MS2106

AV&S-Video to USB Convertor

DATA SHEET

General Description

MS2106 is a video & audio processor chip. It can convert AV&S-Video signals to USB signal. It also can covert audio signal to USB signal, USB Video and Audio signals follow UVC and UAC protocol. It can play or recorded Video and Audio signals through USB interface.MS2106 support both YUV and MJPEG mode, As the built-in MCU, using the ROM code and without driver installation, MS2106 is very simple to use.

Features

Video

- Supports AV full format video input: NTSC and PAL
- Supports S-Video full format video input NTSC and PAL
- Automatic format & interface detection
- De-interlace/Scalar Module
- Supports Brightness/Contrast/Saturation/Hue adjustment
- Supports both MJPEG and YUV422
  MJPEG mode output resolutions:
  720×480@25Hz/20Hz/15Hz/10Hz
  640×480@25Hz/20Hz/15Hz/10Hz
  480×320@25Hz
  YUV422 mode output resolution:
  480×320@25Hz

Audio

- On-chip audio ADC
- Supports external audio ADC
- USB UAC output 48kHz stereo

MCU

- On-chip 1T 8051 MCU
- On-chip ROM/RAM/IO/Timer
- Rom code included

USB2.0

- On-chip high speed USB function
- USB video followed UVC protocol
- USB audio followed UAC protocol

Clock

- Only one 12M crystal needed
- It can output 12.288M clock for external audio ADC

Power & Reset

- On-chip 3.3V&1.2V regulator
- On-chip power on reset

Package

- TQFP-48 plastic(7mm×7mm)
- PB-free and RoHS

Applications

- Security and protection monitoring
- Video & Audio record
- Medical
- Industrial Camera
- Car Camera

Table of Contents

Function Block Diagram

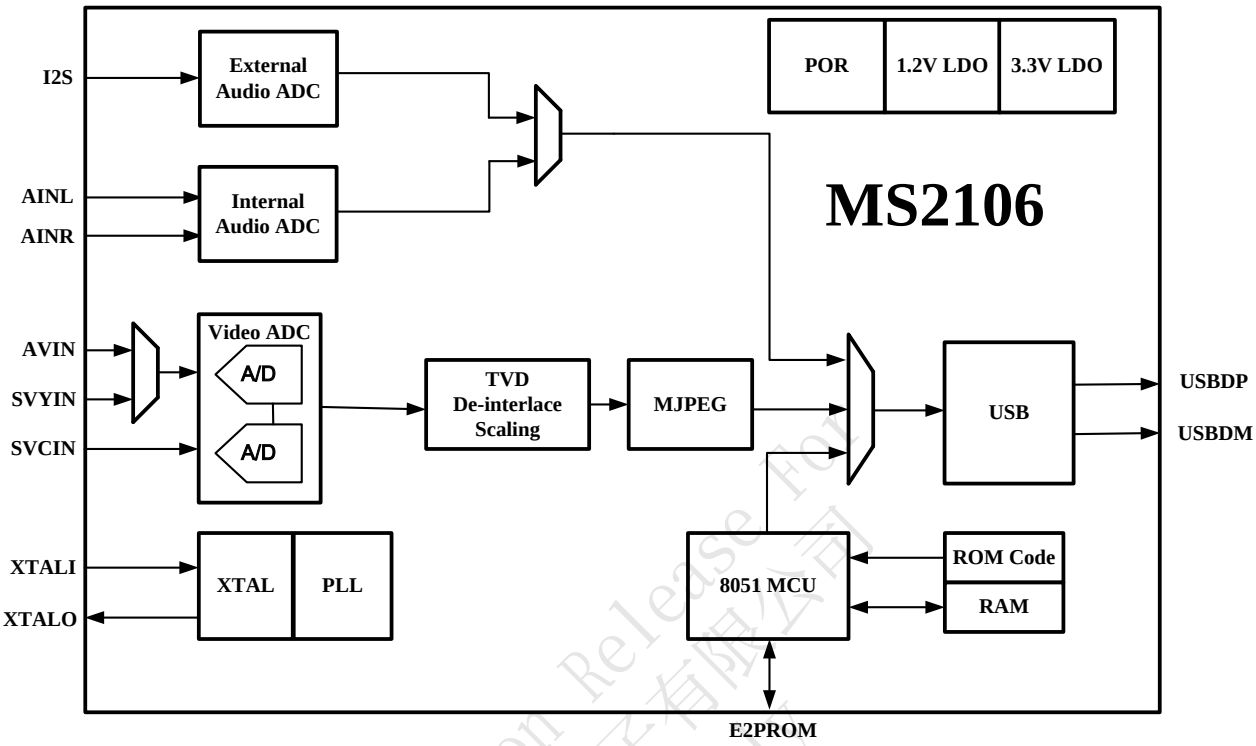

Figure 1. Function Block Diagram

Function Description

Audio

- MS2106 has 16 bits on-chip Audio ADC.
- MS2106 supports external Audio ADC through I2S interface.
- MS2106 followed USB UAC protocol, output 48kHz stereo sound.

On-chip Audio ADC Reference Circuit

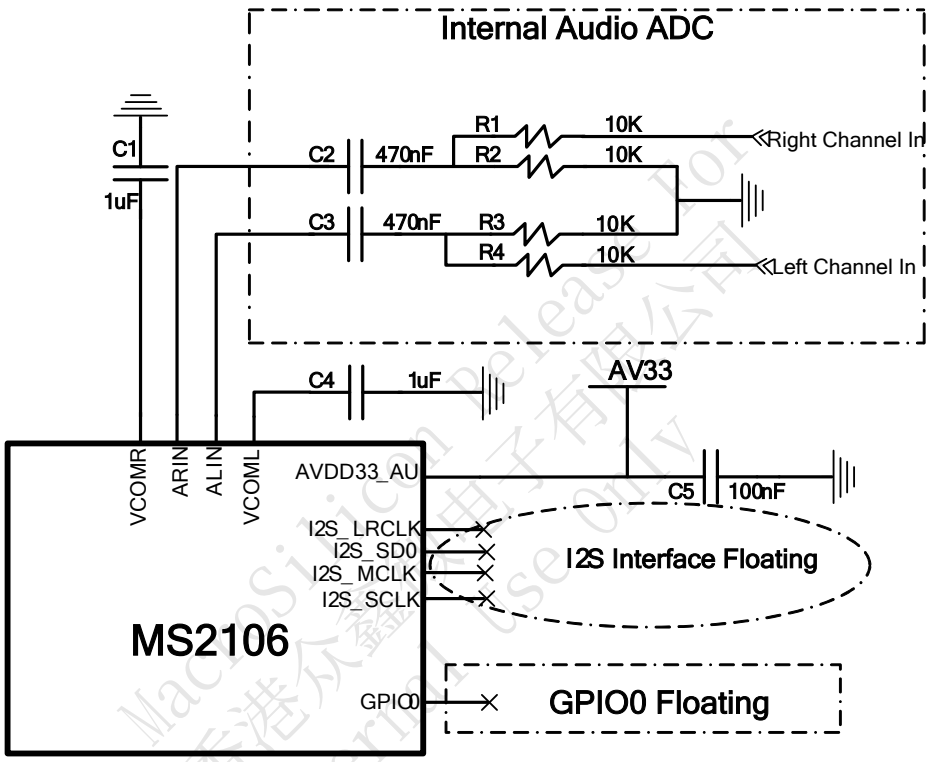

Figure 2. On-chip Audio ADC Reference Circuit

Note1:On-chip Audio ADC,GPIO0 need floating.

External Audio ADC Reference Circuit

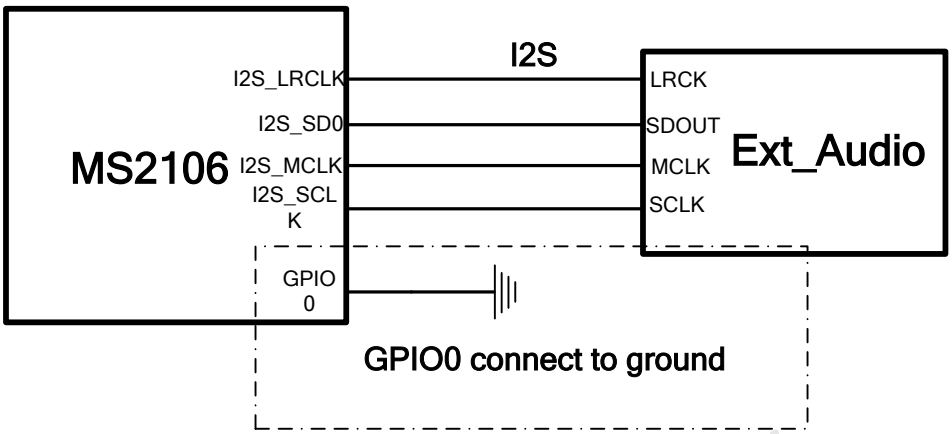

Figure 3. External Audio ADC Reference Circuit

Note2:External Audio ADC ,GPIO0 need connecting to ground.

Video

- MS2106 supports AV&S-Video full format video input. It can auto detect the valid signal, When AV&S-Video both have valid signals, the first plug in will be used and the later plug in will be ignored.
- MS2106 has On-chip decoder/De-interlace/Scalar Module.
- MS2106 supports Brightness/Contrast/Saturation/Hue adjustment.
- Output resolutions:

  MJPEG mode:
  - 720×480@25Hz/20Hz/15Hz/10Hz
  - 640×480@25Hz/20Hz/15Hz/10Hz
  - 480×320@25Hz

  YUV422 mode:
  - 480×320@25Hz

Video Block Diagram

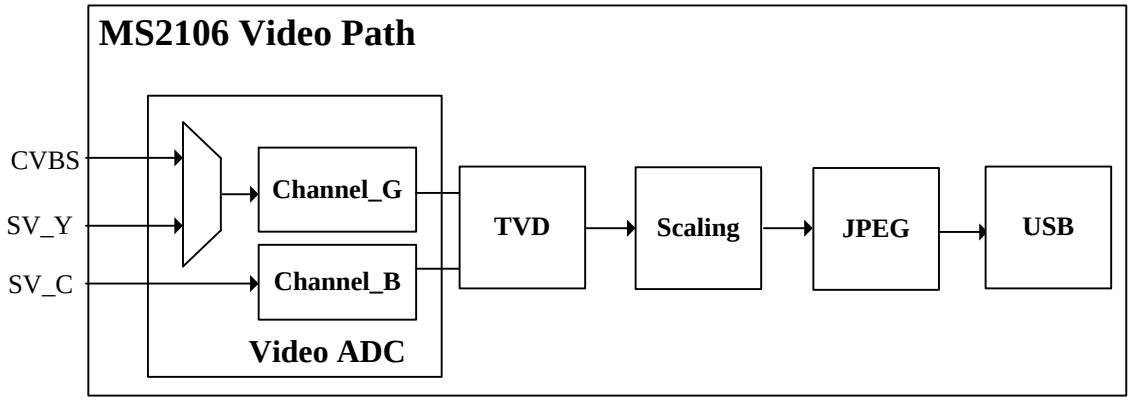

Figure 4. Video Block Diagram

PIN Map

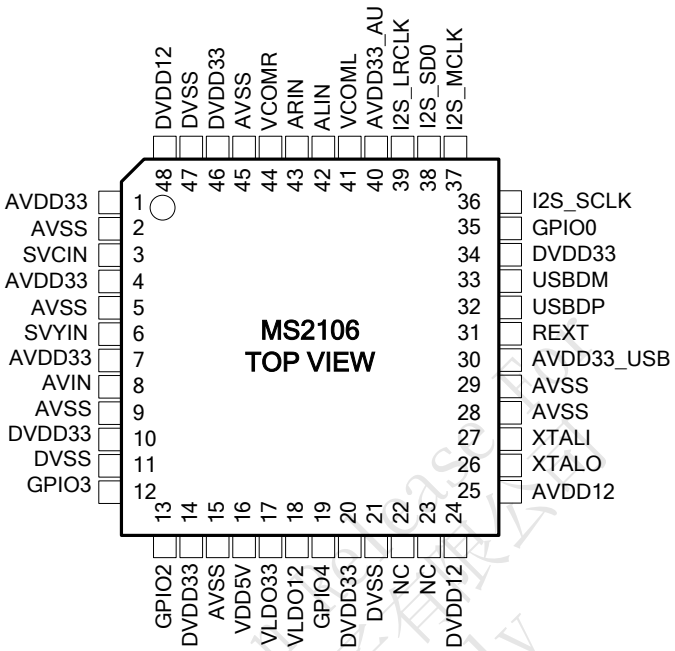

Figure 5. PIN MAP

PIN DESCRIPTION

Table 1. Pin Description

Pin Name	Pin #	Type	Description
Video ADC			
SVCIN	3	AI	S-Video C channel input
SVYIN	6	AI	S-Video Y channel input
AVIN	8	AI	CVBS input
Audio ADC			
I2S_SCLK	36	DI	I2S clock (48k)
I2S_MCLK	37	DO	12.288M Clock Output
I2S_SD0	38	DI	I2S data input
I2S_LRCLK	39	DI	I2S left/right channel select
VCOML	41	AO	Left channel VCOM
ALIN	42	AI	Left channel input
ARIN	43	AI	Right channel input
VCOMR	44	AO	Right channel VCOM
USB			
XTALO	26	AO	12M crystal output
XTALI	27	AI	12M crystal input
REXT	31	AO	Connect 4.7k resister to ground
USBDP	32	DIO	USB differential signal D+
USBDM	33	DIO	USB differential signal D-
GPIO			
GPIO0	35	DIO	Audio ADC options: Connect to ground: external Audio ADC Floating: internal Audio ADC
GPIO2	13	DIO	Used as I2C(SCL)
GPIO3	12	DIO	Used as I2C(SDA)
GPIO4	19	DIO	General purpose IO
System Power & Ground			
VDD5V	16	P	Power (5V)
AVSS	2,5,9,15,28,29,45	G	Ground(Analog)
VLDO33	17	P	Power (LDO 3.3V out)
VLDO12	18	P	Power (LDO 1.2V out)
DVDD12	24,48	P	Power (1.2V)
AVDD12	25	P	Power (1.2V)
DVDD33	10,14,20,34,46	P	Power (Digital 3.3V)
AVDD33	1,4,7	P	Power(Video ADC 3.3V)
AVDD33_AU	40	P	Analog Power (Audio ADC 3.3V)
AVDD33_USB	30	P	Analog Power (Audio ADC 3.3V)

Pin Name	Pin #	Type	Description
DVSS	11,21,47	G	Ground(Digital)

Table 2. Abbreviation of Pin Description

Abbreviation	Description
AI	Analog Input
AO	Analog Output
DI	Digital Input
DO	Digital Input
DIO	Digital Bi-direction
P	Power
G	Ground
NC	No Connect

Electrical Characteristics

Absolute Maximum Ratings

Table 3. Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Maximum Operating Voltage	VDD5V	5.5	V
Voltage On Any Pin With Respect to Ground	V_I	-0.5 to DVDD33+0.5	V
Ambient Operating Temperature	TA	0 to 70	℃
Storage Temperature	Tsto	-55 to +125	℃
ESD Ratings	Vsed		
Human Body Model		4000	V
Machine Model		200	V

Note4: Stresses beyond those listed under “Absolute Maximum Ratings” may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or other conditions beyond those indicated in the operational sections of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability. (ESD Ratings condition: GND = 0V，TA = +25°C unless otherwise noted)

ESD CAUTION: Electrostatic charges accumulate on the human body and test equipment and can discharge without detection. Although this product features has dedicated ESD protection circuitry, permanent damage may occur on devices subjected to high energy electrostatic discharges. Therefore, proper ESD precautions are recommended to avoid performance degradation or loss of functionality.

DC Characteristics

Table 4. DC Characteristics

Parameter	MIN	Typical	MAX	Unit	Condition
VDD5V	4.5	5.0	5.5	V	GND = 0V，TA = +25°C unless otherwise noted
DVDD33	3.0	3.3	3.6	V	
AVDD33	3.0	3.3	3.6	V	
DVDD12	1.08	1.2	1.32	V	
Input Low Voltage	GND		0.2×DVDD33	V	
Input High Voltage	0.7×DVDD33		DVDD33	V	

Current Of Different Modes

Table 5. Current Of Different Modes

Mode	MIN	Typical	MAX	Unit	Condition
Normal Work Mode		120		mA	Video/Audio/USB ON
Idle Mode		60		mA	Video/Audio OFF USB ON
Suspend Mode		7		mA	USB Suspend

Audio ADC Characteristics

Table 6. On-chip Audio ADC Characteristics

Parameter	MIN	Typical	MAX	Unit	Condition
Resolution		16		bit	GND = 0V，TA = +25°C unless otherwise noted
Channel		2			
Normal Work Current		8		mA	

Video ADC Characteristics

Table 7. Video ADC Characteristics

Parameter	MIN	Typical	MAX	Unit	Condition
Resolution		10		bit	GND = 0V，TA = +25°C unless otherwise noted
Channel		2			
Normal Work Current		100		mA	

LDO Characteristics

Table 8. On-chip 1.2V LDO Characteristics

Parameter	MIN	Typical	MAX	Unit	Condition
Output Voltage		1.2		V	GND = 0V，TA = +25°C unless otherwise noted
Current Limit	100			mA	

Table 9. On-chip 3.3V LDO Characteristics

Parameter	MIN	Typical	MAX	Unit	Condition
Output Voltage		3.3		V	GND = 0V，TA = +25°C unless otherwise noted
Current Limit	200			mA	

Package Outline

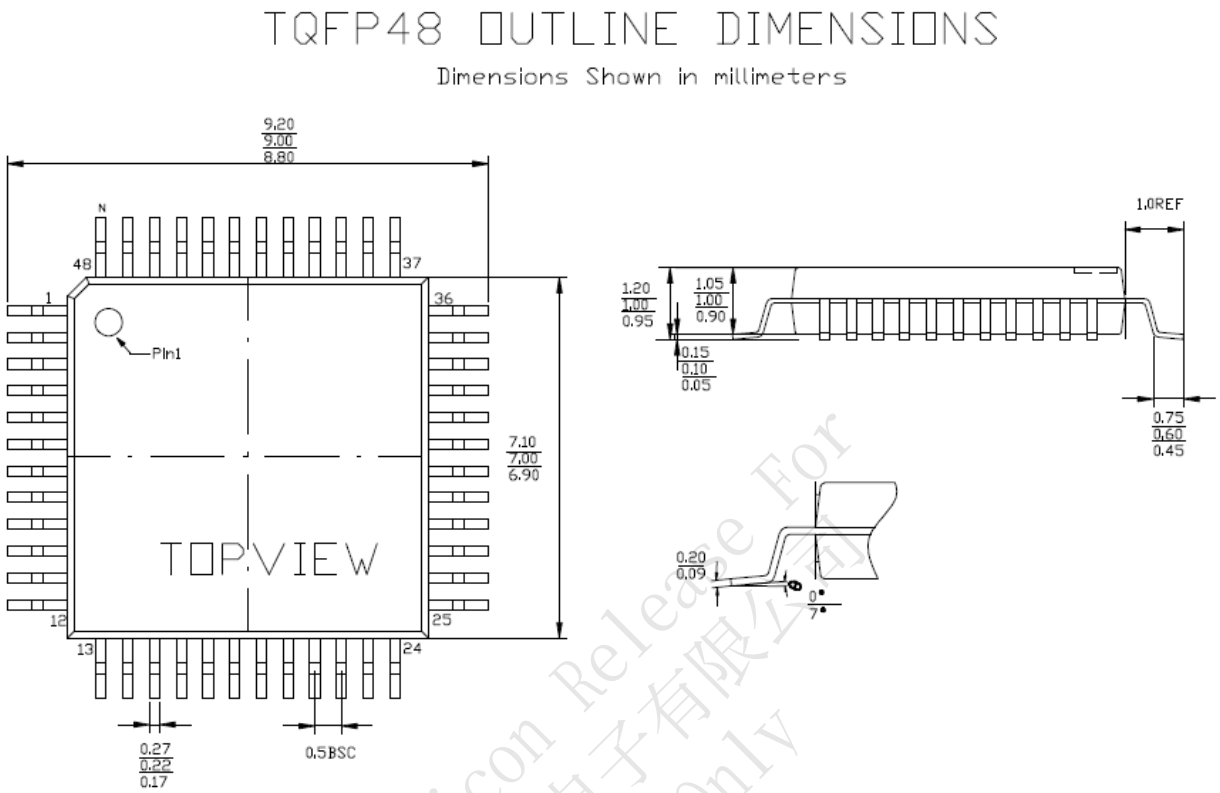

Figure 6. TQFP48 Package Diagram

Top Mark

Figure 7. Top Mark Diagram

Revision History

Date	Version	Author	Comments
2017-4	V1.0	ZF Wang	Initial Version