

MS1835

Analog RGB to CVBS/S-Video Converter

DATA SHEET

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General Description

The MS1835 is a single chip RGB to CVBS/S-Video converter with embedded MCU and memory. It consists of 10-bit triple-ADC for RGB input, NTSC/PAL encoder with 10-bit DAC for output, integrated OSD function. It is capable of video enhancement, 3D noise reduction, brightness/saturation/sharpness and hue adjustment, which can help the designer acquire the required video quality. No programming technology can help customers to reduce production cost and cycle.

Features

Analog Input

- ◆ 10-bit triple-ADC
- ◆ Maximum analog sampling rate up to 165MSPS
- ◆ Supports analog input range: 0.45V ~ 1.1V (P-P)
- ◆ Supports RGBHV input
- ◆ Auto offset/phase adjustment
- ◆ Supports input resolution up to 1080P
- ◆ Support interlace signal input

Auto-mode Detection

Auto Position (Blank) Detection

Scalar

- ◆ Independent horizontal and vertical scaling up and down from (1/8)x to 8x
- ◆ Frame rate conversion

Video Enhancement

- ◆ Black/white level expansion
- ◆ Color transition improvement

- ◆ Dynamic peaking
- ◆ Brightness, saturation, contrast and hue adjustable

Embedded OSD

- ◆ Supports 1 bit DRCS character mode
- ◆ Zoom in
- ◆ One OSD window with alpha-blending

Embedded MCU

Output Format

- ◆ 10-bit triple-DAC for component video output
- ◆ Supports CVBS and S-Video output
- ◆ Supports NTSC(J,M,4.43) and PAL(B,D,G,H,I,M,N,Nc,60)

2-wire I2C Master Interface

Package

- ◆ TQFP-48 plastic(7mmX7mm)
- ◆ PB-free and RoHS compliant

Applications

- ◆ Car Infotainment Device
- ◆ VGA to CVBS Adapter/Docking Station
- ◆ Handheld/Portable Device

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Function Block Diagram

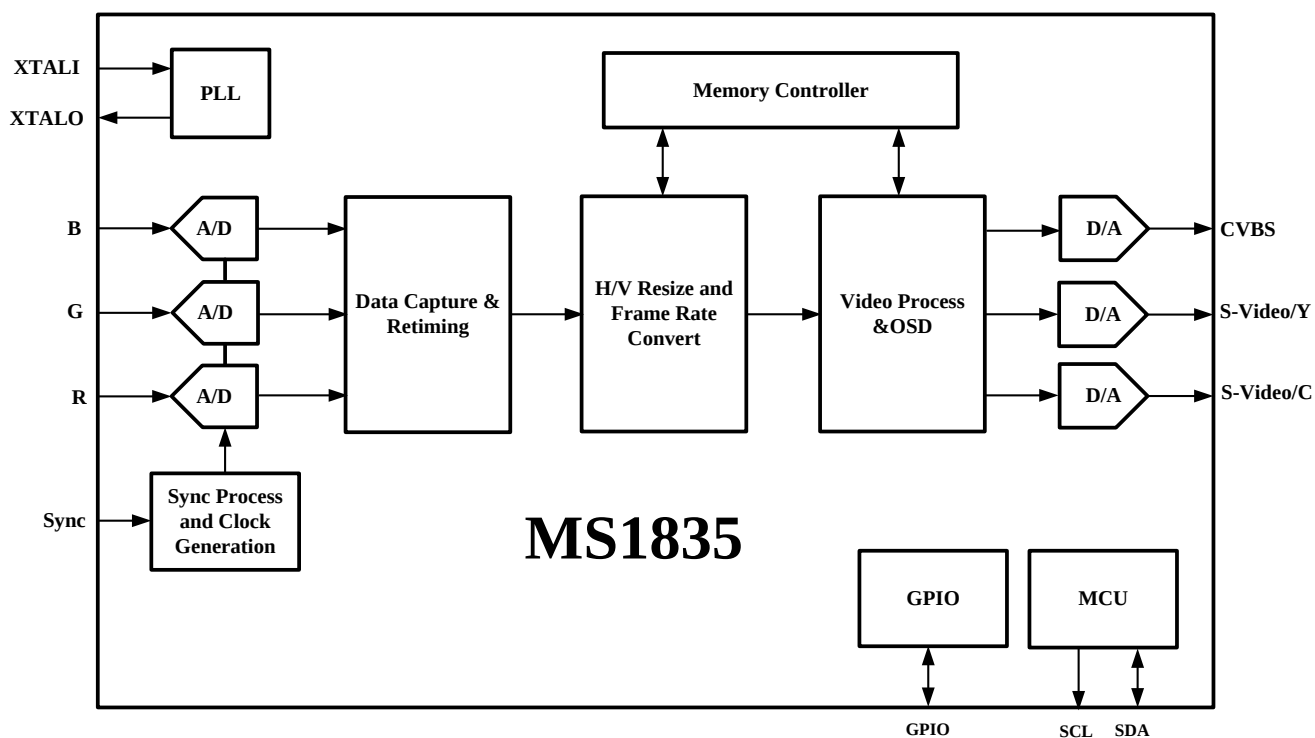


Figure 1. Function Block Diagram

PIN Map

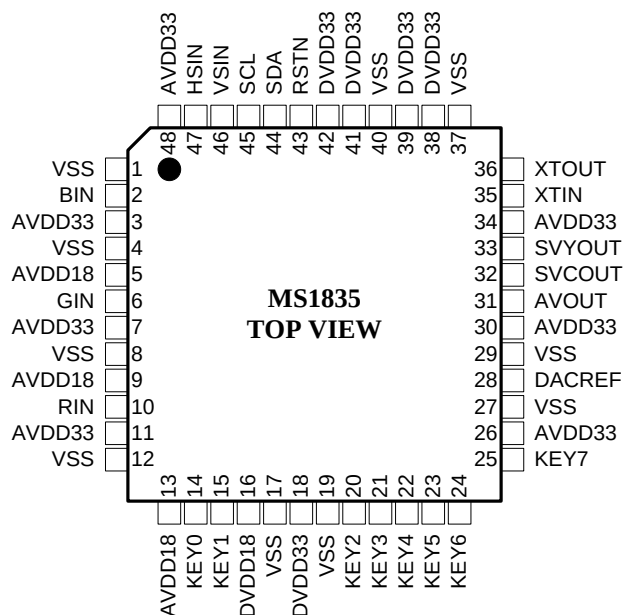


Figure 3. PIN MAP

PIN Description

Table 2. PIN Description

Pin Name	Pin #	Type	Description
System			
KEY0	14	DI	Work mode select
KEY1	15	DI	Move left
KEY2	20	DI	Move right
KEY3	21	DI	Move down
KEY4	22	DI	Move up
KEY5	23	DI	Menu
KEY6	24	DI	Zoom
KEY7	25	DI	N/P Select
XTIN	35	AI	External crystal input
XTOUT	36	AO	External crystal output
RSTN	43	AI	Chip reset, Low active
SDA	44	DIO	Serial bus data
SCL	45	DI	Serial bus clock
Video Input			
BIN	2	AI	Analog video B component in
GIN	6	AI	Analog video G component in
RIN	10	AI	Analog video R component in
VSIN	46	DI	Video vertical SYNC input
HSIN	47	DI	Video horizontal SYNC input
Video Output			
DACREF	28	AI	Full-scale adjust reference resistor
AVOUT	31	AO	Analog component CVBS output
SVCOOUT	32	AO	Analog component S-Video C output
SVYOUT	33	AO	Analog component S-Video Y output
Power and Ground			
DVDD33	18,38,39,41,42	P	I/O power 3.3V
AVDD33	3,7,11,26,30,34,48	P	Analog power 3.3V
DVDD18	16	P	Core power 1.8V
AVDD18	5,9,13	P	Analog power 1.8V
VSS	1,4,8,12,17,19,27,29,37,40	G	I/O ground

Table 3. Abbreviation of Pin Description

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

Electrical Characteristics

Absolute Maximum Ratings

Table 4. Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Ambient Operating Temperature	TA	0 to 70	°C
Storage Temperature	Tsto	-40 to 150	°C
ESD Ratings	Vsed		
Human Body Model		2000	V
Machine Model		200	V

Note1: Stresses above those listed in Absolute Maximum Ratings may cause permanent damage to the device. This is a stress rating only and does not imply functional operation of the device. Exposure to Absolute Maximum Ratings for extended periods may affect device reliability.

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 5. DC Characteristics

Parameter	Symbol	MIN	TYP	MAX	Unit
Analog Module 3.3V Power	AVDD33	2.97	3.3	3.63	V
Digital IO Power	DVDD33	2.97	3.3	3.63	V
Analog Module 1.8V Power	AVDD18	1.62	1.8	1.98	V
Core Power	DVDD18	1.62	1.8	1.98	V
Analog ADC 3.3V Current	IAVDD33		30		mA
Analog DAC 3.3V Per Channel Current	IDAC33		36		mA
Digital IO Power Current	IDVDD33		14		mA
Analog Module 1.8V Power	IAVDD18		97		mA
Core Power Current	IDVDD18		80		mA

Video DAC Characteristics

Table 6. Video DAC Characteristics

Analog Output	MIN	TYP	MAX	Unit
Output Signal Voltage	0	--	1.8	V

Analog Output	MIN	TYP	MAX	Unit
Resolution		10		Bit
DNL (Differential Non-Linearity)		+/-0.5		LSB
INL (Integral Non-Linearity)		+/-0.7		LSB
Clock Rate	13.5	--	162	MHz

Video ADC Characteristics

Table 7. Video ADC Characteristics

Symbol	MIN	TYP	MAX	Unit
Input Signal Voltage		0.7		V
Resolution		10		Bit
DNL (Differential Non-Linearity)		+/-0.5		LSB
INL (Integral Non-Linearity)		+/-1		LSB
Sample Rate	13.5	--	162	MHz
SNDR		56		dB
SFDR		70		dB

Package Outline

TQFP48 OUTLINE DIMENSIONS

Dimensions Shown in millimeters

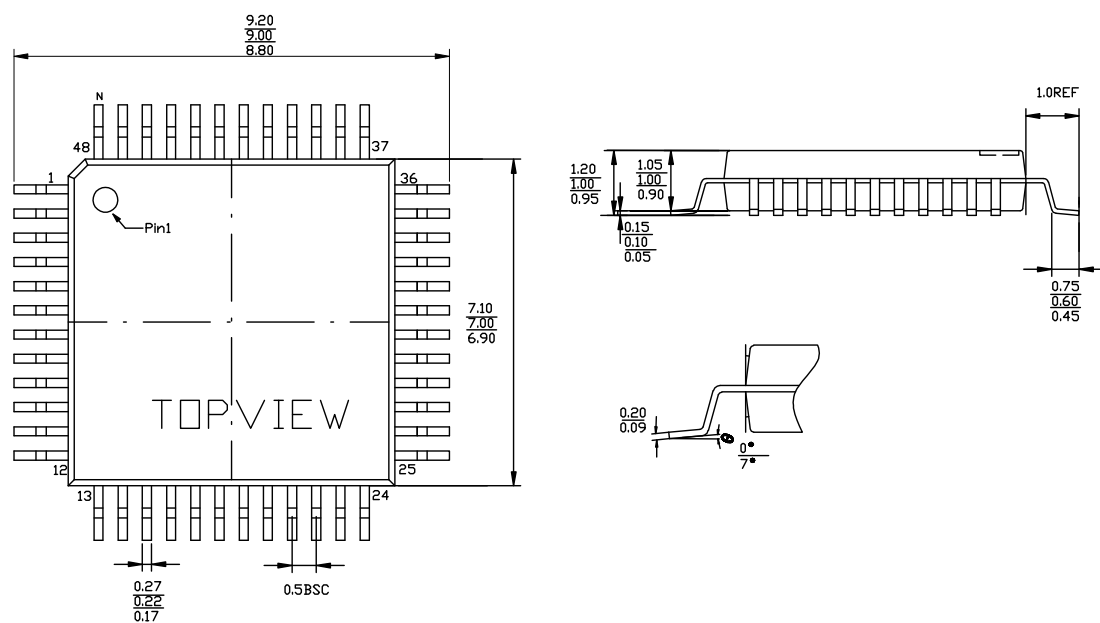


Figure 6. TQFP48 Package Diagram

Top Mark

Figure 7. MS1835 Top Mark Diagram

Revision History

Date	Version	Author	Comments
2016-11-16	V1.0	C Tang	Initial Version