

SOLID STATE TECHNOLOGY APPLICABLE TO TRANSMITTERS



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Recent advances in silicon bipolar and FET technologies are making solid state power a vital component of the emerging microwave communications network. Silicon transistors today are central to the design of a wide range of systems from cellular radios at 900MHz to high power phased array radars at S-Band frequencies. With the application of state of the art technologies of ion-implantation, sub-micron lithography and dry processing, silicon device based systems offer sufficient reliability and bandwidth advantage to make a vast number of new designs economically practical.

Consider the power/frequency options available today using high power bipolars:

- 55 Watts at 900 to 950MHz
- 35 Watts CW at 1.6 - 1.8 GHz
- 6 Watts Class A at 2.3 GHz
- 20-50 Watts at 2.9 - 3.1 GHz.

Also waiting in the wings, for some application is a new silicon device called the ISOFET. It offers more gain per stage and is easier to modulate resulting in simplified power amplifier designs and broadband matching techniques. The state of the art performance for this device is:

- 40 Watts CW at 200 - 400MHz
- 300 Watts CW at 88 - 108MHz

The ISOFET is a technology that will provide a 3-4 db improvement in gain over Si bipolar devices at the same power level.

Together with innovations of process improvement in Silicon bipolar transistors at S-Band, material improvements in GaAs FET power transistor and device structure improvement in Silicon ISOFET it is clear that the solid state viability of transmitters are both cost effective and available today.