DM214: Fast Temperature-Stable Detector

General Description

DM214 is a tunnel diode coaxial microwave detector intended for 915 MHz and 2450 MHz industrial applications.

The detector delivers well-scaled DC voltage proportional to the input power. The tunnel diode ensures high temperature stability of the output voltage and low video resistance for fast pulse rise/fall times.

Fig. 1. Detector DM214.

Specifications

Frequency range	880 – 930 MHz	2350 – 2550 MHz
Frequency response variation (max)	±0.25 dB	±0.5 dB
Typical output voltage; P_{IN} = 1 mW, R_{LOAD} = 33 kΩ	220 mV	230 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 ^{0}C)	< 0.5 dB	
Video resistance (typ)	120 Ω	
Max input working power	1 mW	
Max input power (destruction limit)	20 mW	
Input RF connector	SMA-M	
Output DC connector	SMA-F	
Dimensions (L × W × H)	38.7 × 18 × 11 mm	

Dimensional Drawing

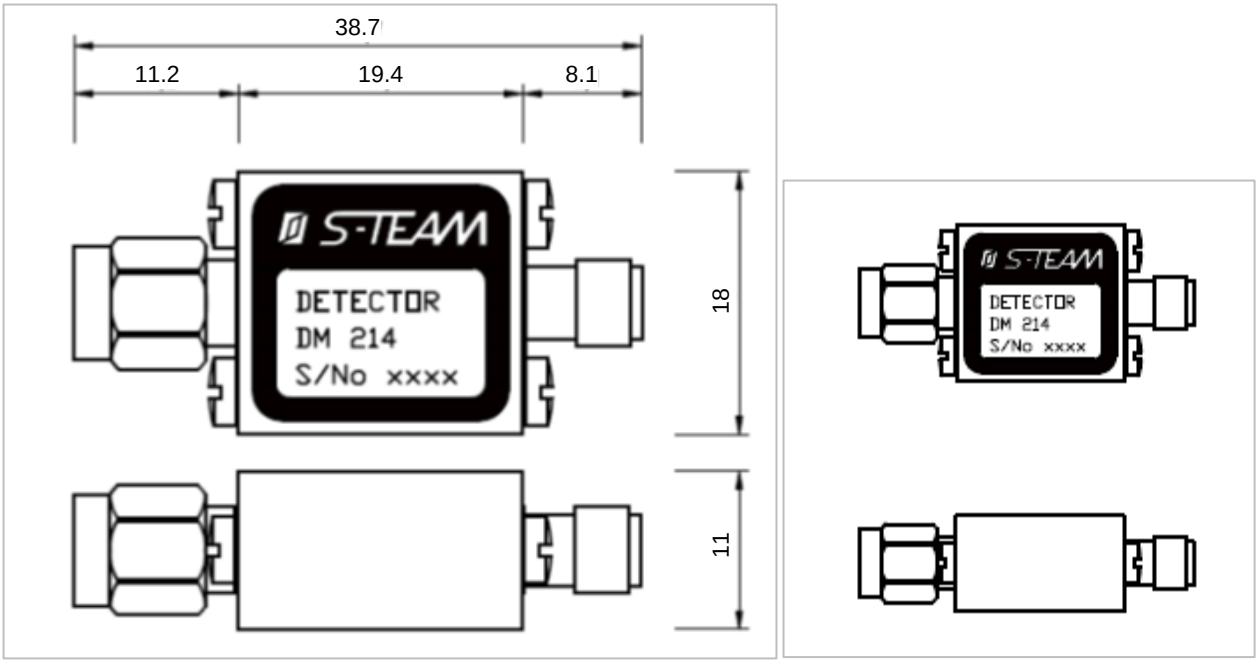

Fig. 2. Basic DM214 dimensions (millimeters). Right: Actual size.

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Typical Transfer Characteristics

Typical detector transfer characteristics for the ambient temperature T_A = 25 °C and load resistance R_L = 33 kΩ is shown in Fig. 3, where P_{IN} is the input microwave power in dBm and V_{OUT} is the (negative) output DC voltage in mV. Note that $P_{IN\_dBm} = 10*\log(P_{IN\_mW})$.

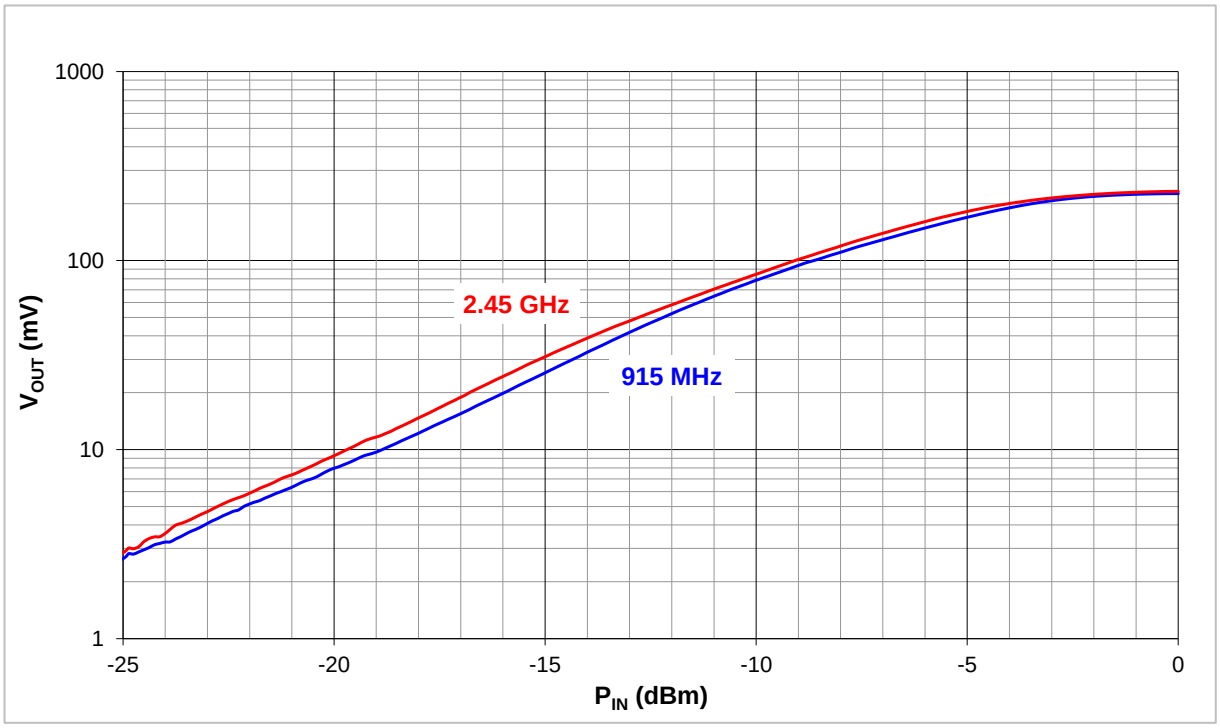

Fig. 3. Typical DM214 transfer characteristics.

Detector Correction Curves

A detector correction curve is the inverse of its transfer curve. It can serve, in particular in its mathematical form, for determining the input power from the output voltage. Fig. 4 shows the typical DM214 correction curves in lin-lin format.

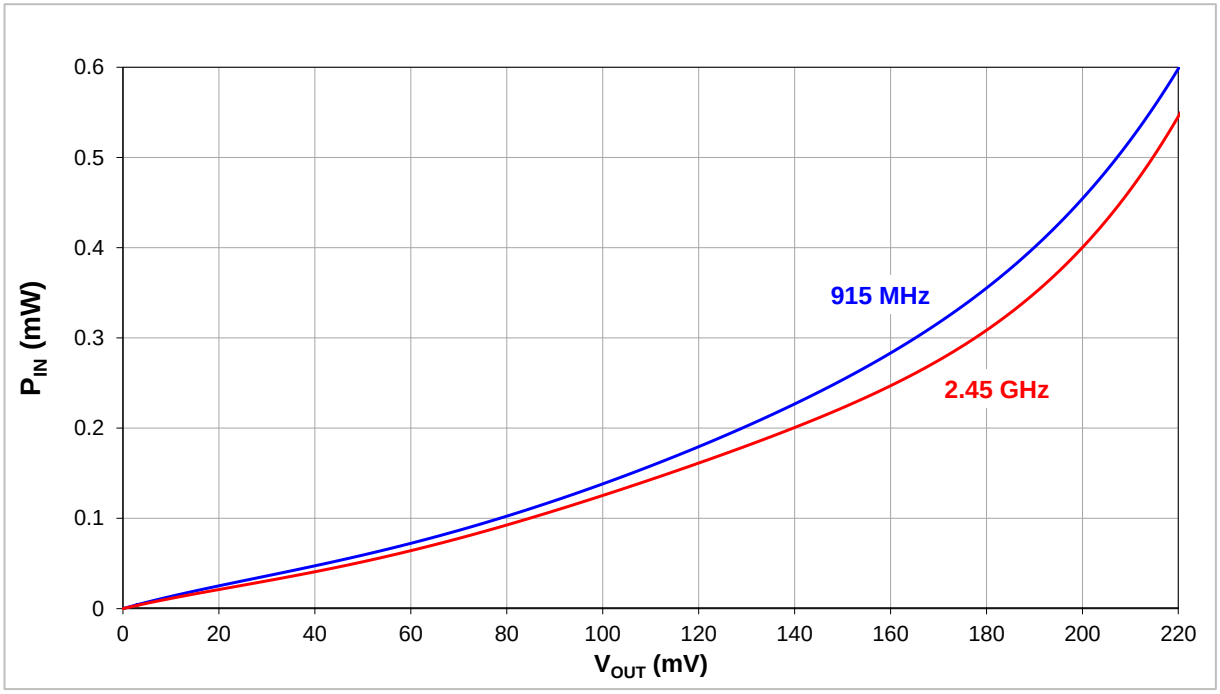

Fig. 4. Typical DM214 correction curves.

The curves can be approximated by the polynomials

$$P = d_1 V + d_2 V^2 + d_3 V^3 + d_4 V^4 + d_5 V^5$$

where $P = P_{IN}$ in milliwatts, $V = V_{OUT}$ in millivolts, and d_i are coefficients, listed in Tab. 1. The curves in Fig. 4 and the coefficients in Tab. 1 are valid for $T_A = 25\ ^{o}C$, $R_L = 33\ k\Omega$ **and for the output voltages not exceeding 210 mV** (to avoid using the detector in the saturation region).

Tab. 1. Polynomial coefficients for the DM214 detector correction curves.

Frequency:	915 MHz	2.45 GHz
d_1	1.4903894E-03	1.2430940E-03
d_2	-1.6404612E-05	-1.4451703E-05
d_3	2.7777734E-07	2.9077875E-07
d_4	-1.6104676E-09	-1.9062158E-09
d_5	3.6466985E-12	4.5418784E-12

Note

Please be aware that the functions are a statistical average based on evaluation of a number of detectors. Behavior of individual detectors may slightly differ.