Cook Your Chips and PCBs

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FOR FURTHER READING
called accelerated dynamic burn-in (ADBI), shows promise for detecting weak parts when combined with IDDQ testing.3 Though not yet ready for prime time, ADBI shows promise as efforts proceed to provide maximum reliability in minimum time.

More Stress Sooner
If you're burning-in VLSI devices you won't need ±0.1°C accuracy. Accuracy is nevertheless important, especially when considering the thermal mass of a flip-chip or C4 package can result in the device quickly reaching destructive temperatures in response to sudden changes in temperature.

Accurate Temperature Control
For best results, you'll want to electrically test your devices while subjecting them to environmental test (see "Control Chip Temperature During VLSI Device Burn-in," T&MW November/December 1991, April 1992). This compartmentalizes them. You have to choose a system that not only meets your environmental requirements but is compatible with your ATE system. In addition, your temperature control system must contend with accurate and rapid thermal cycles while providing test integrity.

Series thermal platforms cover a –65°C (LCO2) or –100°C (LN2) to +200°C range and offer 2x2-in. to 11x22-in. plate areas.

For thermal testing in the lab you have several choices. If your product uses a heat sink for direct-conduction cooling, you'll need a laboratory test chamber that brings a conductive heat sink or source into contact with each device on a burn-in board. If your product doesn't contain heat sink and you decide to use a forced-air system, you can employ a heating/cooling unit or a water-cooled system. For lower temperatures you'll need liquid CO2 to provide cooling down to –65°C.

A variety of thermal environmental-test products can help you test electronic devices and subassemblies and subject device to temperature extremes. They range from hot-box to walk-in chambers. In both, you'll find a plethora of vendors, test equipment, and temperature sources. (See "Environmental Stress Testing," T&MW November/December 1991, April 1992.)

Simultaneous burn-in and test can help verify that your devices will operate properly at temperature extremes. Integral 75-MHz JTAG signal generation enables the ScanPro from Unisys Unigen to burn-in JTAG devices while testing them. Many vendors combine environmental-test capabilities with other functions. For instance, this pick-and-place memory handler from Delta Design can condition devices at temperatures from –40°C to +195°C. It handles several surface-mount packages on TOS, BGA, PGA, LQFP, and QFP.

You don't necessarily need an environmental chamber to test your product's temperature performance. For example, the Model T95000 Thermofurnace system from Tenney Environmental (see Figure 1) can focus 2 to 6 SCFM (cubic feet per minute at standard room temperature, pressure, and volume) of heated or cooled air on a DUT.

Figure 1. Or you can use a temperature forcing system to deliver conditioned air to your ATE test site.