



Approved by:

Checked by:

Issued by:

# ***SPECIFICATION***

**PRODUCT: SAW FILTER**

**MODEL: HDAF38A2D 2.3mm**



**SHOULDER ELECTRONICS LIMITED**

## 1.SCOPE

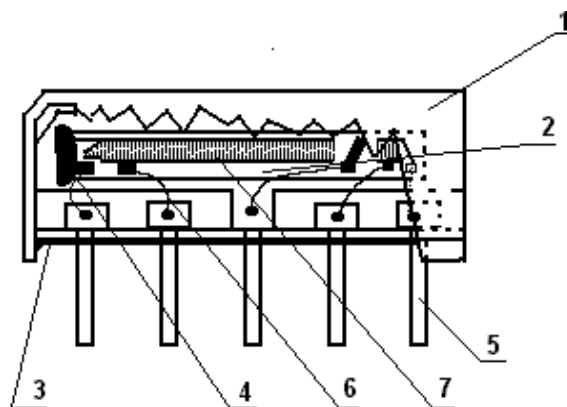
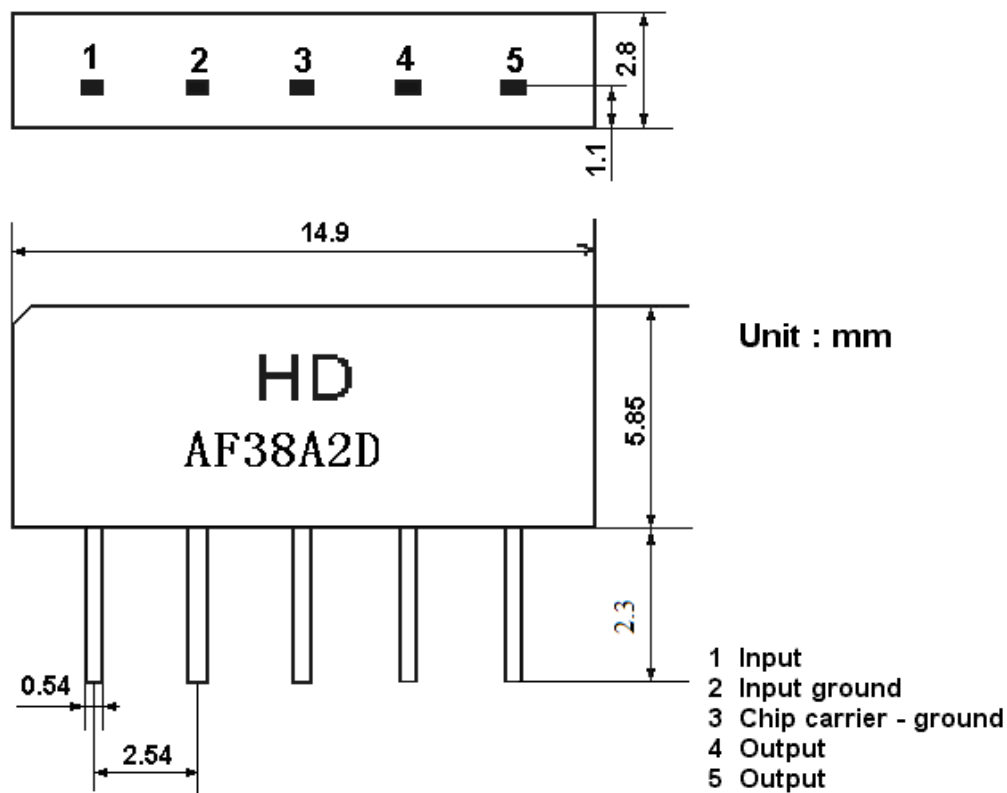
SHOULDER's SAW filter series have broad line up products meeting all broadcast standard including NTSC,PAL and SECAM systems. These filters are composed of two interdigital transducers on a single-crystal, piezoelectrical chip. they are used in electronic equipments such as TV and so on.

## 2.Construction

### 2.1 Dimension and materials

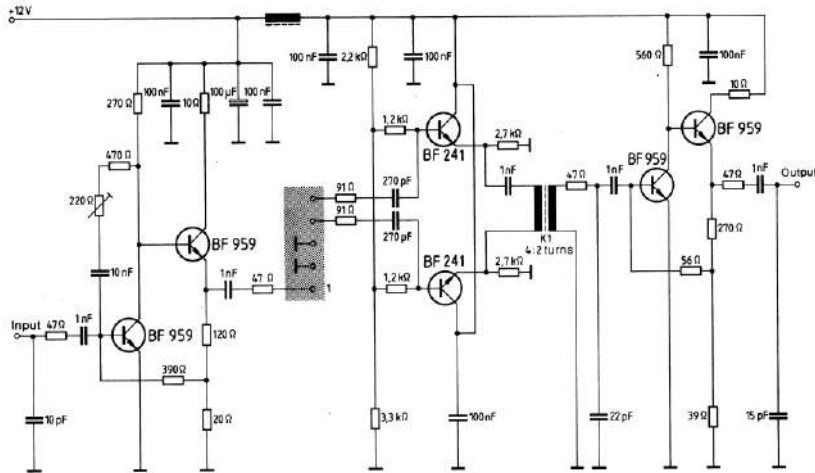
Manufacturer's name : SHOULDER ELECTRONICS Co. LTD(CHINA)

Type : AF38A2D



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°C to 35°C 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°C ~ +60°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°C ~ +70°C	
Reference temperature	+25°C	

### 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

$Z_S=50\ \Omega$

Load impedance

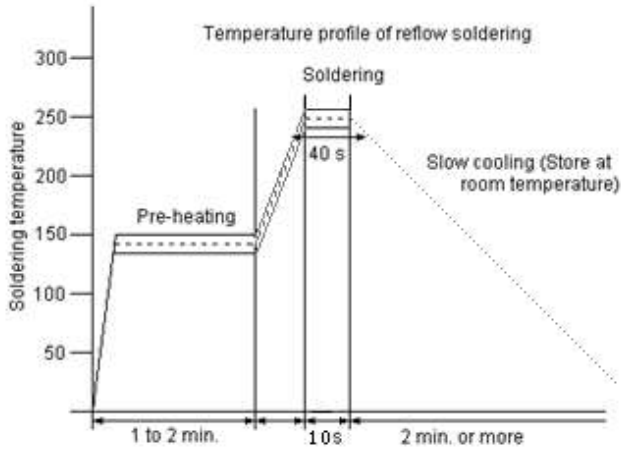
$Z_L=2k\ \Omega //3pF$

$T_A=25^\circ C$

Item	Freq	min	typ	max	
Insertion attenuation Reference level	31.50MHz	11.9	13.9	15.9	dB
Relative attenuation	32.50MHz	-1.3	-0.1	1.1	dB
	33.50MHz	-1.0	0.2	1.4	dB
	38.00MHz	40.0	50.0	-	dB
	30.00MHz	40.0	55.0	-	dB
	39.50MHz	40.0	52.0	-	dB
	40.00MHz	40.0	48.0	-	dB
	40.50MHz	40.0	55.0	-	dB
Sidelobe	25.00~30.00MHz	35.0	42.0	-	dB
	38.00~45.00MHz	36.0	45.0	-	dB
Temperature coefficient		-72			ppm/k

### 3.3 Environmental Performance Characteristics

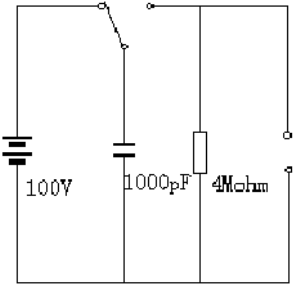
Item	Condition	Specifications																						
High temperature	The specimen shall be store at a temperature of $80\pm 2^\circ C$ for $96\pm 4h$ . Then it shall be subjected to standard atmospheric conditions for 1h, after which measurement shall be made within 1h.	Mechanical characteristics and specifications in electrical characteristics shall be satisfied. There shall be no excessive change in appearance.																						
Low temperature	The specimen shall be store at a temperature of $-20\pm 3^\circ C$ for $96\pm 4h$ . Then it shall be subjected to standard atmospheric conditions for 1h, after which measurement shall be made within 1h.																							
Humidity	The specimen shall be store at a temperature of $40\pm 2^\circ C$ with relative humidity of 90% to 96% for $96\pm 4h$ . Then it shall be subjected to standard atmospheric conditions for 1h, after which measurement shall be made within 1h.																							
Thermal shock	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 border="1"> <thead> <tr> <th></th> <th>Temperature</th> <th>Duration</th> </tr> </thead> <tbody> <tr> <td>1</td> <td><math>+25^\circ C \Rightarrow -40^\circ C</math></td> <td>0.5h</td> </tr> <tr> <td>2</td> <td><math>-40^\circ C</math></td> <td>4h</td> </tr> <tr> <td>3</td> <td><math>-40^\circ C \Rightarrow +85^\circ C</math></td> <td>2h</td> </tr> <tr> <td>4</td> <td><math>+85^\circ C</math></td> <td>4h</td> </tr> <tr> <td>5</td> <td><math>+85^\circ C \Rightarrow +25^\circ C</math></td> <td>0.5h</td> </tr> <tr> <td>6</td> <td><math>+25^\circ C</math></td> <td>1h</td> </tr> </tbody> </table>		Temperature	Duration	1	$+25^\circ C \Rightarrow -40^\circ C$	0.5h	2	$-40^\circ C$	4h	3	$-40^\circ C \Rightarrow +85^\circ C$	2h	4	$+85^\circ C$	4h	5	$+85^\circ C \Rightarrow +25^\circ C$	0.5h	6	$+25^\circ C$	1h
			Temperature	Duration																				
	1	$+25^\circ C \Rightarrow -40^\circ C$	0.5h																					
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	3	$-40^\circ C \Rightarrow +85^\circ C$	2h																					
	4	$+85^\circ C$	4h																					
5	$+85^\circ C \Rightarrow +25^\circ C$	0.5h																						
6	$+25^\circ C$	1h																						
Resistance to Soldering	Reflow soldering method Peak: $255 \pm 5^\circ C$ , $220 \pm 5^\circ C$ , 40s																							

heat	<p>At electrode temperature of the specimen.</p>  <p>The specimen shall be passed through the reflow furnace with the condition shown in the above profile for 1 time.</p> <p>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.</p>	
Solder ability	<p>Immerse the pins melt solder at <math>260^{\circ}\text{C}+5/-0^{\circ}\text{C}</math> for 5 sec.</p>	<p>More then 95% of total area of the pins should be covered with solder</p>

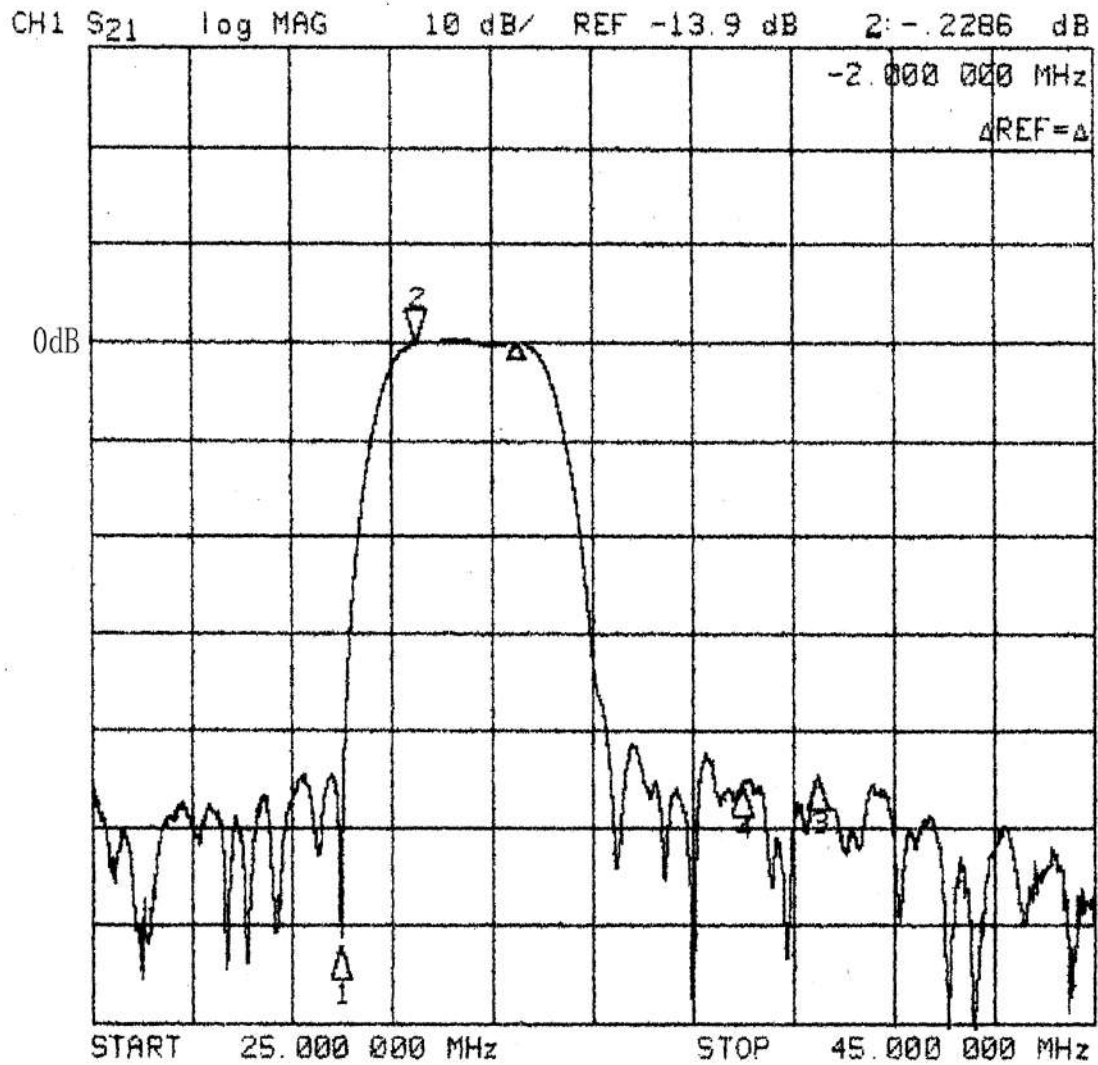
### 3.4 Mechanical Test

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

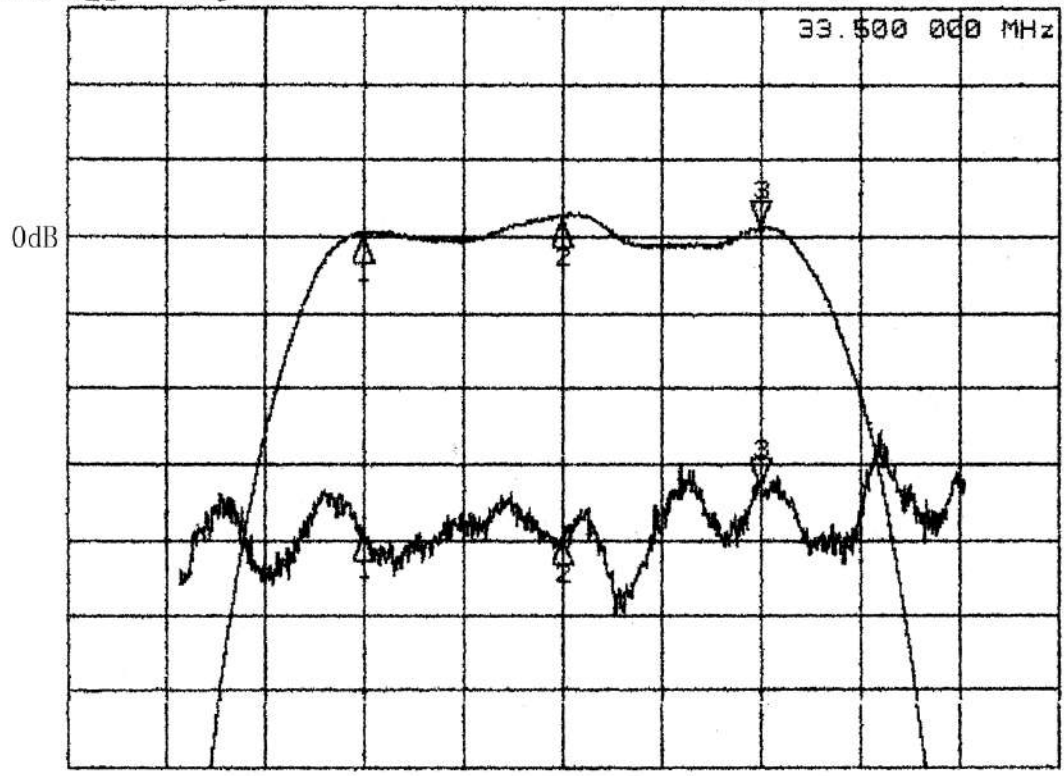
### 3.5 Voltage Discharge Test

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

### 3.6 Frequency response



CH1 S21 delay 30 ns/ REF 1.194  $\mu$ s Q: 1.095  $\mu$ s  
CH2 S21 log MAG 1 dB/ REF -13.9 dB Q: -13.788 dB



START 30.000 000 MHz

STOP 35.000 000 MHz