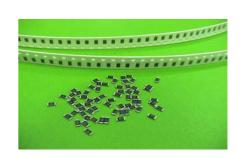


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THICK FILM CHIP RESISTORS

Features

- Small size and lightweight
- Suitable for both flow and reflow soldering
- Reduction of assembly costs and matching with placement machines



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

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

Resistor Type:

Chip Resistor types as follows: 0402, 0603, 0805, 1206, 1210, 2010, 2512, 2D02, 4D02, 4D03, 10P8, 16P8

Wattage:

Normal size: WH=1/32W, WG=1/16W, WA=1/10W, W8=1/8W, W4=1/4W, W2=1/2W,

1W=1W

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

S3=1/3W-S, 07=3/4W-S

Tolerance:

 $F = \pm 1\%$, $G = \pm 2\%$, $J = \pm 5\%$ 0 = Jumper

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 numbering of the zeros.
- E-96 series: the 1st to 3rd digits are for the significant figures of the resistance and the 4th digit indicate the number of zeros.
 "J" ~ 0.1, "K" ~ 0.01, "L" ~ 0.001
 Ex. 012J ~ 1Ω2, 226K ~ 2Ω26
- Jumper: use "0"

Packing Type:

T =Tape / Reel
B =Bulk in Poly-bag
C =Bulk in Cassette

Packing Qty:

1 = 1,000 pcs, 4 = 4,000 pcs, 5 = 5,000 pcs, :: 9 = 9,000 pcs,

A = 500 pcs, B = 2,500 pcs, C = 10,000 pcs, D = 20,000 pcs

* More explanation on part no, please see details on pages 79-80.

Note:

Special resistance value or tolerance or T.C.R. requirement available on a case-to-case basis. Please indicate when ordering.

Special Feature:

0 = NIL

E = Lead (Pb) Free Plating Type / RoHS Compliant

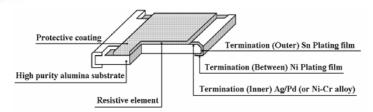




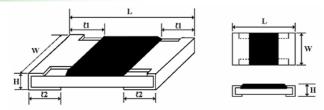


THICK FILM CHIP RESISTORS

Construction

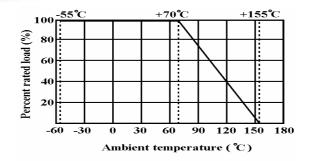


Power Rating & Dimension



Туре	Power Rating at 70°C	Max. Working Voltage	Max. Overload Voltage	Operating Temp. (°C)	Tolerance %	Resistance	Standard	Dimension (mm)				
						Range	Series	L	w	Н	£ 1	£ 2
0402	1/16W	1A	2A	-55~+155	Jumper	<50 m Ω	г«	1.00±0.10	0.50±0.05	0.35±0.05	0.20±0.10	0.25±0.10
		50V	100V		±1 ±2 ±5	10 Ω -1M Ω 1 Ω -10M Ω 1 Ω -10M Ω	E-96 E-24 E-24					
	440040	4.0		-55~+155	Jumper	< 50 m Ω			+0.15 0.80 -0.10	0.45±0.10	0.30±0.20	0.30±0.20
0603	1/10W-S	1A	2A		±1 +2	10 Ω -1M Ω 1 Ω -10M Ω	E-96 E-24	24 1.0020.10				
	1/16VV	50V	100V		±5	1 Ω -10M Ω	E-24					
	1/8W-S 1/10W	2A	4A	-55~+155	Jumper	< 50 m Ω			+0.15 1.25 -0.10 0.55±0.10			
0805		150V	150V 300V		±1 ±2	10 Ω -1M Ω 1 Ω -10M Ω	E-96 E-24			0.40±0.20	0.40±0.20	
		150 V	3007		±5	1 Ω -10Μ Ω	E-24					
1206	1/4W-S 1/8W	2A	4A	-55~+155	Jumper	<50 m Ω	E-96 E-24	3.10±0.15	+0.15 1.55 -0.10	0.55±0.10	0.45±0.20	0.45±0.20
1200		2001 / 4001 /	400) /		±1 ±2	10 Ω -1M Ω 1 Ω -10M Ω						
		2007	200V 400V		±5	1 Ω -10M Ω	E-24					
	1/3W-S 1/4W	2A	4A	-55~+155	Jumper	< 50 m Ω	E-96 E-24 E-24	3.10±0.10	260±0.15	0.55±0.10	0.50±0.25	0.50±0.20
1210		200V 40	400V		±1 ±2	10 Ω -1M Ω 1 Ω -10M Ω						
		200V	2007 4007		±5	1Ω-10MΩ						
	3/4W-S 1/2W	2A	4A		Jumper	< 50 m Ω						
2010		0001 / 4001 /	-55~+155	±1	10 Ω -1Μ Ω	E-96	5.00±0.10	2.50±0.15	0.55±0.10	0.60±0.25	0.50±0.20	
		200V	400V		±2 ±5	1 Ω -10M Ω 1 Ω -10M Ω	E-24 E-24					
	1W	2.5A	5A		Jumper	< 50 m Ω	E-96 E-24 E-24	6.35±0.10	320±0.15	0.55±0.10	0.60±0.25	0.50±0.20
2512		V 200V		-55~+155	±1 ±2	10Ω-1M Ω 1Ω-10M Ω						
			/ 400V		±5	1Ω-10M Ω 1Ω-10M Ω						

Derating Curve





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THICK FILM CHIP RESISTORS

Multiplier Code (for 0603 1% marking)

Code	Α	В	С	D	E	F	G	Н	Х	Υ	Z
Multiplier	10º	10¹	10 ²	10 ³	10⁴	10 ⁵	10 ⁶	10 ⁷	10 ⁻¹	10 ⁻²	10 ⁻³

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

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

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. (Including resistance values less than 1Ω ; both 1% and 5%) The marking is 3 digits, the first 2 digits are the significant figures of the resistance and the 3^{rd} digit denotes number of zeros.

153 = 15000Ω = 15
$$KΩ$$
; **120** = 12 $Ω$

Below
$$10\Omega$$
 shown as this: **6R8** = 6.8Ω

153

• 1% tolerance marking of case size 0805 and bigger is 4 digits, the first 3 digits are the significant figures of the resistance and the 4th digit denotes number of zeros.

2372 = 23700Ω = 23.7KΩ; **1430** = 143Ω

Below 10Ω shown as this: **3R24** = 3.24Ω

2372

3R24





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THICK FILM CHIP RESISTORS

• Standard E-96 series values (±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 Multiplier code & Standard E-96 Series Resistance Value Code as shown on Page 6.

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

29B

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

10X

Standard E-24 series values which does not belong to E-96 series values (±1% tolerance) of 0603 size.
 The marking is the same as 5% tolerance but mark with underline.

$$122 = 1200 = 1.2K\Omega$$

<u>122</u>

 $680 = 68\Omega$



Performance Specifications

Temperature coefficient $\pm 5\%$: $1\Omega \sim 10M\Omega \le \pm 200PPM/^{\circ}C$

 $\pm 1\%$: 10Ω ~ 100Ω ≤ ± 200 PPM/°C: 101Ω ~ 1MΩ ≤ ± 100 PPM/°C

Short-time overload $\pm 5\%$: $\pm (2.0\% + 0.1\Omega)$ Max.

±1%: ±(1.0% + 0.1Ω) Max.

Insulation resistance Min. 1,000 Mega Ohm

> Terminal bending $\pm (1.0\% + 0.05\Omega)$ Max. Soldering heat $\pm (1.0\% + 0.05\Omega)$ Max.

> > Solderability Min. 95% coverage

Temperature cycling $\pm 5\%$: $\pm (1.0\% + 0.05\Omega)$ Max.

 $\pm 1\%$: $\pm (0.5\% + 0.05Ω)$ Max.

Humidity (Steady state) $\pm 5\%$: $\pm (3.0\% + 0.1\Omega)$ Max.

 $\pm 1\%$: $\pm (0.5\% + 0.1\Omega)$ Max.

Load life in humidity $\pm 5\%$: $\pm (3.0\% + 0.1\Omega)$ Max.

 $\pm 1\%$: $\pm (1.0\% + 0.1\Omega)$ Max.

Load life $\pm 5\%$: $\pm (3.0\% + 0.1\Omega)$ Max.

 $\pm 1\%$: $\pm (1.0\% + 0.1\Omega)$ Max.

* More details, please see pages 77-78.

^{*} 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.