

## Data Sheet

Customer:

Product: Automotive Grade Anti-Sulfurated Thick Film Array Chip Resistor – AS42..A / AS43..A / AS21..A / AS41..A

Size: 0402x4 / 0603x4 / 0201x2 / 0201x4

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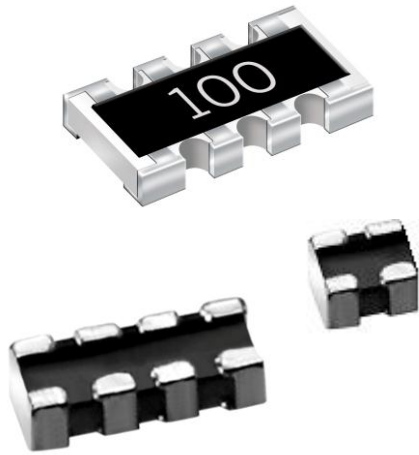
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# Automotive Grade Anti-Sulfurated Thick Film Array Chip Resistor



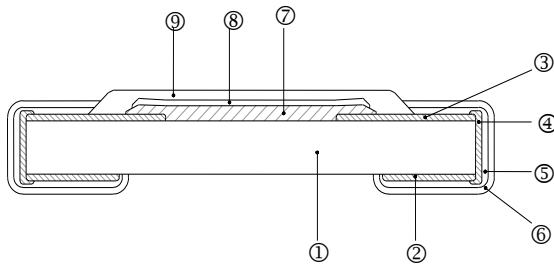
## Scope

– This specification applies to all sizes of rectangular-type fixed chip resistors with Ruthenium-base as material.

## Features

- Special construction to prevent sulfuration in a sulfur containing environment
- Reduction of assembly costs and matching with placement machines
- Reliability, high quality
- Suitable for IR reflow soldering
- AEC-Q200 Compliance
- 100% CCD inspection

## Construction

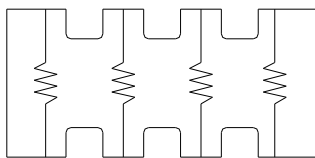


## Applications

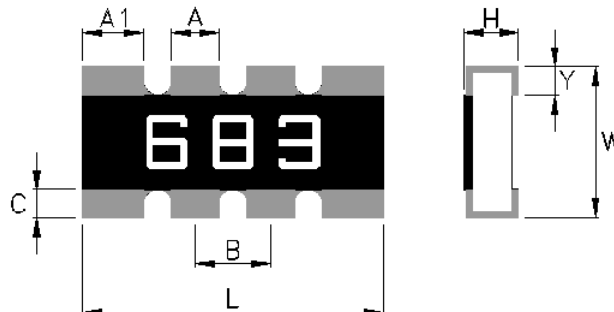
- High-end Computer
- Industrial Equipment
- Automatic Equipment Controller
- Medical Equipment
- High-end Multimedia Electronics
- Outdoor Electronic Applications

① Alumina Substrate	④ Edge Electrode	⑦ Resistor Layer
② Bottom Electrode	⑤ Barrier Layer	⑧ Primary Overcoat
③ Top Electrode	⑥ External Electrode	⑨ Secondary Overcoat

## Equivalent Circuit Diagram



AS42/AS43

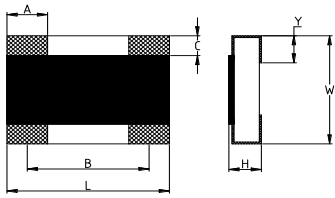


## Dimensions

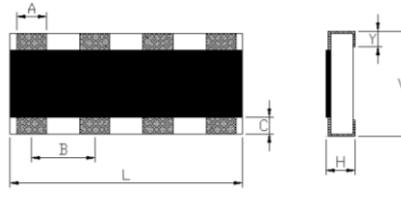
Type	Number of Resistors	L (mm)	W (mm)	H (mm)	A1 (mm)	A (mm)	B (mm)	C (mm)	Y (mm)	Weight (g) (1000pcs)
AS43	4	3.20±0.15	1.60±0.15	0.55±0.10	0.60±0.10	0.50±0.15	0.80±0.05	0.30±0.15	0.30±0.15	8.6
AS42	4	2.00±0.10	1.00±0.10	0.45±0.10	0.40±0.10	0.30±0.10	0.50±0.05	0.22±0.15	0.22±0.15	3.1

# 【AS..A Series (Array)】

Automotive Grade Anti-Sulfurated Thick Film Array Chip Resistor



AS21



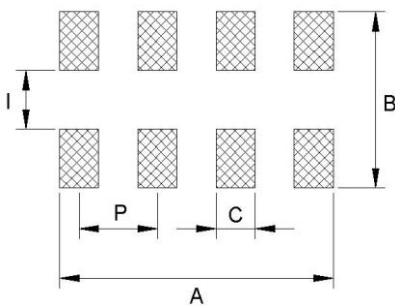
AS41

Type	Number of Resistors	L (mm)	W (mm)	H (mm)	A (mm)	B (mm)	C (mm)	Y (mm)	Weight (g) (1000pcs)
AS21	2	0.80±0.10	0.60±0.10	0.35±0.10	0.30±0.10	0.50±0.10	0.15±0.10	0.15±0.10	0.5
AS41	4	1.40±0.10	0.60±0.10	0.35±0.10	0.20±0.10	0.40±0.10	0.10±0.07	0.15±0.05	0.8

## Part Numbering

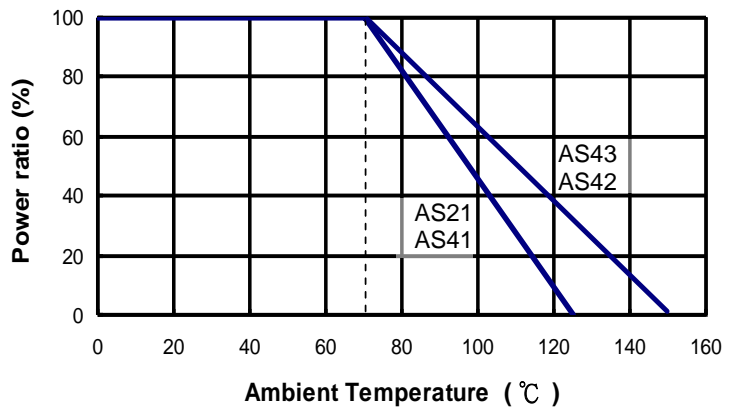
AS	43	J	T	F	1000	A
Product Type	Dimensions	Resistance Tolerance	Packaging Code	TCR (PPM/°C)	Resistance	Making
	43: 0603x4 42: 0402x4 21: 0201x2 41: 0201x4	J: ±5% F: ±1%	T: 7" Taping Reel V: 10" Taping Reel W: 13" Taping Reel	F: ±200	1000: 100Ω 1002: 10KΩ 2201: 2.2KΩ 1003: 100KΩ	A: Automotive Grade

## Recommend Land Pattern

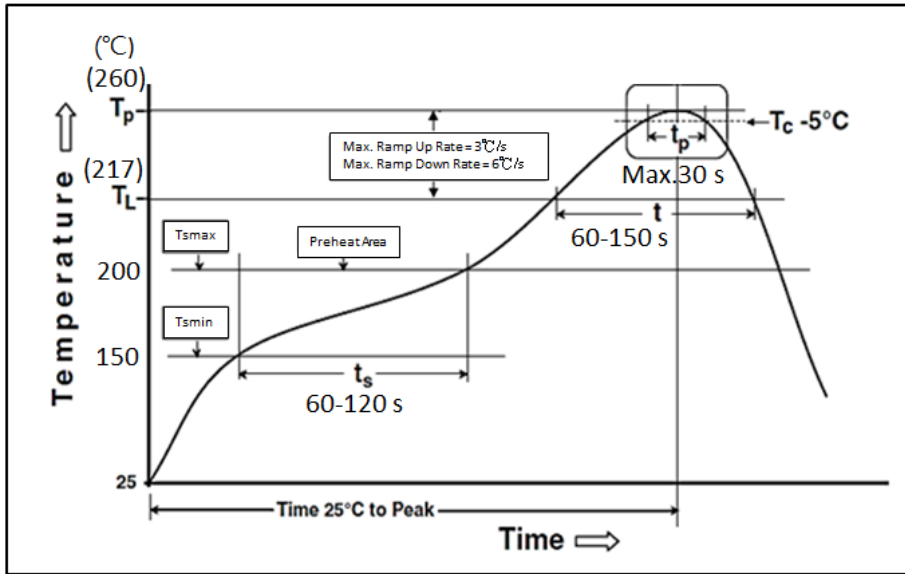


Type	A (mm)	B (mm)	C (mm)	I (mm)	P (mm)
AS43	3.10	2.85	0.45	0.80	0.80
AS42	2.10	1.80	0.30	0.50	0.50
AS21	0.80	0.90	--	0.30	0.50
AS41	1.40	0.90	0.20	0.30	0.40

## Derating Curve



**■ Soldering Condition (IPC/JEDEC J-STD-020)**



**■ Standard Electrical Specifications**

Item Type	Power Rating at 70°C Jumper Rated Current	Operating Temp. Range	Max. Operating Voltage	Max. Overload Voltage	Number of Resistors	Resistance Range		TCR (PPM/°C)
						±1%	±5%	
AS43	1/10W	-55 ~ +155°C	50V	100V	4	10Ω - 1MΩ	1Ω - 1MΩ	±200
AS42	1/16W	-55 ~ +155°C	25V	50V	4	10Ω - 1MΩ	1Ω - 1MΩ	±200
AS21	1/32W	-55 ~ +125°C	12.5V	25V	2	-	3Ω - 9.1Ω	±300
						10Ω - 1MΩ		±200
AS41	1/32W	-55 ~ +125°C	12.5V	25V	4	10Ω - 1MΩ		±200

Operating Voltage= $\sqrt{P \cdot R}$  or Max. Operating Voltage listed above, whichever is lower.

Overload Voltage= $2.5 \cdot \sqrt{P \cdot R}$  or Max. Overload Voltage listed above, whichever is lower.

■ Viking is capable of manufacturing the optional spec based on customer's requirement.

**Environmental Characteristics**

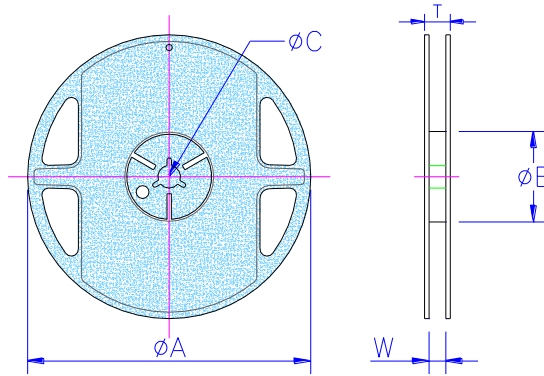
Item	Requirement		Test Method
	±1%	±5%	
Temperature Coefficient of Resistance (T.C.R.)	As Spec.		<b>JIS-C-5201-1 4.8</b> <b>IEC-60115-1 4.8</b> At 25°C/-55°C and 25°C/+125°C, 25°C is the reference temperature
Short Time Overload	±(1.0%+0.05Ω)	±(2.0%+0.05Ω)	<b>JIS-C-5201-1 4.13</b> <b>IEC-60115-1 4.13</b> RCWV*2.5 or Max. Overload Voltage whichever is lower for 5 seconds
Insulation Resistance	≥10G		<b>JIS-C-5201-1 4.6</b> <b>IEC-60115-1 4.6</b> Max. Overload Voltage for 1 minute
Operational Life	±(2.0%+0.10Ω)	±(3.0%+0.10Ω)	<b>MIL-STD-202 Method 108</b> Condition D Steady State TA=125°C at derated power Measurement at 24±4 hours after test conclusion.
Biased Humidity	±(2.0%+0.10Ω)	±(3.0%+0.10Ω)	<b>MIL-STD-202 Method 103</b> 1000 hrs 85°C/85%RH 10% of operating power (≤100V)
High Temperature Exposure	±(1.0%+0.05Ω)	±(1.5%+0.10Ω)	<b>MIL-STD-202 Method 108</b> at +155°C/+125°C for 1000 hrs
Board Flex	±(1.0%+0.05Ω)	±(1.0%+0.05Ω)	<b>AEC-Q200-005</b> Bending once for 60 seconds with 3mm
Solderability	95% min. coverage		<b>JIS-C-5201-1 4.17</b> <b>IEC-60115-1 4.17</b> 245±5°C for 3 seconds
Resistance to Soldering Heat	±(0.5%+0.05Ω)	±(1.0%+0.05Ω)	<b>MIL-STD-202 Method 210</b> 260±5°C for 10 seconds
Voltage Proof	No breakdown or flashover		<b>JIS-C-5201-1 4.7</b> <b>IEC-60115-1 4.7</b> 1.42 times Max. Operating Voltage for 1 minute
Leaching	Individual leaching area ≤5% Total leaching area ≤ 10%		<b>JIS-C-5201-1 4.18</b> <b>IEC-60068-2-58 8.2.1</b> 260±5°C for 30 seconds
Temperature Cycling	±(0.5%+0.05Ω)	±(1.5%+0.05Ω)	<b>JESD22 Method JA-104</b> -55°C to +125°C, 1000 cycles
Mechanical Shock	±(0.25%+0.05Ω)	±(1.0%+0.05Ω)	<b>MIL-STD-202 Method 213</b> Wave Form: Tolerance for half sine shock pulse. Peak value is 100g's. Normal duration (D) is 6.
Vibration	±(0.5%+0.05Ω)	±(1.0%+0.05Ω)	<b>MIL-STD-202 Method 204</b> 5 g's for 20 min., 12 cycles each of 3 orientations, 10-2000 Hz
ESD	±(1%+0.05Ω)		<b>AEC-Q200-002</b> Human body, 0.5KV
Resistance to Solvents	No visible damage on appearance and marking.		<b>MIL-STD-202 Method 215</b> Add Aqueous wash chemical - OKEM Clean or equivalent. Do not use banned solvents.
Terminal Strength	No broken		<b>AEC-Q200-006</b> Force of 1.8kg for 60 seconds.
Flammability	No ignition of the tissue paper or scorching or the pinewood board		<b>UL-94</b> V-0 or V-1 are acceptable. Electrical test not required.
Sulfur Test	△R±1%	△R±5%	<b>EIA-977 (Condition B)</b> 105±2°C, no power rating for 750 hrs.

RCWV(Rated Continuous Working Voltage)=√(P\*R) or Max. Operating Voltage whichever is lower.

**Storage Temperature: 15~28°C; Humidity < 80%RH**

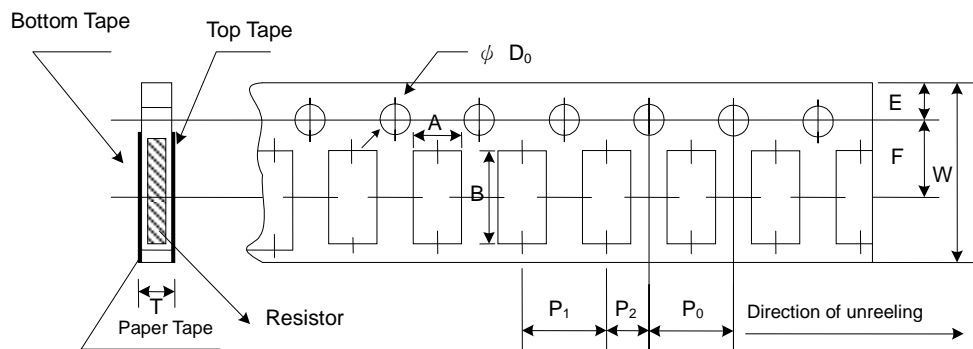
**■Packaging**

Reel Specifications & Packaging Quantity



Type	Packaging Quantity	Tape Width	Reel Diameter	ΦA (mm)	ΦB (mm)	ΦC (mm)	W (mm)	T (mm)	
AS43	Paper	5K	8mm	7 inch	178.5±1.5	60 <sup>+1/-0</sup>	13.0±0.2	9.0±0.5	12.5±0.5
		10K	8mm	10 inch	254±1.0	100±0.5	13.0±0.2	9.5±0.5	13.5±0.5
		20K	8mm	13 inch	330±1.0	100±0.5	13.0±0.2	9.5±0.5	13.5±0.5
AS42	Paper	10K	8mm	7 inch	178.5±1.5	60 <sup>+1/-0</sup>	13.0±0.2	9.0±0.5	12.5±0.5
		20K	8mm	10 inch	254±1.0	100±0.5	13.0±0.2	9.5±0.5	13.5±0.5
		40K	8mm	13 inch	330±1.0	100±0.5	13.0±0.2	9.5±0.5	13.5±0.5
AS21 AS41	Paper	10K	8mm	7 inch	178.5±1.5	60 <sup>+1/-0</sup>	13.0±0.2	9.0±0.5	12.5±0.5

Paper Tape Specifications



Type	A (mm)	B (mm)	W (mm)	E (mm)	F (mm)	P <sub>0</sub> (mm)	P <sub>1</sub> (mm)	P <sub>2</sub> (mm)	ΦD <sub>0</sub> (mm)	T (mm)
AS43	1.95±0.1	3.50±0.1	8.0±0.2	1.75±0.1	3.5±0.05	4.0±0.1	4.0±0.05	2.0±0.05	1.50+0.1,-0	0.85±0.1
AS42	1.20±0.1	2.20±0.1	8.0±0.2	1.75±0.1	3.5±0.05	4.0±0.1	2.0±0.05	2.0±0.05	1.50+0.1,-0	0.70±0.1
AS21	0.77±0.05	0.97±0.05	8.0±0.2	1.75±0.1	3.5±0.05	4.0±0.1	2.0±0.05	2.0±0.05	1.50+0.1,-0	0.50±0.1
AS41	0.77±0.05	1.57±0.05	8.0±0.2	1.75±0.1	3.5±0.05	4.0±0.1	2.0±0.05	2.0±0.05	1.50+0.1,-0	0.50±0.1

## ■ Marking

No Marking for AS21/AS41

1% for AS43 & AS42 : 4 digits marking (non-including E24 series)

Example:

Resistance	102Ω	2.49KΩ	49.9KΩ	121KΩ
marking	1020	2491	4992	1213

5% for AS43 & AS42 : 3 digits marking in E24

Example: 101=100Ω 102=1KΩ (1<sup>st</sup> and 2<sup>nd</sup> are E24 code and 3<sup>rd</sup> code is multiplier)

E24 code	10	11	12	13	15	16	18	20	22	24	27	30	33	36	39	43	47	51	56	62	68	75	82	91

**REVISION HISTORY**

REVISION	DATE	CHANGE NOTIFICATION	DESCRIPTION
Version A	Mar 10, 21	-	- New product release