

Product Bulletin

# GC1115 Crest Factor Reduction Processor

## Peak Cancellation for 3G Wireless Base Stations

### Improved Power Efficiency

The GC1115 Crest Factor Reduction (CFR) Processor from Texas Instruments (TI) significantly improves the power efficiency of wireless base station power amplifiers (PAs) by reducing output signal peaks. By lowering the peak-to-average ratio of signals to as little as 6 dB peak-to-average ratio (PAR), the GC1115 processor reduces transmission power requirements, reducing base station operating and capital costs for wireless service providers. With flexible

channel configurations and programmable frequency cancellation, the CFR processor supports a variety of air interface standards and applications, including:

- 3GPP (WCDMA) base stations
- 3GPP2 (CDMA2000) base stations
- CDMA multicarrier power amps (MCPAs)
- CFR reduction of OFDM and HSDPA signals
- Two-channel transmit diversity applications

### Key Features

- Signal peak reduction down to 6 dB PAR to improve power amplifier efficiency
- One 20 MHz or two independent 10 MHz channels
- Programmable cancellation pulses for custom frequency response
- Up to 125 MSPS input sample rate supports four 5 MHz carriers (composite bandwidth of 20 MHz)
- Programmable 2x or 4x interpolator after peak reduction

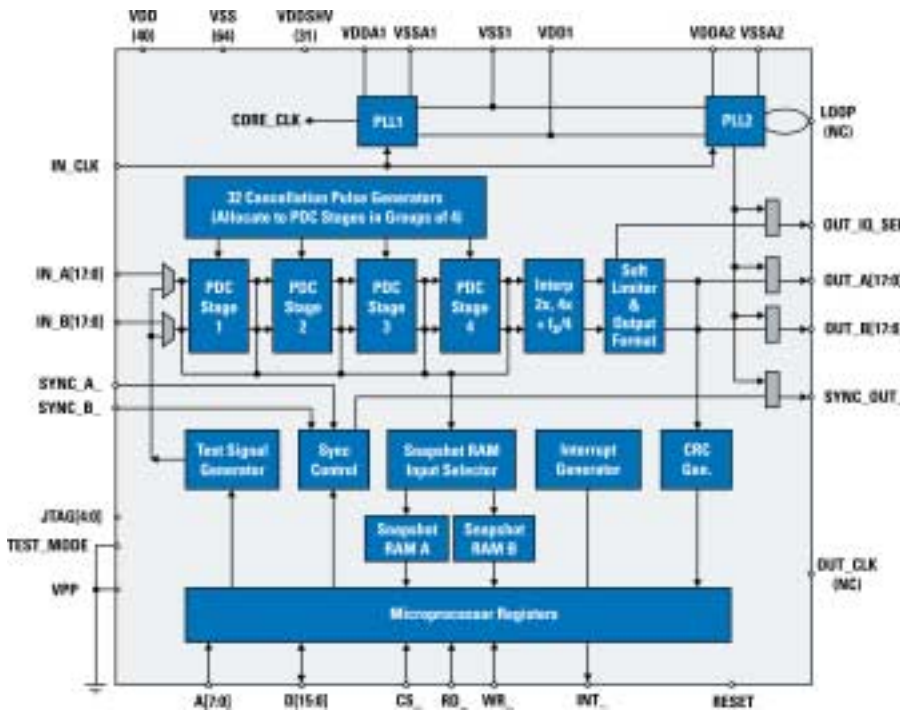
### Reducing System Costs

Composite digital communication signals in quadrature (IQ) format associated with wideband code division multiple access (WCDMA) and orthogonal frequency division multiplexed (OFDM) standards have high PARs ranging from 10 dB to 15 dB. Since the PAR is so high, the average power required to amplify the converted analog signal is relatively low, resulting in an inefficient use of the PA.

By decreasing the PAR, the GC1115 processor is a cost-effective method of increasing output power and efficiency for the PA. This allows the manufacturer to use a lower-rated, less expensive PA. Because the PA is the most expensive component of a wireless base station, lowering its cost can significantly lower the cost of the entire system.

### High Performance

The exceptional PAR delivered by the GC1115 makes the device among the highest-performing CFR processors available. The



The GC1115 CFR processor improves power amplifier efficiency and helps reduce both the acquisition and operating costs of 3G base stations.

device meets 3G performance standards for peak code domain error (PCDE), composite error vector magnitude (EVM), and adjacent channel leakage ratio (ACLR) at PAR output levels down to 6 dB, for both single-carrier and multi-carrier configurations. The GC1115 can produce a single output of up to 20 MHz bandwidth, or two independent outputs of up to 10 MHz each for support of diversity transmission. The GC1115's maximum input sampling rate is 125 MSPS.

The GC1115 is programmable for a variety of carrier configurations and interface standards, providing base station manufacturers design flexibility. The

GC1115 uses four cascaded stages of peak detection and cancellation (PDC) to remove over-threshold peaks from the input signal. Each PDC stage can be independently programmed with detection target peak levels and spectrally shaped cancellation pulse coefficients that are bandlimited to match the user's carrier frequency allocation.

#### **Ease of Design**

The high performance and flexibility of the GC1115 CFR processor extend TI's leadership as a provider of end-to-end signal chain solutions for wireless base stations. Operating with a 1.2V core and 3.3V I/Os, the CFR

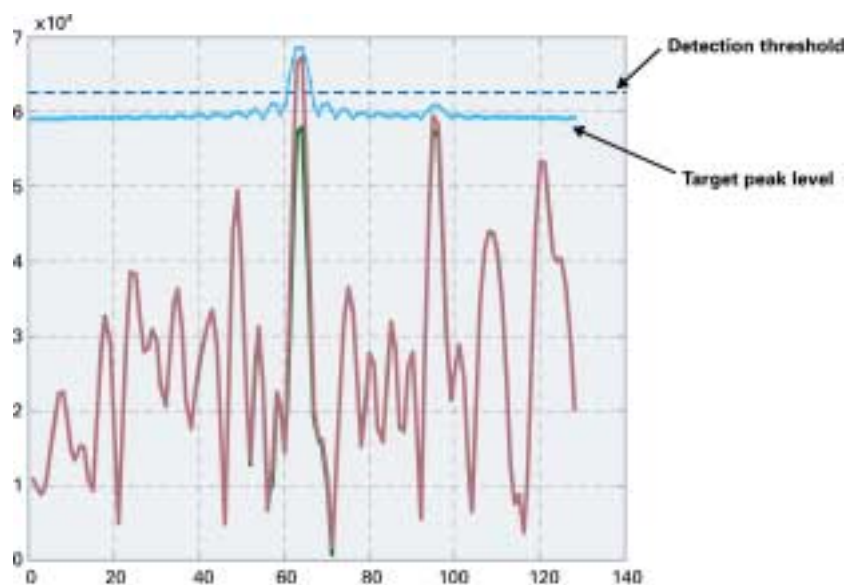
processor is designed to integrate smoothly with TI's high-performance D/A converters (DACs), digital upconverters (DUCs), and digital signal processors (DSPs).

The GC1115 is available in a 17 x 17 mm, 256-ball grid array (BGA) package. Support includes an evaluation module and full documentation to help simplify designing the device into 3G wireless base stations and multi-carrier power amplifiers.

#### **For More Information**

To learn more about the GC1115 CFR processor, or other TI wireless solutions, visit [www.ti.com/gc1115](http://www.ti.com/gc1115)

Find out how the GC1115 can improve transmission power efficiency in your next design.



*The GC1115 CFR processor cancels signal peaks, optimizing the total dynamic range and efficiency of the transmit power amp.*

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