



SM1109-5

Maximum Rating

- Maximum input power: +10dBm (In Passband)
- Maximum DC Voltage : +/-5 V (Device only)
- Operating temperature: -30°C to +85°C
- Device storage temperature: -40°C to +100°C
- Moisture Sensitive Level: Level 1

Electrical Characteristics

Terminating source impedance: $Z_s = 50 \Omega$ (Single-ended)

Terminating load impedance: $Z_L = 100//18nH \Omega$ (Balanced)

Parameters Description		Unit	Minimum	Typical	Maximum
Insertion Loss	1574.42~1576.42 MHz	dB(*1)	-	1.5	1.9
	1565.42~1585.42 MHz	dB(*1)	-	1.6	2.0
	1597.5515~1605.8860 MHz	dB(*1)	-	1.7	2.1
VSWR(Input/Output)	1574.42~1576.42 MHz	-	-	1.4	2.0
	1565.42~1585.42 MHz	-	-	1.5	2.0
	1597.5515~1605.8860 MHz	-	-	1.6	2.0
Amplitude balance ((S21/S31))	1574.42~1576.42 MHz	dB	-1.5	+0.5/+0.7	+1.5
	1565.42~1585.42 MHz	dB	-5	-0.2/+2.7	+5
	1597.5515~1605.8860 MHz	dB	-1.8	+1/-0.6	+1.8
Phase balance (($\phi_{S21}-\phi_{S31}$)+180)	1574.42~1576.42 MHz	deg	-10	+5/+7	+10
	1565.42~1585.42 MHz	deg	-10	-2/+7	+10
	1597.5515~1605.8860 MHz	deg	-15	-10/-8	+15
Attenuation:					
10~794 MHz		dB	45	50	-
794~925 MHz		dB	40	47	-
925~960 MHz		dB	40	46	-
1427~1463 MHz		dB	30	34	-
1710~1785 MHz		dB	35	42	-
1850~1910 MHz		dB	35	42	-
1920~1980 MHz		dB	34	39	-
2401~2483 MHz		dB	30	35	-
2500~2570 MHz		dB	30	34	-

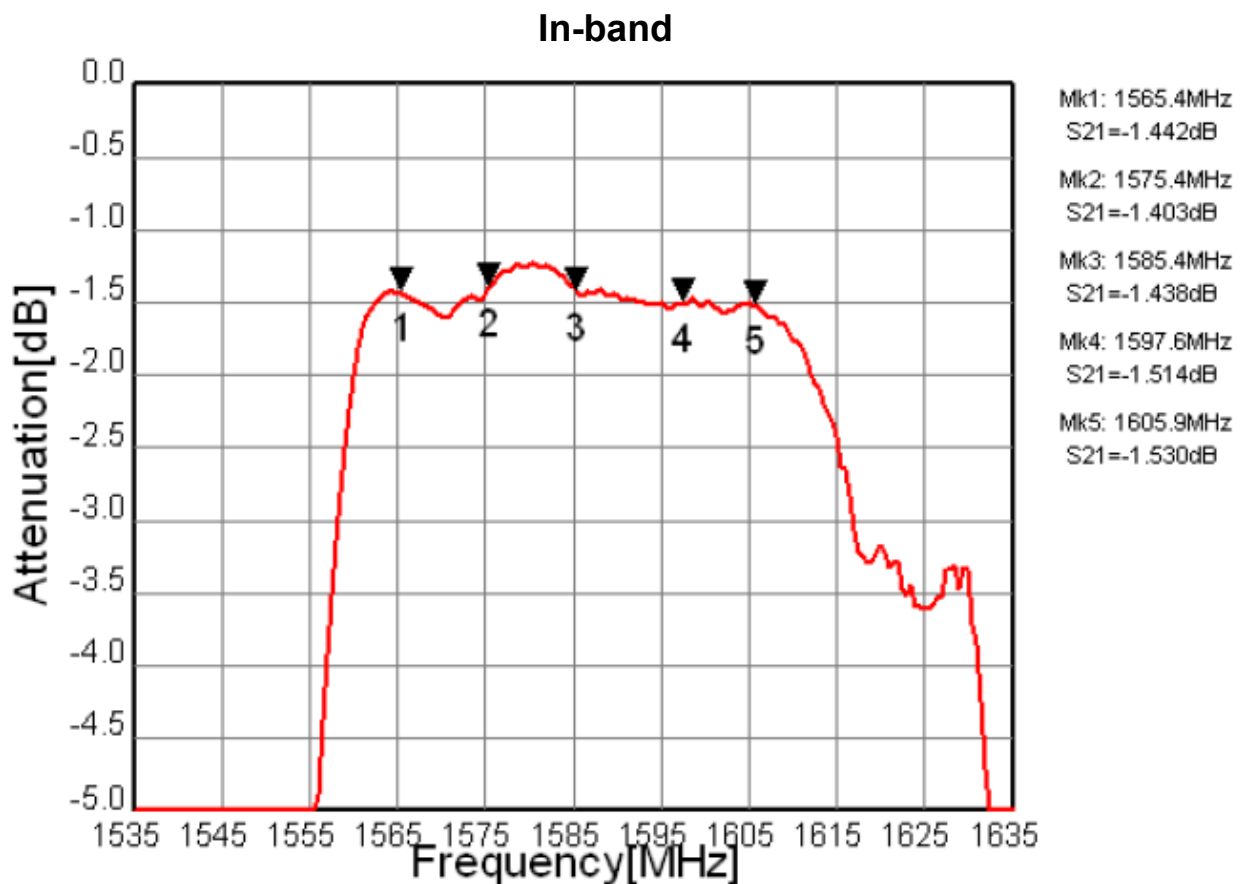
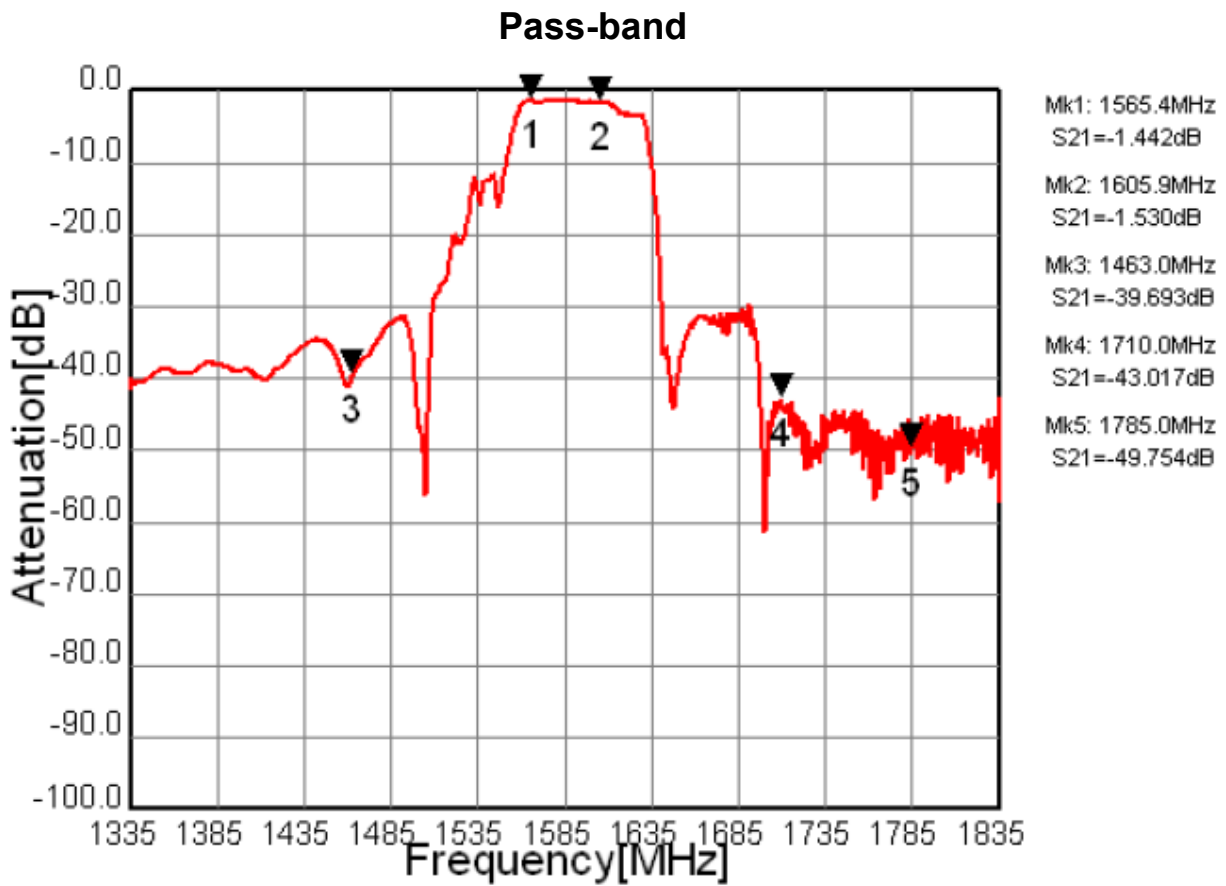
(*1) Specification of insertion loss includes loss that comes from the test board. (0.1dB)



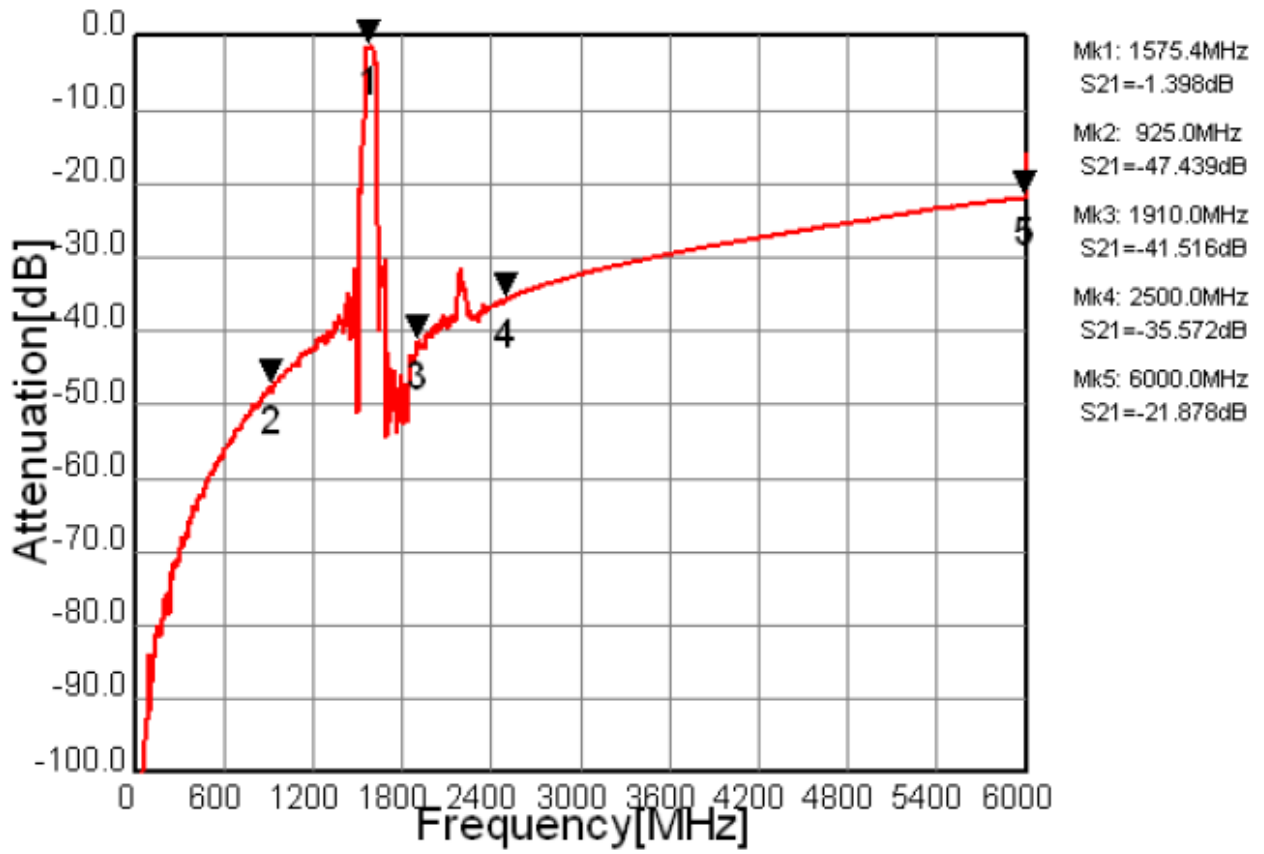
CAUTION: Electrostatic Sensitive Device. Observe precautions for handling.

1. The design, manufacturing process, and specifications of this device are subject to change.
2. US or International patents may apply.
3. RoHS compliant from the first date of manufacture.

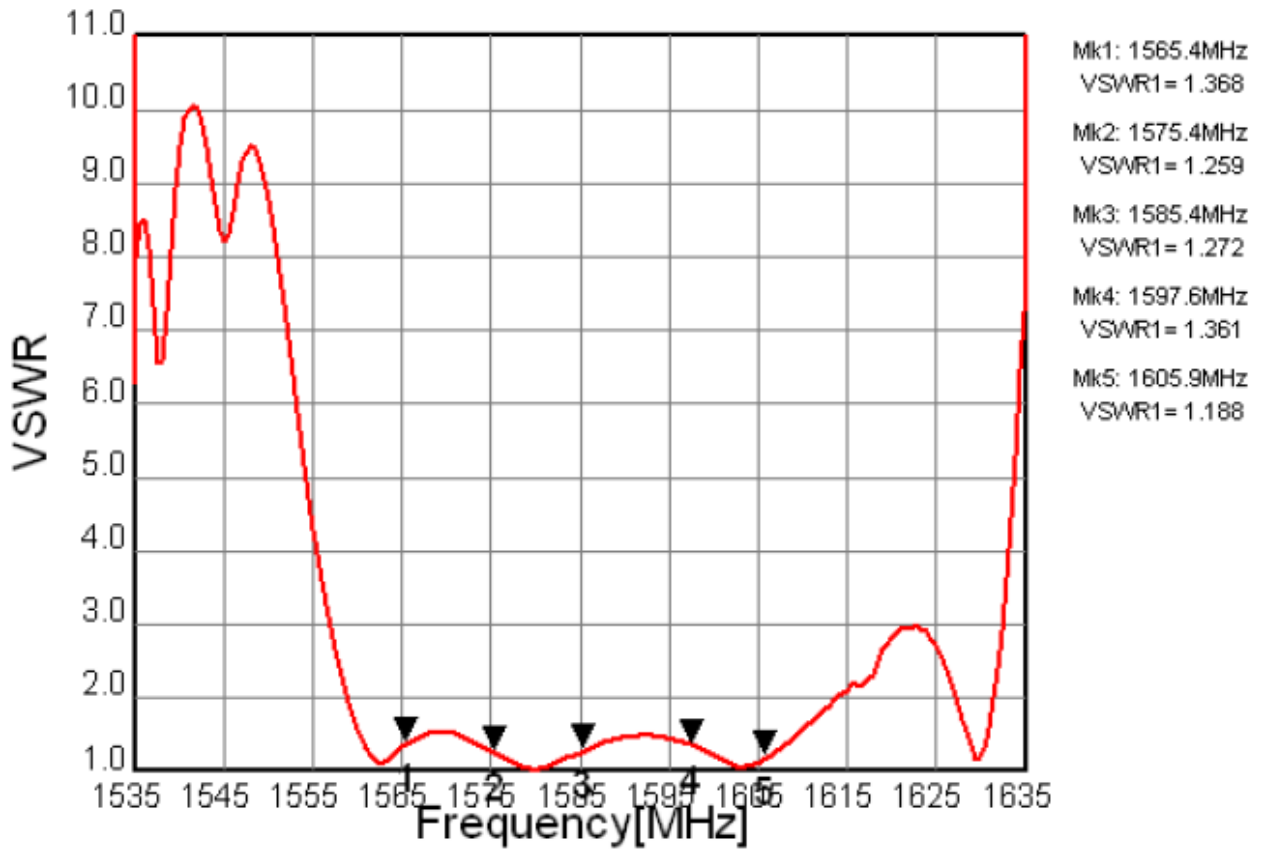
Frequency Characteristics



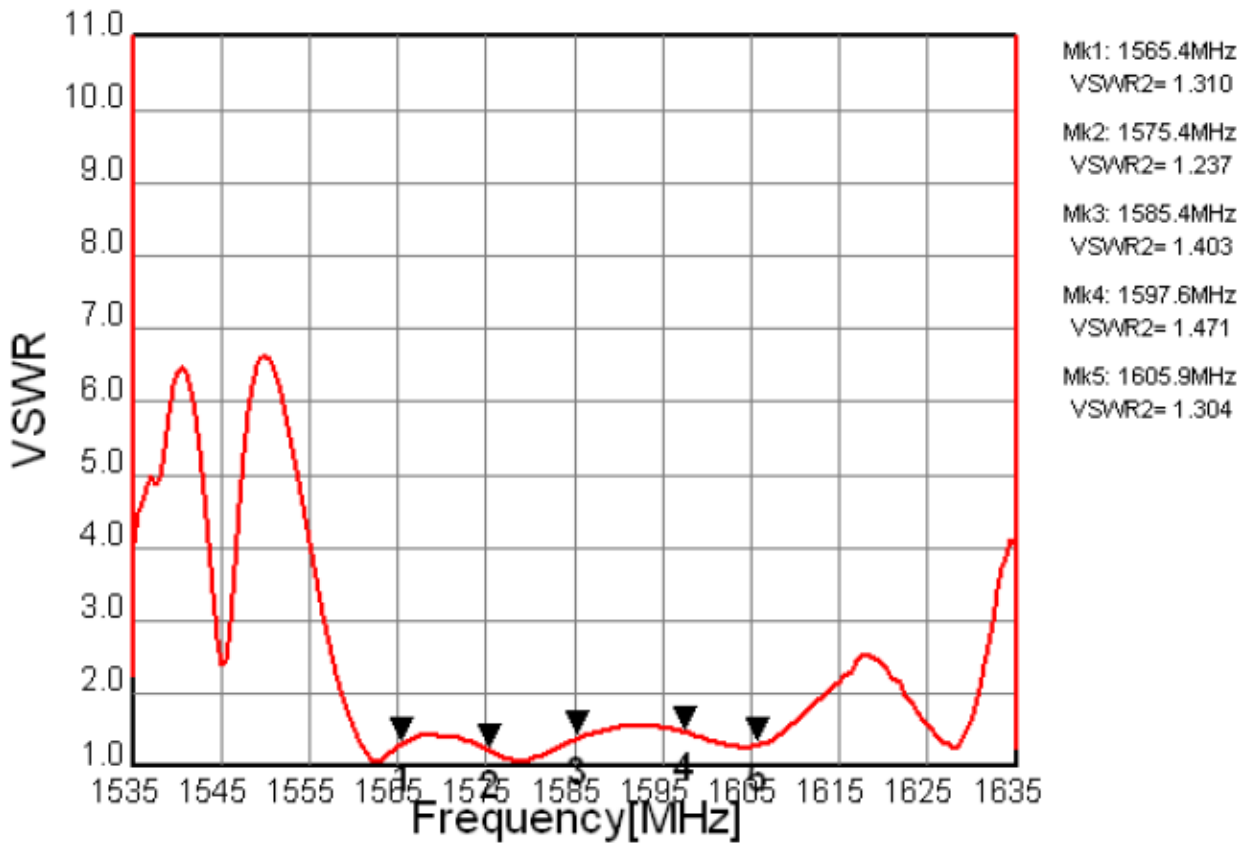
Wide-band



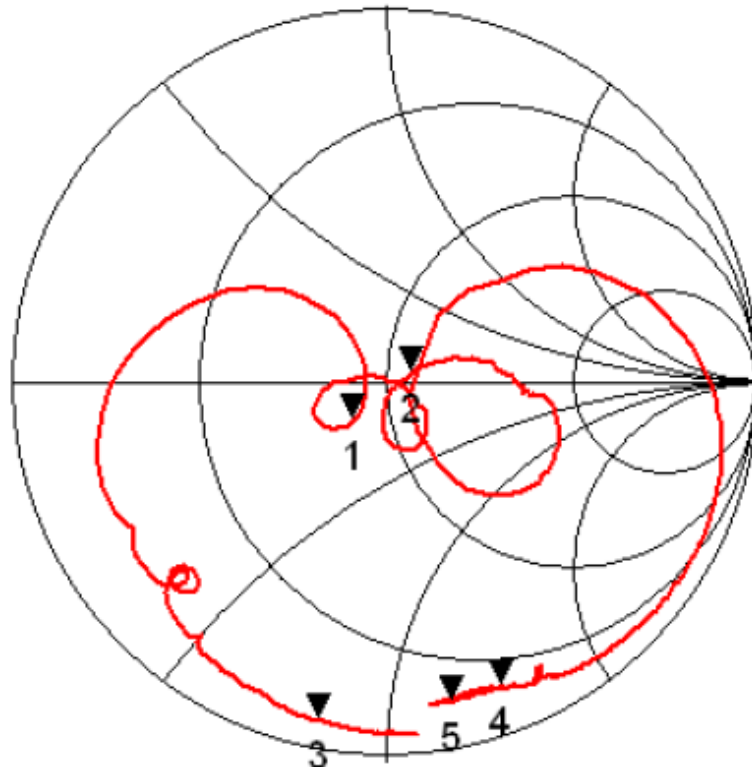
VSWR (Input)



VSWR (Output)

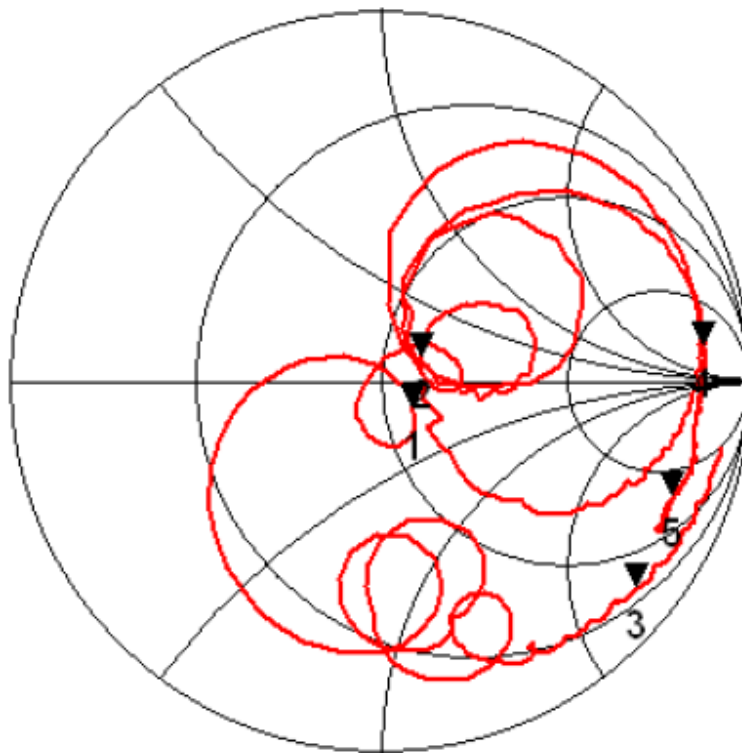


Input Impedance



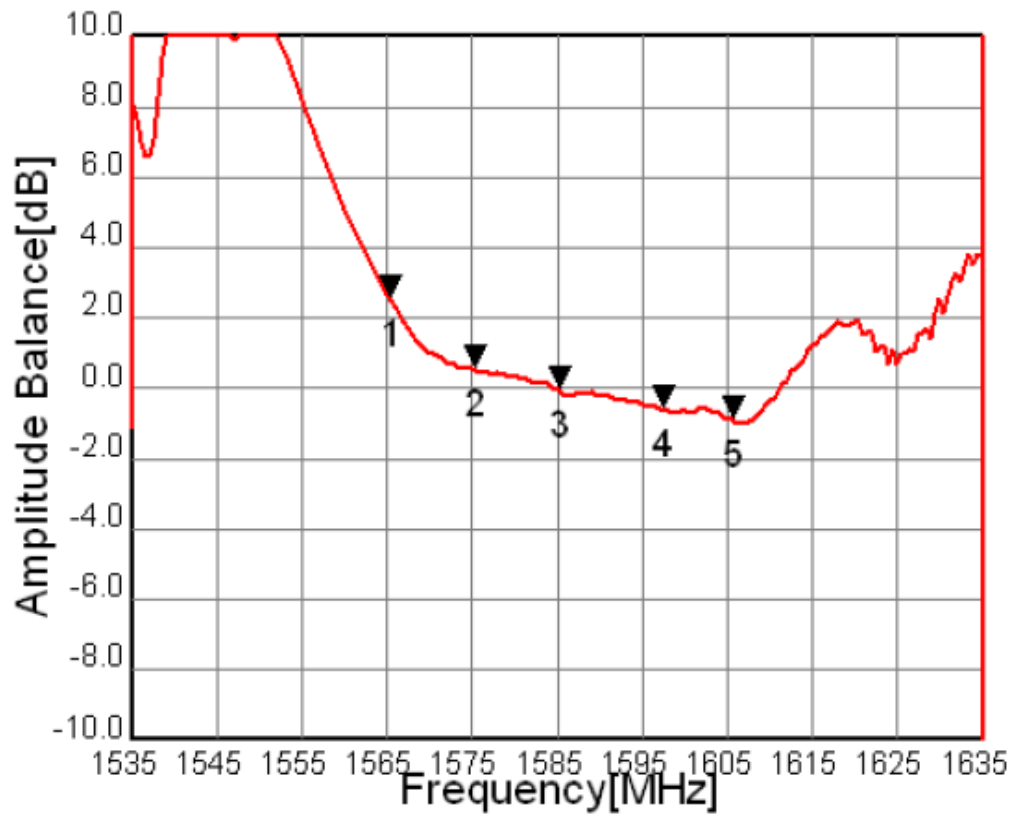
Mk1: 1565.4
S11= 0.808 - j 0.173
Mk2: 1605.9
S11= 1.141 + j 0.064
Mk3: 1463.0
S11= 0.064 - j 0.814
Mk4: 1710.0
S11= 0.205 - j 1.433
Mk5: 1785.0
S11= 0.167 - j 1.215

Output Impedance



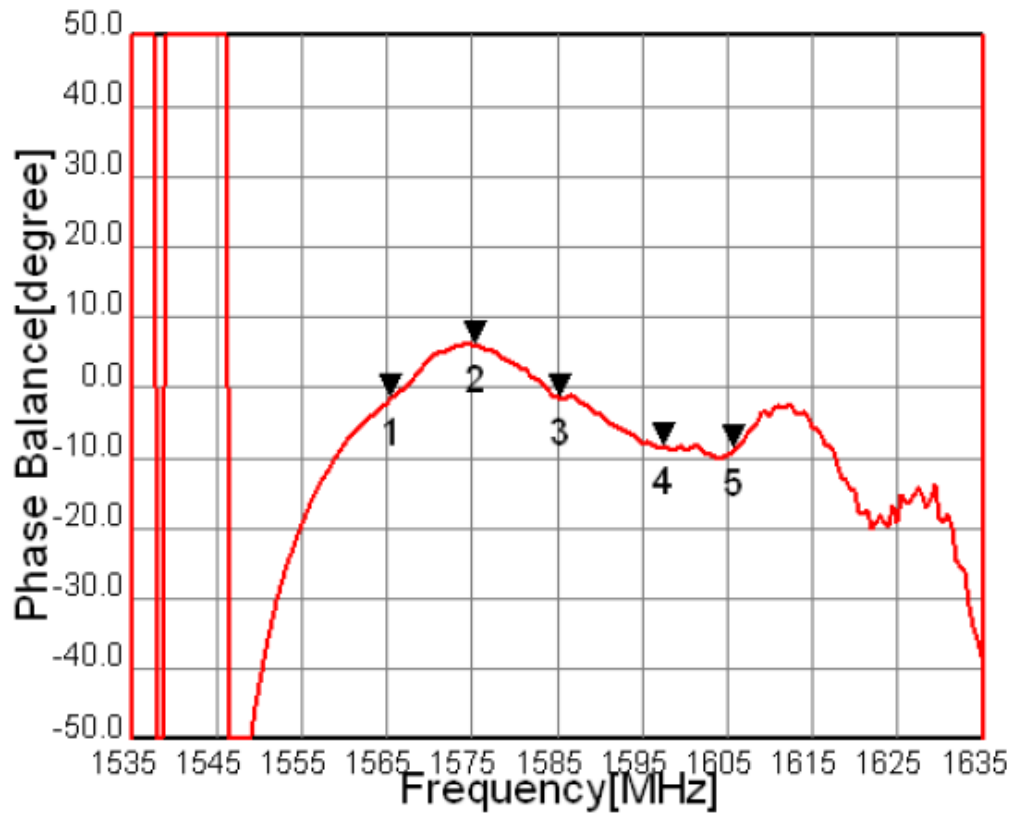
Mk1: 1565.4
S22= 1.180 - j 0.194
Mk2: 1605.9
S22= 1.238 + j 0.163
Mk3: 1463.0
S22= 0.511 - j 2.720
Mk4: 1710.0
S22= 9.121 + j 7.454
Mk5: 1785.0
S22= 1.934 - j 4.306

Amplitude balance



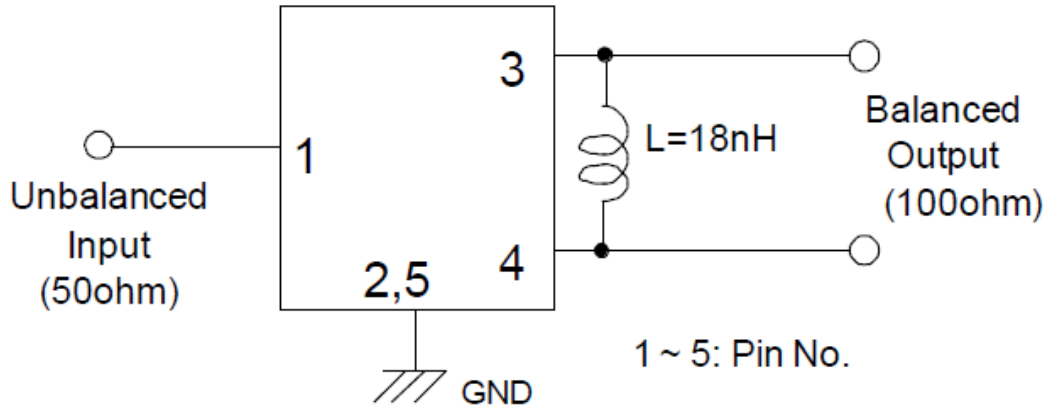
Mk1: 1565.4MHz
A Bal= 2.518dB
Mk2: 1575.4MHz
A Bal= 0.528dB
Mk3: 1585.4MHz
A Bal=-0.120dB
Mk4: 1597.6MHz
A Bal=-0.605dB
Mk5: 1605.9MHz
A Bal=-0.947dB

Phase balance



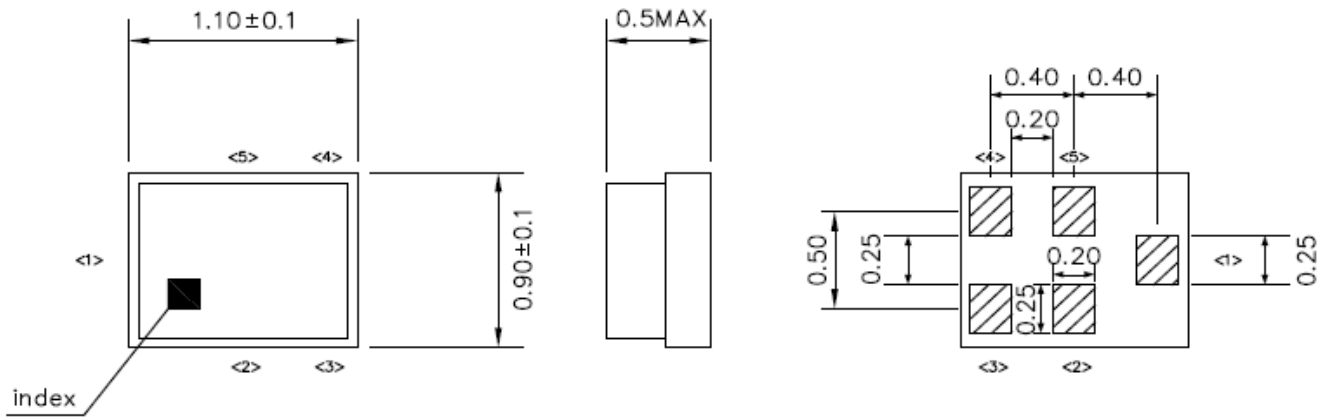
Mk1: 1565.4MHz
P Bal=-1.509deg
Mk2: 1575.4MHz
P Bal= 5.796deg
Mk3: 1585.4MHz
P Bal=-1.583deg
Mk4: 1597.6MHz
P Bal=-8.465deg
Mk5: 1605.9MHz
P Bal=-8.791 deg

Measurement Circuit



Outline Drawing

Device size: 1.1mmtyp. x 0.9mmtyp. x 0.5mmmax.

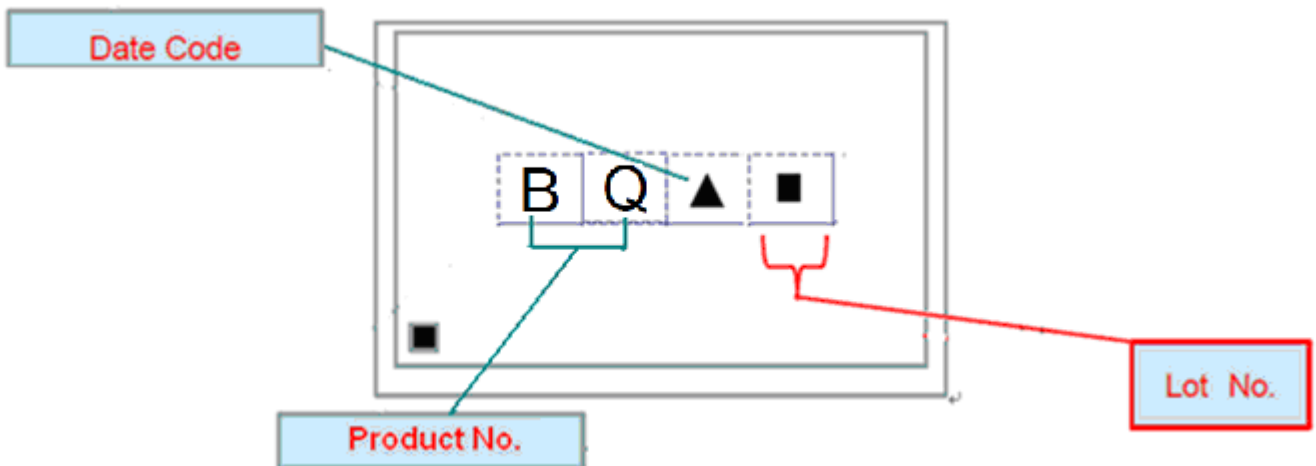


Unit: mm

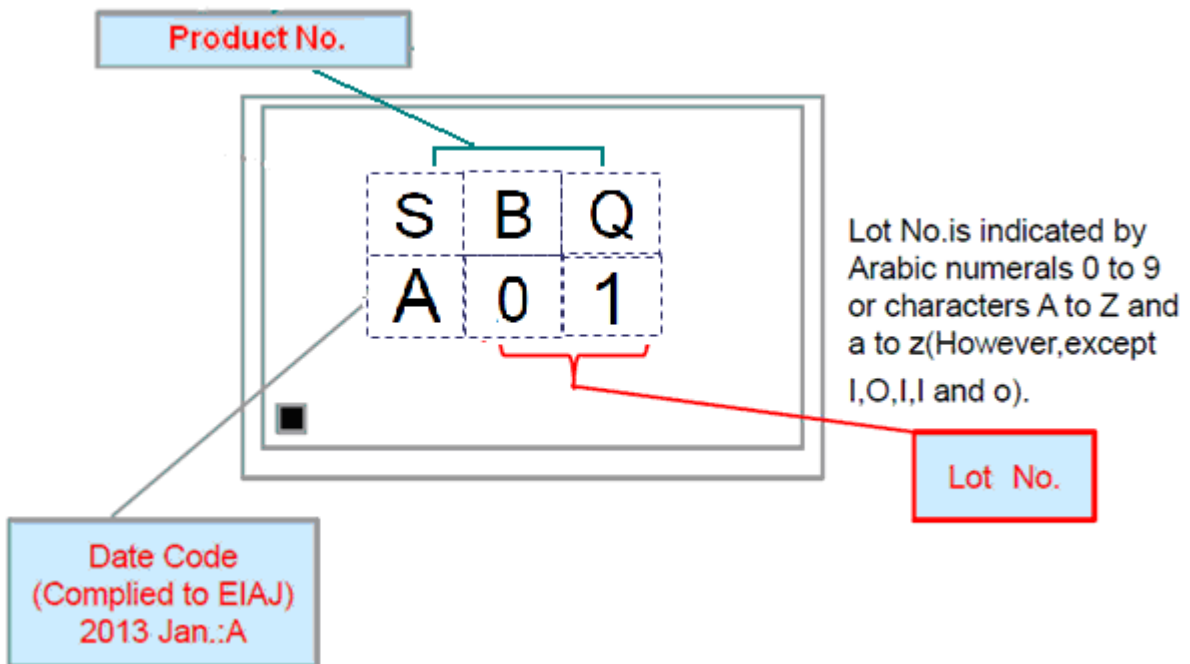
Pin Configuration

Pin No.	Symbol	Function
1	IN	Unbalanced pin
2	GND	Ground
3	OUT	Balanced pin
4	OUT	Balanced pin
5	GND	Ground

Top View (Sample Production):



Top View (Mass Production):

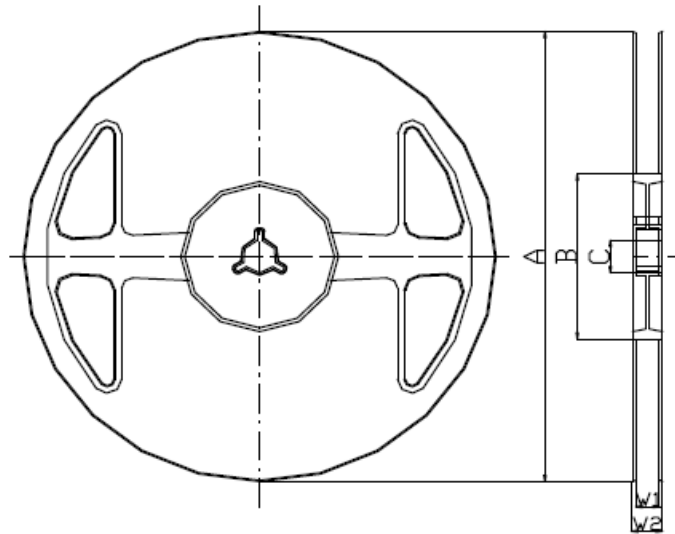


Product date code (EIAJ)

Year	Jan.	Feb.	Mar.	Apr.	May.	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
2015	a	b	c	d	e	f	g	h	j	k	l	m
2016	n	p	q	r	s	t	u	v	w	x	y	z
2017	A	B	C	D	E	F	G	H	J	K	L	M
2018	N	P	Q	R	S	T	U	V	W	X	Y	Z

Packing

Reel Dimension



Materials of Reel

Material : Polystyrene + Carbon

Characteristics : Conforms to EIAJ-ET-7200A

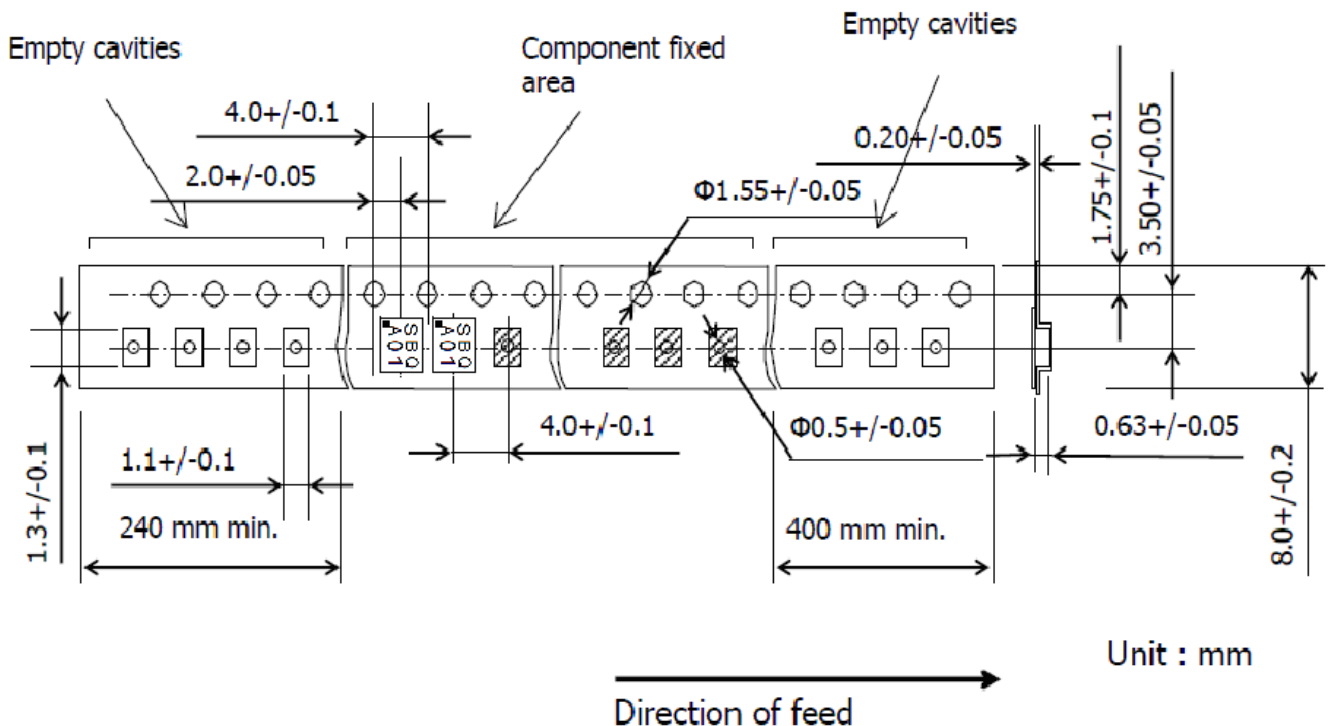
Color : Black

Surface resistance (reference value) : $10^9 \Omega/\text{sq}$ Max.

Unit : mm

Code	Quantity	A	B	C	W1	W2
J	5,000 pcs	$\phi 180.0 +0.0/-1.5$	$\phi 66.0 +/-0.5$	$\phi 13.0 +/-0.2$	$9.0 +1.0/-0.0$	$11.4 +/-1.0$

Tape Dimension



Unit : mm

Direction of feed

Recommended Temperature Profile of Reflow Soldering

The figure below shows the recommended temperature profile for reflow soldering in the case of lead-free solder alloy Sn3.0Ag0.5Cu.

Recommended number of reflow cycles is 5 maximum.

Suitable condition for solder heating is different depending on composition and manufacturing method. Please contact the solder manufacturer for details.

