Benefits

• Extracts models for an entire package or only selected nets
• Creates ball grid array (BGA), system-in-package (SiP), and leadframe package models
• Supports designs with wirebond and flip-chip die attachment
• Produces standard IBIS models (with or without coupling)
• Generates RLGC models with asymmetric PI or T circuits
• Produces compact broadband models with verifiable full-wave accuracy
• Examines RLC model values as tables and netlists, or as 2D curves and 3D distributions
• Assures broadband model compatibility with time-domain circuit simulation
• Generates HTML format electrical performance assessment report

Features

Full-wave accuracy

In contrast with quasi-static RLGC package extraction tools, XtractIM provides RLGC parasitics based on S-parameters obtained from full-wave hybrid solvers. The numerical solvers include all physical effects, such as nets, vias, wirebonds, solder balls/bumps, and arbitrarily shaped planes. All coupling mechanisms are also considered; these include net to net, net to plane, plane to plane, and wirebond to wirebond. High-capacity solvers enable the XtractIM tool to uniquely generate entire package models from a single simulation, which
increases accuracy by including all return path effects. Full-wave solvers enable extraction of circuit netlists that correctly represent asymmetric physical structures for higher model accuracy and greater bandwidth.

**Comprehensive package support**

XtractIM supports a wide range of IC package types, including both BGA and leadframe. The tool also supports wirebond and flip-chip die attach styles for single-die and SiP implementations. Multi-die designs can include stacked die, side-by-side positioning, and package-on-package approaches. You can extract models for entire packages or for selected nets. XtractIM models can incorporate discrete components (such as on-package decoupling capacitors), more accurately reflecting package power delivery systems and the coupling amongst power, ground, and signal nets. This is particularly important for simultaneous switching output (SSO)/simultaneous switching noise (SSN) analysis.

**Broadband frequency support**

XtractIM is the only dedicated package extraction solution to provide broadband multi-stage optimized models. These models offer verifiable accuracy over a specified frequency range and fill a gap between IBIS/RLGC and full-wave S-parameters. With their compact sizes (typically 2% of S-parameter or pole-zero models), you benefit from highly efficient time-domain simulations. The circuit topology of these broadband models implicitly assures passivity, causality, and proper DC behavior. The XtractIM optimization of RLC component values to fit broadband full-wave results is significantly more accurate than approaches that depend on guesses to distribute single R, L, and C static values for multi-stage circuits.

**User-friendly workflow**

XtractIM has an easy-to-use workflow that assists with set-up tasks such as stackup checking, C4 bump and solder ball creation, signal and power/ground net selection, and defining other extraction parameters. This guidance ensures that extracted models accurately reflect your objectives. You can select either RLGC or broadband model options from a menu in the step-by-step flow. XtractIM provides a variety of options for viewing results and for the analysis of RLC distributions among all the nets. You can export extracted models in a variety of formats to accommodate specific application objectives.

**Integration**

- Available for use with Windows and Linux
- Interfaces to IC package layout databases from Cadence, Mentor Graphics, Zuken, and AutoCAD
- DXF import utility with customization options for leadframe designs
- Outputs Model Connection Protocol (MCP) and Chip Package Protocol (CPP) for circuit model connection