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Approved by:
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SPECIFICATION

PRODUCT: SAW FILTER

MODEL: HDAF389A2DF15

SHOULDER ELECTRONICS LIMITED

1.SCOPE

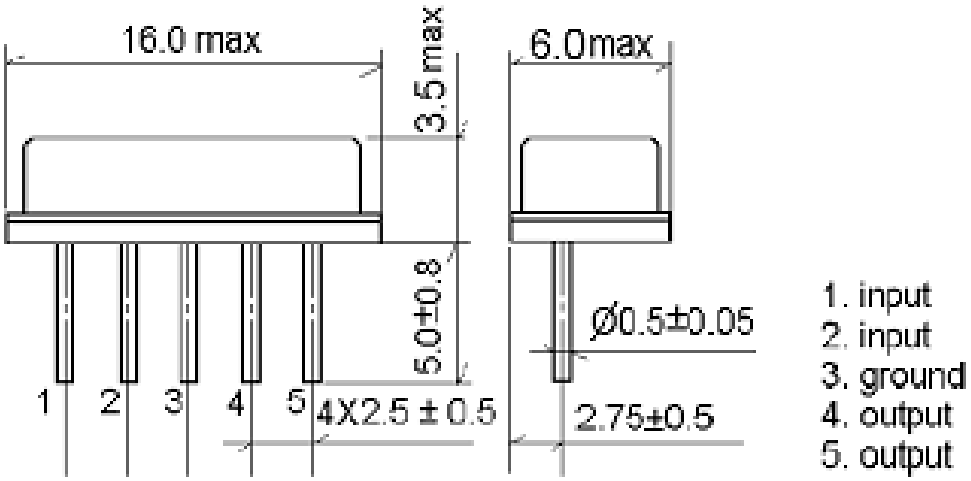
SHOULDER's SAW filter series have broad line up products meeting all broadcast standard including NTSC,PAL and SECAM systems. These filters are composed of two interdigital transducers on a single-crystal. piezoelectrical chip. they are used in electronic equipments such as TV and so on.

2.Construction

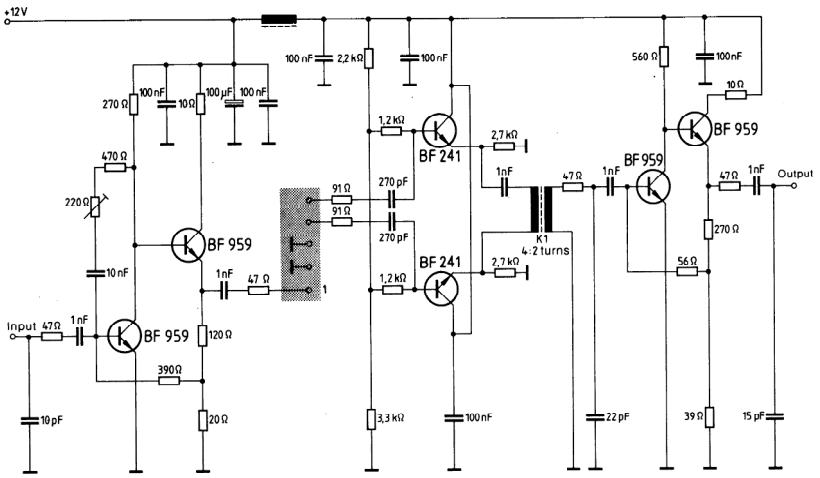
2.1 Dimension and materials

Manufacturer's name : SHOULDER ELECTRONICS LTD(CHINA)

Type : AF389A2D



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

Characteristics of channel 1 (switching input pin 2 connected to ground pin 3)

Source impedance Zs=50Ω

Load impedance Z_L=2kΩ//3pF T_A=25℃

Item		Freq	min	typ	max	
Insertion attenuation Reference level		40.40MHz	11.6	14.1	16.6	dB
Relative attenuation		33.90MHz	38.0	45.0	-	dB
		38.40MHz	38.0	45.0	-	dB
		41.90MHz	34.0	44.0	-	dB
		32.40MHz	36.0	45.0	-	dB
Sidelobe	25.00~38.40MHz		35.0	42.0	-	dB
	41.90~45.00MHz		33.0	40.0	-	dB
Temperature coefficient			-72			ppm/k

Characteristics of channel 2 (switching input pin 2 connected to input pin 1)

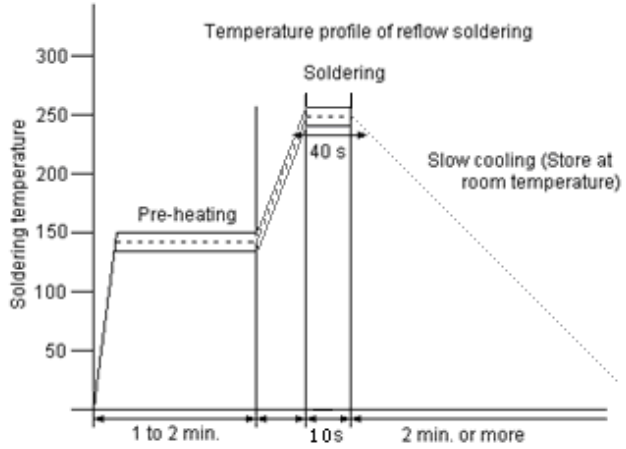
Source impedance Zs=50Ω

Load impedance Z_L=2kΩ//3pF T_A=25℃

Item		Freq	min	typ	max	
Insertion attenuation Reference level		33.40MHz	12.9	15.4	17.9	dB
Relative attenuation		33.05MHz	-1.9	-0.4	1.1	dB
		32.90MHz	-1.6	-0.1	1.4	dB
		32.40MHz	-1.6	-0.1	1.4	dB
		38.90MHz	35.0	45.0	-	dB
		34.47MHz	24.0	32.0	-	dB
		30.90MHz	30.0	40.0	-	dB
		40.40MHz	32.0	40.0	-	dB
		40.90MHz	32.0	45.0	-	dB
		41.40MHz	32.0	40.0	-	dB
Sidelobe	25.00~30.50MHz		35.0	42.0	-	dB
	40.40~45.00MHz		30.0	38.0	-	dB
Temperature coefficient			-72			ppm/k

3.3Environmental Performance Characteristics

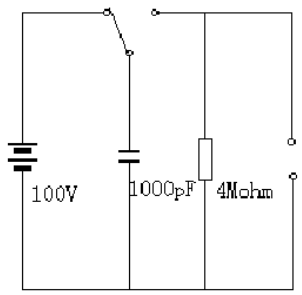
<table>
<tr><th>Item</th><th>Condition</th><th>Specifications</th></tr>
<tr><td>High temperature</td><td>The specimen shall be store at a temperature of 80±2℃ for 96±4h. Then it shall be subjected to standard atmospheric conditions for 1h, after which measurement shall be made within 1h.</td><td rowspan="5">Mechanical 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>
<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></tr>
<tr><td>Resistance to Soldering heat</td><td>Reflow soldering method
Peak: 255 ±5 ℃, 220 ±5℃, 40s
At electrode temperature of the specimen.</td></tr>
</table>

	 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.	
Solder ability	Immerse the pins melt solder at 260℃+5/-0℃ for 5 sec.	More then 95% of total area of the pins should be covered with solder

3.4Mechanical Test

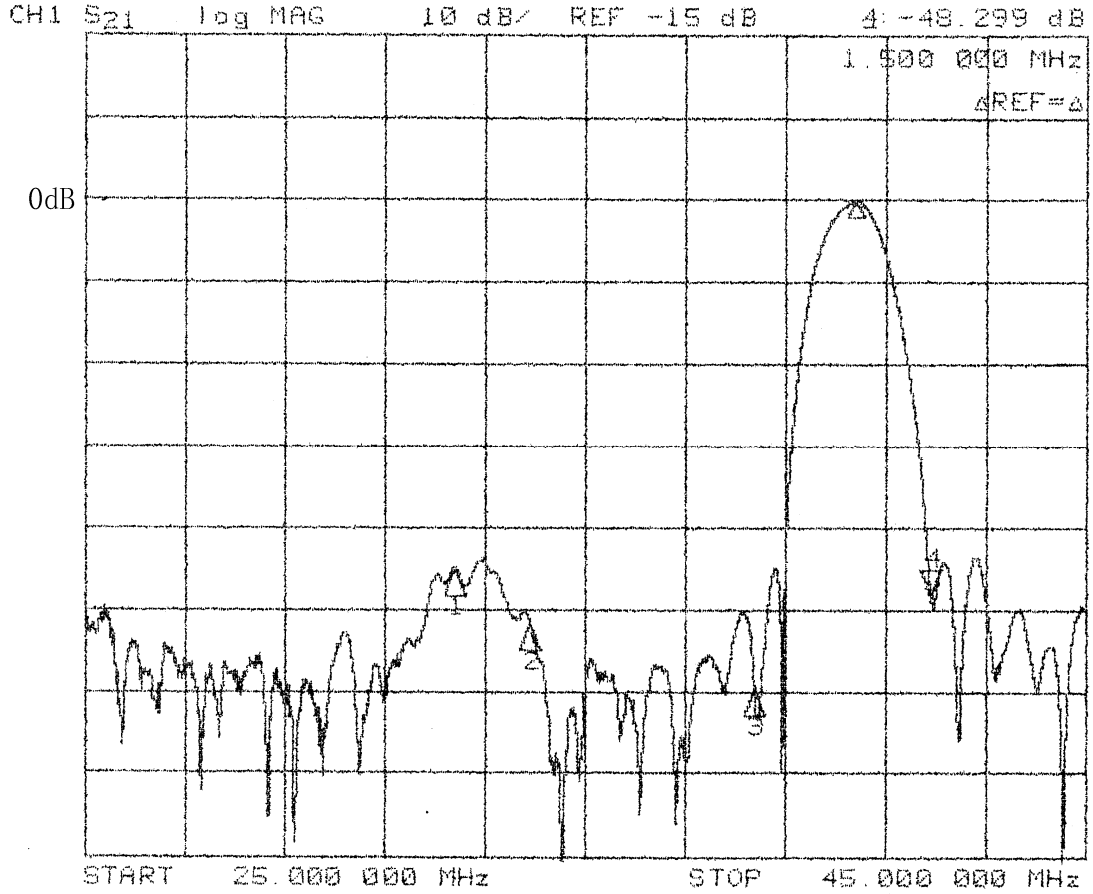
Items	Conditions	Specifications
Vibration	600-3300rpm amplitude 1.5mm 3 directions 2 H each	There shall be no damage.
Drop	On maple plate from 1m high 3 times	
Lead pull	Pull with 1kg force for 30 seconds	
Lead bend	90^{o} bending with 500g weigh 2 times	

3.5Voltage Discharge Test

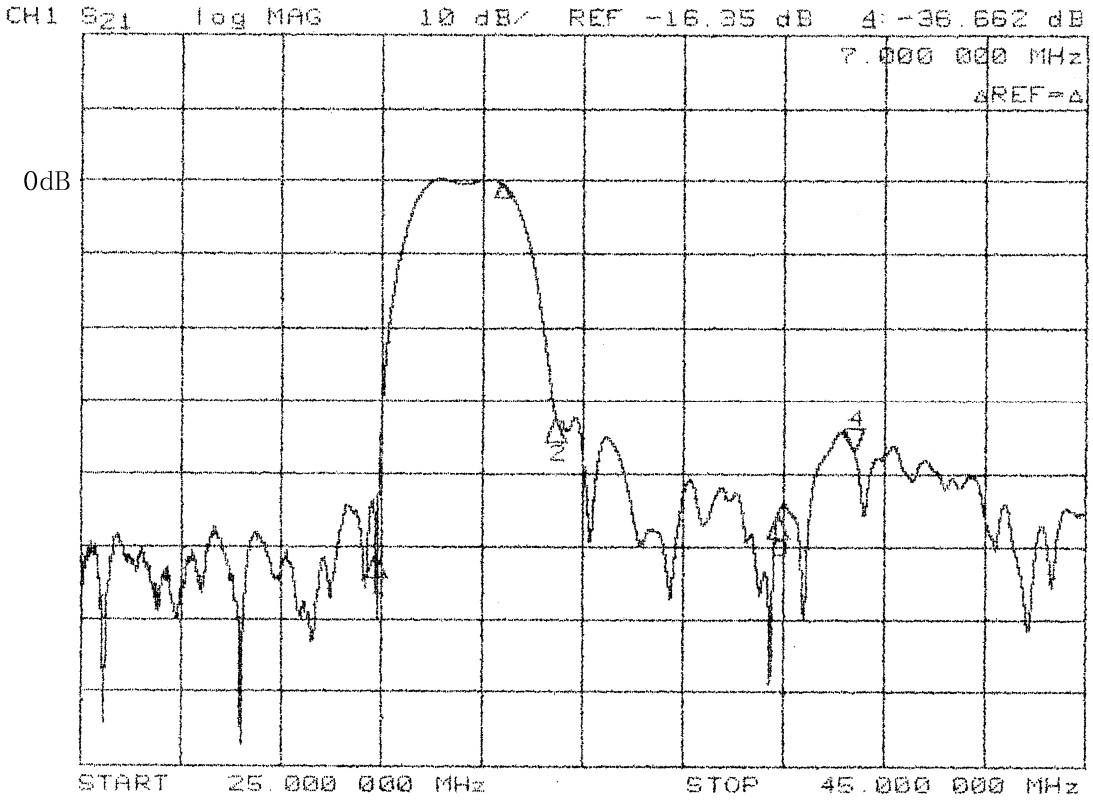
Item	Condition	Specifications
Surge	Between any two electrode 	There shall be no damage

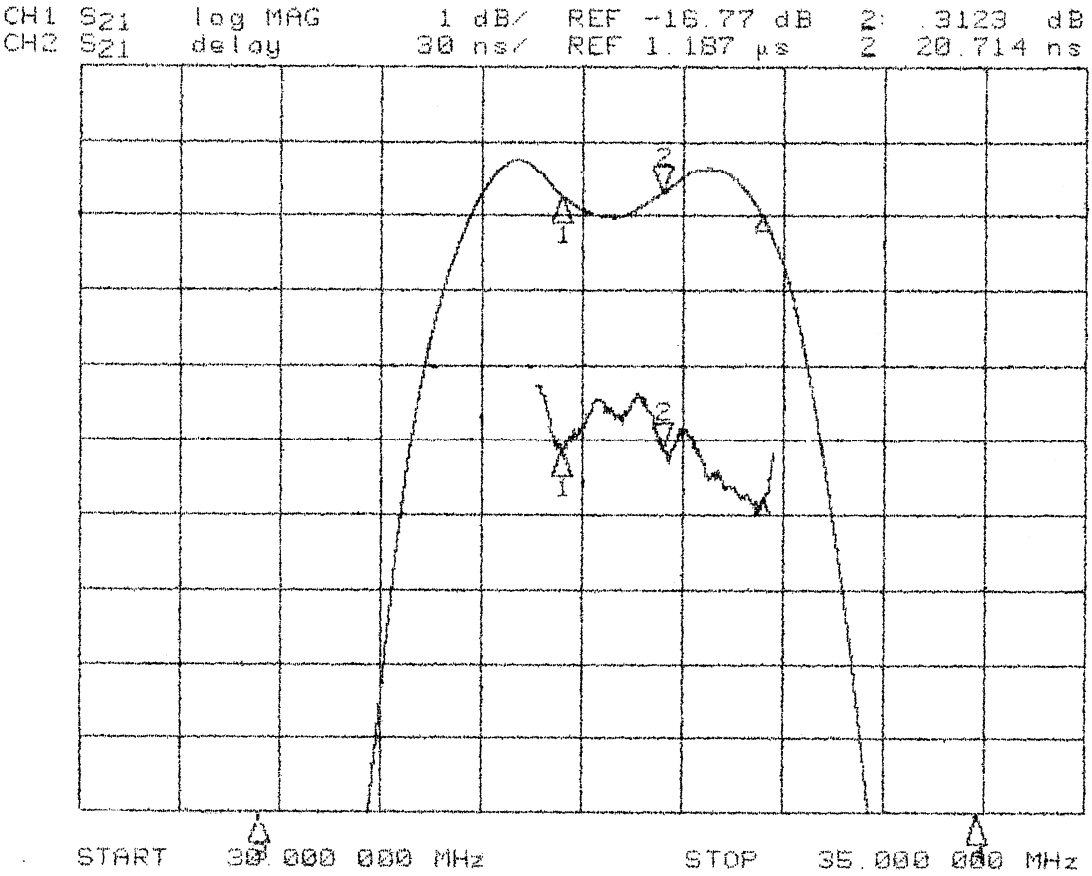
3.6 Frequency response

Frequency response of channel 1



Frequency response of channel 2


CH1 S21 log MAG 10 dB/ REF -16.35 dB 4: -36.662 dB
7.000 000 MHz
ΔREF=Δ
0dB
START 25.000 000 MHz
STOP 45.000 000 MHz


CH1 S21 log MAG 1 dB/ REF -16.77 dB 2: .3123 dB
CH2 S21 delay 30 ns/ REF 1.187 µs 2 20.714 ns
START 30.000 000 MHz
STOP 35.000 000 MHz