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**FCC ID: 2ABA2LTM100****Model: LTM100****September 1, 2016**

## Operational Description

This LTM100 Module is a wireless modem that supports Global 3G / LTE, Data Speed in the case of LTE (Cat4) can be up to downlink 150Mbps uplink 50Mbps, In case of 3G (HSPA +) up to downlink 42Mbps uplink 5.76Mbps.

This LTM100 possible applications include security, power meter, remote control systems, billing systems, BIS, gateway, and so can the instruments and devices in a variety of industries and provides a SMD type and B2B connector type.

### ■ Support Band

- LTE: B1, **B2**, **B4**, **B5**, B7, B18, B19

Note: LTE B7 does not work in US.

This device can receive the PLMN information from network and this PLMN is composed of MCC and MNC. If MCC equals 310, 311 or 316, then this device will disable the LTE Band 7.

- WCDMA: B1, **B2**, **B4**, **B5**, B19

- GSM: **850**, 900, 1800, **1900**

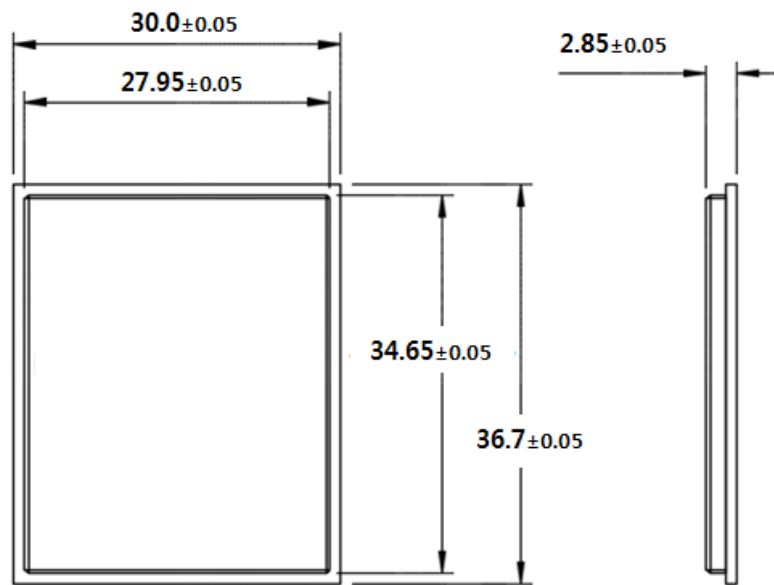
### ■ External Interface (SMD PAD Type (101-PAD))

- DC Power Supply : 3.4V ~ 4.2V
- UART: up to 4Mbps support (2port)
- USB: USB 2.0 Support (1port)
- SDIO/SPI (UP TO 50MHz) Interface support
- External UIM card support (Voltage 1.8V/2.95V)
- External Audion Codec Support (I2S)
- Control pin : power on, reset, I2C, Status Indicator Output

## Product Description

Classification		Specification	Remark
BAND	LTE	B1/B2/B4/B5/B7/B18/B19	B7 does not work in US
	WCDMA	B1/B2/B4/B5/B19	
	GSM	850/900/1800/1900	
GPS		GPS, Glonass, Beidou, Galileo, QZSS	
Main chipset		MDM9207	Qualcomm
Memory (MCP)		4Gb NAND Flash / 2Gb LPDDR2 SDRAM	
External Interface (101 PAD I/O)		DC / UART(x2) / USB 2.0 / External USIM / I2C / SDIO / SPI / Power on key / Reset key / GPIO	SMD Type
Antenna		MAIN(LTE P,WCDMA), SUB(LTE S), GPS Antenna PAD	LTE P:Primary LTE S:Secondary
Operating Voltage		+3.4 Vdc~ +4.2 Vdc (Typ 3.8Vdc)	
Dimensions		30 x 36.7 x 2.85 (mm)	
Weight		5.4g	
Temperature Range		-30°C to +85°C	

■ Drawing modem & Real picture



[Top View]



[Top View]

## I . Interface PAD (SMD Type)

This module offers the Interface of 101 PAD Bottom side so that you can send and receive control data and control by connecting with external devices.

Please design with reference to the description of each of the PAD.

### I . 1 101 PAD Detail Outline

Module Bottom PAD(101 ea) are formed as SMD Type as the following drawings  
SMT(Surface Mounting Technology) with the customer's device, it can Module, control and communications

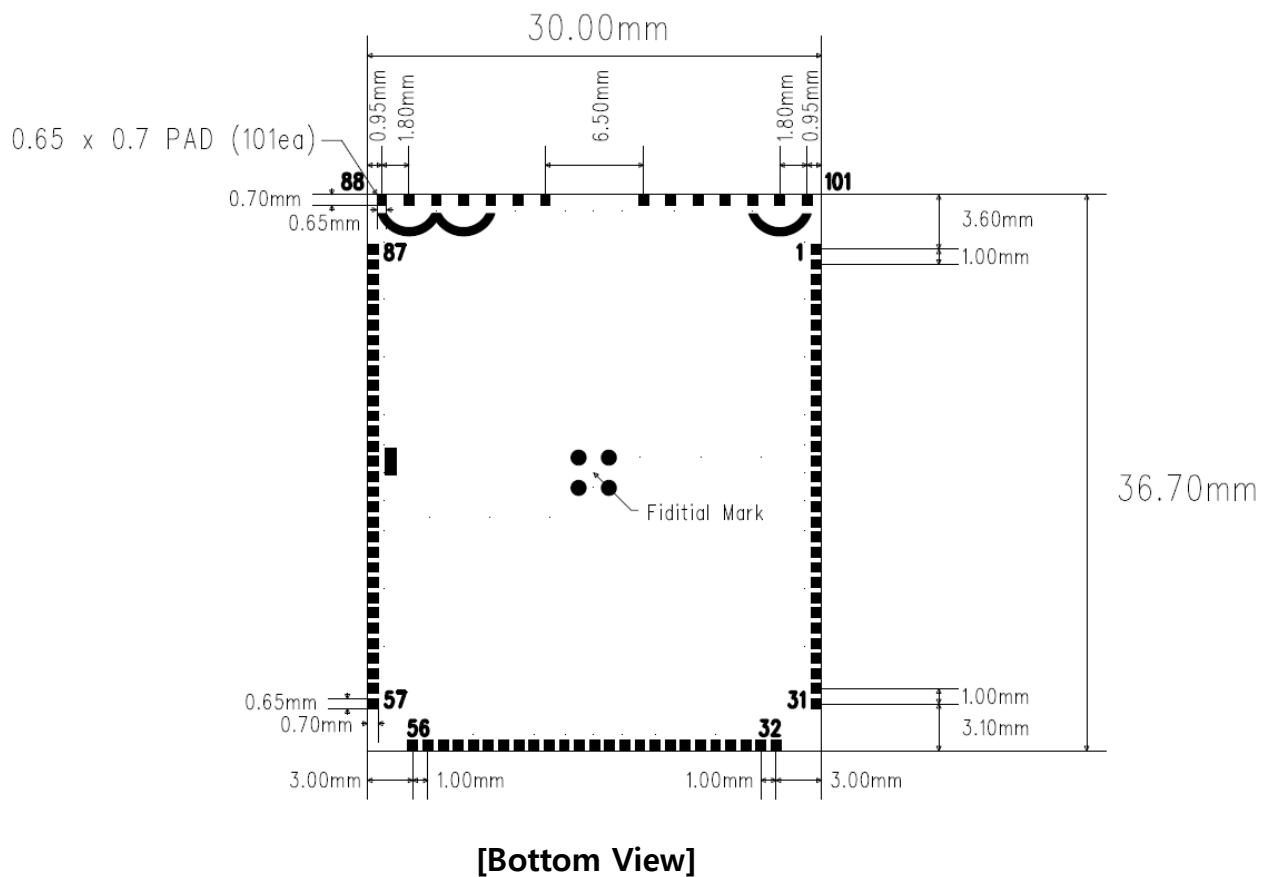


Figure I - 1 LTM100 Bottom Drawing

## 1.2 101 PAD Description

Descriptions of Bottom side 101PAD refer to Table I - 1 below.

**Table I - 1 101 PAD description**

PAD No.	PAD name	Input / Output		Remark
		Voltage	Type	
1	GND	GND	-	Ground
2	GND	GND	-	Ground
3	EMERGENCY DOWNLOAD	-	-	For EMERGENCY DOWNLOAD/ internal pull up (Low enable)
4	GPO_01	1.8V	Out	GPIO output port 01
5	DSR	1.8V	Out	UART1 Data Set Ready
6	RI	1.8V	Out	UART1 Ring Indicator
7	SPI_MOSI	1.8V	Out	SPI Master-out Slave-in
8	SPI_MISO	1.8V	In	SPI Master-in Slave-out
9	SPI_CLK	1.8V	Out	Clock for SPI data communication
10	SPI_CS	1.8V	Out	Chip Selectfor SPI data communication
11	RESOUT_N	1.8V	Out	RESOUT signal output (Low active)
12	UIM2 Power	1.8/2.95V	Out	UIM2 Power
13	UIM2_CLK	1.8/2.95V	-	UIM2 Clock
14	UIM2_DATA	1.8/2.95V	-	UIM2 Data
15	UIM2_RESET	1.8/2.95V	-	UIM2 Reset
16	UIM2_DET	1.8V	In	UIM2 Detect signal
17	Reserved	-	-	Reserved
18	Reserved	-	-	Reserved
19	Reserved	-	-	Reserved
20	Reserved	-	-	Reserved
21	GND	GND	-	Ground
22	USB (-)	-	-	USB (-) signal
23	USB (+)	-	-	USB (+) signal
24	HSIC_STB	-	-	HSIC Strobe
25	HSIC_DATA	-	-	HSIC Data
26	SDC1_CLK	1.8V	-	SDC1 Clock
27	SDC1_CMD	1.8V	-	SDC1 Commend
28	SDC1_DATA_3	1.8V	-	SDC1 DATA bit 3
29	SDC1_DATA_0	1.8V	-	SDC1 DATA bit 0
30	SDC1_DATA_1	1.8V	-	SDC1 DATA bit 1
31	SDC1_DATA_2	1.8V	-	SDC1 DATA bit 2
32	Codec_I2C_SDA	1.8V	Bath	I2C Data (for Codec)
33	Codec_I2C_SCL	1.8V	Out	I2C Clock (for Codec)
34	Reserved	-	-	Reserved
35	Codec_I2S_DATA0	1.8V	-	I2S DATA bit 0 (for Codec)
36	Codec_I2S_DATA1	1.8V	-	I2S DATA bit 1 (for Codec)
37	Codec_I2S_SCK	1.8V	-	I2S Data Clock (for Codec)
38	Codec_I2S_WS	1.8V	-	I2S Word Select (for Codec)
39	Reserved	1.8V	-	Reserved
40	I2S_MCLK	-	Out	I2S Master Clock (for Codec)

PAD No.	PAD name	Input / Output		Remark
		Voltage	Type	
41	CODEC_RESET_N	1.8V	Out	RESET signal output (for Codec)
42	Reserved	-	-	Reserved
43	Reserved	-	-	Reserved
44	TXD	1.8V	In	UART1 Data Input
45	CTS	1.8V	Out	UART1 Clear To Send
46	RXD	1.8V	Out	UART1 Data Output
47	RTS	1.8V	In	UART1 Ready To Send
48	Reserved	-	-	Reserved
49	GPI_01	1.8V	In	GPIO input port 01
50	GPI_02	1.8V	In	GPIO input port 02
51	GPI_03	1.8V	In	GPIO input port 03
52	UIM1 Power	1.8/2.95V	Out	UIM1 Power
53	ADC	1.8V	In	Analog-to-digital converter
54	Not used	-	-	Not used
55	USB_VBUS	5.0V	In	USB Power
56	GND	GND	-	Ground
57	VBATT	3.8V	In	Power
58	VBATT	3.8V	In	Power
59	VBATT	3.8V	In	Power
60	GPI_04	1.8V	In	GPIO input port 04
61	GPO_02	1.8V	Out	GPIO output port 02
62	RESET_N	1.8V	In	Hardware Reset (low active)
63	Power_on_key	1.8V	In	Power on/off (Low enable)
64	In_Service_IND	1.8V	Out	In Service(3G/LTE) Indicate
65	Development key Dump mode	1.8V	In	Dump mode for Software/ internal pull down (High enable)
66	GPO_03	1.8V	Out	GPIO output port 03
67	GPO_04	1.8V	Out	GPIO output port 04
68	DTR	1.8V	In	UART1 Data Terminal Ready
69	DCD	1.8V	Out	UART1 Data Carrier Detect
70	Not used	-	-	Not used
71	Not used	-	-	Not used
72	Not used	-	-	Not used
73	Not used	-	-	Not used
74	Not used	-	-	Not used
75	Not used	-	-	Not used
76	UIM1_CLK	1.8/2.95V	-	UIM1 Clock
77	UIM1_RESET	1.8/2.95V	-	UIM1 Reset
78	UIM1_DATA	1.8/2.95V	-	UIM1 Data
79	UIM1_DET	1.8V	In	UIM1 Detect signal
80	LTE_Service	1.8V	Out	LTE Service Indicate
81	UART2_TXD	1.8V	In	UART2 Data Input
82	I2C_SCL	1.8V	Out	I2C Clock
83	UART2_RXD	1.8V	Out	UART2 Data Output
84	I2C_SDA	1.8V	Both	I2C Data
85	GPO_05	1.8V	Out	GPIO output port 05

PAD No.	PAD name	Input / Output		Remark
		Voltage	Type	
86	3G_Service	1.8V	Out	3G Service Indicate
87	GND	GND	-	Ground
88	GND	GND	-	Ground
89	GPS_ANT	-	-	GPS Antenna connection PAD
90	GND	GND	-	Ground
91	SUB_ANT	-	-	2nd Antenna connection PAD
92	GND	GND	-	Ground
93	GND	GND	-	Ground
94	GND	GND	-	Ground
95	GND	GND	-	Ground
96	GND	GND	-	Ground
97	GND	GND	-	Ground
98	GND	GND	-	Ground
99	GND	GND	-	Ground
100	MAIN_ANT	-	-	1st Antenna connection PAD
101	GND	GND	-	Ground

**note1)** In/Out indication of the "Type is based on the module.

**note2)** Reserved, Not Used pin should not be there, please open a connection with your device.

Module is can be damage and can cause malfunctions muse be urged compliance.

### I . 3 Module DC Power Input PADs

The Power supply of the modules are designed to supply hope in the Table below of the Power and Ground PAD 101 PADs.

**Table I - 2 DC Power Input PADs**

PAD No.	PAD name	Input / Output		Remark
		Voltage	Type	
57	VBATT	3.8V	In	Power input
58	VBATT	3.8V	In	Power input
59	VBATT	3.8V	In	Power input
1,2	GND	GND	-	Ground
21,56	GND	GND	-	Ground
87,88	GND	GND	-	Ground
90,92	GND	GND	-	Ground
93,94	GND	GND	-	Ground
95,96	GND	GND	-	Ground
97,98	GND	GND	-	Ground
99,101	GND	GND	-	Ground

**note)** Please supply VBATT pins have a DC power on 3.4V ~ 4.2V (Typ. 3.8V) range.

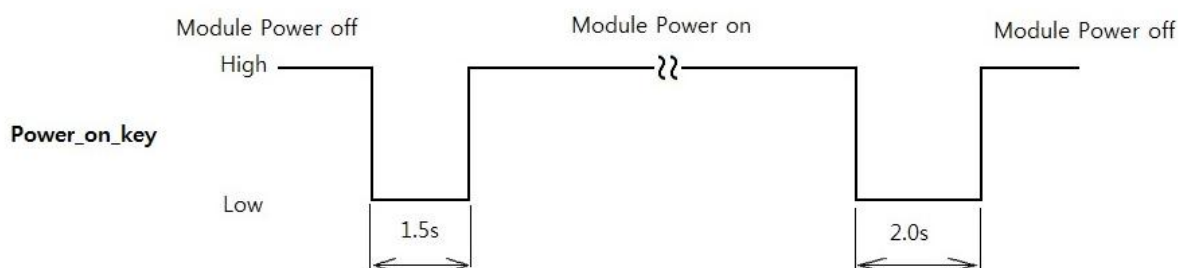
## I . 4 Module Power on/off and Reset control PADS

Power on / off control of the Module is in a 101 PAD "Power\_on\_key signal" of PAD number 63, "Hardware Power Reset" of Module is controlled by the RESET\_N signal of the PAD number 62.

**Table I - 3 Power on/off 및 Reset control PADS**

PAD No.	PAD name	Input / Output		Remark
		Voltage	Type	
62	RESET_N	1.8V	In	Modem Hardware Power Reset control (Active Low)
63	Power_on_key	1.8V	In	Modem Power on/off control (Active Low)

When power on as "Figure 2-4" below 1.5s (1,500ms) to over, power off when there 2.0s (2,000ms) is applied to at least give it high signal on / off operation.



**Figure I - 2 Power On/Off control**

Module power on If the condition remains, the pin 36 is High (approximately 1.6V) by the internal pull-up, to give Module Reset maintain a "Low" signal as shown below 500ms or more if required by the Low Module It will be Reset.



**Figure I - 3 RESET control**



## I . 5 UART Interface PADS

As Interface for "Data terminal equipment"(DTE) and UART data communications, and supports UART1 and UART2, you can send and receive data by RS-232 data communication requirements.

**Table I - 4 UART Interface PADS**

PAD No.	PAD name	Input / Output		Remark
		Voltage	Type	
5	DSR	1.8V	Out	UART1 Data Set Ready
6	RI	1.8V	Out	UART1 Ring Indicator
44	TXD	1.8V	In	UART1 Data Input
45	CTS	1.8V	Out	UART1 Clear To Send
46	RXD	1.8V	Out	UART1 Data Output
47	RTS	1.8V	In	UART1 Ready To Send
68	DTR	1.8V	In	UART1 Data Terminal Ready
69	DCD	1.8V	Out	UART1 Data Carrier Detect
81	UART2_TXD	1.8V	In	UART2 Data Input
83	UART2_RXD	1.8V	Out	UART2 Data Output

## I . 6 USB Interface PADS

As Interface for "Data terminal equipment"(DTE) and USB data communication, in addition to data communication it can also be used as a Source Download Software and debugging purposes.

**Table I - 5 USB Interface PADS**

PAD No.	PAD name	Input / Output		Remark
		Voltage	Type	
55	USB_VBUS	5.0V	In	USB Power input
22	USB (-)	-	Both	USB (-) signal
23	USB (+)	-	Both	USB (+) signal
24	HSIC_STB	-		HSIC Strobe
25	HSIC_DATA	-		HSIC Data

## I . 7 External USIM Interface PADS

This model is used to select an internal e-SIM, or support the Interface to enable External USIM outside.

**Table I - 6 External USIM Interface PADS**

PAD No.	PAD name	Input / Output		Remark
		Voltage	Type	
12	UIM2 Power	1.8/2.95V	Out	UIM2 Power Supply
13	UIM2_CLK	1.8/2.95V	-	UIM2 Clock
14	UIM2_DATA	1.8/2.95V	-	UIM2 Data
15	UIM2_RESET	1.8/2.95V	-	UIM2 Reset
16	UIM2_DET	1.8V	In	UIM2 Detect signal
52	UIM1 Power	1.8/2.95V	Out	UIM1 Power Supply
76	UIM1_CLK	1.8/2.95V	-	UIM1 Clock
77	UIM1_RESET	1.8/2.95V	-	UIM1 Reset
78	UIM1_DATA	1.8/2.95V	-	UIM1 Data
79	UIM1_DET	1.8V	In	UIM1 Detect signal

## I . 8 Audio and I2C Interface PADS

This Module with I2C Interface is able to control communication with the outside Device, Interface, which offers support for external Codec.

**Table I - 7 I2C and Audio Interface PADS**

PAD No.	PAD name	Input / Output		Remark
		Voltage	Type	
32	Codec_I2C_SDA	1.8V	Both	<b>Note1)</b> I2C Data (for Codec)
33	Codec_I2C_SCL	1.8V	Out	<b>Note1)</b> I2C Clock (for Codec)
35	Codec_I2S_DATA0	1.8V	-	I2S DATA bit 0 (for Codec)
36	Codec_I2S_DATA1	1.8V	-	I2S DATA bit 1 (for Codec)
37	Codec_I2S_SCK	1.8V	-	I2S Data Clock (for Codec)
38	Codec_I2S_WS	1.8V	-	I2S Word Select (for Codec)
40	I2S_MCLK	-	Out	I2S Master Clock (for Codec)
41	CODEC_RESET_N	1.8V	Out	RESET signal output (for Codec)
53	ADC	1.8V	In	Analog-to-digital converter
82	I2C_SCL	1.8V	Out	<b>Note2)</b> I2C Clock (for external device)
84	I2C_SDA	1.8V	Both	<b>Note2)</b> I2C Data (for external device)

**note1)** These signals are set high by internal pull-up resistor.

**note2)** These signals require external pull-up resistor.

## I . 9 SPI and SDIO Interface PADS

This module also supports SPI and SDIO Interface for additional data communication with external devices.

**Table I - 8 SPI and SDIO Interface PADS**

PAD No.	PAD name	Input / Output		Remark
		Voltage	Type	
7	SPI_MOSI	1.8V	Out	SPI Master-out Slave-in
8	SPI_MISO	1.8V	In	SPI Master-in Slave-out
9	SPI_CLK	1.8V	Out	Clock for SPI data communication
10	SPI_CS	1.8V	Out	Chip Selectfor SPI data communication
26	SDC1_CLK	1.8V	-	SDIO Clock
27	SDC1_CMD	1.8V	-	SDIO Commend
28	SDC1_DATA_3	1.8V	-	SDIO DATA bit 3
29	SDC1_DATA_0	1.8V	-	SDIO DATA bit 0
30	SDC1_DATA_1	1.8V	-	SDIO DATA bit 1
31	SDC1_DATA_2	1.8V	-	SDIO DATA bit 2

## I . 10 GPIO Interface PADS

Indicating the status of this Module is a GPO and the GPI are available to suit customers' applications , As shown below are assigned as the general Input / Output PADS.

**Table I - 9 GPIO Interface PADS**

PAD No.	PAD name	Input / Output		Remark
		Voltage	Type	
3	EMERGENCY_DOWNLOAD	-	-	For EMERGENCY_DOWNLOAD (Low enable)
4	GPO_01	1.8V	Out	GPIO output port 01
11	RESOUT_N	1.8V	Out	RESOUT signal output (Low active)
49	GPI_01	1.8V	In	GPIO input port 01
50	GPI_02	1.8V	In	GPIO input port 02
51	GPI_03	1.8V	In	GPIO input port 03
60	GPI_04	1.8V	In	GPIO input port 04
61	GPO_02	1.8V	Out	GPIO output port 02
64	In_Service_IND	1.8V	Out	In Service(3G/LTE) Indicate
65	Development key	1.8V	In	Dump mode for Software (High enable)
66	GPO_03	1.8V	Out	GPIO output port 03
67	GPO_04	1.8V	Out	GPIO output port 04
80	LTE_Service	1.8V	Out	LTE Service Indicate
85	GPO_05	1.8V	Out	GPIO output port 05
86	3G_Service	1.8V	Out	3G Service Indicate

## I . 11 RF signal PADS

So please RF signal is assigned to the following PADS see Table 2.14 below when connected to the Antenna.

**Table I - 10 RF signal PADS**

PAD No.	PAD name	Input / Output		Remark
		Voltage	Type	
89	GPS_ANT	-	RF	GPS RF connection PAD
91	SUB_ANT	-	RF	2nd RF connection PAD (LTE 2nd RF signal PAD)
100	MAIN_ANT	-	RF	1st RF connection PAD (WCDMA Main RF signal PAD LTE 1st RF signal PAD)

## I . 12 Reserved and Not Used PADS

Assigned to the pin to the inside of the other uses of this Module,don't need to connect customer's device, please to open

**Table I - 11 Reserved & Not Used PADS**

PAD No.	PAD name	Input / Output		Remark
		Voltage	Type	
17,18,19,20,34,39,42,43,48	Reserved	-	-	
54,70,71,72,73,74,75	Not Used	-	-	

## II. Customer PCB Design Guide

### II.1 Customer PCB Board Design Guide

With reference to the following Figure 3. 1 Design Guide, please design the customer's PCB.

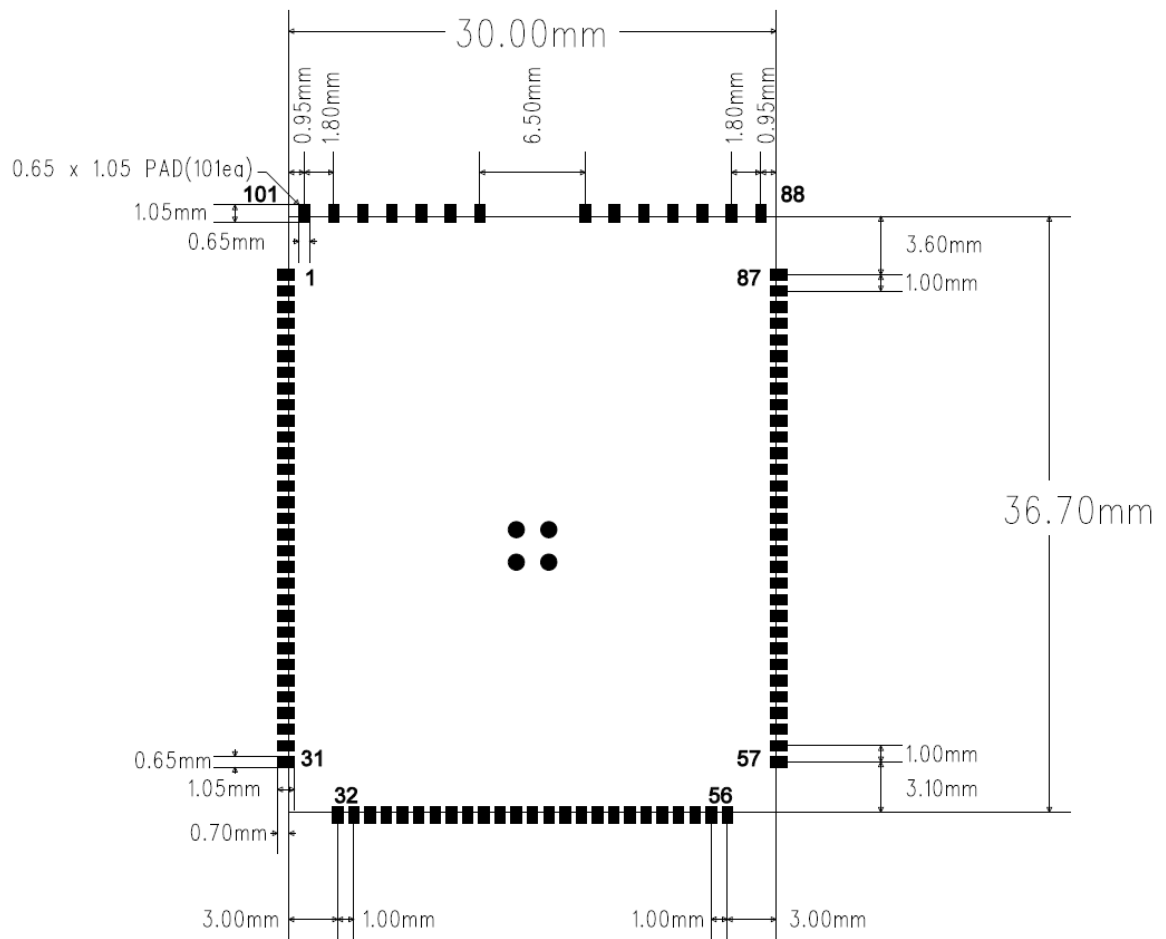


Figure II- 1 RESET control