

## WizFi250 Datasheet

### Introduction

The WizFi250 is a small size wireless module.

The WizFi250 provides for the highest-level integration, featuring 802.11b/g and 802.11n.

It includes a 2.4 GHz WLAN CMOS power amplifier (PA) that meets the output power requirements of most handheld systems.

Along with the integrated power amplifier, the WizFi250 also includes integrated transmit and receive baluns, further reducing the overall solution cost.

The small size & low profile physical design make it easier for system design to enable high performance wireless connectivity without space constrain.

Hardware WAPI acceleration engine, AES, TKIP, WPA and WPA2 are supported to provide the latest security requirement on your network.

For the software and driver development, WIZnet provides extensive technical document and reference software code for the system integration.

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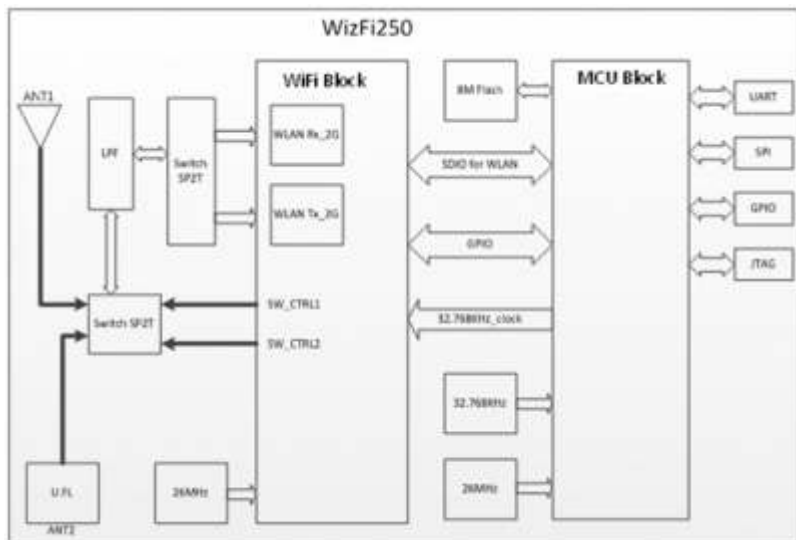
### Features

- Single band 2.4GHz IEEE 802.11b/g/n
- Integrated RF power amplifier
- Supports wireless data rates up to 65Mbit/s
- 1MB Flash Memory, 128KB SRAM, 1MB Serial Flash
- Supports per packet Rx Antenna diversity
- Low power consumption & excellent power management performance extend battery life.
- Small size suitable for low volume system integration.
- Easy for integration into mobile and handheld device with flexible system configuration.
- 2.412-2.484 GHz two SKUs for worldwide market.
- Lead Free design which supporting Green design requirement, RoHS Compliance.
- Device Package : 28×20 mm (17×20 mm)
- Serial Interface : UART, SPI
- Powerful Web server provides
- Soft AP
  - Enough memory retention
  - Wi-Fi Security (WEP, WPA/WPA2PSK)
  - L2 Switching
- OTA(Over The Air F/W Upgrading)

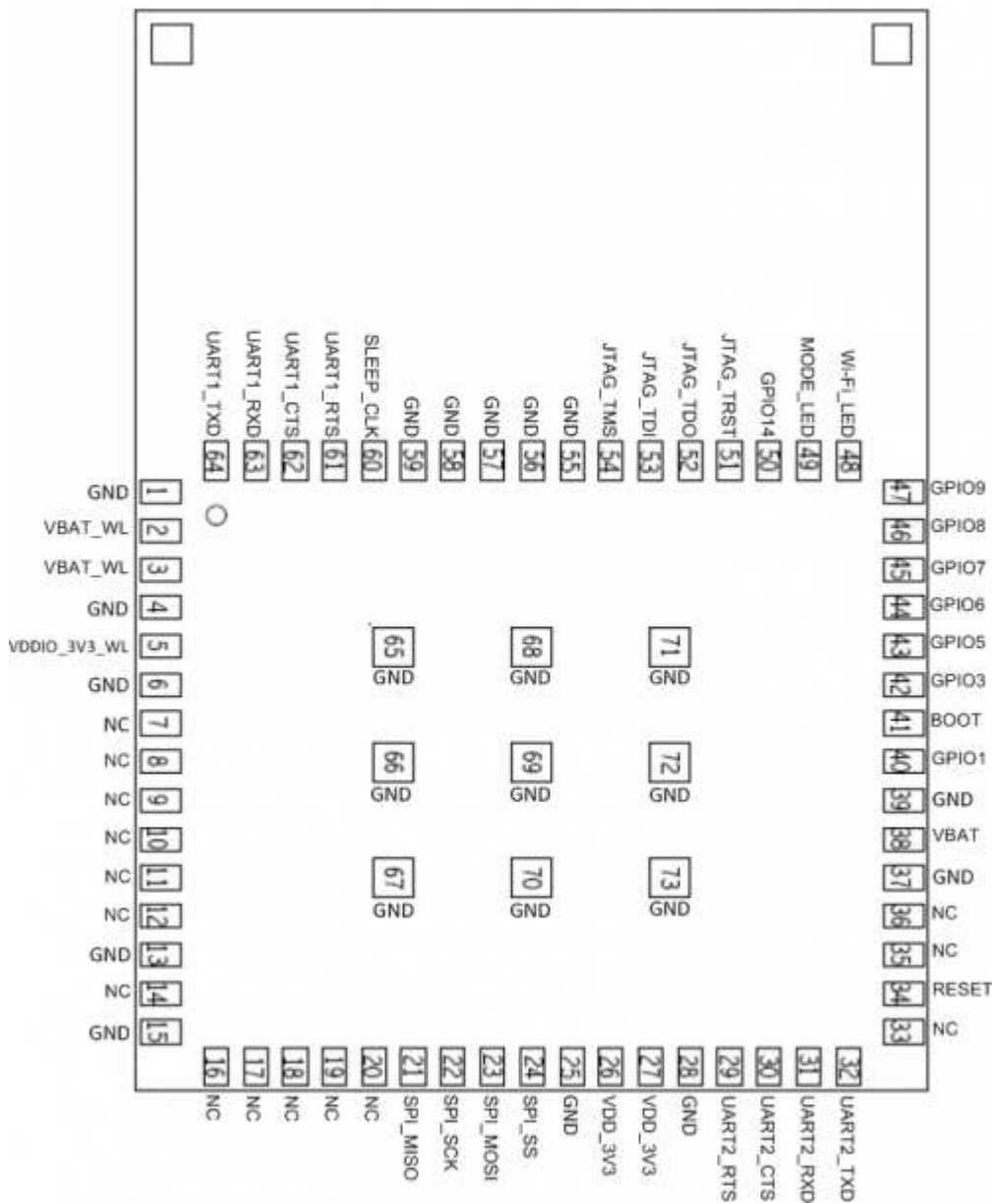
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### Block diagram

The WizFi250 module is designed based on WiFi block and MCU block . It supports generic SPI, UART interface to connect the WLAN to the host processor. A simplified block diagram of the WizFi250 module is depicted in the Fig. below.



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 Pin description  
 Pin map



## Pin description

Pin Number	Pin Define	Type	Description
<b>1</b>	GND	-	Ground
<b>2</b>	VBAT_WL	I	Battery supply input
<b>3</b>	VBAT_WL	I	Battery supply input
<b>4</b>	GND	-	Ground
<b>5</b>	VDDIO_3V3_WL	I	Digital I/O supply.
<b>6</b>	GND	-	Ground
<b>7</b>	NC	-	-
<b>8</b>	NC	-	-
<b>9</b>	NC	-	-
<b>10</b>	NC	-	-
<b>11</b>	NC	-	-
<b>12</b>	NC	-	-
<b>13</b>	GND	-	Ground
<b>14</b>	NC	-	-
<b>15</b>	GND	-	Ground
<b>16</b>	NC	-	-
<b>17</b>	NC	-	-
<b>18</b>	NC	-	-
<b>19</b>	NC	-	-
<b>20</b>	NC	-	-
<b>21</b>	SPI_MISO	I/O	SPI_MISO
<b>22</b>	SPI_SCK	I/O	SPI CLOCK
<b>23</b>	SPI_MOSI	I/O	SPI_MOSI
<b>24</b>	SPI_SS	I/O	SPI_SS
<b>25</b>	GND	-	Ground
<b>26</b>	VDD_3V3	I	Power supply for I/O and the internal regulator
<b>27</b>	VDD_3V3	I	Power supply for I/O and the internal regulator
<b>28</b>	GND	-	Ground
<b>29</b>	UART2_RTS	I/O	Active-low request-to-send signal for UART2 interface
<b>30</b>	UART2_CTS	I/O	Active-low clear-to-send signal for UART2 interface
<b>31</b>	UART2_RXD	I/O	Serial data input for UART2 interface
<b>32</b>	UART2_TXD	I/O	Serial data output for UART2 interface
<b>33</b>	NC	-	-
<b>34</b>	RESET	I	RESET pin (Active Low)
<b>35</b>	NC	-	-
<b>36</b>	NC	-	-
<b>37</b>	GND	-	Ground
<b>38</b>	VBAT_MICRO	I	Power supply when VDD_3V3 is not present.
<b>39</b>	GND	-	Ground
<b>40</b>	GPIO1	I/O	GPIO1 pin
<b>41</b>	BOOT_MODE	I	BOOT MODE pin (Active low)
<b>42</b>	FUNCTION	I	FUNCTION pin (Active Low)
<b>43</b>	GPIO5	I/O	GPIO5 pin
<b>44</b>	GPIO6	I/O	GPIO6 pin

<b>45</b>	GPIO7	I/O	GPIO7 pin
<b>46</b>	GPIO8	I/O	GPIO8 pin
<b>47</b>	GPIO9	I/O	GPIO9 pin
<b>48</b>	Wi-Fi_LED	I/O	Wi-Fi_LED pin
<b>49</b>	MODE_LED	I/O	MODE_LED pin
<b>50</b>	GPIO14	I/O	GPIO14 pin
<b>51</b>	JTAG_TRST	I	For normal operation, if JTAG is not used, this pin can be left unconnected (NC)
<b>52</b>	JTAG_TDO	I/O	For normal operation, if JTAG is not used, this pin can be left unconnected (NC)
<b>53</b>	JTAG_TDI	I/O	For normal operation, if JTAG is not used, this pin can be left unconnected (NC)
<b>54</b>	JTAG_TMS	I	For normal operation, if JTAG is not used, this pin can be left unconnected (NC)
<b>55</b>	JTAG_TCK	I	For normal operation, if JTAG is not used, this pin can be left unconnected (NC)
<b>56</b>	GND	-	Ground
<b>57</b>	GND	-	Ground
<b>58</b>	GND	-	Ground
<b>59</b>	GND	-	Ground
<b>60</b>	SLEEP_CLK	I	Input pin for optional high- precision 32.768kHz Clock(Sleep Clock).
<b>61</b>	UART1_RTS	I/O	Active-low request-to-send signal for UART1 interface
<b>62</b>	UART1_CTS	I/O	Active-low clear-to-send signal for UART1 interface
<b>63</b>	UART1_RXD	I/O	Serial data input for UART1 interface
<b>64</b>	UART1_TXD	I/O	Serial data output for UART1 interface
<b>65~73</b>	GND	-	Ground

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Technical specification

Absolute maximum rating

<b>Supply Power</b>	Max +3.6 Volt	
<b>NonOperating Temperature</b>	- 40° to 85° Celsius	
<b>Voltage ripple</b>	+/- 2% Max	Values not exceeding Operating voltage

Recommendable operation condition

Temperature, humidity

The WizFi250 has to withstand the operational requirements as listed in the table below.

<b>Operating Temperature</b>	-20° to 85° Celsius
<b>Humidity range</b>	Max 95%, Non condensing, relative humidity

\* The maximum operating ambient temperature range can up to 85°, but exposure to absolute-maximum-rated conditions may cause performance degradation and affect device reliability. So we recommend -20° to 75° for the best performance.

Voltage

Power supply for the WizFi250 module will be provided by the host via the power pins.

Symbol	Parameter	Min	Typ.	Max	Unit
VBAT_WL	power supply for WizFi250	3.0	3.3	3.6	V
VDDIO_3V3_WL	host Interface power supply	3.0	3.3	3.6	V
VBAT_MICRO	backup operating voltage	3.0	3.3	3.6	V
VDD_3V3	power supply for MCU	3.0	3.3	3.6	V

#### Current consumption

The WizFi250 on operation output current consumption :

MCU mode	WiFi mode (802.11n)	Typ. (RMS)	Max.
Normal mode	Not Associated	14 mA	18 mA
Normal mode	Associated	67 mA	69 mA
Normal mode	Associated (IEEE Power Save mode)	32 mA	65 mA
Stop mode	Associated (IEEE Power Save mode)	14 mA	17 mA
Stop mode	Not Associated	3 mA	23 mA

The WizFi250 on TX mode output current consumption :

(Typical spec is defined @3.3V 25°C ; MAX. spec is defined @3.0V 70°C)

Current Consumption	Typ.	Max.
Tx output power @16.5 dBm on 11b 1M	385 mA	430 mA
Tx output power @ 16.5 dBm on 11b 11M	370 mA	410 mA
Tx output power @ 15 dBm on 11g 6M	345 mA	380 mA
Tx output power @ 13 dBm on 11g 54M	290 mA	320 mA
Tx output power @ 14.5 dBm on 11n MCS0	315 mA	350 mA
Tx output power @ 12 dBm on 11n MCS7	265 mA	295 mA

The WizFi250 on RX mode current consumption :

(Typical spec is defined @3.3V 25°C; MAX. spec is defined @3.0V 70°C)

Current Consumption	Typ.	Max.
Rx @ 11b 1M	120 mA	150 mA
Rx @ 11b 11M	120 mA	150 mA
Rx @ 11g 6M	120 mA	150 mA
Rx @ 11g 54M	120 mA	150 mA
Rx @ 11n MCS0	120 mA	150 mA
Rx @ 11n MCS7	120 mA	150 mA

#### Wireless specifications

The WizFi250 complies with the following features and standards;

Features	Description
WLAN Standards	IEEE 802 11 b/g/n
Antenna Connector Port	One printed antenna, one U.FL connector for external antenna
Frequency Band	2.400 GHz ~ 2.484 GHz
Number of Sub Channels	CH1 to CH14

Modulation	DSSS, CCK, OFDM, BPSK, QPSK, 16QAM, 64QAM	
Supported data rates	11b	1, 2, 5.5, 11 (Mbps)
	11g	6, 9, 12, 18, 24, 36, 48, 54 (Mbps)
	11n	HT20 MCS0(6.5Mbps) to HT20 MCS7(65Mbps)

Specifications of WiFi's output power, evm, sensitivity

The WizFi250 WiFi output power as list in the table below:

Characteristics		Typ.	Criteria	Unit
RF Average Output Power, 802.11b CCK Mode	1M	16.5	+/- 1.5	dBm
	11M	16.5	+/- 1.5	dBm
RF Average Output Power, 802.11g OFDM Mode	6M	15	+/- 1.5	dBm
	54M	13	+/- 1.5	dBm
RF Average Output Power, 802.11n OFDM Mode	MCS0	14.5	+/- 1.5	dBm
	MCS7	12	+/- 1.5	dBm

WiFi TX EVM follow the IEEE spec that as list in the table below:

Characteristics		IEEE Spec	Unit
RF Average Output EVM (11b)	@1 Mbps	-10	dB
	@11 Mbps	-10	dB
RF Average Output EVM (11g)	@6 Mbps	-5	dB
	@54 Mbps	-25	dB
RF Average Output EVM (11n)	@ MCS0	-5	dB
	@ MCS7	-28	dB

The WizFi250 Wi-Fi sensitivity as list in the table below:

Receiver Characteristics	Typ.	Max.	Unit
PER <8%, Rx Sensitivity @ 1 Mbps	-96	-89	dBm
PER <8%, Rx Sensitivity @ 11 Mbps	-88	-84	dBm
PER <10%, Rx Sensitivity @ 6 Mbps	-90	-83	dBm
PER <10%, Rx Sensitivity @ 54 Mbps	-74	-70	dBm
PER <10%, Rx Sensitivity @ MCS0	-89	-83	dBm
PER <10%, Rx Sensitivity @ MCS7	-71	-67	dBm

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I/O port characteristics

Unless otherwise specified, the parameters given as below Table. The WizFi250 is a small size wireless module.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V <sub>IL</sub>	Standard IO input low level voltage		-0.3		0.28*(V <sub>DD</sub> -2V)+0.8V	V
	IO FT <sup>(1)</sup> input low level voltage		-0.3		0.32*(V <sub>DD</sub> -2V)+0.75V	V

V <sub>IH</sub>	Standard IO input high level voltage		0.41*(V <sub>DD</sub> -2V)+1.3V		V <sub>DD</sub> +0.3	V
	IO FT <sup>(1)</sup> input high level voltage	V <sub>DD</sub> > 2V	0.42*(V <sub>DD</sub> -2V)+1V		5.5	V
V <sub>DD</sub> ≤ 2V					5.2	
V <sub>hys</sub>	Standard IO Schmitt trigger voltage hysteresis <sup>(2)</sup>		200			mV
	IOFT Schmitt trigger voltage hysteresis <sup>(2)</sup>		5%V <sub>DD</sub> <sup>(3)</sup>			mV
I <sub>Ikg</sub>	Input leakage current <sup>(4)</sup>	V <sub>SS</sub> ≤ V <sub>IN</sub> ≤ V <sub>DD</sub> Standard I/Os			±1	μA
		V <sub>IN</sub> = 5V, I/O FT			3	
R <sub>PU</sub>	Weak pull-up equivalent resistor <sup>(5)</sup>	V <sub>IN</sub> = V <sub>SS</sub>	30	40	50	k Ω
R <sub>PD</sub>	Weak pull-down equivalent resistor <sup>(5)</sup>	V <sub>IN</sub> = V <sub>DD</sub>	30	40	50	k Ω
C <sub>IO</sub>	I/O pin capacitance			5		pF

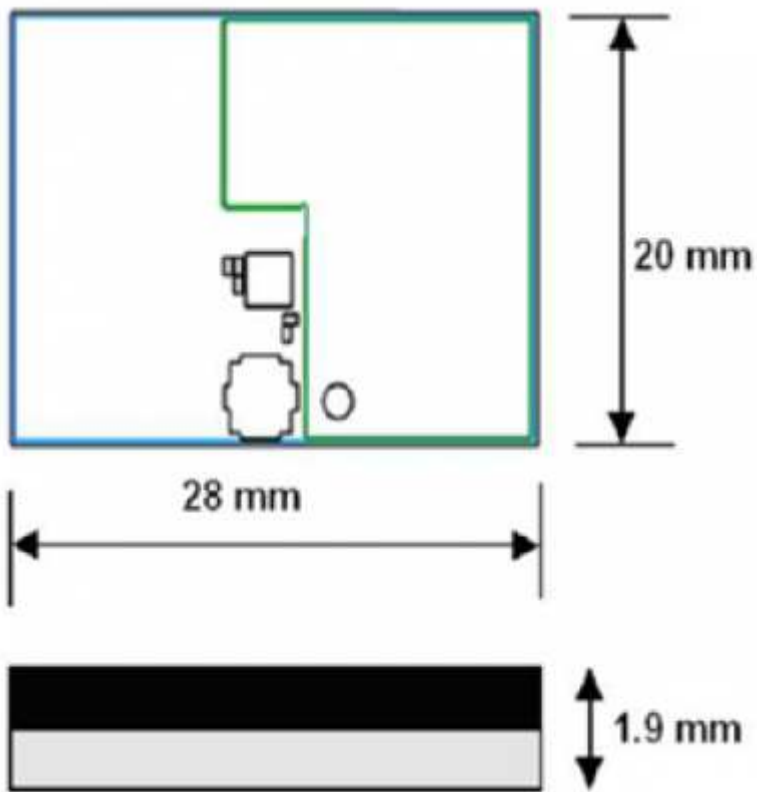
1. FT = Five-volt tolerant. In order to sustain a voltage higher than V<sub>DD</sub>+0.3 the internal pull-up/pull-down resistors must be disabled.
2. Hysteresis voltage between Schmitt trigger switching levels. Based on characterization, not tested in production.
3. With a minimum of 100 mV.
4. Leakage could be higher than max. if negative current is injected on adjacent pins.
5. Pull-up and pull-down resistors are designed with a true resistance in series with a switchable PMOS/NMOS. This MOS/NMOS contribution to the series resistance is minimum (~10% order).

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 Dimensions, weight and mounting

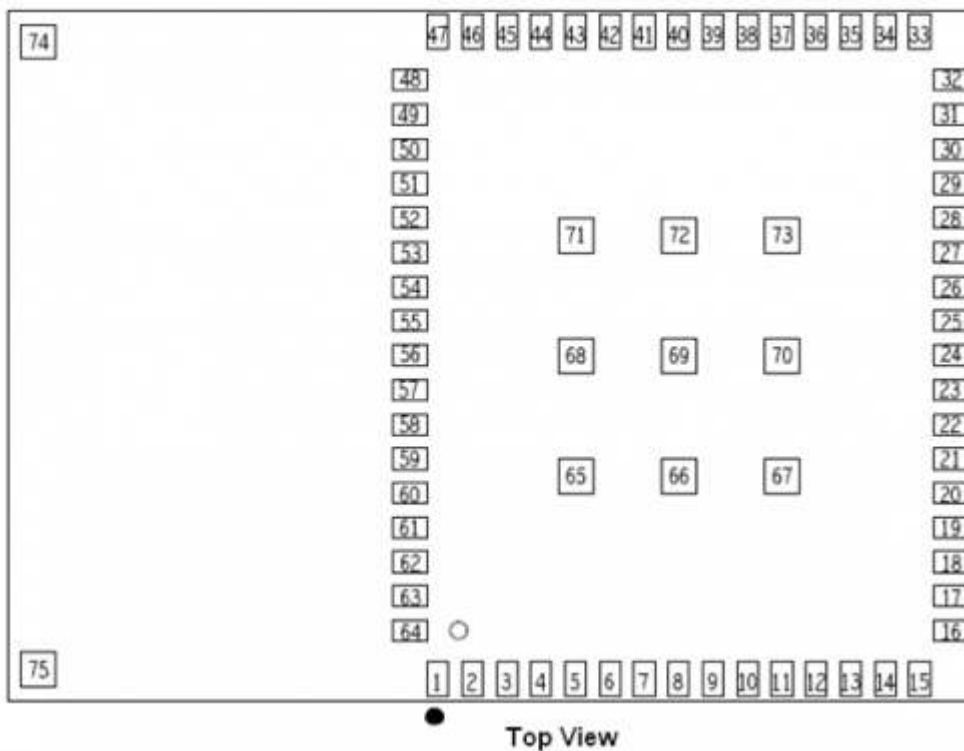
The following paragraphs provide the requirements for the size, weight and mounting of the WizFi250.

Dimensions

28 mm (W) x 20 mm (L) x 1.9 mm (H) (+/- 0.1mm) (PCB Antenna, Including metal shielding)  
 17 mm (W) x 20 mm (L) x 1.9 mm (H) (+/- 0.1mm)

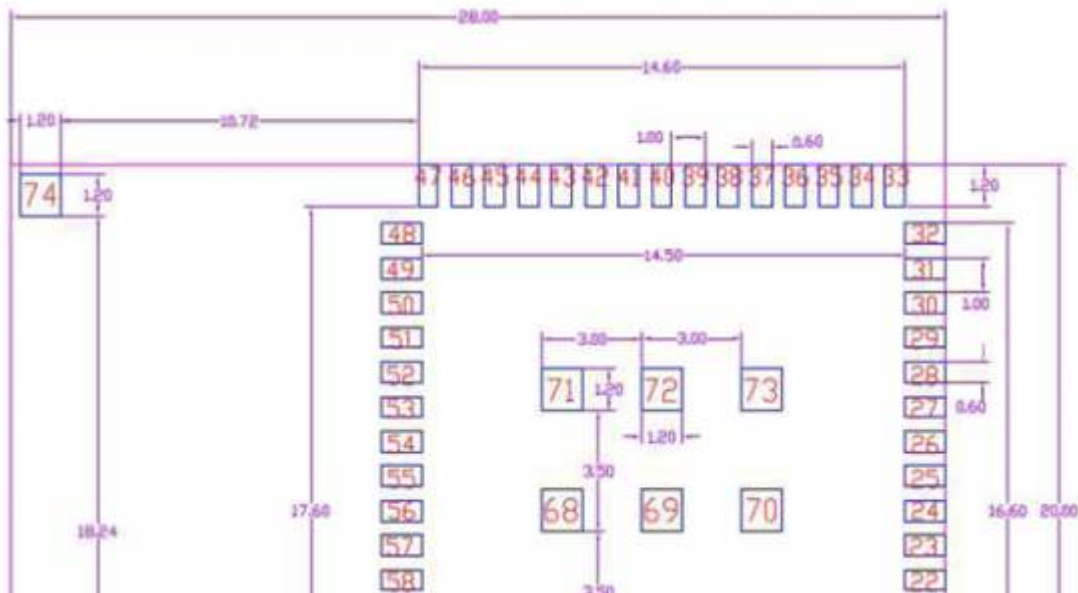


Pin out and pin description



Recommend footprint

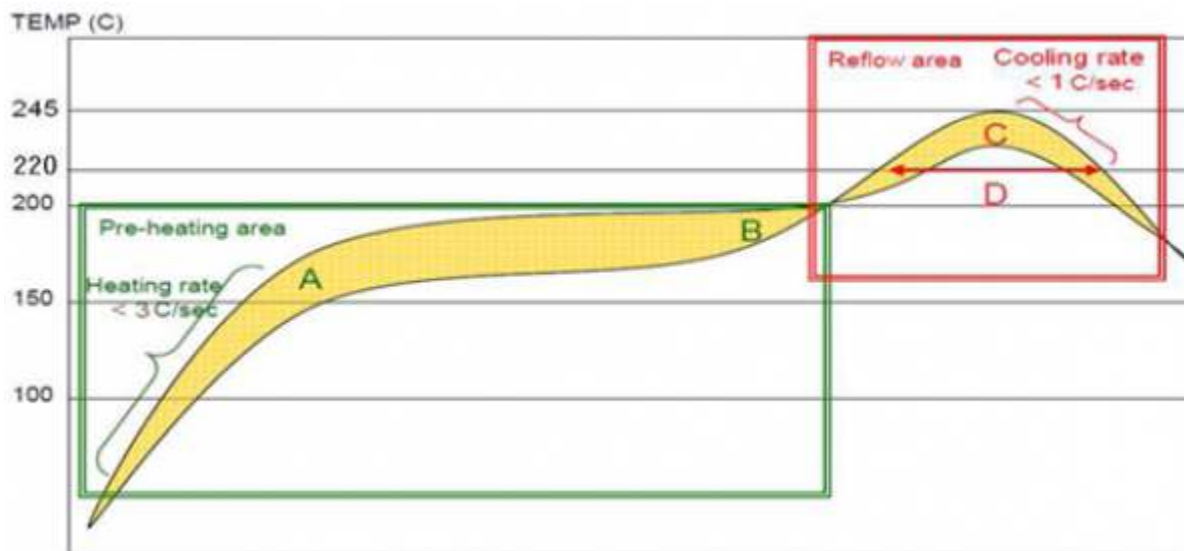




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Recommend reflow profile

The following paragraphs provide the requirements for the size, weight and mounting of the WizFi250.



A-B. Temp.: 150~200°C; soak time:60~120sec.

C. Peak temp: 235~245°C.

D. Time above 220 °C: 40~90sec.

Suggestion: Optimal cooling rate is <1°C/sec. from peak to 220 °C.

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WizFi250 Ref. Schematic

Ref Schematic(PDF) : [wizfi250\\_ref\\_schematic.pdf](#)

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