APPROVAL SHEET

ASH-3921 SERIES

Alloy Shunt

Version	Date	Description of amendment	Draft	Checked
A1.0	14-Dec-2023	First issue	Jiamiao Wang	Ziyang Hu
A1.1	10-Mar-2023	Added the 0.1&0.2 mΩ specification of "S" material	Weilong Fan	Jiamiao Wang

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1.Product Description

Product name:ASH-3921 series

Description:ASH-3921 series Alloy Shunt provide precise current sensing with low TCR and high power, ideal for automotive and industrial applications.

1.1 Part Number Explanation

The part number of the high power precision resistor is identified by the type name, Resistance Alloy, tolerance, special,Dimension and resistance value.

Example: ASH-M-3921-0.5F

Type	Resistance Alloy	Dimension	Resistance Value	Tolerance	Special
ASH	M=CuMn S=CuMnSn	3921 Unit：in	0.5 Unit：mΩ	D=±0.5% F=±1% J=±5%	-X

(1) **Type name:** ASH series

(2) **Resistance Alloy:**M=CuMn;S=CuMnSn

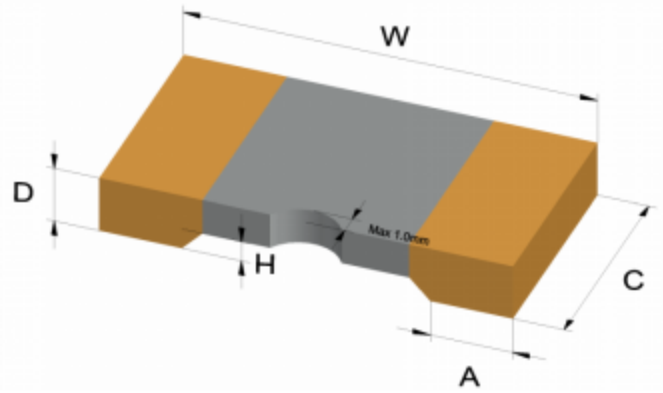
(3) **Dimension:**3921

(4) **Resistance**：0.5

(5) **Tolerance**：D=±0.5%;F=±1%;J=±5%

(6) **Special:**X

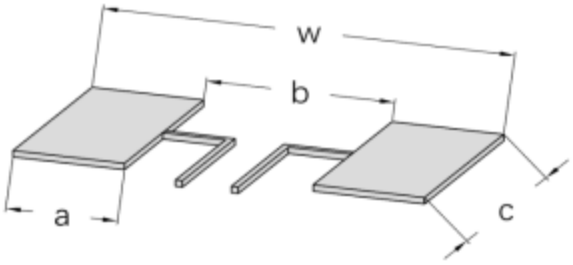
1.2 Products Dimension



(Unit: mm)

Size (in)	Type	Value (mΩ)	W	A	C	H	D
3921	ASH-S-3921	0.1	10.0±0.2	3.3±0.2	5.2±0.3	≥0.3	2.0±0.15
		0.2	10.0±0.2	3.3±0.2	5.3±0.3	≥0.3	1.2±0.15
	ASH-M-3921	0.5	10.0±0.2	2.0±0.3	5.3±0.3	≥0.3	1.5±0.15
		0.7	10.0±0.2	2.0±0.3	5.3±0.3	≥0.3	1.2±0.15
		1.0	10.0±0.2	2.0±0.3	5.3±0.3	≥0.3	1.0±0.15

1.3 PCB-layout (Reflow-soldering)



(Unit: mm)

Solder pad type	w	c	a	b
ASH-S-3921	11	6.2	4	3
ASH-M-3921	11	6	2.7	5.6

2. Technical Data

Size (in)	Type	Value (mΩ)	Element material	*TCR (ppm/℃)	P120℃ (W)
3921	ASH-S-3921	0.1	CuMnSn	±125	9
		0.2	CuMnSn	±125	9
	ASH-M-3921	0.5	CuMn	±50	9
		0.7	CuMn	±50	9
		1.0	CuMn	±50	9

***TCR（ppm/℃）： Test conditions at -40℃~+150℃;**

Special: The TCR test conditions of CuMnSn material is 20°C~120°C

3. Performance testing

Items	Additional Requirements	Reference	Limits
Short Time Overload	Apply 5 times the rated power for 5 seconds and relea se the load for about 30 minutes, then measure its res istance variance rate.	MIL-STD-202 Method 301	±0.5%

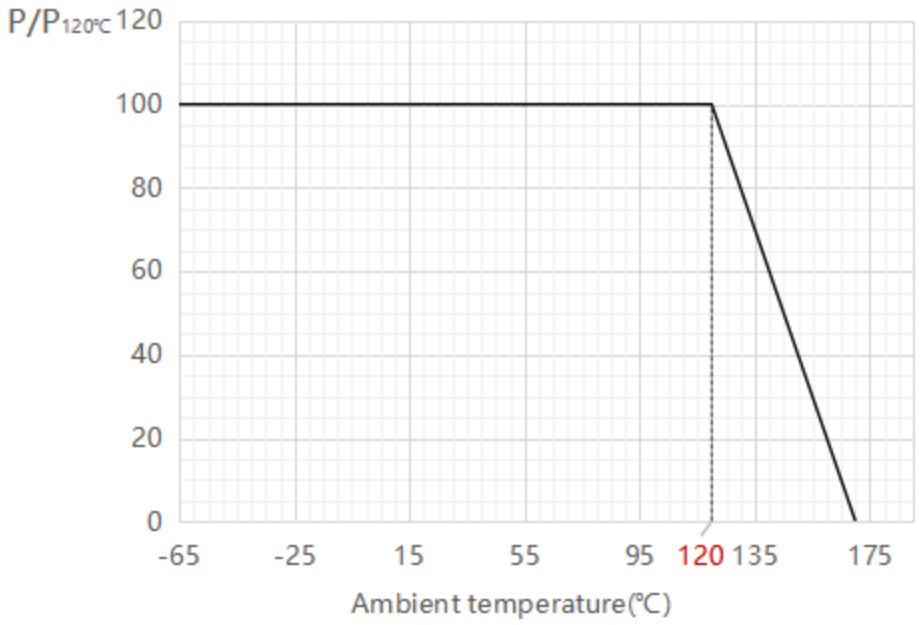
4. Endurance Test

Items	Additional Requirements	Reference	Limits

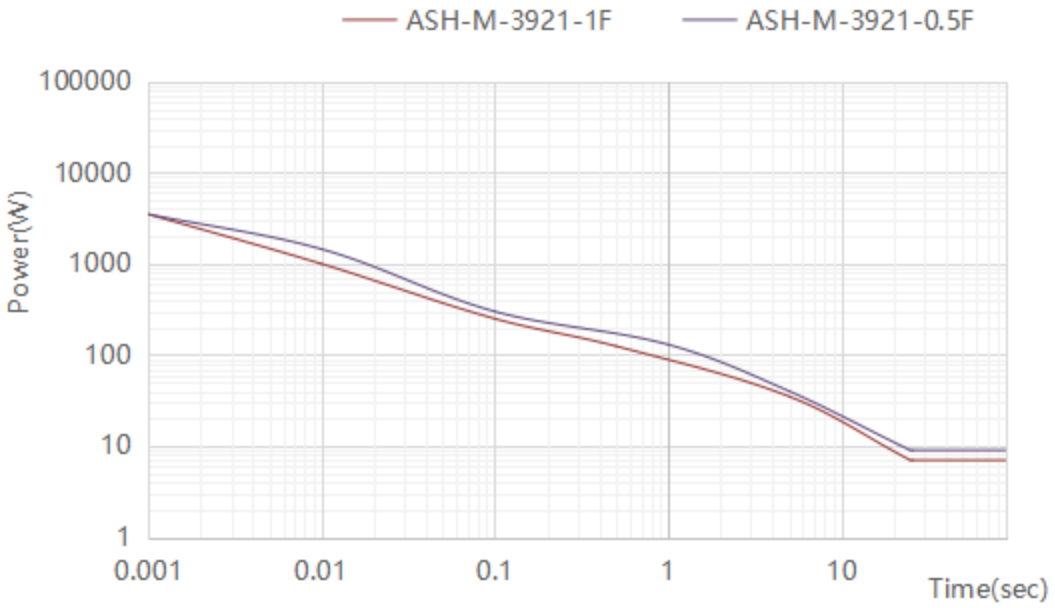
High Temperature Exposure	1000 hrs. (T=170°C) , unpowered. Measurement at 24±4 hoursafter test conclusion .	MIL-STD-202Method 108	±0.5%
Temperature Cycling	1000 Cycles(-55°C to +155°C) , unpowered. Minimum dwell time 15min. at each temperature extreme.maximum transition time1 min. . Measurement atleast 24hours after test conclusion .	JESD22-A-104	±0.5%
HumidityBias	1000hrs. (85℃/85%RH) . Note: Specify conditions: 10% of operation power.Measurement at 24±4 hoursafter test conclusion .	MIL-STD-202Method 103	±0.5%
High Temperature Operating Life	1000 hrs.(T=125°C). Rate power was applied to the products intermittently: 90 minutes ON and 30 minutes OFF . Measurement at 24±4 hoursafter test conclusion .	MIL-STD-202Method 108	±0.5%
Resistance to Soldering Heat	250℃±5℃ , 30s±5s	MIL-STD-202Method 210	±0.5%
Solderability	Weld bath temperature 245°C±5°C, duration5 ±0.5S .	J-STD-002	95% Coverage Minimum
Vibration	20 min.(5 g's) , test from10Hz-2000 Hz, 12 cycles each of3 orientations .	MIL-STD-202Method 204	±0.5%
Board Flex Test	Apply an external force once to the circuit board, bend at least Dx = 2mm, duration 60+5 S .	AEC-Q200-005	±0.5%
Terminal Strength (SMD)	Apply an external force once to the side of the test device, the force is 17.7N (1.8kg), duration 60+1S .	AEC-Q200-006	±0.5%
Mechanical Shock	1) Pulse waveform: Half-Sine pulse; 2) Accelerate peak: 100g's; 3) Pulse duration: 6ms; 4) Orientation & Shock time: ±X, ±Y, ±Z, 3 times each orientation, total 18 times .	MIL-STD-202H Method 213	±0.5%
ESD	1) Direct Contact (DC): ±6kV ; 2) Air Discharge (AD): ±12kV, ±16kV, ±	AEC-Q200-002 REV-B	±0.5%

	25kV .		
Resistance to Solvents	Note: Add Aqueous wash chemical - OKEM Clean or equivalent.Do not use banned solvents .	MIL-STD-202 Method215	There was no missing, faded, smeared, blurred, or shifted (dislodged) with the marks. There was no crack, separation, crazing, swelling, softening, degradation on the samples.
Flame Retardance	1) Test current: 100%, 115%, 130%, 150% (Long-term operating current) . 2) Test duration: 1h .	AEC-Q200-001	The temperature is not higher than 350 ° C for more than 10 seconds, no flame, no explosion.

5.Power Derating Curve



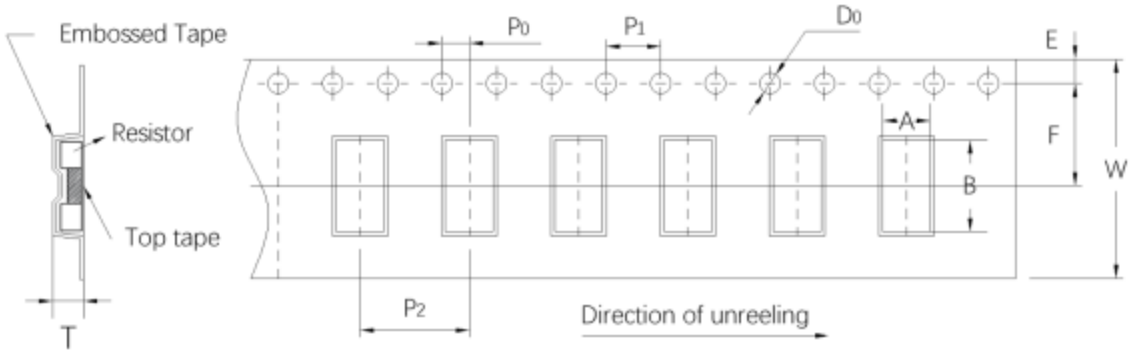
6.Pulse power curve



7.Marking

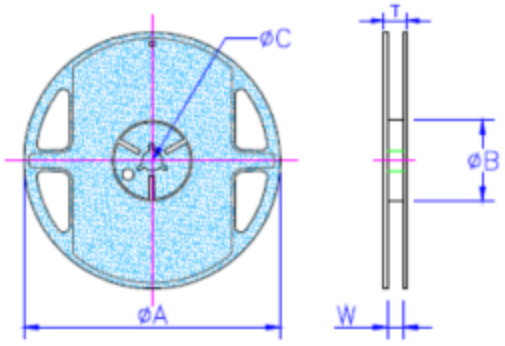
Type	Mark	Explanation
ASH-S-3921	0m10F	Resistance: 0.1mΩ Tolerance: ±1%
ASH-M-3921	R001 1%	Resistance: 1mΩ Tolerance: ±1%
	0m50 0.5%	Resistance: 0.5mΩ Tolerance: ±0.5%

8.Packing



Unit/mm

Size	A± 0.2	B± 0.2	W± 0.3	E± 0.2	F± 0.2	P0± 0.2	P1± 0.2	P2± 0.2	D0± 0.2	T± 0.2	Quantity (pcs)
3921	5.8	10.5	24	1.75	11.5	2	4	12	1.5	2.0	2000



Size	φA	φB	φC	W	T
3921	330	100	13	24.5	29

This document is a product specification. Contents are subject to change without notice.

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