

双、三和四通道标清视频滤波放大器， 提供直流耦合输入缓冲器

概述

MAX9583/MAX9584/MAX9585是集成了视频重建滤波器的小尺寸、低功耗、多通道视频放大器。特别适合标清视频信号，可广泛应用于电视、机顶盒以及便携设备。

视频数/模转换器(DAC)的输出可直接连接至MAX9583/MAX9584/MAX9585的输入端。视频重建滤波器在8.5MHz通带内具有±1dB平坦度，在27MHz处衰减为55dB。放大器增益为2V/V，其输出端可直流耦合到一个等效为两路视频负载的75Ω负载，或交流耦合到一路150Ω负载。

MAX9583/MAX9584/MAX9585采用2.7V至3.6V单电源供电，工作于-40°C至+125°C汽车级温度范围。MAX9583采用小尺寸、6引脚薄型SOT23封装；MAX9584采用小尺寸、8引脚μMAX®封装；MAX9585采用小尺寸、10引脚μMAX封装。

应用

机顶盒
电视
便携设备

特性

- ◆ 双通道(MAX9583)、三通道(MAX9584)和四通道(MAX9585)器件
- ◆ ±1dB通频带为8.5MHz
- ◆ 27MHz处衰减55dB
- ◆ 2V/V固定增益
- ◆ 低功耗：每通道3.5mA
- ◆ 2.7V至3.6V单电源供电
- ◆ 小尺寸SOT23或μMAX封装

订购信息

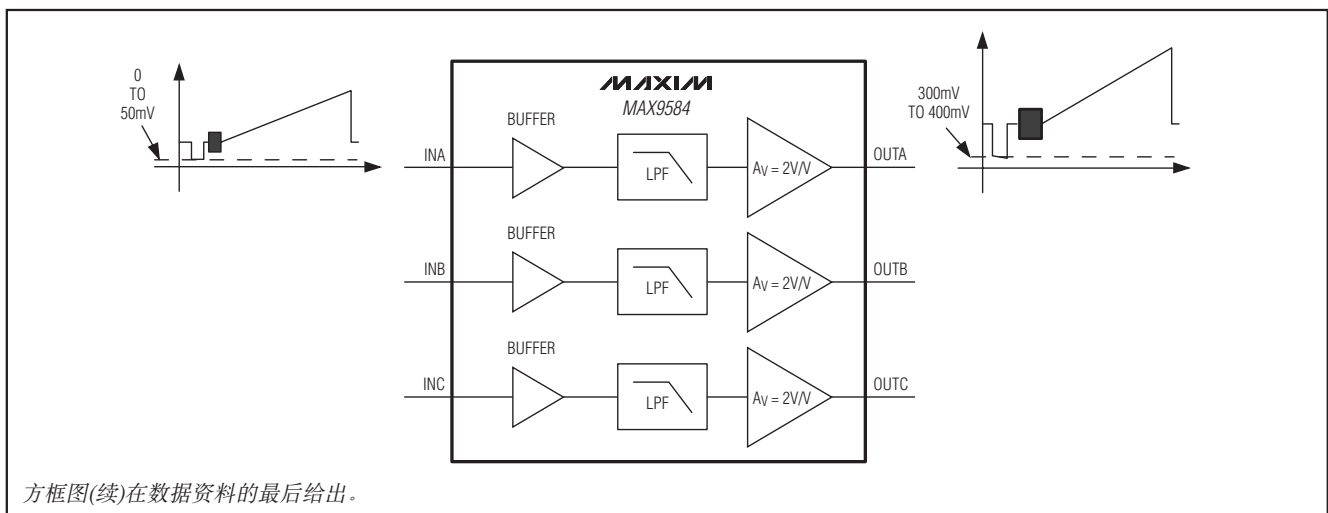
PART	PIN-PACKAGE	CHANNELS	PKG CODE
MAX9583AZT+T	6 Thin SOT23-6	2	Z6+1
MAX9584AUA+T	8 μMAX-8	3	U8+1
MAX9585AUB+T	10 μMAX-10	4	U10+2

注：所有器件额定工作于-40°C至+125°C温度范围。
+表示无铅封装。
T = 卷带包装。

引脚配置和选型指南在数据资料的最后给出。

μMAX是Maxim Integrated Products, Inc.的注册商标。

方框图



双、三和四通道标清视频滤波放大器， 提供直流耦合输入缓冲器

ABSOLUTE MAXIMUM RATINGS

V _{DD} to GND	-0.3V to +4V	8-Pin μ MAX (derate 4.5mW/°C above +70°C)	362mW
IN ₋ to GND	-0.3V to +4V	10-Pin μ MAX (derate 5.6mW/°C above +70°C)	444mW
OUT ₋ Short-Circuit Duration to V _{DD} , GND	Continuous	Operating Temperature Range	-40°C to +125°C
Continuous Input Current		Junction Temperature	+150°C
IN ₋	± 20 mA	Storage Temperature Range	-65°C to +150°C
Continuous Power Dissipation (T _A = +70°C)		Lead Temperature (soldering, 10s)	+300°C
6-Pin Thin SOT23 (derate 9.1mW/°C above +70°C)....	727mW		

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, GND = 0V, R_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			3.5	7	mA
Input Voltage Range	V _{IN}	Guaranteed by DC voltage gain	V _{DD} = 2.7V	0		1.05	V _{P-P}
			V _{DD} = 3V	0		1.2	
Input Current	I _{IN}	V _{IN} = 0V			0.6	10	μ A
Input Resistance	R _{IN}				25		M Ω
DC Voltage Gain (Note 2)	A _v	R _L = 150 Ω to GND	V _{DD} = 2.7V, 0V \leq V _{IN} \leq 1.05V	1.92	2	2.04	V/V
			V _{DD} = 3V, 0V \leq V _{IN} \leq 1.2V	1.92	2	2.04	
DC Gain Matching		Guaranteed by DC voltage gain		-2	0	+2	%
Output Level		Measured at V _{OUT} , V _{IN} = 0V, R _L = 150 Ω to GND		0.210	0.300	0.410	V
Output-Voltage Swing			Measured at output, V _{DD} = 2.7V, 0V \leq V _{IN} \leq 1.05V, R _L = 150 Ω to -0.2V		2.1		V _{P-P}
			Measured at output, V _{DD} = 2.7V, 0V \leq V _{IN} \leq 1.05V, R _L = 150 Ω to V _{DD} /2		2.1		
			Measured at output, V _{DD} = 3V, 0V \leq V _{IN} \leq 1.2V, R _L = 150 Ω to -0.2V		2.4		
			Measured at output, V _{DD} = 3V, 0V \leq V _{IN} \leq 1.2V, R _L = 150 Ω to V _{DD} /2		2.4		
			Measured at output, V _{DD} = 3.135V, 0V \leq V _{IN} \leq 1.05V, R _L = 75 Ω 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 \leq I _{LOAD} \leq 10mA			0.2		Ω
Power-Supply Rejection Ratio	PSRR	2.7V \leq V _{DD} \leq 3.6V		48			dB
		f = 1MHz, 100mV _{P-P}			29		

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MAX9583/MAX9584/MAX9585

ELECTRICAL CHARACTERISTICS (continued)

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

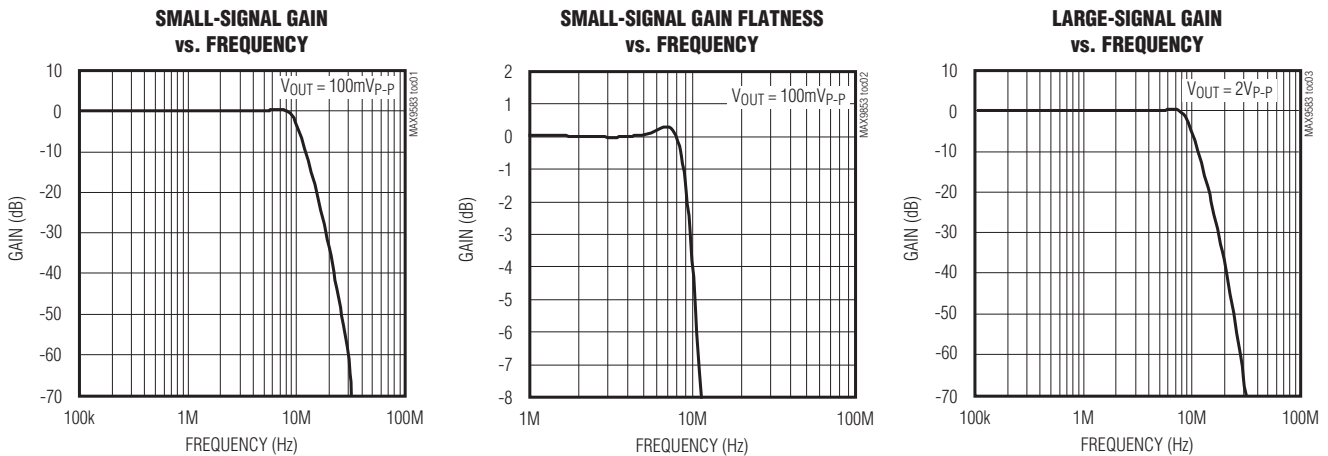
PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Standard-Definition Reconstruction Filter		±1dB passband flatness		8.5		MHz
		V _{IN} = 1V _{P-P} , reference frequency is 100kHz	f = 5.5MHz	-0.15		dB
			f = 27MHz	-55		
Differential Gain	DG	5-step modulated staircase of 129mV step size and 286mV peak-to-peak 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.

典型工作特性

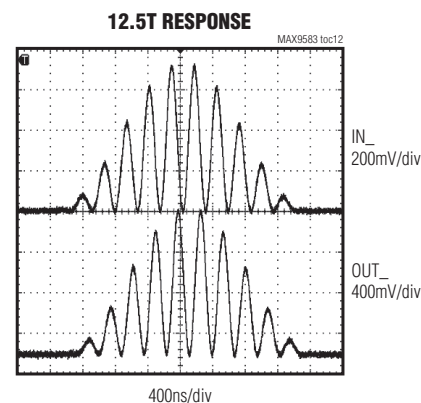
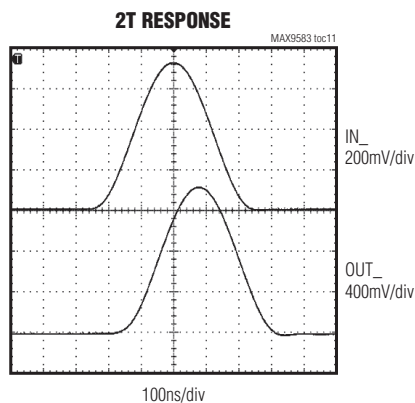
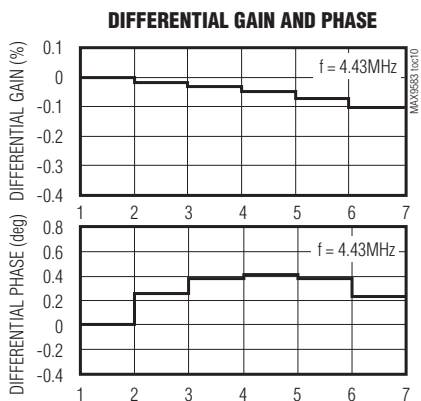
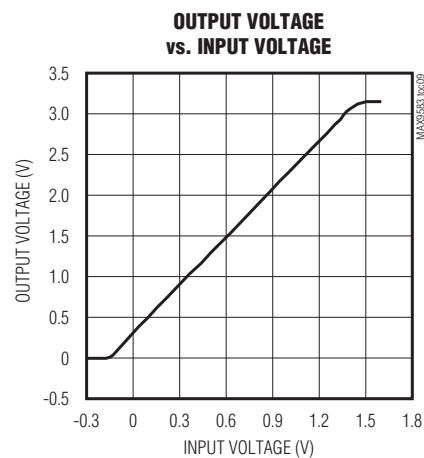
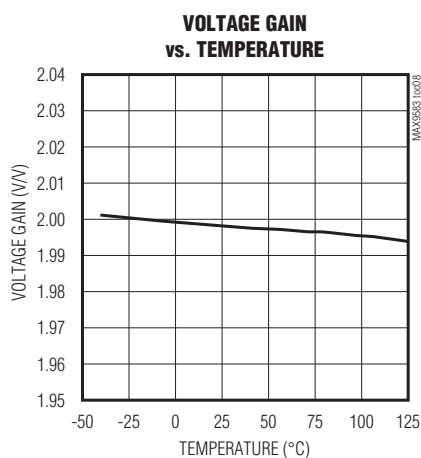
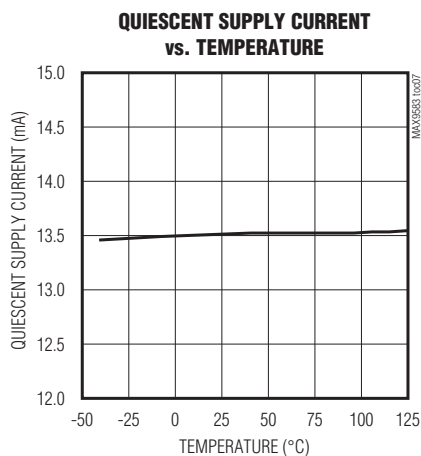
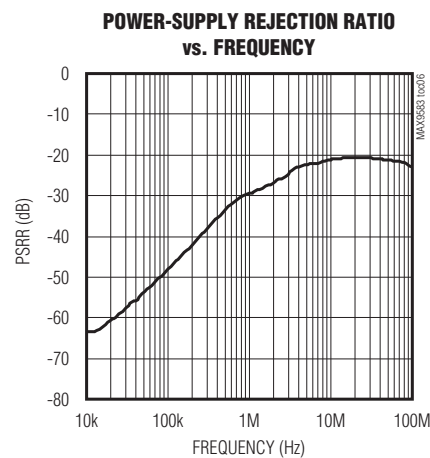
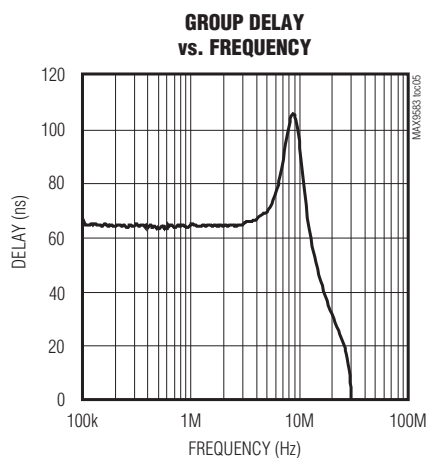
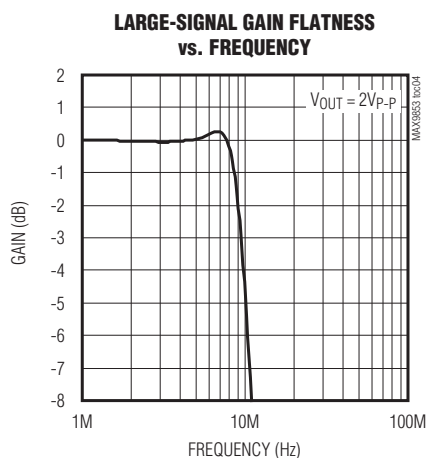
(V_{DD} = $\overline{\text{SHDN}}$ = 3.3V, video outputs have R_L = 150Ω connected to GND, T_A = +25°C, unless otherwise noted.)



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典型工作特性(续)

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

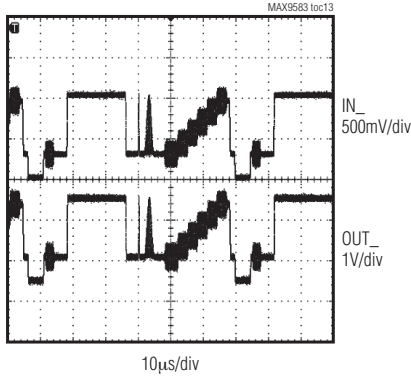


双、三和四通道标清视频滤波放大器， 提供直流耦合输入缓冲器

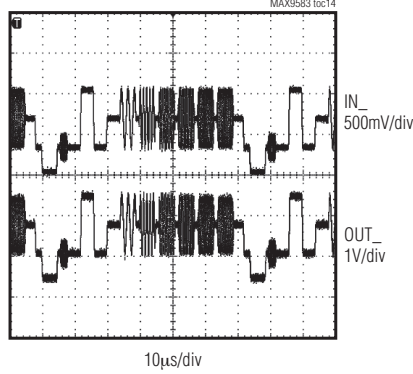
典型工作特性(续)

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

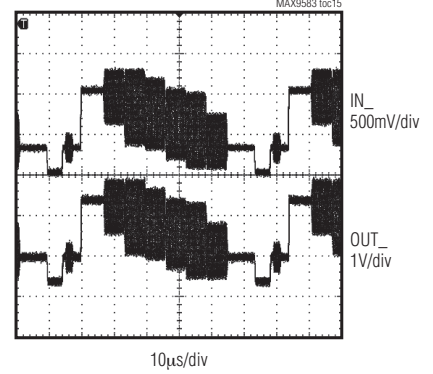
NTC-7 VIDEO TEST SIGNAL ON CVBS OUTPUTS



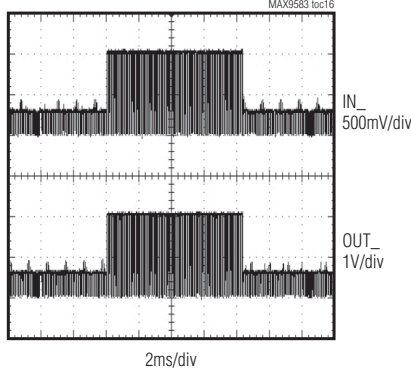
PAL MULTIBURST RESPONSE



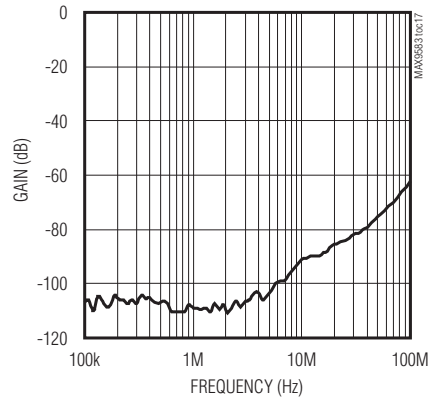
PAL COLOR BARS



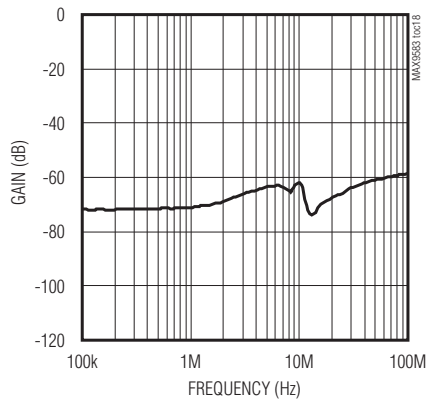
FIELD SQUARE-WAVE RESPONSE



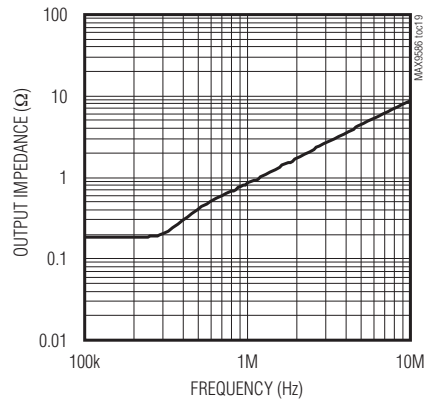
INPUT-TO-INPUT CROSSTALK vs. FREQUENCY



OUTPUT-TO-OUTPUT CROSSTALK vs. FREQUENCY



OUTPUT IMPEDANCE vs. FREQUENCY



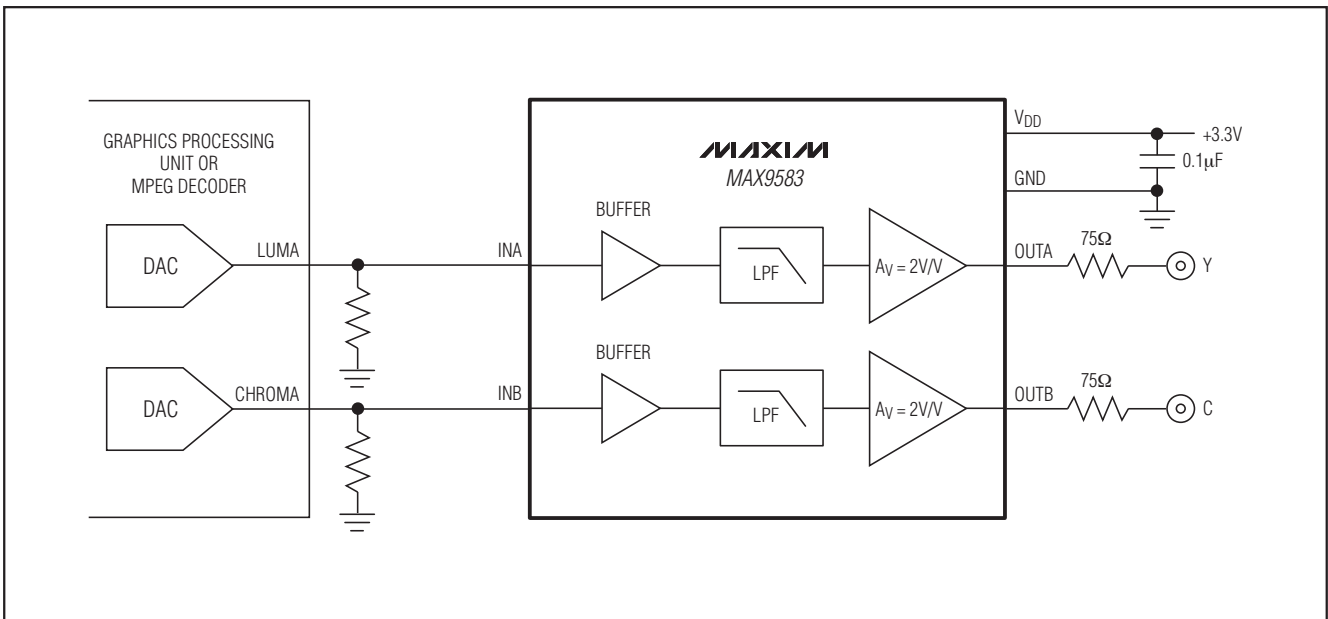
MAX9583/MAX9584/MAX9585

双、三和四通道标清视频滤波放大器， 提供直流耦合输入缓冲器

引脚说明

MAX9583 6 SOT23	MAX9584 8 μ MAX	MAX9585 10 μ MAX	名称	功能
2	4	5	GND	地。
3	1	1	INA	视频输入A。
1	2	2	INB	视频输入B。
—	3	3	INC	视频输入C。
—	—	4	IND	视频输入D。
4	7	9	OUTA	视频输出A。
6	6	8	OUTB	视频输出B。
—	5	7	OUTC	视频输出C。
—	—	6	OUTD	视频输出D。
5	8	10	V _{DD}	正电源，采用一只0.1 μ F电容旁路至GND。

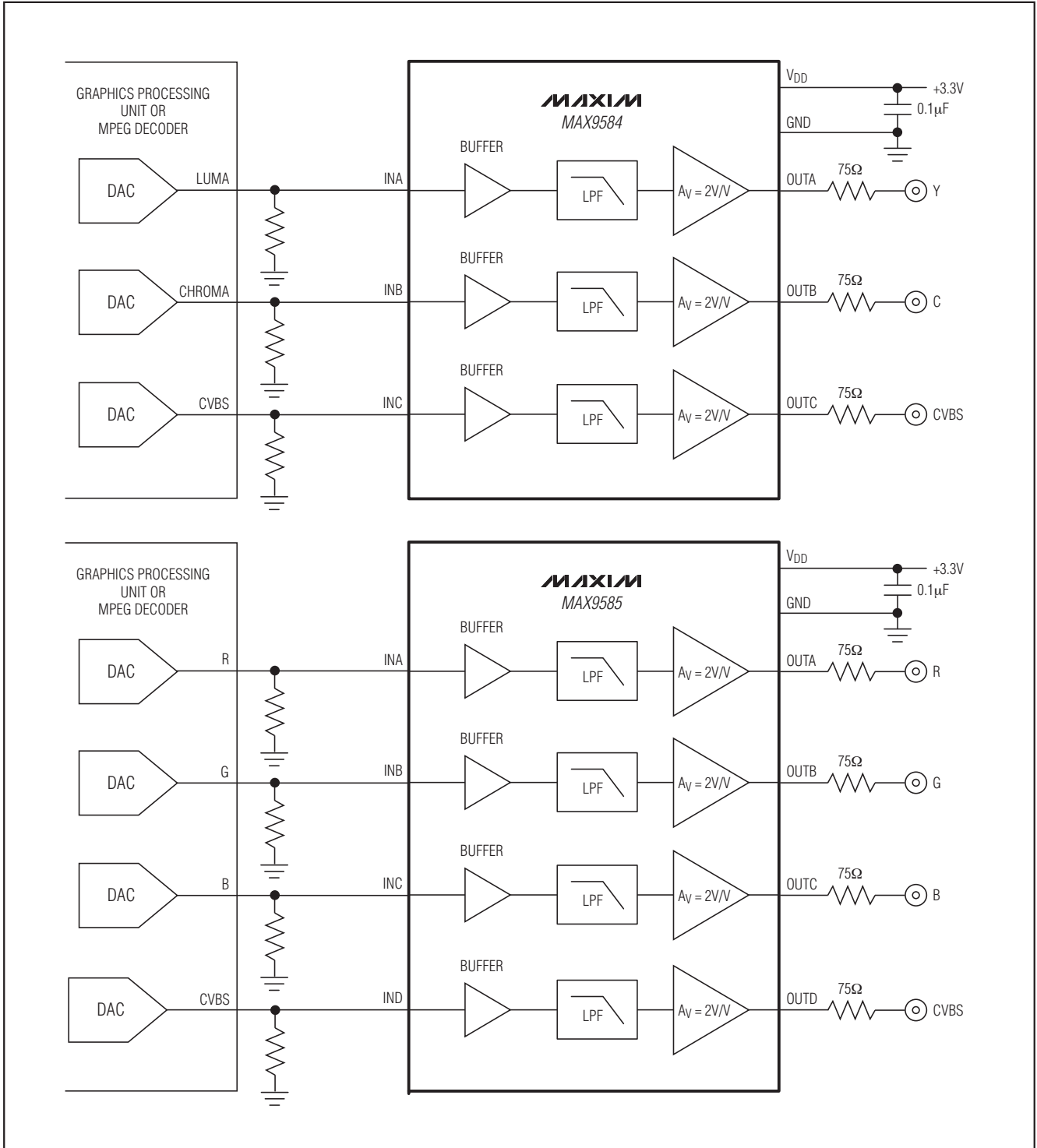
典型应用电路



双、三和四通道标清视频滤波放大器， 提供直流耦合输入缓冲器

典型应用电路(续)

MAX9583/MAX9584/MAX9585



双、三和四通道标清视频滤波放大器， 提供直流耦合输入缓冲器

详细说明

MAX9583/MAX9584/MAX9585可对机顶盒和电视应用中的视频DAC输出进行滤波、放大。该系列器件由输入缓冲器、低通滤波器和增益为2V/V的输出放大器构成，能够驱动标准的150Ω对地视频负载。

输入

视频输入应直接连接到视频电流DAC的输出端，直流耦合确保输入信号以地为参考，因此复合信号或亮度信号的同步头在地电位的50mV以内；并且色度信号的消隐电平位于0.5V和0.65V之间。因为输入缓冲器均相同，在 $V_{DD} = 2.7V$ 时，任何标清视频信号均可作用到这些输入端，提供介于地电平和1.05V之间的信号。例如，三路复合视频信号可接入MAX9584的INA、INB和INC，RGB或YPbPr信号也可接入MAX9584的INA、INB和INC。

视频滤波器

该系列滤波器的通频带($\pm 1dB$)典型值为8.5MHz，能够适合各种信号源(例如，广播或DVD)的标清视频信号。广播视频信号受信道限制：NTSC信号的带宽为4.2MHz，PAL信号的带宽为5MHz。而来自DVD播放器的视频信号不受信道限制，因此DVD视频信号的带宽可能接近6.75MHz奈奎斯特限制(ITU-R BT.601-5指定标清视频信号的采样率为13.5MHz)。由此可见，信号的最大带宽为6.75MHz。为降低滤波要求，大多数新型视频系统采用两倍过采样，因此，视频电流输出DAC的时钟为27MHz。

输出

视频输出放大器可以源出或吸入负载电流，允许输出负载采用直流或交流耦合。放大器的输出级需要在电源电压摆幅的两端留有约300mV的裕量。该系列器件内部具有电平偏移调节电路，可将输出信号的同步头设定在大约300mV。如果色度输入信号的消隐电平为0.5V，偏移电路可将色度输出消隐电平设定在大约1.3V；如果色度输入信号的消隐电平为0.6V，偏移电路可将色度输出的消隐电平设定在1.5V左右。

电源电压大于3.135V(比3.3V电源低5%)时，每路放大器可驱动两路以地为参考的直流耦合视频负载；如果电源电压低于3.135V，每路放大器只能驱动一路直流耦合或交流耦合的视频负载。

应用信息

降低视频DAC的功耗

MAX9583/MAX9584/MAX9585具有高阻输入缓冲器，可配合高达1000Ω的源阻抗使用。为降低视频DAC的功耗，DAC输出电阻可按比例增大。视频DAC内部用于设置基准电流的电阻也必须按比例增大。例如，如果输出阻抗为37.5Ω，当输出为1V时，DAC必须源出26.7mA电流。如果输出阻抗为300Ω，当输出为1V时，DAC仅需源出3.33mA电流即可。

DAC输出与地之间存在寄生电容，该电容与DAC输出电阻并联，形成了可能影响视频信号频率响应的极点。比如，300Ω电阻和50pF电容并联，会在10.6MHz处产生一个极点。为使该电容最小，须尽可能地减小连接DAC输出信号的环路面积，并将MAX9583/MAX9584/MAX9585尽可能靠近视频DAC输出放置。

交流耦合输出

如图1所示，由于输出级可以源出或吸入电流，因此输出端可以采用交流耦合。耦合电容为220μF或更大，以保证该电容与视频传输线150Ω等效电阻所形成的高通滤波器具有4.8Hz或更低的转角频率。PAL系统的帧频率为25Hz，NTSC系统的帧频率为30Hz，转角频率应远低于帧频率。

电源旁路与接地

MAX9583/MAX9584/MAX9585可以工作在低至2.7V的单电源，提供低功耗操作。采用一只0.1μF电容将 V_{DD} 旁路至GND，所有外部元件须尽可能靠近器件放置。

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MAX9583/MAX9584/MAX9585

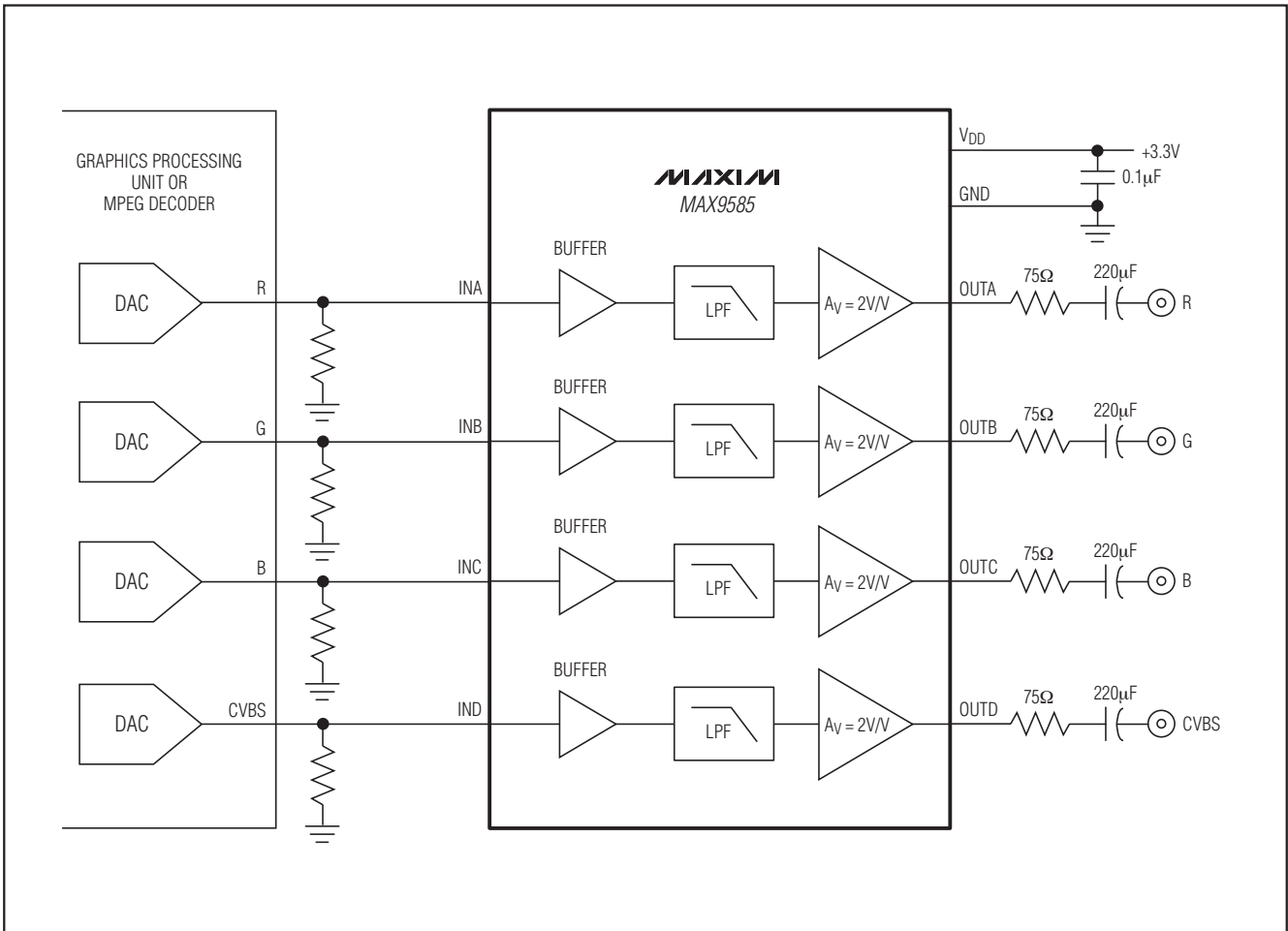
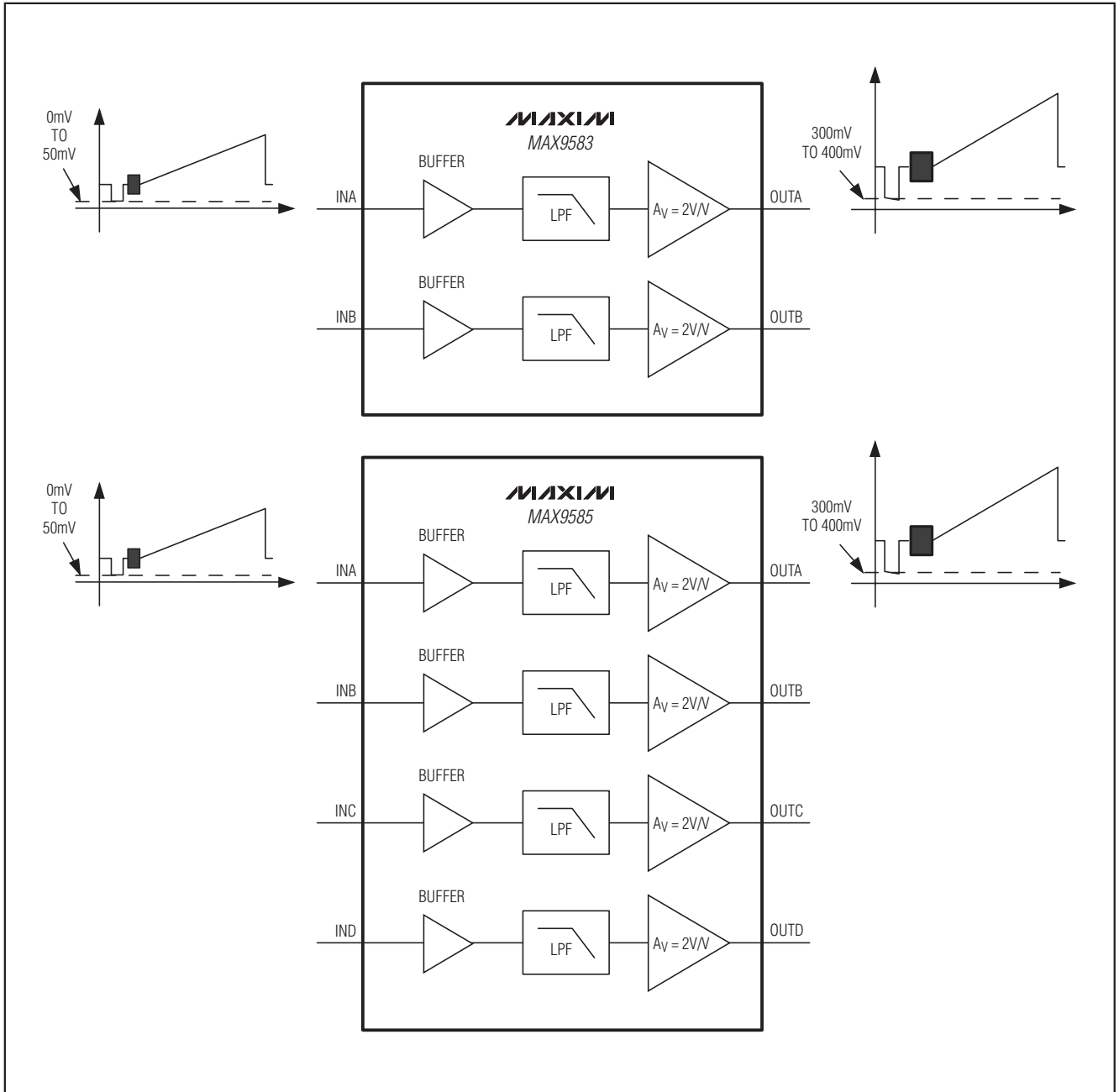


图1. 交流耦合输出

双、三和四通道标清视频滤波放大器， 提供直流耦合输入缓冲器

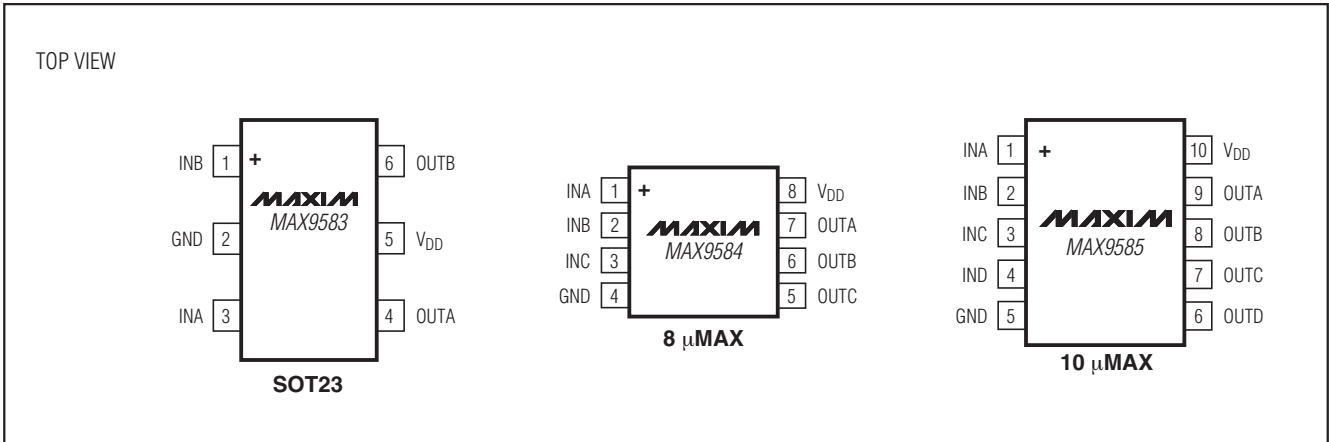
MAX9583/MAX9584/MAX9585

方框图(续)



双、三和四通道标清视频滤波放大器， 提供直流耦合输入缓冲器

引脚配置



选型指南

PART	PIN-PACKAGE	PACKAGE SIZE	CHANNELS	TOP MARK	PKG CODE
MAX9583AZT+	6 Thin SOT23-6	2.9mm x 1.6mm	2	AADJ	Z6+1
MAX9584AUA+	8 μ MAX-8	3mm x 3mm	3	—	U8+1
MAX9585AUB+	10 μ MAX-10	3mm x 3mm	4	—	U10+2

注：所有器件额定工作于-40°C至+125°C温度范围。
+表示无铅封装。

芯片信息

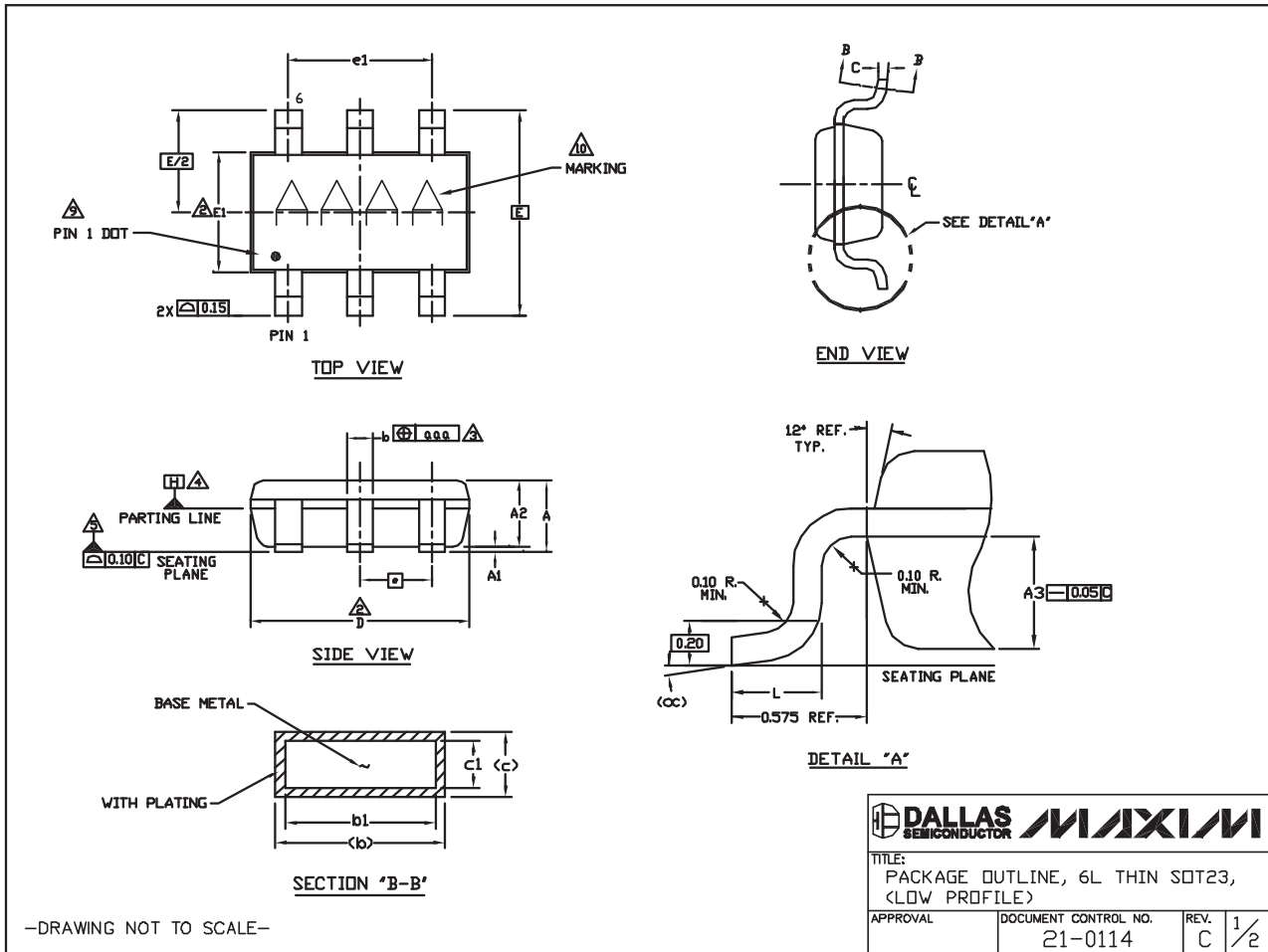
PROCESS: BiCMOS

MAX9583/MAX9584/MAX9585

双、三和四通道标清视频滤波放大器， 提供直流耦合输入缓冲器

封装信息

(本数据资料提供的封装图可能不是最近的规格，如需最近的封装外形信息，请查询 www.maxim-ic.com.cn/packages.)



6L THIN SOT23.EPS

双、三和四通道标清视频滤波放大器， 提供直流耦合输入缓冲器

封装信息(续)

(本数据资料提供的封装图可能不是最近的规格，如需最近的封装外形信息，请查询 www.maxim-ic.com.cn/packages.)

MAX9583/MAX9584/MAX9585

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-J] AND THE OTHER PLANE IS AT THE SPECIFIED DISTANCE FROM [-C-J] 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 JEDEC 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		
OC	0°	4°	8°
aaa	0.20		
Pkg. codes: Z6-1J Z6-2			

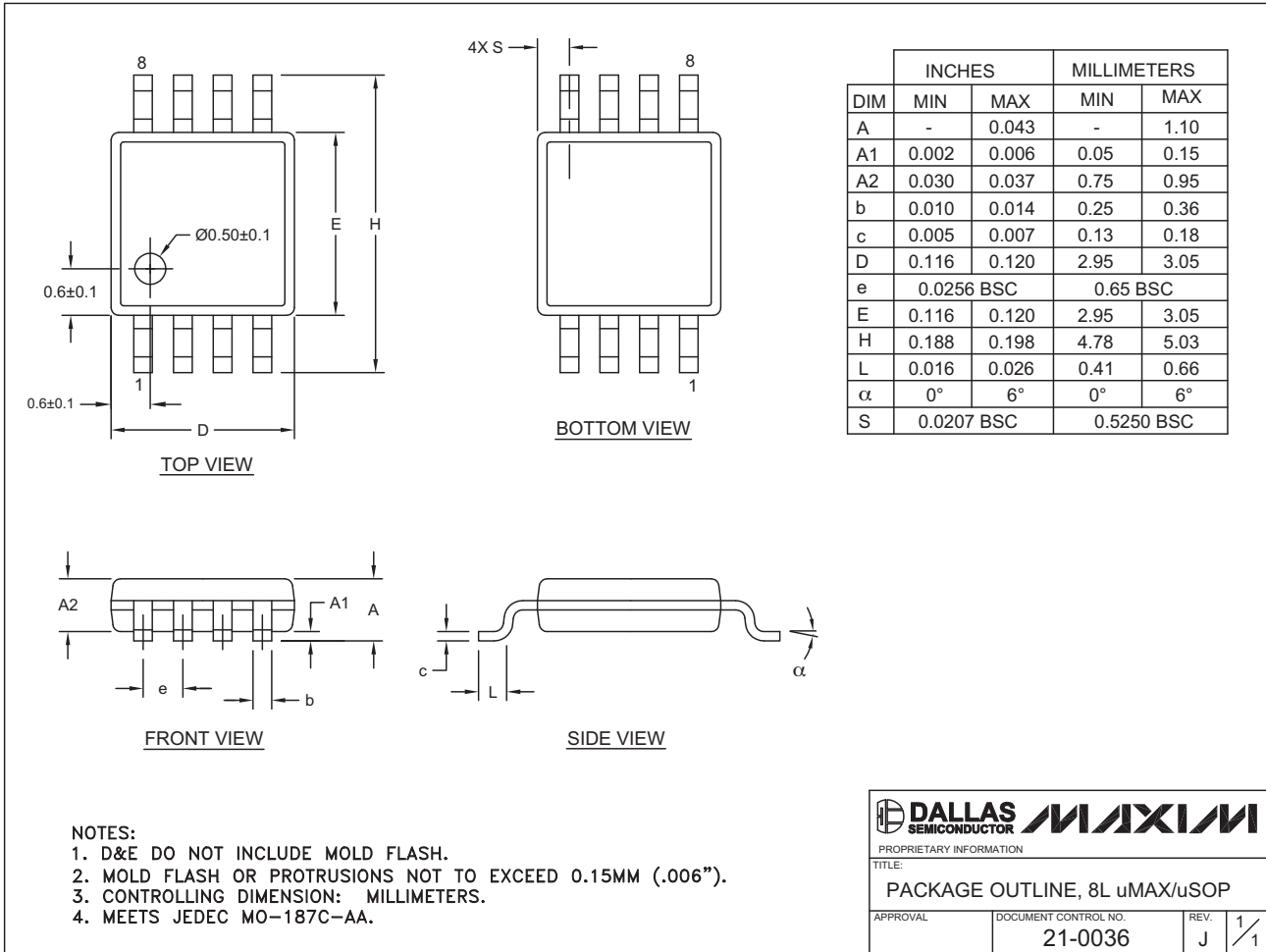
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TITLE: PACKAGE OUTLINE, 6L THIN SOT23, (LOW PROFILE)			
APPROVAL	DOCUMENT CONTROL NO.	REV.	2/2
	21-0114	C	

双、三和四通道标清视频滤波放大器， 提供直流耦合输入缓冲器

封装信息(续)

(本数据资料提供的封装图可能不是最近的规格，如需最近的封装外形信息，请查询 www.maxim-ic.com.cn/packages.)



8LUMAXD EPS

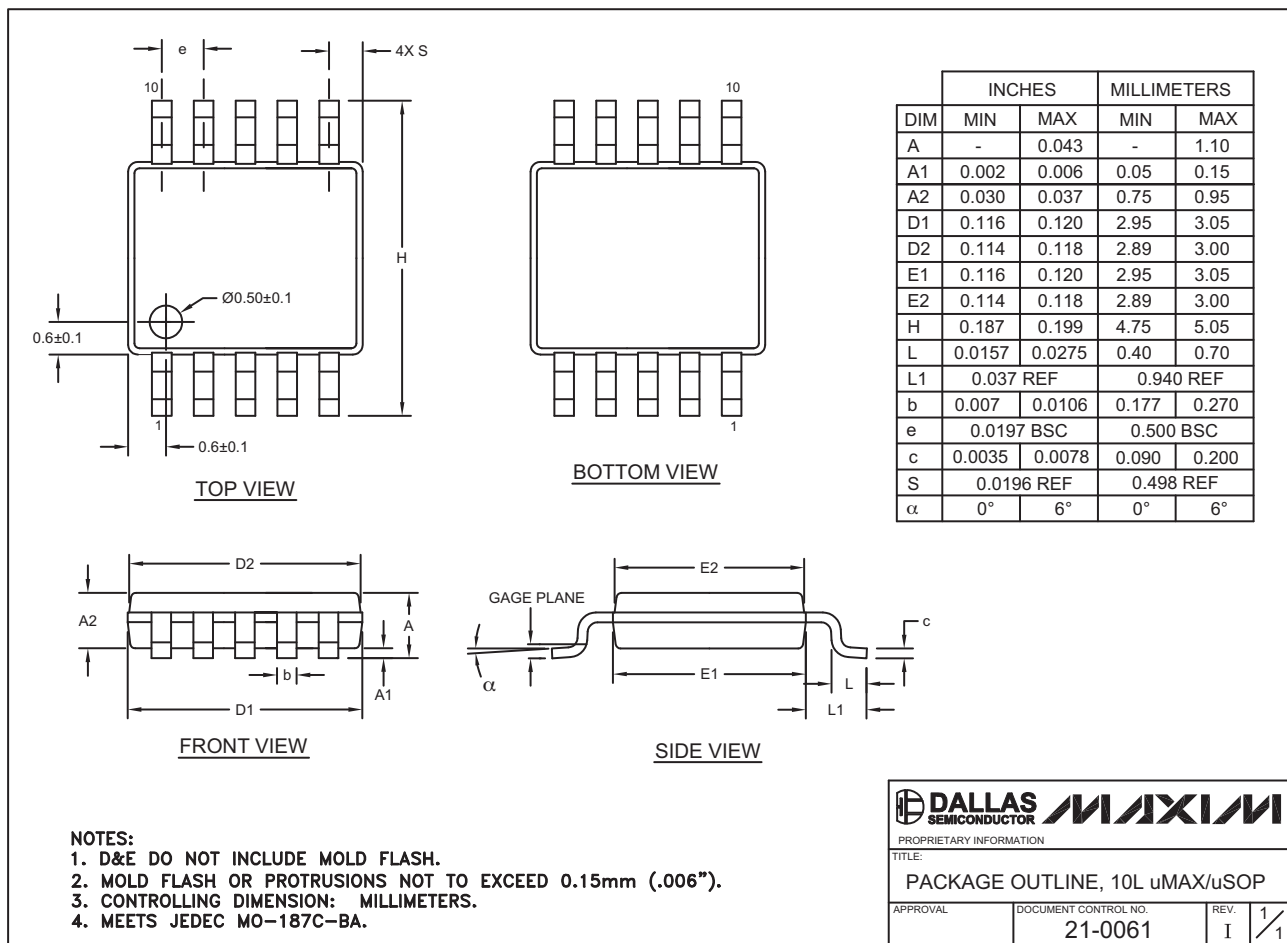
双、三和四通道标清视频滤波放大器， 提供直流耦合输入缓冲器

封装信息(续)

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10LUMAXEFS

MAX9583/MAX9584/MAX9585



修订历史

Rev 1中的修改页：1、2、20。

Rev 2中的修改页：1、2、6、11-15 (删除了一些封装图)。

Rev 3中的修改页：1、15。

Rev 4中的修改页：1-4、8、15。

Rev 5中的修改页：1、8、15。

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