Product Information

MMS 1

Monolithic Miniature Spectrometer

ZEISS

**Construction**

The module consists of a spectrometer body made of UBK 7 glass with an aberration corrected grating, a fiber cross section converter as optical entrance and a diode array. Cross section converter and diode array are fixed to the glass body.

**Benefits**

- Use for diverse measuring tasks
- Compact, permanently aligned
- Robust and thermally stable
- Small
- High sensitivity
### Specifications

**Optical entrance:**
- Fiber cable consisting of approx. 30 quartz glass fibers with 70 µm core diameter each, designed as a cross section converter.
  - Input round: diameter 0.5 mm, NA = 0.2, mounted in SMA-coupling
  - Output linear: 70 µm x 2500 µm (optical entrance)

**Grating**
- Flat-field, 366 l/mm (center), blazed for approx. 330 nm UV enh.
- 450 nm VIS enh.
- 600 nm NIR enh.

**Spectral range:**
- 305 nm ... 1150 nm
- Specifications for the range: 360 nm ... 900 nm

**Wavelength accuracy absolute:**
- 0.3 nm

**Temperature - induced drift:**
- < 0.02 nm/K

**Spectral distance of pixel:**
- $\Delta \lambda_{\text{Pixel}} \approx 3.3$ nm

**Resolution (Rayleigh-criterion):**
- $\Delta \lambda_{\text{Rayleigh}} \approx 10$ nm

**Sensitivity:**
- $\approx 10^{13}$ Counts/Ws (with 14-Bit-conversion)

**Straylight:**
- 2.0% Halogen lamp
- Signal at 360 nm with NaNO$_2$ solution (50g/l)

**Dimensions:**
- Total (with case): 70 x 60 x 40 mm$^3$
- Cross section converter (external length): 24 cm standard, up to 1 m available.

**Options:**
- MMS1 VIS enhanced
- MMS1 UV enhanced
- MMS1 NIR enhanced
Diode array

Producer: Hamamatsu
Type: S3904 - 256Q in a special housing
(S4874 - 256 Q for MMS1 NIR enhanced)
Number of pixels: 256
Dimensions of pixels: 25 x 2500 µm²
Maximum clock-rate: 2 MHz

Blocking filter for the second order is directly coated on the diode array.

Preamplifier

Output: 3 V (full modulation)
Sensitivity: 40 µA/V
Rise time: 35 V/ms
Frequency range: < 400 KHz
Power consumption: 50 mW

Interface

Video - Output: SMB - socket
Diode array drive: Micromodul - connection MICS - D 10
Connector assignment:

```
<table>
<thead>
<tr>
<th>Pin</th>
<th>Assignment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0 V - digital ground</td>
</tr>
<tr>
<td>2</td>
<td>start</td>
</tr>
<tr>
<td>3</td>
<td>Phi 2 - clock rate</td>
</tr>
<tr>
<td>4</td>
<td>EOS - End of Scan</td>
</tr>
<tr>
<td>5</td>
<td>- 5 V</td>
</tr>
<tr>
<td>7</td>
<td>+ 5 V</td>
</tr>
<tr>
<td>9</td>
<td>0 V - digital ground</td>
</tr>
<tr>
<td>10</td>
<td>+ 5 V</td>
</tr>
</tbody>
</table>
```

System data

Realised with: 14 - Bit - AD - conversion,
integration time 10 ms
clock rate 28KHz and 20-cycles averaging
Dynamic range: 2.14
Noise: 1 count standard deviation

Subject to technical alteration. 5.98