

## Thick Film Copper Multilayer Substrates and Modules

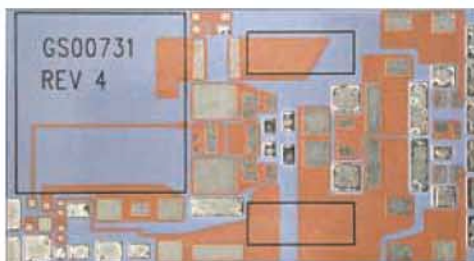
Scrantom, Inc.'s thick film copper multilayer substrates offer solutions for demanding micro-electronic packaging applications. Effective thermal management with outstanding RF performance are two of the many characteristics designers can rely on to meet challenging circuit designs.

NATEL Engineering and Scrantom, Inc. offer extensive design and manufacturing experience utilizing printed and photo defined thick film resin and solder mounted bare die, wire bonded or flip-chip attached surface mount assemblies on ceramic or organic interconnect, and LTCC (Low Temperature Co-fired Ceramic) based modules. These capabilities and services are offered for both build-to-print programs as well as full internal design supported products. These capabilities are supported with extensive electronic and environmental testing on site.

NATEL Engineering Co. offers over 27 years of microelectronics experience with advanced capabilities for a wide range of products and industries, including fully automated assembly of modules, hybrids, MCM, and chip-on-board products. NATEL holds and maintains industry specific certifications such as ISO-9001 and MIL-PRF-38534 (DSCC) and operates in manufacturing facilities that include 30,000 square feet of advanced clean room area.

Typical applications include:

- ◆ RF Power Amplifiers
- ◆ Distributed Power Converters
- ◆ Passive Components
  - 3 dB Quadrature combiner/splitter
  - Baluns
  - Filters
  - Power Terminations
- ◆ RFIC Packaging



- ◆ Cost-effective
- ◆ Low-loss designs, available with plated through vias or edge metallization
- ◆ Fine, well-controlled lines and spaces
- ◆ Short cycle times for prototypes and production
- ◆ Low tooling cost
- ◆ High electrical and thermal conductivity conductors
- ◆ Compatible with plated thermal vias to increase heat transfer under die
- ◆ High thermal conductivity substrates (10x advantage over laminates)
- ◆ Compatible with large panel sizes to reduce cost per square inch and facilitate large array processing
- ◆ Leach-resistant, solderable surface
- ◆ Low moisture absorption
- ◆ Close TCE match with die