

DATASHEET



Free-standing wire-grid polarizers

5 μm tungsten wire | PW005 series

The PW005 series comprises precision free-standing wire-grid polarizers for far-infrared and terahertz systems. The grids use 5 μm tungsten wire at 12.5, 16 or 22 μm periods, giving useful ranges from 0.1 THz up to 6 THz, depending on period.

The substrate-free grid avoids absorption, dispersion and beam deviation from a support film. It transmits the electric field perpendicular to the wires and predominantly reflects the parallel field, enabling polarisation selection and attenuation.

Standard circular frames offer nominal clear apertures from 14 to 124 mm. Select a size for the beam diameter and mounting layout; consult the size-specific drawing.

Key features

- 5 μm tungsten wire for fine-grid THz/FIR control
- Broad operating band: approximately 0.1–6 THz
- 12.5 μm period extends usable range to 6 THz
- Substrate-free design avoids loss and dispersion
- Up to six OD sizes and clear apertures
- Polarisation selection, reflection and attenuation
- Custom grids and frames available on request

Application areas

- **6G and Metamaterials**
Control polarisation in THz link and engineered-surface research.
- **Spectroscopy and Molecular Physics**
Probe anisotropic samples with selected incident and detected polarisation.
- **Instrumentation and Metrology**
Calibrate polarisation-sensitive instruments and suppress unwanted components.
- **Spintronics and Ultrafast Dynamics**
Analyse polarisation in time-resolved THz signals.
- **Space-Based Sensing and Astrophysics**
Select polarisation in submillimetre receiver and sensing research.

Selecting the wire period

Period sets a trade-off between pass transmission and extinction ratio. The 12.5 μm grid retains the strongest indicative extinction at higher frequencies; wider periods offer greater pass transmission. Select against the polarisation contrast your system needs.

12.5 μm	0.1–6 THz	16 μm	0.1–3.5 THz	22 μm	0.1–1.5 THz
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Full part list and mounting details: page 2 • Performance guidance: page 3

Questions or custom requirements? info@purewavepolarizers.com

Configurations and integration

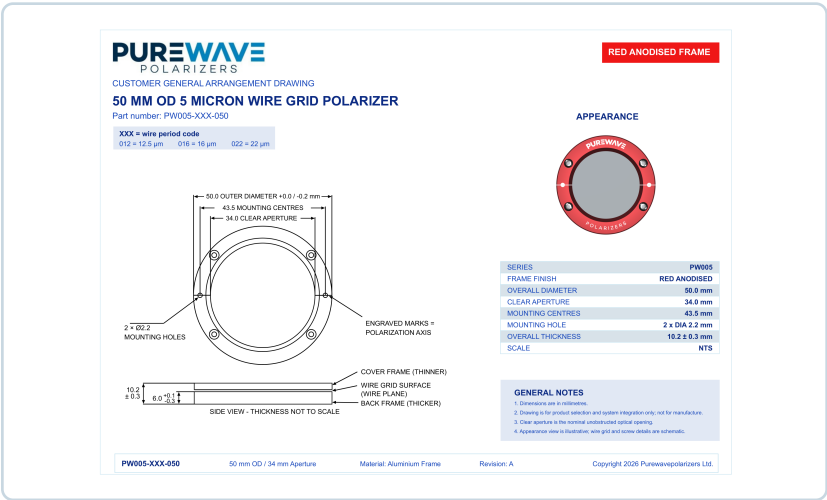
All listed parts use 5 µm tungsten wire in an anodised aluminium frame. Dimensions below are nominal; use the size-specific general arrangement drawing when designing the mount.

Part number	Range (THz)	Period (µm)	OD (mm)	ID (mm)	Thickness (mm)
12.5 µm period					
PW005-012-025	0.1-6	12.5	25	14	7
PW005-012-050	0.1-6	12.5	50	34	10
PW005-012-075	0.1-6	12.5	75	56	10
PW005-012-100	0.1-6	12.5	100	80	10
16 µm period					
PW005-016-025	0.1-3.5	16	25	14	7
PW005-016-050	0.1-3.5	16	50	34	10
PW005-016-075	0.1-3.5	16	75	56	10
PW005-016-100	0.1-3.5	16	100	80	10
PW005-016-125	0.1-3.5	16	125	100	12
22 µm period					
PW005-022-025	0.1-1.5	22	25	14	7
PW005-022-050	0.1-1.5	22	50	34	10
PW005-022-075	0.1-1.5	22	75	56	10
PW005-022-100	0.1-1.5	22	100	80	10
PW005-022-125	0.1-1.5	22	125	100	12
PW005-022-150	0.1-1.5	22	150	124	12

Useful range depends on period and required extinction ratio. Thickness values are rounded nominal dimensions; see size-specific drawings for tolerances.

General arrangement drawing — example only

50 mm OD example: PW005-XXX-050



For mounting and integration

The drawing gives OD, 34.0 mm clear aperture, 43.5 mm mounting centres, two Ø2.2 mm fixing holes and the frame side profile. Consult the full-size drawing before machining a mount.

Drawings and STEP files for all polarizers: see our website

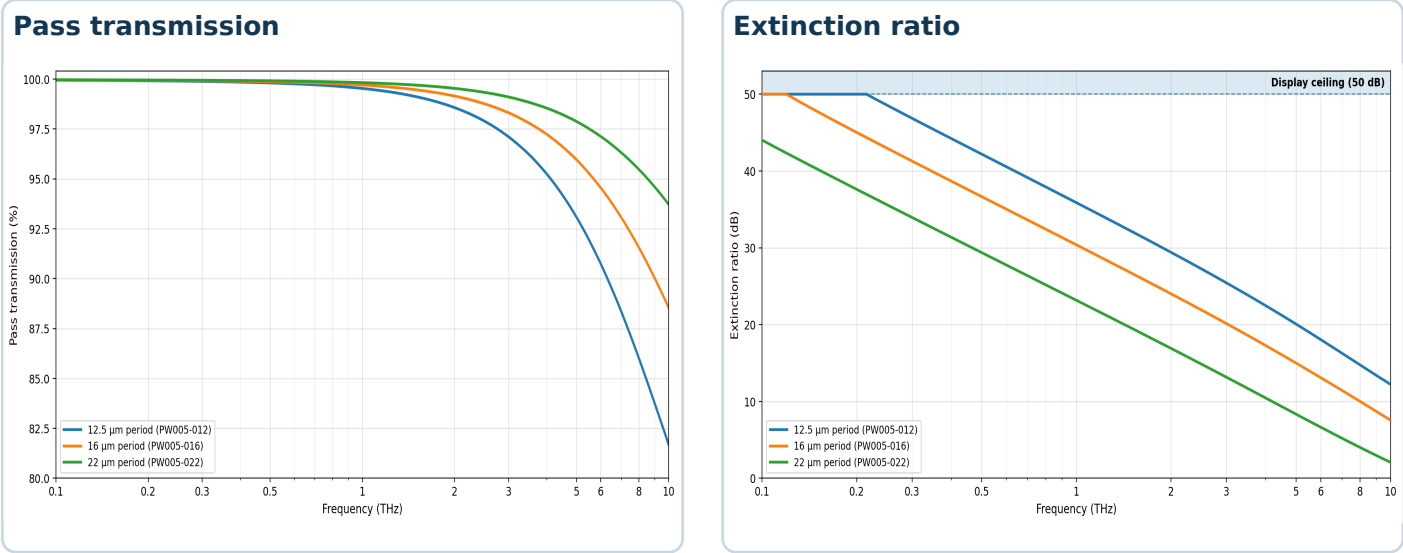
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Engraved marks identify the polarisation axis. STEP models show nominal geometry; use the size drawing for mounting.

Performance at normal incidence

These curves and selected values show expected normal-incidence pass transmission and extinction ratio for the three PW005 wire periods. Actual performance can vary with alignment, system configuration and component tolerances; the curves are not individual test certificates.



Graphs extend to 10 THz to show the trend. See page 2 for the useful range of each period.

Selected performance values

Frequency		12.5 μm period		16 μm period		22 μm period	
THz		Pass Tp (%)	ER (dB)	Pass Tp (%)	ER (dB)	Pass Tp (%)	ER (dB)
0.1		>99.9	>50	>99.9	>50	>99.9	44
0.3		99.9	47	99.9	41	99.9	34
0.5		99.8	42	99.9	37	99.9	29
1		99.5	36	99.7	30	99.8	23
3		97.0	25	98.0	20	99.1	13
6		91.0	18	95.0	13	97.0	7
10		82.0	12	89.0	8	94.0	2

Tp values are indicative; trailing zeros standardise formatting, not accuracy. $ER = 10 \log_{10}(Tp/Ts)$.
ER above 50 dB is clipped at the graph ceiling; 10 THz values are reference only.

Recommended operating range

Recommended ranges are 0.1–6 THz (12.5 μm period), 0.1–3.5 THz (16 μm) and 0.1–1.5 THz (22 μm). Performance outside each range is shown for reference. In particular, 6–10 THz may be more sensitive to component variation and less reliable for specification purposes.

Handling

Handle the polarizer by its frame and avoid contact with the exposed wire grid during mounting and inspection.

Ordering and support

For custom parts, performance questions, regulatory declarations or qualified operating and storage limits, email info@purewavepolarizers.com.