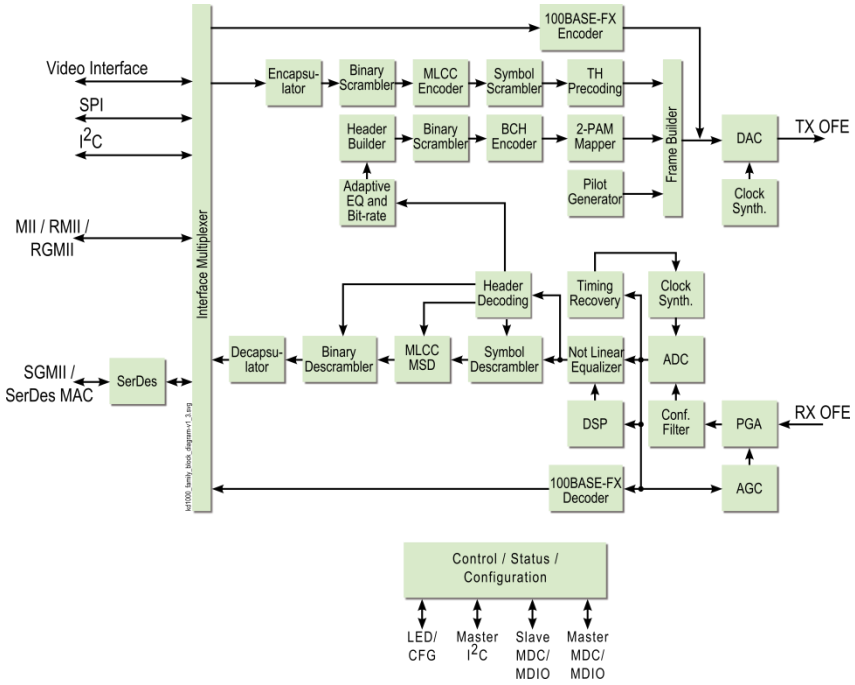
Product Brochure

KD1000 Family

Gigabit Ethernet POF Transceivers

KD1000 FAMILY



OVERVIEW

The KD1000 family comprises fully integrated Gigabit Plastic Optical Fiber (POF) Ethernet devices, optimized for low-power and featuring a small footprint. This new family of Gigabit Ethernet POF devices implements the physical layer of the ETSI TS 105 175-1-2 to transmit data on standard SI-POF, MC-POF, or PCS. Manufactured using a 65 nm CMOS Low-Power process, KD1000 devices offer the best performance, lowest cost, and lowest power for Gigabit POF solutions.

The KD1000 family incorporates leading-edge digital communication technology developed by KDPOF, which uses the most advanced techniques in high-spectral efficiently coded modulations, adaptive non-linear equalization, and adaptive bit-rate—never before used in optical fiber communications. Enabling performance very close to the Shannon limit, KDPOF technology increases both the bit rate and the coverage, which is possible due to the company's reliable and short time-to-market ASIC architecture. The KD1000 integrates a custom Digital Signaling Processor that is based on the flexible and suitable Transport Triggered Architecture (TTA) optimized for adaptive filtering.

The KD1000 family is designed to be used with current off-the-shelf photonics, including RCLED, LED, and PIN PD which are currently used in 100 Mbps products with an analog optoelectronics / interface. The built-in analog interface of the devices simplifies connectivity to the Fiber Optic Transceiver (FOT).

The KD1000 devices support standard MII, RMII, RGMII, SGMII and 1000BASE-X interfaces, simplifying system and board-level designs. These devices can be used as an Ethernet MAC or PHY. In addition, by using the SerDes interface, the POF port offers the same connectivity as an IEEE 802.3 1000BASE-X device (such as 1.25 Gbps with 8b/10b NRZ line code) or IEEE 802.3 100BASE-X (Clause 24) device (such as 125 Mbps with 4b/5b NRZI line code).

Single-port KD1000 devices are available in 88-pin QFN or LGA packages as well as in bare die, which reduces the size of the POF port by enabling integration of the KD1000 devices with optoelectronics in a single optical package.

FEATURES

GENERAL

- Fully integrated Gigabit Ethernet POF transceiver for any type of large core fiber (SI-POF, MI-POF, MC-POF, GI-POF, PCS)
- Key POF markets: home, industrial and automotive

STANDARDS

- First silicon compliant with ETSI TS 105 175-1-2 Gigabit POF standard and fully compatible with optional Adaptive Bit Rate and 100 Mbps long-reach operations
- IEEE 802.3 100BASE-X PCS extension for backward compatibility
- Compliant with IEEE 802.3x for full-duplex operation
- Supports ETSI TS 105 175-1 (V2.0.0) and ETSI TS 105 175-1 -1 (V2.1.0) specifications and specified for IEC 60793-2-40 A4a.2 POF
- Compliant with CENELEC EN 50173-1:2002 and CENELEC EN 50173-4:2007
- Tested according to IETF RFC 2544

DIGITAL DATA INTERFACE

- Open and flexible Ethernet interfaces (MII, RMII, RGMII, SGMII and SerDes), and easy connectivity to any Ethernet MAC or PHY
- Raw-video parallel and SPI/I2C master/slave interfaces
- Direct connection of video cameras and ECUs for automotive ADAS applications
- Flow-control support when ABR is enabled

DIGITAL CONTROL INTERFACE

- I2C master interface for reading optional boot memory
- Two MDC/MDIO interfaces: one slave for configuration and monitoring, and one master for link management in MAC operation

INTEGRATION

- Designed for use with current off-the-shelf photonics, and offers low-cost BOM and simple connectivity with multiple FOT vendors
- Link / activity monitoring and speed LED outputs
- Hardware configuration pins (most are multi-function)
- Five loopback modes and four PMD test-modes
- Monitoring and configuration capabilities via the slave MDC/MDIO interface

ASIC

- 65 nm CMOS process
- Low power, less than 500 mW per port
- Available in QFN / LGA package or bare die, and can be integrated with optoelectronics in single optical package

APPLICATIONS

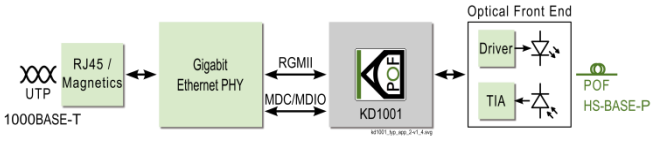
The KD1000 family of Gigabit Ethernet POF transceivers is designed to fulfill the requirements of the primary POF markets: home networking, automotive, and industrial.

Home and small office networks are two of the key applications for future POF networking development. KD1000 ASICs are ideal for integration of Gigabit capabilities in POF ports, including those in set top boxes, routers, digital TVs, and network-attached drives, as well as in network components like switches, wall plugs, and media converters (such as copper-to-POF). Both point-to-point and daisy-chain topologies are possible with KD1000, which also is backward compatible with POF ports based on IEEE 802.3 100BASE-FX, enabling connectivity in legacy installations.

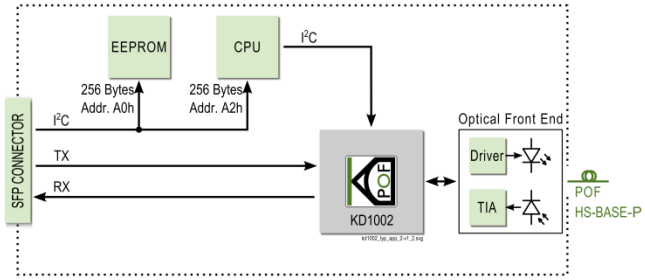
KD1000 devices are well suited for industrial market requirements. Under industrial power budget requirements, KDPOF technology extends the reach of Industrial Ethernet and other field buses from the actual limits to more than 150 meters at 100 Mbps. Suitable for integration in SFF and SFP packages, the KD1000 devices also ensure smooth backward compatibility with current requirements and systems.

POF has been used in car networks for several years. Now, with the growing demand for automotive safety, leading automotive OEMs and suppliers are heavily investing in Automotive Driving Assistance Systems (ADAS) technologies. Most of the ADAS implementations are based on a sensor (typically a CMOS or CCD image device), an ECU, and a display or any other HMI. POF is ideal as the link between these subsystems, running at Gigabit speeds and with low latency. Some of the KD1000 devices are optimized for ADAS applications by integrating parallel video and SPI/I2C control interfaces as well as an advanced multi-protocol multiplexer. KD1000 transceivers can be integrated in an image-based sensor without requiring additional microcontroller, encapsulating transparently the video data and control signals between the sensor and ECU over a single POF link.

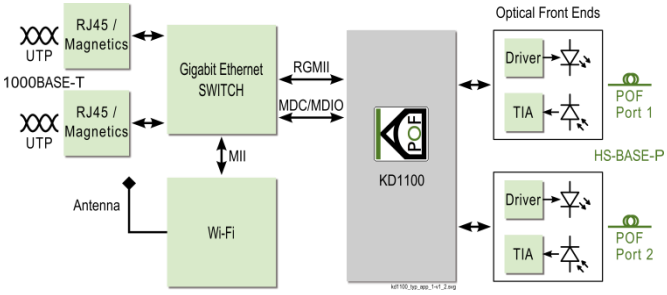
Media Converter (MAC Operation)



Gigabit POF SFP/GBIC Module



Network Node with POF Daisy-Chain Topology



	Home/SOHO	Industrial	Automotive
KD1001 **KD1002** **KD1100**	RGMII SGMII 2xRGMII		
KD1011 **KD1012**		RGMII SGMII	
KD1051 **KD1056**			RGMII DVP

SPECIFICATIONS

General Specifications

Maximum Power Consumption	500 mW per port
Operating Temperature	Depends upon the application: home, industrial or automotive
Storage Temperature	-65 to 140 °C
Package	QFN (64 to 88 pins) or bare die

POF Optical Front End (OFE) Specifications (informative)

POF Length at 100 Mbps (Industrial)	150 m (over SI-POF IEC 60793-2-40 A4a.2)
POF Length at 1 Gbps (Home Networking)	50 m (over SI-POF IEC 60793-2-40 A4a.2)

MAC/PHY Interface Specifications

Supported Interfaces	MII, RMII, RGMII, RSMII

ORDERING INFORMATION

KD1001/02/11/12 products are available.
Please, contact support@kdpof.com .

KDPOF
Ronda del Poniente 16, 2A
28760 Tres Cantos (Madrid)
Spain
Tel: +34 918043387 ● Fax: +34 918063725
www.kdpof.com

BR001 v1.10 | APRIL 2015

© 2014 KDPOF. Specifications can be changed without notice.