



# DATASHEET

**Product Name** Current Sense Resistors

**Part Name** CSR/CSS Series

**File No.** DIP-SP-051

## 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 Co., Ltd.

Aeon Technology Corporation

Royal Electronic Factory (Thailand) Co., Ltd.

Royal Technology (Thailand) Co., Ltd.

**1. Scope**

- 1.1 This datasheet is the characteristics of Current Sense Resistors manufactured by UNI-ROYAL.
- 1.2 Made by Cu/Ni or Mn/Cu Alloy resistance wire materials
- 1.3 Excellent Solderability
- 1.4 Suitable for all kinds of Current sense application
- 1.5 Application: Power Supply
- 1.6 Compliant with RoHS directive.
- 1.7 Halogen free requirement.

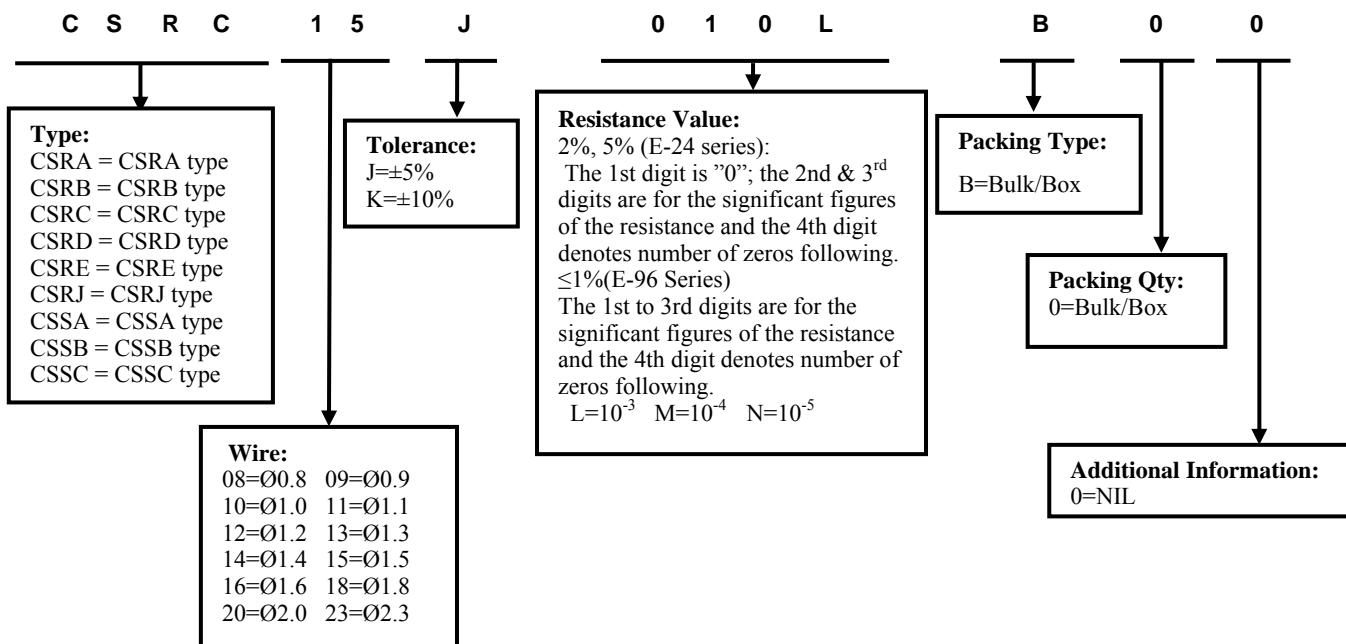
**2. Part No. System**

The standard Part No. includes 14 digits with the following explanation:

- 2.1 Current Sense Resistors the 1<sup>st</sup> to 3<sup>rd</sup> digits are to indicate the product type and 4<sup>th</sup> digit is the special feature.  
Example:  
CSRA= CSRA type
- 2.2 5<sup>th</sup>~6<sup>th</sup> digits:  
For Current Sense Resistors, The 5<sup>th</sup> & 6<sup>th</sup> digits will be indicated with "Lead diameter"  
Example: 1.0mm=10
- 2.3 The 7<sup>th</sup> digit is to denote the Resistance Tolerance. The following letter code is to be used for indicating the standard Resistance Tolerance.  
 $J=\pm 5\%$     $K=\pm 10\%$
- 2.4 The 8<sup>th</sup> to 11<sup>th</sup> digits is to denote the Resistance Value.  
2.4.1 For the standard resistance values of E-24 series, the 8<sup>th</sup> digit is "0", the 9<sup>th</sup> & 10<sup>th</sup> digits are to denote the significant figures of the resistance and the 11<sup>th</sup> digit is the zeros following;  
For the standard resistance values of E-96 series, the 8<sup>th</sup> digit to the 10<sup>th</sup> digits is to denote the significant figures of the resistance and the 11th digit is the zeros following.
- 2.4.2 The following numbers and the letter codes are to be used to indicate the number of zeros in the 11<sup>th</sup> digit:  
 $0=10^0$     $1=10^1$     $2=10^2$     $3=10^3$     $4=10^4$     $5=10^5$     $6=10^6$     $J=10^{-1}$     $K=10^{-2}$     $L=10^{-3}$     $M=10^{-4}$     $N=10^{-5}$     $P=10^{-6}$
- 2.4.3 The 12<sup>th</sup>, 13<sup>th</sup> & 14<sup>th</sup> digits.  
The 12<sup>th</sup> digit is to denote the Packaging Type with the following codes:  
B=Bulk /Box
- 2.4.4 Current Sense Resistors, The 13<sup>th</sup> digit should be filled with "0"
- 2.4.5 Current Sense Resistors, The 14<sup>th</sup> digit should be filled with "0"

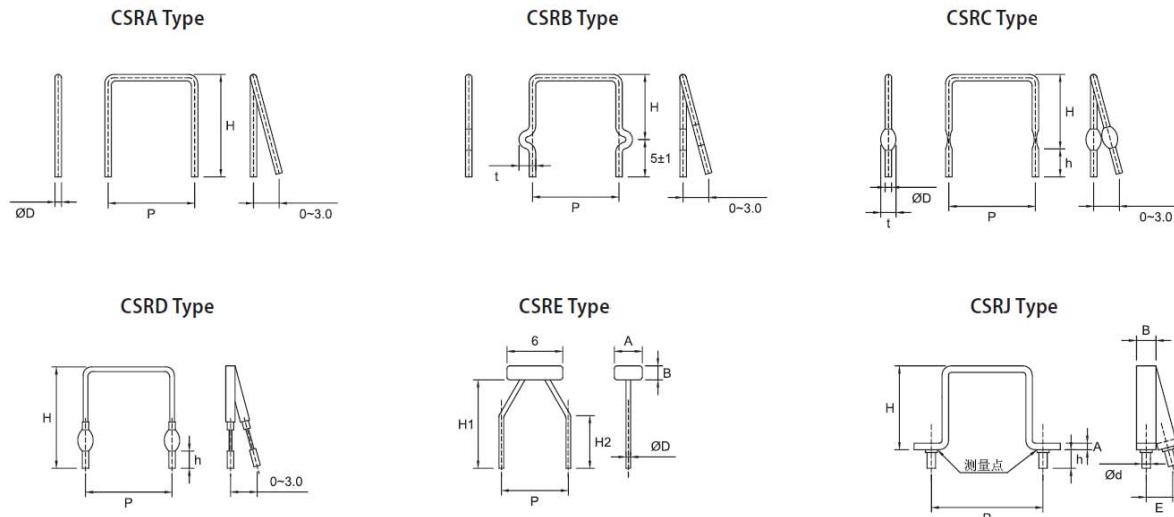
**3. Ordering Procedure**

(Example: CSRC Ø1.5 ±5% 10mΩ B/B )



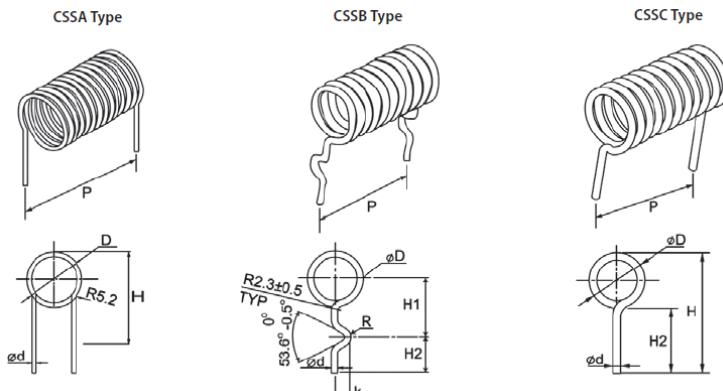
## 4. Specification

### 4.1 CSR-Type



Type	ΦD	Rated Current	Resistance Range	TCR	Remark
CSR	Φ0.8mm	4.5A	5mΩ~50mΩ	±100PPM/°C	*P&H could be design by customer's requirement *Temperature coefficient of resistor could be design by customer's requirement
	Φ0.9mm	5.0A	5mΩ~40mΩ		
	Φ1.0mm	5.5A	3mΩ~30mΩ		
	Φ1.1mm	6.0A	3mΩ~20mΩ		
	Φ1.2mm	7.0A	3mΩ~20mΩ		
	Φ1.3mm	7.5A	3mΩ~20mΩ		
	Φ1.4mm	8.0A	3mΩ~20mΩ		
	Φ1.5mm	9.0A	3mΩ~20mΩ		
	Φ1.6mm	9.5A	3mΩ~15mΩ		
	Φ1.8mm	11A	3mΩ~10mΩ		
	Φ2.0mm	12A	3mΩ~10mΩ		
	Φ2.3mm	14A	3mΩ~7mΩ		
CSRE	Φ1.0mm	50A	1mΩ		

### 4.2 CSS-Type



Type	ΦD	Rated Current	Resistance Range	Remark
CSS	Φ0.8mm	4.5A	5mΩ~50mΩ	*P&H could be design by customer's requirement
	Φ1.0mm	5.5A	3mΩ~30mΩ	
	Φ1.6mm	9.5A	3mΩ~15mΩ	
	Φ2.0mm	12A	3mΩ~10mΩ	

## 5. Performance Specification

Characteristic	Limits	Test Method (GB/T 5729&JIS-C-5201&IEC60115-1)
Temperature Coefficient	±100PPM/°C	4.8 Natural resistance changes per temp. Degree centigrade $\frac{R_2-R_1}{R_1(t_2-t_1)} \times 10^6 \text{ (PPM/°C)}$ R <sub>1</sub> : Resistance Value at room temperature (t <sub>1</sub> ) ; R <sub>2</sub> : Resistance at test temperature (t <sub>2</sub> ) t <sub>1</sub> : +25°C or specified room temperature t <sub>2</sub> : Test temperature (+125°C )
Solderability	Surface area must be covered with new solder 95%.	4.17 dipping specimen with flux into 245±3°C solder for 2~3 sec
Resistance to soldering heat	1.No mechanical damage 2.ΔR/R: ≤±2%	4.18 Dipping into 260±5°C solder for 10±1 sec measure after 1hr recover time
Rapid change of temperature	Resistance change rate must be in ±(1%+0.05Ω), and no mechanical damage.	4.19 30 min at -55 °C and 30 min at 155°C; 100 cycles.
Humidity (steady state)	Resistance change rate must be in ±(2%+0.05Ω)	4.24 Temporary resistance change after 240 hours exposure in a humidity test chamber controlled at 40±2°C and 90~95% relative humidity
Load life in humidity	Resistance change rate must be in ±(5%+0.05Ω), and no mechanical damage.	7.9 Resistance change after 1000 hours (1.5 hours “ON”, 0.5 hours “OFF”) at RCWV or Max.Working Voltage whichever less in a humidity test chamber controlled at 40±2°C and 93%±3% RH.
Load life	Resistance change rate must be in ±(5%+0.05Ω), and no mechanical damage.	4.25.1 Permanent Resistance change after 1000 hours operating at RCWV or Max.Working Voltage whichever less with duty cycle of 1.5 hours “ON”, 0.5 hour “OFF” at 70±2°C ambient.

## 6. Note

6.1. UNI-ROYAL recommend products store in warehouse with temperature between 15 to 35°C under humidity between 25 to 75%RH.  
Even under storage conditions recommended above, solder ability of products will be degraded stored over 1 year old.

6.2. Cartons must be placed in correct direction which indicated on carton, otherwise the reel or wire will be deformed.

6.3. Storage conditions as below are inappropriate:

- Stored in high electrostatic environment
- Stored in direct sunshine, rain, snow or condensation.
- Exposed to sea wind or corrosive gases, such as Cl<sub>2</sub>, H<sub>2</sub>S, NH<sub>3</sub>, SO<sub>2</sub>, NO<sub>2</sub>, Br etc.

## 7. Record

Version	Description	Page	Date	Amended by	Checked by
1	First version	1~4	Apr.12, 2019	Haiyan Chen	Yuhua Xu
2	Modify the temperature coefficient test conditions	4	Nov.08, 2022	Haiyan Chen	Yuhua Xu
3	Add the CSRJ type	3	Jul.18, 2022	Haiyan Chen	Yuhua Xu

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