MAXLINEAR

GPY21x Ethernet PHYs

Single-Port 2.5G Ethernet PHYs for Routers, Switches, and Gateways

PRODUCTS

GPY211	Single-port 2.5GbE PHY with 1588v2 support
GPY212	Single-port 2.5GbE PHY with 1588v2 and MACsec support
GPY215	Single-port 2.5GbE PHY with 1588v2, MACsec, and SyncE support

FEATURES

- Supports IEEE802.3 modes:
  - 2.5GBASE-T and 1000BASE-T: full-duplex
  - 100BASE-TX and 10BASE-Te: full- and half-duplex
- Industrial temp. range (-40°C to +85°C) GPY215
- SGMII+/SGMII interface for MAC connection
- Rate adaptation over SGMII+/ SGMII using IEEE802.3x flow control
- Single power supply of 3.3V using the integrated DC/DC switching regulator or 2 voltage rails without integrated DC/DC
- Single-row VQFN-56 package (7mm x 7mm)
- Control of up to 4 LEDs with smart LED brightness control for link status display
- Smart-AZ feature supports Energy Efficient Ethernet (EEE, IEEE802.3az) with MACs that do not support EEE
- Field firmware upgrade capability with external optional flash
- Programmable temperature sensor monitors device temperature for system warning and down speed
- Supports Jumbo frames of up to 10kB
- Cable diagnostics
- Auto down speed for Cat3 (4-wire) cables or bad cables
- Auto MDI/MDI-X and auto polarity correction
- Wake-on-LAN
- Ultra-low power mode with automatic wake-up and power consumption below 10mW, when the cable is unplugged (supported with internal DC/DC only)
- Precise time stamping support according to IEEE 1588 Version 2
- MACsec wire-speed data encryption and decryption with 16 security channels and 32 MACsec associations (GPY212 and GYP215)
- Synchronous Ethernet (SyncE) support according to ITU-T G.8262 (GPY215)

MAIN APPLICATIONS

- Broadband router: xPON, wireless, 4G/5G, G.Fast, G.hn, cable, xDSL
- Home gateway: wireless gateway, home server, home storage (NAS)
- High port and low port count 2.5GbE switch
- Wi-Fi 6 / Wi-Fi 7 routers and access points

Faster Ethernet connectivity enables users to make the most of increased speeds available through the enhanced broadband access networks. 2.5Gigabit Ethernet (GbE) increases the bandwidth without the need to change cables and it is more cost-effective and consumes less power than 5GbE or 10GbE.

The GPY21x is a 2.5GbE PHY that is suited for routers, switches, and home gateways. The device supports the 2.5GBASE-T, 1000BASE-T, 100BASE-TX and 10BASE-Te modes of the IEEE802.3 standard and provides great interoperability for high data rate connections as well as for connections with legacy 1000BASE-T, 100BASE-TX and 10BASE-T devices.

GPY21x is connected to the MAC of an SoC or switch with a low pin-count SGMII+/SGMII interface. SGMII+ is a Serial-GMII (SGMII) interface operated at 3.125Gbaud/s to support a data rate of 2.5Gbit/s. The SGMII+/SGMII interface supports 10M, 100M, 1G and 2.5Gbit/s rates or IEEE802.3x rate adaptation using pause frames.

GPY21x supports the Precision Time Protocol (PTP, 1588v2). GPY212 and GYP215 also support MACsec point-to-point wire speed encryption and decryption for MAC layer data security. GPY215 also supports Synchronous Ethernet (SyncE).

Standards:

- IIEEE 802.3: Relevant clauses
- IEEE 1588 Version 2
- ITU-T G.8261/G.8262: SyncE
- IEEE 802.1AE MACSec

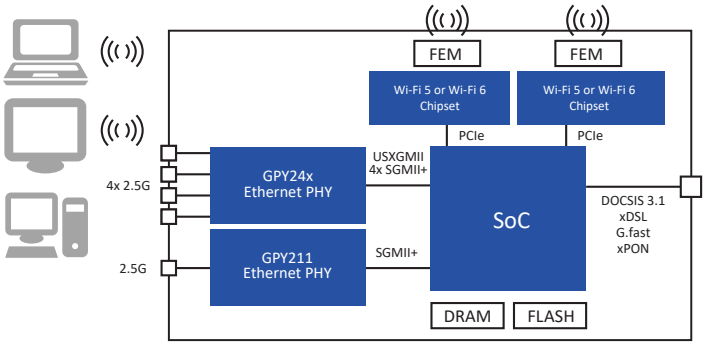
Low Power Consumption

The GPY21x has a typical power consumption of 1.0W in 2.5GBASE-T. It supports Energy-Efficient Ethernet (EEE) in the 2.5GBASE-T, 1000BASE-T and 100BASE-TX modes to reduce power consumption during periods of low traffic. Additional power saving can be achieved by using the Wake-on-LAN (WoL) functionality and the ultra-low power mode.

Small Footprint and RBOM

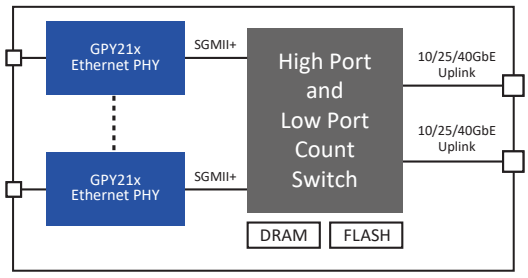
The devices are available in small 7mm x 7mm single-row VQFN-56 packages, ideal for 2 or 4-layer PCBs. A low EMI line driver with integrated termination simplifies the PCB design. GPY21x can be operated from a single 3.3V power supply using the integrated DC/DC switching regulator. It is configurable through pin strapping, MDIO interface, or an optional external flash.

GPY211, GPY211 and GPY215 are pin compatible and also pin compatible with MaxLinear's 1G Ethernet PHY GPY115.



Router and Gateway Application

5 ~ 16
2.5GbE LAN



High Port and Low Port Count Switch Application

Product Information

Product	Description	Temperature Range	Ordering Code	Package
GPY211C0VC	Single-port 2.5GbE PHY	Commercial 0°C to 70°C	99AFC6	VQFN-56
GPY212C0VC	Single-port 2.5GbE PHY with MACsec	Commercial 0°C to 70°C	99AFC7	VQFN-56
GPY215C0VI	Single-port 2.5GbE PHY with MACsec and SyncE	Industrial -40°C to 85°C	99AFCM	VQFN-56

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