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## Contact us

Tel: +86-755-8981 8866 Fax: +86-755-8427 6832

Email & Skype: info@chipsmall.com Web: www.chipsmall.com

Address: A1208, Overseas Decoration Building, #122 Zhenhua RD., Futian, Shenzhen, China



- ◆Structure : Silicon Monolithic integrated circuit
- ◆Product name : Voice Synthesis LSI
- ◆Type : BU6939FV

**◆Features**

- 1) Single playback mode, Available bit-rate is 16kbps(High compression) - 128kbps(High Quality) at 32kHz sampling or 16kHz sampling).
- 2) Voice/audio data is stored in serial Flash ROM which is connected to BU6939FV through SPI-serial Interface. Duration for playback is 32seconds/Mbits(standard) or max 64s/Mbits(Maximum).
- 3) Input system clock: 16.384MHz/8.192MHz/4.096MHz/2.048MHz.
- 4) Audio sampling rate is 32kHz or 16kHz and Built-in 16bits DAC
- 5) Operation by single power supply. Available voltage:2.7 to 3.6V.
- 6) Max numbers of tunes : 512
- 7) Maximum 10 phrase numbers memory as a ROM-phrase Number,and playback them only one command.(ROM\_phrase number is available 0-46)
- 8) HOST-I/F is selectable from serial interface with status or direct-pin mode.
- 9) Enable to access(read/write) data stored in serial Flash ROM connected directly to BU6939FV.
- 10) Various play modes are available.

**【play modes from serial Interface】**

- available ROM-phrase function.
- adjustable volume at each track independently
- enable to playback tunes which are registered in the sequencer list. Order of tunes are randomly selected. Max 16 tunes can be registered.
- For each track, enable to playback a selected tune or to playback tunes in the sequencer list with/without loop.
- fade-in and fade-out functions are supported.

**【Play modes from direct pin control】**

- available ROM-phrase function.
- maximum 23 tunes are registered to play.

★Radiation resistance design is not arranged.

◆ Absolute maximum ratings (Ta = 25 °C)

Item	Symbol	Ratings	Unit
Power dissipation <sup>*)</sup>	Pd	640	mW
Applied voltage	V <sub>DD</sub>	-0.2~7.0	V
Input voltage	V <sub>IN</sub>	-0.2~V <sub>DD</sub> +0.3	V
Operating temperature range	T <sub>OPR</sub>	-40~+85	°C
Storage temperature range	T <sub>STG</sub>	-50~125	°C

\*) Over Ta = 25°C or more, reducing 6.4mW per °C.

★ Radiation resistance design is not arranged.

◆ Operation Conditions

(Ta = -40~+85°C unless otherwise specified)

Item	Symbol	Specified value			Unit	Condition
		Min	Typ	Max		
Operation power-supply voltage	V <sub>DD_IN</sub>	2.7	—	3.6	V	—

◆ Electric characteristic (DC characteristic)

DC Characteristics

■ V<sub>DD\_IN</sub>=3V (Ta=25°C)

Item	Symbol	Specified value			Unit	Condition	Circuit form
		Min	Typ	Max			
"H" Input Voltage	V <sub>IH</sub>	0.7V <sub>DD</sub>	—	—	V		2
"L" Input Voltage	V <sub>IL</sub>	—	—	0.3V <sub>DD</sub>	V		2
"H" Output Voltage	V <sub>OH</sub>	V <sub>DD</sub> -0.4	—	—	V	IO=2.0mA	2
"L" Output Voltage	V <sub>OL</sub>	—	—	0.4	V	IO=2.0mA	2
"H" Input current	I <sub>IH</sub>	—	—	10	μA	V <sub>IH</sub> =V <sub>DD</sub>	1
"L" Input current	I <sub>IL</sub>	—	—	-10	μA	V <sub>IL</sub> =GND	1
Static consumption current	I <sub>ST</sub>	—	—	10	μA	V <sub>i</sub> =V <sub>DD</sub> OrGND	3

DAC characteristics

■ V<sub>DD\_IN</sub>=3V (Ta=25°C)

Item	Symbol	Specified Value			Unit	Condition
		Min.	Typ.	max.		
DACOUToutput load resistance	R <sub>AOUT</sub>	10	—	—	KΩ	at No signal
DACOUT Output Voltage	V <sub>AOUT</sub>	GND	—	V <sub>DD</sub>	V	at No load

◆ External dimensions • Block diagram

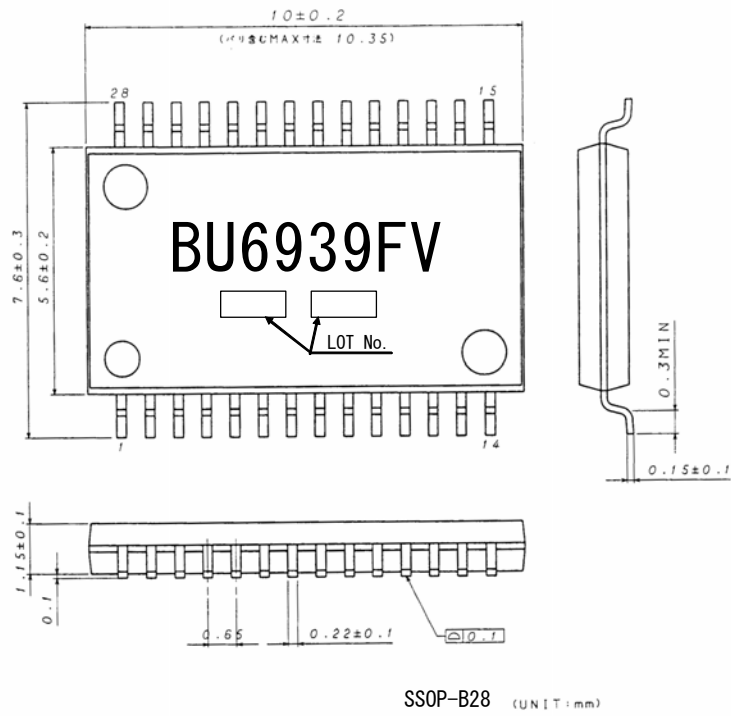


Figure1 External dimension

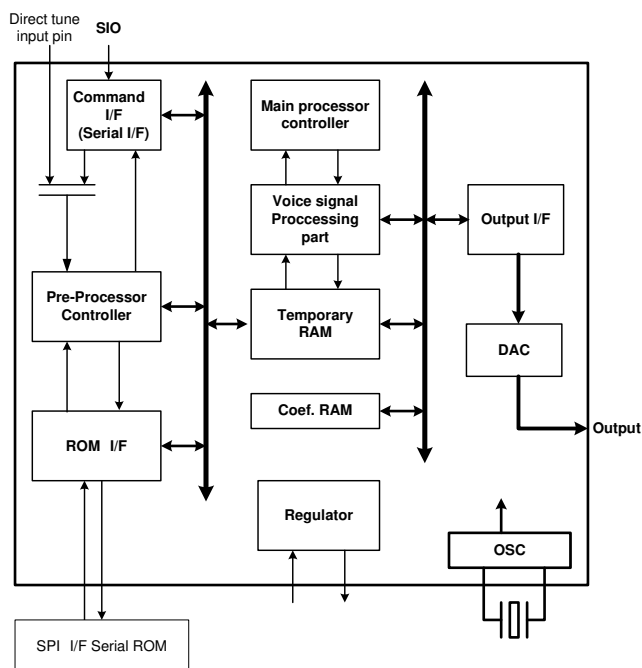


Figure 2. Block diagram

◆ Pin name

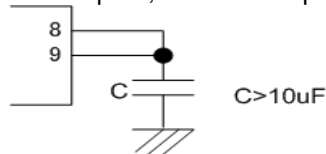
Table Pin name Detailed table

PIN NO.	Pin Name	I/O	Function
1	GND	—	GND
2	VSEL2/TXD	IO	tune number pin#2 / Serial Interface output data
3	VSEL1/RXD	I	tune number pin#1 / Serial Interface input data
4	VSEL0/RXCB	I	tune number pin#0 / Serial Interface CLK
5	TSEVENT/BUSY	O	Playing / ending flag("H":playing "L":stop) accessing Flash ROM ("H" : busy "L" : not busy)
6	VSEL3/SYNCREQ	IO	tune number pin#3 / Synchronous character request ("H" synchronization error)
7	GND	—	GND
8	VDD1.8_IN	I	Core power supply input <sup>*3)</sup>
9	REG18	O	Core power supply output <sup>*3)</sup>
10	STBY	I	Standby ("H" oscillation stop) normally "L"
11	TESTEN	I	Test Input("L" fixation)
12	VDD_IN	—	Power supply input
13	SPISCK	O	Clock for serial SPI-ROM
14	SPISO	O	Serial output data to serial SPI-ROM
15	SPISI	I	Serial Input data from serial SPI-ROM
16	SPICEB	O	chip enable for serial SPI-ROM
17	GND	—	GND
18	VSEL4/BFULLB	IO	tune number pin#4 /command buffer Full signal
19	APOFF	I	Analog Circuit Power off
20	CLK16SEL	I	Clock selection "H":16.384Mhz mode "L":4.096MHzmode
21	REFOUT	O	LSI TEST Pin (attach capacitance(>10uF))
22	DACOUT	O	DAC Output
23	GND	—	GND
24	VDD_IN	—	Power supply input
25	RESETB	I	Reset pin (low active)
26	SIO_ENBL	I	Selection of host interface(SIO or direction pin input <sup>*1)</sup> )
27	XIN	I	Oscillation cell input <sup>*2</sup>
28	XOUT	O	Oscillation cell Output <sup>*2</sup>

\*1) At SIO\_ENBL = "L", VSEL4, VSEL3, VSEL2, VSEL1, VSEL0 is valid, and SIO is invalid.

\*2) At no setting CLK setting Register, Clock is 16.384MHz at CLK16SEL="H", 4.096MHz at CLK16SEL = "L".

\*3) pin #8 and pin #9 should be connected in a shortest pass, and attach capacitance(>10uF) as following figure.



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