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Integrated 40-Gb/s DQPSK Receiver

The integrated DQPSK receiver incorporates an optical phase demodulator (delay-line interferometer or DLI) with 2 pairs of balanced photo-diodes and 2 linear TIAs into a single butterfly package. Compared with the currently available discrete solution in which a separate DLI and a separate receiver are used, the integrated DQPSK receiver eliminates labor intensive fiber routing and coupling (between the DLI and the balanced receiver) as well as the skew control. Moreover, the integrated DQPSK receiver offers a smaller footprint suitable for today's demanding high speed transponder applications.

The optical phase demodulator is based on Optoplex's proprietary technology with high tuning speed (up to *ms* range) to achieve superior optical and thermal performance. Free space optical alignment is employed to couple the optical outputs from the DLI directly into the waveguide-based balanced photodiodes.

Differential TIAs with bandwidth control, AGC, MGC and PLD are used in the integrated receiver. The high speed interface (RF output) is CPW-SMT with pin dimensions compatible with OIF2009.033.05 IA for 100-Gb/s coherent receiver.

The FSR of the DQPSK receivers can be customer specific, such as 21.5, 21.9, 25, or 28GHz, etc. A colorless version with the spectrum peaks aligned to 25-GHz ITU grid is also available upon request.

Key Features and Benefits

- Fast tuning speed
- Low PDPS and TDFS
- High extinction ratio
- Small skew
- High bandwidth
- Built-in AGC/MGC and PLD
- Small footprint
- CPW-SMT output interface
- Low power consumption

Applications

- 40G DQPSK transponder
- 100G DP-DQPSK transponder
- DQPSK demodulation

Optical-Electrical Performance Specification

Parameter	Unit	Min	Typ	Max	Notes
Operating Wavelength Range	*nm*	1525		1565	
Free Spectral Range (FSR)	*GHz*		21.9 or 28		Or customer specific
FSR accuracy	-			± 1%	
Symbol rate	*GBaud*		22		For 21.9 GHz FSR
Optical Input Power	*dBm*	-3		10	
Extinction Ratio	*dB*	18	20		
Polarization Dependent Phase Shift (PDPS)	*deg*			5	
Polarization Dependent Loss	*dB*			0.8	
Return Loss	*dB*	27			
Temperature Dependent Frequency Shift (TDFS)	*GHz*			10	Over operating temperature range
Common-Tuner (C-Tuner) Tuning Time Constant	*ms*			1	
Differential-Tuner (D-Tuner, for phase difference between I- and Q-arms) Time Constant	*s*			1	
Tuning Range (C- and D-tuners can be tuned independently)	*FSR*	1.5 0.5			C-Tuner; D-Tuner
Tuning Cross-Talk				5 7	C to D; D to C
Tuning Voltage	*Volt*			5	
3dB Cut-Off Frequency	*GHz*	20	22		
PIN Diode Bandwidth	*GHz*	20			
Electrical Output Reflectance Co-efficient, S_{22} [@22GHz]	*dB*			>10 >4	DC – 20GHz 20-40GHz
Output Voltage Swing (Differential)	mV_{p-p}	300	400	600	
Skew	*ps*			1	
Responsivity	*A/W*	0.1	0.2	0.3	
Differential Trans-impedance amplifier	-	Differential Linear TIA with BW control, AGC, MGC, and Peak Level Detection (PLD)			
Operating Temperature range	^oC	-5		75	
Physical Dimension (Package Body only. Input collimator, DC & AC PIN length ad mounting pads excluded)	*mm*	50 x 27 x 8.5			

For detail specification and product availability, please contact ***sales@optoplex.com***