AQUANTIA

AQrate[™] Gen2 Ethernet PHYs

10GBASE-T | 5GBASE-T | 2.5GBASE-T | 1000BASE-T | 100BASE-TX Ethernet PHYs

Product Overview

The Aquantia® GEN2 AQrate PHYs are low-power, high-performance, multi-gigabit 10GBASE-T/5GBASE-T/2.5GBASE-T/1000BASE-T/100BASE-TX transceivers. AQrate technology enables broad-based market adoption of multi-gigabit network connectivity through a wide range of cable types including Cat 5e, Cat 6, and Cat 6a or above. AQrate bridges the bandwidth gap between legacy cabling infrastructure designed for 1 Gbps data rates and new applications that demand bandwidth in excess of 1 Gbps with zero changes to legacy cabling or infrastructure, enabling the unabated roll-out of higher-speed connectivity solutions for Enterprise, Data Center, SMB/SOHO, Carrier, Automotive, and ISM (Industrial, Scientific, Medical) markets.

AQrate PHYs are compliant with both the IEEE® 802.3an/bz standard and the NBASE-TTM Alliance PHY Specification to perform all the physical layer functions required to implement 10GBASE-T/5GBASE-T/2.5GBASE-T/1000BASE-T/100BASE-TX transmission over 100 meters of twisted pair cabling. The AQrate PHY family integrates such features as Energy Efficient Ethernet (EEE), Precision Time Protocol (PTP)/1588v2, IEEE MAC Security (MACsec), supports all PoE standards up to 100W, and supports jumbo packets up to 16KB in all operating modes.

Device Name	Speeds	Package
AQR407/AQR107	5-speed	10 Gbps/5 Gbps/2.5 Gbps/1 Gbps/ 100 Mbps
AQR408/AQR108	4-speed	5 Gbps/2.5 Gbps/1 Gbps/ 100 Mbps
AQR409/AQR109	3-speed	2.5 Gbps/1 Gbps/ 100 Mbps

Quad: The AQR407/AQR408/AQR409 are pin-compatible, multi-gigabit, quad-port PHYs housed in 19 mm flip-chip BGA packages enabling efficient, high-density design for high port-count and compact switches across a range of speed requirements.

Single: The AQR107/AQR108/AQR109 are pin-compatible, multi-gigabit, single-port PHYs that address multiple network connectivity applications and speed requirements. These devices are available in compact 7 mm x 11 mm flip-chip BGA packages featuring the Industrial (-40°C to +108°C) temperature operating range.



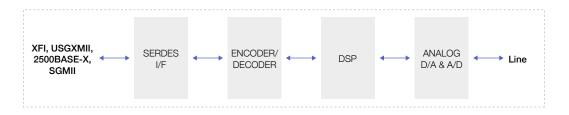
Applications

Aquantia's GEN2 AQrate multi-gigabit PHYs are a game changing technology enabling Enterprise, Data Center, SMB/ SOHO, Carrier, Automotive, and ISM (Industrial, Scientific, Medical) markets to evolve beyond 1 Gbps to 5 Gbps and 2.5 Gbps data rates. The single-port product family is ideally suited for wireless access point backhaul, residential gateways/ routers, client computing, and a myriad of networked device applications while the quad-port family permits efficient high-port density and compact switch design.

1 Minimum specification is ambient temperature, and the maximum is junction temperature.

Features	Benefits
 IEEE 802.3an/bz and NBASE-T featuring AQrate technology 10GBASE-T: 100 meters over Augmented Cat 6 (Cat 6A) and Cat 7, 55 meters over Cat 6, and best effort over Cat 5e 5GBASE-T, 2.5GBASE-T: over 100 meters of Cat 5e or better cabling 	 Ability to support highest data rate possible with a given cable environment while reducing power and latency 5G and 2.5G operation over legacy infrastructure, while delivering backward compatibility with existing equipment
 Energy-Efficient Ethernet (EEE) MACsec (IEEE 802.1ae, MAC security standard) Full support for Advanced Encryption Standard (AES-256) and standalone operation PTP/1588v2 Synchronous Ethernet (Sync-E), ITU-T standard in cooperation with IEEE 	 EEE lowers overall power consumption and lowers equipment operating costs MACsec provides for secure, encrypted data communications across networks PTP/1588v2 provides for timing accuracy across the network Sync-E synchronizes clock signals on the PCB
Integrated Wake-on-LAN (WoL) Support Compliant to Microsoft Network Device Class specification	Integrated packet filtering enables sub-1W support in 100BASE-TX mode
 Built-in Thermal Management On-chip thermal sensor with alarm and warning thresholds 	Enables deployment in thermally constrained environments
Advanced Cable Diagnostics On-chip high-resolution cable analyzer	Enables the deployment of meaningful cable analysis tools for debugging installation problems
 High-Performance full KR (with autonegotiation)/ XFI/USXGMII/2500BASE-X/SGMII I/F w/ AC-JTAC Capable of rate adapting all rates into KR/XFI via PAUSE and 100M/1G into 2500BASE-X 	 Ensures trouble-free operation over a range of interconnect scenarios Comprehensive interface support Supports legacy and next generation MACs/switches/processors
 Advance Loopback and Diagnostic Capability Flexible on-chip BERT Full 1-second packet counters and CRC-32 checkers 	Enables extensive system test and debug with remote loopback control
Integrated MDI Filter and Advanced RFI Cancellation Eliminates external filter components	Robust Radio Frequency Interference (RFI) performance Resilient operation when exposed to RFI

AQRATE PHY BLOCK DIAGRAM (PER-PORT)





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