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Product Brief
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CB16-Type 2.5 Gbits/s DWDM Transponder with 16-Channel 155 Mbits/s Multiplexer/Demultiplexer

The Transponders integrate up to 15 discrete ICs and optical components, including a 2.5 Gbits/s optical transmitter and receiver pair, all in a single, compact package.

Features

- 2.5 Gbits/s optical transmitter and receiver with 16-channel 155 Mbits/s multiplexer/demultiplexer
- Available with 1.55 µm cooled laser transmitter and an APD receiver for long-reach applications:
  — Offers 45 standard ITU wavelengths with 100 GHz spacing.
- Pigtailed, low-profile package
- Differential LVPECL data interface
- Operating case temperature range: –5 °C to +70 °C
- Automatic transmitter optical power control
- Transmitter laser disable input
- Loss of signal indication
- Line loopback and diagnostic loopback capability

Applications

- Telecommunications:
  — Inter- and intraoffice SONET/SDH
  — Subscriber loop
  — Metropolitan area networks
- High-speed data communications

Description

The CB16-type transponder performs the parallel-to-serial-to-optical transport and optical transport-to-serial-to-parallel function of the section and photonic layers of the SONET/SDH protocol. The CB16 transmitter section performs the bit serialization and optical transmission of SONET/SDH OC-48/STM-16 data that has been formatted into standard SONET/SDH compliant, 16-bit parallel format. The CB16 receiver performs the optical-to-electrical conversion function and is then able to detect frame and byte boundaries and demultiplex the serial data into 16-bit parallel OC-48/STM-16 format.

The CB16 transponder does not perform byte-level multiplexing or interleaving.

Description (continued)

This device is a bidirectional module designed to provide a SONET or SDH compliant electro-optical interface between the SONET/SDH photonic physical layer and the electrical section layer. The module contains a 2.5 Gbits/s optical transmitter and a 2.5 Gbits/s optical receiver in the same physical package along with the electronics necessary to multiplex and demultiplex sixteen 155 Mbits/s electrical channels. Clock synthesis and clock recovery circuits are also included within the module.

In the transmit direction, the transponder module multiplexes sixteen 155 Mbits/s PECL electrical data signals into an optical signal at 2488.32 Mbits/s for launching into optical fiber. An internal 2.488 GHz reference oscillator can be phase-locked to an external 155.52 MHz data timing reference, or a 155.52 MHz clock can be derived from the internal reference oscillator and phase-locked to the data.

The optical transmitter is available at any ITU grid wavelength with a 1.55 μm cooled laser for long-reach applications. The optical output signal is SONET and ITU compliant for OC-48/STM-16 applications.

In the receive direction, the transponder module receives a 2488.32 Mbits/s optical signal and converts it to an electrical signal, and then extracts a clock signal and demultiplexes the data into sixteen 155 Mbits/s differential LVPECL data signals. The optical receiver is available with an APD photodetector. The receiver operates over the wavelength range of 1.1 μm to 1.6 μm and is fully compliant with SONET/SDH OC-48/STM-16 physical layer specifications.

The target application for CB16A2 is for fiber dispersion up to 1800 ps/nm.

The target application for the CB16B2 is for fiber dispersion up to 3000 ps/nm.

Optical Characteristics

Minimum and maximum values specified over operating case temperature range at 50% duty cycle data signal. Typical values are measured at room temperature unless otherwise noted.

Table 1. CB16 Long-Reach/Long-Haul 1550 nm (Cooled Laser, APD Receiver) Optical Characteristics
(Tc = –5 °C to +70 °C, V_{CC} = 3.3 V ± 5%)

Parameter	Symbol	Min	Typ	Max	Unit
Average Output Power:[1] BOL EOL	 P_{BOL} P_{EOL}	 0 –2	 1 —	 2 3	 dBm dBm
Operating Wavelength	λ	1528	—	1563	nm
Spectral Width[2]	$\Delta\lambda_{20}$	—	—	1	nm
Side-mode Suppression Ratio (DFB laser)[3]	SSR	30	—	—	dB
Extinction Ratio: BOL[4] EOL[4]	 reBOL reEOL	 9 8.2	 10 —	 — —	 dB dB
Optical Rise and Fall Times	t_R, t_F	—	—	200	ps
Eye Mask of Optical Output [5, 6]	Compliant with GR-253 and ITU-T G.957				
Jitter Generation	Compliant with GR-253 and ITU-T G.783				
Power Output with Transmitter Disabled	P_{DIS}	—	—	–40	dBm
Average Receiver Sensitivity: BOL (BER = 1 x 10^{-10})[7] EOL (BER = 1 x 10^{-10})[7]	 PR_{BOL} PR_{EOL}	 –31 –30	 –32 —	 — —	 dBm dBm
Maximum Receiver Optical Power	PR_{MAX}	–6	—	—	dBm
Link Status Response Time	—	3	—	100	µs
Optical path Penalty	—	—	—	2	dB
Receiver Reflectance	—	—	—	–27	dB
Jitter Tolerance and Jitter Transfer	Compliant with GR-253 and ITU-T G.958, G.825				

1. Output power definitions and measurements per ITU-T Recommendation G.957.
2. Full spectral width measured 20 dB down from the central wavelength peak under fully modulated conditions.
3. Ratio of the output power in the dominant longitudinal mode to the power in the most significant side mode under fully modulated conditions.
4. Ratio of logic 1 output power to logic 0 output power under fully modulated conditions.
5. GR-253-CORE, *Synchronous Optical Network (SONET) Transport Systems: Common Generic Criteria.*
6. ITU-T Recommendation G.957, *Optical Interfaces for Equipment and Systems Relating to the Synchronous Digital Hierarchy.*
7. At 1 x 10^{-10} BER, 2^{23-1} pseudorandom data input.

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