

**TECHNOLOGIE OPTIC.CA INC.****ACM762NB-11100S****100 Gigabit QSFP28 LR4 Optical Transceiver**

4×25G LAN-WDM · 1295–1309 nm · Single-mode (G.652) · 10 km · Duplex · Optic.ca LC Q28-LR4-NT-OC

The Optic.ca ACM762NB-11100S is a 100 Gigabit Ethernet QSFP28 transceiver engineered for long-reach links over single-mode fiber in data-center interconnect, 100G aggregation, and client-side telecom environments. Four cooled LAN-WDM EML lanes at 1295.56, 1300.05, 1304.58, and 1309.14 nm are multiplexed onto a single duplex-LC fiber pair, delivering reliable 100 Gb/s (4×25.78 Gb/s) transport to 10 km over G.652 fiber, and the module is designed for seamless interoperability with standards-compliant 100GBASE-LR4 host ports, with full validation against NETGEAR® switching platforms. Each unit is individually serialized and validated for host platform compatibility prior to shipment, factory-coded and traffic-tested, with full SFF-8636 digital diagnostics, and is backed by the Optic.ca lifetime warranty.

Key Features

- 100GBASE-LR4 compliant per IEEE 802.3ba (Clause 88)
- 100 Gb/s aggregate over 4×25.78 Gb/s LAN-WDM lanes, multiplexed to a single duplex-LC fiber pair
- Cooled 4×25G LAN-WDM EML TOSA (1295.56 / 1300.05 / 1304.58 / 1309.14 nm) and 4×25G PIN ROSA
- Reach up to 10 km over G.652 single-mode fiber
- CAUI-4 host electrical interface (IEEE 802.3bm); OIF CEI-28G-VSR signalling
- Hot-pluggable QSFP28 MSA form factor with full SFF-8636 digital diagnostics (DDM/DOM)
- Certified compatible with NETGEAR® switching platforms
- Single +3.3 V supply; ≤4.0 W power consumption
- Commercial temperature range, 0 to 70 °C
- TAA compliant (Country of Origin: Taiwan); RoHS and REACH compliant; Class 1 laser per IEC/EN 60825-1:2014

Target Applications

- 100GBASE-LR4 Ethernet links
- Data-center and campus 100G interconnect and aggregation
- InfiniBand QDR / DDR interconnects
- Client-side 100G telecom connections

Ordering Information

Part Number	Description
ACM762NB-11100S	100GBASE-LR4 QSFP28 transceiver, 4×25G LAN-WDM (1295–1309 nm), single-mode (G.652), 10 km, duplex LC, full DDM, pull tab; NETGEAR® Certified Compatible

Standards Compliance

The ACM762NB-11100S is designed and manufactured to comply with the applicable standards listed below. These statements indicate conformance to the referenced specifications; they do not constitute third-party certification, agency listing, registration, or regulatory approval unless explicitly stated otherwise.

Standard / Program	Detail
Interface & MSA	
IEEE 802.3ba	100GBASE-LR4 PMD (Clause 88)
IEEE 802.3bm	CAUI-4 chip-to-module electrical interface
QSFP28 MSA	SFF-8665 form factor and SFF-8636 management interface (DDM/DOM)
OIF CEI-28G-VSR	Very-short-reach electrical interface
Safety	
21 CFR 1040.10 and 1040.11	Complies except for deviations pursuant to Laser Notice No. 56 (May 8, 2019)
IEC/EN 60825-1:2014	Class 1 laser product
IEC/EN 62368-1	Designed to conform — AV/ICT equipment safety
Electromagnetic Compatibility	
FCC Part 15, Subpart B	Designed to conform to Class A limits (USA)
ICES-003	Designed to conform to Class A limits (Canada)
CISPR 32 / EN 55032	Designed to conform — emissions limits
CISPR 35 / EN 55035	Designed to conform — immunity requirements
Environmental & Trade	
RoHS	Directive (EU) 2015/863
REACH	Regulation (EC) No 1907/2006
Trade Agreements Act (TAA)	Compliant — Country of Origin: Taiwan

Note: EMC and product safety for a pluggable component are determined at the host-equipment level. The module is designed to conform to the listed limits and requirements when installed in compliant host equipment.

Operating Distance

Fiber Type	Wavelengths	Supported Distance
Single-mode (G.652)	4× LAN-WDM, 1295–1310 nm	Up to 10 km

Optical Specifications

Defined over the recommended operating conditions unless otherwise noted. Per-lane values apply to each of the four LAN-WDM lanes.

Parameter	Symbol	Min	Typ	Max	Unit	Notes
Lane wavelengths (LAN-WDM grid)						
Lane 0 (L0)	λ_0	1294.53	1295.56	1296.59	nm	—
Lane 1 (L1)	λ_1	1299.02	1300.05	1301.09	nm	—
Lane 2 (L2)	λ_2	1303.54	1304.58	1305.63	nm	—
Lane 3 (L3)	λ_3	1308.09	1309.14	1310.19	nm	—
Transmitter (each lane unless noted)						
Side-mode suppression ratio	SMSR	30	—	—	dB	—
Total average launch power (all lanes)	PT	—	—	10.5	dBm	—
Average launch power, each lane	Pavg	-4.3	—	4.5	dBm	—
Optical modulation amplitude (OMA)	POMA	-1.3	—	4.5	dBm	1
Launch power in OMA minus TDP	—	-2.3	—	—	dBm	—
Transmitter dispersion penalty	TDP	—	—	2.2	dB	—
Extinction ratio	ER	4	—	—	dB	—
Difference in launch power between any two lanes (OMA)	Ptx,diff	—	—	5	dB	—
Relative intensity noise	RIN20OMA	—	—	-130	dB/Hz	—
Optical return loss tolerance	TOL	—	—	20	dB	—
Transmitter reflectance	RT	—	—	-12	dB	—
TX eye mask {X1,X2,X3,Y1,Y2,Y3}	—	{0.25, 0.40, 0.45, 0.25, 0.28, 0.40}	—	—	—	2
Average launch power, TX off	Poff	—	—	-30	dBm	—
Receiver (each lane unless noted)						
Damage threshold, each lane	THd	5.5	—	—	dBm	3
Total average receive power (all lanes)	—	—	—	10.5	dBm	—
Average receive power, each lane	—	-10.6	—	4.5	dBm	—
Receive power (OMA), each lane	—	—	—	4.5	dBm	—
Receiver sensitivity (OMA), each lane	SEN	—	—	-8.6	dBm	4
Stressed receiver sensitivity (OMA), each lane	—	—	—	-6.8	dBm	5
Difference in receive power between any two lanes (OMA)	Prx,diff	—	—	5.5	dB	—
LOS assert	LOSA	-18	—	—	dBm	—
LOS deassert	LOSD	—	—	-15	dBm	—

Parameter	Symbol	Min	Typ	Max	Unit	Notes
LOS hysteresis	LOSH	0.5	—	—	dB	—
Receiver 3 dB upper cutoff frequency, each lane	Fc	—	—	31	GHz	—

Note 1. Even where TDP < 1 dB, OMA (min) must meet the value specified.

Note 2. Per the 100GBASE-LR4 transmitter eye-mask definition (normalized time / amplitude).

Note 3. Maximum continuous optical input the receiver tolerates without damage on one lane; correct operation is not guaranteed at this level.

Note 4. Receiver sensitivity is specified for BER = 1×10^{-12} .

Note 5. Stressed sensitivity is measured with a conformance test signal for BER = 1×10^{-12} ; the stressed-eye conditions (vertical eye-closure penalty 1.8 dB, J2 0.3 UI, J9 0.47 UI) are test conditions, not required receiver characteristics.

Electrical Specifications

Defined over the recommended operating conditions unless otherwise noted.

Parameter	Min	Typ	Max	Unit	Notes
Power consumption	—	—	4.0	W	—
Supply current (I _{cc})	—	—	1.21	A	—
Power-on initialization time	—	—	2000	ms	1
Transmitter input, each lane (host → module)					
Single-ended input voltage tolerance	−0.3	—	4.0	V	2
AC common-mode input voltage tolerance	—	—	15	mV RMS	—
Differential input swing threshold (LOS assert)	—	—	50	mVpp	—
Differential input voltage swing (V _{in,pp})	190	—	700	mVpp	—
Differential input impedance (Z _{in})	90	100	110	Ω	—
Receiver output, each lane (module → host)					
Single-ended output voltage	−0.3	—	4.0	V	—
AC common-mode output voltage	—	—	7.5	mV RMS	—
Differential output voltage swing (V _{out,pp})	300	—	850	mVpp	—
Differential output impedance (Z _{out})	90	100	110	Ω	—

Note 1. Time from when the supply voltages reach and remain above the minimum recommended levels to when the module is fully functional.

Note 2. Allowable range of the instantaneous single-ended input signal, referred to TP1 signal common.

Absolute Maximum Ratings

Stress beyond any single rating below may cause permanent damage. These are stress ratings only; functional operation is not implied at these limits.

Parameter	Symbol	Min	Max	Unit
Storage temperature	Ts	-40	85	°C
Operating case temperature	Top	0	70	°C
Power supply voltage	Vcc	-0.5	3.6	V
Relative humidity (non-condensing)	RH	0	85	%
Optical damage threshold, each lane	THd	5.5	—	dBm

Recommended Operating Conditions

Parameter	Symbol	Min	Typ	Max	Unit	Notes
Operating case temperature	Top	0	—	70	°C	—
Power supply voltage	Vcc	3.135	3.3	3.465	V	—
Signaling rate, each lane	—	—	25.78125	—	Gb/s	—
Control input voltage, high	VIH	2	—	Vcc	V	—
Control input voltage, low	VIL	0	—	0.8	V	—
Link distance over G.652 SMF	—	0.002	—	10	km	—

Digital Diagnostic Monitoring

The module reports real-time temperature, supply voltage, and per-channel transmit bias current, transmit optical power, and receive optical power over the 2-wire serial interface, per SFF-8636.

Monitored Parameter	Symbol	Accuracy	Conditions
Temperature monitor	—	±3 °C	Over operating temperature range
Supply-voltage monitor	—	±0.1 V	Full operating range
RX optical-power monitor, per channel	—	±2 dB	See note 1
TX bias-current monitor, per channel	—	±10% of reading	—
TX optical-power monitor, per channel	—	±2 dB	See note 1

Note 1. Optical-power monitor accuracy may vary by an additional ±1 dB depending on the characteristics of the connected single-mode fiber (±3 dB total).

Functional Overview

On the transmit path, the module accepts four lanes of 25.78 Gb/s differential CML data (TX1–TX4). A four-channel clock-and-data-recovery (CDR) stage retimes and reshapes each lane and drives four cooled LAN-WDM electro-absorption-modulated (EML) lasers at 1295.56, 1300.05, 1304.58, and 1309.14 nm. A 4-to-1 optical multiplexer combines the four wavelengths onto a single fiber for 100 Gb/s transmission. A thermo-electric cooler (TEC) stabilizes the laser array, and an automatic power-control loop holds per-lane output power constant across supply and temperature. The transmitter can be disabled in hardware (TX_Dis) or over the 2-wire interface.

On the receive path, the aggregate optical signal is separated by a 1-to-4 optical demultiplexer and detected by a four-channel PIN receiver array. The recovered signals are retimed and amplified by the receive CDR and presented to the host as four lanes of CML data (RX1–RX4) compliant with the CAUI-4 interface. Each lane's receive power is monitored; if any lane falls below threshold, the module asserts RX_LOS.

An on-board microcontroller manages serial identification, per-channel digital diagnostics (SFF-8636), and the low-speed control pins — ModSelL, ResetL, LPMode, ModPrsL, and IntL. The module operates from a single +3.3 V supply, is hot-pluggable, and presents a duplex-LC optical interface.

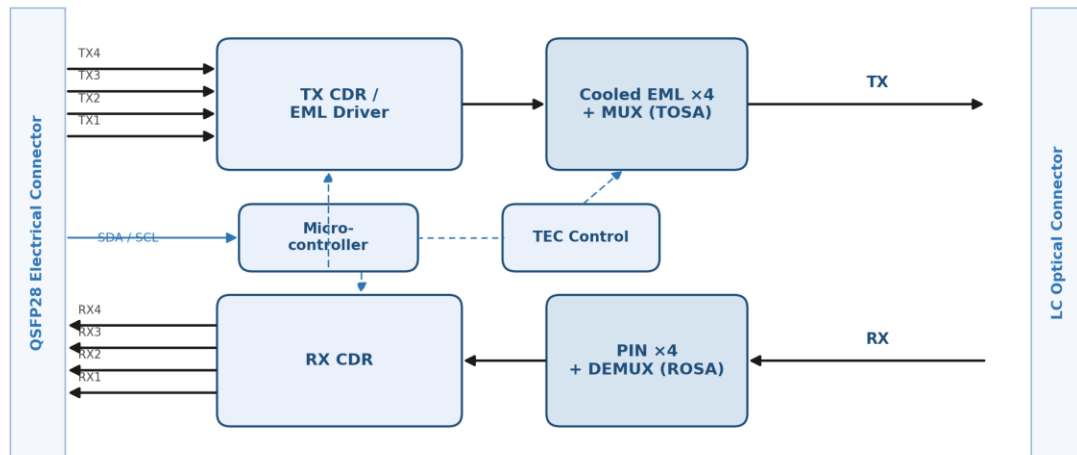


Figure 1. Functional block diagram

Host Interface & Pin Assignment

The module is hot-pluggable and conforms to the QSFP28 MSA (SFF-8665) with the SFF-8636 management interface. The low-speed control and status pins (ModSelL, ResetL, LPMode, ModPrsL, IntL) and the 2-wire interface are pulled up on the host to +3.3 V through 4.7–10 kΩ resistors. All ground (GND) pins are common within the module and connect to the host signal-ground plane; each Vcc pin is rated for up to 1000 mA.

Pin	Symbol	Logic	Description
1	GND	—	Ground
2	Tx2n	CML-I	Transmitter inverted data input
3	Tx2p	CML-I	Transmitter non-inverted data input
4	GND	—	Ground
5	Tx4n	CML-I	Transmitter inverted data input
6	Tx4p	CML-I	Transmitter non-inverted data input

Pin	Symbol	Logic	Description
7	GND	—	Ground
8	ModSelL	LVTTL-I	Module select (low = module responds on 2-wire bus)
9	ResetL	LVTTL-I	Module reset (active low)
10	VccRx	—	Receiver +3.3 V supply
11	SCL	LVC MOS-I/O	2-wire serial interface clock
12	SDA	LVC MOS-I/O	2-wire serial interface data
13	GND	—	Ground
14	Rx3p	CML-O	Receiver non-inverted data output
15	Rx3n	CML-O	Receiver inverted data output
16	GND	—	Ground
17	Rx1p	CML-O	Receiver non-inverted data output
18	Rx1n	CML-O	Receiver inverted data output
19	GND	—	Ground
20	GND	—	Ground
21	Rx2n	CML-O	Receiver inverted data output
22	Rx2p	CML-O	Receiver non-inverted data output
23	GND	—	Ground
24	Rx4n	CML-O	Receiver inverted data output
25	Rx4p	CML-O	Receiver non-inverted data output
26	GND	—	Ground
27	ModPrsL	LVTTL-O	Module present (asserted low when seated)
28	IntL	LVTTL-O	Interrupt (open-collector, active low)
29	VccTx	—	Transmitter +3.3 V supply
30	Vcc1	—	+3.3 V supply
31	LPMode	LVTTL-I	Low-power mode
32	GND	—	Ground
33	Tx3p	CML-I	Transmitter non-inverted data input
34	Tx3n	CML-I	Transmitter inverted data input
35	GND	—	Ground
36	Tx1p	CML-I	Transmitter non-inverted data input
37	Tx1n	CML-I	Transmitter inverted data input
38	GND	—	Ground

Mechanical Dimensions

Per the QSFP28 MSA mechanical outline (SFF-8665). Key envelope dimensions are summarized below; refer to the mechanical drawing for complete dimensioning.

Parameter	Value	Unit
Form factor	QSFP28 (SFF-8665)	—
Width	18.35	mm

Parameter	Value	Unit
Height	8.50	mm
Overall length (incl. pull tab)	125.35	mm
Optical connector	Duplex LC	—
Latch	Pull tab	—

Handling, ESD & Laser Safety

Electrostatic Discharge

The module withstands 1 kV on the high-speed data pins and 2 kV on all other electrical pins per MIL-STD-883 Method 3015.4 / JESD22-A114-A (HBM). Standard ESD precautions still apply: remove the module from its protective packaging only within an ESD-protected environment.

Laser Safety

This is a Class 1 laser product per IEC/EN 60825-1:2014.

It complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to Laser Notice No. 56 (May 8, 2019).

Use of controls, adjustments, or procedures other than those specified herein may result in hazardous radiation exposure.

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