Innovative Service Around the Globe YAGEO

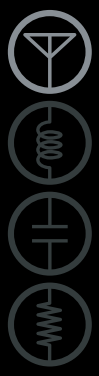
DATA SHEET

HIGH FREQUENCY

SMD type antennas
for BT/802.11b/g application

2.45 GHz

size 7.8 × 3.6



Phicomp

Product specification – Jul 27, 2004 V.3

High Frequency

SMD type antennas for BT/802.11b/g application 2.45 GHz size 7.8 × 3.6

FEATURES

- Designed for 2.45 GHz ISM-band
- Simplifies antenna circuitry
- NiSn lead-free terminations
- Suitable for wave and reflow soldering
- Supplied in tape on reel.

APPLICATIONS

- Telecommunications
- Computing (PCs, printers, PDAs)
- Wireless office data communications including WLAN
- Consumer electronics (wireless headphones).

DESCRIPTION

This 2.45 GHz ceramic multilayer antenna has been designed to meet the requirements of the Bluetooth™(1) and IEEE 802.11b/g wireless communications protocol. It consists of a rectangular block of low-dielectric ceramic material and is fabricated in a water-based non-toxic process. The antenna is capable of providing good connectivity using near 50 Ω microstrip directly onto the PC board.

(1) Bluetooth is a trademark owned by Telefonieaktiebolaget L M Ericsson, Sweden.

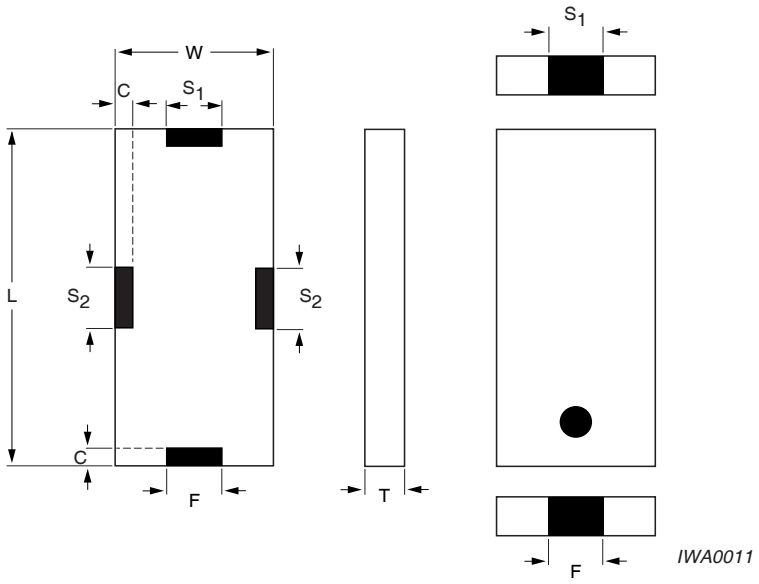
ENVIRONMENTAL CARE

The foil making process uses an environment-friendly aqueous-solvent technology that fully complies with today's green-product design requirements. All terminations are lead-free. Packing materials can be recycled.

QUICK REFERENCE DATA

DESCRIPTION	VALUE
Centre frequency (for different central frequency shifts)	2.45 GHz 02 type/03 type/Default/06 type/07 type
Bandwidth	> 100 MHz
Gain	4.1 dBi max. (depends on the special environment)
VSWR	2.5 max. (depends on the special environment)
Polarization	Linear
Azimuth beamwidth	Omni-directional
Impedance	50 Ω
Power dissipation	1 W
Operating temperature	−55 to +85 °C
Terminations	NiSn
Resistance to soldering heat	260 °C for 10 seconds

MECHANICAL DATA



For dimensions see Table 1.

Fig.1. Component outline.

Physical dimensions

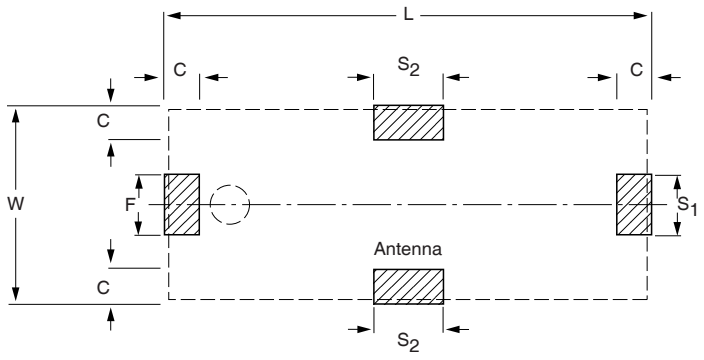
Table 1 antenna dimensions

SYMBOL	DETAILS	DIMENSIONS (mm)
L	–	7.8 ±0.25
W	–	3.6 ±0.20
T	–	0.9 ±0.20
F	feed termination	1.25 ±0.25
C	–	0.4 ±0.20
S1	–	1.25 ±0.25
S2	–	1.25 ±0.25

ELECTRICAL CHARACTERISTICS

DESCRIPTION	VALUE
Centre frequency (for different central frequency shifts)	2.45 GHz 02 type/03 type/Default/06 type/07 type
Bandwidth	$>$100 MHz
Gain	4.1 dBi max. (depends on the special environment)
VSWR	2.5 max. (depends on the special environment)
Polarization	Linear
Azimuth beamwidth	Omni-directional
Impedance	50 Ω
Power dissipation	1 W
Operating temperature	−55 to +85 °C
Terminations	NiSn
Resistance to soldering heat	260 °C for 10 s
Weight	0.0839 g/piece

FOOTPRINT DIMENSIONS



For dimensions see Table 2.

IWA0012

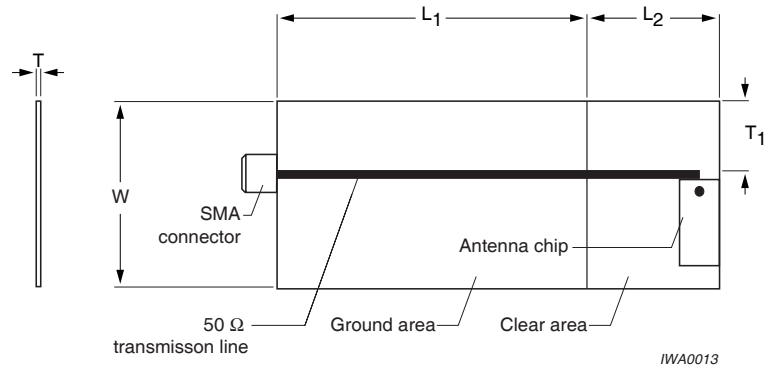
Fig.2. Recommend dimension of solder lands

Physical dimensions

Table 2 The dimensions of antenna appearance

SYMBOL	DETAILS	DIMENSIONS (mm)
L	–	9.0 ±0.1
W	–	4.4 ±0.2
F	feed pad	1.4 ±0.25
C	–	0.8 ±0.20
S1	–	1.4 ±0.25
S2	–	1.6 ±0.25

ANTENNA CHARACTERISTICS IN STANDRD TEST BOARD



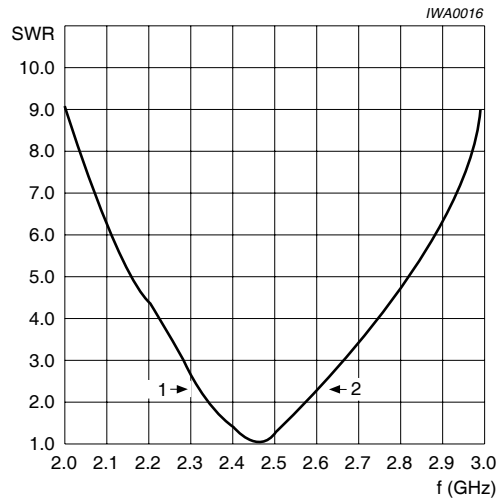
For dimensions see Table 3.

Fig.3. Typical FR4 test board.

Physical dimensions

Table 3 The dimensions of test board

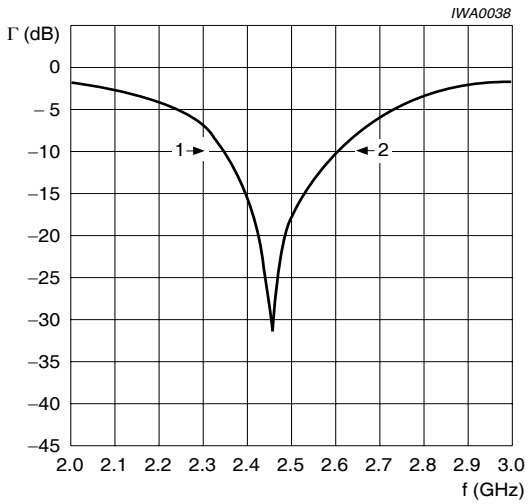
SYMBOL	DETAILS	DIMENSIONS (mm)
L1	–	30
L2	–	10
W	–	18
T	–	0.8
T1	–	5.0



Marker data:

1: SWR= 2.5; f= 2.31 GHz

2: SWR= 2.5; f= 2.62 GHz



Marker data:

1: Γ= –10 dB; f= 2.35 GHz

2: Γ= –10 dB; f= 2.56 GHz

Pre-tuning reference only,after-tuning performance is depending on customer installation.

Fig.4 The measurements of typical SWR and return loss on standard test board .

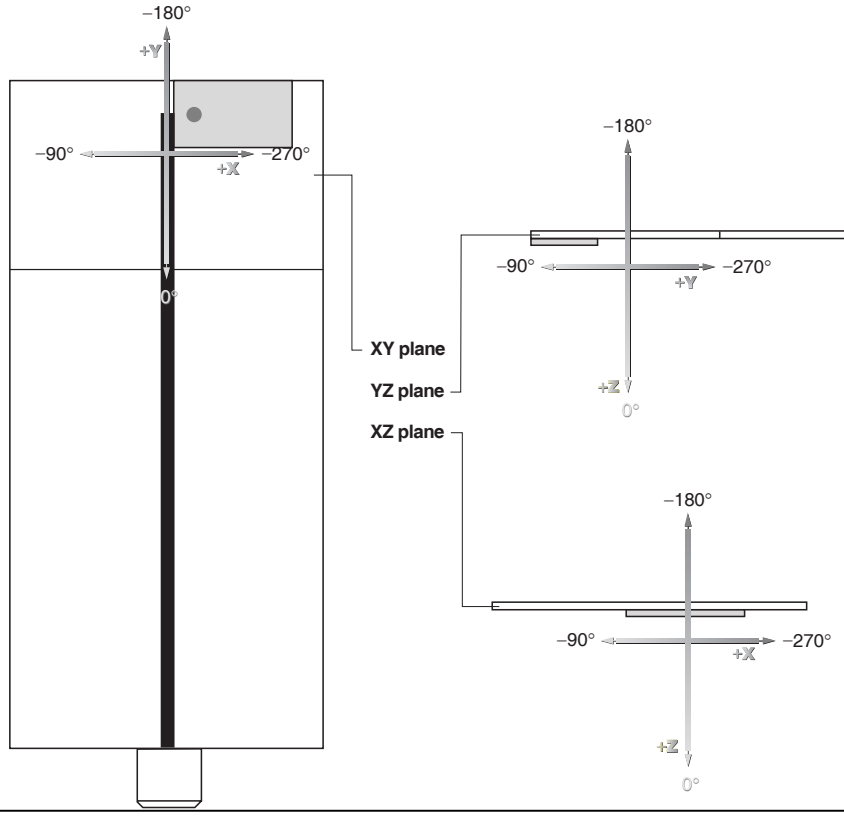
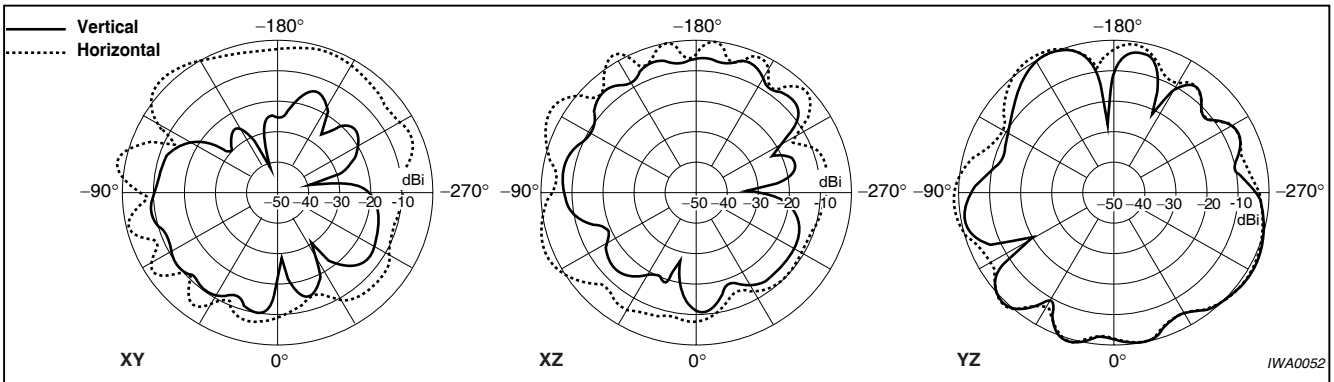


Fig.5 The definition of X-Y-Z plane and angle for radiation pattern



For antenna gain value see Table 4.

Fig.6 Radiation pattern measurements

Table 4 Max. and avg. antenna gain value of radiation pattern

Plane	XY (dBi)	XZ(dBi)	YZ (dBi)
Vertical Pol. (max.)	−8.9	−4.3	1.4
Vertical Pol. (avg.)	−14.6	−9.8	−2.8
Horizontal Pol. (max.)	2.4	4.1	1.1
Horizontal Pol. (avg.)	−3.7	−3.1	−5.2
Total gain (max.)	2.4	4.1	1.6
Total gain (avg.)	−3.6	−2.8	−1.6

High Frequency

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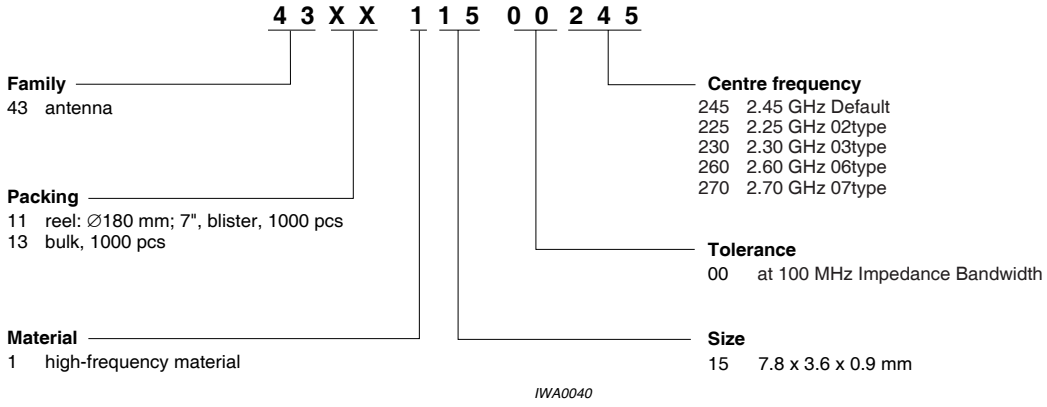
ORDERING INFORMATION

Components may be ordered by using either a Phycomp's unique 12NC or the simple 17-digit clear text code (Yageo part number)

12NC ORDERING CODE

EXAMPLE: 4311 115 00245



Yageo part number

EXAMPLE: CAN4311115002451K

DESCRIPTION	CODE
Family	CAN43 = antenna products
Packing	11 = 180 mm/7" blister
Materials	1 = high frequency materials
Size	15 = 7.8 × 3.6 × 0.9 mm
Tolerance	00 = large than 100 MHz
Working Frequency(1)	245 = 2.45 GHz (Default) 220 = 2.25 GHz (02 type) 230 = 2.30 GHz (01 type) 260 = 2.60 GHz (06 type) 270 = 2.70 GHz (07 type)
Packing type	1K = 1,000 pcs tape reel

Notes
1. Depend on yageo's demoboard.

TESTS AND REQUIREMENTS

Table 5 Test procedures and requirements

IEC 384-10/ CECC32 100 CLAUSE	IEC 60068-2 TEST METHOD	TEST	PROCEDURE	REQUIREMENTS
4.4		mounting	the antenna may 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 × 10 magnification	in accordance with specification (chip off 4 mm)
4.6.1		antenna	central frequency at 20 °C	standard test board from Fig.3
4.8		adhesion	a force of 3 N applied for 10 s to the line joining the terminations and in a plane parallel to the substrate	
4.9		bond strength of plating on end face	mounted in accordance with CECC 32 100, paragraph 4.4	no visible damage
			conditions: bending 0.5 mm at a rate of 1 mm/s; radius jig: 340 mm; 2 mm warp on FR4 board of 90 mm length	no visible damage
4.10	20 (Tb)	resistance to soldering heat	260 ±5 °C for 10 ±5 s in a static solder bath	the terminations should be well tinned after recovery; central frequency. change to ±6%
		resistance to leaching	at 260 ±5 °C for 30 ±1 s in a static solder bath	using visual enlargement of × 10, dissolution of the terminations should not exceed 10%
4.11	20 (Ta)	solderability	zero hour test, and test after storage (20 to 24 months) in original atmosphere; unmounted chips completely immersed for 2 ±0.5 s at 235 ±5 °C	the terminations should be well tinned,at least 75% is the well tinned at termination

IEC 60384-10/ CECC32 100 CLAUSE	IEC 60384-2 TEST METHOD	TEST	PROCEDURE	REQUIREMENTS
4.12	4 (Na)	rapid change of temperature	−55 °C (30 minutes) to +85 °C (30 minutes); 100 cycles	no visual damage; central frequency change to ±6%
4.14	3 (Ca)	damp heat	500 ±12 hours at 60 °C; 90 to 95% RH	no visual damage; 2 hours recovery; centre frequency. change to ±6%
4.15		endurance	500 ±12 hours at 85 °C	no visual damage; 2 hours recovery; centre frequency. change to ±6%

PACKING

Tape and reel specifications

Tape and reel specifications are in accordance with *"IEC 60286-3"*. Basic dimensions are given in Figs 7 and 8, and Tables 6 and 7.

Peel-off force

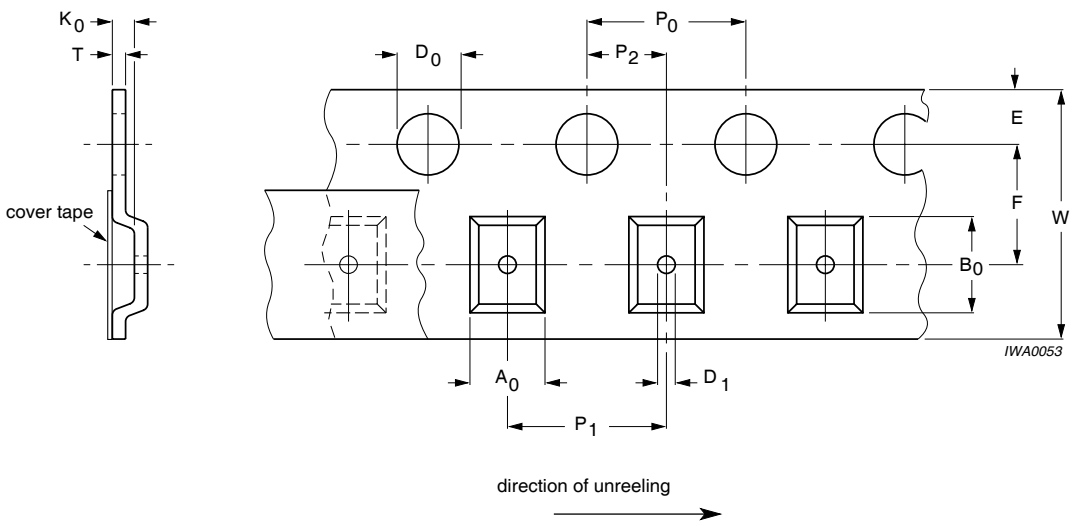
Peel-off force of the blister tape is in accordance with *"IEC 60286-3"*; that is, at a peel-off speed of 300 ±10 mm/minute, 0.1 N to 1.3 N for 16 mm tape. The peel-off angle should be between 165° and 180°

Blister tape

ENVIRONMENTAL CONSIDERATIONS

- Cover tape, carrier tape and reel do not contain environmentally harmful PVC materials.
- Because the carrier tape is made of polycarbonate, a homogeneous material (mono-plastic), it is ideally suited for recycling.
- Compared to other PVC-free materials polycarbonate shows excellent stiffness and very little deformation with temperature.

Blister tape specifications



Cumulative pitch error: 0.2 mm over 10 pitches.
Cumulative tolerance over 10 holes: ±0.2 mm.
K_0: chosen so that the orientation of the component cannot change.
For dimensions see Table 6.

Fig.7 Blister tape

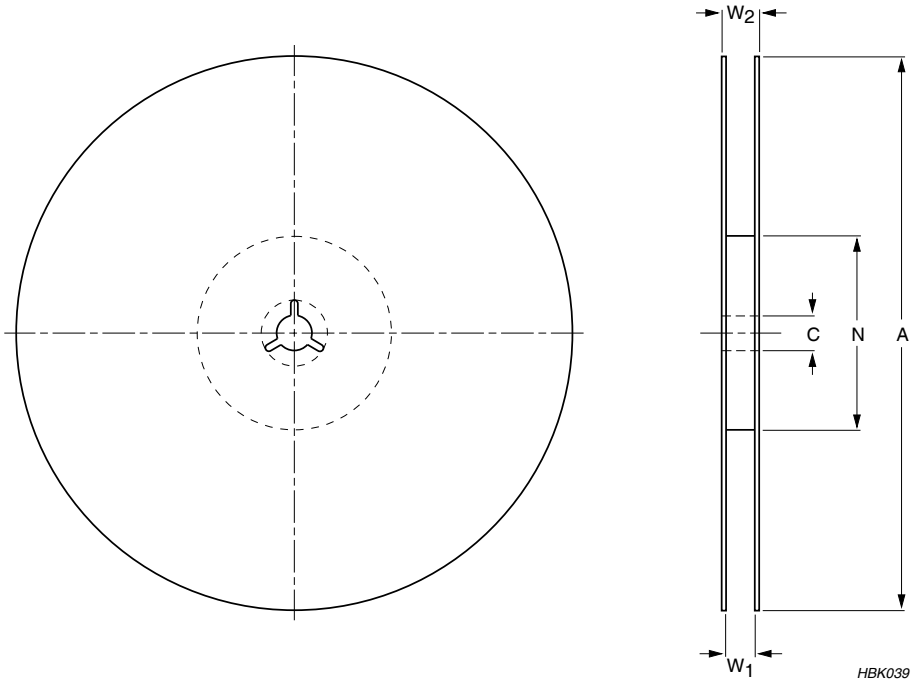
Table 6 Dimensions of blister tape; see Fig. 7

SYMBOL	DIMENSION	TOLERANCE	UNIT
A_0	4.20	±0.10	mm
B_0	8.50	±0.10	mm
K_0	1.20	±0.10	mm
W	16.0	±0.30	mm
E	1.80	±0.10	mm
F	7.50	±0.10	mm
D_0	1.55	±0.10	mm
D_1	1.60	±0.10	mm
P_0	4.0	±0.10	mm
P_1	8.0	±0.10	mm
P_2	2.0	±0.10	mm
T	0.25	±0.10	mm

Note

1. P_0 pitch tolerance over any 10 pitches is ±0.2 mm.

Reel specifications



Dimensions in mm.
For reel dimension see Table 7

Fig.8 Reel.

Table 7 Reel dimensions; see Fig.8

TAPE WIDTH (mm)	A (mm)	C (mm)	N (mm)	W_1 (mm)	W_2 (mm)	QUANTITY PER REEL (pcs)
16 ±0.3	180 ±1.0	13.0 ±1.0	62 ±2.0	16.5 ±0.5	20.5 ±0.2	1,000

REVISION HISTORY

Revision	Date	Change Notification	Description
Rev.3	2004 Jul 27	-	- Updated data compile