FAIRCHILD

SEMICONDUCTOR

FST6800 10-Bit Bus Switch with Precharged Outputs

General Description

The Fairchild Switch FST6800 provides 10-bits of highspeed CMOS TTL-compatible bus switching. 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 precharges the B Port to a selectable bias voltage (BiasV) to minimize live insertion noise.

The device is organized as a 10-bit switch with a bus enable (\overline{OE}) signal. 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 the B Port is precharged to BiasV through an equivalent 10-k Ω resistor.

Features

• 4Ω switch connection between two ports.

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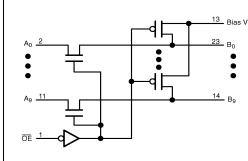
- Minimal propagation delay through the switch.
- Low I_{CC}.
- Zero bounce in flow-through mode.
- Output precharge to minimize live insertion noise.
- Control inputs compatible with TTL level.

Ordering Code:

Order Number	Package Number	Package Description
FST6800WM	M24B	24-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-013, 0.300 Wide
FST6800QSC	MQA24	24-Lead Quarter Size Outline Package (QSOP), JEDEC MO-137, 0.150 Wide
FST6800MTC	MTC24	24-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

ŌE _		24	Vcc
A0 —	2	23	— B ₀
A1 —	3	22	— B1
A2 -	4	21	— B ₂
A3 -	5	20	— В ₃
A4 -	6	19	— в4
A ₅ —	7	18	— В ₅
A ₆ —	8	17	— B ₆
A7 -	9	16	— В ₇
A ₈ —	10	15	— В ₈
A9 —	11	14	— В ₉
GND -	12	13	- BIASV
I			l

Pin Descriptions

Pin Name	Description		
OE	Bus Switch Enable		
А	Bus A		
В	Bus B		



OE	В ₀ –В ₉	Function		
L	A ₀ –A ₉	Connect		
н	BiasV	Precharge		

Absolute Maximum Ratings(Note 1)

Supply Voltage (V _{CC})	-0.5V to +7.0V
DC Switch Voltage (V _S)	-0.5V to +7.0V
Bias V Voltage Range	-0.5V to +6.0V
DC Input Voltage (V _{IN}) (Note 2)	-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 3)

Power Supply Operating (V_{CC})	4.0V to 5.5V
Precharge Supply (BiasV)	1.5V to V _{CC}
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	0nS/V to 5nS/V
Switch I/O	0nS/V to DC

Free Air Operating Temperature (T_A) $-40 \degree C$ to $+85 \degree C$

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 ratings. The Recommended Operating Conditions tables 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

	Parameter	V _{CC} (V)	$T_A = -40 \ ^\circ C$ to $+85 \ ^\circ C$				
Symbol			Min	Typ (Note 4)	Max	Units	Conditions
V _{IK}	Clamp Diode Voltage	4.5			-1.2	V	$I_{IN} = -18 \text{mA}$
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	
l _l	Input Leakage Current	5.5			±1.0	μΑ	0≤ V _{IN} ≤5.5V
I _O	Output Current	4.5	0.25			mA	BiasV = 2.4V, B = 0
I _{OZ}	OFF-STATE Leakage Current	5.5			±1.0	μΑ	$0 \le A \le V_{CC}$
R _{ON}	Switch On Resistance	4.5		4	7	Ω	$V_{IN} = 0V, I_{IN} = 64mA$
	(Note 5)	4.5		4	7	Ω	$V_{IN} = 0V$, $I_{IN} = 30mA$
		4.5		8	15	Ω	$V_{IN} = 2.4V, I_{IN} = 15mA$
		4.0		11	20	Ω	$V_{IN} = 2.4V, I_{IN} = 15mA$
I _{CC}	Quiescent Supply Current	5.5			3	μΑ	$V_{IN} = V_{CC}$ 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 $T_A{=}\,{+}25^{\circ}C$

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

		$T_A = -40$ °C to +85 °C, $C_L = 50$ pF, RU = RD = 500 Ω				Unite	0	Figure
Symbol	Parameter	$V_{CC}=4.5-5.5V$		$V_{CC} = 4.0V$		Units	Conditions	No.
		Min	Max	Min	Max			
t _{PHL} ,t _{PLH}	Prop Delay Bus to Bus (Note 6)		0.25		0.25	ns	V _I = OPEN	Figures 1, 2
t _{PZH}	Output Enable Time	1.5	6.2		6.5	ns	$V_I = OPEN$, Bias $V = GND$	Figures
t _{PZL}		1.5	6.2		6.5	ns	V _I = 7V, BiasV = 3V	1, 2
t _{PHZ}	Output Disable Time	1.5	6.1		6.5	ns	$V_I = OPEN$, Bias $V = GND$	Figures
t _{PLZ}		1.5	7.3		6.8	ns	$V_I = 7V$, Bias $V = 3V$	1, 2

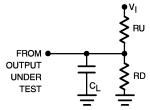
Note 6: This parameter is guaranteed by design but is not tested. The bus switch contributes no propagation delay other than the RC delay of the typical On resistance of the switch and the 50pF load capacitance, when driven by an ideal voltage the source (zero output impedance).

Capacitance (Note 7)

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

Note 7: $T_A = +25^{\circ}C$, f = 1 MHz, Capacitance is characterized but not tested.

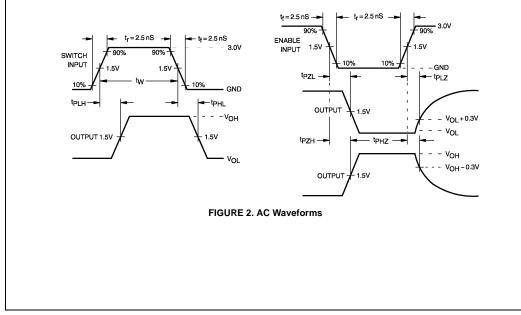
AC Loading and Waveforms



Note: Input driven by 50 Ω source terminated in 50 Ω

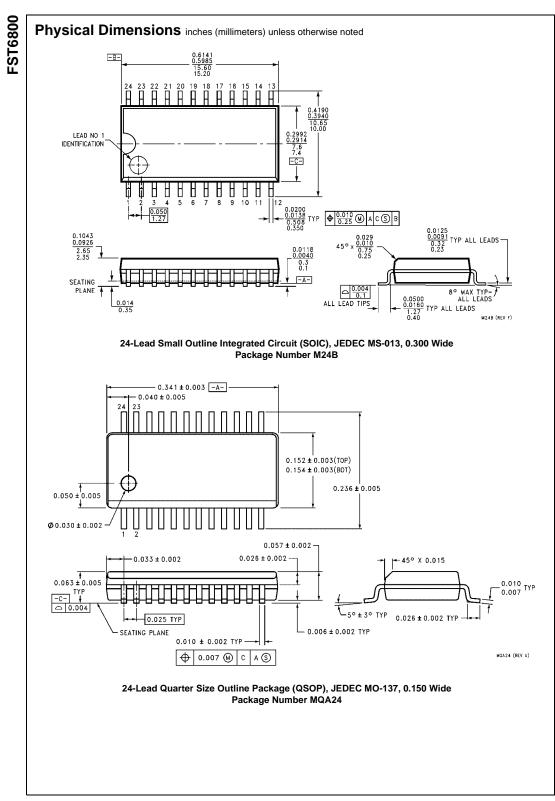
Note: C_L includes load and stray capacitance Note: Input PRR = 1.0 MHz, t_W = 500 ns

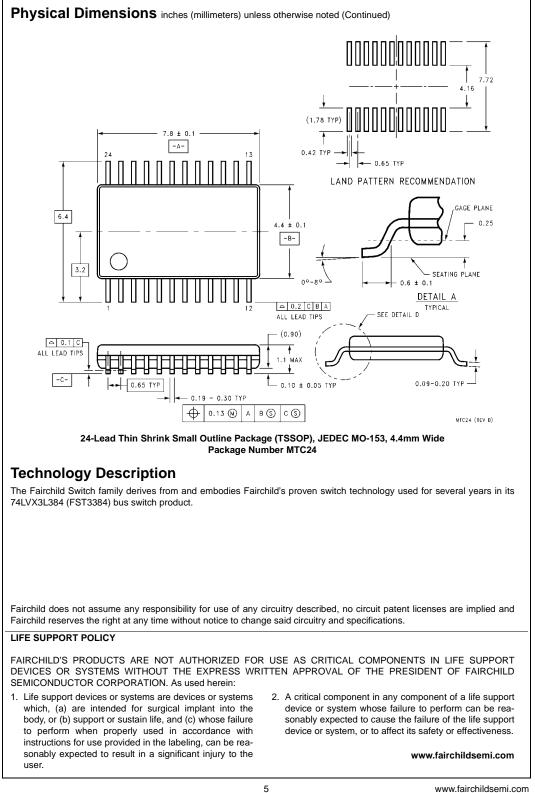
FIGURE 1. AC Test Circuit



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FST6800





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