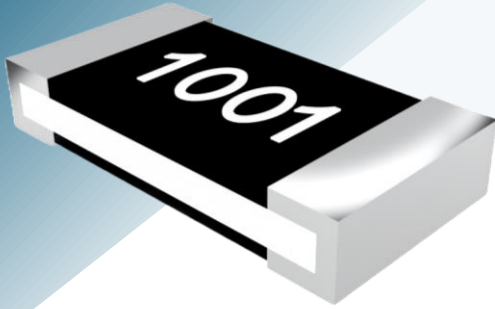


# HRRAS Hi-Reliability Chip Resistor Arrays



## FEATURES

- Thick film technology
- Power rating up to 2 watts at +70 °C
- 1 Ω to 1 MΩ
- High power surge withstanding
- Available with Sn, Sn/Pb, Au terminals
- MIL-PRF-55342 and Space Level screening available

## APPLICATIONS

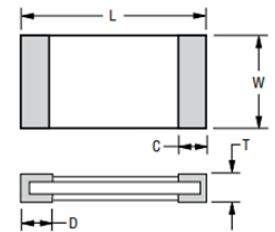
- Aerospace
- Avionics
- Military
- Medical

## Electrical Characteristics

Characteristic	Model					
	HRRAS0603	HRRAS0805	HRRAS1206	HRRAS1210	HRRAS2010	HRRAS2512
Power Rating @ 70 °C	0.125 W	0.25 W	0.5 W	0.5 W	1 W	2 W
Operating Temperature Range	-55°C to +155°C					
Derated to Zero Load	+155°C					
Maximum Working Voltage	50 V	150 V	200 V	200 V	200 V	300 V
Maximum Overload Voltage	100 V	300 V	400 V	400 V	400 V	600 V
Resistance Tolerance	±1%, ±5%					
Temperature Coefficient	±100 PPM/°C					
1 ohm to 9.76 ohms (± 1%)	±200 PPM/°C	±150 PPM/°C			±100 PPM/°C	
10 ohms to 1 megohm (± 1%)	±100 PPM/°C	±100 PPM/°C			±100 PPM/°C	
1 ohm to 1 megohm (± 5%)	±200 PPM/°C	±200 PPM/°C			±200 PPM/°C	

## Product Dimensions

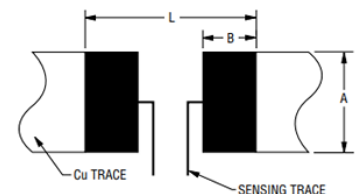
Model	L	W	C	D	T
HRRAS0603	1.60 ± 0.10 (0.063 ± 0.004)	0.80 ± 0.10 (0.031 ± 0.004)	0.30 ± 0.20 (0.012 ± 0.008)	0.30 ± 0.20 (0.012 ± 0.008)	0.45 ± 0.10 (0.018 ± 0.004)
HRRAS0805	2.00 ± 0.10 (0.079 ± 0.004)	1.25 ± 0.10 (0.049 ± 0.004)	0.40 ± 0.20 (0.016 ± 0.008)	0.40 ± 0.20 (0.016 ± 0.008)	0.50 ± 0.10 (0.020 ± 0.004)
HRRAS1206	3.10 ± 0.10 (0.122 ± 0.004)	1.60 ± 0.10 (0.063 ± 0.004)	0.50 ± 0.25 (0.020 ± 0.010)	0.50 ± 0.25 (0.020 ± 0.010)	0.55 ± 0.10 (0.022 ± 0.004)
HRRAS1210	3.10 ± 0.10 (0.122 ± 0.004)	2.60 ± 0.10 (0.102 ± 0.004)	0.50 ± 0.25 (0.020 ± 0.010)	0.50 ± 0.25 (0.020 ± 0.010)	0.55 ± 0.10 (0.022 ± 0.004)
HRRAS2010	5.00 ± 0.20 (0.197 ± 0.008)	2.50 ± 0.20 (0.098 ± 0.008)	0.65 ± 0.25 (0.026 ± 0.010)	0.60 ± 0.25 (0.024 ± 0.010)	0.60 ± 0.10 (0.024 ± 0.004)
HRRAS2512	6.40 ± 0.20 (0.252 ± 0.008)	3.10 ± 0.20 (0.122 ± 0.008)	0.60 ± 0.25 (0.024 ± 0.010)	1.80 ± 0.25 (0.071 ± 0.010)	0.60 ± 0.15 (0.024 ± 0.006)



DIMENSIONS:  $\frac{\text{MM}}{\text{(INCHES)}}$

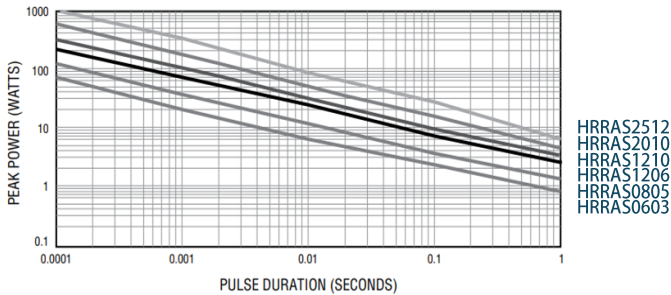
## Recommended Pad Layout

Model	A	B	L	Model	A	B	L
HRRAS0603	0.90 (0.035)	1.00 (0.039)	3.00 (0.118)	HRRAS1210	3.00 (0.118)	1.30 (0.051)	4.70 (0.185)
HRRAS0805	1.30 (0.051)	1.15 (0.045)	3.50 (0.138)	HRRAS2010	3.00 (0.118)	1.50 (0.059)	6.80 (0.268)
HRRAS1206	1.80 (0.071)	1.30 (0.051)	4.70 (0.185)	HRRAS2512	3.70 (0.146)	2.45 (0.096)	7.60 (0.299)

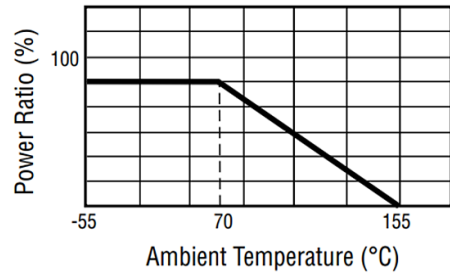


# AEM, INC.'s HRRAS Hi-Reliability Chip Resistor Arrays

## Surge Performance



## Derating Curve



## Typical Part Marking

HRRAS0603, HRRAS0805, HRRAS1206,  
HRRAS1210, HRRAS2010, HRRAS2512

HRRAS0805, HRRAS1206, HRRAS1210,  
HRRAS2010, HRRAS2512

± 5% (E96)  
3 digits identify the  
resistance value



301 -  $30 \times 10^1 = 300$   
ohms

HRRAS0603

± 1% (E24)  
3 digits identify the  
resistance value



222 -  $22 \times 10^2 = 2.2K$   
ohms

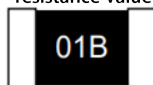
± 1% (E24 / E96)  
4 digits identify the  
resistance value



1542 -  $154 \times 10^2 = 15.4K$   
ohms

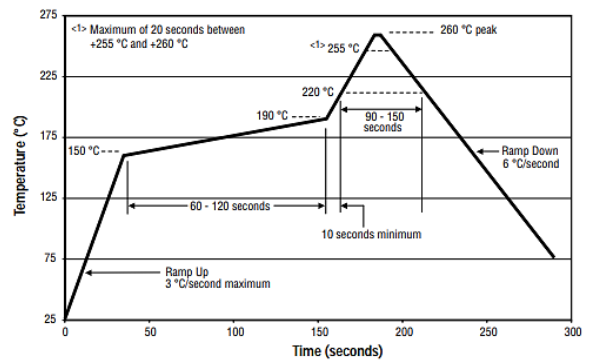
HRRAS0603

± 1% (E96)  
3 digits identify the  
resistance value



01B = 1K ohms  
(Refer to Marking Table  
below)

## Soldering Profile



## E96 Marking for HRRAS, 1%

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

This table shows the first two digits for the three-digit E96 part marking scheme. The third character is a letter multiplier:  
A=10<sup>0</sup> B=10<sup>1</sup> C=10<sup>2</sup> D=10<sup>3</sup> E=10<sup>4</sup> X=10<sup>-1</sup> Y=10<sup>-2</sup>

# AEM, INC.'s HRRAS Hi-Reliability Chip Resistor Arrays

AEM PN	Package Size	Resistance Code	Resistance Value (Ohms)	Resistance Tolerance	TCR	Screening Options	Terminal Code
HRRAS0603-1000FX	0603	1000	100	1%	X	X	XX
HRRAS0603-2101FX	0603	2101	2.1K	1%	X	X	XX
HRRAS0805-1R00FY	0805	1R00	1.00	1%	Y	X	XX
HRRAS0805-6R20FY	0805	6R20	6.20	1%	Y	X	XX
HRRAS0805-1000FX	0805	1000	100	1%	X	X	XX
HRRAS0805-1001FX	0805	1001	1K	1%	X	X	XX
HRRAS0805-1002FX	0805	1002	10K	1%	X	X	XX
HRRAS0805-1004FX	0805	1004	100K	1%	X	X	XX
HRRAS0805-10R0FX	0805	10R0	10.0	1%	X	X	XX
HRRAS0805-15R0FX	0805	15R0	15.0	1%	X	X	XX
HRRAS0805-2493FX	0805	2493	249K	1%	X	X	XX
HRRAS0805-3302FX	0805	3302	33K	1%	X	X	XX
HRRAS0805-4701FX	0805	4701	4.7K	1%	X	X	XX
HRRAS0805-75R0FX	0805	75R0	75.0	1%	X	X	XX
HRRAS0805-8201FX	0805	8201	8.20K	1%	X	X	XX
HRRAS0805-3R3JW	0805	3R3	3.30	5%	W	X	XX
HRRAS0805-1000FX	0805	1000	100	1%	X	X	XX
HRRAS0805-3010FX	0805	3010	301	1%	X	X	XX
HRRAS1206-1R00FY	1206	1R00	1.00	1%	Y	X	XX
HRRAS1206-3R30FY	1206	3R30	3.30	1%	Y	X	XX
HRRAS1206-1000FX	1206	1000	100	1%	X	X	XX
HRRAS1206-1001FX	1206	1001	1K	1%	X	X	XX
HRRAS1206-1002FX	1206	1002	10K	1%	X	X	XX
HRRAS1206-1004FX	1206	1004	1M	1%	X	X	XX
HRRAS1206-1180FX	1206	1180	118	1%	X	X	XX
HRRAS1206-1623FX	1206	1623	162K	1%	X	X	XX
HRRAS1206-2202FX	1206	2202	22K	1%	X	X	XX
HRRAS1206-2491FX	1206	2491	2.49K	1%	X	X	XX
HRRAS1206-3003FX	1206	3003	300K	1%	X	X	XX
HRRAS1206-33R0FX	1206	33R0	33.00	1%	X	X	XX
HRRAS1206-4701FX	1206	4701	4.7K	1%	X	X	XX
HRRAS1206-4702FX	1206	4702	47K	1%	X	X	XX

\* A list of all additional part numbers are provided upon inquiry.

## Standard Screening Options

- **Option 1:** 100% visual inspection per MIL-PRF-55342, AS9102 FAIR, MIL-STD-1580 DPA.
- **Option 2:** 100% Group A and B Screening per MIL-PRF-55342, AS9102 FAIR, MIL-STD-1580 DPA (see AEM detail specification for more details).
- **Option 3:** 100% Group A, B, and C Screening per MIL-PRF-55342, AS9102 FAIR, MIL-STD-1580 DPA (see AEM detail specification for more details).
- **Option 4:** 100% Group A, B, and Qualification Screening per MIL-PRF-55342, AS9102 FAIR, MIL-STD-1580 DPA (see AEM detail specification for more details).
- **Option 5:** Customer Source Control Drawing (SCD) defined screening. AEM will customize screening based on customer requirements.

## Ordering Information

HRRAS 0603 - 103 J W 1 PB

HRRAS - Hi-Reliability Chip Resistor Arrays

0603 - EIA Package Size

103 - Resistance Code

For 1% Tolerance: First three digits are significant; fourth digit represents number of zeros to follow (example: 8252 = 82.5 K $\Omega$  ohms). "R" represents decimal point (example: 24R3 = 24.3  $\Omega$ )

For 5% Tolerance: First two digits are significant; third digit represents number of zeros to follow (example: 474 = 470 K $\Omega$ ) - "R" represents decimal point (example: 4R7 = 4.7  $\Omega$ )

J - Resistance Tolerance (F = 1%, J = 5%)

W - TCR (W =  $\pm 200$  PPM/ $^{\circ}$ C, X =  $\pm 100$  PPM/ $^{\circ}$ C, Y =  $\pm 150$  PPM/ $^{\circ}$ C)

Screening Options: 1, 2, 3, 4, 5 (see screening options below)

Terminal Code: PB - Sn/Pb plated; SN - Sn plated; AU - Au plated

