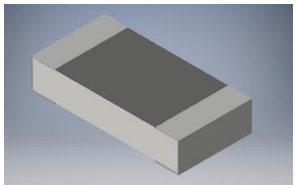
CSRT-AS Series

Anti-Sulfur Metal Film Low Resistance Chip Resistor

Stackpole Electronics, Inc.
Resistive Product Solutions

Features:

- Low resistance, TCR and inductance
- High precision current sensing
- Sulfur resistant
- RoHS compliant, REACH compliant, lead free and halogen free
- AEC-Q200 qualified



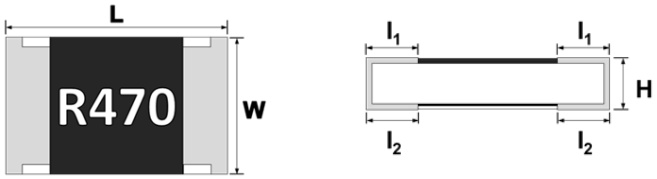
Electrical Specifications							
Type/Code	Power Rating (W) @ 70ºC	Max Rated Current (A)	Max Overload (A)	TCR (ppm/ºC)	Ohmic Range (Ω) and Tolerance		
					0.5%	1%	5%
CSRT0402-AS	0.25	2.24	5	± 100	0.05 - 0.091		
				± 50	0.1 - 10		
CSRT0603-AS	0.4	2.83	6.32	± 100	0.05 - 0.091		
				± 50	0.1 - 10		
CSRT0805-AS	0.5	3.16	7.07	± 100	0.05 - 0.091		
				± 50	0.1 - 10		
CSRT1206-AS	1	4.47	10	± 100	0.05 - 0.091		
				± 50	0.1 - 10		
CSRT1210-AS	1	4.47	10	± 100	0.05 - 0.091		
				± 50	0.1 - 10		
CSRT2010-AS	1.5	3.87	8.66	± 50	0.1 - 10		
CSRT2512-AS	2	4.47	10	± 50	0.1 - 10		

V = √(P*R)

Electrical Specifications – Long Side Termination							
Type/Code	Power Rating (W) @ 70ºC	Max Rated Current (A)	Max Overload (A)	TCR (ppm/ºC)	Ohmic Range (Ω) and Tolerance		
					0.5%	1%	5%
CSRT0612-AS	1	10	22.36	± 100	0.1 - 2	0.01 - 2	
CSRT1020-AS	2	14.14	31.62				
CSRT1225-AS	3	17.32	38.73				

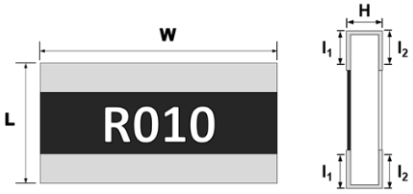
V = √(P*R)

Mechanical Specifications



Type/Code	L Body Length	W Body Width	H Body Height	I_1 Top Termination	I_2 Bottom Termination	Unit
CSRT0402-AS	0.039 ± 0.004 1.00 ± 0.10	0.020 ± 0.002 0.50 ± 0.05	0.014 ± 0.002 0.35 ± 0.05	0.008 ± 0.004 0.20 ± 0.10	0.010 ± 0.004 0.25 ± 0.10	inches mm
CSRT0603-AS	0.063 ± 0.004 1.60 ± 0.10	0.031 ± 0.004 0.80 ± 0.10	0.018 ± 0.004 0.45 ± 0.10	0.010 ± 0.006 0.25 ± 0.15	0.012 ± 0.006 0.30 ± 0.15	inches mm
CSRT0805-AS	0.079 ± 0.004 2.00 ± 0.10	0.049 ± 0.004 1.25 ± 0.10	0.022 ± 0.004 0.55 ± 0.10	0.014 ± 0.008 0.35 ± 0.20	0.016 ± 0.008 0.40 ± 0.20	inches mm
CSRT1206-AS	0.122 ± 0.004 3.10 ± 0.10	0.063 ± 0.004 1.60 ± 0.10	0.022 ± 0.004 0.55 ± 0.10	0.016 ± 0.008 0.40 ± 0.20	0.018 ± 0.008 0.45 ± 0.20	inches mm
CSRT1210-AS	0.122 ± 0.004 3.10 ± 0.10	0.098 ± 0.006 2.50 ± 0.15	0.022 ± 0.004 0.55 ± 0.10	0.020 ± 0.008 0.50 ± 0.20	0.020 ± 0.008 0.50 ± 0.20	inches mm
CSRT2010-AS	0.197 ± 0.008 5.00 ± 0.20	0.098 ± 0.006 2.50 ± 0.15	0.022 ± 0.004 0.55 ± 0.10	0.024 ± 0.010 0.60 ± 0.25	0.024 ± 0.010 0.60 ± 0.25	inches mm
CSRT2512-AS	0.248 ± 0.008 6.30 ± 0.20	0.126 ± 0.008 3.20 ± 0.20	0.022 ± 0.006 0.55 ± 0.15	0.026 ± 0.010 0.65 ± 0.25	0.026 ± 0.010 0.65 ± 0.25	inches mm

Mechanical Specifications – Long Side Termination

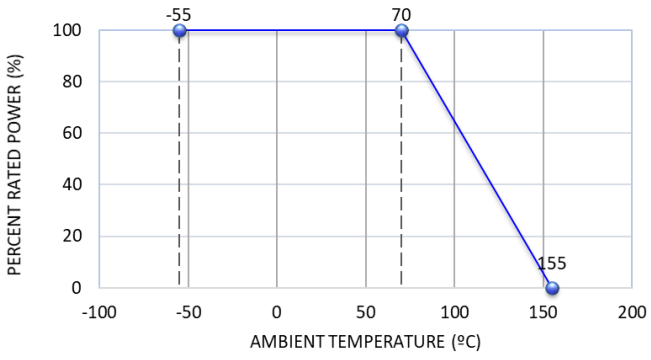


Type/Code	L Body Length	W Body Width	H Body Height	I_1 Top Termination	I_2 Bottom Termination	Unit
CSRT0612-AS	0.063 ± 0.006 1.60 ± 0.15	0.126 ± 0.008 3.20 ± 0.20	0.022 ± 0.006 0.55 ± 0.15	0.012 ± 0.008 0.30 ± 0.20	0.020 ± 0.008 0.50 ± 0.20	inches mm
CSRT1020-AS	0.098 ± 0.006 2.50 ± 0.15	0.197 ± 0.006 5.00 ± 0.15	0.022 ± 0.006 0.55 ± 0.15	0.016 ± 0.008 0.40 ± 0.20	0.020 ± 0.008 0.50 ± 0.20	inches mm
CSRT1225-AS	0.126 ± 0.008 3.20 ± 0.20	0.248 ± 0.008 6.30 ± 0.20	0.022 ± 0.006 0.55 ± 0.15	0.024 ± 0.010 0.60 ± 0.25	0.031 ± 0.010 0.80 ± 0.25	inches mm

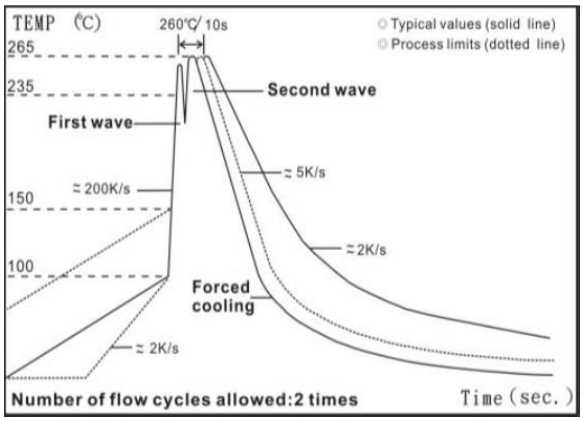
Performance Characteristics			
Test Item	Test Method	Test Condition	Test Limits
Temperature Coefficient of Resistance (TCR)	JIS C-5201-1 4.8 IEC-60115-1 4.8	TCR +125°C, 25°C is the reference temperature	Refer to Electrical Specifications table
Short Time Overload	JIS C-5201-1 4.13 IEC-60115-1 4.13	Standard power: 6.25 times rated power whichever is less for 5 seconds.	± (1% + 0.001Ω)
Insulation Resistance	JIS C-5201-1 4.8 IEC-60115-1 4.8	100 VDC for 1 minute	≥ 10GΩ
Dielectric Withstanding Voltage	JIS C-5201-1 4.7	0805, 1206, 1210, 2010, 2512 applied 500 VAC for 1 minute. 0402, 0603 applied 300 VAC for 1 minute.	No short or burned on the appearance
Core Body Strength	JIS C-5201-1 4.15	Central part pressurizing force: 10 N, 10 seconds	No breakage.
Solderability	JIS C-5201-1 4.17 IEC-60115-1 4.17	245ºC ± 5°C for 3 seconds	>95% coverage - no visual damage
Resistance to Soldering Heat	JIS C-5201-1 4.18 IEC-60115-1 4.18	260ºC ± 5°C for 10 seconds	± (1% + 0.001Ω) No visual damage
Leaching	JIS C5201-1 4.18 IEC-60068-2-58 8.2.1	260ºC ± 5°C for 30 seconds	>95% coverage - no visual damage
Rapid Change of Temperature	JIS C-5201-1 4.19 IEC-60115-1 4.19	-55°C to +155°C, 300 cycles	± (1% + 0.001Ω) No visual damage
Damp Heat with Load	JIS C-5201-1 4.24 IEC-60115-1 4.24	40ºC ± 2°C, 90 ~ 95% R.H., RCWV or max. working current whichever is less for 1000 hours with 1.5 hours "ON" and 0.5 hours "OFF"	± (1% + 0.001Ω)
Biased Humidity	MIL-STD-202 Method 103	1000 hours; 85°C/85% RH, 10% of operating power. Measurement at 24 ± 4 hours after test conclusion.	± (0.5% + 0.05Ω)
Load Life (Endurance)	JIS C-5201-1 4.25 IEC-60115-1 4.25.1	70ºC ± 2°C, rated power or max. working current whichever is less for 1000 hours with 1.5 hours "ON" and 0.5 hours "OFF"	± (0.5% + 0.001Ω)
High Temperature Exposure	JIS C-5201-1 4.23.2 IEC 60068-2-2	At 155 ± 5°C for 1000 + 48/-0 hours.	± (1% + 0.001Ω)
Resistance to Solvent	JIS C-5201-1 clause 4.29	The tested resistor be immersed into isopropyl alcohol of 20°C ~ 25°C for 60 seconds. Then the resistor is left in room for 48 hours	± (1% + 0.001Ω) No visual damage
Terminal Strength	JIS C-5201-1 4.32 AEC Q200-006	Pressurizing force for 10 seconds. 0402, 0603: 8 N; 0805 and above: 17.7N	No breakage
Bending Strength	JIS C-5201-1 4.33 IEC-60115-1 4.33	Bending once for 5 seconds. D: 0402, 0603, 0805 = 5 mm 1206, 1210 = 3 mm 2010, 2512 = 2 mm	± (1% + 0.001Ω) No visual damage
Sulfur Test (FoS)	ASTM B809-95 ANSI/EIA-977	105 ± 2°C, no power rating for 750 hours	± (2% + 0.001Ω)

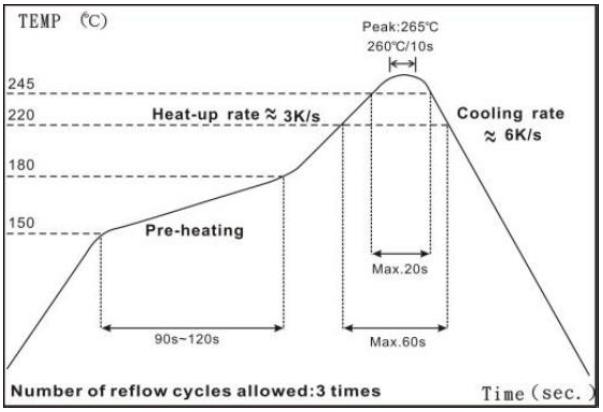
Temperature Coefficient of Resistance test to -55°C is available on request.
AEC-Q200 test reports are availble on request. Contact Stackpole.

Power Derating Curve:



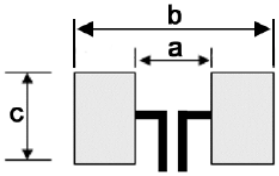
Wave Solder Temperature Condition and Solder Reflow Temperature Condition





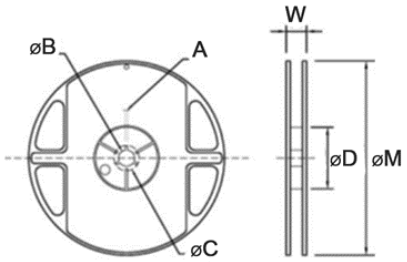
Rework temperature (hot air equipment): 350°C, 3 ~ 5 seconds
Recommended reflow methods:
IR, vapor phase oven, hot air oven
If reflow temperatures exceed the recommended profile, devices may not meet the performance requirements.

Recommended Pad Layout



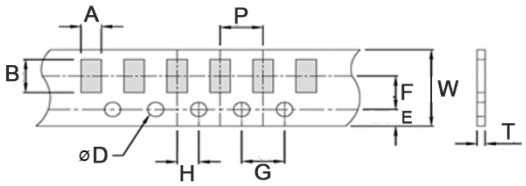
Type/Code	a	b	c	Unit
CSRT0402-AS	0.020 0.50	0.063 1.60	0.028 0.70	inches mm
CSRT0603-AS	0.031 0.80	0.094 2.40	0.039 1.00	inches mm
CSRT0805-AS	0.051 1.30	0.114 2.90	0.057 1.45	inches mm
CSRT1206-AS	0.087 2.20	0.165 4.20	0.071 1.80	inches mm
CSRT1210-AS	0.079 2.00	0.173 4.40	0.106 2.70	inches mm
CSRT2010-AS	0.150 3.80	0.260 6.60	0.106 2.70	inches mm
CSRT2512-AS	0.193 4.90	0.319 8.10	0.134 3.40	inches mm
CSRT0612-AS	0.020 0.50	0.102 2.60	0.126 3.20	inches mm
CSRT1020-AS	0.039 1.00	0.159 4.05	0.217 5.50	inches mm
CSRT1225-AS	0.047 1.20	0.205 5.20	0.276 7.00	inches mm

Reel Specifications



Type/Code	A	B	C	D	W	M	Unit
CSRT0402-AS	0.079 ± 0.020 2.00 ± 0.50	0.531 ± 0.039 13.50 ± 1.00	0.827 ± 0.039 21.00 ± 1.00	2.362 ± 0.039 60.00 ± 1.00	0.453 ± 0.079 11.50 ± 2.00	7.008 ± 0.079 178.00 ± 2.00	inches mm
CSRT0603-AS							inches mm
CSRT0805-AS							inches mm
CSRT1206-AS							inches mm
CSRT1210-AS							inches mm
CSRT2010-AS					0.630 ± 0.079 16.00 ± 2.00		inches mm
CSRT2512-AS					0.630 ± 0.079 16.00 ± 2.00		inches mm
CSRT0612-AS					0.453 ± 0.079 11.50 ± 2.00		inches mm
CSRT1020-AS					0.630 ± 0.079 16.00 ± 2.00		inches mm
CSRT1225-AS					0.630 ± 0.079 16.00 ± 2.00		inches mm

Packaging Specifications - Paper Tape

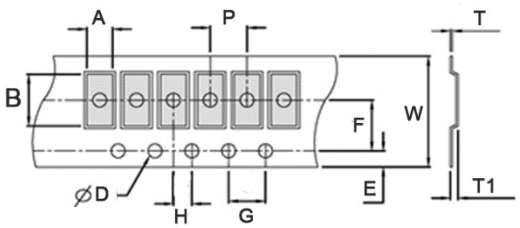


Type/Code	A	B	W	E	F	Unit
CSRT0402-AS	0.028 ± 0.004 0.70 ± 0.10	0.047 ± 0.004 1.20 ± 0.10	0.315 ± 0.008 8.00 ± 0.20	0.069 ± 0.004 1.75 ± 0.10	0.138 ± 0.002 3.50 ± 0.05	inches mm
CSRT0603-AS	0.041 ± 0.008 1.05 ± 0.20	0.071 ± 0.008 1.80 ± 0.20				inches mm
CSRT0805-AS	0.061 ± 0.008 1.55 ± 0.20	0.091 ± 0.008 2.30 ± 0.20				inches mm
CSRT1206-AS	0.075 ± 0.008 1.90 ± 0.20	0.120 ± 0.008 3.05 ± 0.20				inches mm
CSRT1210-AS	0.112 ± 0.008 2.85 ± 0.20	0.120 ± 0.008 3.05 ± 0.20				inches mm
CSRT0612-AS	0.112 ± 0.008 2.85 ± 0.20	0.120 ± 0.008 3.05 ± 0.20				inches mm

Packaging Specifications - Paper Tape (cont.)

Type/Code	G	H	T	P	D	Unit
CSRT0402-AS	0.157 ± 0.004 4.00 ± 0.10	0.079 ± 0.002 2.00 ± 0.05	0.018 ± 0.004 0.45 ± 0.10	0.079 ± 0.004 2.00 ± 0.10	0.059 +0.004/-0 1.50 +0.10/-0	inches mm
CSRT0603-AS			0.024 ± 0.004 0.60 ± 0.10	0.157 ± 0.004 4.00 ± 0.10		inches mm
CSRT0805-AS			0.030 ± 0.004 0.75 ± 0.10	0.157 ± 0.004 4.00 ± 0.10		inches mm
CSRT1206-AS			0.030 ± 0.004 0.75 ± 0.10	0.157 ± 0.004 4.00 ± 0.10		inches mm
CSRT1210-AS			0.030 ± 0.004 0.75 ± 0.10	0.157 ± 0.004 4.00 ± 0.10		inches mm
CSRT0612-AS			0.030 ± 0.004 0.75 ± 0.10	0.157 ± 0.004 4.00 ± 0.10		inches mm

Packaging Specifications - Plastic Tape



Type/Code	A	B	W	E	F	G	Unit
CSRT2010-AS	0.110 ± 0.008 2.80 ± 0.20	0.220 ± 0.008 5.60 ± 0.20	0.472 ± 0.004 12.00 ± 0.10	0.069 ± 0.004 1.75 ± 0.10	0.217 ± 0.002 5.50 ± 0.05	0.157 ± 0.004 4.00 ± 0.10	inches mm
CSRT2512-AS	0.134 ± 0.008 3.40 ± 0.20	0.264 ± 0.008 6.70 ± 0.20					inches mm
CSRT1020-AS	0.110 ± 0.008 2.80 ± 0.20	0.220 ± 0.008 5.60 ± 0.20					inches mm
CSRT1225-AS	0.134 ± 0.008 3.40 ± 0.20	0.264 ± 0.008 6.70 ± 0.20					inches mm

Type/Code	H	T	T1	P	D	D1	Unit
CSRT2010-AS	0.079 ± 0.002 2.00 ± 0.05	0.009 ± 0.004 0.23 ± 0.10	0.033 ± 0.006 0.85 ± 0.15	0.157 ± 0.004 4.00 ± 0.10	0.059 +0.004/-0 1.50 +0.10/-0	0.059 ± 0.004 1.50 ± 0.10	inches mm
CSRT2512-AS							inches mm
CSRT1020-AS							inches mm
CSRT1225-AS							inches mm

RoHS Compliance

Stackpole Electronics has joined the worldwide effort to reduce the amount of lead in electronic components and to meet the various regulatory requirements now prevalent, such as the European Union's directive regarding "Restrictions on Hazardous Substances" (RoHS 3). As part of this ongoing program, we periodically update this document with the status regarding the availability of our compliant components. All our standard part numbers are compliant to EU Directive 2011/65/EU of the European Parliament as amended by Directive (EU) 2015/863/EU as regards the list of restricted substances.

RoHS Compliance Status

Standard Product Series	Description	Package / Termination Type	Standard Series RoHS Compliant	Lead-Free Termination Composition	Lead-Free Mfg. Effective Date (Std Product Series)	Lead-Free Effective Date Code (YY/WW)
CSRT-AS	Anti-Sulfur Metal Film Low Resistance Chip Resistor	SMD	YES	100% Matte Sn over Ni	Always	Always

"Conflict Metals" Commitment

We at Stackpole Electronics, Inc. are joined with our industry in opposing the use of metals mined in the "conflict region" of the eastern Democratic Republic of the Congo (DRC) in our products. Recognizing that the supply chain for metals used in the electronics industry is very complex, we work closely with our own suppliers to verify to the extent possible that the materials and products we supply do not contain metals sourced from this conflict region. As such, we are in compliance with the requirements of Dodd-Frank Act regarding Conflict Minerals.

Compliance to "REACH"

We certify that all passive components supplied by Stackpole Electronics, Inc. are SVHC (Substances of Very High Concern) free and compliant with the requirements of EU Directive 1907/2006/EC, "The Registration, Evaluation, Authorization and Restriction of Chemicals", otherwise referred to as REACH. Contact us for complete list of REACH Substance Candidate List.

Environmental Policy

It is the policy of Stackpole Electronics, Inc. to protect the environment in all localities in which we operate. We continually strive to improve our effect on the environment. We observe all applicable laws and regulations regarding the protection of our environment and all requests related to the environment to which we have agreed. We are committed to the prevention of all forms of pollution.

How to Order

C	S	R	T	2	5	1	2	F	T	1	R	0	0	-	A	S

Product Series

CSRT

Size

Code	W
0402	0.25
0603	0.4
0805	0.5
1206	1
1210	1
2010	1.5
2512	2
0612	1
1020	2
1225	3

Tolerance

Code	Tol	Values*
D	0.5%	E24
F	1%	
J	5%	

(*) E96 values may be available

Packaging

Code	Description	Size	Quantity
T	7" Reel Paper Tape	0402	10000
		0603, 0805 1206, 1210, 0612	5000
	7" Reel Plastic Tape	2010, 2512 1020, 1225	4000

Resistance Value

Four characters with the multiplier used as the decimal holder.
"L" used as multiplier of 10^{-3} for any value under 0.1 ohm.

0.01 ohm = 10L0
0.068 ohm = 68L0
10 ohm = 10R0

Special

Code	Description
-AS	Anti-Sulfur