19-0744; Rev 6; 2/11

EVALUATION KIT AVAILABLE

Single, Dual, Triple, and Quad Standard-Definition Video Filter Amplifiers with AC-Coupled Input Buffers

General Description

The MAX9586–MAX9589 are small, low-power, multichannel video amplifiers with integrated reconstruction filters and input clamps. Specially suited for standard-definition video signals, these devices are ideal for a wide range of television and set-top box applications.

The video signals from the outputs of a digital-to-analog converter (DAC) are AC-coupled to the inputs of the MAX9586–MAX9589. External video signals, in which the DC bias is usually not known, can also be AC-coupled to the inputs of the MAX9586–MAX9589. The input sync-tip clamps set the DC level of composite video or luma signals, and the input bias circuits set the DC level of chroma signals.

The reconstruction filter typically has ±1dB passband flatness at 8.5MHz and 55dB attenuation at 27MHz. The amplifiers have 2V/V gain and the outputs can be DC-coupled to a 75Ω load, which is the equivalent of two video loads, or AC-coupled to a 150Ω load.

The MAX9586–MAX9589 operate from a 2.7V to 3.6V single supply and are specified over the -40°C to +125°C automotive temperature range. The MAX9586–MAX9589 are offered in small SOT23 and µMAX® packages.

Applications

Set-Top Boxes

Televisions

µMAX is a registered trademark of Maxim Integrated Products, Inc.

Features

- **Single- (MAX9586), Dual- (MAX9587), Triple- (MAX9588), and Quad- (MAX9589) Channel Devices**
- **8.5MHz, ±1dB Passband**
- **55dB Attenuation at 27MHz**
- **Fixed Gain of 2V/V**
- **Low Power: 4.25mA per Channel**
- **2.7V to 3.6V Single-Supply Operation**
- **Small SOT23 and µMAX Packages**

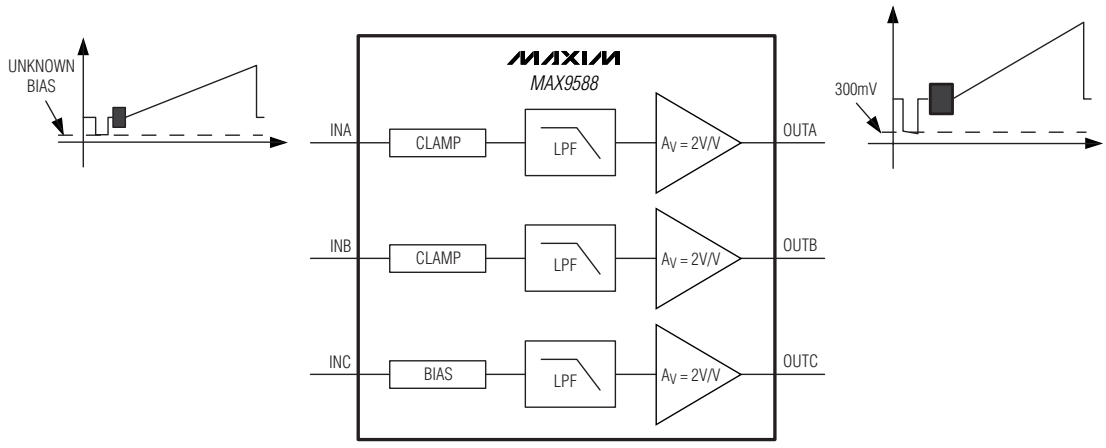
Ordering Information

PART	PIN-PACKAGE	CHANNELS
MAX9586AZK+T	5 Thin SOT23	1
MAX9587AZT+T	6 Thin SOT23	2
MAX9588AUA+T	8 µMAX	3
MAX9589AUB+T	10 µMAX	4

Note: *All devices are specified over the -40°C to +125°C operating temperature range.*
+Denotes a lead(Pb)-free/RoHS-compliant package.
T = Tape and reel.

Pin Configurations and Selector Guide located at end of data sheet.

Block Diagrams



Block Diagrams continued at end of data sheet.

For pricing, delivery, and ordering information, please contact Maxim Direct at 1-888-629-4642, or visit Maxim's website at www.maxim-ic.com.

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ABSOLUTE MAXIMUM RATINGS

V_{DD} to GND .....-0.3V to +4V
IN_ to GND .....-0.3V to +4V
SHDN to GND.....-0.3V to +4V
OUT_ Short Circuit Duration to V_{DD}, GND .....Continuous
Continuous Input Current
IN_, SHDN .....±20mA
Continuous Power Dissipation (T_A = +70°C)
5-Pin Thin SOT23 (derate 9.1mW/°C above +70°C) 727mW
6-Pin Thin SOT23 (derate 9.1mW/°C above +70°C) 727mW
8-Pin µMAX (derate 4.5mW/°C above +70°C) 362mW
10-Pin µMAX (derate 5.6mW/°C above +70°C) 444mW
Operating Temperature Range .....-40°C to +125°C
Junction Temperature .....+150°C
Storage Temperature Range .....-65°C to +150°C
Lead Temperature (soldering, 10s) .....+300°C
Soldering Temperature (reflow) .....+260°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_{DD} = 3.3V, V_{GND} = 0V, VR_L = no load, T_A = T_{MIN} to T_{MAX}, unless otherwise noted. Typical values are at T_A = +25°C.) (Note 1)

PARAMETER	SYMBOL	CONDITIONS		MIN	TYP	MAX	UNITS
Supply Voltage Range	V_{DD}	Guaranteed by PSRR		2.7		3.6	V
Supply Current	I_{DD}	Per channel			4.25	8	mA
Sync-Tip Clamp Level	V_{CLP}	Sync-tip clamp		0.24		0.41	V
Input Voltage Range	V_{IN}	Guaranteed by DC voltage gain	V_{DD} = 2.7V, sync-tip clamp input			1.05	V_{P-P}
			V_{DD} = 2.7V, bias input			1.05	
			V_{DD} = 3V, sync-tip clamp input			1.2	
			V_{DD} = 3V, bias input			1.2	
Sync Crush		Sync-tip clamp, percentage reduction in sync pulse (0.3V_{P-P}), guaranteed by input clamping current measurement, measured at input				2	%
Input Clamping Current		Sync-tip clamp			1	2	µA
Maximum Input Source Resistance					300		Ω
Bias Voltage	V_{BIAS}	Bias circuit		0.40	0.50	0.62	V
Input Resistance		Bias circuit			11		kΩ
DC Voltage Gain (Note 2)	A_V	R_L = 150Ω to GND	V_{DD} = 2.7V, V_{IN} = V_{CLP} to (V_{CLP} + 1.05V)	1.95	2.00	2.04	V/V
			V_{DD} = 3V, V_{IN} = V_{CLP} to (V_{CLP} + 1.2V)	1.95	2.00	2.04	
			V_{DD} = 2.7V, V_{IN} = V_{BIAS} ±0.525V	1.95	2.00	2.04	
			V_{DD} = 3V, V_{IN} = V_{BIAS} ±0.600V	1.95	2.00	2.04	
DC Gain Matching		Guaranteed by DC voltage gain		-2	0	+2	%
Output Level		Measured at V_{OUT}, IN_ = 0.1µF to GND, R_L = 150Ω to GND	Sync-tip clamp	0.2	0.3	0.4	V
			Bias circuit		1.3		

ELECTRICAL CHARACTERISTICS (continued)

(V_{DD} = 3.3V, V_{GND} = 0V, VR_L = no load, T_A = T_{MIN} to T_{MAX}, unless otherwise noted. Typical values are at T_A = +25°C.) (Note 1)

PARAMETER	SYMBOL	CONDITIONS		MIN	TYP	MAX	UNITS
Output-Voltage Swing		Sync-tip clamp	Measured at output, V_{DD} = 2.7V, V_{IN} = V_{CLP} to (V_{CLP} + 1.05V), R_L = 150Ω to -0.2V		2.1		V_{P-P}
			Measured at output, V_{DD} = 2.7V, V_{IN} = V_{CLP} to (V_{CLP} + 1.05V), R_L = 150Ω to V_{DD}/2		2.1		
			Measured at output, V_{DD} = 3V, V_{IN} = V_{CLP} to (V_{CLP} + 1.2V), R_L = 150Ω to -0.2V		2.4		
			Measured at output, V_{DD} = 3V, V_{IN} = V_{CLP} to (V_{CLP} + 1.2V), R_L = 150Ω to V_{DD}/2		2.4		
			Measured at output, V_{DD} = 3.135V, V_{IN} = V_{CLP} to (V_{CLP} + 1.05V), R_L = 75Ω to -0.2V		2.1		
		Bias Circuit	Measured at output, V_{DD} = 2.7V, V_{IN} = V_{BIAS} ±0.525V, R_L = 150Ω to -0.2V		2.1		
			Measured at output, V_{DD} = 2.7V, V_{IN} = V_{BIAS} ±0.500V, R_L = 150Ω to V_{DD}/2		2.0		
			Measured at output, V_{DD} = 3V, V_{IN} = V_{BIAS} ±0.600V, R_L = 150Ω to -0.2V		2.4		
			Measured at output, V_{DD} = 3V, V_{IN} = V_{BIAS} ±0.500V, R_L = 150Ω to V_{DD}/2		2.0		
			Measured at output, V_{DD} = 3.135V, V_{IN} = V_{BIAS} ±0.525V, R_L = 75Ω to -0.2V		2.1		
Output Short-Circuit Current		Short to GND (sourcing)			140		mA
		Short to V_{DD} (sinking)			70		
Output Resistance	R_{OUT}	V_{OUT} = 1.5V, -10mA ≤ I_{LOAD} ≤ +10mA			0.2		Ω

Single, Dual, Triple, and Quad Standard-Definition Video Filter Amplifiers with AC-Coupled Input Buffers

ELECTRICAL CHARACTERISTICS (continued)

(V_{DD} = 3.3V, V_{GND} = 0V, VR_L = no load, T_A = T_{MIN} to T_{MAX}, unless otherwise noted. Typical values are at T_A = +25°C.) (Note 1)

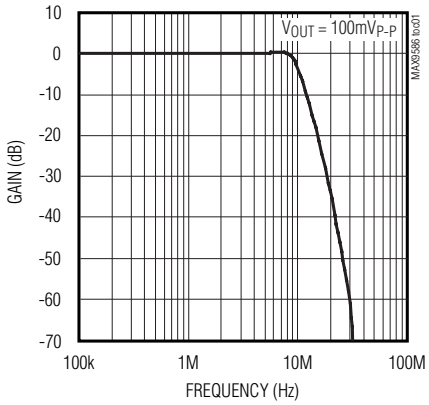
PARAMETER	SYMBOL	CONDITIONS		MIN	TYP	MAX	UNITS
Power-Supply Rejection Ratio		2.7V ≤ V_{DD} ≤ 3.6V		48			dB
		f = 1MHz, 100mV_{P-P}			29		
Standard-Definition Reconstruction Filter		±1dB passband flatness			8.5		MHz
		$V_{OUT_}$ = 2V_{P-P}, reference frequency is 100kHz	f = 5.5MHz		-0.15		dB
			f = 9.5MHz		-3		
			f = 27MHz		-55		
Differential Gain	DG	5-step modulated staircase of 129mV step size and 286mV peak-to-peak subcarrier amplitude, f = 4.43MHz			0.1		%
Differential Phase	DP	5-step modulated staircase of 129mV step size and 286mV peak-to-peak subcarrier amplitude, f = 4.43MHz			0.4		Degrees
2T Pulse-to-Bar K Rating		2T = 200ns, bar time is 18µs; the beginning 2.5% and the ending 2.5% of the bar time are ignored			0.6		K%
2T Pulse Response		2T = 200ns			0.2		K%
2T Bar Response		2T = 200ns, bar time is 18µs; the beginning 2.5% and the ending 2.5% of the bar time are ignored			0.2		K%
Nonlinearity		5-step staircase			0		%
Group Delay Distortion		100kHz ≤ f ≤ 5.5MHz, outputs are 2V_{P-P}			9		ns
Peak Signal to RMS Noise		100kHz ≤ f ≤ 5.5MHz			71		dB
Output Impedance		f = 5.5MHz			4.8		Ω
All-Hostile Crosstalk		f = 4.43MHz			-64		dB

Note 1: All devices are 100% production tested at T_A = +25°C. Specifications over temperature limits are guaranteed by design.
Note 2: Voltage gain (A_V) is a two-point measurement in which the output-voltage swing is divided by the input-voltage swing.

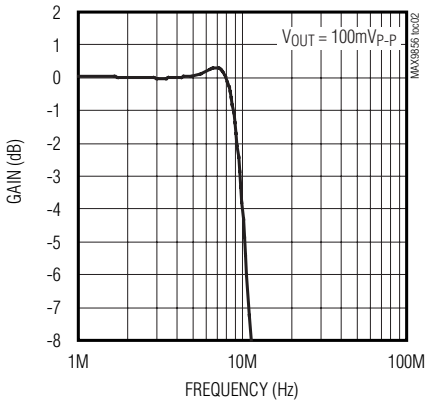
Typical Operating Characteristics

(V_{DD} = $V_{\overline{SHDN}}$ = +3.3V, video outputs have R_L = 150Ω connected to GND, T_A = +25°C, unless otherwise noted.)

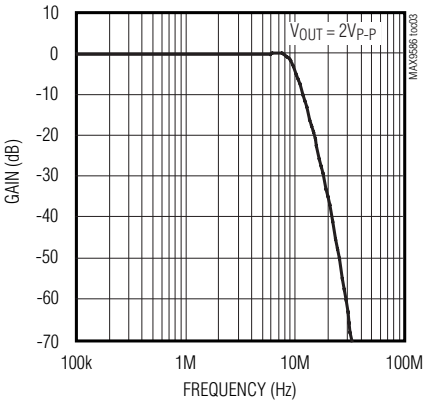
SMALL-SIGNAL GAIN vs. FREQUENCY



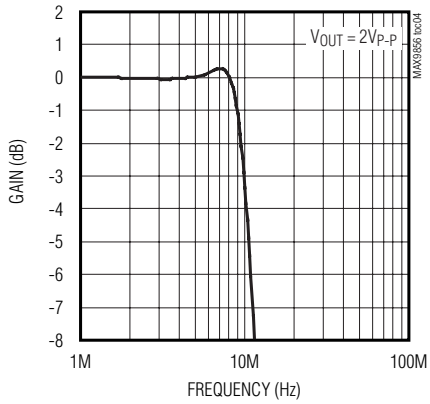
SMALL-SIGNAL GAIN FLATNESS vs. FREQUENCY



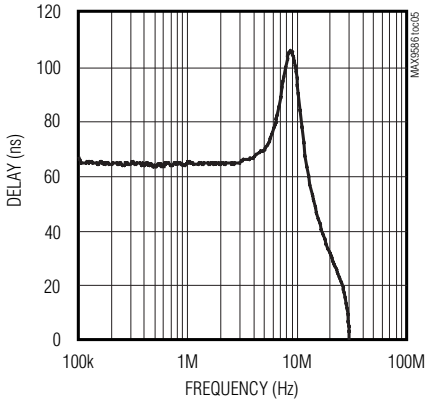
LARGE-SIGNAL GAIN vs. FREQUENCY



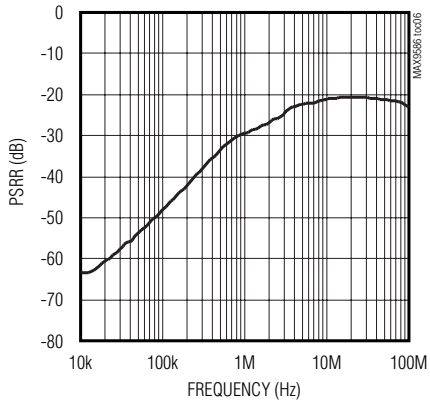
LARGE-SIGNAL GAIN FLATNESS vs. FREQUENCY



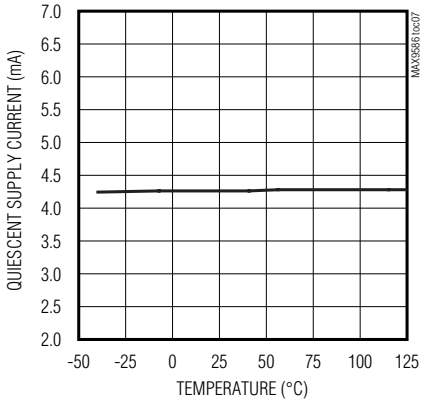
GROUP DELAY vs. FREQUENCY



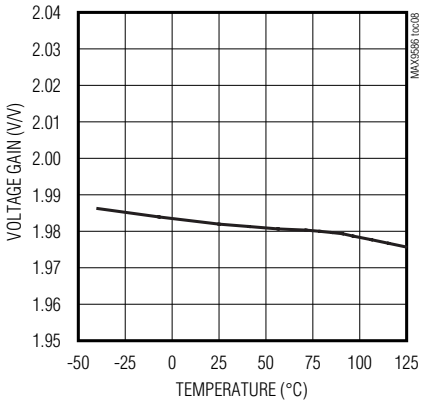
POWER-SUPPLY REJECTION RATIO vs. FREQUENCY



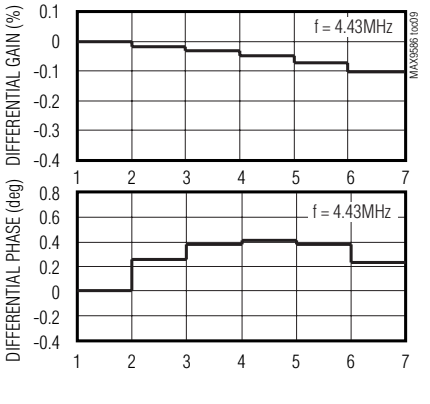
QUIESCENT SUPPLY CURRENT vs. TEMPERATURE



VOLTAGE GAIN vs. TEMPERATURE



DIFFERENTIAL GAIN AND PHASE

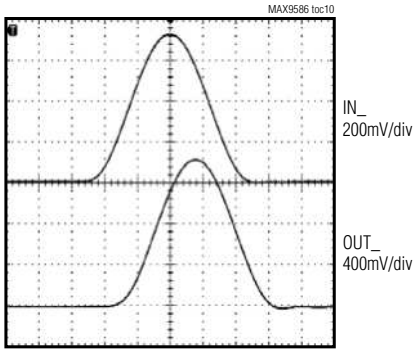


Single, Dual, Triple, and Quad Standard-Definition Video Filter Amplifiers with AC-Coupled Input Buffers

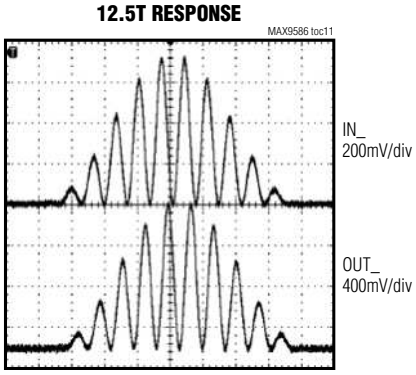
Typical Operating Characteristics (continued)

(V_{DD} = $V_{\overline{SHDN}}$ = +3.3V, video outputs have R_L = 150Ω connected to GND, T_A = +25°C, unless otherwise noted.)

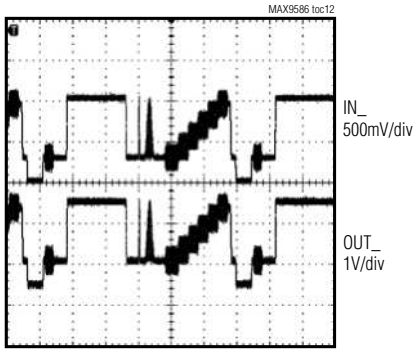
2T RESPONSE



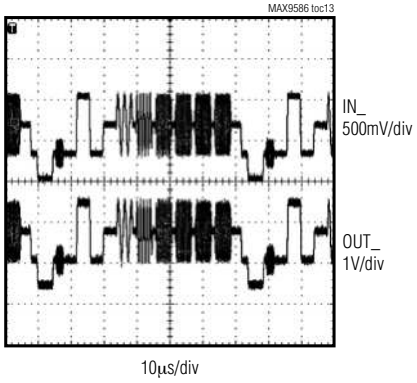
12.5T RESPONSE



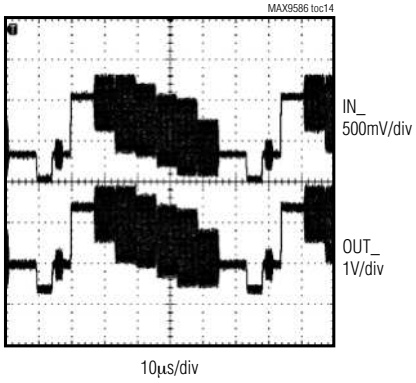
NTC-7 VIDEO TEST SIGNAL



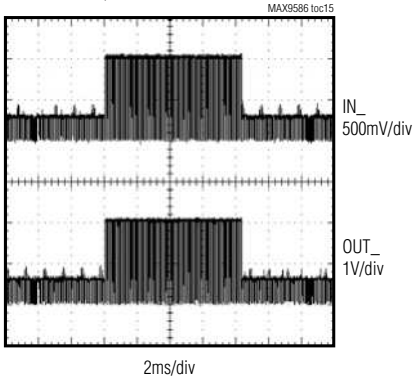
PAL MULTIBURST RESPONSE



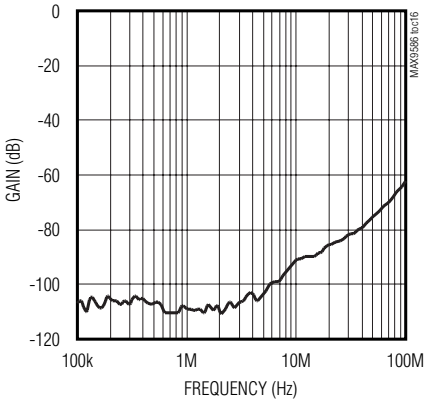
PAL COLOR BARS



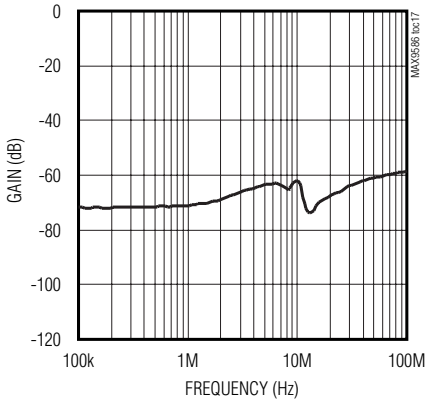
FIELD SQUARE-WAVE RESPONSE



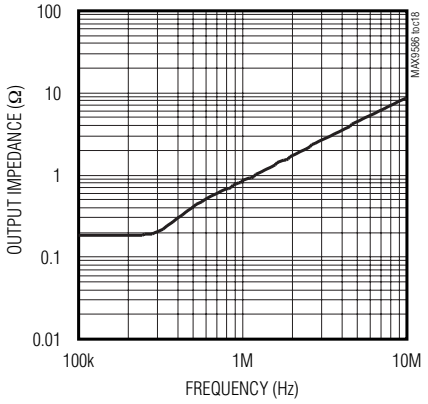
INPUT-TO-INPUT CROSSTALK vs. FREQUENCY



OUTPUT-TO-OUTPUT CROSSTALK vs. FREQUENCY



OUTPUT IMPEDANCE vs. FREQUENCY



Pin Description

PIN				NAME	FUNCTION
MAX9586	MAX9587	MAX9588	MAX9589		
5 SOT23	6 SOT23	8 µMAX	10 µMAX		
1	—	—	—	$\overline{SHDN}$	Active-Low Shutdown Input. Connect to GND to shut down.
2	2	4	5	GND	Ground
3	—	—	—	IN	Video Input
—	3	1	1	INA	Video Input A
—	1	2	2	INB	Video Input B
—	—	3	3	INC	Video Input C
—	—	—	4	IND	Video Input D
4	—	—	—	OUT	Video Output
—	4	7	9	OUTA	Video Output A
—	6	6	8	OUTB	Video Output B
—	—	5	7	OUTC	Video Output C
—	—	—	6	OUTD	Video Output D
5	5	8	10	V_{DD}	Positive Power Supply. Bypass to GND with a 0.1µF capacitor.

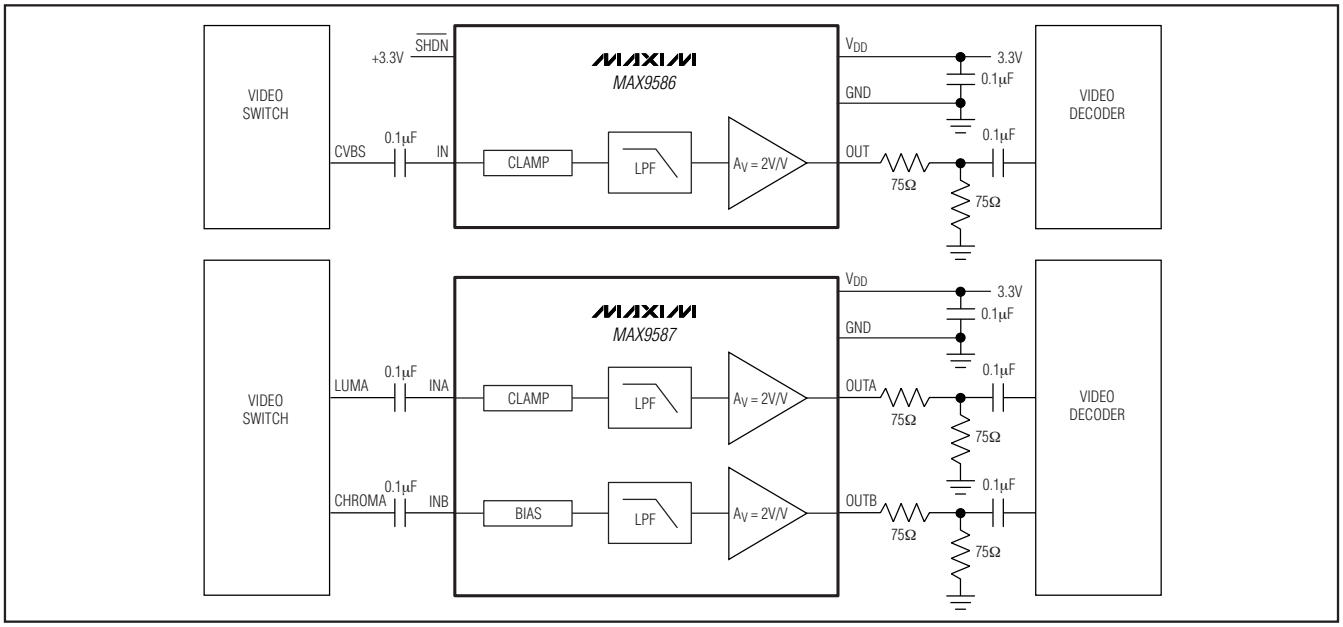


Figure 1. Typical Application Circuits for the MAX9586/MAX9587 (Anti-Alias Filter)

Single, Dual, Triple, and Quad Standard-Definition Video Filter Amplifiers with AC-Coupled Input Buffers

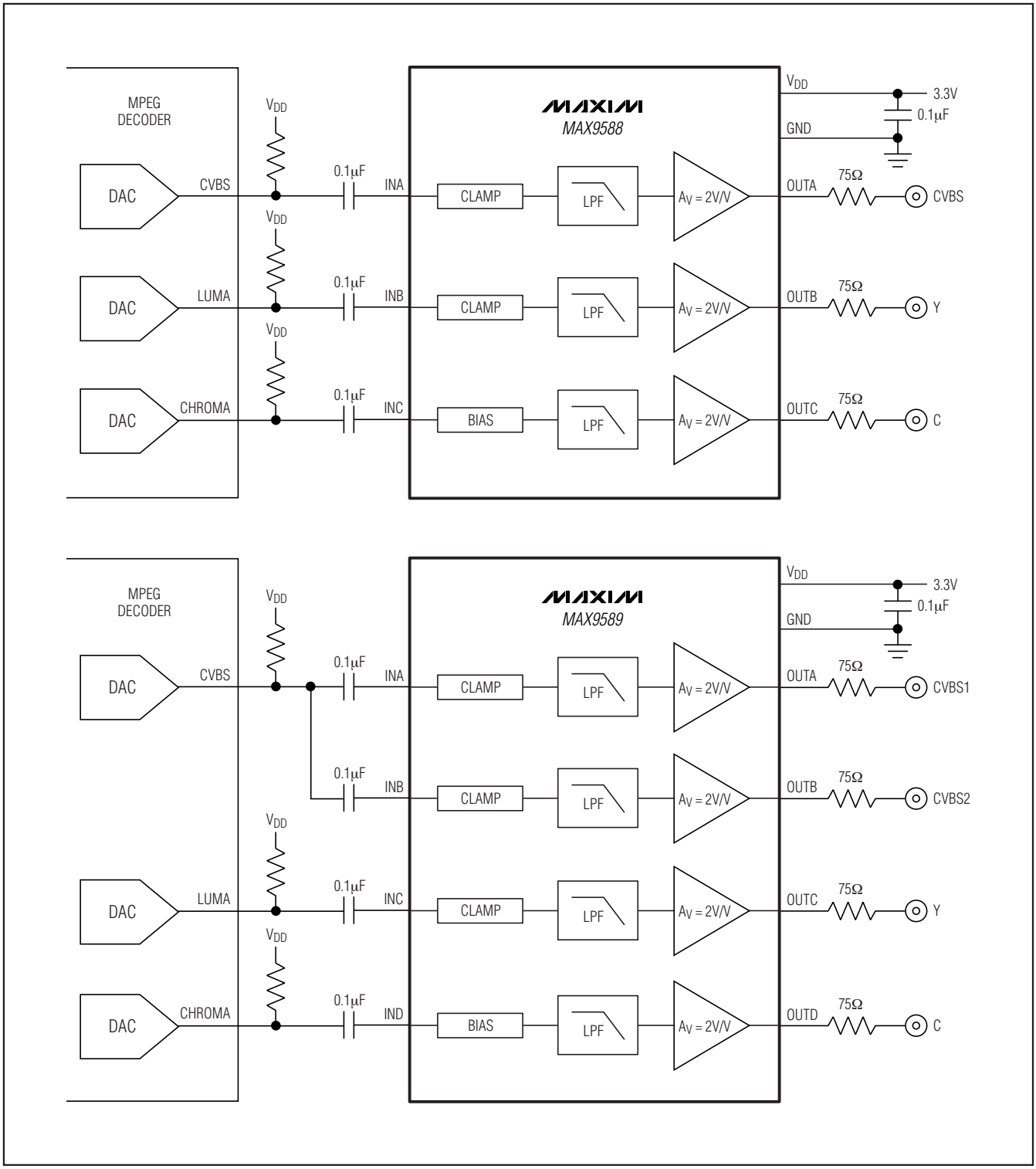


Figure 2. Typical Application Circuits for the MAX9588/MAX9589 (Reconstruction Filter)

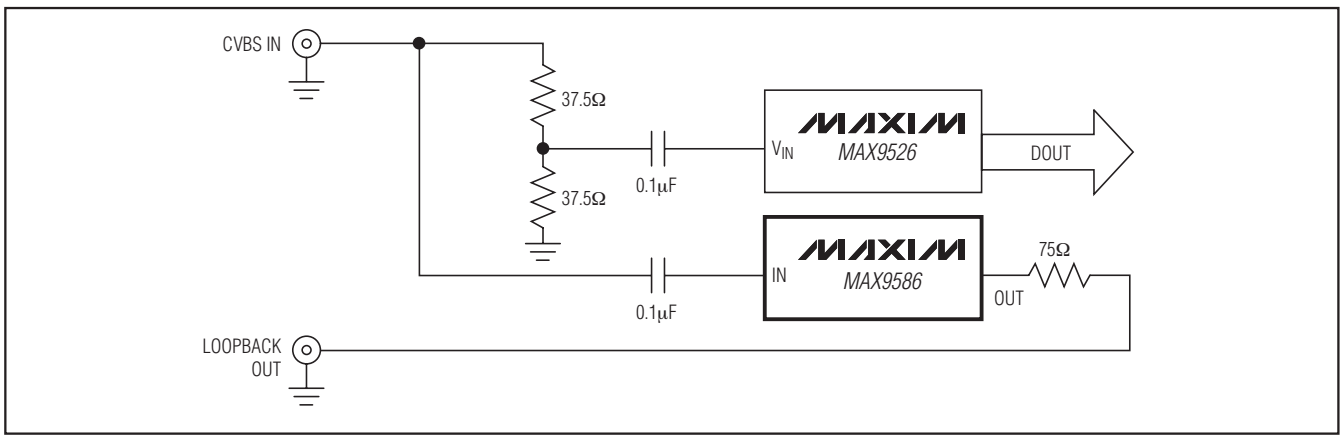


Figure 3. Loopback Circuit Diagram

Detailed Description

The MAX9586–MAX9589 filter and amplify the video DAC output in applications such as set-top boxes and televisions. These devices consist of input clamps, input bias circuits, lowpass filters, and gain of 2V/V output amplifiers capable of driving a standard 150Ω video load to ground.

Inputs

The input stages of the MAX9586–MAX9589 are either sync-tip clamps or bias circuits. Sync-tip clamps accept AC-coupled CVBS or luma video signals with sync pulses. The sync-tip voltage is internally set to 300mV. Bias circuit inputs accept AC-coupled chroma, a subcarrier modulated with the color information. The bias voltage of the bias circuits is approximately 500mV.

Video Filter

The filter passband (±1dB) is typically 8.5MHz, which makes the device suitable for standard-definition video signals from all sources (e.g., broadcast and DVD). Broadcast video signals are channel limited: NTSC signals have 4.2MHz bandwidth and PAL signals have 5MHz bandwidth. Video signals from a DVD player, however, are not channel limited, so the bandwidth of DVD video signals can approach the Nyquist limit of 6.75MHz. (Recommendation ITU-R BT.601-5 specifies 13.5MHz as the sampling rate for standard-definition video). Therefore, the maximum bandwidth of the signal is 6.75MHz. To ease the filtering requirements, most modern video systems oversample by two times, clocking the video current DAC at 27MHz.

Outputs

The video output amplifiers can both source and sink load current, allowing output loads to be DC- or AC-coupled. The amplifier output stage needs approximately 300mV of headroom from either supply rail. The devices have an internal level-shift circuit that positions the sync tip at approximately 300mV at the output.

If the supply voltage is greater than 3.135V (5% below a 3.3V supply), each amplifier can drive two DC-coupled video loads to ground. If the supply is less than 3.135V, each amplifier can drive only one DC-coupled or AC-coupled video load.

Shutdown (MAX9586)

The MAX9586 draws less than 1µA supply current when $\overline{SHDN}$ is low. In shutdown mode, the amplifier output becomes high impedance.

Applications Information

AC-Coupling the Outputs

The outputs can be AC-coupled since the output stage can source and sink current as shown in Figure 4. Coupling capacitors should be 220µF or greater to keep the highpass filter, formed by the 150Ω equivalent resistance of the video transmission line, to a corner frequency of 4.8Hz or below. The frame rate of PAL systems is 25Hz, and the frame rate of NTSC systems is 30Hz. The corner frequency should be well below the frame rate.

Power-Supply Bypassing and Ground

The MAX9586–MAX9589 operate from a single-supply voltage down to 2.7V, allowing for low-power operation. Bypass V_{DD} to GND with a 0.1µF capacitor. Place all external components as close as possible to the device.

Single, Dual, Triple, and Quad Standard-Definition Video Filter Amplifiers with AC-Coupled Input Buffers

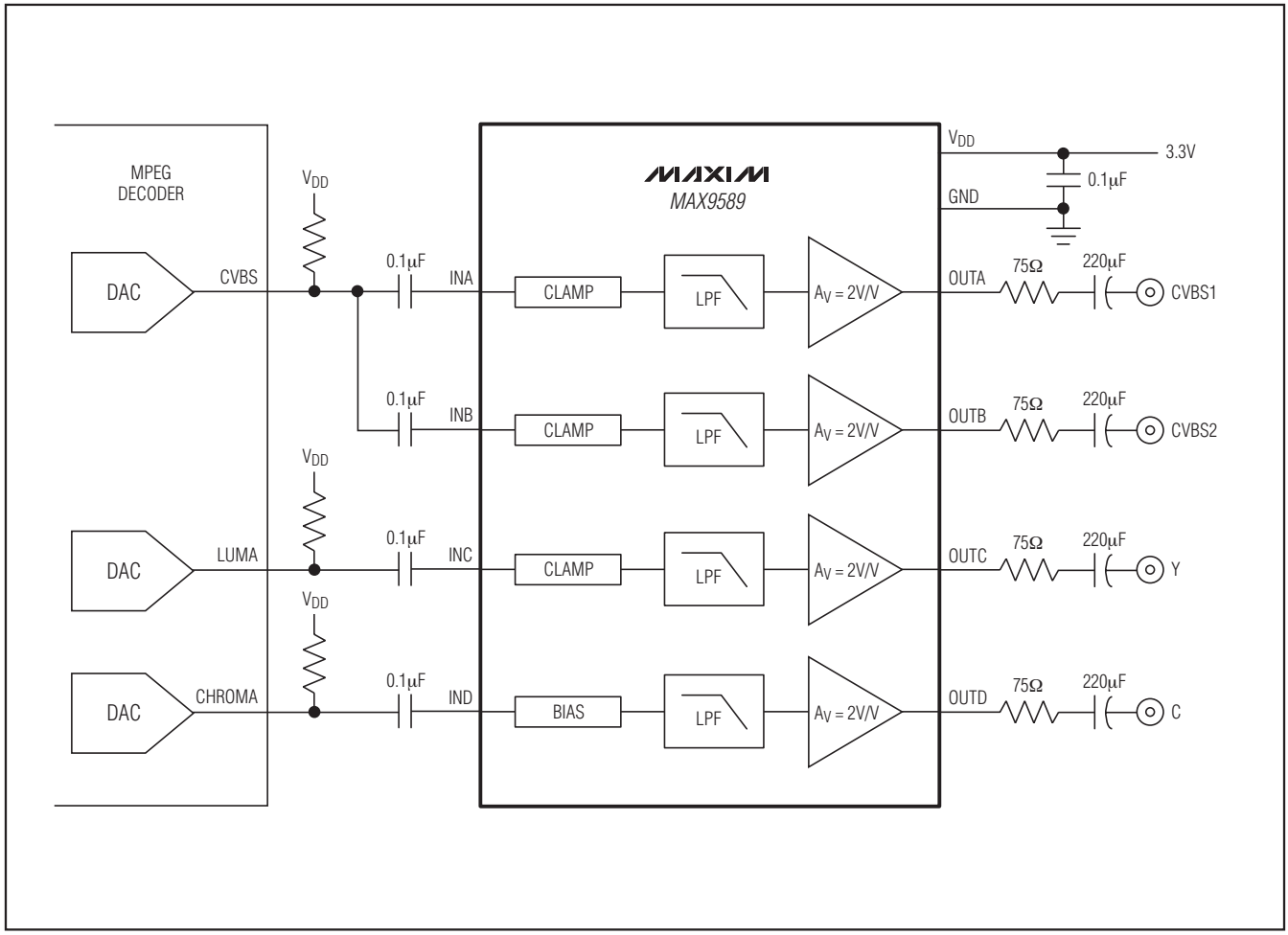
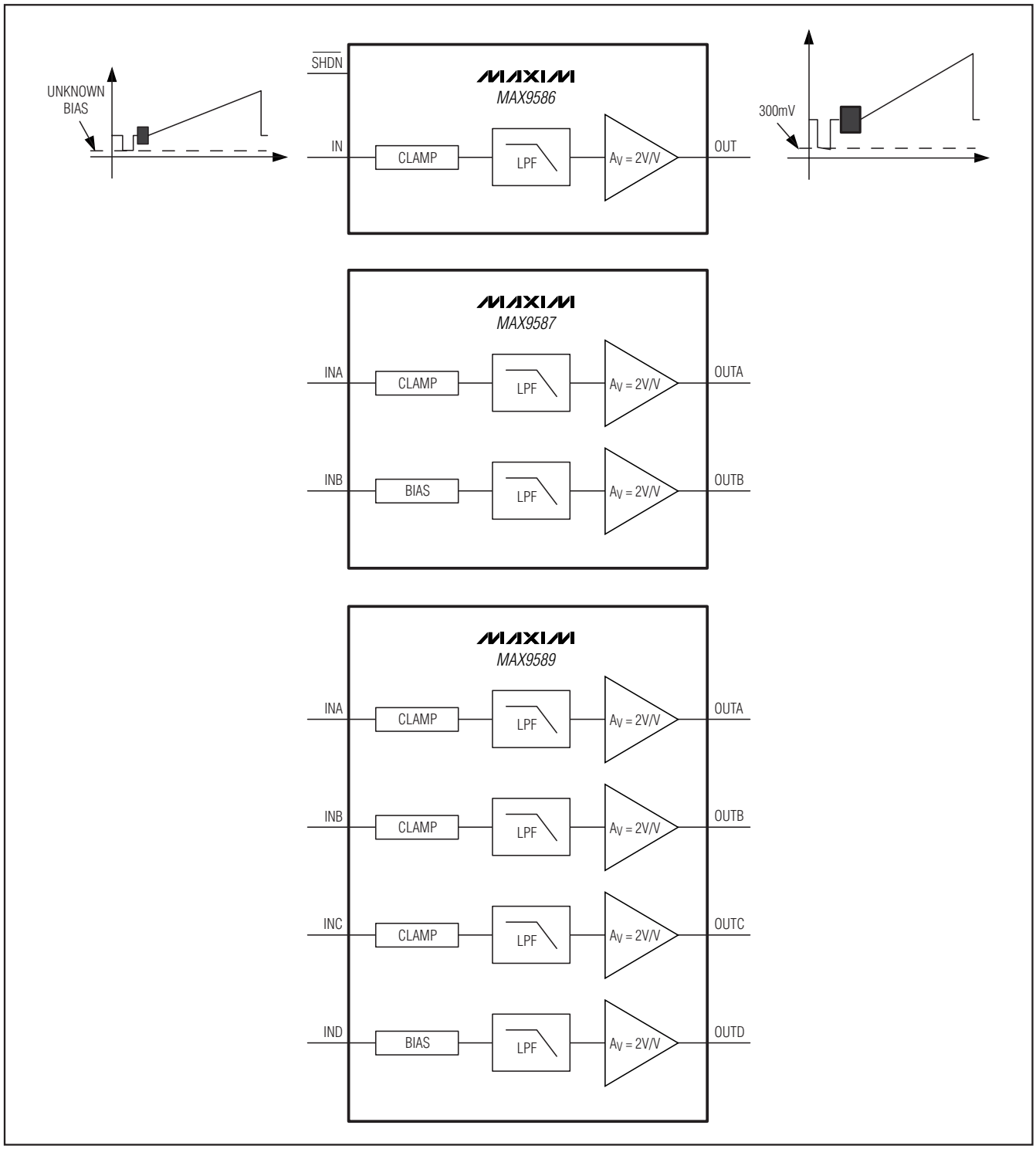


Figure 4. AC-Coupled Outputs

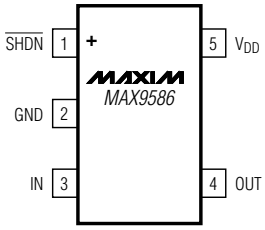
Block Diagrams (continued)



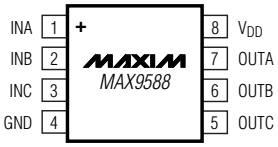
Single, Dual, Triple, and Quad Standard-Definition Video Filter Amplifiers with AC-Coupled Input Buffers

Pin Configurations

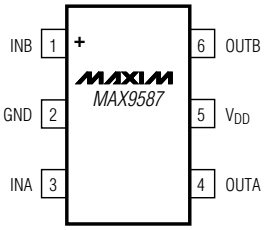
TOP VIEW



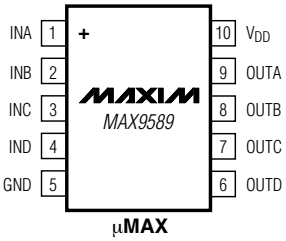
SOT23



µMAX



SOT23



µMAX

Selector Guide

PART	PIN-PACKAGE	PACKAGE SIZE	CHANNELS	TOP MARK
MAX9586AZK+T	5 SOT23-5	2.9mm x 1.6mm	1	ADSH
MAX9587AZT+T	6 SOT23-6	2.9mm x 1.6mm	2	AADI
MAX9588AUA+T	8 µMAX-8	3mm x 3mm	3	—
MAX9589AUB+T	10 µMAX-10	3mm x 3mm	4	—

Note: *All devices are specified over the -40°C to +125°C operating temperature range.*
+Denotes a lead-free package.

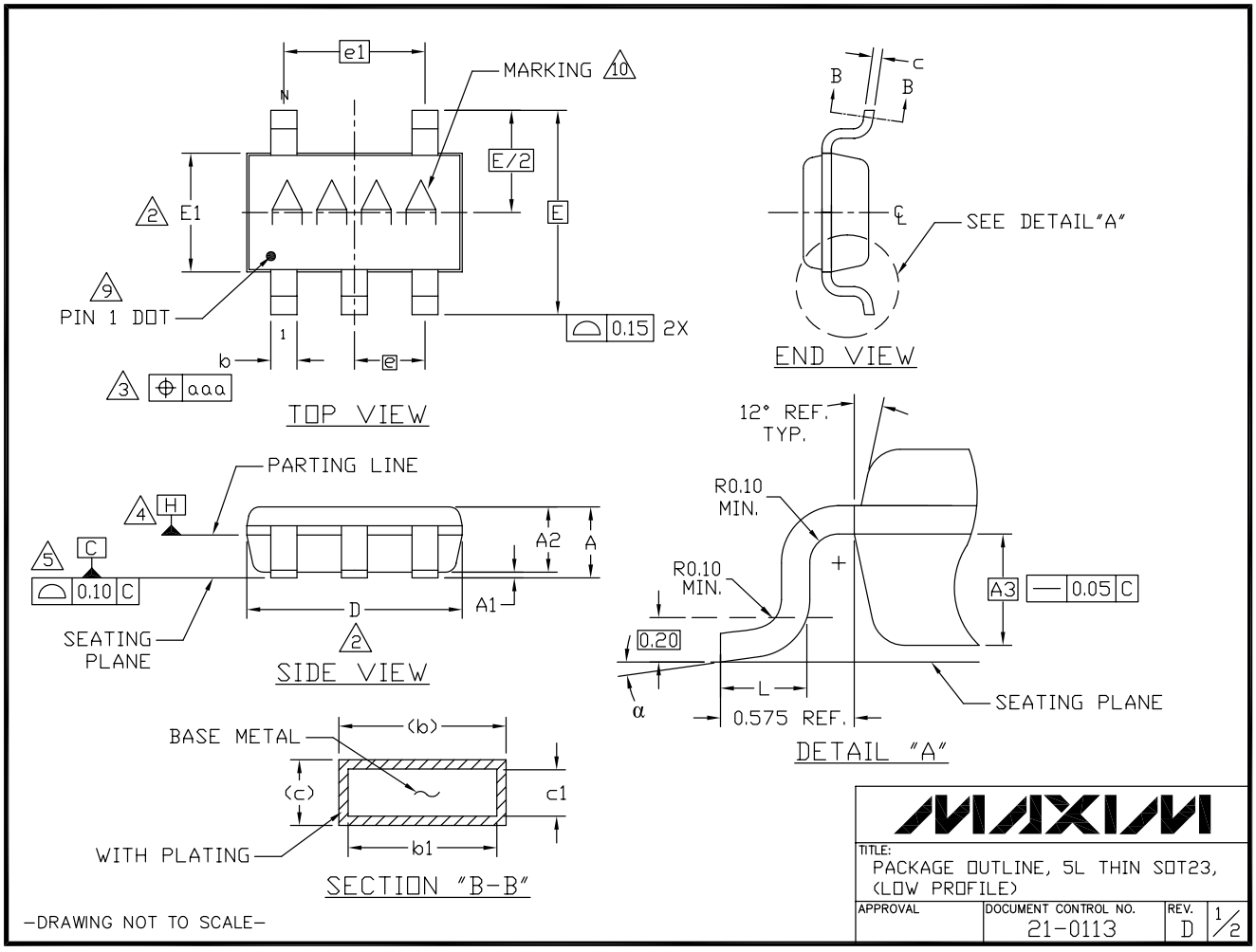
Chip Information

PROCESS: BiCMOS

Package Information

For the latest package outline information and land patterns (footprints), go to **www.maxim-ic.com/packages**. Note that a "+", "#", or "-" in the package code indicates RoHS status only. Package drawings may show a different suffix character, but the drawing pertains to the package regardless of RoHS status.

PACKAGE TYPE	PACKAGE CODE	OUTLINE NO.	LAND PATTERN NO.
5 TSOT23	Z5+1	**21-0113**	**90-0241**
6 TSOT23	Z6+1	**21-0114**	**90-0242**
8 µMAX	U8+1	**21-0036**	**90-0092**
10 µMAX	U8+2	**21-0061**	**90-0330**



Single, Dual, Triple, and Quad Standard-Definition Video Filter Amplifiers with AC-Coupled Input Buffers

Package Information (continued)

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NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SPECIFIED.
2. "D" AND "E1" ARE REFERENCE DATUM AND DO NOT INCLUDE MOLD FLASH OR PROTRUSIONS, AND ARE MEASURED AT THE BOTTOM PARTING LINE. MOLD FLASH OR PROTRUSION SHALL NOT EXCEED 0.15mm ON "D" AND 0.25mm ON "E" PER SIDE.
3. THE LEAD WIDTH DIMENSION DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.07mm TOTAL IN EXCESS OF THE LEAD WIDTH DIMENSION AT MAXIMUM MATERIAL CONDITION.
4. DATUM PLANE -H- LOCATED AT MOLD PARTING LINE AND COINCIDENT WITH LEAD, WHERE LEAD EXITS PLASTIC BODY AT THE BOTTOM OF PARTING LINE.
5. THE LEAD TIPS MUST LINE WITHIN A SPECIFIED TOLERANCE ZONE. THIS TOLERANCE ZONE IS DEFINED BY TWO PARALLEL LINES. ONE PLANE IS THE SEATING PLANE, DATUM -C-; AND THE OTHER PLANE IS AT THE SPECIFIED DISTANCE FROM -C- IN THE DIRECTION INDICATED. FORMED LEADS SHALL BE PLANAR WITH RESPECT TO ONE ANOTHER WITH 0.10mm AT SEATING PLANE.
6. THIS PART IS COMPLIANT WITH JEDEC SPECIFICATION MO-193 EXCEPT FOR THE "e" DIMENSION WHICH IS 0.95mm INSTEAD OF 1.00mm. THIS PART IS IN FULL COMPLIANCE TO EIAJ SPECIFICATION SC-74.
7. COPLANARITY APPLIES TO THE EXPOSED PAD AS WELL AS THE TERMINALS. COPLANARITY SHALL NOT EXCEED 0.08mm.
8. WARPAGE SHALL NOT EXCEED 0.10mm.
9. THE TERMINAL #1 IDENTIFIER AND TERMINAL NUMBERING CONVENTION SHALL CONFORM TO JESD 95-1 PP-012. DETAILS OF TERMINAL #1 IDENTIFIER ARE OPTIONAL. THE TERMINAL #1 IDENTIFIER MAY BE EITHER A MOLD OR MARKED FEATURE.
10. MARKING IS FOR PACKAGE ORIENTATION REFERENCE ONLY.
11. MATERIAL MUST COMPLY WITH BANNED AND RESTRICTED SUBSTANCES SPEC # 10-0131.
12. ALL DIMENSIONS APPLY TO BOTH LEADED (-) AND LEAD FREE (+) PACKAGE CODES.

DIMENSIONS			
	MIN	NOM	MAX
A	–	–	1.10
A1	0.00	0.075	0.10
A2	0.85	0.88	0.90
A3		0.50 BSC	
b	0.30	–	0.45
b1	0.25	0.35	0.40
c	0.15	–	0.20
c1	0.12	0.127	0.15
D	2.80	2.90	3.00
E		2.75 BSC	
E1	1.55	1.60	1.65
L	0.30	0.40	0.50
e1		1.90 BSC	
e		0.95 BSC	
α	0°	4°	8°
aaa		0.20	
PKG CODE		Z5-1, Z5-2, Z5-3	

–DRAWING NOT TO SCALE–

MAXIM

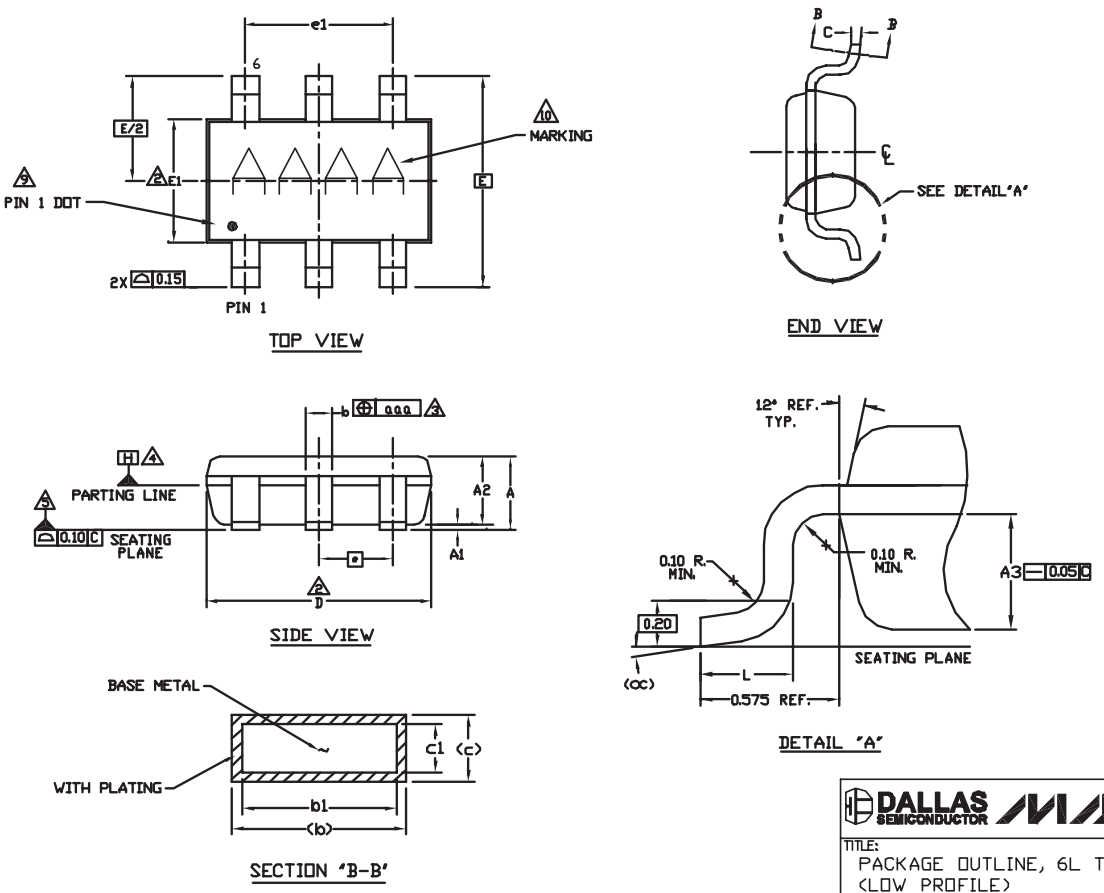
TITLE: PACKAGE OUTLINE, 5L THIN SOT23, (LOW PROFILE)

APPROVAL	DOCUMENT CONTROL NO.	REV.	
	21-0113	D	2/2

Package Information (continued)

For the latest package outline information and land patterns (footprints), go to **www.maxim-ic.com/packages**. Note that a "+", "#", or "-" in the package code indicates RoHS status only. Package drawings may show a different suffix character, but the drawing pertains to the package regardless of RoHS status.

6L THIN SOT23.EPS



Single, Dual, Triple, and Quad Standard-Definition Video Filter Amplifiers with AC-Coupled Input Buffers

Package Information (continued)

For the latest package outline information and land patterns (footprints), go to **www.maxim-ic.com/packages**. Note that a "+", "#", or "-" in the package code indicates RoHS status only. Package drawings may show a different suffix character, but the drawing pertains to the package regardless of RoHS status.

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. "D" AND "E1" ARE REFERENCE DATUM AND DO NOT INCLUDE MOLD FLASH OR PROTRUSIONS, AND ARE MEASURED AT THE BOTTOM PARTING LINE. MOLD FLASH OR PROTRUSION SHALL NOT EXCEED 0.15mm ON "D" AND 0.25mm ON "E" PER SIDE.
3. THE LEAD WIDTH DIMENSION DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.07mm TOTAL IN EXCESS OF THE LEAD WIDTH DIMENSION AT MAXIMUM MATERIAL CONDITION.
4. DATUM PLANE "H" LOCATED AT MOLD PARTING LINE AND COINCIDENT WITH LEAD, WHERE LEAD EXITS PLASTIC BODY AT THE BOTTOM OF PARTING LINE.
5. THE LEAD TIPS MUST LINE WITHIN A SPECIFIED TOLERANCE ZONE. THIS TOLERANCE ZONE IS DEFINED BY TWO PARALLEL LINES. ONE PLANE IS THE SEATING PLANE, DATUM (-C-), AND THE OTHER PLANE IS AT THE SPECIFIED DISTANCE FROM (-C-) IN THE DIRECTION INDICATED. FORMED LEADS SHALL BE PLANAR WITH RESPECT TO ONE ANOTHER WITH 0.10mm AT SEATING PLANE.
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7. COPLANARITY APPLIES TO THE EXPOSED PAD AS WELL AS THE TERMINALS. COPLANARITY SHALL NOT EXCEED 0.08mm.
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9. THE TERMINAL #1 IDENTIFIER AND TERMINAL NUMBERING CONVENTION SHALL CONFORM TO JESD 95-1 PP-012. DETAILS OF TERMINAL #1 IDENTIFIER ARE OPTIONAL. THE TERMINAL #1 IDENTIFIER MAY BE EITHER A MOLD OR MARKED FEATURE.
10. MARKING IS FOR PACKAGE ORIENTATION REFERENCE ONLY.
11. ALL DIMENSIONS APPLY TO BOTH LEADED (-) AND LEAD FREE (+) PACKAGE CODES.

SYMBOLS			
	MIN	NOM	MAX
A	–	–	1.10
A1	0.00	0.075	0.10
A2	0.85	0.88	0.90
A3		0.50 BSC	
b	0.30	–	0.45
b1	0.25	0.35	0.40
c	0.15	–	0.20
c1	0.12	0.127	0.15
D	2.80	2.90	3.00
E		2.75 BSC	
E1	1.55	1.60	1.65
L	0.30	0.40	0.50
e1		1.90 BSC	
e		0.95 BSC	
∝	0°	4°	8°
aaa		0.20	
Pkg. codes: Z6-1, Z6-2			

DALLAS SEMICONDUCTOR MAXIM

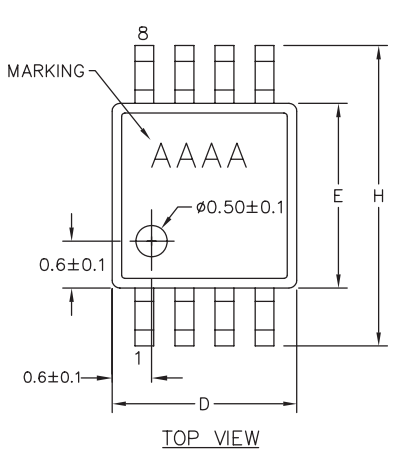
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APPROVAL	DOCUMENT CONTROL NO.	REV.	
	21-0114	C	2/2

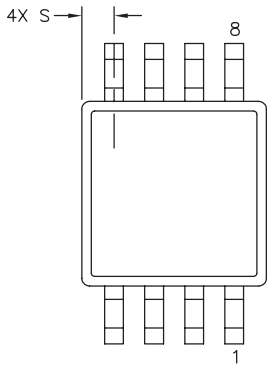
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Package Information (continued)

For the latest package outline information and land patterns (footprints), go to **www.maxim-ic.com/packages**. Note that a "+", "#", or "-" in the package code indicates RoHS status only. Package drawings may show a different suffix character, but the drawing pertains to the package regardless of RoHS status.

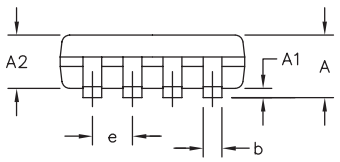


TOP VIEW

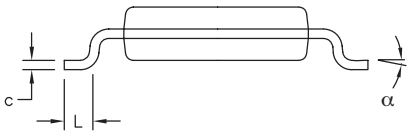


BOTTOM VIEW

	INCHES		MILLIMETERS	
DIM	MIN	MAX	MIN	MAX
A	–	0.043	–	1.10
A1	0.002	0.006	0.05	0.15
A2	0.030	0.037	0.75	0.95
b	0.010	0.014	0.25	0.36
c	0.005	0.007	0.13	0.18
D	0.114	0.122	2.90	3.10
e	0.0256 BSC		0.65 BSC	
E	0.114	0.122	2.90	3.10
H	0.188	0.198	4.78	5.03
L	0.016	0.026	0.41	0.66
α	0°	6°	0°	6°
S	0.0207 BSC		0.5250 BSC	
PKG. CODES: U8–1; U8–3; U8CN–1				



FRONT VIEW



SIDE VIEW

NOTES:
1. D&E DO NOT INCLUDE MOLD FLASH.
2. MOLD FLASH OR PROTRUSIONS NOT TO EXCEED 0.15MM (.006").
3. CONTROLLING DIMENSION: MILLIMETERS.
4. COMPLIES TO JEDEC MO–187, LATEST REVISION, VARIATION AA.
5. MARKING SHOWN IS FOR PKG. ORIENTATION ONLY.
6. ALL DIMENSIONS APPLY TO BOTH LEADED (–) AND PbFREE (+) PKG. CODES.

–DRAWING NOT TO SCALE–

MAXIM

TITLE: PACKAGE OUTLINE, 8L uMAX/uSOP

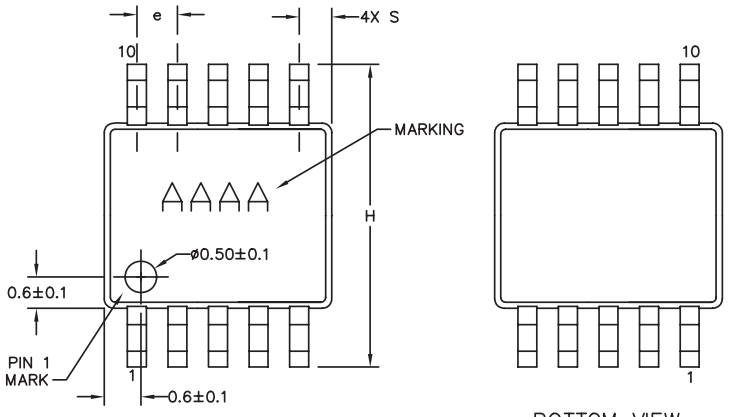
APPROVAL	DOCUMENT CONTROL NO.	REV.	
	21–0036	L	1/1

Single, Dual, Triple, and Quad Standard-Definition Video Filter Amplifiers with AC-Coupled Input Buffers

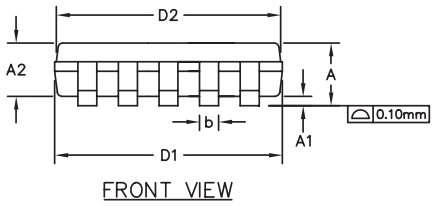
Package Information (continued)

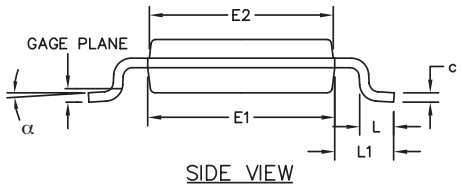
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10LUMAX.EPS



	INCHES		MILLIMETERS	
DIM	MIN	MAX	MIN	MAX
A	–	0.043	–	1.10
A1	0.002	0.006	0.05	0.15
A2	0.030	0.037	0.75	0.95
D1	0.116	0.120	2.95	3.05
D2	0.114	0.118	2.89	3.00
E1	0.116	0.120	2.95	3.05
E2	0.114	0.118	2.89	3.00
H	0.187	0.199	4.75	5.05
L	0.0157	0.0275	0.40	0.70
L1	0.037 REF		0.940 REF	
b	0.007	0.0106	0.177	0.270
e	0.0197 BSC		0.500 BSC	
c	0.0035	0.0078	0.090	0.200
S	0.0196 REF		0.498 REF	
α	0°	6°	0°	6°
Pkg Codes: U10–2; U10CN–1				





NOTES:
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2. MOLD FLASH OR PROTRUSIONS NOT TO EXCEED 0.15mm (.006").
3. CONTROLLING DIMENSION: MILLIMETERS.
4. COMPLIES TO JEDEC MO–187, LATEST REVISION, VARIATION BA.
5. MARKING SHOWN IS FOR PKG. ORIENTATION ONLY.
6. ALL DIMENSIONS APPLY TO BOTH LEADED (–) AND PbFREE (+) PKG. CODES.

–DRAWING NOT TO SCALE–

MAXIM

TITLE: PACKAGE OUTLINE, 10L uMAX/uSOP

APPROVAL	DOCUMENT CONTROL NO.	REV.	
	21–0061	L	1/1

Revision History

REVISION NUMBER	REVISION DATE	DESCRIPTION	PAGES CHANGED
6	2/11	Added loopback circuit diagram	9

Maxim cannot assume responsibility for use of any circuitry other than circuitry entirely embodied in a Maxim product. No circuit patent licenses are implied. Maxim reserves the right to change the circuitry and specifications without notice at any time.

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