

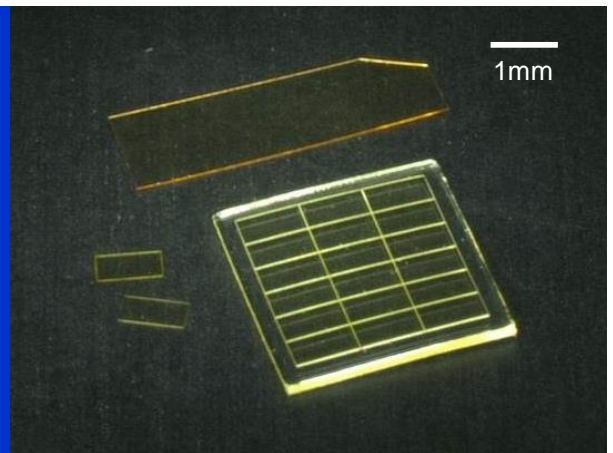
**Highly reliable, ultra-thin wave plate with arbitrary shape, for TE/TM mode conversion and eliminating polarization-dependency in optical circuit**

**Polyimide Half-Wave Plate**

**AT-HWP**

**New !**  
10μm Thickness

The AT-HWP polyimide half-wave plate is made of flexible polyimide film, which is excellent in heat and environment resistance. It is thin and easy to handle, so it is optimal as a wave plate to be inserted into an optical circuit (PLC).



**Eliminates PLC polarization dependency**

Converts TE(TM) mode to TM(TE) mode.  
Eliminates polarization dependency of AWG\* and directional couplers.

\* AWG: Arrayed-waveguide grating

**Low Insertion Loss**

Ultra-thin 10μm type.  
Since it is transparent at the transmission wavelength, there is almost no transmission loss.

**Any Size or Shape**

Miniaturization (minimum 250 x 250μm) and free shape are also possible.  
Made of easy-to-cut film, so you can freely design size and shape.

**Specifications**

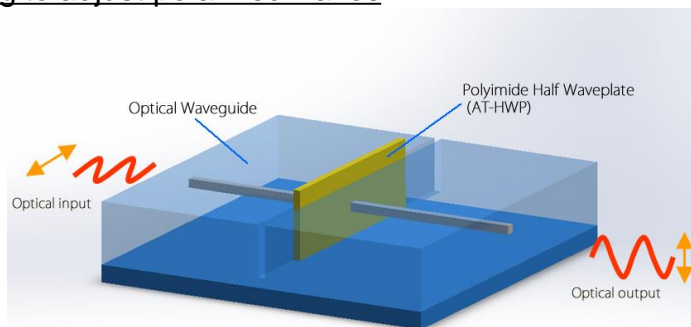
\* Based on NTT Advanced Technology measurements.

Type	AT-HWP Polyimide Half-Wave Plate
Extinction Ratio*	≥25 dB (@1550 nm)
Thickness*	10~15 ±2μm
Size	0.25 x 0.25 mm ~ 3 x 5 mm (Dimension and aspect ratio can vary with this range upon consultation)

## Applications

### TE/TM mode conversion for devices needing to adjust polarized waves

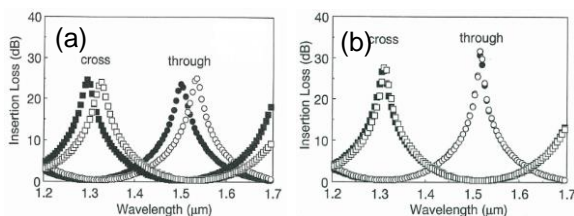
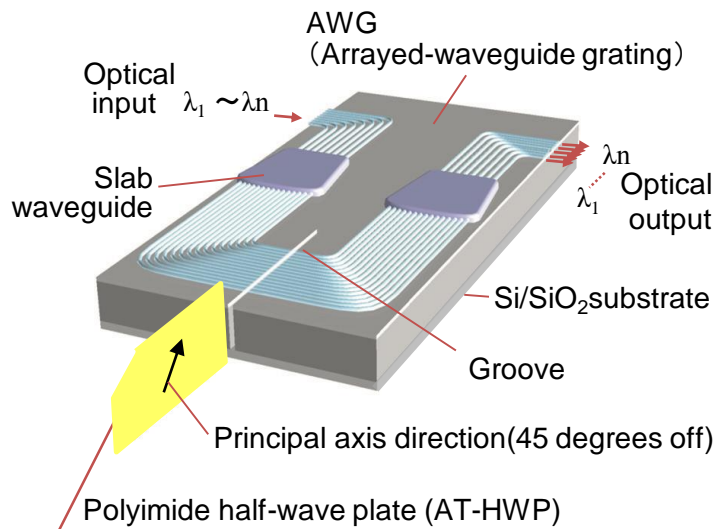
In phase modulators for 100Gbps applying light interference or WSS using LCOS, it is necessary to adjust one polarized wave to the other after polarized wave separation. Since the half-wave plate can rotate in the direction of polarized wave, it is easy to adjust by inserting the half-wave plate into the waveguide or the spatial optical path where the polarized wave needing to be converted goes through.



Polarization mode converter with polyimide wave plate inserted.

### Reduction of polarization dependency in the optical waveguide

Polarization dependency in the waveguide is one factor causing usability trouble. By inserting the half-wave plate in the middle of the waveguide, the losses received before and after polarization conversion become equal, so polarization dependent can be eliminated.



Insertion loss spectra (a) before and (b) after inserting **AT-HWP** into the waveguide gap.

(○: TE through ●: TM through □: TE cross ■: TM cross)

Y. Inoue, H. Takahashi, S. Ando, T. Sawada, A. Himeno, and M. Kawachi, J. Lightwave Technol. 15, 1947 (1997).

## Recommended optical adhesive

AT8224 (UV Curing Type)

UV Irradiation: 10mW/cm<sup>2</sup>, 5min  
Refractive Index @ 589 nm: 1.51

※ We can also discuss about other adhesives according to your request.

## We support handling of polyimide wave plate.

Please inquire about handling, including safe insertion into optical circuits and fixing with optical adhesive.

NTT-AT experts are happy to support the safe handling of polyimide wave plate.

For more information

<http://www.ntt-at.com/product/Waveplate/>



NTT Advanced Technology Corporation

Global Sales Section

NTT Musashino R&D Center, 3-9-11

Midoricho, Musashino-Shi, Tokyo, 180-0012, Japan

TEL: +81 422 39 8934