## Description

The F6513 is an 8-channel transmit active beamforming RFIC designed for application in Ku-Band planar phased array antennas for communications or radar applications. The IC has a single common RF input port and eight output channels. The eight independently controlled output channels can drive eight single-polarized elements or four dual-polarized elements of an electronically scanned array (ESA). Each channel has 6 bits of digital phase control covering 360° and 25dB of gain control with a minimum step size of 0.2dB, enabling precise beam pattern and polarization control.

Operating from a single supply of 2.1 - 2.5V, the RFIC has 23dB of nominal small signal gain with a typical P1dB of 12.5dBm per channel. The device is highly efficient and features a low power standby mode as well as independent enable controls on every channel. The F6513's 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.

Finally, the compact and CTE-matched FC-BGA organic package with all single-ended 50ohm matched RF ports greatly simplifies the physical integration of the F6513 onto large antenna panels.

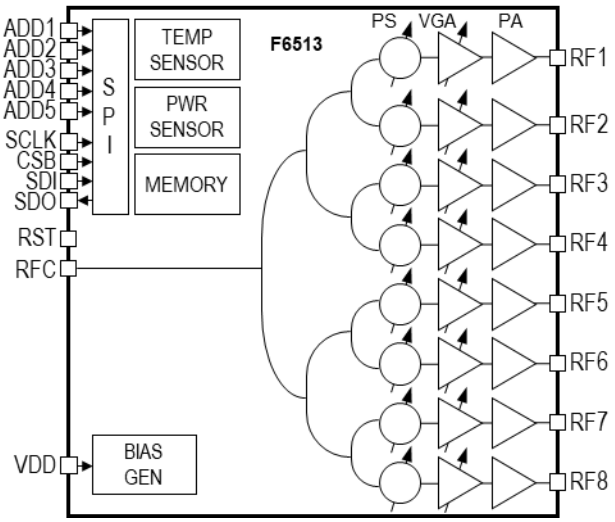
## Typical Applications

- Phased array antennas
- Ku-band SATCOM terminals
- Common Data Link (CDL) terminals
- Ku-band radar
- Aerospace and maritime
- Instrumentation

## Features

- 13.75 – 17.3GHz operation
- Supports 4 dual-pol elements or 8 single-pol
- 360° phase control with 6-bit resolution
- 25dB gain control with 0.2dB minimum step
- 23dB small signal gain
- 12.5dBm output P1dB
- 2.3V nominal single supply input
- Standard 1.8V digital logic
- Temperature compensation
- Temperature sensor with digital readout
- Advanced digital modes with fast beam steering
- On-chip beam-state memory
- 3.8 × 4.6 × 0.9 mm, 62-pin FC-BGA package

## Block Diagram




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## Ordering Information

| Orderable Part Number | Package | MSL Rating | Carrier Type | Temperature |
|---|---|---|---|---|
| F6513AVGI | 3.8 × 4.6 × 0.9 mm 62-BGA | 3 | Tray | -40°C to +85°C |
| F6513AVGI8 | 3.8 × 4.6 × 0.9 mm 62-BGA | 3 | Reel | -40°C to +85°C |
| F6513EVS | F6513 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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