ORMET CIRCUITS, INC.

Preliminary Technical Data Sheet

Ormet 555

February 2010

PRODUCT DESCRIPTION

Ormet 555 is a lead-free die attach conductive paste used to form conductive interconnection between an IC and a metal substrate. The innovative metal matrix utilizes Ormet Circuits' patented Thermal Liquid Phase Sintering (TLPS) technologies to make robust, reliable interconnects. TLPS compounds enable lead-free metallic bonding at temperatures as low as 165°C, and after reacting are capable of withstanding thermal excursions to 265°C without remelting.

TYPICAL PROPERTIES

Property	Test Method	Value
Color	'As-received' Visual	Copper color
Color	'Post-reaction' Visual	Grey color[1]
Filler	Type	Copper Filler and Tin Alloy Filler
Nominal Particle Size	Hegman Gauge	< 15 microns
Metal loading	Weight percentage	90%
Viscosity	Brookfield TE Spindle @ 5 rpm	325 kcps
Thixotropic Index	Ratio of viscosity 1rpm / 10rpm	2.8
Specific Gravity	Graduated cylinder	4.9 grams/cc
Electrical Resistivity	Volume Resistivity 4-point probe	50µm ohm∗cm
Thermal Conductivity	Laser Flash Diffusivity	25 W/mK
Elastic Modulus	DMA @ 25°C	11.9 GPa
Elastic Modulus	DMA @ 150°C	6.1 GPa
Elastic Modulus	DMA @ 260°C	2.6 GPa
Die Shear @ Room Temperature	4mmx4mm copper die to NiPd Leadframe	2.2 kg/mm^2
Die Shear @ 260°C	4mmx4mm copper die to NiPd Leadframe	0.3 kg/mm^2
Weight Loss on Cure	TGA	2%
Work Life	Application testing after RT storage	12 hours @ 25°C
Estimated Storage Life		12 months < -40°C (anticipated)

10080 Willow Creek Road • San Diego, CA 92131 • T: 858-831-0010 • F: 858-831-1437
Website: http://www.ormetcircuits.com

TYPICAL APPLICATIONS

Ormet 555 is used in die attach applications when conventional solder paste or adhesive products are problematic. **Ormet 555** offers an alternative die attach solution in LED, discrete device and power IC applications where solder pastes are either not a reliable or a Green solution, and where adhesives are not electrically or thermally conductive enough to meet an application's requirements.

MATERIAL DEPOSITION GUIDELINES

Ormet 555 can be applied by a range of techniques. Most frequently **Ormet 555** is applied by a jet dispensing process utilizing a DJ9000 pump from Asymtek. The material can also be applied by needle dispensing or conventional stencil or screening printing.

SINTERING PROCESS GUIDELINES

	Recommended Profile	**Alternate Profiles** (after 30 minute ramp)
Sintering/Curing	30 minute ramp + 90 minutes @ 205°C[1]	120 minutes @ 190°C[2] 15 minutes @ 210°C

STORAGE AND HANDLING

Ormet 555 is supplied in 10cc syringes as well as a range of jar and cartridge sizes, and must be stored at or below -40°C. **Ormet 555** must be stabilized to room temperature for at least 30 to 90 minutes before opening the jars or syringes for use.

GENERAL INFORMATION

The Material Safety Data Sheet (MSDS) contains safe handling information for this product. Please read carefully before handling or using this product.

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This product is covered by United States and foreign patents, both issued and pending, for the material compositions, applications and techniques for use. Refer to www.ormetcircuits.com for detailed patent information.

[1] If voids are present after sintering, a 30 minute ramp from room temperature to the sintering temperature may reduce or eliminate the voids.

[2] The ultimate conductivity of Ormet materials may not develop at very low temperatures, but will improve upon subsequent thermal exposures. A post-sintering thermal exposure above 210°C will quickly condition the material and develop its final properties.