GAINSTRONG

Oolite V5.1-QCA4531 Spec

Specification Version 1.0.4

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Rev.	Date	Contents of Revision Change	Remark
1.0.1	2016-8-30	Initial release	
1.0.2	2016-11-17	Adjust new template	
1.0.3	2017-11-07	Modifiy the specific shape and size of the module	
1.0.4	2017-12-16	Add the target power of wifi	

1 PRODUCT OVERVIEW

General Description

The OoliteV5.1 is a complete,small 802.11a/b/g/n Wi-Fi Solution optimized for low-cost, and highly integrated AP and consumer electronic devices,the module integrates all Wi-Fi functionality in a package friendly to low-cost PCB design, requiring only a 3.3V power supply .

The module based on the QCA4531 which integrates an 802.11n 2x2. MIMO MAC/BB/ radio with external PA and LNA. TX power up to 23dbm. RX sensitivity up to -75dbm, It supports 802.11 n operations up to 144 Mbps for 20 MHz and 300 Mbps for 40 MHz, compatible 802.11b/g/n.

The module support AP mode, client mode at the same time , and include mass service application software to reduce the research and design work of customer.

Applications Stage

- Smart home network equipment
- Wireless WIFI device, unmanned aerial vehicle
- Dual band Router, Industry Controller and so on.

Features

- PCI Express 1.1 Root Complex interface for minicpe device
- One USB 2.0 interface
- 1 WAN AND 4 LAN Ethernet PORTS
- One low-speed UART (115 Kbps) and multiple GPIO pins for general purpose I/O
- Built in 2.4GHz 300Mbps high power wifi transmitter with PA and LNA.
- 3.3V power supply
- 128Mbyte RAM and 16Mbyte ROM, max up to 32Mbyte ROM

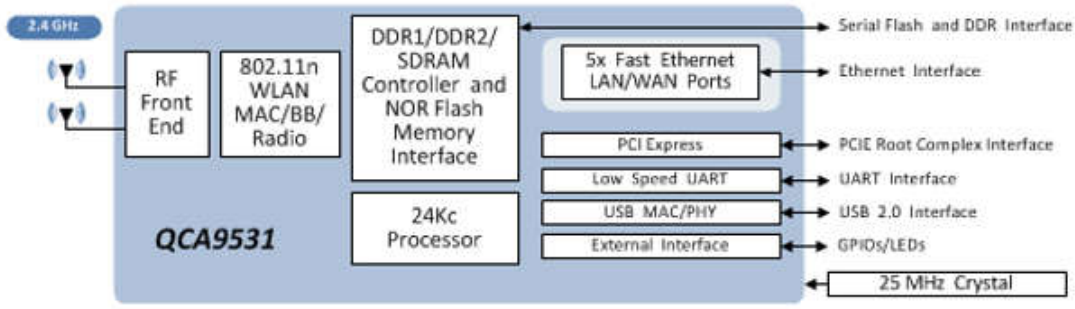
Item	type	real target
Antenna 0	Frequency error	6.0ppm
	power	CCK 11M 23dbm OFDM 54M 21dbm MCS7(HT20)21dbm MCS7(HT40)21dbm
	evm	CCK 11M -27.5db OFDM 54M -25db MCS7(HT20)-28db MCS7(HT40)-27db
	Reception Sensitivity	CCK 11M -89dbm OFDM 54M -75dbm MCS7(HT20)-70dbm MCS7(HT40)-68dbm

Item	type	real target
Antenna 1	Frequency error	6.0ppm
	power	CCK 11M 23dbm OFDM 54M 21dbm MCS7(HT20)21dbm MCS7(HT40)21dbm
	evm	CCK 11M -27db OFDM 54M -25db MCS7(HT20)-28db MCS7(HT40)-27db
	Reception Sensitivity	CCK 11M -89dbm OFDM 54M -75dbm MCS7(HT20)-70dbm MCS7(HT40)-68dbm

2 HARDWARE OVERVIEW

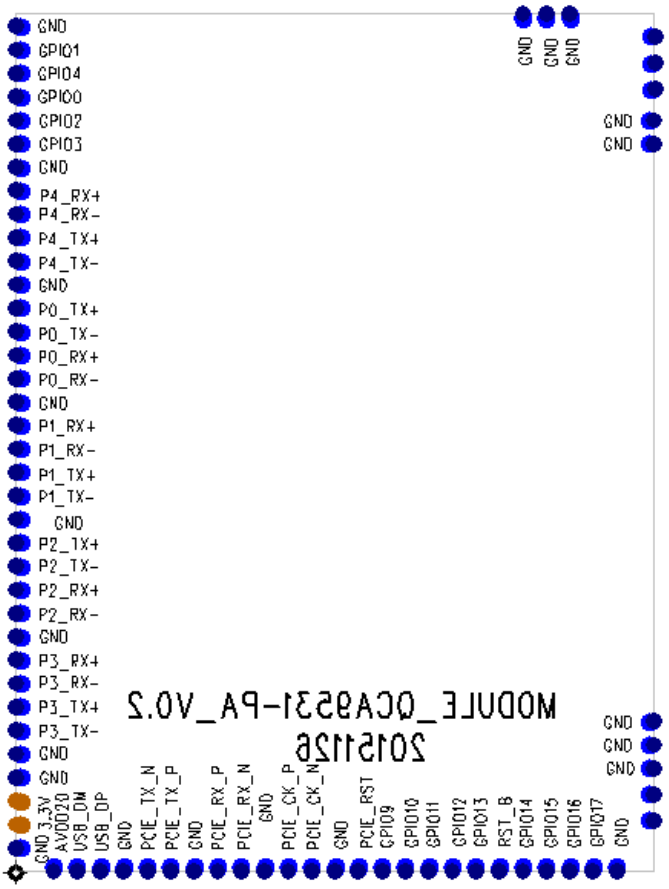
Block Diagram

The general Hardware architecture is shown below Figure:



Module Block Diagram

Pin Assignment



Pin Description

The OoliteV5.1 has 74 pins , including x1 PCI-E channel*1, USB2.0*1, JTAG*1, 1WAN AND 4 LAN Ethernet ports, and many GPIOs.

Pin NO.	Pin name	I/O	Description	Raemark
1	GND	G		
2	GPIO1	I/O	TDI	JTAG
3	GPIO4		LED_link4	
4	GPIO0		TCK	
5	GPIO2		TDO	
6	GPIO3		TMS	
7	GND	G		
8	P4_RX+	I	Ethernet port 4 receive pair	P4
9	P4_RX-			
10	P4_TX+	O	Ethernet port 4 transmit pair	
11	P4_TX-			
12	GND	G		
13	P0_TX+	O	Ethernet port 2 transmit pair	P0
14	P0_TX-			
15	P0_RX+	I	Ethernet port 2 receive pair	
16	P0_RX-			
17	GND	G		
18	P1_RX+	I	Ethernet port 1 receive pair	P1
19	P1_RX-			
20	P1_TX+	O	Ethernet port 1 transmit pair	
21	P1_TX-			
22	GND	G		
23	P2_TX+	O	Ethernet port 2 transmit pair	P2
24	P2_TX-			
25	P2_RX+	I	Ethernet port 2 receive pair	
26	P2_RX-			
27	GND	G		
28	P3_RX+	I	Ethernet port 3 receive pair	P3

29	P3_RX-			
30	P3_TX+	O	Ethernet port 3 transmit pair	
31	P3_TX-			
32	GND	G		
33	GND			
34	3.3V	P	3.3V input 1000mA, recommended voltage 3.3V, Min2.97V, MAX 3.63V	
35	3.3V			
36	GND	G		
37	AVDD20	P		
38	USB_DM	I/O	USB 2.0 D- signal	USB2.0
39	USB_DP	I/O	USB 2.0 D+ signal	
40	GND	G		
41	PCIE_TX_N	O	Differential transmit	PCIE_TX
42	PCIE_TX_P			
43	GND	G		
44	PCIE_RX_P	I	Differential receive	PCIE_RX
45	PCIE_RX_N			
46	GND	G		
47	PCIE_CK_P	O	Differential reference clock (100 MHz)	PCIE_CLK
48	PCIE_CK_N	O		
49	GND	G		
50	PCIE_RST	I/O	PCI Express reset, open drain, should be pulled up to Vdd33 through 1 KΩ resistor	
51	GPIO9	I/O	UART_SIN	UART
52	GPIO10		UART_SOUT	
53	GPIO11	I/O	LED_LINK_4	
54	GPIO12	I/O	WLAN_LED	
55	GPIO13	I/O	SYS_LED	
56	RST_B	I/O	This signal is internally pulled up to 3.3 V. It is recommended to leave this signal floating if resetting the chip externally is not required. Otherwise the RESET_L input must be driven with 3.3 V logic.	
57	GPIO14	I/O	LED_LINK_3	

58	GPIO15	I/O	LED_LINK_2	
59	GPIO16	I/O	LED_LINK_1	
60	GPIO17	I/O		
61	GND	G		
62	GND			
63	AT	O	nc	
64	GND	G		
65	GND			
66	GND			
67	GND			
68	GND			
69	GND			
70	AT	O	nc	
71	GND	G		
72	GND			
73	GND			
74	GND			

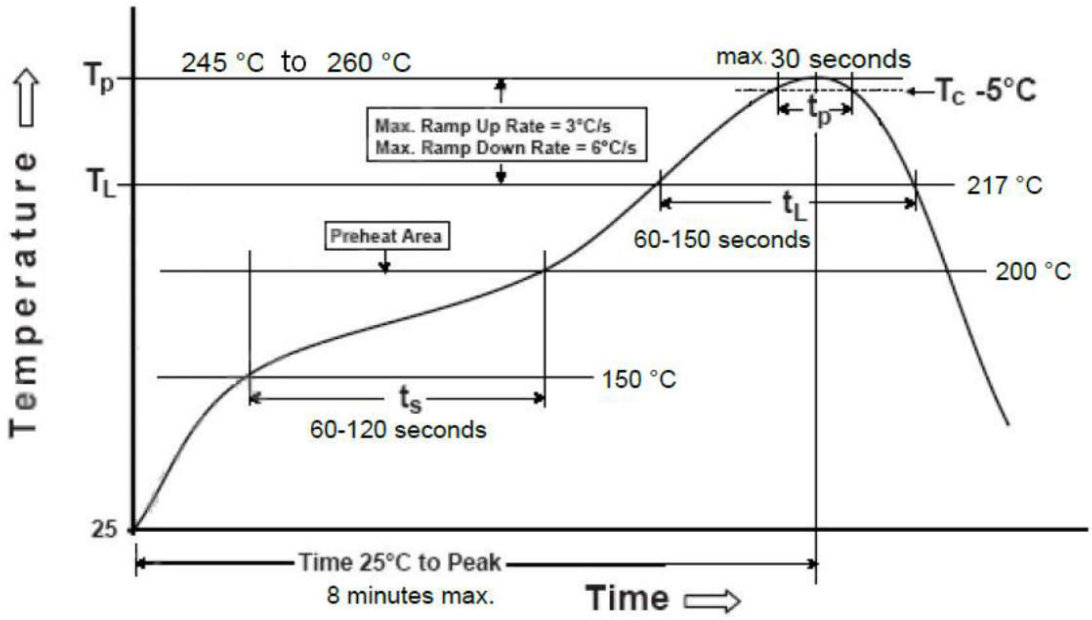
3 ELECTRICAL CHARACTERISTICS

Absolute Maximum Rating				
Parameter	Symbol	Min	Max	Units
Power Supply Voltage				
3.3V	3.3	-0.3	3.6	V
GND	0	-0.3		V
GPIO Voltage				
VIH	1.2	0.5	1.5	V
VIL	——	-0.3	0.12	V
VOH	1.2	1.1	1.23	V
VOL	——	-0.3	0.12	V
Power Supply Current				
3.3V	1	0.95	1.2	A
GPIO Current				
IIH	——	——	10	uA
IOH	——	——	9	mA
Environment				
Storage Temperature	Tstg	-40	80	°C
Peak Reflow Soldering Temperature <10s	Tpeak		260	°C
Humidity			95	%

4 MANUFACTURING PROCESS RECOMMENDATIONS

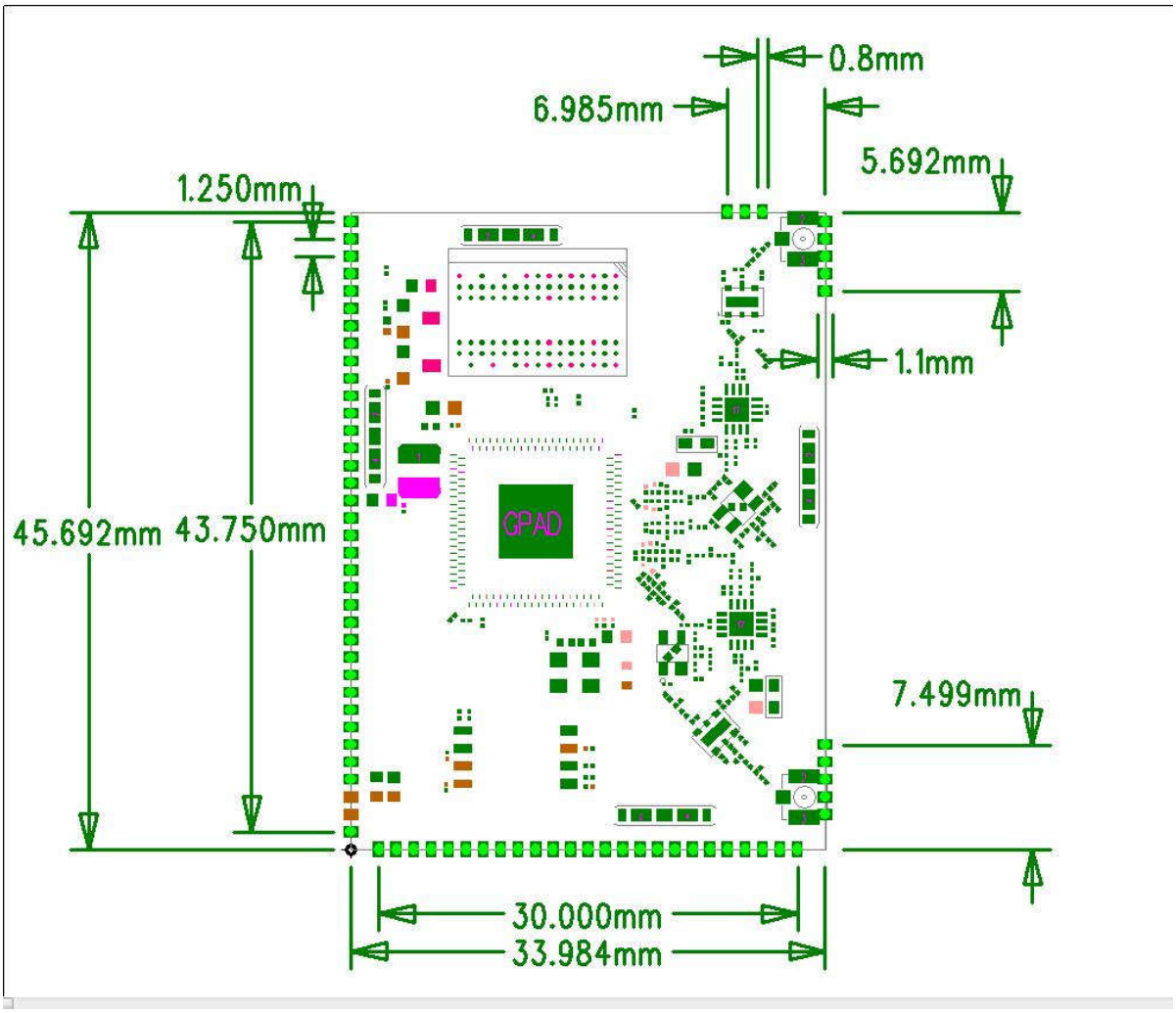
When the module is welded, please note that it's heating time and heating temperature, if you do not know how to set the corresponding parameters, please refer to the following figure, it helps to make the module get good welding performance, and not to appear unnecessary problems. Of course, you can adjust according to the actual situation.

Manufacturing Process Recommendations



5 RECOMMEND LAYOUT

The following figure is the specific shape and size of the module, you can adjust your PCB package, in order to facilitate Lay_out.



6 REFERENCE DESIGN SCHEMATIC

Please refer to the http://www.ooioe.com/oolitev5/openwrt