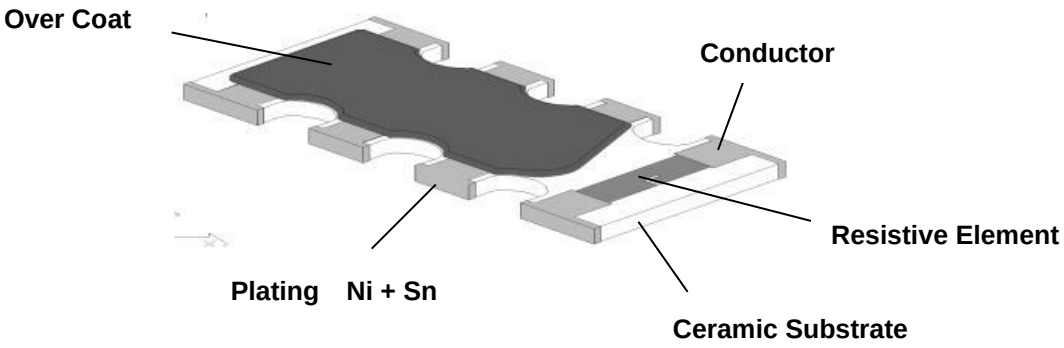
1. Scope :

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

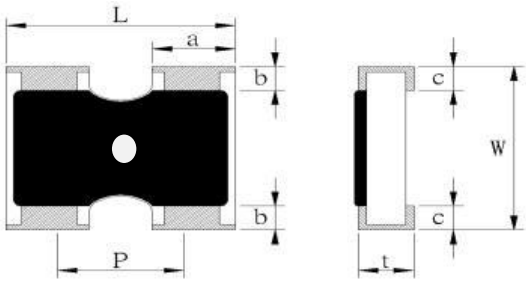
2. Construction , Dimensions , Schematic :

2.1 Construction :

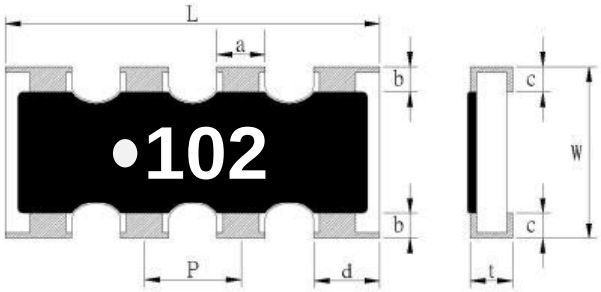


2.1.1 Chip Resistor Arrays :

CNS22



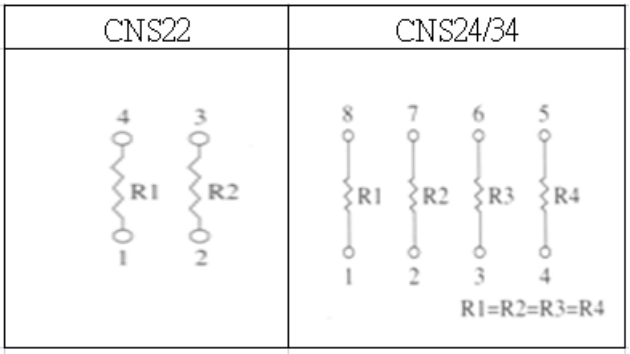
CNS24/34



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

2.3 Schematic :



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.

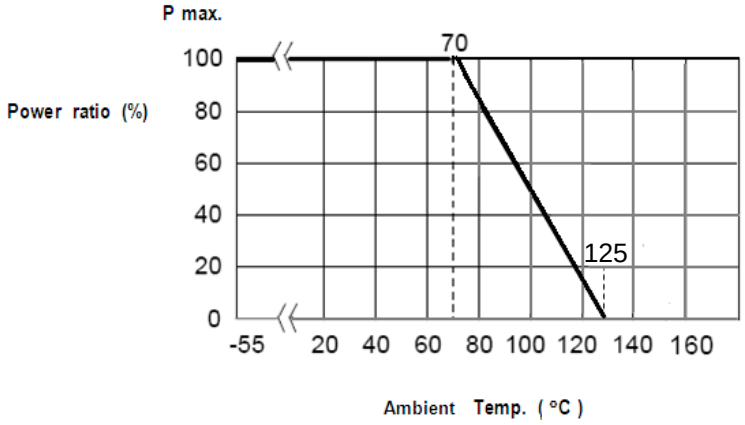


Figure 1

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：Mineral Spirits= 1：3 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. Note: 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	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

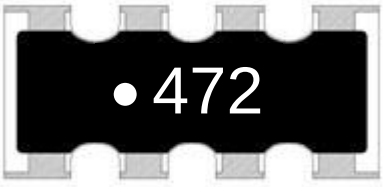
Note* : RCWV : Rated continuous working voltage .

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.

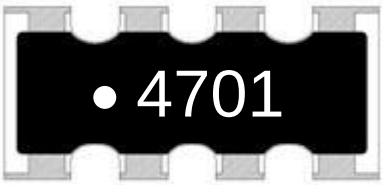
E.G. $472 = 47 \times 10^2 = 4700\,\Omega = 4.7K\,\Omega$



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.

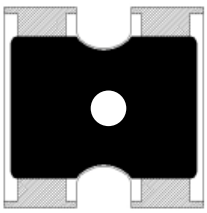
E.G. $4701 = 470 \times 10^1 = 4700\,\Omega = 4.7k\,\Omega$



6.3 CNS24 / 34

E.G. : 0 = 0Ω

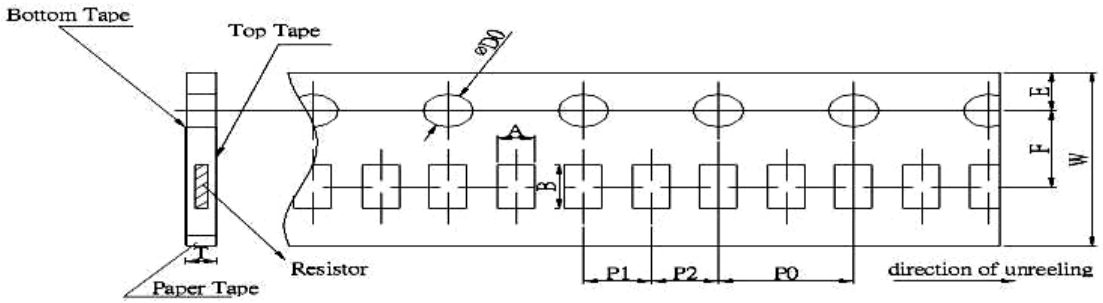
6.4 CNS22 :



7. Taping & Reel

7.1 Taping Dimensions

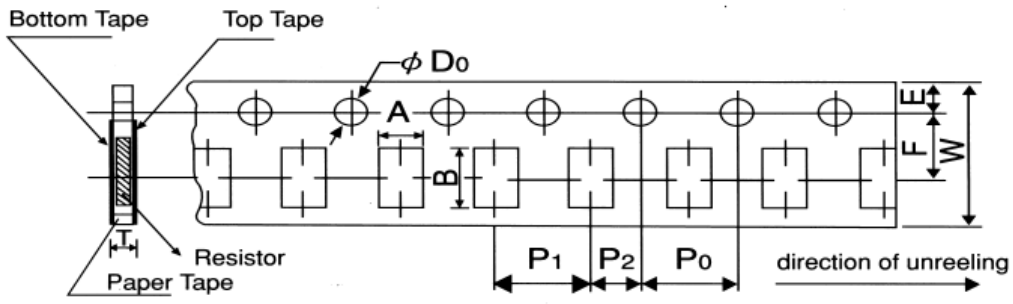
7.1.1 2 mm pitch paper



UNIT: mm

Type	A	B	W	F	E	P1	P2	P0	φ D0	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

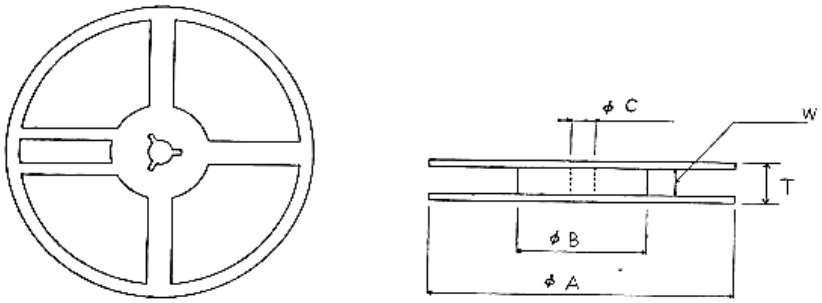


UNIT: mm

Type	A	B	W	F	E	P1	P2	P0	φ D0	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

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

7.2 Reel Specifications



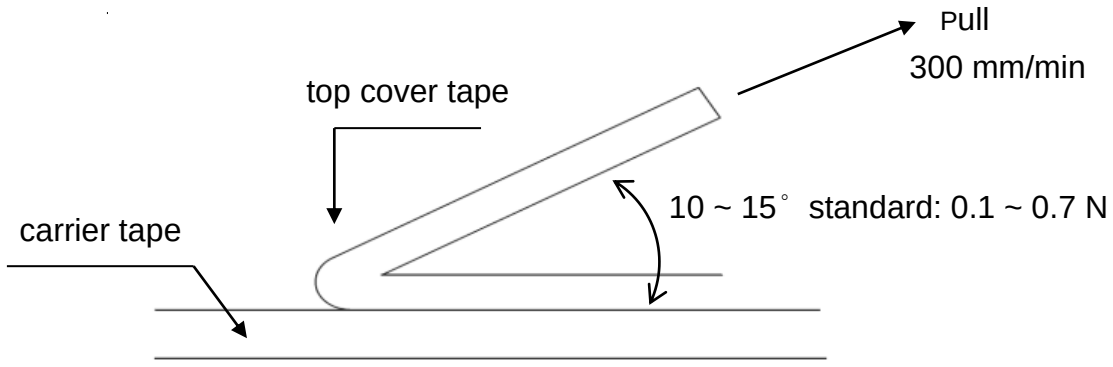
UNIT: mm

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:

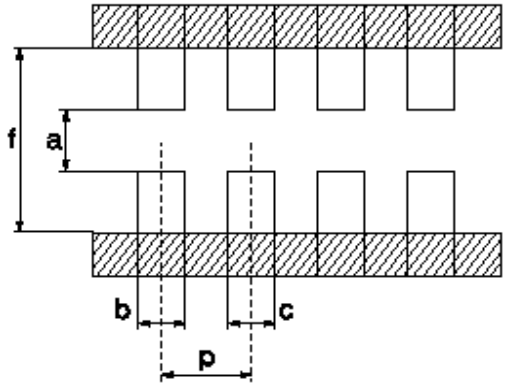
Peel –off force of paper and blister tape is in accordance with “JIS-C5202”

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



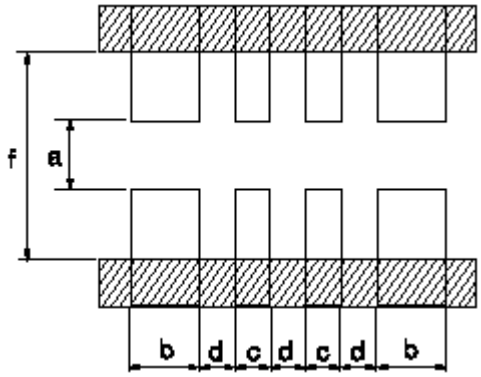
8. Recommended land patterns :

8.1 CNS22, CNS34



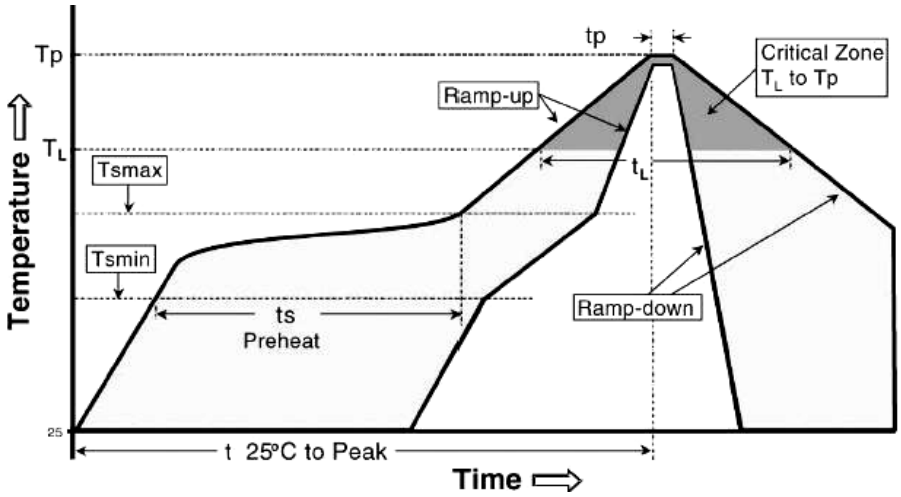
Type \ Land pattern Size		Dimension (mm)				
		a	b	c	p	f
CNS	22	0.5	0.35~0.4	0.35~0.4	0.65	1.4~1.5
CNS	34	0.7~0.9	0.4~0.5	0.4~0.5	0.8	2.2~2.6

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	8mimutes 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.

13. Manufacturing Country & City :

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Tel :(+86) 512-63457879 Fax : (+86) 512-63457869

(2) TA-I TECHNOLOGY ELECTRONIC (DONGGUAN) CO., LTD. (China –Dongguan)

Tel : (+86) 769-8339-4790～3 Fax : (+86) 769-8339-4794

(3) FORTUNE TASK ENTERPRISES LIMITED.(China – Dongguan)

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