MAX2992

G3-PLC MAC/PHY Powerline Transceiver

Benefits and Features

- ♦ **G3-PLC™ Compliant**
- ♦ **Prestandard Conformance: IEEE® P1901.2, ITU G.hnem G.9955, IEC/CENELEC**
- ♦ **Frequency-Band Compliant with CENELEC, FCC, and ARIB**
- ♦ **Operating Frequency from 10kHz to 490kHz**
- ♦ **Single-Chip Solution Integrating Physical Layer (PHY) and Media Access Controller (MAC)**
- ♦ **Two UART and Two SPI™ Interfaces**
- ♦ **Supports IPV6-Compatible Networking Layer**
  - ✧ **6LoWPAN IPV6 Header Compression Maximizes Payload Size**
  - ✧ **Dynamic Routing Mechanism Supports Mesh Networking**
  - ✧ **CSMA/CA (Carrier Sense Multiple Access with Collision Avoidance/Channel Access)**
- ♦ **High-Speed, Reliable Communication**
  - ✧ **Data Rate of up to 300kbps**
  - ✧ **Two Layers of Forward Error Correction (FEC) and Cyclic Redundancy Check (CRC16)**
  - ✧ **Enhanced FEC with Reed-Solomon and Viterbi**
  - ✧ **CCM* Authentication Coprocessor featuring AES-128 Encryption/Decryption**
  - ✧ **Automatic Repeat Request (ARQ) Enhances Error Detection and Data Reliability**
  - ✧ **Dynamic Link Adaptation to Select Optimum Data Rate Based on Channel Condition**
  - ✧ **Programmable Tone Notching**
- ♦ **AEC-Q100 Automotive Qualified**

Applications

Smart Grid Communications

Advanced Metering Infrastructure (AMI)

Smart Meters

AMI Concentrators

Electronic Vehicle Charging

Street Lighting Automation

Home Energy Monitoring

Building Automation

Solar and Renewable Energy Management

General Description

The MAX2992 powerline communication (PLC) baseband modem delivers half-duplex, asynchronous data communication over AC power lines at speeds up to 300kbps. The MAX2992 is a system-on-chip (SoC) that combines the physical (PHY) and media access control (MAC) layers using Maxim's 32-bit MAXQ30 microcontroller core. The MAX2991 integrated analog front-end transceiver interfaces seamlessly with the MAX2992, and together with the MAX2992 G3-PLC firmware, forms a complete G3-PLC-compliant modem solution.

The MAX2992 utilizes OFDM techniques with DBPSK, DQPSK, D8PSK modulation and forward error correction (FEC) to enable robust data communication using the electrical power grid. The design provides inherent adaptability to frequency selective channels, robustness in the presence of group delay, and immunity to impulsive noise. To allow for regulatory compliance, the MAX2992 incorporates a programmable tone notching mechanism. This allows the notching of certain frequency bands in the transmit spectrum of the modem. This feature also provides an alternative method to address coexistence with other narrowband transmitters such as legacy FSK-based PLC systems.

The MAX2992 MAC incorporates a 6LoWPAN adaptation layer to support IPv6 packets. An enhanced CSMA/CA and ARQ, together with the mesh routing protocol, supports all common MAC layer services for various network topologies. Intelligent communication mechanisms adapt and enhance system performance over a range of channel conditions. These mechanisms include channel estimation, adaptive tone mapping, and routing protocols. An on-chip CCM (an extension of CCM specified in IEEE 802.15.4) authentication coprocessor with AES-128 encryption/decryption provides security and authentication.

Ordering Information

PART	TEMP RANGE	PIN-PACKAGE
MAX2992GCB/V+	-40°C to +105°C	64 LQFP

/V denotes an automotive qualified part.

+Denotes a lead(Pb)-free/RoHS-compliant package.

G3-PLC is a trademark of Maxim Integrated Products, Inc.
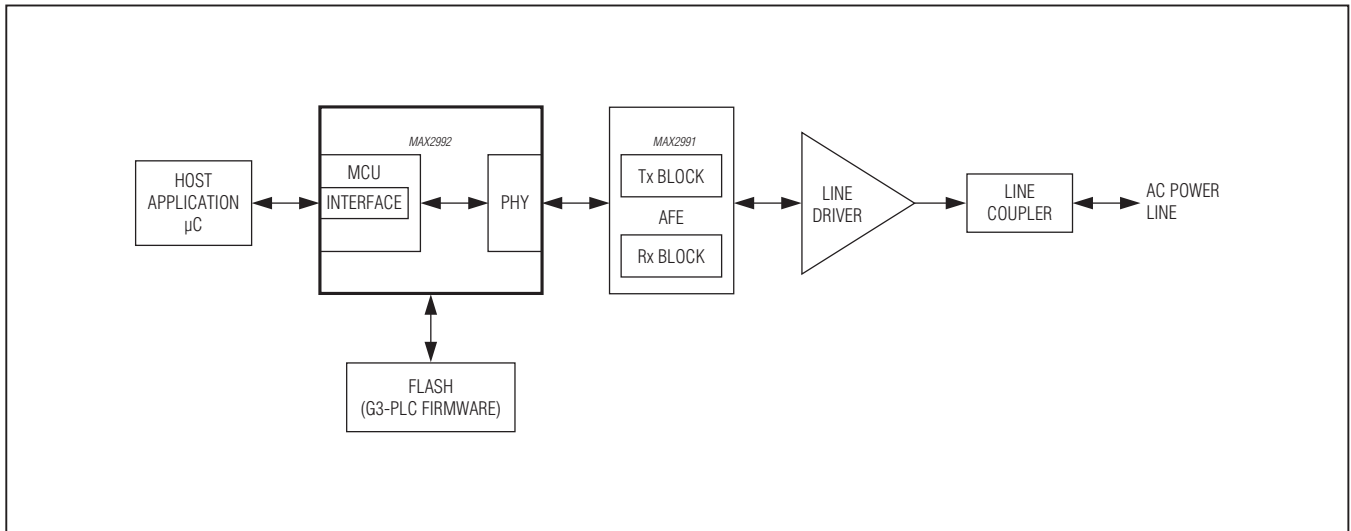*SPI is a trademark of Motorola, Inc.*
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For pricing, delivery, and ordering information, please contact Maxim Direct at 1-888-629-4642, or visit Maxim's website at www.maximintegrated.com.

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Typical Application Circuit