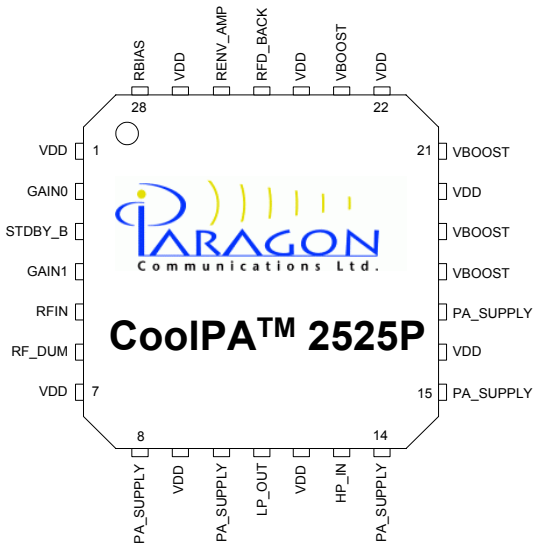
CoolPA™ Features

CoolPA1001™ is an integrated circuit application for RF Power Amplifiers performance enhancement featuring:

- 0.18u Standard CMOS process
- Single supply voltage (3.3 +/- 10% volt)
- Compact die (fits in 2mm^2 cavity)
- QFN5x5 package Optional QFN4x4
- Supports Wi-Fi, Wi-Max and Wibro RF signals input
- Low power stand-by mode
- Power Boosting: Output Power and Efficiency Increase under same EVM criteria
- Current Reduction: Efficiency Enhancement Only (keeping the same Pout and EVM)



CoolPA™ Operation Principal

CoolPA™ Idea

Sensing RF input envelope and enhancing Power Amplifier's drain voltage **only** when there is a need for high power

CoolPA™ Power Boosting Benefits

→**Output Power** Increase of: 20*log(Vmax/Vnom) in (db)

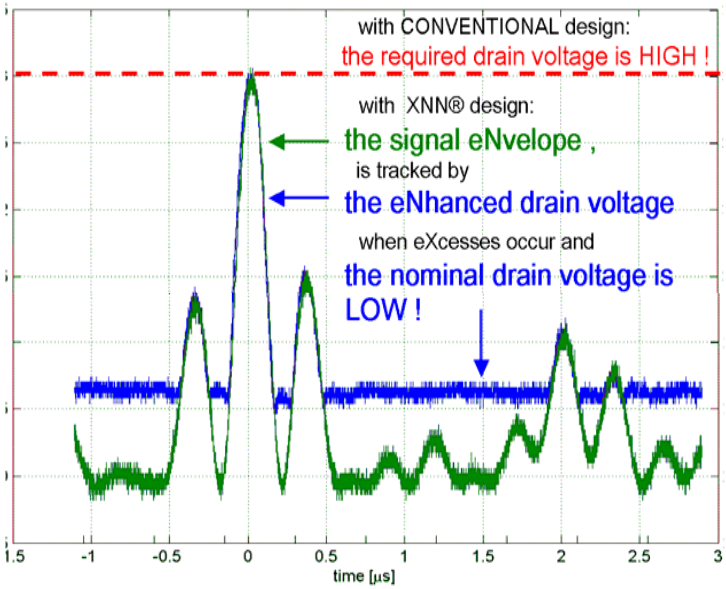
→**Efficiency Improvement** by a factor of: (Vmax/Vnom)

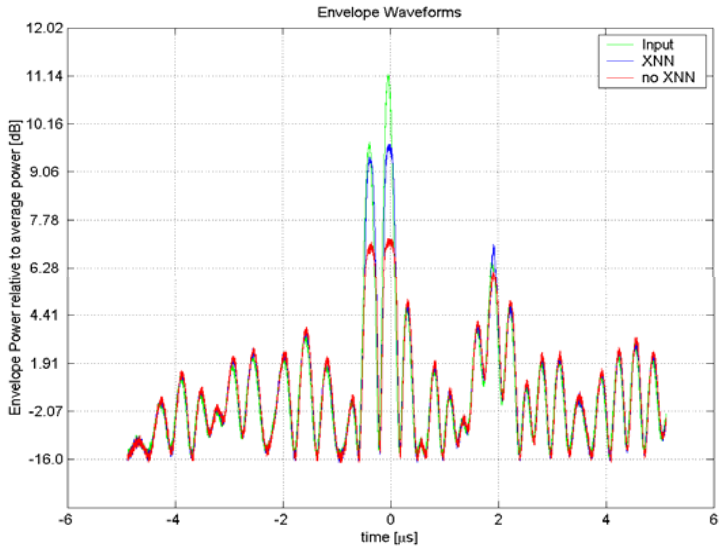
* While keeping the same Power Amplifier EVM

CoolPA™ Current Reduction Benefits

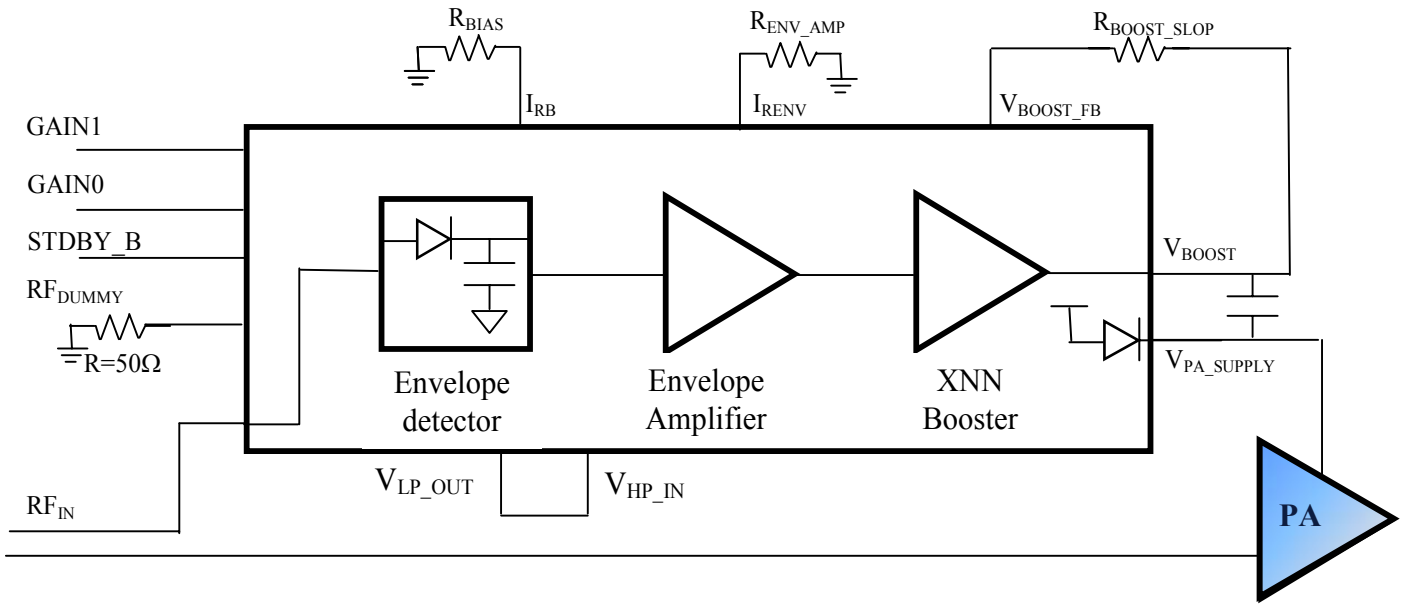
→**Keeping same nominal Pout and EVM** while reducing PA's drain current

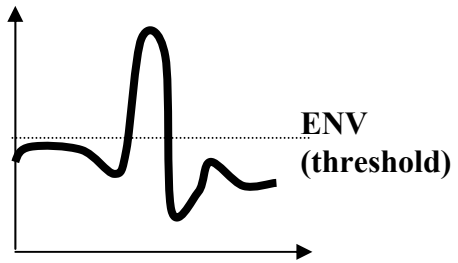
CoolPA™ Operation Principal

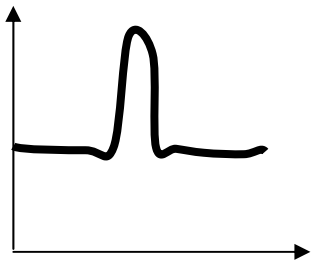


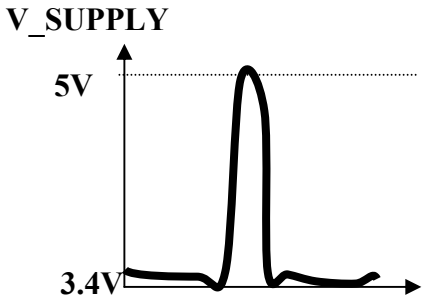


CoolPA™ Block Diagram







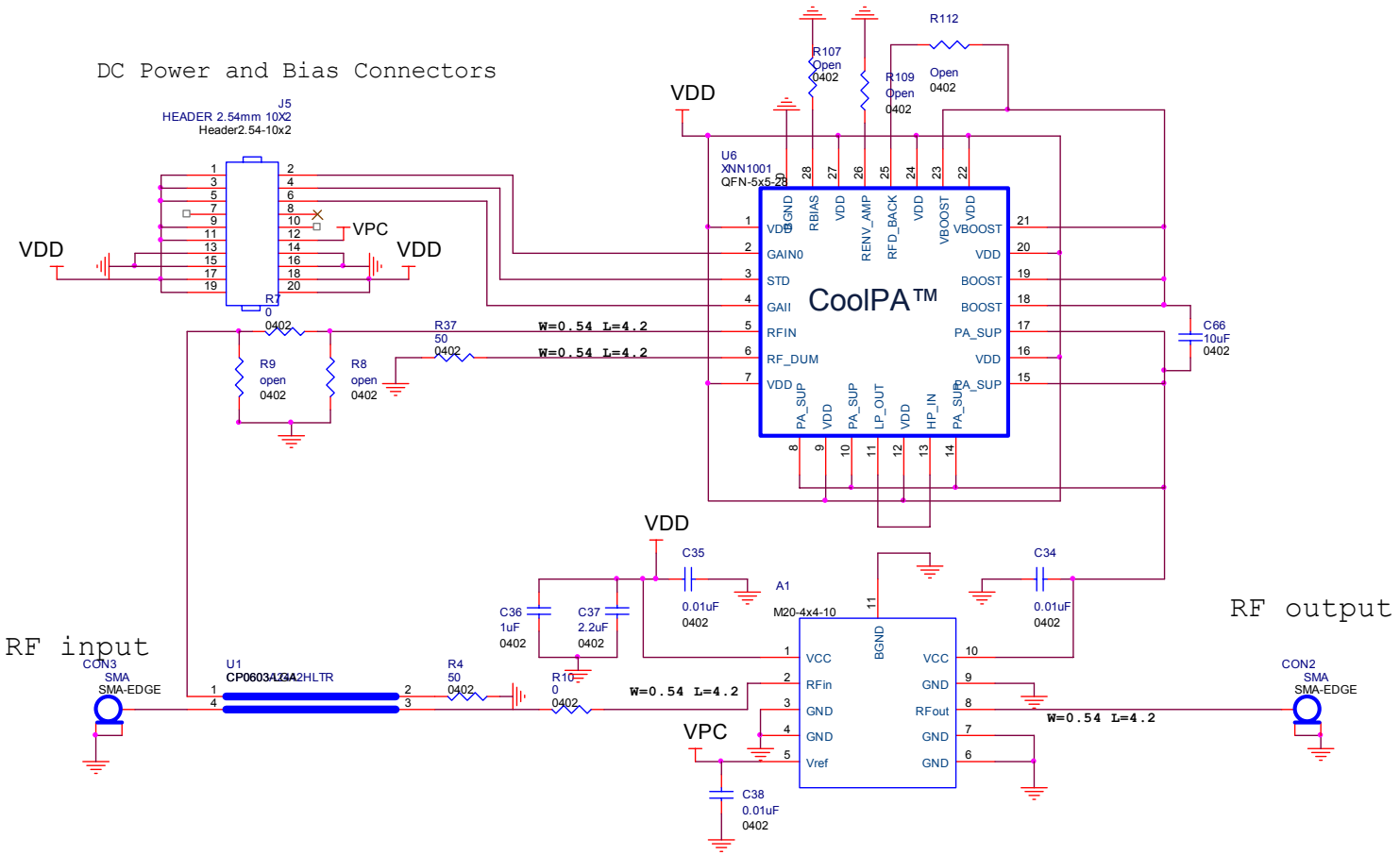


CoolPA™ Integration Requirements

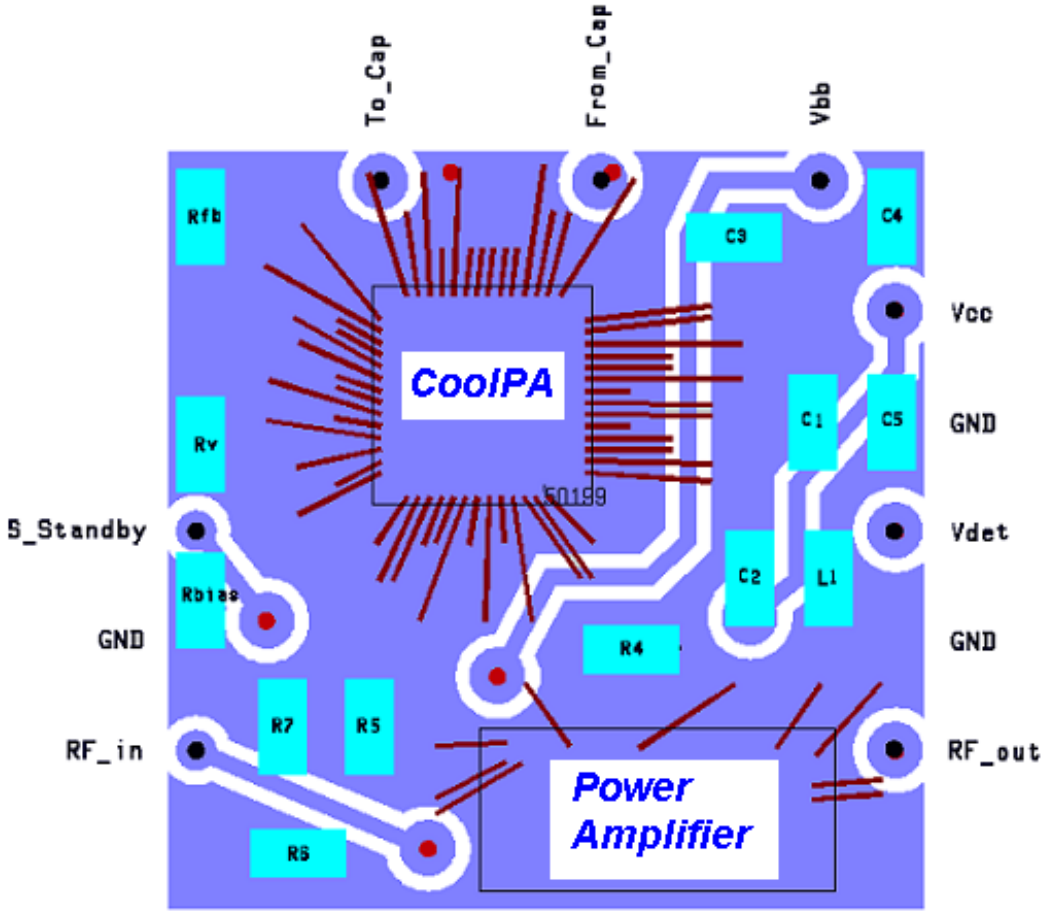
- Power Booster
  - Last stage Drain access
  - Last stage driver capable of driving additional 3-4 dB's
  - Power detector supporting higher output power

- Current Reduction
  - Last stage Drain access
  - Class AB-B PA (Future CoolPA™ products will support class A-AB PA's)

CoolPA™ Integration Schematics - Chip

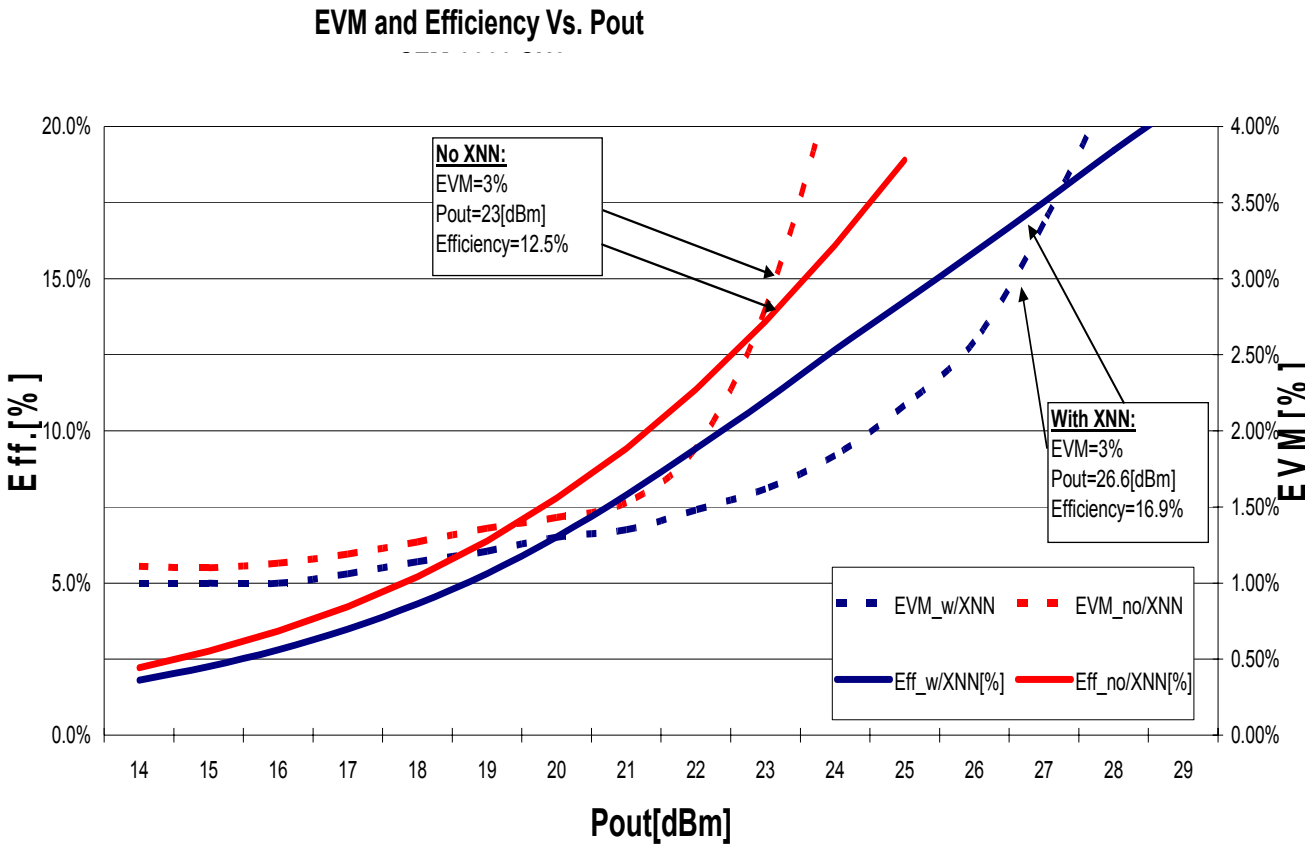


CoolPA™ Integration Schematics - Die

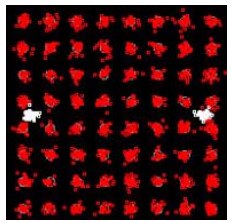


Standard QFN5x5

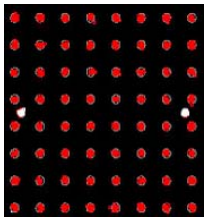
CoolPA™ test results – Power Boosting



No CoolPA™

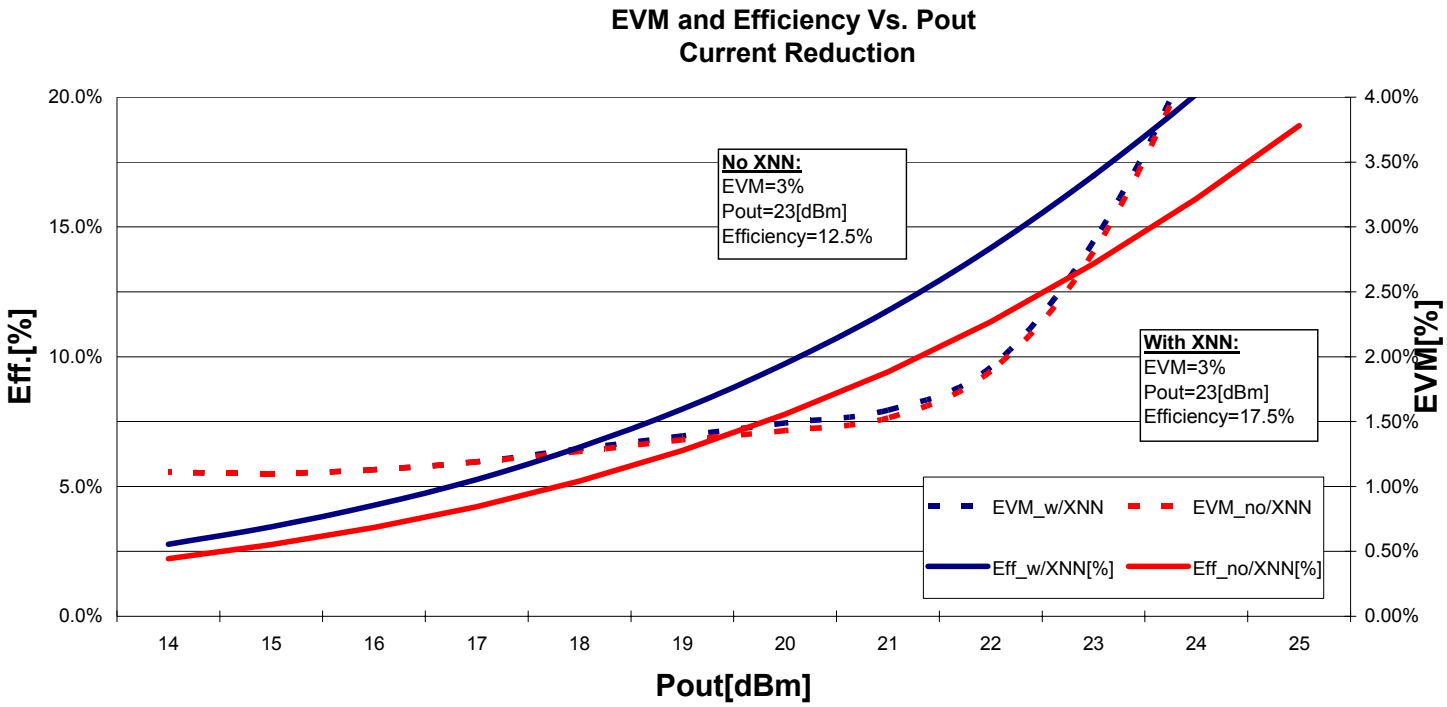


With CoolPA™

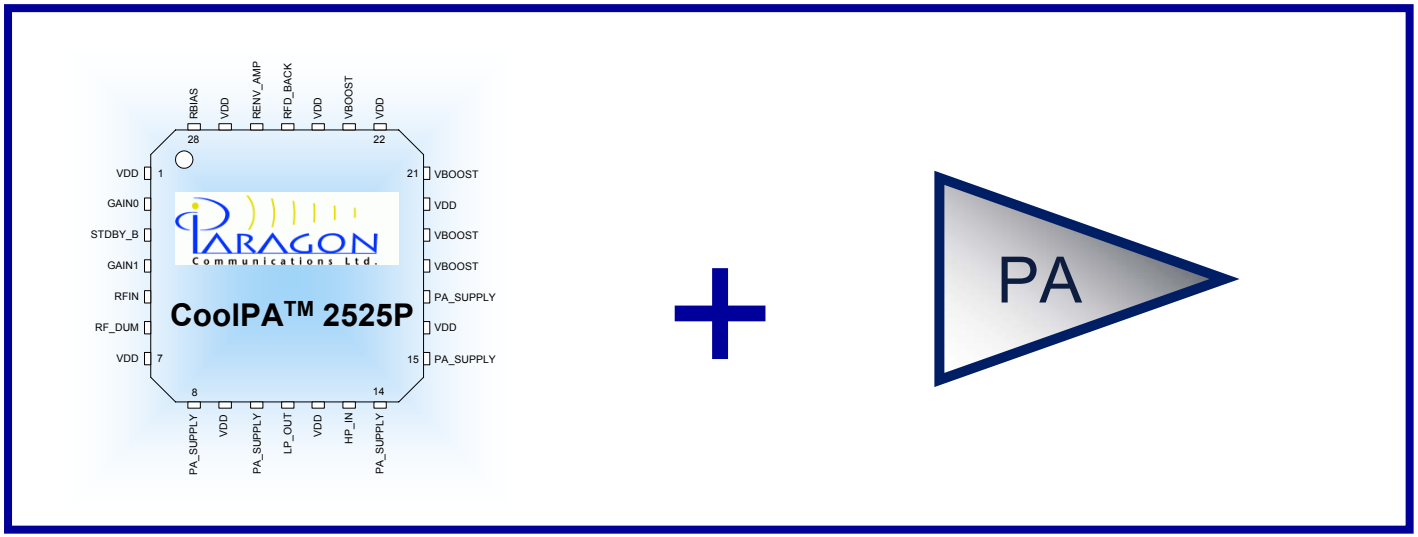


All PA's tested provide more than 3dB Pout enhancement

CoolPA™ test results – Current Reduction



CoolPA™ + Power Amplifier Product



World's best Power Amplifier