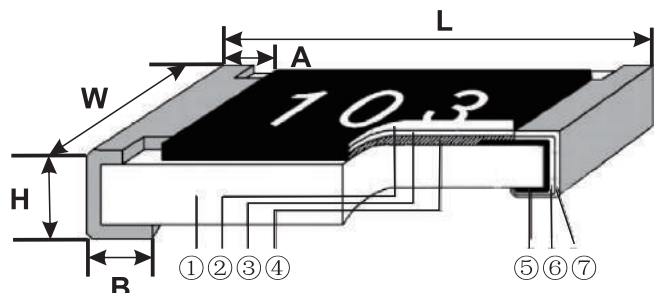


Thick Film Chip Resistors (RI)

1. Construction



- ① High purity Alumina substrate
- ② Secondary Overcoat (Epoxy)
- ③ Primary Overcoat (Glass)
- ④ Resistance element
- ⑤ Termination (Inner) Ni / Cr
- ⑥ Termination (Between) Ni Barrier
- ⑦ Termination (Outer) Sn

2. Features:

- 1) Small size & light weight
- 2) Reduction of assembly costs and matching with placement machine.
- 3) Suitable for both wave & re-flow soldering.

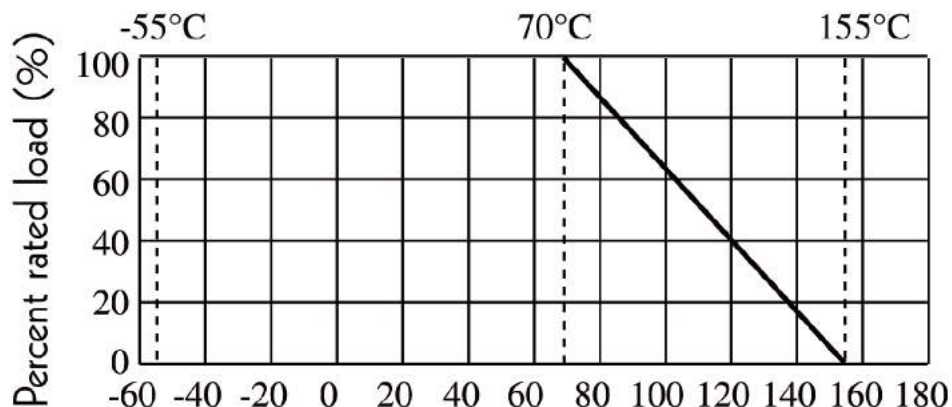
3. Application:

Navigator (GPS), Mobile Phone, Telecom, PDA, Setbox, Meter..

4. Dimensions

Size	L	W	H	A	B
01005	0.40±0.02	0.20±0.02	0.13±0.02	0.10±0.05	0.10±0.03
0201	0.60±0.03	0.30±0.03	0.23±0.03	0.10±0.05	0.15±0.05
0402	1.00±0.10	0.50±0.05	0.35±0.05	0.20±0.10	0.25±0.10
0603	1.60±0.10	0.80±0.10	0.45±0.10	0.30±0.20	0.30±0.20
0805	2.00±0.15	1.25±0.15	0.55±0.10	0.40±0.20	0.40±0.20
1206	3.10±0.15	1.55±0.15	0.55±0.10	0.45±0.20	0.45±0.20
1210	3.10±0.10	2.60±0.20	0.55±0.10	0.50±0.25	0.50±0.20
1812	4.50±0.20	3.20±0.20	0.55±0.20	0.50±0.20	0.50±0.20
2010	5.00±0.10	2.50±0.20	0.55±0.10	0.60±0.25	0.50±0.20
2512	6.35±0.10	3.20±0.20	0.55±0.10	0.60±0.25	0.50±0.20

5. Derating Curve



6. Specifications

Size	Working Voltage	Overload Voltage	Dielectric withstanding Voltage	Operating Temperature	Power Rating at 25°C	Resistance Value of Jumper	Rated Current of Jumper	Overload Current of Jumper
	Max.(V)	Max.(V)	(V)	(°C)	(W)	(mΩ)	(A)	Max.(A)
01005	15	30	-	-55~+155	1/32	-	-	-
0201	25	50	-	-55~+155	1/20	<50	0.5	1
0402	50	100	100	-55~+155	1/16	<50	1	2
0603	75	150	300	-55~+155	1/10	<50	1	2
0805	150	300	500	-55~+155	1/8	<50	2	5
1206	200	400	500	-55~+155	1/4	<50	2	10
1210	200	500	500	-55~+155	1/2	<50	2	10
1812	200	500	500	-55~+155	3/4	<50	2	10
2010	200	500	500	-55~+155	3/4	<50	2	10
2512	200	500	500	-55~+155	1	<50	2	10

7. Resistance Range

Size	Resistance Range of 0.5%	Resistance Range of 1%	Resistance Range of 2%	Resistance Range of 5%
01005	-	10Ω~10MΩ	10Ω~10MΩ	1Ω~10MΩ
0201	-	1Ω~10MΩ	1Ω~10MΩ	1Ω~10MΩ
0402	1Ω~10MΩ	1Ω~10MΩ	1Ω~10MΩ	1Ω~10MΩ
0603	1Ω~10MΩ	0.1Ω~10MΩ	0.1Ω~10MΩ	0.1Ω~10MΩ
0805	1Ω~10MΩ	0.1Ω~10MΩ	0.1Ω~10MΩ	0.1Ω~10MΩ
1206	1Ω~10MΩ	0.1Ω~10MΩ	0.1Ω~10MΩ	0.1Ω~10MΩ
1210	1Ω~10MΩ	0.1Ω~10MΩ	0.1Ω~10MΩ	0.1Ω~10MΩ
1812	1Ω~10MΩ	0.1Ω~10MΩ	0.1Ω~10MΩ	0.1Ω~10MΩ
2010	1Ω~10MΩ	0.1Ω~10MΩ	0.1Ω~10MΩ	0.1Ω~10MΩ
2512	1Ω~10MΩ	0.1Ω~10MΩ	0.1Ω~10MΩ	0.1Ω~10MΩ

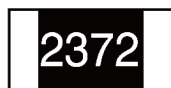
8. Marking on the Resistors Body



153 = 15000Ω = 15KΩ



Below 10Ω: 6R8 = 6.8Ω



2372 = 23700Ω = 23.7KΩ



Below 10Ω : 3R24 = 3.24Ω

- (For 01005, 0201, 0402 size, no marking on the body due to the small size of the resistor.)
- (±5% tolerance product: the marking is 3 digits, the first 2 digits are the significant of the resistance and the 3rd digit denotes number of zeros following.)
- (0805, 1206, 1210, 2010, 2512 ≤±1%: the marking is 4 digits, the first 3 digits are the significant of the resistance and the 4th digit denotes number of zeros following.)
- (values of 0603 ≤±1%: 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.)

9. 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

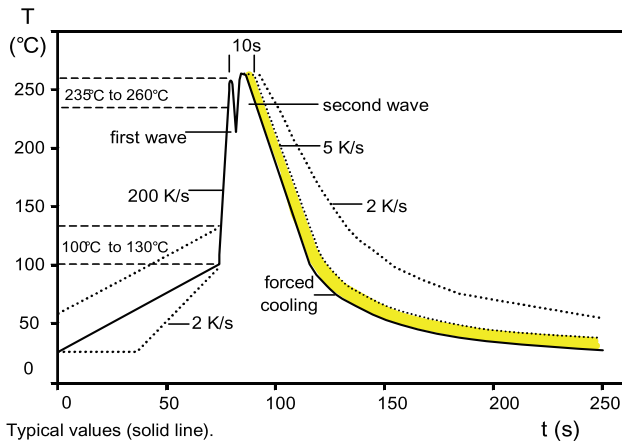
10. Performance Specifications

Temperature coefficient	01005: 1Ω~10Ω: ≤±600PPM/°C 10Ω~100Ω: ≤±400PPM/°C >100Ω: ≤±250PPM/°C	0402, 0603, 0805, 1206, 1210, 2010, 2512: 0.1Ω~0.99Ω: ≤±800PPM/°C 1Ω~10Ω: ≤±400PPM/°C 11Ω~100Ω: ≤±200PPM/°C >100Ω: ≤±100PPM/°C (0201>100Ω: ≤±200PPM/°C)
Short-time overload	±5%, ± 2%: ±(2.0% + 0.1Ω) Max. ±1%, ± 0.5%: ±(1.0% + 0.1Ω) Max.	
Insulation resistance	≥ 1,000 MΩ	
Dielectric withstanding voltage	No evidence of flashover, mechanical damage, arcing or insulation breakdown	
Terminal bending	±(1.0% + 0.05Ω) Max.	
Soldering heat	±(1.0% + 0.05Ω) Max.	
Solderability	Min. 95% coverage	
Temperature cycling	±5%, ± 2%: ±(1.0% + 0.05Ω) Max. ±1%, ± 0.5%: ±(0.5% + 0.05Ω) Max.	
Humidity (Steady State)	±5%, ± 2%: ±(3.0% + 0.1Ω) Max. ±1%, ± 0.5%: ±(0.5% + 0.1Ω) Max.	
Load life in humidity	±5%, ± 2%: ±(3.0% + 0.1Ω) Max. ±1%, ± 0.5%: ±(1.0% + 0.1Ω) Max.	
Load life	±5%, ± 2%: ±(3.0% + 0.1Ω) Max. ±1%, ± 0.5%: ±(1.0% + 0.1Ω) Max.	

11. Ordering Procedure

<u>RI</u>	<u>0603</u>	<u>L</u>	<u>1003</u>	<u>F</u>	<u>I</u>
Product Type	Resistor Size	Temperature coefficient	Resistance Value	Tolerance	Packing Type
Thick Film Chip Resistors	01005(0402)	01005: 1Ω~10Ω: ≤±600PPM/°C 10Ω~100Ω: ≤±400PPM/°C >100Ω: ≤±250PPM/°C	103=10KΩ 1003=100KΩ 1R0=1Ω	B = ±0.1% C = ±0.25% D = ±0.5% F = ±1% J = ±5%	T = T/R B = Bulk in Poly bag C = Bulk in cassette
	0201(0603)				
	0402(1005)				
	0603(1608)	0402~2512: 0.1Ω~0.99Ω: ≤±800PPM/°C 1Ω~10Ω: ≤±400PPM/°C 11Ω~100Ω: ≤±200PPM/°C >100Ω: ≤±100PPM/°C (0201>100Ω: ≤±200PPM/°C)			
	0805(2012)				
	1206(3216)				
	1210(3225)				
	1812(4532)				
	2010(5025)				
2512(6432)					

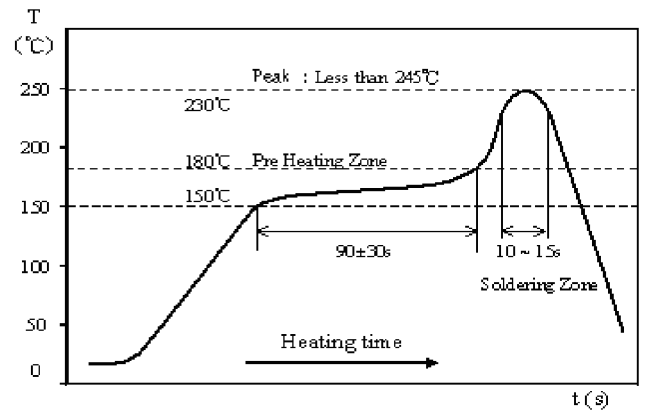
12. Soldering Temperature Curve



Typical values (solid line).

Process limits (dotted line).

WAVE soldering.

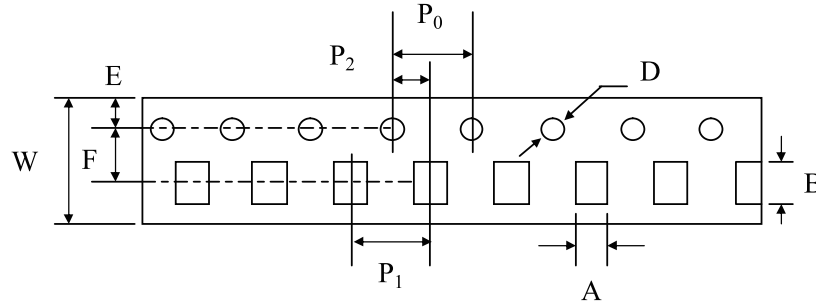


IR Reflow Soldering

13. Specification

■ Tape And Reel Package

· Taping specs are according to EIA RS-481

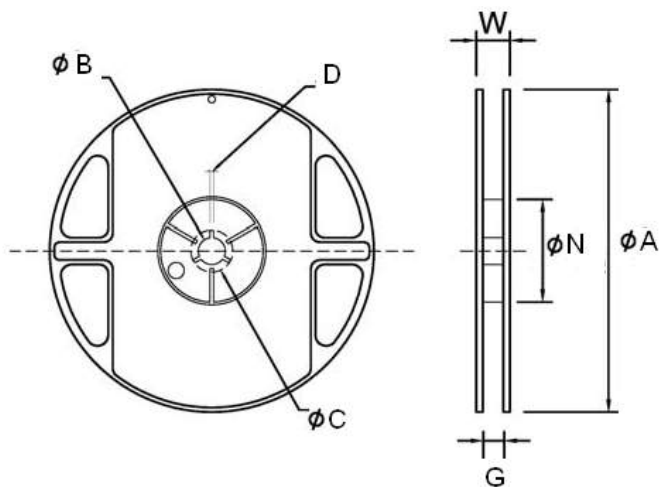


Accumulated dimensional tolerance $40 \pm 2\text{mm}$

Size	A	B	W	F	E	P1	P2	P0	D
0201	0.37±0.05	0.67±0.05	8.00±0.20	3.50±0.05	1.75±0.10	2.00±0.05	2.00±0.05	4.00±0.10	1.50+0.10/-0
0402	0.70±0.10	1.20±0.10	8.00±0.30	3.50±0.05	1.75±0.10	2.00±0.10	2.00±0.05	4.00±0.10	1.50+0.10/-0
0603	1.10±0.20	1.90±0.20	8.00±0.30	3.50±0.05	1.75±0.10	4.00±0.10	2.00±0.05	4.00±0.10	1.50+0.10/-0
0805	1.65±0.20	2.40±0.20	8.00±0.30	3.50±0.05	1.75±0.10	4.00±0.10	2.00±0.05	4.00±0.10	1.50+0.10/-0
1206	2.00±0.20	3.60±0.20	8.00±0.30	3.50±0.05	1.75±0.10	4.00±0.10	2.00±0.05	4.00±0.10	1.50+0.10/-0
1210	3.00±0.20	3.60±0.20	8.00±0.30	3.50±0.05	1.75±0.10	4.00±0.10	2.00±0.05	4.00±0.10	1.50+0.10/-0
1812	3.30±0.20	4.60±0.20	12.00±0.30	5.50±0.05	1.75±0.10	4.00±0.10	2.00±0.05	4.00±0.10	1.50+0.10/-0
2010	2.80±0.20	5.50±0.20	12.00±0.30	5.50±0.05	1.75±0.10	4.00±0.10	2.00±0.05	4.00±0.10	1.50+0.10/-0
2512	3.50±0.20	6.70±0.20	12.00±0.30	5.50±0.05	1.75±0.10	4.00±0.10	2.00±0.05	4.00±0.10	1.50+0.10/-0

(unit: mm)

· Reel Package



Size	Packaging Q'ty	A	N	B	C	D	G	W
0201	15Kpcs / Reel	178.0±2.0	60.0±0.5	13.0±0.5	20min	2.0±0.5	10.0±1.5	14.9 max.
0402	10Kpcs / Reel	178.0±2.0	60.0±0.5	13.0±0.5	20min	2.0±0.5	10.0±1.5	14.9 max.
0603 0805 1206 1210	1Kpcs / Reel	100.0±0.5	52.0±0.5	13.0±0.5	20min	2.0±0.5	9.0±0.5	12.5 max.
	5Kpcs / Reel	178.0±2.0	60.0±0.5	13.0±0.5	20min	2.0±0.5	10.0±1.5	14.9 max.
	10Kpcs / Reel	254.0±2.0	100.0±1.0	13.5±0.5	20min	2.0±0.5	10.0±1.5	14.9 max.
	20Kpcs / Reel	330.0±2.0	100.0±1.0	13.5±0.5	20min	2.0±0.5	10.0±1.5	14.9 max.
1812 2010 2512	4Kpcs / Reel	178.0±2.0	60.0±0.5	13.0±0.5	20min	2.0±0.5	13.8±1.5	16.7 max.
	8Kpcs / Reel	254.0±2.0	100.0±1.0	13.5±0.5	20min	2.0±0.5	13.8±1.5	16.7 max.
	16Kpcs / Reel	330.0±2.0	100.0±1.0	13.5±0.5	20min	2.0±0.5	13.8±1.5	20.0 max.

(unit: mm)