CLAIMS

1. A device comprising:

a region comprising printed circuit board; a heat generating device; located over a surface of the printed circuit board, wherein the heat generating device includes a semiconductor die, wherein the heat generating device comprises a backside and

a lateral side, and wherein the backside of the heat generating device faces away from the printed circuit board; a thermally conductive adhesive coupled to the heat generating device; and an energy harvesting device coupled to the region comprisingheat generating device and laterally surrounding the heat generating device, wherein the energy harvesting device comprises:

is in contact with the lateral side of the heat generating device through the thermally conductive adhesive, wherein the energy harvesting device comprises: a first thermal conductive layer;

, extending vertically along the lateral side of the heat generating device, and located laterally around the lateral side of the heat generating device; a thermoelectric generator (TEG) coupled to the first thermal conductive layer; and

, wherein the TEG is configured to convert heat that passes through the TEG into electrical energy; a second thermal conductive layer coupled to the thermoelectric generator (TEG) such that the thermoelectric generator (TEG) is located between the first thermal conductive layer and the second thermal conductive layer.

2. The device of claim 1, wherein; and a thermal insulation layer coupled to the energy harvesting device, and located over the backside of the heat generating device, wherein the thermal insulation layer comprises a solid material, wherein the thermoelectric generator (TEG) and the second thermal conductive layer laterally surround the lateral side of the heat generating device, wherein the second thermal conductive layer is a separate thermal conductive layer from the first thermal conductive layer is configured to dissipate heat away from the heat generating device and towards the TEG., wherein the second thermal conductive layer is not in direct contact with the first thermal conductive layer, wherein the thermoelectric generator (TEG) laterally surrounds the first thermal conductive layer, and wherein the second thermal conductive layer laterally surrounds the thermoelectric generator (TEG).

2. The device of claim 1, further comprising an energy storage device configured to store electrical energy from the TEG.

3. The device of claim 1, further comprising an integrated device, wherein the ~~second thermal conductive layer~~ TEG is further configured to ~~dissipate heat away from~~provide electrical energy to the ~~TEG and away from the heat generating~~integrated device.

4. The device of claim 1, ~~wherein the~~ further comprising: a camera device; and a second energy harvesting device ~~further comprises an insulation layer configured~~coupled to ~~force more heat from~~the camera device and laterally surrounding the camera device, wherein the backside and the lateral side of the heat generating device ~~to dissipate through the first thermal conductive layer, the TEG and the second thermal conductive layer~~comprises a backside and a lateral side of the semiconductor die.

~~5. The device of claim 1, wherein a temperature gradient across the thermoelectric generator (TEG) is about 25 degrees or greater.~~

~~6.~~ The device of claim 1, wherein the energy harvesting device is configured ~~such that~~to harvest about ~~70 percent or more~~at least 1.5% of the input power of the heat ~~from the heat~~ generating device ~~dissipates laterally through the first thermal conductive layer, the TEG and the second thermal conductive layer~~.

~~7.~~ 6. The device of claim 1, wherein the ~~heat generating device includes a die, an integrated circuit (IC) device, a memory, and/or a camera device.~~

~~8. The device of claim 1, wherein the first thermal conductive layer is an inner ring of the energy harvesting device, and the second thermal conductive layer is an outer ring of the energy harvesting device.~~

~~9. The device of claim 1, wherein the thermoelectric generator (TEG) comprises a plurality of thermoelectric generators (TEGs).~~

~~10. The device of claim 1, wherein the device is incorporated into a device selected from the group consisting of a music player, a video player, an entertainment unit, a navigation device, a communications device, a mobile device, a mobile phone, a smartphone, a personal digital assistant, a fixed location terminal, a tablet computer, a computer, a wearable device, an Internet of things (IoT) device, a laptop computer, a server, and a device in an automotive vehicle.~~

~~11. An apparatus comprising:~~

~~a region comprising a heat generating device; and~~

~~means for energy harvesting coupled to the region comprising the heat generating device, wherein the means for energy harvesting comprises:~~

~~a first thermal conductive layer;~~

~~means for thermal energy harvesting coupled to the first~~ thermal ~~conductive layer; and~~insulation layer is operable to reduce heat dissipating vertically from the heat generating device.

~~a second~~ 7. The device of claim 6, wherein the thermal ~~conductive~~insulation layer ~~coupled~~is operable to direct heat dissipation laterally through the ~~means for~~first thermal ~~energy harvesting such that~~conductive layer.

8. The device of claim 6, wherein the ~~means for~~ thermal ~~energy harvesting~~insulation layer is ~~located between~~operable to direct heat dissipation laterally through the first thermal conductive layer, the TEG, and the second thermal conductive layer.

~~12.~~ 9. The ~~apparatus~~device of claim ~~11~~1, wherein the ~~first~~ thermal ~~conductive layer is configured to dissipate heat away from the heat generating device and towards the means for thermal energy harvesting.~~

~~13. The apparatus of claim 11, wherein the second thermal conductive~~insulation layer is ~~configured to dissipate heat away from the means for thermal energy harvesting and away from the heat generating device.~~

~~14. The apparatus of claim 11, wherein the means for energy harvesting further comprises means for insulation configured to force more heat from the heat generating device to dissipate through the first thermal conductive layer, the means for thermal energy harvesting and the second thermal conductive layer.~~

~~15. The apparatus of claim 11, wherein a temperature gradient across the means for thermal energy harvesting is about 25 degrees or greater.~~

~~16. The apparatus of claim 11, wherein the means for energy harvesting is configured such that about 70 percent or more of the~~operable to direct heat ~~from the heat generating~~

device dissipates laterally through the first thermal conductive layer, the means for thermal energy harvesting and the second thermal conductive layer.

17. The apparatus of claim 11, wherein the heat generating device includes a die, an integrated circuit (IC) device, a memory, and/or a camera device.

18. The apparatus of claim 11, wherein the first thermal conductive layer is an inner ring of the means energy harvesting, and the second thermal conductive layer is an outer ring of the means for energy harvesting.

19. The apparatus of claim 11, wherein the means for thermal energy harvesting comprises a plurality of thermoelectric generators (TEGs).

20. The apparatus of claim 11, wherein the apparatus is incorporated into a device selected from the group consisting of a music player, a video player, an entertainment unit, a navigation device, a communications device, a mobile device, a mobile phone, a smartphone, a personal digital assistant, a fixed location terminal, a tablet computer, a computer, a wearable device, an Internet of things (IoT) device, a laptop computer, a server, and a device in an automotive vehicle.

21. A method for fabricating a device, comprising:

providing a heat generating device to a region of the device; and

coupling an energy harvesting device to the region comprising the heat generating device, wherein coupling the energy harvesting device comprises:

providing a first thermal conductive layer;

coupling a thermoelectric generator (TEG) to the first thermal conductive layer; and

coupling a second thermal conductive layer to the thermoelectric generator (TEG) such that the thermoelectric generator (TEG) is located between the first thermal conductive layer and the second thermal conductive layer.

22. The method of claim 21, wherein the first thermal conductive layer is configured to dissipate heat away from the heat generating device and towards the TEG.

~~23. The method of claim 21, wherein the second thermal conductive layer is configured to dissipate heat away from the TEG and away from the heat generating device.~~

~~24. The method of claim 21, wherein coupling the energy harvesting device further comprises coupling an insulation layer configured to force more heat from the heat generating device to dissipate~~dissipation laterally through the first thermal conductive layer, the TEG, and the second thermal conductive layer.

~~25. The method of claim 21, wherein a temperature gradient across the thermoelectric generator (TEG) is about 25 degrees or greater.~~

~~26. A method for harvesting energy in a device, comprising:~~

~~using a first thermal conductive layer to dissipate heat away from a heat generating device and towards a thermoelectric generator (TEG);~~

~~using the thermoelectric generator (TEG) to convert the heat that passes though the thermoelectric generator (TEG) into an electrical energy; and~~

~~using a second thermal conductive layer to dissipate heat away from the thermoelectric generator (TEG) and away from the heat generating device.~~

~~27. The method of claim 26, wherein a temperature gradient across the thermoelectric generator (TEG) is about 25 degrees or greater.~~

~~28. The method of claim 26, further storing the electrical energy in an energy storage device.~~

~~29. The method of claim 26, further providing the electrical energy to the heat generating device.~~

~~30. The method of claim 26, further providing the electrical energy to an integrated device of the device.~~