Pulsonix Advanced Technology Option

Embedded Component Technology

Leading-edge Technology

Where embedded or buried components are being employed in your PCB design, the Pulsonix Advanced Technology option provides the essential functionality to support embedded semiconductors, thinned dies as well as buried or printed resistors, buried capacitors, RF spiral inductors and planar transformers.

Buried Semiconductors and Thinned Dies

As part of the European funded Hermes project, Pulsonix has been developed well beyond the current commercial capabilities such is the belief that Pulsonix can also be used to help steer new technology into the market.

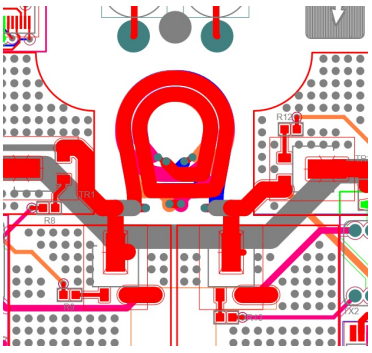
The Hermes project has enabled Pulsonix to introduce the concept of 'thinned' dies and buried semiconductors into inner layer substrates. Essentially, that means burying semiconductors into cavities within the layer substrate, as well as the current capability where special components can be added to the surface of an inner layer using build-up technology that would then be used to construct the board.

Passive Components

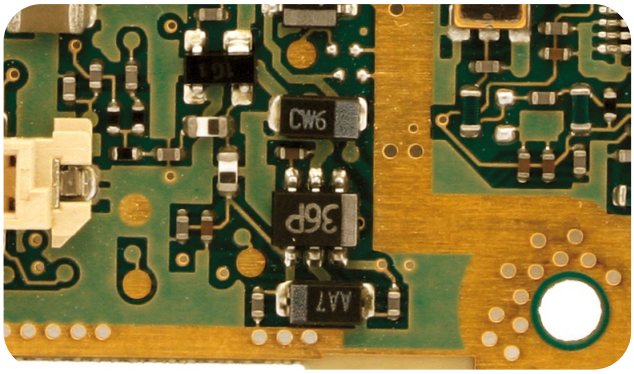
Passive resistors can be printed on inner layers and connected using resistive material. Depending on the manufacturing method, a resist mask or encapsulating coating will be required. Pulsonix handles this by allowing you to associate the necessary additional manufacturing layers for the resistive and other materials with the correct inner copper layer.

Planar Components

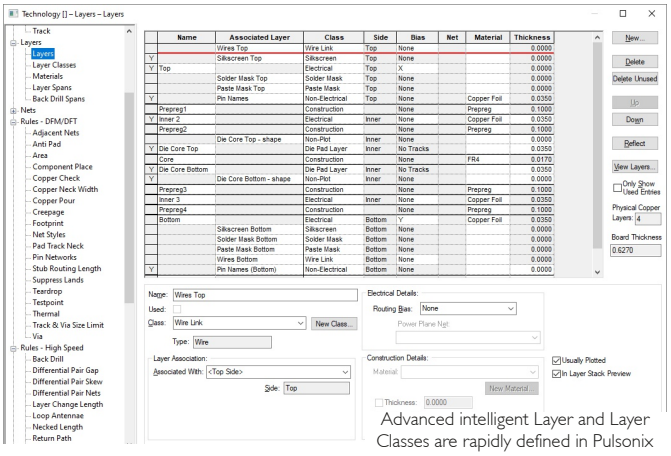
A planar converter or transfer component may exist on the outer only or through-hole layers and may have a physical body applied to the outer layers. However, part of the footprint consists of copper spirals which are connected by a component via, effectively joining the two footprint pads. By defining the footprint as embedded, the Component can be mirrored in situ and all the inner layers will swap as required. Special DRC properties also allow the checking of correct internal connectivity made on the elements of these components.



Irregular spiral shapes can be created using the Pulsonix Embedded Component option



Where boards become too dense for conventional components, embedded components become essential



Advanced intelligent Layer and Layer Classes are rapidly defined in Pulsonix

Feature Summary:

- Supports embedded component types for:
  - Buried resistors and printed 'internal' resistor components
  - Buried capacitors and dielectric/insulator layers
  - Planar convertors and transformers
  - Embedded semiconductors and thinned dies
  - Flexi-rigid components
- Rules driven technology interface
- Layer definitions and layer class definitions for 'internal' components
- Supports mixed PTH, SMD & embedded component technologies
- Internal layer cavity spans
- Board Outline Cutouts and Area spans
- Interactive component layer change feature supports internal layers
- Manufacturing checks for embedded technologies
- Footprint definition with 'component via' support
- Report Maker output of embedded technology features
- Layers report with reference for embedded components

Flexi-rigid Board Technology

Flexi-rigid technology

True Flexi-rigid support is available using the features within the Advanced Technology package; Multi-spanned Layer Areas, Board Outlines, Board Cutouts and Layer Spanned Components. Using these powerful options, Board outlines can be created to span 'internal' flexi layers that are still exposed externally.

Advanced Layer Spans

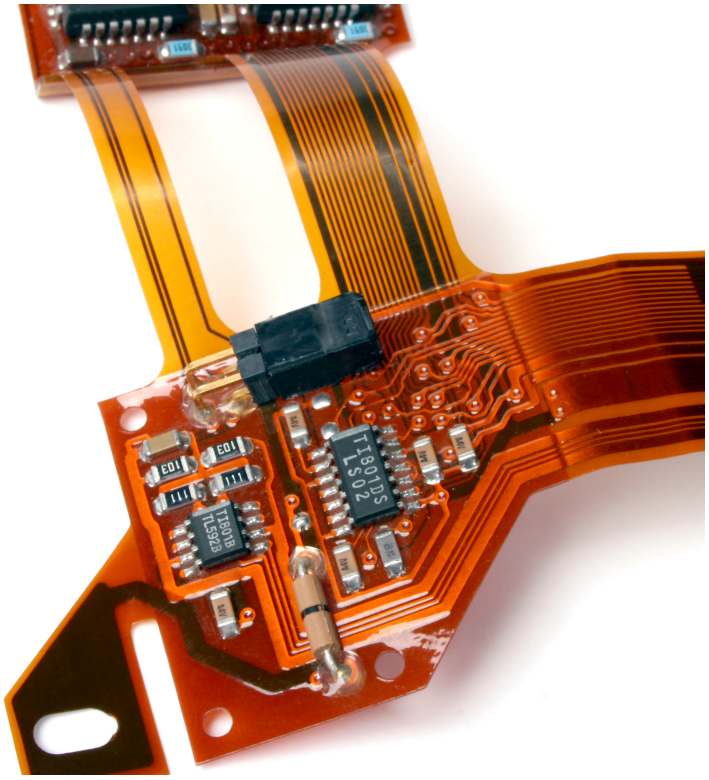
Advanced layer span definitions enable you to create the regular board outline plus the board outline required for an inner flexi-layer which may extend outside of the normal board boundaries.

Layer Spanned Components

Adding Components to layer spans allow them to also be exposed. Both through-hole and surface-mounted components on inner flexi layers can be achieved but with true 'side' and layer characteristics available within their Property definitions. This means accurate assembly reports, manufacturing plots. Precise build details can be exported for accurate manufacturing.

Manufacturing Outputs

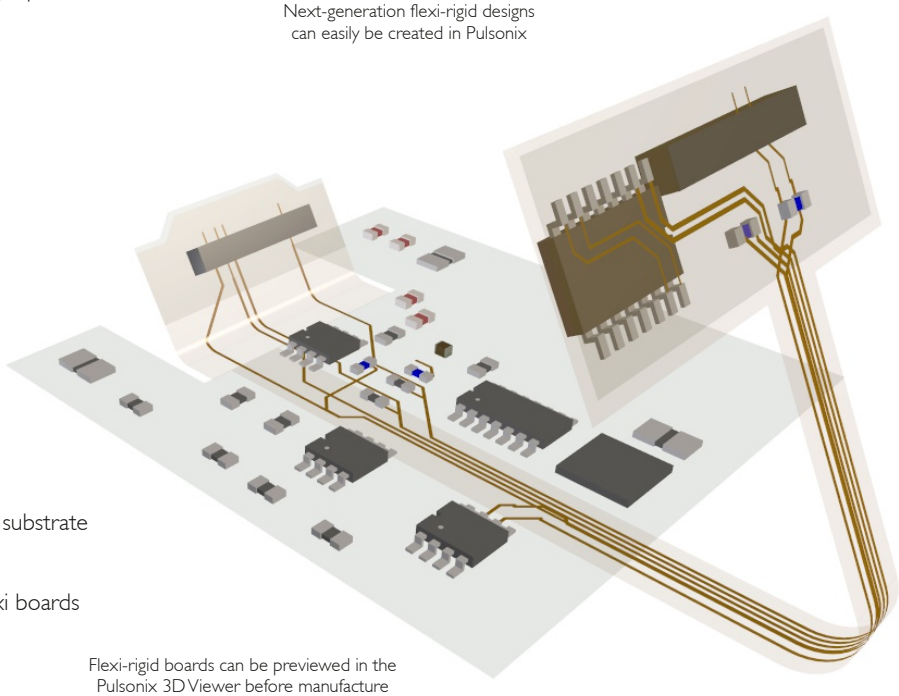
Each set of board outlines can be output in a 'drill-ready' format for profiling for each layer span produced. Manufacturing reports and design detail can all be easily output through a set ‹
Maker and standard output options.



Next-generation flexi-rigid designs can easily be created in Pulsonix

Feature Summary:

- Advanced Intelligent Layer definition
- Advanced Layer spans
- Layer spanned Components
- Layer spanned Board Outlines
- Layer spanned Areas and Board Area Cutouts
- Components on flexi-layers as:
  - Through-hole
  - Surface mounted on top and bottom flexi substrate
- 3D View of flexi-board including 'exploded' view
- Advanced Board Area Cutouts for creation of flexi boards
- Layer Stack preview
- Advanced placements reports for manufacturing



Flexi-rigid boards can be previewed in the Pulsonix 3D Viewer before manufacture

Chip-On-Board Technology

Advanced Packaging Support

Where real estate space needs to be maximised, devices can often be supplied as stripped down versions presented as bare dies. These can be mounted on traditional substrates using chip on board technology. The Pulsonix Chip-On-Board toolset option enables this technology to be easily incorporated into your Pulsonix PCB designs.

Chip-On-Board

The Chip-On-Board option provides features for creation and annotation of die & bond pads and bond wires. It also allows automatic placing bond pads around the die. Within the Pulsonix design the bond pads are treated as special pads and can move independently of die and normal pads.

Advanced Rule Sets

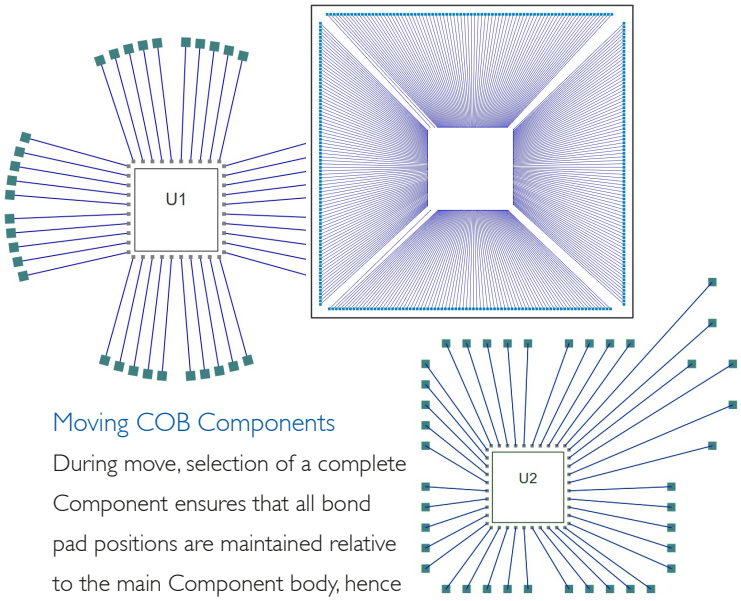
Pulsonix contains a set of rules that are obeyed using both the Online DRC and batch DRC processes. Rules can be set for min and max length of the bond pad from the die pad, and for the crossing over of bond wires. Conditional Spacing rules can be defined for COB devices that use smaller values for this type of detailing. This is also a highly desirable requirement where mixed conventional and bare die technologies are used.

Footprint Creation

The Footprint editor allows fast and simple creation of Chip-On-Board footprints. Options for the insertion of die and bond pads into the footprint ensure that the correct pad type is available and subsequently handled correctly later on in the design editor. Addition of die pads will allow the die and bond pad plus the bond wire to be added in one single process. To facilitate placement of bond pads in a uniform pattern, a Place on Shape option is provided where the pads follow any shape drawn. Where bond pads must be in-line with the wire, regardless of the pad angle, automatic alignment, even when the bond pad is rotated or moved in the footprint is possible.

Component Interaction

Components which contain die and bond pads are handled intelligently using an advanced rule set. Bond pads can be interactively moved independently of the main die 'body'. This movement is controlled using the min and max length rules of the bond wire, with cross-over rules also maintained in this process. The chip die can also be moved independently of the bond pads and position reset if necessary.



Moving COB Components

During move, selection of a complete Component ensures that all bond pad positions are maintained relative to the main Component body, hence precise bond pad positions are always guaranteed.

Comprehensive Reports

Pulsonix provides a set of detailed reports that can be used to output wire positions. The built-in Report Maker option also allows all Chip-On-Board items to be output into comprehensive customised reports.

Feature summary:

- Insert Bond and Die Pad functions
- Insert Wire between die and bond pads
- Automatically place bond pads around shape
- Die pads allowed on inner layers and in board cavities
- Min/Max wire length rules
- Min Die pad space
- Support for insulated or non-insulated (bond) wires

Aancillary features which aid the production:

- Output bond and die pad positions using Report Maker
- Create a report for wire machines using the Report Maker
- Wire report output
- On-line and batch design rules checking of:
  - Wires crossing and their insulation status (insulated or not)
  - Min/max bond wire lengths
  - Item colours for bond pads and wires
  - Wires inserted on special layer
  - Layer Class definitions for bond pad only plots

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