Innovative Service Around the Globe YAGEO

DATA SHEET

CURRENT SENSOR - LOW TCR

AUTOMOTIVE GRADE

PA Series - Wide Terminal

5%, 1%, 0.5%

sizes 0508/0612/1020/1225

RoHS compliant & Halogen free



YAGEO

Product specification – April 28, 2026 V.2

SCOPE

This specification describes PA series wide-terminal current sensor - low TCR chip resistors made by metal alloy process.

APPLICATIONS

- Power supplies
- Laptop
- HDDs
- Car electronics
- Consumer goods
- Consumer
- Telecom / Datacom
- Industrial / Power supply
- Alternative Energy
- Automotive

FEATURES

- AEC-Q200 qualified
- Halogen-free Epoxy
- RoHS compliant
- Total lead free without RoHS exemption
- Reduce environmentally hazardous wastes
- High component and equipment reliability
- None for bidden-materials used in products/production
- Low resistances applied to current sensing
- 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	XXXX	L
	(1)	(2)	(3)	(4)	(5)	(6)	(7)

(1) SIZE

0508/0612/1020/1225

(2) TOLERANCE

D = ±0.5% F = ±1% J = ±5%

(3) PACKAGING TYPE

R = Paper taping reel

K= Embossed taping reel

(4) TEMPERATURE COEFFICIENT OF RESISTANCE

E = ±50 ppm/°C

M =±75 ppm/°C

F = ±100 ppm/°C

L = ±150 ppm/°C

G= ±200ppm/°C

(5) TAPING REEL

07/7W = 7 inch dia. Reel and specific rated power. Detailed power ratings are shown in the Table 2

(6) RESISTANCE VALUE

0R001 (1mΩ) ~ 0R006 (6mΩ)

There are 3~5 digits indicated the resistance value. Letter R is decimal point.

(7) DEFAULT CODE

L = system default code for ordering only

ORDERING EXAMPLE

The ordering code for a PA0612 1W chip resistor,TC100 value 0.002Ω (2mR) with ±1% tolerance, supplied in 7-inch tape reel with 4Kpcs quantify is: PA0612FRF070R002L.

NOTE

1. All our RSMD products are RoHS compliant. "LFP" of the internal 2D reel label mentions "Lead-Free Process"

MARKING

PA0508/PA0612/PA1020/PA1225



No marking

Fig. 1

CONSTRUCTION

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

The advanced resistive materials are adopted to get the precisely required resistance.

Finally, the three materials of external terminations (Cu / Ni / matte Tin) are added, as shown in Fig. 5

Outlines

For dimension see Table 1

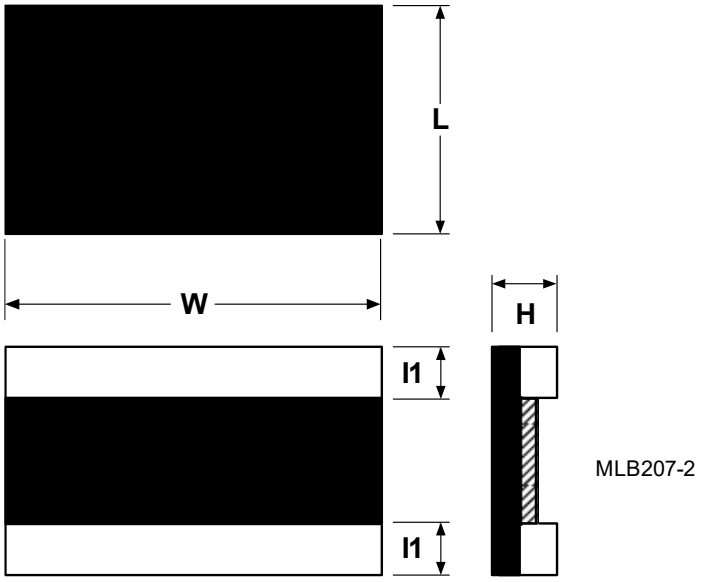


Fig. 2 Chip resistor outlines

DIMENSION

Table 1

TYPE	RESISTANCE RANGE	L (mm)	W (mm)	H (mm)	I_1 (mm)
PA0508	1 mΩ ≤ R <2 mΩ	1.20±0.15	2.00±0.15	0.42±0.15	0.35±0.25
	2 mΩ ≤ R ≤ 5 mΩ	1.20±0.15	2.00±0.15	0.28±0.15	0.35±0.25
PA0612	1 mΩ ≤ R ≤ 5 mΩ	1.6±0.20	3.2±0.20	Max.0.45	0.45±0.20
PA1020	1 mΩ ≤ R ≤ 6 mΩ	2.6±0.20	5.1±0.20	0.35±0.15	0.60±0.15
PA1225	1 mΩ ≤ R ≤ 5 mΩ	3.18±0.25	6.35±0.25	Max.0.6	0.50±0.20

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

TYPE	POWER RATING (1) 07/7W	TOLERANCE	RESISTANCE RANGE	TEMPERATURE COEFFICIENT OF RESISTANCE
PA0508	1W	± 0.5% (By request) ±1% ±5%	1mΩ ≤ R ≤ 1.5mΩ	±200 ppm/°C
			2mΩ ≤ R ≤ 5mΩ	±50 ppm/°C ±75 ppm/°C ±100 ppm/°C

TYPE	POWER RATING (1) 07	POWER RATING (1) 7W	TOLERANCE	RESISTANCE RANGE	TEMPERATURE COEFFICIENT OF RESISTANCE
PA0612	2W	---	± 0.5% (By request) ±1% ±5%	1mΩ ≤ R ≤ 1.5mΩ	±150 ppm/°C
				2mΩ ≤ R ≤ 5mΩ	±75 ppm/°C ±100 ppm/°C
PA1020	1W	2W	±1% ±5%	1mΩ ≤ R ≤ 6mΩ	±50ppm/°C ±75 ppm/°C ±100 ppm/°C ±200 ppm/°C
PA1225	1.5W	3W	± 0.5% (By request) ± 1% ± 5%	1mΩ ≤ R ≤ 5mΩ	±75ppm/°C

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

FUNCTIONAL DESCRIPTION

OPERATING TEMPERATURE RANGE

PA0508/PA0612 : –55°C to +155°C

PA1020/PA1225 : –55°C to +170°C

POWER RATING

Standard rated power at 70°C:

PA0508 = 1W

PA0612 = 2W

PA1020 = 1W/2W

PA1225 = 1.5W/3W

RATED VOLTAGE

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

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

Where

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

P = Rated power (W)

R = Resistance value (Ω)

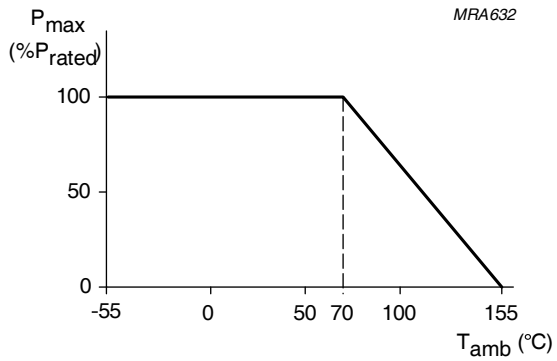


Fig. 3 Maximum dissipation (P_{max}) in percentage of rated power as a function of the operating ambient temperature (T_{amb})

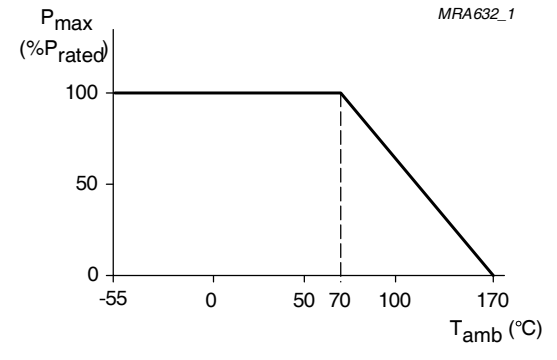


Fig. 4 Maximum dissipation (P_{max}) in percentage of rated power as a function of the operating ambient temperature (T_{amb})

PACKING STYLE AND PACKAGING QUANTITY

Table 3 Packing style and packaging quantity

PACKING STYLE	REEL DIMENSION	PA0508	PA0612	PA1020	PA1225
Paper taping reel (R)	7" (178 mm)	5,000	4000	---	---
Embossed taping reel (K)	7" (178 mm)	---	---	4000	4000

PAPER TAPE

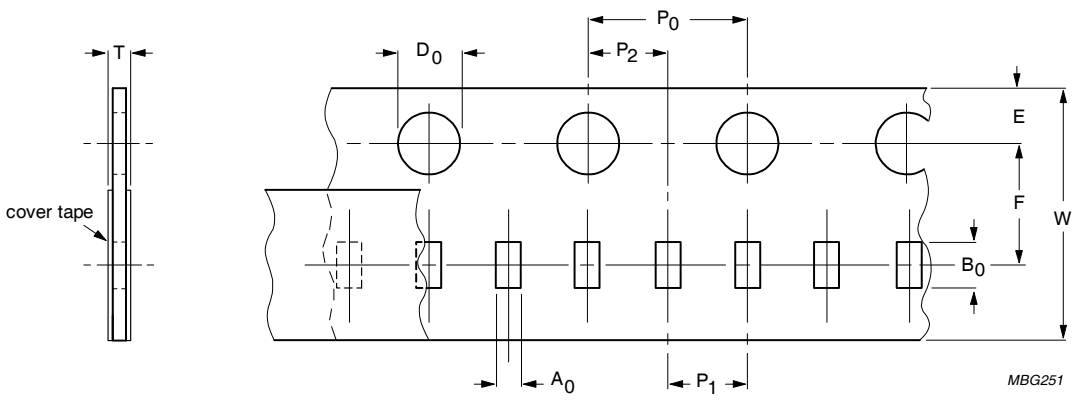


Fig. 5 Paper Tape

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	$\varnothing D_0$	T
PA0508	1.60± 0.10	2.35± 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	1.50±0.10	0.55±0.15
PA0612	1.80±0.15	3.50±0.15	8.00±0.30	1.75±0.10	3.50±0.10	4.00±0.10	4.00±0.10	2.00±0.10	1.50±0.10	0.55±0.15

EMBOSSED TAPE

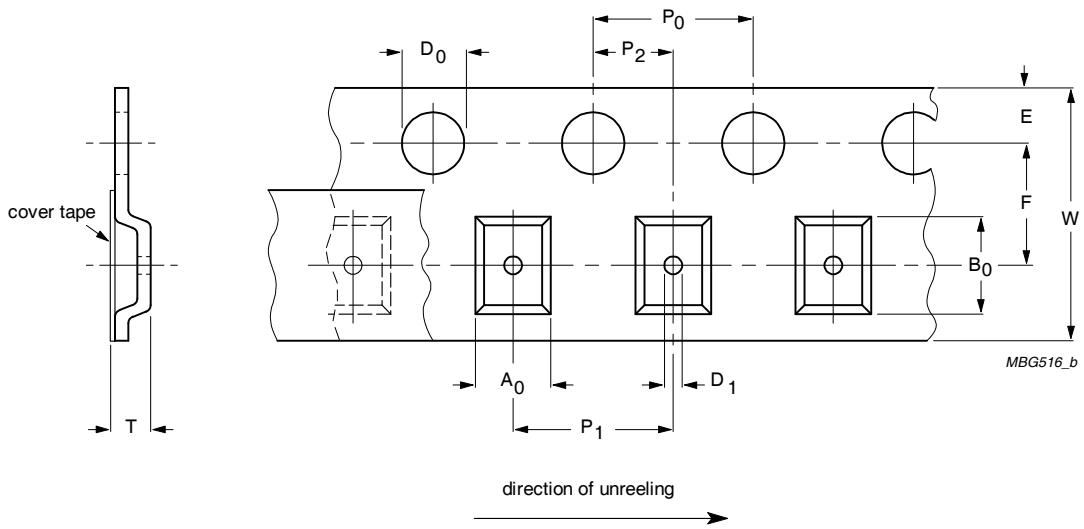


Fig. 6 Embossed Tape

Table 5 Dimensions of embossed tape for relevant chip resistors size

SIZE	SYMBOL										Unit: mm
	A_0	B_0	W	E	F	P_0	P_1	P_2	$\varnothing D_0$	D_1	T
PA1020	2.80±0.15	5.35±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	1.55±0.10	0.55±0.15
PA1225	3.40±0.15	6.70±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	0.80±0.15	0.75±0.15

REEL SPECIFICATION

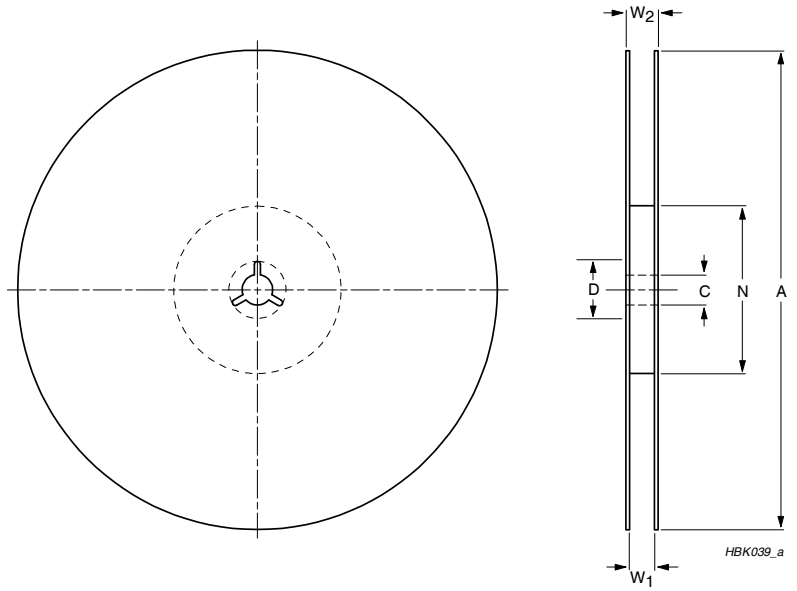


Fig. 7 Reel

Table 6 Dimensions of reel specification for relevant chip resistors size

SIZE		SYMBOL					Unit: mm
	8 mm TAPE WIDE	A	N	C	D	W_1	$W_{2\ MAX.}$
PA0508	7" (Ø178 mm)	178.0±5	60.0+1/-0	13.00±0.5	17.70±0.5	9.0± 0.5	12.4
PA0612	7" (Ø178 mm)	178.0±5	60.0+1/-0	13.00±0.5	17.70±0.5	9.0± 0.5	12.4

SIZE		SYMBOL					Unit: mm
	12 mm TAPE WIDE	A	N	C	D	W_1	$W_{2\ MAX.}$
PA1020	7" (Ø178 mm)	178.0±1.0	60.0+1/-0	13.50±0.5	21.0±0.8	13.6±0.5	16.4+1/-0
PA2512	7" (Ø178 mm)	178.0±5	60.0+1/-0	13.00±0.5	21.0±0.8	13.6±0.5	18.3+1/-0

SOLDERING PROFILES

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

FOOTPRINT

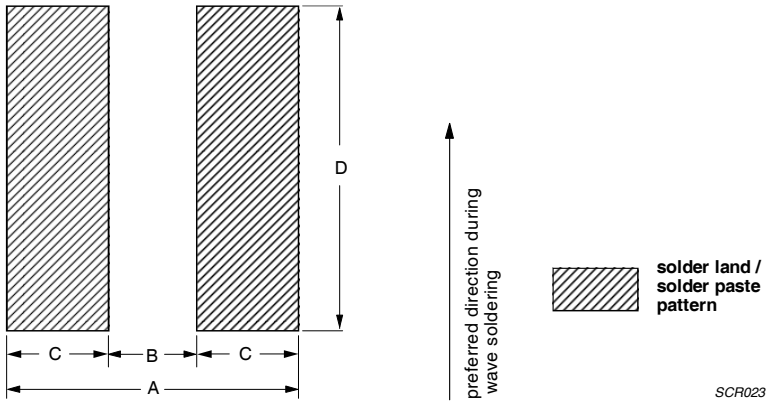


Fig. 8 Single resistor chips recommended dimensions of footprints

Table 7 Footprint dimensions

Unit: mm

SIZE	RESISTANCE RANGE	A	B	C	D
PA0508	1mΩ ≤ R ≤ 5mΩ	3.05	0.45	1.3	2.65
PA0612	1mΩ ≤ R ≤ 5mΩ	4.60	0.60	2	3.68
PA1020	1mΩ ≤ R ≤ 6mΩ	3.45	1.15	1.15	5.5
PA1225	1mΩ ≤ R ≤ 5mΩ	6.1	1.4	2.35	7.25

TESTS AND REQUIREMENTS

Table 8 Test condition, procedure and requirements

TEST	TEST METHOD	PROCEDURE	REQUIREMENTS
Short time overload	IEC60115-1 8.1	5 times of rated power for 5 seconds at room temperature	±(0.5%+0.0005Ω)
High Temperature Exposure	MIL-STD-202-Method 108	1,000 hours at max. operating temperature, unpowered	±(1.0%+0.0005Ω)
Temperature Cycling	JESD22-A104	-55/+155°C, 1000 cycles Dwell time is 15 minutes. Devices mounted Air – Air.	±(1%+0.0005Ω)
Biased Humidity	MIL-STD-202 Method 103	1,000 hours; 85°C / 85% RH 10% of operating power	±(1%+0.0005Ω)
Life Endurance	MIL-STD-202-Method 108	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	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-Q200-002	Human Body Model, 1 pos + 1 neg. Discharges 2KV	±(1.0%+0.0005Ω)
Solderability	J-STD-002	1) Baking 4 hours@155 °C dry heat, dipping at @245±3 °C for 5±0.5 second 2) Baking 4 hours@155 °C dry heat, dipping at @260±3 °C for 30±0.5 second	Good tinning (≥95% covered); no visual damage.

TEST	TEST METHOD	PROCEDURE	REQUIREMENT
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 glass epoxy resin PCB (FR4), Bending for 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)
Flame Retardance	AEC-Q200-001	Applied power to 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/+125°C **Formula:** $T.C.R = \frac{R_2 - R_1}{R_1(t_2 - t_1)} \times 10^6$ (ppm/°C) Where t_1=+25°C or specified room temperature t_2=+125°C test temperature R_1=resistance at reference temperature in ohms R_2=resistance at test temperature in ohms	Refer to table 2

REVISION HISTORY

REVISION	DATE	CHANGE NOTIFICATION	DESCRIPTION
Version 2	Apr. 28, 2026	-	- Update size 0508 electrical characteristics power description.
Version 1	Feb. 04, 2025	-	- Add size of PA1020
Version 0	Jan. 07, 2023	-	- New datasheet

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