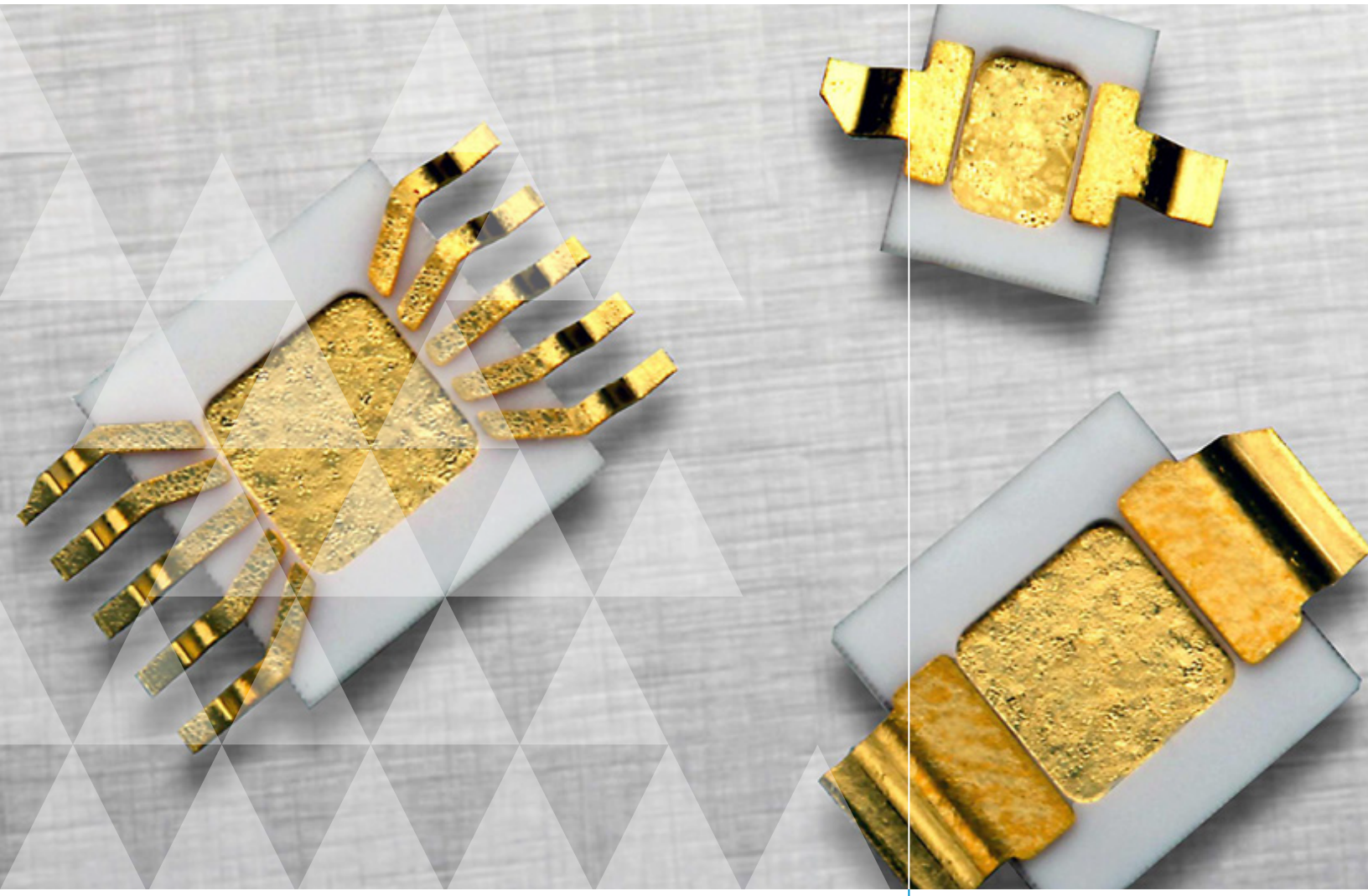
MATERION



ADVANCED MATERIALS

CuPack™ RF Power Packages

CuPack™ RF Power Packages

Ideal for 5G RF Power Transistors

Cutting edge, high power Si, GaAs and GaN transistors and MMICs demand very low thermal resistance and very low RF loss. CuPack™ packages deliver outstanding performance for both requirements.

These unique packages feature 0.2 mm thick copper leads and base, and an alumina ceramic ringframe. CuPack™ packages are electrolytically plated with nickel + gold and are compatible with a wide range of die attach materials. CuPack™ packages are surface mount packages with lead configuration options of straight, gull wing, or J-shaped forms.

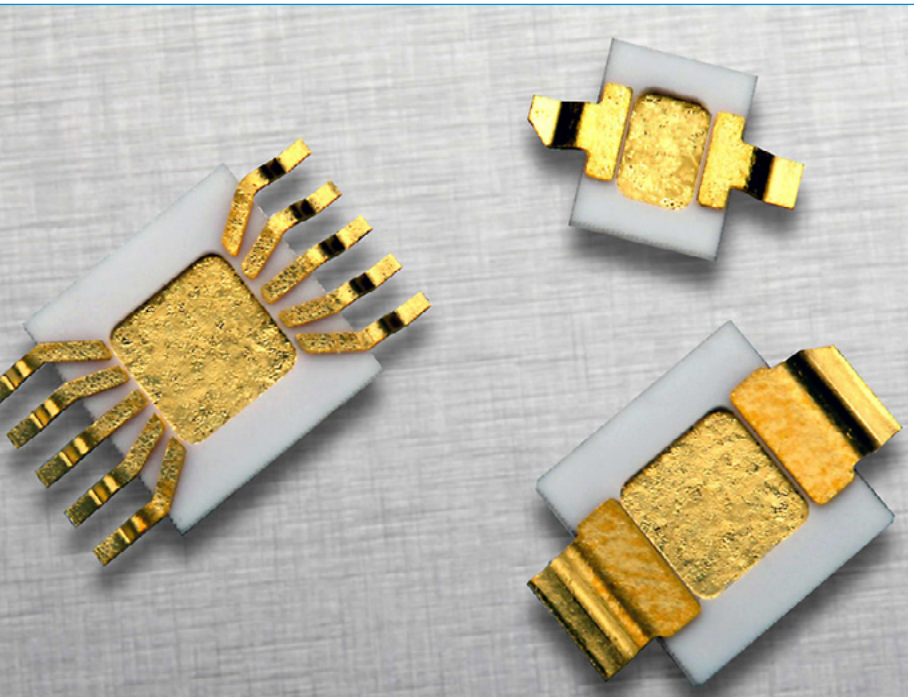
ADVANTAGES OF CUPACK™ RF POWER PACKAGES:

- Ideal for 5G GaN RF power FETs and MMICs
- Low loss at frequencies up to 10 GHz and beyond, providing the user great flexibility in designing their RF power devices
- 50Ω leads available: 0.5 mm wide copper leads
- Very low thermal resistance: die attach onto a 0.20 mm thick copper base
- Industry standard footprints, interchangeable with many leaded plastic packages
- Direct bond copper construction; narrow lead pitch is possible
- Cavity area up to 3.8mm x 3.8mm for 420°C rating (AuSi die attach)
- Cavity up to 5.0mm x 5.0mm for 320°C rating (AuSn die attach)
- Wide variety of standard designs, plus rapid fabrication of new designs based on customers drawings
- Over 15 years of proven performance and reliability

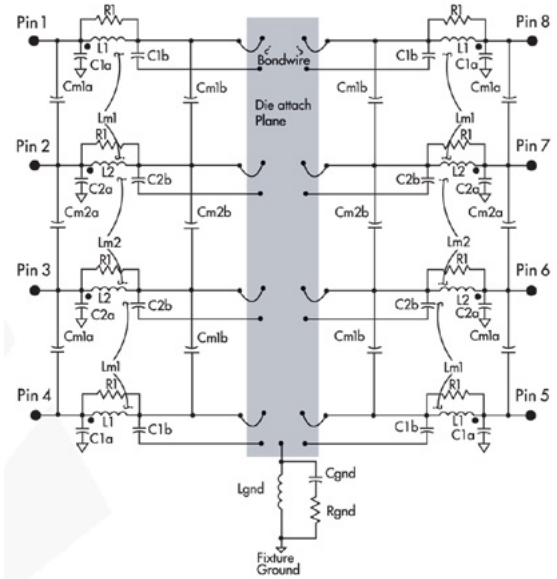
We offer a full line of high performance RF and microwave packages optimized for power devices. Ceramic air cavity packages are available in a variety of designs for GaN MMICs and FETs, Si LDMOS FETs, and GaAs FETs. In addition to CuPack™ packages, Materion manufactures CA-Pack™ packages and Hybrid CA-Pack™ packages optimized for cellular basestation preamplifiers and amplifiers.

ACCOUNTABILITY AND ENVIRONMENTAL REVIEW

Customers are invited to review or audit Materion's manufacturing, environmental or financial policies and practices with respect to their refines.



EQUIVALENT CIRCUIT MODEL:



Materion … Making Advanced Materials that Improve the World.

MATERION

COMPLIANCE AND ENVIRONMENTAL LEADERSHIP

All disposal procedures comply with state and federal regulations.

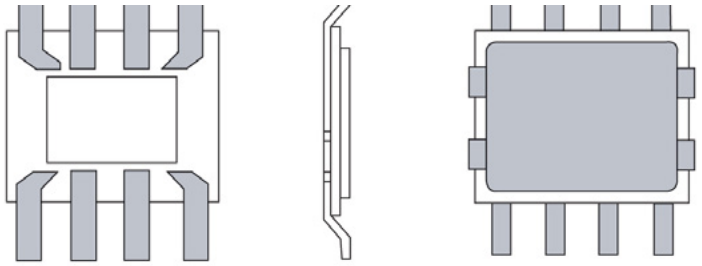
Accreditations and Certifications include:

- ISO 9001:2008 Quality System
- ISO 14001:2004 Environmental and Safety Management System
- LeanSigma

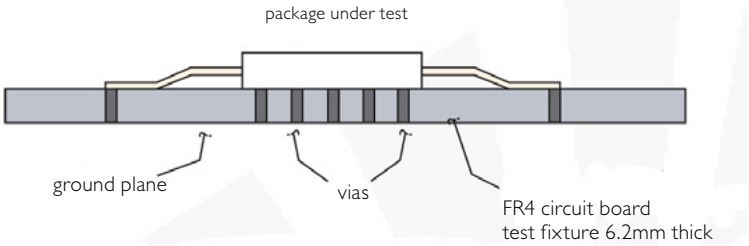
RF024 ELECTRICAL CHARACTERIZATION

Electrical Test Setup:

The RF024 CuPack™ packages utilize a copper base which is also the die pad. Below is a side view of how the package was fixtured for measurement. The vias directly under the package connect the package to the circuit board ground plane. In this case, 12 vias were used in a 6.2 mm thick FR4 circuit board, resulting in an equivalent ground inductance of 0.18 nH.



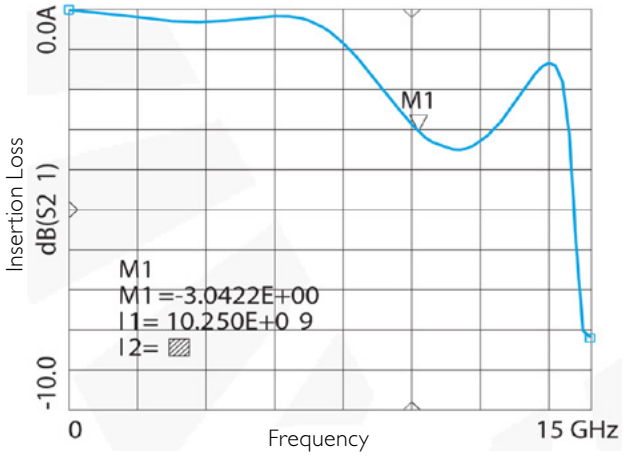
CuPack™ Package RF024



Side view of fixture used to measure packages

INSERTION LOSS:

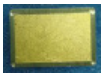
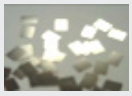
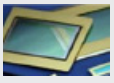
Measured thru response of RF024 package with 60 mm long 50 Ohm transmission line inside package. Response includes fixture parasitics. Lid not installed.



EQUIVALENT CIRCUIT VALUES:

L1	Lm1	L2	Lm2	Lgnd	R1	Rgnd
1.55nH	0.54nH	1.4nH	0.42nH	0.18nH	5K Ohms	1 Ohm

C1a	C1b	Cm1a	Cm1b	C2a	C2b	Cm2a	Cm2b	Cgnd
0.03pF	0.25pF	.003pF	.034pF	0.01pF	0.18pF	.001pF	.034pF	0.7pF

Packaging Products	Applications	Illustrations	Lid Material	Preform Material
Combo-Lid™ Covers (Flat)	High reliability hermetic packaging		Kovar or Alloy 42	Gold-Tin or other alloys
Combo-Lid™ Covers (Drawn)	High reliability hermetic packaging where die height is higher than package cavity depth		Kovar or Alloy 42	Gold-Tin or other alloys
Non-magnetic Metal Combo-Lid™ Covers	Medical Imaging and signal noise control		Mo, CuW, Bronze, Cu	Gold-Tin or other alloys
Non-magnetic Metal Combo-Lid™ Covers	High Purity non-magnetic combo lids, does not contain Nickel or plating		Mo, CuW, Bronze, Cu	Gold-Tin or other alloys
Non-magnetic BeCu Combo-Lid™ Covers	High Purity non-magnetic combo lids, does not contain Nickel or plating		BeCu	Gold-Tin or other alloys
Nozzle Combo-Lid™ Covers	MEMS, Automotive and High reliability hermetic package sealing		Kovar	Gold-Tin
Ceramic Combo-Lid™ Covers with edge metallization	Non-magnetic applications		Al2O3	Gold-Tin or other alloys
Tack welding services for Ceramic Lids	Non-magnetic applications		Al2O3	Gold-Tin or other alloys
Selectively plated Combo-Lid™ Covers	High reliability hermetic package sealing		Kovar or Al2O3	Gold-Tin or other alloys
Getter Tack welded Combo-Lid™ Covers	High reliability hermetic package sealing		Kovar	Gold-Tin or other alloys
Palladium Combo-Lid™ Covers	High reliability and hermetic package sealing		Kovar with Palladium	Gold-Tin or other alloys
Seam Seal-Lid™ Covers	Hermetic package sealing without preform		Kovar	–
Special Shaped Combo-Lid™ Covers	High reliability hermetic package sealing		Kovar	Gold-Tin
Epo-Lid™ Covers	Ceramic Lid for non-hermetic packages including CuPack™ packages		Al2O3	MEG-150 or MEG-165 Epoxy
Ceramic Air Cavity Packages	Wireless Applications - Si, GaAs and GaN RF power transistors		Plated Alloy 42 with Ni, NiCo or Au	Alumina ring frames
Etch Lids for AR Coated Glass	Double preform attached lid for Visi-Lid™ cover application		Kovar	Gold-Tin or other alloys

MATERION

ADVANCED MATERIALS
2978 Main Street
Buffalo, NY 14214 USA
Phone: +1 800.327.1355
advancedmaterials@materion.com
www.materion.com/advanced-materials

Europe: +441 488.686056
Asia: +65 6559.4450

MATERION CORPORATION
www.materion.com

MATERION ADVANCED MATERIALS is a global advanced materials company, dedicated to providing solutions that enable our customers' technologies and drive their growth. Our products include precious and non-precious specialty metals, precision optical filters, inorganic chemicals and powders, specialty coatings, specialty-engineered beryllium alloys, beryllium and beryllium composites, and engineered clad and plated metal systems. The Materion business is structured to enhance our ability to provide customers with innovative, best total-cost solutions.