

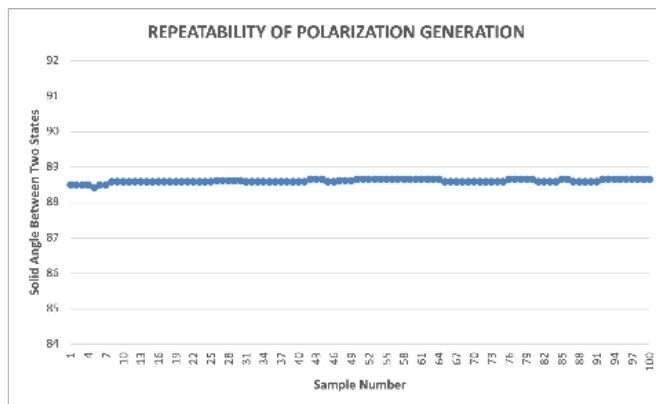
## PSG-002

### High-Speed Polarization State Generator

Luna Innovations' high-speed polarization state generator (PSG) module enables quick generation of up to six distinctive polarization states (LCP, RCP, Linear  $\pm 22.5^\circ$ , Linear  $\pm 67.5^\circ$ ) across a Poincaré sphere in less than 50  $\mu\text{s}$  between two consecutive states, with high repeatability of less than 0.1 degrees.

The new compact packaging is ideal for integration into systems that require precise generation of these 6 polarization states or precise  $90^\circ$  polarization rotation. The PSG-002 uses a new self-latching technique which reduces power consumption and heat generation. In addition, its predictable wavelength and temperature dependence allows for easy calibration, making it a perfect choice in swept wavelength component measurement systems.

Other applications include Mueller matrix-based measurements, polarization OTDR, performance monitoring, medical imaging, material birefringence measurements, and fiber sensors.



#### KEY FEATURES

- Switches between 6 polarization states: LCP, RCP, Linear  $\pm 22.5^\circ$ , Linear  $\pm 67.5^\circ$
- Typical switching time 45  $\mu\text{s}$
- SOP repeatability 0.1°
- Self-latching
- Zero static power dissipation
- 4-bit control
- Compact
- Minimal heat generation

#### APPLICATIONS

- Swept-frequency measurement
- Polarization OTDR
- Polarization rotation
- Mueller matrix-based polarization analysis
- Material birefringence
- Optical imaging

**High-speed deterministic polarization state generation with improved performance, increased reliability, and reduced footprint**

## PERFORMANCE

PARAMETER	MIN.	TYPICAL	MAX.	UNITS
Optical Characteristics				
Operation Wavelength <sup>1</sup>	1480	1550	1620	nm
Insertion Loss <sup>2</sup>			1.0	dB
Return Loss			-55	dB
Number of Distinct Polarization States	6			
SOP Relative Angle Accuracy (Deviation from 90° of angle between output SOPs on Poincaré Sphere) <sup>3,4</sup>			±5	deg
SOP Repeatability (on Poincaré Sphere) <sup>3</sup>		±0.1		deg
SOP Accuracy to Target (on Poincaré Sphere at $\lambda_c$ and 23°C) <sup>1,3</sup>			±5	deg
SOP Switching Time <sup>5</sup>				
At Bias Voltage 10 V	40	45	50	µs
At Bias Voltage 5 V	70	80	100	µs
At Bias Voltage 3.3 V	90	120	150	µs
Optical Power Handling			300	mW
Physical Operating Conditions				
Operating Temperature	0		50	°C
Storage Temperature	-40		85	°C
Mechanical Properties				
Dimension	60 mm (L) x 14.6 mm (W) x 11 mm (H)			
Mounting Holes	4X #0-80 UNF-28, 3 mm DEEP			
Fiber Jacket	900 µm loose tube			

**Notes:** Values are referenced without connectors

- Center wavelength  $\lambda_c$ =1550 nm. Calibrated wavelength range 1500-1580 nm standard.
- With input polarization aligned to polarizer transmission axis.
- Relative angles on the Poincaré sphere are twice the electrical field rotation angles in real space.
- Over all wavelengths and temperatures in the operational ranges.
- Time interval between drive signal pulse leading edge and completion of SOP transition at room temperature (~23 °C) using an H-bridge driver circuit.

## ORDERING

Catalog #	Wavelength	Input Fiber Type	Pigtail Length	Connector Type
PSG - 002	<input type="checkbox"/> <input type="checkbox"/> 15 – 1550 nm 13 – 1310 nm <sup>1</sup>	<input type="checkbox"/> S – SM fiber <sup>2</sup> P – PM fiber	<input type="checkbox"/> 1.0 – 1.0 m Specify	<input type="checkbox"/> <input type="checkbox"/> NC – no connector FC/PC FC/APC SC/PC SC/APC
<b>Notes:</b> <ol style="list-style-type: none"> <li>1310 nm coming soon</li> <li>SM fiber input may result in higher loss due to input polarizer</li> </ol>				

Distribution in the UK & Ireland



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## CUSTOM AND OEM OPTIONS NOTES

\*For more detailed specification, refer to PSG-002 technical specification sheet.



PSG-002 REV.1 06.24.2021