Innovative Service Around the Globe YAGEO

DATA SHEET

CURRENT SENSOR - LOW TCR
AUTOMOTIVE GRADE

PA1206_L series

5%, 1%

RoHS compliant & Halogen free

YAGEO

Product specification – April 26, 2021 V.0

SCOPE

This specification describes PA1206 series chip resistors with RoHS compliant.

APPLICATIONS

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

FEATURES

- AEC-Q200 qualified
- Total lead free without RoHS exemption
- Halogen-free Epoxy
- RoHS compliant
- Reduce environmentally hazardous wastes
- High component and equipment reliability
- Non-forbidden materials used in products/production
- Low resistances applied to current sensing
- Low thermal EMF
- Moisture sensitivity level: MSL1

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	XXXX	L
	(1)	(2)	(3)	(4)	(5)	(6)	(7)

(1) SIZE

1206

(2) TOLERANCE

F = ±1%

J = ±5%

(3) PACKAGING TYPE

K = Embossed taping reel

(4) TEMPERATURE COEFFICIENT OF RESISTANCE

L = ± 150ppm/°C

(5) TAPING REEL

07 = 7 inch dia. Reel & standard power (1/4W)

7W = 7 inch dia. Reel & 2 x standard power (1/2W)

47 = 7 inch dia. Reel & 4 x standard power (1W)

67 = 7 inch dia. Reel & 6 x standard power (1.5W)

(6) RESISTANCE VALUE

0U5(0.5mR) and 0U6(0.6mR)

(7) DEFAULT CODE

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

ORDERING EXAMPLE

The ordering code of a PA1206 1/2W chip resistor, TC150, value 0.0005Ω with ±1% tolerance, supplied in 7-inch tape reel with 2Kpcs quantify is: PA1206FKL7W0U5L

NOTE

1. All our RChip products are RoHS compliant and Halogen Free. "LFP" of the internal 2D reel label mentions "Lead-Free Process"
2. On customized label, “LPF” or specific symbol can be printed.

MARKING

PA1206

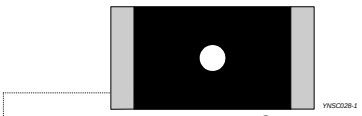

Fig. 1 Value = 0.5 mΩ

1 digit
For PA1206 0.5mΩ and 0.6mΩ

CONSTRUCTION

The composition of the resistive material is adjusted to give the approximate required resistance and is covered with a protective coat.

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

Outlines

For dimensions, please refer to Table 1

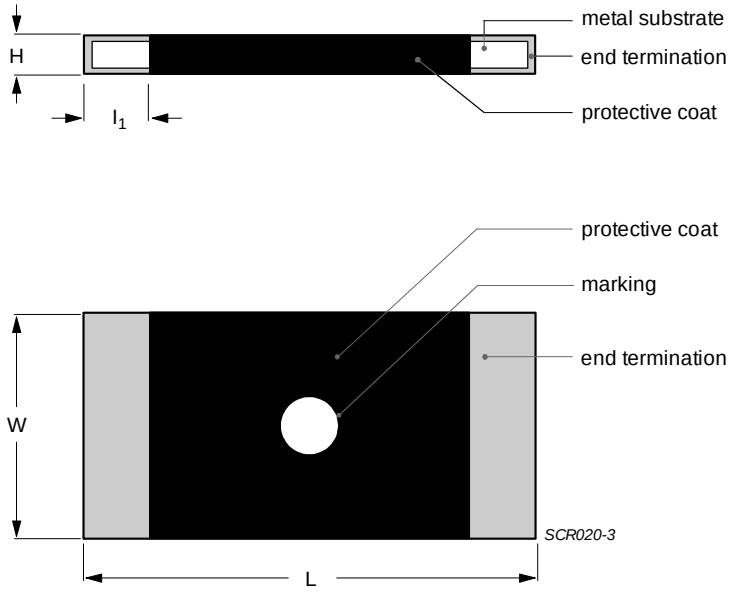

Fig. 2 Chip resistor outlines

DIMENSION

Table 1 For outlines, please refer to Fig. 2

TYPE	L (mm)	W (mm)	H (mm)	I_1 (mm)
PA1206	3.20 ± 0.25	1.60±0.25	1.15±0.25	0.73±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[4]	TOLERANCE[2]	RESISTANCE RANGE	TEMPERATURE COEFFICIENT OF RESISTANCE[3]
PA	1206	1/4W (07) 1/2W (7W) 1W (47) 1.5W (67)	±1% (F) ±5% (J)	0.5mΩ/ 0.6mΩ	150ppm/°C (L)

Note: 1. Please contact with sales offices, distributors and representatives in your region before ordering.
2. Global part number (code7)
3. Global part number (code 9)
4. Global part number (code 10-11)

FUNCTIONAL DESCRIPTION

OPERATING TEMPERATURE RANGE

PA1206 Range: –55°C to +170°C

POWER RATING

Standard rated power at 70°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:

$$V = \sqrt{(PxR)}$$

Where

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

P = Rated power (W)

R = Resistance value (Ω)

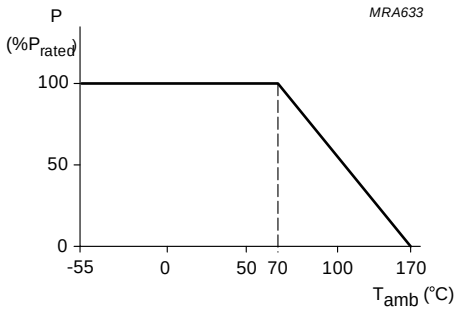

Fig. 3 Maximum dissipation (P_{max}) in percentage of rated power as a function of the operating ambient temperature (T_{amb})

PACKING STYLE AND PACKAGING QUANTITY

Table 3 Packing style and packaging quantity

PACKING STYLE	REEL DIMENSION	PA1206
Embossed taping reel (k)	7" (178 mm)	2,000

EMBOSSED TAPE

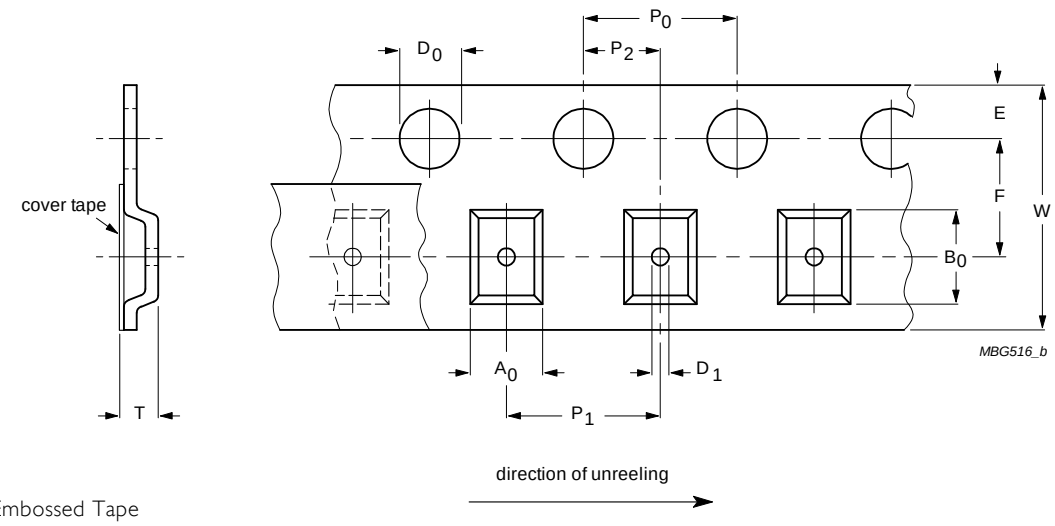

Fig. 4 Embossed Tape

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	$\varnothing D_0$	$\varnothing D_1$	T
PA1206	1.95± 0.10	3.50± 0.10	8.00± 0.20	1.75± 0.10	3.50± 0.05	4.00±0.05	4.00±0.10	2.00±0.05	1.50+0.10	1.00±0.10	1.74± 0.10

REEL SPECIFICATION

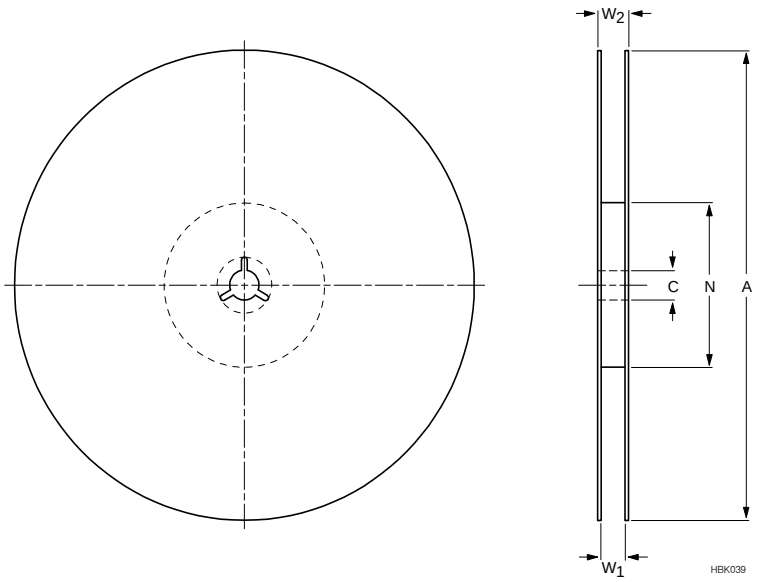

Fig. 5 Reel

Table 5 Dimensions of reel specification for relevant chip resistors size

Unit: mm

SIZE	QUANTITY PER REEL	REEL SIZE		SYMBOL					
		8 mm TAPE WIDE	12 mm TAPE WIDE	A	N	C	D	W_1	$W_{2\ MAX.}$
PA1206	2000	7" (Ø178 mm)	--	180.0+0/-3	60.0+1/-0	13.0± 0.2	21.0±0.8	8.4 +1/-0	12.4

LEADER/TRAILER TAPE SPECIFICATION

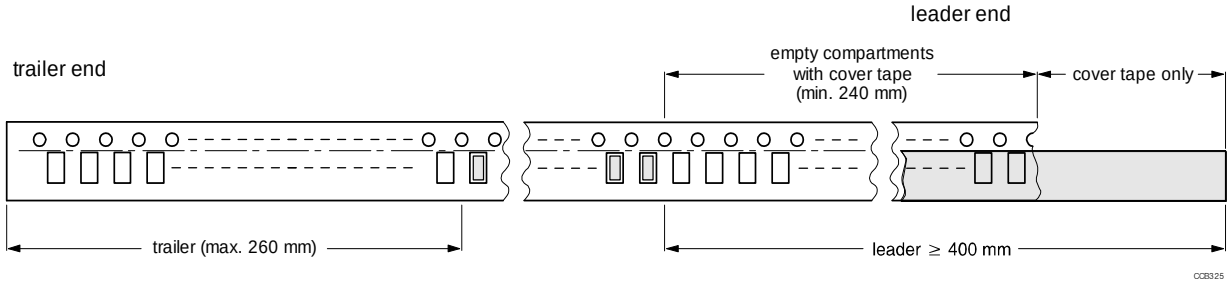

Fig. 6 Leader/Trailer Tape

FOOTPRINT AND SOLDERING PROFILES

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

FOOTPRINT

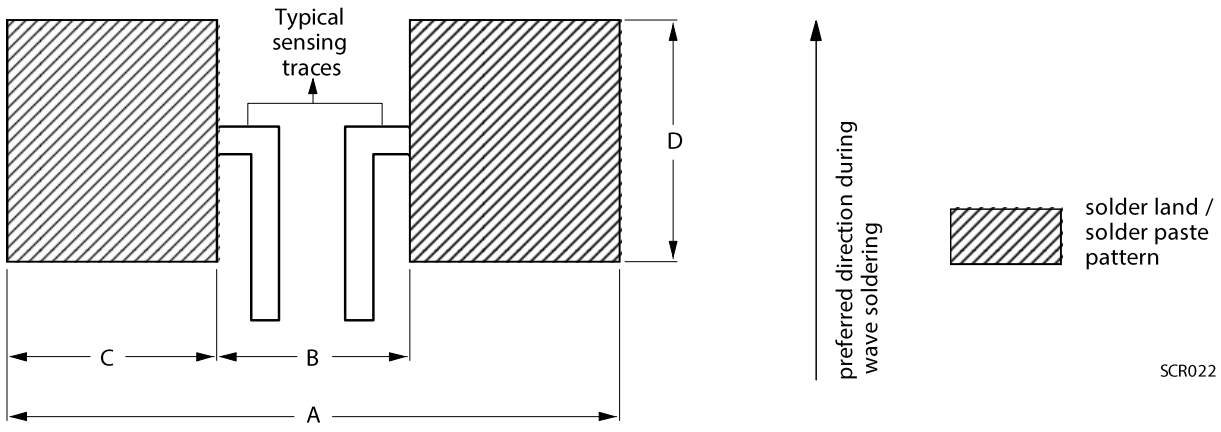

Fig. 7 Single resistor chips recommended dimensions of footprints

Table 6 Footprint dimensions

Unit: mm

SIZE	A	B	C	D
PA1206	4.20	0.90	1.65	2.18

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	±0.5%+0.0005Ω No visible damage
High Temperature Exposure	MIL-STD-202-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	JESD22-A104C	1,000 cycles, -55/+125°C for 1 cycle per hour	±1.0%+0.0005Ω
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	±0.5%+0.0005Ω
Biased Humidity	MIL-STD-202 Method 103	1,000 hours; 85°C / 85% RH 10% of operating power	±1.0%+0.0005Ω
Operational Life/ Endurance	MIL-STD-202-Method 108 IEC 60115-1 4.25.1	1,000 hours at 125±3°C, applied de-rated power 1.5 hours on, 0.5 hour off, still-air required	±1.0%+0.0005Ω
		1,000 hours at 70±2°C applied rated power 1.5 hours on, 0.5 hour off, still air required	±1.0%+0.0005Ω
Resistance to Solvents	MIL-STD-202 Method 215	Immerse in isopropyl alcohol for 5 min with ultrasonic at room temperature	No Visible damage
Mechanical Shock	MIL-STD-202 Method 213	Three shocks in each direction shall be applied along the three mutually perpendicular axes of the test specimen. Peak value: 100 g's Duration: 6 ms Velocity change: 12.3 ft/s Waveform: Half sine	±0.5%+0.0005Ω
Vibration	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	IEC60115-14.18 & IEC60068-2-58	Specimen passed 3 times reflow temperature at 260+0/-5°C, with solder	±0.5%+0.0005Ω No visible damage
Thermal Shock	MIL-STD-202 Method 107	-55/+125°C, Number of cycles is 300. Devices mounted. Maximum transfer time is 20 seconds. Dwell time is 15 minutes. Air -Air	±0.5%+0.0005Ω No visible damage

TEST	TEST METHOD	PROCEDURE	REQUIREMENT
Electrostatic Discharge	AEC-Q200-002	Human Body Model, 1 pos + 1 neg. Discharges 1206=2KV	±1.0%+0.0005Ω No visible damage
Solderability - Wetting	IPC/JEDEC J-STD-002	(a) Baking 4 hours at 155°C dry heat, dipping at 235±3°C for 5±0.5 seconds. (b) Steam aging 8 hours, dipping at 215±3°C for 5±0.5 seconds. (c) Steam aging 8 hours, dipping at 260±3 °C for 30±0.5 seconds.	Well tinned (>95% covered) No visible damage
Flammability	UL94	Try to inflame a specimen by a needle flame	No ignition of specimen; V-0
Board Flex / Bending	AEC-Q200-005	Chips mounted on a 90mm glass epoxy resin PCB FR4, Bending for 1206=2 mm Holding time: Min.60 seconds	±1.0%+0.0005Ω
Terminal Strength SMD	AEC-Q200-006	Applied a 17.7N 1.8Kg for 60±1 seconds.	±1.0%+0.0005Ω No visible damage
Flame Retardance	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	At +25/+150°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=+150°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 0	Apr. 26, 2021	-	- New datasheet for automotive grade current sensor – PA1206_L 0.5mΩ & 0.6mΩ.