

Main Technical Parameters of Optical Transceiver

Transmitter:

Average transmitting power P_0 : Refers to the arithmetic average value of optical power when signal logic is 1 and 0. $PAWG = (P_0 + P_1)/2$

Extinction ratio (P_{on}/P_{off}): The comparative value when signal logic is 1 and 0. $ER = 10 \log P_1/P_0$.

Center wavelength: optical band is used to transmit optical signal. Mainly use 850nm, 1310nm and 1550nm.

Eye diagram pattern: in high speed optical fiber system, optical transmit pulse shape is difficult to control, often may be rising edge, falling edge overshoot, undershoot and ringing. All of these may lead to worsening of the sensitivity of the receiver, and therefore must be limited, so ITU-T proposed G.957 specify a eye diagram template.

Receiver:

Receiving sensitivity P_r : Receiving sensitivity means when the module is working, the minimum receiving power based on a certain error value (such as $BER = 10^{-9}$).

Saturated optical power P_s : means when the module is working, the maximum receiving power based on a certain error value (such as $BER = 10^{-9}$).

Fiberall Technology (China) Limited

Tel.: 0086-755-29526392 Fax: 0086-755-86314392

Email: sales@fiber-all.com Website: www.fiber-all.com

Alarm (H-L): when the module is working, change optical power in descending order, the alarm output signal level reversal appears when the optical power decreases to a certain value, optical power at this time is the alarm signal threshold (PH-L).

Cancel alarm (L-H): when the module is working, change optical power in ascending order, the alarm output signal level reversal appears when the optical power increases to a certain value, optical power at this time is the alarm signal threshold (PL-H).

Other parameters:

Optical Path Penalty: It is receiver's sensitivity changes caused by pulse transmission in the optical channel. Factors causing the Optical Path Penalty mainly includes the nonlinear effects, chromatic dispersion (CD), polarization mode dispersion (PMD), polarization dependent loss (PDL), optical channel reflection and crosstalk etc..

Optical Link budget: It is equal to the absolute value of optical power subtract receiving sensitivity, it is the key to evaluate transmission distance.

Optical power penalty of different wavelength: For example, G652 SM fiber, loss is 0.4dB/km @ 1310nm and 0.25dB/km @ 1550nm; 50um MM fiber, loss is 4dB/km at 850nm and 2dB/km at 1310nm.

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