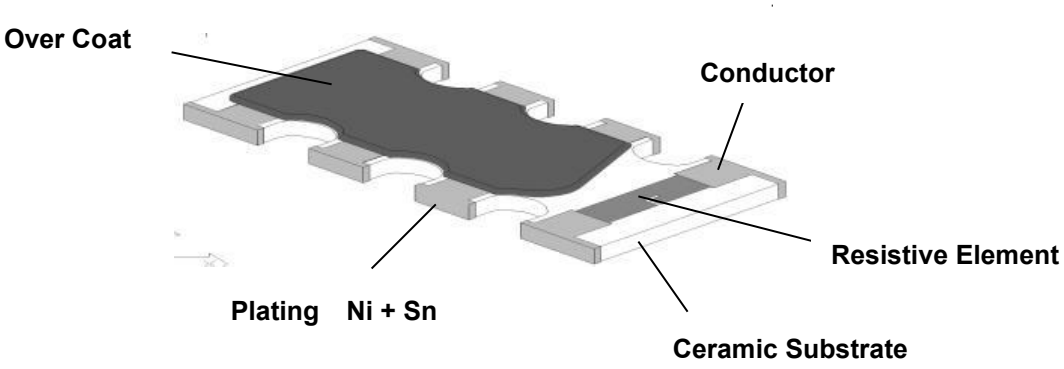
1. Scope：

This specification applies for the CNS series of Anti-Sulfurated thick film chip resistor arrays by TA-I.

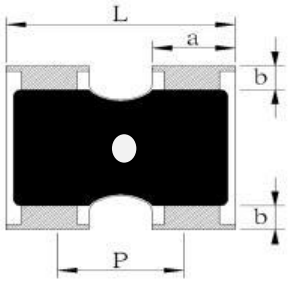
2. Construction , Dimensions , Schematic：

2.1 Construction：

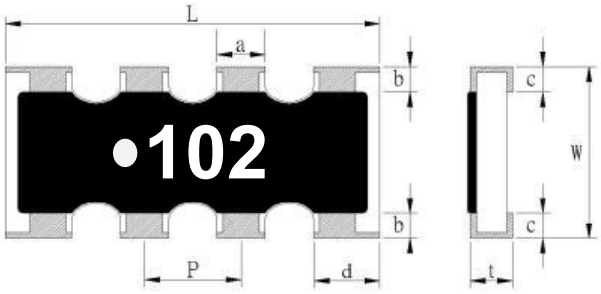


2.1.1 Chip Resistor Arrays：

CNS22



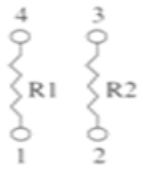
CNS24/34



UNIT：mm

Type	L	W	t	P	a	b	c	d
CNS22	1.0 ± 0.1	1.0 ± 0.1	0.35 ± 0.1	0.65 ± 0.1	0.33 ± 0.1	0.15 ± 0.1	0.25 ± 0.1	0.33 ± 0.1
CNS24	2.0 ± 0.1	1.0 ± 0.1	0.4 ± 0.1	0.5 ± 0.05	0.3 ± 0.1	0.15 ± 0.1	0.25 ± 0.1	0.4 ± 0.1
CNS34	3.2 ± 0.2	1.6 ± 0.15	0.5 ± 0.1	0.8 ± 0.05	0.45 ± 0.1	0.3 ± 0.2	0.3 ± 0.2	0.6 ± 0.1

2.2 Schematic：

CNS22	CNS24/34
	

3. Type Designation：

3.1 Chip Resistor Arrays：

CNS	**34**	**J**	**T**	**103**
Product Code CNS：Anti-Sulfurated Chip Resistor Array	size Power Rating	Tolerance	Packaging	Nominal Resistance
	22-0402*2 24-0402*4 34-0603*4	J - ±5% G - ±2% F - ±1%	T - Paper Tape	3 digits e.g., (E-24) 103 = 10KΩ 5R6 = 5.6Ω 4 digits e.g., (E-96) 1540 = 154Ω 43R2 = 43.2Ω

4. Ratings & Characteristics：

Type	Power Rating at 70℃	Rating Voltage	Max. Working Voltage	Max. Over Load Voltage	Operating Temp. (℃)	Resistance Tolerance (%)	Resistance Range (Ω)	Temp Co-efficient PPM/℃
CNS22	1/16W	Refer 4.2	25V	50V	-55 ~ +125℃	±5% ±2% ±1%	10Ω~1MΩ	±200
CNS24								
CNS34			50V	100V				
CNS34			50V	100V		±5%	3.0Ω~9.1Ω	±400
CNS22			25V	50V				±500
CNS24								

0Ω THICK FILE CHIP RESISTOR ARRAYS			
Type	Rate Current	Max Overload Current	Resistance Range
CNS Series	1A	2.5A	50mΩ MAX

4.1 Derating Curve：

For resistors operated at ambient temperature over 70℃ , power rating shall be derated in accordance with figure 1.

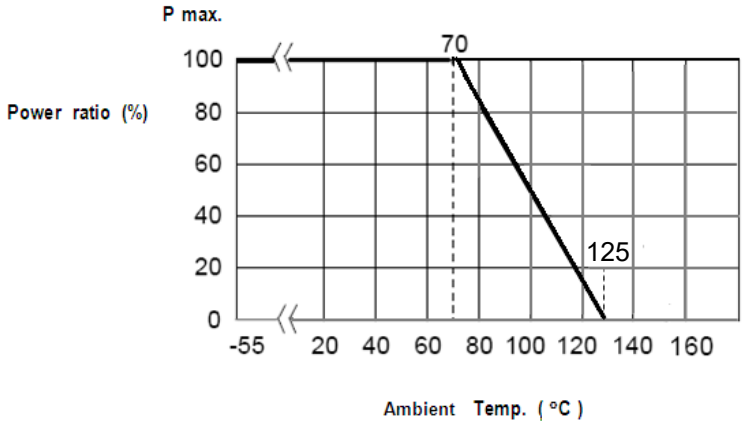


Figure 1

4.2 Rated Voltage：

The rated voltage is calculated by the following formula:

$E = \sqrt{P * R}$

E=Rated Voltage(V)

P=Rated Power(W)

R=Resistance Value(Ω)

e.g., What is CNS34JT102 the rated voltage ?

CNS34JT102 P：1/16W ; R：102 = 1KΩ = 1000Ω

$E = \sqrt{0.0625(W) * 1000(\Omega)} = 7.9\ (V)$

5. Reliability Tests:

Test Items	Reference standard	Condition of Test	Test Limits △R
Temperature Coefficient of Resistance	IEC 60115-1 4.8	-At +25/–55 °C and +25/+125 °C	Refer 5.0
Short Time Overload	IEC60115-1 4.13	2.5 X rated voltage for 5 sec	±(2% + 0.1Ω) 0Ω：50 mΩ or less
High Temperature Exposure (Storage)	AEC-Q200-REV D-Test 3 MIL-STD-202 Method 108	1000 hrs. @ T=125°C. Unpowered. Measurement at 24±2 hours after test conclusion.	0.5%,1%：±(1% + 0.05Ω) 2%,5%：±(2% + 0.1Ω) 0Ω：50mΩ or less
Temperature Cycling	AEC-Q200-REV D-Test 4 JESD22 Method JA-104	1000 Cycles (-55°Cto+125°C) Measurement at 24±4 hours after test conclusion. 30min maximum dwell time at each temperature extreme. 1 min. maximum transition time.	±(2% + 0.1Ω) 0Ω：50mΩ or less
Moisture Resistance	AEC-Q200-REV D-Test 6 MIL-STD-202 Method 106	T=24 hours / Cycle, 10 Cycles. Notes：Steps 7a& 7b not required. Unpowered.	±(2% + 0.1Ω) 0Ω：50mΩ or less
Biased Humidity	AEC-Q200-REV D-Test 7 MIL-STD-202 Method 103	1000 hours 85°C/85%RH. Note：Specified conditions: 10% of operating power (not exceeding max working voltage). Measurement at 24±2 hours after test conclusion.	±(3% + 0.1Ω) 0Ω：100mΩ or less
Operational Life	AEC-Q200-REV D-Test 8 MIL-STD-202 Method 108	1000 hours TA=125°C at 35% rated power. Measurement at 24±4 hours after test conclusion.	±(3% + 0.1Ω) 0Ω：100mΩ or less
External Visual	AEC-Q200-REV D-Test 9 MIL-STD-883 Method 2009	Electrical test not required. Inspect device construction, marking and workmanship.	
Physical Dimension	AEC-Q200-REV D-Test 10 JESD22 Method JB-100	Verify physical dimensions to the applicable device detail specification. Note: User(s) and Suppliers spec. Electrical test not required.	
Resistance to Solvents	AEC-Q200-REV D-Test 12 MIL-STD-202 Method 215	a：Isopropyl Alcohol b：Terpene Defluxer c：Deionized water：Propylene Glycol Monomethyl Ether：monoethanolamine = 42：1：1	Marking and protective layer can not be detached
Mechanical Shock	AEC-Q200-REV D-Test 13 MIL-STD-202 Method 213	Wave Form：Tolerance for half sine shock pluse. Peak value is 100g's. Normal duration(D) is 6(ms)	±(1% + 0.05Ω) 0Ω：50mΩ or less
Vibration	AEC-Q200-REV D-Test 14 MIL-STD-202 Method 204	5 g's for 20 min., 12 cycles each of 3 orientations. Note6.：Test from 10-2000 Hz.	±(1% + 0.05Ω) 0Ω：50mΩ or less

Resistance to Soldering Heat	AEC-Q200-REV D-Test 15 MIL-STD-202 Method 210	Condition B： Immerse the specimens in and eutectic solder at 260±5℃ for 10±1S .	±(1% + 0.05Ω) 0Ω：50mΩ or less
Thermal Shock	AEC-Q200-REV D-Test 16 MIL-STD-202 Method 107	-55°C/+155°C. Note：Number of cycles required-300, Maximum transfer time-20 seconds, Dwell time-15 minutes. Air-Air.	±(1% + 0.05Ω) 0Ω：50mΩ or less
ESD	AEC-Q200-REV D-Test 17	Human body model verify the voltage setting at 500V	±(2% + 0.1Ω)
Solderability	AEC-Q200-REV D-Test 18 J-STD-002	Method B, aging 4 hours at 155 °C dry heat Lead-free solder bath at 235±3 °C Dipping time: 3±0.5 seconds	> 95% area covered with tin
Flammability	AEC-Q200-REV D-Test 20 UL-94	V-0 or V-1 are acceptable. Electrical test not required.	V-0 or V-1
Board Flex (Bending)	AEC-Q200-REV D-Test 21	The duration of the applied forces shall be 60 (+ 5) Sec 3mm deflection	±(1% + 0.05Ω) 0Ω：50mΩ or less
Terminal Strength (SMD)	AEC-Q200-REV D-Test 22	Force of 1.8kg for 60 seconds	±(1% + 0.05Ω) 0Ω：50mΩ or less
Sulfuration Test	ASTM-B-809-95	Sulfur (Saturated Vapor) 1,000 hours,105±2°C, unpowered	0.5%,1%：±(1%+0.05Ω) 2%, 5%：±(2%+0.1Ω) 0Ω：100mΩ or less

Note* : RCWV : Rated continuous working voltage .

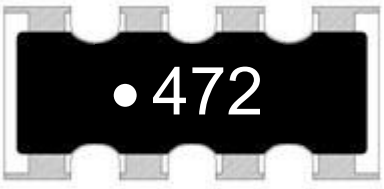
Moisture Sensitivity Level：Level 1

6. Marking :

6.1 ±2% & ±5%(E24) : CNS24 / 34

Resistance value is expressed by 3 digits, the first two digits represent the significant figures of nominal resistance value inΩ, and the third digit represents exponent for base of 10.

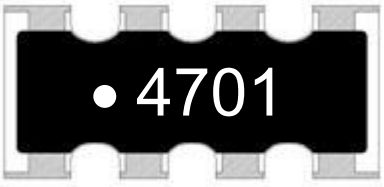
e.g., $472 = 47 \times 10^2 = 4700\,\Omega = 4.7K\,\Omega$



6.2 ±1% (E96) : CNS24 / 34

Resistance value is expressed by 4 digits, the first three digits represent the significant figures of nominal resistance value inΩ, and the fourth digit represents exponent for base of 10.

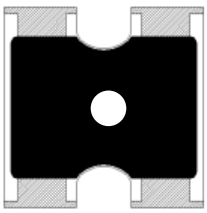
e.g., $4701 = 470 \times 10^1 = 4700\,\Omega = 4.7K\,\Omega$



6.3 CNS24 / 34 :

e.g., 0 = 0Ω

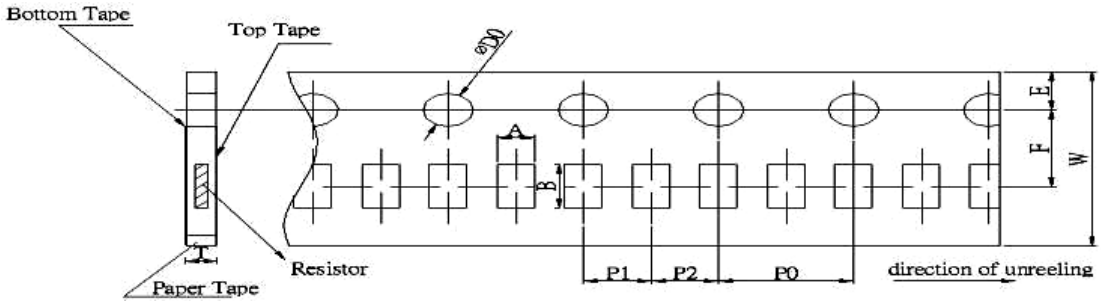
6.4 CNS22 :



7. Taping & Reel

7.1 Taping Dimensions

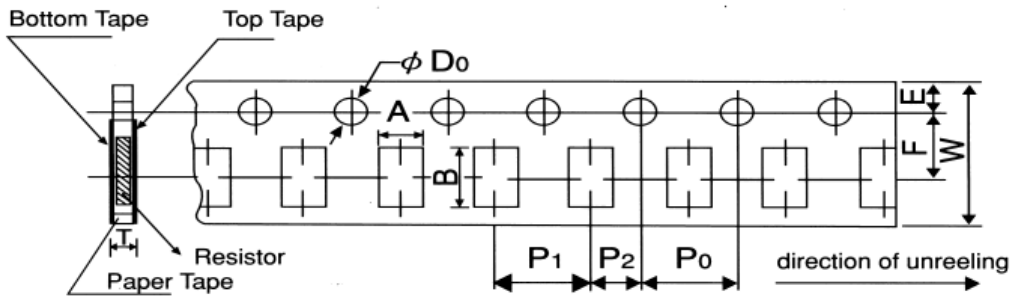
7.1.1 2 mm pitch paper



UNIT：mm

Type	A	B	W	F	E	P1	P2	P0	φD0	T0
CNS22	1.2±0.15	1.2±0.1	8.0±0.2	3.5±0.05	1.75±0.1	2.0±0.1	2.0±0.05	4.0±0.1	1.5 +0.1 -0	0.45±0.1
CNS24		2.2±0.2								0.64±0.1

7.1.2 4 mm pitch paper



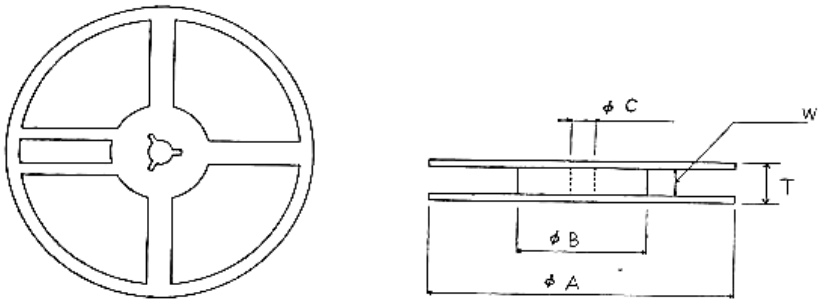
UNIT：mm

Type	A	B	W	F	E	P1	P2	P0	φD0	T
CNS34	2.0±0.15	3.6±0.2	8.0±0.2	3.5±0.05	1.75±0.1	4.0±0.1	2.0±0.05	4.0±0.1	1.5 +0.1 -0	0.84±0.1

UNIT：PCS

Package Type	Paper Tape	
	4 mm pitch	2 mm pitch
	178mm/R	178mm/R
CNS22		10000
CNS24		10000
CNS34	5000	

7.2 Reel Specifications：



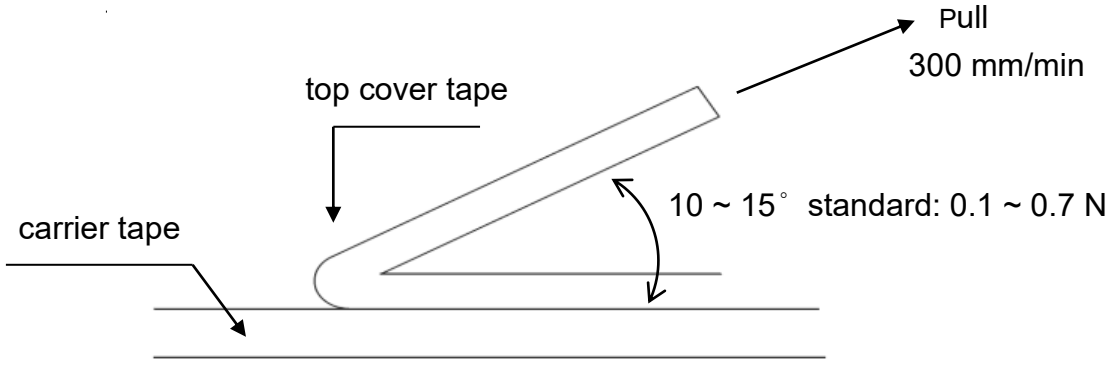
UNIT：mm

Type	ϕ A	ϕ B	ϕ C	W	T
CNS22/24/34	178.0 ± 2.0	60.0 ± 1.0	13.0 ± 1.0	9.0 ± 1.0	11.5 ± 1.0

7.3 Peel off Strength：

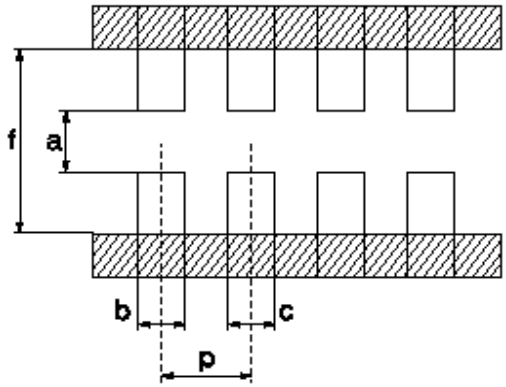
Peel –off force of paper and blister tape is in accordance with “JIS-C5202”

that is , 0.1 to 0.7 N at a peel-off speed of 300 mm / minute.



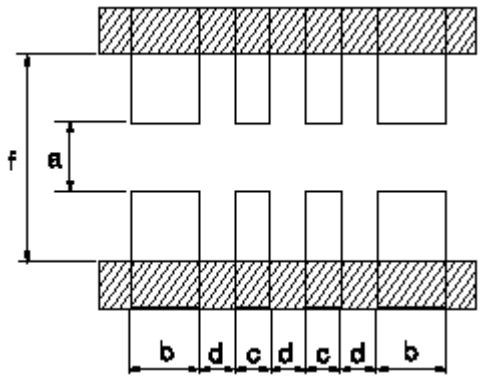
8. Recommended land patterns：

8.1 CNS22, CNS34：



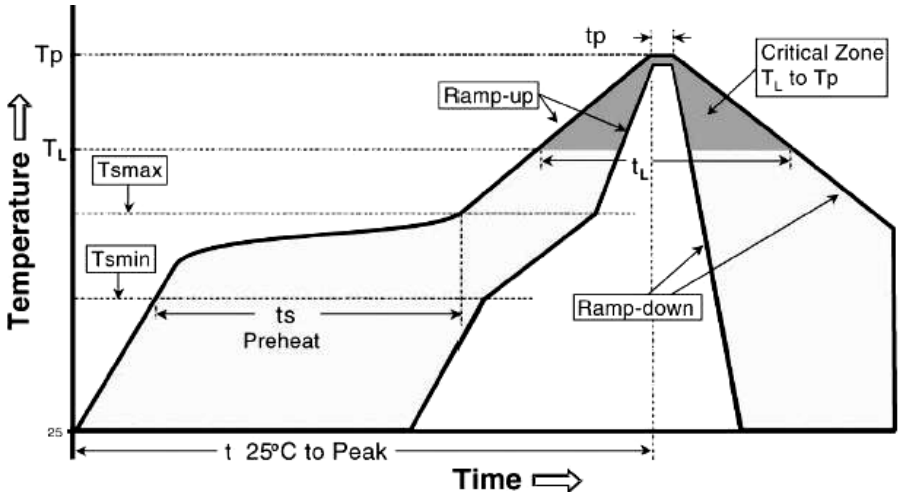
Type \ Land pattern Size		Dimension (mm)				
		a	b	c	p	f
CNS	22	0.5	0.35~0.4	0.35~0.4	0.65	1.4~1.5
CNS	34	0.7~0.9	0.4~0.5	0.4~0.5	0.8	2.2~2.6

8.2 CNS24：



Type \ Land pattern Size		Dimension (mm)				
		a	b	c	d	f
CNS	24	0.4	0.525	0.25	0.25	1.4

9. Recommend IR – Reflow profile：(solder : Sn96.5 / Ag3 / Cu0.5)



Profile Feature	Lead (Pb)-Free Assembly
Average ramp-up rate (Tsmax to Tp)	3℃ / second max.
Preheat - Temperature Min (Ts_{min}) - Temperature Max (Ts_{max}) - Time (Ts_{min} to Ts_{max}) (ts)	 150℃ 200℃ 60 -120 seconds
Time maintained above : - Temperature (T_L) - Time (T_L)	 217℃ 60-150 seconds
Peak Temperature (Tp)	260℃
Time within $^{+0}_{-5}$℃ of actual Peak Temperature $(tp)^2$	10 seconds
Ramp-down Rate	6℃/second max.
Time 25℃ to Peak Temperature	8minutes max.

Allowed Re-flow times：3 times

Remark：To avoid discoloration phenomena of chip on terminal electrodes, please use N2 Re-flow furnace.

10. Storage Conditions：

Temperature：5 to 35 ℃
Related Humidity：40 to 75% RH

11. Shelf Life：

2 Years from manufacturing date.

12. ECN：

Engineering Change Notice：The customer will be informed with ECN if there is significant modification on the characteristics and materials described in Approval Sheet.