

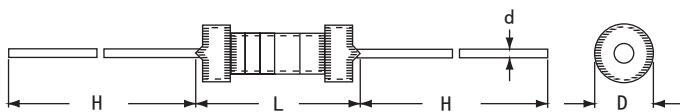
## Carbon Film Fixed Resistors Series

### KLS6-Carbon Film Fixed Resistors Series

#### 1.Features

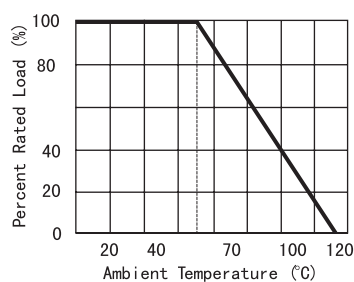
- Temperature Range -55 °C ~ +155 °C
- $\pm 5\%$  tolerance
- High quality performance at economical prices
- Compatible with automatic insertion equipment
- Flame retardant type available
- Weldable type with copper plated lead wire available
- Values below 1 $\Omega$  or above 10M $\Omega$  are available by special request, please ask for details

Dimension (Unit: mm)

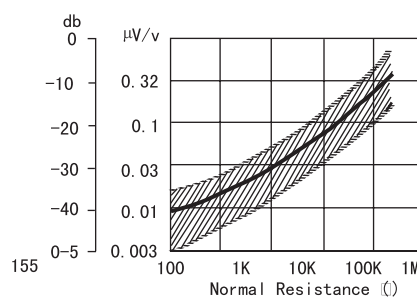


| Code          | power   | Dimension(mm) |        |                  |     | Max.<br>w orking<br>voltage | Max.<br>Permission<br>voltage | Insulation<br>dielectric<br>strength | Resistance<br>range |
|---------------|---------|---------------|--------|------------------|-----|-----------------------------|-------------------------------|--------------------------------------|---------------------|
|               | (70° C) | D Max.        | L Max. | d +0.02<br>-0.05 | H±3 |                             |                               |                                      |                     |
|               |         |               |        |                  |     |                             |                               |                                      |                     |
| Standard Size |         |               |        |                  |     |                             |                               |                                      |                     |
| 1/8W          | 1/8W    | 1.85          | 3.5    | 0.5              | 28  | 200V                        | 400V                          | 400V                                 | 1Ω~10MΩ             |
| 1/4W          | 1/4W    | 2.5           | 6.8    | 0.6              | 28  | 250V                        | 500V                          | 500V                                 | 1Ω~10MΩ             |
| 1/2W          | 1/2W    | 3.5           | 10     | 0.6              | 28  | 350V                        | 700V                          | 700V                                 | 1Ω~10MΩ             |
| 1W            | 1W      | 5             | 12     | 0.7              | 28  | 500V                        | 1000V                         | 1000V                                | 1Ω~10MΩ             |
| 2W            | 2W      | 5.5           | 16     | 0.8              | 28  | 500V                        | 1000V                         | 1000V                                | 1Ω~10MΩ             |
| Small Size    |         |               |        |                  |     |                             |                               |                                      |                     |
| 1/4WS         | 1/4W    | 1.85          | 3.5    | 0.5              | 28  | 200V                        | 400V                          | 400V                                 | 1Ω~10MΩ             |
| 1/2WS         | 1/2W    | 2.5           | 6.8    | 0.6              | 28  | 250V                        | 500V                          | 500V                                 | 1Ω~10MΩ             |
| 1WS           | 1W      | 3.5           | 10     | 0.6              | 28  | 500V                        | 1000V                         | 1000V                                | 1Ω~10MΩ             |
| 2WS           | 2W      | 5             | 12     | 0.7              | 28  | 500V                        | 1000V                         | 1000V                                | 1Ω~10MΩ             |
| 3WS           | 3W      | 5.5           | 16     | 0.8              | 28  | 500V                        | 1000V                         | 1000V                                | 1Ω~10MΩ             |

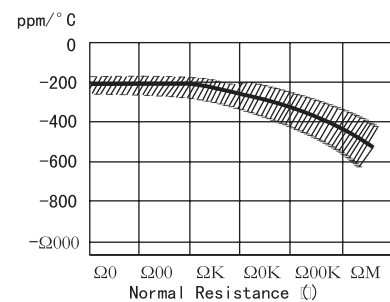
#### DERATING CURVE



#### CURRENT NOISE



#### TEMPERATURE COEFFICIENT



## ORDER INFORMATION

**KLS6-CF-1/8W- 10KR-J A**

Part Number: KLS6-CF-1/8W- 10KR-J A  
 Carbon Film Fixed Resistors  
 Power Code: 1/8W  
 Packing Type: A = Tape / Box  
 Tolerance: J =  $\pm 5\%$   
 Standard Values  
 R = Tape / Reel  
 B = Bulk / Box



## ■ CHARACTERISTICS

| Characteristics                 | Limits                                                                               |                                               | Test Methods ( JIS C 5201-1 )                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                    |                                                                                                                                                  |
|---------------------------------|--------------------------------------------------------------------------------------|-----------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|
| DC. Resistance                  | Must be within the specified tolerance.                                              |                                               | 5.1 The limit of error of measuring apparatus shall not exceed allowable range or 5% of resistance tolerance                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                    |                                                                                                                                                  |
| Temperature coefficient         | Resist. Range                                                                        | T.C.R. (PPM / °C)                             | 5.2 Natural resistance change per temp. degree centigrade.<br>R2-R1<br>———— x106 (PPM/°C)<br>R1(t2-t1)<br>R1: Resistance value at room temperature (t1)<br>R2: Resistance value at room temp.plus 100°C (t2)                                                                                                                                                                                             |                                                                                                                                                                                                    |                                                                                                                                                  |
|                                 | < 10 Ω<br>11Ω ~ 99K<br>100K ~ 1M<br>1.1M ~ 10M                                       | 0 ~ ±350<br>0 ~ -450<br>0 ~ -700<br>0 ~ -1500 |                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                    |                                                                                                                                                  |
| Short time overload             | Resistance change rate is ± (1 % + 0.05Ω) Max. with no evidence of mechanical damage |                                               | 5.5 Permanent resistance change after the application of a potential of 2.5 times RCWV for 5 seconds.                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                    |                                                                                                                                                  |
| Insulation Resistance           | Insulation resistance is 10,000 MΩ Min                                               |                                               | 5.6 Resistors shall be clamped in the trough of a 90° metallic V-block and shall be tested at DC potential respectively specified in the above list for 60 +10/ -0 seconds.                                                                                                                                                                                                                              |                                                                                                                                                                                                    |                                                                                                                                                  |
| Dielectric withstanding voltage | No evidence of flashover mechanical damage,arcing or insulation break down.          |                                               | 5.7 Resistors shall be clamped in the trough of a 90° metallic V-block and shall be tested at AC potential respectively specified in the table 1 for 60 + 10/-0 seconds.                                                                                                                                                                                                                                 |                                                                                                                                                                                                    |                                                                                                                                                  |
| Terminal strength               | No evidence of mechanical damage.                                                    |                                               | 6.1 <b>Direct load</b><br>Resistance to a 2.5 kgs direct load for 10 secs. in the direction of the longitudinal axis of the terminal leads.<br><b>Twist test :</b><br>Terminal leads shall be bent through 90° at a point of about 6mm from the body of the resistor and shall be rotated through 360° about the original axis of the bent terminal in alternating direction for a total of 3 rotations. |                                                                                                                                                                                                    |                                                                                                                                                  |
| Resistance to soldering heat    | Resistance change rate is ± (1% + 0.05Ω) Max. with no evidence of mechanical damage. |                                               | 6.4 Permanent resistance change when leads immersed to 3.2 to 4.8 mm from the body in 350 °C ± 10°C solder for 3 ± 0.5 seconds                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                    |                                                                                                                                                  |
| Solderability                   | 95 % coverage Min.                                                                   |                                               | 6.5 The area covered with a new , smooth clean , shiny and continuous surface free from concentrated pinholes.<br>Test temp. of solder : 245°C ± 3°C<br>Dwell time in solder : 2 ~ 3 seconds                                                                                                                                                                                                             |                                                                                                                                                                                                    |                                                                                                                                                  |
| Temperature cycling             | Resistance change rate is ± (1% + 0.05Ω) Max. with no evidence of mechanical damage. |                                               | 7.4 Resistance change after continuous 5 cycles for duty shown below:                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                    |                                                                                                                                                  |
|                                 |                                                                                      |                                               | Step                                                                                                                                                                                                                                                                                                                                                                                                     | Temperature                                                                                                                                                                                        | Time                                                                                                                                             |
|                                 |                                                                                      |                                               | 1                                                                                                                                                                                                                                                                                                                                                                                                        | -55°C ±3°C                                                                                                                                                                                         | 30 mins                                                                                                                                          |
|                                 |                                                                                      |                                               | 2                                                                                                                                                                                                                                                                                                                                                                                                        | Room temp.                                                                                                                                                                                         | 10~15 mins                                                                                                                                       |
|                                 |                                                                                      |                                               | 3                                                                                                                                                                                                                                                                                                                                                                                                        | +155°C ±2°C                                                                                                                                                                                        | 30 mins                                                                                                                                          |
| 4                               | Room temp.                                                                           | 10~15 mins                                    |                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                    |                                                                                                                                                  |
| Load life in humidity           | Resistance value                                                                     |                                               | ΔR/R                                                                                                                                                                                                                                                                                                                                                                                                     | 7.9 Resistance change after 1,000 hours operating at RCWV with duty cycle of (1.5 hours "on", 0.5 hour "off") in a humidity test chamber controlled at 40°C ± 2°C and 90 to 95 % relative humidity |                                                                                                                                                  |
|                                 | Normal Type                                                                          | < than 100KΩ<br>>100KΩ                        |                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                    | ± 3 %<br>± 5 %                                                                                                                                   |
| Load life                       | Resistance value                                                                     |                                               | ΔR/R                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                    | 7.10 Permanent resistance change after 1,000 hours operating at RCWV with duty cycle of ( 1.5 hours "on", 0.5 hour "off" ) at 70°C ± 2°C ambient |
|                                 | Normal Type                                                                          | < than 56KΩ<br>> 56KΩ                         |                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                    |                                                                                                                                                  |

Part Number KLS6-CF-1/8W- 10KR-J A Packing Type: A = Tape / Box R = Tape / Reel B = Bulk / Box  
Carbon Film Fixed Resistors Tolerance: J =  $\pm 5\%$   
Power Code Standard Values