

Fuse Resistors

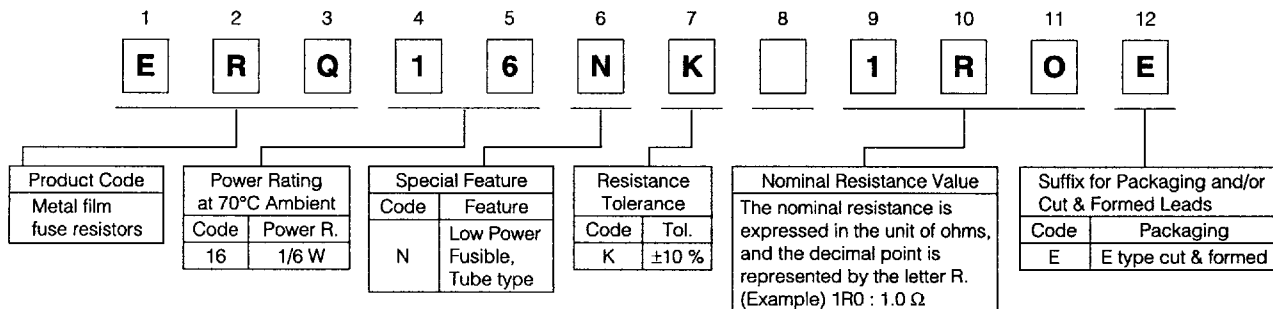
Type: **ERQN**

(Fixed metal film resistors
Low power fusible type)

■ Features

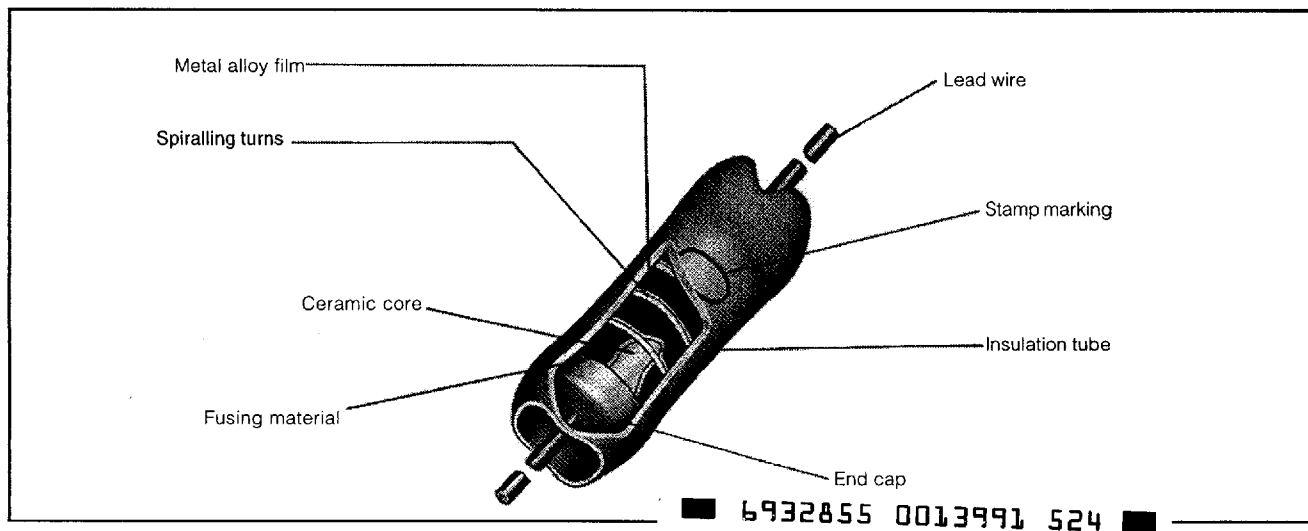
- Fuse within 60 second at 1.25 W
- No increase of electric current, arcing at fusion
- Covered with shrunk tube and small size
- Very low temperature of surface of resistor at over-load because of low power fusible type
- Low resistance values on request

■ Explanation of Part Numbers



The above example shows a standard metal film fuse resistor, 1/6 W power rating, resistance value of 1.0 Ω tolerance of 10 %, and package of E type cut & formed.

■ Construction



■ 6932855 0013991 524 ■

■ Ratings

Part No.	Power Rating at 70 °C	Maximum Overload Voltage	Dielectric Withstanding Voltage	Resistance Tolerance (%)	Resistance Range (Ω)		TCR ppm/°C	Standard Resistance Values	Marking Method on Body	Weight g/pcs.
					min.	max.				
ERQ16N	1/6 W	2.5 times of rated voltage*	350 VAC	K (±10)	0.10	2.2	3200±500	E-12	Stamp	0.26

* Rated Continuous Working Voltage (RCWV)
 $= \sqrt{\text{Power Rating (W)} \times \text{Nominal Resistance Value (}\Omega\text{)}}$

Maximum Open Circuit Voltage

Referring to the maximum value of the voltage applied between terminals of the resistor when the resistor is opened in an electric circuit, 10 kW (Zero to peak) is regarded as the maximum open circuit voltage.

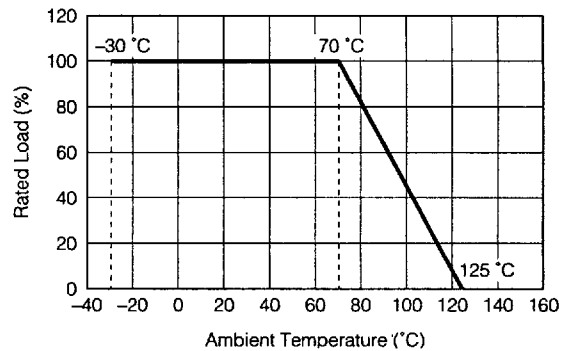
$$E_p = \sqrt{10000 \times R}$$

E_p : Maximum Open Circuit Voltage (V)

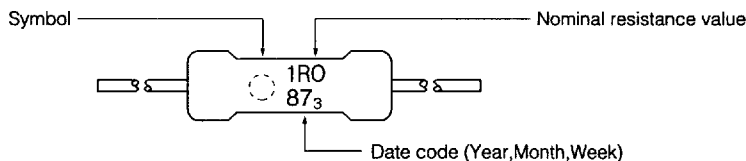
R: Nominal Resistance (Ω)

Power Derating Curve

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

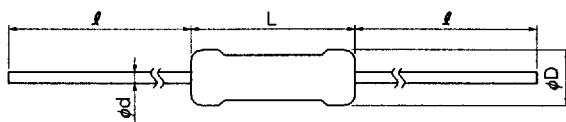


■ Explanation of Marking



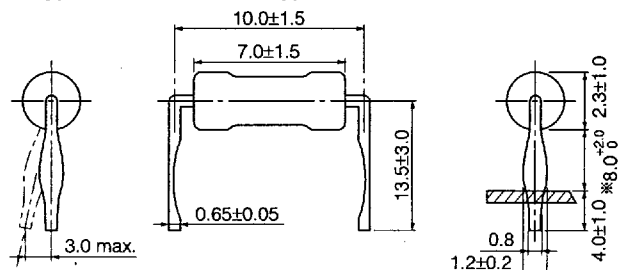
■ Dimensions in mm (not to scale)

● Bulk type



Part No.	L	φD	l	φd
ERQ16N	7.0±1.5	2.3±1.0	30.0±3.0	0.65±0.05

● Type E Cut & Formed type



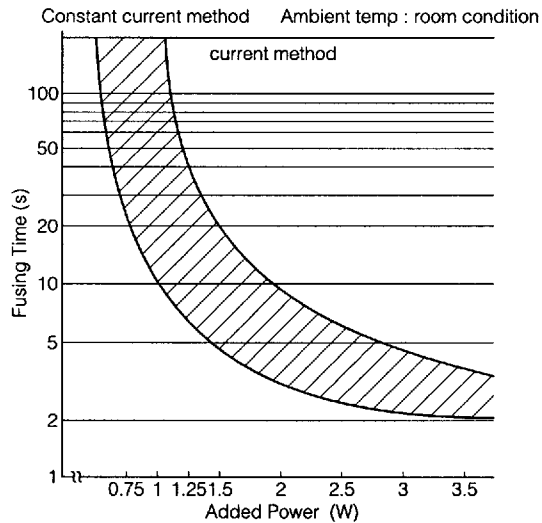
■ Performance Specifications

Characteristics	Specifications	Test Methods (JIS-C-5202)
Incombustibility	The flame should be extinguished within 10 seconds when the resistor is taken out of the test flame.	The resistor is exposed to specified test flame for 15 seconds by gas burner, and is taken out for 15 seconds. This cycle is conducted 5 times.
Fusing Characteristics	When resistors are tested using the specified circuit, the resistors shall meet the requirements which have been tailored individually.	

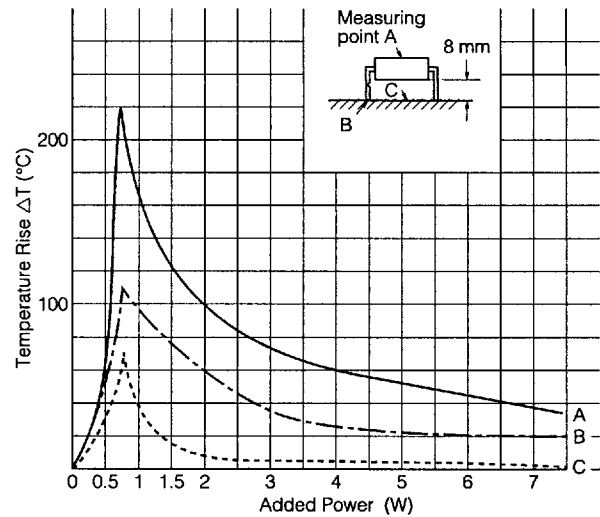
Note: For calculation for resistance change in each test, if there is temperature difference before and after the test, the effect of the resistance temperature coefficient shall be compensated.

■ Typical Performance Data

1. Example of Fusing Characteristics (Reference)



2. Hot Spot Temperature (Reference)



⚠ Cautions for Safety

These are fixed metal film resistors, low power fusible type, and are different from ordinary fixed resistors and for its handling, particular cautions are required as instructed below. Conditions of use shall be mutually confirmed by the both parties and designated in the individual specifications for approval.

1. Confirming fusing condition

This resistor differs in the fusing characteristics between the constant current circuit and the constant voltage circuit, and it shall be confirmed carefully in actual circuit before use. (To be determined in the individual specification for approval by mutual confirmation.)

2. Consideration for waveform pulse voltage, inrush voltage, transient voltage.

In the case of inrush voltage circuit, transient phenomenon for such application of a considerably high voltage in a short time, or application of waveform pulse voltage with high peak voltage, sufficient considerations shall be necessary depending on the actual application circuit.

3. Conditions of use in steady state

Unless used in the load range within power derating curve, a premature breakage (opening of circuit although it is not abnormal) may occur. Consider to use them within the sufficient allowance under the power derating curve.

4. Mounting by soldering

1) When mounting on printed circuit board by soldering, cares should be paid to the soldering temperature and time applied to the lead wires. Particular, cares should be necessary when preheating process is involved before dipping in solder bath.

Soldering conditions are specified as follows.

(Type E cut & formed)

- Preheat Not higher than 100 °C, within 60 seconds.
- Solder dip Not higher than 260 °C, within 4 seconds.

(For details, test and review for every possible cases)

2) When using a soldering iron, release heat by using pliers or the like as shown is Fig. 1 so as to minimize the heat effect to the resistance element. If soldered for a long time at high temperatures the performance may be deteriorated by heat, or the resistor may open. So, keep a safe distance over 6 mm from the body and solder within 3 seconds at 300 °C or lower temperatures.

5. Precaution for use

The products in this catalog are intended for use in general standard applications for general electronic equipment (AV products, household electric appliances, office equipment, information and communication equipment, etc.); hence, they do not take the use under the following special environments into consideration.

Accordingly, the use in the following special environments, and such environmental conditions may affect the performance of the products; prior to use, verify the performance, reliability, etc. thoroughly.

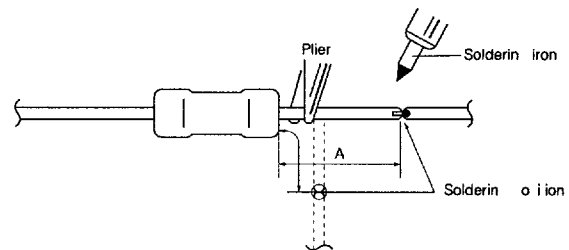


Fig.1

- ① Use in liquids such as water, oil, chemical, and organic solvent.
- ② Use under direct sunlight and in outdoor and dusty atmospheres.
- ③ Use in places full of corrosive gases such as sea breeze, Cl_2 , H_2S , NH_3 , SO_2 , and NO_2 .
- ④ Use in environment with large static electricity and strong electromagnetic waves.
- ⑤ Where the product is close to a heating component, and where an inflammable such as a polyvinyl chloride wire is arranged close to the product.
- ⑥ Where the resistor is sealed and coated with resin, etc.
- ⑦ Where water or a water-soluble detergent is used in cleaning free soldering and in flux cleaning after soldering. (Pay particular attention to soluble flux.)

6. Cleaning

This resistor is not solvent resistant, and where the manufacturing process includes a cleaning step using organic solvent or the like, arrange the process so as to mount in the set after cleaning.

7. Handling of resistor

- 1) Do not apply tension more than necessary on the lead wire, in particular, the joint of terminal. When bending a lead wire, be careful not to apply force to the resistance element, and bend in a natural curvature.
- 2) Be careful so that the surface coating tube of the resistor may not be injured by sharp edge of knife or the like.

8. Mounting position of resistor

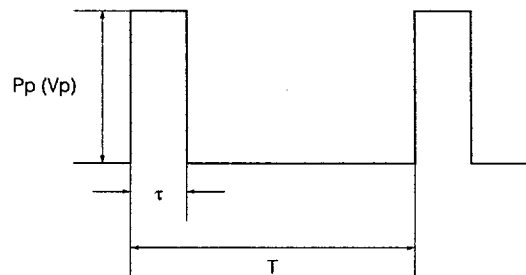
Arrange so that the vinyl coated wire may not contact with the resistor. Select the mounting position carefully if there is any heat source in the peripheral parts.

9. Long-term storage

When storing the resistors for a long period, avoid damp, dusty or hot place, and harmful atmosphere (hydrogen chloride, sulfurous acid, etc.)

(Data for Reference)

■ Pulse Characteristics (Usual)



- P_p : Pulse limit power (W)
- V_p : Pulse limit voltage (V)
- τ : Pulse continuous time (s)
- T : Period (s)
- V_R : Rated voltage (V)
- P : Rated power (W)
- R : Nominal resistance (Ω)
- $V_{p,max}$: Max. pulse limit voltage (V)

Withstand pulse limit power is calculated by the next method.

$$P_p = K \cdot P \cdot T/\tau$$

$$V_p = \sqrt{K \cdot P \cdot R \cdot T/\tau}$$

$$I_p = \sqrt{K \cdot P \cdot 1/R \cdot T/\tau}$$

Kind	K	V _{p max.} (V)
ERQ16H	0.2	—

Reference to the right about a fixed number of V_{p max.}

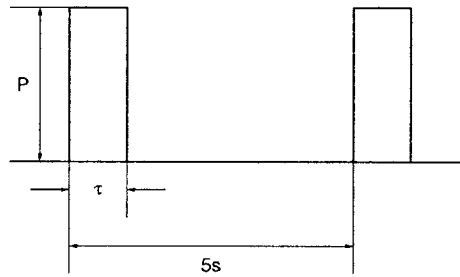
- T > 1(s) → T = 1(s)
 - T/τ > 100 → T/τ = 100
 - P_p < P → P stands for P_p
(V_p < V_R → V_R stands for V_p)
 - Added voltage ≤ V_{p max.}
 - P_p or V_p is referent value
- Conditions: Pulse added time = 1000 h
Resistance change = ±5 %
Room temperature

■ Pulse Characteristics (Inrush)

(Test Methods)

Resistance change ≤ ±5 % with pulse 10000 cycles as like the figure.

- 1) Added power and added voltage are within the lower territory of this graph
- 2) Added in normal temperature and humidity



(Closely Resemble Methods)

Peak voltage put together as like the figure.

