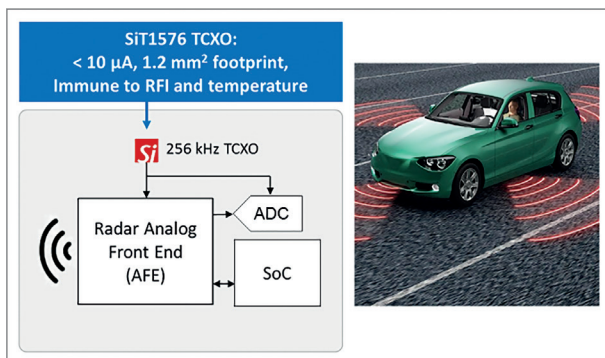


GROWING SCOPE OF RADAR SENSORS ELEVATES THE NEED FOR LOWER POWER AND SMALLER SIZE

As with many technologies, the growing ubiquity of radar-based detection systems mirrors the growth of silicon advances in integration, miniaturization, and lower power consumption. Rapid adoption of radar sensors in transportation and industrial applications is fueled by safety, efficiency, and automation trends on one side, and boosted by reductions in size, power, and costs on the systems side.

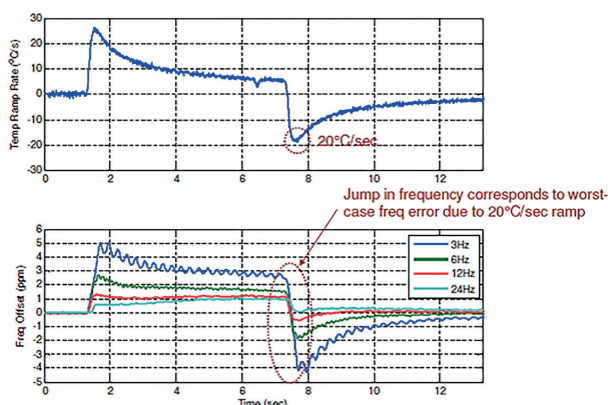
From collision-avoidance and obstacle detection to measurement and ranging, radar systems depend on an accurate clock reference at the front end. Recent advances in silicon MEMS and analog IC technologies provide smaller, lower-power, ultra-reliable, ultra-rugged timing solutions for these applications. The SiT1576 Super-TCXO™ is one such example. This MEMS-based device is ideal for small-form-factor, radar-based detection systems because of its unique combination of programmable frequency, small footprint, ultra-low power, and accuracy.



Unlike other TCXOs (temperature-compensated oscillators), the SiT1576 is factory-programmable between 1 Hz and 2 MHz, enabling it to match the frequency of low-power SoCs and MCUs. This Super-TCXO is accurate to within ± 5 ppm over the -40°C to $+85^{\circ}\text{C}$ temperature range and consumes only micro-amps of current from a flexible supply voltage between 1.8 V and 3.3 V. The SiT1576 provides a reliable, compensated reference for the ADC and radar AFE (analog front end). Because this Super-TCXO is self-compensated, the system doesn't require external, power-hungry, system calibration overhead to maintain frequency stability, further reducing system power.

SIT1576 SUPER-TCXO ELIMINATES SYSTEM CALIBRATION AND DRAWS μ AMPS

In the example shown above, a MEMS Super-TCXO provides the timing reference for the ADAS sensor. The SiT1576 is programmed to operate at 256 kHz, draws less than 10 μ A over temperature, and consumes only 1.2 mm² of board space.



Automotive and industrial systems operate under harsh conditions with high temperatures and fast ramp rates. However, temperature gradients can cause system headaches. The tight thermal coupling of the internal temperature sensor of the SiT1576 combined with a 3 Hz compensation refresh rate, maintain accuracy even when exposed to a temp gradient up to $2^{\circ}\text{C}/\text{sec}$. For steeper temperature gradients, the SiT1576 can be factory programmed for faster refresh rates up to 24 Hz, and still maintain stability under temperature gradients up to $20^{\circ}\text{C}/\text{sec}$.

SiTime's 1 Hz to 2 MHz Super-TCXOs are ultra-small, micro-power reference sources that provide new architectural options