DM211: General-Purpose Microwave Detector

General Description

DM211 is a general-purpose, 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 DM211.

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	N-male	
Output DC connector	BNC-female	
Dimensions (L × W × H)	58 × 26 × 26 mm	
Mass	90 g	
Operating temperature range	-10 °C to +65 °C	
Storage temperature range	-20 °C to +80 °C	

Typical Transfer Characteristics

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

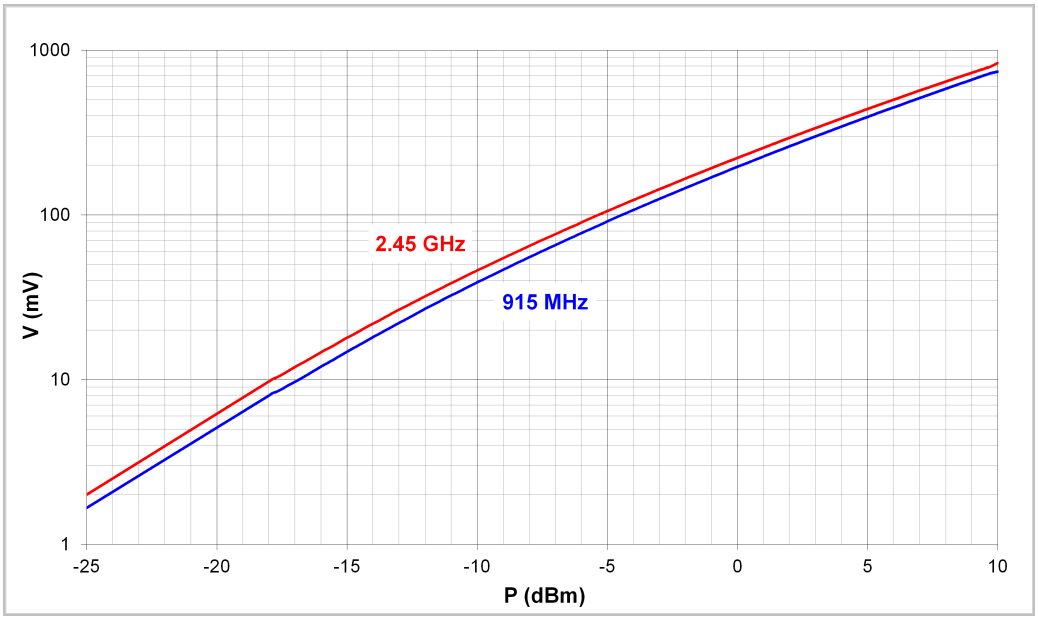

Fig. 2. Typical DM211 transfer characteristics.

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. Typical DM211 correction curves in lin-lin format are shown in Fig. 3 below.

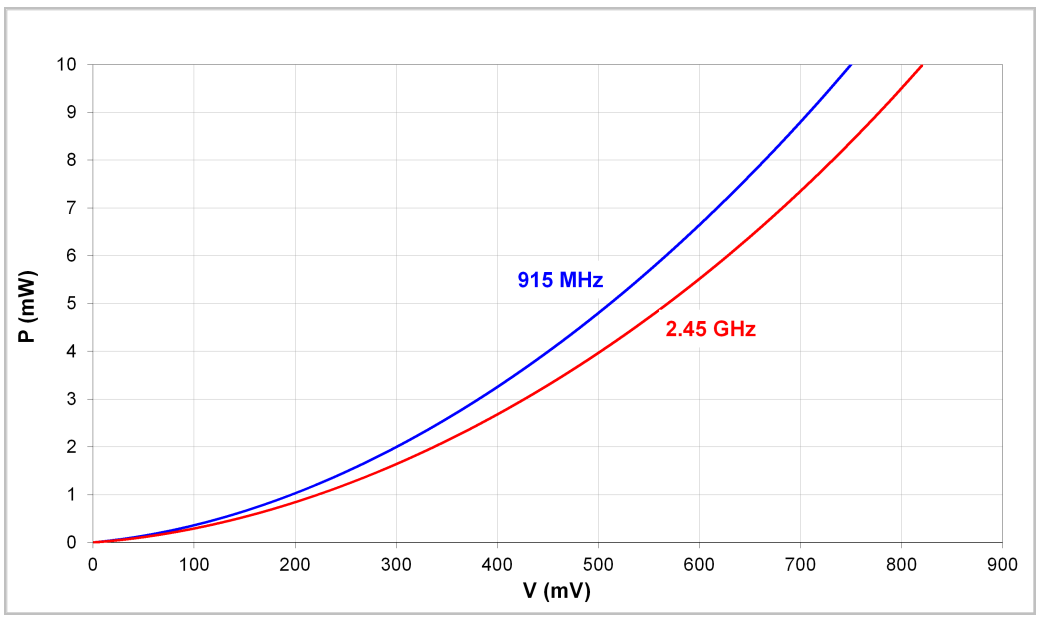

Fig. 3. Typical DM211 correction curves.

The curves can be approximated by the polynomial

$$P = d_1 V + d_2 V^2 + d_3 V^3 + \ldots + d_n V^n$$

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

Tab. 1. Polynomial coefficients for the DM211 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

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

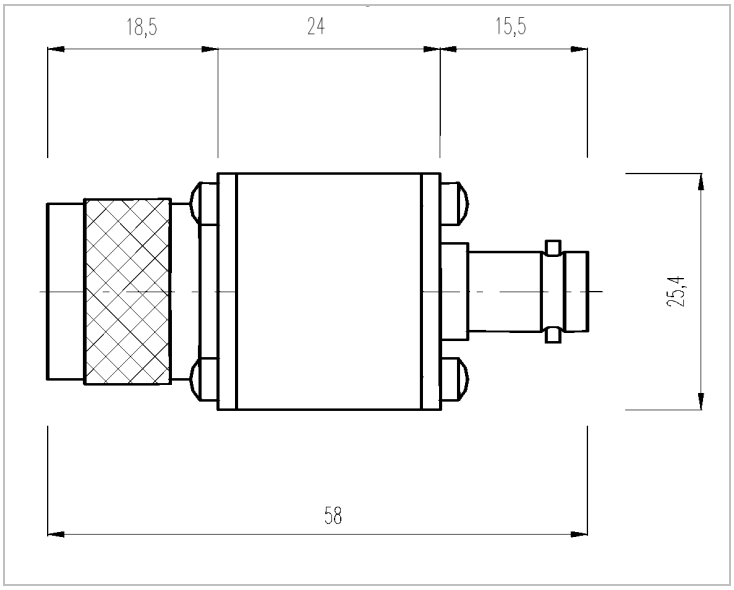

Fig. 4. Basic DM211 dimensions in millimeters.