

DATA SHEET

Product Name Anti-Surge Thick Film Chip Resistors

Part Name AS Series

Uniroyal Electronics Global Co., Ltd.

88 Longteng Road, Economic & Technical Development Zone, Kunshan, Jiangsu, China

Tel +86 512 5763 1411 / 22 /33

Email marketing@uni-royal.cn

Manufacture Plant Uniroyal Electronics Industry (kunshan) co., ltd.
Uniroyal Electronics Industry Co., Ltd.
Uniroyal Electronics Global Co.,Ltd Shenzhen Branch
Aeon Technology Corporation
Uniroyal Electronics Global Co.,Ltd Xiamen Branch
Kunshan Foss Electronic material Co., Ltd.

Brands *RoyalOhm* *UniOhm*



1. Scope

- 1.1 This specification for approve relates to the Anti-Surge Thick Film Chip Resistors manufactured by UNI-ROYAL.
- 1.2 Superior Anti-surge Voltage performance
- 1.3 Suitable for both wave& re-flow soldering
- 1.4 Application AV adapters, LCD back-light camera strobe etc.

2. Part No. System

Part No. includes 14 codes shown as below:

2.1 1st~4th codes: Part name. E.g.: AS02,AS05,AS06,AS07,AS10,AS12.

2.2 5th~6th codes: Power rating.

E.g.: W=Normal Size "1~G" = "1~16"

Wattage	1/32	3/4	1/2	1/3	1/4	1/8	1/10	1/16	1/20	1
Normal Size	WH	07	W2	W3	W4	W8	WA	WG	WM	1W

If power rating is lower or equal than 1 watt, 5th code would be "W" and 6th code would be a number or letter.

E.g.: WA=1/10W W4=1/4W

2.3 7th code: Tolerance. E.g.: D=±0.5% F=±1% G=±2% J=±5% K=±10%

2.4 8th~11th codes: Resistance Value.

2.4.1 If value belongs to standard value of ≥5% series, 8th code would be zero, 9th~10th codes are significant figures of the resistance and 11th code is the power of ten.

2.4.2 If value belongs to standard value of ≤2% series, 8th~10th codes are significant figures of the resistance, and 11th code is the power of ten.

2.4.3 11th codes listed as following:

0=10⁰ 1=10¹ 2=10² 3=10³ 4=10⁴ 5=10⁵ 6=10⁶ J=10⁻¹ K=10⁻² L=10⁻³ M=10⁻⁴

2.5 12th~14th codes.

2.5.1 12th code: Packaging Type. E.g.: C=Bulk T=Tape/Reel

2.5.2 13th code: Standard Packing Quantity.

4=4000pcs 5=5000pcs C=10000pcs D=20000pcs E=15000pcs

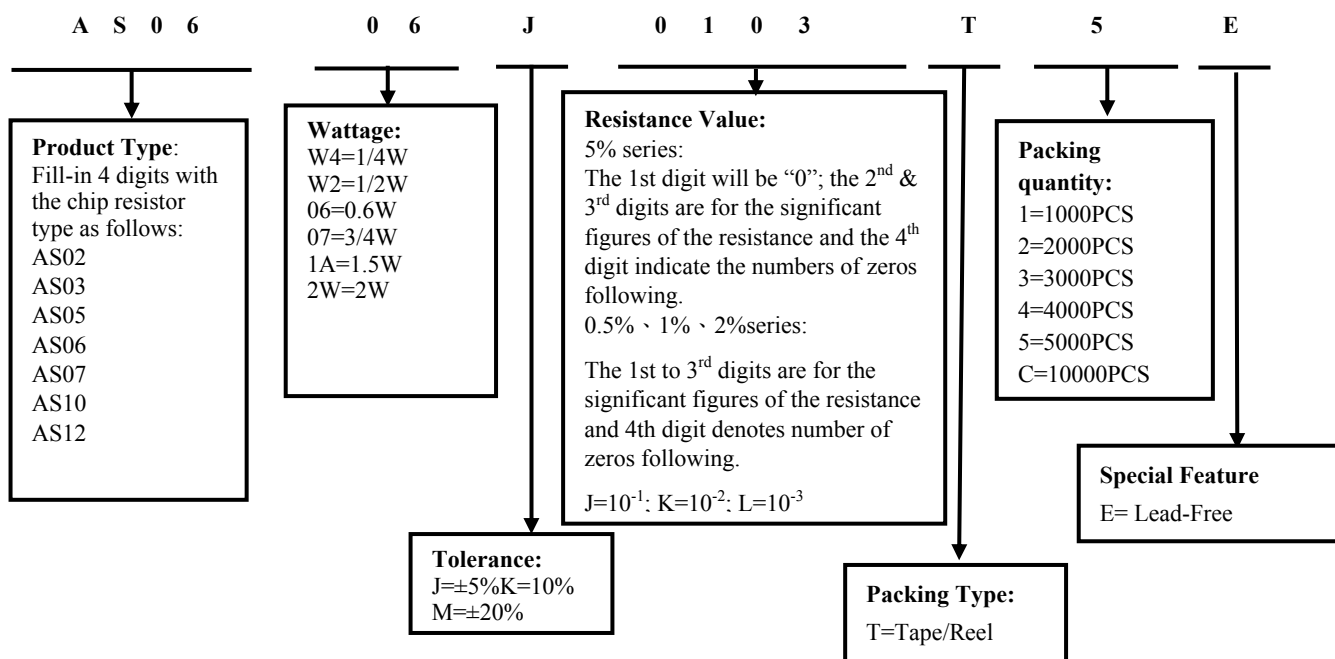
Chip Product: BD=B/B-20000pcs TC=T/R-10000pcs

2.5.3 14th code: Special features.

E = Environmental Protection, Lead Free, or Standard type.

3. Ordering Procedure

(Example: AS06 0.6W ±5% 10KΩ T/R-5000)

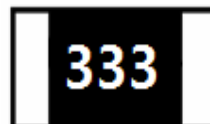


4. Marking

(1) For AS02 size. Due to the very small size of the resistor's body, there is no marking on the body.



(2) ±5% ±10% ±20% Tolerance: the first two digits are significant figures of resistance and the third denotes number of zeros following.



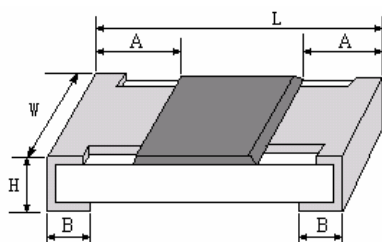
333 → 33KΩ

(3) ±5%±10% ±20%Tolerance: below 10Ω Show as following, read alphabet "R" as decimal point.



2R2 → 2.2Ω

5. Dimension



Type	Dimension(mm)				
	L	W	H	A	B
AS02(0402)	1.00±0.10	0.50±0.05	0.35±0.05	0.20±0.10	0.25±0.10
AS03(0603)	1.60±0.10	0.80±0.10	0.45±0.10	0.30±0.20	0.30±0.20
AS05(0805)	2.00±0.15	1.25 +0.15/-0.10	0.55±0.10	0.40±0.20	0.40±0.20
AS06(1206)	3.10±0.15	1.55 +0.15/-0.10	0.55±0.10	0.45±0.20	0.45±0.20
AS07(1210)	3.10±0.10	2.60±0.20	0.55±0.10	0.50±0.25	0.50±0.20
AS10(2010)	5.00±0.10	2.50±0.20	0.55±0.10	0.60±0.25	0.50±0.20
AS12(2512)	6.35±0.10	3.20±0.20	0.55±0.10	0.60±0.25	0.50±0.20

6. Resistance Range

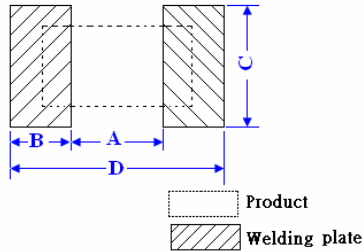
Type	Power Rating at 70°C	Resistance Range		
		5%	10%	20%
AS02	1/8W	1Ω~10MΩ	1Ω~10MΩ	1Ω~10MΩ
AS03	1/4W	1Ω~10MΩ	1Ω~10MΩ	1Ω~10MΩ
AS05	1/2W	1Ω~10MΩ	1Ω~10MΩ	1Ω~10MΩ
AS06	0.6W	1Ω~10MΩ	1Ω~10MΩ	1Ω~10MΩ
AS07	3/4W	1Ω~10MΩ	1Ω~10MΩ	1Ω~10MΩ
AS10	1.5W	1Ω~10MΩ	1Ω~10MΩ	1Ω~10MΩ
AS12	2W	1Ω~10MΩ	1Ω~10MΩ	1Ω~10MΩ

7. Ratings

Type	Max. Working Voltage	Max. Overload Voltage	Dielectric withstanding Voltage	Operating Temperature
AS02	50V	100V	--	-55°C~155°C
AS03	75V	150V	300V	-55°C~155°C
AS05	150V	300V	500V	-55°C~155°C
AS06	200V	400V	500V	-55°C~155°C
AS07	200V	500V	500V	-55°C~155°C
AS10	400V	800V	500V	-55°C~155°C

AS12	500V	1000V	500V	-55°C~155°C
------	------	-------	------	-------------

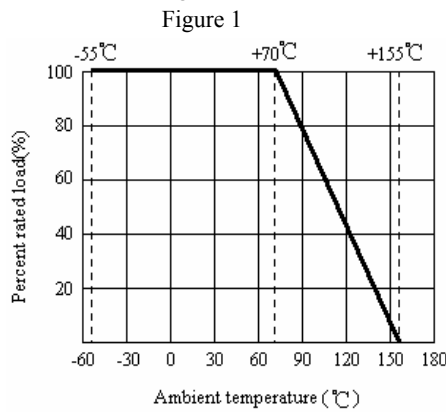
8. Recommend the size of welding plate



Type	Dimension(mm)			
	A	B	C	D
AS03	0.8±0.05	0.65±0.05	0.8±0.05	2.4±0.05
AS05	1.0±0.1	1.0±0.1	1.4±0.1	3.0±0.1
AS06	2.0±0.1	1.1±0.1	1.8±0.1	4.2±0.1
AS07	2.0±0.1	1.1±0.1	3.0±0.1	4.2±0.1
AS10	3.6±0.1	1.4±0.1	3.0±0.1	6.4±0.1
AS12	4.9±0.1	1.35±0.1	3.7±0.1	7.6±0.1

9. Derating Curve

Resistors shall have a power rating based on continuous load operation at an ambient temperature from -55°C to 70°C. For temperature in excess of 70°C, the load shall be derate as shown in figure 1



Resistors shall have a rated direct-current (DC) continuous working Voltage or an approximate sine-wave root-mean-square (RMS) alternating-current (AC) continuous working voltage at commercial-line frequency and waveform corresponding to the power rating, as determined from the following formula:

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

Where: RCWV commercial-line frequency and waveform (Volt.)

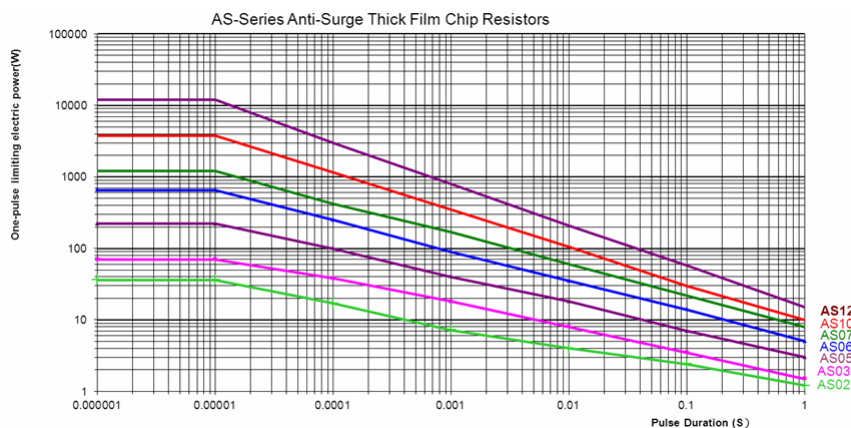
P = power rating (WATT.) R = nominal resistance (OHM)

In no case shall the rated DC or RMS AC continuous working voltage be greater than the applicable maximum value.

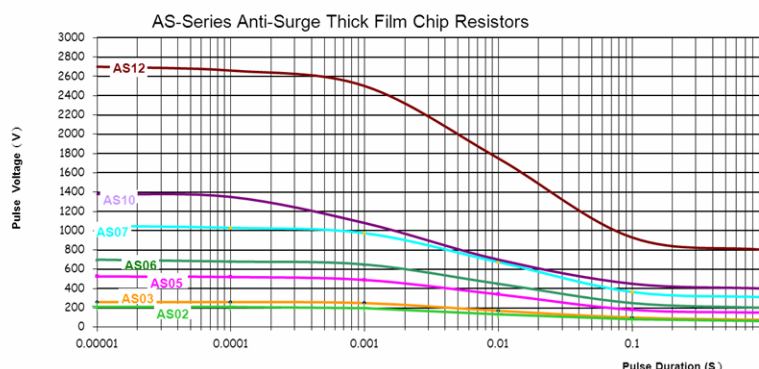
The overload voltage is 2.5 times RCWV or Max. Overload voltage whichever is less

10. One-pulse Limiting Electric Power

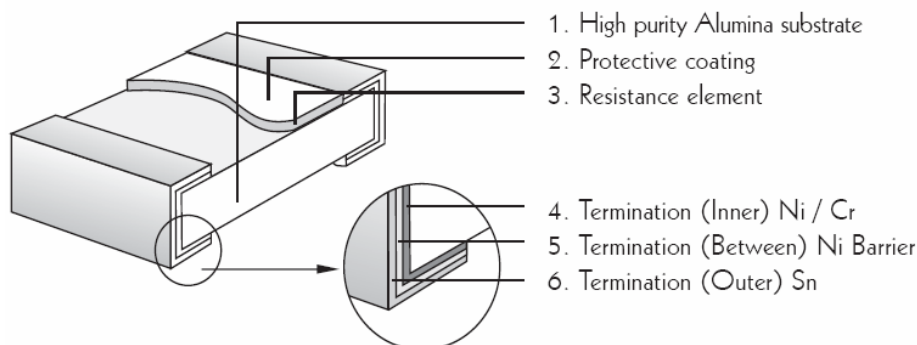
Curve of Pulse Duration :



Pulse Voltage Limit :



11. Structure



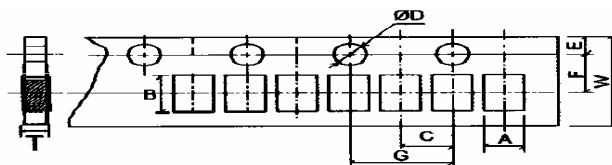
12. Performance Specification

Characteristic	Limits	Test Method (GB/T5729&JIS-C-5201&IEC60115)
Temperature Coefficient	1Ω ≤ R ≤ 10Ω: ±400PPM/°C 10Ω < R ≤ 10M: ±100PPM/°C	4.8 Natural resistance changes per temp. Degree centigrade $\frac{R_2 - R_1}{R_1(t_2 - t_1)} \times 10^6 \text{ (PPM/°C)}$ $\frac{R_3 - R_1}{R_1(t_3 - t_1)} \times 10^6 \text{ (PPM/°C)}$ R ₁ : Resistance Value at room temperature (t ₁) ; R ₂ : Resistance Value at upper limit temperature ± 2°C (t ₂) R ₃ : Resistance Value at lower limit temperature ± 3°C (t ₃) Test pattern : Room temperature : (t ₁) Upper limit temperature : (t ₂) Lower limit temperature : (t ₃)
Short-time overload	±(1%+0.1Ω) Max	4.13 Permanent resistance change after the application of 2.5 times RCWV for 5 seconds.
Terminal bending	±(1%+0.05Ω) Max	4.33 Twist of test board: Y/X = 3/90 mm for 60Seconds
Solderability	95% coverage Min.	Wave solder: Test temperature of solder: 245°C±3°C dipping time in solder: 2-3 seconds.
		Reflow:

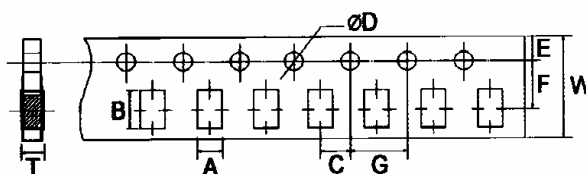
Dielectric withstanding voltage	No evidence of flashover mechanical damage, arcing or insulation breaks done.	4.7 Clamped in the trough of a 90° metallic V-block and shall be tested at ac potential respectively specified in the type for 60-70 seconds
Soldering heat	Resistance change rate is $\pm(1\%+0.05\Omega)$ Max	4.18 Dipping the resistor into a solder bath having a temperature of $260^{\circ}\text{C}\pm 5^{\circ}\text{C}$ and hold it for 10 ± 1 seconds
Rapid change of temperature	$\pm(3.0\%+0.1\Omega)$ Max.	4.19 30 min at lower limit temperature and 30 min at upper limit temperature , 5 cycles
Load life in humidity	$\pm(3.0\%+0.1\Omega)$ Max.	7.9 Resistance change after 1,000 hours (1.5 hours "ON",0.5 hour "OFF") at RCWV in a humidity chamber controlled at $40^{\circ}\text{C}\pm 2^{\circ}\text{C}$ and 90 to 95% relative humidity.
Load life	$\pm(3.0\%+0.1\Omega)$ Max.	4.25.1 Permanent resistance change after 1,000 hours operating at RCWV with duty cycle 1.5 hours "ON", 0.5 hour "OFF" at $70^{\circ}\text{C}\pm 2^{\circ}\text{C}$ ambient.
Humidity (steady state)	$\pm(3.0\%+0.1\Omega)$ Max.	4.24 Temporary resistance change after 240 hours exposure in a humidity test chamber controlled at $40\pm 2^{\circ}\text{C}$ and 90-95% relative humidity,
Low Temperature Storage	$\pm(3.0\%+0.1\Omega)$ Max.	4.23.4 Lower limit temperature , for 2H.
High Temperature Exposure	$\pm(3.0\%+0.1\Omega)$ Max.	4.23.2 Upper limit temperature , for 16H.
Leaching	No visible damage	J-STD-002 Test D Samples completely immersed for 30 sec in solder bath at 260°C

13. Packing of Surface Mount Resistors

13.1 Dimension of Paper Taping :(Unit: mm)

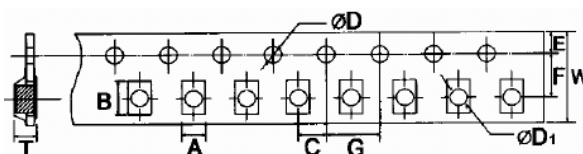


Type	A	B	C	$\begin{matrix} +0.1 \\ \Phi D \\ -0 \end{matrix}$	E	F	G	W	T
AS02	0.65	1.20	2.00	1.50	1.75	3.50	4.00	8.00	0.42



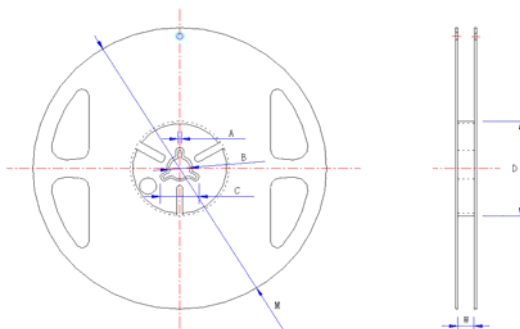
TYPE	A ±0.2	B ±0.2	C ±0.05	ϕD $\begin{matrix} +0.1 \\ -0 \end{matrix}$	E ±0.1	F ±0.05	G ±0.1	W ±0.2	T ±0.10
AS03	1.10	1.90	2.00	1.50	1.75	3.50	4.00	8.00	0.67
AS05	1.65	2.40	2.00	1.50	1.75	3.50	4.00	8.00	0.81
AS06	2.00	3.60	2.00	1.50	1.75	3.50	4.00	8.00	0.81
AS07	2.80	3.50	2.00	1.50	1.75	3.50	4.00	8.00	0.75

13.2 Dimension of Embossed Taping: (Unit: mm)



Type	A ±0.2	B ±0.2	C ±0.05	ϕD $\begin{matrix} +0.1 \\ -0 \end{matrix}$	$\phi D1$ $\begin{matrix} +0.25 \\ -0 \end{matrix}$	E ±0.1	F ±0.05	G ±0.1	W ±0.2	T ±0.1
AS10	2.90	5.60	2.00	1.50	1.50	1.75	5.50	4.00	12.00	1.00
AS12	3.50	6.70	2.00	1.50	1.50	1.75	5.50	4.00	12.00	1.00

13.3 Dimension of Reel : Unit: mm



Type	Taping	Size	A±0.5	B±0.5	C±0.5	D±1	M±2	W±1
AS02	Paper	10,000pcs	2.0	13.0	21.0	60.0	178.0	10.0
AS03		5000pcs	2.0	13.0	21.0	60.0	178.0	10.0
AS05			2.0	13.0	21.0	60.0	178.0	10.0
AS06			2.0	13.0	21.0	60.0	178.0	10.0
AS07			2.0	13.0	21.0	60.0	178.0	10.0
AS10	Embossed	4000pcs	2.0	13.0	21.0	60.0	178.0	13.8
AS12			2.0	13.0	21.0	60.0	178.0	13.8

14. **Note**

- 14.1. UNI-ROYAL recommend the storage condition temperature: 15°C~35°C, humidity :25%~75%.
 (Put condition for individual product).Even under UNI-ROYAL recommended storage condition, solderability of products over 1 year old.
 (Put condition for each product) may be degraded.
- 14.2. Store / transport cartons in the correct direction, which is indicated on a carton as a symbol.
 Otherwise bent leads may occur due to excessive stress applied when dropping of a carton.
- 14.3. Product performance and soldered connections may deteriorate if the products are stored in the following places:
 - a. Storage in high Electrostatic.
 - b. Storage in direct sunshine · rain and snow or condensation.
 - c. Where the products are exposed to sea winds or corrosive gases, including Cl₂, H₂S₃ NH₃, SO₂, NO₂.

15. **Record**

Version	Description of amendment	Page	Date	Amended by	Checked by
---------	--------------------------	------	------	------------	------------

1	First issue of this specification	1~7	Mar.20, 2018	Chen Haiyan	Chen Nana
---	-----------------------------------	-----	--------------	-------------	-----------

Uniroyal Electronics Global Co., Ltd. , all rights reserved. Spec. herein would be changed at any time without prior notice.