APPROVAL SHEET

WA06W_N

±5%, ±1% Convex Type

General purpose chip resistors array

Size 1506 (3816)

16p8R

Customer :

Approval No :

Issue Date :

Customer Approval :

FEATURE

1. Small size and light weight
2. Reduced size of final equipment
3. Lower surface mounted assembly costs
4. Higher component and equipment reliability
5. RoHS compliant and Lead (Pb) free, Halogen free

APPLICATION

- Consumer electrical equipment
- EDP, Computer application
- Telecom

DESCRIPTION

The resistors array is constructed in a high grade ceramic body (aluminum oxide). Internal metal electrodes are added at each end and connected by a resistive paste that 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 coat. Finally, the two external end terminations are added. For ease of soldering the outer layer of these end terminations is a Tin (Pb free) solder alloy.

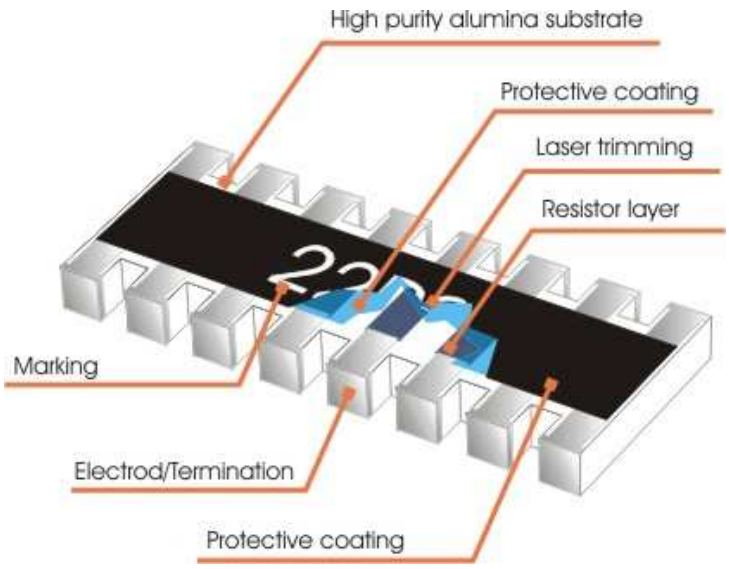


Fig 1. Construction of a Chip-R array WA06W_N

QUICK REFERENCE DATA

Item	General Specification
Series No.	WA06W_N
Size	1506 (0602x8)
Termination construction	Convex type
Resistance Tolerance	±5%, ±1% (E24/E96 series)
Resistance Range	10Ω ~ 100KΩ, Jumper
TCR (ppm/°C)	≤ ± 200 ppm/°C
Max. dissipation at T_{amb}=70°C	1/16 W
Max. Operation Voltage (DC or RMS)	25V
Max. overload voltage	50V
Climatic category (IEC 60068)	55/125/56

Note :

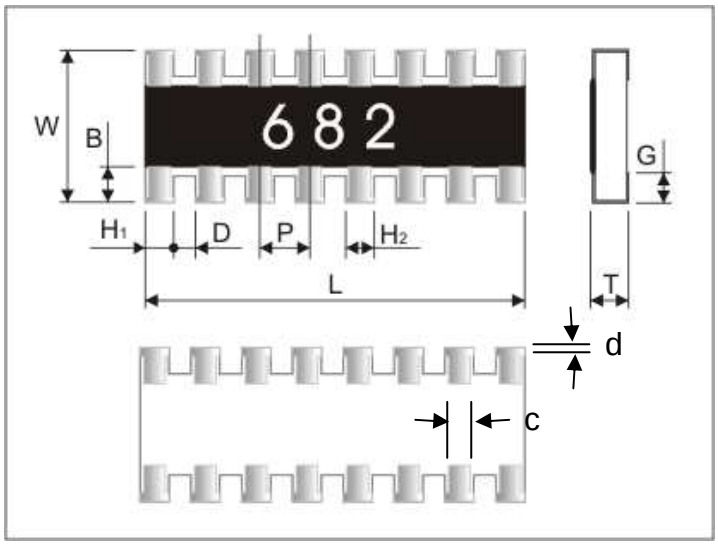
1. This is the maximum voltage that may be continuously supplied to the resistor element, see "IEC publication 60115-8"

2. Max. Operation Voltage : So called RCWV (Rated Continuous Working Voltage) is determined by

$$RCWV = \sqrt{Rated\,Power \times Resistance\,Value}$$ or Max. RCWV listed above, whichever is lower.

Dimensions (mm)

	WA06W_N
L	**3.80 ± 0.10**
W	1.60 ± 0.10
T	0.45 ± 0.10
B	0.30 ± 0.10
G	**0.30 ± 0.10**
D	0.20 ± 0.10
P	**0.50 ± 0.10**
H1	0.30 ± 0.10
H2	0.30 ± 0.10
c	**0.20 ± 0.10**
d	**Min. 0.03**



Marking

Each resistor is marked with a three-digit code on the protective coating to designate the nominal resistance value of E24 series. There is no marking for resistance value of E96 series !

Example:

100 = 10Ω
101 = 100Ω

FUNCTIONAL DESCRIPTION

Product characterization

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

Derating

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

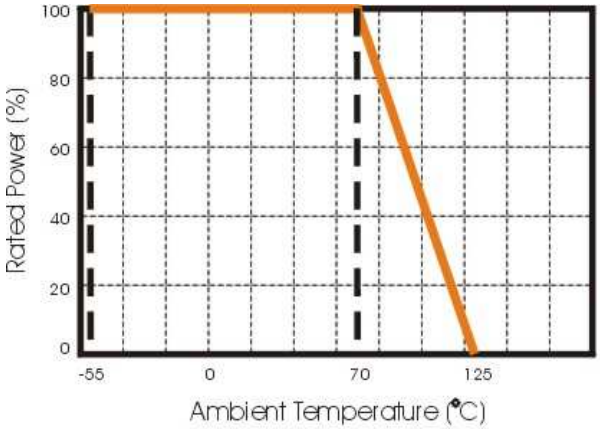
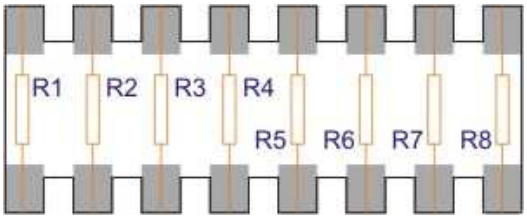


Fig.2 Maximum dissipation in percentage of rated power
As a function of the ambient temperature

CONSTRUCTION



R1=R2=R3=R4=…=R8

CATALOGUE NUMBERS

The resistors have a catalogue number starting with .

WA06	W	472_	J	T	L	N
Size code WA06 : 0602 per element	**Type code** W : x8, convex	**Resistance code** ±5%, E24 : 2 significant digits followed by no. of zeros and a blank 10Ω =100_ 220Ω =221_ Jumper =000_ (“_” means a blank) ±1%, E24+E96: 3 significant digits followed by no. of zeros 102Ω =1020 37.4KΩ =3742	**Tolerance** J : ±5% F : ±1% P : Jumper	**Packaging code** T : 7” Reel taping	**Termination code** **L** = Sn base (lead free)	**Customer Code** **N = Customized**

1. Reeled tape packaging : 8mm width paper taping 5000pcs per reel.
2. Bulk packaging : 5000pcs per polybag

MOUNTING

Due to their rectangular shapes and small tolerances, Surface Mountable Resistors are suitable for handling by automatic placement systems.

Chip placement can be on ceramic substrates and printed-circuit boards (PCBs).

Electrical connection to the circuit is by individual soldering condition.

The end terminations guarantee a reliable contact.

SOLDERING CONDITION

The robust construction of chip resistors allows them to be completely immersed in a solder bath of **260°C for 10 seconds**. Therefore, it is possible to mount Surface Mount Resistors on one side of a PCB and other discrete components on the reverse (mixed PCBs).

Surface Mount Resistors are tested for solderability at **235°C during 2 seconds.** The test condition for no leaching is **260°C for 30 seconds.** Typical examples of soldering processes that provide reliable joints without any damage are given in Fig 3.

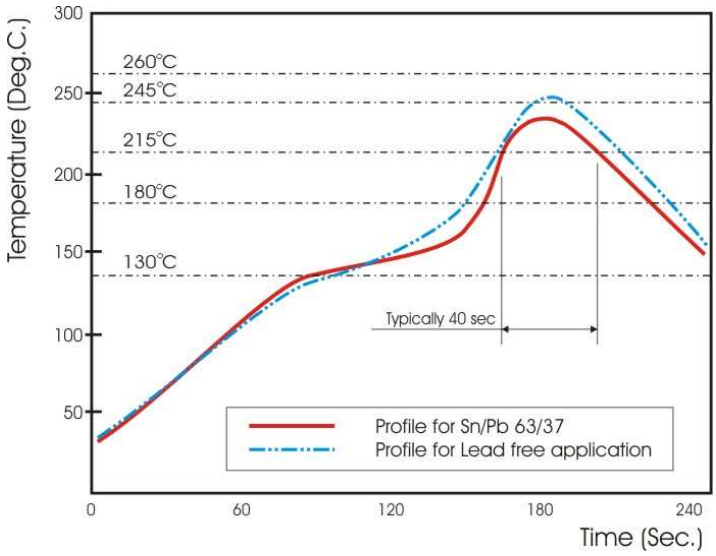


Fig 3. Infrared soldering profile for Chip Resistors array

TEST AND REQUIREMENTS

Essentially all tests are carried out according to the schedule of IEC publication 115-8, 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 meets the requirements specified by EIA, EIAJ and JIS.

The tests are carried out in accordance with IEC publication 68, "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 value supplied :

Temperature: 15°C to 35°C.
Relative humidity: 45% to 75%.
Air pressure: 86kPa to 106 kPa (860 mbar to 1060 mbar).

All soldering tests are performed with midly activated flux.

TEST CONDITION FOR JUMPER (0Ω)
Resistance: 50mΩ max.
Rated Current: 1A
Peak Current: 3A
Operating Temperature: -55 to 125°C

TEST	PROCEDURE				REQUIREMENT	
					Resistor	Jumper
DC resistance (JIS C 5202 5.1)	DC resistance values measured at the test voltages specified below :				Within the specified tolerance	< 50mΩ
	Resistance Test voltage	<100Ω 0.3V		<10KΩ 3.0V		
	Resistance Test voltage	<100KΩ 10V				
TCR (JIS C5202 5.2 / IEC115-1 4.8.4.2)	Natural resistance change per change in degree centigrade. $\frac{R_2 - R_1}{R_1(t_2 - t_1)} \times 10^6$ (ppm/°C) R_1 : Resistance at reference temperature R_2 : Resistance at test temperature t_1 : 25°C				Test temperature – 55~+125°C ≤±200ppm/°C	N/a
Short time overload (JIS C 5202 5.5 / IEC115-1 4.13)	Permanent resistance change after a 5second application of a voltage 2.5 times RCWV or the maximum overload voltage specified in the above list, whichever is less.				ΔR/R max. ±(2%+0.10Ω)	< 50mΩ
Resistance to soldering heat (JIS C 5202 6.4 / IEC115-1 4.18)	Unmounted chips 10±1 seconds, 260±5°C				no visible damage Δ R/R max. ±(1.0%+0.05Ω)	no visible damage, < 50mΩ
Solderability (JIS C 5202 6.5 / IEC115-1 4.17)	Termination SnPb base : Unmounted chips completely immersed for 2±0.5 sec. in a solder bath at 230±5°C Termination Sn base (lead free) : Unmounted chip completely immersed in a lead free solder bath, **235°C±5°C, 2±0.5 sec**				good tinning (>95% covered) no visible damage	
Temperature cycling (JIS C 5202 7.4 / IEC115-1 4.19)	1. 30 minutes at -55°C±3°C, 2. 10~15minutes at room temperature, 3. 30 minutes at +125°±3°C, 4. 10~15minutes at room temperature, 5 continuous cycles				no visible damage ΔR/R max. ±(1%+0.05Ω)	no visible damage, < 50mΩ
Load life (endurance) (JIS C 5202 7.10/ IEC115-1 4.25.1)	70±2°C, 1000 hours, loaded with RCWV or Vmax,1.5 hours on and 0.5 hours off				10Ω~1MΩ ±(3%+0.1Ω)	< 50mΩ
Load life in Humidity (JIS C 5202 7.9 / IEC115-1 4.24.2)	1000 hours, at rated continuous working voltage in humidity chamber controller at 40°C±2°C and 90~95% relative humidity, 1.5hours on and 0.5 hours off				10Ω~1MΩ ±(3%+0.1Ω)	< 50mΩ

PACKAGING

Taping

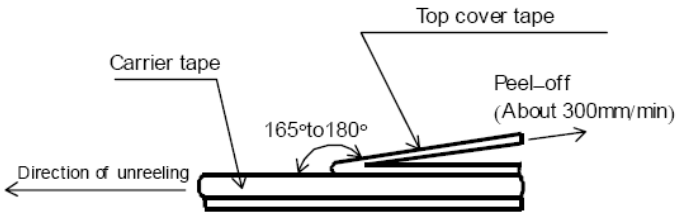
Note 1). The resistor shall easily moved in the carrier cavity.

2). The resistors shall be faced to upward at the over coating side in the carrier cavity and no missing resistor.

3). Pitches tolerance is ±0.2mm for 10 pitches

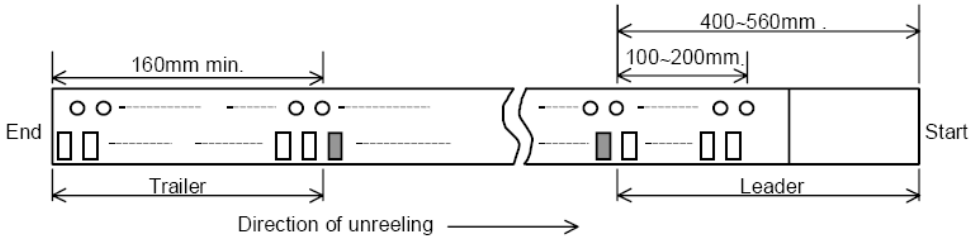
4). The peel strength of the top cover tape shall be within 0.1N to 0.7N on the test method as shown in the following Figure–1.

5). When the tape is bent with an around radius of 15mm min., the carrier tape shall not be damaged and the components shall be maintain their position.

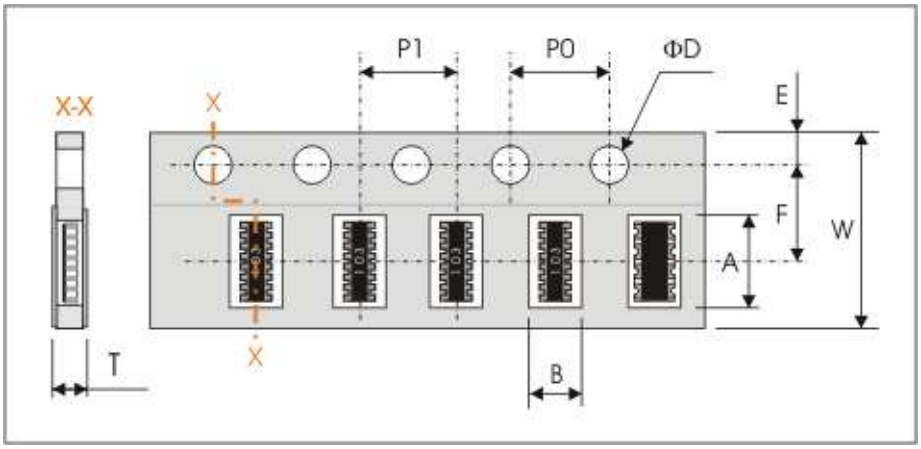


Figure–1

6). Leader and trailer tape.

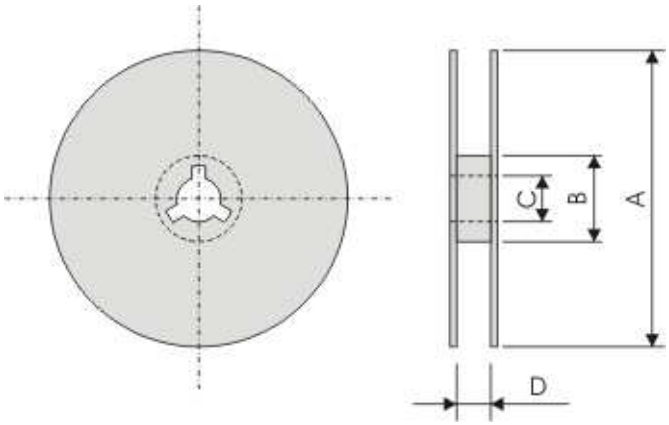


Paper Tape specifications (unit :mm)



	A	B	W	F	E
(mm)	**4.1±0.15**	**1.9±0.15**	8.0±0.10	**3.50±0.05**	1.75±0.10
	P1	P0	∅D	T	
(mm)	4.00±0.10	4.00±0.10	1.55±0.05	0.80±0.05	

Reel dimensions



Symbol	A	B	C	D
(unit : mm)	Φ178.0±2.0	Φ60.0±1.0	13.0±0.2	**9.0±0.3**