



VDI Zero Bias Detector Specifications

Product Name	WR15ZBD	WR12ZBD	WR10ZBD	WR8.0ZBD	WR6.5ZBD	WR5.1ZBD	WR4.3ZBD	WR3.4ZBD	WR2.8ZBD
RF Frequency (GHz)	50-75	60-90	75-110	90-140	110-170	140-220	170-260	220-330	260-400
RF Input Flange	WR-15 UG-385/U	WR-12 UG-387/U	WR-10.0 UG-387/U-M	WR-8.0 UG-387/U-M	WR-6.5 UG-387/U-M	WR-5.1 UG-387/U-M	WR-4.3 UG-387/U-M	WR-3.4 UG-387/U-M	WR-2.8 UG-387/U-M
Typical Responsivity (V/W) ^{††}	2000	2000	2000	2000	2000	2000	1750	1500	1500
Typical NEP (pW/√Hz) - for ZBD / ZBD-F	13.2 / 3	13.2 / 3	13.2 / 3	13.2 / 3	13.2 / 3	13.2 / 3	15.1 / 3.5	17.6 / 4.1	17.6 / 4.1
Detector Output - for ZBD (Internal ESD Protection)	DC to ~250kHz / 2.9mm(f)								
Detector Output - for All ZBD-F (External ESD Protection)*	DC to ~50kHz / BNC(f)								
Detector Output - for ZBD-F06 (6 GHz Bias-Tee / Amplifier)	~50MHz to ~6GHz / SMA(f)								
Maximum Available Response Rate (GHz)**	~10	~12	~15	~19	~24	~31	~36	~40	~40

Product Name	WR2.2ZBD	WR1.9ZBD	WR1.5ZBD	WR1.2ZBD	WR1.0ZBD	WR0.8ZBD	WR0.65ZBD	QOD	
RF Frequency (GHz)	325-500	400-600	500-750	600-900	750-1100	900-1400	1100-1700	100-1000	
RF Input Flange	WR-2.2 UG-387/U-M	WR-1.9 UG-387/U-M	WR-1.5 UG-387/U-M	WR-1.2 UG-387/U-M	WR-1.0 UG-387/U-M	~25dBi Diagonal Horn [‡]	WM-164 UG-387/U-M	Silicon Lens [‡]	
Typical Responsivity (V/W) ^{††}	1250	1000	750	250	200	100	100	100-250	
Typical NEP (pW/√Hz) - for ZBD / ZBD-F	9.1 / 1.9	11.4 / 2.4	15.2 / 3.2	45.5 / 9.7	56.8 / 12.2	113.7 / 24.4	113.7 / 24.4	50-115 / 10-25	
Detector Output - for ZBD (Internal ESD Protection)	DC to ~250kHz / 2.9mm(f)								
Detector Output - for All ZBD-F (External ESD Protection)*	DC to ~50kHz / BNC(f)								
Detector Output - for ZBD-F06 (6 GHz Bias-Tee / Amplifier)	~50MHz to ~6GHz / SMA(f)								
Maximum Available Response Rate (GHz)**	~40	~40	~40	~40	~40	~40	~40	~40	~40

[†]~25dBi is specified from center frequency of waveguide band. Gain changes as a function of frequency.

^{††}Typical Responsivity assumes optimal RF input power applied to ZBD. Higher RF input power will reduce responsivity. Responsivity may be reduced for ZBD-F configurations and near band edges.

[‡] Output Lens Directivity: 25-35dB nominal.

*External ESD Protection Circuit is included (detached) with every Fast Detector.

**Maximum Available Response Rate applies to Fast Detectors with no external components (bias-tee, amplifier, external ESD protection circuit, etc) attached to the detector output. External components may limit the maximum detector response rate.

General Notes:

- All ZBDs are specified for 0dBm maximum recommended input power with a 5dBm damage limit. Optimal RF input power is <-25dBm with an approximate 1dB compression point of -15dBm.
- The customer is liable for repair costs of detectors damaged by ESD, and are recommended to use stringent ESD precautions when making connections to the detectors.
- ZBDs, by default, are shipped with an internal ESD protection circuit. While this circuit protects the diode from ESD, it also reduces the maximum detector response to ~250kHz into a high impedance load.

Fast Detector Option

- Fast Detectors (denoted by "-F" at the end of the part name) are Zero-Bias Detectors optimized for Fast Detection. Contact VDI for more information.
- Standard Fast Detector configuration includes 6 GHz bias tee and amplifier (attached) and an External ESD Protection Circuit (detached). Higher frequency bias-tee and amplifiers are available for purchase. Contact VDI for more information.
- External ESD Protection Circuit is included with all ZBD-F configurations for applications where low frequency detector output is more appropriate (DC to ~50kHz, BNC(f)). See Operational Manual for more information.
- Fast Detectors (WR2.8 and higher frequency) can achieve >40GHz response rate. Contact VDI for more information.

How to Order:

PRODUCT-EXT or **PRODUCT-FXX**

PRODUCT= Choose from "Product Name" in above table.

FXX = Fast Detection option with bias tee / amplifier (see examples below)

Examples:

WR8.0ZBD: 90-140GHz Zero-Bias Detector with Internal ESD Protection circuit option

WR8.0ZBD-F06: 90-140GHz Fast Detector, Shipped with 6 GHz Bias Tee and Amplifier (attached) and External ESD Protection Circuit (detached)

WR8.0ZBD-F20: 90-140GHz Fast Detector, Shipped with 20 GHz Bias-Tee and Amplifier (attached) and External ESD Protection Circuit (detached). Contact VDI for pricing.

WR8.0ZBD-F40: 90-140GHz Fast Detector, Shipped with 40 GHz Bias-Tee and Amplifier (attached) and External ESD Protection Circuit (detached). Contact VDI for pricing.

Typical data is available on the VDI website.