FAIRCHILD SEMICONDUCTOR™

April 2004
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FSAV332
Wide Bandwidth Video Switch

General Description

The Fairchild video switch FSAV32 is a quad high speed video switch. Low On Resistance 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 output enable (OE) pins. 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

- Wide bandwidth: 368 MHz
- –84 dB non adjacent channel crosstalk at 10MHz
- –49 dB Off Isolation at 10MHz
- 3Ω typical On Resistance (R_{ON})
- Low power consumption (3uA maximum)
- Control input: TTL compatible

Applications

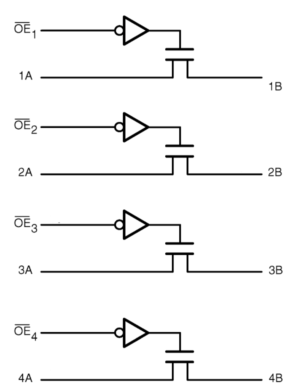
- Y/C video or CVBS video switch in LCD, plasma, and projector displays

Ordering Code:

Order Number	Package Number	Package Description
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
FSAV332MTC_NL	MTC14	Pb-Free 14-Lead Thin Shrink Small Outline Package (TSSOP), JEDEC MO-153, 4.4mm Wide

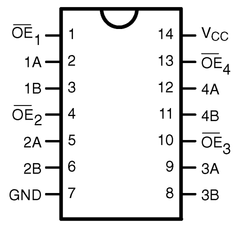
Devices also available in Tape and Reel. Specify by appending the suffix letter “X” to the ordering code.
Pb-Free package per JEDEC J-STD-020B.

Logic Diagram

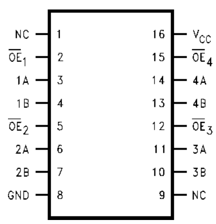


Connection Diagrams

Pin Assignment for TSSOP



Pin Assignment for QSOP



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

Truth Table

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

Absolute Maximum Ratings (Note 1)

Supply Voltage (V_{CC})	−0.5V to +7.0V
DC Switch Voltage (V_S) (Note 2)	−0.5V to V_{CC} + 0.5V
DC Input Voltage (V_{IN}) (Note 2)	−0.5V to +7.0V
DC Input Diode Current	−50 mA
DC Output Current	128 mA
Storage Temperature Range (T_{STG})	−65°C to +150°C
ESD (Human Body Model)	4000V

Recommended Operating Conditions (Note 3)

Supply Voltage (V_{CC})	4.75V to 5.25V
Control Input Voltage	0V to V_{CC}
Switch Input Voltage	0V to V_{CC}
Operating Temperature	−40°C to +85°C
Thermal Resistance	
(TSSOP)	115°C/W
(TSSOP)	127°C/W

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 All typical values are for V_{CC} = 5V @ 25°C unless otherwise specified.

Symbol	Parameter	V_{CC} (V)	T_A = −40 °C to +85 °C			Units	Conditions
			Min	Typ	Max		
V_{ANALOG}	Analog Signal Range	4.75 to 5.25	0		2.0	V	
V_{IK}	Clamp Diode Voltage	4.75			−1.2	V	I_{IN} = −18 mA
V_{IH}	Input Voltage HIGH	4.75 to 5.25	2.0			V	
V_{IL}	Input Voltage LOW	4.75 to 5.25			0.8	V	
I_{IN}	Control Input Leakage	5.25			±1.0	µA	V_{IN} = 0V to V_{CC}
I_{OZ}	OFF State Leakage Current	5.25			±1.0	µA	0 ≤ A, B ≤ V_{CC}
R_{ON}	Switch On Resistance	4.75		3.0	7.0	Ω	V_{IN} = 1V, R_L = 75Ω, I_{ON} = 13 mA
	(Note 4)	4.75		7.0	10.0		V_{IN} = 2V, R_L = 75Ω, I_{ON} = 26 mA
I_{CC}	Quiescent Supply Current	5.25			3.0	µA	V_{IN} = 0V V_{CC} or I_{OUT} = 0

Note 4: 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 Ports).

AC Electrical Characteristics

All typical value are for V_{CC} = 5V @ 25°C unless otherwise specified.

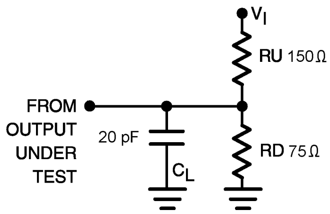
Symbol	Parameter	V_{CC} (V)	$T_A = -40°C$ to $+85°C$ Min		Max	Units	Conditions	Figure Number
t_{ON}	Turn ON Time	4.75 to 5.25	1.0		5.0	ns	V_I = 7V for t_{PZL} and V_I = OPEN for t_{PZH}	Figures 1, 2
t_{OFF}	Turn OFF Time	4.75 to 5.25	1.0		5.0	ns	V_I = 7V for t_{PLZ} and V_I = OPEN for t_{PHZ}	Figures 1, 2
t_{PLH} t_{PHL}	Propagation Delay (Note 5)	4.75 to 5.25			0.1	ns	V_I = OPEN	Figures 1, 2
DG	Differential Gain	4.75 to 5.25		0.29		%	$R_L = 150\Omega$, f = 3.58MHz	
DP	Differential Phase	4.75 to 5.25		0.10		Degree	$R_L = 150\Omega$, f = 3.58MHz	
O_{IRR}	OFF-Isolation	4.75 to 5.25		−84.0		dB	f = 10MHz, RL = 150Ω	Figure 3
X_{TALK}	Non Adjacent Channel Crosstalk	4.75 to 5.25		−54.0		dB	$R_L = 150\Omega$, f = 10MHz	Figure 4
BW	−3dB Bandwidth	4.75 to 5.25		368		MHz	$R_L = 150\Omega$	Figure 5

Note 5: This specification is guaranteed by design.

Capacitance

Symbol	Parameter	$T_A = -40°C$ to $+85°C$ Typ	Units	Conditions
C_{IN}	Control Pin Input Capacitance	3.0	pF	V_{CC} = 5.0V
C_{ON}	A/B ON Capacitance	30.0	pF	V_{CC} = 5.0V, OE = 0V
C_{OFF}	Port B OFF Capacitance	5.0	pF	V_{CC} and OE = 5.0V

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 = 500ns

FIGURE 1. AC Test Circuit

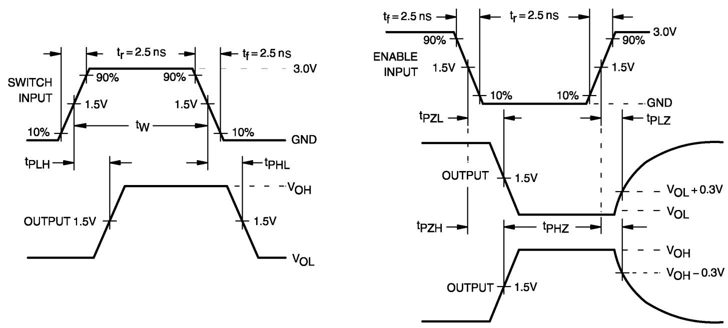


FIGURE 2. AC Waveforms

Test Diagrams

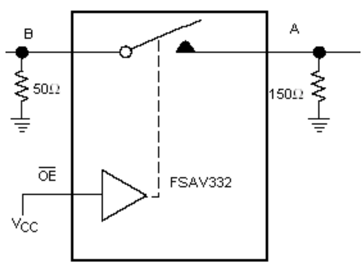


FIGURE 3. OFF Isolation Test

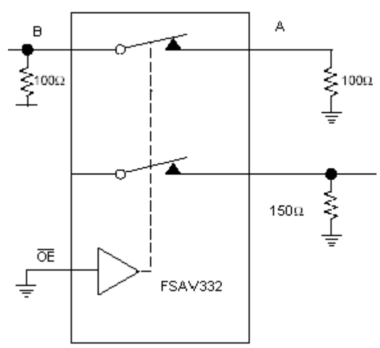


FIGURE 4. Crosstalk Test

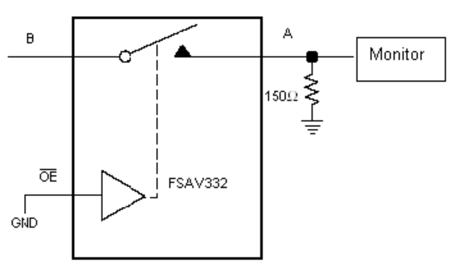
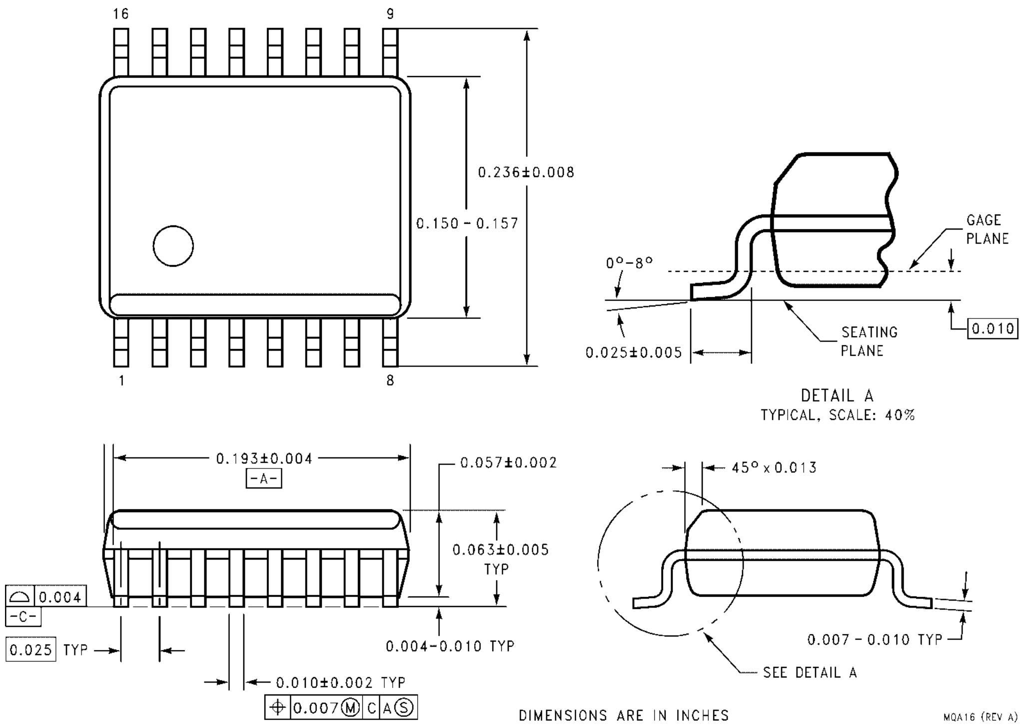


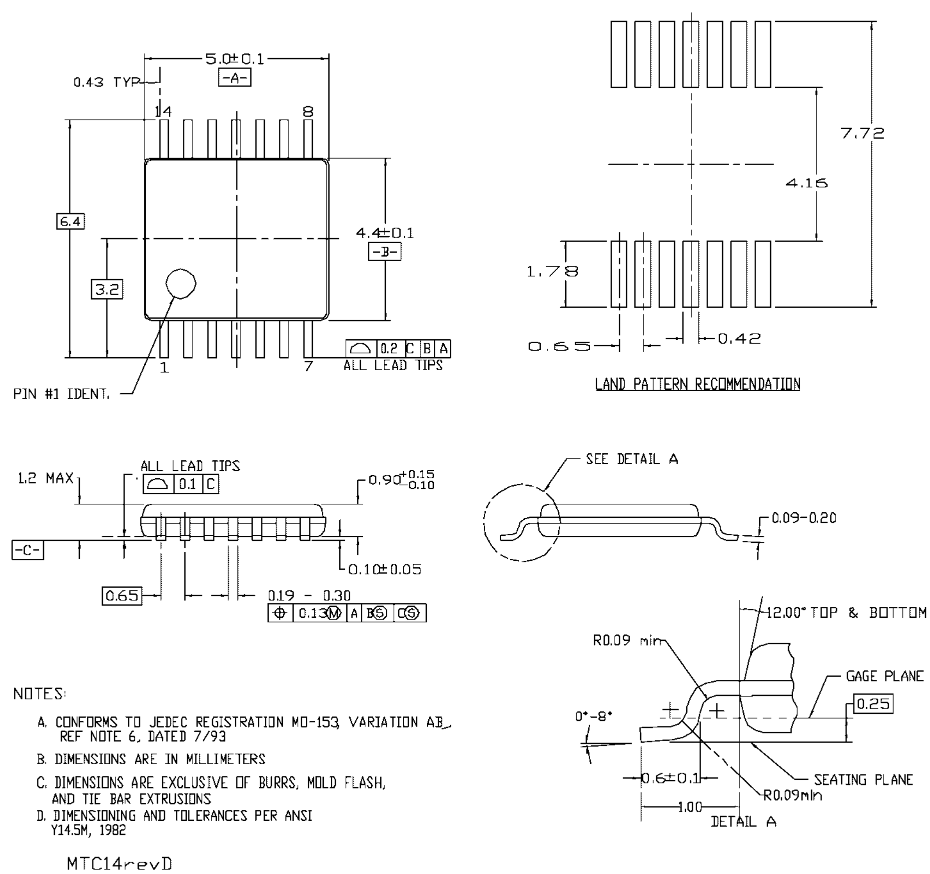
FIGURE 5. Bandwidth Test

Physical Dimensions inches (millimeters) unless otherwise noted



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

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



14-Lead Thin Shrink Small Outline Package (TSSOP), JEDEC MO-153, 4.4mm Wide
Package Number MTC14

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.