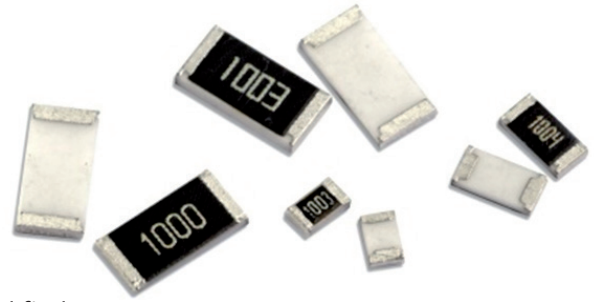



Anti-Sulphur Precision Chip

APC Series

- Precision thin film technology
- Two grades of sulphur protection
- Precision to $\pm 0.05\%$ and $\pm 10\text{ppm}/^\circ\text{C}$
- AEC-Q200 qualified option
- Anti-sulphur tested to EIA-977 cond. B & ASTM-B-809-95 modified



 All parts are Pb-free and comply with EU Directive 2011/65/EU amended by (EU) 2015/863 (RoHS3)

Summary of Types

Range	Sulphur protection grade	Test applied	AEC-Q200 qualified	High power option
SR	Sulphur Resistant	ASTM-B-809-95 modified		
AS	Anti-Sulphur	EIA-977 cond. B		

Electrical Data – SR Range

Type	TCR (ppm/ $^\circ\text{C}$)	Power (W)	Limiting Element Voltage (V)	Ohmic Value Range				
				$\pm 0.05\%$	$\pm 0.1\%$	$\pm 0.25\%$	$\pm 0.5\%$	$\pm 1.0\%$
APC0402R	25, 50	0.063	50	10 - 100K				
APC0603R	25, 50	0.063	50	4.7 - 330K				
APC0805R	25, 50	0.1	100	10 - 1M				
APC1206R	25, 50	0.125	200	10 - 1M				
APC1210R	25, 50	0.25	200	10 - 1M				
APC2010R	25, 50	0.5	200	10 - 1.5M				
APC2512R	25, 50	0.75	200	10 - 1.5M				

Electrical Data – AS Range

Type	TCR (ppm/ $^\circ\text{C}$)	Power (W)	Limiting Element Voltage (V)	Ohmic Value Range				
				$\pm 0.05\%$	$\pm 0.1\%$	$\pm 0.25\%$	$\pm 0.5\%$	$\pm 1.0\%$
APC0402A	10	0.063	25	49.9 - 10K				
	15			49.9 - 69.8K				
	25, 50			49.9 - 100K				
APC0603A	10, 15, 25, 50	0.063	50	10 - 49.9K	10 - 332K			
APC0805A	10	0.1	100	10 - 511K				
	15, 25, 50			10 - 1M				
APC1206A	10, 15, 25, 50	0.125	150	10 - 200K	10 - 1M			
APC1210A	10, 15, 25, 50	0.25	150	10 - 499K	10 - 1M			
APC2010A	10, 15, 25, 50	0.25	150	10 - 499K	10 - 1M			
APC2512A	10, 15, 25, 50	0.5	150	10 - 499K	10 - 1M			

Electrical Data – AS High Power Range

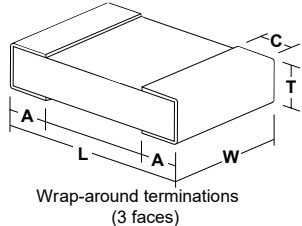
Type	TCR (ppm/ $^\circ\text{C}$)	Power (W)	Limiting Element Voltage (V)	Ohmic Value Range				
				$\pm 0.05\%$	$\pm 0.1\%$	$\pm 0.25\%$	$\pm 0.5\%$	$\pm 1.0\%$
APC0603AH	10, 15, 25, 50	0.1	75	10 - 49.9K	10 - 332K			
APC0805AH	10	0.125	150	10 - 511K				
	15, 25, 50			10 - 1M				
APC1206AH	10, 15, 25, 50	0.25	200	10 - 200K	10 - 1M			
APC1210AH	10, 15, 25, 50	0.33	200	10 - 499K	10 - 1M			
APC2010AH	10, 15, 25, 50	0.33	200	10 - 499K	10 - 1M			

General Note

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Physical Data

Dimensions (mm) and weight (mg)						
Size	L	W	C	A	T	Wt
0402	1 ±0.1	0.5 ±0.05	0.3 ±0.15	0.25 ±0.1	0.35 ±0.05	0.54
0603	1.55 ±0.1	0.8 ±0.1	0.3 ±0.2	0.3 ±0.2	0.45 ±0.1	1.8
0805	2 ±0.15	1.25 ±0.15	0.3 ±0.2	0.4 ±0.2	0.55 ±0.1	4.7
1206	3.05 ±0.15	1.55 ±0.15	0.42 ±0.2	0.35 ±0.25	0.55 ±0.1	9.0
1210	3.1 ±0.15	2.6 ±0.15	0.5 ±0.2	0.5 ±0.25	0.55 ±0.1	10
2010	4.9 ±0.15	2.5 ±0.15	0.6 ±0.3	0.6 ±0.25	0.55 ±0.1	24
2512	6.3 ±0.15	3.2 ±0.15	0.6 ±0.3	0.9 ±0.25	0.55 ±0.1	38



Construction

A thin-film material is selectively deposited on an alumina substrate together with metallic contacts at each end of the resistor. The unadjusted resistors are heat treated to give the required TCR and stability, then a precisely controlled laser trim process adjusts the resistance value. Epoxy protection is applied, and wrap-around terminations are added and plated. Each resistor is measured immediately before packing into tape.

Marking

APC resistors size 0603 and larger are marked white on black with 3 or 4 characters indicating ohmic value. APC0402 is not marked.

Performance Data

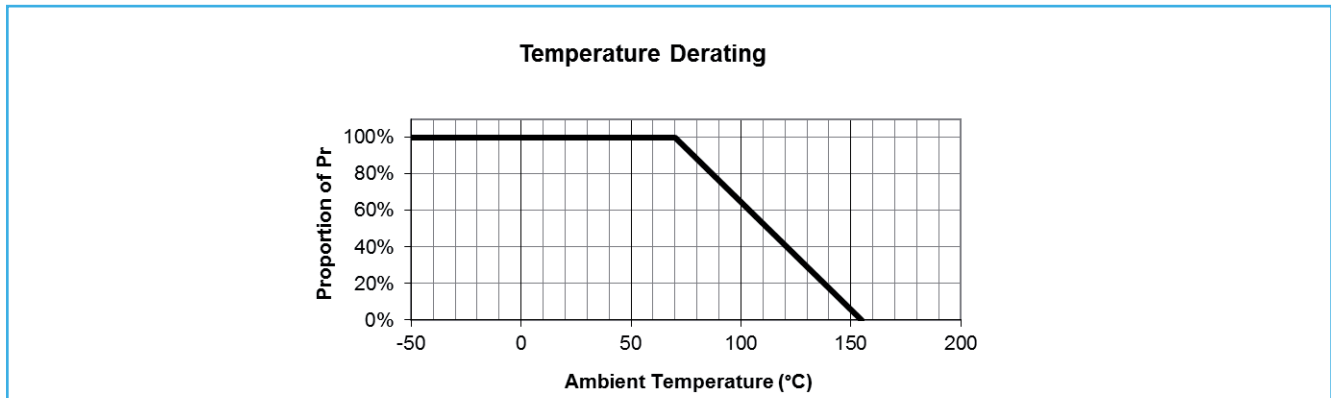
Test	Condition	SR Range ±ΔR%	AS Range (AEC-Q200) ±ΔR%	
			0.05% tol.	≥0.1% tol.
High Temperature Exposure	MIL-STD-202 Method 108	0.3	0.2	
Temperature Cycling	JESD22 Method JA-104	0.3	0.1	
Biased Humidity	MIL-STD-202 Method 103	0.3	0.1	
Operational Life	MIL-STD-202 Method 108	0.3	≤7K0: 0.05 >7K0: 0.2	0.2
			High Power range: 0.5	
Terminal Strength	MIL-STD202 Method 211	No Damage	No Damage	
Resistance to Solvents	MIL-STD202 Method 215	Marking Legible	Marking Legible	
Mechanical Shock	MIL-STD202 Method 213	0.25	0.05	0.1
Vibration	MIL-STD202 Method 204	0.1	0.05	0.1
Resistance to Soldering Heat	MIL-STD-202 Method 210	0.2	0.05	
ESD	AEC-Q200-002 or ISO/DIS 10605	-	0.5	
Solderability	J-STD-002	>95% covered, no visible damage	>95% covered, no visible damage	
Flammability	UL-94	-	No ignition	
Board Flex	AEC Q200-005	0.1	0.1	
Short Term Overload	2.5xRCWV for 5seconds	0.1	0.05	
Sulphur Test	EIA-977 cond. B 750hrs, 105°C, no humidity	-	1	
	ASTM-B-809-95 modified 1000hrs, 105°C, 85% RH	4	-	

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APC Series

Thermal Performance Data



Application Notes

APC resistors are ideally suited for handling by automatic methods due to their rectangular shape and the small dimensional tolerances. Electrical connection to a ceramic substrate or to a printed circuit board can be made by reflow or wave soldering of wrap-around terminations.

Wrap-around terminations provide good leach properties and ensure reliable contact. Due to the robust construction, the APC can be immersed in the solder bath for 30 seconds at 260°C. This enables the resistor to be mounted on one side of a printed circuit board and wire-leaded components applied on the other side.

Ordering Procedure

Example: APC1206AHY-1K54WT5 (1206, anti sulphur grade, high power range, 15ppm/°C, 1.54 kilohms ±0.05%, Pb-free)



1	2	3	4	5	6	7	8		
Type	Size	Sulphur Grade	Range	TCR	Value	Tolerance	Packing		
APC	0402	A = AS Range	Omit for Standard	T = ±10ppm/°C	E24 / E96	W = ±0.05%	T10	0402	10,000/reel
	0603	R = SR Range	H = High Power	Y = ±15ppm/°C	3/4 characters	B = ±0.1%	T5	0603 to 1210	5000/reel
	0805			D = ±25ppm/°C	R = ohms	C = ±0.25%	T4	2010, 2512	4000/reel
	1206			C = ±50ppm/°C	K = kilohms	D = ±0.5%			
	1210				M = megohms	F = ±1%			
	2010								
	2512								

Note – See Electrical Data for valid combinations of size, sulphur grade and range

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