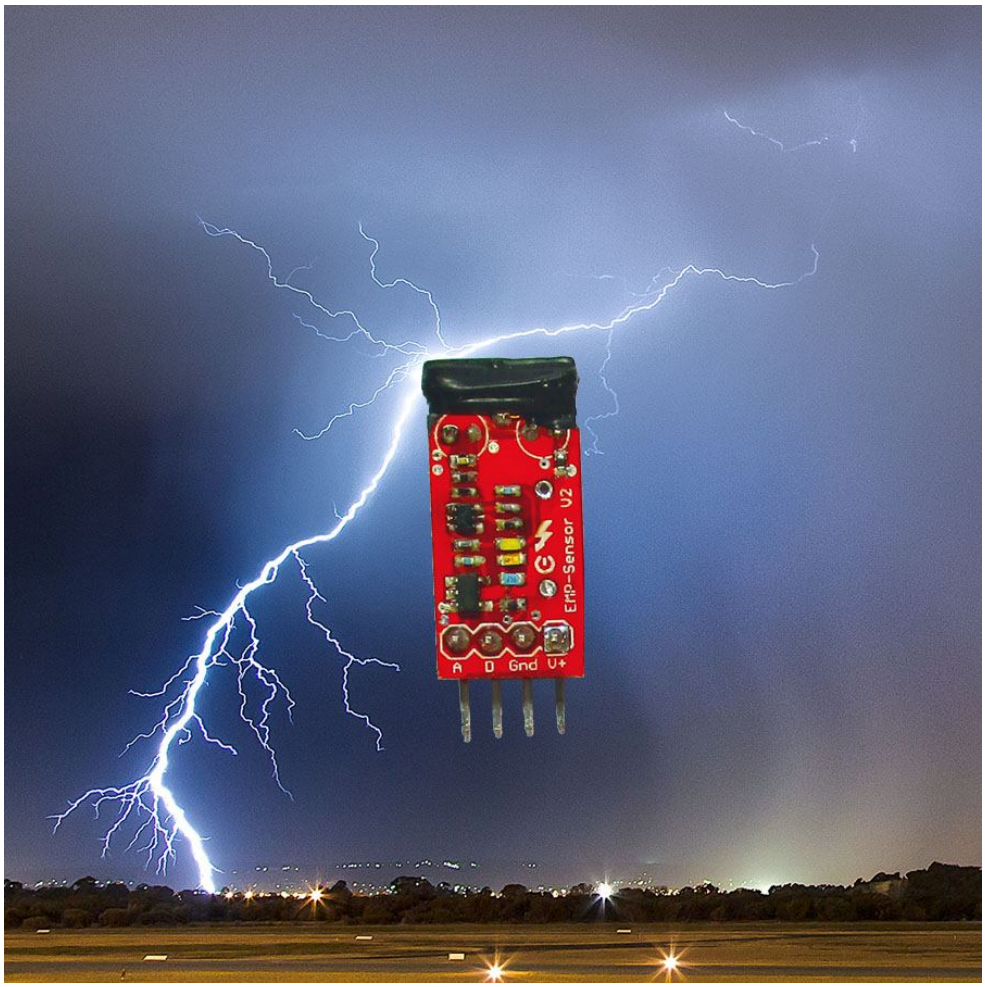
EMP-Detector V2.x



RoHS COMPLIANT Pb Pb-Free

DEVICE : EMP Detector V2.x

FEATURES : Detecting high energy pulses

APPLICATIONS : Detecting lightning and other types of high energy discharges

IMPORTANT : For pin-connections, check page 3

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INFO

With 2 years of thorough research and testing several prototypes at SMDking, we proudly present a new type of sensor which got available to the market. It is about our EMP (Electro Magnetic Pulse) sensor. This sensor can be used for a variety of usage :

- **Outdoor events**
  Early warning system for any outdoor sports, like golf, football, soccer, hockey, tennis etc.

- **Photography**
  The sublime way to catch a lighting-event by camera, when triggered by this EMP-detector. Can also be used as trigger for other events, like activating multiple flash-lights.

- **Scientific experiments**
  Detecting EMP's for analysis-purposes, like locating the impact of lighting by multiple sensors, or figuring out how lighting works.

- **Arduino experiments**
  For the hobbyists who are interested in weather-conditions or detecting other types of EMP-sources.

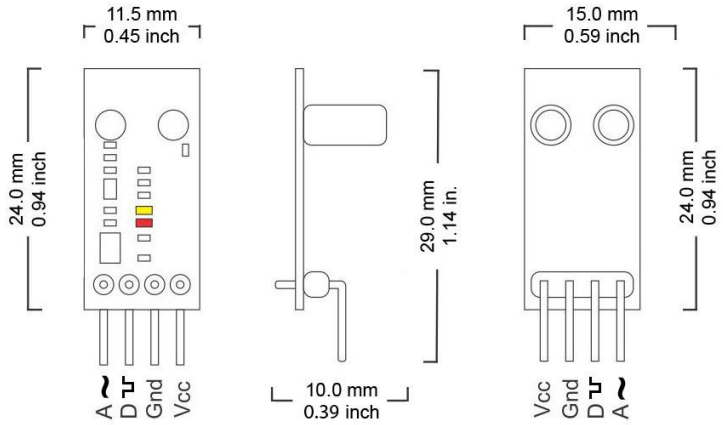
- **Weather stations**
  Next to rain,- barometric,- temperature,- moisture-sensors, a lighting detector can be included.

SPECIFICATIONS

Input Voltage (Vcc)	: 3.3V to 5.0V DC
Input Current	: 5 mA to 15 mA at 5V DC
Dimensions	: 11.5 x 29.0 x 10.0 mm / 0.45 x 1.14x 0.39 inch (W x L x H)
Weight	: 1.9 gram / 0.07 ounce
Pins	: 4
Pinning	: ⇒ Vcc (3.3V to 5 V DC) ⇒ Gnd ⇒ Digital inverted output (sourcing upto 12.5 mA at Vcc) ⇒ Analog output
Detection range	: Lighting upto 30 km / 20 miles distance
Audible alarm	: **No**
RoHS	: **Yes**

HOW IT OPERATES (pins)

PARAMETERS (size)



[For reference of pinning, look at right picture]

V+ and GND : For activating the sensor, [V+] and [Gnd] need to be connected to a powersource. The powersource should be at least 3.3V DC and max. 5.0 V DC.
The EMP-detector is running low power (5 mA), when no lighting is detected.
When lighting is detected, the detector requires a pulse of 10 mA.

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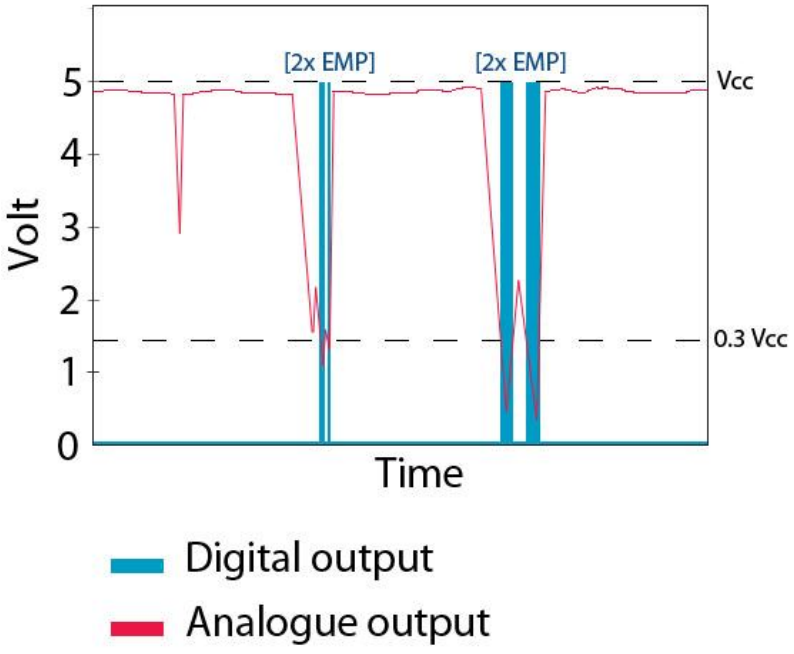
Digital : This pin can be used as a trigger-function for high energy EMP's. When no or low activity is detected the pin will remain 0 Volts. When detecting a strong signal at analogue pin, the digital pin will generate a peek signal (Vcc level).
(See image below)

Analogue : Analogue output. When no EMP is detected, a continuous signal (at Vcc level) will be generated. When minor / low energy EMP activity is detected, the signal will drop / fluctuate slightly.
When high energy EMP is detected, the signal will drop significantly.



LOCATION at PCB

PowerLED

This LED is active, when Vcc and GND are connected to a powersource of at least 3.3 Volts DC (marked as **red** rectangular object).

Flash-LED

When a high energy EMP is detected :
- a white LED will blink shortly (marked as **yellow** rectangular object)

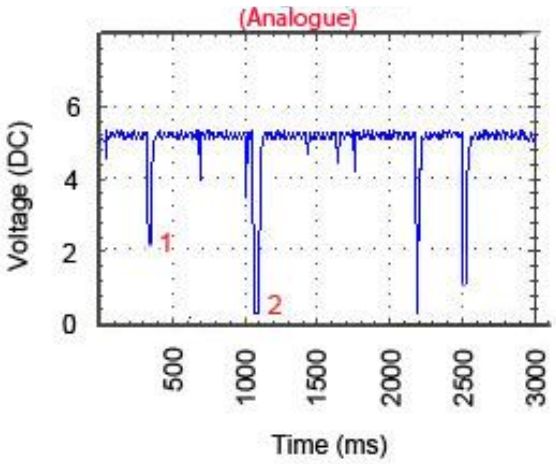
Antenna (Int/Ext)

Onboard is an integrated wire-wound antenna.

NOTES :
1) Changing the detection-range, results in a shift of detection-range. The effect might result in detecting EMPs at a further distance, while close range will not be detected.

DETAILS ABOUT "DIGITAL PIN"

At the right, you see measurements, while lighting took place, while the sensor was powered at 5V DC.



Please, keep the following in mind :

A) for reliable detection of EMPs, a Voltage-drop of nearly 0.7 * Vcc is required at pin "Analogue".

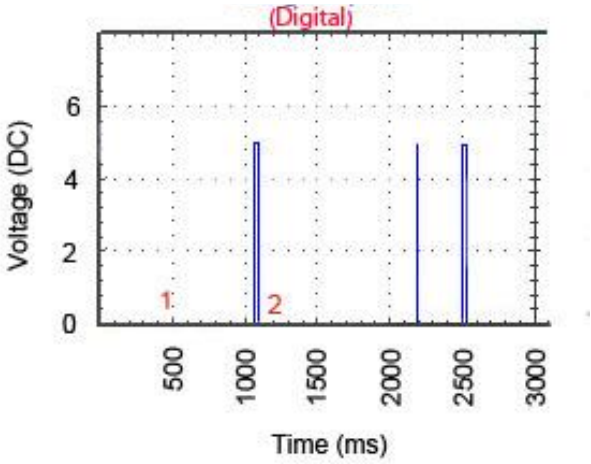
B) if Vcc is 5 Volts, than 0.7 * Vcc = 3.5 Volts.

C) pin "Digital" will shift level when "Analogue" pin is at or below (5 - 3.5 =) 1.5 V

Vcc is the Voltage you use to power the sensor.

Examples to help understanding.

At the right you can see an actual read-out by an oscilloscope at pin "Analogue" and at pin "Digital".



Example 1)

A *low* or *medium* EMP is detected, and pin "analogue" will drop to 2 Volts.
5 Volts - 2 Volts = 3.0 Volts. This 3 volts is less than the minimum required drop of 3.5 Volts.
Pin "Digital" will stay at 0 Volts.

Example 2)

A *high* EMP is detected, and pin"Analogue" will drop to 0.2 Volts.
5 Volts - 0.2 Volts = 4.8 Volts. This 4.8 Volts is more than the minimum required drop of 3.5 Volts. Pin "Digital" will generate a pulse of 5 Volts.

Good to know

In general, pin "Digital" will respond with a delay of approx. **5 ns**, which is pretty fast, which makes it very interesting to use it as a trigger-function for activating external electronic devices.

Manufacturer : SMDKing
Datasheet : EMP detector / sensor V2.x
Version : 1.2
Date of release : 1st of june, 2017