

# DATA SHEET

**Product Name** Current Sense Resistors

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**Part Name** CSR/CSS Series

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

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## 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 4th 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=±5%      K= ±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 8th 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 number s and the letter codes are to be used to indicate the number of zeros in the 11<sup>th</sup> digit:

0=10<sup>0</sup>    1=10<sup>1</sup>    2=10<sup>2</sup>    3=10<sup>3</sup>    4=10<sup>4</sup>    5=10<sup>5</sup>    6=10<sup>6</sup>    J=10<sup>-1</sup>    K=10<sup>-2</sup>    L=10<sup>-3</sup>    M=10<sup>-4</sup>    N=10<sup>-5</sup>    P=10<sup>-6</sup>

- 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:

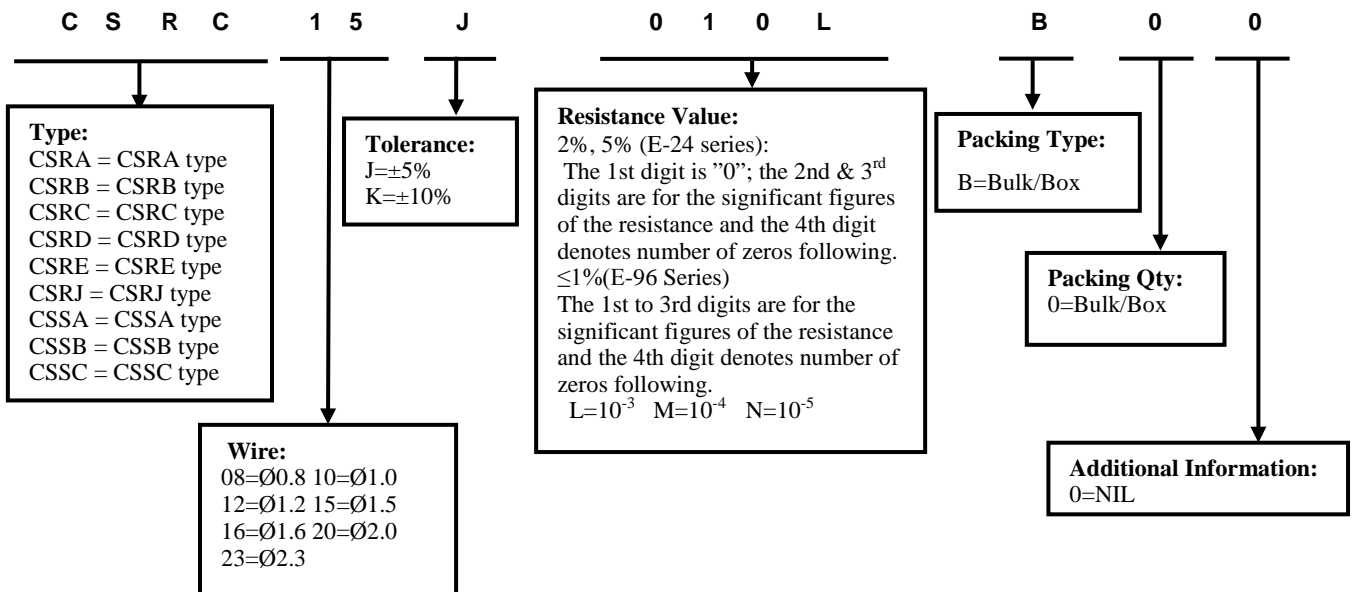
B=Bulk /Box

- 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"

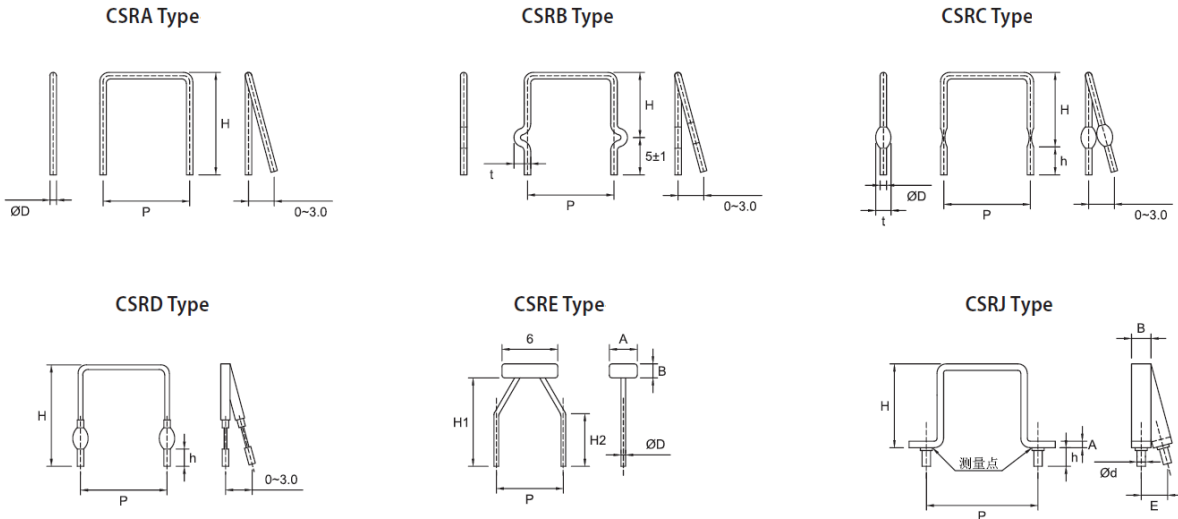
## 3. Ordering Procedure

(Example: CSRC Ø1.5 ±5% 10mΩ B/B )



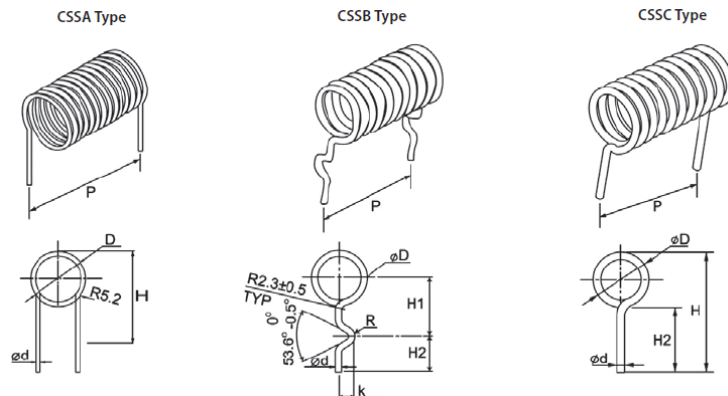
4. Specification

4.1 CSR-Type



Type	$\Phi D$	Rated Current	Resistance Range	TCR	Remark
CSRA CSRB CSRC CSRD CSRJ	$\Phi 0.8\text{mm}$	4.5A	5m $\Omega$ ~50m $\Omega$	$\pm 100\text{PPM}/^\circ\text{C}$	*P&H could be design by customer's requirement *Temperature coefficient of resistor could be design by customer's requirement
	$\Phi 0.9\text{mm}$	5.0A	5m $\Omega$ ~40m $\Omega$		
	$\Phi 1.0\text{mm}$	5.5A	3m $\Omega$ ~30m $\Omega$		
	$\Phi 1.1\text{mm}$	6.0A	3m $\Omega$ ~20m $\Omega$		
	$\Phi 1.2\text{mm}$	7.0A	3m $\Omega$ ~20m $\Omega$		
	$\Phi 1.3\text{mm}$	7.5A	3m $\Omega$ ~20m $\Omega$		
	$\Phi 1.4\text{mm}$	8.0A	3m $\Omega$ ~20m $\Omega$		
	$\Phi 1.5\text{mm}$	9.0A	3m $\Omega$ ~20m $\Omega$		
	$\Phi 1.6\text{mm}$	9.5A	3m $\Omega$ ~15m $\Omega$		
	$\Phi 1.8\text{mm}$	11A	3m $\Omega$ ~10m $\Omega$		
	$\Phi 2.0\text{mm}$	12A	3m $\Omega$ ~10m $\Omega$		
CSRE	$\Phi 1.0\text{mm}$	50A	1m $\Omega$		

4.2 CSS-Type



Type	$\Phi D$	Rated Current	Resistance Range	Remark
CSSA CSSB CSSC	$\Phi 0.8\text{mm}$	4.5A	5m $\Omega$ ~50m $\Omega$	*P&H could be design by customer's requirement
	$\Phi 1.0\text{mm}$	5.5A	3m $\Omega$ ~30m $\Omega$	
	$\Phi 1.6\text{mm}$	9.5A	3m $\Omega$ ~15m $\Omega$	
	$\Phi 2.0\text{mm}$	12A	3m $\Omega$ ~10m $\Omega$	

## 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:

- a. Stored in high electrostatic environment
- b. Stored in direct sunshine, rain, snow or condensation.
- c. 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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