DM213: General-Purpose Microwave Detector

Description

DM213 (Fig. 1) is a general-purpose, small housing, zero-bias Schottky diode coaxial microwave detector covering the frequency range 100 MHz – 4 GHz but intended primarily for 915 MHz and 2450 MHz industrial applications.

The detector delivers well-scaled DC voltage approximately proportional to the input power.

Fig. 1. Microwave detector DM213.

Specifications

Frequency range	880 – 930 MHz	2350 – 2550 MHz
Frequency response variation (max)	±0.25 dB	±0.5 dB
Typical output voltage for P = 1 mW, R_{LOAD} = 33 kΩ	190 mV	220 mV
VSWR max	2	
VSWR typ	1.3	
Statistical spread of output voltage	±1 dB (3-σ deviation)	
Output voltage polarity	Negative	
Output voltage temp. variation (5 to 65 °C)	< 3 dB	
Video resistance (typ)	9 kΩ	
Max input working power	10 mW	
Max input power (destruction limit)	100 mW	
Input RF connector	SMA-male	
Output DC connector	SMA-female	
Dimensions (L × W × H)	38.7 × 18 × 11 mm	
Mass	15 g	
Operating temperature range	-10 °C to +65 °C	
Storage temperature range	-20 °C to +80 °C	

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Typical Transfer Characteristics

Typical detector transfer characteristics for an ambient temperature of T_a = 25 °C and load resistance R_L = 33 kΩ are shown in Fig. 2, where P is the input microwave power in dBm and V is the (negative) output DC voltage in mV. Note that $P_{dBm} = 10*\log(P_{mW})$.

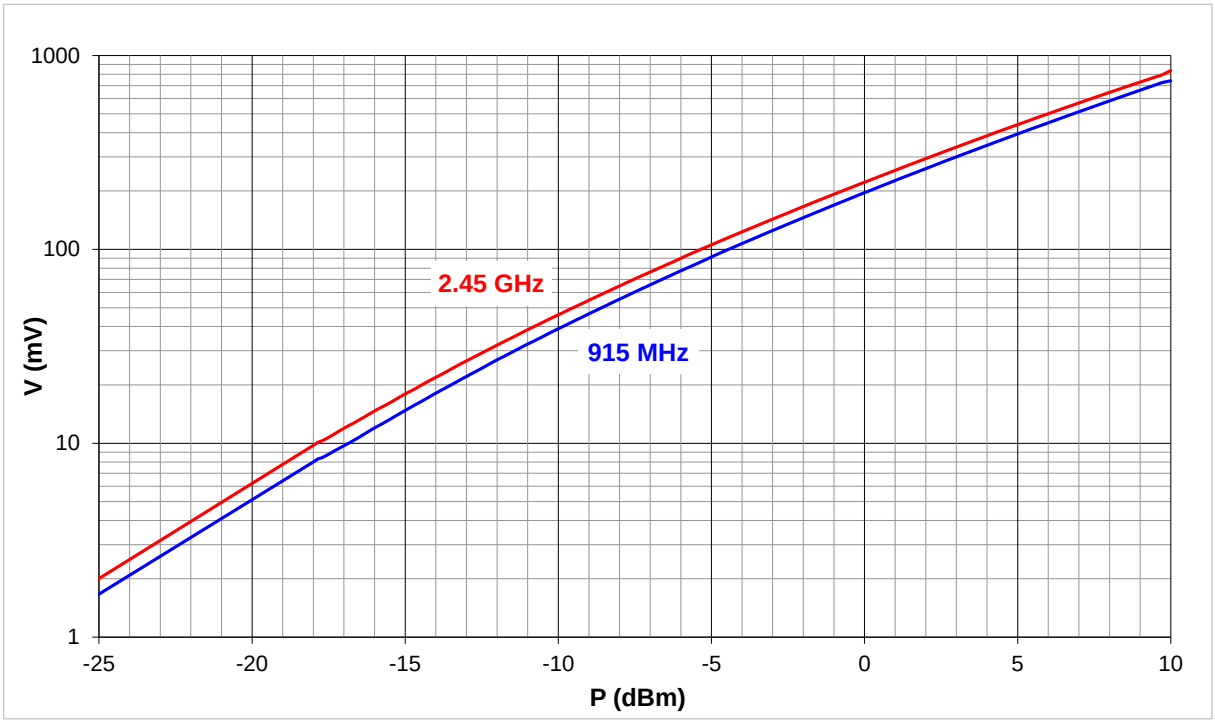

Fig. 2. Typical DM213 transfer characteristics.

Detector Correction Curves

A detector correction curve is the inverse of the transfer curve. It can serve, in particular in its mathematical form, for determining the input power from the output voltage. Fig. 3 shows a typical DM213 correction curves in lin-lin format.

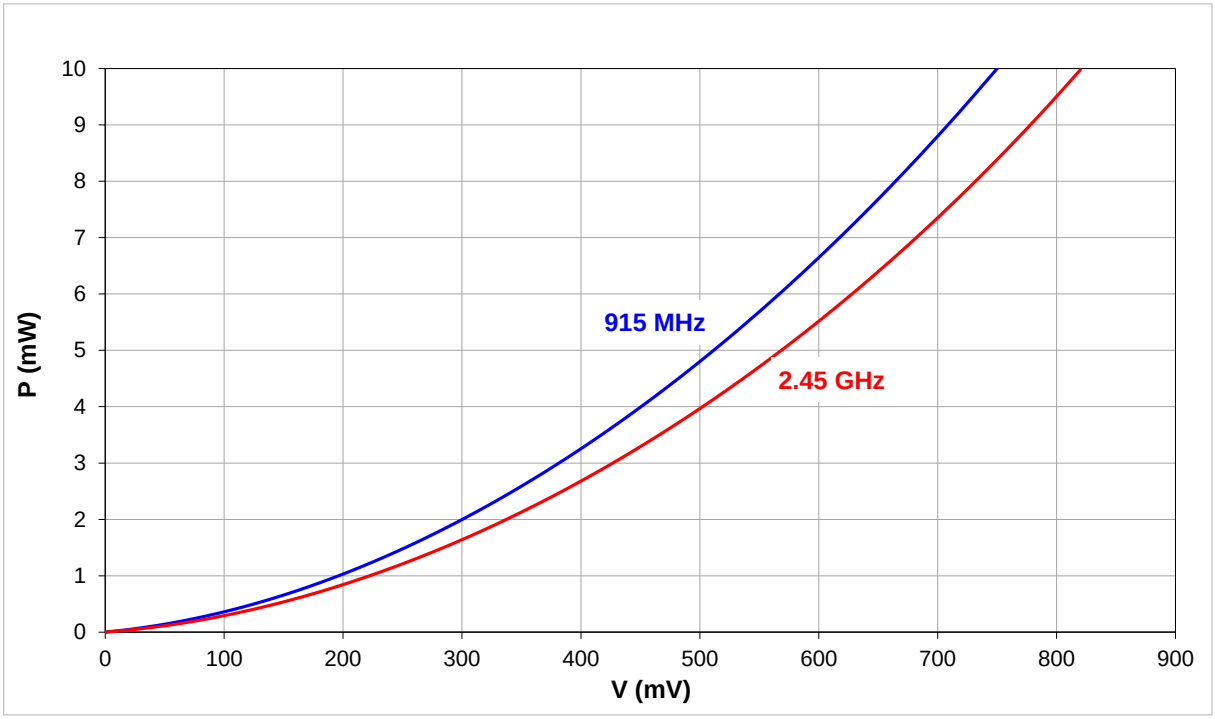

Fig. 3. Typical DM213 correction curves.

The curves can be approximated by the polynomial

$$P = d_1 V + d_2 V^2 + d_3 V^3 + d_4 V^4$$

where P is the input microwave power in milliwatts, V is the output voltage in millivolts, and d_i are the coefficients listed in Tab. 1. The curves in Fig. 3 and the coefficients in Tab. 1 are valid for T_a = 25 °C, R_L = 33 kΩ **and for the output voltages not exceeding about 800 mV**.

Tab. 1. Polynomial coefficients for the DM213 detector correction curves.

Frequency:	**915 MHz**	**2.45 GHz**
d_1	2.0001365E-03	1.5710780E-03
d_2	1.6422633E-05	1.3937957E-05
d_3	-3.7757650E-09	-4.2596562E-09
d_4	2.7126730E-12	3.6874391E-12

Note

Please be aware that these functions are a statistical average based on evaluation of a number of detectors. The behavior of individual detectors may vary.

Dimensional Drawing

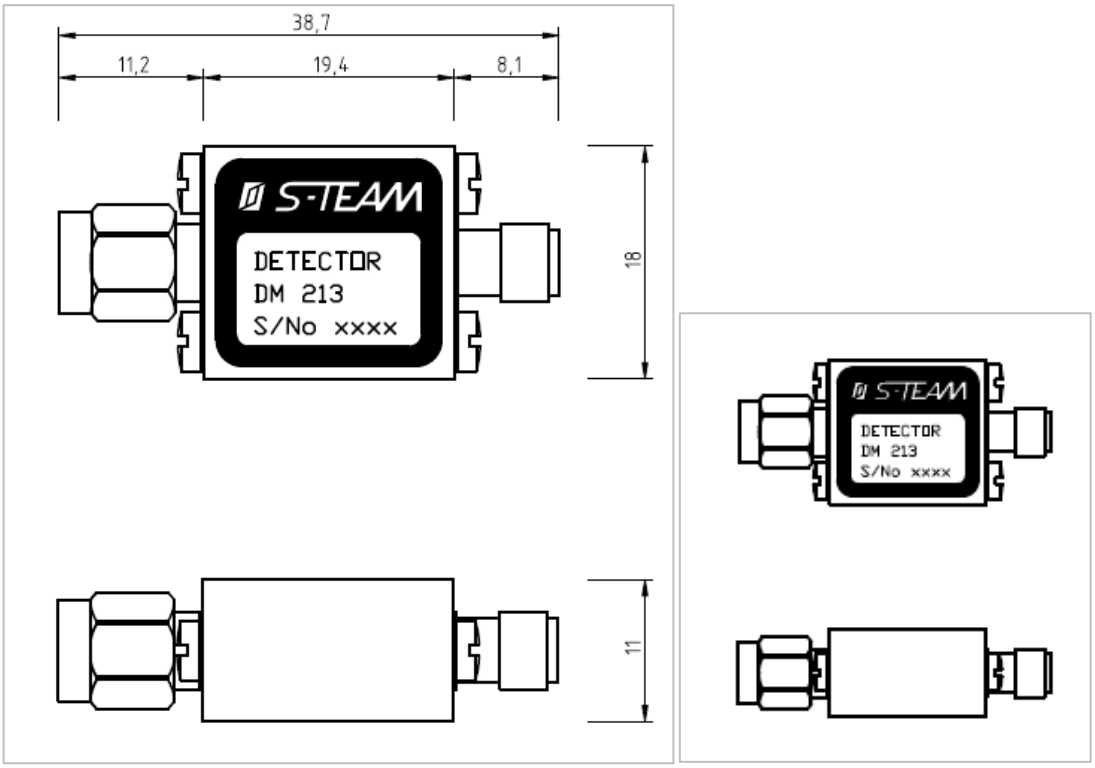

Fig. 4. Basic DM213 dimensions (millimeters). Right: Actual size.