FAIRCHILD SEMICONDUCTOR™

November 2001
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FSLV3245
Low Voltage Octal Bus Switch (Preliminary)

General Description

The Fairchild Switch FSLV3245 provides 8-bits of high-speed CMOS bus switching in a standard 245 pin-out. The low On Resistance of the switch allows inputs to be connected to outputs without adding propagation delay or generating additional ground bounce noise.

The device is organized as an 8-bit switch. When $\overline{OE}$ is LOW, the switch is on and Port A is connected to Port B. When $\overline{OE}$ is HIGH, the switch is open and a high-impedance state exists between the two ports.

Features

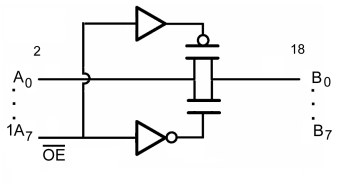
- 5Ω switch connection between two ports
- Minimal propagation delay through the switch
- Low I_{CC}
- Zero bounce in flow-through mode

Ordering Code:

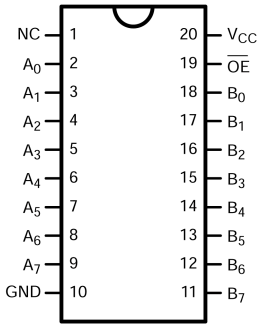
Order Number	Package Number	Package Description
FSLV3245WM	M20B	20-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-013, 0.300" Wide
FSLV3245MTC	MTC20	20-Lead Thin Shrink Small Outline Package (TSSOP), JEDEC MO-153, 4.4mm Wide

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

Logic Diagram



Connection Diagram



Pin Descriptions

Pin Name	Description
$\overline{OE}$	Bus Switch Enable
A	Bus A
B	Bus B
NC	No Connect

Truth Table

Input $\overline{OE}$	Function
L	Connect
H	Disconnect

Absolute Maximum Ratings(Note 1)

Supply Voltage (V_{CC})	−0.5V to +4.6V
DC Switch Voltage (V_S)	−0.5V to +4.6V
DC Input Voltage (V_{IN}) (Note 2)	−0.5V to +6.0V
DC Input Diode Current (I_{IK}) V_{IN} < 0V	−50mA
DC Output (I_{OUT}) Sink Current	128mA
DC V_{CC}/GND Current (I_{CC}/I_{GND})	+/− 100mA
Storage Temperature Range (T_{STG})	−65°C to +150 °C

Recommended Operating Conditions (Note 3)

Power Supply Operating (V_{CC})	3.0V to 3.6V
Control Input Voltage	0V to 3.6V
Switch Input Voltage	0V to 3.6V
Output Voltage (V_{OUT})	0V to 3.6V
Input Rise and Fall Time (t_r, t_f)	
Switch Control Input	0 ns/V to 4 ns/V
Switch I/O	0 ns/V to DC
Free Air Operating Temperature (T_A)	−40 °C to +85 °C

Note 1: The Absolute Maximum Ratings are those values beyond which the safety of the device cannot be guaranteed. The device should not be operated at these limits. The parametric values defined in the Electrical Characteristics tables are not guaranteed at the absolute maximum rating. The "Recommended Operating Conditions" table will define the conditions for actual device operation.

Note 2: The input and output negative voltage ratings may be exceeded if the input and output diode current ratings are observed.

Note 3: Unused control inputs must be held HIGH or LOW. They may not float.

DC Electrical Characteristics

Symbol	Parameter	V_{CC} (V)	T_A = −40 °C to +85 °C			Units	Conditions
			Min	Typ (Note 4)	Max		
V_{IK}	Clamp Diode Voltage	3.0			−1.2	V	I_{IN} = −18mA
V_{IH}	HIGH Level Input Voltage	2.7 - 3.6	2.0			V	
		2.3 - 2.7	1.7				
V_{IL}	LOW Level Input Voltage	2.7 - 3.6			0.8	V	
		2.3 - 2.7			0.7		
I_I	Input Leakage Current	3.6			±1.0	µA	0 ≤ V_{IN} ≤ 3.6V
		0			10	µA	V_{IN} = 3.6V
I_{OFF}	OFF-STATE Leakage Current	0			±10.0	µA	0 ≤ A, B ≤ V_{CC}
I_{OZ}	OFF-STATE Leakage	3.6			±1	µA	0.0V ≤ A, B ≤ 3.6V
R_{ON}	Switch On Resistance	3.0		5	7	Ω	V_{IN} = 0V, I_{IN} = 64mA
	(Note 5)	3.0		5	7	Ω	V_{IN} = 0V, I_{IN} = 30mA
		3.0		10	15	Ω	V_{IN} = 2.4V, I_{IN} = 15mA
		3.0			20	Ω	V_{IN} = 3.0V, I_{IN} = 15mA
		2.3		5	8	Ω	V_{IN} = 0.0V, I_{IN} = 64mA
		2.3		5	8	Ω	V_{IN} = 0.0V, I_{IN} = 30mA
		2.3		10	15	Ω	V_{IN} = 1.7V, I_{IN} = 15mA
		2.3			20	Ω	V_{IN} = 2.3V, I_{IN} = 15mA
I_{CC}	Quiescent Supply Current	3.6			3	µA	V_{IN} = V_{CC} or GND, I_{OUT} = 0
ΔI_{CC}	Increase in I_{CC} per Input	3.6			300	µA	One Input at 3.0V Other Inputs at V_{CC} or GND

Note 4: Typical values are at V_{CC} = 3.3V and T_A = +25°C

Note 5: Measured by the voltage drop between A and B pins at the indicated current through the switch. On Resistance is determined by the lower of the voltages on the two (A or B) pins.

AC Electrical Characteristics

Symbol	Parameter	$T_A = -40°C$ to $+85°C$, RU = RD = 500Ω				Units	Conditions	Figure Number
		$V_{CC} = 3.3 \pm 3.0V$, $C_L = 50$ pF		$V_{CC} = 2.5V \pm 0.2V$, $C_L = 30$ pF				
		Min	Max	Min	Max			
t_{PHL}, t_{PLH}	Propagation Delay Bus to Bus (Note 6)		0.25		0.15	ns	V_I = OPEN	Figures 1, 2
t_{PZH}, t_{PZL}	Output Enable Time	1.0	4.5	1.0	4.8	ns	V_{CC} = 3.3V, V_I = 6V for t_{PZL} V_I = GND for t_{PZH} V_{CC} = 2.5V, V_I = 2 x V_{CC} for t_{PZL} V_I = GND for t_{PZH}	Figures 1, 2
t_{PHZ}, t_{PLZ}	Output Disable Time	1.0	4.5	1.0	4.8	ns	V_{CC} = 3.3V, V_I = 6V for t_{PLZ} V_I = GND for t_{PHZ} V_{CC} = 2.5V, V_I = 2 x V_{CC} for t_{PLZ} V_I = GND for t_{PHZ}	Figures 1, 2

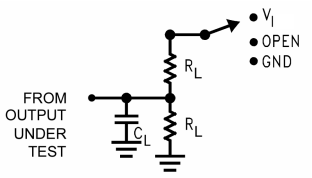
Note 6: This parameter is guaranteed by design but is not tested. The bus switch contributes no propagation delay other than the RC delay of the typical On Resistance of the switch and the 50pF load capacitance, when driven by an ideal voltage source (zero output impedance).

Capacitance (Note 7)

Symbol	Parameter	Typ	Max	Units	Conditions
C_{IN}	Control Pin Input Capacitance	3	6	pF	V_{CC} = 3.3V
$C_{I/O\ OFF}$	Input/Output Capacitance "OFF - State"	7	14	pF	V_{CC}, $\overline{OE}$ = 3.3V

Note 7: $T_A = +25°C$, f = 1 Mhz, Capacitance is characterized but not tested.

AC Loading and Waveforms

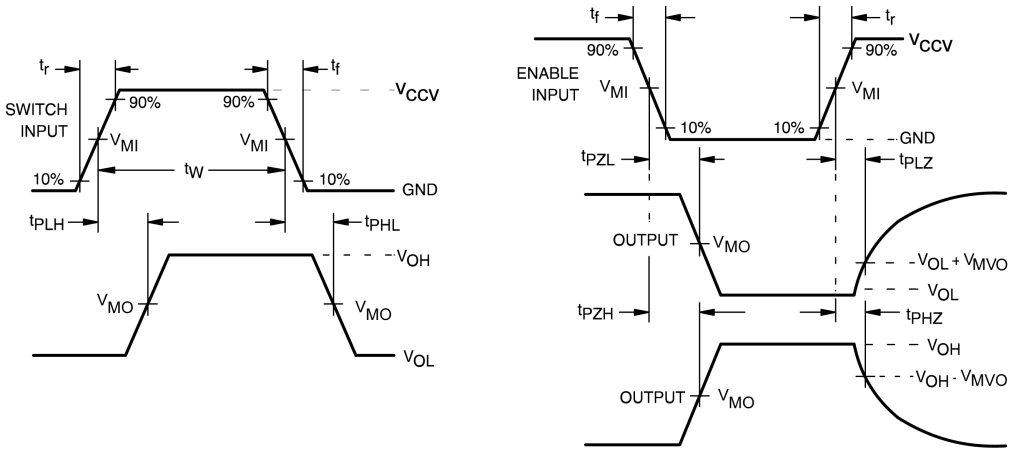


Note: C_L includes load and stray capacitance

Note: Input PRR = 1.0 MHz, t_W = 500 ns

Test	Switch
t_{PD}	Open
t_{PLZ}/t_{PZL}	V_I
t_{PHZ}/t_{PZH}	GND

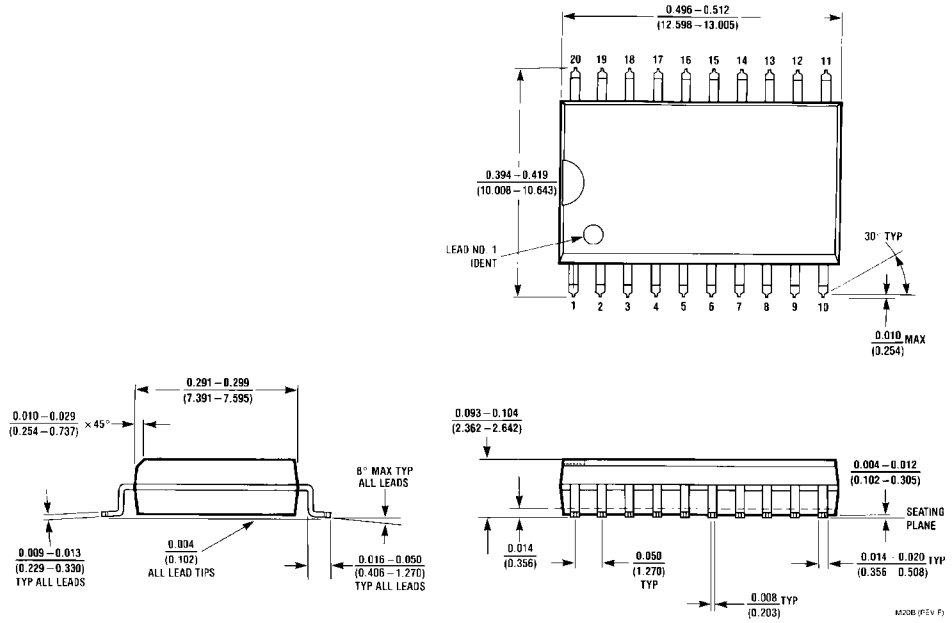
FIGURE 1. AC Test Circuit



	V_{CC}	
Symbol	**3.3V ± 0.3V**	**2.5V ± 0.2V**
V_{MI}	1.5V	$V_{CC}/2$
V_{MO}	1.5V	$V_{CC}/2$
V_{MVO}	0.3V	0.15V
V_I	6.0V	2 x V_{CC}
V_{CCV}	3.0	V_{CC}
t_r/t_f	2 ns	2.5 ns

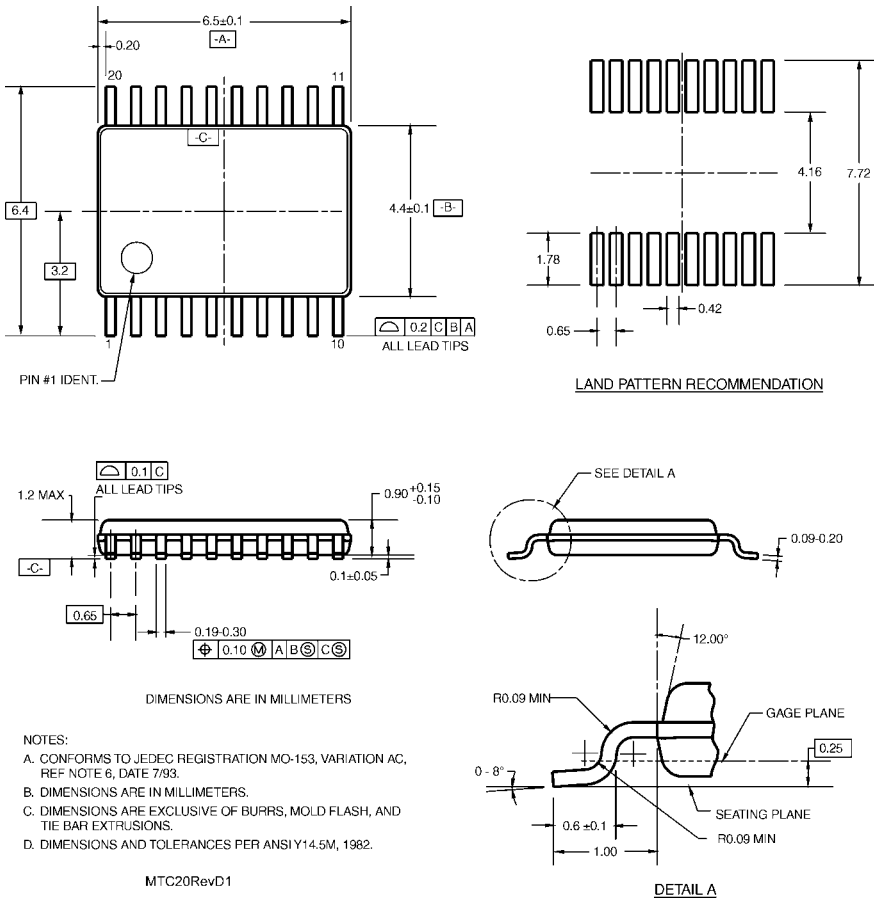
FIGURE 2. AC Waveforms

Physical Dimensions inches (millimeters) unless otherwise noted



20-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-013, 0.300" Wide
Package Number M20B

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



20-Lead Thin Shrink Small Outline Package (TSSOP), JEDEC MO-153, 4.4mm Wide
Package Number MTC20

Technology Description

The Fairchild Switch family derives from and embodies Fairchild's proven switch technology used for several years in its 74LVX3L384 (FST3384) bus switch product.