

Analog/Mixed-signal/RF Technology Overview

TSI Semiconductors provides a cutting-edge analog/mixed-signal/RF 0.18-micron technology. The process is ideal for a wide variety of high-speed and low-power products in many consumer, infrastructure, and automotive applications.

Features

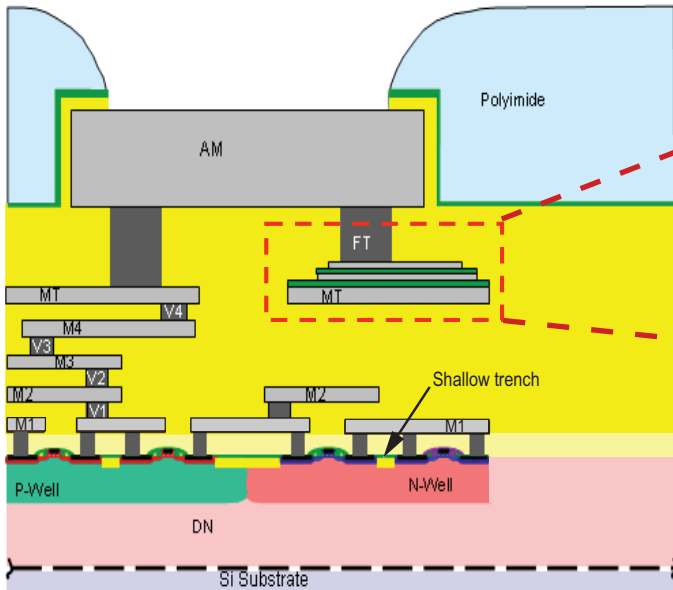
- Poly, diffusion & well resistors
- Thin film resistors (TaN)
- MIM & MOM Capacitors (VN Cap)
- Varactors
- Schottky Barrier Diode (SBD)
- Inductors

Benefits

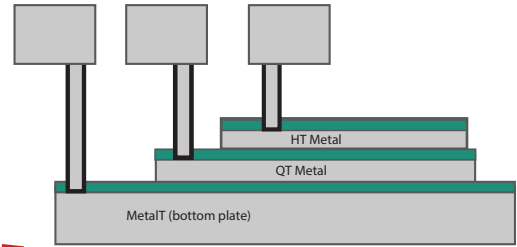
- Flexibility – modular
- Reliability of device
- IP security
- Efficiency, reducing overall costs

| TSI Semiconductors 0.18um Process Device Menu | | |
|---|---|---|
| Process | Analog/Mixed-signal/RF | |
| VGS | 1.8V & 5V | 5V Only |
| Triple Well Isolation | Yes | Yes |
| FETs | 1.8V (RF only), 5V | 5V Only |
| | High Vt * (2ML) | High Vt * (2ML) |
| | Super high Vt * (2ML) | Super high Vt * (2ML) |
| Resistors | N+, P+ diffusion & poly | N+, P+ diffusion & poly |
| | RR poly high R - 1.6KΩ/sq (1ML) | RR poly high R - 1.6KΩ/sq (1ML) |
| | RP poly precision R - 165Ω/sq (1ML) | RP poly precision R - 165Ω/sq (1ML) |
| | TaN BEOL (1ML) | TaN BEOL (1ML) |
| Diodes | Schottky Barrier | Schottky Barrier |
| Decoupling Caps and Varactors | 1.8V/5V N, P caps, vars | 1.8V/5V N, P caps, vars |
| BEOL Caps | Vertical native (Vncap) | Vertical native (Vncap) |
| | Single MIM - 2.1 fF/μm ² * (1ML) | Single MIM - 2.1 fF/μm ² * (1ML) |
| | Dual MIM - 4.1 fF/μm ² * (1ML) | Dual MIM - 4.1 fF/μm ² * (1ML) |
| BEOL Metal | 7LM: M1-MT Analog Metal (AM) - 4μm | 7LM: M1-MT Analog Metal (AM) - 4μm |
| | M3, V3, M4,V4,M5,V5 | M3, V3, M4,V4,M5,V5 |
| Inductors | Analog Metal (AM) - 4μm Al | Analog Metal (AM) - 4μm Al |
| Masks | 21 | 16 |

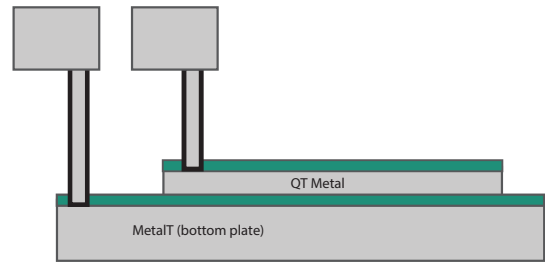
* Optional Devices/Layers



Dual MIM Option: 4.10 fF/um²



Single MIM Option: 2.05 fF/um²



| Resistors | |
|----------------|----------------------|
| Resistors | R _s (Ω/□) |
| N+ diffusion | 72 |
| P+ diffusion | 105 |
| N+ poly | 370 |
| P+ poly | 260 |
| HiRes poly | 1600 |
| Precision poly | 165 |
| HV N-well | 3074 |
| HV P-well | 725 |
| TaN | 61 |

Standard LV Process
Optional Masks

| Capacitors | |
|------------|-------------------------|
| Capacitors | C (fF/um ²) |
| Single MIM | 2.05 |
| Dual MIM | 4.1 |
| Vncap | 0.1 - 0.7 |
| HV Vncap | 0.1 - 0.5 |

Optional Masks
Standard LV Process

Summary

The TSI Semiconductors 0.18-micron analog/mixed-signal/RF process supports a 4-micron thick analog backend metal and both single and dual level MIM capacitors for a wide variety of low power or high speed SoCs.

TSI Semiconductors is a world-class, specialty foundry offering flexible technology development and the highest industry quality manufacturing solutions. Our flexible technology development and manufacturing services allow our customers to benefit from accelerated cycles of learning, which enables them to get products to market faster, and gain greater control and protection of their specific technology. With our headquarters and 8-inch fabrication plant in Roseville, California, we manufacture in a large array of versatile processes that include analog/mixed-signal/RF, deep-submicron, standard product solutions, automotive-grade, high-voltage, and technology capabilities utilizing novel materials, structures and devices. For more information, visit www.tsisemi.com.

