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USHIO Begins Sample Shipments of High Light Output 1900nm SWIR LEDs

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Ushio Inc. (hereinafter referred to as "Ushio") is pleased to announce the commencement of sample shipments for its new line of Short Wavelength Infrared (SWIR) LED devices with an emission wavelength of 1900nm. Mass production is scheduled to begin in October 2023.

These products are an addition to the high-efficiency SWIR LED "epitex D Series" that was developed in 2020. While the previous "epitex D Series" had emission wavelengths ranging from 1050nm to 1750nm, the new lineup expands the wavelength range up to 1900nm, achieving the world's highest class^{※1} in both output power and efficiency for 1900nm band LEDs.

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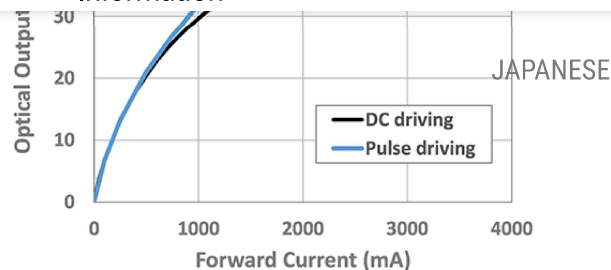
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Operating Temperature	Topr	-40~+85	°C	
Storage Temperature	Tstg	-40~+100	°C	
Soldering Temperature	TSOL	250	°C	
Optical and Electrical Characteristics				
Parameter	Symbol	Typ.	Unit	Test Condition
Forward Voltage	VF	1.2	V	IF=1A
	VFP	1.6		IFP=2A*2
Total Radiated Power	PO	29	mW	IF=1A
		45		IFP=2A*2



※1: Based on internal research conducted by Ushio

※2: Pulse Current Conditions: Duty 1%, Pulse Width 10μs.

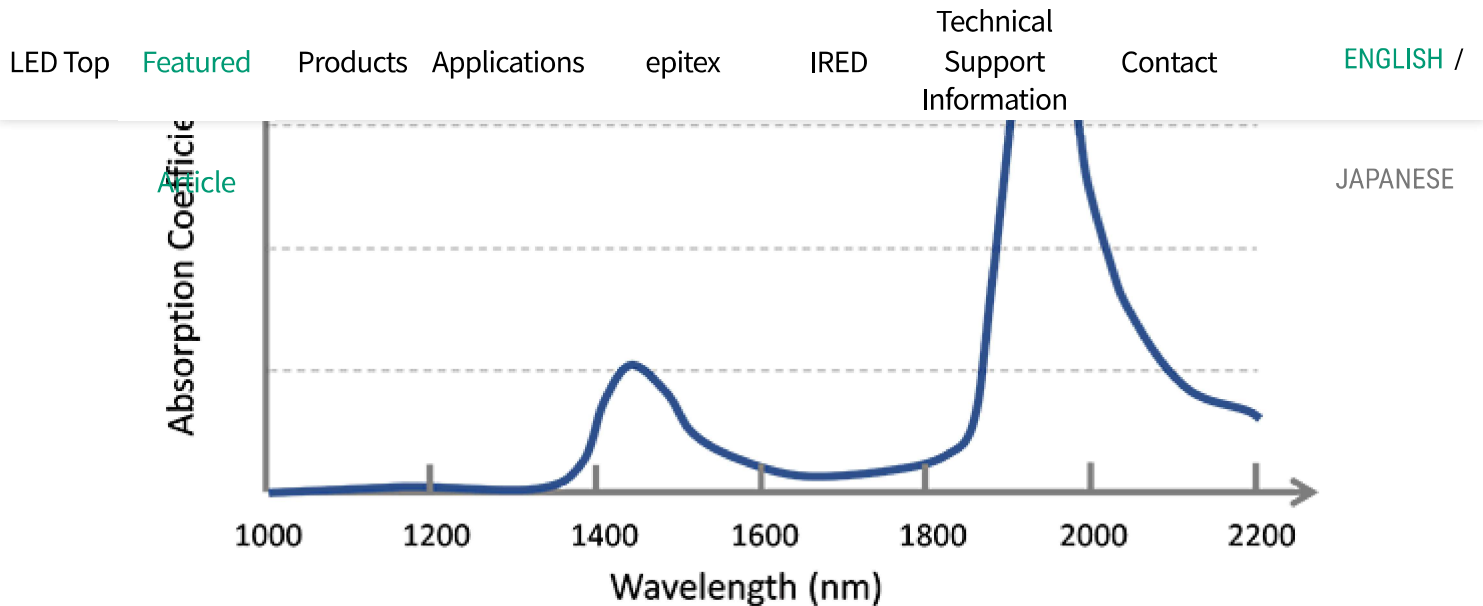
Main Applications

One of the significant characteristics of the 1900nm band is its high water absorption coefficient. Conventionally, the 1450nm band, which has a relatively high water absorption coefficient, has been used as a light source for moisture detection.

However, the 1900nm band has four times higher absorption coefficient compared to the 1450nm band. This allows for significant contrast ratios in imaging cameras even with minute amounts of moisture, making it easier to detect. Therefore, it is well-suited for applications such as moisture detection and sensing.

Relationship Between Wavelength and Water Absorption Coefficient

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Reliability Test Results

In the SWIR wavelength range, indium phosphide (InP) is commonly used as the substrate for epitaxial growth. To achieve a wavelength of 1900nm using an InP substrate, it is necessary to introduce an appropriate amount of strain into the emitting layer. It is generally known that excessive strain in the emitting layer can lead to rapid degradation of the LED device. However, in the newly developed 1900nm LED device, through the optimization of semiconductor structure design, it has been confirmed that there is no qualitative degradation in the emitting layer even during high-temperature continuous operation exceeding 1000 hours.

SWIR D Series SMBB1900D-1100 Reliability Test Data

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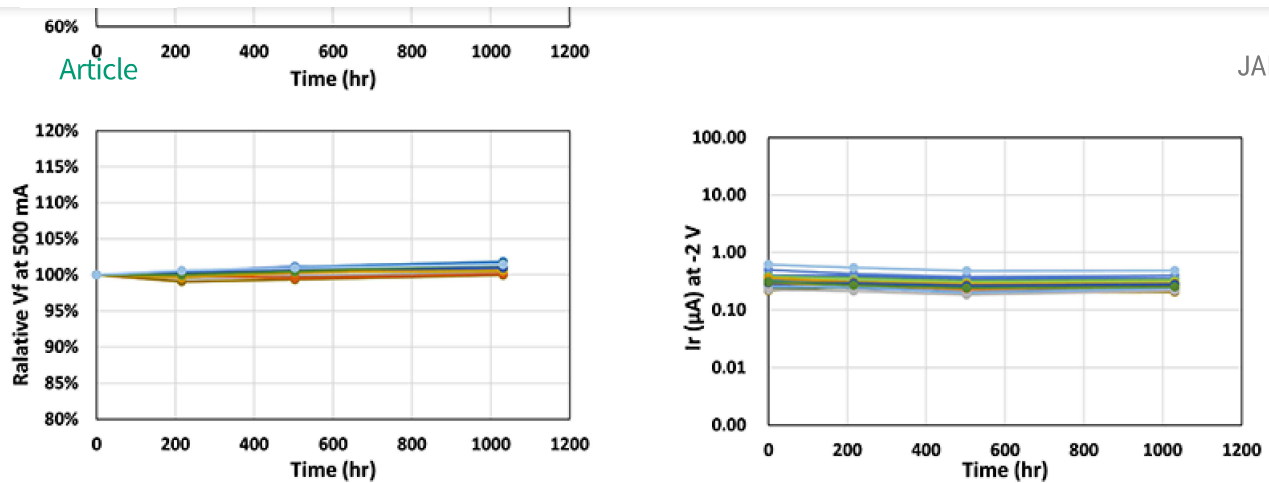
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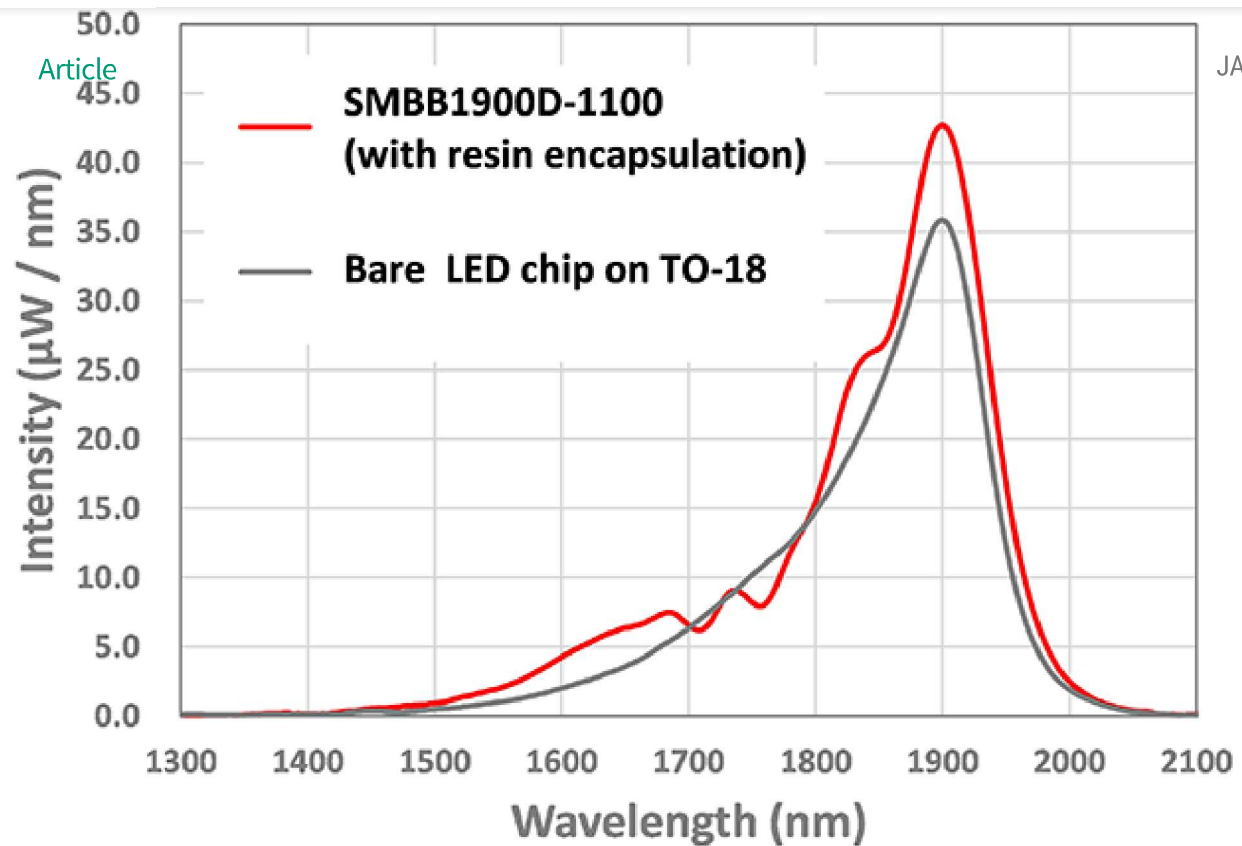
Product Lineup

The product lineup includes both standard power chip products and high-power chip products. The standard power chip products are available in [SMT](#) and [molded](#) packages, while the high-power chip products with a chip size of 1mm² can be mounted on [EDC](#), [SMBB](#), and other packages. For information regarding [product availability and handling](#), please refer to our technical and support information.

In packaged products, the emission spectrum on the shorter wavelength side of 1900nm is affected by light absorption from the encapsulating resin. However, the benefits of improved light extraction efficiency through resin encapsulation outweigh the drawbacks. Therefore, resin encapsulation results in higher light output compared to bare chips. If you require the spectral shape of bare chips, we also offer packaged products with glass windows instead of resin encapsulation. However, please note that the light output may be lower compared to resin encapsulation, and availability

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