TE7022L

USB 2.0 Full-Speed

Hi-Q USB Audio Streaming Controller

Revision v2.1

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Galaxy Far East Corporation

1. Features

- USB 2.0 Full-Speed compliant supported USB Audio Class 1.0
- 16/24 bit Resolutions supported
- 8/16/32/44.1/48/96 KHz sampling rates supported
- 2-input channels and 2-output channels supported by one I2S pairs with independent sample rate
- Built in IEC60958 professional S/PDIF TX & RX, AES/EBU supported
- 8 GPIO pins with interrupt
- Built-in ROM for USB descriptor (support up to 16-bit/48KHz)
- Two-wire MPU interface
- Built in 1.8V LDO for core voltage
- 3.3V Operation Voltage
- 0.18 um CMOS process
- LQFP-48 package
- Sony Green Partner

2. Applications

- Musical Instrument
- USB Sound Box
- Digital Audio Mastering
- USB Speaker

3. Overview

The TE7022L is a versatile, USB 2.0 Full-Speed compliant Audio Streaming Controller. It features one independent stereo playback and recording pairs and one IEC60958 S/PDIF receive and transmit streaming pair with independent volume control. Two USB audio devices are built in the TE7022L that makes it ideal for both 2-in and 2-out professional digital audio interface applications and increasing demand of PC entertainment requires dual audio/voice applications. Its resolution and sampling rate can be configured up to 24-bit and 96 KHz respectively.

Due to 12Mbps bandwidth limitation of the USB full speed operation, only one I2S input or output can be set for 24bit/96KHz application, under this condition, for simultaneous multiple-channel applications, rest of I2S interfaces has to be configured at the combination of 16-bit / 48KHz, 16-bit/96KHz and even lower resolution/sampling rate. In the application of USB internet telephony, lower resolution and sampling rate are needed.
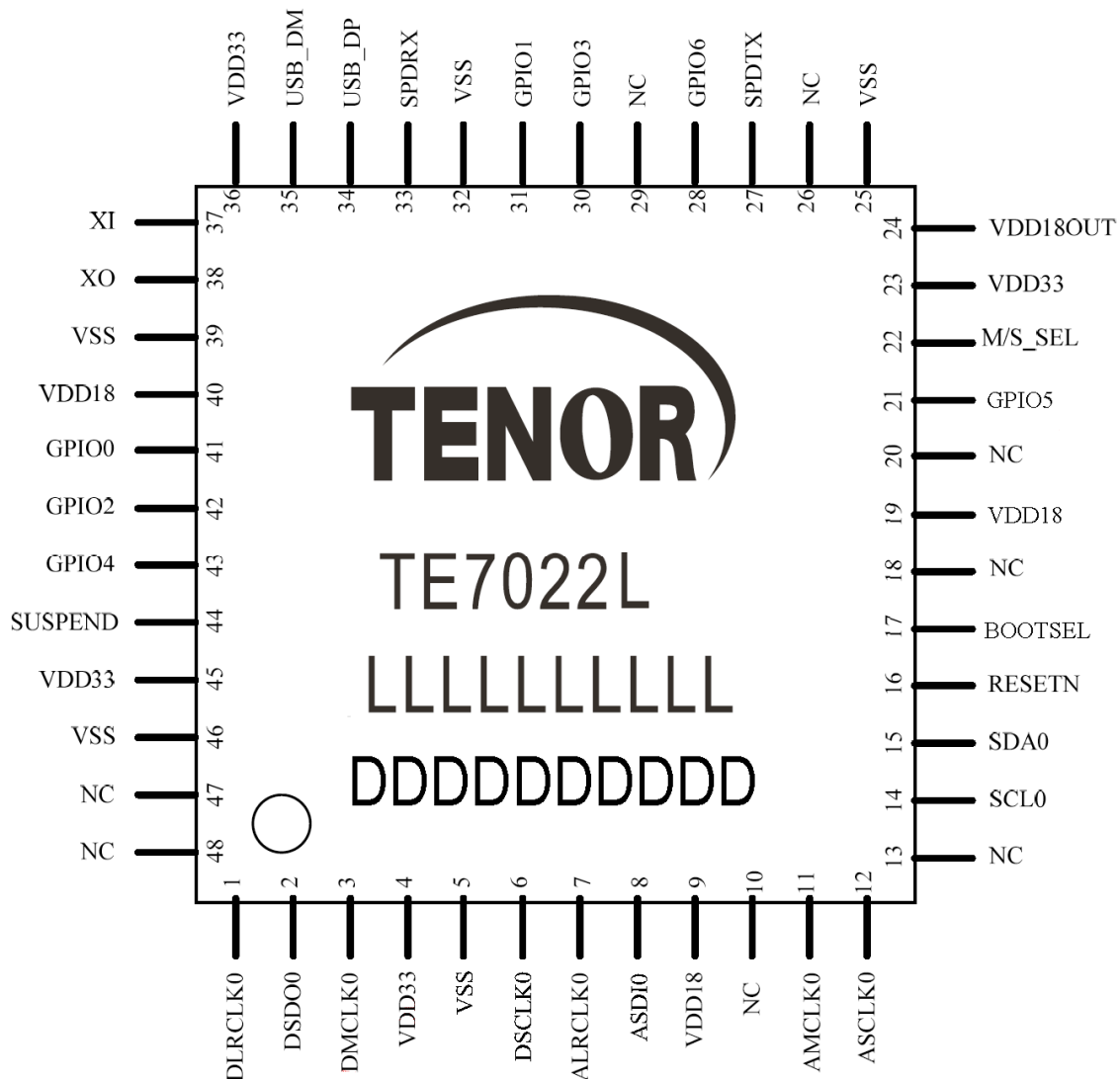
4. Blocks Diagram
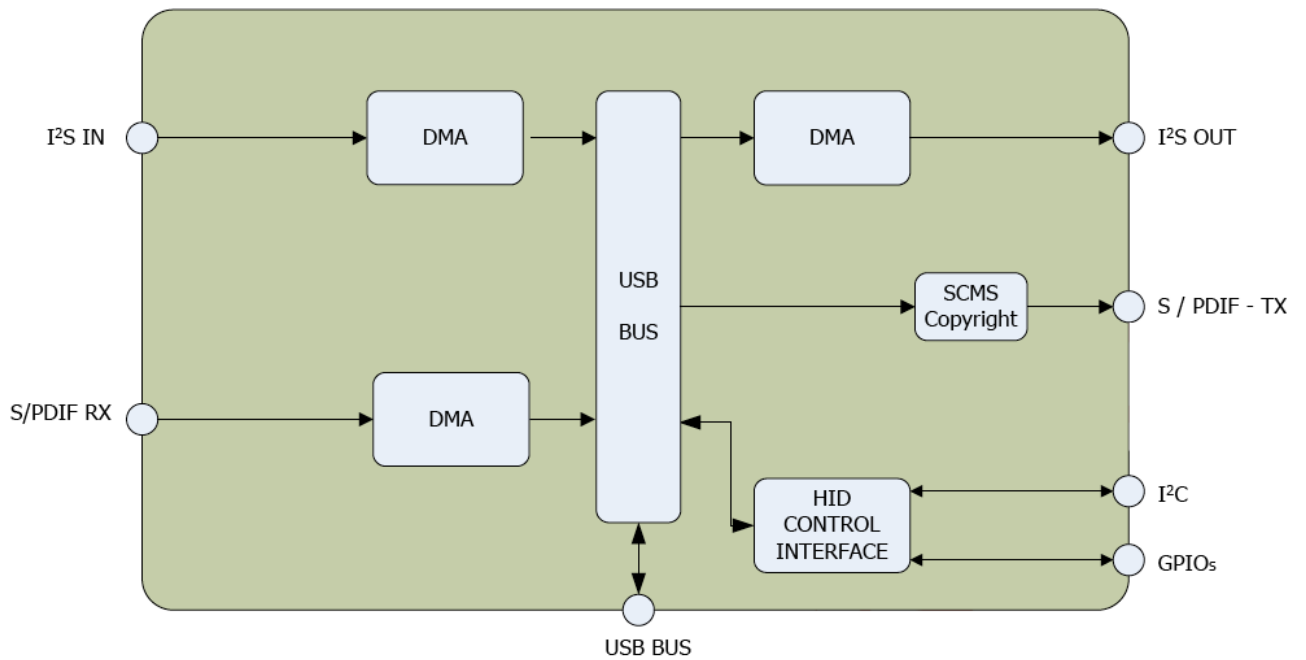
■ **Standard Operation Modes**

- USB to SPDIF TX
- USB to I2S Output (connect to DAC)
- SPDIF RX to USB
- I2S Input to USB   (I2S connect to ADC)

5. Pin Configuration

■ Pin Lists

Pin	Symbol	Pin	Symbol	Pin	Symbol	Pin	Symbol
1	DLRCLK0	13	NC	25	VSS	37	XI
2	DSDO0	14	SCL0	26	NC	38	XO
3	DMCLK0	15	SDA0	27	SPDTX	39	VSS
4	VDD33	16	RESETN	28	GPIO6	40	VDD18
5	VSS	17	BOOTSEL	29	NC	41	GPIO0
6	DSCLK0	18	NC	30	GPIO3	42	GPIO2
7	ALRCLK0	19	VDD18	31	GPIO1	43	GPIO4
8	ASDI0	20	NC	32	VSS	44	SUSPEND
9	VDD18	21	GPIO5	33	SPDRX	45	VDD33
10	NC	22	M/S_SEL	34	USB_DP	46	VSS
11	AMCLK0	23	VDD33	35	USB_DM	47	NC
12	ASCLK0	24	VDD18OUT	36	VDD33	48	NC

6. Package Dimensions
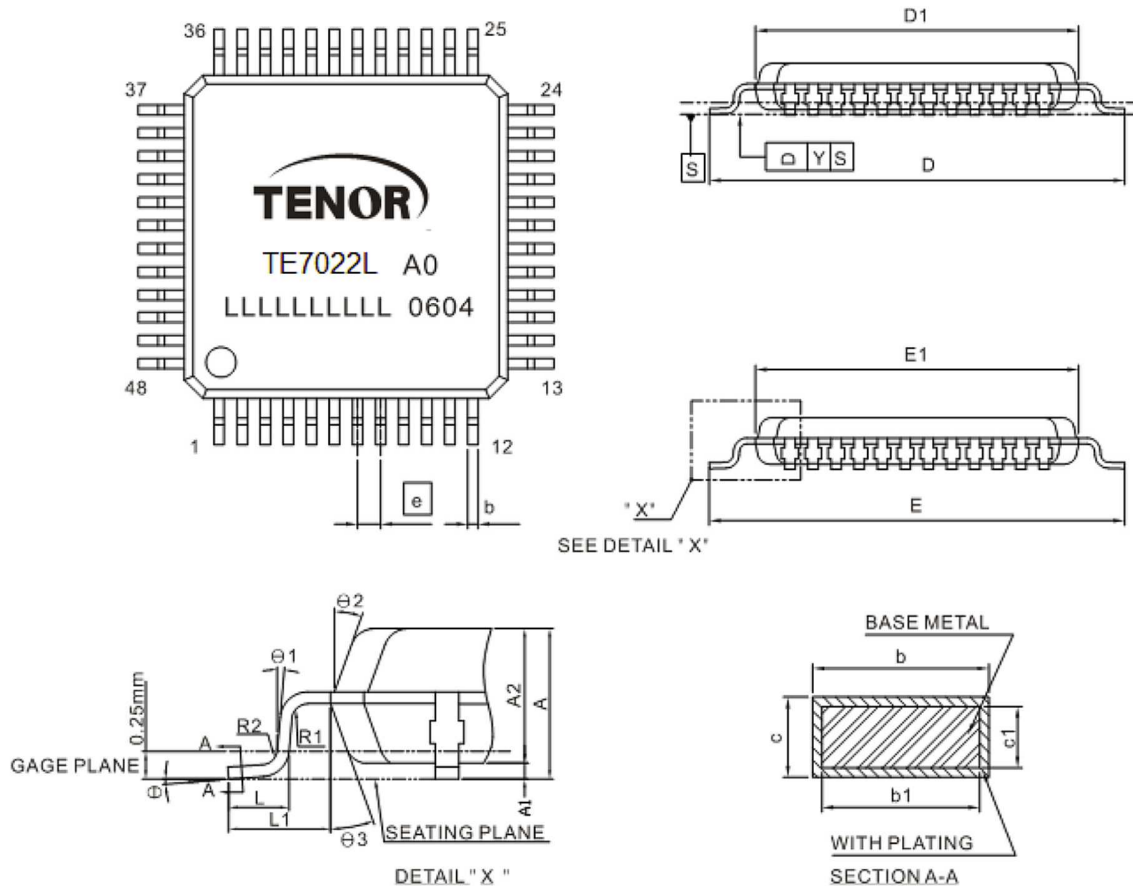
SYMBOL	DIMENSION(MM)			DIMENSION(NIL)		
	Min.	Nom.	Max.	Min.	Nom.	Max.
A			1.60			63
A1	0.05		0.15	2		6
A2	1.35	1.40	1.45	53	55	57
b	0.17	0.22	0.27	7	9	11
b1	0.17	0.2	0.23	7	8	12
c	0.09		0.2	4		8
c1	0.09		0.16	4		6
D	9.00 BSC			354 BSC		
D1	7.00 BSC			276 BSC		
	9.00 BSC			354 BSC		
E1	7.00 BSC			276 BSC		
e	0.35	0.50	0.65	14	20	26
L	0.45	0.60	0.75	18	24	30
L1	1.00REF			39 REF		
R1	0.08			3		
R2	0.08		0.20	3		8
Y			0.075			3
θ	0°	3.5°	7˚	0°	3.5°	7˚
θ1	0°			0°		
θ2	11°	12°	13˚	11°	12°	13˚
θ3	11°	12°	13˚	11°	12°	13˚

Note.

1. REFER TO JEDEC MS-026 / BBC

2. DIMENSION D1 AND E1 DO NOT INCLUDE MOLD PROTRUSION.

3. DIMENSION b DOES NOT INCLUDE DAMBER PRODTUSION. ALLOWABLE THE MAXIMUM b DIMENSION BY MORE THAN 0.08mm.

4. ALL DIMENSIONS IN MILLIMETERS.