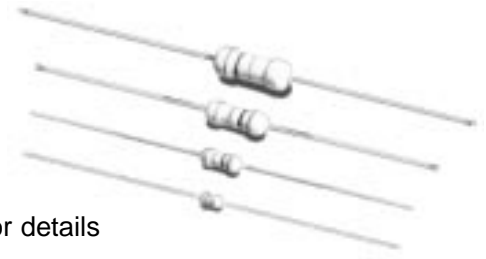


FEATURES

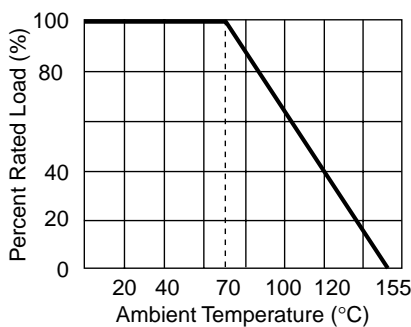
- ±5% tolerance
- High quality performance at economical prices
- Compatible with automatic insertion equipment
- Flame retardant type available
- Weldable type with copper plated lead wire available
- Values below 1Ω or above 10MΩ are available by special request, please ask for details



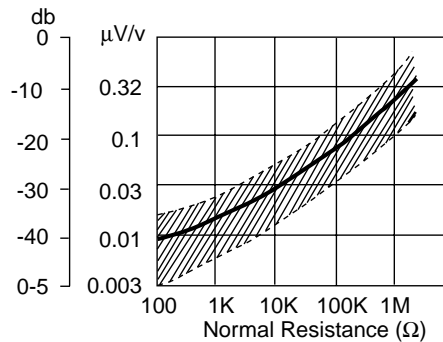
CHARACTERISTICS

Item	Characteristics
Operating Temperature Range	-55°C ~ +155°C
Temperature Coefficient	1Ω ~ 91KΩ is 0 ~ -450ppm/°C; 100KΩ ~ 1MΩ is 0 ~ -700ppm/°C; 1.1MΩ ~ 10MΩ is -800 ~ -700ppm/°C Test methods: natural resistance change per temp. °C; $[R_2 - R_1 / R_1 (t_2 - t_1)] \times 10^6$ (ppm/°C); R ₁ is resis. value at room temp. (t ₁); R ₂ is resis. value at room temp.+100°C (t ₂); Test pattern is room temp., room temp.+100°C.
Dielectric Withstanding Voltage	No evidence of flashover mechanical damage, arcing or insulation breakdown. Test method is resistors are clamped in the trough of a 90° metallic V-block and tested at the maximum overload voltage for 60 +10/-0 seconds.
Temperature Cycling	±1% +0.05Ω max. with no evidence of mechanical damage. Test method is five cycles for duty cycle as follows: step 1 at -55°C ±3°C for 30 min.; step 2 at room temp. for 10~15 min.; step 3 at +155°C ±2°C for 30 min.; step 4 at room temp. for 10~15 min.
Short-Time Overload (permanent resistance change)	±1% +0.05Ω max. with no evidence of mechanical damage. Test method is the application of a potential of 2.5 times RCWV for 5 seconds.
Load Life in Humidity	For normal type: <100KΩ is ±3%, ≥100KΩ is ±5%. For flame retardant type: <100KΩ is ±5%, ≥100KΩ is ±10%. Test method is 1,000 hours operating at RCWV with duty cycle of 1.5 hours "on", 0.5 hour "off" in a humidity test chamber controlled at 40°C ±2°C and 90~95% relative humidity.
Load Life (permanent resistance change)	For normal type: <56KΩ is ±2%, ≥56KΩ is ±3%. For flame retardant type: <100KΩ is ±5%, ≥100KΩ is ±10%. Test method is 1,000 hours operating at RCWV with duty cycle of 1.5 hours "on", 0.5 hour "off" at +70°C ±2°C ambient.
Insulation Resistance	10,000MΩ min. Test method is resistors are clamped in the trough of a 90° metallic V-block and tested at the maximum overload voltage for 60 +10/-0 seconds.
Resistance to Soldering Heat (permanent resistance change)	±1% +0.05Ω max. with no evidence of mechanical damage. Test method is leads are immersed 3.2~4.8mm from the body in 350°C ±10°C solder for 3 ±0.5 seconds

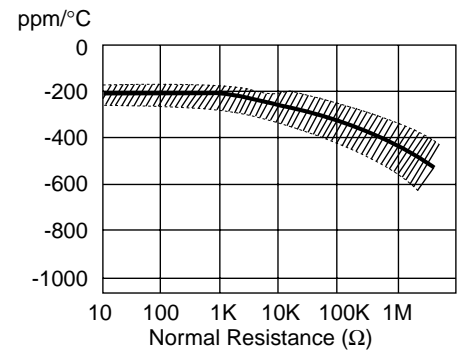
DERATING CURVE



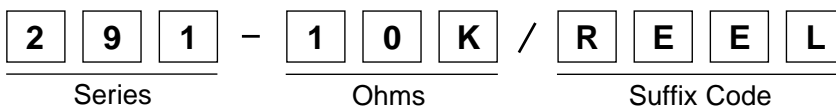
CURRENT NOISE



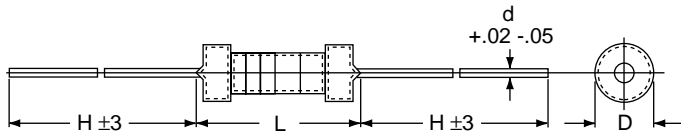
TEMPERATURE COEFFICIENT



PART NUMBERING SYSTEM



■ SERIES, WATTAGE, SIZE, VOLTAGE, DIMENSIONS, AND AVAILABLE PACKAGING



Suffix Code:	Package:
1000	Bulk
REEL	Tape and Reel
AP	Ammo Pack

Series	Watts	Size	Voltage (max.)		Dimensions (mm)						Standard Quantities Available		
			W.V.	O.V.	L max.	L min.	D max.	D min.	H	d	Bulk	Tape and Reel	Ammo Pack
291S	1/4W	Small	250	500	4.2	3.2	2.0	1.7	28	0.5	1,000	5,000	2,000
293S	1/2W	Small	350	700	9	5.6	3.0	2.1	28	0.6	1,000	5,000	1,000
294	1W	Small	500	1,000	12	10.5	5.0	4.0	28	0.7	1,000	3,000	1,000
297S	2W	Small	500	1,000	12	10.5	5.0	4.0	28	0.7	1,000	1,000	1,000
299	1/8W	Standard	200	400	4.2	3.2	2.0	1.7	28	0.5	1,000	5,000	2,000
291	1/4W	Standard	250	500	6.8	5.6	2.5	2.1	28	0.6	1,000	5,000	1,000
293	1/2W	Standard	350	700	10	8.5	3.5	3.0	28	0.6	1,000	3,000	1,000
294L	1W	Standard	500	1,000	16	14.5	5.5	4.5	28	0.8	1,000	1,000	1,000
297	2W	Standard	500	1,000	16	14.5	5.5	4.5	28	0.8	1,000	500	500

■ STANDARD VALUES (Ω)

0.5	2.0	4.3	9.1	20	43	91	200	430	910	2K	3.9K	8.2K	18K	39K	82K	180K	390K	820K	1.8M	3.9M	8.2M
1.0	2.2	4.7	10	22	47	100	220	470	1K	2.2K	4.3K	9.1K	20K	43K	91K	200K	430K	910K	2M	4.3M	9.1M
1.1	2.4	5.1	11	24	51	110	240	510	1.1K	2.4K	4.7K	10K	22K	47K	100K	220K	470K	1M	2.2M	4.7M	10M
1.2	2.7	5.6	12	27	56	120	270	560	1.2K	2.7K	5.1K	11K	24K	51K	110K	240K	510K	1.1M	2.4M	5.1M	15M
1.3	3.0	6.2	13	30	62	130	300	620	1.3K	3K	5.6K	12K	27K	56K	120K	270K	560K	1.2M	2.7M	5.6M	22M
1.5	3.3	6.8	15	33	68	150	330	680	1.5K	3.2K	6.2K	13K	30K	62K	130K	300K	620K	1.3M	3M	6.2M	
1.6	3.6	7.5	16	36	75	160	360	750	1.6K	3.3K	6.8K	15K	33K	68K	150K	330K	680K	1.5M	3.3M	6.8M	
1.8	3.9	8.2	18	39	82	180	390	820	1.8K	3.6K	7.5K	16K	36K	75K	160K	360K	750K	1.6M	3.6M	7.5M	