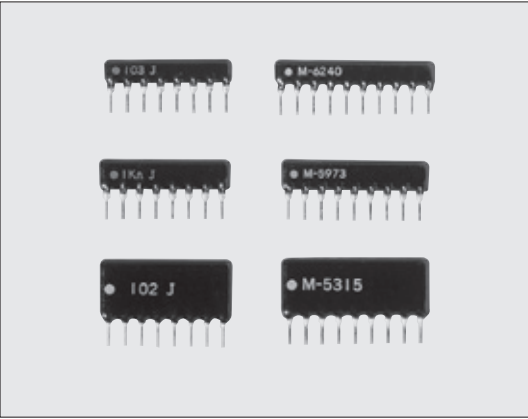
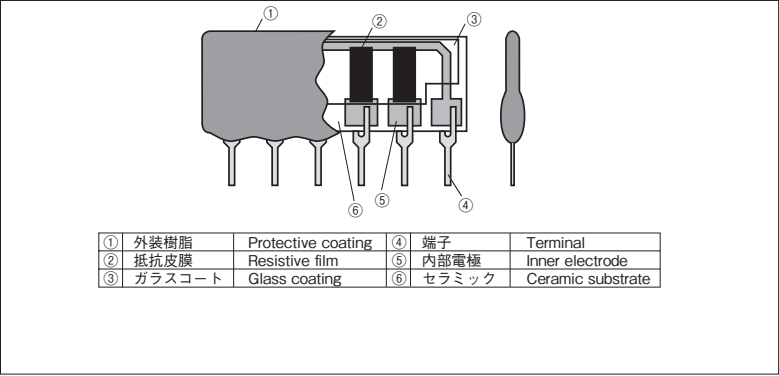


RKL・RKC・RKH ■ スタンダード厚膜抵抗ネットワーク  
Standard Thick Film Resistor Networks



■構造図 Construction



外装色：黒 Coating color：Black

■特長 Features

- 小形品から大電力品にわたり標準回路が豊富です。(取付高さ 5.08mm, 6.5mm, 10.7mm Max.)
- 自動機挿入可能なマガジン品(リード端子先端はVカット)、テーピング品(TBA：全端子、TPA：3端子)対応。
- 端子鉛フリー品は、欧州RoHS対応です。電極、抵抗、ガラスに含まれる鉛ガラスは欧州RoHSの適用除外です。
- Various types of standard circuits in different sizes and power are available. (Seated height 5.08mm, 6.5mm, 10.7mm Max.)
- For automatic insertion machines, stick magazines (the tip of lead terminal is cut to a V shape) and taping packages (TBA:All leads taping, TPA:3 leads taping) are applicable.
- Products with lead free termination meet EU-RoHS requirements. EU-RoHS regulation is not intended for Pb-glass contained in electrode, resistor element and glass.

■品名構成 Type Designation

例 Example

| 回路<br>Circuit | 品 種<br>Product<br>Code | 素子数<br>Number of<br>Elements | 回路記号<br>Circuit<br>Symbol | 端子表面材質<br>Terminal<br>Surface Material | 二次加工<br>Taping &<br>Stick                                                                        | 公称抵抗値<br>Nominal<br>Resistance  | 抵抗値許容差<br>Resistance<br>Tolerance  |
|---------------|------------------------|------------------------------|---------------------------|----------------------------------------|--------------------------------------------------------------------------------------------------|---------------------------------|------------------------------------|
| A, B, C, D, S | RKL<br>RKC<br>RKH      | 8                            | A, B, C, D, S             | D : SnAgCu<br>(L : Sn/Pb)              | 無記号：バルク<br>Nil: Bulk<br>STP:Stick<br>STB:Stick<br>TPA:Taping (3 leads)<br>TBA:Taping (All leads) | G, J : 3 digits<br>F : 4 digits | F : ±1 %<br>G : ±2 %<br>J : ±5 %   |
| T, E, R       | RKL<br>RKC<br>RKH      |                              | T, E, R                   |                                        |                                                                                                  | R1/R2<br>3 digits/3 digits      | ※R回路はG、Jのみ<br>R circuit: G, J only |

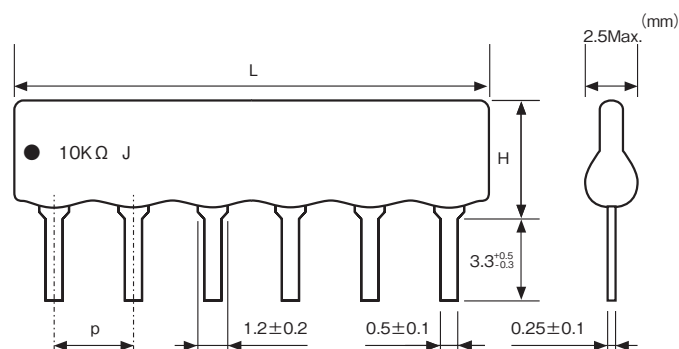
| 回路<br>Circuit | 品 種<br>Product<br>Code | ビット数<br>Number of<br>Bits | 回路記号<br>Circuit<br>Symbol | 端子表面材質<br>Terminal<br>Surface Material | 二次加工<br>Taping &<br>Stick | 出力インピーダンス(L回路)<br>Output Impedance (L circuit)<br>MSB側抵抗値(K回路)<br>Resistance of MSB (K circuit) |
|---------------|------------------------|---------------------------|---------------------------|----------------------------------------|---------------------------|-------------------------------------------------------------------------------------------------|
| L             | RKC                    | 8                         | L                         | D : SnAgCu<br>(L : Sn/Pb)              | 上表参照<br>See table above   | 3 digits                                                                                        |
| K             | RKC                    |                           | K                         |                                        |                           |                                                                                                 |

許容差：±1/2 LSB Tolerance：±1/2 LSB

| M—                                 | 6000                 | D                                      |
|------------------------------------|----------------------|----------------------------------------|
| カスタムの記号<br>Custom R. Net<br>Symbol | 製造番号<br>KOA Ref. No. | 端子表面材質<br>Terminal<br>Surface Material |

端子表面材質は鉛フリーめっき品が標準となります。  
環境負荷物質含有についてEU-RoHS以外の物質に対するご要求がある場合にはお問合せ下さい。  
テーピングの詳細については巻末のAPPENDIX Cを参照して下さい。  
The terminal surface material lead free is standard.  
Contact us when you have control request for environmental hazardous material other than the substance specified by EU-RoHS.  
For further information on taping, please refer to APPENDIX C on the back pages.

## ■外形寸法及びパッケージ電力 Dimensions and Wattage/Package



## ■質量 Weight (g/1000pcs)

| ピン数 Number of Pins |     |     |     |     |     |     |     |
|--------------------|-----|-----|-----|-----|-----|-----|-----|
|                    | 3   | 4   | 5   | 6   | 7   | 8   | 9   |
| RKL                | 147 | 185 | 228 | 271 | 314 | 357 | 400 |
| RKC                | 160 | 217 | 273 | 330 | 387 | 444 | 501 |
| RKH                | —   | 416 | 511 | 606 | 701 | 796 | 891 |

| ピン数 Number of Pins |     |      |      |      |     |     |     |
|--------------------|-----|------|------|------|-----|-----|-----|
|                    | 10  | 11   | 12   | 13   | 14  | 15  | 16  |
| RKL                | 443 | 486  | 529  | —    | —   | —   | —   |
| RKC                | 558 | 615  | 672  | 728  | 785 | 842 | 893 |
| RKH                | 986 | 1081 | 1176 | 1271 | —   | —   | —   |

|                     |   | ピン数 Number of Pins |       |       |       |       |       |       |       |       |       |      |      |      |      | H Max.<br>(mm) | p<br>(mm) |
|---------------------|---|--------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|------|------|------|----------------|-----------|
|                     |   | 3                  | 4     | 5     | 6     | 7     | 8     | 9     | 10    | 11    | 12    | 13   | 14   | 15   | 16   |                |           |
| RKL                 | L | 8.20               | 10.16 | 12.70 | 15.24 | 17.78 | 20.32 | 22.86 | 25.40 | 27.94 | 30.48 | —    | —    | —    | —    | 5.08           | 2.54±0.2  |
|                     | W | 250                | 375   | 500   | 625   | 750   | 875   | 1000  | 1050  | 1150  | 1250  | —    | —    | —    | —    |                |           |
| RKC<br>(2.54 pitch) | L | 8.2                | 10.8  | 13.2  | 15.8  | 18.3  | 20.9  | 23.4  | 25.9  | 28.5  | 31.0  | 33.6 | 36.1 | 38.7 | 41.3 | 6.5            | 2.54±0.2  |
|                     | W | 250                | 375   | 500   | 625   | 750   | 875   | 1000  | 1050  | 1150  | 1250  | 1350 | 1450 | 1500 | 1550 |                |           |
| RKH                 | L | —                  | 10.8  | 13.3  | 15.8  | 18.3  | 20.9  | 23.4  | 25.9  | 28.5  | 31.0  | 33.6 | —    | —    | —    | 10.7           | 2.54±0.2  |
|                     | W | —                  | 525   | 700   | 875   | 1050  | 1250  | 1400  | 1500  | 1600  | 1700  | 1800 | —    | —    | —    |                |           |
| RKC<br>(1.8 pitch)  | L | —                  | 10.2  | 10.8  | 12.7  | 15.5  | 15.8  | 17.8  | 20.4  | 20.9  | 23.5  | 25.4 | 28.5 | —    | —    | 6.5            | 1.8±0.15  |
|                     | W | —                  | 300   | 400   | 500   | 580   | 650   | 720   | 760   | 820   | 850   | 880  | 900  | —    | —    |                |           |
| RKS<br>(2.0 pitch)  | L | —                  | 10.1  | 12.7  | 12.7  | 15.3  | 17.8  | 20.3  | 22.8  | 22.8  | 25.4  | —    | —    | —    | —    | 5.08           | 2.0±0.2   |
|                     | W | —                  | 195   | 260   | 325   | 390   | 455   | 520   | 585   | 650   | 715   | —    | —    | —    | —    |                |           |

L : L Dimensions (mm) Max. W : Wattage/Package (mW) Max.

RKC (1.8pitch)とRKSは、カスタム対応です。 RKC (1.8pitch) and RKS are custom circuits only.

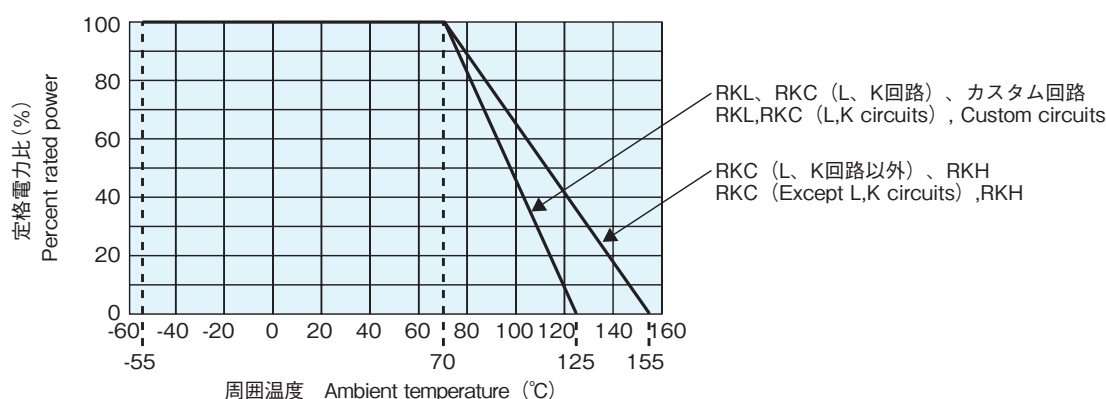
RKC (1.8pitch)の形名は、RKC・素子数・回路記号の後に‘S’ (1.8pitchを示す)を付加します。

The symbol ‘s’ showing 1.8 pitch is added to the type designation after its circuit symbol.

定格電圧は $\sqrt{\text{定格電力} \times \text{公称抵抗値}}$ による算出値、又は表中の最高使用電圧のいずれか小さい値が定格電圧となります。

Rated voltage =  $\sqrt{\text{Power Rating} \times \text{Resistance value}}$  or Max. working voltage, whichever is lower.

## ■負荷軽減曲線 Derating Curve



周囲温度70℃以上で使用される場合は、上図負荷軽減曲線に従って、定格電力を軽減して御使用下さい。

For resistors operated at an ambient temperature of 70°C or above, a power rating shall be derated in accordance with the above derating curve.

## ■使用上の注意 Precautions for Use

- 鉛フリー端子品のフローはんだ付条件は260℃以下、10秒以内でお願いします。
- ネットワーク抵抗器においては、わずかながらクロストークが発生します。コモン電極に電流が流れると、その電圧降下により電流を流していない抵抗素子にも微小な電圧が誘起されますので、クロストークの影響を配慮した回路設計をして下さい。
- The conditions of flow soldering for lead-free terminal resistors are set up at 260°C max. within 10 sec.
- A few cross talks will happen in network resistors. Design the circuit taking the effect by the cross talks into consideration as very low voltage will occur to the resistor elements that don't pass current by the voltage drop in common electrode if current flows to the common electrodes.

# NETWORKS

## RKL・RKC・RKHスタンダード厚膜抵抗ネットワーク Standard Thick Film Resistor Networks

### ■定格 Ratings

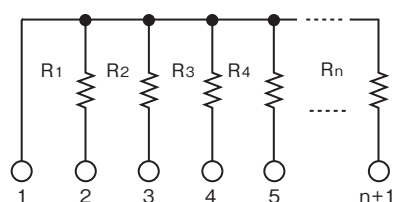
| 形 名<br>Type | 回 路<br>Circuit<br>Symbol | ピン数<br>Number of<br>Pins | 定格電力<br>Power<br>Rating                     | 抵抗値範囲<br>Resistance<br>Range | 抵抗値許容差<br>Resistance<br>Tolerance | 抵抗温度係数<br>T.C.R.<br>(×10 <sup>-6</sup> /K) | 最高使用電圧<br>Max. Working<br>Voltage | 定格周囲温度<br>Rated Ambient<br>Temp. | 使用温度範囲<br>Operating Temp.<br>Range |                      |      |      |                |
|-------------|--------------------------|--------------------------|---------------------------------------------|------------------------------|-----------------------------------|--------------------------------------------|-----------------------------------|----------------------------------|------------------------------------|----------------------|------|------|----------------|
| RKC         | B                        | 3～16                     | 125mW                                       | 22Ω～2.2MΩ (E24)              | F : ±1%<br>G : ±2%<br>J : ±5%     | ±200                                       | 200V                              | +70℃                             | -55℃～<br>+155℃                     |                      |      |      |                |
|             | C                        | 5～13                     |                                             |                              |                                   |                                            |                                   |                                  |                                    |                      |      |      |                |
|             | D                        | 5～14                     |                                             |                              |                                   |                                            |                                   |                                  |                                    |                      |      |      |                |
|             | A                        | 4～14                     |                                             |                              |                                   |                                            |                                   |                                  |                                    |                      |      |      |                |
|             | T                        | 5～13                     |                                             |                              |                                   |                                            |                                   |                                  |                                    |                      |      |      |                |
|             | E                        | 5～13                     |                                             |                              |                                   |                                            |                                   |                                  |                                    |                      |      |      |                |
|             | S                        | 4～16                     | 250mW                                       |                              |                                   |                                            |                                   |                                  |                                    |                      |      |      |                |
|             | R                        | 4～16                     | 125mW                                       | 100Ω～100kΩ (E24)             | G : ±2%<br>J : ±5%                | ±200                                       | 20V                               | +70℃                             | -55℃～<br>+125℃                     |                      |      |      |                |
| L           | 6～11                     | 20mW                     | R=2.5kΩ, 5kΩ<br>10 kΩ, 25kΩ<br>50 kΩ, 100kΩ | ±1/2LSB<br>(Bit Error)       |                                   |                                            |                                   |                                  |                                    |                      |      |      |                |
| K           | 5～9                      | 40mW                     | R1 (MSB):100Ω Min<br>Rn (LSB):1MΩ Max       | ±1/2LSB<br>(Bit Error)       |                                   |                                            |                                   |                                  |                                    |                      |      |      |                |
| RKL         | B                        | 3～12                     | 125mW                                       | 22Ω～1MΩ (E24)                | F : ±1%<br>G : ±2%<br>J : ±5%     | ±200                                       | 100V                              | +70℃                             | -55℃～<br>+125℃                     |                      |      |      |                |
|             | C                        | 5～11                     |                                             |                              |                                   |                                            |                                   |                                  |                                    |                      |      |      |                |
|             | D                        | 5～12                     |                                             |                              |                                   |                                            |                                   |                                  |                                    |                      |      |      |                |
|             | A                        | 3～12                     |                                             |                              |                                   |                                            |                                   |                                  |                                    |                      |      |      |                |
|             | T                        | 5～11                     |                                             |                              |                                   |                                            |                                   |                                  |                                    |                      |      |      |                |
|             | E                        | 5～11                     |                                             |                              |                                   |                                            |                                   |                                  |                                    |                      |      |      |                |
|             | S                        | 4～12                     | 200mW                                       |                              |                                   |                                            |                                   |                                  |                                    |                      |      |      |                |
| R           | 4～11                     | 125mW                    | 100Ω～100kΩ (E24)                            | G : ±2%<br>J : ±5%           | ±200                              | 250V                                       | +70℃                              | -55℃～<br>+155℃                   |                                    |                      |      |      |                |
| RKH         | B                        | 4～13                     | 250mW                                       | 56Ω～2.2MΩ (E24)              |                                   |                                            |                                   |                                  | F : ±1%<br>G : ±2%<br>J : ±5%      | ±200                 | 250V | +70℃ | -55℃～<br>+155℃ |
|             | C                        | 5～13                     |                                             |                              |                                   |                                            |                                   |                                  |                                    |                      |      |      |                |
|             | D                        | 5～12                     |                                             |                              |                                   |                                            |                                   |                                  |                                    |                      |      |      |                |
|             | A                        | 4～12                     |                                             |                              |                                   |                                            |                                   |                                  |                                    |                      |      |      |                |
|             | T                        | 5～13                     |                                             |                              |                                   |                                            |                                   |                                  |                                    |                      |      |      |                |
|             | E                        | 5～13                     |                                             |                              |                                   |                                            |                                   |                                  |                                    |                      |      |      |                |
| S           | 4～12                     | 500mW                    |                                             |                              |                                   |                                            |                                   |                                  |                                    |                      |      |      |                |
| R           | 5～11                     | 250mW                    | 100Ω～100kΩ (E24)                            | G : ±2%<br>J : ±5%           | ±100<br>±150<br>±200              | 100V                                       | +70℃                              | -55℃～<br>+125℃                   |                                    |                      |      |      |                |
| M-          | RKL                      | 3～12                     | 0.1W<br>0.125W<br>0.25W<br>0.5W<br>1W       | 10Ω～1MΩ                      |                                   |                                            |                                   |                                  | ±0.5%<br>±1%<br>±2%<br>±5%         | ±100<br>±150<br>±200 | 100V |      |                |
|             | RKC<br>(1.8pitch)        | 4～14                     |                                             |                              |                                   |                                            |                                   |                                  |                                    |                      | 50V  |      |                |
|             | RKC<br>(2.54pitch)       | 3～16                     |                                             |                              |                                   |                                            |                                   |                                  |                                    |                      | 200V |      |                |
|             | RKH                      | 4～13                     |                                             |                              |                                   |                                            |                                   |                                  |                                    |                      | 250V |      |                |
|             | RKS<br>(2.0pitch)        | 4～12                     |                                             |                              |                                   |                                            |                                   |                                  |                                    |                      | 100V |      |                |

### ■性能 Performance

| 試験項目<br>Test Items                     | 規格値 Performance Requirements<br>ΔR± (%+0.05Ω) |             | 試験方法<br>Test Methods                                                         |
|----------------------------------------|-----------------------------------------------|-------------|------------------------------------------------------------------------------|
|                                        | 保証値 Limit                                     | 代表値 Typical |                                                                              |
| 抵抗値<br>Resistance                      | 規定の許容差内<br>Within specified tolerance         | —           | 25℃                                                                          |
| 抵抗温度係数<br>T.C.R.                       | 規定値内<br>Within specified T.C.R.               | —           | +25℃/-55℃ and +25℃/+125℃ (RKL)<br>+25℃/-55℃ and +25℃/+155℃ (RKC, RKH)        |
| 過負荷 (短時間)<br>Overload (Short time)     | 0.5                                           | 0.25        | 定格電圧×2.5倍を5秒印加<br>Rated voltage×2.5 for 5s                                   |
| はんだ耐熱性<br>Resistance to soldering heat | 0.5                                           | 0.25        | 260℃±5℃, 10s±1s                                                              |
| 温度サイクル<br>Temperature cycling          | 0.5                                           | 0.25        | -40℃ (30min.) / +85℃ (30min.) 5 cycles                                       |
| 耐湿負荷<br>Moisture resistance            | 2                                             | 1           | 40℃±2℃, 90%~95%RH, 1000h<br>1.5時間 ON / 0.5時間 OFFの周期 1.5h ON / 0.5h OFF cycle |
| 70℃での耐久性<br>Endurance at 70℃           | 2                                             | 1           | 70℃±2℃, 1000h<br>1.5時間 ON / 0.5時間 OFFの周期 1.5h ON / 0.5h OFF cycle            |

## ■回路図 Circuit Schematics

**B circuit**



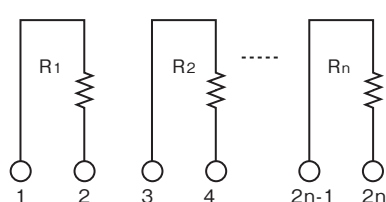
$$R1 = R2 = R3 = R4 = \dots = Rn$$

n : 素子数 number of elements

例 example

RKC8B 103 J  
RKL8B 472 J  
RKH8B 332 J

**S circuit**



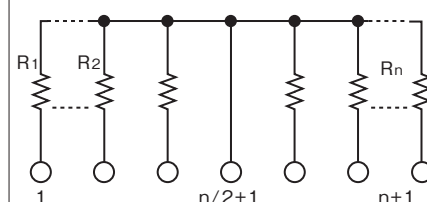
$$R1 = R2 = \dots = Rn$$

n : 素子数 number of elements

例 example

RKC4S 103 J  
RKL4S 472 J  
RKH4S 332 J

**C circuit**



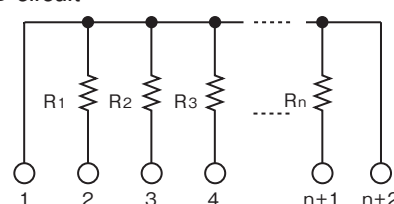
$$R1 = R2 = \dots = Rn$$

n : 素子数 number of elements

例 example

RKC8C 103 J  
RKL8C 472 J  
RKH8C 332 J

**D circuit**



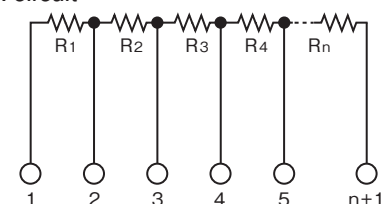
$$R1 = R2 = R3 = \dots = Rn$$

n : 素子数 number of elements

例 example

RKC8D 103 J  
RKL8D 472 J  
RKH8D 332 J

**A circuit**



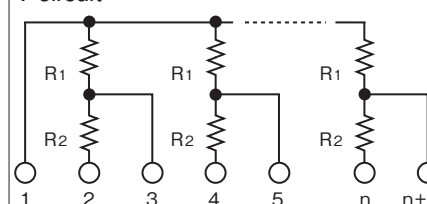
$$R1 = R2 = R3 = R4 = \dots = Rn$$

n : 素子数 number of elements

例 example

RKC8A 103 J  
RKL8A 472 J  
RKH8A 332 J

**T circuit**



$$R1 = R2 \text{ or } R1 \neq R2$$

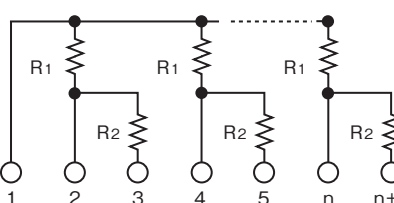
n : 素子数 number of elements

例 example

RKC8T 103/103 J  
RKL8T 103/103 J  
RKH8T 103/103 J

ネットワーク抵抗器  
Network Resistors

**E circuit**



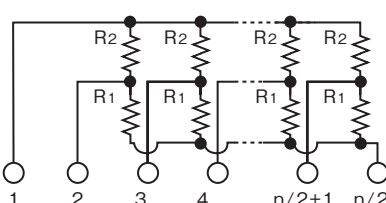
$$R1 = R2 \text{ or } R1 \neq R2$$

n : 素子数 number of elements

例 example

RKC8E 103/103 J  
RKL8E 103/103 J  
RKH8E 103/103 J

**R circuit**



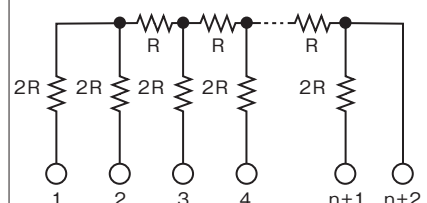
$$R1 = R2 \text{ or } R1 \neq R2$$

n : 素子数 number of elements

例 example

RKC16R 331/471 J  
RKL16R 331/471 J  
RKH16R 331/471 J

**L circuit**



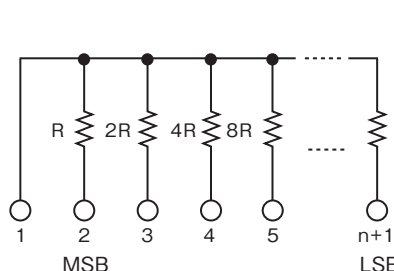
$$R1 = R2 \text{ or } R1 \neq R2$$

n : ビット数 number of bits

例 example

RKC5L 253

**K circuit**



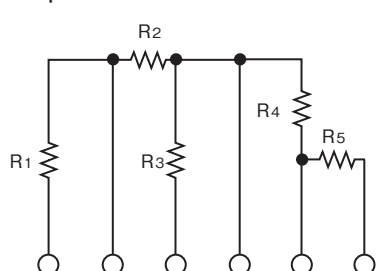
$$R1 = R2 \text{ or } R1 \neq R2$$

n : ビット数 number of bits

例 example

RKC4K 102

**Example of custom circuit**



**Example of custom circuit**

