KOA SPEER ELECTRONICS, INC.

CW, CWP, CWH

coat insulated, precision coat insulated and miniature wirewound leaded resistors

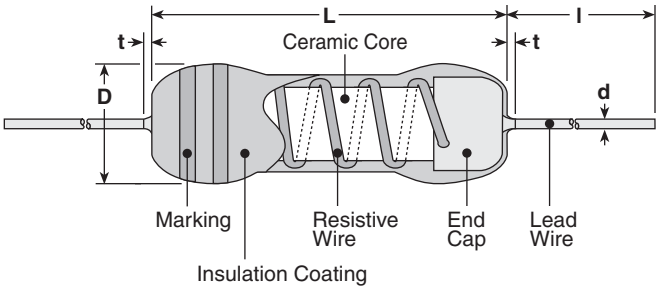


EU RoHS COMPLIANT

features

- Flameproof silicone coating equivalent (UL94V0)
- CWH resistors meet MIL-PRF-26 (U characteristics)
- CWH high precision resistors with T.C.R. less than ±50x10^{-6}/K
- Suitable for automatic machine insertion
- Various types of formings are available
- Excellent in pulse characteristic
- Marking: Blue body color: CW, CW_X, CW_P
  Black body color: CW1S, CW1SSCT52A100J, CWH
  Color-code: CW, CW_X, CW1SSCT52A100J (two silver lines)
  Alpha-numeric: CW_P, CW1S, CWH
- Products with lead-free terminations meet EU RoHS and China RoHS requirements
- CW1SSCT52A100J has UL1412 approval
- Surface mount style “N” forming is suitable for automatic mounting CW, CWP

dimensions and construction



Type	Dimensions inches (mm) L	t (max.)	D	d (nom.)	l*
CW1/4	.13±.012 (3.3±0.3)	.02 (0.5)	.075±.012 (1.9±0.3)	.018 (0.45)	1.18±.118 (30.0±3.0)
CW1/2	.256±.039 (6.5±1.0)	.039 (1.0)	.098±.039 (2.5±1.0)	.024 (0.6)	
CW1	.374±.039 (9.5±1.0)	.118 (3.0)	.138±.039 (3.5±1.0)	.031 (0.8)	
CW1X			$.138^{+.039}_{-0}$ $(3.5^{+1.5}_{-0})$		
CW1P			.138±.039 (3.5±1.0)		
CW2	.472±.039 (12.0±1.0)		.157±.039 (4.0±1.0)		
CW2X			$.157^{+.039}_{-0}$ $(4.0^{+1.5}_{-0})$		
CW2P			.157±.039 (4.0±1.0)		
CW3	.591±.039 (15.0±1.0)		.236±.039 (6.0±1.0)		
CW3X			$.236^{+.039}_{-0}$ $(6.0^{+1.5}_{-0})$		
CW3P			.236±.039 (6.0±1.0)		
CW5	.945±.059 (24.0±1.5)		.354±.039 (9.0±1.5)		1.50±.118 (38.0±3.0)
CW1S	.256±.039 (6.5±1.0)	.039 (1.0)	.098±.039 (2.5±1.0)	.024 (0.6)	1.18±.118 (30.0±3.0)
CW1SS					
CW1H	.374±.039 (9.5±1.0)	.118 (3.0)	.138±.039 (3.5±1.0)	.031 (0.8)	1.18±.118 (30.0±3.0)
CW2H	.472±.039 (12.0±1.0)		.157±.039 (4.0±1.0)		
CW3H	.591±.039 (15.0±1.0)		.236±.039 (6.0±1.0)		

* Lead length changes depending on taping and forming type.

Specifications given herein may be changed at any time without prior notice. Please confirm technical specifications before you order and/or use. 12/18/12

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ordering information

New Part #

CW	1/2	P	C	T52	A	103	F
Type	**Power Rating**	**Style**	**Termination Material**	**Taping and Forming**	**Packaging**	**Nominal Resistance**	**Tolerance**
	1/4: 0.25W 1/2: 0.5W 1: 1W 2: 2W 3: 3W 5: 5W	H: Stability Nil: Power P: Precision S: Small X: Power SS: Small type, UL Approved	C: SnCu	Axial: T26, T52, T521, T631 Stand-off Axial: L52A, L52B Radial: VTP, GT L forming: L12.5A, L15A, L20A, L25A N forming: N17	A: Ammo R: Reel TEB: Embossed plastic (N forming)	±2%, ±5%: 2 significant figures + 1 multiplier "R" indicates decimal on value <10Ω ±1%: 3 significant figures + 1 multiplier "R" indicates decimal on value <100Ω	C: ±0.25% D: ±0.5% F: ±1% G: ±2% J: ±5% K: ±10%

For further information on packaging, please refer to Appendix C.

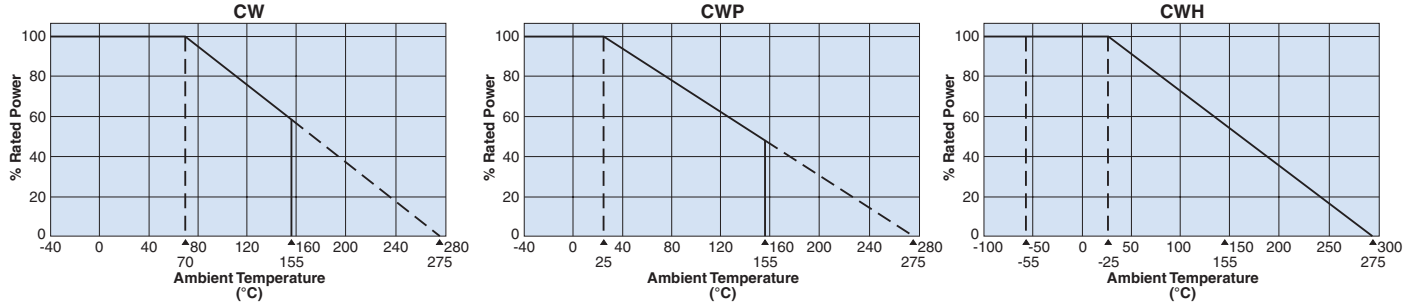
applications and ratings

Part Designation	Power Rating	T.C.R. (ppm/°C) Max.	Resistance Range (Ω) E-24, E-96 (C±0.25%)	E-24, E-96 (D±0.5%)	E-24, E-96 (F±1%)	E-24 (G±2%)	E-24 (J±5%)	E-24 (K±10%)	Rated Ambient Temperature	Operating Temperature Range
CW1/4	0.25W	±250	—	—	—	—	0.47 - 15	0.47 - 15	+70°C	-40°C to +155°C
CW1/2	0.5W						0.1 - 100	0.1 - 100		
CW1	1.0W					0.1 - 390	0.1 - 390	—		
CW2	2.0W					0.1 - 390	0.1 - 390			
CW3	3.0W					0.1 - 390	0.1 - 390			
CW5	5.0W					0.1 - 390	0.1 - 390			
CW1X	1.0W	±500	—	—	—	—	0.01 - 0.091	0.01 - 0.091		
CW2X	2.0W						0.01 - 0.091	0.01 - 0.091		
CW3X	3.0W						0.01 - 0.091	0.01 - 0.091		
CW1S	1.0W	±250	—	—	—	—	0.1 - 100	0.1 - 100		
CW1SS	1.0W	±100	—	—	—	—	10	—		
CW1P	1.0W	±90: R≥10Ω* ±50: R<10Ω	1 - 100	0.47 - 220	0.1 - 430	—	—	—	+25°C	
CW2P	2.0W		1 - 390	0.47 - 390	0.1 - 390					
CW3P	3.0W		1 - 390	0.47 - 390	0.1 - 390					
CW1H	1.0W	±20: R≥10Ω ±50: R<10Ω	—	0.47 - 220	0.1 - 430	—	—	—	+25°C	-55°C to +275°C
CW2H	2.0W			0.47 - 750	0.1 - 2k					
CW3H	3.0W			0.47 - 1k	0.1 - 3k					

* T.C.R. = 20ppm/°C available on request

environmental applications

Derating Curve



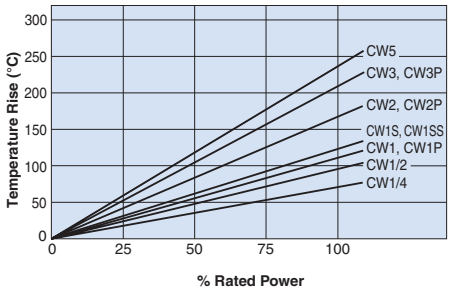
For resistors operated at an ambient temperature of 25°C or above, a power rating shall be derated in accordance with the above derating curve.

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1/05/13

environmental applications

Surface Temperature Rise



Fixing board: t=1.2
Material: Glass epoxy board

Performance Characteristics

Parameter	Requirement Δ R ±(% + 0.05Ω) Limit	Typical	Test Method
Resistance	Within regulated tolerance	—	25°C
T.C.R.	Within specified T.C.R.	—	CW: Room temperature/100°C up CWP: +25°C/-40°C and +25°C/+155°C CWH: +25°C/-55°C and +25°C/+155°C
Overload (Short Time)	1%: CW, CWX 0.5%: CWP 2%: CW1S, CW1SS 0.2%: CWP(R<10Ω)*, CWH	0.8%: CW, CWX 0.4: CWP 1.8%: CW1S, CW1SS 0.18%:CWP(R<10Ω) 0.15%: CWH	CW,CWX,CW1S,CW1SS: Power rating x 10 for 5 seconds CWP: Power rating x 6.25 for 5 seconds CWP (R<10Ω), CWH: Power rating x 5 for 5 seconds
Resistance to Solder Heat	1%: CW,CW1S,CW1SS,CWX 0.5%: CWP 0.2%: CWP (R<10Ω)*, CWH	0.8%: CW,CW1S,CW1SS,CWX 0.4%: CWP 0.18%: CWP (R<10Ω) 0.15%: CWH	350°C ± 10°C for 3.5 seconds or 260°C ± 5°C for 10 seconds
Moisture Resistance	5%: CW, CW1S, CWX 2%: CWP 0.5%: CWP (R<10Ω)*	4%: CW, CW1S, CWX 1.6%: CWP 0.45%: CWP (R<10Ω)	Power rating x 1/10, 40°C, 90 - 95% RH, 1000 hours, 1.5 hr ON, 0.5 hr OFF cycle
Endurance @ 70°C	5%: CW,CW1S,CW1SS,CWX 2%: CWP 0.5%: CWP (R<10Ω)*	4%: CW,CW1S,CW1SS,CWX 1.6%: CWP 0.45%: CWP (R<10Ω)	70°C, 1000 hours (CW, CWX, CW1S, CW1SS), 25°C, 1000 hours (CWP) 1.5 hr ON, 0.5 hr OFF cycle
Resistance to Solvent	No evidence of damage to protective coating and marking	—	After immersing the sample in IPA for 3 min., the resistor surface should be wiped with a dry cloth (velvet or gauze)
Low Temperature	0.2%: CWH	0.15%: CWH	-65°C, 24 hours
High Temperature	0.5%: CWH	0.45%: CWH	+275°C, 250 hours
Thunder Surge	3%: CW1SS	—	Combination wave, +1.5kV 20 seconds 3 cycles
Load Life	0.5%: CWH	0.45%: CWH	-25°C, rated power, 1.5 hr ON, 0.5 hr OFF 2000 hours

* Refer to MIL-PRF-26G standard