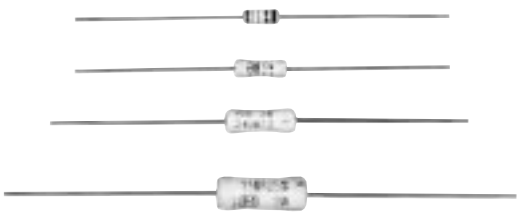
Anti-Pulse Power Resistors

Type: **ERGD**

(0.5 W, 1 W, 2 W, 3 W)



■ Features

- **Resistance Value Correspondence**
  A resistance value range is an electric power type resistor of 750 kΩ (3W).
- **Miniaturization**
  It is the shape and the size which is the same as the ERGS type.
- **Noninflammable Nature**
  It is a resistor of the noninflammable nature/resistance solvent nature that leads an industry standard.
- **Anti-Pulse Characteristic**
  It is a resistor which is excellent about the anti-pulse characteristic.
- **Automatic Insertion**
  An automatic insertion is possible with solid structure.

■ Explanation of Part Numbers

1	2	3	4	5	6	7	8	9	10	11	12
E	R	G		2	D	J		2	2	4	

Product Code
Anti-Pulse Power Resistors

Power Rating	
12	0.5 W
1	1 W
2	2 W
3	3 W

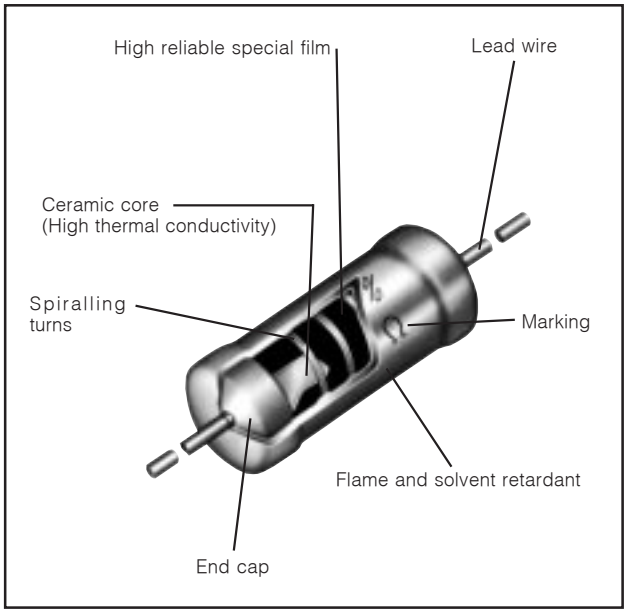
Resistance Tolerance	
G	±2 %
J	±5 %

Resistance Value
The first two digits are significant figures of resistance and the third one denotes number of zeros following.

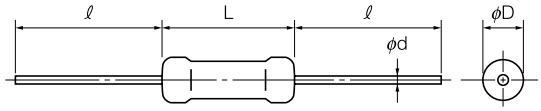
Code	Forming / Packaging	Forming & Taping matrix			
		12D	1D	2D	3D
□···□	Straight lead wire type	○	○	○	○
□···V	Axial paping type (Straight lead)	○	○	○	○
□···P	Cut & Forming type	○	○	○	○
U···V	Axial paping type (Stand off)		○	○	○
□···E	Radial Taping type (E type)	○	○	○	
W···E	Radial Taping type (WE type)	○	○	○	

The above example shows an anti-pulse resistor, 2 W power rating, resistance value of 220 k ohms, tolerance ±5 %, and package of standard bulk packing.

■ Construction



■ Dimensions in mm (not to scale)



Type	Dimensions (mm)				Mass (Weight) [g/pc.]
	L	ϕD	ℓ	ϕd	
ERG12D	$6.35^{+0.65}_{-0.35}$	$2.3^{+0.5}_{-0.3}$	$30.0^{\pm3.0}$	$0.65^{\pm0.05}$	0.26
ERG1D	$9.00^{+1.50}_{-1.00}$	$2.8^{\pm0.5}$	$30.0^{\pm3.0}$	$0.65^{\pm0.05}$	0.33
ERG2D	$12.00^{+1.50}_{-1.00}$	$4.0^{\pm1.0}$	$30.0^{\pm3.0}$	$0.80^{\pm0.05}$	0.66
ERG3D	$15.00^{\pm1.50}$	$5.5^{\pm1.0}$	$38.0^{\pm3.0}$	$0.80^{\pm0.05}$	1.47

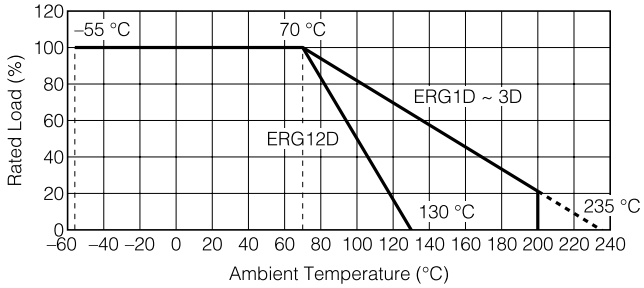
■ Ratings

Type	Power Rating at 70 °C (W)	Limiting Element Voltage (Maximum RCWV(1)) (V)	Maximum Overload Voltage(2) (V)	Maximum Intermittent Overload Voltage(3) (V)	Dielectric With-standing Voltage (VAC)	Res. Tol. (%)	Resistance Range (Ω) (4)		Standard Resistance Value
							min.	max.	
ERG12D	0.5	400	800	800	500	J (±5) G (±2)	51 k	240 k	E24
ERG1D	1	500	1000	1000	500	J (±5) G (±2)	110 k	330 k	E24
ERG2D	2	500	1000	1000	700	J (±5) G (±2)	110 k	510 k	E24
ERG3D	3	500	1000	1000	700	J (±5) G (±2)	110 k	750 k	E24

(1) Rated Continuous Working Voltage (RCWV) shall be determined from RCWV=$\sqrt{\text{Power Rating} \times \text{Resistance Value}}$ or Limiting Element Voltage (max. RCWV) listed above whichever less.
(2) Overload (Short-time Overload) Test Voltage (SOTV) shall be determined from SOTV=2.5 × Power Rating or max. Overload Voltage listed above whichever less.
(3) Intermittent Overload Test Voltage (IOTV) shall be determined from IOTV=4.0 × Power Rating or max. Intermittent Overload Voltage listed above whichever less.
(4) Resistance tolerance and resistance range is of use besides range listed, please inquire.

Power Derating Curve

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



■ See page ER90 to ER92 about packaging and / or cut formed leads.

⚠Cautions for Safety

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 Anti-Pulse Power Resistors (hereafter called the 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. The Resistors are covered with a special coating. Do not apply shock or vibration to them, or pinch them with long-nose pliers. Otherwise, the Resistors may be damaged.
3. Do not apply excessive tension to the lead-connected sections. When bending the lead wire, do not apply excessive stress to the Resistors and provide the wire with a natural curvature.
4. Do not brush the Resistors during or after the cleaning process, which may be conducted after soldering. Otherwise, the coating film may be damaged.

⚠Caution for Safety
(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 purpose and standard use in general electronic equip ment (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. In an environment where strong static electricity or electromagnetic waves exist
  5. In an environment where these products cause dew condensation
  6. 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 perfor mance 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.

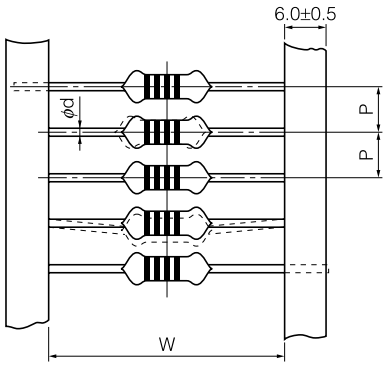
1. In salty air or in air with a high concentration of corrosive gas, such as Cl_2, H_2S, NH_3, SO_2, or NO_2
2. In direct sunlight

<Package markings>

Package markings include the product number, quantity, and country of origin.
In principle, the country of origin should be indicated in English.

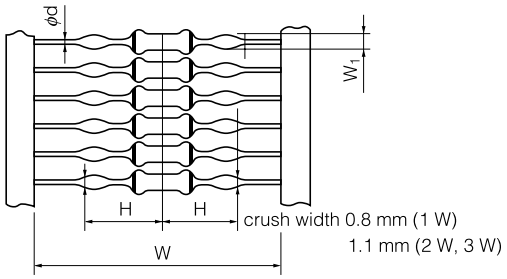
■ Taped & Box:

ERG(X)□□S□□□□V

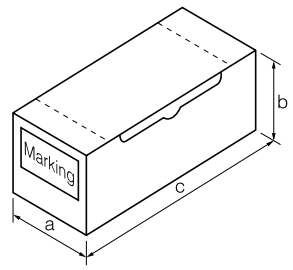


■ Stand-off Taped & Box:

ERG(X)□□S□U□□□V

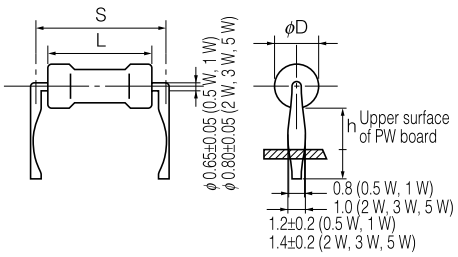


Part Number	Standard Quantity (pcs./box)	Taping (mm)						Box (mm)		
		P	50×P	W	H	W_1	ϕd	a	b	c
ERG(X)12S□□□□□V	2000	$5.0^{\pm0.3}$	$250^{\pm2}$	$52.0^{\pm1.5}$	—	—	$0.65^{\pm0.05}$	85	80	255
ERG(X) 1S□□□□□V	2000	$5.0^{\pm0.3}$	$250^{\pm2}$	$52.0^{\pm1.5}$	—	—	$0.65^{\pm0.05}$	85	80	255
ERG(X) 1S□U□□□V					$12.0^{0}_{-2.0}$	$1.2^{+0.15}_{0}$				
ERG(X) 2S□□□□□V	1000	$5.0^{\pm0.3}$	$250^{\pm2}$	$52.0^{\pm1.5}$	—	—	$0.80^{\pm0.05}$	85	80	255
ERG(X) 2S□U□□□V					$15.5^{0}_{-2.0}$	$1.4^{+0.15}_{0}$				
ERG(X) 3S□□□□□V	1000	$10.0^{\pm0.5}$	$500^{\pm2}$	$74.0^{\pm2.0}$	—	—	$0.80^{\pm0.05}$	105	100	325
ERG(X) 3S□U□□□V					$23.0^{0}_{-2.0}$	$1.4^{+0.15}_{0}$				



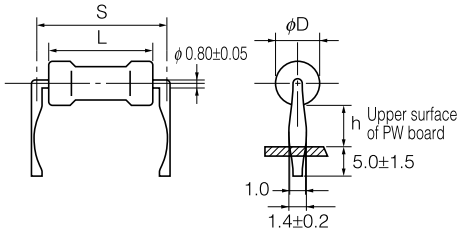
■ Cut & Formed Type

ERG(X)□□S□□□□P



Part Number	Standard Quantity (pcs./box)	Dimensions (mm)			
		L	ϕD	S	h
ERG(X)12S□□□□P	2000	$6.35^{+0.65}_{-0.35}$	$2.3^{+0.5}_{-0.3}$	$10.0^{\pm1.5}$	$4.0^{\pm1.5}$
ERG(X)1S□□□□P	2000	$9.00^{+1.50}_{-1.00}$	$2.8^{\pm0.5}$	$12.5^{\pm1.5}$	$4.0^{\pm1.5}$
ERG(X)2S□□□□P	1000	$12.00^{+1.50}_{-1.00}$	$4.0^{\pm1.0}$	$15.0^{\pm1.5}$	$6.0^{\pm1.5}$
ERG(X)3S□□□□P	1000	$15.00^{\pm1.50}$	$5.5^{\pm1.0}$	$20.0^{\pm2.0}$	$6.5^{\pm1.5}$
ERG(X)5S□□□□P	500	$24.00^{\pm1.50}$	$8.0^{\pm1.0}$	$30.0^{\pm2.0}$	$7.5^{\pm1.5}$

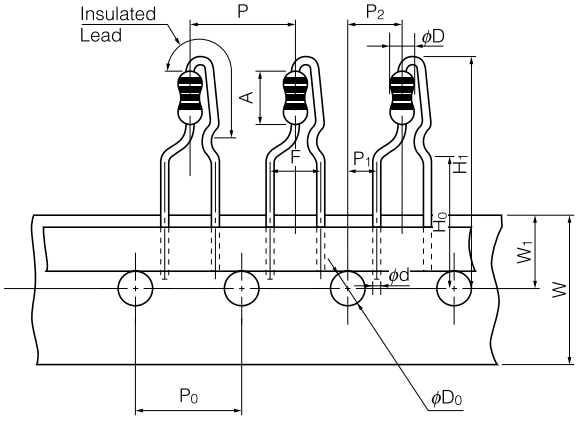
ERG(X)□F□□□□H



Part Number	Standard Quantity (pcs./box)	Dimensions (mm)			
		L	ϕD	S	h
ERG(X)2F□□□□H	1000	$12.0^{+1.5}_{-1.0}$	$4.0^{\pm1.0}$	$15.0^{\pm1.5}$	$6^{\pm2}$
ERG(X)3F□□□□H	1000	$15.0^{\pm1.5}$	$5.5^{\pm1.0}$	$20.0^{\pm2.0}$	$10^{\pm2}$
ERG(X)5F□□□□H	500	$24.0^{\pm1.5}$	$8.0^{\pm1.0}$	$30.0^{\pm2.0}$	$10^{\pm2}$

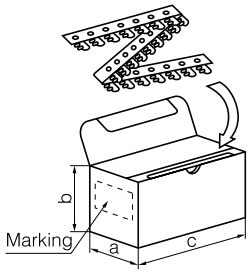
■ For Panasert Automatic Insertion Machine Radial Tape & Box

Type ERG(X)□□S□□□□E (12S, 1S, 2S)



Dimensions (mm)		Dimensions (mm)		Dimensions (mm)			Dimensions (mm)			Dimensions (mm)		
P	12.7±1.0	W	18.0±0.5	H_1	12S	32 max.	A	12S	$6.35^{+0.65}_{-0.35}$	φD	12S	$2.3^{+0.5}_{-0.3}$
P_0	12.7±0.3	W_1	9.0±0.5		1S	32 max.		1S	$9.0^{+1.5}_{-1.0}$		1S	2.8±0.5
P_1	3.85±0.70				2S	38 max.		2S	$12.0^{+1.5}_{-1.0}$		2S	4.0±1.0
P_2	6.35±1.00			H_0	16.0±0.5		φd	0.65±0.05				
F	5.0±0.8			φD_0	4.0±0.2							

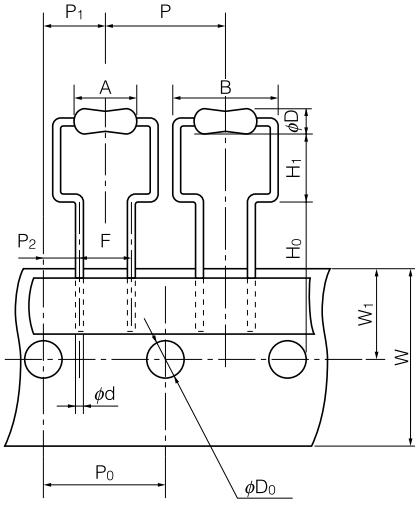
Radial Tape Package Specifications



Purt Number	Dimensions (mm)			Standard Quantity (pcs./box)
	a	b	c	
ERG(X)12S□□□□E	46	130	335	2000
ERG(X) 1S□□□□E	46	130	335	2000
ERG(X) 2S□□□□E	49	100	335	1000

■ For Panasart Automatic Insertion Machine Radial Taped & Box

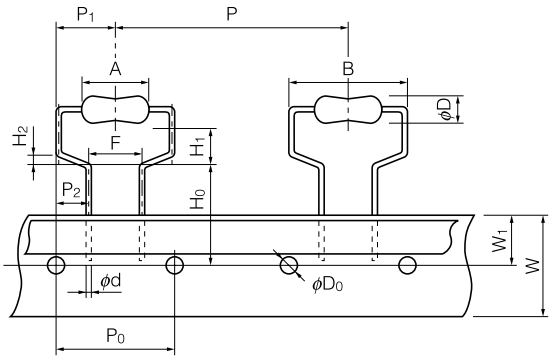
Type ERG(X)□□S□W□□□E (12S, 1S, 2S)



Dimensions (mm)			Dimensions (mm)		
P	12S	12.7±1.0	H_1	12S	$6.5^{+0.6}_{0}$
	1S, 2S	30.0±1.0		1S	$6.5^{+1.0}_{0}$
P_0	12S	12.7±0.3		2S	$6.5^{+1.0}_{0}$
	1S, 2S	15.0±0.3	φD_0	4.0±0.2	
P_1	12S	6.35±1.00	A	12S	$6.35^{+0.65}_{-0.35}$
	1S, 2S	7.5±1.0		1S	$9.0^{+1.5}_{-1.0}$
P_2	12S	3.85±0.70		2S	$12.0^{+1.5}_{-1.0}$
	1S, 2S	3.75±0.50	B	12S	11.2 max.
F	12S	5.0±0.5		1S	14 max.
	1S, 2S	7.5±0.8		2S	17 max.
W	18.0±0.5		φD	12S	$2.3^{+0.5}_{-0.3}$
W_1	9.0±0.5			1S	2.8±0.5
H_0	12S	16.0±0.5		2S	4.0±1.0
	1S	18.0±1.0	φd	12S	0.65±0.05
	2S	18.0±1.0		1S, 2S	0.80±0.05

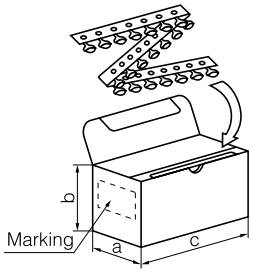
■ For Panasart Automatic Insertion Machine Radial Taped & Box

Type ERG(X)□F□S□□□E (1F, 2F, 3F)



Dimensions (mm)			Dimensions (mm)		
P	30.0±1.0		H_2	1.0±0.3	
P_0	15.0±0.3		ϕD_0	4.0±0.2	
P_1	7.5±1.0		A	1F	$9.0^{+1.5}_{-1.0}$
P_2	3.75±0.50			2F	$12.0^{+1.5}_{-1.0}$
F	7.5±0.8			3F	15.0±1.5
W	18.0±0.5		B	1F	14 max.
W_1	9.0±0.5			2F	17 max.
H_0	$16.0^{+1.0}_{0}$			3F	21 max.
H_1	1F	$7.0^{+0.1}_{0}$	ϕD	1F	2.8±0.5
	2F	$8.0^{+0.1}_{0}$		2F	4.0±1.0
	3F	$9.0^{+0.1}_{0}$		3F	5.5±1.0
			ϕd	0.80±0.05	

Radial Tape Package Specifications



Type	Dimensions (mm)			Standard Quantity (pcs./box)
	a	b	c	
ERG(X)12S□W□□□E	46	145	325	2000
ERG(X)1S□W□□□E	49	150	317	1000
ERG(X)1F□S□□□E				
ERG(X)2S□W□□□E	49	150	317	500
ERG(X)2F□S□□□E				
ERG(X)3F□S□□□E	49	190	315	500