

# Power Amplifier Solutions



# High Power Amplifiers, Drivers and Power Amplifier Subsystems

API Technologies is a leading manufacturer of **high performance** RF and microwave GaN, GaAs, MESFET, E-pHEMT, LDMOS, Class A, Class AB, Class C, broadband, hybrid, fully-modifiable power amplifier modules, drivers, and subsystems. API's diverse lineup of power amplifier solutions include broadband models covering DC to 26 GHz in a small, low profile package. Using advanced semiconductor technologies for broader bandwidths, along with proprietary design techniques, our power amplifiers deliver exceptional performance up to 1,000 watts and output power to 500 watts.

Working closely with leading edge semiconductor suppliers, API Technologies exploits the benefits of innovative semiconductor technologies, paving the way toward increased power density and complexity while reducing the overall size of the amplifier. This translates to power amplifier solutions that are both reliable and **smaller, lighter, and more efficient**.

## Experts at Vertical Integration

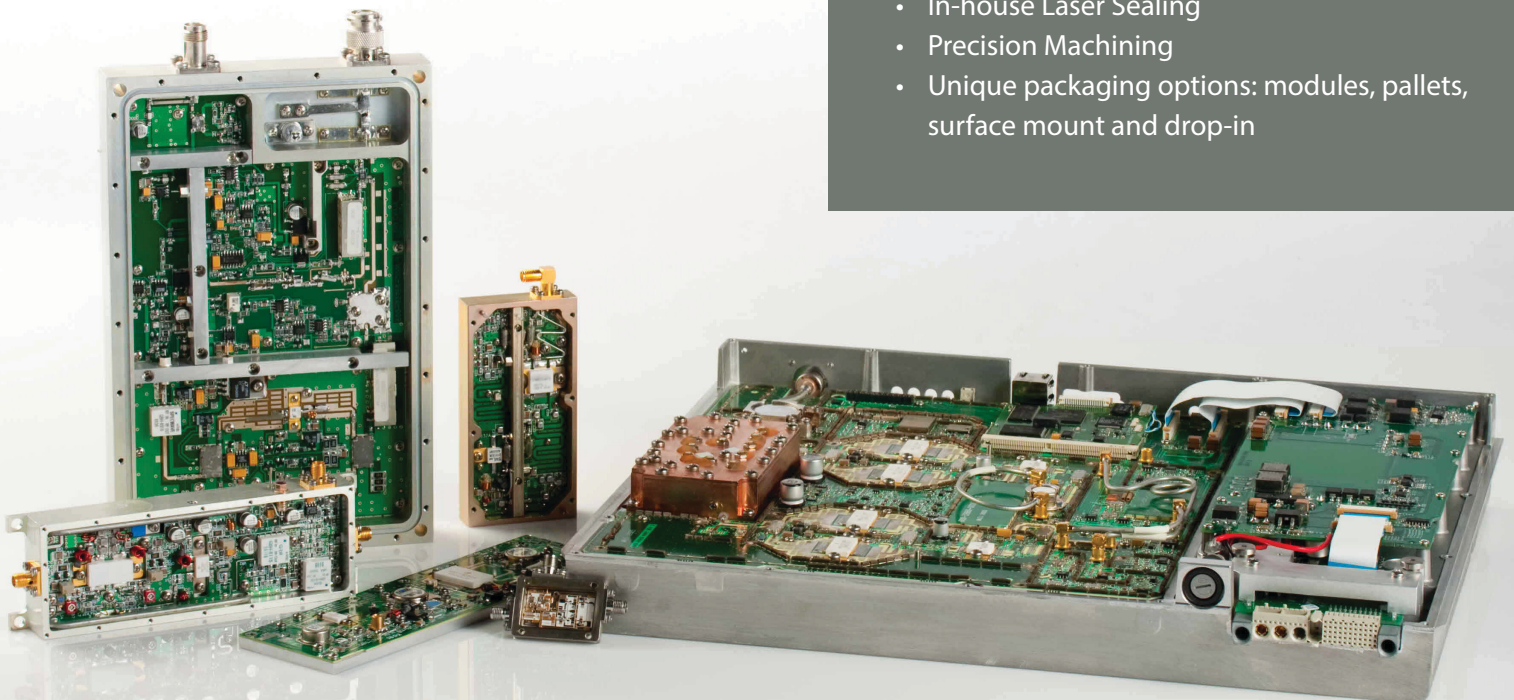
Through commitment to technical innovation and engineering, full product life-cycle involvement, and vertical integration capabilities, our standard and custom-designed high-reliability solutions are designed to address the most complex needs of military and commercial customers.

## Complex Designs. Small Footprint.

API engineers optimize package configurations to address challenging thermal and environmental conditions, meeting the end customer's system level integration needs in the smallest footprint possible.

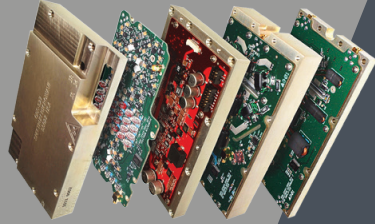
## Features & Core Competencies

- RF Jamming
- Broad Pulsed Power Capabilities
- Built-in User Control Interfaces
- High Input Protection Circuitry
- Thermal Temperature Compensating Circuits
- Fault Monitoring
- In-house Thin and Thick Film Fabrication
- In-house Chip & Wire (Hybrid) Technology
- SMT Manufacturing
- Void Free Die Attach Process
- Thermal Simulation
- Built-in Monitoring
- Linear & Non-linear Simulations
- In-house SAW Fabrication
- In-house Laser Sealing
- Precision Machining
- Unique packaging options: modules, pallets, surface mount and drop-in



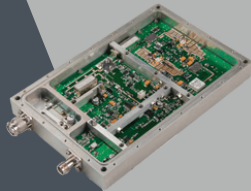
# Power Amplifiers Reaching Next Levels of Integration

*From Gain Blocks, Drivers and Single-Function Modules to Fully Integrated High Power Amplifier Assemblies and Subsystems Designs*



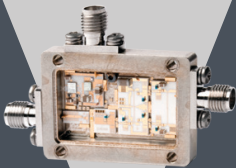
## Multi-Function Power Amplifier Subsystems

- Integrated LNA, Filtering, Switching Functions
- Integrated Power Supplies & Cooling Features
- Digital Control Capabilities
- Rack Mount Sub-Assembly and Chassis Design
- GaN-Based Solid State Power Amplifier Technology



## Power Amplifier Modules

- Broadband Jamming & EW Solutions
- GaN Solid State Pulsed Power
- TWT Amplifier Replacement
- Radar & Communications Applications
- Wireless & Co-Site Solutions



## Power Amplifier Drivers & Gain Blocks

- Multi-Stage Amplifier Solutions
- Internal Voltage Regulation
- Radar and Jammer Applications
- Balanced Output Stage
- Filtered Input
- GaN-Based Standard Designs

## Reduced Size & Weight

Integrating multiple RF and function components in a single housing reduces package housing size and weight while optimizing heat transfer.

## Improved Performance

Improvements to overall system performance across the block diagram as the result of the optimization of integrated components.

## Cost Savings

Reductions in overall material costs across the supply chain and improvements to accuracy and repeatability through manufacturing process controls.

## Diverse Power Amplifier + Component Integration Capabilities

API Technologies Components	Integration Applications
Small Signal Linear Amplifiers	Power Amplifier Driver Stages
Filters	Harmonic and Spurious Suppression of Power Amplifiers
Switches and Phase Shifters	Beam Steering of Electronically Steerable Array Radars
Couplers, Detectors and Digital Circuitry	Built-In Test and Smart Biasing Capabilities of Power Amplifiers

# High Power Amplifier Modules, Assemblies and Subsystems

*Narrow, Broadband and Band-Specific. Rack Mount Solutions and Custom Module Assemblies.*

At API Technologies, our high performance power amplifier modules, assemblies and subsystem solutions are designed with strict attention to efficiency and reliability, utilizing the latest GaN, LDMOS and GaAsFET technologies. Our diverse product line features low noise figure designs, custom band configurations, rack mount and custom housings, and integration capabilities with a wide range of high performance RF and microwave components.

Utilizing in-house chip and wire (hybrid), thin film, and SMT technology, our integrated power amplifier solutions are available as standard or custom designs in operating frequencies up to 26 GHz with output levels from 500mW to 1 kW, ideal for communications, jamming, electronic warfare, aerospace and industrial applications.



## Pulsed Power Amplifiers

*GaN-Based Solid State Pulsed Power Amplifiers. Expanded Pulsing Capabilities.*



API's line of Gallium Nitride (GaN) Power Amplifiers utilize pulsed, solid state power amplifier technology and include designs that operate with output power levels up to 1,000 watts and frequencies to 18 GHz.

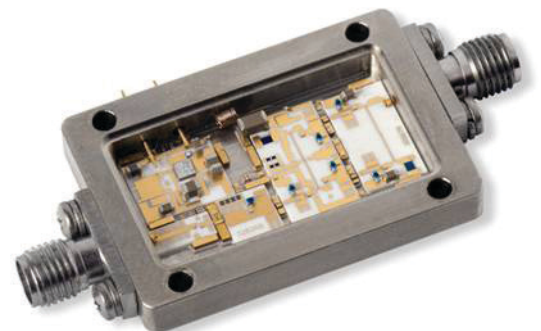
These power amplifiers serve as cost-effective replacements for traveling wave tube (TWT) amplifiers and offer longer life, better efficiencies and reduced size and weight than their TWT counterparts.

## Power Amplifier Drivers & Gain Blocks

*Excellent Linearity, Low Noise, Standard and Configurable Models Available Off-the-Shelf*

Designed to support various system requirements, API's drivers and gain blocks are packaged in a variety of configurations designed to meet customer-specific applications.

- 3 Stage Amplifier w/ Internal Voltage Regulation
- Includes Class A, and Class AB Linear Amplifiers
- Balanced Output Stage
- Filtered Input (18 dB/Octave Filter Roll-off)
- Latest GaN , GaAs, LDMOS Technologies
- Frequency ranges within 1 MHz - 26 GHz
- Transistor die - extended operating temperature range, -55C to +125C



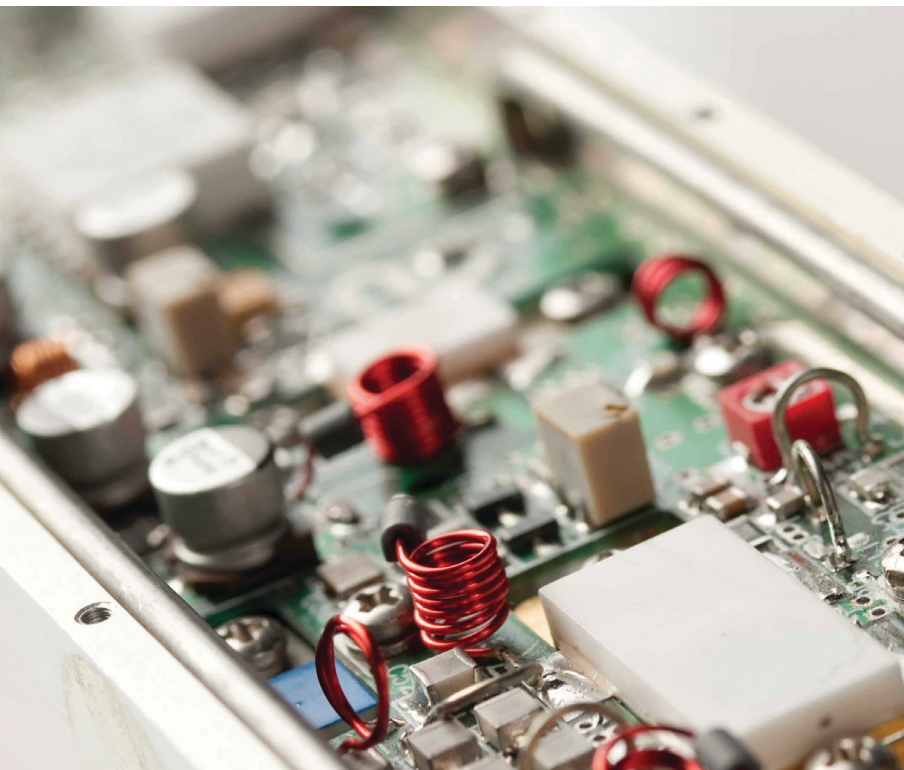
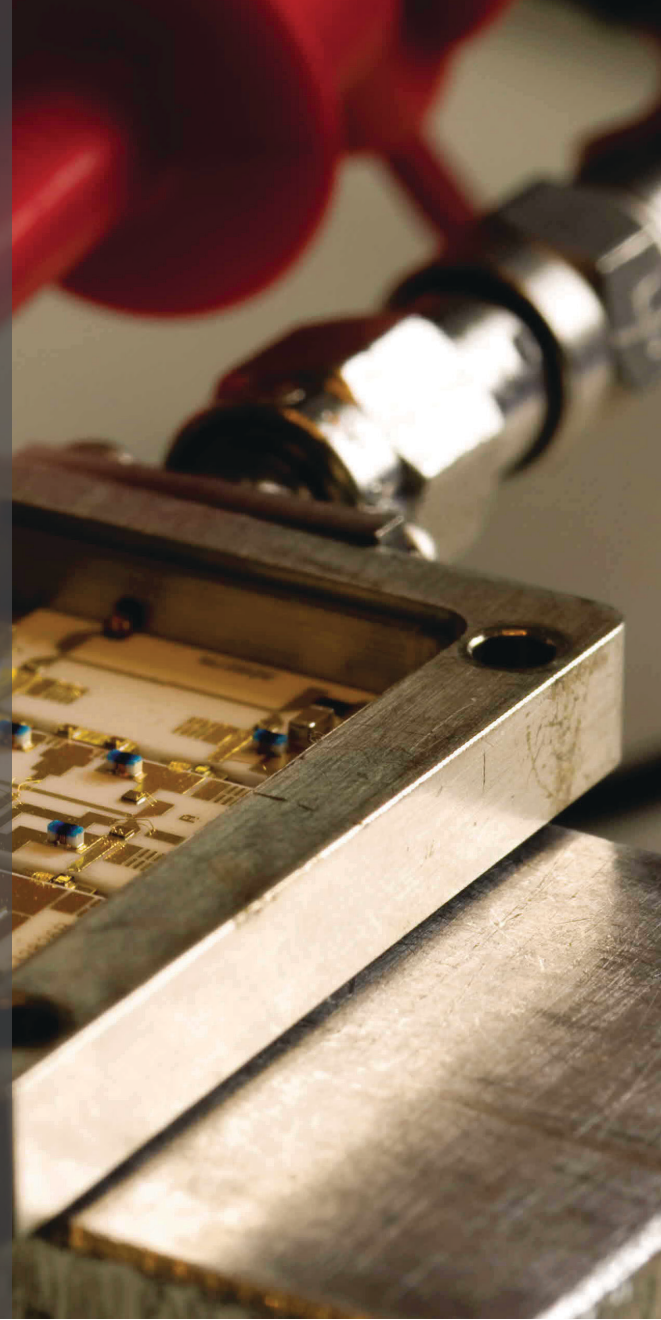
## Reliability Through Testing & Quality Assurance

Prior to delivery, API Technologies performs 100% electrical testing on all power amplifiers to confirm compliance with the customer's specification requirements.

Our quality management system is compliant with ISO-9001:2008 and periodically audited by our registrar. Additionally, API Technologies also offers military and high reliability commercial environmental screening.

- Comprehensive Testing Capabilities
- Conversion Gain
- Spurious Testing
- Vibration and Shock
- IP2, IP3, and IP2H
- Current Draw
- Noise Figure
- Windowed Gain Ripple
- Compression Tests
- Linearity Testing
- LO Leakage Testing
- Image Rejection
- Group Delay
- Temperature Cycling

Our thick and thin film amplifiers are designed and tested to meet the reliability and testing requirements of MIL-PRF-38534 and the screening requirements of MIL-STD-883.



## API Power Amplifier Applications

- Electronic Warfare
- Broadband Jamming
- Radar
- Pulsed Radar
- Military Communications
- Defense
- Transmitters
- Digital Control
- Satellite Links
- Test Equipment
- Test Sets
- Automated Metering Infrastructure
- Commercial/Medical/Industrial
- Aerospace

# API's Complete Line of Amplifier Solutions

*Standard, Configurable and Fully-Customizable Amplifier Products & Solutions*

## High Linearity Amplifiers

- Second order intercept performance as high as +113 dBm

## Ultra Low Phase Noise Amplifiers

- Low phase noise performance as low as -181 kHz at 10 kHz

## Surface Mount Amplifiers

- High volume packaged amplifiers at reduced costs

## High Frequency Amplifiers

- Small size; Internal voltage regulators
- Configurable without NRE

## Automatic Gain Control Amps

- Frequency ranges from 100 MHz to 2000 MHz

## RF Limiting Amplifiers

- High input power ranges; Hermetic packaging

## Low Noise Amplifiers

- Low noise figure performance as low as 0.8 dB

## Filtered GPS LNAs

- COTS-based; Noise figure of 1.8 dB typical



**api**   
**technologies corp.**

API Technologies Corp. is a trusted provider of RF, microwave, microelectronics, and security solutions for high-reliability applications.

The company designs, develops, and manufactures electronic components, modules, systems and products for technically demanding defense, commercial/industrial and aerospace applications. API Technologies' customers include many leading Fortune 500 companies, as well as a majority of NATO governments. While API was founded in 1981, our heritage brands have served the demanding, hi-rel marketplace for more than 60 years. API Technologies trades on the NASDAQ under the symbol ATNY.

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