



Chip Resistors & Arrays



BOURNS®

Chip Resistors & Arrays Overview

POWER RATING (WATTS) AND AVAILABLE SIZES PER PRODUCT SERIES

Type	Series	01005	0201	0402	0603	0612	0805	0815	1206	2010	2512	
Thick Film	CR (A, AS, PF)	General Purpose (A - AEC-Q200 Compliant, Auto Grade) (AS - AEC-Q200 Compliant, Auto Grade, Sulfur-Resistant)										
	CRL	Low Ohmic										
	CHV (A)	High Voltage (A - AEC-Q200 Compliant, Auto Grade)										
	CRM (A)	High Power (A - AEC-Q200 Compliant, Auto Grade, Sulfur-Resistant)										
	CRS (A)	Surge Withstand (A - AEC-Q200 Compliant, Auto Grade, Sulfur-Resistant)										
	CHP (A)	Ultra High Power (A - AEC-Q200 Compliant, Auto Grade, Sulfur-Resistant)										
	CMP (A)	High Power, Surge Withstand (A - AEC-Q200 Compliant, Auto Grade, Sulfur-Resistant)										
Thin Film	CRT (AS) (A)	High Precision (AS - Sulfur-Resistant) (A - AEC-Q200 Compliant, Auto Grade)										
Metal Strip	CRF	High Power, Current Sense, AEC-Q200 Compliant, Auto Grade										
	CRE	High Power, Current Sense, AEC-Q200 Compliant, Auto Grade										
	CRA	High Power, Current Sense, AEC-Q200 Compliant, Auto Grade										
	CRK	Wide Terminal, Current Sense										
	CST	4-Terminal, Current Sense, AEC-Q200 Compliant, Auto Grade										
	Metal Foil	CFN (A)	High Power, Current Sense, (A - AEC-Q200 Compliant, Auto Grade)									
CFG		Wide Terminal, Current sense										

AVAILABLE RESISTANCE VALUE RANGE (OHMS) PER PRODUCT SERIES

Type	Series	Very Low Ohmic	Low Ohmic	Middle Ohmic	High Ohmic
Thick Film	CR	General purpose		1 – 20M	
	CRL	Low Ohmic		0.1 - 1	
	CHV	High Voltage		100k – 100M	
	CRM	High Power		0.047 – 1	
	CRS	Surge Withstand		1 – 1M	
Thin Film	CRT (A)	High Precision		10 – 1M	
	CHP	Ultra High Power		0.001 – 1	
Metal Strip	CMP	High Power, Surge Withstand		1 – 1M	
	CRF	High Power, Current Sense		0.001 – 0.05	
	CRE	High Power, Current Sense		0.001 – 0.009	
	CRA	High Power, Current Sense		0.01 – 0.1	
	CRK	Wide Terminal, Current Sense		0.005 - 0.01	
	CST	4-Terminal, Current Sense		0.0005 – 0.002	
	Metal Foil	CFN (A)	High Power, Current Sense		0.005 - 0.02
CFG		High Power, Current Sense		0.001 - 0.01	

CHIP ARRAY SUMMARY

Bourns®	Sulfur-Resistant Available	AEC-Q200 Compliant/Auto Grade Available	Package Size	Termination Style
CAT10-J2		•	0402 x 2	concave
CAT10-J4		•	0402 x 4	concave
CAT16-J2			0603 x 2	concave
CAT16-J4/F4		•	0603 x 4	concave
CAY06-J2	•		0201 x 2	convex
CAY10-J2	•	•	0402 x 2	convex
CAY10-J4	•	•	0402 x 4	convex
CAY16-J2			0603 x 2	convex
CAY16-J4/F4	•	•	0603 x 4	convex

CHIP RESISTOR FEATURES

Thick Film

- 1 % in E96 + E24 series
- 5 % in E24 series

Thin Film

- 0.01 % to 1 % in E96 + E24 series

Metal Foil/Metal Strip

- Based on the value table in the data sheet

STANDARD PACKAGING

01005 size - 20,000 pcs. / 7 " Plastic Reel
 0201 and 0402 sizes - 10,000 pcs. / 7 " Plastic Reel
 0603-1206 sizes - 5,000 pcs. / 7 " Plastic Reel
 2010, 2512 and 0612 sizes - 4,000 pcs. / 7 " Plastic Reel

CHIP RESISTOR & CHIP ARRAY APPLICATIONS

- Test equipment
- Consumer electronics
- Appliances
- Telecommunications
- Handheld electronics
- Office equipment
- Industrial equipment
- Small signal instrumentation
- DC/DC converters in power modules
- Current sensing
- Snubbers

HOW TO ORDER - THICK FILM AND METAL STRIP CHIPS

CR 0201 - A F W - 8252 E LF

Model _____

- CR/CRL/CRM/CRS/CHP
- CMP/CHV/CRA/CRE/CRF/CST

Size _____

- 01005/0201/0402/0603/0612/0805/1206/2010/2512

Feature _____

- A = AEC-Q200 Compliant, Auto Grade

Resistance Tolerance _____

- J = $\pm 5\%$
- F = $\pm 1\%$

TCR (PPM/ $^{\circ}$ C) _____

- Z = ± 50
- X = ± 100
- W = ± 200 (± 250 for 01005, 0201)
- V = ± 400
- U = ± 600
- / = -250 to +250, and for zero ohm jumper for CR, CRM

Resistance Value _____

- F = $\pm 1\%$
Three significant digits; 4th digit is number of zeroes to follow.
< 100 ohms, 24R3 = 24.3 ohms
> 100 ohms, 8252 = 82.5 K ohms
- J = $\pm 5\%$
Two significant digits; 3rd digit is number of zeroes to follow.
< 100 ohms, 24R3 = 24.3 ohms
> 100 ohms, 474 = 470 K ohms
- 000 - zero ohm jumper for CR, CRM

Packaging _____

- E = Paper Tape (5,000 Pieces) on 7" Plastic Reel
- E = Embossed Plastic Tape (4,000 Pieces) on 7" Plastic Reels for 0603, 0612, 0805, 1206, 2010 and 2512
- G = Paper Tape (20,000 pcs.) on 7" Plastic Reel for 01005
- G = Paper Tape (10,000 pcs.) on 7" Plastic Reel for 0201, 0402

Terminations _____

- LF = Tin-Plated (RoHS compliant*)
- PF = Ultra-Low Lead Content, without RoHS exemptions

CHIP ARRAYS

Available Types

- Thick film chip resistor array
- Convex and concave
- Isolated, bussed

Available Tolerances

- 5 % and 1 % in CAT16, CAY16 series
- 5 % in CAY06, CAT10, CAY10 series
- 5 % in E24 series
- 1 % in E96 + E24 series

CHIP ARRAY VS. DIP PACKAGE

Chip Array

- Ceramic has topside protective coating
- Terminates to metallization on ceramic
- Low power

DIP Package

- Ceramic covered with molding
- Terminates to pins connected to ceramic
- Higher power rating than chip array

HOW TO ORDER - THICK FILM CHIP ARRAYS

CAT 10A - 103 J 4 LF

Chip Arrays _____

Type _____

- T = Concave
- Y = Convex

Package Size _____

- 06 = 0202
- 10 = xx04
- 16 = xx06
- 17 = 1206
- 25 = 1608

Feature _____

A = AEC-Q200 Compliant, Auto Grade

Resistance Code _____

- 103 = 10K ohms
(Two significant digits; 3rd digit is number of zeroes to follow)
- 000 = Zero-ohm Jumper

Resistance Tolerance _____

- J = $\pm 5\%$
- F = $\pm 1\%$

Resistor Quantity _____

- 2 = 2 Resistors (CAY06/CAY10/CAT16/CAY16 models)
- 4 = 4 Resistors (CAT10/CAY10/CAT16/CAY16 models)
- 8 = 8 Resistors (CAY16/CAT16 models)
- A = 8 Resistors (CAT25)
- A = Common from Terminal 5 to 10 (CAY17 models)
- B = Common from Terminal 1 to 6 (CAY17 models)

Terminations _____

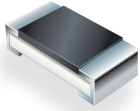
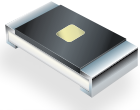
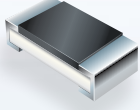



- LF = Tin-Plated (RoHS compliant*)

Note: CAT16 available as J2, F4, J4, F8, J8; CAY16 available as J2, F4, J4, J8

Chip Resistor Product Information

THICK FILM CHIP RESISTORS

Bourns offers several sizes of thick film chip resistors in standard values for most market requirements. These products provide designers off-the-shelf flexibility of performance, space savings and low cost.

CR Series		General Purpose					
Size	Resistance Range	Tolerance	Temperature Coefficient	Rated Power (W)	Packaging	Features	
	01005 to 2512	1 ohm to 20 megohms	1%/5%	±100 ppm/±250 ppm	0.03 to 1	Tape & Reel	<ul style="list-style-type: none"> • Small package dimensions • Nickel barrier prevents leaching • Suitable for most types of soldering • RoHS compliant*
CR-A Series		General Purpose, AEC-Q200 Compliant, Auto Grade					
Size	Resistance Range	Tolerance	Temperature Coefficient	Rated Power (W)	Packaging	Features	
	0201 to 2512	1 ohm to 20 megohms	1%/5%	±100 ppm/±200 ppm/ ±400 ppm/±500 ppm	0.05 to .125	Tape & Reel	<ul style="list-style-type: none"> • Small package dimensions • Nickel barrier prevents leaching • Suitable for most types of soldering • RoHS compliant*
CR-A-AS Series		General Purpose, AEC-Q200 Compliant, Auto Grade, Sulfur-Resistant					
Size	Resistance Range	Tolerance	Temperature Coefficient	Rated Power (W)	Packaging	Features	
	0201 to 2512	1 ohm to 20 megohms	1%/5%	±100 ppm/ ±200 ppm/±400 ppm	0.05 to 0.1	Tape & Reel	<ul style="list-style-type: none"> • Small package dimensions • Nickel barrier prevents leaching • Suitable for most types of soldering • RoHS compliant*
CR-PF Series		General Purpose - Ultra-Low Lead Content					
Size	Resistance Range	Tolerance	Temperature Coefficient	Rated Power (W)	Packaging	Features	
	0402 to 1206	1 ohm to 10 megohms	1%/5%	±100ppm/ ±200 ppm/±400 ppm	0.63 to 0.25	Tape & Reel	<ul style="list-style-type: none"> • RoHS compliant* - without exemptions
CRL Series		Low Resistance Value - for Current Sensing					
Size	Resistance Range	Tolerance	Temperature Coefficient	Rated Power (W)	Packaging	Features	
	0603 to 2512	0.1 to 1 ohm	1%/5%	±200 ppm/±600 ppm	0.1 to 1	Tape & Reel	<ul style="list-style-type: none"> • RoHS compliant*
CHV Series		High Voltage					
Size	Resistance Range	Tolerance	Temperature Coefficient	Rated Power (W)	Packaging	Features	
	0603 to 2512	100K ohms to 100 megohms	1%/5%	±100 ppm/±200 ppm	0.1 to 1	Tape & Reel	<ul style="list-style-type: none"> • UL 1676 Listed • UL/IEC 60950 & 60065 Compatible • RoHS compliant*
CHV (A) Series		High Voltage, AEC-Q200 Compliant, Auto Grade					
Size	Resistance Range	Tolerance	Temperature Coefficient	Rated Power (W)	Packaging	Features	
	0603 to 2512	100K ohms to 100 megohms	1%/5%	±100 ppm/±200 ppm	0.1 to 1	Tape & Reel	<ul style="list-style-type: none"> • UL 1676 Listed • UL/IEC 60950 & 60065 Compatible • RoHS compliant*

CRM Series High Power - for Current Sensing, Power Supplies, Flyback Power Supplies							
Size	Resistance Range	Tolerance	Temperature Coefficient	Rated Power (W)	Packaging	Features	
0805 to 2512	0.047 ohm to 1 megohm	1%/5%	±100 ppm/±200 ppm	0.25 to 2	Tape & Reel	<ul style="list-style-type: none"> Low resistance value available RoHS compliant* 	



CRM-A Series High Power - AEC-Q200 Compliant, Auto Grade, Sulfur-Resistant							
Size	Resistance Range	Tolerance	Temperature Coefficient	Rated Power (W)	Packaging	Features	
0603 to 2512	0.05 ohm to 1 megohm	1%/5%	±100 ppm/±200 ppm	0.125 to 2	Tape & Reel	<ul style="list-style-type: none"> Low resistance value available RoHS compliant* 	



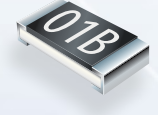
CRS Series High Power Surge-Resistant - for Pulse Power Applications							
Size	Resistance Range	Tolerance	Temperature Coefficient	Rated Power (W)	Packaging	Features	
0805 to 2512	1 ohm to 1 megohm	1%/5%	±100 ppm/±200 ppm	0.25 to 2	Tape & Reel	<ul style="list-style-type: none"> IEC 61000-4-5 1.2/50 µs RoHS compliant* 	



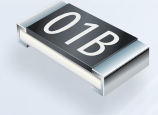
CRS-A Series High Power Surge-Resistant - AEC-Q200 Compliant, Auto Grade, Sulfur-Resistant							
Size	Resistance Range	Tolerance	Temperature Coefficient	Rated Power (W)	Packaging	Features	
0603 to 2512	1 ohm to 1 megohm	1%/5%	±100 ppm/±200 ppm	0.125 to 2	Tape & Reel	<ul style="list-style-type: none"> IEC 61000-4-5 1.2/50 µs RoHS compliant* 	



CHP Series Ultra-High Power Resistor							
Size	Resistance Range	Tolerance	Temperature Coefficient	Rated Power (W)	Packaging	Features	
0603 to 2512	1 ohm to 1 megohm	1%/5%	±100 ppm/±200 ppm	0.33 to 3 W	Tape & Reel	<ul style="list-style-type: none"> RoHS compliant* High power surge withstanding 	



CHP-A Series Ultra-High Power Resistor, AEC-Q200 Compliant, Auto Grade, Sulfur Resistant							
Size	Resistance Range	Tolerance	Temperature Coefficient	Rated Power (W)	Packaging	Features	
0603 to 2512	1 ohm to 1 megohm	1%/5%	±100 ppm/±200 ppm/±150 ppm	0.33 to 3 W	Tape & Reel	<ul style="list-style-type: none"> RoHS compliant* High power surge withstanding 	



CMP Series High Power Resistor, Surge-Resistant							
Size	Resistance Range	Tolerance	Temperature Coefficient	Rated Power (W)	Packaging	Features	
0603 to 2512	1 ohm to 1 megohm	1%/5%	±100 ppm/±200 ppm	0.25 to 1.5 W	Tape & Reel	<ul style="list-style-type: none"> RoHS compliant* Surge resistant 	



CMP-A Series High Power Resistor, AEC-Q200 Compliant, Auto Grade, Surge & Sulfur-Resistant							
Size	Resistance Range	Tolerance	Temperature Coefficient	Rated Power (W)	Packaging	Features	
0603 to 2512	1 ohm to 1 megohm	1%/5%	±100 ppm/±200 ppm/±150 ppm	0.25 to 1.5 W	Tape & Reel	<ul style="list-style-type: none"> RoHS compliant* Surge resistant 	





Chip Resistor Product Information


THIN FILM CHIP RESISTORS

Bourns® Model CRT Series provides tight tolerance and high precision over a wide range of resistance values.

These resistors are typically used in current sense applications and precision circuits, with specific ordering characteristics for size and performance selection.

CRT Series	High Precision						
	Size	Resistance Range	Tolerance	Temperature Coefficient	Rated Power (W)	Packaging	Features
	0402 to 1206	1 ohm to 1 megohm	0.01 % to 1 %	±2 to ±50 ppm	0.063 to 0.25	Tape & Reel	<ul style="list-style-type: none"> Ultra-tight tolerance RoHS compliant*

CRT-A Series	High Precision - AEC-Q200 Compliant, Auto Grade						
	Size	Resistance Range	Tolerance	Temperature Coefficient	Rated Power (W)	Packaging	Features
	0402 to 1206	10 ohm to 1 megohm	0.1% to 1%	±-10 to ±-50 ppm	0.063 to 0.25	Tape & Reel	<ul style="list-style-type: none"> AEC-Q200 compliant Ultra-tight tolerance RoHS compliant*

CRT-AS Series	High Precision - Sulfur-Resistant						
	Size	Resistance Range	Tolerance	Temperature Coefficient	Rated Power (W)	Packaging	Features
	0402 to 1206	1 ohm to 1 megohm	0.05% to 1%	±10 to ±50 ppm	0.063 to 0.25	Tape & Reel	<ul style="list-style-type: none"> Sulfur-resistant Ultra-tight tolerance RoHS compliant*

RoHS Directive 2015/863, Mar 31, 2015 and Annex.



METAL FOIL AND STRIP CHIP RESISTORS

Bourns offers several metal foil and metal strip chip resistors and EB welded metal strip shunts. These high-power resistors have very low resistance values and TCR due to their metal resistive element and are suitable for all types of current sensing applications.

Metal foil resistors are constructed with a metal foil resistive element mounted on a ceramic substrate for excellent heat conductivity. Metal strip chip resistors have electroplated tin (Sn) outer terminations for soldering onto the board. The resistive element is protected by an epoxy overcoat layer.

CFN Series 	Metal Foil Current Sense Resistor						
	Size	Resistance Range	Tolerance	Temperature Coefficient	Rated Power (W)	Packaging	Features
	0402 to 1206	0.005 to 0.4 ohm	1 %, 5 %	±50 ppm ±100 ppm	0.25 to 1	Tape & Reel	<ul style="list-style-type: none"> • High power density • RoHS compliant*
CFN(A) Series 	Metal Foil Current Sense Resistor, AEC-Q200 Compliant, Auto Grade						
	Size	Resistance Range	Tolerance	Temperature Coefficient	Rated Power (W)	Packaging	Features
	0402 to 1206	0.005 to 0.4 ohm	1 %, 5 %	±50 ppm ±100 ppm	0.25 to 1	Tape & Reel	<ul style="list-style-type: none"> • High power density • AEC-Q200 compliant • RoHS compliant*
CRF Series 	High Power Current Sense Chip Resistor - AEC-Q200 Compliant, Auto Grade						
	Size	Resistance Range	Tolerance	Temperature Coefficient	Rated Power (W)	Packaging	Features
	0805, 1206 & 2512	0.001 to 0.05 ohm	1 %, 5 %	±50 ppm	0.5 to 2	Tape & Reel	<ul style="list-style-type: none"> • High power density • AEC-Q200 compliant • RoHS compliant*
CRE Series 	High Power Current Sense Chip Resistor - AEC-Q200 Compliant, Auto Grade						
	Size	Resistance Range	Tolerance	Temperature Coefficient	Rated Power (W)	Packaging	Features
	2512	0.001 to 0.009 ohm	1 %	±50 ppm	2 & 3	Tape & Reel	<ul style="list-style-type: none"> • Mn/Cu alloy resistor • Low EMF • AEC-Q200 compliant • RoHS compliant*
CRA Series 	High Power Current Sense Chip Resistor - AEC-Q200 Compliant, Auto Grade						
	Size	Resistance Range	Tolerance	Temperature Coefficient	Rated Power (W)	Packaging	Features
	2512	0.01 to 0.1 ohm	1 %, 5 %	±50 ppm	3	Tape & Reel	<ul style="list-style-type: none"> • Special alloy resistor • AEC-Q200 compliant • RoHS compliant*
CRK Series 	Metal Strip, Wide Terminal Current Sense Resistor						
	Size	Resistance Range	Tolerance	Temperature Coefficient	Rated Power (W)	Packaging	Features
	0612, 0815	0.005 to 0.01 ohm	1 %	±50 ppm	1	Tape & Reel	<ul style="list-style-type: none"> • Wide terminal type • Excellent heat dissipation • RoHS compliant*
CST Series 	4-Terminal Current Sense Resistor - AEC-Q200 Compliant, Auto Grade						
	Size	Resistance Range	Tolerance	Temperature Coefficient	Rated Power (W)	Packaging	Features
	0612	0.0005 to 0.002 ohm	1 %	±100 ppm/±200 ppm	1	Tape & Reel	<ul style="list-style-type: none"> • Four terminal design • AEC-Q200 compliant • RoHS compliant*

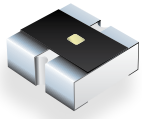
Chip Array Product Information

CHIP RESISTOR ARRAYS WITH CONVEX TERMINALS

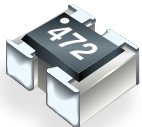
Bourns provides a wide selection of standard resistance values, in several popular sizes, available with convex terminations. Chip arrays require minimal space, and offer cost and component count reductions.

AEC-Q200 compliant, automotive grade and sulfur-resistant designs are available.

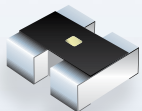
CAY06-J2 AS Series		Chip Resistor Array - Sulfur-Resistant				
Size	Resistance Range	Tolerance	Temperature Coefficient	Power per Resistor (W)	Features	
0202	10 ohms to 1 megohm	±5 %	±250 ppm/°C	0.0625	<ul style="list-style-type: none"> Sulfur-resistant Convex termination style RoHS compliant* 	



CAY10-J2/J4 Series		Chip Resistor Array				
Size	Resistance Range	Tolerance	Temperature Coefficient	Power per Resistor (W)	Features	
0404, 0804	10 ohms to 1 megohm	±5 %	±250 ppm/°C	0.0625	<ul style="list-style-type: none"> Convex termination style 2/4 isolated resistors in an 0404/0804 size package E24 series from 10 ohms to 1 megohm RoHS compliant* 	



CAY10A-J2/J4 (AS) Series		Chip Resistor Array, AEC-Q200 Compliant, Auto Grade - Sulfur-Resistant Available				
Size	Resistance Range	Tolerance	Temperature Coefficient	Power per Resistor (W)	Features	
0404, 0804	3 ohms to 1 megohm	±5 %	±250 ppm/°C	0.0625	<ul style="list-style-type: none"> Sulfur-resistant 2/4 isolated resistors in an 0404/0804 size package E24 series from 3 ohms to 1 megohm RoHS compliant* 	



RoHS Directive 2015/863, Mar 31, 2015 and Annex.



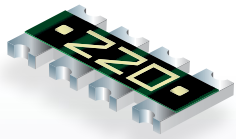
CAY16-/F4/J4 Series



Chip Resistor Array

Size	Resistance Range	Tolerance	Temperature Coefficient	Power per Resistor (W)	Features
1206	10 ohms to 1 megohm	±1 %, ±5 %	±200 ppm/°C	0.0625	<ul style="list-style-type: none">• Convex termination style• Isolated elements available• RoHS compliant*

CAY16A-F4/J4 (AS)



Chip Resistor Array - AEC-Q200 Compliant, Auto Grade - Sulfur-Resistant Available)

Size	Resistance Range	Tolerance	Temperature Coefficient	Power per Resistor (W)	Features
1206	3 ohms to 1 megohm	±1 %, ±5 %	±200 ppm/°C	0.0625	<ul style="list-style-type: none">• Sulfur-resistant• Convex termination style• RoHS compliant*



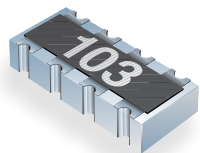
Chip Array Product Information

CHIP RESISTOR ARRAYS WITH CONCAVE TERMINALS

Bourns provides a wide selection of standard resistance values in several popular sizes concave terminations. Chip arrays require minimal space, and offer cost and component count reductions.

AEC-Q200 compliant, automotive grade and sulfur-resistant designs are available.

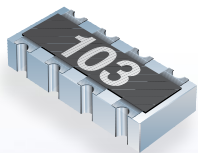
CAT10-J4 Series



Chip Resistor Array

Size	Resistance Range	Tolerance	Temperature Coefficient	Power per Resistor (W)	Features
0804	10 ohms to 1 megohm	±5 %	±250 ppm/°C	0.0625	<ul style="list-style-type: none"> Concave termination style E24 series from 10 ohms to 1 megohm RoHS compliant*

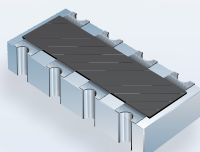
CAT16-F4/J4 Series



Chip Resistor Array

Size	Resistance Range	Tolerance	Temperature Coefficient	Power per Resistor (W)	Features
1206	10 ohms to 1 megohm	±1 %, ±5 %	±200 ppm/°C	0.0625	<ul style="list-style-type: none"> Concave termination style 2 or 4 isolated elements available RoHS compliant*

CAT10A-J2/J4 Series



Chip Resistor Array, AEC-Q200 Compliant, Auto Grade

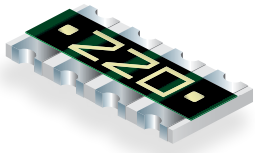
Size	Resistance Range	Tolerance	Temperature Coefficient	Power per Resistor (W)	Features
0404, 0804	10 ohms to 1 megohm	±5 %	±300 ppm/°C	0.063	<ul style="list-style-type: none"> Concave termination style E24 series from 10 ohms to 1 megohm RoHS compliant*

RoHS Directive 2015/863, Mar 31, 2015 and Annex.



CAT16A-F4/J4 Series

Chip Resistor Array, AEC-Q200 Compliant, Auto Grade



Size	Resistance Range	Tolerance	Temperature Coefficient	Power per Resistor (W)	Features
1206	10 ohms to 1 megohm	1 %, 5 %	± 200 ppm/ $^{\circ}\text{C}$	0.0625	<ul style="list-style-type: none">• Concave termination style• 2/4 isolated elements available• RoHS compliant*





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