



Low Voltage (Single-cell battery) Operating Headphone Amplifier BU7150NUV

●Outline

BU7150NUV is Headphone Amplifier designed for Single-cell battery operated audio products (VDD = 0.93 to 3.5V, at Ta=0°C). BU7150NUV can be selected in single-ended mode for stereo headphone and BTL mode for mono speaker operations. For BU7150NUV at VDD = 1.5V, THD+N = 1%, the output power is 14mW at RL = 16Ω in single-ended mode and the output power is 85mW at RL = 8Ω in BTL mode.

●Features

- 1) Wide battery operating voltage range (0.93V to 3.5V, Ta=0 to 85°C) (1.03V to 3.5V, Ta= -40 to 85°C)
- 2) BU7150NUV can be selected in single-ended mode for stereo headphone and BTL mode for mono speaker operation
- 3) Unity-gain stability
- 4) Click and pop-noise reduction circuit built-in
- 5) Shutdown mode(Low power mode)
- 6) High speed turn-on mute mode
- 7) Thermal shutdown protection circuit
- 8) Power-on reset circuit not sensed during start-up slew rate of supply voltage
- 9) Small package (VSON010V3030)

●Applications

Noise-canceling headphones, IC recorders, Mobile phones, PDAs, Electronic toys etc.

●Absolute Maximum Ratings (Ta=25°C)

Parameter	Symbol	Rating	Unit
Supply Voltage	VDD	4.5	V
Input Voltage	VIN	VSS-0.3 to VDD+0.3	V
Input Current	IIN	-10 to 10	mA
Power Dissipation	PD	560 *	mW
Storage Temperature Range	TSTG	-55 to +150	°C

*For operating over 25°C, de-rate the value at 5.6mW/°C.

This value is for IC mounted on 74.2 mm x 74.2mm x 1.6mm glass-epoxy PCB of single-layer.

●Recommended Operating Range

Parameter	Symbol	Limit			Unit
		Min.	Typ.	Max.	
Operating Temperature Range	TOPR	-40	-	85	°C
Supply Voltage (Note 1,2)	VDD	0.93	-	3.5	V

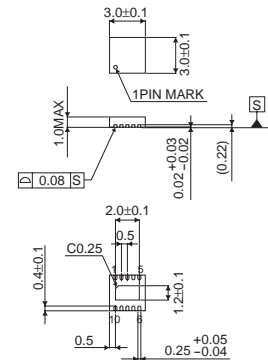
Note 1: If the supply voltage is 0.93V, BU7150NUV does not function at less than 0°C.

If the supply voltage is more than 1.03V, BU7150NUV operates until -40°C.

(But, it is not the one which guarantees the standard value for electric characteristics.)

Note 2: Ripple in power supply line should not exceed 400mV_{P-P}.(VDD=1.5 V, Ta=25°C)

●Dimensions (Unit: mm)



VSON010V3030

●Electrical Characteristics (Ta=25°C, VDD=1.5V, f=1kHz, VSS=GND unless otherwise specified)

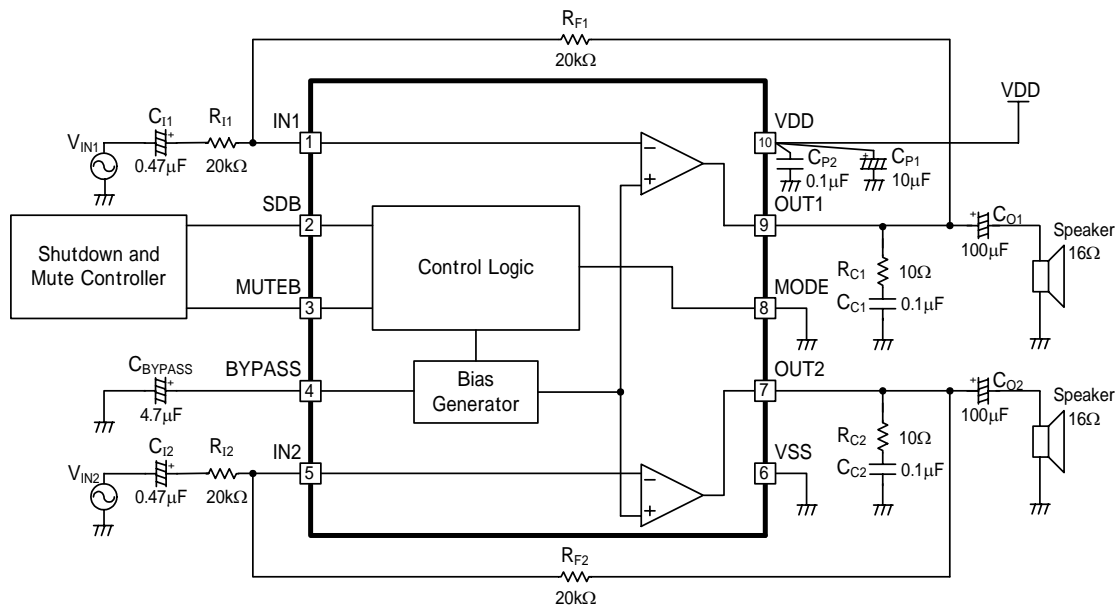
Parameter	Symbol	Limit			Unit	Conditions
		Min.	Typ.	Max.		
No Signal Operating Current	IDD	-	1	1.4	mA	No load, No signal
Shutdown Current	ISD	-	3	9	μA	SDB Pin=VSS
Mute Current	IMUTE	-	15	-	μA	MUTEB Pin=VSS, SE
Output Offset Voltage	VOFS	-	5	50	mV	VOUT1 - VOUT2 , No signal
Maximum Output Power	PO	70	85	-	mW	RL=8Ω, BTL, THD+N=1%
		-	14	-	mW	RL=16Ω, SE, THD+N=1%
Total Harmonic Distortion +Noise	THD+N	-	0.2	0.5	%	20kHz LPF, RL=8Ω, BTL, PO=25mW
		-	0.1	0.5	%	20kHz LPF, RL=16Ω, SE, PO=5mW
Output Voltage Noise	VNO	-	10	-	μV _{rms}	20kHz LPF + A-weight
Crosstalk	CT	-	85	-	dB	RL=16Ω, SE, 1kHz BPF
Power Supply Rejection Ratio	PSRR	-	62	-	dB	Ripple voltage=200mV _{P-P} , RL=8Ω, BTL, C _{BYPASS} =4.7μF
		-	66	-	dB	Ripple voltage=200mV _{P-P} , RL=16Ω, SE, C _{BYPASS} =4.7μF
Input Logic High Level	VIH	0.7	-	-	V	MUTEB Pin, SDB Pin
Input Logic Low Level	VIL	-	-	0.3	V	MUTEB Pin, SDB Pin

“BTL” is BTL-mode when MODE Pin = VDD, “SE” is single-ended mode when MODE Pin = VSS.

Turn-on time in BTL mode is about 11 times faster than single-ended mode.

Also, BTL mode does not have MUTE mode. When MUTEB Pin = VSS, then will be shutdown mode.

●Block diagram(Single-ended mode application circuit)



- Resistors R_{F1} , R_{F2} should be used in 20kΩ to 1MΩ range.
- For gain setting greater than 4 times, then R_{C1} , R_{C2} , C_{C1} , C_{C2} can be eliminated.

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