



Approved by:

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# SPECIFICATION

PRODUCT: SAW FILTER

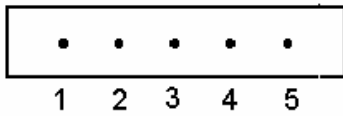
MODEL: HB4401M (X6965M) SIP5 K

**HOPE MICROELECTRONICS CO., LIMITED**

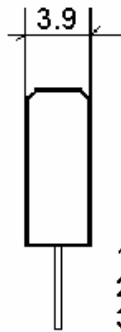
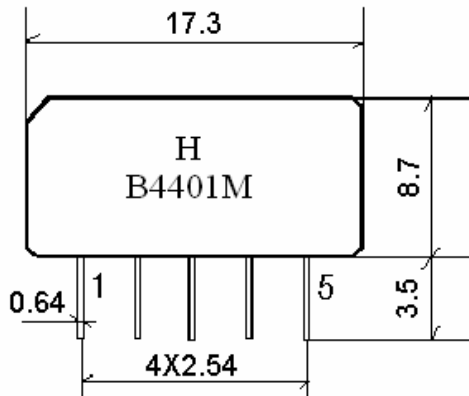
# 1. Construction

## 1.1 Dimension and materials

Type : B4401M

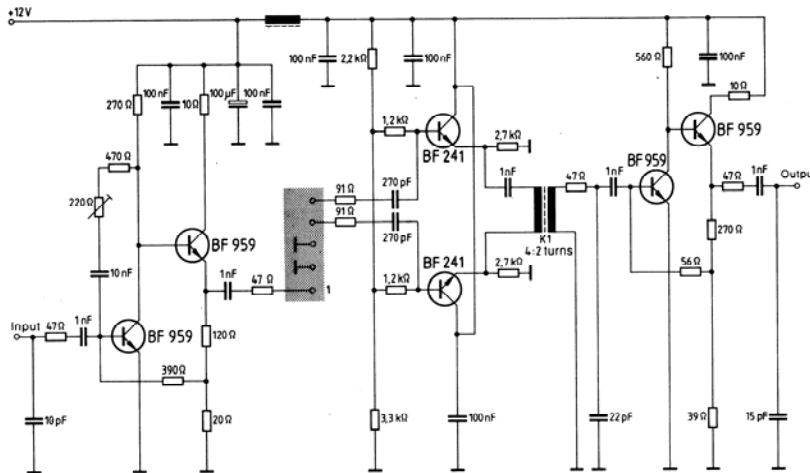


Unit : mm



- 1 Input
- 2 Input-ground
- 3 ground
- 4 Output
- 5 Output

## 1.2. Circuit construction, measurement circuit



Test circuit for SIP-5 filter

Input impedance of the symmetrical post-amplifier: 2 kΩ in parallel with 3 pF

# 2.Characteristics

## Standard atmospheric conditions

Unless otherwise specified , the standard range of atmospheric conditions for making measurements and tests is as follows;

- Ambient temperature : 15°C to 35°C
- Relative humidity : 25% to 85%
- Air pressure : 86kPa to 106kPa

### Operating temperature rang

Operating temperature rang is the rang of ambient temperatures in which the filter can be operated continuously.  $-10^{\circ}\text{C} \sim +60^{\circ}\text{C}$

### Storage temperature rang

Storage temperature rang is the rang of ambient temperatures at which the filter can be stored without damage.  
Conditions are as specified elsewhere in these specifications.  $-40^{\circ}\text{C} \sim +70^{\circ}\text{C}$

### Reference temperature $+25^{\circ}\text{C}$

## 2.1 Maximum Rating

<b>DC voltage</b>	<b>VDC</b>	<b>12</b>	<b>V</b>	<b>Between any terminals</b>
<b>AC voltage</b>	<b>Vpp</b>	<b>10</b>	<b>V</b>	<b>Between any terminals</b>

## 2.2 Electrical Characteristics

Source impedance

$$Z_S=50\ \Omega$$

Load impedance

$$Z_L=2\text{k}\ \Omega // 3\text{pF}$$

$$T_A=25^{\circ}\text{C}$$

	Freq	min	typ	max	
<b>Center frequency</b>	Fo	43.96	44.06	44.16	MHz
<b>Insertion attenuation</b> Reference level	44.06MHz	12.9	14.7	16.5	dB
<b>Pass bandwidth</b>	B <sub>3dB</sub>	-	6.1	-	MHz
	B <sub>30dB</sub>	-	7.7	-	MHz
<b>Amplitude ripple</b> (41.53~46.59 MHz)			0.4	0.8	dB
<b>Relative attenuation</b>	41.53MHz	-	0.3	-	dB
	46.59MHz	-	0.4	-	dB
	41.06MHz	1.4	2.7	4.0	dB
	47.06MHz	1.5	3.0	4.5	dB
	47.31MHz	-	6.2	-	dB
<b>Sidelobe</b>	39.81MHz	37.0	52.0	-	dB
	35.06~39.46MHz	38.0	47.0		dB
	39.46~40.06MHz	36.0	41.0		dB
	48.06~50.06MHz	35.0	40.0		dB
50.06~55.06MHz	38.0	45.0		dB	
<b>Reflected wave signal suppression</b> 1.3 us ... 6.0 us after main pulse (test pulse 250 ns , carrier frequency 44.06 MHz)		42.0	52.0		dB
<b>Feedthrough signal suppression</b> 1.3 us ... 1.2 us before main pulse (test pulse 250 ns , carrier frequency 44.06 MHz)		45.0	54.0		dB

<b>Group delay ripple (p-p)</b> 41.53 ~ 46.59 Mhz	-	40	-	ns
<b>Impedance at 44.06 Mhz</b>	-	-	-	-
Input: $Z_{in} = R_{in} // C_{in}$	-	1.3//16.1	-	k $\Omega$ // pF
Output: $Z_{in} = R_{in} // C_{in}$	-	1.1//5.6	-	k $\Omega$ // pF
<b>Temperature coefficient</b>	-72			ppm/K

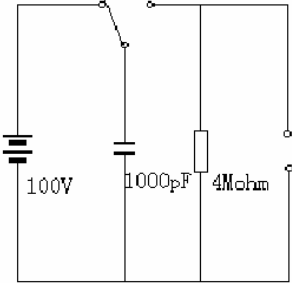
### 2.3 Environmental Performance Characteristics

Item Test condition	Allowable change of absolute Level at center frequency(dB)
High temperature test 70°C 1000H	< 1.0
Low temperature test -40°C 1000H	< 1.0
Humidity test 40°C 90-95% 1000H	< 1.0
Thermal shock -20°C==25°C==80°C 20 cycle 30M 10M 30M	< 1.0
Solder temperature test Sold temp.260°C for 10 sec.	< 1.0
Soldering Immerse the pins melt solder at 260°C+5/-0°C for 5 sec.	More then 95% of total area of the pins should be covered with solder

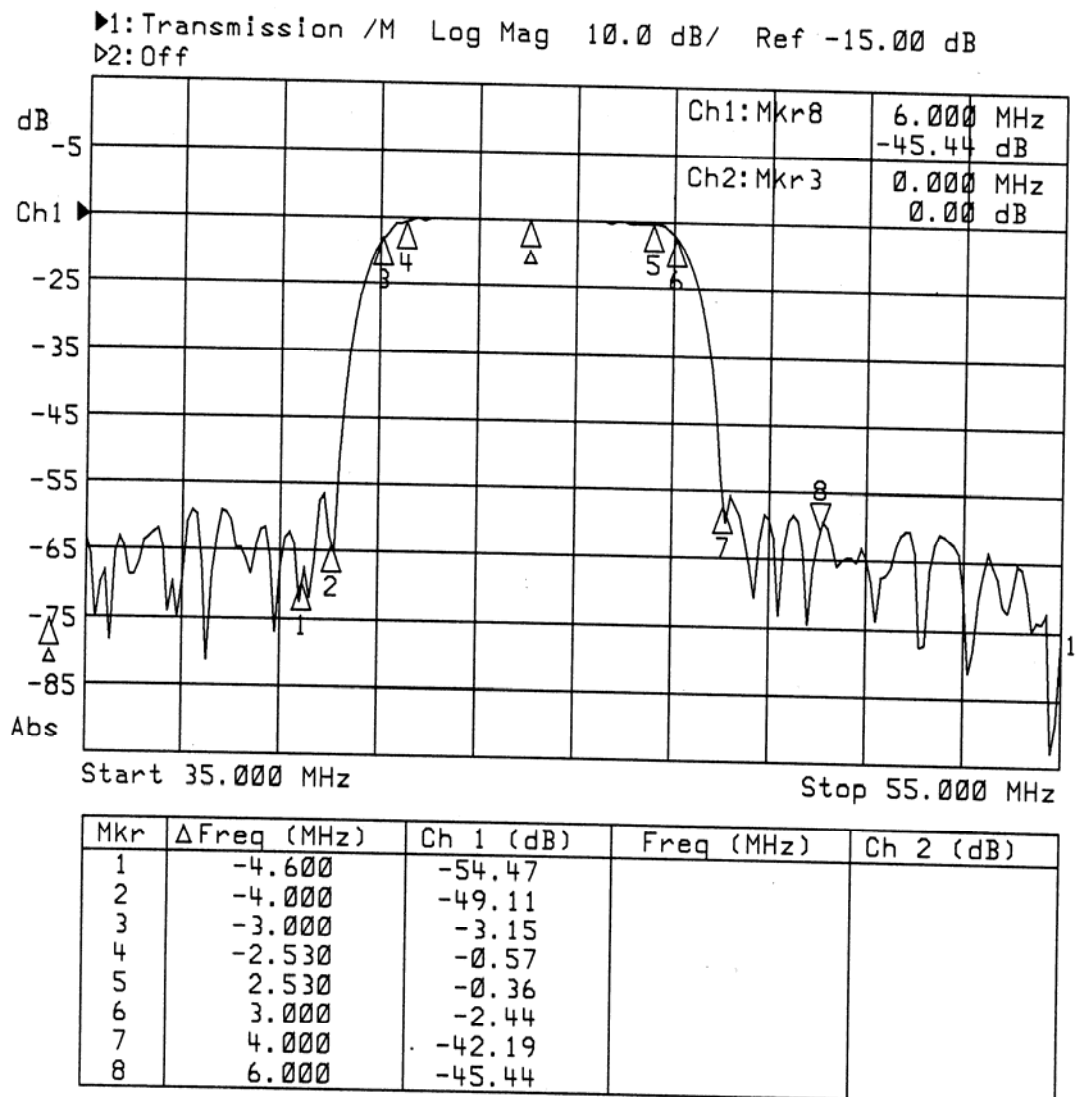
### 2.4 Mechanical Test

Item Test condition	Allowable change of absolute Level at center frequency(dB)
Vibration test 600-3300rpm amplitude 1.5mm 3 directions 2 H each	<1.0
Drop test On maple plate from 1 m high 3 times	<1.0
Lead pull test Pull with 1 kg force for 30 seconds	<1.0
Lead bend test 90° bending with 500g weigh 2 times	<1.0

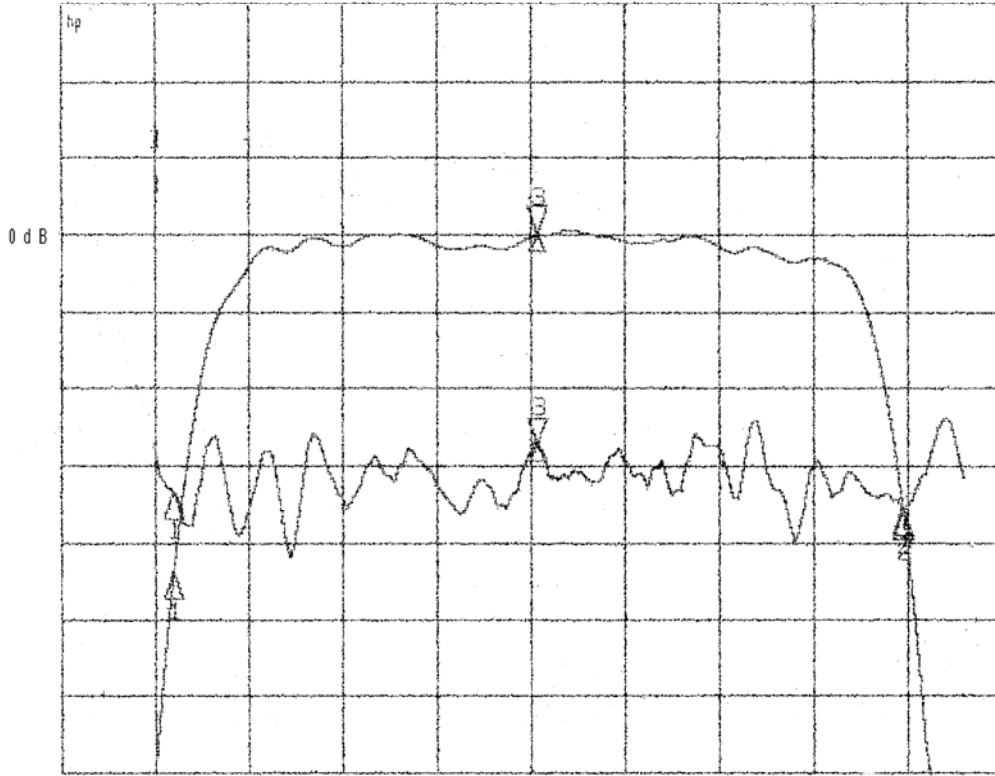
## 2.5 Voltage Discharge Test

Item	Allowable change of absolute Level at center frequency(dB)
Test condition	
Surge test Between any two electrode	
	<1.0

## 2.6 Frequency response:

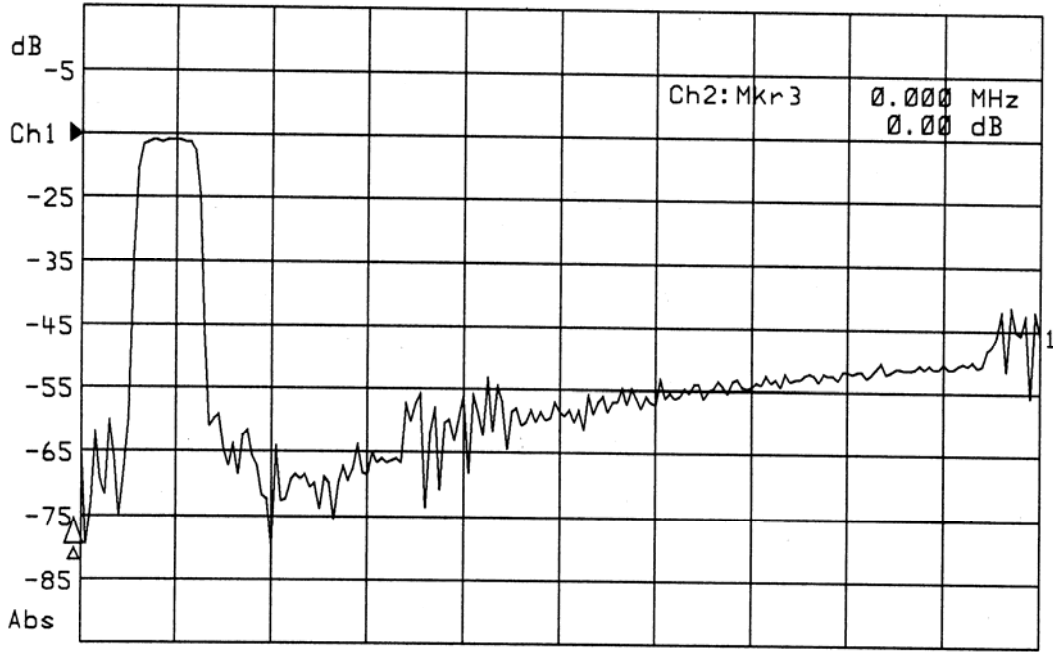


CH1 S21 log MAG 1 dB/ REF -14.81 dB @ -0.0010 dB  
 CH2 S21 delay 30 ns/ REF 1.302 μs @ -119.37 ps



START 40.000 000 MHz STOP 48.000 000 MHz

►1: Transmission /M Log Mag 10.0 dB/ Ref -15.00 dB  
 ►2: Off



Start 35.000 MHz

Stop 135.000 MHz