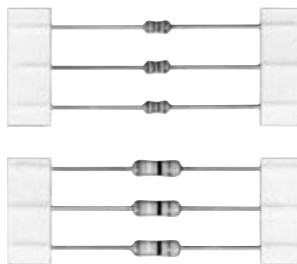


## Carbon Film Resistors

ERDS1 (0.5 W)

ERDS2 (0.25 W)

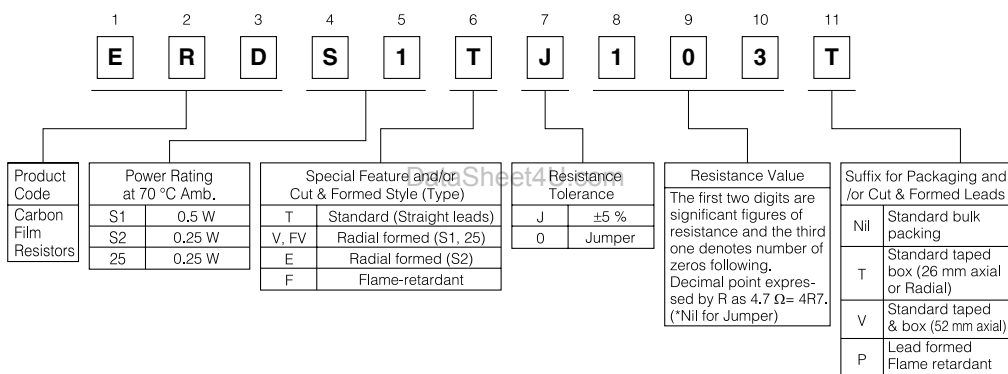
ERD25 (0.25 W)



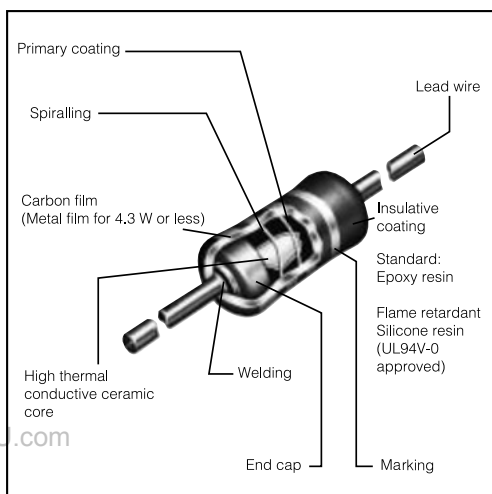
## ■ Features

- Reliability ..... High reliability using carbon film
- Automatic insertion ..... Taping style for automatic inserting machine
- Marking ..... 4 color code marking
- Flame Retardant ..... Uses UL 94 V-0 approved coating for Flame Retardant type
- Approved under the ISO 9001 system
- Reference Standard ..... IEC 60115-2, JIS C 5201-2

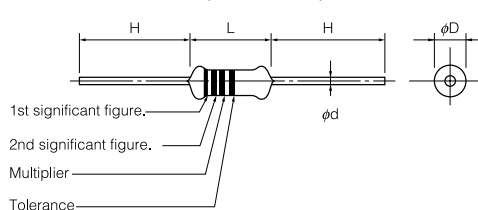
## ■ Explanation of Part Numbers



## ■ Construction



## ■ Dimensions in mm (not to scale)



See Page ER158 for color code indication  
Standard Quantity : 2000 pcs.

Type	Dimensions (mm)				Mass (mg)
	L	φD	φd	H	
ERDS1T	6.35 <sup>+0.55</sup> <sub>-0.55</sub>	2.30 <sup>+0.50</sup> <sub>-0.50</sub>	0.60 <sup>+0.05</sup>	20 min.	228
ERDS1F					
ERDS2T	3.20 <sup>+0.20</sup>	1.70 <sup>+0.30</sup> <sub>-0.30</sub>	0.45 <sup>+0.05</sup>	20 min.	107
ERDS2F					
ERD25T	6.35 <sup>+0.65</sup> <sub>-0.35</sub>	2.30 <sup>+0.50</sup> <sub>-0.30</sub>	0.60 <sup>+0.05</sup>	20 min.	228
ERD25F					

## ■ Ratings

Type	Power Rating at 70 °C (W)	Limiting Element Voltage (Maximum RCWV) <sup>(1)</sup> (V)	Maximum Overload Voltage <sup>(2)</sup> (V)	Maximum Intermittent Overload Voltage <sup>(3)</sup> (V)	Dielectric Withstanding Voltage (VAC)	Standard Resistance Value	Resistance Tolerance (%)	Resistance Range (Ω)	
								min.	max.
ERDS1T	0.5	300	600	750	500	E24	±5 (J)	1	3.3 M
ERDS1F (Flame Retardant)					350				1 M
ERDS2T	0.25	250	500	750	300	E24	±5 (J)	1	2.2 M
ERDS2F (Flame Retardant)					200				1 M
ERDS2T0	Jumper Rated Current : 2 A, Resistance : < 50 mΩ								
ERD25T	0.25	300	600	750	500	E24	±5 (J)	1	3.3 M
ERD25F (Flame Retardant)					350				1 M
ERD25T0	Jumper Rated Current : 2 A, Resistance : < 50 mΩ								

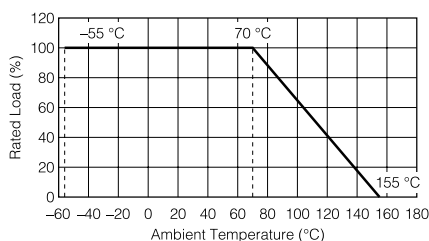
(1) Rated Voltage =  $\sqrt{\text{Power Rating} \times \text{Resistance Value}}$  or Limiting Element Voltage (max. RCWV), whichever is less.  
(RCWV: Rated Continuous working Voltage).

(2) Overload (Short-time Overload) Test Voltage (SOTV) shall be determined from  $\text{SOTV} = 2.5 \times \text{Power Rating}$  or max. Overload Voltage listed above whichever is less.

(3) Intermittent Overload Test Voltage (IOTV) shall be determined from  $\text{IOTV} = 4 \times \text{Power Rating}$  ( $\text{IOTV} = 3 \times \text{Power Rating}$  for ERDS2 type) or max. Intermittent Overload Voltage listed above whichever is less.

## Power Derating Curve

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



## ■ Performance Specifications

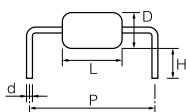
Characteristics	Specifications	Test Methods	
T.C.R.	Resistance Value range	Resistance value at room temperature and room temperature +100 °C	
	ERDS2		ERDS1, 25
	4.3 Ω or less		4.3 Ω or less
	4.7 Ω to 62 Ω		4.7 Ω to 51 kΩ
	68 kΩ to 200 kΩ		56 kΩ to 430 kΩ
	220 kΩ to 510 kΩ		470 kΩ to 910 kΩ
	560 kΩ or over	1 MΩ or over	
		Temperature coefficient $\times 10^{-4}/^{\circ}\text{C}$ (ppm/°C)	
		± 350	
		-150 to -350	
		-150 to -500	
		-150 to -700	
		-150 to -1000	

### ■ Shape and Packaging

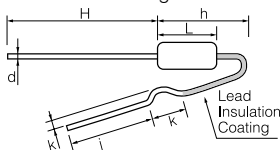
Refer to item (ER83-ER84) for other resistors which have same shape and packaging as Carbon Film Resistors (Carbon Film R): Anti-Pulse Resistors, Flame Retardant (Anti Pulse R), Metal Film Resistors (Metal Film R), Carbon Film Resistors, Flame Retardant Fuse type (Fuse R)

#### ● Bulk type (Lead forming)

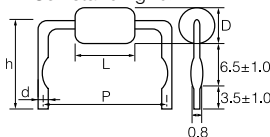
Standard forming



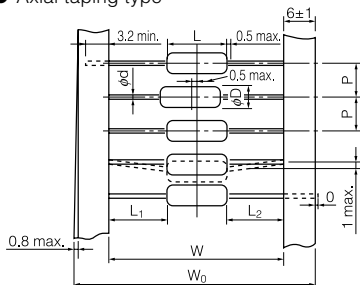
Radial forming



Self standing form



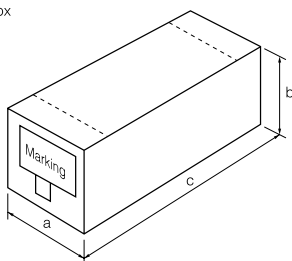
#### ● Axial taping type



Shape	L max.	φD max.	φd	P ±0.3	W	W <sub>0</sub>
①	3.4	1.9	0.45	5.0	26 <sup>+1</sup> <sub>0</sub>	41.5max.
②	3.4	1.9	0.45	5.0	52±1	64.5±0.5
③	6.5	2.5	0.6	5.0	26 <sup>+1</sup> <sub>0</sub>	41.5max.
④	6.5	2.5	0.6	5.0	52±1	64.5±0.5

- ① |L<sub>1</sub>-L<sub>2</sub>|≤1.0 (10T type |L<sub>1</sub>-L<sub>2</sub>|≤0.5)  
 ② Cumulative 250±2 mm by 50 pitch

Flat box

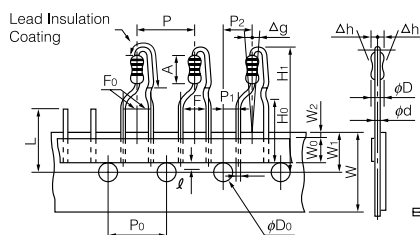


Packaging	Shape	Type	Part Numbers	Std. Qty. (pcs.)	Size of box a×b×c (mm)
26mm Axial taping	①	Carbon Film R	ERDS2TJ□□□T	5000	52×85×255
		Metal Film R	ERDS2FJ□□□T		
		Fuse R	ERD6FCO□□□T	2000	52×41×255
52mm Axial taping	②	Carbon Film R	ERDS2TJ□□□V	2000	78×58×255
		Metal Film R	ERDS2FJ□□□V		
		Fuse R	ERD6FCO□□□V		
26mm Axial taping	③	Carbon Film R	ERD25TJ□□□T	4000	52×95×255
			ERD25FJ□□□T		
			ERDS1TJ□□□T		
		Anti Pulse R	ERD25FAJ□□□T	2000	52×58×255
		Metal Film R	ERO25TOO□□□□		
Fuse R	ERD2FCO□□□T				
52mm Axial taping	④	Carbon Film R	ERD25TJ□□□V	2000	78×58×255
			ERD25FJ□□□V		
			ERDS1TJ□□□V		
		Anti Pulse R	ERD25FAJ□□□V	2000	78×58×255
		Metal Film R	ERO25POO□□□□		
Fuse R	ERD2FCO□□□V				

Design and specifications are subject to change without notice. Ask factory for technical specifications before purchase and/or use.  
 Whenever a doubt about safety arises from this product, please contact us immediately for technical consultation.

## ● Radial Taping type

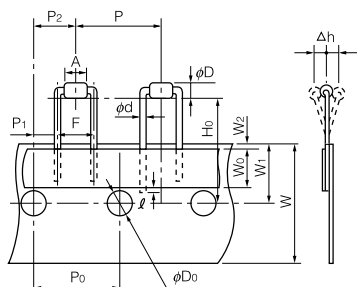
### Radial Taping



Type	Part Numbers	Std. Qty. (pcs.)
Carbon Film R	ERDS1VJ□□□T	2000
	ERD25VJ□□□T	
	ERDS1FVJ□□□T	
	ERD25FVJ□□□T	
Anti Pulse R	ERD2FAVJ□□□T	
Fuse R	ERD2FCVO□□□T	

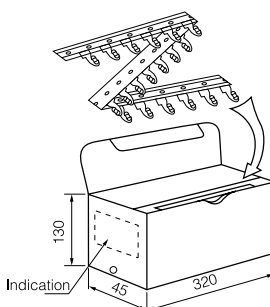
Dimensions (mm)		Dimensions (mm)		Dimensions (mm)	
P	12.7±1.0	W <sub>0</sub>	5 min.	ℓ	0 max.
P <sub>0</sub>	12.7±0.3	W <sub>1</sub>	9.0±0.5	t	0.7±0.2
P <sub>1</sub>	3.85±0.70	W <sub>2</sub>	3 max.	Δg	0±2.5°
P <sub>2</sub>	6.35±1.00	H <sub>1</sub>	32 max.	Δh	0±2
F	5.0±0.5	H <sub>0</sub>	16.0±0.5	A	6.35 <sup>+0.65</sup> <sub>-0.35</sub>
F <sub>0</sub>	2.5±0.5	φD <sub>0</sub>	4.0±0.2	φD	2.3 <sup>+0.5</sup> <sub>-0.3</sub>
W	18.0±0.5	L	11 max.	φd	0.60±0.05

### Radial Taping for small type



Type	Part Numbers	Std. Qty. (pcs.)
Carbon Film R	ERDS2TYJ□□□T	2000

Dimensions (mm)		Dimensions (mm)		Dimensions (mm)	
P	12.7±1.0	W <sub>0</sub>	5 min.	Δh	0±2
P <sub>0</sub>	12.7±0.3	W <sub>1</sub>	9.0±0.5	t	0.7±0.2
P <sub>1</sub>	3.85±0.70	W <sub>2</sub>	3 max.	A	3.2±0.2
P <sub>2</sub>	6.35±1.00	H <sub>0</sub>	19.0 <sup>+0.8</sup> <sub>-0.8</sub>	φD	1.7 <sup>+0.2</sup> <sub>-0.2</sub>
F	5.0±0.5	φD <sub>0</sub>	4.0±0.2	φd	0.45±0.05
W	18.0±0.5	ℓ	0 max.		



**⚠ Safety Precautions****1. Rated Power and Ambient Temperature**

Keep the rated power and ambient temperature within the specified derating curve.

\* Place and fit resistors and other heating components on board, taking into consideration the temperature rise due to proximity of these components with each other.

**2. External Shock**

Mechanical shock during automatic mounting or handling of board after chip being mounted may cause break, flaw or fall-off of paint film of resistor that may impair initial characteristics.

**3. Ultrasonic Cleaning**

Ultrasonic cleaning may cut lead wire due to resonance. Try and check before use.

**4. Application of Pulse**

When pulse is applied to a resistor, the peak value of the pulse should be within rated voltage.

**[Flame-retardant Product]****5. External Shock**

Flame-retardant resistors are more susceptible to external shock and solvent than regular resistors. Take care of handling.

**6. Solvent Resistance**

External coating for flame-retardant resistors is not resistant to solvent. Pay attention to use of solvent. If any difficulty is encountered, fit such resistors after solvent is used.

This catalog shows the quality and performance of a unit component. For quality assurance, please confirm your specific requirements with us. Before design-in, be sure to evaluate and verify the product by mounting it in your product.

# Panasonic Fixed Resistors

## ■ The standard how to express the resistance tolerance on to the Matsushita part number

The resistance tolerance is identified by a single letter in accordance with the following table and the code should be placed just before the resistance code in the following examples.

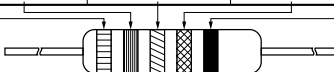
Tolerance Code	Tolerance (%)	Examples
W	±0.05	W1001: 1000 Ω±0.05 %
B	±0.1	B1001: 1000 Ω±0.1 %
C	±0.25	C1001: 1000 Ω±0.25 %
D	±0.5	D1001: 1000 Ω±0.5 %
F	±1	F1001: 1000 Ω±1 %
G	±2	G1001: 1000 Ω±2 %
J	±5	J101: 100 Ω±5 %
K	±10	K101: 100 Ω±10 %
M	±20	M101: 100 Ω±20 %

## ■ Color code indication for the resistance value and the tolerance

Fixed resistors whose resistance value and tolerance are indicated by color code follow the standard below.

### Color code

Color	First digit	Second digit	Third digit	Multiplier	Resistance tolerance	
					%	Code
Black	0	0	0	1		
Brown	1	1	1	10	±1	F
Red	2	2	2	10 <sup>2</sup>	±2	G
Orange	3	3	3	10 <sup>3</sup>	±0.05	W
Yellow	4	4	4	10 <sup>4</sup>		
Green	5	5	5	10 <sup>5</sup>	±0.5	D
Blue	6	6	6	10 <sup>6</sup>	±0.25	C
Violet	7	7	7	10 <sup>7</sup>	±0.1	B
Grey	8	8	8			
White	9	9	9			
Gold				10 <sup>-1</sup>	±5	J
Silver				10 <sup>-2</sup>	±10	K
None					±20	M



### Indication example

#### Color code of 5 color bands

When standard resistance value follows E48 series, 96 series or 192 series, color code of the resistors are indicated by five color bands. Example below is 154 kΩ.

#### Example 1

1st Color	2nd Color	3rd Color	4th Color	5th Color
Brown (1)	Green (5)	Yellow (4)	Orange (1000)	Brown (±1 %)

#### Color code of 4 color bands

When standard resistance value follows E6 series, 12 series or 24 series, color code of the resistors are indicated by four color bands. Example below is 15 kΩ.

#### Example 2

1st Color	2nd Color	3rd Color	4th Color
Brown (1)	Green (5)	Orange (1000)	Gold (±5 %)