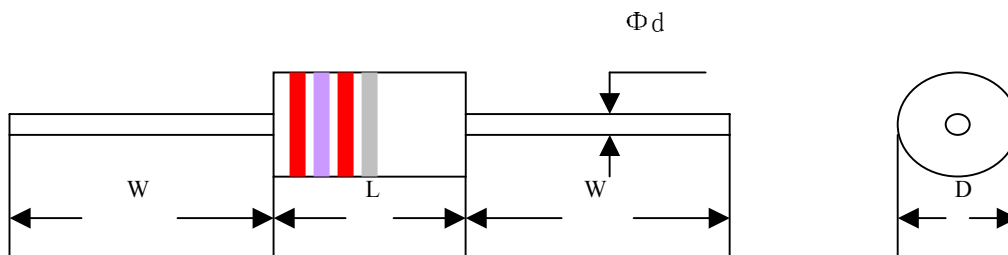


## THE FIXED CARBON COMPOSITION RESISTORS

### 1. Dimensions:



### 2. Rating and Dimensions:

| Type     | Rated Power (W) | Dimensions in mm |           |        |             | Max Rated Voltage (v) | Max Overload Voltage (v) | Resistance range (Ω) |
|----------|-----------------|------------------|-----------|--------|-------------|-----------------------|--------------------------|----------------------|
|          |                 | L                | D         | W      | d           |                       |                          |                      |
| RS11-1/2 | 0.5             | 9.5 ± 0.8        | 3.5 ± 0.2 | 26 ± 2 | 0.69 ± 0.01 | 350                   | 500                      | 4.7 to 22M           |

### 3. Sold Resistance in Packs

#### 1/2WATT

| SHARMA Type # | Ω   | SHARMA Type # | Ω  | SHARMA Type # | Ω   | SHARMA Type # | Ω    |
|---------------|-----|---------------|----|---------------|-----|---------------|------|
| RS11-1/2W-4R7 | 4.7 | RS11-1/2W-18  | 18 | RS11-1/2W-75  | 75  | RS11-1/2W-300 | 300  |
| RS11-1/2W-5R1 | 5.1 | RS11-1/2W-20  | 20 | RS11-1/2W-82  | 82  | RS11-1/2W-330 | 330  |
| RS11-1/2W-5R6 | 5.6 | RS11-1/2W-22  | 22 | RS11-1/2W-91  | 91  | RS11-1/2W-360 | 360  |
| RS11-1/2W-6R2 | 6.2 | RS11-1/2W-24  | 24 | RS11-1/2W-100 | 100 | RS11-1/2W-390 | 390  |
| RS11-1/2W-6R8 | 6.8 | RS11-1/2W-27  | 27 | RS11-1/2W-110 | 110 | RS11-1/2W-430 | 430  |
| RS11-1/2W-7R5 | 7.5 | RS11-1/2W-30  | 30 | RS11-1/2W-120 | 120 | RS11-1/2W-470 | 470  |
| RS11-1/2W-8R2 | 8.2 | RS11-1/2W-33  | 33 | RS11-1/2W-130 | 130 | RS11-1/2W-510 | 510  |
| RS11-1/2W-9R1 | 9.1 | RS11-1/2W-36  | 36 | RS11-1/2W-150 | 150 | RS11-1/2W-560 | 560  |
| RS11-1/2W-10  | 10  | RS11-1/2W-39  | 39 | RS11-1/2W-160 | 160 | RS11-1/2W-620 | 620  |
| RS11-1/2W-11  | 11  | RS11-1/2W-43  | 43 | RS11-1/2W-180 | 180 | RS11-1/2W-680 | 680  |
| RS11-1/2W-12  | 12  | RS11-1/2W-47  | 47 | RS11-1/2W-200 | 200 | RS11-1/2W-750 | 750  |
| RS11-1/2W-13  | 13  | RS11-1/2W-51  | 51 | RS11-1/2W-220 | 220 | RS11-1/2W-820 | 820  |
| RS11-1/2W-15  | 15  | RS11-1/2W-62  | 62 | RS11-1/2W-240 | 240 | RS11-1/2W-910 | 910  |
| RS11-1/2W-16  | 16  | RS11-1/2W-68  | 68 | RS11-1/2W-270 | 270 | RS11-1/2W-1K  | 1.0K |

## 1/2WATT (Cont.)

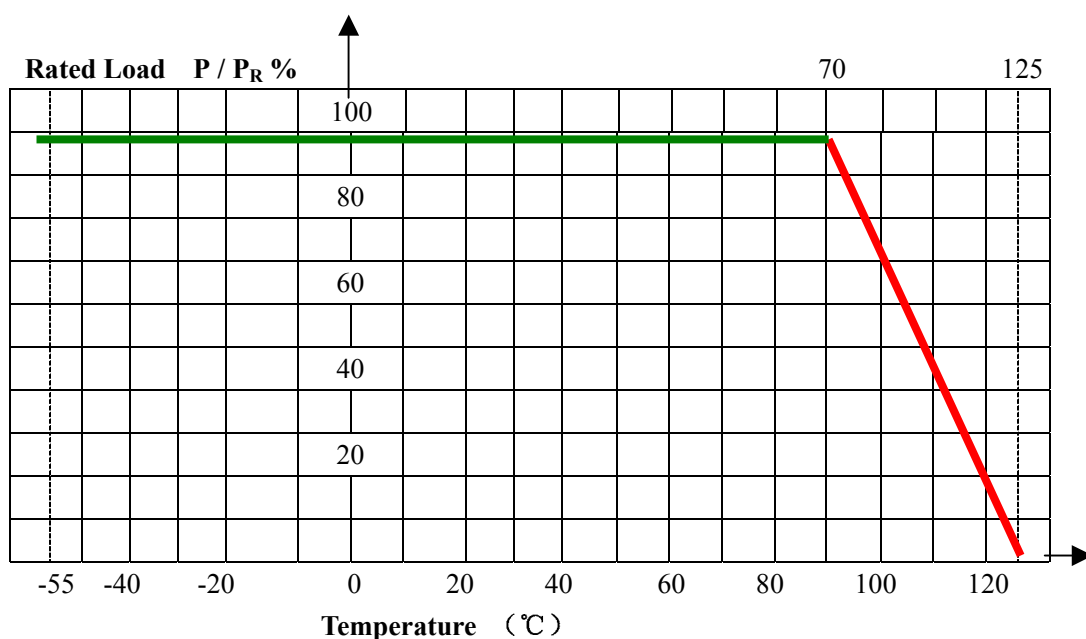
| SHARMA Type # | Ω    | SHARMA Type #  | Ω    | SHARMA Type #  | Ω    | SHARMA Type # | Ω    |
|---------------|------|----------------|------|----------------|------|---------------|------|
| RS11-1/2W-1K1 | 1.1K | RS11-1/2W-13K  | 13K  | RS11-1/2W-160K | 160K | RS11-1/2W-2M  | 2.0M |
| RS11-1/2W-1K2 | 1.2K | RS11-1/2W-15K  | 15K  | RS11-1/2W-180K | 180K | RS11-1/2W-2M2 | 2.2M |
| RS11-1/2W-1K3 | 1.3K | RS11-1/2W-16K  | 16K  | RS11-1/2W-200K | 200K | RS11-1/2W-2M4 | 2.4M |
| RS11-1/2W-1K5 | 1.5K | RS11-1/2W-18K  | 18K  | RS11-1/2W-220K | 220K | RS11-1/2W-2M7 | 2.7M |
| RS11-1/2W-1K6 | 1.6K | RS11-1/2W-20K  | 20K  | RS11-1/2W-240K | 240K | RS11-1/2W-3M0 | 3.0M |
| RS11-1/2W-1K8 | 1.8K | RS11-1/2W-22K  | 22K  | RS11-1/2W-270K | 270K | RS11-1/2W-3M3 | 3.3M |
| RS11-1/2W-2K  | 2.0K | RS11-1/2W-24K  | 24K  | RS11-1/2W-300K | 300K | RS11-1/2W-3M6 | 3.6M |
| RS11-1/2W-2K2 | 2.2K | RS11-1/2W-27K  | 27K  | RS11-1/2W-330K | 330K | RS11-1/2W-3M9 | 3.9M |
| RS11-1/2W-2K4 | 2.4K | RS11-1/2W-30K  | 30K  | RS11-1/2W-360K | 360K | RS11-1/2W-4M3 | 4.3M |
| RS11-1/2W-2K7 | 2.7K | RS11-1/2W-33K  | 33K  | RS11-1/2W-390K | 390K | RS11-1/2W-4M7 | 4.7M |
| RS11-1/2W-3K  | 3.0K | RS11-1/2W-36K  | 36K  | RS11-1/2W-430K | 430K | RS11-1/2W-5M1 | 5.1M |
| RS11-1/2W-3K3 | 3.3K | RS11-1/2W-39K  | 39K  | RS11-1/2W-470K | 470K | RS11-1/2W-5M6 | 5.6M |
| RS11-1/2W-3K6 | 3.6K | RS11-1/2W-43K  | 43K  | RS11-1/2W-510K | 510K | RS11-1/2W-6M2 | 6.2M |
| RS11-1/2W-3K9 | 3.9K | RS11-1/2W-47K  | 47K  | RS11-1/2W-560K | 560K | RS11-1/2W-6M8 | 6.8M |
| RS11-1/2W-4K3 | 4.3K | RS11-1/2W-51K  | 51K  | RS11-1/2W-620K | 620K | RS11-1/2W-7M5 | 7.5M |
| RS11-1/2W-4K7 | 4.7K | RS11-1/2W-56K  | 56K  | RS11-1/2W-680K | 680K | RS11-1/2W-8M2 | 8.2M |
| RS11-1/2W-5K1 | 5.1K | RS11-1/2W-62K  | 62K  | RS11-1/2W-750K | 750K | RS11-1/2W-9M1 | 9.1M |
| RS11-1/2W-5K6 | 5.6K | RS11-1/2W-68K  | 68K  | RS11-1/2W-820K | 820K | RS11-1/2W-10M | 10M  |
| RS11-1/2W-6K2 | 6.2K | RS11-1/2W-75K  | 75K  | RS11-1/2W-910K | 910K | RS11-1/2W-11M | 11M  |
| RS11-1/2W-6K8 | 6.8K | RS11-1/2W-82K  | 82K  | RS11-1/2W-1M   | 1.0M | RS11-1/2W-12M | 12M  |
| RS11-1/2W-7K5 | 7.5K | RS11-1/2W-91K  | 91K  | RS11-1/2W-1M1  | 1.1M | RS11-1/2W-13M | 13M  |
| RS11-1/2W-8K2 | 8.2K | RS11-1/2W-100K | 100K | RS11-1/2W-1M2  | 1.2M | RS11-1/2W-15M | 15M  |
| RS11-1/2W-9K1 | 9.1K | RS11-1/2W-110K | 110K | RS11-1/2W-1M3  | 1.3M | RS11-1/2W-16M | 16M  |
| RS11-1/2W-10K | 10K  | RS11-1/2W-120K | 120K | RS11-1/2W-1M5  | 1.5M | RS11-1/2W-18M | 18M  |
| RS11-1/2W-11K | 11K  | RS11-1/2W-130K | 130K | RS11-1/2W-1M6  | 1.6M | RS11-1/2W-20M | 20M  |
| RS11-1/2W-12K | 12K  | RS11-1/2W-150K | 150K | RS11-1/2W-1M8  | 1.8M | RS11-1/2W-22M | 22M  |

## 4. Part Numbering System:

Example:

| <u>RS11</u> | <u>1/2W</u>   | <u>2k7</u>        | <u>J</u>                           | <u>T</u>                |
|-------------|---------------|-------------------|------------------------------------|-------------------------|
| type        | Rated Power W | Normal Resistance | Resistance Tolerance               | Packaging               |
| RS11        | 0.5W          | 2k7=2.7k          | J = ± 5%<br>K = ± 10%<br>M = ± 20% | B Bulk<br>T Tape & Reel |

### 5. Derating Curve :



### 6. Resistance Temperature Characteristics:

| Resistance range                                                                                                              | Max. Resistance Characteristics<br>$\pm(\Delta R^*/R)\%$ |                                                   |
|-------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------|---------------------------------------------------|
|                                                                                                                               | Temperature range                                        | Temperature range                                 |
|                                                                                                                               | -55 $^{\circ}\text{C}$ to +20 $^{\circ}\text{C}$         | +20 $^{\circ}\text{C}$ to +125 $^{\circ}\text{C}$ |
| 1k $\Omega$ and under                                                                                                         | $\pm 6.5$                                                | $\pm 6.5$                                         |
| 1.1k $\Omega$ to 10k $\Omega$                                                                                                 | $\pm 10$                                                 | $\pm 8$                                           |
| 11k $\Omega$ to 100k $\Omega$                                                                                                 | $\pm 13$                                                 | $\pm 10$                                          |
| 110k $\Omega$ to 1M $\Omega$                                                                                                  | $\pm 15$                                                 | $\pm 13$                                          |
| 1.1M $\Omega$ to 10M $\Omega$                                                                                                 | $\pm 20$                                                 | $\pm 19.5$                                        |
| 11M $\Omega$ and over                                                                                                         | $\pm 25$                                                 | $\pm 19.5$                                        |
| * $\Delta R = R_2 - R_1$<br>$R_1$ : Resistance value at reference temperature<br>$R_2$ : Resistance value at test temperature |                                                          |                                                   |

### 7. Mechanical and Electronic Performance

| Description | Test method                                                                  | Performance Requirements                                 |
|-------------|------------------------------------------------------------------------------|----------------------------------------------------------|
| (Vibration) | Frequency range:<br>10HZ ~ 500HZ<br>Amplitude: 0.75mm<br>Total last time: 6h | No visible damage<br>$(R \leq \pm (2\%R + 0.1\Omega))$ . |

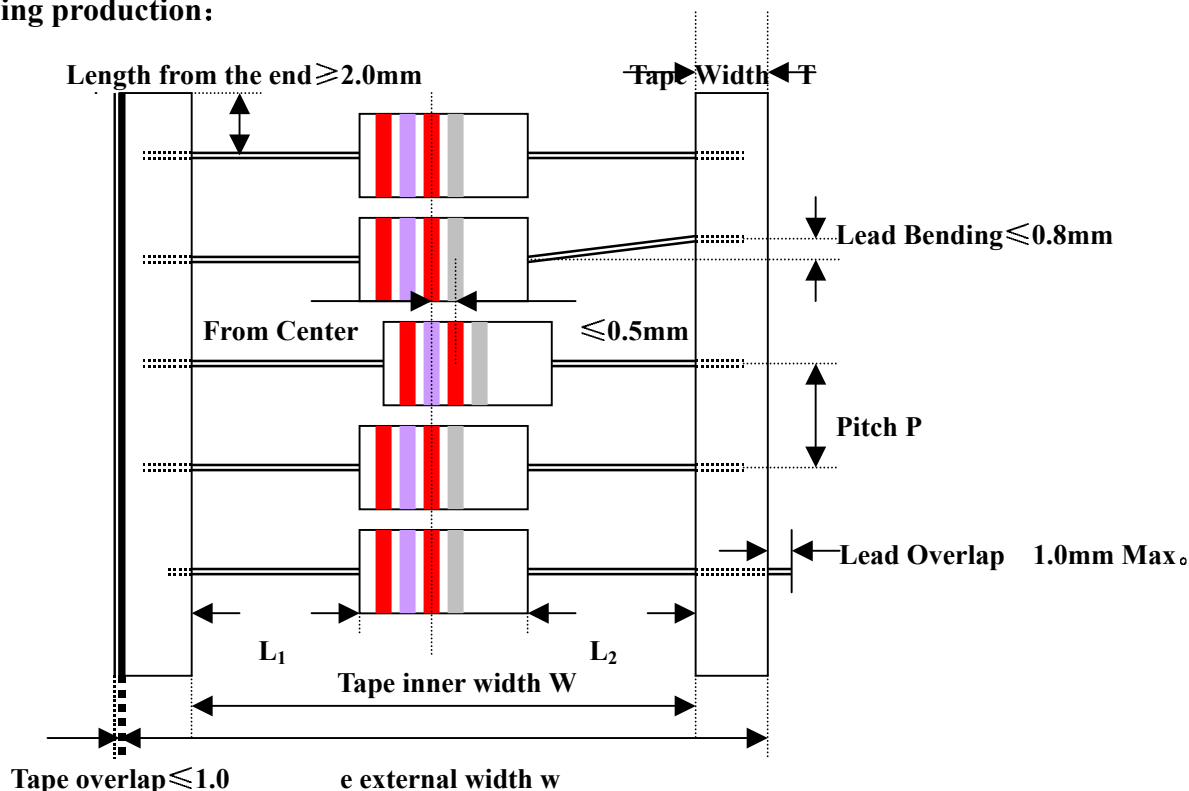
## 8. Mechanical and Electronic Performance Cont. :

| Description                                                          |         | Test method                                                                                                                                                              | Performance Requirements                                                             |
|----------------------------------------------------------------------|---------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| Terminal Strength                                                    | Pull    | Along the longitudinal axis of the terminal leads 20N, 5S                                                                                                                | No visible damage<br>( $R \leq \pm (2\%R + 0.1 \Omega)$ ).                           |
|                                                                      | Bending | Bending two times, Once in each direction                                                                                                                                |                                                                                      |
|                                                                      | Twist   | Twist 180° two times                                                                                                                                                     |                                                                                      |
| Resistance to Soldering Heat                                         |         | Solder temperature: $350 \pm 10^\circ\text{C}$<br>Immerge time : $3.5 \pm 0.5\text{S}$<br>Depth from the body of the resistor:<br>$2^{+0.5} \text{ mm}$                  | No visible damage<br>( $R \leq \pm (2\%R + 0.1 \Omega)$ ).                           |
| Solderability                                                        |         | Solder temperature : $235 \pm 5^\circ\text{C}$<br>Dwell time in solder: $3 \pm 0.5\text{S}$<br>Depth from the body of the sesistor:<br>$2 \pm 0.5 \text{ mm}$            | At least 95% of the dipping surface must be covered by new solder, no flaws gathered |
| Voltage Coefficient<br>(Application in 1K $\Omega$ to 10M $\Omega$ ) |         | Use 10%Resistance rated voltage and 100%Resistance rated voltage to test resistance value                                                                                | A total resistance change of $\pm 2\%$ max. or $\pm 0.035\%/V$                       |
| Short time overload                                                  |         | 2.5 times of rated voltage or times of Max. rated voltage (selecting lower) 5S.                                                                                          | No visible damage<br>( $R \leq \pm (2\%R + 0.1 \Omega)$ )                            |
| Dielectric withstanding voltage                                      |         | Resistois shall be clamped in the trough of a 90° metallic V-block and shall be tested at AC potential respectively Specified in the above list for $60 \pm 5\text{s}$ , | No evidence of arcing or insulation breakdown                                        |

## 9. Mechanical and Electronic Performance Cont. :

| Description             | Test method                                                                                                                      | Performance Requirements                                                                            |
|-------------------------|----------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|
| Temperature change fast | $\theta_A: -55^\circ\text{C}$<br>$\theta_B: +125^\circ\text{C}$<br>Shape check<br>Resistance                                     | No visible damage<br>$(R \leq \pm (2\%R + 0.1 \Omega))$                                             |
| 70°C endurance          | Last out time : 1000h<br>When 48h, 500h and 1000h check:<br>Shape check resistance<br>When 1000h check:<br>Insulation Resistance | No visible damage, Mark clarity<br>$\Delta R \leq \pm (10\%R + 0.5 \Omega)$<br>$R \geq 1G \Omega$   |
| Fixing state Damp heat  | Shape check<br>Resistance<br>Insulation Resistance                                                                               | No visible damage, Mark clarity<br>$\Delta R \leq \pm (10\%R + 0.5 \Omega)$<br>$R \geq 100M \Omega$ |

## 10. Taping production:



| Tape Style | Taping Dimensions mm |          |         |         |                                |
|------------|----------------------|----------|---------|---------|--------------------------------|
|            | W                    | A        | T       | P       | L <sub>1</sub> -L <sub>2</sub> |
| T-52       | 52±1.0               | 64.5±0.5 | 6.0±1.0 | 5.0±0.3 | 0±1.0                          |

## 11. Products Package:

### a. In bulk

| Description                          | Specification | Quantity      | Dimension (mm)     |                    |                    |             |
|--------------------------------------|---------------|---------------|--------------------|--------------------|--------------------|-------------|
|                                      |               |               | Length             | Width              | Height             | Thickness   |
| Small-size plastic bag               | 1/2 W         | 100 pieces    | 115                | 75                 | —                  | 0.075±0.005 |
| Big-size plastic bag                 | 1/2 W         | 5 bags        | 175                | 115                | —                  | 0.025±0.005 |
| Paper box                            | 1/2 W         | 20 boxes      | 310                | 200                | 120                | 3           |
| Outside package                      | 1/2 W         | 3 Paper boxes | 410 <sup>+10</sup> | 330 <sup>+10</sup> | 220 <sup>+10</sup> | 4           |
| Note: Outside package weight 15±1 kg |               |               |                    |                    |                    |             |

### b. Taping Products

| Description                          | Specification | Quantity       | Dimension (mm)     |                    |                    |           |
|--------------------------------------|---------------|----------------|--------------------|--------------------|--------------------|-----------|
|                                      |               |                | Length             | Width              | Height             | Thickness |
| Paper box                            | 1/2 W         | 2000 pieces    | 445                | 80                 | 65                 | 2         |
| Outside package                      | 1/2 W         | 10 Paper boxes | 460 <sup>+10</sup> | 420 <sup>+10</sup> | 150 <sup>+10</sup> | 4         |
| Note: Outside package weight 10±1 kg |               |                |                    |                    |                    |           |