Video Switch for Dual SCART Connectors

General Description

The MAX7457 4-channel video switch is ideal for anti-aliasing and DAC-smoothing video applications or wherever analog video is reconstructed from a digital data stream such as cable/satellite/terrestrial set-top boxes (STBs), DVD players, hard disk recorders (HDRs), and personal video recorders (PVRs). The MAX7457 filters and buffers CVBS and RGB video signals, making it ideal for dual SCART (peritelevision) STBs with an auxillary CVBS input. The MAX7457 operates from a single +5V supply and has a flat passband out to 5MHz with a stopband attenuation of 43dB at 27MHz, making it ideal for NTSC, PAL, and standard-definition digital TV (SDTV) video systems.

The MAX7457 output buffers have a fixed gain of +6dB and are capable of driving two standard 150Ω video loads. The channel for CVBS video has high-frequency boost circuitry that enhances picture sharpness with up to +1.2dB of gain boost without degradation in the stopband. The video output drivers can be disabled by an external control input.

The MAX7457 is available in a 16-pin, 5mm x 5mm x 0.8mm TQFN package, and is specified over the extended (-40°C to +85°C) temperature range.

Applications

STBs/HDRs	DVD Players
Game Consoles	Digital VCRs
Desktop Video Editors	

Features

- **4-Channel Video Filter/Buffer for RGB and CVBS Signals with Auxiliary Input**
- **Allows Auxiliary Input for CVBS Video Loop-Through Applications**
- **Filter Response Ideal for NTSC, PAL, and Interlaced SDTV Video Signals**
- **43dB (typ) Stopband Attenuation at 27MHz**
- **±0.75dB (max) Passband Ripple Out to 5MHz**
- **Blanking Level Voltage on Cable <1V**
- **Each Channel Drives Two 150Ω Video Loads**
- **+5V Single-Supply Operation**
- **Available in 5mm x 5mm x 0.8mm, 16-Pin TQFN**

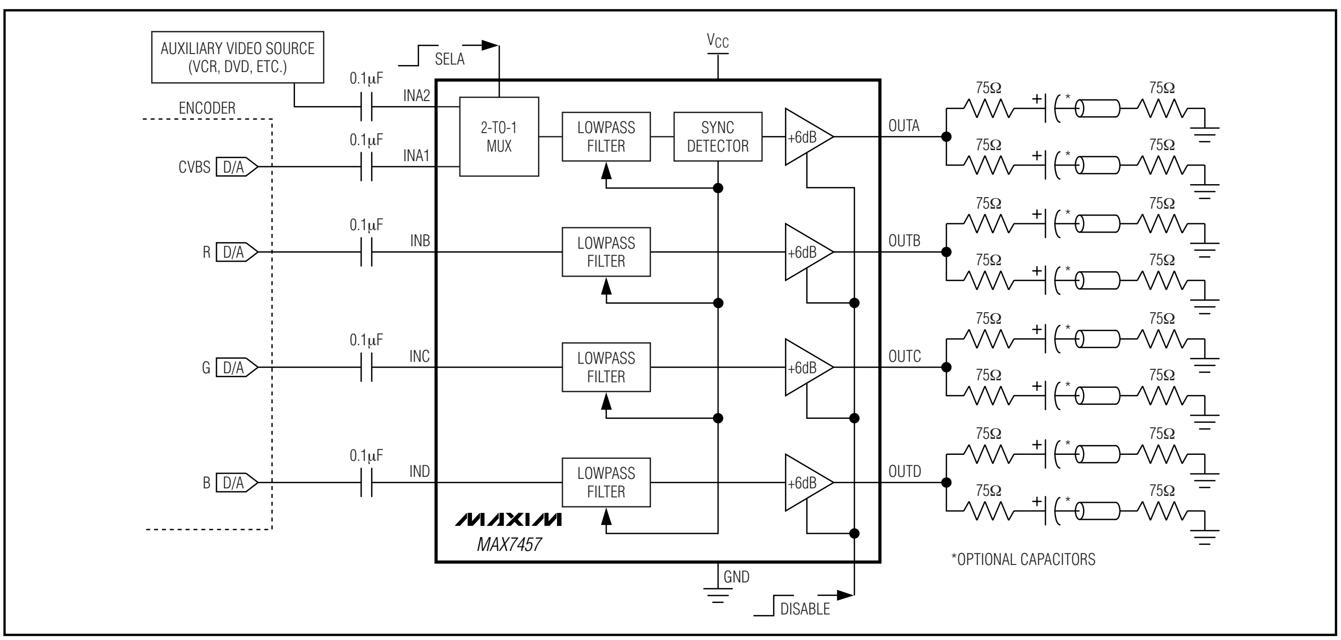
Ordering Information

PART	TEMP RANGE	PIN-PACKAGE	PKG CODE
MAX7457ETE	-40°C to +85°C	16 TQFN-EP*	T1655-2

**EP = Exposed pad.*

Pin Configuration appears at end of data sheet.

Typical Operating Circuit



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ABSOLUTE MAXIMUM RATINGS

V_{CC} to GND ....-0.3V to +6V
INA1, INA2, INB, INC, IND to GND ....-0.3V to (V_{CC} + 0.3V)
OUTA, OUTB, OUTC, OUTD to GND ....-0.3V to (V_{CC} + 0.3V)
SELA, DISABLE to GND ....-0.3V to (V_{CC} + 0.3V)
Maximum Current into Any Pin Except V_{CC} and GND .....±50mA
Continuous Power Dissipation (T_A = +70°C)
16-Pin TQFN (derate 20.8mW/°C above +70°C)..........................1666.7mW

Operating Temperature Range ....-40°C to +85°C
Storage Temperature Range ....-65°C to +150°C
Junction Temperature ....+150°C
Lead Temperature (soldering, 10s) ....+300°C

Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

ELECTRICAL CHARACTERISTICS

(V_{CC} = +5V ±5%, C_L = 0 to 20pF, R_L = 75Ω to GND for DC-coupled load, R_L = 75Ω to V_{CC}/2 for AC-coupled load, T_A = T_{MIN} to T_{MAX}, unless otherwise noted. Typical values are at V_{CC} = 5V, T_A = +25°C.)

PARAMETER	SYMBOL	CONDITIONS		MIN	TYP	MAX	UNITS
Passband Flatness		f = 100kHz to 5MHz, relative to 100kHz	Channel INA_	+0.9	+1.2	+1.5	dB
			Channels INB, INC, IND	-0.75	+0.15	+0.75	
Stopband Attenuation	A_{SB}	f ≥ 27MHz		40	43		dB
Differential Gain	dG	5-step modulated staircase			0.15	0.5	%
Differential Phase	dθ	5-step modulated staircase			0.15	0.5	Degrees
Signal-to-Noise Ratio	SNR	Peak signal ($2V_{P-P}$) to RMS noise, f = 100Hz to 50MHz			80		dB
Group Delay Deviation	Δt_g	Deviation from 100kHz to 4.1MHz	Channel INA_		17	30	ns
			Channels INB, INC, IND		11	20	
Line-Time Distortion	H_{DIST}	18µs, 100 IRE bar				0.3	%
Field-Time Distortion	V_{DIST}	130 lines, 18µs, 100 IRE bar				0.5	%
Clamp Settling Time	t_{CLAMP}	To ±1%			300		Lines
Output DC Clamp Level		Channel INA_		0.6	0.9	1.1	V
		Channel INB, INC, IND		1.1	1.5	1.8	
Low-Frequency Gain Accuracy	A_V	f = 100kHz, relative to gain of +6dB		-3		+3	%
Low-Frequency Gain Matching	$A_{V(MATCH)}$	Low-frequency channel-to-channel matching, f = 100kHz				4	%
Group Delay Matching	$t_{g(MATCH)}$	Low-frequency channel-to-channel matching, f = 100kHz			2		ns
Channel-to-Channel Crosstalk	X_{TALK}	f = 100kHz to 3.58MHz			-60		dB
Disabled Output Impedance	$Z_{DISABLE}$	At 5MHz			2		kΩ
Output Short-Circuit Current	I_{SC}	OUT_ shorted to GND or V_{CC}			70		mA

ELECTRICAL CHARACTERISTICS (continued)

(V_{CC} = +5V ±5%, C_L = 0 to 20pF, R_L = 75Ω to GND for DC-coupled load, R_L = 75Ω to $V_{CC}/2$ for AC-coupled load, T_A = T_{MIN} to T_{MAX}, unless otherwise noted. Typical values are at V_{CC} = 5V, T_A = +25°C.)

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Input Leakage Current	I_{IN}				10	µA
Input Dynamic Swing		Channel INA_			1.2	V_{P-P}
		Channels INB, INC, IND			0.9	
Mux Crosstalk		f = 100kHz to 4.1MHz		-60		dB
SUPPLY						
Supply Voltage Range	V_{CC}		4.75		5.25	V
Supply Current	I_{CC}	No load		100	140	mA
Power-Supply Rejection Ratio	PSRR	V_{IN} = 100mV_{P-P}, f = 0 to 3.5MHz		40		dB
LOGIC INTERFACE						
Logic Input High Voltage	V_{IH}		2.0			V
Logic Input Low Voltage	V_{IL}				0.8	V
Logic Input Current		V_{IL} = 0 (sink), V_{IH} = V_{CC} (source)			±10	µA