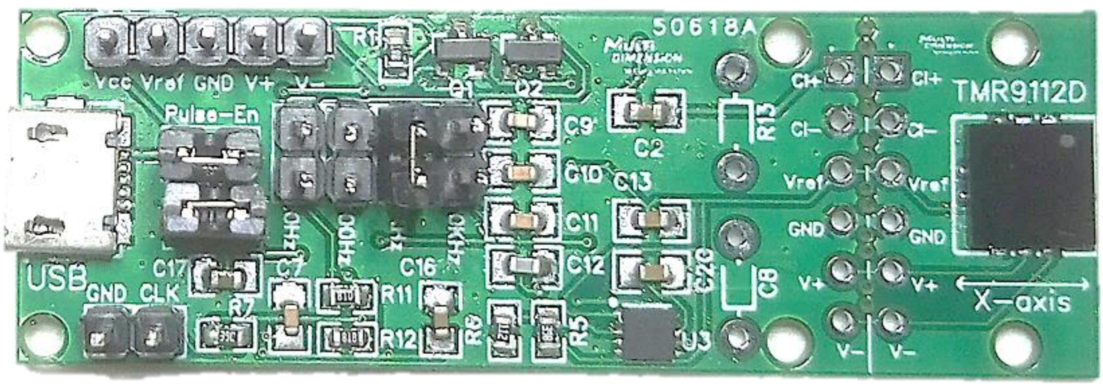
TMR9112D

TMR9112 Pulse Initialization Demo Board

General Description:

The TMR9112D demo board was developed to support evalution of the TMR9112 single-axis sensor. The demo board comes with the fast bipolar current pulsing circuit needed for initialising the TMR9112 sensor, and it can be powered from a USB port or any external 5V power supply. For user convenience, the demo board has an optional on-board timer clock with four selectable frequency settings. The pulse circuit, On-board timer clock and frequency output can be enabled using the jumper pins. The bias voltage for the sensor is provided by TPS7A90 low noise LDO which is configured to give 2.62Voutput. This demo board is divisable along the dotted line so that the sensor board can be seperated from the pulsing circuit board.



Features:

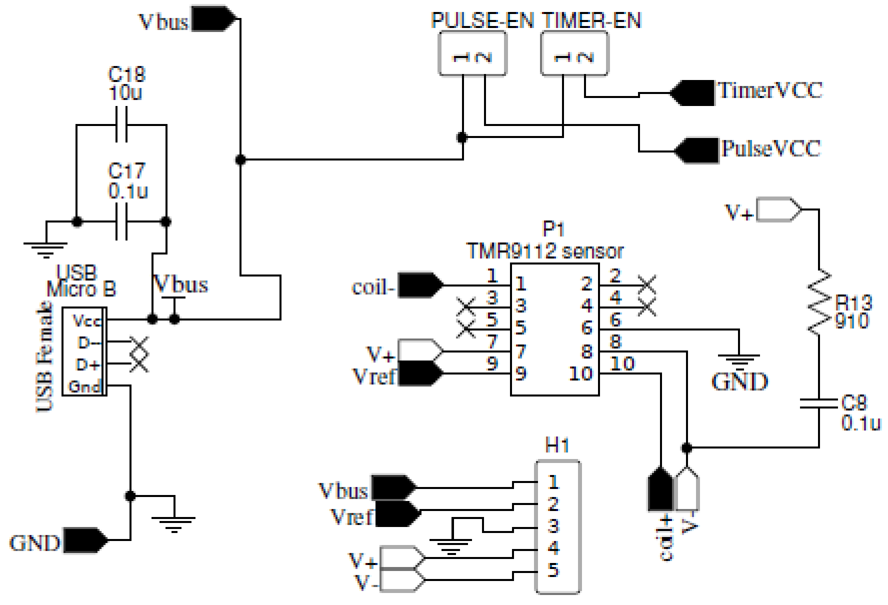
- Operate using 5 Volt external supply or through USB port.
- On board low noise LDO to power sensor
- On board timer clock with four selectable frequency options.
- Bipolar fast current pulsing circuit and Voltage tripler circuit.
- Clock Input signal can be 3.3V or 5V logic.
- Demo board can be split along the dotted line to separate the sensor from the pulse electronics board

Pin descriptions:

Pin Name	Description
Vcc	Positive power supply
GND	Ground
Vref	Regulated output voltage supply (2.62V)
V+ and V-	Differential output from the sensor
CLK	Clock input
Pulse-En	Jumper pins for Pulse circuit enable
Timer-En	Jumper pins for On board Timer output enable
C8, R13	Through hole pads for adding low pass filter, resistor and capacitor for user selectable filtering.

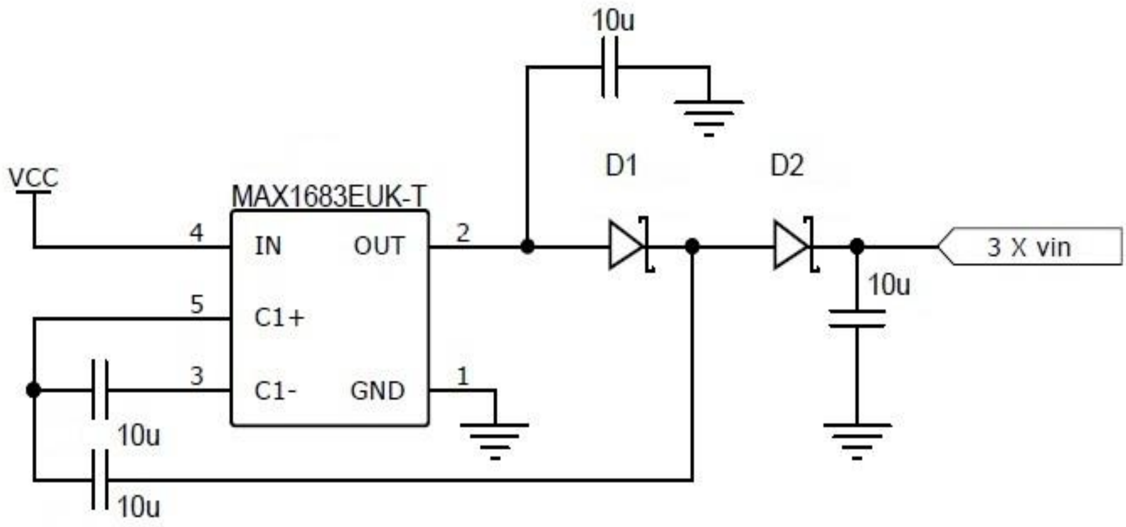
Schematic Diagram:

Figure. 1



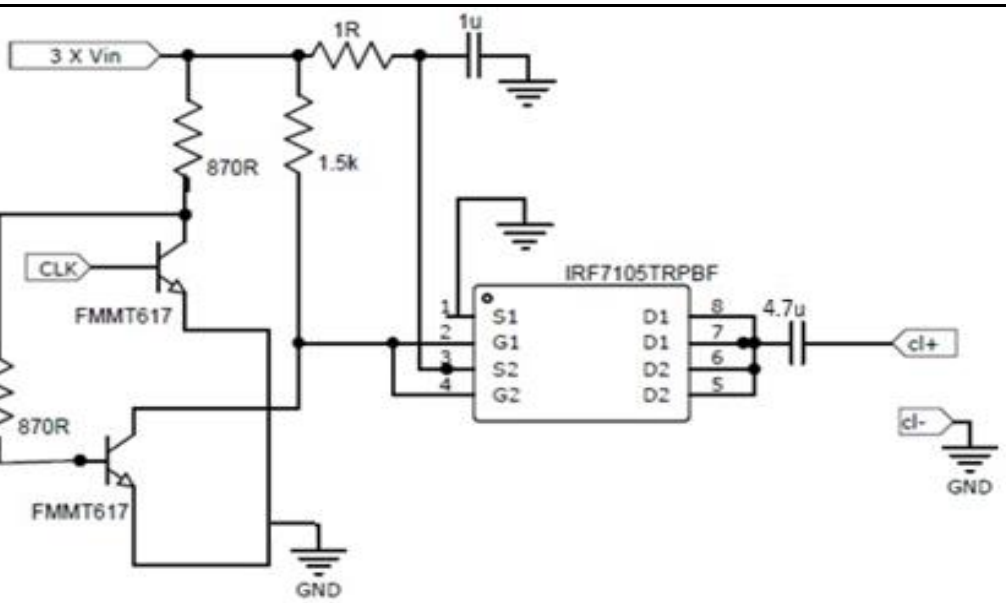
Power Port, sensor connections and I/O pin-outs

Figure. 2



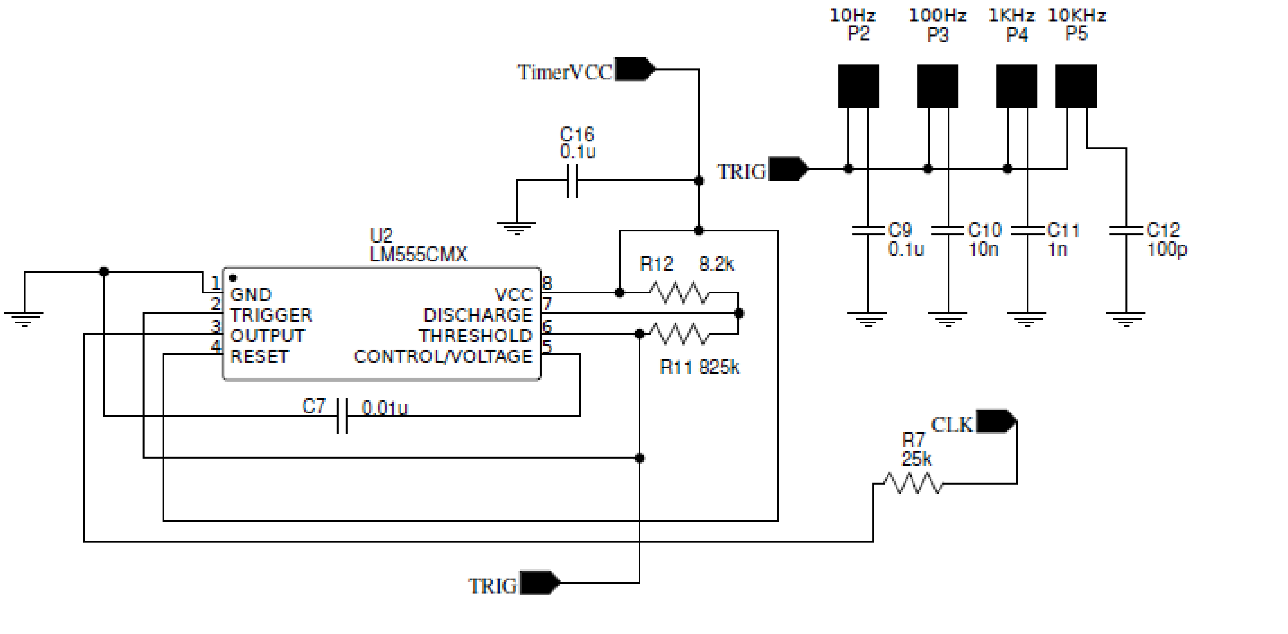
MAX1683 Configured as Voltage Tripler

Figure. 3



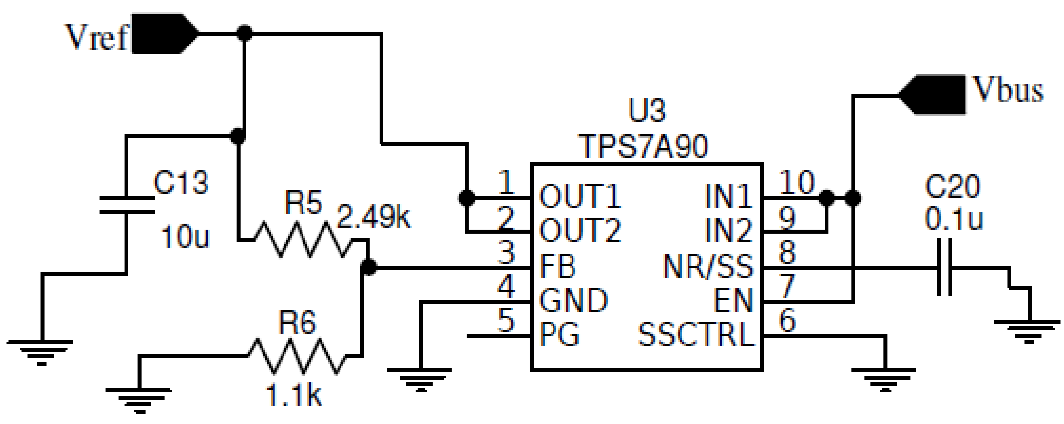
Fast Bipolar Current Pulsing Circuit

Figure. 4



LM555 configured as clock source

Figure.5



$V(out) = 0.8 * (\frac{R5}{R6} + 1)$

TPS7A90 Low noise LDO configured for 2.62V

Interfacing the TMR9112 Single-Axis Demo Board:

The diagram below illustrates a method to interface the TMR9112 demo board with data acquisition equipment. The sensor output can be read with the on-board timer enabled or from using external waverform to initalize the sensor on demand or as needed based on a user's custom algorithm.

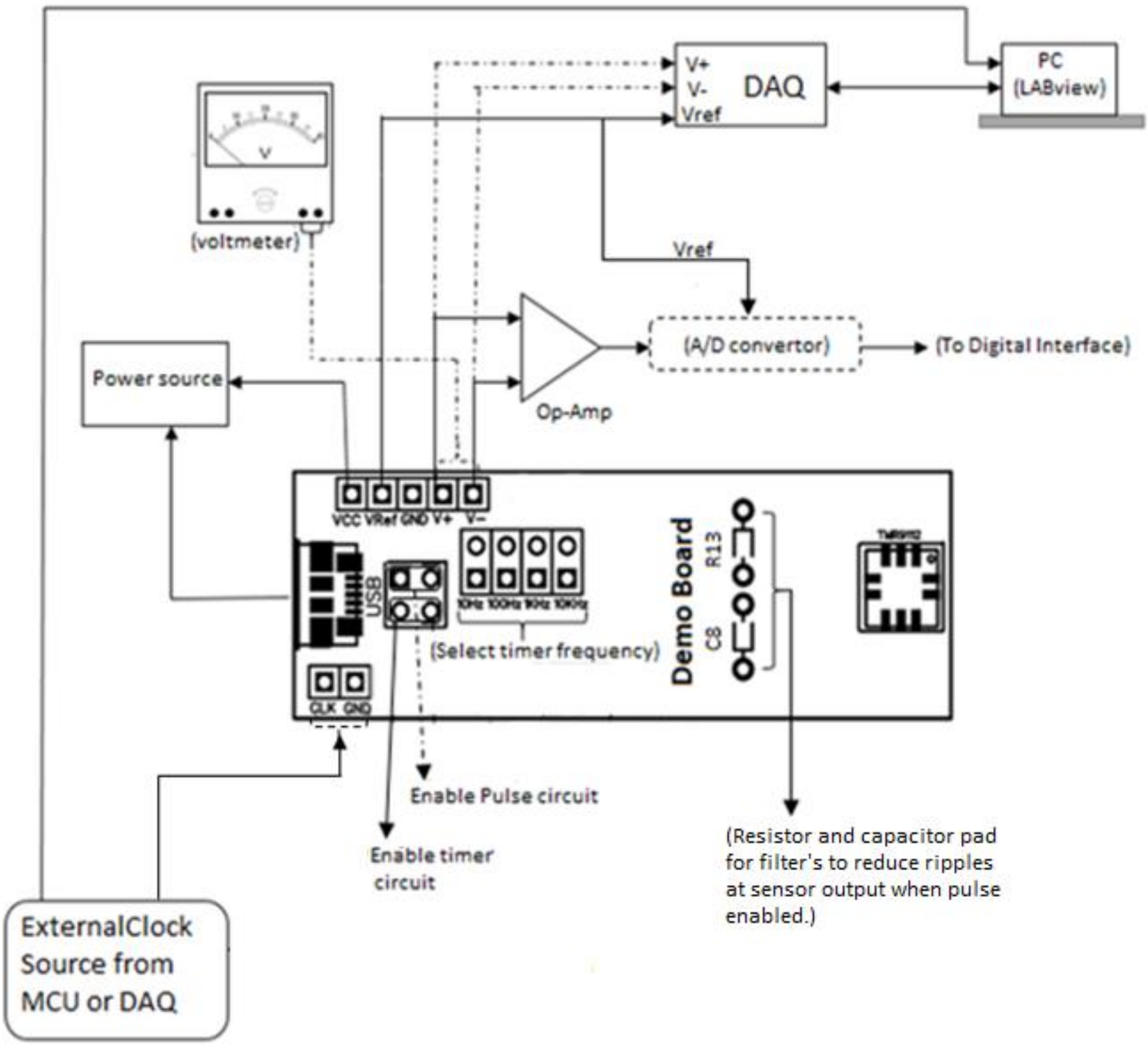


Figure.6

1. Using a Continous Pulse from the On-board Timer:

To enable the On-board timer, place the jumper pin onto the "Timer-en" terminal pins. Additionally select the appropriate frequency output, by placing a jumper onto the desired labeled frequency pins. The duty cycle of the timer ouput is roughly 52 .3%. The sensor output at V+ and V- is the analog output, with reduction of unwanted hysteresis. Some residual high frequency ripple may appear in this output, and to remove its high harmonic content from the sensor output, a resistor and Capacitor should be added at the R18 and C8 through hole pads. The cut off frequency(f_c) must be choosen with respect to the pusle width, but a good rule of thumb would be to set it at clock freq(f_p) , f_p >5 fc, where f_c=1/2πRC.

2. Using a Timing Pulse from an MCU or External Clock Source:

An external timing pulse is often more efficient in terms of power efficiency and further hysteresis reduction. The timining cycle for one possible clock input and sensor read is shown in the figure below.

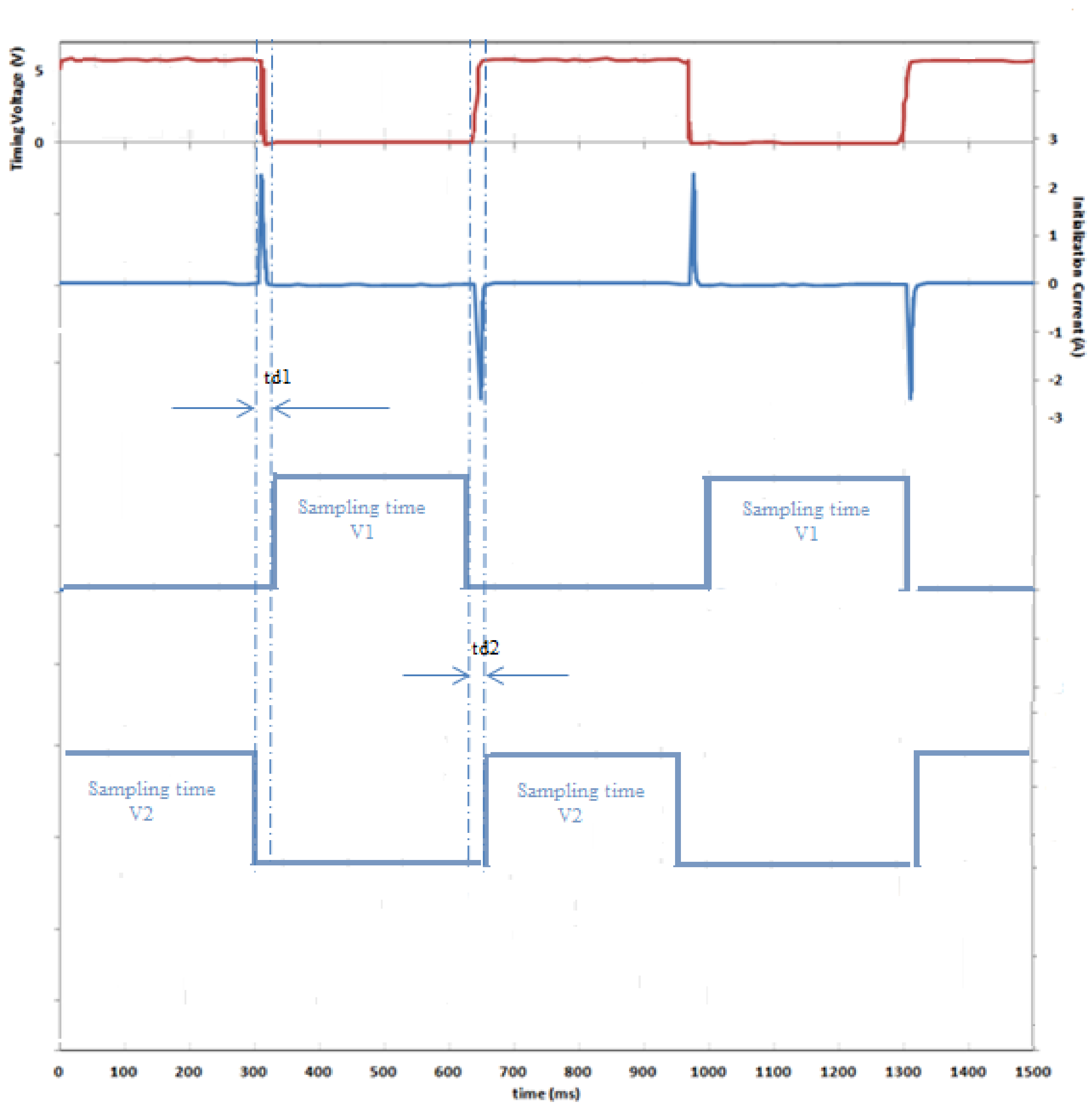


Figure.7

The ideal clock input waveform should be held high, and when the clock input goes LOW , a positive current pulse will be induced in the sensor initialization coil and negative current pulse will be induced when the clock input goes HIGH. The sensor value V1 should be sampled after the completion of positive current pulse with the time delay td1 and sensor value V2 should be sampled after the completion of negative current pulse follwed by the time delay td2. The final sensor output V, should be calculated as, V= (V1+V2) /2.

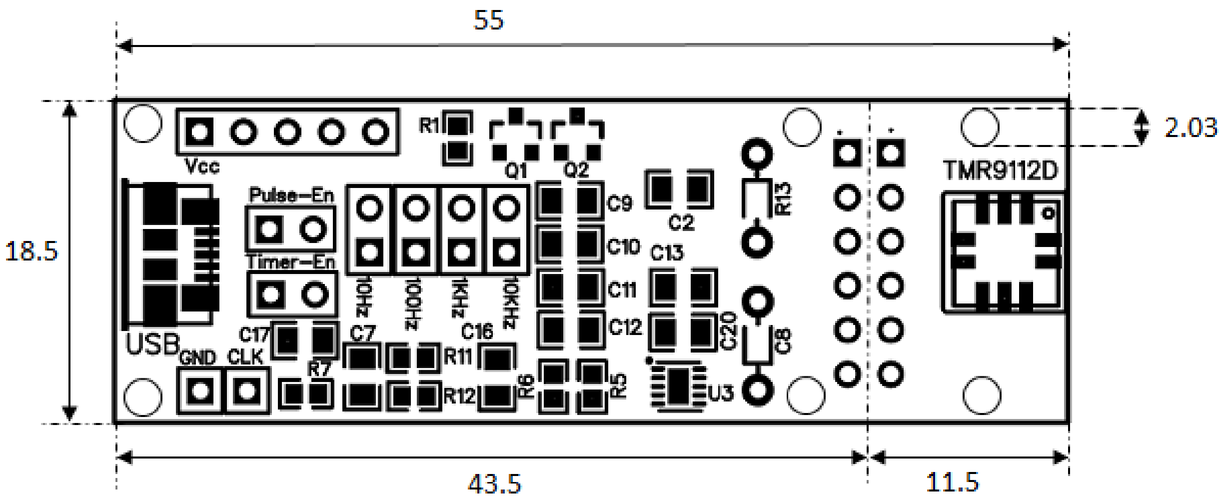
Electrical Specification:

Tested at room temperature, T=25^{0}C.

Parameters	Min	Typ	Max	Units
Supply voltage	4.5	5	5.5	V
Supply current				
Without using pulse	--	--	27	mA
1. Clock freq=1Hz	--	--	32	mA
2. Clock freq ≤10H	--	--	45	mA
3. Clock freq >10Hz<100Hz	--	--	163	mA
4. Clock freq >100Hz<1KHz	--	--	187	mA
5. Clock freq>1KHz<10KHz	--	--	190	mA
Clock Input	3.3	5	Vcc	V

Mechanical Dimensions:

(Top view)



*All Dimensions are in millimeters (mm)

Datasheet Revision History

Date	Version	Change Summary
November 2017	1.0	Initial datasheet released
October 2018	2.0	Included voltage regulator for sensor’s, Added jumper enable pins for pulse circuit and timer circuit

MultiDimension Technology Co., Ltd.

Address: No.7 Guangdong Road, Zhangjiagang Free Trade Zone, Jiangsu, 215634, China

Web: www.dowaytech.com/en

Email: info@dowaytech.com