Innovative Service Around the Globe YAGEO

DATA SHEET

SHUNT RESISTOR
AUTOMOTIVE GRADE

PU Series

1%, 5%

sizes 1216

RoHS Compliant & Halogen Free

YAGEO

Product specification – October 11, 2024 V.2

SCOPE

This specification describes shunt resistor PU1216 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

PU1216	X	X	X	XX	XXXX	L
	(1)	(2)	(3)	(4)	(5)	(6)

(1) TOLERANCE

F = ±1%

J = ±5%

(2) PACKAGING TYPE

K = Embossed taping reel

(3) TEMPERATURE COEFFICIENT OF RESISTANCE

E = ±50ppm/°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 PU1216 5W chip resistor, TCR 50 ppm/°C value 0.0005Ω(0.5mR) with ±1% tolerance, supplied in 13-inch tape reel with 3Kpcs quantify is: PU1216FKEP50U5L.

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:

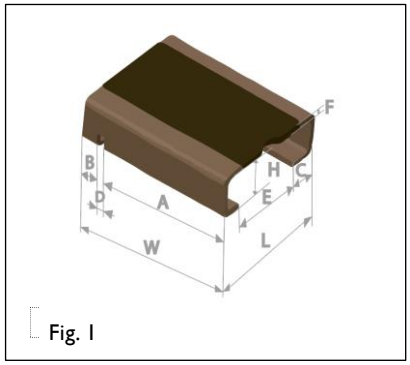

Fig. 1

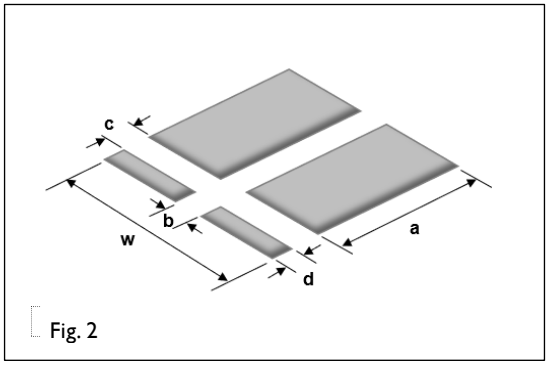

Fig. 2

0.2mohm-marking 0M20

1mohm-marking R001

TAPING REEL & POWER

Table 1

TYPE	DIMENSIONS (MILLIMETERS)							
	L	W	H	A	B	C	D	E
PU1216	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
PU1216	3.6	2.95	0.6	0.5	0.7

Table 2

TYPE	RESISTANCE VALUE (mΩ)	F (MM)
PU1216	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.
PU1216	12	330.0±2.0	100.0±1.0	13.50±0.5	21.0±0.8	12.4+2/-0	18.4

OUTLINES

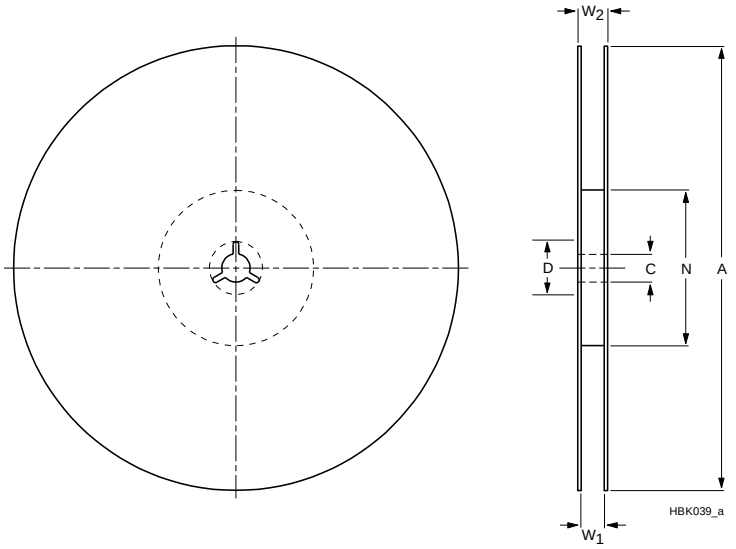

Fig. 3 Reel

DIMENSIONS

Table 4

DIMENSION	A_0 (mm)	B_0 (mm)	W MAX. (mm)	E (mm)	F (mm)	P_0 (mm)	P_1 (mm)	P_2 (mm)	D_0 (mm)	D_1 (mm)	T MAX.
PU1216	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

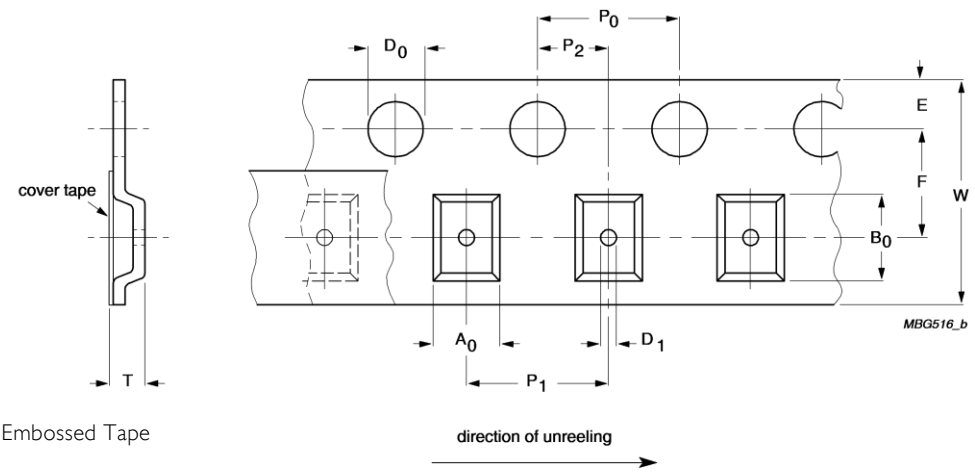

Fig. 4 Embossed Tape

PACKING METHOD

Leader/trailer tape specification

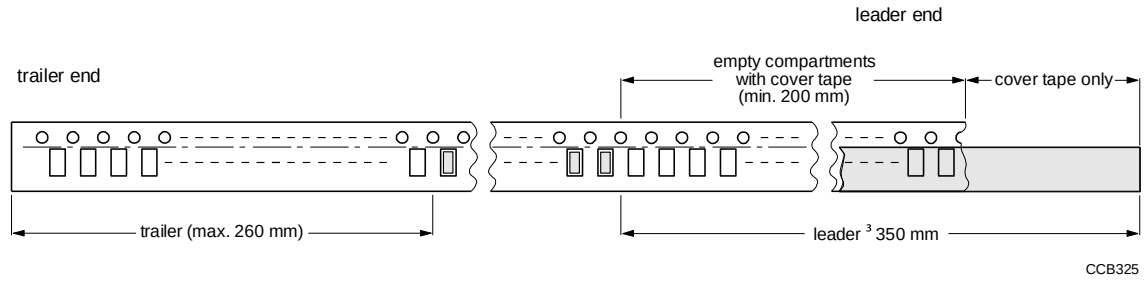

Fig. 5

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

1. 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 RATIING

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:

$U=\sqrt{(PxR)}$

Where

U=Continuous rated DC

or AC (rms) working voltage (V)

P=Rated power

R=Resistance value (Ω)

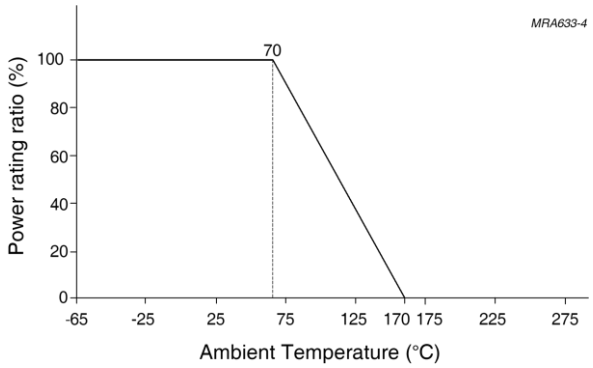

Fig. 5 Maximum dissipation (P_{max}) in percentage of rated power as a function of the operating ambient temperature ($T_{amb.}$)

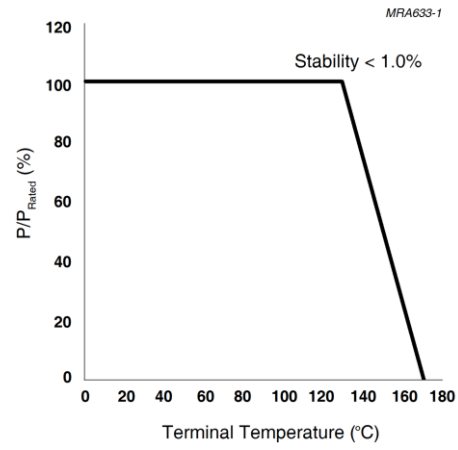

Fig. 6 Stability Performance

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

REVISION	DATE	CHANGE NOTIFICATION	DESCRIPTION
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

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