

THICK FILM CHIP RESISTOR NETWORK HYC/HTC SERIES

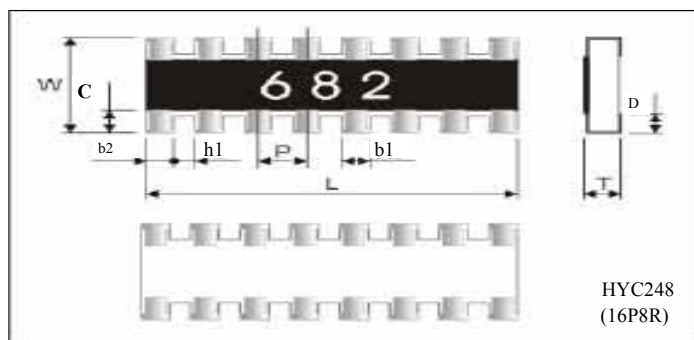
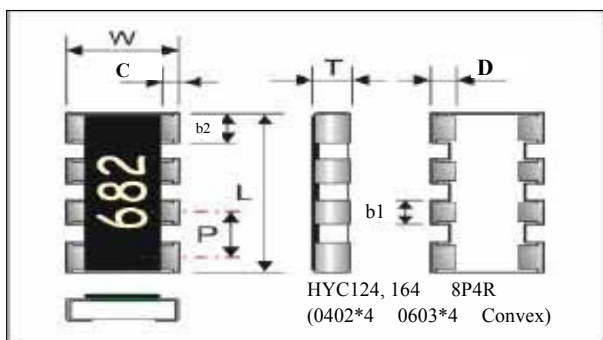
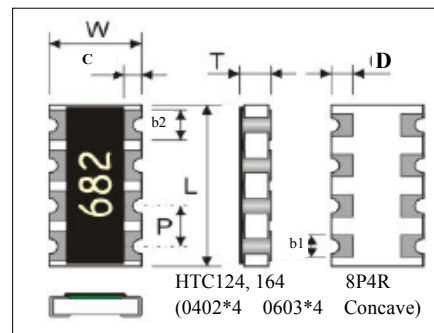
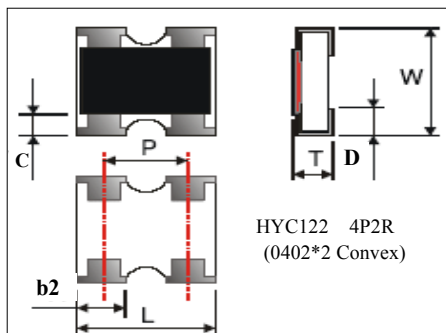
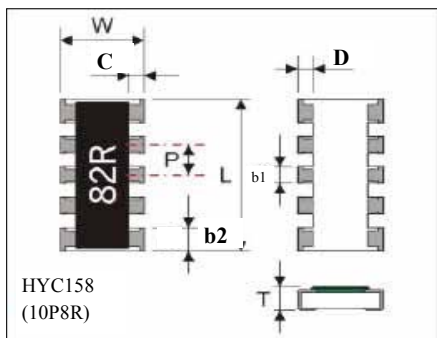
Features

- High density packaging provides higher productivity.
- Stable convex terminal reduces assembly costs.
- Compatible with flow and reflow soldering.

Applications

- Computer
- Mobile phone
- Camcorder
- Portable audio
- Battery charger
- Hard Disk Driver

Configuration



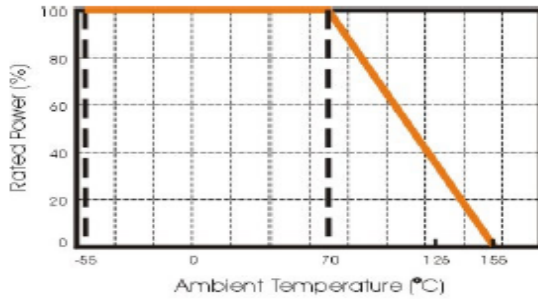
Dimensions

| TYPE | L | W | T | C | D | P | b1 | b2 | h1 |
|--------|-----------------|-----------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| HYC122 | 1.00±0.10 | 1.00±0.10 | 0.35±0.10 | 0.20±0.15 | 0.25±0.17 | 0.65±0.10 | - | 0.34±0.10 | - |
| HYC124 | 2.00±0.10 | 1.00±0.10 | 0.45±0.10 | 0.20±0.10 | 0.25±0.10 | 0.50±0.05 | 0.30±0.05 | 0.40±0.10 | - |
| HTC124 | 2.00±0.10 | 1.00±0.10 | 0.45±0.10 | 0.20±0.15 | 0.25±0.10 | 0.50±0.05 | 0.25±0.05 | 0.25±0.05 | - |
| HYC164 | 3.20±0.20 | 1.60±0.10 | 0.50±0.10 | 0.30±0.20 | 0.30±0.20 | 0.80±0.10 | 0.45±0.10 | 0.60±0.15 | - |
| HTC164 | 3.20±0.20/-0.10 | 1.60±0.20/-0.10 | 0.60±0.10 | 0.35±0.15 | 0.50±0.15 | 0.80±0.10 | 0.50±0.15 | 0.60±0.15 | - |
| HYC158 | 3.30±0.20 | 1.60±0.15 | 0.55±0.10 | 0.40±0.15 | 0.40±0.15 | 0.64±0.05 | 0.40±0.15 | 0.50±0.05 | - |
| HYC248 | 4.00±0.20 | 1.60±0.15 | 0.45±0.10 | 0.30±0.25 | 0.30±0.20 | 0.50±0.20 | 0.30±0.10 | 0.40±0.20 | 0.20±0.10 |

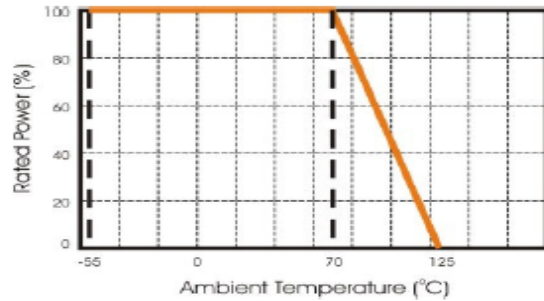
unit:mm

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Power Derating Curve

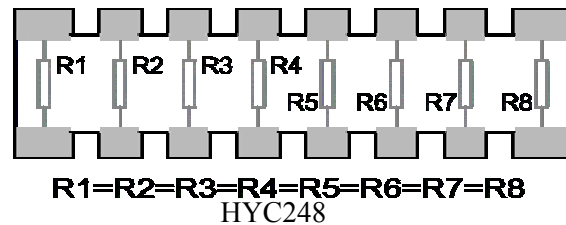
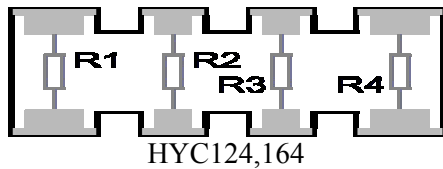
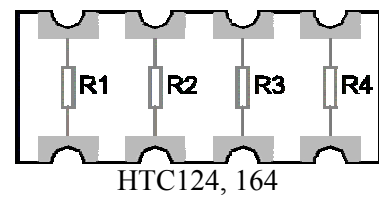
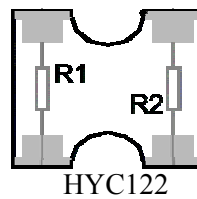
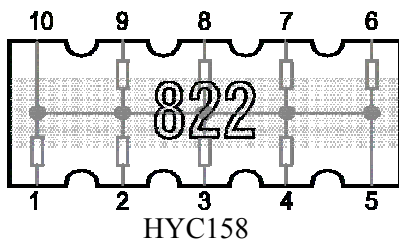


Maximum dissipation in percentage of rated power as a function of the ambient temperature for HYC122 , HYC124 , HTC124 , HYC164 , HTC164 , HYC158



Maximum dissipation in percentage of rated power as a function of the ambient temperature for HYC248

Circuit



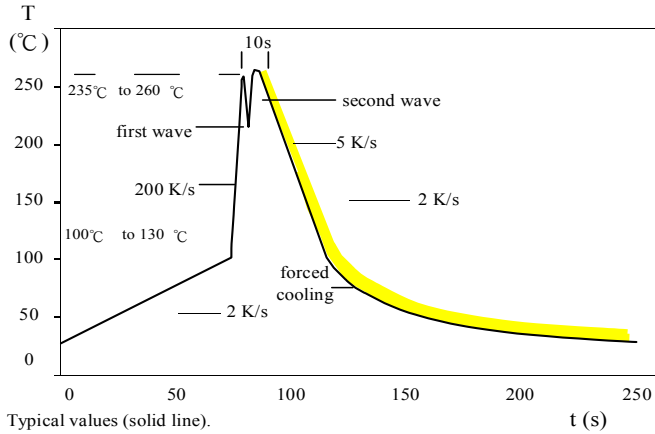
Rating

| Type | Size | Termination Construction | Power Rating at 70°C | Max. RCWV | Max. Overload Voltage | Resistance Tolerance (%) | Temperature Coefficient (TCR; ppm/°C) | Resistance Range (Ω) | | Standard Resistance Values |
|--------|----------------|--------------------------|----------------------|-----------|-----------------------|--------------------------|---------------------------------------|----------------------|----------------|----------------------------|
| | | | | | | | | Min. | Max. | |
| HYC122 | 4P2R 0402*2 | Convex | 1/16W | 25V | 50V | ±5%(J) | ±300 | 0Ω,10Ω | 1MΩ | E-24 |
| HYC124 | 8P4R 0402*4 | Convex | 1/16W | 25V | 50V | ±5%(J) ±1%(F) | ±300 | 0Ω,10Ω 100Ω | 1MΩ 1MΩ | E-24 |
| HTC124 | 8P4R 0402*4 | Concave | 1/16W | 25V | 50V | ±5%(J) ±1%(F) | ±300 | 0Ω,10Ω 10Ω | 1MΩ 1MΩ | E-24 |
| HYC164 | 8P4R 0603*4 | Convex | 1/16W | 50V | 100V | ±5%(J) ±1%(F) | ±200 | 0Ω,10Ω | 1MΩ | E-24 |
| HTC164 | 8P4R 0603*4 | Concave | 1/16W | 50V | 100V | ±5%(J) | ±200 | 0Ω,10Ω | 1MΩ | E-24 |
| HYC158 | 10P8R | Convex | 1/16W | 25V | 50V | ±5%(J) | ±200 | 10Ω | 100KΩ | E-24 |
| HYC248 | 16P8R | Convex | 1/16W | 25V | 50V | ±5%(J) ±1%(F) | ±200 | 0Ω,10Ω 10Ω | 100KΩ 100KΩ | E-24 |

Jumper : ◎ 8P4R size maximum resistance $R_{max} < 50m\Omega$ and rated current $I_R \leq 1A$

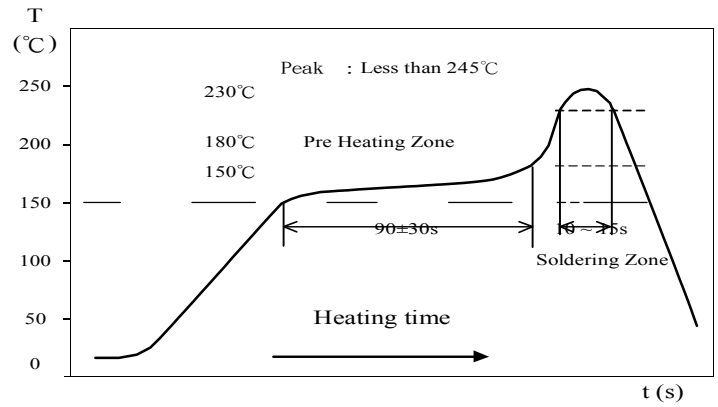
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Soldering Temperature Curve



Typical values (solid line).
Process limits (dotted line).

WAVE soldering.



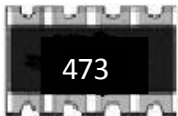
IR Reflow Soldering

Part Number

| <u>HYC</u> | <u>164</u> | <u>J</u> | <u>R</u> | - | <u>4K7R</u> |
|------------|-----------------------|-----------|----------------|---|-------------|
| Type | Size | Tolerance | Packing | | Ohmic value |
| HYC | 122 : 0402*2 | F : ± 1% | R : Paper tape | - | 5Kpcs |
| | 124 : 0402*4(Convex) | J : ± 5% | | | |
| HTC | 124 : 0402*4(Concave) | | | | |
| | 164 : 0603*4(Concave) | | | | |
| HYC | 164 : 0603*4(Convex) | | | | |
| | 158 : 10P8R | | | | |
| | 248 : 16P8R | | | | |

Resistance Marking

- E - 24 SERIES



3 digit marking for E24

examples **473** $47 \times 10^3 = 47K$

Standard resistance value

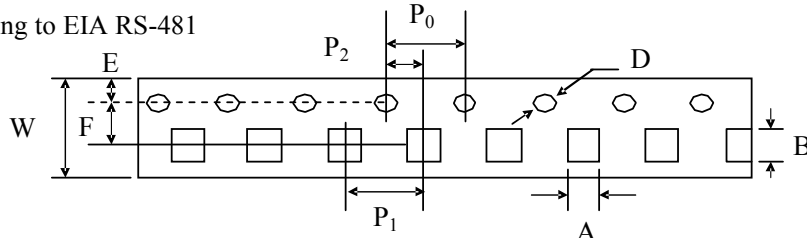
| E3 | 10 | | | | 22 | | | | 47 | | | |
|-----|----|----|----|----|----|----|----|----|----|----|----|----|
| E6 | 10 | | 15 | | 22 | | 33 | | 47 | | 68 | |
| E12 | 10 | 12 | 15 | 18 | 22 | 27 | 33 | 39 | 47 | 56 | 68 | 82 |
| E24 | 10 | 12 | 15 | 18 | 22 | 27 | 33 | 39 | 47 | 56 | 68 | 82 |
| | 11 | 13 | 16 | 20 | 24 | 30 | 36 | 43 | 51 | 62 | 75 | 91 |

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GENERAL SPECIFICATION

■ Tape And Reel Package

Taping specs are according to EIA RS-481

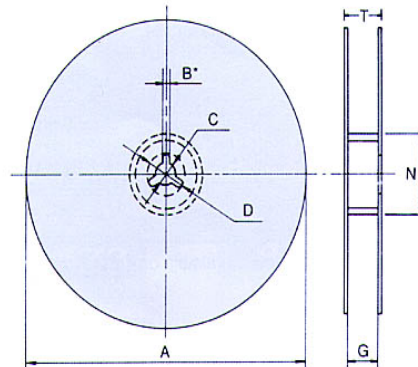


Accumulated dimensional tolerance $40\pm 0.2\text{mm}$

| Size | A | B | W | F | E | P1 | P2 | P0 | D |
|-------------------------------|----------------|----------------|-----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| 0402*2 | 1.15 ± 0.10 | 1.15 ± 0.10 | 8.00 ± 0.30 | 3.50 ± 0.20 | 1.75 ± 0.10 | 2.00 ± 0.05 | 2.00 ± 0.05 | 4.00 ± 0.10 | $1.50+0.10/-0$ |
| 0402*4 (Convex Concave) | 1.20 ± 0.20 | 2.20 ± 0.20 | 8.00 ± 0.30 | 3.50 ± 0.20 | 1.75 ± 0.10 | 2.00 ± 0.05 | 2.00 ± 0.05 | 4.00 ± 0.10 | $1.50+0.10/-0$ |
| 0603*2 (Convex) | 1.80 ± 0.10 | 1.80 ± 0.10 | 8.00 ± 0.30 | 3.50 ± 0.10 | 1.75 ± 0.10 | 4.00 ± 0.10 | 4.00 ± 0.10 | 4.00 ± 0.10 | $1.50+0.10/-0$ |
| 8P4R (Convex Concave) | 2.00 ± 0.20 | 3.60 ± 0.20 | 8.00 ± 0.30 | 3.50 ± 0.20 | 1.75 ± 0.10 | 4.00 ± 0.10 | 2.00 ± 0.05 | 4.00 ± 0.10 | $1.50+0.10/-0$ |
| 10P8R | $1.85+0.20/-0$ | $3.45+0.20/-0$ | 8.00 ± 0.30 | 3.50 ± 0.20 | 1.75 ± 0.10 | 4.00 ± 0.10 | 2.00 ± 0.05 | 4.00 ± 0.10 | $1.50+0.10/-0$ |
| 16P8R | $1.80+0.20/-0$ | $4.20+0.20/-0$ | 12.00 ± 0.10 | 5.50 ± 0.05 | 1.75 ± 0.10 | 4.00 ± 0.10 | 2.00 ± 0.05 | 4.00 ± 0.10 | $1.50+0.10/-0$ |

(unit: mm)

■ Reel Package



| Size | Packaging Q'ty | A | N | C | D | B | G | T |
|---|----------------|----------------|----------------|---------------|-------|--------------|---------------|-----------|
| 0402*2 0402*4 (Convex , Concave) 0603*2 (Convex) 8P4R (Convex , Concave) 10P8R, 16P8R | 5Kpcs / Reel | 178.0 ± 2.0 | 60.0 ± 0.5 | 13.0 ± 0.5 | 20min | 2.0 ± 0.5 | 10.0 ± 1.5 | 14.9 max. |
| 8P4R | 10Kpcs / Reel | 254.0 ± 2.0 | 100.0 ± 1.0 | 13.5 ± 0.5 | 20min | 2.0 ± 0.5 | 10.0 ± 1.5 | 14.9 max. |
| | 20Kpcs / Reel | 330.0 ± 2.0 | 100.0 ± 1.0 | 13.5 ± 0.5 | 20min | 2.0 ± 0.5 | 10.0 ± 1.5 | 14.9 max. |

(unit: mm)

THICK FILM CHIP RESISTOR NETWORK HYC/HTC SERIES GENERAL SPECIFICATION

■ Specification And Test Methods

| ITEM | SPECIFICATION | TEST METHOD |
|--|---|---|
| DC Resistance | J: $\pm 5\%$, F: $\pm 1\%$ Zero ohm Jumper < 50m Ω | IEC 60115-1 / JIS C 5201-1 , Clause 4.5 Measure the resistance value. |
| Short time Overload | J: $\Delta R \leq \pm (2\% + 0.1 \Omega)$ F: $\Delta R \leq \pm (1\% + 0.05 \Omega)$ | IEC 60115-1 / JIS C 5201-1 , Clause 4.13 2.5×Rated voltage or Max. Overload Voltage for 5 sec. measure resistance after 30 minutes |
| Solderability | Over 95% of termination must be covered with solder | IEC 60115-1 / JIS C 5201-1 , Clause 4.17 After immersing flux, dip in the 235±2°C molten solder bath for 2±0.5 sec. |
| Resistance to Solder Heat | J: $\Delta R \leq \pm (1\% + 0.1 \Omega)$ F: $\Delta R \leq \pm (0.5\% + 0.05 \Omega)$ No mechanical damage | IEC 60115-1 / JIS C 5201-1 , Clause 4.18 With 260±5°C for 10±1 sec. |
| Temperature Coefficient of Resistance(TCR) | Size: 0402*2,0402*4 ± 300 ppm/°C Size:0603*2, 0603*4, 10P8R, 16P8R ± 200 ppm/°C | IEC 60115-1 / JIS C 5201-1 , Clause 4.8 Test temperature : 25°C (T1) → -55°C (T2) 25°C (T1) → +155°C (T2) $TCR (ppm/^\circ C) = \frac{R2-R1}{R1} \times \frac{1}{T2-T1} \times 10^6$ T1: 25°C T2: Test temperature R1: Resistance at reference temperature (T1) R2: Resistance at test temperature (T2) |
| Load Life Humidity | J: $\Delta R \leq \pm (3\% + 0.1 \Omega)$ F: $\Delta R \leq \pm (1\% + 0.05 \Omega)$ | IEC 60115-1 / JIS C 5201-1 , Clause 4.24 Maintain the temperature of the resistor at 40±2°C and 90~95% R.H. with the rated voltage applied. Cycle ON for 1.5 hours and OFF for 0.5 hour for 1000+480 hours. After 1~4 hour, measure the resistance value. |
| Load Life | J: $\Delta R \leq \pm (3\% + 0.1 \Omega)$ F: $\Delta R \leq \pm (1\% + 0.05 \Omega)$ | IEC 60115-1 / JIS C 5201-1 , Clause 4.25 Permanent resistance change after 1000+48/-0 hours (1.5 hours ON , 0.5 hour OFF) at RCWV or Max. Keep the resistor at 70±2°C ambient |
| Temperature Cycle | J: $\Delta R \leq \pm (1\% + 0.1 \Omega)$ F: $\Delta R \leq \pm (0.5\% + 0.05 \Omega)$ No mechanical damage | IEC 60115-1 / JIS C 5201-1 , Clause 4.19 Repeat 5 cycles as follows -55°C (30 min.) + 25°C (2~3 min.) +125°C (30 min.) + 25°C (2~3 min.) for HYC248 -55°C (30 min.) + 25°C (2~3 min.) +155°C (30 min.) + 25°C (2~3 min.) for HYC122,HYC124,HTC124,HYC164,HTC164,HYC158 |
| Insulation Resistance | Between termination and coating must be over 1000M Ω | IEC 60115-1 / JIS C 5201-1 , Clause 4.6 Test voltage: 100±15V |
| Bending Strength | J: $\Delta R \leq \pm (1\% + 0.1 \Omega)$ F: $\Delta R \leq \pm (0.5\% + 0.05 \Omega)$ No mechanical damage | IEC 60115-1 / JIS C 5201-1 , Clause 4.33 Resistance change after bended on the 90mm PCB. Bend: 1mm for HYC248 2mm for HYC122,HYC124,HTC124,HYC164,HTC164,HYC1 |