

Appendix A – ESP32-S3 Consolidated Pin Overview

Pin No.	Pin Name	Pin Type	Pin Providing Power	Pin Settings		RTC Function		Analog Function		IO MUX Function									
				At Reset	After Reset	0	3	0	1	0	Type	1	Type	2	Type	3	Type	4	Type
1	LNA_IN	Analog																	
2	VDD3P3	Power																	
3	VDD3P3	Power																	
4	CHIP_PU	Analog	VDD3P3_RTC																
5	GPIO0	IO	VDD3P3_RTC	IE, WPU	IE, WPU	RTC_GPIO0	sar_i2c_scl_0			GPIO0	I/O/T	GPIO0	I/O/T						
6	GPIO1	IO	VDD3P3_RTC	IE	IE	RTC_GPIO1	sar_i2c_sda_0	TOUCH1	ADC1_CH0	GPIO1	I/O/T	GPIO1	I/O/T						
7	GPIO2	IO	VDD3P3_RTC	IE	IE	RTC_GPIO2	sar_i2c_scl_1	TOUCH2	ADC1_CH1	GPIO2	I/O/T	GPIO2	I/O/T						
8	GPIO3	IO	VDD3P3_RTC	IE	IE	RTC_GPIO3	sar_i2c_sda_1	TOUCH3	ADC1_CH2	GPIO3	I/O/T	GPIO3	I/O/T						
9	GPIO4	IO	VDD3P3_RTC			RTC_GPIO4		TOUCH4	ADC1_CH3	GPIO4	I/O/T	GPIO4	I/O/T						
10	GPIO5	IO	VDD3P3_RTC			RTC_GPIO5		TOUCH5	ADC1_CH4	GPIO5	I/O/T	GPIO5	I/O/T						
11	GPIO6	IO	VDD3P3_RTC			RTC_GPIO6		TOUCH6	ADC1_CH5	GPIO6	I/O/T	GPIO6	I/O/T						
12	GPIO7	IO	VDD3P3_RTC			RTC_GPIO7		TOUCH7	ADC1_CH6	GPIO7	I/O/T	GPIO7	I/O/T						
13	GPIO8	IO	VDD3P3_RTC			RTC_GPIO8		TOUCH8	ADC1_CH7	GPIO8	I/O/T	GPIO8	I/O/T						
14	GPIO9	IO	VDD3P3_RTC		IE	RTC_GPIO9		TOUCH9	ADC1_CH8	GPIO9	I/O/T	GPIO9	I/O/T			SUBSPICS1	O/T		
15	GPIO10	IO	VDD3P3_RTC		IE	RTC_GPIO10		TOUCH10	ADC1_CH9	GPIO10	I/O/T	GPIO10	I/O/T	FSPIIO4	II/O/T	SUBSPICSD	O/T	FSPIPHD	II/O/T
16	GPIO11	IO	VDD3P3_RTC		IE	RTC_GPIO11		TOUCH11	ADC2_CH0	GPIO11	I/O/T	GPIO11	I/O/T	FSPIIO5	II/O/T	SUBSPICSD	II/O/T	FSPIPHD	II/O/T
17	GPIO12	IO	VDD3P3_RTC		IE	RTC_GPIO12		TOUCH12	ADC2_CH1	GPIO12	I/O/T	GPIO12	I/O/T	FSPIIO6	II/O/T	SUBSPICSD	O/T	FSPIPHD	II/O/T
18	GPIO13	IO	VDD3P3_RTC		IE	RTC_GPIO13		TOUCH13	ADC2_CH2	GPIO13	I/O/T	GPIO13	I/O/T	FSPIIO7	II/O/T	SUBSPICSD	II/O/T	FSPIPHD	II/O/T
19	GPIO14	IO	VDD3P3_RTC		IE	RTC_GPIO14		TOUCH14	ADC2_CH3	GPIO14	I/O/T	GPIO14	I/O/T	FSPIIO8	O/T	SUBSPICSD	II/O/T	FSPIPHD	II/O/T
20	VDD3P3_RTC	Power																	
21	XTAL_32K_P	IO	VDD3P3_RTC			RTC_GPIO15		XTAL_32K_P	ADC2_CH4	GPIO15	I/O/T	GPIO15	I/O/T	UORTS	O				
22	XTAL_32K_N	IO	VDD3P3_RTC			RTC_GPIO16		XTAL_32K_N	ADC2_CH5	GPIO16	I/O/T	GPIO16	I/O/T	UORTS	O				
23	GPIO17	IO	VDD3P3_RTC		IE	RTC_GPIO17			ADC2_CH6	GPIO17	I/O/T	GPIO17	I/O/T	UORTS	O				
24	GPIO18	IO	VDD3P3_RTC		IE	RTC_GPIO18			ADC2_CH7	GPIO18	I/O/T	GPIO18	I/O/T	UORTS	O				
25	GPIO19	IO	VDD3P3_RTC			RTC_GPIO19		USB_D-	ADC2_CH8	GPIO19	I/O/T	GPIO19	I/O/T	UORTS	O	CLK_OUT3	O		
26	GPIO20	IO	VDD3P3_RTC	USB_PU	USB_PU	RTC_GPIO20		USB_D+	ADC2_CH9	GPIO20	I/O/T	GPIO20	I/O/T	UORTS	O	CLK_OUT1	O		
27	GPIO21	IO	VDD3P3_RTC			RTC_GPIO21				GPIO21	I/O/T	GPIO21	I/O/T						
28	SPICSD	IO	VDD_SPI	IE, WPU	IE, WPU					SPICSD	O/T	GPIO26	I/O/T						
29	VDD_SPI	Power																	
30	SPIHD	IO	VDD_SPI	IE, WPU	IE, WPU					SPIHD	II/O/T	GPIO27	I/O/T						
31	SPIWP	IO	VDD_SPI	IE, WPU	IE, WPU					SPIWP	II/O/T	GPIO28	I/O/T						
32	SPICSD	IO	VDD_SPI	IE, WPU	IE, WPU					SPICSD	O/T	GPIO29	I/O/T						
33	SPICLK	IO	VDD_SPI	IE, WPU	IE, WPU					SPICLK	O/T	GPIO30	I/O/T						
34	SPIQ	IO	VDD_SPI	IE, WPU	IE, WPU					SPIQ	II/O/T	GPIO31	I/O/T						
35	SPID	IO	VDD_SPI	IE, WPU	IE, WPU					SPID	II/O/T	GPIO32	I/O/T						
36	SPICLK_N	IO	VDD_SPI / VDD3P3_CPU	IE	IE					SPI CLK_N_DIFF	O/T	GPIO48	I/O/T	SUBSPI CLK_N_DIFF	O/T				
37	SPICLK_P	IO	VDD_SPI / VDD3P3_CPU	IE	IE					SPI CLK_P_DIFF	O/T	GPIO47	I/O/T	SUBSPI CLK_P_DIFF	O/T				
38	GPIO33	IO	VDD_SPI / VDD3P3_CPU		IE					GPIO33	I/O/T	GPIO33	I/O/T	FSPIHD	II/O/T	SUBSPICSD	II/O/T	SPIIO4	II/O/T
39	GPIO34	IO	VDD_SPI / VDD3P3_CPU		IE					GPIO34	I/O/T	GPIO34	I/O/T	FSPIHD	II/O/T	SUBSPICSD	O/T	SPIIO5	II/O/T
40	GPIO35	IO	VDD_SPI / VDD3P3_CPU		IE					GPIO35	I/O/T	GPIO35	I/O/T	FSPIHD	II/O/T	SUBSPICSD	II/O/T	SPIIO6	II/O/T
41	GPIO36	IO	VDD_SPI / VDD3P3_CPU		IE					GPIO36	I/O/T	GPIO36	I/O/T	FSPIHD	II/O/T	SUBSPICSD	O/T	SPIIO7	II/O/T
42	GPIO37	IO	VDD_SPI / VDD3P3_CPU		IE					GPIO37	I/O/T	GPIO37	I/O/T	FSPIHD	II/O/T	SUBSPICSD	II/O/T	SPIIO8	II/O/T
43	GPIO38	IO	VDD3P3_CPU		IE					GPIO38	I/O/T	GPIO38	I/O/T	FSPIHD	II/O/T	SUBSPICSD	II/O/T	SPIIO9	II/O/T
44	MTCK	IO	VDD3P3_CPU		IE*					MTCK	II	GPIO39	I/O/T	CLK_OUT3	O	SUBSPICSD	O/T		
45	MTDO	IO	VDD3P3_CPU		IE					MTDO	O/T	GPIO40	I/O/T	CLK_OUT2	O				
46	VDD3P3_CPU	Power																	
47	MTDI	IO	VDD3P3_CPU		IE					MTDI	II	GPIO41	I/O/T	CLK_OUT1	O				
48	MTMS	IO	VDD3P3_CPU		IE					MTMS	II	GPIO42	I/O/T						
49	UORTX	IO	VDD3P3_CPU	IE, WPU	IE, WPU					UORTX	O	GPIO43	I/O/T	CLK_OUT1	O				
50	UORXD	IO	VDD3P3_CPU	IE, WPU	IE, WPU					UORXD	II	GPIO44	I/O/T	CLK_OUT2	O				
51	GPIO45	IO	VDD3P3_CPU	IE, WPD	IE, WPD					GPIO45	I/O/T	GPIO45	I/O/T						
52	GPIO46	IO	VDD3P3_CPU	IE, WPD	IE, WPD					GPIO46	I/O/T	GPIO46	I/O/T						
53	XTAL_N	Analog																	
54	XTAL_P	Analog																	
55	VDDA	Power																	
56	VDDA	Power																	
57	GND	Power																	

* For details, see Section 2 Pins. Regarding highlighted cells, see Section 2.3.4 Restrictions for GPIOs and RTC_GPIOs.