

TOSHIBA BIPOLAR LINEAR INTEGRATED CIRCUIT SILICON MONOLITHIC

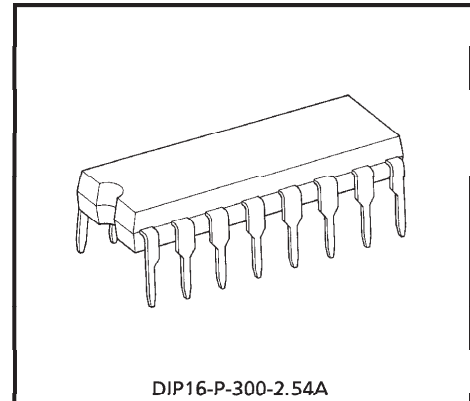
TA8119P

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.

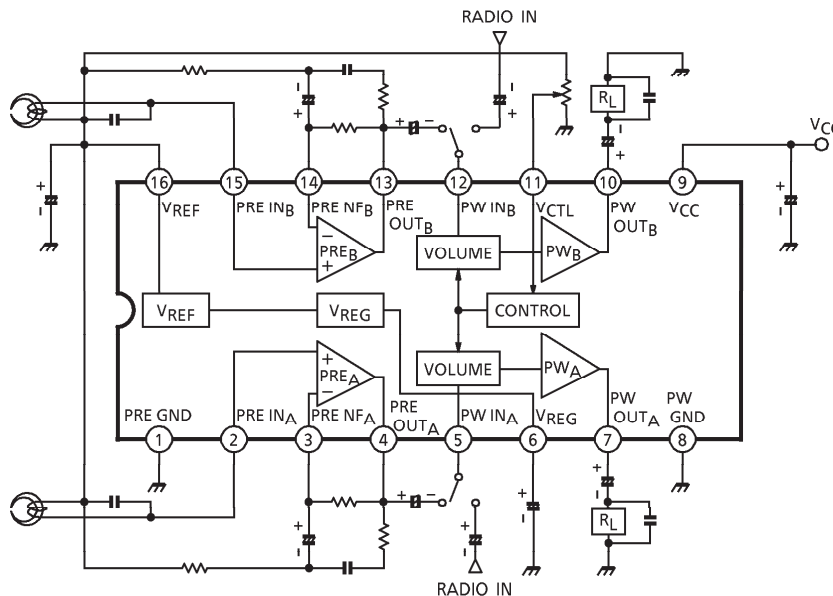
FEATURES

- 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 ($V_{CC} = 3V, T_a = 25^\circ C$)
 $I_{CCQ} = 9mA$ (Typ.)
- Operating supply voltage range ($T_a = 25^\circ C$)
 $V_{CC} (opr) = 1.8 \sim 6V$



Weight : 1.00g (Typ.)

BLOCK DIAGRAM



961001EBA2

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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 _A	Input of preamplifier		1.3
15	PRE IN _B			1.3
3	PRE NF _A	NF of preamplifier		1.3
14	PRE NF _B			1.3
4	PRE OUT _A	Output of preamplifier		1.3
13	PRE OUT _B			1.3
5	PW IN _A	Input of power amplifier for headphone (through DC volume stage)		2.6
12	PW IN _B			1.3
6	V _{REG}	Ripple filter of power supply		1.3
16	V _{REF}	Reference voltage		1.3
7	PW OUT _A	Output of power amplifier		1.3
10	PW OUT _B			1.3
8	PW GND	—	—	0
9	V _{CC}	—	—	3
11	V _{CTL}	Input of control voltage for volume control		—

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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.
 - Oscillation preventing capacitors for power amplifier output.
 - Capacitor between V_{REF} and GND.
 - Capacitor between V_{CC} and GND.
 - Capacitor between V_{REG} and GND.

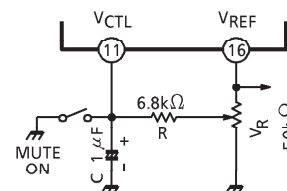


Fig.1 Function of mute

MAXIMUM RATINGS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	RATING	UNIT
Supply Voltage	V_{CC}	7	V
Output Current	I_O (peak)	120	mA
Power Dissipation	P_D (Note)	750	mW
Operating Temperature	T_{opr}	- 25~75	°C
Storage Temperature	T_{stg}	- 55~150	°C

(Note) Derated above $T_a = 25^\circ\text{C}$ in the proportion of $6\text{mW}/^\circ\text{C}$.

ELECTRICAL CHARACTERISTICS

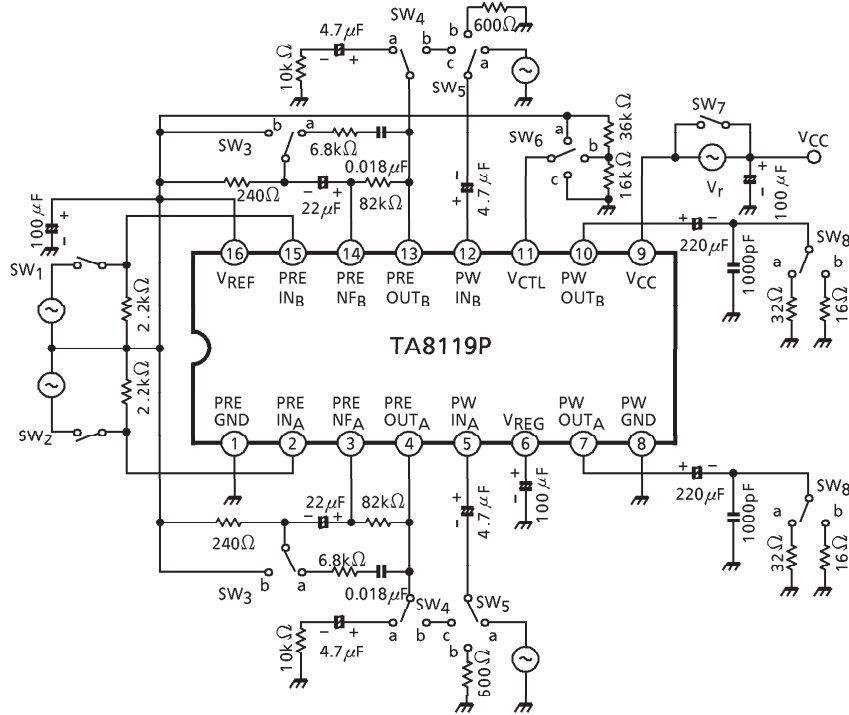
Unless otherwise specified, $V_{CC} = 3V$, $T_a = 25^\circ C$, $f = 1kHz$

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_{rms}
	Total Harmonic Distortion	$THD1$	—	$V_O = -12dBV$	—	0.04	0.1	%
	Equivalent Input Noise Voltage	V_{ni}	—	$R_g = 2.2k\Omega$ $BPF = 30Hz \sim 20kHz$ $NAB (G_V = 33dB, f = 1kHz)$	—	1.2	2.0	μV_{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	—	$V_O = -12dBV$	—	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}	—	$R_g = 600\Omega$ $BPF = 30Hz \sim 20kHz$	—	250	320	μV_{rms}
Maximum Attenuation	ATT	—	$V_O = -12dBV$ $Vol = MAX \rightarrow MIN$	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 ₁	SW ₂	SW ₃	SW ₄	SW ₅	SW ₆	SW ₇	SW ₈
I _{CCQ1}	x	x	a	a	b	c	○	a
I _{CCQ2}	x	x	a	a	b	a	○	a
G _{VO}	○	○	b	a	b	c	○	a
G _{VC}	○	○	a	a	b	c	○	a
V _{om}	○	○	a	a	b	c	○	a
THD1	○	○	a	a	b	c	○	a
V _{ni}	x	x	a	a	b	c	○	a
RR1	x	x	a	a	b	c	x	a
P _{o1}	x	x	a	a	a	a	○	a
P _{o2}	x	x	a	a	a	a	○	b
G _{V1}	x	x	a	a	a	a	○	a
CB	x	x	a	a	a	a	○	a
G _{V2}	x	x	a	a	a	b	○	a
THD2	x	x	a	a	a	a	○	a
THD3	x	x	a	a	a	b	○	a
V _{no}	x	x	a	a	b	a	○	a
ATT	x	x	a	a	a	a→c	○	a
RR2	x	x	a	a	b	c	x	a
CT	○ / x	x / ○	a	b	c	a	○	a

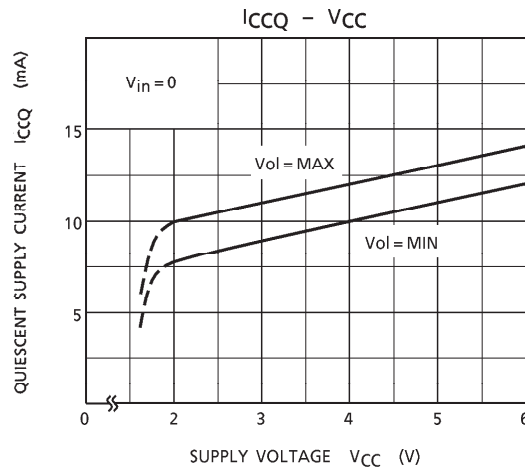
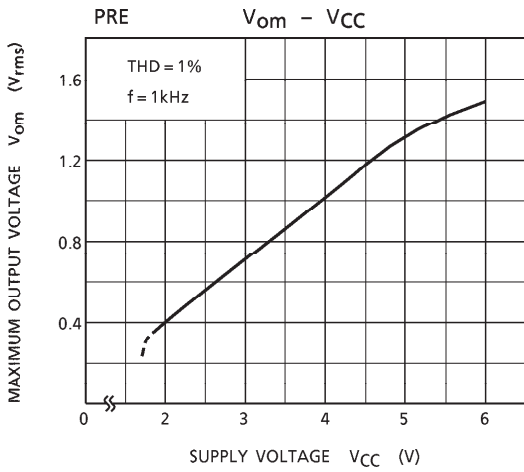
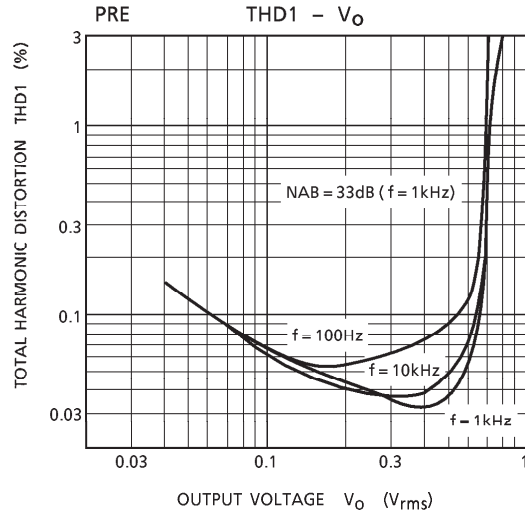
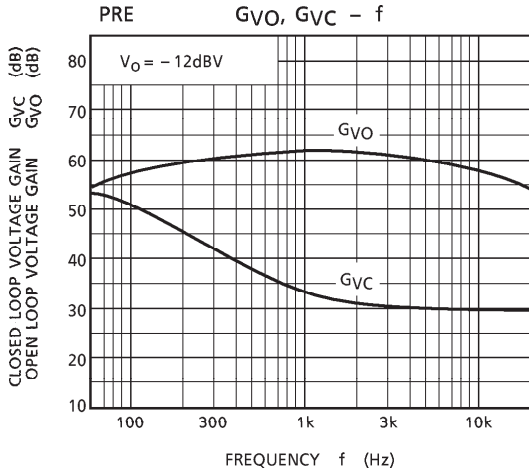
○ : short x : open

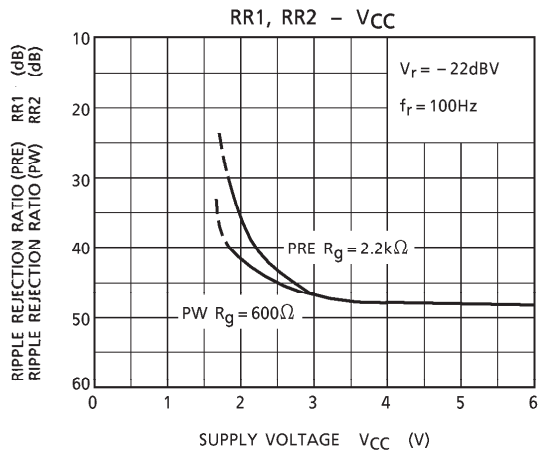
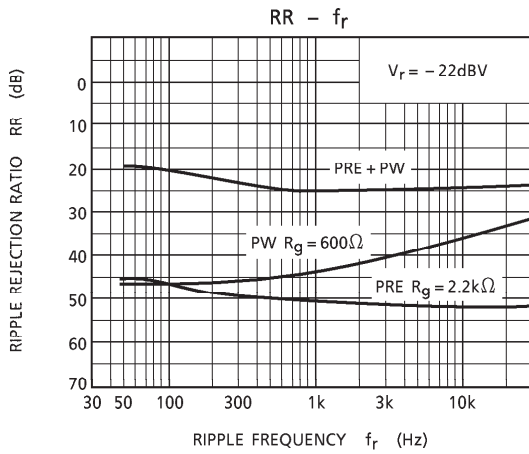
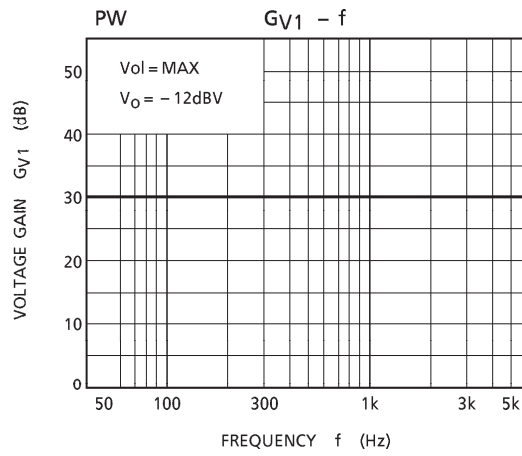
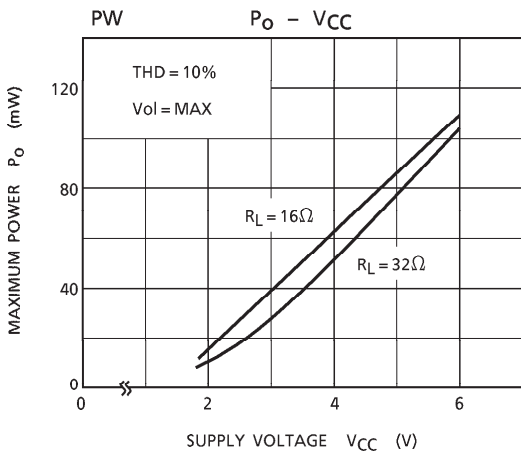
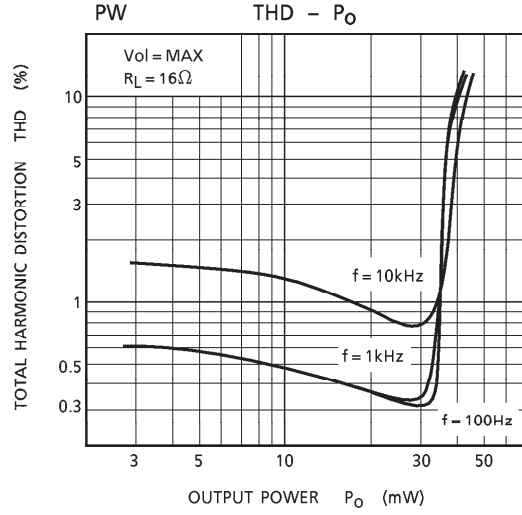
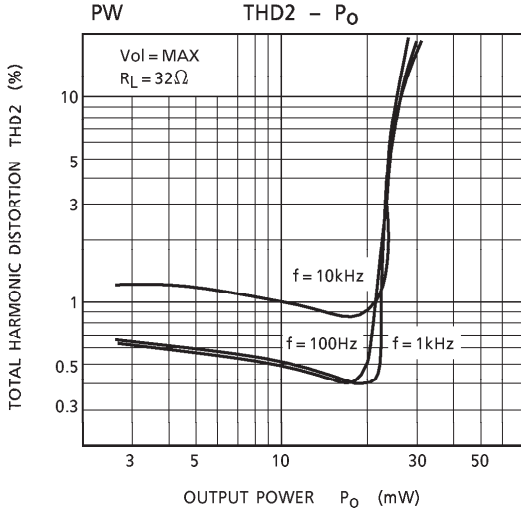
CHARACTERISTIC CURVES

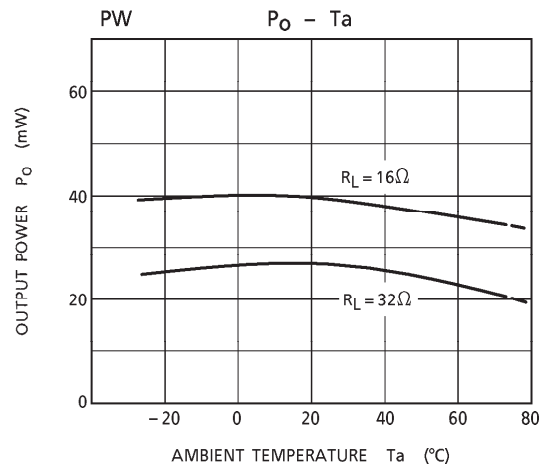
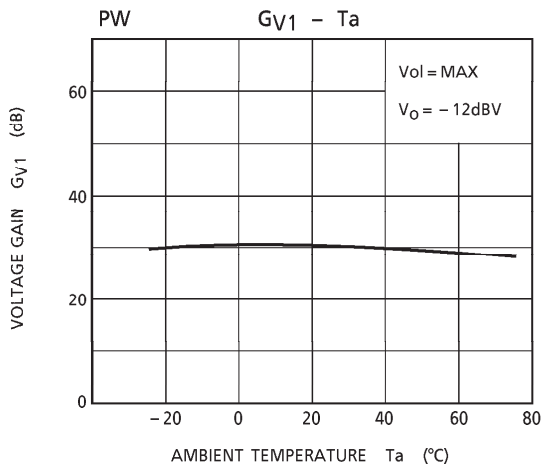
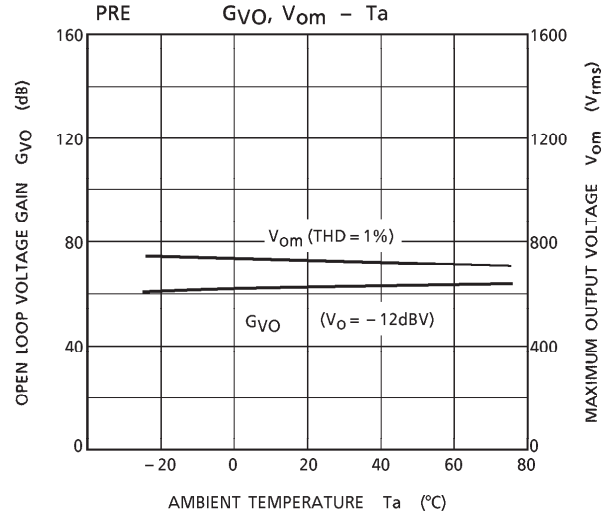
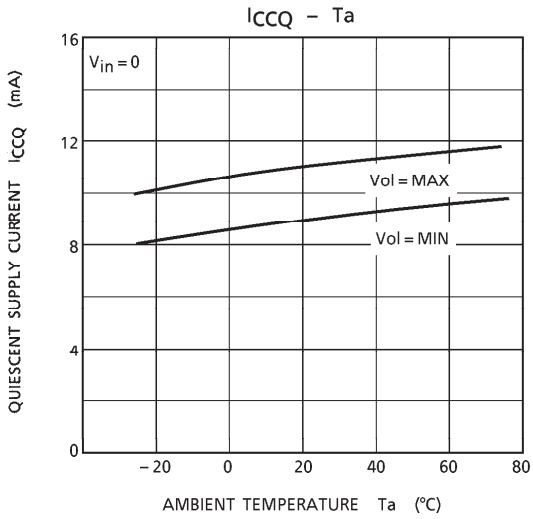
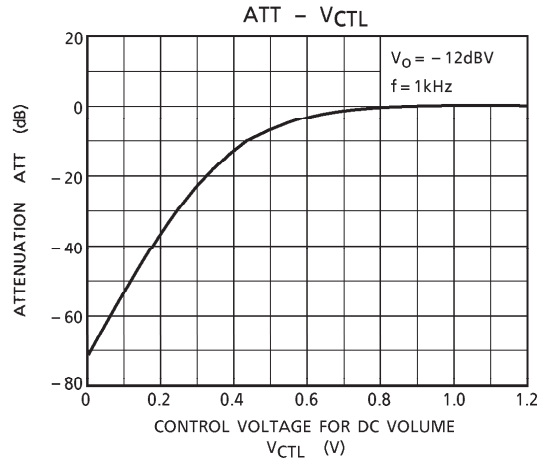
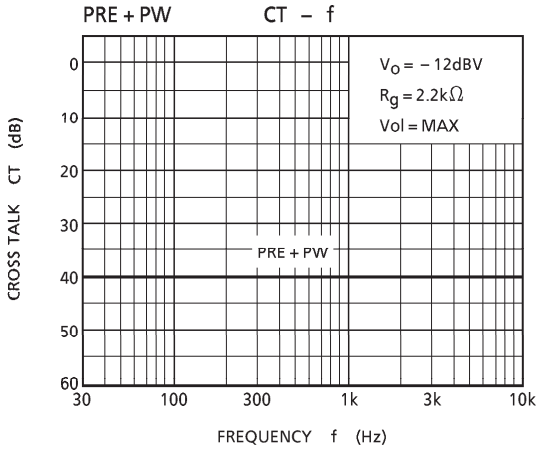
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Power Amplifier : $R_L = 32\Omega$, Vol = MAX

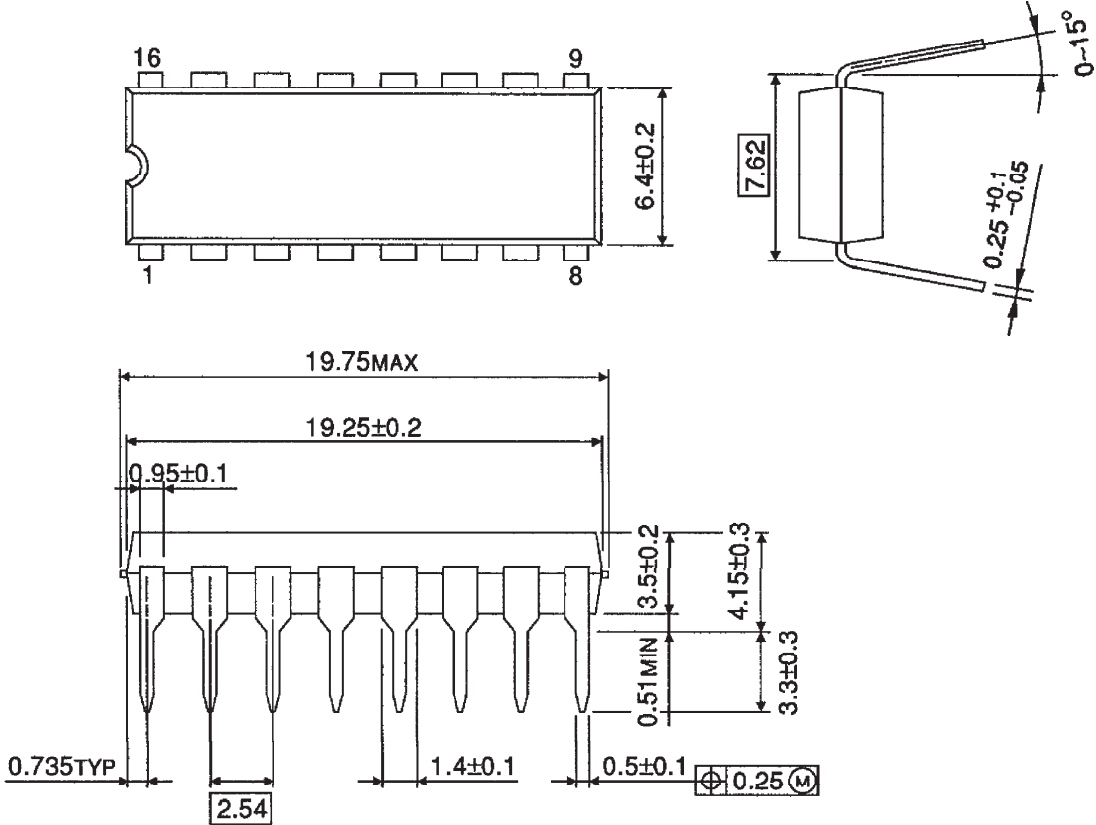






OUTLINE DRAWING
DIP16-P-300-2.54A

Unit : mm



Weight : 1.00g (Typ.)