

THICK FILM CHIP RESISTOR - GENERAL

Features

- Miniature, Light-weight
- Ideal for reflow and wave flow solder
- Low assembly cost, suited for automatic SMT equipment
- Stable properties, high reliability
- Superior mechanical and frequency characteristics
- RoHS Compliant



How to Order

R	S	05	K	103	J	T
A	B	C	D	E	F	G

A		B		C		D			E	
Product Code		Power Rating Series Code		Size Code		Resistance Temperature Coefficient			Resistance Value	
Thick Film Chip Fixed Resistor				Code	Size	Code	Type	T.C.R.	E24 Series - expressed in 3 digits	
		Code	Power Rating Series	02	0402	0201	W	±200ppm/°C	First two digits are significant figures, the third digit denotes the number of zeros	
		C	Normal Series	03	0603	0402	U	±400ppm/°C		
		S	Upgrade Series	05	0805	0603	K	±100ppm/°C	E96 Series - expressed in 4 digits	
				06	1206	0805			First 3 digit are significant figures, the fourth digit denotes the number of zeros	
				1210	1210	1206				
				1812	1812	1210				
				10	2010	1812	L	±250ppm/°C		
				12	2512	2010				
						2512				

F		G	
Tolerance		Packaging Style	
Code	Tolerance	Code	Style
D	±0.5%	T	Tape & Reel
F	±1%	B	Bulk case
G	±2%		
J	±5%		
K	±10%		

Decimal place is expressed by "R". In this scenario all digits are significant figures

Jumper is expressed by 000

Example:

103=10KΩ (E-24)
1243=124KΩ(E-96)
1R0=1RΩ

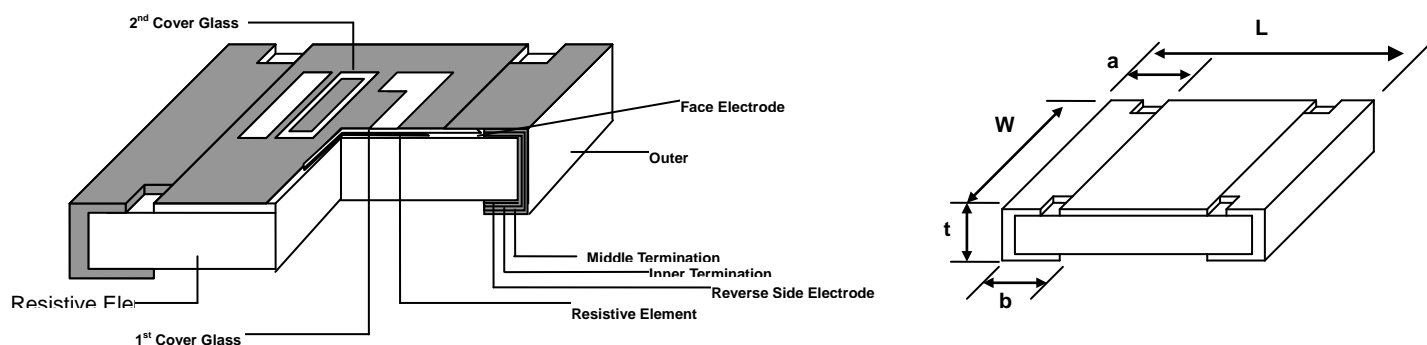
Standard Resistance Series

E-24 Series										
1.0	1.1	1.2	1.3	1.6	1.8	2.0	2.2	2.4	2.7	3.0
3.3	3.6	3.9	4.3	5.1	5.6	6.2	6.8	7.5	8.2	9.1

E-96 Series											
1.00	1.02	1.05	1.07	1.10	1.13	1.15	1.18	1.21	1.24	1.27	1.30
1.33	1.37	1.40	1.43	1.47	1.51	1.54	1.58	1.62	1.65	1.69	1.74
1.78	1.82	1.87	1.91	1.96	2.00	2.05	2.10	2.15	2.21	2.26	2.32
2.37	2.43	2.49	2.55	2.61	2.67	2.74	2.80	2.87	2.94	3.01	3.09
3.16	3.24	3.32	3.40	3.48	3.57	3.65	3.74	3.83	3.92	4.02	4.12
4.22	4.32	4.42	4.53	4.64	4.75	4.87	4.99	5.11	5.23	5.36	5.49
5.62	5.76	5.90	6.04	6.19	6.34	6.49	6.65	6.81	6.98	7.15	7.32
7.50	7.68	7.87	8.06	8.25	8.45	8.66	8.87	9.09	9.31	9.53	9.76

THICK FILM CHIP RESISTOR - GENERAL

Construction and Dimensions



Type	Dimensions(mm)				
	L	W	a	b	t
0402	1.0±0.10	0.5±0.10	0.2±0.1	0.25±0.1	0.30±0.10
0603	1.6±0.15	0.8±0.15	0.3±0.15	0.30±0.20	0.40±0.1
0805	2.0±0.15	1.25±0.15	0.4±0.20	0.4±0.20	0.5±0.1
1206	3.1±0.15	1.6±0.15	0.5±0.20	0.50±0.20	0.60±0.1
1210	3.2±0.20	2.50±0.20	0.55±0.10	0.50±0.20	0.50±0.20
1812	4.50±0.20	3.20±0.20	0.55±0.10	0.50±0.20	0.50±0.20
2010	5.00±0.20	2.50±0.20	0.55±0.10	0.60±0.20	0.60±0.20
2512	6.40±0.20	3.20±0.20	0.55±0.10	0.60±0.20	0.60±0.20

Ratings

Item	0402	0603	0805	1206	1210	1812	2010	2512
Rated power	Normal Series (RC)	1/16W	1/16W	1/10W	1/8W	1/4W	1/2W	1W
	Upgrade Series (RS)	N/A	1/10W	1/8W	1/4W	1/3W	N/A	3/4W
Max. Operating Voltage	50V	50V	100V (RC) 150V (RS)	200V	200V	200V	200V	200V
Max. Overload Voltage	100V	100V	200V (RC) 300V (RS)	400V	400V	400V	400V	400V
Resistance Tolerance	1Ω ~ 10MΩ: ±1% ±2% ±5% ±10% ±20%, (10Ω ~ 1MΩ: ±0.5%)						±1% ±2% ±5% ±10% ±20%	
Resistance Range	E-24, E-96 Series							
Jumper Rated Current	1A	1A	2A	2A	2A	2A	2A	2A
Operating Temperature Range	-55°C ~ +125°C							
Temperature Coefficient	10Ω ≤ R ≤ 1MΩ : ±200ppm/°C 1Ω ≤ R ≤ 10Ω, 1MΩ < R ≤ 10MΩ : ±400ppm/°C		10Ω ≤ R ≤ 1MΩ : ±100ppm/°C 1Ω ≤ R < 10Ω, 1MΩ < R ≤ 10MΩ : ±250ppm/°C					
Rated temperature	+70°C							

NOTE: Operating Voltages = $\sqrt{\text{Power Rating} \times \text{Resistance Value}}$ or Max. working voltage listed above, whichever is lower.

THICK FILM CHIP RESISTOR - GENERAL

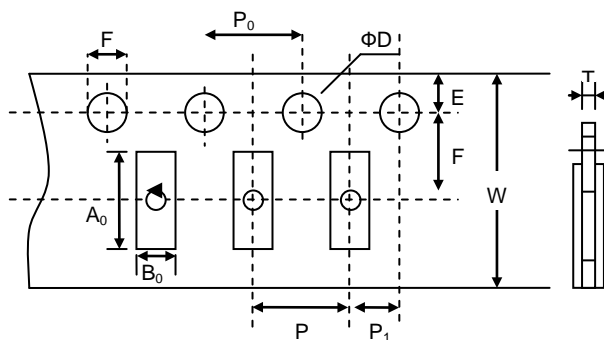
Characteristics

Item	Specifications	Test Methods (GB/T 5729-2003)
Temperature Cycling	$\Delta R \leq \pm(1.0\%R+0.05\Omega)$	-55°C ~ +125°C for 5 cycles
Short Time Over Load	$\Delta R \leq \pm(2\%R+0.1\Omega)$	Rated Voltage x2.5 for 5 seconds
Resistance To Soldering Heat	$\Delta R \leq \pm(1.0\%R+0.05\Omega)$	260°C \pm 5°C for 10 seconds
Load Life	$\Delta R \leq \pm(3\%R+0.1\Omega)$	70°C \pm 2°C, 1000h at RcwV 1.5Hrs ON, 0.5Hrs OFF
Solderability	$\geq 95\%$ Coverage	235°C \pm 5°C 3 seconds
Bending Strength	$\Delta R \leq \pm(1.0\%R+0.05\Omega)$	Bending Distance: 3mm (0402, 0603, 0805, 1206, 1210) 1mm (1812, 2010, 2512) (10 \pm 1 sec.)
T.C.R.	Within specified T.C.R.	Measure between -55°C ~ + 125°C
Steady State Humidity	$\Delta R \leq \pm(3.0\%R+0.1\Omega)$	40°C \pm 2°C 90%~95%RH at 1000h
Upper Temperature Endurance	$\Delta R \leq \pm(3.0\%R+0.1\Omega)$	125°C \pm 2°C at 1000h
Resistance to Solvent	$\Delta R \leq \pm(1.0\%R+0.05\Omega)$	Submerge in chloroethylene(氯乙烯) for 10h \pm 1h
Adhesion	No visible damage on surface	Apply 5N force for 10s \pm 1s
Insulation Resistance	1000M Ω Min	Check insulation resistance, after applying DC 100V between substrate and termination for 1 minute

Packaging

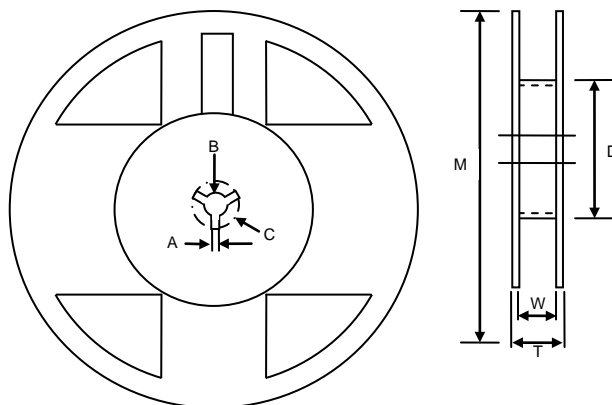
Tape and Reel

Type	A	B	W	F	E	P	P1	P0	D0	T
0402	1.2 \pm 0.1	0.7 \pm 0.1	0.8 \pm 0.20	3.5 \pm 0.05	1.75 \pm 0.1	2.0 \pm 0.01	2.0 \pm 0.05	4.0 \pm 0.05	1.5 \pm 0.10	0.42 \pm 0.05
0603	1.85 \pm 0.1	1.10 \pm 0.1	0.8 \pm 0.20	3.5 \pm 0.05	1.75 \pm 0.1	4.0 \pm 0.10	2.0 \pm 0.05	4.0 \pm 0.05	1.5 \pm 0.10	0.6 \pm 0.1
0805	2.35 \pm 0.1	1.65 \pm 0.1	0.8 \pm 0.20	3.5 \pm 0.05	1.75 \pm 0.1	4.0 \pm 0.10	2.0 \pm 0.05	4.0 \pm 0.05	1.5 \pm 0.10	0.75 \pm 0.1
1206	3.5 \pm 0.2	1.90 \pm 0.2	0.8 \pm 0.20	3.5 \pm 0.05	1.75 \pm 0.1	4.0 \pm 0.10	2.0 \pm 0.05	4.0 \pm 0.05	1.5 \pm 0.10	0.75 \pm 0.1
1210	3.5 \pm 0.2	2.8 \pm 0.2	0.8 \pm 0.20	3.5 \pm 0.05	1.75 \pm 0.1	4.0 \pm 0.10	2.0 \pm 0.05	4.0 \pm 0.05	1.5 \pm 0.10	0.75 \pm 0.1
1812	4.8 \pm 0.1	3.4 \pm 0.1	12.0 \pm 0.1	5.5 \pm 0.1	1.75 \pm 0.1	4.0 \pm 0.10	2.0 \pm 0.05	4.0 \pm 0.05	1.5 \pm 0.10	0.81 \pm 0.05
2010	5.45 \pm 0.1	2.77 \pm 0.1	12.0 \pm 0.1	5.5 \pm 0.1	1.75 \pm 0.1	4.0 \pm 0.10	2.0 \pm 0.05	4.0 \pm 0.05	1.5 \pm 0.10	0.84 \pm 0.1
2512	6.73 \pm 0.1	3.4 \pm 0.1	12.0 \pm 0.1	5.5 \pm 0.1	1.75 \pm 0.1	4.0 \pm 0.10	2.0 \pm 0.05	4.0 \pm 0.05	1.5 \pm 0.10	0.81 \pm 0.1



THICK FILM CHIP RESISTOR - GENERAL

Type	T	W	M	A	B	C	D
0402							
0603							
0805	12.5±1.5	9.5±1.0	178±2.0	2.0±0.5	13.0±0.5	21.0±0.5	58.0±2.0
1206							
1210							
1812							
2010	15.5±1.5	13.0±0.5	178±2.0	2.0±0.5	13.0±0.5	21.0±0.5	57.0±2.0
2512							



Packaging Quantity

Packaging Style	Tape & Reel		
Type	0402	0603, 0805, 1206, 1210	1812, 2010, 2512
PCS / REEL	10000	5000	4000