JL7036M Datasheet

Zhuhai Jieli Technology Co.,LTD

Version 1.2

Date 2025.06.13

Revision History

Date	Revision	Description
2025.03.17	V1.0	Initial Release
2025.04.25	V1.1	Update Datasheet Format Update Audio ADC Characteristics
2025.06.13	V1.2	Update Features_Audio

Table of Contents

JL7036M Features

SYSTEM

- Dual Core 32bit DSP 320MHz
- With IEEE754 Single precision FPU
- Support FFT/MATRIX/MATH
- 2 x I-cache and D-cache
- Support SDTAP/EMU
- On-chip SRAM 528kbyte
- Support MMU
- Support MPU
- Support External PSRAM
- Built-In Flash
- 24MHz crystal oscillator
- Internal RC oscillator,PLL

DSP Audio Processing

- SBC/AAC/LDAC/LHDC/LC3/CVSD/mSBC codec
- mSBC voice codec supported for BT phone
- PLC for voice processing
- Multi-MIC ENC
- Multi-band DRC
- Multi-band EQ
- Support spatial sound
- Support Hi-Res Audio

Audio

- 2 x 24bit DAC
  - SNR 113dB
  - Noise 3uVrms
  - Supports differential mode
  - Sampling rate 8~96kHz
- 3 x 24bit ADC
  - SNR 105dB
  - Sampling rate 8~48kHz
  - Support AMUX
- 2 x I^2S AUDIO Master/Slave interface
  - Sampling rate 8~384kHz
  - Support TX and RX
  - Support multi-slot mode(TDM)
- 1 x SPDIF AUDIO Master/Slave interface
  - Sampling rate 8~384kHz
  - Support TX and RX
- 1 x PDM AUDIO Slave interface
  - Sampling rate 8~192kHz
  - 2 x DMIC input

Bluetooth

- Dual-mode BT6.0 with LE Audio (DN Q332415)
- Support AoA/AoD
- Support LE audio BIS/CIS
- Support long range BLE
- Maximum transmitting power 10dBm
- Receiver sensitivity
  - -95 dBm @BR
  - -95 dBm @EDR Π/4 DQPSK
  - -87 dBm @EDR 8DPSK

Peripherals

- 1 x High speed USB2.0
- 2 x SD host controller
- 6 x Multi-function 32bit timer
- 3 x UART interface
- 1 x I^2C Master/Slave interface
- 3 x SPI Master/Slave interface
- 3 x QDEC
- 1 x 10bit ADC(13 Channels)
- 14 x GPIO Support function remapping
- 1 x VLCD driver
- 3 x Light strip controller
- 12 x MCPWM
- 1 x LP_Touch with low power wake up
- 1 x IR RX

PMU

- Integrated battery charger up to 350mA
- Support temperature sensor
- VPWR range 4.5V to 5.5V
- VBAT range 2.7V to 4.5V
- IOVDD range 2.2V to 3.4V

Packages

- QFN32(4mm*4mm)

Temperature

- Operating temperature
  TC = -20℃ to +85℃(standard range)
  TC = -40℃ to +105℃(extended range)
- Storage temperature -65℃ to +150℃

Applications

- Bluetooth live sound card
- Bluetooth soundbar
- Bluetooth TV Soundbar
- Bluetooth Party Speaker

1 Block Diagram

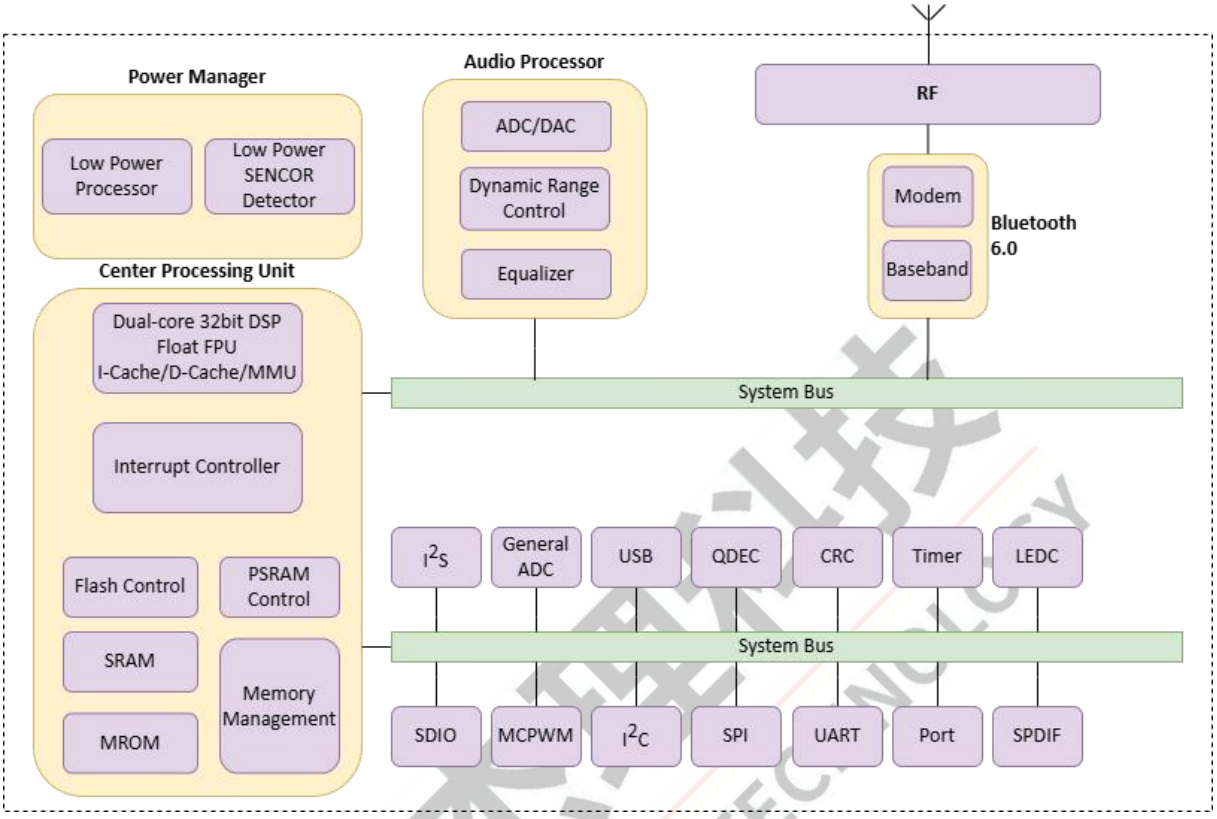


Figure 1-1 JL7036M Block Diagram

2 Pin Definition

2.1 Pin Assignment

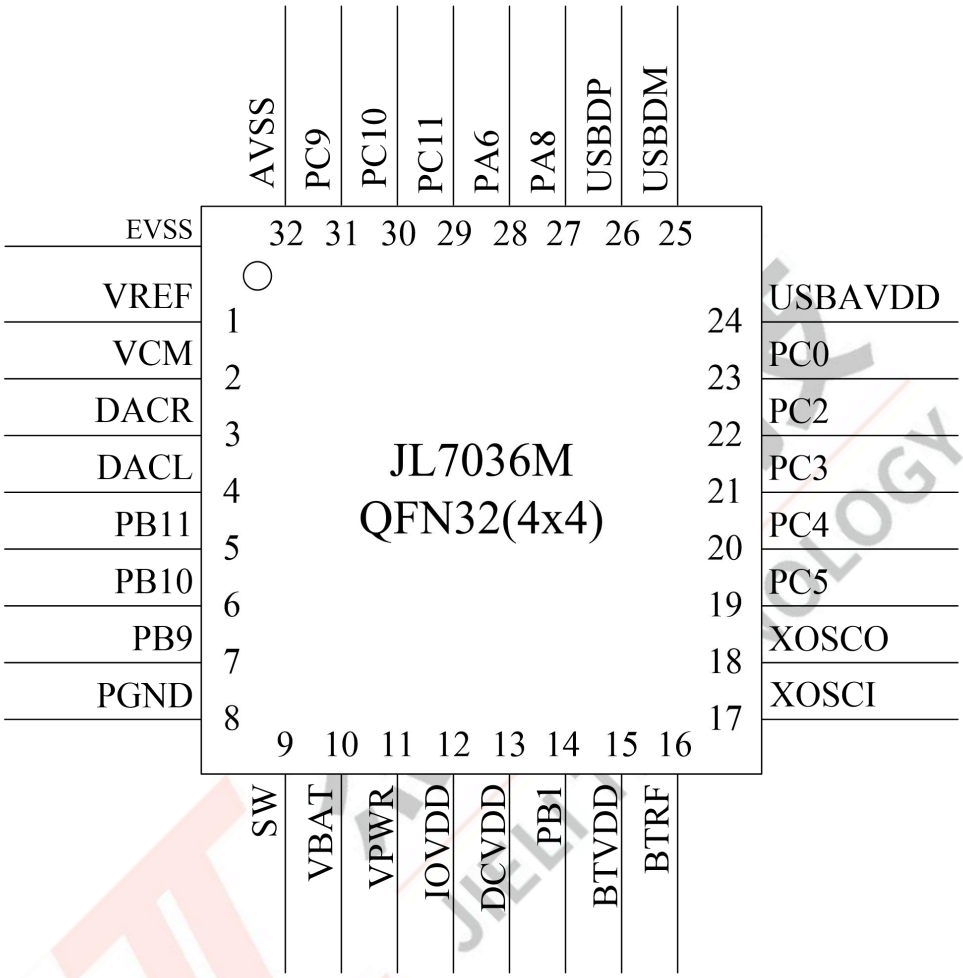


Figure 2-1 JL7036M Pin Assignment

2.2 Pin Description

Table 2-2-1 JL7036M Pin Description

Pin No.	Name	Type	IO Initial State	Description
1	VREF	P	--	Audio Power
2	VCM	P	--	Audio Reference Voltage
3	DACR	O	--	Right Channel DAC Output
4	DACL	O	--	Left Channel DAC Output
5	PB11	I/O	Z	ADC10(ADC Input Channel 10) SD Power
6	PB10	I/O	Z	ADC9(ADC Input Channel 9) AIN_B0(Audio ADC Positive Input)
7	PB9	I/O	Z	AIN_A0(Audio ADC Positive Input)
8	PGND	G	--	Ground of Buck DC-DCc onverter
9	SW	P	--	Buck DCDC Switch Port
10	VBAT	P	--	Battery Input
11	VPWR	I/O	Z	Charge Power Input
12	IOVDD	P	--	IO Power
13	DCVDD	P	--	DCDC power
14	PB1	I/O	10kΩ Pull-up	Hold down 0 to reset ADC5(ADC Input Channel 5) LP_TOUCHA0(TOUCH_CHA0)
15	BTVDD	P	--	BT Power
16	BTRF	RF	--	Bluetooth RF Antenna
17	XOSCI	I	--	Crystal Oscillator Input
18	XOSCO	O	--	Crystal Oscillator Output
19	PC5	I/O	Z	ADC14(ADC Input Channel 14) LCD COM0 PSRAM_D3A
20	PC4	I/O	Z	ADC13(ADC Input Channel 13) LCD COM1 PSRAM_CKA
21	PC3	I/O	Z	ADC12(ADC Input Channel 12) LCD COM2 PSRAM_CSA
22	PC2	I/O	Z	ADC11(ADC Input Channel 11) LCD COM3 LCD SEG18 PSRAM_D1A SPDIF_IN_AMP_D

Pin No.	Name	Type	IO Initial State	Description
23	PC0	I/O	Z	LCD COM5 LCD SEG16 PSRAM_D0A SPDIF_IN_AMP_C
24	USBAVDD	P	--	High Speed USB Power
25	USBDM	I/O	15kΩ Pull-down	USB Negative Data
26	USBDP	I/O	15kΩ Pull-down	USB Positive Data
27	PA8	I/O	Z	LCD SEG8 PAP_D6 LCD_SPI_D1 SPDIF_IN_AMP_B
28	PA6	I/O	Z	ADC2(ADC Input Channel 2) LCD SEG6 PAP_D4 LCD_SPI_CLK SPDIF_IN_AMP_A
29	PC11	I/O	Z	LCD SEG24 AIN_C0N(Audio ADC Negative Input)
30	PC10	I/O	Z	LCD SEG23 AIN_C1(Audio ADC Positive Input) MICBIASC(MIC Bias Output)
31	PC9	I/O	Z	LCD SEG22 AIN_C0(Audio ADC Positive Input)
32	AVSS	G	--	Audio Ground

Note

1.IO initial state abbreviations Z--High resistance, H--High level, L--Low level, X--May be changed during power on.

2.Timer, MCPWM, QDEC, UART, LEDC, I^2C, I^2S, SPI,IR RX and SD functions can be remapped to any I/O.

Table 2-2-2 Pin Types Description

Pin Type	Description	Pin Type	Description
P	Power	I/O	Input or Output
G	Ground	I	Input
RF	RF antenna	O	Output

3 Electrical Characteristics

3.1 Absolute Maximum Ratings

Table 3-1 Absolute Maximum Ratings

Symbol	Parameter	Min	Max	Unit
Topt	Operating temperature	-20	+85	℃
Tstg	Storage temperature	-65	+150	℃
VBAT	Supply Voltage	-0.3	4.5	V
VPWR		-0.3	6	V
IOVDD		-0.3	3.6	V
DCVDD		-0.3	1.4	V
BTVDD		-0.3	3	V
USBAVDD		-0.3	3.6	V
GPIO	Input voltage of GPIO	-0.3	3.6	V

Note

1.Stresses beyond those listed under absolute maximum ratings may cause permanent damage to the device.

3.2 ESD Ratings

Table 3-2 ESD Ratings

Parameter	Typ	Test pin	Reference standard
Human Body Mode	±4kV	All pins	JEDEC EIA/JESD22-A114
Machine Mode	±400V	All pins	JEDEC EIA/JESD22-A115
Charge Device Model	±1kV	All pins	ANSI/ESDA/JEDEC JS-002-2022

3.3 PMU Characteristics

Table 3-3 PMU Characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
VBAT	Voltage Input	--	2.7	3.7	4.5	V
VPWR	Charger supply Voltage	--	4.5	5.0	5.5	V
Operating mode						
Symbol	**Parameter**	**Conditions**	**Min**	**Typ**	**Max**	**Unit**
IOVDD	Voltage output	VBAT = 4.2V, 10mA loading	--	3	--	V
	Loading current	IOVDD=3.0V@VBAT = 3.7V or VPWR=5V	--	--	300	mA
DCVDD	Voltage output	--	--	1.2	--	V
	Loading current	DCVDD=1.2V@IOVDD=3.0V on LDO mode	--	--	150	mA
		DCVDD=1.2V@VBAT=3.7V on DCDC mode	--	--	180	mA

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Low Power mode						
Symbol	**Parameter**	**Conditions**	**Min**	**Typ**	**Max**	**Unit**
IOVDD	Loading current	IOVDD=3.0V@VBAT = 3.7V	--	--	20	mA

3.4 Battery Charge

Table 3-4 Charger Characteristics

Symbol	Parameter	Min	Typ	Max	Unit
VPWR	Charge Input Voltage	4.5	5	5.5	V
CV	CV Mode Voltage Accuracy	4.175	4.2	4.225	V
		4.325	4.35	4.375	V
CC	CC Mode Current	15	--	350	mA
I_{end}	End Of Charge Current	1.5	--	35	mA
V_{Trikl}	Trickle Charge Voltage	--	3	--	V

3.5 IO Characteristics

Table 3-5 IO Characteristics

Input Characteristics						
Symbol	**Parameter**	**Conditions**	**IO**	**Min**	**Max**	**Unit**
V_{IL}	Low-Level Input Voltage	IOVDD = 3.0V	PA6,PA8 PB1,PB9~PB11 PC0,PC2~PC5,PC9~PC11 USBDP USBDM VPWR	-0.3	1.4	V
V_{IH}	High-Level Input Voltage	IOVDD = 3.0V	PA6,PA8 PB1,PB9~PB11 PC0,PC2~PC5,PC9~PC11 PR0~PR1 USBDP USBDM	1.7	3.3	V
		IOVDD = 3.0V	VPWR	1.7	5.5	V
Output Characteristics						
Symbol	**Parameter**	**Conditions**	**IO**	**Typ**		**Unit**
$\lvert I_{OL} \rvert$	Output Current	IOVDD = 3.0V Voutput = 0.3V	PA6,PA8 PB1,PB9~PB11 PC0,PC2~PC5,PC9~PC11	2(HD=0) 8(HD=1) 26(HD=2) 50(HD=3)		mA
			USBDP USBDM	8		mA

			VPWR	2	mA
| I_{OH} |	Output Current	IOVDD = 3.0V Voutput = 2.7V	PA6,PA8 PB1,PB9~PB11 PC0,PC2~PC5,PC9~PC11	2(HD=0) 8(HD=1) 26(HD=2) 50(HD=3)	mA
			USBDP USBDM	8	mA
			VPWR	2	mA
Internal Resistance Characteristics					
Symbol	**Parameter**	**Conditions**	**IO**	**Typ**	**Unit**
R_{pu}	Pull-up Resistance	IOVDD = 3.0V	PA6,PA8 PB1,PB9~PB11 PC0,PC2~PC5,PC9~PC11 VPWR	10k(PU=1) 100k(PU=2) 1M(PU=3)	Ω
			USBDP USBDM	1.5k(PU=1) 1k(PU=3)	Ω
R_{pd}	Pull-down Resistance	IOVDD = 3.0V	PA6,PA8 PB1,PB9~PB11 PC0,PC2~PC5,PC9~PC11 VPWR	10k(PD=1) 100k(PD=2) 1M(PD=3)	Ω
			USBDP USBDM	15k(PD=1)	Ω

Note

1.Internal pull-up/pull-down resistance accuracy ±20%.

3.6 Audio DAC Characteristics

Table 3-6 Stereo DAC Characteristics

Parameter	Conditions	Min	Typ	Max	Unit
Resolution	--	--	--	24	bit
Output Sample Rate	--	8	--	96	kHz
SNR①	Differential Mode Fin=1kHz@0dBFS Fs=44.1kHz B/W=20Hz~20kHz A-Weighted load=10kΩ	--	113	--	dB
	Single-ended Mode Fin=1kHz@0dBFS Fs=44.1kHz B/W=20Hz~20kHz A-Weighted load=10kΩ	--	110	--	dB
Dynamic Range	Differential Mode Fin=1kHz@-60dBFS Fs=44.1kHz B/W=20Hz~20kHz A-Weighted load=10kΩ	--	109	--	dB
	Single-ended Mode Fin=1kHz@-60dBFS Fs=44.1kHz B/W=20Hz~20kHz A-Weighted load=10kΩ	--	106	--	dB
THD+N	Differential Mode Fin=1kHz@0dBFS Fs=44.1kHz B/W=20Hz~20kHz A-Weighted load=32Ω	--	-86	--	dB
	Single-ended Mode Fin=1kHz@0dBFS Fs=44.1kHz B/W=20Hz~20kHz A-Weighted load=32Ω	--	-86	--	dB
Noise Floor	Differential Mode B/W=20Hz~20kHz A-Weighted load=10kΩ	--	7	--	uVrms
	Single-ended Mode B/W=20Hz~20kHz A-Weighted load=10kΩ	--	5	--	uVrms
Noise Floor with MUTE	Differential Mode	--	4	--	uVrms

	B/W=20Hz~20kHz A-Weighted load=10kΩ				
	Single-ended Mode B/W=20Hz~20kHz A-Weighted load=10kΩ	--	3	--	uVrms
Stereo Crosstalk	Single-ended Mode Fin=1kHz@0dBFS Fs=44.1kHz B/W=20Hz~20kHz A-Weighted load=10kΩ	--	-108	--	dB
Max Output Power	Differential Mode Fin=1kHz@0dBFS Fs=44.1kHz B/W=20Hz~20kHz A-Weighted load=16Ω THD+N＜0.1%	--	30	85	mW
	Single-ended Mode Fin=1kHz@0dBFS Fs=44.1kHz B/W=20Hz~20kHz A-Weighted load=16Ω THD+N＜0.1%	--	30	38	mW

Note

1.①SNR is the ratio of output level with a 1kHz full-scale input to output level with MUTE on.

3.7 Audio ADC Characteristics

Table 3-7 Audio ADC Characteristics

Parameter	Conditions	Min	Typ	Max	Unit
Resolution	--	--	--	24	bits
Input Sample Rate	--	8	--	48	kHz
SNR	Differential input Mode Fin=1kHz@0dBFS Fs=44.1kHz B/W=20Hz~20kHz A-Weighted ADC gain=-3dB	--	105	--	dB
	Single-ended input Mode Fin=1kHz@0dBFS Fs=44.1kHz B/W=20Hz~20kHz A-Weighted ADC gain=-3dB	--	102	--	dB
Dynamic Range	Differential input Mode Fin=1kHz@-60dBFS	--	105	--	dB

Parameter	Conditions	Min	Typ	Max	Unit
	Fs=44.1kHz B/W=20Hz~20kHz A-Weighted ADC gain=-3dB				
	Single-ended input Mode Fin=1kHz@-60dBFS Fs=44.1kHz B/W=20Hz~20kHz A-Weighted ADC gain=-3dB	--	102	--	dB
THD+N	Differential input Mode Fin=1kHz@0dBFS Fs=44.1kHz B/W=20Hz~20kHz A-Weighted ADC gain=-3dB	--	-90	--	dB
	Single-ended input Mode Fin=1kHz@0dBFS Fs=44.1kHz B/W=20Hz~20kHz A-Weighted ADC gain=-3dB	--	-90	--	dB
Analogue Gain	--	-9	--	32	dB
Max Input Level	Differential input Mode ADC gain=-3dB	--	2	--	Vrms
	Single-ended input Mode ADC gain=-3dB	--	1	--	Vrms

3.8 BT Characteristics

3.8.1 Transmitter

Table 3-8-1 Transmitter characteristics

Parameter	Conditions	Min	Typ	Max	Unit
Maximum RF Transmit Power	BR	--	10	--	dBm
Maximum RF Transmit Power	EDR Π/4 DQPSK EDR 8DPSK	--	10	--	dBm
Relative Transmit Power	EDR Π/4 DQPSK EDR 8DPSK	--	-3	--	dB
Maximum RF Transmit Power	BLE-1Mbps	--	10	--	dBm

3.8.2 Receiver

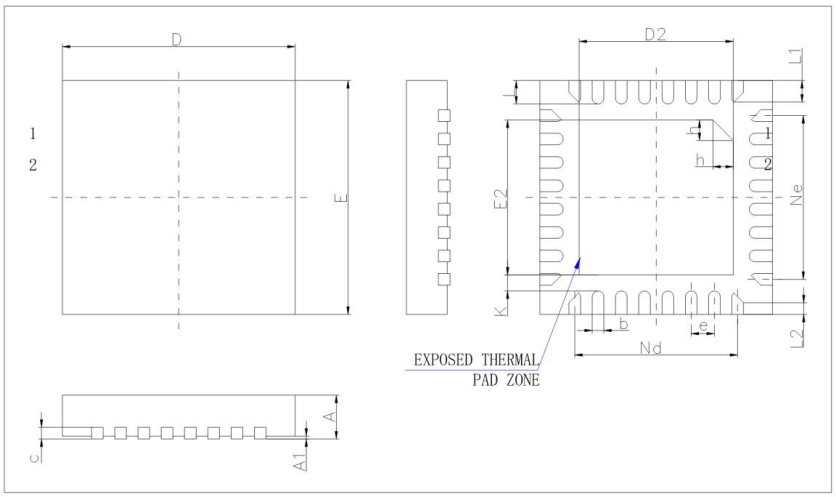
Table 3-8-2 Receiver characteristics

Parameter	Conditions	Min	Typ	Max	Unit
Sensitivity	BR	--	-95	--	dBm

Parameter	Conditions	Min	Typ	Max	Unit
	EDR Π/4 DQPSK	--	-95	--	dBm
	EDR 8DPSK	--	-87	--	dBm
	BLE-1Mbps	--	-98.5	--	dBm
	BLE-2Mbps	--	-95.5	--	dBm
	BLE-S2	--	-101	--	dBm
	BLE-S8	--	-106	--	dBm

4 Package Information

4.1 QFN32_4x4mm



SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	0.65	0.80	0.95
A1	0	0.02	0.05
b	0.15	0.20	0.25
c	0.18	0.20	0.25
D	3.90	4.00	4.10
D2	2.50	2.65	2.80
e	0.40BSC		
Nd	2.80BSC		
E	3.90	4.00	4.10
E2	2.50	2.65	2.80
Ne	2.80BSC		
K	0.20	-	-
L	0.35	0.40	0.45
L1	0.30	0.35	0.40
L2	0.15	0.20	0.25
h	0.30	0.35	0.40
L/F 载体尺寸 (mil)	112*112		

Figure 4-1 JL7036M Package

5 IC Marking Information

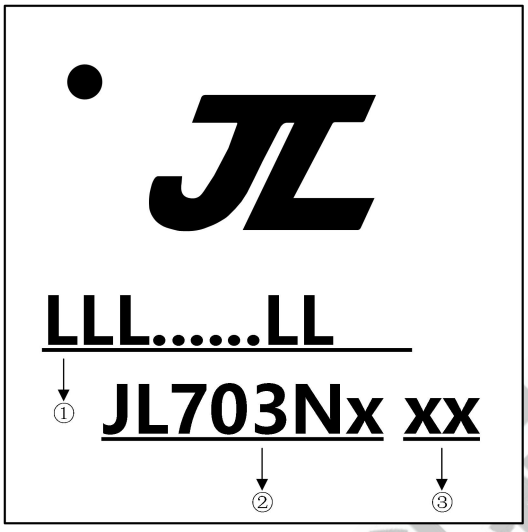


Figure 5-1 JL7036M Package Outline

① LLL.....LL LOT No. , It contains 7 to 18 alphanumerics

② JL703Nx Chip Model

③ xx Built-in Memory

0 No Flash Memory

2 2Mbit Flash

4 4Mbit Flash

8 8Mbit Flash

6 16Mbit Flash

3 32Mbit Flash

nS memory is flash plus PSRAM, n represents the flash capacity, S represents 16Mbit PSRAM

nT memory is flash plus PSRAM, n represents the flash capacity, T represents 64Mbit PSRAM

6 Solder-Reflow Condition

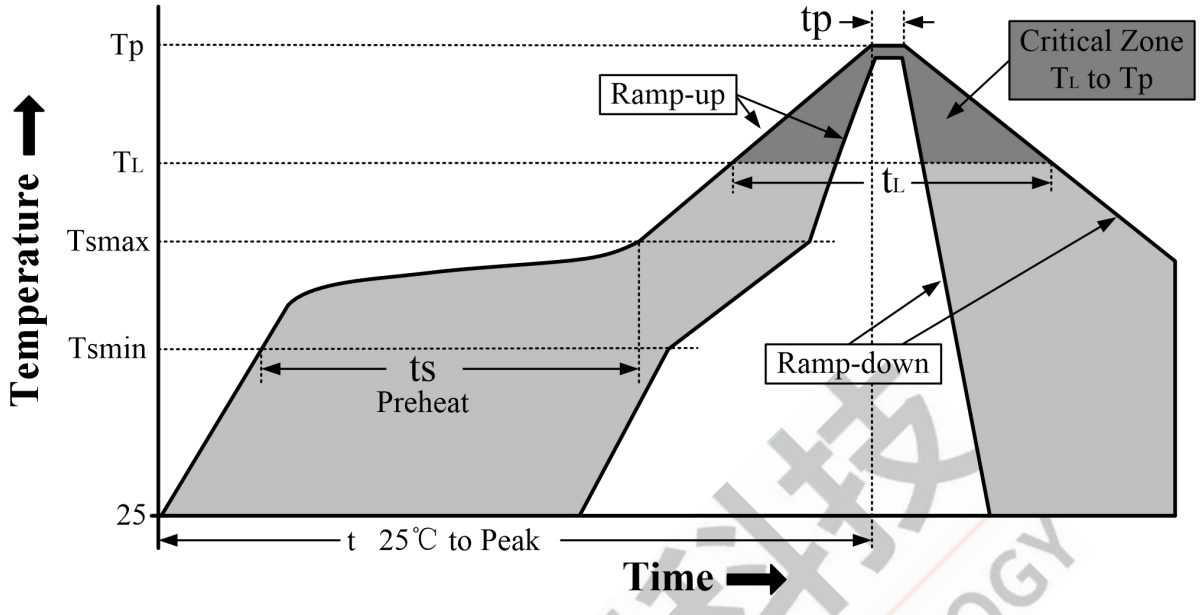


Figure 6-1 Classification Reflow Profile

Table 6-1 Classification Profiles

Profile Feature		Sn-Pb Eutectic Assembly	Pb-Free Assembly
Preheat/Soak	Temperature Min (T_{smin})	100℃	150℃
	Temperature Max (T_{smax})	150℃	200℃
	Time (ts) from (T_{smin} to T_{smax})	60-120 seconds	60-180 seconds
Average ramp-up rate (T_{smax} to T_p)		3℃/second max	3℃/second max
Liquidous temperature (T_L) Time (t_L) maintained above T_L		183℃ 60-150 seconds	217℃ 60-150 seconds
Peak package body temperature (T_p)		See Table 6-2	See Table 6-3
Time within 5℃ of actual Peak Temperature (tp)[2]		10-30 seconds	20-40 seconds
Ramp-down rate (T_p to T_L)		6℃/second max	6℃/second max
Time 25℃ to peak temperature		6 minutes max	8 minutes max

Note

1.All temperatures refer to topside of the package, measured on the package body surface

2.Time within 5℃ of actual peak temperature (tp) specified for the reflow profiles is a "supplier" and "user" maximum.

Table 6-2 SnPb Classification Temperature

Package Thickness	Volume mm^3 < 350	Volume mm^3 ≥ 350
<2.5 mm	240 +0/-5℃	225 +0/-5℃
≥2.5 mm	225 +0/-5℃	225 +0/-5℃

Table 6-3 Pb-free - Classification Temperature

Package Thickness	Volume mm^3 < 350	Volume mm^3 350 - 2000	Volume mm^3 > 2000
< 1.6mm	260℃	260℃	260℃
1.6 mm - 2.5mm	260℃	250℃	245℃
> 2.5mm	250℃	245℃	245℃

Note

1.*Tolerance The device manufacturer/supplier shall assure process compatibility up to and including the stated classification temperature (this means Peak reflow temperature +0℃.For example 260℃+0℃)at the rated MSL level.