Hi-Reliability High Power Anti-Surge Resistor

HRRAS Series

Features

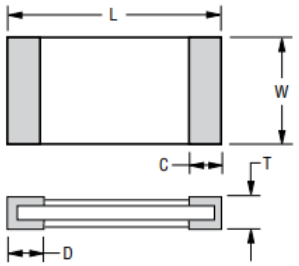
- Thick film technology
- Power rating up to 2 watts at +70 °C
- High power surge withstanding
- Sulfur resistant design
- Available with Sn, Sn/Pb, or Au terminal finish
- MIL-PRF-55342 and Space Level screening available

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	2W
Operating Temperature Range	-55C °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 1 ohm to 9.76 ohms (±1%, E24 & E96) 10 ohms to 1 megohm (±1%, E24 & E96) 1 ohm to 1 megohm (±5%, E24)	 ±200 PPM/°C ±100 PPM/°C ±200 PPM/°C	 ±150 PPM/°C ±100 PPM/°C ±200 PPM/°C	±100 PPM/°C ±100 PPM/°C ±200 PPM/°C			

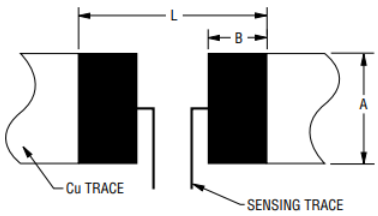
Product Dimensions

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)



Recommended Solder Pad Layout

Model	A	B	L	Model	A	B	L
HRRAS1210	3.00 (0.118)	1.30 (0.051)	4.70 (0.185)	HRRAS1210	3.00 (0.118)	1.30 (0.051)	4.70 (0.185)
HRRAS2010	3.00 (0.118)	1.50 (0.059)	3.50 (0.138)	HRRAS2010	3.00 (0.118)	1.50 (0.059)	3.50 (0.138)
HRRAS2512	1.80 (0.071)	2.45 (0.096)	7.60 (0.299)	HRRAS2512	1.80 (0.071)	2.45 (0.096)	7.60 (0.299)



Part Ordering Information

HRRAS 0603 – 103 J W 1 PB

HRRAS = High Reliability High Power Anti-Surge Resistor

0603 = EIA Package Size

103 = Resistance Code

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

W = TCR (W = ± 200 PPM/°C, X = ± 100 PPM/°C)

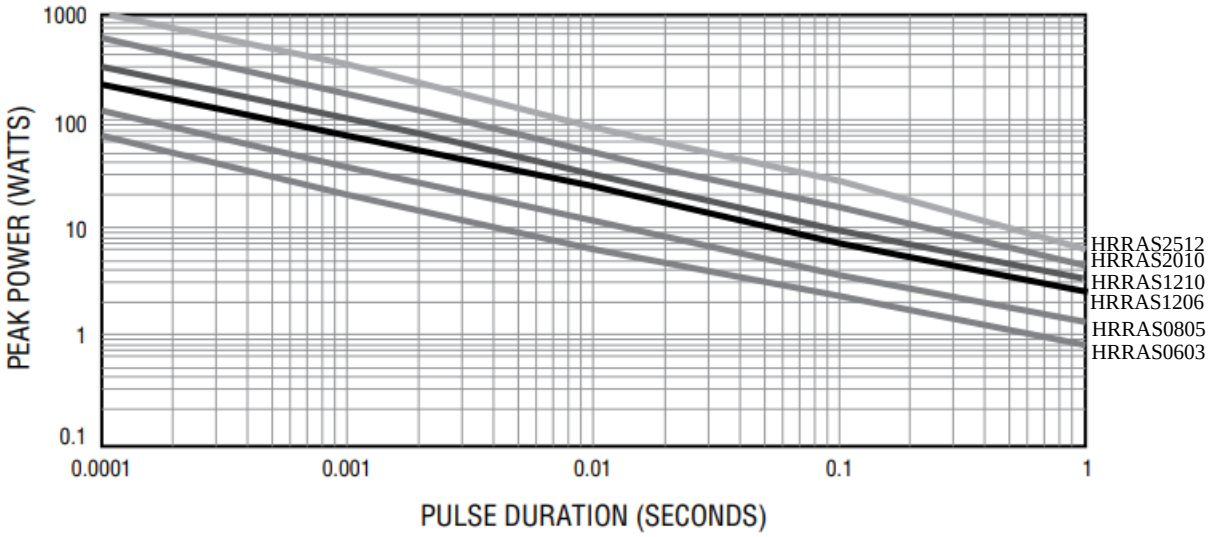
Screening Options: 1, 2, 3, 4, 5 (see screening options below)

Termination Code: PB = Sn/Pb plated; Sn = Sn plated; AU – Au plated

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.

Surge Performance



Typical Marking

HRRAS0603, HRRAS0805, HRRAS1206, HRRAS1210, HRRAS2010, HRRAS2510

E96 ± 5 %
3 digits identify the resistance value

301 – 30 X 10^1 = 300 ohms

HRRAS0805, HRRAS1206, HRRAS1210, HRRAS2010, HRRAS2512

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

1542 - 154 X 10^2 = 15.4K ohms

HRRAS0603

E24 ± 1 %
3 digits identify the resistance value

222 - 22 X 10^2 = 2.2K ohms

HRRAS0603

E96 ± 1 %
3 digits identify the resistance value

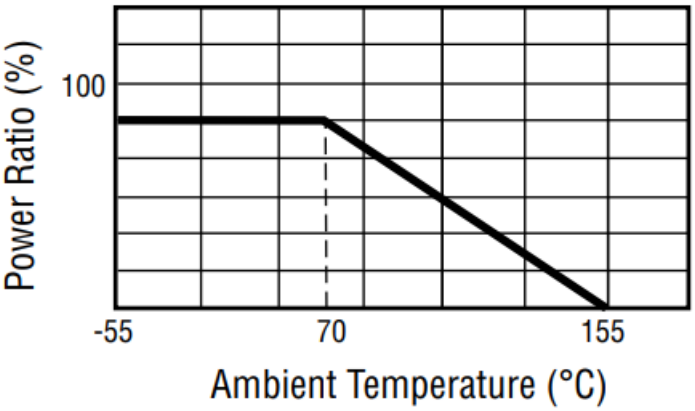
01B = lK ohms
(Refer to Marking Table below)

E96 Marking for HRRAS0603, 1%

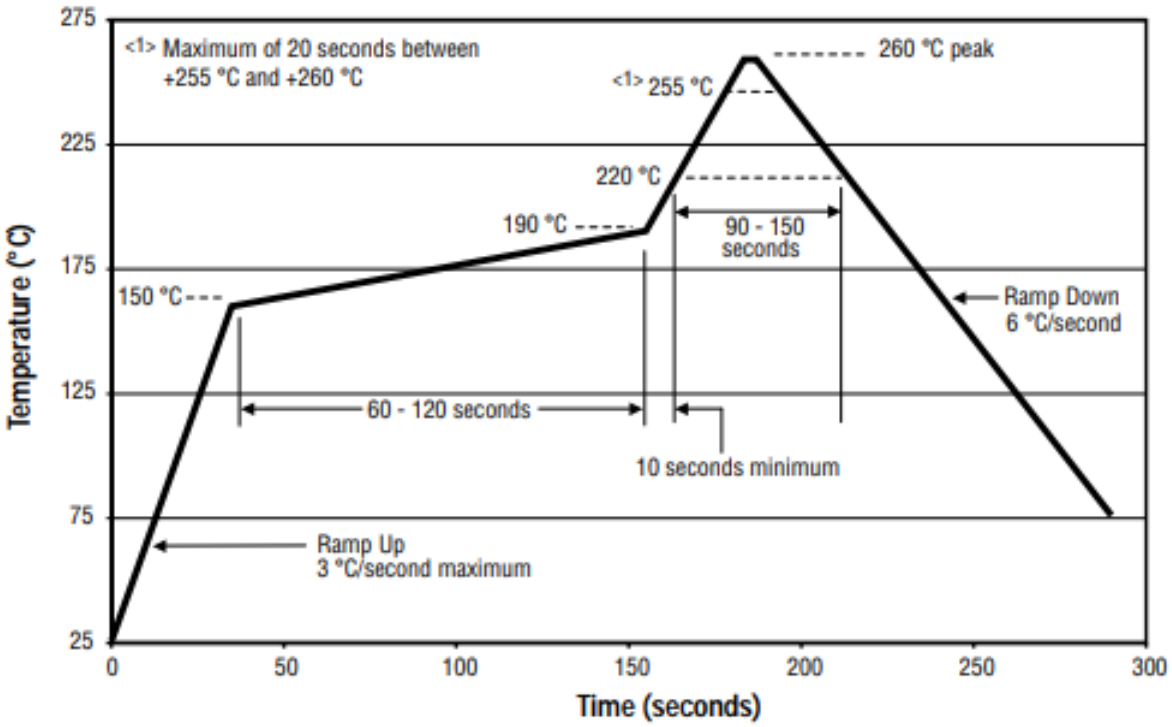
Code	R Value	Code	R Value	Code	R Value	Code	R Value	Code	R Value	Code	R Value	Code	R Value	Code	R Value
01	100	13	133	25	178	37	237	49	316	61	422	73	562	85	750
02	102	14	137	26	182	38	243	50	324	62	432	74	576	86	768
03	105	15	140	27	187	39	249	51	332	63	442	75	590	87	787
04	107	16	143	28	191	40	255	52	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=10^0 B=10^1 C=10^2 D=10^3 E=10^4 F=10^5 G=10^{-6} H=10^{-7} X=10^{-1} Y=10^{-2} Z=10^{-3}

Derating Curve



Recommended Lead-Free Soldering Profile



Recommended Sn/Pb Soldering Profile