FAIRCHILD SEMICONDUCTOR™

November 1989
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74F2645
Octal Bus Transceiver with 25Ω Series Resistors in the Outputs

General Description

This device is an octal bus transceiver designed for asynchronous two-way data flow between the A and B busses and is functionally equivalent to the 74F645. The 25Ω series resistors in the outputs reduce ringing and eliminate the need for external resistors. Both busses are capable of sinking 12 mA, sourcing 15 mA, have 3-STATE outputs, and a common output enable pin. The direction of data flow is determined by the transmit/receive ($T/\overline{R}$) input. The 74F2645 is a low power version of the 74F245 with 25Ω series resistors in the outputs.

Features

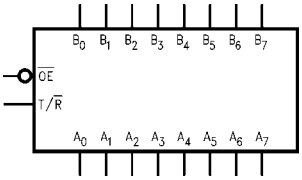
- 25Ω series resistors in the outputs eliminates the need for external resistors
- Designed for asynchronous two-way data flow between busses
- Outputs sink 12 mA and source 15 mA
- Transmit/receive ($T/\overline{R}$) input controls the direction of data flow
- 74F2645 is a low power version of the 74F245 with 25Ω series resistors in the outputs

Ordering Code:

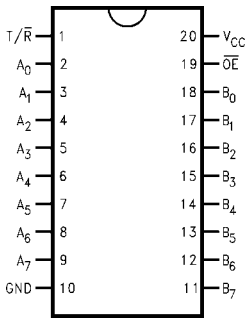
Order Number	Package Number	Package Description
74F2645SC	M20B	20-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-013, 0.300 Wide

Devices also available in Tape and Reel. Specify by appending the suffix letter "X" to the ordering code.

Logic Symbol



Connection Diagram



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Unit Loading/Fan Out

Pin Names	Description	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	3.5/0.667	70 μA/–0.4 mA
	3-STATE Outputs	750/20	–15 mA/12 mA
B_0–B_7	Side B Inputs or	3.5/0.667	70 μA/–0.4 mA
	3-STATE Outputs	750/20	–15 mA/12 mA

Functional Description

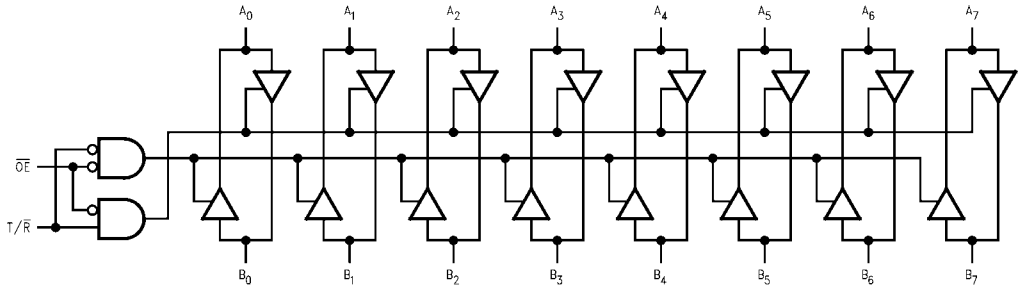
The output enable ($\overline{OE}$) is active LOW. If the device is disabled ($\overline{OE}$ HIGH), the outputs are in the high impedance state. The transmit/receive input (T/$\overline{R}$) controls whether data is transmitted from the A bus to the B bus or from the B bus to the A bus. When T/$\overline{R}$ 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/$\overline{R}$	
L	L	Bus B data to Bus A
L	H	Bus A data to Bus B
H	X	Z

H = HIGH Voltage Level
L = LOW Voltage Level
X = Don't Care
Z = High Impedance State

Logic Diagram



Absolute Maximum Ratings(Note 1)

Storage Temperature	−65°C to +150°C
Ambient Temperature under Bias	−55°C to +125°C
Junction Temperature under Bias	−55°C to +150°C
V_{CC} Pin Potential to Ground Pin	−0.5V to +7.0V
Input Voltage (Note 2)	−0.5V to +7.0V
Input Current (Note 2)	−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	0°C to +70°C
Supply Voltage	+4.5V to +5.5V

Note 1: 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 2: Either voltage limit or current limit is sufficient to protect inputs.

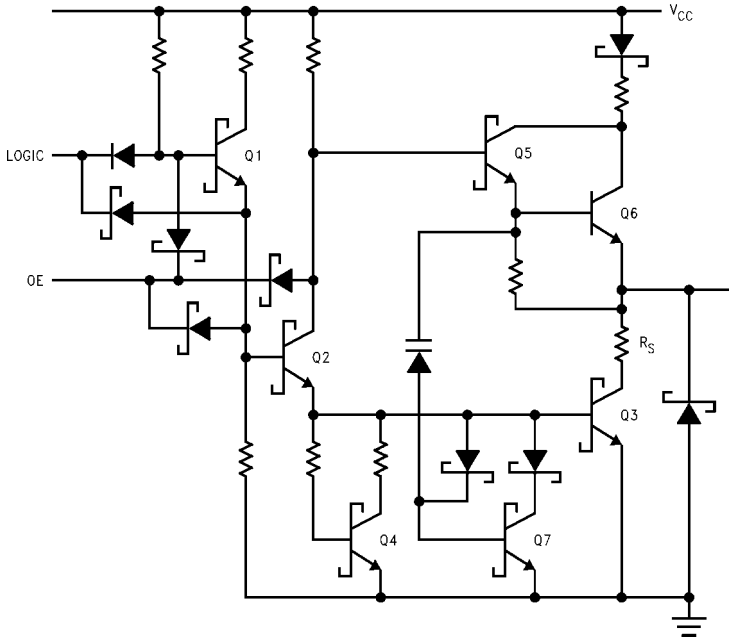
DC Electrical Characteristics

Symbol	Parameter		Min	Typ	Max	Units	V_{CC}	Conditions
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	10% V_{CC}	2.0			V	Min	I_{OH} = −15 mA (A_n, B_n)
V_{OL}	Output LOW Voltage	10% V_{CC}			0.50	V	Min	I_{OL} = 1 mA (A_n, B_n)
		10% V_{CC}			0.75			I_{OL} = 12 mA (A_n, B_n)
I_{IH}	Input HIGH Current				5.0	µA	Max	V_{IN} = 2.7V (Non I/O Pins)
I_{BVI}	Input HIGH Current Breakdown Test				7.0	µA	Max	V_{IN} = 7.0V (Non I/O Pins)
I_{BVIT}	Input HIGH Current Breakdown (I/O)				0.5	mA	Max	V_{IN} = 5.5V (A_n, B_n)
I_{CEX}	Output HIGH Leakage Current				50	µA	Max	V_{OUT} = V_{CC}
V_{ID}	Input Leakage Test		4.75			V	0.0	I_{ID} = 1.9 µA All Other Pins Grounded
I_{OD}	Output Leakage Circuit Current				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_{CCL}	Power Supply Current (74F2645)				82	mA	Max	V_O = LOW, V_{IN} = 0.2V
I_{CCZ}	Power Supply Current (74F2645)				95	mA	Max	V_O = HIGH Z

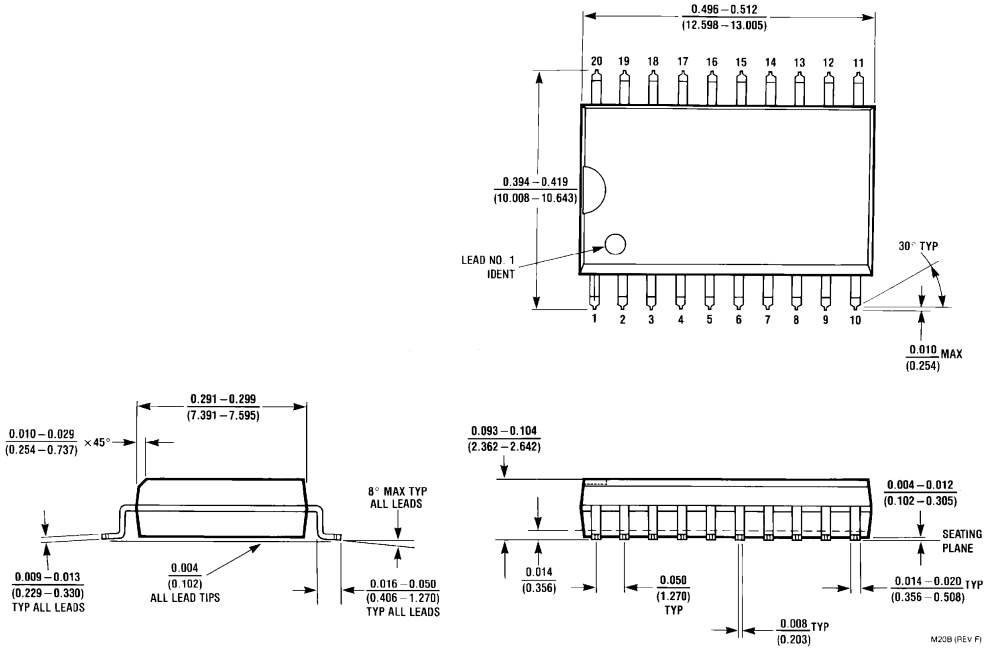
AC Electrical Characteristics

Symbol	Parameter	$T_A = +25°C$, $V_{CC} = +5.0V$, $C_L = 50$ pF			$T_A = 0°C$ to $+70°C$, $V_{CC} = +5.0V$, $C_L = 50$ pF		Units
		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	2.5		7.5	2.5	8.0	
t_{PLH}	Propagation Delay	1.5		6.0	1.5	7.0	ns
t_{PHL}	B Input to A Output	2.5		7.5	2.5	8.0	
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	
t_{PZH}	Enable Time	2.5		7.5	2.0	9.5	ns
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	
t_{PLZ}	$\overline{OE}$ Input to B Output	1.0		6.5	1.0	6.5	

Basic FAST Circuit Showing Series Resistor Placement



Physical Dimensions inches (millimeters) unless otherwise noted



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