PRODUCT DATA SHEET

QuickSinter® QS815-AR

Pressureless and Pressure Silver Sintering Paste

Introduction

Indium Corporation's **QS815-AR Silver Sintering Paste** is a high metal-loading material designed to fit easily into a printing or dispensing process with no change of deposition equipment. The paste can also use fast "reflow-like" (RFL) sintering to form strong joints on many standard leadframe, DBC, and IPM pad finishes, and will bond strongly to die with Ag, Au, or Cu surfaces. **QS815-AR** is a pressureless and pressure silver sintering formulation which can be sintered in a variety of atmospheres.

Solder and many standard epoxy-silver materials are proving increasingly unsuitable for many discrete and small module device applications. They may, for example, be incapable of surviving the ambient conditions seen from longer mission profiles for automotive applications. These mission profiles typically may drive longer high-temperature operating life (HTOL) and larger temperature swings in usage (thermal cycling).

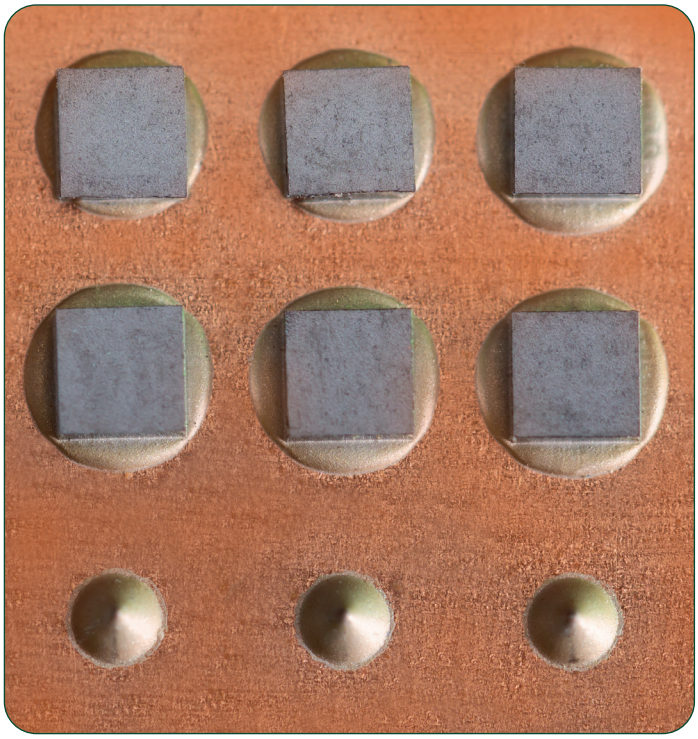
Printing: The silver sintering paste is capable of being printed at speeds ≤50mm/s using standard squeegees at relatively standard squeegee pressure. Nanocoated stencil preferred.

Dispense: The silver sintering paste is capable of being dispensed at very high speed (>>3dots/second) using readily available needles and a variety of unique dispense patterns. Needle gauges tested are 18–30G needles.

Sinter: Smaller die are typically better suited to faster-ramping RFL sintering, and guidelines are given below.

Features

- Die size ≤20 x 20mm (application dependent)
- Pressureless and pressure sinterable
- Quick sinterable within 12 minutes, compatible with inline reflow oven
- Can be used on Cu-, Ag-, and Au-finished surface
- No or very low void (<2%) silver sintering joint with high shear strength (>30MPa)
- Stencil printable and dispensable
- High electrical conductivity
- High thermal conductivity
- RoHS-compliant
- Long shelf life
- Long work life
- Not a nanomaterial per EU definition (2011/696/EU)



Application

The paste is used as die-attach materials in devices such as discrete, high power IGBT, MOSFET, and semiconductor diodes. It is designed for Pb-free joints requiring high thermal and electrical conductivity, as well as high service temperature. Silver sintering paste maintains high adhesion and tensile strength at operating temperatures >350°C.

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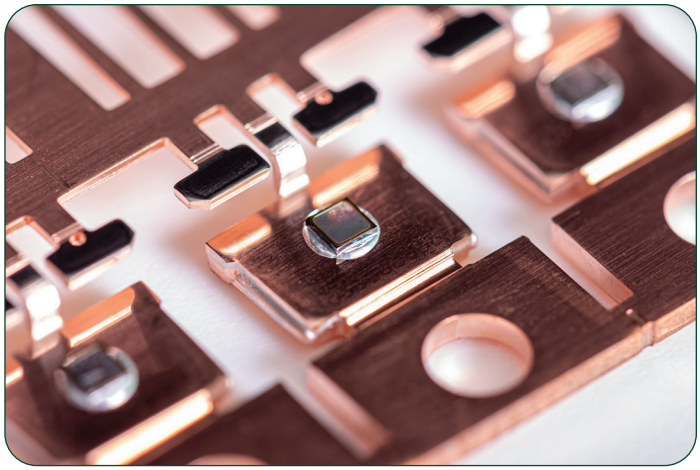
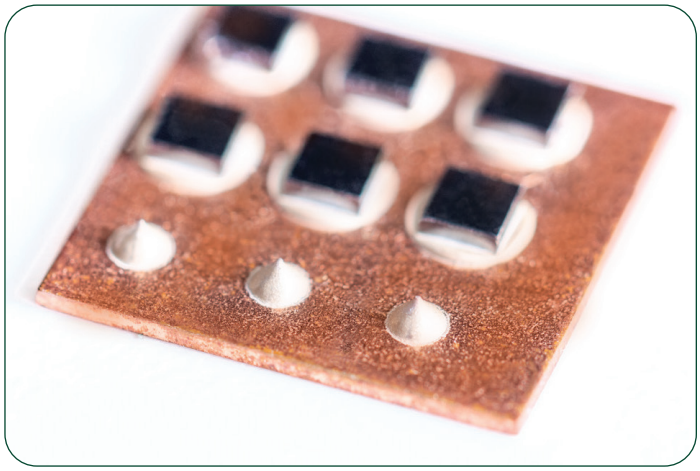
Typical Properties of Paste Before and After Sintering

Properties	QS815-AR
Before sintering	
Ag content, wt%	92
Viscosity, kcps, 5rpm at 25°C	24.7
Paste applied method	Printing or dispensing
After sintering	
Melting point (°C)	961
Electrical resistivity (μΩ.cm)	5
Thermal conductivity (W/mK)	>200
CTE (ppm/K)	19



Workability

Work (Dispense) Life [h]	≥48 hours
Work (Stencil) Life [h]	≥4 hours
Tack Life [h]	≥10 hours
Staging Life [h]	≥24 hours
Pressure During Sintering	0–25MPa



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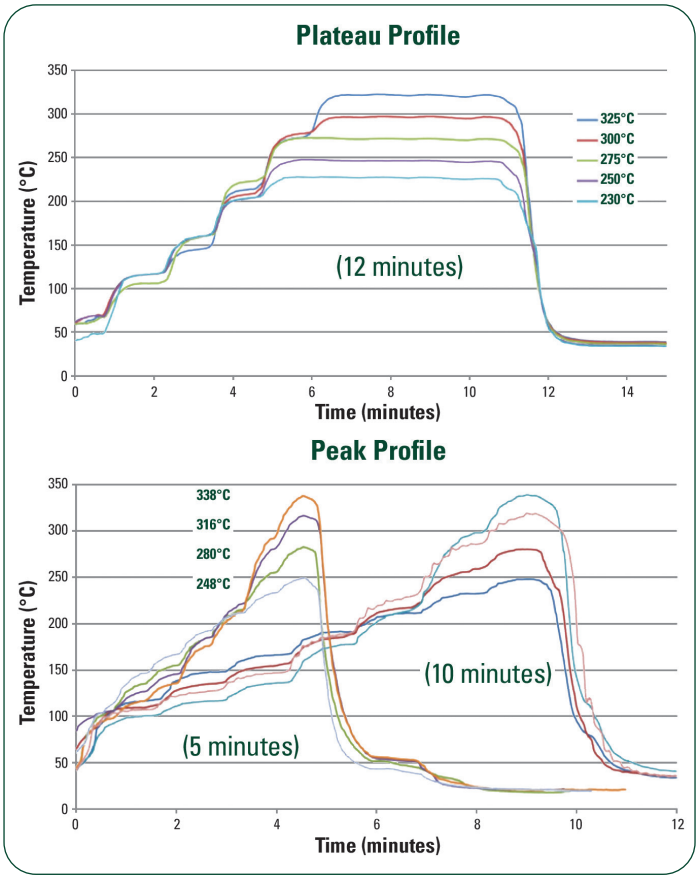
Sintering Example and Result

The profiles recommended below are guidelines. Temperatures are measured at joints.

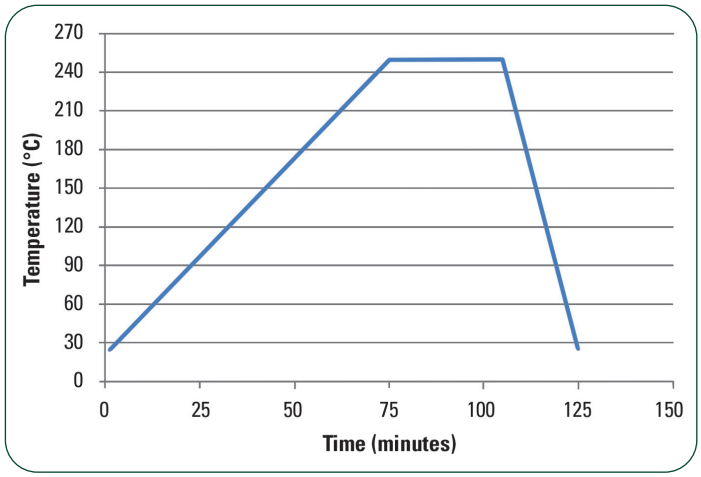
Quick Pressureless Sintering with BTU Reflow Oven

The experiments are conducted in BTU reflow oven in air or nitrogen using the following profiles:



Box Oven Pressureless Sintering

The experiments are conducted in air using the following profile:



Pressure Sintering

Using a pressure sintering process, our silver sintering paste is compatible with a variety of surface metallizations with known good adhesion (>45MPa) to Cu, Ag, and Au. Capable of sintering variable die sizes with uniform porosity, our silver sintering paste can be effortlessly implemented in any pressure sintering production line.

Reliability Test

Shear strength of the joints generated between Ag-finished 3 x 3mm and 5 x 5mm Si die on Ag-AMB substrate remains without degradation after >4,000 cycles of -40–175°C thermal cycling test.

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Storage and Handling Procedure

Refrigerated storage will prolong the shelf life of Ag sintering paste (6 months). The shelf life of the paste is 6 months when sealed tightly and stored at <-20°C. Ag sintering paste packaged in syringe should be stored tip down.

Ag sintering paste should be allowed to reach ambient working temperature prior to use. Generally, paste should be removed from refrigeration at least 1 hour before use. Actual time to reach thermal equilibrium will vary with container size. Paste temperature should be verified before use. Syringes and jars should be labeled with date and time of opening.

Packaging

Ag sintering paste is available in syringes or jars.

Technical Support

Indium Corporation's internationally experienced engineers provide in-depth technical assistance to our customers. Thoroughly knowledgeable in all facets of Materials Science as it applies to the electronics and semiconductor sectors, Technical Support Engineers provide expert advice on Ag sintering applications. Indium Corporation's Technical Support Engineers provide rapid response to all technical inquiries.

Safety Data Sheet

Please refer to the SDS document within the product shipment, or contact our local team to receive a copy

All of Indium Corporation's solder paste and preform manufacturing facilities are IATF 16949:2016 certified.
Indium Corporation is an ISO 9001:2015 registered company.

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