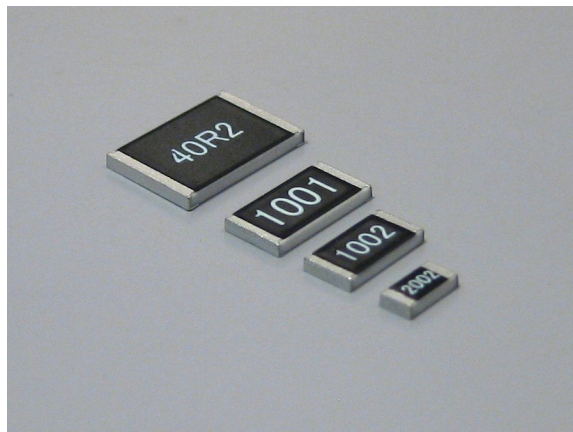


## Precision Thin Film Chip

CAR0402, CAR0603, CAR0805,  
CAR1206, CAR2010, CAR2512

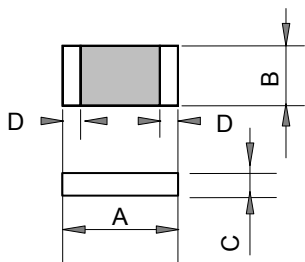


### Features and Applications

- Resistances from 1ohm to 3Mohm
- Power Rating 0.0625 to 0.75Watt
- Resistance Tolerances  $\pm 0.01$  to  $\pm 1\%$
- TCR's  $\pm 50$  to  $\pm 5\text{ppm}/^\circ\text{C}$
- Size: 0402 / 0603 / 0805 / 1206 / 2010 / 2512

Applications includes industrial measurement, control electronics and automatic test equipment.

### Dimensional Specifications (mm)



	CAR0402	CAR0603	CAR0805	CAR1206	CAR2010	CAR2512
A	1.00 $\pm 0.05$	1.55 $\pm 0.10$	2.00 $\pm 0.15$	3.05 $\pm 0.15$	4.90 $\pm 0.15$	6.30 $\pm 0.15$
B	0.5 $\pm 0.05$	0.80 $\pm 0.10$	1.25 $\pm 0.15$	1.55 $\pm 0.15$	2.40 $\pm 0.15$	3.10 $\pm 0.15$
C	0.3 $\pm 0.05$	0.45 $\pm 0.10$	0.55 $\pm 0.10$	0.55 $\pm 0.10$	0.55 $\pm 0.10$	0.55 $\pm 0.10$
D	0.2 $\pm 0.10$	0.30 $\pm 0.20$	0.30 $\pm 0.20$	0.42 $\pm 0.20$	0.60 $\pm 0.30$	0.60 $\pm 0.30$

### Ordering Information

Type	TCR	Resistance	Tolerance	Packaging
CAR0402	Z (5ppm/ $^\circ\text{C}$ )	100 ohm	T (0.01%)	Z01
CAR1216	N (10ppm/ $^\circ\text{C}$ )		A (0.05%)	Z00 (Bulk)
CAR2010	D (15ppm/ $^\circ\text{C}$ )		B (0.1%)	Z01 (Tape)
CAR2040	E (25ppm/ $^\circ\text{C}$ )		C (0.25%)	
CAR2512	C (50ppm/ $^\circ\text{C}$ )		D (0.5%)	
CAR4020			F (1%)	
CAR1216HP				
CAR2010HP				
CAR2040HP				
CAR2512HP				
CAR4020HP				

## Precision Thin Film Chip

CAR0402, CAR0603, CAR0805, CAR1206, CAR2010, CAR2512

## SPECIFICATIONS - STANDARD

Package Size	Power Rating (W) at 70°C	MAX Operating Voltage1	MAX Overload Voltage2	Resistance Range						TCR Ppm/°C
				±0.01%	±0.05%	±0.1%	±0.25%	±0.5%	±1%	
0402	1/16	25V	50V	49.9Ω - 4.99KΩ						±5
				49.9Ω - 12KΩ						±10
				49.9Ω - 12KΩ		49.9Ω - 69.8KΩ				±15
				49.9Ω - 12KΩ		10Ω - 255KΩ				±25
				49.9Ω - 12KΩ		10Ω - 255KΩ		1Ω - 255KΩ		±50
0603	1/16	50V	100V	24.9Ω - 15KΩ						±5
				24.9Ω - 100KΩ		4.7Ω - 332KΩ				±10
				4.7Ω - 332KΩ		4.7Ω - 1MΩ		2Ω - 1MΩ		±15
				4.7Ω - 332KΩ		4.7Ω - 1MΩ		1Ω - 1MΩ		±25
				4.7Ω - 332KΩ		4.7Ω - 1MΩ		1Ω - 1MΩ		±50
0805	1/10	100V	200V	24.9Ω - 30KΩ						±5
				24.9Ω - 200KΩ		4.7Ω - 511KΩ				±10
				4.7Ω - 511KΩ		4.7Ω - 2.49MΩ		1Ω - 2.49MΩ		±15
				4.7Ω - 511KΩ		4.7Ω - 2.49MΩ		1Ω - 2.49MΩ		±25
				4.7Ω - 511KΩ		4.7Ω - 2.49MΩ		1Ω - 2.49MΩ		±50
1206	1/8	150V	300V	24.9Ω - 49.9KΩ						±5
				24.9Ω - 499KΩ		4.7Ω - 1MΩ				±10
				4.7Ω - 1MΩ		4.7Ω - 2.49MΩ		1Ω - 2.49MΩ		±15
				4.7Ω - 1MΩ		4.7Ω - 2.49MΩ		1Ω - 2.49MΩ		±25
				4.7Ω - 1MΩ		4.7Ω - 2.49MΩ		1Ω - 2.49MΩ		±50
2010	1/4	150V	300V	24.9Ω - 100KΩ						±5
				24.9Ω - 499KΩ		4.7Ω - 1MΩ				±10
				4.7Ω - 1MΩ		4.7Ω - 3MΩ		1Ω - 3MΩ		±15
				4.7Ω - 1MΩ		4.7Ω - 3MΩ		1Ω - 3MΩ		±25
				4.7Ω - 1MΩ		4.7Ω - 3MΩ		1Ω - 3MΩ		±50
2512	1/2	150V	300V	24.9Ω - 100KΩ						±5
				24.9Ω - 499KΩ		4.7Ω - 1MΩ				±10
				4.7Ω - 1MΩ		4.7Ω - 3MΩ		1Ω - 3MΩ		±15
				4.7Ω - 1MΩ		4.7Ω - 3MΩ		1Ω - 3MΩ		±25
				4.7Ω - 1MΩ		4.7Ω - 3MΩ		1Ω - 3MΩ		±50

## SPECIFICATIONS - HIGH POWER RATING

Package Size	Power Rating (W) at 70°C	MAX Operating Voltage1	MAX Overload Voltage2	Resistance Range						TCR Ppm/°C
				±0.01%	±0.05%	±0.1%	±0.25%	±0.5%	±1%	
0603HP	1/10	75V	150V	24.9Ω - 15KΩ						±5
				24.9Ω - 100KΩ		4.7Ω - 332KΩ		4.7Ω - 332KΩ		±10
				4.7Ω - 332KΩ		4.7Ω - 1MΩ				±15
				4.7Ω - 332KΩ		4.7Ω - 1MΩ				±25
				4.7Ω - 332KΩ		4.7Ω - 1MΩ				±50
0805HP	1/8	150V	300V	24.9Ω - 30KΩ						±5
				24.9Ω - 200KΩ		4.7Ω - 511KΩ		4.7Ω - 511KΩ		±10
				4.7Ω - 511KΩ		4.7Ω - 1MΩ		4.7Ω - 1MΩ		±15
				4.7Ω - 511KΩ		4.7Ω - 1MΩ		1Ω - 1MΩ		±25
				4.7Ω - 511KΩ		4.7Ω - 1MΩ		1Ω - 1MΩ		±50
1206HP	1/4	200V	400V	24.9Ω - 49.9KΩ						±5
				24.9Ω - 499KΩ		4.7Ω - 1MΩ				±10
				4.7Ω - 1MΩ		4.7Ω - 1MΩ				±15
				4.7Ω - 1MΩ		4.7Ω - 1MΩ				±25
				4.7Ω - 1MΩ		4.7Ω - 1MΩ				±50
2010HP	1/3	200V	400V	24.9Ω - 100KΩ						±5
				24.9Ω - 499KΩ		4.7Ω - 1MΩ				±10
				4.7Ω - 1MΩ		4.7Ω - 1MΩ				±15
				4.7Ω - 1MΩ		4.7Ω - 1MΩ				±25
				4.7Ω - 1MΩ		4.7Ω - 1MΩ				±50
2512HP	2/15	200V	400V	24.9Ω - 2KΩ						±10
				24.9Ω - 2KΩ		4.7Ω - 2KΩ		1Ω - 2KΩ		±15
				4.7Ω - 2KΩ		4.7Ω - 2KΩ				±25
				4.7Ω - 2KΩ		4.7Ω - 2KΩ				±25
				4.7Ω - 2KΩ		4.7Ω - 2KΩ				±50

\*1 Operating Voltage = or MAX Listed, whichever is lower.

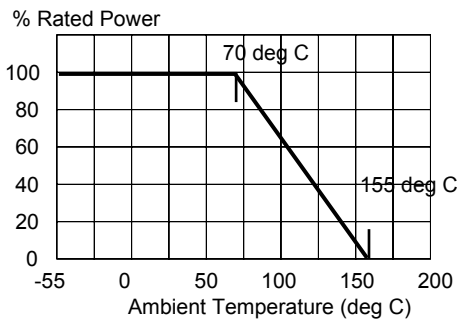
\*\*2 Overload Voltage = 2.5 \* or MAX Listed, whichever is lower.

Precision Thin Film Chip  
 CAR0402, CAR0603, CAR0805, CAR1206, CAR2010, CAR2512

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 MΩ		Apply 100VDC for 1 minute
Load Life	$\Delta R \pm 0.05\%$	$\Delta R \pm 0.2\%$	70±2°C, Max. working voltage for 1000 hrs with 1.5 hrs "ON" and 0.5 hrs "OFF"
	>7kΩ $\Delta R \pm 0.5\%$		
	$\Delta R \pm 0.5\%$ for high power rating		
Damp Heat with Load	$\Delta R \pm 0.05\%$	$\Delta R \pm 0.3\%$	40±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±5°C for 3 seconds
Resistance to Soldering Heat	$\Delta R \pm 0.05\%$	$\Delta R \pm 0.2\%$	260±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		

Power Derating Curve



Note

1. The performance of an short time overload test is the specification about one time overload test. Please do not apply the continuous pulse exceeding rated power.
2. When you apply continuous pulse, please care not to exceed the range of a derating curve and not to exceed maximum working voltage and maximum working current.