



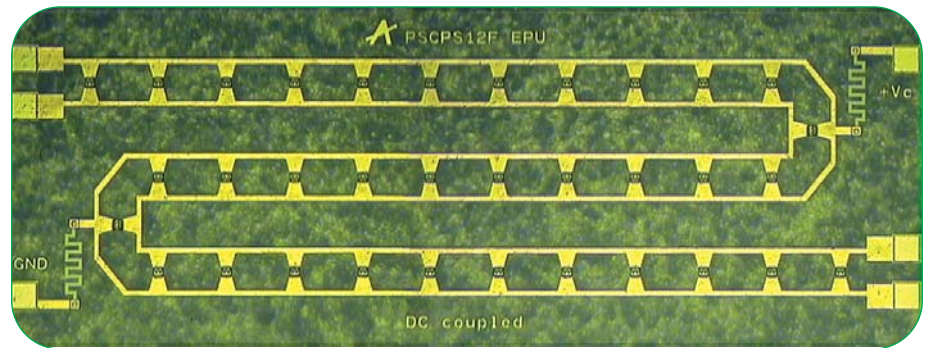
28th Annual Product of the Year Awards

From the thousands of products introduced in 2003, the editors of *Electronic Products* have chosen the most outstanding. The selections are based on significant advances in technology or its application, a decided innovation in design, or a substantial gain in price-performance. As usual, picking winners was made difficult by the many impressive products announced during the year. Here is a product by Agile Materials & Technologies chosen as a 2003 award winner.

Ferroelectric phase shifters expand smart-antenna horizons

Long used in expensive military radar and satellite applications, electronically scanned phased-array-antennas offer performance that could benefit a variety of other applications, such as commercial wireless communications or collision-avoidance radar in automobiles. However, widespread deployment of these smart antennas has been impeded by their traditionally high cost—mainly due to the use of expensive GaAs- and MEMS-based phase shifters, which can account for almost half the total cost of such designs.

Using an alternative approach consisting of a proprietary thin-film ferroelectric technology, the PSCPS family of coplanar analog phase shifters claims to dramatically cut the costs of smart antenna arrays. In addition, by reducing size, complexity, and power consumption over current solutions, the devices position smart antennas for use in more cost-sensitive applications such as wireless base stations, mobile units, and automotive radars, as well as more



Agile Materials' PSCPS family of coplanar analog phase shifters

widespread military use.

The highly tunable devices (as low as 2:1 at High-Q) devices comprise capacitors made of barium strontium titanate, a material that offers a dielectric constant that is tunable in response to voltage potential. Suitable for frequencies from below 1 to over 40 GHz, the phase shifters require a footprint from 3 to 6 mm². Using only passive components and requiring a maximum control voltage of 20 V, the de-

vices consume no power and can handle RF power levels in excess of 20 dBm.

The phase shifters achieve more than 360° of phase shift with typical insertion loss of 6 to 7 dB. (From \$10 ea/prod qty—available now.)

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