

DATA SHEET

**CURRENT SENSOR - LOW TCR
AUTOMOTIVE GRADE**

PA1206_L series

5%, 1%

RoHS compliant & Halogen free



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 = $\pm 1\%$

J = $\pm 5\%$

(3) PACKAGING TYPE

K = Embossed taping reel

(4) TEMPERATURE COEFFICIENT OF RESISTANCE

L = $\pm 150\text{ppm}/^{\circ}\text{C}$

(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

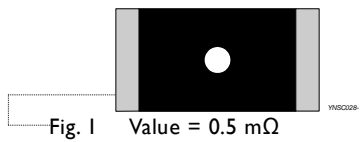
Letter L is the system default code for ordering only. (Note)

ORDERING EXAMPLE

The ordering code of a PA1206 1/2W chip resistor, TC150, value 0.0005 Ω with $\pm 1\%$ 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, "LFP" or specific symbol can be printed.

MARKING**PA1206**

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

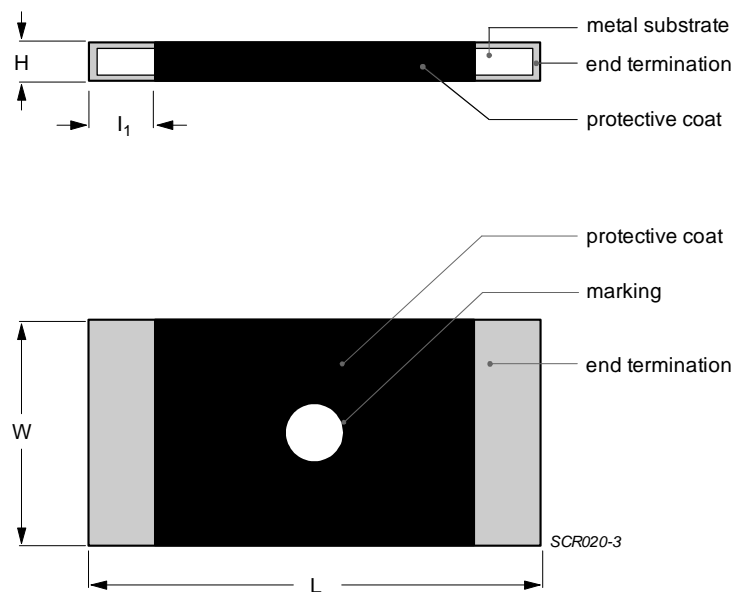


Fig. 2 Chip resistor outlines

DIMENSION

Table 1 For outlines, please refer to Fig. 2

TYPE	L (mm)	W (mm)	H (mm)	l 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)	±1% (F)	0.5mΩ/ 0.6mΩ	150ppm/°C (L)
		1W (47)	±5% (J)		
		1.5W (67)			

Note: 1. Please contact with sales offices, distributors and representatives in your region before ordering.

2. Global part number (code 7)
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:

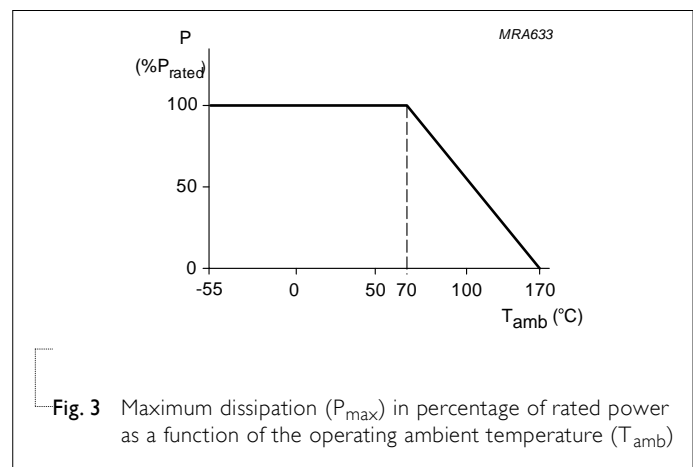
$$V = \sqrt{P \times R}$$

Where

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

P = Rated power (W)

R = Resistance value (Ω)



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

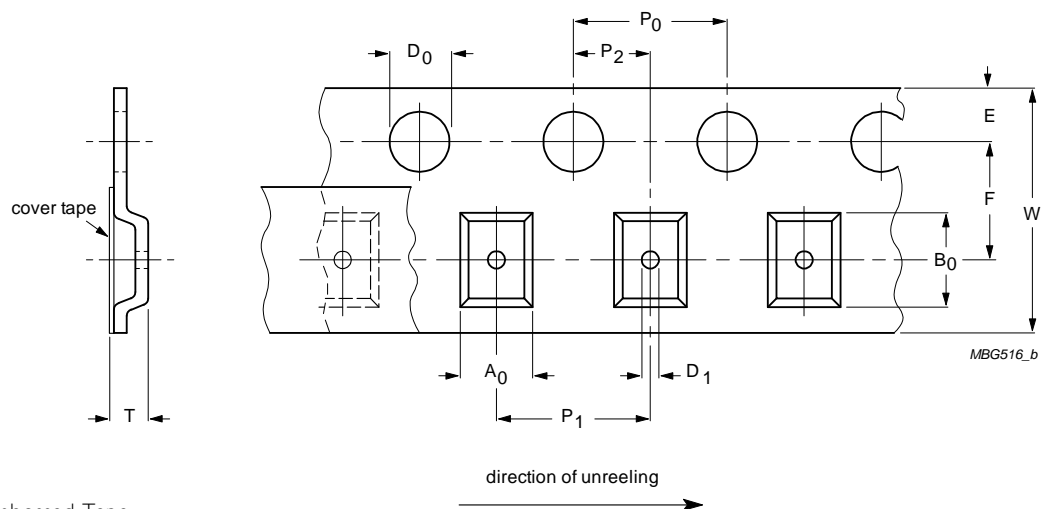
EMBOSSED TAPE

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	ØD ₀	ØD ₁	
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

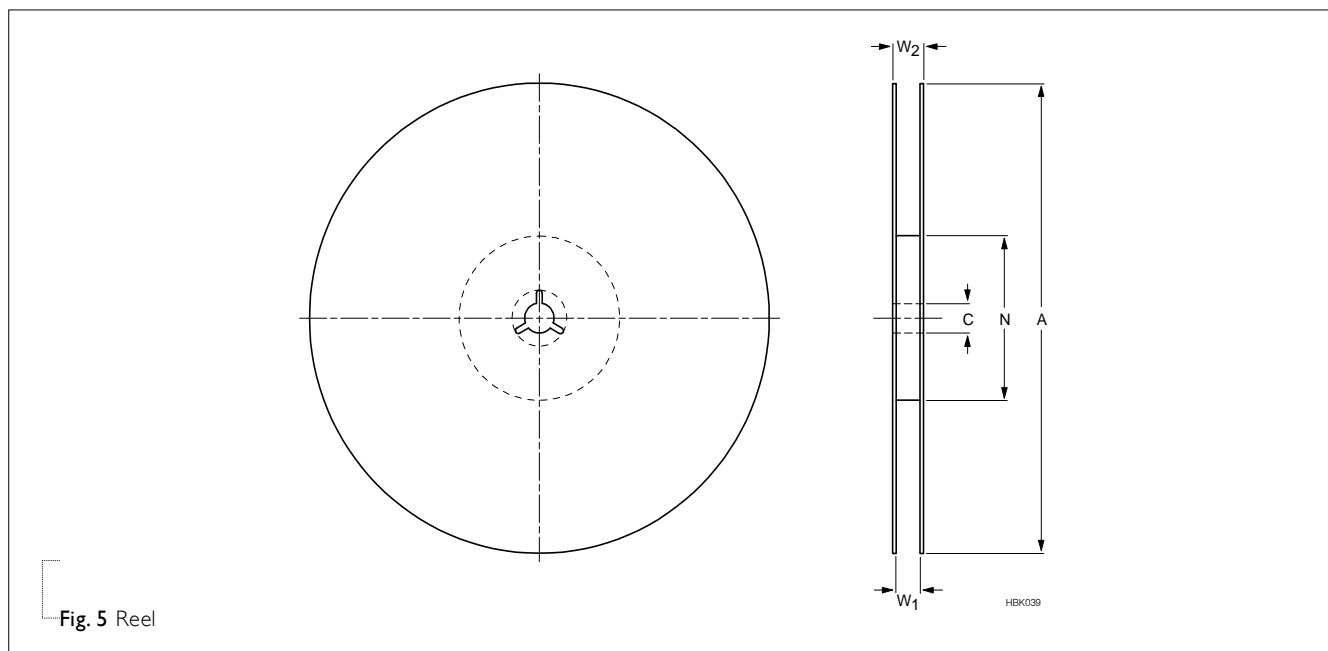
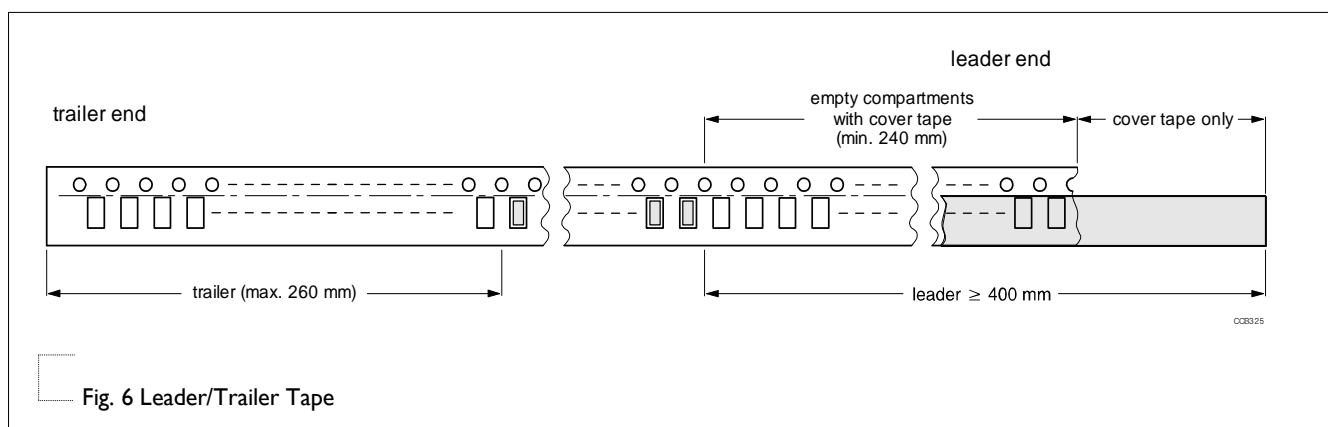


Table 5 Dimensions of reel specification for relevant chip resistors size

SIZE	QUANTITY PER REEL	REEL SIZE		SYMBOL				Unit: mm	
		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



FOOTPRINT AND SOLDERING PROFILES

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

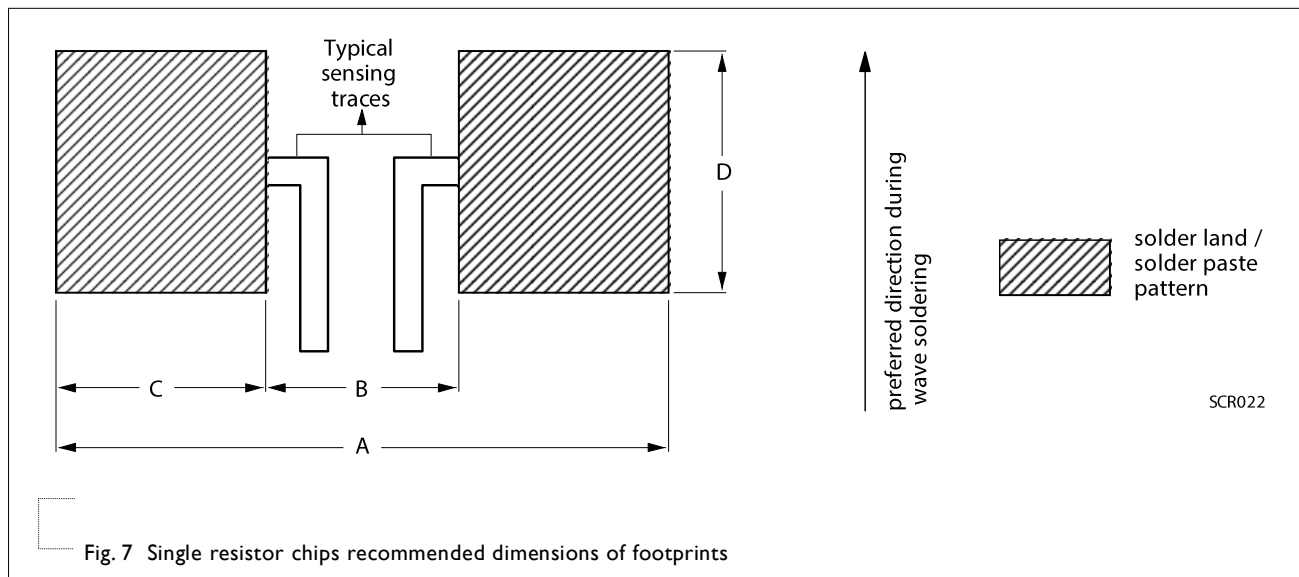
FOOTPRINT

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	$\pm 0.5\% + 0.0005\Omega$ 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: $170 \pm 3^\circ\text{C}$	$\pm 1.0\% + 0.0005\Omega$
Temperature Cycling	JESD22-A104C	1,000 cycles, $-55/+125^\circ\text{C}$ for 1 cycle per hour	$\pm 1.0\% + 0.0005\Omega$
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	$\pm 0.5\% + 0.0005\Omega$
Biased Humidity	MIL-STD-202 Method 103	1,000 hours; 85°C / 85% RH 10% of operating power	$\pm 1.0\% + 0.0005\Omega$
Operational Life/ Endurance	MIL-STD-202-Method 108 IEC 60115-1 4.25.1	1,000 hours at $125 \pm 3^\circ\text{C}$, applied de-rated power 1.5 hours on, 0.5 hour off, still-air required	$\pm 1.0\% + 0.0005\Omega$
		1,000 hours at $70 \pm 2^\circ\text{C}$ applied rated power 1.5 hours on, 0.5 hour off, still air required	$\pm 1.0\% + 0.0005\Omega$
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	$\pm 0.5\% + 0.0005\Omega$
Vibration	MIL-STD-202 Method 204	5 g's for 20 min., 12 cycles each of 3 orientations Test from 10-2000 Hz.	$\pm 0.5\% + 0.0005\Omega$
Resistance to Soldering Heat	IEC60115-14.18 & IEC60068-2-58	Specimen passed 3 times reflow temperature at $260 \pm 0/-5^\circ\text{C}$, with solder	$\pm 0.5\% + 0.0005\Omega$ No visible damage
Thermal Shock	MIL-STD-202 Method 107	$-55/+125^\circ\text{C}$, Number of cycles is 300. Devices mounted. Maximum transfer time is 20 seconds. Dwell time is 15 minutes. Air -Air	$\pm 0.5\% + 0.0005\Omega$ No visible damage

TEST	TEST METHOD	PROCEDURE	REQUIREMENT
Electrostatic Discharge	AEC-Q200-002	Human Body Model, 1 pos + 1 neg. Discharges 1206=2KV	$\pm 1.0\%+0.0005\Omega$ 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	$\pm 1.0\%+0.0005\Omega$
Terminal Strength SMD	AEC-Q200-006	Applied a 17.7N 1.8Kg for 60±1 seconds.	$\pm 1.0\%+0.0005\Omega$ 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: $T.C.R = \frac{R_2 - R_1}{R_1(t_2 - t_1)} \times 10^6 \text{ppm/}^\circ\text{C}$ 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.	$\pm 1.0\%+0.0005\Omega$

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.

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