

# DATA SHEET

## CURRENT SENSOR - LOW TCR

4 Termination

PS Series

5%, 1%, 0.5%

0306/0612

RoHS compliant & Halogen free



SCOPE

This specification describes PS series 4-terminal current sensor - low TCR chip resistors with lead-free terminations made by metal alloy process.

APPLICATIONS

- Battery pack
- Inverter/Converter (DC-DC/AC-DC/DC-AC)
- Consumer electronics
- Laptops

FEATURES

- This product with lead-free terminations meet RoHS requirements
- High component and equipment reliability
- Ultra low resistance and narrow tolerance suitable for current detection

ORDERING INFORMATION - GLOBAL PART NUMBER

Global part numbers are identified by the series, size, tolerance, packing type, temperature coefficient, taping reel and resistance value.

**GLOBAL PART NUMBER**

**PS    XXXX    X    X    X    XX    XXXX    L**  
 (1)    (2) (3) (4) (5)    (6)    (7)

**(1) SIZE**

0306 / 0612

**(2) TOLERANCE**

D=±0.5% (10mΩ & 20mΩ)  
 F = ±1%  
 J = ±5%

**(3) PACKAGING TYPE**

K= Embossed taping reel  
 R = Paper taping reel

**(4) TEMPERATURE COEFFICIENT OF RESISTANCE**

M = ±75ppm/°C  
 F = ±100ppm/°C  
 L = ±150ppm/°C  
 G = ±200ppm/°C  
 P = ±300ppm/°C

**(5) TAPING REEL**

07 / 7W / 7T= 7 inch dia. Reel and specific rated power.  
 Detailed power rating are shown in the Table 2.

**(6) RESISTANCE VALUE**

0.5mΩ to 100mΩ  
 There are 3~5 digits indicated the resistance value. Letter R is decimal point.  
 Detailed coding rules of resistance are shown in the table of "Resistance rule of global part number".

**(7) DEFAULT CODE**

Letter L is the system default code for ordering only. (Note)

Resistance rule of global part number

Resistance code rule	Example
0RXXX	0R001 = 1mΩ
(0UX)	0R1 = 100mΩ
	0U5 = 0.5mΩ

**ORDERING EXAMPLE**

The ordering code of a PS0306 1W chip resistor, value 0.003 Ω with ±1% tolerance, supplied in 7-inch tape reel is:  
**PS0306FRL0R003L**

**NOTE**

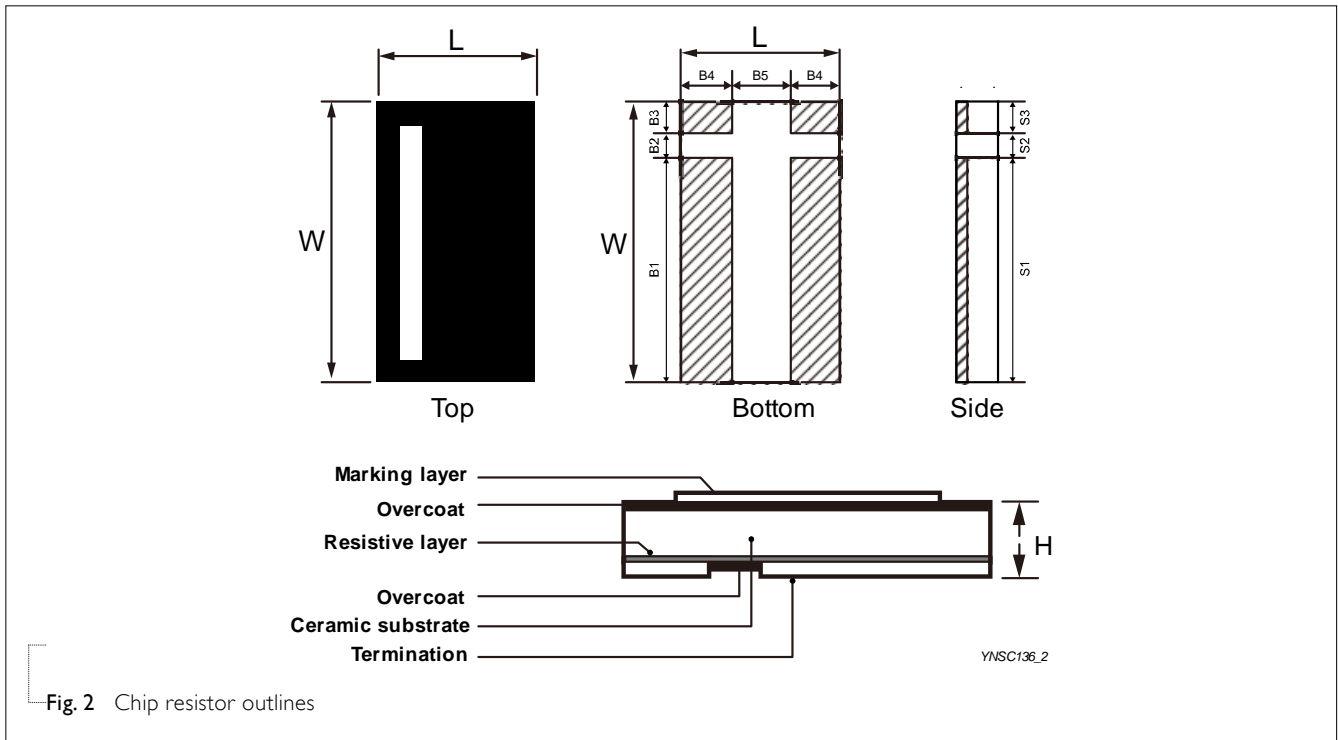
I. All our RSMD products are RoHS compliant. "LFP" of the internal 2D reel label mentions "Lead-Free Process"

MARKING

PS0306/0612



**Outlines**



DIMENSION

Table 1

TYPE	L (mm)	W (mm)	B1/S1 (mm)	B2/S2 (mm)	B3/S3 (mm)	B4 (mm)	B5 (mm)	H (mm)
PS0306	0.80±0.15	1.60±0.20	1.10±0.20	0.25±0.10	0.25±0.10	0.20±0.10	0.40±0.20	0.50±0.20
PS0612	1.60+0.15/-0.20	3.20±0.20	2.20±0.20	0.50±0.20	0.50±0.20	0.45±0.20	0.70±0.20	(0.5~1mΩ) 0.70±0.20
								(2~10mΩ) 0.60±0.20
								(12~100mΩ) 0.50±0.20

Note:

1. For relevant physical dimensions, please refer to construction outlines.
2. Please contact with sales offices, distributors and representatives in your region before ordering.

**ELECTRICAL CHARACTERISTICS**

Table 2

SERIES	SIZE	POWER RATING	TOLERANCE	RESISTANCE RANGE	TEMPERATURE COEFFICIENT OF RESISTANCE
0306		1/4W	± 0.5%(10, 20mΩ)	2mΩ ≤ R < 5mΩ	±150ppm/°C
		1/3W		5mΩ ≤ R ≤ 100mΩ	±75ppm/°C
		1/2W			±100ppm/°C
PS			±1%, ±5%	0.5mΩ	±300ppm/°C
				1mΩ	±100ppm/°C ±150ppm/°C
0612		1W		2mΩ ≤ R ≤ 9mΩ	±100ppm/°C
				14mΩ ≤ R ≤ 100mΩ	±100ppm/°C
				10mΩ ≤ R ≤ 13mΩ	±200ppm/°C

Note: Please contact with sales offices, distributors and representatives in your region before ordering.

**FUNCTIONAL DESCRIPTION**

**OPERATING TEMPERATURE RANGE**

PS0612 0.5mΩ ≤ R ≤ 10mΩ -55°C to +155°C  
 12mΩ ≤ R ≤ 100mΩ -55°C to +125°C

PS0306 -55°C to +125°C

**POWER RATING**

Standard rated power at 70°C

**RATED VOLTAGE**

The DC or AC (rms) continuous working voltage corresponding to the rated power is determined by the following formula:

$$V = \sqrt{P \cdot R}$$

Where

V = Continuous rated DC or AC (rms) working voltage (V)

P = Rated power (W)

R = Resistance value (Ω)

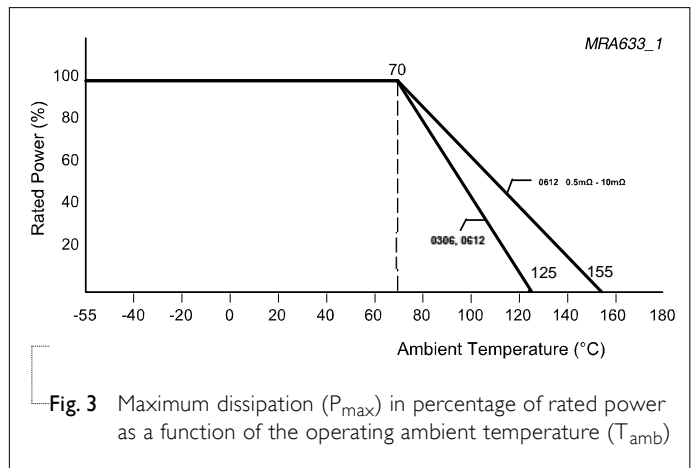


Fig. 3 Maximum dissipation (P<sub>max</sub>) in percentage of rated power as a function of the operating ambient temperature (T<sub>amb</sub>)

**PACKING STYLE AND PACKAGING QUANTITY**

Table 3 Packing style and packaging quantity

PACKING STYLE	REEL DIMENSION	PS0306	PS0612
Paper taping reel (R)	7" (178 mm)	5,000	---
Embossed taping reel (K)	7" (178 mm)	---	4,000

**PAPER TAPE**

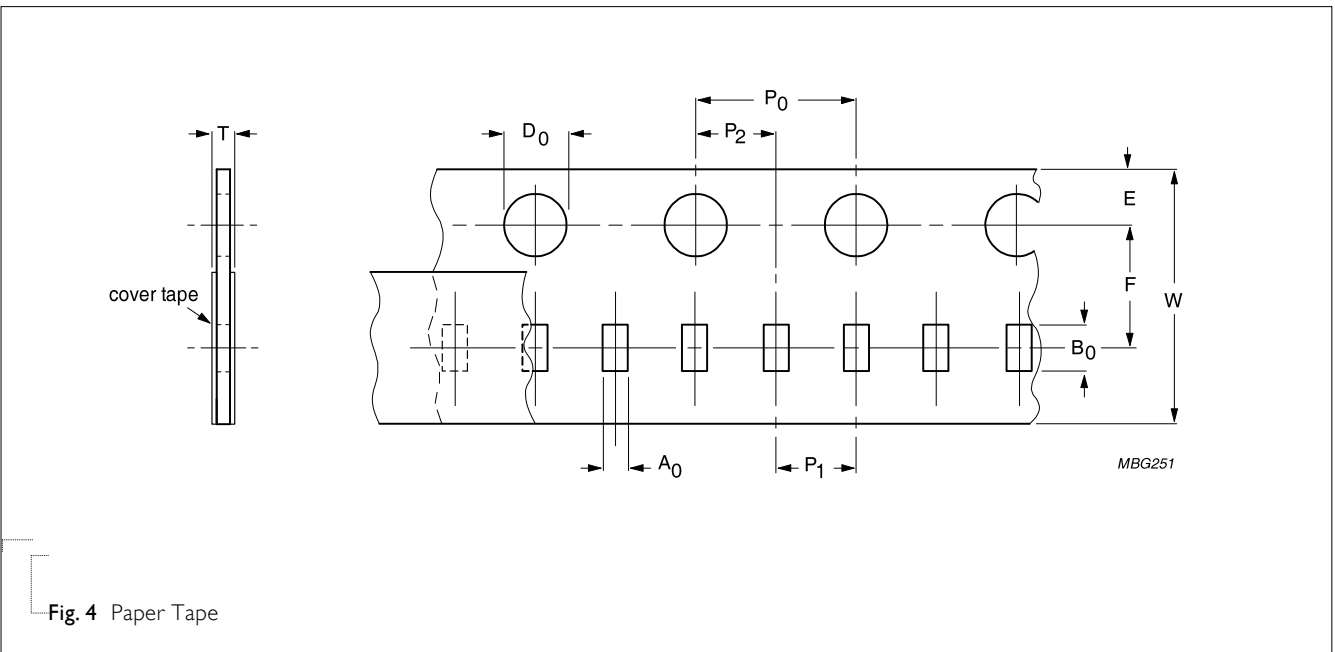


Fig. 4 Paper Tape

Table 4 Dimensions of paper tape for relevant chip resistors size

SIZE	SYMBOL										Unit: mm
	A <sub>0</sub>	B <sub>0</sub>	W	E	F	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	ØD <sub>0</sub>	T	
PS0306	1.10±0.15	1.90±0.15	8.00±0.30	1.75±0.10	3.50±0.10	4.00±0.10	4.00±0.10	2.00±0.10	1.5±0.10	0.80±0.10	

**EMBOSSED TAPE**

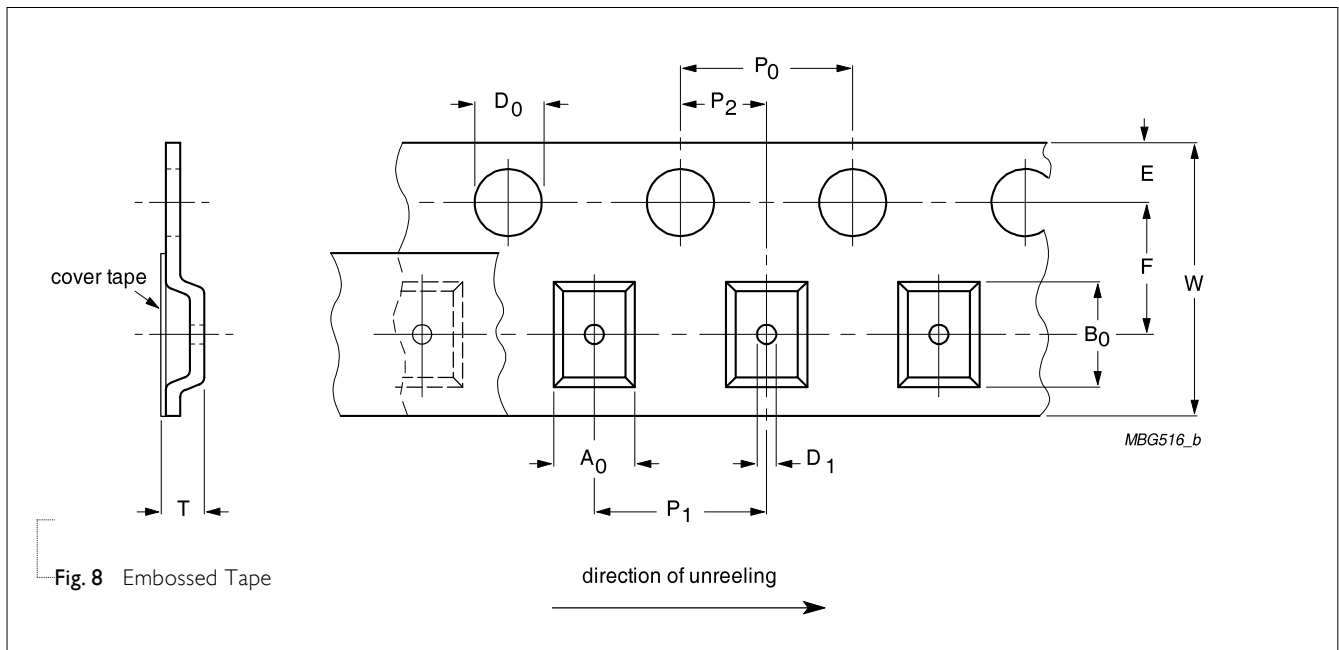


Fig. 8 Embossed Tape

Table 5 Dimensions of embossed tape for relevant chip resistors size

SIZE	SYMBOL										Unit: mm
	A <sub>0</sub>	B <sub>0</sub>	W	E	F	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	ØD <sub>0</sub>	T	
PS0612	1.91±0.05	3.65±0.05	8.00+0.30/-0.10	1.75±0.10	3.50±0.05	4.00±0.10	4.00±0.10	2.00±0.05	1.5±0.10	0.88±0.05	

**REEL SPECIFICATION**

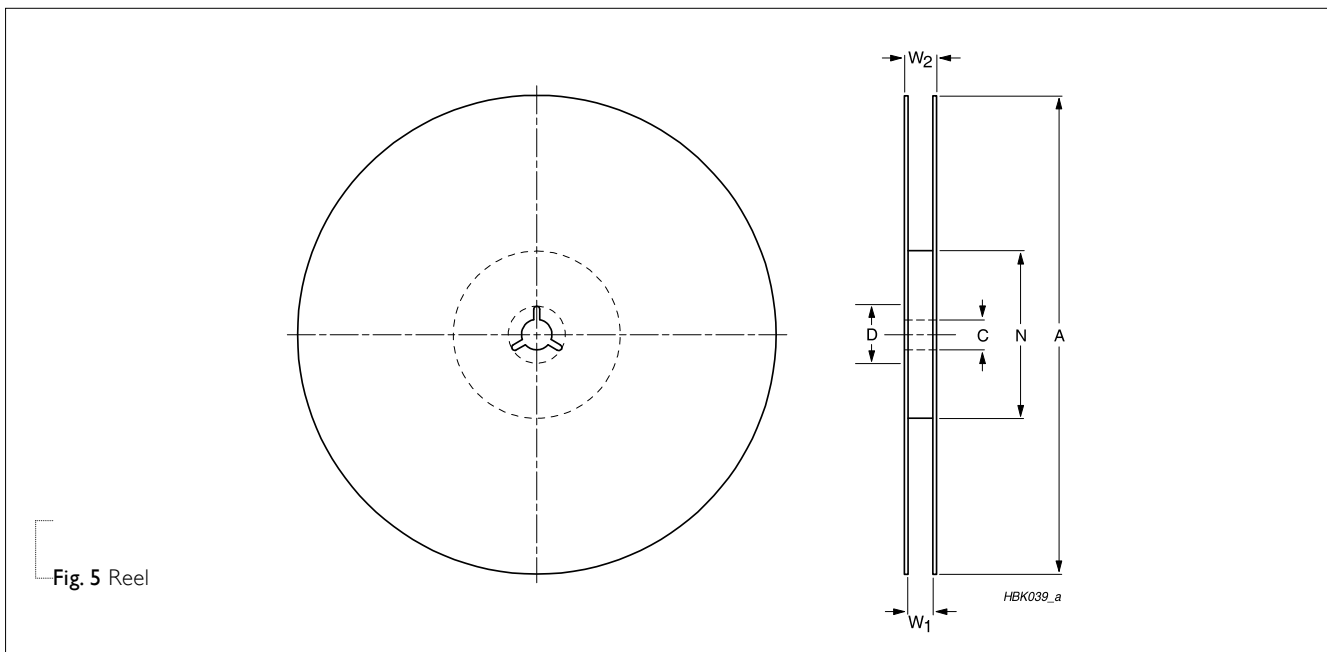


Table 6 Dimensions of reel specification for relevant chip resistors size

SIZE	QUANTITY PER REEL	REEL SIZE		SYMBOL			Unit: mm
		8 mm TAPE WIDE	7" (Ø 178 mm)	A	N	$W_1$	$W_2$ MAX.
PS0306	5000	8 mm	7" (Ø 178 mm)	178.0±5	60.0±2	9.0±0.2	12.0±0.2
PS0612	4000	8 mm	7" (Ø 178 mm)	178.0± 5	60.0±2	9.0±0.2	12.0±0.2

SOLDERING PROFILES

For recommended soldering profiles, please refer to data sheet “Chip resistors mounting”.

FOOTPRINT

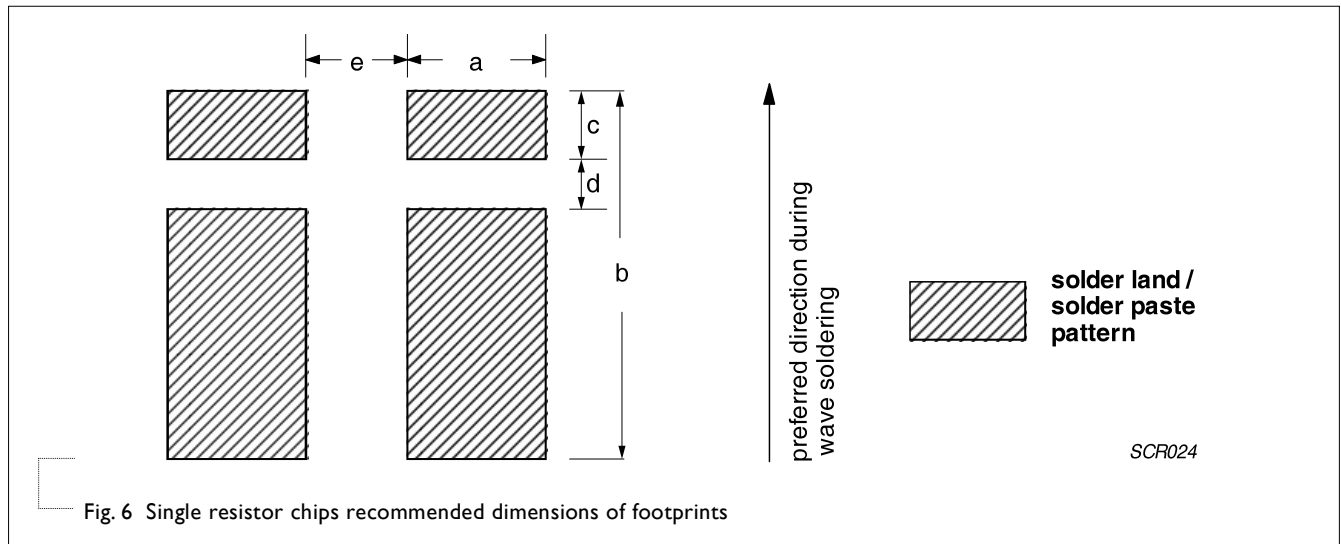


Fig. 6 Single resistor chips recommended dimensions of footprints

Table 7 Footprint dimensions

SIZE FOOTPRINT	DIMENSIONS CODE					Unit: mm
	a	b	c	d	e	t(um)
PS0306	0.40	1.75	0.35	0.20	0.20	105
PS0612	1.00	3.50	0.80	0.38	0.75	105



**TESTS AND REQUIREMENTS**
**Table 8** Test condition, procedure and requirements

TEST	TEST METHOD	PROCEDURE	REQUIREMENTS
Life/ Operational Life/ Endurance	MIL-STD-202-method 108 IEC 60115-1 4.25.1	1,000 hours at 70±2 °C applied RCWV 1.5 hours on, 0.5 hour off, still air required	±(1%+0.0005 Ω)
High Temperature Exposure/ Endurance at Upper Category Temperature	IEC 60068-2-2	1,000 hours at 125 °C & 155 °C ,unpowered	±(1%+0.0005 Ω)
Moisture Resistance	MIL-STD-202-method 106	Each temperature / humidity cycle is defined at 8 hours (method 106F), 3 cycles / 24 hours for 10d with 25 °C / 65 °C 95% R.H, without steps 7a & 7b, unpowered  Parts mounted on test-boards, without condensation on parts  Measurement at 24±2 hours after test conclusion	±(0.5%+0.0005 Ω)
Thermal Shock	MIL-STD-202-method 107	-55/+125 °C  Note: Number of cycles required is 300. Devices mounted  Maximum transfer time is 20 seconds. Dwell time is 15 minutes. Air – Air	±(1%+0.0005 Ω)
Short Time Overload	IEC60115-1 4.13	5 times of rated power for 5 seconds at room temperature	±(1%+0.0005 Ω) No visible damage
Board Flex/ Bending	IEC 60068-2-21	Chips mounted on a 90mm glass epoxy resin PCB(FR4) 2 mm bending Bending time: 60±5 seconds	±(1%+0.0005 Ω) No visible damage

TEST	TEST METHOD	PROCEDURE	REQUIREMENTS
Solderability - Wetting	J-STD-002 test B	Electrical Test not required Magnification 50X SMD conditions: 1 <sup>st</sup> step: method B, aging 4 hours at 155 °C dry heat 2 <sup>nd</sup> step: leadfree solder bath at 245±3 °C Dipping time: 3±0.5 seconds	Well tinned (≥95% covered) No visible damage
- Resistance to Soldering Heat	IEC 60068-2-58	Condition B, no pre-heat of samples Leadfree solder, 260 °C, 10 seconds immersion time Procedure 2 for SMD: devices fluxed and cleaned with isopropanol	±(0.5%+0.0005 Ω) No visible damage

REVISION HISTORY

REVISION	DATE	CHANGE NOTIFICATION	DESCRIPTION
Version 1	July 16, 2019	-	- Extend resistor value
Version 0	Mar. 06, 2017	-	- New datasheet for current sensor - low TCR 4 terminal PS series

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