

**Preliminary**

## Semiconductor Burn-In – Model 5030



### High Power Semiconductor Burn-In Test System

#### Introduction

The 5030 Burn-In Test System is a large-scale, configurable burn-in system for high-volume production of semiconductor devices.

The Model 5030 can simultaneously burn in up to 32 different work orders, each with its own burn-in recipe consisting of voltage, temperature, burn-in time, digital test, etc.

Other features include:

- Multiple input and output lanes allow constant production without stopping for operator loading/unloading.
- Sophisticated DUT-level controls allow for automatic reduction of DUT voltage if current or temperature limits are exceeded
- Parametrics from up to 768 devices can be logged to a file every 400 milliseconds.
- Highly-efficient, two-phase refrigeration-based cooling allows the 5030 to achieve unprecedented DUT power levels while controlling DUT temperature.

#### Redefining the Economics of Semiconductor Burn-In

The Model 5030 provides complete turn-key burn-in capabilities for testing of high-power components such as microprocessors and other VLSI devices.

It achieves this while using a fraction of the floor space, electrical power, and personnel associated with previous-generation equipment

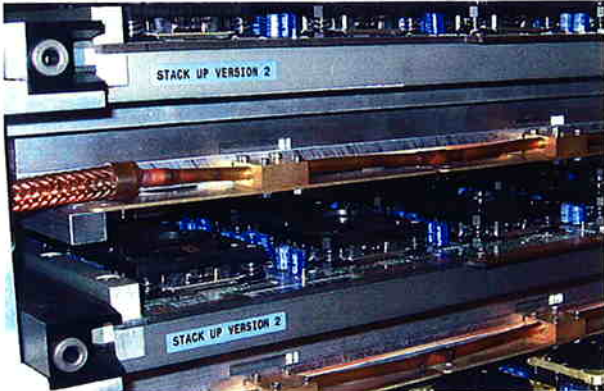
The 5030 achieves improved economics in a number of ways:

- Utilizes separate closed-loop temperature control of every DUT using a temperature sensing diode designed into the DUT. Since required burn-in times depend upon the temperature of the coldest DUT, this closed-loop feature helps to achieve burn-in times of 10 minutes or less.



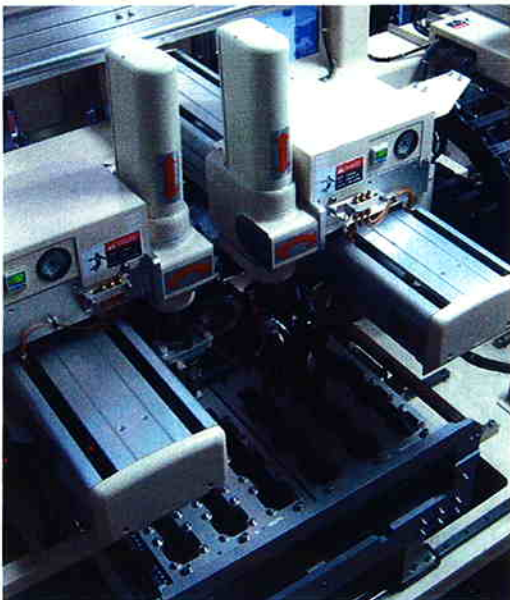
- ◆ **High-volume production system with 32 independently-configurable burn-in slots holding up to 768 devices**
- ◆ **3600W of DUT Power available per slot using your custom burn-in boards**
- ◆ **Individual DUT temperature and power control for all 768 devices**
- ◆ **Test and burn-in data monitored and logged every 400 milliseconds**
- ◆ **Proven robotic pick-and-place system to quickly move devices from station to station**
- ◆ **JEDEC tray loading and unloading**
- ◆ **JTAG testing up to 10MHz**
- ◆ **Supports multiple work orders being processed at the same time**
- ◆ **Full-featured IDE operating software with "Intellisense" and online Help**
- ◆ **Interfaces with Factory ERP and Manufacturing Execution Systems**
- ◆ **Dedicated and experienced world-wide training and support organization**

- Unlike batch-oriented burn-in systems, the 5030 processes components continuously using up to 32 separate “slots”, or mini-chambers. Together with full automation, the chamber utilization can be maintained above 90% because the 5030’s various components work continuously rather than performing in a “batch mode” found with most burn-in solutions. Continuous processing avoids backlogging of operations within the tool by spreading the workload requirements of critical resources such as the handler system out over time, thereby achieving continuous socket utilization and optimum throughput.



**Thirty-Two Separate Slots to Hold Up to 768 Devices**

- The 5030’s on-line slot repair allows for the system’s major elements to be removed and replaced safely during system operations. This feature together with the 5030’s inherent reliability and modular architecture, provide unsurpassed levels of tool availability.



**Dual Pick/Place Heads To Improve Speed**

- To improve efficiency and speed, we use two heads to pick and place both the tray and burn-in board loading areas. This improves the efficiency of the robotic handling speed.

These three factors, taken together with the 5030’s ability to fit in-line with your existing assembly/test product operations, provide for a burn-in cost per DUT that is substantially below that which is achievable using previous-generation tools.

**Ready for the Factory of the Future**

The 5030 was designed from the ground up to work in a linked factory environment rather than being yet another “island of automation”. Features such as full connectivity with your MES (manufacturing Execution System), user-definable process control rules database, fully implemented SECSII/GEM interface, support for DUT serialization control and DUT-specific data collection ensure that the 5030 remains a key part of your cost-cutting strategy well into the future.



**Multiple Load Ports for Safe Loading and Unloading of Devices During Operation.**

**Efficient with Large or Small Lots**

Whether you operate with small or large quantities of parts per work order, the 5030 keeps your factory efficient with features such as zero-downtime lot cascading, parallel lot processing, multiple Input and Output lanes, automated Burn-In Board (BIB) swap capability, and lot-specific burn-in recipes.



**32 Separate Hi-Capacity Power Supplies**

## Advanced DUT Protection Features

The 5030's independent DUT voltage and temperature control allow for the implementation of three unique DUT protection features:

1. *T<sub>j</sub> Fold* – Protects the DUT from an over temperature condition. The V<sub>CC</sub> (DUT power supply) will reduce or “fold” DUT voltage if the T<sub>j</sub> maximum setpoint limit is exceeded. This limit is adjustable via software commands.
2. *I<sub>CC</sub> Fold* – Feature monitors three DUT current parameters to form a comprehensive fault detection function.
  - I<sub>CCmax</sub> is monitored to detect gross short circuits
  - I<sub>CCmin</sub> detects an open socket/faulty DUT
  - I<sub>CCmedian</sub> is monitored to determine the presence of non gross shorts

All I<sub>CC</sub> parameters are adjustable via software.



Uses Standard JEDEC Handling Trays

## Model 5030 System Software

Our ActivATE™ software was especially configured to provide a constant stream of data to monitor V<sub>cc</sub>, I<sub>cc</sub>, Temperature, and Power – offering slot and DUT level electrical and thermal control. The software uses Microsoft's latest .NET technology to provide a very open architecture for user-defined extensibility and a very short TPS learning curve. There is specific online documentation and help as well as a fully-integrated debugger and test sequencer.

The .NET framework allows developers to focus on the architecture and the applications rather than the code. This technology supports very rapid development of extremely flexible, extensible and deployable tool sets that have a high level of software integration and connectivity. ActivATE™ test programs are robust and provide the “hooks” to easily tie into other applications, components, and libraries. This allows the test engineer to leverage off the

best technology and products; such as Mathwork Matlab for data analysis and modeling and Visual Studio .NET for GUI and application enhancements. A driver wizard helps the user rapidly create new tools and plug-in components that simply drop into the ActivATE environment. ActivATE™ also leverages Microsoft .NET's integration with Web services, which provides for additional flexibility in deployment of your test systems across physical boundaries.



5029 Option - 32 Burn-In Positions, Manual Loading

## 5029 Burn-In Chamber Only Option

The 5029 features the same burn-in and test chamber and operating software, but does not include the robotic handler section. This allows for manual insertion of device-loaded burn-in boards by operating personnel in situations where this is cost-effective or preferred.

All of the burn-in power and temperature specifications are the same.

## 5030-1 Single Slot Test Development Station

The 5030-1 is an engineering-level station to assist in the development of burn-in “recipes” and special configurations.

## World-Wide System-Dedicated Field Support

The 5030 and 5029 semiconductor burn-in systems are supported by factory-trained personnel located around the globe. All have received extensive training and have Internet access to documentation and training videos. When needed, they are supported by first-tier and engineering support dedicated to the semiconductor product line.

# SPECIFICATIONS & ORDERING INFORMATION

## Model 5030 SPECIFICATIONS

### ELECTRICAL PERFORMANCE

#### DUT Voltage

VRM9.1	+1.1 to +1.85 Vdc
VRM10	+0.8 to +1.60 Vdc
Resolution	VRM9.1 – 25 mV VRM10 – 12.5 mV
Slew Rate	3 W/μsec
Settling Time	< 1 sec
Accuracy	± 5 mV
Switching Noise	± 10 mV
Sample Freq	250 msec
Efficiency	75-85%

Other DUT voltages available upon request

#### DUT Current

Standard	160 A/DUT
Upgradeable	> 200 A/DUT
Meas. Accuracy	± 5%
Meas. Freq	250 msec

#### Power

Minimum	20 W/DUT
Maximum	3600 W/Slot

### HANDLER PERFORMANCE

#### Burn-In Board (BIB)

Dimensions	23in x 14in
Avg. Weight	20 lbs
Socket Actuation	
Force*	100 lbs (10 lbs)
Stroke	0.050 – 0.500in
Speed*	6 in/sec (1 in/sec)

#### JEDEC Trays Supported:

Standard Thick	322.6mm(L)x135.9mm(W)x12.19mm(H)
Standard Thin	322.6mm(L)x135.9mm(W)x7.62mm(H)

#### Conversions

Entire System	6 hrs
BIB	45 min
Pick & Place Heads	45 min

### THERMAL PERFORMANCE

#### Tj (DUT Junction Temperature)

Range	20 - 145°C
Over/Undershoot	
Start-Up	± 10°C
Transient	± 5°C
Control	
Accuracy	± 3°C
Freq	4 Hz
Sensing	
Accuracy	± 2°C
Freq	4 Hz
Resolution	≤ 0.25°C
Settling Time	< 20 sec

### DIGITAL TEST PERFORMANCE

JTAG Pattern Rate	10 MHz
Program & Pattern Memory	512 Mb
Pattern Memory Depth	100 Mb
Parametrics Recorded	400 msec
Each slot can execute unique test program	

### STANDARDS COMPLIANCE

SEMI: S2, S8, E5-0702, E30-1000, E37-0702, E37.1-702, E116-0702, E58-0697, E122-0303, E123-0303

## ORDERING INFORMATION

MODEL	DESCRIPTION	PART NUMBER
5030	32 Slot Chamber, Automated Handler	
5029	32 Slot Chamber, Manual BIB Handling	
5030-1	Single Slot Test Development Station	

 The CE Mark indicates that the product has completed and passed rigorous testing in the area of RF Emissions, Immunity to Electromagnetic Disturbances and complies with European electrical safety standards.

The EADS North America Defense Test and Services policy is one of continuous development, consequently the equipment may vary in detail from the description and specification in this publication.

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