

# Hybrid Technology Yields State-of-the-Art Results



*You Can Combine Modules To Get The Power Needed For Numerous Military, Wireless and Commercial Applications*

*New Hybrid Power Modules Now Cover an Instantaneous BW From 0.7– 6 GHz*

Whereas others cover this extremely wide BW in two separate amplifiers, AR, through the use of chip and wire technology, covers the full band in ONE amplifier module. High gain 50 ohm modules provide 30 watts of Class A output power in a convenient, compact, connectorized housing. A higher power 50 watt Class AB configuration is also available when increased efficiency is required. These modules can be used in various wireless and military applications due to their broadband frequency coverage and excellent gain flatness.

*AR has the Capabilities to Produce Cost-Effective, Custom-Designed HPM's to Your Specs*

Both military and commercial solutions can be provided to meet your specific need for high performance in a compact size. Connectorized modules or pallet type custom designs which can be integrated into higher order assemblies can also be provided, giving you an alternative solution for even your most demanding applications.

- Lower cost since entire BW covered in one amplifier
- Ultimate in performance due to latest device technology so you don't have to compromise
- Lower life cycle cost and greater reliability due to total solid state approach
- Low current consumption saving precious current in military grade systems
- $\Gamma : 1$  Output VSWR capability so you don't have to worry about harsh environments and operator error
- Great gain flatness and NF

### *With Our Latest Standard Solid State Modular Amplifier Series We Now Cover An Instantaneous Bandwidth From 0.7–6 GHz*

*New Hybrid Modules Provide State-of-the-Art Performance 0.7 – 6 GHz Models*

#### *A Combination of Innovative Technologies*

Our HPMs use the latest construction methods and techniques to achieve world-class performance.

- Either thick or thin film micro-electronics circuits can be fabricated to meet your cost, performance, and delivery objectives.
- They incorporate plated-thru holes and air bridge technology to ensure optimum RF performance.
- Our standard modules use transistor chips and thin film capacitors which are die attached and wire bonded to the thin film substrates. Thick film lower frequency custom modules have integrated resistors and can use either chip or packaged transistors.
- Materials and process techniques are selected to achieve excellent thermal dissipation and have compatible coefficients of expansion to survive temperature extremes.
- All microelectronic housings are hermetically sealed and tested to meet gross & fine leak according to military standards.

### *AR Will Custom Design Hybrid Power Modules To Meet Your Individual Requirements*

AR's engineering and manufacturing experience and expertise gained in producing our standard power amplifiers can be used to provide our customers with a custom solution specifically tailored to meet your exacting specification requirements. Both military and commercial types of solutions can be provided at a cost effective price where one demands high performance in a compact size.

Connectorized or pallet type custom designs which can be integrated into higher order assemblies can also be provided giving you alternate approaches to meet your demanding requirements.

### *Applications For Our HPMs Are Only Limited By Your Imagination*

Even though applications are limitless, possible uses for our HPM's are: :

- Radar systems
- ECM
- ECCM
- Jammers
- Wireless Communication
- Data Links
- Ground based Satellite Communication
- TWTA replacements
- Drivers for Microwave Power Modules (MPMs)

# Hybrid Power Modules



## **Clean Room**

- Class 10,000 clean room facility with full ESD controlled environment

## **Die Mounting**

- Eutectic die mounting with forming gas environment
- Gold & silver epoxy die attach

## **Manual & automatic wire bonding**

- Ball bonders
- Wedge bonders
- Ribbon bonders
- Parallel-gap welding

## **Cascade Probe Station**

- Supports new design performance verification
- Allows for in process testing of RF devices at carrier level resulting in production consistency between lots

## **Surface mount components**

- Lead and lead-free soldering
- Gold and silver conductive epoxy

## **Hermetic Sealing**

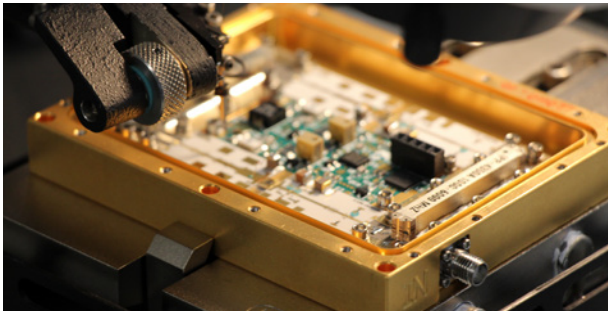
- All microelectronic housings are hermetically sealed
- Hermeticity can be tested to meet gross and fine leak military standards

## **Sophisticated Engineering Design Software**

- Microwave Office (AWR)
- CST Studio Suite (3D EM simulation)
- Autodesk CFD Simulation (cooling and fluid flow design)

## **Engineering CAD Design**

- AutoCAD (2D)
- Autodesk Inventor (3D)
- CAD design Electronic Packaging Designer







### Standard Catalog Products

- 0.7 – 6 GHz modules (instantaneous frequency range)
- Output powers up to 50 watts from 0.7 – 6 GHz
- 50 ohm cascable gain blocks
- Single supply voltage
- Thin film design
- Active devices in die form
- Special material & processes
- Provide excellent thermal dissipation
- Meet demanding military environmental specs
- RF input/output connectors are field replaceable
- Hermetically sealed to pass fine and gross leak military requirements

### Custom Design Products

- Coverage from 500 MHz to 18 GHz in narrow band increments
- Output powers up to and exceeding 50 watts
- 50 ohm cascable gain blocks
- Single supply voltage
- Thick or thin film designs
- Active devices in die or packaged form
- Special material & processes
- Provide excellent thermal dissipation
- Meet demanding military environmental specs
- RF input/output connectors are field replaceable
- Can be supplied on pallets for integration into higher order assemblies
- Hermetically sealed to pass fine and gross leak military requirements

### Standard Products Specification Summary

| HPM Model #  | Frequency (GHz) | P-1dB (dBm min.) | Gain (dB) | Input VSWR | Output VSWR | Harmonics P-1dB (dBc) | Noise Figure (dB) | IP3 (dBm) | DC Volts | DC Amps | Typical Size (cm) WxLxH | Typical Size (in) WxLxH |
|--------------|-----------------|------------------|-----------|------------|-------------|-----------------------|-------------------|-----------|----------|---------|-------------------------|-------------------------|
| 15HM1G6-44   | 1-6             | 41               | 44        | 2.0:1      | 2.0:1       | -20                   | 8.5               | 50        | 27       | 6.0     | 17.5 x 20.3 x 3         | 6.9 x 8.2 x 1.2         |
| 30HM1G6-45   | 1-6             | 43               | 45        | 2.0:1      | 2.0:1       | -20                   | 8.5               | 50        | 27       | 8.5     | 28.6 x 21 x 2.54        | 11.25 x 8.25 x 1.0      |
| 50HM1G6AB-47 | 1-6             | 46*              | 47        | 2.0:1      | 2.0:1       | -20                   | 8.5               | 48        | 27       | 11.0    | 28 x 21 x 2.54          | 11 x 8.25 x 1.0         |
| 30HM1G6AB-45 | 1-6             | 44*              | 45        | 2.0:1      | 2.0:1       | -20                   | 8.5               | 50        | 28       | 7.0     | 17.5 x 20.3 x 3         | 6.9 x 8.2 x 1.2         |

\* Class AB, output power specified at P-3dB.