

Doppler Sensor Application

1. Principle:

Microwave Doppler motion sensor uses the Doppler shift phenomenon to "sense" motion..

The MDU (Motion Detector Unit) is a miniature microwave Doppler radar sensor which has low power consumption, short range and low cost. The circuit features a dielectric resonator which provides stable operation over a broad temperature range in either CW or low duty cycle pulse mode and a balanced mixer for enhanced sensitivity and reliability.

The MDU emits a low level 5.8GHz microwave signal which is reflected from all objects within its coverage area. If any of the objects that the signal has bounced off are moving towards or away from the sensor, the frequency of the reflected signal received back by the sensor will be increased or decreased from that of the transmitted signal by the Doppler effect.

The MDU compares the transmitted and received frequencies and produces an output signal, the frequency of which is proportional to the velocity of the object. The amplitude of this signal is a complex function of the size and reflectivity of the object and its distance from the MDU, as well as the characteristics of the MDU.

Signal processing circuitry amplifies this signal and analyses its frequency spectrum. If the signal strength is above a threshold level, and has the required frequency spectrum an output signal can be generated.

In order to conserve power it is usual for the MDU to be pulsed on and off rapidly so that it is only transmitting for approximately 5% of the time. As well as reducing power consumption, this also reduces the average power transmitted. This does not reduce the ability of the MDU to detect moving objects.

2. Applications :

- Light control

- Security product (sensing device, alarm etc)

- Traffic/highway observation and control

- Automobile rear sensing

- Automatic door

- Possible to apply to all product by working with sensor

#	Item	Specification
Electrical Characteristics (at +25°C, +5VDC)		
1.	Operating Voltage	5.0±0.2V DC
2.	Operating Current	20 mA typ. 50 mA max.
3.	Center Frequency	5.825GHz
4.	Frequency Stability	± 5 MHz max. (-30 to +55°C)
5.	Output Power	0dBm typ
6.	Return Loss Sensitivity	-90dBc typ.
7.	Second Harmonic Emission	1 μW max.
8.	Antenna Gain	1.85dBi
9.	Antenna Beamwidth (-3dB)	
	E-Plane	180 deg. nom.
	H-Plane	180 deg. nom.
10.	IF frequency	1~32Hz (Normal walking)
11.	Amplitude	0~3mV
12.	Detection range	1~15m(Wall mounting)
Absolute Maximum Ratings		
1.	DC Input Voltage	+6 V DC
2.	Operating Temperature Range	-30 to +80°C
3.	Storage Temperature Rang	-40 to +80°C
4.	Relative Humidity	95 % at 35°C
5.	Vibration	G=10 (f=30,50 Hz, t=10min., Direction; X, Y, Z)
6.	Shock	G=20 (Half Sine, 10msec., Direction; X, Y, Z)

FCC Caution

§ 15.19 Labelling requirements.

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

§ 15.21 Information to user.

Any Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

§ 15.105 Information to the user.

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Module use requirements

If the FCC ID is not visible when the module is installed inside another device, the OEM integrator shall apply a label in a visible area on his product with the following statement:
Contains Transmitter Module FCC ID: 2ADDD-0580WA