

ROYALOHM

C O N F I D E N T I A L D O C U M E N T

SPECIFICATION FOR APPROVAL

MOUSER

Description : Thick Film Chip Resistors KIT (Terminal Lead Free)

Royalohm Part no.:

0402WGFxxxxKIT	(RMC (0402)	1/16W	+/- 1% KIT Series)
0603WAFxxxxKIT	(RMC (0603)	1/10W	+/- 1% KIT Series)
0805W8FxxxxKIT	(RMC (0805)	1/8W	+/- 1% KIT Series)
1206W4FxxxxKIT	(RMC (1206)	1/4W	+/- 1% KIT Series)
25121WFxxxxKIT	(RMC (2512)	1W	+/- 1% KIT Series)

Approved by

RoHS V3 Compliant (EU) 2015/863
REACH Compliant

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Issue Date: 2024/01/16

Thick Film Chip Resistors KIT (Terminal Lead Free)

1. Scope:

This specification for approval relates to Thick Film Chip Resistors KIT (Terminal Lead Free) manufactured by ROYALOHM 's specifications.

2. Type designation:

The type designation shall be in the following form:

Type	Power Rating	Resistance tolerance	Nominal Resistance
Ex. RMC (0603)	1/10W	F	10Ω

3. Ratings:

Type	0402	0603	0805	1206	2512
Power Rating	1/16W	1/10W	1/8W	1/4W	1W
Max. Working Current for Jumper	1 A	1 A	2 A	2 A	2 A
Max. Overload Current for Jumper	2 A	2 A	5 A	10 A	10 A
Max. Working Voltage	50 V	75 V	150 V	200 V	200 V
Max. Overload Voltage	100 V	150 V	300 V	400 V	500 V
Dielectric Withstanding Voltage	100 V	300 V	500 V	500 V	500 V
Temperature Range	-55°C ~ +155°C				
Ambient Temperature	70 °C				

3.1 Nominal Resistance

Effective figures of nominal resistance shall be in accordance :

E-24 values – these are preferred and will have standard MOQ

E-96 values – are available on case by case basis and availability and MOQ need to be confirmed with factory first

3.2 Voltage rating:

Resistors shall have a rated direct-current (DC) continuous working voltage or an approximate sine-wave root-mean-square (RMS) alternating-current (AC) continuous working voltage at commercial-line frequency and waveform corresponding to the power rating , as determined from the following formula :

$$RCWV = \sqrt{P \times R}$$

Note : Max. Working Voltage or $\sqrt{P \times R}$ whichever is lesser

Max. Overload Voltage or $2.5 \sqrt{P \times R}$ whichever is lesser

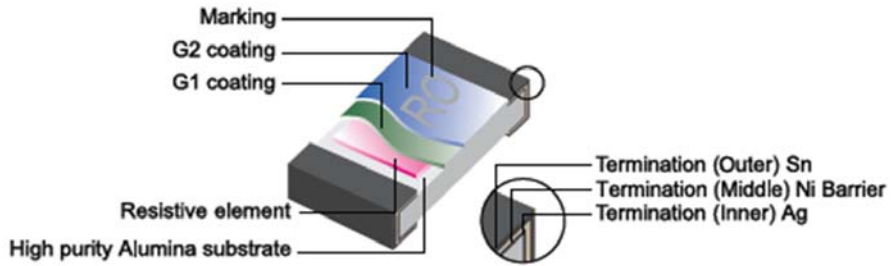
Where : RCWV = Rated DC or RMS AC continuous working voltage at commercial-line frequency and waveform (volt)

P = Power Rating (watt)

R = Nominal Resistance (ohm)

Thick Film Chip Resistors KIT (Terminal Lead Free)

4. Construction :

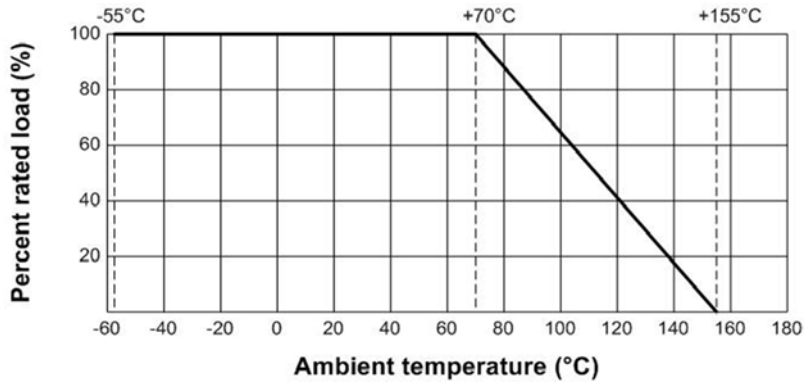


5. Power rating and dimensions

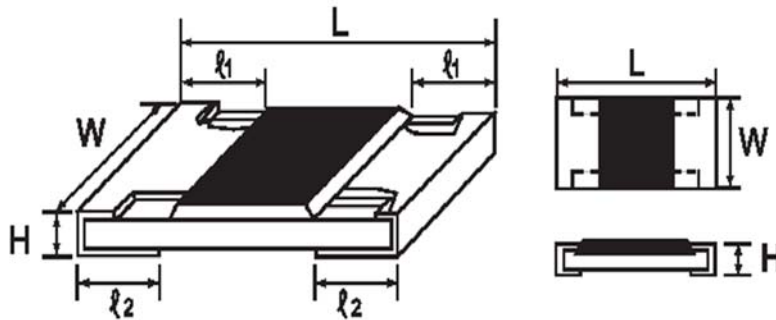
5.1 Power rating:

Resistors shall have a power rating based on continuous load operation at an ambient temperature of 70 °C . For temperature in excess of 70 °C , The load shall be derate as shown in figure 1.

Figure 1



5.2 Dimension :



Type	Dimension (mm)				
	L	W	H	ℓ1	ℓ2
RMC (0402)	1.00 ± 0.10	0.50 ± 0.05	0.35 ± 0.05	0.20 ± 0.10	0.25 ± 0.10
RMC (0603)	1.60 ± 0.10	0.80 ± 0.10	0.45 ± 0.10	0.30 ± 0.20	0.30 ± 0.20
RMC (0805)	2.00 ± 0.15	1.25 + 0.15 - 0.10	0.55 ± 0.10	0.40 ± 0.20	0.40 ± 0.20
RMC (1206)	3.10 ± 0.15	1.55 + 0.15 - 0.10	0.55 ± 0.10	0.45 ± 0.20	0.45 ± 0.20
RMC (2512)	6.35 ± 0.10	3.20 ± 0.20	0.55 ± 0.10	0.60 ± 0.25	0.50 ± 0.20

Thick Film Chip Resistors KIT (Terminal Lead Free)

5.3 Power Rating :

Type	Power Rating at 70 °C	Tolerance %	Resistance Range	TCR PPM/°C	Standard Series
RMC (0402)	1/16W	Jumper	<30mΩ		
		±1	10Ω~1MΩ	10Ω : ±200 > 10Ω : ±100	E-6, E-12 E-24, E-96
RMC (0603)	1/10W	Jumper	<30mΩ		
		±1	10Ω~1MΩ	10Ω : ±200 > 10Ω : ±100	E-6, E-12 E-24, E-96
RMC (0805)	1/8W	Jumper	<30mΩ		
		±1	10Ω~1MΩ	10Ω : ±200 > 10Ω : ±100	E-6, E-12 E-24, E-96
RMC (1206)	1/4W	Jumper	<30mΩ		
		±1	10Ω~1MΩ	10Ω : ±200 > 10Ω : ±100	E-6, E-12 E-24, E-96
RMC (2512)	1W	Jumper	<30mΩ		
		±1	10Ω~1MΩ	10Ω : ±200 > 10Ω : ±100	E-6, E-12 E-24, E-96

Thick Film Chip Resistors KIT (Terminal Lead Free)

6. Marking

6.1 Resistors

A. Chip Resistors type 0402 No marking

B. ± 1% Tolerance 0603 E-96 series use below decoding method:

Mutiplier Code :

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

Coding

Formula

Example :

$$10.2K\Omega = 102 \overset{2}{X} 10 \Omega = 02C$$

$$33.2\Omega = 332 \overset{-1}{X} 10 \Omega = 51X$$

XX

X

Resistance Code

Multiplier 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 for 0603 E-24, E-96 series, the resistance value that no have multiplier code indicate marking follow this:

The first two digits are significant figures of resistance and the third one denoted number of zeros and under line the marking letters.

Ex.

	<u>122</u>	
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1.2KΩ

Thick Film Chip Resistors KIT (Terminal Lead Free)

C. For E-96 series [$\pm 1\%$] in 0603 size 3 digit system (due to space restrictions)
please refer to page 4 for coding formula

Ex.

	02C	
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 10.2K Ω

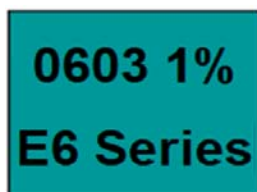
D. $\pm 1\%$ Tolerance 0805, 1206, 2512 : 4 Digits, the first three digits are significant figures of resistance and the fourth digit denoted number of zeros. Letter "R" is for decimal point.

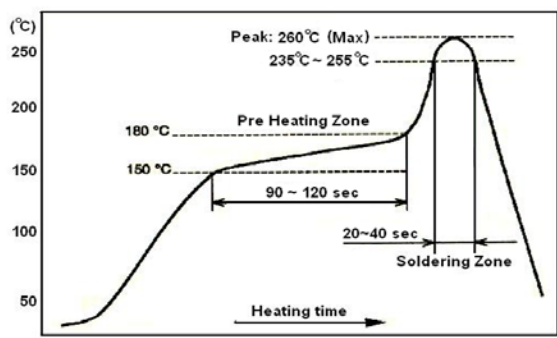
Ex.

	2701	
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 2.7K Ω

6.2 Labels



Thick Film Chip Resistors KIT (Terminal Lead Free)		
7. Performance specification :		
Characteristics	Limits	Test Methods (JIS C 5201-1)
*Insulation Resistance	1,000 MΩ or more	Apply 500V DC between protective coating and termination for 1 min, then measure (Sub-clause 4.6)
*Dielectric Withstanding Voltage	No evidence of flashover mechanical damage, arcing or insulation break down	Apply 100V(0402) 300V(0603) & 500V (0805,1206,1210,2010, 2512) AC between protective coating and termination for 1 minute (Sub-clause 4.7)
Temperature Coefficient	Refer to item 5.3	Natural resistance change per temp. degree centigrade. $\frac{R_2 - R_1}{R_1(t_2 - t_1)} \times 10^6 \text{ (PPM/°C)}$ R1: Resistance value at room temperature (t1) R2: Resistance value at room temp. plus 100 °C (t2) (Sub-clause 4.8)
Short Time Overload	Resistance change rate is ± (1.0% + 0.1Ω) Max.	Permanent resistance change after the application of a potential of 2.5 times RCWV for 5 seconds (Sub-clause 4.13)
*Solderability	95 % coverage Min.	Test temperature of solder : 245 ± 3°C Dipping them solder : 2-3 seconds (Sub-clause 4.17)
Soldering Temperature Reference	Electrical characteristics shall be satisfied. Without distinct deformation in appearance. (95 % coverage Min.)	<p><u>Wave soldering condition:</u> (2 cycles Max.) Pre-heat : 100 ~ 120 °C, 30 ± 5 sec. Suggestion solder temp.: 235 ~ 255 °C, 10 sec. (Max.) Peak temp.: 260 °C</p> <p><u>Reflow soldering condition:</u> (2 cycles Max.) Pre-heat : 150 ~ 180 °C, 90 ~ 120 sec. Suggestion solder temp.: 235 ~ 255 °C, 20 ~ 40 sec. Peak temp.: 260 °C</p>  <p style="text-align: center;">Temperature profile for avaluation</p> <p><u>Hand soldering condition:</u> The soldering iron tip temperature should be less than 300°C and maximum contract time should be 5 sec.</p>

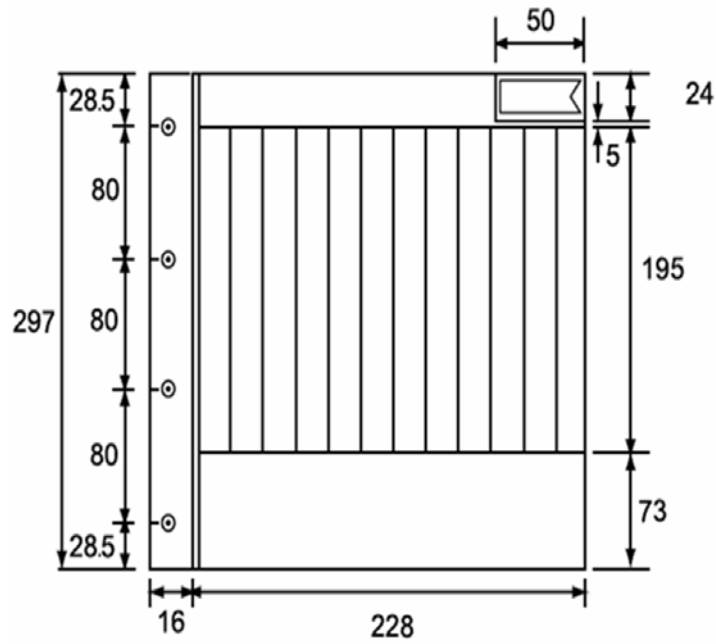
Thick Film Chip Resistors KIT (Terminal Lead Free)																	
7. Performance specification :																	
Characteristics	Limits	Test Methods (JIS C 5201-1)															
Soldering Heat	Resistance change rate is: $\pm (1\%+0.05\Omega)$ Max.	Dip the resistor into a solder bath having a temperature of $260^{\circ}\text{C}\pm 3^{\circ}\text{C}$ and hold it for 10 ± 1 seconds. (Sub-clause 4.18)															
Temperature Cycling	Resistance change rate is $\pm (0.5\% + 0.05\Omega)$ Max.	Resistance change after continuous 100 cycles for duty cycle specified below :															
		<table border="1"> <thead> <tr> <th>Step</th> <th>Temperature</th> <th>Time</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>$-55^{\circ}\text{C} \pm 3^{\circ}\text{C}$</td> <td>30 mins</td> </tr> <tr> <td>2</td> <td>Room temp.</td> <td>10~15 mins</td> </tr> <tr> <td>3</td> <td>$+155^{\circ}\text{C} \pm 2^{\circ}\text{C}$</td> <td>30 mins</td> </tr> <tr> <td>4</td> <td>Room temp.</td> <td>10~15 mins</td> </tr> </tbody> </table>	Step	Temperature	Time	1	$-55^{\circ}\text{C} \pm 3^{\circ}\text{C}$	30 mins	2	Room temp.	10~15 mins	3	$+155^{\circ}\text{C} \pm 2^{\circ}\text{C}$	30 mins	4	Room temp.	10~15 mins
		Step	Temperature	Time													
		1	$-55^{\circ}\text{C} \pm 3^{\circ}\text{C}$	30 mins													
		2	Room temp.	10~15 mins													
3	$+155^{\circ}\text{C} \pm 2^{\circ}\text{C}$	30 mins															
4	Room temp.	10~15 mins															
(Sub-clause 4.19)																	
Load Life in Humidity	Resistance change rate is $\pm (1.0\% + 0.1\Omega)$ Max.	Resistance change after 1,000 hours (1.5 hours "on", 0.5 hour "off") at RCWV in a humidity chamber controlled at $40^{\circ}\text{C} \pm 2^{\circ}\text{C}$ and 90 to 95 % relative humidity (Sub-clause 4.24.2.1)															
Load Life	Resistance change rate is $\pm (1.0\% + 0.1\Omega)$ Max.	Permanent resistance change after 1,000 hours operating at RCWV, with duty cycle of (1.5 hours"on", 0.5 hour"off") at $70^{\circ}\text{C} \pm 2^{\circ}\text{C}$ ambient (Sub-clause 4.25.1)															
Terminal Bending	Resistance change rate is $\pm (1.0\% + 0.05\Omega)$ Max.	Twist of Test Board : Y/X = 5/90 mm for 10 seconds (Sub-clause 4.33)															
The resistors of 0Ω only can do the characteristic noted of *																	

Thick Film Chip Resistors KIT (Terminal Lead Free)

8. Kit resistors :

8.1 Insert for Chip Kit

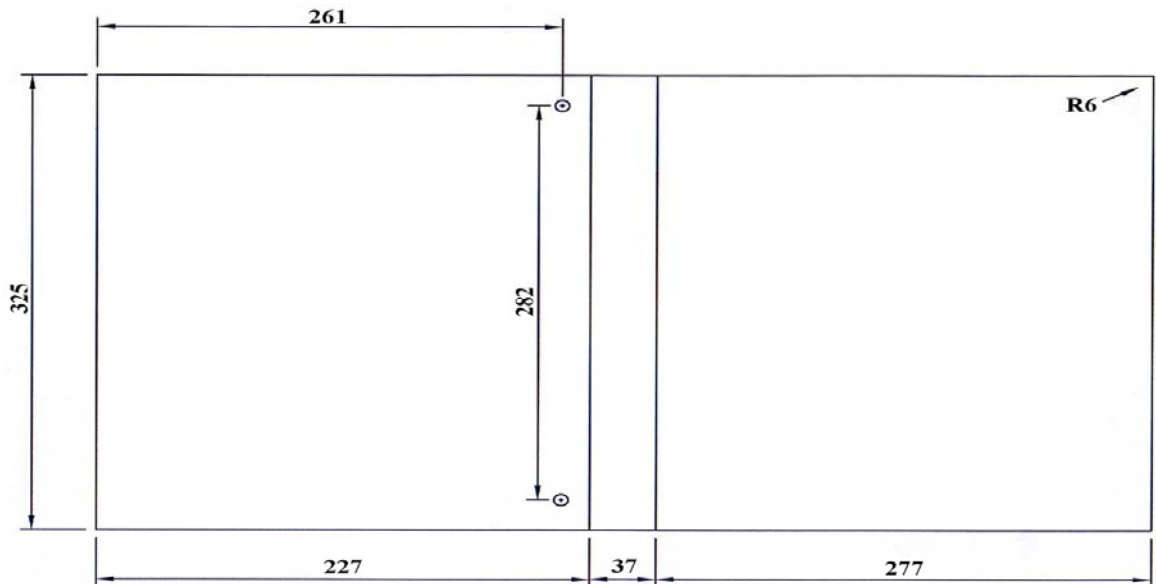
Dimension (mm)



8.2 Album for Chip Kit

* Green Album

Dimension (mm)



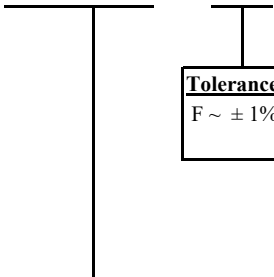
Part Number System

Explanation of Part Number System
Thick Film Chip Resistors KIT (Terminal Lead Free)

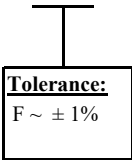
1	2	3	4	5	6	7	8	9	10	11	12	13	14
0	6	0	3	W	A	F	E	0	0	6	K	I	T



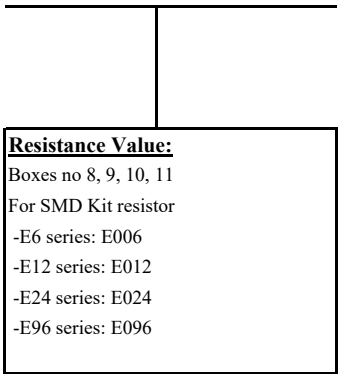
Product Type:
 Fill-in these 4 digits with the Chip resistor types as follows:
 0402
 0603
 0805
 1206
 2512



Wattage:
Normal size:
 WG = 1/16W
 WA = 1/10W
 W8 = 1/8W
 W4 = 1/4W
 1W = 1W



Tolerance:
 F ~ ± 1%



Resistance Value:
 Boxes no 8, 9, 10, 11
 For SMD Kit resistor
 -E6 series: E006
 -E12 series: E012
 -E24 series: E024
 -E96 series: E096



Special Feature:
 Fill-in these 3 digits with the chip resistor types as follows:
 - KIT: Kit resistor (with resistor)
 - KON: Album only (no resistor)
 - KIL: Index Only
 - KIN: Insert Only
 - KIC: Insert and Album, Cover Lid (no resistor)

Sample : RMC 0603 1/10W 1% KIT E-6 Series → 0603WAFE006KIT

Thick Film Chip Resistors KIT (Terminal Lead Free)**Environment Related Substance**

This product complies to EU RoHS directive, EU PAHs directive, EU PFOS directive and Halogen free.

Ozone layer depleting substances.

Ozone depleting substances are not used in our manufacturing process of this product.

This product is not manufactured using Chloro fluorocarbons (CFCs), Hydrochlorofluorocarbons (HCFCs), Hydrobromofluorocarbons (HBFCs) or other ozone depleting substances in any phase of the manufacturing process.

Storage Condition (MSL1)

The performance of these products, including the solderability, is guaranteed for a year from the date of arrival at your company, provided that they remain packed as they were when delivered and stored at a temperature of $25^{\circ}\text{C} \pm 10^{\circ}\text{C}$ and a relative humidity of $60\%\text{RH} \pm 10\%\text{RH}$, chemical and dust free atmosphere

Even within the above guarantee periods, do not store these products in the following conditions.

Otherwise, their electrical performance and/or solderability may be deteriorated, and the packaging materials (e.g. taping materials) may be deformed or deteriorated, resulting in mounting failures.

1. In salty air or in air with a high concentration of corrosive gas, such as Cl_2 , H_2S , NH_3 , SO_2 , or NO_2
2. In direct sunlight

Thick Film Chip Resistors KIT (Terminal Lead Free)**Legal Disclaimer**

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Regardless of the application of ROYALOHM products, it is recommended to carry out safety tests while using measures such as protective circuits and redundant circuits to protect the safety of equipment.

Thick Film Chip Resistors KIT (Terminal Lead Free)

**PRODUCT: Kit (0402) +/-1% (With resistor 1 strip per value)
 (0603, 0805, 1206, 2512) +/-1% (With resistor 2 strip per value)**

E6 Series = 32 values (0R/10R to 1M)

Total Qty: 3,200pcs (100 pcs per value)

NO.	Value
1	0R
2	10R
3	15R
4	22R
5	33R
6	47R
7	68R
8	100R

NO.	Value
9	150R
10	220R
11	330R
12	470R
13	680R
14	1K
15	1K5
16	2K2

NO.	Value
17	3K3
18	4K7
19	6K8
20	10K
21	15K
22	22K
23	33K
24	47K

NO.	Value
25	68K
26	100K
27	150K
28	220K
29	330K
30	470K
31	680K
32	1M

Thick Film Chip Resistors KIT (Terminal Lead Free)

**PRODUCT: Kit (0402) +/-1% (With resistor 1 strip per value)
 (0603, 0805, 1206, 2512) +/-1% (With resistor 2 strip per value)
 E12 Series = 62 values (0R/10R to 1M)
 Total Qty: 6,200pcs (100 pcs per value)**

NO.	Value
1	0R
2	10R
3	12R
4	15R
5	18R
6	22R
7	27R
8	33R
9	39R
10	47R
11	56R
12	68R
13	82R
14	100R
15	120R

NO.	Value
16	150R
17	180R
18	220R
19	270R
20	330R
21	390R
22	470R
23	560R
24	680R
25	820R
26	1K
27	1K2
28	1K5
29	1K8
30	2K2

NO.	Value
31	2K7
32	3K3
33	3K9
34	4K7
35	5K6
36	6K8
37	8K2
38	10K
39	12K
40	15K
41	18K
42	22K
43	27K
44	33K
45	39K

NO.	Value
46	47K
47	56K
48	68K
49	82K
50	100K
51	120K
52	150K
53	180K
54	220K
55	270K
56	330K
57	390K
58	470K
59	560K
60	680K
61	820K
62	1M

Thick Film Chip Resistors KIT (Terminal Lead Free)

**PRODUCT: Kit (0402) +/-1% (With resistor 1 strip per value)
 (0603, 0805, 1206, 2512) +/-1% (With resistor 2 strip per value)
 E24 Series = 121 values (0R/10R to 1M)
 Total Qty: 12,100pcs (100 pcs per value)**

NO.	Value
1	10R
2	11R
3	12R
4	13R
5	15R
6	16R
7	18R
8	20R
9	22R
10	24R
11	27R
12	30R
13	33R
14	36R
15	39R
16	43R
17	47R
18	51R
19	56R
20	62R
21	68R
22	75R
23	82R
24	91R
25	100R
26	110R
27	120R
28	130R
29	150R
30	160R
31	180R
32	200R
33	220R
34	240R
35	270R

NO.	Value
36	300R
37	330R
38	360R
39	390R
40	430R
41	470R
42	510R
43	560R
44	620R
45	680R
46	750R
47	820R
48	910R
49	1K
50	1K1
51	1K2
52	1K3
53	1K5
54	1K6
55	1K8
56	2K
57	2K2
58	2K4
59	2K7
60	3K
61	3K3
62	3K6
63	3K9
64	4K3
65	4K7
66	5K1
67	5K6
68	6K2
69	6K8
70	7K5

NO.	Value
71	8K2
72	9K1
73	10K
74	11K
75	12K
76	13K
77	15K
78	16K
79	18K
80	20K
81	22K
82	24K
83	27K
84	30K
85	33K
86	36K
87	39K
88	43K
89	47K
90	51K
91	56K
92	62K
93	68K
94	75K
95	82K
96	91K
97	100K
98	110K
99	120K
100	130K
101	150K
102	160K
103	180K
104	200K
105	220K

NO.	Value
106	240K
107	270K
108	300K
109	330K
110	360K
111	390K
112	430K
113	470K
114	510K
115	560K
116	620K
117	680K
118	750K
119	820K
120	910K
121	1M

Thick Film Chip Resistors KIT (Terminal Lead Free)

PRODUCT: Kit (0402) +/-1% (With resistor 1 strip per value)

(0603, 0805, 1206, 2512) +/-1% (With resistor 2 strip per value)

E96 Series = 482 values (0R/10R to 1M)

Total Qty: 48,200pcs (100 pcs per value)

NO.	Value
1	0R
2	10R
3	10R2
4	10R5
5	10R7
6	11R
7	11R3
8	11R5
9	11R8
10	12R
11	12R1
12	12R4
13	12R7
14	13R
15	13R3
16	13R7
17	14R
18	14R3
19	14R7
20	15R
21	15R4
22	15R8
23	16R
24	16R2
25	16R5
26	16R9
27	17R4
28	17R8
29	18R
30	18R2
31	18R7
32	19R1
33	21R
34	21R5
35	22R1

NO.	Value
36	22R6
37	23R2
38	23R7
39	24R3
40	24R9
41	25R5
42	26R1
43	26R7
44	27R4
45	28R
46	28R7
47	29R4
48	30R1
49	30R9
50	31R6
51	32R4
52	33R2
53	34R
54	34R8
55	35R7
56	36R5
57	37R4
58	38R3
59	39R2
60	40R2
61	41R2
62	42R2
63	43R2
64	44R2
65	45R3
66	46R4
67	47R5
68	48R7
69	49R9
70	51R1

NO.	Value
71	52R3
72	53R6
73	54R9
74	56R2
75	57R6
76	59R
77	60R4
78	61R9
79	63R4
80	64R9
81	66R5
82	68R1
83	69R8
84	71R5
85	73R2
86	75R
87	76R8
88	78R7
89	80R6
90	82R5
91	84R5
92	86R6
93	88R7
94	90R9
95	93R1
96	95R3
97	97R6
98	100R
99	102R
100	105R
101	107R
102	110R
103	113R
104	115R
105	118R

NO.	Value
106	121R
107	124R
108	127R
109	130R
110	133R
111	137R
112	140R
113	143R
114	147R
115	150R
116	154R
117	158R
118	162R
119	165R
120	169R
121	174R
122	178R
123	182R
124	187R
125	191R
126	186R
127	200R
128	205R
129	210R
130	215R
131	221R
132	226R
133	232R
134	237R
135	243R
136	249R
137	255R
138	261R
139	267R
140	274R

Thick Film Chip Resistors KIT (Terminal Lead Free)

**PRODUCT: Kit (0402) +/-1% (With resistor 1 strip per value)
 (0603, 0805, 1206, 2512) +/-1% (With resistor 2 strip per value)
 E96 Series = 482 values (0R/10R to 1M)
 Total Qty: 48,200pcs (100 pcs per value)**

NO.	Value
141	280R
142	287R
143	294R
144	301R
145	309R
146	316R
147	324R
148	332R
149	340R
150	348R
151	357R
152	365R
153	374R
154	383R
155	392R
156	402R
157	412R
158	422R
159	432R
160	442R
161	453R
162	464R
163	475R
164	487R
165	499R
166	511R
167	523R
168	536R
169	549R
170	562R
171	576R
172	590R
173	604R
174	619R
175	634R

NO.	Value
176	649R
177	665R
178	681R
179	698R
180	715R
181	732R
182	750R
183	768R
184	787R
185	806R
186	825R
187	845R
188	866R
189	887R
190	909R
191	931R
192	953R
193	976R
194	1K
195	1K02
196	1K05
197	1K07
198	1K1
199	1K13
200	1K15
201	1K18
202	1K21
203	1K24
204	1K27
205	1K3
206	1K33
207	1K37
208	1K4
209	1K43
210	1K47

NO.	Value
211	1K5
212	1K54
213	1K58
214	1K62
215	1K65
216	1K69
217	1K74
218	1K78
219	1K82
220	1K87
221	1K91
222	1K96
223	2K
224	2K05
225	2K1
226	2K15
227	2K21
228	2K26
229	2K32
230	2K37
231	2K43
232	2K49
233	2K55
234	2K61
235	2K67
236	2K74
237	2K8
238	2K87
239	2K94
240	3K01
241	3K09
242	3K16
243	3K24
244	3K32
245	3K4

NO.	Value
246	3K48
247	3K57
248	3K65
249	3K74
250	3K83
251	3K92
252	4K02
253	4K12
254	4K22
255	4K32
256	4K42
257	4K53
258	4K64
259	4K75
260	4K87
261	4K99
262	5K11
263	5K23
264	5K36
265	5K49
266	5K62
267	5K76
268	5K9
269	6K04
270	6K19
271	6K34
272	6K49
273	6K65
274	6K81
275	6K98
276	7K15
277	7K32
278	7K5
279	7K68
280	7K87

Thick Film Chip Resistors KIT (Terminal Lead Free)

**PRODUCT: Kit (0402) +/-1% (With resistor 1 strip per value)
 (0603, 0805, 1206, 2512) +/-1% (With resistor 2 strip per value)
 E96 Series = 482 values (0R/10R to 1M)
 Total Qty: 48,200pcs (100 pcs per value)**

NO.	Value
281	8K06
282	8K25
283	8K45
284	8K66
285	8K87
286	9K09
287	9K31
288	9K53
289	9K76
290	10K
291	10K2
292	10K5
293	10K7
294	11K
295	11K3
296	11K5
297	11K8
298	12K1
299	12K4
300	12K7
301	13K
302	13K3
303	13K7
304	14K
305	14K3
306	14K7
307	15K
308	15K4
309	15K8
310	16K2
311	16K5
312	16K9
313	17K4
314	17K8
315	18K2

NO.	Value
316	18K7
317	19K1
318	19K6
319	20K
320	20K5
321	21K
322	21K5
323	22K1
324	22K6
325	23K2
326	23K7
327	24K3
328	24K9
329	25K5
330	26K1
331	26K7
332	27K4
333	28K
334	28K7
335	29K4
336	30K1
337	30K9
338	31K6
339	32K4
340	33K2
341	34K
342	34K8
343	35K7
344	36K5
345	37K4
346	38K3
347	39K2
348	40K2
349	41K2
350	42K2

NO.	Value
351	43K2
352	44K2
353	45K3
354	46K4
355	47K5
356	48K7
357	49K9
358	51K1
359	52K3
360	53K6
361	54K9
362	56K2
363	57K6
364	59K
365	60K4
366	61K9
367	63K4
368	64K9
369	66K5
370	68K1
371	69K8
372	71K5
373	73K2
374	75K
375	76K8
376	78K7
377	80K6
378	82K5
379	84K5
380	86K6
381	88K7
382	90K9
383	93K1
384	95K3
385	97K6

NO.	Value
386	100K
387	102K
388	105K
389	107K
390	110K
391	113K
392	115K
393	118K
394	121K
395	124K
396	127K
397	130K
398	133K
399	137K
400	140K
401	143K
402	147K
403	150K
404	154K
405	158K
406	162K
407	165K
408	169K
409	174K
410	178K
411	182K
412	187K
413	191K
414	196K
415	200K
416	205K
417	210K
418	215K
419	221K
420	226K

Thick Film Chip Resistors KIT (Terminal Lead Free)

PRODUCT: Kit (0402) +/-1% (With resistor 1 strip per value)

(0603, 0805, 1206, 2512) +/-1% (With resistor 2 strip per value)

E24+E96 Series = 572 values (0R/10R to 1M)

Total Qty: 57,200pcs (100 pcs per value)

NO.	Value
1	0R
2	10R
3	10R2
4	10R5
5	10R7
6	11R
7	11R3
8	11R5
9	11R8
10	12R
11	12R1
12	12R4
13	12R7
14	13R
15	13R3
16	13R7
17	14R
18	14R3
19	14R7
20	15R
21	15R4
22	15R8
23	16R
24	16R2
25	16R5
26	16R9
27	17R4
28	17R8
29	18R
30	18R2
31	18R7
32	19R1
33	19R6
34	20R
35	20R5

NO.	Value
36	21R
37	21R5
38	22R
39	22R1
40	22R6
41	23R2
42	23R7
43	24R
44	24R3
45	24R9
46	25R5
47	26R1
48	26R7
49	27R
50	27R4
51	28R
52	28R7
53	29R4
54	30R
55	30R1
56	30R9
57	31R6
58	32R4
59	33R
60	33R2
61	34R
62	34R8
63	35R7
64	36R
65	36R5
66	37R4
67	38R3
68	39R
69	39R2
70	40R2

NO.	Value
71	41R2
72	42R2
73	43R
74	43R2
75	44R2
76	45R2
77	46R4
78	47R
79	47R5
80	48R7
81	49R9
82	51R
83	51R1
84	52R3
85	53R6
86	54R9
87	56R
88	56R2
89	57R6
90	59R
91	50R4
92	61R9
93	62R
94	63R4
95	64R9
96	66R5
97	68R
98	68R1
99	69R8
100	71R5
101	73R2
102	75R
103	76R8
104	78R7
105	80R6

NO.	Value
106	82R
107	82R5
108	84R5
109	86R6
110	88R7
111	90R9
112	91R
113	93R1
114	95R3
115	97R6
116	100R
117	102R
118	105R
119	107R
120	110R
121	113R
122	115R
123	118R
124	120R
125	121R
126	124R
127	127R
128	130R
129	133R
130	137R
131	140R
132	143R
133	147R
134	150R
135	154R
136	158R
137	160R
138	162R
139	165R
140	169R

Thick Film Chip Resistors KIT (Terminal Lead Free)

PRODUCT: Kit (0402) +/-1% (With resistor 1 strip per value)

(0603, 0805, 1206, 2512) +/-1% (With resistor 2 strip per value)

E24+E96 Series = 572 values (0R/10R to 1M)

Total Qty: 57,200pcs (100 pcs per value)

NO.	Value
141	174R
142	178R
143	180R
144	182R
145	187R
146	191R
147	196R
148	200R
149	205R
150	210R
151	215R
152	220R
153	221R
154	226R
155	232R
156	237R
157	240R
158	243R
159	249R
160	255R
161	261R
162	267R
163	270R
164	274R
165	280R
166	287R
167	294R
168	300R
169	301R
170	309R
171	316R
172	324R
173	330R
174	332R
175	340R

NO.	Value
176	348R
177	357R
178	360R
179	365R
180	374R
181	383R
182	390R
183	392R
184	402R
185	412R
186	422R
187	430R
188	432R
189	442R
190	453R
191	464R
192	470R
193	475R
194	487R
195	499R
196	510R
197	511R
198	523R
199	536R
200	549R
201	560R
202	562R
203	576R
204	590R
205	604R
206	619R
207	620R
208	634R
209	649R
210	665R

NO.	Value
211	680R
212	681R
213	698R
214	715R
215	732R
216	750R
217	768R
218	787R
219	806R
220	820R
221	825R
222	845R
223	866R
224	887R
225	909R
226	910R
227	931R
228	953R
229	976R
230	1K
231	1K02
232	1K05
233	1K07
234	1K1
235	1K13
236	1K15
237	1K18
238	1K2
239	1K21
240	1K24
241	1K27
242	1K3
243	1K33
244	1K37
245	1K4

NO.	Value
246	1K43
247	1K47
248	1K5
249	1K54
250	1K58
251	1K6
252	1K62
253	1K65
254	1K69
255	1K74
256	1K78
257	1K8
258	1K82
259	1K87
260	1K91
261	1K96
262	2K
263	2K05
264	2K1
265	2K15
266	2K2
267	2K21
268	2K26
269	2K32
270	2K37
271	2K4
272	2K43
273	2K49
274	2K55
275	2K61
276	2K67
277	2K7
278	2K74
279	2K8
280	2K87

Thick Film Chip Resistors KIT (Terminal Lead Free)

PRODUCT: Kit (0402) +/-1% (With resistor 1 strip per value)

(0603, 0805, 1206, 2512) +/-1% (With resistor 2 strip per value)

E24+E96 Series = 572 values (0R/10R to 1M)

Total Qty: 57,200pcs (100 pcs per value)

NO.	Value
281	2K94
282	3K
283	3K01
284	3K09
285	3K16
286	3K24
287	3K3
288	3K32
289	3K4
290	3K48
291	3K57
292	3K6
293	3K65
294	3K74
295	3K83
296	3K9
297	3K92
298	4K02
299	4K12
300	4K22
301	4K3
302	4K32
303	4K42
304	4K53
305	4K64
306	4K7
307	4K75
308	4K87
309	4K99
310	5K1
311	5K11
312	5K23
313	5K36
314	5K49
315	5K6

NO.	Value
316	5K62
317	5K76
318	5K9
319	6K04
320	6K19
321	6K2
322	6K34
323	6K49
324	6K65
325	6K8
326	6K81
327	6K98
328	7K15
329	7K32
330	7K5
331	7K68
332	7K87
333	8K06
334	8K2
335	8K25
336	8K45
337	8K66
338	8K87
339	9K09
340	9K1
341	9K31
342	9K53
343	9K76
344	10K
345	10K2
346	10K5
347	10K7
348	11K
349	11K3
350	11K5

NO.	Value
351	11K8
352	12K
353	12K1
354	12K4
355	12K7
356	13K
357	13K3
358	13K7
359	14K
360	14K3
361	14K7
362	15K
363	15K4
364	15K8
365	16K
366	16K2
367	16K5
368	16K9
369	17K4
370	17K8
371	18K
372	18K2
373	18K7
374	19K1
375	19K2
376	20K
377	20K5
378	21K
379	21K5
380	22K
381	22K1
382	22K6
383	23K2
384	23K7
385	24K

NO.	Value
386	24K3
387	24K9
388	25K5
389	26K1
390	26K7
391	27K
392	27K4
393	28K
394	28K7
395	29K4
396	30K
397	30K1
398	30K9
399	31K6
400	32K4
401	33K
402	33K2
403	34K
404	34K8
405	35K7
406	36K
407	36K5
408	37K4
409	38K3
410	39K
411	39K2
412	40K2
413	41K2
414	42K2
415	43K
416	43K2
417	44K2
418	45K3
419	46K4
420	47K

Thick Film Chip Resistors KIT (Terminal Lead Free)

**PRODUCT: Kit (0402) +/-1% (With resistor 1 strip per value)
 (0603, 0805, 1206, 2512) +/-1% (With resistor 2 strip per value)
 E24+E96 Series = 572 values (0R/10R to 1M)
 Total Qty: 57,200pcs (100 pcs per value)**

NO.	Value
421	47K5
422	48K7
423	49K9
424	51K
425	51K1
426	52K3
427	53K6
428	54K9
429	56K
430	56K2
431	57K6
432	59K
433	60K4
434	61K9
435	62K
436	63K4
437	64K9
438	66K5
439	68K
440	68K1
441	69K8
442	71K5
443	73K2
444	75K
445	76K8
446	78K7
447	80K6
448	82K5
449	82K5
450	84K5
451	86K6
452	88K7
453	90K9
454	91K
455	93K1

NO.	Value
456	95K3
457	97K6
458	100K
459	102K
460	105K
461	107K
462	110K
463	113K
464	115K
465	118K
466	120K
467	121K
468	124K
469	127K
470	130K
471	133K
472	137K
473	140K
474	143K
475	147K
476	150K
477	154K
478	158K
479	160K
480	162K
481	165K
482	169K
483	174K
484	178K
485	180K
486	182K
487	187K
488	191K
489	196K
490	200K

NO.	Value
491	205K
492	210K
493	215K
494	220K
495	221K
496	226K
497	232K
498	237K
499	240K
500	243K
501	249K
502	255K
503	261K
504	267K
505	270K
506	274K
507	280K
508	287K
509	294K
510	300K
511	301K
512	309K
513	316K
514	324K
515	330K
516	332K
517	340K
518	348K
519	357K
520	360K
521	365K
522	374K
523	383K
524	390K
525	392K

NO.	Value
526	402K
527	412K
528	422K
529	430K
530	432K
531	442K
532	453K
533	464K
534	470K
535	475K
536	487K
537	499K
538	510K
539	511K
540	523K
541	536K
542	549K
543	560K
544	562K
545	576K
546	590K
547	604K
548	619K
549	620K
550	634K
551	649K
552	665K
553	680R
554	681K
555	698K
556	715K
557	732K
558	750K
559	768K
560	787K

