

# Dual-band Zero Bias Detector (ZBD) Datasheet

## Dual-band Zero Bias Detector (ZBD).

The 116x series is a family of passive envelope detectors, also called square-law detectors, based on zero-biased Schottky diodes. 116x series is designed to operate across two waveguide frequency bands. Utilizing exclusive Schottky diode technology and an innovative design approach, these detectors offer high responsivity and exceptionally fast response times.

Each detector is engineered to cover two waveguide bands via two different waveguide flanges and can be operated individually or simultaneously for maximum flexibility.

The 116x series of zero-biased detectors is available from WR-19 (37.5–55 GHz) up to WR-1.5 (500–750 GHz).



Various options can optionally be offered and integrated under customer request:

- Horn antenna
- Waveguide sections compatible with the RF-port
- Waveguide variable or fixed attenuator
- Dedicated RF Source

Please consult [sales@acst.de](mailto:sales@acst.de) for available options for this product type

### Product Features

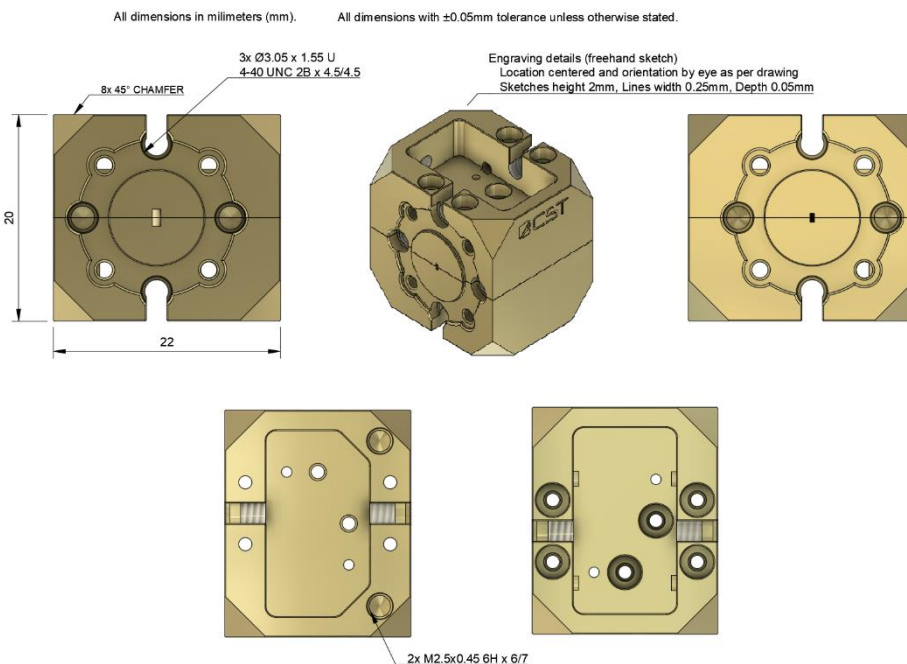
- > Dual frequency band
- > Compactness
- > High-Sensitivity
- > Full Waveguide bandwidth
- > Flat response
- > Simplicity
- > Short response time

### Application Areas

- > Laboratory instrumentation
- > Active imaging
- > Telecommunications
- > Radiometry



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## General Specification

Description		Specification
Output port *	ZBD	K-Connector
RF Input Power **	Linear (typ.)	<-30 dBm****
	1dB Compression (typ.)	<-25 dBm
Max. RF Input Power	Port 1	0 dBm
	Port 2	0 dBm
Maximum Weight (without screws and covers)		60 gr
Block dimensions		18x22x20 mm
RF Waveguide Orientation		E-Plane
Operational Temperature and Humidity (at the case)		5 °C to 45 °C
Storage Temperature		5 °C to 65 °C
Storage Humidity		0% to 80%
Material ***		Brass
Finishing		Gold-Plated

\* Output connector can be adapted to user needs under request.

\*\* Higher RF power will lead to lower responsivities than those specified below.

\*\*\* Different block materials can be used under user request.

\*\*\*\* Minimum RF power detectable strongly depends on bandwidth and calibration settings of the measurement equipment.

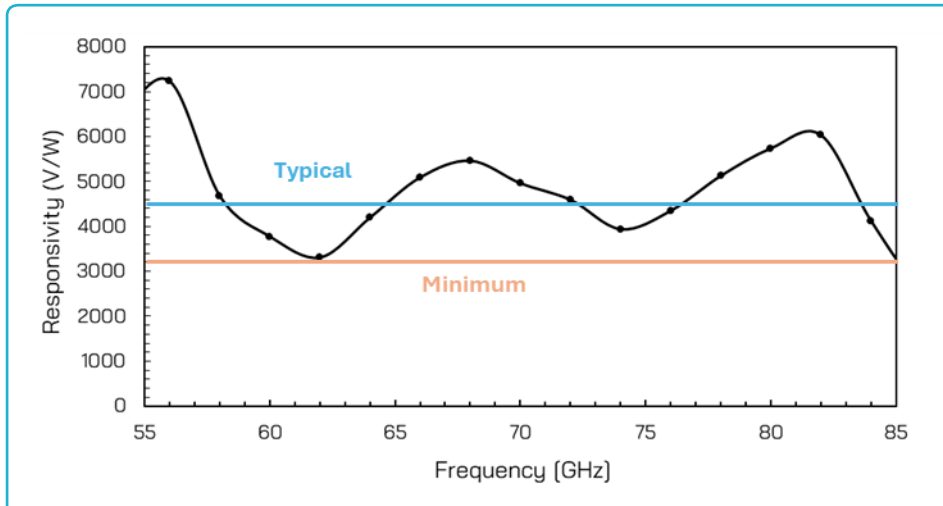
## Technical Specification

Flange Port I (UG-387/U)	Frequency Port I (GHz)	Typical Sensitivity (V/W)	Flange Port II (UG-387/U)	Frequency Port II (GHz)	Typical Sensitivity (V/W)	Max. Response Rate (GHz)	Product ID
WR-19	37.5-55	9500	WR-10	75-110	6500	15	<b>116A</b>
WR-15	45-70	9000	WR-8	90-140	6000	20	<b>116B</b>
<b>WR-12</b>	<b>55-85</b>	<b>4500</b>	<b>WR-6.5</b>	<b>110-170</b>	<b>3500</b>	<b>25</b>	<b>116C</b>
WR-10	70-110	8500	WR-5.1	140-220	6000	40	<b>116D</b>
WR-8	85-130	8000	WR-4.3	170-260	5500	40	<b>116E</b>
<b>WR-6.5</b>	<b>110-165</b>	<b>7500</b>	<b>WR-3.4</b>	<b>220-330</b>	<b>4000</b>	<b>40</b>	<b>116F</b>
WR-5.1	130-200	6000	WR-2.8	260-400	3500	40	<b>116G</b>
<b>WR-4.3</b>	<b>165-250</b>	<b>5000</b>	<b>WR-2.2</b>	<b>330-500</b>	<b>1600</b>	<b>40</b>	<b>116H</b>
WR-2.8	250-375	2500	WR-1.5	500-750	1000	40	<b>116K</b>

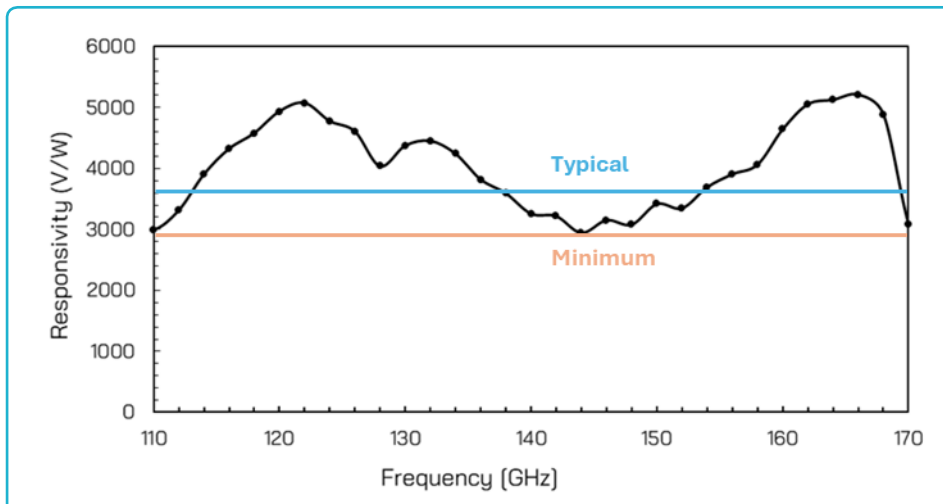
\*Yellow color means "under development".

# Dual-band Zero Bias Detector (ZBD) Datasheet

## 116C Responsivity Performance Port 1

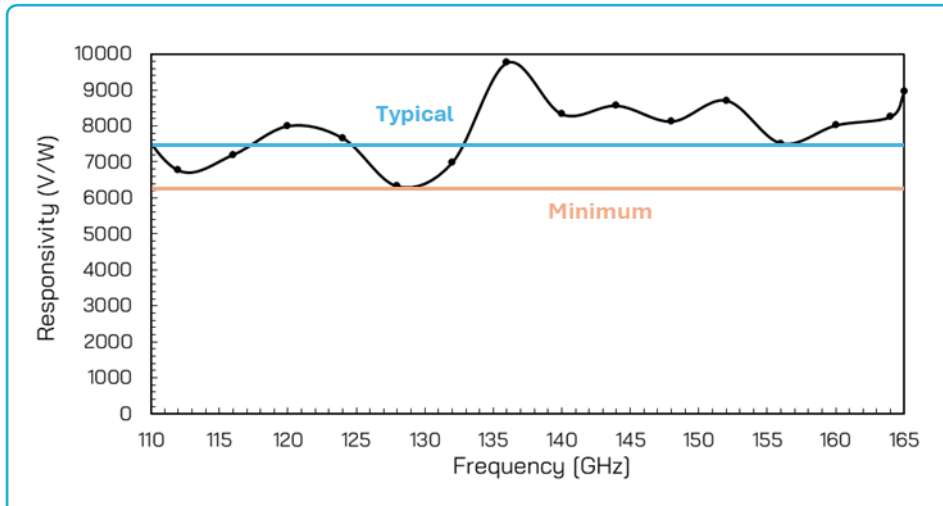


## 116C Responsivity Performance Port 2

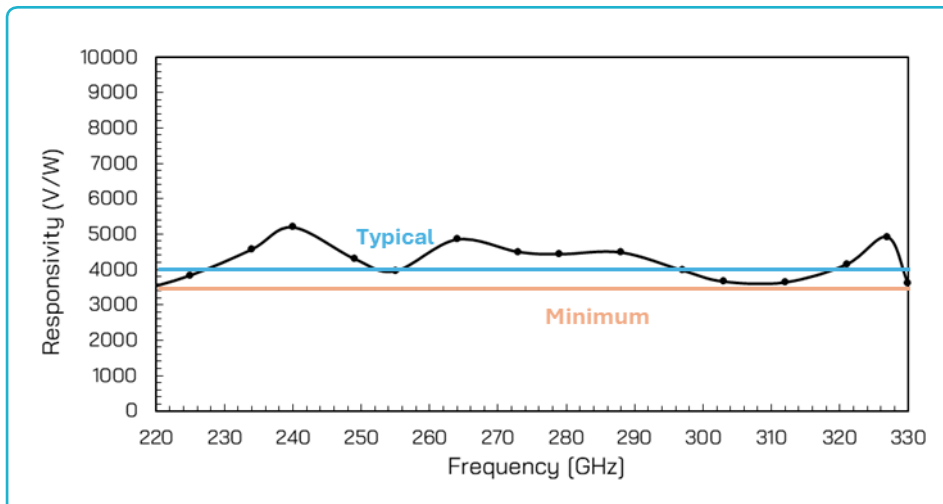


# Dual-band Zero Bias Detector (ZBD) Datasheet

## 116F Responsivity Performance Port 1

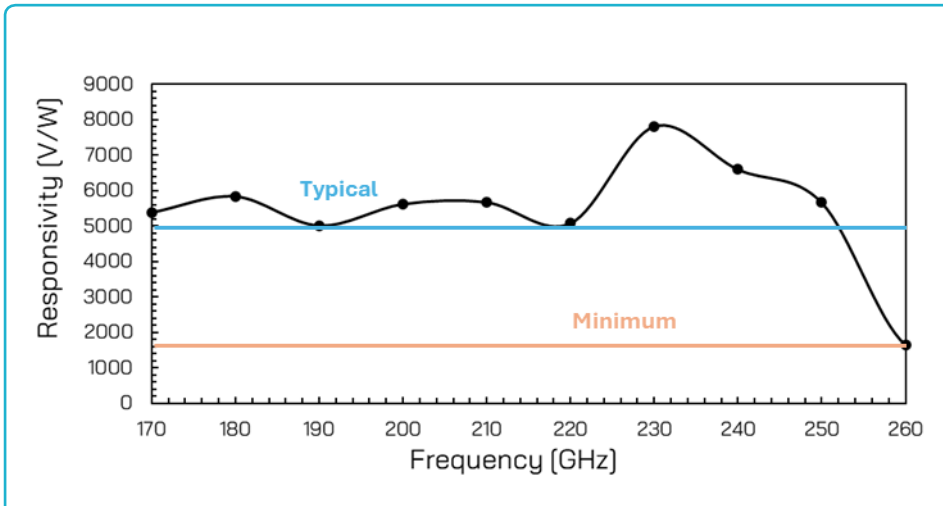


## 116F Responsivity Performance Port 2

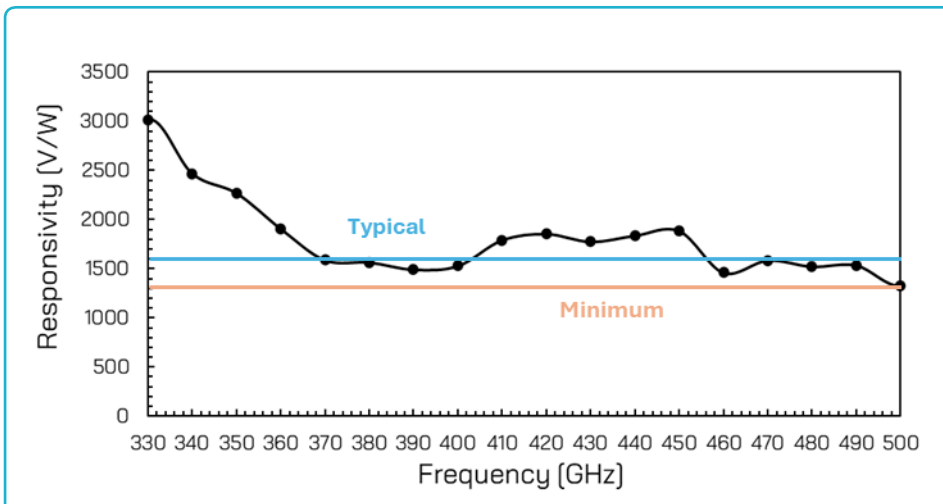


# Dual-band Zero Bias Detector (ZBD) Datasheet

## 116H Responsivity Performance Port 1



## 116H Responsivity Performance Port 2



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## Responsivity vs RF Input Power in 116C

The plot below illustrates how the responsivity changes with RF input power for device 116F at 280 GHz. At low power levels, the output voltage is proportional to RF power, and the responsivity remains essentially constant. As the input power increases the detector responsivity reduces with increasing the input power.

This behavior is often described through the 1-dB compression point, defined as the power level at which the responsivity has dropped by 1 dB from its nominal value.

Although the overall shape of the curve is similar for all ZBDs offered by ACST, the exact compression point may vary from device to device.

