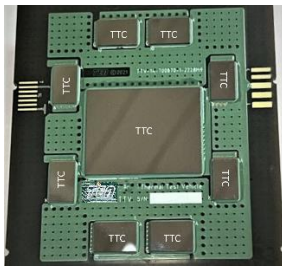


Thermal Test Vehicles for Thermal Management Solutions

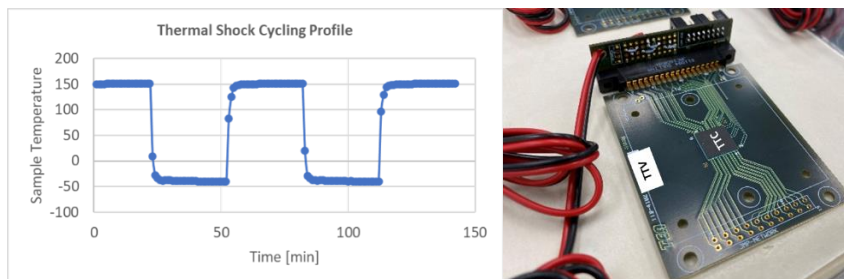
Dr. Dongkai Shangguan

Thermal Test Chips (TTC) from TEA, made in America, can accurately simulate the non-uniform power distribution (“hot spots”) of a real semiconductor chip, with embedded on-chip sensors (<100um in size) for real time and accurate temperature measurement of the chip, providing the capability for configurable power distribution and in situ temperature measurement on the chip - down to the scale of a Unit Cell (1mm x 1mm). Versatile, stable, and accurate TTCs can be a reliable thermal twin of various semiconductor chips, from chiplets as small as 1mm x 1mm, to large chips and interposers (up to 50mm x 50mm, or larger if needed).

With the TTC's (wire bonding or flip chip), TTV's can be developed in various packaging formats, such as BGA, LGA, COB, etc., as well as multi-chips per package to simulate system-in-package (SiP) that is often used for heterogeneous integration.



Recent testing by a large U.S.-based company has demonstrated the reliability of the TTV's from TEA, through 1000 cycles of -40C/150C thermal shock testing.



With the ability to use TTV's as a de facto standard tool, thermal management solutions can be optimized in fast iterations, in a real life environment (including power cycling), at different power levels, to assess the performance for different applications.



More information can be found at www.thermengr.net.