



十速科技股份有限公司
tenx technology inc.

TP6930

USB Speaker Controller

Data Sheet

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AMENDMENT HISTORY

Version	Date	Description
V1.0	July, 2011	New release
V1.1	Mar, 2012	Modify Feature description and pin assignment definition in Application Circuit.
V1.2	June, 2012	Modify Application Circuit and Electrical Parameter and Characteristics.
V1.3	July, 2012	Add ordering information.

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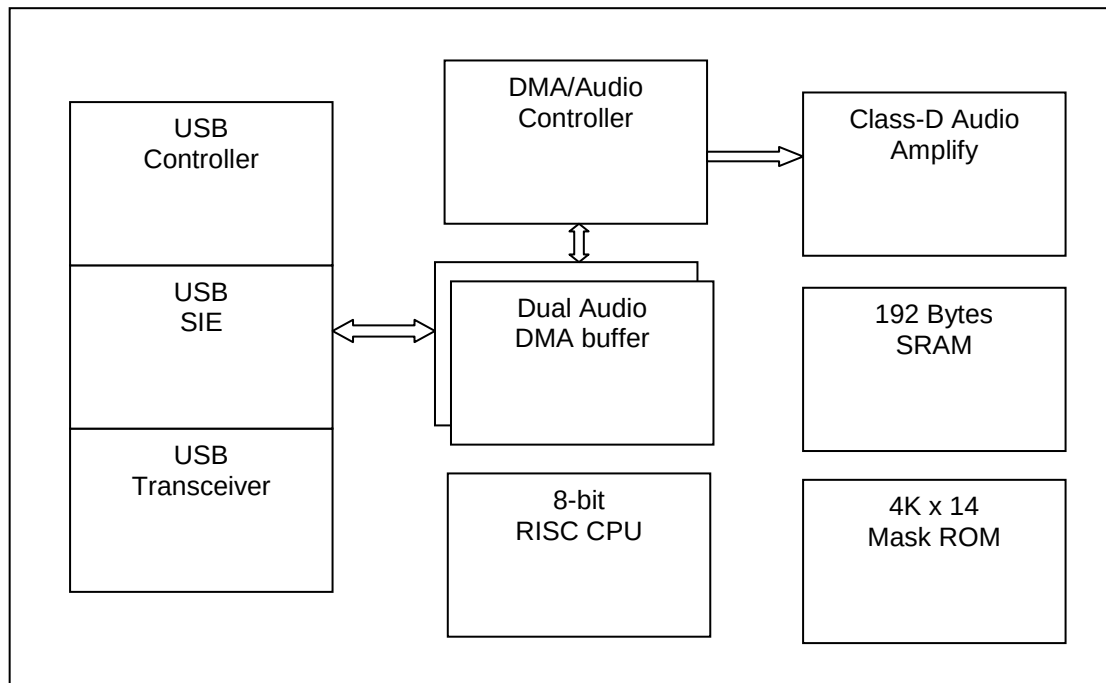
GENERAL DESCRIPTION

The TP6930 is an 8-bit microcontroller 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 and 44.1 KHz sampling rate for audio playback
- Two channels audio Class-D Amplify for speaker driving
- 64-level volume control
- Key pad control for mute, volume up and volume down
- Support USB Suspend function
- 24 MHz crystal oscillation
- 28/20-pin package

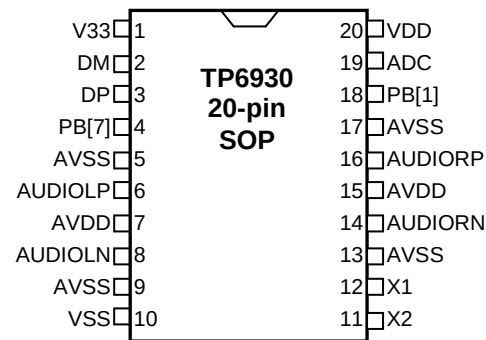
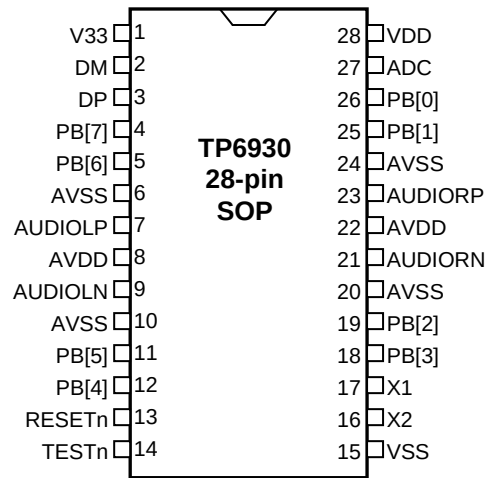
BLOCK DIAGRAM



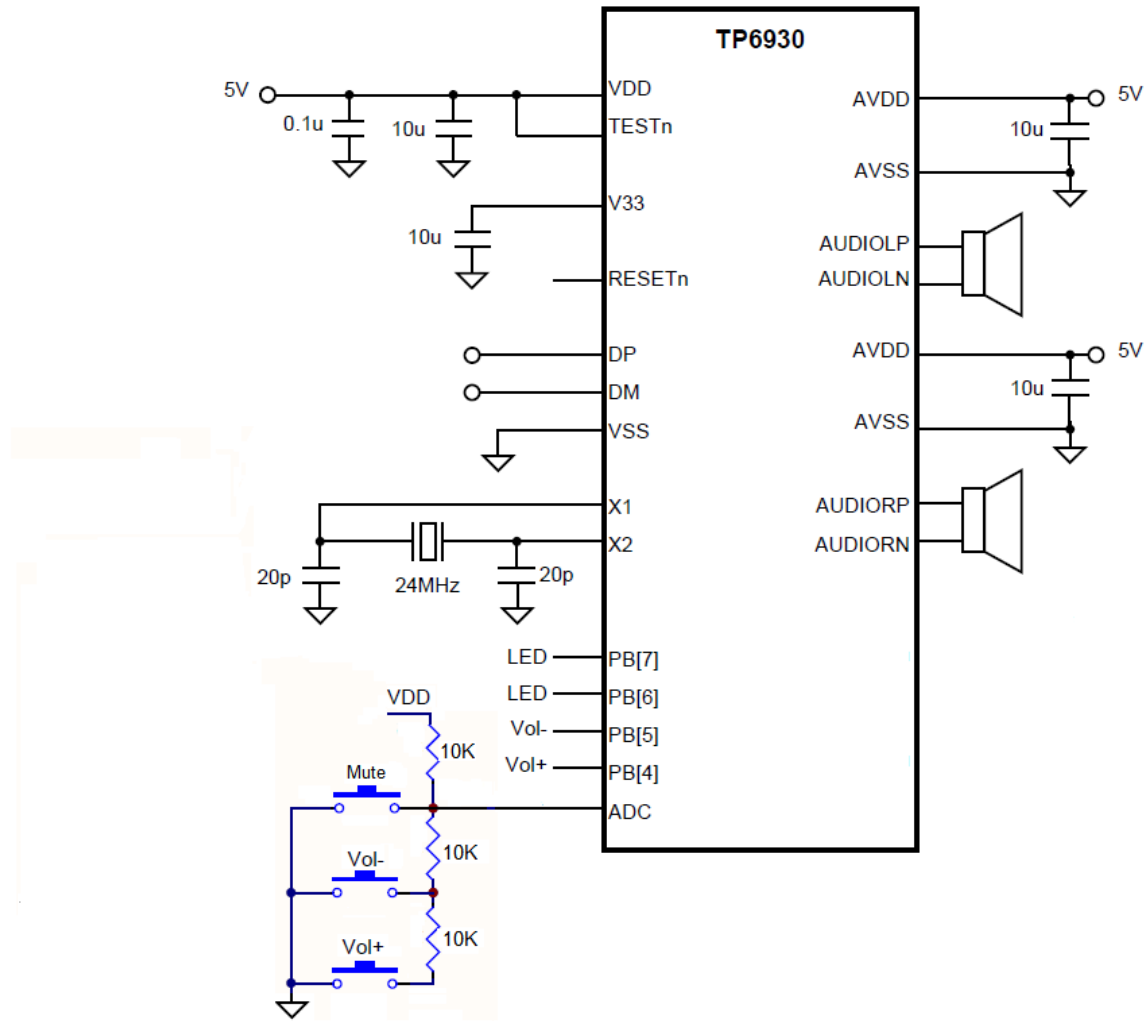
PIN DESCRIPTION

Name	I/O	Description
V33	O	3.3V Regulator output
VSS	P	Ground
VDD	P	5V Power from USB cable
ADC	I	VR input for volume adjustment
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)

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	VDD	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.	Max	Unit
Maximum Audio Output Current @ 4 ohm Load	Iout	250	mA
Maximum Audio Output Current @ 8 ohm Load	Iout	200	mA

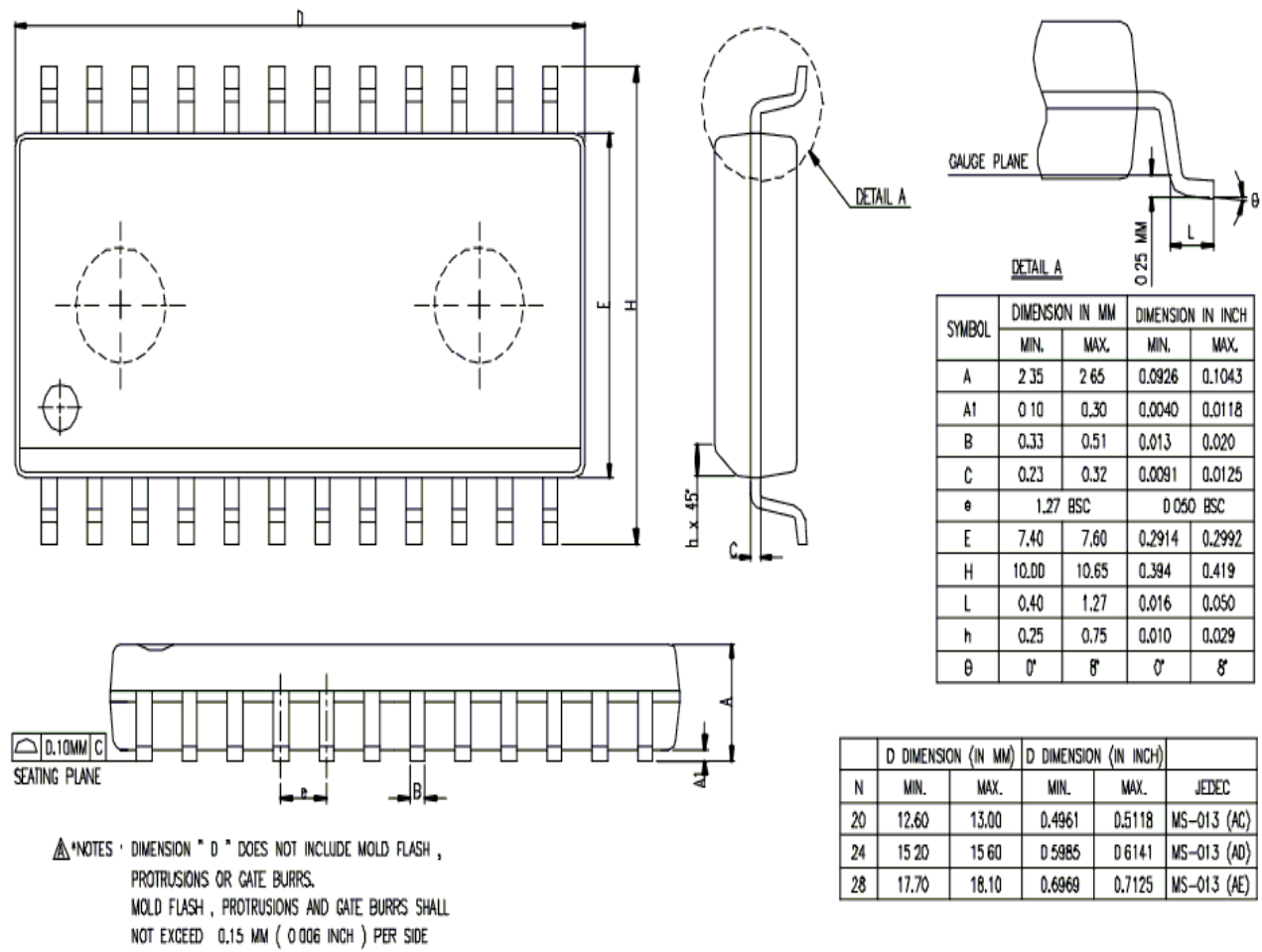
DC ELECTRICAL CHARACTERISTICS

At Ta=-25 °C, VDD=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 = 150 mA	Max. scale volume
Audio Output Low Voltage				0.8	V	Iol = 150 mA	Max. scale volume
V33 output voltage	V3o	3.2		3.4	V	VDD=5V	

PACKAGE INFORMATION

a. 300 mil SOP-20/SOP-28



Ordering Information

The ordering information:

Ordering number	Package
TP6930-COD-23-X	SOP 28-pin (300 mil)
TP6930-COD-21-X	SOP 20-pin (300 mil)

Note: “-X” represents the package material:

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