Innovative Service Around the Globe YAGEO

DATA SHEET

ANTI SURGE AND ANTI SULFURATION AUTOMOTIVE GRADE CHIP RESISTORS

AS series

0.5%, 1%, 5%, 10%, 20%

sizes 0402/0603/0805/1206/1210/2512

RoHS compliant & Halogen free



Product specification – February 03, 2026 V.6

YAGEO

SCOPE

This specification describes AS0402 to AS1210 and AS2512 chip resistors with lead-free terminations made by thick film process.

APPLICATIONS

- Telecommunications
- Power supplies
  Car electronics

FEATURES

- AEC-Q200 qualified
- Superior to AF series in pulse withstanding voltage and surge withstanding voltage.
- MSL class: MSL 1
- Halogen free epoxy
- RoHS compliant
- Reduce environmentally hazardous waste
- High component and equipment reliability

ORDERING INFORMATION - GLOBAL PART NUMBER

Part number is identified by the series name, size, tolerance, packaging type, temperature coefficient, taping reel and resistance value.

GLOBAL PART NUMBER

AS XXXX X X X XX XXXX L
(1) (2) (3) (4) (5) (6) (7)

(1) SIZE

0402 / 0603 / 0805 / 1206 / 1210 / 2512

(2) TOLERANCE

D = ±0.5%
F = ±1%
J = ± 5%
K = ±10%
M = ±20%

(3) PACKAGING TYPE

R = Paper taping reel
K = Embossed taping reel

(4) TEMPERATURE COEFFICIENT OF RESISTANCE

– = Based on spec.

(5) TAPING REEL & POWER

07= 7 inch dia. Reel 7W = 7 inch dia. Reel & 2 x standard power
7T = 7 inch dia. Reel & 3 x standard power
47 = 7 inch dia. Reel & 4 x standard power

(6) RESISTANCE VALUE

1 Ω ≤ R ≤ 4M Ω
There are 2~4 digits indicated the resistance value. Letter R/K/M is decimal point, no need to mention the last zero after R/K/M, e.g.1K2, not 1K20.
Detailed coding rules of resistance are shown in the table of "Resistance rule of global part number".

(7) DEFAULT CODE

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

Resistance rule of global part number

Resistance coding rule	Example
XRXX (1 to 9.76 Ω)	1R = 1 Ω 1R5 = 1.5 Ω 9R76 = 9.76 Ω
XXRX (10 to 97.6 Ω)	10R = 10 Ω 97R6 = 97.6 Ω
XXXR (100 to 976 Ω)	100R = 100 Ω
XKXX (1 to 9.76 KΩ)	1K = 1,000 Ω 9K76 = 9760 Ω
XXKX (10 to 97.6 KΩ)	10K = 10,000 Ω 97K6= 976,000 Ω
XXXK (100 KΩ)	100K = 100,000 Ω

ORDERING EXAMPLE

The ordering code for an AS0805 chip resistor, value 10 KΩ with ±5% tolerance, supplied in 7-inch tape reel is: AS0805JR-0710KL.

MARKING

AS0402



Fig. 1

No Marking

AS0603



Fig. 2 Value = 24 Ω

1%, 0.5%,E24 exception values 10/11/13/15/20/75 of E24 series



Fig. 3 Value = 806 Ω

1%, 0.5%, E96 refer to EIA-96 marking method, including values 10/11/13/15/20/75 of E24 series

AS0805 / 1206 / 1210 / 2512



Fig. 4 Value = 10 K Ω

Both E-24 and E-96 series: 4 digits, ±0.5% & ±1%

First three digits for significant figure and 4th digit for number of zeros

NOTE

For further marking information, please refer to data sheet "Chip resistors marking".

TAPING REEL & POWER

Table 1

TYPE	POWER, W (P70)			
	CODING			
	07	7W	7T	47
0402	1/16	1/8	1/5	1/4
0603	1/10	1/5	1/4	1/3
0805	1/8	1/4	1/3	1/2
1206	1/4	1/2	3/4	1
1210	1/2	1	-	-
2512	1	2	3	-

CONSTRUCTION

The resistor is constructed on top of a high-grade ceramic body. Internal metal electrodes are added at each end and connected by a resistive glaze. The resistive glaze is covered by a lead-free glass. The composition of the glaze is adjusted to give the approximately required resistance value. The whole element is covered by a protective overcoat. The top of overcoat is marked with the resistance value. Finally, the two external terminations (Ni/matte tin) are added, as shown in Fig. 5.

OUTLINES

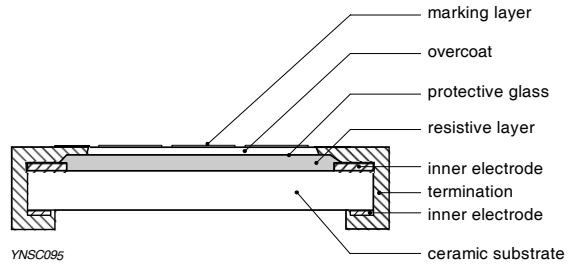


Fig. 5 Chip resistor outlines

DIMENSIONS

Table 2

TYPE	L (mm)	W (mm)	H (mm)	I_1 (mm)	I_2 (mm)
AS0402	1.00±0.05	0.50±0.05	0.35±0.05	0.20±0.10	0.25±0.10
AS0603	1.60±0.10	0.80±0.10	0.45±0.10	0.25±0.15	0.25±0.15
AS0805	2.00±0.10	1.25±0.10	0.50±0.10	0.35±0.20	0.35±0.20
AS1206	3.10±0.10	1.60±0.10	0.55±0.10	0.45±0.20	0.45±0.20
AS1210	3.10±0.10	2.60±0.15	0.55±0.10	0.45±0.15	0.50±0.20
AS2512	6.35±0.10	3.10±0.15	0.57±0.10	0.60±0.20	2.50±0.25

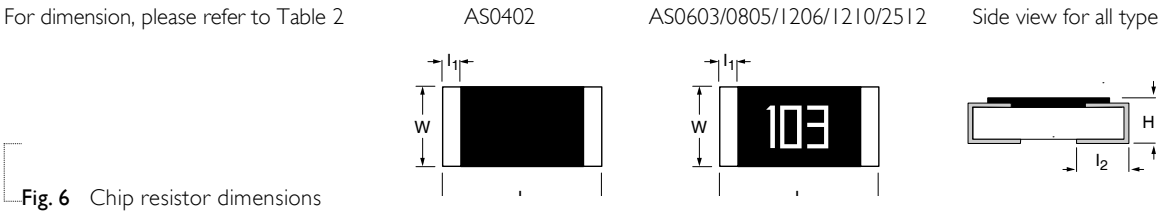


Fig. 6 Chip resistor dimensions

ELECTRICAL CHARACTERISTICS

Table 3

TYPE	POWER	RESISTANCE RANGE	CHARACTERISTICS				
			Operating Temperature Range	Max. Working Voltage	Max. Overload Voltage	Dielectric Withstanding Voltage	Temperature Coefficient of Resistance
AS0402	1/16W 1/8W 1/5W 1/4W	E24 5%, 10%, 20% E24/E96 0.5%, 1% 1Ω≤ R ≤ 1MΩ for 0402~1210 1Ω≤ R ≤ 4MΩ for 2512	−55 °C to +155 °C	75V	100V	100V	1Ω ≤ R ≤ 10Ω ±200 ppm°C 10Ω < R ≤ 4MΩ ±100 ppm°C
AS0603	1/10W 1/5W 1/4W 1/3W			150V	300V	300V	
AS0805	1/8W 1/4W 1/3W 1/2W			500V	1000V	1000V	
AS1206	1/4W 1/2W 3/4W 1W			500V	1000V	1000V	
AS1210	1/2W 1W			500V	1000V	1000V	
AS2512	1W 2W 3W			500V	1000V	1000V	

FOOTPRINT AND SOLDERING PROFILES

Recommended footprint and soldering profiles, please refer to data sheet “Chip resistors mounting”.

PACKING STYLE AND PACKAGING QUANTITY

Table 4 Packing style and packaging quantity

PACKING STYLE	REEL DIMENSION	AS0402	AS0603/0805/1206/1210	AS2512
Paper taping reel (R)	7" (178 mm)	10,000	5,000	-
Embossed taping reel (K)	7" (178 mm)	-	-	4,000

NOTE

1. For paper/embossed tape and reel specification/dimensions, please refer to data sheet “Chip resistors packing”.

FUNCTIONAL DESCRIPTION

OPERATING TEMPERATURE RANGE

Range: –55 °C to +155 °C

POWER RATING

Each type rated power at 70 °C:
AS0402: 1/16W, 1/8W, 1/5W, 1/4W
AS0603: 1/10W, 1/5W, 1/4W, 1/3W
AS0805: 1/8W, 1/4W, 1/3W, 1/2W
AS1206: 1/4W, 1/2W, 3/4W, 1W
AS1210: 1/2W, 1W
AS2512: 1W, 2W, 3W

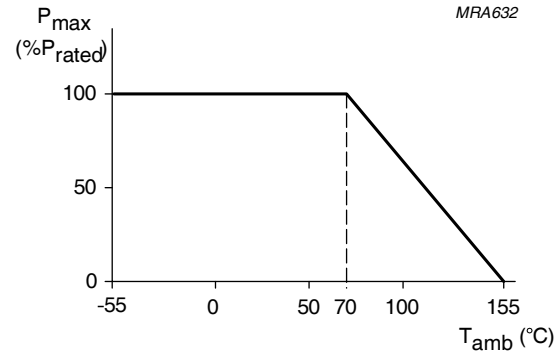


Fig. 7 Maximum dissipation (P_{max}) in percentage of rated power as a function of the operating ambient temperature (T_{amb})

RATED VOLTAGE

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

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

or max. working voltage whichever is less

Where

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

P = Rated power (W)

R = Resistance value (Ω)

PULSE LOAD BEHAVIOR

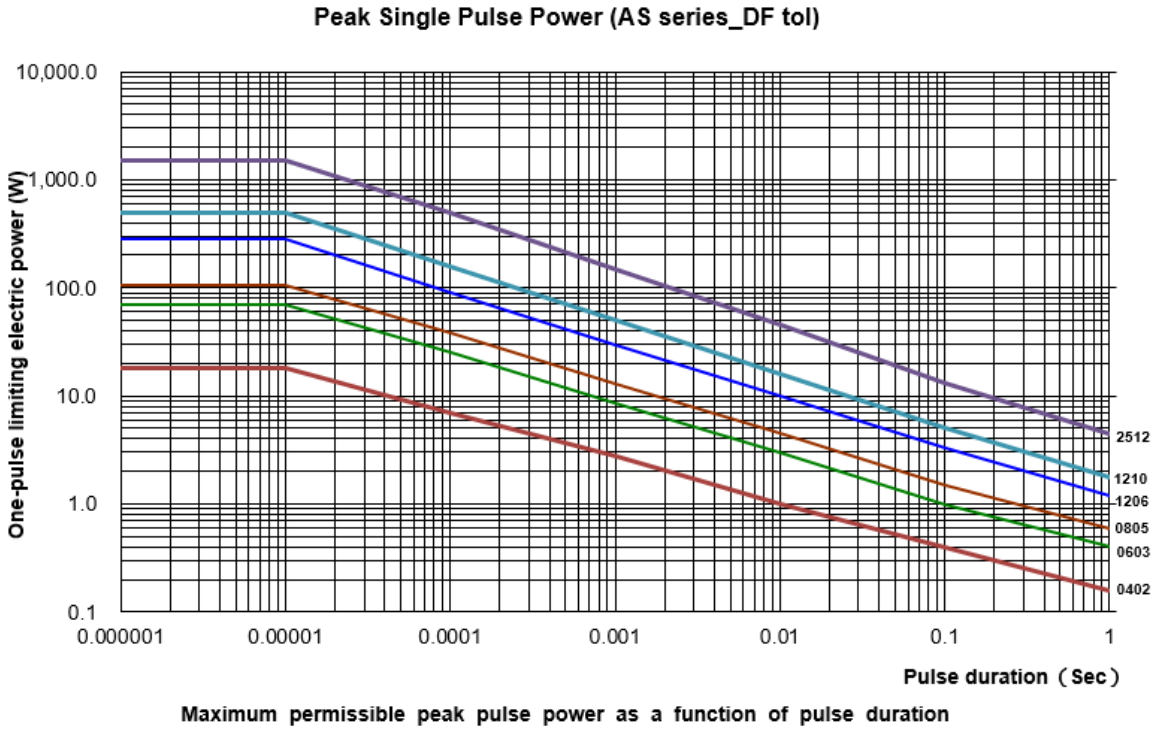


Fig.8 Pulse-Load behavior

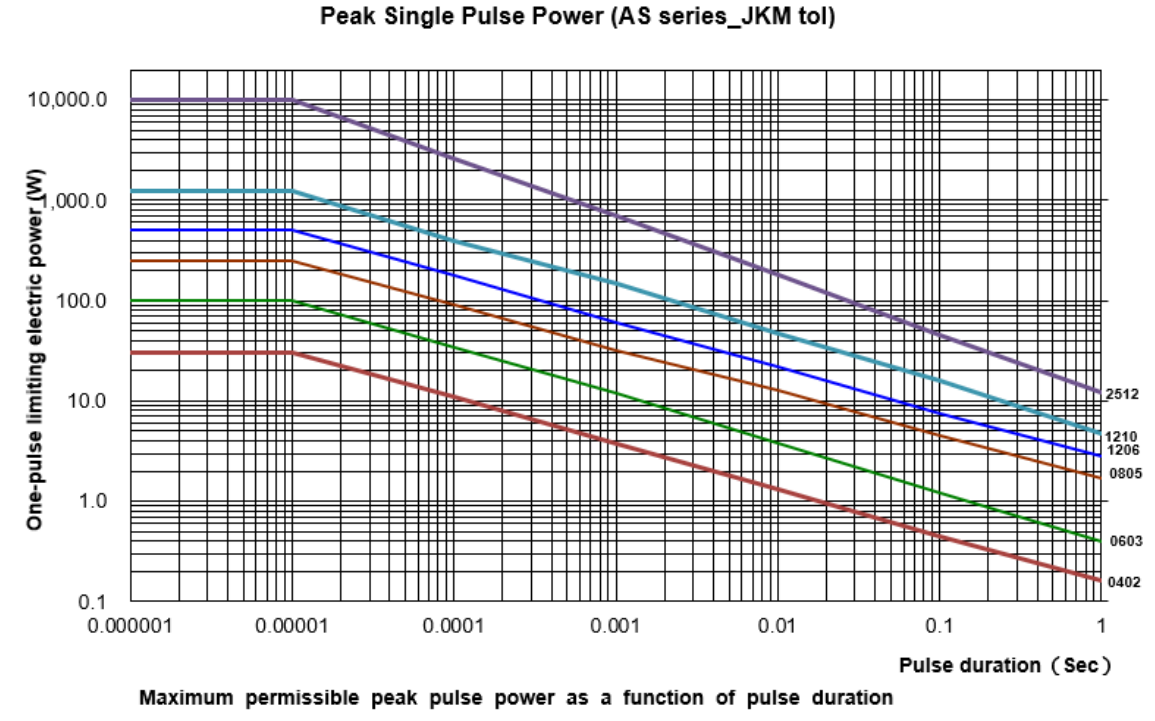


Fig. 9 Pulse-Load behavior

TESTS AND REQUIREMENTS

Table 5 Test condition, procedure and requirements

TEST	TEST METHOD	PROCEDURE	REQUIREMENTS
High Temperature Exposure	AEC-Q200 Test 3 MIL-STD-202 Method 108	1,000 hours at T_A = 155 °C, unpowered	±(1.0%+0.05Ω) for D/F tol ±(2.0%+0.05Ω) for J tol
Moisture Resistance	MIL-STD-202 Method 106	Each temperature / humidity cycle is defined at 8 hours, 3 cycles / 24 hours for 10d. with 25 °C / 65 °C 95% R.H, without steps 7a & 7b, unpowered	±(0.5%+0.05Ω) for D/F tol ±(2.0%+0.05Ω) for J tol
Biased Humidity	AEC-Q200 Test 7 MIL-STD-202 Method 103	1,000 hours; 85 °C / 85% RH 10% of operating power Measurement at 24±4 hours after test conclusion.	±(1.0%+0.05Ω) for D/F tol ±(3.0%+0.05Ω) for J tol
Operational Life	AEC-Q200 Test 8 MIL-STD-202 Method 108	1,000 hours at 125 °C, derated voltage applied for 1.5 hours on, 0.5 hour off, still-air required	±(1.0%+0.05Ω) for D/F tol ±(3.0%+0.05Ω) for J tol
Resistance to Soldering Heat	AEC-Q200 Test 15 MIL-STD-202 Method 210	Condition B, no pre-heat of samples Lead-free solder, 260±5 °C, 10±1 seconds immersion time Procedure 2 for SMD: devices fluxed and cleaned with isopropanol	±(0.5%+0.05Ω) for D/F tol ±(1.0%+0.05Ω) for J tol 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%+0.05Ω) for D/F tol ±(1.0%+0.05Ω) for J tol
ESD	AEC-Q200 Test 17 AEC-Q200-002	Human Body Model, $1_{pos.}$ + $1_{neg.}$ discharges 0201: 500V 0402/0603: 1KV 0805 and above: 2KV	±(3.0%+0.05Ω)

TEST	TEST METHOD	PROCEDURE	REQUIREMENTS
Solderability - Wetting	AEC-Q200 Test 18 J-STD-002	Electrical Test not required Magnification 50X SMD conditions: (a) Method B, aging 4 hours at 155 °C dry heat, dipping at 235±3 °C for 5±0.5 seconds. (b) Method B, steam aging 8 hours, dipping at 215±3 °C for 5±0.5 seconds. (c) Method D, steam aging 8 hours, dipping at 260±3 °C for 30±0.5 seconds.	Well tinned (≥95% covered) No visible damage
Board Flex	AEC-Q200 Test 21 AEC-Q200-005	Chips mounted on a 100mm x 40mm glass epoxy resin PCB (FR4) Bending for 0201/0402: 5 mm 0603/0805: 3 mm 1206 and above: 2 mm Holding time: minimum 60 seconds	±(1.0%+0.05Ω)
Temperature Coefficient of Resistance (T.C.R.)	MIL-STD-202 Method 304	At +25/–55 °C and +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=–55 °C or +125 °C test temperature R_1=resistance at reference temperature in ohms R_2=resistance at test temperature in ohms	Refer to table 3
Short Time Overload	IEC60115-1 8.1	2.5 times of rated voltage or maximum overload voltage whichever is less for 5 sec at room temperature	±(1.0%+0.05Ω) for D/F tol ±(2.0%+0.05Ω) for J tol
FOS	ASTM-B-809-95* * Modified	Sulfur 750 hours, 105 °C, unpowered	± (4.0%+0.05Ω)

REVISION HISTORY

REVISION	DATE	CHANGE NOTIFICATION	DESCRIPTION
Version 6	Feb. 03, 2026	-	- Add size 1210
Version 5	Jul. 10, 2025	-	- Add 1W for 1206
Version 4	Jun. 10, 2025	-	- Add 2512
Version 3	Nov. 06, 2024	-	- Add 0402, - Upgrade the voltage to 150V of 0603 and add 1/3W - Upgrade the voltage to 500V of 0805 and 1206
Version 2	Aug. 03, 2022	-	- I2 dimension updated, for size1206.
Version 1	Apr. 08, 2021	-	- Upgrade to Automotive Grade
Version 0	Nov. 30, 2020	-	- New product datasheet

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