

Gemicom Technology, Inc.



Product Specifications

4G LTE Cat-4 LGA Module

Model Number: N720

Revision 1.0
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Gemicom Technology, Inc.

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Introduction

Gemicom N720 is a series of LTE Cat 4 module optimized especially Qualcomm platform for industrial grade applications. Adopting ARM Cortex-A7 CPU cores, 1.3GHz clock speed, it delivers 150Mbps downlink and 50Mbps uplink data rates. Designed in the LGA form factor, N720 is compatible with GSM/GPRS/EDGE & CDMA2000 1x/1x Advanced/1xEV-DOa & WCDMA R99 to DC-HSPA+ & TD-SCDMA & LTE Cat4, which allows for flexible migration among them in design and manufacturing.

N720 contains 11 variants: N720-CA, N720-CB, N720-CC, N720-EA, N720-EB, N720-NA, N720-A, N720-V, N720-AU, N720-TWN and N720-IN. This makes it backward-compatible with existing EDGE and GSM/GPRS networks, ensuring that it can be connected even in remote areas devoid of 4G or 3G coverage, as shown in Table-1.

A rich set of Internet protocols, industry-standard interfaces extend the applicability of the module to a wide range of M2M and IoT applications such as industrial router, industrial PDA, rugged tablet PC, hand held POS, video surveillance, and smart metering.

Table-1 Model version and the Band defined

| Version | Region | Category | Frequency Band |
|---------|--------|----------|---|
| CA | China | Cat 4 | FDD-LTE: B1, B3, B5, B8 TDD-LTE: B38, B39, B40, B41 TD-SCDMA: B34, B39 UMTS: B1, B8 EV-DO: BC0 CDMA 1x: BC0 GSM/GPRS/EDGE: 900/1800 MHz |

| | | | |
|-----|---|-------|--|
| CB | China/India | Cat 4 | FDD-LTE: B1, B3, B5, B8 TDD-LTE: B38, B39, B40, B41 TD-SCDMA: B34, B39 UMTS: B1, B8 GSM/GPRS/EDGE: 900/1800 MHz |
| CC | China | Cat 4 | FDD-LTE: B1, B3, B8, B28 TDD-LTE: B38, B39, B40, B41 TD-SCDMA: B34, B39 UMTS: B1, B8 EV-DO: BC0 GSM/GPRS/EDGE: 900/1800 MHz |
| EA | Europe | Cat 4 | FDD-LTE: B1, B3, B5, B7, B8, B20 TDD-LTE: B40 UMTS: B1, B8 GSM/GPRS/EDGE: 900/1800 MHz |
| EB | Europe | Cat 4 | FDD-LTE: B1, B3, B5, B7, B8, B20 TDD-LTE: B38 UMTS: B1, B8 GSM/GPRS/EDGE: 900/1800 MHz |
| NA | North America | Cat 4 | FDD-LTE: B2, B4, B5, B7, B12, B17 UMTS: B2, B4, B5 GSM/GPRS/EDGE: 850/900/1800/1900 MHz |
| A | USA AT&T | Cat 4 | FDD-LTE: B2, B4, B12, B17 UMTS: B2, B4, B5 |
| V | USA Verizon | Cat 4 | FDD-LTE: B4, B13 |
| AU | Australia New Zealand Philippines | Cat 4 | FDD-LTE: B1, B3, B5, B7, B28 TDD-LTE: B40 TD-SCDMA: B34, B39 UMTS: B1, B5 |
| TWN | Taiwan | Cat 4 | FDD-LTE: B1, B3, B7, B8, B28 UMTS: B1, B8 GSM/GPRS/EDGE: 900/1800 MHz |
| IN | India | Cat 4 | FDD-LTE: B3, B5 TDD-LTE: B40 |

Standards

1. 3GPP TS 07.07 AT command set for GSM Mobile Equipment (ME)
2. YD 1214-2006 Technical requirement of 900/1800MHz TDMA Digital Cellular Mobile Telecommunication Network General Packet Radio Service (GPRS) – Equipment: Mobile Stations
3. YD 1215-2006 Test Methods of 900/1800MHz TDMA Digital Cellular Mobile Telecommunication Network General Packet Radio Service(GPRS) - Equipment: Mobile Stations
4. YD 1032-2000 Limits and Measurement Methods of Electromagnetic Compatibility for 900/1800MHz Digital Cellular Telecommunications System - Part 1: Mobile Station and its Ancillary Equipment
5. YD/T 2220-2011 Technical requirement and test method of WCDMA/GSM (GPRS) dual mode digital mobile user equipment (phase 4)
6. People's Republic of China - Administration of the Network Connection of Telecommunications Equipment Procedures
7. GB4943.1-2011 Information technology equipment – Safety – Part 1: General requirements
8. GB/T22450.1-2008 Limits and measurement methods of electromagnetic compatibility for 900/1800MHz TDMA digital cellular telecommunications system - Part 1: Mobile station and ancillary equipment
9. CNCA-O7C-031:2007 Implementation Rules for Compulsory Certification of telecommunications equipment - telecommunications terminal equipment
10. GSM/GPRS/EDGE 2G protocol
11. WCDMA R99, Rel9DC-HSDPA+ (42Mbps) protocol
12. CDMA2000@1x, 1xAdvanced, 1xEV-DOrA protocol
13. LTE Cat-4 4G protocol

Characteristics

| | |
|----------------|---|
| Main core | ARM Cortex-A7, 1.3GHz, L2 cache 256KB |
| Memory | 128MB/256MB RAM; 256MB ROM |
| Frequency Band | Table-1 |
| Data Rate | GPRS: Max 85.6Kbps (DL) / Max 85.6Kbps (UL) CDMA: Max 3.1Mbps (DL) / Max 1.8Mbps (UL) WCDMA: DC-HSPA+, Max 42Mbps (DL) / Max 5.76Mbps (UL) TD-SCDMA: Max 4.2Mbps (DL) / Max 2.2Mbps(UL) FDD-LTE: non-CA cat4, Max 150Mbps (DL) / Max 50Mbps (UL) TDD-LTE: non-CA cat4, Max 130Mbps (DL) / Max 35Mbps (UL) |
| Transmit Power | GSM850: +33dBm (Power Class 4) EGSM900: +33dBm (Power Class 4) DCS1800: +30dBm (Power Class 1) PCS1900: +30dBm (Power Class 1) EDGE 850MHz: +27dBm (Power Class E2) EDGE 900MHz: +27dBm (Power Class E2) EDGE1800MHz: +26dBm (Power Class E2) EDGE1900MHz: +26dBm (Power Class E2) TD-SCDMA: +23dBm (Power Class 3) CDMA 1X/EVDO: +23dBm(Power Class 3) UMTS: +23dBm (Power Class 3) LTE: +23dBm (Power Class 3) |
| Consumption | Sleep mode: < 4 mA Standby mode: < 20 mA |
| Antenna | 2G/3G/4G antenna 4G Diversity Receiver antenna GNSS antenna |
| Interface | 1x UART, up to 4Mbps 1x UIM, 1.8V/3V 1x USB 2.0 2x 15bit ADC 1x SDIO for WLAN 1x PCM 1x I2C Master only |
| Power | VBAT: 3.3V ~ 4.3V (TYP: 3.8V) |
| Temperature | -40 ~ +85 Celsius (operating) |
| Form Factor | 100 pin LGA |

Reliability & Test Performance

Environment Condition

| Temperature | Min | Typical | Max |
|-------------|------|---------|------|
| Operating | -40C | +25C | +85C |
| Storage | -45C | | +90C |

Module Operating Frequency

| Operating Frequency | Uplink | Downlink |
|---------------------|-------------------|-------------------|
| GSM850 | 824 ~ 849 MHz | 869 ~ 894 MHz |
| EGSM900 | 880 ~ 915 MHz | 925 ~ 960 MHz |
| DCS1800 | 1710 ~ 1785 MHz | 1805 ~ 1880 MHz |
| PCS1900 | 1850 ~ 1910 MHz | 1930 ~ 1990 MHz |
| CDMA BC0 | 824 ~ 849 MHz | 869 ~ 894 MHz |
| UMTS B1 | 1920 ~ 1980 MHz | 2110 ~ 2170 MHz |
| UMTS B2 | 1850 ~ 1910 MHz | 1930 ~ 1990 MHz |
| UMTS B4 | 1710 ~ 1755 MHz | 2110 ~ 2155 MHz |
| UMTS B5 | 824 ~ 849 MHz | 869 ~ 894 MHz |
| UMTS B8 | 880 ~ 915 MHz | 925 ~ 960 MHz |
| UMTS B9 | 1749.9~1784.9 MHz | 1844.9~1879.9 MHz |
| UMTS B19 | 869 ~ 894 MHz | 869 ~ 894 MHz |
| TD-SCDMA B34 | 2010~2025 MHz | 2010~2025 MHz |
| TD-SCDMA B39 | 1880~1920 MHz | 1880~1920 MHz |
| FDD-LTE B1 | 1920~1980 MHz | 2110~2170 MHz |
| FDD-LTE B2 | 1850~1910 MHz | 1930~1990 MHz |
| FDD-LTE B3 | 1710~1785 MHz | 1805~1880 MHz |
| FDD-LTE B4 | 1710~1755 MHz | 2110~2155 MHz |
| FDD-LTE B5 | 824 ~ 849 MHz | 869 ~ 894 MHz |
| FDD-LTE B7 | 2500~2570 MHz | 2620~2690 MHz |
| FDD-LTE B8 | 880 ~915 MHz | 925 ~ 960 MHz |
| FDD-LTE B9 | 1749.9~1784.9 MHz | 1844.9~1879.9 MHz |
| FDD-LTE B12 | 699 ~ 716 MHz | 728 ~ 746 MHz |
| FDD-LTE B17 | 704 ~ 716 MHz | 734 ~ 746 MHz |
| FDD-LTE B19 | 830 ~ 845 MHz | 875 ~ 890 MHz |
| FDD-LTE B20 | 832 ~ 862 MHz | 791 ~ 821 MHz |
| FDD-LTE B28 | 703 ~ 748 MHz | 758 ~ 803 MHz |
| TDD-LTE B38 | 2570 ~ 2620 MHz | 2570 ~ 2620 MHz |
| TDD-LTE B39 | 1880 ~ 1920 MHz | 1880 ~ 1920 MHz |
| TDD-LTE B40 | 2300 ~ 2400 MHz | 2300 ~ 2400 MHz |
| TDD-LTE B41 | 2555 ~ 2655 MHz | 2555 ~ 2655 MHz |

Module Transmit Power & Receiver Sensitivity

| Frequency | Tx Power | Rx Sensitivity |
|---------------------|------------|----------------|
| GSM850 | 33 ± 2 dBm | < -108 dBm |
| EGSM900 | 33 ± 2 dBm | < -108 dBm |
| DCS1800 | 30 ± 2 dBm | < -108 dBm |
| PCS1900 | 30 ± 2 dBm | < -108 dBm |
| CDMA BC0 | 24 ± 1 dBm | < -107 dBm |
| UMTS B1 | 23 ± 2 dBm | < -108 dBm |
| UMTS B2 | 23 ± 2 dBm | < -108 dBm |
| UMTS B4 | 23 ± 2 dBm | < -108 dBm |
| UMTS B5 | 23 ± 2 dBm | < -108 dBm |
| UMTS B8 | 23 ± 2 dBm | < -108 dBm |
| UMTS B9 | 23 ± 2 dBm | < -108 dBm |
| UMTS B19 | 23 ± 2 dBm | < -108 dBm |
| TD-SCDMA B34 | 23 ± 2 dBm | < -109 dBm |
| TD-SCDMA B39 | 23 ± 2 dBm | < -109 dBm |
| FDD-LTE B1 (10MHz) | 23 ± 2 dBm | < -97 dBm |
| FDD-LTE B2 (10MHz) | 23 ± 2 dBm | < -95 dBm |
| FDD-LTE B3 (10MHz) | 23 ± 2 dBm | < -95 dBm |
| FDD-LTE B4 (10MHz) | 23 ± 2 dBm | < -97 dBm |
| FDD-LTE B5 (10MHz) | 23 ± 2 dBm | < -95 dBm |
| FDD-LTE B7 (10MHz) | 23 ± 2 dBm | < -95 dBm |
| FDD-LTE B8 (10MHz) | 23 ± 2 dBm | < -95 dBm |
| FDD-LTE B9 (10MHz) | 23 ± 2 dBm | < -96 dBm |
| FDD-LTE B12 (10MHz) | 23 ± 2 dBm | < -95 dBm |
| FDD-LTE B17 (10MHz) | 23 ± 2 dBm | < -95 dBm |
| FDD-LTE B20 (10MHz) | 23 ± 2 dBm | < -95 dBm |
| FDD-LTE B28 (10MHz) | 23 ± 2 dBm | < -95 dBm |
| TDD-LTE B38 (10MHz) | 23 ± 2 dBm | < -97 dBm |
| TDD-LTE B39 (10MHz) | 23 ± 2 dBm | < -97 dBm |
| TDD-LTE B40 (10MHz) | 23 ± 2 dBm | < -97 dBm |
| TDD-LTE B41 (10MHz) | 23 ± 2 dBm | < -95 dBm |

GNSS Technical Specifications

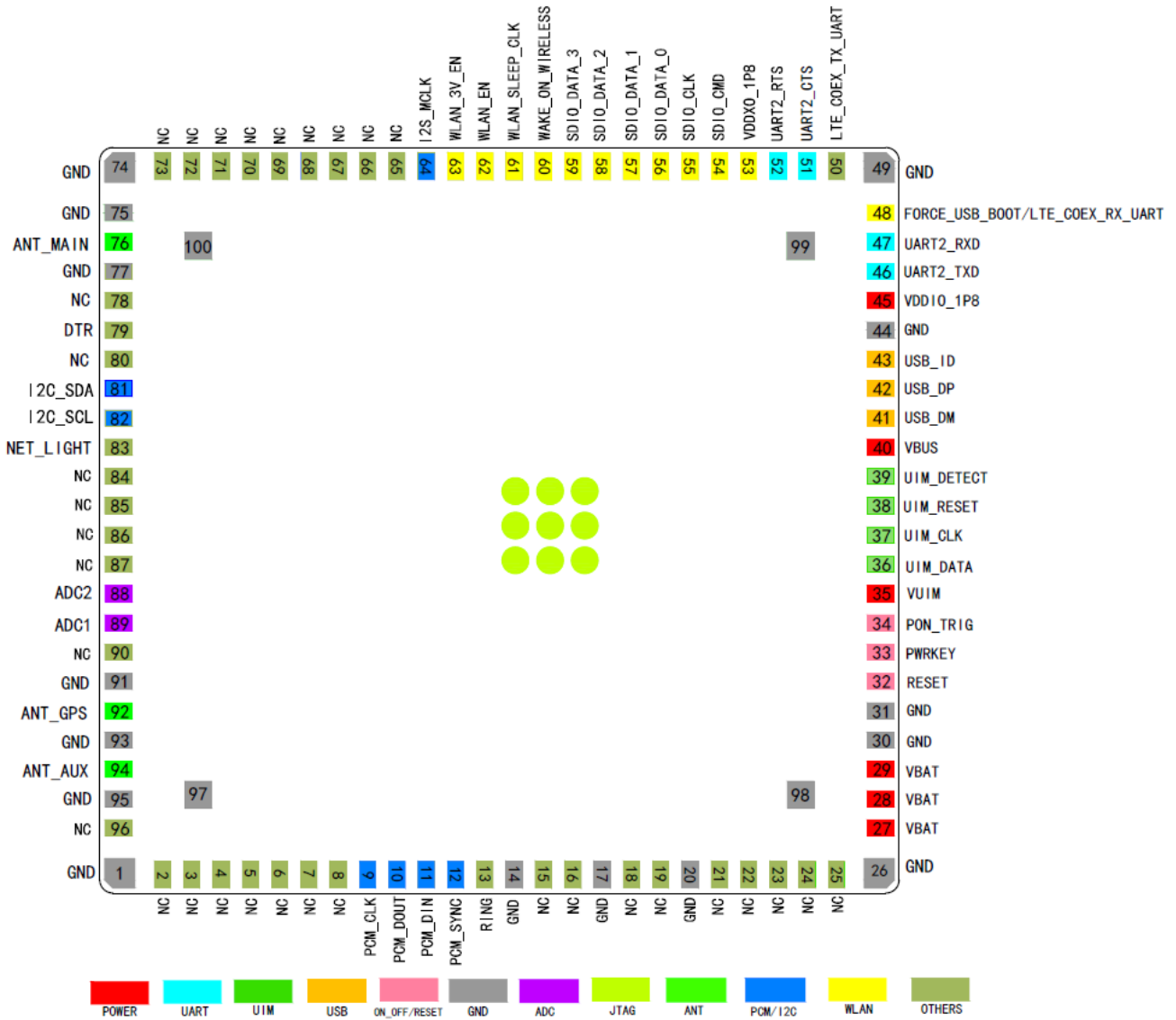
| Receiver Parameter | Performance |
|--------------------------------|-----------------------------|
| GPS L1 Frequency | 1575.42 ± 1.023 MHz |
| GLONASS Frequency | 1597.5 ~ 1605.9 MHz |
| Beidou Frequency | 1559.1 ~ 1563.1 MHz |
| Tracking Sensitivity | -160 dBm (GPS) / -159.5 dBm |
| Acquisition Sensitivity | -144 dBm (GPS) / -143.5 dBm |
| Position Accuracy (open space) | < 3m (CEP50) |
| Hot Start (open space) | < 2.5 sec |
| Cold Start (open space) | < 35 sec |
| Update Rate | Default 1 Hz |
| Noise Figure (CNRin/CNRout) | 3 dB |
| Max. Altitude | 18,000 m |
| Max. Velocity | 515 m/s |
| Dynamics | 4g |
| Protocol Support | NMEA-0183 |
| Antenna Support | Active/Passive antenna |

EMI/EMC Test

(in Humidity 45%; Temperature 25C)

| Test Item | Contact Discharge | Air Discharge |
|-----------|-------------------|---------------|
| VBAT | ± 8 kV | ± 15 kV |
| GND | ± 8 kV | ± 15 kV |
| ANT | ± 8 kV | ± 15 kV |
| Shielding | ± 8 kV | ± 15 kV |
| Others | ± 8 kV | ± 4 kV |

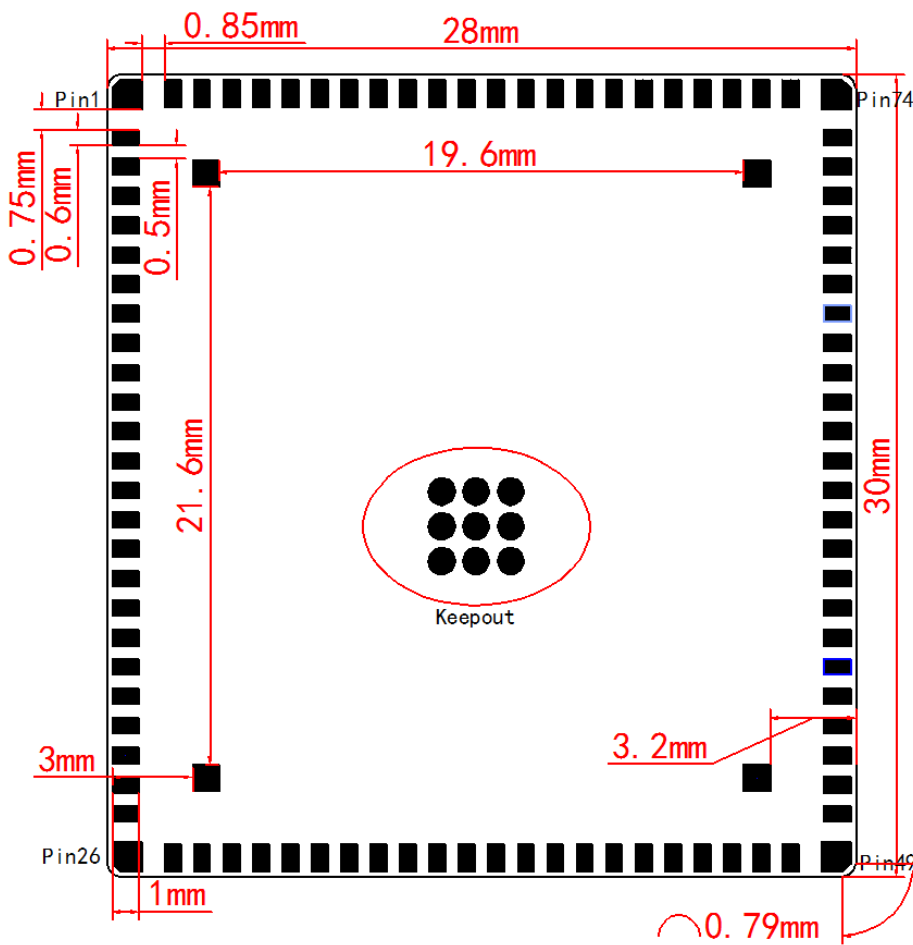
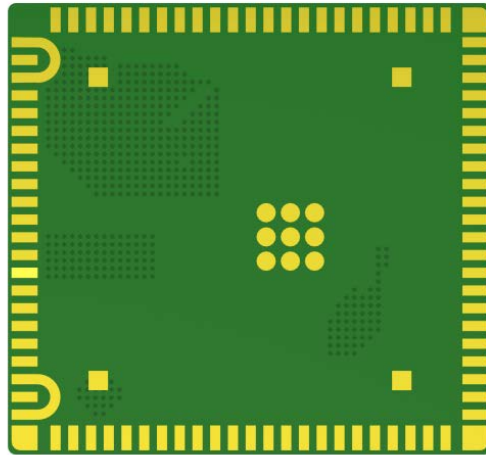
Pin Definition

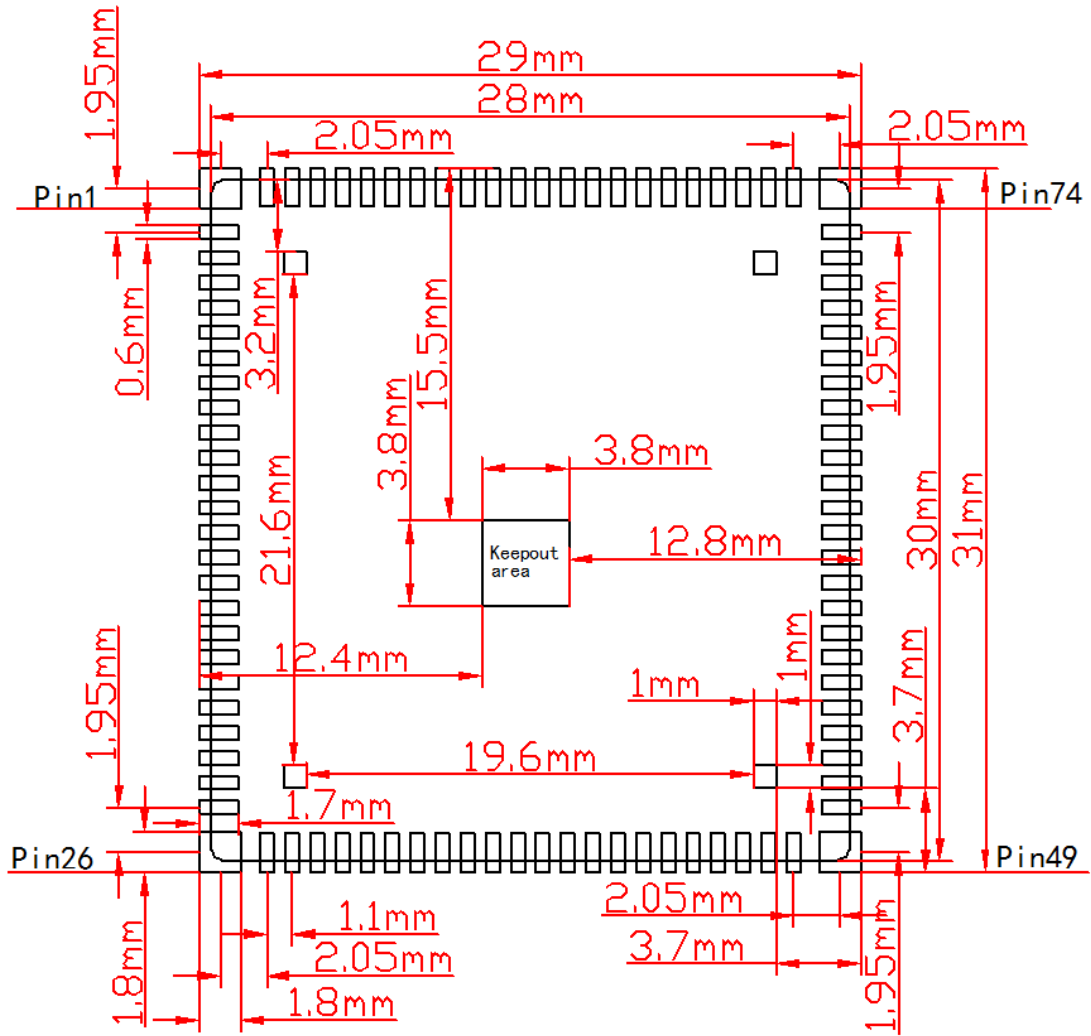


Mechanical Drawing

Dimension: 30 (L) x 28 (W) x 2.8 (H) mm (tolerance: $\pm 0.1\text{mm}$)

Weight: 5.1 g





Packing of Devices

LGA modules are contained in Tray configuration, and are dry packed for transportation and storage. Packing media are design to protect modules from electrical, mechanical, and chemical damages as well as moisture absorption, included with Desiccant, Humidity indicator, and Aluminum vacuum bag. But proper handling and storage of dry packs is recommended. Improper handling and storage increases various quality and reliability risks, modules shall be baked to use after improper exposure in air for long time storage.



- The Tray is Non-high temperature resistant material, CANNOT be baked when the modules are baked.
- Recommended module baking temperature is 90°C, no shorter than 12 hours.
- Recommended storage condition:
 - Temperature: 20°C - 26°C
 - Humidity: 40% - 60%
 - Life: 120 days

