AU6850C Datasheet

USB Host MP3 Decoder SOC

Rev

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Revision History

Data	Revision	Description
		initial

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1. Overview

A highly integrated SOC for car MP3 player, AU6850C integrates MCU, MP3 decoder, USB Host controller, SD/MMC card controller, ADC, audio DAC, LCD driver and an IR decoder in a single chip. Compared with traditional flash-MP3 player, AU6850C offers ultra low cost, low power consumption, flexible and more powerful host MP3 player solution.

1.1 Features

- Low power 0.18um CMOS technology
- Enhanced 8051, up to 10 times faster than standard 8051
- USB2.0 full-speed host controller
- SD/MMC card controller
- Support MPEG 1/2/2.5 layer2/3 decoding, data rate 32kbps ~ 320kbps, including VBR
- Support 9 sampling frequency: 8kHz/11.025kHz/12kHz/16kHz/22.05kHz/24kHz/32kHz/44.1kHz/48kHz
- Embedded sound equalizer
- Support tag format ID3v1 and ID3v2.4
- Support FAT16/FAT32 file system
- Embedded 16-bit DAC
- 1 channel AUX in
- 1 channel FM in
- 3 channel 6bit SARADC for peripheral controls
- Embedded segment LCD driver, support 1/3 bias or 1/4 bias two types
- Support IR Remote control
- GPIO for various purposes
- Embedded LDO, convert 5V to 3.3V and 1.8V
- Embedded Power-on-Reset
- Embedded ROM for program code storage

1.2 Chip Architecture

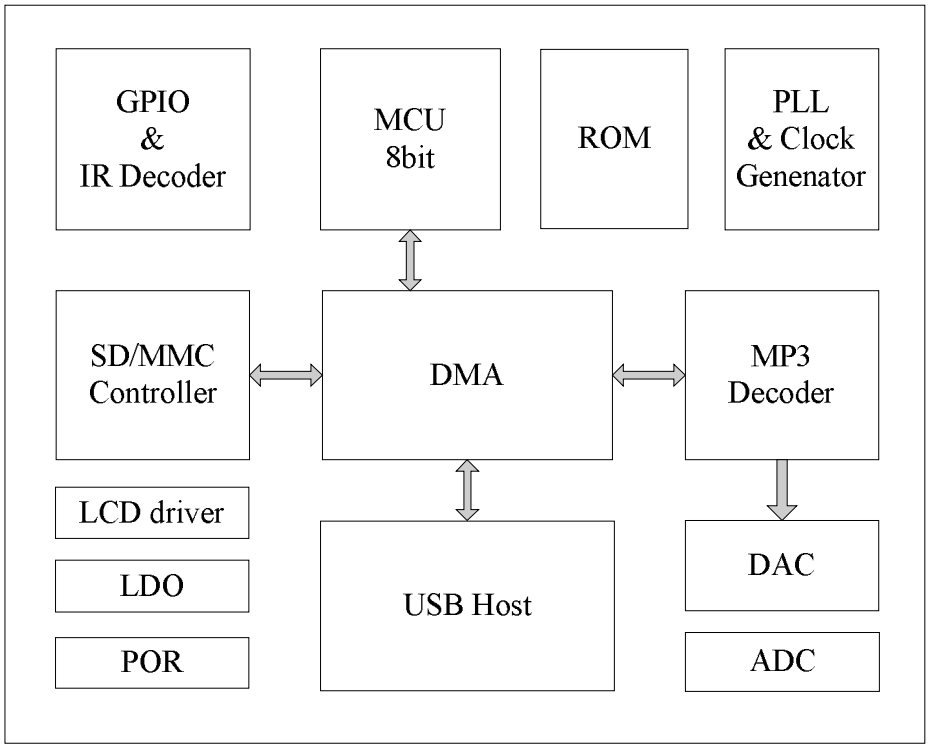

Figure 1 AU6850C Functional Block Diagram

2. System Application

l MP3 mini audio system

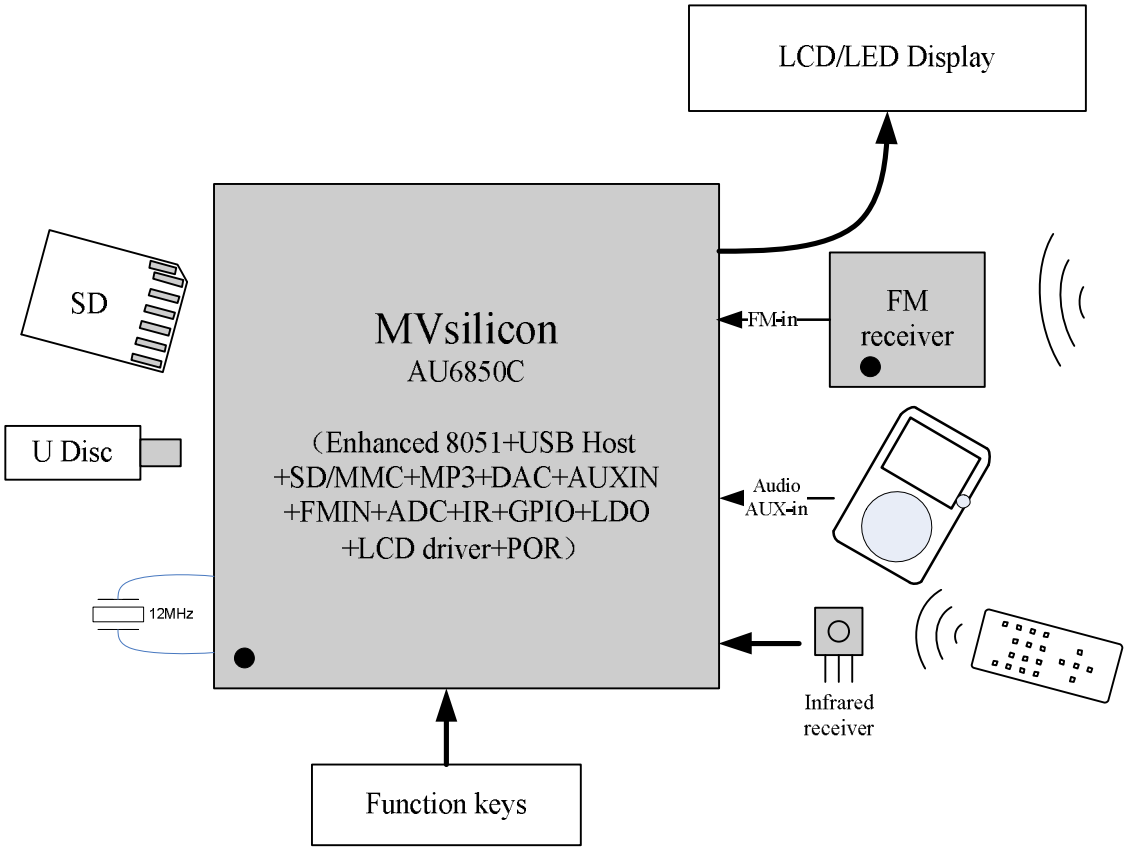

Figure 2 Mini Audio System

3. Pin Description

AU6850C is a CMOS device. Floating level on input signals causes unstable device operation and abnormal current consumption. Pull-up or Pull-down resistors should be used appropriately for input or bidirectional pins.

Notation	Description
I	Input
O	Output
I/O	Bidirectional
PWR	Power
GND	Ground

3.1 Pin Description

Table 1 Pin Description

Pin name	Pin #	Type	Description
			USB interface pins
USB_DP	14	I/O	USB Function D+ bus
USB_DM	13	I/O	USB Function D- bus
			DAC interface pins
DAC_R	39	AO	audio right channel output
DAC_L	40	AO	audio left channel output
DACVMID	38	AI	Internal voltage reference
DAC_AUX_R	41	AI	External AUX right channel in
DAC_AUX_L	42	AI	External AUX left channel in
			GPIO/MCU IO pins
GPIO_A[1:0]	31:30	I/O	GPIO PORT, bank A
GPIO_A[2]	12	I/O	GPIO PORT, bank A
GPIO_A[3]	8	I/O	GPIO PORT, bank A
GPIO_A[4]	11	I/O	GPIO PORT, bank A
GPIO_A[5]	9	I/O	GPIO PORT, bank A
GPIO_A[7:6]	44:33	I/O	GPIO PORT, bank A
GPIO_B[3:0]	29:26	I/O	GPIO PORT, bank B
GPIO_B[7:4]	5:2	I/O	GPIO PORT, bank B
GPIO_C[2:0]	34:32	I	GPIO PORT, bank C
GPIO_D[1:0]	7:6	I/O	GPIO PORT, bank D
GPIO_D[7:2]	25:20	I/O	GPIO PORT, bank D
GPIO_E[3:0]	45:48	I/O	GPIO PORT, bank E
			CLK pins
XIN	18	I	12MHz Crystal oscillator input for PLL
XOUT	19	O	12MHz Crystal oscillator output for PLL

			Power/Ground pins
VDD33	10 35	PWR	power for digital
DVSS	1	GND	ground for digital
LDO18O	17	PWR	LDO 1.8V out
LDO33O	15	PWR	LDO 3.3V out
LDO5V	16	PWR	LDO 5V power in
DACVDD33	36	PWR	power for DAC
DACVSS	37	GND	ground for DAC

4. Package

4.1 Package Diagram

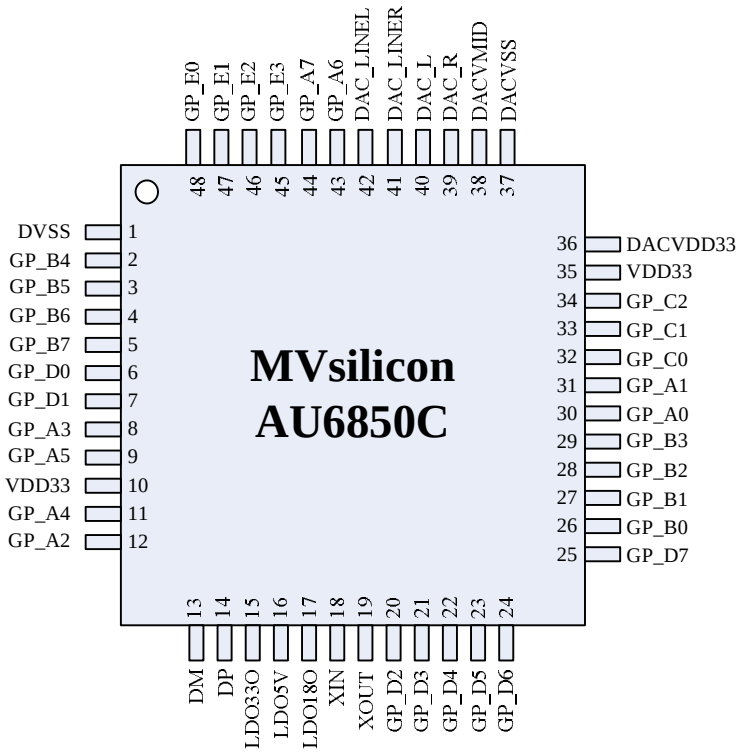

Figure 3 Package Diagram (LQFP48-7x7mm / TOP View)

4.2 Package Dimension Parameter

SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	—	—	1.60
A1	0.05	0.15	0.25
A2	1.30	1.40	1.50
A3	0.54	0.64	0.74
b	0.19	—	0.27
b1	0.18	0.20	0.23
c	0.13	—	0.18
c1	0.12	0.13	0.14
D	8.80	9.00	9.20
D1	6.80	7.00	7.20
E	8.80	9.00	9.20
E1	6.80	7.00	7.20
e		0.50BSC	
L	0.35	0.50	0.65
L1		1.00BSC	
θ	0	—	8°

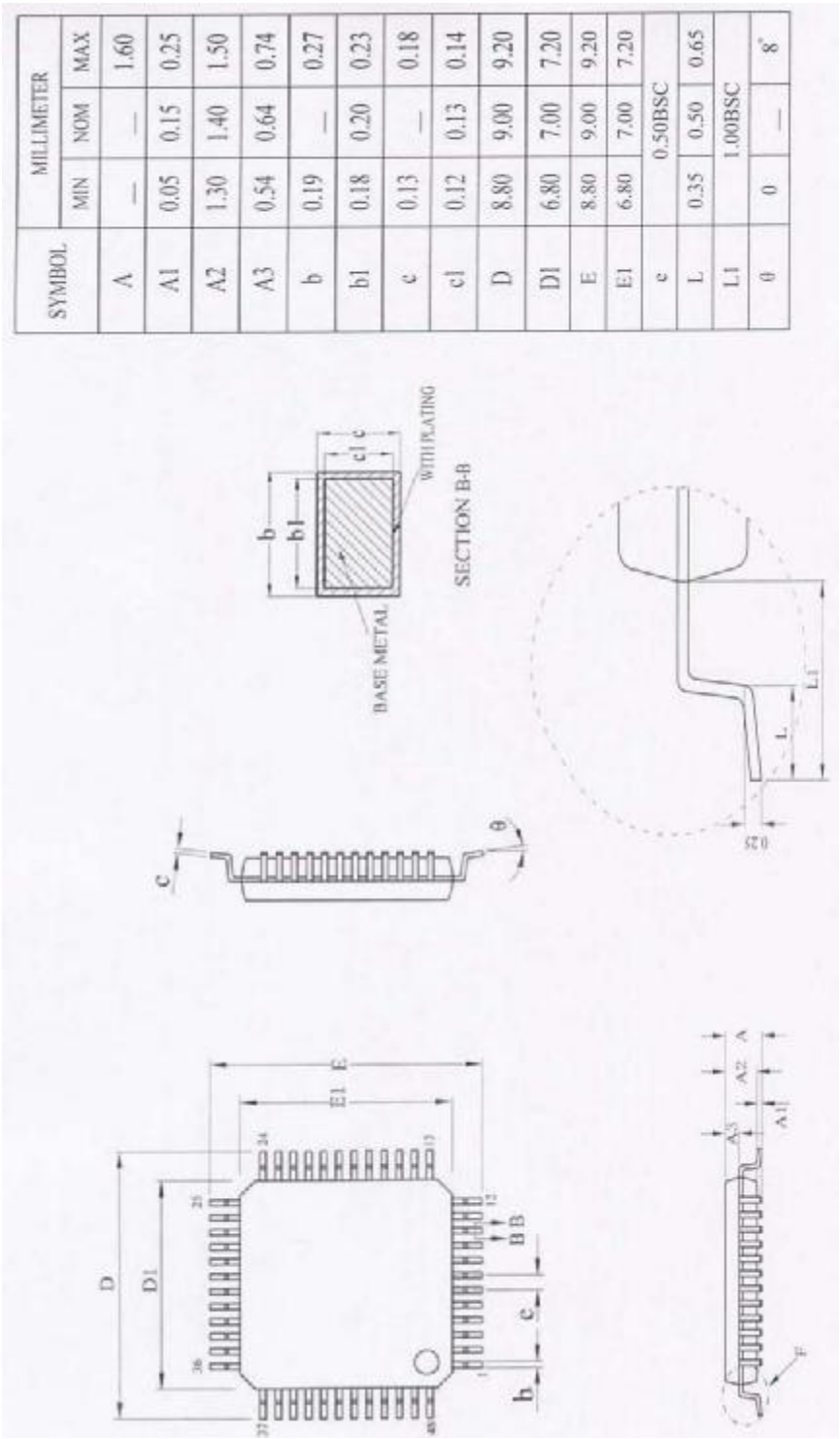

Figure 4 LQFP48-7x7mm Package Dimension Parameter

5. Electrical Specification

5.1 Absolute Maximum Ratings (Note 1)

Table 2 Absolute Maximum Ratings

Parameter	Symbol	Rating	Unit
Power Supply Voltage (IO)	VCC_IO_AB	-0.5 to 4.6	V
Power Supply Voltage (Core)	VCC_CORE_AB	0 to 2	V
Storage Temperature	TEMP_STG	-65 to 150	C

5.2 Recommended Operating Conditions

Table 3 Recommended Operating Conditions

Parameter	Symbol	Min	Typ	Max	Unit
Power Supply Voltage (IO)	VCC_IO_OP	3	3.3	3.6	V
Power Supply Voltage (Core)	VCC_CORE_OP	1.62	1.8	1.98	V
Input Voltage (digital IO exclude GPIO C)	VIN	0		3.6	V
Input Voltage (GPIO C)	VIN	0		5.5	V
Operating Free Air Temperature	TEMP_OPR	-20		70	C

5.3 Electrical Characteristics

Table 4 Electrical Characteristics

Symbol	Parameter	Condition	Min	Typ	Max	Unit
VIH	Input High Voltage		1.57		3.6	V
VIL	Input Low Voltage		-0.3		1.2	V
VOH	Output high voltage	@IOH=16mA	3.0			V
VOL	Output low voltage	@IOL=16mA			0.3	V
IL	Input leakage current		-10		10	uA
P_PLAY	Power consumption when playing	Playing mode		85		mW

5.4 Audio Performance

Table 5 Audio Performance

Characteristics	Min	Typ	Max	Unit
Frequency response 40HZ ~ 20KHZ		<=1		DB
THD + N (1K OUT=800MV Rms)		<0.3		%
S/N (1KHZ OUT=800MV Rms)		>-65		DB
L/R CH DIFFERENCE		0		DB
L/R CH SEPARATION		-65		DB
Max Noise out		<0.5		MV

Note:

1. “Absolute Maximum Ratings” are those values beyond which the safety of the device cannot be guaranteed. They are not meant to imply that the device should be operated at these limits.

Contact Information

Shanghai Mountain View Silicon Technology Co Ltd

Shanghai Headquarter:
Suite 403, Jinying Tower A, 1518 Minsheng Road, Pudong New Area,
Shanghai, P.R. China
Zip code: 200135
Tel: 86-21-68549851
Fax: 86-21-68549859

Shenzhen Sales & Technical Support Office:
Suite 6A Olympic Plaza, Shangbao Road, Futian District,
Shenzhen, Guangdong, P.R. China
Zip code: 518034
Tel: 86-755-83522955
Fax: 86-755-83522957

Email: support@mvsilicon.com
Website: http://www.mvsilicon.com