Dual Low-Voltage Power Amplifier

Features

- Supply Voltage Down to 1.8V
- Low Crossover Distortion
- Low Quiescent Current
- Bridge-tied or Stereo(Single-ended) Configurations
- Both DIP-8 and SOP-8 packages available

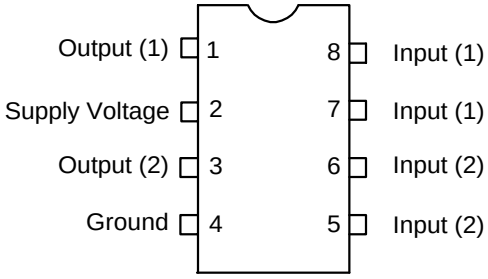
General Description

The APA2822 is a monolithic integrated circuit in 8-lead PDIP package. It is intended for use as dual audio power amplifier in portable cassette players, active speakers, and radios.

Applications

- Audio Amplifiers
- Active Speakers
- Sound Cards
- Filters
- Analog Circuit

Pin Description



Ordering Information

APA 2822 □□-□□

- Handling Code
- Temp. Range
- Package Code

Package Code
J : PDIP - 8 K : SOP - 8
Temp. Range
C : 0 to +70° C
Handling Code
TU : Tube

Absolute Maximum Ratings

Symbol	Parameter	Rating	Unit
V_{CC}	Supply Voltage	15	V
I_O	Peak Output Current	1	A
V_I	Input Voltage	15	V
P_{TOT}	Power Dissipation at T_{AMB} = 50°C at T_{CASE} = 50°C	1 1.4	W
T_{STG} , T_J	Storage and Junction Temperature Range	-40 to +150	°C

Thermal Data

Symbol	Parameter		Rating	Unit
$R_{TH\ J\text{-}AMB}$	Thermal Resistance Junction-Ambient	Max.	100	°C/ W
$R_{TH\ J\text{-}CASE}$	Thermal Resistance Junction-Pin	Max.	70	°C/ W

Electrical Characteristics (V_S= 6V , T_A = 25°C, unless otherwise specified)

Symbol	Parameter	Test Conditions		APA2822 Min.	APA2822 Typ.	APA2822 Max.	Unit
STEREO (test circuit of Figure 1)							
V_S	Supply Voltage			1.8		15	V
V_O	Quiescent Output Voltage	V_S =3V			2.7 1.2		V
I_D	Quiescent Drain Current				6		mA
I_B	Input Bias Current				100		nA
P_O	Output Power (f = 1kHz, d = 10%)	R_L =32Ω	V_S = 9V		300		mW
			V_S = 6V		120		
			V_S = 4.5V		60		
			V_S =3V		20		
			V_S = 2V		5		
		R_L =16Ω	V_S = 6V		220		
		R_L =8Ω	V_S = 9V		1000		
			V_S = 6V		380		
		R_L =4Ω	V_S = 6V		650		
			V_S = 4.5V		320		
			V_S = 3V		110		

Electrical Characteristics Cont. (V_S= 6V , T_A = 25°C, unless otherwise specified)

Symbol	Parameter	Test Conditions	APA2822			Unit
			Min.	Typ.	Max.	
d	Distortion (f = 1kHz)	R_L =32Ω P_O = 40mW R_L =16Ω P_O = 75mW R_L = 8Ω P_O = 150mW		0.2 0.2 0.2		%
STEREO (test circuit of Figure 1)						
G_V	Closed Loop Voltage Gain	f = 1kHz		39		dB
ΔG_V	Channel Balance				±1	dB
R_I	Input Resistance	f = 1kHz	100			kΩ
e_N	Total Input Noise	R_S = 10kΩ B = 22Hz to 22kHz		2.5		μV
SVR	Supply Voltage Rejection	f = 100Hz, C1 = C2 = 100μF		30		dB
C_S	Channel Separation	f = 1kHz		50		
BRIDGE (test circuit of Figure 2)						
V_S	Supply Voltage		1.8		15	V
I_D	Quiescent Drain Current	R_L =8Ω		6	9	mA
V_{OS}	Output Offset Voltage (between the outputs)	R_L =8Ω			±50	mV
I_B	Input Bias Current			100		nA
P_O	Output Power (f = 1kHz, d = 10%)	R_L =32Ω V_S = 9V V_S = 6V V_S = 4.5V V_S =3V V_S = 2V		1000 400 200 65 8		mW
		R_L =16Ω V_S = 9V V_S = 6V V_S = 3V		2000 800 120		
		R_L =8Ω V_S = 6V V_S = 4.5V V_S = 3V		1350 700 220		
		R_L =4Ω V_S = 4.5V V_S = 3V V_S = 2V		1000 350 80		
d	Distortion	P_O = 0.5W, R_L =8Ω , f = 1kHz		0.2		%
G_V	Closed Loop Voltage Gain	f = 1kHz		39		dB
R_J	Input Resistance	f = 1kHz	100			kΩ
e_N	Total Input Noise	R_S =10kΩ , B = 22Hz to 22kHz		3		μV
SVR	Supply Voltage Rejection	f = 100Hz		30		dB
B	Power Bandwidth (-3dB)	R_L =8Ω , P_O = 1W			120	kHz

Test Information

Figure 1 : Test Circuit (Stereo)

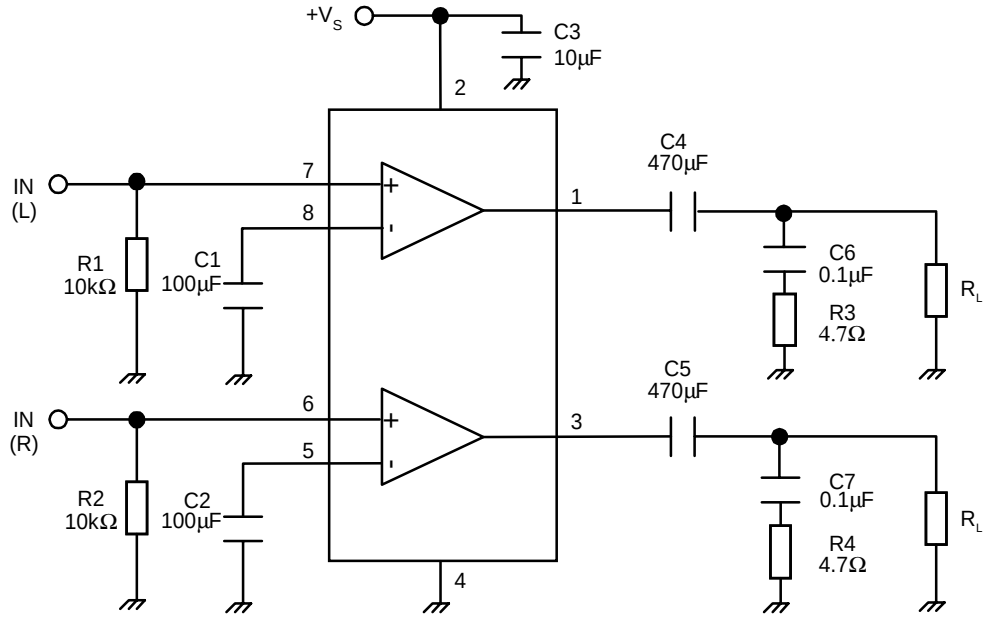
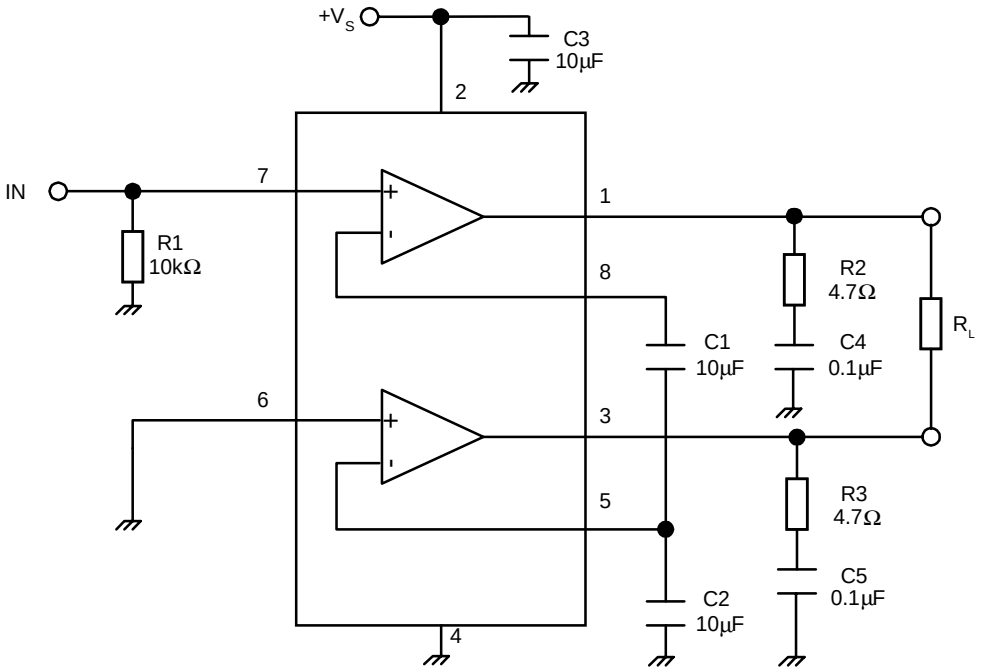
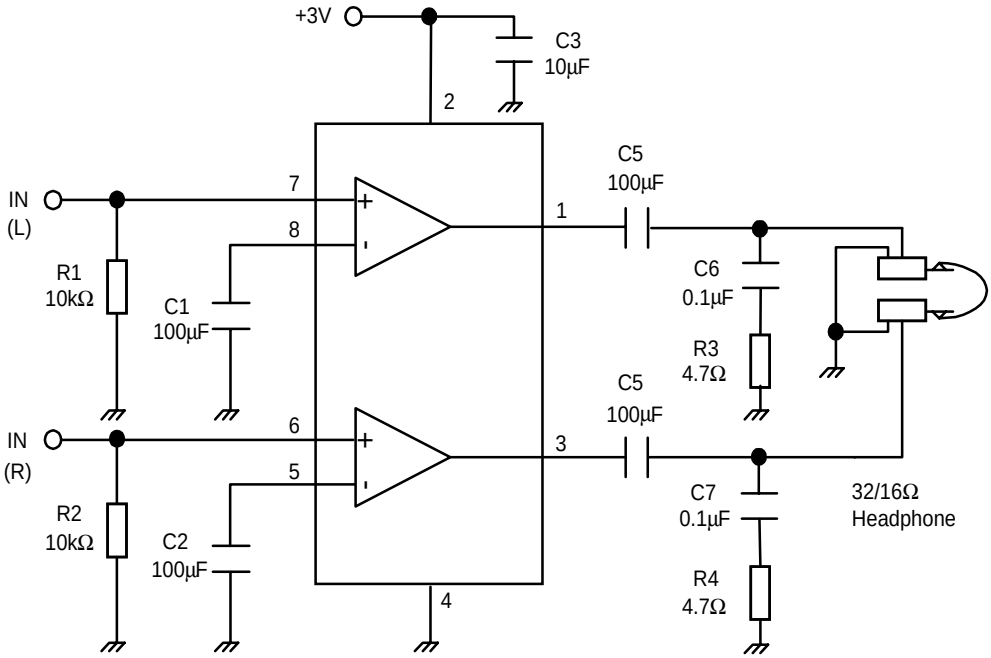


Figure2 : Test Circuit (Bridge)



Test Information

Figure 3 : Typical Application in Portable Players



Customer Service

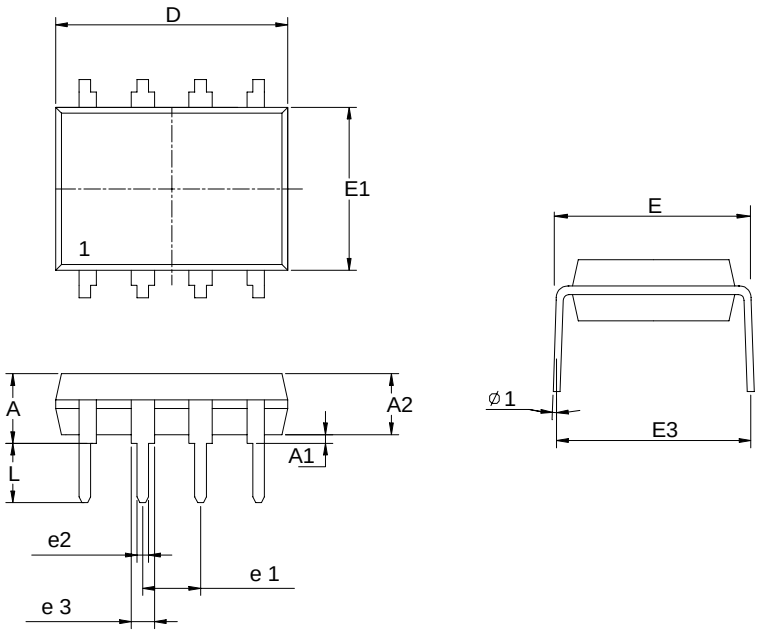
Anpec Electronics Corp.

Head Office :
5F, No. 2 Li-Hsin Road, SBIP,
Hsin-Chu, Taiwan, R.O.C.
Tel : 886-3-5642000
Fax : 886-3-5642050

Taipei Branch :
7F, No. 137, Lane 235, Pac Chiao Rd.,
Hsin Tien City, Taipei Hsien, Taiwan, R.
O. C.
Tel : 886-2-89191368
Fax : 886-2-89191369

Packaging Information

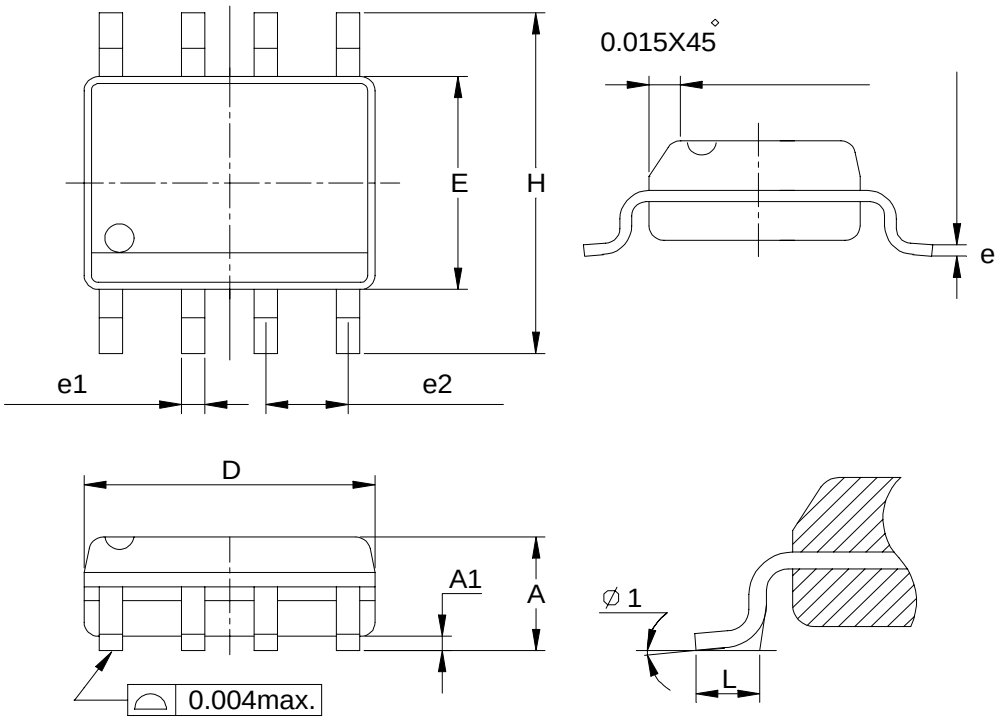
PDIP-8 pin (Reference JEDEC Registration MS-001)



Dim	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A		5.33		0.210
A1	0.38		0.015	
A2	2.92	3.68	0.115	0.145
D	9.02	10.16	0.355	0.400
e1	2.54BSC		0.100BSC	
e2	0.36	0.56	0.014	0.022
e3	1.14	1.78	0.045	0.070
E	7.62 BSC		0.300 BSC	
E1	6.10	7.11	0.240	0.280
E3		10.92		0.430
L	2.92	3.81	0.115	0.150
ϕ 1	15°		15°	

Packaging Information

SOP-8 pin (Reference JEDEC Registration MS-012)



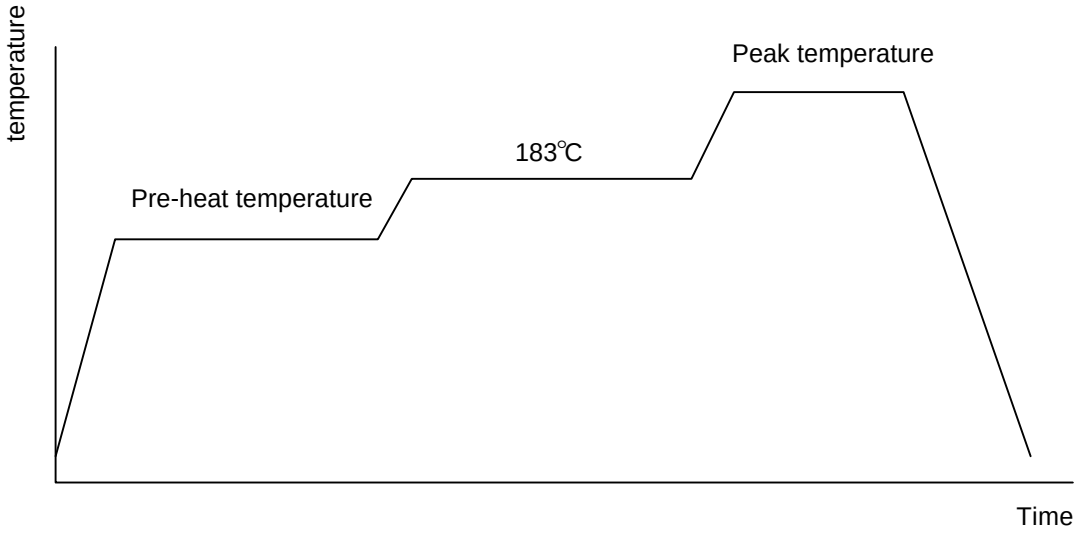
Dim	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	1.35	1.75	0.053	0.069
A1	0.10	0.25	0.004	0.010
D	4.80	5.00	0.189	0.197
E	3.80	4.00	0.150	0.157
H	5.80	6.20	0.228	0.244
L	0.40	1.27	0.016	0.050
e1	0.33	0.51	0.013	0.020
e2	1.27BSC		0.50BSC	
ϕ 1	0°	8°	0°	8°

Physical Specifications

Terminal Material	Solder-Plated Copper (Solder Material : 90/10 or 63/37 SnPb
Lead Solderability	Meets EIA Specification RSI86-91, ANSI/J-STD-002 Category 3.
Packaging	2500 devices per reel

Reflow Condition (IR/Convection or VPR Reflow)

Reference JEDEC Standard J-STD-020A APRIL 1999



Classification Reflow Profiles

	Convection or IR/ Convection	VPR
Average ramp-up rate(183°C to Peak)	3°C/second max.	10 °C /second max.
Preheat temperature 125 ± 25°C)	120 seconds max	
Temperature maintained above 183°C	60 – 150 seconds	
Time within 5°C of actual peak temperature	10 –20 seconds	60 seconds
Peak temperature range	220 +5/-0°C or 235 +5/-0°C	215-219°C or 235 +5/-0°C
Ramp-down rate	6 °C /second max.	10 °C /second max.
Time 25°C to peak temperature	6 minutes max.	

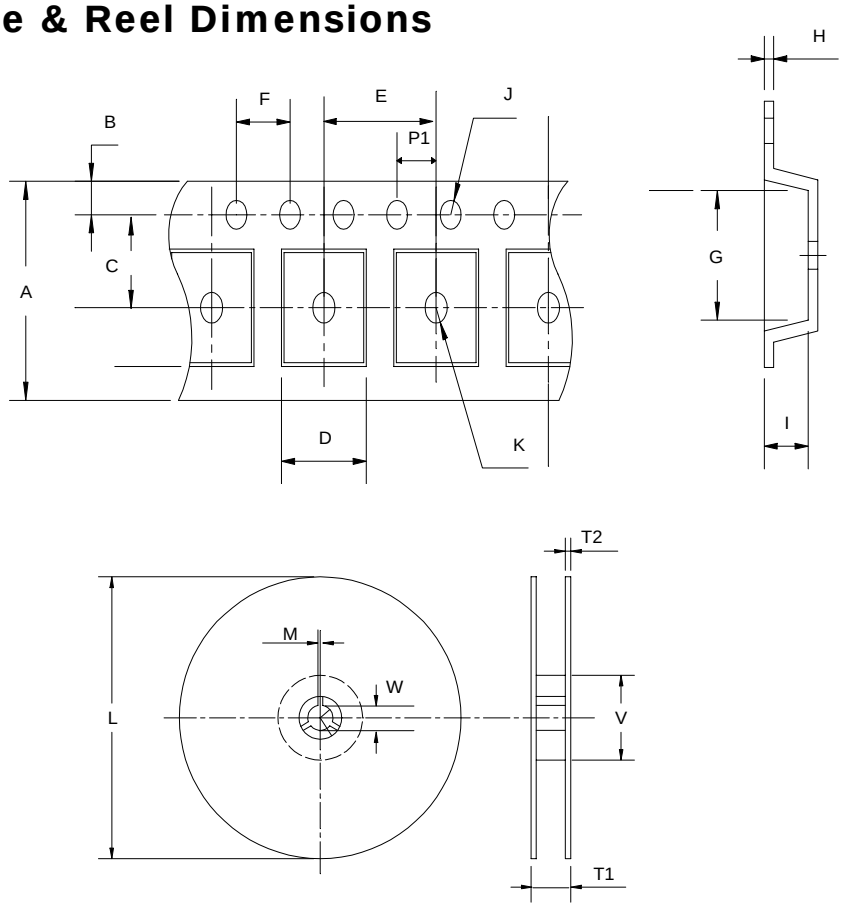
Package Reflow Conditions

pkg. thickness ≥ 2.5mm and all bgas	pkg. thickness < 2.5mm and pkg. volume ≥ 350 mm³	pkg. thickness < 2.5mm and pkg. volume < 350mm³
Convection 220 +5/-0 °C		Convection 235 +5/-0 °C
VPR 215-219 °C		VPR 235 +5/-0 °C
IR/Convection 220 +5/-0 °C		IR/Convection 235 +5/-0 °C

Reliability test program

Test item	Method	Description
SOLDERABILITY	MIL-STD-883D-2003	245°C , 5 SEC
HOLT	MIL-STD-883D-1005.7	1000 Hrs Bias @ 125 °C
PCT	JESD-22-B, A102	168 Hrs, 100 % RH , 121°C
TST	MIL-STD-883D-1011.9	-65°C ~ 150°C, 200 Cycles
ESD	MIL-STD-883D-3015.7	VHBM > 2KV, VMM > 200V
Latch-Up	JESD 78	10ms , I_{tr} > 100mA

Carrier Tape & Reel Dimensions



Application	A	E	B	C	J	K	F	P1	D
SOP 8N	12 + 0.3 12 - 0.1	8.0 ± 0.1	1.75± 0.1	5.5± 0.1	1.55± 0.1	1.5± 0.25	4.0 ± 0.1	2.0 ± 0.1	6.4 ± 0.1
Application	G	I	H	L	V	W	M	T1	T2
SOP 8N	5.2 ±0.1	2.1 ± 0.1	0.3±0.013	330±1	100±1	13+0.5 13 -0.1	2.2±0.1	12.5± 0.5	2.0 ± 0.2

(mm)

Cover Tape Dimensions

Carrier Width	12
Cover Tape Width	9.3

(mm)