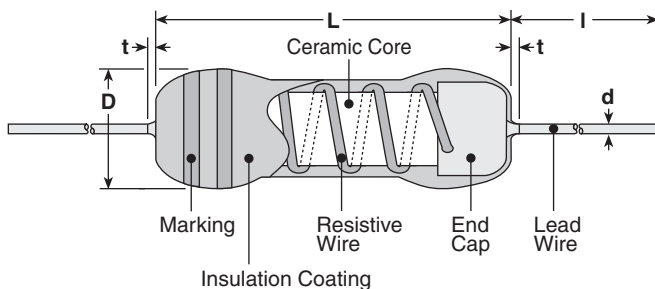




features

- Flameproof silicone coating equivalent (UL94V0)
- CWH resistors meet MIL-PRF-26 (U characteristics)
- CWH high precision resistors with T.C.R. less than $\pm 50 \times 10^{-6}/K$
- 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
- CW1SS has UL1412 approval (File No. E320246)
- 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.)	I*
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 ^{+.006} ₋₀ (3.5±1.5)		
CW1P			.138±.039 (3.5±1.0)		
CW2	.157±.039 (4.0±1.0)				
CW2X	.157 ^{+.006} ₋₀ (4.0±1.5)				
CW2P	.157±.039 (4.0±1.0)				
CW3	.591±.039 (15.0±1.0)		.236±.039 (6.0±1.0)		
CW3X			.236 ^{+.006} ₋₀ (6.0±1.5)		
CW3P			.236±.039 (6.0±1.0)		
CW5	.945±.006 (24.0±1.5)		.354±.006 (9.0±1.5)		
CW1S	.256±.039 (6.5±1.0)	.039 (1.0)	.098±.039 (2.5±1.0)	.024 (0.6)	
CW1SS					
CW1H	.354±.039 (9.0±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.

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, N20	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.

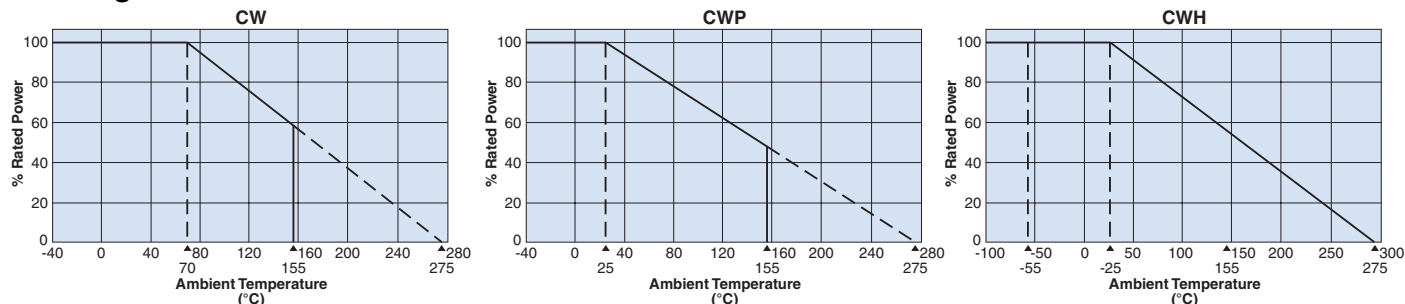
applications and ratings

Part Designation	Power Rating	T.C.R. (ppm/°C) Max.	Resistance Range (Ω)						Rated Ambient Temperature	Operating Temperature Range		
			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%)				
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	-55°C to +275°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			
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 CW_H: Max. Working Voltage: $E = \sqrt{P \times R}$ CW_H: Max. Overload Voltage: $E = \sqrt{P \times R \times 5}$

environmental applications

Derating Curve



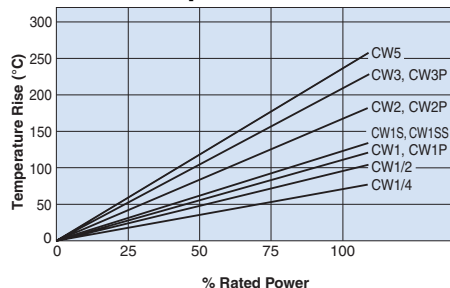
For resistors operated at an ambient temperature of 25°C or above, a power rating shall be derated in accordance with the above derating curve.

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

12/27/13

environmental applications

Surface Temperature Rise



Fixing board: $t=1.2$
Material: Glass epoxy board

Performance Characteristics

Parameter	Requirement Limit	ΔR (% + 0.05%) 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/+125°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, power rating, 1.5 hr ON, 0.5 hr OFF 2000 hours

* Refer to MIL-PRF-26G standard