DESIGN

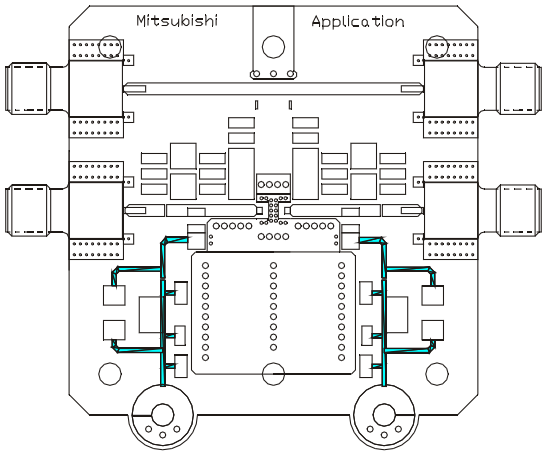
A New Circuit Element For Jumper-Tunable HPA Product Development

High power device port impedance create difficult design problems. Together with internal S12 feedback, Non-Linear Push Pull bias and Load Pull considerations make designing-to-schedual unpredictable and sometimes leads to failure.

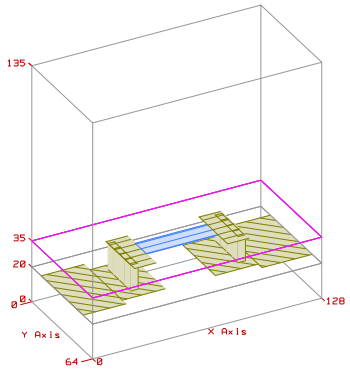
Methods for establishing performance based tuning recipes in the absence of reliable design data are few. Traditional techniques rely on the inventiveness of trustworthy technicians. A method of extremely flexible tuning using semi distributed “Zero ohm” resistors and EM modeling software has opened a new dimension in design turnaround. A novel .1 to 3.3GHz 10Watt power amplifier was developed. The method needs no iteration and can be immediately mass produced using automation. Advance in EM software have made possible the characterization of discrete components and their associated footprints routine. As frequencies and data rates increase it becomes important to characterize critical components for low, high and spurious responses. The traditional Zero ohm resistor can be constructed and accurately analyzed in EM space.

Michael Hillbun
Diamond Engineering
484Main Street, Diamond Springs,Ca.
(530) 626-3857
e-mail mikehill@diamondeng.net

The Jumper Tuned PA application circuit sample may be obtained from the Device Group



To begin we onsider the nature and construction of such a component. An 0603 size is modeled.



2. The EM construction of a Zero ohm resistor consisting of a layer of Alumina on a defined PCB dielectric. The resist ink is defined in Ohms per Squasre with measured physical aspect ratios. The metalized ends are modeled using via current elements. Multiple via elements improve the distributed nature of the EM via.