



|                          |                 |                                 |                                            |
|--------------------------|-----------------|---------------------------------|--------------------------------------------|
| 文件编号<br>Document No.     | ESP-03-2-014-03 | 文件名称<br>Document Name           | 产品/工艺变更通知<br>Product/Process Change Notice |
| 文件版本<br>Document Version | 00              | 秘密级别<br>Security Classification | 公开<br>Public                               |

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                         |                                           |            |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------|------------|
| <b>变更标题/Change Title:</b> ESP32 系列芯片 Efuse 变更/ESP32 Efuse Bits Change                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                         |                                           |            |
| PCN 编号<br>PCN No.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | P20180115-1                                                             | 提出日期<br>Issue Date of PCN                 | 2018/01/03 |
| 产品名称<br>Product Name                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | ESP32-D0WD<br>ESP32-D0WDQ6<br>ESP32-S0WD<br>ESP32-D2WD<br>ESP32-PICO-D4 | 变更日期<br>Proposed Date of Change           | 2018/01/29 |
| 封装类型/尺寸<br>Package Type/Size                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | QFN/5x5 & 6x6<br>LGA/7x7                                                | 首次出货日期<br>Proposed Date of First Shipment | 2018/02/05 |
| <b>客户批准/Customer Consent:</b> <input checked="" type="checkbox"/> 需要批准/Approval Required<br><input type="checkbox"/> 通知，无需批准/Notification, Approval Not Required                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                         |                                           |            |
| <b>变更等级/Change Classification:</b> <input checked="" type="checkbox"/> 主要变更/Major <input type="checkbox"/> 轻微变更/Minor                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                         |                                           |            |
| <b>变更原因/Reason for Change:</b><br>当前 ESP32 系列芯片的 Efuse BLOCK0 剩余 bit 位无法满足 Espressif IDF 功能扩展，需从其他 BLOCK 中选取部分 bit 位作为 Espressif IDF 系统参数使用。<br>Currently, the remaining bits in the Efuse BLOCK0 of the ESP32 series of chips do not meet the requirements for Espressif IDF function extension, and some bits from other BLOCKs need to be used as Espressif IDF system parameters.                                                                                                                                                                                                                       |                                                                         |                                           |            |
| <b>变更描述/Description of Change:</b><br><b>当前状况/Current State:</b><br>1. Efuse BLOCK1/2/3 对用户开放。<br>Efuse BLOCK1/2/3 are available to the customers.<br>2. Efuse BLOCK1/2/3 编码方式未固定。<br>The coding scheme of Efuse BLOCK1/2/3 is not defined.<br><b>变更内容/Proposed Change:</b><br>1. 将 Efuse BLOCK1/2/3 编码方式固定为 3/4 编码。<br>The coding scheme of Efuse BLOCK1/2/3 is the 3/4 coding scheme.<br>2. 将 Efuse BLOCK3 中的 64bit (3/4 编码后的 bit 数) 用于 Espressif 内部使用，不对用户开放。<br>The 64 bits of Efuse BLOCK3 are used internally by Espressif, and are not available to customers.<br>3. 将 EFUSE_BLK0_RDATA3[14]用于变更标识位。 |                                                                         |                                           |            |



Use EFUSE\_BLK0\_RDATA3[14] as the change identification bit.

变更对比/Comparison:

| 变更前/Before Change                                                                                                                                                                                                                                                                                                                   | 变更后/After Change                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>1. Espressif 未固定 Efuse BLOCK1/2/3 的编码方式。<br/>The coding scheme of Efuse BLOCK1/2/3 is not defined.</p> <p>2. Espressif 未对 Efuse BLOCK1/2/3 进行定义，可开放供用户使用。<br/>Espressif does not program Efuse BLOCK1/2/3. They can be programmed by users.</p> <p>3. EFUSE_BLK0_RDATA3[14]为 0。<br/>The value of EFUSE_BLK0_RDATA3[14] is 0.</p> | <p>1. Espressif 将 Efuse BLOCK1/2/3 编码方式固定为 3/4 编码。<br/>Espressif uses the 3/4 coding scheme for Efuse BLOCK1/2/3.</p> <p>2. Espressif 选取 Efuse BLOCK3 中的 64bit(为 3/4 编码后的 bit 数, 编码前为 48bit, 编码后为 64bit) 供内部使用。<br/>Espressif reserves 64 bits of Efuse BLOCK3 for internal use only. (Before using the 3/4 coding scheme, only 48 bits are reserved for internal use.)</p> <p>(1) 上述预留的 64bit:<br/>The 64 bits reserved for internal use:</p> <p>a. Efuse 写操作对应的寄存器为 EFUSE_BLK3_WDATA4/5, 客户须避免写这 2 个 word;<br/>Registers EFUSE_BLK3_WDATA4/5 are used for writing Efuse. It is recommended that customers do not write the two words.</p> <p>b. Efuse 读操作对应的寄存器为 EFUSE_BLK3_RDATA3 和 EFUSE_BLK_RDATA4[15:0].<br/>Registers EFUSE_BLK3_RDATA3 and EFUSE_BLK_RDATA4[15:0] are used for reading Efuse.</p> <p>(2) Efuse BLOCK3 中剩余可供客户使用的 bit 数为 144, 3/4 编码后为 192;<br/>Originally, 144 bits of Efuse BLOCK3 are available to customers. After using the 3/4 coding scheme, 192 bits are available.</p> <p>a. 烧写编码后的 192bit 时, 对应的寄存器为 EFUSE_BLK3_WDATA0/1/2/3/6/7;<br/>The registers for programming the 192 bits are EFUSE_BLK3_WDATA0/1/2/3/6/7;</p> <p>b. 读取编码前的 144bit 时, 操作对应的寄存器为 EFUSE_BLK3_RDATA0/1/2, EFUSE_BLK3_RDATA4[31:16], EFUSE_BLK3_RDATA5.<br/>Before the 3/4 coding scheme is used, the corresponding registers for reading the 144 bits are EFUSE_BLK3_RDATA0/1/2, EFUSE_BLK3_RDATA4[31:16], EFUSE_BLK3_RDATA5.</p> <p>3. EFUSE_BLK0_RDATA3[14]为 1。<br/>The value of EFUSE_BLK0_RDATA3[14] is 1.</p> |



#### 变更影响/Impact of Change:

1. 影响产品

Products Impacted

该变更受影响产品为：ESP32-D0WDQ6, ESP32-D0WD, ESP32-D2WD, ESP32-S0WD, ESP32-PICO-D4.

The products impacted by the change include ESP32-D0WDQ6, ESP32-D0WD, ESP32-D2WD, ESP32-S0WD, ESP32-PICO-D4.

2. 针对已自定义烧写 Efuse BLOCK1/2/3 的客户：

For those customers that have already programmed the Efuse we recommend taking the following measures:

(1) 须客户确认 EfuseE 使用位置或编码方式是否与上述变更内容冲突，若无冲突，则无影响。

The customers should confirm that their use and coding scheme of the Efuse bits are not incompatible with the changes mentioned above.

(2) 若有冲突，则须客户做如下处理：

If the use and the coding scheme of the Efuse bits are incompatible with the changes, the customers are recommended to do the following:

a. 使用变更后剩余的 Efuse 位；

Use the remaining bits of the Efuse BLOCKs to which the 3/4 coding scheme is applied.

b. 变更 Efuse BLOCK1/2/3 的编码方式为 3/4 编码；

Use 3/4 coding scheme for Efuse BLOCK1/2/3.

c. 更新用户固件，在应用软件端进行。

Update the user firmware in the application software.

3. 针对未自定义烧写 Efuse BLOCK1/2/3 的客户：

For customers that have not programmed the Efuse BLOCK1/2/3:

无影响。

There is no need to take extra measures.

#### 变更识别方式/Method of Identifying Change:

1. 通过读取寄存器 EFUSE\_BLK0\_RDATA3[14]标识位进行区分：

Revised chips can be identified by checking the register bit EFUSE\_BLK0\_RDATA3[14].

a. 1 表示变更后，说明 Efuse BLOCK3 中预留的 64bit 已被使用，客户须避免针对该区域进行写操作，且 BLOCK1/2/3 的编码方式已固定为 3/4 编码；

If the value of the bit is 1, it means that, after the change, the 64 bits reserved in Efuse BLOCK3 have been used. Users should avoid writing to this area, as the coding scheme of BLOCK1/2/3 has been fixed to the 3/4 coding scheme.

b. 0 表示变更前，说明 Efuse BLOCK3 中预留的 64bit 未被使用，且 BLOCK1/2/3 的编码方式未固定。

If the value of the bit is 0, it means that, before the change, the 64 bits reserved in Efuse BLOCK3 were not used and the coding scheme of BLOCK1/2/3 was not fixed.



- 从芯片表面 Marking 显示 Date Code 可直接区分变更前产品，具体依据实际执行日期。  
The date code on the revised chips' surface-marking indicates the date when the change was actually implemented. Customers can distinguish between different products, according to the date code.
- 从包装标签上显示的 Date Code 可区分变更前产品，具体依据实际实行日期。  
Customers can distinguish between different products, based on the date code on packaging labels. The products' detailed date code after the change corresponds to the actual date of change.
- 包装标签上加贴绿色圆点，带有绿色圆点表示为变更后之产品，该方式执行至 2018 年 4 月 30 日，2018 年 5 月 1 日后生产之芯片，不再加贴该绿色圆点。  
Chips with a green dot on the packaging labels are the revised chips. The method of using green dots to distinguish revised chips will continue until April 30th, 2018. This method, however, will be not applicable to chips produced after May 1st, 2018.

**变更前后产品处理/How to deal with products:**

若客户端实际使用情况符合上述变更影响描述，则建议客户联系 Espressif 确认处理方式，联系方式为 [sales@espressif.com](mailto:sales@espressif.com)

Should the changes mentioned in this PCN impact the use of these chips, users can contact us at [sales@espressif.com](mailto:sales@espressif.com).

**相关报告/Report(s) Attached:**

Reliability Report or Plan: \_\_\_\_\_ N/A  
Qualification Report or Plan: \_\_\_\_\_ N/A  
RoHS/HF Test Report: \_\_\_\_\_ N/A  
FunctionTest Report: \_\_\_\_\_ N/A  
Other Reports (Pls specify): \_\_\_\_\_ N/A

|                          |                   |                       |
|--------------------------|-------------------|-----------------------|
| 变更人/Change Owner:<br>符运生 | 签名/Signature:<br> | 日期/Date:<br>2018.1.15 |
|--------------------------|-------------------|-----------------------|

**Approved By**

批准人

|                    |     |            |                  |
|--------------------|-----|------------|------------------|
| Technical Support  | 栾春涛 | Signature: | Date: 2018.1.17  |
|                    | 戴玮  | Signature: | Date: 2018.1.17  |
| R&D Digital Team   | 符运生 | Signature: | Date: 2018.1.17  |
| R&D Hardware       | 王栋  | Signature: | Date: 2018.01.17 |
| QA                 | 陶袁  | Signature: | Date: 2018.01.17 |
| Operations         | 汤上金 | Signature: | Date: 1/17/2018  |
| Sales Manager      | 易雨皓 | Signature: | Date: 1/17/2018  |
| Purchasing Manager | 吴柏均 | Signature: | Date: 1/17/2018  |
| Marketing Manager  | 王珏  | Signature: | Date: 1/17/2018  |
| CEO                | 张瑞安 | Signature: | Date: 1/17/2018  |



如果无需相关人员批准，请在相应栏位填写“N/A”。

Input "N/A" in column(s) where approval is not required.

注：以上信息由 Espressif 填写。

Note: The information above shall be filled in by Espressif.

**客户响应要求/Customer Response Requirements:**

客户须按照如下要求给予 Espressif PCN 反馈：

Customers are required to respond to Espressif according to the following guidelines to confirm receipt of the PCN:

**主要变更/For Major Changes:**

- a) 客户须在接收到 PCN 后的 30 天内告知已收到 PCN。
- a) Customers should acknowledge receipt of the PCN within 30 calendar days from the date of receiving the PCN.
- b) 如客户未在接收到 PCN 后的 30 天内告知已收到，则视为客户接受变更。
- b) Lack of acknowledgment of the PCN within 30 calendar days constitutes acceptance of the proposed changes.
- c) 客户告知确认收到 PCN 后，如未在 90 天内反馈其他要求，则视为客户接受变更。
- c) After customers acknowledge receipt of the PCN, lack of additional response on their part within 90 calendar days constitutes acceptance of the changes.

**轻微变更/For Minor Changes:**

- a) 如客户未在接收到 PCN 后的 7 天内告知已收到，则视为客户接受变更。
- a) Lack of acknowledgement of the PCN within 7 calendar days constitutes acceptance of the changes.

请反馈至 [pcn@espressif.com](mailto:pcn@espressif.com)。

Please feedback to [pcn@espressif.com](mailto:pcn@espressif.com).

注：以下信息由客户或 Espressif 销售与客户服务部门填写。

Note: The information below shall be filled in by customers or Espressif's sales department.

**客户批准/确认信息**

**Customer Approval/Acknowledgement and Remarks**

客户公司全称：

Customer's Company Name:

PCN 评审结果/PCN Study Result: ☐ 批准/Approval ☐ 不批准/Disapproval ☐ 需要分析/Further Analysis Required

客户意见/Comment:



|                                        |  |                                        |  |
|----------------------------------------|--|----------------------------------------|--|
| 公司代表人姓名<br>Representative's Name:      |  | 公司代表人职责<br>Representative's Job Title: |  |
| 公司代表人签名<br>Representative's Signature: |  | 日期<br>Date:                            |  |