

文件编号 Document No.	ESP-07-2-007-03	文件名称 Document Name	产品/工艺变更通知 Product/Process Change Notice (PCN)
文件版本 Document Version	1.4	保存期限 Retention Period	5 年 5 years

**基于 ESP32-S2 芯片的 ESP32-S2 系列产品的芯片版本升级**

**Upgrade Chip Revision of ESP32-S2 Series Products Based on ESP32-S2**

PCN 编号 PCN No.	PCN20230702	提出日期 Issue Date of PCN	2023/07/28
变更日期 Proposed Date of Change	2023/09/28	预计变更后产品首次出货日期 Proposed Date of First Shipment After Change	2023/11/01
PCN 类型 / PCN Category	<input checked="" type="checkbox"/> 客户需要批准 / Customer Approval Required <input type="checkbox"/> 客户通知 / Customer Notification		

**1. 影响产品名称 / Affected Product Name**

1) 芯片产品 / Chip Products:

ESP32-S2

2) 模组产品 / Module Products:

Product Name	Product MPN
ESP32-S2-SOLO	ESP32-S2-SOLO-N4
ESP32-S2-SOLO	ESP32-S2-SOLO-N8
ESP32-S2-SOLO	ESP32-S2-SOLO-N16
ESP32-S2-SOLO	ESP32-S2-SOLO-H4
ESP32-S2-SOLO-U	ESP32-S2-SOLO-U-N4
ESP32-S2-SOLO-U	ESP32-S2-SOLO-U-N8
ESP32-S2-SOLO-U	ESP32-S2-SOLO-U-N16
ESP32-S2-SOLO-U	ESP32-S2-SOLO-U-H4
ESP32-S2-WROOM	ESP32-S2-WROOM-N4 ESP32-S2-WROOM(M22S2H3200PH3Q0)
ESP32-S2-WROOM	ESP32-S2-WROOM-H4 ESP32-S2-WROOM(M22S2H3200PS3Q0)
ESP32-S2-WROOM	ESP32-S2-WROOM-N8 ESP32-S2-WROOM(M22S2H6400PH3Q0)
ESP32-S2-WROOM	ESP32-S2-WROOM-N16 ESP32-S2-WROOM(M22S2H2800PH3Q0)
ESP32-S2-WROOM-I	ESP32-S2-WROOM-I-N4 ESP32-S2-WROOM-I(M22S2H3200UH3Q0)
ESP32-S2-WROOM-I	ESP32-S2-WROOM-I-H4

	ESP32-S2-WROOM(M22S2H3200PS3Q0)
ESP32-S2-WROOM-I	ESP32-S2-WROOM-I-N8 ESP32-S2-WROOM-I(M22S2H6400UH3Q0)
ESP32-S2-WROOM-I	ESP32-S2-WROOM-I-N16 ESP32-S2-WROOM-I(M22S2H2800UH3Q0)
ESP32-S2-WROVER	ESP32-S2-WROVER-N4R2 ESP32-S2-WROVER(M22S2H3216PH3Q0)
ESP32-S2-WROVER	ESP32-S2-WROVER-N4R8 ESP32-S2-WROVER(M22S2H3264PH3Q0)
ESP32-S2-WROVER	ESP32-S2-WROVER-N8R2 ESP32-S2-WROVER(M22S2H6416PH3Q0)
ESP32-S2-WROVER	ESP32-S2-WROVER-N16R2 ESP32-S2-WROVER(M22S2H2816PH3Q0)
ESP32-S2-WROVER-I	ESP32-S2-WROVER-I-N4R2 ESP32-S2-WROVER-I(M22S2H3216UH3Q0)
ESP32-S2-WROVER-I	ESP32-S2-WROVER-I-N8R2 ESP32-S2-WROVER-I(M22S2H6416UH3Q0)
ESP32-S2-WROVER-I	ESP32-S2-WROVER-I-N16R2 ESP32-S2-WROVER-I(M22S2H2816UH3Q0)

### 3) 开发板产品/ Development Board Products:

Product Name	Product MPN	Module on Board
ESP32-S2-Saola-1	ESP32-S2-Saola-1R	ESP32-S2-WROVER-N4R2
ESP32-S2-Saola-1	ESP32-S2-Saola-1RI	ESP32-S2-WROVER-I-N4R2
ESP32-S2-Saola-1	ESP32-S2-Saola-1M	ESP32-S2-WROOM-N4
ESP32-S2-Saola-1	ESP32-S2-Saola-1MI	ESP32-S2-WROOM-I-N4
ESP32-S2-DevKitC-1	ESP32-S2-DevKitC-1	ESP32-S2-SOLO-N4
ESP32-S2-DevKitC-1	ESP32-S2-DevKitC-1U	ESP32-S2-SOLO-U-N4
ESP32-S2-Kaluga-1	ESP32-S2-Kaluga-1	ESP32-S2-WROVER-N4R2

### 2. 变更原因/ Reason for Change

产品持续升级优化，进一步提升 ESP32-S2 系列芯片性能。

Upgrade ESP32-S2 series of chips to further improve the performance.

### 3. 变更描述/ Description of Change

ESP32-S2 系列产品的芯片版本将由 v0.0 升级为 v1.0。结合使用乐鑫推荐版本的软件，芯片版本为 v1.0 的 ESP32-S2 系列产品提升了 11g, 11n 中高速率发射功率。同时，芯片版本为 v1.0 的 ESP32-S2 系列产品的其他性能较变更前版本的产品有提升。具体信息参见附录 I 中勘误表信息。

段落 1 中列出的模组和开发板产品中使用的主芯片为 ESP32-S2 系列芯片，因此也进行相应变更。

Upgrade ESP32-S2 series of chips from chip revision v0.0 to chip revision v1.0. With the [recommended](#) ESP-IDF versions, the ESP32-S2 series products based on chip revision v1.0 have improved transmit power in high rates for 11g and 11n. The ESP32-S2 series products based on chip revision v1.0 have other performance improvements. For details, please refer to Appendix I for Errata Information.

Related products listed in Para 1 are based on ESP32-S2 series of chips, and thus will change accordingly.

#### 4. 变更对比/ Change Comparison

请见附录 I: 变更对比。

Please refer to Appendix I: Change comparison.

识别方式/ Identification Method:

芯片产品: 通过 eFuse 及产品丝印。

Chip products: Identified by eFuse bits and chip marking.

模组产品通过主芯片的 eFuse, 模组屏蔽盖丝印的产品规格标识位, 或产品外箱标签中的 PW 号。

Module products: Identified by the chip eFuse, module shield marking, or PW No. on carton box.

开发板产品通过主芯片的 eFuse, 模组屏蔽盖丝印的产品规格标识位, 或产品外箱标签中的 PW 号。

Development board product: Identified by the chip eFuse, module shield marking, or PW No. on carton box.

#### 5. 变更影响/ Impact of Change

##### 1) 品质和性能/ Quality & Performance:

结合使用乐鑫[推荐](#)版本的软件, 芯片版本为 v1.0 的 ESP32-S2 系列产品提升了 11g, 11n 中高速率发射功率, 低速率及 11b 的发射功率未做调整, 对认证无直接影响。具体射频功率参见附录 I 中 射频功率信息。[结合使用需求版本的乐鑫软件, 芯片版本为 v1.0 的 ESP32-S2 系列产品射频功率无变化。](#)

With the [recommended](#) ESP-IDF versions, the ESP32-S2 series products based on chip version v1.0 have improved transmit power in high rates for 11g and 11n. The transmit power in low rates and for 11b remains unchanged, which does not have a direct impact on certification. For details about RF transmit power, please refer to Appendix I for RF Power Information. [The RF transmit power of the ESP32-S2 series products based on chip version v1.0 remains unchanged as before.](#)

芯片版本为 v1.0 的 ESP32-S2 系列产品的其他性能较变更前版本的产品有提升。具体信息参见附录 I 中勘误表信息。

The ESP32-S2 series products based on chip revision v1.0 have other performance improvements. For details, please refer to Appendix I for Errata Information.

##### 2) 交期/ Delivery: 无影响/No impact.

##### 3) 生产料号/ Material Part Numbers (MPN):

客户可以继续使用原有的芯片产品名称下单;

You can still use the current chip name to place orders.

段落 1 中列出的模组和开发板的 MPN 不变更, 客户可以继续使用原有的产品 MPN 进行下单。

There is no change to the MPN of the affected Espressif modules and development board products listed in para 1. You can still use the current MPN to place orders.

#### 4) 认证/ Certification:

段落 1 列出的芯片产品变更后对认证无直接影响。由于客户的匹配电路存在差异，建议客户对发射功率进行对比测试，如需要，可联系乐鑫提供相应的支持。

**Changes to the chip products listed in para 1 have no direct impact on certification.** Given the differences between matching circuits, it is recommended to conduct comparative tests on transmit power. Please contact Espressif for support if needed.

段落 1 中涉及的模组的认证有效性无变化，客户可正常使用变更后的模组产品。

Certifications for the modules listed in para 1 are still valid, and you can use the upgraded module products directly.

#### 5) 软件/ ESP-IDF

使用段落 1 列出的变更后的产品时，如需表现更优的射频功率，请识别确认所使用的 ESP-IDF 版本为推荐版本的 ESP-IDF 版本，ESP-IDF 各分支支持信息参见表 1。同时强烈建议您升级到 ESP-IDF release 分支的**最新稳定版本**，更多软件信息参见 [ESP-IDF 版本简介](#)。如有问题，请联系乐鑫。

(注：使用需求版本和推荐版本都可支持变更后的产品运行。使用需求版本的 ESP-IDF 版本，搭载变更后的产品的射频功率维持不变。)

For the upgraded products listed in para 1 **with better RF performance**, please be sure that you use the **recommended** ESP-IDF versions for your branch. Please refer to Table 1 for details about the required and recommended ESP-IDF versions. Moreover, it is highly recommended to upgrade to the **latest stable version** for your branch. For more software information, please refer to [ESP-IDF Versions](#). If you have any questions, please contact [Espressif](#).

(Note: **The upgraded products can run on all required and recommended ESP-IDF versions. The RF transmit power of the upgraded products remains unchanged as long as the required version of ESP-IDF is used.**)

表 1 ESP-IDF 各分支支持信息

Table 1 **Required and recommended ESP-IDF versions corresponding to the upgraded products**

<b>ESP-IDF Branch</b>	<b>Required IDF Ver. From</b>	<b>RF Improved Commit ID</b>	<b>Recommended IDF Ver. From</b>
release/v4.2	<a href="#">v4.2</a>	<a href="#">7482ad51</a>	<a href="#">v4.2.3</a>
release/v4.3	<a href="#">v4.3</a>	<a href="#">87c2352a</a>	<a href="#">v4.3.3</a>
release/v4.4	<a href="#">v4.4</a>	<a href="#">71b81e4a</a>	<a href="#">v4.4.1</a>
release/v5.0	<a href="#">v5.0</a>	<a href="#">9909c4a3</a>	<a href="#">v5.0</a>

注意/ Note:

ESP-IDF v4.2 已正式停止维护，乐鑫将不再对该版本提供增加新功能、修复 bug、修复安全问题等支持。  
ESP-IDF v4.2 has reached End-of-Life. New features, bug fixes, and security fixes will no longer be supported on this branch.

**6. 变更前后产品处理/ How to Deal with Products**

FIFO

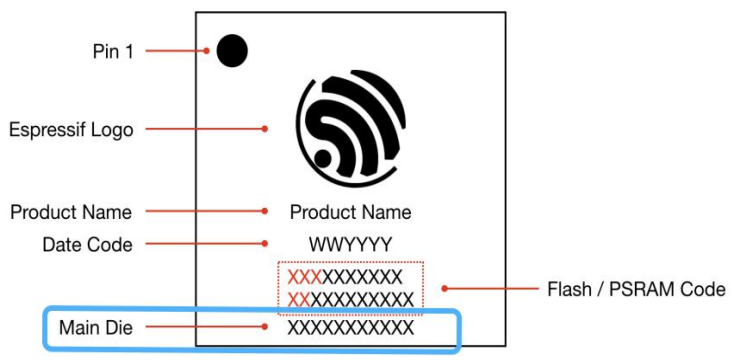

**7. 相关报告/ Related Report(s):**

- Related ECN No.                      ECN-2021-031
- Performance Test Report              射频性能验证/ RF Performance Verification: Pass
- Other Reports (Pls specify)              其他项目信息参见 [ESP32-S2 系列芯片勘误表](#)  
For information about other items, refers to [ESP32-S2 Series SoC Errata](#)

**8. 给使用者的验证建议/ Verification Suggestion To Users**

建议客户可识别确认所使用的 ESP-IDF 版本为**推荐版本**的 ESP-IDF 版本，结合实际应用场景进行验证。  
Suggest to check if you use the **recommended** ESP-IDF versions, and do the verification with practical application scenarios.

## Appendix I 变更对比/ Change Comparison

1 产品基本信息/ Product Basic Information			
No.	项目/ Item	变更前/ Before Change	变更后/ After Change
1.1	Chip Revision	v0.0	v1.0
1.2	eFuse 标识位/ eFuse identification bit		
	EFUSE_RD_MAC_SPI_SYS_3_REG[19]	0	0
	EFUSE_RD_MAC_SPI_SYS_3_REG[18]	0	1
	EFUSE_RD_MAC_SPI_SYS_3_REG[20]	0	0
	EFUSE_RD_MAC_SPI_SYS_4_REG[6]	0	0
	EFUSE_RD_MAC_SPI_SYS_4_REG[5]	0	0
	EFUSE_RD_MAC_SPI_SYS_4_REG[4]	0	0
1.3	Chip Marking (Main Die Line)		
		xAXXXXXX	xBXXXXXX
1.4	Module MPN	No change	
1.5	Module Marking (Specification Marking Line)		
		XXXXXX	MBXXXX
2 射频功率信息/ RF Power Information			

No.	Tx_Rate	Before Change	After Change	
		(Chip Revision v0.0)	(Chip Revision v1.0 with Recommended ESP-IDF Version)	Chip Revision v1.0 with Required ESP-IDF Version)
2.1	1m	19.5	19.5	19.5
2.2	2m	19.5	19.5	19.5
2.3	5.5m	19.5	19.5	19.5
2.4	11m	19.5	19.5	19.5
2.5	6m	18	18	18
2.6	9m	18	18	18
2.7	12m	18	18	18
2.8	18m	18	18	18
2.9	24m	17	18	17
2.10	36m	17	18	17
2.11	48m	16	18	16
2.12	54m	15	18	15
2.13	mcs0	18	18	18
2.14	mcs1	18	18	18
2.15	mcs2	18	18	18
2.16	mcs3	17	18	17
2.17	mcs4	17	17	17
2.18	mcs5	16	17	16
2.19	mcs6	15	17	15
2.20	mcs7	13.5	17	13.5
2.21	mcs0_40	18	18	18
2.22	mcs1_40	18	18	18
2.23	mcs2_40	18	18	18
2.24	mcs3_40	17	18	17
2.25	mcs4_40	17	17	17
2.26	mcs5_40	16	17	16
2.27	mcs6_40	15	16.5	15
2.28	mcs7_40	13.5	16.5	13.5
<b>3</b>	<b>勘误表信息/ Errata Information</b>			
No.	Item	Before Change	After Change	
3.1	系统 System	NA	1) 修复 VDDA 和 VDD3P3_RTC 管脚在芯片关闭时漏电问题。 Fixed leakage current at the VDDA and VDD3P3_RTC pin during shutdown 2) 修复 flash 下载随机失败问题。 Fixed random flash download failure	
3.2	RTC I2C	NA	修复低温条件下 RTC_I2C_RESET 下降沿触发复位问题	

			Fixed reset triggered by the falling edge of RTC_I2C_RESET at low temperature	
3.3	SPI	NA	修复 SPI 自动暂停后软件重启卡住问题 Fixed SPI stuck after soft restart from auto suspension	
3.4	USB OTG	NA	修复 USB OTG 使用 AHB 总线仲裁时出现异常数据 Fixed abnormal data during AHB bus arbitration by USB OTG	
3.5	SAR ADC	NA	修复 SAR ADC 的位 1 不反转问题。 Fixed the non-flip of Bit 1 in SAR ADC	
<b>4</b>	<b>软件信息/ ESP-IDF Information</b>			
<b>No.</b>	<b>ESP-IDF Branch</b>	<b>Required IDF Ver. From</b>	<b>RF Improved Commit ID</b>	<b>Recommended IDF Ver. From</b>
4.1	release/v4.2	<a href="#">v4.2</a>	<a href="#">7482ad51</a>	<a href="#">v4.2.3</a>
4.2	release/v4.3	<a href="#">v4.3</a>	<a href="#">87c2352a</a>	<a href="#">v4.3.3</a>
4.3	release/v4.4	<a href="#">v4.4</a>	<a href="#">71b81e4a</a>	<a href="#">v4.4.1</a>
4.4	release/v5.0	<a href="#">v5.0</a>	<a href="#">9909c4a3</a>	<a href="#">v5.0</a>
<b>5</b>	<b>技术规格书信息/ Datasheet Information</b>			
<b>No.</b>	<b>Item</b>	<b>Before Change</b>	<b>After Change</b>	
5.1	ESP32-S2 Datasheet	<a href="#">ESP32-S2 Series Datasheet (for chip revision v0.0)</a>	<a href="#">ESP32-S2 Series Chip Revision v1.0 Datasheet</a>	
5.2	ESP32-S2-SOLO & ESP32-S2-SOLO-U Datasheet	v1.6	v1.7	
5.3	ESP32-S2-WROOM & ESP32-S2-WROOM-I Datasheet	v1.3	v1.4	
5.4	ESP32-S2-WROVER & ESP32-S2-WROVER-I Datasheet	v1.2	v1.3	



**邮件订阅**
**Espressif Email Notifications**

乐鑫为注册用户提供电子邮件通知服务，用户可通过[乐鑫订阅系统](#)接收技术文档更新、新闻通讯、PCN 等邮件通知。

Espressif sends email notifications of technical documentation changes, along with newsletters, PCNs and other valuable information, to subscribed customers only. If you wish to stay updated on our products and services, please subscribe [here](#).

**客户响应要求**
**Customer Response Requirements**
**需客户批准的变更/ Change Requiring Customer Approval:**

a) 客户须在乐鑫发出 PCN 后的 30 天内告知乐鑫已收到 PCN。如客户未在接收到 PCN 后的 30 天内告知已收到，则视为客户收到变更。

Customers are requested to acknowledge receipt of the PCN within 30 calendar days from the date of issue of the PCN. Customers would be considered as notified 30 calendar days after issue of the PCN if no acknowledgement is received.

b) 自发布 PCN 之日起 90 天内，客户没有任何其他反馈，则表示客户接受该 PCN。

The lack of any additional responses from customers within 90 calendar days from the date of issue of the PCN constitutes acceptance of the proposed changes.

**客户通知/ Customer Notification:**

a) 客户需在乐鑫发出 PCN 后 14 天内通知乐鑫收到该 PCN。如客户未在接收到 PCN 14 日反馈乐鑫，则视为客户确认该 PCN。

Customers are requested to acknowledge receipt of the PCN within 14 calendar days from the date of issue of the PCN. Customers would be considered as having acknowledged the PCN if no response is received after 14 calendar days.

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

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

**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 Review Result:

批准/确认 Accepted/Acknowledged

不批准/ Rejected

需要分析/ Further Analysis Required

客户意见/Comment:

公司代表人姓名

Representative's Name:

公司代表人职责

Representative's Job Title:

公司代表人签名

Representative's Signature:

日期

Date: