

Wirewound Resistors, Flameproof, Bath-tub Type

Type: **ERF**

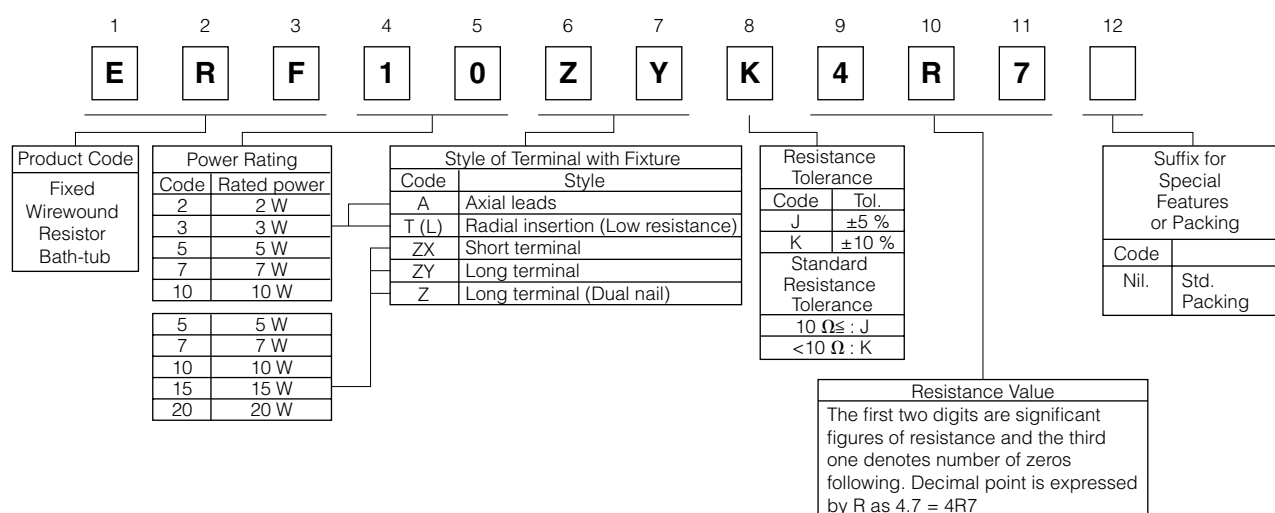
Discontinued

Axial leads type	ERFA	
Radial insertion type	ERFT(L)	
Off PC board type	ERFZX ERFZY ERFZ	

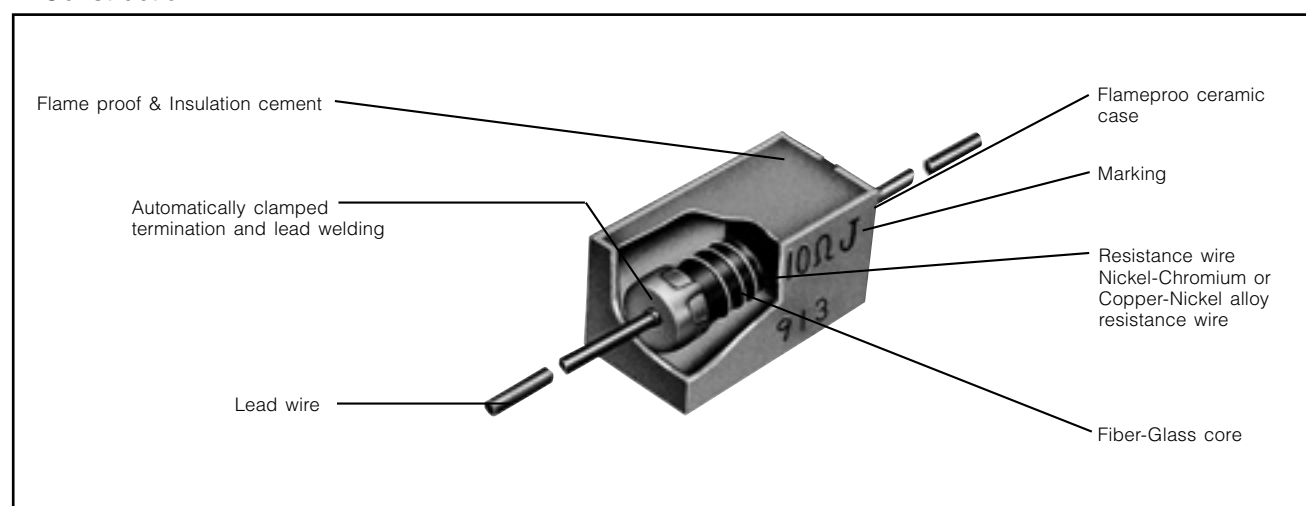
■ Features

- Flameproof
- Exclusive surge characteristics
- Uniform quality
- Reference standards to IEC 60115-4, EIAJ RC-2123A
- RoHS compliant

■ Explanation of Part Numbers



■ Construction



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01 Aug. 2012

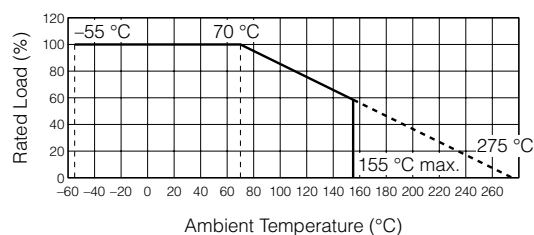
ERFA (Axial Lead Type)

■ Ratings

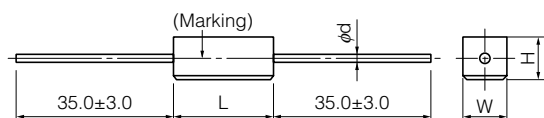
Type	Power Rating at 70 °C (W)	Resistance Range (Ω)		Dielectric Withstanding Voltage (VAC)	Standard Quantity (pcs.)
		min.	max.		
ERF2A	2	0.1	390	1000	1000
ERF3A	3	0.18	680	1000	1000
ERF5A	5	0.18	680	1000	1000
ERF7A	7	0.22	1.5 k	1000	500
ERF10A	10	0.33	2.4 k	1000	500

Power Derating Curve

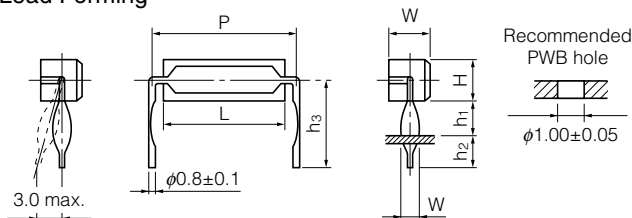
For resistors operated in ambient temperatures above 70 °C, power rating shall be derated in accordance with the figure below.



■ Dimensions in mm (not to scale)



Lead Forming



Type	Dimensions (mm)				Mass (Weight) [g/pc.]
	L	W±1.0	H±1.0	d±0.1	
ERF2A	18.0±1.0	6.4	6.4	0.8	2
ERF3A	22.0±1.0	8.0	8.0	0.8	4
ERF5A	22.0±1.0	9.5	9.0	0.8	5
ERF7A	35.0±1.5	9.5	9.0	0.8	8
ERF10A	48.0±2.0	9.5	9.0	0.8	12

Type	L±1	W±1.0	H±1.0	P±2	W±0.2	h1±2	h2±1	h3±1
ERF2A...P	18	6.4	6.4	25	1.4	6	4	13.2
ERF3A...H	22	8.0	8.0	27.5	1.4	10	4	18
ERF5A...H	22	9.0	9.5	27.5	1.4	10	4	18.75

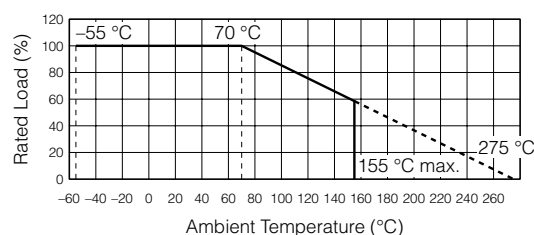
Radial Insertion Type

■ Ratings

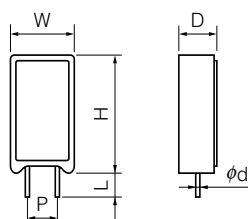
Type	Power Rating at 70 °C (W)	Resistance Range (Ω)		Dielectric Withstanding Voltage (VAC)	Standard Quantity (pcs.)
		min.	max.		
ERF2T(L)	2	(0.01) 0.1	(0.082) 390	1000	500
ERF3T(L)	3	(0.01) 0.18	(0.082) 680	1000	500
ERF5T(L)	5	(0.01) 0.18	(0.082) 680	1000	500
ERF7T(L)	7	(0.01) 0.22	(0.1) 1.5 k	1000	500
ERF10T(L)	10	(0.01) 0.33	(0.1) 2 k	1000	500

● TL (2TL to 10TL) are series of low resistance value.

Power Derating Curve



■ Dimensions in mm (not to scale)



Type	Dimensions (mm)						Mass (Weight) [g/pc.]
	W	D	H	L	P	φd	
ERF2T(L)	11.0±1.0	7.0±1.0	20.5±1.5	4.5 ^{+2.0} _{-1.0}	5.0 ^{+2.0} _{-1.0}	0.8±0.1	3.9
ERF3T(L)	12.0±1.0	8.0±1.0	25.0±1.5	4.5 ^{+2.0} _{-1.0}	5.0 ^{+2.0} _{-1.0}	0.8±0.1	5.5
ERF5T(L)	13.0±1.0	9.0±1.0	25.5±1.5	4.5 ^{+2.0} _{-1.0}	5.0 ^{+2.0} _{-1.0}	0.8±0.1	6.7
ERF7T(L)	16.0±1.0	9.0±1.0	29.0±1.5	4.5 ^{+2.0} _{-1.0}	7.5 ^{+2.0} _{-1.0}	0.8±0.1 (1.0±0.1)	8.8
ERF10T(L)	16.0±1.0	9.0±1.0	34.0±1.5	4.5 ^{+2.0} _{-1.0}	7.5 ^{+2.0} _{-1.0}	0.8±0.1 (1.0±0.1)	10.7

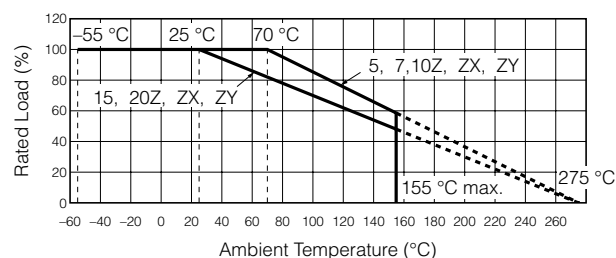
ERFZ (Off PC Board Type)

■ Ratings

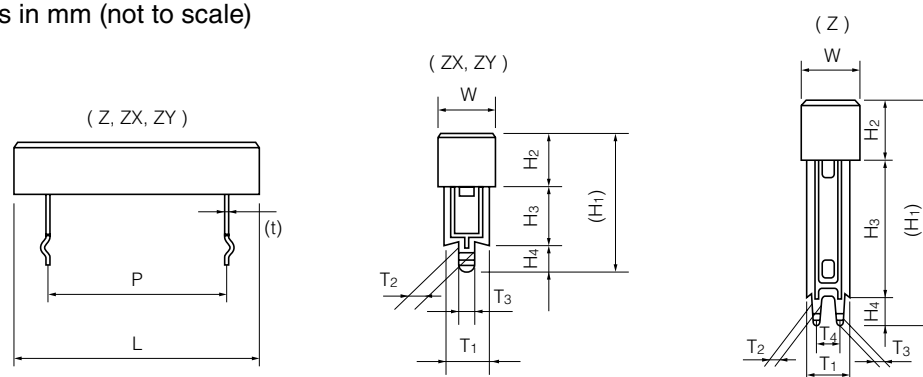
Type	Power Rating (W)	Resistance Range (Ω)		Dielectric Withstanding Voltage (VAC)	Standard Quantity pcs.
		min.	max.		
ERF5Z	5	0.22	820	1000	500
ERF7Z	7	0.39	1.5k	1000	500
ERF10Z	10	0.39	2.2k	1000	500
ERF15Z	15	0.51	2.2k	1000	500
ERF20Z	20	0.51	2.4k	1000	500

Power Derating Curve

For resistors operating in ambient temperatures above 70 °C (25 °C) power rating shall be derated in accordance with the figure below.



■ Dimensions in mm (not to scale)



Type		Dimensions (mm)												Mass (Weight) [g/pc.]
		L	P±1.5	W±1.0	(H ₁)	H ₂ ±1.0	H ₃ ⁺²	H ₄ ±0.5	T ₁ ±0.3	T ₂ ±0.2	T ₃ ±0.2	T ₄	(t)	
ERF5Z	X	27.0±1.0	15.0	9.5	24	9.5	10	4.5	7.3	1.6	1.4	—	0.5	6
	Y	27.0±1.0	15.0	9.5	39	9.5	25	4.5	7.3	1.6	1.4	—	0.5	7
		27.0±1.0	(15.0) ⁽¹⁾	9.5	36	9.5	22	4.5	7.3	1.5	1.0	3.5	0.5	6.9
ERF7Z	X	35.0±1.0	22.5	9.5	24	9.5	10	4.5	7.3	1.6	1.4	—	0.5	7.6
	Y	35.0±1.0	22.5	9.5	39	9.5	25	4.5	7.3	1.6	1.4	—	0.5	8.6
		35.0±1.0	(22.5) ⁽²⁾	9.5	36	9.5	22	4.5	7.3	1.5	1.0	3.5	0.5	8.5
ERF10Z	X	48.0±1.5	35.0	9.5	24	9.5	10	4.5	7.3	1.6	1.4	—	0.5	10
	Y	48.0±1.5	35.0	9.5	39	9.5	25	4.5	7.3	1.6	1.4	—	0.5	10.8
		48.0±1.5	(35.0) ⁽³⁾	9.5	36	9.5	22	4.5	7.3	1.5	1.0	3.5	0.5	10.6
ERF15Z	X	48.0±1.5	32.5	12.5	32.5	12.5	15	5.0	10.0	3.0	2.7	—	0.5	17
	Y	48.0±1.5	32.5	12.5	47.5	12.5	30	5.0	10.0	3.0	2.7	—	0.5	20
		48.0±1.5	(32.5) ⁽⁴⁾	12.5	47.5	12.5	30	5.0	10.0	2.0	1.5	5	0.5	19.2
ERF20Z	X	63.5±1.5	47.5	12.5	32.5	12.5	15	5.0	10.0	3.0	2.7	—	0.5	23.5
	Y	63.5±1.5	47.5	12.5	47.5	12.5	30	5.0	10.0	3.0	2.7	—	0.5	26.5
		63.5±1.5	(47.5) ⁽⁵⁾	12.5	47.5	12.5	30	5.0	10.0	2.0	1.5	5	0.5	25.7

Note: (1) to (3); Tolerance +2 to +6, (4) to (5); Tolerance 0 to +4.

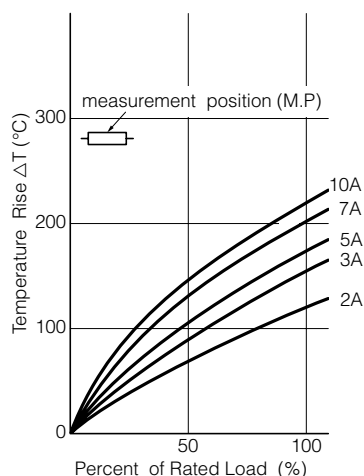
Recommended PWB Hole

Power Rating (W)	Dimensions (mm)		P
	ZX · ZY	Z	
5			15
7			22.5
10			35
15			32.5
20			47.5

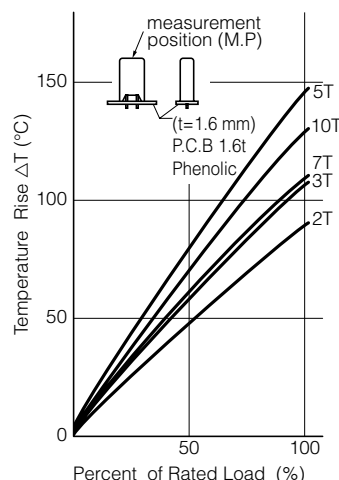
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■ Temperature Rising Data

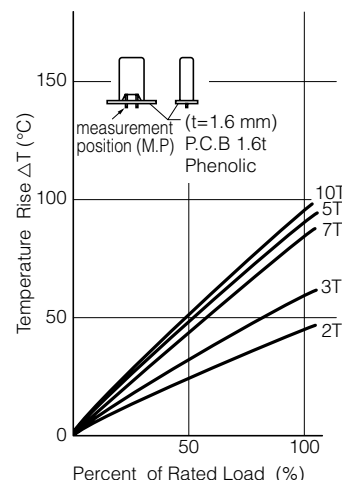
Axial Leads Type
(Hot Spot Temperature)



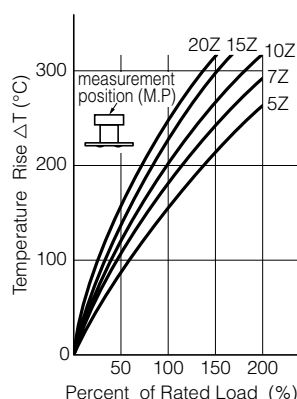
Radial Insertion Type
(Hot Spot Temperature)



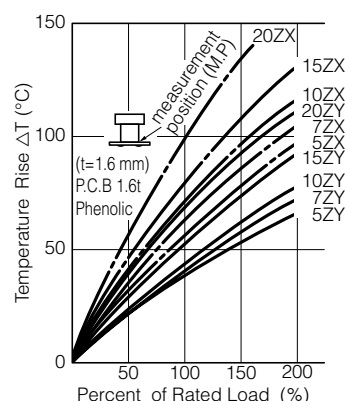
(Terminal Temperature of
PC Board Conjunction Point)



Off PC Board Type
(Hot Spot Temperature)



(Terminal Temperature of
PC Board Conjunction Point)



■ Packaging Methods

Please contact the factory for packaging methods

⚠ Safety Precautions

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

1. Since Wirewound Resistors (hereafter called the resistors) generate heat during use, mount them on your product and carefully check the effect of heat on other components. Provide for adequate safety when designing your product. Otherwise, when a short circuit or other abnormality occurs, or when a voltage or current exceeding the rating is applied, the resistors may overheat without breaking, or may generate smoke or red-heat, breaking the ceramic case and thus exposing the red-heating resistor element.
2. Carefully check the inductance effect of the resistors when using them in a high-frequency circuit.
3. If a transient load (heavy load in a short time) like a pulse is expected to be applied, check and evaluate the operations of the resistors when installed in your products under the most adverse conditions before use.