

# CXA3275Q

With digital TV ground wave broadcasting scheduled to begin in 2003 in Japan, following in the footsteps of the US and Europe, Japan is poised to enter the digital broadcasting age.

Sony has now developed a device for use in tuners for terrestrial digital TV broadcasts and cable modems for Internet Web broadcasts, areas which are expected to become rapidly expanding markets in the near future.

This device, the CXA3275Q, integrates, on a single chip, a low phase noise PLL circuit as well as oscillator, mixer, and IF amplifier circuits that achieve superlative performance by taking full advantage of Sony's high-speed bipolar process technology.

- Low phase noise PLL synthesizer
- Oscillator circuit with excellent oscillation stability
- Mixer and IF amplifier circuits with excellent linearity

The CXA3275Q is a digital broadcast tuner IC that includes an on-chip PLL synthesizer that achieves lower phase noise than currently available tuner ICs for analog TV ground wave broadcast reception. It also features on-chip mixer and IF amplifier circuits with excellent linearity. This device was designed for optimal performance under the strict OFDM specification requirements, and

achieves superlative performance.

## ■ Low Phase Noise PLL Synthesizer

The CXA3275Q was designed to radically reduce PLL synthesizer phase noise, which can be a problem in digital demodulation, and achieves 73 dBc/Hz for an offset frequency of 1 kHz, an oscillator frequency of 845 MHz, and a comparison frequency of 166.7 kHz using a 4 MHz crystal. It also provides an extensive set of reference frequencies to choose from.

## ■ Oscillator Circuit with Excellent Oscillation Stability

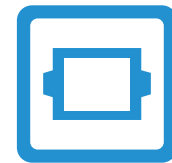
The CXA3275Q adopts a balanced oscillator circuit (VHF low and VHF high: 2 pins, UHF: 4 pins) that provides excellent oscillation stability for the oscillator circuit for each band. This circuit achieves stable oscillation by canceling both the digital noise that occurs during PLL data communication and the sneak path digital noise from other digital equipment that enters the IC from the power or ground lines. This circuit provides oscillator signals with no parasitic oscillation over a wide bandwidth, and, like the PLL synthesizer circuit, is designed to hold the phase noise in the oscillator circuit itself to an absolute minimum.

## ■ Mixer and IF Amplifier Circuits Feature Excellent Linearity

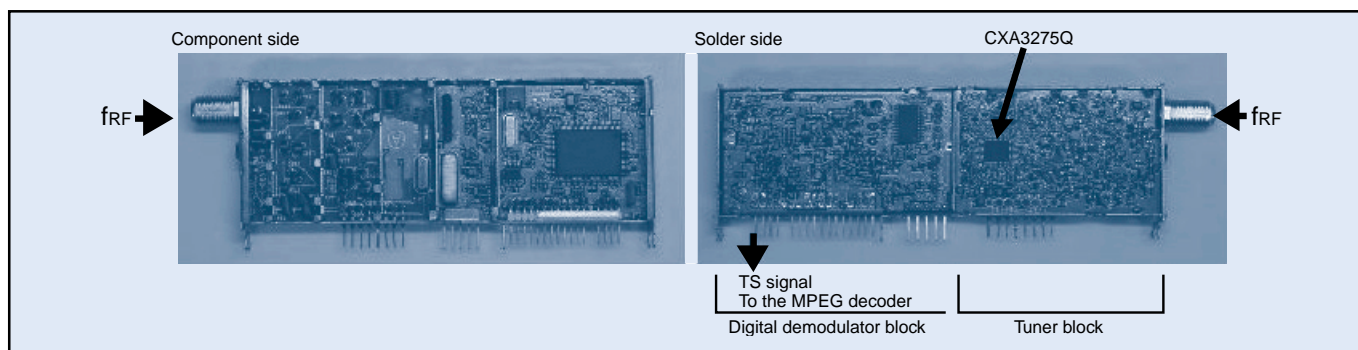
A common emitter circuit type is adopted for the VHF low and VHF high mixer circuit inputs, and a common base circuit type is used for UHF, and the UHF amplifier achieves particularly excellent linearity. The IF amplifier circuit is a Sony-designed push-pull output circuit, and provides a more than adequate third-order intercept point. The output system supports either parallel output to directly drive a SAW filter or unbalanced output to drive a SAW filter preamplifier.

## V O I C E

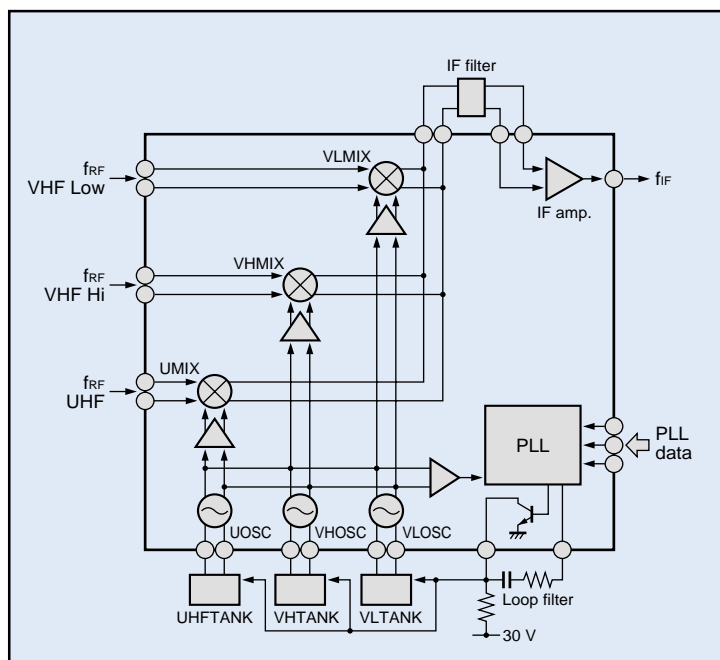
The CXA3275Q integrates high-frequency analog circuits and a low phase noise PLL circuit on a single chip. As might be expected, we had great difficulties discovering means to suppress mutual interference between the digital and analog systems, and finding ways to improve the already low phase noise characteristics of the PLL synthesizer. I am proud that we have achieved such superlative performance in a single-chip device that includes not only an oscillator circuit, a mixer circuit, and a IF amplifier circuit, but a PLL circuit as well, and feel that this device achieves the industry's highest level of performance in these circuits. I strongly recommend that you look into this device.



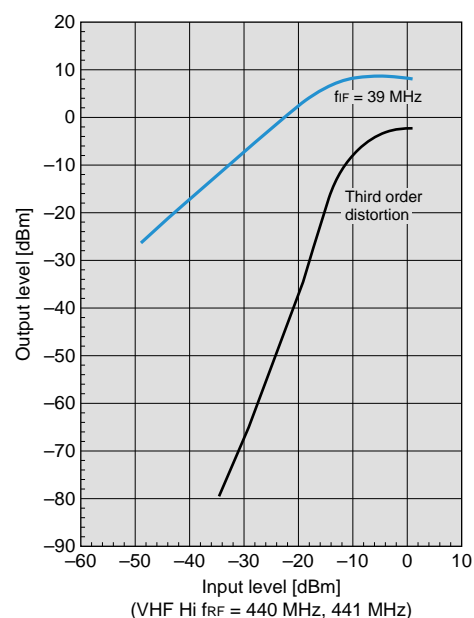
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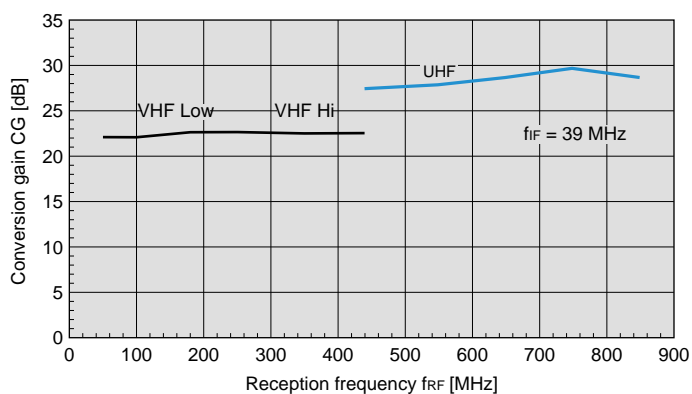
■ Figure 1 Digital Broadcast Tuner Pack



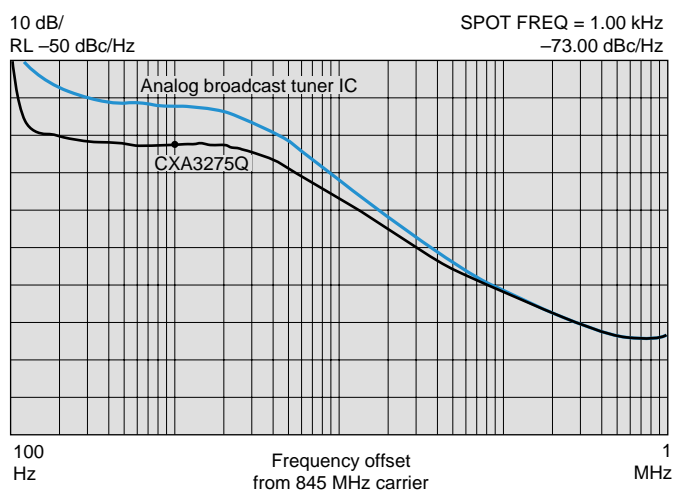
■ Figure 2 CXA3275Q Block Diagram



■ Figure 4 Third Order Intermodulation Distortion



■ Figure 3 Conversion Gain vs. Reception Frequency



■ Figure 5 Phase Noise