NT1068.AR
4-Channel GPS/GLONASS/Galileo/BeiDou/NavIC/QZSS S/L1/L2/L3/L5 band Low Power RF Front-End IC

NT1068.AR is a four-channel RF Front-End IC for the reception of Global Navigation Satellite System (GNSS) signals (GPS, GLONASS, Galileo, BeiDou, NavIC, QZSS) and also signals of satellite-based augmentation systems like OmniSTAR at all frequency bands in various combinations: S, L1, L2, L3, L5, E1, E5a, E5b, E6, B1, B2, B3. When high performance is not needed (e.g. for tracking mode) NT1068.AR can be 'on-fly' switched to ECO mode to furthermore reduce power consumption. There is a specific configuration to acquire signals of S+L2 bands and L1+L3/L5 bands by single chip. Extended functionality of NT1068.AR allows receiving all Galileo signals (E1, E5a, E5b and E6) or other signal combinations in L1/L2 band and L1+L3+L5 bands. Being a low-power RF FE IC with supply voltage from 1.8 to 3.3V it can be used in various mobile applications for high precision positioning. Each setting, including RF input, output signal frequency bandwidth, AGC options, mirror channel suppression option, etc., can be set for every channel individually. NT1068.AR does also integrate two fully independent frequency synthesizers that have the common reference (TCXO) input making LO signals coherent in terms of frequency. Channel#1 and channel#2 are supplied with common LO signal or two different LO signals generated in PLL "A", while PLL "B" is assigned for channels #3 and #4. For specific applications PLL "B" can be also used to feed channel#1 along with channels #3 and #4, PLL "A" – to feed all four channels with single LO signal.

APPLICATION

➢ GNSS based positioning systems
➢ GNSS based goniometric systems
➢ In-vehicle navigation systems
➢ GNSS based driverless car systems
➢ Professional drone

Package preliminary view

QFN88 package   WLCSP package
(Appearance may differ from the view above (in color, print, dimensions, PINs)

FEATURES

• S, L1, L2, L3, L5 bands single conversion super heterodyne receiver with low-IF architecture
• Four independent configurable channels, each includes preamplifier, image rejection mixer, IF filter, IFA, 2-bit ADC
• 1-to-n RF splitter input (n=2,3,4) that can be used along with separate RF inputs for other channels
• Signal bandwidth up to 33MHz supports GNSS high precision codes such as P-code in GPS or wideband E5 Galileo
• Dual adoptable AGC system (RF + IF) or programmable gain
• High dynamic range with 1dB compression point more than 21dBm
• Analog differential output with two options of voltage swing 0.2/0.47Vp-p and 0.4/0.98Vp-p (sine wave/noise) or 2-bit ADC digital output data (CMOS or LVDS)
• Two independent fully integrated synthesizers with flexible LO and CLK frequencies selection
• Wide range of chip supply voltage (from 1.8V ±5% to 3.3V ±10%)
• Low power consumption (50mW per channel) and power economy mode (45mW per channel)
• Embedded temperature sensor
• SPI interface with easy-to-use register map
• Individual status indicators of main subsystems (available in SPI registers) and cumulative status indicator (AOK, available both as a separate pin and in SPI registers)
• 10×10mm QFN88 package or WLCSP type of package.

BLOCK DIAGRAM
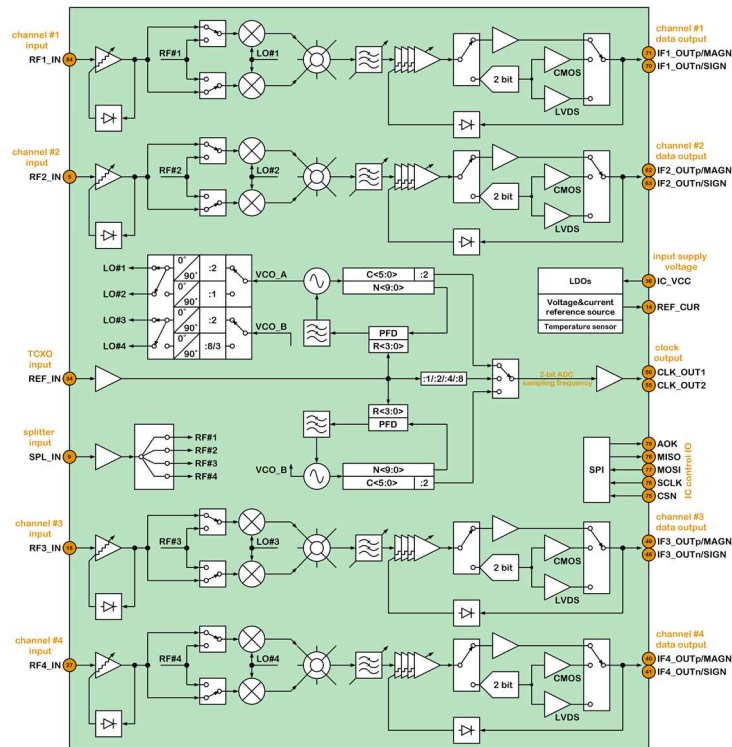
PRELIMINARY MAIN ELECTRICAL CHARACTERISTICS

- Supply voltage from 1.71V to 3.6V (3.0V typ)
- Temperature range $T_a = -40 \div 85°C$ (+25°C typ)
- Input frequency range:
    - from 1530 to 1610MHz (L1 band),
    - from 1150 to 1300MHz (L2/L3/L5 band),
    - from 2460 to 2530MHz (S band);
- Total power gain (@ referred to RF inputs):
    - 87.3 dB (L1 band);
    - 86.4 dB (L2/L3/L5 band);
    - 87.5 (S band)
- Total power gain (@referred to splitter input):
    - 71.3 dB (L1 band);
    - 70.4 dB (L2/L3/L5 band);
    - 71.5 (S band)
- Noise figure (@ referred to RF inputs RFAGC = max gain, IFAGC gain > 30dB):
    - 4.6 dB (L1 band);
    - 5.7 dB (L2/L3/L5 band);
    - 7.9 dB (S band)
- Noise figure (@ referred to splitter input IFAGC gain > 30dB):
    - 19.0 dB (L1 band);
    - 17.6 dB (L2/L3/L5 band);
    - 20.5 dB (S band)

- 1 dB compression point (@ referred to RF inputs RFAGC = min gain, IFAGC = min gain):
    - -25.0 dBm (L1 band);
    - -24.0 dBm (L2/L3/L5 band);
    - -23.0 dBm (S band)
- 1 dB compression point (@ referred to RF inputs RFAGC = max gain, IFAGC = max gain):
    - -39.0 dBm (L1 band);
    - -35.0 dBm (L2/L3/L5 band);
    - -35.0 dBm (S band)
- 1 dB compression point (@ referred to splitter input IFAGC = min gain):
    - -21.0 dBm (L1 band);
    - -21.0 dBm (L2/L3/L5 band);
    - -23.0 dBm (S band)
- Reference frequency (TCXO) range: from 5 to 60MHz (10/24.84 typ)
- RF AGC range: 14.25 dB
- IF AGC range: 62.1 dB
- Channel isolation: 35dB