CARRIER TAPE AND CARRIER TAPE ASSEMBLY

Technical Field

The disclosure generally relates to carrier tapes, particularly carrier tapes for electronic components, and carrier tape assemblies including a carrier tape and a cover film.

Background

As electronic equipment become miniaturized, it has become desirable to design and manufacture electronic components, such as integrated circuit (IC) chips, to be lighter in weight and smaller in size. Methods for storing and/or transporting such components have evolved over the years. One such method is use of a carrier tape. Carrier tapes are used to store and transport electronic components (such as resistors, capacitors, or integrated circuits) from a component manufacturer to a different manufacturer that assembles the components carried within the carrier tape. These electronic components are mounted onto a printed circuit board (PCB) or other substrate during assembly of electronic equipment, or sub-assemblies that will be used later to build the electronic equipment.

Summary

In some aspects of the disclosure a flexible carrier tape for transporting a plurality of components includes a plurality of spaced apart pockets arranged along a longitudinal direction of the carrier tape and configured to receive the components therein. Each of the pockets includes a pocket opening for receiving the component therethrough and into the pocket, a bottom wall, and one or more sidewalls extending from the pocket opening to the bottom wall. The carrier tape includes a flexible substrate joining the pockets to each other along the longitudinal direction. A substantially continuous heat-activatable adhesive layer conformably covers at least a top surface of the substrate and the bottom and side walls of each of the pockets, wherein the flexible carrier tape is configured to bond to a cover film by selectively heat activating the heat-activatable adhesive layer only in adhesive regions disposed between the pockets, the heat-activated adhesive regions bonding the corresponding regions of the substrate to the cover film; wherein the heat-activatable adhesive layer is formed by drying a heat-activatable adhesive material dispersed in a solvent or as an emulsion to remove liquid, thereby providing the substantially continuous heat-activatable adhesive layer on the top surface of the substrate and on the bottom wall and the side walls of the pockets.

Other aspects of the disclosure relate to a carrier tape assembly including a plurality of alternating pockets and connecting portions arranged along a longitudinal direction of the carrier tape. Each pocket is defined by an interior surface and includes a pocket opening. The connecting portions substantially surround the pocket opening of each of the pockets. A substantially continuous heat-activatable adhesive layer is disposed on the pocket openings side of the carrier tape. The heat-activatable adhesive layer includes a first adhesive portion conformably covering a top surface of the connecting portions at least

where the connecting portions substantially surround the pocket openings, and a second adhesive portion conformably covering the interior surface of each of the pockets, wherein the heat-activatable adhesive layer is formed by drying a heat-activatable adhesive material dispersed in a solvent or as an emulsion to remove liquid, thereby providing the substantially continuous heat-activatable adhesive layer on the top surface of the substrate and on the bottom wall and the side walls of the pockets. A cover film is disposed on the pocket openings side of the carrier tape, such that the first, but not the second, adhesive portions of the heat-activatable adhesive layer are activated and bond the carrier tape to the cover film.

CLAIMS

1. A flexible carrier tape for transporting a plurality of components, the carrier tape comprising:

a plurality of spaced apart pockets arranged along a longitudinal direction of the carrier tape and configured to receive the components therein, each of the pockets comprising a pocket opening for receiving the component therethrough and into the pocket, a bottom wall, and one or more sidewalls extending from the pocket opening to the bottom wall;

a flexible substrate joining the pockets to each other along the longitudinal direction; and

a substantially continuous heat-activatable adhesive layer conformably covering at least a top surface of the substrate and the bottom and side walls of each of the pockets, wherein the flexible carrier tape is configured to bond to a cover film by selectively heat activating the heat-activatable adhesive layer only in adhesive regions disposed between the pockets, the heat-activated adhesive regions bonding the corresponding regions of the substrate to the cover film; wherein the heat-activatable adhesive layer is formed by drying a heat-activatable adhesive material dispersed in a solvent or as an emulsion to remove liquid, thereby providing the substantially continuous heat-activatable adhesive layer on the top surface of the substrate and on the bottom wall and the side walls of the pockets.

2. The flexible carrier tape of claim 1, configured to bond to a cover film by selectively heat activating the heat-activatable adhesive layer only in adhesive regions disposed between the pockets, the heat-activated adhesive regions bonding the corresponding regions of the substrate to the cover film.

3. The flexible carrier tape of claim 2, wherein each of the heat-activated regions disposed between two adjacent pockets covers substantially an entire region between the two adjacent pockets.

4. The flexible carrier tape of claim 2, wherein each of the heat-activated regions disposed between two adjacent pockets further substantially surrounds the pocket opening of each of the two adjacent pockets.

5. The flexible carrier tape of claim 1, wherein the heat-activatable adhesive layer comprises one or more of a polyester, a polyolefin, an ethylene vinyl acetate, an ethylene vinyl chloride, a polyurethane, an acrylic, and a styrene.

6. The flexible carrier tape of claim 1, wherein the substrate comprises one or more of a polyester, a polycarbonate, an acrylic, a polyurethane, a polyethylene terephthalate (PET), a polypropylene (PP), a polystyrene(PS), an acrylonitrile butadiene styrene (ABS), and an amorphous polyethylene terephthalate (APET).

7. The flexible carrier tape of claim 1, wherein the bottom wall of each of the pockets comprises a major inner surface facing an interior of the pocket and an opposing major outer surface facing away from the interior of the pocket, and wherein the adhesive layer conformally covers the major inner surface.

8. The flexible carrier tape of claim 1, wherein the one or more sidewalls of each of the pockets comprises a major inner surface facing an interior of the pocket and an opposing major outer surface facing away from the interior of the pocket, and wherein the adhesive layer conformally covers the major inner surface.

9. A carrier tape assembly, comprising:

a plurality of alternating pockets and connecting portions arranged along a longitudinal direction of the carrier tape, each pocket defined by an interior surface and comprising a pocket opening, the connecting portions substantially surrounding the pocket opening of each of the pockets;

a substantially continuous heat-activatable adhesive layer disposed on the pocket openings side of the carrier tape and comprising a first adhesive portion conformably covering a top surface of the connecting portions at least where the connecting portions substantially surround the pocket openings, and a second adhesive portion conformably covering the interior surface of each of the pockets, wherein the heat-activatable adhesive layer is formed by drying a heat-activatable adhesive material dispersed in a solvent or as an emulsion to remove liquid,

thereby providing the substantially continuous heat-activatable adhesive layer on the top surface of the substrate and on the bottom wall and the side walls of the pockets; and

a cover film disposed on the pocket openings side of the carrier tape, such that the first, but not the second, adhesive portions of the heat-activatable adhesive layer are activated and bond the carrier tape to the cover film.

10. The carrier tape of claim 9, wherein the first adhesive portion substantially covers an entire top surface of the connecting portions disposed between the pocket openings.