

A S J

DATA SHEET
Anti-Sulphur Thick Film
Chip Resistor Array (B)
(Flat Type)
YAS Series

1% TO 5%, TCR -200 TO +400

ANTI-SULPHUR THICK FILM CHIP RESISTOR ARRAY (B) (Flat Type)

YAS Series

DS-ENG-068

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1. SCOPE

- 1.1 This specification is applicable to Lead-free and Halogen-free of RoHS directive for YAS Series Anti-Sulfurated Thick Film Chip Resistor Array.
- 1.2 Superior Sulfur resistant capability (Refer to ASTM-B-809-95 & EIA977 sulfur vapor test).
- 1.3 The product is for general electronic purpose.

2. PART NUMBERING SYSTEM

Part Numbering is made in accordance with the following system:

YAS	052	F	100	J	K	B				
Type	Size (Inch/mm)	Terminal Type	Nominal Resistance	Resistance Tolerance	Packaging	FoS Test				
Anti - Sulfurated Thick Film Chip Resistors Array	052 - 0201 x 2 054 - 0201 x 4	F: Positive packaging V: w/s packaging	<table border="1"> <tr> <td>5% (3-Digit)</td> <td>EX. 100 = 10Ω 102 = 1KΩ</td> </tr> <tr> <td>1% (4-Digit)</td> <td>EX. 10R2 = 10.2Ω 1001 = 1KΩ</td> </tr> </table>	5% (3-Digit)	EX. 100 = 10Ω 102 = 1KΩ	1% (4-Digit)	EX. 10R2 = 10.2Ω 1001 = 1KΩ	F = ±1% J = ±5%	K = 10,000 pcs Lead Free Y = 20,000 pcs Lead Free N = 50,000 pcs Lead Free	B : 105°C
5% (3-Digit)	EX. 100 = 10Ω 102 = 1KΩ									
1% (4-Digit)	EX. 10R2 = 10.2Ω 1001 = 1KΩ									

3. RATING

3.1 Rated Power

3.1.1 Resistor Rated Power

Type	Rated Power at 70°C	Max. Working Voltage	Max. Overload Voltage	Number of Terminals	Number Of Resistors
YAS052V (0201x2)	$\frac{1}{32}$ W	12.5V	25V	4	2
YAS052F (0201x2)	$\frac{1}{32}$ W	12.5 V	25 V	4	2
YAS054V (0201x4)	$\frac{1}{32}$ W	12.5V	25V	8	4
YAS054F (0201x4)	$\frac{1}{32}$ W	12.5 V	25 V	8	4



Product Specification

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3.2 Power Derating Curve:

Operating Temperature Range : - 55 ~ 155 °C

If the ambient temperature exceeds 70 degrees centigrade to 155 degrees centigrade, the power can be modified by the curve as below.

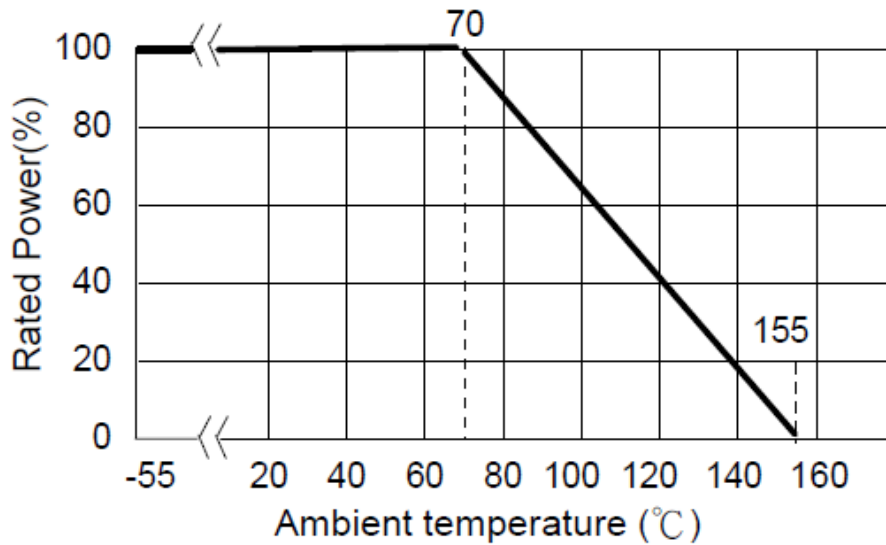


Fig.1 Power Derating Characteristics

3.3 Standard Atmospheric Condition

Unless otherwise specified, the standard range of atmospheric conditions for making measurements and tests is as follows:

Ambient Temperature = + 5°C to +35°C

Relative Humidity = < 85% RH

Air Pressure = 86 kPa to 106kPa

If there may be any doubt about the results, measurement shall be made within the following limits:

Ambient Temperature = 20 ± 2°C

Relative Humidity = 60 to 70% RH

Air Pressure = 86 kPa to 106kPa

3.4 Operating Temperature Range -55°C to +155°C

3.5 Storage Temperature Range -5°C to + 40°C / < 85% RH

3.6 Flammability Rating Tested in accordance to UL-94, V-0

3.7 Moisture Sensitivity Level Rating: Level 1

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3.8 Product Assurance

ASJ resistor shall warranty 24 months from manufacturing date with control conditions.

3.9 ASJ resistors are RoHS compliance in accordance to RoHS Directive.

3.10 Resistance, Resistance Tolerance and Temperature Coefficient of Resistance.

Type	Rated Power at 70°C	Max. Working Voltage	Max. Overload Voltage	T.C.R. (ppm/°C)	Resistance Range		Number of Terminals	Number Of Resistors
					F (±1%)	J (±5%)		
YAS052V (0201x2)	$\frac{1}{32}$ W	12.5V	25V	+400/-200	$10\Omega \leq R \leq 100\Omega$	4	2	
				±250	$100\Omega < R \leq 1M\Omega$			
YAS052F (0201x2)	$\frac{1}{32}$ W	12.5 V	25 V	+400/-200	$10\Omega \leq R \leq 100\Omega$	4	2	
				±250	$100\Omega < R \leq 1M\Omega$			
YAS054V (0201x4)	$\frac{1}{32}$ W	12.5V	25V	+400/-200	$10\Omega \leq R \leq 100\Omega$	8	4	
				±250	$100\Omega < R \leq 1M\Omega$			
YAS054F (0201x4)	$\frac{1}{32}$ W	12.5 V	25 V	+400/-200	$10\Omega \leq R \leq 100\Omega$	8	4	
				±250	$100\Omega < R \leq 1M\Omega$			
Operating Temperature Range				-55~+155°C				

3.11 Rated Voltage

The resistor shall have a DC continuous working voltage or an rms. AC Continuous working voltage at commercial-line frequency and waveform corresponding to the power rating, as determined from the following:

$$E = \sqrt{R \times P}$$

E= Rated voltage (V)

P= power rating (W)

R= Nominal resistance(Ω)



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4. MARKING ON PRODUCT

The nominal resistance shall be marked on the surface of each resistor

Part Number	Color	Marking on Product
YAS052F/V (0201 x 2)	-	No marking
YAS054F/V (0201 x 4)	-	

4.1 Numeric Numbering

4.1.1 5% Tolerance: **Three Numerals Marking**

First 2 digits are significant figures, third digit is number of zeros. Letter R is decimal point.

Example

Nominal Resistance	Marking	Remarks
1 Ω	1R0	$1 \times 10^0 = 1$
10 Ω	100	$10 \times 10^0 = 10$
100 Ω	101	$10 \times 10^1 = 100$
4.7K Ω	472	$47 \times 10^2 = 4700$
47K Ω	473	$47 \times 10^3 = 47000$
470K Ω	474	$47 \times 10^4 = 470000$
4.7M Ω	475	$47 \times 10^5 = 4700000$

4.1.2 1% Tolerance : **Four Numerals Marking**

First 3 digits are significant figures, fourth digit is number of zeros.

Examples:

Nominal Resistance	Marking	Remarks
1 Ω	1R00	$1 \times 10^0 = 1$
10 Ω	10R0	$10 \times 10^0 = 10$
100 Ω	1000	$100 \times 10^0 = 100$
4.7K Ω	4701	$470 \times 10^1 = 4700$
47K Ω	4702	$470 \times 10^2 = 47000$
470K Ω	4703	$470 \times 10^3 = 470000$
1M Ω	1004	$100 \times 10^4 = 1000000$

ANTI-SULPHUR THICK FILM CHIP RESISTOR ARRAY (B) (Flat Type)

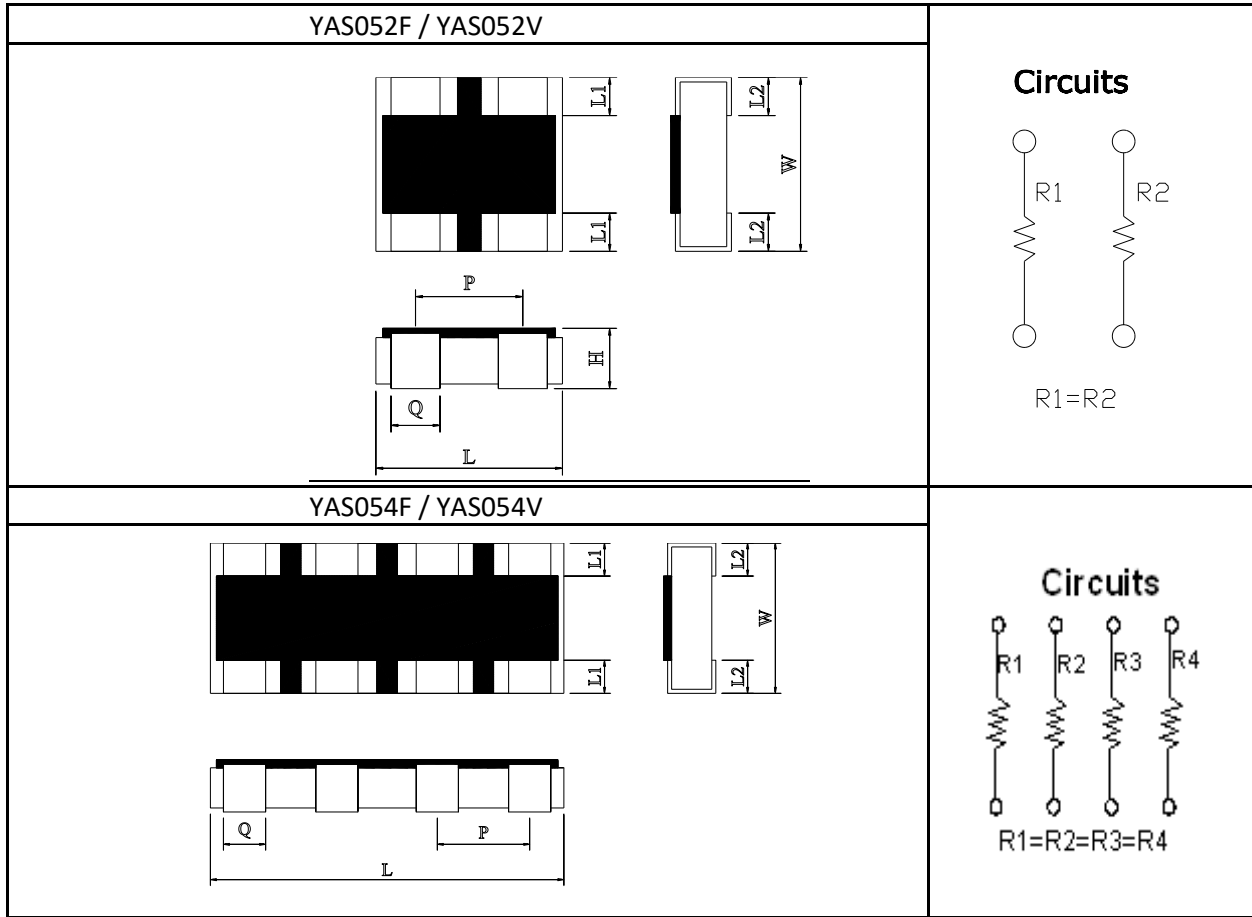
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5. DIMENSIONS

5.1 Dimensions



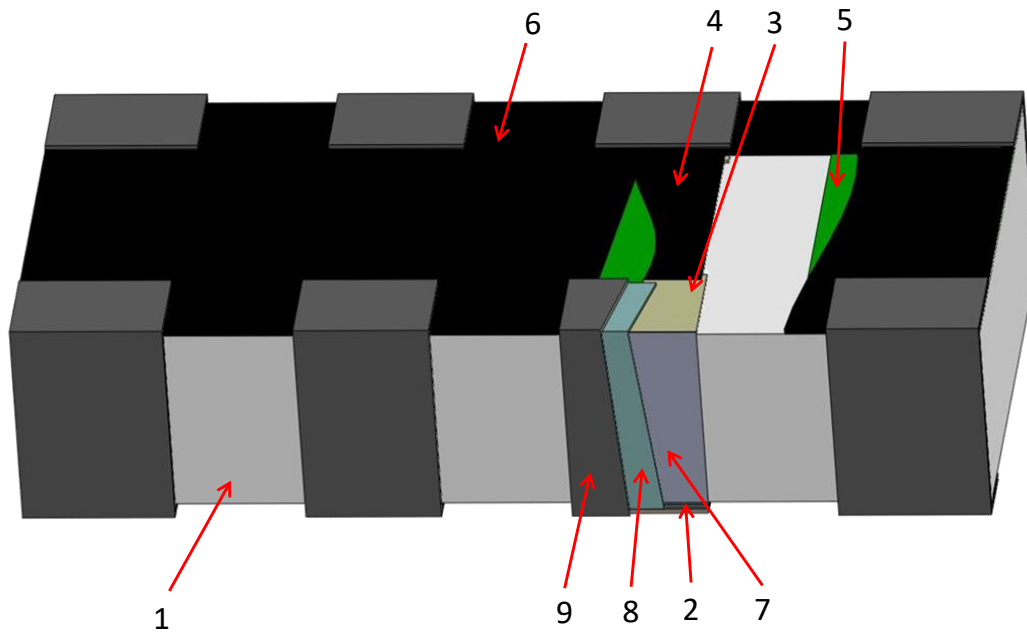
Type	Dimensions (mm)						
	L	W	H	L1	L2	P	Q
YAS052V (0201x2)	0.80±0.05	0.60±0.05	0.23±0.10	0.20 ^{+0.05} _{-0.10}	0.10 ^{+0.10} _{-0.05}	0.50±0.05	0.20±0.10
YAS052F (0201x2)	0.80±0.05	0.60±0.05	0.23±0.10	0.20 ^{+0.05} _{-0.10}	0.10 ^{+0.10} _{-0.05}	0.50±0.05	0.20±0.10
YAS054V (0201x4)	1.40±0.05	0.60±0.05	0.23±0.10	0.20 ^{+0.05} _{-0.10}	0.10 ^{+0.10} _{-0.05}	0.40±0.05	0.20±0.10
YAS054F (0201x4)	1.40±0.05	0.60±0.05	0.23±0.10	0.20 ^{+0.05} _{-0.10}	0.10 ^{+0.10} _{-0.05}	0.40±0.05	0.20±0.10



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5.2 Structure Graph



1	Ceramic substrate	6	2ndProtective coating
2	Bottom inner electrode	7	Terminal inner electrode
3	Top inner electrode	8	Ni plating
4	Resistive layer	9	Sn plating
5	1st Protective coating	10	

5.3 Plating Thickness

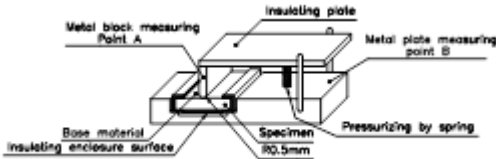
Ni: $\geq 2\mu\text{m}$

Sn(Tin): $\geq 3\mu\text{m}$

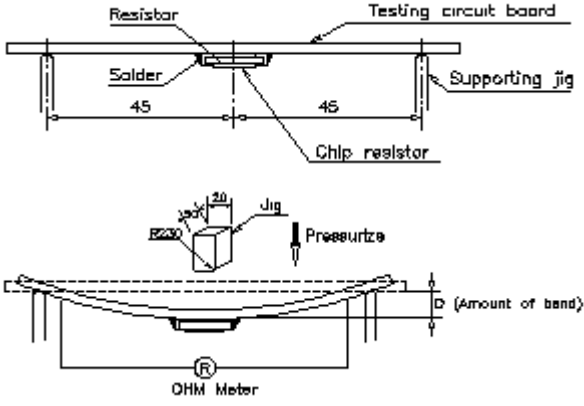
Sn(Tin): Mate Sn

6. Reliability Test

6.0.1 Electrical Performance Test

Item	Conditions	Specifications
		Resistors
Temperature Coefficient of Resistance	$TCR(ppm/^{\circ}C) = \frac{(R2 - R1)}{R1(T2 - T1)} \times 10^6$ R1: Resistance at room temperature R2: Resistance at -55°C or +125°C T1: Room temperature T2: Temperature -55°C or +125°C Refer to JIS-C5201-1 4.8	Refer item 3.10
Short Time Overload	Applied 2.5 times rated voltage for 5 seconds and release the load for about 30 minutes, then measure its resistance variance rate. (Rated voltage refer to item 3.10) Refer to JIS-C5201-1 4.13	$\Delta R\% = \pm 2.0\%$
Insulation Resistance	Put the resistor in the fixture, add 100 VDC in +, - terminal for 60 sec then measured the insulation resistance between electrodes and insulating enclosure or between electrodes and base material. Refer to JIS-C5201-1 4.6 	$\geq 10^9 \Omega$
Dielectric Withstand Voltage	Put the resistor in the fixture, add 300 VAC in +, - terminal for 60 sec. Refer to JIS-C5201-1 4.7	No short or burned on the appearance.

6.0.2 Mechanical Performance Test

Item	Conditions	Specifications
		Resistors
Resistance to Solvent	The tested resistor be immersed into isopropyl alcohol of 20~25°C for 5 minutes, then the resistor is left in the room for 48 hr , then measure its resistance variance rate. Refer to JIS-C5201-1 4.29	$\Delta R\% = \pm 1.0\%$
Solderability	The resistor be immersed into solder pot in temperature $235 \pm 5^\circ\text{C}$ for 2 sec, then the resistor is left as placed under microscope to observed its solder area. Refer to JIS-C5201-1 4.17	Solder coverage over 95%
Resistance to Soldering Heat	<p>©Test method 1 (solder pot test): The tested resistor be immersed into molten solder of $260^{+5}_{-0}^\circ\text{C}$ for 10 seconds. Then the resistor is left in the room for 1 hour.</p> <p>©Test method 2 (solder pot test): The tested resistor be immersed into molten solder of $260^{+5}_{-0}^\circ\text{C}$ for 30 seconds. Then the resistor is left as placed under microscope to observe its solder area.</p> <p>Refer to JIS-C5201-1 4.18</p>	<p>Test item 1: (1).Variance rate on resistance $\Delta R\% = \pm 1.0\%$</p> <p>Test item 2: (1).Solder coverage over 95%. (2).The underlying material (such as ceramic) shall not be visible at the crest corner area of the electrode.</p>
Joint Strength of Solder	<p>©Bending Strength: Solder tested resistor on the PC board, add force in the middle down, and under load measure its resistance variance rate. D=3mm</p>  <p>Refer to JIS-C5201-1 4.33</p>	<p>(1).Variance rate on resistance $\Delta R\% = \pm 1.0\%$</p> <p>(2).No evidence of mechanical damage. No terminal peeling off and core body cracked.</p>

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6.0.3 Environmental Performance

Item	Conditions	Specifications									
		Resistors									
Resistance to Dry Heat	Put tested resistors in chamber under temperature $155\pm 5^{\circ}\text{C}$ for $1,000\pm 4$ hours. Then leaving in room temperature for 60 minutes, and measure its resistance variance rate. Refer to JIS-C5201-1 4.25	$\Delta R\% = 1.0\%$									
Thermal Shock	Put the tested resistor in the thermal shock chamber under the temperature cycle which shown in the following table shall be repeated 300 times consecutively. Then leaving the tested resistor in the room temperature for 1 hours, and measure its resistance variance rate. <table border="1" data-bbox="316 689 880 842"> <thead> <tr> <th colspan="2">Testing Condition</th> </tr> </thead> <tbody> <tr> <td>Lowest Temperature</td> <td>$-55\pm 5^{\circ}\text{C}$</td> </tr> <tr> <td>Highest Temperature</td> <td>$125\pm 5^{\circ}\text{C}$</td> </tr> <tr> <td>Temperature-retaining time</td> <td>15 minutes each</td> </tr> </tbody> </table> Refer to MIL-STD 202 Method 107	Testing Condition		Lowest Temperature	$-55\pm 5^{\circ}\text{C}$	Highest Temperature	$125\pm 5^{\circ}\text{C}$	Temperature-retaining time	15 minutes each	$\Delta R\% = 1.0\%$	
Testing Condition											
Lowest Temperature	$-55\pm 5^{\circ}\text{C}$										
Highest Temperature	$125\pm 5^{\circ}\text{C}$										
Temperature-retaining time	15 minutes each										
Loading Life in Moisture	Put the tested resistor in the chamber under temperature $40\pm 2^{\circ}\text{C}$, relative humidity 90~95% and load the rated voltage for 90 minutes on, 30 minutes off, total 1000 hours. Then leaving the tested resistor in room temperature for 60 minutes, and measure its resistance variance rate. Refer to JIS-C5201-1 4.24	$\Delta R\% = \pm 3.0\%$									
Load Life	Put the tested resistor in chamber under temperature $70\pm 2^{\circ}\text{C}$ and load the rated voltage for 90 minutes on, 30 minutes off, total 1000 hours. Then leaving the tested resistor in room temperature for 60 minutes, and measure its resistance variance rate. Refer to JIS-C5201-1 4.25	$\Delta R\% = \pm 3.0\%$									
Sulfuration Test	Put the tested resistor in sulfur vapor, at a temperature of $105\pm 2^{\circ}\text{C}$ for 750hrs. Refer to ASTM-B-809-95&EIA977	$\Delta R\% = \pm 1.0\%$	Refer to item 3.10								

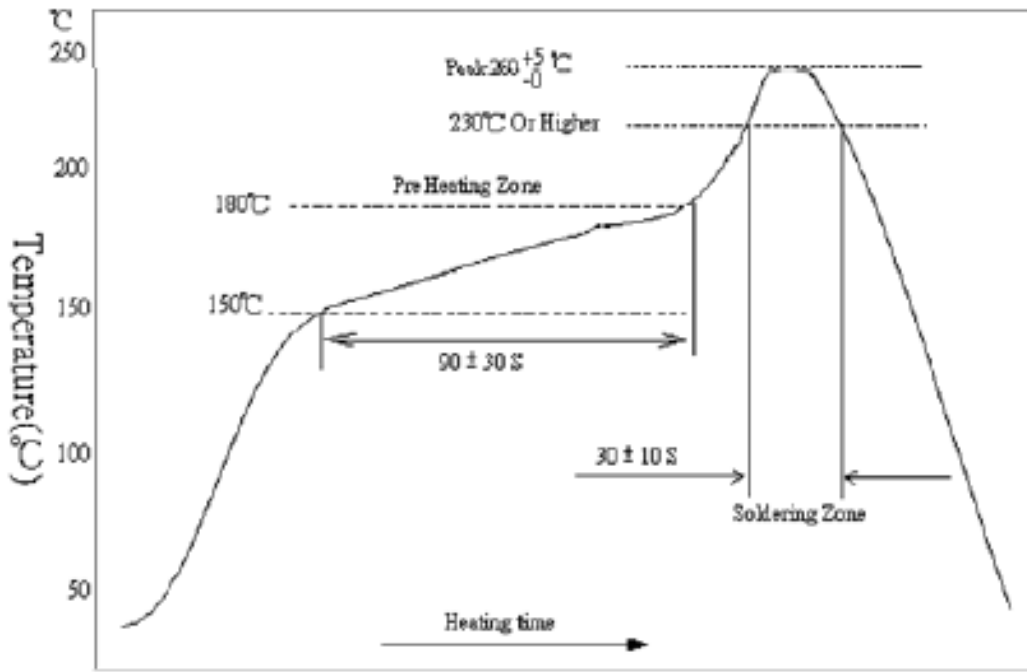


Product Specification

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6.1 Technical application notes: (This is for recommendation, customer are please to perform adjustment according to actual application)
Soldering Profile

6.1.1 Lead Free IR Reflow Soldering Profile



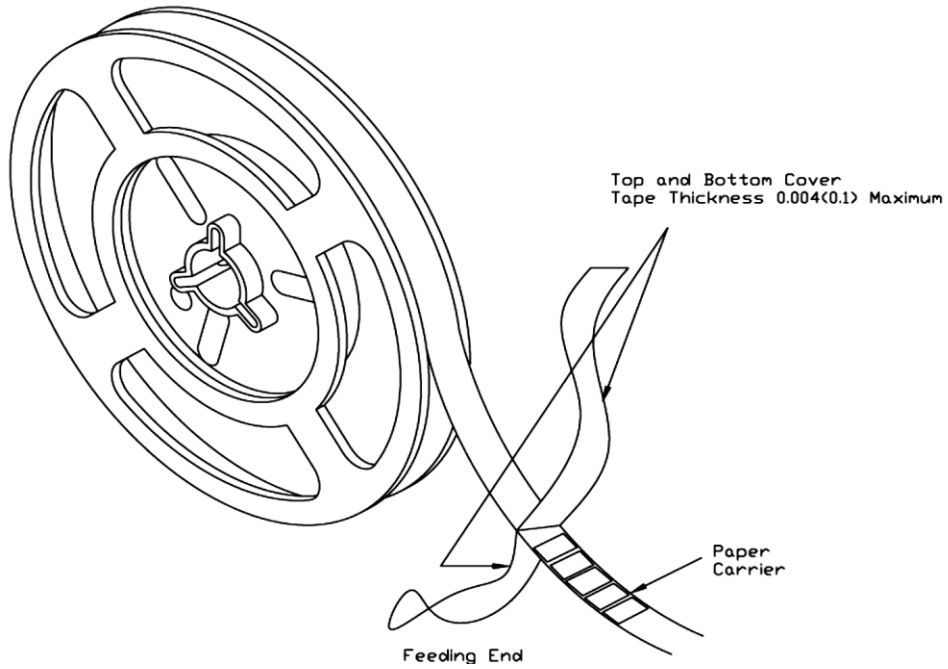
Remark : The peak temperature of soldering heat is 260 ± 5 °C for 10 second

6.1.2 Soldering Iron: Temperature 350 ± 10 °C, dwell time shall be less than 3 sec

7. TAPING

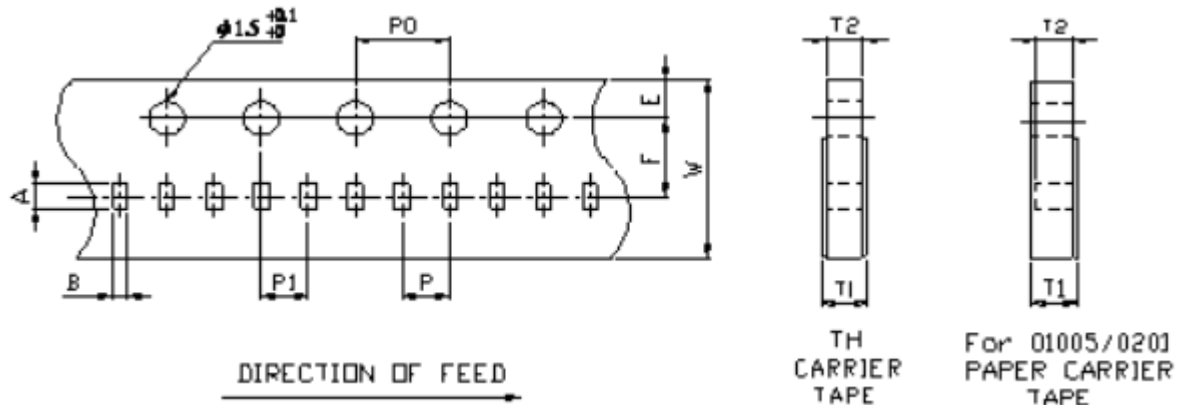
7.1 Structure of Taping

Paper Carrier



7.2 Dimension

7.2.1 Dimension of Punched Paper Tape Carrier System YAS052F/V and YAS054F/V



Remark: Pitch tolerance over any 10 pitches of P₀ is ± 0.2 mm

Dimension of Punched Paper Tape Carrier System

(unit : mm)

Code	A	B	W	E	F	T1
YAS052F/V	0.90 \pm 0.10	0.70 \pm 0.10	8.00 \pm 0.20	1.75 \pm 0.10	3.50 \pm 0.05	0.40 \pm 0.05
YAS054F/V	1.60 \pm 0.10	0.75 \pm 0.05	8.00 \pm 0.20	1.75 \pm 0.10	3.50 \pm 0.05	0.40 \pm 0.05

Code	T2	P	P0	10xP0	P1
YAS052F/V	0.30 \pm 0.05	2.00 \pm 0.10	4.00 \pm 0.05	40.0 \pm 0.20	2.00 \pm 0.05
YAS054F/V	0.30 \pm 0.05	2.00 \pm 0.10	4.00 \pm 0.05	40.0 \pm 0.20	2.00 \pm 0.05

7.3 Packaging

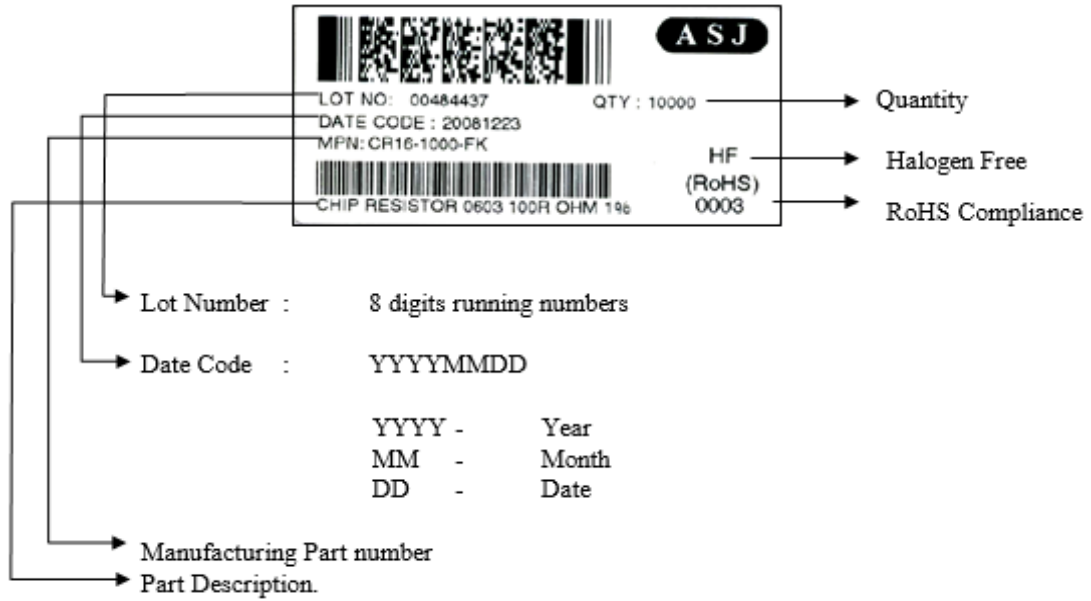
7.3.1 Taping

7.3.1.1 Quantity – Tape and Reels

Code	Quantity	Reel	Remarks
YAS052F/V	10,000	7"	2mm pitch
	20,000	10"	2mm pitch
YAS054F/V	50,000	13"	2mm pitch

7.3.2 Identification

Production label that indicates the 8 digits lot number, product type, resistance value and tolerance shall be pasted on the surface of each reel.



7.3.3 Packaging Reel Box

Dimension	Reel Box	Number of Reels
185 × 60 × 186 mm	25K Box	5
185 × 120 × 186 mm	50K Box	10

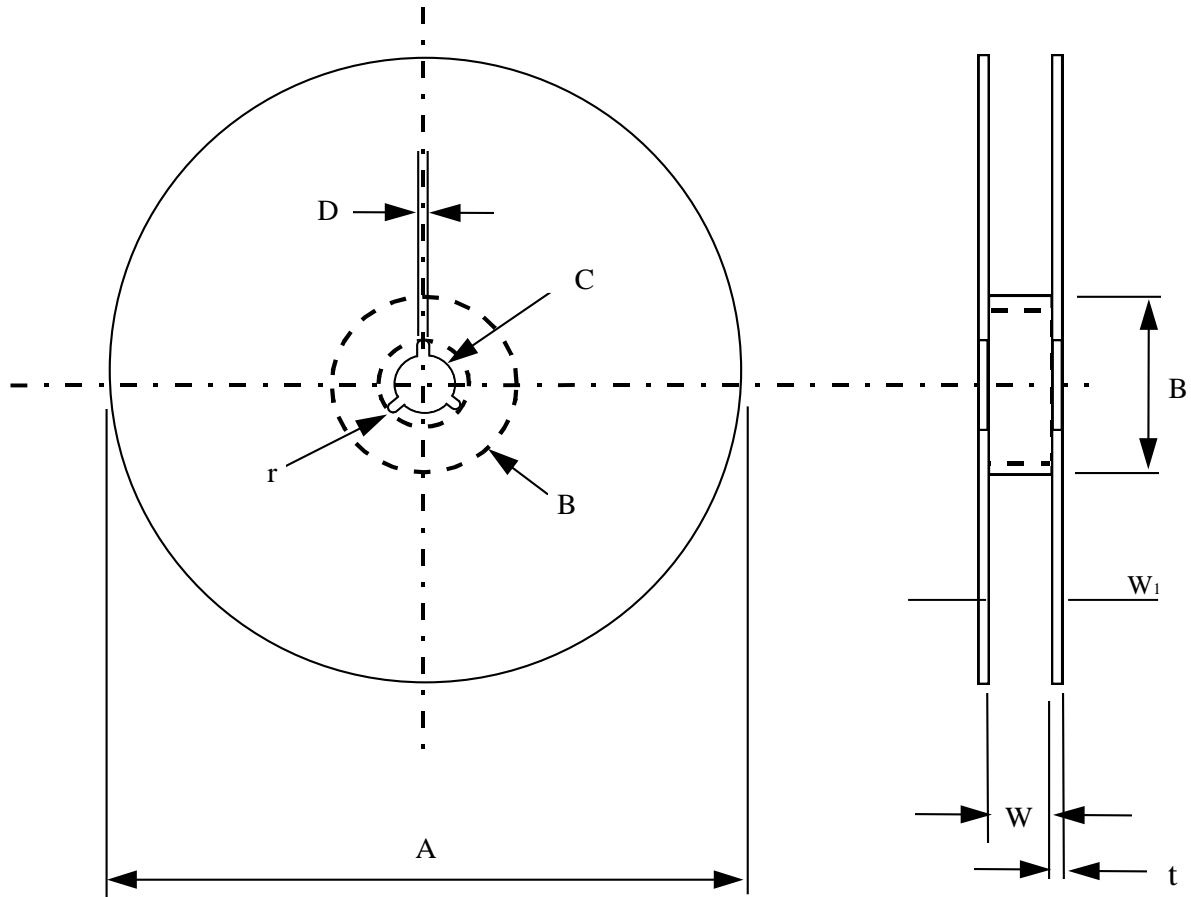
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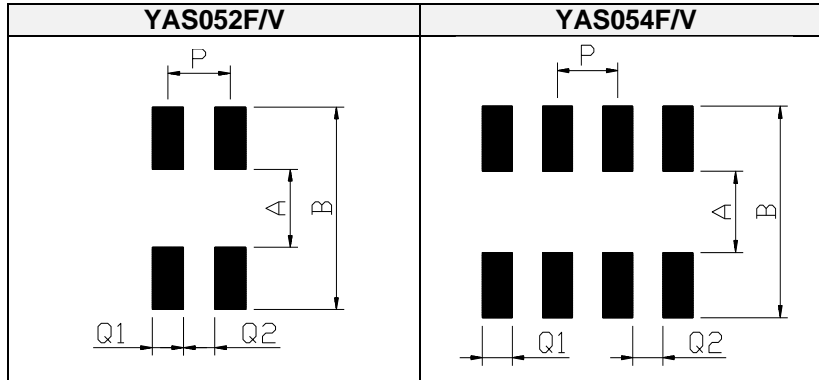
7.3.4 Reel Dimensions



Model	A	B	C	D	W	W ₁	t	r
7" Reel (5K) (except 0402 10K)	$\phi 178 \pm 2.0$	$\phi 60 \text{min}$	13 ± 0.2	$\phi 2.0 \pm 0.5$	11 ± 0.1	14.4 max	1.0 ± 0.1	1.0
7" Reel (4K)	$\phi 178 \pm 2.0$	$\phi 80 \text{min}$	13 ± 0.2	$\phi 2.0 \pm 0.5$	13 ± 1.0	14.4 max	1.2 ± 0.1	1.0
10" Reel (10K)	$\phi 254 \pm 2.0$	$\phi 100 \text{min}$	13 ± 0.2	$\phi 2.0 \pm 0.5$	11 ± 1.0	14.4 max	1.5 ± 0.1	1.0
13" Reel (20K, 50K)	$\phi 330 \pm 2.0$	$\phi 100 \text{min}$	13 ± 0.2	$\phi 2.0 \pm 0.5$	11 ± 1.0	14.4 max	2.1 ± 0.1	-
13" Reel (20K, 50K)	$\phi 330 \pm 1.0$	$\phi 100 \pm 1$	13.5 ± 0.5	$2 \sim 3 \pm 0.5$	10 ± 0.5	-	-	-

8. SURFACE MOUNT LAND PATTERNS DESIGN (For Reflow Soldering)

When a component is soldered, the resistance after soldering changes slightly depending on the size of the soldering area and the amount of soldering. When designing a circuit, it is necessary to consider the effect of a decrease or increase in its resistance.



Type	Dimensions (mm)				
	A	B	P	Q1	Q2
YAS052F/V (0201x2)	0.30	0.90	0.50	0.30	0.20
YAS054F/V (0201x4)	0.30	0.90	0.40	0.20	0.20

9. Measurement Point

Bottom electrode		Unit : mm	
TYPE	DIM	A	B
	YAS052F/V		0.56±0.05

⊕ Current Terminal
 ⊖ Voltage Terminal

Bottom electrode		Unit : mm	
TYPE	DIM	A	B
	YAS054F/V		0.56±0.05

⊕ Current Terminal
 ⊖ Voltage Terminal

ANTI-SULPHUR THICK FILM CHIP RESISTOR ARRAY (B) (Flat Type)

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10. REVISION HISTORY

REVISION	DATE	CHANGE NOTIFICATION	DESCRIPTION
Version.1	01.11.2019		Initial Release
Version.2	14.10.2020		Revise clause 2 part numbering system Revise clause 3.1.1 Resistor rated power Revise clause 3.5 Storage temp. range Revise clause 3.10 TCR table Revise clause 4 Marking on product Revise clause 5.1 dimension Revise clause 7.2.1 tape dimension Revise clause 7.3.1.1 Tape and reel qty Revise clause 8 Land pattern dimension Revise clause 9 Measurement point dimension
Version 3	13.04.2023		Revise clause 3.8 Product Assurance



Product Specification

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DATA SHEET

Anti-Sulphur Thick Film Chip Resistor Array (A/B) (Convex Type)

YAS Series

1% To 5%, TCR ± 200 To ± 300

SIZE: 102/104/162/164

RoHS Compliant

ANTI-SULPHUR THICK FILM CHIP RESISTOR ARRAY (CONVEX TYPE)

YAS Series

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1. SCOPE

- 1.1 This specification is applicable to Lead-free and Halogen-free of RoHS Directive for YAS series anti-sulfurated thick film chip resistors array.
- 1.2 Superior Sulfur-resistant capability (Refer to ASTM-B-809-95 & EIA977 sulfur vapor test).
- 1.3 The product is for general electronic purpose.

2. PART NUMBERING SYSTEM

Part Numbering is made in accordance with the following system

YAS	102	□	100	□	J	K	□	A
Type	Size (Inch/mm)	Nominal Resistance		Resistance Tolerance	Packaging		FoS Test	
Anti - Sulfurated Thick Film Chip Resistors Array	102 - 0402 x 2 104 - 0402 x 4 162 - 0603 x 2 164 - 0603 x 4	5% (3-Digit)	EX. 10Ω = 100 4.7Ω = 4R7 JUMPER = 000	F = ±1% J = ±5% Z=Zero ohm	L = 5,000 pcs Lead Free K = 10,000 pcs Lead Free Y = 20,000 pcs Lead Free N = 50,000 pcs Lead Free	A : 60°C B : 105°C		
		1% (4-Digit)	EX. 10.2Ω = 10R2 10KΩ = 1002					

3. RATING

3.1 Rated Power

3.1.1 Resistor Rated Power

Type	Rated Power at 70°C	Max. Working Voltage	Max. Overload Voltage	JUMPER (0Ω) Rated Current	JUMPER (0Ω) Resistance Value		
					Z(±5%)		F(±1%)
					A	B	B
YAS102 (0402)	$\frac{1}{16}$ W	25V	50V	1A	50mΩ MAX.	100mΩ MAX.	50mΩ MAX.
YAS162 (0603)	$\frac{1}{16}$ W	50V	100V	1A	50mΩ MAX.	100mΩ MAX.	50mΩ MAX.
YAS104 (0402)	$\frac{1}{16}$ W	25V	50V	1A	50mΩ MAX.	100mΩ MAX.	50mΩ MAX.
YAS164 (0603)	$\frac{1}{16}$ W	50V	100V	1A	50mΩ MAX.	100mΩ MAX.	50mΩ MAX.



Product Specification

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- 3.2 Power Derating Curve:
Operating Temperature Range : - 55~155 °C
If the ambient temperature exceeds 70 degrees centigrade to 155 degrees centigrade, the power can be modified by the curve as below.

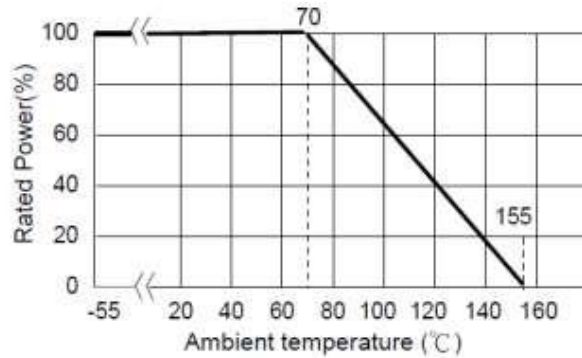


Fig.1 Power Derating Characteristics

- 3.3 Standard Atmospheric Condition

Unless otherwise specified, the standard range of atmospheric conditions for making measurements and tests is as follows:

Ambient Temperature = + 5°C to +35°C

Relative Humidity = < 85% RH

Air Pressure = 86 kPa to 106kPa

If there may be any doubt about the results, measurement shall be made within the following limits:

Ambient Temperature = $20 \pm 2^\circ\text{C}$

Relative Humidity = 60 to 70% RH

Air Pressure = 86 kPa to 106kPa

- 3.4 Operating Temperature Range -55°C to +155°C
- 3.5 Storage Temperature Range -5°C to + 40°C / < 85% RH
- 3.6 Flammability Rating Tested in accordance to UL-94, V-0
- 3.7 Moisture Sensitivity Level Rating: Level 1
- 3.8 Product Assurance
ASJ resistor shall warranty 24 months from the manufacturing date with control conditions.
- 3.9 ASJ resistors are RoHS compliance in accordance to RoHS Directive.
- 3.10 Resistance, Resistance Tolerance and Temperature Coefficient of Resistance.

ANTI-SULPHUR THICK FILM CHIP RESISTOR ARRAY (CONVEX TYPE)

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Type	Rated Power at 70°C	Max. Working Voltage	Max. Overload Voltage	T.C.R. (ppm/°C)	Resistance Range		Number of Terminals	Number of Resistors	JUMPER (0Ω) Rated Current	JUMPER (0Ω) Resistance Value		
					F(±1%) E-24、E-96	J(±5%) E-24				Z (±5%)		F(±1%)
					A	B				B		
YAS102 (0402)	$\frac{1}{16}$ W	25V	50V	±300	$1\Omega \leq R < 10\Omega$	$1\Omega \leq R < 10\Omega$	4	2	1A	50mΩ MAX.	100mΩ MAX.	50mΩ MAX.
				±200	$10\Omega \leq R \leq 10M\Omega$	$10\Omega \leq R \leq 10M\Omega$						
YAS162 (0603)	$\frac{1}{16}$ W	50V	100V	±200	$10\Omega \leq R \leq 10M\Omega$	$10\Omega \leq R \leq 10M\Omega$	4	2	1A	50mΩ MAX.	100mΩ MAX.	50mΩ MAX.
YAS104 (0402)	$\frac{1}{16}$ W	25V	50V	±300	$1\Omega \leq R < 10\Omega$	$1\Omega \leq R < 10\Omega$	8	4	1A	50mΩ MAX.	100mΩ MAX.	50mΩ MAX.
				±200	$10\Omega \leq R \leq 10M\Omega$	$10\Omega \leq R \leq 10M\Omega$						
YAS164 (0603)	$\frac{1}{16}$ W	50V	100V	±200	$1\Omega \leq R \leq 10M\Omega$	$1\Omega \leq R \leq 10M\Omega$	8	4	1A	50mΩ MAX.	100mΩ MAX.	50mΩ MAX.
Operating Temperature Range				-55°C ~ +155°C								

3.11 Rated Voltage

DC voltage or AC voltage (rms) based on the rated power.

The voltage can be calculated by the following formula. If the calculated value exceeds the Max. voltage specified in the Table 3, the Max. voltage rating is set as the voltage rating.

$$E = \sqrt{R \times P}$$

E= Rated voltage (V)

P= Power rating (W)

R= Nominal resistance (Ω)

4. MARKING ON PRODUCT

The nominal resistance shall be marked on the surface of each resistor

Part Number	Color	Marking on Product
YAS102 (0402 x 2)	-	No marking
YAS104 (0402 x 4)	Light Yellow	1) Tolerance : $\pm 1.0\%$ (F) Four Numerals Marking (E96 Series) 2) Tolerance; $\pm 5.0\%$ (J) Three Numerals Marking
YAS162 (0603 x 2)	Light Yellow	
YAS164 (0603 x 4)	Light Yellow	

4.1 Numeric Numbering

4.1.1 5% Tolerance: **Three Numerals Marking**

First 2 digits are significant figures, third digit is number of zeros. Letter R is decimal point.

Example

Nominal Resistance	Marking	Remarks
1 Ω	1R0	$1 \times 10^0 = 1$
10 Ω	100	$10 \times 10^0 = 10$
100 Ω	101	$10 \times 10^1 = 100$
4.7K Ω	472	$47 \times 10^2 = 4700$
47K Ω	473	$47 \times 10^3 = 47000$
470K Ω	474	$47 \times 10^4 = 470000$
4.7M Ω	475	$47 \times 10^5 = 4700000$

4.1.2 1% Tolerance : **Four Numerals Marking**

First 3 digits are significant figures, fourth digit is number of zeros.

Examples:

Nominal Resistance	Marking	Remarks
1 Ω	1R00	$1 \times 10^0 = 1$
10 Ω	10R0	$10 \times 10^0 = 10$
100 Ω	1000	$100 \times 10^0 = 100$
4.7K Ω	4701	$470 \times 10^1 = 4700$
47K Ω	4702	$470 \times 10^2 = 47000$
470K Ω	4703	$470 \times 10^3 = 470000$
1M Ω	1004	$100 \times 10^4 = 1000000$

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YAS Series

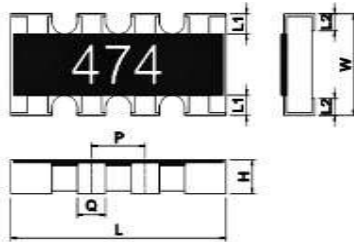
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5. DIMENSION

5.1 Dimension

Unit:mm



TYPE	DIM	L	W	H	L1	L2	P	Q
YAS102 (0402)		1.00±0.10	1.00±0.10	0.30±0.05	0.15±0.10	0.25±0.15	(0.67)	0.33±0.10
YAS104 (0402)		2.00±0.10	1.00±0.10	0.40±0.10	0.20±0.10	0.25±0.15	(0.50)	0.30±0.10
YAS162 (0603)		1.60±0.15	1.60±0.15	0.45±0.10	0.30±0.15	0.30±0.20	(0.80)	0.60±0.10
YAS164 (0603)		3.20±0.20	1.60±0.15	0.50±0.10	0.30±0.15	0.30±0.20	(0.80)	0.50±0.10

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6. RELIABILITY TEST

Item	Conditions	Specifications	
		Resistors	
High Temperature Exposure (Storage)	Put the specimens in the chamber with temperature of $155\pm 3^{\circ}\text{C}$ for 1000 hours. Then take them out to stabilize in room temperature for 24 ± 4 hr or more, and measure of its resistance variance rate. Experiment evidence: AEC-Q200	1. 1% : $\Delta R = \pm 1.0\%$ 2. 5% : $\Delta R = \pm 2.0\%$	Refer to item 3.10
Temperature Cycling	Put the specimens in the High & low temperature test chamber with temperature varies from -55°C to 125°C for 15 minutes and total 1000 cycles. Then take them out to stabilize in room temperature for 24 ± 4 hr or more, and measure of its resistance variance rate. Experiment evidence: AEC-Q200	$\Delta R = \pm 2.0\%$	Refer to item 3.10
Biased Humidity	Solder the specimens on the test PCB and put them into the constant temperature humidity chamber with $85\pm 2^{\circ}\text{C}$ and $85\pm 5\%$ RH. Then apply the test voltage that calculates based on the 10% of rated power for 1000hrs. Then take them out to stabilize in room temperature for 24 ± 4 hr or more, and measure of its resistance variance rate. Experiment evidence: AEC-Q200	1. 1% : $\Delta R = \pm 2.0\%$ 2. 5% : $\Delta R = \pm 3.0\%$	Refer to item 3.10
Operational Life	Solder the specimens on the test PCB and Put them in the chamber with temperature of $125\pm 3^{\circ}\text{C}$ and load the voltage for 1000 hours. Then take them out to stabilize in room temperature for 24 ± 4 hr or more, and measure of its resistance variance rate. Note: The input voltage shall refer to the power de-rating curve (referring to page 3, No.3.2) Experiment evidence: AEC-Q200	1. 1% : $\Delta R = \pm 2.0\%$ 2. 5% : $\Delta R = \pm 3.0\%$	Refer to item 3.10
Short Time Overload	Applied 2.5 times rated voltage for 5 seconds and release the load for about 30 minutes, then measure its resistance variance rate. (Rated voltage refer to item 3.10) Refer to JIS-C5201-1 4.13	1. 1% : $\Delta R = \pm 1.0\%$ 2. 5% : $\Delta R = \pm 2.0\%$	Refer to item 3.10
Resistance to Soldering Heat	The specimens are fully immersed into the Pb-free solder pot, then take them out to stabilize for 1 hour or more and measure of its resistance variance rate. Temp of solder pot : $260\pm 5^{\circ}\text{C}$ Soldering duration : 10 ± 1 sec. Experiment evidence AEC-Q200	$\Delta R = \pm 1.0\%$	Refer to item 3.10
ESD	Put the specimens on the test fixture and two (2) discharges (2KVDC) shall be applied to each PUT, one (1) with a positive polarity and one (1) with a negative polarity. Afterwards, the specimens stabilize for 30min or more and measure of its resistance variance rate. The test is performed with direct contact and regular discharge mode. The resistor and capacitor used on the spearhead is 2000Ω and 150pF respectively. Experiment evidence AEC-Q200	$\Delta R = \pm 3.0\%$	Refer to item 3.10



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Item	Conditions	Specifications	
		Resistors	
Solderability	<p>Test method: Test item 1 (solder pot test): Method B Precondition: The specimens are subjected to 155°C dry bake for 4hrs±15min. The specimens are immersed into the flux first, then fully immersed into the solder pot, at a temperature of 235±5°C for 5⁺⁰_{-0.5} sec. Then rinse with water and observe the soldering coverage under the microscope. Test item 2 (Leaching test): Method D The specimens are immersed into the flux first, then fully immersed into the solder pot, at a temperature of 260±5°C for 30⁺⁰_{-0.5} sec. Then rinse with water and observe the soldering coverage under the microscope. Experiment evidence AEC-Q200</p>	1.Soldering coverage over 95% 2. At the edge of terminal, the object underneath (e.g. white ceramic) shall not expose.	
Electrical Characterization	$TCR(ppm/^{\circ}C) = \frac{(R2 - R1)}{R1(T2 - T1)} \times 10^6$ <p>R1: Resistance at room temperature (Ω) R2: Resistance at -55°C or +125°C(Ω) T1: Room temperature (°C) T2: Temperature -55°C or +125°C Experiment evidence: AEC-Q200</p>	Refer to item 3.10	NA
Board Flex (Bending Test)	Solder the specimens on the test PCB and put the PCBA onto the Bending Tester. Add force at the central part of PCB, and the duration of the applied forces shall be 60 (+ 5) Sec. Measure of its resistance variance rate in load. Bending depth (D)=5mm Experiment evidence: AEC-Q200	ΔR=±1.0%	Refer to item 3.10
		No mechanical damage, peeling off of side end or chip crack.	
Sulfuration Test	Class : A Put the tested resistor in sulfur vapor, at a temperature of 60±2°Cfor 1000hrs Refer to ASTM-B-809-95&EIA977	ΔR=±4.0%	Refer to item 3.10
	Class : B Put the tested resistor in sulfur vapor, at a temperature of 105±2°Cfor 750hrs Refer to ASTM-B-809-95&EIA977	ΔR=±4.0%	



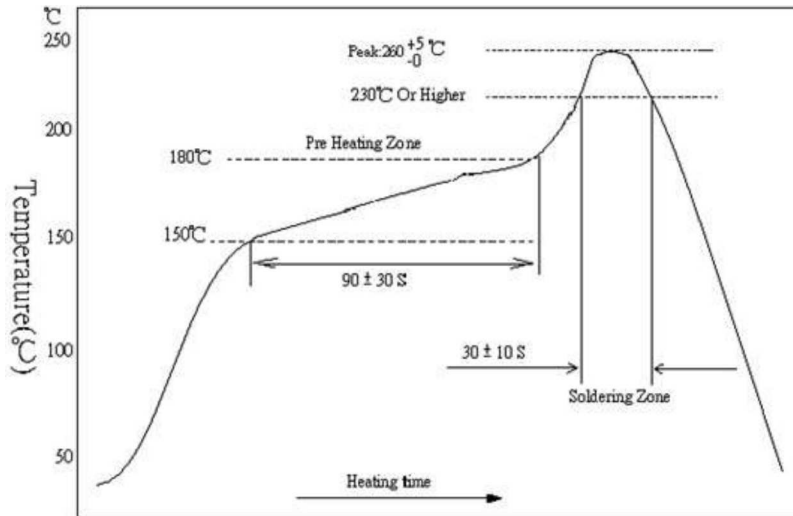
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6.1 Soldering Profile

Technical application notes: This is for recommendation, customer please to perform adjustment according to actual application.

6.1.1 Lead-Free IR Reflow Soldering Profile



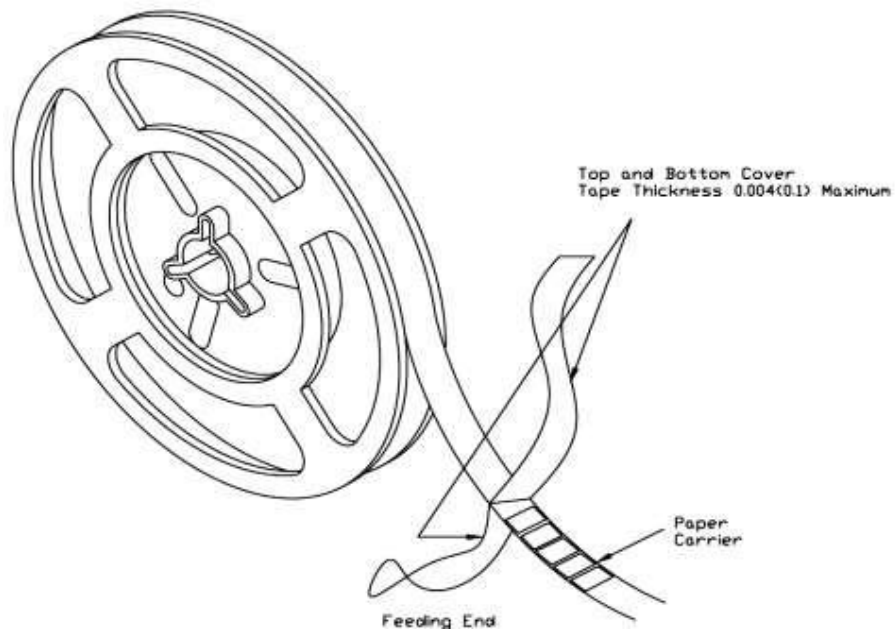
Remark : The peak temperature of soldering heat is 260^{+5}_{-0} °C for 10 second

6.1.2 Soldering Iron: Temperature 350 ± 10 °C, dwell time shall be less than 3 sec

7. TAPING

7.1 Structure of Taping

Paper Carrier



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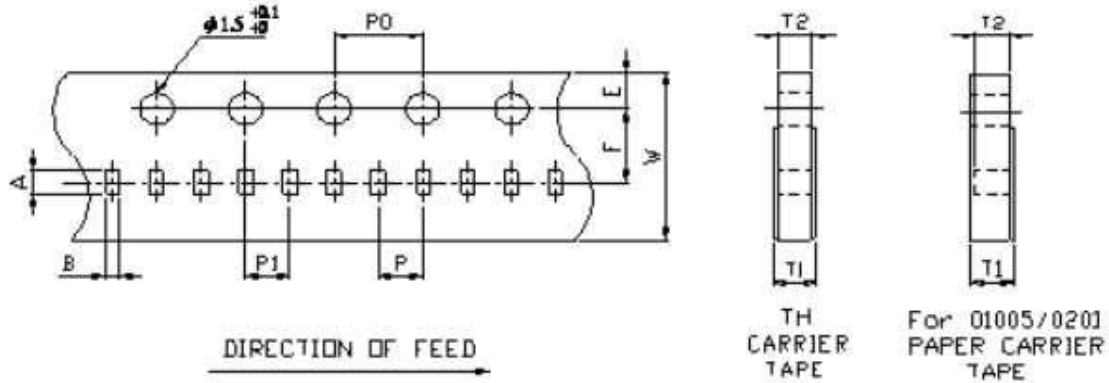
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7.2 Dimension

7.2.1 Dimension of Punched Paper Tape Carrier System YAS102D and YAS104D



Remark: Pitch tolerance over any 10 pitches of P_0 is ± 0.2 mm

Dimension of Punched Paper Tape Carrier System

(unit : mm)

Code	A	B	W	E	F	T1
YAS102	1.20 ± 0.10	1.20 ± 0.10	8.00 ± 0.20	1.75 ± 0.10	3.50 ± 0.05	$0.40^{+0.2}_0$
YAS104	2.20 ± 0.10	1.20 ± 0.10	8.00 ± 0.20	1.75 ± 0.10	3.50 ± 0.05	$0.60^{+0.2}_0$

Code	T2	P	P0	10xP0	P1
YAS102	0.40 ± 0.10	2.00 ± 0.10	4.00 ± 0.05	40.0 ± 0.20	2.00 ± 0.05
YAS104	0.60 ± 0.10	2.00 ± 0.10	4.00 ± 0.05	40.0 ± 0.20	2.00 ± 0.05



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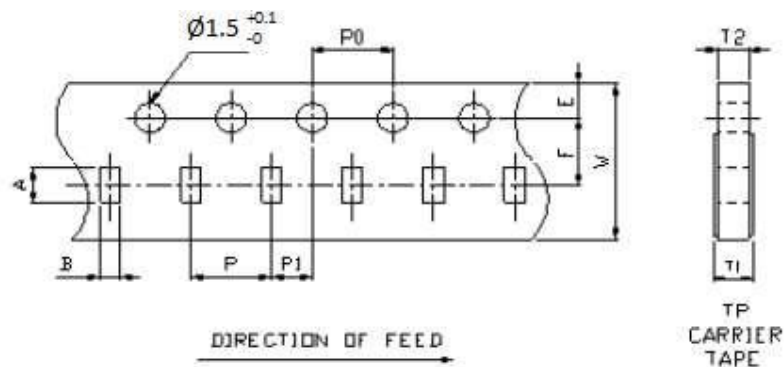
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7.2.2 Dimension of Punched Paper Tape Carrier System YAS162D and YAS164D



Code	A	B	W	E	F	T1
YAS162	1.90±0.10	1.90±0.10	8.00±0.20	1.75±0.10	3.50±0.05	0.60 ^{+0.2} ₀
YAS164	3.45±0.10	1.90±0.10	8.00±0.20	1.75±0.10	3.50±0.05	0.75 ^{+0.2} ₀

Code	T2	P	P0	10xP0	P1
YAS162	0.60±0.10	4.00±0.10	4.00±0.05	40.0±0.20	2.00±0.05
YAS164	0.75±0.10	4.00±0.10	4.00±0.05	40.0±0.20	2.00±0.05

7.3 Packaging

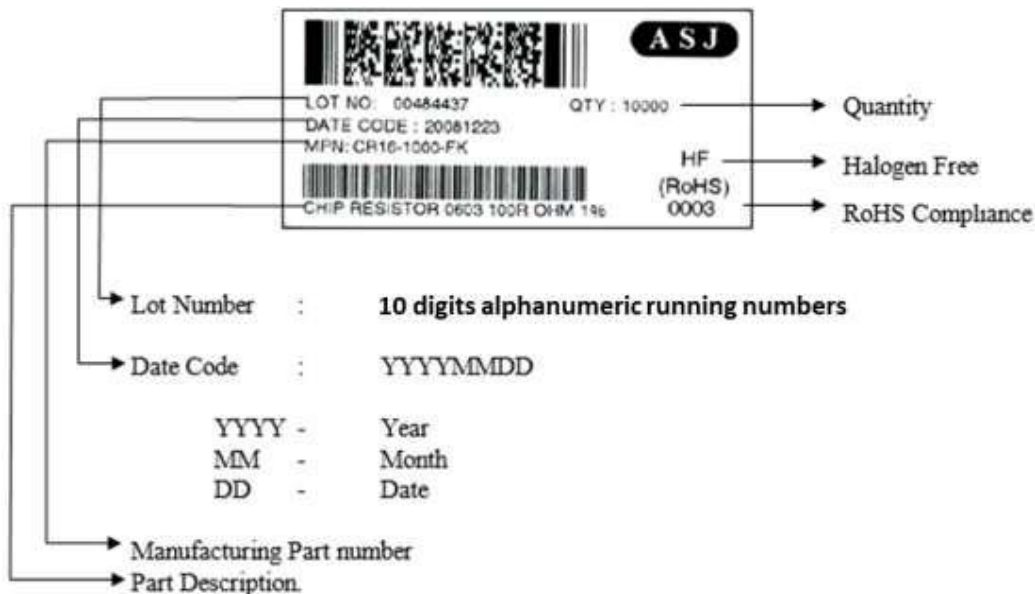
7.3.1 Taping

Quantity – Tape and Reels

Code	Quantity	Reel	Remarks
YAS102 YAS104	10,000	7"	2mm pitch
	20,000	10"	2mm pitch
	50,000	13"	2mm pitch
YAS162 YAS164	5,000	7"	4mm pitch
	10,000	10"	4mm pitch
	20,000	13"	4mm pitch

7.3.2 Identification

Production label that indicates the 10 digits lot number, product type, resistance value and tolerance shall be pasted on the surface of each reel.



7.3.3 Packaging Reel Box

Dimension	Reel Box	Number of Reels
185 × 60 × 186 mm	25K Box	5
185 × 120 × 186 mm	50K Box	10

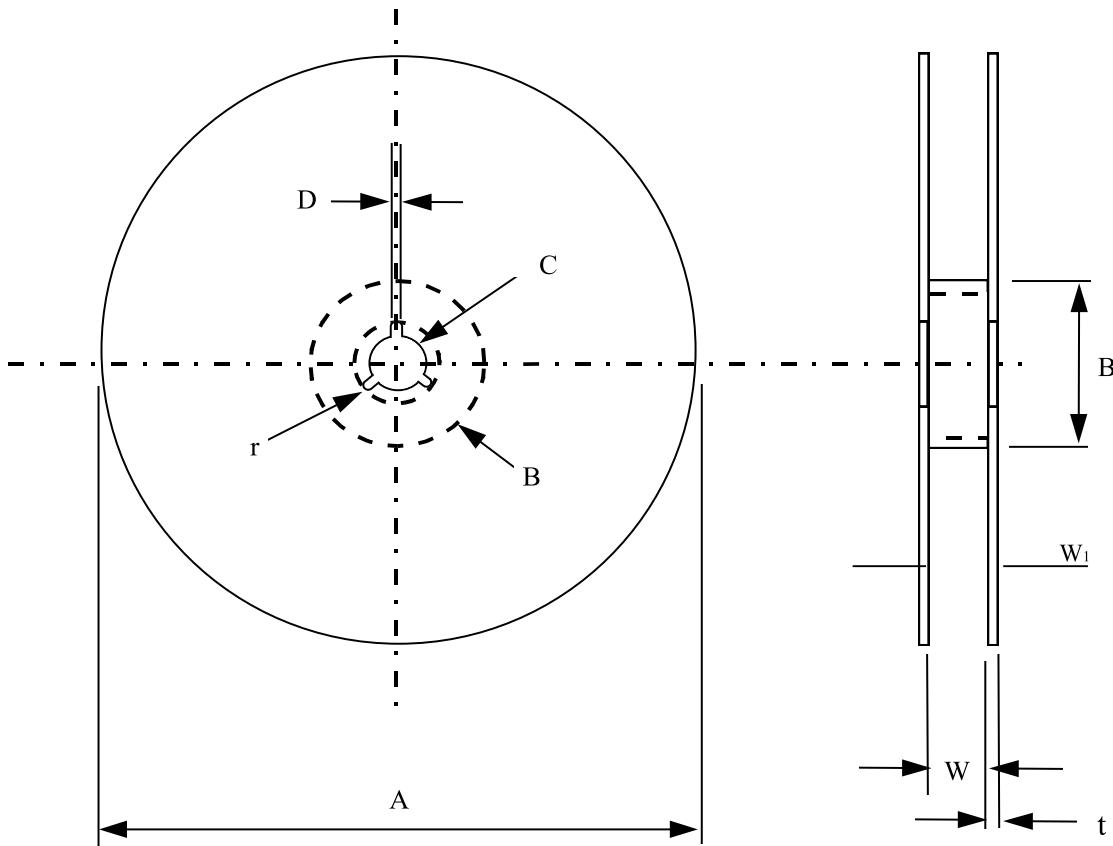
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7.3.4 Reel Dimensions



Model	A	B	C	D	W	W ₁	t	r
7" Reel (5K) (except 0402 10K)	$\phi 178 \pm 2.0$	$\phi 60 \text{min}$	13 ± 0.2	$\phi 2.0 \pm 0.5$	11 ± 0.1	14.4 max	1.0 ± 0.1	1.0
7" Reel (4K)	$\phi 178 \pm 2.0$	$\phi 80 \text{min}$	13 ± 0.2	$\phi 2.0 \pm 0.5$	13 ± 1.0	14.4 max	1.2 ± 0.1	1.0
10" Reel (10K)	$\phi 254 \pm 2.0$	$\phi 100 \text{min}$	13 ± 0.2	$\phi 2.0 \pm 0.5$	11 ± 1.0	14.4 max	1.5 ± 0.1	1.0
13" Reel (20K, 50K)	$\phi 330 \pm 2.0$	$\phi 100 \text{min}$	13 ± 0.2	$\phi 2.0 \pm 0.5$	11 ± 1.0	14.4 max	2.1 ± 0.1	-
13" Reel (20K, 50K)	$\phi 330 \pm 1.0$	$\phi 100 \pm 1$	13.5 ± 0.5	$2 \sim 3 \pm 0.5$	10 ± 0.5	-	-	-

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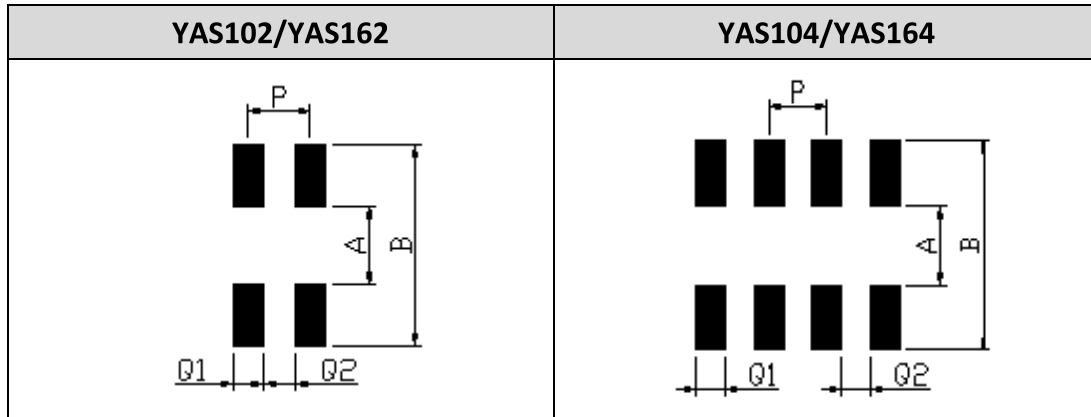
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8. SURFACE MOUNT LAND PATTERNS

Unit:mm



TYPE	DIM	A	B	P	Q1	Q2
	YAS102		0.50	2.00	0.67	0.33
YAS104		0.50	2.00	0.50	0.28	0.22
YAS162		1.00	2.60	0.80	0.40	0.40
YAS164		1.00	2.60	0.80	0.40	0.40

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9. REVISION HISTORY

REVISION	DATE	CHANGE NOTIFICATION	DESCRIPTION
Version.1	February 13,2015		Initial Release
Version.2	December 15,2015		Update Datasheet Spec.
Version.3	August 16, 2016		Update information :- Part Numbering System Resistor Rated Power Resistance, Resistance Tolerance and TCR Reliability Test Punch paper tape dimension Packaging
Version.4	October 05, 2016		Typo error in clause 3.11 Typo error in clause 4.1.3 Clause 7.1, remove Embossed Plastic Carrier Insert 13' reel information into clause 7.3.4 table
Version.5	February 08, 2018		1· Change Title to Anti-Sulphur Thick Film Chip Resistor Array(A/B) (Convex) 2· Update clause 1 information 3· Update clause 2, Part Numbering System information 4· Update clause 3.1.1, Resistor Rated Power information 5· Update clause 3.10, Resistance, Resistance Tolerance and TCR information 6· Update clause 6 information on i· High Temperature Exposure(Storage) ii· Temperature Cycling iii· Biased Humidity iv· Operational Life v· Solderability vi· Board Flex(Bending Test) 7· Delete clause 6 Physical Dimension and Resistance to solvents strength(SMD) test 8· Add Short time overload test to clause 6 9· Add Sulfuration test "B : 105°C" to clause 6
Version.6	20.12.2018		Datasheet update
Version.7	21.02.2019		1. Update clause 1.2 2. Update clause 6 Sulfuration Test
Version.8	06.09.2019		Revise clause 1.2 Revise clause 2 Revise clause 3.9 Revise clause 6 Sulfuration Test
Version.9	28.09.2020		Revise clause 3.5
Version.10	18.11.2021		Revise clause 2 part numbering system Revise clause 3.1.1 Resistor rated power Revise clause 3.10 TCR table Revise clause 5.1 dimension Revise clause 6 item Temperature cycling.
Version 11	18.11.2023		Revise clause 3.8 Product Assurance Revise clause 7.3.2 Identification



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