

## Chip Magneto Resistors

### Type: EZMPL

Chip Magneto Resistors change their resistance value in accordance with an external magnetic field.

The EZMPL type is a reliable sensor with no contact, for applications like detecting the number of rotations, rotation angle and direction of rotations.

And this type is surface mounting component.



Type M

Type S

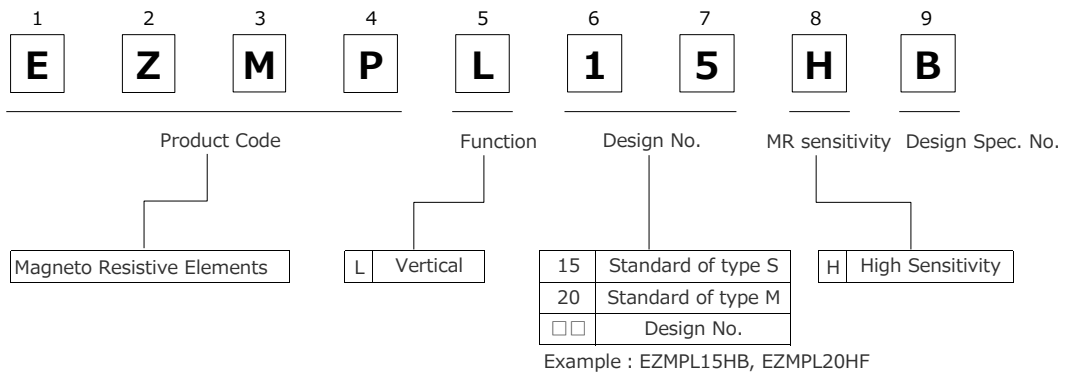
### Features

- High sensitivity
  - Response to  $4 \times 10^3$  [A/m] magnetic force
- Compact design
  - Suitable for thin design (H: 0.7 mm)
  - Strong body (Uses alumina substrate)
- RoHS compliant

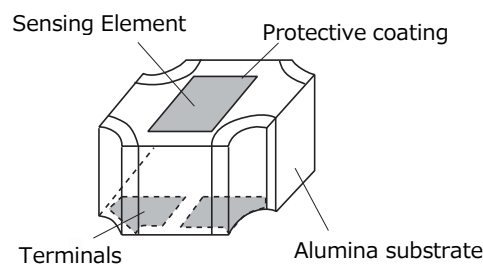
### Recommended Applications

- Disc drive actuator (position of rotation)
- Flow meter
- Switch
- Printer (Printing timing)
- Counter (Number of rotations)

### Explanation of Part Numbers



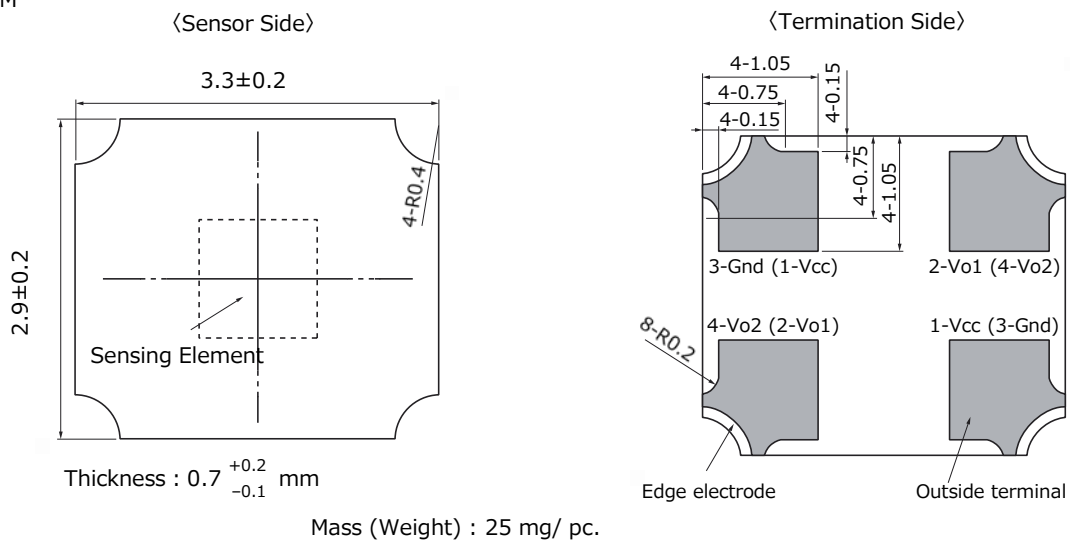
### Construction



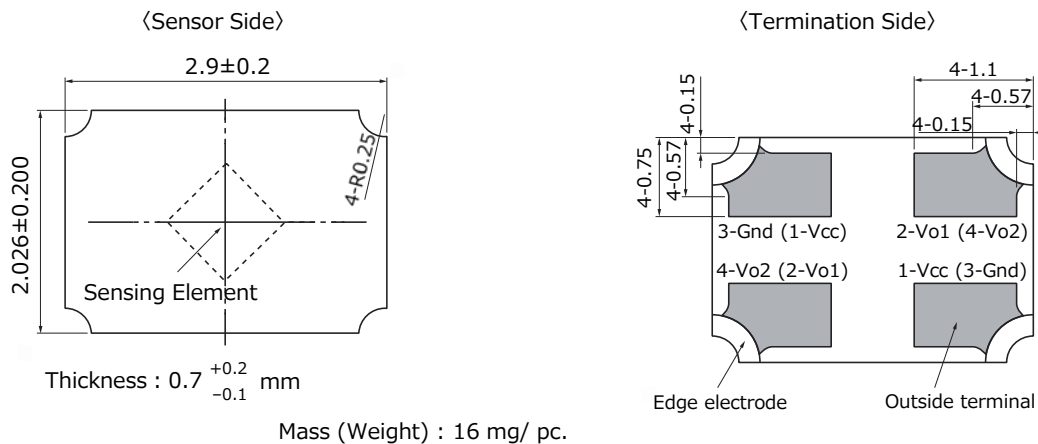
Performance Specifications, Summary	
Item	Characteristics
Resistance Value	1.5 kΩ (standard) ±30 % : Type S , EZMPL15HB 10 kΩ (standard) ±30 % : Type M , EZMPL20HF
Sensing Range	1600 A / m to 16000 A / m
Category Temperature Range	- 30 °C to + 70 °C
Applied Voltage	5 V (standard)
Resistance Change by Magnetic Force	P : 2 % min. (at ±16000 A / m)
Resistance Pair-Matching	$\frac{R_B}{R_A + R_B} = (50 \pm 1) \%$ <p>Circuit Diagram</p>

**Dimensions in mm (not to scale)**

- Type M



- Type S

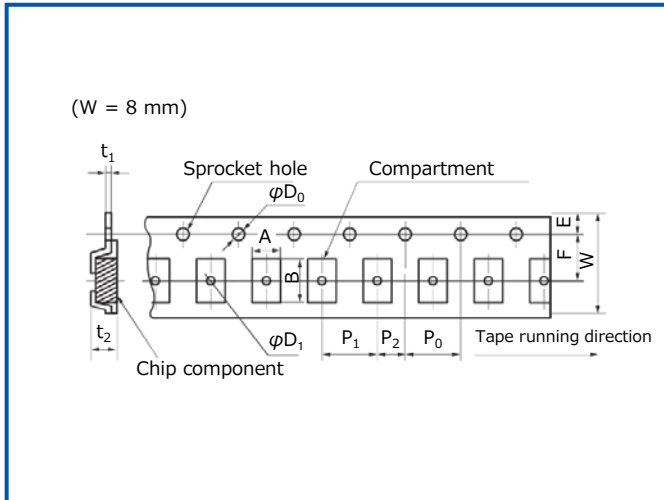


## Packaging Methods

### ● Standard Quantity

Part No.	Kind of Taping	Pitch (P <sub>1</sub> )	Quantity
Type M EZMPL□□□□	Embossed Carrier Taping	4 mm	4,000 pcs/ reel
Type S EZMPL□□□□			

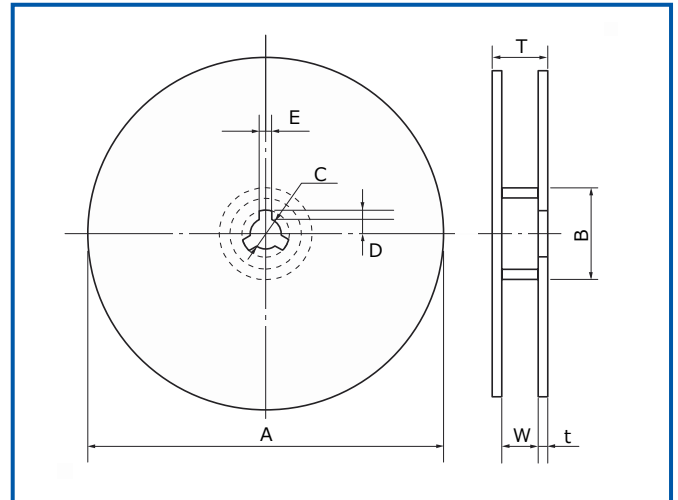
### ● Embossed Carrier Taping



Dimensions(mm)	A	B	W	F	E	P <sub>0</sub>
Type M	3.40 <sup>±0.35</sup>	3.80 <sup>±0.35</sup>	8.0 <sup>±0.3</sup>	3.5 <sup>±0.1</sup>	1.75 <sup>±0.15</sup>	4.0 <sup>±0.1</sup>
Type S	2.50 <sup>±0.35</sup>	3.40 <sup>±0.35</sup>				

Dimensions(mm)	P <sub>1</sub>	P <sub>2</sub>	φD <sub>0</sub>	t <sub>1</sub>	t <sub>2</sub>	φD <sub>1</sub>
Type M	4.0 <sup>±0.1</sup>	2.0 <sup>±0.1</sup>	1.5 <sup>±0.1</sup>	0.25 <sup>±0.05</sup>	1.20 <sup>±0.25</sup>	1.50 <sup>±0.15</sup>
Type S						

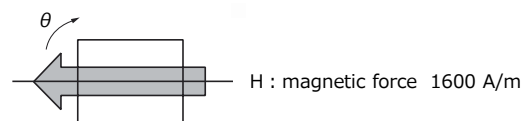
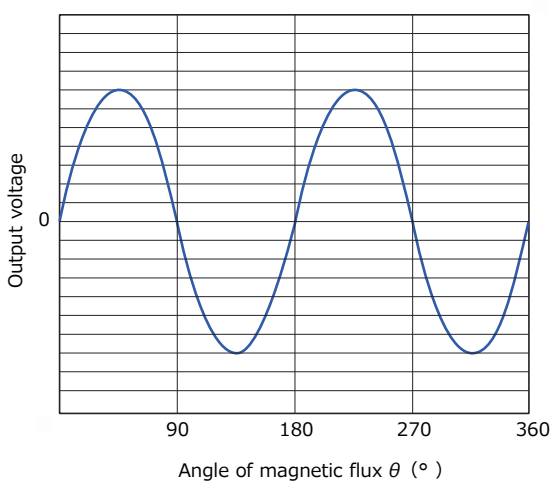
### ● Taping Reel



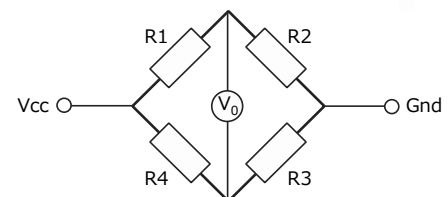
Dimensions (mm)	φA	φB	φC	φD
	178 <sup>±2</sup>	60 <sup>±1</sup>	13.0 <sup>±0.5</sup>	21.0 <sup>±0.8</sup>

Dimensions (mm)	E	W	T	t
	2.0 <sup>±0.5</sup>	9.0 <sup>±0.3</sup>	11.4 <sup>±0.1</sup>	1.35 <sup>±0.20</sup>

## Direction of Magnetic Field and Typical Output Voltage (EZMPL15HB)

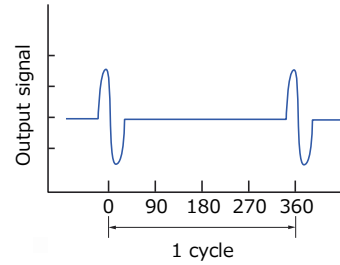
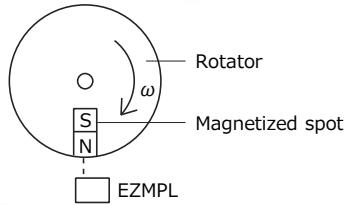


- With rotation of magnetic field (flux)
  - R<sub>1</sub> to R<sub>4</sub> : Resistance value change at θ = 45 °
  - R<sub>1</sub>·R<sub>3</sub> : Resistance Value minimize
  - R<sub>2</sub>·R<sub>4</sub> : Resistance Value maximize



## Application Examples

- Position Detection  
EZMPL detects the magnetized area on a rotator.



## Recommended Land Patterns

The diagram shows two rows of land patterns. The top row is for Type M, with dimensions A, B, C, and D. The bottom row is for Type S, with dimensions A, B, C, and D. Dashed lines indicate the alignment and placement of the components.

( Unit : mm )

	A	B	C	D
Type M	0.8	1.2	1.2	1.2
Type S	0.625	0.85	1.2	0.8

### ⚠ Safety Precautions

The following are precautions for individual products. Please also refer to the common precautions for MR Sensors in this catalog.

1. Conduct reflow soldering at 240 °C max. for up to 30 seconds (time during which 220 °C is exceeded).
2. Do not rework the soldered joints.
3. Do not apply any excessive shocks to Chip Magneto Resistors (hereafter called the MR Elements).
4. Do not use the MR Elements once they've been dropped on the floor.

**Guidelines and precautions regarding the technical information and use of our products described in this online catalog.**

- If you want to use our products described in this online catalog for applications requiring special qualities or reliability, or for applications where the failure or malfunction of the products may directly jeopardize human life or potentially cause personal injury (e.g. aircraft and aerospace equipment, traffic and transportation equipment, combustion equipment, medical equipment, accident prevention, anti-crime equipment, and/or safety equipment), it is necessary to verify whether the specifications of our products fit to such applications. Please ensure that you will ask and check with our inquiry desk as to whether the specifications of our products fit to such applications use before you use our products.
- The quality and performance of our products as described in this online catalog only apply to our products when used in isolation. Therefore, please ensure you evaluate and verify our products under the specific circumstances in which our products are assembled in your own products and in which our products will actually be used.
- If you use our products in equipment that requires a high degree of reliability, regardless of the application, it is recommended that you set up protection circuits and redundancy circuits in order to ensure safety of your equipment.
- The products and product specifications described in this online catalog are subject to change for improvement without prior notice. Therefore, please be sure to request and confirm the latest product specifications which explain the specifications of our products in detail, before you finalize the design of your applications, purchase, or use our products.
- The technical information in this online catalog provides examples of our products' typical operations and application circuits. We do not guarantee the non-infringement of third party's intellectual property rights and we do not grant any license, right, or interest in our intellectual property.
- If any of our products, product specifications and/or technical information in this online catalog is to be exported or provided to non-residents, the laws and regulations of the exporting country, especially with regard to security and export control, shall be observed.

**<Regarding the Certificate of Compliance with the EU RoHS Directive/REACH Regulations>**

- The switchover date for compliance with the RoHS Directive/REACH Regulations varies depending on the part number or series of our products.
- When you use the inventory of our products for which it is unclear whether those products are compliant with the RoHS Directive/REACH Regulation, please select "Sales Inquiry" in the website inquiry form and contact us.

**We do not take any responsibility for the use of our products outside the scope of the specifications, descriptions, guidelines and precautions described in this online catalog.**

## Safety Precautions (Common precautions for MR Sensors)

- When using our products, no matter what sort of equipment they might be used for, be sure to make a written agreement on the specifications with us in advance. The design and specifications in this catalog are subject to change without prior notice.
- Do not use the products beyond the specifications described in this catalog.
- This catalog explains the quality and performance of the products as individual components. Before use, check and evaluate their operations when installed in your products under the actual conditions for use.
- Install the following systems for a failsafe design to ensure safety if these products are to be used in equipment where a defect in these products may cause the loss of human life or other significant damage, such as damage to vehicles (automobile, train, vessel), traffic lights, medical equipment, aerospace equipment, electric heating appliances, combustion/gas equipment, rotating equipment, and disaster/crime prevention equipment.
- \* Systems equipped with a protection circuit and a protection device.
- \* Systems equipped with a redundant circuit or other system to prevent an unsafe status in the event of a single fault.
- \* Systems equipped with an arresting the spread of fire or preventing glitch.

### (1) Precautions for use

- These products are designed and manufactured for general and standard use in general electronic equipment. (e.g. AV equipment, home electric appliances, office equipment, information and communication equipment)  
For applications in which special quality and reliability are required, or if the failure or malfunction of the products may directly jeopardize life or cause threat of personal injury (such as for aircraft and aerospace equipment, traffic and transport equipment, combustion equipment, medical equipment, accident prevention and anti-theft devices, and safety equipment), please be sure to consult with our sales representative in advance and to exchange product specifications which conform to such applications.
- These products are not intended for use in the following special conditions. Before using the products, carefully check the effects on their quality and performance, and determine whether or not they can be used.
  1. In liquid, such as water, oil, chemicals, or organic solvent.
  2. In direct sunlight, outdoors, or in dust.
  3. In salty air or air with a high concentration of corrosive gas, such as  $\text{Cl}_2$ ,  $\text{H}_2\text{S}$ ,  $\text{NH}_3$ ,  $\text{SO}_2$ , or  $\text{NO}_x$ .
  4. Electric Static Discharge (ESD) Environment.  
These components are sensitive to static electricity and can be damaged under static shock (ESD). Please take measures to avoid any of these environments.  
Smaller components are more sensitive to ESD environment.
  5. Electromagnetic and Radioactive Environment.  
Avoid any environment where strong electromagnetic waves and radiation exist.
  6. In an environment where these products cause dew condensation.
  7. Sealing or coating of these products or a printed circuit board on which these products are mounted, with resin or other materials.
- These products generate Joule heat when energized. Carefully position these products so that their heat will not affect the other components.
- Carefully position these products so that their temperatures will not exceed the category temperature range due to the effects of neighboring heat-generating components. Do not mount or place heat-generating components or inflammables, such as vinyl-coated wires, near these products.
- Note that non-cleaning solder, halogen-based highly active flux, or water-soluble flux may deteriorate the performance or reliability of the products.
- Carefully select a flux cleaning agent for use after soldering. An unsuitable agent may deteriorate the performance or reliability. In particular, when using water or a water-soluble cleaning agent, be careful not to leave water residues. Otherwise, the insulation performance may be deteriorated.
- Do not apply flux to these products after soldering. The activity of flux may be a cause of failures in these products.
- Refer to the recommended soldering conditions and set the soldering condition. High peak temperature or long heating time may impair the performance or the reliability of these products.
- Recommended soldering condition is for the guideline for ensuring the basic characteristics of the products, not for the stable soldering conditions. Conditions for proper soldering should be set up according to individual conditions.

- Do not reuse any products after removal from mounting boards.
- Do not drop these products. If these products are dropped, do not use them. Such products may have received mechanical or electrical damage.
- If any doubt or concern to the safety on these products arise, make sure to inform us immediately and conduct technical examinations at your side.

## **(2) Precautions for storage**

The performance of these products, including the solderability, is guaranteed for a year from the date of arrival at your company, provided that they remain packed as they were when delivered and stored at a temperature of 5 °C to 35 °C and a relative humidity of 45 % to 85 %.

The performance of Chip MR is guaranteed for 3 months after our delivery, provided that they are stored at a temperature of 5 °C to 35 °C and a relative humidity of 45 % to 85 %.

Even within the above guarantee periods, do not store these products in the following conditions.

Otherwise, their electrical performance and/or solderability may be deteriorated, and the packaging materials (e.g. taping materials) may be deformed or deteriorated, resulting in mounting failures.

1. In salty air or in air with a high concentration of corrosive gas, such as Cl<sub>2</sub>, H<sub>2</sub>S, NH<sub>3</sub>, SO<sub>2</sub>, or NO<sub>x</sub>.
2. In direct sunlight.

<Package markings>

Package markings include the product number, quantity, and country of origin.

In principle, the country of origin should be indicated in English.