

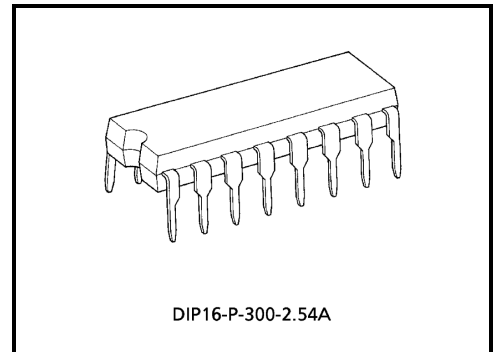
# TA8119P

## Stereo Headphone Amplifier (3V USE)

The TA8119P is developed for play-back stereo headphone player (3V use), which is built-in preamplifiers, power amplifiers (for headphone) and DC volume controls.

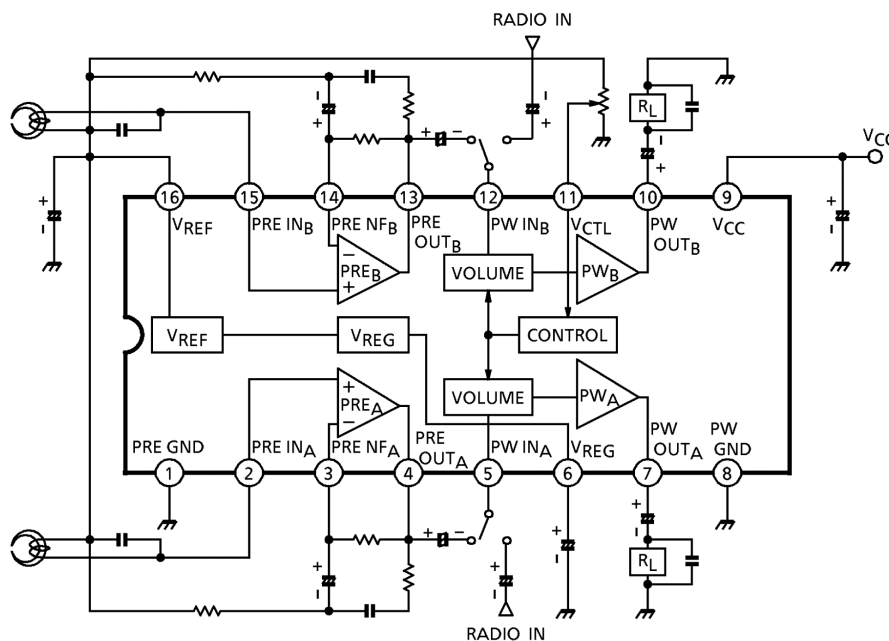
### Features

- Built-in DC volume controls
- Coupling condenser-less for input of preamplifier
- The loop gain of power amplifier is 30dB (typ.), in case that DC volume is at maximum
- Available of external input signal from DC volume stage
- Low quiescent current ( $V_{CC} = 3V, T_a = 25^\circ C$ )  
 $ICCQ = 9mA$  (typ.)
- Operating supply voltage range ( $T_a = 25^\circ C$ )  
 $V_{CC} (opr) = 1.8\sim 6V$



Weight: 1.00g (typ.)

### Block Diagram



## Pin Function

Terminal Voltage: Typical Terminal Voltage at no Signal with Test Circuit  
 ( $V_{CC} = 3V$ ,  $T_a = 25^\circ C$ )

Pin No.	Pin Name	Contents	Equivalent	Terminal Voltage (V)
1	PRE GND	—	—	0
2	PRE IN <sub>A</sub>	Input of preamplifier		1.3
15	PRE IN <sub>B</sub>			1.3
3	PRE NF <sub>A</sub>	NF of preamplifier		1.3
14	PRE NF <sub>B</sub>			1.3
4	PRE OUT <sub>A</sub>	Output of preamplifier		1.3
13	PRE OUT <sub>B</sub>			1.3
5	PW IN <sub>A</sub>	Input of power amplifier for headphone (through DC volume stage)		1.3
12	PW IN <sub>B</sub>			1.3
6	V <sub>REG</sub>	Ripple filter of power supply		2.6
16	V <sub>REF</sub>	Reference voltage		1.3
7	PW OUT <sub>A</sub>	Output of power amplifier		1.3
10	PW OUT <sub>B</sub>			1.3
8	PW GND	—	—	0
9	V <sub>CC</sub>	—	—	3
11	V <sub>CTL</sub>	Input of control voltage for volume control		—

## Application Note

- (1) A volume which has the characteristic “curve A” is available for the DC volume control.
- (2) The capacitor C is used for absorbing volume sliding noise.
- (3) The DC volume control circuit is applicable to “function of mute”, connecting as Fig.1.  
In case of tuning mute-on, the load of “reference voltage circuit” is R, at maximum volume.
- (4) Small temperature coefficient and excellent frequency characteristic is needed by capacitors below.

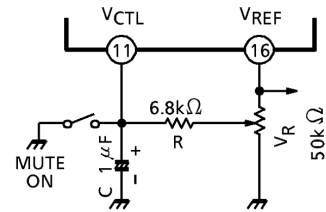


Fig.1 Function of mute

- Oscillation preventing capacitors for power amplifier output.
- Capacitor between VREF and GND.
- Capacitor between VCC and GND.
- Capacitor between VREG and GND.

## Maximum Ratings (Ta = 25°C)

Characteristic	Symbol	Rating	Unit
Supply voltage	V <sub>CC</sub>	7	V
Output current	I <sub>O</sub> (peak)	120	mA
Power dissipation	P <sub>D</sub> (Note)	750	mW
Operating temperature	T <sub>opr</sub>	-25~75	°C
Storage temperature	T <sub>stg</sub>	-55~150	°C

(Note) Derated above Ta = 25°C in the proportion of 6mW / °C.

## Electrical Characteristics

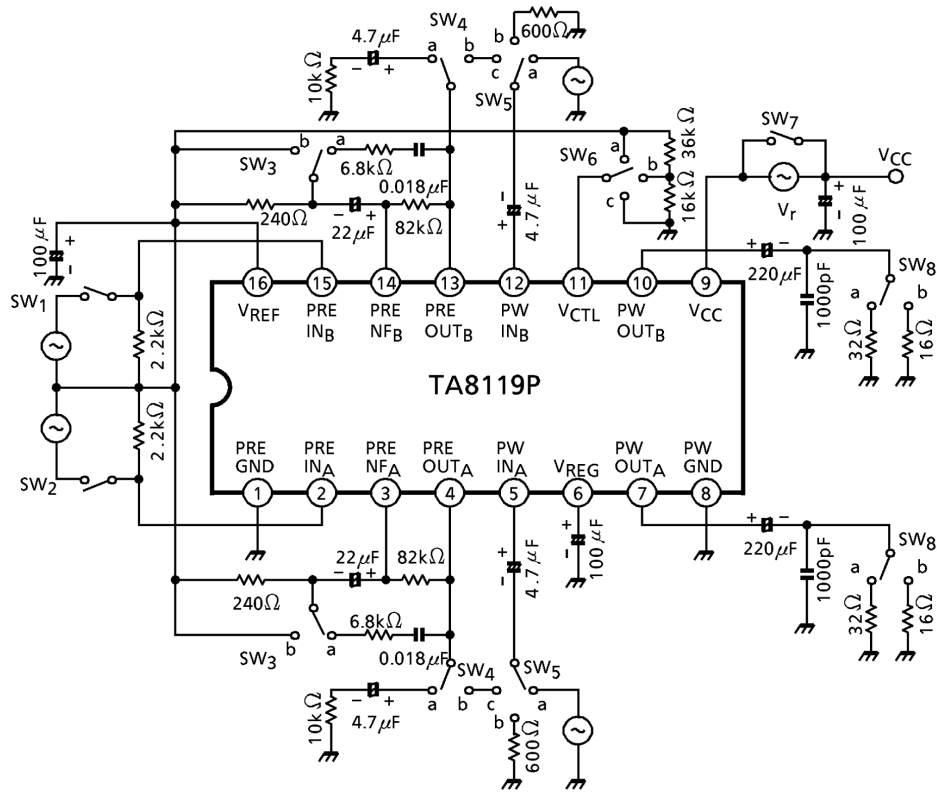
Unless Otherwise Specified,  $V_{CC} = 3V$ ,  $T_a = 25^\circ C$ ,  $f = 1kHz$

Preamplifier:  $R_L = 10k\Omega$ , Vol = Min

Power Amplifier:  $R_L = 32\Omega$ , Vol = Max

Characteristic		Symbol	Test Circuit	Test Condition	Min.	Typ.	Max.	Unit
Quiescent supply current		$I_{CCQ1}$	—	$V_{in} = 0$ , Vol = min	—	9.0	13.0	mA
		$I_{CCQ2}$	—	$V_{in} = 0$ , Vol = max	—	11.0	—	
Preamplifier section	Open loop voltage gain	$G_{VO}$	—	$V_o = -12dBV$	55	62	—	dB
	Closed loop voltage gain	$G_{VC}$	—	NAB = 1kHz, $V_o = -12dBV$	—	33	—	dB
	Maximum output voltage	$V_{om}$	—	THD = 1%	600	720	—	mV <sub>rms</sub>
	Total harmonic distortion	THD1	—	$V_o = -12dBV$	—	0.04	0.1	%
	Equivalent input noise voltage	$V_{ni}$	—	$R_g = 2.2k\Omega$ BPF = 30Hz~20kHz NAB ( $G_V = 33dB$ , $f = 1kHz$ )	—	1.2	2.0	$\mu V_{rms}$
	Ripple rejection ratio	RR1	—	$R_g = 2.2k\Omega$ $V_r = -22dBV$ , $f_r = 100Hz$	—	46	—	dB
Power amplifier section	Output power	(1)	$P_{o1}$	—	THD = 10%	20	27	mW
		(2)	$P_{o2}$	—	$R_L = 16\Omega$ , THD = 10%	—	39	
	Voltage gain (1)	$G_{V1}$	—	$V_o = -12dBV$	28	30	32	dB
	Channel balance	CB	—		—	0	1.5	dB
	Voltage gain (2)	$G_{V2}$	—	$V_o = -12dBV$ , Vol = mid	—	15	—	dB
	Total harmonic distortion	THD2	—	$P_o = 10mW$	—	0.5	1.2	%
		THD3	—	$P_o = 10mW$ , Vol = mid	—	0.3	—	
	Output noise voltage	$V_{no}$	—	$R_g = 600\Omega$ BPF = 30Hz~20kHz	—	250	320	$\mu V_{rms}$
	Maximum attenuation	ATT	—	$V_o = -12dBV$ Vol = max→min	66	72	—	dB
Ripple rejection ratio	RR2	—	$R_g = 600\Omega$ $V_r = -22dBV$ , $f_r = 100Hz$	—	46	—	dB	
Total	Cross talk (ch-A / ch-B)	CT	—	$R_g = 2.2k\Omega$ $V_o = -12dBV$ , Vol = max	34	40	—	dB

## Test Circuit



## Switch State For Electrical Characteristics

Characteristic	SW <sub>1</sub>	SW <sub>2</sub>	SW <sub>3</sub>	SW <sub>4</sub>	SW <sub>5</sub>	SW <sub>6</sub>	SW <sub>7</sub>	SW <sub>8</sub>
I <sub>CCQ1</sub>	×	×	a	a	b	c	○	a
I <sub>CCQ2</sub>	×	×	a	a	b	a	○	a
G <sub>VO</sub>	○	○	b	a	b	c	○	a
G <sub>VC</sub>	○	○	a	a	b	c	○	a
V <sub>om</sub>	○	○	a	a	b	c	○	a
THD1	○	○	a	a	b	c	○	a
V <sub>ni</sub>	×	×	a	a	b	c	○	a
RR1	×	×	a	a	b	c	×	a
P <sub>o1</sub>	×	×	a	a	a	a	○	a
P <sub>o2</sub>	×	×	a	a	a	a	○	b
G <sub>V1</sub>	×	×	a	a	a	a	○	a
CB	×	×	a	a	a	a	○	a
G <sub>V2</sub>	×	×	a	a	a	b	○	a
THD2	×	×	a	a	a	a	○	a
THD3	×	×	a	a	a	b	○	a
V <sub>no</sub>	×	×	a	a	b	a	○	a
ATT	×	×	a	a	a	a→c	○	a
RR2	×	×	a	a	b	c	×	a
CT	○ / ×	× / ○	a	b	c	a	○	a

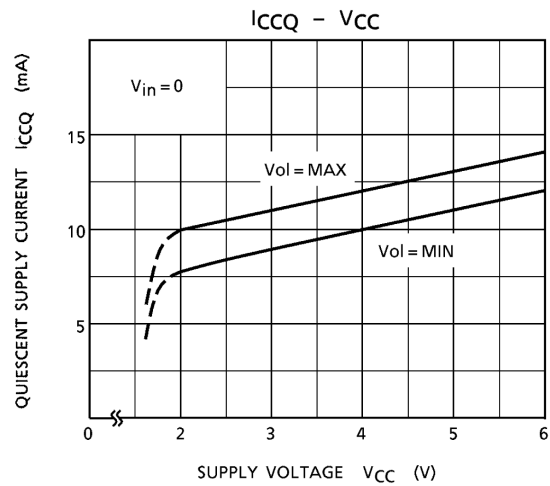
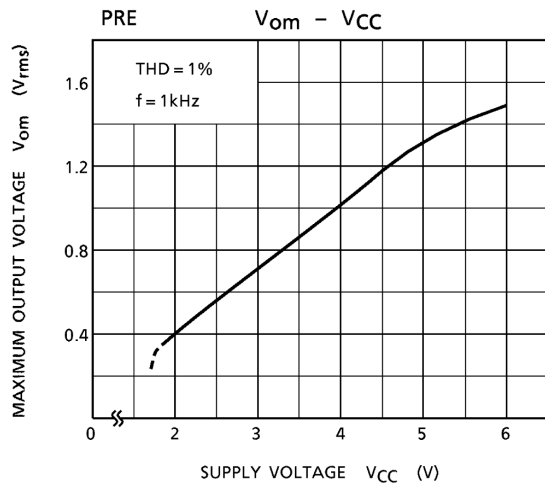
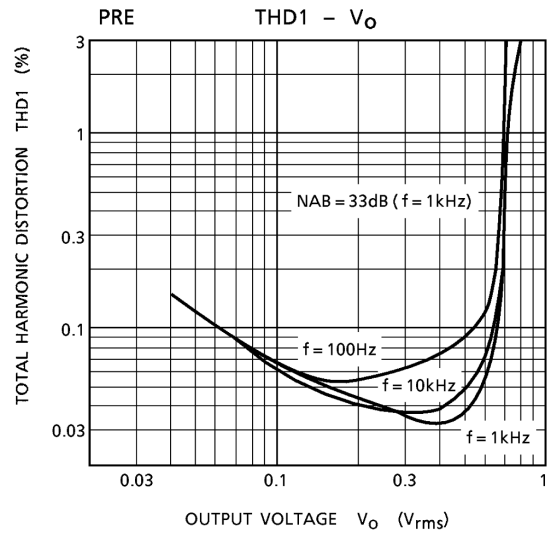
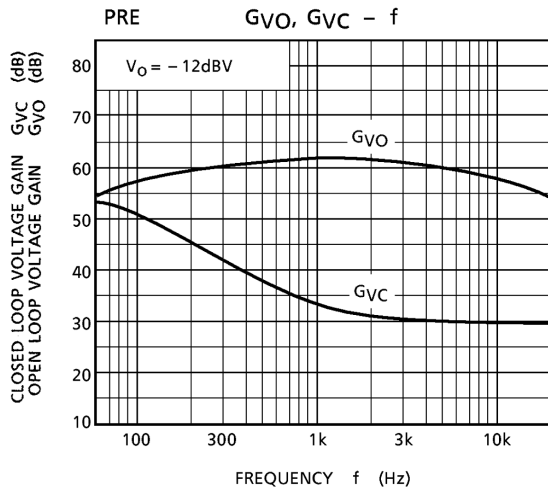
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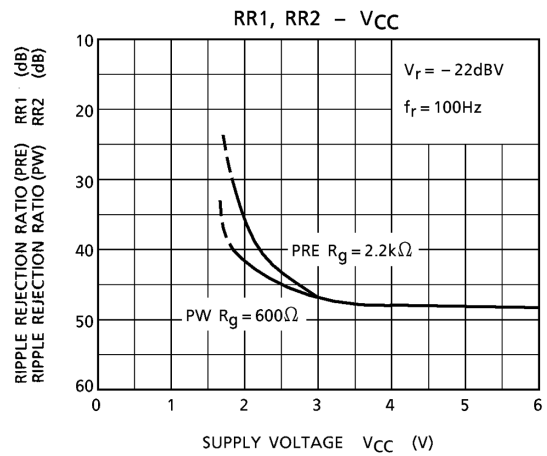
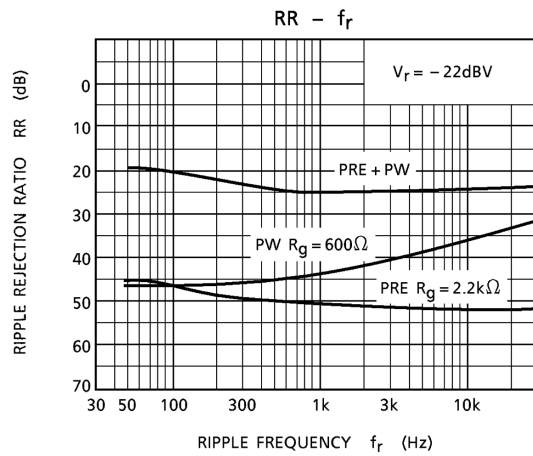
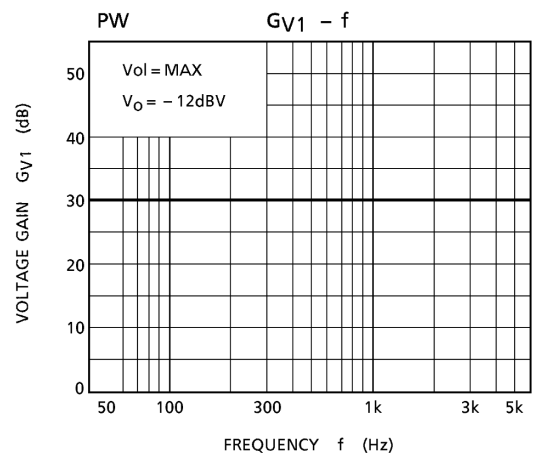
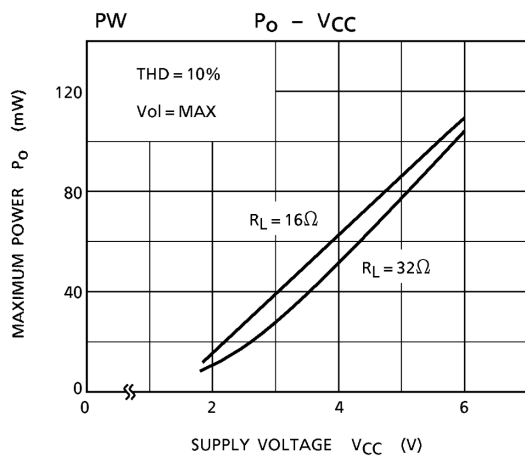
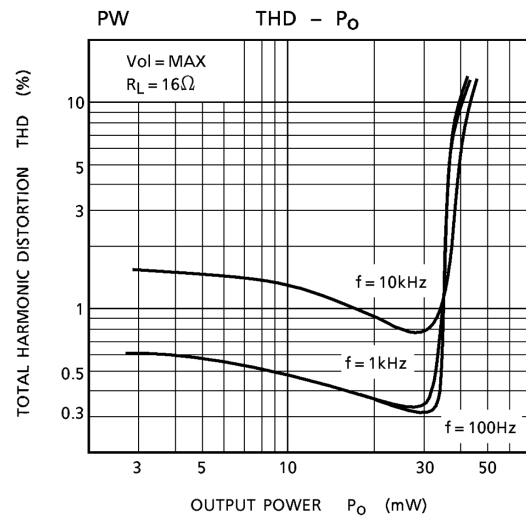
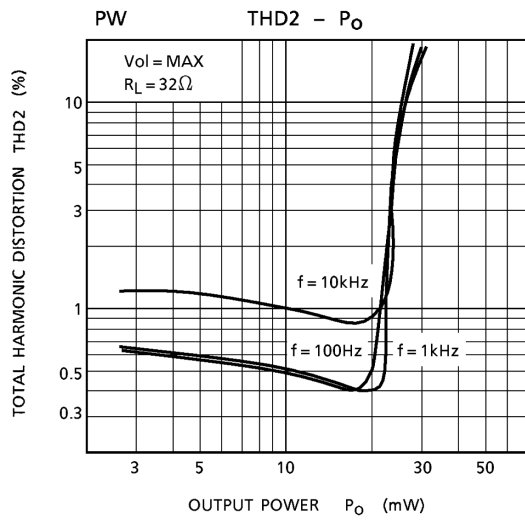
## Characteristic Curves

Unless Otherwise Specified:  $V_{CC} = 3V$ ,  $f = 1kHz$ ,  $T_a = 25^\circ C$

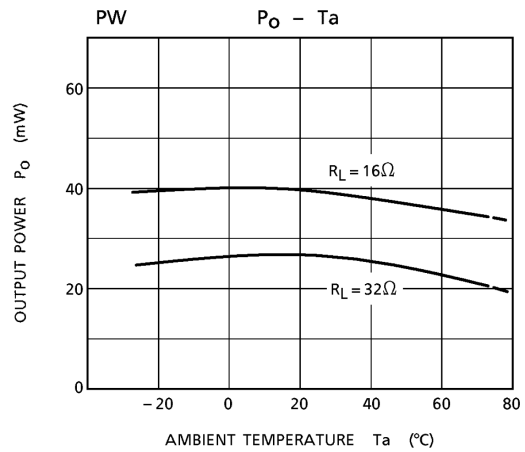
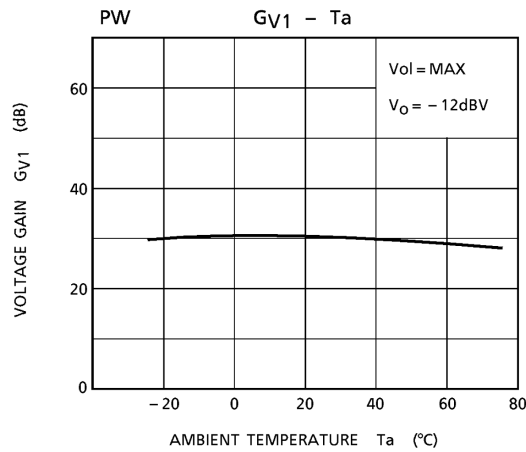
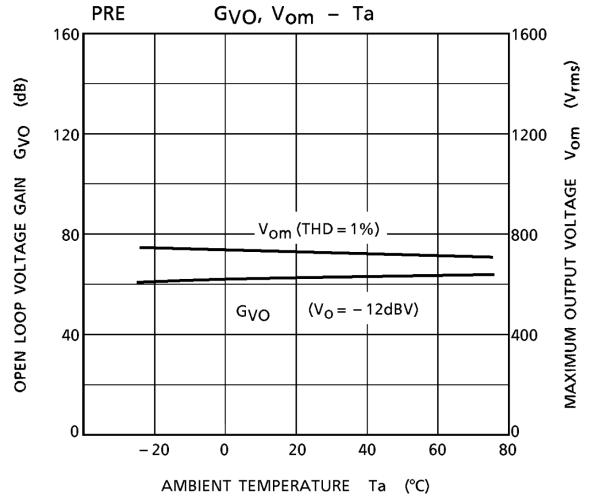
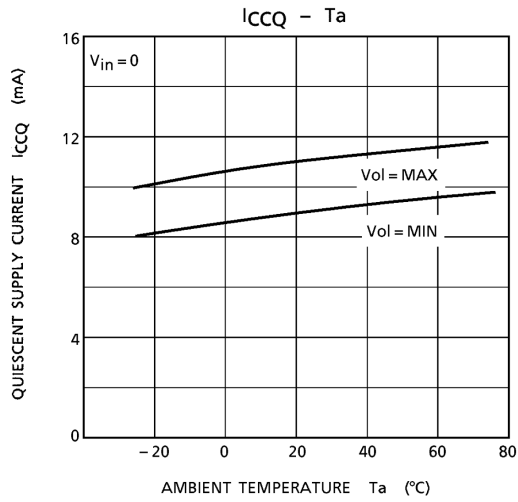
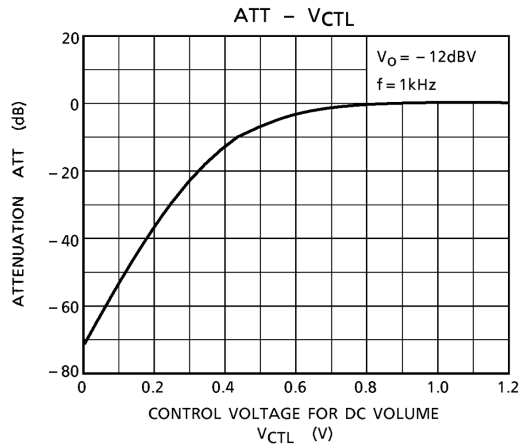
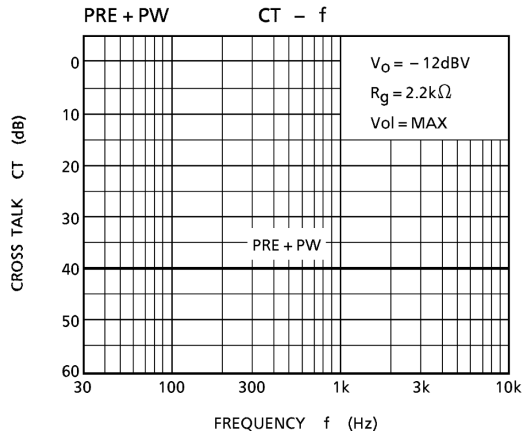
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Power Amplifier:  $R_L = 32\Omega$ ,  $Vol = Max$





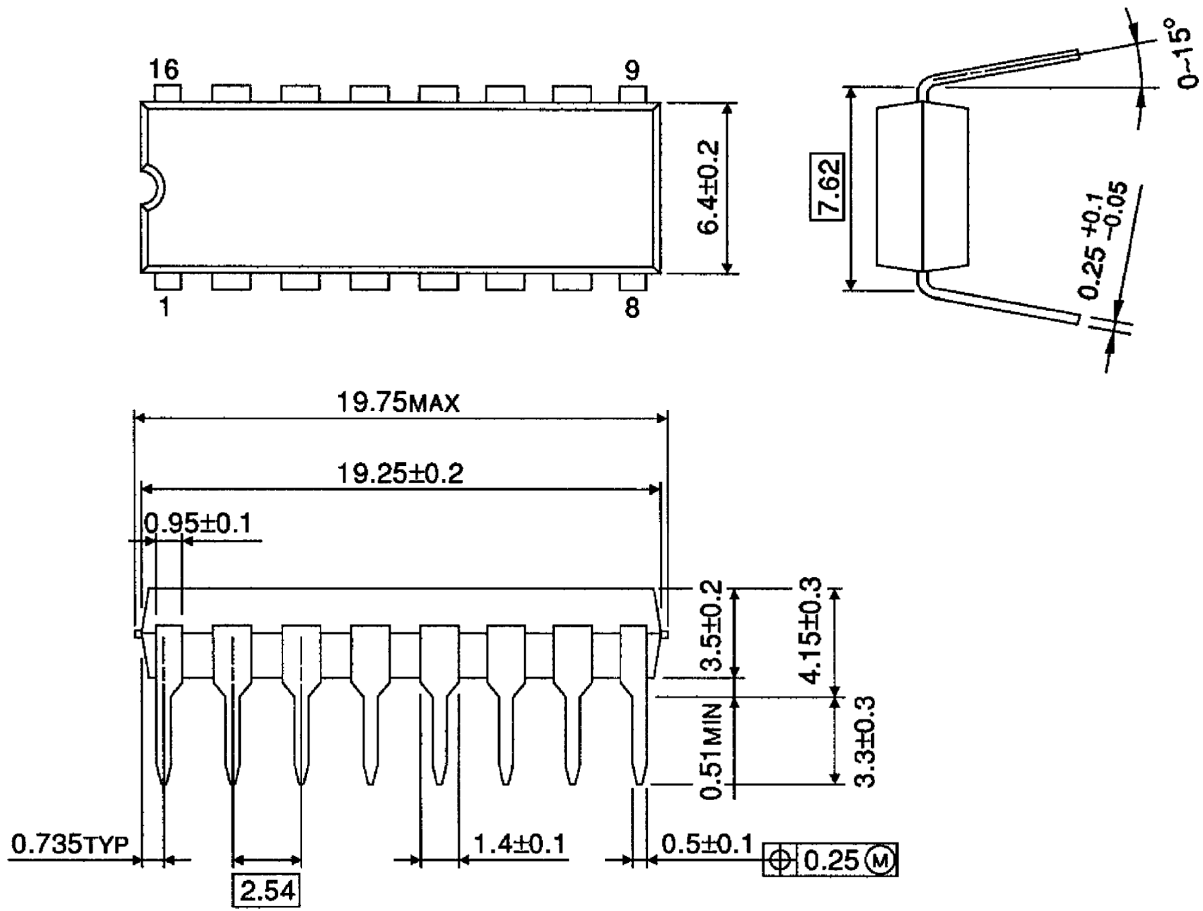




## Package Dimensions

DIP16-P-300-2.54A

Unit : mm



Weight: 1.00g (typ.)

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