IPQ4018 core module

Pupfish-IPQ4018 Spec

Specification Version 1.0.0

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Revision	Date	Contents of Revision Change	Remark
1.0.0	2017-11-17	First release	

1. INTRODUTION

The Pupfish-IPQ4018 module use the IPQ4018 chipset. IPQ4018 is a highly integrated network router system-on-chip used for high wireless performance, home entertainment, home automation and so on .

The PQI20 with QCA9886 is a highly integrated wireless local area network (WLAN) system for 5GHz 802.11ac and 2.4GHz 802.11n WLAN applications. The IPQ4018 is a highly integrated system-on-chip (SoC) designed for high-performance, power efficient, and cost-effective 2×2, 802.11ac, dual-band concurrent access-point applications. The SoC incorporates a quad-core ARM Cortex A7 processor, two dual-band, concurrent 802.11ac Wave-2 Wi-Fi subsystems, and a five-port Gigabit Ethernet Layer2/3/4 multilayer switch supporting line rate network address translation (NAT). It supports one USB3.0 and one USB2.0. It also supports miscellaneous interfaces such as I2S, SPDIF, I2C, SMI, UART, JTAG, etc., which can be configured as general purpose I/O pins.

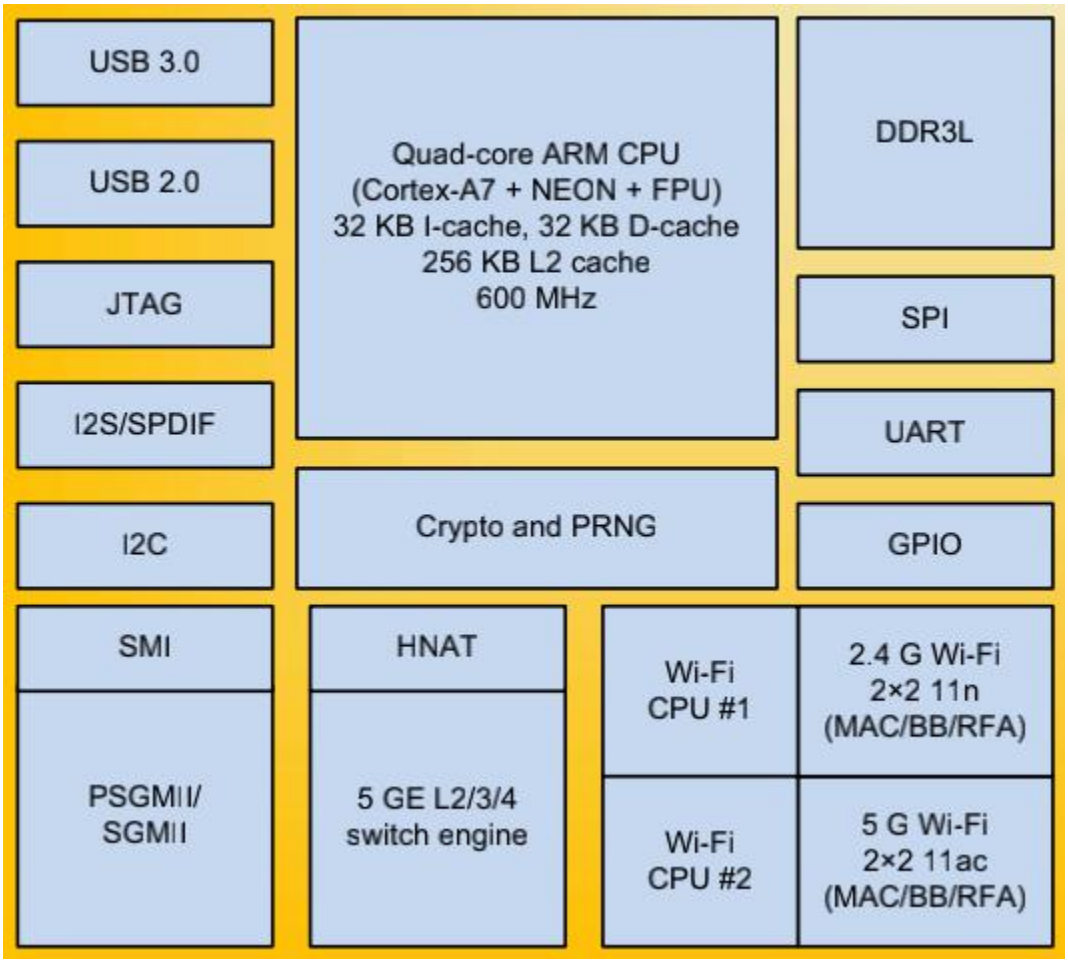
The Pupfish-IPQ4018 module include all the function from IPQ4018 chipset, it has one DDR3L, two fast flash.

A major feature of this module is its high power, you can connect extra 5V for the module, then more stable signals and wider coverage are obtained. Another feature supports the MMCX connector. This will make your use experience even better.

2. CHARACTERISTICS

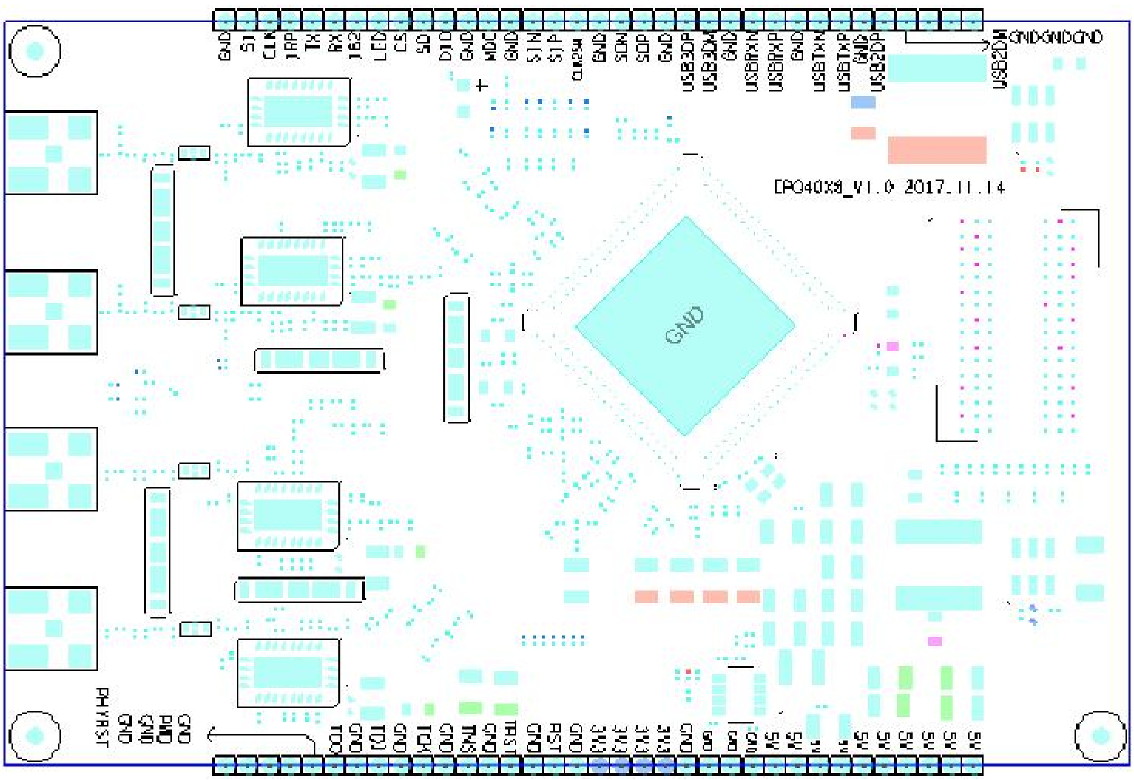
- Quad-core ARM Cortex-A7 at 600 MHz
- DRAM memory
  - JEDEC standard DDR3L SDRAM
- Flash memory
  - SPI (x1b) flash
  - Supports NOR and/or NAND flash
- Dual Wi-Fi subsystem with Qualcomm® VIVE™ technology
  - On-chip dual-band concurrent (DBDC) 2×2 2G 802.11n (256QAM) and 2×2 5G 802.11ac Wi-Fi, supporting MU-MIMO beamforming techniques.
- High-speed interfaces
  - 1× PSGMII/SGMII
  - 1 × USB3.0
  - 1 × USB2.0
- Miscellaneous
  - I^2S, SPDIF, I^2C, UART, SMI
  - JTAG
  - GPIO
- Package
  - 14 mm × 14 mm 180-pin Dual Row QFN package

3. FUNCTIONAL BLOCK DIAGRAM

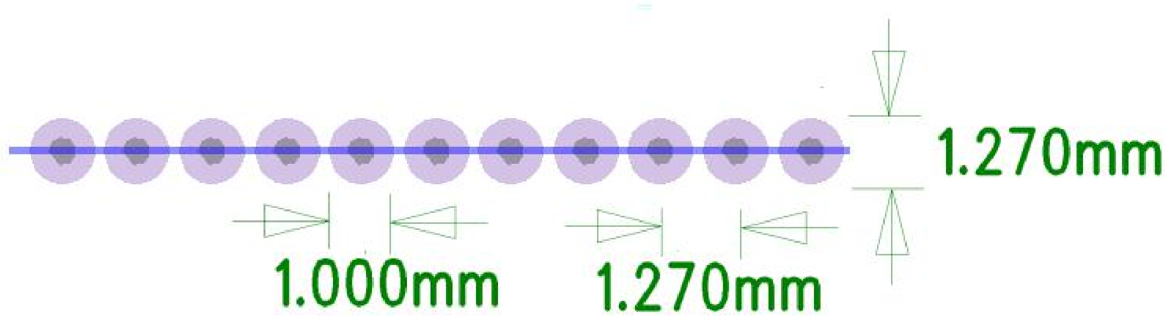


4. PINS

Dimensions (mm)	Length	Width	Height
	44.3 (Tolerance:±0.2mm)	1.27 (Tolerance:±0.2mm)	1.2 (Tolerance:±0.2mm)



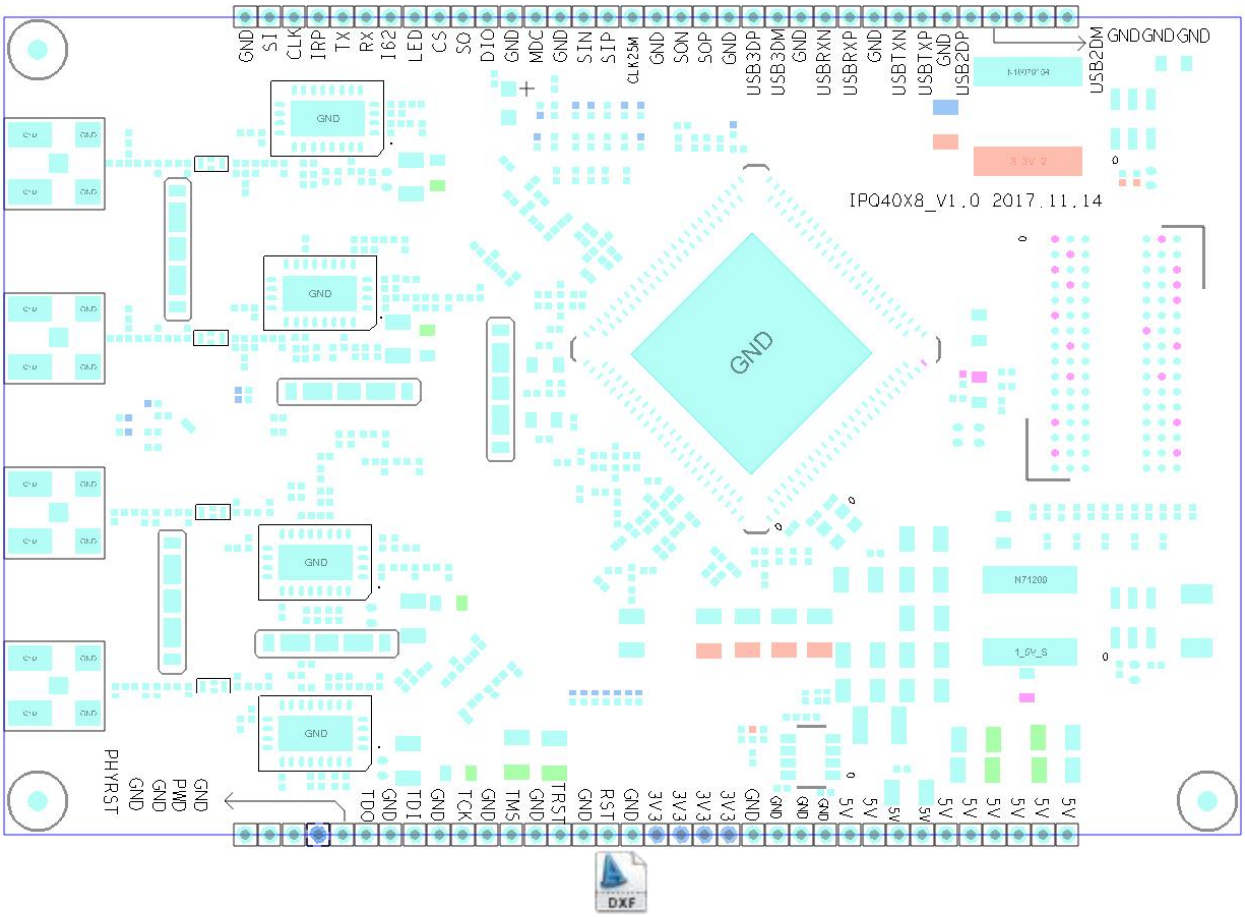
Pin describe:



PIN NO	Name	GPIO state	spec
1	PSGMII_SIP		Differential positive input
2	PSGMII_SIN		Differential negative input
3	PSGMII_SOP		Differential positive output
4	PSGMII_SON		Differential negative output
5	CLOCK25M		Supply external PHY with 25 MHz clock
6	USB3_HS_DM		USB HS data minus
7	USB3_HS_DP		USB HS data plus
8	USB3_SS_RX_P		USB SS receive data plus
9	CHIP_PWD_L		System reset
10	USB3_SS_RX_N		USB SS receive data minus
11	USB3_SS_TX_P		SS USB transmit data plus
12	USB3_SS_TX_N		USB SS transmit data minus
13	USB2_DM		USB HS data minus
14	USB2_DP		USB HS data plus
15	JTAG_TDI	10KΩ to 3.3V	GPIO0:JTAG test data in
16	JTAG_TCK	10KΩ to 3.3V	GPIO1:JTAG test clock
17	JTAG_TMS	10KΩ to 3.3V	GPIO2:JTAG test mode state
18	JTAG_TDO	10KΩ to 3.3V	GPIO3:JTAG test data out
19	JTAG_RST_N	10KΩ to 3.3V	GPIO4:JTAG reset for debug
20	JTAG_TRST_N	10KΩ to 3.3V	GPIO5:JTAG test reset
21	EMDC	10KΩ to GND	GPIO52:Management Data Clock
22	EMDIO	1.5KΩ to 3.3V	GPIO53:Management Data I/O
23	SPI_CS	Floating ouput	GPIO54:SPI0 chipselect 0
24	SPI_MOSI	10KΩ to 3.3V	GPIO55:SPI0 Master-out Slave-in data
25	SPI_CLK	10KΩ to 3.3V	GPIO56:SPI0 serial clock
26	SPI_MISO	Floating ouput	GPIO57:SPI0 Master-in Slave-out data
27	LED	Floating ouput	GPIO58
28	UART_RX	Floating ouput	GPIO60:UART receive data
29	UART_TX	10KΩ to GND	GPIO61:UART transmit data
30	GPIO62	10KΩ to 3.3V	GPIO62:Chip reset signal
31	chip_irp_in	Floating ouput	GPIO63:Factory set Reset
32	GND	GND	
33	5V	5V	
34	3.3V	3.3V	
35	GND	GND	
36	GND	GND	
37	5V	5V	
38	GND	GND	
39	3.3V	3.3V	

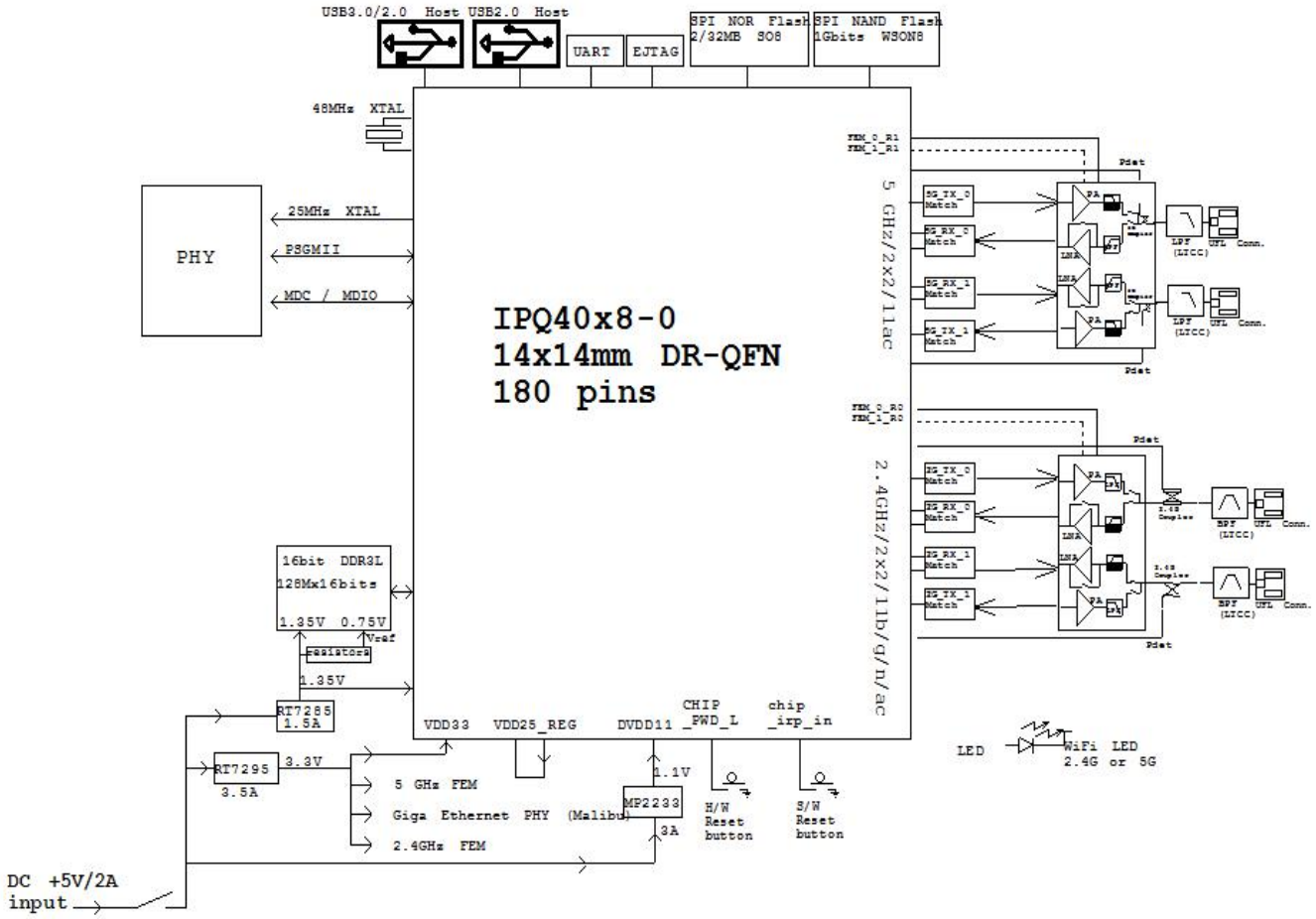
40	GND	GND	
41	5V	5V	
42	GND	GND	
43	GND	GND	
44	5V	5V	
45	3.3V	3.3V	
46	GND	GND	
47	GND	GND	
48	5V	5V	
49	GND	GND	
50	3.3V	3.3V	
51	5V	5V	
52	GND	GND	
53	GND	GND	
54	5V	5V	
55	GND	GND	
56	GND	GROUND	
57	5V	5V	
58	GND	GND	
59	GND	GND	
60	GND	GND	
61	5V	5V	
62	GND	GND	
63	5V	5V	
64	GND	GND	
65	GND	GND	
66	GND	GND	
67	GND	GND	
68	GND	GND	
69	GND	GND	
70	SPINANDcs_SPINORrst	GPIO53	

5. PIN FOOTPRINT&DXF



Pupfish-IPQ4018
_V1_0_10.dxf

6. BLOCK DIAGRAM OF SCHEMATIC



7. RADIO TRANSMITTER CHARACTERISTICS (OPTIONAL)

Table A-2 Tx power (2.4 GHz)

	Each Chain	Tx Power (dBm)	
802.11b	1L	20	
802.11g	6 Mbps	20	
	54 Mbps	18	
802.11n 20/40 MHz	MCS0 (EVM: -5 dB HO)	20	20
	MCS7 (EVM: -32 dB HO)	17	16
	MCS9 (EVM: -36 dB HO)	N/A	14

Table A-3 Tx power (5 GHz)

	Each Chain	Tx Power (dBm)[1]			
		Unii1 (5.15-5.25 GHz)	Unii2 (5.25-5.35 GHz)	Unii2ext (5.47-5.725 GHz)	Unii3 (5.725-5.875 GHz)
802.11a	6 Mbps	20	20	20	20
	54 Mbps	17	17	17	17
802.11ac 20/40/80 MHz	MCS0 (EVM: -5 dB HO)	20/19/18	20/19/18	20/19/18	20/19/18
	MCS7 (EVM: -32 dB HO)	16/16/16	16/16/16	16/16/16	16/16/16
	MCS9 (EVM: -36 dB HO)	NA/12/11	NA/12/11	NA/12/11	NA/12/11

A.2 Rx sensitivity

Table A-4 Rx sensitivity (2.4 GHz)

	Each Chain	Rx Power (dBm)	
802.11b	1L (8% PER)	-97	N/A
802.11g	6 Mbps (10% PER)	-92.5	N/A
	54 Mbps (10% PER)	-75	N/A
802.11n 20/40 MHz	MCS0 (10% PER)	-91.5	-89
	MCS7 (10% PER)	-73.5	-71
256-QAM 20/40 MHz	MCS9 (10% PER)	N/A	-65

Table A-5 Rx sensitivity (5 GHz)

	Each Chain (10% PER)	Rx Power (dBm)		
802.11g	6 Mbps	-90		
	54 Mbps	-73		
802.11ac 20/40/80 MHz	MCS0	-89.5	-87.5	-85.5
	MCS7	-72.5	-70	-67.5
	MCS8	-68.5	-65.5	-62.5
	MCS9	N/A	-64	-60

8. REFLOW SOLDERING TEMPERATURE CURVE

Table 6-1 Typical SMT reflow profile conditions (for reference only)

Profile stage	Description	Temp range	Condition
Preheat	Initial ramp	< 150°C	3°C/sec max
Soak	Dry-out and flux activation	150 to 190°C	60 to 120sec
Ramp	Transition to liquidus (solder-paste melting point)	190 to 220°C	< 30 sec
Reflow	Time above liquidus	220 to 245°C [1]	50 to 70 sec
Cool down	Cool rate – ramp to ambient	< 220°C	6°C/sec max

1. During the reflow process, the recommended peak temperature is 245°C. This temperature should not be confused with the peak temperature reached during MSL testing, as described in Section 6.2.3.

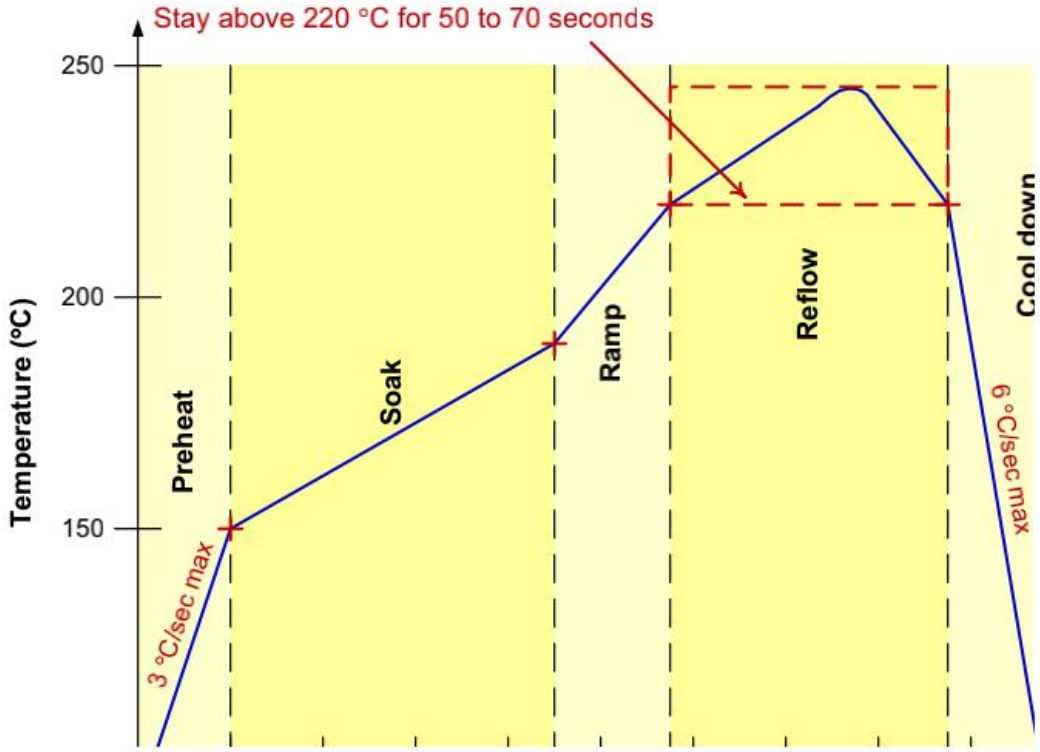


Figure 6-1 Typical SMT reflow profile

9. MODULE OPERATING ENVIRONMENT

Working temperature: MAX 110 ℃;

Storage temperature: -45 ℃ to 135 ℃;

Humidity: 10% to 90% RH no condensation;

Storage humidity: 5% to 90% RH no condensation.