

Gennum Optical and Copper Portfolio:

TIAs

ROSAs

SINGLE-LANE CDRs

MULTI-LANE SIGNAL CONDITIONERS

DUAL-LANE CDRs

LASER DRIVERS

LIMITING AMPLIFIERS

CROSSPOINT SWITCHES

TOSAs

OPTICAL REFERENCE DESIGN KITS

COPPER REFERENCE DESIGN KITS

OPTICAL & IC PRODUCTS FOR HIGH-SPEED COMMUNICATIONS

2011 PRODUCT GUIDE - 2

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High Performance Optical and Copper Products

Gennum offers some of the industry's most innovative products for applications from 2.5G to 40G and beyond. Robust solutions that improve performance and reliability, simplify design, lower system costs and speed time to market.

Comprehensive Portfolio

Gennum's broad portfolio of high performance optical and copper ICs and components help you meet the demands of today's high-speed networks while facilitating improved performance, increased reliability and expediting your integration process. Our industry-proven products also give you a distinct advantage in design-cycle turn around and cost-effective manufacturing.

Gennum is also an active contributor in networking standards development. Combine that with the fact that we've shipped over 19 million CDRs and TIAs, and you get a feel for the sort of real-world experience in networking complexities and solution delivery we can bring to your designs.



Enabling High Performance, High-Speed:

- Receive Optical Sub-Assembly (ROSA) based on Gennum's Rchip Technology
- Full portfolio of integrated solutions to address all SFP+ and XFP link types
- Dual lane signal conditioners with integrated DML or EML driver
- Low power, reference-free CDRs
- Limiting Amplifiers (LA) which provide wideband, low noise post-amplification
- Transimpedance amplifiers (TIAs) that exceed the IEEE 10GbE Stressed Receiver Sensitivity (SRS) specifications
- High performance, low power laser drivers
- Industry's first single-chip 10G EPON Transceiver
- Industry's first Quad 10 Gb/s CDR, enabling long reach Infiniband® QDR, 40 GbE and 100 GbE applications
- Protocol-independent repeaters/redrivers
- SFP+ reference design kits for optical module and copper cable assemblies to decrease design time

Let's Build the Future Together

As networking requirements continue to evolve, so will we, working with you to provide solutions for tomorrow's networking challenges. One thing that won't change, however, is Gennum's commitment to being a reliable partner, providing innovative approaches that deliver unrivaled performance to your latest products.



Gennum Solutions

Technology Leadership for the Future of Optical Communications

TECHNOLOGIES

CDRs

Market leader in CDRs
Integrated solutions

ROSAs

Best in class sensitivity, based on our patented Rchip technology

TIAs

Proven reliability, with over 12 million sold

LASER DRIVERS & LIMITING AMPS

Only integrated solution among industry leaders

CROSSPOINTS

Extensive portfolio including world's biggest and fastest crosspoints

MARKETS

10G EPON

Industry's first fully integrated solution, now in pre-production
SPF+ reference design speeds time-to-market

16G FIBRE CHANNEL

Industry's first complete integrated IC solution for 16G Fibre Channel SFP+

40G – 100G ETHERNET

R&D efforts clearly focused on the future with products in development

UP TO 10G

Continuing to invest and develop products



Gennum

Emerging Technology

25-28Gb/s Reference-Free CDRs

Ultra Low Power, High Performance Reference-Free CDRs for Next-Generation 100Gb/s Networks

The GN2425 and GN2426 are Gennum's new clock and data recovery (CDR) retimers designed to support the implementation of 100Gb Ethernet optical modules. They are designed to handle 25Gb/s data streams within next-generation 100Gb/s pluggable fiber-optic modules, line cards and direct-attach copper cables.

FEATURES

- Enable OIF CEI-28G-VSR retimed interfaces by compensating for losses in the data transmission and resetting the jitter budget
- Optimized for best jitter performance at lowest power
- Designed specifically for the next-generation 100GbE CFP2 module form-factor
- Allow for the serializer and deserializer to be positioned outside of the CFP2 module enabling a simpler, lower power and lower cost solution
- Enable higher module density and faster serial bit rates

APPLICATIONS

- Fiber-optic modules
- Chip-to-module links
- Direct-attach copper cables
- Line cards

GN2425

Provides excellent output jitter performance for optimal interfacing to laser drivers, RF amplifiers or Mach-Zehnder modulator drivers.

GN2426

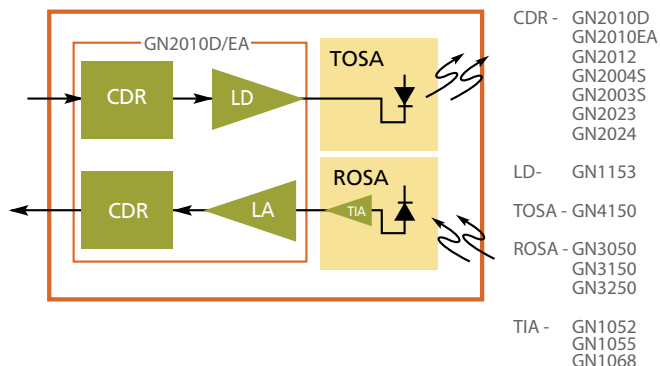
In the receive chain, the GN2426 removes jitter from the recovered optical signal, providing ample margin for line card receivers to recover the high-speed data stream from the module.

	GN2425	GN2426
Data Rate (Gb/s)	24.8 to 28.3	24.8 to 28.3
Input Stage	Equalizer	Limiting Amp

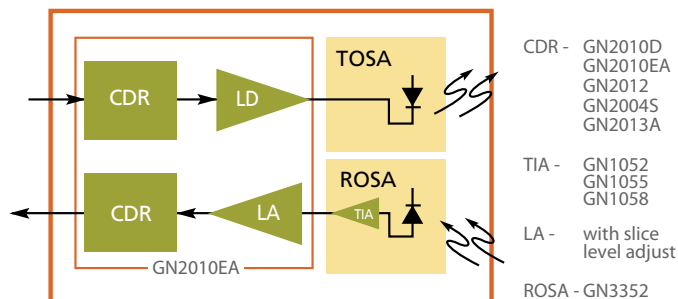
Optical Applications

Gennum offers a comprehensive selection of optical transceiver ICs and components for all 10GbE and OC-192 module form factors, as well as copper solutions for high-speed serial line card and backplane communications.

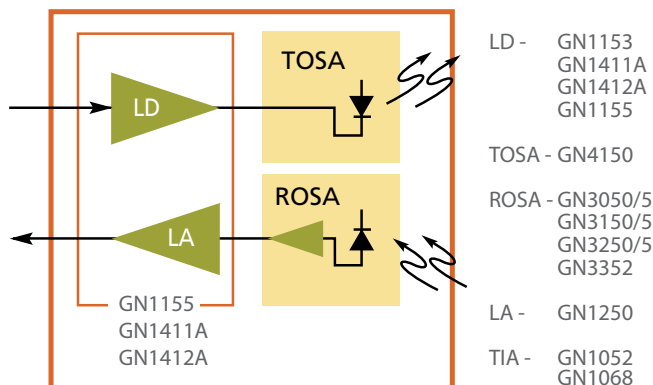
10G XFP Module for $\leq 40\text{Km}$ Applications



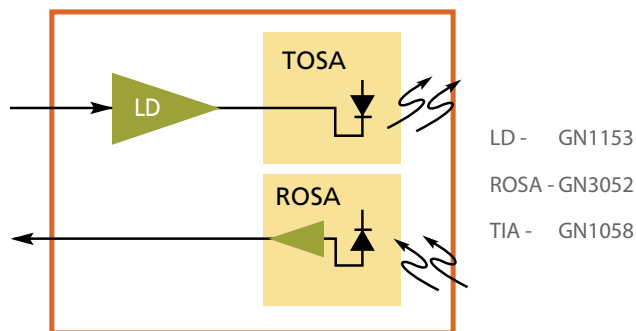
10G XFP Module for $\leq 80\text{Km}$ Applications



6/8/10G SFP+ Module Applications



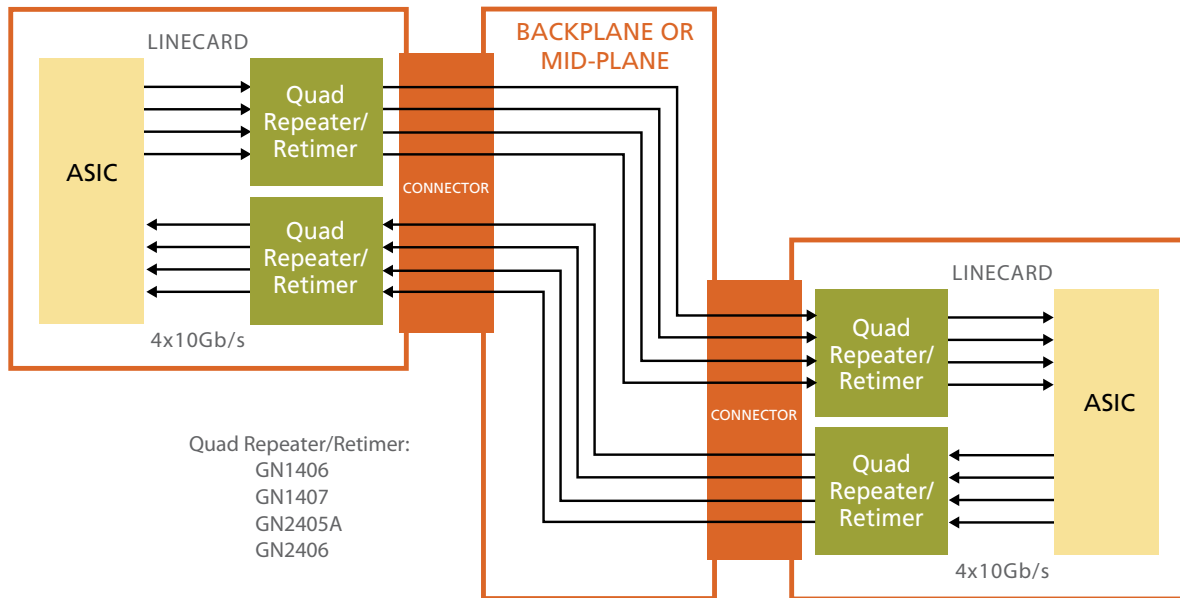
10G SFP+ LRM Module Applications



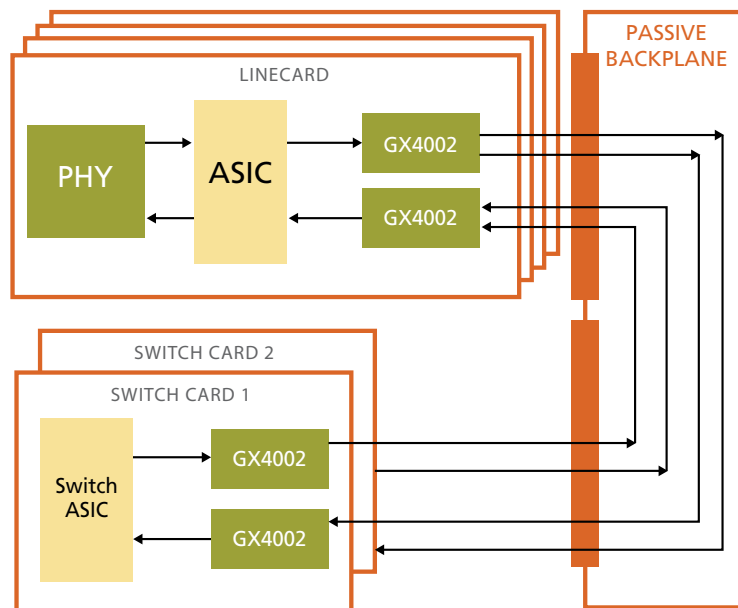
Copper Applications

Gennum offers a comprehensive selection of optical transceiver ICs and components for all 10GbE and OC-192 module form factors, as well as copper solutions for high-speed serial line card and backplane communications.

High-Speed Backplanes



Redundancy Switching



TIAs

Wideband, low noise transimpedance amplifiers (TIAs) for your optical communication applications.

Gennum offers a portfolio of fully integrated Silicon Germanium (SiGe) BiCMOS transimpedance amplifiers providing wideband, low noise pre-amplification of a current signal from a PIN photodiode or APD. Gennum's TIAs offer best-in-class performance in limiting, linear or automatic gain control versions for use in high performance optical receivers operating from 2.5 Gb/s to 14.3 Gb/s.

FEATURES

- Wideband, low noise TIAs
- Limiting, linear and AGC versions
- Decoupling capacitor on the supply is the only external component required

APPLICATIONS

- ITU/IEEE-based transmission systems
- 10 Gigabit Ethernet
- OC-48 to OC-192 fiber optic modules and line termination
- SONET/SDH-based transmission systems, test equipment and modules
- 8G and 16G Fibre Channel
- Serial data systems up to 14.3 Gb/s

GN1032

Automatic gain control TIA for 2.5 Gb/s applications.

GN1035

Automatic gain control TIA for 2.5 Gb/s applications providing excellent dynamic range performance.

GN1052

Limiting TIA providing excellent performance for serial systems operating up to 11.3 Gb/s.

GN1055

Limiting TIA with low power and slicing level adjustment for PIN and APD applications up to 11.3 Gb/s.

GN1056

Linear TIA providing excellent performance for APD applications up to 11.3 Gb/s.

GN1057

Automatic gain control TIA with high gain for 10GbE LRM and linear applications in APD-based receivers.

GN1058

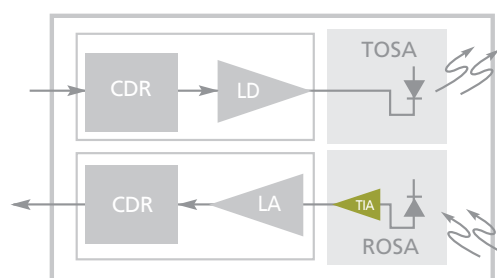
Automatic gain control TIA with high gain for 10GbE SFP+ applications.

GN1068

Multi-rate limiting TIA providing high gain and wideband performance for use in emerging 16G Fibre Channel applications.

GN7068

Limiting TIA for use in 10G PON applications in APD-based receivers.



	Overview	Data Rate (Gb/s)	Gain	BW (GHz)	Supply (V)	Noise	Applications
GN1032	2.5G AGC	to 2.5	3.6kΩ	2.05	+3.3	250nA	OC-48
GN1035	2.5G AGC	to 2.5	10kΩ	2.0	+3.3	250nA	OC-48
GN1052	10G Limiting	to 11.3	4kΩ	11.1	+3.3	1μA	10GbE, FC, OC-192
GN1055	10G Limiting with Slice Adjust	to 11.3	4kΩ	12	+3.3	995nA	10GbE, OC-192
GN1056	10G Linear	to 11.3	500/1kΩ	12	+3.3	1μA	OC-192
GN1057	10G AGC	to 11.3	4kΩ	12	+3.3	1μA	OC-192, 10GbE LRM
GN1058	10G AGC	to 11.3	4kΩ	12	+3.3	1μA	10GbE LRM for SFP+
GN7068	10G Limiting	to 11.3	3kΩ	12	+3.3	1μA	10G EPON ONU
GN1068	14G Limiting	to 14.3	6.75kΩ	12	+3.3	1.2μA	16GFC

ROSAs

Best-in-class receive optical sub-assemblies (ROSAs) based on Gennum's patented Rchip technology.

Gennum's complete line of PIN and APD ROSA products spans 850 nanometer (nm) to 1550 nm including limiting, linear and automatic gain control (AGC) functionality. Gennum PIN ROSAs operate at $+3.3V \pm 10\%$ and from $-40^{\circ}C$ to $+85^{\circ}C$, with highly accurate RSSI functionality and dynamic range capability. The ROSA products feature Gennum's external Rchip packaged in a fully compliant SC or LC type optical subassembly and are available with optional flex circuits.

Gennum's Rchip technology utilizes a die stack implementation of an optical receiver at the silicon level. The result is a ROSA with exceptional performance that is insensitive to assembly variations with maximum manufacturing yields.

FEATURES:

- Best-in-class stressed receiver sensitivity
- High gain to ensure exceptional crosstalk performance within the module
- Patented Rchip technology to ensure maximum module manufacturing yield
- Outstanding interoperability of our LRM ROSA with all leading EDC solutions for SFP+ modules

APPLICATIONS:

- 10GBASE-SR
- 10GBASE-LR
- 10GBASE-ER
- 10GBASE-LRM
- OC-192 SR-1
- OC-192 IR-2
- OC-192 IR-2
- 10G EPON
- 80 KM
- DWDM
- 8GFC and 10GFC

GN3050

10 km limiting ROSA provides excellent performance achieving -21dBm unstressed sensitivity. Ideal for 10GBASE-LR and SR-1 applications.

GN3052

AGC ROSA for 10 GbE LRM and linear applications. Delivers -12dBm OMA symmetric stressed sensitivity and interoperability with all leading EDC solutions for LRM.

GN3150

850 nm limiting ROSA is ideal for 10GBASE-SR and 8G Fibre Channel applications. Unstressed sensitivity of -15dBm OMA and stressed sensitivity of -13.5dBm OMA in a low cost package.

GN3250

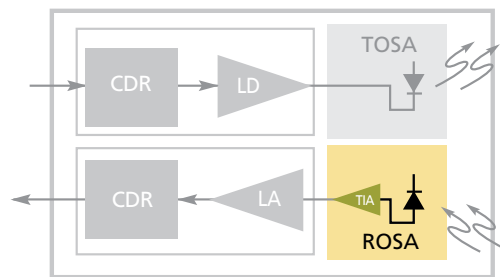
10/40 km XMD compatible limiting ROSA provides excellent -21dBm unstressed sensitivity and high optical return loss for 10GBASE-ER and IR-2 applications.

GN3352

10G APD ROSA with AGC TIA is ideal for both 80km limiting and DWDM applications requiring excellent OSNR performance. Typical sensitivity of -27dBm is XMD compatible package.

GN7468

10G APD TO-can with low power limiting TIA for 10G-EPON ONU BOSA applications. Typical sensitivity of -27dBm with very low power dissipation.



	Overview	Data Rate (Gb/s)	Gain	Supply	RSSI	Unstressed Sensitivity	Stressed Sensitivity	ORL
GN3150	SR Rchip Limiting	to 11.3	10kΩ	$+3.3V \pm 10\%$	Yes	-15dBm OMA	-13.5dBm OMA (BASE-SR)	-14dB
GN3050	10km Rchip Limiting	to 11.3	10kΩ	$+3.3V \pm 10\%$	Yes	-21dBm	-16.8dBm OMA (BASE-L)	-14dB
GN3250	40km Rchip Limiting	to 11.3	10kΩ	$+3.3V \pm 10\%$	Yes	-21dBm	-16.0dBm OMA (BASE-E)	-27dB min
GN3052	LRM Rchip AGC	to 11.3	10kΩ	$+3.3V \pm 10\%$	Yes	-17dBm OMA	-12dBm OMA (LRM Symmetric, 6" FR4)	-14dB
GN3352	APD with AGC	to 11.3	4kΩ	$+3.3V \pm 10\%$	VAPD	-27dBm		-27dB min
GN7468	APD with Limiting	to 11.3	4kΩ	$+3.3V \pm 10\%$	VAPD	-27dBm		-14dB

Single-Lane CDRs

Gennum's clock and data recovery (CDR) products offer the highest performance in the key areas of power consumption, receiver sensitivity, output jitter and jitter tolerance.

LOW POWER

Delivering the industry's lowest power single lane 10Gb/s CDR products enables small form factor module designs.

PIN COMPATIBILITY

With pin compatible solutions for 10GbE, SONET OC-192 and 8G, 10G and 16G Fibre Channel, overall design effort is reduced.

REFERENCE FREE

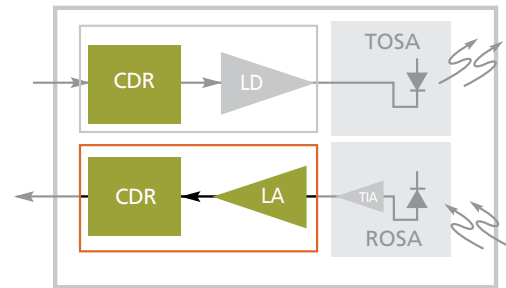
Reference-free CDRs ease the requirements at both the module and system level.

LEADING JITTER PERFORMANCE

With industry leading input jitter tolerance and output jitter, Gennum's CDRs help create an extremely robust design.

XFP AND SFP+ COMPATIBLE

Gennum's CDRs are fully XFP compliant. The low power, reference-free architecture also enables the use of CDRs in SFP+ modules.



	Data Rate (Gb/s)	Input Stage	Laser Driver	Slice Level Adjust	Loopback Support	Pin Compatibility	Supply (V)	Pkg	Applications
GN1113	8.5	Limiting Amplifier			Yes	GN2003S GN2023 GN2015	3.3	24 QFN	8GFC
GN1114	8.5	Equalizer	VCSEL		Yes	GN2014A GN2016	3.3	24 QFN	8GFC
GN2003S	9.95 - 11.3	Limiting Amplifier			Yes	GN1113 GN2023 GN2015	3.3	24 QFN	OC-192, 10GbE, 10GFC
GN2004S	9.95 - 11.3	Equalizer			Yes	GN2024	3.3	24 QFN	OC-192, 10GbE, 10GFC
GN2013A	9.95 - 11.3	Limiting Amplifier		Yes	Yes		3.3	24 QFN	OC-192, 10GbE, 10GFC
GN2014A	9.95 - 11.3	Equalizer			Yes	GN1114 GN2016	3.3	24 QFN	10GbE, 10GFC
GN2023	9.95 - 11.3	Limiting Amplifier			Yes	GN1113 GN2003S	3.3	24 QFN	10GbE, 10GFC
GN2024	9.95 - 11.3	Equalizer			Yes	GN2004S	3.3	24 QFN	10GbE, 10GFC
GN2015	14.025	Limiting Amplifier			Yes	GN1113 GN2003S GN2023	3.3	24 QFN	16GFC
GN2016	14.025	Equalizer	VCSEL		Yes	GN1114 GN2014A	3.3	24 QFN	16GFC

Dual-Lane CDRs

Gennum's dual-lane signal conditioners, with integrated VCSEL, DML or EML driver, offer the lowest power, smallest footprint solution for XFP and retimed SFP+ modules.

ENABLING SFP+ SONET

The GN2010D and GN2010EA enable a SONET compliant module in an SFP+ form factor. The integration of the laser driver enables a low power solution for SFP+. The high level of integration also delivers a small footprint solution to fit within the form factor. The 3.3V, reference clock free architecture simplifies the overall module design and saves cost.

FEATURE SET FOR DWDM APPLICATIONS

The GN2010/12 family has a rich feature set to enable optimal performance in DWDM applications. The features include slice level adjust, programmable peaking on the receive path input and sampling clock phase adjust.

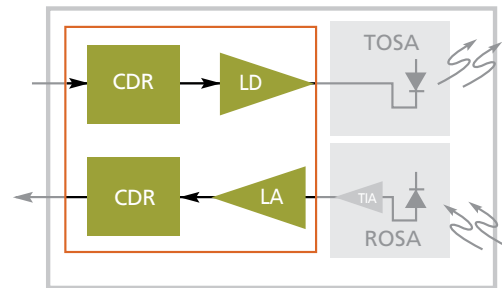
LOW COST, SMALL FOOTPRINT SOLUTION

By integrating the limiting amplifier, laser driver and receive and transmit CDR, the GN2010D, GN2010EA and GN2017A provide an optimal path for lower cost designs. The integrated APC loop and small number of external components also save cost. The high level of integration in a small, 5mmx5mm 32-QFN package enables use in very high density designs.

MULTI-RATE SUPPORT

The GN2010/12 family supports multiple data rates and standards in a single device. The device is able to retime data at 8.5Gb/s for 8G Fibre Channel and is able to retime anywhere from 9.95Gb/s to 11.7Gb/s to support standards such as 10GbE and OC-192 SONET.

The GN2017A supports 9.95 - 11.3 Gb/s and 14.025 Gb/s data rates enabling retimed, converged SFP+ modules for 16G FC and 10G FCoE applications.



	Data Rate (Gb/s)	Lanes	Laser Driver	Slice Level Adjust	Pin Compatibility	Supply (V)	Pkg	Applications
GN2010D	8.5 9.95-11.7	2 (1 Rx + 1 Tx)	DML	Yes	GN2010EA	3.3	32 QFN	XFP and SFP+ 10GbE, OC-192 and 8GFC
GN2010EA	8.5 9.95-11.7	2 (1 Rx + 1 Tx)	EML	Yes	GN2010D	3.3	32 QFN	XFP and SFP+ 10GbE, OC-192, 8GFC and DWDM
GN2012A	8.5 9.95-11.7	2 (1 Rx + 1 Tx)		Yes		3.3	32 QFN	XFP and SFP+ 10GbE, OC-192, 8GFC and DWDM
GN2017A	9.95-11.7 14.025	2 (1 Rx + 1 Tx)	VCSEL	No	GN2010X	3.3	32 QFN	16G FC, 10G FCoE

Multi-Lane Signal Conditioners

Gennum's multi-channel signal conditioners enhance the reach and robustness of high-speed serial links by compensating for transmission losses and re-setting the crosstalk and jitter budgets.

HIGH LEVEL OF INTEGRATION AND SMALL FOOTPRINT

Gennum's multi-channel signal conditioners are ideal for small form factor modules or dense backplane applications.

FULL PORTFOLIO

Gennum offers solutions for SAS, SATA, PCI Express, Infiniband® and Ethernet. Solutions are available with and without CDR functionality.

DRIVE LONG BACKPLANES OR CABLES

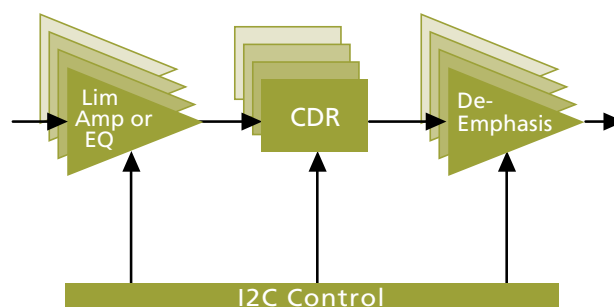
A combination of equalizer and CDR technology allows for an optimal solution to drive long, dense backplanes or cables at high speeds.

LOW POWER

Gennum's 5 Gb/s and higher CDR products require the lowest power in the industry, a key factor as densities increase.

RESET THE JITTER AND CROSSTALK BUDGETS

Using CDRs will reset the jitter budget, substantially increasing the robustness of the system and allowing for design flexibility. Using CDRs in multi-channel systems will also reset the crosstalk budget, an increasing concern at higher data rates.



	Data Rate (Gb/s)	Lanes	CDR	Ref Clock	Input Stage	De-emphasis	Pin Compatibility	Supply (V)	Pkg	Applications
GN1406	2.5 3.125 5.0, 6.25	4	Yes	Required	Equalizer (Program-mable)	Yes	GN1407	1.2 1.8	56 QFN	PCIe Gen 1/2, Infiniband® SDR/DDR, SATA 1/2/ SAS6G, SAS 1/2/SAS6G, SNAP-12, POP-4/LX-4/ CX-4/KX-4, XAUI/RXAUI and Rapid I/O
GN1407	1 - 8	4		N/A	Equalizer (Program-mable)		GN1406	1.2 1.8	56 QFN	PCIe Gen 1/2/3, Infiniband® SDR/DDR, SATA 1/2/SAS6G, SAS 1/2/SAS6G, SNAP-12, POP-4/LX-4/ CX-4/KX-4, XAUI/RXAUI and Rapid I/O
GN2405A	2.49 - 2.8 4.98 - 5.6 9.95 - 11.3	4	Yes	Not Required	Equalizer	Yes	GN2406	3.3	48 QFN	10GbE 40GbE, 100GbE Infiniband® SDR, DDR, QDR
GN2406	2.49 - 2.8 4.98 - 5.6 9.95 - 11.3	4	Yes	Not Required	Limiting Amp	Yes	GN2405A	3.3	48 QFN	10GbE 40GbE, 100GbE Infiniband® SDR, DDR, QDR

Laser Drivers and Limiting Amplifiers

High performance laser drivers and limiting amplifiers for optical communication

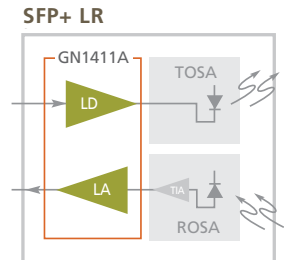
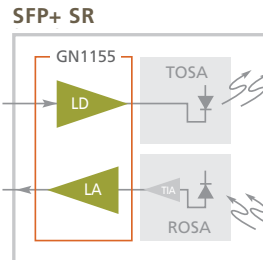
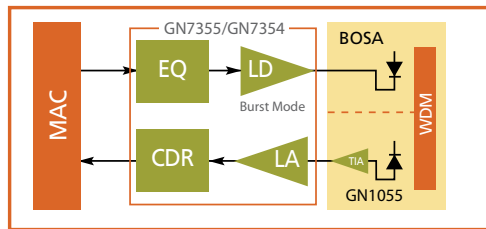
APPLICATIONS:

- 10G EPON , XG-PON1
- 8G Fibre Channel
- 9.95 Gb/s OC-192 and 10.70 Gb/s OC-192 with FEC
- 10.3 Gb/s Ethernet
- 10.52 Gb/s Fibre Channel
- 11.1 Gb/s Ethernet over SONET
- 11.3 Gb/s Fibre Channel with Forward Error Correction

GN7355 & GN7354

Industry's first single-chip 10G EPON transceiver for next generation PON systems. The GN7355 combines a 10G burst mode laser driver with a receive CDR and is targeted at 10G EPON symmetric applications.

The GN7354 is a pin-for-pin compatible, de-rated version of the GN7355 intended to address the 1.25Gb/s and 2.5Gb/s transmit data rate, and cost pressures of the 10Gb/s asymmetric EPON and XGPON applications.



LASER DRIVERS

	Overview	Data Rate (Gb/s)	Max Mod Current	Output termination (single ended)	Supply	Pkg.
GN7355	Burst Mode DFB + Receive LA & CDR	10.3		25 Ω	3.3V +5 V output stage (optional 3.3 V)	32 QFN
GN7354	Burst Mode DFB + Receive LA & CDR	Rx: 10.3 Tx: to 2.5		25 Ω	3.3V (3.3 V or 5V output stage)	32 QFN
GN1153B/C	DFB/FP Laser Driver	to 11.3	80mA	25 Ω	3.3V (optional 5V output stage)	24 QFN
GN1155	VCSEL Driver + Receive LA	to 11.3	12mA	50 Ω	3.3V	24 QFN
GN1411A	DFB/FB Laser Driver + Receive LA GN	to 11.3G	80mA	25 Ω	3.3V	32 QFN
GN1412A	EML Laser Driver + Receive LA	to 11.3G		50 Ω	3.3V	32 QFN

LIMITING AMPLIFIERS

	Overview	Data Rate (Gb/s)	Gain	BW	Supply	Noise Figure	Applications
GN1250L	10/14G Limiting Amp	to 14.5	33.7dB	14.7GHz	+3.3V	13dB	10GbE, OC-192, 8G and 16GFC

TOSAs

High performance 850 nm VCSEL-based transmit optical subassembly (TOSA) for optical communication applications up to 10 Gb/s

Gennum’s TOSA converts an electrical signal into optical power at data rates up to 10 Gb/s. It is designed for performance over extended operating temperature and power conditions with high reliability.

FEATURES

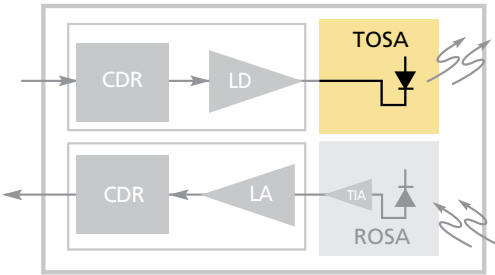
- Excellent performance over extended operational temperatures
- Modulation performance verification
- Very high reliability

APPLICATIONS

- 10 Gigabit Ethernet
- 8G Fibre Channel

GN4150

The Gennum 850 nm 10 Gb/s connectorized TOSA is designed for high-speed data communication applications in 10 Gb/s transceiver modules. The product utilizes a high performance, high reliability VCSEL, integrated in a custom hermetically sealed TO package aligned to a precision LC or SC housing. The device is configured for differential drive and a controlled impedance flex circuit is available for optimum performance.



	Overview	Data Rate (Gb/s)	Wave length	BW	Rise Time	Fall Time	Applications
GN4150	850nm 10G TOSA	to 10.3	850 nm	7.8GHz	45psec	50psec	10GbE, 8GFC

Optical Module Reference Design Kit

Improve the performance of your SFP+ design with Gennum’s industry-leading CDRs. The CDR-based reference design kit (RDK) demonstrates the superior results achievable with Gennum’s transceiver components.

FAST TIME TO MARKET

Gennum’s reference design kits include schematics, layout files and a design guide as well as attentive support from experienced applications engineers. This reduces both design costs and decreases time to market. This is further realized in the FTTx market where it is possible to re-use the 10G symmetric SFP+ design to address the 10G asymmetric market.

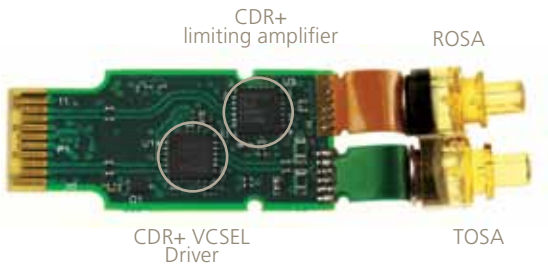
CDR ADVANTAGE

Using Gennum CDRs in an SFP+ module will result in a high performance, robust product. It can reduce overall system cost and power by eliminating the need for silicon on the line card. It also allows for longer trace lengths on the host and the use of lower cost PCB material. Module costs can also be reduced through higher yields.

SUPERIOR JITTER PERFORMANCE

By using a CDR in the receive path, the output jitter is low, regardless of the input to the module. Utilizing a CDR in the transmit path, the optical eye margin will be high, even with a degraded input.

RDK-SFP+-Optical00



RDK-SFP+-PON-S00
RDK-SFP+-PON-A00



Rx CDR+ Tx Burst Mode DML driver
GN7355 - Symmetric PON
GN7354 - Asymmetric PON

	Data Rate (Gb/s)	Connector Type	Wavelength (nm)	Applications
RDK-SFP+-Optical00	10.3	SFP+	850	10GbE
RDK-SFP+-PON-S00	10.3	SFP+	1577/ 1270	10G EPON
RDK-SFP+-PON-A00	10/1.25 10/2.5	SFP+	1577/1310 1577/ 1270	10G EPON Asym. XG-PON1

CDR-based Copper Cable Assembly Reference Design Kits

SFP+ copper cable assembly reference design kits (RDK) based on Gennum's industry leading 8 Gb/s and 10 Gb/s CDR technology.

FAST TIME TO MARKET

Gennum's reference design kits include schematics, layout files and a design guide as well as attentive support from experienced applications engineers. This reduces both design costs and time, to get to market quickly.

MULTIPLE EVALUATION OPTIONS

The RDKs are available in two forms, with or without attached cable. The version with attached cable can be immediately plugged into a system or test set up for quick evaluation. The version without attached cable comes as a set of two populated PCBs with housing, wherein any manufacturer's cable can be soldered onto the PCBs for a custom evaluation.

CDR ADVANTAGE

There are multiple advantages to a CDR-based copper cable assembly. By resetting the jitter budget in the connector, the cable's performance will be independent of the system it is plugged into. It allows for longer trace lengths and reduces overall crosstalk in the system.

Copper Cable Assembly RDK



	Data Rate (Gb/s)	Connector Type	Length (m)	Cable Gauge (AWG)	Full Action/ Half Action	Applications
RDK-SFP+-Copper00	8.5	SFP+	8	30	Full	8GFC
RDK-SFP+-Copper01	8.5	SFP+	15	24	Full	8GFC
RDK-SFP+-Copper02	10.3	SFP+	12	24	Full	10GbE, 10GFC
RDK-SFP+-Copper03	10.3	SFP+	7	30	Full	10GbE, 10GFC
RDK-SFP+-Copper04*	8.5	SFP+	N/A	N/A	Full	8GFC
RDK-SFP+-Copper05*	10.3	SFP+	N/A	N/A	Full	10GbE, 10GFC
RDK-QSFP-Copper00	40	QSFP	13	26	Full	10GbE, 40GbE, Infiniband® QDR
RDK-QSFP-Copper05	40	QSFP	13	26	Half	10GbE, 40GbE, Infiniband® QDR

*A version of the Reference Design Kit is available that contains two populated PCBs without housing, but no cable. It can be used to solder cable to the boards, if a cable type other than the one provided with the reference design kit is desired.

Crosspoint Switches

Extensive portfolio of solutions including the world's biggest and fastest crosspoints

Gennum's new crosspoint switches are the most feature-rich available. They are available in sizes from 2 x 2 up to 290 x 290 – the largest asynchronous, fully non-blocking crosspoint switch in the industry.

FEATURES

- Fastest data rates in the industry
- Lowest power in industry
- Advanced signal integrity features like input equalization, integrated CDRs and output de-emphasis to enable longer trace lengths and reset jitter and crosstalk
- Real-time performance monitoring
- Support for non-square router configurations

APPLICATIONS

- DWDM systems
- SONET/SDH/OTN systems
- 10GbE, Fibre Channel and InfiniBand® networks
- Redundancy switching
- Video routers and switchers

	Data Rate (Gb/s)	Size	CDR	Ref Clock	Input Stage	De-emphasis	Supply (V)	Pkg.	Applications
GX3290	3.5	290 x 290		Not Required	Equalizer	Yes	2.5, 1.8	2377 BGA	- DWDM systems - SONET/SDH/OTN systems - Video routers & switchers
GX3190	3.5	146 x 290		Not Required	Equalizer	Yes	2.5, 1.8	2377 BGA	- DWDM systems - SONET/SDH/OTN systems - Video routers & switchers
GX3246	3.5	290 x 146		Not Required	Equalizer	Yes	2.5, 1.8	2377 BGA	- DWDM systems - SONET/SDH/OTN systems - Video routers & switchers
GX3202	3.5	202 x 202		Not Required	Equalizer	Yes	2.5, 1.8	2377 BGA	- DWDM systems - SONET/SDH/OTN systems - Video routers & switchers
GX3146	3.5	146 x 146		Not Required	Equalizer	Yes	2.5, 1.8	2377 BGA	- DWDM systems - SONET/SDH/OTN systems - Video routers & switchers
GX3074	3.5	74 x 74		Not Required	Equalizer	Yes	2.5, 1.8	2377 BGA	- DWDM systems - SONET/SDH/OTN systems - Video routers & switchers
GX4002	up to 14	2x2	Yes	Not Required	Equalizer	Yes	3.3	32 QFN	- 16G FC, 10GbE backplane interconnects - Redundancy switching

Portfolio Summary

TIA's

	Overview	Data Rate (Gb/s)	Gain	BW (GHz)	Supply (V)	Noise	Applications
GN1032	2.5G AGC	to 2.5	3.6kΩ	2.05	+3.3	250nA	OC-48
GN1035	2.5G AGC	to 2.5	10kΩ	2.0	+3.3	250nA	OC-48
GN1052	10G Limiting	to 11.3	4kΩ	11.1	+3.3	1μA	10GbE, FC, OC-192
GN1055	10G Limiting with Slice Adjust	to 11.3	4kΩ	12	+3.3	995nA	10GbE, OC-192
GN1056	10G Linear	to 11.3	500/1kΩ	12	+3.3	1μA	OC-192
GN1057	10G AGC	to 11.3	4kΩ	12	+3.3	1μA	OC-192, 10GbE LRM
GN1058	10G AGC	to 11.3	4kΩ	12	+3.3	1μA	10GbE LRM for SFP+
GN7068	10G Limiting	to 11.3	3kΩ	12	+3.3	1μA	10G EPON ONU
GN1068	14G Limiting	to 14.3	6.75kΩ	12	+3.3	1.2μA	16GFC

ROSAs

	Overview	Data Rate (Gb/s)	Gain	Supply	RSSI	Unstressed Sensitivity	Stressed Sensitivity	ORL
GN3150	SR Rchip Limiting	to 11.3	10kΩ	+3.3V ± 10%	Yes	-15dBm OMA	-13.5dBm OMA (BASE-SR)	-14dB
GN3050	10km Rchip Limiting	to 11.3	10kΩ	+3.3V ± 10%	Yes	-21dBm	-16.8dBm OMA (BASE-L)	-14dB
GN3250	40km Rchip Limiting	to 11.3	10kΩ	+3.3V ± 10%	Yes	-21dBm	-16.0dBm OMA (BASE-E)	-27dB min
GN3052	LRM Rchip AGC	to 11.3	10kΩ	+3.3V ± 10%	Yes	-17dBm OMA	-12dBm OMA (LRM Symmetric, 6" FR4)	-14dB
GN3352	APD with AGC	to 11.3	4kΩ	+3.3V ± 10%	VAPD	-27dBm		-27dB min
GN7468	APD with Limiting	to 11.3	4kΩ	+3.3V ± 10%	VAPD	-27dBm		-14dB

SINGLE-LANE CDRs

	Data Rate (Gb/s)	Input Stage	Laser Driver	Slice Level Adjust	Loopback Support	Pin Compatibility	Supply (V)	Pkg	Applications
GN1113	8.5	Limiting Amplifier			Yes	GN2003S GN2023 GN2015	3.3	24 QFN	8GFC
GN1114	8.5	Equalizer	VCSEL		Yes	GN2014A GN2016	3.3	24 QFN	8GFC
GN2003S	9.95 - 11.3	Limiting Amplifier			Yes	GN1113 GN2023 GN2015	3.3	24 QFN	OC-192, 10GbE, 10GFC
GN2004S	9.95 - 11.3	Equalizer			Yes	GN2024	3.3	24 QFN	OC-192, 10GbE, 10GFC
GN2013A	9.95 - 11.3	Limiting Amplifier		Yes	Yes		3.3	24 QFN	OC-192, 10GbE, 10GFC
GN2014A	9.95 - 11.3	Equalizer			Yes	GN1114 GN2016	3.3	24 QFN	10GbE, 10GFC
GN2023	9.95 - 11.3	Limiting Amplifier			Yes	GN1113 GN2003S	3.3	24 QFN	10GbE, 10GFC
GN2024	9.95 - 11.3	Equalizer			Yes	GN2004S	3.3	24 QFN	10GbE, 10GFC
GN2015	14.025	Limiting Amplifier			Yes	GN1113 GN2003S GN2023	3.3	24 QFN	16GFC
GN2016	14.025	Equalizer	VCSEL		Yes	GN1114 GN2014A	3.3	24 QFN	16GFC

MULTI-LANE SIGNAL CONDITIONERS

	Data Rate (Gb/s)	Lanes	CDR	Ref Clock	Input Stage	De-emphasis	Pin Compatibility	Supply (V)	Pkg	Applications
GN1406	2.5 3.125 5.0, 6.25	4	Yes	Required	Equalizer (Program-mable)	Yes	GN1407	1.2 1.8	56 QFN	PCIe Gen 1/2, Infiniband® SDR/DDR, SATA 1/2/SAS6G, SAS 1/2/SAS6G, SNAP-12, POP-4/LX-4/CX-4/KX-4, XAUI/RXAUI and Rapid I/O
GN1407	1 - 8	4		N/A	Equalizer (Program-mable)		GN1406	1.2 1.8	56 QFN	PCIe Gen 1/2/3, Infiniband® SDR/DDR, SATA 1/2/SAS6G, SAS 1/2/SAS6G, SNAP-12, POP-4/LX-4/CX-4/KX-4, XAUI/RXAUI and Rapid I/O
GN2405A	2.49 – 2.8 4.98 – 5.6 9.95 – 11.3	4	Yes	Not Required	Equalizer	Yes	GN2406	3.3	48 QFN	10GbE 40GbE, 100GbE Infiniband® SDR, DDR, QDR
GN2406	2.49 – 2.8 4.98 – 5.6 9.95 – 11.3	4	Yes	Not Required	Limiting Amp	Yes	GN2405A	3.3	48 QFN	10GbE 40GbE, 100GbE Infiniband® SDR, DDR, QDR

DUAL-LANE CDRS

	Data Rate (Gb/s)	Lanes	Laser Driver	Slice Level Adjust	Pin Compatibility	Supply (V)	Pkg	Applications
GN2010D	8.5 9.95-11.7	2 (1 Rx + 1 Tx)	DML	Yes	GN2010EA	3.3	32 QFN	XFP and SFP+ 10GbE, OC-192 and 8GFC
GN2010EA	8.5 9.95-11.7	2 (1 Rx + 1 Tx)	EML	Yes	GN2010D	3.3	32 QFN	XFP and SFP+ 10GbE, OC-192, 8GFC and DWDM
GN2012A	8.5 9.95-11.7	2 (1 Rx + 1 Tx)		Yes		3.3	32 QFN	XFP and SFP+ 10GbE, OC-192, 8GFC and DWDM
GN2017A	9.95-11.7 14.025	2 (1 Rx + 1 Tx)	VCSEL	No	GN2010X	3.3	32 QFN	16G FC, 10G FCoE

LASER DRIVERS

	Overview	Data Rate (Gb/s)	Max Mod Current	Output termination (single ended)	Supply	Pkg.
GN7355	Burst Mode DFB + Receive LA + CDR	10.3		25 Ω	3.3V +5 V output stage (optional 3.3 V)	32 QFN
GN7354	Burst Mode DFB + Receive LA + CDR	Rx: 10.3 Tx: to 2.5		25 Ω	3.3V (3.3 V or 5V output stage)	32 QFN
GN1153B/C	DFB/FP Laser Driver	to 11.3	80mA	25 Ω	3.3V (optional 5V output stage)	24 QFN
GN1155	VCSEL Driver + Receive LA	to 11.3	12mA	50 Ω	3.3V	24 QFN
GN1411A	DFB/FB Laser Driver + Receive LA GN	to 11.3G	80mA	25 Ω	3.3V	32 QFN
GN1412A	EML Laser Driver + Receive LA	to 11.3G		50 Ω	3.3V	32 QFN

LIMITING AMPLIFIERS

	Overview	Data Rate (Gb/s)	Gain	BW	Supply	Noise Figure	Applications
GN1250L	10/14G Limiting Amp	to 14.5	33.7dB	14.7GHz	+3.3V	13dB	10GbE, OC-192, 8G and 16GFC

TOSAs

	Overview	Data Rate (Gb/s)	Wave length	BW	Rise Time	Fall Time	Applications
GN4150	850nm 10G TOSA	to 10.3	850 nm	7.8GHz	45psec	50psec	10GbE, 8GFC

OPTICAL REFERENCE DESIGN KITS

	Data Rate (Gb/s)	Connector Type	Wavelength (nm)	Applications
RDK-SFP+-Optical00	10.3	SFP+	850	10GbE
RDK-SFP+-PON-S00	10.3	SFP+	1577/ 1270	10G EPON
RDK-SFP+-PON-A00	10/1.25 10/2.5	SFP+	1577/1310 1577/ 1270	10G EPON Asym. XG-PON1

COPPER REFERENCE DESIGN KITS

	Data Rate (Gb/s)	Connector Type	Length (m)	Cable Gauge (AWG)	Full Action/ Half Action	Applications
RDK-SFP+-Copper00	8.5	SFP+	8	30	Full	8GFC
RDK-SFP+-Copper01	8.5	SFP+	15	24	Full	8GFC
RDK-SFP+-Copper02	10.3	SFP+	12	24	Full	10GbE, 10GFC
RDK-SFP+-Copper03	10.3	SFP+	7	30	Full	10GbE, 10GFC
RDK-SFP+-Copper04*	8.5	SFP+	N/A	N/A	Full	8GFC
RDK-SFP+-Copper05*	10.3	SFP+	N/A	N/A	Full	10GbE, 10GFC
RDK-QSFP-Copper00	40	QSFP	13	26	Full	10GbE, 40GbE, Infiniband® QDR
RDK-QSFP-Copper05	40	QSFP	13	26	Half	10GbE, 40GbE, Infiniband® QDR

* Please see Copper RDK page for explanation

CROSSPOINT SWITCHES

	Data Rate (Gb/s)	Size	CDR	Ref Clock	Input Stage	De-emphasis	Supply (V)	Pkg.	Applications
GX3290	3.5	290 x 290		Not Required	Equalizer	Yes	2.5, 1.8	2377 BGA	- DWDM systems - SONET/SDH/OTN systems - Video routers & switchers
GX3190	3.5	146 x 290		Not Required	Equalizer	Yes	2.5, 1.8	2377 BGA	- DWDM systems - SONET/SDH/OTN systems - Video routers & switchers
GX3246	3.5	290 x 146		Not Required	Equalizer	Yes	2.5, 1.8	2377 BGA	- DWDM systems - SONET/SDH/OTN systems - Video routers & switchers
GX3202	3.5	202 x 202		Not Required	Equalizer	Yes	2.5, 1.8	2377 BGA	- DWDM systems - SONET/SDH/OTN systems - Video routers & switchers
GX3146	3.5	146 x 146		Not Required	Equalizer	Yes	2.5, 1.8	2377 BGA	- DWDM systems - SONET/SDH/OTN systems - Video routers & switchers
GX3074	3.5	74 x 74		Not Required	Equalizer	Yes	2.5, 1.8	2377 BGA	- DWDM systems - SONET/SDH/OTN systems - Video routers & switchers
GX4002	up to 14	2x2	Yes	Not Required	Equalizer	Yes	3.3	32 QFN	- 16G FC, 10GbE blackplane interconnects - Redundancy switching

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