

# **LA4585M**

# 3-V Preamplifier + Power Amplifier for Headphone Stereo Products

#### Overview

The LA4585M is a preamplifier plus power amplifier IC that supports auto-reverse and was developed for use in 3-V headphone stereo products.

#### **Features**

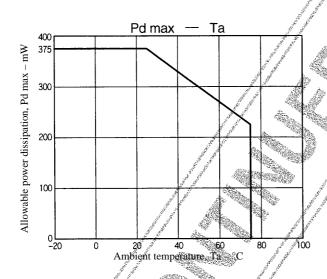
 The LA4585M is designed for use in playback-only compact cassette players. In addition to preamplifier and power amplifier functions, the LA4585M also provides low boost and automatic power output limiter (PVSS:Peak Volume Select System) functions.

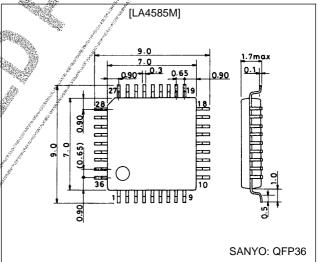
- Provided in a mini-flat 36-pin quad package (0.65 mm lead pitch) optimal for miniature end products.
- Two auto-reverse playback preamplifiers
- Two headphone power amplifiers (16  $\Omega$ )
- Low boost function (auto-loudness effect)
- Output limiter function (PVSS)
- Two radio input switches (pre-muting switches)
- Power muting switch

## **Package Dimensions**

unit: mm

3162B-QFP36





# **Specifications**

Maximum Ratings at Ta = 25°C

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Parameter	Symbol	Conditions	Ratings	Unit
Maximum supply voltage	V <sub>CC</sub> max		4.5	V
Allowable power dissipation	Pd max		375	mW
Operating temperature	Topr		-20 to +75	°C
Storage temperature	Tstg		-40 to +150	°C

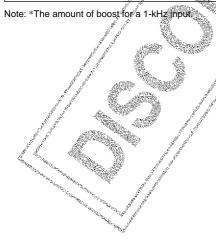
## Operating Conditions at $Ta = 25^{\circ}C$

Parameter	Symbol	Conditions	Ratings	Unit
Recommended supply voltage	V <sub>CC</sub>		3.0	V
Operating supply voltage range	V <sub>CC</sub> op		1.8 to 3.6	V

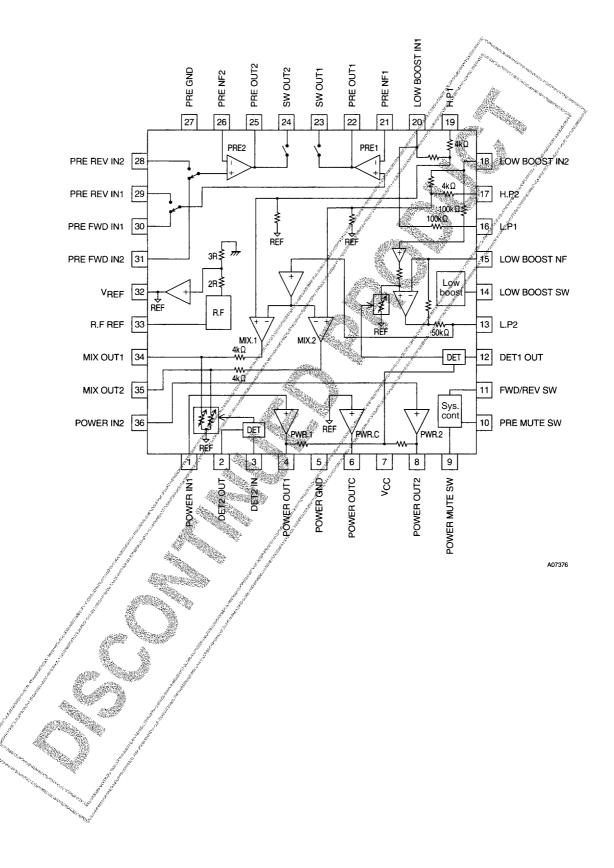
## LA4585M

# Operating Characteristics at Ta = 25°C, $V_{CC}$ = 3.0 V, fi = 1 kHz, 0.775 = 0 dBm, preamplifier $R_L$ = 10 k $\Omega$ , low boost, power amplifier $R_L$ = 10 $\Omega$

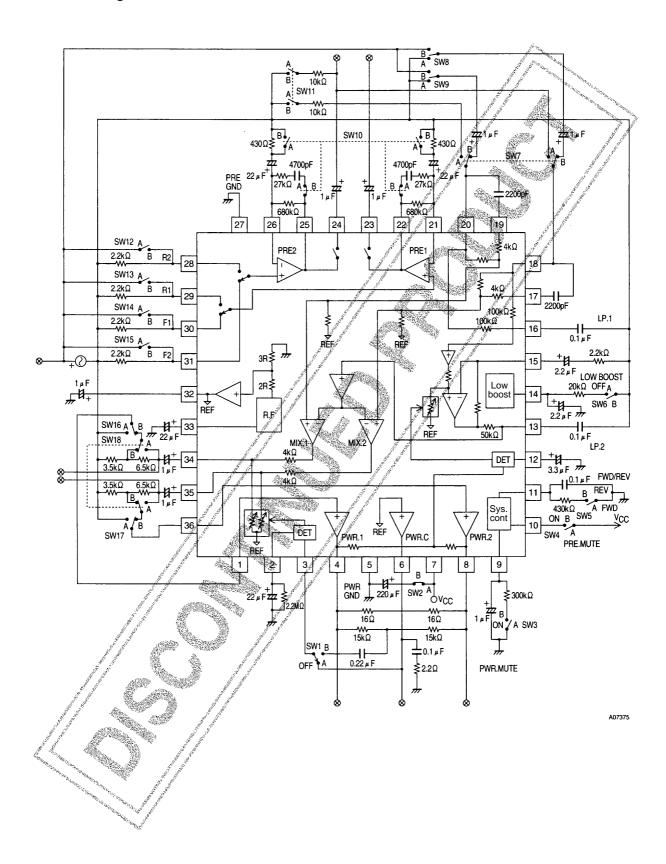
Parameter	Symbol	Conditions	Ratings			Unit		
Parameter	Symbol	Conditions	min	typ	max	Unit		
[PRE + LOW BOOST + PVSS + PWR]								
	I <sub>CCO</sub> 1	Rg = $2.2 \text{ k}\Omega$ , low boost off, PVSS off	12	15	21	mA		
Quiescent current	I <sub>CCO</sub> 2	Rg = $2.2 \text{ k}\Omega$ , low boost on, PVSS on	12	15	21	μΑ		
Voltage gain (closed loop)	VGT	$V_O = -5 \text{ dBm}$	62	64	67	dB		
[PRE AMP]								
Voltage gain (open loop)	VG <sub>0</sub>	$V_O = -5 \text{ dBm}$	J / 70	े 83	7	∦ dB		
Voltage gain (closed loop)	VG1	$V_O = -5 \text{ dBm}$		40		dB		
Maximum output voltage	V <sub>O</sub> max1	THD = 1 %, V <sub>CC</sub> = 1.8 V	0.1	0.2		V		
Total harmonic distortion	THD1	$V_{O} = 0.2 \text{ V, VG} = 40 \text{ dB/NAB}$		0.05	9.5	%		
Equivalent input noise voltage	$V_{NI}$	Rg = 2.2 k $\Omega$ , BPF = 20 Hz to 20 kHz		1.3	<i>[ ]</i> 2.0	μV		
Crosstalk	CT1	Rg = 2.2 k $\Omega$ , TUNE 1 kHz	60	80		dB		
Ripple rejection ratio	SVRR	Rg = 2.2 k $\Omega$ , V <sub>CC</sub> = 1.8 V, Vr = -20 dBm, fr = 100 Hz	40	50	Marie Control	dB		
[POWER AMP]		1/ 2	K (2) - 1-15-12					
Output voltage	Po	THD = 10 %	23	, 34		mW		
Voltage gain	VG2	$V_O = -5 \text{ dBm}$	27	<i>J</i> 29	32	dB		
Total harmonic distortion	THD2	P <sub>O</sub> = 1 mW	-20Est 6.	Ø Ø 0.4	1.0	%		
Interchannel crosstalk	CT2	$V_O = -5$ dBm, $R_V = 0 \Omega$	30 /	40		dB		
Output noise voltage	V <sub>NO</sub> 1	$R_V = 0 \Omega$ , BPF = 20 Hz to 20 kHz		25	40	μV		
Ripple rejection ratio	R <sub>r</sub> 2	$R_V = 0 \Omega$ , $Vr = -20 dB_{ph}$ , $fr = 100 Hz$ , $V_{CC} = 1.8 V$	45	55		dB		
Input resistance	Ri	// ****	/ /22	30	38	kΩ		
DC offset voltage	V <sub>ODC OFF</sub>	Between pin 6 and pins 4 and 8	<i>∱ ∱</i> −90		+90	mV		
[LOW BOOST]			St. Ja	•				
Voltage gain	VG3	Vi = -30 dBm, boost on off	<i>∮</i> −2.3	-3.8	-5.3	dB		
Dt*	BST1	Vi <sub>BST</sub> = -30 dBm, f = 100 Hz, boost on	11.2	14.7	18.2	dB		
Boost*	BST2	Vi <sub>BST</sub> = -30 dBm f = 10 kHz, boost on	7.0	8.5	10	dB		
Maximum output voltage	V <sub>O</sub> max2	THD = 1%, boost on	0.25	0.4		V		
Total harmonic distortion	THD3	V <sub>O</sub> = 0.1 V, boost on		0.1	0.5	%		
Interchannel crosstalk	CT3	V <sub>O</sub> = −20 dBm, Rg ≠ 0, beost on √	25	32		dB		
Output noise voltage	V <sub>NO</sub> 2	Rg = 0, BPF = 20 Hz to 20 kHz, boost on		2.0	5.0	μV		
Ripple rejection ratio	R <sub>r</sub> 3	Rg = 0, f <sub>R</sub> ⇒ 100 Hz, V <sub>R</sub> = −20 dBm, V <sub>CC</sub> ≠1⋅8 V, boost on	45	53		dB		
[LOW BOOST + PVSS + POWER] The following	items are r	neasured at an R <sub>V</sub> of 10 kΩ maximum.		•				
Voltage gain	VG4	Vi = 40 dBm, f = 1 kHz, boost off/on	22	24	27	dB		
LOW BOOST output voltage	. ∂V <sub>0</sub> 1	Vi = -43 dBm, f = 100 Hz, boost on	0.13	0.23	0.33	V		
LOW BOOST output voltage	/ V <sub>O</sub> 2	Vi = 28 dBm, f = 100 Hz, boost on	0.25	0.40	0.55	V		
LOW BOOST total harmonic distortion	THD4	Vr = 40 dBm, f = 100 Hz, boost on		0.5	1.2	%		
Output noise voltage	V <sub>NO</sub> 3	Rg = 0, CCIR-ARM, boost off, with the power input switch K18 set to B.	-88	-85	-82	dBm		
PVSS voltage	√ V <sub>O</sub> 3	V ≠ -40 dBm, PVSS 2	-40	-37	-34	dBm		
PVSS width	W <sub>PVS</sub>	The input amplitude between the start point and the point where the output is +4 dB. PVSS on	30	40		dB		
PVSS harmonic distortion	THD5	Vi = -40 dBm, PVSS 2		0.5	1.2	%		
PVSS start input level	Von	PV\$\$.2	-67	-63	-59	dBm		
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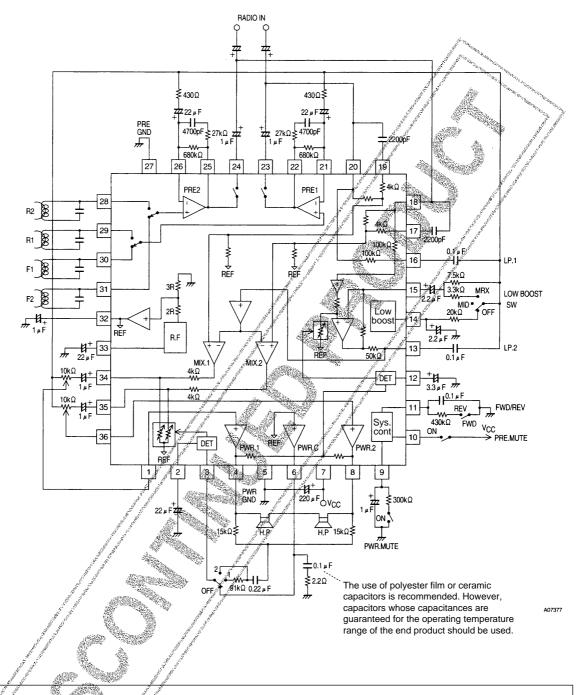
## **Block Diagram**



#### **Test Circuit Diagram**



#### **Sample Application Circuit**



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