

QOGRISYS

欧飞信科技

O9201UDH

Wi-Fi Single-band 2x2
802.11ax + Bluetooth5.4
Module Datasheet

Cover of Approval Sheet

PRODUCT NAME	Part No.	Description
O9201UDH	FWAAO9201UDH10	WQ9201HS USB 3.3V 5V 2T2R 27*18*2.5mm 80MHz 11ax WIFI6 BT5.4 External 3Antenna IPEX Shield CAN

Customer: _____

Customer P/N: _____

Signature: _____

Date: _____

Maker Information:

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Revision History

Version	Date	Description	Draft	Approved
V1.0	2025-01-08	Preliminary Project version	EZX	Ben·Chen
V1.1	2026-04-20	Update module laser engraving information	EZX	Ben·Chen
V1.2	2026-06-02	Adjust reference design pin numbers	EZX	Ben·Chen

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1. Overview

1.1 Introduction

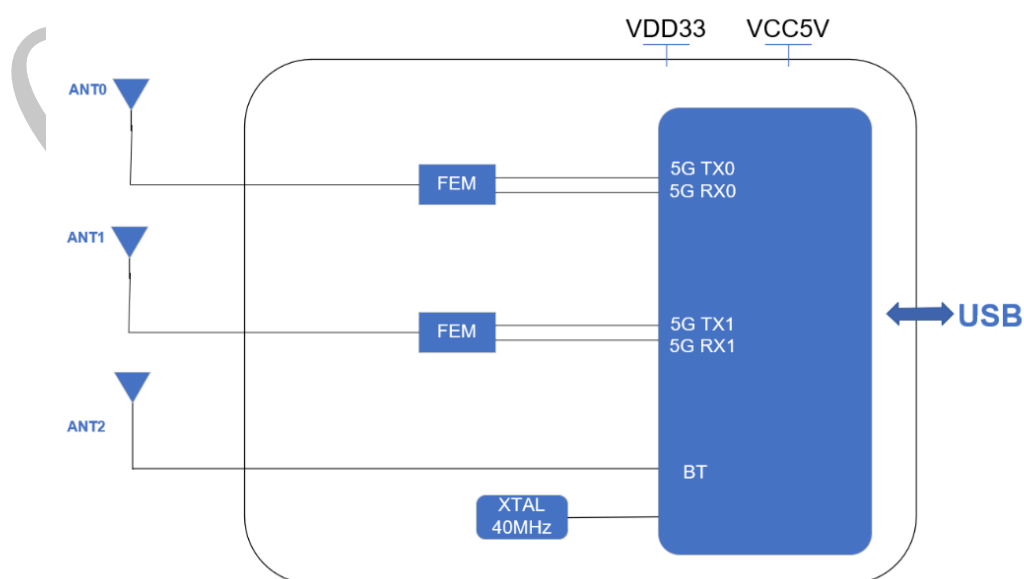
The O9201UDH is a Single-mode chip, support 2x2 5G frequency Wi-Fi function and Bluetooth function. supports Wi-Fi protocol IEEE 802.11ax and backward compatibility protocol 802.11a/n/ac. The Bluetooth subsystem supports the Bluetooth system Protocol 5.4 with low-power audio.

The O9201UDH chip integrates five high-performance RISC-V CPUs. The chip supports a good radio frequency with very low power consumption And baseband performance.

1.2 Features

- Supported for the IEEE 802.11 a/n/ac/ax protocol.
- Single-band 5 GHz support.
- Support for 2x2 MIMO.
- 20MHz/40MHz/80MHz channel bandwidth for 5 GHz.
- Support uplink MU-OFDMA TX and downlink MU-OFDMA RX.
- Support uplink MU-MIMO TX and downlink MU-MIMO RX.
- Support for Beamforming.
- Support WPA、WPA/WPA2/WPA3、WEP、WAPI.
- Supports IEEE 802.11k /v/r protocol.
- Support P2P GO/GC mode.
- Fully compatible with Bluetooth 5.4 protocol.
- Support for BT / BLE dual-mode.
- Support BLE Audio.
- Support BR/EDR/LE-1M/LE-2M/LE-500k/LE-125k modulation mode.
- Intelligent AFH channel selection strategy is supported.

1.3 Block Diagram



1.4 General Specification

Model Name	O9201UDH
Product Description	Support WiFi6+BT5.4
Dimension	L x W x H: 27 x 18 x 2.5 (typical) mm
Wi-Fi Interface	USB2.0
BT Interface	USB
Operating temperature	-10°C to 85°C
Storage temperature	-40°C to 125°C

Note: This module operates normally within a temperature range of -10°C to 85°C; continuous operation at extreme temperature points over extended periods is not recommended.

1.5 Recommended Operating Rating

Feature		Minimum	Type	Maximum	Units
Operating Temperature		-10	25	85	°C
VDD		3.15	3.3	3.45	V
VCC		4.85	5	5.15	V
Power Consumption (Type VDD)	TX (HE20)	348mA			
	RX (HE20)	275mA			
	TX (HE80)	335mA			
	RX (HE80)	328mA			
	BT TX (3DH5)	125mA			
	BT RX (3DH5)	98mA			
Power Consumption (Type VCC)	TX (HE20)	462mA			
	RX (HE20)	32mA			
	TX (HE80)	294mA			
	RX (HE80)	33mA			

2. RF Specification

2.1 Wi-Fi RF Specification

5GHz RF Specification			
Feature		Description	
Operating Frequency		5G:5.15 GHz ~ 5.845 GHz (5.0 GHz ISM Band)	
Standards		Wi-Fi: IEEE 802.11 a/n/ac/ax Wi-Fi compliant	
Modulation		802.11 a/n/ac/ax : OFDM /1024-QAM、256-QAM、64-QAM、16-QAM、QPSK、BPSK	
PHY Data rates		Wi-Fi: 802.11a:54,48,36,24,18,12,9,6Mbps 802.11n: up to 300Mbps(5G HT40 2T2R) 802.11ac: up to 800Mbps (5G VHT80 2T2R) 802.11ax: up to 1200Mbps data rate (5G HE80 2T2R)	
Output Power, tolerance ± 1.5 dB			
Protocol Standard		Data Rate	Spec.(dBm) EVM(dBm)

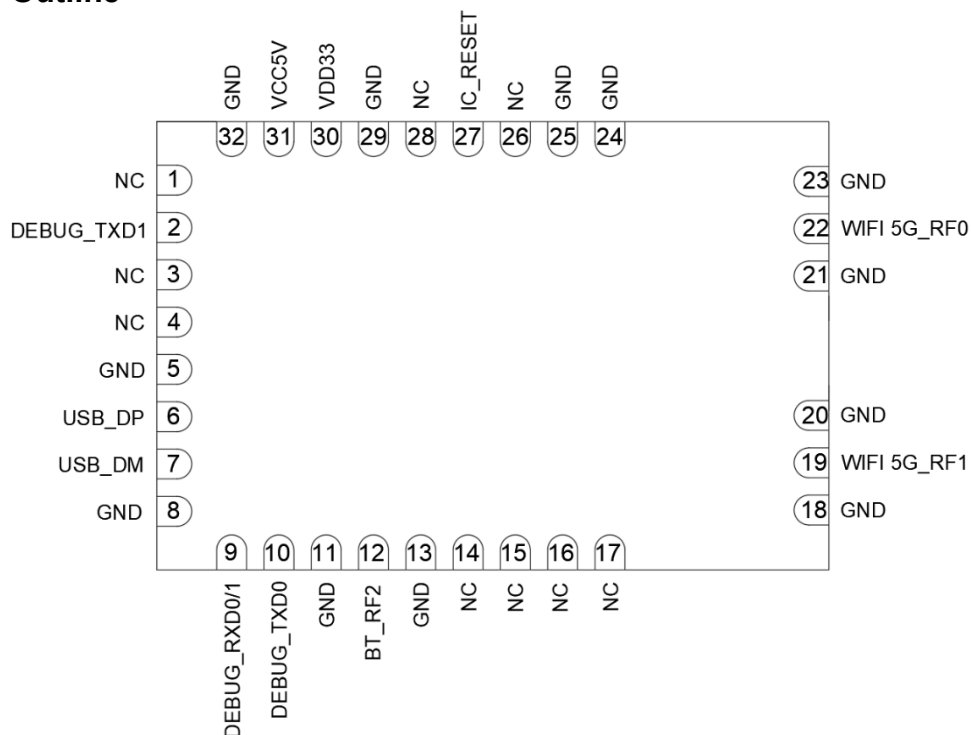
802.11a	@54Mbps	21	≤ -25
802.11n	@HT20 MCS 0	26	≤ -10
802.11n	@HT40 MCS 7	21	≤ -28
802.11ac	@VHT80 MCS 9	18	≤ -32
802.11ax	@HE80 MCS 11	17	≤ -35
Receiver Sensitivity, OFDM modulation PER $\leq 10\%$			
Protocol Standard	Data Rate	Spec.(dBm)	
802.11a(20MHz)	6Mbps	-87	
	54Mbps	-70	
802.11n(20MHz)	MCS 0 NSS1	-87	
	MCS 7 NSS1	-69	
802.11n(40MHz)	MCS 0 NSS1	-84	
	MCS 7 NSS1	-66	
802.11ac(20MHz)	MCS 0 NSS1	-87	
	MCS 9 NSS1	-62	
802.11ac(40MHz)	MCS 0 NSS1	-84	
	MCS 9 NSS1	-59	
802.11ac(80MHz)	MCS 0 NSS1	-81	
	MCS 9 NSS1	-56	
802.11ax(20MHz)	MCS 0 NSS1	-87	
	MCS 11 NSS1	-57	
802.11ax(40MHz)	MCS 0 NSS1	-84	
	MCS 11 NSS1	-54	
802.11ax(80MHz)	MCS 0 NSS1	-81	
	MCS 11 NSS1	-51	

2.2 BT RF Specification

Feature	Description		
Operating Frequency	2.402~2.480GHz		
Number of Channels	79 channels		
Standards	Bluetooth V5.4		
Modulation	8DPSK, $\pi/4$ DQPSK, GFSK		
PHY Data rates	Supports 2Mbps Bluetooth Low Energy(BLE), BLE Long Range		
Output Power	Min(dBm)	Typical(dBm)	Max(dBm)
	7.5	9	10.5
Sensitivity @ BER=0.1% for GFSK (1Mbps)		-88	
Sensitivity @ BER=0.01% for $\pi/4$ -DQPSK (2Mbps)		-84	
Sensitivity @ BER=0.01% for 8DPSK (3Mbps)		-81	

3.Pin Assignments

3.1 Pin Outline



3.2 Pin Definition

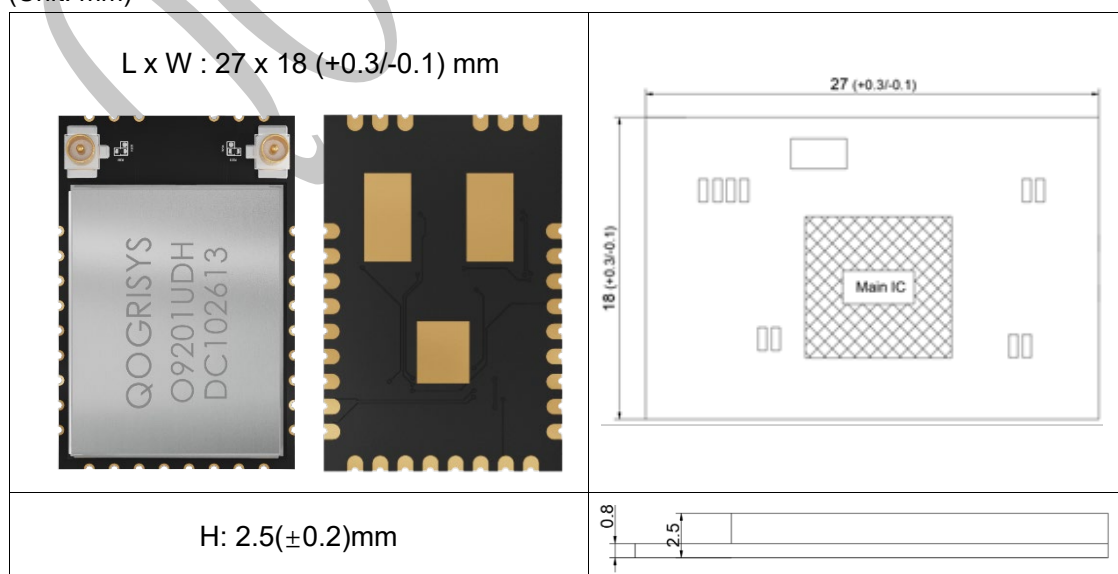
PIN	Name	Type	Description	Voltage
1	NC	—	Not connected	
2	DEBUG_TXD1	—	Debug UART1 TXD don't connect to ground	
3	NC	—	Not connected	
4	NC	—	Not connected	
5	GND	—	Ground connections	
6	USB_DP	I/O	USB2.0 differential pair D+ for WLAN and Bluetooth	
7	USB_DM	I/O	USB2.0 differential pair D- for WLAN and Bluetooth	
8	GND	—	Ground connections	
9	DEBUG_RXD0/1	—	Debug UART1 and UART0 RXD don't connect to ground	
10	DEBUG_TXD0	—	Debug UART0 TXD0 don't connect to ground	
11	GND	—	Ground connections	
12	BT_RF2	I/O	RF I/O port for BT	
13	GND	—	Ground connections	

14	NC	—	Not connected	
15	NC	—	Not connected	
16	NC	—	Not connected	
17	NC	—	Not connected	
18	GND	—	Ground connections	
19	WIFI5G_RF1	I/O	RF I/O port for Wi-Fi 5G	
20	GND	—	Ground connections	
21	GND	—	Ground connections	
22	WIFI5G_RF0	I/O	RF I/O port for Wi-Fi 5G	
23	GND	—	Ground connections	
24	GND	—	Ground connections	
25	GND	—	Ground connections	
26	NC	—	Not connected	
27	IC_RESET	—	Chip global reset (internal weak pullup, active low)	3.3V
28	NC	—	Not connected	
29	GND	—	Ground connections	
30	VDD33	P	Main power input 3.3V	3.3V
31	VCC5V	P	Main power input 5V	5V
32	GND	—	Ground connections	

4. Dimensions

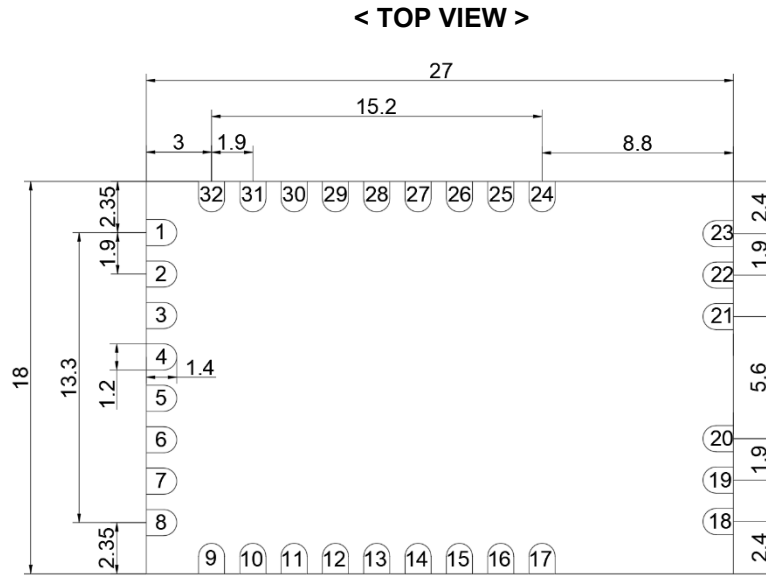
4.1 Physical Dimensions and Module Photo

(Unit: mm)



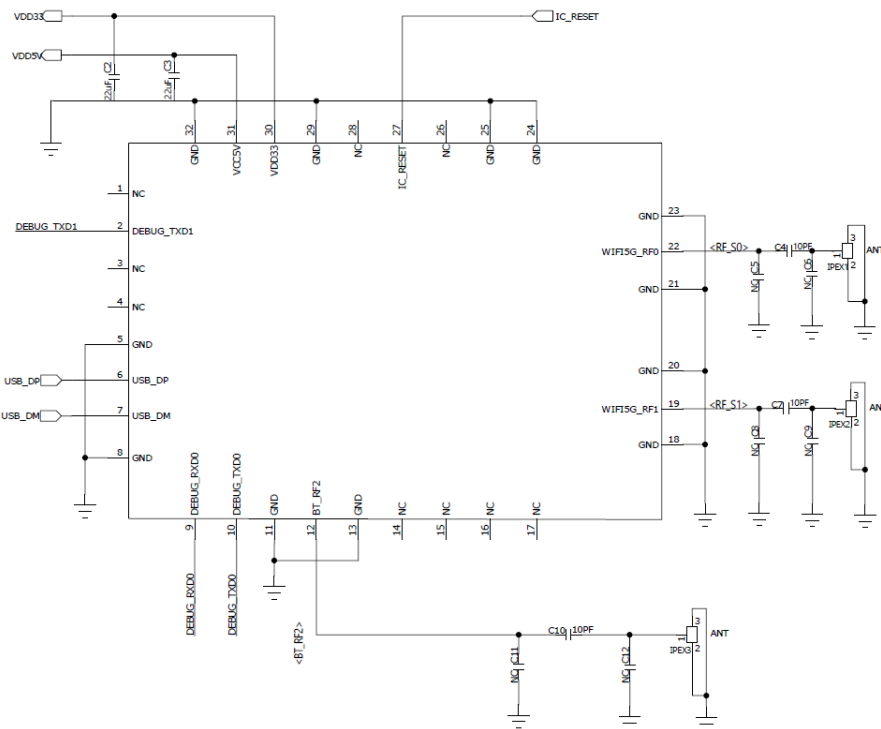
4.2 Module Physical Dimensions

(Unit: mm)



5 Reference Design

5.1 Reference schematic



NOTE:

PCB design must maintain a large enough heat dissipation area, and place as many vias as possible at the grounding position of the module center pad to ensure heat dissipation.

5.2 External Antenna

When the customer selects an external antenna, the external antenna selected must meet the parameter requirements specified ,Impedance 50Ω

5.3 Real-world Testing

5G Real-world Testing					
Protocol Standard		channel	Power (dBm)	EVM(dB)	Rx Sensitivity (dBm)
802.11a(54Mps)	ANT1	5180	21.6	-30.0	-76
		5600	21.7	-31.7	-76
		5825	21.0	-30.6	-76
	ANT2	5180	21.5	-29.5	-76
		5600	21.5	-29.8	-76
		5825	21.4	-32.6	-76
802.11ax(HE20_MCS0)	ANT1	5180	25.7	-15.8	-91
		5500	26.7	-15.2	-91
		5825	26.6	-12.3	-91
	ANT2	5180	25.2	-16.1	-91
		5500	25.4	-17.2	-91
		5825	26.2	-13.7	-91
802.11ax(HE20_MCS11)	ANT1	5180	18.1	-37.9	-63
		5500	17.8	-37.4	-63
		5825	17.7	-37.0	-63
	ANT2	5180	18.0	-38.3	-63
		5500	17.9	-37.6	-63
		5825	17.9	-37.0	-63
802.11ax(HE80_MCS11)	ANT1	5210	16.5	-38.6	-57
		5690	16.8	-37.3	-57
		5775	16.4	-37.8	-57
	ANT2	5210	16.3	-38.5	-57
		5690	17.3	-37.5	-57
		5775	17.7	-37.8	-57

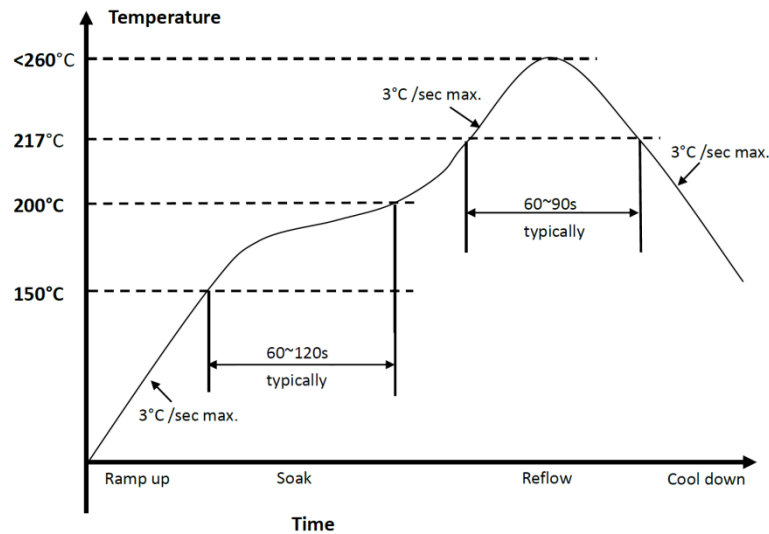
Description: The test environment is: temperature 25 °C humidity 60%

6 Recommended Reflow Profile

Referred to IPC/JEDEC standard.

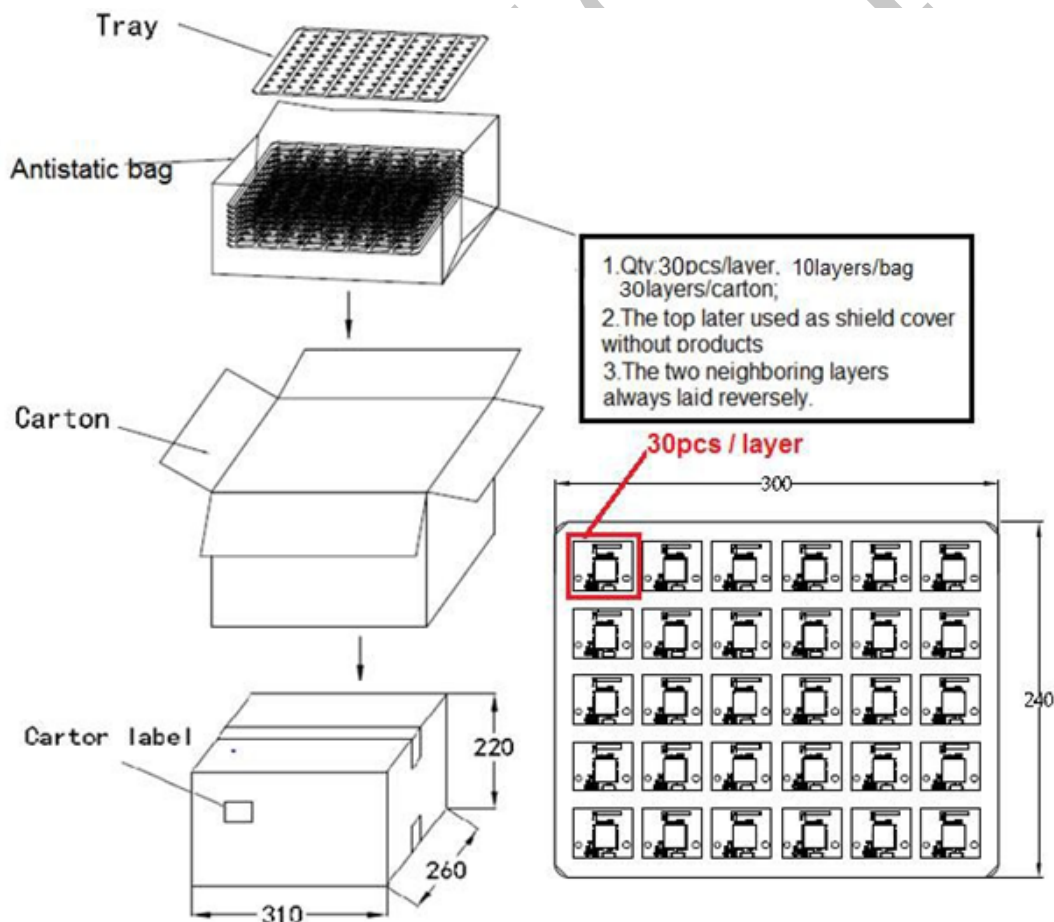
Peak Temperature : <260°C

Number of Times : 2 times max



7 Package

7.1 Reel



7.2 Storage Temperature And Humidity

The Modules is a Moisture Sensitive Device level 3, in according with standard IPC/JEDEC J-STD-020, tak e care all the relatives requirements for using this kind of components.

Moreover, the customer has to take care of the following conditions:

- a) Calculated shelf life in sealed bag: 12 months at <40°C and <90% relative humidity (RH).
- b) Environmental condition during the production: 30°C / 60% RH according to IPC/JEDEC J-STD-033A paragraph 5.
- c) The maximum time between the opening of the sealed bag and the reflow process must be 168 hours if condition.
- d) "IPC/JEDEC J-STD-033A paragraph 5.2" is respected.
- e) Baking is required if conditions b) or c) are not respected.
- f) Baking is required if the humidity indicator inside the bag indicates 10% RH or more.

THE END