

DM311/DM313: General-Purpose 5.8 GHz Microwave Detectors

Description

DM311 and DM313 are general-purpose zero-bias Schottky diode coaxial microwave detectors that are intended primarily for 5800 MHz industrial applications. The detectors deliver well-scaled DC voltage approximately proportional to the input power. DM311 has a cubic outline (Fig. 1 left) while DM313 (Fig. 1 right) has a flat outline. Otherwise, their electric parameters are identical.

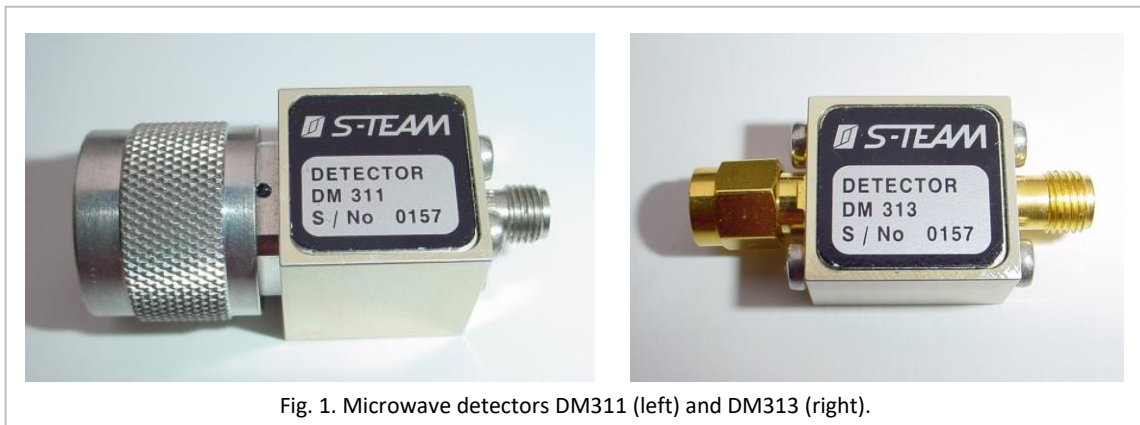


Fig. 1. Microwave detectors DM311 (left) and DM313 (right).

Specifications

Frequency range	5500 – 6100 MHz
Frequency response variation (max)	±0.5 dB
Typical output voltage; $P = 1 \text{ mW}$, $R_{\text{LOAD}} = 33 \text{ k}\Omega$	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 temperature variation (5 to 65 °C)	< 3 dB
Video resistance (typ)	6 k Ω
Max input working power	10 mW
Max input power (destruction limit)	100 mW
Input RF connector	N-male
Output DC connector	SMA-female
Dimensions (L × W × H)	46.9 × 19.4 × 19.4 mm
Mass	DM311: 50 g, DM313: 15 g
Operating temperature range	-10 °C to +65 °C
Storage temperature range	-20 °C to +80 °C

Typical Transfer Characteristic

Typical detector transfer characteristic for the frequency 5800 MHz, ambient temperature $T_a = 25\text{ }^\circ\text{C}$ and load resistance $R_L = 33\text{ k}\Omega$ 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 $P_{\text{dBm}} = 10 \cdot \log(P_{\text{mW}})$.

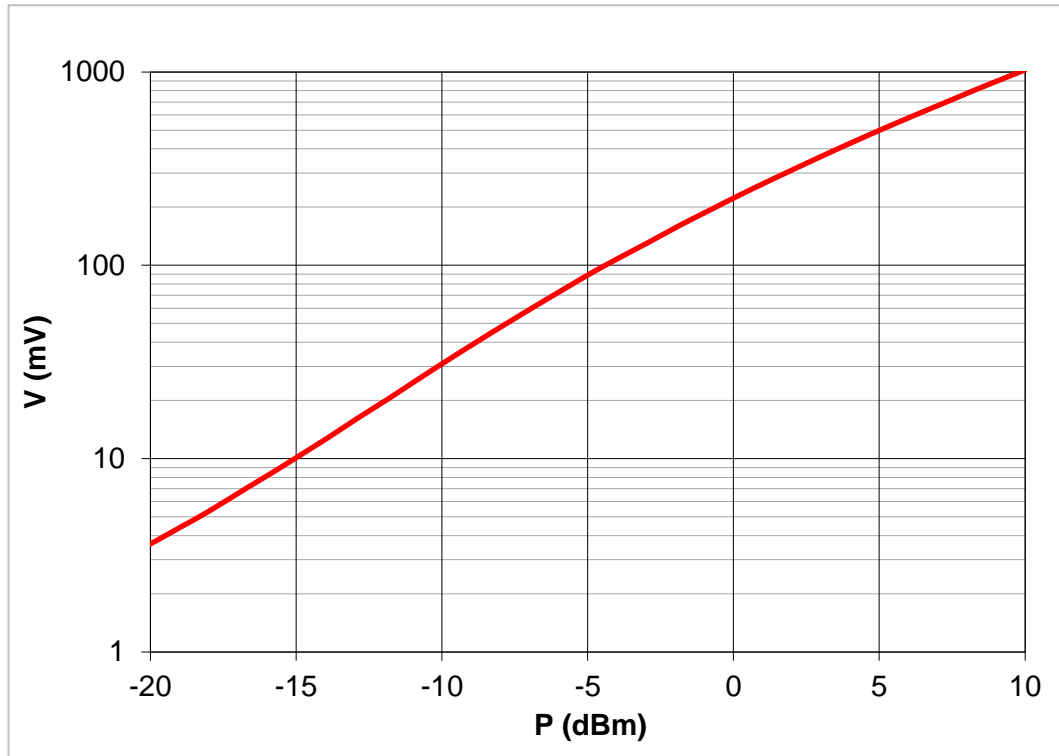


Fig. 2. Typical DM311/DM313 transfer characteristic.

Detector Correction Curve

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 DM311/DM313 correction curve in the lin-lin format.

The curve can be approximated by a 3th degree polynomial

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

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 curve in Fig. 3 and the coefficients in Tab. 1 are valid for $T_a = 25\text{ }^\circ\text{C}$, $R_L = 33\text{ k}\Omega$ and for the output voltages not exceeding 1100 mV.

Tab. 1. Polynomial coefficients for the DM311/DM313 detector correction curves.

Coefficient	Value
d_1	2.9796503E-03
d_2	6.8857676E-06
d_3	-2.9442634E-10

Note

Please be aware that this function is a statistical average based on evaluation of a number of detectors. The behavior of individual detectors may vary.

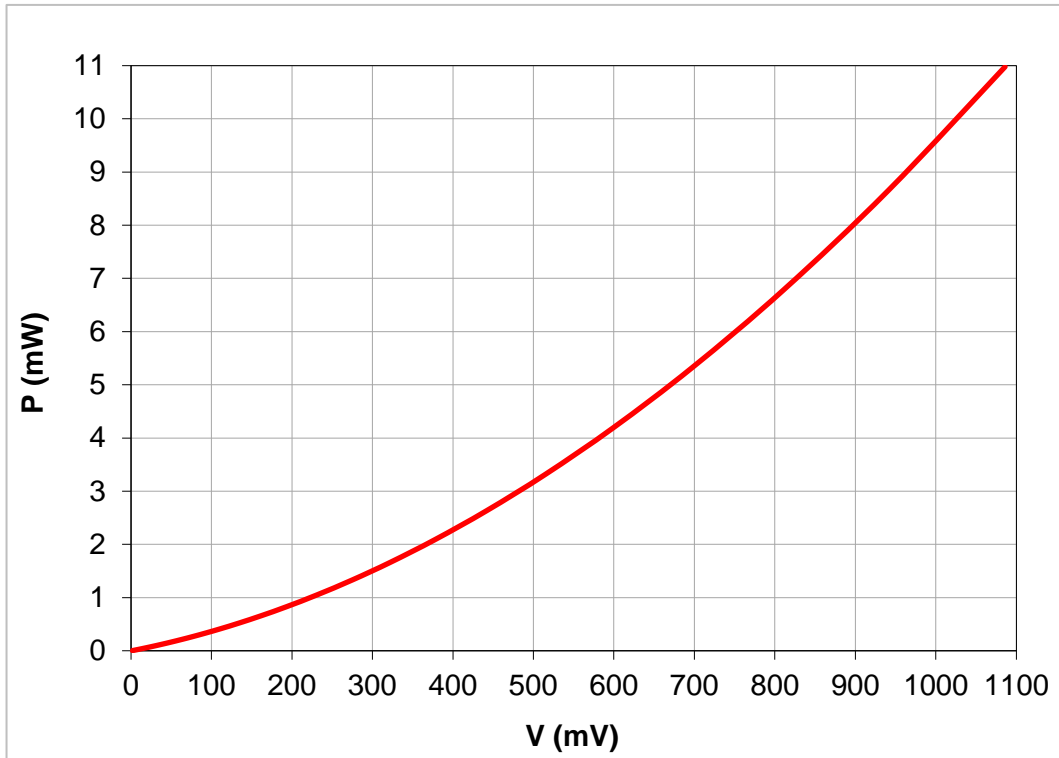


Fig. 3. Typical DM311/DM313 correction curves.

Dimensional Drawings

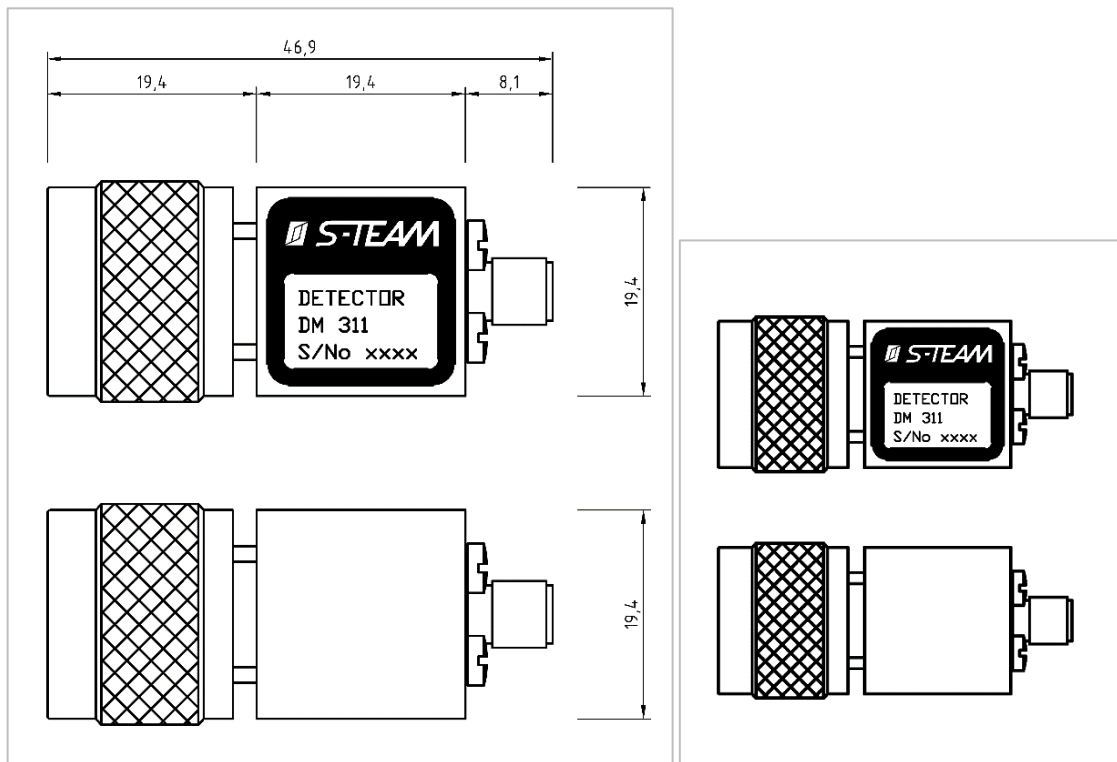


Fig. 4. Basic DM311 dimensions in millimeters. Right: Actual size.

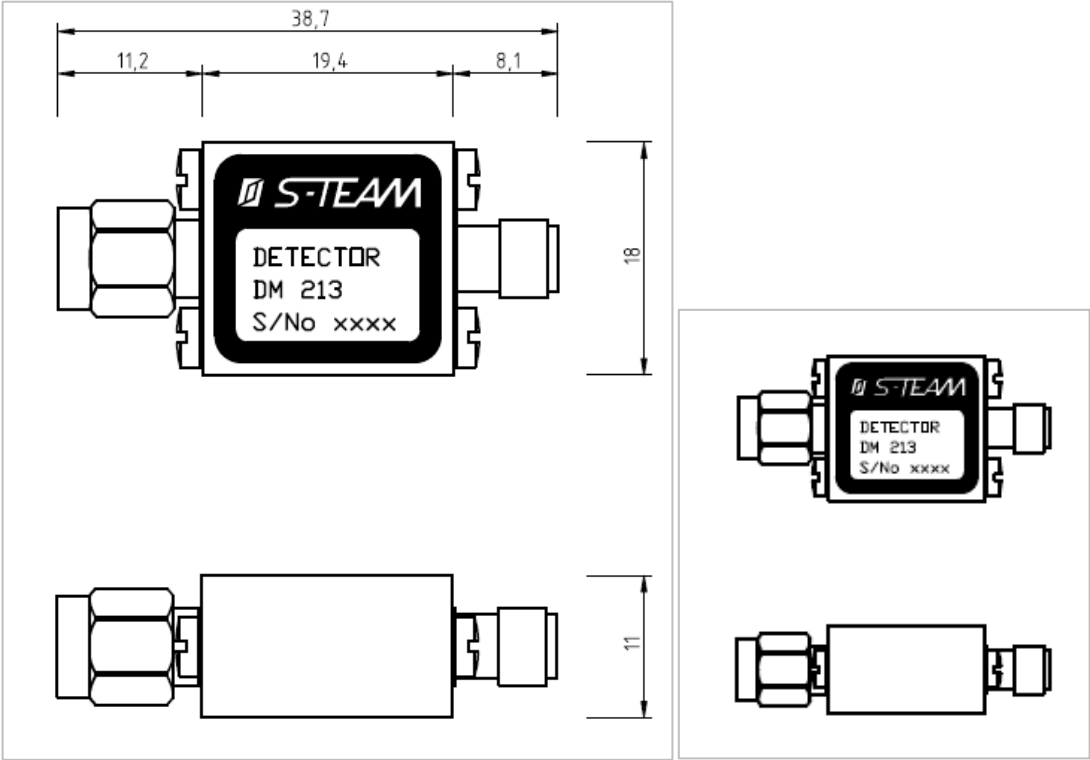


Fig. 5. Basic DM313 dimensions in millimeters (the dimensions are the same as for the DM213 shown). Right: Actual size.