FAIRCHILD SEMICONDUCTOR®

March 2008

FSAV332 — Quad Video Switch with Individual Enables

Features

- Wide Bandwidth: 368MHz
- -84dB Non-adjacent Channel Crosstalk at 10MHz
- -49dB Off-Isolation at 10MHz
- 3Ω Typical On Resistance (R_{ON})
- Low-Power Consumption: 3µA Maximum
- Control Input: TTL Compatible

Applications

- Y/C Video or CVBS Video Switch in LCD Plasma, or Projector Displays

Description

The FSAV332 video switch 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 one-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.

Ordering Information

Part Number	Operating Temperature Range	Package	Packing Method
FSAV332MTC	-40 to +85°C	14-Lead, Thin Shrink Small Outline Package (TSSOP), JEDEC MO-153, 4.4mm Wide	Tube
FSAV332MTCX	-40 to +85°C	14-Lead, Thin Shrink Small Outline Package (TSSOP), JEDEC MO-153, 4.4mm Wide	Tape and Reel
FSAV332QSC	-40 to +85°C	16-Lead, Quarter Size Outline Package (QSOP), JEDEC MO-137, 0.150 inch Wide	Tube
FSAV332QSCX	-40 to +85°C	16-Lead, Quarter Size Outline Package (QSOP), JEDEC MO-137, 0.150 inch Wide	Tape and Reel

All packages are lead free per JEDEC: J-STD-020B standard.

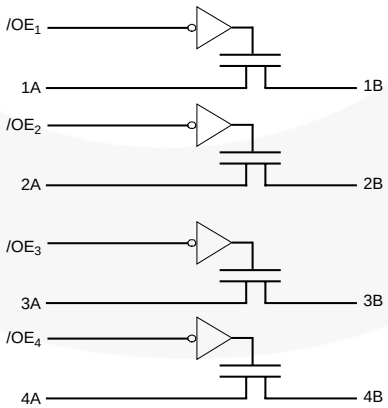


Figure 1. Logic Diagram

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Pin Assignments

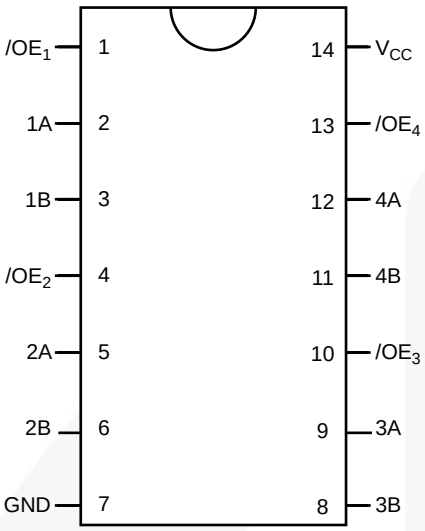


Figure 2. TSSOP Pin Assignments

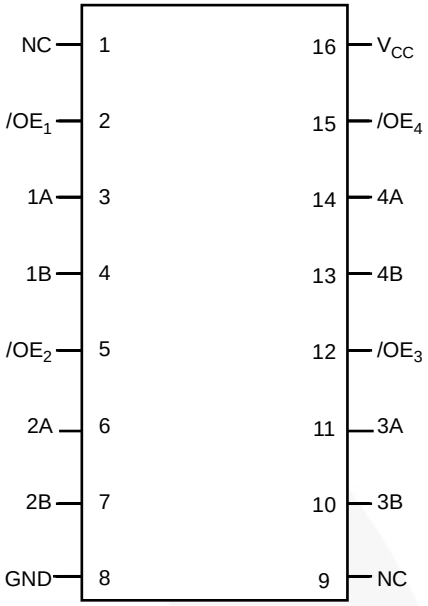


Figure 3. QSOP Pin Assignments

Pin Descriptions

Pin Names	Description
$/OE_1$, $/OE_2$, $/OE_3$, $/OE_4$	Bus Switch Enables
1A, 2A, 3A, 4A	Bus A
1B, 2B, 3B, 4B	Bus B
NC	Not Connected
V_{CC}	Supply Voltage
GND	Ground

Truth Table

Inputs	Inputs/Outputs
/OE	A, B
LOW	A = B
HIGH	High Impedance

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Absolute Maximum Ratings

Stresses exceeding the absolute maximum ratings may damage the device. The device may not function or be operable above the recommended operating conditions and stressing the parts to these levels is not recommended. In addition, extended exposure to stresses above the recommended operating conditions may affect device reliability. The absolute maximum ratings are stress ratings only.

Symbol	Parameter	Min.	Max.	Unit
V_{CC}	Supply Voltage	-0.5	7.0	V
V_S	DC Switch Voltage[1]	-0.5	V_{CC} + 0.5	V
V_{IN}	DC Input Voltage[1]	-0.5	7.0	V
I_{IK}	DC Input Diode Current	-50		mA
I_{OUT}	DC Output Current		128	mA
T_{STG}	Storage Temperature Range	-65	+150	°C
ESD	Human Body Model, JESD22-A114		4000	V

Note:

1. The input and output negative voltage ratings may be exceeded if the input and output diode current ratings are observed.

Recommended Operating Conditions

The Recommended Operating Conditions table defines the conditions for actual device operation. Recommended operating conditions are specified to ensure optimal performance to the datasheet specifications. Fairchild does not recommend exceeding them or designing to Absolute Maximum Ratings.

Symbol	Parameter		Min.	Max.	Unit
V_{CC}	Power Supply		4.75	5.25	V
V_{IN}	Control Input Voltage[2]		0	V_{CC}	V
V_S	Switch Input Voltage		0	V_{CC}	V
T_A	Operating Temperature		-40	+85	°C
Θ_{JA}	Thermal Resistance	TSSOP		+115	°C/W
		QSOP		+127	

Note:

2. Unused control inputs must be held HIGH or LOW; they may not float.

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DC Electrical Characteristics

All typical values are for V_{CC}=5.0V and 25°C, unless otherwise noted.

Symbol	Parameter	Conditions	V_{CC} (V)	Min.	Typ.	Max.	Units
V_{ANALOG}	Analog Signal Range		4.75 to 5.25	0		2	V
V_{IK}	Clamp Diode Voltage	I_{IN}=-18mA	4.75			-1.2	V
V_{IH}	High-Level Input Voltage		4.75 to 5.25	2.0			V
V_{IL}	Low-Level Input Voltage		4.75 to 5.25			0.8	V
I_{IN}	Input Leakage Current	V_{IN} = 0V to V_{CC}	5.25			±1.0	µA
I_{OZ}	Off-state Leakage Current	0 ≤ A, B ≤ V_{CC}	5.25			±1.0	µA
R_{ON}	Switch On Resistance(3)	V_{IN}=1V, R_L=75Ω, I_{ON}=13mA	4.75		3	7	Ω
		V_{IN}=2V, R_L=75Ω, I_{ON}=26mA	4.75		7	10	
I_{CC}	Quiescent Supply Current	V_{IN}= 0V V_{CC} or I_{OUT}=0	5.25			3	µA

Note:

3. Measured by the voltage drop between the A and B pins at the indicated current through the switch. On resistance is determined by the lower of the voltages on the A or B pins.

AC Electrical Characteristics

All typical values are for V_{CC}=5.0V at T_A=25°C, unless otherwise noted.

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Units	Figure
t_{ON}	Turn-on Time	V_{IN}=7V for t_{PZL}, V_{IN}=Open for t_{PZH}	1.0		5.0	ns	Figure 4 Figure 5
t_{OFF}	Turn-off Time	V_{IN}=7V for t_{PZL}, V_{IN}=Open for t_{PZH}	1.0		5.0	ns	Figure 4 Figure 5
t_{PLH}, t_{PHL}	Propagation Delay(4)	V_{IN}=Open			0.1	ns	Figure 4 Figure 5
D_G	Differential Gain	R_L=150Ω, f=3.58MHz		0.29		%	
D_P	Differential Phase	R_L=150Ω, f=3.58MHz		0.1		°	
O_{IRR}	Off Isolation	f=10MHz, R_L=150Ω		-84		dB	Figure 6
X_{TALK}	Crosstalk	R_L=150Ω, f=10MHz		-54		dB	Figure 7
B_W	-3dB Bandwidth	R_L=150Ω		368		MHz	Figure 8

Note:

4. This parameter is guaranteed by design.

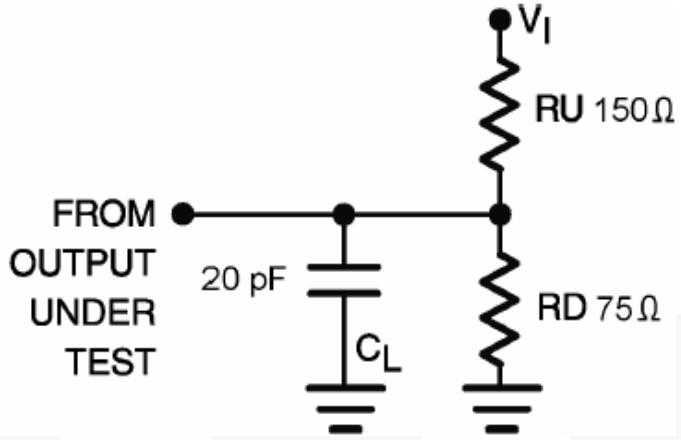
Capacitance

All typical values are for T_A= -40 to +85°C.

Symbol	Parameter	Conditions	Typ.	Units
C_{IN}	Control Pin Input Capacitance	V_{CC}=5.0V	3.0	pF
C_{ON}	A/B On Capacitance	V_{CC}=5.0V, /OE=0V	30.0	pF
C_{OFF}	Port B Off Capacitance	V_{CC} and /OE=5.0V	5.0	pF

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AC Loadings and Waveforms



Notes: Input drive by 50Ω source terminated in 50Ω.
C_L includes load and stray capacitance.
Input PRR=1.0MHz, t_W=500ns.

Figure 4. AC Test Circuit

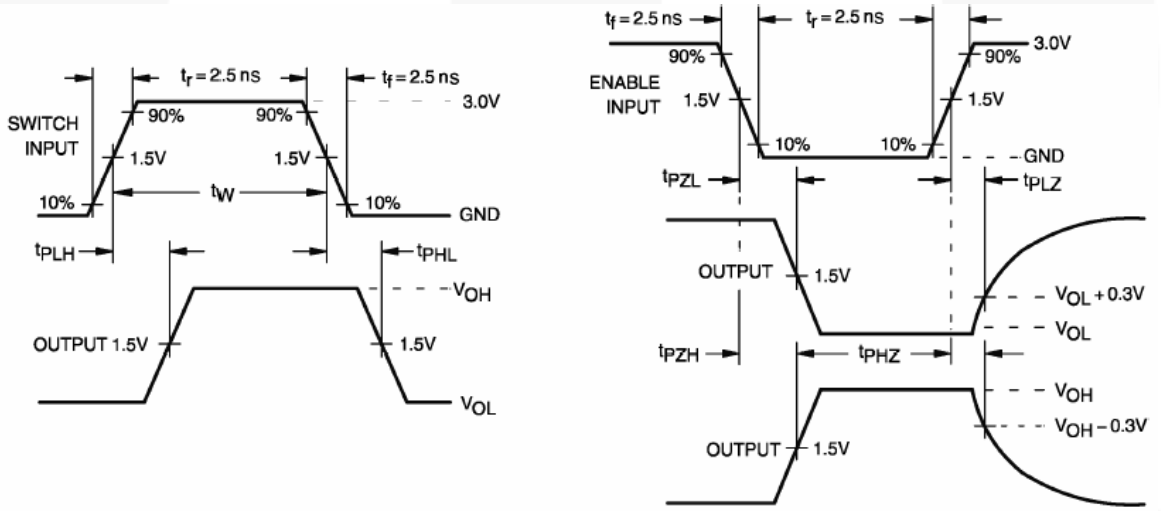


Figure 5. AC Waveforms

Test Diagrams

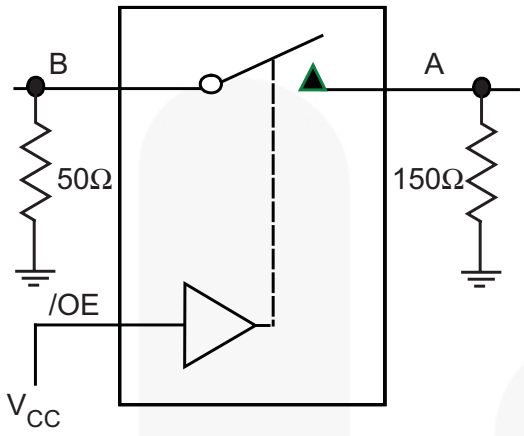


Figure 6. Off Isolation

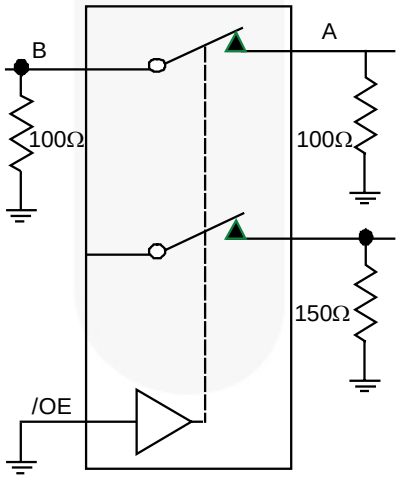


Figure 7. Crosstalk

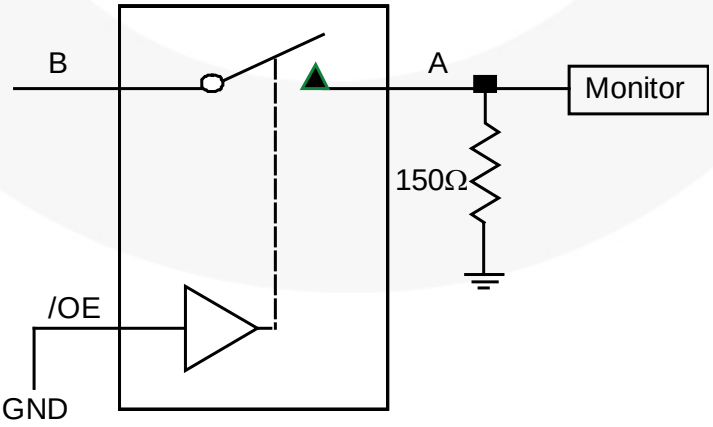


Figure 8. Bandwidth

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Physical Dimensions

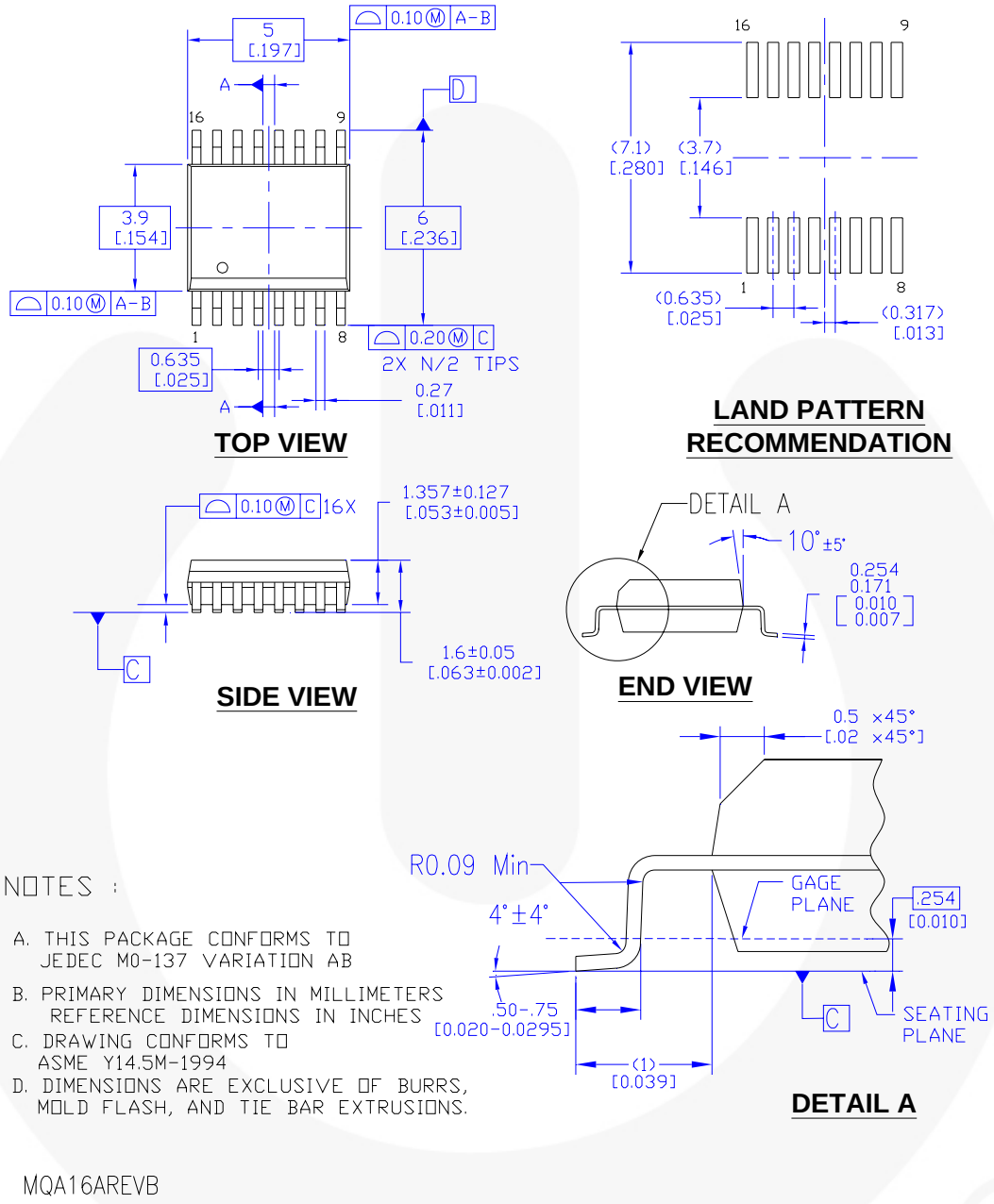


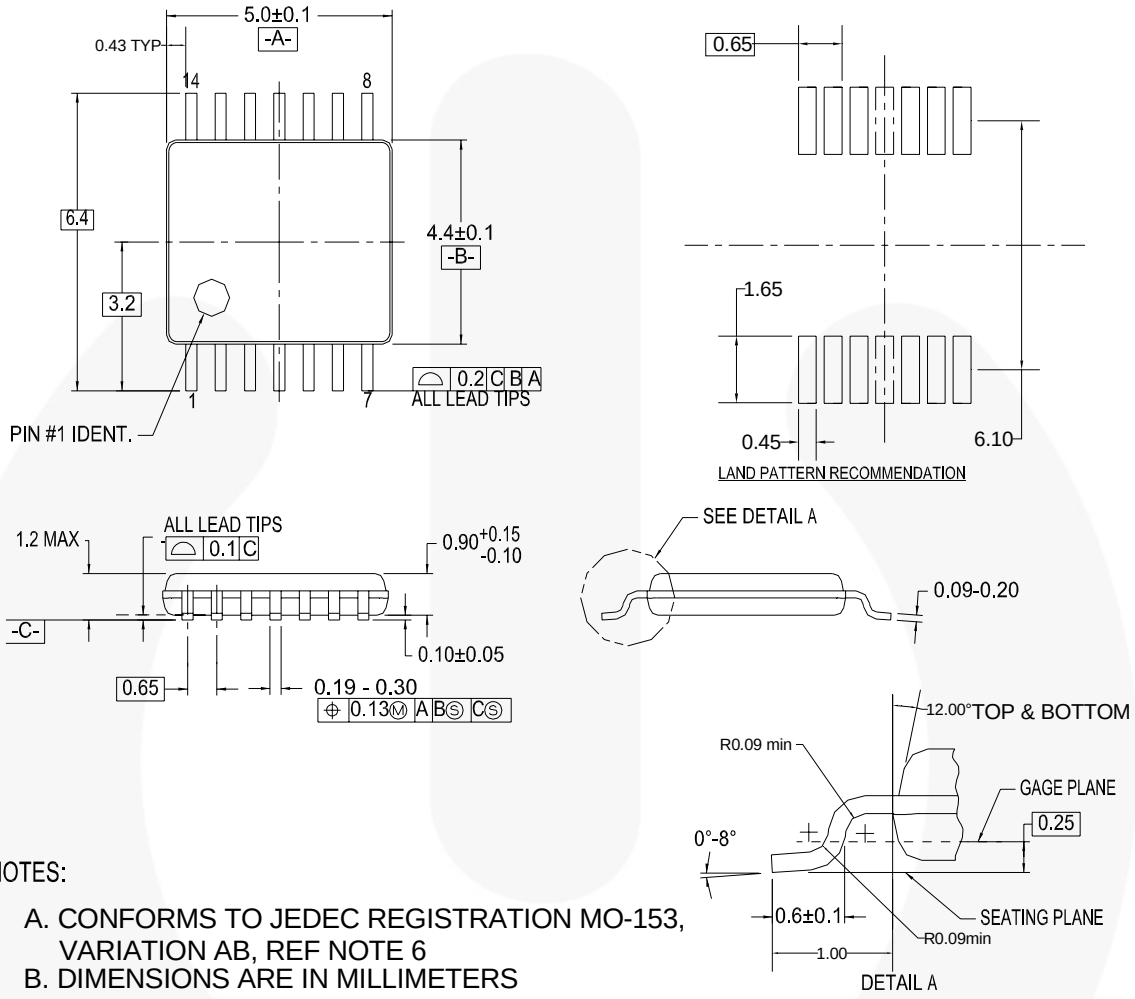
Figure 9. 16-Lead, Quarter Size Outline Package (QSOP), JEDEC MO-137, 0.150-inch Wide

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Physical Dimensions



NOTES:

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B. DIMENSIONS ARE IN MILLIMETERS
C. DIMENSIONS ARE EXCLUSIVE OF BURRS, MOLD FLASH, AND TIE BAR EXTRUSIONS
D. DIMENSIONING AND TOLERANCES PER ANSI Y14.5M, 1982
E. LANDPATTERN STANDARD: SOP65P640X110-14M
F. DRAWING FILE NAME: MTC14REV6

Figure 10. 14-Lead, Thin Shrink Small Outline Package (TSSOP), JEDEC MO-153, 4.4mm Wide

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Rev. I34

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