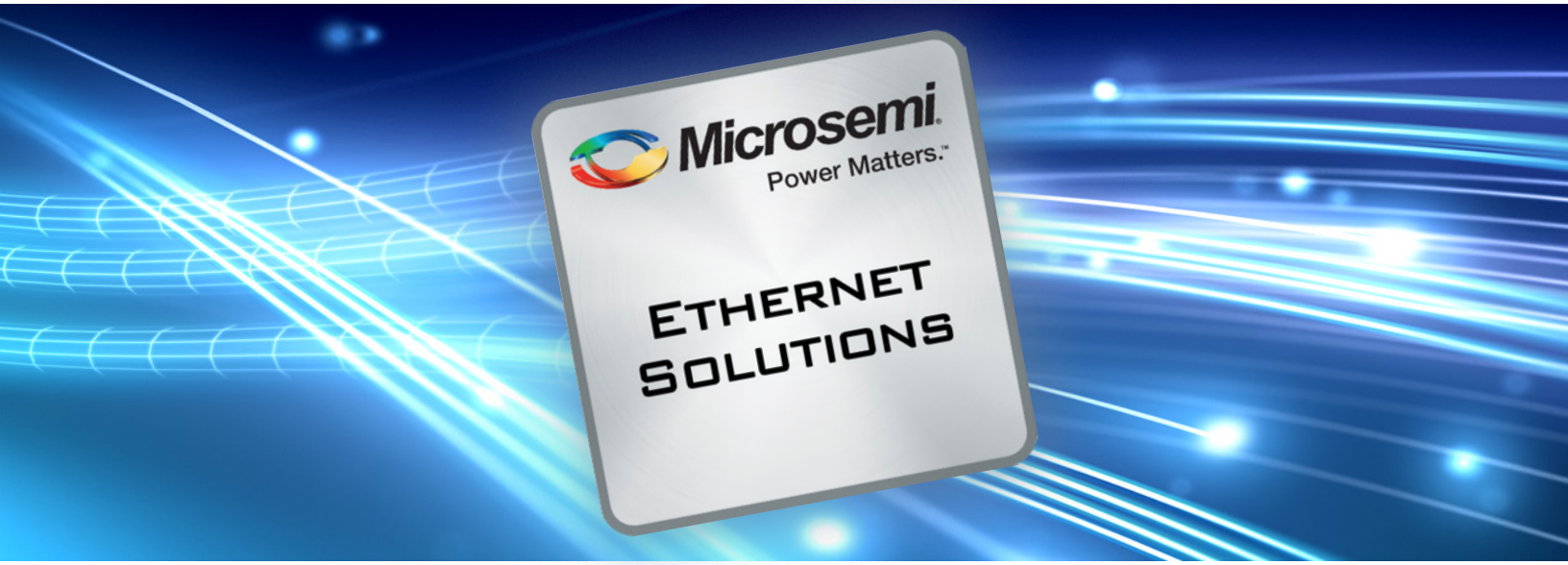
Advancing “Ethernet Everywhere” in Next-Generation Networks



Ethernet Switches

Ethernet PHYs

Ethernet Software

Ethernet IP Cores

Power over Ethernet

Timing ICs

Signal Conditioners & Crosspoint Switches

Microsemi
Power Matters.™

Ethernet & Power over Ethernet (PoE) Solutions

Ethernet is the dominant networking technology for IP traffic in carrier and enterprise networks, and the common denominator in diverse applications such as industrial process control, smart grid energy distribution, intelligent transportation, automotive, and storage.

Microsemi is an innovator in Ethernet technologies with a broad portfolio of Ethernet ICs, systems, software, IP, and ecosystem solutions for carrier, enterprise, and industrial IoT (IIoT) applications.

ICs and Systems: Microsemi's Ethernet solutions portfolio—which includes switches, PHYs, PoE, signal integrity, and timing and synchronization solutions—provides optimized, high-feature architectures for low-power, reliability, and scalability. Microsemi also offers indoor and outdoor PoE midspans/injectors, grandmasters, and network time servers.

Software: Microsemi's comprehensive software choices include IEEE 1588 timing, as well as mature, flexible, and fully supported Ethernet software stacks that reduce development costs and time-to-market.

IP: Microsemi offers a variety of IP technology cores for licensing and design services in process technologies, providing critical building blocks for ASIC, FPGA, or ASSP designs.

Ecosystem: Microsemi's ecosystem offers MEF CE 2.0-certifiable ODM turnkey solutions.

Microsemi Advantages

- Differentiated Ethernet switch silicon and software
- Secure Ethernet PHYs with end-to-end security over any network while preserving network timing
- Industry leader in IEEE 1588 with the most widely deployed PLLs and leading implementation of highest accuracy IEEE 1588v2 timing on Ethernet PHYs and switches
- Leading provider of end-to-end PoE ICs and midspans/injectors since 1999, with the broadest PoE product portfolio for indoor and outdoor deployments, including PoE ICs delivering power (PSE), receiving power (PD), and a wide range of PoE injectors (up to 95 W over a single Category 5/5E/6/6A/7 cable)
- Flexible signal conditioner and crosspoint switch solutions with outstanding channel equalization performance
- Industry's most comprehensive portfolio of SyncE timing devices, providing G.8262 compliance and ultra-low jitter for PHYs up to 100G

Carrier Networking

Microsemi's Ethernet networking portfolio addresses the technical and operational challenges of video bandwidth requirements in carrier networks. It is widely used in mobile access equipment (including base stations, small cells, fiber, and microwave wireless backhaul) and cloud access equipment such as network interface devices (NIDs) and Ethernet access devices (EADs).

Microsemi offers the industry's only service-aware switch architecture and turnkey solution for MEF CE 2.0 Carrier Ethernet equipment and appliances.

Enterprise Networking

Today's enterprise networks include broadband connections for the communication of voice and data outside the enterprise, and for access to cloud-based services. Microsemi's Ethernet networking portfolio supports enterprise network equipment such as blade server and data center switches and routers, cloud-managed switches, Layer 2 and Layer 3 managed Ethernet switches, high-density routers, HDTV video, storage, WLAN access points, and IP phones.

Microsemi also offers indoor and outdoor PoE midspans and PoE switches for multiple industries, including financial services, education, retail, healthcare, transportation, and government.

Industrial IoT Networking

The vastly higher networking and bandwidth requirements of IIoT networks have made Ethernet the upgrade path for modernizing heterogeneous network architectures.

Microsemi is the only IC, systems, and software provider with a power-optimized, flexible, and reliable industrial Ethernet networking portfolio that supports Ethernet interfaces and fieldbus protocols, and enables reliable and secure IIoT networks with a broad range of industrial Ethernet applications such as industrial process control, smart grid energy distribution, transportation, and automotive.

Process Control

Smart Energy

Intelligent Transportation

Automotive

Storage

Ethernet Solutions

Ethernet Switches, PHYs, Software & PoE

With over 300 million Gigabit Ethernet ports shipped, Microsemi is a global leader in Ethernet switch and physical layer IC technology and IP. As networks of all kinds have transitioned to Ethernet, Microsemi has been at the forefront of this transition with a growing portfolio of products with advanced features and efficient architectures that result in low-power, highly reliable performance, and scalability in voice, video, and data transmission.

Key Features

- Faster time-to-production with complete hardware and software solutions
- Ethernet switch solutions with up to 100 Gbps of bandwidth
- Small package footprint designs
- Industrial temperature range operation
- Complete IEEE 1588PTPv2-compliant 1GE and 10GE PHYs with nanosecond time stamping accuracy while performing IEEE 802.1AE 128-/256-bit strong MACsec packet encryption
- Solutions with low-alpha mold compound, improving overall SEU immunity
- PoE PSE and PD ICs for powering indoor and outdoor deployment scenarios

Ethernet Switches

Product	Ports*			PHYs		Interfaces						Ext Temp	SyncE/ 1588	Use Case
	1G	2.5G	10G	10G	1G	SGMII	RGMII	QSGMII	XAUI	SFI/XFI	PCIe			
VSC7511 Ocelot-4um	4				4	•					•	•		Lightly Managed
VSC7512 Ocelot-10um	10	2			4	•		•			•	•		Lightly Managed
VSC7420 SparX-III-10um	10	2			8	•						•		Lightly Managed
VSC7421 SparX-III-17um	17	2			12	•						•		Lightly Managed
VSC7422 SparX-III-25um	25	1			12	•		•				•		Lightly Managed
VSC7424 SparX-III-10	10				8	•								Managed
VSC7414 SparX-III-11	11	2				•					•	•	•	Managed
VSC7425 SparX-III-18	18				12	•		•						Managed
VSC7426 SparX-III-24	24				12			•						Managed
VSC7444 SparX-IV-44	26	16	2	2		•		•	R	•	•	•	•	Managed
VSC7427 SparX-III-26	26				12	•		•						Managed
VSC7442 SparX-IV-52	52					•		•			•	•	•	Managed
VSC7448 SparX-IV-80	52	24	4	4		•		•	R	•	•	•	•	Managed
VSC7449 SparX-IV-90	52	24	4	4		•		•	R	•	•	•	•	Managed
VSC7440 SparX-IV-34	10	6	2	2	2	•				•	•	•	•	Managed
VSC7513 Ocelot-8	8				4	•		•			•	•	•	Managed
VSC7514 Ocelot-10	10	2			4	•		•			•	•	•	Managed
VSC7431 E-StaX-III-28	28					•								Stacking
VSC7432 E-StaX-III-48	27	2	2			•			•					Stacking
VSC7434 E-StaX-III-68	29	4	4			•			•					Stacking
VSC7416 Serval Lite	6	2				•					•	•	•	Carrier Ethernet
VSC7423 Caracal Lite	7	2			5	•						•	•	Carrier Ethernet
VSC7436 Serval-2 Lite	10	6	2	2	2	•				•	•	•	•	Carrier Ethernet
VSC7428 Caracal-1	11	2			8	•						•	•	Carrier Ethernet
VSC7418 Serval-1	11	2				•					•	•	•	Carrier Ethernet
VSC7438 Serval-2	14	12	2	2		•		•	•	•	•	•	•	Carrier Ethernet
VSC7462 LynX-1	20	10	4			•			•			•	•	Carrier Ethernet
VSC7464 LynX-2	26	16	4	4		•		•	•	•	•	•	•	Carrier Ethernet
VSC7429 Caracal-2	26	2			12	•		•				•	•	Carrier Ethernet
VSC7460 Jaguar-1	31	10	4			•			•			•	•	Carrier Ethernet
VSC7468 Jaguar-2	52	24	4	4		•		•	•	•	•	•	•	Carrier Ethernet
WP3-SPO WP3 SuperLite	6	3				•	•				•	•	•	Carrier Ethernet
WP3SL WP3 SuperLite	6	3				•	•				•	•	•	Carrier Ethernet
WP3 WinPath3	16	6	2			•	•		•		•	•	•	Carrier Ethernet
WP4 WinPath4	24	12	4			•	•	•	•		•	•	•	Carrier Ethernet

Notes: *Denotes maximum ports excluding the NPI port. Shall not surpass the device's max available I/O bandwidth.
R denotes both RXAUI and XAUI support
1G integrated ports support dual media copper or fiber applications
VSC products are Ethernet switches
WP products are network processors

Ethernet Solutions

10G Ethernet PHYs

Product	Ports	Temp. Min.°C (Ambient)	Temp. Max. °C (Junction)	XGMII	XAUI	RXAUI	XFI	SFI	SFI-4	PON Burst Mode	OTN	SyncE	IEEE 1588	MACsec
VSC8257	4	–40	110				•	•				•	•	
VSC8258	4	–40	110				•	•				•	•	•
VSC8479	1	–40	90	•			•		•	•				
VSC8484	4	–40	105		•		•	•				•		
VSC8486	1	–40	95	•	•		•	•				•		
VSC8489	1/2	–40	110		•	•	•	•				•	•	
VSC8490	2	–40	110		•	•	•	•				•	•	•
VSC8491	1	–40	110		•	•	•	•				•	•	•
VSC8492	2	–40	110		•	•	•	•			•	•	•	
VSC8494	4	–40	110		•	•	•	•			•	•	•	
VSC8496	4	–40	110				•	•			•	•	•	

1G Ethernet PHYs

Product	Cu/Fiber Ports	Temp. Min.°C (Ambient)	Temp. Max. °C (Junction)	Q/SGMII	GMII/MII	RGMII/RMII	SyncE	IEEE 1588	MACsec
VSC8211	1/1	0	100	SGMII	GMII/MII	RGMII			
VSC8221	1/1	0	100	SGMII					
VSC8224	4/4	0	100			RGMII			
VSC8244	4/-	0	100			RGMII			
VSC8501	1/-	–40	125		GMII/MII	RGMII	•		
VSC8502	2/-	–40	125		GMII/MII	RGMII	•		
VSC8504	4/4	–40	125	QSGMII/SGMII			•		
VSC8512	12/4	–40	125	QSGMII/SGMII			•		
VSC8514	4/-	–40	125	QGMII			•		
VSC8522	12/-	–40	125	QGMII					
VSC8531	1/-	–40	125			RGMII/RMII			
VSC8541	1/-	–40	125		GMII/MII	RGMII/RMII	•		
VSC8552	2/2	–40	125	QSGMII/SGMII		RGMII	•		
VSC8562	2/2	–40	125	QSGMII/SGMII			•		•
VSC8564	4/4	–40	125	QSGMII/SGMII			•		•
VSC8572	2/2	–40	125	QSGMII/SGMII		RGMII	•	•	
VSC8574	4/4	–40	125	QSGMII/SGMII			•	•	
VSC8575	4/4	–40	125	QSGMII/SGMII			•	•	
VSC8582	2/2	–40	125	QSGMII/SGMII			•	•	•
VSC8584	4/4	–40	125	QSGMII/SGMII			•	•	•
VSC8658	8/8	0	90	SGMII					
VSC8662	2/2	–40	100	SGMII			•		
VSC8664	4/4	–40	100	SGMII			•		

Ethernet Solutions

Ethernet Software

Product		Description	Market	Application	Basic L2	Advanced L2	Protection	IEEE 1588	Carrier Ethernet	iCLI, JSON/ RPC, SNMP
eCOS	LINUX									
VSC6810SDK	VSC6818SDK	CEServices	Service Provider	Turnkey	•	•	•	•	•	•
VSC6815SDK	VSC6817SDK	IStaX	Industrial IoT	Turnkey	•	•	•	•		•
VSC6813SDK	VSC6816SDK	SMBStaX	Enterprise	Turnkey	•	•				•
VSC6812SDK	VSC6819SDK	WebStaX	Enterprise	Turnkey	•					
VSC6802API		Unified API		Development						
VSC6803API		Open API		Development						
VSC6811SDK		WebConfig		Turnkey	•					
VSC6825SDK		Unmanaged		Turnkey	•					
VSC6830SDK		Linux BSP		Development						

Ethernet IP Cores

Forward Error Correction (FEC)

Product	IP Type	Core Detail	NECG	Overhead
VSC9800	eFEC Core	40G CI-BCH-3	9.35 dB	6.7%
VSC9802	eFEC Core	100G CI-BCH-3	9.35 dB	6.7%
VSC9803	eFEC Core	100G CI-BCH-3	9.15 dB	6.7%
VSC9804	eFEC Core	100G CI-BCH-4	>10 dB	20%

Gigabit Ethernet PHY Cores

Product	IP Type	Type	Process
VSC9901	Gigabit Ethernet PHY Core	Soft Macro	65 nm
VSC9902	Gigabit Ethernet PHY Core	Hard Macro	65 nm
VSC9903	Gigabit Ethernet PHY Core	Hard Macro	65 nm
VSC9905	Gigabit Ethernet PHY Core	Hard Macro	40 nm
VSC9906	Gigabit Ethernet PHY Core	Soft Macro	65 nm
VSC9907	Gigabit Ethernet PHY Core	Hard Macro	65 nm

Gigabit Ethernet Switch Cores

Product	IP Type	Type	Core Detail
VSC9953	Ethernet Switch Core	Soft Macro	13 Gbps
VSC9954	AVB Switch Core Core	Soft Macro	13 Gbps
VSC9957	TSN Switch Core	Soft Macro	6 Gbps
VSC9958	Ethernet Switch Core	Soft Macro	68 Gbps

Power over Ethernet (PoE)

Microsemi has also been a leading provider of PoE midspans/injectors since 1999, offering the broadest range of PoE solutions delivering up to 95 W over a single Category 5/5E/6/6A/7 cable in both indoor and outdoor environments.

Indoor PoE Midspan/Injector

Watts per Port	Product	Number of Ports	Data Rate	Remotely Managed	Power Input	Warranty
15.4 W	PD-3501G/AC	1	1G		AC	1 Year
15.4 W	PD-3504G/AC	4	1G		AC	1 Year
15.4 W	PD-6506G/AC/M, PD-6512G/AC/M, PD-6524G/AC/M/F	6/12/24	1G	•	AC	Lifetime*
30 W	PD-EM-8100/AC *New 2.5G Mux*	1	2.5G		AC	1 Year
30 W	PD-9001-25GR/AC *New 2.5G PoE Midspan*	1	2.5G		AC	1 Year
30 W	PD-9001-10GR/AC *New 10G PoE Midspan*	1	10G		AC	1 Year
30 W	PD-9001GR/AT/AC	1	1G		AC	1 Year
30 W	PD-9004G/AC	4	1G		AC	1 Year
30 W	PD-9006G/ACDC/M, PD-9012G/ACDC/M, PD-9024G/ACDC/M/F	6/12/24	1G	•	AC & DC	Lifetime*
30 W	PD-5501G/12-24VDC	1	1G		DC	1 Year
30 W	PD-5524G/ACDC/M	24	1G	•	AC & DC	Lifetime*
60 W	PD-9501GR/AC	1	1G		AC	1 Year
60 W	PD-9501G/24VDC	1	1G		DC	1 Year
60 W	PD-9501G/48VDC	1	1G		DC	1 Year
60 W	PD-9506G/ACDC/M, PD-9512G/ACDC/M, PD-9524G/ACDC/M	6/12/24	1G	•	AC & DC	Lifetime*
60 W	PD-9501G/SFP/AC *New PoE Media converter*	1	1G		AC	1 Year
95 W	PD-9601G/AC	1	1G		AC	1 Year
95 W	PD-9606G/ACDC/M, PD-9612G/ACDC/M	6/12	1G	•	AC & DC	Lifetime*

* Limited lifetime warranty

Outdoor PoE Solutions

Watts per Port	Product	Number of Ports	Remotely Managed	Power Input	Warranty	Applications
60 W	PDS-104GO/AC/M	5 (1 SFP data input, 4 PoE outputs)	•	AC	3 Year	Outdoor switch with lightning protection
30 W	PDS-102GO/AC/M	3 (1 data input, 2 PoE outputs)	•	AC	3 Year	Outdoor switch with lightning protection
30 W	PDS9002GHO/AC	2		AC	3 Year	Outdoor PoE hub with lightning protection
30 W	PD-9001GO/AC	1		AC	3 Year	
60 W	PD-9501GO/AC	1		AC	3 Year	
60 W	PD-9501GO/12-24VDC	1		DC	3 Year	
60 W	PD-9501GO/48VDC	1		DC	3 Year	
90 W	PD-9601GO/AC	1		AC	3 Year	
30 W	PD-9001GR/SP/AC	1		AC	3 Year	Indoor use with integrated lightning protection
60 W	PD-9501GR/SP/AC	1		AC	3 Year	Indoor use with integrated lightning protection
0 W–95 W	PD-OUT/SP11	1 port surge protector			3 Year	Outdoor surge protection

Ruggedized/Industrial PoE Solutions

Watts per Port	Product	Number of Ports	Power Input	Warranty	Applications
30 W	PD-9001GI/DC	1	DC	5 Year	Industrial
60 W	PD-9501GI/DC	1	DC	5 Year	Industrial

All Microsemi PoE products support Gigabit data rates or higher

PoE PD Front-End ICs

Product	IC Type	PoE Type	IEEE Compliant	Max Power (W)	Max Current (A)	Max Channel Impedance (Ω)
PD70100ILD	Front end	Type 1 – AF – 15 W	IEEE 802.3af	15.4	0.45	0.6
PD70101ILQ	Combo: Front + PWM controller	Type 1 – AF – 15 W	IEEE 802.3af	15.4	0.45	0.6
PD70200ILD	Front end	Type 2 – AT – 30 W	IEEE 802.3at	51	1.2	0.6
PD70201ILQ	Combo: Front + PWM controller	Type 2 – AT – 30 W	IEEE 802.3at	51	1.2	0.6
PD70210ILD/PD70210AILD	Front end	PoH – 95 W	PoH	95	2	0.3
PD70211ILQ	Combo: Front + PWM controller	PoH – 95 W	PoH	95	2	0.3
PD70224ILQ-TR	Ideal diode bridge	PoH – 95 W	PoH	95	2	

Power over Ethernet (PoE)

PoE PSE Manager

Product	Ports	FETs	Sense Resistor	MCU Options	Host I/F Options	LED Driving Options	Standards Supported	Max PM System	Evaluation Boards
PD69208ILQ	8	Internal 0.2 Ω	Internal 0.1 Ω	PD69200-VVVSS Marvell ISSR	I²C UART SPI	CPLD Host	IEEE 802.3af 15.4 W IEEE 802.3at 30 W IEEE 802.3at 60 W PoH 95 W	96 Ports	PD-IM-7648 PD-IM-7648H
PD69204ILQ	4	Internal 0.2 Ω	Internal 0.1 Ω	PD69200-VVVSS Marvell ISSR	I²C UART SPI	CPLD Host	IEEE 802.3af 15.4 W IEEE 802.3at 30 W IEEE 802.3at 60 W PoH 95 W	96 Ports	PD-IM-7648 PD-IM-7648H
PD69108ILQ/ PD69108FILQ	8	Internal 0.3 Ω	External 0.36 Ω	PD39100X-0YYY PD69100Y-GGGG Marvell ISSR	I²C UART SPI	CPLD Host	IEEE 802.3af 15.4 W IEEE 802.3at 30 W IEEE 802.3at 60 W PoH 95 W	96 Ports	PD-IM-7548 PD-IM-7548H
PD69104ILQ	4	Internal 0.3 Ω	External 0.36 Ω	PD39100X-0YYY PD69100Y-GGGG Marvell ISSR	I²C UART SPI	CPLD Host	IEEE 802.3af 15.4 W IEEE 802.3at 30 W IEEE 802.3at 60 W PoH 95 W	92 Ports	Use PD69108 EVB
PD69104B1ILQ/ PD69104B1FILQ	4	Internal 0.3 Ω	External 0.36 Ω	Auto Mode	I²C UART	Direct Host	IEEE 802.3af 15.4 W IEEE 802.3at 30 W IEEE 802.3at 60 W PoH 95 W	4 Ports	PD-IM-7504B
PD69101ILQ	1	Internal 0.3 Ω	External 0.5 Ω	Auto Mode	SPI	Direct Host	IEEE 802.3af 15.4 W IEEE 802.3at 30 W IEEE 802.3at 60 W	2 Ports	PD-IM-7401
PD69012	12	External 0.1 Ω	External 0.5 Ω	PD69000XX-GGGG Marvell ISSR Auto Mode	I²C UART SPI	CPLD Host	IEEE 802.3af 15.4 W IEEE 802.3at 30 W IEEE 802.3at 60 W	96 Ports	PD-IM-7448E PD-IM-7448A
PD69008	8	External 0.1 Ω	External 0.5 Ω	PD69000XX-GGGG Marvell ISSR Auto Mode	I²C UART SPI	CPLD Host	IEEE 802.3af 15.4 W IEEE 802.3at 30 W IEEE 802.3at 60 W	88 Ports	PD-IM-7416A
PD64001	1	External 0.1 Ω	External 2 Ω	Auto Mode	none	Direct	IEEE 802.3af 15.4 W IEEE 802.3at 30 W IEEE 802.3at 60 W	1 Port	PD-IM-7301

PoE PSE Modules

Product	Ports	MCU	Host I/F Options	Standards Supported	Max PM System
PD67124M	24	Internal (Enhanced Master)	I²C UART SPI	IEEE 802.3af 15.4 W IEEE 802.3at 30 W IEEE 802.3at 60 W	96 Ports
PD67124S	24	PD67124M (Enhanced Slave)	I²C UART SPI	IEEE 802.3af 15.4 W IEEE 802.3at 30 W IEEE 802.3at 60 W	96 Ports
PD67112M	12	Internal (Enhanced Master)	I²C UART SPI	IEEE 802.3af 15.4 W IEEE 802.3at 30 W IEEE 802.3at 60 W	84 Ports
PD67108M	8	Internal (Enhanced Master)	I²C UART SPI	IEEE 802.3af 15.4 W IEEE 802.3at 30 W IEEE 802.3at 60 W	80 Ports
PD67124AM	24	Internal (Auto Master)	I²C	IEEE 802.3af 15.4 W IEEE 802.3at 30 W	48 Ports
PD67124AS	24	PD67124A (Auto Slave)	I²C	IEEE 802.3af 15.4 W IEEE 802.3at 30 W	48 Ports
PD67112A	12	Internal (Auto Standalone)	I²C	IEEE 802.3af 15.4 W IEEE 802.3at 30 W	12 Ports
PD67108A	8	Internal (Auto Standalone)	I²C	IEEE 802.3af 15.4 W IEEE 802.3at 30 W	8 Ports

Timing ICs

Timing ICs: From the Market Leader in SyncE

Microsemi provides both SyncE alone (with an easy migration path to IEEE 1588) or combined SyncE and IEEE 1588 for frequency and time alignment. The market leader in Synchronous Ethernet timing devices, Microsemi was the first to introduce Synchronous Ethernet PLLs in 2006. Microsemi now offers the industry's most comprehensive portfolio of SyncE timing devices, providing G.8262 compliance and ultra-low jitter for PHYs up to 100G.

SyncE for Timing Card

Product	Description	DPLLs / NCOs	BW (Hz)	Split XO Feature	Inputs	Input Frequency	Embedded PPS & EPP2S	Diff. Outputs	CMOS Outputs	Output Frequency	Low-Jitter APLLs	GP Clock Gen	Jitter (ps_{RMS})	Pkg Size (mm)
ZL30142	10 GbE Single SyncE and Telecom DPLL	1	01. m–890		3 SE	2k, N x 8K, SDH, SyncE		1	2	2k, N x 8K, SDH, SyncE	1	1	1.0	9 x 9
ZL30143	10 GbE Dual SyncE and Telecom DPLL	2	01. m–890		8 SE	2k, N x 8K, SDH, SyncE		2	6	2k, N x 8K, SDH, SyncE	1	2	1.0	9 x 9
ZL30161	10 GbE Any-Frequency SyncE PLL/NCO	1	0.1 m–1 k		11	1 Hz–750 MHz		6	6	1 Hz–750 MHz	3	0	0.6	13 x 13
ZL30162	10 GbE Any-Frequency Quad SyncE PLL/NCO	4	0.1 m–1 k		11	1 Hz–750 MHz		8	8	1 Hz–750 MHz	4	0	0.6	13 x 13
ZL30163	10 GbE Any-Frequency Dual SyncE PLL/NCO	2	0.1 m–1 k		11	1 Hz–750 MHz		8	8	1 Hz–750 MHz	4	0	0.6	13 x 13
ZL30164	10 GbE Any-Frequency Triple SyncE PLL/NCO	3	0.1 m–1 k		11	1 Hz–750 MHz		8	8	1 Hz–750 MHz	4	0	0.64	13 x 13
ZL30621	10 GbE and above Single SyncE PLL/NCO	1	0.1 m–10		2 D/SE + 1 SE	8 kHz–1250 MHz		3	6	<1 Hz–1035 MHz	1	0	0.25	5 x 10
ZL30622	10 GbE and above Single SyncE PLL/NCO	1	0.1 m–500		2 D/SE + 1 SE	8 kHz–1250 MHz		3	6	<1 Hz–1035 MHz	1	0	0.25	5 x 5
ZL30623	10 GbE and above Dual SyncE PLL/NCO	2	0.1 m–500		4 D/SE + 1 SE	8 kHz–1250 MHz		6	12	<1 Hz–1035 MHz	2	0	0.25	5 x 10
ZL30601	Single Channel Network Synchronizer	1	0.1 m–448	•	5 D/10 SE	0.5 Hz–900 MHz	•	6	14	0.5 Hz–900 MHz	2 or 3	1	0.25	10 x 10
ZL30602	Dual Channel Network Synchronizer	2	0.1 m–448	•	5 D/10 SE	0.5 Hz–900 MHz	•	6	14	0.5 Hz–900 MHz	2 or 3	1	0.25	10 x 10
ZL30603	Triple Channel Network Synchronizer	3	0.1 m–448	•	5 D/10 SE	0.5 Hz–900 MHz	•	6	14	0.5 Hz–900 MHz	2 or 3	1	0.25	10 x 10
ZL30604	Quad Channel Network Synchronizer	4	0.1 m–448	•	5 D/10 SE	0.5 Hz–900 MHz	•	6	14	0.5 Hz–900 MHz	2 or 3	1	0.25	10 x 10

SyncE for Line Card

Product	Description	DPLLs	BW (Hz)	Inputs	Input Frequency	Embedded PPS	Outputs (Diff/CMOS)	Output Frequency	Low-Jitter APLLs/GP Clock Gen	Jitter (ps_{RMS})	Pkg Size (mm)
ZL30151	10 GbE and above Single SyncE PLL	1	1–500	2 D/SE + 1 SE	1 kHz–650 MHz		0–3/0–6	<1 Hz–650 MHz	1/0	0.25	5 x 5
ZL30165	10 GbE Any-Frequency Quad SyncE PLL/NCO	4 or (4 NCO)	5–896	8 D/SE	1 kHz–750 MHz		8/8	1 kHz–750 MHz	4/0	0.63	13 x 13
ZL30166	10 GbE Any-Frequency Triple SyncE PLL/NCO	3 or (3 NCO)	5–896	9 D/SE + 2 SE	1 kHz–750 MHz		8/8	1 kHz–750 MHz	4/0	0.63	13 x 13
ZL30167	10 GbE Any-Frequency Dual SyncE PLL/NCO	2 or (2 NCO)	5–896	9 D/SE + 2 SE	1 kHz–750 MHz		8/8	1 kHz–750 MHz	4/0	0.63	13 x 13
ZL30611	SyncE Line Card	1 or (1 NCO)	14–448	5 D/10 SE	1 kHz–900 MHz	•	6/14	0.5 Hz–650 MHz	3/1	0.25	10 x 10
ZL30612	Dual SyncE Line Card	2 or (2 NCO)	14–448	5 D/10 SE	1 kHz–900 MHz	•	6/14	0.5 Hz–650 MHz	3/1	0.25	10 x 10
ZL30614	Quad SyncE Line Card	4 or (4 NCO)	14–448	5 D/10 SE	1 kHz–900 MHz	•	6/14	0.5 Hz–650 MHz	3/1	0.25	10 x 10

IEEE 1588 PLL

IEEE 1588 is a protocol-based synchronization mechanism useful for existing unaware networks where frequency syntonization is required. When coupled with physical layer technologies such as Synchronous Ethernet, IEEE 1588 can also provide robust time alignment. Microsemi offers the industry's most comprehensive and cost effective IEEE 1588 solution with a range of products offering ultra-low jitter for PHYs up to 100G and IEEE 1588 profiles.

IEEE 1588 for Timing Cards

Product	Description	DPLLs	BW (Hz)	Split XO Feature	Inputs	Input Frequency	Embedded PPS & EPP2S	Diff. Outputs	CMOS Outputs	Output Frequency	Low-Jitter APLLs	GP Clock Gen	Jitter (ps_{RMS})	Pkg Size (mm)
ZL30342	SyncE/SONET/SDH G.8262/ Stratum 3 & IEEE 1588 Packet G.8261 Synchronizer	1 NCO	0.1–890		3 SE	N x 8K, SyncE		1	2	N x 8K, SDH, SyncE	1-Int-N	1	1.0	9 × 9
ZL30343	SyncE/SONET/SDH G.8262/ Stratum 3 & IEEE 1588 Packet G.8261 Synchronizer	2 NCO	0.1–890		8 SE	N x 8K, SyncE		2	6	N x 8K, SDH, SyncE	1-Int-N	2	1.0	9 × 9
ZL30361	Single Channel Combined IEEE 1588 ToP & SyncE Device	1 NCO	0.1–896		11	1 Hz– 750 MHz		6	6	1 Hz– 750 MHz	3	0	0.6	13 × 13
ZL30362	Quad Channel Combined IEEE 1588 ToP & SyncE Device	4 NCO	0.1–896		11	1 Hz– 750 MHz		8	8	1 Hz– 750 MHz	4	0	0.6	13 × 13
ZL30363	Dual Channel Combined IEEE 1588 ToP & SyncE Device	2 NCO	0.1–896		11	1 Hz– 750 MHz		8	8	1 Hz– 750 MHz	4	0	0.6	13 × 13
ZL30364	Triple Channel Combined IEEE 1588 ToP & SyncE Device	3 NCO	0.1–896		11	1 Hz– 750 MHz		8	8	1 Hz– 750 MHz	4	0	0.64	13 × 13
ZL30721	Single Channel Combined IEEE 1588 ToP & SyncE Device	1 NCO	0.1–10		2 D/SE + 1 SE	8 kHz– 1250 MHz		3	6	<1 Hz– 1035 MHz	1	0	0.25	5 × 10
ZL30722	Single Channel Combined IEEE 1588 ToP & SyncE Device	1 NCO	0.1–500		2 D/SE + 1 SE	8 kHz– 1250 MHz		3	6	<1 Hz– 1035 MHz	1	0	0.25	5 × 5
ZL30723	Dual Channel Combined IEEE 1588 ToP & SyncE Device	2 NCO	0.1–500		4 D/SE + 1 SE	8 kHz– 1250 MHz		6	12	<1 Hz– 1035 MHz	2	0	0.25	5 × 10
ZL30701	Single Channel IEEE 1588 Synchronizer	1 or (1 NCO)	0.1 m–448	•	5 D/ 10 SE	0.5 Hz– 900 MHz	•	6	14	0.5 Hz– 900 MHz	2 or 3	1	0.25	10 × 10
ZL30702	Dual Channel IEEE 1588 Synchronizer	2 or (2 NCO)	0.1 m–448	•	5 D/ 10 SE	0.5 Hz– 900 MHz	•	6	14	0.5 Hz– 900 MHz	2 or 3	1	0.25	10 × 10
ZL30703	Triple Channel IEEE 1588 Synchronizer	3 or (3 NCO)	0.1 m–448	•	5 D/ 10 SE	0.5 Hz– 900 MHz	•	6	14	0.5 Hz– 900 MHz	2 or 3	1	0.25	10 × 10
ZL30704	Quad Channel IEEE 1588 Synchronizer	4 or (4 NCO)	0.1 m–448	•	5 D/ 10 SE	0.5 Hz– 900 MHz	•	6	14	0.5 Hz– 900 MHz	2 or 3	1	0.25	10 × 10

IEEE 1588 for Line Cards

Product	Description	DPLLs	BW (Hz)	Inputs	Input Frequency	Diff. Outputs	CMOS Outputs	Output Frequency	Low-Jitter APLLs	GP Clock Gen	Jitter (ps_{RMS})	Pkg Size (mm)
ZL30347	10 GbE Any Frequency Stratum 2/3E/3 DPLL	1	0.5 m–400	2 D/SE	Nx8k, SyncE	2	6	N x 8K, SDH, SyncE	1-Int-N	2	1.0	9 × 9
ZL30365	Quad Channel Combined IEEE 1588 ToP and SyncE Device	4 NCO	5–890	8 D/SE	1 Hz– 750 MHz	8	8	<1 Hz– 750 MHz	4	0	0.65	13 × 13
ZL30367	Dual Channel Combined IEEE 1588 ToP and SyncE Device	2 NCO	5–890	9 D/ SE+2 SE	1 Hz– 750 MHz	6	6	<1 Hz– 750 MHz	3	0	0.65	13 × 13

Clock Management

Microsemi's clock management portfolio includes devices for clock synthesis, frequency conversion, jitter attenuation, and fanout buffers to reduce bill of material costs and board space requirements, improve performance reliability, and simplify design complexity. Key features include industry-leading ultra-low jitter, high integration, wide frequency range, and highly programmable outputs.

Clock Synthesis Devices

Product	Independent Output Freq. Families	Inputs	Crystal Input Freq. Range	Xtal Osc. or CMOS Input Freq. Range	Diff Input Freq. Range	Typical Jitter (fs_{RMS})	NCO (ppb)	Outputs Diff/CMOS	Output Freq. Range	NV Memory	Host Bus	Pkg Size (mm)
ZL30250	1	1 XTAL/SE, 3 D/SE	25 M–60 M	9.72 M–300 M	9.72 M–1250 M	160[1]	0.01	0–3/0–6	<1 Hz–1035 M[2]	Ext EE[3]	SPI/I2C	5 × 5
ZL30251	1	1 XTAL/SE, 3 D/SE	25 M–60 M	9.72 M–300 M	9.72 M–1250 M	160[1]	0.01	0–3/0–6	<1 Hz–1035 M[2]	Int EE[3]	SPI/I2C	5 × 5
ZL30244	2	2 XTAL/SE, 6 D/SE	25 M–60 M	9.72 M–300 M	9.72 M–1250 M	160[1]	0.01	0–6/0–12	<1 Hz–1035 M[2]	Ext EE[3]	SPI/I2C	5 × 10
ZL30245	2	2 XTAL/SE, 6 D/SE	25 M–60 M	9.72 M–300 M	9.72 M–1250 M	160[1]	0.01	0–6/0–12	<1 Hz–1035 M[2]	Int EE[3]	SPI/I2C	5 × 10
ZL30260	2	1 XTAL/SE, 3D/SE	25 M–60 M	9.72 M–300 M	9.72 M–1250 M	170[1]	0.01	0–6/0–12	1 Hz–1035 M[2]	Ext EE[4]	SPI/I2C	8 × 8
ZL30261	2	1 XTAL/SE, 3 D/SE	25 M–60 M	9.72 M–300 M	9.72 M–1250 M	170[1]	0.01	0–6/0–12	1 Hz–1035 M[2]	Int EE[4]	SPI/I2C	8 × 8
ZL30262	2	1 XTAL/SE, 3 D/SE	25 M–60 M	9.72 M–300 M	9.72 M–1250 M	170[1]	0.01	0–10/0–20	1 Hz–1035 M[2]	Ext EE[4]	SPI/I2C	8 × 8
ZL30263	2	1 XTAL/SE, 3 D/SE	25 M–60 M	9.72 M–300 M	9.72 M–1250 M	170[1]	0.01	0–10/0–20	1 Hz–1035 M[2]	Int EE[4]	SPI/I2C	8 × 8
ZL30264	4	1 XTAL/SE, 3 D/SE	25 M–60 M	9.72 M–300 M	9.72 M–1250 M	170[1]	0.01	0–6/0–12	1 Hz–1035 M[2]	Ext EE[4]	SPI/I2C	8 × 8
ZL30265	4	1 XTAL/SE, 3 D/SE	25 M–60 M	9.72 M–300 M	9.72 M–1250 M	170[1]	0.01	0–6/0–12	1 Hz–1035 M[2]	Int EE[4]	SPI/I2C	8 × 8
ZL30266	4	1 XTAL/SE, 3 D/SE	25 M–60 M	9.72 M–300 M	9.72 M–1250 M	170[1]	0.01	0–10/0–20	1 Hz–1035 M[2]	Ext EE[4]	SPI/I2C	8 × 8
ZL30267	4	1 XTALI/SE, 3 D/SE	25 M–60 M	9.72 M–300 M	9.72 M–1250 M	170[1]	0.01	0–10/0–20	1 Hz–1035 M[2]	Int EE[4]	SPI/I2C	8 × 8

Rate Conversion/Jitter Attenuation Devices

Product	Independent Output Freq. Families	Inputs	Crystal Input Freq. Range	XTAL Osc. or CMOS Input Freq. Range	Diff Input Freq. Range	Typical Jitter (fs_{RMS})	DPLL Features: Ref. Switching/ Holdover/ Bandwidth	NCO (ppb)	Outputs Diff/CMOS	Output Freq. Range	NV Memory	Host Bus	Pkg Size (mm)
MAX24605	2	1 XTAL/SE, 3 D/SE	25 M–52 M	2 KHz–160 M	2 KHz–750 M	180[1]	Glitchless/ Digital Hold/ 4 Hz–400 Hz	<0.001	0–5/0–10	<1 Hz–750 M	Ext EE	SPI	10 × 10
MAX24610	2	1 XTAL/SE, 3 D/SE	25 M–52 M	2 KHz–160 M	2 KHz–750 M	180[1]	Glitchless/ Digital Hold/ 4 Hz–400 Hz	<0.001	0–10/0–20	<1 Hz–750 M	Ext EE	SPI	10 × 10
ZL30252	1	1 XTAL/SE, 3 D/SE	25 M–60 M	1 kHz–300 M	1 kHz–1250 M	160[1]	Glitchless/ Digital Hold/ 14 Hz–500 Hz	0.01	0–3/0–6	<1 Hz–1035 M[2]	Ext EE[3]	SPI/ I2C	5 × 5
ZL30253	1	1 XTAL/SE, 3 D/SE	25 M–60 M	1 kHz–300 M	1 kHz–1250 M	160[1]	Glitchless/ Digital Hold/ 14 Hz–500 Hz	0.01	0–3/0–6	<1 Hz–1035 M[2]	Int EE[3]	SPI/ I2C	5 × 5
ZL30254	1	1 XTAL, 2 SE	49.152 MHz	8 kHz or 25 MHz		<1 ps	Glitchless/ Digital Hold/ 25 Hz		2/0	125 MHz or 156.25 MHz		None	5 × 5
ZL30255	2	2 XTAL/SE, 6 D/SE	25 M–60 M	1 kHz–300 M	1 kHz–1250 M	160[1]	Glitchless/ Digital Hold/ 14 Hz–500 Hz	0.01	0–6/0–12	<1 Hz–1035 M[2]	Int EE[3]	SPI/ I2C	5 × 10

Abbreviation Key: D = Differential
SE = Single-ended (CMOS)
NCO = Numerically controlled oscillator
Ext EE = External EEPROM
Int EE = Internal EEPROM
Supply Voltage = 3.3 & 1.8
[1] Integer-mode APLL-only operation
[2] Spread spectrum capable
[3] Up to four configurations (pin-selectable)
[4] up to eight configurations (pin-selectable)
[5] 2.5 V only, 3.3 V only, 1.8 V & 2.5 V, 1.8 V & 3.3 V

Microsemi miSmartBuffer™ family provides 3-, 6-, or 10-output programmable fanout buffers with multi-format I/Os and per-output dividers. Applications include clock signal fanout, format conversion, frequency division, and skew adjustment in a wide variety of equipment types.

Precision Differential miSmartBuffers

Product	Input Type	Input Freq.	Crystal Driver	Diff Outputs LVPECL/ LVDS/HCSL	CMOS Outputs	Output Banks	Divider Value	Per-output Enable	Per-output Phase Adjust	OE Control	Host Bus	Internal Memory	Operating Temp. (°C)	Pkg	Pkg Size (mm)
ZL40250	3 Diff/ LVCMOS + Crystal	<1 GHz	•	0–6	0–12	6	32-bit	•	•	Per output by GPIO	SPI/I2C	ROM	–40 to 85	QFN-56	8 × 8
ZL40251												EEPROM			
ZL40252				0–10	0–20							ROM			
ZL40253												EEPROM			
ZL40255				0–3 400 mV/ 800 mV CML	0–6	3								QFN-32	5 × 5

Precision Differential Fanout Buffers

Product	Output Type	Inputs	Outputs	Input Termination	Switching	750 MHz Additive Jitter (fs_{RMS}), typ	Input Type	Input Coupling	Operating Frequency	Power Supply (V)	Operating Temp. (°C)	Pkg	Pkg Size (mm)
ZL40200	LVPECL	1	2	External		30–40	LVPECL LVDS HCSL CML	DC or AC	Up to 750 MHz	2.5 or 3.3	–40 to 85	QFN-16	3 × 3
ZL40201				Internal									
ZL40202			4	External									
ZL40203				Internal									
ZL40204			6	External								QFN-32	5 × 5
ZL40205				Internal									
ZL40206			8	External									
ZL40207				Internal									
ZL40224		2		External	Simple								
ZL40225				Internal									
ZL40208			6	External	Glitch Free	106–121							
ZL40209				Internal									
ZL40210			8	External									
ZL40211				Internal									
ZL40212	LVDS	1	2	External		78–138						QFN-16	3 × 3
ZL40213				Internal									
ZL40214			4	External									
ZL40215				Internal									
ZL40216			6	External								QFN-32	5 × 5
ZL40217				Internal									
ZL40218			8	External									
ZL40219				Internal									
ZL40226		2		External	Simple								
ZL40227				Internal									
ZL40220			6	External	Glitch Free	165–194							
ZL40221				Internal									
ZL40222			8	External									
ZL40223				Internal									

Signal Conditioners & Crosspoint Switches

The Ultimate in Flexibility & Performance

Microsemi offers a wide range of signal conditioner and crosspoint switch ICs across a range of port speeds, channel counts, and practical feature sets for a wide variety of Ethernet, SDI, HDMI, PCIe, SAS/SATA, and other standards-based or proprietary applications. Microsemi products deliver many industry-leading features such as very low jitter as well as autonomous equalization for demanding backplane, module host, and high port count Layer 1 switching applications. Microsemi's low-power, multi-protocol family of signal integrity devices includes both redrivers and retimers, and delivers the ultimate in flexibility and performance.

Key Features

- Data rates up to 16 Gbps
- Per channel adaptive input equalization and gain adjustment
- Per channel output multi-tap de-emphasis and drive level adjustment
- Power-saving green mode options including ability to power down unused ports

Product	Ports	Device Type	Temp. Min.°C (Ambient)	Temp. Max. °C (Junction)	Max Data Rate
VSC7109	Dual 2x2	Redriver	–40	110	3.5 Gbps
VSC7110	Dual 2x2	Redriver	–40	110	6.5 Gbps
VSC7111	Dual 2x2	Redriver	–40	110	11.5 Gbps
VSC7113	Dual 2x2	Redriver	–40	110	10.3 Gbps
VSC7223	4	Retimer	–40	90	16 Gbps
VSC7224	4	Retimer	–40	110	12.5 Gbps
VSC7227	12	Retimer	–40	100	14.5 Gbps
VSC8247	4	Retimer	0	95	11.3 Gbps
VSC8248	4 (bidirectional)	Retimer	0	95	11.3 Gbps
VSC3303	4x4	Redriver	–40	110	8.5 Gbps
VSC3304	4x4	Redriver	–40	100	8.5 Gbps
VSC3308	8x8	Redriver	–40	100	11.5 Gbps
VSC3312	12x12	Redriver	–30	110	8.5 Gbps
VSC3316	16x16	Redriver	–40	100	11.5 Gbps
VSC3340	40x40	Redriver	–40	100	6.5 Gbps

Why Choose Microsemi for Ethernet Networking?

Microsemi has extensive systems understanding and Ethernet networking expertise, solving general industry needs and our customers' specific challenges for over 30 years. With our industry-leading product portfolio of semiconductors, systems, software, IP, and ecosystem solutions, Microsemi solutions are engineered to help you design, deploy, or manage your Ethernet-based networks.

Contact your local Microsemi sales office today to find the right technologies and solutions for your Ethernet networking needs.

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