Low-Power, 10Base-T/100Base-TX Physical Layer Transceiver

Description

The KSZ8051/8031/8021 series is a low-power, small package 10/100 Physical (PHY) Layer Transceiver that provides the MII interface or the RMII interface to transmit and receive data over standard CAT-5 unshielded twisted pair (UTP) cable or fiber.

This PHY device is based on an enhanced mix-signal design and 0.13um CMOS technology, which enable a new level of features, low power consumption and high performance in a very compact package. It is the ideal choice of physical layer transceiver for adding power-efficient 10/100 Ethernet connectivity to digital TV, IP Set Top Box, Game console, industrial and automotive applications.
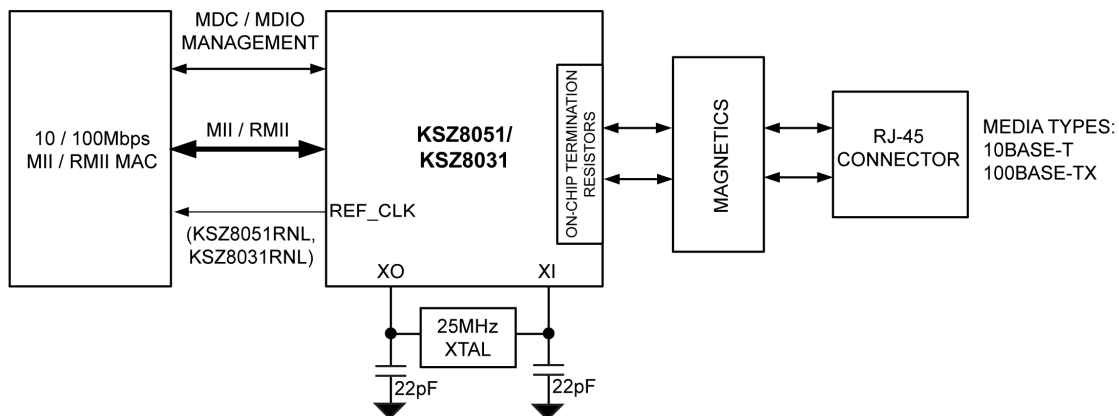
On-chip termination resistors and integrated regulator simplifies board layout while reducing the system BOM. The digital I/O interface supports 1.8V, 2.5V, and 3.3V voltage levels, offering flexibility in design. A suite of power-down and power-saving modes helps to further reduce power in various operating conditions. This PHY device also provides patented techniques for lower EMI.

The configurations provided by this product family enable the flexibility to meet requirements of different applications:

- KSZ8051MLL: Supports MII over standard CAT-5 UTP cable. RoHS compliant 48-pin LQFP package.

- KSZ8051FLL: Supports MII or RMII over fiber. RoHS compliant 48-pin LQFP package.

- KSZ8051MNL: Supports MII over standard CAT-5 UTP cable. RoHS compliant 32-pin QFN package.

- KSZ8051RNL: Supports RMII with the default 50MHz reference clock output to the MAC, over standard CAT-5 UTP cable. RoHS compliant 32-pin QFN package.

- KSZ8031RNL: Supports RMII with the default 50MHz reference clock output to the MAC, over standard CAT-5 UTP cable. RoHS compliant 24-pin QFN package.

- KSZ8021RNL: Supports RMII with the default 50MHz reference clock input, over standard CAT-5 UTP cable. RoHS compliant 24-pin QFN package.

Industrial grade is also available. The datasheets and supporting documents can be found at Micrel's web site at: www.micrel.com.

Functional Diagram

Features	Benefits
Fully-compliant to IEEE 802.3/802.3u Standard	Standard compliance ensures to work with other standard compliant, already deployed devices.
Single 3.3V supply with internal 1.2V regulator, and optional 3.3V, 2.5V or 1.8V VDDIO	Enables low-power design and offers flexibility in design
Integration of termination resistors on the chip	On-chip termination (eliminating 4 external resistors) not only simplifies PCB design and reduces system BOM, but also improves overall signal integrity and EMI emission.
Energy Detect Power Down when the cable is not plugged; and power down/ slow oscillator mode when the device is not in use.	Power consumption is optimized based on the status of the link or the device.
25MHz crystal for input reference clock	The use of 25MHz crystal as input reference clock no longer requires 50MHz system clock. The PHY outputs 50MHz reference clock to the MAC. It reduces the system BOM in the RMII mode.
HP Auto MDI/MDIX crossover support	Auto-MDI/MDIX eliminates the need for cross-over cable, thus reduces installation costs. Easy to use.
LinkMD® TDR-based cable diagnostics	Allows identification of common cabling problems, including those not addressed by IEEE. Simplifies network deployment and reduces network downtime.

Applications

- Digital TV
- IP Set-top box
- Game Console
- IP Phone
- IP camera
- Network printer/project
- Media converter
- Industrial control
- Automotive

Corporate Sales Offices

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