



48500 Kato Road
Fremont, CA 94538 USA

Product Specification

**DPSK Demodulator, C-Band,
2.5GHz FSR, Tunable**

Part No.: **DI-CCEFAS001**

Revision: 1.2

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DPSK Phase Demodulator, C-Band, 2.5GHz FSR, Tunable

P/N: DI-CCEFAS001

Rev. 1.2

Revision History

Rev.	Date	Revision History	Originated	Signed by
1.0	6/15/2016	Initial Release	Stephanie Hung	James Pang
1.1	6/16/2016	<ul style="list-style-type: none">Removed Figure 2 on section 1Revised mechanical dimension, mechanical drawing, and Port Definition and Labeling (section 5)	Stephanie Hung	James Pang
1.2	6/23/2016	Changed PN from DI-CCEFAS052 to DI-CCEFAS001	Stephanie Hung	James Pang

Product Specification

1. Introduction

Optoplex's **Optical DPSK Demodulator**, also known as **Delay Line Interferometer (DLI)**, converts *phase modulation* to *amplitude modulation* over the entire C+L band in support of data transmission rates of 2.5, 10 or 40 Gb/s. The DPSK demodulator is designed for phase modulated optical communication systems utilized in commercial, defense and space exploration markets. The device plays a key role in improving signal quality and performance to meet the expanding demand for higher data rates and more complex transmission formats within current and next generation systems without major capital expenditure. Optoplex's DPSK Demodulator is based on a patented free-space optical design, which is compact, athermal and polarization-independent. The measured frequency drift over temperature is only ~ 0.02 GHz/ $^{\circ}$ C for our standard passive device. Further, this DPSK Demodulator exhibits a total polarization-dependent phase shift of less than 2 degrees over the entire operating temperature range with a high extinction ratio. Optoplex's DPSK Demodulators can be configured to be fully tunable, colorless tunable or purely passive. Dual-Rate DPSK Demodulator is also available.

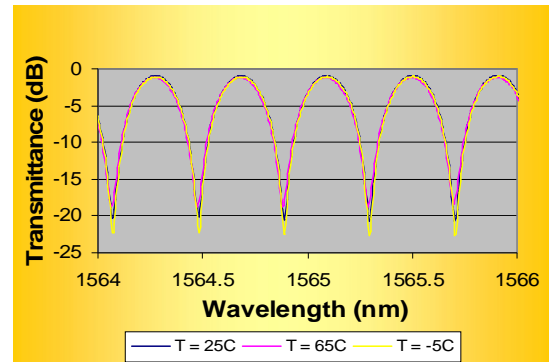


Figure 1, measured optical transmission spectra of DPSK DLI at 3 temperatures

Key Features and Benefits

- Athermal design
- C+L band coverage by a single device
- Low temperature-dependent frequency shift (TDFS)
- Low polarization-dependent frequency shift (PDFS)
- Low insertion loss & PDL
- High power handling
- Passive, colorless tunable (both aligned to ITU Grid) or fully tunable
- Telcordia GR-1221 qualified

Applications

- 2.5, 10, 20 or 40 Gb/s commercial DPSK signal reception
- Customized data rate for advanced applications
- Data rate optimization
- Extend transmission distance

The DPSK DLI described in this product specification is a DPSK DLI with a FSR of 2.5GHz.



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2. Absolute Maximum Rating

Table 1, Absolute maximum rating

Item	Parameter	Symbol	Condition	Min	Max	Unit
1	Storage temperature range	T_{stg}		-40	85	°C
2	Storage humidity	RH_{stg}	Non Condensing	5	95	%
3	Maximal optical input power	P_{opt_max}	Continuous wave		21	dBm
4	DLI tuning voltage	V_{max}	DC voltage		6	V
5	Minimum bending radius of the fiber	R	SMF-28	15		mm

3. Operating Conditions

Table 2, Operating Conditions

Item	Parameter	Symbol	Condition	Min	Typ.	Max	Unit
1	Operating case temperature range	T_{case}		-5		65	°C
2	Relative humidity range	RH	Long Term, non condensing	5		90	%
3	Operating frequency range	f	C- Band	191.15		196.1	THz
4	DLI Tuning Voltage	V	DC	0		5	V



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4. Optical Performance Specification

Table 3, optical performance specification

Parameter	Unit	Specification
Wavelength Range (C-Band)	<i>nm</i>	1527 ~ 1567
Free Spectral Range ¹ (FSR)	<i>GHz</i>	2.5GHz
FSR Error	<i>%</i>	< 1
Insertion Loss ¹ (including 2 connectors)	<i>dB</i>	2.2 Typical; 2.7 Max
Insertion Loss Difference ¹ (between two Output ports)	<i>dB</i>	< 0.7
Extinction Ratio ¹	<i>dB</i>	> 18
PMD ¹	<i>ps</i>	< 0.1
Return Loss	<i>dB</i>	> 40
PDL ¹	<i>dB</i>	< 0.2
PDFS ¹	<i>deg</i>	< 3
TDFS ¹	<i>MHz/°C</i>	< 10
Optical Path Delay ¹ (between the 2 receiving ports)	<i>ps</i>	< 0.5
Tuning Time Constant ²	<i>sec</i>	< 1.0
Tuning Range	<i>FSR</i>	> 1.5
Tuning Voltage Range	<i>V</i>	0 ~ 5
Tuning Power Consumption	<i>W</i>	0.5 Typical; 1.0 Max

Note:

1. Over the stated spectral and operating temperature ranges and all polarization states.
2. Defined as the time required to reach half-way from the starting and ending points.

5. Physical and Mechanical Specification

5.1 Device Dimension

Table 4, Device Dimensions

Parameter	Length	Width	Height	Unit
Value	73	54	16.2	mm

Note:

1. Not including the collimator sleeves extending in two adjacent sides. See the detailed drawing below.

5.2 Mechanical Drawing

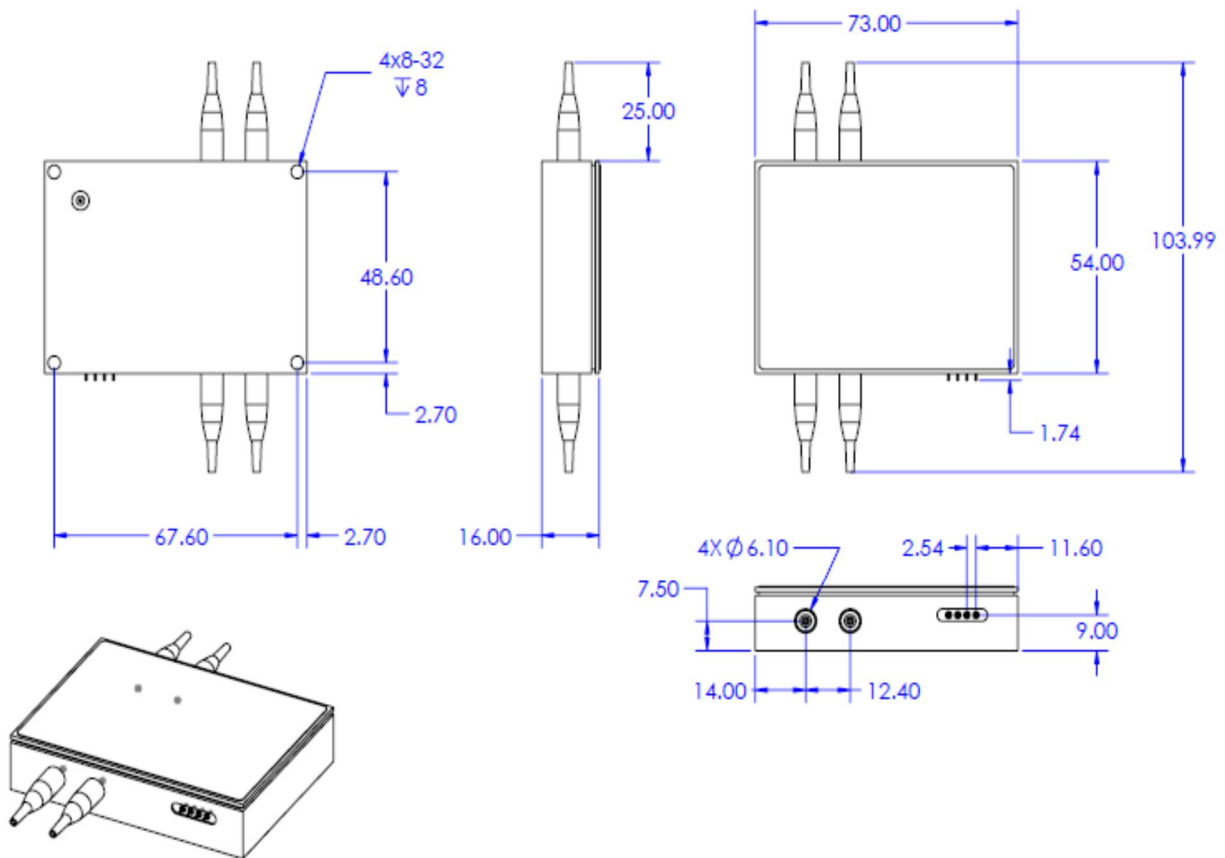


Figure 2, mechanical drawings of a 2.5GHz DPSK DLI

5.3 Fiber and Connector

Table 5, Fiber and Connector Requirements

Item	unit	Description
Connector Type	-	FC/APC
Fiber Pigtail Type	-	SMF-28 with 900 μ m loose tube
Fiber Pigtail Length	cm	100 \pm 10

5.4 Port Definition and Labeling

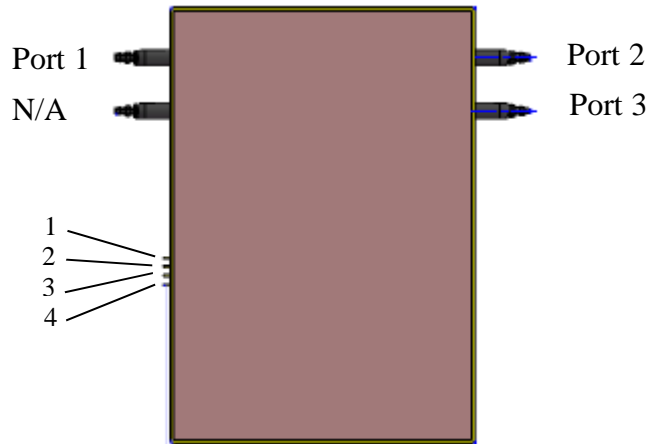


Figure 3. Port definition and labeling

Port Labeling:

- Type and location — Flag-type on fiber near connector.
- Content — 1, 2 and 3 for Port 1, Port 2 and Port 3 respectively.



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6. Electrical Specification

Table 6, Electrical Pin Definition

Pin	Name	Function
1	I+	Control the phase tuner. No parity.
2	I-	The driving voltage (0~5VDC) applied to Pin#1 and #2.
3	-	Not in use
4	-	

7. Label Requirements

7.1 Port label position and type — Flag tape on pigtail near connector. Width of tape: ~3 mm.

7.2 Port label contents — See Figure 3.

7.3 Device label — On top, contains the following information:

- Optoplex logo
- Product description: **DPSK Phase Demodulator, C-Band, 2.5 GHz FSR, Tunable**
- Manufacturer P/N: **DI-CCEFAS001**
- Manufacturer S/N: (TBD)

8. Quality and Reliability

8.1 General

- RoHS 6/6 compliance
- Telcordia 1221-CORE qualified

8.2 Special Requirements

- Optoplex's DPSK DLI has been successfully used for aerospace application, i.e., in an environment of low pressure.
- Also, the device can withstand more stringer mechanical shock and vibration conditions (than normally specified by Telcordia 1221-CORE)
- For special requirements, please contact sales@optoplex.com