ADMV1355

17.7GHz to 55GHz, Wideband, Microwave Upconverter

FEATURES

- Wideband RF output frequency range: 17.7GHz to 55GHz
- Integrated LO chain features
  - Input frequency range: 8.85GHz to 27.5GHz
  - Internal 2× multiplier
  - Variable gain to accommodate the various LO drive strength values
  - 360° phase control shifter for LO synchronization
  - Programmable LO harmonic reject filter
  - I/Q phase correction
- Integrated mixer features:
  - Three frequency translation modes
    - Differential I/Q mode
    - Single input IF mode
    - Complex input IF mode
  - Programmable I/Q baseband common-mode voltages
  - Sideband reject optimization
  - LO carrier feedthrough calibration
- Impedance matched input and output pins
- Programmable via 3-wire or 4-wire SPI
- General purpose logic outputs for integration with other chips
- Look-up table logic inputs for fast frequency hopping applications
- 120-ball, 6mm × 6.5mm, BGA package (see the Outline Dimensions section)

APPLICATIONS

- Radar and electronic warfare systems
- SATCOM ground station and payload applications
- Instrumentation and automatic test equipment (ATE)
- Millimeter-wave 5G tester applications

GENERAL DESCRIPTION

The ADMV1355 is a highly integrated microwave upconverter optimized for wideband radio designs operating in the 17.7GHz to 55GHz RF range. It can be used as a smaller alternative to larger multichip implementations, allowing for reduced size, weight, and power at the system level.

The ADMV1355 has an integrated local oscillator (LO) signal chain that accepts LO input signals in the 8.85GHz to 27.5GHz range. Within the LO signal chain are internal amplifiers, a frequency 2× multiplier, a programmable harmonic reject filter, and phase adjust circuitry, which produces the necessary 17.7GHz to 55GHz signal to drive the internal mixer.

The ADMV1355 offers three mixer modes of frequency translation, single input IF mode, complex input IF mode, and differential I/Q mode. The single input IF mode utilizes one intermediate frequency (IF) input signal, in the 8GHz to 12GHz range, which then pass through an on-chip 90° IF hybrid. The hybrid produces the necessary quadrature signals for the mixer. The complex input IF mode utilizes two quadrature IF input signals, in the 1GHz to 12GHz range. The differential I/Q mode utilizes differential baseband in-phase/quadrature (I/Q) input signals, from DC to 12GHz.

Immediately following the mixer are two, switch selectable, RF output driver signal chains. One chain operates within the 17.7GHz to 34GHz range, and the other chain operates in the 30GHz to 55GHz range. Each chain has multiple stages of signal level control and harmonic filtering.

The RF output, LO input, and IF input pins are all single-ended and matched to 50Ω impedance. The differential I/Q baseband input pins are matched to a 100Ω differential impedance and have programmable I/Q baseband common-mode voltages.

A programmable serial port interface (SPI) is provided, which can be operated in either 3-wire or 4-wire implementations. The SPI allows for adjustment of various performance metrics, such as LO feedthrough adjustment, sideband rejection optimization, filtering, and gain control. Additionally, the SPI can be used to configure general-purpose logic outputs for integration with other chips.

The ADMV1355 upconverter comes in a compact RoHS-compliant, thermally enhanced, 6mm × 6.5mm, ball grid array (BGA) package. The BGA package enables the ability to heat sink the ADMV1355 from the top of the package for the most efficient thermal heat sinking. The ADMV1355 operates over the −40°C to +85°C case temperature range.

Rev. PrE

DOCUMENT FEEDBACK
TECHNICAL SUPPORT

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FUNCTIONAL BLOCK DIAGRAM

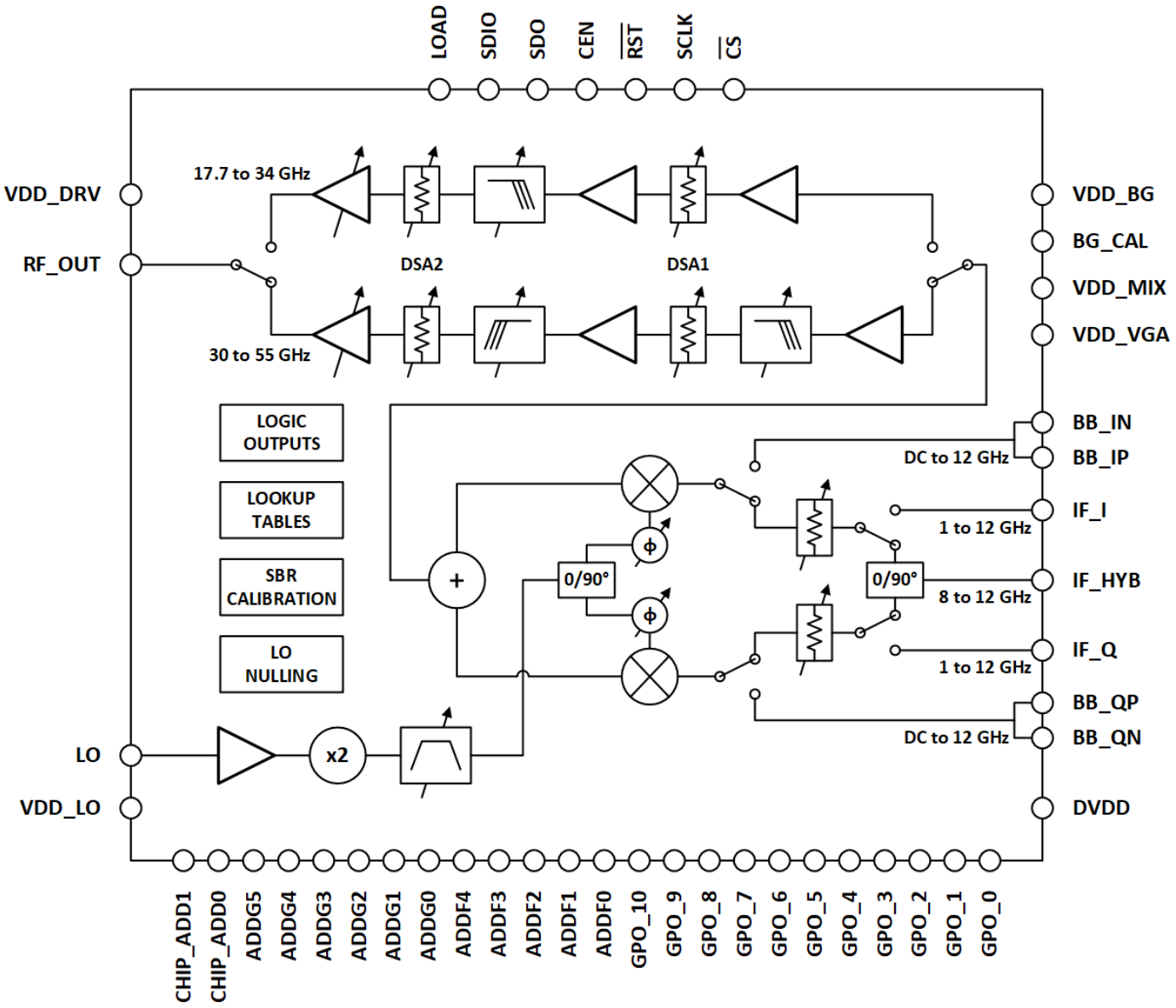

Figure 1. Functional Block Diagram

OUTLINE DIMENSIONS

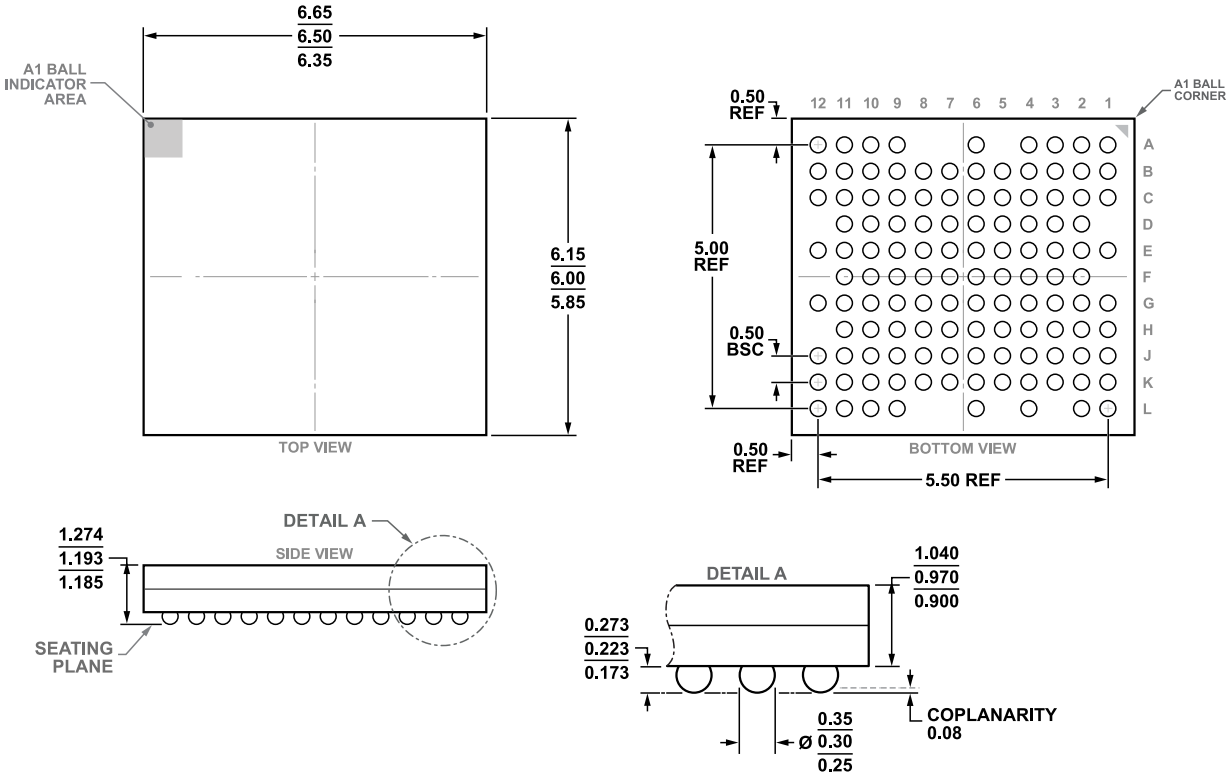

Figure 2. 120-Ball Chip Scale Package Ball Grid Array [CSP_BGA],
(BC-120-4)
Dimensions Shown in Millimeters

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