



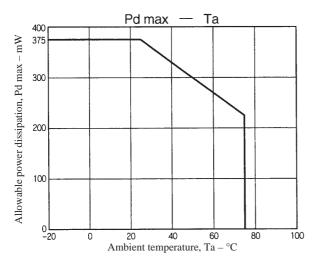
# 3-V Preamplifier + Power Amplifier for Headphone Stereo Products

#### 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.

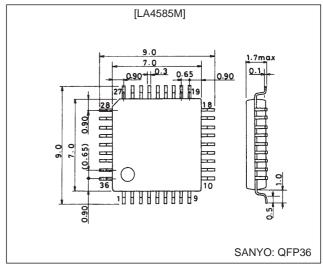


- Provided in a mini-flat 36-pin quad package (0.65 mm lead pitch) optimal for miniature end products.
- · Two auto-reverse playback preamplifiers
- Two headphone power amplifiers (16  $\Omega$ )
- Low boost function (auto-loudness effect)
- Output limiter function (PVSS)
- Two radio input switches (pre-muting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

# **Package Dimensions**

unit: mm

#### 3162B-QFP36



#### **Specifications**

Maximum Ratings at  $Ta = 25^{\circ}C$ 

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

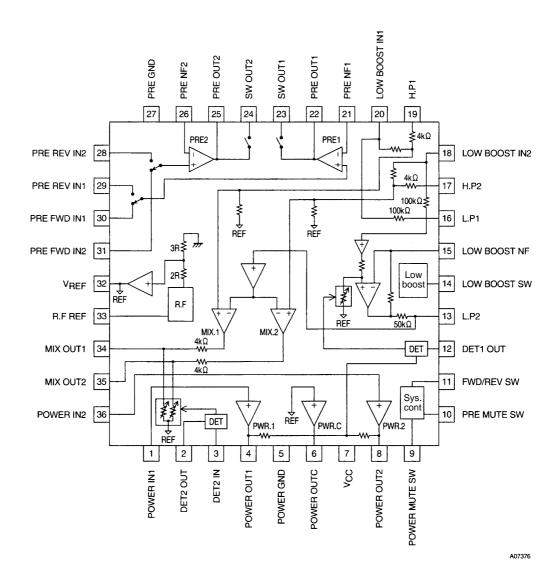
### LA4585M

# Operating Characteristics at Ta = 25 $^{\circ}$ C, V<sub>CC</sub> = 3.0 V, fi = 1 kHz, 0.775 = 0 dBm, preamplifier R<sub>L</sub> = 10 k $\Omega$ , low boost, power amplifier R<sub>L</sub> = 10 $\Omega$

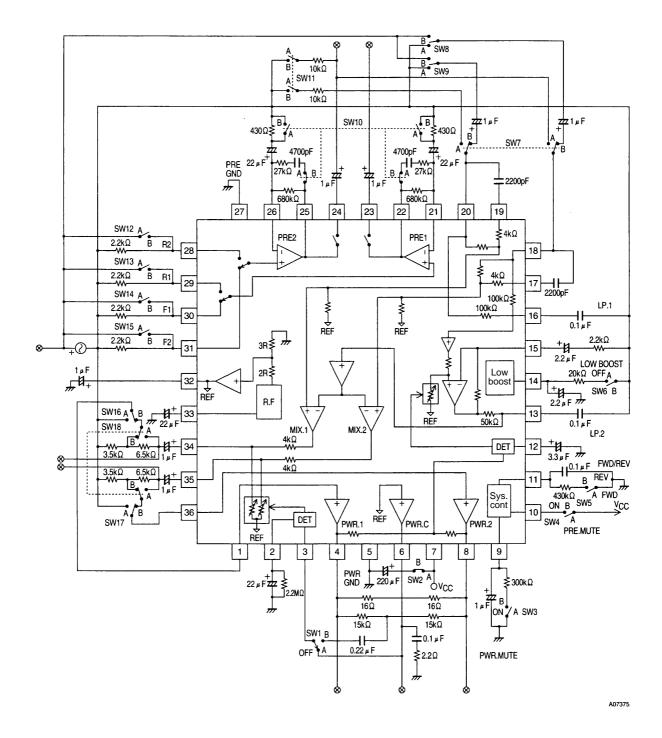
Parameter	Cumbal	Conditions	Ratings			
	Symbol	Conditions	min	typ	max	Unit
[PRE + LOW BOOST + PVSS + PWR]						
Quiescent current	I <sub>CCO</sub> 1	Rg = $2.2 \text{ k}\Omega$ , low boost off, PVSS off	12	15	21	mA
Quiescent current	I <sub>CCO</sub> 2	Rg = $2.2 \text{ k}\Omega$ , low boost on, PVSS on	12	15	21	μA
Voltage gain (closed loop)	VGT	$V_O = -5 \text{ dBm}$	62	64	67	dB
[PRE AMP]						
Voltage gain (open loop)	VG <sub>0</sub>	$V_O = -5 \text{ dBm}$	70	83		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	0.5	%
Equivalent input noise voltage	V <sub>NI</sub>	Rg = $2.2 \text{ k}\Omega$ , BPF = $20 \text{ Hz}$ to $20 \text{ kHz}$		1.3	2.0	μV
Crosstalk	CT1	Rg = 2.2 kΩ, 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		dB
[POWER AMP]						
Output voltage	Po	THD = 10 %	23	34		mW
Voltage gain	VG2	$V_O = -5 \text{ dBm}$	27	29	32	dB
Total harmonic distortion	THD2	P <sub>O</sub> = 1 mW		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	$R_V = 0 \Omega$ , $Vr = -20 \text{ dBm}$ , $fr = 100 \text{ Hz}$ , $V_{CC} = 1.8 \text{ V}$	45	55		dB
Input resistance	Ri		22	30	38	kΩ
DC offset voltage	V <sub>ODC</sub> OFF	Between pin 6 and pins 4 and 8	-90		+90	mV
[LOW BOOST]	1 020 0			1		
Voltage gain	VG3	Vi = -30 dBm, boost on/off	-2.3	-3.8	-5.3	dB
	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		0.25	0.4	-	V
Total harmonic distortion	THD3	$V_0 = 0.1 \text{ V, boost on}$		0.1	0.5	%
Interchannel crosstalk	CT3	$V_O = -20$ dBm, Rg = 0, boost 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	uV
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	ng items are r					I
Voltage gain	VG4	Vi = -40  dBm, f = 1  kHz, boost off/on	22	24	27	dB
LOW BOOST output voltage	V <sub>O</sub> 1	Vi = -43 dBm, f = 100 Hz, boost on	0.13	0.23	0.33	V
LOW BOOST output voltage	V <sub>0</sub> 2	Vi = -28 dBm, f = 100 Hz, boost on	0.25	0.40	0.55	v
LOW BOOST total harmonic distortion	THD4	Vi = -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>0</sub> 3	Vi = -40 dBm, PVSS 2	-40	-37	-34	dBm
PVSS width	W <sub>PVSS</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	V <sub>OPi</sub>	PVSS 2	-67	-63	-59	dBm

Note: \*The amount of boost for a 1-kHz input.

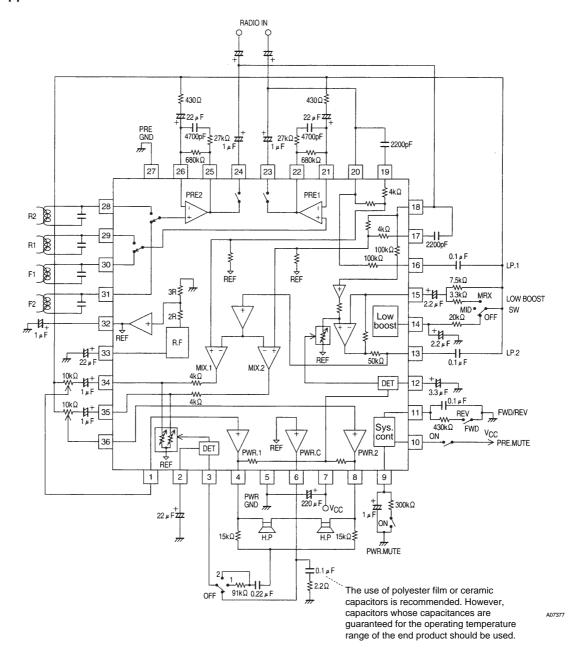
## **Block Diagram**



#### **Test Circuit Diagram**



#### **Sample Application Circuit**



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