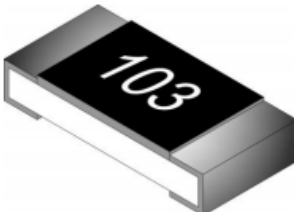




Product Family: General Purpose Thick Film Chip Resistor

Part Number Series: KGN Series

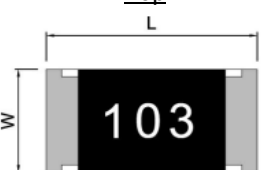
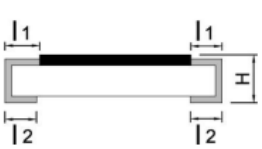


	Construction: - High purity alumina ceramic - Thick film resistive element 100% matte tin over Ni terminations - Halogen free - RoHS compliant and Pb free - Inherently anti-sulfur	Features: 0201, 0402, 0603, 0805, 1206, 1210, 1812, 2010 and 2512 English case sizes - Resistance from 1Ω~10MΩ + Jumpers available - TCR down to ±100ppm/°C - Tolerance down to ±0.1% - Moisture Sensitivity Level (MSL) = 1
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Description:

These general purpose thick film chip resistors are excellent for use in consumer electronics, communication, power supply, and measuring equipment. This series features a wide range of case sizes, resistive values, and resistance tolerances. High volume production provides excellent pricing and is suitable for commercial and special applications.

Product Dimensions:

Top 	Side 
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All dimensions shown in inches, mm in parentheses.

Dimension (Metric)	L	W	H	I1	I2
KGN0201 (0603)	0.024 ±0.001 (0.60 ±0.03)	0.012 ±0.001 (0.30 ±0.03)	0.009 ±0.001 (0.23 ±0.03)	0.006 ±0.002 (0.15 ±0.05)	0.006 ±0.002 (0.15 ±0.05)
KGN0402 (1005)	0.039 ±0.002 (1.00 ±0.05)	0.020 ±0.002 (0.50 ±0.05)	0.012 ±0.002 (0.30 ±0.05)	0.006 ±0.004 (0.15 ±0.10)	0.008 ±0.004 (0.20 ±0.10)
KGN0603 (1608)	0.063 ±0.004 (1.60 ±0.10)	0.031 ±0.004 (0.80 ±0.10)	0.016 ±0.004 (0.40 ±0.10)	0.012 ±0.008 (0.30 ±0.20)	0.012 ±0.004 (0.30 ±0.10)
KGN0805 (2012)	0.079 ±0.004 (2.00 ±0.10)	0.049 ±0.004 (1.25 ±0.10)	0.020 ±0.006 (0.50 ±0.15)	0.012 ±0.006 (0.30 ±0.15)	0.016 ±0.006 (0.40 ±0.15)
KGN1206 (3116)	0.120 ±0.004 (3.05 ±0.10)	0.063 ±0.004 (1.60 ±0.10)	0.022 ±0.006 (0.55 ±0.15)	0.016 ±0.008 (0.40 ±0.20)	0.020 ±0.008 (0.50 ±0.20)
KGN1210 (3125)	0.120 ±0.004 (3.05 ±0.10)	0.099 ±0.006 (2.50 ±0.15)	0.022 ±0.006 (0.55 ±0.15)	0.020 ±0.008 (0.50 ±0.20)	0.020 ±0.008 (0.50 ±0.20)
KGN1812 (4532)	0.177 ±0.004 (4.50 ±0.10)	0.118 ±0.006 (3.10 ±0.15)	0.022 ±0.002 (0.55 ±0.05)	0.022 ±0.008 (0.55 ±0.20)	0.028 ±0.008 (0.70 ±0.20)
KGN2010 (5025)	0.197 ±0.008 (5.00 ±0.20)	0.099 ±0.006 (2.50 ±0.15)	0.022 ±0.004 (0.55 ±0.10)	0.024 ±0.008 (0.60 ±0.20)	0.024 ±0.008 (0.60 ±0.20)
KGN2512 (6332)	0.248 ±0.008 (6.30 ±0.20)	0.126 ±0.006 (3.20 ±0.15)	0.022 ±0.004 (0.55 ±0.10)	0.024 ±0.008 (0.60 ±0.20)	0.024 ±0.008 (0.60 ±0.20)

Part Numbering: Ex: KGN0603R1001F-T5

Series Name	English Size (Metric Size)	Temp. Coefficient of Resistance (TCR)	Resistance Value	Resistance Tolerance	T&R Packaging Quantity
KGN	0201 (0603) 0402 (1005) 0603 (1608) 0805 (2012) 1206 (3116) 1210 (3125) 1812 (4532) 2010 (5025) 2512 (6332)	R = 100ppm/°C S = 200ppm/°C W = Refer to electrical tables	4 digits with the first 3 being significant. The last digit specifies the number of zeros. "R" denotes decimal position as necessary. Ex. 16R4 = 16.4Ω 2001 = 2kΩ JUMP = Jumper	B = ±0.1% D = ±0.5% F = ±1.0%* G = ±2.0% J = ±5.0%	-T4 = 4,000 pcs/reel -T5 = 5,000 pcs/reel -T10 = 10,000 pcs/reel (Refer to electrical tables)

* Note: Use "F" resistance tolerance code for all Jumper products indicating max resistance of 50mΩ.

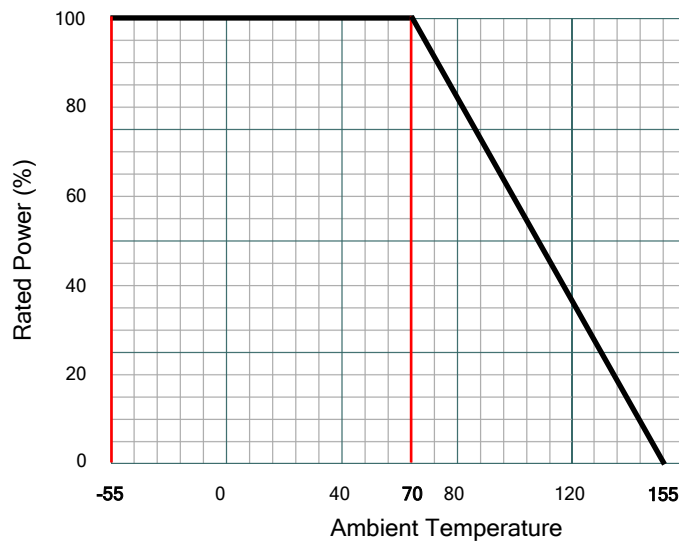
Electrical Specifications:

Type		KGN0201		KGN0402		KGN0603		KGN0805		KGN1206	
Metric Size		0603		1005		1608		2012		3116	
Power Rating		1/20W (0.05W)		1/16W (0.063W)		1/10W (0.10W)		1/8W (0.125W)		1/4W (0.25W)	
Resistance Range/ Tolerance % (code)	±0.1%(B)	-		-	10Ω~1MΩ	-	10Ω~1MΩ	-	10Ω~1MΩ	-	10Ω~1MΩ
	±0.5%(D)	-		1Ω~<10Ω	10Ω~10MΩ	1Ω~<10Ω	10Ω~10MΩ	1Ω~<10Ω	10Ω~10MΩ	1Ω~<10Ω	10Ω~10MΩ
	±1.0%(F)	1Ω~<10Ω	10Ω~10MΩ								
	±2.0%(G)										
	±5.0%(J)										
TCR ppm/°C (code)		-200/ +400(W)	±200(S)	±400(W)	±100(R)	±400(W)	±100(R)	±400(W)	±100(R)	±400(W)	±100(R)
Operating Voltage		25V		50V		75V		150V		200V	
Overload Voltage		50V		100V		150V		300V		400V	
Operating Temp. Range		-55°C~-+155°C									
Packaging (code)		10,000pcs/reel (-T10)					5,000pcs/reel (-T5)				

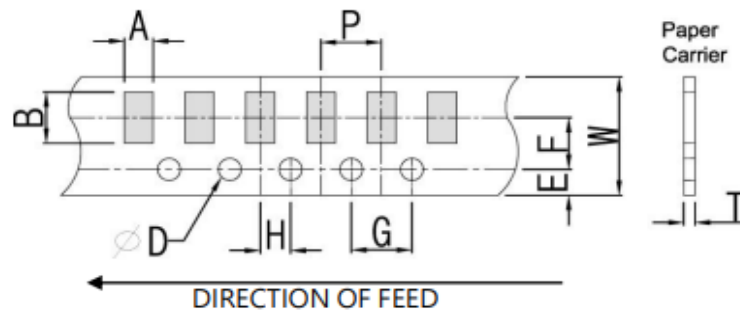
Type	KGN1210		KGN1812		KGN2010		KGN2512		
Metric Size	3125		4532		5025		6332		
Power Rating	1/2W (0.50W)		3/4W (0.75W)		3/4W (0.75W)		1W		
Resistance Range/ Tolerance % (code)	±0.1%(B)	-	10Ω~1MΩ	-	10Ω~1MΩ	-	10Ω~1MΩ	-	10Ω~1MΩ
	±0.5%(D)	1Ω~<10Ω	10Ω~10MΩ	1Ω~<10Ω	10Ω~10MΩ	1Ω~<10Ω	10Ω~10MΩ	1Ω~<10Ω	10Ω~10MΩ
	±1.0%(F)								
	±2.0%(G)								
	±5.0%(J)								
TCR ppm/°C (code)	±400(W)	±100(R)	±400(W)	±100(R)	±400(W)	±100(R)	±400(W)	±100(R)	±100(R)
Operating Voltage	200V								
Overload Voltage	400V								
Operating Temp. Range	-55°C~+155°C								
Packaging (code)	5,000pcs/reel (-T5)			4,000pcs/reel (-T4)					

Conditions for Jumper:

Type	KGN0201	KGN0402	KGN0603	KGN0805	KGN1206	KGN1210	KGN1812	KGN2010	KGN2512
Metric Size	0603	1005	1608	2012	3116	3125	4532	5025	6332
Resistance Value	50mΩ Max								
Rated Current	0.5A	1.0A		2.0A					
Max Current	1.0A	3.0A		10A					
Operating Temp. Range	-55°C~+155°C								
Packaging (code)	10,000pcs/reel (-T10)		5,000pcs/reel (-T5)				4,000pcs/reel (-T4)		

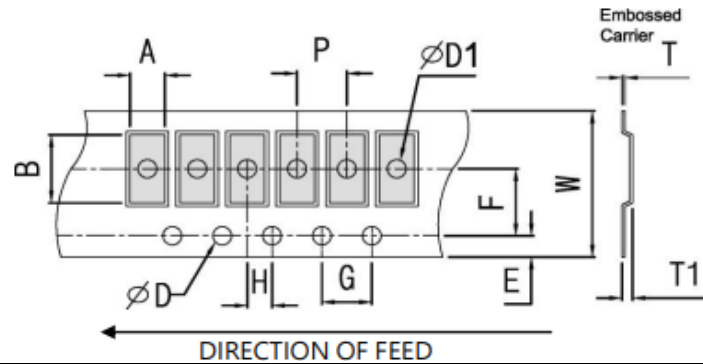
Power Derating Curve:**Reliability Specifications:**

Test	Procedure	Specification
Temperature Coefficient of Resistance (TCR) JIS C 5201-1 Clause 4.8 IEC-60115-1 4.8	At 25°C / -55°C and 25°C / +155°C, 25°C is the reference temperature	As Spec
Short Time Overload JIS C 5201-1 Clause 4.13 IEC-60115-1 4.13	2.5 times RCWV or Max. Overload voltage whichever is less for 5 seconds. Jumper: Over Load Current for 5 seconds 0201=1A, 0402/0603=2.5A 0805/1206/1210/1812/2010/2512=5A	1% and below: $\pm(1.0\%+0.05\Omega)$ 2%-5%: $\pm(2.0\%+0.10\Omega)$ Jumper: Max 0.05 Ω after test.
Leaching JIS-C-5201-1 4.18 IEC-60068-2-58 8.2.1	260 $\pm$ 5°C for 30 seconds.	Individual leaching area $\leq$ 5% Total leaching area $\leq$ 10%
Resistance to Soldering Heat JIS C 5201-1 Clause 4.18 IEC-60115-1 4.18	260 $\pm$ 5°C for 10 seconds.	1% and below: $\pm(0.5\%+0.05\Omega)$ 2%-5%: $\pm(1.0\%+0.05\Omega)$
Rapid Change of Temperature JIS C 5201-1 Clause 4.19 IEC-60115-1 4.19	-55°C to +155°C, 5 cycles	1% and below: $\pm(0.5\%+0.05\Omega)$ 2%-5%: $\pm(1.0\%+0.10\Omega)$
Resistance to Solvent JIS C 5201-1 Clause 4.29	The tested resistor to be immersed into isopropyl alcohol of 20~25°C for 60 secs. Then the resistor is left in the room for 48 hrs.	1% and below: $\pm(0.5\%+0.05\Omega)$ 2%-5%: $\pm(0.5\%+0.05\Omega)$ Jumper: Max 0.05 Ω after test.
Damp Heat with Load JIS C 4201-1- clause 4.24 IEC-60115-1 4.24	40 $\pm$ 2°C, 90~95% R.H. RCWV or Max. working voltage whichever is less for 1000 hrs. with 1.5 hrs. "ON" and 0.5 hr. "OFF".	1% and below: $\pm(1.0\%+0.05\Omega)$ 2%-5%: $\pm(2.0\%+0.05\Omega)$ Value <1 Ω : $\pm(2.0\%+0.05\Omega)$ Jumper: Max 0.1 Ω after test.
Load Life (Endurance) JIS C 5201-1 clause 4.25 IEC-60115-1 4.25.1	70 $\pm$ 2°C, RCWV or Max. working voltage whichever is less for 1000 hrs with 1.5 hrs "ON" and 0.5 hrs "OFF".	1% and below: $\pm(1.0\%+0.05\Omega)$ 2%-5%: $\pm(3.0\%+0.10\Omega)$ Value <1 Ω : $\pm(3.0\%+0.10\Omega)$ Jumper: Max 0.1 Ω after test.
Insulation Resistance JJIS-C-5201-1 Clause 4.6 IEC-60115-1 4.6	Apply 100VDC for 1 minute	$\geq$ 10G Ω
Bending Strength JIS C 5201-1 clause 4.33 IEC-60115-1 4.33	Bending once for 5 seconds D: 0402, 0603, 0805=5mm 1206, 1210, 1812= 3mm 2010, 2512= 2mm	1% and below: $\pm(1.0\%+0.05\Omega)$ 2%-5%: $\pm(1.0\%+0.05\Omega)$

Paper Tape Dimensions:

All dimensions in mm.

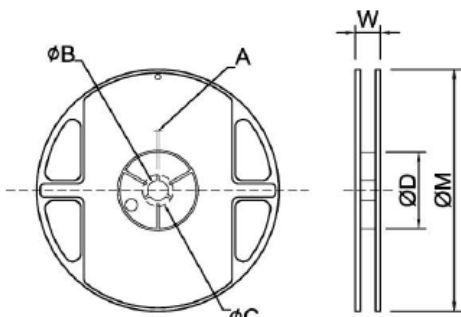
Type	A	B	W	E	F	G	H	T	ΦD	P
KGN0201	0.45 ±0.10	0.75 ±0.10	8.00 ±0.20	1.75 ±0.10	3.50 ±0.05	4.00 ±0.10	2.00 ±0.05	0.35 ±0.10	1.50 +0.10/-0	2.00 ±0.10
KGN0402	0.70 ±0.10	1.20 ±0.10	8.00 ±0.20	1.75 ±0.10	3.50 ±0.05	4.00 ±0.10	2.00 ±0.05	0.45 ±0.10	1.50 +0.10/-0	2.00 ±0.10
KGN0603	1.05 ±0.20	1.80 ±0.20	8.00 ±0.20	1.75 ±0.10	3.50 ±0.05	4.00 ±0.10	2.00 ±0.05	0.60 ±0.10	1.50 +0.10/-0	4.00 ±0.10
KGN0805	1.55 ±0.20	2.30 ±0.20	8.00 ±0.20	1.75 ±0.10	3.50 ±0.05	4.00 ±0.10	2.00 ±0.05	0.75 ±0.10	1.50 +0.10/-0	4.00 ±0.10
KGN1206	1.90 ±0.20	3.50 ±0.20	8.00 ±0.20	1.75 ±0.10	3.50 ±0.05	4.00 ±0.10	2.00 ±0.05	0.75 ±0.10	1.50 +0.10/-0	4.00 ±0.10
KGN1210	2.85 ±0.20	3.50 ±0.20	8.00 ±0.20	1.75 ±0.10	3.50 ±0.05	4.00 ±0.10	2.00 ±0.05	0.75 ±0.10	1.50 +0.10/-0	4.00 ±0.10

Plastic Tape Dimensions:

All dimensions in mm.

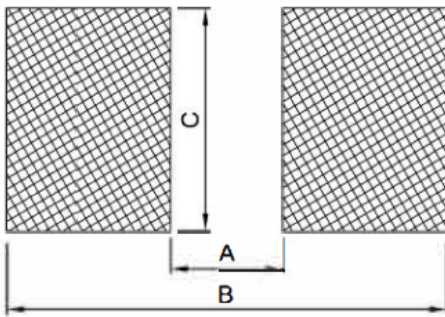
Type	A	B	W	E	F	G	H	T	ΦD	ΦD1	T1	P
KGN2010	2.80 ±0.20	5.60 ±0.20	12.0 ±0.10	1.75 ±0.10	5.50 ±0.05	4.00 ±0.10	2.00 ±0.05	0.23 ±0.10	1.50 +0.10/-0	1.50 ±0.10	0.85 ±0.15	4.00 ±0.10
KGN2512	3.40 ±0.20	6.70 ±0.20	12.0 ±0.10	1.75 ±0.10	5.50 ±0.05	4.00 ±0.10	2.00 ±0.05	0.23 ±0.10	1.50 +0.10/-0	1.50 ±0.10	0.85 ±0.15	4.00 ±0.10
KGN1812	3.30 ±0.20	4.60 ±0.20	12.0 ±0.10	1.75 ±0.10	5.50 ±0.05	4.00 ±0.10	2.00 ±0.05	0.23 ±0.10	1.50 +0.10/-0	1.50 ±0.10	0.85 ±0.15	4.00 ±0.10

Reel Dimensions:

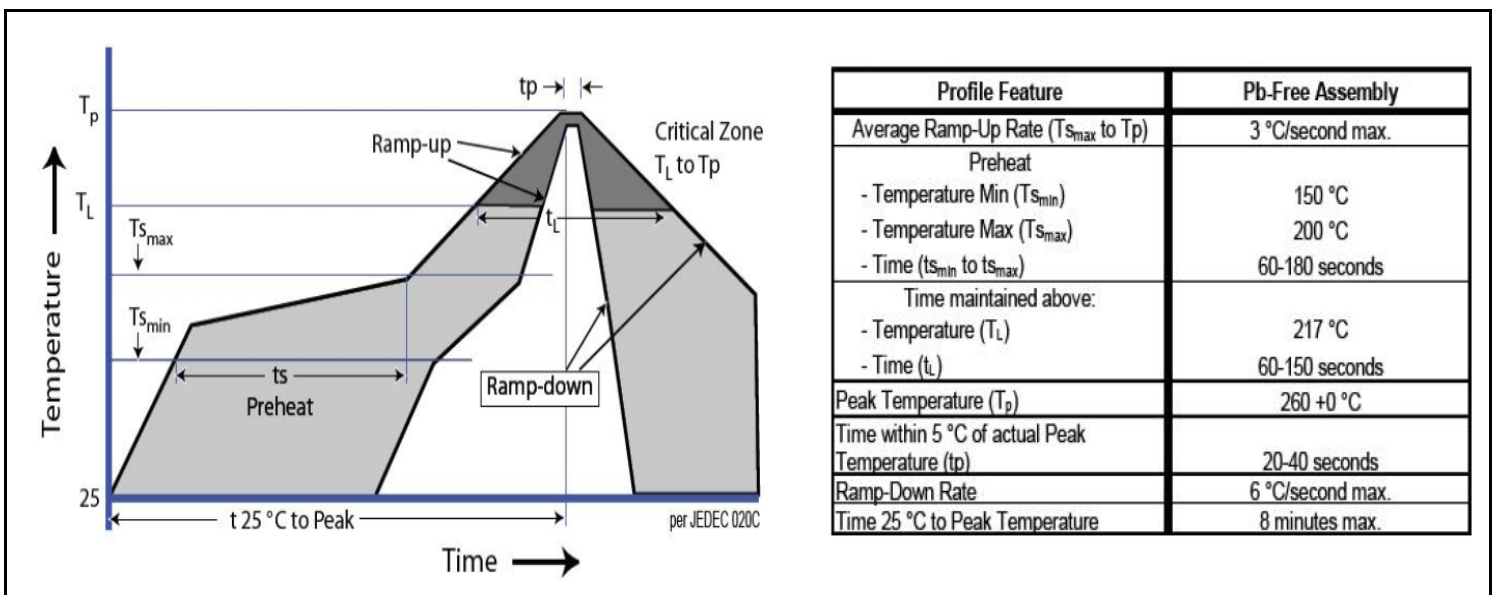
	Type	A	ΦB	ΦC	ΦD	W	ΦM
	KGN0201	2.00 $\pm$ 0.50	13.5 $\pm$ 1.00	21.0 $\pm$ 1.00	60.0 $\pm$ 1.00	11.5 $\pm$ 2.00	178 $\pm$ 2.00
	KGN0603	2.00 $\pm$ 0.50	13.5 $\pm$ 1.00	21.0 $\pm$ 1.00	60.0 $\pm$ 1.00	11.5 $\pm$ 2.00	178 $\pm$ 2.00
	KGN0805	2.00 $\pm$ 0.50	13.5 $\pm$ 1.00	21.0 $\pm$ 1.00	60.0 $\pm$ 1.00	11.5 $\pm$ 2.00	178 $\pm$ 2.00
	KGN1206	2.00 $\pm$ 0.50	13.5 $\pm$ 1.00	21.0 $\pm$ 1.00	60.0 $\pm$ 1.00	11.5 $\pm$ 2.00	178 $\pm$ 2.00
	KGN1210	2.00 $\pm$ 0.50	13.5 $\pm$ 1.00	21.0 $\pm$ 1.00	60.0 $\pm$ 1.00	16.0 $\pm$ 2.00	178 $\pm$ 2.00
	KGN1812	2.00 $\pm$ 0.50	13.5 $\pm$ 1.00	21.0 $\pm$ 1.00	60.0 $\pm$ 1.00	16.0 $\pm$ 2.00	178 $\pm$ 2.00
	KGN2010	2.00 $\pm$ 0.50	13.5 $\pm$ 1.00	21.0 $\pm$ 1.00	60.0 $\pm$ 1.00	16.0 $\pm$ 2.00	178 $\pm$ 2.00
	KGN2512	2.00 $\pm$ 0.50	13.5 $\pm$ 1.00	21.0 $\pm$ 1.00	60.0 $\pm$ 1.00	16.0 $\pm$ 2.00	178 $\pm$ 2.00

All dimensions in mm

Recommended Land Pattern:

	Type	A	B	C
	KGN0201	0.25	1.10	0.32
	KGN0402	0.60	1.60	0.70
	KGN0603	0.80	2.40	1.00
	KGN0805	1.30	2.90	1.40
	KGN1206	2.20	4.20	1.70
	KGN1210	2.00	4.40	2.70
	KGN1812	3.11	5.91	3.00
	KGN2010	3.80	6.60	2.70
	KGN2512	4.90	8.10	3.40

All dimensions in mm

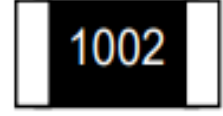
Soldering Profile:

Marking Information:

0402: no marking



0603: 3 digits code

0805~2512: 3
digits code (5.0%)0805~2512: 4 digits code for
(1% and below)**Standard E96 Values and 0603 Resistance Codes**

R-Value	100	102	105	107	110	113	115	118	121	124	127	130	133	137	140	143	147	150	154	158	162	165	169	174
Code	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
R-Value	178	182	187	191	196	200	205	210	215	221	226	232	237	243	249	255	261	267	274	280	287	294	301	309
Code	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48
R-Value	316	324	332	340	348	357	365	374	383	392	402	412	422	432	442	453	464	475	487	499	511	523	536	549
Code	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72
R-Value	562	576	590	604	619	634	649	665	681	698	715	732	750	768	787	806	825	845	866	887	909	931	953	976
Code	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96

Multiplier Codes for 0603 E96 Values

Code	A	B	C	D	E	F	X	Y
Multiplier	10 ⁰	10 ¹	10 ²	10 ³	10 ⁴	10 ⁵	10 ⁻¹	10 ⁻³

Examples of 0603 Resistance Codes for E96 Values

R-Value	4.99Ω	33.2Ω	475Ω	2.21KΩ	10.2KΩ	604KΩ
Code	68Y	51X	66A	34B	02C	76C

Examples of 0603 Resistance Codes for E24 Values

R-Value	4.7Ω	33Ω	470Ω	5.6KΩ	62KΩ	680KΩ
Code	4R7	330	471	562	623	684

Examples of 4 Digit Resistance Codes for 0805 ~ 2512

R-Value	5.6Ω	10Ω	22.6Ω	100Ω	1.1KΩ	10KΩ	332KΩ	1MΩ
Code	5R60	10R0	22R6	1000	1101	1002	3323	1004

Note: Jumper zero ohm resistor marking code is one 0, except type 0201 and 0402.

Note: All resistance values under 10ohm will have a 'R' character. 3 digits code for E24 5.0% and 4 digits code for E24 and E96 for 0.1%, 0.5% and 1.0%.

Storage Conditions:**Environment Conditions:**

Products should be stored under the following environmental conditions.

- Temperature: +5 to +35°C
- Humidity: 45 to 85% relative humidity
- Do not keep products in environments where they may be subject to particulate contamination or harmful gases such as sulfuric acid or hydrogen chloride as it may cause oxidation on electrodes, resulting in poor solderability.
- Products should be stored in a space that does not expose it to high temperatures, vibration, or direct sunlight.
- Products should be stored in the original airtight packaging until use.