ROYAL OHM

Chip Resistor

Features

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

Application

- Automotive industry (indicators)
- Medical and military equipment, Radio and tape recorders
- Telecommunication equipment, TV tuners and video cameras
- Computers, Pocket Calculators

Explanation of Part Number and Ordering Procedure:

1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	2	0	6	S	4	J	0	1	2	J	T	5	0

Product Type

Fill in these 4 digits with the Chip Resistor types as follows:

0402
0603
0805
1206
1210
2010
2512
08P4
10P8
16P8

Wattage

Fill in these 2 digits with the Codes as follows:

Normal size
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
Special:
WH=1/32W

Resistance Value

1. 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 following;
2. 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.

Tolerance

F=±1%
G=±2%
J=±5%

Packaging Type

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

Packing Qty.

1 ~ 1,000 pcs
: :
9 ~ 9,000 pcs
A ~ 10,000 pcs
B ~ 20,000 pcs

Special Feature

0 = NIL

Note: 1. Special resistance tolerance requirement available on a case-to-case basis. Please indicate when ordering.

2. Special T.C.R. requirements can be supplied on a case-to-case basis. Please indicate when ordering.

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

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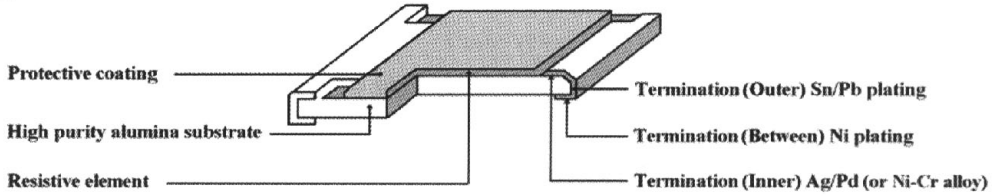
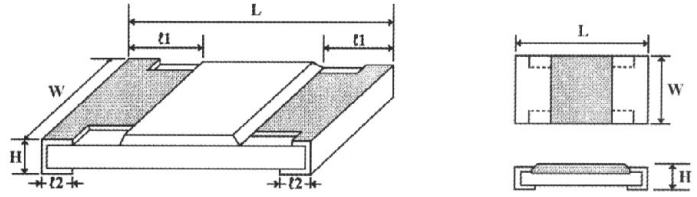
Chip Resistor

Construction



Power Rating and Dimension



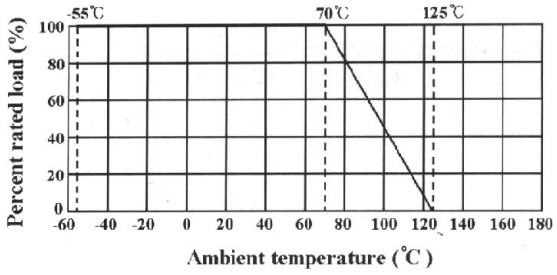
Type	Power Rating at 70℃	Max. Working Voltage	Max. Overload Voltage	Operating Temp. (℃)	Tolerance %	Resistance Range	Standard Series	Dimension (mm)				
								L	W	H	ℓ1	ℓ2
0402	1/16W	25V	50V	-55~+125	Jumper ±1 ±2 ±5	<50 mΩ 100Ω-1MΩ 2Ω-3.3MΩ 2Ω-3.3MΩ	E-96 E-24 E-24	1.00±0.10	0.50±0.05	0.35±0.05	0.20±0.10	0.25±0.10
0603	1/10W (1/16W)	50V	100V	-55~+125	Jumper ±1 ±2 ±5	<50 mΩ 10Ω-1MΩ 10Ω-1MΩ 1Ω-10MΩ	E-96 E-24 E-24	1.60±0.10	0.80 +0.15 -0.10	0.45±0.10	0.30±0.20	0.30±0.20
0805	1/8W (1/10W)	150V	300V	-55~+125	Jumper ±1 ±2 ±5	<50 mΩ 10Ω-1MΩ 10Ω-1MΩ 1Ω-10MΩ	E-96 E-24 E-24	2.00±0.15	1.25 +0.15 -0.10	0.55±0.10	0.40±0.20	0.40±0.20
1206	1/4W (1/8W)	200V	400V	-55~+125	Jumper ±1 ±2 ±5	<50 mΩ 10Ω-1MΩ 10Ω-1MΩ 1Ω-10MΩ	E-96 E-24 E-24	3.10±0.15	1.55 +0.15 -0.10	0.55±0.10	0.45±0.20	0.45±0.20
1210	1/3W (1/4W)	200V	400V	-55~+125	Jumper ±1 ±2 ±5	<50 mΩ 10Ω-1MΩ 1Ω-10MΩ 1Ω-10MΩ	E-96 E-24 E-24	3.10±0.10	2.60±0.15	0.55±0.10	0.50±0.25	0.50±0.20
2010	3/4W (1/2W)	200V	400V	-55~+125	Jumper ±1 ±2 ±5	<50 mΩ 10Ω-1MΩ 1Ω-10MΩ 1Ω-10MΩ	E-96 E-24 E-24	5.00±0.10	2.50±0.15	0.55±0.10	0.60±0.25	0.50±0.20
2512	1W	200V	400V	-55~+125	Jumper ±1 ±2 ±5	<50 mΩ 10Ω-1MΩ 1Ω-10MΩ 1Ω-10MΩ	E-96 E-24 E-24	6.35±0.10	3.20±0.15	0.55±0.10	0.60±0.25	0.50±0.20

Performance Specifications

Characteristics	Test Methods	Limits
Temperature coefficient JIS - C - 5202 5.2	Natural resistance change per temp. degree centigrade $\frac{R_2 - R_1}{R_1(t_2-t_1)} \times 10^6$ (PPM / ℃) R_1 : Resistance value at room temperature (t_1) R_2 : Resistance value at room temp. plus 100℃ (t_2)	± 5% 1Ω --- 10Ω ≤ ± 400PPM/℃ 11Ω --- 10MΩ ≤ ± 200PPM/℃ ± 1% 10Ω --- 100Ω ≤ ± 200PPM/℃ 101Ω --- 1MΩ ≤ ± 100PPM/℃
Short - time overload JIS - C - 5202 5.5	Permanent resistance change after the application of a potential of 2.5 times RCWV for 5 seconds.	± 5% Tolerance ±(2.0% + 0.1Ω) ± 1% Tolerance ±(1.0% + 0.1Ω)
Insulation resistance JIS - C - 5202 5.6	Apply 500V DC between protective coating and termination for 1 min, then measure.	1,000 Mega ohm or more
Dielectric withstanding voltage JIS - C - 5202 5.7	Apply 500V AC between protective coating and termination for 1 minute.	No evidence of flashover mechanical damage, arcing or insulation break down
Terminal bending JIS - C - 5202 6.1.4	Twist of Test Board: Y / X = 5 / 90mm for 10 seconds.	± (1.0% + 0.05Ω)
Soldering Heat JIS - C - 5202 6.4	Dip the resistor into a solder bath having a temperature of 260℃± 5℃ and hold it for 10 ± 1 seconds.	Resistance change rate is ± (1.0%+0.05Ω)
Solderability JIS - C - 5202 6.5	Test temperature of solder 235℃ ± 5℃. Dipping them in solder: 3 ± 0.5 seconds.	95% coverage Min.
Temperature cycling JIS - C - 5202 7.4	Resistance change after continuous five cycles for duty cycle specified below:	±5% Tolerance ± (1.0% + 0.05Ω) ±1% Tolerance ± (0.5% + 0.05Ω)
	Step 1: Temperature −55℃ ± 3℃, Time 30 mins. Step 2: Room temp., Time 10 - 15 mins. Step 3: +125℃ ± 2℃, Time 30 mins. Step 4: Room temp., Time 10 - 15 mins.	
Load life in humidity JIS - C - 5202 7.9	Resistance change after 1,000 hours (1.5 hours "on", 0.5 hour "off") at RCWV in a humidity chamber controlled at 40℃ ± 2℃ and 90 to 95% relative humidity.	±5% Tolerance ± (3.0% + 0.1Ω) ±1% Tolerance ± (1.0% + 0.1Ω)
Load Life JIS - C - 5202 7.10	Permanent resistance change after 1,000 hours operating at RCWV, with duty cycle (1.5 hours "on", 0.5 hour "off") at 70℃ ± 2℃ ambient	±5% Tolerance ± (3.0% + 0.1Ω) ±1% Tolerance ± (1.0% + 0.1Ω)

*RCWV = Rated Continuous Working Voltage = $\sqrt{\text{Rated Power} \times \text{Resistance Value}}$

Derating Curve



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Chip Resistor

RMC 0603 E - 96 Multiplier Code

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}

Coding Formula

XX X

Multiplier Code

Resistance Code

Example: $10.2K\Omega = 102 \times 10^{2}\Omega = 02C$

02 C

$33.2\Omega = 332 \times 10^{-1}\Omega$

51 X

Standard E - 96 Values and 0603 Resistance Code

Ω Value	Code	Ω Value	Code	Ω Value	Code	Ω Value	Code	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		