

MARKING

RESISTANCE CODE

Wherever it is possible, chip resistors are provided with a resistance code.

The resistance code includes the first two or three significant digits of the resistance value (Ω) followed by the number of zeros; see Table 1.

Whether two or three significant values are represented depends on the tolerance:

- $\pm 5\%$ requires two digits (E24 series)
 - For example: 244 = $24 \times 10^4 = 240,000 = 240 \text{ k}\Omega$
- $\pm 1\%$ and lower requires three digits (E24/E96 series)
 - For example: 3160 = $316 \times 10^0 = 316 \Omega$






Table 1 Resistance value indication






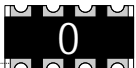






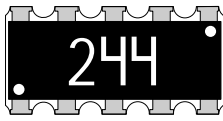



| Indicator | Tol. $\geq 5\%$ | Tol. $\leq 1\%$ |
|------------------|-----------------------|------------------------|
| R ⁽¹⁾ | 0.001 to 9.1 Ω | 0.001 to 97.6 Ω |
| 0 | 10 to 91 Ω | 100 to 976 Ω |
| 1 | 100 to 910 Ω | 1 to 9.76 k Ω |
| 2 | 1 to 9.1 k Ω | 10 to 97.6 k Ω |
| 3 | 10 to 91 k Ω | 100 to 976 k Ω |
| 4 | 100 to 910 k Ω | 1 to 9.76 M Ω |
| 5 | 1 to 9.1 M Ω | 10 to 97.6 M Ω |
| 6 | 10 to 91 M Ω | — |







NOTE

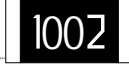


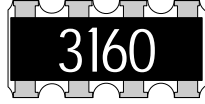


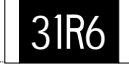





1. R denotes the decimal point.




GENERAL PRINCIPLES AND ILLUSTRATORS OF MARKING CODES

| KINDS | FORMS | PRODUCT TYPES | RESISTANCE RANGE | ILLUSTRATORS & EXAMPLES | | |
|------------|-------|------------------------------------|---|--|----------------------------------|---|
| No marking | — | Sizes 0100/0201/0402 of all series | All |  Fig. 1 No marking | | |
| | | All sizes of TR series | All | | | |
| | | Size 0603 of RL series | R < 100 m Ω except 10/20/30/40/50/60 m Ω | | | |
| | | | | YC102/122 | All |  Fig. 2 No marking |
| | | | | TC122 | All |  Fig. 3 No marking |
| | | | | TC124 | All |  Fig. 4 No marking |
| | | | | ATV321 | All |  Fig. 5 No marking (rectangle for position) |
| | | | | Speciality | Out of standard resistance value | Based on type |

| KINDS | FORMS | PRODUCT TYPES | RESISTANCE RANGE | ILLUSTRATORS & EXAMPLES |
|-----------------|---|--|------------------|---|
| 1-Digit marking | 0 | All sizes of RC/AF/AC series except wide termination | Jumper = 0 Ω |  <p>Fig. 6 Value = 0 Ω</p> |
| | | Size 1218 of RC/AC series | Jumper = 0 Ω |  <p>Fig. 7 Value = 0 Ω</p> |
| | | YC162 YC124/164 YC248 TC164 | Jumper = 0 Ω |     <p>Fig. 8 Value = 0 Ω</p> |
| 3-Digit marking | xxx | Size 0603 to 2512 of RC/RV/AC series | 5% E24: R ≥ 10 Ω |  <p>Fig. 9 240 = 24 × 10⁰ = 24 Ω</p> |
| | | Size 0603 to 1206 of AR/AF/RE series | |  <p>Fig. 10 240 = 24 × 10⁰ = 24 Ω</p> |
| | | Size 0805 to 2512 of SR series except wide termination | 5% E24: R ≥ 10 Ω |       <p>Fig. 11 244 = 24 × 10⁴ = 240 KΩ (dot for position)</p> |
| | | YC162 YC124/164 YC324 YC158 YC358 YC248 | |  <p>Fig. 12 244 = 24 × 10⁴ = 240 KΩ</p> |
| TC164 |  <p>Fig. 12 244 = 24 × 10⁴ = 240 KΩ</p> | | | |

| KINDS | FORMS | PRODUCT TYPES | RESISTANCE RANGE | ILLUSTRATORS & EXAMPLES |
|-------------------------|--|--|---|--|
| 3-Digit marking | XXX with short bar below | Size 0603 of RC/RE series | 1%, 0.5% E24 |  Fig. 13 $240 = 24 \times 10^0 = 24 \Omega$ |
| | | Size 0603 of AR/AF/AC series | 1% E24 | |
| | | Size 0603 of RT/RJ | 1%, 0.5%, 0.25%, 0.1%, 0.05% E24 exception values 10/11/13/15/20/75 of E24 series | |
| | XXX formed with 2 numerals + 1 letter | Size 0603 of RC/RE series | 1%, 0.5% E96 |  Fig. 14 $88A = 806 \times 10^0 = 806 \Omega$ |
| | | Size 0603 of AR/AF/AC series | 1% E96 | |
| | | Size 0603 of RT/RJ | 1%, 0.5%, 0.25%, 0.1%, 0.05% E96 including values 10/11/13/15/20/75 of E24 series | |
| | XRX | Size 0603 to 2512 of RC/AC series Size 0603 to 1206 of AR/AF series Size 0805 to 2512 of SR series except wide termination | 5% E24: $R < 10 \Omega$ |  Fig. 15 $2R2 = 2.2 \Omega$ |
| | | Size 1218 of RC/AC/SR series | 5% E24: $R < 10 \Omega$ |  Fig. 16 $2R2 = 2.2 \Omega$ |
| | RXX | Size 0603 of RL series | 5%, 1%: $R = 10/20/30/40/50/60 \text{ m}\Omega$ 5%, 1% E24: $R \geq 100 \text{ m}\Omega$, reference to Table 3 |  Fig. 17 $R22 = 220 \text{ m}\Omega$ |
| | | Size 0603 of RT series | 5%, 1% E24: $R \geq 100 \text{ m}\Omega$, reference to Table 3 | |
| XmX with top bar | PR series | 1.5 mΩ |  Fig. 18 $1m5 = 0.0015 \Omega = 1.5 \text{ m}\Omega$ | |

| KINDS | FORMS | PRODUCT TYPES | RESISTANCE RANGE | ILLUSTRATORS & EXAMPLES | | |
|-----------------------------------|---|--|--|--|------------------------------|--|
| 4-Digit marking | XXXX | Size 0805 to 2512 of RC/RV/AC series | 1% E24/E96: $R \geq 100 \Omega$ |  Fig. 19 $1002 = 100 \times 10^2 = 10 \text{ K}\Omega$ | | |
| | | Size 0805 to 1206 of AR/AF/RE series except wide termination | | | | |
| | | Size 0805 to 2512 of RT/RJ series | 1%, 0.5%, 0.25%, 0.1% E24/E96: $R \geq 100 \Omega$ |  Fig. 20 $1002 = 100 \times 10^2 = 10 \text{ K}\Omega$ | | |
| | | Size 1218 of RC/AC series | 1% E24/E96: $R \geq 100 \Omega$ | | | |
| | | YC124/164 | 1% E24/E96: $R \geq 100 \Omega$ |    Fig. 21 $3160 = 316 \times 10^0 = 316 \Omega$ | | |
| | | YC248 | | | | |
| | | YC324 | | | | |
| | | TC164 | 1% E24/E96: $R \geq 100 \Omega$ |  Fig. 22 $3160 = 316 \times 10^0 = 316 \Omega$ | | |
| | | | XRXX, XXRX | Size 0805 to 2512 of RC/AC series | 1% E24/E96: $R < 100 \Omega$ |  Fig. 23 $31R6 = 31.6 \Omega$ |
| | | | | Size 0805 to 1206 of AR/AF/RE series except wide termination | | |
| Size 0805 to 2512 of RT/RJ series | 1%, 0.5%, 0.25%, 0.1% E24/E96: $R < 100 \Omega$ | | |  Fig. 24 $31R6 = 31.6 \Omega$ | | |
| Size 1218 of RC/AC series | 1% E24/E96: $R < 100 \Omega$ | | | | | |
| YC124/164 | 1% E24/E96: $R < 100 \Omega$ | | |    Fig. 25 $31R6 = 31.6 \Omega$ | | |
| YC248 | | | | | | |
| YC324 | | | | | | |
| TC164 | 1% E24/E96: $R < 100 \Omega$ |  Fig. 26 $31R6 = 31.6 \Omega$ | | | | |

| KINDS | FORMS | PRODUCT TYPES | RESISTANCE RANGE | ILLUSTRATORS & EXAMPLES |
|-----------------|-------------------|--|---|--|
| 4-Digit marking | RXXX | Size 0805 to 2512 of RL series except wide termination | 5%, 1% E24, reference to Table 4 |  Fig. 27 R020 = 0.02 Ω = 20 mΩ |
| | | All sizes of PF series | 20 mΩ/25 mΩ/50 mΩ | |
| | RXXX with top bar | Size 0805 to 2512 of PT series except wide termination | 5%, 1% E24: R ≥ 100mΩ, reference to Table 4 |  Fig. 28 R220 = 220 mΩ |
| | | Size 1218 of RL series Size 0815 of PT series | 5%, 1% E24, reference to Table 4 |  Fig. 29 R025 = 25 mΩ |
| | | All sizes of PR series All sizes of PF series | 1/2/3/4/5 mΩ 6/7/10 mΩ |  Fig. 30 R001 = 0.001 Ω = 1 mΩ |

NOTE

1. Please contact with local sales force for unavailable resistance

Table 2 EIA-96 marking rule

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

Table 2. shows the first two digits of the three-digit EIA-96 part-marking scheme. The third character is a letter multiplier:

$X = 10^{-1}$, $Y = 10^{-2}$, $A = 10^0$, $B = 10^1$, $C = 10^2$, $D = 10^3$, $E = 10^4$, $F = 10^5$

Table 3 EIA-24 marking rule for size 0603 of RL/PT

| CODE | VALUE (mΩ) |
|------------|--------------------|
| R01 | 10 |
| R02 | 20 |
| No marking | 25 ⁽²⁾ |
| R03 | 30 |
| R04 | 40 ⁽²⁾ |
| R05 | 50 ⁽²⁾ |
| R06 | 60 ⁽²⁾ |
| R10 | 100 |
| R11 | 110 |
| R12 | 120 |
| R13 | 130 |
| R15 | 150 |
| R16 | 160 |
| R18 | 180 |
| R20 | 200 |
| R22 | 220 |
| R24 | 240 |
| R25 | 250 ⁽²⁾ |
| R27 | 270 |
| R30 | 300 |
| R33 | 330 |
| R36 | 360 |
| R39 | 390 |
| R40 | 400 ⁽²⁾ |
| R43 | 430 |
| R47 | 470 |
| R50 | 500 ⁽²⁾ |
| R51 | 510 |
| R56 | 560 |
| R62 | 620 |
| R68 | 680 |
| R75 | 750 |
| R82 | 820 |
| R91 | 910 |

NOTE

1. All above values for E24 series are marked with a 3-digit code (RXX).
2. The partial values of 25/40/50/60/250/400/500 mΩ are belonged to non-E series.
3. Except customer special requirement, values for E96 series are no marking
4. 5% and 1% follow the same marking rules.

Table 4 EIA-24 marking rule for size 0805 to 2512 of RL/PT

| CODE | VALUE (mΩ) | CODE | VALUE (mΩ) |
|------|-------------------|------|--------------------|
| R010 | 10 | R110 | 110 |
| R011 | 11 | R120 | 120 |
| R012 | 12 | R125 | 125 ⁽²⁾ |
| R013 | 13 | R130 | 130 |
| R015 | 15 | R150 | 150 |
| R016 | 16 | R160 | 160 |
| R018 | 18 | R180 | 180 |
| R020 | 20 | R200 | 200 |
| R022 | 22 | R220 | 220 |
| R024 | 24 | R240 | 240 |
| R025 | 25 ⁽²⁾ | R249 | 249 ⁽³⁾ |
| R027 | 27 | R250 | 250 ⁽²⁾ |
| R030 | 30 | R255 | 255 ⁽³⁾ |
| R033 | 33 | R270 | 270 |
| R036 | 36 | R300 | 300 |
| R039 | 39 | R330 | 330 |
| R040 | 40 ⁽²⁾ | R360 | 360 |
| R043 | 43 | R390 | 390 |
| R047 | 47 | R400 | 400 ⁽²⁾ |
| R050 | 50 ⁽²⁾ | R430 | 430 |
| R051 | 51 | R470 | 470 |
| R056 | 56 | R500 | 500 ⁽²⁾ |
| R060 | 60 ⁽²⁾ | R510 | 510 |
| R062 | 62 | R560 | 560 |
| R068 | 68 | R620 | 620 |
| R075 | 75 | R680 | 680 |
| R082 | 82 | R750 | 750 |
| R091 | 91 | R820 | 820 |
| R100 | 100 | R910 | 910 |

NOTE

1. All above values for E24 series are marked with a 4-digit code (RXXX).
2. The partial values of 25/40/50/60/125/250/400/500 mΩ are belonged to non-E series.
3. Except customer special requirement, values for E96 series are no marking.
4. 5% and 1% follow the same marking rules.

REVISION HISTORY

| REVISION | DATE | CHANGE NOTIFICATION | DESCRIPTION |
|-----------|--------------|---------------------|--|
| Version 2 | Jun 01, 2011 | - | - AC/AF/PT/RE series added - Figure for wide termination added - EIA-24 marking rule updated |
| Version 1 | Apr 02, 2008 | - | - Marking kinds added according to range extended. |
| Version 0 | Dec 17, 2004 | - | - Yageo/Phycomp brand new data sheet of "Marking". |