



## 80–150 GHz waveguide phase modulator



### APPLICATION

Waveguide phase modulator **M343004** is intended for use both in equipment of general application and in onboard equipment in frequency range  $F_0 = 80\text{--}150$  GHz.

The modulator can be used in the complex radio engineering systems, for example, as a part of pulse or CW transmitters as a device of controlling phase of microwave signal.

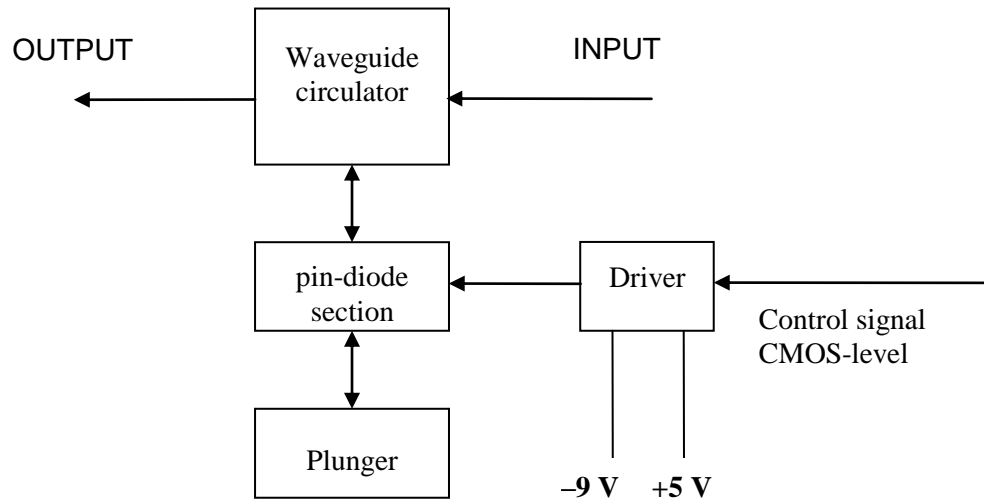
### DESCRIPTION

Functionally phase modulator on an external command carries out fast phase-shift keying of microwave signal in a waveguide transmission line.

In operating frequency range ( $F_0 \pm 0.5$  GHz) the modulator has loss no more than 3 dB and provides output signal phase changing with accuracy of 2 degrees. Switching rate of microwave signal phase with the driver is of 5–10 nanoseconds.

The phase modulator is built under the reflective scheme and made on the base of waveguide circulator, pin-modulator and short plunger.

Phase manipulation is provided by switching a reflecting plane of microwave signal. The discrete value of a phase switching for each phase modulator is set by means of a short plunger in course of manufacturing. High speed of a phase switching is provided by means of special silicon packaged *p-i-n*-diodes of RI "Orion" production. The thickness of *i*-layer is some microns. In through mode the direct current of 10-20 mA flows through *p-i-n*-diode. In reflection mode the *p-i-n*-diode is under a reverse voltage no more than 20 V.



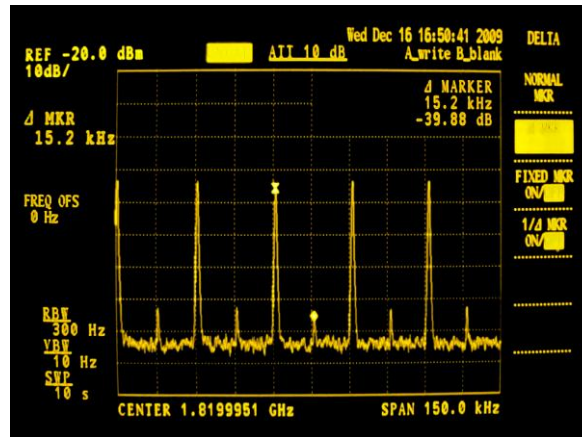
### SPECIFICATIONS

Parameter	Typical value
Central operating frequency range, $F_0^*$ , GHz	80–150
Band of operating frequencies, GHz	$F_0 \pm 0.5$
Loss, dB, no more	3
Accuracy of signal phase setting on switching at central operating frequency $F_0$ , degree	2
Switching time, nanosecond, no more	10
Input resistance at control input, Ohm	50
Driver supply voltage, V	-9 / +5
Phase modulator weight, g, no more	110
<i>Electrical characteristics of control pulse</i>	
Input levels at loading 50 Ohm, V	
low	0...1.5
high	3.5...5.00
Type of connecting flanges – according to ГOCT 13317-89.	

\*  $F_0$  value is specified by a customer.



### CHARACTERISTICS



Spectrogram of pulse microwave signal after  $0/\pi$  shift keying with waveguide phase modulator. Spectrogram was obtained at 30 kHz frequency of  $0/\pi$  shift keying

### OUTLINE DRAWING

