

Detectors

Description and purpose

D5 series microwave detectors are designed to detect continuous and modulates microwave signals within wide frequency range. Special design and up-to-date components of the detectors provide small dimensions and wide operating frequency range, excellent bandpass flatness and output SWR flatness, and wide dynamic range. The detectors are used in measuring microwave equipment and automatic power adjustment systems. The detector response time depends on resistance (R_L) of connected load. For pulse modulated input signal, build-up and fall times of detector output pulses are shown in the table below. Build-up time is assumed as time required to change output voltage of detector from 10% to 90% at power level of -10 dBm (0.1 mW). Self-capacitance of the detector is 30 pF. Typical voltage sensitivity (γ) for low-level signal operation is 500 mV/mW. Typical load is 30 kOhm.



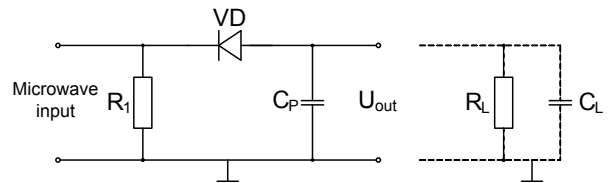
	$R_L=50$ Ohm	$R_L=1$ MOhm
Build-up time, T_r	7 ns	240 ns
Fall time, T_f	7 ns	350 ns

To calculate approximate build-up time (T_r), use the following formula:

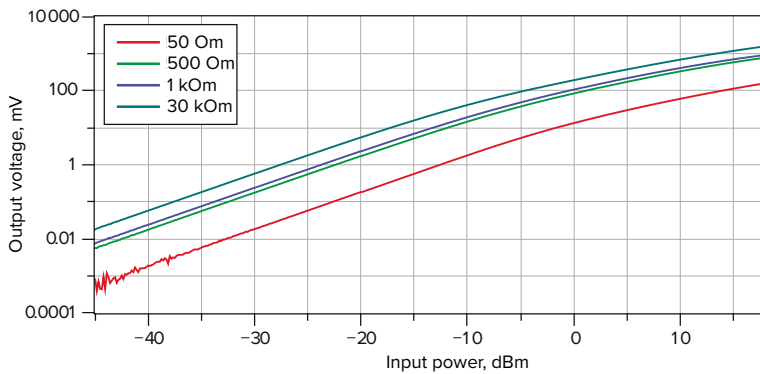
$$T_r = \frac{4.5 \cdot R_V \cdot R_L \cdot (C_L + C_V)}{R_V + R_L}$$

- where $R_V = 1$ kOhm – diode video resistance;
- R_L – resistance of connected load;
- C_L – capacitance of connected load;
- C_p – detector capacitance.

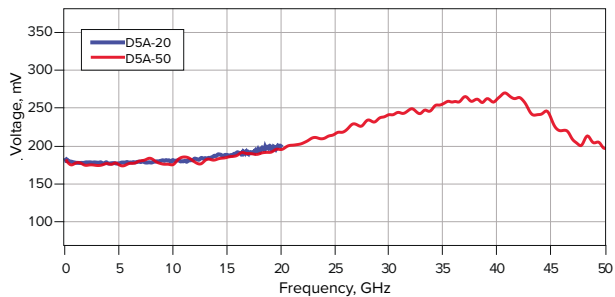
Equivalent circuit of power detector



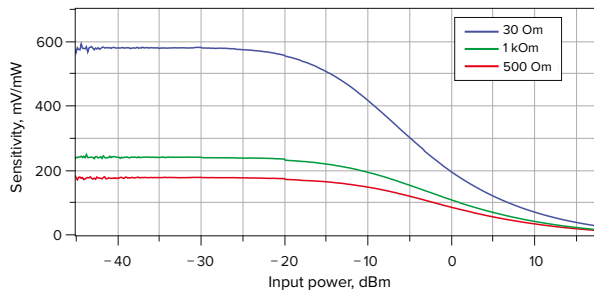
Detector specifications



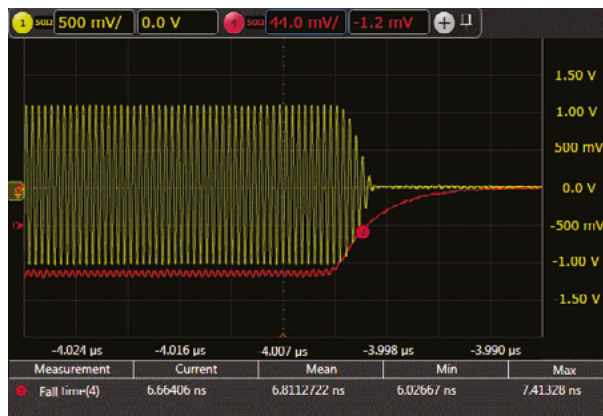
Detector specifications for various loads



Frequency response (for input power of 0 dBm)



Voltage sensitivity



Pulse modulated signal and respective detector output signal. Maximum fall and build-up times are 7.5 ns.

Specifications

Model	Connectors		Frequency range, GHz	Bandpass flatness, dB	VSWR, max	P _{MAX} , dBm	Polarity	Fig.
	Input	Output						
D5A-20-03-03R	Type IX, ver. 3	Type IX, ver. 3	0.01 ... 20	± 1.5	1.25	+21	-	1
D5B-20-03-03R	(male)	(female)						
D5A-20-03-13R	Type IX, ver. 3	3.5 mm (female)						
D5B-20-03-13R	(male)							
D5A-20-13-03R	3.5 mm (male)	Type IX, ver. 3						
D5B-20-13-03R		(female)						
D5A-20-13-13R	3.5 mm (male)	3.5 mm (female)						
D5B-20-13-13R		(male)						

Dimensions

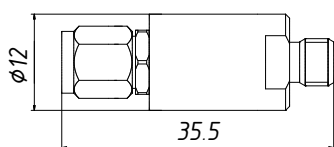


Fig. 1

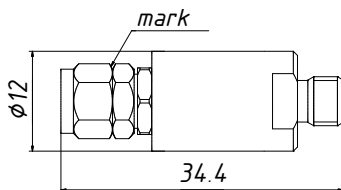


Fig. 2

Ordering example

- D5A-20-03-03R Microwave detector, type IX, ver. 3 (male) – type IX, ver. 3 (female) connectors.