Wideband Multifunction Reception System GaAs MMIC Completely Covers GPS and CDMA

CXG1100TN
CXG1115ER

The gpsOne system is seen as a revolutionary technology for the next generation of position information services. The gpsOne system uses information from GPS satellites and the CDMA network to complement each other and acquire reliable positioning information. (See figure 1.)
A position information service that uses gpsOne cellular phones is scheduled to start service this fall in Japan.
Sony has now developed a chip set that responds to the needs of this market.
The CXG1100TN is a wideband DPDT switch, and the CXG1115ER is a dual-mode front-end IC.
These devices adopt Sony's unique JFET process and mounting technologies to achieve high functionality and miniaturization.

CXG1100TN

- Switching can be controlled from CMOS lines
- Wide bandwidth, low insertion loss, and low distortion
- Provided in an ultraminiature package

CXG1115ER

- Dual band support
- Circuit area reduced by the adoption of 2× frequency multiplier technology
- High gain, low noise, low distortion
- Provided in an ultraminiature package

CXG1100TN DPDT Switch

Switching Can Be Controlled from CMOS Lines

The CXG1100TN is a DPDT*1 antenna switch MMIC. While conventional single band systems use a SPDT*2 switch, the CXG1100TN supports dual-band systems with DPDT operation. In this device, Sony integrated logic circuits on the same chip by using Sony's unique GaAs JFET E/D hybrid process. This device can be directly controlled from CMOS control lines.

Wide Bandwidth, Low Insertion Loss, and Low Distortion

Since the CXG1100TN covers the wide bandwidth of up to 3 GHz, it is optimal for switching between two bands in the quasi-microwave band. Furthermore, it achieves a low insertion loss and low distortion by adopting a Sony JFET process that features single positive supply voltage operation. (See table 1.)

CXG1115ER Low-Noise Amplifier/Mixer

The CXG1115ER is a gpsOne low-noise amplifier and downconversion mixer IC that uses Sony's GaAs JFET process.

Dual Band Support

The CXG1115ER receiver IC provides a bypass switch in the CDMA system low-noise amplifier block, can switch gain appropriately for strong, medium, and weak electric field reception conditions, and furthermore provides a low-current mode for standby operation. It consists of two circuit systems, one for the 850 MHz band CDMA system and one for the 1575 MHz band GPS system, and fully supports both CDMA and GPS by providing a control switch.

Circuit Area Reduced by the Adoption of 2× Frequency Multiplier Technology

By doubling the frequency of the LO input signal from the LO input (740 MHz) to 1480 MHz in the GPS system mixer block, the CXG1115ER is able to share a single LO circuit between two systems. This reduces the circuit area, and in addition to reducing costs, allows a smaller package to be used providing greater liberty in PWB mounting design.

High Gain, Low Noise, Low Distortion

One feature of the CXG1115ER is that it achieves a good balance between high gain, low noise, and low distortion. (See figure 3.) Additionally, it also provides a medium-gain mode to further improve distortion characteristics and a low power mode to conserve power. Applications can easily obtain desired characteristics by controlling the control switching inputs.

Provided in Ultraminiature Packages

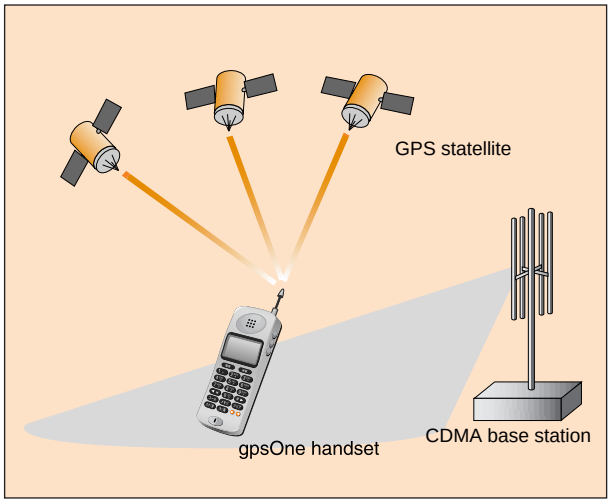
The CXG1100TN is provided in a 10-pin TSSOP (3.2 × 2.8 mm) package, and the CXG1115ER is provided in a 24-pin VQFN (4.0 × 4.0 mm) package. These ultraminiature packages allow the mounting area to be reduced significantly.

*1 DPDT: Dual Pole Dual Throw
*2 SPDT: Singlel Pole Dual Throw

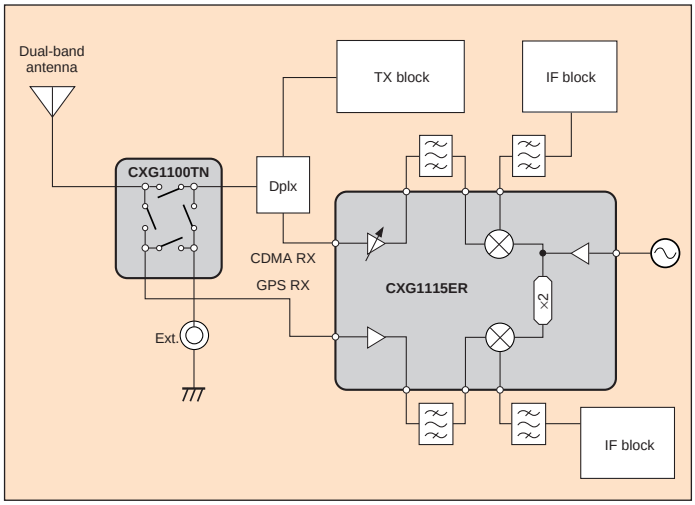
V O I C E

Our duty as chip designers is to provide the market with ICs with distinctive features and high performance in a timely manner and at a low price. The chip set introduced here is a product that meets all of these conditions, and we are sure that our customers will find it more than satisfactory.

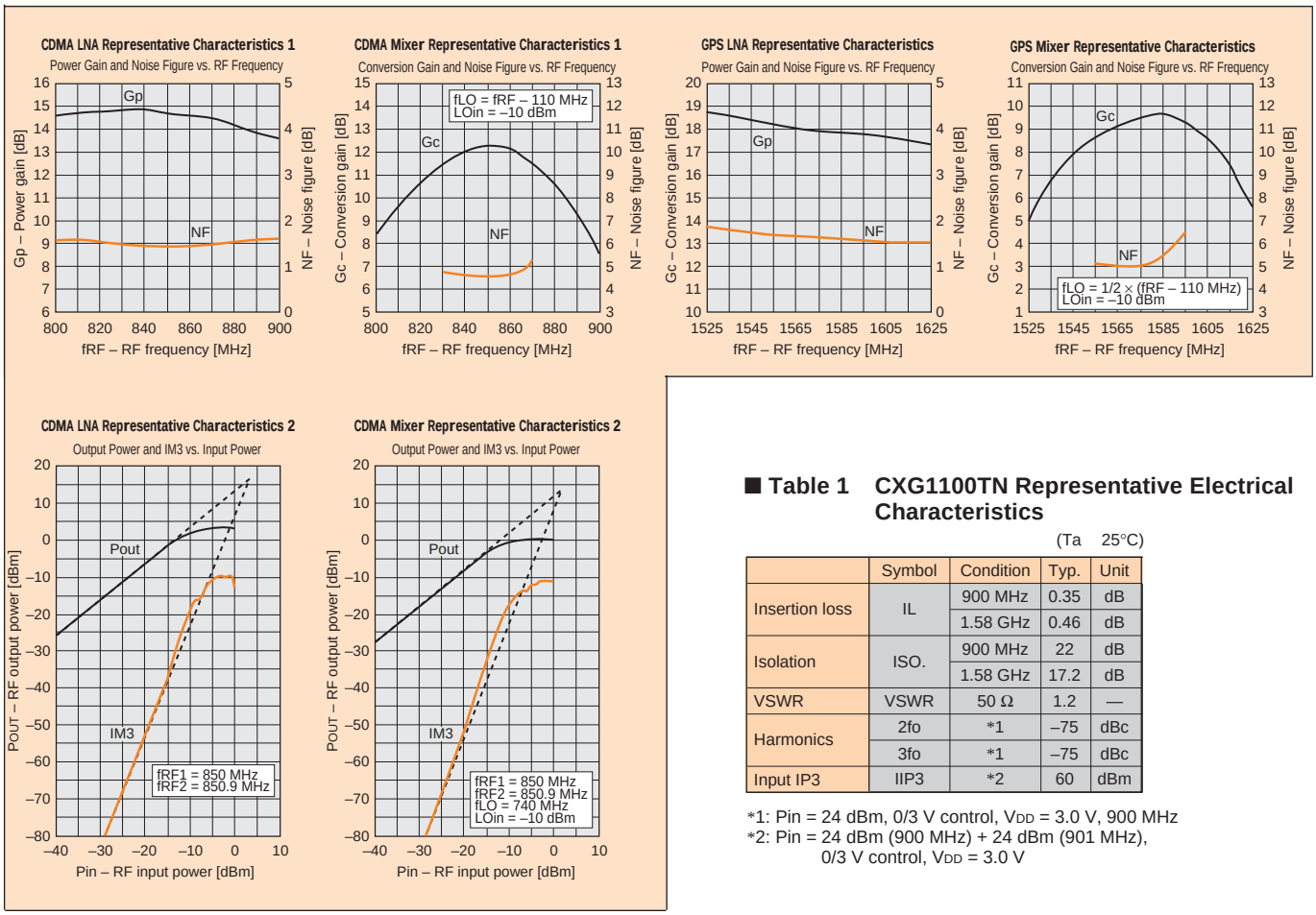
New Products



■ Figure 1 Next-Generation Global Positioning Information Service



■ Figure 2 CXG1100TN/CXG1115ER Application Circuit



■ Figure 3 CXG1115ER Representative Characteristics

■ Table 1 CXG1100TN Representative Electrical Characteristics

(Ta 25°C)

	Symbol	Condition	Typ.	Unit
Insertion loss	IL	900 MHz	0.35	dB
		1.58 GHz	0.46	dB
Isolation	ISO.	900 MHz	22	dB
		1.58 GHz	17.2	dB
VSWR	VSWR	50 Ω	1.2	—
Harmonics	2fo	*1	–75	dBc
	3fo	*1	–75	dBc
Input IP3	IIP3	*2	60	dBm

*1: Pin = 24 dBm, 0/3 V control, V_{DD} = 3.0 V, 900 MHz
*2: Pin = 24 dBm (900 MHz) + 24 dBm (901 MHz), 0/3 V control, V_{DD} = 3.0 V