FAIRCHILD SEMICONDUCTOR™

June 2001
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FST32245
Octal Bus Switch with 25Ω Series Resistor in Outputs (Preliminary)

General Description

The Fairchild Switch FST32245 provides 8-bits of high-speed CMOS TTL-compatible 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.

The FST32245 has an equivalent 25Ω series resistors to reduce signal-reflection noise, eliminating the need for external terminating resistors.

Features

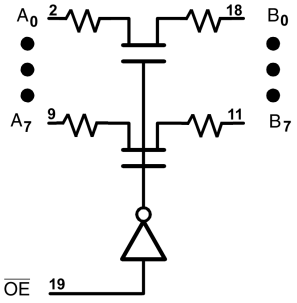
- 25Ω switch connection between two ports
- Minimal propagation delay through the switch
- Low I_{CC}
- Zero bounce in flow-through mode
- Control inputs compatible with TTL level

Ordering Code:

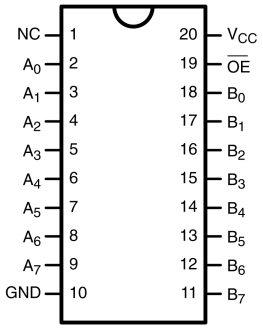
Order Number	Package Number	Package Description
FST32245WM	M20B	20-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-013, 0.300" Wide
FST32245QSC	MQA20	20-Lead Quarter Size Outline Package (QSOP), JEDEC MO-137, 0.150" Wide
FST32245MTC	MTC20	20-Lead Thin Shrink Small Outline Package (TSSOP), JEDEC 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

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Absolute Maximum Ratings(Note 1)

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 2)	−0.5V to +7.0V
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})	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 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	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 ≤ V_{IN} ≤ 5.5V
		0			10	µA	V_{IN} = 5.5V
I_{OZ}	OFF-STATE Leakage Current	5.5			±1.0	µA	0 ≤ A, B ≤ V_{CC}
R_{ON}	Switch On Resistance	4.5	20	26	38	Ω	V_{IN} = 0V, I_{IN} = 64 mA
	(Note 5)	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	5.5			3	µA	V_{IN} = V_{CC} or GND, I_{OUT} = 0
ΔI_{CC}	Increase in I_{CC} per Input	5.5			2.5	mA	One input at 3.4V Other inputs at V_{CC} or GND

Note 4: Typical values are at V_{CC} = 5.0V 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 $+85\,°C$, $C_L = 50pF$, $RU = RD = 500\Omega$				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 6)		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

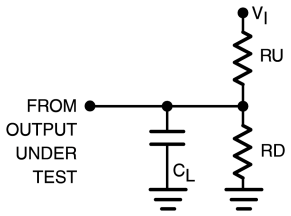
Note 6: This parameter is guaranteed by design but is not tested. The bus switch contributes no propagation delay other than the RC delay of the typical On Resistance of the switch and the 50pF load capacitance, when driven by an ideal voltage the source (zero output impedance).

Capacitance (Note 7)

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 7: $T_A = +25°C$, 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

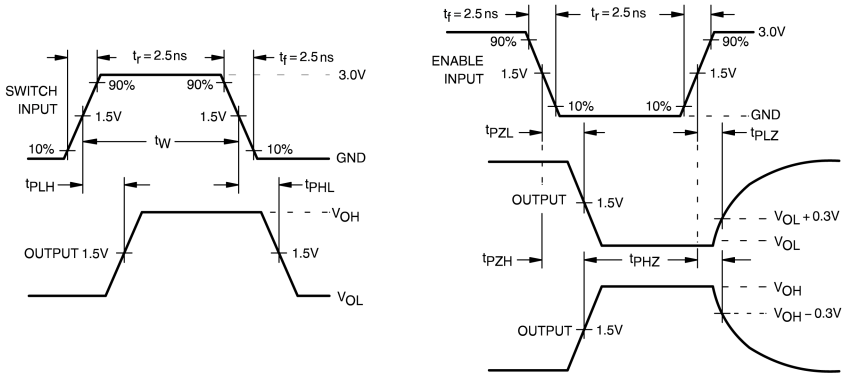
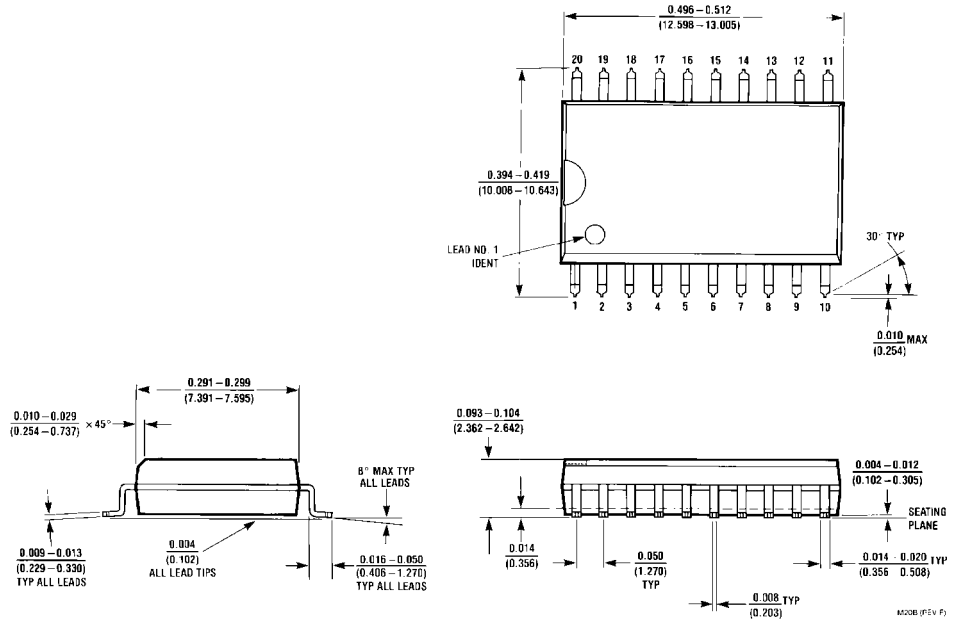
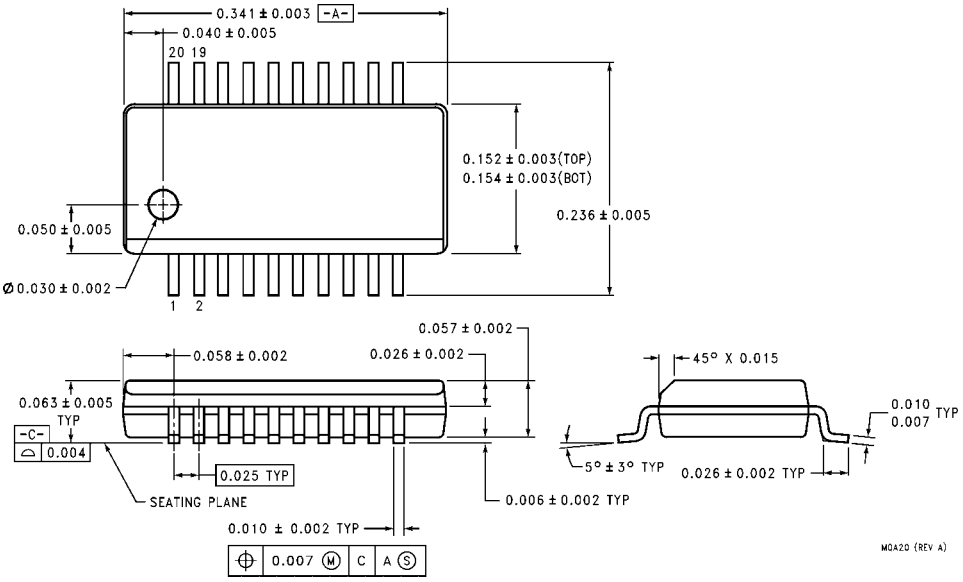


FIGURE 2. AC Waveforms

Physical Dimensions inches (millimeters) unless otherwise noted

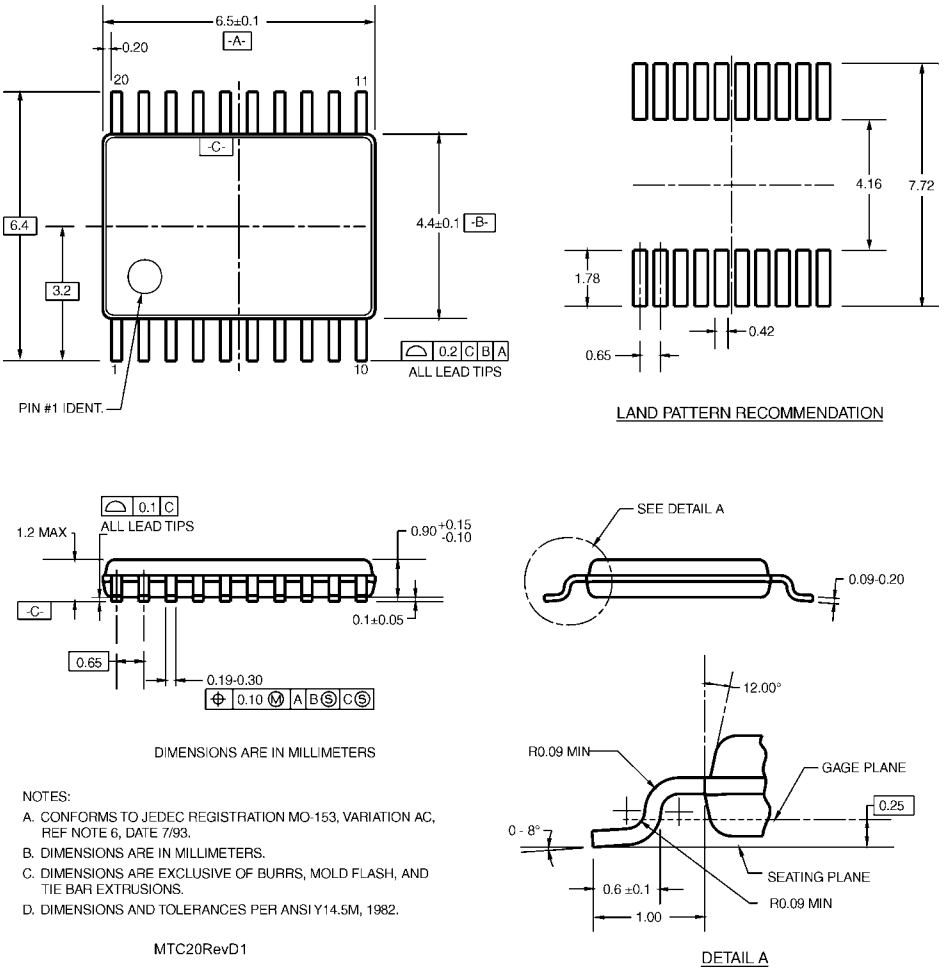


20-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-013, 0.300" Wide
Package Number M20B



20-Lead Quarter Size Outline Package (QSOP), JEDEC MO-137, 0.150" Wide
Package Number MQA20

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.

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