Innovative Service Around the Globe YAGEO

DATA SHEET

CURRENT SENSOR - LOW TCR

4 Termination

PS Series

5%, 1%, 0.5%

0306/0612

RoHS compliant & Halogen free

YAGEO Phycomp

Product specification – July 17, 2019 V.1

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 (0UX)	0R001 = 1mΩ
	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

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

MARKING

PS0306/0612

Fig. 1 Bar marking

Outlines

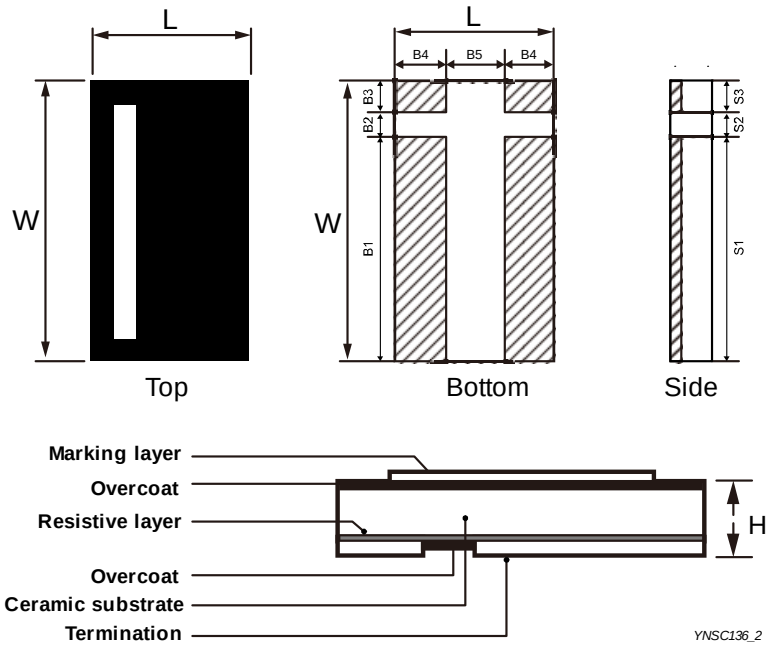

Fig. 2 Chip resistor outlines

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 COEEFICIENT OF RESISTANCE
PS	0306	1/4W	± 0.5%(10, 20mΩ) ±1%, ±5%	2mΩ ≤ R < 5mΩ	±150ppm/°C
		1/3W		5mΩ ≤ R ≤ 100mΩ	±75ppm/°C ±100ppm/°C
		1/2W			
	0612	1W		0.5mΩ	±300ppm/°C
				1mΩ	±100ppm/°C ±150ppm/°C
				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℃ to +155℃
12mΩ ≤ R ≤ 100mΩ -55℃ to +125℃

PS0306 -55℃ to +125℃

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:

$$V = \sqrt{(P*R)}$$

Where

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

P = Rated power (W)

R = Resistance value (Ω)

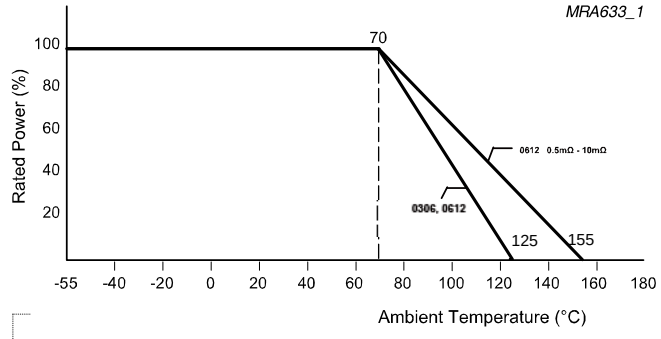

Fig. 3 Maximum dissipation (P_{max}) in percentage of rated power as a function of the operating ambient temperature (T_{amb})

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

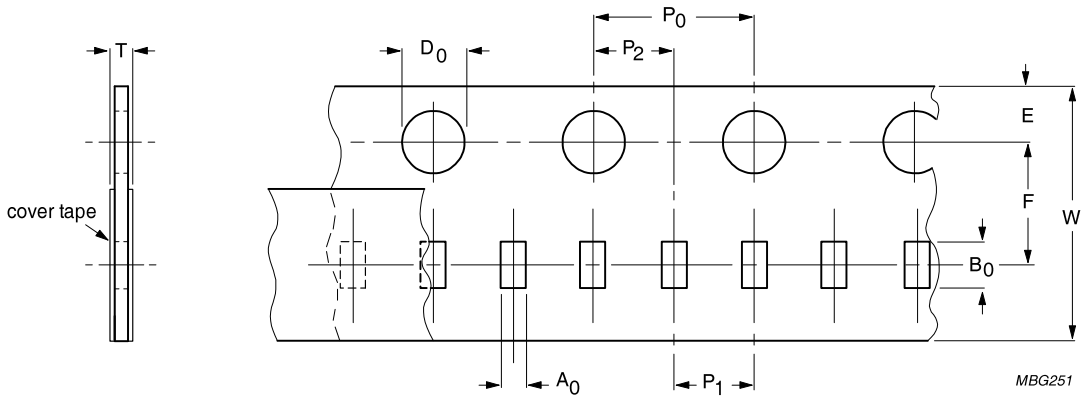

Fig. 4 Paper Tape

Table 4 Dimensions of paper tape for relevant chip resistors size

SIZE	SYMBOL									Unit: mm
	A_0	B_0	W	E	F	P_0	P_1	P_2	$\varnothing D_0$	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

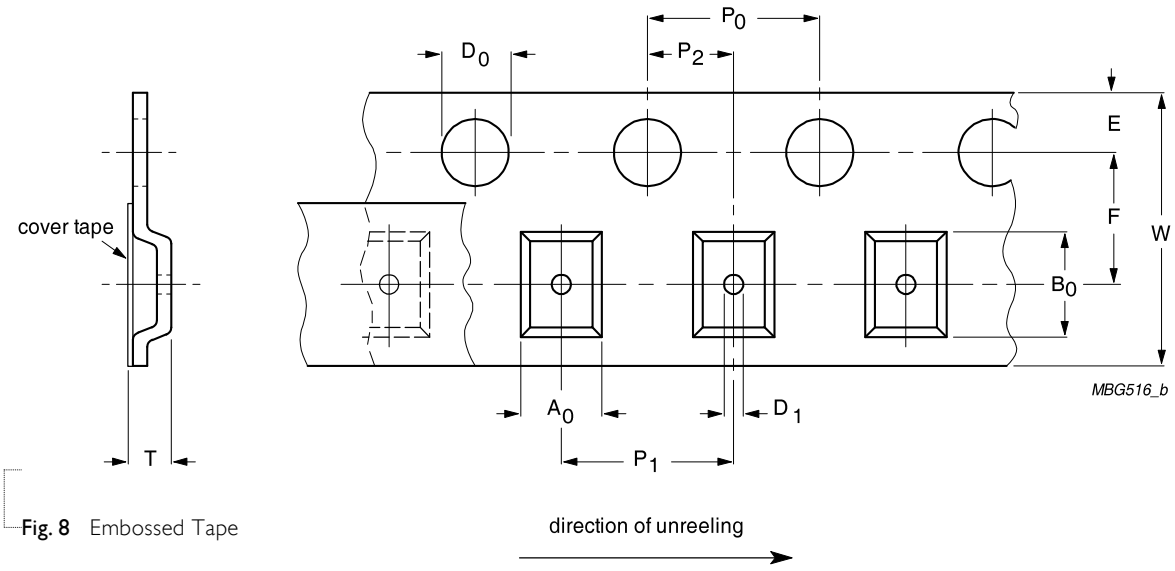

Fig. 8 Embossed Tape

Table 5 Dimensions of embossed tape for relevant chip resistors size

SIZE	SYMBOL									Unit: mm
	A_0	B_0	W	E	F	P_0	P_1	P_2	$\varnothing D_0$	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

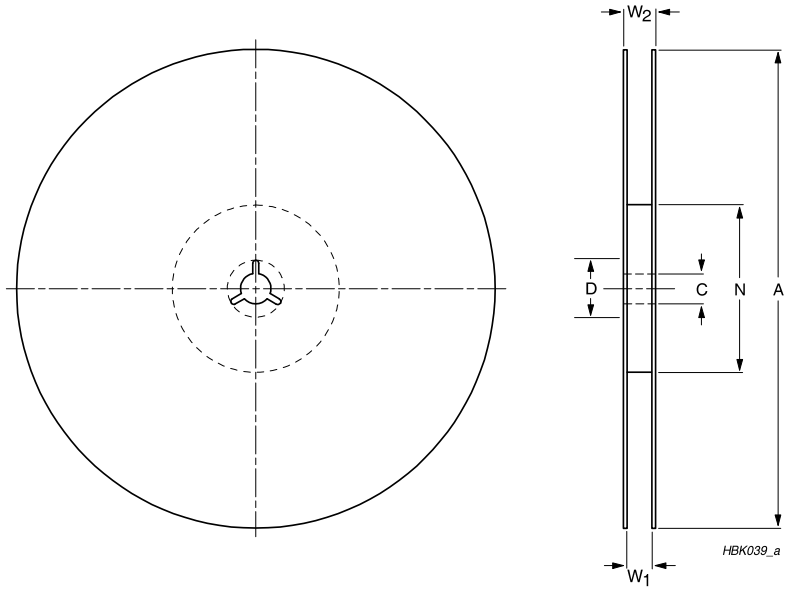

Fig. 5 Reel

Table 6 Dimensions of reel specification for relevant chip resistors size

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

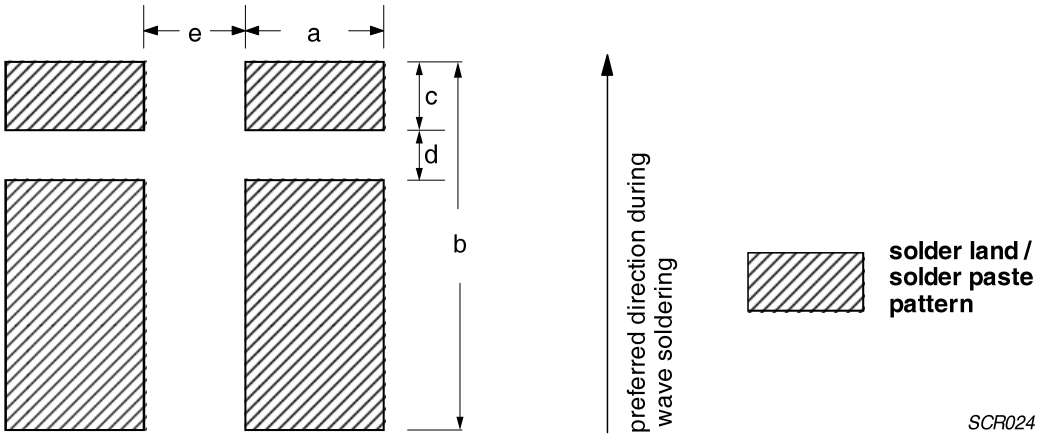

Fig. 6 Single resistor chips recommended dimensions of footprints

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: 1st step: method B, aging 4 hours at 155 °C dry heat 2nd 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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