

TDK RF Products for Wireless LAN

2/10/2003

for 2.4GHz

Balun Transformers

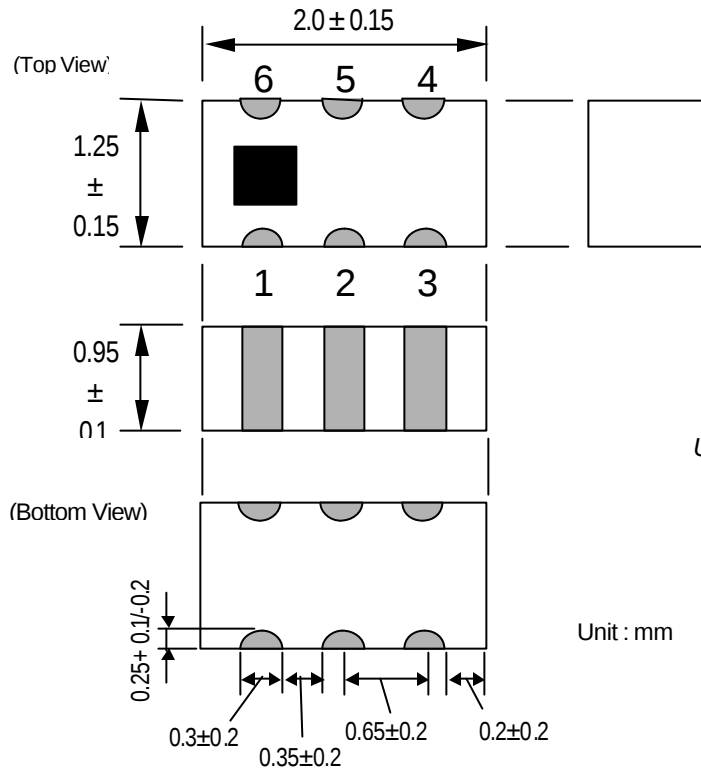
Start Freq. MHz	Stop Freq. MHz	Ins. Loss dB (MAX)	Bal. imped. ohm	Amp. bal. dB (MAX)	Phase bal. deg	Size mm (typ.)	Part No.
2400(2300)	2500	1.2	50	2.0	180 +/- 10	2.0x1.2x0.95	HHM1517(A2)
2400(2300)	2500	1.2	75	2.0	180 +/- 10	2.0x1.2x0.95	HHM1541(A2)
2400(2300)	2500	1.0	100	2.0	180 +/- 10	2.0x1.2x0.95	HHM1520(A2)
2400(2300)	2500	1.0(1.1)	200	2.0	180 +/- 10	2.0x1.2x0.95	HHM1521(A2)
2400	2500	1.2	50	2.0	180 +/- 10	1.6x0.8x0.6	HHM1710D1
2400	2500	1.2	100	2.0	180 +/- 10	1.6x0.8x0.6	HHM1711D1
2400	2500	1.2	150	2.0	180 +/- 10	1.6x0.8x0.6	HHM1712D1
2400	2500	1.2	200	2.0	180 +/- 10	1.6x0.8x0.6	HHM1713D1

	Sample Available
	Under developing

MULTILAYER BALUN SPECIFICATION

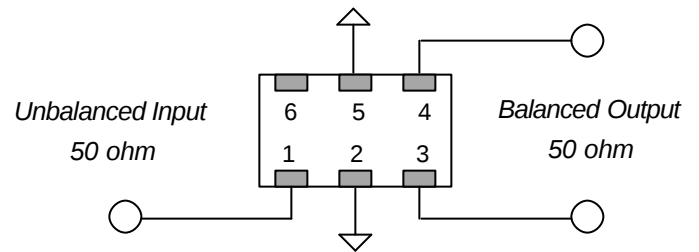
P/N: **HHM1517** For Bluetooth & IEEE802.11b/g

[MECHANICAL DIMENSIONS]



Pin configuration

- 1 Unbalanced Port
- 2 GND or DC feed + RF GND
- 3 Balanced Port
- 4 Balanced Port
- 5 GND
- 6 N.C.



[ELECTRICAL CHARACTERISTICS]

Unbalanced Impedance	50 ohm
Balanced Impedance	50 ohm
Frequency Range	2400-2500MHz
Unbalanced Port Return Loss	10 dB Min.
Phase Imbalance at Balanced Port	180 ± 10 deg.
Amplitude Imbalance at Balanced Port	0 ± 2.0 dB
Insertion Loss	1.2dB Max.

[TEMPERATURE RANGE]

Storage Temperature	-40°C ~ +85°C
Operating Temperature	-40°C ~ +85°C

[STANDARD PACKAGING QUANTITIES]

2000pcs. /reel

Notes : All the technical data and information contained herein are subject to change without prior notice.

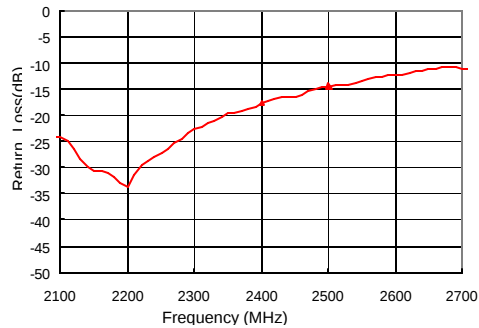
PRELIMINARY

[Frequency response]

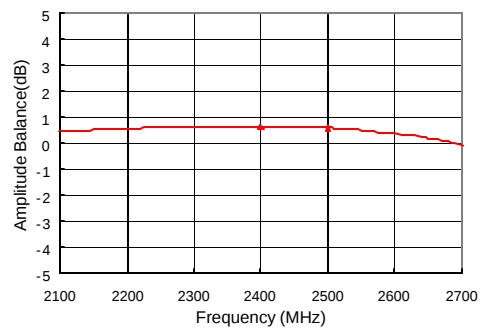
HHM1517 (UNBALANCE 50ohm/BALANCE 50ohm)

TDK Corporation

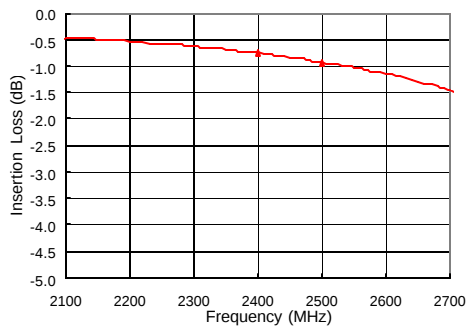
Return Loss



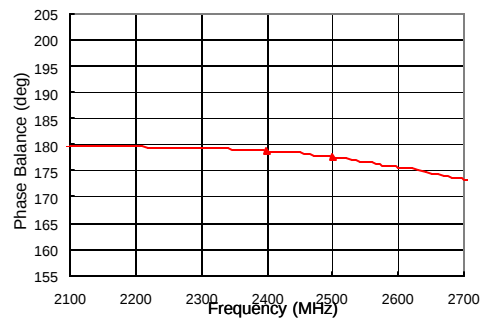
Amplitude Balance



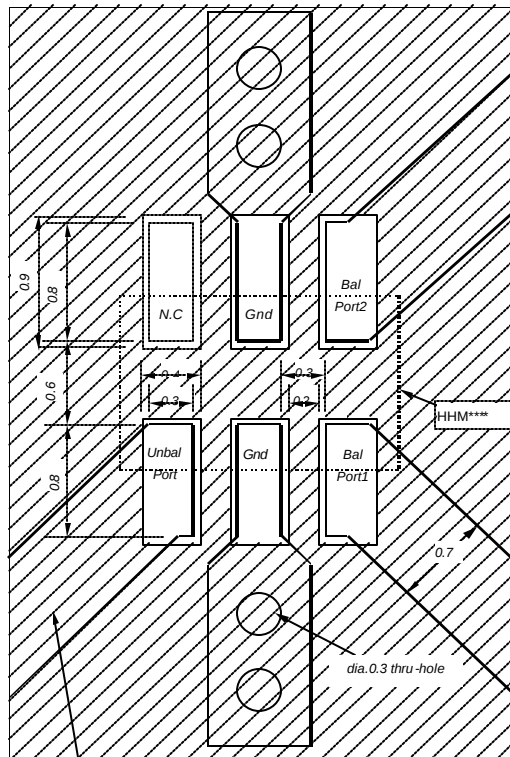
Insertion Loss



Phase Balance



[Recommended PCB Pattern]



This width is 50ohm.

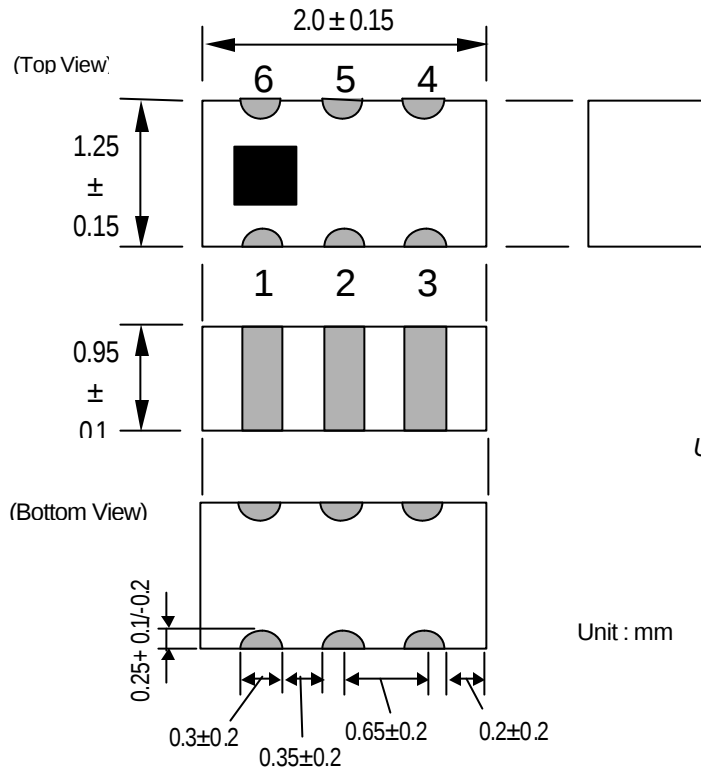
Micro-strip line for 0.4mm thick glass-epoxy substrate.

Notes : All the technical data and information contained herein are subject to change without prior notice.

MULTILAYER BALUN SPECIFICATION

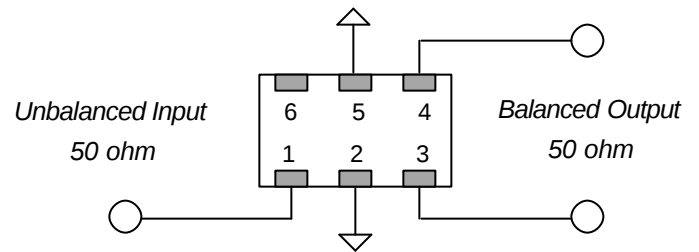
P/N: **HHM1517A2** For Bluetooth & IEEE802.11b/g

[MECHANICAL DIMENSIONS]



Pin configuration

- 1 Unbalanced Port
- 2 GND or DC feed + RF GND
- 3 Balanced Port
- 4 Balanced Port
- 5 GND
- 6 N.C.



[ELECTRICAL CHARACTERISTICS]

Unbalanced Impedance	50 ohm
Balanced Impedance	50 ohm
Frequency Range	2300-2500MHz
Unbalanced Port Return Loss	10 dB Min.
Phase Imbalance at Balanced Port	180 ± 10 deg.
Amplitude Imbalance at Balanced Port	0 ± 2.0 dB
Insertion Loss	1.2dB Max.

[TEMPERATURE RANGE]

Storage Temperature	-40°C ~ +85°C
Operating Temperature	-40°C ~ +85°C

[STANDARD PACKAGING QUANTITIES]

2000pcs./reel

Notes : All the technical data and information contained herein are subject to change without prior notice.

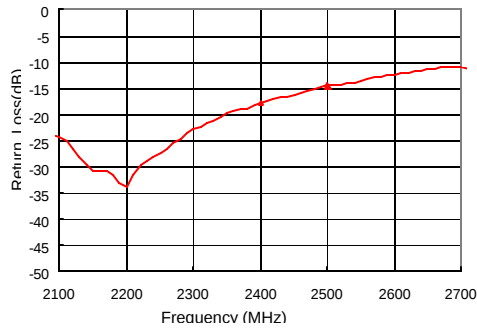
PRELIMINARY

[Frequency response]

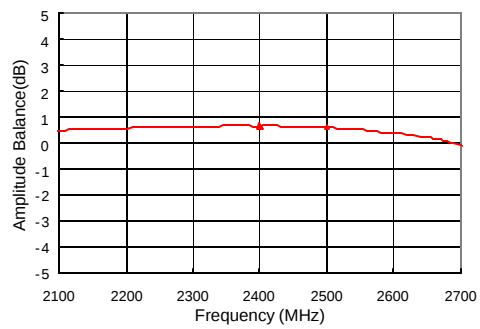
HHM1517A2 (UNBALANCE 50ohm/BALANCE 50ohm)

TDK Corporation

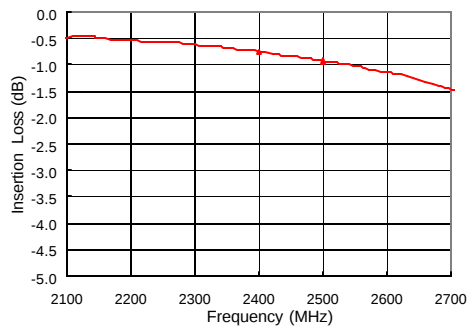
Return Loss



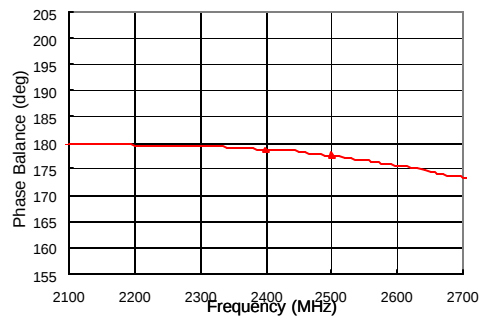
Amplitude Balance



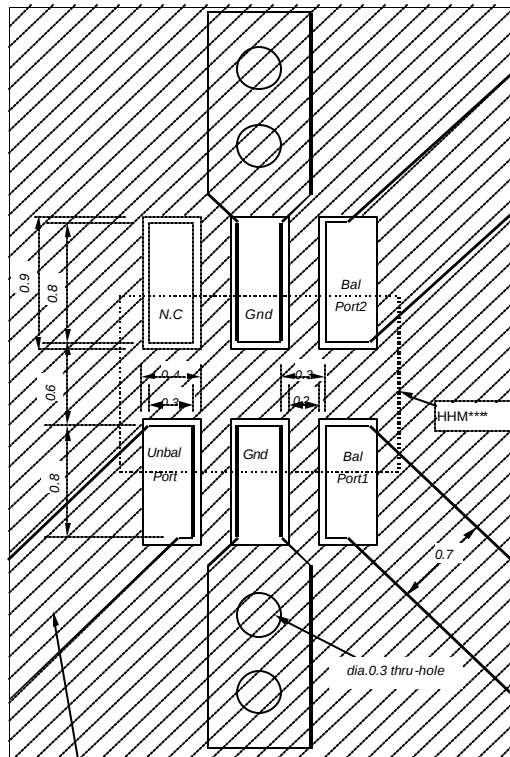
Insertion Loss



Phase Balance



[Recommended PCB Pattern]



This width is 50ohm.

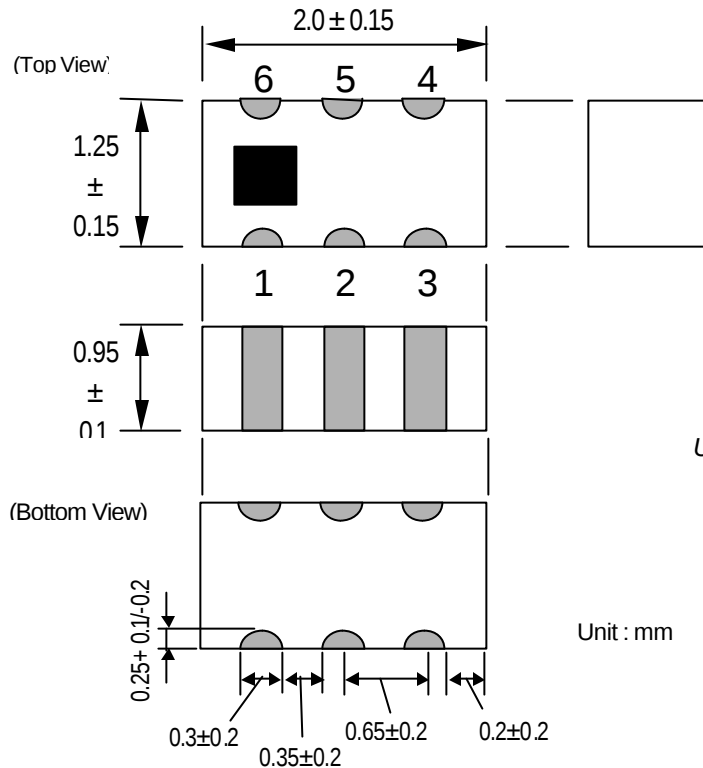
Micro-strip line for 0.4mm thick glass-epoxy substrate.

Notes : All the technical data and information contained herein are subject to change without prior notice.

MULTILAYER BALUN SPECIFICATION

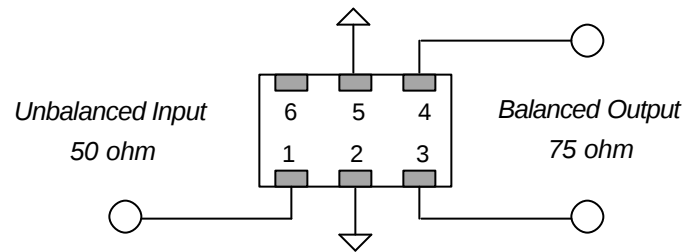
P/N: **HHM1541** For Bluetooth & IEEE802.11b/g

[MECHANICAL DIMENSIONS]



Pin configuration

- 1 Unbalanced Port
- 2 GND or DC feed + RF GND
- 3 Balanced Port
- 4 Balanced Port
- 5 GND
- 6 N.C.



[ELECTRICAL CHARACTERISTICS]

Unbalanced Impedance	50 ohm
Balanced Impedance	75 ohm
Frequency Range	2400-2500MHz
Unbalanced Port Return Loss	10 dB Min.
Phase Imbalance at Balanced Port	180 ± 10 deg.
Amplitude Imbalance at Balanced Port	0 ± 2.0 dB
Insertion Loss	1.2dB Max.

[TEMPERATURE RANGE]

Storage Temperature	-40°C ~ +85°C
Operating Temperature	-40°C ~ +85°C

[STANDARD PACKAGING QUANTITIES]

2000pcs./reel

Notes : All the technical data and information contained herein are subject to change without prior notice.

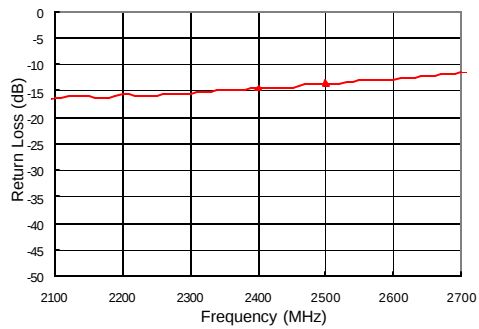
PRELIMINARY

[Frequency response]

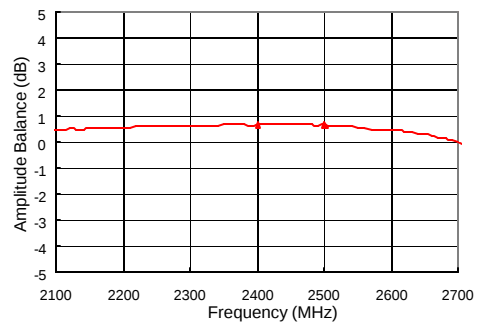
HHM1541 (UNBALANCE 50ohm/BALANCE 75ohm)

TDK Corporation

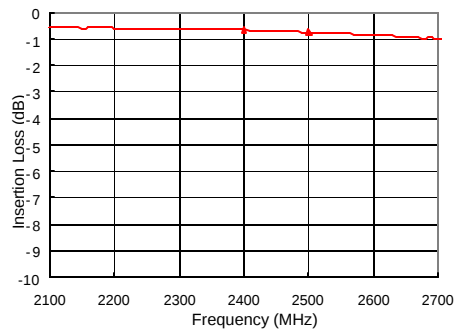
Return Loss



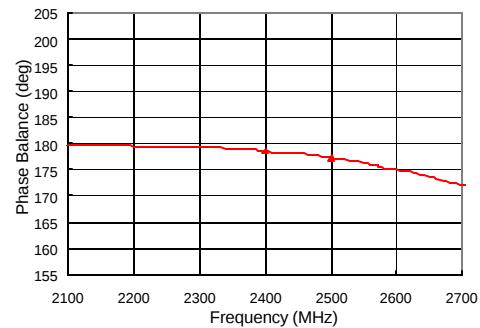
Amplitude Balance



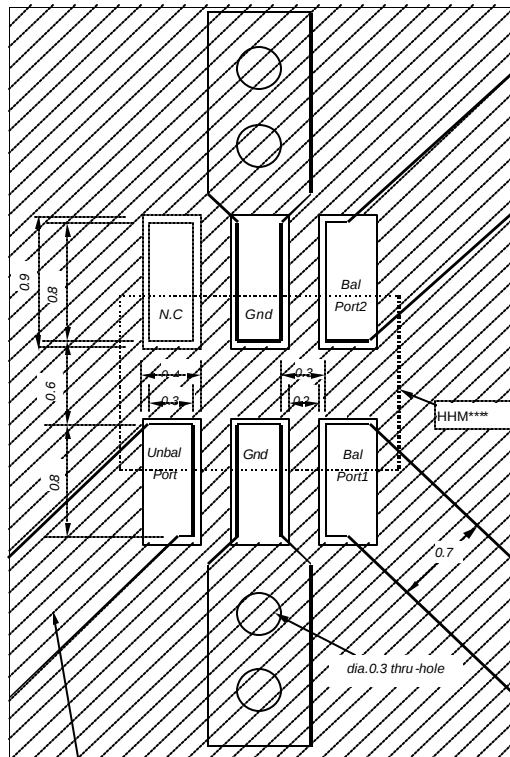
Insertion Loss



Phase Balance



[Recommended PCB Pattern]



This width is 50ohm.

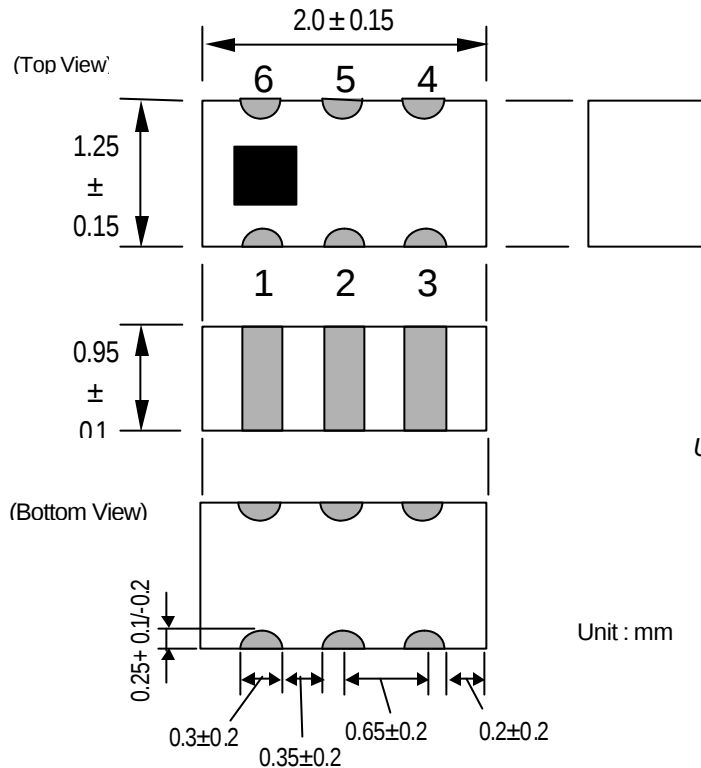
Micro-strip line for 0.4mm thick glass-epoxy substrate.

Notes : All the technical data and information contained herein are subject to change without prior notice.

MULTILAYER BALUN SPECIFICATION

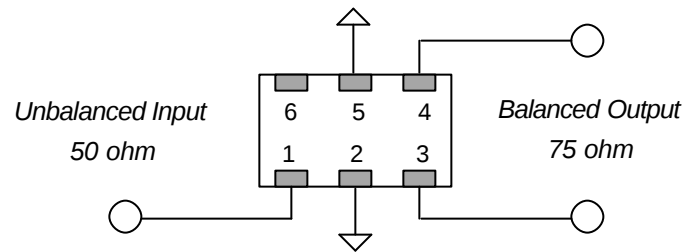
P/N: **HHM1541A2** For Bluetooth & IEEE802.11b/g

[MECHANICAL DIMENSIONS]



Pin configuration

- 1 Unbalanced Port
- 2 GND or DC feed + RF GND
- 3 Balanced Port
- 4 Balanced Port
- 5 GND
- 6 N.C.



[ELECTRICAL CHARACTERISTICS]

Unbalanced Impedance	50 ohm
Balanced Impedance	75 ohm
Frequency Range	2300-2500MHz
Unbalanced Port Return Loss	9 dB Min.
Phase Imbalance at Balanced Port	180 ± 10 deg.
Amplitude Imbalance at Balanced Port	0 ± 2.0 dB
Insertion Loss	1.2dB Max.

[TEMPERATURE RANGE]

Storage Temperature	$-40^{\circ}\text{C} \sim +85^{\circ}\text{C}$
Operating Temperature	$-40^{\circ}\text{C} \sim +85^{\circ}\text{C}$

[STANDARD PACKAGING QUANTITIES]

2000pcs./reel

Notes : All the technical data and information contained herein are subject to change without prior notice.

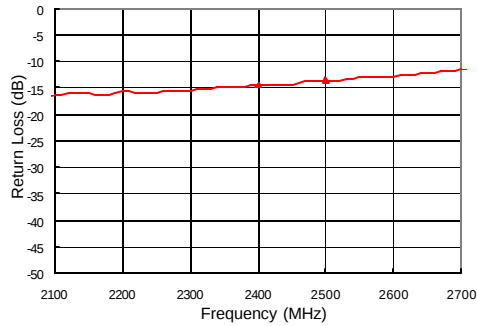
PRELIMINARY

[Frequency response]

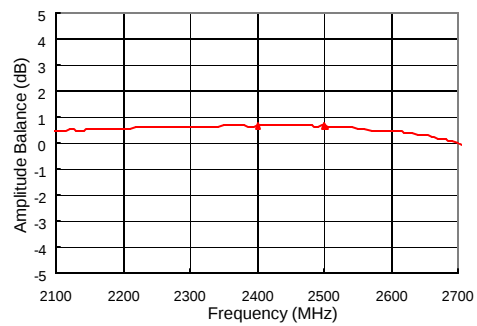
HHM1541A2 (UNBALANCE 50ohm/BALANCE 75ohm)

TDK Corporation

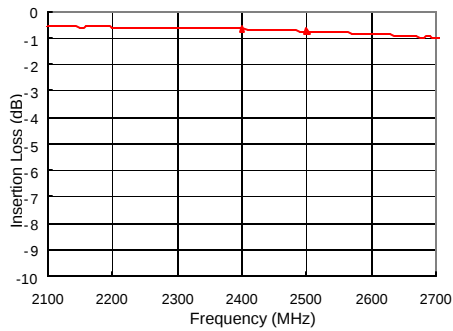
Return Loss



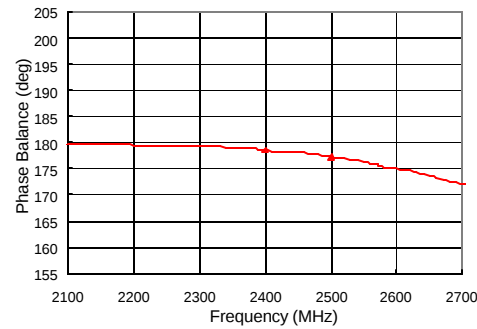
Amplitude Balance



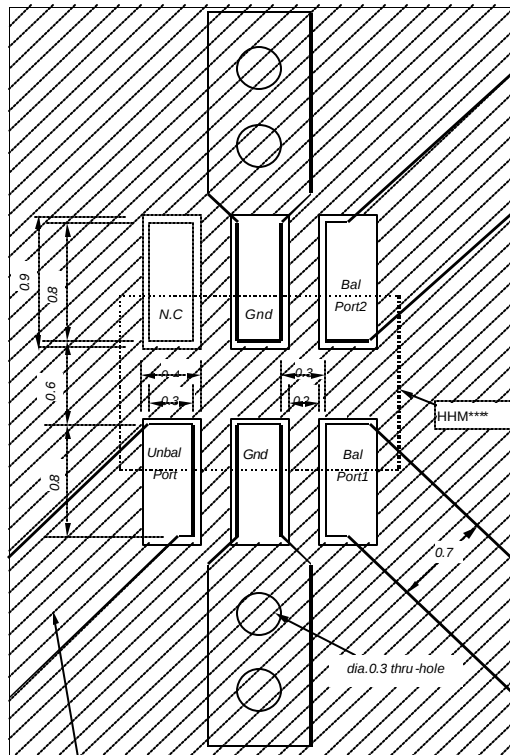
Insertion Loss



Phase Balance



[Recommended PCB Pattern]



This width is 50ohm.

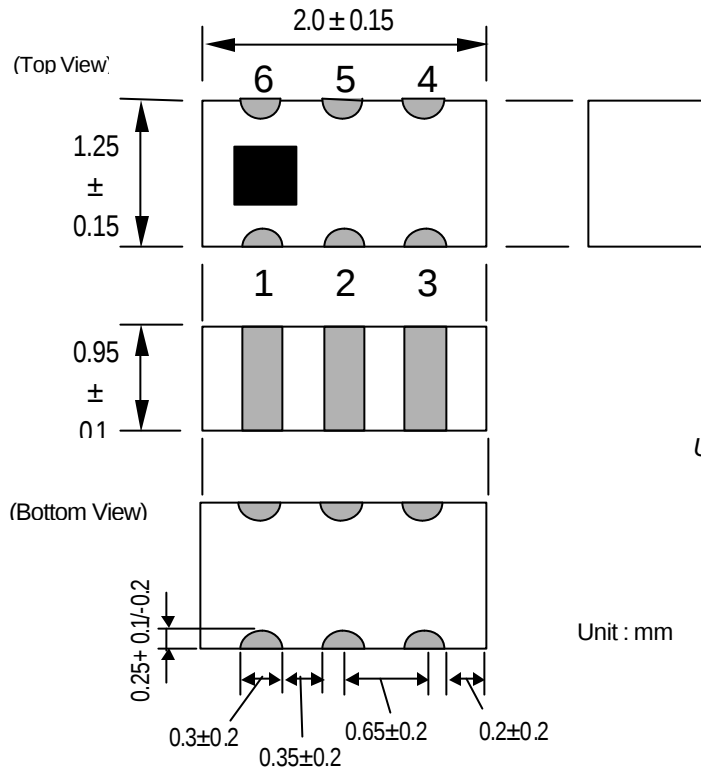
Micro-strip line for 0.4mm thick glass-epoxy substrate.

Notes : All the technical data and information contained herein are subject to change without prior notice.

MULTILAYER BALUN SPECIFICATION

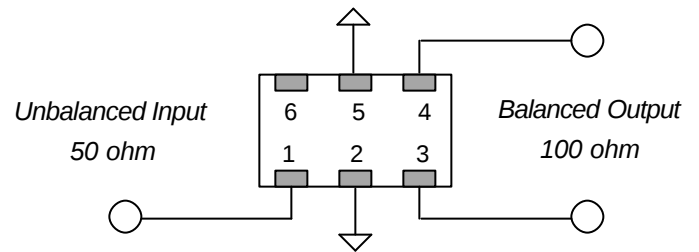
P/N: **HHM1520** For Bluetooth & IEEE802.11b/g

[MECHANICAL DIMENSIONS]



Pin configuration

- 1 Unbalanced Port
- 2 GND or DC feed + RF GND
- 3 Balanced Port
- 4 Balanced Port
- 5 GND
- 6 N.C.



[ELECTRICAL CHARACTERISTICS]

Unbalanced Impedance	50 ohm
Balanced Impedance	100 ohm
Frequency Range	2400-2500MHz
Unbalanced Port Return Loss	10 dB Min.
Phase Imbalance at Balanced Port	180 ± 10 deg.
Amplitude Imbalance at Balanced Port	0 ± 2.0 dB
Insertion Loss	1.0dB Max.

[TEMPERATURE RANGE]

Storage Temperature	-40°C ~ +85°C
Operating Temperature	-40°C ~ +85°C

[STANDARD PACKAGING QUANTITIES]

2000pcs./reel

Notes : All the technical data and information contained herein are subject to change without prior notice.

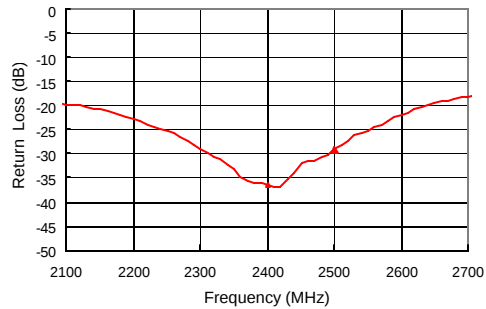
PRELIMINARY

[Frequency response]

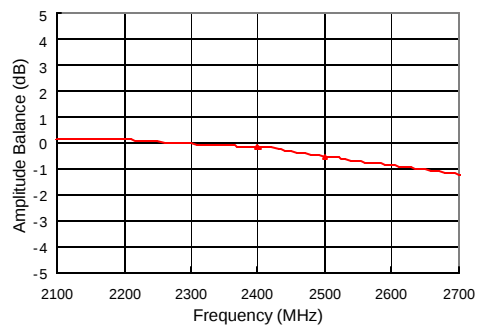
HHM1520 (UNBALANCE 50ohm/BALANCE 100ohm)

TDK Corporation

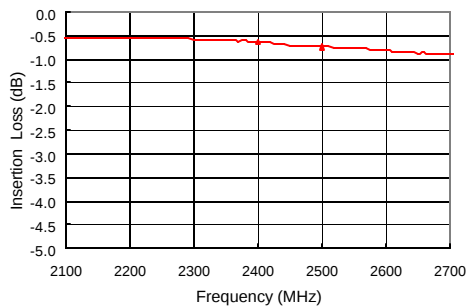
Return Loss



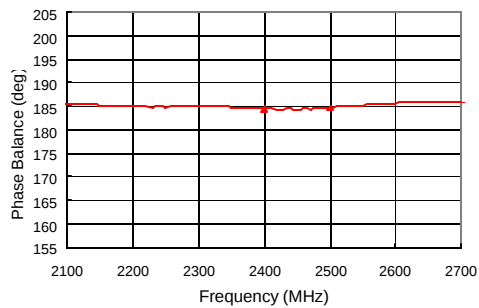
Amplitude Balance



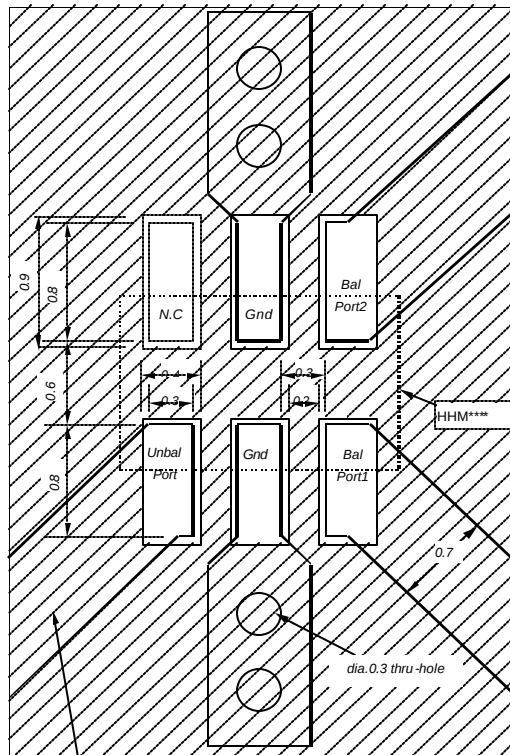
Insertion Loss



Phase Balance



[Recommended PCB Pattern]



This width is 50ohm.

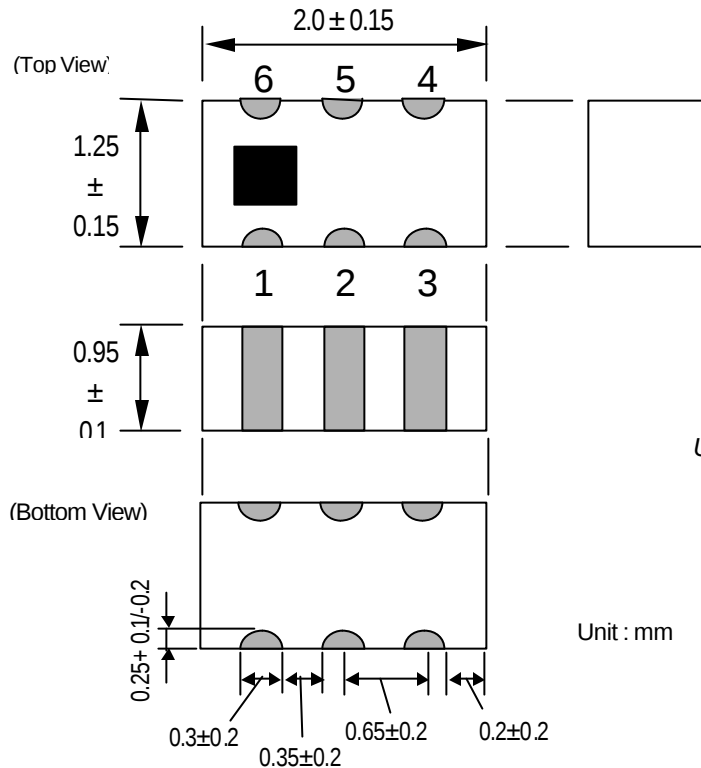
Micro-strip line for 0.4mm thick glass-epoxy substrate.

Notes : All the technical data and information contained herein are subject to change without prior notice.

MULTILAYER BALUN SPECIFICATION

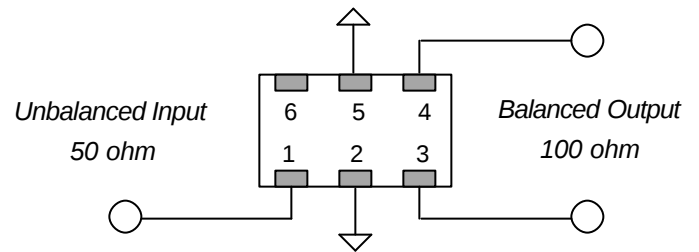
P/N: **HHM1520A2** For Bluetooth & IEEE802.11b/g

[MECHANICAL DIMENSIONS]



Pin configuration

- 1 Unbalanced Port
- 2 GND or DC feed + RF GND
- 3 Balanced Port
- 4 Balanced Port
- 5 GND
- 6 N.C.



[ELECTRICAL CHARACTERISTICS]

Unbalanced Impedance	50 ohm
Balanced Impedance	100 ohm
Frequency Range	2300-2500MHz
Unbalanced Port Return Loss	10 dB Min.
Phase Imbalance at Balanced Port	180 ± 10 deg.
Amplitude Imbalance at Balanced Port	0 ± 2.0 dB
Insertion Loss	1.0dB Max.

[TEMPERATURE RANGE]

Storage Temperature	-40°C ~ +85°C
Operating Temperature	-40°C ~ +85°C

[STANDARD PACKAGING QUANTITIES]

2000pcs./reel

Notes : All the technical data and information contained herein are subject to change without prior notice.

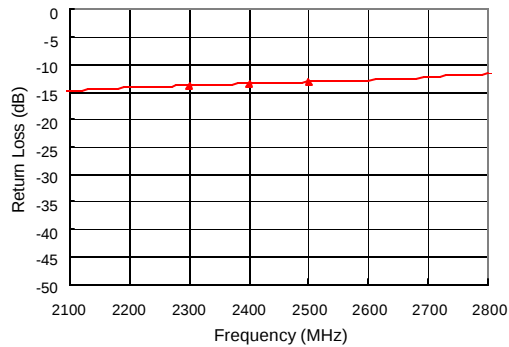
PRELIMINARY

[Frequency response]

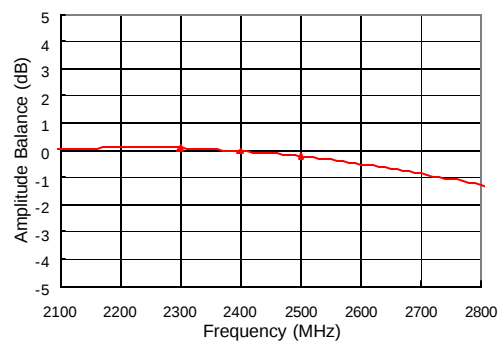
HHM1520A2 (UNBALANCE 50ohm/BALANCE 100ohm)

TDK Corporation

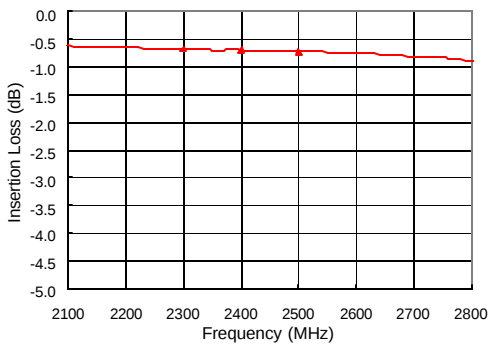
Return Loss



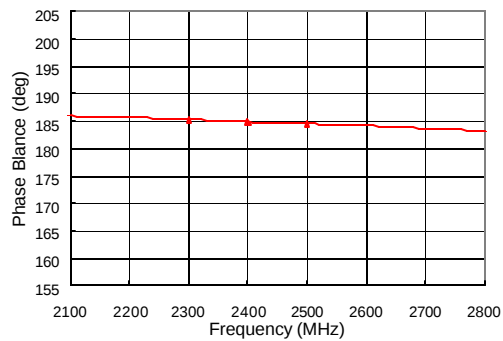
Amplitude Balance



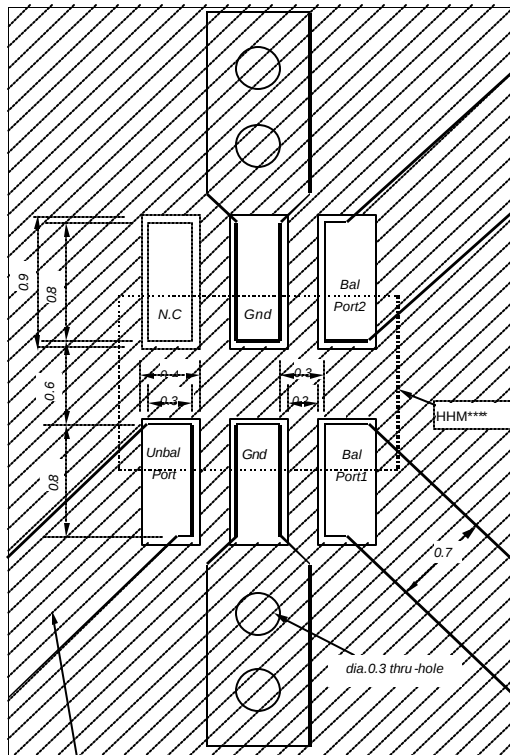
Insertion Loss



Phase Balance



[Recommended PCB Pattern]



This width is 50ohm.

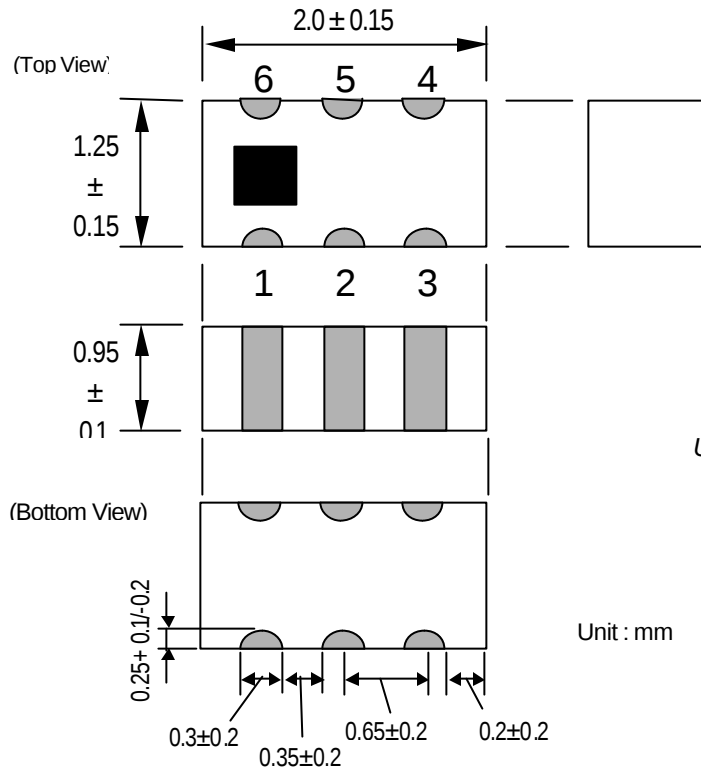
Micro-strip line for 0.4mm thick glass-epoxy substrate.

Notes : All the technical data and information contained herein are subject to change without prior notice.

MULTILAYER BALUN SPECIFICATION

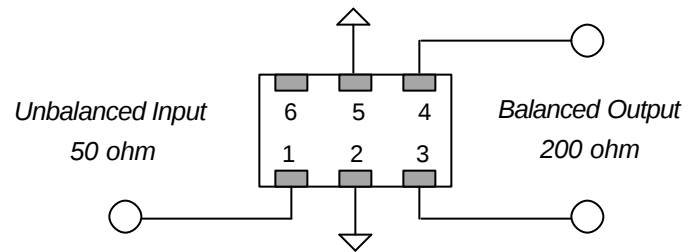
P/N: **HHM1521** For Bluetooth & IEEE802.11b/g

[MECHANICAL DIMENSIONS]



Pin configuration

- 1 Unbalanced Port
- 2 GND or DC feed + RF GND
- 3 Balanced Port
- 4 Balanced Port
- 5 GND
- 6 N.C.



[ELECTRICAL CHARACTERISTICS]

Unbalanced Impedance	50 ohm
Balanced Impedance	200 ohm
Frequency Range	2400-2500MHz
Unbalanced Port Return Loss	10 dB Min.
Phase Imbalance at Balanced Port	180 ± 10 deg.
Amplitude Imbalance at Balanced Port	0 ± 2.0 dB
Insertion Loss	1.0dB Max.

[TEMPERATURE RANGE]

Storage Temperature	-40°C ~ +85°C
Operating Temperature	-40°C ~ +85°C

[STANDARD PACKAGING QUANTITIES]

2000pcs./reel

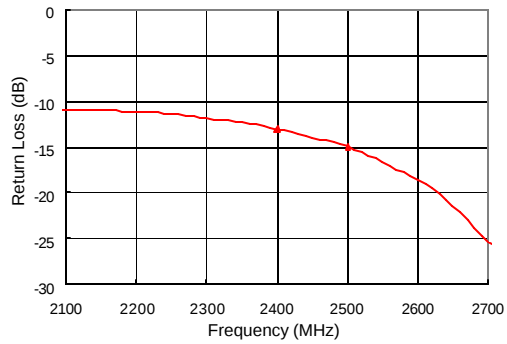
Notes : All the technical data and information contained herein are subject to change without prior notice.

[Frequency response]

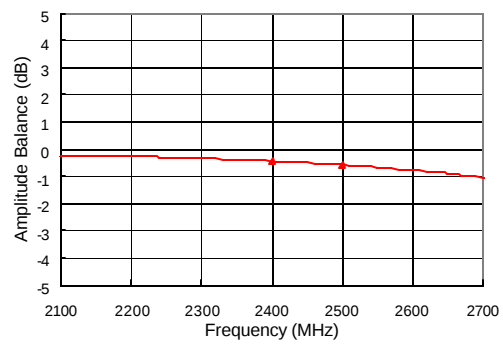
HHM1521(UNBALANCE 50ohm/BALANCE 200ohm)

TDK Corporation

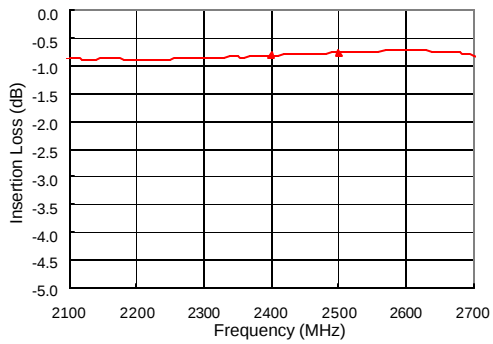
Return Loss



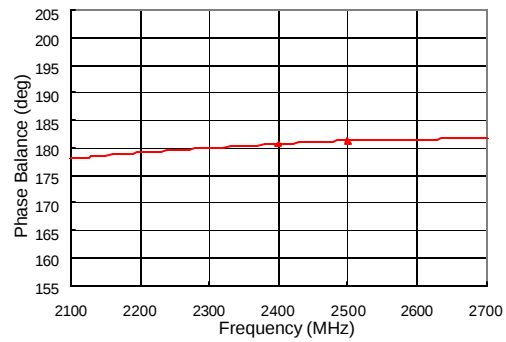
Amplitude Balance



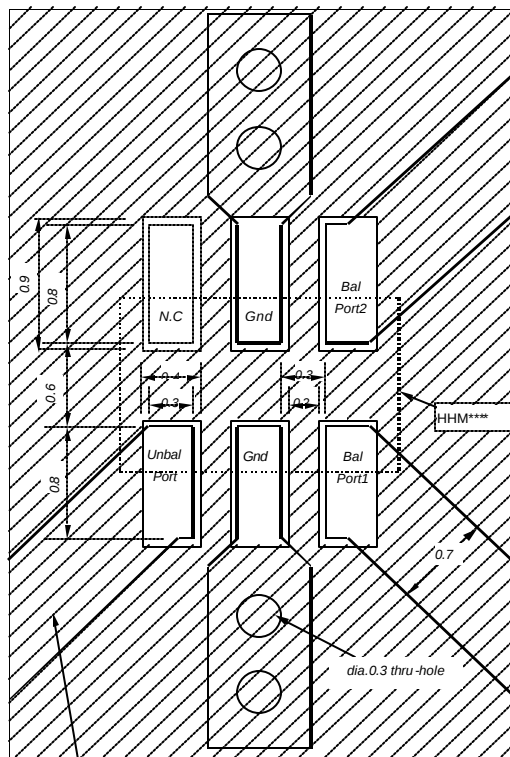
Insertion Loss



Phase Balance



[Recommended PCB Pattern]



This width is 50ohm.

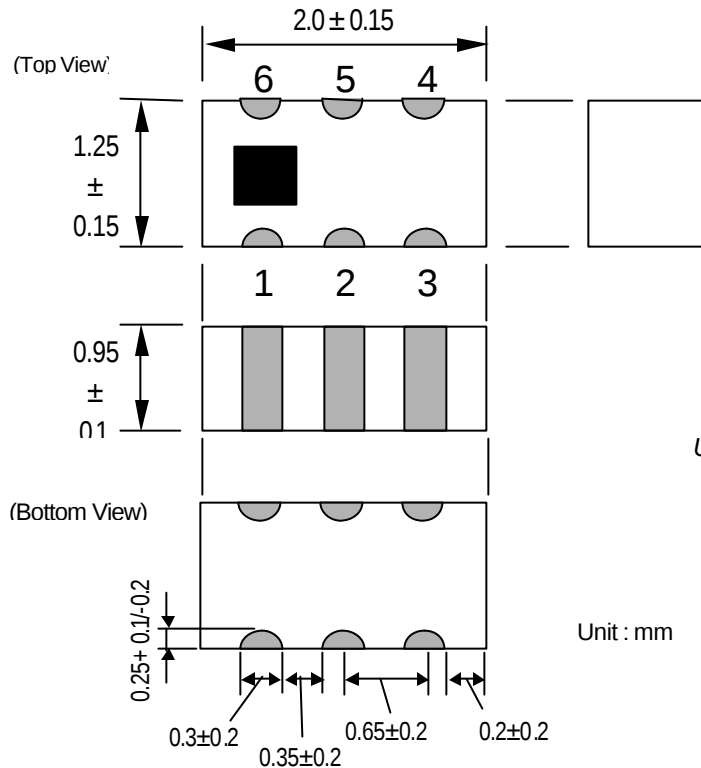
Micro-strip line for 0.4mm thick glass-epoxy substrate.

Notes : All the technical data and information contained herein are subject to change without prior notice.

MULTILAYER BALUN SPECIFICATION

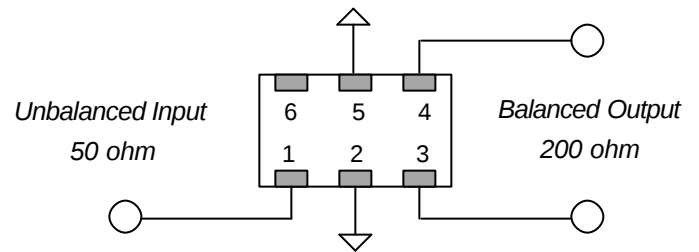
P/N: **HHM1521A2** For Bluetooth & IEEE802.11b/g

[MECHANICAL DIMENSIONS]



Pin configuration

- 1 Unbalanced Port
- 2 GND or DC feed + RF GND
- 3 Balanced Port
- 4 Balanced Port
- 5 GND
- 6 N.C.



[ELECTRICAL CHARACTERISTICS]

Unbalanced Impedance	50 ohm
Balanced Impedance	200 ohm
Frequency Range	2300-2500MHz
Unbalanced Port Return Loss	9.5 dB Min.
Phase Imbalance at Balanced Port	180 ± 10 deg.
Amplitude Imbalance at Balanced Port	0 ± 2.0 dB
Insertion Loss	1.1dB Max.

[TEMPERATURE RANGE]

Storage Temperature	-40°C ~ +85°C
Operating Temperature	-40°C ~ +85°C

[STANDARD PACKAGING QUANTITIES]

2000pcs./reel

Notes : All the technical data and information contained herein are subject to change without prior notice.

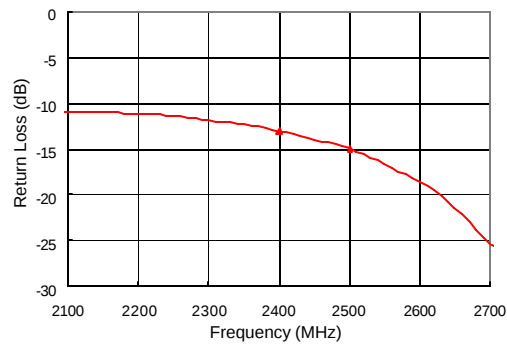
PRELIMINARY

[Frequency response]

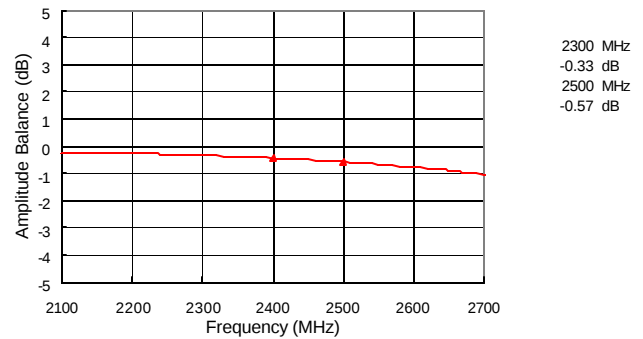
HHM1521A2(UNBALANCE 50ohm/BALANCE 200ohm)

TDK Corporation

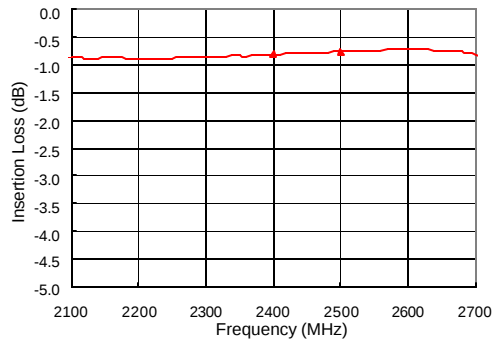
Return Loss



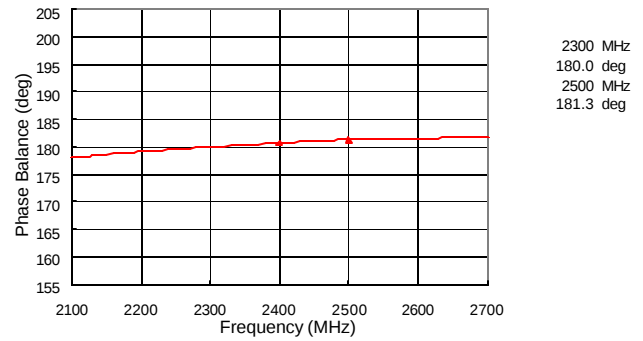
Amplitude Balance



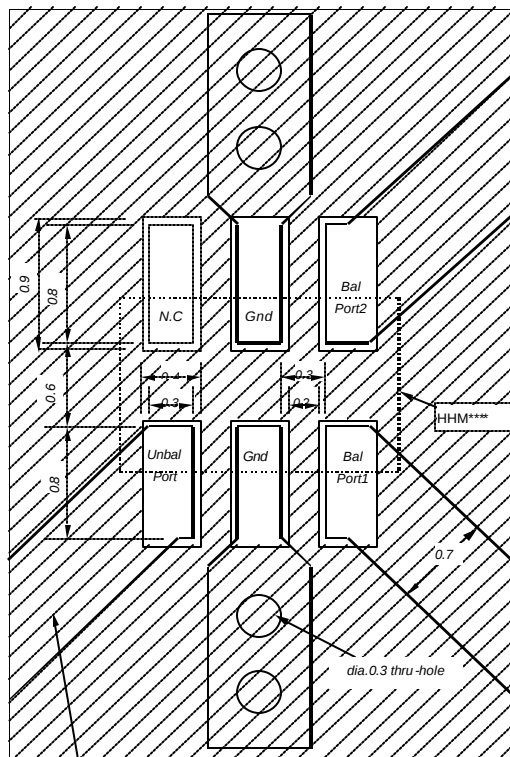
Insertion Loss



Phase Balance



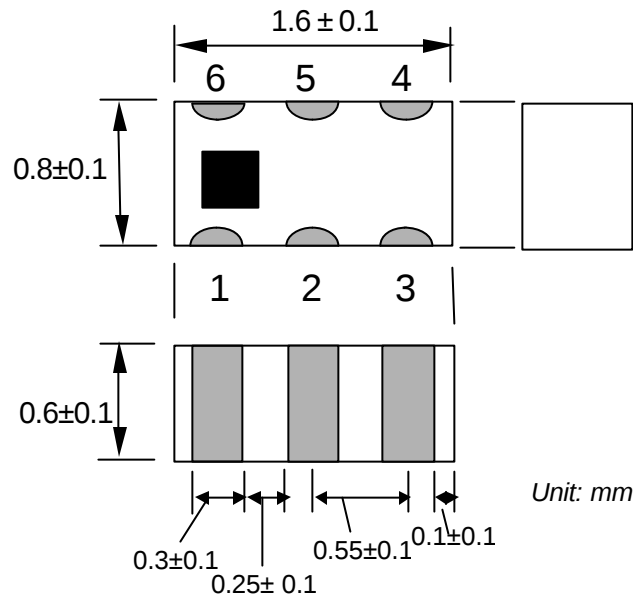
[Recommended PCB Pattern]



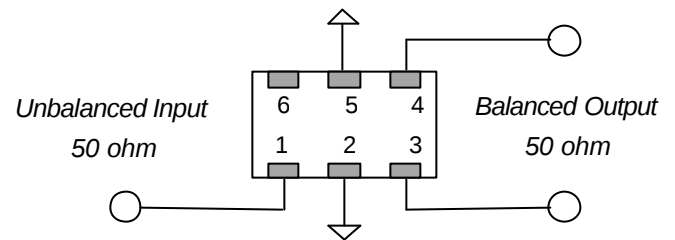
This width is 50ohm.

Micro-strip line for 0.4mm thick glass-epoxy substrate.

Notes : All the technical data and information contained herein are subject to change without prior notice.

MULTILAYER BALUN SPECIFICATIONP/N: **HHM1710D1** For Bluetooth & IEEE802.11b/g**[MECHANICAL DIMENSIONS]****Pin configuration**

1. Unbalanced Port
2. GND or DC feed+ RF GND
3. Balanced Port
4. Balanced Port
5. GND
6. N.C.

**[ELECTRICAL CHARACTERISTICS]**

Unbalanced Impedance	50 ohm
Balanced Impedance	50 ohm
Frequency Range	2400 – 2500 MHz
Unbalanced Port Return Loss	10dB min.
Phase Imbalance at Balanced Port	180 ± 10 deg
Amplitude Imbalance at Balanced Port	0 ± 2.0 dB
Insertion Loss	1.2 dB Max.

[TEMPERATURE RANGE]

Storage Temperature	-40°C ~ +85°C
Operating Temperature	-40°C ~ +85°C

[STANDARD PACKAGING QUANTITIES]

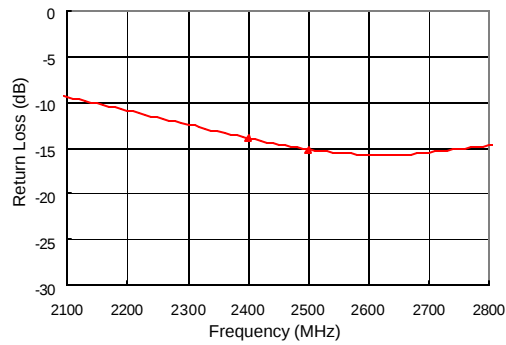
4000pcs. /reel

[Frequency response]

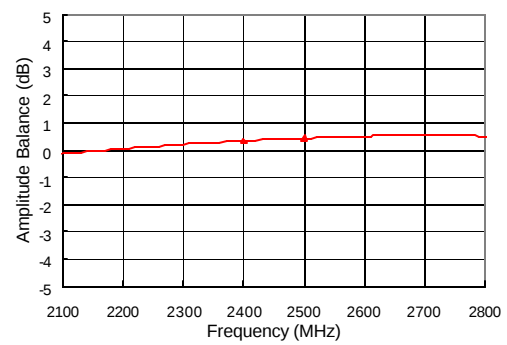
HHM1710D1(UNBALANCE 50ohm/BALANCE 50ohm)

TDK Corporation

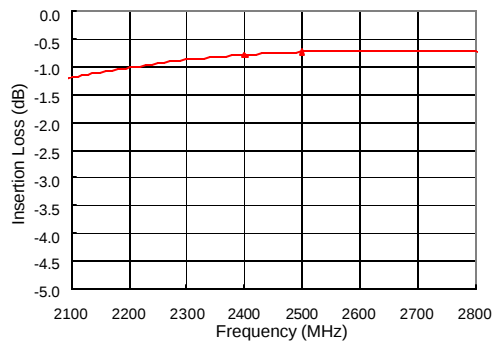
Return Loss



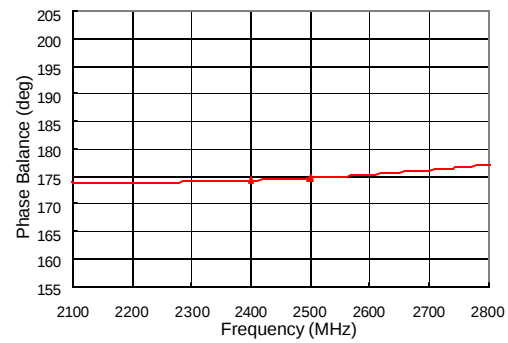
Amplitude Balance



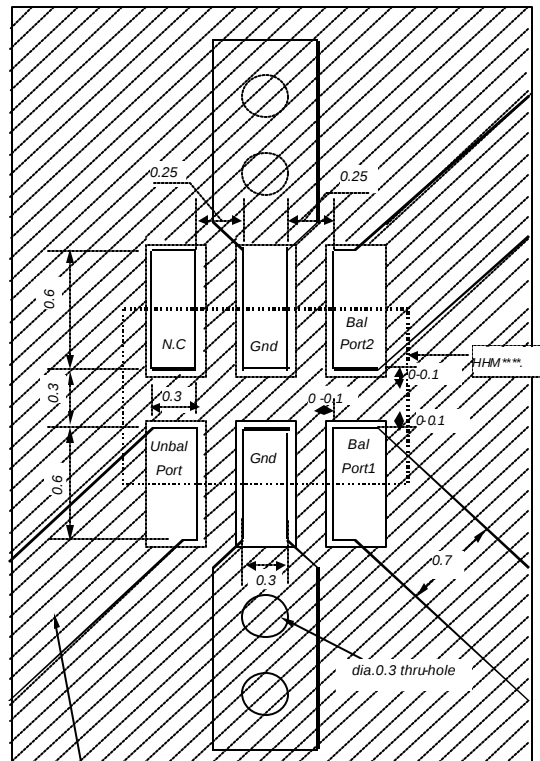
Insertion Loss



Phase Balance



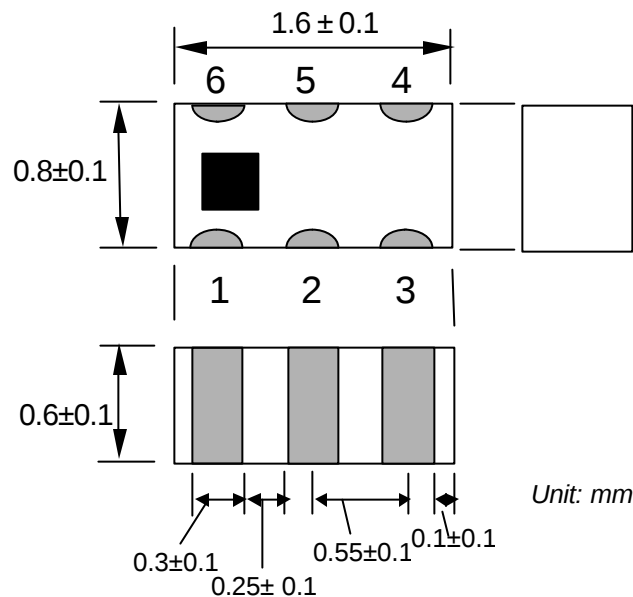
[Recommended PCB Pattern]



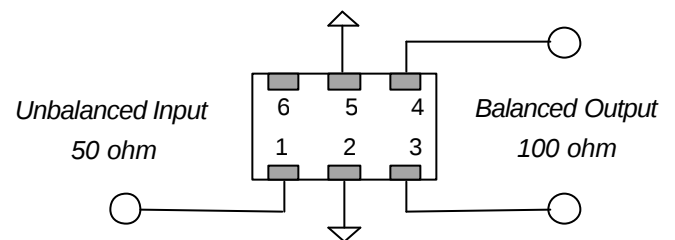
This width is 50ohm.

Micro-strain line for 0.4 mm thick glass-epoxy substrate

Note: The above PRELIMINARY data are not guaranteed, and are subject to change without notice.

MULTILAYER BALUN SPECIFICATIONP/N: **HHM1711D1** For Bluetooth & IEEE802.11b/g**[MECHANICAL DIMENSIONS]****Pin configuration**

1. Unbalanced Port
2. GND or DC feed+ RF GND
3. Balanced Port
4. Balanced Port
5. GND
6. N.C.

**[ELECTRICAL CHARACTERISTICS]**

Unbalanced Impedance	50 ohm
Balanced Impedance	100 ohm
Frequency Range	2400 – 2500 MHz
Unbalanced Port Return Loss	10dB min.
Phase Imbalance at Balanced Port	180 ± 10 deg
Amplitude Imbalance at Balanced Port	0 ± 2.0 dB
Insertion Loss	1.2 dB Max.

[TEMPERATURE RANGE]

Storage Temperature	-40°C ~ +85°C
Operating Temperature	-40°C ~ +85°C

[STANDARD PACKAGING QUANTITIES]

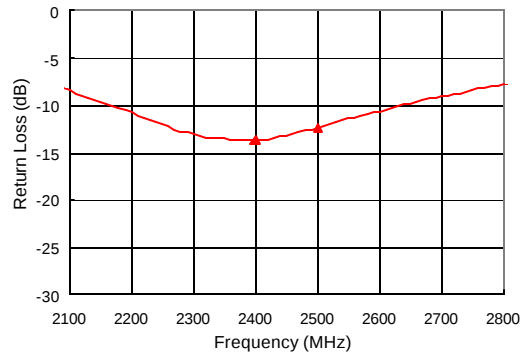
4000pcs. /reel

PRELIMINARY

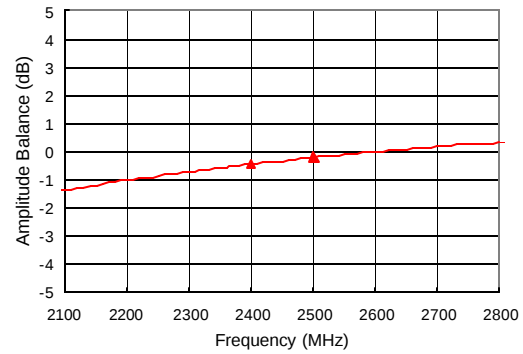
[Frequency response]

HHM1711D1(UNBALANCE 50ohm/BALANCE 100ohm)
Return Loss

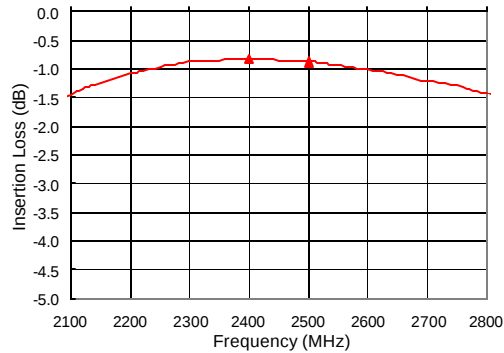
TDK Corporation



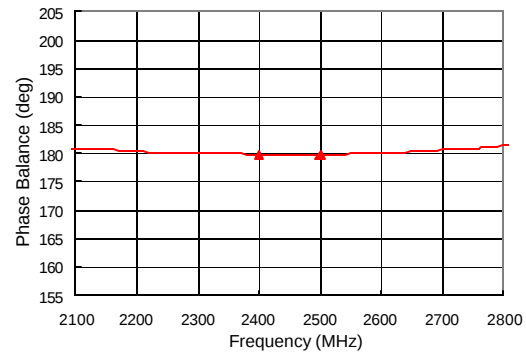
Amplitude Balance



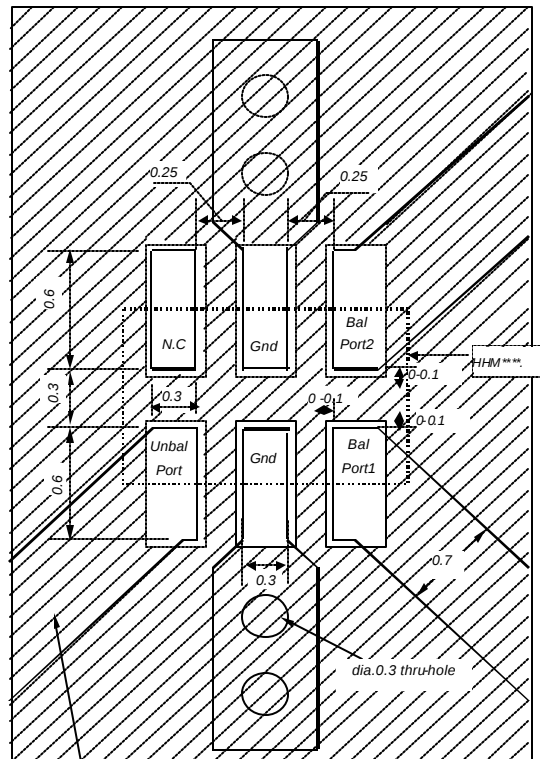
Insertion Loss



Phase Balance



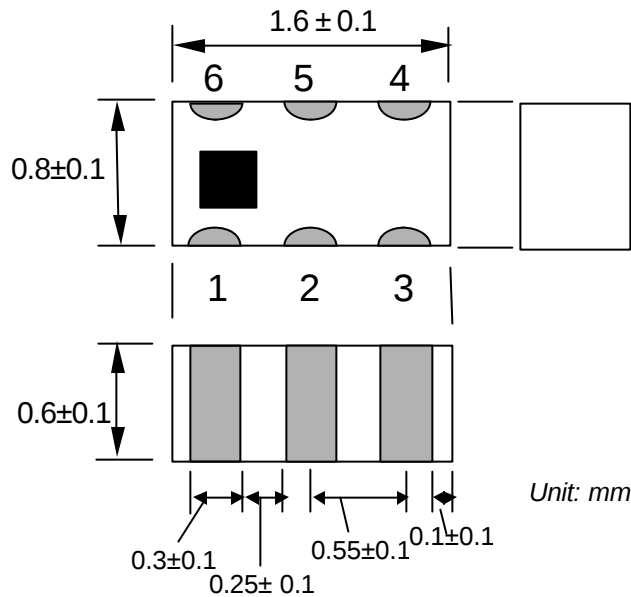
[Recommended PCB Pattern]



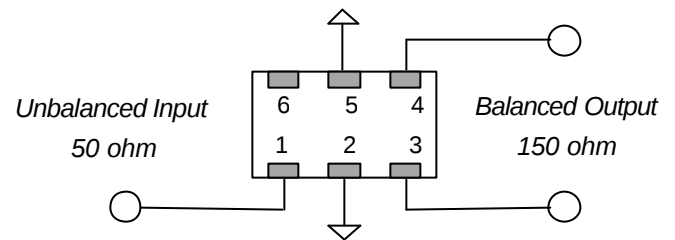
This width is 50ohm.

Micro-strin line for 0.4mm thick glass-epoxy substrate

Note: The above PRELIMINARY data are not guaranteed, and are subject to change without notice.

MULTILAYER BALUN SPECIFICATIONP/N: **HHM1712D1** For Bluetooth & IEEE802.11b/g**[MECHANICAL DIMENSIONS]****Pin configuration**

1. Unbalanced Port
2. GND or DC feed+ RF GND
3. Balanced Port
4. Balanced Port
5. GND
6. N.C.

**[ELECTRICAL CHARACTERISTICS]**

Unbalanced Impedance	50 ohm
Balanced Impedance	150 ohm
Frequency Range	2400 – 2500 MHz
Unbalanced Port Return Loss	10dB min.
Phase Imbalance at Balanced Port	180 ± 10 deg
Amplitude Imbalance at Balanced Port	0 ± 2.0 dB
Insertion Loss	1.2 dB Max.

[TEMPERATURE RANGE]

Storage Temperature	-40°C ~ +85°C
Operating Temperature	-40°C ~ +85°C

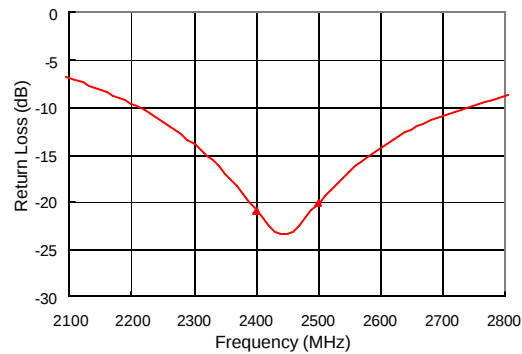
[STANDARD PACKAGING QUANTITIES]

4000pcs. /reel

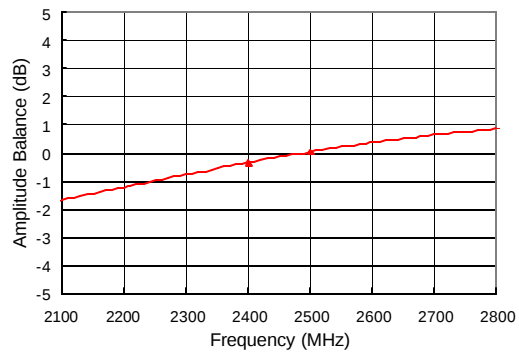
PRELIMINARY

[Frequency response]

HHM1712D1(UNBALANCE 50ohm/BALANCE 150ohm)
Return Loss



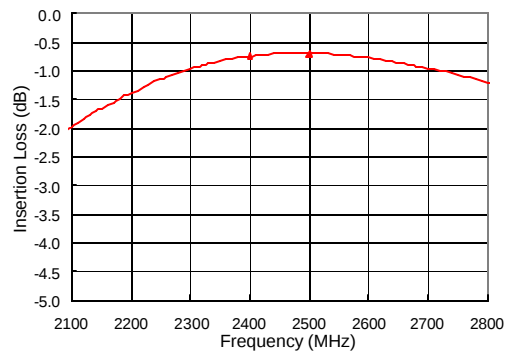
Amplitude Balance



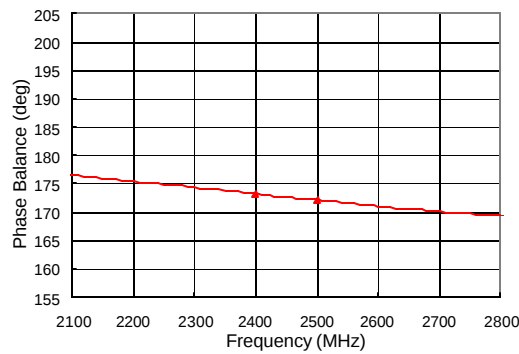
TDK Corporation

2400 MHz
-0.33 dB
2500 MHz
0.04 dB

Insertion Loss

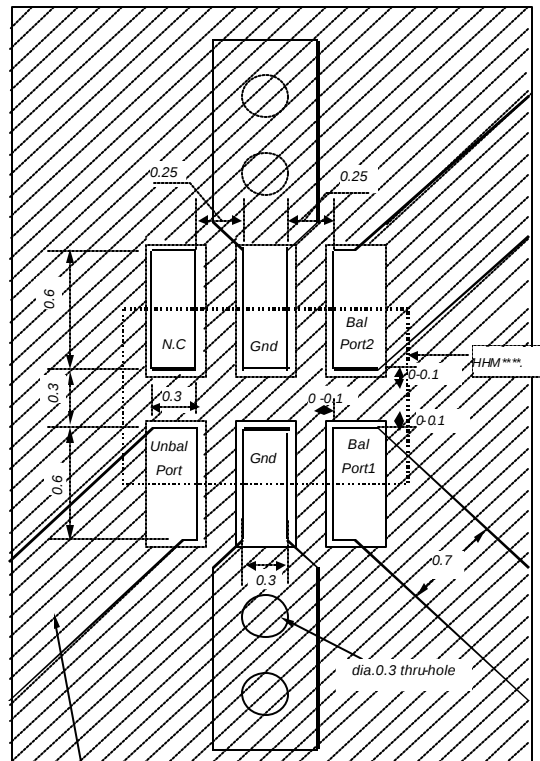


Phase Balance



2400 MHz
173.3 deg
2500 MHz
172.2 deg

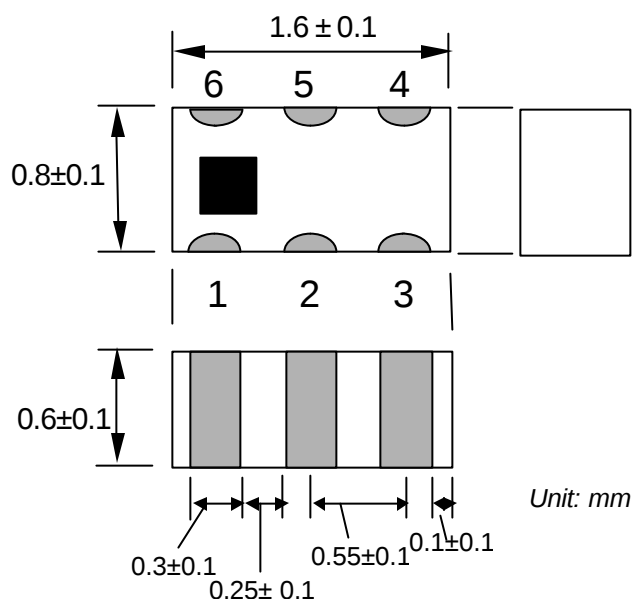
[Recommended PCB Pattern]



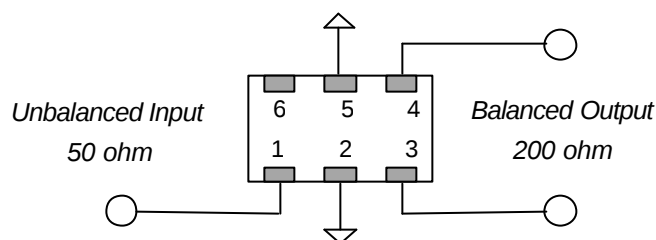
This width is 50ohm.

Micro-strin line for 0.4mm thick glass-epoxy substrate

Note: The above PRELIMINARY data are not guaranteed, and are subject to change without notice.

MULTILAYER BALUN SPECIFICATIONP/N: **HHM1713D1** For Bluetooth & IEEE802.11b/g**[MECHANICAL DIMENSIONS]****Pin configuration**

1. Unbalanced Port
2. GND or DC feed+ RF GND
3. Balanced Port
4. Balanced Port
5. GND
6. N.C.

**[ELECTRICAL CHARACTERISTICS]**

Unbalanced Impedance	50 ohm
Balanced Impedance	200 ohm
Frequency Range	2400 – 2500 MHz
Unbalanced Port Return Loss	10dB min.
Phase Imbalance at Balanced Port	180 ± 10 deg
Amplitude Imbalance at Balanced Port	0 ± 2.0 dB
Insertion Loss	1.2 dB Max.

[TEMPERATURE RANGE]

Storage Temperature	-40°C ~ +85°C
Operating Temperature	-40°C ~ +85°C

[STANDARD PACKAGING QUANTITIES]

4000pcs. /reel

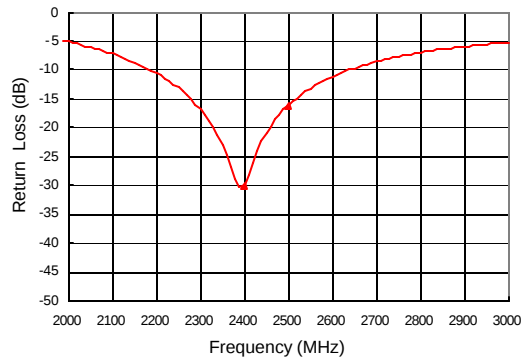
PRELIMINARY

[Frequency response]

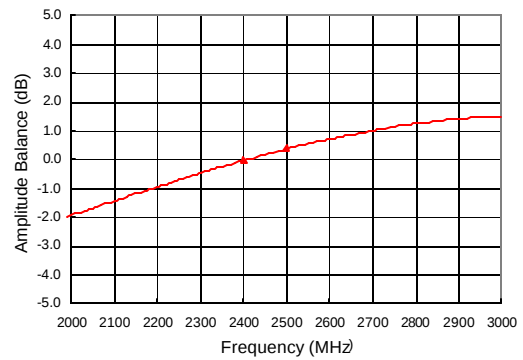
HHM1713D1 (UNBALANCE 50ohm/BALANCE 200ohm)

TDK Corporation

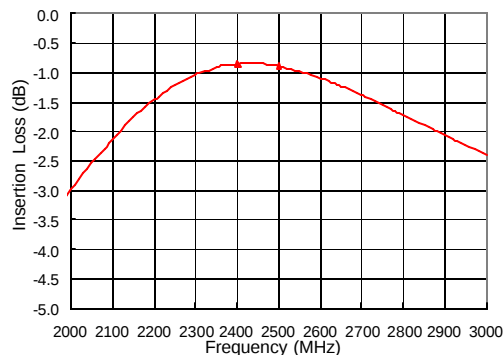
Return Loss



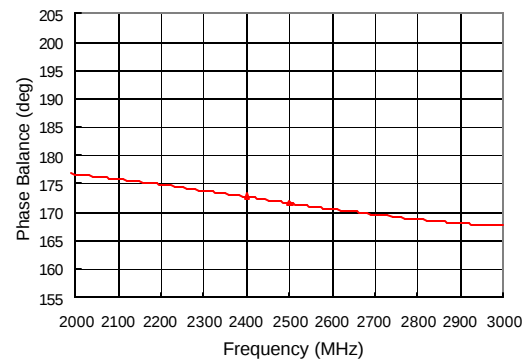
Amplitude Balance



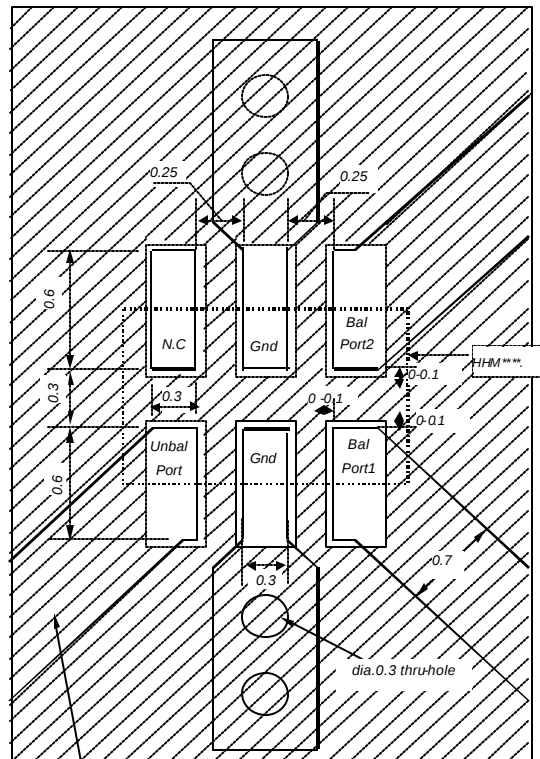
Insertion Loss



Phase Balance



[Recommended PCB Pattern]



This width is 50ohm.

Micro-strin line for 0.4mm thick glass-epoxy substrate

Note: The above PRELIMINARY data are not guaranteed, and are subject to change without notice.