

## 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.

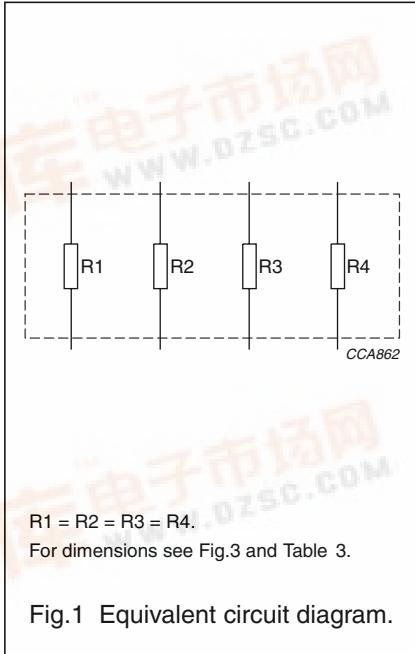
### APPLICATIONS

- 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.



### 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	≤±200 × 10 <sup>-6</sup> /K	≤±100 × 10 <sup>-6</sup> /K	≤±200 × 10 <sup>-6</sup> /K	
Absolute maximum dissipation per resistive element at T <sub>amb</sub> = 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  $\pm 5\%$  or  $\pm 1\%$ . The values of the E24/E96 series are in accordance with "IEC publication 60063".

### Limiting values

TYPE	LIMITING VOLTA GE <sup>(1)</sup> (V)	LIMITING POWER (W)
ARC241		
ARC242		
ARV241	50	0.063
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.

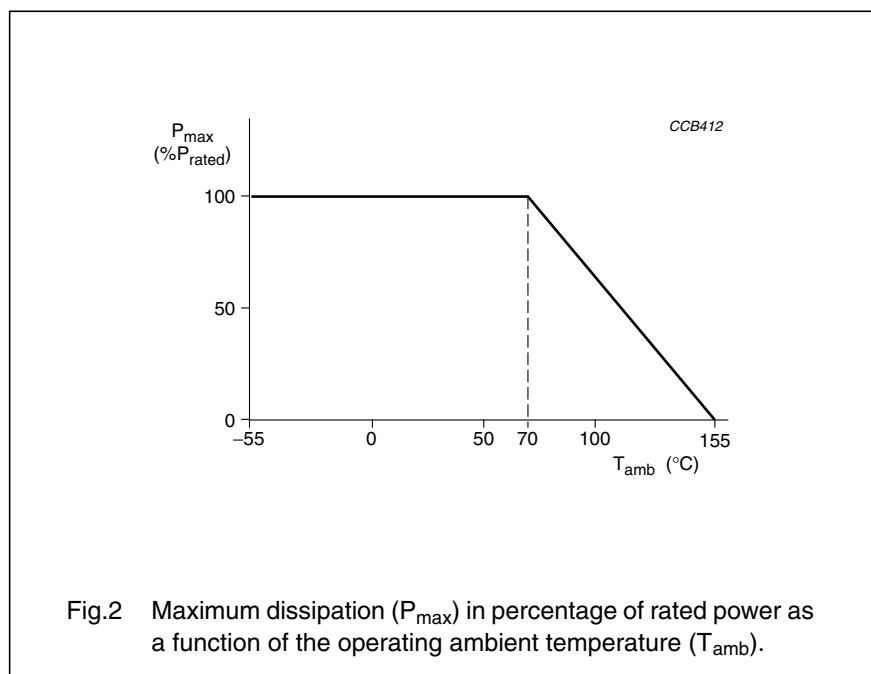


Fig.2 Maximum dissipation ( $P_{\max}$ ) in percentage of rated power as a function of the operating ambient temperature ( $T_{\text{amb}}$ ).

# Array chip resistors

size  $4 \times 0603$

ARC241/ARC242  
ARV241/ARV242

## 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  $91 \Omega$  the R is used as a decimal point. For values of  $100 \Omega$  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	$12 \Omega$
124	$120 \text{ k}\Omega$
000	jumper

### 4-DIGIT MARKING

For values up to  $976 \Omega$  the R is used as a decimal point. For values of  $1 \text{ k}\Omega$  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	$12 \Omega$
1203	$120 \text{ k}\Omega$

## PACKAGE MARKING

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

### Outlines

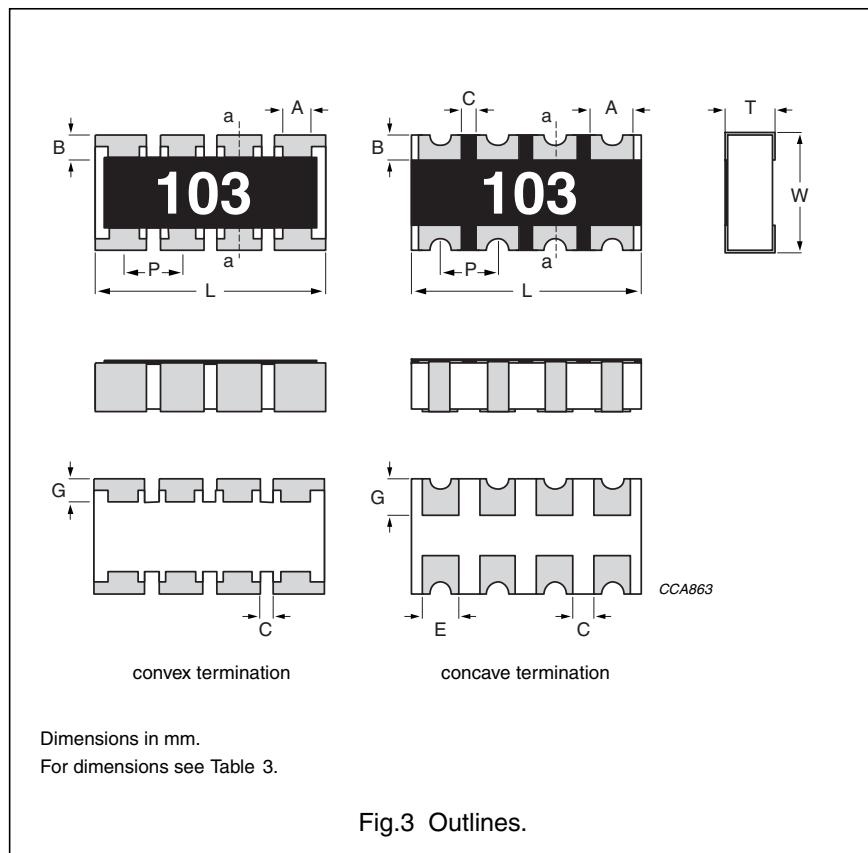


Table 3 Physical dimensions; see Fig.3

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

## TEST REQUIREMENTS

all tests are carried out in accordance with the schedule of *“IEC publication 60115-8”*, category **LCT/UCT/56** (rated temperature Lower Category Temperature, Upper Category Temperature; short, long term, **56** days). The testing also covers the requirements by EIA and EIAJ.

are carried out in accordance with IEC publication 60068, *“Extended basic climatic and mechanical robustness testing 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.

## Test procedures and requirements

IEC 60068-2 TEST METHOD	TEST	PROCEDURE	REQUIREMENTS					
			ARC241	ARV241	ARC242	ARV242		
<b>accordance with the schedule of IEC publication 60115-8</b>								
	visual examination		no holes; clean surface; no visible damage					
	dimensions (outline; see Fig.3)	gauge (mm)	see Table 3		–			
	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 <sub>nom</sub> : max. ±5%	R – R <sub>nom</sub> : max. ±1%	R – R <sub>nom</sub> : max. ±5%			
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)			
45 (Xa)	component solvent resistance	isopropyl alcohol or H <sub>2</sub> O followed by brushing in accordance with “ <i>MIL 202 F</i> ”	no visible damage					
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 60068-2 TEST METHOD	TEST	PROCEDURE	REQUIREMENTS			
			ARC241	ARV241	ARC242	ARV242
	voltage proof on insulation	maximum voltage (RMS) during 1 minute, metal block method	no breakdown or flashover			
	short time overload	room temperature; $P = 6.25 \times P_n$ ; 5 s ( $V \leq 2 \times V_{max}$ )	$\Delta R/R$ max.: $\pm(1\% + 0.05 \Omega)$		$\Delta R/R$ max.: $\pm(2\% + 0.1 \Omega)$	
	bending	resistors mounted on a 90 mm glass epoxy resin PCB (FR4), bending: 5 mm	no visible damage			
			$\Delta R/R$ max.: $\pm(1\% + 0.05 \Omega)$	$\Delta R/R$ max.: $\pm(0.5\% + 0.05 \Omega)$	$\Delta R/R$ max.: $\pm(1\% + 0.05 \Omega)$	
14 (Na)	rapid change of temperature	30 minutes at LCT and 30 minutes at UCT; 5 cycles	no visible damage			
			$\Delta R/R$ max.: $\pm(0.5\% + 0.05 \Omega)$		$\Delta R/R$ max.: $\pm(1\% + 0.05 \Omega)$	
3 (Ca)	damp heat (steady state)	56 days; $40 \pm 2$ °C; $93 +2/-3\%$ RH; loaded with $0.01 P_n$	$\Delta R/R$ max.: $\pm(3\% + 0.1 \Omega)$	$\Delta R/R$ max.: $\pm(1\% + 0.05 \Omega)$	$\Delta R/R$ max.: $\pm(2\% + 0.1 \Omega)$	
	endurance	1000 +48/-0 hours; $70 \pm 2$ °C; loaded with $P_n$ or $V_{max}$ ; 1.5 hours on and 0.5 hours off	$\Delta R/R$ max.: $\pm(2\% + 0.1 \Omega)$	$\Delta R/R$ max.: $\pm(1\% + 0.05 \Omega)$	$\Delta R/R$ max.: $\pm(2\% + 0.1 \Omega)$	
27 (Ba)	endurance at upper category temperature	1000 +48/-0 hours; no load	$\Delta R/R$ max.: $\pm(2\% + 0.1 \Omega)$	$\Delta R/R$ max.: $\pm(1\% + 0.05 \Omega)$	$\Delta R/R$ max.: $\pm(2\% + 0.1 \Omega)$	
	temperature coefficient	at 20/LCT/20 °C and 20/UCT/20 °C	$\leq 200 \times 10^{-6}/K$	$\leq 100 \times 10^{-6}/K$	$\leq 200 \times 10^{-6}/K$	
<b>Tests in accordance with IEC 60115 clauses and IEC 60068 test method</b>						
20 (Ta)	solderability (after ageing)	8 hours steam or 16 hours 155 °C; unmounted chips completely immersed for $2 \pm 0.5$ s in a solder bath at $235 \pm 2$ °C	good tinning ( $\geq 95\%$ covered); no damage			
	insulation resistance	voltage (DC) after 1 minute, metal block method: 10 V	$R_{ins}$ min.: $10^3 \text{ M}\Omega$			
	noise	IEC publication 60195 (measured with Quantech-equipment): $R \leq 100 \Omega$ $100 \Omega < R \leq 1 \text{ k}\Omega$ $1 \text{ k}\Omega < R \leq 10 \text{ k}\Omega$ $10 \text{ k}\Omega < R \leq 100 \text{ k}\Omega$ $100 \text{ k}\Omega < R \leq 1 \text{ M}\Omega$	max. $0.316 \mu\text{V}/\text{V}$ (-10 dB) max. $1 \mu\text{V}/\text{V}$ (0 dB) max. $3 \mu\text{V}/\text{V}$ (9.54 dB) max. $6 \mu\text{V}/\text{V}$ (15.56 dB) max. $10 \mu\text{V}/\text{V}$ (20 dB)			

IEC 60068-2 TEST METHOD	TEST	PROCEDURE	REQUIREMENTS			
			ARC241	ARV241	ARC242	ARV242
<b>Applicable tests</b>						
	endurance (under damp and load)	1 000 +48/-0 hours; 40 $\pm 2$ °C; 93 +2/-3% RH; loaded with $P_n$ or $V_{max}$ ; 1.5 hours on and 0.5 hours off	$\Delta R/R$ max.: $\pm(3\% +0.1 \Omega)$		$\Delta R/R$ max.: $\pm(2\% +0.1 \Omega)$	
	leaching	unmounted chips; 60 $\pm 1$ s; 260 $\pm 5$ °C		good tinning; no leaching		
	load humidity	1 000 +48/-0 hours; 85 $\pm 2$ °C; 85 $\pm 5\%$ RH; loaded with 0.01 $P_n$ or $V_{max}$		$\Delta R/R$ max.: $\pm(2\% +0.1 \Omega)$		