

# DATA SHEET

## SHUNT RESISTOR AUTOMOTIVE GRADE

PU Series

1%, 5%

sizes 1216

RoHS Compliant & Halogen Free



## SCOPE

This specification describes shunt resistor PUI216 series with lead-free terminations made by welding technology.

## APPLICATIONS

- Power
- Telecom base station
- Automotive (Headlight/ Window control/ Engine control unit/ Steering control....)
- Alternative Energy

## FEATURES

- AEC-Q200 qualified
- High power up to 5W

## ORDERING INFORMATION - GLOBAL PART NUMBER

Part number is identified by the series name, size, tolerance, packaging type, temperature coefficient of resistance, taping reel, resistance value.

### GLOBAL PART NUMBER

**PUI216** X X X XX XXXX L  
 (1) (2) (3) (4) (5) (6)

#### (1) TOLERANCE

F =  $\pm 1\%$

J =  $\pm 5\%$

#### (2) PACKAGING TYPE

K = Embossed taping reel

#### (3) TEMPERATURE COEFFICIENT OF RESISTANCE

E =  $\pm 50\text{ppm}/^\circ\text{C}$

#### (4) TAPING REEL & POWER

P3 = 3W, 13 inch dia. reel

P5 = 5W, 13 inch dia. reel

#### (5) RESISTANCE VALUE

0U2 (0.2mR)~0R003 (3mR)

#### (6) DEFAULT CODE

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

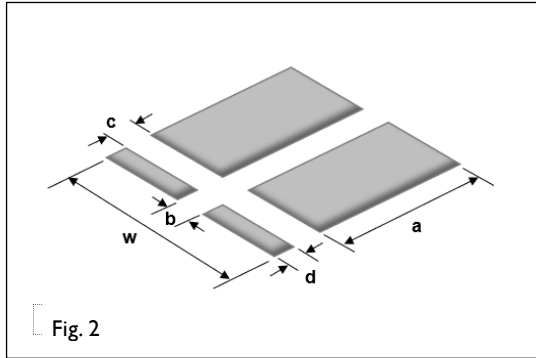
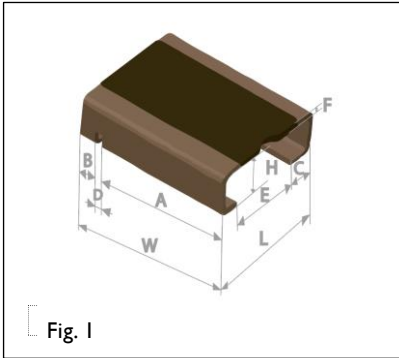
### ORDERING EXAMPLE

The ordering code for a PUI216 5W chip resistor, TCR 50 ppm/ $^\circ\text{C}$  value 0.0005 $\Omega$ (0.5mR) with  $\pm 1\%$  tolerance, supplied in 13-inch tape reel with 3Kpcs quantify is: PUI216FKPE50U5L.

### NOTE

1. All our RSMD products meet RoHS compliant and Halogen Free. "LFP" of the internal 2D reel label mentions "Lead Free Process".
2. On customized label, "LFP" or specific symbol can be printed.

**DIMENSIONS & CONSTRUCTION:**



0.2mohm-marking 0M20  
1mohm-marking R001

**TAPING REEL & POWER**

Table 1

TYPE	DIMENSIONS (MILLIMETERS)							
	L	W	H	A	B	C	D	E
PUI216	3.10 ±0.2	4.00 ±0.2	1.50 ±0.10	2.70 ±0.10	0.50 ±0.10	1.10 ±0.10	0.70 ±0.15	0.80 ±0.2

TYPE	SOLDER PAD DIMENSIONS (MILLIMETERS)				
	w	a	b	c	d
PUI216	3.6	2.95	0.6	0.5	0.7

Table 2

TYPE	RESISTANCE VALUE (mΩ)	F (MM)
PUI216	0.2	1.10±0.1
	0.3	0.70±0.1
	0.5	0.30±0.1
	1	0.30±0.1
	2	0.35±0.1
	3	0.24±0.1

**TAPING REEL**

Table 3

DIMENSION	TAPE WIDTH (mm)	ØA (mm)	ØN (mm)	ØC (mm)	ØD (mm)	W1 (mm)	W2 MAX.
PUI216	12	3300±20	1000±1.0	1350±0.5	21.0±0.8	12.4+2/-0	18.4

**OUTLINES**

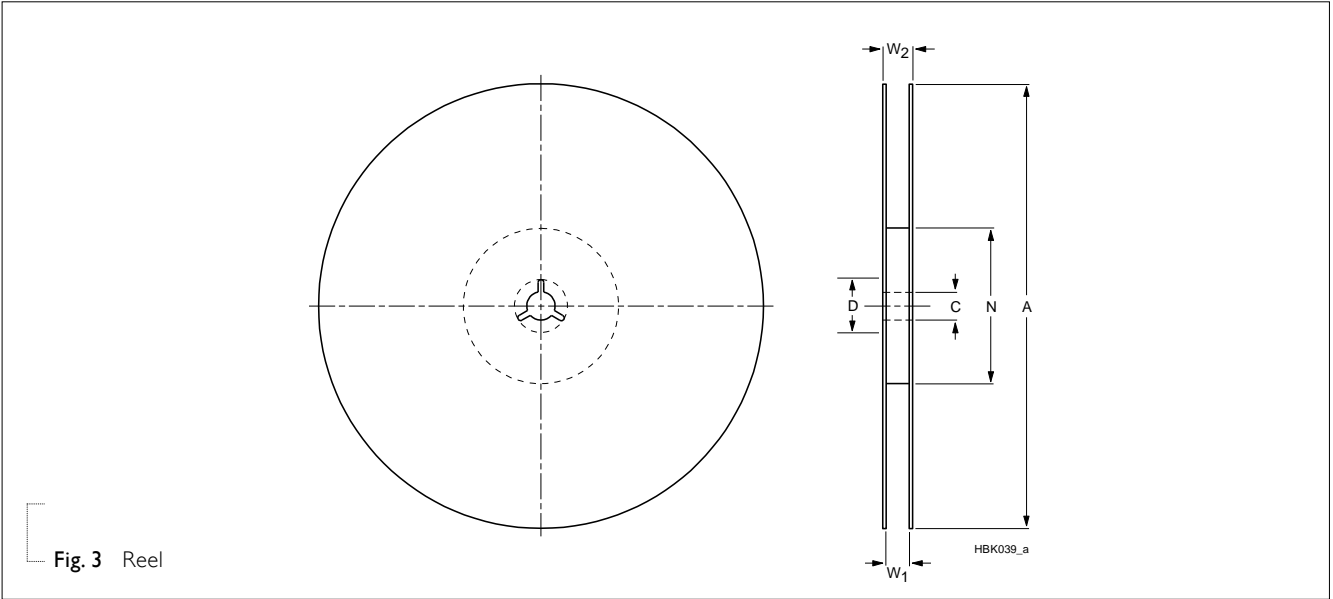


Fig. 3 Reel

**DIMENSIONS**

Table 4

DIMENSION	A <sub>0</sub> (mm)	B <sub>0</sub> (mm)	W MAX. (mm)	E (mm)	F (mm)	P <sub>0</sub> (mm)	P <sub>1</sub> (mm)	P <sub>2</sub> (mm)	D <sub>0</sub> (mm)	D <sub>1</sub> (mm)	T MAX.
PUI216	4.06±0.10	4.85±0.10	12.30	1.75±0.10	5.50±0.10	4.00±0.10	8.00±0.10	2.00±0.10	1.50±0.10	1.50±0.10	3.3

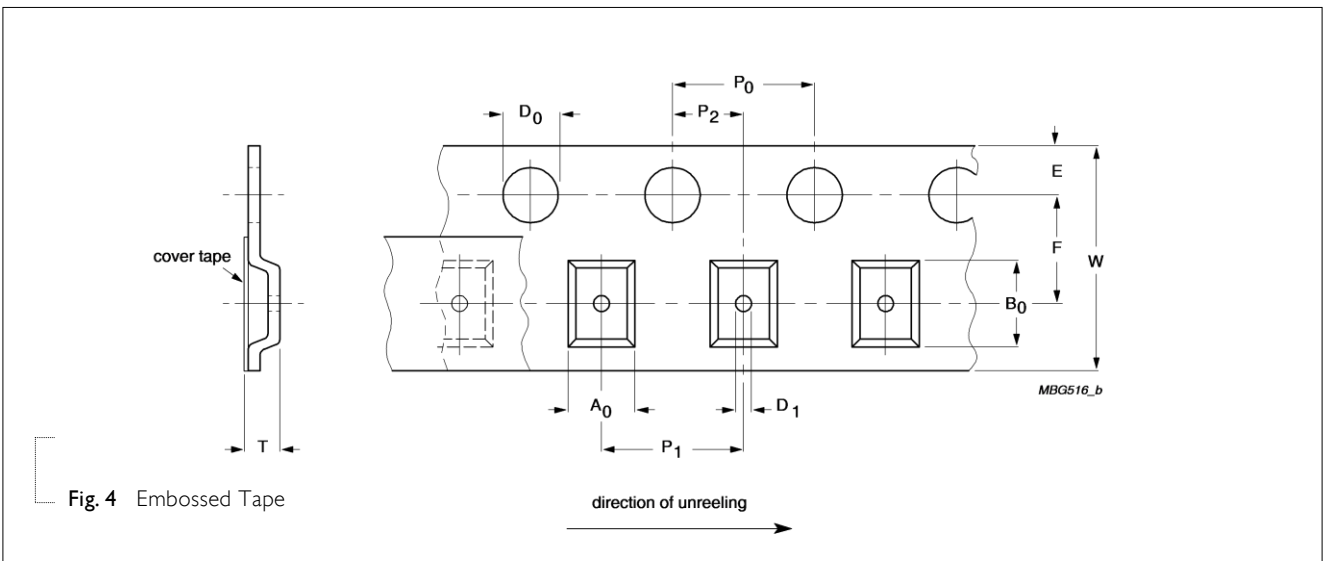
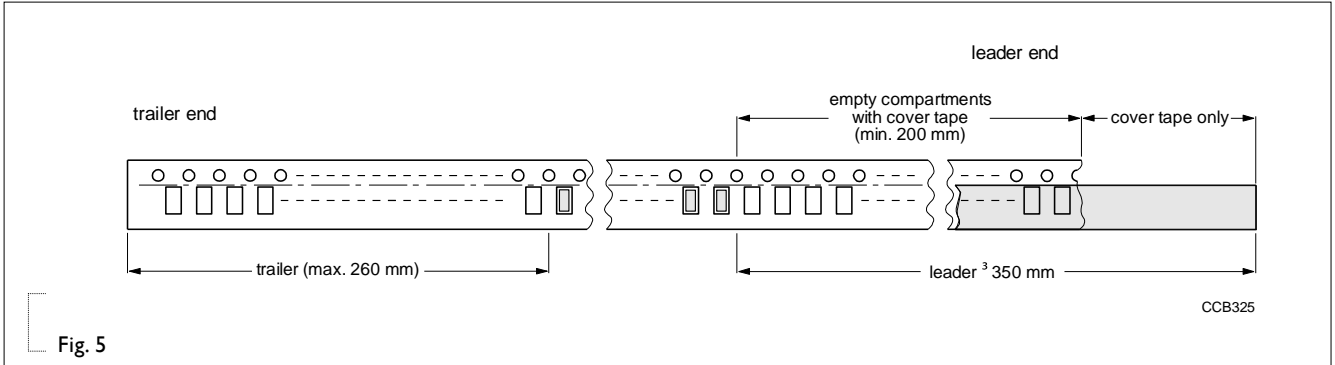


Fig. 4 Embossed Tape

**PACKING METHOD**

**Leader/trailer tape specification**



**ELECTRICAL CHARACTERISTICS**

Table 5

TYPE	CHARACTERISTICS			
	Operating Temperature Range	Max. Working Voltage	Resistance Range	Temperature Coefficient
PU1216	-65 °C to +170 °C	$\sqrt{P \times R}$	5W: 0.2/0.3/0.5mΩ 3W: 1/2/3mΩ	0.2 ±75ppm/°C others ±50ppm/°C

**FOOTPRINT AND SOLDERING PROFILES**

Recommended footprint and soldering profiles, please refer to data sheet “Chip resistors mounting”.

**PACKING STYLE AND PACKAGING QUANTITY**

Table 6 Packing style and packaging quantity

PACKING STYLE	REEL DIMENSION	QUANTITY PER REEL
Embossed Taping Reel (K)	13" (330 mm)	2,500 (0.2 & 0.3mΩ)
		3,000 (above 0.3mΩ)

**NOTE**

I. For paper/embossed tape and reel specification/dimensions, please refer to data sheet “Chip resistors packing”.

FUNCTIONAL DESCRIPTION

**OPERATING TEMPERATURE RANGE**

Range: -65 °C to +170 °C

**POWER RATING**

Standard rated power at 70°C:

PU1216 = 3W/5W

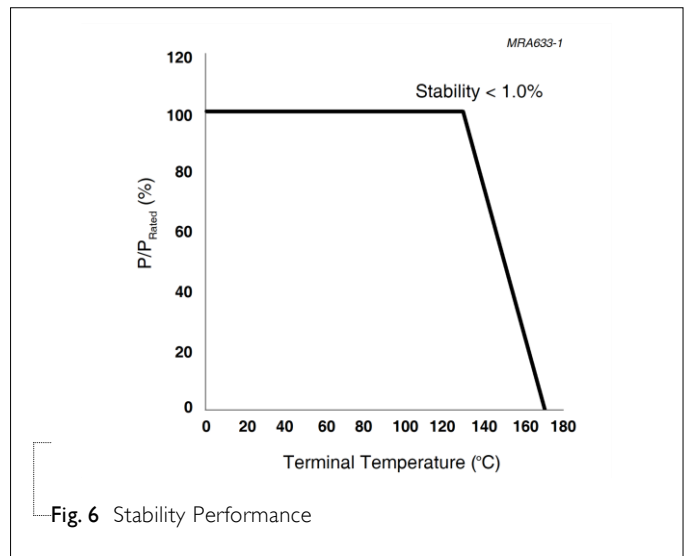
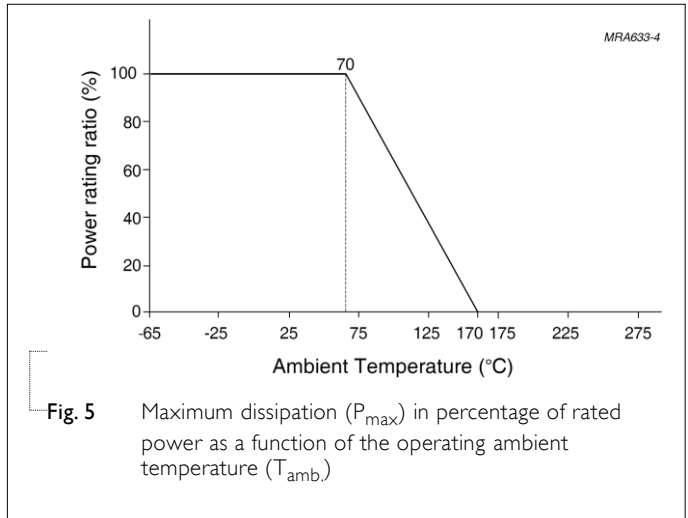
**RATED VOLTAGE**

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

$$U = \sqrt{(P \times R)}$$

Where

- U=Continuous rated DC or AC (rms) working voltage (V)
- P=Rated power
- R=Resistance value (Ω)



**TESTS AND REQUIREMENTS**

Table 7

TEST	TEST METHOD	PROCEDURE	REQUIREMENTS
Short Time Overload	IEC 60115-1 8.1	5 times of rated power for 5 seconds at room temperature	±(1%+0.0005 Ω) No visible damage
High Temperature Exposure	MIL-STD-202 method 108 IEC 60068-2-2	1,000 hours at maximum operating temperature depending on specification, unpowered,	±(1%+0.0005 Ω)
Temperature Cycling	JESD22-A104	-55/+155°C, 1000 cycles Dwell time is 15 minutes. Devices mounted Air – Air.	±(1%+0.0005 Ω)
Biased Humidity	MIL-STD-202 method 103	1,000 hours; 85 °C / 85% RH 10% of operating power	±(1%+0.0005 Ω)
Life/ Operational Life/ Endurance	MIL-STD-202 method 108 IEC 60115-1 7.1	1,000 hours at 70 °C applied rated power 1.5 hours on, 0.5 hour off, still air required	±(1%+0.0005 Ω)
Resistance to Soldering Heat	MIL-STD-202 method 210	Specimen passed 3 times reflow temperature at 260°C, with solder.	±(0.5%+0.0005 Ω) No visible damage
Board Flex / Bending	AEC-Q200-005	Chips mounted on a glass epoxy resin PCB (FR4) Bending: 2 mm Holding time: minimum 60 seconds	±(1%+0.0005 Ω)
Vibration	MIL-STD-202 method 204	5 g's for 20 min., 12 cycles each of 3 orientations Test from 10-2000 Hz	±(1%+0.0005 Ω)

**REVISION HISTORY**

<b>REVISION</b>	<b>DATE</b>	<b>CHANGE NOTIFICATION</b>	<b>DESCRIPTION</b>
Version 2	Oct. 11, 2024	-	- Range extension to 3mR
Version 1	Jul. 16, 2024	-	- Range extension to 0.2mR
Version 0	May 31, 2024	-	- First issue of this specification



## LEGAL DISCLAIMER

YAGEO, its distributors and agents (collectively, "YAGEO"), hereby disclaims any and all liabilities for any errors, inaccuracies or incompleteness contained in any product related information, including but not limited to product specifications, datasheets, pictures and/or graphics. YAGEO may make changes, modifications and/or improvements to product related information at any time and without notice.

YAGEO makes no representation, warranty, and/or guarantee about the fitness of its products for any particular purpose or the continuing production of any of its products. To the maximum extent permitted by law, YAGEO disclaims (i) any and all liability arising out of the application or use of any YAGEO product, (ii) any and all liability, including without limitation special, consequential or incidental damages, and (iii) any and all implied warranties, including warranties of fitness for a particular purpose, non-infringement and merchantability.

YAGEO products are designed for general purpose applications under normal operation and usage conditions. Please contact YAGEO for the applications listed below which require especially high reliability for the prevention of defects which might directly cause damage to the third party's life, body or property: Aerospace equipment (artificial satellite, rocket, etc.), Atomic energy-related equipment, Aviation equipment, Disaster prevention equipment, crime prevention equipment, Electric heating apparatus, burning equipment, Highly public information network equipment, data-processing equipment, Medical devices, Military equipment, Power generation control equipment, Safety equipment, Traffic signal equipment, Transportation equipment and Undersea equipment, or for any other application or use in which the failure of YAGEO products could result in personal injury or death, or serious property damage. Particularly **YAGEO Corporation and its affiliates do not recommend the use of commercial or automotive grade products for high reliability applications or manned space flight.**

Information provided here is intended to indicate product specifications only. YAGEO reserves all the rights for revising this content without further notification, as long as products are unchanged. Any product change will be announced by PCN.