



March 2003
Revised March 2003

FSAV332

Low On Resistance Quad Video Switch with Individual Enables (Preliminary)

General Description

The Fairchild Switch FSAV332 provides four high-speed CMOS TTL-compatible video switches. 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 four 1-bit switches with separate OE inputs. When OE is LOW, the switch is ON and Port A is connected to Port B. When OE is HIGH, the switch is OPEN and a high-impedance state exists between the two ports.

Features

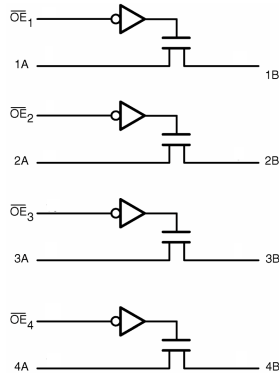
- 3Ω switch connection between two ports
- Wide bandwidth 250 MHz
- Minimal propagation delay through the switch
- Low I_{CC}
- Zero bounce in flow-through mode
- Control inputs compatible with TTL level

Ordering Code:

Order Number	Package Number	Package Description
FSAV332M	M14A	14-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-012, 0.150" Narrow
FSAV332QSC	MQA16	16-Lead Quarter Size Outline Package (QSOP), JEDEC MO-137, 0.150" Wide
FSAV332MTC	MTC14	14-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

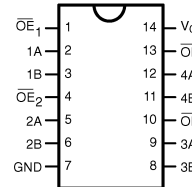


Pin Descriptions

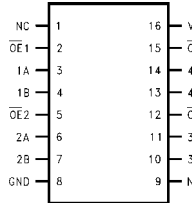
Pin Name	Description
$\overline{OE}_1, \overline{OE}_2, \overline{OE}_3, \overline{OE}_4$	Bus Switch Enables
1A, 2A, 3A, 4A	Bus A
1B, 2B, 3B, 4B	Bus B
NC	Not Connected

Connection Diagrams

Pin Assignment for SOIC and TSSOP



Pin Assignment for QSOP



Truth Table

Inputs	Inputs/Outputs
\overline{OE}	A,B
L	A = B
H	Z

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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})	4.75V to 5.25V
Input Voltage (V_{IN})	0V to 5.25V
Output Voltage (V_{OUT})	0V to 5.25V
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)	$T_A = -40^\circ\text{C to } +85^\circ\text{C}$			Units	Conditions
			Min	Typ (Note 4)	Max		
	Analog Signal Range	4.75 - 5.25	0		2.0	V	
V_{IK}	Clamp Diode Voltage	4.75			-1.2	V	$I_{IN} = -18\text{ mA}$
V_{IH}	High Level Input Voltage	4.75 - 5.25	2.0			V	
V_{IL}	Low Level Input Voltage	4.75 - 5.25			0.8	V	
I_I	Input Leakage Current	5.25			± 1.0	μA	$0 \leq V_{IN} \leq 5.5V$
I_{OZ}	OFF-STATE Leakage Current	5.25			± 1.0	μA	$0 \leq A, B \leq V_{CC}$
R_{ON}	Switch On Resistance (Note 5)	4.75		3	7	Ω	$V_{IN} = 0V, I_{IN} = 13\text{ mA}$
		4.75		7	10		$V_{IN} = 2.4V, I_{IN} = 26\text{ mA}$
I_{CC}	Quiescent Supply Current	5.25			3	μA	$V_{IN} = V_{CC}$ or GND, $I_{OUT} = 0$
ΔI_{CC} (Note 6)	Increase in I_{CC} per Input	5.25			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 $T_A = +25^\circ\text{C}$

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.

Note 6: Per TTL driven inputs, control pins only.

AC Electrical Characteristics						
Symbol	Parameter	T _A = -40°C to +85°C, C _L = 20pF, R _U = R _D = 75Ω V _{CC} = 4.75V-5.25V		Units	Conditions	Figure Number
		Min	Max			
		t _{PHL} , t _{PLH}	Propagation Delay Bus to Bus (Note 7)			
t _{PZH} , t _{PZL}	Output Enable Time	1.0	5.0	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	5.0	ns	V _I = 7V for t _{PLZ} V _I = OPEN for t _{PHZ}	Figures 1, 2
B _W ⁽⁸⁾	-3 dB Bandwidth (Note 8)	250		MHz	R _L = 150Ω, T _A = 25°C	
X _{TALK}	Crosstalk		-58	dB	R _{IN} = 10Ω R _L = 150Ω, 10 MHz	
D _G	Differential Gain		0.64	%	R _L = 150Ω, f = 3.58 MHz	
D _P	Differential Phase		0.27	Degree	R _L = 150Ω, f = 3.58 MHz	
O _{IRR}	Off Insulation		-38	dB	R _L = 150Ω, 10 MHz	

Note 7: 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).

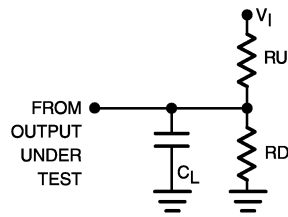
Note 8: This parameter is characterized but not tested in production.

Capacitance (Note 9)

Symbol	Parameter	Typ	Max	Units	Conditions
C _{IN}	Control Pin Input Capacitance	3		pF	V _{CC} = 5.0V
C _{OFF}	Switch-Off Capacitance	5		pF	V _{CC} , \overline{OE} = 5.0V
C _{ON}	Switch-On Capacitance	TBD		pF	V _{CC} = \overline{OE} = 5.0V

Note 9: 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, $t_W = 500\text{ns}$

FIGURE 1. AC Test Circuit

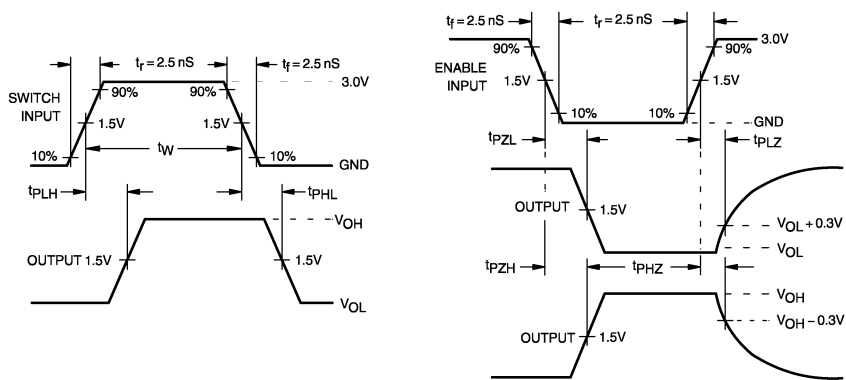
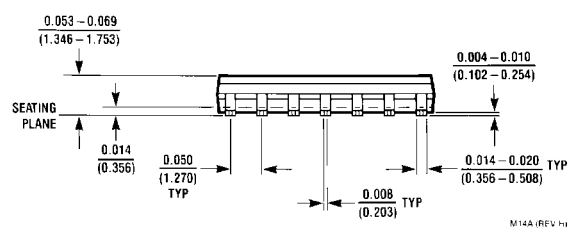
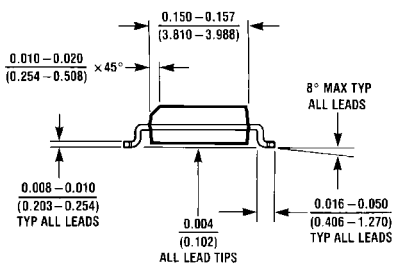
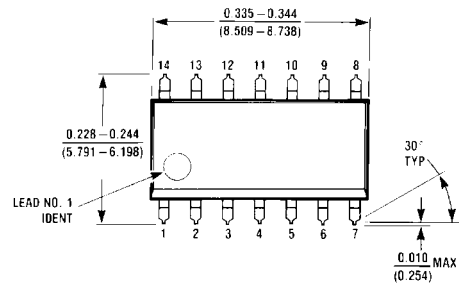
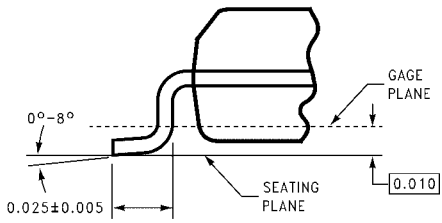
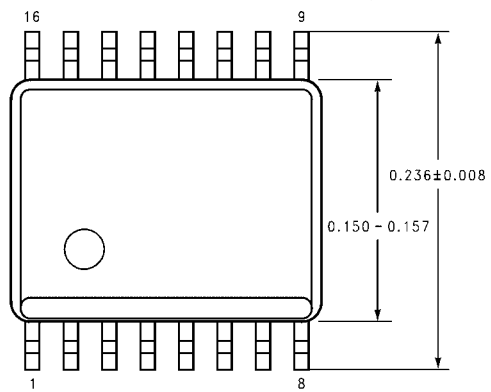


FIGURE 2. AC Waveforms

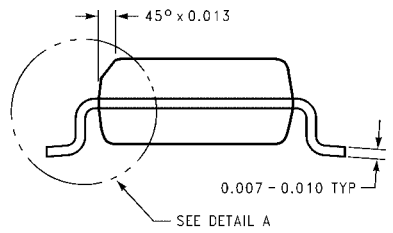
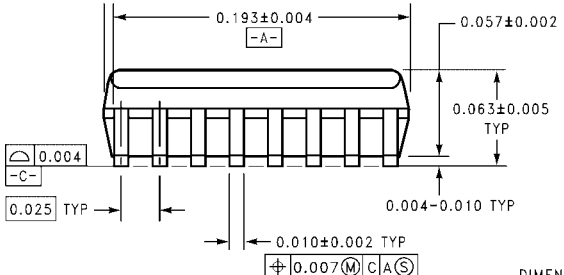
Physical Dimensions inches (millimeters) unless otherwise noted



14-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-012, 0.150" Narrow Package Number M14A



DETAIL A
TYPICAL, SCALE: 40%



DIMENSIONS ARE IN INCHES

16-Lead Quarter Size Outline Package (QSOP), JEDEC MO-137, 0.150" Wide Package Number MQA16

MQA16 (REV A)

