SHENZHEN HI-LINK ELECTRONIC CO.,LTD

HLK-7628N USER MANUAL

Version：V1.0 modified date：2017-7-6

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1. INTRODUCTION

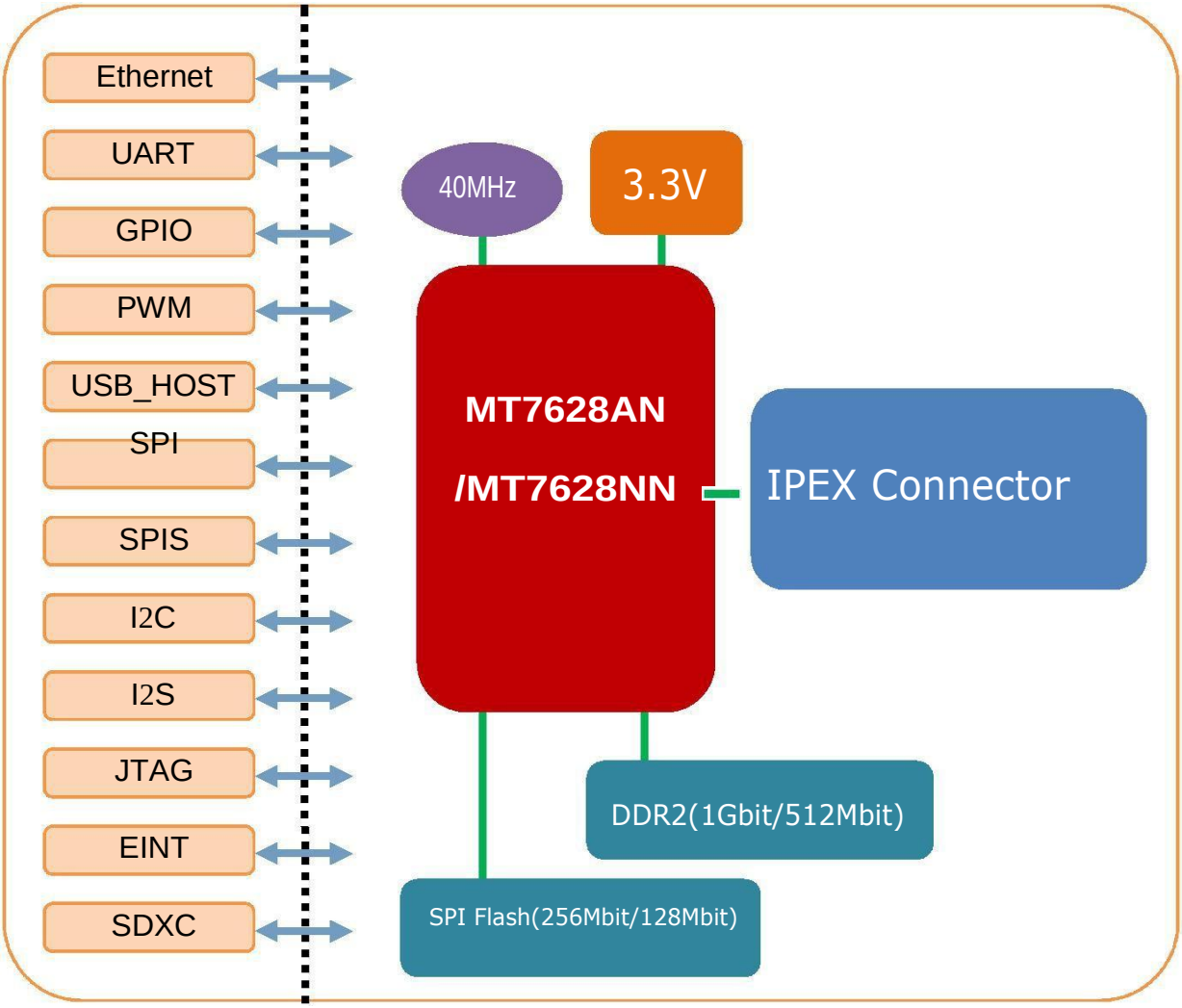
HLK-7628N based on MT7628AN is a low cost and low power consumption IOT module developed by Hi-Link. This module leads to all the interfaces of MT7628NN,The module supports Linux, OpenWRT operating system and custom development. It could be widely applied to smart devices or cloud services application with its rich interface and powerful processors, at the same time ,it also support secondary development.

1.1. BASIC PARAMETER

- High data processing ability，MCU frequency 580MHz
- 300M Mbps
- Support 802.11b/g/n
- 20/40 Channel bandwidth
- Support 802.11v
- Support AP,STA and AP,STA mixed
- Five 10/100M ETH PORT
- 1 USB2.0 Host interface port
- Interface SPI/SD-XC/eMMC
- Rich peripheral interfaces，SPI,I2C,I2S,PCM,UART,JTAG,GPIO
- Widely used in IOT
- Inbuilt powerful PMU
- Support 16 Multiple BSSID
- Support multiple security methods WEP64/128, TKIP,AES, WPA, WPA2, WAPI
- Support QoS，WMM，WMM-PS

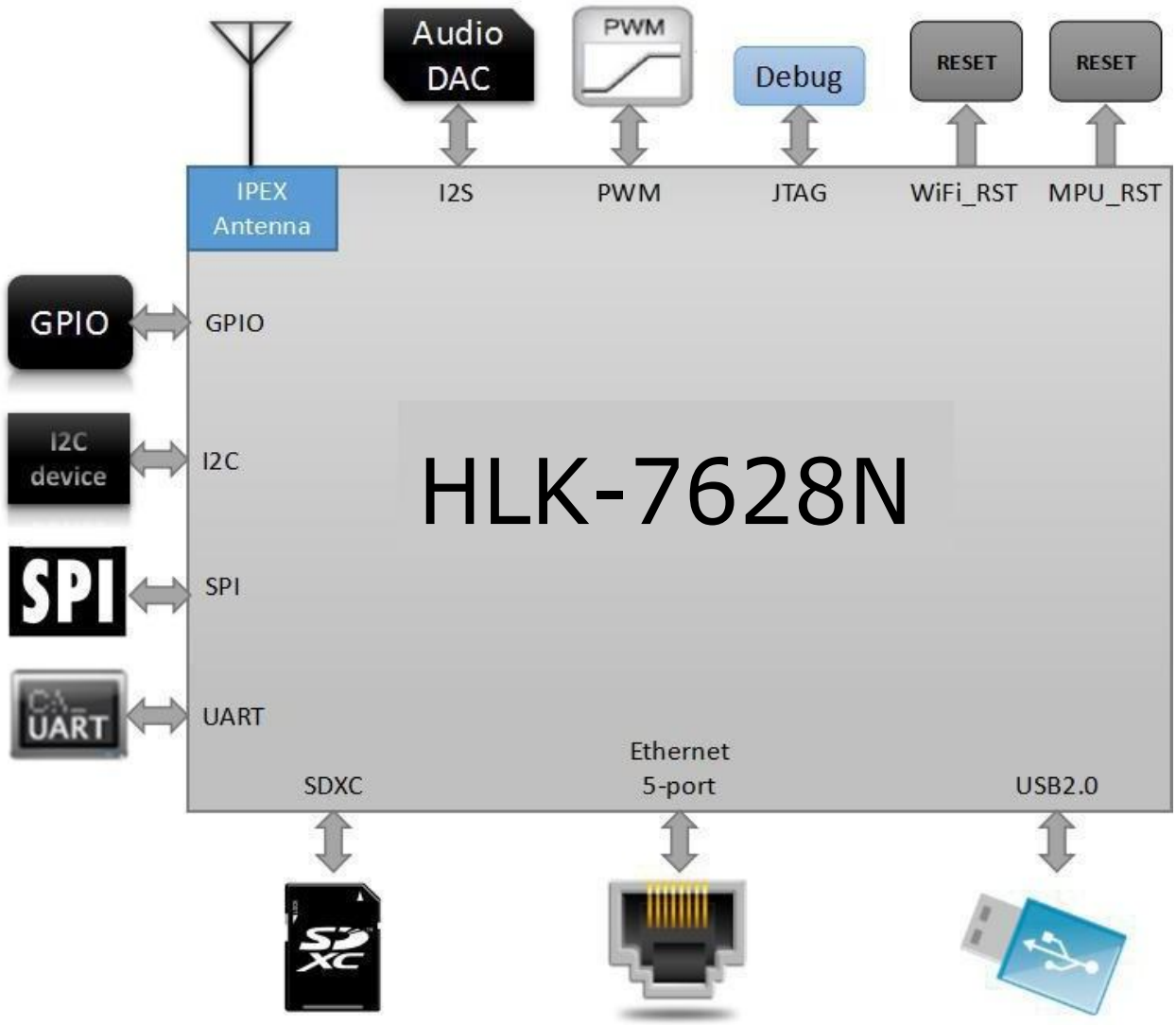
- Support Linux 2.6.36 SDK，OpenWrt 3.10

2. DIAGRAM



HLK-7628 structure

2.1. TYPICAL APPLICATION



HLK-7628N typical peripheral interfaces

2.2. SPECIFICATIONS

Item	Parameter	Note
Model	HLK-7628N	Version V1.0
Chip	MT7628AN/MT7628NN	
Kernel	MIPS24KEc	
Basic frequency	580MHz	
RAM	DDR2 128MB	Customizable DDR2 64M/32MB
Flash	32MB	Customizable 16MB/8MB
Temperature	Environment temperature：-40℃~85℃	
Humidity	Working：10~95%（noncondensing） Storage：5~95%（noncondensing）	
Size	18mm×35.2mm×2.8mm	

2.3. INTERFACE NUMBER

Interface	Contain interface	Interface supported
WiFi Standard	IEEE 802.11b/g/n	Support
Ethernet Interface	Five 10/100M ETH PORT	1 WAN、4 LAN
UART	3	2 UART support transmitting
SDIO	1	Non support
SPI	1	Non support
I2C	1	Non support
I2S	1	Non support
PWM	1	Non support
GPIO	More than 8	Defined functions

Notes：

1、The module was default embedded our firmware which based on Linux; the Ethernet,WiFi,UART0 and UART1 of the firmware have the function of transmission.

2、Based on actual usage, the module also can be embedded OPENWRT program and LINUX program of MTK original plant before sent out.

3. ELECTRICAL CHARACTERISTIC

3.1. POWER SUPPLY REQUIREMENT

Power supply requirement	
Input voltage	DC:3.3±0.2V
Non-load current	170±50mA
Supply current	≥800mA

3.2. RF PERFORMANCE

3.2.1. 802.11b 11M

802.11b Transmit (Conductive)					
Item	Condition	Min.	Typ.	Max.	Unit
Frequency Range		Channel 1		Channel 13	
Tx Power Level	DQPSK	18	20	22	dBm
Frequency Tolerance		-15	0	15	ppm
Spectral Mask	11MHz→22MHz		40		dBr
	＞22MHz		53		dBr
Modulation Accuracy	All Data Rate		15		%
802.11b Receiver (Conductive)					
Item	Condition	Min.	Typ.	Max.	Unit
Frequency Range		Channel 1		Channel 13	
Min. Input	11Mbps PER<8%	-91.5	-89.5	-87.5	dBm

3.2.2. 802.11g 54M

802.11g Transmit (Conductive)					
Item	Condition	Min.	Typ.	Max.	Unit

Frequency Range		Channel 1		Channel 13	
Tx Power Level	OFDM	15	17	19	dBm
Frequency Tolerance		-15	0	15	ppm
Modulation Accuracy	All Data Rate		-31	-28	%
802.11g Receiver (Conductive)					
Item	Condition	Min.	Typ.	Max.	Unit
Frequency Range		Channel 1		Channel 13	
Min. Input	54Mbps PER<10%	-78.0	-76.0	-74.0	dBm

3.2.3. 802.11n MCS7(HT20)

802.11n_HT20 Transmit (Conductive)					
Item	Condition	Min.	Typ.	Max.	Unit
Frequency Range		Channel 1		Channel 13	
Tx Power Level	OFDM	15	17	19	dBm
Frequency Tolerance		-15	0	15	ppm
Modulation Accuracy	All Data Rate		-31	-28	dB
802.11n_HT20 Receiver (Conductive)					
Item	Condition	Min.	Typ.	Max.	Unit
Frequency Range		Channel 1		Channel 13	
Min. Input	MCS7 PER<10%	-76.5	-74.5	-72.5	dBm

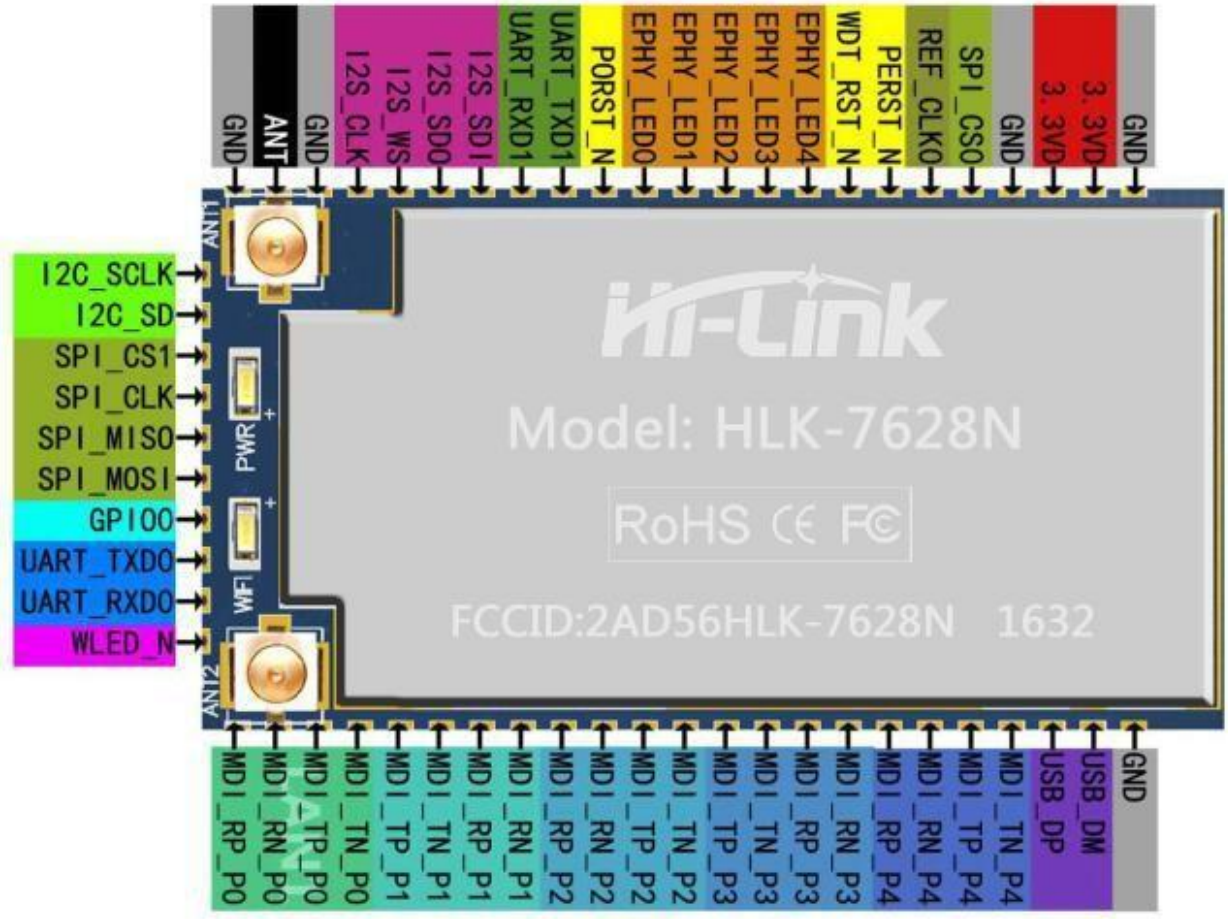
3.2.4. 802.11n_MCS7(HT40)

802.11n_HT40 Transmit (Conductive)					
项目	条件	最小	典型值	最大	单位
Frequency Range		Channel 1		Channel 13	
Tx Power Level	OFDM	15.0	17.0	19.0	dBm

Frequency Tolerance		-15	0	15	ppm
Modulation Accuracy	All Data Rate		-31	-28	dB
802.11n_HT40 Receiver (Conductive)					
Item	Condition	Min.	Typ.	Max.	Unit
Frequency Range		Channel 1		Channel 13	
Min. Input	MCS7 PER<10%	-76.5	-74.5	-72.5	dBm

4. MODULE PINS DEFINITION

4.1. PIN DEFINITION CHART



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4.2. DEFAULT PIN DEFINITION CHART

PIN	Name(Function 1)	Function 2	Function 3	Function 4	GPIO#	Note
1	GND					
2	3.3VD					Supply current≥800mA
3	3.3VD					Supply current≥800mA
4	GND					
5	SPI_CS0				GPIO# 10	SPI bus chip select 0
6	REF_CLK0				GPIO# 38	Reference clock output
7	PERST_N				GPIO# 36	PCIe device reset
8	WDT_RST_N				GPIO# 37	Watchdog reset
9	EPHY_LED4	JTAG_RST_N			GPIO# 39	
10	EPHY_LED3	JTAG_CLK			GPIO# 40	
11	EPHY_LED2	JTAG_TMS			GPIO# 41	
12	EPHY_LED1	JTAG_TDI			GPIO# 42	
13	EPHY_LED0	JTAG_TDO			GPIO# 43	
14	PORST_N					CPU reset
15	UART_TXD1			PWM_CH0	GPIO# 45	Port 1 date transmission
16	UART_RXD1			PWM_CH1	GPIO# 46	Port 1 date reception
17	I2S_SDI	PCMDRX			GPIO# 0	I2S date input
18	I2S_SDO	PCMDTX			GPIO# 1	I2S date output
19	I2S_WS	PCMCLK			GPIO# 2	I2S sound channel selection,0:left; 1:right

20	I2S_CLK	PCMFS			GPIO#3	I2S
21	GND					
22	ANT					Antennal RF interface(not connect)
23	GND					
24	I2C_SCLK				GPIO#4	I2C
25	I2C_SD				GPIO#5	I2C
26	SPI_CS1				GPIO#6	SP 1
27	SPI_CLK				GPIO#7	SPI
28	SPI_MISO				GPIO#9	SPI
29	SPI_MOSI				GPIO#8	SPI
30	GPIO0				GPIO#11	

31	UART_TXD0				GPIO#12	Port 0 date output
32	UART_RXD0				GPIO#13	Port 0 date input
33	WLED_N				GPIO#44	WiFi LED
34	MDI_RP_P0					
35	MDI_RN_P0					
36	MDI_TP_P0					
37	MDI_TN_P0					
38	MDI_TP_P1	SPIS_CS		PWM_CH0	GPIO#14	
39	MDI_TN_P1	SPIS_CLK		PWM_CH1	GPIO#15	
40	MDI_RP_P1	SPIS_MISO		UART_TXD2	GPIO#16	
41	MDI_RN_P1	SPI_MOSI		UART_RXD2	GPIO#17	
42	MDI_RP_P2		eMMC_D7	PWM_CH0	GPIO#18	
43	MDI_RN_P2		eMMC_D6	PWM_CH1	GPIO#19	
44	MDI_TP_P2	UART_TXD2	eMMC_D5	PWM_CH2	GPIO#20	
45	MDI_TN_P2	UART_RXD2	eMMC_D4	PWM_CH3	GPIO#21	
46	MDI_TP_P3	SD_WP	eMMC_WP		GPIO#22	
47	MDI_TN_P3	SD_CD	eMMC_CD		GPIO#23	
48	MDI_RP_P3	SD_D1	eMMC_D1		GPIO#24	
49	MDI_RN_P3	SD_D0	eMMC_D0		GPIO#25	
50	MDI_RP_P4	SD_CLK	eMMC_CLK		GPIO#26	
51	MDI_RN_P4	SD_CMD	eMMC_CMD		GPIO#28	
52	MDI_TP_P4	SD_D3	eMMC_D3		GPIO#29	
53	MDI_TN_P4	SD_D2	eMMC_D2		GPIO#27	
54	USB_DP					
55	USB_DM					
56	GND					

Notes：

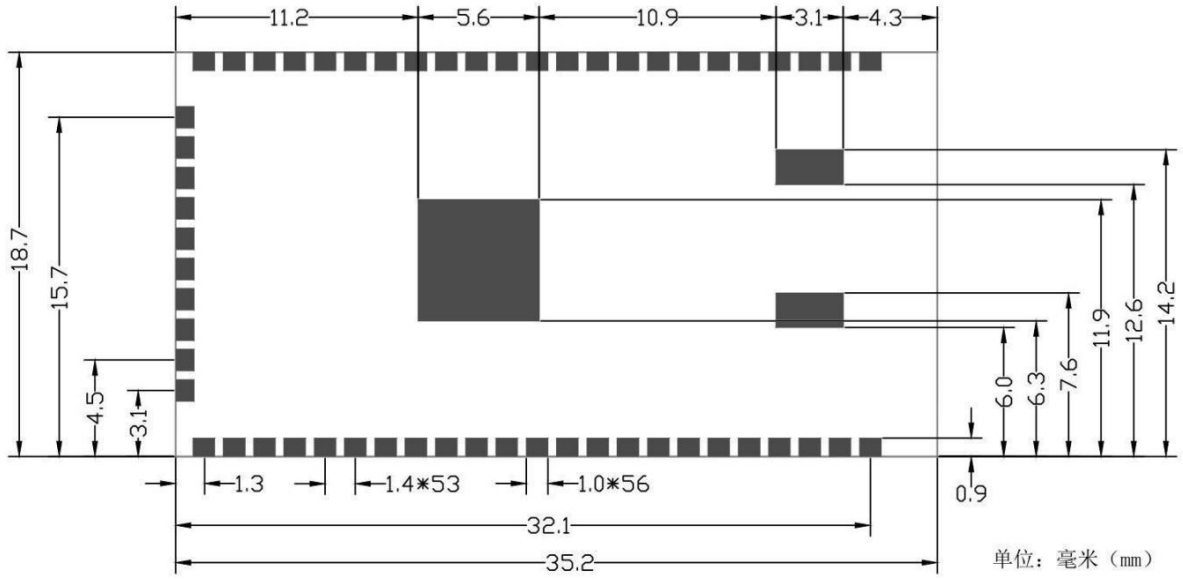
1，All pins default 1,drive current 8MA.

2，Red representation on the name bar: related to the start of the chip, the outside can not be pulled up and down, not connected with the driver source.

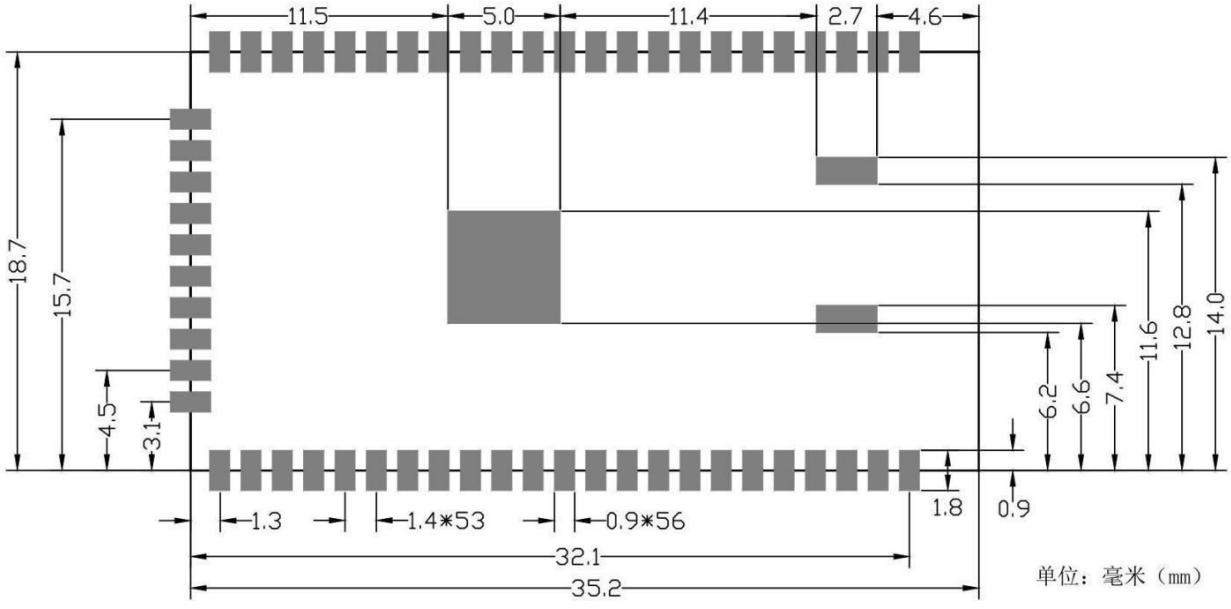
3，Blue representation on the name bar: The default firmware .

4，The module of MT7628NN chip does not have PCIE interface.

5. MODULE DIMENSION CHART



Module dimension chart (TOP)

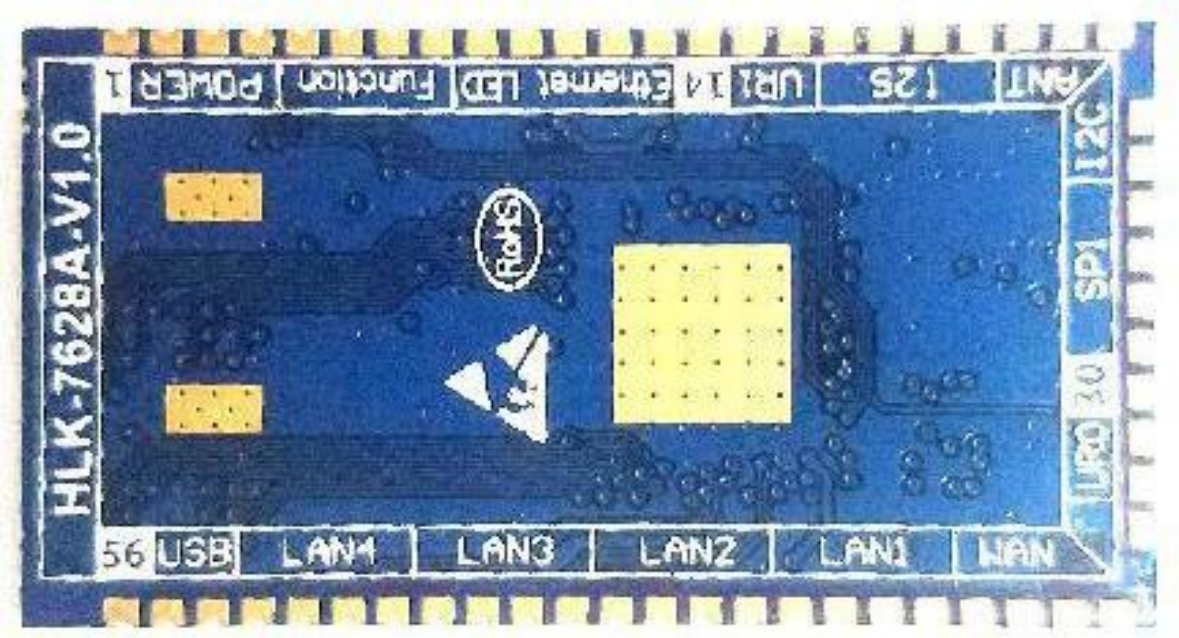


Recommended package size diagram

Notes：

1，The three intermediate pads are hot pads, please ground.

2，Package pad epitaxial size can be appropriately shortened or lengthened according to demand.



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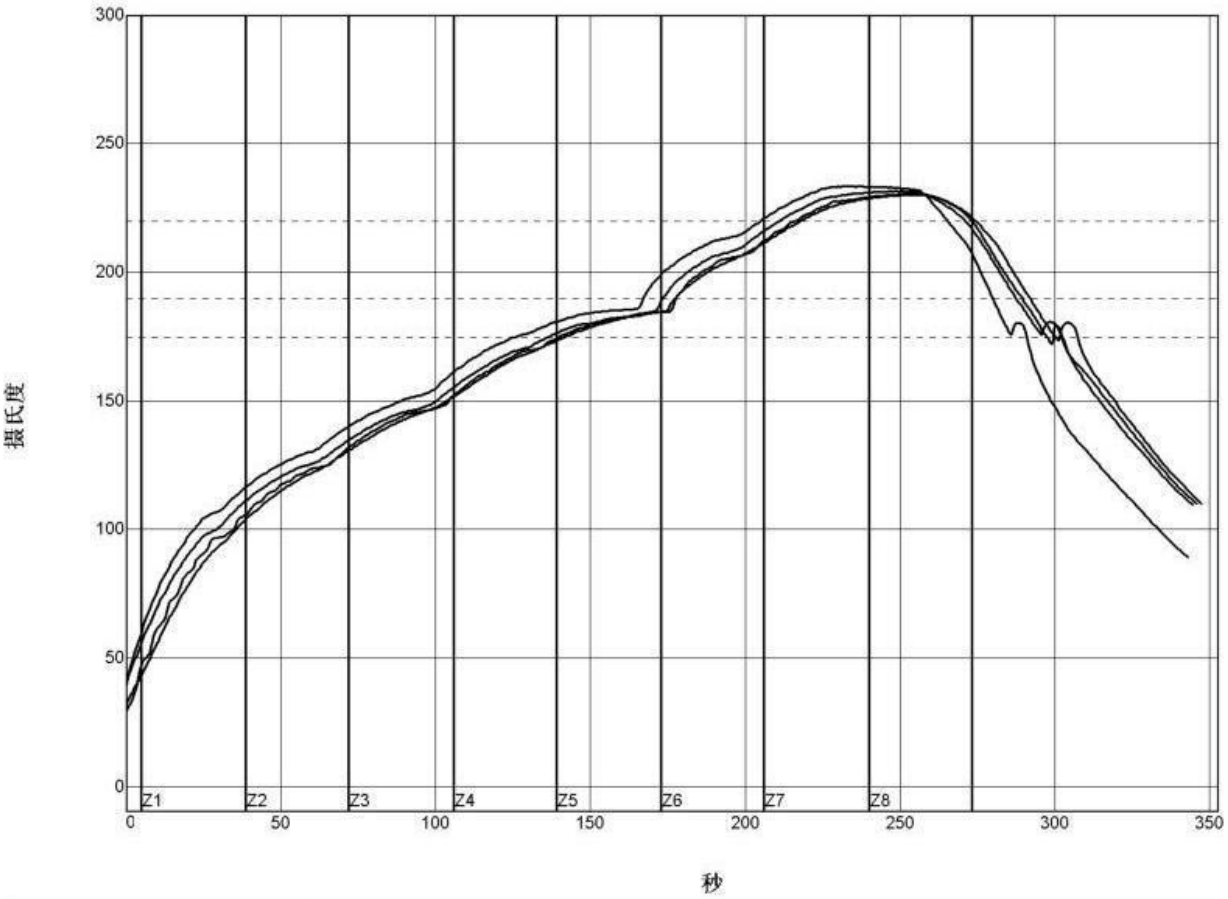
6. REFLOW WELDING TEMPERATURE CURVE

Please following this temperature curve strictly when the module passes through the furnace twice, as the module damage caused by reflow welding temperature deviation.

坏！温度设置（摄氏度）									
温区	1	2	3	4	5	6	7	8	
上温区	125	135	155	185	195	225	240	230	
下温区	125	135	155	185	195	225	240	230	
传送带速度：70.0 公分/分									



PWI= 94%	恒温时间175至190C		回流时间 /220C		最高温度	
<TC2>	35.53	-82%	55.58	-72%	230.28	-94%
<TC3>	37.66	-74%	58.66	-57%	230.56	-89%
<TC4>	41.52	-62%	60.63	-47%	233.62	-28%
<TC5>	37.07	-76%	60.44	-48%	231.67	-67%
温差	5.99		5.05		3.34	

制程界限:

锡膏:	System Default for Reflow		
统计数名称	最低界限	最高界限	单位
恒温时间175-190摄氏度	30	90	秒
回流以上时间 - 220摄氏度	50	90	秒
最高温度	230	240	度 摄氏度