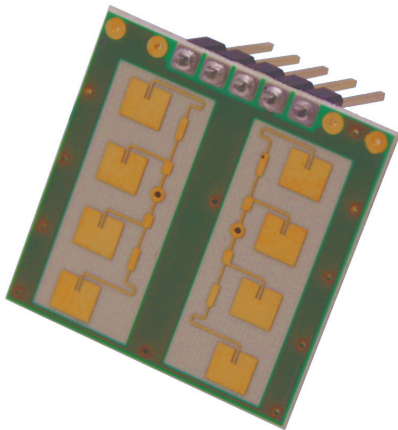


DATA SHEET

Radar movement alarm unit RSM2650



Description



Characteristic features

- Universal HF-module (K-Band Transceiver), without NF-Signal amplifier
- Innovative Radar-function principle: High sensitivity to smallest movement
- Ideal for movement alarm units: invisible mounting, safe against vandalisms
- Optimised PHEMT-Oscillator with low current consumption, Stereo (two channel) operation
- With I/Q output for direction detection
- Separate sending and receiving antenna for maximum sensitivity
- Fulfils ETSI-Standard, universally CE-approved
- Very compact external dimensions

Areas of application

- Direction detection
- Alarm and safety applications
- Reliable combination sensor system
- OEM applications, automotive

Technical data

Movement alarm unit	
Operating voltage VCC	4.75 ... 5.25 V
Supply current	30 ... 40 mA
Operating temperature	-20 ... +60 °C
Sending frequency	Standard: 24.000 ... 24.250 GHz UK: 24.150 ... 24.250 GHz F: 24.075 ... 24.175 GHz
Output power	16 dBm
Temperature Drift	-1 MHz/°C
I/Q Balance	max. 6 db
I/Q Phase	min 60°, nom. 90°, max 120°
Antenna Characteristics	Horizontal 80 ° (azimuth) Vertical 32 ° (elevation)
Side lobe suppression	Horizontal 13 dB (azimuth) Vertical 13 dB (elevation)
IF output voltage (DC Offset)	-300 ... +300 mV
Dimensions	25.0 x 25.0 x 12.7 mm
Art.-No.	RSM2650

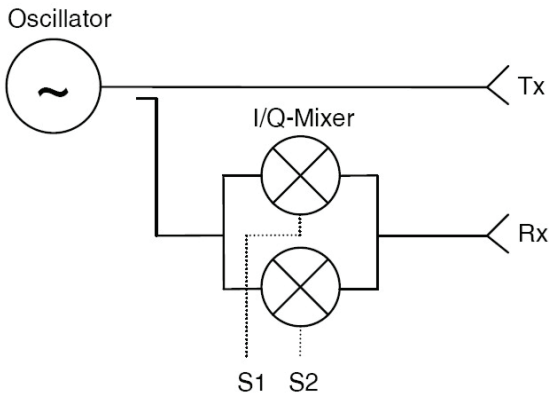
Description

The radar module has been developed for the majority of demands that are for door opening systems, alarm and safety equipment, control of machines, sanitary rooms and going up to games and sports devices. The module is suitable for a variety of applications, in which movement or presence must be registered and based on this, the switching process must be triggered. In comparison to passive infra-red movement alarm units, which registers only objects with a temperature difference to the background, the Radar module reacts to all movements in the direction of sensor. Because of this, the movement sensitivity is extremely high, even smallest movements of almost up to standstill condition is detected, therefore the modules are also very well suitable for presence alarm units. Radar modules can sense through many materials, like for example plastics, hence vandalism safe, hidden mounting is possible. The stereo module has two I/Q outputs at around 90° phase shift, and hence, this enables detection of the movement direction. The module supplies an un-amplified mixed signal as output, which must be processed in two subsequent amplifier circuit, before it can be evaluated by means of a comparator or a micro-controller. The electronics module is meant for assembly into customised projects as a HF-sub module.

Further application write-up and circuit examples are available on request.

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Function

The radar module comprises of a highly integrated radar sensor with sending and receiving element as well as two push-pull mixer at around 90° phase shift. The evaluation of movement direction is enabled by these two available phase shift I/Q signals, because of which the module is ideally suitable for alarm technology applications. Careful circuit interpretation and selection of suitable components ensure that the module meets the requirements of European ETSI standard and has a universally valid CE-approval.

The Radar movement alarm unit works on the Doppler principle: The electromagnetic waves sent in the microwave range are reflected from the object and superimposed over the sending signal with the help of a mixer in the module. Therefore, the signal developed at the mixer output is proportional to the frequency of speed: 44 Hz corresponds to a movement speed of approx. 1 km/h. The amplitude of resulting signal depends on the size of the object and its distance from the sensor.

While PIR sensors react very insensitively to movements in straight direction to the sensor, the radar sensor shows its highest sensitivity here. On the other hand, radar sensors react very insensitively to circular movements around the sensor, while the PIR sensors straight away has the highest sensitivity here. Therefore, in modern safety related applications, the PIR sensors and radar sensors are effectively combined.

The signal voltage at output of the mixer is relatively low, with a magnitude of several hundred μV . Hence, downstream amplifiers with defined bandwidth (approx. 20... 900 Hz) are required, which bring the signal to a utilizable level, which can then be evaluated with the help of a micro-controller. Application circuits can be received on request, and alternatively, modules with integrated amplifier are also available.

Handling Recommendation



The sensor is susceptible to ESD danger due to wrong handling. However, the usual precautionary measures for CMOS circuits are sufficient for handling of the component. Touching the signal outputs should be avoided, before the module is assembled on the mother board.

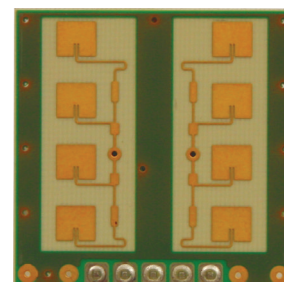
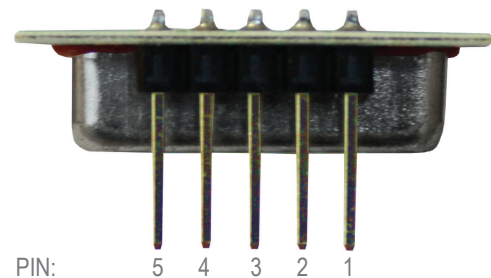
The use of a multimeter for resistance measurement between the connection pins can lead to damage of the module.

The proximity of fluorescent lamps can lead to incorrect triggering. Therefore, the module should not be installed in direct proximity of fluorescent lamps. This effect can be suppressed by a 100-Hz notch filter in the subsequent electronics.

Because of its type of construction, the modules are sensitive to sound impacts. Just mounting over the pins is not sufficient, additionally the module should also be mechanically secured.

Connection

Pin	Function
1	Not occupied
2	Operating voltage 4.75 ... 5.25 V
3	Signal output 1
4	Ground
5	Signal output 2

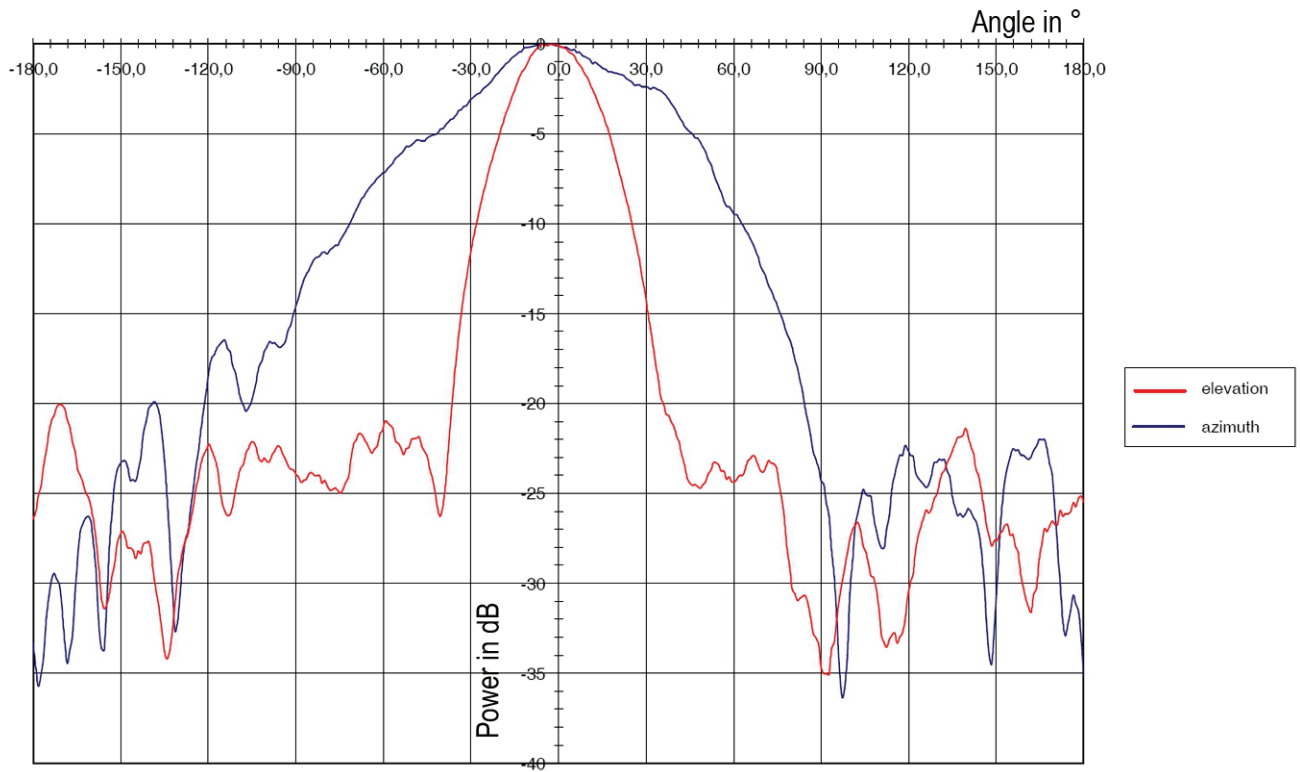


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Antenna-Diagram



Drawing

