SolidWorks Flow Simulation Electronics Module

Thermal Resistance Interfacing Library

The SolidWorks Flow Simulation “Electronics” add-on module contains a handy library of products used for interfacing applications between electronic components (such as bonding or dielectric/insulator). The library is handy because it has built-in contact resistances (or “thermal resistance”) so you don’t have to call on a manufacturer, and enter data by hand. The command is “Flow Simulation, Insert, Contact Resistance”. You can pick “Pre-Defined/interface Materials” and see a list of interfaces from Bergquist, Chomerics, Dow Corning and Thermagon. The list is available for viewing in the Engineering Database, as shown in the graphic.

For example, an application can use an adhesive interface material from Bergquist called “Bond-Ply 660”. It is a thin, double-sided, adhesive-backed, polyimide film. In the application, it can be used to bond a metal heat sink to an electronic package, such as a CPU or other processor. The Bond-Ply provides a mechanical joint and thermal heat path connection between the processor and the heat sink.

Bergquist’s properties for Bond-Ply 660 are shown on the next page from a screen shot at their web site (www.bergquistcompany.com). You may be able to see the “Thermal Performance vs. Pressure” items at the bottom of the properties list. These are the data that are loaded into SolidWorks Flow Simulation, Electronics Module, for each and every material at various assembly pressures.
Thermal Tid-Bits The line-item labeled with thermal performance values are of interest, particularly the “Thermal Impedance” item. This characteristic is also known as the “Thermal Resistance”, or “Contact Resistance”. Of course you want this value to be as low as possible to get maximum heat transfer across the interface. You can see that increasing the pressure during assembly causes the value to decrease, which is associated with better performance of the product.

The manufacturer also conducted actual tests on a TO-220 integrated circuit package so you can observe what they call “Thermal Performance” on that package. In a nutshell, it shows the actual temperature drop across the interface between that package mounting surface area and a heat sink, per unit Watt of heat transferred out of the package. Again, you can see the “performance” of the Bond-Ply 660 adhesive tape increases with more assembly pressure. Keeping the temperature drop small is obviously a good thing so as to preclude excessive heating and possible failure of the function of the adhesive tape to efficiently transfer thermal energy or maintain a secure mechanical connection.

Please let us know if you have any questions!

GoEngineer Technical Support Team

support@goengineer.com

Toll free: 800 688 3234