

Integrated Passive Devices



GCS has developed high-Q, small-size passive IC elements for integration with GaAs PA and switch chips to further reduce cell phone front-end module size and cost

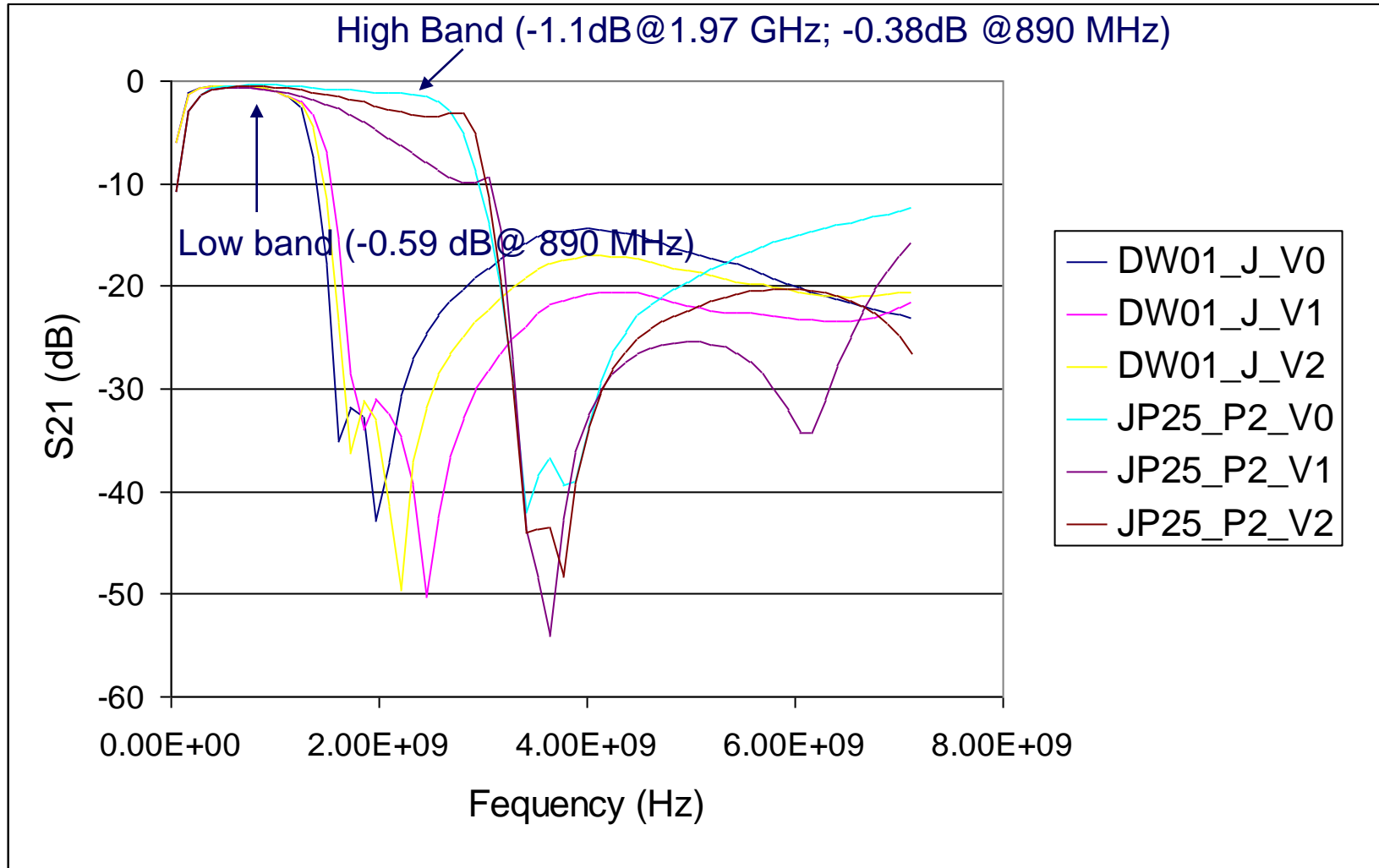
- **Thick M1 and M2 for stacked high-Q and high-accuracy inductors**
- **Multi-layer M-Nitride-M for stacked high-Q and high-accuracy capacitors**
- **Thick M2 can also be used for thermal shunt and flip-chip mount**

Large through-substrate vias are also available with IPD process

IPD on GaAs Wafer



– Performance Examples of Hi/Lo Band Filters



IPD Process with Large Via Opening



- Enables hybrid integration of expensive active devices (GaN, InP, Si) and low-cost, low-loss passive elements
- Large via openings for discrete die insertions
- Minimizes parasitics and interconnects for high frequency applications
- Compact realization with reduced component counts to improve long term reliability
- Same large vias can be fabricated on active MMIC chips to allow integration of different active devices on a single chip

