# Fixed Metal (Oxide) Film Resistors, Surface Mount Type

Type: **ERG(X)1H (1 W)**
**ERG(X)2H (2 W)**

## ■ Features

- Non-flammable
- High Reliability

## ■ Explanation of Part Numbers

Ex.1 : ERX type

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|
| E | R | X | 2 | H | Z | J | 1 | R | 0 | H |

| Product Code | |
|---|---|
| ERX | Metal Film Resistors |

| Power Rating at 70 °C | |
|---|---|
| 1 | 1 W |
| 2 | 2 W |

| Style · Specification | |
|---|---|
| H | Surface Mount Type |

| Resistance Tolerance | |
|---|---|
| J | ± 5 % |
| G | ± 2 % |

Resistance Value
The first two digits are significant figures of resistance and the third one denotes number of zeros following.
Decimal point is expressed by
(Ex.) 1R0 : 1.0 Ω

| Packaging Methods | |
|---|---|
| H | Embossed Carrier Taping |

"Z", "Q" is added according to resistance.

| Type | Resistance Tolerance | Resistance Value Range (Ω) | | |
|---|---|---|---|---|
| | | ERX□HQ | ERX□HZ | ERX□H |
| ERX1H | ±5 % | 22 m to 82 m | 0.10 to 0.18 | 0.20 to 9.1 |
| | ±2 % | — | 0.10 to 0.91 | 1.0 to 9.1 |
| ERX2H | ±5 % | 22 m to 82 m | 0.10 to 0.20 | 0.22 to 9.1 |
| | ±2 % | — | 0.10 to 0.91 | 1.0 to 9.1 |

The above example 1 shows a metal film resistor SMD type, 2 W power rating, resistance value of 1.0 Ω, tolerance ±5 %, and embossed taping.

Ex.2 : ERG type

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|
| E | R | G | 2 | H | J | 1 | 0 | 2 | H |

| Product Code | |
|---|---|
| ERG | Metal Oxide Film Resistors |

| Power Rating at 70 °C | |
|---|---|
| 1 | 1 W |
| 2 | 2 W |

| Style · Specification | |
|---|---|
| H | Surface Mount Type |

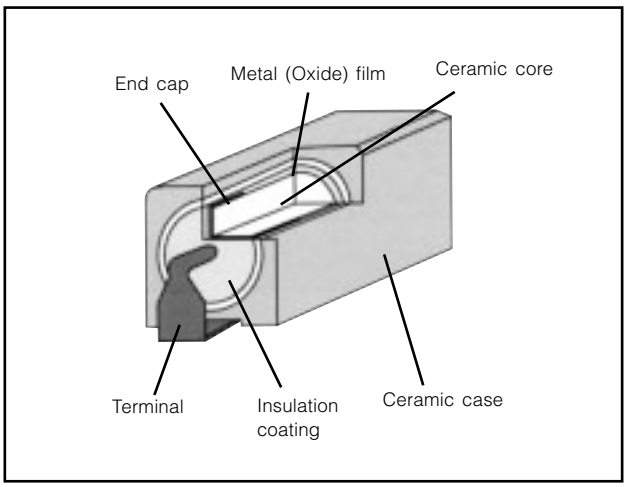
| Resistance Tolerance | |
|---|---|
| J | ± 5 % |
| G | ± 2 % |

Resistance Value
The first two digits are significant figures of resistance and the third one denotes number of zeros following.
Decimal point is expressed by
(Ex.) 102 : 1.0 kΩ

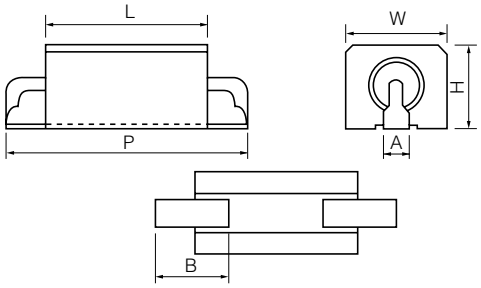
| Packaging Methods | |
|---|---|
| H | Embossed Carrier Taping |

The above example 2 shows a metal oxide film resistor SMD type, 2 W power rating, resistance value of 1.0 kΩ, tolerance ±5 %,and embossed taping.

## ■ Construction




## ■ Dimensions in mm (not to scale)




| Type | Dimensions (mm) | | | | | |
|---|---|---|---|---|---|---|
| | P | L | W | H | A | B |
| ERG(X)1H | $12.5^{+1.0}_{-0.5}$ | 9.0±0.5 | 5.6±0.3 | 5.0±0.2 | 1.5±0.3 | 3.0±1.0 |
| ERG(X)2H | $15.0^{+1.0}_{-0.5}$ | 12.0±0.5 | 6.4±0.3 | 5.8±0.2 | 1.5±0.3 | 4.0±1.0 |

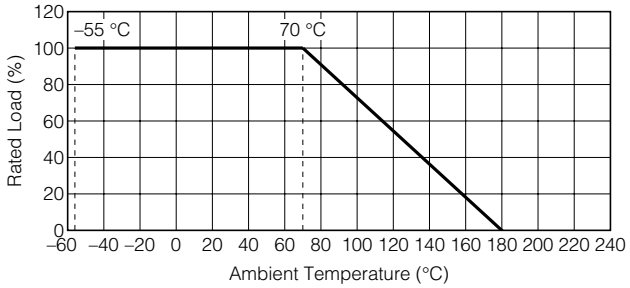
## ■ Ratings

| Type | Power Rating at 70 °C (W)(1) | Dielectric Withstanding Voltage (VAC) | Res. Tol. (%)(2) | Resistance Range (Ω)(2) | | T.C.R. [×10⁻⁶/°C (ppm/°C)] | Standard Resistance Value |
|---|---|---|---|---|---|---|---|
| | | | | min.(3) | max. | | |
| ERG(X)1H | 1 | 1000 | J (±5) | 22 m | 39 m | ±1000 | E12 |
| | | | | 47 m | 82 m | ±500 | |
| | | | G (±2) J (±5) | 0.1 | 10 k | ±350 | |
| ERG(X)2H | 2 | 1000 | J (±5) | 22 m | 39 m | ±1000 | E12 |
| | | | | 47 m | 82 m | ±500 | |
| | | | G (±2) J (±5) | 0.1 | 10 k | ±350 | |

(1) Rated Continuous Working Voltage (RCWV) shall be determined from RCWV=$\sqrt{\text{Power Rating} \times \text{Resistance Value}}$.
(2) Resistance tolerance and resistance range is of use besides range listed, please inquire.
(3) As for the low resistance value range, "Q" or "Z" is given to the part number.(Refer to the explanation of part numbers.)

### Power Derating Curve

For resistors operated in ambient temperatures above 70 °C, power rating shall be derated in accordance with the figure on the right.

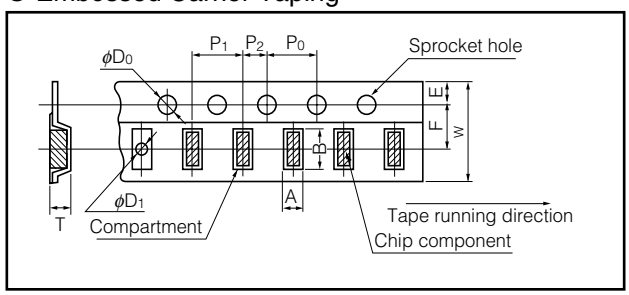



## ■ Packaging Methods

● Standard Quantity

| Type | Embossed Carrier Taping |
|---|---|
| ERG(X)1H | 2000 pcs./reel |
| ERG(X)2H | 1000 pcs./reel |

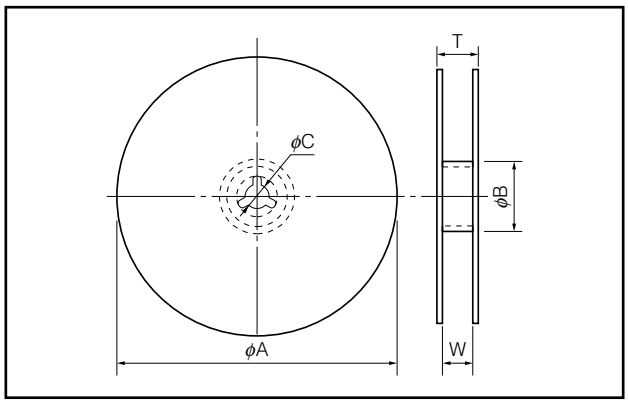
### ● Embossed Carrier Taping




| Dimensions (mm) | Type | W | F | E | A | B | $P_1$ |
|---|---|---|---|---|---|---|---|
| | 1H | $24.0^{\pm0.30}$ | $11.5^{\pm0.10}$ | $1.75^{\pm0.10}$ | $6.2^{\pm0.20}$ | $13.7^{\pm0.20}$ | $8.0^{\pm0.10}$ |
| | 2H | | | | $7.0^{\pm0.20}$ | $16.2^{\pm0.20}$ | $12.0^{\pm0.10}$ |

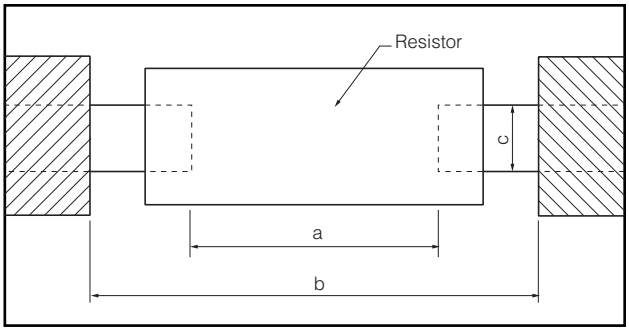
| Dimensions (mm) | Type | $P_2$ | $P_0$ | $\phi D_0$ | $\phi D_1$ | T |
|---|---|---|---|---|---|---|
| | 1H | $2.00^{\pm0.10}$ | $4.00^{\pm0.10}$ | $1.50^{+0.10}_{-0}$ | 1.5 min. | $5.7^{\pm0.10}$ |
| | 2H | | | | | $6.4^{\pm0.10}$ |

### ● Taping Reel




| Dimensions (mm) | Type | φA | φB | φC | W | T |
|---|---|---|---|---|---|---|
| | 1H, 2H | $380^{\pm3}$ | $80^{\pm2}$ | $13.0^{\pm1.0}$ | $25.5^{\pm1.0}$ | $29.5^{\pm1.0}$ |

## ■ Recommended Land Pattern




| Type | Dimensions (mm) | | |
|---|---|---|---|
| | a | b | c |
| ERG(X)1H | 3.5 to 4.0 | 14.5 to 15.0 | 2.8 to 3.3 |
| ERG(X)2H | 4.0 to 4.5 | 17.0 to 17.5 | 3.1 to 3.6 |

## ■ Recommended Soldering Conditions

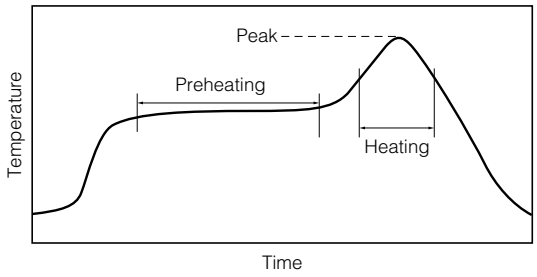
Recommendations and precautions are described below.

● Recommended soldering conditions for reflow

· Reflow soldering shall be performed a maximum of two times.

· Please contact us for additional information when used in conditions other than those specified.

· Please measure the temperature of the terminals and study every kind of solder and printed circuit board for solderability before actual use.




For soldering (Example : Sn/Pb)

| | Temperature | Time |
|---|---|---|
| Preheating | 150 °C to 180 °C | 60 s to 120 s |
| Main heating | Above 200 °C | 30 s to 40 s |
| Peak | 235 °C | max. 10 s |

For lead-free soldering (Example : Sn/Ag/Cu)

| | Temperature | Time |
|---|---|---|
| Preheating | 150 °C to 180 °C | 60 s to 120 s |
| Main heating | Above 230 °C | 30 s to 40 s |
| Peak | 255 °C | max. 5 s |

## ⚠ Safety Precautions

The following are precautions for individual products. Please also refer to the precautions common to Fixed Resistors shown on page ER3 of this catalog.

1. Transient voltage
   If there is a possibility that the transient phenomenon (significantly high voltage applied in a short time) may occur or that a high voltage pulse may be applied, make sure to evaluate and check the characteristics of Fixed Metal (Oxide) Film Resistors mounted on your product rather than only depending on the calculated power limit or steady-state conditions to complete the design or decide to use the resistors.

2. Do not apply excessive tension to the terminals.

## ⚠ Safety Precautions
(Common precautions for Fixed Resistors)

- 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.
- 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

### (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)
- 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 $Cl_2$, $H_2S$, $NH_3$, $SO_2$, or $NO_2$
  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 Environment
     Avoid any environment where strong electromagnetic waves 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.

### (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 %.

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 $Cl_2$, $H_2S$, $NH_3$, $SO_2$, or $NO_2$
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.