

Data Sheet

Customer:

Product: Automotive Grade Anti-Sulfurated Thick Film Flat Array
Chip Resistor –ASF..A

Size: 0402x4
0603x4

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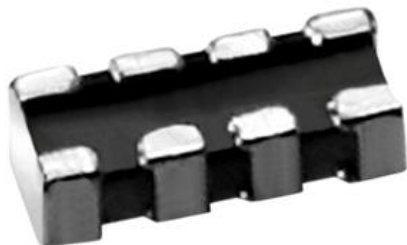
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Automotive Grade Anti-Sulfurated Thick Film Flat Array Chip Resistor

Scope

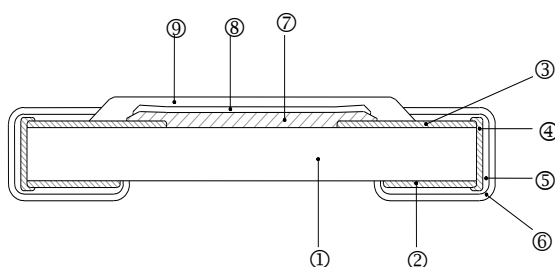
- This specification applies to all sizes of rectangular-type fixed chip resistors with Ruthenium-base as material.



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 Qualified
- 100% CCD inspection
- MSL: Level 1

Construction

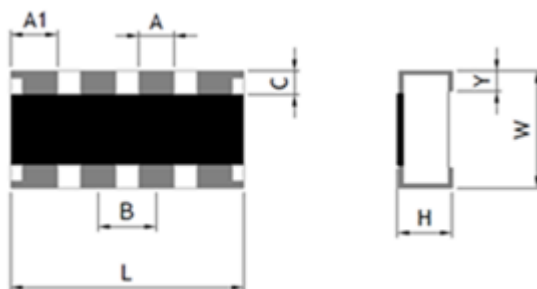
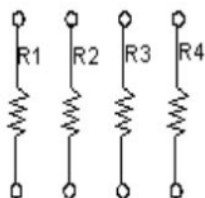


Applications

- 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



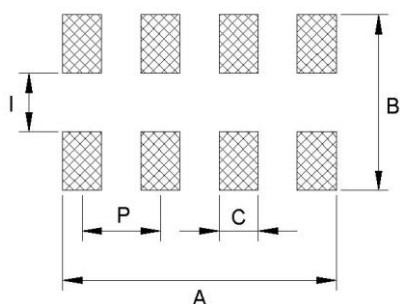
Dimensions

Type	Number of Resistors	L (mm)	W (mm)	H (mm)	A (mm)	A1 (mm)	B (mm)	C (mm)	Y (mm)	Weight (g) (1000pcs)
ASF42	4	2.00±0.10	1.00±0.10	0.45±0.10	0.30±0.10	0.40±0.10	0.50±0.10	0.20±0.10	0.30±0.10	3.3
ASF43	4	3.20±0.10	1.55±0.10	0.55±0.10	0.50±0.15	0.65±0.10	0.80±0.05	0.23±0.15	0.40±0.10	9.0

Part Numbering

ASF	43	F	T	F	X	1000	A
Product Type	Dimensions	Resistance Tolerance	Packaging Code	TCR (PPM/°C)	Power Rating	Resistance	Marking
	42: 0402x4 43: 0603x4	F: $\pm 1\%$ J: $\pm 5\%$ or Jumper	T: 7"Taping Reel V: 10"Taping Reel W: 13"Taping Reel	F: ± 200 -: No specified (For Jumper)	Y: 1/16W X: 1/10W	0030: 3 Ω 1000: 100 Ω 1002: 10K Ω 2201: 2.2K Ω 1003: 100K Ω 1004: 1M Ω R0R0: 0 Ω	A : Automotive Grade

Recommend Land Pattern



Type	A (mm)	B (mm)	C (mm)	I (mm)	P (mm)
ASF42	2.10	1.80	0.30	0.50	0.50
ASF43	3.10	2.85	0.45	0.80	0.80

Derating Curve

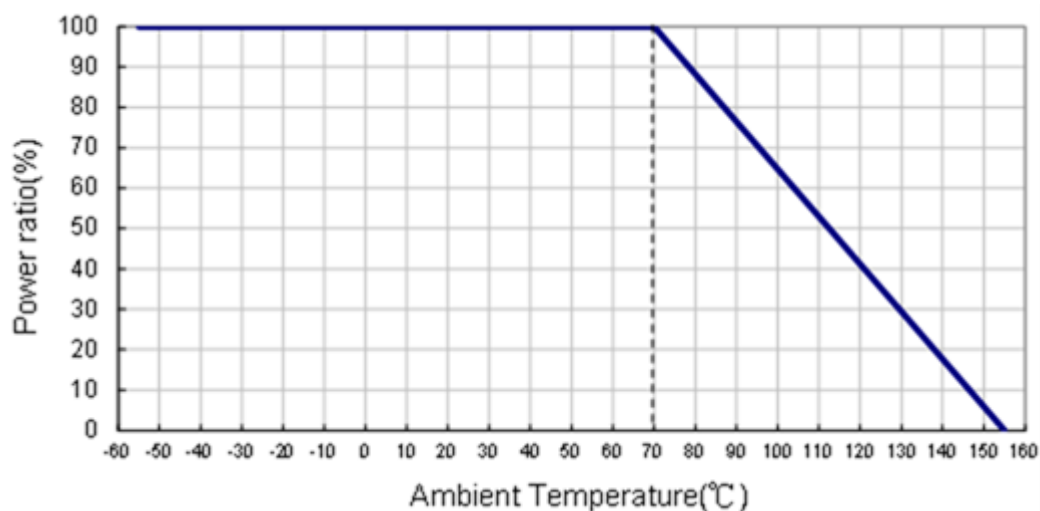


Figure 1 is a graph showing Temperature (°C) versus Time (s) for a typical heat treatment cycle. The curve starts at 25°C, rises through a "Preheat Area" (60~120s) to T_{smax} , then continues to a peak T_p (Max. 30s) before cooling. Key temperatures include T_p , T_L , T_{smax} , T_{smin} , and T_c (-5°C). Ramp rates are specified as Max. Ramp Up Rate = 3°C/s and Max. Ramp Down Rate = 6°C/s. Time intervals include t_s (60~120s) and t (60~150s).

Reflow Profiles	
Profile Feature	Pb-Free Assembly
Preheat	
Min. Temperature (T _{sm})	150 °C
Max Temperature (T _{sm})	200 °C
Preheating time (ts) from (T _{sm} to T _{sm})	60-120 seconds
Ramp-up rate (T _L to T _p)	3 °C/second max.
Liquidous temperature (T _L)	217 °C
Time (t _L) maintained above T _L	60-150 seconds
Min. Peak temperature (T _p min)	235°C
Max. Peak temperature (T _p max)	260°C
Time (tp) within 5 °C of the specified classification temperature (T _c)	30 seconds max.
Ramp-down rate (T _p to T _L)	6 °C/second max.
Time 25 °C to peak temperature	8 minutes max.

Item Type	Power Rating at 70°C	Operating Temp. Range	Max. Operating Voltage	Max. Overload Voltage	Number of Resistors	Resistance Range		TCR (PPM/°C)
						±1% (E24,E96)	±5% (E24)	
ASF42	1/16W	-55 ~ +155°C	50V	100V	4	10Ω - 1MΩ	1Ω - 10MΩ	±200
						-	0Ω(<50mΩ)	-
ASF43	1/10W	-55 ~ +155°C	50V	100V	4	10Ω - 1MΩ	1Ω - 10MΩ	±200
						-	0Ω(<50mΩ)	-

Item	Requirement			Test Method
	±1%	±5%	Jumper	
Temperature Coefficient of Resistance (T.C.R.)	As Spec.			JIS-C-5201-1 4.8 IEC-60115-1 4.8 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)	<50mΩ	JIS-C-5201-1 4.13 IEC-60115-1 4.13 RCWV*2.5 or Max. Overload Voltage whichever is lower for 5 seconds
Insulation Resistance	≥10G			JIS-C-5201-1 4.6 IEC-60115-1 4.6 Max. Overload Voltage for 1 minute

Item	Requirement			Test Method
	±1%	±5%	Jumper	
Operational Life	±(2.0%+0.10Ω)	±(3.0%+0.10Ω)	<100mΩ	MIL-STD-202 Method 108 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)	<100mΩ	MIL-STD-202 Method 103 1000 hrs 85°C/85%RH 10% of operating power (≤100V)
High Temperature Exposure	±(1.0%+0.05Ω)	±(1.5%+0.10Ω)	<50mΩ	MIL-STD-202 Method 108 at +155°C for 1000 hrs
Board Flex	±(1.0%+0.05Ω)	±(1.0%+0.05Ω)	<50mΩ	AEC-Q200-005 Bending once for 60 seconds with 3mm
Solderability	95% min. coverage			JIS-C-5201-1 4.17 IEC-60115-1 4.17 J-STD-002 245±5°C for 3 seconds
Resistance to Soldering Heat	±(0.5%+0.05Ω)	±(1.0%+0.05Ω)	<50mΩ	MIL-STD-202 Method 210 260±5°C for 10 seconds
Voltage Proof	No breakdown or flashover			JIS-C-5201-1 4.7 IEC-60115-1 4.7 1.42 times Max. Operating Voltage for 1 minute
Leaching	Individual leaching area ≤5% Total leaching area ≤ 10%			JIS-C-5201-1 4.18 IEC-60068-2-58 8.2.1 260±5°C for 30 seconds
Temperature Cycling	±(0.5%+0.05Ω)	±(1.5%+0.05Ω)	<50mΩ	JESD22 Method JA-104 -55°C to +125°C, 1000 cycles
Mechanical Shock	±(0.25%+0.05Ω)	±(1.0%+0.05Ω)	<50mΩ	MIL-STD-202 Method 213 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)	<50mΩ	MIL-STD-202 Method 204 5 g's for 20 min., 12 cycles each of 3 orientations, 10-2000 Hz
ESD	±(3%+0.05Ω)			AEC-Q200-002 Human body model ASF42: 0.5KV ASF43: 1KV
Resistance to Solvents	No visible damage on appearance and marking.			MIL-STD-202 Method 215 Add Aqueous wash chemical - OKEM Clean or equivalent. Do not use banned solvents.
Terminal Strength	No broken			AEC-Q200-006 Force of 1.8kg for 60 seconds.
Flammability	No ignition of the tissue paper or scorching or the pinewood board			UL-94 V-0 or V-1 are acceptable. Electrical test not required.
Sulfur Test	△R±1%	△R±5%	<100mΩ	EIA-977 (Condition B) 105±2°C, no power rating for 750 hrs.

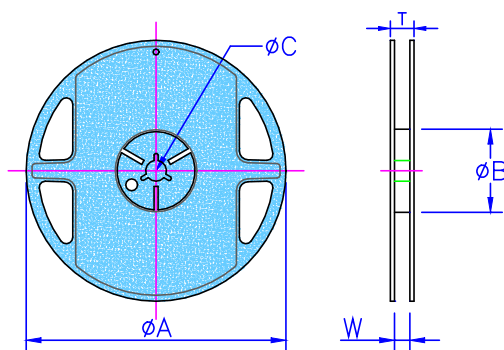
RCWV(Rated Continuous Working Voltage)= $\sqrt{P \cdot R}$ or Max. Operating Voltage whichever is lower.

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

■ **Shelf Life: 2 years from production date.**

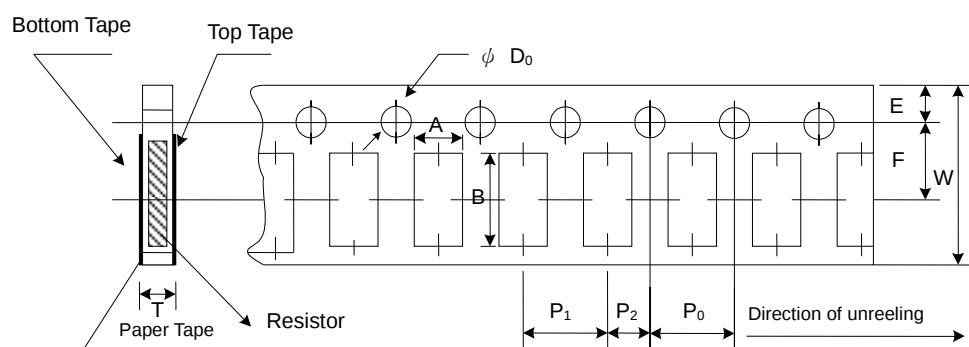
■ Packaging

Reel Specifications & Packaging Quantity



Type	Packaging Quantity	Tape Width	Reel Diameter	ΦA (mm)	ΦB (mm)	ΦC (mm)	W (mm)	T (mm)
ASF42 ASF43	Paper	5K	8mm	7 inch	178.5±1.5	60 ^{+1/-0}	13.0±0.2	9.0±0.5
		10K	8mm	10 inch	254±1.0	100±0.5	13.0±0.2	9.5±0.5
		20K	8mm	13 inch	330±1.0	100±0.5	13.0±0.2	9.5±0.5

Paper Tape Specifications



Type	A (mm)	B (mm)	W (mm)	E (mm)	F (mm)	P ₀ (mm)	P ₁ (mm)	P ₂ (mm)	ΦD ₀ (mm)	T (mm)
ASF42	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
ASF43	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

■ Marking

1% for ASF42/ASF43 : 4 digits marking (non-including E24 series)

Example:

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

1% & 5% for ASF42/ ASF43 : 3 digits marking in E24

Example: 101=100Ω 102=1KΩ (1st and 2nd are E24 code and 3rd 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
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REVISION HISTORY

REVISION	DATE	CHANGE NOTIFICATION	DESCRIPTION
Version A	Jan 06, 25	-	- New product release
Version A1	Nov 26, 25	-	- Add ASF42..A production range