Wuhan Xinyuan Semiconductor Co., Ltd.

web: www.whxy.com

Wholly-owned subsidiary of P&S
Stock code: 300184
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COMPANY PROFILE

- Overview
- History
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- Business Culture
- Product Operation Pattern
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Overview

**Parent company**

**P&S Information**

- Top technology electronic component distribution enterprise;
- The first A-share listed company in the domestic electronic component service field in China, with stock code 300184;
- The total number of employees exceeds 1400;
- Professional distribution of MCU for 30 years, with abundant downstream MCU customer resources;
- More than 200 technical engineers distributed nationwide;

**Wholly owned subsidiary**

**Wuhan Xinyuan Semiconductor Co., Ltd**

- Established in August 2018, focusing on chip design, research and development, sales, and technical services;
- The CW brand originates from the initial letter CW of Creative Wisdom, conveying the brand concept of "creativity comes from wisdom";
- Having advanced integrated circuit design platforms and standardized product development processes;
- The core backbone has nearly 20 years of experience in mixed signal integrated circuit design;
- Headquarters - Wuhan, R&D - Shanghai, Wuhan; Sales Center - Shanghai and Shenzhen, Operations Center - Shanghai and Wuhan
2011
P&S information listed
Stock code: 300184

2015
P&S set up Semiconductor Division for own products development and sale

2016
SJ-MOSFET MP
Serial EEPROM MP

2018
Reorganized as an independent semiconductor company

2019
Upgraded SJ-MOSFET to Gen 2.5 technology

2020
Upgraded 256/512 Kbit 12C EEPROM to 5 million write cycles

2021
First 32-bit MCU, Arm Cortex-M0+-based CW32F030C8 MP

2022
First 32-bit MCU, Arm Cortex-M0+-based CW32F003/030 series MP
Ultra low power M0+-based CW32L052 series MP
Wireless MCU CW32W031/R031 MP

2023
Ultra low power M0+-based CW32L052 series MP
Wireless MCU CW32W031/R031 MP
Hardcore China Chip awards: "MCU of the Year", "Excellence in Enterprise Growth Performance Yearly"
Organizational structure

CEO
Mark Zhao

Operations Director
Simon Li
- Sealing and Testing Technology Group
- Project management
- Transportation Management Group

Marketing Director
Coco Chen
- Mass Market
- Key Account Department
- Channel Management Department
- Marcom

Technical Director
Frank Zhang
- IC design team
- Application Support Team
- Quality Control Team
Corporate Vision
Committed to becoming the leader of the domestic chip industry

Product Positioning
Localized, industrial standard, high quality, affordable ICs

Business Philosophy
Open Innovation
Win-Win

Service Tenet
Cost Advantage
Quality Guarantee
Technology Innovation
Reliable Service
Gather target customers

Promote high-matched product

Product reliability verification

Research technical requirements

Improve IC Design

Market-oriented R&D

Product Operation Pattern

Requirement Analysis  Design Evaluation  Fab  Assembly & Testing  Reliability Testing  Application Assessment  End-user applications
HHGrace, a wholly owned subsidiary of Hua Hong Semiconductor Limited (stock code: 1347.HK), focuses on continuous innovation of “8-inch + 12-inch” specialty technologies, with expertise in all technical nodes ranging from 1pm to 65/55nm. Its 110nm process is verified by fabless semiconductors as the most reliable technology for embedded MCUs in China.

HT-Tech is a professional IC assembly and testing company founded in 2003 (stock code:002185), has fully independent intellectual property rights of wafer-level fan-out packaging solution -- eSiFO.

Founded in 1972, JCET Group is the world’s leading IC manufacturing with advanced wafer-level packaging, 2.5D/3D, System-in-Package, and reliable flip chip and wire bonding technologies.
Quality and Reliability

- Quality Management System
- Certifications
- High Reliability Testing Process
- Environmental Compliance
## Quality Management System

### Design Development
- Design review
- Product design
- Reliability design
- Qualification

### Sample Trial Production
- Staff training
- Device management
- Material control
- System document control
- Environmental management
- Exception control
- Change management

### Batch Production
- First article inspection
- Process sampling inspection
- Reliability testing
- Yield management
- Outgoing quality control

### Testing/Inspection
- QCC root cause analysis
- Quality specification maintenance and upgradation
- Customer complaints handling and improvement measures validation
- Quarterly/annual quality improvement plans
- Quality training
- DCC maintenance and upgradation

### Customer Application
- User Manual
- Quality information
- Failure analysis
- Qualification
- Quality analysis meetings

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### Process Quality Control
- Staff training
- Device management
- Material control
- System document control
- Environmental management
- Exception control
- Change management

### Production Quality Control
- First article inspection
- Process sampling inspection
- Reliability testing
- Yield management
- Outgoing quality control

### Quality Improvement
- QCC root cause analysis
- Quality specification maintenance and upgradation
- Customer complaints handling and improvement measures validation
- Quarterly/annual quality improvement plans
- Quality training
- DCC maintenance and upgradation

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### Customer Support
- User Manual
- Quality information
- Failure analysis
- Qualification
- Quality analysis meetings
Certified by ISO 14001:2015 Environmental Management System Certification

Certified by ISO 9001:2015 Quality Management System

Certified by ISO 45001:2018 Occupational Health and Safety Management System
HBM/CDM/MM ESD; Room temperature/high temperature Latch Up; EFT
All meet the highest level of testing standards

Chip manufacturing reliability
Chip electrical performance verification
Accelerated life testing
Accelerated environmental stress
Packaging integrity testing
Destructive Physical Analysis
Functional safety and reliability

CW32 full range of products, in compliance with IEC60730 and IEC61508 functional safety design specifications

**IEC60730 specification self inspection test**
- CPU register self-test test
- Program Counter PC Self Test
- Interrupt self-test test
- Flash memory self check test
- Stack self-test
- SRAM (Variable Memory) Self Test
- Clock self-test test
- Digital I/O self-test
- Analog to Digital Converter (ADC) Self Test

**IEC61508 specification self inspection test**
- CPU register self-test test
- CPU Instruction Self Test
- Bus self-test test
- Flash memory self check test
- SRAM (Variable Memory) Self Test
- Stack overflow self-test
- Clock self-test test
- Digital I/O self-test
- Analog to Digital Converter (ADC) Self Test
- DMA self-test
PRODUCTS AND APPLICATIONS

- Arm Cortex-M0+ MCU
- Wireless RF MCU
- EEPROM
- SJ-MOSFET
# CW32 Arm Cortex-M0+ MCU

## Selection Table

<table>
<thead>
<tr>
<th>CW32 Arm Cortex-M0+ MCU</th>
<th>Max. Frequency (MHz)</th>
<th>FLASH (KB)</th>
<th>RAM (KB)</th>
<th>GPIO</th>
<th>DMA</th>
<th>Timer</th>
<th>RTC</th>
<th>UART</th>
<th>SPI</th>
<th>I2C</th>
<th>Security Functions</th>
<th>LCD</th>
<th>Operating Temperature (°C)</th>
<th>Package</th>
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<tr>
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<td>64</td>
<td>8</td>
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<td>-40 ~ +105</td>
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<td>8/6</td>
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<td>8</td>
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<td>-</td>
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<td>87</td>
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<td>√</td>
<td>-40 ~ +85</td>
<td>LQFP64</td>
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<td>CW32L052C8</td>
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<td>8</td>
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<td>-40 ~ +85</td>
<td>LQFP48</td>
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<td>64</td>
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<td>39</td>
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<td>3</td>
<td>1</td>
<td>1</td>
<td>CRC16</td>
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<td>-40 ~ +85</td>
<td>LQFP48/QFN48</td>
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<td>CW32L031K8</td>
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<td>8</td>
<td>25</td>
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<td>3</td>
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<td>1</td>
<td>CRC16</td>
<td>-</td>
<td>-40 ~ +85</td>
<td>QFN32</td>
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<td>8</td>
<td>14</td>
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<td>1</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td>CRC16</td>
<td>-</td>
<td>-40 ~ +85</td>
<td>QFN20/TSSOP20</td>
</tr>
</tbody>
</table>

- **1.65V~5.5V power supply**
- **HBM ESD 8KV**
- **12-bit ADC; ±1 LSB**
- **Vref ±60ppm/°C**
- **Temp Sensor ±3°C**
- **Dual voltage comparator**
- **POR/BOR**
- **Programmable LVD**
- **Clocks HSIOSC/LSI/RC10K/RC150K/HSE/LSI**
- **Timers: ATIM/GTIM/BTIM**
- **Watchdog: IWDG/WWDG**
- **OTP memory**
- **IR modulator**
- **Serial wire debug (SWD)**
- **80-bit unique ID**
CW32 Arm Cortex-M0+ MCU

Flash/RAM (bytes)

256K / 24K

128K / 24K

64K / 8K

- CW32L030F6 64MHz QFN
- CW32L031F8 48MHz TSSOP/QFN
- CW32L083RC 64MHz LQFP
- CW32L083MC 64MHz LQFP
- CW32L083VC 64MHz LQFP
- CW32L083RB 64MHz LQFP

- CW32F030K8 48MHz LQFP/QFN
- CW32F030C8 64MHz LQFP

32K / 6K

- CW32F030F6 64MHz TSSOP

32K / 4K

- CW32L032F6 48MHz TSSOP/QFN
- CW32L032E6 48MHz TSSOP
- CW32L032K6 48MHz LQFP/QFN

20K / 3K

- CW32F003F4 48MHz TSSOP/QFN
- CW32F003E4 48MHz TSSOP
Product Advantages

Operating Voltage: 1.65V-5.5V
Operating Temperature: -40 ℃ -105 ℃

ESD protection capability (HBM ESD, MM ESD, CDM ESD, Latch up @105 ℃) is certified to the highest class of JEDEC standard

Adopting the Prefetch+Cache architecture
The computing power/power ratio of the same frequency CoreMark surpasses that of similar products

Stable and reliable eFLASH manufacturing
Ensure highly reliable industrial applications
### Product Advantages

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td><strong>01</strong></td>
<td>Operating Voltage: 1.65V-5.5V; Operating Temperature: -40 ℃ -105 ℃</td>
</tr>
<tr>
<td><strong>02</strong></td>
<td>CW32L083/052 series integrated features</td>
</tr>
<tr>
<td></td>
<td>1. 16-bit low-power timer</td>
</tr>
<tr>
<td></td>
<td>2. Monochrome passive LCD controller (Built-in charge pump)</td>
</tr>
<tr>
<td></td>
<td>3. Advanced Encryption Standard module (CW32L083)</td>
</tr>
<tr>
<td></td>
<td>4. True Random Number Generator (CW32L083)</td>
</tr>
<tr>
<td><strong>03</strong></td>
<td>AUTOTRIM supports automatic clock calibration or automatic wake-up MCU from DeepSleep mode</td>
</tr>
<tr>
<td><strong>04</strong></td>
<td>12-bit ADC, ±1 LSB, Internal 1.5V and 2.5 voltage reference Vref +60ppm/°C</td>
</tr>
<tr>
<td><strong>05</strong></td>
<td>Multilevel program security protection</td>
</tr>
<tr>
<td><strong>06</strong></td>
<td>ESD protection capability (HBM ESD, MM ESD, CDM ESD, Latch up @105℃) is certified to the highest class of JEDEC standard</td>
</tr>
<tr>
<td><strong>07</strong></td>
<td>Current consumption reference values</td>
</tr>
</tbody>
</table>

#### CW32L031 Typical Current Consumption

<table>
<thead>
<tr>
<th>Mode</th>
<th>Current (mA)</th>
</tr>
</thead>
<tbody>
<tr>
<td>High-freq Run mode</td>
<td></td>
</tr>
<tr>
<td>Low-freq Run mode</td>
<td></td>
</tr>
<tr>
<td>Sleep mode LSE ON</td>
<td></td>
</tr>
<tr>
<td>DeepSleep mode</td>
<td></td>
</tr>
</tbody>
</table>

- **DeepSleep mode**:
  - Typical Current Consumption: 0.45μA
  - Wakeup time: 4μs
- **High-freq Run mode**:
  - Coremark executing from Flash: 113μA/MHz
  - Code executing from Flash or RAM: 8.3μA

#### Internal 1.5V and 2.5V voltage reference

- Vref +60ppm/°C

#### 12-bit ADC

- ±1 LSB

#### Multilevel program security protection

- ESD protection capability
Consumer Electronics

Electronic cigarette, wireless charging, fascia gun, pan tilt control, electronic scale, wireless microphone, headphone charging case, remote control, electric toy, pet barking stop.
Intelligent Life

Electric curtains, temperature controller, intelligent lifting table, intelligent toilet, intelligent door lock, washing machine control board, ice maker control board, vacuum cleaner, intelligent clothes hanger, intelligent water meter, intelligent gas meter, intelligent lighting, air purifier
Industrial control

Lighting, digital power supply, intelligent circuit breaker, wireless temperature measurement, welding machine, material level switch, combustible gas alarm, smoke detector, industrial sensor
Traffic

Electric motorcycle/bicycle dashboard, electric vehicle charger, two wheeled vehicle controller, portable charging gun, in car wireless charger, reverse radar, tailgate control, car ambient light, tire pressure monitoring, and air pump
New energy sector

Photovoltaic inverter, portable energy storage, household energy storage, lithium battery protection board BMS, photovoltaic combiner device, solar umbrella controller

Portable energy storage  PV Inverter  Photovoltaic convergence device  Home energy storage
Personal Health and Care

Blood oxygen meter, electronic thermometer, electronic blood pressure meter, household hair removal device, beauty device, ear temperature gun, handheld thermometer, massage chair
**Electric tools**

Handheld electric drill, garden tools, aircraft model servo, BLDC driver, lawn mower

- water pump
- Hand-held electric drill
- Aircraft model servo
- cropper
<table>
<thead>
<tr>
<th>CW32 RF series</th>
<th>core</th>
<th>modulation</th>
<th>Protocol class</th>
<th>Working frequency band (MHz)</th>
<th>output power (dBm)</th>
<th>sensitivity (dBm)</th>
<th>Working current (RF part)</th>
<th>Max. Frequency (MHz)</th>
<th>FLASH (KB)</th>
<th>RAM (KB)</th>
<th>GPIO</th>
<th>communication interface</th>
<th>working voltage (V)</th>
<th>Operating Temperature (°C)</th>
<th>Package</th>
</tr>
</thead>
<tbody>
<tr>
<td>CW32R031C8</td>
<td>M0+</td>
<td>GFSK</td>
<td>2.4G private, Bluetooth Beacon</td>
<td>2400~2483</td>
<td>-40~+10</td>
<td>-88@1Mbps</td>
<td>Sleep: 100nA RX: 20mA TX: 25mA@0dBm</td>
<td>48</td>
<td>64</td>
<td>8</td>
<td>31</td>
<td>1xIIC 1xSPI 3xUART</td>
<td>2.2~3.6</td>
<td>-40~+85</td>
<td>QFN48</td>
</tr>
<tr>
<td>CW32W031R8</td>
<td>M0+</td>
<td>ChirpIoT</td>
<td>proprietary protocol</td>
<td>370<del>590 740</del>1180</td>
<td>-7~+22</td>
<td><a href="mailto:-140@62.5kHz">-140@62.5kHz</a></td>
<td>Sleep: 400nA RX: 12.5mA@DCDC TX: 25mA@0dBm</td>
<td>48</td>
<td>64</td>
<td>8</td>
<td>33</td>
<td>1xIIC 1xSPI 3xUART</td>
<td>LDO1.8<del>3.6 DCDC2.0</del>3.6</td>
<td>-40~+85</td>
<td>QFN64</td>
</tr>
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</table>

CW32W031 embedded low-power long-distance ChirpIoT™ The RF subsystem operates in the frequency bands of 370MHz~590MHz and 740MHz~1180MHz, supports half duplex wireless communication, supports low-speed modes of 0.08kbps~20.4kbps, supports automatic identification of spreading factors and CAD functions, and has high anti-interference, high sensitivity, low power consumption, and ultra long distance communication characteristics, suitable for long-distance wireless connections.

CW32R031 supports the communication frequency range of 2400MHz~2483MHz, is compatible with BLE and XN297L data packets, has a programmable output power of up to +10dBm, has a good reception sensitivity of -88dBm, supports automatic response and automatic retransmission functions, and is suitable for short distance wireless connections.
**CW32R031 application field**
Remote control, e-cigarettes, drones, toys, electronic fences, electronic tags, lighting, door locks, keyboards and mice, and other products.

**CW32W031 application field**
Wireless automatic meter reading, long-distance data communication, smart home, industrial Internet of Things, smart agriculture, supply chain logistics, etc.
R&D SUPPORT

- R&D data
- Development tools
- Development Environment and Technology Forum
Standard Peripheral Libraries and Examples

Provide example codes for testing items of IEC 60730 / IEC 60335 Class B specifications.

Product Materials on Official Website
(Datasheets, User Manuals, Libraries, Application Notes...)

www.whxy.com
Development tools

Evaluation Boards

Debuggers

CW-DAPLINK: DAP-based debugger for CW32 MCUs, no driver required

General SWD debuggers, e.g. JLINK

Programmers

CW-Writer: for CW32 MCUs online/offline programming, with port to automatic programming machine

Referring to the application note about CW32 MCU ISP protocol, 3rd parties also provide compatible programmers
Software IDE

Development Environment and Technology Forum

Technical Exchange Forum