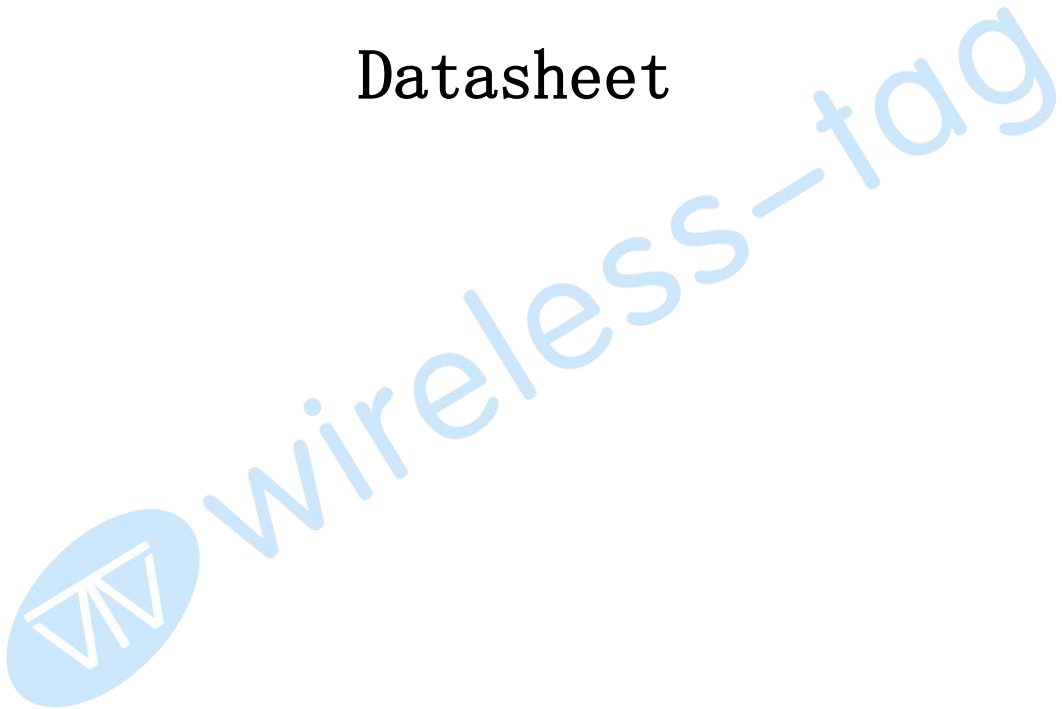


WT0132P4-A1

Datasheet



Version 1.0

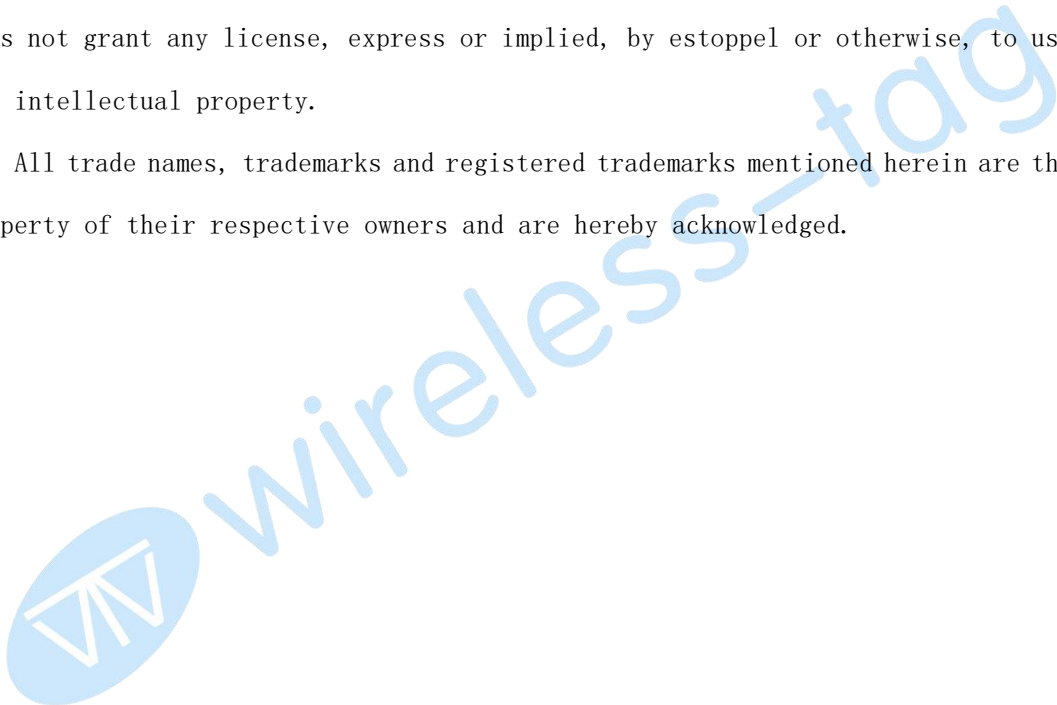
September 12, 2024

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Revision History

Version	Modifier By	Date	Reason	Main changes
V1.0	Pail	2024.9.12	Creation	Creating Documents



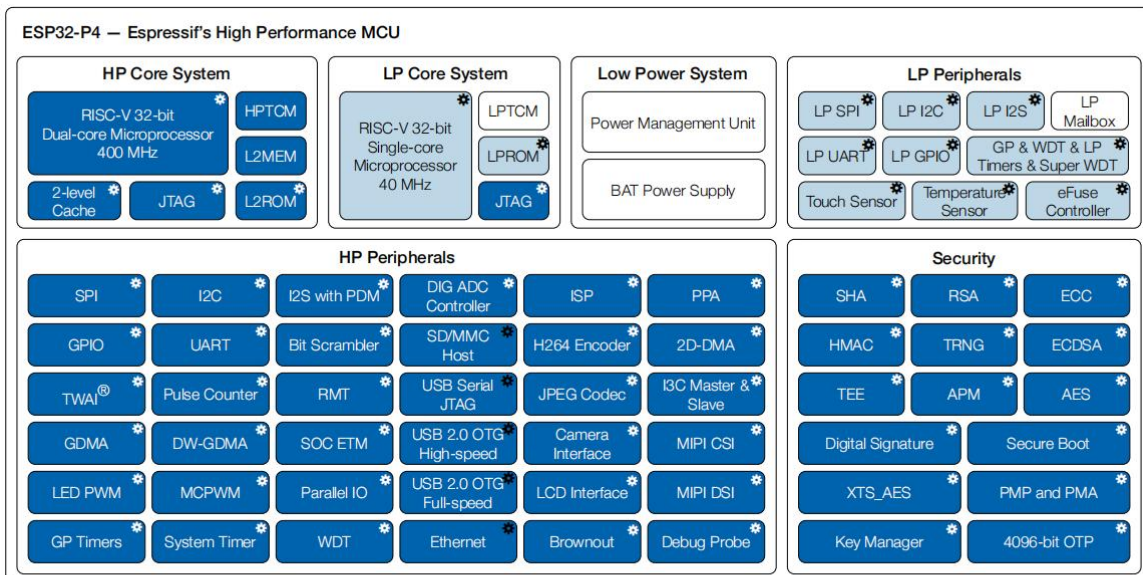
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1. Overview

WT0132P4-A1 is an integrated NOR FLASH small core board based on Espressif ESP32-P4 chip designed by Wireless-Tag Technology Co., Limited. The core processor chip, ESP32-P4, can be stacked with 16MB or 32MB PSRAM in the package, and contains a high-performance (HP) system and a low-power (LP) system; the HP system adopts a RISC-V dual-core processor with a main frequency up to 400MHz, and contains a JPEG encoder/decoder, pixel-processing gas pedal, H.264 video encoder, and a MIPI interface; it has powerful image and voice processing capabilities. The HP system uses a RISC-V dual-core processor with up to 400MHz, including a JPEG coder/decoder, pixel processing accelerator, H.264 video encoder, and MIPI interface.



Modules having power in specific power modes:



Features

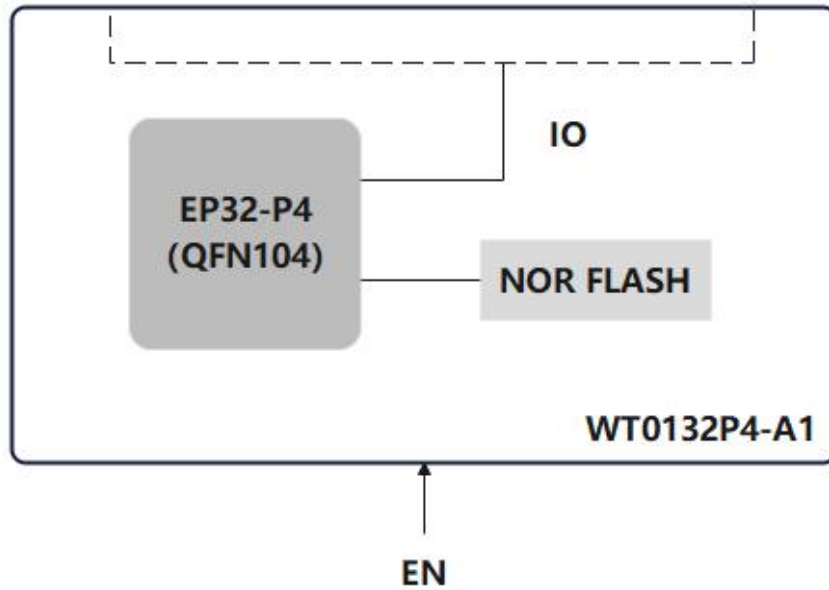
CPU and Memory	32-bit RISC-V dual-core processor up to 400 MHz for HP system
	32-bit RISC-V single-core processor up to 40 MHz for LP system
	128 KB HP ROM
	16 KB LP ROM
	768 KB HP L2MEM
	32 KB LP SRAM

Image and Voice Processing Interfaces	JPEG Codec
	Pixel Processing Accelerator (PPA)
	Image Signal Processor (ISP)
	H264 Encoder
Digital interfaces	Programmable GPIOs
	SPI * 4 (LP SPI * 1)
	UART * 5 (LP UART * 1)
	I3C
	I2C * 2 (LP I2C * 1)
	I2S * 3 (LP I2S * 1)
	RMT * 1
	LED PWM (8 channels)
	MCPWM * 2 (6 channels)
	TWAI [®] controllers * 3 (compatible with ISO 11898-1)
	USB 2.0 OTG Hi-Speed
	USB 2.0 OTG Full-Speed
	USB 2.0 Full-Speed Serial/JTAG Controller
	100 Mbit Ethernet
	SD/MMC 3.0 host
	MIPI CSI-2, 2-lane x 1.5 Gbps
	MIPI DSI, 2-lane x 1.5 Gbps
	24-bit LCD parallel port
	16-bit CAM parallel port
	Parallel IO (PARLIO) Controller
Analog interface	12-bit multi-channel ADC * 2
	Temperature sensor
	Touch sensor
	Analog Voltage Comparator
	Brown-out detector

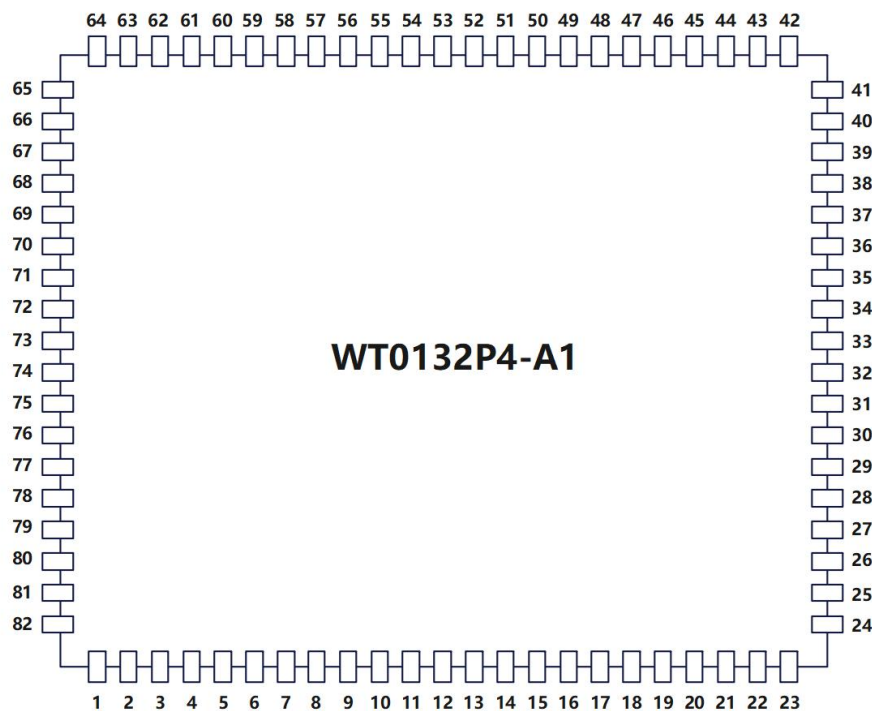
The core board contains two models to choose from, as shown in the table below.

Core Board Model	Flash	PSRAM	size (mm)
WT0132P4-A1-N16R16	16MB	16MB	25*20
WT0132P4-A1-N16R32	16MB	32MB	

2 .Core Board Functional Block Diagrams



3. Hardware Specifications



3.1 WT0132P4-A1 Pin Layout & Description

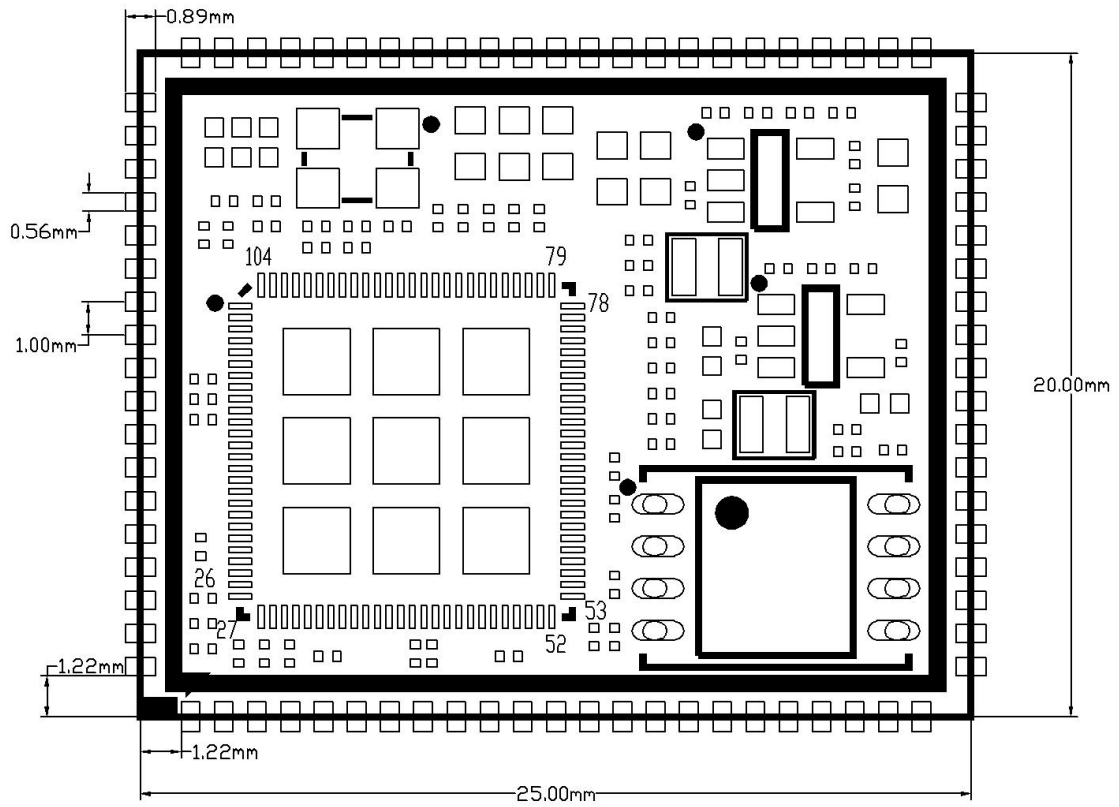
No.	Name	Function
1	GND	GROUND
2	DSI_DATAP1	MIPI DSI PHY DATAP1
3	DSI_DATAN1	MIPI DSI PHY DATAN1
4	DSI_CLKN	MIPI DSI PHY CLKN
5	DSI_CLKP	MIPI DSI PHY CLKP
6	DSI_DATAPO	MIPI DSI PHY DATAPO
7	DSI_DATANO	MIPI DSI PHY DATANO
8	GND	GROUND
9	CSI_DATANO	MIPI CSI PHY DATANO
10	CSI_DATAPO	MIPI CSI PHY DATAPO
11	CSI_CLKP	MIPI CSI PHY CLKP
12	CSI_CLKN	MIPI CSI PHY CLKN
13	CSI_DATAN1	MIPI CSI PHY DATAN1
14	CSI_DATAP1	MIPI CSI PHY DATAP1
15	GND	GROUND
16	USB_DM	USB2 OTG PHY DM
17	USB_DP	USB2 OTG PHY DP
18	GND	GROUND
19	GPI024	GPI024, USB1P1_N0
20	GPI025	GPI025, USB1P1_P0
21	GND	GROUND
22	GPI026	GPI026, USB1P1_N1
23	GPI027	GPI027, USB1P1_P1
24	GPI028	GPI028, GPSPI SPI2 CS, EMAC PHY RXDV, DBG_PSRAM_D
25	GPI029	GPI029, GPSPI SPI2 D, EMAC PHY RXD0, DBG_PSRAM_Q
26	GPI030	GPI030, GPSPI SPI2 CK, EMAC PHY RXD1, DBG_PSRAM_WP
27	GPI031	GPI031, GPSPI SPI2 Q, EMAC PHY RXER, DBG_PSRAM_HOLD

28	GPI032	GPI032, I3CMST_SCL, GPSPI SPI2 HOLD. EMAC RMII CLK, DBG_PSRAM_DQ4
29	GPI033	gpio33, i3cmst_sda, gpspi spi2 wp. EMAC PHY TXEN, DBG_PSRAM_DQ5
30	GPI034	GPI034, GPSPI SPI2 IO4, EMAC PHY TXD0, DBG_PSRAM_DQ6
31	GPI035	GPI035, GPSPI SPI2 IO5, EMAC PHY TXD1, DBG_PSRAM_DQ7 (IO35 pulls down into download mode)
32	GND	GROUND
33	GPI036	GPI036, GPSPI SPI2 IO6, EMAC PHY TXER, DBG_PSRAM_DQS0 (Default IO35, 36 pull-up to enter SPI Boot mode)
34	GPI037	GPI037, UART0_TXD, GPSPI SPI2 IO7
35	GPI038	GPI038, UART0_RXD, GPSPI SPI2 DQS
36	GPI039	GPI039, SD1_CDATA0_PAD, REF_50M_CLK_PAD
37	GPI040	GPI040, SD1_CDATA1_PAD, GMAC_PHY_TXEN_PAD
38	GPI041	GPI041, SD1_CDATA2_PAD, GMAC_PHY_TXD0_PAD
39	GPI042	GPI042, SD1_CDATA3_PAD, GMAC_PHY_TXD1_PAD
40	GPI043	GPI043, SD1_CCLK_PAD, GMAC_PHY_TXER_PAD
41	VCC	POWER
42	GND	GROUND
43	GPI044	GPI044, SD1_CCMD_PAD, GMAC_RMII_CLK_PAD
44	GPI045	GPI045, SD1_CDATA4_PAD, GMAC_PHY_RXDV_PAD
45	GPI046	GPI046, SD1_CDATA5_PAD, GMAC_PHY_RXD0_PAD
46	GPI047	GPI047, SD1_CDATA6_PAD, GMAC_PHY_RXD1_PAD
47	GPI048	GPI048, SD1_CDATA7_PAD, GMAC_PHY_TXER_PAD
48	GPI049	GPI049, GMAC_PHY_TXEN_PAD, ADC2_CHANNEL2
49	GPI050	GPI050, GMAC_RMII_CLK_PAD, ADC2_CHANNEL3
50	GPI051	GPI051, GMAC_PHY_RXDV_PAD, ADC2_CHANNEL4, ANA_COMP0
51	GPI052	GPI052, GMAC_PHY_RXD0_PAD, ADC2_CHANNEL5, ANA_COMP0
52	GPI053	GPI053, GMAC_PHY_RXD1_PAD, ADC2_CHANNEL6, ANA_COMP1

53	GND	GROUND
54	GPI054	GPI054, GMAC_PHY_RXER_PAD, ADC2_CHANNEL7, ANA_COMP1
55	GPI02	GPI02, MTCK, LP_GPIO 2, TOUCH_CHANNEL0
56	GPI03	GPI03, MTDI, LP_GPIO 3, TOUCH_CHANNEL1
57	GPI04	GPI04, MTMS, LP_GPIO4, TOUCH_CHANNEL2
58	GPI05	GPI05, MTDO, LP_GPIO5, TOUCH_CHANNEL3
59	GPI06	GPI06, SPI2_HOLD_PAD, LP_GPIO6, TOUCH_CHANNEL4
60	GPI07	GPI07, SPI2_CS_PAD, LP_GPIO7, TOUCH_CHANNEL5
61	GPI08	GPI08, UART0_RTS_PAD, SPI2_D_PAD , LP_GPIO8, TOUCH_CHANNEL6
62	GPI09	GPI09, UART0_CTS_PAD, SPI2_CK_PAD, LP_GPIO9, TOUCH_CHANNEL7
63	GPI010	GPI010, UART1_TXD_PAD, SPI2_Q_PAD, LP_GPIO10, TOUCH_CHANNEL8
64	GND	GROUND
65	GPI011	GPI011, UART1_RXD_PAD, SPI2_WP_PAD, LP_GPIO11, TOUCH_CHANNEL9
66	GPI012	GPI012, UART1_RTS_PAD , LP_GPIO12, TOUCH_CHANNEL10
67	GPI013	GPI013, UART1_CTS_PAD, LP_GPIO13, TOUCH_CHANNEL11
68	GPI014	GPI014, LP_GPIO14, LP_UART_TXD_PAD, TOUCH_CHANNEL12
69	GPI015	GPI015, LP_GPIO15, LP _UART_R XD_PA D, TOUCH_CHANNEL13
70	CHIP_PU	Enable P4 chip (internal 10K pull-up)
71	GPI00	GPI00, LP_GPIO0 , XTAL_32K_N
72	GPI0 1	GPI01, LP_GPIO1, XTAL_32K_P
73	GND	GROUND
74	GPI016	GPI016, ADC1_CHANNEL0
75	GPI017	GPI017, ADC1_CHANNEL1
76	GPI018	GPI018, ADC1_CHANNEL2
77	GPI019	GPI019, ADC1_CHANNEL3
78	GPI020	GPI020, ADC1_CHANNEL4
79	GPI021	GPI021, ADC1_CHANNEL5
80	GPI022	GPI022, ADC1_CHANNEL6
81	GPI023	GPI023, ADC1_CHANNEL7, REF_50M_CLK_PAD

82	GND	GROUND
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3.2 WT0132P4-A1 Core Board Dimensions



4. Electrical Characteristics

Parameter	Min	Typ	Max	Unit
Input Voltage	-	5	-	V
Operating Temperature	-40	-	85	°C