

OVERVIEW

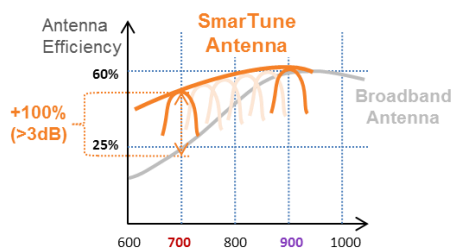
SmarTune™ Antenna Tuners are extremely precise and low-loss variable capacitors that tolerate high RF Voltages, making them ideal for tunable antennas, dynamic load adjustments, tunable filters, and analog RF applications that require high voltage operation.

SmarTune Antenna Tuners are based on Cavendish Kinetics' patented RF Micro-Electro-Mechanical-Systems (MEMS) technology, which eliminates the high insertion loss and RF Voltage handling limitations of traditional Silicon-on-Insulator (SOI) or GaAs devices otherwise used in the RF front-end. Cavendish Kinetics' patented RF MEMS technology and process produces devices with unprecedented accuracy and reliability, maintaining full specification compliance even after 100 billion cycles.

APPLICATIONS

SmarTune Antenna Tuners are perfectly suited to enable the antennas in LTE Smartphones, Tablets and Wearable Devices to cover the entire set of frequency bands and provide consistently high antenna efficiency, something impossible with other antenna structures or tuning methods.

Figure 1: SmarTune Antenna Tuning Advantages

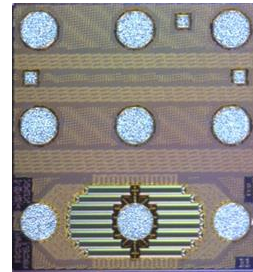


SmarTune Advantages over Broadband Antennas: full spectrum coverage at high efficiency (>3dB gain)!

PRODUCTS

SmarTune Antenna Tuners are extremely compact, combining the tunable capacitor and all required control logic in a small 2mm² Wafer-level-Chip-Scale-Package (WLCSP), which is easily controlled through the integrated MIPI RFFE controller.

Figure 2: SmarTune Antenna Tuner – bottom view



The RF MEMS Capacitor is grouped around the RF Pin, the RFFE controller is integrated in the CMOS.

FEATURES

- 2 different Shunt capacitors
- Cmin: 0.50 pF or 0.75 pF
- Cmax: 1.65 pF or 3.10 pF
- Very high Quality Factor (>200)
- ESR ~ 0.35 or 0.4 Ohm
- Step-size: 37 or 76 fF
- 32 capacitor states (5 bit control)
- RF Power handling: +39 dBm
- Cycling: > 10⁹ cycles
- High Linearity
- Serial MIPI RFFE interface
- Small size: ~2 mm² WLCSP
- Low power: 100 μA typical

PACKAGE

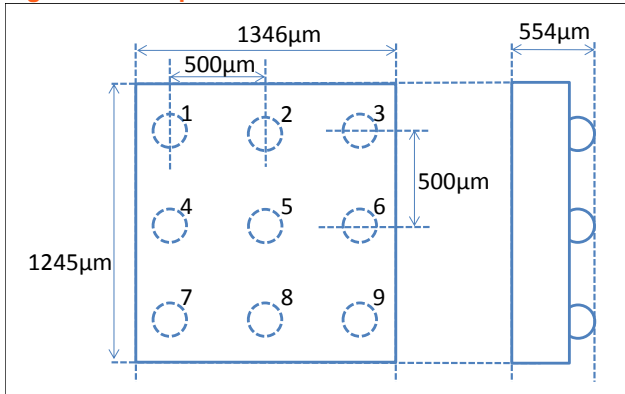
The SmarTune Antenna Tuner comes in a WLCSP package with 9 pins. The pin numbers are defined in Table 1 and the dimensions are shown in Figure 3.

Table 1: Pin Descriptions

Note: Pins 1, 3 and 4 should be tied together

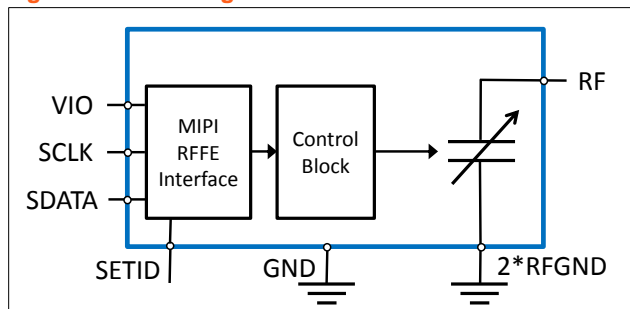
#	PIN	Description
6	VIO	power supply
4	GND	DC ground
5	NC	Unused
7	SCLK	clock input
9	SDATA	data input/output
8	SETID	Set MIPI USID to 6 (GND) or 7 (VIO)
2	RF	RF connection of RF capacitor
1,3	RFGND	RF ground connection

Figure 3: Transparent TOP view of WLCSP



RFFE BLOCK DIAGRAM

Figure 4: Block diagram of 32CKxxxR with MIPI RFFE



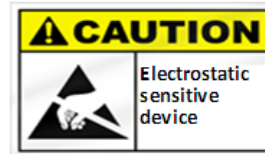
DEVICE SELECTION

Table 2: Product Catalog

Device	Cmin (pF)	Cmax (pF)	Step Size (fF)
32CK417R	0.50	1.65	37
32CK503R	0.75	3.10	76

SHIPPING AND HANDLING

Unpackaged CMOS devices can be fragile: manual handling is NOT RECOMMENDED. If necessary, use only vacuum wands and NEVER USE TWEEZERS to handle the devices as die chipping and cracking may occur even though there is no visible damage.



CMOS devices are sensitive to electrostatic discharge. Do not handle devices without appropriate ESD protection such as using wrist straps and electrostatic-free smocks.



All Cavendish Kinetics products are lead-free and fully ROHS compliant.

SALES CONTACT AND INFORMATION

For further information please visit:

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