MGA6230A CAT12 Module

User Manual

MGA6230A Module

Product User Manual

MGA6230A module is an industrial-grade LTE module, which provides multiple bands support.
This module can be adapted to various types of terminal devices, providing LTE network connection and data communication, such as industrial routers, industrial handsets, tablet computers, laptops, etc.

Industrial handset

Industrial router

Laptop

Tablet computer

General Features

Main Chipset	GCT GDM7243A
LTE Category	3GPP Release11 Cat12
Band support	B2/4/5/12/13/66/71
Antenna	4 ANT PIN LTE: Main and Diversity antenna
Tx/Rx	B2/4/66,2T4R B5/12/13/71,1T2R
CA/MIMO	DL: 2CA intra band ,4x4 MIMO 2CA inter band ,2x2 MIMO 3CA&4CA,2x2 MIMO UL: 2CA 2x2MIMO
Modulation	Uplink: QPSK/16QAM/64QAM Downlink: QPSK/16QAM/64QAM/256QAM
Power output	+23dBm (Power Class3)
Throughput	DL: Max 600Mbps UL: Max 150Mbps
Interface	USB 2.0&USB3.0 UART、SIM*1、PCIE、RGMII GPIO、SDIO、SPI、PCM
Voltage Input	3.0VDC ~ 3.6VDC (Recommend 3.3V)
Operating Temperature	-40℃~+85℃ (Reduce RF performance: -40℃~-30℃, +70℃~+85℃)
Storage Temperature	-40℃~+85℃

Dimensions

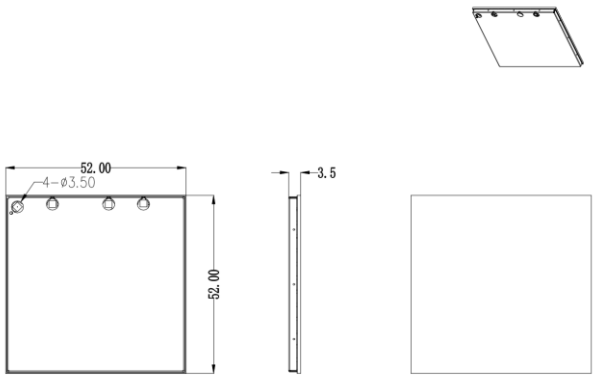
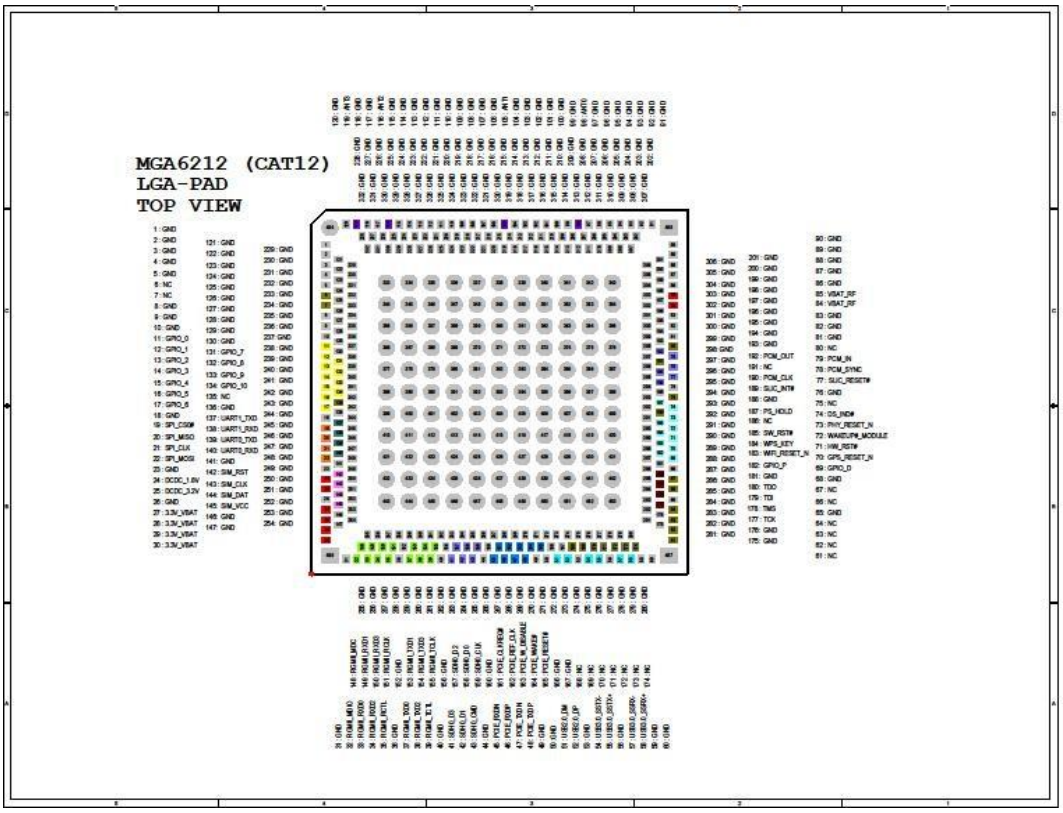


Fig. 1 - Detail module dimension

Pin Definition



Pin Description

Pin Name	Pin No.	Description	I/O	Voltage Domain
Power				
3.3V_VBAT	27,28,29,30	Power supply for the module's baseband part	PI	3.0V-3.6V
VBAT_RF	84,85	Power supply for the module's RF part	PI	3.3V-4.3V
DCDC_1.8V	24	1.8V output power supply for external circuits	PO	1.8V
DCDC_3.2V	25	3.2V output power supply for external circuits	PO	3.2V
GND	1~5,8~10,18,23,26,31,36,40,44,49,50,53,56,59,60,65,68,76,81,82,83,86~97,99~104,106~115,117,118,120~130,136,141,146,147,152,156,160,166,167,175,176,181,188,193~457	Ground		
RESERVED Pins				

Pin Name	Pin No.	Description	I/O	Voltage Domain
RESERVER	6,7,61~64,66,67,75,80,135,168~174,186,191	NC		
USB Interface				
USB2.0_DM	51	USB differential data bus (-)	AI/AO	
USB2.0_DP	52	USB differential data bus (+)	AI/AO	
USB3.0_SSTX-	54	USB superspeed transmission (-)	AO	
USB3.0_SSTX+	55	USB superspeed transmission (+)	AO	
USB3.0_SSRX-	56	USB superspeed receiving (-)	AI	
USB3.0_SSRX+	57	USB superspeed receiving (+)	AI	
UART Interface				
UART1_TXD	137	UART serial data interface	DO	1.8V
UART1_RXD	138		DI	1.8V
UART0_TXD	139		DO	1.8V
UART0_RXD	140		DI	1.8V
PCM Interface				
PCM_IN	79	PCM serial data interface	DI	1.8V
PCM_OUT	192		DO	1.8V
PCM_SYNC	78		DI	1.8V
PCM_CLK	190		DO	1.8V
RGMII Interface				
RGMII_MDIO	32	RGMII MDIO management data	IO	3.3V
RGMII_MDC	148	RGMII MDC management clock	DO	3.3V
RGMII_RXD0	33	RGMII receive data bit 0	DI	3.3V
RGMII_RXD1	149	RGMII receive data bit 1	DI	3.3V
RGMII_RXD2	34	RGMII receive data bit 2	DI	3.3V
RGMII_RXD3	150	RGMII receive data bit 3	DI	3.3V
RGMII_RCTL	35	RGMII receive control	DI	3.3V
RGMII_RCLK	151	RGMII receive clock	DI	3.3V
RGMII_TXD0	37	RGMII transmit data bit 0	DO	3.3V
RGMII_TXD1	153	RGMII transmit data bit 1	DO	3.3V
RGMII_TXD2	38	RGMII transmit data bit 2	DO	3.3V
RGMII_TXD3	154	RGMII transmit data bit 3	DO	3.3V
RGMII_TCTL	39	RGMII transmit control	DO	3.3V
RGMII_TCLK	155	RGMII transmit clock	DO	3.3V
PHY_RESET_N	73	Reset output for RGMII PHY	DO	3.3V
Other Interface Pins				
GPIO_0	11	General Purpose Input/Output	DIO	1.8V

Pin Name	Pin No.	Description	I/O	Voltage Domain
GPIO_1	12		DIO	
GPIO_2	13		DIO	
GPIO_3	14		DIO	
GPIO_4	15		DIO	
GPIO_5	16		DIO	
GPIO_6	17		DIO	
GPIO_7	131		DIO	
GPIO_8	132		DIO	
GPIO_9	133		DIO	
GPIO_10	134		DIO	
GPIO_D	69		DIO	
GPIO_P	182		DIO	
SLIC_INT#	189	SLIC INT	DI	
SLIC_RESET#	77	SLIC reset	DO	
PS_HOLD	187	Holding PMIC on state with ONOFF KEY.	DO	
HW_RST#	71	Turn on/off the module	DI	3.3V
SW_RST#	185	Reset the module	DI	1.8V
WAKEUP#_MODULE	72	Used to wake up the module	DI	
WPS_KEY	184	WPS input	DI	
WIFI_RESET_N	183	WIFI reset	DO	
GPS_RESET_N	70	GPS reset	DO	
DS_IND#	74	Enable external AP power supply	DO	
SDIO Interface				
SDH0_D3	41	Secure digital controller data bit 3	I/O	1.8V
SDH0_D2	157	Secure digital controller data bit 2	I/O	1.8V
SDH0_D1	42	Secure digital controller data bit 1	I/O	1.8V
SDH0_D0	158	Secure digital controller data bit 0	I/O	1.8V
SDH0_CMD	43	SD command	DO	1.8V
SDH0_CLK	159	SD serial clock	DO	1.8V
RF Interface				
ANT0	98	Main antenna 0,support TX and RX	AI/AO	
ANT1	105	Receive diversity antenna interface1	AI	
ANT2	116	Main antenna 2,support TX and RX	AI/AO	
ANT3	119	Receive diversity antenna interface3	AI	
SPI Interface				
SPI_CS0#	19	SPI chip select	DO	1.8V
SPI_MISO	20	SPI master input salve output	DI	
SPI_CLK	21	SPI clock	DO	

Pin Name	Pin No.	Description	I/O	Voltage Domain
SPI_MOSI	22	SPI master output slave input	DO	
JTAG Interface				
TDO	180	Test Data Out	DO	
TDI	179	Test Data In	DI	
TMS	178	Test Mode Select	DI	
TCK	177	Test Clock	DI	
Pin Name	Pin No.	Description	I/O	Voltage Domain
(U)SIM Interface				
SIM_RST	142	Reset signal of (U)SIM card	DO	1.8V/3V
SIM_CLK	143	Clock signal of (U)SIM card	DI	1.8V/3V
SIM_DAT	144	Data signal of (U)SIM card	DO	1.8V/3V
SIM_VCC	145	Power supply for (U)SIM card	PO	1.8V/3V
PCIe Interface				
PCIE_RXDN	45	PCIe receiving (-)	AI	
PCIE_RXDP	46	PCIe receiving (+)	AI	
PCIE_TXDN	47	PCIe transmission(-)	AO	
PCIE_TXDP	48	PCIe transmission(+)	AO	
PCIE_CLKREQ#	161	PCIe clock request	DIO	
PCIE_REF_CLK	162	Output PCIe reference clock	AIO	
PCIE_W_DISABLE	163	PCIE W_DISABLE	DI	
PCIE_WAKE#	164	PCIe wake-up	DI	
PCIE_RESET#	165	PCIe reset	DO	

Pin Direction Definition

PI	Power input
PO	Power output
AI/AO	Both Analog input output
AI	Analog input
AO	Analog output
DI/DO	Both Digital input and output
DI	Digital input
DO	Digital output

DC Electrical

Parameter	Description	Min	Max	Unit
VIH	High-level input voltage	1.17	VDD_IO	V
VIL	Low-level input voltage	-0.3	0.63	V
VOH	high-level output voltage	1.6	VDD_IO	V
VOL	low-level output voltage	0	0.4	V

Power Consumption

Parameter	Min	Typical	Max	Unit
TDD Band FDD Band		600 800	800 1000	mA mA

RF Performance

Operating Band	Transmit Power (dBm)	Antenna Interface receiving sensitivity
Band 2	23±2.7	<–95dBm @ 10MHz bandwidth
Band 4	23±2.7	<–97dBm @ 10MHz bandwidth
Band 5	23±2.7	<–95dBm @ 10MHz bandwidth
Band 12	23±2.7	<–94dBm @ 10MHz bandwidth
Band 13	23±2.7	<–94dBm @ 10MHz bandwidth
Band 66	23±2.7	<–96.5dBm @ 10MHz bandwidth
Band 71	23±2.7	<–94.2dBm @ 10MHz bandwidth

FCC ID：2AVFNMGA6230A

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

INTEGRATION INSTRUCTIONS:

This modular transmitter complies with FCC Rules Part 2, Part 22, Part 24, Part 27.

Specific operational use conditions

Antenna Change Notice to Host manufacturer

Recommend using antenna which certified with this module mentioned in this manual.
If you desire to increase antenna gain and either change antenna type or use same antenna type certified, a Class II permissive change application is required to be filed by us, or you (host manufacturer) can take responsibility through the change in FCC ID (new application) procedure followed by a Class II permissive change application, based on the new emissions testing. Please perform testing on frequency bands where the antenna gain is highest, worst-case band-edges based on original filing, and only on frequency bands where the antenna gain is highest.

Notice regarding trace antenna to host product manufacturer

Any deviation(s) from the defined parameters of the antenna trace, as described by this instruction, host product manufacturer must notify us that you wish to change the antenna trace design. In this case, a Class II permissive change application is required to be filed by us, or you (host manufacturer) can take responsibility through the change in FCC ID (new application) procedure followed by a Class II permissive change application.

RF exposure compliance instruction:

This module is limited to installation in mobile application with a minimum separation distance of at least 20 cm from a person's body, a separate approval is required for all other operating configurations, including portable configurations with respect to §*2.1093* and different antenna configurations.
Host product manufacturer shall at least provide information of minimum separation distance to end users in RF exposure compliance statement to end users in their end-product manuals.

This module is tested with the following antenna

Antenna Type	Brand/ manufacturer	Model No.	Max. Antenna Gain
Xxx e.g PIFA	Applicable to limited module	Applicable to limited module	
Xxx			

Labelling and compliance statement instruction for host product manufacturer

Please notice that if the FCC identification number is not visible when the module is installed inside another device, then the outside of the device into which the module is installed must also display a label referring to the enclosed module. This exterior label can use wording such as the following: "Contains FCC ID: 2AVFNMGA6230A" any similar wording that expresses the same meaning may be used.

§ 15.19 Labelling requirements shall be complied on end user device.
Labelling rules for special device, please refer to *§2.925, § 15.19 (a)(5)* and relevant KDB publications. For E-label, please refer to *§2.935*.
FCC regulatory Compliance Statement mentioned in this manual shall be properly included in host product manual per FCC Rules.
The host product manufacturer shall be aware not to provide information to the end user on how to install or remove this module in your host product manual.

Guide on test modes and additional testing requirements

Host product manufacturer is ultimately responsible for testing their end-product for any additional compliance requirements required with this module installed (for example, digital device emissions, PC peripheral requirements, additional transmitter(s) in the host, etc.).

Disclaimer on additional testing, Part 15 Subpart B compliance of Host Product

This modular transmitter is only FCC authorized for the specific rule parts listed on our grant, host product manufacturer is responsible for compliance to any other FCC rules that apply to the host not covered by the modular transmitter grant of certification.
Host manufacturer in any case shall ensure host product which is installed and operating with the module is in compliant with Part 15B requirements.
Please note that For a Class B or Class A digital device or peripheral, the instructions furnished the user manual of the end-user product shall include statement set out in *§15.105 Information to the user* or such similar statement and place it in a prominent location of host product manual.
Original texts from FCC Rules are as following you may refer to:
For Class B

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:
—Reorient or relocate the receiving antenna.
—Increase the separation between the equipment and receiver.
—Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
—Consult the dealer or an experienced radio/TV technician for help.

For Class A

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Warning: changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Disposal of Electronic and Electrical Waste

Pursuant to the WEEE EU Directive, electronic and electrical waste must not be disposed of with unsorted waste. Please contact your local recycling authority for disposal of this product.