300" Wide) Molded Small Outline, JEDEC
74F645PC	N20A	20-Lead (0.300" Wide) Molded Dual-In-Line

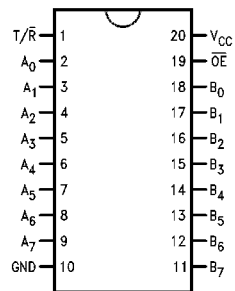
Note 1: Devices also available in 13" reel. Use suffix = SCX.

Logic Symbol



Connection Diagram

Pin Assignment for DIP and SOIC



74F640 • 74F645 Octal Bus Transceiver with 3-STATE Outputs

Unit Loading/Fan Out

Pin Names	Description	74F	
		U.L. HIGH/LOW	Input I_{IH}/I_{IL} Output I_{OH}/I_{OL}
\overline{OE}	Output Enable Input (Active LOW)	1.0/1.0	20 μA / -0.6 mA
T/\overline{R}	Transmit/Receive Input	1.0/1.0	20 μA / -0.6 mA
A_0 - A_7	Side A Inputs or 3-STATE Outputs	3.5/0.667 600/106.6	70 μA / -0.4 mA -12 mA / 64 mA
B_0 - B_7	Side B Inputs or 3-STATE Outputs	3.5/0.667 600/106.6	70 μA / -0.4 mA -12 mA / 64 mA

Functional Description

The output enable (\overline{OE}) is active LOW. If the device is disabled (\overline{OE} HIGH), the outputs are in the high impedance state. The transmit/receive input (T/\overline{R}) controls whether data

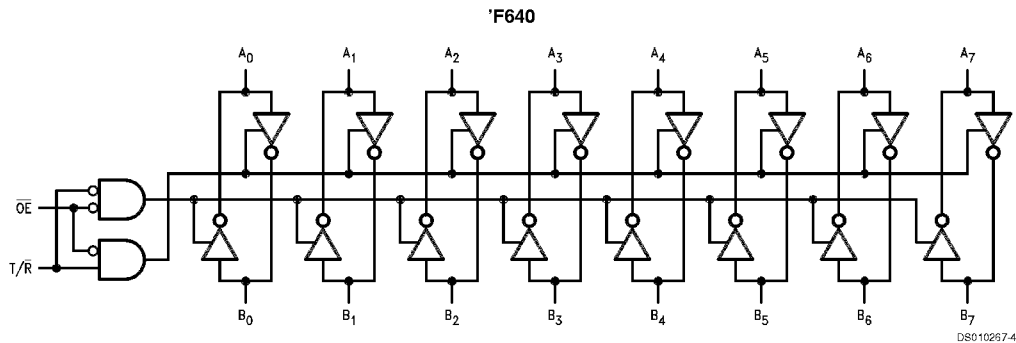
is transmitted from the A bus to the B bus or from the B bus to the A bus. When T/\overline{R} is LOW, B data is sent to the A bus. If T/\overline{R} is HIGH, A data is sent to the B bus.

Function Table

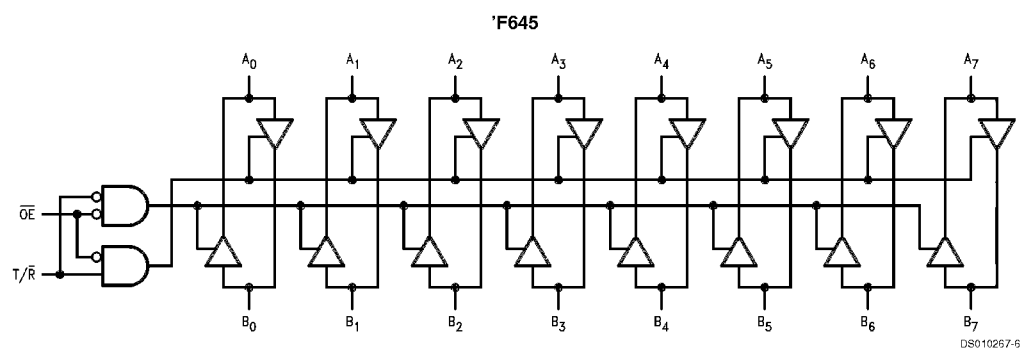
Inputs		Outputs	
\overline{OE}	T/\overline{R}	'F640	'F645
L	L	Bus \overline{B} data to Bus A	Bus B data to Bus A
L	H	Bus \overline{A} data to Bus B	Bus A data to Bus B
H	X	Z	Z

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

Logic Diagrams



Logic Diagrams (Continued)



Absolute Maximum Ratings (Note 2)

Storage Temperature	-65°C to +150°C
Ambient Temperature under Bias	-55°C to +125°C
Junction Temperature under Bias	-55°C to +175°C
Plastic	-55°C to +150°C
V _{CC} Pin Potential to Ground Pin	-0.5V to +7.0V
Input Voltage (Note 3)	-0.5V to +7.0V
Input Current (Note 3)	-30 mA to +5.0 mA
Voltage Applied to Output in HIGH State (with V _{CC} = 0V)	
Standard Output	-0.5V to V _{CC}
3-STATE Output	-0.5V to +5.5V
Current Applied to Output	

in LOW State (Max) twice the rated I_{OL} (mA)
ESD Last Passing Voltage (Min) 4000V

Recommended Operating Conditions

Free Air Ambient Temperature	
Commercial	0°C to +70°C
Supply Voltage	
Commercial	+4.5V to +5.5V

Note 2: Absolute maximum ratings are values beyond which the device may be damaged or have its useful life impaired. Functional operation under these conditions is not implied.

Note 3: Either voltage limit or current limit is sufficient to protect inputs.

DC Electrical Characteristics

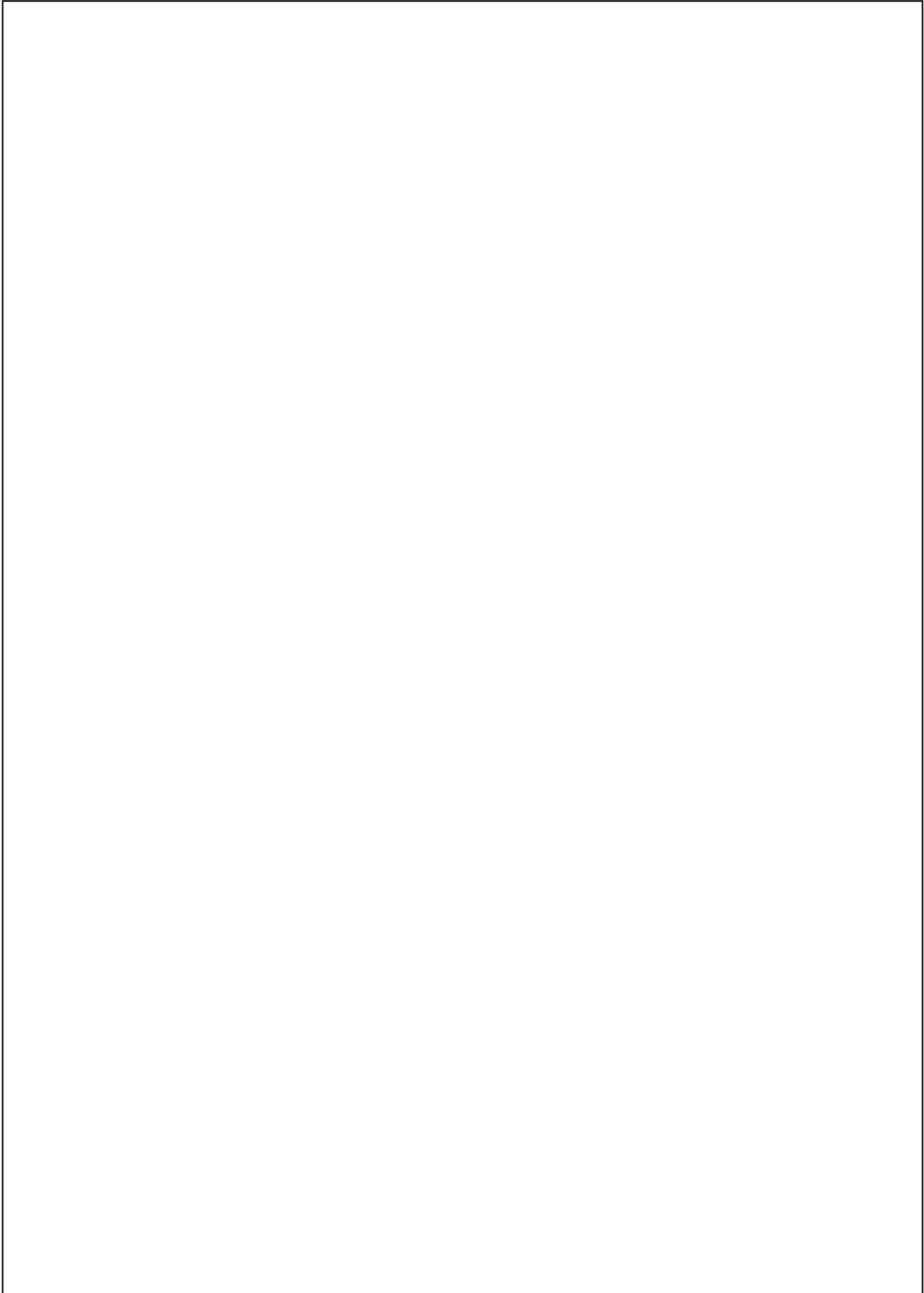
Symbol	Parameter	74F			Units	V _{CC}	Conditions
		Min	Typ	Max			
V _{IH}	Input HIGH Voltage	2.0			V		Recognized as a HIGH Signal
V _{IL}	Input LOW Voltage	0.8			V		Recognized as a LOW Signal
V _{CD}	Input Clamp Diode Voltage	-1.2			V	Min	I _{IN} = -18 mA (Non I/O Pins)
V _{OH}	Output HIGH Voltage	74F 10% V _{CC}	2.0		V	Min	I _{OH} = -15 mA (A _n , B _n)
V _{OL}	Output LOW Voltage	74F 10% V _{CC}	0.55		V	Min	I _{OL} = 64 mA (A _n , B _n)
I _{IH}	Input HIGH Current	74F	5.0		μA	Max	V _{IN} = 2.7V (Non I/O Pins)
I _{BVI}	Input HIGH Current Breakdown Test	74F	7.0		μA	Max	V _{IN} = 7.0V (Non I/O Pins)
I _{BVIT}	Input HIGH Current Breakdown (I/O)	74F	0.5		mA	Max	V _{IN} = 5.5V (A _n , B _n)
I _{CEX}	Output HIGH Leakage Current	74F	50		μA	Max	V _{OUT} = V _{CC}
V _{ID}	Input Leakage Test	74F	4.75		V	0.0	I _{ID} = 1.9 μA All Other Pins Grounded
I _{OD}	Output Leakage Circuit Current	74F	3.75		μA	0.0	V _{IOD} = 150 mV All Other Pins Grounded
I _{IL}	Input LOW Current	-0.6			mA	Max	V _{IN} = 0.5V (Non I/O Pins)
I _{IH} + I _{OZH}	Output Leakage Current	70			μA	Max	V _{OUT} = 2.7V (A _n , B _n)
I _{IL} + I _{OZL}	Output Leakage Current	-650			μA	Max	V _{OUT} = 0.5V (A _n , B _n)
I _{OS}	Output Short-Circuit Current	-100	-225		mA	Max	V _{OUT} = 0V
I _{ZZ}	Bus Drainage Test	500			μA	0.0V	V _{OUT} = 5.25
I _{CCH}	Power Supply Current ('F640)	80			mA	Max	V _O = HIGH, V _{IN} = 0.2V
I _{CCL}	Power Supply Current ('F640)	80			mA	Max	V _O = LOW
I _{CCZ}	Power Supply Current ('F640)	96			mA	Max	V _O = HIGH Z
I _{CCH}	Power Supply Current ('F645)	65			mA	Max	V _O = HIGH
I _{CCL}	Power Supply Current ('F645)	80			mA	Max	V _O = LOW, V _{IN} = 0.2V
I _{CCZ}	Power Supply Current ('F645)	90			mA	Max	V _O = HIGH Z

'F640 AC Electrical Characteristics:

Symbol	Parameter	74F			74F		Units
		T _A = +25° C V _{CC} = +5.0V C _L = 50 pF			T _A , V _{CC} = Com C _L = 50 pF		
		Min	Typ	Max	Min	Max	
t _{PLH}	Propagation Delay	2.5		7.5	2.0	8.0	ns
t _{PHL}	A Input to B Output	2.0		7.0	2.0	7.0	
t _{PLH}	Propagation Delay	2.5		7.5	2.0	8.0	ns
t _{PHL}	B Input to A Output	2.0		7.0	2.0	7.0	
t _{PZH}	Enable Time	2.5		7.5	2.0	9.0	ns
t _{PZL}	\overline{OE} Input to A Output	2.5		8.0	2.0	8.5	
t _{PHZ}	Disable Time	1.5		7.0	1.0	7.5	
t _{PLZ}	\overline{OE} Input to A Output	1.5		6.0	1.5	6.0	ns
t _{PZH}	Enable Time	2.5		7.5	2.0	9.0	
t _{PZL}	\overline{OE} Input to B Output	2.5		8.0	2.0	8.5	
t _{PHZ}	Disable Time	1.5		7.0	1.0	7.5	ns
t _{PLZ}	\overline{OE} Input to B Output	1.5		6.0	1.5	6.0	

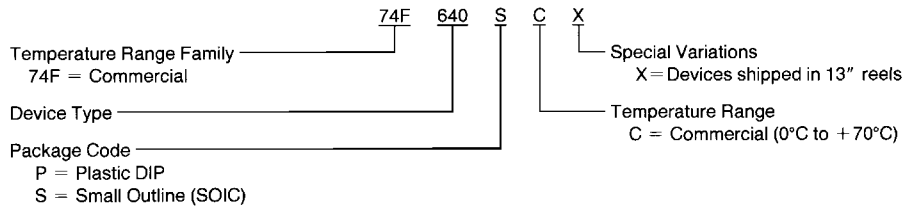
'F645 AC Electrical Characteristics:

Symbol	Parameter	74F			74F		Units
		T _A = +25° C V _{CC} = +5.0V C _L = 50 pF			T _A , V _{CC} = Com C _L = 50 pF		
		Min	Typ	Max	Min	Max	
t _{PLH}	Propagation Delay	1.5		6.0	1.5	7.0	ns
t _{PHL}	A Input to B Output	2.0		7.0	2.0	7.5	
t _{PLH}	Propagation Delay	1.5		6.0	1.5	7.0	ns
t _{PHL}	B Input to A Output	2.0		7.0	2.0	7.5	
t _{PZH}	Enable Time	2.5		8.0	2.0	9.0	ns
t _{PZL}	\overline{OE} Input to A Output	2.5		8.5	2.0	8.5	
t _{PHZ}	Disable Time	1.5		7.0	1.0	8.0	
t _{PLZ}	\overline{OE} Input to A Output	1.0		5.5	1.0	5.5	ns
t _{PZH}	Enable Time	2.5		7.5	2.0	9.5	
t _{PZL}	\overline{OE} Input to B Output	2.5		8.5	2.5	9.0	
t _{PHZ}	Disable Time	1.5		6.5	1.0	7.5	ns
t _{PLZ}	\overline{OE} Input to B Output	1.0		5.5	1.0	5.5	



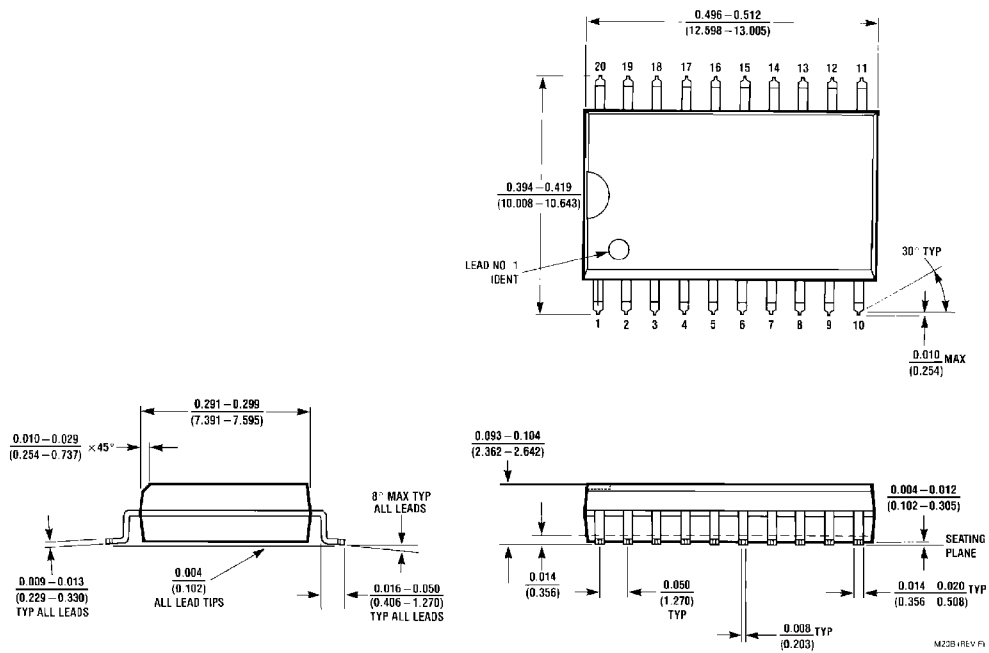
Ordering Information

The device number is used to form part of a simplified purchasing code where a package type and temperature range are defined as follows:



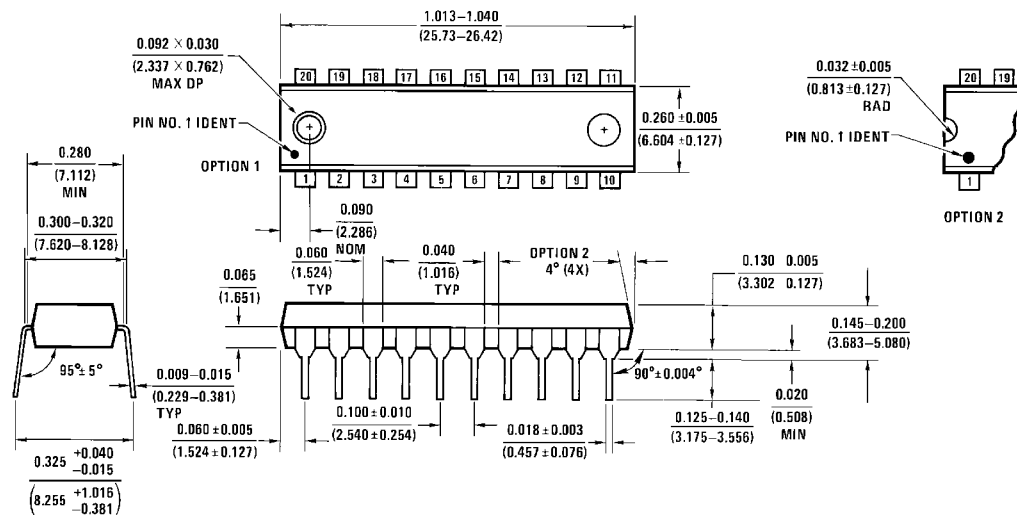
DS010267-7

Physical Dimensions inches (millimeters) unless otherwise noted



20-Lead (0.300" Wide) Molded Small Outline Package, JEDEC (S)
 Package Number M20B

Physical Dimensions inches (millimeters) unless otherwise noted (Continued)



**20-Lead (0.300" Wide) Molded Dual-In-Line Package (P)
Package Number N20A**

LIFE SUPPORT POLICY

FAIRCHILD'S PRODUCTS ARE NOT AUTHORIZED FOR USE AS CRITICAL COMPONENTS IN LIFE SUPPORT DEVICES OR SYSTEMS WITHOUT THE EXPRESS WRITTEN APPROVAL OF THE PRESIDENT OF FAIRCHILD SEMICONDUCTOR CORPORATION. As used herein:

1. Life support devices or systems are devices or systems which, (a) are intended for surgical implant into the body, or (b) support or sustain life, and (c) whose failure to perform when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in a significant injury to the user.
2. A critical component in any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

Fairchild Semiconductor Corporation
Americas
Customer Response Center
Tel: 1-888-522-5372

Fairchild Semiconductor Europe
Fax: +49 (0) 1 80-530 85 86
Email: europe.support@nsc.com
Deutsch Tel: +49 (0) 8 141-35-0
English Tel: +44 (0) 1 793-85-68-56
Italy Tel: +39 (0) 2 57 5631

Fairchild Semiconductor Hong Kong Ltd.
13th Floor, Straight Block,
Ocean Centre, 5 Canton Rd.
Tsimshatsui, Kowloon
Hong Kong
Tel: +852 2737-7200
Fax: +852 2314-0061

National Semiconductor Japan Ltd.
Tel: 81-3-5620-6175
Fax: 81-3-5620-6179

www.fairchildsemi.com