

# CAR Series

Thin Film Precision Chip Resistor



- Resistances from 1 Ohm to 3M Ohms
- Power Rating 0.06 to 0.75 Watt
- Resistance Tolerances to  $\pm 0.01\%$
- TCR's to  $\pm 5$  ppm/ $^{\circ}\text{C}$
- Sizes: 0402 / 0603 / 0805 / 1206 / 2010 / 2512
- Operating Temperature:  $-55^{\circ}\text{C}$  to  $155^{\circ}\text{C}$



## SPECIFICATIONS - STANDARD

Package Size	Power Rating (W) at 70°C	MAX Operating Voltage <sup>1</sup>	MAX Overload Voltage <sup>2</sup>	Resistance Range						TCR PPM/ $^{\circ}\text{C}$
				$\pm 0.01\%$	$\pm 0.05\%$	$\pm 0.1\%$	$\pm 0.25\%$	$\pm 0.5\%$	$\pm 1\%$	
0402	0.0625	25V	50V	49.9 $\Omega$ - 4.99K $\Omega$						$\pm 5$
				49.9 $\Omega$ - 12K $\Omega$						$\pm 10$
				49.9 $\Omega$ - 12K $\Omega$			49.9 $\Omega$ - 69.8K $\Omega$			$\pm 15$
				-	49.9 $\Omega$ - 12K $\Omega$		10 $\Omega$ - 255K $\Omega$		$\pm 25$	
				-	49.9 $\Omega$ - 12K $\Omega$		10 $\Omega$ - 255K $\Omega$	1 $\Omega$ - 255K $\Omega$		$\pm 50$
0603	0.0625	50V	100V	24.9 $\Omega$ - 15K $\Omega$						$\pm 5$
				24.9 $\Omega$ - 100K $\Omega$	4.7 $\Omega$ - 332K $\Omega$					$\pm 10$
				-	4.7 $\Omega$ - 332K $\Omega$	4.7 $\Omega$ - 1M $\Omega$	2 $\Omega$ - 1M $\Omega$			$\pm 25$
				-	4.7 $\Omega$ - 332K $\Omega$	4.7 $\Omega$ - 1M $\Omega$	1 $\Omega$ - 1M $\Omega$			$\pm 50$
				24.9 $\Omega$ - 30K $\Omega$						$\pm 5$
0805	0.100	100V	200V	24.9 $\Omega$ - 30K $\Omega$						$\pm 5$
				24.9 $\Omega$ - 200K $\Omega$	4.7 $\Omega$ - 511K $\Omega$					$\pm 10$
				-	4.7 $\Omega$ - 511K $\Omega$	4.7 $\Omega$ - 2M $\Omega$	1 $\Omega$ - 2M $\Omega$			$\pm 25$
				-	4.7 $\Omega$ - 511K $\Omega$	4.7 $\Omega$ - 2M $\Omega$	1 $\Omega$ - 2M $\Omega$			$\pm 50$
				24.9 $\Omega$ - 49.9K $\Omega$						$\pm 5$
1206	0.125	150V	300V	24.9 $\Omega$ - 49.9K $\Omega$						$\pm 5$
				24.9 $\Omega$ - 499K $\Omega$	4.7 $\Omega$ - 1M $\Omega$					$\pm 10$
				-	4.7 $\Omega$ - 1M $\Omega$	4.7 $\Omega$ - 2.49M $\Omega$	1 $\Omega$ - 2.49M $\Omega$			$\pm 25$
				-	4.7 $\Omega$ - 1M $\Omega$	4.7 $\Omega$ - 2.49M $\Omega$	1 $\Omega$ - 2.49M $\Omega$			$\pm 50$
				24.9 $\Omega$ - 100K $\Omega$						$\pm 5$
2010	0.250	150V	300V	24.9 $\Omega$ - 100K $\Omega$						$\pm 5$
				24.9 $\Omega$ - 499K $\Omega$	4.7 $\Omega$ - 1M $\Omega$					$\pm 10$
				-	4.7 $\Omega$ - 1M $\Omega$	4.7 $\Omega$ - 3M $\Omega$	1 $\Omega$ - 3M $\Omega$			$\pm 25$
				-	4.7 $\Omega$ - 1M $\Omega$	4.7 $\Omega$ - 3M $\Omega$	1 $\Omega$ - 3M $\Omega$			$\pm 50$
				24.9 $\Omega$ - 100K $\Omega$						$\pm 5$
2512	0.500	150V	300V	24.9 $\Omega$ - 100K $\Omega$						$\pm 5$
				24.9 $\Omega$ - 499K $\Omega$	4.7 $\Omega$ - 1M $\Omega$					$\pm 10$
				-	4.7 $\Omega$ - 1M $\Omega$	4.7 $\Omega$ - 3M $\Omega$	1 $\Omega$ - 3M $\Omega$			$\pm 25$
				-	4.7 $\Omega$ - 1M $\Omega$	4.7 $\Omega$ - 3M $\Omega$	1 $\Omega$ - 3M $\Omega$			$\pm 50$
				24.9 $\Omega$ - 100K $\Omega$						$\pm 5$

<sup>1</sup> Operating Voltage =  $\sqrt{P \cdot R}$  or MAX Listed, whichever is lower.

<sup>2</sup> Overload Voltage =  $2.5 \cdot \sqrt{P \cdot R}$  or MAX Listed, whichever is lower.

## SPECIFICATIONS - HIGH POWER RATING

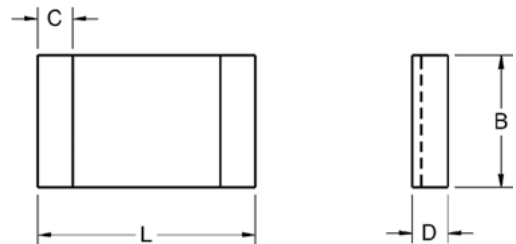
Package Size	Power Rating (W) at 70°C	MAX Operating Voltage <sup>1</sup>	MAX Overload Voltage <sup>2</sup>	Resistance Range						TCR PPM/°C
				±0.01%	±0.05%	±0.1%	±0.25%	±0.5%	±1%	
0603 HP	0.100	75V	150V	24.9Ω - 15KΩ						±5
				24.9Ω - 100KΩ	4.7Ω - 332KΩ	4.7Ω - 332KΩ				±10
						4.7Ω - 1MΩ				±15
						4.7Ω - 1MΩ				±25
4.7Ω - 1MΩ				±50						
0805 HP	0.125	150V	300V	24.9Ω - 30KΩ						±5
				24.9Ω - 200KΩ	4.7Ω - 511KΩ	4.7Ω - 511KΩ				±10
						4.7Ω - 1MΩ				±15
						4.7Ω - 1MΩ	1Ω - 1MΩ			±25
4.7Ω - 1MΩ				±50						
1206 HP	0.250	200V	400V	24.9Ω - 49.9KΩ						±5
				24.9Ω - 499KΩ	4.7Ω - 1MΩ				±10	
					4.7Ω - 1MΩ				±15	
					4.7Ω - 1MΩ				±25	
4.7Ω - 1MΩ				±50						
2010 HP	0.333	200V	400V	24.9Ω - 49.9KΩ						±5
				24.9Ω - 499KΩ	4.7Ω - 1MΩ				±10	
					4.7Ω - 1MΩ				±15	
					4.7Ω - 1MΩ				±25	
4.7Ω - 1MΩ				±50						
2512 HP	0.750	200V	400V	24.9Ω - 2KΩ	4.7Ω - 2KΩ	1Ω - 2KΩ			±10	
						1Ω - 2KΩ			±15	
						1Ω - 2KΩ			±25	
						1Ω - 2KΩ			±50	

<sup>1</sup> Operating Voltage =  $\sqrt{P \cdot R}$  or MAX Listed, whichever is lower.

<sup>2</sup> Overload Voltage =  $2.5 \cdot \sqrt{P \cdot R}$  or MAX Listed, whichever is lower.

### Dimensions

Type	L mm [inches]	B mm [inches]	D mm [inches]	C mm [inches]
CAR0402	1.00 [0.04]	0.50 [0.02]	0.3 [0.012]	0.2 [0.007]
CAR0603	1.55 [0.06]	0.80 [0.03]	0.45 [0.018]	0.3 [0.012]
CAR0805	2.00 [0.08]	1.25 [0.05]	0.55 [0.022]	0.3 [0.012]
CAR1206	3.05 [0.12]	1.55 [0.06]	0.55 [0.022]	0.42 [0.016]
CAR2010	4.90 [0.19]	2.40 [0.09]	0.55 [0.022]	0.6 [0.023]
CAR2512	6.30 [0.25]	3.10 [0.12]	0.55 [0.022]	0.6 [0.023]

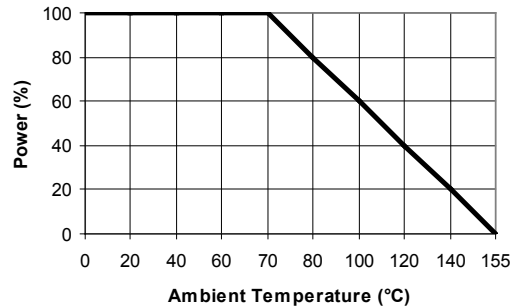


# CAR Series

Thin Film Precision Chip Resistor



Power Derating Curve



## Environmental Characteristics

Test	Requirement		Conditions
	Tol. < 0.05%	Tol. >0.05%	
TCR	As Spec.		+25/-55/+25/+125/+25°C
Short Time Overload	$\Delta R \pm 0.05\%$	$\Delta R \pm 0.2\%$	RCWV*2.5 or Max. overload voltage for 5 seconds
	$\Delta R \pm 0.2\%$ for high power rating		
Insulation Resistance	>1000 M $\Omega$		Apply 100VDC for 1 minute
Load Life	$\Delta R \pm 0.05\%$	$\Delta R \pm 0.2\%$	70 $\pm$ 2°C, Max. working voltage for 1000 hrs with 1.5 hrs "ON" and 0.5 hrs "OFF"
	>7k $\Omega$ $\Delta R \pm 0.5\%$		
	$\Delta R \pm 0.5\%$ for high power rating		
Damp Heat with Load	$\Delta R \pm 0.05\%$	$\Delta R \pm 0.3\%$	40 $\pm$ 2°C, 90~95% R.H. Max. working voltage for 1000 hrs with 1.5 hrs "ON" and 0.5 hrs "OFF"
	$\Delta R \pm 0.5\%$ for high power rating		
Bending Strength	$\Delta R \pm 0.05\%$	$\Delta R \pm 0.2\%$	Bending amplitude 3 mm for 10 seconds
Solderability	95% min. coverage		245 $\pm$ 5°C for 3 seconds
Resistance to Soldering Heat	$\Delta R \pm 0.05\%$	$\Delta R \pm 0.2\%$	260 $\pm$ 5°C for 10 seconds
Thermal Shock	$\Delta R \pm 0.05\%$	$\Delta R \pm 0.25\%$	-55°C~150°C, 100 cycles
Low Temperature Operation	$\Delta R \pm 0.05\%$	$\Delta R \pm 0.2\%$	1 hour, -65°C, followed by 45 minutes of RCWV
	$\Delta R \pm 0.5\%$ for high power rating		

## Ordering Information

Part Description: Part Type - Package Size- Resistance - Tolerance - TCR - HP option

Example: CAR0402 50 Ohms 0.05% 25ppm HP

(Note: if no TCR is specified: The highest value will be supplied)