

CXG1096FN

Diversity antennas have been adopted in PHS terminals to increase receiver sensitivity. While Sony has previously created PHS RF front-end combined ICs with a “two chips in one package”, we have developed and are now releasing the CXG1096FN, in which the switch block structure has been modified to support diversity antennas and features characteristics that have been improved over previous Sony products.

The CXG1096FN can assist the evolution of the PHS terminal.

- Single positive power supply operation
- 26-pin HSOF small molded package
- Built-in diversity antenna switch
- Power amplifier/antenna switch transmitter block
 - Low current consumption: $I_{dd} = 150 \text{ mA}$
 - High power gain: $G_p = 40 \text{ dB}$ ($f = 1.9 \text{ GHz}$)
- Antenna switch receiver block/low-noise downconversion mixer
 - Low current consumption: $I_{dd} = 5.5 \text{ mA}$
 - High conversion gain: $G_c = 19.5 \text{ dB}$ ($f = 1.9 \text{ GHz}$)
 - High 1/2 IF suppression ratio: $1/2 \text{ IFR} = 47 \text{ dBc}$ ($f = 1.9 \text{ GHz}$)

■ Small Molded Package

The CXG1096FN is provided in a 26-pin HSOF package. This is an ultrasmall package with a size of $4.4 \times 5.6 \text{ mm}$ and a 0.4 mm lead pitch, and can contribute to reduced mounting areas in application circuits.

■ Built-in Diversity Antenna Switch

The CXG1096FN adopts the “two chips in one package” structure established in the CXG1051AFN, but changes the switch type from the SPDT*1 to the DPDT*2 type. This allows a diversity antenna to be used without degrading the PA and LNA/mixer block characteristics. (See figures 1 and 2.)

■ Improved LNA/Mixer Block Distortion Characteristics

Another major theme in developing this product was improvement of the LNA/mixer block distortion characteristics, in particular, improvement of the 1/2 IF suppression ratio. The CXG1096FN LNA and mixer are connected within the chip (direct connection type). By reviewing the design of the interstage filter circuit, we succeeded in improving the 1/2 IF suppression ratio by 3 dB over the CXG1051AFN, which uses the same direct connection structure. (See figure 4.) For LNA/mixer block products, Sony previously provided both direct connection type, which is advantageous from the parts count standpoint, and separate circuit type, which is advantageous from the characteristics standpoint. However, the direct connection type characteristics now match those of the separate circuit type in this product.

■ Improved Resistance to ESD

The CXG1096FN features a machine model (200 pF, 0 Ω) ESD resistance improved to approximately twice that of the conventional type products by the provision of protective elements on all RF and power supply pins. We optimized the size and the positioning of these protective elements so that device characteristics were not influenced. The CXG1096FN can be used with confidence, from the standpoints of both the electrical characteristics of the device and ease of handling.

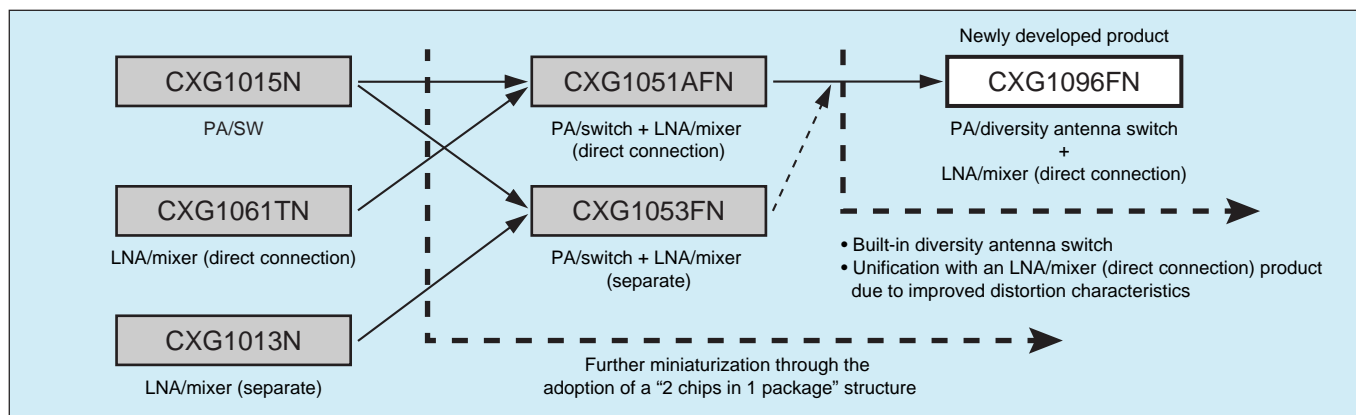
*1 SPDT: Single Port Double Transmission
*2 DPDT: Double Port Double Transmission

V O I C E

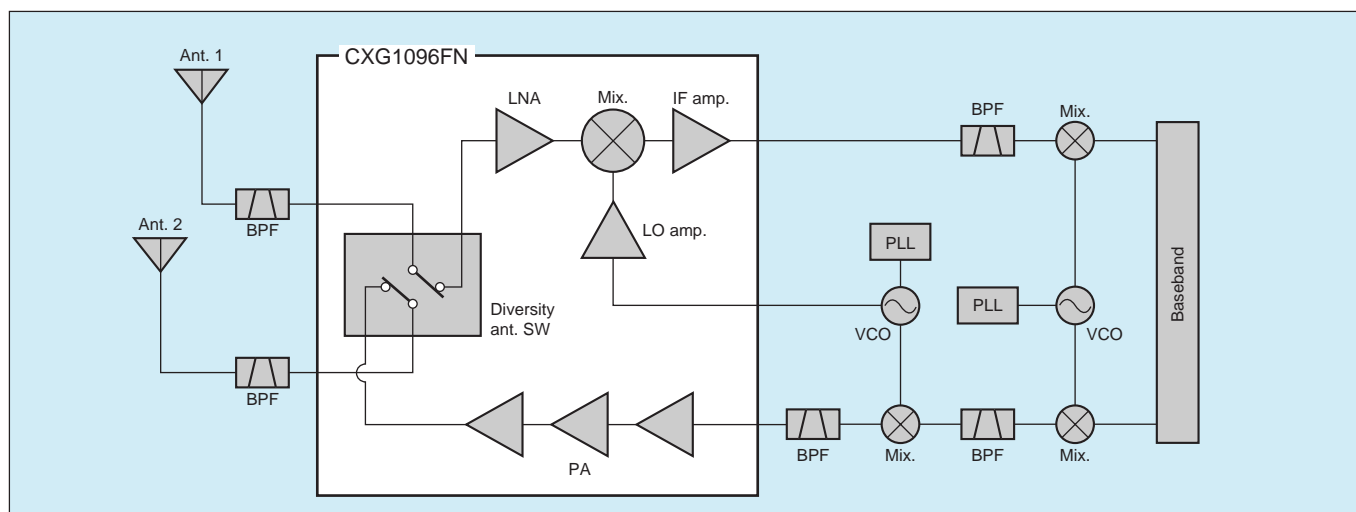
While our main goal in developing the CXG1096FN was to incorporate a built-in diversity antenna switch, we also put substantial effort into improving the distortion characteristics of the integrated LNA/mixer block. This allows us to recommend the CXG1096FN with confidence, even to Sony customers who had previously been using separate LNA and mixer circuit devices.



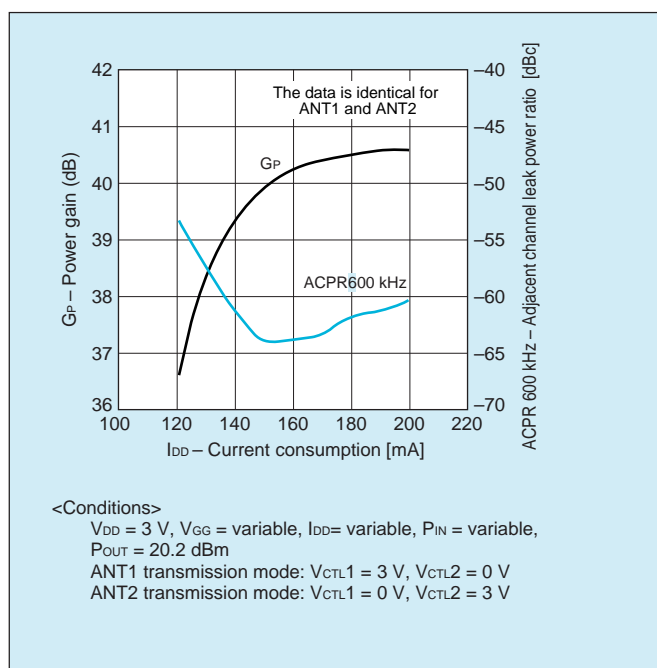
New Products



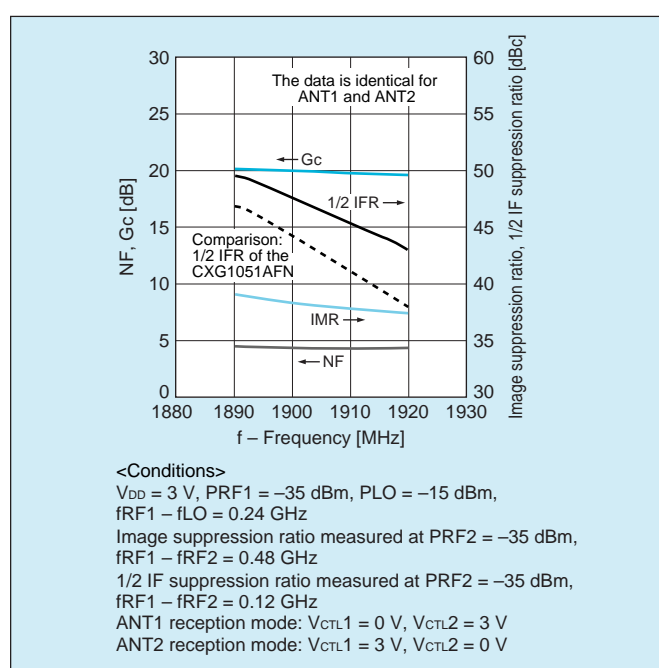
■ Figure 1 PHS RF Front-end IC Development



■ Figure 2 CXG1096FN-based High-frequency System Block Diagram



■ Figure 3 PA + Switch Transmitter Block Characteristics



■ Figure 4 Switch Receiver Block + LNA/Mixer Characteristics