

Thermasil™

Product Description:

American Standard Circuits, Inc. (ASC) has recently developed a wide range of thermal management materials and printed circuit board (PCB) packaging solutions to efficiently manage the heat generated during the electronic performance of the PCB assembly. One of such materials is called Thermasil™, which is a high temperature stable thermally conducting and electrically insulating bonding material. Thermasil™ technology the U.S. patent No. 7,540,081

The heat generated in electronic device circuit assemblies during operation can be effectively dissipated by a judicious selection of material, packaging concept, and design of the PCB assembly. ASC has the technical experience and capabilities to manufacture customer-specific thermally conductive interface materials, bond the circuitry layer with it to the heat sink laminate per the customer's requirements, machine complex heat sink shapes, and produce the PCBs of any complexity quickly.

Developed by ASC recently, Thermasil has also been granted a Trade Mark (Thermasil™) by the Trademark Office. This high-temperature mechanically, thermally and chemically stable dielectric bonding film is used to bond printed circuit boards with metal heat sinks made of aluminum, brass, or copper. Thermasil can be produced to any precise thickness from (3 to 20) ± 0.5 mil. The thermal conductivity can be tailored to suit the customer's specific requirements. Usually, a 40, 31, 62, 125 mil aluminum of 6061 or 5052 alloy type is used as the heat sink. The aluminum can be kept as is or given a final finish of chromate or electrolytic gold based on the customers needs. Other materials that can be used are brass, copper, and Osprey.

ASC provides the following thermal management solutions for the automotive and high frequency telecommunication industries. Since these interface materials are elastomeric, they easily conform to varying CTE values of the adjacent bonded layers. This means there will not be any delamination or crack formation during high temperature thermal cycles. Thus, the bonded PCB assembly can go through multiple reflow cycles without any risk of bond failure. All of these materials can function in a wide range of temperature, from -110 to 600 F.

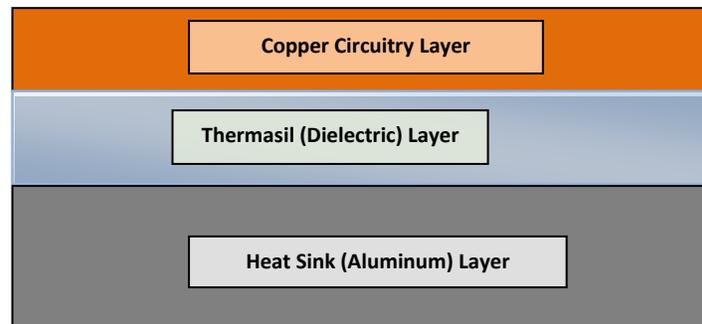
Thermasil can be tailored as per customer's requirements. Typical applications include:

- RF base stations and antenna
- Power supplies
- PCBs for LEDs
- Automotive (under the hood)
- Telecommunications (through-hole plating)
- Active power components such as resistors, capacitors, and inductors
- Computers: CPU, GPU, hard drives, ASICs
- Heat and Rail Forming
- Solid State Relays
- Motor Drives

Typical circuits using Thermasil bonding film are shown in the following images:



STACK UP



Physical Description:

The adhesive is a silicone based thermoplastic elastomer that utilizes both mechanical and chemical bonding mechanisms to insure reliable adhesion at the bond-line interface. With the proven stability under adverse environmental conditions of the silicone adhesives over several decades (in aerospace, land and water), Thermasil based PCBs will consistently deliver high performance over an extended life cycle. The thermal conductivity can be precisely varied anywhere from 1.5 W/mK (called pure AO Grade) to 4.5 W/m K (called pure BN Grade). For any of these vast range of conductivity, dielectric thickness can also be precisely tailored from (3 to 20) ± 0.5 mil to suit individual product requirements. The dielectric can be delivered as a free standing sheet or bonded to copper foil of 0.5 Oz to 4.0 Oz thickness, or as a Cu/Thermasil/Al bonded laminate with Al of 5052, 6061 or any other grade and thickness commercially available. Any of these can be sized from 6"x6" to 18"x24". Larger size formats possible, please inquire.

Physical Properties:

Property	6 MIL	Value	Method of Test
Thickness, mils		3 to 20	
Specific Gravity		1.55 to 1.75	
Durometer, Shore A		90 ± 5	ASTM D2240
Tensile (PSI)		1020 to 1030	ASTM D412
Elongation (%)		150	ASTM D412
Tear, Die B (PPI)		50	ASTM D624
Bond Strength, PPI		17 Minimum	ASTM D429
Continuous Operating Temp		260 Deg C (500 Deg F)	
Thermal Conductivity, W/m-K		1.5 to 4.5	ASTM C 408-82
Flame Retardance		Pass	UL94VO
Dielectric Constant		3.5±.2	INSTEK LCR Meter 817
Breakdown Voltage		50 kV	ASTM D-149-97

The information in this data sheet is intended to assist you in designing with ASC Thermal Management Materials. It is not intended to and does not create any warranties express or implied, including any warranty of merchantability or fitness for a particular purpose or that the results shown on this data sheet will be achieved by a user for a particular purpose. The user should determine the suitability of ASC Thermal Management Materials for each application.