

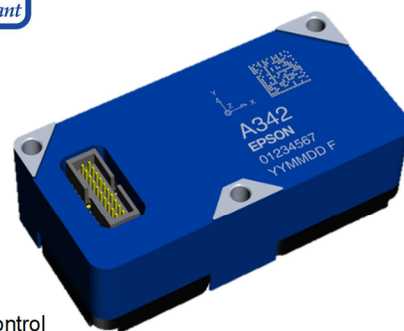


## 3 Axis Vibration Sensor M-A342VD10

- Capable of measuring velocity, velocity RMS, and velocity P-P (ISO10816 / ISO20816 compliant)
- Frequency response characteristics: 10 Hz to 1,000 Hz (-3dB)
- Insensitive to magnetic influences
- High dynamic range:  $\pm 100$  mm/s (110 dB)
- 3-axis digital output SPI / UART
- Power consumption : 29 mA Typ.



Product number  
M-A342VD10 : E91E606400



### Recommended Application

- MHM (Machine Health Monitoring) • Condition Based Maintenance (CBM) • Motion analysis and control
- SHM (Structural Health Monitoring) • Vibration analysis, control and stabilization • Lissajous analysis

### Recommended Operating Condition

| Parameter                     | Condition                 | Min  | Typ | Max      | Unit |
|-------------------------------|---------------------------|------|-----|----------|------|
| VCC to GND                    |                           | 3.15 | 3.3 | 3.45     | V    |
| Digital Input Voltage to GND  |                           | GND  |     | VCC      | V    |
| Digital Output Voltage to GND |                           | -0.3 |     | VCC +0.3 | V    |
| Operating Temperature Range   |                           | -30  |     | 85       | °C   |
| Start up Time                 | Power-on to start output. |      |     | 900      | ms.  |

### Specifications

T<sub>A</sub>= -30 °C to +85 °C, VCC=3.15 V~3.45 V,  $\leq \pm 1$  G, unless otherwise noted.

| Parameter                      | Test Conditions / Comments             | Min    | Typ                   | Max       | Unit                           |
|--------------------------------|----------------------------------------|--------|-----------------------|-----------|--------------------------------|
| <b>VELOCITY</b>                |                                        |        |                       |           |                                |
| Sensitivity                    |                                        |        |                       |           |                                |
| Output Dynamic Range           | f = 10 Hz ~ 1000 Hz                    |        |                       | $\pm 100$ | mm/s                           |
| Scale Factor                   | 2 <sup>-22</sup> m/s/LSB               |        | 2.38*10 <sup>-4</sup> |           | mm/s/LSB                       |
| Sensitivity Error              | 25 °C, $\leq 1$ G                      | -1550  |                       | 1550      | $\times 10^{-6}$ (ppm)         |
| Nonlinearity                   | $\leq 1$ G, Best fit straight line, RT | -0.15  |                       | 0.15      | % of FS                        |
| Cross Axis Sensitivity         | No alignment correction                |        | $\pm 0.9$ *3          |           | %                              |
| Noise                          |                                        |        |                       |           |                                |
| Noise Density                  | 25 °C, Avg, f = 200 Hz ~ 1000 Hz       |        | 1.4*10 <sup>-4</sup>  |           | mm/s/ $\sqrt{\text{Hz}}$ , rms |
| Cantilever Resonance Frequency | 25 °C, VCC 3.3 V                       |        | 4,460                 |           | Hz                             |
| Frequency Property             |                                        |        |                       |           |                                |
| Frequency Range                | -3 dB at 25 °C                         |        | 10~1,000              |           | Hz                             |
| <b>DISPLACEMENT</b>            |                                        |        |                       |           |                                |
| Sensitivity                    |                                        |        |                       |           |                                |
| Dynamic Range                  | f = 1 Hz ~ 100 Hz                      |        |                       | $\pm 200$ | mm                             |
| Scale Factor                   | 2 <sup>-22</sup> m/LSB                 |        | 2.38*10 <sup>-4</sup> |           | mm/LSB                         |
| Nonlinearity                   | $\leq 1$ G, Best fit straight line, RT | -0.15  |                       | 0.15      | % of FS                        |
| Cross Axis Sensitivity         |                                        |        | $\pm 0.9$ *3          |           | %                              |
| Noise                          |                                        |        |                       |           |                                |
| Noise Density                  | 25 °C, Avg, f = 20 Hz ~ 100 Hz         |        | 0.7*10 <sup>-5</sup>  |           | mm/ $\sqrt{\text{Hz}}$ , rms   |
| Frequency Property             |                                        |        |                       |           |                                |
| Frequency Range                | -3 dB at 25 °C                         |        | 1~100                 |           | Hz                             |
| <b>TEMPERATURE SENSOR</b>      |                                        |        |                       |           |                                |
| Output Range                   |                                        | -40    |                       | 85        | °C                             |
| 16bit Scale Factor *1          | Output=2634(0x0A4A) at 25 °C           |        | -0.0037918            |           | °C/LSB                         |
| 8bit Scale Factor *1           | Output=2634(0x0A4A) at 25 °C           |        | -0.9707008            |           | °C/LSB                         |
| <b>RELIABILITY</b>             |                                        |        |                       |           |                                |
| MTBF*2                         | JIS-C5003 TA = 25 °C                   | 87,600 |                       |           | hour                           |

\*1) This is a reference value used for the internal temperature correction, and is not guaranteed to accurately output the interior temperature.

\*2) The MTBF is an estimated value derived from the result of high temperature operation with a system requirement of TA=25°C and a 60% reliability level.

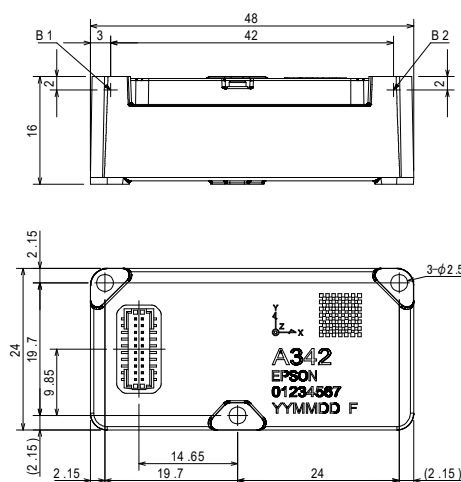
\*3) When the alignment is corrected by the host, the other axis sensitivity is Typ. 0.1 %.

Note) The values in the specifications are based on the data calibrated at the factory. The values may change according to the way the product is used.

Note) The Max/Min value is the maximum/minimum value of the design or factory shipment examination, unless otherwise specified.

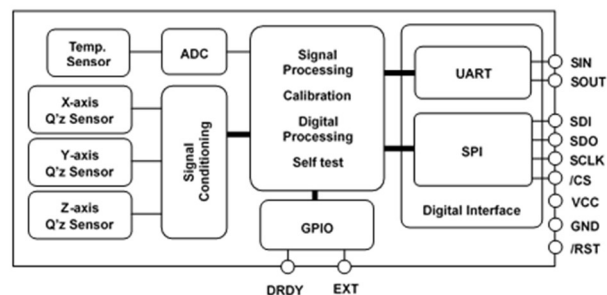
Note) The calibrated standard 1G gravitational acceleration value is 9.80665 m/s<sup>2</sup>

## Outline Dimensions

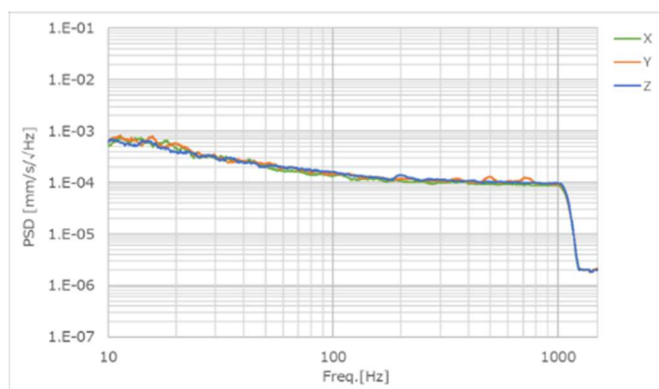


Unit: mm

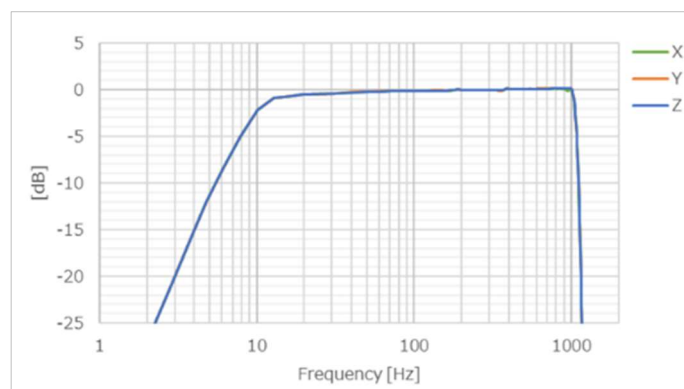
## Block Diagram



## Noise Density (Velocity Output)



## Frequency Response (Velocity Output)



The product characteristics shown above are just examples and are not guaranteed as specifications

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