Array chip resistors size 4 × 0603

ARC241/ARC242 ARV241/ARV242

FEATURES

- 4 × 0603 sized resistors in one 1206-sized package
- Reduced reel exchange time
- Low assembly costs
- Reduced PCB area
- Reduced size of final equipment
- Higher component and equipment reliability.

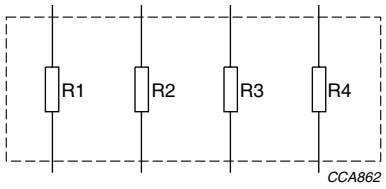
APPLICATIONS

- Camcorders
- Hand held measuring equipment
- Car telephones
- Computers
- Portable radio, CD and cassette players.

DESCRIPTION

The resistors are constructed on a high grade ceramic body (aluminium oxide). Internal metal electrodes are added at each end and connected by a resistive paste which is applied to the top surface of the substrate. The composition of the paste is adjusted to give the approximate resistance required and the value is trimmed to within tolerance, by laser cutting of this resistive layer.

The resistive layer is covered with a protective coating and printed with the resistance value. Finally, external end terminations are added. For ease of soldering the outer layer of these end terminations is a lead-tin alloy.



R1 = R2 = R3 = R4.
For dimensions see Fig.3 and Table 3.

Fig.1 Equivalent circuit diagram.

QUICK REFERENCE DATA

DESCRIPTION	VALUE			
	ARC241	ARV241	ARC242	ARV242
Resistance range	10 Ω to 1 MΩ			
Resistance tolerance and E-series	±5%; E24 series		±1%; E96 series	±1%; E24/E96 series
Temperature coefficient	$\leq \pm 200 \times 10^{-6}$/K		$\leq \pm 100 \times 10^{-6}$/K	$\leq \pm 200 \times 10^{-6}$/K
Absolute maximum dissipation per resistive element at T_{amb} = 70 °C	0.063 W			
Maximum permissible voltage	50 V (DC or RMS)			
Climatic category (IEC 60068)	55/155/56			
Basic specification	IEC 60115-8			

R-Array overview

TYPE	TERMINATION TECHNOLOGY	SIZE	TOLERANCE (%)
ARC241	concave	4 × 0603	5
ARC242	concave	4 × 0603	1
ARV241	convex	4 × 0603	5
ARV242	convex	4 × 0603	1

FUNCTIONAL DESCRIPTION

Product characterization

Standard values of nominal resistance are taken from the E24 or E96 series for resistors with a tolerance of ±5% or ±1%. The values of the E24/E96 series are in accordance with *"IEC publication 60063"*.

Limiting values

TYPE	LIMITING VOLTAGE(1) (V)	LIMITING POWER (W)
ARC241	50	0.063
ARC242		
ARV241		
ARV242		

Note

1. This is the maximum voltage that may be continuously applied to the resistor element, see *"IEC publication 60115-8"*.

DERATING

The power that the resistor can dissipate depends on the operating ambient temperature; see Fig.2.

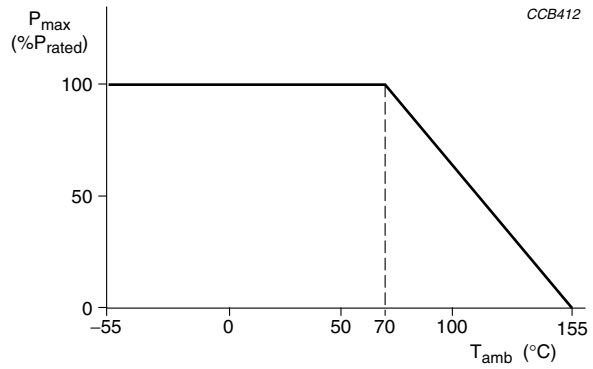


Fig.2 Maximum dissipation (P_{max}) in percentage of rated power as a function of the operating ambient temperature (T_{amb}).

MECHANICAL DATA

Mass per 100 units

TYPE	MASS (g)
ARC241	1.1
ARC242	1.1
ARV241	0.9186
ARV242	0.9186

Marking

All resistors within the E24 series are marked with a 3-digit code and a 4-digit code for resistors of the E96 series, on the protective coat to designate the nominal resistance value.

3-DIGIT MARKING

For values up to 91 Ω the R is used as a decimal point. For values of 100 Ω or greater the first 2 digits apply to the resistance value and the third indicates the number of zeros to follow.

Example

MARKING	RESISTANCE
12R	12 Ω
124	120 kΩ
000	jumper

4-DIGIT MARKING

For values up to 976 Ω the R is used as a decimal point. For values of 1 K or greater the first 3 digits apply to the resistance value and the fourth indicates the number of zeros to follow.

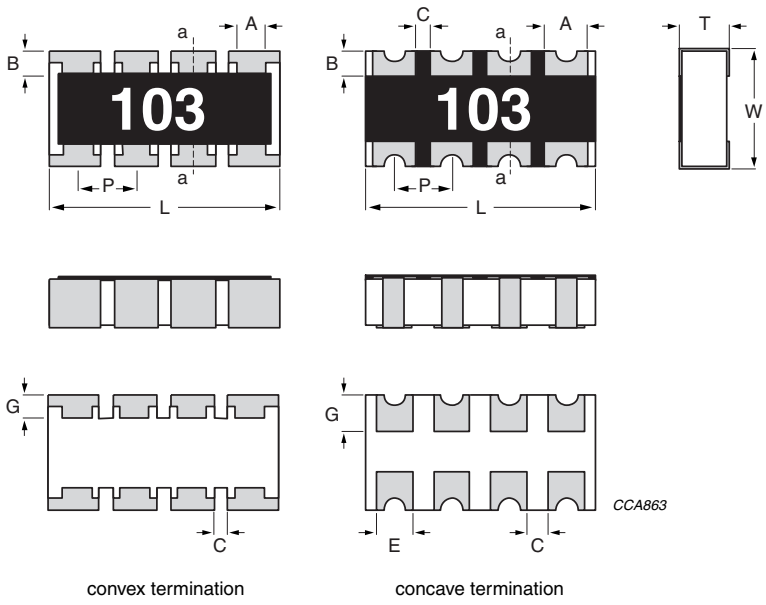
Example

MARKING	RESISTANCE
12R0	12 Ω
1203	120 kΩ

PACKAGE MARKING

The packaging is also marked and includes resistance value, tolerance, catalogue number, quantity, production period, batch number and source code.

Outlines



Dimensions in mm.
For dimensions see Table 3.

Fig.3 Outlines.

Table 3 Physical dimensions; see Fig.3

SYMBOL	ARC241/242		ARV241		ARV242		UNIT
	VALUE	TOL.	VALUE	TOL.	VALUE	TOL.	
L	3.20	+0.20/–0.10	3.20	±0.15	3.20	±0.15	mm
W	1.60	+0.20/–0.10	1.60	±0.15	1.60	±0.15	mm
T	0.60	±0.20	0.55	±0.10	0.55	±0.10	mm
A	0.60	±0.15	0.40	±0.15	0.60	±0.05	mm
B	0.35	±0.15	0.30	±0.20	0.30	±0.20	mm
P	0.80	±0.15	0.80	±0.15	0.80	±0.15	mm
E	0.50	±0.15	–	–	–	–	mm
G	0.50	±0.15	0.30	±0.15	0.30	±0.15	mm
C	0.10	min.	0.10	min.	0.40	±0.15	mm

TESTS AND REQUIREMENTS

Essentially all tests are carried out in accordance with the schedule of *"IEC publication 60115-8"*, category **LCT**/**UCT**/**56** (rated temperature range: **L**ower **C**ategory **T**emperature, **U**pper **C**ategory **T**emperature; damp heat, long term, **56** days). The testing also covers the requirements specified by EIA and EIAJ.

The tests are carried out in accordance with IEC publication 60068, *"Recommended basic climatic and mechanical robustness testing procedure for electronic components"* and under standard atmospheric conditions according to *"IEC 60068-1"*, subclause 5.3.

Unless otherwise specified the following values apply:

Temperature: 15 °C to 35 °C

Relative humidity: 25% to 75%

Air pressure: 86 kPa to 106 kPa (860 mbar to 1060 mbar).

In Table 4 the tests and requirements are listed with reference to the relevant clauses of *"IEC publications 60115-8 and 60068"*; a short description of the test procedure is also given.
In some instances deviations from the IEC recommendations were necessary for our method of specifying.

All soldering tests are performed with mildly activated flux.

Table 4 Test procedures and requirements

IEC 60115-8 CLAUSE	IEC 60068-2 TEST METHOD	TEST	PROCEDURE	REQUIREMENTS			
				ARC241	ARV241	ARC242	ARV242
Tests in accordance with the schedule of IEC publication 60115-8							
4.4.1		visual examination		no holes; clean surface; no visible damage			
4.4.2		dimensions (outline; see Fig.3)	gauge (mm)	see Table 3			–
4.5		resistance	applied voltage (+0/−10%): 10 Ω ≤ R < 100 Ω: 0.3 V 100 Ω ≤ R < 1 kΩ: 1 V 1 kΩ ≤ R < 10 kΩ: 3 V 10 kΩ ≤ R < 100 kΩ: 10 V 100 kΩ ≤ R < 1 MΩ: 25 V R ≥ 1 MΩ: 50 V	$R - R_{nom}$: max. ±5%		$R - R_{nom}$: max. ±1%	$R - R_{nom}$: max. ±5%
4.18	20 (Tb)	resistance to soldering heat	unmounted chips; 10 ±1 s; 260 ±5 °C	no visible damage			
				ΔR/R max.: ±(0.5% +0.05 Ω)			ΔR/R max.: ±(1% +0.05 Ω)
4.29	45 (Xa)	component solvent resistance	isopropyl alcohol or H_2O followed by brushing in accordance with *"MIL 202 F"*	no visible damage			
4.17	20 (Ta)	solderability	unmounted chips completely immersed for 2 ±0.5 s in a solder bath at 235 ±2 °C	good tinning (≥95% covered); no visible damage			

IEC 60115-8 CLAUSE	IEC 60068-2 TEST METHOD	TEST	PROCEDURE	REQUIREMENTS			
				ARC241	ARV241	ARC242	ARV242
4.7		voltage proof on insulation	maximum voltage (RMS) during 1 minute, metal block method	no breakdown or flashover			
4.13		short time overload	room temperature; $P = 6.25 \times P_n$; 5 s ($V \leq 2 \times V_{max}$)	ΔR/R max.: ±(1% +0.05 Ω)			ΔR/R max.: ±(2% +0.1 Ω)
4.33		bending	resistors mounted on a 90 mm glass epoxy resin PCB (FR4), bending: 5 mm	no visible damage			
				ΔR/R max.: ±(1% +0.05 Ω)		ΔR/R max.: ±(0.5% +0.05 Ω)	ΔR/R max.: ±(1% +0.05 Ω)
4.19	14 (Na)	rapid change of temperature	30 minutes at LCT and 30 minutes at UCT; 5 cycles	no visible damage			
				ΔR/R max.: ±(0.5% +0.05 Ω)			ΔR/R max.: ±(1% +0.05 Ω)
4.24.2	3 (Ca)	damp heat (steady state)	56 days; 40 ±2 °C; 93 +2/–3% RH; loaded with 0.01 P_n	ΔR/R max.: ±(3% +0.1 Ω)		ΔR/R max.: ±(1% +0.05 Ω)	ΔR/R max.: ±(2% +0.1 Ω)
4.25.1		endurance	1000 +48/–0 hours; 70 ±2 °C; loaded with P_n or V_{max}; 1.5 hours on and 0.5 hours off	ΔR/R max.: ±(2% +0.1 Ω)		ΔR/R max.: ±(1% +0.05 Ω)	ΔR/R max.: ±(2% +0.1 Ω)
4.23.2	27 (Ba)	endurance at upper category temperature	1000 +48/–0 hours; no load	ΔR/R max.: ±(2% +0.1 Ω)		ΔR/R max.: ±(1% +0.05 Ω)	ΔR/R max.: ±(2% +0.1 Ω)
4.8.4.2		temperature coefficient	at 20/LCT/20 °C and 20/UCT/20 °C	$\leq \pm 200 \times 10^{-6}$/K		$\leq \pm 100 \times 10^{-6}$/K	$\leq \pm 200 \times 10^{-6}$/K
Other tests in accordance with IEC 60115 clauses and IEC 60068 test method							
4.17	20 (Ta)	solderability (after ageing)	8 hours steam or 16 hours 155 °C; unmounted chips completely immersed for 2 ±0.5 s in a solder bath at 235 ±2 °C	good tinning (≥95% covered); no damage			
4.6.1.1		insulation resistance	voltage (DC) after 1 minute, metal block method: 10 V	R_{ins} min.: 10^3 MΩ			
4.12		noise	IEC publication 60195 (measured with Quantech-equipment):				
			R ≤ 100 Ω	max. 0.316 μV/V (–10 dB)			
			100 Ω < R ≤ 1 kΩ	max. 1 μV/V (0 dB)			
			1 kΩ < R ≤ 10 kΩ	max. 3 μV/V (9.54 dB)			
			10 kΩ < R ≤ 100 kΩ	max. 6 μV/V (15.56 dB)			
			100 kΩ < R ≤ 1 MΩ	max. 10 μV/V (20 dB)			

IEC 60115-8 CLAUSE	IEC 60068-2 TEST METHOD	TEST	PROCEDURE	REQUIREMENTS			
				ARC241	ARV241	ARC242	ARV242
Other applicable tests							
(JIS) C 5202 7.9		endurance (under damp and load)	1000 +48/–0 hours; 40 ±2 °C; 93 +2/–3% RH; loaded with P_n or V_{max}; 1.5 hours on and 0.5 hours off	ΔR/R max.: ±(3% +0.1 Ω)		ΔR/R max.: ±(2% +0.1 Ω)	
EIA 575 3.13		leaching	unmounted chips; 60 ±1 s; 260 ±5 °C	good tinning; no leaching			
EIA/IS 703 4.5		load humidity	1000 +48/–0 hours; 85 ±2 °C; 85 ±5% RH; loaded with 0.01 P_n or V_{max}	ΔR/R max.: ±(2% +0.1 Ω)			