Claims

What is claimed is:

1. An enclosure for an integrated circuit (IC) assembly, the enclosure comprising:

a molded lid structure having

a body portion, and

a side portion that extends from the body portion and forms a cavity configured to house the IC assembly, wherein the body portion and the side portion share a contiguous interior material comprising a polymer and share a contiguous exterior material comprising a metal, the contiguous interior material having an opening formed in the body portion such that the IC assembly can be thermally coupled with the contiguous exterior material through the opening.

2. The enclosure of claim 1, wherein the IC assembly includes heat-generating elements of a solid-state drive (SSD).

3. The enclosure of claim 1, wherein the opening is one of multiple openings formed in the body portion such that the IC assembly can be thermally coupled with the contiguous exterior material through the multiple openings.

4. The enclosure of claim 1, wherein the polymer is selected from a group consisting of ABS (Acrylonitrile Butadiene Styrene), ABS + PC (ABS + Polycarbonate), Acetal (POM), Acrylic (PMMA), LCP (Liquid Crystal Polymer), PA-Nylon 6 (Polyamide), PA-Nylon 6/6 (Polyamide), PA-Nylon 11 (Polyamide), PBT (Polybutylene Terepthalate), PC (Polycarbonate), PEI (Polyetherimide), PE (Polyethylene), LDPE (Low Density Polyethylene), HDPE (High Density Polyethylene), PET (Polyethylene Terepthalate), PP (Polypropylene), PPA (Polyphthalamide), PPS (Polyphenylene Sulfide), PS (Polystyrene), HIPS (High Impact Polystyrene), PSU (Polysulfone), PU (Polyurethane), PVC (Polyvinylchloride), PVDF (Polyvinylidene Fluoride), SAN (Styrene Acrylonitrile), TPE (Thermoplastic Elastomer) and TPU (Thermoplastic Polyurethane).

5. The enclosure of claim 1, wherein the metal is selected from a group consisting of aluminum (Al), iron (Fe), titanium (Ti), copper (Cu), nickel (Ni), magnesium (Mg), stainless steel and Inconel.

6. The enclosure of any of claims 1-5, further comprising:

a primer material disposed between the contiguous interior material and the contiguous exterior material to promote adhesion between the contiguous interior material and the contiguous exterior material.

7. The enclosure of claim 6, wherein the primer material comprises a polymer or nano-structured metal oxide.

8. The enclosure of any of claims 1-5, further comprising:

a base structure configured to couple with the molded lid structure such that the cavity is disposed between the base structure and the molded lid structure when the base structure is coupled with the molded lid structure.

9. The enclosure of any of claims 1-5, wherein the molded lid structure has a rectangular profile.

10. A method of fabricating an enclosure for an integrated circuit (IC) assembly, the method comprising:

forming a lid structure using a molding process, the lid structure having a body portion, and a side portion that extends from the body portion and forms a cavity configured to house the IC assembly, wherein the body portion and the side portion share a contiguous interior material comprising a polymer and share a contiguous exterior material comprising a metal;

wherein forming the lid structure comprises forming an opening in the body portion such that the IC assembly can be thermally coupled with the contiguous exterior material through the opening.

11. The method of claim 10, wherein forming the lid structure comprises:

shaping the metal to provide an exterior of the body portion and the side portion; and

depositing the polymer on the metal using the molding process to provide an interior of the body portion and the side portion, wherein the molding process is an injection molding process.

12. The method of claim 11, wherein shaping the metal and depositing the polymer are simultaneously performed during the injection molding process.

13. The method of claim 12, wherein depositing the polymer shapes the metal to provide the exterior of the body portion and the side portion.

14. The method of claim 11, wherein forming the opening in the body portion comprises using mold insert blocks to prevent the polymer from being deposited

on the metal in an area where the opening is to be formed when depositing the polymer on the metal.

15. The method of claim 11, wherein forming the lid structure further comprises:

providing a primer material on the metal prior to depositing the polymer to promote adhesion between the polymer and the metal.

16. The method of any of claims 10-15, further comprising:

providing a base structure;

coupling the IC assembly with the base structure; and

coupling the base structure with the lid structure such that the IC assembly is thermally coupled with the contiguous exterior material through the opening.

17. The method of claim 16, wherein coupling the base structure with the lid structure comprises permanently affixing the base structure with the lid structure using snap fasteners.

18. A solid-state drive (SSD) comprising:

a molded lid structure having

a body portion, and

a side portion that extends from the body portion and forms a cavity configured to house an integrated circuit (IC) assembly, wherein the body portion and the side portion share a contiguous interior material comprising a polymer and share a contiguous exterior material comprising a metal, the contiguous interior material having an opening formed in the body portion;

a base structure coupled with the molded lid structure such that the cavity is disposed between the base structure and the molded lid structure; and

the IC assembly, the IC assembly being disposed between the base structure and the molded lid structure, wherein the IC assembly is thermally coupled with the contiguous exterior material of the molded lid structure through the opening.

19. The SSD of claim 18, wherein:

the opening is one of multiple openings formed in the body portion; and

the IC assembly is thermally coupled with the contiguous exterior material through the multiple openings.

20. The SSD of any of claims 18-19, further comprising:

a primer material disposed between the contiguous interior material and the contiguous exterior material to promote adhesion between the contiguous interior material and the contiguous exterior material.

Claims

What is claimed is:

1. An enclosure for an integrated circuit (IC) assembly, the enclosure comprising:

a molded lid structure having

a body portion, and

a side portion that extends from the body portion and forms a cavity configured to house the IC assembly, wherein the body portion and the side portion share a contiguous interior material comprising a polymer and share a contiguous exterior material comprising a metal, the contiguous interior material having an opening formed in the body portion such that the IC assembly can be thermally coupled with the contiguous exterior material through the opening.

2. The enclosure of claim 1, wherein the IC assembly includes heat-generating elements of a solid-state drive (SSD).

3. The enclosure of claim 1, wherein the opening is one of multiple openings formed in the body portion such that the IC assembly can be thermally coupled with the contiguous exterior material through the multiple openings.

4. The enclosure of claim 1, wherein the polymer is selected from a group consisting of ABS (Acrylonitrile Butadiene Styrene), ABS + PC (ABS + Polycarbonate), Acetal (POM), Acrylic (PMMA), LCP (Liquid Crystal Polymer), PA-Nylon 6 (Polyamide), PA-Nylon 6/6 (Polyamide), PA-Nylon 11 (Polyamide), PBT (Polybutylene Terepthalate), PC (Polycarbonate), PEI (Polyetherimide), PE (Polyethylene), LDPE (Low Density Polyethylene), HDPE (High Density Polyethylene), PET (Polyethylene Terepthalate), PP (Polypropylene), PPA (Polyphthalamide), PPS (Polyphenylene Sulfide), PS (Polystyrene), HIPS (High Impact Polystyrene), PSU (Polysulfone), PU (Polyurethane), PVC (Polyvinylchloride), PVDF (Polyvinylidene Fluoride), SAN (Styrene Acrylonitrile), TPE (Thermoplastic Elastomer) and TPU (Thermoplastic Polyurethane).

5. The enclosure of claim 1, wherein the metal is selected from a group consisting of aluminum (Al), iron (Fe), titanium (Ti), copper (Cu), nickel (Ni), magnesium (Mg), stainless steel and Inconel.

6. The enclosure of claim 1, further comprising:

a primer material disposed between the contiguous interior material and the contiguous exterior material to promote adhesion between the contiguous interior material and the contiguous exterior material.

7. The enclosure of claim 6, wherein the primer material comprises a polymer or nano-structured metal oxide.

8. The enclosure of claim 1, further comprising:

a base structure configured to couple with the molded lid structure such that the cavity is disposed between the base structure and the molded lid structure when the base structure is coupled with the molded lid structure.

9. The enclosure of claim 1, wherein the molded lid structure has a rectangular profile.

10. A method of fabricating an enclosure for an integrated circuit (IC) assembly, the method comprising:

forming a lid structure using a molding process, the lid structure having a body portion, and a side portion that extends from the body portion and forms a cavity configured to house the IC assembly, wherein the body portion and the side portion share a contiguous interior material comprising a polymer and share a contiguous exterior material comprising a metal;

wherein forming the lid structure comprises forming an opening in the body portion such that the IC assembly can be thermally coupled with the contiguous exterior material through the opening.

11. The method of claim 10, wherein forming the lid structure comprises:

shaping the metal to provide an exterior of the body portion and the side portion; and

depositing the polymer on the metal using the molding process to provide an interior of the body portion and the side portion, wherein the molding process is an injection molding process.

12. The method of claim 11, wherein shaping the metal and depositing the polymer are simultaneously performed during the injection molding process.

13. The method of claim 12, wherein depositing the polymer shapes the metal to provide the exterior of the body portion and the side portion.

14. The method of claim 11, wherein forming the opening in the body portion comprises using mold insert blocks to prevent the polymer from being deposited on the metal in an area where the opening is to be formed when depositing the polymer on the metal.

15. The method of claim 11, wherein forming the lid structure further comprises:

providing a primer material on the metal prior to depositing the polymer to promote adhesion between the polymer and the metal.

16. The method of claim 10, further comprising:

providing a base structure;

coupling the IC assembly with the base structure; and

coupling the base structure with the lid structure such that the IC assembly is thermally coupled with the contiguous exterior material through the opening.

17. The method of claim 16, wherein coupling the base structure with the lid structure comprises permanently affixing the base structure with the lid structure using snap fasteners.

18. A solid-state drive (SSD) comprising:

a molded lid structure having

a body portion, and

a side portion that extends from the body portion and forms a cavity configured to house an integrated circuit (IC) assembly, wherein the body portion and the side portion share a contiguous interior material comprising a polymer and share a contiguous exterior material comprising a metal, the contiguous interior material having an opening formed in the body portion;

a base structure coupled with the molded lid structure such that the cavity is disposed between the base structure and the molded lid structure; and

the IC assembly, the IC assembly being disposed between the base structure and the molded lid structure, wherein the IC assembly is thermally coupled with the contiguous exterior material of the molded lid structure through the opening.

19. The SSD of claim 18, wherein:

the opening is one of multiple openings formed in the body portion; and

the IC assembly is thermally coupled with the contiguous exterior material through the multiple openings.

20. The SSD of claim 18, further comprising:

a primer material disposed between the contiguous interior material and the contiguous exterior material to promote adhesion between the contiguous interior material and the contiguous exterior material.