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(54) **POWER AMPLIFIER MODULES INCLUDING RELATED SYSTEMS, DEVICES, AND METHODS**

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USPC 330/277, 302, 307

See application file for complete search history.

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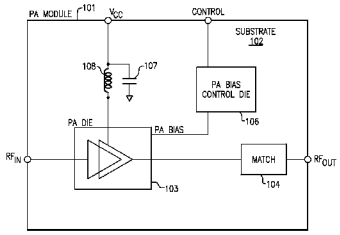
(57) **ABSTRACT**

A power amplifier module includes a power amplifier including a GaAs bipolar transistor having a collector, a base abutting the collector, and an emitter, the collector having a doping concentration of at least about 3×10^{16} cm^{-3} at a junction with the base, the collector also having at least a first grading in which doping concentration increases away from the base; and an RF transmission line driven by the power amplifier, the RF transmission line including a conductive layer and finish plating on the conductive layer, the finish plating including a gold layer, a palladium layer proximate the gold layer, and a diffusion barrier layer proximate the palladium layer, the diffusion barrier layer including nickel and having a thickness that is less than about the skin depth of nickel at 0.9 GHz. Other embodiments of the module are provided along with related methods and components thereof.

29 Claims, 99 Drawing Sheets