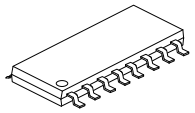
STEREO 2.6W AUDIO POWER AMPLIFIER WITH DC VOLUME CONTROL



SOP-16

■ DESCRIPTION

As an audio power amplifier with DC volume control, UTC **PA7468** is a stereo bridged audio power amplifier. In normal operation it can produce 2.6Ω (1.8W) into 4W with less than 10% (1.0%) THD+N.

In UTC **PA7468**, the attenuator range of the volume control is from 20dB (@DC_V_{OL}=0V) to -80dB (@DC_V_{OL}=3.54V) with 32 steps. Besides, the UTC **PA7468** includes the depop circuitry and the thermal shutdown protection circuitry (to reduce pops and clicks noise during power up or shutdown mode operation).

The **UTC PA7468** has a BTL mode for speaker drive and a SE mode for headphone drive. These tow modes can be quickly chosen by the SE/$\overline{BTL}$ input control pin signal.

■ FEATURES

* Low Operating Current: 9mA
* Two Output Modes Allowable with BTL and SE Modes(chosen by SE/$\overline{BTL}$ pin)
* Low Current Consumption :1mA(in Shutdown Mode)
* With Short Circuit Protection
* With Thermal Shutdown Protection
* With Over Current Protection Circuitry
* Eliminating Turn-on and Turn-off Transients in Outputs by Improved Depop Circuitry to.
* Very High PSRR
* 32 Steps Volume Adjustable
* BTL Mode :2.6W per Channel Output Power into 4Ω Load at 5V

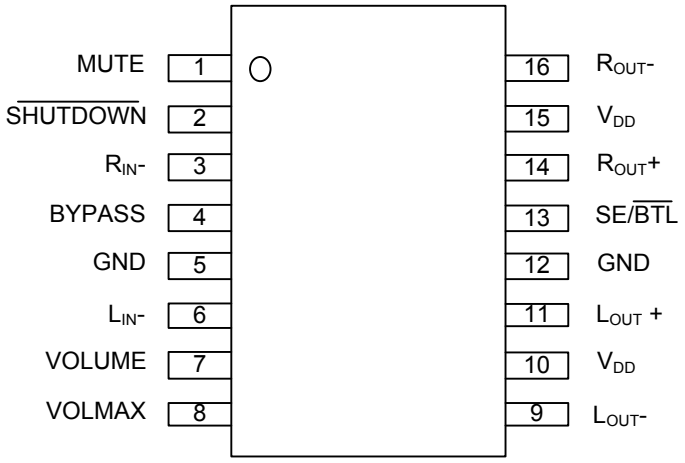
■ ORDERING INFORMATION

Ordering Number		Package	Packing
Lead Free	Halogen Free		
PA7468L-S16-R	PA7468G-S16-R	SOP-16	Tape Reel
PA7468L-S16-T	PA7468G-S16-T	SOP-16	Tube

PA7468L-S16-R
- (1)Packing Type
- (2)Package Type
- (3)Lead Free

(1) R: Tape Reel
(2) S16: SOP-16
(3) G: Halogen Free, L: Lead Free

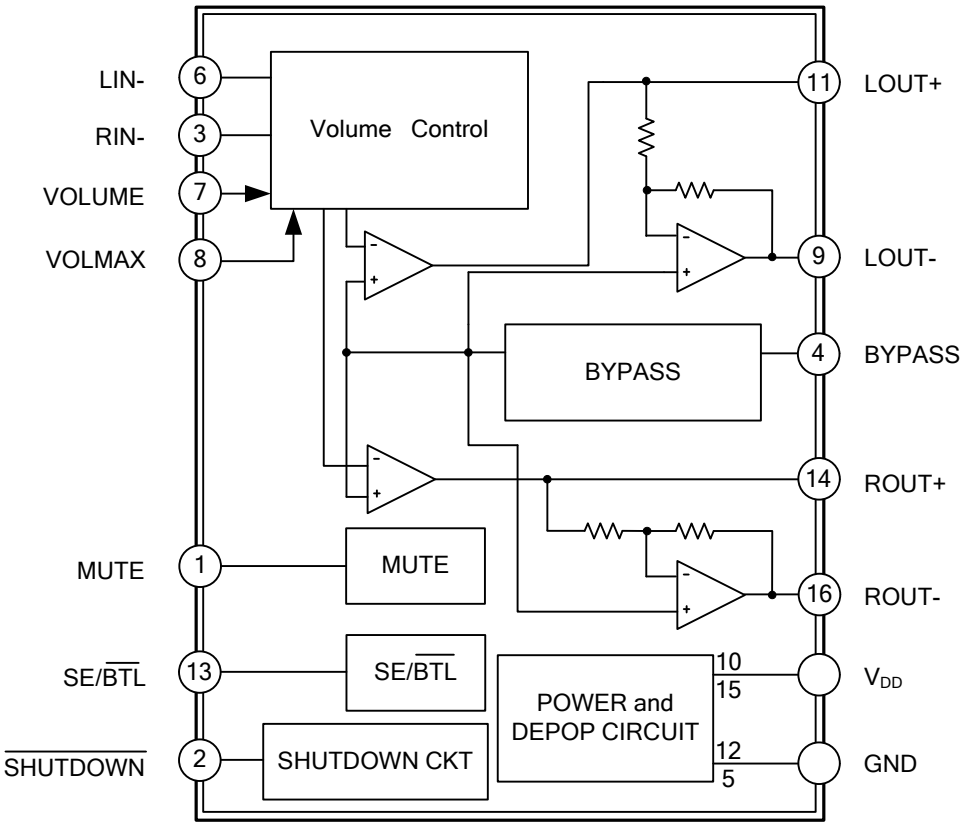
■ PIN CONFIGURATION



■ PIN DESCRIPTION

PIN NO.	PIN NAME	DESCRIPTION
1	MUTE	Input pin for mute controlling: low for normal operation; high to mute.
2	SHUTDOWN	When this pin is pulled low the chip will be into shutdown mode. I_{SD}= 1μA
3	R_{IN}-	Right channel input pin
4	BYPASS	Pin for bias voltage generator
5.12	GND	Ground
6	L_{IN}-	Left channel input pin
7	VOLUME	Volume gain setting input signal.
8	VOLMAX	Pin for setting the maximum output swing. Inputting V_C to this pin, the output voltage swing will be clamped between V_{OH}- V_C & V_{OL} + V_C. Connecting GND to this pin will disable the function. For this pin, the max input voltage must be ≤1/2 V_{DD}.
9	L_{OUT}-	Left channel's negative output in BTL mode; high impedance in SE mode.
10, 15	V_{DD}	Supply voltage
11	L_{OUT}+	Left channel's positive output in BTL mode and SE mode
13	SE/BTL	Output mode control input, high :SE output mode ,low :for BTL mode.
14	R_{OUT}+	Right channel's positive output in BTL mode and SE mode
16	R_{OUT}-	Right channel's negative output in BTL mode ;high impedance in SE mode.

■ BLOCK DIAGRAM



■ ABSOLUTE MAXIMUM RATING (unless otherwise specified)

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	V_{DD}	-0.3 ~ +6.0	V
Input Voltage (SE/$\overline{BTL}$, $\overline{SHUTDOWN}$, MUTE)	V_{IN}	-0.3 ~ V_{DD}+0.3	V
Power Dissipation	P_D	Internal Limited	W
Junction Temperature	T_J	150	°C
Storage Temperature	T_{STG}	-65 ~ +150	°C

Note: Absolute maximum ratings are those values beyond which the device could be permanently damaged. Absolute maximum ratings are stress ratings only and functional device operation is not implied.

■ THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	θ_{JA}	90	°C/W

■ RECOMMENDED OPERATING CONDITIONS

PARAMETER			SYMBOL	RATINGS	UNIT
Supply Voltage			V_{DD}	4.5 ~ 5.5	V
Threshold Voltage	High	$\overline{SHUTDOWN}$, MUTE	V_{IH}	2.0	V
		SE/$\overline{BTL}$		4.0	V
	Low	$\overline{SHUTDOWN}$, MUTE	V_{IL}	1.0	V
		SE/$\overline{BTL}$		1.0	V
Common Mode Input Voltage			V_{ICM}	V_{DD}-1.0	V
Ambient Temperature			T_A	-40 ~ 85	°C

■ ELECTRICAL CHARACTERISTICS (T_A=25°C, unless otherwise specified)

V_{DD} = 5V

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Differential Voltage	V_{OS}			5		mV
Supply Current	I_{DD}	SE/$\overline{BTL}$ =0V		9	20	mA
		SE/$\overline{BTL}$ =5V		4	10	mA
Supply Current in Shutdown Mode	I_{SD}	SE/$\overline{BTL}$ =0V, $\overline{SHUTDOWN}$ =0V		1		μA
High Input Current	I_{IH}			900		nA
Low Input Current	I_{IL}			900		nA

Operating Characteristics, BTL mode (V_{DD} = 5V, R_L = 4Ω, Gain = 2V/V)

PARAMETER	SYMBOL	TEST CONDITIONS		MIN	TYP	MAX	UNIT
Maximum Output Power	P_{OUT}	THD+N=10%, f_{IN}=1kHz	R_L=3Ω		2.9		W
			R_L=4Ω		2.6		W
			R_L=8Ω		1.6		W
		THD+N=1%, f_{IN}=1kHz	R_L=3Ω		2.4		W
			R_L=4Ω		1.8		W
			R_L=8Ω	1	1.3		W
Total Harmonic Distortion Plus Noise	THD+N	P_{OUT} =1.2W, R_L= 4Ω, f_{IN}=1kHz			0.07		%
		P_{OUT} =0.9W, R_L= 8Ω, f_{IN}=1kHz			0.08		%
Power Ripple Rejection Ratio	PSRR	V_{RR}=0.1Vrms, R_L=8Ω, C_B=1μF, f_{IN}=120Hz			60		dB
Channel Separation	Crosstalk	C_B =1μF, R_L=8Ω, f_{IN}=1kHz			90		dB
Signal to Noise Ratio	S/N	P_{OUT}=1.1W, R_L=8Ω, A Weighting			95		dB

■ ELECTRICAL CHARACTERISTICS(Cont.)

Operating Characteristics, SE mode (V_{DD} = 5V, Gain = 1V/V)

PARAMETER	SYMBOL	TEST CONDITIONS		MIN	TYP	MAX	UNIT
Maximum Output Power	P_{OUT}	THD+N=10%, f_{IN}=1kHz	R_L= 16Ω		220		mW
			R_L= 32Ω		120		mW
		THD+N=1%, f_{IN}=1kHz	R_L= 16Ω		160		mW
			R_L= 32Ω		95		mW
Total Harmonic Distortion Plus Noise	THD+N	P_{OUT}=125mW, R_L= 16Ω, f_{IN}=1kHz			0.09		%
		P_{OUT}=65mW, R_L= 32Ω, f_{IN}=1kHz			0.09		%
Power Ripple Rejection Ratio	PSRR	V_{IN}=0.1Vrms, R_L=8Ω, C_B=1μF, f_{IN}=120Hz			60		dB
Channel Separation	Crosstalk	C_B=1μF, R_L=32Ω, f_{IN}=1kHz			60		dB
Signal to Noise Ratio	S/N	P_{OUT}=75mW, SE, R_L=32Ω, A Weighting			100		dB

■ VOLUME CONTROL TABLE_BTL MODE (Supply Voltage V_{DD}=5V)

GAIN(DB)	HIGH(V)	LOW(V)	HYSTERESIS(MV)	RECOMMENDED VOLTAGE(V)
20	0.12	0.00		0
18	0.23	0.17	52	0.20
16	0.34	0.28	51	0.31
14	0.46	0.39	50	0.43
12	0.57	0.51	49	0.54
10	0.69	0.62	47	0.65
8	0.80	0.73	46	0.77
6	0.91	0.84	45	0.88
4	1.03	0.96	44	0.99
2	1.14	1.07	43	1.10
0	1.25	1.18	41	1.22
-2	1.37	1.29	40	1.33
-4	1.48	1.41	39	1.44
-6	1.59	1.52	38	1.56
-8	1.71	1.63	37	1.67
-10	1.82	1.74	35	1.78
-12	1.93	1.85	34	1.89
-14	2.05	1.97	33	2.01
-16	2.16	2.08	32	2.12
-18	2.28	2.19	30	2.23
-20	2.39	2.30	29	2.35
-22	2.50	2.42	28	2.46
-24	2.62	2.53	27	2.57
-26	2.73	2.64	26	2.69
-28	2.84	2.75	24	2.80
-30	2.96	2.87	23	2.91
-32	3.07	2.98	22	3.02
-34	3.18	3.09	21	3.14
-36	3.30	3.20	20	3.25
-38	3.41	3.32	18	3.36
-40	3.52	3.43	17	3.48
-80	5.00	3.54	16	5

■ TYPICAL APPLICATION CIRCUIT