F6123

Dual-beam Rx Active Beamforming IC 14GHz – 17GHz

The F6123 is a dual-beam receive active beamforming RFIC designed for application in Ku-Band planar phased array antennas. The IC has eight RF input ports, two RF output ports and 16 (8 per beam) phase/amplitude control channels. The eight input ports of the device can be driven by eight single-polarized elements, or four dual-polarized antenna elements. Each channel has 6 bits of digital phase and gain control resolution spanning 360° and 28dB, enabling precise amplitude and phase adjustment for beam pattern and polarization control. The typical RMS phase and gain errors are 1.7° and 0.15dB, respectively.

The IC operates from a single supply of 2.1 - 2.5V. When paired with the Renesas F6923 LNA, it achieves a typical cascaded electronic gain of 30dB, while minimizing the front-end feed loss due to the flexibility of LNA physical placement near the antenna feeds. The chip includes power management features such as a low-power standby mode, independent enable controls on every channel, and a single-beam mode. The device SPI bus and control pins operate from standard 1.8V logic at speeds up to 50MHz. Advanced digital modes and large on-chip memory allow for 100ns beam position switching times at the array level, greatly reducing dead time and latency.

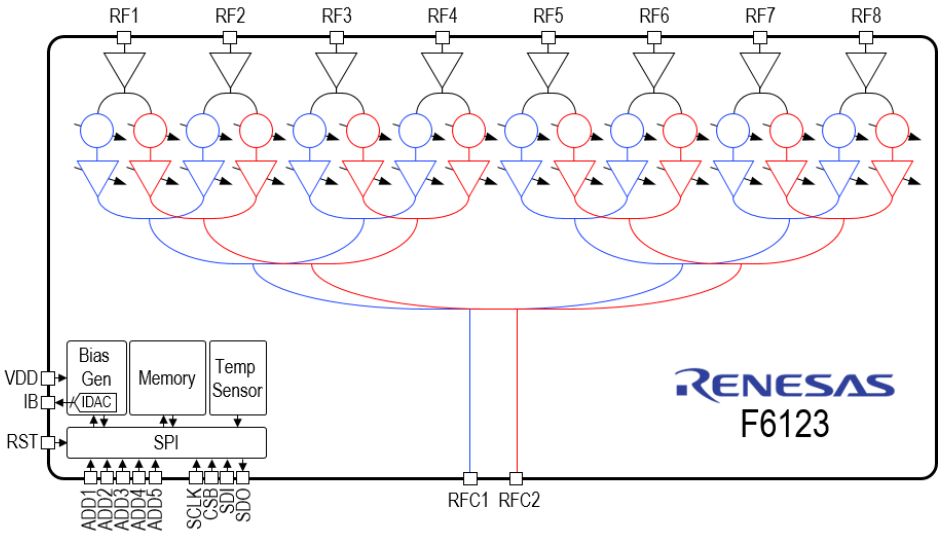
The compact and CTE-matched FCBGA package of the F6123 with all single-ended 50ohm RF ports and 0.5mm pitch greatly simplifies the physical integration of these devices onto large antenna panels.

Features

- 14GHz – 17GHz operation
- Supports 4 dual-pol or 8 single-pol elements
- Two simultaneous and independent beam outputs
- 360° phase control with 6-bit resolution
- 28dB gain control with 0.45dB step size
- 2.3V nominal single supply input
- Standard 1.8V digital logic
- IDAC for external LNA biasing
- Temperature compensation
- Temperature sensor w/ digital readout
- Advanced digital modes with fast beam steering
- On-chip beam-state memory
- 4.6 × 3.8 × 0.9 mm, 63-FCCSP

Applications

- Electronically Steered Phased Array Antennas (ESAs)
- Ku-Band SATCOM and CDL Antennas
- Ku-Band radar
- Aerospace, Maritime, and Satcom-on-the-Move (SOTM)



Ordering Information

Part Number	Package	MSL Rating	Carrier Type	Temperature Range
F6123SAVGI	4.6 × 3.8 × 0.9 mm 63-FCCSP	3	Tray	-40°C to +85°C
F6123SAVGI8	4.6 × 3.8 × 0.9 mm 63-FCCSP	3	Reel	-40°C to +85°C
F6123SEVS	F6123 Evaluation System. Includes Digital Interface Board, RF Evaluation Board, USB Cable, Power Supply Cable, Digital Interconnect Cable, Evaluation Software, Device Drivers, and RF De-embed Files.			

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