Bluetooth Low Energy SoC

DESCRIPTIONS

The SUM7055 is a System on Chip (SoC) fully compliant with BLE 5.0 Spec. It integrates a low power, high performance 2.4GHz transceiver, a 32-bit RISC MCU up to 64 MHz, and rich interface peripherals. The SOC's memory system includes 128 KB ROM, 48 KB retention SRAM, 16 KB Cache SRAM, and up to 2 Mb flash. To help customers to reduce BOM cost, The SUM7055 integrates Balun, DCDC, 32 KHz RC oscillator and charger. Under certain circumstances, The SUM7055 can work with one external crystal only. The SUM7055 offers abundant SDK with the function of over-the-air (OTA) firmware updating.

FEATURES

- 32-bit RSIC MCU
  - Max. speed up to 64 MHz
  - integrate MPU
  - equipped with SWD debug interface
- Memory
  - Up to 2 Mb in-system flash memory
  - Totally 56 KB system SRAM, including 16 KB cache-shared SRAM.
  - 128 KB ROM
- Peripherals
  - 17 GPIOs with programmable IO MUX function mapping
  - PWM/TIMER/WATCHDOG
  - UART/SPI/I²C
  - KEYPAD/QUADRATURE DECODER
  - IR transceiver
  - DMA controller
  - 5-channel 12-bit GPADC
  - Support DMIC and AMIC with microphone bias
  - Internal temperature sensor
  - Support 4 capacitive touch keys
  - Support external NTC temperature sensor
- Clocking
  - Support 12 MHz/16 MHz/24 MHz/32 MHz XTAL
  - Internal low power 32 KHz RC oscillator
  - Support external 32 KHz XTAL
  - Internal 54 MHz high frequency RC oscillator, optional 27.12/13.56 MHz output for HF applications.
  - Integrate Real timer counter (RTC)
- Power management
  - Wide Operating Voltage Range: 1.7 V ~ 5.5 V
  - Integrate DCDC
  - Battery voltage monitor
  - Linear Li-on battery charger
  - Multiple low power modes
- BLE features
  - Fully compliant with BLE 5.0 Spec
  - Support SIG Mesh
  - Hardware AES-128 encryption/decryption
  - Support advertiser, master, slave, and observer
  - Support all BLE data rates: 2 Mbps, 1 Mbps, 500 Kbps and 125 Kbps

- RF Features
  - Single-end RF pin
  - Sensitivity:
    -94 dBm@2 Mbps
    -97 dBm@1 Mbps
    -102 dBm@500 Kbps
    -105 dBm@125 Kbps
  - TX power max to 8 dBm, 30 dB power range
  - -36 dBm harmonic emissions at max power 8 dBm output
  - RX mode current under 5.2 mA@1Mbps (DCDC mode)
  - TX mode current under 5.1 mA@1Mbps (0dBm, DCDC mode)
- Low power current data
  - Deep sleep mode with 32 KHz RC shut off: < 300 nA, GPIO/KEYPAD wake up.
  - Deep sleep mode with 32 KHz RC on: < 400 nA, GPIO/KEYPAD/RTC wake up.
  - Sleep mode with 48 KB SRAM retention: < 3.5 μA
  - Average current at 3.0 V supply with 0dBm broadcast per second: 12 μA
  - Average current at 3.0 V supply with BLE connection per second < 8 μA
- Operating temperature -40℃ ~ 85℃ or 105℃
- Package: QFN3 x 3-20, QFN4 × 4-32

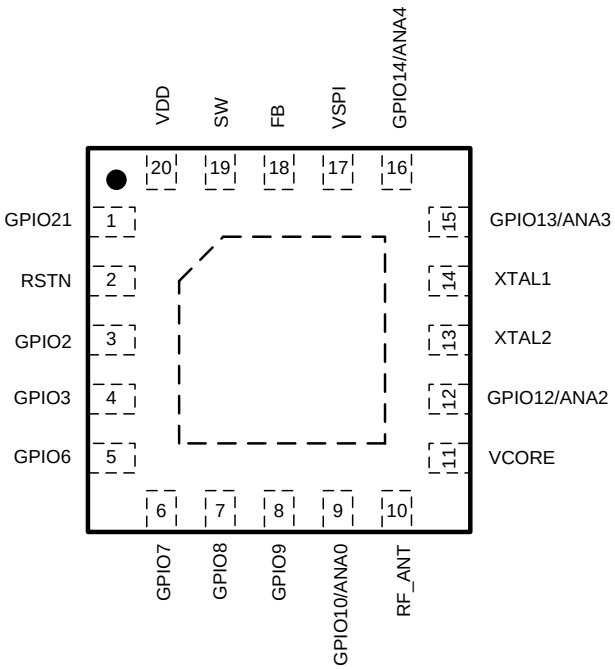
APPLICATIONS

- Internet of Things(IoT)
  - Home automation
  - Sensor networks
  - Building automation
  - Industrial
  - Retail tags and labels
- Personal area networks
  - Health/fitness sensor and monitor devices
  - Medical devices
  - Key fobs and bracelet
- Interactive entertainment devices
  - Remote controls
  - Gaming controllers
- Beacons
- Asset tags
- Remote control toys
- Computer peripherals and I/O devices
  - Mouse
  - Gaming

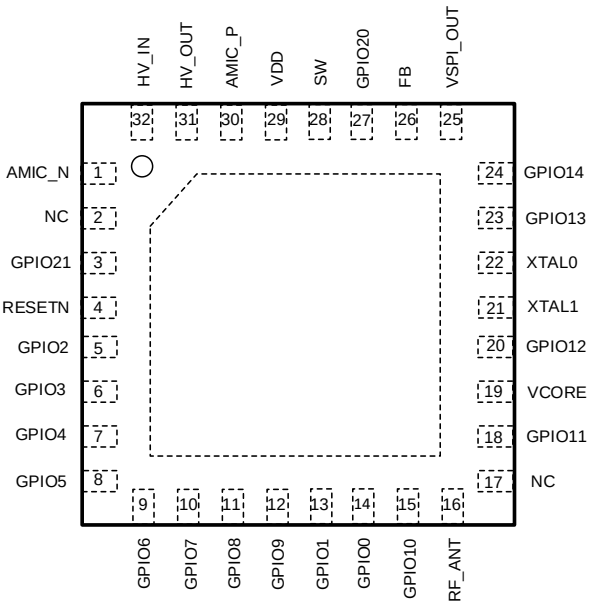
ORDER INFORMATION

Model	Package	Ordering Number	Packing Option
SUM7055	QFN3 × 3-20	SUM7055F256QNA20	Tape and Reel
	QFN4 × 4-32	SUM7055F512QNB32	Tape and Reel

PIN CONFIGURATION (Top View)



QFN3 × 3-20



QFN4 × 4-32

PIN FUNCTION

Table 1-1 QFN3 × 3-20 Pin Function

Pin Number	Name	Type	Description
1	GPIO21	I/O	General-Purpose Input/Output, shared with NTC Sensor/GPADC
2	RESETN	I/O	Global chip enable/resetn, low level reset
3	GPIO2	I/O	General-Purpose Input/Output
4	GPIO3	I/O	General-Purpose Input/Output
5	GPIO6	I/O	General-Purpose Input/Output
6	GPIO7	I/O	General-Purpose Input/Output
7	GPIO8	I/O	General-Purpose Input/Output
8	GPIO9	I/O	General-Purpose Input/Output
9	GPIO10	I/O	General-Purpose Input/Output, shared with GPADC/LPCOMP/CTK
10	RF_ANT	I/O	RF in/out
11	VCORE	I/O	Core supply
12	GPIO12	I/O	General-Purpose Input/Output, shared with
13	XTAL2	I/O	High frequency crystal input, 16M/24M/26M/32M
14	XTAL1	I/O	High frequency crystal output,16M/24M/26M/32M
15	GPIO13	I/O	General-Purpose Input/Output, shared with GPADC/LPCOMP/CTK/XTAL32K_1
16	GPIO14	I/O	General-Purpose Input/Output, shared with GPADC/LPCOMP/CTK/XTAL32K_0
17	VSPI	I/O	I/O supply for external flash
18	FB	I/O	VDD feedback for BUCK
19	SW	IO	Used for external inductor (BUCK)
20	VDD	I/O	VDD supply, 1.7 V ~ 3.6 V

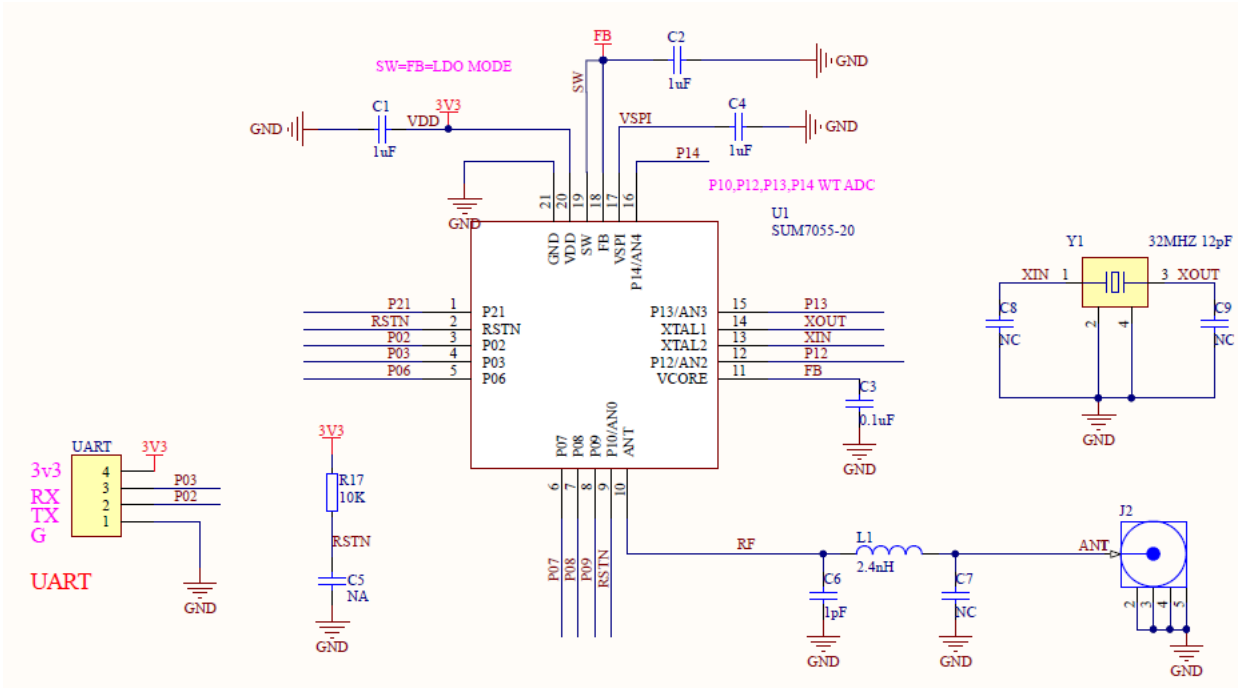
Table 1-2 QFN4 × 4-32 Pin Function

Pin Number	Name	Type	Description
1	AMIC_N	I	Analog Microphone N Port
2	NC	I/O	Not connected
3	GPIO21	I/O	General-Purpose Input/Output, shared with NTC Sensor/GPADC
4	RESETN	I/O	Global chip enable/resetn, low level reset.
5	GPIO2	I/O	General-Purpose Input/Output
6	GPIO3	I/O	General-Purpose Input/Output
7	GPIO4	I/O	General-Purpose Input/Output
8	GPIO5	I/O	General-Purpose Input/Output
9	GPIO6	I/O	General-Purpose Input/Output
10	GPIO7	I/O	General-Purpose Input/Output
11	GPIO8	I/O	General-Purpose Input/Output
12	GPIO9	I/O	General-Purpose Input/Output
13	GPIO1	I/O	General-Purpose Input/Output
14	GPIO0	I/O	General-Purpose Input/Output
15	GPIO10	I/O	General-Purpose Input/Output, shared with GPADC/LPCOMP/CTK
16	RF_ANT	I/O	RF in/out
17	NC	I/O	Not connected
18	GPIO11	I/O	General-Purpose Input/Output, shared with LPCOMP
19	VCORE	I/O	Core supply
20	GPIO12	I/O	General-Purpose Input/Output, shared with GPADC/LPCOMP/CTK
21	XTAL1	I/O	High frequency crystal input, 16M/24M/26M/32M
22	XTAL0	I/O	High frequency crystal output, 16M/24M/26M/32M
23	GPIO13	I/O	General-Purpose Input/Output, shared with GPADC/LPCOMP/CTK/XTAL32K_1
24	GPIO14	I/O	General-Purpose Input/Output, shared with GPADC/LPCOMP/CTK/XTAL32K_0
25	VSPI_OUT	I/O	I/O supply for flash
26	FB	I/O	VDD feedback for BUCK
27	GPIO20	I/O	General-Purpose Input/Output
28	SW	IO	Used for external inductor (BUCK)
29	VDD	I/O	VDD supply, 1.7 V ~ 3.6 V
30	AMIC_P	I/O	Analog Microphone P Port
31	HV_OUT	I/O	High Voltage LDO OUT
32	HV_IN	I/O	High Voltage LDO IN

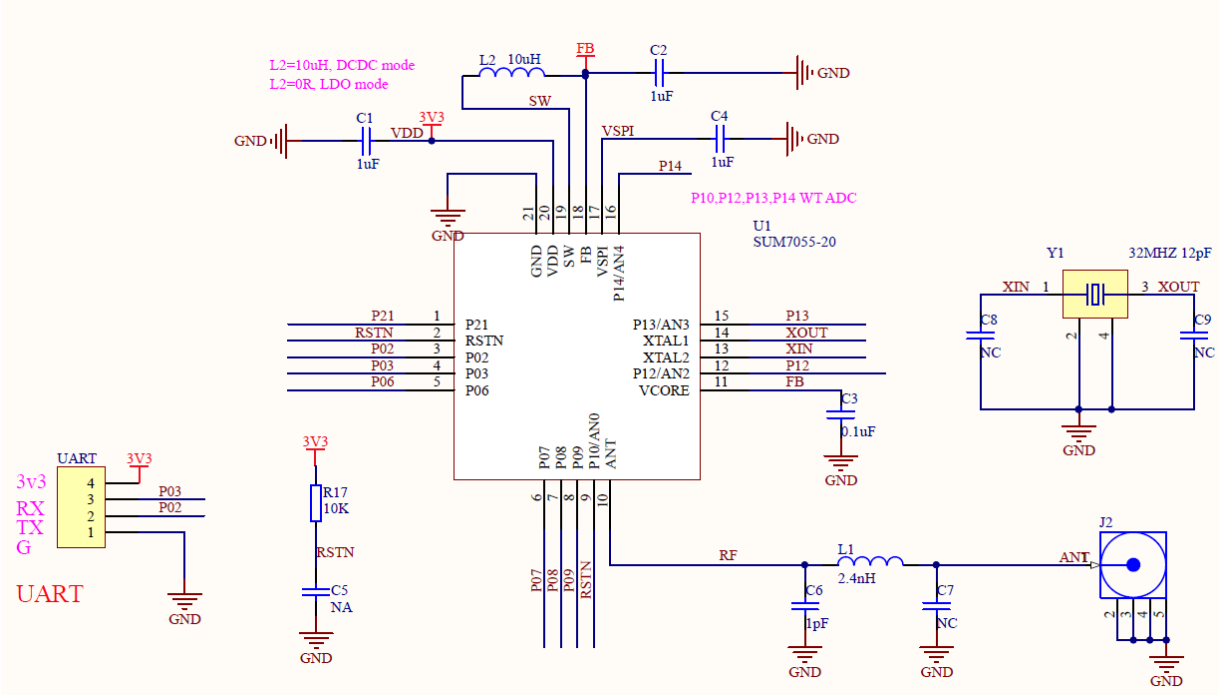
Table 1-3 GPIO Pin Mux

No. QFN4 × 4-32/ QFN3 × 3-20	Pin Name	Function 0	Function 1	Function 2	Function 3	Function 4	Function 5	Function 6	Function 7	Function 8	Function 9	Function 10	Function 11	Function 12	Function 13	Function 14	Function 15	Function 16	Function 17
14/NC	GPIO0	gpio0	RFU	i2c_scl	uart_rtsn	ir_rxd	spi_cs3	pwm 0	qdec_x_a	kp_out_0	kp_in_0	RFU	gpt_in_trigger0	gpt_pwm0	gpt_out_trigger0	swd_io	hf0_clk	RFU	pdm_clk
13/NC	GPIO1	gpio1	RFU	i2c_sda	uart_ctsn	ir_txd	spi_di3	pwm 1	qdec_x_b	kp_out_1	kp_in_1	RFU	gpt_in_trigger1	gpt_pwm1	gpt_out_trigger1	swd_clk	hf1_clk	RFU	pdm_data
5/3	GPIO2	uart_txd	gpio2	i2c_scl	uart_rxd	ir_rxd	spi_cs2	pwm 2	qdec_y_a	kp_out_2	kp_in_2	RFU	gpt_in_trigger2	gpt_pwm2	gpt_out_trigger2	swd_io	lf_clk	RFU	pdm_clk
6/4	GPIO3	uart_rxd	gpio3	i2c_sda	uart_txd	ir_txd	spi_di2	pwm 3	qdec_y_b	kp_out_3	kp_in_3	RFU	gpt_in_trigger3	gpt_pwm3	gpt_out_trigger3	swd_clk	hf1_clk	RFU	pdm_data
7/NC	GPIO4	uart_rtsn	gpio4	i2c_scl	uart_ctsn	ir_rxd	spi_cs1	pwm 4	qdec_z_a	kp_out_4	kp_in_4	RFU	gpt_in_trigger4	gpt_pwm4	gpt_out_trigger4	swd_io	lf_clk	RFU	pdm_clk
8/NC	GPIO5	uart_ctsn	gpio5	i2c_sda	uart_rxd	ir_txd	spi_di1	pwm 5	qdec_z_b	kp_in_0	kp_out_0	RFU	gpt_clk	gpt_pwm5	gpt_out_trigger5	swd_clk	hf0_clk	RFU	pdm_data
9/5	GPIO6	swd_clk	gpio6	i2c_scl	uart_txd	ir_rxd	spi_clk	pwm 6	qdec_x_a	kp_in_1	kp_out_1	RFU	gpt_in_trigger0	gpt_pwm0	gpt_out_trigger0	swd_io	hf0_clk	RFU	pdm_clk
10/6	GPIO7	swd_io	gpio7	i2c_sda	uart_rtsn	ir_txd	spi_cs0	pwm 7	qdec_x_b	kp_in_2	kp_out_2	RFU	gpt_in_trigger1	gpt_pwm1	gpt_out_trigger1	swd_clk	lf_clk	RFU	pdm_data
11/7	GPIO8	RFU	gpio8	i2c_scl	uart_rxd	ir_rxd	spi_di0_do	pwm 0	qdec_y_a	kp_in_3	kp_out_3	RFU	gpt_in_trigger2	gpt_pwm2	gpt_out_trigger2	swd_io	hf1_clk	RFU	pdm_clk
12/8	GPIO9	RFU	gpio9	i2c_sda	uart_ctsn	ir_txd	spi_dcx	pwm 1	qdec_y_b	kp_in_4	kp_out_4	RFU	gpt_in_trigger3	gpt_pwm3	gpt_out_trigger3	swd_clk	hf1_clk	RFU	pdm_data
15/9	GPIO10	gpio10	RFU	i2c_scl	uart_txd	ir_rxd	spi_di0_do	pwm 2	qdec_z_a	kp_in_5	kp_out_5	RFU	gpt_in_trigger4	gpt_pwm4	gpt_out_trigger4	swd_io	hf0_clk	RFU	pdm_clk
18/NC	GPIO11	gpio11	RFU	i2c_sda	uart_rtsn	ir_txd	spi_cs0	pwm 3	qdec_z_b	kp_in_6	kp_in_5	RFU	gpt_in_trigger5	gpt_pwm5	gpt_out_trigger5	swd_clk	lf_clk	RFU	pdm_data
20/12	GPIO12	gpio12	RFU	i2c_scl	uart_ctsn	ir_rxd	spi_clk	pwm 4	qdec_x_a	kp_in_7	kp_in_6	RFU	gpt_clk	gpt_pwm0	gpt_out_trigger0	swd_io	hf1_clk	RFU	pdm_clk
23/15	GPIO13	gpio13	RFU	i2c_sda	uart_rxd	ir_txd	spi_di1	pwm 5	qdec_x_b	kp_in_8	kp_in_7	RFU	gpt_in_trigger0	gpt_pwm1	gpt_out_trigger1	swd_clk	hf0_clk	RFU	pdm_data
24/16	GPIO14	gpio14	RFU	i2c_scl	uart_txd	ir_rxd	spi_cs1	pwm 6	qdec_y_a	kp_out_5	kp_in_8	RFU	gpt_in_trigger1	gpt_pwm2	gpt_out_trigger2	swd_io	lf_clk	RFU	pdm_clk
27/NC	GPIO20	gpio20	RFU	i2c_scl	uart_ctsn	ir_rxd	spi_cs2	pwm 4	qdec_y_a	kp_in_8	kp_in_7	RFU	gpt_in_trigger0	gpt_pwm2	gpt_out_trigger2	swd_io	hf0_clk	RFU	pdm_clk
3/1	GPIO21	gpio21	RFU	i2c_sda	uart_rxd	ir_txd	spi_di2	pwm 5	qdec_y_b	kp_out_5	kp_in_8	RFU	gpt_in_trigger1	gpt_pwm3	gpt_out_trigger3	swd_clk	hf1_clk	RFU	pdm_data

APPLICATION CIRCUITS 1

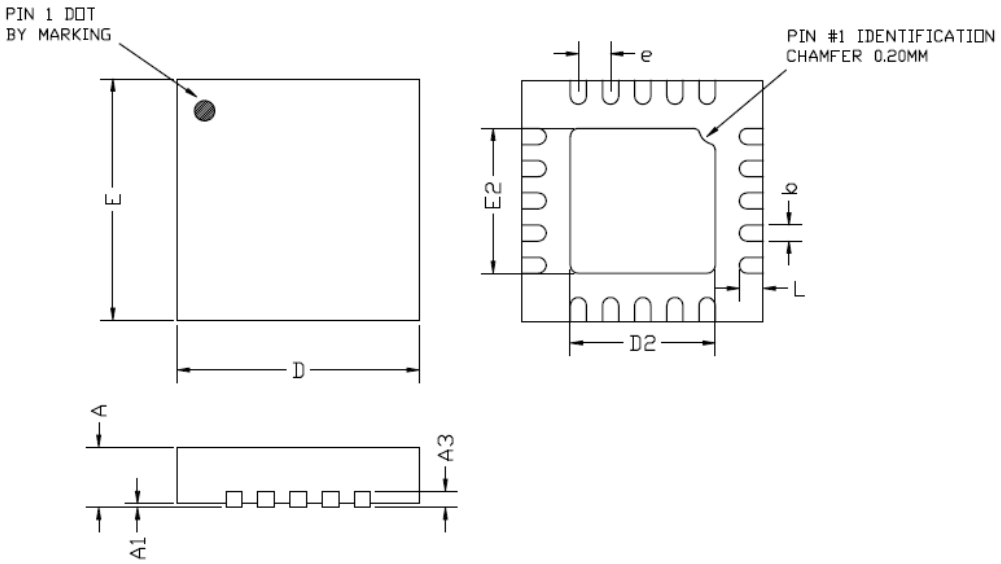


APPLICATION CIRCUITS 2



PACKAGE DIMENSION

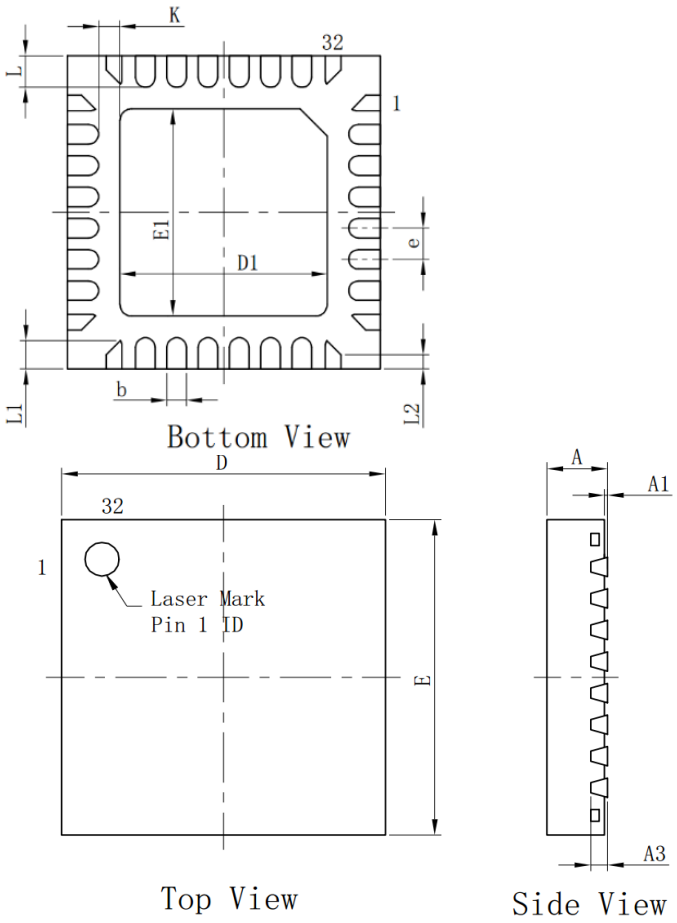
QFN3×3-20



Symbol	Dimensions In Millimeters		
	MIN	TYP	MAX
A	0.70	0.75	0.80
A1	0		0.05
A3	0.20 REF		
D	2.95	3.00	3.05
E	2.95	3.00	3.05
b	0.15	0.20	0.25
L	0.25	0.30	0.35
D2	1.65	1.80	1.90
E2	1.65	1.80	1.90
e	0.40 BSC		

PACKAGE DIMENSION

QFN4×4-32



Symbol	Dimensions In Millimeters		
	MIN	MOD	MAX
D		4.0 BSC	
E		4.0 BSC	
D1	2.55	2.65	2.75
E1	2.55	2.65	2.75
A	0.70	0.75	0.80
A1	0	-	0.05
A2	-	0.55	-
A3		0.203 REF	
b	0.15	0.20	0.25
e		0.40 TYP	
K	0.20	-	-
L	0.30	0.40	0.50
L1	0.31	0.36	0.41
L2	0.13	0.18	0.23

V 1.2