



UNI-ROYAL
厚聲集團

DATA SHEET

Product Name **Chip Resistors Shunt**

Part Name **RS06/RS12/RS20/RS30 Series**

File No. **SMD-SP-029**

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1. Scope

- 1.1 This data sheet is the characteristics of Chip Resistors Shunt manufactured by UNI-ROYAL.
- 1.2 Low Resistance / TCR
- 1.3 Excellent long-term stability
- 1.4 RoHS compliant and halogen free.
- 1.5 Lead free
- 1.6 High precision current sensing and voltage division.
- 1.7 Excellent Anti-Surge ability .
- 1.8 AEC-Q200 compliant

2. Part No. System

Part No. includes 14 codes shown as below:

2.1 1st~4th codes: Part name. E.g.: RS06,RS12,RS20,RS30

2.2 5th~6th codes: Power rating.

E.g.: W=Normal Size “1~G” = “1~16”

Wattage	2	2.5	3	4	5	6	7	8	9	10	12	15
Normal Size	2W	2A	3W	4W	5W	6W	7W	8W	9W	AW	CW	FW

If power rating is greater than 1 watt, 5th code would be a number or letter and 6th code would be “W”.

E.g.: AW=10W 2W=2W

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

2.4 8th~11th codes: Resistance Value.

2.4.1 If value belongs to standard value of E-24 series, the 8th code is zero, 9th~10th codes are the significant figures of resistance value, and the 11th code is the power of ten.

2.4.2 If value belongs to standard value of E-96 series, the 8th~10th codes are the significant figures of resistance value, and the 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 N=10⁻⁵ P=10⁻⁶

2.5 12th~14th codes.

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

2.5.2 13th code: Standard Packing Quantity.

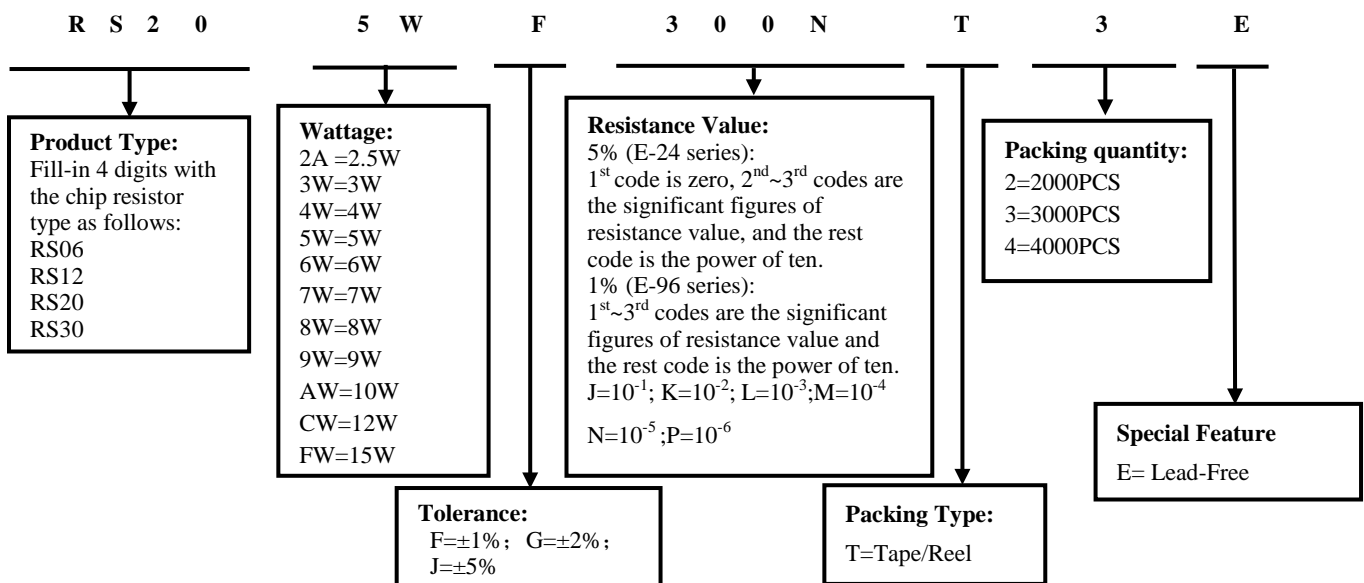
2=2000 pcs 3=3000 pcs 4=4,000pcs

2.5.3 14th code: Special features.

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

3. Ordering Procedure

(Example: RS20 5W ±1% 3mΩ T/R-3000)



4. Marking

4.1 RS06 no marking.

4.2 RS12/RS20/RS30 marking are 3 digits.

“L” designates the decimal location in milliohm

e.g. 3mΩ the product marking is 3L0.

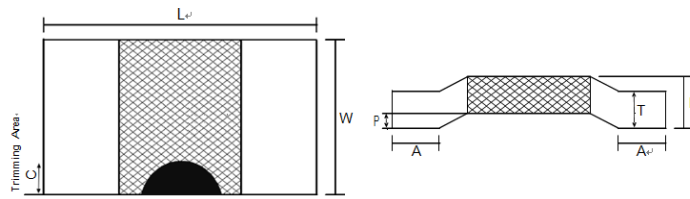
0.3mΩ the product marking is L30.

5. Standard Electrical Specifications

Type	Power Rating at 70°C	T.C.R. (ppm/°C)	Max. Rating Current(A)	Max. Overload Current(A)	Resistance Range (mΩ)	Operating Temperature Range (°C)
					1.0% (F);2.0% (G) 5.0% (J)	
RS06 (1206)	2W	≡ ±300	81.6	182.57	0.3	- 65°C ~ + 170°C
	2W	≡ ±200	63.24	141.42	0.5	
	2W	≡ ±150	44.72	100	1	
RS12 (2512)	6W	≡ ±200	154.92	346.41	0.25	
	6W	≡ ±150	141.42	316.22	0.3	
	6W	≡ ±115	109.54	244.94	0.5	
	5W	≡ ±115	81.65	182.57	0.75	
	5W	≡ ±100	70.71	158.11	1	
	5W	≡ ±50	50	111.80	2	
	4W	≡ ±50	36.51	81.65	3	
	3W	≡ ±50	27.38	61.23	4	
	2.5W	≡ ±50	22.36	50	5	
RS20 (3920)	12W	≡ ±200	244.94	547.72	0.2	
	10W	≡ ±150	182.57	408.24	0.3	
	9W	≡ ±75	134.16	300	0.5	
	8W	≡ ±50	89.44	200	1	
	7W	≡ ±50	83.66	187.08	1	
	7W	≡ ±50	68.31	152.75	1.5	
	6W	≡ ±50	54.77	122.47	2	
	5W	≡ ±50	40.82	91.28	3	
	4W	≡ ±50	31.62	70.71	4	
	3W	≡ ±50	24.49	54.77	5	
RS30 (5930)	15W	≡ ±100	273.86	612.37	0.2	
	10W	≡ ±100	182.57	408.24	0.3	
	8W	≡ ±75	126.49	282.84	0.5	
	8W	≡ ±50	89.44	200	1	
	7W	≡ ±50	59.16	132.28	2	
	5W	≡ ±50	40.82	91.28	3	

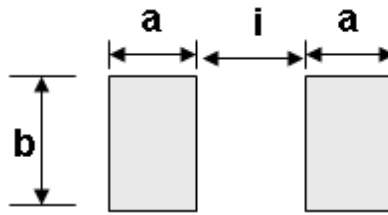
Note: Power rating is guaranteed when terminal temperature of resistor is below 70°C

Note : The resistance value not shown in the list can be provided by the factory

6. Dimension (Unit: mm)

Type	Resistance	L	W	H	T	A	C (Max.)	p
RS06 (1206)	0.3 mΩ	3.2±0.3	1.65±0.3	1.20±0.15	/	0.80±0.2	/	/
	0.5 mΩ	3.2±0.3	1.65±0.3	0.90±0.15	/	0.80±0.2	/	/
	1 mΩ							
RS12 (2512)	0.25 mΩ	6.5±0.3	3.25±0.3	1.35±0.15	1.00±0.15	1.0±0.3	1.0	0.45±0.2
	0.3 mΩ			1.17±0.15	0.82±0.15			
	0.5 mΩ			1.07±0.15	0.72±0.15			
	0.75 mΩ			0.95±0.15	0.6±0.15			
	1 mΩ			0.73±0.15	0.38±0.15			
	2 mΩ			0.96±0.15	0.61±0.15			
	3 mΩ			0.76±0.15	0.41±0.15			
	4 mΩ			0.70±0.25	0.31±0.15			
	5 mΩ			0.66±0.15	0.31±0.15			
RS20 (3920)	0.2 mΩ	10.2±0.30	5.10±0.4	1.98±0.15	1.48±0.15	1.8±0.3	1.0	0.50±0.1
	0.3 mΩ			1.92±0.15	1.42±0.15			
	0.5 mΩ			1.36±0.15	0.86±0.15			
	1 mΩ			0.92±0.15	0.42±0.15			
	1 mΩ			1.87±0.15	1.37±0.15			
	1.5 mΩ			1.46±0.15	0.96±0.15			
	2 mΩ			1.19±0.15	0.69±0.15			
	3 mΩ			0.94±0.15	0.44±0.15			
	4 mΩ			0.85±0.15	0.35±0.15			
	5 mΩ			0.85±0.15	0.35±0.15			
RS30 (5930)	0.2 mΩ	15±0.3	7.6±0.4	1.92±0.15	1.42±0.15	4.2±0.2	1.0	0.50±0.1
	0.3 mΩ			1.44±0.15	0.94±0.15			
	0.5 mΩ			1.08±0.15	0.58±0.15			
	1 mΩ			1.37±0.15	0.87±0.15			
	2 mΩ			0.95±0.15	0.46±0.15			
	3 mΩ			0.90±0.15	0.40±0.15			

7. Recommend land pattern(Unit:mm)

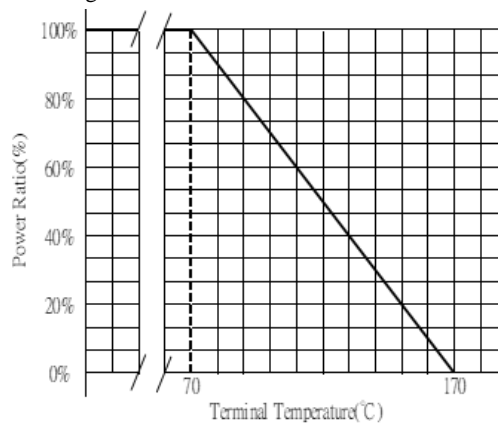


Type	Resistance Range	a	b	i
RS06 (1206)	0.3mΩ~1mΩ	2.10	1.80	1.40
RS12 (2512)	0.25mΩ~5mΩ	1.80	3.40	3.80
RS20 (3920)	0.2mΩ~5mΩ	2.70	6.20	5.60
RS30 (5930)	0.2mΩ~3mΩ	5.20	8.75	5.60

8. Derating Curve

The Operating Temperature Range: -65°C ~+170°C.

Terminal temperatures above 70°C, power rating must be derated in accordance with the curve as below



8.1 Rating Current

The following equation may be used to determine the DC (Direct Current) or AC (Alternating Current) (RMS, root mean square value) of normal rated power. However, if the result value exceeds the highest current of regulated standards, the highest normal rated power is to be used:

$$I = \sqrt{P/R}$$

I = Rating current (A)

P= Rating Power (W)

R= Resistance(Ω)

9. Performance Specification

Test Item	Test Method	Procedure	Requirements
Temperature Coefficient of Resistance	JIS-C-5201-1 4.8 IEC-60115-1 4.8	At 25°C /+125°C, 25°C is the reference temperature	List by specification
Short Time Overload	JIS-C-5201-1 4.13 IEC-60115-1 4.13	The number of rated power are as follows: RS06、RS12、RS20、RS30: 5 times of rated Power for 5 seconds.	$\Delta R/R1 \leq \pm(1.0\% + 0.0005\Omega)$

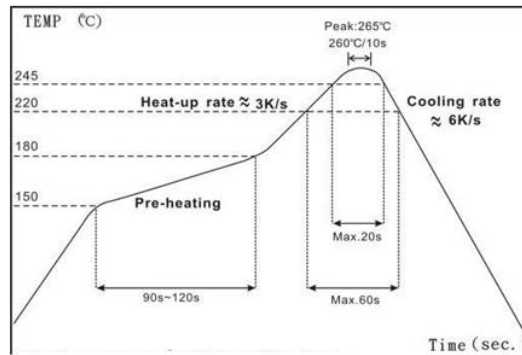
High Temperature Exposure (Storage)	MIL-STD-202 Method 108	1000 hrs. @ T=170°C. Unpowered. Measurement at 24±4 hours after test conclusion.	$\Delta R/R1 \leq \pm(1.0\%+0.0005\Omega)$
Temperature Cycling	JESD22 Method JA-104	1000 Cycles (-55°C to +155°C) Measurement at 24±4 hours after test conclusion. 30min maximum dwell time at each temperature extreme.	$\Delta R/R1 \leq \pm(1.0\%+0.0005\Omega)$
Biased Humidity	MIL-STD-202 Method 103	1,000 hours; 85°C / 85% RH, 10% of operating power. Measurement at 24±4 hours after test conclusion.	$\Delta R/R1 \leq \pm(1.0\%+0.0005\Omega)$
Operation Life	MIL-STD-202 Method 108	Condition D Steady State TA=125°C at derated power. Measurement at 24±4 hours after test conclusion.	$\Delta R/R1 \leq \pm(1.0\%+0.0005\Omega)$
Vibration	MIL-STD-202 Method 204	5 g's for 20 min., 12 cycles each of 3 orientations. Note: Test from 10-2000Hz	$\Delta R/R1 \leq \pm(0.5\%+0.0005\Omega)$
Board Flex	AEC Q200-005	2mm, 60 seconds	$\Delta R/R1 \leq \pm(1.0\%+0.0005\Omega)$
Solderability	J-STD-002	1) 4 hrs 155°C dry heat 2) 245±5°C 3 sec.	>95% coverage(electrode area)

*All Reliability test should follow De-rating curve , terminal temperature of component should be below 70°C.

*Certain factors (such as Footprint size, solder insufficient, excessive solder, solder void and component shifted) will affect the resistance accuracy after IR reflow. Circuit calibration is a must to be done by functional test.

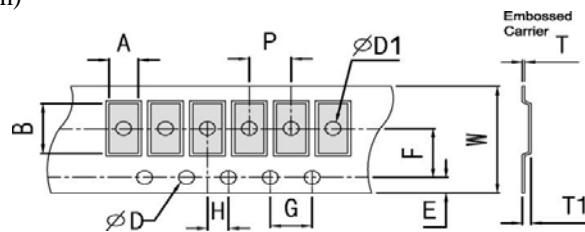
10. Soldering Condition

Solder reflow Temperature condition



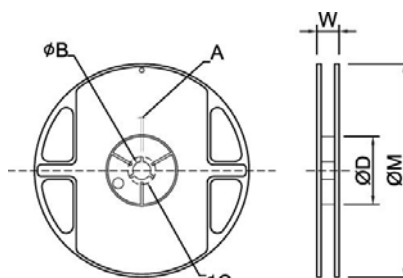
10. Packing

10.1 Embossed Dimensions:(Unit: mm)



Type	Resistance(mΩ)	W	P	E	F	φD	G	H	A	B	T1
RS06	0.3,0.5,1	8.0±0.30	4.0±0.10	1.75±0.10	3.5±0.10	1.50 ^{+0.1} ₀	4.0±0.10	2.0±0.10	1.88±0.10	3.56±0.10	1.40±0.10
	0.25,0.3,0.5,0.75,2	12.0±0.30	4.0±0.10	1.75±0.10	5.5±0.10				1.40±0.10		
RS12	1,3								3.55±0.10	6.75±0.10	1.10±0.10
	4,5	0.80±0.10									
RS20	0.2,0.3,0.5,2,1(8W), 1.5	16.0±0.30	8.0±0.10	1.75±0.10	7.5±0.10				5.5±0.10	10.8±0.10	1.97±0.10
	1(7W),3,4,5								1.25±0.10		
RS30	0.2,0.3,1	24.0±0.30	12.0±0.10	1.75±0.10	11.5±0.10				8.3±0.10	15.4±0.10	2.30±0.10
	0.5,2,3								1.40±0.10		

10.2 Dimension of Reel : (Unit: mm)



Type	Qty/Reel	A	φB	φC	φD	W	φM
RS06	2000PCS	2±0.5	13.0±0.5	17.7±0.5	60.0±0.5	12.0±0.5	178±1.0
RS12	4000PCS	2±0.5	13.0±0.5	17.7±0.5	62.0±0.5	16.5±0.5	250±1.0
RS20	3000PCS	2.5±0.5	13.5±0.5	17.7±0.5	99.0±0.5	20.7±0.5	330±1.0
RS30	2000PCS	2.5±0.5	13.5±0.5	17.7±0.5	99.0±0.5	29.4±0.5	330±1.0

11. Note

- 11.1. UNI-ROYAL recommend products store in warehouse with temperature between 15 to 35°C under humidity between 25 to 75%RH (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.
- 11.2. 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.
- 11.3. Product performance and soldered connections may deteriorate if the products are stored in the following places:
- Storage in high Electrostatic.
 - Storage in direct sunshine、rain and snow or condensation.
 - Where the products are exposed to sea winds or corrosive gases, including Cl₂, H₂S, NH₃, SO₂, NO₂ Br etc.

12. Record

Version	Description	Page	Date	Amended by	Checked by
1	First version	1~8	Oct.16,2020	Song Nie	Yuhua Xu
2	Modify the Dimension Modify Performance Specification	4 6	Jun.23,2022	Song Nie	Haiyan Chen