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TP6902

USB Audio Controller

DATA SHEET

Rev 1.6

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AMENDMENT HISTORY

Version	Date	Description
V1.0	Apr, 2005	New release
V1.1	July, 2005	Modify SOP, Skinny DIP to HSOP.
V1.2	Jan, 2008	Modify PIN DESCRIPTION in FEATURE section
V1.3	Mar, 2008	Omit the contents in ELECTRICAL PARAMETER about Maximum Audio Output Current per Channel @4ohm Load
V1.4	Jan, 2012	Add Ordering Information table.
V1.5	Aug, 2016	Add Ordering Information table (p8)
V1.6	Apr, 2017	Modify Package Information (p11)

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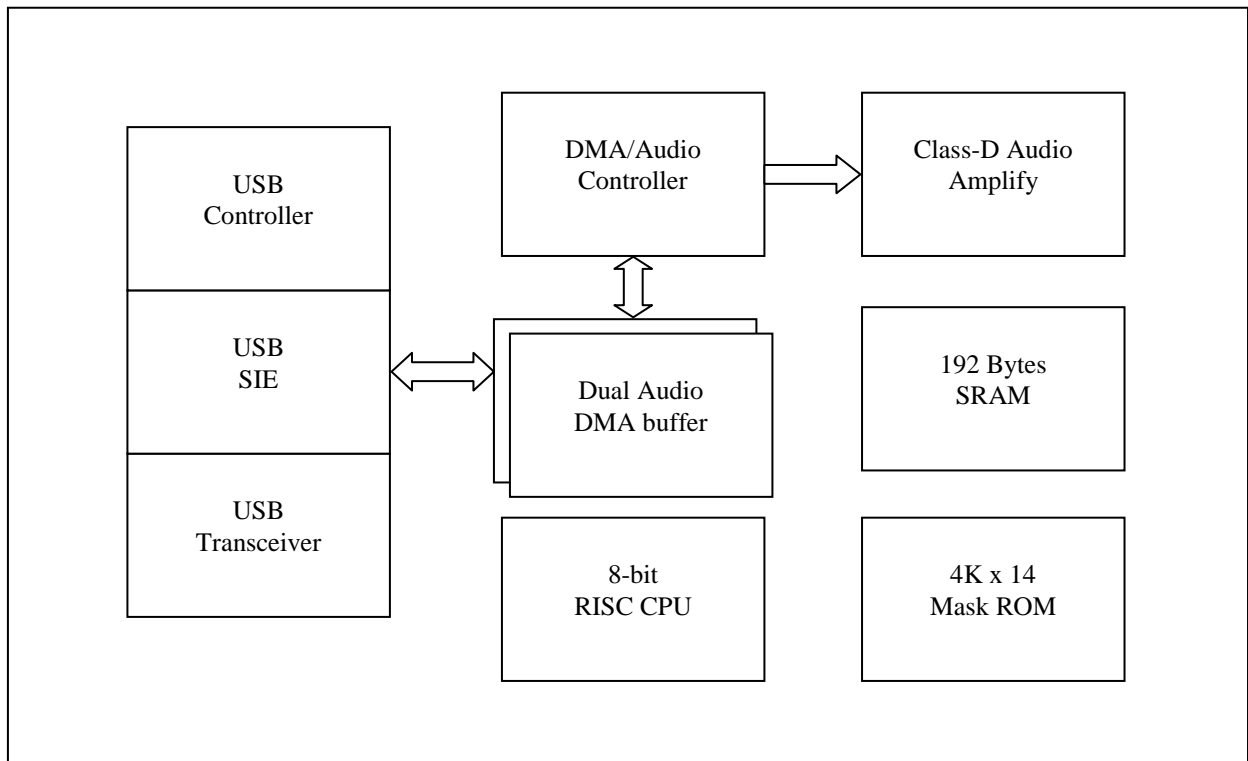
GENERAL DESCRIPTION

The TP6902 is an 8-bit micro-controller embedded device tailored to the USB audio application. It is able to play two channels PC audio through Full-Speed USB bus.

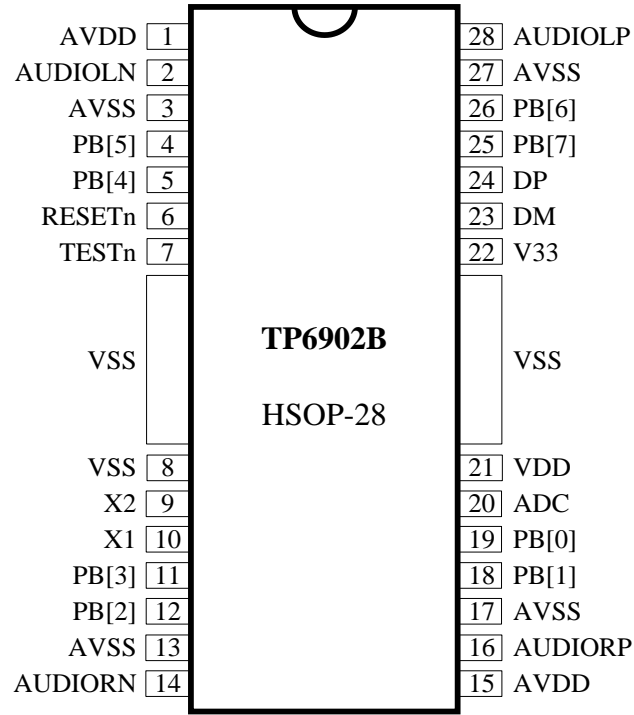
FEATURE

- Compliance with the Universal Serial Bus specification v2.0 Full-Speed
- Built-in USB Transceiver & 3.3V Regulator
- Isochronous transfer with adaptive synchronization
- High performance 48 KHz sampling rate for audio playback
- Two channel audio Class-D Amplify for speaker driving
- Support USB Suspend function
- 24MHz crystal oscillation
- 28 pin package

BLOCK DIAGRAM



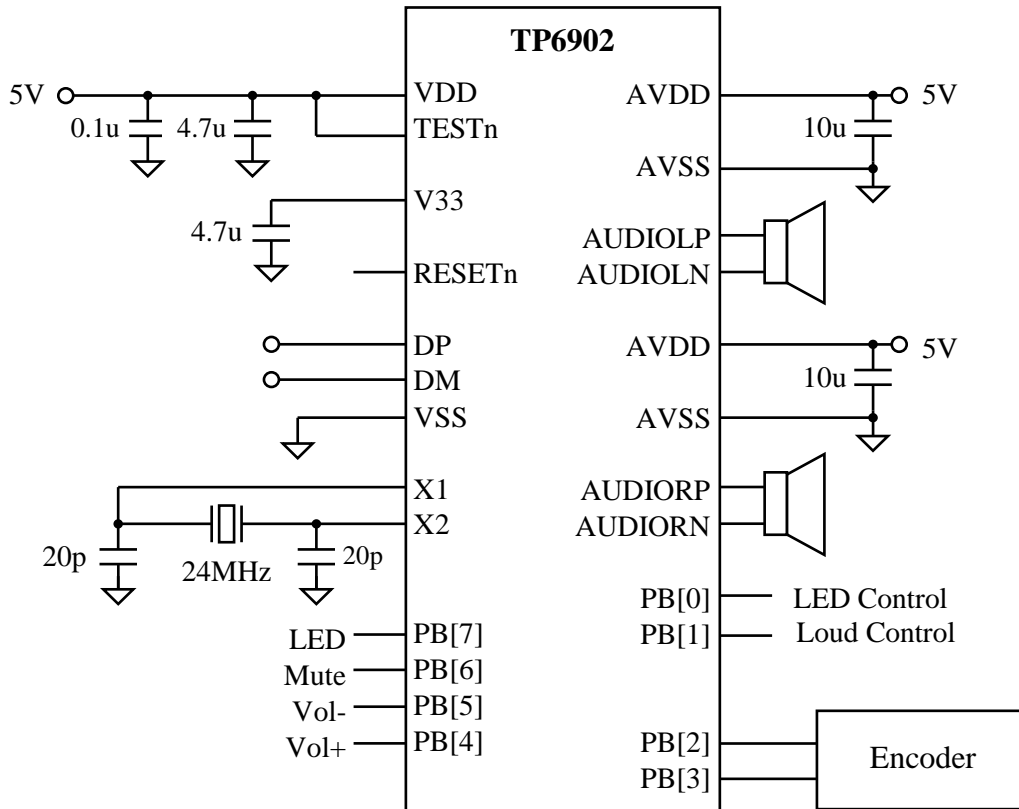
PIN ASSIGNMENT DIAGRAM



PIN DESCRIPTION

Name	I/O	Description
V33	O	3.3V Regulator output
VSS	P	Ground
VDD	P	5V Power from USB cable
ADC	I	Volume table control
X1	I	Crystal in (24 MHz)
X2	O	Crystal out
RESETn	I	Chip reset (active low)
TESTn	I	Test Mode control (active low)
DP	I/O	USB positive data signal
DM	I/O	USB negative data signal
AVDD	P	5V Power for Audio output
AVSS	P	Ground for Audio output
AUDIOLP	O	Audio output
AUDIOLN	O	Audio output
AUDIORP	O	Audio output
AUDIORN	O	Audio output
PB[7:0]	I/O	General purpose I/O (Pseudo Open Drain)

APPLICATION CIRCUIT



ABSOLUTE MAXIMUM RATINGS

GND=0V

Name	Symbol	Range	Unit
Maximum Supply Voltage	VDD	-0.3 to 5.5	V
Maximum Input Voltage	Vin	-0.3 to VDD +0.3	V
Maximum output Voltage	Vout	-0.3 to VDD +0.3	V
Maximum Operating Temperature	Topg	-20 to +70	°C
Maximum Storage Temperature	Tstg	-25 to +125	°C

OPERATING CONDITION

at Ta= -20°C to 70°C, GND=0V

Name	Symb.	Min.	Typ.	Max.	Unit
Supply Voltage	VDD5	4.5		5.5	V
Input "H" Voltage	Vih	4.0		5.5	V
Input "L" Voltage	Vil	0		0.8	V
Crystal frequency	Fosc		24		MHz

ELECTRICAL PARAMETER

at Ta= -20°C to 70°C, GND=0V

Name	Symb.	Typ	Unit
Maximum Audio Output Current per Channel @8ohm Load	Iout	346	mA

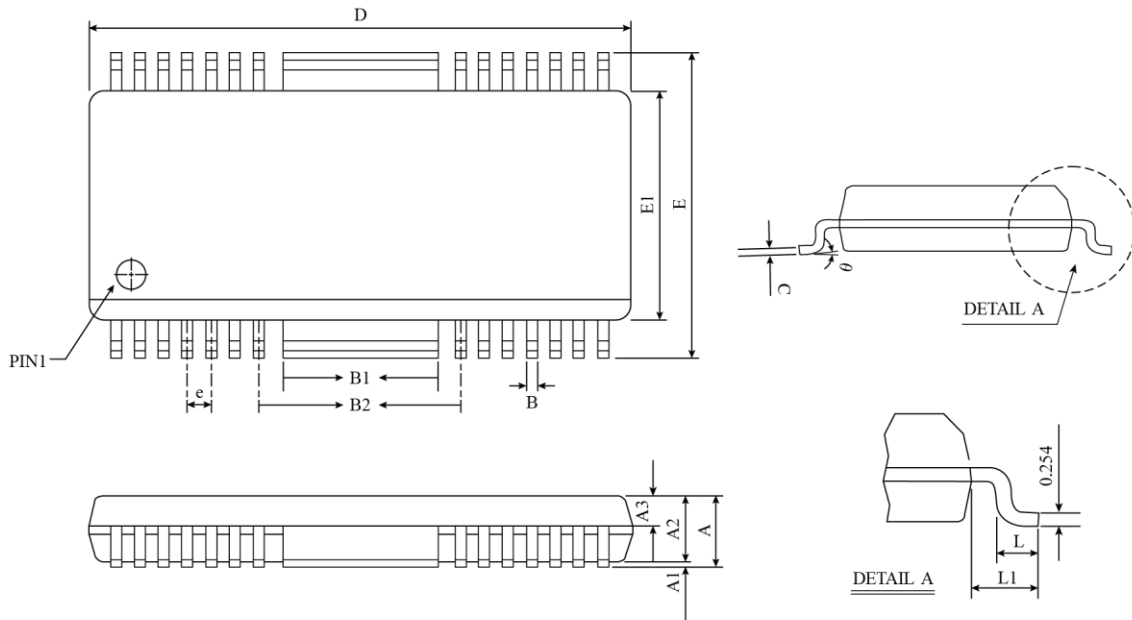
DC ELECTRICAL CHARACTERISTICS:

at Ta= -25°C, VDD5=5.0V, VSS=0V, Fosc=24 MHz

Name	Symb.	Min.	Typ.	Max.	Unit	Condition	Note
Operating current	Icc		40		mA	Fosc=24 MHz	Audio playing
Suspend current	Isus		300		uA		
PB Output High Voltage	Vboh1		4.5		V	Ioh=4 mA	Only one clock time
	Vboh2		4.0		V	Ioh=40 uA	
PB Output Low Voltage	Vbol		0.4		V	Iol=10 mA	
Audio Output High Voltage		4.0			V	Ioh=200 mA	Max. scale volume
Audio Output Low Voltage				0.8	V	Iol=200 mA	Max. scale volume
V33 output voltage	V3o	3.2		3.4	V	VDD5= 5V	

PACKAGE INFORMATION

HSOP-28 (300mil) Package Dimension



SYMBOL	DIMENSION IN MM			DIMENSION IN INCH		
	MIN	NOM	MAX	MIN	NOM	MAX
A	-	-	2.7	-	-	1.063
A1	0.05	-	0.20	0.020	-	0.079
A2	2.25	2.30	2.35	0.886	0.906	0.925
A3	0.97	1.02	1.07	0.382	0.402	0.421
B	0.34	-	0.42	0.134	-	0.165
B1	5.15 BCS			2.028 BCS		
B2	6.40 BCS			2.520 BCS		
C	0.25	-	0.31	0.098	-	0.122
D	17.73	18.00	18.27	6.980	7.087	7.193
E	9.90	10.10	10.30	3.898	3.976	4.055
E1	7.30	7.50	7.70	2.874	2.953	3.031
e	0.80 BSC			0.315 BSC		
L	0.55	-	0.85	0.217	-	0.335
L1	1.30 REF			0.051 REF		
θ	0°	-	8°	0°	-	8°