

# Multilayer Balun Transformers

For 2.4GHz W-LAN/Bluetooth

## HHM Series

**Type:**            **HHM1904C1 (1.0×0.5×0.4mm max.)**  
                      **HHM1902A1 (1.0×0.5×0.5mm max.)**  
                      **HHM1902B1 (1.0×0.5×0.5mm max.)**  
                      **HHM1903A1 (1.0×0.5×0.5mm max.)**  
                      **HHM1904A1 (1.0×0.5×0.5mm max.)**  
                      **HHM1907B1 (1.0×0.5×0.5mm max.)**  
                      **HHM1908A1 (1.0×0.5×0.5mm max.)**

**Issue date:**     December 2010

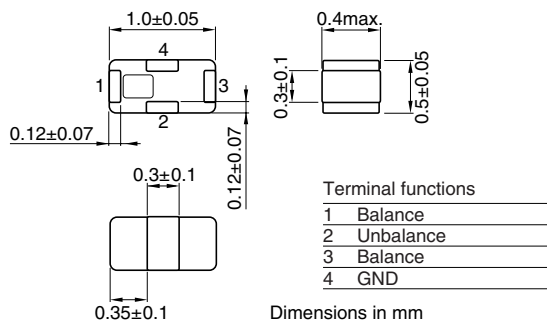
- All specifications are subject to change without notice.
- Conformity to RoHS Directive: This means that, in conformity with EU Directive 2002/95/EC, lead, cadmium, mercury, hexavalent chromium, and specific bromine-based flame retardants, PBB and PBDE, have not been used, except for exempted applications.

# Multilayer Chip Baluns For Bluetooth & 2.4GHz W-LAN

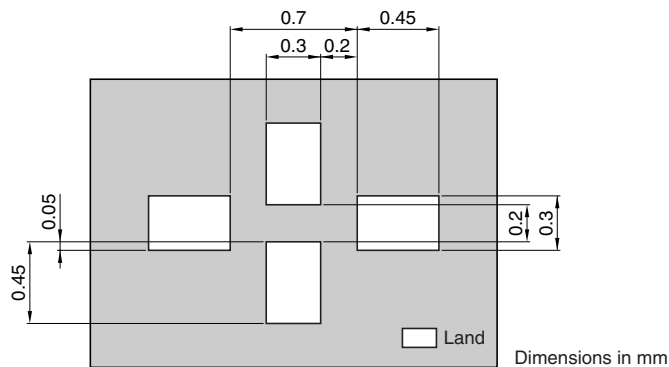
Conformity to RoHS Directive

HHM Series HHM1904C1

## SHAPES AND DIMENSIONS



## RECOMMENDED PC BOARD PATTERNS



## ELECTRICAL CHARACTERISTICS

Unbalanced impedance		50Ω
Balanced impedance		75Ω
Frequency range		2400 to 2500MHz
Unbalanced port return loss		10dB min.
Phase imbalance at balanced port		180±10deg.
Amplitude imbalance at balanced port		0±2.0dB
Insertion loss		1.0dB max.
Temperature range	Operating	-40 to +85°C
	Storage	-40 to +85°C

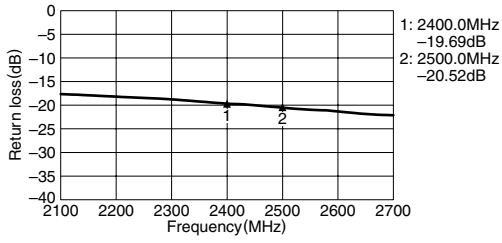
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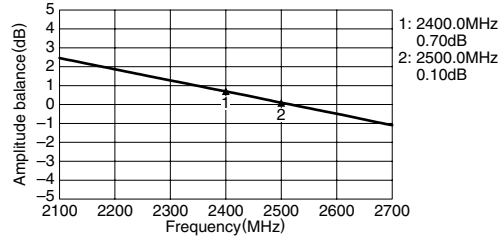
### FREQUENCY CHARACTERISTICS

Unbalance 50Ω/Balance 75Ω

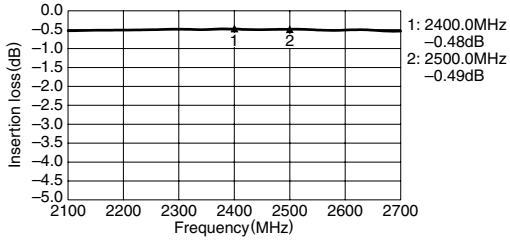
#### RETURN LOSS



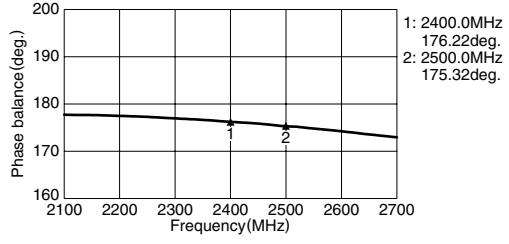
#### AMPLITUDE BALANCE



#### INSERTION LOSS



#### PHASE BALANCE



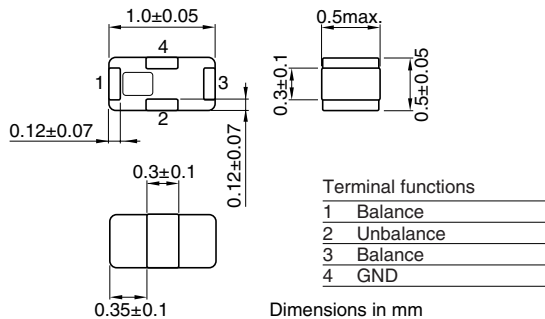
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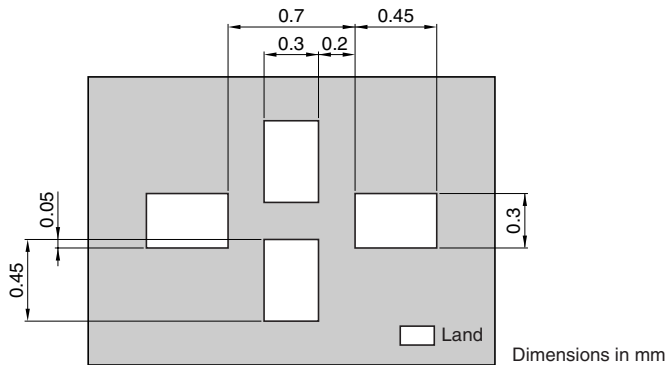
Conformity to RoHS Directive

HHM Series HHM1902A1

## SHAPES AND DIMENSIONS



## RECOMMENDED PC BOARD PATTERNS



## ELECTRICAL CHARACTERISTICS

Unbalanced impedance		50Ω
Balanced impedance		50Ω
Frequency range		2400 to 2500MHz
Unbalanced port return loss		10dB min.
Phase imbalance at balanced port		180±10deg.
Amplitude imbalance at balanced port		0±2.0dB
Insertion loss		1.0dB max.
Temperature range	Operating	-40 to +85°C
	Storage	-40 to +85°C

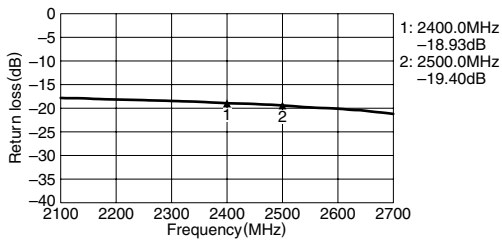
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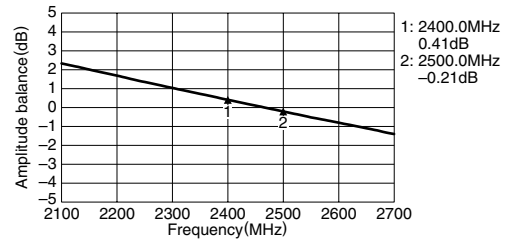
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Unbalance 50Ω/Balance 50Ω

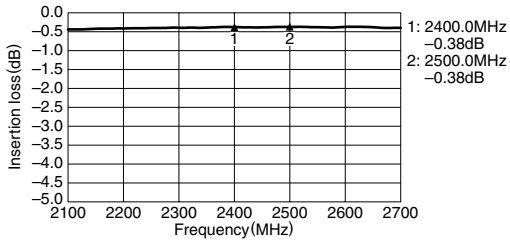
#### RETURN LOSS



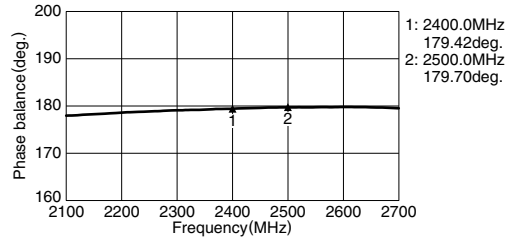
#### AMPLITUDE BALANCE



#### INSERTION LOSS



#### PHASE BALANCE

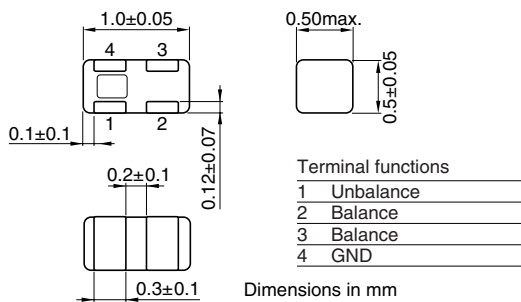


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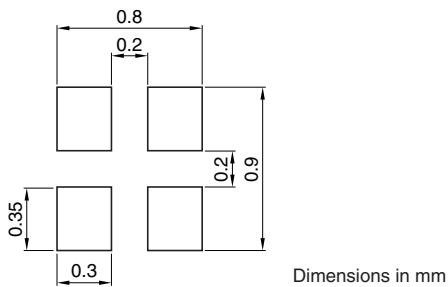
Conformity to RoHS Directive

HHM Series HHM1902B1

## SHAPES AND DIMENSIONS



## RECOMMENDED PC BOARD PATTERNS



## ELECTRICAL CHARACTERISTICS

Unbalanced impedance		50Ω
Balanced impedance		50Ω
Frequency range		2400 to 2500MHz
Unbalanced port return loss		10dB min.
Phase imbalance at balanced port		180±10deg.
Amplitude imbalance at balanced port		0±2.0dB
Insertion loss		0.8dB max.
Temperature range	Operating	-40 to +85°C
	Storage	-40 to +85°C

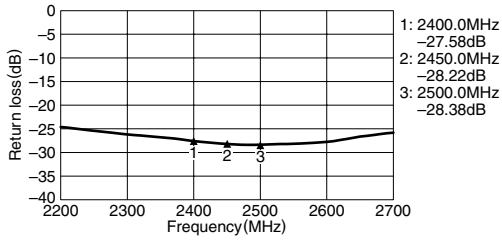
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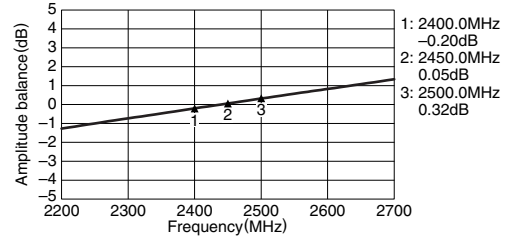
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Unbalance 50Ω/Balance 50Ω

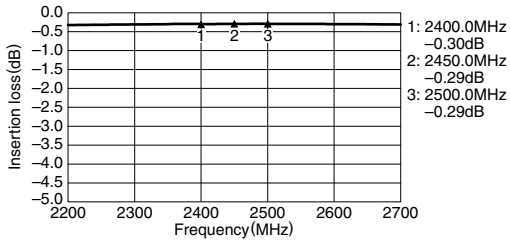
#### RETURN LOSS



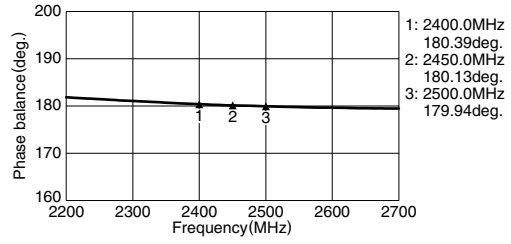
#### AMPLITUDE BALANCE



#### INSERTION LOSS



#### PHASE BALANCE



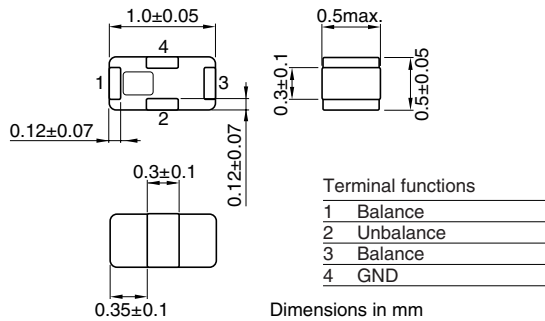
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# Multilayer Chip Baluns For Bluetooth & 2.4GHz W-LAN

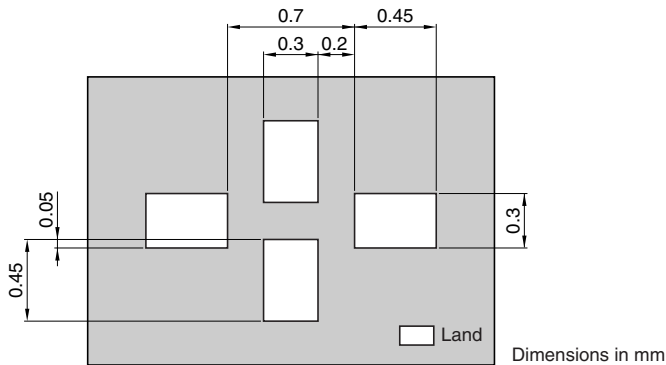
Conformity to RoHS Directive

HHM Series HHM1903A1

## SHAPES AND DIMENSIONS



## RECOMMENDED PC BOARD PATTERNS



## ELECTRICAL CHARACTERISTICS

Unbalanced impedance		50Ω
Balanced impedance		100Ω
Frequency range		2400 to 2500MHz
Unbalanced port return loss		10dB min.
Phase imbalance at balanced port		180±10deg.
Amplitude imbalance at balanced port		0±2.0dB
Insertion loss		1.0dB max.
Temperature range	Operating	-40 to +85°C
	Storage	-40 to +85°C

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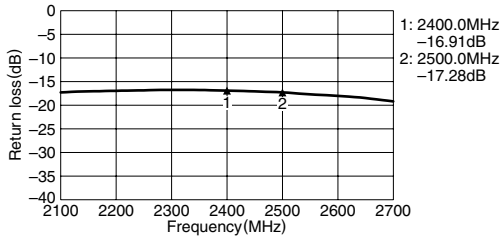
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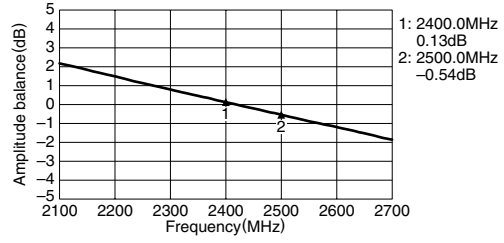
### FREQUENCY CHARACTERISTICS

Unbalance 50Ω/Balance 100Ω

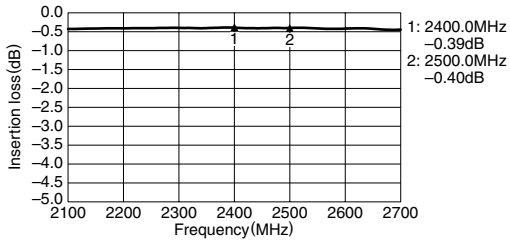
#### RETURN LOSS



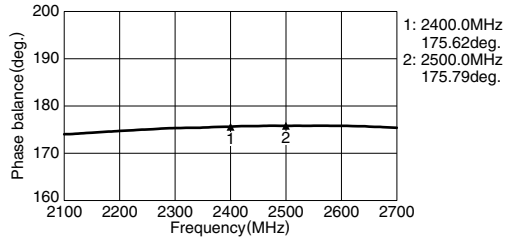
#### AMPLITUDE BALANCE



#### INSERTION LOSS



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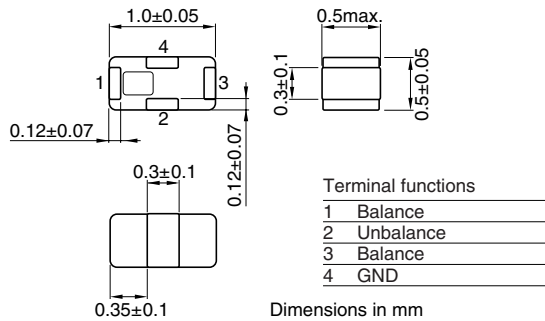
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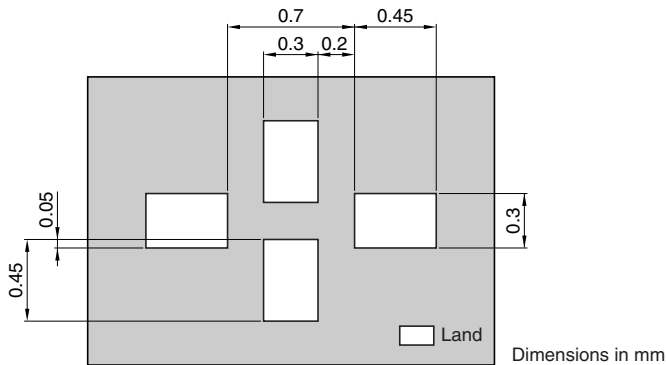
Conformity to RoHS Directive

HHM Series HHM1904A1

## SHAPES AND DIMENSIONS



## RECOMMENDED PC BOARD PATTERNS



## ELECTRICAL CHARACTERISTICS

Unbalanced impedance	50Ω	
Balanced impedance	75Ω	
Frequency range	2400 to 2500MHz	
Unbalanced port return loss	10dB min.	
Phase imbalance at balanced port	180±10deg.	
Amplitude imbalance at balanced port	0±2.0dB	
Insertion loss	0.8dB max.	
Temperature range	Operating	-40 to +85°C
	Storage	-40 to +85°C

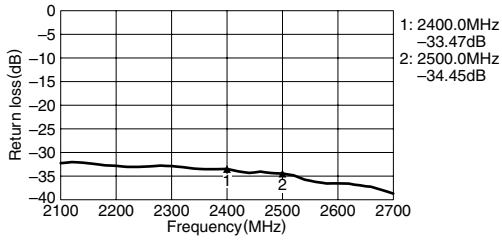
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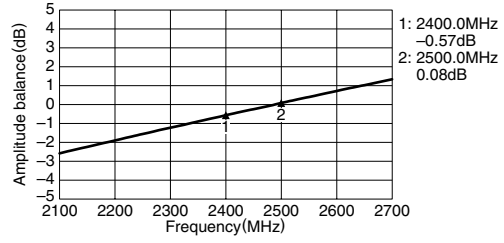
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Unbalance 50Ω/Balance 75Ω

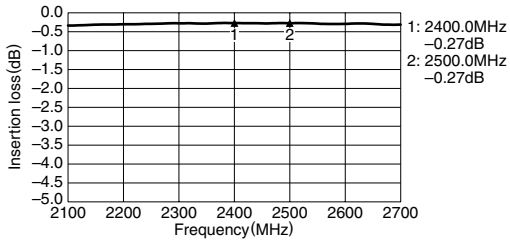
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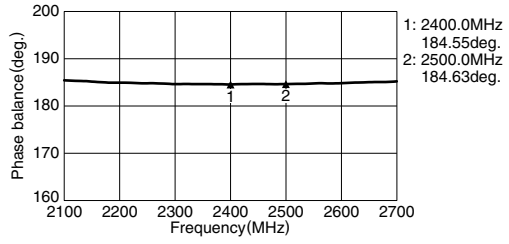
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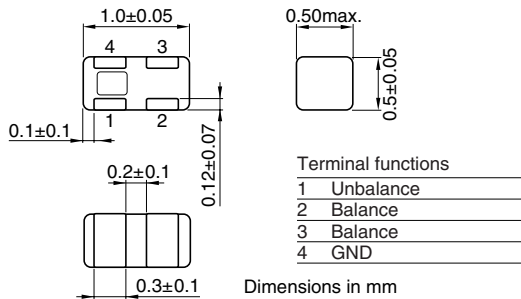
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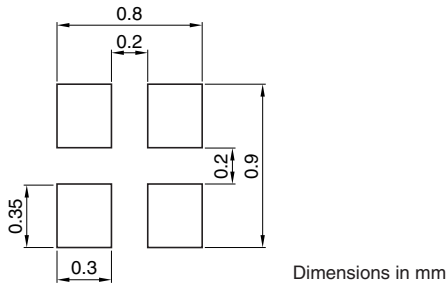
Conformity to RoHS Directive

HHM Series HHM1907B1

## SHAPES AND DIMENSIONS



## RECOMMENDED PC BOARD PATTERNS



## ELECTRICAL CHARACTERISTICS

Unbalanced impedance		50Ω
Balanced impedance		50Ω
Frequency range		4900 to 5950MHz
Unbalanced port return loss		10dB min.
Phase imbalance at balanced port		180±10deg.
Amplitude imbalance at balanced port		0±2.5dB
Insertion loss		0.8dB max.
Temperature range	Operating	-40 to +85°C
	Storage	-40 to +85°C

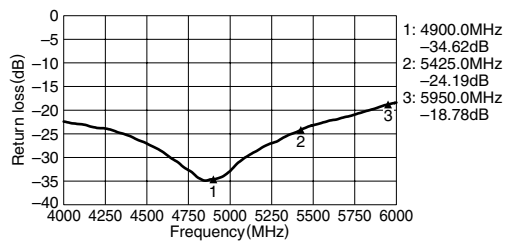
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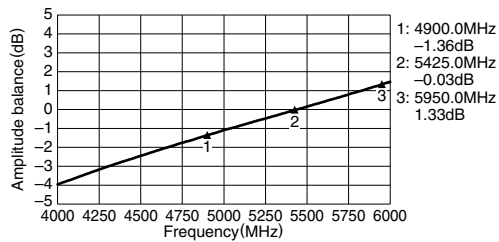
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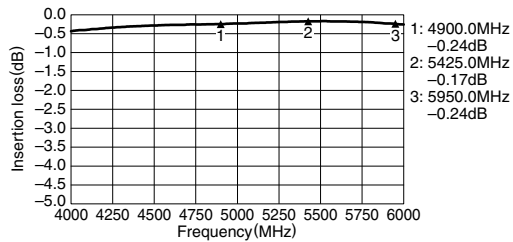
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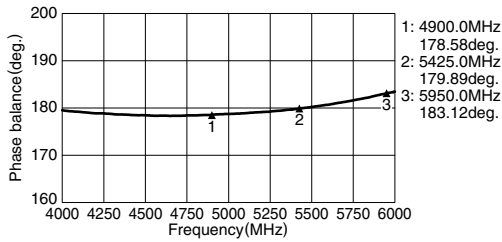
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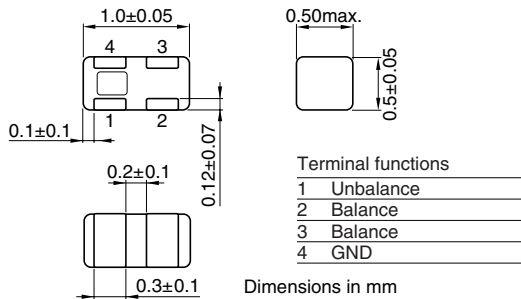
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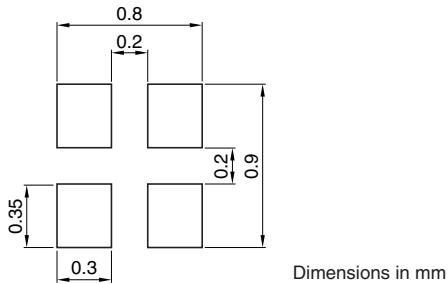
Conformity to RoHS Directive

HHM Series HHM1908A1

## SHAPES AND DIMENSIONS



## RECOMMENDED PC BOARD PATTERNS



## ELECTRICAL CHARACTERISTICS

Unbalanced impedance		50Ω
Balanced impedance		100Ω
Frequency range		4900 to 5950MHz
Unbalanced port return loss		10dB min.
Phase imbalance at balanced port		180±10deg.
Amplitude imbalance at balanced port		0±2.5dB
Insertion loss		0.8dB max.
Temperature range	Operating	-40 to +85°C
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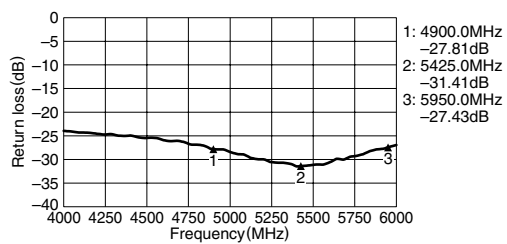
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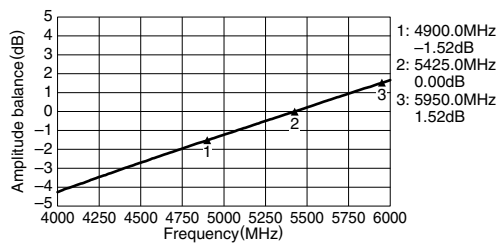
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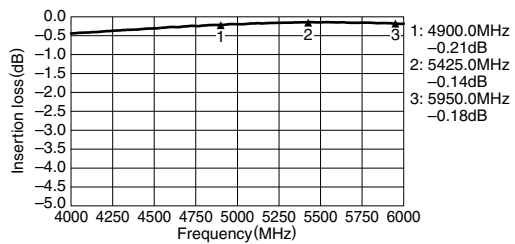
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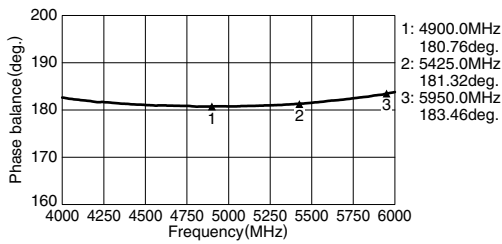
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