Thermal Performance & Silicone Extraction Advantages of Gap Pad S-Class Gap Filling Materials

Thermal Performance vs Pressure

- RD-2010 (TO220 Method)
- Thickness values reported in mils
- Values reported in °C/W = Tr – Ts / Power
  where: Tr = transistor base temp
  Ts = sink temp
- Pressure range: 10, 25, 50, 100, 200 (psi)

Note that Gap Pad is typically used for low-pressure applications that have either built in stand-offs or are clip assembled. Resulting pressures are typically 10 to 100 psi for Gap Pad 10 to 20 mil-thickness and 10 to 50 psi for 40 mil thicknesses or higher.

Gap Pad 2500S20

Figure 1 illustrates Gap Pad 2500S20's significant thermal performance advantages at low pressures over the key competitive product, C.1, for material thicknesses of 40 mils and higher (data for 60 mil is shown above). This is due to the ability of Gap Pad 2500S20 to better wet-out surfaces eliminating air voids resulting in reduced interfacial resistances.

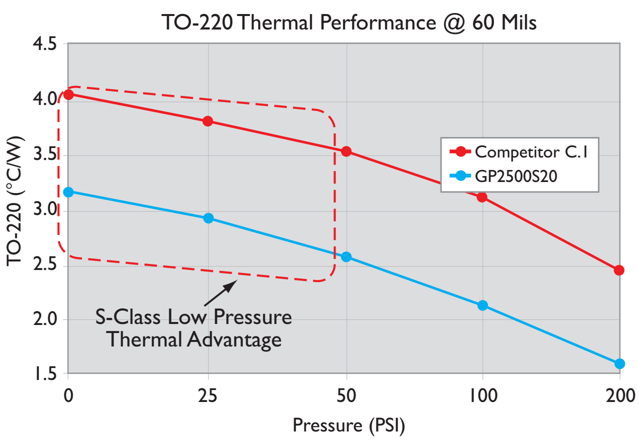


Figure 1

Gap Pad 3000S30

Figure 2 compares thermal performance data of Gap Pad 3000S30 to the previous generation Gap Pad A3000 product at 20 mil thickness. Though both products are 3000 level (~3W/mK) products, the Gap Pad 3000S30 is softer with improved wet-out characteristics resulting in lower interfacial resistances ultimately improving overall thermal performance.

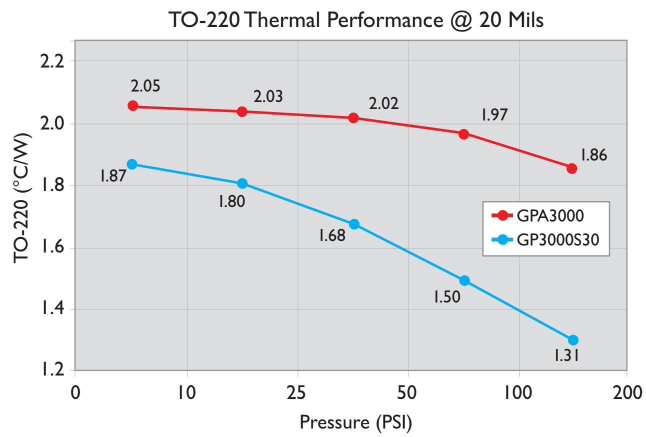


Figure 2

Figure 3 illustrates Gap Pad 3000S30's significant thermal performance advantages at low pressures over the key competitive product A.1, for thicknesses of 10 to 20 mils (data for 20 mil is shown below). This is due to the ability of Gap Pad 3000S30 to better wet-out surfaces eliminating air voids resulting in reduced interfacial resistances.

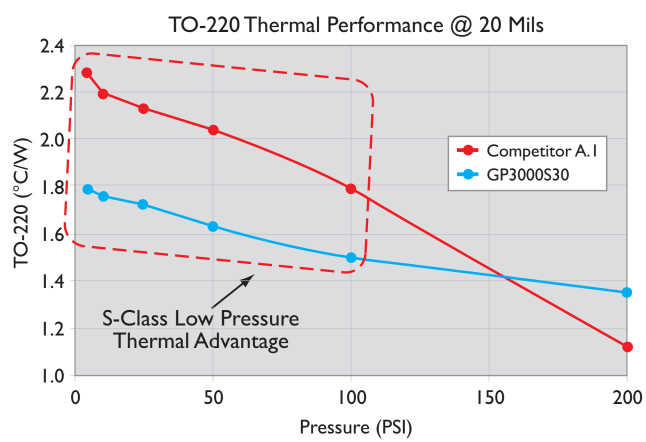


Figure 3

continued ▸

Figure 4 compares Gap Pad 3000S30 to the primary competitive product, A.2 in the 40 mil and higher thickness range (40 mil data shown). Gap Pad 3000S30 demonstrates significant thermal performance advantages at low pressures. This is due to the ability of the Gap Pad 3000S30 to conform to surface irregularities that helps eliminate air voids resulting in reduced interfacial resistances.

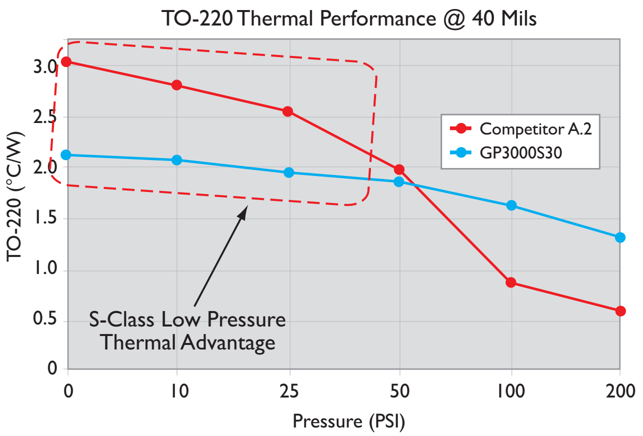


Figure 4

Gap Pad 2000S40

Figure 5 compares thermal performance data of Gap Pad 2000S40 to the previous generation Gap Pad A2000 product at 20 mil thickness. Though both products are 2000 level (~2W/mK) products, the Gap Pad 2000S40 is softer with improved wet-out characteristics resulting in lower interfacial resistances ultimately improving overall thermal performance.

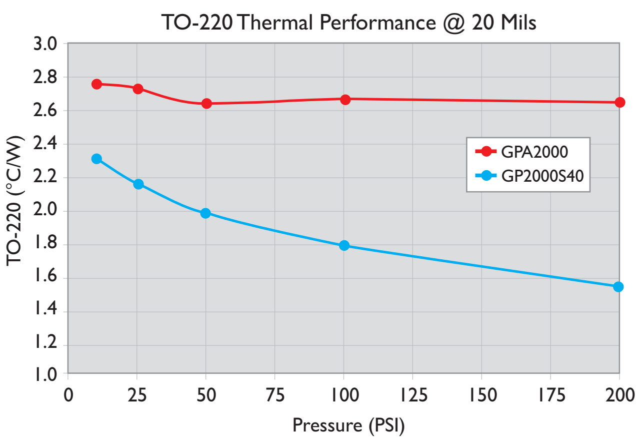


Figure 5

Figure 6 compares Gap Pad 2000S40 to the primary competitive product, A.4, in the 40 mil and higher thickness range (100 mil data shown). Gap Pad 2000S40 demonstrates significant thermal performance advantages at low pressures due to its ability to conform to surface irregularities, thus helping eliminate air voids and reducing interfacial resistances.

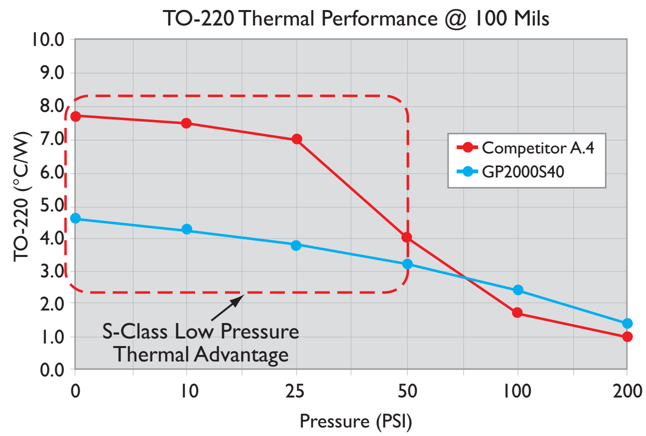


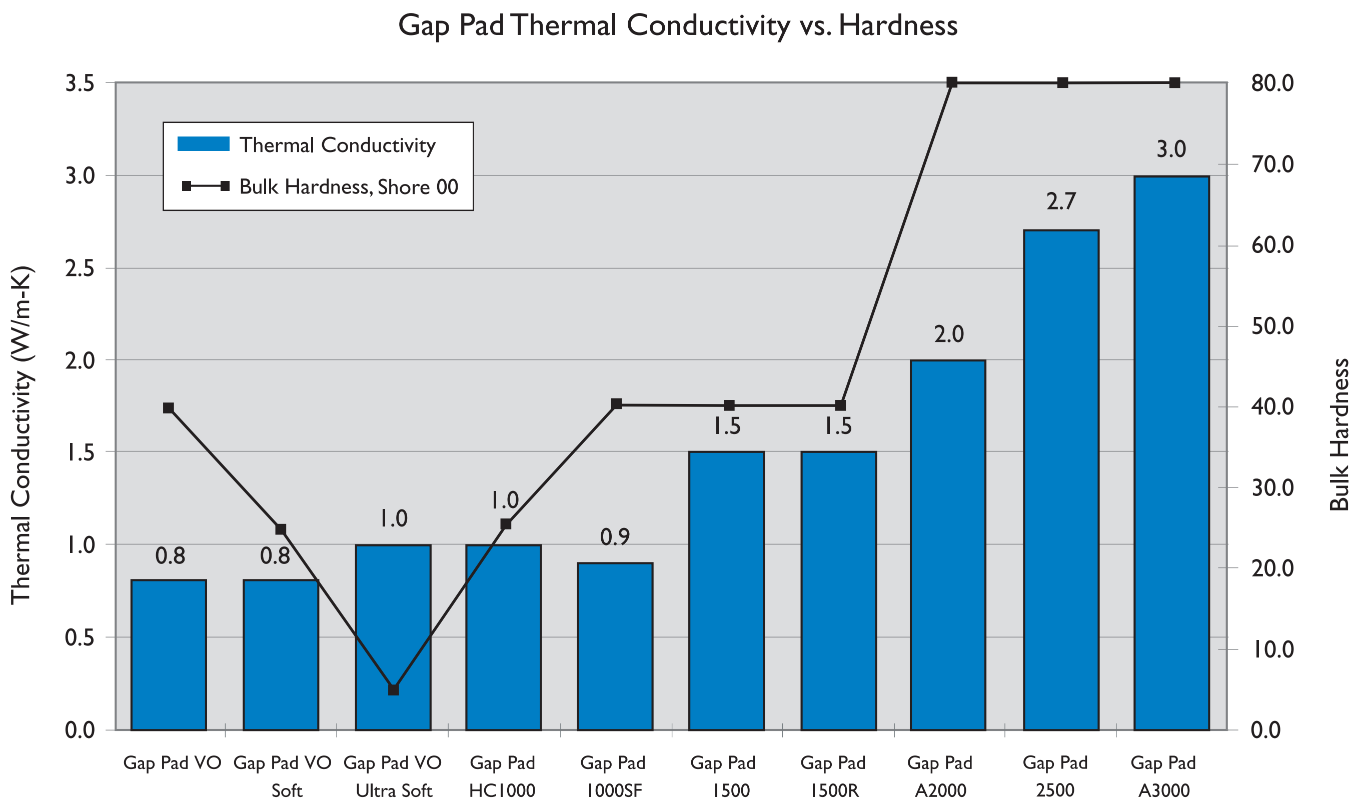
Figure 6

Determination of Soluble Residual Contamination by Soxhlet Extraction (Silicone Extraction Test)

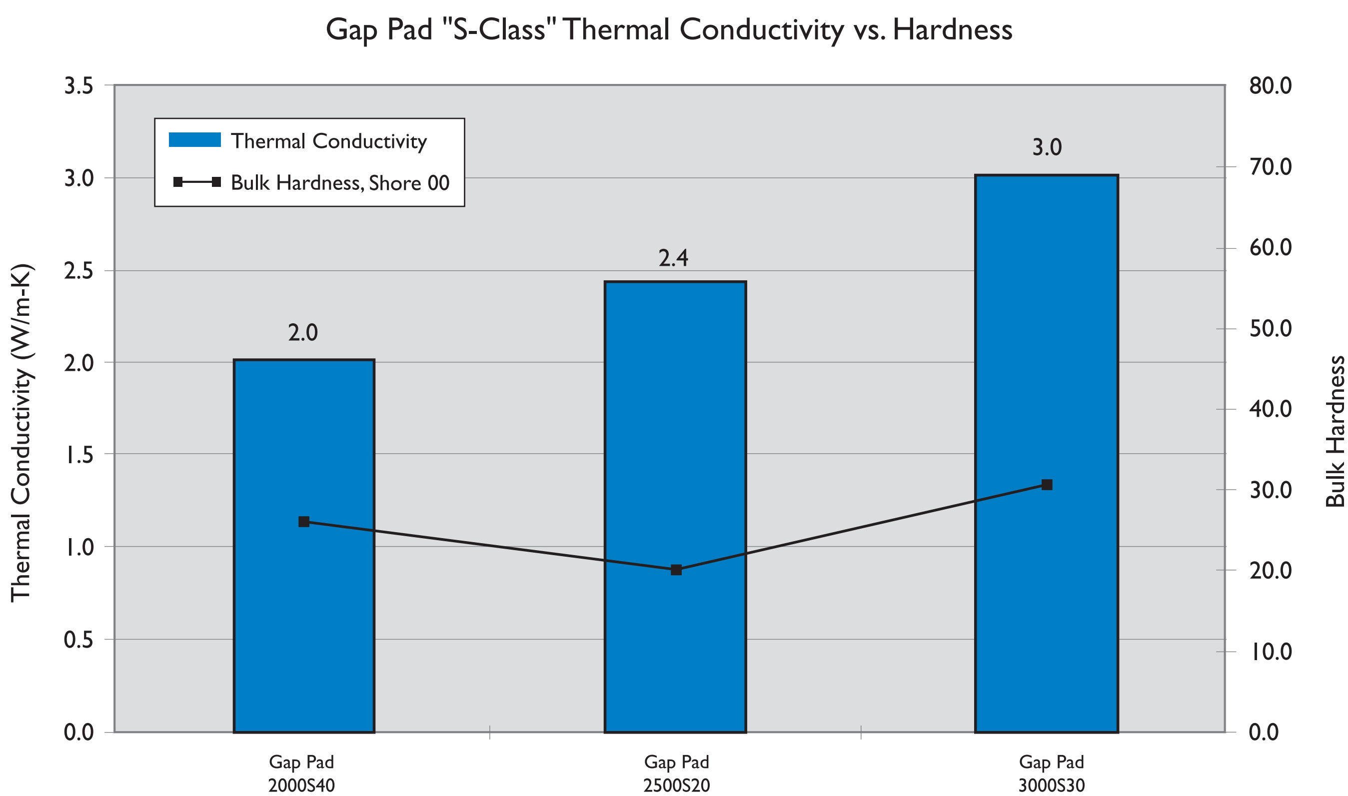
- Test Method: ASTM G120
- Reagent grade Hexane solvent for 6 hours.
- Place thimble in 70°C oven for a minimum of 12 hrs.
- Place thimble in desiccator for equilibration to ambient temperature for weighting.
- Reporting as follows:
  % Weight Loss (total percentage weight loss)

SAMPLE	% LOSS
Gap Pad 2500S20	6
Competitor A.3	43
Competitor B.1	23
Competitor C.1	10
Gap Pad 3000S30	6
Competitor A.1	35
Competitor A.2	44
Gap Pad 2000S40	6
Competitor A.4	31
Competitor B.1	23

For more detailed information on the competitive materials tested, please contact the Bergquist Product Management Department.



Gap Pad Thermal Conductivity vs. Hardness
Thermal Conductivity
Bulk Hardness, Shore 00
Thermal Conductivity (W/m-K)
Bulk Hardness
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
80.0
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0.0
0.8
0.8
1.0
1.0
0.9
1.5
1.5
2.0
2.7
3.0
Gap Pad VO
Gap Pad VO Soft
Gap Pad VO Ultra Soft
Gap Pad HC1000
Gap Pad 1000SF
Gap Pad 1500
Gap Pad 1500R
Gap Pad A2000
Gap Pad 2500
Gap Pad A3000



Gap Pad "S-Class" Thermal Conductivity vs. Hardness
Thermal Conductivity
Bulk Hardness, Shore 00
Thermal Conductivity (W/m-K)
Bulk Hardness
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
80.0
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0.0
2.0
2.4
3.0
Gap Pad 2000S40
Gap Pad 2500S20
Gap Pad 3000S30

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