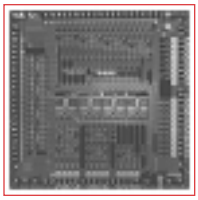


10/100 PHY TRANSCEIVER PRODUCT Selector Guide

Fast Ethernet based networks continue to be the workhorse for business communications. Broadcom has developed a portfolio of 10/100BASE-TX/FX PHY transceivers that provide innovative solutions for this market. These offerings include a full-featured Broadcom Brand and a cost-effective Value Brand.

DIGI-Φ™ TECHNOLOGY

The Broadcom Brand employs DSP PHY design and full-custom circuit design techniques to create a highly integrated and robust physical layer solution. DSP techniques allow Broadcom PHYs to achieve high interoperability and to exhibit robust performance across voltage, temperature, and process variations. Broadcom's Digi-Φ core is the world's most proven 10/100 PHY architecture, deployed worldwide in over 250 million Fast Ethernet ports. Since 1998, the same Digi-Φ architecture has been successfully implemented and proven in 0.5 micron, 0.35 micron, 0.22 micron, and 0.18 micron single-poly CMOS processes. The digital nature of Broadcom's Digi-Φ architecture is far more portable than competitive analog solutions, which must be redesigned as they migrate from one manufacturing process to another. It also allows for substantially higher test coverage, resulting in inherent advantages in manufacturing and outgoing quality. Broadcom's family of Digi-Φ transceivers offers the world's highest level of outgoing quality, well below 10 parts per million (PPM).

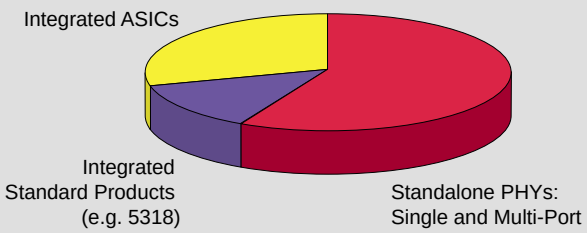
NETWORK TOLERANCE

Broadcom's latest Digi-Φ offerings include features that simplify the installation, debugging, and maintenance of Local Area Networks. One such feature is the HP Auto-MDIX capability, which automatically and transparently detects and corrects crossed cables. With HP Auto-MDIX, the installer does not need to know what Ethernet equipment is on the other end of the network cable: any cable can be used to connect to a switch, repeater, NIC, or router. In addition, Broadcom's latest Digi-Φs are designed and tested to withstand over 9kV of cable-sourced electrostatic discharge (CESD), a recently discovered phenomenon that occurs when an electrically charged network cable is plugged into networking equipment. The high tolerance for CESD protects the system from destruction caused by this electrical discharge during installation and cable insertion.

FULL FEATURE SET

In addition to robust performance, the Digi-Φ products come with features that ease design and manufacturing. Multi-port PHYs have both RMII and SMII interfaces, while the single-port solutions have RMII and MII. The latest Digi-Φs operate at 1.8V. In addition, the Digi-Φs provide full LED support and feature programmability and serial mode support in multi-port solutions. All of these features create options that make it easier for engineering to design a system solution. When the design is complete, IEEE 1149.1 (JTAG) Scan Chain support lowers the cost of putting the design through production.

OVER 250 MILLION PORTS



Broadcom's Digi-Φ core is ported easily from one product to the next, from one process to the next. Portability is the key to Broadcom's rapid product introduction in standalone PHYs and integrated switches. Broadcom is driving rapid growth in custom ASICs using customer owned technology integrated with the Digi-Φ core.

ALTI-Φ™ TECHNOLOGY

Broadcom's Value Brand targets cost-sensitive applications where basic Ethernet functionality is required. The Alti-Φ technology is fully compliant with IEEE 802.3/802.3u and features the industry's lowest power consumption at 3.3V. The optimized die size and process geometry for the Alti-Φ family of products enable an aggressive price structure. With fully compliant Ethernet functionality and an extremely low power consumption, the Alti-Φ family presents a compelling set of solutions for the basic Ethernet market.

DIGI-Φ AND ALTI-Φ PRODUCT MATRIX

Part Number	10/100 Ports	FX Ports	MAC Interface	Vdd	I/O Voltage	Package	Programmable LED	MDIO Clock Speed	Cable ESD	HP Auto-MDIX	Description
MULTI-PORT PHY TRANSCEIVERS											
BCM5228U	8	0	RMII/SMII	2.5V	2.5V/3.3V	208PQFP	Yes	25 MHz	9kV	X	Fully featured transceiver (less than 10 PPM). Includes JTAG, jumbo packets, Next Page, Serial LEDs, 160m cable reach, and cable diagnostics.
BCM5228F	8	8	RMII/SMII	2.5V	2.5V/3.3V	208PQFP	Yes	25 MHz	9kV	X	
BCM5228B	8	8	RMII/SMII	2.5V	2.5V/3.3V	256fpBGA	Yes	25 MHz	9kV	X	
BCM5226S	6	6	RMII	2.5V	2.5V/3.3V	128PQFP	Yes	25 MHz	9kV	X	For space-constrained hex applications (smallest footprint).
BCM5226R	6	6	RMII/SMII	2.5V	2.5V/3.3V	160PQFP		25 MHz	9kV	X	For RMII hex requirements.
BCM5218	8	8	RMII/SMII	3.3V	3.3V	256TBGA	No	12.5 MHz	9kV		BCM5228 recommended for new designs.
BCM5216	6	6	RMII/SMII	3.3V	3.3V	208PQFP	No	12.5 MHz	7.5kV		BCM5226 recommended for new designs.
BCM5214	4	0	RMII/SMII	3.3V	3.3V	128PQFP	No	12.5 MHz	9kV		
BCM5208R	4	0	MII	3.3V	3.3V	208PQFP	No	12.5 MHz	9kV		Full MII quad transceiver.
AC104	4	1	RMII	3.3V	3.3V	100QFP	No	25 MHz	4kV		Low cost quad.
SINGLE PHY TRANSCEIVERS											
BCM5222	2	0	MII	1.8V	3.3V	100PQFP/ 100fpBGA	Yes	25MHz	9kV	X	Fully featured Broadcom brand (less than 10PPM). Includes JTAG, 160m cable reach, Industrial temperature (-40° to 85°C).
BCM5221	1	1	MII/RMII	2.5V/3.3V	2.5V/3.3V	64TQFP/ 64fpBGA	No	25 MHz	9kV	X	
BCM5201	1	1	MII	3.3V	3.3V	64TQFP	No	12.5 MHz	6kV		BCM5221 recommended for new designs.
AC101	1	1	MII	3.3V	3.3V	80TQFP/ 100PQFP	No	25 MHz	4kV		Low cost single.

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