

EstradaEM

Integrated Wafer-Level Test Cell for Electromigration

Overview

The Estrada™ turnkey wafer-level reliability (WLR) test system for electromigration (EM) accelerates reliability evaluation of integrated circuit interconnect technologies. This wafer-level implementation of both conventional and accelerated wafer-level EM test provides a practical means of bypassing the packaging step required for traditional package-level reliability (PLR), yielding faster results which correlate well to baseline PLR data. Estrada-EM comprehensive WLR test cells for 300 mm wafers are designed specifically to meet the unique challenges of EM WLR requirements, such as very high temperatures and prevention of copper oxidation. These inclusive, pre-validated configurations simplify specifying, deploying, and supporting WLR EM.



Everything needed for EM and stress migration (SM) testing directly on the wafer is provided by the Estrada-EM high-performance integrated measurement solution. Estrada-EM systems marry the industry's gold standard for engineering probe stations (including innovative, patented PureZone™ nano-chamber technology for oxygen-free testing) with a proven fast parallel reliability test system and high-performance probe cards. Don't risk delays or lose productivity when an optimized solution is already available from industry leader FormFactor.

Features / Benefits

Fast Results

- No delays for packaging, delivering answers days to weeks earlier for conventional intrinsic EM and stress migration (SM)
- Broad test suite includes fast wafer-level tests such as standard wafer-level EM accelerated test (SWEAT) and isothermal EM
- High temperature (350°C) test capability to cut test time compared to other (300°C) WLR options
- Oxygen-free PureZone nano-chamber for testing partially processed wafers (no passivation/capping)
- Automatic, camera-based realignment after TCR temperature changes to eliminate waiting for operator
- High-parallel DUT capacity for faster reliability study completion and better statistics

Data Integrity

- Continuous monitoring and fast sampling to capture momentary events (rapid void formation, self-healing)
- PLR correlation by using same accurate source measurement circuitry
- Programmable compliance and CVEM capability to prevent false failures and enable failure analysis
- Elimination of latent ESD and water damage to DUTs from dicing, bonding, and handling packages
- Oxygen-free nano-chamber environment which prevents copper oxidation during test

Confidence

- Fast path to first data with comprehensive, pre-validated solutions
- Single source for specification, ordering, installation, and support
- Worldwide support network, with local teams throughout Asia, U.S., and Europe

➤ Available Pre-Configured Packages



BLP Packages



BLN Packages



BFP Packages

For oxygen-free (purged) 300 mm semi-automated full-wafer testing

For non-purged (purge-ready) 300 mm semi-automated full-wafer testing

For oxygen-free (purged) 300 mm fully-automated full-wafer testing

For Constant Current EM, Constant Voltage EM, Low Frequency Pulsed EM, SWEAT, Isothermal EM, and SM

25 mA per DUT, 10 V, 10 Hz

BLP-MPE package
Up to 64 parallel DUTs

BLN-MPE package
Up to 64 parallel DUTs

For Constant Current EM, SWEAT, Isothermal EM and SM

±200 mA per DUT, 40 V

BLP-SEM package
Up to 64 parallel DUTs

BLN-SEM package
Up to 64 parallel DUTs

For Constant Current EM and SM

5 mA per DUT, 10 V

BFP-UHA-Q package
Up to 64 parallel DUTs

➤ Available Pre-Configured Packages

Subsystem	Key Specifications
CM300xi probe station	<ul style="list-style-type: none"> • Semi-automated or fully-automated station • 35°C~350°C chuck and thermal system for broad test temperature range • Patented PureZone nanochamber with nitrogen purge capability to remove oxygen from test environment • Shielded Microchamber® for low-noise measurements • eVue™ digital microscope and VueTrack™ technology for camera-assisted alignment and stepping, including automatic multisite realignment after TCR temperature changes • Motorized large-area bridge for multisite probe alignment • Velox™ productivity software • See CM300xi data sheet and product highlights, as well as Velox product highlights
Material Handling Unit (MHU)	<ul style="list-style-type: none"> • FOUP/FOSB cassette compatibility • Up to two probe stations per MHU
Symphony™ full-featured reliability test system with Conductor software	<ul style="list-style-type: none"> • Modular, scalable, compact WLR test system • Up to eight Application Modules of mixed types for high-parallel DUT capacity system with Zeus reliability experiment software • Test executive software to automate test execution including stepping • See Symphony data sheet
Multipurpose EM Application Module (“MPE” packages only)	<ul style="list-style-type: none"> • Constant Voltage EM, Constant Current EM, Low Frequency Pulsed Current EM, SWEAT, Isothermal EM, and Stress Migration test algorithms • Up to 25 mA per DUT, 10 V, 10 Hz, high-accuracy multi-modal source measurement units (SMUs) • Up to 16 DUTs in parallel per Module (128 max per Symphony) • True parallel stress/measurement, >40 Hz sampling • See MPEM Module data sheet
Standard EM Application Module (“SEM” packages only)	<ul style="list-style-type: none"> • Constant Current, SWEAT, Isothermal EM and Stress Migration test • Up to ±200 mA per DUT, ±40 V, broad operating range SMUs • Up to 16 DUTs in parallel per Module (128 max per Symphony) • True parallel stress/measurement, >100 Hz sampling • See SEM Module data sheet
Ultra High Accuracy EM Application (“UHA” packages only)	<ul style="list-style-type: none"> • Constant Current EM and Stress Migration test algorithms • Up to 5 mA/DUT, 10 V, high-accuracy SMUs • Up to 16 DUTs in parallel per Module (128 max per rack-mount 1164) • True parallel stress/measurement, >40 Hz sampling • See UHAEM Module data sheet
Celadon T350 probe card	<ul style="list-style-type: none"> • Up to 50 probes per test site • Up to dozens of edge-to-edge test sites per 300 mm multisite probe card optimized for target test temperature and TCE-compensated to match wafer thermal expansion • Up to 350°C continuous use • Sealed viewports to preserve oxygen-free environment and enable camera-based automatic card alignment

➤ Regulatory Compliance

CE certified, CB compliance tested, certified for US and Canada (cNRTLus)*, SEMI S-2 (BFP packages only). Thermal chuck and purge control accessories may require field labeling.

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➤ Available Options

Warranty*	Fifteen months from date of delivery or twelve months from date of installation
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Service contracts**	Single- and multi-year programs available to suit your needs
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* See FormFactor's Terms and Conditions of Sale for more details.

** Service contracts cover FormFactor equipment only – third-party items such as probe cards have manufacturer warranty only.

➤ Ordering Information

Consult factory for more detailed specifications, additional options, suitability of configuration for intended usage, part numbers, pricing, and delivery.

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