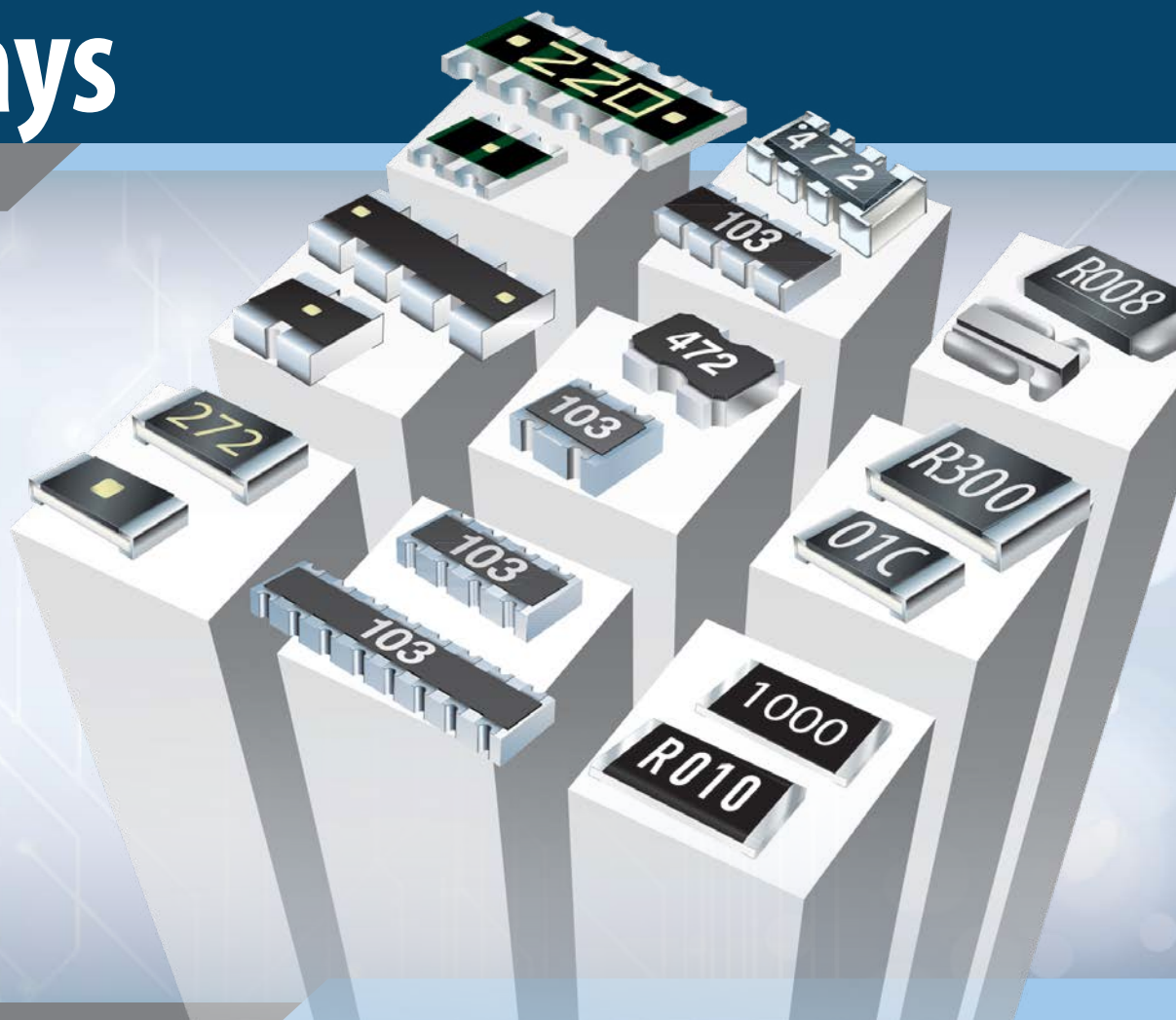




Chip Resistors & Arrays



BOURNS®

Chip Resistors & Arrays Overview

POWER RATING (WATTS) AND AVAILABLE SIZES PER PRODUCT SERIES

Type	Series		01005	0201	0402	0603	0612	0805	1206	2010	2512
Thick Film	CR (AS, PF)	General Purpose (AS - Sulfur-Resistant)	0.03	0.05	0.063	0.1	-	0.125	0.25	0.5	1
	CRL	Low Ohmic		-	-	0.1	-	0.125	0.25	0.5	1
	CHV	High Voltage		-	-	0.1	-	0.125	0.25	0.5	1
	CRM (A)	High Power (A - AEC-Q200 Compliant, Sulfur-Resistant)		-	-	0.125	-	0.25	0.5	1	2
	CRS (A)	Surge Withstand (A - AEC-Q200 Compliant, Sulfur-Resistant)		-	-	0.125	-	0.25	0.5	1	2
	CHP	Ultra High Power		-	-	0.33	-	0.5	0.75	-	3
Thin Film	CRT (AS)	High Precision (AS - Sulfur-Resistant)		-	0.063	0.1	-	0.125	0.25	-	-
Metal Strip	CRF	High Power, Current Sense, AEC-Q200 Compliant		-	-	-	-	0.5	1	-	1 & 2
	CRE	High Power, Current Sense, AEC-Q200 Compliant		-	-	-	-	-	-	-	2 & 3
	CRA	High Power, Current Sense, AEC-Q200 Compliant		-	-	-	-	-	-	-	3
	CST	4-Terminal, Current Sense, AEC-Q200 Compliant		-	-	-	1	-	-	-	-

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		0.02 – 9.1		
	CHV	High Voltage				100k – 100M
	CRM	High Power		0.047 – 1	1 – 1M	
	CRS	Surge Withstand			1 – 1M	
Thin Film	CRT	High Precision			1 – 1M	
Metal Strip	CHP	Ultra High Power	0.001 – 1		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		
	CST	4-Terminal, Current Sense	0.0005 – 0.002			

CHIP ARRAY SUMMARY

Bourns Model	Sulfur-Resistant	Density	Package Size (EIA)	Package Size (mm)
CAT10-J4		0402 x 4	0804	2.0 x 1.0
CAT16-J2		0603 x 2	0606	1.6 x 1.6
CAT16-J2AS	•	0603 x 2	0606	1.6 x 1.6
CAT16-J4/F4		0603 x 4	1206	3.2 x 1.6
CAT16-J4AS	•	0603 x 4	1206	3.2 x 1.6
CAT16-J8/F8		0603 x 8	2506	6.4 x 1.6
CAT25		0804 x 4	1608	4.0 x 2.1
CAY06-J2		0201 x 2	0202	0.85 x 0.6
CAY06-J2AS	•	0201 x 2	0202	0.85 x 0.6
CAY10-J2		0402 x 2	0404	1.0 x 1.0
CAY10-J2AS	•	0402 x 2	0404	1.0 x 1.0
CAY10-J4		0402 x 4	0804	2.0 x 1.0
CAY10-J4AS	•	0402 x 4	0804	2.0 x 1.0
CAY16-J2		0603 x 2	0606	1.6 x 1.6
CAY16-J4/F4		0603 x 4	1206	3.2 x 1.6
CAY16-J4AS	•	0603 x 4	1206	3.2 x 1.6
CAY16-J8		0602 x 8	1506	3.8 x 1.6
CAY17		0603 x 5	1206	3.2 x 1.6

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 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 - F W - 8252 E LF

Model <ul style="list-style-type: none"> • CR/CRL/CRM/CRS/CHP/CHV/CRA/CRE/CRF/CST 	Size <ul style="list-style-type: none"> • 01005 / 0201 / 0402 / 0603 / 0612 / 0805 / 1206 / 2010 / 2512 	Resistance Tolerance <ul style="list-style-type: none"> • J = $\pm 5\%$ • F = $\pm 1\%$ 	TCR (PPM/$^{\circ}$C) <ul style="list-style-type: none"> • 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 <ul style="list-style-type: none"> • 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 <ul style="list-style-type: none"> • 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 <ul style="list-style-type: none"> • LF = Tin-Plated (RoHS compliant*) • PF = Ultra-Low Lead Content, without RoHS exemptions
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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, CAY17, CAT25 series
- 5 % in E24 series
- 1 % in E96 + E24 series

CHIP ARRAY VS. DIP PACKAGE

Chip Array

- Ceramic has protective coating on top
- Terminate to metallization on ceramic
- Low power

DIP Package

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

HOW TO ORDER - THICK FILM CHIP ARRAYS

CA T 10 - 103 J 4 LF

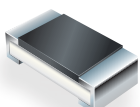
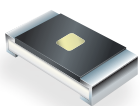
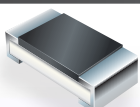


Chip Arrays <ul style="list-style-type: none"> • T = Concave • Y = Convex 	Type <ul style="list-style-type: none"> • T = Concave • Y = Convex 	Package Size <ul style="list-style-type: none"> • 06 = 0202 • 10 = xx04 • 16 = xx06 • 17 = 1206 • 25 = 1608 	Resistance Code <ul style="list-style-type: none"> • 103 = 10K ohms (Two significant digits; 3rd digit is number of zeros to follow) • 000 = Zero-ohm Jumper 	Resistance Tolerance <ul style="list-style-type: none"> • J = $\pm 5\%$ • F = $\pm 1\%$ 	Resistor Quantity <ul style="list-style-type: none"> • 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 <ul style="list-style-type: none"> • LF = Tin-Plated (RoHS compliant*)
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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-AS Series		General Purpose - Sulfur-Resistant					
	Size	Resistance Range	Tolerance	Temperature Coefficient	Rated Power (W)	Packaging	Features
	01005 to 0603	1 ohm to 10 megohms	1 %/5 %	±100 ppm/±250 ppm	0.03 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	0.02 to 9.1 ohms	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*

*RoHS Directive 2002/95/EC Jan. 27, 2003 including annex and RoHS Recast 2011/65/EU June 8, 2011.



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, 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, 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





Chip Resistor Product Information


THIN FILM CHIP RESISTORS

Bourns® 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-ST 	Precision						
	Size	Resistance Range	Tolerance	Temperature Coefficient	Rated Power (W)	Packaging	Features
	0402 to 1206	1 ohm to 2.49 megohm	0.01 % to 1 %	±25 to ±50 ppm	0.063 to 0.25	Tape & Reel	<ul style="list-style-type: none">• RoHS compliant*

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-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*




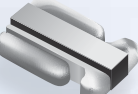
*RoHS Directive 2002/95/EC Jan. 27, 2003 including annex and RoHS Recast 2011/65/EU June 8, 2011.



METAL STRIP CHIP RESISTORS

There are four series of AEC-Q200 compliant metal strip chip resistors. They offer 1 % and 5 % tolerances and a ± 50 ppm/ $^{\circ}\text{C}$ temperature coefficient of resistance value with operating temperature ranges from -55°C to $+170^{\circ}\text{C}$.

These products are offered for high precision current sense applications because they have very low resistance, high rated power, good long-term stability and low thermal EMF.

CRF Series High Power Current Sense Chip Resistor							
	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							
	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							
	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*
CST Series 4-Terminal Current Sense Resistor							
	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, as well as reduce cost and component count.

Beyond standard isolated and bussed configurations, several high-speed termination chip arrays designed for use in terminating FPGAs, using either LVDS or LVPCL I/O standards are available.

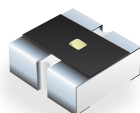
CAY06-J2 Series



Chip Resistor Array

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">Convex termination styleRoHS compliant*

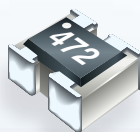
CAY06-J2 AS Series



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-resistantConvex termination styleRoHS compliant*

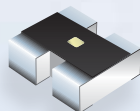
CAY10-J2/J4 Series



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 style2/4 isolated resistors in an 0404/0804 size packageE24 series from 10 ohms to 1 megohmRoHS compliant*

CAY10-J2/J4 AS Series



Chip Resistor Array - Sulfur-Resistant

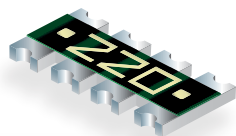
Size	Resistance Range	Tolerance	Temperature Coefficient	Power per Resistor (W)	Features
0404, 0804	10 ohms to 1 megohm	±5 %	±250 ppm/°C	0.0625	<ul style="list-style-type: none">Sulfur-resistant2/4 isolated resistors in an 0404/0804 size packageE24 series from 10 ohms to 1 megohmRoHS compliant*

*RoHS Directive 2002/95/EC Jan. 27, 2003 including annex and RoHS Recast 2011/65/EU June 8, 2011.

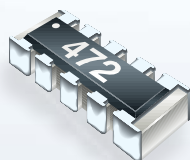


CAY16-J2/F4/J4/J8 Series**Chip Resistor Array**

Size	Resistance Range	Tolerance	Temperature Coefficient	Power per Resistor (W)	Features
0606 - 1506	10 ohms to 1 megohm	$\pm 1\%$, $\pm 5\%$	± 200 ppm/ $^{\circ}\text{C}$	0.0625	<ul style="list-style-type: none"> Convex termination style 2, 4 or 8 isolated elements available RoHS compliant*

CAY16-J4 AS Series**Chip Resistor Array - Sulfur-Resistant**

Size	Resistance Range	Tolerance	Temperature Coefficient	Power per Resistor (W)	Features
0606 - 1206	10 ohms to 1 megohm	$\pm 5\%$	± 200 ppm/ $^{\circ}\text{C}$	0.0625	<ul style="list-style-type: none"> Sulfur-resistant Convex termination style RoHS compliant*

CAY17 Series**Chip Resistor Array**

Size	Resistance Range	Tolerance	Temperature Coefficient	Power per Resistor (W)	Features
1206	10 ohms to 100K ohms	$\pm 5\%$	± 250 ppm/ $^{\circ}\text{C}$	0.0625	<ul style="list-style-type: none"> Convex termination style 10 pin with 8 resistors in bussed type for pull up/down circuit E24 series from 10 ohms to 43K ohms RoHS compliant*



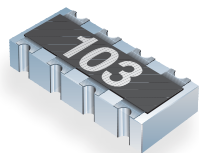
Chip Array Product Information

CHIP RESISTOR ARRAYS WITH CONCAVE TERMINALS

Bourns provides a wide selection of standard resistance values in several popular sizes \pm terminations. Chip arrays require minimal space, as well as reduce cost and component count.

Beyond standard isolated and bussed configurations, several high-speed termination chip arrays designed for use in terminating FPGAs, using either LVDS or LVPCL I/O standards are available.

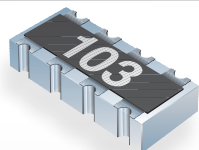
CAT10-J4 Series



Chip Resistor Array

Size	Resistance Range	Tolerance	Temperature Coefficient	Power per Resistor (W)	Features
0804	10 ohms to 1 megohm	$\pm 5\%$	± 250 ppm/ $^{\circ}\text{C}$	0.0625	<ul style="list-style-type: none">Concave termination styleE24 series from 10 ohms to 1 megohmRoHS compliant*

CAT16-J2/F4/J4/F8/J8 Series



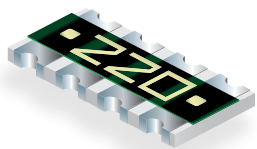
Chip Resistor Array

Size	Resistance Range	Tolerance	Temperature Coefficient	Power per Resistor (W)	Features
0606 - 2406	10 ohms to 1 megohm	$\pm 1\%$, $\pm 5\%$	± 200 ppm/ $^{\circ}\text{C}$	0.0625	<ul style="list-style-type: none">Concave termination style2, 4 or 8 isolated elements availableRoHS compliant*

*RoHS Directive 2002/95/EC Jan. 27, 2003 including annex and RoHS Recast 2011/65/EU June 8, 2011.



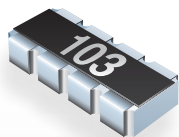
CAT16-J2/J4 AS Series



Chip Resistor Array - Sulfur-Resistant

Size	Resistance Range	Tolerance	Temperature Coefficient	Power per Resistor (W)	Features
0606 - 1206	10 ohms to 1 megohm	$\pm 5\%$	± 200 ppm/ $^{\circ}\text{C}$	0.0625	<ul style="list-style-type: none">• Sulfur-resistant• Concave termination style• 2/4 isolated elements available• RoHS compliant*

CAT25 Series



Chip Resistor Array

Size	Resistance Range	Tolerance	Temperature Coefficient	Power per Resistor (W)	Features
1608	10 ohms to 1 megohms	$\pm 5\%$	± 200 ppm/ $^{\circ}\text{C}$	0.0625	<ul style="list-style-type: none">• Concave termination style• 10 pins/ 8 bussed resistors• For 8-bit multiple applications• RoHS compliant*





Worldwide Sales Offices

Country/Region	Phone	Email
Americas:	+1-951-781-5500	americus@bourns.com
Brazil:	+55 11 5505 0601	americus@bourns.com
China:	+86 21 64821250	asiacus@bourns.com
Europe, Middle East, Africa:	+36 88 520 390	eurocus@bourns.com
Japan:	+81 49 269 3204	asiacus@bourns.com
Korea:	+82 70 4036 7730	asiacus@bourns.com
Singapore:	+65 6348 7227	asiacus@bourns.com
Taiwan:	+886 2 25624117	asiacus@bourns.com
Other Asia-Pacific Countries:	+886 2 25624117	asiacus@bourns.com
Technical Assistance Region	Phone	Email
Asia-Pacific:	+886 2 25624117	techweb@bourns.com
Europe, Middle East, Africa:	+36 88 520 390	eurotech@bourns.com
Americas:	+1-951-781-5500	techweb@bourns.com

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