Approved by:

Checked by:

Issued by:

SPECIFICATION

PRODUCT: SAW FILTER

MODEL: HDIF389A1M

SHOULDER ELECTRONICS LIMITED

1.SCOPE

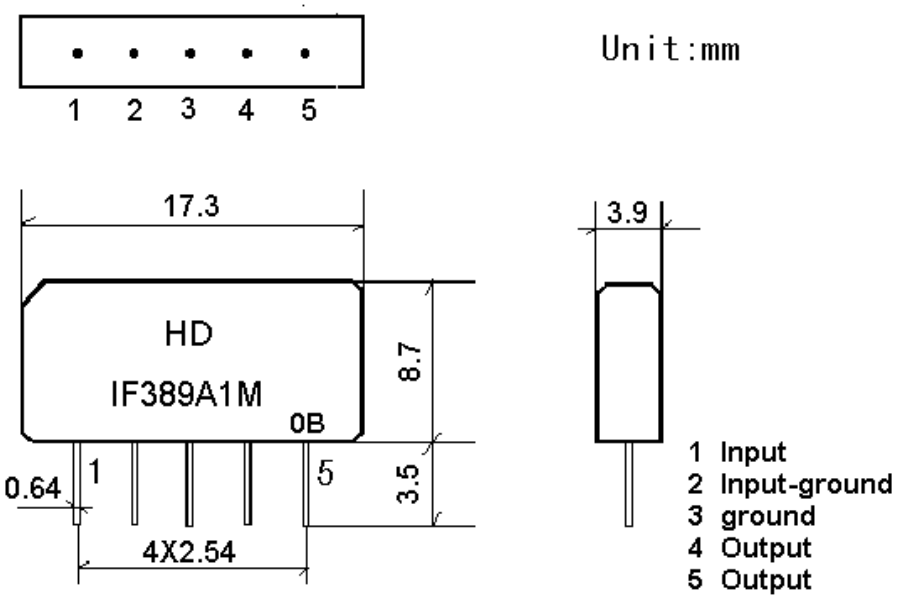
SHOULDER's SAW filter series have broad line up products meeting all broadcast standard including NTSC,PAL and SECAM systems. These filters are composed of two interdigital transducers on a single-crystal. piezoelectrical chip. they are used in electronic equipments such as TV and so on.

2.Construction

2.1 Dimension and materials

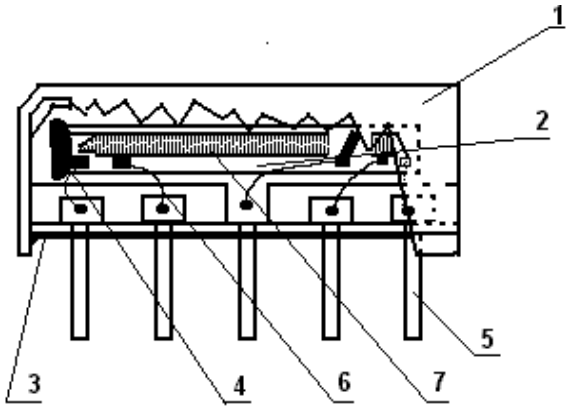
Manufacturer's name : SHOULDER ELECTRONICS Co. LTD(CHINA)

Type : IF389A1M



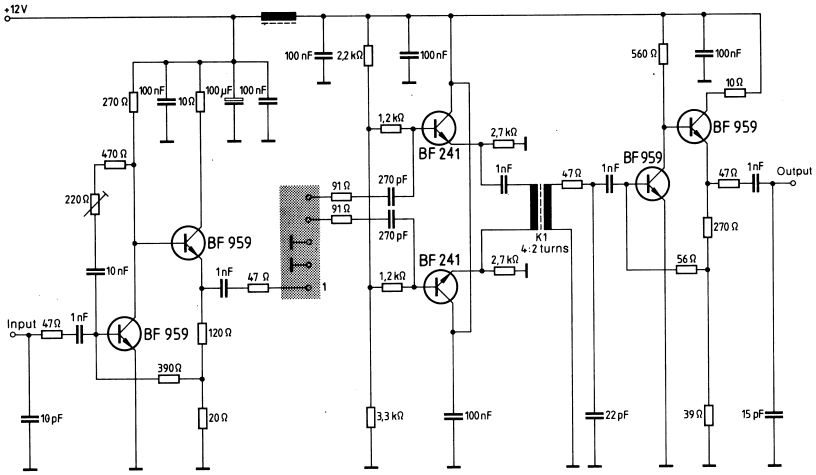
0: year(0,1,2,3,4,5,6,7,8,9)

B:product in this quarter(A:1~3,B:4~6,C:7~9,D:10~12)



Components	Materials
1.Outer casing	PPS
2.Substrate	Lithium niobate
3.Base	Epoxy resin
4.Absorber	Epoxy resin
5.Lead	Cu alloy+Au plate
6.Bonding wire	AlSi alloy
7.Electrode	Al

2.2. Circuit construction, measurement circuit



Test circuit for SIP-5 filter
Input impedance of the symmetrical post-amplifier: 2 kΩ in parallel with 3 pF

3.Characteristics

Items	Conditions	Specifications

Standard atmospheric conditions	Unless otherwise specified , the standard rang of atmospheric conditions for making measurements and tests is as follows; Ambient temperature : 15℃ to 35℃ Relative humidity : 25% to 85% Air pressure : 86kPa to 106kPa	There shall be no damage.
Operating temperature rang	Operating temperature rang is the rang of ambient temperatures in which the filter can be operated continuously. -10℃ ~ +60℃	
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℃ ~ +70℃	
Reference temperature	+25℃	

3.1 Maximum Rating

DC voltage VDC	**12**	**V**	**Between any terminals**
AC voltage Vpp	**10**	**V**	**Between any terminals**

3.2 Electrical Characteristics

Source impedance Zs=50Ω

Load impedance Z_L=2KΩ//3pF T_A=25℃

	Freq	Min	typ	max	
Insertion attenuation Reference level	37.40MHz	13.5	15.5	17.5	dB
Relative attenuation	38.90MHz	5.5	6.5	7.5	dB
	34.47MHz	1.2	2.7	4.2	dB
	33.40MHz	17.0	19.0	21.0	dB
	31.90MHz	42.0	50.0	-	dB
	40.40MHz	40.0	55.0		dB

	41.40MHz	40.0	50.0		dB
Sidelobe	25.00~31.90MHz	34.0	40.0		dB
	40.40~45.00MHz	33.0	38.0		dB
Reflected wave signal suppression 1.2μs…6.0μs after main pulse (test pulse 250ns, carrier frequency 37.4MHz)		40.0	50.0		dB
Feedthrough signal suppression 1.2μs…1.1μs before main pulse (test pulse 250ns, carrier frequency 37.4MHz)		42.0	52.0	-	dB
Group delay predistortion (reference frequency 38.90 MHz) 36.90 MHz 34.47 MHz		- - -	-40 80 -	- - -	ns ns ns
Impedance at 37.40 MHz: Input: Zin = Rin // Cin Output Zout=Rout // Cout		- -	2.6//9.5 2.9 //2.6	- -	kΩ//pF kΩ//pF
Temperature coefficient		-72			ppm/k

3.3 Environmental Performance Characteristics

<table>
<tr><th>Item</th><th>Condition</th><th>Specifications</th></tr>
<tr><td>High temperature</td><td>The specimen shall be store at a temperature of 80±2℃ for 96±4h. Then it shall be subjected to standard atmospheric conditions for 1h, after which measurement shall be made within 1h.</td><td rowspan="4">Mechanical characteristics and specifications in electrical characteristics shall be satisfied. There shall be no excessive change in appearance.</td></tr>
<tr><td>Low temperature</td><td>The specimen shall be store at a temperature of -20±3℃ for 96±4h. Then it shall be subjected to standard atmospheric conditions for 1h, after which measurement shall be made within 1h.</td></tr>
<tr><td>Humidity</td><td>The specimen shall be store at a temperature of 40±2℃ with relative humidity of 90% to 96% for 96±4h. Then it shall be subjected to standard atmospheric conditions for 1h, after which measurement shall be made within 1h.</td></tr>
<tr><td>Thermal shock</td><td>The specimen shall be subjected to 8 continuous cycles each as shown below. Then it shall be subjected to standard atmospheric conditions for 1h, after which measurement shall be made within 1h.
<table>
<tr><th></th><th>Temperature</th><th>Duration</th></tr>
<tr><td>1</td><td>+25 ℃=>-40 ℃</td><td>0.5h</td></tr>
<tr><td>2</td><td>-40 ℃</td><td>4h</td></tr>
<tr><td>3</td><td>-40 ℃=>+85 ℃</td><td>2h</td></tr>
<tr><td>4</td><td>+85 ℃</td><td>4h</td></tr>
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</td></tr>
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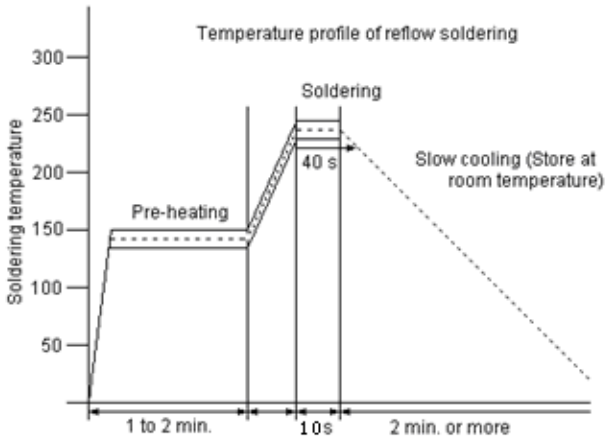
<table>
<tr><td></td><td><table>
<tr><td>5</td><td>+85 ℃=>+25 ℃</td><td>0.5h</td></tr>
<tr><td>6</td><td>+25 ℃</td><td>1h</td></tr>
</table></td><td></td></tr>
<tr><td>Resistance to Soldering heat</td><td>Reflow soldering method
Peak: 255 ±5 ℃, 220 ±5 ℃, 40s
At electrode temperature of the specimen.
 

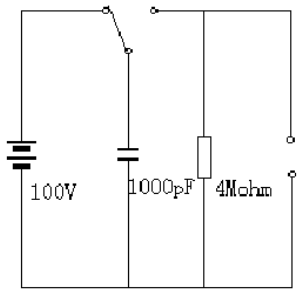
The specimen shall be passed through the reflow furnace with the condition shown in the above profile for 1 time.
The specimen shall be stored at standard atmospheric conditions for 1h, after which the measurement shall be made. Test board shall be 1.6 mm thick. Base material shall be glass fabric base epoxy resin.</td><td></td></tr>
<tr><td>Solder ability</td><td>Immerse the pins melt solder at 260℃+5/-0℃ for 5 sec.</td><td>More then 95% of total area of the pins should be covered with solder</td></tr>
</table>

3.4 Mechanical Test

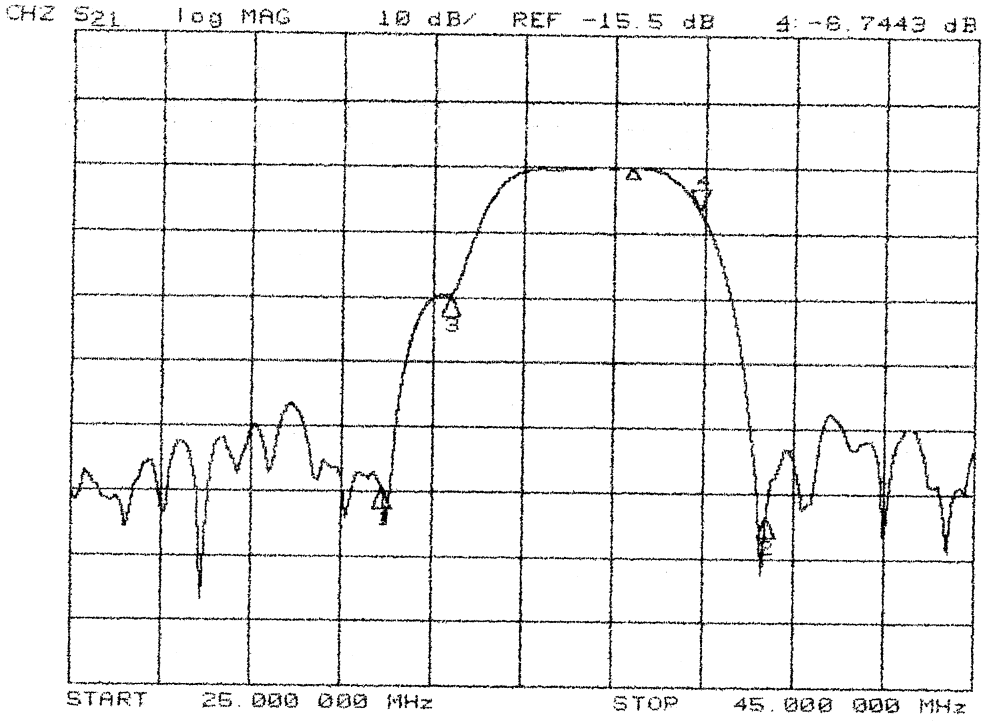
Items	Conditions	Specifications

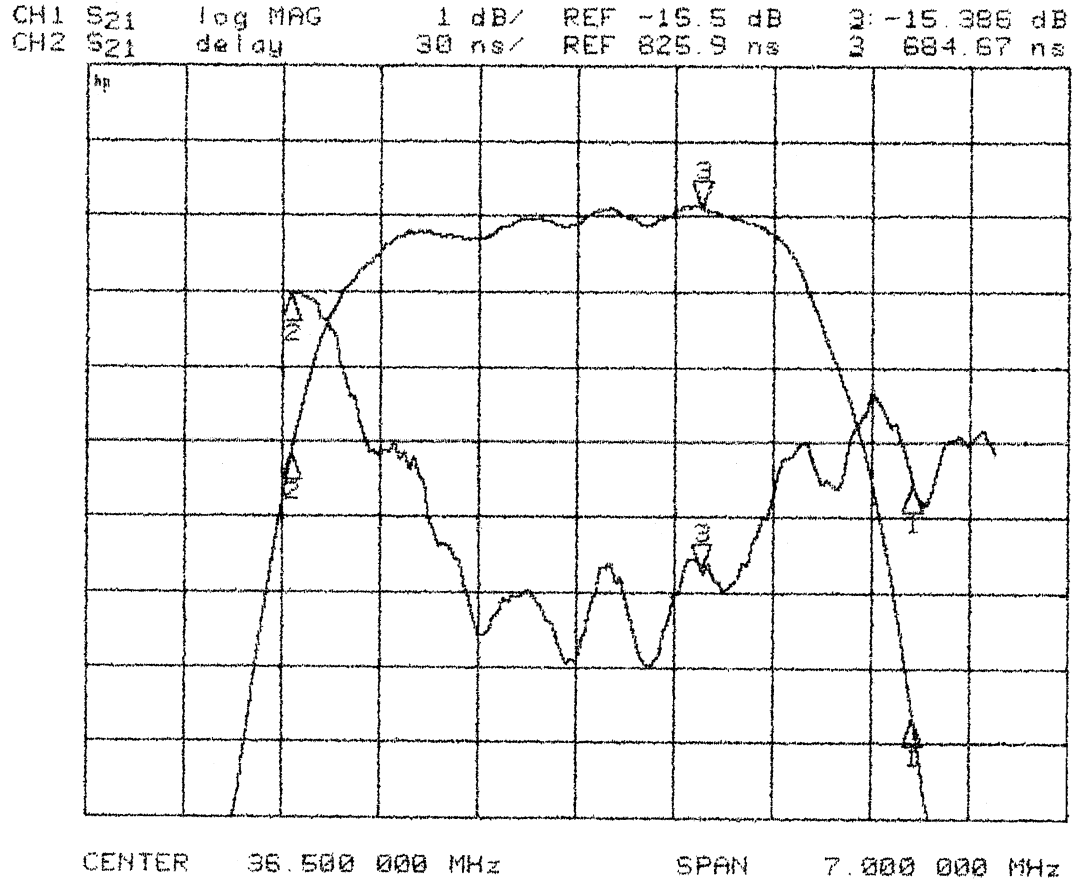
Vibration	600-3300rpm amplitude 1.5mm 3 directions 2 H each	There shall be no damage.
Drop	On maple plate from 1 m high 3 times	
Lead pull	Pull with 1 kg force for 30 seconds	
Lead bend	90° bending with 500g weigh 2 times	

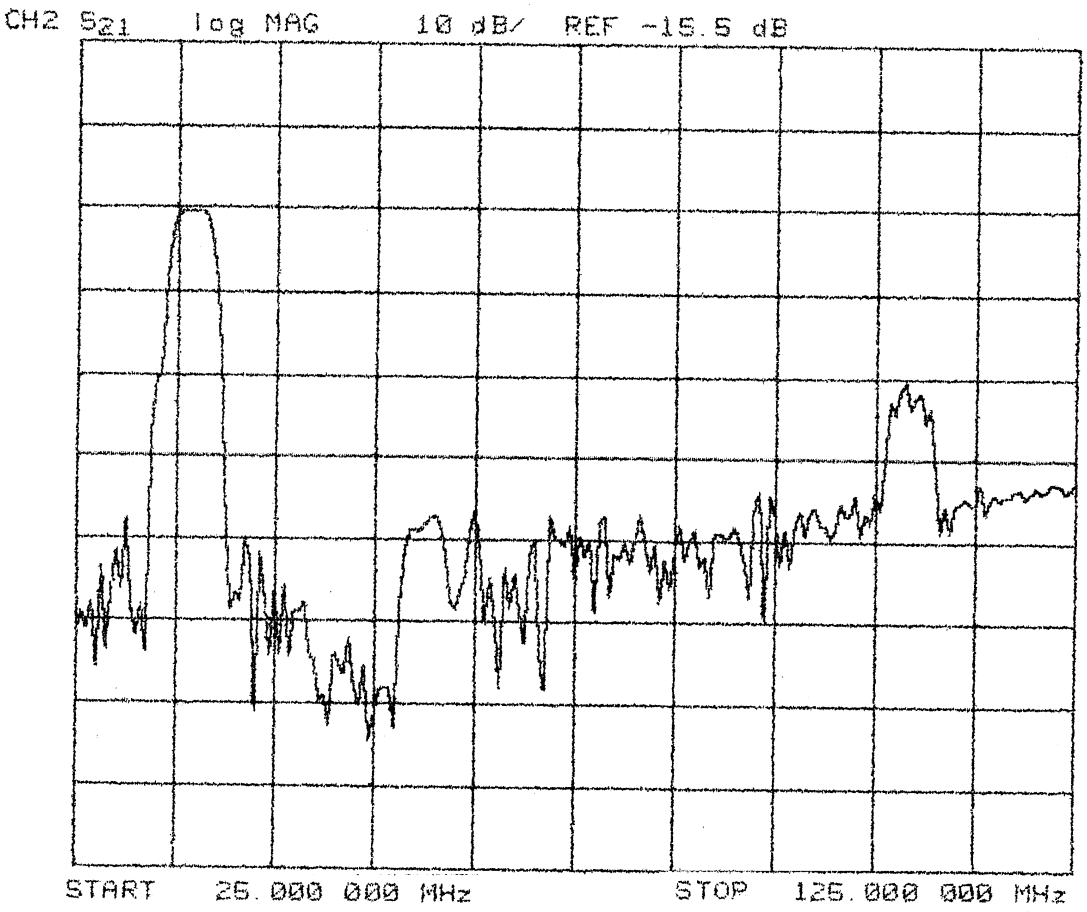
3.5 Voltage Discharge Test

Item	Condition	Specifications
Surge	Between any two electrode 	There shall be no damage

3.6 Frequency response


CH2 S21 log MAG 10 dB/ REF -15.5 dB 4: -6.7443 dB
START 25.000 000 MHz
STOP 45.000 000 MHz


CH1 S21 log MAG 1 dB/ REF -15.5 dB 3: -15.386 dB
CH2 S21 delay 30 ns/ REF 825.9 ns 2 684.67 ns
CENTER 36.500 000 MHz
SPAN 7.000 000 MHz


CH2 S21 log MAG 10 dB/ REF -15.5 dB
START 25.000 000 MHz
STOP 125.000 000 MHz