Dedicated to comprehensive quality and customer support

AMKOR TEST SERVICES
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AMKOR TESTS A VARIETY OF DEVICES, ACROSS MANY MARKETS
A HISTORY OF QUALITY

With knowledge gathered from decades of supporting Tier 1 and emerging industry leaders, Amkor understands that test solutions must address advanced technology, quality, performance and cost of test. Through early engagement in each customer’s product lifecycle, Amkor helps define test strategies and intelligent equipment selection to provide differentiated test solutions.

WHO IS AMKOR?

Amkor provides comprehensive test services that complement wafer-level and package assembly.

We are the #1 OSAT supplier for Automotive.

Amkor has a vast array of test capabilities and rich experience in device testing.

Markets
- Automotive & Industrial, Communications, Networking, Computing and Consumer

Applications
- Analog/Mixed Signal, Digital, Imaging, Memory, Power/Discrete, PMIC, RF, Sensors & Actuators and SoC(s)

Advanced Packages
- 2.5/3D, Cavity MEMS, fine pitch Cu pillar, MCM (Multi-Chip Module), advanced SiP, SWIFT®, WLCSP, WLFO
ACCURATE AND THOROUGH TEST SERVICES

Wafer probe, final test, strip test, film frame test, system level test, post-saw test, opens/shorts test, burn-in and complete end-of-line.

24/7
Operation of fully networked test floors

Full range of test consultation, development and engineering services across our customer’s product lifecycle

IN 2016 WE TESTED
>7 BILLION UNITS
USING
>2,500 TESTERS

OUR SITES ARE STRATEGICALLY LOCATED
near leading foundries, major customer sites and co-located to support probe with bump/WLCSP and test with assembly

Co-location benefits include:
FAST feedback
STREAMLINED logistics and
SHORTER cycle times

LOCATIONS & SERVICES

PORTUGAL
- Wafer probe
- Communication, Memory experience, RF
- WLFO
- UFLEx RF, Rack & Stack, T5XXX
- Test development

SHANGHAI
- Wafer probe/Package test, Film frame test, System level test
- Communication, Memory
- Bumping, FC, CSP, MLF®, PBGA
- 93K, UFLEx, FLEX, J750, Magnum, T5XXX
- Test development

TAIWAN
- Wafer probe/Package test, Film frame test
- Communication, Gaming, PC
- Bumping, FC, WLCSP
- 93K, UFLEx, FLEX, J750, T2K, ETS, LTX, T6XXX, STS

MALAYSIA
- Package test
- Power, Discrete
- TO-220FP, SO8-FL, TSON8-FL, SONXXX-FL
- TESEC, CATS, ITS, Tsuruga

KOREA
- Wafer probe/Package test, Film frame test, System level test
- Automotive, Consumer, Communication
- Bumping, FC, CSP, MLF®, TSV, TMV®, TQFP
- 93K, UFLEx, FLEX, J750, T5XXX, T2K
- Test development

JAPAN
- Wafer probe/Package test
- Automotive, Consumer, Memory
- FC, PBGA, QFN
- 93K, UFLEx, FLEX, J750, T2K, Magnum, T65XX
- Test development

JAPAN (J-DEVICES)
- Wafer probe/Package test
- Automotive, Consumer, Memory
- FC, PBGA, QFN
- 93K, UFLEx, FLEX, J750, T2K, Magnum, T65XX
- Test development

PHILIPPINES
- Wafer probe/Package test, Film frame test, System level test, MEMS test
- Automotive, Consumer, Memory
- MLF®, Leadframe, QFP, Burn-in
- 93K, FLEX, J750, T2K, Magnum, ETS, LTX, D10, ASLX
- Test development
Amkor has an extensive equipment fleet and continues to invest in new capabilities required to test the latest devices.

Primary testers, probers and handlers include:

### TESTERS

<table>
<thead>
<tr>
<th>APPLICATION</th>
<th>MIXED SIGNAL</th>
<th>POWER ANALOG</th>
<th>RF</th>
<th>MEMORY</th>
<th>CIS</th>
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<tbody>
<tr>
<td>PS400/800, T657X, I-FLEX, J750, Catalyst, SX-37XX</td>
<td>PS1600, T2000, UFLEX, Diamond</td>
<td>ETS88/364, J750, ASLX, EVA100</td>
<td>I-FLEX RF, Catalyst RF, PAX, NI-STS</td>
<td>T537X, T558X, Magnum 1, Magnum 2, Magnum 2x</td>
<td>IP750</td>
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<td>PS1600, T2000, UFLEX, Diamond</td>
<td>PS1600, T2000 IPS, UFLEX, J750EX/HD</td>
<td>PS1600 (PS-RF), UFLEX, (UW-12G/24G)</td>
<td>PS1600 (WS-RF), PAX-II</td>
<td>T5503/HS, T5832/33, T5851, Magnum V (VU)</td>
<td>T2000 ISS</td>
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<td>Chroma 3650</td>
<td>ETS800</td>
<td>ETS800</td>
<td>PS1600</td>
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**ROADMAPS FOR TESTING**
TESTERS FOR NAND

<table>
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<tr>
<th>Data Transfer Rate (bps)</th>
<th>Tester Model Name/Spec.</th>
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<tbody>
<tr>
<td>8G</td>
<td>T537X (286 Mbps)</td>
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<tr>
<td></td>
<td>T5588 (800 Mbps)</td>
</tr>
<tr>
<td></td>
<td>Magnum 2x (800 Mbps)</td>
</tr>
<tr>
<td></td>
<td>Magnum V (1.6 Gbps)</td>
</tr>
<tr>
<td></td>
<td>T5851 (2.4 Gbps)</td>
</tr>
<tr>
<td>5G</td>
<td></td>
</tr>
<tr>
<td>4G</td>
<td></td>
</tr>
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<td>3G</td>
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<td>800M</td>
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<td>500M</td>
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<tr>
<td>400M</td>
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<tr>
<td>300M</td>
<td></td>
</tr>
<tr>
<td>200M</td>
<td></td>
</tr>
<tr>
<td>100M</td>
<td></td>
</tr>
<tr>
<td>11.6 Gbps (UFS 2.0 G4)</td>
<td>PCIe Gen3</td>
</tr>
<tr>
<td>5.8 Gbps (UFS 2.0 G3)</td>
<td>PCIe Gen2</td>
</tr>
<tr>
<td>2.9 Gbps (UFS)</td>
<td></td>
</tr>
<tr>
<td>1.6 Gbps</td>
<td></td>
</tr>
<tr>
<td>1.33 Gbps (Toggle 4.0)</td>
<td></td>
</tr>
<tr>
<td>800 Mbps (Toggle 3.0)</td>
<td></td>
</tr>
<tr>
<td>533 Mbps (Toggle 2.0)</td>
<td></td>
</tr>
<tr>
<td>400 Mbps (Toggle 2.0)</td>
<td></td>
</tr>
<tr>
<td>200 Mbps</td>
<td></td>
</tr>
<tr>
<td>133 Mbps (Toggle 1.0)</td>
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</tr>
</tbody>
</table>

PROBERS

- 300 MM WAFER PROBE:
  - >±1.5 µm
  - *P12XL, *UF3000, *OPUS3

- 200 MM WAFER PROBE:
  - >±4.0 µm
  - P8XL, UF200

- FILM FRAME PROBE:
  - >±2.0 µm
  - FP200A

*Tri-Temp option, **Tri-Temp option for FFP
# HANDLERS

<table>
<thead>
<tr>
<th>APPLICATION</th>
<th>MATURE</th>
<th>MAINSTREAM</th>
<th>QUALIFICATION</th>
</tr>
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<tbody>
<tr>
<td><strong>PICK &amp; PLACE</strong></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>TURRET</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BOWL</td>
<td>&gt;4 SITES</td>
<td>&lt;8 SITES</td>
<td>&gt;16 SITES</td>
</tr>
<tr>
<td>NX16/32 XD248</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BOWL</td>
<td>&gt;4 SITES</td>
<td>&lt;8 SITES</td>
<td>&gt;16 SITES</td>
</tr>
<tr>
<td>NY20 FT2018</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>FILM FRAME</td>
<td>&gt;4 SITES</td>
<td>&lt;8 SITES</td>
<td>&gt;16 SITES</td>
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<tr>
<td>NY32W PM38</td>
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</tr>
<tr>
<td><strong>GRAVITY</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;4 SITES</td>
<td>&gt;8 SITES</td>
<td></td>
<td></td>
</tr>
<tr>
<td>*SO1000 *SO2000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>*ZEUS</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>MEMORY</strong></td>
<td>&lt;128 SITES</td>
<td>&lt;256 SITES</td>
<td>&gt;512 SITES</td>
</tr>
<tr>
<td>HT3309 M6771</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M6300 TW350HT M6242 M6243</td>
<td></td>
<td></td>
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</tr>
<tr>
<td><strong>STRIP/FILM FRAME</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>*InStrip HT3323A</td>
<td>&gt;384 SITES, STRIP</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FH1200 SH5000 SH3000 SO3000 *Jaguar</td>
<td></td>
<td></td>
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<tr>
<td><strong>SLT</strong></td>
<td>HT3016 (x12) Chroma 3260 (x6)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>SENSOR/ACTUATOR</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CUSTOM</td>
<td>PM35 (x8) – microphone NX32 (x8) – microphone XD248 (x4) – e-compass NX16 (x1) – Hall sensor PM35 (x8) – humidity/temperature</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOTAL SOLUTION</td>
<td>InStrip – Accel/Gyro OSAI (x140) – Pressure</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Tri-Temp, **Active Thermal Control (ATC), ***Both
There are many benefits to partnering with Amkor for full turnkey solutions, including wafer processing, advanced bump, wafer probe, assembly, final test, system level test, burn-in and end-of-line services.

**WAFFER PROBE**

- 25 years experience spanning 4”-12” (300 mm) wafers at 14 nm and below
- Logic, Mixed Signal, Analog and RF including high power (>100A)
- Multiple probe card technologies: cantilever (<1 GHz), vertical (up to 40,000 probes), pogo, membrane (>4 GHz), MEMS and dual-level CoW

**PROBE TECHNOLOGY**

<table>
<thead>
<tr>
<th>Cantilever</th>
<th>Cu Pillar Bump</th>
<th>Membrane</th>
<th>MEMS</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSP&lt;sup&gt;®&lt;/sup&gt;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pogo Pin</td>
<td></td>
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</tr>
</tbody>
</table>

**FINAL TEST**

- Automatic Test Equipment (ATE)
  - Singulated up to x16/x32 parallelism
  - Massively parallel NAND
  - Strip, massively parallel
    - Leadframe (x308)
    - Saw MLF<sup>®</sup> film frame
    - InCarrier
- System Level
  - Synchronous & asynchronous
- Specialized Solutions
  - SiP – using distributed test flows
    - 2.5/3D in-situ

**BURN-IN**

- Development Services
- Automotive (MCC)
- Analog (Shikino HighTech)
- MCU (Shikino HighTech)
- SoC (STK)
- Memory (STK, JEC, AEHR)
  - Small MLF strip (x960)
- NAND
AMKOR LOWERS THE COST OF TEST

In an effort to lower the cost of test, Amkor also offers massively parallel strip test and full test software and hardware development.

MASSIVELY PARALLEL STRIP TEST

For applications with long test times and lifecycles such as serial EEPROM, microcontrollers, power management and op amps, parallel testing in a strip format is cost effective. By utilizing Amkor’s highest density leadframe (XDLF) process, high parallelism is achieved – up to 300 units per touch down.

TEST DEVELOPMENT

Some customers develop their own complete test solutions and offload to Amkor for production. Amkor can enable co-development, or full development, of complete test software and hardware solutions. Engage with us early in the product design for maximum impact, or come to us later in the product lifecycle for significant cost savings with migrations to more cost effective testers and/or higher parallelism.

Working collaboratively with customers, Amkor ensures:

▶ Novel low cost
▶ Robust solutions with first-pass yield
▶ One-stop accountability
▶ Close linkage to Amkor bump and assembly

Whether a customer needs to bring up NPI or reduce costs and achieve higher throughput, Amkor offers full service test development and draws upon a large existing tester fleet. New testers are only recommended as a last resort.

ASSEMBLY FORMAT

<table>
<thead>
<tr>
<th>PACKAGES</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Std Leadframe</strong></td>
</tr>
<tr>
<td>➤ TQFP up to 64 lead, 10 x 10 mm²</td>
</tr>
<tr>
<td>➤ SOIC (mil): N (150), W (300), Std (208) mil</td>
</tr>
<tr>
<td>➤ TSSOP up to 28 lead (3.0 and 4.4 mm body sizes)</td>
</tr>
<tr>
<td>➤ PDIP up to 8 lead</td>
</tr>
<tr>
<td>➤ LGA 12 x 12 mm²</td>
</tr>
<tr>
<td><strong>Film Frame (FH1200)</strong></td>
</tr>
<tr>
<td>➤ Saw MLF® up to 7 x 7 mm²</td>
</tr>
<tr>
<td><strong>InCarrier</strong></td>
</tr>
<tr>
<td>➤ Saw MLF (including various sensors/actuators (MEMS))</td>
</tr>
</tbody>
</table>

PACKAGES

TYPICAL TEST DEVELOPMENT CYCLE TIMES

Month 0

- Planning
- Proposal S.O.W. P.O.

Month 1

- Development
- Socket Load Board Interface (3~4+ weeks)
- PIB Probe Card (4~8+ weeks)

Month 2

- SW Development
- Program Dev. (3~4+ weeks)
- Debug (2~3+ weeks)
- Corr/Qual. (1+ weeks)

Month 3

- Production
- Release HVM

LEAD-TIME PER APPLICATION

▶ Logic/Mixed: 6 ~ 8 weeks
▶ Analog: 8 ~ 10 weeks
▶ RF/MEMS: 12 ~ 14 weeks

Note: Development lead-time can vary depending on customer test requirements.
Amkor is the number one automotive OSAT, supporting major Asian, US and European supply chains. Products in this area include infotainment and safety requiring high levels of performance. This requires a much more comprehensive set of test requirements.

- High-quality, standards-compliant processes and systems
- Added inspections and tri-temperature multi-temperature test capabilities
  - Wafer probe at -55°C to +200°C
  - Final test at -55°C to 175°C
  - Burn-in
- Leverage cold wafer probe and perform only room and hot temperature final test
- Supplement post assembly final (functional) test with outgoing post assembly opens/shorts testing, includes 2/4 wire O/S: 2/4 wires Kelvin

**CURRENT SOLUTIONS**

- Large body SiP (Infotainment) using tri-temperature System Level Test
- ABS & Electronic Control Unit (ECU) test (MLF®, QFP)
- ADAS test (FCBGA)
- IoT (MCU, RF & sensors/actuators)
- Specialized test for electric vehicle components – inverters, converters

**IN DEVELOPMENT**

- mmWave radar component test – wafer & die-level
- Solutions for LIDAR
- AEC-Q100 grade zero compliant burn-in solutions

AMKOR IS THE NUMBER ONE AUTOMOTIVE OSAT SUPPLIER
COMMUNICATIONS

Over 40% of Amkor’s revenue is derived from Communications (smartphone, tablets and handheld devices). Our leading edge test solutions keep pace with rapid changes in cellular and connectivity technology requirements. Amkor is already well positioned for 5G wireless and its new test requirements – working with leading customers and ATE suppliers, we have next generation RF test capability in place.

▶ Leverage RF wafer probe capabilities – known good die (KGD) for WLCSP and known tested die (KTD) for SiP
▶ Multi-site x8 RF test to lower cost
▶ Augment ATE coverage with SLT (protocol test)
▶ Address complex SiP with simple SLT
▶ SoC + memory PoP – double side test/stack CSP – memory and logic test
▶ Advanced ATE w/32 port and 6G
▶ Local RF shielding ≤60 dBm
▶ NI-STS for front end RF, SiP and IoT
▶ Asynchronous test for different RF connectivity standards

CURRENT SOLUTIONS

▶ Memory interface test through logic or modem die
▶ DRAM test at system level test and memory fuse blow through logic die
▶ Top/bottom socket with 0.3 & 0.35 mm pitch respectively
▶ LTE-A, WLAN, Bluetooth, GPS, Zigbee
▶ RF front end (Antenna, Switch, Filter, PA, LNA)
▶ Transceiver, connectivity (Bluetooth, Zigbee, WLAN), GPS
▶ RF MEMS, Passive On Glass (POG)
▶ Fine pitch TMV®/MeP
▶ Mobile AP & BB PoP
▶ Mobile modem & memory stack CSP
Amkor is a leading provider of high performance test solutions for the demanding networking and computing market – where five nines (99.999%) or higher uptime is expected. We have multiple customers supplying SiP(s), SoC(s) and components into these markets (servers, routers, switches, PCs, laptops and peripherals). Integral to these markets are storage technology and migrations from hard disk drives to solid state drives (SSD). In addition, Amkor has a strong array of NAND test capabilities.

- Distributed test (wafer probe, in-situ test between key assembly steps and final test (SLT and ATE) for 2.5D)
- Active thermal control for 300 watt products across tri-temperature in SLT and ATE test
- Probe solutions and wafer map management for chip on wafer (CoW)
- Dynamic burn-in
- Test during burn-in (TDBI)
- Film frame and strip test (x308 EEPROM)

CURRENT SOLUTIONS

- >2 TB bandwidth in package
- High performance >3 GHz DDR4
- Memory interface test through logic die
- UFS Protocol system-level test
- PoP, MCP
- eMMC (NAND + controller), MCP (SDRAM + NAND)
- MicroSD, SSD, UFS

TESTER ROADMAP FOR MEMORY

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<tr>
<td>eMMC400/533/667</td>
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</tr>
<tr>
<td>Toggle 533/800/1.XG</td>
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</tr>
<tr>
<td>LP-3 1600/2133</td>
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<tr>
<td>LP-4 3200/4266</td>
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<tr>
<td>SCM ~3200</td>
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<tr>
<td>T5371/2/5</td>
<td>Magnum 2x</td>
<td>Magnum V</td>
<td>T5832 Scalable</td>
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</table>
DIFFERENTIATED TEST BY MARKET

POWER/DISCRETES

Amkor is a world leader in power discrete devices, with test services that are closely integrated with assembly flow for shorter cycle times and reduced costs. Unique requirements include:

- High current, high voltage
- Adequate thermal capacity
- Kelvin contact-type tests
- Low $R_{ds(on)}$

HIGH-VOLUME PRODUCTS AT AMKOR INCLUDE:

- Intelligent power modules
- Multi-voltage FETs
- Flip-chip MOSFETs
- Insulated-Gate Bipolar Transistors (IGBT)
- Diodes
- Regulators and bipolar transistors for the automotive, power transmission and industrial segments

TEST EQUIPMENT OFFERINGS

<table>
<thead>
<tr>
<th>COMPANY</th>
<th>MODEL</th>
<th>TEST ITEM</th>
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<tbody>
<tr>
<td>Tesec</td>
<td>881-TT, 351-TT, 341-TT</td>
<td>DC</td>
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<tr>
<td>ERD</td>
<td>CMS-100S8 Series</td>
<td>Rg DC</td>
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<td>VS240AN, DTS-241</td>
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<tr>
<td>Hokuto</td>
<td>AT-999 Series AM-083</td>
<td>VDSX (SUS)/VCEX (SUS)/$trr$/$V_{surge}$</td>
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<tr>
<td>CATS</td>
<td>DV-240 Series</td>
<td>$\Delta V_{DS}/\Delta V_{BE}$</td>
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<td>Minekoon</td>
<td>615-SW</td>
<td>Switching test ($trr/I_{rr}/t_{off}/t_{on}/I_{Latch}$)</td>
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<td>ITC</td>
<td>ITC55100C</td>
<td>UIS</td>
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<td>Shibasoku</td>
<td>WL-22, WL-25</td>
<td>IC</td>
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<td>Power Tech</td>
<td>QT-4100 Series QT101</td>
<td>DC UIS</td>
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<td>Series</td>
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<td>POWorld</td>
<td>VC6700</td>
<td>Transient test</td>
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HANDLERS MANUFACTURER

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<td>Ueno Seiki</td>
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<td>Turret</td>
<td>Sowa</td>
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<td>KES</td>
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<td>SRM</td>
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DIFFERENTIATED TEST BY MARKET

SENSORS & ACTUATORS (MEMS)

Products for today's Internet of Things require an MCU, RF transmitter/receiver, sensors and actuators. The test solution needs to cover conversion of physical real-world analog signals into electrical data and processing of the data to determine if the product is good or not.

<table>
<thead>
<tr>
<th>TYPE</th>
<th>TEST APPLICATION</th>
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<tbody>
<tr>
<td>Magnetometer</td>
<td>3-Axis, 0 to 10 gauss, 0.1° accuracy</td>
</tr>
<tr>
<td>Accelerometer</td>
<td>3-Axis, Low-g, High-g, Strip test</td>
</tr>
<tr>
<td>Gyroscope</td>
<td>3-Axis yaw rate, Gyroscope test</td>
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<tr>
<td>Microphone</td>
<td>Sound stimulus for both top-port/bottom/port</td>
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<tr>
<td>Pressure</td>
<td>0 to 20 bar, Strip test, Bench characterization</td>
</tr>
<tr>
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<td>6-10 Degrees of Freedom (DoF)</td>
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<td>Optical</td>
<td>Auto-focus, Microdisplay, Picoprojectors</td>
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<td>Timing devices, Switch/Varicaps, BFilters, Duplexers</td>
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<thead>
<tr>
<th>TYPE</th>
<th>TEST APPLICATION</th>
</tr>
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<tbody>
<tr>
<td>Magnetometer</td>
<td>3-Axis, 0 to 10 gauss, 0.1° accuracy</td>
</tr>
<tr>
<td>Accelerometer</td>
<td>3-Axis, Low-g, High-g, Strip test</td>
</tr>
<tr>
<td>Gyroscope</td>
<td>3-Axis yaw rate, Gyroscope test</td>
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<tr>
<td>Microphone</td>
<td>Sound stimulus for both top-port/bottom/port</td>
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<tr>
<td>Pressure</td>
<td>0 to 20 bar, Strip test, Bench characterization</td>
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**INERTIAL**

- Magnetometer: 3 Gauss, x144, 10 Gauss, x256
- Accelerometer: Up to 180°/sec, x144, Up to 90°/sec, x256
- Gyroscope: Accuracy <0.5%, x144, <0.1%, x256
- 6DOF, 9DOF: x72, x144, x256

**RF**

- Oscillator/Filter: x4/x8, x16, x32

**OPTIC**

- IR/RGB/UV: Accuracy <0.3%, x32, Accuracy <0.1%, x64

**ENVIRONMENT**

- Microphone: SNR 70 dB, THD 130 dB, x35, SNR 73, THD 135 dB, x64
- Humidity/Temperature: Accuracy ±1°C, x144, Accuracy ±0.5°C, x256
- Pressure: Stable time <1 sec, 20 bars, x96, <0.5 sec, 20 bars, x144

**MICROFLUIDICS**

- x2, x4/x8

**Development Ongoing**

<table>
<thead>
<tr>
<th>2016</th>
<th>2017</th>
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<th>2019</th>
<th>2020</th>
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<tr>
<td>Amkor Development/Production</td>
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<tr>
<td>Development Plan</td>
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</table>

Amkor Test Services | amkor.com
OTHER AMKOR TEST SERVICES AND PROCESSES

FULL END-OF-LINE PROCESSING
- Bake
- Scan
- Pack
- Ship
- Finished good services

ROBUST FACTORY AUTOMATION (CIM/CAM)
- High levels of quality and efficiency
- RFID and hardware control
- Auto test program loading
- Utilization monitor
- Yield monitor
- Data analysis
- Report automation

OPERATIONAL EXPERIENCE
- Fully automated production environments
- Fast and accurate operation by skilled operator and system

TECHNICAL SUPPORT
- Advanced solution for advanced package (PoP/TSV/fcCSP/FCBGA)
- High quality advanced equipment and quick technical support

EXTENSIVE FAILURE ANALYSIS
Non-Destructive Analysis
- E/L Bench Test
- X-ray
- Scanning Acoustic Tomograph

Destructive Analysis
- Decapsulation
- Grinder: X-section
- Microscope
- Field Emission Scanning Electron Microscope

Die-Level Analysis
- Photo Emission and OBIRCH
- Thermal Emission

EQUIPMENT CAPACITY
- Full range of services: laser mark/FVI/bake/tape & reel/dry-pack
- Various material suppliers for tape & reel and packing

GLOSSARY
ABS: Anti-lock Braking System
ADAS: Advanced Driver-Assistance Systems
ATE: Automatic Test Equipment
CoW: Chip on Wafer
CSP: Chip Scale Packaging
EEPROM: Electrically Erasable Programmable Read-Only Memory
GPS: Global Positioning System
LIDAR: Light Detection and Ranging
LNA: Low Noise Amplifier
MCP: Multi-Chip Packaging
NAND: Non-volatile storage memory
PMIC: Power Management Integrated Circuit
SiP: System in Package
SLT: System Level Test
SoC: System on Chip
UFS: Universal Flash Storage
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