19-4116; Rev 0; 4/08

10kHz to 490kHz OFDM-Based Power Line Communication Modem

General Description

The MAX2990 power line communication (PLC) baseband modem delivers a cost-effective, reliable, half-duplex asynchronous data communication over AC power lines at speeds up to 100kbps. The MAX2990 is a highly integrated system-on-chip (SoC) that combines the physical (PHY) and media access control (MAC) layers using Maxim's 16-bit MAXQ microcontroller core. The MAX2990 utilizes OFDM modulation techniques to enable robust data communication using the same electrical network that supplies power to all other devices on the network.

The MAX2990 includes the MAXQ microcontroller core. The MAXQ is a 16-bit RISC microcontroller with 32kB flash memory, 5.12kB of ROM, and 8kB SRAM, of which 4kB that can be simultaneously accessed by the MCU and the PHY. The MAX2990 is integrated with modules for serial communication (SPI™, I²C, UART) and a real-time clock (RTC) for time stamping, in addition to standard blocks such as timers, GPIO, and external interrupts.

The MAX2990 transceiver is based on an orthogonal frequency division multiplexing (OFDM) technique that allows robust data transmission over poor channel conditions specifically for environments with impulsive noise. OFDM with binary phase shift key (BPSK) and forward error correcting (FEC) blocks are used because of their inherent adaptability in the presence of frequency selective channels without the use of equalizers, resilience to jammer signals, robust communications in the presence of group delay spread, and robustness to impulsive noise. The MAX2990 features jammer cancellation that removes constant sinusoidal interference signals for FCC and ARIB bands. Privacy is provided by DES encryption.

The MAX2990 is available in a 64-pin LQFP package and is specified over the -40°C to +85°C extended temperature range.

Applications

Automatic Meter Reading

Home Automation

Heating Ventilation and Air Conditioning (HVAC)

Building Automation

Industrial Automation

Lighting Control

Sensor Control and Data Acquisition

Remote Monitoring and Control

Voice-Over-Powerline

Security Systems/Keyless Entry

SPI is a trademark of Motorola, Inc.

Features

- **Combines the Physical Layer (PHY) and Media Access Controller (MAC)**
- **Integrated Microcontroller with 32kB Password-Protected Flash Memory and 8kB SRAM**
- **Maximum Effective Data Rate in Normal Mode**
  - **32kbps at 10kHz to 95kHz and 100kbps at 10kHz to 490kHz**
- **Complies with**
  - **CENELEC A (10kHz to 95kHz)**
  - **CENELEC B (95kHz to 120kHz)**
  - **CENELEC C (120kHz to 140kHz)**
  - **FCC (10kHz to 490kHz)**
  - **ARIB (10kHz to 450kHz)**
- **Includes Forward Error Correction (FEC) Mechanism and CRC16**
- **Includes Fast DES Engine as the Encryption/Decryption Coprocessor and CRC32**
- **Jammer Cancellation for FCC and ARIB**
- **User-Configured Start and End Operating Frequency**
- **Carrier Sense Multiple Access/Collision Avoidance (CSMA/CA) Channel Access Arbitration**
- **Automatic Repeat Request (ARQ) to Enhance Error Detection and Improve Data Reliability**
- **Supports SPI, I²C, and UART Interfaces**
- **Real-Time Clock (RTC)**
- **PWM Counters**
- **Built-In Test Mode Engine for Identifying Channel Conditions**

Ordering Information

PART	TEMP RANGE	PIN-PACKAGE
MAX2990ECB+	-40°C to +85°C	64 LQFP

+Denotes a lead-free package.

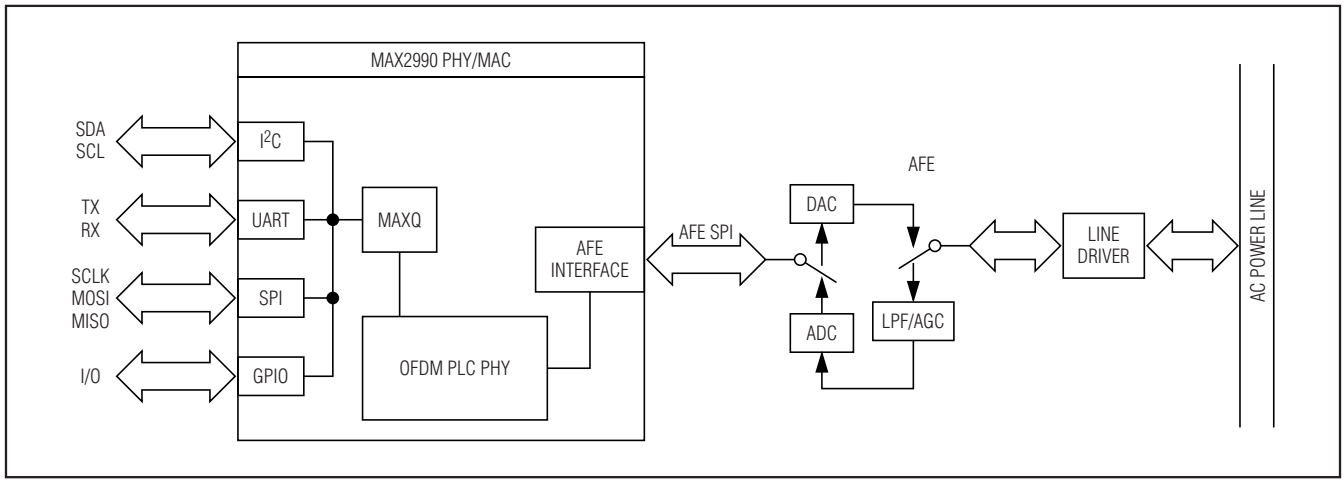
Pin Configuration appears at end of data sheet.

Typical Application Circuit appears at end of data sheet.

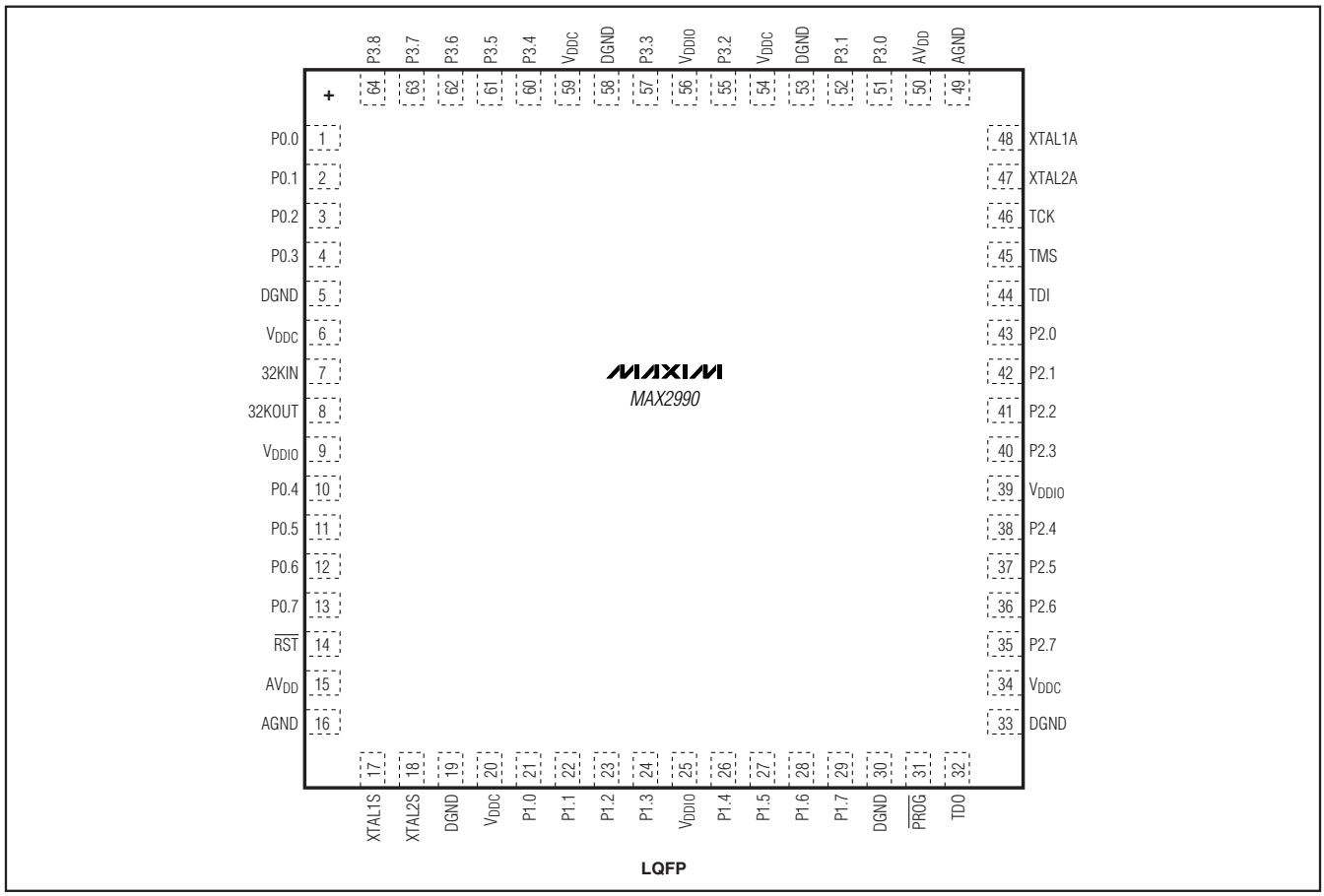
For pricing, delivery, and ordering information, please contact Maxim Direct at 1-888-629-4642, or visit Maxim's website at www.maxim-ic.com.

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Typical Application Circuit



Pin Configuration



LQFP

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