High-output dual power amplifier

BA5417

The BA5417 is a 6 to 15V-compatible dual power amplifier developed for use radio cassette players. It is equipped with standby switching functions for excellent total harmonic distortion and other basic characteristics.

●Applications

Radio cassette / Mini compo players

●Features

1) High output.
   P_{OUT} = 2.8W (V_{CC} = 9V, R_L 3Ω, THD = 10%)
   P_{OUT} = 5.0W (V_{CC} = 12V, R_L 3Ω, THD = 10%)
2) Excellent audio quality
   THD = 0.1% (f = 1kHz, P_O = 0.5W)
   V_{NO} = 0.3mVrms (Rg = 10kΩ)
   RR = 55dB (f_{RR} = 100Hz)
3) Wide supply voltage operating range
   (V_{CC} = 6.0V to 15.0V).
4) Switching noise (“pop” noise) generated when the power is switched on and off is small.
5) Ripple mixing when motor starts has been prevented.
6) Built-in thermal shutdown circuit.
7) Built-in standby switch. Output is not influenced by the standby pin voltage.
8) Soft clipping.

●Absolute maximum ratings (Ta = 25°C)

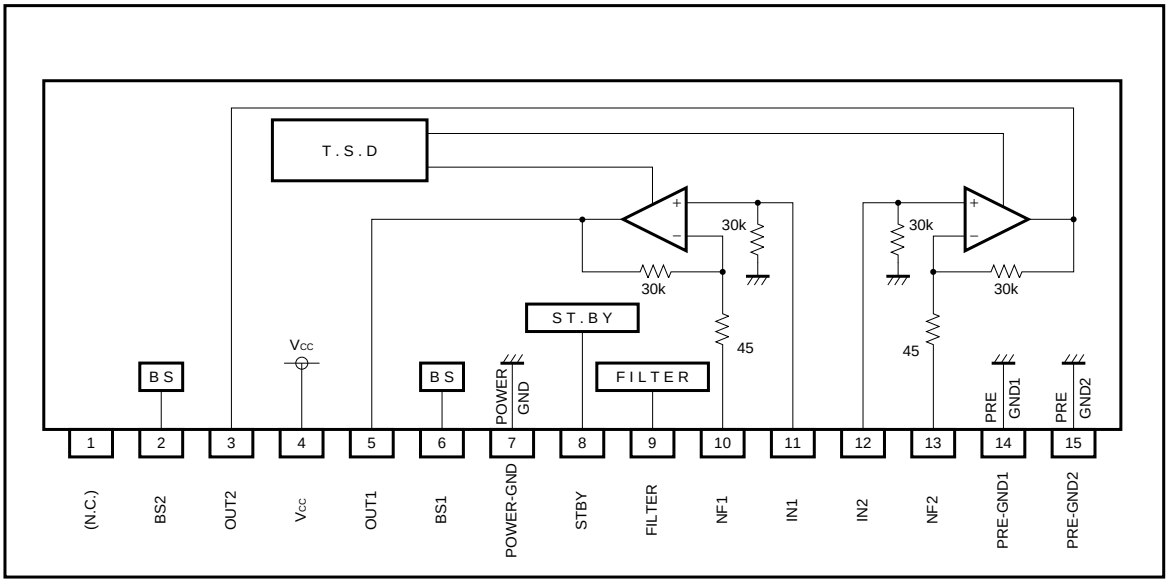
Parameter	Symbol	Limits	Unit
Power supply voltage	V_{CC}	20*1	V
Power dissipation	Pd	15*2	W
Operating temperature	Topr	−20 ~ +75	°C
Storage temperature	Tstg	−55 ~ +150	°C

*1 Must be within standby values.
*2 Ta=75°C(when using infinite heatsink)

●Recommended operating conditions (Ta = 25°C)

Parameter	Symbol	Limits	Unit
Power supply voltage	V_{CC}	6.0 ~ 15.0	V

●**Block diagram**

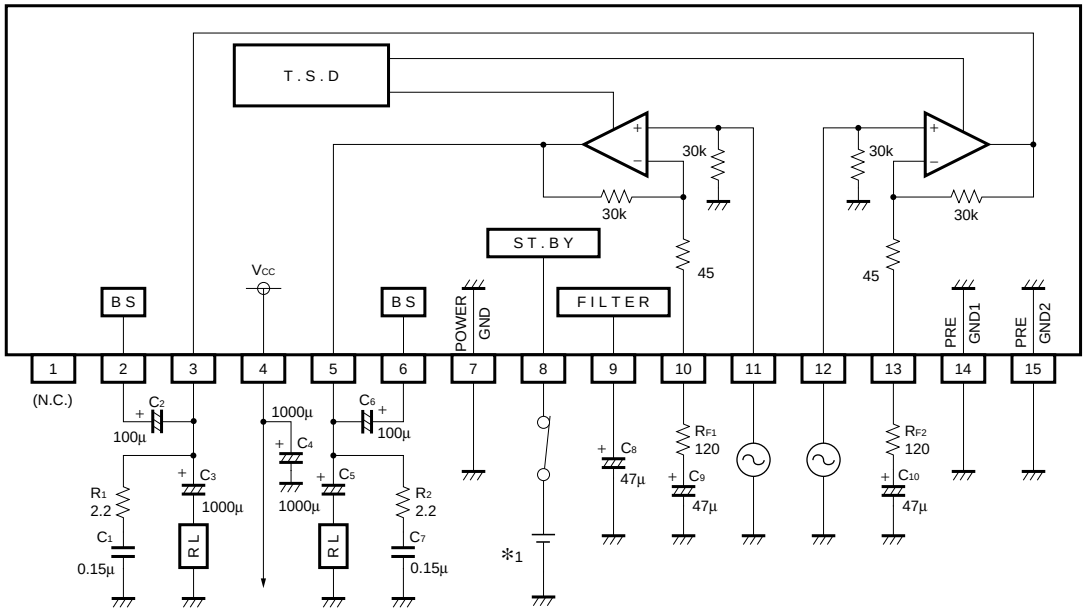


●Electrical characteristics

(unless otherwise noted, Ta=25°C, Vcc=9.0V, R_L=3Ω, R_F=120Ω, Rg=600Ω, f=1kHz, OTL mode)

Parameter		Symbol	Min.	Typ.	Max.	Unit	Coniditions
Quiescent current		I_O	–	22	45	mA	V_{IN}=0Vrms
Rated output voltage 1		$P_{OUT}1$	2.2	2.8	–	W	TDH=10%
Rated output voltage 2		$P_{OUT}2$	4.0	5.0	–	W	TDH=10%, V_{CC}=12V
Closed-loop voltage gain		G_{VC}	43	45	47	dB	–
Output noise voltage		V_{NO}	–	0.3	1.0	mVrms	Rg=10kΩ, DIN AUDIO
Total harmonic distortion		THD	–	0.1	1.0	%	P_{OUT}=0.5W
Ripple rejection		RR	42	55	–	dB	f_{RR}=100Hz, V_{RR}=–10dBm
Crosstalk		CT	48	65	–	dB	V_O=0dBm
Circuit current (with standby switch off)		I_{OFF}	–	0	20	μA	–
Standby pin current when on		I_{SIN}	–	0.15	0.4	mA	V_{STBY}=V_{CC}
Standby pin control voltage	Activated	V_{STH}	3.5	–	–	V	–
	Not activated	V_{STL}	–	–	1.2	V	–

●Measurement circuit



*1 V_{STBY}=3.5V ~ V_{CC}

Fig.1

●Application example

OTL mode circuit

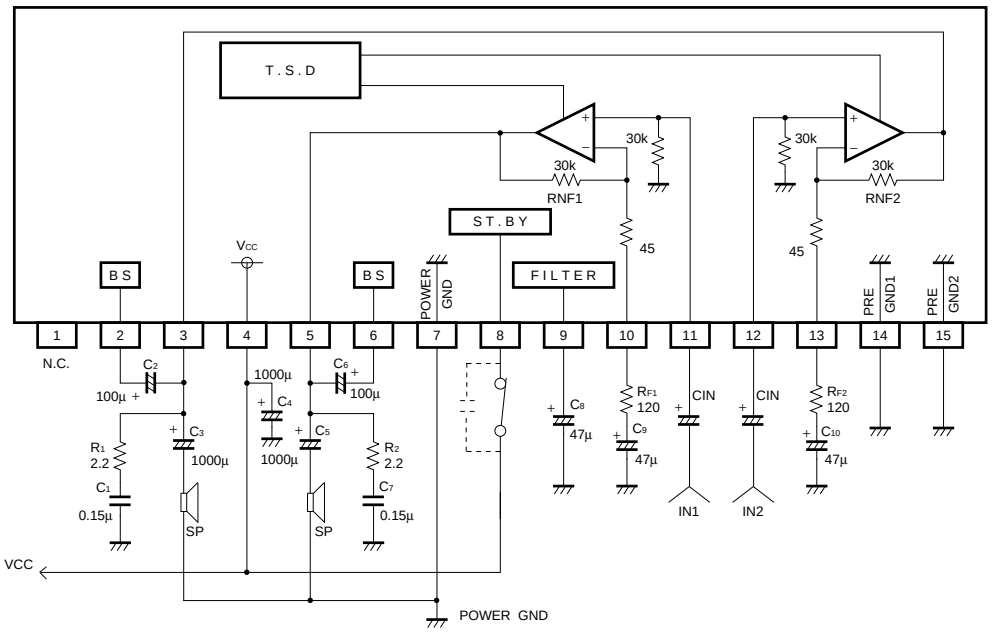
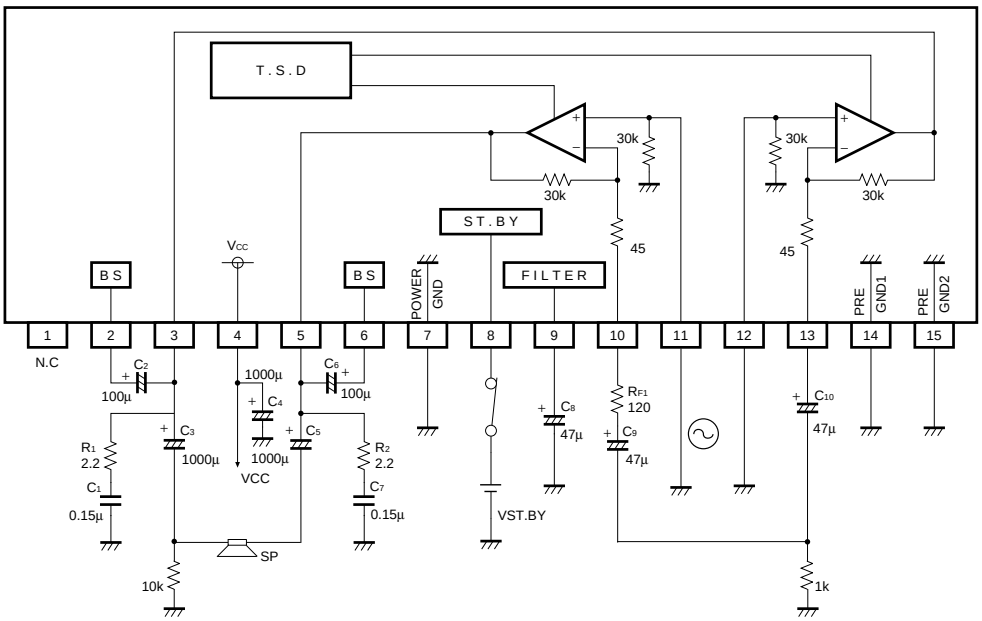


Fig.2

BTL mode circuit



Note : 3pin,5pin need coupling capacitors (C3,C5 100µF) for DC offset voltage.

Fig.3

●Electrical characteristics

OTL mode

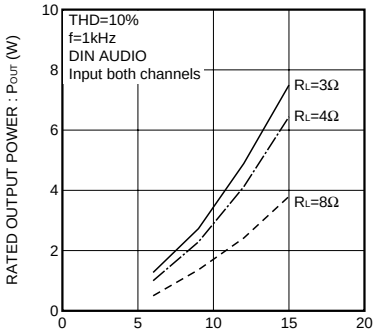


Fig.4 Rated output power vs. Power supply voltage

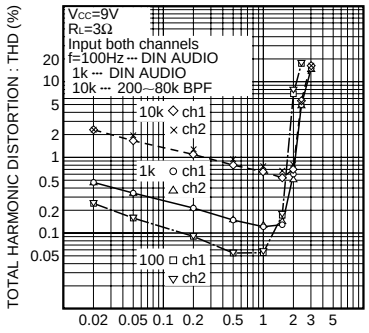


Fig.5 Total harmonic distortion vs. Output power

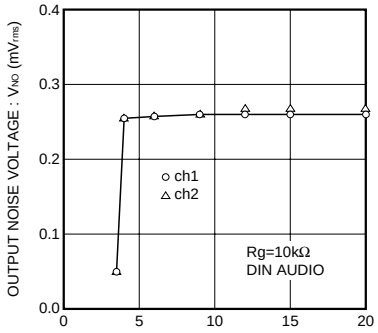


Fig.6 Output noise voltage vs. Power supply voltage

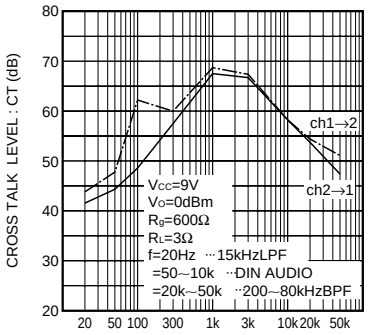


Fig.7 Crosstalk vs. Frequency

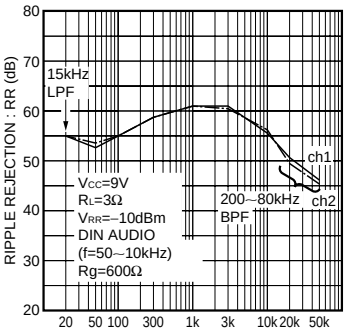


Fig.8 Ripple rejection vs. Frequency

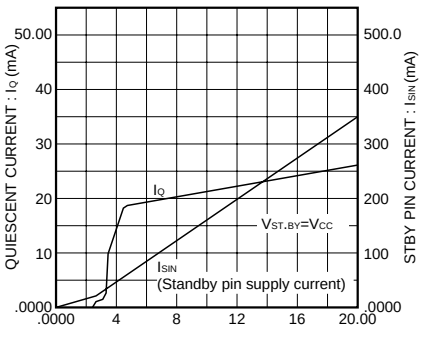


Fig.9 Quiescent standby pin supply current vs. Power supply voltage

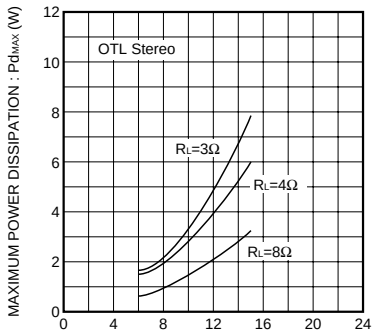


Fig.10 Maximum power dissipation vs. Power supply voltage

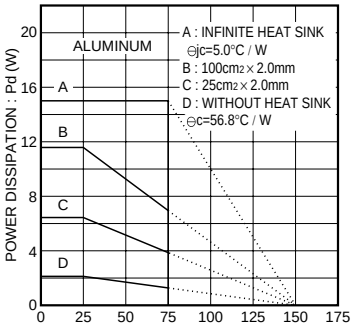


Fig.11 Thermal derating curve

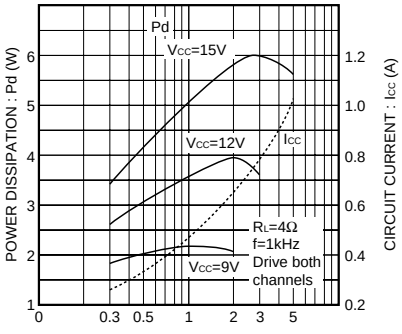


Fig.12 Power dissipation vs. Power supply voltage (R_L=4Ω)

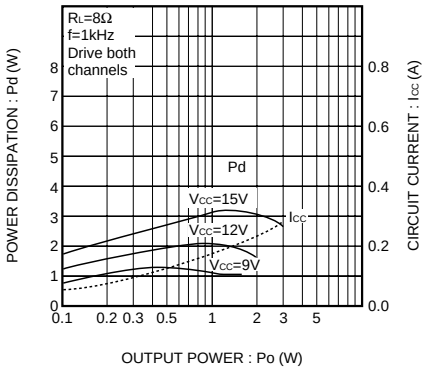


Fig.13 Power dissipation vs. Power supply voltage (R_L=8Ω)

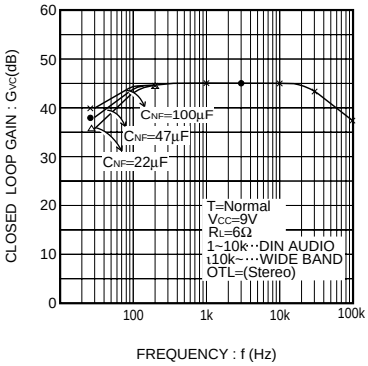


Fig.14 Closed loop gain vs. Frequency

BTL mode

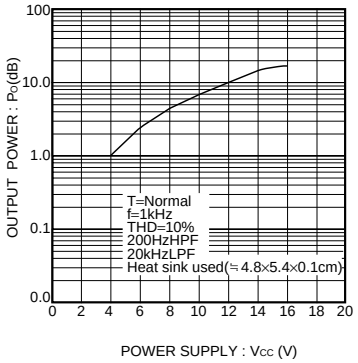


Fig.15 Rated output power vs. Power supply voltage

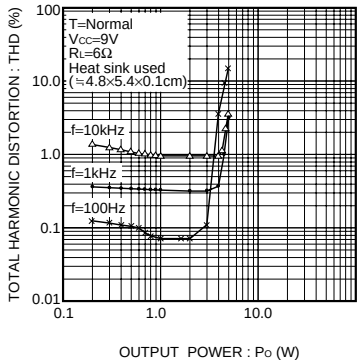


Fig.16 Total harmonic distortion vs. Output power

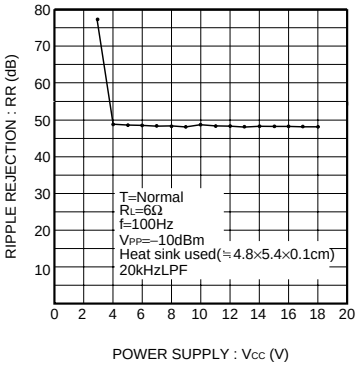


Fig.17 Ripple rejection vs. Power supply voltage

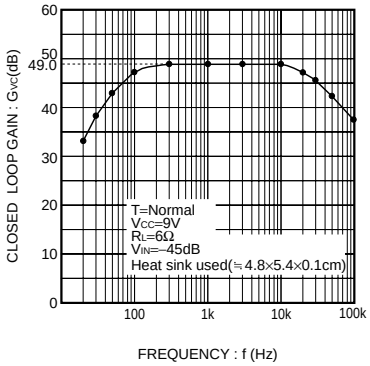


Fig.18 Closed loop gain vs. Frequency

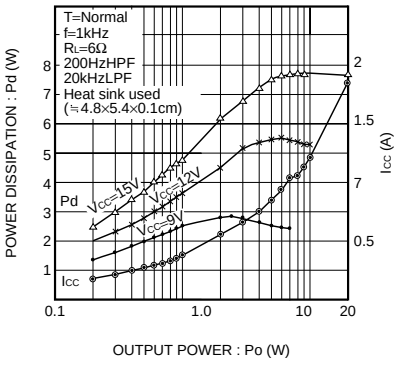


Fig.19 Power dissipation vs. Power supplyvoltage (R_L=6Ω)

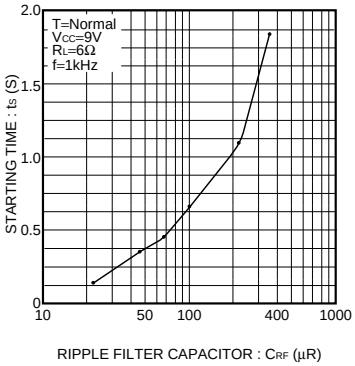


Fig.20 Starting time vs. Ripple filter capacitor

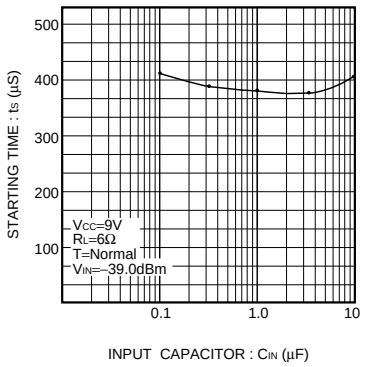


Fig.21 Starting time vs. Input capacitor

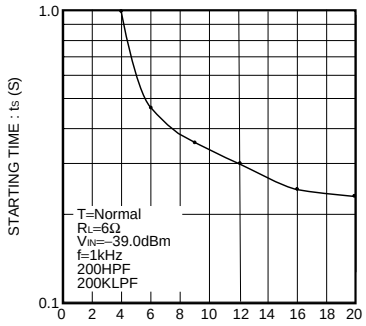


Fig.22 Starting time vs. Power supply voltage

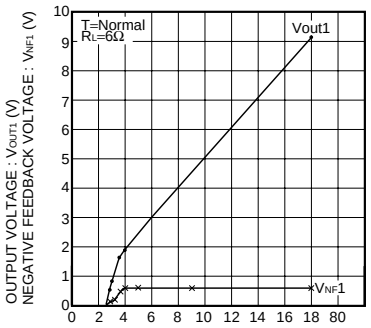


Fig.23 Output voltage Nagative teed back voltage vs. Power supply voltage

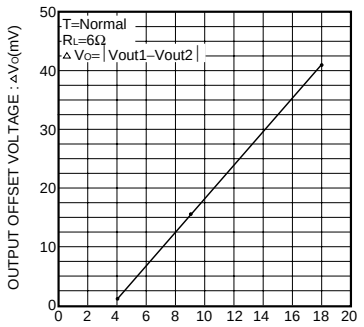


Fig.24 Output offset voltage vs. Power supply voltage

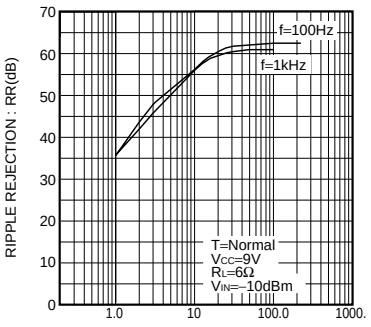
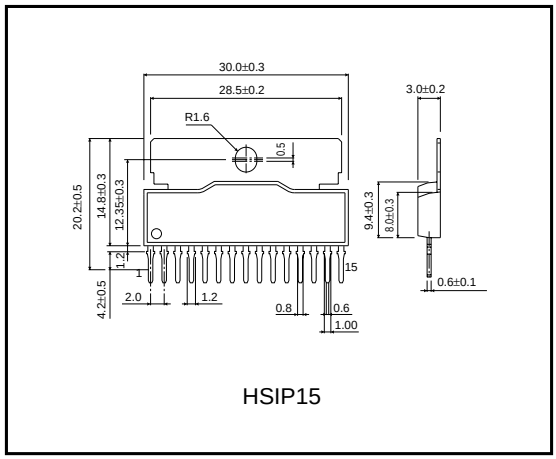


Fig.25 Ripple rejection vs. Ripple filter capacitor

● **External dimensions** (Units : mm)



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