

# VSC8541

## Single Port Gigabit Ethernet Copper PHY with GMII/RGMII/MII/RMII Interfaces

Low-power, small form-factor Cu PHY with IEEE 802.3az Energy Efficient Ethernet (EEE), Wake-on-LAN (WoL), Synchronous Ethernet (SyncE), Start of Frame (SOF), and Fast Link Failure 2.0 (FLF2) indication, with widest I/O LVCMOS support.

The VSC8541 device, offered in a small 8 mm x 8 mm single-row QFN package, is designed for space-constrained 10/100/1000BASE-T applications. It features integrated line-side termination to conserve board space, lower EMI, and improve system performance. Additionally, integrated RGMII version 2.0 standard timing compliant compensation eliminates the need for on-board delay lines.

The device supports the industry's widest range of LVCMOS levels for a parallel MAC interface including: 1.5 V, 1.8 V, 2.5 V, and 3.3 V, as well as 1.2 V, 1.5 V, 1.8 V, 2.5 V, and 3.3 V support on the MDIO/MDC interface. It includes Microsemi's EcoEthernet™ 2.0 technology with Energy Efficient Ethernet and power saving features to reduce power based on link state and cable reach. It optimizes power consumption at all link operating speeds, and features Wake-on-LAN power management using magic packets.

The device has a recovered clock output for Synchronous Ethernet applications. Programmable clock squelch control is included to inhibit undesirable clocks from propagating and to help prevent timing loops. Microsemi's patented Ring Resiliency™ allows a PHY port to switch between master and slave timing references with no link drop while in 1000BASE-T mode.

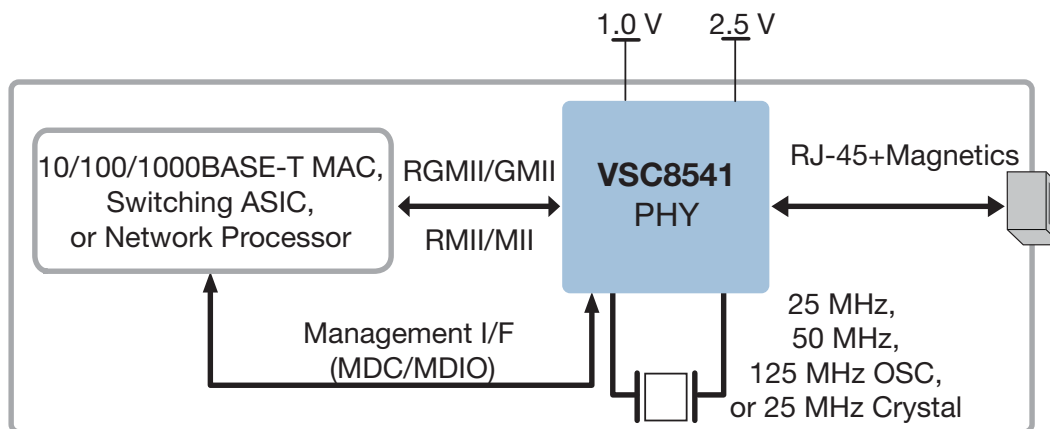
VSC8541 also includes Fast Link Failure (FLF) indication for high-availability networks. FLF indication identifies the onset of a link failure in less than 1 ms typical, which goes beyond the IEEE 802.3 standard requirement of 750 ms ±10 ms (link master). In addition, the device adds a programmable threshold for applications where indication of even a potential link drop must be known at the microsecond level (<10 μs).

### Highlights

- EcoEthernet™ 2.0, with Energy Efficient Ethernet
- Fast Link Failure™ 2.0 with failure indication for commutator ring applications
- Widest voltage range, fully-compliant parallel MAC interface device
- Start of Frame sync for ingress and egress enables high accuracy calculation of latency (RGMII/RMII mode, VSC8541-03 only)
- Configurable drive strength on MAC interface enables better control of system-level EMI/EMC
- Synchronous Ethernet support and Ring Resiliency™

### Applications

- IoT applications such as digital signage, eHealth, and industrial grade switches for automation
- Consumer electronics such as CPE, UHD TV, media servers, and NAS
- Wireless backhaul, Hybrid Wi-Fi / LTE-U APs, 4G/5G Small Cells



Microsemi makes no warranty, representation, or guarantee regarding the information contained herein or the suitability of its products and services for any particular purpose, nor does Microsemi assume any liability whatsoever arising out of the application or use of any product or circuit. The products sold hereunder and any other products sold by Microsemi have been subject to limited testing and should not be used in conjunction with mission-critical equipment or applications. Any performance specifications are believed to be reliable but are not verified, and Buyer must conduct and complete all performance and other testing of the products, alone and together with, or installed in, any end-products. Buyer shall not rely on any data and performance specifications or parameters provided by Microsemi. It is the Buyer's responsibility to independently determine suitability of any products and to test and verify the same. The information provided by Microsemi hereunder is provided "as is, where is" and with all faults, and the entire risk associated with such information is entirely with the Buyer. Microsemi does not grant, explicitly or implicitly, to any party any patent rights, licenses, or any other IP rights, whether with regard to such information itself or anything described by such information. Information provided in this document is proprietary to Microsemi, and Microsemi reserves the right to make any changes to the information in this document or to any products and services at any time without notice.

# VSC8541

## Single Port Gigabit Ethernet Copper PHY with GMII/RGMII/MII/RMII Interfaces

### Superior PHY and Interface Technology

- 10/100/1000BASE-T Ethernet copper transceiver (IEEE 802.3ab compliant) with Microsemi exclusive non-TDR based VeriPHY™ cable diagnostics software enables testing without taking down link or impacting data bandwidth while in 1000BASE-T mode
- Patented line driver with low-EMI voltage mode and integrated line-side termination resistors
- WOL support using magic packets
- HP Auto-MDIX and manual MDI/MDIX support
- RGMII/GMII/RMII/MII MAC interface with widest voltage range support in the industry: 1.5 V, 1.8 V, 2.5 V, and 3.3 V (LVCMOS)
- Jumbo frame support up to 16 kilobytes with programmable synchronization FIFOs
- Additional internal FIFO located on ingress side enables support for EtherCAT® applications

### Synchronous Ethernet Support

- Recovered clock output with programmable clock squelch control and FLF indication (<1 ms typical) for ITU-T G.8261/Y.1361 compliant SyncE applications
- 1000BASE-T Ring Resiliency™ to switch between master and slave timing without dropping link
- Clock output squelch to inhibit clocks during auto-negotiation and no link status

### 1588v2 PTP System-Level Support (VSC8541-03 only)

- When in RGMII mode, SOF signal (for both ingress and egress) on line side along with synchronized 125 MHz clock enables a high-accuracy time stamping capability when used in conjunction with an appropriate 1588v2 time stamping engine

### Best-in-Class Power Consumption

- EcoEthernet™ 2.0 green energy efficiency with ActiPHY™, PerfectReach™, and IEEE 802.3az EEE
- Clause 45 registers to support IEEE 802.3az EEE and IEEE 802.3bf
- Fully optimized power consumption for all link speeds
- 10BASE-Te mode support enables even lower power consumption than 10BASE-T

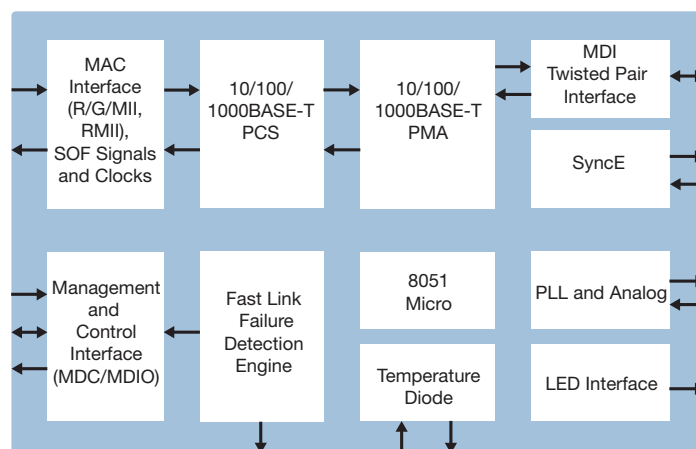
### Key Specifications

- Compliant with IEEE 802.3 (10BASE-T, 10BASE-Te, 100BASE-TX, 1000BASE-T)
- Supports GMII and RGMII (version 1.3), RMII (version 1.2), and MII at 1.5 V, 1.8 V, 2.5 V, and 3.3 V LVCMOS
- RGMII version 2.0 timing compliant
- Supports clocking from 25 MHz crystal or 25/50/125 MHz oscillator
- Microcontroller-free configurability through hardware strapping
- Optionally reports if a link partner is requesting inline Power over Ethernet (PoE and PoE+)
- Optional stand-alone capability supports even the most cost-sensitive Ethernet enabled designs
- Low alpha mold compound enables 80 SER FIT (VSC8541XMV-03 only)
- Devices support operating temperatures of -40 °C ambient to 125 °C junction or 0 °C ambient to 125 °C junction
- Available in 8 mm x 8 mm, 68-pin single-row QFN package

### Related Products

Visit [www.microsemi.com](http://www.microsemi.com) for information about these related products:

- VSC8531/VSC8531-03: Single Port Gigabit Ethernet Copper PHY with RGMII/RMII Interface
- VSC8540-03: Single Port Industrial Grade Fast Ethernet Copper PHY with Synchronous Ethernet, GMII/RGMII/MII/RMII Interface
- VSC8530-03: Single Port Industrial Grade Fast Ethernet Copper PHY with RGMII/RMII Interface



**Microsemi**

**Microsemi Corporate Headquarters**  
 One Enterprise, Aliso Viejo, CA 92656 USA  
 Within the USA: +1 (800) 713-4113  
 Outside the USA: +1 (949) 380-6100  
 Sales: +1 (949) 380-6136  
 Fax: +1 (949) 215-4996  
 email: [sales.support@microsemi.com](mailto:sales.support@microsemi.com)  
[www.microsemi.com](http://www.microsemi.com)

Microsemi Corporation (Nasdaq: MSCC) offers a comprehensive portfolio of semiconductor and system solutions for communications, defense & security, aerospace and industrial markets. Products include high-performance and radiation-hardened analog mixed-signal integrated circuits, FPGAs, SoCs and ASICs; power management products; timing and synchronization devices and precise time solutions, setting the world's standard for time; voice processing devices; RF solutions; discrete components; enterprise storage and communication solutions, security technologies and scalable anti-tamper products; Ethernet solutions; Power-over-Ethernet ICs and midspans; as well as custom design capabilities and services. Microsemi is headquartered in Aliso Viejo, Calif., and has approximately 4,800 employees globally. Learn more at [www.microsemi.com](http://www.microsemi.com).



Компания «ЭлектроПласт» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

Наши преимущества:

- Оперативные поставки широкого спектра электронных компонентов отечественного и импортного производства напрямую от производителей и с крупнейших мировых складов;
- Поставка более 17-ти миллионов наименований электронных компонентов;
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- Лицензия ФСБ на осуществление работ с использованием сведений, составляющих государственную тайну;
- Поставка специализированных компонентов (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Aeroflex, Peregrine, Syfer, Eurofarad, Texas Instrument, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

Помимо этого, одним из направлений компании «ЭлектроПласт» является направление «Источники питания». Мы предлагаем Вам помощь Конструкторского отдела:

- Подбор оптимального решения, техническое обоснование при выборе компонента;
- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



#### Как с нами связаться

**Телефон:** 8 (812) 309 58 32 (многоканальный)

**Факс:** 8 (812) 320-02-42

**Электронная почта:** [org@eplast1.ru](mailto:org@eplast1.ru)

**Адрес:** 198099, г. Санкт-Петербург, ул. Калинина, дом 2, корпус 4, литера А.