



UNI-ROYAL
厚聲集團

DATA SHEET

Product Name **Chip Resistors Shunt**

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

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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

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.

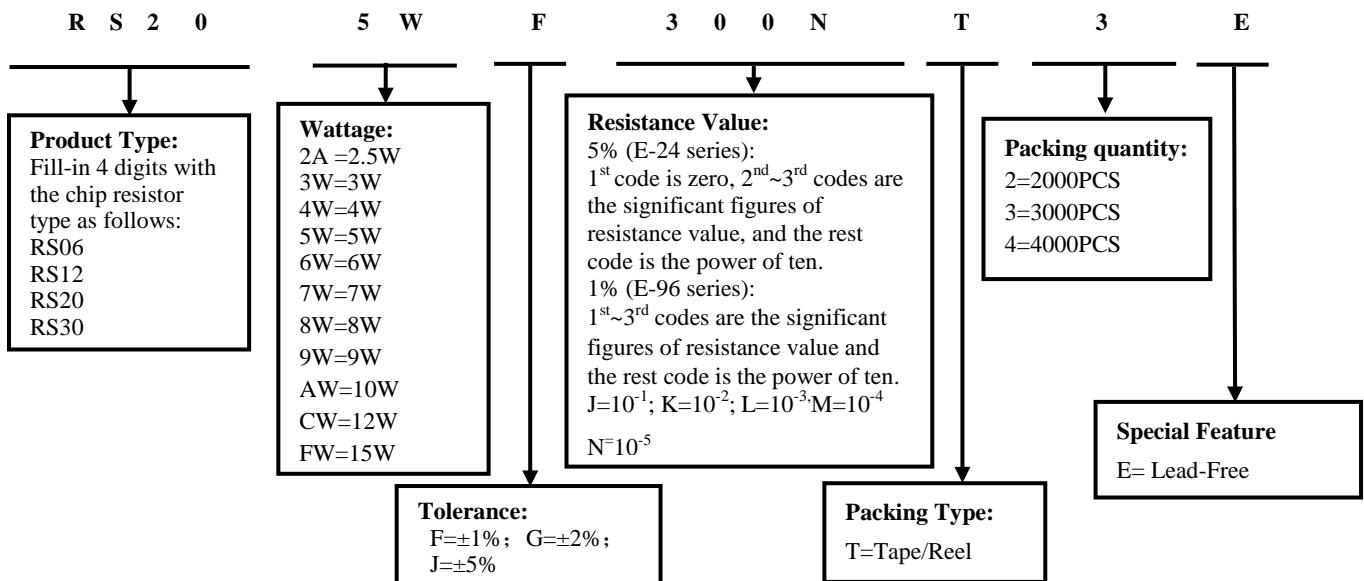
2=2000 pcs 3=3000 pcs 4=4,000pcs

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.

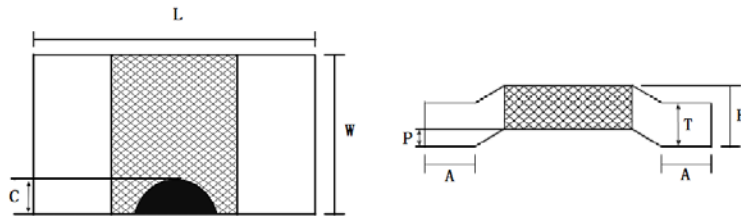
0.3mΩ the product marking is L30.

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

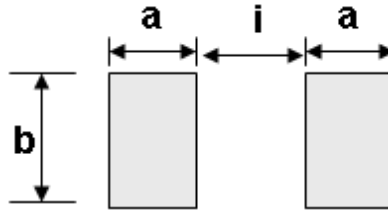
Note: Power rating is guaranteed when terminal temperature of resistor is below 70°C

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	Material
RS06 (1206)	0.3 mΩ	3.2±0.3	1.65±0.3	1.20±0.15	-	0.80±0.2	-	-	MnCuSn
	0.5 mΩ 1 mΩ	3.2±0.3	1.65±0.3	0.90±0.15	-	0.80±0.2	-	-	MnCuSn MnCu
RS12 (2512)	0.25 mΩ	6.5±0.3	3.25±0.3	1.35±0.15	1.00±0.15	0.90±0.2	0.4	0.35±0.1	MnCuSn
	0.3 mΩ			1.17±0.15	0.82±0.15				MnCuSn
	0.5 mΩ			1.07±0.15	0.72±0.15				MnCu
	0.75 mΩ			0.95±0.15	0.6±0.15				MnCu
	1 mΩ			0.73±0.15	0.38±0.15				MnCu
	2 mΩ			0.96±0.15	0.61±0.15				FeCrAl
	3 mΩ			0.76±0.15	0.41±0.15				FeCrAl
	4 mΩ			0.66±0.15	0.31±0.15				FeCrAl
	5 mΩ			0.66±0.15	0.31±0.15				FeCrAl
RS20 (3920)	0.2 mΩ	10.2±0.30	5.20±0.3	1.98±0.15	1.48±0.15	1.8±0.3	0.6	0.50±0.1	MnCuSn
	0.3 mΩ			1.92±0.15	1.42±0.15				MnCu
	0.5 mΩ			1.36±0.15	0.86±0.15				MnCu
	1 mΩ			0.92±0.15	0.42±0.15				MnCu
	1 mΩ			1.87±0.15	1.37±0.15				FeCrAl
	1.5 mΩ			1.46±0.15	0.96±0.15				FeCrAl
	2 mΩ			1.19±0.15	0.69±0.15				FeCrAl
	3 mΩ			0.94±0.15	0.44±0.15				FeCrAl
	4 mΩ			0.85±0.15	0.35±0.15				FeCrAl
	5 mΩ			0.85±0.15	0.35±0.15				FeCrAl
RS30 (5930)	0.2 mΩ	15±0.3	7.75±0.3	1.92±0.15	1.42±0.15	4.2±0.2	1.0	0.50±0.1	MnCu
	0.3 mΩ			1.44±0.15	0.94±0.15				MnCu
	0.5 mΩ			1.08±0.15	0.58±0.15				MnCu
	1 mΩ			1.37±0.15	0.87±0.15				FeCrAl
	2 mΩ			0.95±0.15	0.46±0.15				FeCrAl
	3 mΩ			0.90±0.15	0.40±0.15				FeCrAl

7. Recommend land pattern

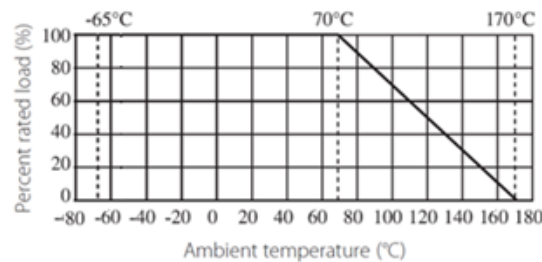


Type	Resistance Range	a	b	i
RS06 (1206)	0.3mΩ~1mΩ	2.10	1.80	1.40
RS12 (2512)	0.25mΩ~5mΩ	1.80	3.40	3.80
RS20 (3920)	0.2mΩ~5mΩ	2.70	6.20	5.60
RS30 (5930)	0.2mΩ~3mΩ	5.20	8.75	5.60

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)

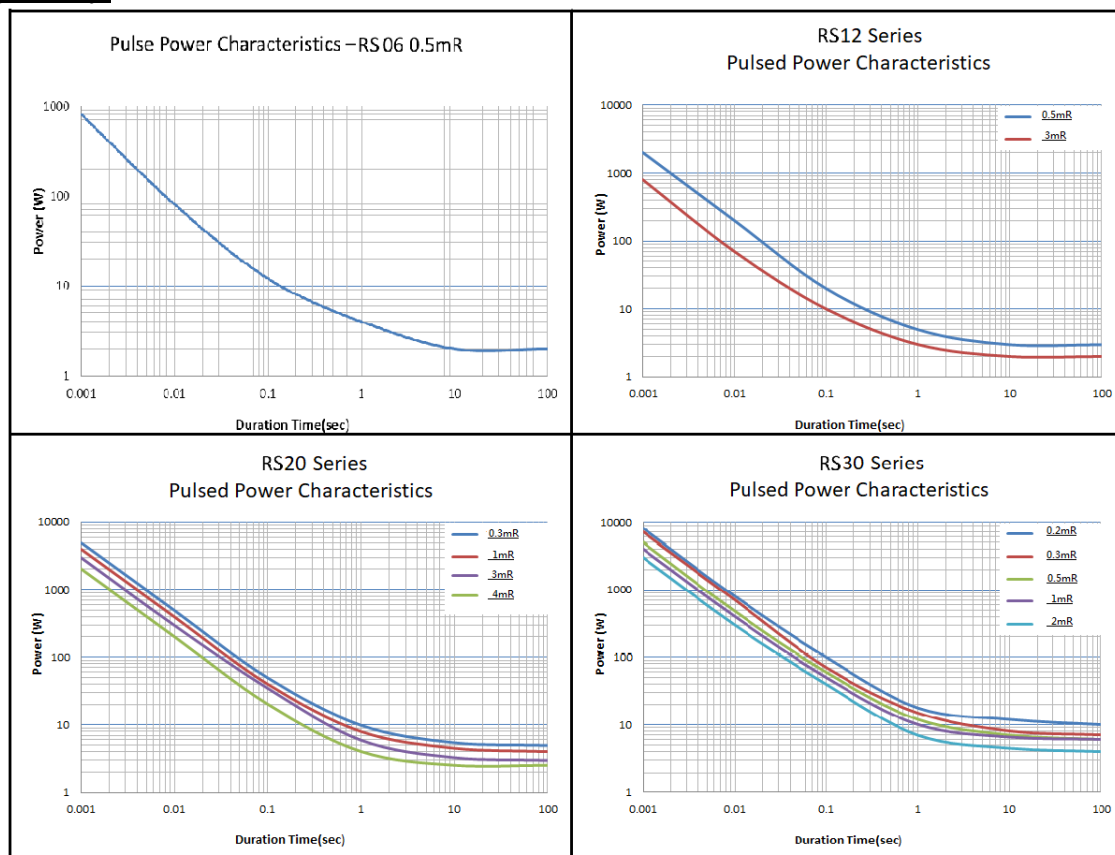
R= Resistance(Ω)

10. Performance Specification

Test Item	Test Method	Procedure	Requirements
Temperature Coefficient of Resistance (T.C.R)	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.	$\Delta R/R1 \leq \pm(1.0\% + 0.0005\Omega)$

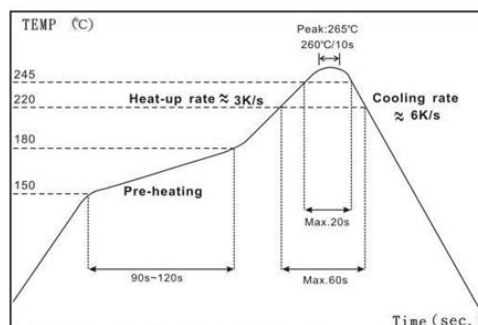
Biased Humidity	MIL-STD-202 Method 103	1,000 hours; 85°C / 85% RH, 10% of operating power. Measurement at 24±4 hours after test conclusion.	$\Delta R/R1 \leq \pm(1.0\% + 0.0005\Omega)$
Operation Life	MIL-STD-202 Method 108	Condition D Steady State TA=125°C at derated power. Measurement at 24±4 hours after test conclusion.	$\Delta R/R1 \leq \pm(1.0\% + 0.0005\Omega)$
Moisture Resistance	MIL-STD-202, Method 106	Humidity of 90~98% and a temperature of 25°C / 65°C ,10 cycles	$\Delta R/R1 \leq \pm(1.0\% + 0.0005\Omega)$
Mechanical Shock	MIL-STD-202 Method 213	Test ½ Sine Pulse, Peak value: 100g, normal duration: 6ms, Velocity change:12.3ft/sec.	$\Delta R/R1 \leq \pm(0.5\% + 0.0005\Omega)$
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	Beading once for 60 seconds ,2mm	$\Delta R/R1 \leq \pm(1.0\% + 0.0005\Omega)$
Solderability	J-STD-002	1) 4 hrs 155°C dry heat 2) 245±5°C 3 sec.	>95% coverage(electrode area)

11. Anti-Surge Ability:



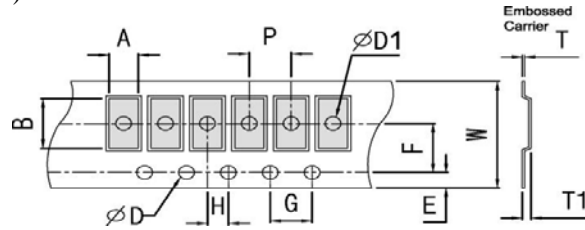
12. Soldering Condition

Solder reflow Temperature condition



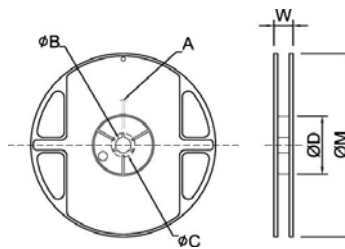
13. Packing

13.1 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	
RS12	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				3.55±0.10	6.75±0.10	1.40±0.10	
	1,3											1.10±0.10
	4,5											
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	

13.2 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

14. Note

- 14.1. UNI-ROYAL recommend the storage condition temperature: 25 ± 5°C, humidity :60 ± 20%.
 (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	Page	Date	Amended by	Checked by
1	First version	1~7	Oct.16,2020	Song Nie	Yuhua Xu

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