



**MATERION**



**ADVANCED MATERIALS**

Hybrid  
CA-Pack™

# Hybrid CA-Pack™

## The Challenge

5G wireless amplifiers will operate at frequencies > 3 GHz. For high power base stations located in rural areas, GaN RF power transistors will need to deliver > 5 W at frequencies between 2 and 10 GHz. For this commercial application, high cost, hermetic packages originally developed for military applications are too expensive.

## The Solution

Hybrid CA-Pack™ delivers the benefits of Materion's successful CuPack™ products and our new CA-Pack™ products. Like CuPacks™, Hybrid CA-Packs™ are air cavity packages with 0.2 mm thick copper leads direct bonded to alumina frames. There is no metallization on the alumina or braze alloy between the copper and the alumina. Therefore, the leads can be made 0.5 mm wide, and spaced only 0.3mm apart (gap width). Like CA-Packs™, the flange of a Hybrid CA-Pack™ can be practically any desired material, with or without bolt-down ears. The flange can be copper, CuW, CPC, aluminum or exotic flange materials like Cu-diamond, Cu-graphite, Al-diamond or Al-graphite. All Hybrid CA-Packs™ are compatible with die attach using AuSn, nanosilver or any silver-filled epoxy. As with most commercial RF packages, Hybrid CA-Packs™ can be sealed with low-cost, epoxy coated ceramic lids like Materion Epo-Lids™.

### FEATURES

Hybrid CA-Packs™ can be manufactured with a wide variety of design options to address the demands of 5G RF power transistors.

- No silver or silver alloy content
- 50Ω copper leads
- Leads can be straight or formed (gull-wing)

- Sense leads possible
- Copper flange
- Ear'd or earless flanges
- Copper flange with pedestal (to minimize wire bond length)
- Ni + Au or Ni + Pd + Au plating available
- Capable of low loss up to at least 10 GHz
- Able to withstand 1000 temp cycles

### BENEFITS

- Low cost, high conductivity Cu flanges enable low  $\theta_{jc}$
- Low loss at frequencies up to 10 GHz
- Pedestal to minimize wire bond length
- Compatible with AuSn die attach
- No possibility of Ag dendrites
- Ear'd or earless flanges

### APPLICATIONS

- Si LDMOS Transistors
- Doherty Amplifiers
- GaAs FETs
- GaAs MMICs
- GaN FETs
- GaN MMICs



**Air Cavity RF Packages from Materion**



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**MATERION ADVANCED MATERIALS** is an industry leader in providing durable and best-cost solutions for ceramic packages and hermetic cover/lids for the wireless infrastructure market. We offer a comprehensive portfolio of packaging materials and can customize package materials to satisfy your unique needs. Our high-reliability packaging also supports most configurations, applications and volume requirements. Because of our industry expertise, extensive global manufacturing capabilities and R&D proficiency, we are able to meet customers' packaging requirements today and partner with them to meet future challenges.