Ultra-High Speed Hybrid Detectors for TCSPC

Ultra fast instrument response function: <20 ps FWHM with SPC-150NX
HPM-100-06: 290 to 600 nm (Bialkali)
HPM-100-07: 220 to 850 nm (Multialkali)
No afterpulsing background
Excellent dynamic range of TCSPC measurements
Internal generators for PMT operating voltages
Power supply and control via bh DCC-100 card
Overload shutdown
Direct interfacing to all bh TCSPC systems

The HPM-100 module combines a Hamamatsu R10467 hybrid detector tube with a preamplifier and the generators for the tube operating voltages in one compact housing. The principle of the hybrid detector yields excellent timing resolution, a clean TCSPC instrument response function, high detection quantum efficiency, and extremely low afterpulsing probability. The absence of afterpulsing results in a substantially increased dynamic range of TCSPC measurements.

The HPM-100 module is operated via the bh DCC-100 detector controller of the bh TCSPC systems. The DCC-100 provides for power supply, gain control, and overload shutdown. The HPM-100 interfaces directly to all bh SPC or Simple Tau TCSPC systems. It is available with standard C-mount adapters, adapters for the bh DCS-120 confocal scanning FLIM system, and adapters for the NDD and BIG ports of the Zeiss LSM 710/780/880 NLO multiphoton laser scanning microscopes.


Technology Leader in TCSPC
Detection quantum efficiency vs. wavelength

![Graph](after Hamamatsu Specifications)

**Specifications, typical values**

<table>
<thead>
<tr>
<th></th>
<th>-06 version</th>
<th>-07 version</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wavelength Range</td>
<td>290 nm to 600 nm</td>
<td>220 to 850 nm</td>
</tr>
<tr>
<td>Dark Count rate, Tcase = 22°C, 3mm version</td>
<td>100 to 400 s⁻¹</td>
<td>100 to 1000 s⁻¹</td>
</tr>
<tr>
<td>Cathode Diameter</td>
<td>3 mm</td>
<td></td>
</tr>
<tr>
<td>TCSPC IRF width (Transit Time Spread, with SPC-150NX)</td>
<td>&lt;20 ps, FWHM</td>
<td></td>
</tr>
<tr>
<td>Single Electron Response Width</td>
<td>850 ps, FWHM</td>
<td></td>
</tr>
<tr>
<td>Single Electron Response Amplitude</td>
<td>50 to 150 mV, -8000 V, V(epi) 95% of Vbreakdown</td>
<td></td>
</tr>
<tr>
<td>Output Impedance</td>
<td>50 Ω</td>
<td></td>
</tr>
<tr>
<td>Max. Count Rate (Continuous)</td>
<td>10 MHz</td>
<td></td>
</tr>
<tr>
<td>Overload shutdown at</td>
<td>&gt;15 MHz</td>
<td></td>
</tr>
<tr>
<td>Detector Signal Output Connector</td>
<td>SMA</td>
<td></td>
</tr>
<tr>
<td>Power Supply (from DCC-100 Card)</td>
<td>+ 12 V, -5 V, -12V</td>
<td></td>
</tr>
<tr>
<td>Dimensions (width x height x depth)</td>
<td>60 mm x 90 mm x 170 mm</td>
<td></td>
</tr>
<tr>
<td>Optical Adapters</td>
<td>C-Mount, DCS-120, LSM 710/780/880 NDD and BIG ports</td>
<td></td>
</tr>
</tbody>
</table>

1) according to Hamamatsu specifications

**Related products:** HPM-100-40/42 GaAsP and HPM-100-50 GaAs hybrid detector modules

**Literature:** The bh TCSPC Handbook, 6th edition, Becker & Hickl GmbH. Printed copies or electronic version on [becker-hickl.com](http://www.becker-hickl.com)

Sub-20ps IRF Width from Hybrid Detectors and MCP-PMTs. Application note, available from [becker-hickl.com](http://www.becker-hickl.com)

---

**International Sales Representatives**

**USA:**
Boston Electronics Corp
[tcspc@boselec.com](mailto:tcspc@boselec.com)
[www.boselec.com](http://www.boselec.com)

**UK:**
Photonic Solutions PLC
[sales@psplice.com](mailto:sales@psplice.com)
[www.psplice.com](http://www.psplice.com)

**Japan:**
Tokyo Instruments Inc.
sales@tokyoinst.co.jp
[www.tokyoinst.co.jp](http://www.tokyoinst.co.jp)

**China:**
DynaSense Photonics Co. Ltd.
info@dyna-sense.com
[www.dyna-sense.com](http://www.dyna-sense.com)