

CLAIMS

What is claimed is:

1. A clamp configured to be coupled to a printed circuit board to cool and compress one or more electrical connections subject to repeated power and thermal cycling, the clamp comprising:
 - a first conductive column configured to compress a first electrical connection between a first power device lead and a first printed circuit board trace of the printed circuit board, and draw thermal energy away from the first power device lead to cool the first power device lead;
 - a load spreading plate from which the first conductive column extends; and
 - a fastener extending from the load spreading plate, the load spreading plate is an insulator that electrically isolates the fastener from the first conductive column, the fastener is configured to: cooperate with the circuit board to connect the clamp to the circuit board; and compress the load spreading plate against the first conductive column to compress the first electrical connection.
2. The clamp of Claim 1, further comprising a second conductive column configured to compress a second electrical connection between a second power device lead and a second printed circuit board trace of the printed circuit board, and draw thermal energy away from the second power device lead to cool the second power device lead;
 - wherein the load spreading plate electrically isolates the second conductive column from both the fastener and the first conductive column; and
 - wherein the fastener is configured to compress the load spreading plate against the second conductive column to compress the second electrical connection.

3. The clamp of Claim 2, wherein the first power device lead is a first drain lead from a first transistor of a transistor package;
wherein the second power device lead is a second drain lead from a second transistor of the transistor package.
- 5 4. The clamp of Claim 3, wherein the first printed circuit board trace and the second printed circuit board trace supply energy to an RF plasma output network.
5. The clamp of Claim 2, wherein both the first conductive column and the second conductive column include metal.
- 10 6. The clamp of Claim 5, wherein the metal includes copper.
7. The clamp of Claim 2, further comprising thermal energy dispersion surfaces on both the first conductive column and the second conductive column configured to release thermal energy conducted to the first and second conductive columns from the first and second power device
15 leads.
8. The clamp of Claim 7, wherein the thermal energy dispersion surfaces include surface grooves.
9. The clamp of Claim 1, wherein the load spreading plate includes fiberglass.
- 20 10. The clamp of Claim 1, further comprising a compression washer between a head of the fastener and the load spreading plate.
11. The clamp of Claim 1, wherein the fastener is a screw.

12. The clamp of Claim 2, wherein at least one of the first electrical connection and the second electrical connection is a solder connection.

13. The clamp of Claim 2, wherein at least one of the first
5 electrical connection and the second electrical connection is a solderless connection.

14. The clamp of Claim 1, wherein the fastener is further configured to connect the clamp to ground.

10 15. A clamp configured to be coupled to a printed circuit board to cool and compress one or more electrical connections subject to repeated power and thermal cycling, the clamp comprising:

a conductive column configured to compress an electrical connection between a drain lead from a transistor of a transistor package and a printed
15 circuit board trace that supplies energy to an RF plasma output network, and configured to draw thermal energy away from the first drain lead to cool the first drain lead;

a load spreading plate from which the conductive column extends; and
a fastener extending from the load spreading plate, the load spreading
20 plate is an insulator that electrically isolates the fastener from the conductive column, the fastener is configured to: cooperate with the circuit board to connect the clamp to the circuit board; and compress the load spreading plate against the conductive column to compress the electrical connection.

25 16. The clamp of Claim 15, wherein the transistor package is a Gemini-style package configured in a push-pull configuration for wideband, low distortion operation.

17. The clamp of Claim 15, further comprising grooved thermal
30 energy dispersion surfaces on the conductive column.

18. The clamp of Claim 15, wherein the fastener connects the clamp to ground.

19. A circuit board for an RF plasma generator that provides solid
5 state power for thin films processing equipment, the circuit board comprising:
a first transistor mounted to the circuit board with a retention
member;
a first drain lead from the first transistor;
a first printed circuit board trace for supplying energy to an RF
10 plasma output network, the first printed circuit board trace connected to the
first drain lead to provide a first electrical connection therebetween;
a first conductive column compressing the first electrical
connection between the first printed circuit board trace and the first drain lead,
and configured to draw thermal energy away from the first drain lead to cool
15 the first drain lead;
a load spreading plate from which the first conductive column
extends; and
a fastener extending from the load spreading plate, the load
spreading plate is an insulator that electrically isolates the fastener from the
20 first conductive column, the fastener is configured to: cooperate with the
circuit board to connect the clamp to the circuit board; and compress the load
spreading plate against the first conductive column to compress the first
electrical connection.

20. The circuit board of Claim 19, further comprising:
a second transistor mounted to the circuit board, the first
transistor and the second transistor are included with a transistor package;
a second drain lead from the second transistor;
a second printed circuit board trace for supplying energy to the
30 RF plasma output network, the second printed circuit board trace connected
to the second drain lead to provide a second electrical connection
therebetween;
a second conductive column compressing the second
electrical connection between the second printed circuit board trace and the

second drain lead, and configured to draw thermal energy away from the first drain lead to cool the first drain lead;

wherein the load spreading plate electrically isolates the second conductive column from both the fastener and the first conductive column; and

wherein the fastener compresses the load spreading plate against the second conductive column to compress the second electrical connection.

10