

Testing Methodologies and Test Systems for Thermal Interface Materials

Abstract

David L. Saums, Principal
DS&A LLC
Amesbury MA USA
Email: dsaums@dsa-thermal.com

Introduction and Outline

This presentation will include these topics:

- Testing methods and specific practices, especially for newly-developed TIM types that have specific constraints on both testing practices and applications, will follow. Gallium-containing TIMs, for example, must be considered for testing and for application requirements with an understanding of this corrosive metal and containment, to prevent damage to joining copper and aluminum surfaces and components.
- Testing methodologies including:
 - ASTM D 5470-17 for through-plane thermal conductivity and thermal resistance;
 - In-plane lateral testing methods;
 - Three-omega liquid, gel, and paste testing equipment and methods;
 - Transient (structure function) methods.
- Description of the use of thermal test vehicles (TTVs) for in-situ TIM testing for TIM0, TIM1, and TIM2.

The use of standardized testing per ASTM D 5470-17 yields the most consistent, accurate, and repeatable measurements. Transient test and thermal test vehicles (TTVs) are designed to produce in-situ test results that are very accurate but closely matched to a specific package type, surface characteristics, and other non-standard conditions. Understanding the differences and the sequence of testing procedures is therefore important.

This abstract is intended to be complementary to a technical session presentation on describing TIM developments, categorization, and selection for a wide range of semiconductor and component applications.