

# DATASHEET

**Product Name** Metal Strip Chip Resistors

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**Part Name** LR18 Series

**File No.** SMD-SP-61

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Manufacture Plant Uniroyal Electronics Industry Co., Ltd.

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Royal Technology (Thailand) Co., Ltd.

## 1. Scope

- 1.1 This specification for approve relates to the Metal Strip Chip Resistors manufactured by UNI-ROYAL.
- 1.2 Low Resistance / Low TCR/ Low Inductance(<5nH)
- 1.3 Excellent long term stability
- 1.4 Compliant with RoHS directive.
- 1.5 Halogen free requirement.
- 1.6 Lead free.
- 1.7 High precision current sensing and voltage division.
- 1.8 AEC-Q200 compliant
- 1.9 Sulfur resistance by construction that is unaffected by high sulfur environments

## 2. Part No. System

Part No. includes 14 codes shown as below:

2.1 1st~4th codes: Part name. E.g.: LR18

2.2 5th~6th codes: Power rating.

E.g.: W=Normal Size

Wattage	7
Normal Size	7W

2.3 7<sup>th</sup> code: Tolerance. E.g.: D=±0.5%      F=±1%      G=±2%      J=±5%

2.4 8<sup>th</sup>~11<sup>th</sup> codes: Resistance Value.

2.4.1 If value belongs to standard value of ≥2% series, 8<sup>th</sup> code would be zero, 9<sup>th</sup>~10<sup>th</sup> codes are significant figures of the resistance and 11<sup>th</sup> code is the power of ten.

2.4.2 If value belongs to standard value of ≤1% series, 8<sup>th</sup>~10<sup>th</sup> codes are significant figures of the resistance, and 11<sup>th</sup> code is the power of ten.

2.4.3 11<sup>th</sup> codes listed as following:

$$0=10^0 \quad 1=10^1 \quad 2=10^2 \quad 3=10^3 \quad 4=10^4 \quad 5=10^5 \quad 6=10^6 \quad J=10^{-1} \quad K=10^{-2} \quad L=10^{-3} \quad M=10^{-4} \quad N=10^{-5} \quad P=10^{-6}$$

2.5 12<sup>th</sup>~14<sup>th</sup> codes.

2.5.1 12<sup>th</sup> code: Packaging Type. E.g.: T=Tape/Reel

2.5.2 13<sup>th</sup> code: Standard Packing Quantity.

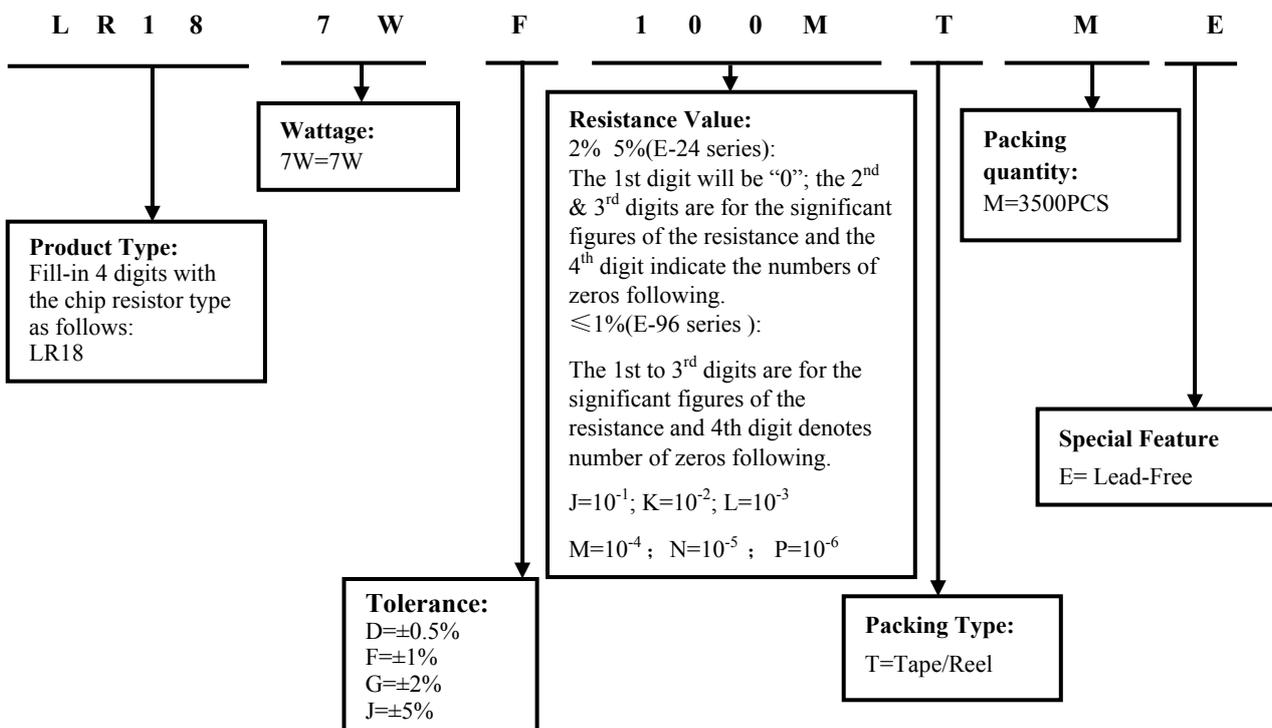
$$M=3500\text{pcs}$$

2.5.3 14<sup>th</sup> code: Special features.

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

## 3. Ordering Procedure

(Example: LR18 7W ±1% 10mΩ T/R-3500)



## 4. Marking

All the products marking are 4 digits.

“R” designates the decimal location in ohms

e.g. 4mΩ the product marking is R004.

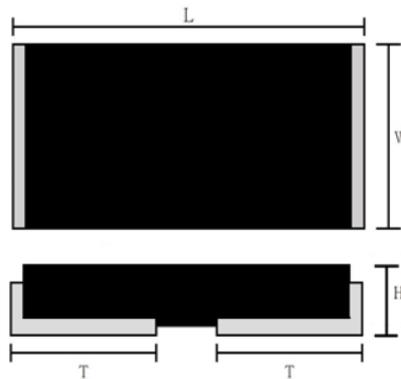
10mΩ the product marking is R010.

The criteria to distinguishing the mark on the surface of products are that characters can be identified.

## 5. Standard Electrical Specifications

Type	Rating Power at 70°C	T.C.R. (ppm/°C)	Max. Rating Current	Max. Overload Current	Resistance Range (mΩ)		Operating Temperature Range (°C)
					±0.5%(D)	±1.0% (F) ±2.0% (G) ±5.0% (J)	
LR18 (2818)	7W	1mΩ: ≅±250PPM/°C 2~7mΩ: ≅±200PPM/°C 8~50mΩ: ≅±75 PPM/°C	83.66A	167.33A	5~50	1~50	- 55 ~ + 170

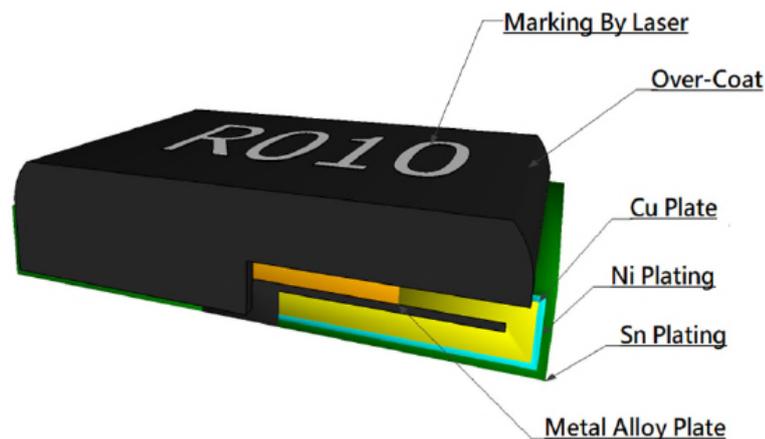
## 6. Dimension



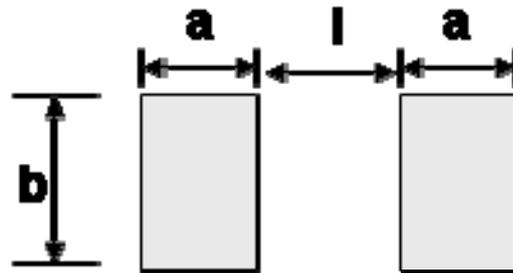
Unit:mm

Type	Power Rating	Resistance Range	L	W	H	T
LR18 (2818)	7W	1~50mΩ	7.20±0.254	4.95±0.254	1.65±0.254	2.90±0.254

## 7. Structure



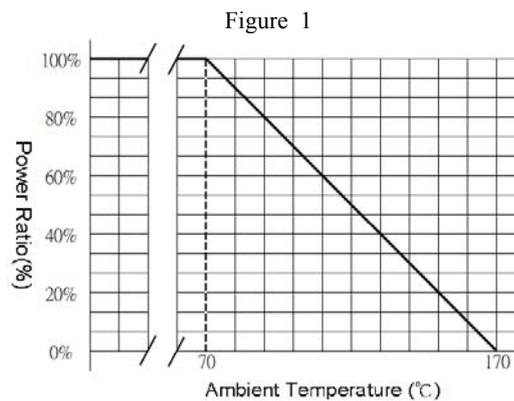
## 8. Recommend land pattern



Unit:mm				
Type	Resistance Range	a	b	i
LR18 (2818)	1mΩ~50mΩ	3.50	5.30	0.60

## 9. Derating Curve

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



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

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

I = Rating current (A)

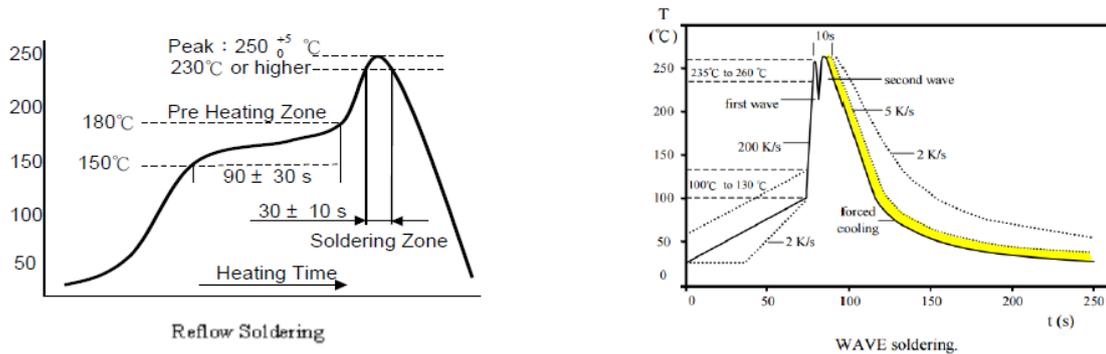
P= Rating Power (W)

R= Resistance(Ω)

## 10. Performance Specification

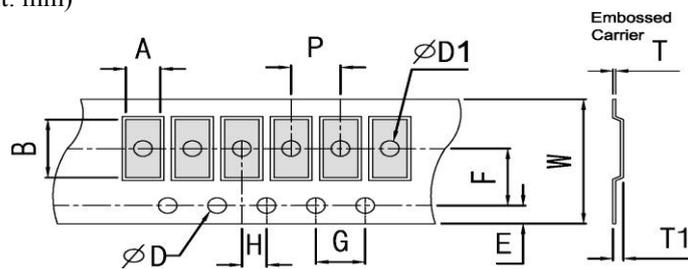
Test Item	Test Method	Procedure	Requirements
Temperature Coefficient of Resistance (T.C.R)	JIS C 5201-1 clause 4.8	$T.C.R. (ppm/^{\circ}C) = \frac{R2-R1}{R1(T2-T1)} \times 10^6 (PPM/^{\circ}C)$ R1: resistance at room temperature (T1) R2: resistance at 125°C (T2)	1mΩ: $\cong \pm 250 PPM/^{\circ}C$ 2~7mΩ: $\cong \pm 200 PPM/^{\circ}C$ 8~50mΩ: $\cong \pm 75 PPM/^{\circ}C$
Short Time Overload	JIS C 5201-1 clause 4.13	The number of rated power are as follows: LR18-7W: 4 times of rated power Rating power duration: 5secs	$\Delta R/R1 \cong \pm 1.0\%$
High Temperature Exposure	JIS C 5201-1 clause 4.25	1,000hrs at + 170 °C	$\Delta R/R1 \cong \pm 1.0\%$
Soldering Heat	JIS C 5201-1 clause 4.18	260±5°C for 10 seconds.	$\Delta R/R1 \cong \pm 0.5\%$
Temperature Cycling	JIS C 5201-1 clause 4.19	-55°C to +155°C, 1,000cycles, Measurement at 24±4hours after test conclusion. 30min Max dwell time at each temperature extreme	$\Delta R/R1 \cong \pm 1.0\%$
Bias Humidity	JIS C 5201-1 clause 4.24	1,000 hours; 85°C / 85% RH, 10% of operating power. Measurement at 24±4 hours after test conclusion.	$\Delta R/R1 \cong \pm 1.0\%$
Load Life	JIS C 5201-1 clause 4.25	70±2°C , RCWV or Max. working voltage whichever is less for 1000 hrs with 1.5 hrs ON and 0.5 hr OFF .	$\Delta R/R1 \cong \pm 1.0\%$
Solderability	JIS C 5201-1 clause 4.17	245±5°C for 3 secs	>95% coverage
Dielectric Withstanding Voltage	JIS-C5201-1 clause 4.7	Applied 500VAC for 1 minute	No short or burned on the appearance.
Core Body Strength	JIS-C5201-1 clause 4.15	Central part pressurizing force : 5N , 10 seconds	No broken
Terminal Strength	JIS-C5201-1 clause 4.32	Pressurizing force : 17.7N , 60 seconds	No broken
Terminal Bending Strength	JIS-C5201-1 clause 4.33	Bending once for 2mm , 10 seconds	$\Delta R/R1 \cong \pm 0.5\%$ No broken
Moisture Resistance (Climatic Sequence)	MIL-STD 202 Method 106	T=24 hours / Cycle ,10Cycles . Steps 7a& 7b not required. Unpowered . 	$\Delta R/R1 \cong \pm 0.5\%$
Sulfuration test	ASTMB-809-95	Sulfur (Saturated vapor) : Test temp.: 105°C Test time: 1000H	$\pm(3.0\%+0.05\Omega)$
	/	Soaked in industrial oil with sulfur substance 3.5% contained 105°C±3°C, 500H	$\pm(5.0\%+0.05\Omega)$

## 11. Soldering Profile



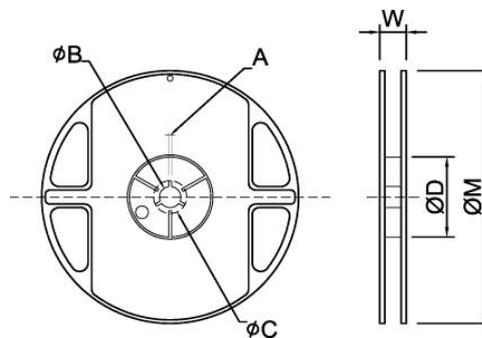
## 12. Packing of Surface Mount Resistors

### 12.1 Embossed Dimensions:(Unit: mm)



Item	W	P	E	F	ΦD	ΦD1	G	H	A	B	T1	T
LR18	16.0±0.30	8.0±0.10	1.75±0.10	7.5±0.10	1.5+0.1/-0	1.5+0.1/-0	4.0±0.10	2.0±0.10	5.21±0.10	7.69±0.10	1.97±0.10	0.30±0.05

### 12.2 Dimension of Reel : (Unit: mm)



TYPE	TAPING	Qty/Reel	A	ΦB	ΦC	ΦD	W	ΦM
LR18	Embossed	3,500pcs	2.3±0.5	13.5±0.5	17.7±0.5	99.0±0.5	20.7±0.5	330±1.0

### 13. Note

13.1 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.

13.2 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.

13.3 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.

### 14. Record

Version	Description of amendment	Page	Date	Amended by	Checked by
1	First issue of this specification	1~7	Apr.18, 2019	Haiyan Chen	Yuhua Xu
2	1.Modify the resistance range 2.Modify the Dimension 3.Update the Performance Specification	3 3 5	Mar.29, 2021	Song Nie	Yuhua Xu
3	1. Modify the rating power Modify the resistance range 2.Modify the dimension 3.Update the performance specification	3 3 3 5	Mar.23, 2024	Haiyan Chen	Yuhua Xu
4	Add the Sulfuration test	5	Feb.12, 2026	Haiyan Chen	Yuhua Xu

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