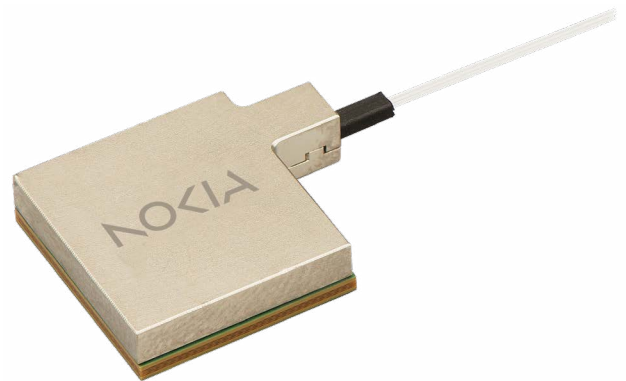


Nokia CSTAR Coherent Optical Engines

Nokia's CSTAR family of coherent silicon photonic optical engines provide a compact, efficient optical front-end solution for modern 100G – 400G coherent optics modules. Ideal for use in QSFP-DD, OSFP, and CFP2-DCO pluggable modules, as well as in fixed optics transponder cards, Nokia CSTAR engines provide a fully integrated coherent optical subassembly (COSA) supporting metro to long-haul applications.

The advancements in coherent optics and digital signal processors has enabled 400ZR/ZR+ coherent line optics in small QSFP-DD and CFP2-DCO pluggable optics. The QSFP-DD is ideal for carriers who want to install coherent line optics directly into their router line cards for access, metro to regional applications. The coherent optical subassembly (COSA) is key to the performance and low power operation of 400ZR/ZR+ modules



Benefits

- Fully integrated coherent front-end optics, including SiPh modulator, drivers, and TIAs
- Supports 100G – 400G operation
- Nokia in-house developed RFICs (TIAs, Drivers), co-designed with the SiPh photonic integrated circuit (PIC)
- Co-packaged multi-chip module for optimized performance and size
- SiPh optics leveraging high volume CMOS and MCM processes, in a compact, non-hermetic BGA package

Applications

- Nokia CSTAR coherent optics are optimized for 100G - 400G applications
- CSTAR is a COSA designed for use in QSFP-DD, OSFP, and CFP2-DCO optical modules
- Data center interconnect (DCI) applications
- The simple addition of DSP and external laser provides a complete coherent transceiver solution
- Multiple CSTAR versions available

Product description

The Nokia CSTAR product family consists of the CSTAR-200+, CSTAR-400, and CSTAR-400 Metro. CSTAR coherent optical engines are optimized for QSFP-DD, OSFP, and CFP2-DCO pluggable optics.

Each CSTAR includes a SiPh dual polarization IQ modulator, a SiPh integrated intradyne receiver, modulator drivers and transimpedance amplifiers (TIA) in a multi-chip module. With the addition of a DSP and external laser, CSTAR engines provide a complete 100G - 400G coherent transceiver solution.

The CSTAR-200+ is designed for 100G (QPSK) and 200G (16QAM) applications operating up to 34 GBaud.

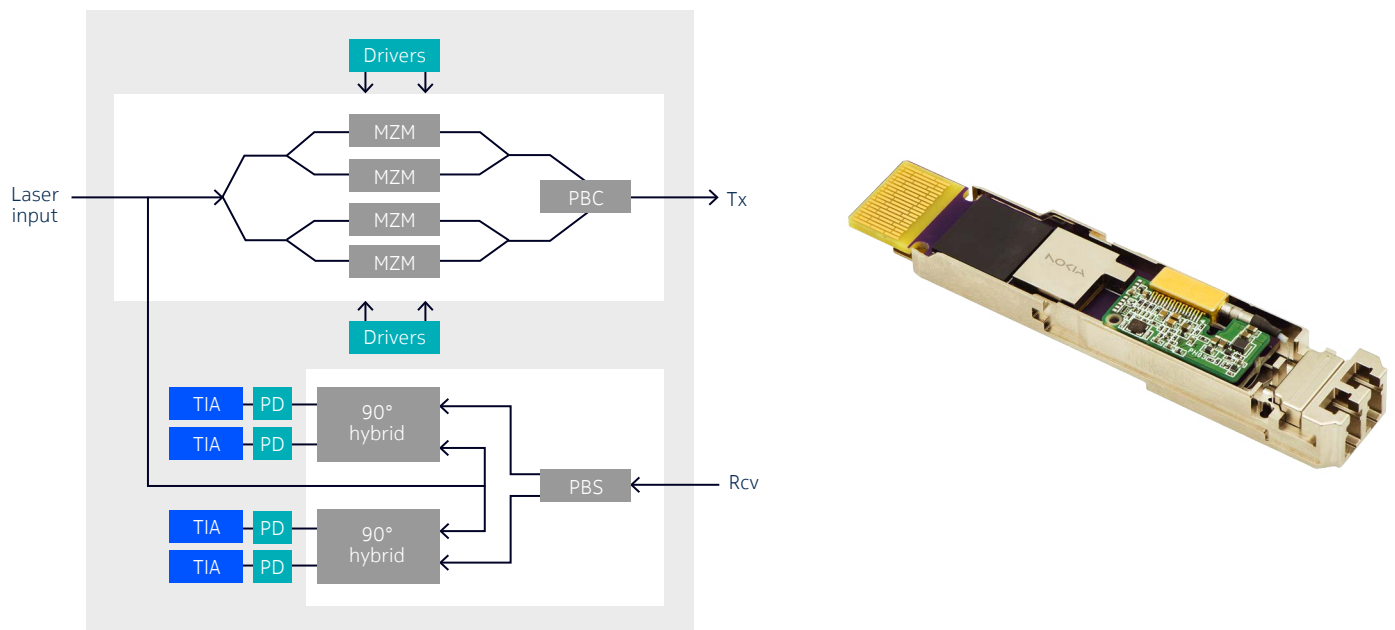
The CSTAR-400 Metro is designed for multi-haul applications, supporting 100G - 400G wavelengths operating at 64 - 67 GBaud, with multiple modulation options (QPSK, 8QAM, 16QAM).

The CSTAR-400 is targeted for OIF compliant 400ZR applications supporting 400G wavelengths using 16QAM modulation and optimized for use in QSFP-DD modules.

The small size and low power consumption provide the optimal solution for use in coherent optical modules. As an industry leader in silicon photonics and MCM technologies, Nokia develops the silicon photonic integrated circuit (PIC), and RFICs in-house, ensuring the drivers and TIAs are closely matched and optimized to the modulator and receiver.

The same coherent optics used in Nokia industry leading transponders and optical interfaces are now available for integration into 400ZR and 400ZR+ QSFP-DD, OSFP, and CFP2-DCO modules.

Figure 1. Nokia CSTAR diagram



CSTAR	Part #	Description
CSTAR 200+	3KC93830AC	CSTAR2p, SiPh coherent optics, 100G - 200G
CSTAR 400	3KC93831AE	CSTAR4, SiPh coherent optics, 400G
CSTAR 400 Metro	3KC93831AF	CSTAR4M, SiPh coherent optics, 100G - 400G



Technical specifications

Specifications	CSTAR 200+	CSTAR 400 Metro	CSTAR 400
Wavelength capacities	100G / 200G	100G – 400G	400G
Target module	-	CFP2-DCO	QSFP-DD
Target application	-	400ZR+, OpenZR+, OpenROADM	400ZR
Modulation	QPSK/16QAM	QPSK/8QAM/16QAM	16QAM
Baud rate	34 GBaud	64 – 67 Gbaud	~ 60 Gbaud
Operating frequency	191.2 – 196.1 THz	191.2 – 196.1 THz	191.2 – 196.1 THz
Case temp	-5°C to 85°C	-5°C to 85°C	-5°C to 85°C

About Nokia

At Nokia, we create technology that helps the world act together.

As a B2B technology innovation leader, we are pioneering networks that sense, think and act by leveraging our work across mobile, fixed and cloud networks. In addition, we create value with intellectual property and long-term research, led by the award-winning Nokia Bell Labs.

Service providers, enterprises and partners worldwide trust Nokia to deliver secure, reliable and sustainable networks today – and work with us to create the digital services and applications of the future.

Nokia operates a policy of ongoing development and has made all reasonable efforts to ensure that the content of this document is adequate and free of material errors and omissions. Nokia assumes no responsibility for any inaccuracies in this document and reserves the right to change, modify, transfer, or otherwise revise this publication without notice.

© 2023 Nokia

Nokia OYJ
Karakaari 7
02610 Espoo
Finland
Tel. +358 (0) 10 44 88 000

Document code: (August) CID212759