



**AU6850B USB HOST MP3 DECODER SOC**

# **AU6850B Datasheet**

**USB Host MP3 Decoder SOC**

**Rev 0.1**

**Sep 11, 2008**



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## Revision History

<b>Data</b>	<b>Revision</b>	<b>Description</b>
2008-9-11	0.1	initial



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## 1. Overview

A highly integrated SOC for MP3 player, AU6850B integrates MCU, MP3 decoder, USB Host controller, SD/MMC card controller, a 16-bit audio decoder and an IR decoder in a single chip. Compared with traditional flash-MP3 player, AU6850B offers a lower cost, lower power consumption, flexible and more powerful host MP3 player solution.

### 1.1 Features

- Low power 0.18um CMOS technology
- Power supply 1.8V/3.3V, power consumption 85mw
- Enhanced 8051, up to 10 times faster than standard 8051
- Dynamic MCU running clock frequency adjustment to reduce power consumption and EMI
- 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 sigma-delta audio DAC
- Embedded headphone amplifier
- Support IR Remote control
- GPIO for various purposes
- Embedded LDO 3.3V->1.8V
- Pin to Pin compatible with AU6850<sup>1</sup>
- Embedded 32KB OTP memory for program code storage

*Note 1: Contact with MVSilicon's FAE for detail.*

## 1.2 Chip Architecture

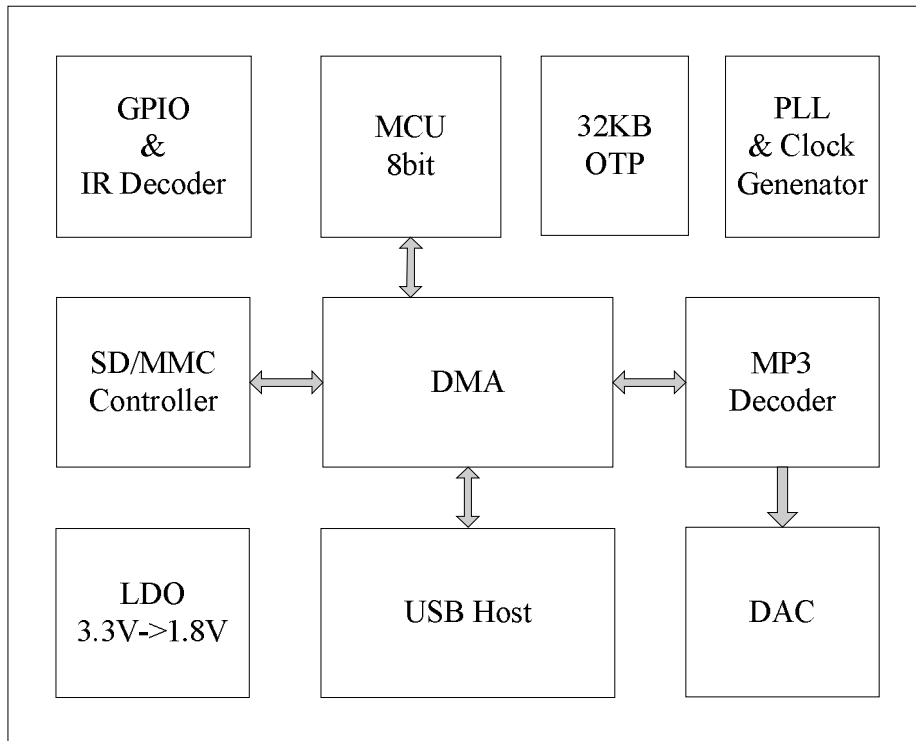


Figure 1 AU6850B Functional Block Diagram



## 2. System Application

- **MP3 mini audio system**

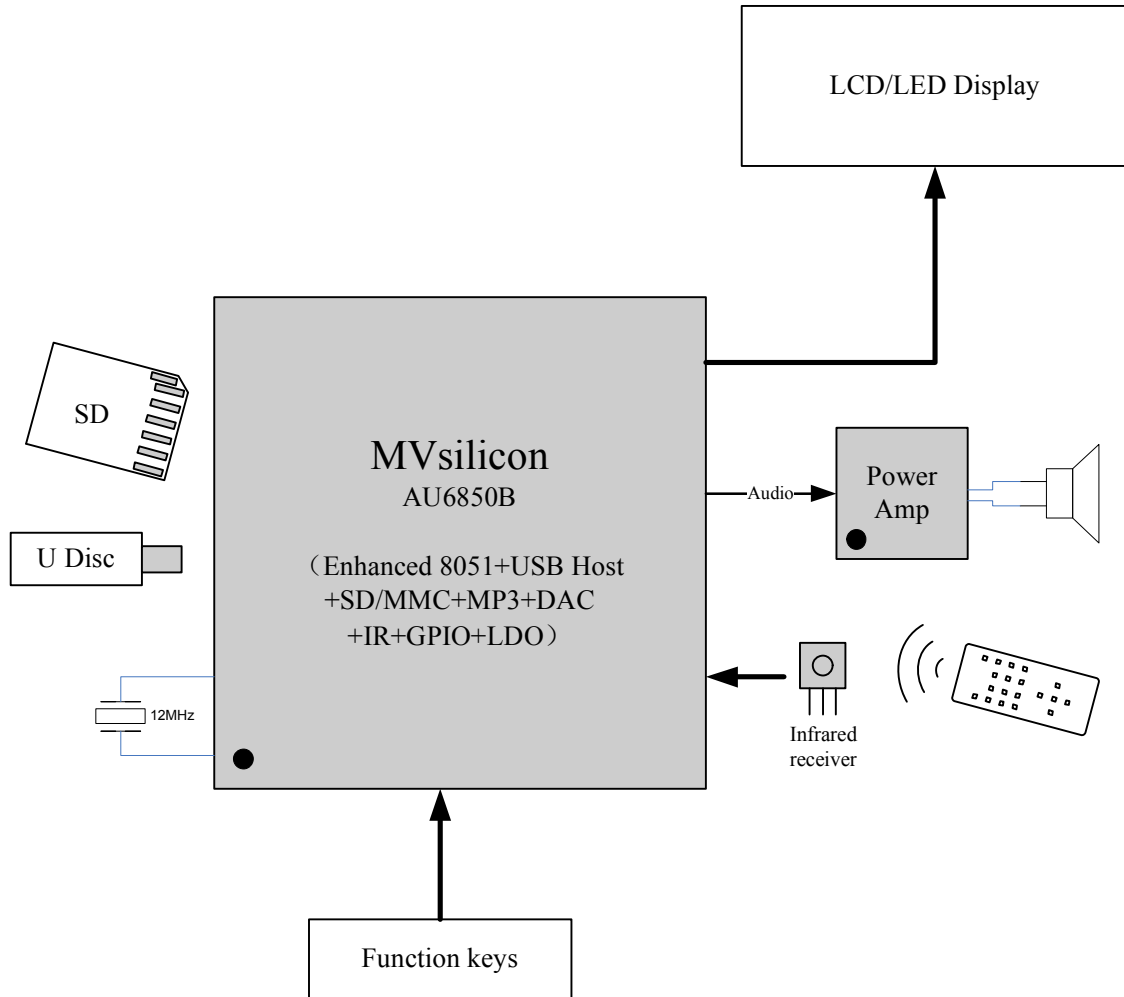


Figure 2 MP3 Audio System



### 3. Pin Description

AU6850B 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
AI	Analog Input
AO	Analog Output
PWR	Power
GND	Ground

#### 3.1 Pin Description

Table 1 Pin Description

Pin name	Pin #	Type	Description
<b>USB interface pins</b>			
USB_DP	31	I/O	USB Function D+ bus
USB_DM	30	I/O	USB Function D- bus
<b>CARD interface pins</b>			
SD_CLK	36	O	SD Card clock
SD_CMD	38	I/O	SD Card command line
SD_DAT0	39	I/O	SD Card data line
<b>DAC AUDIO interface pins</b>			
HPOUTR	1	AO	Head phone right channel output
HPOUTL	3	AO	Head phone left channel output
VREF	5	AI	Internal voltage reference
<b>GPIO/MCU IO pins</b>			
GPIO_A[1:0]	34:33	I/O	GPIO PORT, bank A
GPIO_A[4:2]	42:44	I/O	GPIO PORT, bank A
GPIO_A[6:5]	46:45	I/O	GPIO PORT, bank A
GPIO_A[7]	49	I/O	GPIO PORT, bank A
GPIO_B[3:0]	20:17	I/O	GPIO PORT, bank B
GPIO_B[7:4]	27:24	I/O	GPIO PORT, bank B
GPIO_C[2:0]	52:50	I/O	GPIO PORT, bank C
GPIO_C[7:3]	59:55	I/O	GPIO PORT, bank C
GPIO_D[0]	16	I/O	GPIO PORT, bank D
GPIO_D[2:1]	12:13	I/O	GPIO PORT, bank D
<b>CLK &amp; Reset pins</b>			
XIN	9	I	12MHz Crystal oscillator input for PLL



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<b>XOUT</b>	10	O	12MHz Crystal oscillator output for PLL
<b>RESETN</b>	15	I	System reset, active low
<b>mod pins</b>			
<b>MOD0</b>	14	I	Chip run mode configure pin
<b>MOD1</b>	41	I	Chip run mode configure pin
<b>RUN</b>	35	I	Chip run mode configure pin
<b>Power/Ground pins</b>			
<b>AVDD33</b>	4	PWR	Analog power(3.3V)
<b>AVSS</b>	2	GND	Analog ground
<b>VPP</b>	48	PWR	OTP program power
<b>IO_VDD</b>	23 32 47	PWR	Digital power for I/O(3.3V)
<b>VSS</b>	21 29 37	GND	Digital IO/core ground
<b>VDD</b>	8 22 40	PWR	Digital power for core(1.8V)
<b>Reserved</b>	7:6 11 28 54:53 64:60	NC	



## 4. Package

### 4.1 Package Diagram

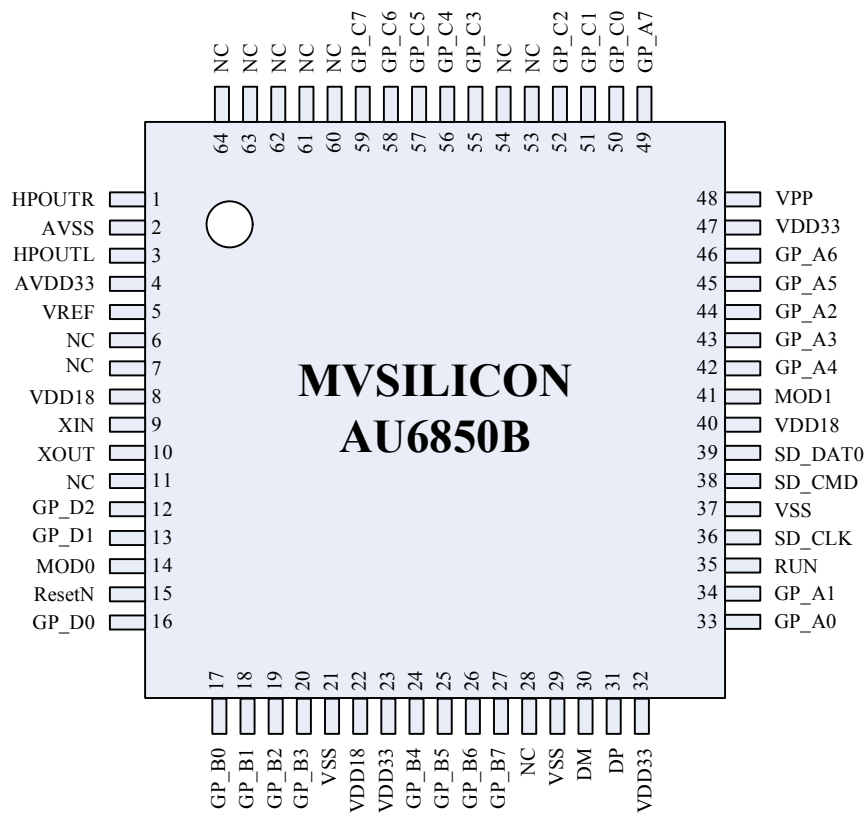


Figure 3 Package Diagram (LQFP64-10x10mm / TOP View)

### 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	11.80	12.00	12.20
D1	9.80	10.00	10.20
E	11.80	12.00	12.20
E1	9.80	10.00	10.20
c	0.50BSC		
L	0.45	0.60	0.75
L1	1.00BSC		
θ	0	—	8°

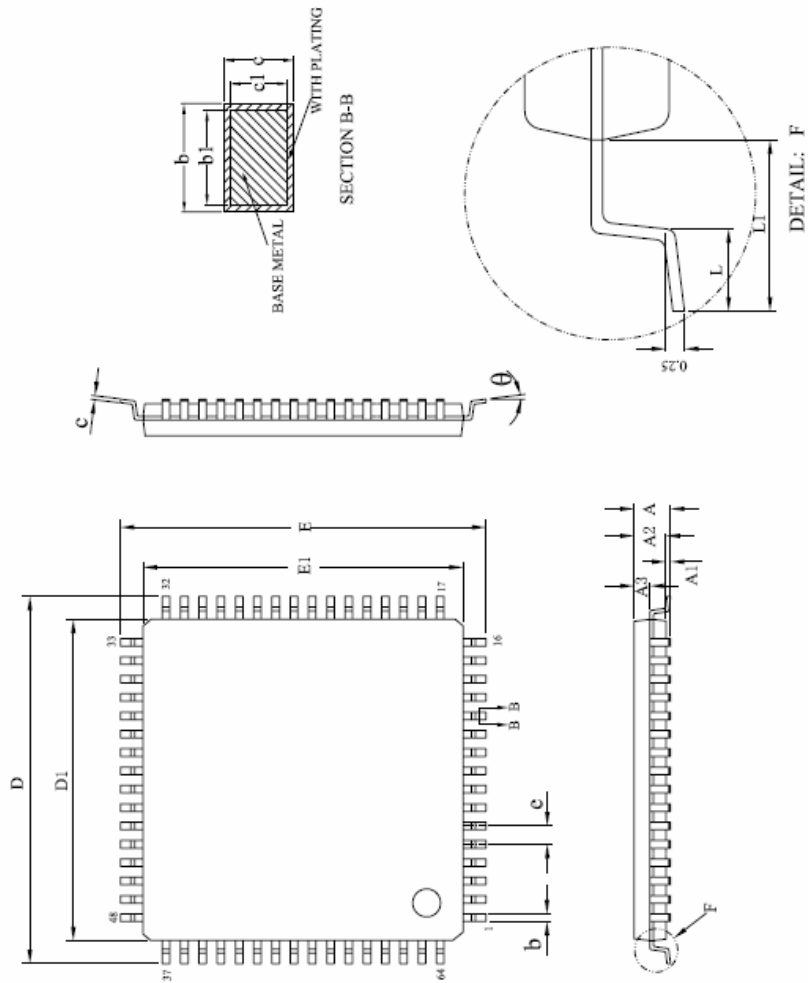


Figure 4 LQFP64-10x10mm Package Dimension Parameter



## 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
Power Supply Voltage (DAC)	VCC_DAC_AB	-0.3 to 3.6	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
Power Supply Voltage (DAC)	VCC_DAC_OP	3.0	3.3	3.6	V
Input Voltage (digital)	VIN	-0.3		5.5	V
Operating Free Air Temperature	TEMP_OPR	-10		70	C

### 5.3 Electrical Characteristics

Table 4 Electrical Characteristics

Symbol	Parameter	Condition	Min	Typ	Max	Unit
VIH	Input High Voltage		2.0		5.5	V
VIL	Input Low Voltage		-0.3		0.8	V
VOH	Output high voltage	@IOH=2mA	2.4			V
VOL	Output low voltage	@IOL=2mA			0.4	V
IL	Input leakage current		-10		10	uA
P_PLAY	Power consumption when playing	Playing mode		85		mW

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.

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