



October 2001  
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# FSLV34X245 32-Bit Bus Switch (Preliminary)

## General Description

The Fairchild Switch FSLV34X245 provides 32-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 32-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.

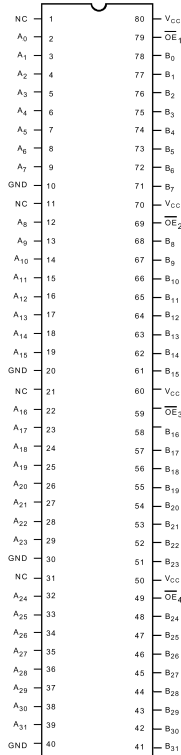
## Features

- 5Ω switch connection between two ports
- Minimal propagation delay through the switch
- Low  $I_{CC}$
- Zero bounce in flow-through mode
- Low Power-Off leakage currents
- 32-bit version of FSLV3245
- Packaged in "slim line" 80-lead package

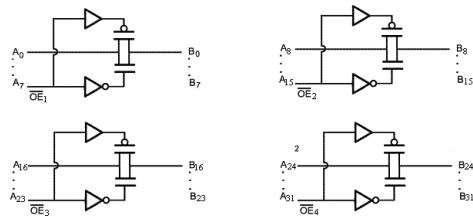
## Ordering Code:

Order Number	Package Number	Package Description
FSLV34X245QSP	MQA80A	80-Lead, QVSOP, JEDEC MO-154, 0.150" Wide

## Connection Diagram



## Logic 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

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FSLV34X245

**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 +4.6V
DC Input Diode Current ( $I_{IK}$ ) $V_{IN} < 0V$	-50 mA
DC Output ( $I_{OUT}$ ) Sink Current	128 mA
DC $V_{CC}$ /GND Current ( $I_{CC}/I_{GND}$ )	+/- 100 mA
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**

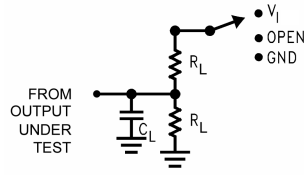
Symbol	Parameter	$V_{CC}$ (V)	$T_A = -40\text{ °C to }+85\text{ °C}$			Units	Conditions
			Min	Typ (Note 4)	Max		
$V_{IK}$	Clamp Diode Voltage	3.0			-1.2	V	$I_{IN} = -18\text{ mA}$
$V_{IH}$	HIGH Level Input Voltage	2.7 - 3.6	2.0			V	
		2.3 - 2.7	1.7				
$V_{IL}$	LOW Level Input Voltage	2.7 - 3.6			0.8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

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

**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 <sub>A</sub> = -40°C to +85°C RU = RD = 500Ω				Units	Conditions	Figure Number
		V <sub>CC</sub> = 3.3 ± 3.0V		V <sub>CC</sub> = 2.5V ± 0.2V				
		C <sub>L</sub> = 50 pF		C <sub>L</sub> = 30 pF				
		Min	Max	Min	Max			
t <sub>PHL</sub> , t <sub>PLH</sub>	Propagation Delay Bus to Bus (Note 6)		0.25		0.15	ns	V <sub>I</sub> = OPEN	Figures 1, 2
t <sub>PZH</sub> , t <sub>PZL</sub>	Output Enable Time	1.0	4.5	1.0	4.8	ns	V <sub>CC</sub> = 3.3V, V <sub>I</sub> = 6V for t <sub>PZL</sub> V <sub>I</sub> = GND for t <sub>PZH</sub> V <sub>CC</sub> = 2.5V, V <sub>I</sub> = 2 x V <sub>CC</sub> for t <sub>PZL</sub> V <sub>I</sub> = GND for t <sub>PZH</sub>	Figures 1, 2
t <sub>PHZ</sub> , t <sub>PLZ</sub>	Output Disable Time	1.0	4.5	1.0	4.8	ns	V <sub>CC</sub> = 3.3V, V <sub>I</sub> = 6V for t <sub>PLZ</sub> V <sub>I</sub> = GND for t <sub>PHZ</sub> V <sub>CC</sub> = 2.5V, V <sub>I</sub> = 2 x V <sub>CC</sub> for t <sub>PLZ</sub> V <sub>I</sub> = GND for t <sub>PHZ</sub>	Figures 1, 2
<p><b>Note 6:</b> 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).</p>								
<p><b>Capacitance</b> (Note 7)</p>								
Symbol	Parameter	Typ	Max	Units	Conditions			
C <sub>IN</sub>	Control Pin Input Capacitance	3	6	pF	V <sub>CC</sub> = 3.3V			
C <sub>I/O OFF</sub>	Input/Output Capacitance "OFF - State"	7	14	pF	V <sub>CC</sub> , $\overline{\text{OE}}$ = 3.3V			
<p><b>Note 7:</b> T<sub>A</sub> = +25°C, f = 1 Mhz, Capacitance is characterized but not tested.</p>								

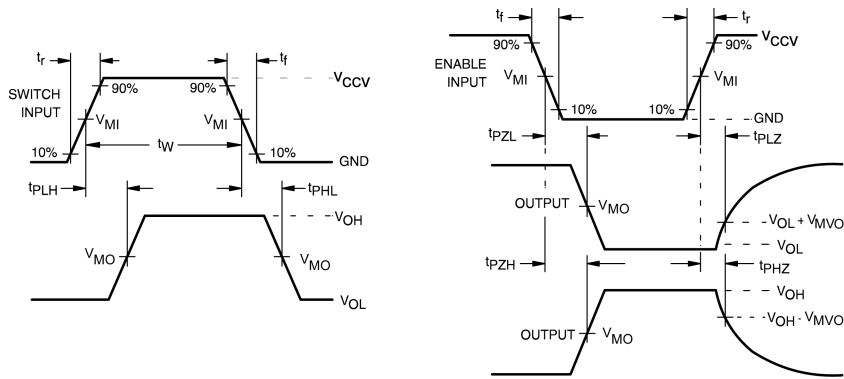
### AC Loading and Waveforms



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

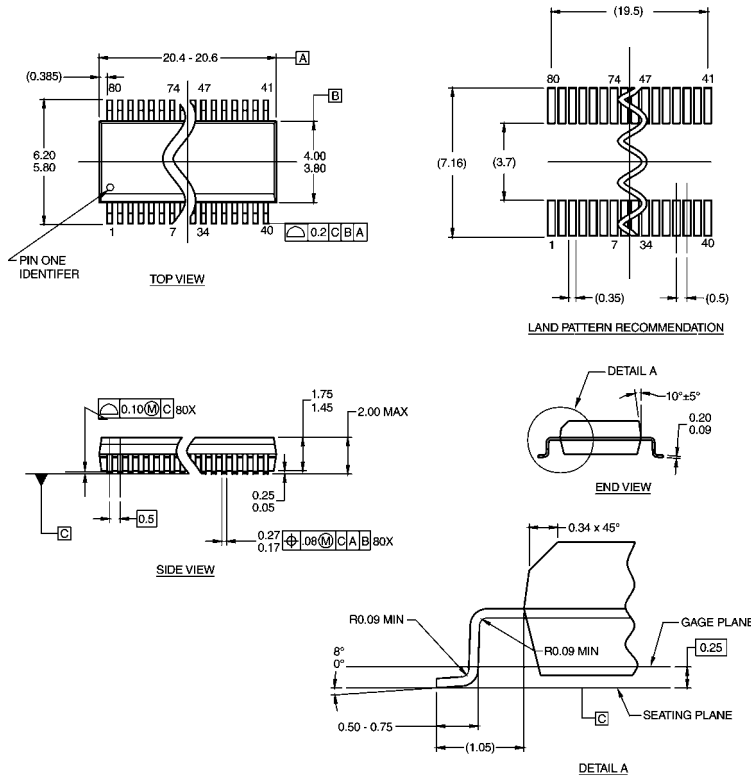
FIGURE 1. AC Test Circuit



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

FIGURE 2. AC Waveforms

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



NOTES:  
 A. THIS PACKAGE CONFORMS TO JEDEC MO-154 VERSION BC.  
 B. ALL DIMENSIONS IN MILLIMETERS.  
 C. DRAWING CONFORMS TO ASME Y14.5M-1994.  
 D. DIMENSIONS ARE EXCLUSIVE OF BURRS, MOLD FLASH, AND TIE BAR EXTRUSIONS.

MQA80Arev1

**80-Lead, QVSOP, JEDEC MO-154, 0.150" Wide  
 Package Number MQA80A**

**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.

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