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Approved by:

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# ***SPECIFICATION***

**PRODUCT: SAW FILTER**

**MODEL: HDAF389A13Dd**



**SHOULDER ELECTRONICS LIMITED**

## 1.SCOPE

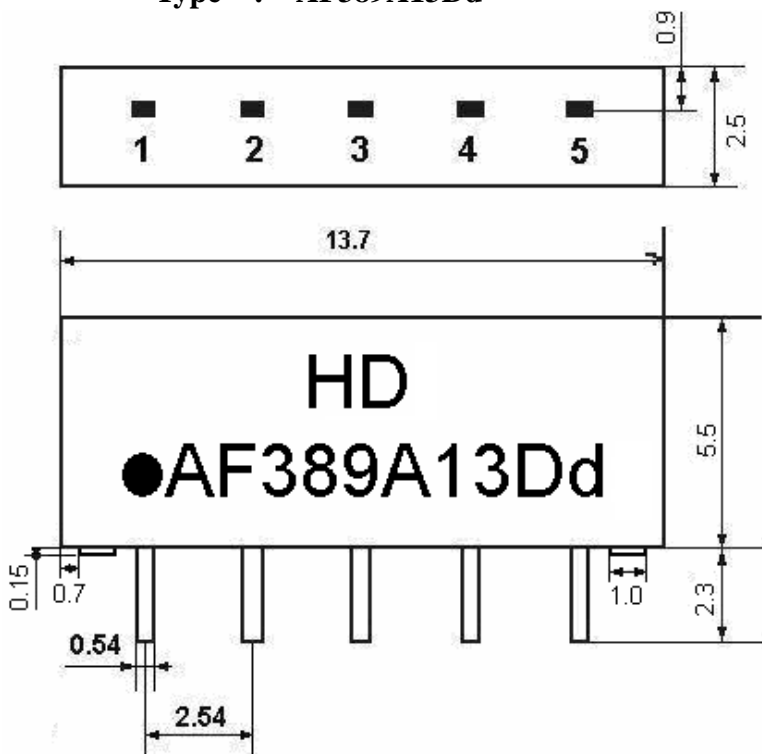
SHOULDER's SAW filter series have broad line up products meeting all broadcast standard including NTSC,PAL and SECAM systems. These filters are composed of two interdigital transducers on a single-crystal, piezoelectrical chip. they are used in electronic equipments such as TV and so on.

## 2.Construction

### 2.1 Dimension and materials

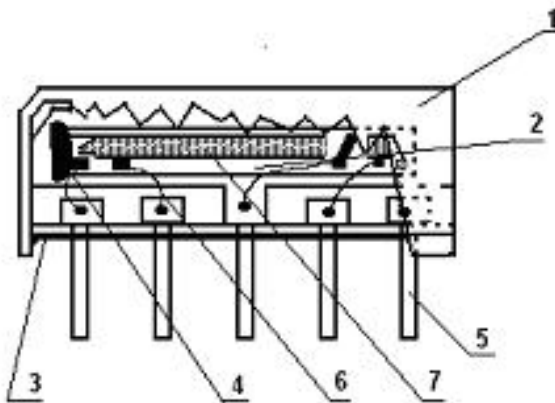
Manufacturer's name : SHOULDER ELECTRONICS Co. LTD(CHINA)

Type : AF389A13Dd



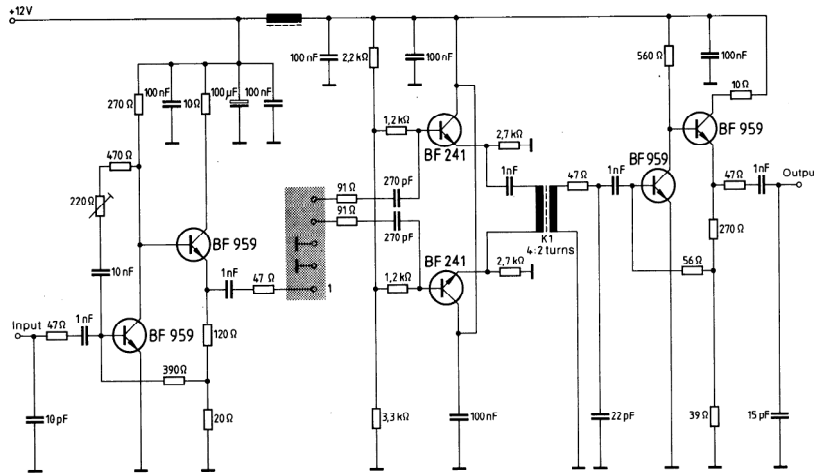
- 1 Input
- 2 Switching Input
- 3 Input - ground / Chip carrier - ground
- 4 Output
- 5 Output

SIP5D 封装为无锡市好达电子有限公司的专利,若因为使用声表所引起的专利纠纷,由好达承担声表的相应责任。



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. -20°C ~ +85°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 ~ +85°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

#### Characteristics of channel 1

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	33.40MHz	14.7	16.2	17.7	dB
Relative attenuation	32.35MHz	-0.8	0.2	1.2	dB
	32.40MHz	-0.9	0.1	1.1	dB
	32.90MHz	-1.3	-0.3	0.7	dB
	38.90MHz	41.0	50.0	-	dB
	34.47MHz	28.0	40.0	-	dB
	30.90MHz	46.0	59.0	-	dB
	40.40MHz	40.0	46.0	-	dB
	40.90MHz	41.0	48.0	-	dB
Sidelobe	25.00~30.90MHz	40.0	45.0	-	dB
	38.90~45.00MHz	38.0	44.0	-	dB
Temperature coefficient			-72		ppm/k

#### Characteristics of channel 2

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	34.40MHz	12.5	14.0	15.5	dB
Relative attenuation	38.90MHz	41.0	54.0	-	dB
	35.32MHz	25.0	34.0	-	dB
	32.90MHz	33.0	48.0	-	dB
	40.40MHz	41.0	50.0	-	dB
Sidelobe	25.00~30.30MHz	33.0	39.0	-	dB
	30.30~32.90MHz	28.0	34.0		
	38.90~45.00MHz	38.0	45.0	-	dB
Temperature coefficient			-72		ppm/k

### 3.3 Environmental Performance Characteristics

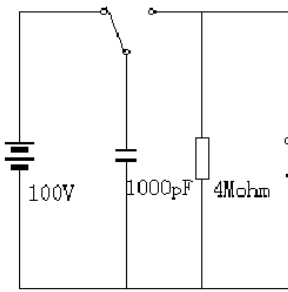
Item	Condition	Specifications
High temperature	The specimen shall be store at a temperature of $80\pm 2^\circ C$ for $96\pm 4h$ . Then it shall be subjected to standard atmospheric conditions for 1h, after which measurement shall be made within 1h.	Mechanical characteristics and specifications in electrical
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.	characteristics shall be satisfied. There shall be no excessive change in appearance.																				
Humidity	The specimen shall be store at a temperature of $40\pm 2^{\circ}\text{C}$ with relative humidity of 90% to 96% for $96\pm 4\text{h}$ . Then it shall be subjected to standard atmospheric conditions for 1h, after which measurement shall be made within 1h.																					
Thermal shock	<p>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.</p> <table border="1"> <thead> <tr> <th></th> <th>Temperature</th> <th>Duration</th> </tr> </thead> <tbody> <tr> <td>1</td> <td><math>+25^{\circ}\text{C} \Rightarrow -40^{\circ}\text{C}</math></td> <td>0.5h</td> </tr> <tr> <td>2</td> <td><math>-40^{\circ}\text{C}</math></td> <td>4h</td> </tr> <tr> <td>3</td> <td><math>-40^{\circ}\text{C} \Rightarrow +85^{\circ}\text{C}</math></td> <td>2h</td> </tr> <tr> <td>4</td> <td><math>+85^{\circ}\text{C}</math></td> <td>4h</td> </tr> <tr> <td>5</td> <td><math>+85^{\circ}\text{C} \Rightarrow +25^{\circ}\text{C}</math></td> <td>0.5h</td> </tr> <tr> <td>6</td> <td><math>+25^{\circ}\text{C}</math></td> <td>1h</td> </tr> </tbody> </table>		Temperature	Duration	1	$+25^{\circ}\text{C} \Rightarrow -40^{\circ}\text{C}$	0.5h	2	$-40^{\circ}\text{C}$	4h	3	$-40^{\circ}\text{C} \Rightarrow +85^{\circ}\text{C}$	2h	4	$+85^{\circ}\text{C}$	4h	5	$+85^{\circ}\text{C} \Rightarrow +25^{\circ}\text{C}$	0.5h	6	$+25^{\circ}\text{C}$	1h
	Temperature	Duration																				
1	$+25^{\circ}\text{C} \Rightarrow -40^{\circ}\text{C}$	0.5h																				
2	$-40^{\circ}\text{C}$	4h																				
3	$-40^{\circ}\text{C} \Rightarrow +85^{\circ}\text{C}$	2h																				
4	$+85^{\circ}\text{C}$	4h																				
5	$+85^{\circ}\text{C} \Rightarrow +25^{\circ}\text{C}$	0.5h																				
6	$+25^{\circ}\text{C}$	1h																				
Resistance to Soldering heat	<p>Reflow soldering method  Peak: <math>255 \pm 5^{\circ}\text{C}</math> for ROHS  At electrode temperature of the specimen.</p> <p style="text-align: center;">Temperature profile of reflow soldering</p> <p>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.</p>																					
Solder ability	Immerse the pins melt solder at $260^{\circ}\text{C} +5/-0^{\circ}\text{C}$ for 5 sec.	More then 95% of total area of the pins should be covered with solder																				

### 3.4 Mechanical Test

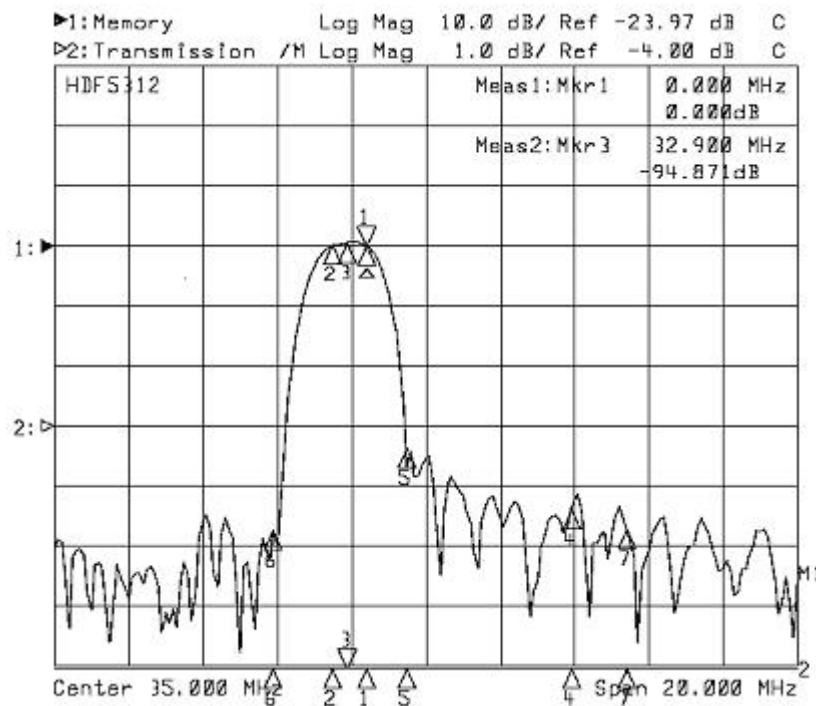
Items	Conditions	Specifications
Vibration	600-3300rpm amplitude 1.5mm 3 directions 2 H each	There shall be no damage.
Drop	On maple plate from 1m high 3 times	
Lead pull	Pull with 1kg force for 30 seconds	
Lead bend	90° bending with 500g weigh 2 times	

### 3.5 Voltage Discharge Test

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

### 3.6 Frequency response

#### Frequency response of channel 1



## Frequency response of channel 2

