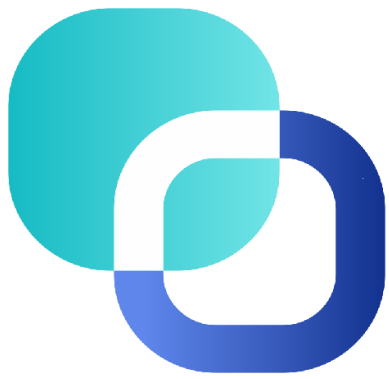




**KEEN SIDE**  
**electronics**

# **DATA SHEET**

**Chip Resistor - General Purpose**

# KSE Chip Resistor - General Purpose [RoHS]

KSE products comply with environmental requirement in accordance with SONY of code no. SS-00259 for not related in 10 harmful materials.

## Features

Small size and lightweight with size range per international standard  
Highly stable in auto-placement surface mounting application  
Compatible with both wave soldering and reflow soldering

## Part Number)

|          |     |      |      |     |
|----------|-----|------|------|-----|
| KSE-XXXX | X   | R-07 | XXXX | L   |
| (1)      | (2) | (3)  | (4)  | (5) |

## Examples

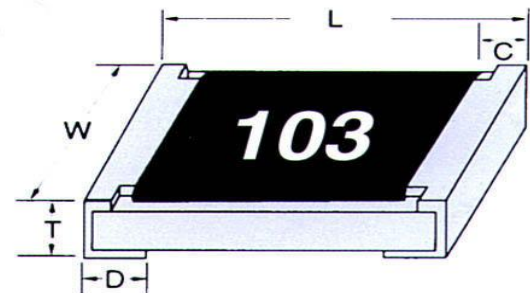
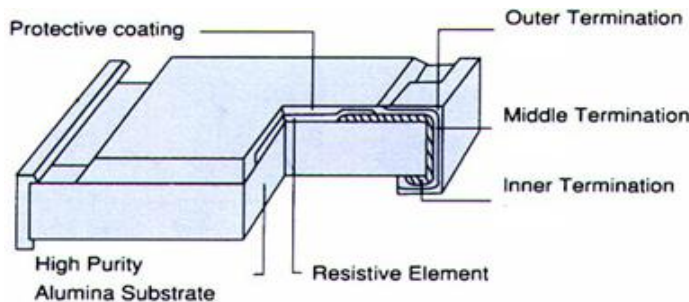
KSE- 0201    F    R-07    10K    L

KSE- 0603    F    R-07    1K3    L

KSE Brand

1. Size = 0201,0402,0603,0805,1206,1210,1812,2010,2512
2. TOLERANCE F :  $\pm 1\%$  J :  $\pm 5\%$
3. R-07 = PACKAGING TYPE REEL
4. RESISTANCE VALUE = 4R8, 10R, 360R, 5K, 1M, 10M
5. L = Lead free

## Configuration

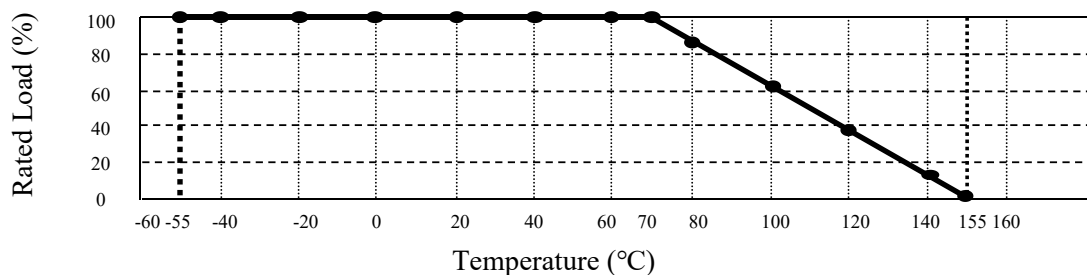


## Dimensions

(unit: mm)

| Size | L          | W          | T          | C          | D          |
|------|------------|------------|------------|------------|------------|
| 0201 | 0.60 ±0.03 | 0.30 ±0.03 | 0.23 ±0.03 | 0.15 ±0.05 | 0.15 ±0.05 |
| 0402 | 1.00 ±0.10 | 0.50 ±0.05 | 0.35 ±0.05 | 0.20 ±0.10 | 0.25 ±0.10 |
| 0603 | 1.60 ±0.10 | 0.80 ±0.10 | 0.45 ±0.10 | 0.25 ±0.15 | 0.30 ±0.15 |
| 0805 | 2.00 ±0.10 | 1.25 ±0.10 | 0.50 ±0.10 | 0.35 ±0.20 | 0.40 ±0.20 |
| 1206 | 3.10 ±0.10 | 1.55 ±0.10 | 0.55 ±0.10 | 0.45 ±0.20 | 0.40 ±0.20 |
| 1210 | 3.10 ±0.10 | 2.50 ±0.10 | 0.55 ±0.10 | 0.45 ±0.25 | 0.45 ±0.25 |
| 1218 | 3.10 ±0.10 | 4.60 ±0.10 | 0.55 ±0.10 | 0.45 ±0.25 | 0.45 ±0.25 |
| 1812 | 4.50 ±0.10 | 3.10 ±0.20 | 0.55 ±0.05 | 0.55 ±0.20 | 0.70 ±0.20 |
| 2010 | 5.00 ±0.20 | 2.50 ±0.15 | 0.55 ±0.10 | 0.60 ±0.25 | 0.50 ±0.25 |
| 1225 | 3.10 ±0.15 | 6.30 ±0.15 | 0.90 ±0.15 | 0.60 ±0.30 | 0.80 ±0.25 |
| 2512 | 6.35 ±0.20 | 3.10 ±0.15 | 0.55 ±0.10 | 0.60 ±0.25 | 0.60 ±0.25 |

## Power Derating Curve



For resistors operated in ambient temperatures above 70°C, power rating must be derated in accordance with the curve as above.

# KSE Chip Resistor - General Purpose

[RoHS]

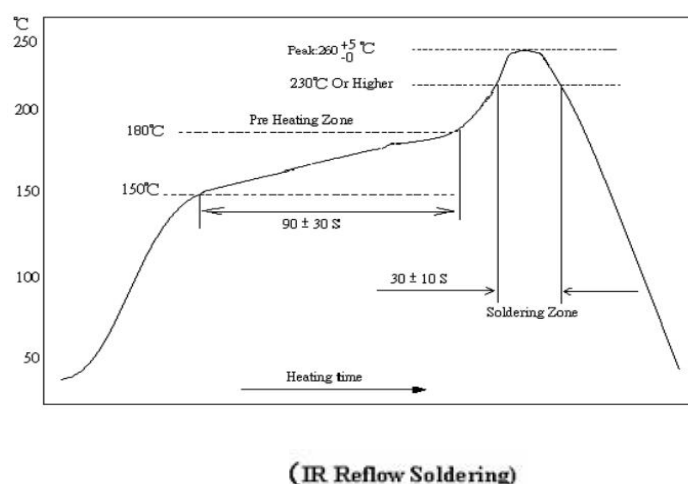
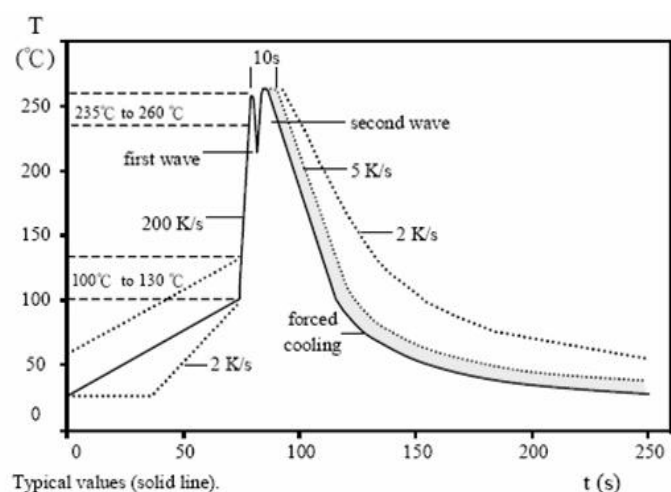
## Rating

| Size                        | 0201       | 0402    | 0603    | 0805 | 1206 | 1210 | 1812 | 1218 | 2010 | 2512 | 1225     |
|-----------------------------|------------|---------|---------|------|------|------|------|------|------|------|----------|
| Power Rating at 70°C        | 1/20W      | 1/16W   | 1/10W   | 1/8W | 1/4W | 1/3W | 1/2W | 1W   | 3/4W | 1W   | 2W       |
| Max RCWV                    | 15V        | 50V     | 75V     | 150V | 200V | 200V | 200V | 200V | 200V | 200V | 200V     |
| Max Overload Voltage        | 30V        | 100V    | 150V    | 300V | 400V | 400V | 400V | 400V | 400V | 400V | 400V     |
| Jumper<50mΩ                 | 0.5A       | 1A      | 1A      | 2A   | 2A   | 2A   | 2A   | 2A   | 2A   | 2A   | 10A      |
| Operating Temperature Range | -55~+155°C |         |         |      |      |      |      |      |      |      |          |
| Standard Resistance Range   | 0Ω         | 0~50mΩ  |         |      |      |      |      |      |      |      |          |
|                             | ±1% (E-96) | 1Ω~10MΩ | 1Ω~10MΩ |      |      |      |      |      |      |      | 10Ω~20KΩ |
|                             | ±5% (E-24) | 1Ω~10MΩ | 1Ω~22MΩ |      |      |      |      |      |      |      | 10Ω~20KΩ |

\* The working voltage is calculated based on the resistance value following the formula of  $V=\sqrt{(P \cdot R)}$  or to its maximum extent as indicated above.

\* The overload voltage is calculated based on the resistance value following the formula of  $V=2.5\sqrt{(P \cdot R)}$  or to its maximum extent as indicated above.

## Soldering Temperature Curve

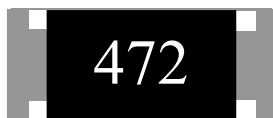


*Specification and Test Methods*

| ITEM                                        | SPECIFICATION                                                                                                                                                                 | TEST METHOD                                                                                                                                                                                                                                                                          |
|---------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Solderability                               | Over 95% of termination must be covered with solder                                                                                                                           | <b>JIS C 5201 4.17 / MIL-STD-202G METHOD 208H / IEC 60115-1 4.17</b><br>Reflow Soldering: Bath temperature:(235±5)°C,Immersion time:(2±0.5)s<br>WAVE Soldering: Bath temperature:(270±10)°C,Immersion time:(2±0.5)s                                                                  |
| Resistance to Solder Heat                   | J、G: $\Delta R \leq \pm(1\% + 0.05\Omega)$<br>F: $\Delta R \leq \pm(0.5\% + 0.05\Omega)$<br>No mechanical damage                                                              | <b>JIS C 5201 4.18 / MIL-STD-202G METHOD 210F / IEC 60115-1 4.18</b><br>The temperature of the solder bath shall be (260±5)°C,The immersion time shall be(5±0.5)s or(10±1)s as prescribed by the detail specification                                                                |
| Temperature Coefficient of Resistance (TCR) | 0402 (0402 & 0201):<br>1Ω~10Ω;>3.3M: ±400ppm/°C<br>10Ω(excluding 10Ω)~3.3M: ±200ppm/°C<br>0603 (0603 or above):<br>1Ω~10Ω;>1M: ±200ppm/°C<br>10Ω(excluding10Ω)~1M: ±100ppm/°C | <b>JIS C 5201 4.8 / MIL-STD-202G METHOD 304 / IEC 60115-1 4.8</b><br><br>The temperature characteristic or temperature coefficient of resistance is not specified for resistance values of less than 5R owing to difficulty of accurate measurement                                  |
| Short time Overload                         | J、G: $\Delta R \leq \pm(2\% + 0.05\Omega)$<br>F: $\Delta R \leq \pm(1\% + 0.05\Omega)$                                                                                        | <b>JIS C 5201 4.13/IEC 60115-1 4.13</b><br>2.5×Rated voltage or Max. Overload Voltage for 5 sec.<br>measure resistance after 30 minutes                                                                                                                                              |
| Load Life Humidity                          | J、G: $\Delta R \leq \pm(3\% + 0.05\Omega)$<br>F: $\Delta R \leq \pm(1\% + 0.05\Omega)$                                                                                        | <b>JIS C 5201 4.24/MIL-STD-202G Method 106G / IEC 60115-1 4.24</b><br>Maintain the temperature of the resistor at 40±2°C and 90~95% RH with the rated voltage applied.Cycle ON for 1.5 hours and OFF for 0.5 hour for1000+48/-0 hours. After 1~4 hour, measure the resistance value. |
| Load Life                                   | J、G: $\Delta R \leq \pm(3\% + 0.05\Omega)$<br>F: $\Delta R \leq \pm(1\% + 0.05\Omega)$                                                                                        | <b>JIS C 5201 4.25/MIL-STD-202G Method 108A / IEC 60115-1 4.25</b><br>70 ±2°C, Max. working voltage for 1000 hrs with 1.5 hrs “ON” and 0.5 hrs “OFF”.                                                                                                                                |
| Temperature Cycle                           | J、G: $\Delta R \leq \pm(1\% + 0.05\Omega)$<br>F: $\Delta R \leq \pm(0.5\% + 0.05\Omega)$<br>No mechanical damage                                                              | <b>JIS C 5201 4.19/MIL-STD-202G Method 107G / IEC 60115-1 4.19</b><br>Repeat 5 cycles as follows -65°C(30 min.)+25°C(2~3 min.) +125°C(30 min.)+25°C(2~3 min.)                                                                                                                        |
| Insulation Resistance                       | Between termination and coating must be over 1000MΩ                                                                                                                           | <b>JIS C 5201 4.6 / MIL-STD-202G Method 302 / IEC 60115-1 4.6</b><br>Test voltage: 100±15V                                                                                                                                                                                           |
| Bending Strength                            | J、G: $\Delta R \leq \pm(1\% + 0.05\Omega)$<br>F: $\Delta R \leq \pm(0.5\% + 0.05\Omega)$<br>No mechanical damage                                                              | <b>JIS C 5201 4.33 / MIL-STD-202G Method 211A / IEC 60115-1 4.33</b><br>Resistance change after bended on the 90mm PCB.<br>Bend: 3mm for 0201、0402、0603、0805、1206<br>2mm for 1210、1812、1218、1225<br>1mm for 2010、2512                                                                |

# KSE Chip Resistor - General Purpose [RoHS]

## Markings



### 1.1. $\pm 5\%$ (IEC E-24 Series) 0603, 0805, 1206 (0201, 0402)

No markings on 0201 and 0402. Markings on the other sizes are expressed by a 3-digit code in its exact value.

E. G. : 6R8=6.8 $\Omega$ ; 100=10 $\times 10^0$ =10 $\Omega$ ; 472=47 $\times 10^2$ =4700 $\Omega$ =4.7K $\Omega$ .

### 1.2. $\pm 1\%$ (+/-1% Resistance value markings)

#### a. 0805, 1206 $\pm 1\%$

Markings on sizes 0805, 1206 and above are expressed by a 4-digit code.

E. G. : 82R5=82.5 $\Omega$ ; 1000=100 $\times 10^0$ =100 $\Omega$ ; 2212=221 $\times 10^2$ =22100 $\Omega$ =22.1K $\Omega$ .

#### b. 0603 $\pm 1\%$ (IEC E-96)

Markings on 0603  $\pm 1\%$  (IEC E-96 Series) are expressed by a 3-digit code; the first two digits represent

E-96: The coding system of the E-96 series is as follows :

| 100 | 01 | 133 | 13 | 178 | 25 | 237 | 37 | 316 | 49 | 422 | 61 | 562 | 73 | 750 | 85 |
|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|
| 102 | 02 | 137 | 14 | 182 | 26 | 243 | 38 | 324 | 50 | 432 | 62 | 576 | 74 | 768 | 86 |
| 105 | 03 | 140 | 15 | 187 | 27 | 249 | 39 | 332 | 51 | 442 | 63 | 590 | 75 | 787 | 87 |
| 107 | 04 | 143 | 16 | 191 | 28 | 255 | 40 | 340 | 52 | 453 | 64 | 604 | 76 | 806 | 88 |
| 110 | 05 | 147 | 17 | 196 | 29 | 261 | 41 | 348 | 53 | 464 | 65 | 619 | 77 | 825 | 89 |
| 113 | 06 | 150 | 18 | 200 | 30 | 267 | 42 | 357 | 54 | 475 | 66 | 634 | 78 | 845 | 90 |
| 115 | 07 | 154 | 19 | 205 | 31 | 274 | 43 | 365 | 55 | 487 | 67 | 649 | 79 | 866 | 91 |
| 118 | 08 | 158 | 20 | 210 | 32 | 280 | 44 | 374 | 56 | 499 | 68 | 665 | 80 | 887 | 92 |
| 121 | 09 | 162 | 21 | 215 | 33 | 287 | 45 | 383 | 57 | 511 | 69 | 681 | 81 | 909 | 93 |
| 124 | 10 | 165 | 22 | 221 | 34 | 294 | 46 | 392 | 58 | 523 | 70 | 698 | 82 | 931 | 94 |
| 127 | 11 | 169 | 23 | 226 | 35 | 301 | 47 | 402 | 59 | 536 | 71 | 715 | 83 | 953 | 95 |
| 130 | 12 | 174 | 24 | 232 | 36 | 309 | 48 | 412 | 60 | 549 | 72 | 732 | 84 | 976 | 96 |

### Multiplier code

| Code       | A               | B               | C               | D               | E               | F               | G               | X                | Y                | Z                |
|------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|------------------|------------------|------------------|
| Multiplier | 10 <sup>0</sup> | 10 <sup>1</sup> | 10 <sup>2</sup> | 10 <sup>3</sup> | 10 <sup>4</sup> | 10 <sup>5</sup> | 10 <sup>6</sup> | 10 <sup>-1</sup> | 10 <sup>-2</sup> | 10 <sup>-3</sup> |

E. G. : 01Y=100 $\times 10^{-2}$ =1 $\Omega$ ; 68A=499 $\times 10^0$ =499 $\Omega$ ; 02D=102 $\times 10^3$ =102K $\Omega$

### c. Any resistance values of 1% tolerance but not included in the E-96 series, the value markings are the same as +/-5% tolerance with labelling identification.

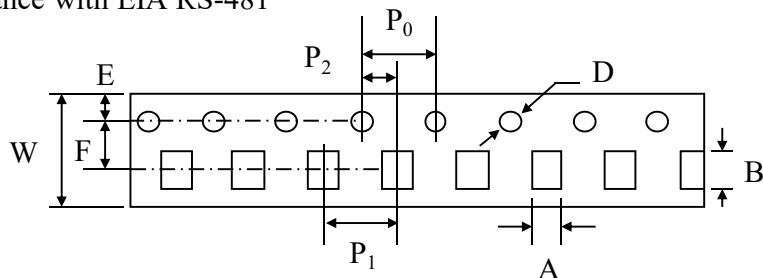
E. G.: 120=12 $\times 10^0$ =12 $\Omega$ ; 475=47 $\times 10^5$ =4.7M $\Omega$ .

### d. Marking of the 0 Ohm resistor is a '0' with its value range from 0-50m $\Omega$ . No tolerance shown on the product label.

# KSE Chip Resistor - General Purpose [RoHS]

## Tape and Reel Package

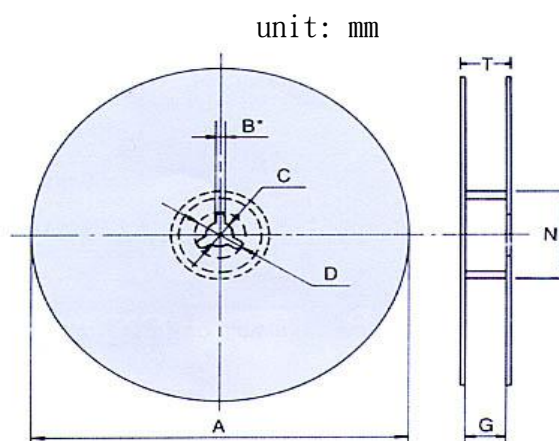
Taping is in accordance with EIA RS-481



Accumulated dimensional tolerance  $40 \pm 0.2 \text{ mm}$

| Size | A          | B          | W          | F          | E          | P <sub>1</sub> | P <sub>2</sub> | P <sub>0</sub> | D          |
|------|------------|------------|------------|------------|------------|----------------|----------------|----------------|------------|
| 0201 | 0.40 ±0.10 | 0.75 ±0.10 | 8.00 ±0.30 | 3.50 ±0.05 | 1.75 ±0.10 | 2.00 ±0.10     | 2.00 ±0.05     | 4.00 ±0.10     | 1.50 ±0.10 |
| 0402 | 0.65 ±0.10 | 1.15 ±0.10 | 8.00 ±0.30 | 3.50 ±0.05 | 1.75 ±0.10 | 2.00 ±0.10     | 2.00 ±0.05     | 4.00 ±0.10     | 1.50 ±0.10 |
| 0603 | 1.10 ±0.20 | 1.90 ±0.20 | 8.00 ±0.30 | 3.50 ±0.05 | 1.75 ±0.10 | 4.00 ±0.10     | 2.00 ±0.05     | 4.00 ±0.10     | 1.50 ±0.10 |
| 0805 | 1.65 ±0.20 | 2.40 ±0.20 | 8.00 ±0.30 | 3.50 ±0.05 | 1.75 ±0.10 | 4.00 ±0.10     | 2.00 ±0.05     | 4.00 ±0.10     | 1.50 ±0.10 |
| 1206 | 2.00 ±0.20 | 3.50 ±0.20 | 8.00 ±0.30 | 3.50 ±0.05 | 1.75 ±0.10 | 4.00 ±0.10     | 2.00 ±0.05     | 4.00 ±0.10     | 1.50 ±0.10 |
| 1210 | 2.85 ±0.20 | 3.50 ±0.20 | 8.00 ±0.30 | 3.50 ±0.05 | 1.75 ±0.10 | 4.00 ±0.10     | 2.00 ±0.05     | 4.00 ±0.10     | 1.50 ±0.10 |
| 1218 | 5.50 ±0.20 | 3.50 ±0.20 | 12.0 ±0.30 | 3.50 ±0.05 | 1.75 ±0.10 | 4.00 ±0.10     | 2.00 ±0.05     | 4.00 ±0.10     | 1.50 ±0.10 |
| 1812 | 3.50 ±0.20 | 5.50 ±0.20 | 12.0 ±0.30 | 3.50 ±0.05 | 1.75 ±0.10 | 4.00 ±0.10     | 2.00 ±0.05     | 4.00 ±0.10     | 1.50 ±0.10 |
| 2010 | 2.80 ±0.20 | 5.50 ±0.20 | 12.0 ±0.30 | 5.50 ±0.05 | 1.75 ±0.10 | 4.00 ±0.10     | 2.00 ±0.05     | 4.00 ±0.10     | 1.50 ±0.10 |
| 1225 | 3.38 ±0.20 | 6.68 ±0.20 | 12.0 ±0.30 | 5.50 ±0.10 | 1.75 ±0.10 | 4.00 ±0.10     | 2.00 ±0.05     | 4.00 ±0.10     | 1.50 ±0.10 |
| 2512 | 3.50 ±0.20 | 6.70 ±0.20 | 12.0 ±0.30 | 5.50 ±0.05 | 1.75 ±0.10 | 4.00 ±0.10     | 2.00 ±0.05     | 4.00 ±0.10     | 1.50 ±0.10 |

| Size | Packaging Q'ty |
|------|----------------|
| 0201 | 10Kpcs/Reel    |
| 0402 | 10Kpcs/Reel    |
| 0603 | 5Kpcs/Reel     |
| 0805 |                |
| 1206 |                |
| 1210 |                |
| 1218 | 4Kpcs/Reel     |
| 1812 |                |
| 2010 |                |
| 2512 |                |
| 1225 | 2Kpcs/Reel     |

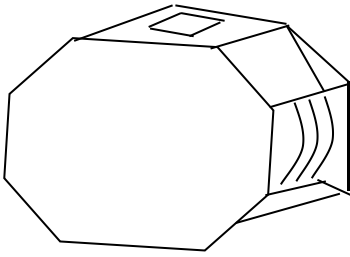


| Symbol    | A        | N         | C         | D         | B         | G         | T         |
|-----------|----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Dimension | 178 ±3.0 | 60.0 ±2.0 | 13.0 ±1.0 | 19.5 ±1.0 | 2.30 ±0.5 | 10.0 ±1.5 | 14.9 max. |
|           | 178 ±3.0 | 60.0 ±2.0 | 13.0 ±1.0 | 19.5 ±1.0 | 2.30 ±0.5 | 13.8 ±1.5 | 16.7 max. |

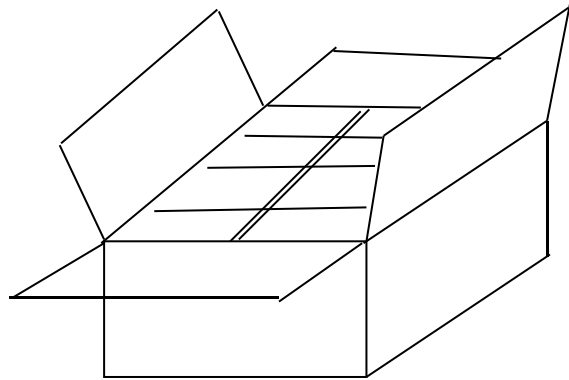
| Storage Condition | Temp   | Humidity | Storage Time | 1 year |
|-------------------|--------|----------|--------------|--------|
|                   | 5~35°C | 20%-70%  |              |        |

# KSE Chip Resistor - General Purpose [RoHS]

## *Outer Packaging*



First package: 1~10 reels (inner box)



Second package: 80 reels Max (export carton)

- When quantity shall not reach the max, the remaining empty space shall be filled up with buffer material.
- When the quantity is a few, alternative packing methods may be used. It is important to ensure the safety of the products during transportation.