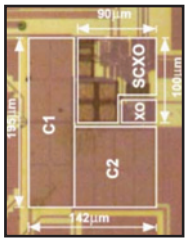
in brief

NEEDLE IN A HAYSTACK

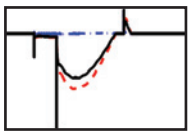
PAGE 325 A one-pin crystal oscillator is presented in research from Taiwan. The crystal oscillator uses a one-pin start-up and self-charged architecture, and consumes 2.89 nW from a 0.25 V supply. This reduced power consumption should allow extended stand-by times with limited battery power, a useful feature for wearable devices.



The self-charged circuit recharges crystal to save power

CUT THE CHATTER

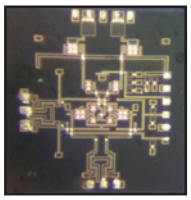
PAGE 272 Due to the complex and non-linear nature of plant-based nuclear reactors, non-linear control problems for research reactors are highly important. Now research from Korea and the UK presents an adaptive integral sliding mode control for a nuclear research reactor with system uncertainties and perturbation.



The control method ensures finite time stability and eliminates chattering

INTO THE MIX

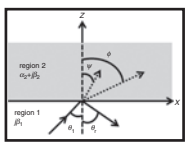
PAGE 291 Research from Taiwan presents a 67–80 GHz double-balanced gilbert-cell mixer in 0.1 µm gallium arsenide pseudo-morphic high-electron-mobility transistor (pHEMT) technology. GaAs technology has a higher electron velocity, bandgap, and breakdown voltage, making it a good candidate for millimetre-wave transceivers.



Gilbert-cell mixers allow a number of advantages, such as small chip area

NEGATIVE REQUIREMENTS

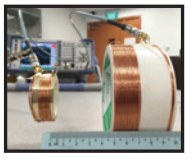
PAGE 260 A paper from the United States provides and experimental study of the conditions for negative energy refraction and negative phase refraction in lossy metamaterials. The paper used split ring resonator wire metamaterial samples to show that negative refractive index is not a requirement for negative energy refraction.



In lossless media negative refractive index is a requirement for negative refraction

POWERING THROUGH

PAGE 314 Work from Singapore presents a rapid design approach to achieve the optimal efficiency in a magnetic resonant wireless power transfer system. The guideline provided in the work determines the optimal efficiency and related coefficients, which the team demonstrated experimentally using both simulations and a prototype.



Power transfer efficiency is vital in wireless power transfer systems

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