

CLAIMS

1. A thermal interface material (TIM) structure comprising:

a TIM sheet comprising:

a lower portion along a lower plane;

a first side portion along a first side plane;

a first upper portion along an upper plane;

a first fold between the lower portion and the first side portion positioning the first side portion substantially perpendicular to the lower portion; and

a second fold between the first side portion and the first upper portion positioning the first upper portion substantially perpendicular to the first side portion and substantially parallel to the lower portion.
2. The TIM structure of claim 1, wherein the TIM sheet further comprises:

a second side portion along a second side plane;

a second upper portion along the upper plane;

a third fold between the lower portion and the second side portion positioning the second side portion substantially perpendicular to the lower portion; and

a fourth fold between the second side portion and the second upper portion positioning the second upper portion substantially perpendicular to the second side portion and substantially parallel to the lower portion.
3. The TIM structure of claim 1, wherein the TIM structure further comprises a gap filler pad in thermal contact with the first upper portion.

4. The TIM structure of claim 1, wherein the first upper portion comprises additional alternating folds creating adjacent layers of the TIM sheet.
5. The TIM structure of claim 1, wherein the first upper portion is coiled.
6. The TIM structure of claim 1, wherein the TIM sheet is compressible.
7. The TIM structure of claim 1, wherein the TIM sheet comprises at least one selected from a group consisting of a single material, a composite material, an elastomer matrix, and a phase change material matrix.
8. A system comprising:

a circuit board comprising a first component having a first load requirement and a second component having a second load requirement;

a heat exchanger; and

a thermal interface material (TIM) sheet comprising:

a lower portion positioned between and in thermal contact with the first component and the heat exchanger;

a first upper portion positioned between and in thermal contact with the heat exchanger and the second component; and

a first side portion connecting the lower portion to the first upper portion.
9. The system of claim 8, further comprising a heat spreader plate positioned between and in thermal contact with the second component and the first upper portion, wherein the heat spreader plate comprises a cavity exposing the first component, and wherein the first side portion connects the lower portion to the first upper portion through the cavity in the heat spreader plate.

10. The system of claim 8, further comprising a gap filler pad between and in thermal contact with the first upper portion and the heat exchanger.
11. The system of claim 8, wherein the TIM sheet further comprises:

a second upper portion positioned between and in thermal contact with the heat exchanger and the second component; and

a second side portion connecting the lower portion to the second upper portion.
12. The system of claim 8, wherein the second load requirement is less than the first load requirement.
13. The system of claim 8, wherein the first upper portion comprises alternating folds creating adjacent layers of the TIM sheet.
14. The system of claim 8, wherein the first upper portion is coiled.
15. A method comprising:

placing a thermal interface material (TIM) sheet between an upper forming tool and a lower forming tool; and

pressing the upper forming tool to the lower forming tool creating a first fold and a second fold in the TIM sheet,

wherein the first fold is between a lower portion of the TIM sheet and a first side portion of the TIM sheet, wherein the first fold positions the first side portion of the TIM sheet substantially perpendicular to the lower portion of the TIM sheet,

wherein the second fold is between the first side portion of the TIM sheet and a first upper portion of the TIM sheet, and wherein the second fold

positions the first upper portion of the TIM sheet substantially perpendicular to the first side portion of the TIM sheet and substantially parallel to the lower portion of the TIM sheet.

16. The method of claim 15, wherein pressing the upper forming tool to the lower forming tool compresses the upper portion of the TIM sheet without compressing the lower portion of the TIM sheet.

17. The method of claim 15, wherein pressing the upper forming tool to the lower forming tool further creates a third fold and a fourth fold in the TIM sheet,

wherein the third fold is between the lower portion of the TIM sheet and a second side portion of the TIM sheet, wherein the third fold positions the second side portion of the TIM sheet substantially perpendicular to the lower portion of the TIM sheet,

wherein the fourth fold is between the second side portion of the TIM sheet and a second upper portion of the TIM sheet, and wherein the fourth fold positions the second upper portion of the TIM sheet substantially perpendicular to the second side portion of the TIM sheet and substantially parallel to the lower portion of the TIM sheet.

18. The method of claim 15, wherein pressing the upper forming tool to the lower forming tool creates additional folds creating adjacent layers of the TIM sheet adjacent and substantially parallel to the first upper portion.

19. The method of claim 15, further comprising rolling the first upper portion into a coil.

20. The method of claim 15, further comprising, prior to pressing the upper forming tool to the lower forming tool:

scoring the TIM sheet between the lower portion of the TIM sheet and the first side portion of the TIM sheet; and

scoring the TIM sheet between the first side portion of the TIM sheet and the first upper portion of the TIM sheet.