GC6016 Transmit-Receive Signal Processor

Check for Samples: GC6016

FEATURES

- **Integrated Transmit and Receive Solution**
- **Transmit Includes DUC, Tx Equalizer, and Bulk Up-Converter**
- **Receive Includes DC-Offset Cancellation, Front-end and Back-end AGC, Bulk Down-converter, Rx Equalizer, I/Q Imbalance Correction, DDC**
- **Up to 4 Tx, 8 Rx**
- **4 Tx Aggregate Output to DACs up to 921 MS/sec Complex**
- **8 Rx Aggregate Input From ADCs up to 1.2 GS/sec Real**
- **Up to 48 Channels (carriers)**
- **Up to 34-Tap (complex) Tx Equalizers**
- **16-Tap (complex) Rx Equalizers**
- **Fractional Resamplers, Multimode Support**
- **Two 4k Complex Word Capture Buffers for Signal Analysis and Adaptive Filtering Algorithms**

- **1.1V Core, 3.3V I/O (CMOS), 1.8V I/O LVDS**
- **Power Consumption, 3.5W Typical**
- **Supports Direct Interface to TI High-Speed Data Converters**
- **484-Ball TE-PBGA Package, 23 × 23 mm**

APPLICATIONS

- **Multi-Standard Base Stations (additional Rx channels as companion to GC5330)**
  - **3GPP (LTE, W-CDMA, TDS-CDMA)**
  - **MC-GSM**
  - **WiMAX and WiBRO (OFDMA)**
  - **3GPP2 (CDMA2000)**
- **Wireless Infrastructure Repeaters**
- **Digital Radio**
- **Test and Measurement**
- **Military Communications**
- **Medical**

PRODUCT PREVIEW

DESCRIPTION

The GC6016 is an ultra-wideband transmit and receive signal processor that includes a transmitter block with complex equalizer and bulk up-converter, receiver block with wideband and narrowband automatic gain control (AGC), and complex equalizer, digital down-converter / up-converter (DDUC), and capture buffers. The DDUC section consists of 4 identical DDUC blocks, each supporting up to 12 channels. Each channel has independent fractional resamplers and NCOs to enable flexible carrier configurations. Multi-mode/multi-standard operation can be supported by configuring the individual DDUC blocks to different over-sampling ratios.

AVAILABLE OPTIONS

PART NUMBER	T$_C$	PACKAGE
GC6016IZEV	−40°C to 85°C	484 ball 23 mm × 23mm PBGA

Please be aware that an important notice concerning availability, standard warranty, and use in critical applications of Texas Instruments semiconductor products and disclaimers thereto appears at the end of this data sheet.

These devices have limited built-in ESD protection. The leads should be shorted together or the device placed in conductive foam during storage or handling to prevent electrostatic damage to the MOS gates.
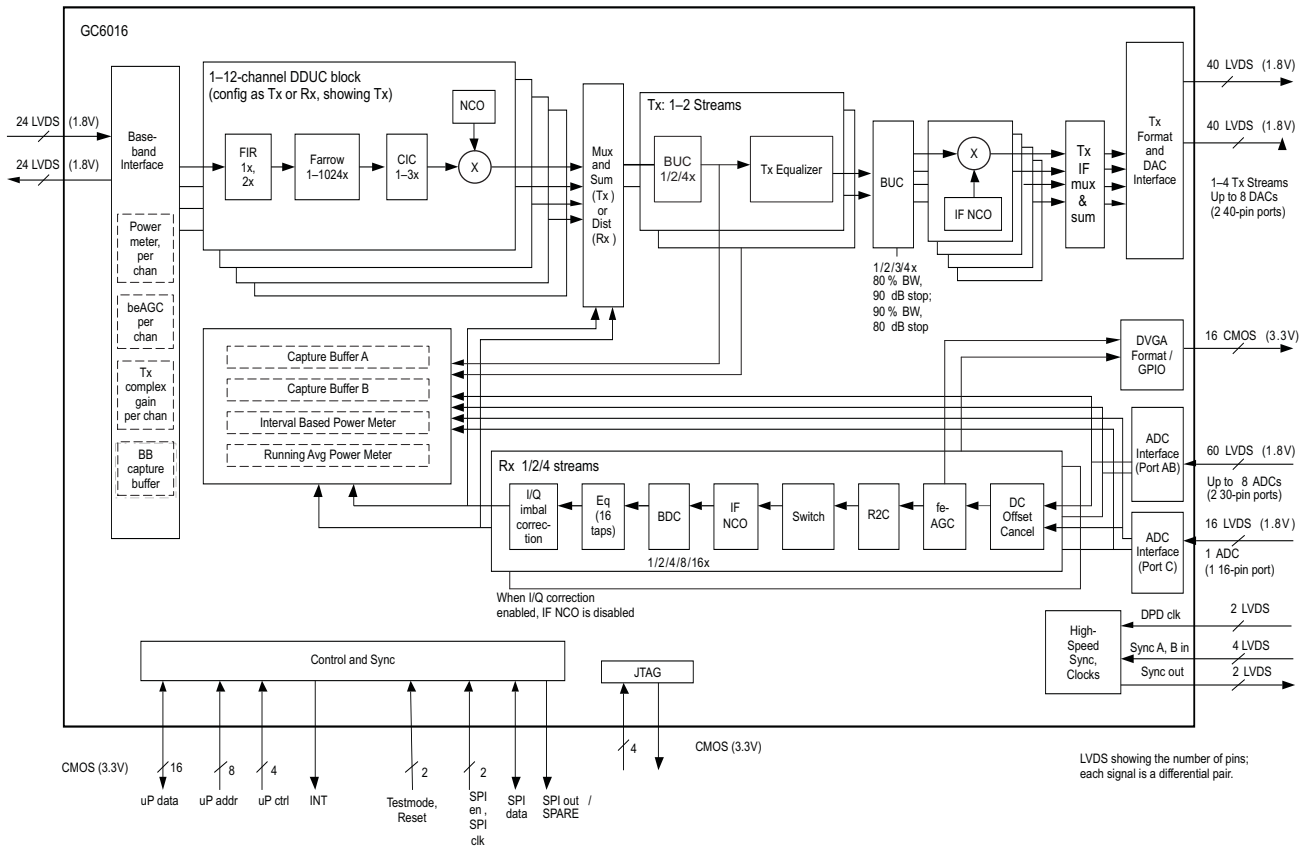
PRODUCT PREVIEW

Figure 1. GC6016 Block Diagram

GC6016 Introduction

The GC6016 is a flexible transmit and receive digital signal processor that includes receiver and transmitter blocks, digital down-converter/up-converter (DDUC) blocks, flexible LVDS data converter and baseband interfaces, and capture buffers for signal analysis and adaptive filtering algorithms.

Each of the four DDUC blocks can be configured as either a digital down-converter (DDC) or a digital up-converter (DUC). Typically a system can be implemented as both TX and RX, with both DDC and DUC functions. The DDUC blocks provide programmable FIR filters with flexible numbers of taps depending on signal bandwidth and number of channels, as well as fractional resamplers, mixers, and CIC filters.

The Receiver block provides DC offset correction, front-end AGC, bulk down converter, complex equalizer, and a blind RX IQ imbalance correction function. Back-end AGC functionality is provided in the baseband interface block.

The Transmitter block provides complex equalizer and bulk up-converter functions.

In wireless infrastructure applications, the GC6016 meets multi-carrier 3G and 4G performance standards and integrates easily into the receive signal chain between Texas Instruments' high-performance data converters and baseband processors such as the TI TMS320C64xx family. In wireless repeater applications, the GC6016 can provide seamless interfaces to TI data converters, along with receive and transmit filtering, DDC, and DUC functions.

PACKAGING INFORMATION

Orderable Device	Status [1]	Package Type	Package Drawing	Pins	Package Qty	Eco Plan [2]	Lead/ Ball Finish	MSL Peak Temp [3]	Samples (Requires Login)
GC6016IZEV	ACTIVE	BGA	ZEV	484	60	Green (RoHS & no Sb/Br)	SNAGCU	Level-3-260C-168 HR	

[1] The marketing status values are defined as follows:
ACTIVE: Product device recommended for new designs.
LIFEBUY: TI has announced that the device will be discontinued, and a lifetime-buy period is in effect.
NRND: Not recommended for new designs. Device is in production to support existing customers, but TI does not recommend using this part in a new design.
PREVIEW: Device has been announced but is not in production. Samples may or may not be available.
OBSOLETE: TI has discontinued the production of the device.

[2] Eco Plan - The planned eco-friendly classification: Pb-Free (RoHS), Pb-Free (RoHS Exempt), or Green (RoHS & no Sb/Br) - please check http://www.ti.com/productcontent for the latest availability information and additional product content details.
TBD: The Pb-Free/Green conversion plan has not been defined.
Pb-Free (RoHS): TI's terms "Lead-Free" or "Pb-Free" mean semiconductor products that are compatible with the current RoHS requirements for all 6 substances, including the requirement that lead not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered at high temperatures, TI Pb-Free products are suitable for use in specified lead-free processes.
Pb-Free (RoHS Exempt): This component has a RoHS exemption for either 1) lead-based flip-chip solder bumps used between the die and package, or 2) lead-based die adhesive used between the die and leadframe. The component is otherwise considered Pb-Free (RoHS compatible) as defined above.
Green (RoHS & no Sb/Br): TI defines "Green" to mean Pb-Free (RoHS compatible), and free of Bromine (Br) and Antimony (Sb) based flame retardants (Br or Sb do not exceed 0.1% by weight in homogeneous material)
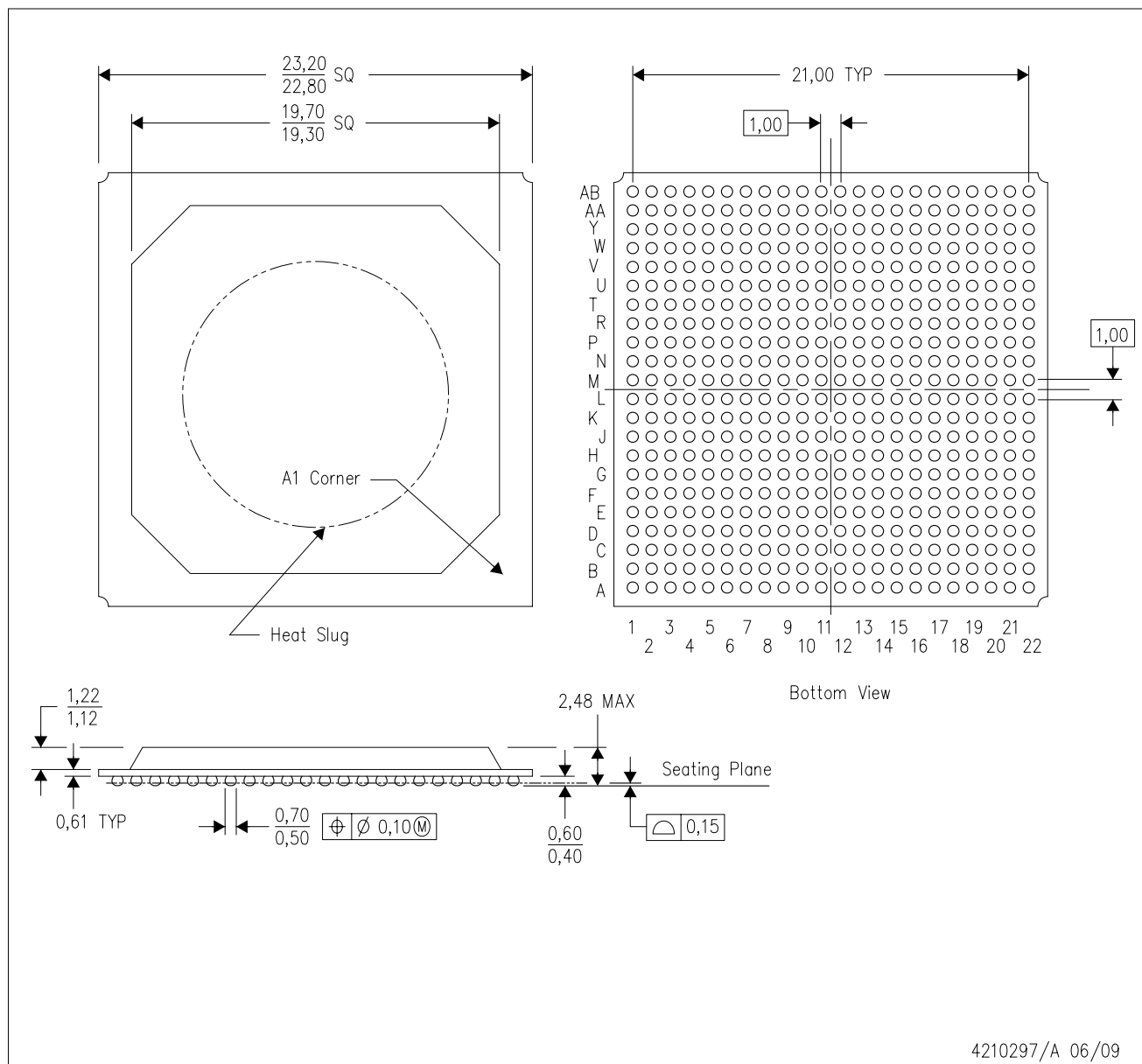
[3] MSL, Peak Temp. -- The Moisture Sensitivity Level rating according to the JEDEC industry standard classifications, and peak solder temperature.

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ZEV (S−PBGA−N484)   PLASTIC BALL GRID ARRAY

$\dfrac{23,20}{22,80}$ SQ

$\dfrac{19,70}{19,30}$ SQ

A1 Corner

Heat Slug

21,00 TYP

1,00

1,00

AB
AA
Y
W
V
U
T
R
P
N
M
L
K
J
H
G
F
E
D
C
B
A

1   3   5   7   9   11 13 15 17 19 21
  2   4   6   8   10 12 14 16 18 20 22

Bottom View

$\dfrac{1,22}{1,12}$

0,61 TYP

$\dfrac{0,70}{0,50}$ ⊕ | Ø 0,10Ⓜ

2,48 MAX

Seating Plane

$\dfrac{0,60}{0,40}$ ⌒ | 0,15

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NOTES: A.   All linear dimensions are in millimeters. Dimensioning and tolerancing per ASME Y14.5M−1994.
         B.   This drawing is subject to change without notice.
         C.   Falls within JEDEC MO−151
         D.   Thermally enhanced molded plastic package with heat slug (HSL) and embedded thermal spacer.
         E.   This package is Pb−free.

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