

BIPOLAR ANALOG INTEGRATED CIRCUIT

μ PC1335V

AUDIO POWER AMPLIFIER

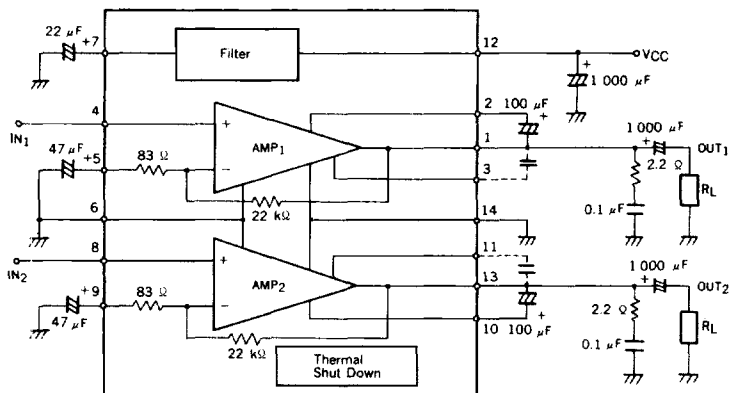
DESCRIPTION

The μ PC1335V is a class B dual audio power amplifier designed for a music center and a radio cassette, and is encapsulated in a new 14 Pins vertical dual in line plastic package.

FEATURES

- High output power.
 - 20 W (TYP.) @ $V_{CC} = 18$ V, $R_L = 8 \Omega$ (BTL)
 - 5.5 W/ch (TYP.) @ $V_{CC} = 18$ V, $R_L = 8 \Omega$
 - 7 W/ch (TYP.) @ $V_{CC} = 15$ V, $R_L = 4 \Omega$
 - 5.7 W/ch (TYP.) @ $V_{CC} = 12$ V, $R_L = 3 \Omega$
 - 4.6 W/ch (TYP.) @ $V_{CC} = 12$ V, $R_L = 4 \Omega$
- Wide operating voltage range. $V_{CC} = 6$ to 20 V
- Low quiescent current. $I_{CC} = 23$ mA (TYP.) @ $V_{CC} = 15$ V
- Low noise. $N_L = 0.25$ mV_{r.m.s.} (TYP.)
- High supply voltage rejection. SVR = 55 dB (TYP.)
- No shock noise at power supply switch on and off.
- Soft clipping wave form.
- Thermal shut down circuit is built in.
- Low thermal resistance : $R_{th(j-c)} = 3^\circ\text{C/W}$
- Very low number of external components, very simple mounting system with no electrical isolation between the package and the heat sink. (one screw only)

BLOCK DIAGRAM



CONNECTION DIAGRAM

PIN NO.	CONNECTION
1	Output ₁
2	Boot Strap ₁
3	Compensation ₁
4	Input ₁
5	NFB ₁
6	GND (Input)
7	Filter
8	Input ₂
9	NFB ₂
10	Boot Strap ₂
11	Compensation ₂
12	V _{CC}
13	Output ₂
14	GND (Output)

ABSOLUTE MAXIMUM RATINGS (T_a = 25 °C)

Supply Voltage (No Signal)	V _{CC1}	28	V
Supply Voltage (Operating)	V _{CC2}	25	V
Power Dissipation	P _D	14*	W
Operating Temperature	T _{opt}	-20 to +70	°C
Storage Temperature	T _{stg}	-40 to +150	°C

* 100 x 100 x 2 mm Al heat sink

RECOMMENDED OPERATING CONDITIONS (T_a = 25 °C)

ITEM	SYMBOL	MIN.	TYP.	MAX.	UNIT
Supply Voltage	V _{CC}	6	12, 15	20	V
Load Impedance (DUAL)	R _L	3	4	8	Ω
Load Impedance (BTL)	R _L	4		8	Ω
Voltage Gain	A _V	36	48		dB

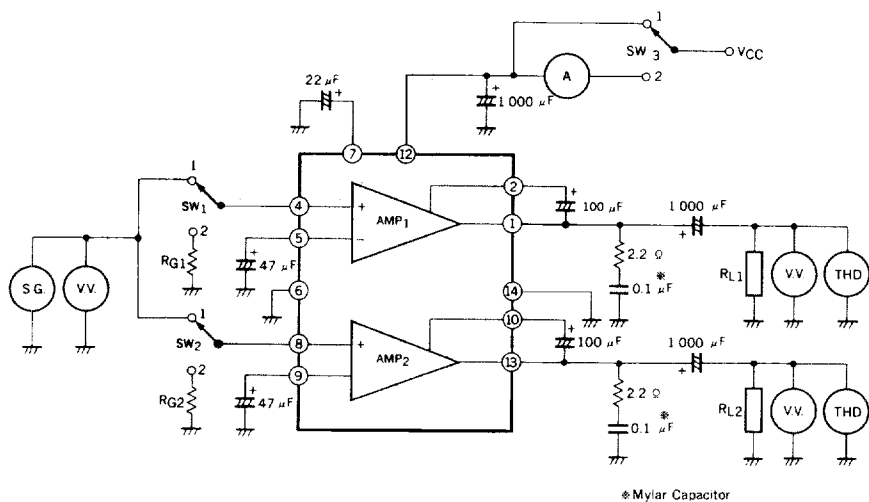
ELECTRICAL CHARACTERISTICS ($V_{CC} = 15\text{ V}$, $R_L = 4\ \Omega$, $f = 1\text{ kHz}$, $T_a = 25\ ^\circ\text{C}$, $100 \times 100 \times 2\text{ mm Al Panel Heat Sink}$)

CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITION
Circuit Current	I_{CC}		23	36	mA	No Signal
Voltage Gain	A_V	46	48	50	dB	
Output Power	P_O		4.6		W	THD = 10 % $V_{CC} = 12\text{ V}$, $R_L = 4\ \Omega$
			5.7		W	THD = 10 % $V_{CC} = 12\text{ V}$, $R_L = 3\ \Omega$
		6	7		W	THD = 10 % $V_{CC} = 15\text{ V}$, $R_L = 4\ \Omega$
			5.5		W	THD = 10 % $V_{CC} = 18\text{ V}$, $R_L = 8\ \Omega$
			20		W	THD = 10 %, BTL $V_{CC} = 18\text{ V}$, $R_L = 8\ \Omega$
Total Harmonic Distortion	THD		0.2	1	%	$P_O = 1\text{ W}$
Output Noise Voltage	NL		0.25	0.6	mV _{r.m.s.}	DIN AUDIO $R_G = 0$
Cross Talk	C.T.	45	55		dB	$P_O = 2\text{ W}$ other Ch. $R_G = 0$
Channel Balance	Ch. B.	-1	0	+1	dB	$P_O = 4\text{ W}$
Ripple Rejection	SVR	45	55		dB	$R_G = 0$, $f = 100\text{ Hz}$ $V = 0.3\text{ V}_{r.m.s.}$
Input impedance	Z_{in}	20	30		k Ω	

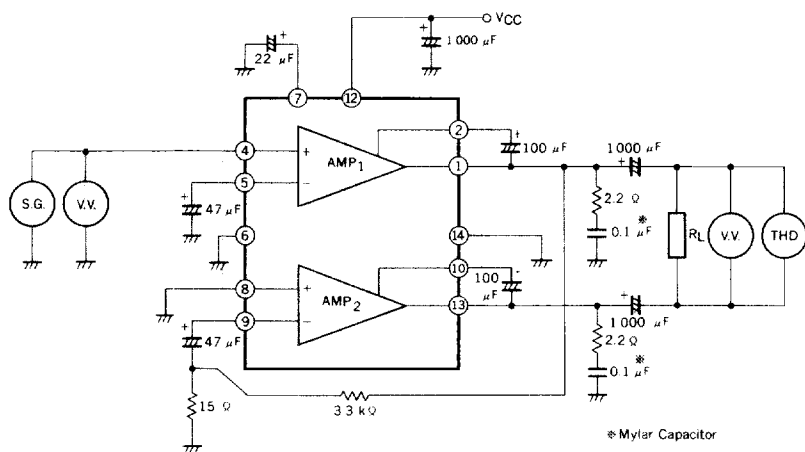
SWITCH POSITION

ITEM	SYMBOL	SW ₁	SW ₂	SW ₃
(DUAL OPERATION)				
Circuit Current	I_{CC}	2	2	2
Voltage Gain	A_V	1	1	1
Output Power	P_O	1	1	1
Total Harmonic Distortion	THD	1	1	1
Output Noise Voltage	NL	2	2	1
Cross Talk	C.T.	1/2	2/1	1
Channel Balance	Ch.B.	1	1	1
Supply Voltage Rejection	SVR	2	2	1
(BTL OPERATION)				
Output Power	P_O	-	-	-

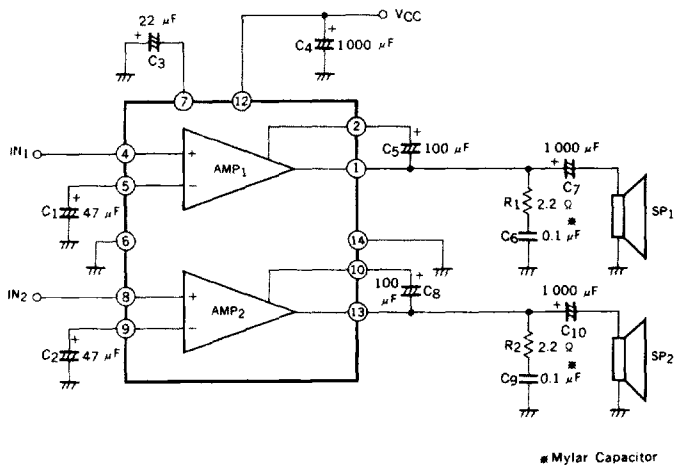
TEST CIRCUIT (DUAL OPERATION)



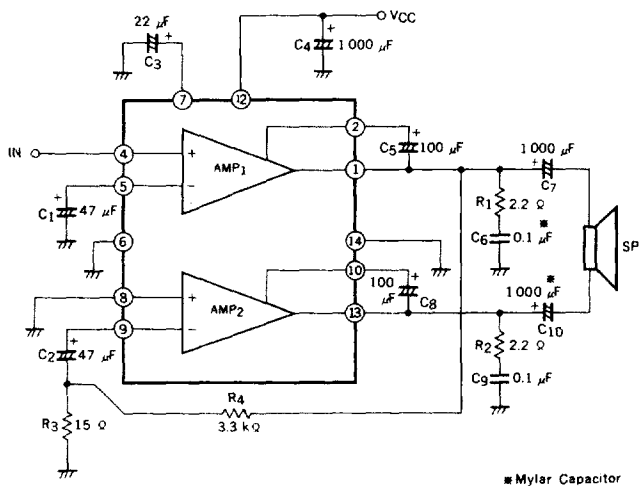
(BTL OPERATION)



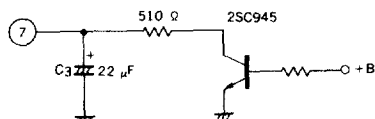
TYPICAL APPLICATION (DUAL OPERATION)

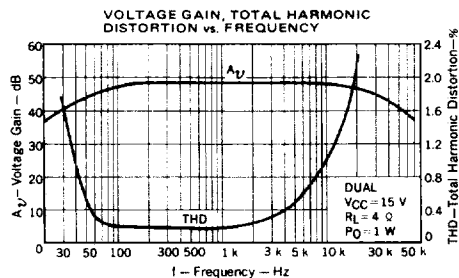
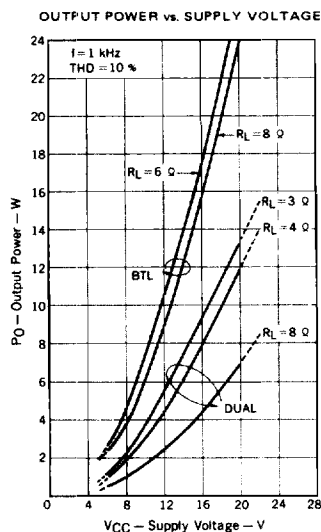
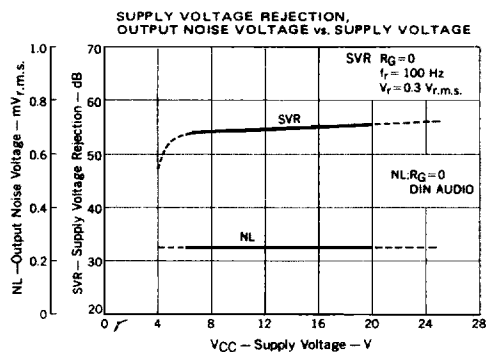
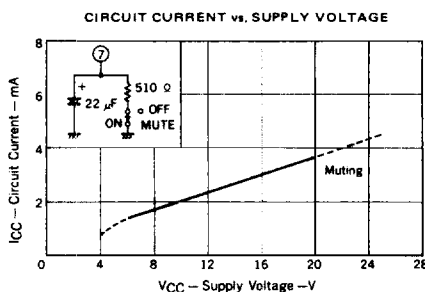
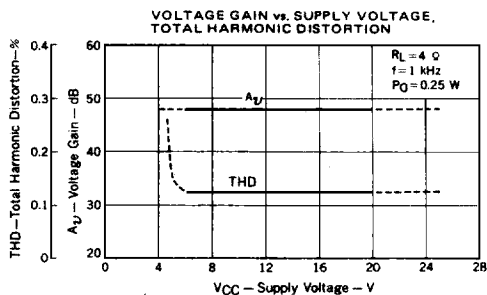
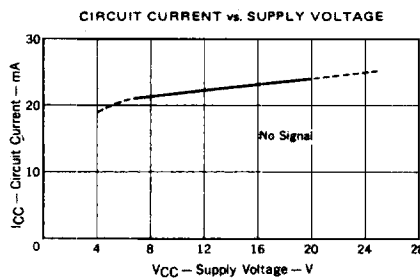


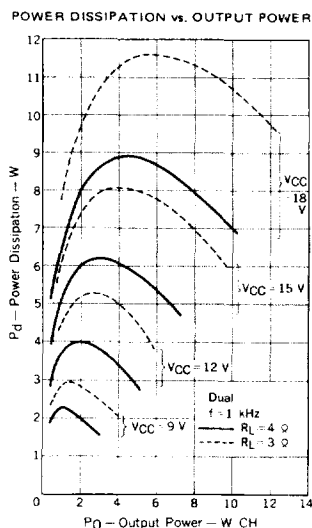
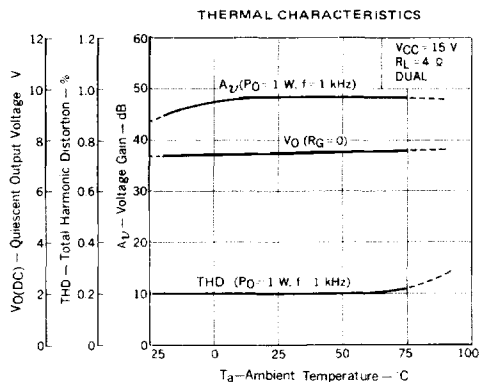
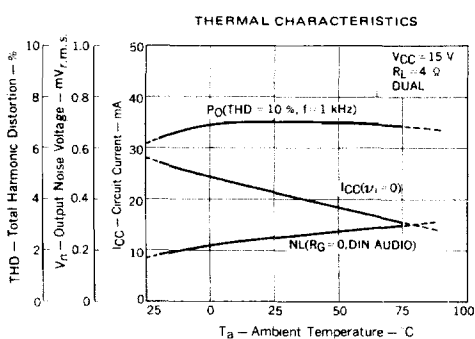
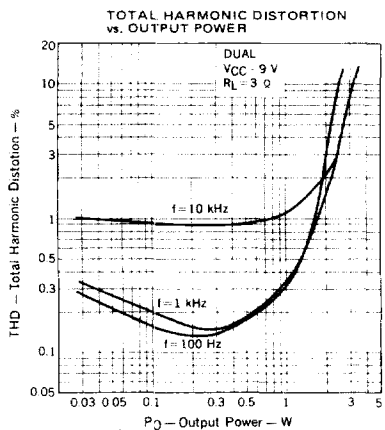
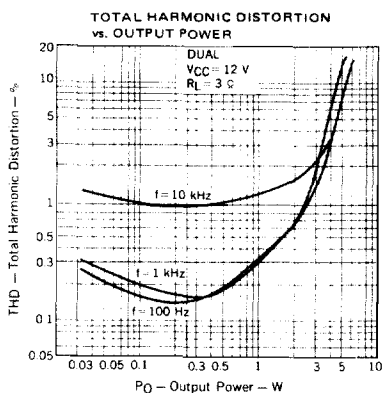
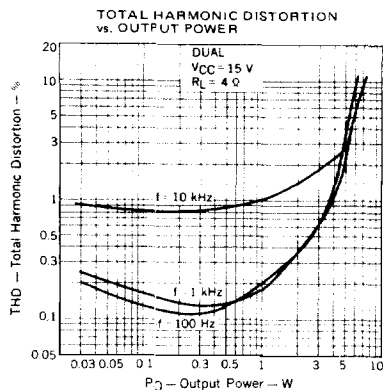
(BTL OPERATION)

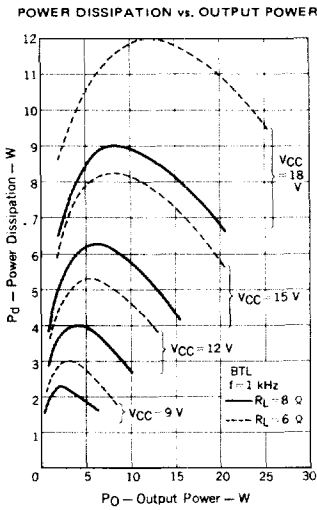
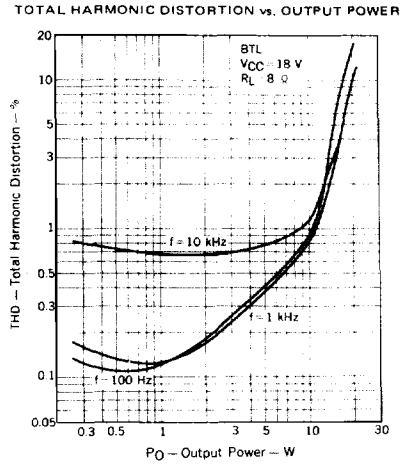
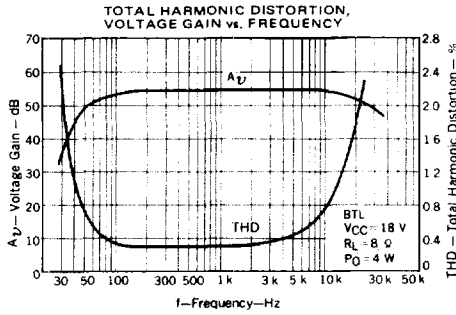


(MUTING CIRCUIT)

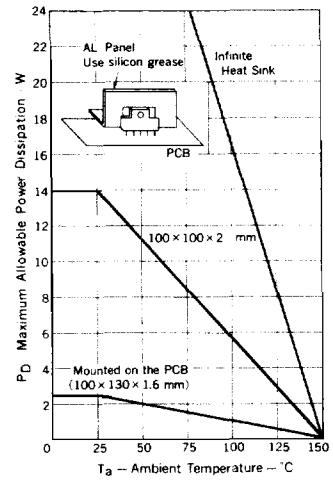


TYPICAL CHARACTERISTICS ($T_a = 25^\circ\text{C}$)





MAXIMUM ALLOWABLE POWER DISSIPATION vs. AMBIENT TEMPERATURE



NOTES FOR USE

- (1) Adding a capacitor for phase compensation between Pin 1 (13) to Pin 3 (11), its value less than 47 pF is recommended, and the value of R_1 (R_2) and of C_6 (C_9) have to be chosen as follows.

$$R_1 (R_2) = 1 \Omega$$

$$C_6 (C_9) = 0.15 \mu\text{F}$$

- (2) At muting by shortage of Pin 7 to GND, ripple rejection is determined by following equation.

$$\text{SVR} = \left| 20 \log \frac{R_L}{200 + R_L} \right|$$

- (3) Keep the μPC1335V's heat sink in shortage to GND or floating condition.
(4) Direct shortage between Pin 1 (13) to V_{CC} or GND will damage the μPC1335V.
(5) Keep some margin at design of external heat sink size.
(6) Use silicon grease and keep the torque of screw driver less than 10 kg·cm in attachment of a external heat sink.

14 PIN V-DIP (Unit: mm)

