FAIRCHILD

SEMICONDUCTOR ™

FST34X2245
32-Bit Bus Switch with 25Ω Series Resistors in Outputs

General Description

The Fairchild Switch FST34X2245 provides 32-bits of high speed CMOS TTL-compatible bus switching in a standard flow-through mode. 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 a 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.

The FST34X2245 has equivalent 25Ω series resistors to reduce signal-reflection noise, eliminating the need for external terminating resistors.
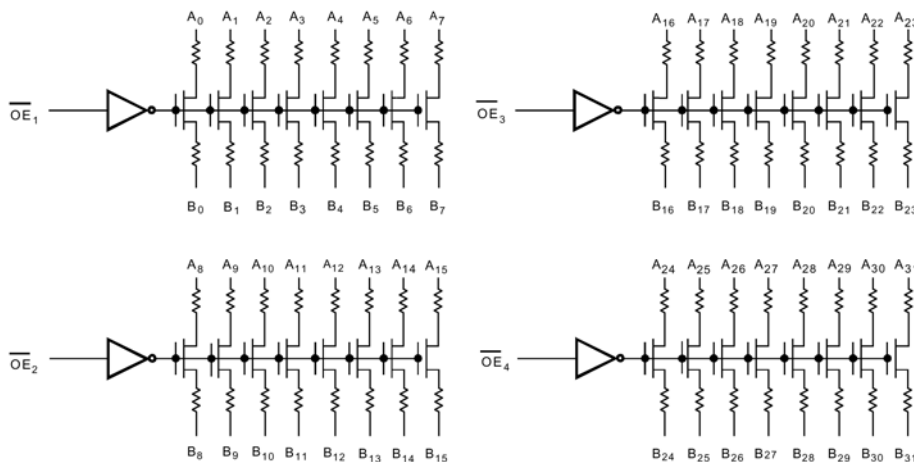
Features

■ 25Ω switch connection between two ports
■ Minimal propagation delay through the switch
■ Low I_{CC}
■ Zero bounce in flow-through mode
■ Control inputs compatible with TTL level
■ 32-bit version of FST32245
■ Packaged in 20.5mm 80-lead package

Ordering Code:

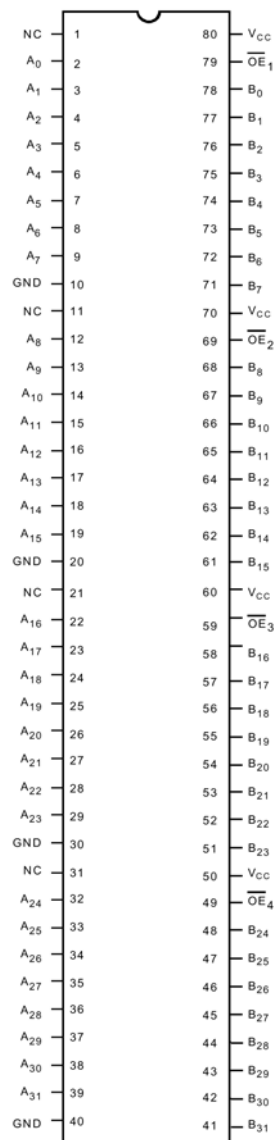| Order Number	Package Number	Package Description
FST34X2245QSPX	MQA80A	80-Lead, QVSOP, JEDEC MO-154, 0.150" Wide
FST34X2245QSPX_NL (Note 1)	MQA80A	Pb-Free 80-Lead, QVSOP, JEDEC MO-154, 0.150" Wide

Note 1: "_NL" indicates Pb-Free product (per JEDEC J-STD-020B). Device is available in Tape and Reel only.

Logic Diagram

FST34X2245

Connection Diagram

NC	1		80	V_CC

$$
\begin{array}{ll}
\text{NC} & 1 \quad\quad 80 \quad V_{CC} \\
A_0 & 2 \quad\quad 79 \quad \overline{OE}_1 \\
A_1 & 3 \quad\quad 78 \quad B_0 \\
A_2 & 4 \quad\quad 77 \quad B_1 \\
A_3 & 5 \quad\quad 76 \quad B_2 \\
A_4 & 6 \quad\quad 75 \quad B_3 \\
A_5 & 7 \quad\quad 74 \quad B_4 \\
A_6 & 8 \quad\quad 73 \quad B_5 \\
A_7 & 9 \quad\quad 72 \quad B_6 \\
\text{GND} & 10 \quad\quad 71 \quad B_7 \\
\text{NC} & 11 \quad\quad 70 \quad V_{CC} \\
A_8 & 12 \quad\quad 69 \quad \overline{OE}_2 \\
A_9 & 13 \quad\quad 68 \quad B_8 \\
A_{10} & 14 \quad\quad 67 \quad B_9 \\
A_{11} & 15 \quad\quad 66 \quad B_{10} \\
A_{12} & 16 \quad\quad 65 \quad B_{11} \\
A_{13} & 17 \quad\quad 64 \quad B_{12} \\
A_{14} & 18 \quad\quad 63 \quad B_{13} \\
A_{15} & 19 \quad\quad 62 \quad B_{14} \\
\text{GND} & 20 \quad\quad 61 \quad B_{15} \\
\text{NC} & 21 \quad\quad 60 \quad V_{CC} \\
A_{16} & 22 \quad\quad 59 \quad \overline{OE}_3 \\
A_{17} & 23 \quad\quad 58 \quad B_{16} \\
A_{18} & 24 \quad\quad 57 \quad B_{17} \\
A_{19} & 25 \quad\quad 56 \quad B_{18} \\
A_{20} & 26 \quad\quad 55 \quad B_{19} \\
A_{21} & 27 \quad\quad 54 \quad B_{20} \\
A_{22} & 28 \quad\quad 53 \quad B_{21} \\
A_{23} & 29 \quad\quad 52 \quad B_{22} \\
\text{GND} & 30 \quad\quad 51 \quad B_{23} \\
\text{NC} & 31 \quad\quad 50 \quad V_{CC} \\
A_{24} & 32 \quad\quad 49 \quad \overline{OE}_4 \\
A_{25} & 33 \quad\quad 48 \quad B_{24} \\
A_{26} & 34 \quad\quad 47 \quad B_{25} \\
A_{27} & 35 \quad\quad 46 \quad B_{26} \\
A_{28} & 36 \quad\quad 45 \quad B_{27} \\
A_{29} & 37 \quad\quad 44 \quad B_{28} \\
A_{30} & 38 \quad\quad 43 \quad B_{29} \\
A_{31} & 39 \quad\quad 42 \quad B_{30} \\
\text{GND} & 40 \quad\quad 41 \quad B_{31}
\end{array}
$$

Pin Descriptions

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

Function Table

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

Absolute Maximum Ratings (Note 2)

Supply Voltage (V_{CC})	−0.5V to +7.0V
DC Switch Voltage (V_S)	−0.5V to +7.0V
DC Input Voltage (V_{IN}) (Note 3)	−0.5V to +7.0V
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 4)

Power Supply Operating (V_{CC})	4.0V to 5.5V
Input Voltage (V_{IN})	0V to 5.5V
Output Voltage (V_{OUT})	0V to 5.5V
Input Rise and Fall Time (t_r, t_f)	
Switch Control Input	0 ns/V to 5 ns/V
Switch I/O	0 ns/V to DC
Free Air Operating Temperature (T_A)	−40 °C to +85 °C

Note 2: 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 3: The input and output negative voltage ratings may be exceeded if the input and output diode current ratings are observed.

Note 4: 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 5)	Max		
V_{IK}	Clamp Diode Voltage	4.5			−1.2	V	$I_{IN} = −18$ mA
V_{IH}	HIGH Level Input Voltage	4.0–5.5	2.0			V	
V_{IL}	LOW Level Input Voltage	4.0–5.5			0.8	V	
I_I	Input Leakage Current	5.5			±1.0	μA	$0 \leq V_{IN} \leq 5.5V$
		0			10	μA	$V_{IN} = 5.5V$
I_{OZ}	OFF-STATE Leakage Current	5.5			±1.0	μA	$0 \leq A, B \leq V_{CC}$
R_{ON}	Switch On Resistance (Note 6)	4.5	20	26	38	Ω	$V_{IN} = 0V$, $I_{IN} = 64$ mA
		4.5	20	27	40	Ω	$V_{IN} = 0V$, $I_{IN} = 30$ mA
		4.5	20	28	48	Ω	$V_{IN} = 2.4V$, $I_{IN} = 15$ mA
		4.0	20	30	48	Ω	$V_{IN} = 2.4V$, $I_{IN} = 15$ mA
I_{CC}	Quiescent Supply Current (Note 7)	5.5			3	μA	$V_{IN} = V_{CC}$ or GND, $I_{OUT} = 0$
ΔI_{CC}	Increase in I_{CC} per Input (Note 8)	5.5			2.5	mA	One Input at 3.4V Other Inputs at V_{CC} or GND

Note 5: Typical values are at $V_{CC} = 5.0V$ and $T_A = +25°C$

Note 6: 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.

Note 7: Per V_{CC} pin.

Note 8: Per TTL input, control pins only.

AC Electrical Characteristics

Symbol	Parameter	$T_A = -40\ °C$ to $+85\ °C$, $C_L = 50pF$, RU = RD = 500Ω				Units	Conditions	Figure Number
		$V_{CC} = 4.5 – 5.5V$		$V_{CC} = 4.0V$				
		Min	Max	Min	Max			
t_{PHL}, t_{PLH}	Propagation Delay Bus to Bus (Note 9)		1.25		1.25	ns	V_I = OPEN	Figures 1, 2
t_{PZH}, t_{PZL}	Output Enable Time	1.0	5.9		6.4	ns	V_I = 7V for t_{PZL} V_I = OPEN for t_{PZH}	Figures 1, 2
t_{PHZ}, t_{PLZ}	Output Disable Time	1.0	6.0		5.7	ns	V_I = 7V for t_{PLZ} V_I = OPEN for t_{PHZ}	Figures 1, 2

Note 9: 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 the source (zero output impedance).

Capacitance (Note 10)

Symbol	Parameter	Typ	Max	Units	Conditions
C_{IN}	Control Pin Input Capacitance	3		pF	V_{CC} = 5.0V
$C_{I/O}$	Input/Output Capacitance	5		pF	V_{CC}, $\overline{OE}$ = 5.0V

Note 10: $T_A = +25°C$, f = 1 MHz, Capacitance is characterized but not tested.

AC Loading and Waveforms
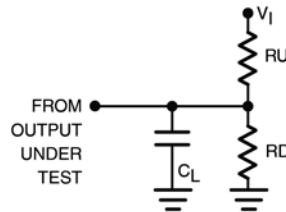
Note: Input driven by 50 Ω source terminated in 50 Ω

Note: C_L includes load and stray capacitance

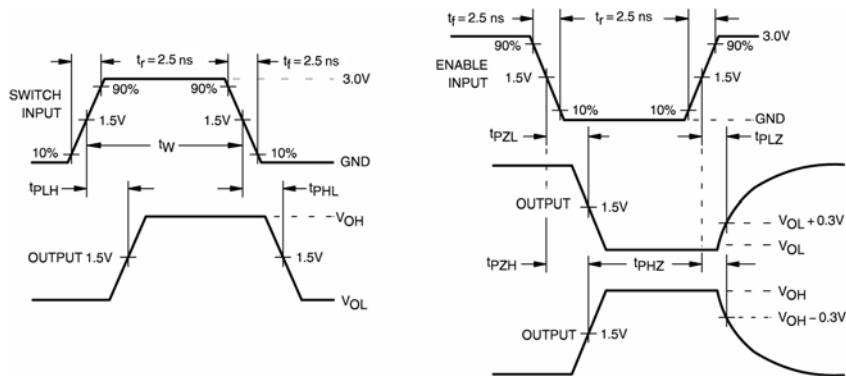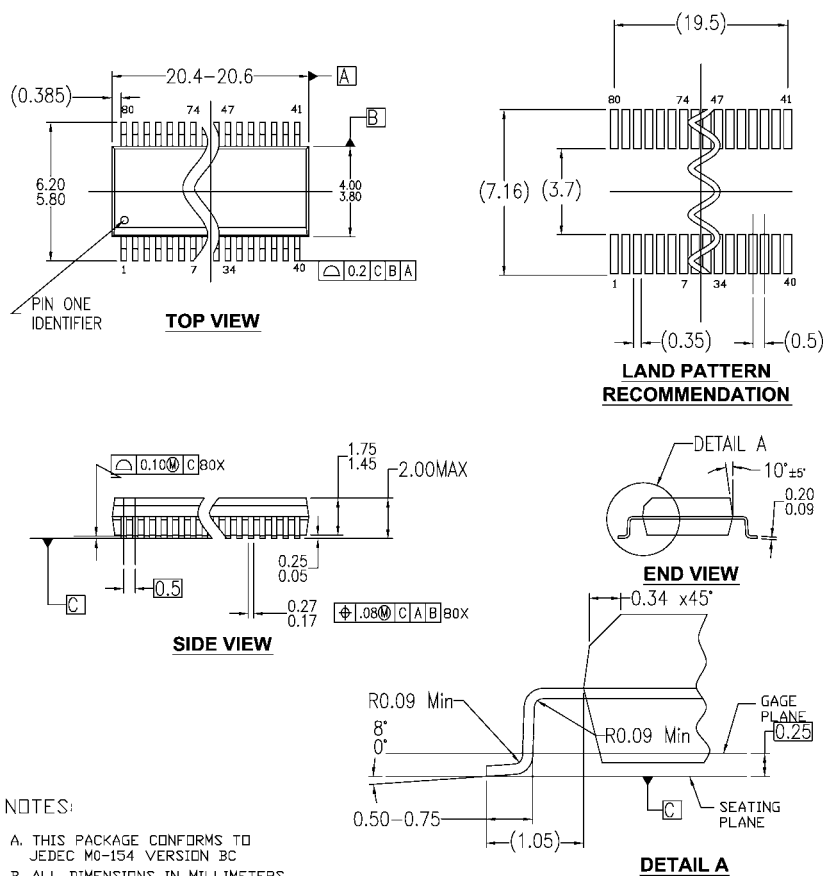**Note:** Input PRR = 1.0 MHz t_W = 500 ns

FIGURE 1. AC Test Circuit

FIGURE 2. AC Waveforms

Physical Dimensions inches (millimeters) unless otherwise noted

TOP VIEW

LAND PATTERN RECOMMENDATION

SIDE VIEW

END VIEW

DETAIL A

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.

MQA80AREVA

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

Fairchild does not assume any responsibility for use of any circuitry described, no circuit patent licenses are implied and Fairchild reserves the right at any time without notice to change said circuitry and specifications.

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.

www.fairchildsemi.com