ROYALOHM

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

SPECIFICATION FOR APPROVAL

Description : Thick Film Chip Resistors (KIT)

Royalohm Part no.:

0201WMFV612KIT	(RMC (0201) 1/20W +/- 1% KIT 612Values Series)
0402WGFV612KIT	(RMC (0402) 1/16W +/- 1% KIT 612Values Series)
0603WAFV612KIT	(RMC (0603) 1/10W +/- 1% KIT 612Values Series)
0805W8FV612KIT	(RMC (0805) 1/8W +/- 1% KIT 612Values Series)
1206W4FV612KIT	(RMC (1206) 1/4W +/- 1% KIT 612Values Series)
25121WFV612KIT	(RMC (2512) 1W +/- 1% KIT 612Values Series)

Approved by

RoHS V3 Compliant (EU) 2015/863
REACH Compliant

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Approved	Checked	Prepared
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Issue Date: 2023/10/18

CHANGE NOTIFICATION HISTORY

Version	Date of Version	History	Remark
1	2023/03/02	1. CHIP Series (0402, 0603, 0805, 1206)	
		2. Resistance tolerance: ±1%	
		3. KIT E-96+E-24	
		4. 612 Values	
2	2023/10/18	1. Add Size (0201, 2512)	

Thick Film Chip Resistors (KIT)

1. Scope:

This specification for approval relates to Thick Film Chip Resistors (KIT) 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	75Ω

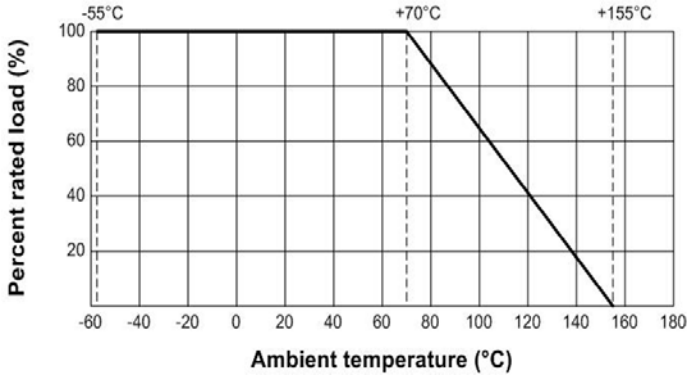
3. Ratings:

Type	0201	0402	0603	0805	1206	2512
Power Rating	1/20W	1/16W	1/10W	1/8W	1/4W	1W
Max. Working Voltage	25 V	50 V	75 V	150 V	200 V	200 V
Max. Working Current for Jumper	0.5 A	1 A	1 A	2 A	2 A	2 A
Max. Overload Voltage	50 V	100 V	150 V	300 V	400 V	500 V
Max. Overload Current for Jumper	1 A	2 A	2 A	5 A	10 A	10 A
Dielectric Withstanding Voltage	-	100 V	300 V	500 V	500 V	500 V
Temperature Range	-55℃～ +155℃					
Ambient Temperature	70 ℃					

3.1 Power rating:

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

Figure 1



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

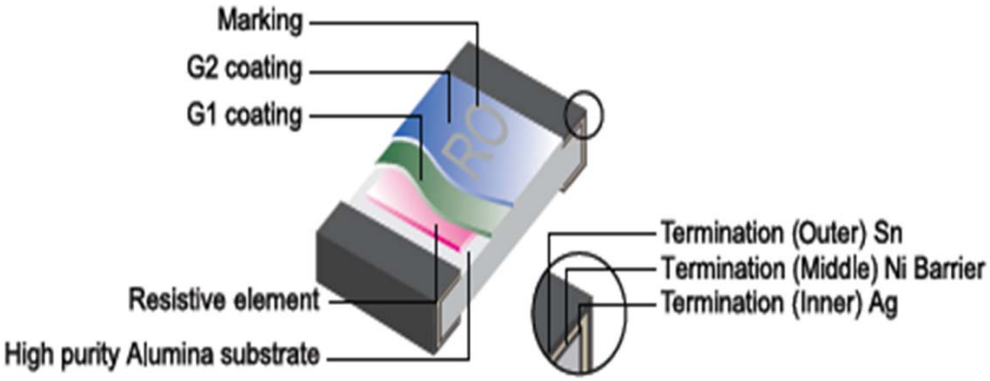
Were : RCWV = Rated DC or RMS AC continuous working voltage at commercial-line frequency and waveform (volt)

P = Power Rating (watt)

R = Nominal Resistance (ohm)

Thick Film Chip Resistors (KIT)

4. Construction :



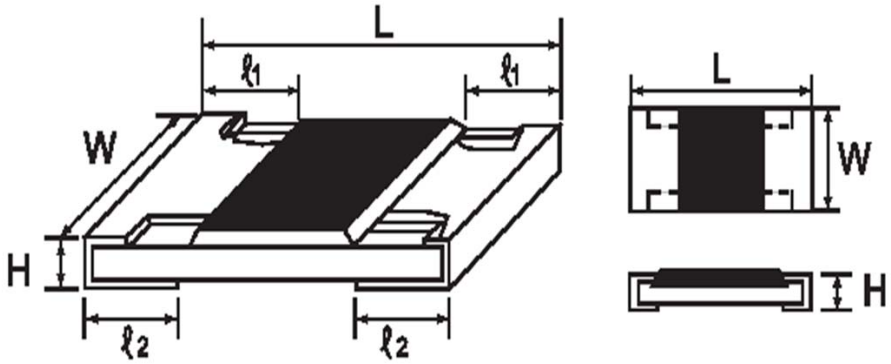
5. Power rating

Power Rating :

Type	Power Rating at 70 ℃	Tolerance %	Resistance Value	Standard Series
RMC 0201	1/20W	Jumper	< 50mΩ	
		± 1	10Ω ~ 1MΩ	E-24, E-96
RMC 0402	1/16W	Jumper	< 50mΩ	
		± 1	10Ω ~ 1MΩ	E-24, E-96
RMC 0603	1/10W	Jumper	< 50mΩ	
		± 1	10Ω ~ 1MΩ	E-24, E-96
RMC 0805	1/8W	Jumper	< 50mΩ	
		± 1	10Ω ~ 1MΩ	E-24, E-96
RMC 1206	1/4W	Jumper	< 50mΩ	
		± 1	10Ω ~ 1MΩ	E-24, E-96
RMC 2512	1W	Jumper	< 50mΩ	
		± 1	10Ω ~ 1MΩ	E-24, E-96

Thick Film Chip Resistors (KIT)

6. Dimensions

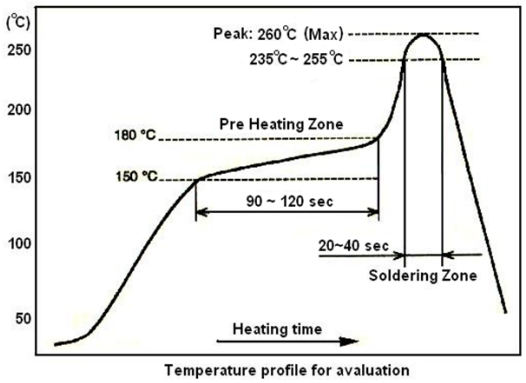


Dimension :

Type	Dimension (mm)				
	L	W	H	ℓ1	ℓ2
RMC 0201	0.60 ± 0.03	0.30 ± 0.03	0.23 ± 0.03	0.10 ± 0.05	0.15 ± 0.05
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)

7. Performance specification :

Characteristics	Limits	Test Methods (JIS C 5201-1)
*Insulation resistance	1,000MΩ 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 (0805,1206,2512) AC between protective coating and termination for 1 minute (Sub-clause 4.7)
Temperature coefficient	10Ω : ± 200 PPM/℃ >10Ω : ± 100 PPM/℃	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 (t1) R_2: Resistance value at room temp. plus 100 ℃ (t2) (Sub-clause 4.8)
Short time overload	Resistance change rate is 1% (1.0% + 0.05Ω) Max.	Permanent resistance change after the application of a potential of 2.5 times RCWV or Max Overload Voltage whichever is lesser for 5 sec. (Sub-clause 4.13)
*Solderability	95 % coverage Min.	Test temperature of solder : 245 ± 3℃ Dipping them solder : 2-3 seconds (Sub-clause 4.17)
Soldering temp. reference	Electrical characteristics shall be satisfied. Without distinct deformation in appearance. (95 % coverage Min.)	Wave soldering condition: (2 cycles Max.) Pre-heat : 100 ~ 120 ℃, 30 ± 5 sec. Suggestion solder temp.: 235 ~ 255 ℃, 10 sec. (Max.) Peak temp.: 260 ℃ Reflow soldering condition: (2 cycles Max.) Pre-heat : 150 ~ 180 ℃, 90 ~ 120 sec. Suggestion solder temp.: 235 ~ 255 ℃, 20 ~ 40 sec. Peak temp.: 260 ℃  Temperature profile for avaluation Hand soldering condition: The soldering iron tip temperature should be less than 300℃and maximum contract time should be 5 sec.

Thick Film Chip Resistors (KIT)

7. Performance specification :

Characteristics	Limits	Test Methods (JIS C 5201-1)
Soldering Heat	Resistance change rate is: ± (1.0%+0.05Ω) Max.	Dip the resistor into a solder bath having a temperature of 260°C±3°C and hold it for 10±1 seconds. (Sub-clause 4.18)
Temperature cycling	Resistance change rate is ±1% (0.5% + 0.05Ω) Max.	Resistance change after continuous 100 cycles for duty cycle specified below :

Step	Temperature	Time
1	-55℃ ± 3℃	30 mins
2	Room temp.	10～15 mins
3	+155℃ ± 2℃	30 mins
4	Room temp.	10～15 mins

(Sub-clause 4.19)

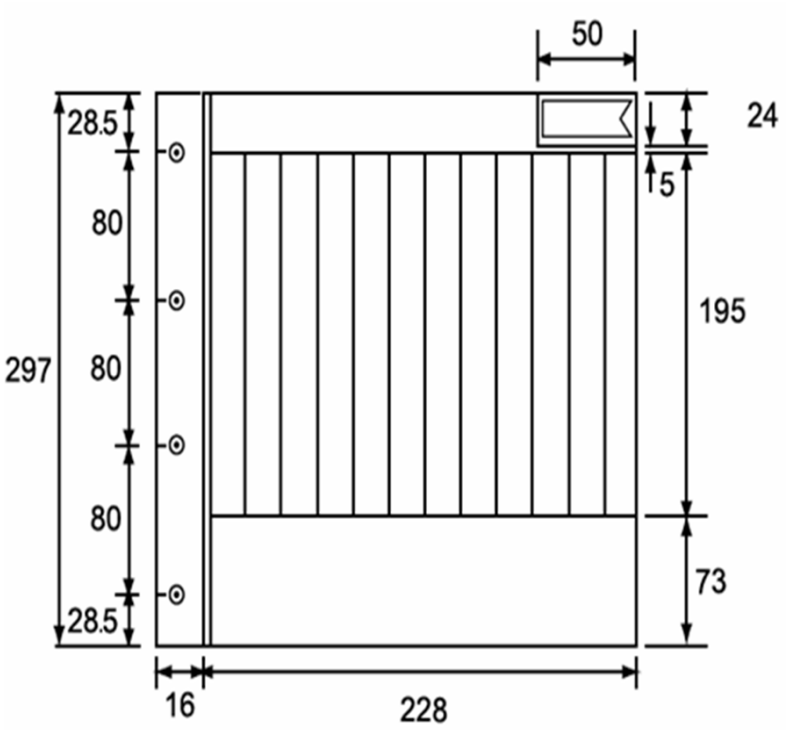
Load life in humidity	Resistance change rate is ±1% (1.0% + 0.05Ω) Max.	Resistance change after 1,000 hours (1.5 hours "on", 0.5 hour "off") at RCWV in a humidity chamber controlled at 40℃ ± 2℃ and 90 to 95 % relative humidity (Sub-clause 4.24.2.1)
Load Life	Resistance change rate is ±1% (1.0% + 0.05Ω) 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℃ ± 2℃ ambient (Sub-clause 4.25.1)
Terminal bending	Resistance change rate is ± (1.0% + 0.05Ω) 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)

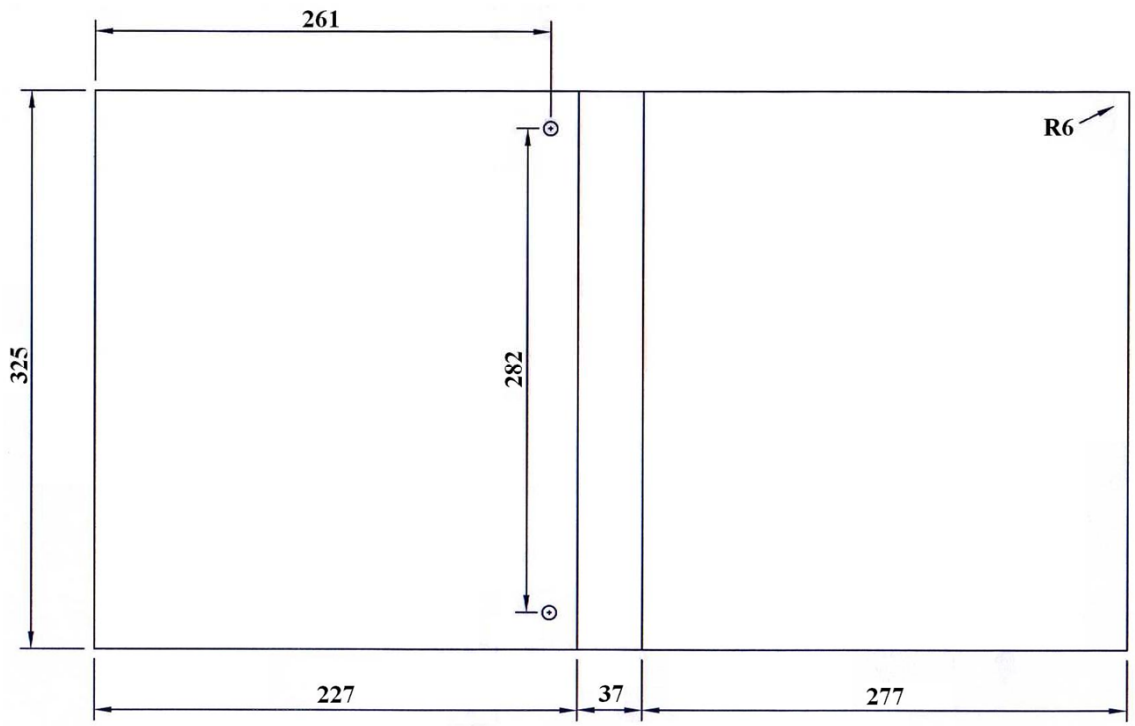
8. Kit resistors :

8.1 Insert for Chip Kit Di mension (mm)



8.2 Album for Chip Kit Dimension (mm)

*Green Album



Thick Film Chip Resistors (KIT)

Explanation of Part Number System

Thick Film Chip Resistors (Terminal Lead Free)

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

Product Type:
Fill-in these 4 digits with the Chip resistor types as follows:
0201
0402
0603
0805
1206
2512

Wattage:
Fill-in these 2 digits with the codes as follows:
Normal size:
WM = 1/20W
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
V612 : 612 Values

Special Feature:
Fill-in these 3 digits with the chip resistor types as follows:
- KIT: Kit resistor (with resistor)
- K0N: 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-96+E-24 (612 Values) Series → 0603WAFV612KIT

Thick Film Chip Resistors (KIT)

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°C ± 10°C and a relative humidity of 60%RH ± 10%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)

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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)

PRODUCT: RMC Kit (0402, 0603, 0805,1206) +/-1%

E-96 = 612values (0R/10R to 10M)

Total Qty: (0201, 0402) 61,200pcs (100 pcs per value = 1 Strips)

Total Qty: (0603, 0805, 1206, 2512) 61,200pcs (100 pcs per value = 2 Strips)

NO.	Value
1	0R
2	1R
3	1R1
4	1R2
5	1R3
6	1R5
7	1R6
8	1R8
9	2R
10	2R2
11	2R4
12	2R61
13	2R7
14	3R
15	3R01
16	3R3
17	3R32
18	3R6
19	3R9
20	3R92
21	4R3
22	4R32
23	4R42
24	4R53
25	4R7
26	5R11
27	5R62
28	5R9
29	6R19
30	6R2

NO.	Value
31	7R5
32	8R2
33	10R
34	10R2
35	10R5
36	10R7
37	11R
38	11R3
39	11R5
40	11R8
41	12R
42	12R1
43	12R4
44	12R7
45	13R
46	13R3
47	13R7
48	14R
49	14R3
50	14R7
51	15R
52	15R4
53	15R8
54	16R
55	16R2
56	16R5
57	16R9
58	17R4
59	17R8
60	18R2

NO.	Value
61	18R7
62	19R1
63	19R6
64	20R
65	20R5
66	21R
67	21R5
68	22R
69	22R1
70	22R6
71	23R2
72	23R7
73	24R
74	24R3
75	24R9
76	25R5
77	26R1
78	26R7
79	27R4
80	28R
81	28R7
82	29R4
83	30R
84	30R1
85	30R9
86	31R6
87	32R4
88	33R
89	33R2
90	34R

NO.	Value
91	34R8
92	36R
93	36R5
94	37R4
95	38R3
96	39R
97	39R2
98	40R2
99	41R2
100	42R2
101	43R
102	44R2
103	45R3
104	46R4
105	47R
106	47R5
107	48R7
108	49R9
109	51R
110	51R1
111	52R3
112	53R6
113	54R9
114	56R
115	56R2
116	57R6
117	59R
118	60R4
119	61R9
120	62R

Thick Film Chip Resistors (KIT)

PRODUCT: RMC Kit (0402, 0603, 0805,1206) +/-1%

E-96 = 612values (0R/10R to 10M)

Total Qty: (0201, 0402) 61,200pcs (100 pcs per value = 1 Strips)

Total Qty: (0603, 0805, 1206, 2512) 61,200pcs (100 pcs per value = 2 Strips)

NO.	Value
121	63R4
122	64R9
123	66R5
124	68R
125	68R1
126	69R8
127	71R5
128	73R2
129	75R
130	76R8
131	78R7
132	80R6
133	82R5
134	84R5
135	86R6
136	88R7
137	90R9
138	91R
139	93R1
140	95R3
141	97R6
142	100R
143	102R
144	105R
145	107R
146	110R
147	115R
148	118R
149	120R
150	121R

NO.	Value
151	124R
152	127R
153	133R
154	137R
155	140R
156	143R
157	147R
158	150R
159	154R
160	158R
161	160R
162	162R
163	165R
164	169R
165	174R
166	178R
167	180R
168	182R
169	187R
170	191R
171	196R
172	200R
173	205R
174	215R
175	220R
176	221R
177	226R
178	232R
179	237R
180	240R

NO.	Value
181	243R
182	249R
183	261R
184	267R
185	270R
186	274R
187	280R
188	287R
189	294R
190	300R
191	301R
192	309R
193	316R
194	324R
195	330R
196	332R
197	340R
198	348R
199	357R
200	360R
201	365R
202	374R
203	383R
204	390R
205	392R
206	402R
207	412R
208	422R
209	430R
210	432R

NO.	Value
211	442R
212	453R
213	464R
214	470R
215	475R
216	487R
217	499R
218	510R
219	511R
220	523R
221	536R
222	549R
223	560R
224	562R
225	576R
226	590R
227	604R
228	619R
229	620R
230	634R
231	649R
232	665R
233	680R
234	681R
235	698R
236	715R
237	732R
238	750R
239	768R
240	787R

Thick Film Chip Resistors (KIT)

PRODUCT: RMC Kit (0402, 0603, 0805,1206) +/-1%

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Total Qty: (0603, 0805, 1206, 2512) 61,200pcs (100 pcs per value = 2 Strips)

NO.	Value
241	806R
242	820R
243	825R
244	845R
245	866R
246	887R
247	909R
248	910R
249	931R
250	953R
251	976R
252	1K0
253	1K02
254	1K05
255	1K07
256	1K1
257	1K13
258	1K15
259	1K18
260	1K2
261	1K21
262	1K24
263	1K27
264	1K3
265	1K33
266	1K37
267	1K4
268	1K43
269	1K47
270	1K5

NO.	Value
271	1K54
272	1K58
273	1K6
274	1K62
275	1K65
276	1K69
277	1K74
278	1K78
279	1K8
280	1K82
281	1K87
282	1K91
283	1K96
284	2K
285	2K2
286	2K05
287	2K15
288	2K21
289	2K26
290	2K32
291	2K37
292	2K4
293	2K43
294	2K49
295	2K55
296	2K61
297	2K67
298	2K7
299	2K74
300	2K8

NO.	Value
301	2K87
302	2K94
303	3K
304	3K01
305	3K09
306	3K16
307	3K24
308	3K3
309	3K32
310	3K4
311	3K48
312	3K57
313	3K6
314	3K65
315	3K83
316	3K9
317	3K92
318	4K02
319	4K12
320	4K22
321	4K3
322	4K42
323	4K53
324	4K64
325	4K75
326	4K87
327	4K99
328	5K1
329	5K11
330	5K23

NO.	Value
331	5K36
332	5K49
333	5K6
334	5K62
335	5K76
336	5K9
337	6K04
338	6K19
339	6K2
340	6K34
341	6K49
342	6K65
343	6K8
344	6K81
345	6K98
346	7K15
347	7K32
348	7K5
349	7K68
350	7K87
351	8K06
352	8K2
353	8K25
354	8K45
355	8K66
356	8K87
357	9K09
358	9K1
359	9K31
360	9K53

Thick Film Chip Resistors (KIT)

PRODUCT: RMC Kit (0402, 0603, 0805,1206) +/-1%

E-96 = 612values (0R/10R to 10M)

Total Qty: (0201, 0402) 61,200pcs (100 pcs per value = 1 Strips)

Total Qty: (0603, 0805, 1206, 2512) 61,200pcs (100 pcs per value = 2 Strips)

NO.	Value
361	9K76
362	10K
363	10K2
364	10K5
365	10K7
366	11K
367	11K5
368	11K8
369	12K
370	12K1
371	12K4
372	12K7
373	13K
374	13K3
375	13K7
376	14K
377	14K3
378	14K7
379	15K
380	15K4
381	15K8
382	16K
383	16K2
384	16K5
385	16K9
386	17K4
387	17K8
388	18K
389	18K2
390	18K7

NO.	Value
391	19K1
392	19K6
393	20K
394	20K5
395	21K
396	21K5
397	22K
398	22K1
399	22K6
400	23K2
401	23K7
402	24K
403	24K3
404	24K9
405	25K5
406	26K1
407	26K7
408	27K
409	27K4
410	28K
411	28K7
412	29K4
413	30K
414	30K1
415	30K9
416	31K6
417	32K4
418	33K2
419	34K
420	34K8

NO.	Value
421	35K7
422	36K
423	36K5
424	37K4
425	38K3
426	39K
427	39K2
428	40K2
429	41K2
430	42K2
431	43K
432	43K2
433	44K2
434	45K3
435	46K4
436	47K
437	47K5
438	48K7
439	51K
440	51K1
441	52K3
442	53K6
443	54K9
444	56K
445	56K2
446	57K6
447	59K
448	60K4
449	61K9
450	63K4

NO.	Value
451	64K9
452	66K5
453	68K
454	68K1
455	69K8
456	71K5
457	73K2
458	75K
459	76K8
460	78K7
461	80K6
462	82K
463	82K5
464	84K5
465	86K6
466	88K7
467	90K9
468	91K
469	93K1
470	95K3
471	97K6
472	100K
473	102K
474	105K
475	107K
476	110K
477	113K
478	115K
479	118K
480	120K

Thick Film Chip Resistors (KIT)

PRODUCT: RMC Kit (0402, 0603, 0805,1206) +/-1%

E-96 = 612values (0R/10R to 10M)

Total Qty: (0201, 0402) 61,200pcs (100 pcs per value = 1 Strips)

Total Qty: (0603, 0805, 1206, 2512) 61,200pcs (100 pcs per value = 2 Strips)

NO.	Value
481	121K
482	124K
483	127K
484	130K
485	133K
486	137K
487	140K
488	143K
489	147K
490	150K
491	154K
492	158K
493	160K
494	162K
495	165K
496	169K
497	174K
498	178K
499	180K
500	187K
501	191K
502	196K
503	200K
504	205K
505	215K
506	220K
507	221K
508	226K
509	232K
510	237K

NO.	Value
511	240K
512	243K
513	249K
514	255K
515	261K
516	267K
517	270K
518	274K
519	280K
520	287K
521	294K
522	300K
523	301K
524	309K
525	316K
526	324K
527	330K
528	332K
529	340K
530	348K
531	357K
532	360K
533	365K
534	374K
535	383K
536	390K
537	392K
538	402K
539	412K
540	422K

NO.	Value
541	430K
542	432K
543	442K
544	453K
545	464K
546	470K
547	475K
548	487K
549	499K
550	511K
551	523K
552	536K
553	562K
554	576K
555	590K
556	604K
557	619K
558	620K
559	634K
560	649K
561	665K
562	680K
563	681K
564	715K
565	732K
566	750K
567	768K
568	787K
569	806K
570	820K

NO.	Value
571	825K
572	845K
573	866K
574	887K
575	909K
576	910K
577	931K
578	953K
579	976K
580	1M
581	1M02
582	1M2
583	1M3
584	1M33
585	1M5
586	1M6
587	1M74
588	1M8
589	2M
590	2M2
591	2M21
592	2M4
593	2M7
594	2M74
595	3M
596	3M24
597	3M3
598	3M6
599	3M83
600	3M9

Thick Film Chip Resistors (KIT)

PRODUCT: RMC Kit (0402, 0603, 0805,1206) +/-1%

E-96 = 612values (0R/10R to 10M)

Total Qty: (0201, 0402) 61,200pcs (100 pcs per value = 1 Strips)

Total Qty: (0603, 0805, 1206, 2512) 61,200pcs (100 pcs per value = 2 Strips)

NO.	Value
601	4M3
602	4M7
603	5M1
604	5M6
605	5M62
606	5M9
607	6M2
608	6M8
609	7M5
610	8M2
611	9M1
612	10M

NO.	Value

NO.	Value

NO.	Value