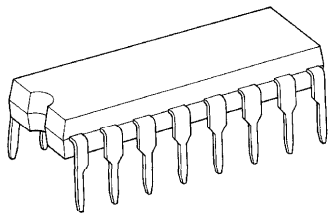
TOSHIBA BIPOLAR LINEAR INTEGRATED CIRCUIT SILICON MONOLITHIC

TA8173AP

SOUND FIELD REPRODUCTION IC

The TA8173AP is the sound field reproduction IC developed for use on such stereo equipment as radio cassette tape recorder, multivoise TV set. etc.
This IC has made it possible to reproduce stereophonic sound with more presence by forcing difference signals of R-ch and L-ch to delay and applying these signals to R-ch and L-ch again.

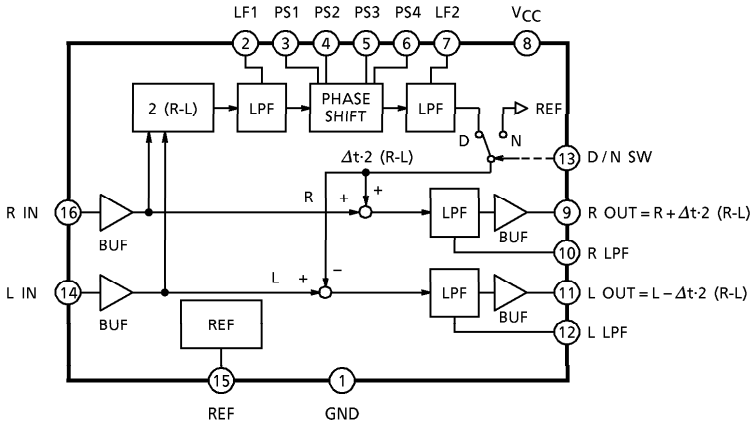


DIP16-P-300-2.54A
Weight : 1.00g (Typ.)

FEATURES

- Built-in 4 stages of the lagging phase filter
- Built-in NORMAL / DELAY switch
- Operating supply voltage range
  $V_{CC\ (opr)}$ = 4~12V (Ta = 25°C)

BLOCK DIAGRAM



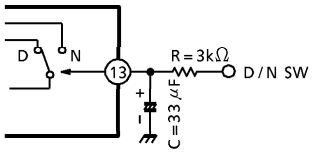
CAUTIONS FOR USE

1. D / N (delay / normal) switch
   The Pin⑬ is the delay / normal mode selector switch. The delay mode / normal mode control voltage ranges are as follows :

   V_{CC} = 5V, Ta = 25°C

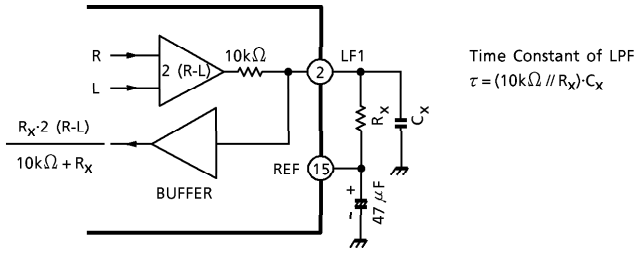
Delay Mode	V_{13} = 2.0V~V_{CC} or open
Normal Mode	V_{13} = 0V~0.7V

   If the output pop noise is generated when the delay / Normal mode is Switched by PIN⑬, the Noise level can be reduced by smoothing current with a capacitor and resistor connected to PIN⑬ externally as shown in the test circuit diagram.
   The recommended values are C = 33μF and R = 3kΩ.



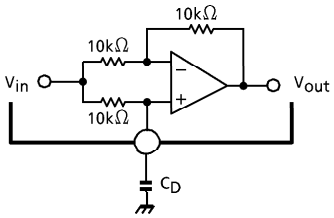
2. Delay system signal level

   This IC delays phase of the difference signal (R-L) of the R (PIN⑯ INPUT) signal and L (PIN⑭ input) signal and adds it to the R and L signals again. This delay system signal level has been set at 2 (R-L) in the standard circuit. However, as it is possible to reduce this signal level by externally connected parts. Set an optimum value through a listening test, etc. as shown below.
   Connect a resistor from the LPF output PIN② or ⑦ to the REF PIN⑮ as illustrated below. As a 10kΩ is seen in the LPF output PIN, it is possible to attenuate the delay system signal level by dividing resistance with the external resistor R_X.
   In this case as the time constant of the LPF changes when the R_X is connected, decide the LPF's time constant by (10kΩ // R_X)·C_X again after deciding the R_X.



3. Delay system signal phase delay circuit

In the phase delay circuit of this IC, 4 stages of the block shown below are connected in series. Decide a time constant by the external C_D and total phase delay by the number of stages to be used.

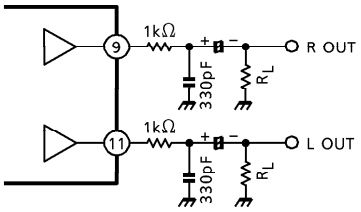


$$\frac{V_{out}}{V_{in}} = \frac{1 - j2\pi f \cdot 10k\Omega \cdot C_D}{1 + j2\pi f \cdot 10k\Omega \cdot C_D}$$

$$\phi = -2\tan^{-1}(2\pi f \cdot 10k\Omega \cdot C)$$

4. Oscillation stability

In the test circuit diagram, the capacitor (C = 330pF) and the resistor (R = 1kΩ) connected to the output PINS ⑨ and ⑪ consist of the LPF for preventing frequency parasitic oscillation. If this LPF is not inserted in the circuit, weak oscillation of several MHz may be generated and therefore, user is advised to surely connect this LPF.



MAXIMUM RATINGS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	RATING	UNIT
Supply Voltage	V_{CC}	14	V
Power Dissipation	P_D (Note)	750	mW
Operating Temperature	T_{opr}	−25~75	°C
Storage Temperature	T_{stg}	−55~150	°C

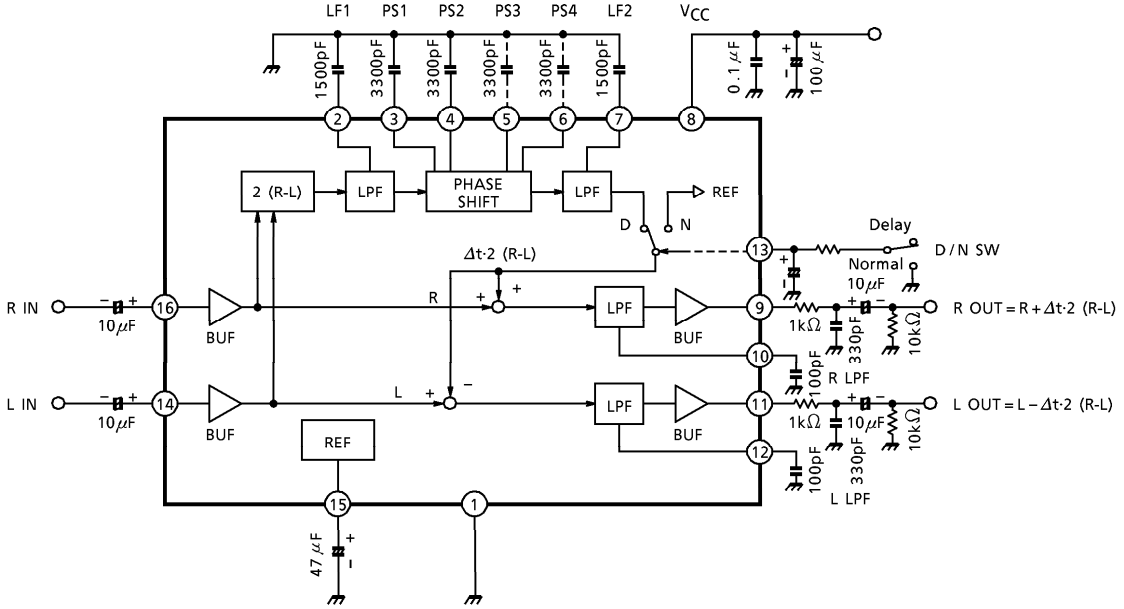
(Note) Derated above Ta = 25°C in the proportion of 6mW / °C.

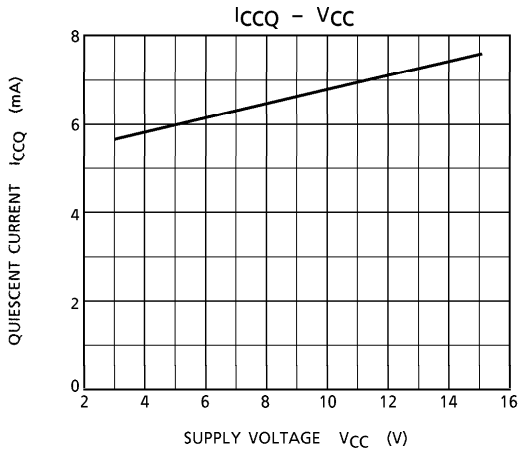
ELECTRICAL CHARACTERISTICS

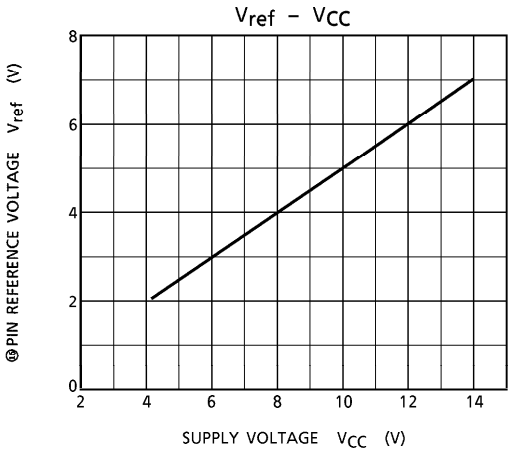
(Unless otherwise specified, V_{CC} = 5V, f = 1kHz, R_L = 10kΩ, Ta = 25°C, NORMAL MODE)

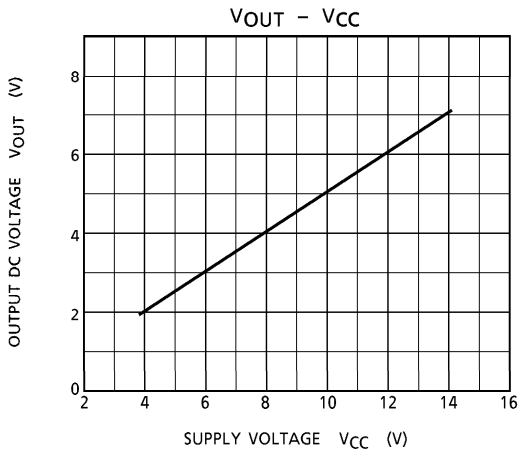
CHARACTERISTIC	SYMBOL	TEST CIR-CUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Quiescent Current	I_{CCQ}	—	V_{in} = 0	—	6	10	mA
Voltage Gain 1	G_{V1}	—	—	−3	−1	1	dB
Voltage Gain Ratio	ΔG_V	—	—	−1	0	1	dB
Voltage Gain 2	G_{V2}	—	DELAY MODE, f = 100Hz	6	8	10	dB
Maximum Output Voltage	V_{om}	—	THD = 1%	—	1.0	—	V_{rms}
Total Harmonic Distortion	THD	—	V_{out} = 300mV_{rms}	—	0.02	0.2	%
Output Noise Voltage 1	V_{no1}	—	NORMAL MODE, DIN AUDIO filter IN	—	10	40	μV_{rms}
Output Noise Voltage 2	V_{no2}	—	DELAY MODE, DIN AUDIO filter IN	—	17	—	μV_{rms}
Channel Separation Ratio	Sep.	—	V_{out} = 1V_{rms}	—	−55	—	dB
Ripple Rejection 1	R.R.1	—	NORMAL MODE, f = 100Hz, V_{ripple} = 0.316V_{rms} (−10dBV)	—	−55	—	dB
Ripple Rejection 2	R.R.2	—	DELAY MODE, f = 100Hz, V_{ripple} = 0.316V_{rms} (−10dBV)	—	−45	—	dB
Input Resistance	R_{IN}	—	—	—	33	—	kΩ

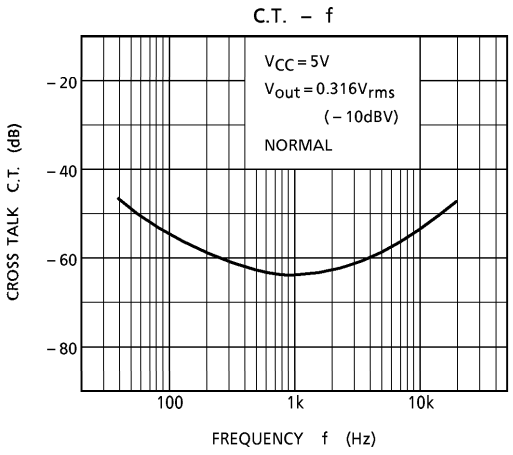
TEST CIRCUIT

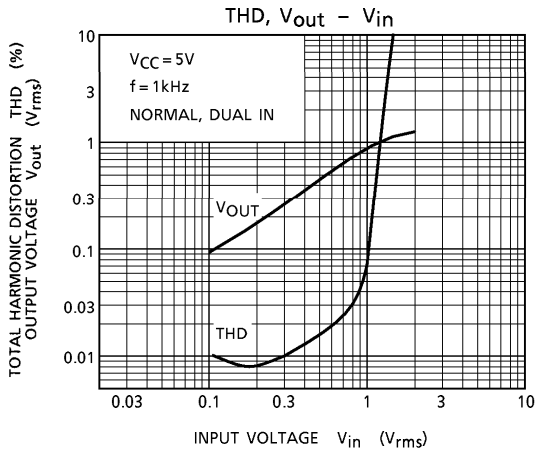


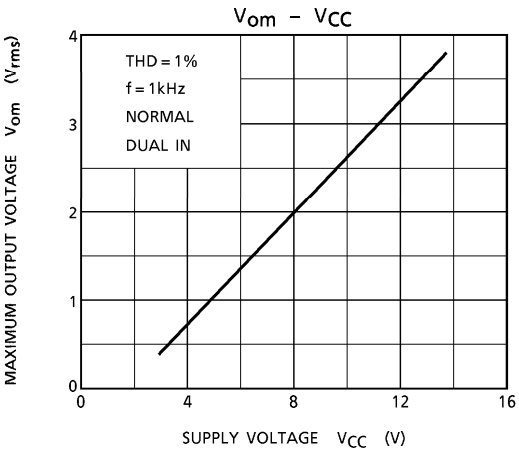




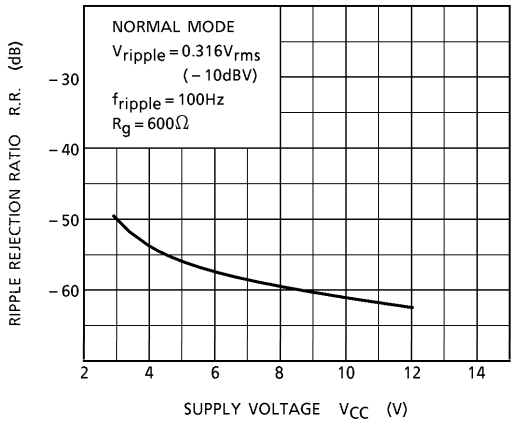








R.R. – V_{CC}



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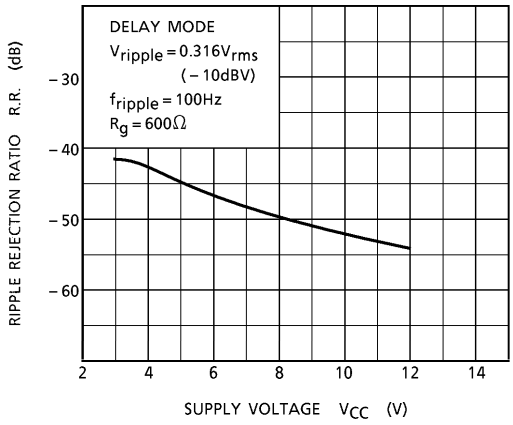
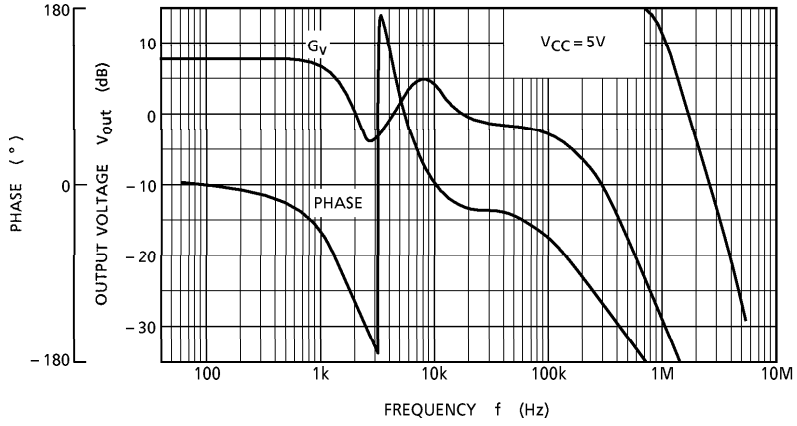
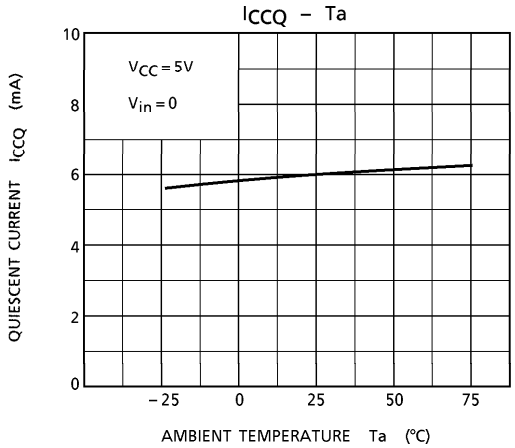


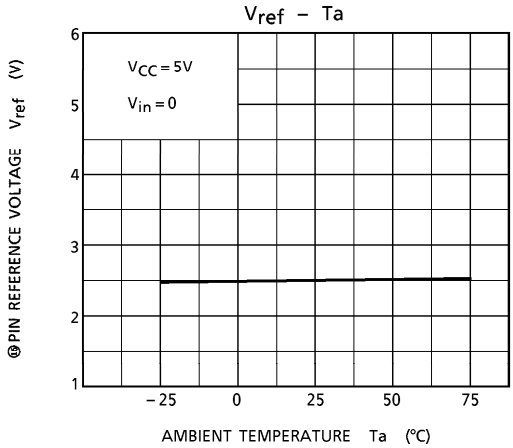
PHASE, V_{out} – f



I_{CCQ} – Ta



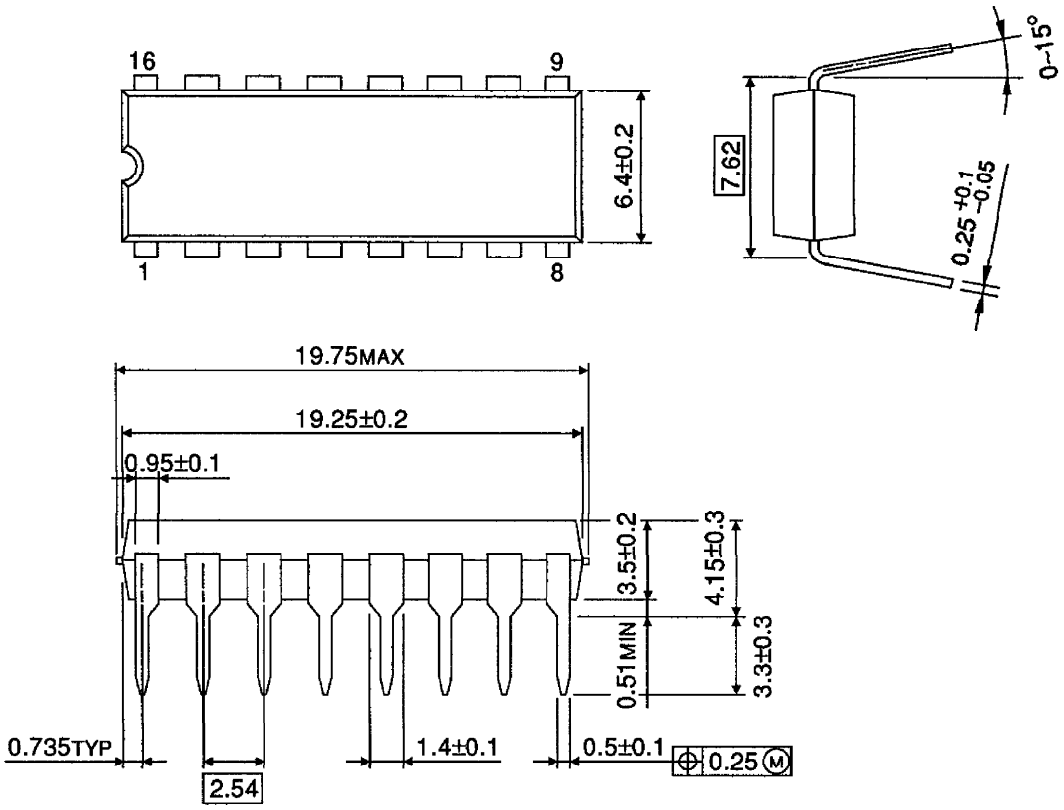
V_{ref} – Ta



OUTLINE DRAWING

DIP16-P-300-2.54A

Unit : mm



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