DATA SHEET

ARV341
5%
Array chip resistors
size 4 × 0402

Product specification
Supersedes data of 21th March 2000

2001 Apr 17 Rev.4

Phicomp
A FORMER PHILIPS COMPANY

Array chip resistors
size 4 × 0402

ARV341
5%

FEATURES

- 4 × 0402 sized resistors in one package
- Reduced size of final equipment
- Low assembly costs
- Higher component and equipment reliability.

APPLICATIONS

- Motherboards
- Notebook computers
- Add-on cards
- Mobile phones
- PDAs
- Dual In line Memory Modules (DIMM).

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. 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
Resistance range	10 Ω to 1 MΩ; E24 series; 0 Ω jumper
Resistance tolerance	±5%
Temperature coefficient	$\leq \pm 200 \times 10^{-6}$/K
Absolute maximum dissipation at T_{amb} = 70 $^\circ$C	0.063 W
Maximum permissible voltage	50 V (DC or RMS)
Operating temperature range	−55 to +125 $^\circ$C
Climatic category (IEC 60068)	55/155/56
Basic specification	IEC 60115-8

ORDERING INFORMATION

Table 1 Ordering code indicating resistor type and packaging

TYPE	ORDERING CODE 2350 033	
	PAPER TAPE ON REEL	
	5000 units	**10000 units**
ARV341	10...	11...
Jumper 0 Ω		
ARV341; see note 1	91002	91001

Note

1. The jumper has a maximum resistance R_{max} = 50 mΩ and a rated current I_R = 1 A.

Ordering code (12NC)

- The resistors have a 12-digit ordering code starting with 2350 033
- The subsequent two digits indicate the resistor type and packaging; see Table 1.
- The remaining 3 digits indicate the resistance value:
  - The first 2 digits indicate the resistance value.
  - The last digit indicates the resistance decade in accordance with Table 2.

Table 2 Last digit of 12NC

RESISTANCE	LAST DIGIT
10 to 91 Ω	9
100 to 910 Ω	1
1 to 9.1 kΩ	2
10 to 91 kΩ	3
100 to 910 kΩ	4
1 MΩ	5

ORDERING EXAMPLE

The ordering code of an ARV341 resistor, value 100 Ω, supplied on paper tape of 5000 units per reel is: 2350 033 10101.

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FUNCTIONAL DESCRIPTION

Product characterization

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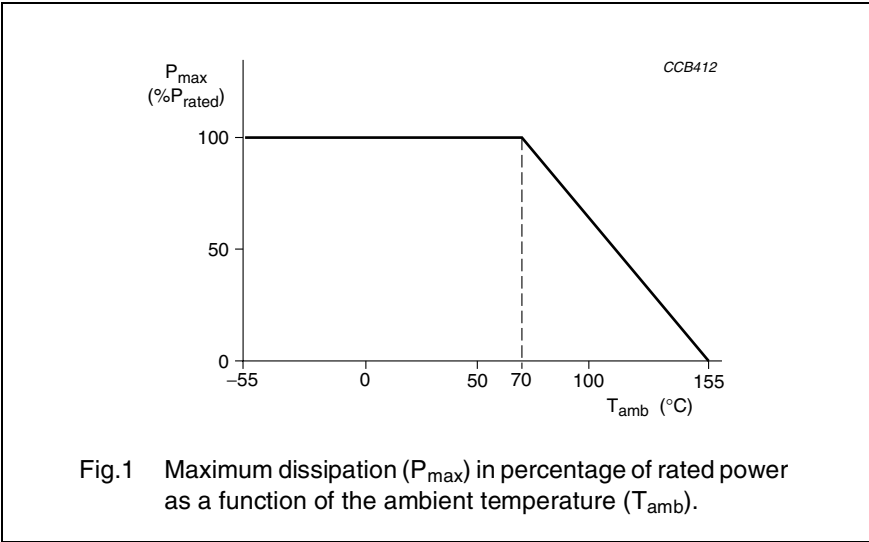
Limiting values

TYPE	LIMITING VOLTAGE[1] (V)	LIMITING POWER (W)
ARV341	50	0.063

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 temperature; see Fig.1.

Fig.1   Maximum dissipation (P_{max}) in percentage of rated power as a function of the ambient temperature (T_{amb}).

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MECHANICAL DATA

Mass per 100 units

TYPE	MASS (g)
ARV341	0.30

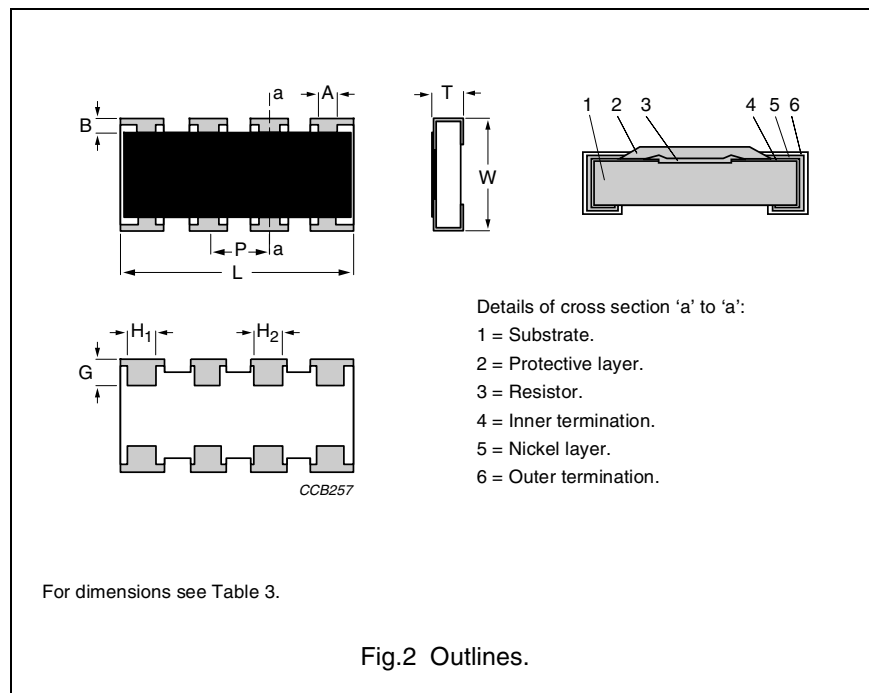**Marking**

There is no marking on the product; the product is marked on request.

PACKAGE MARKING

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

Outlines

Details of cross section 'a' to 'a':

1 = Substrate.
2 = Protective layer.
3 = Resistor.
4 = Inner termination.
5 = Nickel layer.
6 = Outer termination.

For dimensions see Table 3.

Fig.2 Outlines.

Table 3   Physical dimensions; see Fig.2

SYMBOL	VALUE	TOL.	UNIT
L	2.00	±0.10	mm
W	1.00	±0.10	mm
T	0.45	±0.10	mm
A	0.20	±0.10	mm
B	0.20	±0.10	mm
P	0.50	±0.10	mm
G	0.30	±0.10	mm
H_1	0.30	±0.10	mm
H_2	0.20	±0.10	mm

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TESTS AND REQUIREMENTS

Essentially all tests are carried out in accordance with the schedule of *"IEC publication 60115-8"*, category 55/125/56 (rated temperature range −55 to +125 °C; damp heat, long term, 56 days). The testing also covers the requirements specified by EIA, EIAJ and JIS.

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
Tests in accordance with the schedule of IEC publication 60115-8				
4.4.1		visual examination		no holes; clean surface; no 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
4.18	20 (Tb)	resistance to soldering heat	unmounted chips; 10 ±1 s; 260 ±5 °C	no visible damage $\Delta R/R$ max.: $\pm(1\% + 0.05\ \Omega)$
4.29	45 (Xa)	component solvent resistance	isopropyl alcohol or H_2O followed by brushing in accordance with *"MIL 202 F"*	no visible damage

4.5		resistance	applied voltage (+0/−10%):
			    $R < 10\ \Omega$: 0.1 V
			    $10\ \Omega \leq R < 100\ \Omega$: 0.3 V
			    $100\ \Omega \leq R < 1\ k\Omega$: 1 V
			    $1\ k\Omega \leq R < 10\ k\Omega$: 3 V
			    $10\ k\Omega \leq R < 100\ k\Omega$: 10 V
			    $100\ k\Omega \leq R < 1\ M\Omega$: 25 V
				$R - R_{nom}$: max. $\pm5\%$

4.7		voltage proof on insulation	50 V (DC or 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 ($V \leq 2 \times V_{max}$)	$\Delta R/R$ max.: $\pm(2\% + 0.1\ \Omega)$
4.33		bending	resistors mounted on a 90 mm glass epoxy resin PCB (FR4), bending: 5 mm	no visible damage $\Delta R/R$ max.: $\pm(1\% + 0.05\ \Omega)$
4.19	14 (Na)	rapid change of temperature	30 minutes at LCT and 30 minutes at UCT; 5 cycles	no visible damage $\Delta R/R$ max.: $\pm(1\% + 0.05\ \Omega)$
4.24.2	3 (Ca)	damp heat (steady state)	56 days; 40 ±2 °C; 93 +2/−3% RH; loaded with 0.01 P_n	$\Delta R/R$ max.: $\pm(3\% + 0.1\ \Omega)$

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IEC 60115-8 CLAUSE	IEC 60068-2 TEST METHOD	TEST	PROCEDURE	REQUIREMENTS
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	$\Delta R/R$ max.: ±(3% +0.1 Ω)
4.23.2	27 (Ba)	endurance at upper category temperature	1000 +48/−0 hours; 125 °C; no load	$\Delta R/R$ max.: ±(3% +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
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	50 V (DC) after 1 minute, metal block method: 10 V	R_{ins} min.: 10^3 $M\Omega$
4.12		noise	IEC publication 60195 (measured with Quantech-equipment): R ≤ 100 Ω 100 Ω < R ≤ 1 kΩ 1 kΩ < R ≤ 10 kΩ 10 kΩ < R ≤ 100 kΩ 100 kΩ < R ≤ 1 MΩ	max. 0.316 μV/V (−10 dB) max. 1 μV/V (0 dB) max. 3 μV/V (9.54 dB) max. 6 μV/V (15.56 dB) max. 10 μV/V (20 dB)
Other applicable tests				
(JIS) C 5202 7.9		resistance to damp heat (steady state)	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	$\Delta R/R$ max.: ±(3% +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}	$\Delta R/R$ max.: ±(3% +0.1 Ω)

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REVISION HISTORY

Revision	Date	Change Notification	Description
Rev.4	2001 Apr 17	–	- Converted to Phycomp brand - Quick Reference data: TC corrected from $\leq \pm 300$ into $\leq \pm 200 \times 10^{-6}$/K - Table 4: 4.8.4.2 requirements corrected from $\leq \pm 300$ into $\leq \pm 200 \times 10^{-6}$/K