Innovative Service Around the Globe YAGEO

DATA SHEET

CURRENT SENSOR - LOW TCR AUTOMOTIVE GRADE

PA Series

1%, 5%

SIZE 1206 2512

ROHS COMPLIANT & HALOGEN FREE

YAGEO

Product specification– July 21 2025 V. 1



SCOPE

This specification describes PA1206 series chip resistors.

APPLICATIONS

- Power supplies
- Consumer(Mobile、PNDs)
- Laptop
- HDDs
- Automotive

FEATURES

- AEC-Q200 qualified
- Halogen Free Epoxy
- RoHS compliant
- Reduce environmentally hazardous wastes
- High component and equipment reliability with high power rating.
- Non-forbidden materials used in products/production
- Products with lead free terminations meet RoHS requirements.
- Low resistance and narrow tolerance can suitable for current detection.
- Low thermal EMF
- Moisture sensitivity level : MSL 1

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

PA	XXXX	X	X	X	XX	XXXXX	Z
	(1)	(2)	(3)	(4)	(5)	(6)	(7)

(1) SIZE

1206, 2512

(2) TOLERANCE

F = ±1%

J = ±5%

(3) PACKAGING TYPE

R = Paper taping reel

K = Embossed taping reel

(4) TEMPERATURE COEFFICIENT OF RESISTANCE

M= ±75ppm/°C

L = ±150ppm/°C

(5) TAPING REEL

07 / 7W / 7T / 67 = 7 inch dia. Reel and specific rated power

Detailed power rating are shown in the Table 2.

(6) RESISTANCE VALUE

0U3 (0.3mΩ)

0U5 (0.5mΩ)

(7) DEFAULT CODE

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

Resistance rule of global part number

Resistance code rule	Example
0U5	0U5 = 0.0005 mΩ

ORDERING EXAMPLE

The ordering code for a PA1206 1.5W chip resistor, 75 ppm/°C value 0.0005Ω (0.5mΩ) with ±1% tolerance, supplied in 7-inch tape reel with 4Kpcs quantify is: PA1206FRM670U5Z

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.

MARKING

PA1206



Fig. 1 Value=0.5mΩ

No Marking

PA2512



Fig. 2 Value=0.3mΩ

4 digits The "m" is used as a decimal point; the other 3 digits are significant and the unit is milliohm PA2512: 0.3mΩ

CONSTRUCTION

The resistors are constructed using outstanding TCR level material, which makes Yageo PA resistors excellent for current sensing application in battery charger circuit & DC-DC converter.

The composition of the resistive material is adjusted to give the approximate required resistance and is covered with a protective coating. Marking is printed on the top side of the resistor.

Finally, the three external terminations (Cu / Ni / matte Tin) are added, as shown in Fig. 2.

Outlines

For dimensions, please refer to Table 1

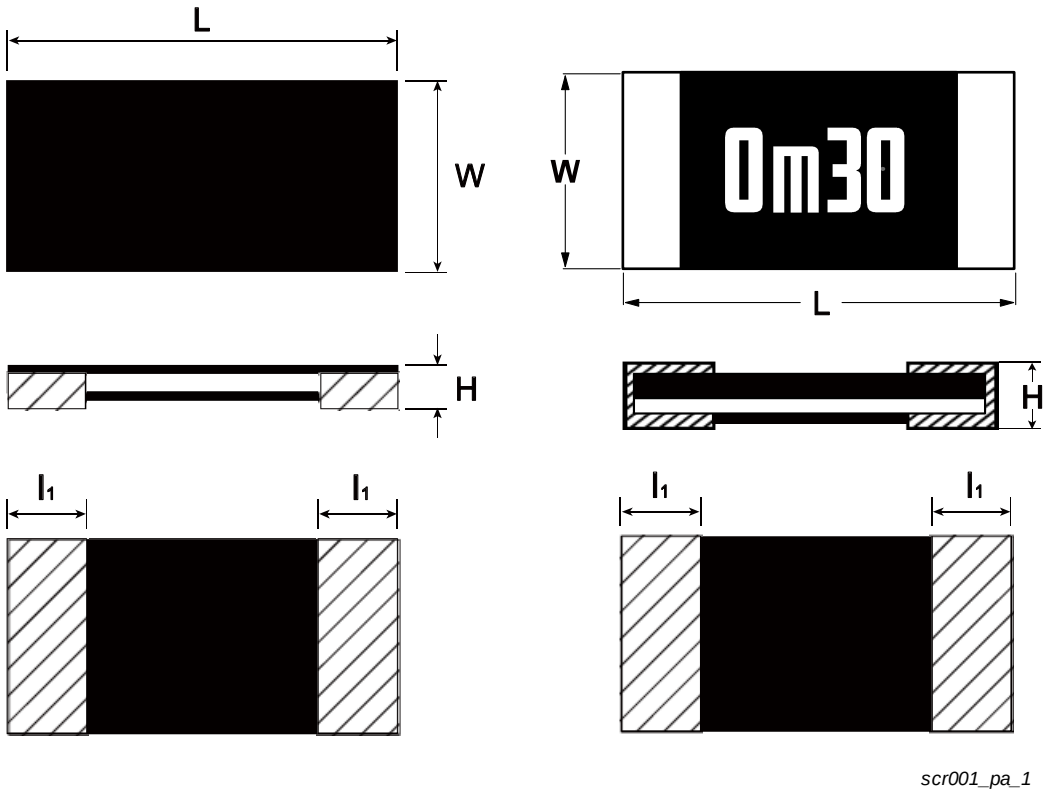


Fig. 2 Chip resistor outlines

DIMENSION

Table 1 For outlines, please refer to Fig. 2

TYPE	RESISTANCE RANGE	L (mm)	W (mm)	H (mm)	I_1 (mm)
PA1206	0.5mΩ	3.20±0.25	1.60±0.25	0.73±0.25	1.05±0.25
PA2512	0.3mΩ / 0.5mΩ	6.35±0.25	3.18±0.25	0.60±0.25	2.72±0.25

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 @70°C				TOLERANCE	RESISTANCE RANGE	TEMPERATURE COEFFICIENT OF RESISTANCE
		07	7W	7T	67			
PA	1206	--	--	--	1.5W	±1%(F), ±5%(J)	0.5 mΩ	±75ppm/°C(M) ±150ppm/°C(L)
PA	2512	1W	2W	3W	--	±1%(F), ±5%(J)	0.3 mΩ	±150ppm/°C(L)
		--	--	3W	--	±1%(F), ±5%(J)	0.5 mΩ	±75ppm/°C(M)

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

FUNCTIONAL DESCRIPTION

OPERATING TEMPERATURE RANGE

PA1206, PA2512 Range: –55°C to +170°C

POWER RATING

Standard rated power at 110°C:

For detail power value, please refer to Table 2.

RATED VOLTAGE

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

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

Where

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

P = Rated power (W)

R = Resistance value (Ω)

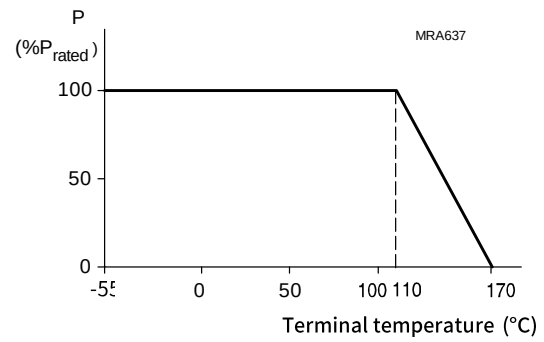


Fig. 3 Maximum dissipation (P_{max}) in percentage of rated power as a function of the operating terminal temperature (Ter.)

PACKING STYLE AND PACKAGING QUANTITY

Table 3 Packing style and packaging quantity

PACKING STYLE	REEL DIMENSION	PA1206	PA2512
Paper Taping Reel (R)	7" (178 mm)	4,000	-
Embossed Taping Reel (K)	7" (178 mm)	-	4,000

PAPER TAPE

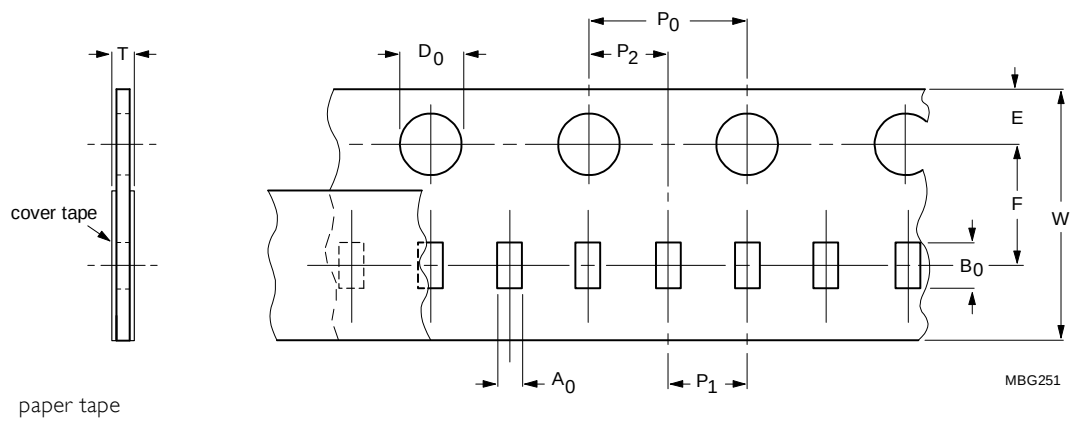


Fig. 4 paper tape

EMBOSSED TAPE

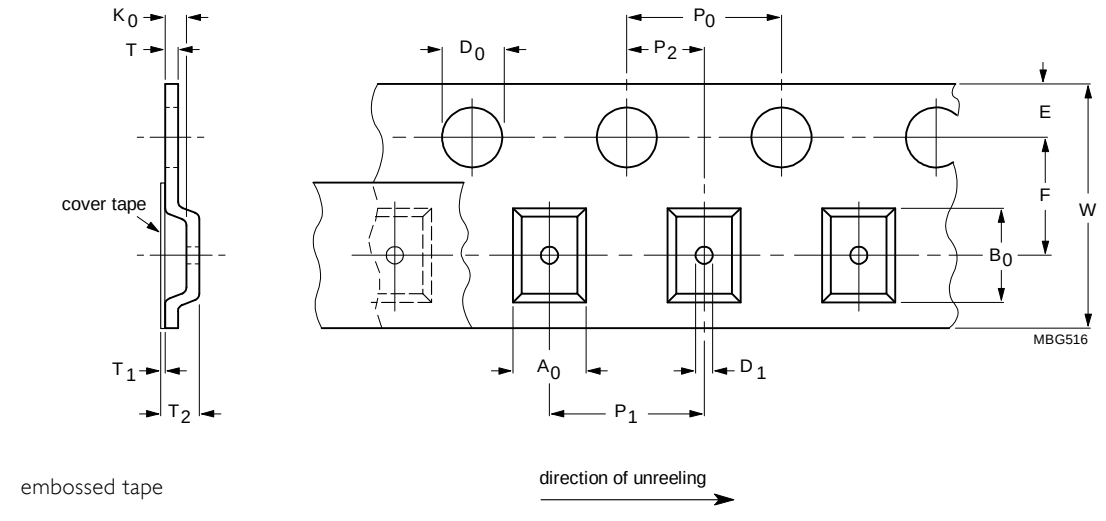


Fig. 5 embossed tape

Table 4 Dimensions of paper tape and embossed tape for relevant chip resistors size

SIZE	SYMBOL										
	A_0	B_0	W	E	F	P_0	P_1	P_2	$\varnothing D_0$	$\varnothing D_1$	T
PA1206	1.90±0.10	3.50±0.10	8.00±0.30	1.75±0.10	3.50±0.10	4.00±0.10	4.00±0.10	2.00±0.10	1.55±0.10	-	0.85±0.15
PA2512	3.55±0.15	6.80±0.15	12.0±0.30	1.75±0.10	5.50±0.10	4.00±0.10	4.00±0.10	2.00±0.10	1.55±0.10	1.50±0.10	1.15±0.15

REEL SPECIFICATION

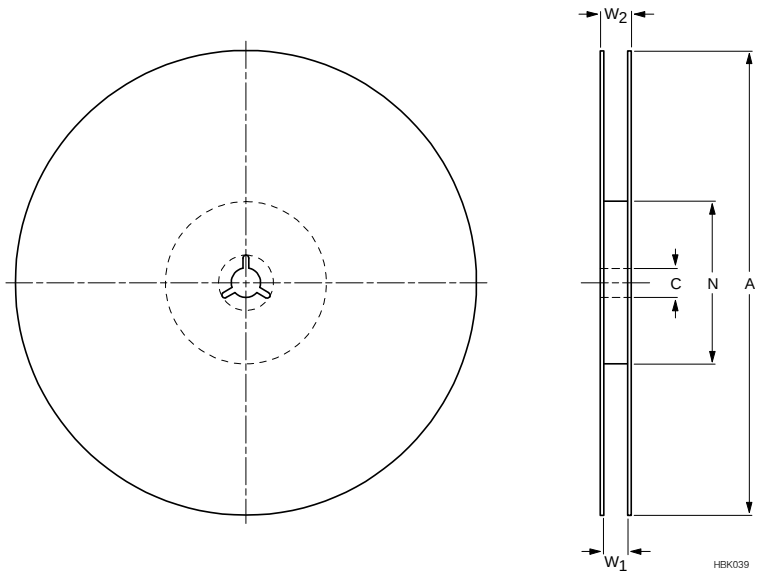


Fig. 6 Reel

Table 5 Dimensions of reel specification for relevant chip resistors size

SIZE	QUANTITY PER REEL	REEL SIZE 8 mm TAPE WIDE	REEL SIZE 12 mm TAPE WIDE	SYMBOL A	N	C	D	W_1	$W_{2\ MAX.}$	Unit: mm
PA1206	4,000	7" (Ø178 mm)	-	178.0±1.0	60.0+1/-0	13.50±0.5	21.0±0.8	9.0±0.5	13.6	
PA2512	4,000	-	7" (Ø178 mm)	178.0±1.0	60.0+1/-0	13.50±0.5	21.0±0.8	13.6±0.5	17.0	

LEADER/TRAILER TAPE SPECIFICATION

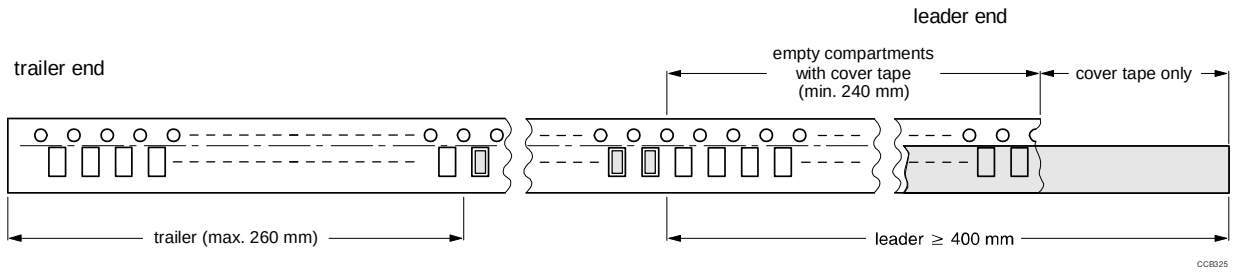


Fig. 7 Leader/Trailer Tape

FOOTPRINT AND SOLDERING PROFILES

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

FOOTPRINT

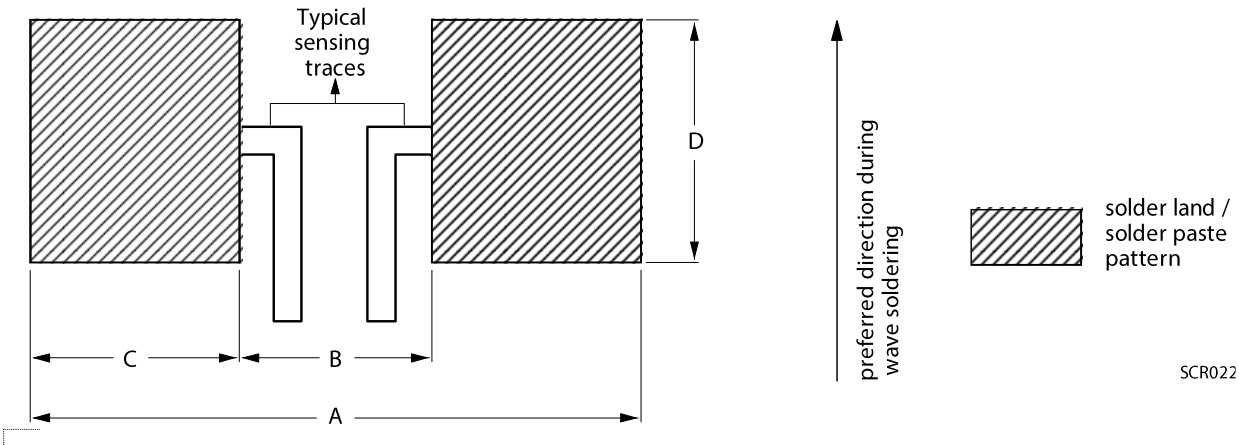


Fig. 8 Single resistor chips recommended dimensions of footprints

Table 6 Footprint dimensions

Unit: mm

SIZE	RESISTANCE RANGE	A	B	C	D
PA1206	0.5mΩ	3.90	0.90	1.50	1.78
PA2512	0.3mΩ / 0.5mΩ	7.46	0.60	3.43	3.68

TESTS AND REQUIREMENTS

Table 7 Test condition, procedure and requirements

TEST	TEST METHOD	PROCEDURE	REQUIREMENT
Short time overload	IEC60115-1 4.13	5 times of rated power for 5 seconds at room temperature	±(1%+0.0005Ω)
High Temperature Exposure/ Endurance at Upper Category Temperature	AEC -Q200 Test 3 MIL-STD-202G-Method 108	1,000 hours at maximum operating temperature depending on specification, unpowered No direct impingement of forced air to the parts Tolerances: 170±3°C	±(1.0%+0.0005Ω)
Temperature Cycling	AEC -Q200 Test 4 JESD22-A104	-55/+155°C, 1000 cycles Dwell time is 15 minutes. Devices mounted Air – Air.	±(1%+0.0005Ω)
Biased Humidity	AEC -Q200 Test 7 MIL-STD-202 Method 103	1,000 hours; 85°C / 85% RH 10% of operating power	±(1%+0.0005Ω)
Life	AEC -Q200 Test 8 MIL-STD-202-Method 108	1,000 hours at terminal temperature 110 °C applied rated power 1.5 hours on, 0.5 hour off	±(1.0%+0.0005Ω)
Resistance to Solvents	AEC -Q200 Test 12 MIL-STD-202 Method 215	Immerse in isopropyl alcohol for 5 min with ultrasonic at room temperature	No Visible damage
Mechanical Shock	AEC -Q200 Test 13 MIL-STD-202 Method 213	Three shocks in each direction, applied along the three mutually perpendicular axes of the test specimen (18 shocks) Peak value: 100 g's Duration: 6 ms Velocity change: 12.3 ft/s Waveform: Half sine	±(0.5%+0.0005Ω)
Vibration	AEC -Q200 Test 14 MIL-STD-202 Method 204	5 g's for 20 min., 12 cycles each of 3 orientations Test from 10-2000 Hz.	±(0.5%+0.0005Ω)
Resistance to Soldering Heat	AEC -Q200 Test 15 MIL-STD-202 Method 210	Specimen passed 3 times reflow temperature at 260°C, with solder	±(0.5%+0.0005Ω) No visible damage
Electrostatic Discharge	AEC -Q200 Test 17 AEC-Q200-002	Test voltage 2KV, HBM mode, 150pF @2KΩ I+ and I-	±(1.0%+0.0005Ω) No visible damage
Solderability - Wetting	AEC -Q200 Test 18 J-STD-002	(1) Baking 4 hours at 155°C dry heat, dipping at 245±3°C for 5±0.5 seconds. (2) Baking 4 hours at 155°C dry heat, dipping at 260±3°C for 30±0.5 seconds.	Well tinned (>95% covered) No visible damage

TEST	TEST METHOD	PROCEDURE	REQUIREMENT
Flammability	AEC -Q200 Test 20 UL94	Try to inflame a specimen by a needle flame	No ignition of specimen; V-0
Board Flex / Bending	AEC -Q200 Test 21 AEC-Q200-005	Chips mounted on a glass epoxy resin PCB (FR4), Bending 2 mm for 60+5 seconds	±(1.0%+0.0005Ω)
Terminal Strength (SMD)	AEC -Q200 Test 22 AEC-Q200-006	Applied a 17.7N (1.8Kg) for 60±1 seconds.	±(1.0%+0.0005Ω) No visible damage
Flame Retardance	AEC -Q200 Test 24 AEC-Q200-001	Only requested, when voltage/power will increase the surface Temp. to 350°C	No flame, no explosion
Temperature Coefficient of Resistance (T.C.R.)	MIL-STD-202 Method 304 IEC 60115-1 4.8	At +25/+125°C Formula: $T.C.R= \frac{R_2 - R_1}{R1(t_2 - t_1)} \times 10^6 (ppm/°C)$ Where t1=+25°C or specified room temperature t2=+125°C test temperature R1=resistance at reference temperature in ohms R2=resistance at test temperature in ohms	Refer to table 2
Flower-of-Sulfur (FOS)	Modified ASTM B809-95	Sulfur 105°C, 750 hours, unpowered.	±(1.0%+0.0005Ω)

REVISION HISTORY

REVISION	DATE	CHANGE NOTIFICATION	DESCRIPTION
Version 1	Jul. 21 2025		- Extend resistor value
Version 0	Jun. 16, 2025		- First issue of this specification

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