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February 2008

74LVT245, 74LVTH245 Low Voltage Octal Bidirectional Transceiver with 3-STATE Inputs/Outputs

Features

- Input and output interface capability to systems at 5V V_{CC}
- Bushold data inputs eliminate the need for external pull-up resistors to hold unused inputs (74LVTH245), also available without bushold feature (74LVT245)
- Live insertion/extraction permitted
- Power Up/Down high impedance provides glitch-free bus loading
- Outputs source/sink, -32mA/+64mA
- Latch-up performance exceeds 500mA
- ESD performance:
 - Human-body model > 2000V
 - Machine model > 200V
 - Charged-device model > 1000V

General Description

The LVT245 and LVTH245 contain eight non-inverting bidirectional buffers with 3-STATE outputs and are intended for bus-oriented applications. The Transmit/ Receive (T/\overline{R}) input determines the direction of data flow through the bidirectional transceiver. Transmit (active-HIGH) enables data from A ports to B ports; Receive (active-LOW) enables data from B ports to A ports. The Output Enable input, when HIGH, disables both A and B ports by placing them in a HIGH Z condition.

The LVTH245 data inputs include bushold, eliminating the need for external pull-up resistors to hold unused inputs.

These transceivers are designed for low-voltage (3.3V) V_{CC} applications, but with the capability to provide a TTL interface to a 5V environment. The LVT245 and LVTH245 are fabricated with an advanced BiCMOS technology to achieve high speed operation similar to 5V ABT while maintaining a low power dissipation.

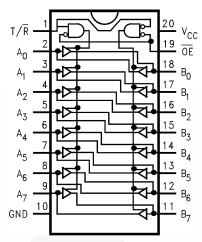
Ordering Information

Order Number	Package Number	Package Description
74LVT245WM	M20B	20-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-013, 0.300" Wide
74LVT245SJ	M20D	20-Lead Small Outline Package (SOP), EIAJ TYPE II, 5.3mm Wide
74LVT245MSA	MSA20	20-Lead Shrink Small Outline Package (SSOP), JEDEC MO-150, 5.3mm Wide
74LVT245MTC	MTC20	20-Lead Thin Shrink Small Outline Package (TSSOP), JEDEC MO-153, 4.4mm Wide
74LVTH245WM	M20B	20-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-013, 0.300" Wide
74LVTH245SJ	M20D	20-Lead Small Outline Package (SOP), EIAJ TYPE II, 5.3mm Wide
74LVTH245MSA	MSA20	20-Lead Shrink Small Outline Package (SSOP), JEDEC MO-150, 5.3mm Wide
74LVTH245MTC	MTC20	20-Lead Thin Shrink Small Outline Package (TSSOP), JEDEC MO-153, 4.4mm Wide

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

All packages are lead free per JEDEC: J-STD-020B standard.

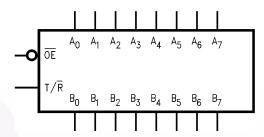
Connection Diagram

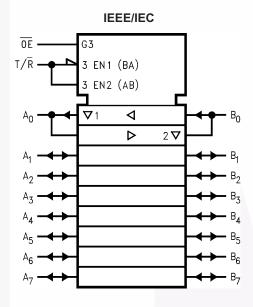


Pin Description

Pin Names	Description			
ŌĒ	Output Enable Input			
T/R	Transmit/Receive Input			
A ₀ -A ₇	Side A Inputs or 3-STATE Outputs			
B ₀ –B ₇	Side B Inputs or 3-STATE Outputs			

Logic Symbols





Truth Table

Inp	uts	
ŌĒ	T/R	Outputs
L	L	Bus B Data to Bus A
L	Н	Bus A Data to Bus B
Н	Х	HIGH-Z State

H = HIGH Voltage Level

L = LOW Voltage Level

X = Immaterial

Absolute Maximum Ratings

Stresses exceeding the absolute maximum ratings may damage the device. The device may not function or be operable above the recommended operating conditions and stressing the parts to these levels is not recommended. In addition, extended exposure to stresses above the recommended operating conditions may affect device reliability. The absolute maximum ratings are stress ratings only.

Symbol	Parameter	Rating		
V _{CC}	Supply Voltage	-0.5V to +4.6V		
V _I	DC Input Voltage	-0.5V to +7.0V		
Vo	DC Output Voltage			
	Output in 3-STATE	-0.5V to +7.0V		
	Output in HIGH or LOW State ⁽¹⁾	-0.5V to +7.0V		
I _{IK}	DC Input Diode Current, V _I < GND	-50mA		
I _{OK}	DC Output Diode Current, V _O < GND			
Io	DC Output Current, V _O > V _{CC}			
	Output at HIGH State	64mA		
	Output at LOW State	128mA		
I _{CC}	DC Supply Current per Supply Pin	±64mA		
I _{GND}	DC Ground Current per Ground Pin ±1			
T _{STG}	Storage Temperature	−65°C to +150°C		

Note:

1. IO Absolute Maximum Rating must be observed.

Recommended Operating Conditions

The Recommended Operating Conditions table defines the conditions for actual device operation. Recommended operating conditions are specified to ensure optimal performance to the datasheet specifications. Fairchild does not recommend exceeding them or designing to absolute maximum ratings.

Symbol	Parameter	Min	Max	Units
V _{CC}	Supply Voltage	2.7	3.6	V
VI	Input Voltage	0	5.5	V
I _{OH}	HIGH-Level Output Current		-32	mA
I _{OL}	LOW-Level Output Current		64	mA
T _A	Free-Air Operating Temperature	-40	85	°C
Δt / ΔV	Input Edge Rate, $V_{IN} = 0.8V-2.0V$, $V_{CC} = 3.0V$	0	10	ns/V

DC Electrical Characteristics

					T _A = -40°C	to +85°C		
Symbol	Paran	neter	V _{CC} (V)	Conditions	Min.	Max.	Units	
V _{IK}	Input Clamp Diode Voltage		2.7	$I_I = -18\text{mA}$		-1.2	V	
V _{IH}	Input HIGH Voltage	Э	2.7–3.6	$V_0 \le 0.1V$ or	2.0		V	
V _{IL}	Input LOW Voltage		2.7-3.6	$V_O \ge V_{CC} - 0.1V$		8.0		
V _{OH}	Output HIGH Volta	ge	2.7–3.6	$I_{OH} = -100 \mu A$	V _{CC} - 0.2		V	
			2.7	$I_{OH} = -8mA$	2.4			
			3.0	$I_{OH} = -32mA$	2.0			
V _{OL}	Output LOW Voltag	ge	2.7	$I_{OL} = 100 \mu A$		0.2	V	
				I _{OL} = 24mA		0.5		
			3.0	I _{OL} = 16mA		0.4		
				$I_{OL} = 32mA$		0.5		
				I _{OL} = 64mA		0.55		
I _{I(HOLD)} ⁽²⁾	Bushold Input Mini	mum Drive	3.0	$V_{I} = 0.8V$	75		μA	
				V _I = 2.0V	-75			
I _{I(OD)} ⁽²⁾	Bushold Input Ove	r-Drive,	3.0	(3)	500		μΑ	
	Current to Change State			(4)	-500			
I _I	Input Current		3.6	$V_{I} = 5.5V$		10	μA	
		Control Pins	3.6	$V_I = 0V \text{ or } V_{CC}$		±1		
		Data Pins	3.6	$V_I = 0V$		- 5		
				$V_I = V_{CC}$		1		
I _{OFF}	Power Off Leakage	e Current	0	$0V \le V_I \text{ or } V_O \le 5.5V$		±100	μA	
I _{PU/PD}	Power Up/Down, 3	-STATE Current	0–1.5V	$V_O = 0.5V \text{ to } V_{CC},$ $V_I = \text{GND to } V_{CC}$		±100	μA	
I _{OZL}	3-STATE Output Lo	eakage Current	3.6	$V_O = 0.5V$		– 5	μA	
I _{OZL} ⁽²⁾	3-STATE Output Le	_	3.6	$V_{O} = 0.0V$		- 5	μA	
I _{OZH}	3-STATE Output Le	_	3.6	$V_0 = 3.0V$		5	μA	
I _{OZH} ⁽²⁾	3-STATE Output Le		3.6	$V_0 = 3.6V$		5	μA	
I _{OZH} +	3-STATE Output Le	eakage Current	3.6	$V_{CC} < V_O \le 5.5V$		10	μA	
I _{CCH}	Power Supply Current		3.6	Outputs HIGH	1	0.19	mA	
I _{CCL}	Power Supply Current		3.6	Outputs LOW		5	mA	
I _{CCZ}	Power Supply Current		3.6	Outputs Disabled		0.19	mA	
I _{CCZ} +	Power Supply Curi		3.6	$V_{CC} \le V_O \le 5.5V$, Outputs Disabled		0.19	mA	
Δl _{CC}	Increase in Power	Supply Current ⁽⁵⁾	3.6	One Input at V _{CC} – 0.6V, Other Inputs at V _{CC} or GND		0.2	mA	

Notes

- 2. Applies to Bushold versions only (LVTH245).
- 3. An external driver must source at least the specified current to switch from LOW-to-HIGH.
- 4. An external driver must sink at least the specified current to switch from HIGH-to-LOW.
- 5. This is the increase in supply current for each input that is at the specified voltage level rather than V_{CC} or GND.

Dynamic Switching Characteristics⁽⁶⁾

		Vcc	V _{CC} Conditions		T _A = 25°C		
Symbol	Parameter	(V)	$C_L = 50 \text{ pF, } R_L = 500\Omega$	Min.	Тур.	Max.	Units
V _{OLP}	Quiet Output Maximum Dynamic V _{OL}	3.3	(7)		0.8		V
V _{OLV}	Quiet Output Minimum Dynamic V _{OL}	3.3	(7)		-0.8		V

Notes:

- 6. Characterized in SOIC package. Guaranteed parameter, but not tested.
- 7. Max number of outputs defined as (n). n-1 data inputs are driven 0V to 3V. Output under test held LOW.

AC Electrical Characteristics

				= -40°C to = 50 pF, R			
		V _{CC}	= 3.3\	√ ± 0.3V	V _{CC} =	2.7V	
Symbol	Parameter	Mir	ı.	Max.	Min.	Max.	Units
t _{PLH}	Propagation Delay	1.2		3.6	1.2	4.0	ns
t _{PHL}		1.2		3.5	1.2	4.0	
t _{PZH}	Output Enable Time	1.3		5.5	1.3	7.1	ns
t _{PZL}		1.7		5.7	1.7	6.7	
t _{PHZ}	Output Disable	2.0)	5.9	2.0	6.5	ns
t _{PLZ}		2.0)	5.0	2.0	5.1	
t _{OSHL} , t _{OSLH}	Output to Output Skew ⁽⁸⁾			1.0		1.0	ns

Note:

8. Skew is defined as the absolute value of the difference between the actual propagation delay for any two separate outputs of the same device. The specification applies to any outputs switching in the same direction, either HIGH-to-LOW (t_{OSHL}) or LOW-to-HIGH (t_{OSLH}).

Capacitance⁽⁹⁾

Symbol	Parameter	Conditions	Typical	Units
C _{IN}	Input Capacitance	$V_{CC} = 0V$, $V_I = 0V$ or V_{CC}	4	pF
C _{OUT}	Output Capacitance	$V_{CC} = 3.0V$, $V_{O} = 0V$ or V_{CC}	8	pF

Note:

9. Capacitance is measured at frequency f = 1MHz, per MIL-STD-883, Method 3012.

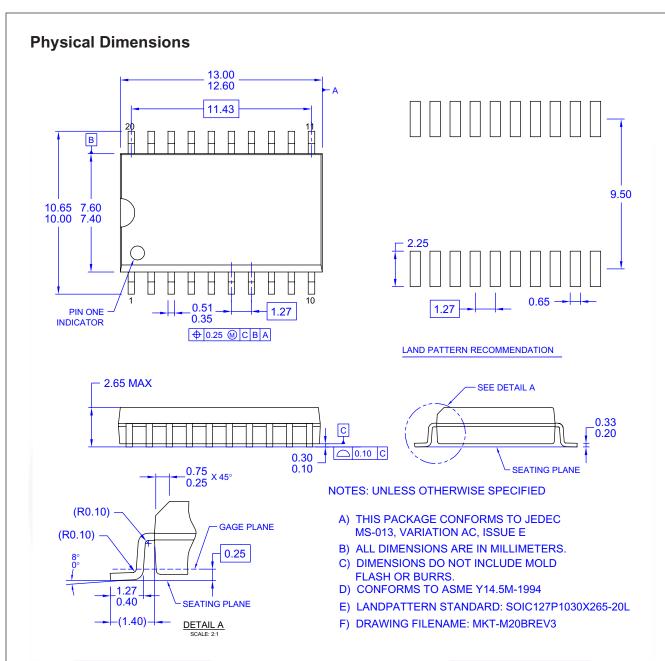
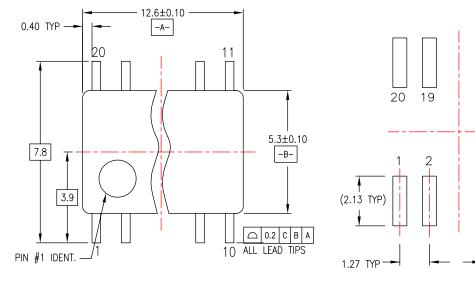


Figure 1. 20-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-013, 0.300" Wide

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Physical Dimensions (Continued)





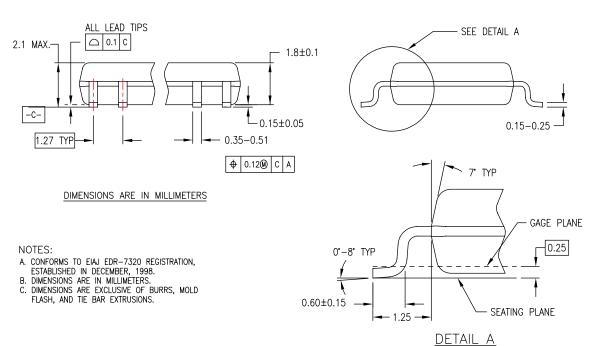
12

10

0.6 TYP

5.01 TYP

9.27 TYP



M20DREVC

Figure 2. 20-Lead Small Outline Package (SOP), EIAJ TYPE II, 5.3mm Wide

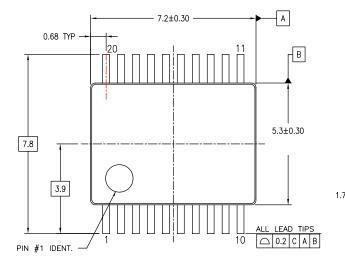
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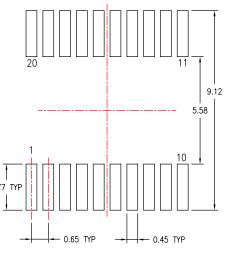
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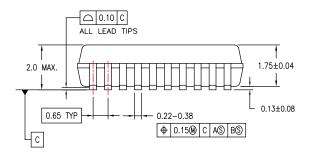
74LVT245, 74LVTH245 Rev. 1.4.0

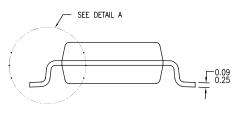
Physical Dimensions (Continued)





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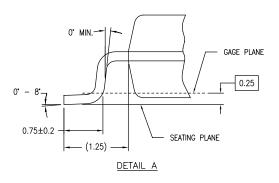




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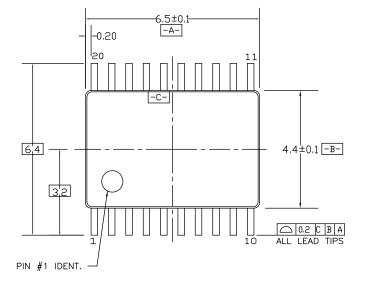
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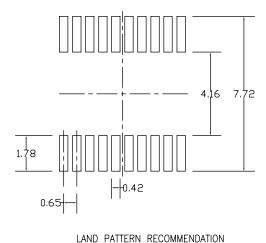
Figure 3. 20-Lead Shrink Small Outline Package (SSOP), JEDEC MO-150, 5.3mm Wide

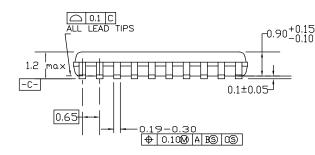
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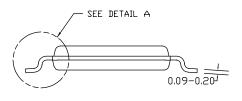


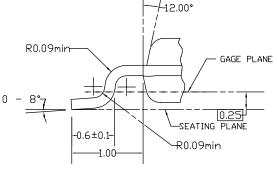


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DETAIL A

MTC20REVD1

Figure 4. 20-Lead Thin Shrink Small Outline Package (TSSOP), JEDEC MO-153, 4.4mm Wide

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Вы можете разместить у нас заказ для любого Вашего проекта, будь то серийное производство или разработка единичного прибора.

В нашем ассортименте представлены ведущие мировые производители активных и пассивных электронных компонентов.

Нашей специализацией является поставка электронной компонентной базы двойного назначения, продукции таких производителей как XILINX, Intel (ex.ALTERA), Vicor, Microchip, Texas Instruments, Analog Devices, Mini-Circuits, Amphenol, Glenair.

Сотрудничество с глобальными дистрибьюторами электронных компонентов, предоставляет возможность заказывать и получать с международных складов практически любой перечень компонентов в оптимальные для Вас сроки.

На всех этапах разработки и производства наши партнеры могут получить квалифицированную поддержку опытных инженеров.

Система менеджмента качества компании отвечает требованиям в соответствии с ГОСТ Р ИСО 9001, ГОСТ РВ 0015-002 и ЭС РД 009

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