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Technical article

STMicroelectronics offers full foundry services for its RF IPD process

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Introduction

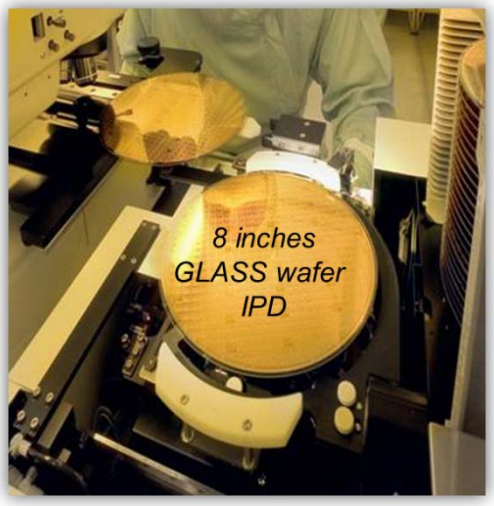
STMicroelectronics is known as a premier supplier of high performance integrated silicon solutions, known as IPAD™ (integrated passive and active devices), with products already in use in large volumes at several mobile phone makers. To sustain the significant market traction in RF integration, STMicroelectronics is now offering to the market its full design kit (DK) and foundry services for its RF IPD (integrated passive device) process.

To cover the wide spectrum and power requirements of the emerging wireless applications, this process technology from STMicroelectronics offers thick copper capabilities on glass or high resistivity silicon substrates.

Providing a comprehensive ADS (Advanced Design System) kit, that includes layout and efficient EM simulation support, partners can now take advantage of STMicroelectronics superior technology process and design tools.

The high quality factor RF integrated passive process from STMicroelectronics is ideal for the production of passive devices such as filters, baluns, couplers, power combiners, diplexers and matching networks used in various types of RF applications combining cost sensitivity and high efficiency requirements. STMicroelectronics IPD process supports the integration of thick copper inductors, high precision capacitors and resistors using a world-class 200 mm wafer manufacturing facility located in Tours, France.

Figure 1. RF IPD wafer (8”)



TM: IPAD is a trademark of STMicroelectronics

1 Technology features

Passive components do not scale well with new high integrated CMOS processes, while digital blocks continue to shrink, analog functions can hardly be shrunk, leading to increased and not optimized cost and performance trade-off. Offering scalable and flexible process options for copper layers and capacitance density, in addition to a large variety of packaging choices, such as micro-bumping, die to die bonding and wafer thinning below 100 µm, STMicroelectronics RF IPD process technology enables lower cost and higher performance function integration for compact system in package and module.

Figure 2. RF IPD technology view

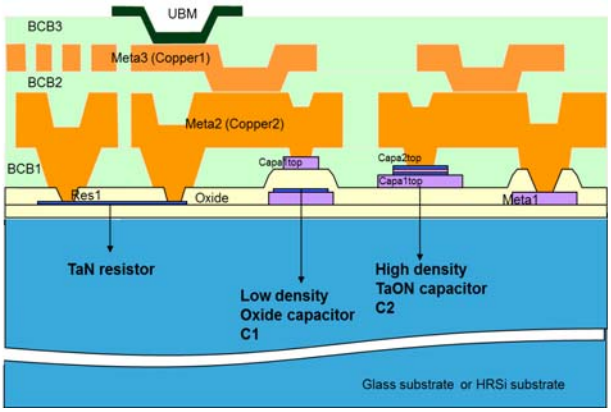


Table 1. RF IPD technology features

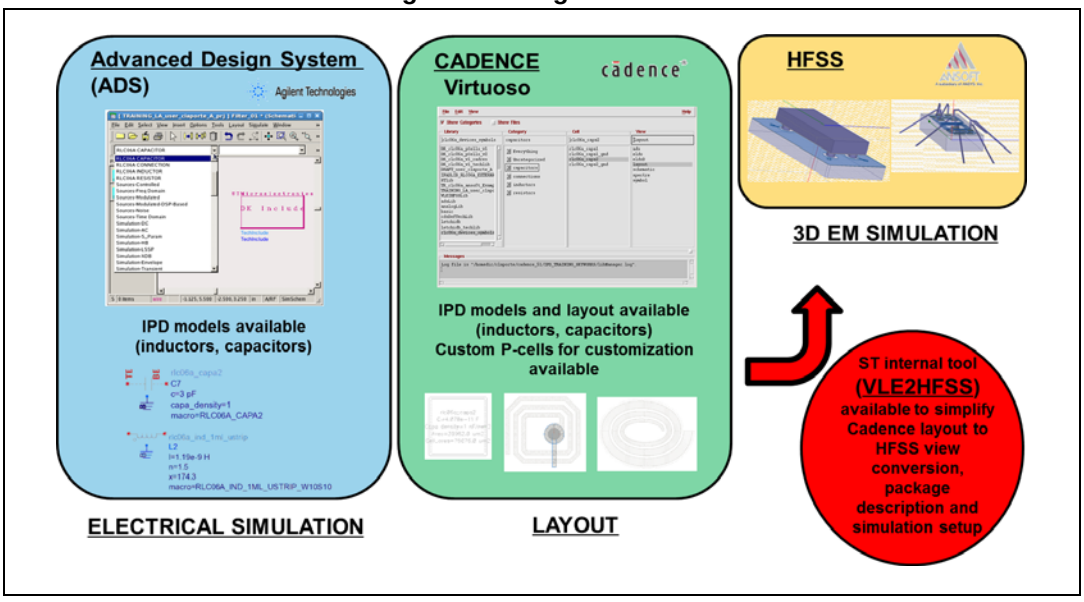
Technology	High-Q RF IPD
Substrate	Glass and high resistivity silicon
Metal layers	Up to 5 metal layers (1 TaN, 2 Al, 2 Cu)
Metal thickness	Up to 10 µm
Passives	R, L, C
MIM capacitors	1 nF/mm² - 150 V, 2 nF/mm² - 100 V, 5 nF/mm² - 50 V, 140 pF/mm² - 200 V, 70 pF/mm² - 400 V
RTaN metal resistor	35 Ω /sq. ±5%
Packaging	Wire-bonding, bumps, copper pads, micro-bumps
Wafers diameter	200 mm
Wafer thickness	<100 µm

2 STMicroelectronics RF IPD benefits

- Cover wide variety of application requirements
- Superior process control over discrete solutions
- Comprehensive design kit
- Efficient design services
- Fast foundry shuttle service
- Smaller area than discrete solutions
- Thinner than LTCC
- Lower cost than GaAs solutions

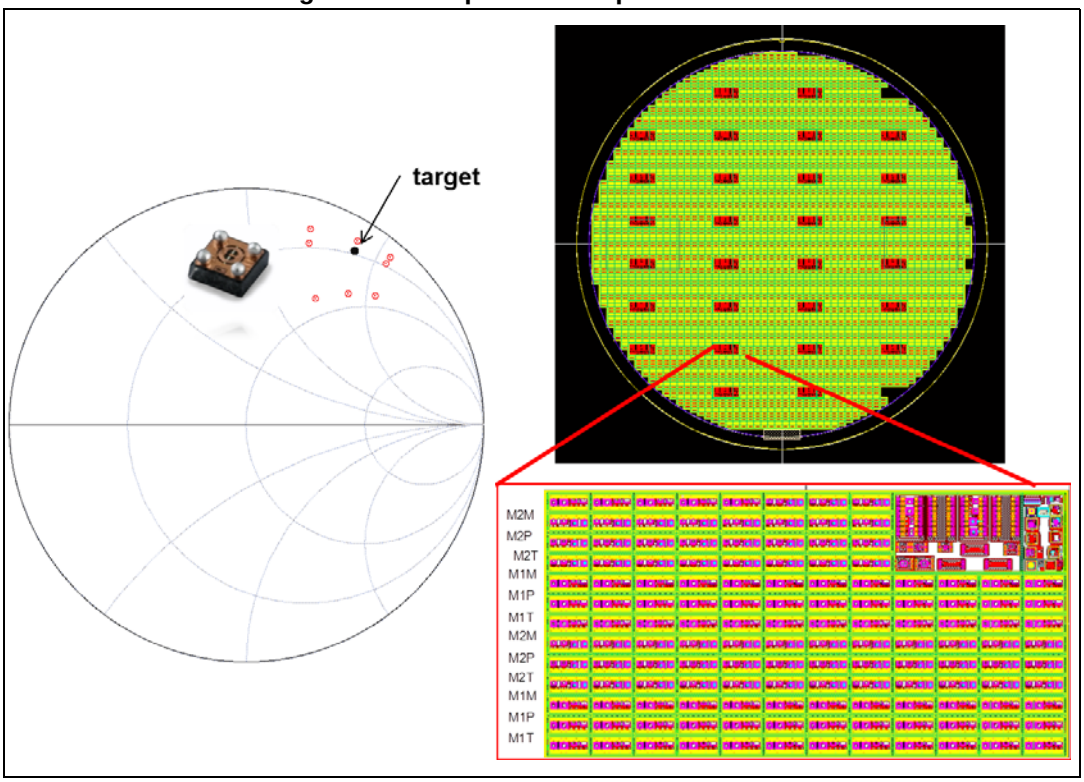
Using industry standard CAD tools, the foundry service offers powerful design capabilities. Based on state-of-the art industry-standard design tools (ADS, Virtuoso and HFSS), STMicroelectronics design kit offers infinite capabilities of RF designs. In addition, the kit offers a special “push-button” tool to simplify Cadence layout to HFSS view conversion, package description and simulation setup.

Figure 3. Design Kit Tools



Set-up to provide high quality services to its partners, the STMicroelectronics RF IPD process offers fast wafer deliveries and quick design optimization thanks to its regular “foundry service shuttle” that offers multi-variant designs on the same multi-product-wafer.

Figure 4. Example of multi-product-wafer



3 Conclusion

Thanks to its large variety of IPD processes, available on Glass or HR Si substrate, STMicroelectronics is the unique partner to offer the best answer for each market application. Its fully automated 200 mm wafer factory using the most advanced and competitive tools and processes are the guarantee for ST partners to access large industrial capacity with the highest quality requirements and the most cost effective system solutions.

4 Revision history

Table 2. Document revision history

Date	Revision	Changes
27-Aug-2013	1	Initial release.
18-Nov-2013	2	Updated *Introduction*.

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