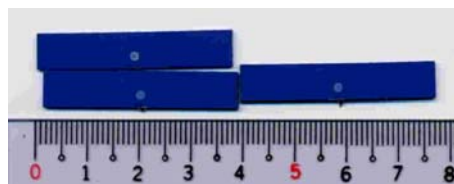


## MULTILAYER CERAMIC ANTENNA (LINEAR POLARIZATION MODE) FOR 400MHz~500MHz

### Product Specification<sup>1</sup> (Preliminary)

#### QUICK REFERENCE DATA

|                       |                                           |
|-----------------------|-------------------------------------------|
| Working Frequency*    | 400~500MHz                                |
| Bandwidth             | 20 MHz (Min)                              |
| Gain                  | 0.5 dBi (Max)                             |
| VSWR                  | 3.0 max                                   |
| Polarization          | Linear                                    |
| Azimuth               | Omni-directional                          |
| Impedance             | 50Ω                                       |
| Operating Temperature | -55~125 °C                                |
| Termination           | Ni/Sn (Environmentally-Friendly Leadless) |



Resistance to soldering heat 260°C, 10 sec.

\* Three types of ceramic antenna are available: Type 43, Type 46, and Type 49

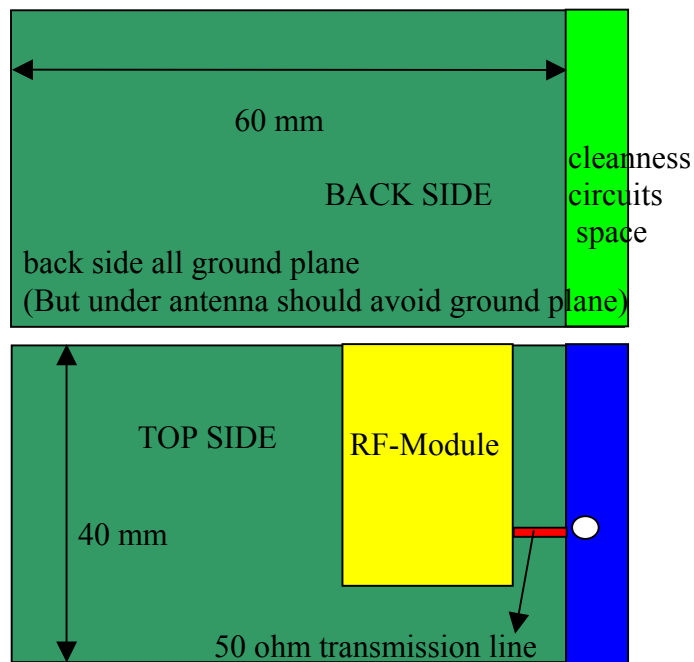


*Special Environmental Concerns- Green Products Design: The foil making process is using environmentally friendly aqueous solvent technology. Termination is lead free and packing materials can be re-cycled*

## 1. APPLICATION

<sup>1</sup> All the technical data and information contained herein are subject to change without prior notice

|             |                                                      |             |                                                                                        |        |             |    |
|-------------|------------------------------------------------------|-------------|----------------------------------------------------------------------------------------|--------|-------------|----|
| R&D         | Print date 04/10/06                                  |             | Preliminary use only                                                                   |        |             |    |
|             | <b>Multilayer Ceramic Antenna<br/>for 433~500MHz</b> |             |                                                                                        |        | Aug. 9, 02  |    |
|             |                                                      |             | <b>CAN4313 121 200431B</b><br><b>CAN4313 121 200461B</b><br><b>CAN4313 121 200491B</b> |        | Oct. 14, 02 |    |
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| spec.doc    | PHYCOMP Ltd.                                         |             |                                                                                        |        |             |    |



## 2. SOLDER LAND PATTERN FOR ANTENNA

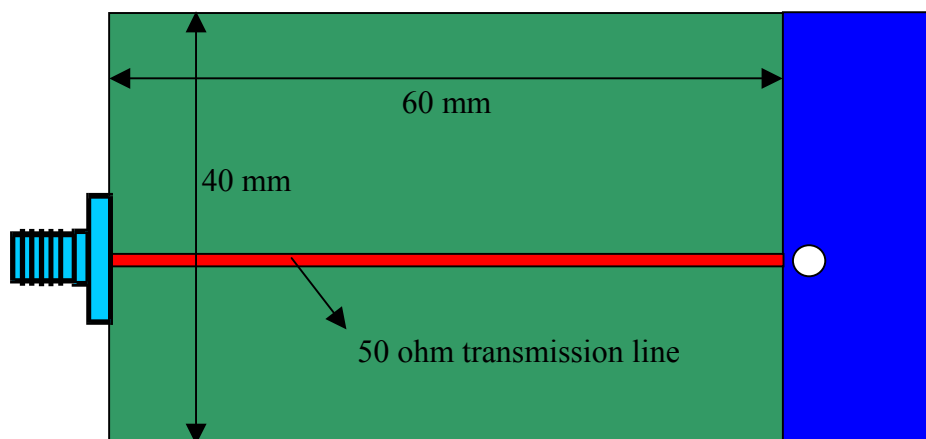
| Figure | Dimensions |                            | Remark    |
|--------|------------|----------------------------|-----------|
|        | L          | $7.30 \pm 0.50 \text{ mm}$ | Feed pad  |
|        | F          | $2.50 \pm 0.50 \text{ mm}$ |           |
|        | C          | $0.90 \pm 0.10 \text{ mm}$ | Mount pad |
|        | S          | $2.50 \pm 0.50 \text{ mm}$ |           |

|             |                                              |             |                                                                   |             |             |    |
|-------------|----------------------------------------------|-------------|-------------------------------------------------------------------|-------------|-------------|----|
| R&D         | Print date 04/10/06                          |             | Preliminary use only                                              |             |             |    |
|             | Multilayer Ceramic Antenna<br>for 433~500MHz |             |                                                                   |             | Aug. 9, 02  |    |
|             |                                              |             | CAN4313 121 200431B<br>CAN4313 121 200461B<br>CAN4313 121 200491B |             | Oct. 14, 02 |    |
| Grant/Cliff |                                              | Oct. 14, 02 | Page 2                                                            | sheet 190-2 |             | A4 |
| spec.doc    | PHYCOMP Ltd.                                 |             |                                                                   |             |             |    |

### 3. MECHANICAL DATA

| Figure                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Dimension | Port                      |                    |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|---------------------------|--------------------|
| <p>Technical drawing of a PCB layout showing top, side, and bottom views. The top view is a blue rectangle with width <math>W</math> and length <math>L</math>. It has a central circular hole. The side view shows a blue rectangle with thickness <math>T</math> and a central feature of width <math>S</math>. The bottom view shows a blue rectangle with width <math>W</math> and length <math>L</math>, with a central feature of width <math>F</math>. Dimensions <math>S1</math> and <math>C</math> are also indicated.</p> | L         | $6.8 \pm 0.5 \text{ mm}$  | -                  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | W         | $37.5 \pm 0.5 \text{ mm}$ | -                  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | T         | $0.90 \pm 0.2 \text{ mm}$ | -                  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | F         | $2.3 \pm 0.3 \text{ mm}$  | Feed termination   |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | C         | $0.5 \pm 0.3 \text{ mm}$  | Solder termination |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | S         | $2.3 \pm 0.3 \text{ mm}$  | Solder termination |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | S1        | $1.4 \pm 0.3 \text{ mm}$  | Solder termination |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |           |                           |                    |

#### 4. TEST BOARD DIMENSION FOR S11 (RETURN LOSS) AND RADIATION PATTERN MEASUREMENT

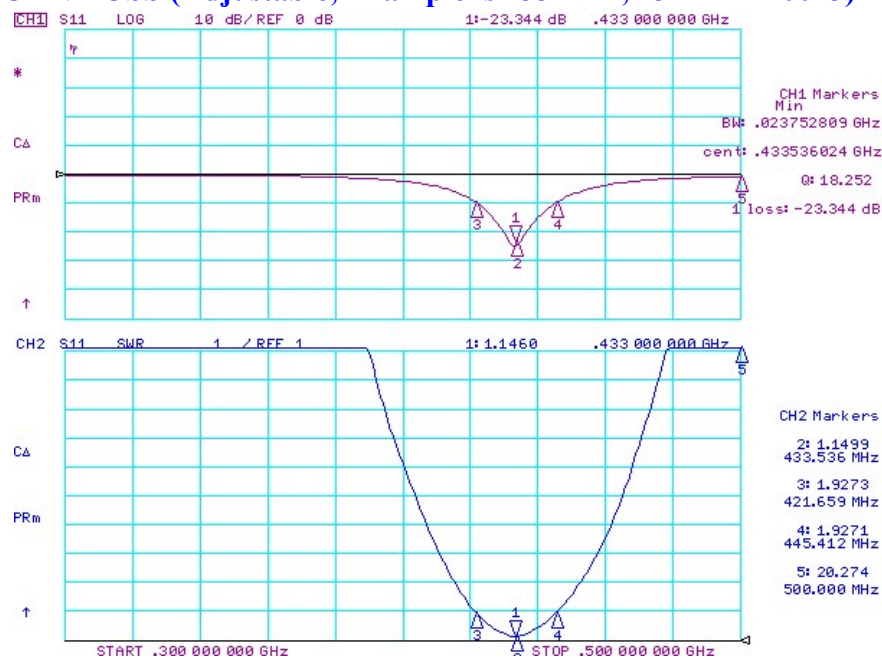


FR-4 PCB thickness = 0.8 mm

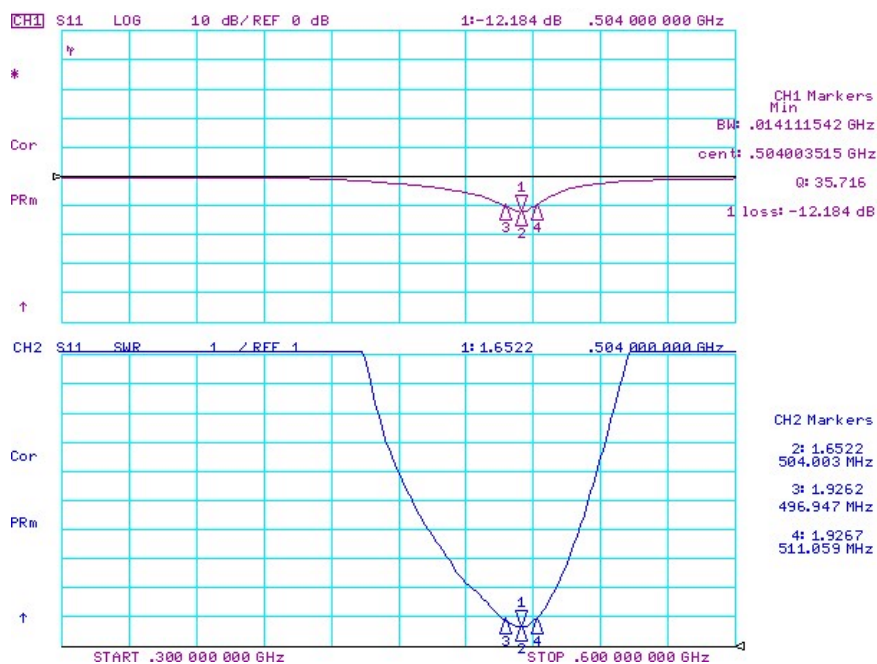
The length of transmission line = 1.35 mm ( depends on PCB thickness)

|             |                                                      |  |  |  |                                                                            |  |  |             |             |
|-------------|------------------------------------------------------|--|--|--|----------------------------------------------------------------------------|--|--|-------------|-------------|
| R&D         | Print date 04/10/06                                  |  |  |  | Preliminary use only                                                       |  |  |             |             |
|             | <b>Multilayer Ceramic Antenna<br/>for 433~500MHz</b> |  |  |  | <b>CAN4313 121 200431B<br/>CAN4313 121 200461B<br/>CAN4313 121 200491B</b> |  |  | Aug. 9, 02  |             |
|             |                                                      |  |  |  |                                                                            |  |  | Oct. 14, 02 |             |
| Grant/Cliff |                                                      |  |  |  |                                                                            |  |  |             | Oct. 14, 02 |
| spec.doc    | PHYCOMP Ltd.                                         |  |  |  |                                                                            |  |  |             |             |

## 5. S11 RETURN LOSS (Adjustable, Example is 433MHz, 4311 121 20043)

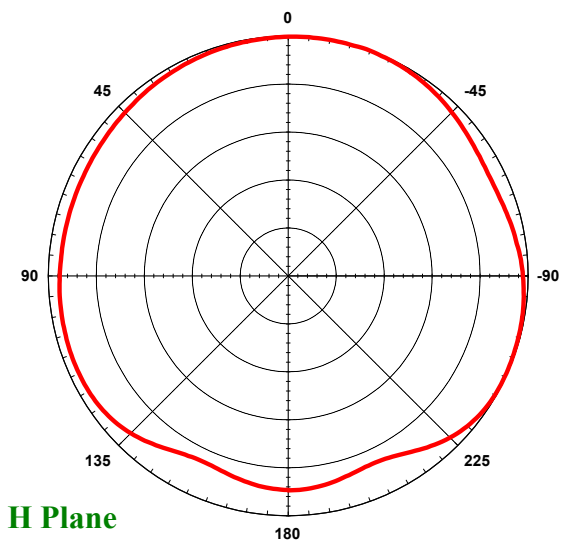
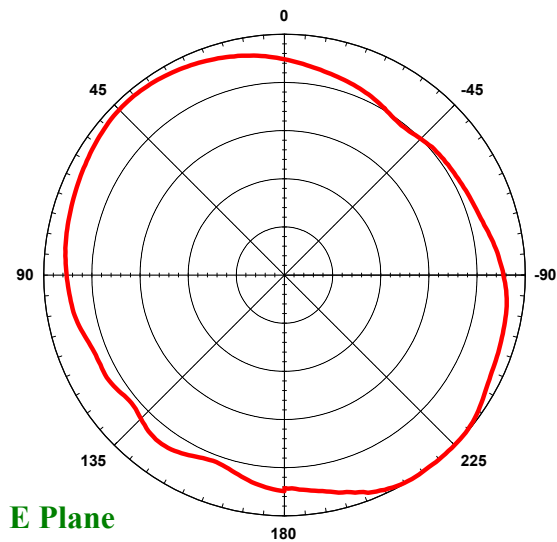


(Adjustable, Example is 490MHz, 4311 121 20049)



|             |                                              |             |  |                                                                   |             |  |             |    |
|-------------|----------------------------------------------|-------------|--|-------------------------------------------------------------------|-------------|--|-------------|----|
| R&D         | Print date 04/10/06                          |             |  | Preliminary use only                                              |             |  |             |    |
|             | Multilayer Ceramic Antenna<br>for 433~500MHz |             |  | CAN4313 121 200431B<br>CAN4313 121 200461B<br>CAN4313 121 200491B |             |  | Aug. 9, 02  |    |
|             |                                              |             |  |                                                                   |             |  | Oct. 14, 02 |    |
|             |                                              |             |  |                                                                   |             |  |             |    |
| Grant/Cliff |                                              | Oct. 14, 02 |  | Page 4                                                            | sheet 190-4 |  |             | A4 |
| spec.doc    | PHYCOMP Ltd.                                 |             |  |                                                                   |             |  |             |    |

## 6. TYPICAL RADIATION PATTERN



|             |                                                      |  |  |  |                                                                            |  |  |             |             |
|-------------|------------------------------------------------------|--|--|--|----------------------------------------------------------------------------|--|--|-------------|-------------|
| R&D         | Print date 04/10/06                                  |  |  |  | Preliminary use only                                                       |  |  |             |             |
|             | <b>Multilayer Ceramic Antenna<br/>for 433~500MHz</b> |  |  |  | <b>CAN4313 121 200431B<br/>CAN4313 121 200461B<br/>CAN4313 121 200491B</b> |  |  | Aug. 9, 02  |             |
|             |                                                      |  |  |  |                                                                            |  |  | Oct. 14, 02 |             |
| Grant/Cliff |                                                      |  |  |  |                                                                            |  |  |             | Oct. 14, 02 |
| spec.doc    | PHYCOMP Ltd.                                         |  |  |  |                                                                            |  |  |             |             |

## RELIABILITY DATA (Reference to IEC Specification)

| IEC<br>384-10/<br>CECC 32<br>100<br>CLAUSE | IEC<br>6006868-2<br>TEST<br>METHOD | TEST                                  | PROCEDURE                                                                                                                                                                         | REQUIREMENTS                                                                           |
|--------------------------------------------|------------------------------------|---------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|
| 4.4                                        |                                    | Mounting                              | The antenna can be mounted on printed-circuit boards or ceramic substrates by applying wave soldering, reflow soldering (including vapour phase soldering) or conductive adhesive | No visible damage                                                                      |
| 4.5                                        |                                    | Visual inspection and dimension check | Any applicable method using $\times 10$ magnification                                                                                                                             | In accordance with specification (no chip off 3 mm)                                    |
| 4.6.1                                      |                                    | Antenna                               | Central Frequency at 20 °C                                                                                                                                                        | Standard test board in page 3                                                          |
| 4.8                                        |                                    | Adhesion                              | A force of 5 N applied for 10 s to the line joining the terminations and in a plane parallel to the substrate                                                                     | No visible damage                                                                      |
| 4.9                                        |                                    | Bond strength of plating on end face  | Mounted in accordance with CECC 32 100, paragraph 4.4                                                                                                                             | No visible damage                                                                      |
|                                            |                                    |                                       | Conditions: bending 0.25 mm at a rate of 1mm/s, radius jig. 340 mm, 1 mm warp on FR4 board of 90 mm length                                                                        | No visible damage                                                                      |
| 4.10                                       | Tb                                 | Resistance to soldering heat          | 260 $\pm$ 5 °C for 10 $\pm$ 0.5 s in a static solder bath                                                                                                                         | The terminations shall be well tinned after recovery and Central Freq. Change $\pm$ 6% |

|             |                                           |             |                      |        |             |    |
|-------------|-------------------------------------------|-------------|----------------------|--------|-------------|----|
| R&D         | Print date 04/10/06                       |             | Preliminary use only |        |             |    |
|             | Multilayer Ceramic Antenna for 433~500MHz |             | CAN4313 121 200431B  |        | Aug. 9, 02  |    |
|             |                                           |             | CAN4313 121 200461B  |        | Oct. 14, 02 |    |
|             |                                           |             | CAN4313 121 200491B  |        |             |    |
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| spec.doc    | PHYCOMP Ltd.                              |             |                      |        |             |    |



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## ORDERING INFORMATION: 12NC Ordering Code

The antennas may be ordered by using the Yageo ordering code. These code numbers can be determined by the following rules:

**CAN 43 13 1 21 20 043 1B**

CAN = Yageo Part No. for Antenna

F. Family Code

**43** = Antenna

C. Packing Type Code

**13** = Bulk, 1000 pcs

M. Materials Code

**1** = High Frequency Material

S. Size Code

**21** = 6.5 \* 38.0 \* 0.9 mm

T. Tolerance

**20** = 20 MHz Bandwidth, VSWR<3

A. Working Frequency

**043** = 433MHz, Type 43 (No Marking)

**046** = 460MHz, Type 46 (Marking 6)

**049** = 490MHz, Type 49 (Marking 9)

Packing Type Code

**1B** = 1000 pcs for tape

|             |                                              |             |  |                                                                   |             |  |             |    |
|-------------|----------------------------------------------|-------------|--|-------------------------------------------------------------------|-------------|--|-------------|----|
| R&D         | Print date 04/10/06                          |             |  | Preliminary use only                                              |             |  |             |    |
|             | Multilayer Ceramic Antenna<br>for 433~500MHz |             |  | CAN4313 121 200431B<br>CAN4313 121 200461B<br>CAN4313 121 200491B |             |  | Aug. 9, 02  |    |
|             |                                              |             |  |                                                                   |             |  | Oct. 14, 02 |    |
|             |                                              |             |  |                                                                   |             |  |             |    |
| Grant/Cliff |                                              | Oct. 14, 02 |  | Page 8                                                            | sheet 190-8 |  |             | A4 |
| spec.doc    | PHYCOMP Ltd.                                 |             |  |                                                                   |             |  |             |    |

| Revision | Date           | Content                                                  | Remark |
|----------|----------------|----------------------------------------------------------|--------|
|          | April 20, 2002 | New Issued                                               |        |
|          | Aug 9, 2002    | Add Type 49 and add 6 terminations' dimension<br>VSWR< 3 |        |
|          | Oct 14, 2002   | Modify dimension and termination width (S1, F, C, T)     |        |

|             |                                              |  |  |  |                                                                   |  |  |             |             |
|-------------|----------------------------------------------|--|--|--|-------------------------------------------------------------------|--|--|-------------|-------------|
| R&D         | Print date 04/10/06                          |  |  |  | Preliminary use only                                              |  |  |             |             |
|             | Multilayer Ceramic Antenna<br>for 433~500MHz |  |  |  | CAN4313 121 200431B<br>CAN4313 121 200461B<br>CAN4313 121 200491B |  |  | Aug. 9, 02  |             |
|             |                                              |  |  |  |                                                                   |  |  | Oct. 14, 02 |             |
| Grant/Cliff |                                              |  |  |  |                                                                   |  |  |             | Oct. 14, 02 |
| spec.doc    | PHYCOMP Ltd.                                 |  |  |  |                                                                   |  |  |             |             |