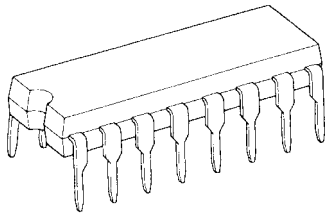
TOSHIBA Bipolar Linear Integrated Circuit Silicon Monolithic

TA7630P

Dual. Volume/Balance/Tone (Bass/Treble) DC Control IC

The TA7630P is DC controlled dual volume, balance, tone (Bass, treble) IC. As these dual channels are constructed on one chip, this IC is excellent in pair characteristic.
It is suitable for automobile stereo, radio cassette, music center, TV multiplex sound receiver and remote controlled applications.



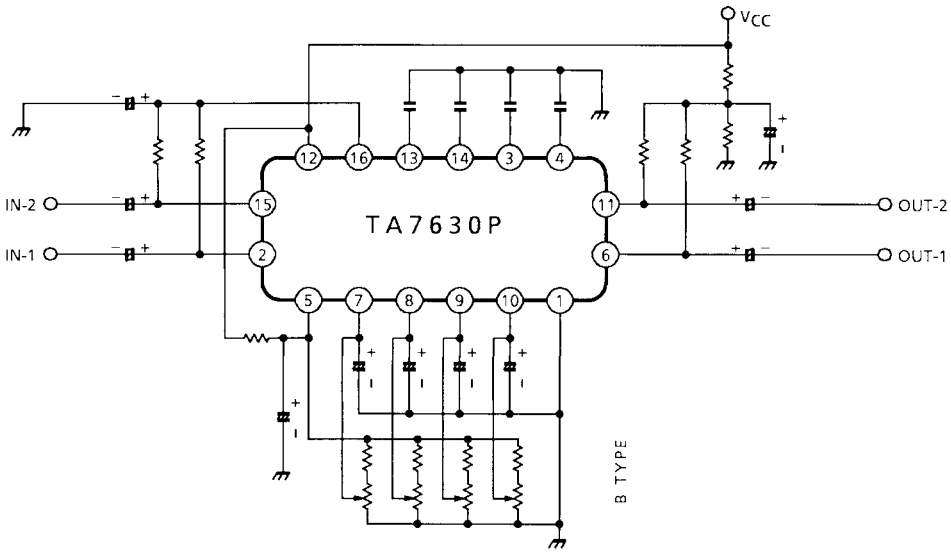
DIP16-P-300-2.54A

Weight: 1.00 g (typ.)

Features

- Wide power supply voltage range:
  Single supply $V_{CC\ (opr)}$ = 8~14 V (Ta = 25°C)
  Dual supply $V_{CC} - V_{EE\ (opr)}$ = ±4~±7 V (Ta = 25°C)
- Wide volume control range: V_R = 80dB (typ.)
- Excellent cross talk: C.T. = 70dB (typ.)
- Stable for temperature drift.
- Wide tone control range
  Control range:
  V_B = 10dB (typ.) (f = 1 kHz → 100 Hz)
  V_T = 12dB (typ.) (f = 1 kHz → 20 kHz)

Block Diagram



Pin Connection

Pin No.	Symbol	Explanation
1	V_{EE}	Negative power supply
2	INPUT-1	Input channel-1
3	$T_{H\ (1)}$	Treble turning frequency setting.
4	$T_{L\ (1)}$	Bass turning frequency setting.
5	REF CONT	Reference control
6	OUTPUT-1	Output channel-1
7	BAL	Balance control
8	VOL	Volume control
9	BASS	Bass control
10	TRBL	Treble control
11	OUTPUT-2	Output channel-2
12	V_{CC}	Power supply
13	$T_{L\ (2)}$	Bass turning frequency setting
14	$T_{H\ (2)}$	Treble turning frequency setting
15	INPUT-2	Input channel-2
16	REF SIG	Reference signal

Maximum Ratings (Ta = 25°C)

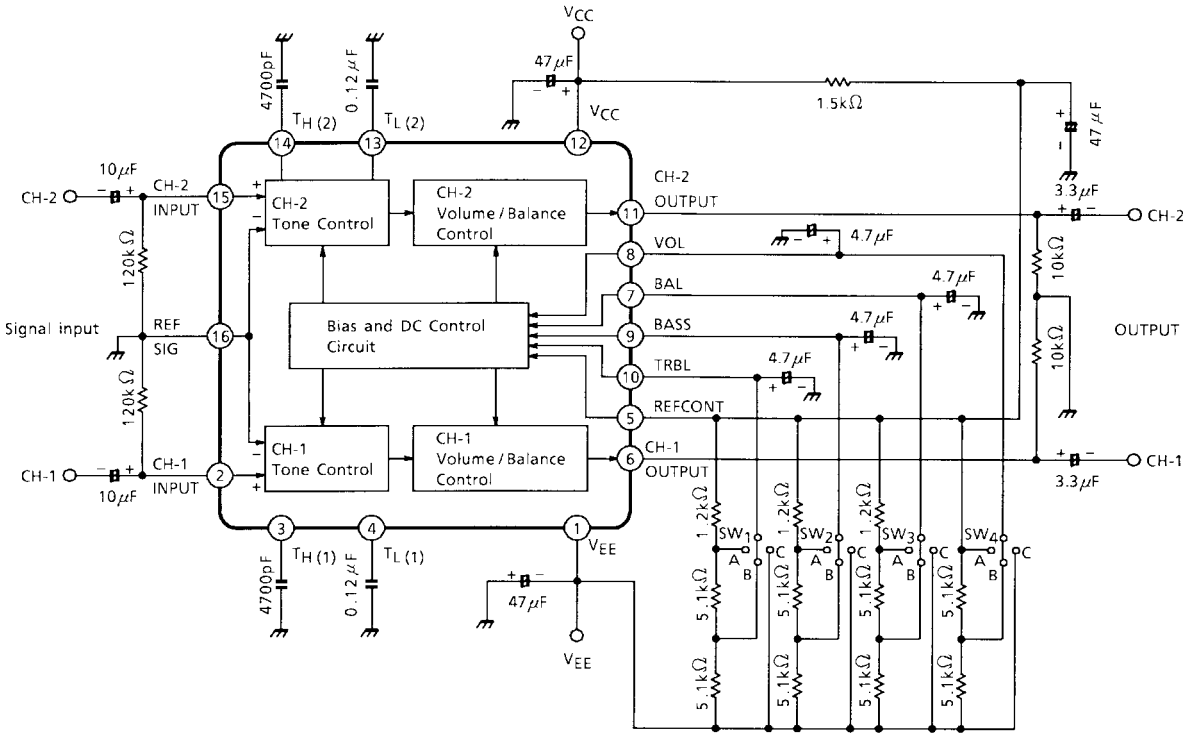
Characteristics	Symbol	Rating	Unit
Supply voltage	V_{CC}	14	V
Power dissipation	P_D (Note)	750	mW
Operating temperature	T_{opr}	−25~75	°C
Storage temperature	T_{stg}	−55~150	°C

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

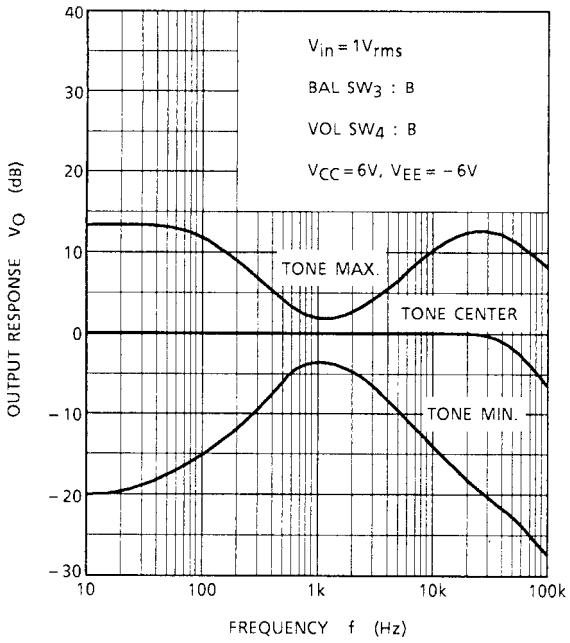
Electrical Characteristics
(unless otherwise specified, V_{CC} = 6 V, V_{EE} = −6 V, f = 1 kHz, Ta = 25°C)

Characteristics	Symbol	Test Circuit	Test Condition	Min	Typ.	Max	Unit
Quiescent current	$I_{CCQ\ (1)}$	—	V_{CC}, V_{EE} = ±4 V VOL/BAL/BASS/TRBL $SW_{1\sim4}$: B	—	11	17	mA
	$I_{CCQ\ (2)}$	—	VOL/BAL/BASS/TRBL $SW_{1\sim4}$: B	10	18	25	
Maximum input voltage	V_{in}	—	VOL/BAL/BASS/TRBL $SW_{1\sim4}$: B VOL SW_4: A, THD = 1%	—	—	1	Vrms
Maximum output voltage	V_{out}	—	BASS/TRBL/BAL SW_1, SW_2, SW_3: B VOL SW_4: A, THD = 1%	1	—	—	Vrms
Voltage gain	G_v	—	V_{in} = 1 Vrms BASS/TRBL/BAL $SW_{1\sim3}$: B VOL SW_4: A	−0.5	2.0	4.5	dB
Channel balance	C.B. -1	—	BASS/TRBL/BAL $SW_{1\sim3}$: B VOL SW_4: A, V_{in} = 1 Vrms	−3	0	3	dB
	C.B. -2	—	VOL/BAL/BASS/TRBL $SW_{1\sim4}$: B f = 100 Hz~20 kHz, V_{in} = 0.1 Vrms	−3.5	0	3.5	
Volume control range	V_R	—	BASS/TRBL/BAL $SW_{1\sim3}$: B, V_{in} = 1 Vrms VOL SW_4: A → C	70	80	—	dB
Bass control range	V_B MAX	—	VOL/BAL $SW_{3,\ 4}$: B BASS/TRBL $SW_{1,\ 2}$: A, V_{in} = 1 Vrms, f = 1kHz → 100Hz	7	11	14	dB
	V_B MIN	—	VOL/BAL $SW_{3,\ 4}$: B BASS/TRBL $SW_{1,\ 2}$: C, V_{in} = 1 Vrms, f = 1 kHz → 100 Hz	−15	−11.5	−7	
Treble control range	V_T MAX	—	VOL/BAL $SW_{3,\ 4}$: B BASS/TRBL $SW_{1,\ 2}$: A, V_{in} = 1 Vrms, f = 1 kHz~20 kHz	7	11	14	dB
	V_T MIN	—	VOL/BAL $SW_{3,\ 4}$: B BASS/TRBL $SW_{1,\ 2}$: C, V_{in} = 1 Vrms, f = 1 kHz~20 kHz	−20	−14	−10	
Tone error	ΔGv	—	VOL/BAL $SW_{3,\ 4}$: B BASS/TRBL $SW_{1,\ 2}$: C → A V_{in} = 1 Vrms	—	6	10	dB
Total harmonic distortion	THD	—	BASS/TRBL/BAL $SW1_{\sim3}$: B VOL SW_4: A, V_{out} = 150 mVrms	—	0.1	0.35	%
Output noise voltage	V_{no}	—	BASS/TRBL/BAL $SW_{1\sim3}$: B VOL SW_4: A BPF = 50 Hz~20 kHz, input open	—	130	300	μVrms
Cross talk	SEP	—	BASS/TRBL/BAL $SW_{1\sim3}$: B VOL SW_4: A, V_{out} = 1 Vrms	—	−70	—	dB
Control terminal input resistance	R_{IN}	—	pin 8, 9, 10	—	500	—	kΩ
		—	pin 7	—	200	—	

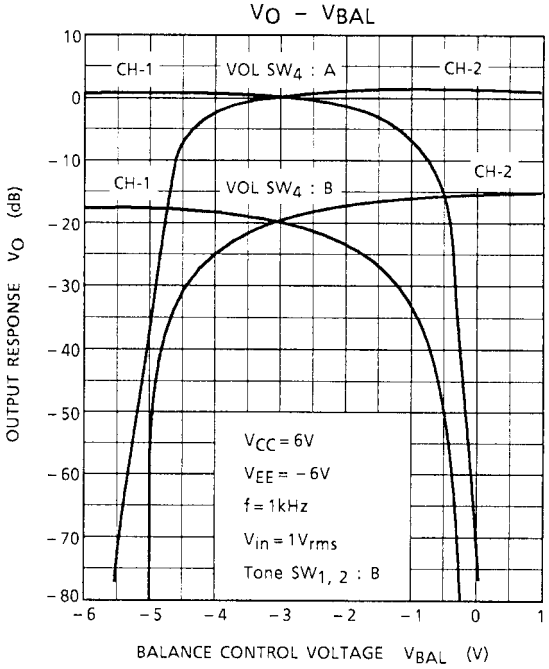
Test Circuit



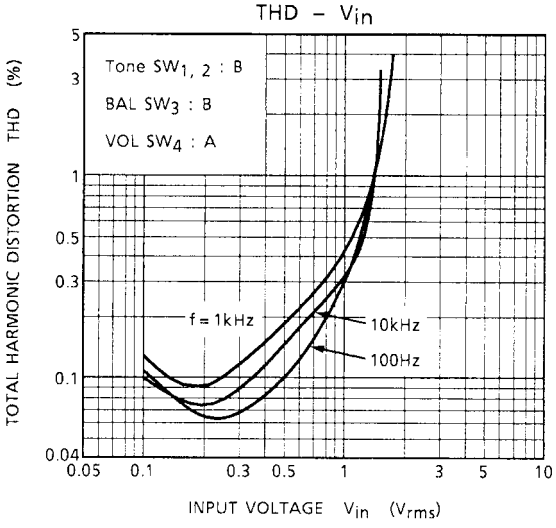
V_O – f



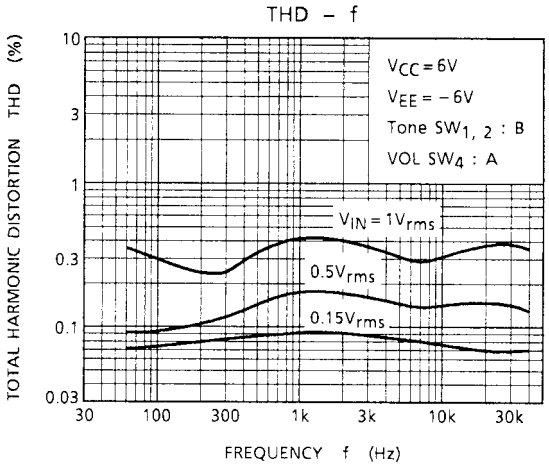
V_O – V_{BAL}



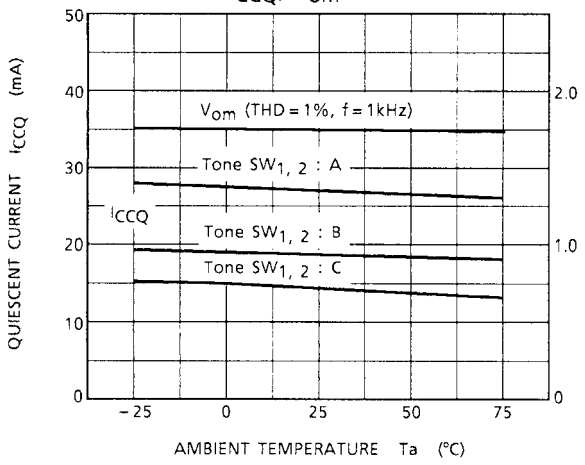
THD – V_{in}



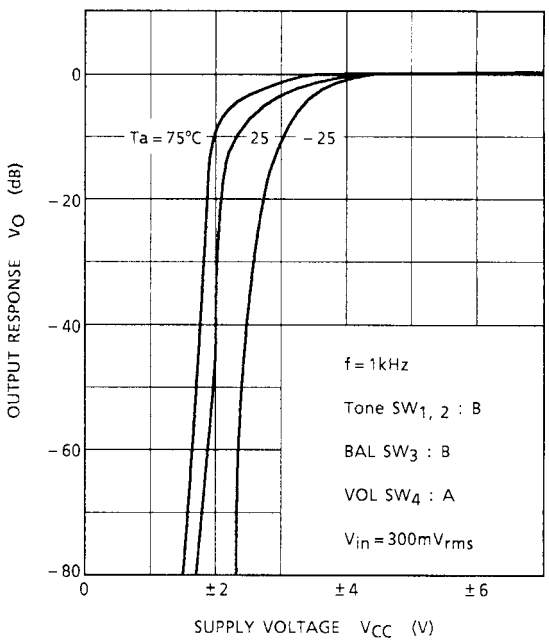
THD – f



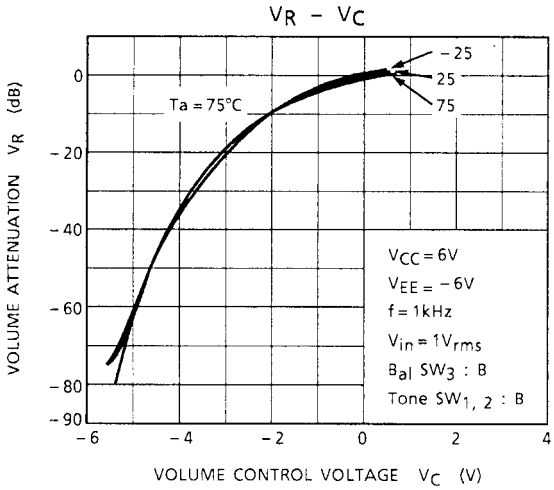
I_{CCQ}, V_{om} – Ta



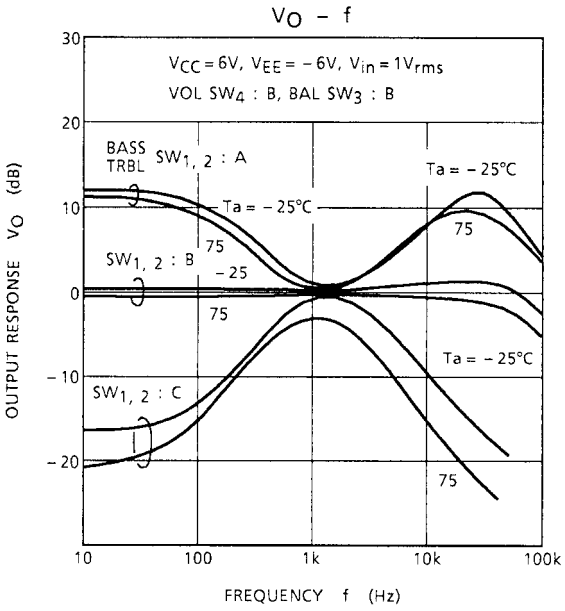
V_O – V_{CC}



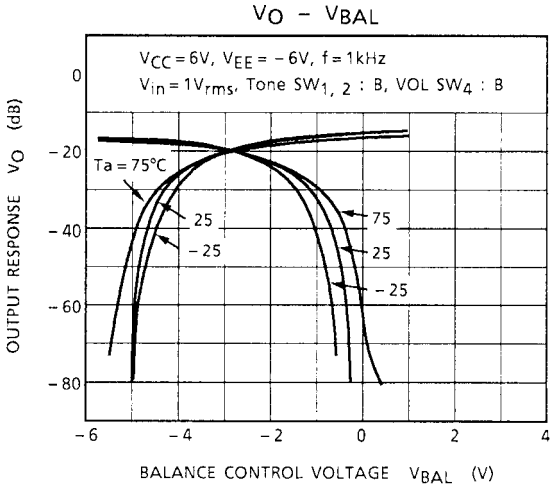
V_R – V_C



V_O – f

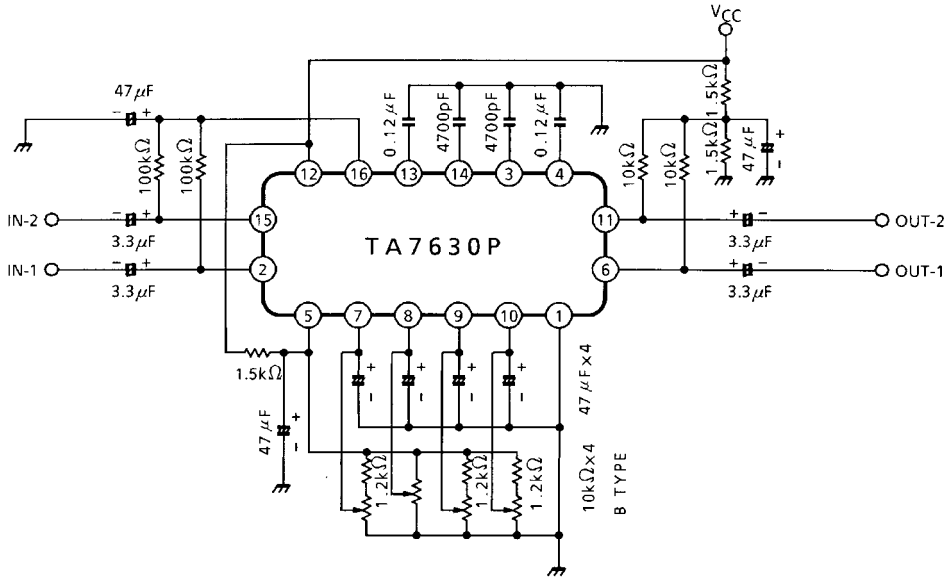


V_O – V_{BAL}

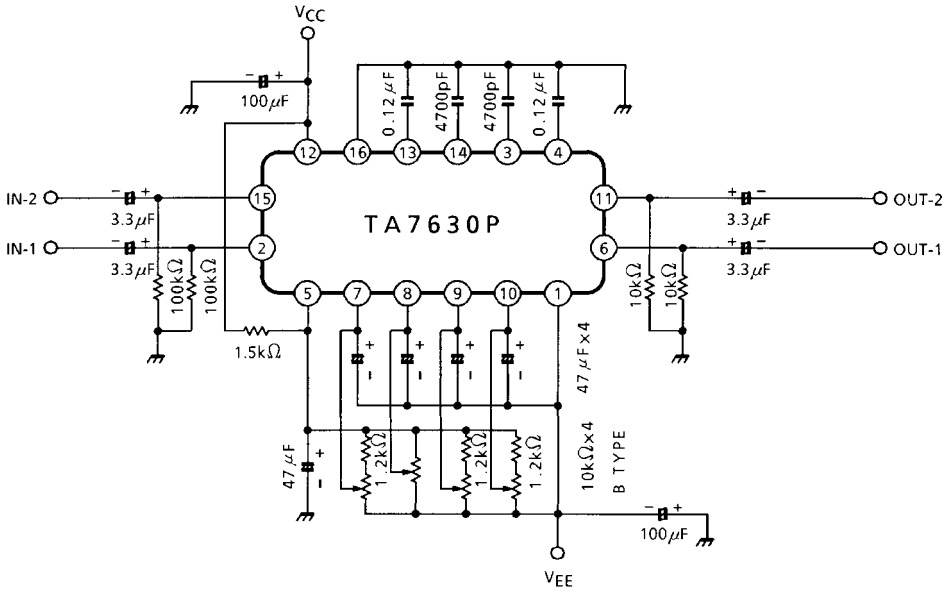


Application Circuits

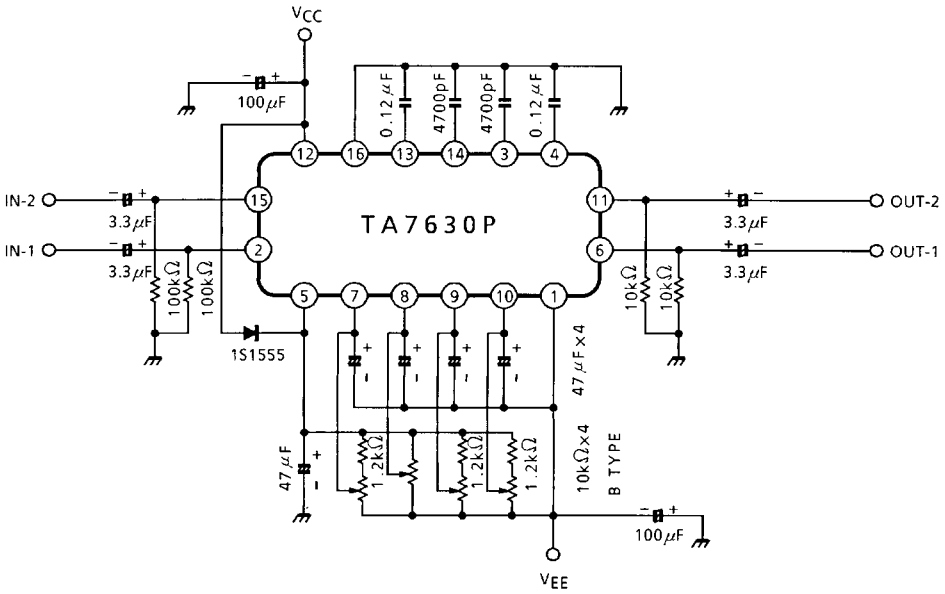
1. Single power supply



2. Dual power supply



3. Application circuit using diode at reference terminal

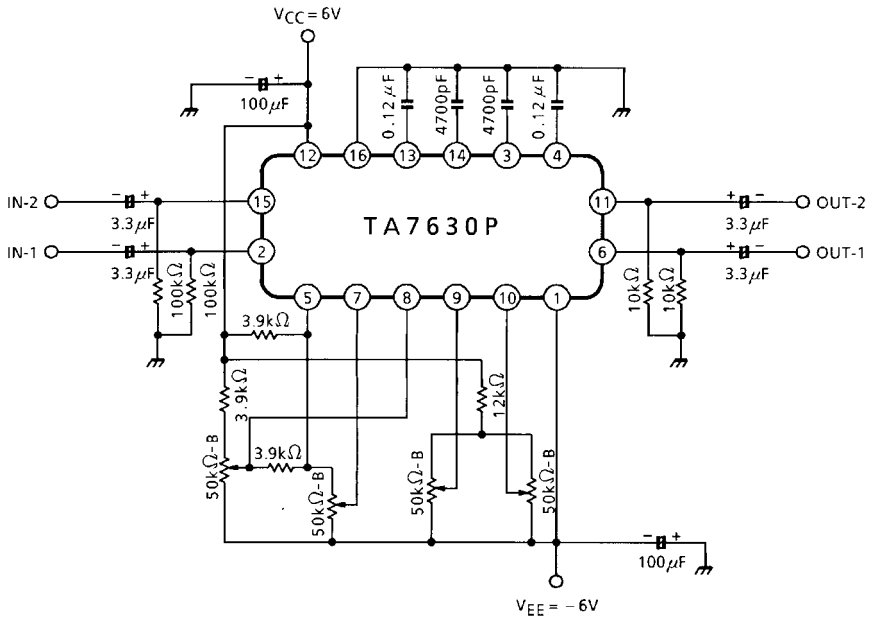


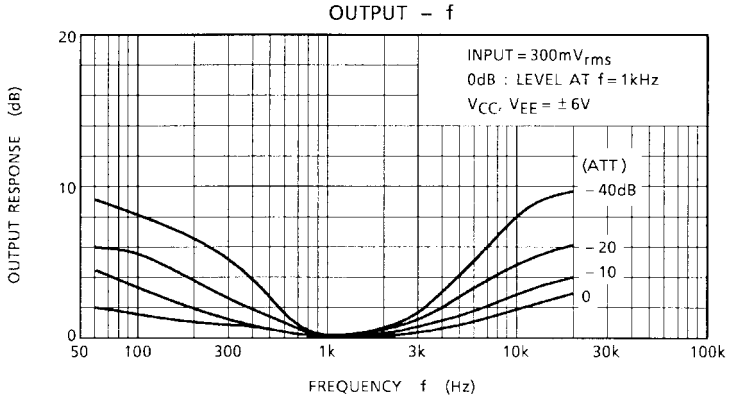
The application circuit using diode between Pin 5 and Pin 12 has the following merits.

(1) When each control terminal is drived by high impedance, the electrolytic capacitor between terminal 5 and GND operates as the back up capacitor, so that the rise time is short at the ON-OFF repetation of supply voltage.

(2) When the current drain into the each control terminal varies by control voltage, the voltage of terminal 5 scarcely varies.
It means a stable reference voltage.

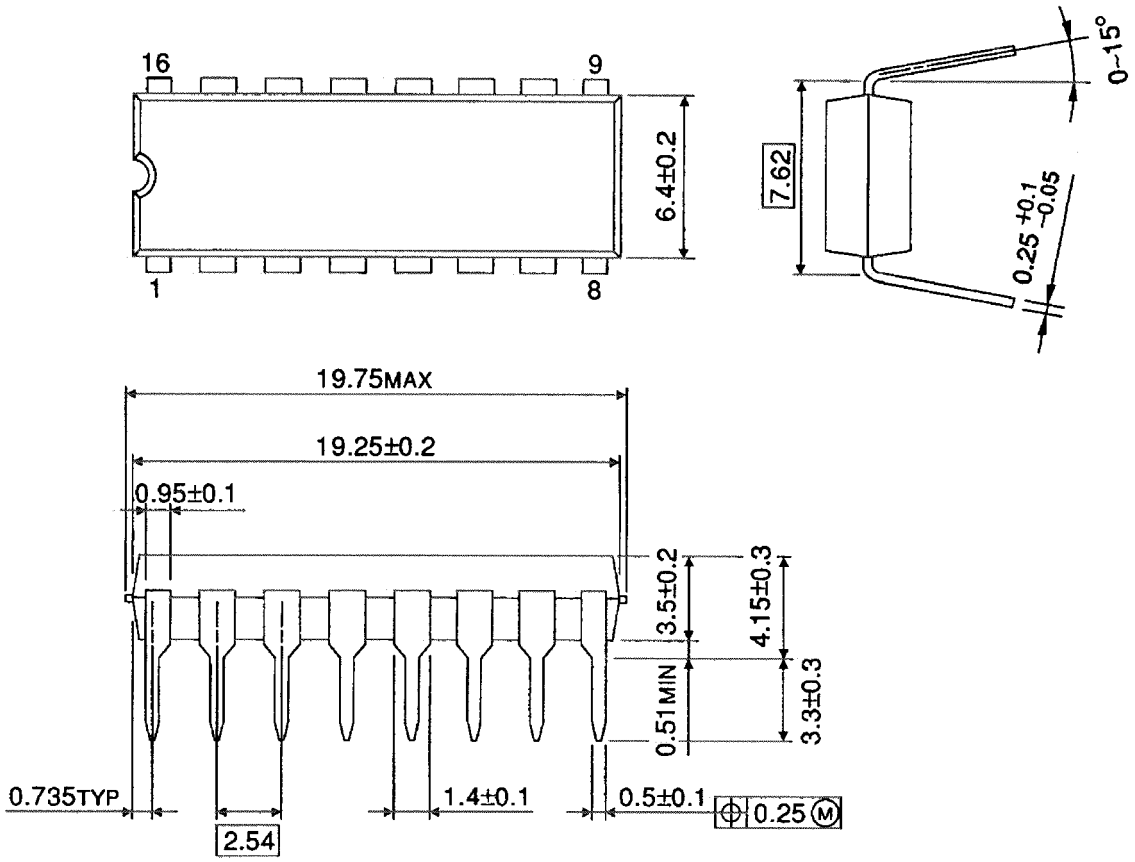
4. Quasi-loudness circuit





Package Dimensions

DIP16-P-300-2.54A Unit : mm



Weight: 1.00 g (typ.)

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