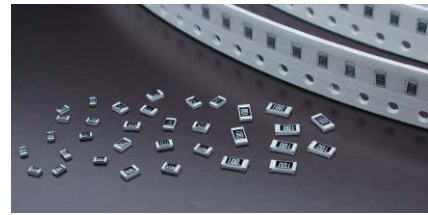


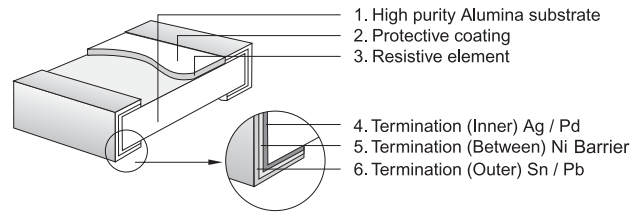
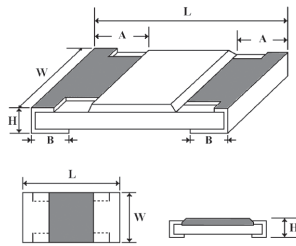
Thick Film Chip Resistors:

Feature

- Small size and light weight
- Reduction of assembly costs and matching with placement machines
- Suitable for both flow & re-flow soldering

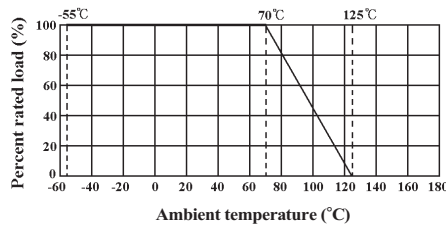


Figures



1. High purity Alumina substrate
2. Protective coating
3. Resistive element
4. Termination (Inner) Ag / Pd
5. Termination (Between) Ni Barrier
6. Termination (Outer) Sn / Pb

Derating Curve & Specification



Type	Max. working Voltage	Max. Overload Voltage	Dielectric withstanding Voltage	Operating Temperature
0402	25V	50V	500V	-55~+125°C
0603	50V	100V		
0805	150V	300V		
1206	200V	400V		
1210	200V	400V		
2010	200V	400V		
2512	200V	400V		

TYPE	0402	0603	0805	1206	1210	2010	2512
Power Rating at 70°C	1/16W	1/16W (1/10W-S)	1/10W (1/8W-S)	1/8W (1/4W-S)	1/4W (1/3W-S)	1/2W (3/4W-S)	1W
L (mm)	1.00 ± 0.10	1.60 ± 0.10	2.00 ± 0.15	3.10 ± 0.15	3.10 ± 0.10	5.00 ± 0.10	6.35 ± 0.10
W (mm)	0.50 ± 0.05	0.80 +0.15 -0.10	1.25 +0.15 -0.10	1.55 +0.15 -0.10	2.60 +0.15 -0.10	2.50 +0.15 -0.10	3.20 +0.15 -0.10
H (mm)	0.35 ± 0.05	0.45 ± 0.10	0.55 ± 0.10	0.55 ± 0.10	0.55 ± 0.10	0.55 ± 0.10	0.55 ± 0.10
A (mm)	0.20 ± 0.10	0.30 ± 0.20	0.40 ± 0.20	0.45 ± 0.20	0.50 ± 0.25	0.60 ± 0.25	0.60 ± 0.25
B (mm)	0.25 ± 0.10	0.30 ± 0.20	0.40 ± 0.20	0.45 ± 0.20	0.50 ± 0.20	0.50 ± 0.20	0.50 ± 0.20
Operating Temperature	-55~+125°C	-55~+125°C	-55~+125°C	-55~+125°C	-55~+125°C	-55~+125°C	-55~+125°C
Resistance Value of Jumper	<50mΩ	<50mΩ	<50mΩ	<50mΩ	<50mΩ	<50mΩ	<50mΩ
Resistance Range of 1% (E-96)	100Ω ~ 1MΩ	10Ω ~ 1MΩ	10Ω ~ 1MΩ	10Ω ~ 1MΩ	10Ω ~ 1MΩ	10Ω ~ 1MΩ	10Ω ~ 1MΩ
Resistance Range of 2% (E-24)	100Ω ~ 1MΩ	10Ω ~ 1MΩ	10Ω ~ 1MΩ	10Ω ~ 1MΩ	10Ω ~ 1MΩ	10Ω ~ 1MΩ	10Ω ~ 1MΩ
Resistance Range of 5% (E-24)	100Ω ~ 1MΩ	1Ω ~ 10MΩ	1Ω ~ 10MΩ	1Ω ~ 10MΩ	1Ω ~ 10MΩ	1Ω ~ 10MΩ	1Ω ~ 10MΩ

Marking on the Resistors Body:

- For 0402 size, no marking on the body due to the small size of the resistor.
- $\pm 5\%$ tolerance product. The marking is 3 digits, the first 2 digits are the significant figures of the resistance and the 3rd digit denotes number of zeros following:

$$153 = 15000\Omega = 15K\Omega; 120 = 12\Omega$$

153

$$\text{Below } 10\Omega \text{ shown as this: } 6R8 = 6.8\Omega$$

6R8

- $\pm 1\%$ tolerance of 0805,1206 sizes. The marking is 4 digits, the first 3 digits are the significant figures of the Resistance and the 4th digit denotes number of zeros following:

$$2372 = 23700\Omega = 23.7K\Omega; 1430 = 143\Omega$$

2372

$$\text{Below } 10\Omega \text{ shown as this: } 3R24 = 3.24\Omega$$

3R24

- Standard E-96 series values ($\pm 1\%$ tolerance) of 0603 size. Due to the small size of the resistor's body, 3 digits marking will be used to indicate the accurate resistance value by using the following Multiplier & Resistance Code.

Multiplier Code (for 0603 1% marking)

Code	A	B	C	D	E	F	G	H	X	Y	Z
Multiplier	10^0	10^1	10^2	10^3	10^4	10^5	10^6	10^7	10^{-1}	10^{-2}	10^{-3}

Standard E-96 Series Resistance Value Code (for 0603 1% marking)

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

So the resistance value are marked as the following examples:

$$1.96K\Omega = 196 \times 10^1 \Omega = 29B$$

29B

$$12.4\Omega = 124 \times 10^{-1} = 10X$$

10 X

- Standard E-24 and not belong to E-96 series values (in $\pm 1\%$ tolerance) of 0603 size. The marking is the same as 5% tolerance but marking as underline.

$$\underline{122} = 1200 = 1.2 K\Omega$$

122

$$\underline{680} = 68\Omega$$

680

Thick Film Chip Resistors:

Performance Specifications

Temperature coefficient	±5%: $1\Omega\sim 10\Omega \leq \pm 400\text{PPM}/^\circ\text{C}$; $11\Omega\sim 10\text{M}\Omega \leq \pm 200\text{PPM}/^\circ\text{C}$ ±1%: $10\Omega\sim 100\Omega \leq \pm 200\text{PPM}/^\circ\text{C}$; $101\Omega\sim 1\text{M}\Omega \leq \pm 100\text{PPM}/^\circ\text{C}$
Short-time overload	±5%: $\pm(2.0\% + 0.1\Omega)$ Max. ±1%: $\pm(1.0\% + 0.1\Omega)$ Max.
Insulation resistance	$\geq 1,000$ Mega Ohm
Dielectric withstanding voltage	No evidence of flashover, mechanical damage, arcing or insulation breakdown.
Terminal bending	$\pm(1.0\% + 0.05\Omega)$ Max.
Soldering heat	Resistance change rate is $\pm(1.0\% + 0.05\Omega)$ Max.
Solderability	Min. 95% coverage.
Temperature cycling	±5%: $\pm(1.0\% + 0.05\Omega)$ Max. ±1%: $\pm(0.5\% + 0.05\Omega)$ Max.
Humidity (Steady State)	±5%: $\pm(3.0\% + 0.1\Omega)$ Max. ±1%: $\pm(0.5\% + 0.1\Omega)$ Max.
Load life in humidity	±5%: $\pm(3.0\% + 0.1\Omega)$ Max. ±1%: $\pm(1.0\% + 0.1\Omega)$ Max.
Load life	±5%: $\pm(3.0\% + 0.1\Omega)$ Max. ±1%: $\pm(1.0\% + 0.1\Omega)$ Max.

•The values which are not of standard E-24 series (2% & 5%) and not of E-96 series (1%) could be offered on a case to case basis.

Ordering Procedure (Example: 1206 1/4W-S 5% 1.2 Ω T/R-5000)

Product Type:

Fill-in 4 digits with the Chip resistor type as follow:
0402, 0603, 0805, 1206,
1210, 2010, 2512, 08P4,
10P8, 16P8

Wattage:

Fill-in 2 digits with the codes as follow:

Normal size: WG=1/16W, WA=1/10W, W8=1/8W, WH=1/32W

Small size: SA=1/10W-S, S8=1/8W-S, S4=1/4W-S, S3=1/3W-S, 07=3/4W-S

Tolerance: F = $\pm 1\%$, G = $\pm 2\%$, J = $\pm 5\%$

Resistance Value:

E-24 series:

the 1st digit is "0", the 2nd & 3rd digits are for the significant figures of the resistance and the 4th indicate the numbers of zeros following;

E-96 series:

the 1st to 3rd digits are for the significant figures of the resistance and the 4th digit indicate the numbers of zeros following

Packing Type:

T = T/R packing, B = Bulk in Poly-bag, C = Bulk in cassette

Packing Quantity:

1=1,000pcs, 2=2,000pcs, 3=3,000pcs, 4=4,000pcs,
5=5,000pcs, C=10,000pcs, D=20,000pcs

Special Feature: 0 = NIL

1 2 0 6 S 4 J 0 1 2 J T 5 0