Espressif

Chip Packaging Information



About This Document

This document summarizes the packing requirements of Espressif's chip products, including the packing method, packing-material dimensions, standard packing quantity, labels, dry-packing requirements and marking conventions.

Release Notes

Date	Version	Release notes
2017.06	V1.0	Initial release.
2017.07	V1.1	Corrected a typo in Table 1-2. Reel Dimensions: The quantity per reel for 6 * 6 package is changed to 2,000.
2017.08	V1.2	Changed the quantity per reel for 6 * 6 package to 3,000 in Table 1-2. Reel Dimensions.
		Updated Table 1-2 in the Chapter 1;
2018.07	V1.3	Updated Chapter 2 for labels;
2010.07	V 1.0	Added description for baking requirement in Chapter 3;
		Updated Chapter 4.
	V1.4	 Updated Table 1-2 in Section 1.2 to include more Quantity Per Reel options for 6*6 and 7*7 packages;
2020.12		 Added Section 4.3 to include Product with Flash and PSRAM.
2021.05	V1.5	Added information for 4 * 4 package in Table 1-1 and Table 1-2.
2021.10	V1.6	Update Figure 2-3 to include company logo on the product label;
		Updated the marking convention in Chapter four.
2022.04	V1.7	Updated Figure 2-3.
2023.06	v1.8	 Updated Figure 2-1, Figure 2-2, Figure 2-3, and Figure 3-1 due to label changes;
		 Added description about the second character of the main die line in Table 4-1.
2023.09	v1.9	Updated Figure 2-1 for typos;
		Replaced the mention of main die to Espressif Tracking Code.

Documentation Change Notification

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1. Tape and Reel Packing

1.1. Tape

Table 1-1 shows the dimensions of the carrier tape.

Table 1-1. Carrier Tape Dimensions (Unit: mm)

Package	Carrier Tape Width (W)	Cavity Pitch (P ₁)	Cavity Width (A ₀)	Cavity Length (B ₀)
4 * 4	12.0 ± 0.30	8.0 ± 0.10	4.30 ± 0.10	4.30 ± 0.10
5 * 5	12.0 ± 0.30	8.0 ± 0.10	5.30 ± 0.10	5.30 ± 0.10
6 * 6	16.0 ± 0.30	12.0 ± 0.10	6.30 ± 0.10	6.30 ± 0.10
7 * 7	16.0 ± 0.30	12.0 ± 0.10	7.30 ± 0.10	7.30 ± 0.10

Note:

The surface resistance of the carrier tape is $10^4 \sim 10^{11}$ ohms.

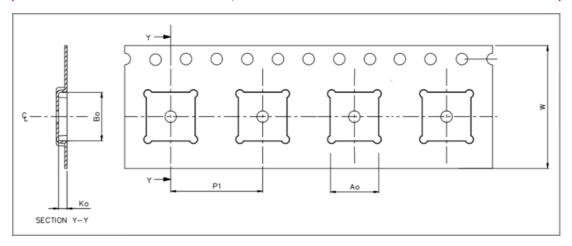


Figure 1-1. Carrier Tape Dimensions



1.2. Reel

Table 1-2 shows the dimensions of the reel.

Table 1-2. Reel Dimensions

Package	Reel Size	Quantity Per Reel
A* A	13"	5,000
4* 4	7"	1,000
5 * 5	13"	5,000
5 " 5	7"	1,000
0 * 0	13"	1,000
6 * 6	13''	3,000
7 * 7	13"	1,000
7 * 7	13"	2,000

Note:

The surface resistance of the reel is $10^4 \sim 10^{11}$ ohms.

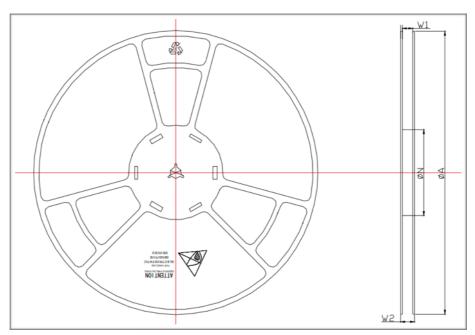


Figure 1-2. Reel Dimensions



1.3. Pin1 Location

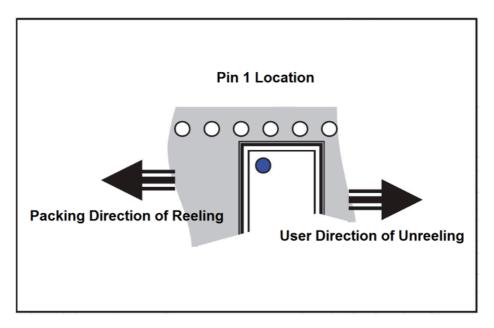


Figure 1-3. Pin 1 Orientation of Chips in Carrier Tape



2. Labels and Symbols

Reel, moisture barrier bag (MBB) and pizza box have relevant labels and symbols, as shown in the figures below.

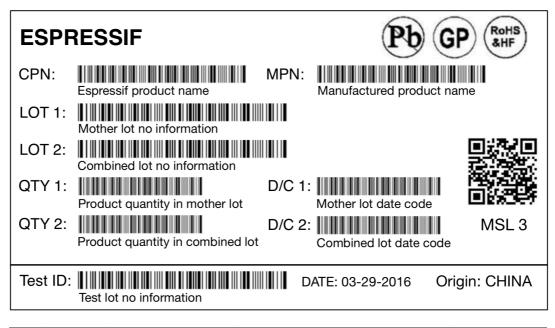


Figure 2-1. Reel Labelling



Figure 2-2. MBB Labels and Symbols





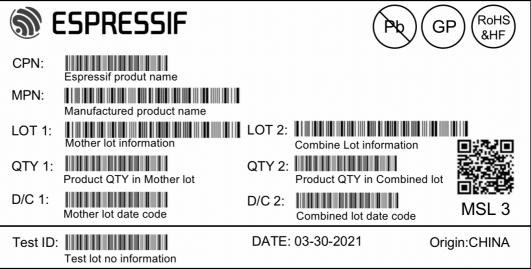


Figure 2-3. Label Formats for Reel, MBB and Pizza Box

Note:

Figure 2-1, Figure 2-2 and Figure 2-3 are for illustrative purposes only. The actual product received shall prevail.

Table 2-1. Label Content

Item	Description	
ESPRESSIF logo	Company logo and name	
CPN	Espressif product name, e.g. ESP32-D0WDQ6	
MPN	Manufacturing product name	
LOT1	Number of mother lot	
LOT2	Number of combined lot	
QTY1	Quantity of mother lot	



Item	Description	
QTY2	Quantity of combined lot	
D/C 1	Assembly date code for LOT1	
D/C 2	Assembly date code for LOT2	
Test ID	Test information	
DATE	Packing date, MM-DD-YYYY, DATE "03-29-2016" stands for Mar 29th in 2016	



3. Dry Packing Requirements

All Espressif products must be dry-packed, as their moisture sensitivity level (MSL) is 3. Dry packing consists of desiccant material (see figure 3-1) and a humidity-indicator card (HIC, see figure 3-2) sealed with the populated reel inside a moisture barrier bag (MBB).

The floor life (the allowable period of time, after removal from a moisture barrier bag, dry storage or dry bake and before the reflow soldering process) is shown in table 3.

Products require bake, before mounting, if:

- The humidity-indicator card reads > 10%, when reading at 23 ± 5 °C;
- Or the period of time after removal from a moisture barrier bag or dry storage or dry bake and before the reflow soldering process is larger than the value listed in table 3.

If baking is required, make sure that the products are taken out of the tape, and IPC/JEDEC J-STD-033 is followed during the bake procedure.

Table 3-1. Moisture Classification Level and Floor Life

Level	Floor life (out of bag) at factory ambient ≤ 30°C/60% RH, or as stated
3	168 hours



Figure 3-1. Desiccant

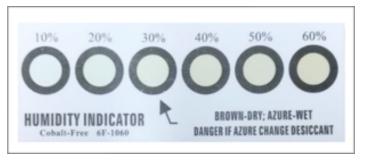


Figure 3-2. HIC



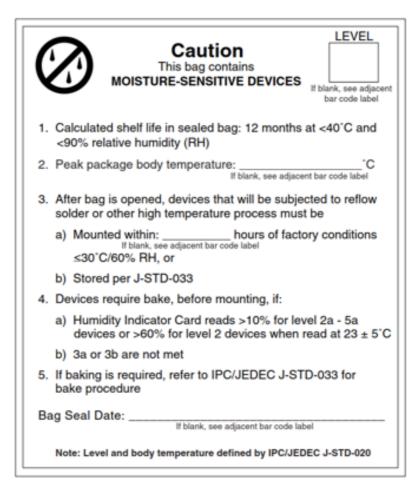


Figure 3-3. Moisture Sensitivity Caution Label

Note:

Figure 3-1, Figure 3-2 and Figure 3-3 are for illustrative purposes only. The actual product received shall prevail.

2023.09



4. Marking Conventions

Espressif chip silk marking provides information such as chip name, flash size, and operating temperature.

4.1. Chip Marking Information

Table 1. Chip Marking Information

Item	Description	
	Pin 1	
Diagram	Espressif Logo —	
Diagram	Product Name Date Code WWYYYY XXXXXXXXXX Flash / PSRAM Code XXXXXXXXXXX XXXXXXXXXX XXXXXXXXXX	
	Tracking Information	
Pin 1	Position of Pin 1	
Espressif Logo	Company logo	
Product Name	Indicates the chip name	
Date Code	WW is the week number of year YYYY. E.g., Date Code "122017" stands for the 12th week of year 2017.	
Flash Code	 A code that indicates: (Optional) Temperature and flash size The tracking information of the embedded flash The arrangement of flash code can be different by products. Please see Section 4.2 for details. 	
PSRAM Code	A code that indicates: • (Optional) Temperature and PSRAM size • The tracking information of the embedded PSRAM; The arrangement of PSRAM code can be different by products. Please see Section 4.2 for details.	
Espressif Tracking Information	Espressif tracking information: The second character correlates to the chip revision. See the detailed mapping in respective chip errata documents from Espressif's documentation page.	



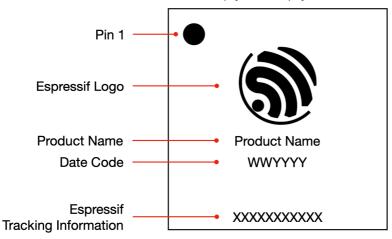
4.2. Flash Code and PSRAM Code Conventions

Based on the embedded flash or PSRAM, Espressif chips can be divided into the following four categories.

4.2.1. No Flash, No PSRAM

This section applies to all Espressif chips without any embedded flash or PSRAM, such as ESP8266EX, ESP32, ESP32-S2, ESP32-C3, and ESP32-S3.

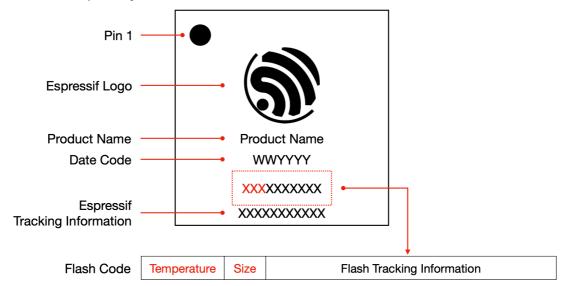
For such chips, no flash code and PSRAM code is provided on the chip marking. Therefore, these two codes are simply left empty.



4.2.2. Embedded Flash, No PSRAM

This section applies to all Espressif chips with only embedded flash, except those listed in the note below as exceptions.

For such chips, only the flash code is used.





Item	Length (unit: character)	Description
Temperature	2	 FH: 105 °C FN: 85 °C This field is optional.
Size	1	2: 2 MB4: 4 MB8: 8 MBThis field is optional.
Flash Tacking Information	7	Flash tracking information. This field is mandatory.

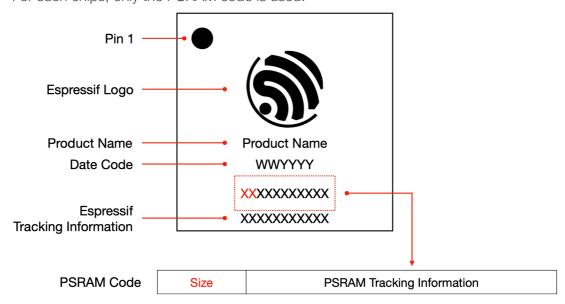
Notes:

- 1. ESP32-S2, ESP8685 and ESP8285 series use 1 character, instead of 2 characters, to indicate the temperature:
 - H: 105 °C
 - N: 85 °C
- 2. Additionally, ESP8285 series uses Mbit, instead of MByte, to indicate flash size:
 - 08: 8 Mbit
 - 16: 16 Mbit
- 3. Instead of following the convention above, the flash codes are not provided on the silk markings of ESP32-PICO-V3 and ESP32-PICO-D4.

4.2.3. Embedded PSRAM, No Flash

This section applies to all Espressif chips with only embedded PSRAM, except those listed in the note below as exceptions.

For such chips, only the PSRAM code is used.





Item	Length (unit: character)	Description
Size	2	• R2: 2 MB • R8: 8 MB
PSRAM Tacking Information	9	PSRAM tracking information. This field is mandatory.

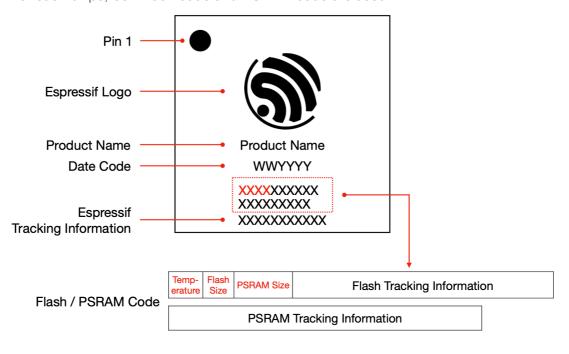
Notes:

1. ESP32-S3R8V has an additional character (V) between the Size field and PSRAM Tracking Information field, indicating this is a 1.8 V chip.

4.2.4. Embedded Flash, Embedded PSRAM

This section applies to all Espressif chips with both embedded flash and PSRAM, except those listed in the note below as exceptions.

For such chips, both flash code and PSRAM code are used.



Item	Length (unit: character)	Description
Temperature	1	• H: 105 °C • N: 85 °C
Flash Size	1	• 4: 4 MB
PSRAM Size	2	• R2: 2 MB
Flash Tacking Information	7	Flash tracking information. This field is mandatory.
PSRAM Tacking Information	9	PSRAM tracking information. This field is mandatory.



Notes:

1. Instead of following the convention above, the flash code and PSRAM code is not provided on the silk marking of ESP32-PICO-V3-02.



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