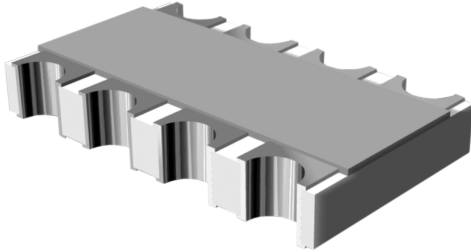


Flat Chip Resistor Array



ACAC 0612 flat chip resistor array combines the proven reliability of precision MFC products with the advantages of a chip array. The possibility of tolerance matching and T.C. tracking makes this product perfectly suited for applications with outstanding requirements towards stable fixed resistor ratios. A small package enables the design of high density circuits in combination with reduction of assembly costs. Different resistance values can be realized on one substrate.

FEATURES

- Advanced thin film technology
- Superior overall stability
- Four resistors on one substrate
- Tight T.C. of ± 25 ppm/K and T.C. tracking of 15 ppm/K, (10 ppm/K on request)
- Tolerance of ± 0.25 % and matched tolerance of 0.1 %
- Different resistance values are possible
- Pure Sn termination on Ni barrier layer
- Compatible with lead (Pb)-free and lead containing soldering processes
- Lead (Pb)-free and RoHS compliant



APPLICATIONS

- Precision analogue circuits
- Voltage divider
- Feedback circuits
- Signal conditioning

TECHNICAL SPECIFICATIONS	
DESCRIPTION	ACAC 0612
EIA size	0612
Metric size	RR 1632M
Configuration, isolated	4 × 0603
Design:	
all equal	AE
two pairs	TP
different values	DF
Resistance values	100 Ω to 221 k Ω ¹⁾
Tolerance:	
absolute	± 0.25 %
matching	0.1 %
Temperature coefficient:	
absolute	± 25 ppm/K
tracking	15 ppm/K
Max. resistance ratio R_{min}/R_{max}	1 : 5
Climatic category (LCT/UCT/days)	55/125/56
Rated dissipation: P_{70} ²⁾	
element	0.1 W
package	0.3 W
Operating voltage	75 V
Film temperature	125 °C
Insulation voltage (U_{ins}) against ambient and between isolated resistors, continuous	75 V

Note

1. Resistance values to be selected from E24 and E96.
2. The power dissipation on the resistor generates a temperature rise against the local ambient, depending on the heat flow support of the printed-circuit board (thermal resistance). The rated dissipation applies only if the permitted film temperature is not exceeded.

12NC INFORMATION

- The arrays have a 12-digit numeric code starting with 2312.
- The subsequent 3 digits indicate the array packing and body size; see the 12NC table.
- The last 5 digits indicate the termination and individual array design number (last 4 digits).

12NC - resistor array type and packing					ORDERING CODE 2312	
DESCRIPTION					AE (ALL EQUAL)	TP (TWO PAIRS)
					P5 5 000 UNITS	P5 5 000 UNITS
TYPE	T.C.	TOL.	R1; R4	R2; R3		
ACAC 0612	15 ppm/K	0.1 %	1 kΩ	1 kΩ	441 09001	-
			10 kΩ	10 kΩ	441 09002	-
			100 kΩ	100 kΩ	441 09003	-
			1 kΩ	2 kΩ	-	441 19004
			10 kΩ	20 kΩ	-	441 19005
			1 kΩ	3 kΩ	-	441 19006
			10 kΩ	30 kΩ	-	441 19007

Note

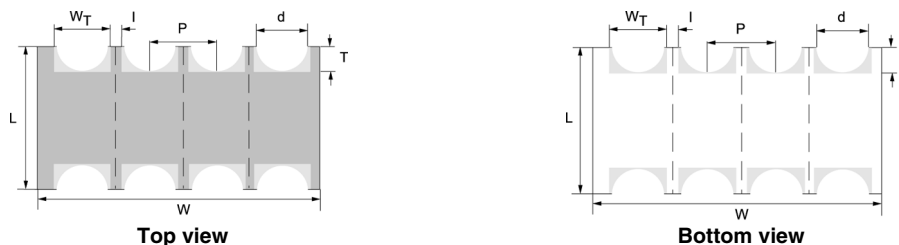
- 12NC indicating resistor array type and packing table shows standard array types with a resistance divider ratio up to 1 : 3. Please consult Vishay BEYSCHLAG for specific divider ratio, temperature coefficient, tolerance and ohmic values.

PART NUMBER AND PRODUCT DESCRIPTION ²⁾																	
PART NUMBER ³⁾ : ACAC06P0839001P500																	
A	C	A	C	0	6	P	0	8	3	9	0	0	1	P	5	0	0
MODEL	SIZE	TERMINAL	PIN	SCHEMATIC	DESIGN NUMBER	PACKING ⁴⁾	SPECIAL										
ACAC	06	P = concave	08 = 8 Pins	3 = 03	Design number is available on request	P1 P5 PW	00 = standard										
PRODUCT DESCRIPTION: ACAC 9001 TP P5																	
A	C	A	C	9001	TP	P5											
MODEL	PRODUCT	SIZE	TERMINATION	DESIGN NUMBER	DESIGN	PACKING ⁴⁾											
A = Array	C = Flat chip	A = 0612	C = Concave	Design number is available on request	AE = All Equal TP = Two Pairs DF = Different Values	P1 P5 PW											

Note

- Products can be ordered using either the PRODUCT DESCRIPTION or the 12 NC.
- The PART NUMBER is shown to facilitate the introduction of a unified part numbering system. Currently, this PART NUMBER is applicable in the Americas only.
- Please refer to table PACKING, page 3.

DIMENSIONS

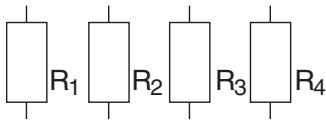


DIMENSIONS - CHIP resistor array top view, mass and relevant physical dimensions									
TYPE	L (mm)	W (mm)	H (mm)	P (mm)	W _T (mm)	T (mm)	d (mm)	I (mm)	mass (mg)
ACAC 0612	1.6 ± 0.15	3.2 ± 0.15	0.55 ± 0.1	0.8 ± 0.1	0.6 ± 0.15	0.3 ± 0.15	0.3 ± 0.1	min. 0.15	9.41

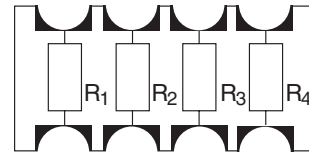
DIMENSIONS - CHIP resistor array bottom view, mass and relevant physical dimensions									
TYPE	L (mm)	W (mm)	H (mm)	P (mm)	W _T (mm)	T (mm)	d (mm)	I (mm)	mass (mg)
ACAC 0612	1.6 ± 0.15	3.2 ± 0.15	0.55 ± 0.1	0.8 ± 0.1	0.6 ± 0.15	0.4 ± 0.15	0.3 ± 0.1	min. 0.25	9.41

PACKING					
MODEL	TAPE WIDTH	DIAMETER	PIECES	PITCH	PACKING CODE
					PAPER TAPE
ACAC	8 mm	180 mm/7"	1000	4 mm	P1
	8 mm	180 mm/7"	5000	4 mm	P5
	8 mm	330 mm/13"	10000	4 mm	PW

APPLICATION INFORMATION



Equivalent circuit.
(SCHEMATIC 03)



Array configuration.

DESCRIPTION

Production is strictly controlled and follows an extensive set of instructions established for reproducibility. A homogeneous film of metal alloy is deposited on a super high grade (96 % Al₂ O₃) ceramic substrate and conditioned to achieve the desired temperature coefficient. Specially designed inner contacts are deposited on both sides. A special laser is used to achieve the target value by smoothly cutting a meander groove in the resistive layer without damaging the ceramics.

The resistor elements are covered by a protective coating designed for electrical, mechanical and climatic protection. The terminations receive a final pure tin on nickel plating.

The result of the determined production is verified by an extensive testing procedure and optical inspection performed on 100 % of the individual chip resistors. Only accepted products are laid directly into the paper tape in accordance with **EN 60 286-3**.

ASSEMBLY

The resistors are suitable for processing on automatic SMD assembly systems and for automatic soldering using wave, reflow or vapour phase. The encapsulation is resistant to all cleaning solvents commonly used in the electronics industry, including alcohols, esters and aqueous solutions. The resistors are lead (Pb)-free, the pure tin plating provides compatibility with lead (Pb)-free and lead-containing soldering processes. The immunity of the plating against tin whisker growth has been proven under extensive testing. All products comply with the CEFIC-EECA-EICTA list of legal restrictions on hazardous substances:

This includes full compliance with the following directives:

- 2000/53/EC End of Vehicle life Directive (ELV)
- 2000/53/EC Annex II to End of Vehicle Life Directive (ELV II)
- 2002/95/EC Restriction of the use of Hazardous Substances Directive (RoHS)
- 2002/96/EC Waste Electrical and Electronic Equipment Directive (WEEE)

Solderability is specified for 2 years after production or re-qualification. The permitted storage time is 20 years.

APPROVALS

Where applicable, the resistors are tested in accordance with **EN 140 401-801** (superseding **CECC 40401-801**) which refers to **EN 140 000 (EN 60 115-1)** and **EN 140 400 (IEC 60 115-8)**.

TESTS AND REQUIREMENTS

Essentially all tests are carried out in accordance with the following specifications:

EN 140 000 / EN 60 115-1, Generic specification (includes tests)

EN 140 400 / EN 60 115-1, Sectional specification (includes schedule for qualification approval)

The testing also covers most of the requirements specified by EIA/IS-703 and JIS-C-5202.

The tests are carried out in accordance with IEC 60 068 and under standard atmospheric conditions according to IEC 60 068-1, 5.3. Climatic category LCT/UCT/56 (rated temperature range: Lower Category Temperature, Upper Category Temperature; damp heat, long term, 56 days) is valid.

Unless otherwise specified the following values apply:

Temperature: 15 °C to 35 °C

Relative humidity: 45 % to 75 %

Air pressure: 86 kPa to 106 kPa (860 mbar to 1 060 mbar).

The components are mounted for testing on boards in accordance with EN 60 115-1, 4.31 unless otherwise specified.

In the following table only the tests and requirements are listed with reference to the relevant clauses of EN 60 115-1 and IEC 60 068-2; a short description of the test procedure is also given.

TEST PROCEDURES AND REQUIREMENTS				
EN 60115-1 CLAUSE	IEC 60068-2 TEST METHOD	TEST	PROCEDURE	REQUIREMENTS ¹⁾ PERMISSIBLE CHANGE ($\Delta R/R$)
			stability for product types: ACAC 0612	100 Ω to 221 k Ω
4.5	–	resistance	–	$\pm 0.25 \%$
4.8.4.2	–	temperature coefficient	at 20 / LCT / 20 °C and 20 / UCT / 20 °C	± 25 ppm/K
4.25.1	–	endurance	$U = \sqrt{P_{70} \times R}$ or $U = U_{max}$; 1.5 h on; 0.5 h off; 70 °C; 1000 h	$\pm (0.25 \% R + 0.05 \Omega)$
4.25.3	–	endurance at upper category temperature	125 °C; 1000 h	$\pm (0.5 \% R + 0.05 \Omega)$
4.24	78 (Cab)	damp heat, steady state	(40 \pm 2) °C; 56 days; (93 \pm 3) % RH	$\pm (0.5 \% R + 0.05 \Omega)$
4.13	–	short time overload ²⁾	$U = 2.5 \times \sqrt{P_{70} \times R}$ or $U = 2 \times U_{max}$; 5 s	$\pm (0.1 \% R + 0.01 \Omega)$ no visible damage
4.19	14 (Na)	rapid change of temperature	30 min. at LCT and 30 min. at UCT; 5 cycles	$\pm (0.1 \% R + 0.01 \Omega)$ no visible damage
4.18.2	58 (Tb)	resistance to soldering heat	reflow method 2 (IR / forced gas convention); (260 \pm 5) °C; (10 \pm 1) s	$\pm (0.1 \% R + 0.01 \Omega)$ no visible damage
4.17.2	58 (Ta)	solderability	solder bath method; (215 \pm 3) °C; (3 \pm 0.3) s	good tinning ($\geq 95 \%$ covered); no visible damage
4.32	21 (Ue ₃)	shear (adhesion)	RR 1632M; 45 N	no visible damage
4.7	–	voltage proof	$U_{rms} = U_{ins}$; 60 \pm 5 s; against ambient, between adjacent resistors	no flashover or breakdown

Note

- Figures are given for equal values.
- For a single element.



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