

# SUSUMU Thin Film Chip Resistors



## RG SERIES

Susumu's proprietary NiCr based alloy exhibits excellent TCR Characteristics as compared to other resistive materials such as tantalum nitride. Despite the belief that NiCr thin film has reliability issues, especially in humid environment, Susumu has developed technologies to apply an inorganic passivation that acts as a hermetic seal, and our ultimate thin-film resistors, RG series, far exceed thick film resistor reliability, reaching 0.01fit (=10 parts per trillion) RG series thin-film chip resistors boast high precision, near zero TCR and unprecedented reliability with all the benefits of thin film resistors!

Susumu's typical resistive thin film is 20-200nm thick whereas thick film resistors can be up to 50um thick. Moreover, thin film is deposited using molecular processes such as sputtering and plasma enhanced chemical vapor deposition, whereas thick film is made of screen printed metal particles suspended in polymer. This fundamental difference results in the clear advantage of thin film resistors in performance. Susumu's thin film resistors has better high frequency characteristics (no skin effect: resistance change due to high frequency), low noise due to the evenness of thin film, and high resistance accuracy due to precise trimming of the thin film. The RG series combines the merit of such thin film performance with robustness and reliability that exceed thick film resistors.

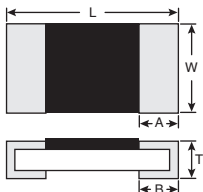
### Features:

- Various standard sizes: 0402, 0603, 0805
- Operating Temperature Range: -55°C to +155°C (100% power at 85°C)
- Tolerance/TCR: 0.02%/5ppm, 0.05%/10ppm, 0.1%/25ppm

- Superior reliability: less than 0.1% drift after 10000 hours of high temp. exposure (155°C) or high temp/humidity bias (85°C/85%RH)
- Can be used in 3 different power ratings (low, regular, and high) based on customer needs

### Environmental Tolerance:

- Sulfur resistant
- High Operating temperature
- Dust/oil/chemical resistance
- Vibration resistant



Dimensions: (in.)	RG1005 (0402)	RG1608 (0603)	RG2012 (0805)
L	1.0±0.05	1.6±0.2	2.0±0.2
W	0.5±0.05	0.8±0.2	1.25±0.2
A	0.2±0.10	0.3±0.2	0.4±0.2
B	0.25±0.05	0.3±0.2	0.4±0.2
T	0.35±0.05	0.4±0.1	0.4±0.1

Table 1: Power and Reliability (Reliability depends on the power rating customers choose.)

Item	Test Method	Drift Limits for Power Rating			(Typical)
		Low	Regular	High	
Short Time Overload	Applied Voltage: 2.5 rate voltage or 2max. operating voltage which ever is less test duration: 5 seconds	±0.05%	±0.05%	±0.25%	±0.01%
Load Life	Test Temperature: 85°C; Applied Voltage: rated voltage; Test Period: Repeat 1000 cycles as follows- 90min./30min. off cycled	±0.1%	±0.25%	±0.5%	±0.01%
Moisture Load Life	Test Condition: 85°C 85%RH; Applied Power: 1/10 rated power; Test Period: Repeat 1000 cycles as follows- 90min./30min. off cycled	±0.05%	±0.25%	±0.5%	±0.05%
Temperature Cycle	Repeat 1000 cycles as follows- -55°C (30min./Room Temp. (2min.))/+125°C (30min./Room Temp. (2min.))	0.1%			0.1%
Hi Temp Exposure	+155°C for 1000 hours with no load	0.1%			0.1%

### Current Noise Comparison

Electrons move smoothly without much dispersion that creates noise.

Electrons move randomly creating noise.

### Power Derating Curve

\* Insert Value Code from Table of Stocked Values

For quantities greater than listed, call for quote.

Size	MOUSER STOCK NO.		Susumu Part No.	Resistance (ohms)	Tolerance	Power Rating (See Table 1 for Reliability for Each Power Rating)			Temperature Coefficient	Price Each		
	Value	Suffix				Low	Regular	High		1	10	100
0402	754-RG1005P-Code	-B-T5	RG1005P-Code-B-T5	49.9-100K	0.1%	0.0312W (1/32W)	0.0625W (1/16W)	0.125W (1/8W)	±25PPM/°C	.60	.539	.269
0603	754-RG1608P-Code	-B-T5	RG1608P-Code-B-T5	47-332K	0.1%	0.0625W (1/16W)	0.125W (1/8W)	0.166W (1/6W)	±25PPM/°C	.42	.409	.204
0805	754-RG2012P-Code	-B-T5	RG2012P-Code-B-T5	47-332K	0.1%	0.0625W (1/16W)	0.125W (1/8W)	0.166W (1/6W)	±25PPM/°C	.42	.409	.204
0603	754-RG1608V-Code	-P-T1	RG1608V-Code-P-T1	100-1.5K	0.02%	0.0625W (1/16W)	0.125W (1/8W)	0.166W (1/6W)	±5PPM/°C	3.08	2.83	2.27
0805	754-RG2012V-Code	-P-T1	RG2012V-Code-P-T1	100-10K	0.02%	0.1W (1/10W)	0.125W (1/8W)	0.25W (1/4W)	±5PPM/°C	3.15	2.91	2.32

TABLE OF STOCKED VALUES																								
Value	Value Code *	Case Size	Value	Value Code *	Case Size	Value	Value Code *	Case Size	Value	Value Code *	Case Size	Value	Value Code *	Case Size	Value	Value Code *	Case Size	Value	Value Code *	Case Size	Value	Value Code *	Case Size	
47	470	X	X	953	9530				2.61K	2611					7.5K	752								
49.9	49R9	X	X	1K	102	X	X	X	2.74K	2741					7.87K	7871								
51	510	X	X	1.02K	1021				2.87K	2871	X	X			8.06K	8061	X							
75	750	X	X	1.05K	1051				3K	302	X	X	X		8.25K	8251	X	X	X					
100	101	X	X	1.07K	1071				3.01K	3011					8.45K	8451	X							
110	111		X	1.1K	112				3.16K	3161	X				8.66K	8661		X	X					
120	121		X	1.2K	122	X	X	X	3.24K	3241		X			8.87K	8871								
124	1240		X	1.21K	1211		X	X	3.3K	332	X		X		9.09K	9091	X	X	X					
150	151		X	1.24K	1241				3.32K	3321	X	X			9.31K	9311	X							
180	181		X	1.3K	132		X		3.92K	3921	X	X	X		9.53K	9531	X	X	X					
200	201	X	X	1.33K	1331		X	X	4.02K	4021	X	X	X		10K	103	X	X	X					
220	221		X	1.4K	1401		X		4.22K	4221		X			10.2K	1022	X	X	X					
249	2490	X	X	1.5K	152		X	X	4.3K	432	X	X	X		10.5K	1052	X	X	X					
270	271		X	1.54K	1541		X	X	4.32K	4321		X	X		10.7K	1072	X							
300	301	X	X	1.62K	1621		X	X	4.64K	4641		X			11K	113	X	X	X					
330	331		X	1.65K	1651		X		4.7K	472	X	X	X		12K	123	X	X	X					
374	3740		X	1.8K	182		X	X	4.75K	4751		X	X		12.1K	1212	X	X	X					
402	4020		X	1.82K	1821		X	X	4.99K	4991	X	X	X		12.4K	1242	X	X	X					
470	471		X	1.91K	1911		X		5.1K	512	X	X	X		12.7K	1272	X	X	X					
475	4750		X	2K	202	X	X	X	5.6K	562		X	X		13K	133	X	X	X					
499	4990	X	X	2.05K	2051		X	X	5.62K	5621		X			13.7K	1372		X						
510	511		X	2.2K	222		X	X	5.9K	5901	X	X	X		14.3K	1432	X	X	X					
604	6040		X	2.32K	2321		X	X	6.04K	6041		X	X		14.7K	1472		X						
649	6490		X	2.4K	242		X	X	6.19K	6191		X	X		15K	153	X	X	X					
750	751		X	2.49K	2491		X	X	6.2K	622		X	X		15.4K	1542	X	X	X					
820	821		X	2.55K	2551		X	X	7.15K	7151		X	X		16.2K	1622	X	X	X					