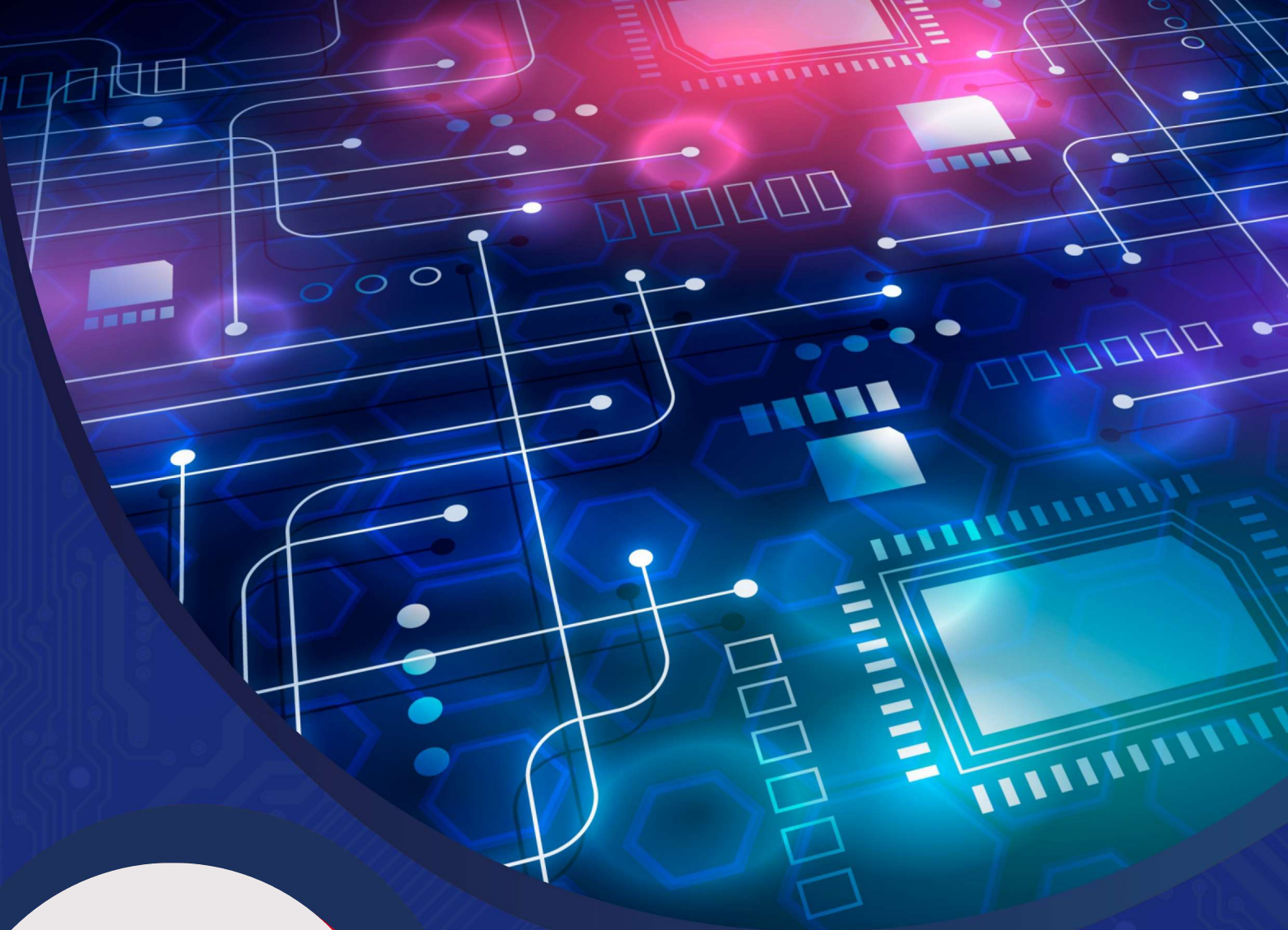
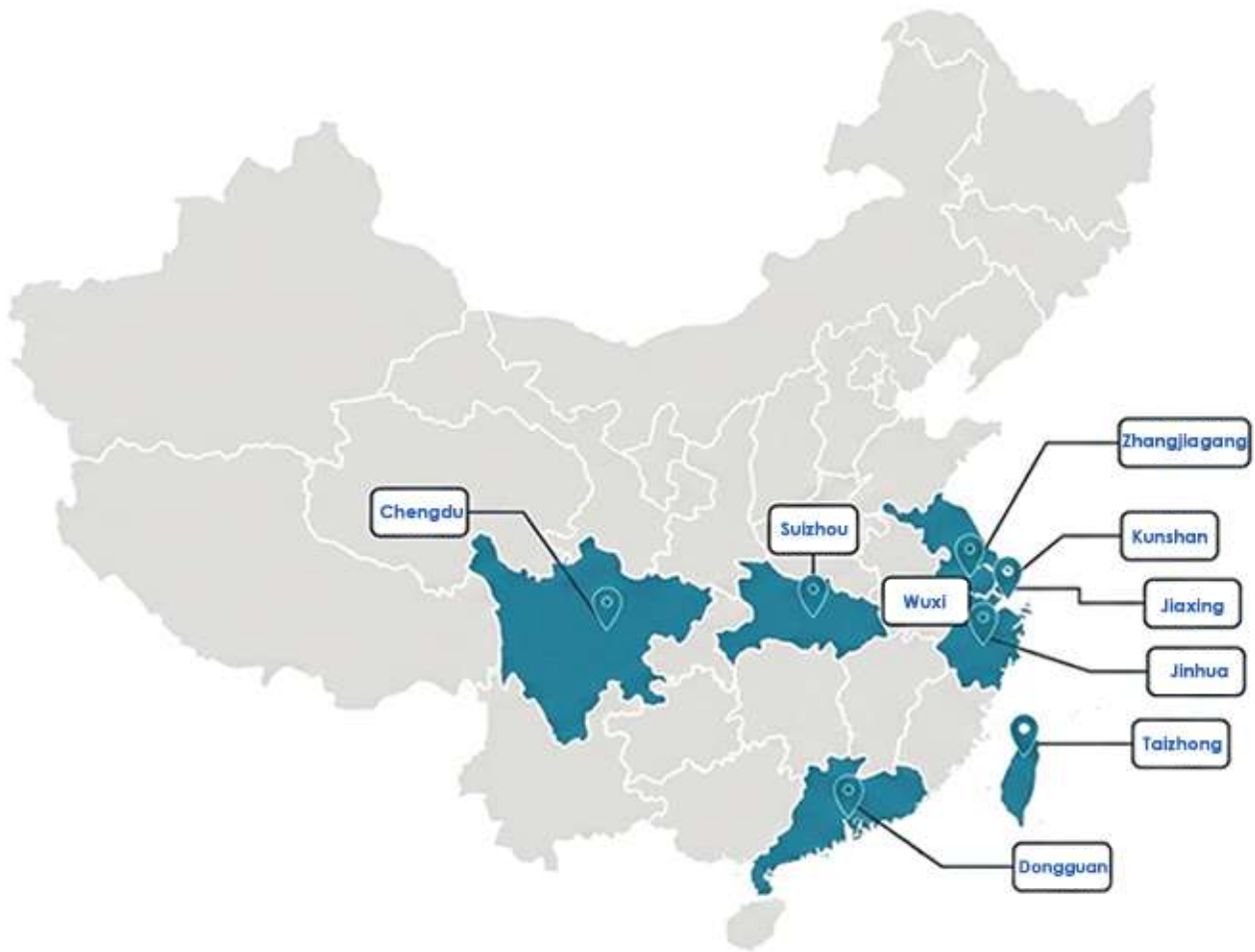




**Dongguan 1st  
Manufacturing  
Base Catalog**



# Manufacturing Footprint Map



WTL has deeply established its expertise in electronic components, with five production bases strategically located across nine cities in five provinces in China. Our facilities are situated in key industrial hubs across South China, East China, Central China, Southwest China, as well as Taiwan, leveraging a coordinated multi-base production network to integrate a full spectrum of product resources.

Backed by a well-structured production layout and robust supply chain capabilities, WTL offers a comprehensive product portfolio, complete specifications, and ample production capacity. We are fully equipped to meet diverse industry needs and application scenarios through one-stop procurement and customized solutions, while delivering stable, diversified, and end-to-end integrated solutions to our customers.

***Rooted in China, Serving the Globe***





# PRODUCT CATALOG

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# Crystal Resonator (32.768KHz)

32.768KHz crystal resonator is a passive electronic component that uses the piezoelectric effect of quartz crystals to generate high-accuracy oscillating frequency, mainly used in timing circuits.



## Key Features

Small Size, High accuracy, SMD package.

## Application

**Automotive electronics:** Central control instrument, Multimedia entertainment system, Driving recorder, T-BOX, Tire pressure monitor, etc.

**Smart terminals:** Wearable electronics, Mobile phones, Digital cameras, Pad, PC, Multi-function calculators, Blue-tooth headsets, etc.

**Smart appliances:** Air conditioning, Fridge, Washing machine, Rice cooker, Water heater, Sweeping robots, etc.

**Smart home:** Smart lock, etc.

**Smart office:** Attendance machine, POS machine, etc.

**Communication equipment:** Intercoms, Server, etc.

**Security:** IPC, Access control, Smoking detector, etc.

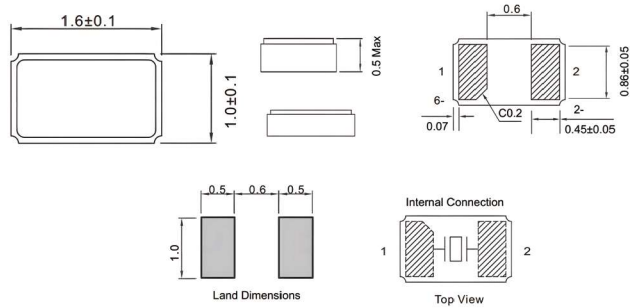
**Metering:** Water meter, Electricity meter, Gas meter, etc.

## Crystals (32.768KHz)

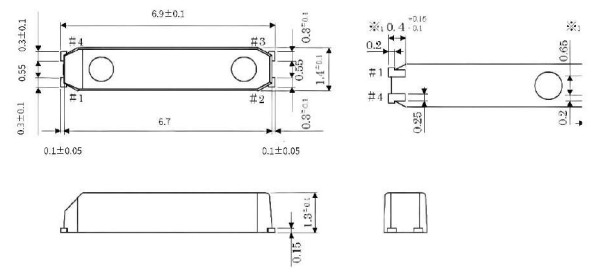
| Model                                              | Dimension (mm)                                     | Frequency (KHz) | Frequency Accuracy @25°C (ppm) | Operating Temp (°C)     | Load Capacitance (pF) |
|----------------------------------------------------|----------------------------------------------------|-----------------|--------------------------------|-------------------------|-----------------------|
| SEAM 1610-2P<br>SEAM 2012-2P/4P<br>SEAM 3215-2P/4P | 1.65*1.05*0.50<br>2.00*1.20*0.50<br>3.20*1.50*0.80 | 32.768KHz       | ±20                            | -40 ~ +85<br>-40 ~ +125 | 6.0/7.0/9.0/12.5      |
| GLASS 7015-4P<br>GLASS 8038-4P                     | 6.90*1.40*1.30<br>8.0*3.8*2.5                      | 32.768KHz       | ±20                            | -40 ~ +85<br>-40 ~ +125 | 6.0/7.0/9.0/12.5      |
| 2*6-2P<br>3*8-2P                                   | 2.0*6.0<br>3.0*8.0                                 | 32.768KHz       | ±20                            | -40 ~ +85               | 9.0/12.5/specify      |

## External dimensions (unit: mm)

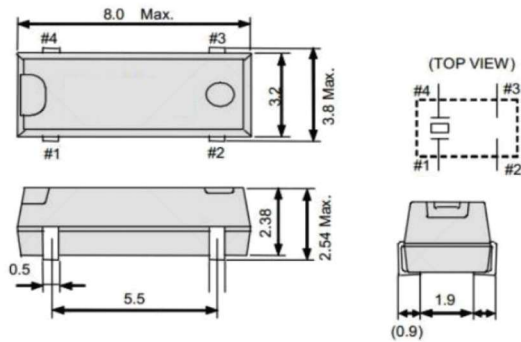
### SEAM 1610-2P



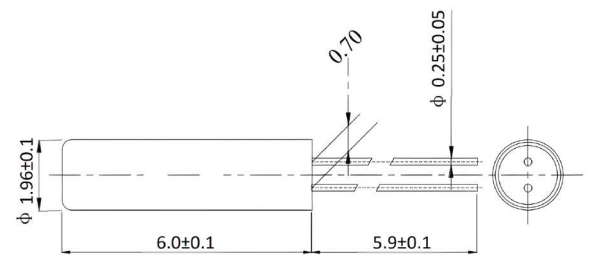
### GLASS 7015-4P



### GLASS 8038-4P



### 2\*6-2P





# MHz Crystals

MHz Crystals is a passive electronic component that uses the piezoelectric effect of quartz crystals to generate high-accuracy oscillating frequency, mainly used to provide a circuit reference clock source.



## Key Features

Ultra-small and ultra-thin, Low power consumption, Wide temperature, High accuracy, SMD package.

## Application

**Automotive electronics:** Central control instrument, Multimedia entertainment system, Driving recorder, T-BOX, Tire pressure monitor, etc.

**Smart terminals:** Wearable electronics, Mobile phones, Digital cameras, Pad, PC, Multi-function calculators, Blue-tooth headsets, etc.

**Smart appliances:** Air conditioning, Fridge, Washing machine, Rice cooker, Water heater, Sweeping robots, etc.

**Smart home:** Smart lock, etc.

**Smart office:** Attendance machine, POS machine, etc.

**Communication equipment:** Intercoms, Server, etc.

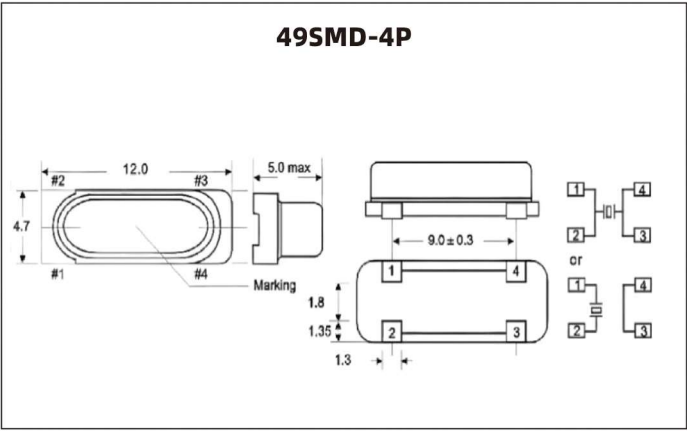
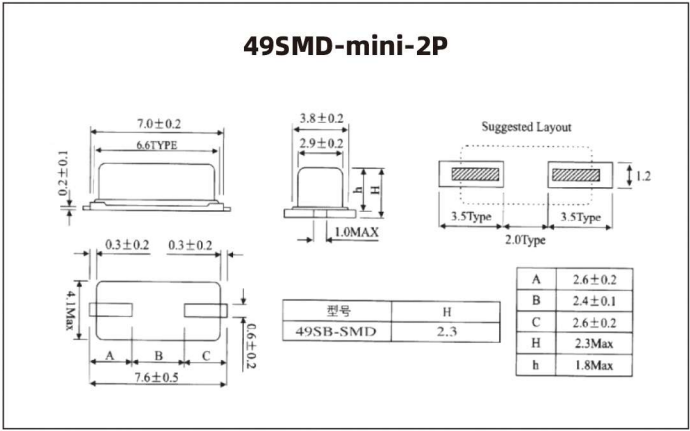
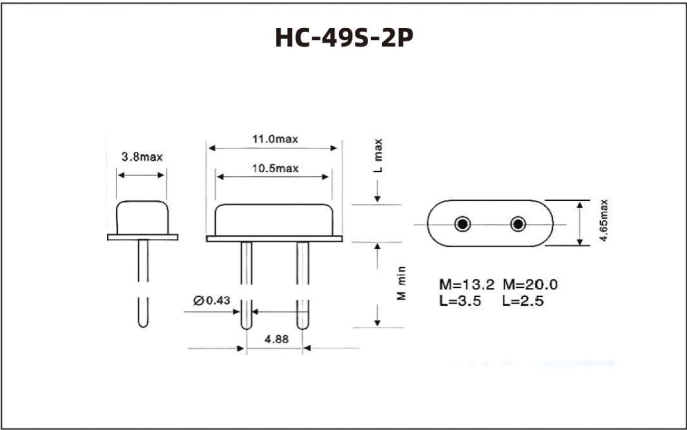
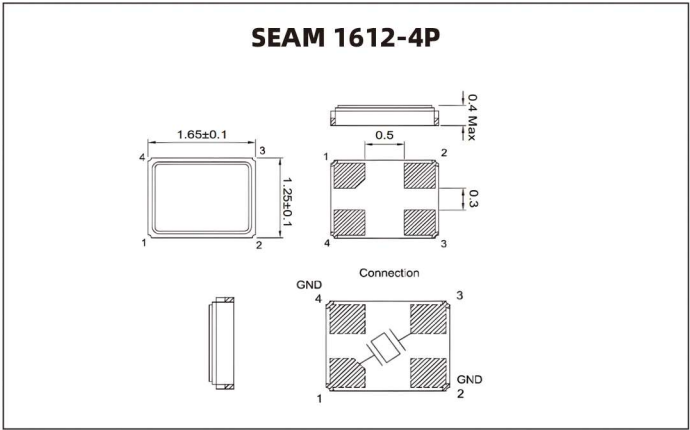
**Security:** IPC, Access control, Smoking detector, etc.

**Metering:** Water meter, Electricity meter, Gas meter, etc.

## Crystals (MHz Frequency Range)

| Model         | Dimension (mm) | Frequency Range (MHz) | Frequency Tolerance@25°C (ppm) | Accuracy (ppm) | Operating Temp (°C)          | Load Capacitance (pF) |
|---------------|----------------|-----------------------|--------------------------------|----------------|------------------------------|-----------------------|
| SEAM 5032-4P  | 5.0*3.2*0.8    | 8~54                  | ±10/30                         | ±10/30         | -40~+85/<br>-40~+125/specify | 8/10/12/specify       |
| SEAM 3225-4P  | 3.2*2.5*0.7    | 8~54                  | ±10/30                         | ±10/30         | -40~+85/<br>-40~+125/specify | 8/10/12/specify       |
| SEAM 2520-4P  | 2.5*2.0*0.55   | 12~54                 | ±10/30                         | ±10/30         | -40~+85/<br>-40~125/specify  | 8/10/12/specify       |
| SEAM 2016-4P  | 2.0*1.6*0.5    | 16~55                 | ±10/30                         | ±10/30         | -40~+85/<br>-40~125/specify  | 8/10/12/specify       |
| SEAM 1612-4P  | 1.65*1.25*0.28 | 24 ~ 54               | ±10/30                         | ±10/30         | -40~+85/<br>-40~+125/specify | 8/10/12/specify       |
| HC-49S-2P     | 11.0*4.65*3.68 | 3.579545 ~ 54         | ±10/30                         | ±10/30         | -20~ +70/<br>-40~ +125       | 4PF ~ ∞(Series)       |
| HC-49SMD-2P   | 11.5*4.7*4.1   | 3.579545 ~ 54         | ±10/30                         | ±10/30         | -20~ +70/<br>-40~ +125       | 4PF ~ ∞(Series)       |
| 49SMD-mini-2P | 6.1*4.0* 2.0   | 8 ~ 50                | ±10/30                         | ±10/30         | -20~ +70/<br>-40~ +125       | 12/20/specify         |
| 49SMD-4P      | 12.0*4.7*5.0   | 3.579545 ~ 54         | ±10/30                         | ±10/30         | -20~ +70/<br>-40~ +125       | 4PF ~ ∞(Series)       |
| 49SMD-2P      | 11.4*4.8*3.0   | 3.2768 ~ 54           | ±10/30                         | ±10/30         | -20~ +70/<br>-40~ +125       | 12/20/specify         |

External dimensions (unit: mm)



# SPXO

SPXO is an active device that integrates a crystal resonator and oscillating circuit, which can output CMOS or differential frequency signals to provide a circuit reference clock source.



## Key Features

Full range of standard package size, Wide operating temperature range, High Stability, Low jitter.

## Application

**Automotive electronics:** Audio, Navigation, GPS, Clocks, IPC, etc.

**Smart terminals:** Digital cameras, Pad, PC, etc.

**Smart appliances:** Air conditioning, Fridge, Washing machine, Rice cooker, Water heater, etc.

**Industrial control equipment:** Robot, Instrumentation, etc.

**Communication equipment:** Small cell, Intercoms, etc.

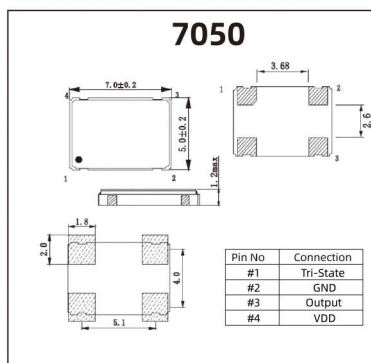
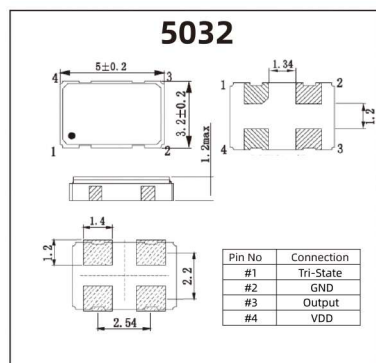
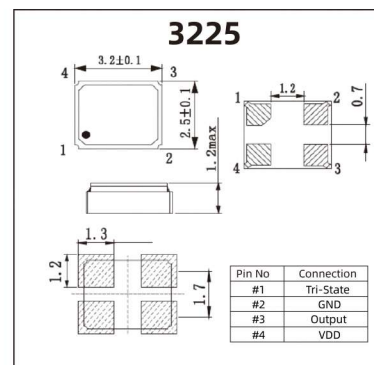
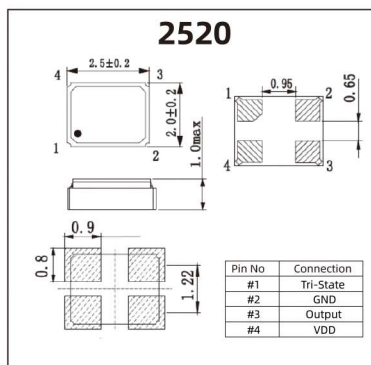
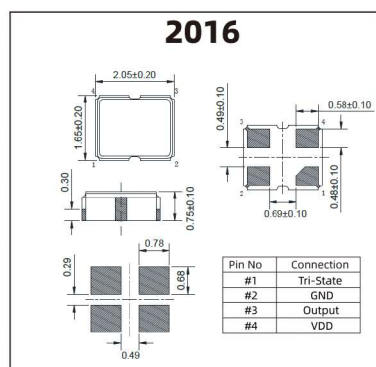
**Datacom products:** Optical modules, Routers, Optical communications, Switches, etc.

## SPXO (CMOS Output)

| Model   | Dimension (mm) | Frequency Range (MHz) | Frequency Accuracy (ppm) | Operating Temp (°C)    | Supply Voltage (V) | Recommended Frequency (MHz)                                                 |
|---------|----------------|-----------------------|--------------------------|------------------------|--------------------|-----------------------------------------------------------------------------|
| DPZ1612 | 1.65*1.25*0.8  | 32.768KHz<br>1~200    | ±25/50                   | -20 ~ +70<br>-40 ~ +85 | 1.8 ~ 3.3          | 32.768kHz* 24.0000<br>1.0000 24.5760<br>1.8432 25.0000<br>2.0000 26.0000    |
| DPZ2016 | 2.0*1.6*0.75   | 1~125                 | ±25/50                   | -20 ~ +70<br>-40 ~ +85 | 1.8 ~ 3.3          | 2.0480 27.0000<br>3.0000 27.1200<br>3.6864 30.0000<br>4.0000 32.7680        |
| DPZ2520 | 2.5*2.0*0.9    | 32.768KHz<br>1~125    | ±25/50                   | -20 ~ +70<br>-40 ~ +85 | 1.8 ~ 3.3          | 4.0960 33.0000<br>4.9152 33.3333<br>7.6800 38.4000<br>8.0000 40.0000        |
| DPZ3225 | 3.2*2.5*1.0    | 32.768KHz<br>1~125    | ±25/50                   | -20 ~ +70<br>-40 ~ +85 | 1.8 ~ 3.3          | 8.1920 48.0000<br>10.0000 49.1520<br>11.0592 50.0000<br>12.0000 54.0000     |
| DPZ5032 | 5.0*3.2*1.2    | 32.768KHz<br>1~125    | ±25/50                   | -20 ~ +70<br>-40 ~ +85 | 1.8 ~ 3.3          | 12.2880 60.0000<br>14.3180 64.0000<br>16.0000 66.6666<br>16.3840 70.0000    |
| DPZ7050 | 7.0*5.0*1.3    | 32.768KHz<br>1~160    | ±25/50                   | -20 ~ +70<br>-40 ~ +85 | 1.8 ~ 3.3          | 18.4320 80.0000<br>19.2000 100.0000<br>20.0000 125.0000<br>20.4800 156.2500 |



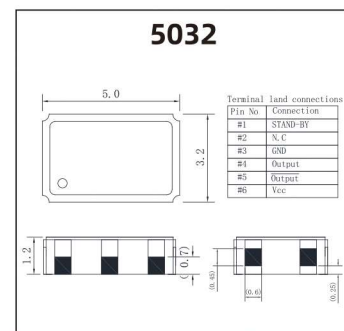
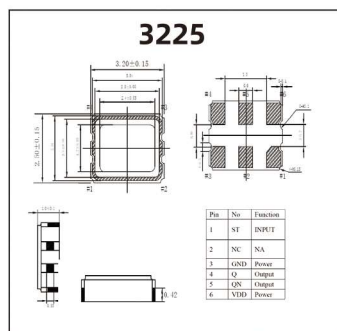
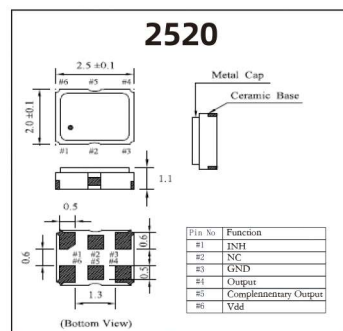
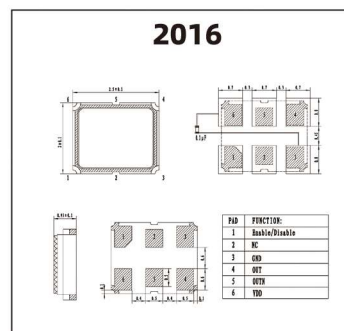
## External dimensions (unit: mm)



## SPXO (Differential Output)

| Model   | Dimension (mm)       | Frequency Range (MHz) | Frequency Accuracy (ppm) | Operating Temp (°C)     | RMS Jitter              | Output waveform       | Recommended Frequency (MHz)    |
|---------|----------------------|-----------------------|--------------------------|-------------------------|-------------------------|-----------------------|--------------------------------|
| DPD2016 | 2.0*1.6*0.95         | 50~220                | ±25/50/100               | -40 ~ +85               | <150 fs<br>@12KHz~20MHz | LVPECL/LVDS /HCSL     | 100<br>125<br>156.25<br>155.52 |
| DPD2520 | 2.5*2.0*0.9          | 50~220                | ±25/50/100               | -40 ~ +85               |                         | LVPECL/LVDS /HCSL     |                                |
| DPD3225 | 3.2*2.5*0.9          | 50~220                | ±25/50/100               | -40 ~ +85               |                         | LVPECL/LVDS /HCSL     |                                |
| DPD5032 | 5.0*3.2*1.2          | 100~170               | ±25/50/100               | -40 ~ +85               |                         | LVPECL/LVDS /HCSL     |                                |
| DPD7050 | 7.0*5.0*1.7          | 62.5~220              | ±25/50/100               | -40 ~ +85               |                         | LVPECL/LVDS           |                                |
| DPD98XX | 7050/5032 /3225/2520 | 100-1000              | ±2/±5                    | -40 ~ +85<br>-40 ~ +105 | 45fs<br>@12KHz~20MHz    | LVDS/LVPECL /CML/HCSL | 100-1000                       |

## External dimensions (unit: mm)



# TCXO

TCXO is a quartz crystal oscillator that utilizes temperature compensation circuitry to compensate the frequency offset caused by changes in environmental temperature, thereby achieving high-precision frequency output.



## Key Features

High stability, Ultra-wide operating temperature, Low phase noise, Ultra-low power consumption.

## Application

Communication network: Transmission network, Access network, Datacom products, BBU/RRU/AAU, Base station, etc.

Private network equipment: Rail transportation, Trunking communication, Navigation system, etc.

Industrial Control : Robot, CNC machine, Signal acquisition, etc.

Instrumentation: Precision instrumentation, Testing equipment, Industrial metering (water, electricity, gas, etc.)

Consumer Electronics: Smart watches, Elderly cell phones, BLE/WIFI modules, etc.

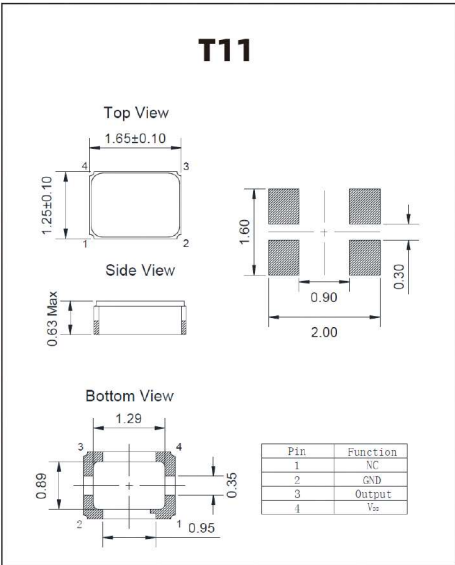
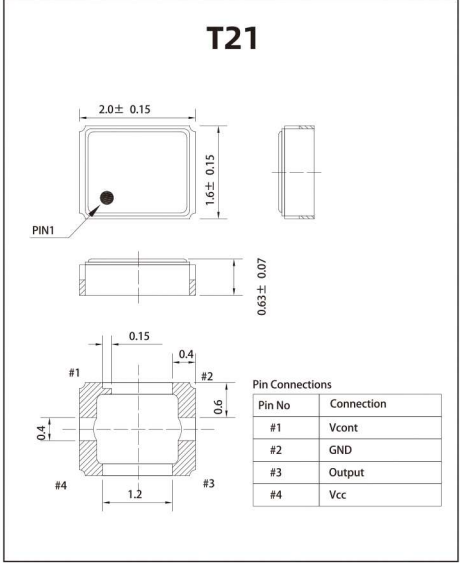
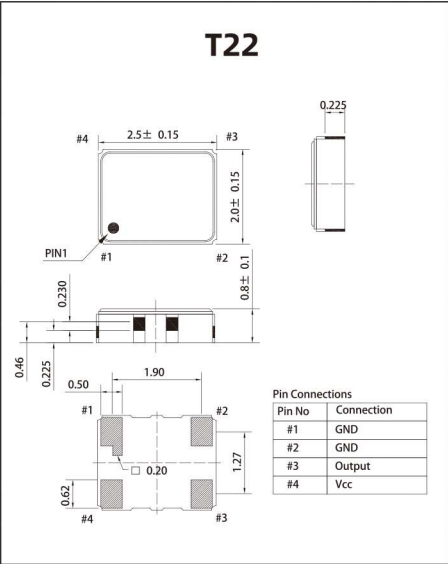
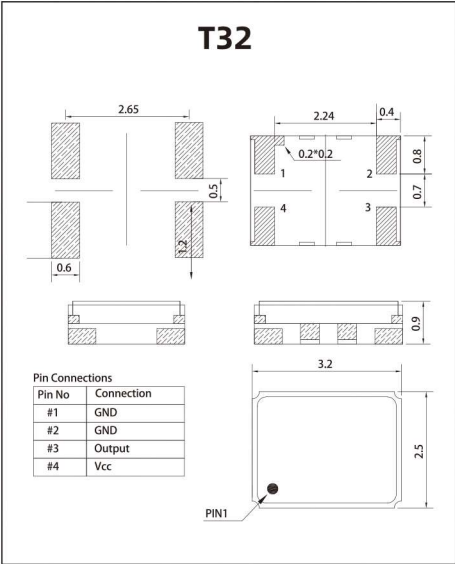
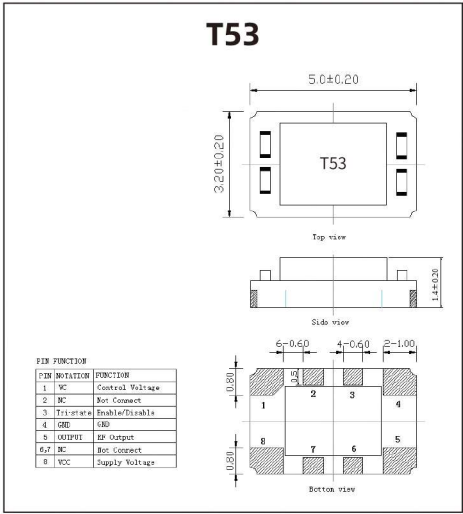
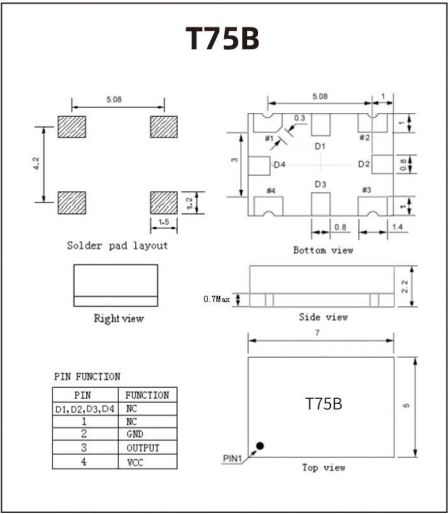
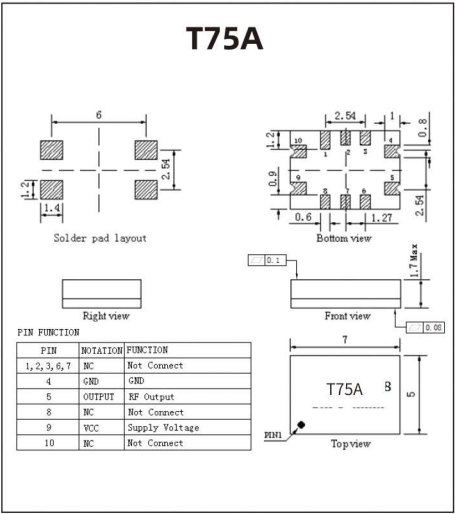
## High stability, Ultra-wide operating temperature range, Low phase noise Series

| Model | Temp Stability (ppm) | Operating Temp (°C)     | Aging                      | Phase Noise (dBc/Hz@1K) | Dimension (mm)     | Recommended Frequency (MHz)                                                        |
|-------|----------------------|-------------------------|----------------------------|-------------------------|--------------------|------------------------------------------------------------------------------------|
| T75A  | ±0.05                | -55 ~ +85<br>-40 ~ +105 | ±10ppb/day<br>±0.5ppm/year | -145                    | SMD<br>7.0*5.0*1.7 | 9.6/10/12.8/13/15.36/<br>16.384/19.20/20/25/<br>26/30.72/32.768/<br>38.88/40/50/80 |
| T75B  | ±0.05                | -55 ~ +85<br>-40 ~ +105 | ±10ppb/day<br>±0.5ppm/year | -145                    | SMD<br>7.0*5.0*2.2 |                                                                                    |
| T53   | ±0.05                | -55 ~ +85<br>-40 ~ +105 | ±10ppb/day<br>±0.5ppm/year | -145                    | SMD<br>5.0*3.2*1.4 |                                                                                    |

## Small size package, Ultra-low power consumption Series

| Model | Temp Stability (ppm) | Operating Temp (°C) | Aging                    | Phase Noise (dBc/Hz@1K) | Dimension (mm)     | Recommended Frequency (MHz)                                                        |
|-------|----------------------|---------------------|--------------------------|-------------------------|--------------------|------------------------------------------------------------------------------------|
| T32   | ±0.28                | -40 ~ +85           | ±20ppb/day<br>±1ppm/year | -140                    | SMD<br>3.2*2.5*0.9 | 9.6/10/12.8/13/15.36/<br>16.384/19.20/20/25/<br>26/30.72/32.768/<br>38.88/40/50/80 |
| T22   | ±0.28                | -40 ~ +85           | ±20ppb/day<br>±1ppm/year | -140                    | SMD<br>2.5*2.0*0.8 |                                                                                    |
| T21   | ±0.28                | -40 ~ +105          | ±20ppb/day<br>±1ppm/year | -140                    | SMD<br>2.0*1.6*0.7 |                                                                                    |
| T11   | ±0.28                | -40 ~ +85           | ±20ppb/day<br>±1ppm/year | -140                    | SMD<br>1.6*1.2*0.5 |                                                                                    |

External dimensions (unit: mm)





# OCXO

OCXO is a crystal oscillator that maintains a constant temperature for the quartz crystal resonator by using a thermostat over, which minimizes the frequency variations caused by changes in ambient temperature.



## Key Features

Ultra-high stability, Wide temperature range, Low phase noise, Low power consumption.

## Application

Wired and Wireless Communication

Industrial Control

Base Station

Instruments

Power Grid Network

## Ultra-high Stability Series

| Model | Temp Stability (ppb) | Aging                         | Phase Noise (dBc/Hz@1K) | Operating Temp (°C)    | Dimension (mm)      | Recommended Frequency (MHz) |
|-------|----------------------|-------------------------------|-------------------------|------------------------|---------------------|-----------------------------|
| O55A  | ±0.01                | ±0.02ppb/day<br>±0.01ppm/year | -150                    | -40 ~ +85<br>-40 ~ +95 | DIP<br>50.8*50.8*19 | 10                          |
| O23B  | ±0.1                 | ±0.1ppb/day<br>±0.02ppm/year  | -158                    | -40 ~ +85<br>-40 ~ +95 | DIP<br>36*27*12.7   | 10                          |
| O22S  | ±0.5                 | ±0.2ppb/day<br>±0.02ppm/year  | -158                    | -40 ~ +85<br>-40 ~ +95 | SMD<br>25*22*12     | 5/10/20                     |

## Wide temperature range, Low phase noise, Low power consumption, Small size Series

| Model  | Temp Stability (ppb) | Aging                     | Phase Noise (dBc/Hz@1K) | Operating Temp (°C)     | Dimension (mm)      | Recommended Frequency (MHz)           |
|--------|----------------------|---------------------------|-------------------------|-------------------------|---------------------|---------------------------------------|
| O11H/F | ±0.3/±5.0            | ±1ppb/day<br>±0.5ppm/year | -160                    | -55 ~ +85<br>-55 ~ +105 | SMD<br>14.4*9.5*6.5 | 10/12.8/19.2/20/25/<br>30.72/38.88/48 |
| O79A   | ±3.0/±10             | ±1ppb/day<br>±0.1ppm/year | -160                    | -55 ~ +85<br>-55 ~ +105 | SMD<br>9.7*7.5*3.9  |                                       |
| O75A   | ±5/±10               | ±2ppb/day<br>±0.3ppm/year | -160                    | -55 ~ +85<br>-55 ~ +105 | SMD<br>7.5*5.5*3.3  |                                       |

## Ultra-low Power Consumption Series

| Model | Temp Stability (ppb) | Aging                      | Phase Noise dBc/Hz @10Hz | Phase Noise dBc/Hz @100Hz | Phase Noise dBc/Hz @1KHz | Phase Noise dBc/Hz @10KHz | Steady Power Consumption (mA) | Operating Temp (°C) | Dimension (mm)       | Recommended Frequency (MHz)        |
|-------|----------------------|----------------------------|--------------------------|---------------------------|--------------------------|---------------------------|-------------------------------|---------------------|----------------------|------------------------------------|
| O21L  | ±0.5<br>±1<br>±3     | ±0.5ppb/day<br>±50ppb/year | -117                     | -135                      | -150                     | -147                      | 30                            | -10 ~ +45           | DIP<br>20.4*12.7*6.0 | 8.192<br>10.00<br>16.384<br>100.00 |

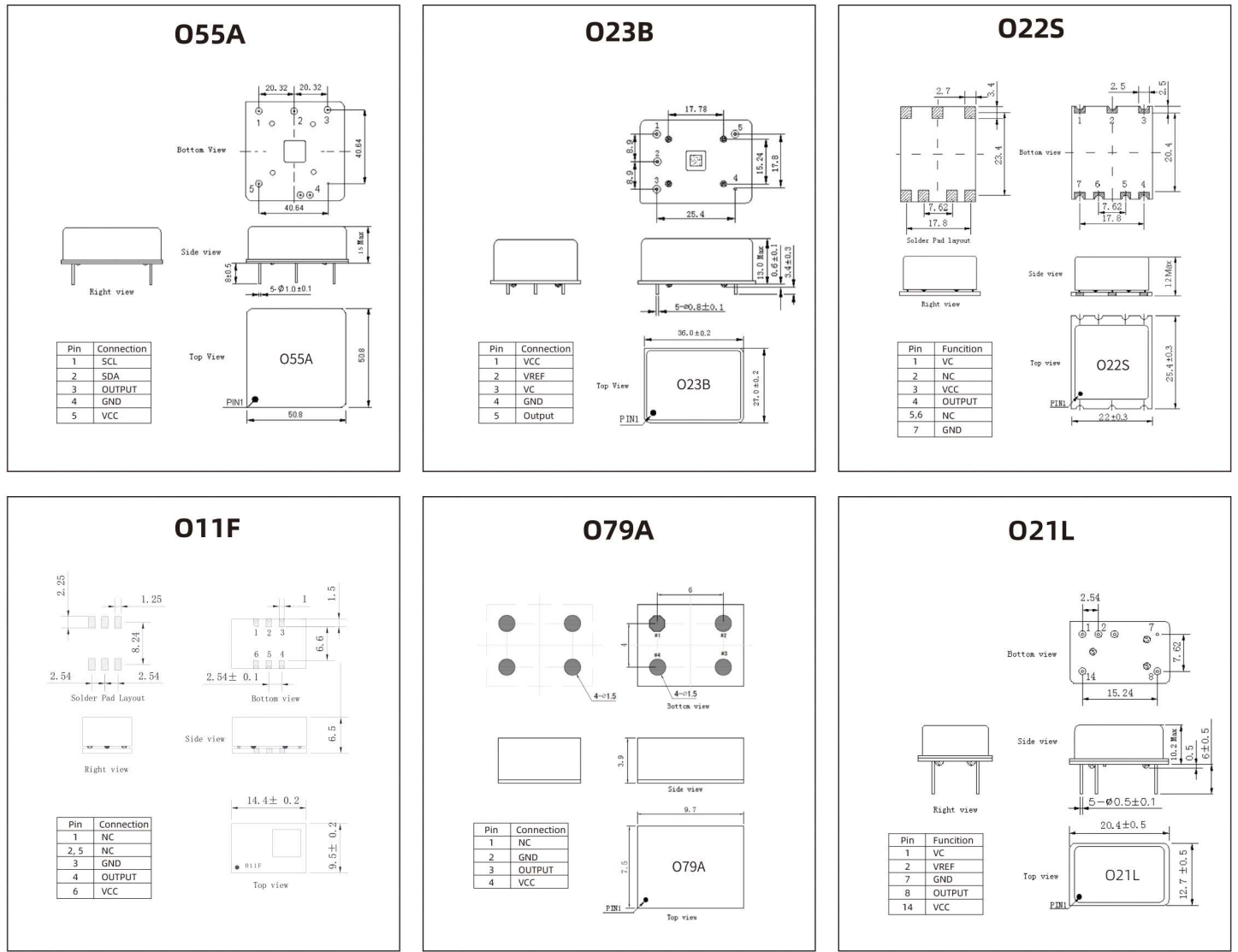
Ultra-low Phase Noise Series

| Model | Standard Frequency (MHz) | Temp Stability (ppb) | Aging                     | Phase Noise dBc/Hz @10Hz | Phase Noise dBc/Hz @100Hz | Phase Noise dBc/Hz @1KHz | Phase Noise dBc/Hz @10KHz | Phase Noise dBc/Hz @100KHz | Operating Temp (°C) | Dimension (mm)        |
|-------|--------------------------|----------------------|---------------------------|--------------------------|---------------------------|--------------------------|---------------------------|----------------------------|---------------------|-----------------------|
| O22A  | 100M                     | ±10                  | ±1ppb/day<br>±0.1ppm/year | -110                     | -140                      | -165                     | -180                      | -185                       | -55 ~ +85           | DIP<br>20.2*20.2*10.0 |

Ultra-Low Short-Term Frequency Stability Series

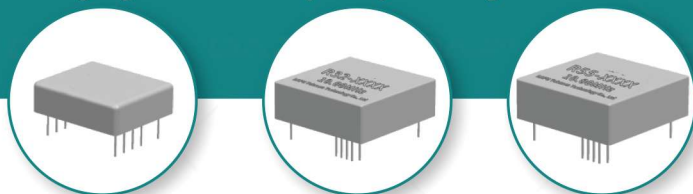
| Model        | Standard Frequency (MHz) | Temp Stability (ppb) | Aging                        | Phase Noise dBc/Hz @1Hz | Phase Noise dBc/Hz @10Hz | Phase Noise dBc/Hz @100KHz | Phase Noise dBc/Hz @1KHz | Short-term Stability (E-13/s) | Operating Temp (°C) | Dimension (mm)       |
|--------------|--------------------------|----------------------|------------------------------|-------------------------|--------------------------|----------------------------|--------------------------|-------------------------------|---------------------|----------------------|
| O23B<br>O23S | 10M                      | ±0.5                 | ±0.1ppb/day<br>±0.01ppm/year | -120                    | -147                     | -160                       | -167                     | 2                             | -40 ~+75            | 36*27*12<br>41*30*16 |

External dimensions (unit: mm)



# Atomic Clock

Atomic Clock is a highly integrated and miniaturized atom clock module product. CPT-based oscillator features a laser to interrogate the Rb atoms and achieves atomic resonance. It has the characteristics of fast etrace, exceptional temperature stability, lower long term aging and low frequency drifting rates.



## Key Features

Output Frequency 10MHz, Low phase noise, high precision atomic clock, Excellent short-term stability, Ultra-tight frequency tolerance

## Application

Satellite timing and frequency control  
LTE base station

Smart grid  
Underwater sensing systems

Test and measurement  
Data center timing card

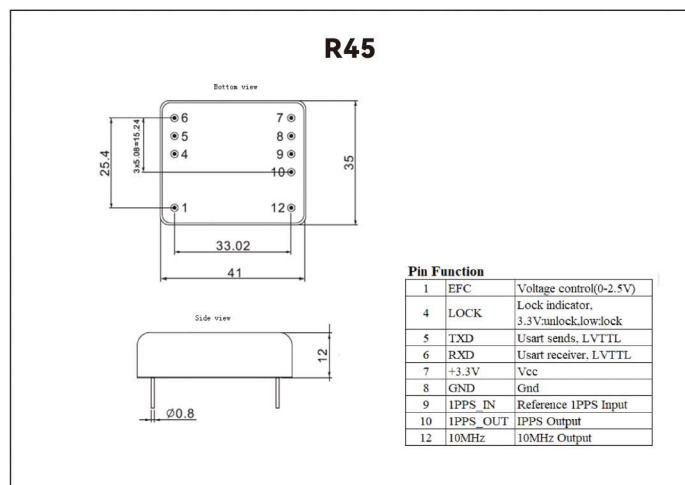
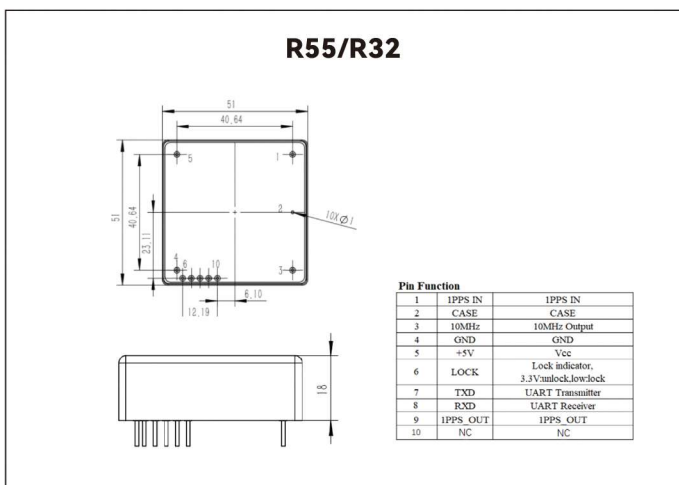
## Miniature Atomic Clock

| Model | Operating Temp (°C) | Frequency Accuracy (at shipment) | Short-term Stability | Phase Noise       | Aging (/day) | Steady @25°C | Holdover (μs@24h) | Warm up time @25°C | Dimension (mm) | Compatible           |
|-------|---------------------|----------------------------------|----------------------|-------------------|--------------|--------------|-------------------|--------------------|----------------|----------------------|
| R55   | -40~ +80            | ±5E-11                           | ≤5E-11/1s            | ≤-140dBc/Hz @1kHz | ≤5E-12       | ≤3W@12V      | ≤1us              | ≤ 10 min.          | 50.8*50.8*17.8 | MAC-SA55 (Microchip) |
| R32   | -20~ +60            | ±1E-10                           | ≤5E-11/1s            | ≤-135dBc/Hz @1kHz | ≤5E-12       | ≤6W          | ≤5us              | ≤ 8 min.           | 50.8*50.8*17.8 | N/A                  |

## Chip-Scale Atomic Clock

| Model | Operating Temp (°C) | Frequency Accuracy (at shipment) | Short-term Stability | Phase Noise       | Aging (/day) | Steady @25°C | Holdover (μs@24h) | Warm up time @25°C | Dimension (mm) | Compatible         |
|-------|---------------------|----------------------------------|----------------------|-------------------|--------------|--------------|-------------------|--------------------|----------------|--------------------|
| R45   | -10~ +70            | ±5E-11                           | ≤3E-10/1s            | ≤-125dBc/Hz @1kHz | ≤3E-11       | ≤130mW       | ≤5                | ≤ 4 min.           | 41*35*12       | SA.455 (Microchip) |
|       | -40~ +70            | ±5E-11                           | ≤1E-10/1s            | ≤-140dBc/Hz @1kHz | ≤1E-11       | ≤1.8W        | ≤3                | ≤ 5 min.           | 41*35*12       | SA.45S (Microchip) |

## External dimensions (unit: mm)





# Clock Module

The CMXX series is a highly integrated clock module product that integrates clock and compensation algorithms. It refer to an external clock source to discipline the local clock, enabling rapid frequency and phase synchronization calibrating. It will enter a hold mode when the reference source loses.



## Key Features

High synchronization accuracy, High holdover ability, High temperature stability, High frequency accuracy, High short-term, Stability performance.

## Application

Wired and Wireless Communication

Industrial Control

Power Grid Network

Instruments etc.

## Built-in TCXO, Ultra-wide Operating Temperature Series

| Model | Sync Accuracy (ns) | Holdover                                             | Temp Stability (ppb) | Phase Noise (dBc/Hz@1K) | Operating Temp (°C) | Dimension (mm) |
|-------|--------------------|------------------------------------------------------|----------------------|-------------------------|---------------------|----------------|
| CM11T | ±50                | ±5us/1hour<br>( $\Delta T = \pm 2^{\circ}\text{C}$ ) | ±50                  | -138                    | -40 ~ +105          | 10.0*10.0*2.2  |

## Built-in OCXO, Ultra-high accuracy Series

| Model | Sync Accuracy (ns) | Holdover                                                  | Temp Stability (ppb) | Phase Noise (dBc/Hz@1K) | Operating Temp (°C) | Dimension (mm) |
|-------|--------------------|-----------------------------------------------------------|----------------------|-------------------------|---------------------|----------------|
| CM55  | ±20                | ±1.5us/24hours<br>( $\Delta T = \pm 15^{\circ}\text{C}$ ) | ±0.1                 | -155                    | -40 ~ +85           | 51.0*51.0*13.0 |
| CM22  | ±20                | ±1.5us/8hours<br>( $\Delta T = \pm 10^{\circ}\text{C}$ )  | ±0.3                 | -155                    | -40 ~ +85           | 20.2*20.2*9.0  |
| CM11H | ±50                | ±80us/24hours<br>( $\Delta T = \pm 40^{\circ}\text{C}$ )  | ±0.5                 | -160                    | -40 ~ +85           | 15.4*10.6*7.0  |

## Ultra-Low Power Consumption Series

| Model | Stable Power Consumption | Holdover                       | Temp Stability (ppb) | Phase Noise (dBc/Hz@1K) | Operating Temp (°C) | Dimension (mm) |
|-------|--------------------------|--------------------------------|----------------------|-------------------------|---------------------|----------------|
| CM22  | <100                     | ±1.5ms/150days<br>±1ms/90days  | ±0.5                 | -148                    | -10 ~ +45           | 20.2*20.2*9.0  |
| CM43  | <100                     | ±0.5ms/60days<br>±0.3ms/30days | ±0.5                 | -148                    | -10 ~ +45           | 40.6*35.3*14.0 |

## Integrated TCXO, High-Frequency & Low-Noise

| Model | Sync Accuracy (ns) | Frequency (MHz) | Temp Stability (ppb) | Phase Noise (dBc/Hz@1K) | Operating Temp (°C) | Dimension (mm) |
|-------|--------------------|-----------------|----------------------|-------------------------|---------------------|----------------|
| CM30  | 1E-11              | 100             | ±50                  | -160                    | -40 ~ +85           | 30.0*25.0*12.4 |

## Built-in OCXO, Ultra-high accuracy Series

| Model | Sync Accuracy (ns) | Interface   | Input Reference           | Frequency Output    | Dimension (mm) |
|-------|--------------------|-------------|---------------------------|---------------------|----------------|
| CM35P | ±50                | 2-way SGMII | 3-way seamless switchover | 4-way any frequency | 40.0*35.0*13.0 |

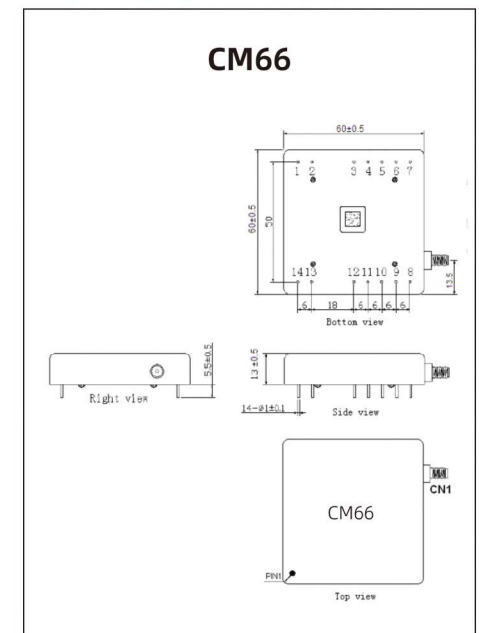
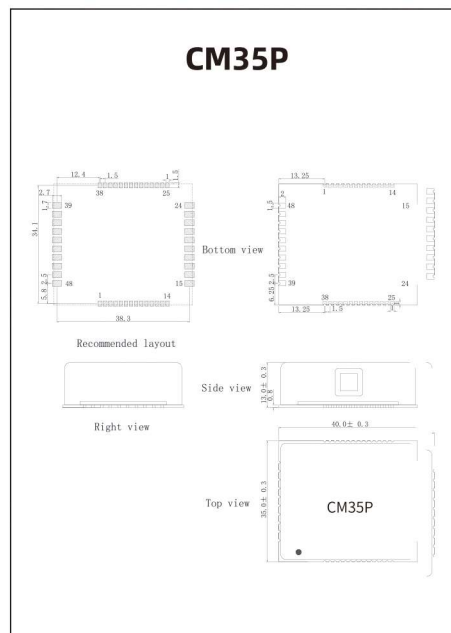
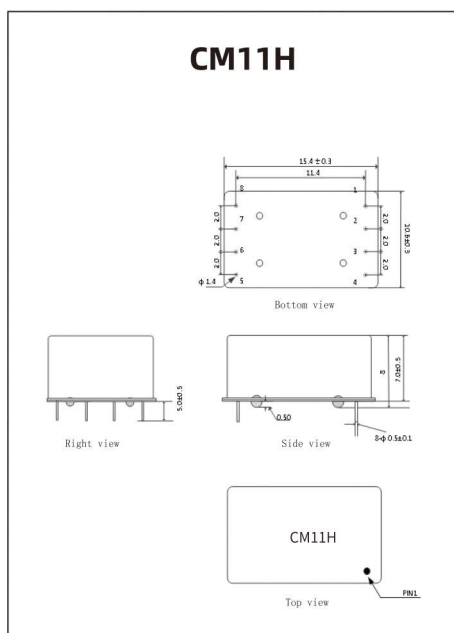
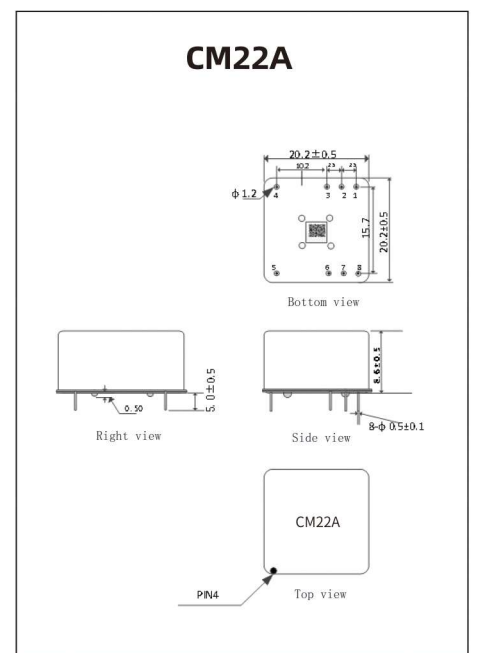
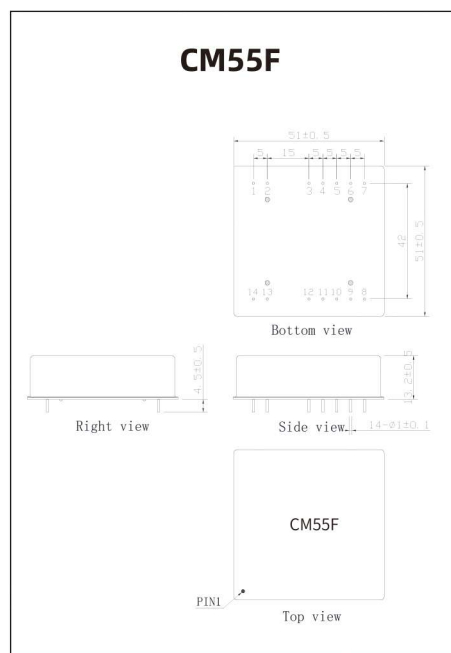
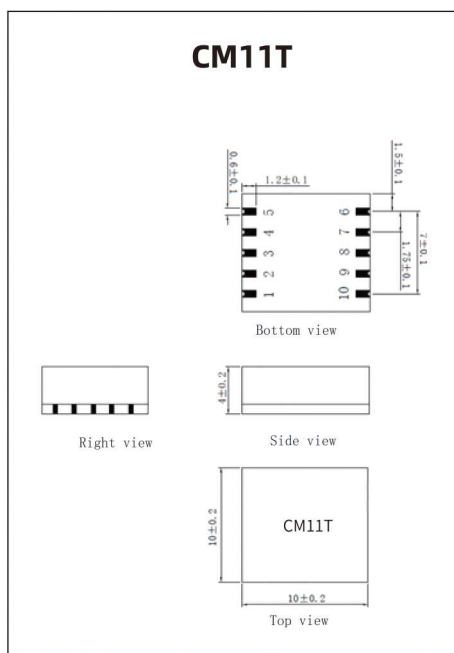
- Support NTP Server and Client configuration
- Meet IEEE1588v2 standard

- Support PTP GM, Slave, BC configuration
- Support SyncE+ PTP

## Integrated Receiver Series

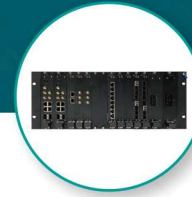
| Model | Sync Accuracy (ns) | Holdover                                               | Temp Stability (ppb) | Phase Noise (dBc/Hz@1K) | Operating Temp (°C) | Dimension (mm) |
|-------|--------------------|--------------------------------------------------------|----------------------|-------------------------|---------------------|----------------|
| CM66  | <50                | ±5us/24hours<br>( $\Delta T = \pm 5^{\circ}\text{C}$ ) | ±0.2                 | -155                    | -40 ~ +85           | 60.0*60.0*13.0 |

## External dimensions (unit: mm)



# Timing Server

DP series timing servers provide high-precision time synchronization in multiple modes, allowing for fast tracking and locking, ensuring industry-leading capabilities. These products are suitable for various applications such as indoor, outdoor, master clock, slave clock, and boundary clock scenarios.



## Application

**Communication network:** Base station, Carrier network equipment.

**Transportation sector:** Subway, High-speed rail, Light rail and other private network communications.

**Power industry:** Operation scheduling, Fault localization, Power transmission, etc.

**Others:** Taxation, Banking, Healthcare, Securities, Postal services, Airport, Meteorology, Autonomous driving, AR/VR, Industrial automation.

## Outdoor

| Model   | Operating Temp (°C) | Power Consumption (W) | IEEE1588v2 & SyncE | GNSS (GPS/BDS/GLONASS/GALILEO) | Frequency Accuracy (@24h)      | Sync Accuracy (ns) | Holdover (μs@24h) | Slave Clock Support (pcs) | Dimension (mm) |
|---------|---------------------|-----------------------|--------------------|--------------------------------|--------------------------------|--------------------|-------------------|---------------------------|----------------|
| DPM1000 | -40 ~ +65           | 30                    | Support            | Support                        | ±1.0E-12 (Tracking satellites) | ±50                | ±1.5              | 128                       | 250*190*75     |

## Miniaturization

| Model  | Operating Temp (°C) | Power Consumption (W) | IEEE1588v2 & SyncE | GNSS (GPS/BDS/GLONASS/GALILEO) | Frequency Accuracy (@24h)      | Sync Accuracy (ns) | Holdover (μs@24h) | Slave Clock Support (pcs) | Dimension (mm) |
|--------|---------------------|-----------------------|--------------------|--------------------------------|--------------------------------|--------------------|-------------------|---------------------------|----------------|
| DP4000 | -20 ~ +65           | 20                    | Support            | Support                        | ±1.0E-12 (Tracking satellites) | ±20                | ±1.5              | 128                       | 432*205*44     |
| DP3100 | -20 ~ +65           | 9                     | Support            | Support                        | ±1.0E-12 (Tracking satellites) | ±50                | ±1.5              | 128                       | 432*146*44     |
| DP2000 | -20 ~ +65           | 7                     | Not Support        | Support                        | ±1.0E-12 (Tracking satellites) | ±50                | ±1.5              | Not Support               | 438*220*44     |

## Primary Node Clock

| Model  | Operating Temp (°C) | Power Consumption (W) | IEEE1588v2 & SyncE | GNSS (GPS/BDS/GLONASS/GALILEO) | Frequency Accuracy (@24h) | Sync Accuracy (ns) | Holdover (μs@24h) | Slave Clock Support (pcs) | Dimension (mm) |
|--------|---------------------|-----------------------|--------------------|--------------------------------|---------------------------|--------------------|-------------------|---------------------------|----------------|
| DP6400 | -20 ~ +65           | 80                    | Support            | Support                        | ±5.0E-12                  | ±20                | 500ns             | 512                       | 437*232 *180   |

## Clock Board

| Operating Temp (°C) | IEEE1588v2 & SyncE | GNSS (GPS/BDS/GLONASS/GALILEO) | Frequency Accuracy (@24h)      | Sync Accuracy (ns) | Holdover (μs@24h) | Interface  | Dimension (mm) |
|---------------------|--------------------|--------------------------------|--------------------------------|--------------------|-------------------|------------|----------------|
| -40 ~ +65           | Support            | Support                        | ±1.0E-12 (Tracking satellites) | ±20                | ±1.5              | Customized | Customized     |



## Outdoor Timing Server

DPM1000 is a robust and durable outdoor master clock device, which meets IP65 protection level. It can provide accurate frequency, phase and time synchronization solutions for packet networks.



### Key Features

- Support GNSS: GPS/Beidou/GLONASS/Galileo/QZSS
- Support IEEE1588v2, NTP, SyncE
- Meet PRTC-B standard
- Frequency Accuracy:  $\pm 1.0E-12$  (Tracking satellites)
- Phase Accuracy:  $\pm 20\text{ns}$  (Tracking satellites)
- Holdover Ability:  $1.5\mu\text{s}/24\text{ hours}$  ( $\Delta T = \pm 10^\circ\text{C}$ )  
 $1.1\mu\text{s}/24\text{ hours}$  ( $25^\circ\text{C} \pm 1^\circ\text{C}$ )
- Support up to 128 slave clocks in unicast mode
- 2 PTP optical ports
- Operating Temperature:  $-40^\circ\text{C} \sim 65^\circ\text{C}$
- Operating Voltage:  $100 \sim 240\text{V AC}$
- Power Consumption (Typical): 30W
- Protection Class: IP65

## Indoor Timing Server

Indoor timing devices, which include master clock and frequency source, etc., can provide high-precision frequency and time references for applications such as telecommunications network and power grid.



### Key Features

- Support GNSS: GPS/Beidou/GLONASS/Galileo
- Support multiple reference sources, including IEEE1588v2, 1PPS, and frequency input
- Full protocol support for IEEE1588v2, NTP, and SyncE
- Compliant with PRTC-B standard
- Frequency accuracy:  $\pm 1.0E-12$  (tracking satellites)
- Support 128/256 slave clocks.
- Phase accuracy:  $\pm 20\text{ns}/\pm 50\text{ns}$  (tracking satellites)
- Holdover capability:  $\pm 1.5\mu\text{s}/24\text{ hours}$  ( $\Delta T = \pm 10^\circ\text{C}$ )
- Multiple and customizable interface
- Operating temperature:  $-20^\circ\text{C} \sim 65^\circ\text{C}$

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- Holdover capability:  $\pm 1.5\mu\text{s}/24\text{ hours}$  ( $\Delta T = \pm 10^\circ\text{C}$ )
- Multiple and customizable interface
- Operating temperature:  $-20^\circ\text{C} \sim 65^\circ\text{C}$

## Clock Board

The clock board utilizes the ACS952X series PTP/NTP single-chip solution developed by Dapu with independent intellectual property rights. It can be combined with the CMXX series clock module as needed to achieve a high-performance PTP/NTP time synchronization solution, meeting the diverse requirements of customers.

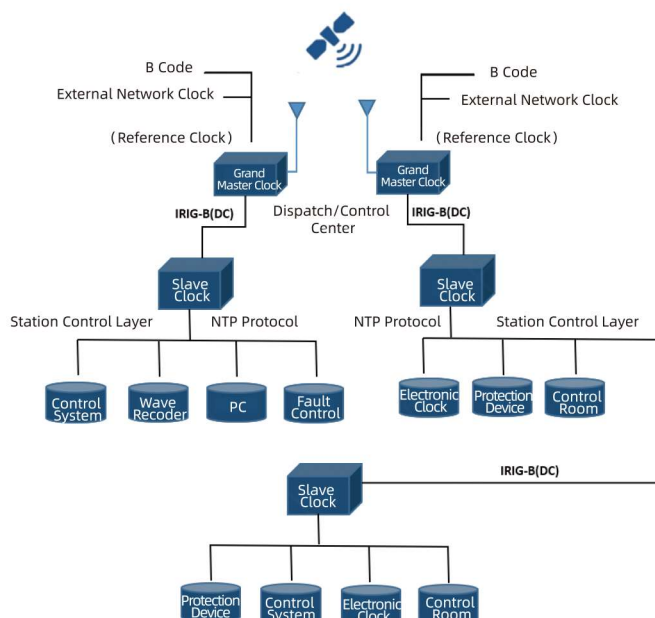


## Key Features

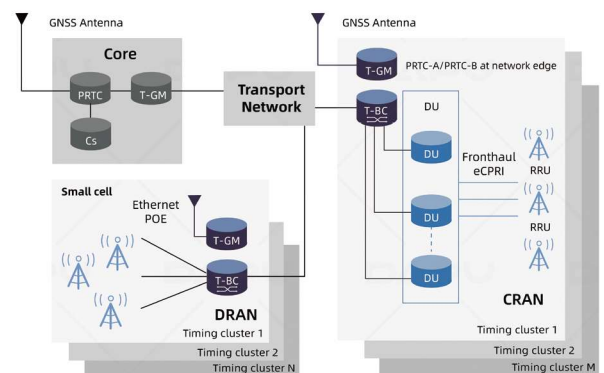
- Support IEEE1588v2, 1PPS, Frequency Input and other reference sources.
- Full IEEE1588v2 protocol support
- Support PTP Master, Slave, BC
- Support NTP Server, Client function
- Support 1PPS+TOD
- Support SyncE
- Support customization

## Solutions Examples

### Time synchronization solution for smart grid

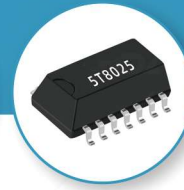


### Time synchronization solution for 5G distributed cluster



# Real Time Clock (RTC)

RTC is an integrated IC that provides accurate time for electronic products or provides accurate time reference for electronic systems.



## Key Features

Built in 32.768KHz crystal, Accuracy up to  $\pm 2\text{ppm}$ , Multiple functions of I<sup>2</sup>C bus interface, Calendar function (year, month, week, day, hour, minute, second, 1/16 second), Leap years autocorrection, Backup battery, Power auto switchover, Timer, Frequency output, Wake-up interrupt.

## Application

**Security monitoring/Security:** IPC, DVR, NVR, Smart lock, Access control system, etc.

**Consumer Electronics:** Notebook, Pad, PC, etc.

**Communication network:** Private network, Base station, Switch/PBX, etc.

**Automotive electronics:** T-BOX, Commercial vehicle IPC, Taxi meter, Driving recorder, Vehicle instrument, etc.

**Metering:** Electric meter, Water meter, Gas meter, etc.

**Smart home:** HEMS home energy management system, Smart thermostat, Sweeper, Water heater, Smart socket, etc.

**Industrial automation:** Robotic arm, PLC motor servo, Human-machine interface/HMI, Servo controller, etc.

**Medical/Office appliance/Testing and measurement:** Oximeter, Medical monitor, Endoscope, Attendance machine, Multifunction printer (MFP), etc.

## RTC for Automotive

| MPN       | Crystal, Temp Compensation             | Interface        | Accuracy                                                                                                                 | Power consumption ( $\mu\text{A}$ ) | Package | Backup Power Support |
|-----------|----------------------------------------|------------------|--------------------------------------------------------------------------------------------------------------------------|-------------------------------------|---------|----------------------|
| INS5A8900 | Built-in crystal and Temp compensation | I <sup>2</sup> C | $\pm 3.4\text{ppm}@-40^{\circ}\text{C} \sim +85^{\circ}\text{C}$<br>Ext. $+85^{\circ}\text{C} \sim +105^{\circ}\text{C}$ | 0.55                                | SMD3225 | Yes                  |
| INS5A8804 | Built-in crystal and Temp compensation | I <sup>2</sup> C | $\pm 5.0\text{ppm}@-40^{\circ}\text{C} \sim +85^{\circ}\text{C}$<br>Ext. $+85^{\circ}\text{C} \sim +105^{\circ}\text{C}$ | 0.55                                | SMD3225 | NO                   |
| INS5A8000 | Built-in crystal and Temp compensation | I <sup>2</sup> C | $\pm 3.4\text{ppm}@-40^{\circ}\text{C} \sim +85^{\circ}\text{C}$<br>Ext. $+85^{\circ}\text{C} \sim +125^{\circ}\text{C}$ | 0.43                                | SMD3225 | NO                   |
| INS5A4000 | Built-in crystal and Temp compensation | SPI              | $\pm 3.4\text{ppm}@-40^{\circ}\text{C} \sim +85^{\circ}\text{C}$<br>Ext. $+85^{\circ}\text{C} \sim +125^{\circ}\text{C}$ | 0.43                                | SMD3225 | NO                   |

## Ultra-high Accuracy

| MPN         | Crystal, Temp Compensation             | Interface             | Accuracy                                                                                                                                  | Power consumption ( $\mu\text{A}$ ) | Package | Backup Power Support |
|-------------|----------------------------------------|-----------------------|-------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|---------|----------------------|
| INS5T8900   | Built-in crystal and Temp compensation | I <sup>2</sup> C      | $\pm 3.4\text{ppm}@-40^{\circ}\text{C} \sim +85^{\circ}\text{C}$                                                                          | 0.55                                | SMD3225 | Yes                  |
| INS5699S    | Built-in crystal and Temp compensation | I <sup>2</sup> C      | $\pm 5\text{ppm}@-40^{\circ}\text{C} \sim +85^{\circ}\text{C}$                                                                            | 1.0                                 | SMD3225 | Yes                  |
| INS5T8025   | Built-in crystal and Temp compensation | I <sup>2</sup> C      | $\pm 3.4\text{ppm}@-40^{\circ}\text{C} \sim +85^{\circ}\text{C}$<br>Ext. $\pm 10\text{ppm}@+85^{\circ}\text{C} \sim +105^{\circ}\text{C}$ | 1.0                                 | SOP14   | NO                   |
| INS5T85053A | Built-in crystal and Temp compensation | Dual I <sup>2</sup> C | $\pm 5.0\text{ppm}@-40^{\circ}\text{C} \sim +85^{\circ}\text{C}$<br>Ext. $+85^{\circ}\text{C} \sim +105^{\circ}\text{C}$                  | 0.6                                 | DFN12   | Yes                  |



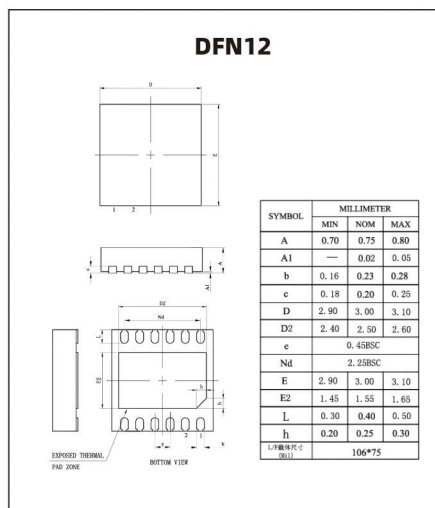
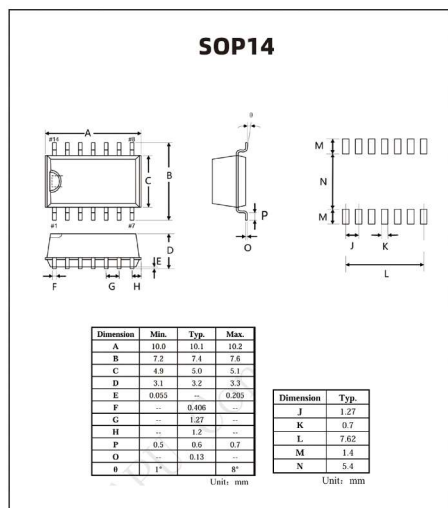
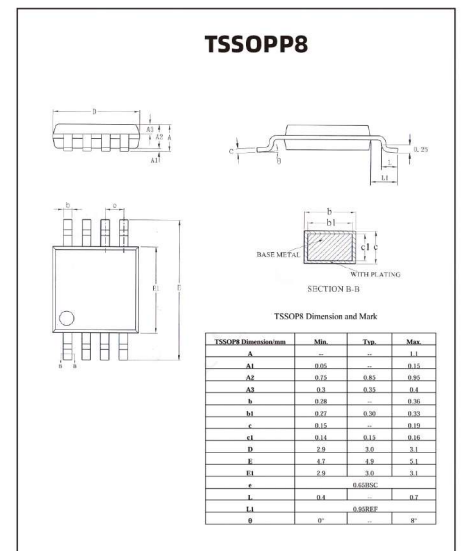
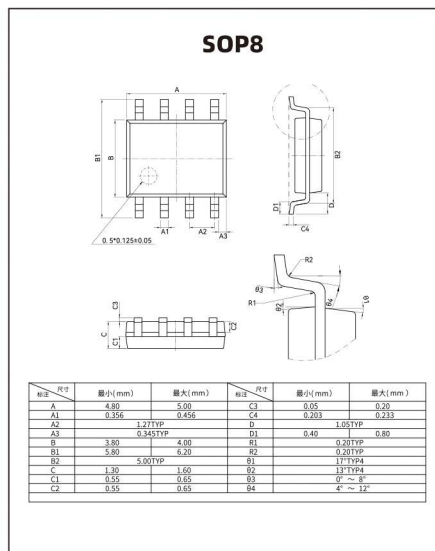
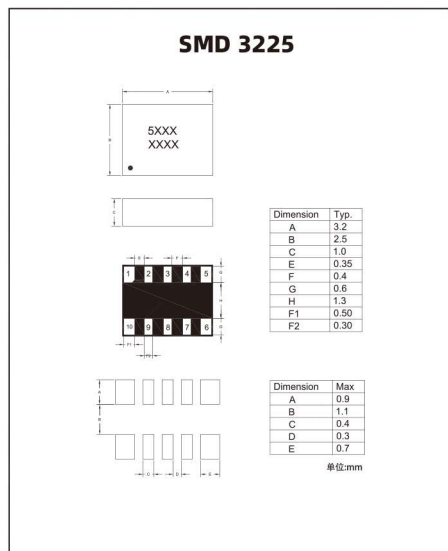
## High Accuracy

| MPN       | Crystal, Temp Compensation             | Interface Type   | Accuracy                                    | Power consumption (μA) | Package | Backup Power Support |
|-----------|----------------------------------------|------------------|---------------------------------------------|------------------------|---------|----------------------|
| INS55710C | Build-in crystal and Temp compensation | I <sup>2</sup> C | ±20ppm@-20°C ~ +70°C<br>Temp. -40°C ~ +85°C | 1.0                    | SOP8    | NO                   |
| INS5T8130 | Build-in crystal                       | I <sup>2</sup> C | 5±23ppm (25°C)<br>Temp. -40°C ~ +85°C       | 0.9                    | SMD3225 | Yes                  |
| INS5T8111 | Build-in crystal                       | I <sup>2</sup> C | ±11.5ppm (25°C)<br>Temp. -40°C ~ +85°C      | 0.25                   | SMD3225 | Yes                  |
| INS5T4111 | Build-in crystal                       | SPI              | ±11.5ppm (25°C)<br>Temp. -40°C ~ +85°C      | 0.25                   | SMD3225 | Yes                  |

## Extetnal RTC

| MPN        | Crystal, Temp Compensation | Operating Temp (°C) | Power consumption (μA) | Package     | Backup Power Support |
|------------|----------------------------|---------------------|------------------------|-------------|----------------------|
| INS5T8563  | External Crystal           | No                  | -40 ~ +85              | SOP8/TSSOP8 | NO                   |
| INS5T85053 | External Crystal           | No                  | -40 ~ +85              | DFN12       | Yes                  |

## External dimensions (unit: mm)



# Clock Buffer

Clock Buffer is a device that buffers, fans out, distributes or multiplexes the input clock signal.



## Key Features

INS6XXX series Buffer has low additive jitter, low power consumption, and supports multiple clock fan-outs, multiple input clock level signals, and configurable I/O voltage.

## Application

**Communication equipment:** Switches, Routers, MSAN, DSLAM, PON, SONET, SDH, etc.

**Industrial Control:** High-speed data acquisition card, Servo motor, etc.

**Instrumentation:** Signal generator, etc.

## Single-ended Buffer

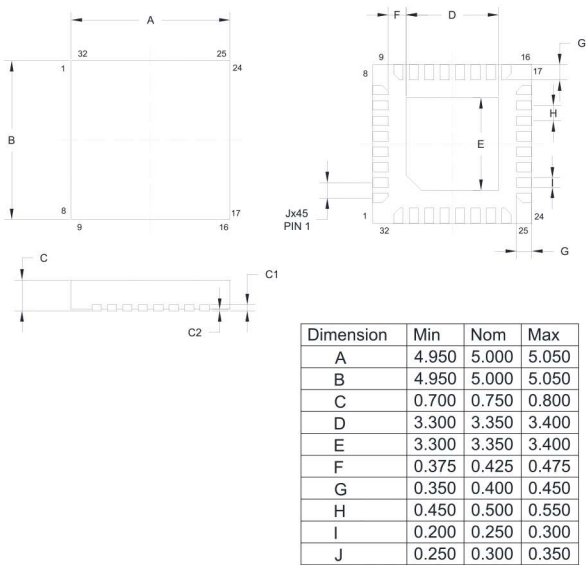
| Model   | Output Channel | Output level | Output IO Voltage (V) | Output Frequency (MHz) | Additional Jitter (fs) | Input Level                 | Supply Voltage |
|---------|----------------|--------------|-----------------------|------------------------|------------------------|-----------------------------|----------------|
| INS6110 | 10             | LVC MOS      | 1.5/1.8/2.5/3.3       | DC ~ 200               | <30                    | LVDS/LVPECL/LVC MOS/Crystal | 2.5/3.3        |
| INS6105 | 5              | LVC MOS      | 1.5/1.8/2.5/3.3       | DC ~ 200               | <30                    | LVDS/LVPECL/LVC MOS/Crystal | 2.5/3.3        |
| INS6104 | 4              | LVC MOS      | 2.5/3.3               | DC ~ 100               | <30                    | LVC MOS                     | 2.5/3.3        |
| INS6102 | 2              | LVC MOS      | 1.8                   | DC ~ 80                | <300                   | LVC MOS、Clipped Sine        | 2.5/3.3        |

## Differential Buffer

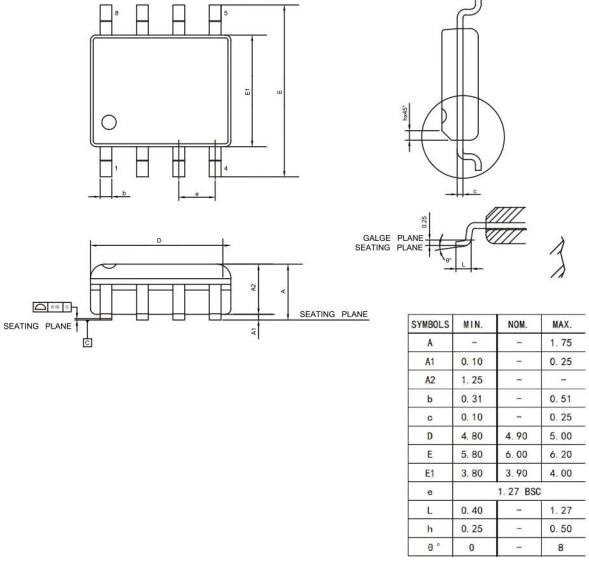
| Model   | Output Channel | Output level      | Output IO Voltage (V) | Output Frequency (MHz) | Additional Jitter (fs) | Input Level                 | Supply Voltage |
|---------|----------------|-------------------|-----------------------|------------------------|------------------------|-----------------------------|----------------|
| INS6310 | 10             | LVDS/HCSL /LVPECL | 2.5/3.3               | DC ~ 2500              | <80                    | LVDS/LVPECL/LVC MOS/Crystal | 2.5/3.3        |
| INS6320 | 20             | LVDS/HCSL /LVPECL | 2.5/3.3               | DC ~ 2500              | <80                    | LVDS/LVPECL/LVC MOS/Crystal | 2.5/3.3        |

External dimensions (unit: mm)

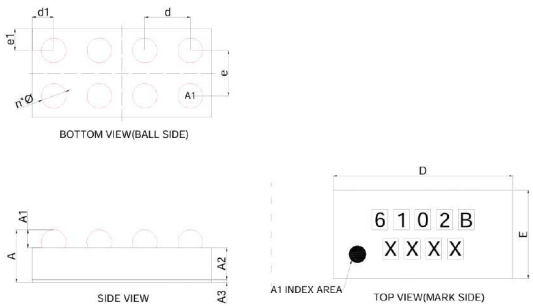
INS6110



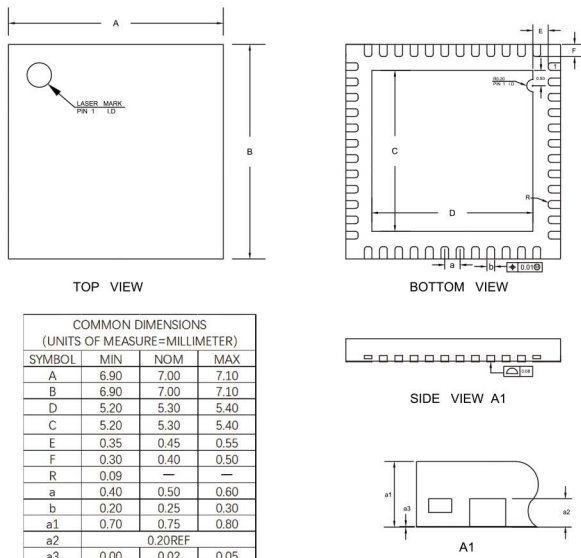
INS6104



INS6102B



INS6310





# Clock Generator

Clock generator is a device that produces clock signals.



## Key Features

High performance, low power consumption, supporting multiple output formats.

## Application

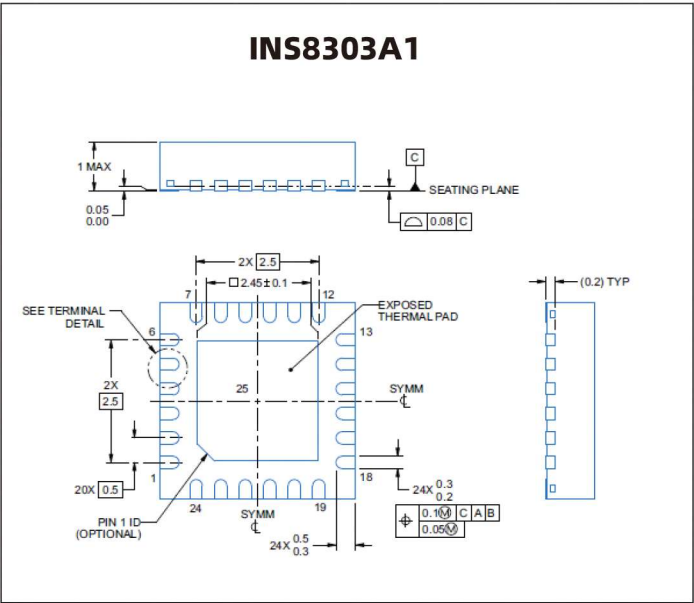
Communication equipment: 1G/10G Ethernet switches, network cards, supporting PCIE1/2/3/4, etc.

Industrial control: high-speed data acquisition cards, servo motors, etc.

Instruments: signal generators, etc.

| Model     | Dimension (mm) | Frequency Range (MHz) | Frequency Accuracy (ppm) | Output Channel | Output Waveform   | Jitter RMS (12 KHz ~20 MHz) | Operating Temp (°C)     |
|-----------|----------------|-----------------------|--------------------------|----------------|-------------------|-----------------------------|-------------------------|
| INS8303A1 | 4.0*4.0        | 50 ~ 220              | ±25/50                   | 3              | LVPECL/LVDS /HCSL | 150fs                       | -40 ~ +85<br>-40 ~ +105 |

## External dimensions (unit: mm)



# PLL

PLL is a feedback control circuit that uses an external input reference signal to control the frequency and phase output of the internal oscillating signal of the loop.



## Key Features

INS83XX series PLL chips have extremely low phase noise and jitter, programmable bandwidth, and dual PLL, and support random frequency input and output with clock accuracy better than 0.05ppm in hold mode.

## Application

Wireless base station, Microwave communications, etc.

Data converter clock

Transmission network

Medical devices, Video equipment

Instrumentation

## PLL

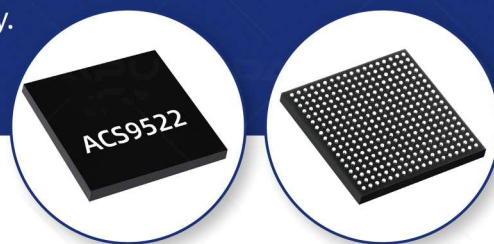
| Model   | Output Channel | Output level       | Output Frequency (MHz) | Additive Jitter (fs) | Input Channel | Input Level                | Supply Voltage (V) |
|---------|----------------|--------------------|------------------------|----------------------|---------------|----------------------------|--------------------|
| INS8320 | 14             | LVDS/LVPECL/LVCMOS | DC ~ 3000              | <125                 | 3             | LVDS/LVPECL/LVCMOS/Crystal | 2.5/3.3            |

## RFPLL

| Model   | Integrated VCO | Normalized Phase Noise (dBc/Hz) | Max Output Frequency (GHz) |
|---------|----------------|---------------------------------|----------------------------|
| INS85XX | YES            | -230                            | 10                         |

# IEEE1588

IEEE1588 is an accurate clock synchronization protocol standard for network measurement and control systems. It adopts the PTP protocol and has nanosecond accuracy.



## Key Features

Single-chip solution, Open SPI interface, Supports firmware upgrade, High system compatibility

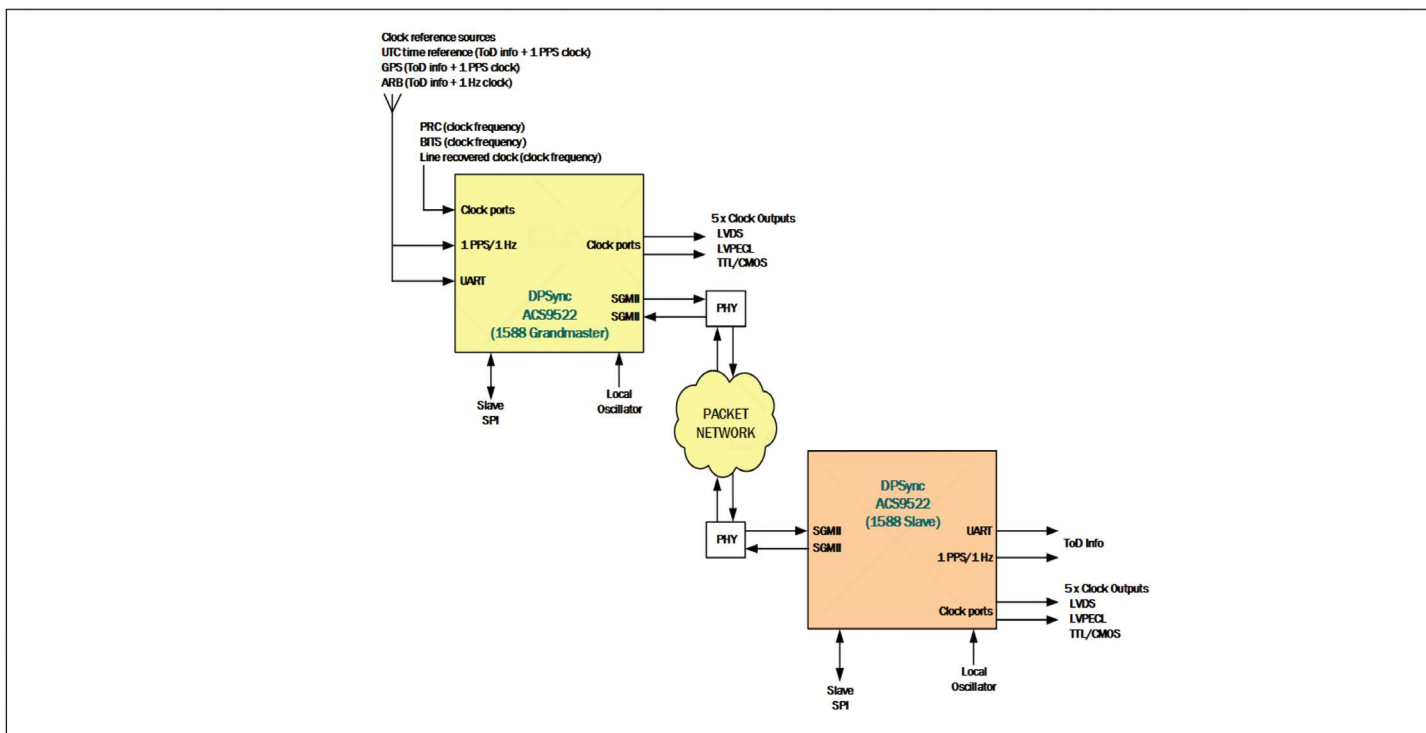
Supports multiple standard protocols: G.8261/ G.8262/ G.8265.1/ G.8275.1/ G.8273.2

## Application

Wired communication, Wireless communication, Electric power, Transportation private network, Instrumentation, etc.

| Model   | Package(mm)   | Characteristics                                                                | Operating Temp(°C) |
|---------|---------------|--------------------------------------------------------------------------------|--------------------|
| ACS9521 | BGA 324 19*19 | Support dual master and dual slave configurations, built-in RAM                | -40 ~ +85          |
| ACS9522 | BGA 324 19*19 | Support dual master and dual slave configurations, built-in RAM, built-in SETs | -40 ~ +85          |
| ACS9528 | BGA 324 19*19 | Support dual master configurations, built-in RAM                               | -40 ~ +85          |

## Functional block diagram





# All Silicon Oscillator

All Silicon Oscillator uses a pure silicon LC oscillating source. Through frequency synthesis and unique compensation technology, it generates single or differential output frequency signals without quartz and MEMS components, providing clock reference to the electronic circuit.



## Key Features

Full IC manufacturing process, Strong anti-shock capability, Flexible configuration of output frequency, Support various output formats.

## Application

Communication: Server, Computer, Storage, Switches, Router, High-speed optical module, Network interface card, etc.

Industry: Video broadcasting, Audio processors, Test equipment, etc.

## Differential/Single-ended Series

| Model                         | Dimension (mm)             | Frequency Range                                                  | Frequency Accuracy (ppm) | Operating Temp(°C) | Frequency Range                                       | Jitter RMS (12KHz ~20MHz) |
|-------------------------------|----------------------------|------------------------------------------------------------------|--------------------------|--------------------|-------------------------------------------------------|---------------------------|
| DSO3001<br>DSO3002<br>DSO3003 | 3.2*2.5*0.8<br>5.0*3.2*0.8 | Differential:<br>10KHz~350MHz<br>Single-ended:<br>10KHz~212.5MHz | ±50                      | -40 ~ +85          | LVDS, LVPECL,<br>HCSL, CML,<br>LVCMOS or<br>dual CMOS | 350fs                     |

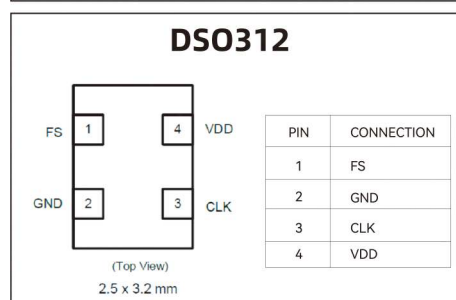
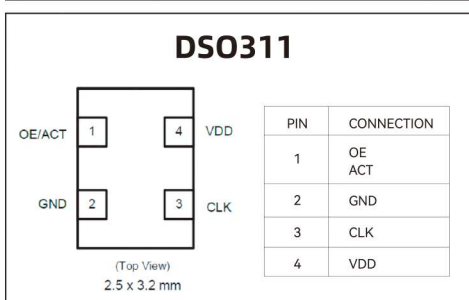
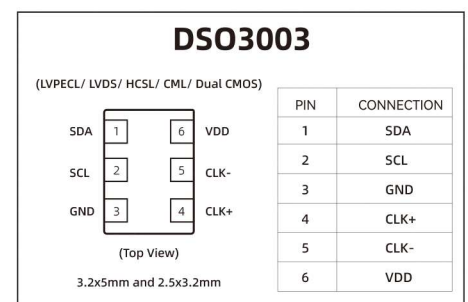
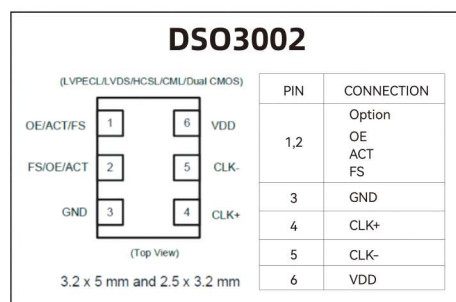
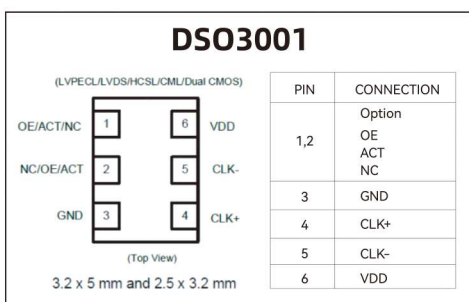
- DSO3001 Customized configurations are available before delivery
- DSO3002 Multiple configurations are available by switching pins after delivery
- DSO3003 Free configuration is available via I<sup>2</sup>C after delivery

## Single output series

| Model            | Dimension (mm) | Frequency Range               | Frequency Accuracy (ppm) | Operating Temp(°C) | Frequency Range | Jitter RMS (12KHz ~20MHz) |
|------------------|----------------|-------------------------------|--------------------------|--------------------|-----------------|---------------------------|
| DSO311<br>DSO312 | 3.2*2.5*0.8    | Single-ended:<br>10KHz~212.5M | ±50                      | -40 ~ +85          | CMOS            | 350fs                     |

- DSO311 Customized configurations are available before delivery
- DSO312 Multiple configurations are available by switching pins after delivery

## External dimensions (unit: mm)



# MEMS Oscillator

The MEMS oscillator uses the principle of piezoelectric conversion to generate high Q-factor resonance, achieving high stability with extremely low phase noise for single and multi-channel high-frequency clock outputs.



## Key Features

Strong seismic resistance, ultra-low phase noise, compact size, flexible output frequency configuration, and support for multiple output formats.

## Application

**Communication equipment:** 10GbE LAN/WAN, high-speed optical modules, optical synchronous digital transmission networks, wireless infrastructure, synchronous Ethernet, etc.

**Industrial Control:** high-speed acquisition cards, memory, clock generation, etc.

**Instrumentation:** signal generators, etc.

## XO Series

| Model   | Dimension (mm) | Output channel | Frequency Range (MHz)  | Total Frequency Accuracy (ppm) | Operating Temp. (°C)    | Output Waveform       | Jitter RMS (12KHz ~20MHz) |
|---------|----------------|----------------|------------------------|--------------------------------|-------------------------|-----------------------|---------------------------|
| DPBO30A | 2.5*2.0        | 1              | Differential: 50 ~1000 | ±20                            | -40 ~ +85<br>-40 ~ +105 | CML/LVDS /LVPECL/HCSL | 45fs                      |
| DPBO30B | 2.5*2.0        | 2              | Differential: 50 ~1000 | ±20                            | -40 ~ +85<br>-40 ~ +105 | CML/LVDS /LVPECL/HCSL | 45fs                      |

## VCXO Series

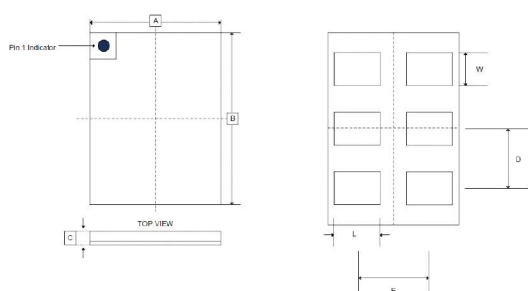
| Model   | Dimension (mm)      | Output channel            | Frequency Range (MHz) | Frequency Accuracy (ppm) | Operating Temp. (°C)    | Output Waveform       | Jitter RMS (12KHz ~20MHz)              |
|---------|---------------------|---------------------------|-----------------------|--------------------------|-------------------------|-----------------------|----------------------------------------|
| DPBV20A | 2.5*2.0 LGA package | Dual Differential Outputs | 50 ~1000              | ±25                      | -40 ~ +85<br>-40 ~ +105 | CML/LVDS /LVPECL/HCSL | Fclk > 100M: 55fs<br>Fclk > 400M: 25fs |
| DPBV20A | 3.2*2.5 LGA package | Dual Differential Outputs | 50 ~1000              | ±25                      | -40 ~ +85<br>-40 ~ +105 | CML/LVDS /LVPECL/HCSL | Fclk > 100M: 55fs<br>Fclk > 400M: 25fs |
| DPBV20A | 5.0*3.2 LGA package | Dual Differential Outputs | 50 ~1000              | ±25                      | -40 ~ +85<br>-40 ~ +105 | CML/LVDS /LVPECL/HCSL | Fclk > 100M: 55fs<br>Fclk > 400M: 25fs |
| DPBV20A | 7.0*5.0 LGA package | Dual Differential Outputs | 50 ~1000              | ±25                      | -40 ~ +85<br>-40 ~ +105 | CML/LVDS /LVPECL/HCSL | Fclk > 100M: 55fs<br>Fclk > 400M: 25fs |

## TCXO Series

| Model  | Dimension (mm)                                          | Output channel            | Frequency Range (MHz) | Frequency Accuracy (ppm) | Operating Temp. (°C)    | Output Waveform          | Jitter RMS (12KHz -20MHz)              |
|--------|---------------------------------------------------------|---------------------------|-----------------------|--------------------------|-------------------------|--------------------------|----------------------------------------|
| DP9866 | 2.5*2.0<br>3.2*2.5<br>5.0*3.2<br>7.0*5.0<br>LGA package | Dual Differential Outputs | 50 ~1000              | ±2                       | -40 ~ +85<br>-40 ~ +105 | CML/LVDS<br>/LVPECL/HCSL | Fclk > 100M: 55fs<br>Fclk > 400M: 45fs |

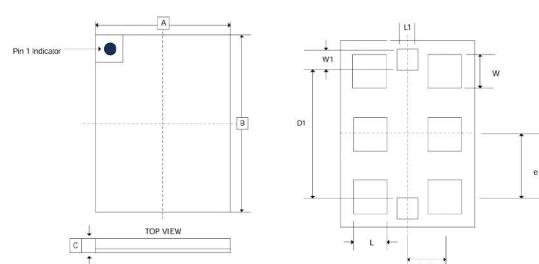
## External dimensions (unit: mm)

### DPB030



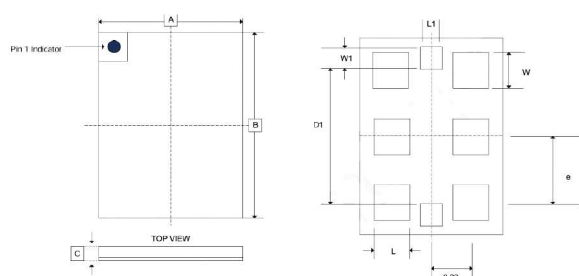
| Dimensions             | Min   | Nom      | Max  |
|------------------------|-------|----------|------|
| A                      |       | 2.00 BSC |      |
| B                      |       | 2.50 BSC |      |
| C                      | 0.903 | 0.96     | 1.1  |
| L                      | 0.55  | 0.60     | 0.65 |
| W                      | 0.35  | 0.40     | 0.45 |
| D                      |       | 0.85 BSC |      |
| E                      |       | 1 BSC    |      |
| Package Edge Tolerance |       | 0.1      |      |
| Mold Flatness          |       | 0.2      |      |
| Coplanarity            |       | 0.08     |      |

### DPBV20A



| Dimensions             | Min   | Nom     | Max  |
|------------------------|-------|---------|------|
| A                      |       | 2.5 BSC |      |
| B                      |       | 3.2 BSC |      |
| C                      | 0.906 | 0.946   | 1.1  |
| W                      | 0.55  | 0.6     | 0.65 |
| L                      | 0.5   | 0.55    | 0.6  |
| W1                     | 0.35  | 0.4     | 0.45 |
| L1                     | 0.35  | 0.4     | 0.45 |
| e                      |       | 1.1 BSC |      |
| D1                     |       | 2.2 BSC |      |
| Package Edge Tolerance |       | 0.1     |      |
| Mold Flatness          |       | 0.1     |      |
| Coplanarity            |       | 0.08    |      |

### DP9866



| Dimensions             | Min  | Nom     | Max  |
|------------------------|------|---------|------|
| A                      |      | 2.5 BSC |      |
| B                      |      | 3.2 BSC |      |
| C                      | 1.09 | 1.18    | 1.23 |
| W                      | 0.55 | 0.6     | 0.65 |
| L                      | 0.5  | 0.55    | 0.6  |
| W1                     | 0.35 | 0.4     | 0.45 |
| L1                     | 0.35 | 0.4     | 0.45 |
| e                      |      | 1.1 BSC |      |
| D1                     |      | 2.2 BSC |      |
| Package Edge Tolerance |      | 0.1     |      |
| Mold Flatness          |      | 0.1     |      |
| Coplanarity            |      | 0.08    |      |

# PHY

The ethernet PHY chip is an ethernet physical layer transceiver, used to modulate and demodulate the optoelectronic signal, and synchronize clock information. It is the MAC layer data transceiver channel.



## Key Features

Compliant with 1000BASE-T/100BASE-TX/10BASE-T IEEE 802.3 specification, Support MAC interfaces RGMII and RMI&MII.

## Application

**Smart appliances:** Smart TV, Set-top box, etc.

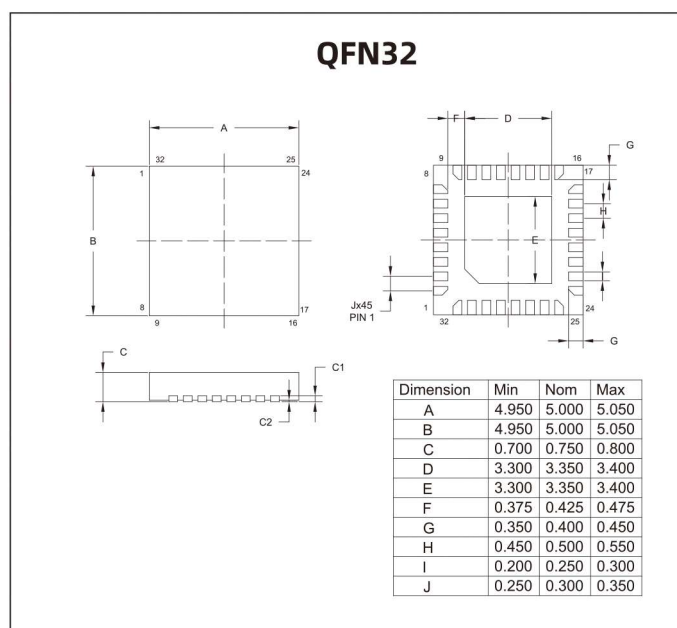
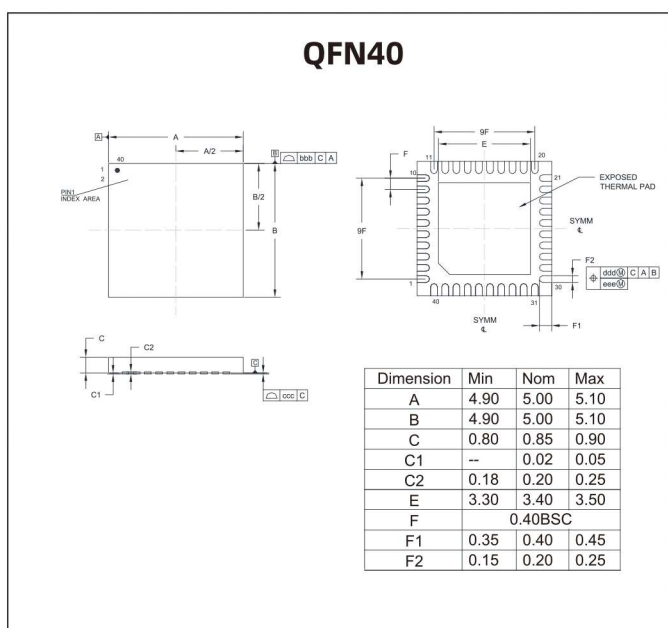
**Communication equipment:** Business single board, Main control board, BBU, AAU, Router, Optical modem, Set-top box, etc.

**Security surveillance:** IPC, DVR, NVR, Face recognition, Access control system, etc.

**Industry:** Industrial robot, Test instrument, Outdoor display, etc.

| Model       | ModMAC Interface | Physical Interface | Standard   | Operating Temp(°C)   | Package(mm)       | Remark        |
|-------------|------------------|--------------------|------------|----------------------|-------------------|---------------|
| DAP8211R(I) | RGMII            | Electrical port    | 1000BASE-T | 0 ~ +70<br>-40 ~ +85 | QFN 40-pin<br>5*5 | Support SyncE |
|             |                  |                    | 100BASE-TX |                      |                   |               |
|             |                  |                    | 10BASE-Te  |                      |                   |               |
| DAP8201M(I) | MII/RMII         | Electrical port    | 100BASE-TX | 0 ~ +70<br>-40 ~ +85 | QFN 32-pin<br>5*5 |               |
|             |                  |                    | 10BASE-Te  |                      |                   |               |

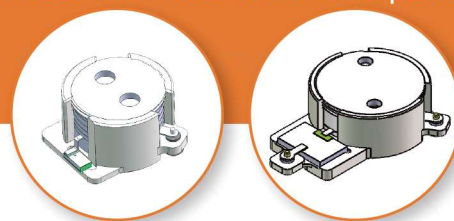
## External dimensions (unit: mm)





# Circulator/Isolator (SMD)

The main function of the circulator is to ensure positive lossless passage of signals, as well as high isolation blocking of reflected signals. An isolator is formed by adding a high-power load or attenuator to the third port of the circulator.



## Key Features

DPXXXXC and DPXXXXS series are featured with low power consumption, low intermodulation, high harmonic rejection and excellent impedance matching consistency.

## Application

Mobile communications, Wireless microwave communications, Phased array, Rail transportation, Radio frequency instruments and equipment

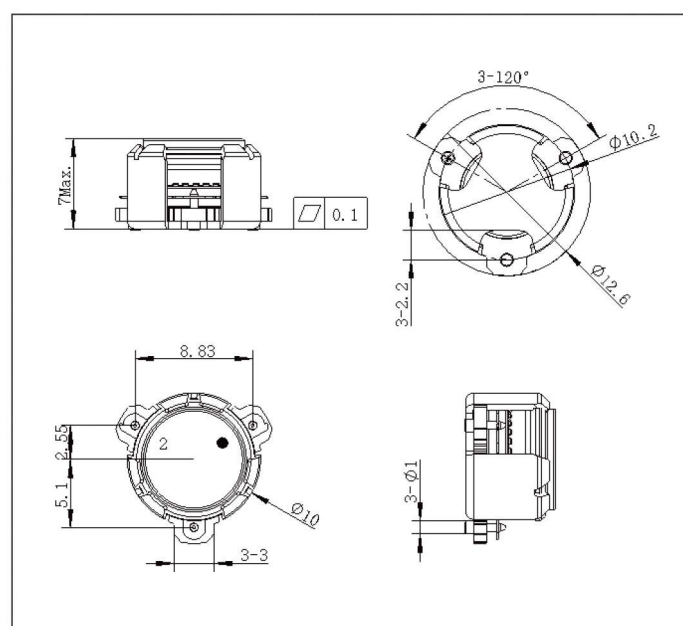
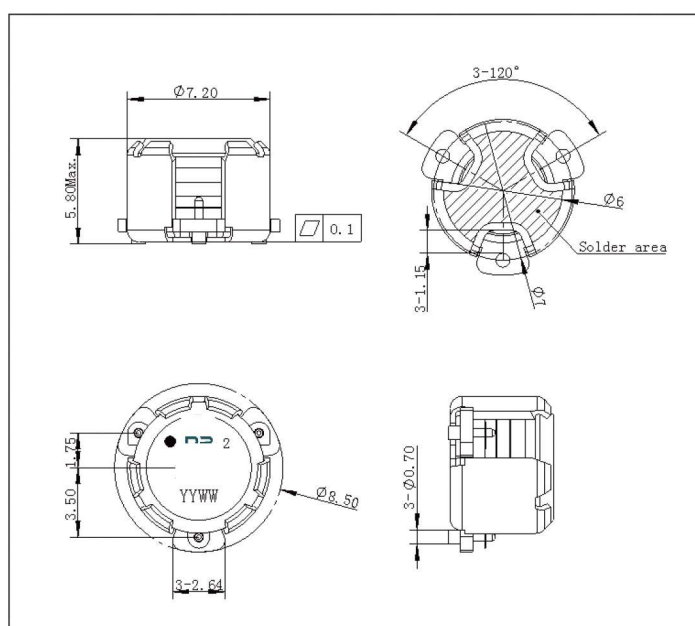
## Circulator/Isolator (SMD)

| Product Series | Operating Frequency (MHz) | Dimension (mm)   | Power (W) | Return Loss (dB) | Insertion Loss (dB) | Isolation (dB) | IM3 (dBc) |
|----------------|---------------------------|------------------|-----------|------------------|---------------------|----------------|-----------|
| DPxxxxC        | 500 ~ 15000               | Ø3.8 ~ 38.1*38.1 | 10 ~ 500  | -22 Max.         | -0.15 ~ -0.35       | -22 Max.       | -80 Min.  |
| DPxxxxC        | 500 ~ 15000               | Ø3.8 ~ 38.1*38.1 | 10 ~ 500  | -22 Max.         | -0.15 ~ -0.35       | -22 Max.       | -80 Min.  |

\* It features low insertion loss, low intermodulation, and broad bandwidth advantages, offering greater compactness under equivalent parameter conditions;

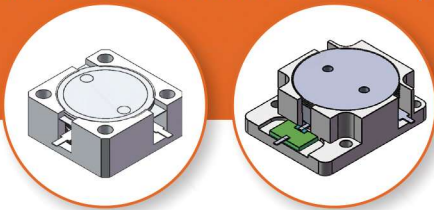
\* Customized designs can be provided based on client requirements for frequency bands, performance, dimensions, and various applications.

## External dimensions (unit: mm)



# Circulator/Isolator (Drop in)

The main function of the circulator is to ensure positive lossless passage of signals, as well as high isolationnm blocking of reflected signals. An isolator is formed by adding a high-power load or attenuator to the third port of the circulator.



## Key Features

DPXXXXC and DPXXXXS series are featured with low power consumption, low intermodulation, high harmonic rejection and excellent impedance matching consistency.

## Application

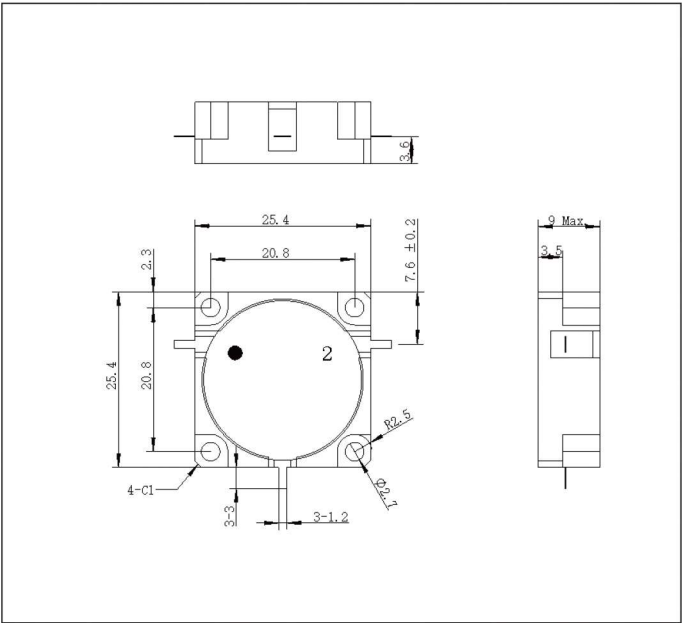
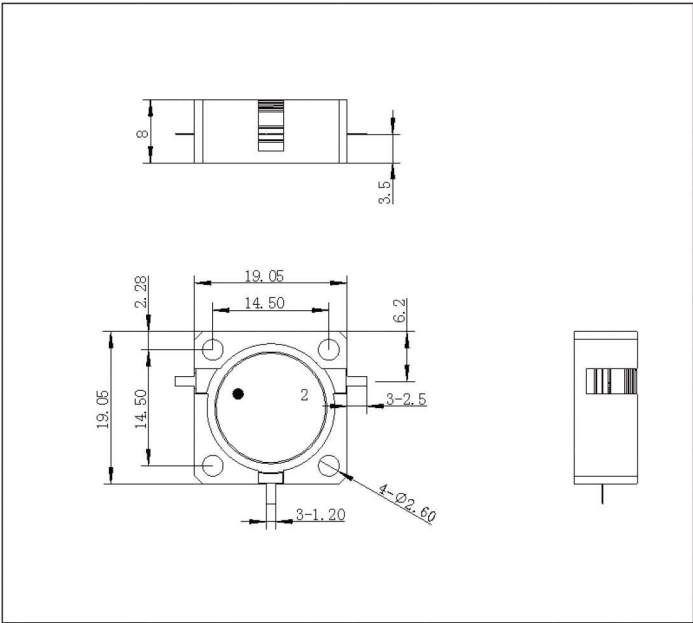
Mobile communications, Wireless microwave communications, Phased array, Rail transportation, Radio frequency instruments and equipment

## Circulator/Isolator (Drop in)

| Product Series | Operating Frequency (MHz) | Dimension (mm)    | Power (W) | Return Loss (dB) | Insertion Loss (dB) | Isolation (dB) | Third-order Inter modulation (dBc) |
|----------------|---------------------------|-------------------|-----------|------------------|---------------------|----------------|------------------------------------|
| DPxxxxC        | 80.5 ~ 15000              | 12.7*12.7~160*160 | 10 ~ 3000 | -22 Max.         | -0.15 ~ -0.35       | -22 Max.       | -80 Min.                           |
| DPxxxxC        | 80.5 ~ 15000              | 12.7*12.7~160*160 | 10 ~ 3000 | -22 Max.         | -0.15 ~ -0.35       | -22 Max.       | -80 Min.                           |

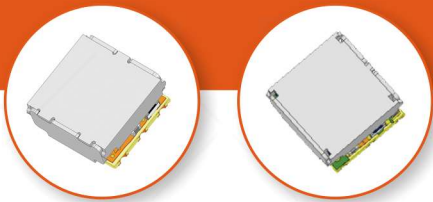
- \* It features low insertion loss, low intermodulation, and broad bandwidth advantages, offering greater compactness under equivalent parameter conditions;
- \* Customized designs can be provided based on requirements for frequency bands, performance, dimensions, and various applications;
- \* Based on client application needs, we offer coaxial and dual-section circulators and isolators.

## External dimensions (unit: mm)



# Low Power Circulator/Isolator

The main function of the circulator is to ensure positive lossless passage of signals, as well as high isolation blocking of reflected signals. An isolator is formed by adding a high-power load or attenuator to the third port of the circulator.



## Key Features

Low power consumption, low intermodulation, high harmonic rejection, excellent impedance matching consistency.

## Application

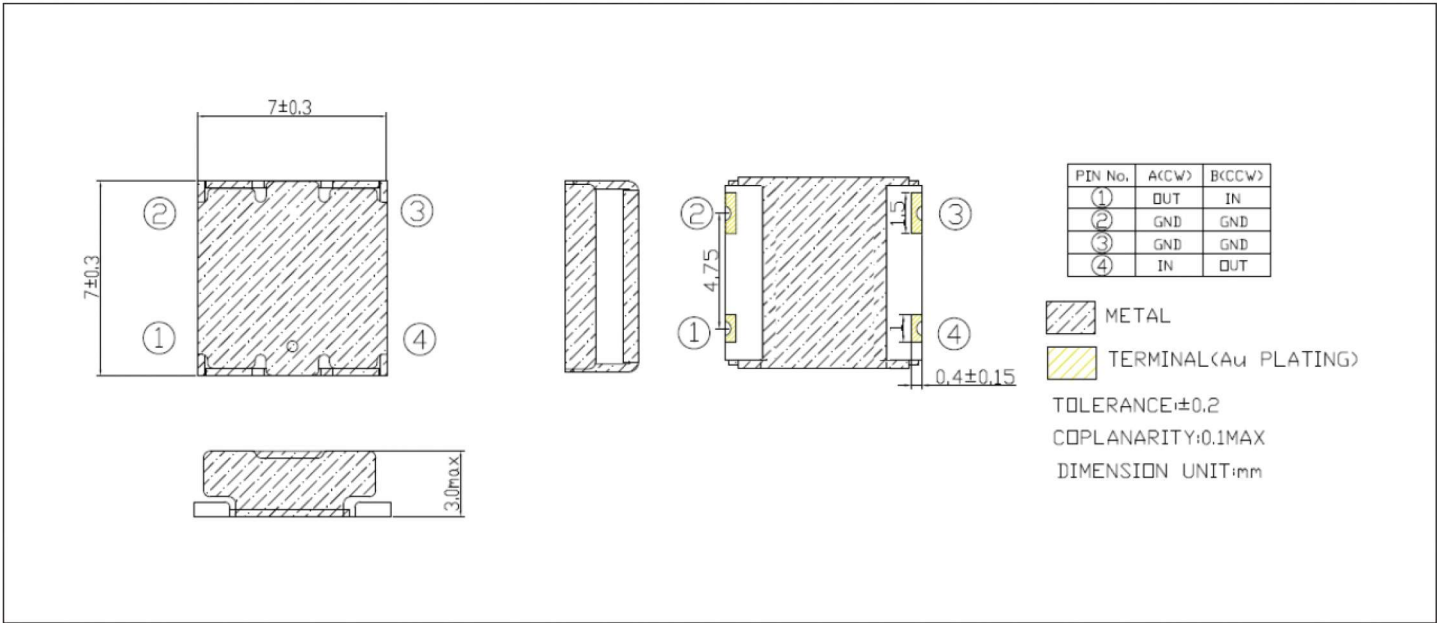
Mobile communications, Wireless microwave communications, Radio frequency instruments and equipment

## Low Power Circulator/Isolator (SMD)

| Product Series | Operating Frequency (MHz) | Dimension (mm) | Power (W) | Return Loss (dB) | Insertion Loss (dB) | Isolation (dB) | IM3 (dBc) |
|----------------|---------------------------|----------------|-----------|------------------|---------------------|----------------|-----------|
| DP-CLxxxxxxxxx | 430 ~ 5000                | 7*7/5*5        | 5         | -12 Max.         | -0.6 ~ -0.8         | -12 Max.       | -55 Max.  |

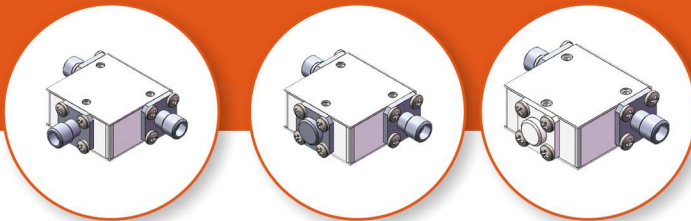
- \* Exhibiting low insertion loss, low intermodulation, and broadband advantages;
- \* Customized designs are available.

## External dimensions (unit: mm)





# Coaxial Series & Ultra-Wideband



## Key Features

Frequency range: 1GHz ~ 18GHz  
Customized designs are available.

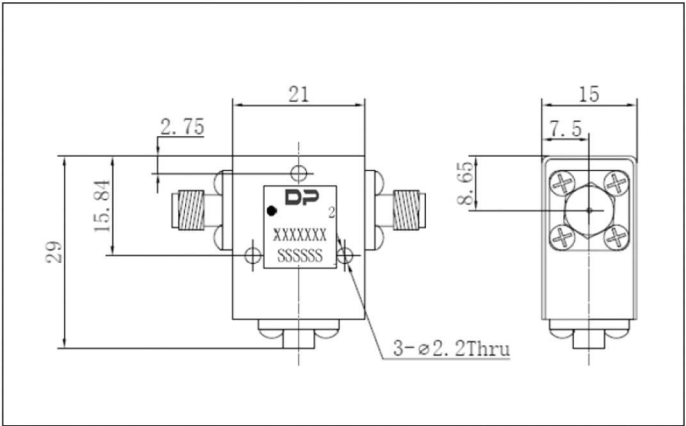
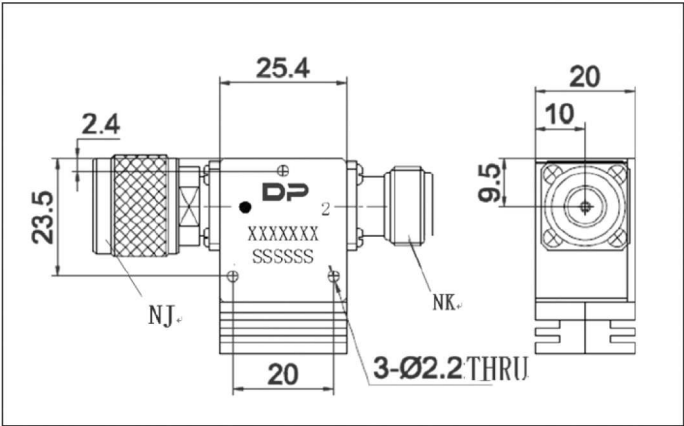
## Application

Television Systems, Satellite Reception, Communication Networks, Radio Frequency (RF) Applications

## Coaxial Series & Ultra-Wideband

| Product Type | Frequency Band (GHz) | Insertion Loss (dB) | Isolation (dB) | VSWR      | Power (W) | Temp. Range (°C) | Joint Type | Size (L*W*H) (mm) |
|--------------|----------------------|---------------------|----------------|-----------|-----------|------------------|------------|-------------------|
| Circulator   | 1-2                  | 0.7 Max.            | 15 Min.        | 1.4 Max.  | 100       | -10 ~ +60        | SMA        | 70*80*21          |
| Circulator   | 1.8-2.7              | 0.5 Max.            | 18 Min.        | 1.35 Max. | 100       | -20 ~ +85        | SMA        | 31.8*31.8*13      |
| Circulator   | 2-3                  | 0.4 Max.            | 20 Min.        | 1.25 Max. | 50        | -30 ~ +75        | SMA        | 28*30*18          |
| Circulator   | 2-4                  | 0.6 Max.            | 17 Min.        | 1.35 Max. | 100       | -30 ~ +75        | SMA        | 32*34*18          |
| Circulator   | 2-6                  | 0.7 Max.            | 15 Min.        | 1.25 Max. | 100       | -10 ~ +60        | SMA        | 32*34*18          |
| Circulator   | 8-12                 | 0.4 Max.            | 20 Min.        | 1.25 Max. | 10        | -30 ~ +75        | SMA        | 16*26*13          |
| Circulator   | 12-18                | 0.5 Max.            | 20 Min.        | 1.25 Max. | 10        | -30 ~ +75        | SMA        | 16*26*13          |
| Isolator     | 4-8                  | 0.4 Max.            | 20 Min.        | 1.25 Max. | 10        | -30 ~ +75        | SMA        | 20*32*14          |
| Isolator     | 6-12                 | 0.4 Max.            | 18 Min.        | 1.3 Max.  | 10        | -30 ~ +75        | SMA        | 16*26*13          |
| Isolator     | 6-18                 | 1.5 Max.            | 11 Min.        | 1.8 Max.  | 10        | -30 ~ +75        | Drop-in    | 12.7*15.7*6.5     |
| Isolator     | 6-18                 | 1.5 Max.            | 11 Min.        | 1.75 Max. | 10        | -30 ~ +75        | SMA        | 19*27*13          |

## External dimensions (unit: mm)





# Microstrip Series

The main function of the circulator is to ensure positive lossless passage of signals, as well as high isolation blocking of reflected signals. An isolator is formed by adding a high-power load or attenuator to the third port of the circulator.



## Key Features

Support C/X/K/Ku/K/Ka bands  
Customized designs are available  
Size: 6X6mm & 7x7mm & 8x8mm

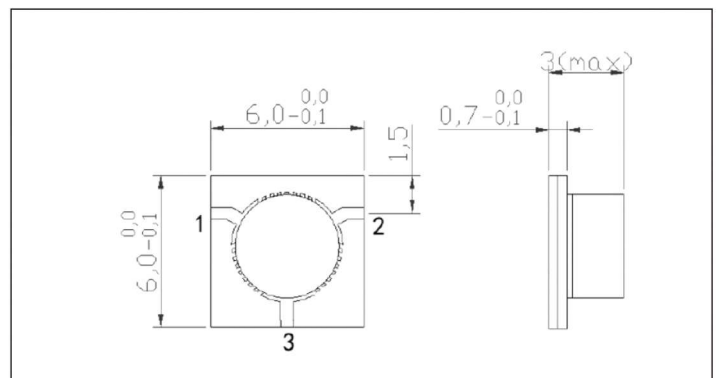
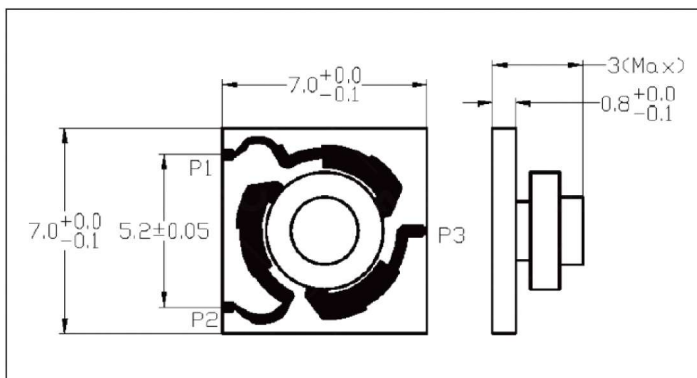
## Application

Radar & High frequency System.

## Microstrip Series

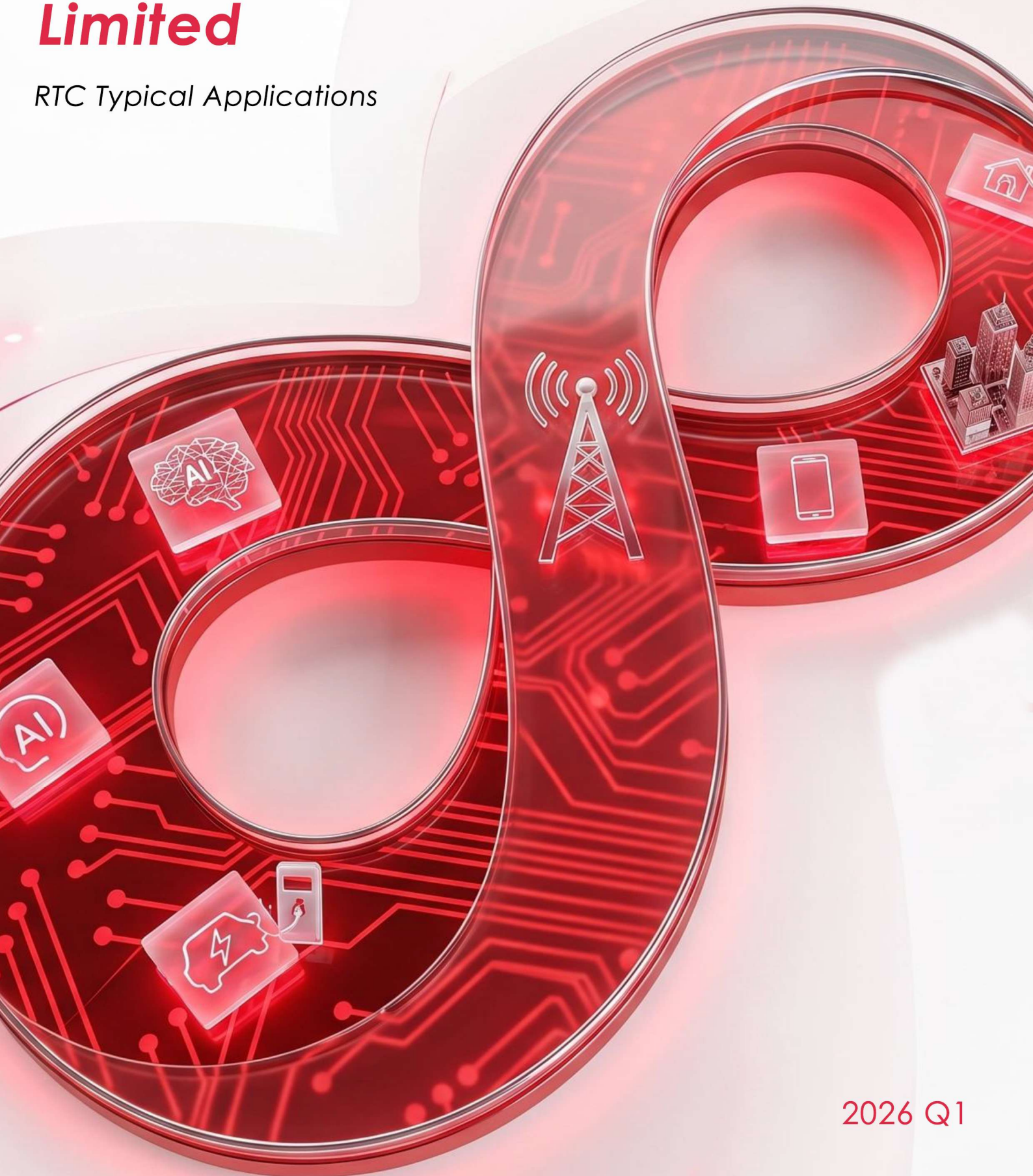
| Product Type | Frequency Band (GHz) | Bandwidth (Max.) | Insertion Loss (dB Max.) | Isolation (dB) | VSWR (Max.) | Temp. Range (°C) |
|--------------|----------------------|------------------|--------------------------|----------------|-------------|------------------|
| Circulator   | 6.6–8.0              | 7%               | 0.4                      | 20             | 1.25        | –40 ~ +85        |
| Isolator     | 6.6–8.0              | 15%              | 0.4                      | 20             | 1.25        | –40 ~ +85        |
| Circulator   | 8.0–12.0             | 20%              | 0.45                     | 20             | 1.25        | –40 ~ +85        |
| Circulator   | 12.0–18.0            | 20%              | 0.5                      | 20             | 1.30        | –40 ~ +85        |
| Circulator   | 14.0–15.0            | Full             | 0.5                      | 20             | 1.25        | –40 ~ +85        |
| Circulator   | 16.5–17.5            | Full             | 0.5                      | 20             | 1.25        | –40 ~ +85        |
| Circulator   | 15.5–17.5            | Full             | 0.6                      | 18             | 1.30        | –40 ~ +85        |
| Circulator   | 15.0–18.0            | Full             | 0.8                      | 15             | 1.45        | –40 ~ +85        |
| Circulator   | 19.6–21.0            | Full             | 0.8                      | 18             | 1.35        | –40 ~ +85        |
| Circulator   | 21.0–22.0            | Full             | 0.9                      | 18             | 1.35        | –40 ~ +85        |
| Isolator     | 8.0–12.0             | 20%              | 0.45                     | 20             | 1.25        | –40 ~ +85        |
| Isolator     | 12.0–18.0            | 20%              | 0.5                      | 20             | 1.30        | –40 ~ +85        |
| Isolator     | 15.5–16.5            | Full             | 0.5                      | 20             | 1.25        | –40 ~ +85        |
| Isolator     | 16.5–17.5            | Full             | 0.5                      | 20             | 1.25        | –40 ~ +85        |
| Isolator     | 15.5–17.5            | Full             | 0.6                      | 18             | 1.30        | –40 ~ +85        |
| Isolator     | 15.0–18.0            | Full             | 0.8                      | 15             | 1.45        | –40 ~ +85        |
| Isolator     | 19.6–21.0            | Full             | 0.8                      | 18             | 1.35        | –40 ~ +85        |
| Isolator     | 21.0–22.0            | Full             | 0.9                      | 18             | 1.35        | –40 ~ +85        |

## External dimensions (unit: mm)



# WTL International Limited

*RTC Typical Applications*



2026 Q1

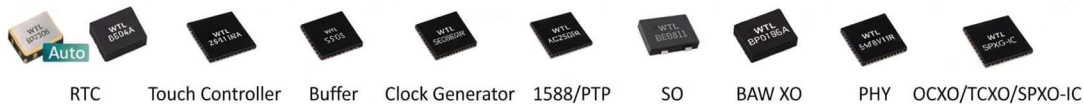


# WTL Product Lines

## Clock Module



## Clock Chip



## RF Component



# Applications & Markets

## Telecom



## Consumers



## Automotive



## Industry



## Private Network



## ◆ Consumer Application Solutions

### Smart Home Ecosystem Products

White Goods such as air conditioners, refrigerators, water heaters, ovens, and rice cookers



Child Monitor/Smart Camera



Smart Door Lock/ Video Doorbell



| WTL Solution | Recommended MPN                        | Function                         |
|--------------|----------------------------------------|----------------------------------|
| RTC          | INS5T8563/INS5T8900                    | Display and record event time    |
| Crystal      | 32.768KHz, 12MHz, 13.56MHz, 24MHZ etc. | Clock source for main controller |

| WTL Solution | Recommended MPN                        | Function                         |
|--------------|----------------------------------------|----------------------------------|
| RTC          | INS5T8900/INS5T8563                    | record event time                |
| Crystal      | 32.768KHz, 12MHz, 13.56MHz, 24MHZ etc. | Clock source for main controller |

| WTL Solution | Recommended MPN                        | Function                         |
|--------------|----------------------------------------|----------------------------------|
| RTC          | INS5T8111/INS5T8563 (low power)        | record event time                |
| Crystal      | 32.768KHz, 12MHz, 13.56MHz, 24MHZ etc. | Clock source for main controller |

### Smart Home Ecosystem Products

Robotic Vacuum Cleaner



Smart Voice Assistant



Smart Thermohygrometer/ Smart Alarm Clock



| WTL Solution | Recommended MPN                        | Function                         |
|--------------|----------------------------------------|----------------------------------|
| Crystal      | 32.768KHz, 12MHz, 13.56MHz, 24MHZ etc. | Clock source for main controller |

| WTL Solution | Recommended MPN                         | Function                         |
|--------------|-----------------------------------------|----------------------------------|
| Crystal      | 32.768KHz, 24MHz, 24.576MHz, 40MHz etc. | Clock source for main controller |

| WTL Solution | Recommended MPN                        | Function                         |
|--------------|----------------------------------------|----------------------------------|
| RTC          | INS778563                              | Display Time                     |
| Crystal      | 32.768KHz, 12MHz, 13.56MHz, 24MHZ etc. | Clock source for main controller |



## ◆ Consumer Application Solutions

### Portable Ecosystem Products

**Smart Watch  
/Kids' Watch/Smart Band**



**Smart Glasses**



**Bike Computer**



**Action Camera/  
Handheld Vlogging Camera**



| WTL Solution | Recommended MPN                 | Function                         |
|--------------|---------------------------------|----------------------------------|
| TCXO         | 2016, 26MHz                     | GPS application                  |
| Crystal      | 16MHz, 24MHz, 26MHz, 48MHz etc. | Clock source for main controller |

| WTL Solution              | Recommended MPN                       | Function                         |
|---------------------------|---------------------------------------|----------------------------------|
| RTC                       | INSST8111/<br>INSST8130/<br>INSST8112 | record event time                |
| Thermal Sensitive Crystal | 16MHz, 24MHz, 26MHz, 48MHz etc.       | Clock source for main controller |

| WTL Solution | Recommended MPN                 | Function                         |
|--------------|---------------------------------|----------------------------------|
| RTC          | INSST8111/<br>INSST8130         | record event time                |
| Crystal      | 16MHz, 24MHz, 26MHz, 48MHz etc. | Clock source for main controller |

| WTL Solution | Recommended MPN                 | Function                         |
|--------------|---------------------------------|----------------------------------|
| RTC          | INSST8111/<br>INSST8130         | record event time                |
| Crystal      | 16MHz, 24MHz, 26MHz, 48MHz etc. | Clock source for main controller |

### Portable Ecosystem Products

**Underwater Camera/  
Handheld Vlogging Camera**



**Wireless Mic**



**Walkie-talkie**



**Wireless Earbuds**



| WTL Solution | Recommended MPN                      | Function                         |
|--------------|--------------------------------------|----------------------------------|
| RTC          | INSST8111<br>/INS5830B<br>/INSST8563 | record event time                |
| Crystal      | 16MHz, 24MHz, 26MHz, 48MHz etc.      | Clock source for main controller |

| WTL Solution | Recommended MPN                      | Function                         |
|--------------|--------------------------------------|----------------------------------|
| RTC          | INS5830B<br>/INSST8130<br>/INSST8563 | record event time                |
| Crystal      | 16MHz, 24MHz, 26MHz, 48MHz etc.      | Clock source for main controller |

| WTL Solution | Recommended MPN                 | Function                         |
|--------------|---------------------------------|----------------------------------|
| TCXO         | 19.2MHz, 26MHz etc.             | GPS application                  |
| Crystal      | 16MHz, 24MHz, 26MHz, 48MHz etc. | Clock source for main controller |

| WTL Solution | Recommended MPN                 | Function                         |
|--------------|---------------------------------|----------------------------------|
| Crystal      | 16MHz, 24MHz, 26MHz, 48MHz etc. | Clock source for main controller |

## ◆ Industrial Application Solutions

### Industrial Use Cases



Data Monitoring and Collection



Instruments



Security Monitoring

| WTL <sup>®</sup> Solution | Recommended MPN                                    | Function                                                                                                                                                                            |
|---------------------------|----------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| RTC                       | INS5710C/<br>INS5T8130/<br>INS5T8111/<br>INS5T8563 | Exact time stamp,<br>Multi node time synchronization,<br>Record data in chronological order,<br>Trigger scheduled acquisition task,<br>Auxiliary data backtracking and verification |

| WTL <sup>®</sup> Solution | Recommended MPN                                    | Function                                                                                                                                            |
|---------------------------|----------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|
| RTC                       | INS5T8130/<br>INS5710C/<br>INS5T8111/<br>INS5T8563 | Provide high-precision frequency reference,<br>Enhanced signal stability,<br>Ensure long-term stability,<br>Improve system synchronization accuracy |
| OCXO                      | O23S/O55/O22A                                      |                                                                                                                                                     |

| WTL <sup>®</sup> Solution | Recommended MPN                                    | Function                                                                                                      |
|---------------------------|----------------------------------------------------|---------------------------------------------------------------------------------------------------------------|
| RTC                       | INS5T8111/<br>INS5710C/<br>INS5T8130/<br>INS5T8563 | Accurate timestamp,<br>Device time synchronization,<br>Scheduled task trigger,<br>Event sequencing management |

### Industrial Use Cases



Smart Meters

| WTL <sup>®</sup> Solution  | Recommended MPN         | Function                                                                                  |
|----------------------------|-------------------------|-------------------------------------------------------------------------------------------|
| RTC<br>(Electricity meter) | INSST8025/<br>INSST8900 | Accurate timing,<br>Data record,<br>Synchronous data reporting,<br>Event time calibration |
| RTC<br>(water meter)       | INS588563               |                                                                                           |



Medical Equipments

| WTL <sup>®</sup> Solution               | Recommended MPN                    | Function                                           |
|-----------------------------------------|------------------------------------|----------------------------------------------------|
| RTC<br>(Large-scale medical equipment ) | INSST8900/<br>INSST5710            | Time stamp function,<br>Timing trigger and control |
| RTC<br>(Small medical equipment)        | INSST8900/<br>INSST5710/INSST 8111 |                                                    |



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