

# TP6902

## USB Audio Controller

### Data Sheet

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## **AMENDMENT HISTORY**

<b>Version</b>	<b>Date</b>	<b>Description</b>
V1.0	April, 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.

# **CONTENTS**

**AMENDMENT HISTORY.....2**

**GENERAL DESCRIPTION.....4**

**FEATURE.....4**

**BLOCK DIAGRAM.....4**

**PIN DESCRIPTION .....5**

**PIN ASSIGNMENT .....5**

**APPLICATION CIRCUIT .....6**

**ABSOLUTE MAXIMUM RATINGS.....7**

**ABSOLUTE MAXIMUM RATINGS.....7**

**OPERATING CONDITION .....7**

**ELECTRICAL PARAMETER .....7**

**DC ELECTRICAL CHARACTERISTICS:.....7**

**PACKAGE INFORMATION.....8**

**Ordering Information.....8**

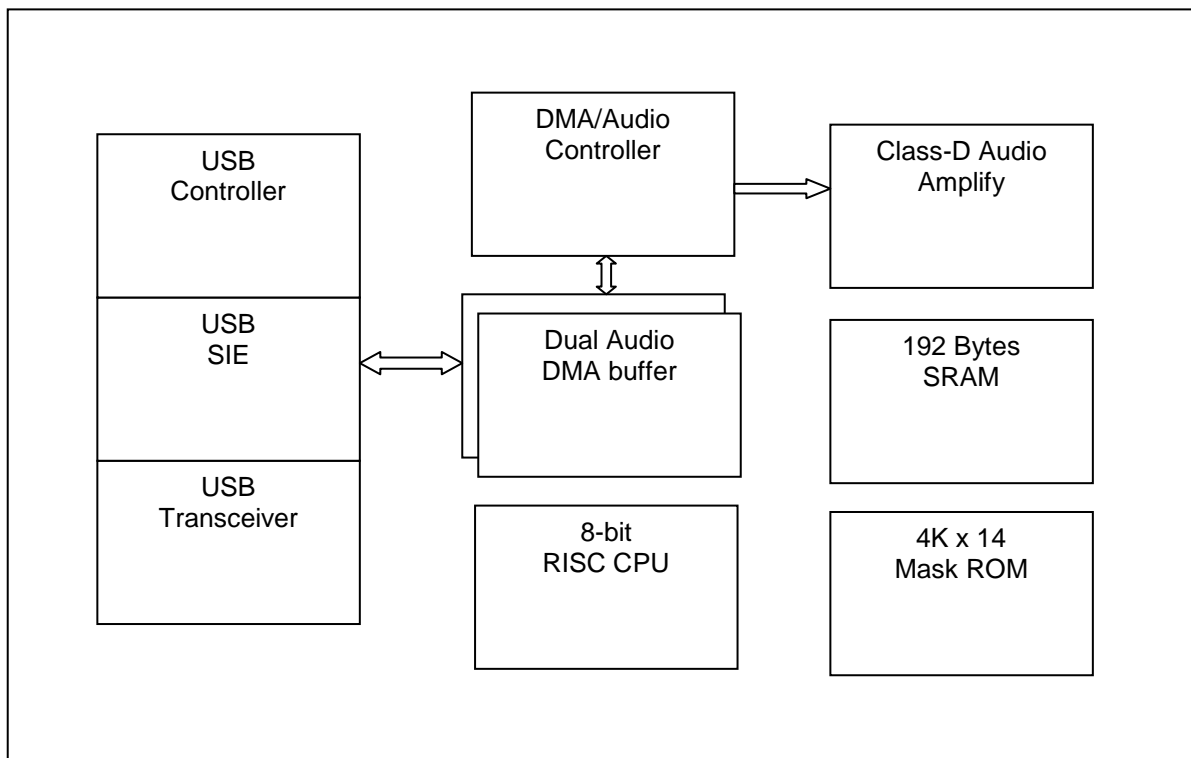
## GENERAL DESCRIPTION

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 48KHz sampling rate for audio playback
- Two channel audio Class-D Amplify for speaker driving
- Support USB Suspend function
- 24MHz crystal oscillation
- 28 pin package

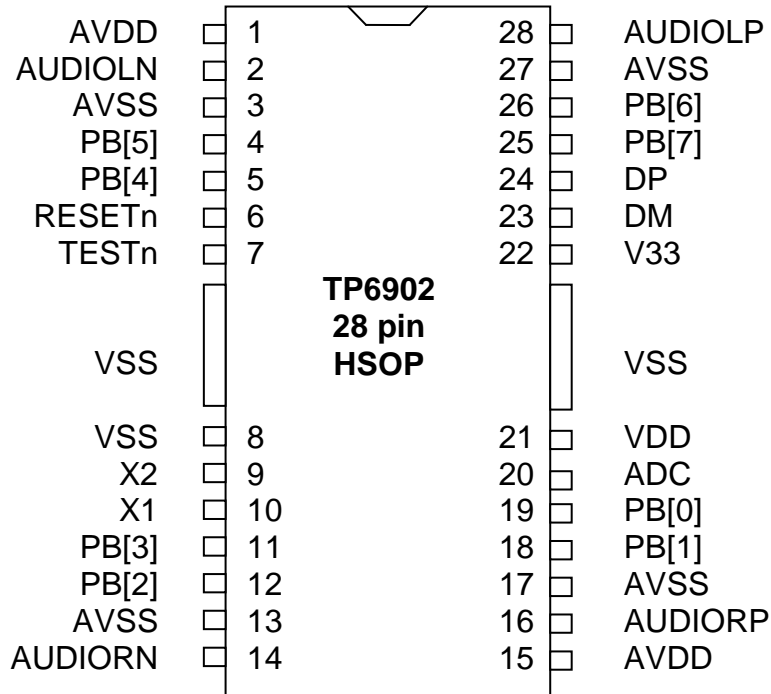
## BLOCK DIAGRAM



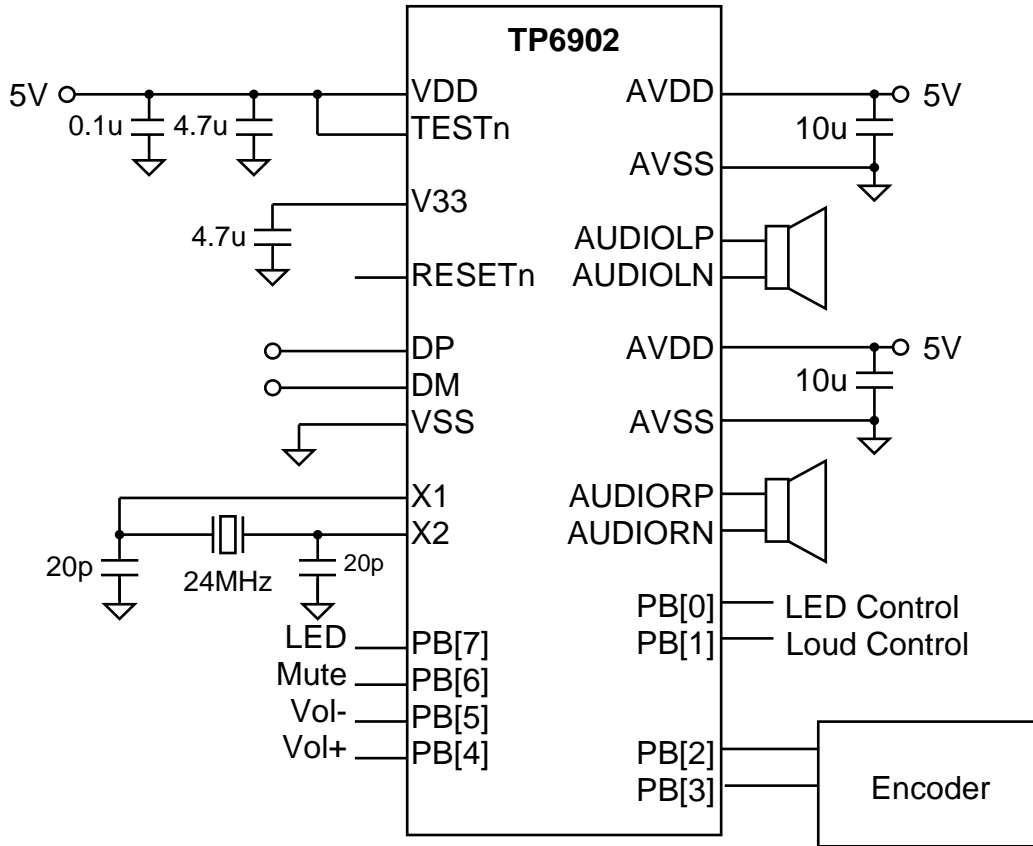
**PIN DESCRIPTION**

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 (24MHz)
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)

**PIN ASSIGNMENT**



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

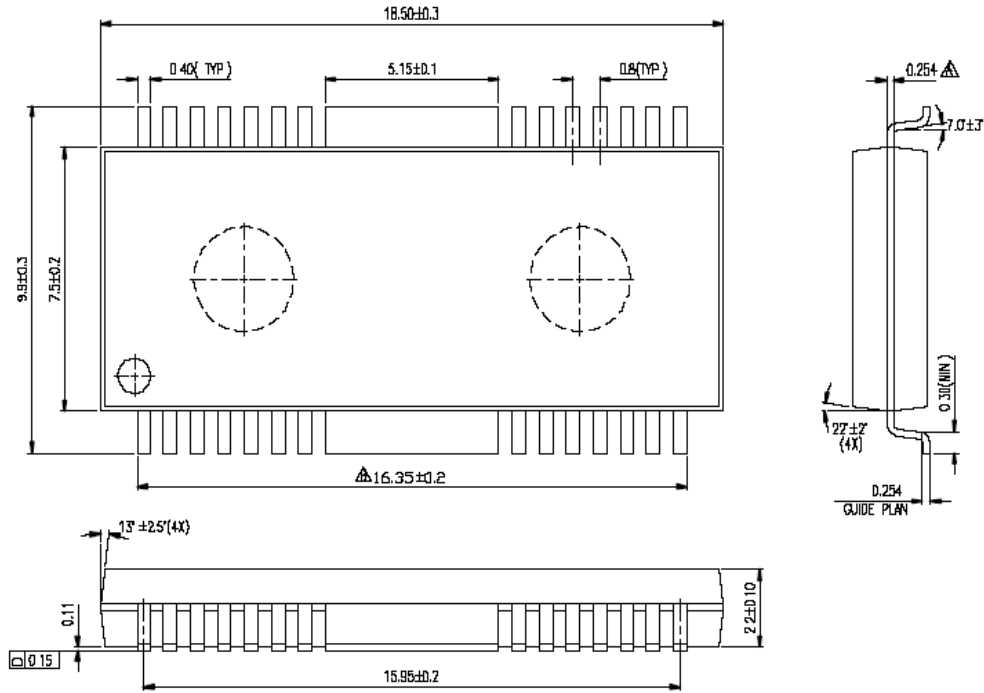
**DC ELECTRICAL CHARACTERISTICS:**

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

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

PACKAGE INFORMATION

- HSOP 300mil



△\*NOTES : DIMENSION "D" DOES NOT INCLUDE MOLD FLASH ,  
PROTRUSIONS OR GATE BURRS.  
MOLD FLASH , PROTRUSIONS OR GATE BURRS SHALL  
NOT EXCEED 0.15 MM PER SIDE

TITLE HSOP 28L PACKAGE OUTLINE BODY WIDTH : 300 MIL		UNIT	MM	QTY	
DESIGNED	SANDY CHEN 97.12.05	CHECKED	C.C. CHO 97.12.06	APPROVED	C.C. CHO 00.01.20
FILE NAME	P4F028P1				
ANGULAR	± 1°	ROUGHNESS	✓	SCALE	1D 1

Ordering Information

The ordering information:

Ordering number	Package
TP6902-201-54-X	HSOP 28-pin (300 mil)

Note: "-X" represents the package material:

- Package material: Pb-free Code: W
- Package material: Green Package Code: G