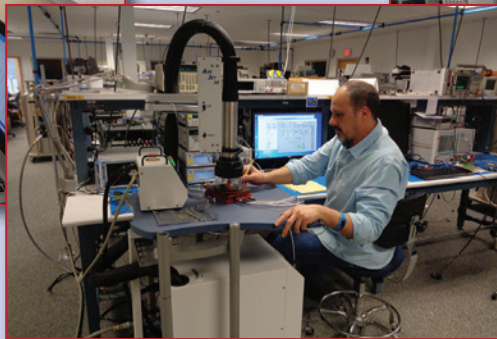
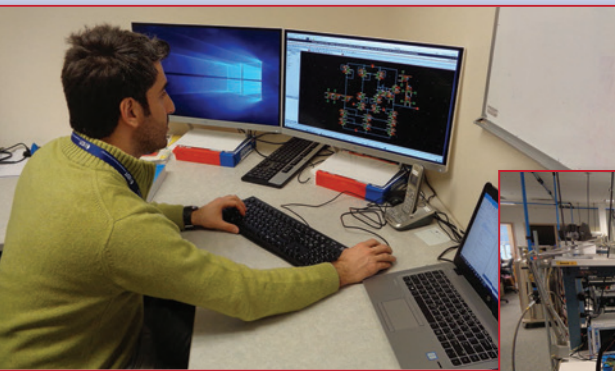


# FAB S and LAB S

## Quietly Gaining Share with Smart Silicon



The technology wall separating GaAs and silicon keeps moving higher in frequency. Integrated Device Technology (IDT) is one of the companies pushing silicon forward, happily winning designs and taking market share from GaAs. Not as well known as some of the larger silicon IC players, IDT was formed in 1980 and has grown to more than \$740 million in annual revenue (adding the prior four quarters). The company's manufacturing strategy uses external foundries to fabricate CMOS, SiGe and SOI ICs, which are tested in IDT's own manufacturing facility in Penang, Malaysia.

IDT quietly entered the RF space in 2009, without a history in either RF or GaAs. The move was based on the confidence that IDT could grow a business through product innovation, not acquisition. That strategy, which it calls "smart silicon," has proven successful, reflected by the growth of the RF team, now with two design centers in Boston and San Diego, and the rapid expansion of IDT's RF business revenue. Its RF product portfolio — all silicon — is focused below 6 GHz and includes virtually all the small-signal RF and IF circuit functions used in a wireless base station: switches, amplifiers, variable-gain amplifiers (VGA), digital-step and voltage variable attenuators (DSA and VVA), mixers, modulators, demodulators, phase-locked loops and synthesizers. IDT also offers products for CATV networks, which are matched to 75  $\Omega$ .

Back to smart silicon. What makes these products smart and so attractive to customers? In general, silicon has lower power consumption, better reliability and a wider operating temperature range than GaAs. To these, IDT's RF designers have added unique and patented circuit techniques to differentiate their products. IDT's switches

and DSAs are designed to change states without high transients or glitches (Glitch-Free™), and port impedances remain constant during the transition ( $K_{|z|}$ ). VGAs maintain a constant noise figure as the gain is reduced (FlatNoise™), and the output intercept point remains high and constant as the gain changes ( $K_{LIN}$ ). Mixers incorporate a technology to minimize intermodulation products (Zero-Distortion™).

Consumer demand for data is driving the wireless industry to 5G, what Qualcomm's CEO has likened to the introduction of electricity and the automobile. For the operators and network equipment manufacturers, it means more, smaller cells, each one with multiple inputs and multiple outputs (MIMO). For the semiconductor supplier, it means integration — which plays to another of IDT's strengths. What you won't see in IDT's online catalog are the many additional integrated products that combine individual circuit functions into custom assemblies for next-generation systems. IDT's product development process is rigorous in definition, yet quick in execution, to minimize time-to-market and deliver well-integrated solutions. All new designs are run on production masks. Circuit changes are made with the metal layers, enabling iterations to be processed in four weeks rather than the normal 10 to 12 weeks for an end-to-end silicon process.

IDT's mantra is innovation, which is the only sane strategy to enter a crowded and price sensitive market. The RF team's performance has established IDT's credentials, shipping millions of ICs per month to four of the top five base station manufacturers. Combining smart silicon, integration and customer credibility, IDT is well positioned to be a leading IC supplier for 5G infrastructure, even at millimeter wave frequencies.

[www.idt.com/products/rf-products](http://www.idt.com/products/rf-products)