KOA SPEER ELECTRONICS, INC.

RoHS COMPLIANT

spec sheet

SS-217 R4
AHA 8/16/12

ISO 9001:2000 CERTIFIED
TS-16949 CERTIFIED

Chip Networks Resistors
Type CNB & CND Series

1. Features

- Manufactured to type RK73 standards
- Four or eight bussed resistor elements included in one array
- Products with lead-free terminations meet EU RoHS requirements. EU RoHS regulation is not intended for Pb-glass contained in electrode, resistor element and glass.
- Concave or convex termnations
- Less board space than individual chips

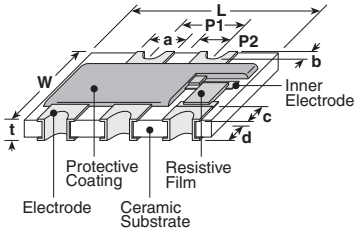
2. Dimensions

Size Code	Dimensions inches *(mm)*									
	L	W	t	P1	P2	a (top)	a (bot.)	b (ref.)	c (ref.)	d
2B9Z	.252±.008 *(6.4±0.2)*	.126±.008 *(3.2±0.2)*	.024±.004 *(0.6±0.1)*	.051±.004 *(1.3±0.1)*	.026±.004 *(0.65±0.1)*	.033 *(0.85)*	.024±.004 *(0.6±0.1)*	.006 *(0.15)*	.018 *(0.45)*	.024±.006 *(0.6±0.15)*
2E5Z	.126±.008 *(3.2±0.2)*	.098±.008 *(2.5±0.2)*	.024±.004 *(0.6±0.1)*	.039±.004 *(1.0±0.1)*	.020±.004 *(0.50±0.1)*	.026 *(0.65)*	.022±.004 *(0.55±0.1)*	.006 *(0.15)*	.012 *(0.3)*	.020±.006 *(0.5±0.15)*

Size Code	Figure No.	Dimensions inches *(mm)*										
		L	W	C	d	e	t	a (top)	a2	a (bot.)	b	p
1J10VK	2	.126±.004 *(3.2±0.1)*	.063±.004 *(1.6±0.1)*	.012±.008 *(0.3±0.2)*	.012±.004 *(0.3±0.1)*	—	.020±.004 *(0.5±0.1)*	.016±.004 *(0.4±0.1)*	—	.012 *(0.3)*	—	.025 *(0.64)*
1J10K	2	.126±.006 *(3.2±0.15)*	.063±.008 *(1.6±0.2)*	.012±.008 *(0.3±0.2)*	.010±.004 *(0.25±0.1)*	—	.020±.004 *(0.5±0.1)*	.016±.004 *(0.4±0.1)*	.022±.004 *(0.55±0.1)*	.012±.008 *(0.3±0.2)*	—	.025 *(0.64)*
1J10Y	1			.014±.004 *(0.35±0.1)*	.014±.004 *(0.35±0.1)*	.016±.006 *(0.4±0.15)*	.022±.004 *(0.55±0.1)*	.013±.006 *(0.33±0.15)*	—	.012±.004 *(0.3±0.1)*	.008±.004 *(0.2±0.1)*	
2A10Y	1	.157±.008 *(4.0±0.2)*	.083±.008 *(2.1±0.2)*	.010±.008 *(0.25±0.2)*	.016±.008 *(0.4±0.2)*	.020±.008 *(0.5±0.2)*	.024±.004 *(0.6±0.1)*	.020±.008 *(0.5±0.2)*	—	.016±.006 *(0.4±0.15)*	.006±.004 *(0.15±0.1)*	.031 *(0.8)*
2B10V	3	.252±.008 *(6.4±0.2)*	.122±.008 *(3.1±0.2)*	.014±.006 *(0.35±0.15)*	.022±.006 *(0.55±0.15)*	—	.024±.004 *(0.6±0.1)*	.024±.004 *(0.6±0.1)*	—	.024±.006 *(0.6±0.15)*	.006±.004 *(0.15±0.1)*	0.05 *(1.27)*
2B10												

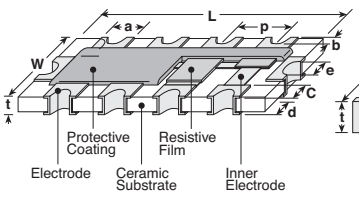
CNB

Figure 1



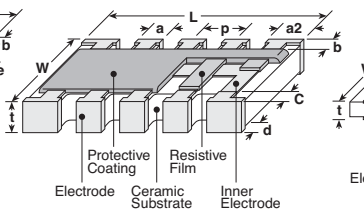
Concave

Figure 2

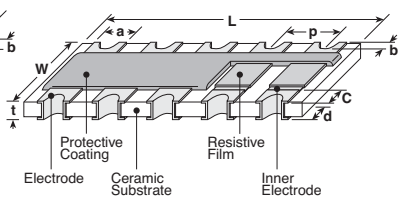


Convex

Figure 3



Concave



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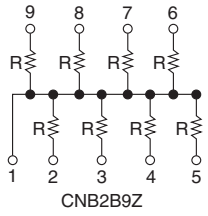
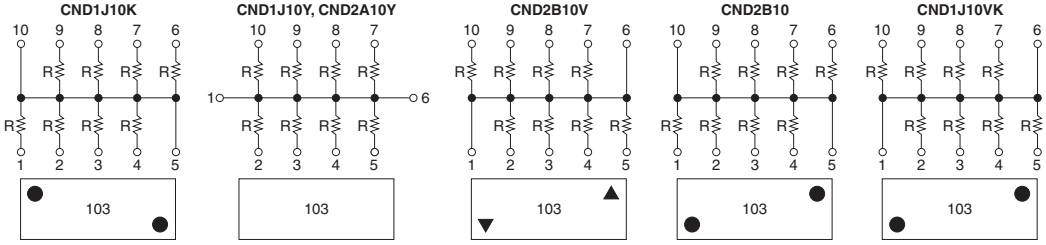
3. Type Designation

The type designation shall be the following form:

CNB	2B	9	Z	T	TE	103	J
Type	Size	Elements	Circuit Symbol	Termination Material	Packaging	Nominal Resistance	Tolerance
CNB CND	1J 2A 2B 2E	5 9 10	V: Reverse common electrode Y: Side electrode type Nil: Standard Z: for CNB	T: Sn (Other termination styles may be available, please contact factory for options)	TD: 7" Paper Taping TE: 7" Embossed Taping	2 significant figures + 1 multiplier	J: ±5%

4. Circuit Construction





5. Standard Applications

Part Designation	Power Rating @ 70°C (Per Element)	T.C.R. (ppm/°C) Max.	Resistance Range E-3*, E-12**	Resistance Tolerance	Absolute Maximum Working Voltage	Maximum Overload Voltage (5 Secs. Max.)	Operating Temperature Range
CNB2B9Z	1/16W (.063W)	±200	1KΩ - 470KΩ	J: ±5%	50V	100V	-55°C to +125°C
CNB2E5Z							
CND1J10VK	.031	±200	47Ω - 39kΩ	J: ±5%	25V	50V	-55°C to +125°C
CND1J10K							
CND1J10Y	.05		22Ω - 39KΩ				
CND2A10Y	.063		100Ω - 100KΩ		50V	100V	
CND2B10V							
CND2B10							

* E-3 significant figures (per decade) are 1.0, 2.2 and 4.7.
** E-12 CND only

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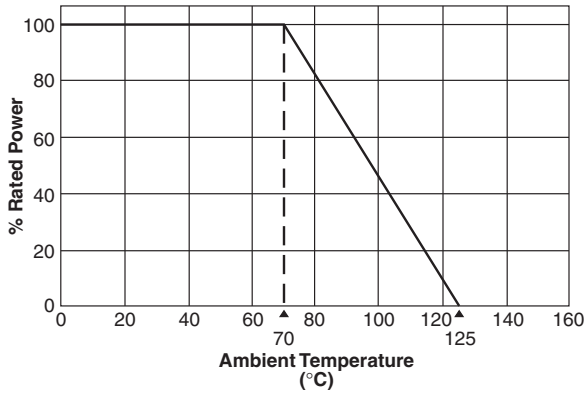
6. Environmental Applications

For temperature in excess of 70°C, the load shall be derated in accordance with the following figure.

Derating Curve



6-2 Voltage Rating

Resistors shall have a rated direct-current (DC) continuous working voltage or approximate sine-wave root-mean-square (R.M.S.) continuous working voltage at commercial-line frequency and wave-form corresponding the power rating as determined from the following formula:

$$E = \sqrt{P \bullet R}$$

Where: E: Rated Voltage (V)
P: Power Rating (W)
R: Nominal Resistance (Ω)

However, if the rated voltage thus obtained surpasses the specified maximum working voltage, it shall be considered the rated voltage.

7. Performance

CNB

Parameter	Requirement Δ R ±% Limit	Typical	Test Method
Resistance	Within regulated tolerance	—	25°C
T.C.R.	Within specified T.C.R.	—	+25°C/-55°C, +25°C/+125°C
Overload (Short time)	±2.0%	±0.5%	Rated voltage x 2.5 for 5 seconds
Resistance to Solder Heat	±1.0%	±0.25%	260°C ± 5°C, 10 seconds ± 1 second
Rapid Change of Temperature	±1.0%	±1.0%	-55°C (30 minutes), +125°C (30 minutes), 5 cycles
Moisture Resistance	±5.0%	±1.0%	40°C ± 2°C, 90 - 95% RH, 1000 hours, 1.5 hr ON, 0.5 hr OFF cycle
Endurance at 70°C	±5.0%	±0.5%	70°C ± 2°C, 1000 hours, 1.5 hr ON, 0.5 hr OFF cycle
Low Temperature Operation	±1.0%	±0.2%	-55°C, 1 hour
High Temperature Exposure	±1.0%	±0.2%	+125°C, 1000 hours

CND

Parameter	Requirement Δ R ±1% Limit	Typical	Test Method
Resistance	Within specified tolerance	—	25°C
T.C.R.	Within specified T.C.R.	—	+25°C/-55°C, +25°C/+125°C
Overload (Short time)	±2.0%	±0.5%	Rated voltage x 2.5 for 5 seconds
Resistance to Solder Heat	±1.0%	±0.25%	260°C ± 5°C, 10 seconds ± 1 second
Rapid Change of Temperature	±1.0%	±0.25%	-55°C (30 minutes), +125°C (30 minutes), 5 cycles
Moisture Resistance	±5.0%	±1.0%	40°C ± 2°C, 90 - 95% RH, 1000 hours, 1.5 hr ON, 0.5 hr OFF cycle
Endurance at 70°C	±5.0%	±1.0%	70°C ± 2°C, 1000 hours, 1.5 hr ON, 0.5 hr OFF cycle
Low Temperature Operation	±1.0%	±0.2%	-55°C, 1 hour
High Temperature Exposure	±1.0%	±0.2%	+125°C, 1000 hours

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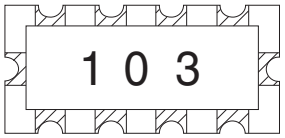
8. Body Color and Marking

Body Color: Black
Marking Color: White



103

Nominal resistance at 3-digit numbers

3-digit numbers
The first and the second numbers show
2 effective numbers, the third number shows
a multiple of 10.

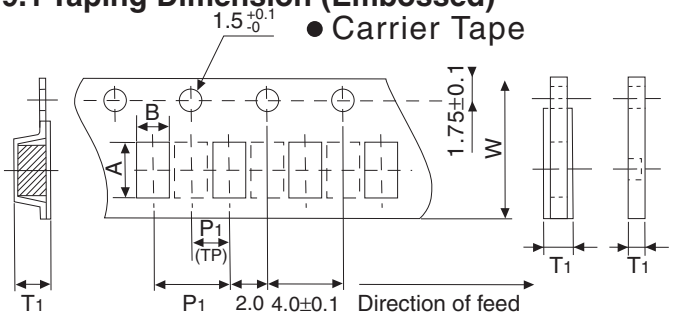
Example: 103 ⟶ 10,000Ω ⟶ 10kΩ
472 ⟶ 4,700Ω ⟶ 4.7kΩ

9. Taping

Tape material and quantity per reel

Tape material	Tape width	Quantity/Reel (pcs.)
Embossed	.472 in. (12 mm)	4,000

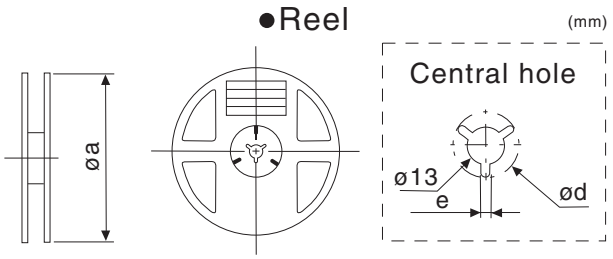
9.1 Taping Dimension (Embossed)



(Notes) Dotted lines are applicable to only "TP" and "TB."

Type		Component Size (mm) L	W	T	Carrier Tape	Quantity/ Reel (Pieces)	Taping (mm) A	B	W	P1	T1	Reel Size
CND	2B10	6.40	3.1	0.6	TE	4000	6.6±0.2	3.4±0.2	12.0±0.1	4.0±0.1	1±0.15	178
	1J10	3.20	1.6	0.55	TD	5000	3.5±0.1	2.0±0.1	8.0±0.2	4.0±0.1	0.75+0.2/-0	178
	2A10	4.00	2.1	0.6	TE	4000	4.45±0.2	2.5±0.2	12.0±0.1	4.0±0.1	1±0.15	178
CNB	2B5Z	3.2	2.5	0.6	TE	4000	3.5±0.2	3.0±0.2	8.0±0.2	4.0±0.1	1±0.15	178
	2E9Z	6.40	3.2		TE	4000	6.7±0.2	3.5±0.2	12.0±0.1	4.0±0.1	1±0.15	178

10. Reel (Polystyrene Reel)



Type	ød (mm)	e (mm)
All	21	2

(Notes) Reel holes, shapes and design are examples

11. Reel Marking

The reel must be marked as follows:
(1) Type designation
(2) Nominal resistance
(3) Quantity
(4) Production lot number
(5) Manufacturer's name
(6) Customer's code number
(7) Order number

Lot Number

Lot number (8 digits)

23	12	8	001
Production year, month	Date	Factory	Continuous number

8	KT & T factory

11~22	January 2011 ~ December 2011
23~34	January 2012 ~ December 2012

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