NEWS RELEASE

Hamamatsu Photonics introduces a new micro PMT encapsulated in a plastic package ideal for downsizing medical diagnostic devices and environmental analyzers.
This new micro PMT goes on sale on October 1, 2019.

August 29, 2019
Hamamatsu Photonics K. K.
Headquarters: 325-6, Sunayama-cho, Naka-ku, Hamamatsu City, Japan
President and CEO: Akira Hiruma

Hamamatsu Photonics now offers a new micro PMT “R12900U” housing the world’s smallest photomultiplier tube in a miniature plastic package designed to easily mount on electronic circuit boards. Installing this new micro PMT to serve as a photodetector means environmental analyzers, portable medical diagnostic devices and so on can now be drastically downsized for convenient use anywhere needed including patient bedsides.

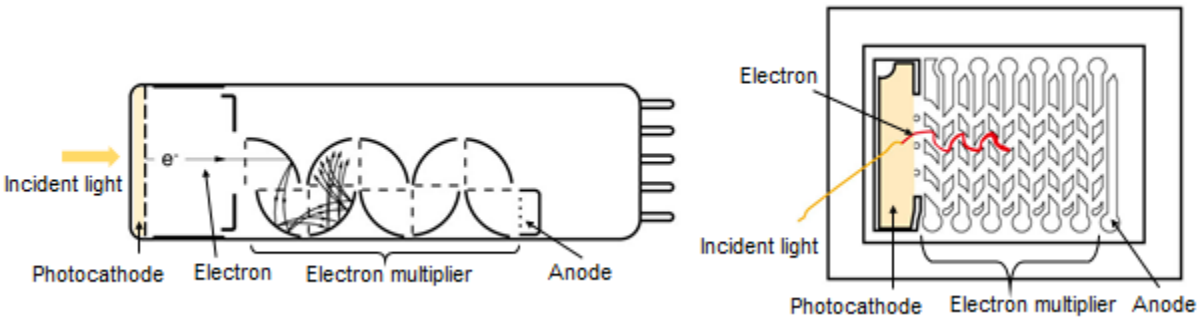
This new micro PMT is available for sale starting from October 1, 2019, mainly for medical device and analytical instrument manufacturers in domestic and overseas markets. We are also developing an even smaller micro PMT, aiming to start shipping sample products next spring.

This new micro PMT will be on display at the JASIS 2019 exhibition held in Makuhari Messe (Mihama-ku, Chiba-city, Japan) for 3 days from September 4 (Wed) to 6 (Fri). This is Asia’s largest exhibition of the latest in analytical and scientific instruments.

<About micro PMT>

A photomultiplier tube (often abbreviated PMT) is a vacuum tube capable of detecting very low level light making it useful in broad-ranging diverse fields such as medical diagnosis, chemical analysis, industrial measurement, and academic research. It basically consists of a photocathode that converts light into electrons, an electron multiplier that multiplies the number of electrons, and an anode that collects and outputs the electrons as electrical signals. Most manufacturing processes for ordinary photomultiplier tubes are carried out by hand, so miniaturizing and mass-producing photomultiplier tubes has been a difficult challenge.

In 2010, by applying the cutting-edge MEMS or Micro-Electro-Mechanical Systems technology used for semiconductor manufacturing, we developed a micro PMT that is small enough to fit on a fingertip yet offers performance characteristics equal to conventional photomultiplier tubes. We also produce micro PMT modules integrated with peripheral circuits and sell these for use in compact stand-alone medical diagnostic devices, environmental analyzers and so on.



Structure of ordinary photomultiplier tube (left) and micro PMT (right)

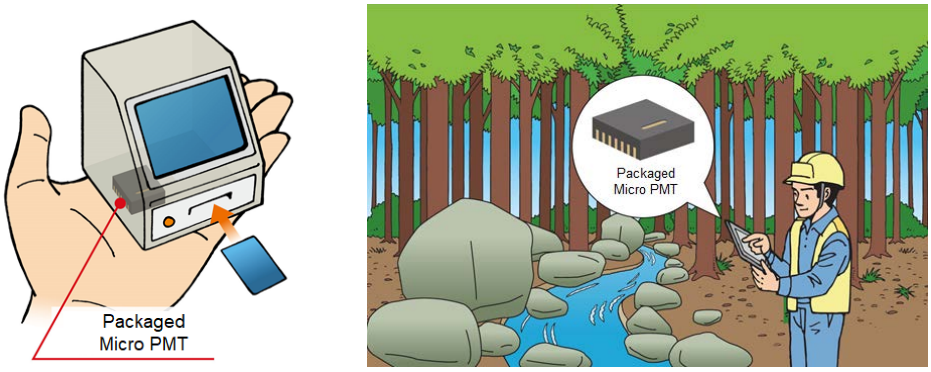
<Product overview>

This new micro PMT is encapsulated in a plastic package that contains no peripheral circuits.

The micro PMT itself is extremely small and has no wiring leads so mounting it on electronic circuit boards is not easy. Operating a micro PMT also requires a high-voltage power supply circuit to apply a voltage of about 900 V and a voltage divider circuit to distribute voltage to each electrode of the electron multiplier. To make micro PMT easier to use, we provide micro PMT modules that combine a micro PMT with the peripheral circuits into a single unit that easily installs into equipment. Even so, there are now increasing demands for much smaller micro PMT that expand design freedom for even further downsizing of currently available medical diagnostic devices, environmental analyzers and so on.

To meet the ever-growing market demand, we developed this new micro PMT encapsulated in a plastic package having no peripheral circuits and whose volume is reduced to about 1/9th that of currently available micro PMT modules while keeping the cost down. This new micro PMT can easily mount on electronic circuit boards and boosts design freedom for flexible layout of the peripheral circuits and components to match the size and shape of equipment. For example, this new micro PMT can be installed and used in nearly any narrow and limited space desired by the user or in equipment with multiple measurement points located close to each other. This allows designing compact medical diagnostic devices that provide immediate results at the patient's bedside, portable environmental analyzers that can be carried anywhere needed and so on. Downsizing the equipment also helps reduce the amount of samples such as blood, curbs the amount of reagents required for reactions, and takes a load off both patients and the environment.

We will continue developing even smaller micro PMT to meet more sophisticated demands such as simultaneous analysis of multiple samples performed by arraying multiple micro PMTs in a single unit. We are aiming to start shipping sample products using this micro PMT from next spring.



Application example to medical diagnostic device (left) and environmental analyzer (right)

<Main product features>

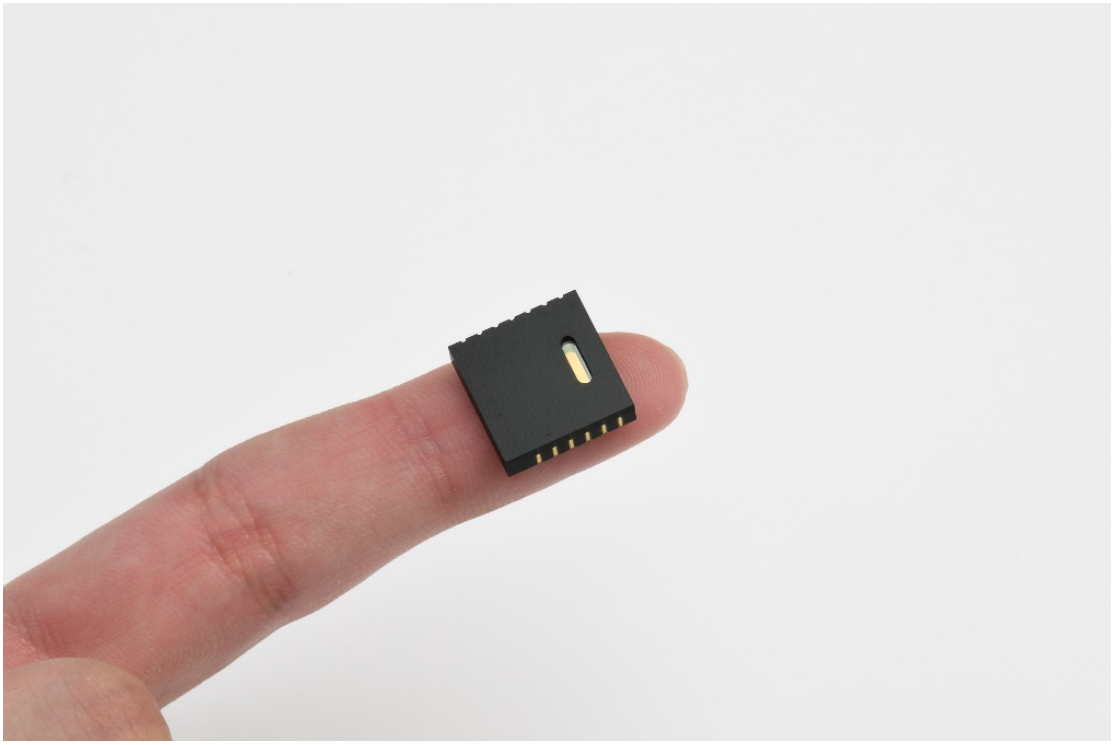
1. Small size, volume slashed to 1/9th that of ordinary micro PMT modules
   The size of this new micro PMT was reduced by eliminating the peripheral circuits normally used in micro PMT modules. It has dimensions of only 14 mm×14 mm×3.5 mm (W×H×D) and volume was reduced to 1/9th that of micro PMT modules while keeping the cost down. This new micro PMT will help increase design freedom to allow flexible layout of peripheral circuits and components to match the size and shape of customer equipment. The peripheral circuits are separately required to operate this new micro PMT.

2. Easily mounts on circuit boards
   New micro PMT is encapsulated into a plastic package designed to easily mount on electronic circuit boards. The size is small enough to fit on a fingertip, making it easy to handle.

● Main specifications

Parameter	R12900U	Unit
Effective photocathode area (W×H)	4.0 × 1.0	mm
Spectral response range	300 to 650	nm
Weight	1.1	g
Maximum supply voltage	1,150	V
Maximum average anode current	5	μA
Dimensions (W×H×D)	14 × 14 × 3.5	mm

●Product release date: Tuesday, October 1, 2019
●Sales target: 1,000 units per year in first year and 10,000 units per year after 3 years



Micro PMT R12900U