Innovative Service Around the Globe YAGEO

DATA SHEET

CHIP RESISTORS RF ATTENUATORS

ATV321 (Pb Free)

SIZE 0404

YAGEO

Product specification – Oct 12, 2004 V.0

SCOPE

This specification describes ATV321 series chip attenuators with lead-free terminations made by thick film process.

ORDERING INFORMATION

Part number is identified by the series, size, tolerance, packing type, temperature coefficient, taping reel and resistance value.

YAGEO ORDERING CODE

CTC CODE

ATV321 X X X XX XXXX L
(1) (2) (3) (4) (5) (6)

(1) TOLERANCE

B = ±0.2 dB
C = ±0.3 dB
D = ±0.5 dB
F = ±1 dB
G = ±2 dB

(2) PACKAGING TYPE

R = Paper/PE taping reel

(3) TEMPERATURE COEFFICIENT OF RESISTANCE

– = Not applicable

(4) TAPING REEL

07 = 7 inch dia. Reel
7H = Half quality packing on 7"reel
(non preferrend)

(5) ATTENUATION VALUE

1 dB to 20 dB shown in the table of "Attenuation value, tolerance v.s. 12 NC code".

(6) RESISTOR TERMINATIONS

L = Lead free terminations (pure Tin)

Attenuation value, tolerance v.s. 12 NC code

Attenuation value (dB)	Standard		Optional	
	Tol.(dB)	12 NC	Tol.(dB)	12 NC
1	±0.3	2350 703 11012 L	±0.2	2350 703 11011 L
2	±0.3	2350 703 11022 L	±0.2	2350 703 11021 L
3	±0.3	2350 703 11032 L	±0.2	2350 703 11031 L
4	±0.3	2350 703 11042 L	±0.2	2350 703 11041 L
5	±0.3	2350 703 11052 L	±0.2	2350 703 11051 L
6	±0.5	2350 703 11063 L	±0.3	2350 703 11062 L
7	±0.5	2350 703 11073 L	±0.3	2350 703 11072 L
8	±0.5	2350 703 11083 L	±0.3	2350 703 11082 L
9	±0.5	2350 703 11093 L	±0.3	2350 703 11092 L
10	±0.5	2350 703 11103 L	±0.3	2350 703 11102 L
15	±1.0	2350 703 11154 L	±0.5	2350 703 11153 L
20	±2.0	2350 703 11205 L	±1.0	2350 703 11204 L

ORDERING EXAMPLE

The ordering code of an ATV321 attenuator with 2±0.3 dB attenuation, supplied in 7-inch tape reel is: ATV321CR-072dBL.

NOTE

1. The "L" at the end of the code is only for ordering. On the reel label, the standard CTC will be mentioned an additional stamp "LFP"= lead free production.
2. Products with lead in terminations fulfil the same requirements as mentioned in this datasheet.
3. Products with lead in terminations will be phased out in the coming months (before July 1st, 2006)

MARKING

No marking.

CONSTRUCTION

The attenuators are constructed on a high-grade ceramic body (aluminium oxide). The internal circuit is applied to the top surface of the substrate, and its design determines the required attenuation value. The attenuation layer is covered with a protective coating and a marking dot indicates input pin 1 as shown in the connection diagram of Fig.1.

Finally, the four external end terminations are added. To guarantee optimum solderability the outer layer of the terminations are lead free (pure Tin).

The rectangular marker designates input pin 1.

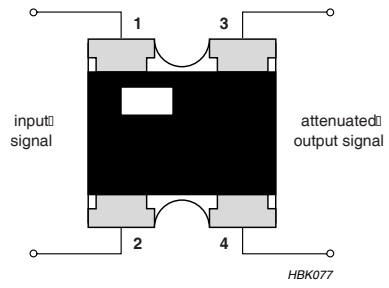

Fig. 1 Connection diagram

DIMENSIONS

Table 1

TYPE	ATV321
L (mm)	1.0 ±0.10
W (mm)	1.0 ±0.10
T (mm)	0.35 ±0.05
A (mm)	0.33 ±0.10
B (mm)	0.15 ±0.10
P (mm)	0.65 ±0.10
D (mm)	0.25 ±0.10

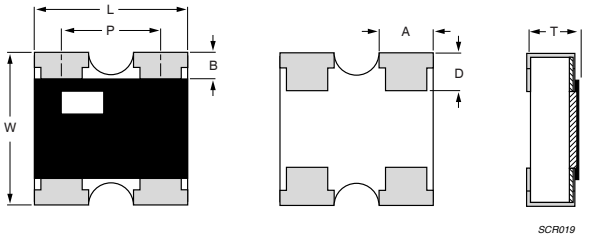

Fig. 2 Attenuator dimensions

For dimension see Table 1

ELECTRICAL CHARACTERISTICS

Table 2

CHARACTERISTICS		ATV321 / 40 mW
Attenuation Range		1 dB to 20 dB
Attenuation tolerance	1 dB to 5 dB	±0.3 dB (optional: ±0.2 dB)
	6 dB and 10 dB	±0.5 dB (optional: ±0.3 dB)
	15 dB	±1.0 dB (optional: ±0.5 dB)
	20 dB	±2.0 dB (optional: ±1.0 dB)
Characteristic impedance		50 Ω
Frequency Range	1 dB to 10 dB	DC to 2.5 GHz
	15 dB and 20 dB	DC to 2.0 GHz
VSWR		1.3 max.
Maximum permissible voltage		50 V (DC or RMS)
Power rating		40 mW

FOOTPRINT AND SOLDERING PROFILES

For recommended footprint and soldering profiles, please see the special data sheet "Chip resistors mounting".

ENVIRONMENTAL DATA

For material declaration information (IMDS-data) of the products, please see the separated info "Environmental data".

PACKING STYLE AND PACKAGING QUANTITY

Table 3 Packing style and packaging quantity

PRODUCT TYPE	PACKING STYLE	REEL DIMENSION	QUANTITY PER REEL
ATV321	Paper / PE Taping Reel (R)	7" (178 mm)	10,000 units
		7" (half quality packing)	5,000 units / not preferred

NOTE

1. For Paper/PE tape and reel specification/dimensions, please see the special data sheet "Packing" document.

FUNCTIONAL DESCRIPTION

POWER RATING

ATV321rated power at 70°C is 40 mW

RATED VOLTAGES

The DC or AC (rms) continuous working voltage corresponding to the rated power is determined by the following formula:

$V=\sqrt{(P \times R)}$

Where

V=Continuous rated DC or AC (rms) working voltage (V)

P=Rated power (W)

R=Resistance value (Ω)

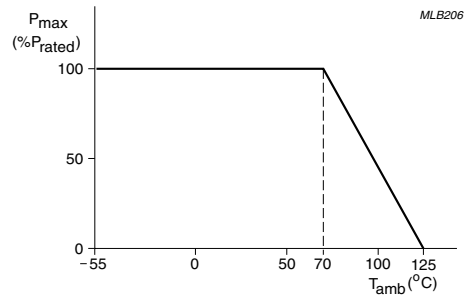

Fig. 3 Maximum dissipation (P_{max}) in percentage of rated power as a function of the operating ambient temperature (T_{amb})

TESTS AND REQUIREMENTS

Table 4 Test condition, procedure and requirements

TEST	TEST METHOD	PROCEDURE	REQUIREMENTS
Thermal Shock	MIL-STD-202F-method 107G; IEC 60115-1 4.19	At –65 (+0/–10) °C for 2 minutes and at +125 (+10/–0) °C for 2 minutes; 25 cycles	Max.: ±0.3 dB No visible damage
Short Time Overload	MIL-R-55342D-Para 4.7.5; IEC 60115-1 4.13	2.5 × RCWV applied for 5 seconds at room temperature	Max.: ±0.3 dB No visible damage
Insulation Resistance	MIL-STD-202F-method 302; IEC 60115-1 4.6.1.1	RCOV for 1 minute Type: ATV321 Voltage (DC): 50 V	≥10 GΩ
Resistance to Soldering Heat	MIL-STD-202F-method 210C; IEC 60115-1 4.18	Unmounted chips; 260 ±5 °C for 10 ±1 seconds	Max.: ±0.1 dB No visible damage
Life	MIL-STD-202F-method 108A; IEC 60115-1 4.25.1	At 70±2 °C for 1,000 hours; RCWV applied for 1.5 hours on and 0.5 hour off	Max.: ±0.3 dB
Solderability	MIL-STD-202F-method 208A; IEC 60115-1 4.17	Solder bath at 245±3 °C Dipping time: 2±0.5 seconds	Well tinned (≥95% covered) No visible damage
Bending Strength	JIS C 5202.6.14; IEC 60115-1 4.15	Resistors mounted on a 90 mm glass epoxy resin PCB (FR4) Bending: 5 mm	Max.: ±0.3 dB No visible damage
Humidity (steady state)	JIS C 5202 7.5; IEC 60115-8 4.24.8	1,000 hours; 40±2 °C; 93(+2/–3)% RH RCWV applied for 1.5 hours on and 0.5 hour off	Max.: ±0.3 dB
Leaching	EIA/IS 4.13B; IEC 60115-8 4.18	Solder bath at 260±5 °C Dipping time: 30±1 seconds	No visible damage
Moisture Resistance Heat	MIL-STD-202F-method 106F; IEC 60115-1 4.24.2	42 cycles; total 1,000 hours Shown as Fig. 4	Max.: ±0.3 dB No visible damage

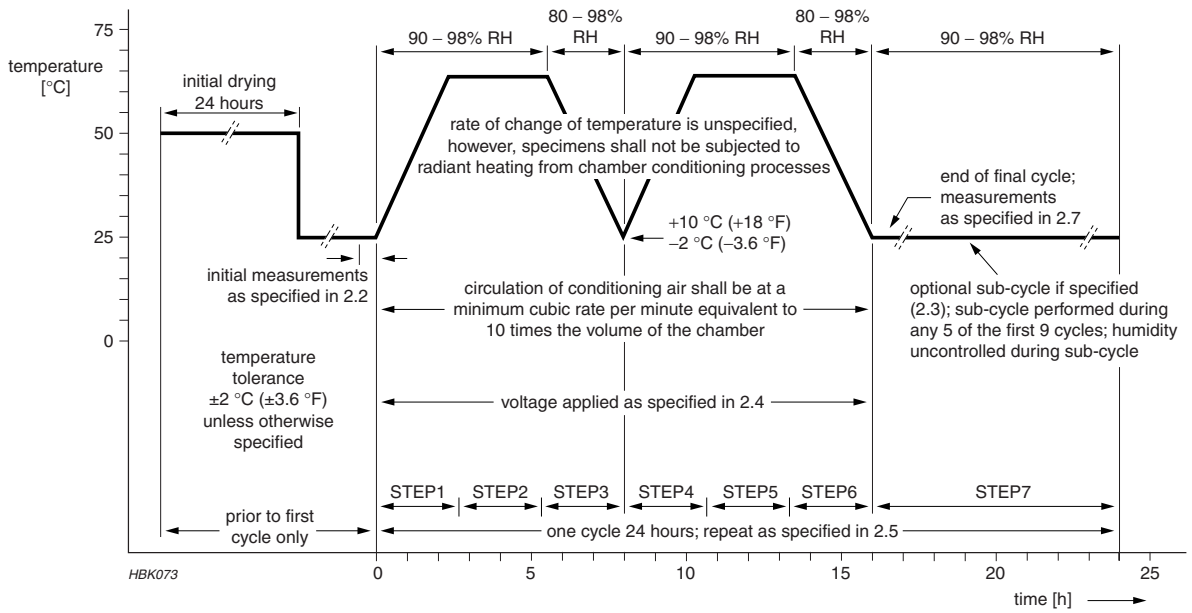

Fig. 4 Moisture resistance test requirements

REVISION HISTORY

REVISION	DATE	CHANGE NOTIFICATION	DESCRIPTION
Version 0	Oct 12, 2004	-	- First issue of this specification for ATV321 series with lead-free terminations