DATA SHEET

5 GHz Multilayer Ceramic Balun (1608)

05th, Jan, 2005 Rev.3

1608/5GHz 50-100ohm Multilayer Ceramic Balun				CBA4711715015004K					— ▶	1	25th, May 2004
									— ▶	2	12th, Oct. 2004
									— ▶	3	5th, Jan, 2005
BY / 製定者	S.U.Hong	SUPER / 原圖編號	J.S. Hsieh	TLL.SH / 共頁	13	PAGE/ 頁	11	SH nr. 190	— ▶	4	
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MULTILAYER CERAMIC BALUN
FOR BLUETOOTH & WLAN IEEE 802.11a (5GHz ISM Band)
Product Specification[1]

QUICK REFERENCE DATA

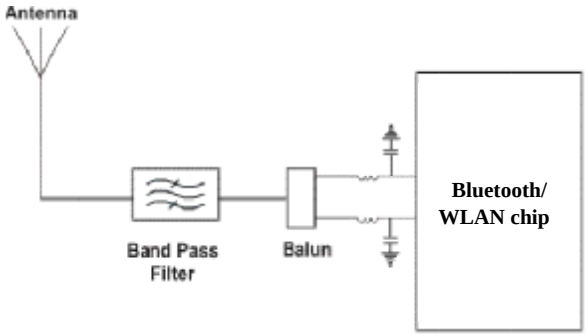
Specifications

Frequency Range	4900-5950 MHz
Unbalanced Impedance	50 Ohm
Balanced Impedance	100 Ohm
Unbalanced port V.S.W.R. (Return Loss)	2.0 (Max) 10dB (Min)
Insertion Loss	1.2 dB (Max) at 25 Deg. C 1.5 dB (Max) at -40 ~ +85 Deg. C
Phase Difference	180 ±10 degree
Amplitude Difference	1.5 dB (Max)
Dimension	1.6 x 0.8 x 0.65 mm

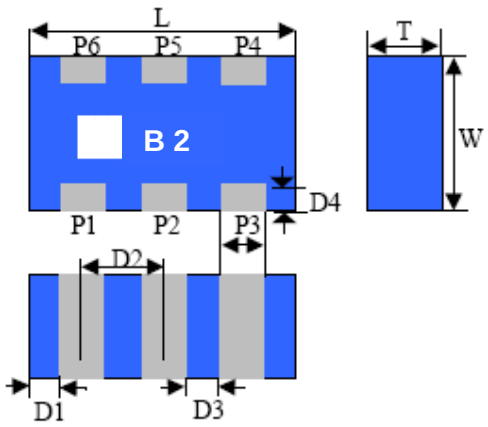
Special Environmental Concerns- Green Products Design: Termination is lead free (Pb free) and packing materials can be re-cycled

[1] All the technical data and information contained herein are subject to change without prior notice

Applications

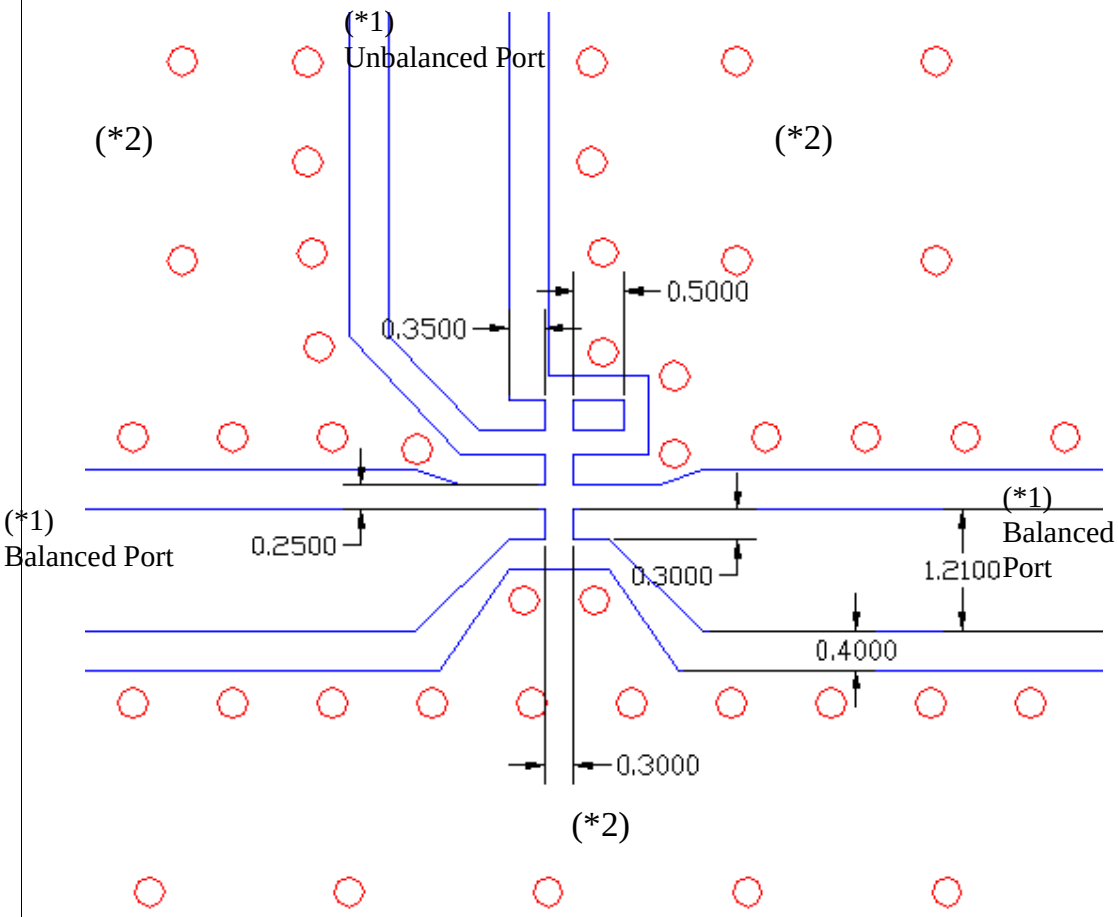


Dimensions and Port Configurations

Figure	Dimension		Port
	L	1.6+-0.15mm	
	W	0.8+-0.15mm	
	T	0.65+-0.15mm	
	P1	0.3+-0.15mm	Unbal. Port
	P2	0.3+-0.15mm	Ground
	P3	0.3+-0.15mm	Balanced Port
	P4	0.3+-0.15mm	Balanced Port
	P5	0.3+-0.15mm	Ground
	P6	0.3+-0.15mm	Not Connect
	D1	0.1+-0.05mm	
	D2	0.55+-0.15mm	
	D3	0.25+-0.15mm	
	D4	0.2+-0.15mm	

Recommended PCB Pattern

PCB pattern (unit: mm and 50 Ohm line of 0.8mm FR4)



(*1) 50Ω line
(*2) GND plane

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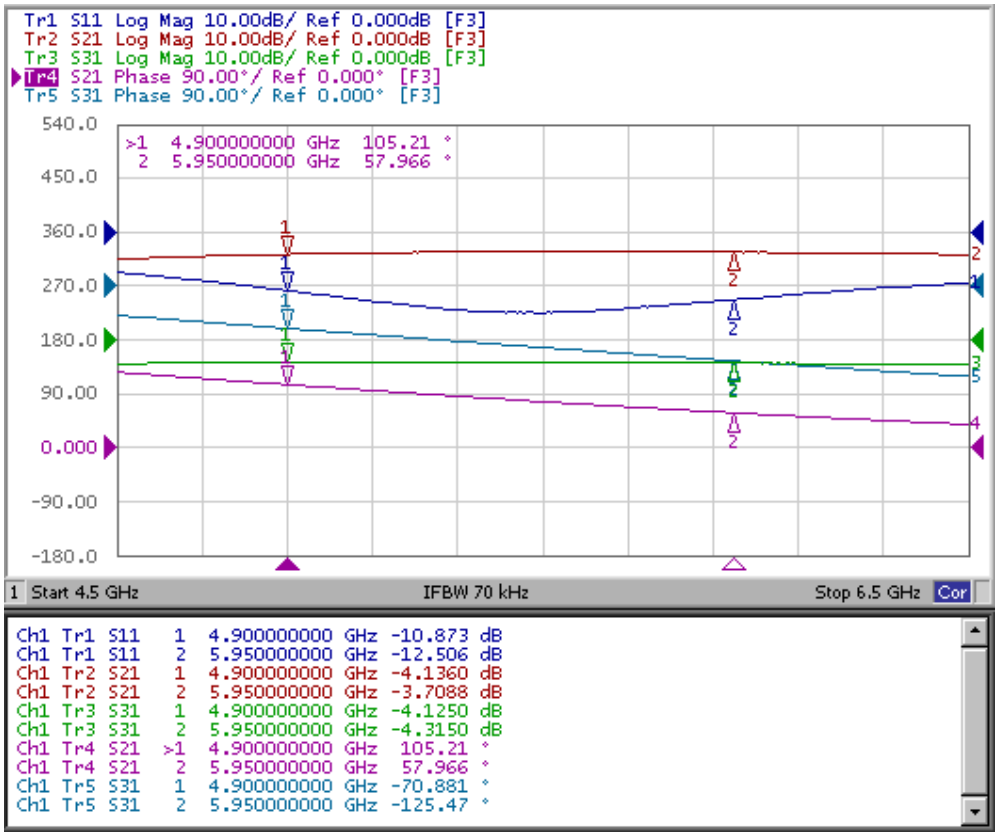
Frequency Characteristics (I)

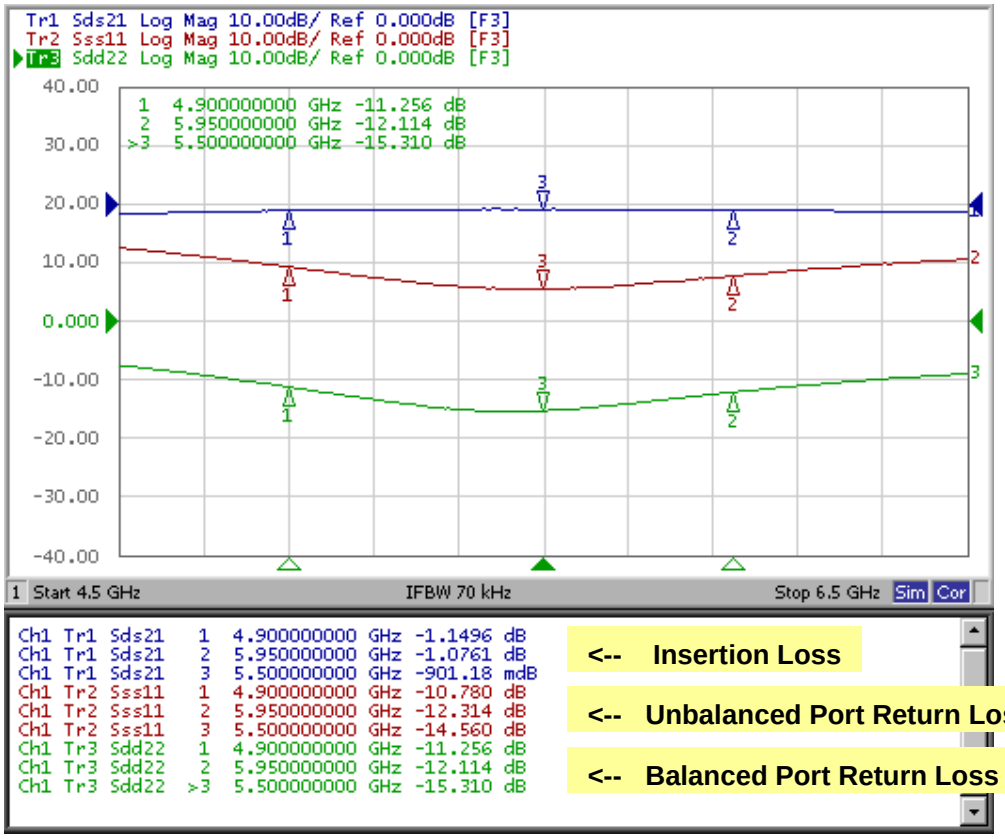
S11, S21, S31 Measured on Agilent E5071b Network Analyzer



Ch1 Tr1 S11	1	4.900000000 GHz	-10.873 dB
Ch1 Tr1 S11	2	5.950000000 GHz	-12.506 dB
Ch1 Tr2 S21	1	4.900000000 GHz	-4.1360 dB
Ch1 Tr2 S21	2	5.950000000 GHz	-3.7088 dB
Ch1 Tr3 S31	1	4.900000000 GHz	-4.1250 dB
Ch1 Tr3 S31	2	5.950000000 GHz	-4.3150 dB
Ch1 Tr4 S21	>1	4.900000000 GHz	105.21 °
Ch1 Tr4 S21	2	5.950000000 GHz	57.966 °
Ch1 Tr5 S31	1	4.900000000 GHz	-70.881 °
Ch1 Tr5 S31	2	5.950000000 GHz	-125.47 °

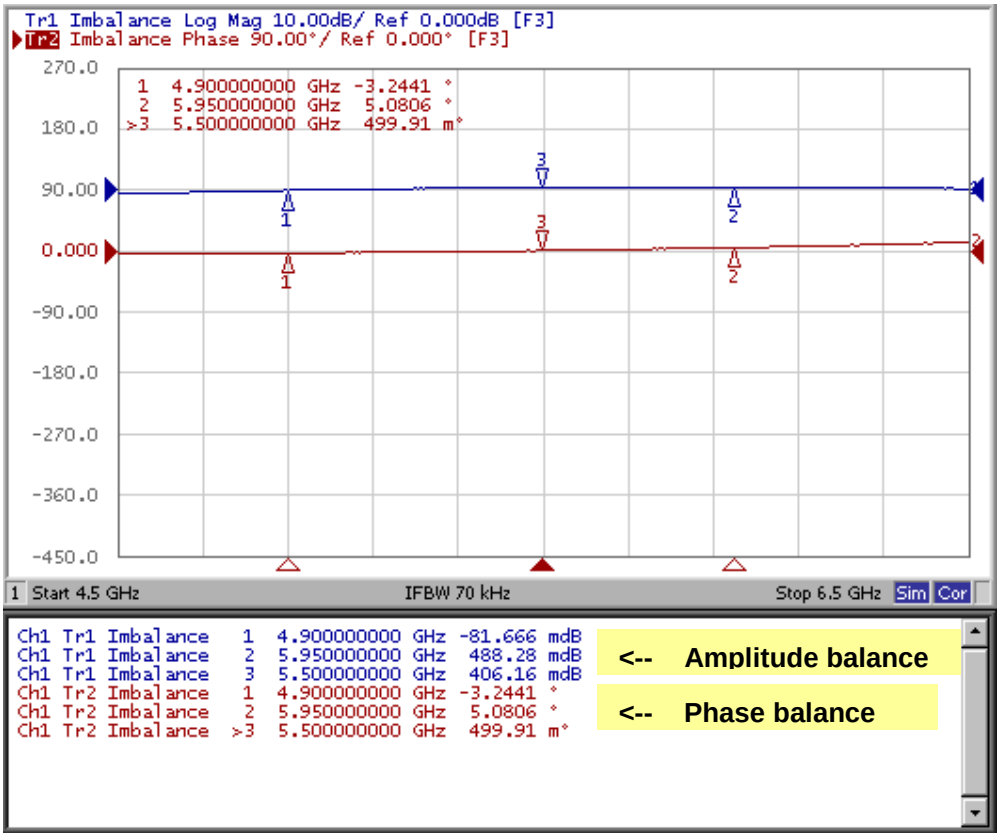
Frequency Characteristics (II)

Insertion loss (Sds21, differential port to single-ended port),
Unbalanced port return loss (Sss11, single-ended port) and
Balanced port return loss (Sdd22, differential port)
Measured on Agilent E5071b Network Analyzer



Frequency Characteristics (III)

Imbalance (S21/S31 amplitude and phase difference)
Measured on Agilent E5071b Network Analyzer



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RELIABILITY DATA (Reference to IEC Specification)

IEC 384-10/ CECC 32 100 CLAUSE	IEC 60068-2 TEST METHOD	TEST	PROCEDURE	REQUIREMENTS
4.4		Mounting	The balun 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 ´ 10 magnification	In accordance with specification (chip off 1mm)
4.6.1		Filter	VSWR < 2 at 20 ^{o}C	Standard test board
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	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 0.5 mm at a rate of 1mm/s, radius jig. 340 mm, 2mm warp on FR4 board of 90 mm length	No visible damage
4.10	20(Tb)	Resistance to soldering heat	260 ± 5 °C for 10 ± 0.5 s in a static solder bath	No visible damage and complies with electrical performance

IEC 384-10/ CECC 32 100 CLAUSE	IEC 60068-2 TEST METHOD	TEST	PROCEDURE	REQUIREMENTS
		Resistance to leaching	260 ± 5 °C for 30 ± 1 s in a static solder bath	Using visual enlargement of ´ 10, dissolution of the termination shall not exceed 10%
4.11	20(Ta)	Solderability	Zero hour test, and test after storage (20 to 24 months) in original atmosphere; un-mounted chips completely immersed for 2 ± 0.5 s in 235 ± 5°C.	The termination must be well tinned, at least 75% is well tinned at termination
4.12	4(Na)	Rapid change of temperature	-40 °C (30 minutes) to +85 °C (30 minutes); 200 cycles	No visible damage and complies with electrical performance
4.13	IEC 60384-10	Climate sequence	1. Initial measurement 2. Dry Heat (16hours, 85deg. C) 3. Damp heat, cycle, Test Db first cycle (24hours; 55deg.C; 95 to 100% R.H.) 4. Cold(-20deg.C, 2hours) 5. Damp heat, cycle, Test Db, remaining 6. Final measurements	No visible damage and complies with electrical performance
4.14	3(Ca)	Damp heat	500 ± 12 hours at 40 °C; 90 to 95 % RH	No visible damage and complies with electrical performance
4.15		Endurance	500 ± 12 hours at 85 °C;	No visible damage and complies with electrical performance

ORDERING INFORMATION:

These code numbers can be determined by the following rules:

4711 7 15 01 500
F C M S T A

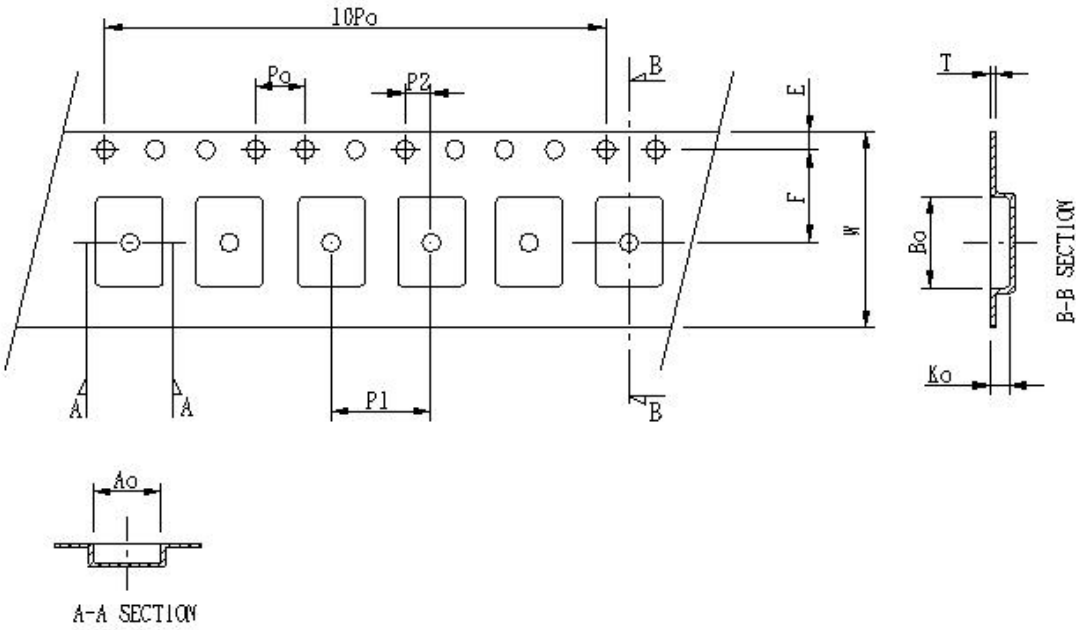
F. Family Code
47 = Balun
C. Packing Type Code
11 = 180 mm/ 7" blister
M. Materials Code
7 = High Frequency Material
S. Size Code
11 = 3.2 * 2.5 mm 12 = 3.2 * 1.6 mm 13 = 2.5 * 2.0 mm 14 = 2.0 * 1.2 mm
15 = 1.6 * 0.8 mm
T. Type
00 = 50-50 ohm Balun
01 = 50-100 ohm Balun
02 = 50-200 ohm Balun
A. Working Frequency
500 = 5 GHz

Ordering Method - by Clear Text Code

The LPF may be ordered by using the 17-digit clear text ordering code. These code numbers can be determined by the following rules:

CBA4711715015004K (Clear Text Code Example)							
CBA47	11	7	15	01	500	4	K
Product	Packing type	Material	Size	Type	Central Frequency	Quantities	Packing
CBA47= Balun	180mm/7”	LTCC material	15=1.6*0.8 mm	01= 50-100 ohm	500=5 GHz	4= 4K pcs	K=7" plastic

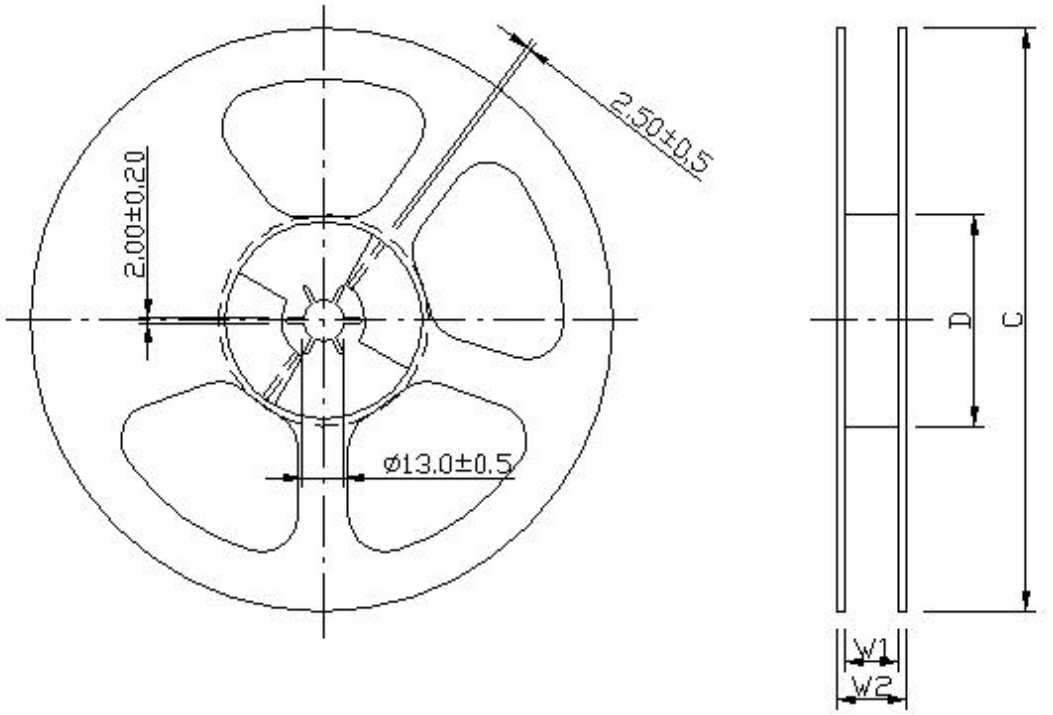
Taping Blister Tape



DIMENSION:

Serial no	Cecking note	Index	Spec(mm)
1	Sprocket hole	Do	1.50±0.10
2	Pocket hole	D1	≥1
3	Distance sprocket hole/sprocket hole	Po	4.0±0.10
4	Distance pocket/pocket	P1	4.0±0.10
5	Distance sprocket hole/pocket	P2	2.0±0.10
6	Tape width	W	8.1±0.20
7	Distance sprocket hole/outside	E	1.75±0.10
8	Distance sprocket hole/pocket	F	3.5±0.0.05
9	Pocket length nominal clearance	Ao	0.88±0.10
10	Pocket length nominal clearance	Bo	1.85±0.10
11	Pocket depth minimum clearance	Ko	0.85±0.10
12	Thickness of tape	T	0.22±0.05
13	10x sprocket hole pitch	10Po	40.0±0.20

7”(180mm) Reel Specifications



Product size code	Units per Reel	Tape Width (mm)	C (mm)	D (mm)	W_1 (mm)	W_2 (mm)
Filter	4000	8	180.0±1.0	62±1.5	8.4+/-0.15	14.4 max

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Revision Control:

Revision	Date	Content	Remark
1	25th,May. 2004	New Issued	
2	12th,Oct. 2004	Modify to wider band 4900~5950MHz and square mark.	
3	5th, Jan, 2005	Modify the mark and add some measuring graph	