Innovative Service Around the Globe YAGEO

DATA SHEET

THIN FILM CHIP RESISTORS AUTOMOTIVE GRADE

NT series

0.1% TO 1%, TC10 TO TC50

sizes 0402/0603/0805/1206/2010

RoHS compliant

YAGEO

Product specification – December 15, 2025 V.2

SCOPE

This specification describes NT0402 to NT2010 high precision-high stability chip resistors made by thin film process.

APPLICATIONS

- Automotive electronics
- Industrial and medical equipment
- Test and measuring equipment
- Telecommunications

FEATURES

- AEC-Q200 qualified
- Halogen free epoxy
- Superior resistance against sulfur containing surroundings
- Moisture sensitivity level: MSL 1
- Environmental hazards Reduction
- Non-forbidden materials used in products / production

ORDERING INFORMATION - GLOBAL PART NUMBER

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

GLOBAL PART NUMBER

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

(1) SIZE

0402 / 0603 / 0805 / 1206 / 2010

(2) TOLERANCE

B = ± 0.1%

C = ± 0.25%

D = ± 0.5%

F = ± 1%

(3) PACKAGING TYPE

R = Paper taping reel

K = Embossed taping reel

(4) TEMPERATURE COEFFICIENT OF RESISTANCE

B = ± 10 ppm/°C

D = ± 25 ppm/°C

E = ± 50 ppm/°C

(5) TAPING REEL

07 = 7 inch dia. Reel

(6) RESISTANCE VALUE

There are 2~4 digits indicated the resistor value.

Letter R/K/M is decimal point

Example: 100R = 100Ω

1K = 1,000Ω

(7) DEFAULT CODE

Letter L indicates Pb-Free with pure matte tin termination. (NOTE)

Letter S indicates Sn/Pb termination.

ORDERING EXAMPLE

The ordering code of a NT0402 chip resistor, TCR 50, value 100Ω with ±0.5% tolerance, Pb-Free with pure matte tin termination, supplied in 7-inch tape reel, is: NT0402DRE07100RL.

NOTE

1. All our Rchip 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

NT0402

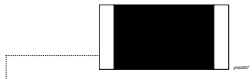

Fig. 1

No marking

NT0603

Fig. 2 Value = 12.4 KΩ

E-96 series: including values 10/11/13/15/20/75 of E-24 series, 3 digits

Fig. 3 Value = 56 KΩ

E-24 series: exception values 10/11/13/15/20/75 of E-24 series, one short bar under marking letter

NT0805 / NT1206 / NT2010

Fig. 4 Value = 10 KΩ

Both E-24 and E-96 series: 4 digits
First three digits for significant figure and 4th digit for number of zeros

NOTE

For further marking information, please see special data sheet "Chip resistors marking".

CONSTRUCTION

The resistors are constructed out of a high grade ceramic body. Internal metal electrodes are added at each end connected by a resistive layer.
This resistive layer is trimmed to its nominal value and on both ends a contact is made which will guarantee optimum solderability. This is achieved by applying several layers and for ease of soldering the outer layer consists of pure matte Tin or Sn/Pb.

OUTLINES

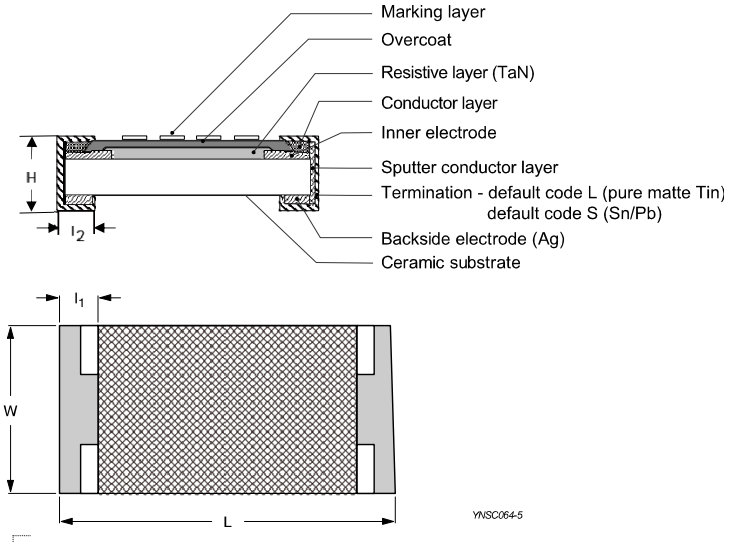

Fig. 5 Chip resistor outlines

DIMENSIONS

Table 1

TYPE	L (mm)	W (mm)	H (mm)	I_1 (mm)	I_2 (mm)
NT0402	1.00 ±0.10	0.50 ±0.05	0.30 ±0.05	0.20 ±0.10	0.25 ±0.10
NT0603	1.60 ±0.10	0.80 ±0.10	0.45 ±0.10	0.25 ±0.15	0.25 ±0.15
NT0805	2.00 ±0.10	1.25 ±0.10	0.50 ±0.10	0.35 ±0.20	0.35 ±0.20
NT1206	3.10 ±0.10	1.60 ±0.10	0.55 ±0.10	0.45 ±0.20	0.40 ±0.20
NT2010	5.00 ±0.10	2.50 ±0.15	0.55 ±0.10	0.60 ±0.20	0.50 ±0.20

ELECTRICAL CHARACTERISTICS

Table 2

TYPE	Operating Temperature Range	Power Rating	Max. Working Voltage	Max. Overload Voltage	Resistance Range (E-24/E-96 series)(Ω) & Tolerance[1]				
					T.C.R. (ppm/°C)[2]	±0.1% (B)	±0.25% (C)	±0.5% (D)	±1% (F)
NT0402	–55 °C to +155 °C	1/20W	75 V	150 V	±10 (B)		100 ≤ R ≤ 12K		
					±25 (D)		10 ≤ R ≤ 63K4		
					±50 (E)				
NT0603		3/20W	75V	150 V	±10 (B)		100 ≤ R ≤ 60K		
					±25 (D)		10 ≤ R ≤ 189K		
					±50 (E)				
NT0805		1/5W	150 V	300 V	±10 (B)		100 ≤ R ≤ 60K		
					±25 (D)		10 ≤ R ≤ 370K		
					±50 (E)				
NT1206		2/5W	200 V	400 V	±10 (B)		100 ≤ R ≤ 100K		
					±25 (D)		10 ≤ R ≤ 1M		
					±50 (E)				
NT2010		4/5W	200 V	500 V	±25 (D)		100 ≤ R ≤ 1M		
					±50 (E)				

NOTE : 1. Global part number (code 7)
2. Global part number (code 9)

FOOTPRINT AND SOLDERING PROFILES

For recommended footprint and soldering profiles, please see the special data sheet "Chip resistors mounting".

PACKING STYLE AND PACKAGING QUANTITY

Table 3 Packing style and packaging quantity

PRODUCT TYPE	PATKING STYLE	REEL DIMENSION	QUANTITY PER REEL
NT0402	Paper taping reel	7" (178 mm)	10,000 Units
NT0603	Paper taping reel	7" (178 mm)	5,000 Units
NT0805	Paper taping reel	7" (178 mm)	5,000 Units
NT1206	Paper taping reel	7" (178 mm)	5,000 Units
NT2010	Embossed taping reel	7" (178 mm)	4,000 Units

NOTE: for paper tape and reel specification/dimensions, please see the special data sheet "packing" document.

FUNCTIONAL DESCRIPTION

OPERATING TEMPERATURE RANGE

Range: –55 °C to +155 °C

POWER RATING

Each type rated power at 70 °C:
NT0402=1/20W
NT0603=3/20W
NT0805=1/5W
NT1206=2/5W
NT2010=4/5W

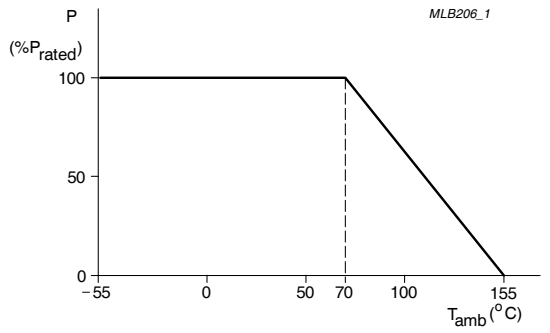

Fig. 6 Maximum dissipation (P_{max}) in percentage of rated power as a function of the operating ambient temperature (T_{amb})

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

R=Resistance value (Ω)

TESTS AND REQUIREMENTS

Table 4 Test condition, procedure and requirements

TEST	TEST METHOD	PROCEDURE	REQUIREMENTS
Short Time Overload	IEC60115-1 4.13	2.5 times of rated voltage or maximum overload voltage, the less of the above, for 5 sec at room temperature	±(0.05%+0.05Ω)
High Temperature Exposure	AEC-Q200 Test 3 MIL-STD-202 Method 108	1,000 hours at Tamb = 155 °C, unpowered	±(0.3%+0.05Ω)
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	±(0.1%+0.05Ω)
Life	AEC-Q200 Test 8 MIL-STD-202 Method 108	1,000 hours at 70±2 °C, Rated power applied for 1.5 hours on, 0.5 hour off, still air required	±(0.1%+0.05Ω)
Resistance to Soldering Heat	AEC-Q200 Test 15 MIL-STD-202-method 210	Specimen passed 3 times reflow temperature at 260°C, with solder.	±(0.05%+0.05Ω)
Temperature Cycling	AEC-Q200 Test 4 JESD22-A104	-55/+155°C, 1000 cycles Dwell time is 15 minutes. Devices mounted Air – Air.	±(0.3%+0.05Ω) No visible damage
Solderability	AEC-Q200 Test 18 J-STD-002	(a) Baking 4 hours @155 °C dry heat, dipping at @245 ±3 °C for 5±0.5 second. (b) Baking 4 hours @155 °C dry heat, dipping at @260 ±3 °C for 30±0.5 second.	Well tinned (>95% covered) No visible damage

TEST	TEST METHOD	PROCEDURE	REQUIREMENTS
Board Flex / Bending	AEC-Q200 Test 21 AEC-Q200-005	Chips mounted on a glass epoxy resin PCB (FR4) Bending for 0402: 5 mm 0603/0805: 3 mm 1206/2010: 2mm Holding time: minimum 60 second	±(0.1%+0.05Ω)
Temperature Coefficient of Resistance (T.C.R.)	IEC 60115-1 4.8	At +25/–55 °C and +25/+125°C Formula: $T.C.R=\frac{R2-R1}{R1(t2-t1)}\times 10^6(ppm/°C)$ Where t1 = +25 °C or specified room temperature t2 = –55 °C (25, 50 ppm/°C) or +125 °C (10, 25, 50 ppm/°C) test temperature R1=resistance at reference temperature in ohms R2=resistance at test temperature in ohms	Refer to table 2
Flower of Sulfur	ASTM-B-809-95* * Modified	Sulfur 750 hours, 105°C, unpowered.	±(2.0%+0.05Ω)

REVISION HISTORY

REVISION	DATE	CHANGE NOTIFICATION	DESCRIPTION
Version 2	Dec. 15, 2025	-	- Extend R value, TCR and add NT2010
Version 1	Apr. 02, 2025	-	- Extend R value and add Sn/Pb termination
Version 0	Oct. 31, 2023	-	- First issue of this specification

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