## 1.SCOPE

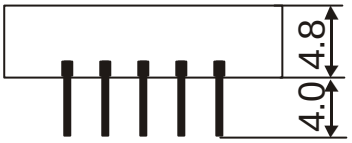
**HAODA's SAW filter series have broad line up products meeting all broadcast standard including NTSC,PAL and SECAM systems. These filters are composed of two interdigital transducers on a single-crystal. piezoelectrical chip. they are used in electronic equipments such as TV and so on.**

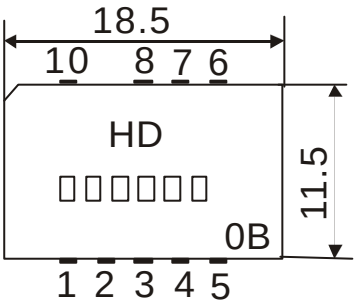
## 2.Construction

**2.1 Dimension and materials**

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

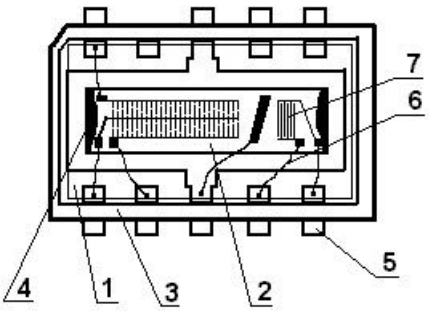
**Type : QSF45A1T**



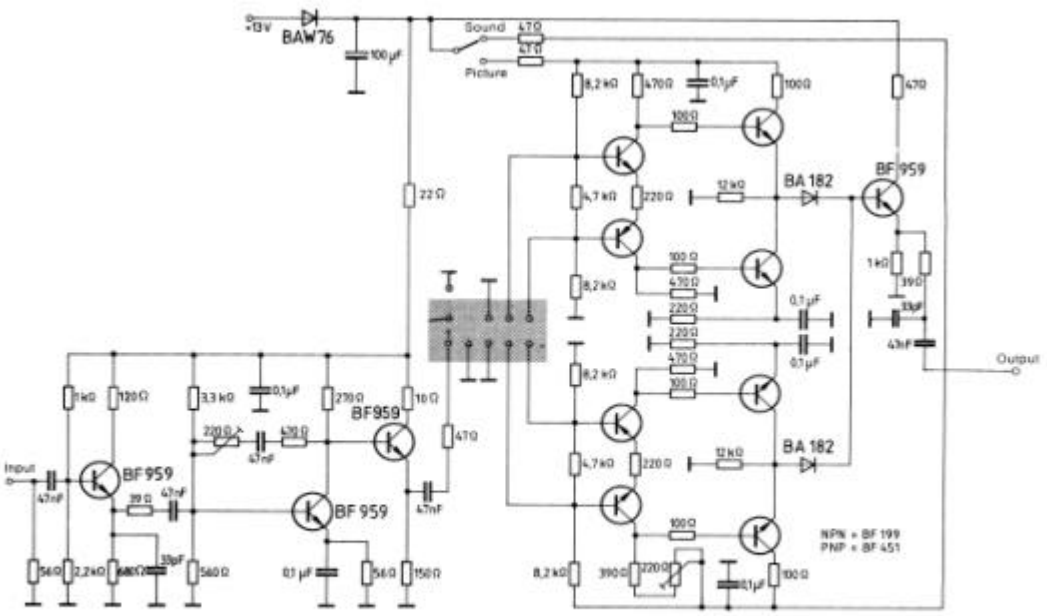

**0: year(0,1,2,3,4,5,6,7,8,9)**

**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 | PPS |
| 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 DIP-10 filter
Input impedance of the symmetrical post-amplifier: 2 kΩ in parallel with 5 pF

## 3.Characteristics

**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

**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 picture channel**

Source impedance Zs=50Ω

Load impedance $Z_L$=2kΩ//3pF $T_A$=25℃

| Item | | Freq | min | typ | max | |
|---|---|---|---|---|---|---|
| Insertion attenuation Reference level | | 44.06MHz | 11.0 | 13.0 | 15.0 | dB |
| Relative attenuation | | 45.81MHz | 4.5 | 6.0 | 7.5 | dB |
| | | 42.23MHz | -0.6 | 0.9 | 2.4 | dB |
| | | 41.31MHz | 22.0 | 35.0 | - | dB |
| | | 39.81MHz | 38.0 | 45 | - | dB |
| | | 47.31MHz | 40.0 | 45 | - | dB |
| Sidelobe | 35.06~39.81MHz | | 32.0 | | | dB |
| | 47.31~55.06MHz | | 32.0 | | | dB |
| Temperature coefficient | | | -72 | | | ppm/k |

**Characteristics of sound channel**

Source impedance Zs=50Ω

Load impedance $Z_L$=2kΩ//3pF $T_A$=25℃

| | | Freq | min | typ | max | |
|---|---|---|---|---|---|---|
| **Insertion attenuation** Reference level | | 41.31MHz | 8.9 | 10.9 | 12.9 | dB |
| Pass bandwidth | | $B_{3dB}$ | - | 0.6 | - | MHz |
| | | $B_{20dB}$ | - | 1.35 | - | MHz |
| Relative attenuation | | 45.81MHz | 38.0 | 45.0 | - | dB |
| | | 42.23MHz | 20.0 | 25.0 | - | dB |
| | | 39.81MHz | 37.0 | 45.0 | - | dB |
| | | 47.31MHz | 38.0 | 45.0 | - | dB |
| **Sidelobe** | 35.06~39.41MHz | | 32.0 | 35.0 | | dB |
| | 48.06~55.06MHz | | 32.0 | 38.0 | | dB |
| Temperature coefficient | | | -72 | | | ppm/K |

### 3.3 Environmental Performance Characteristics

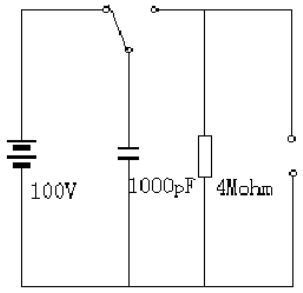
| Item Test condition | Allowable change of absolute Level at center frequency(dB) |
|---|---|
| High temperature test 70℃ 1000H | < 1.0 |
| Low temperature test -40℃ 1000H | < 1.0 |

| | |
|---|---|
| Humidity test<br>40℃ 90-95% 1000H | < 1.0 |
| Thermal shock<br>-20℃==25℃==80℃ 20 cycle<br>30M 10M 30M | < 1.0 |
| Solder temperature test<br>Sold temp.260℃ for 10 sec. | < 1.0 |
| Soldering<br>Immerse the pins melt solder<br>at 260℃+5/-0℃ for 5 sec. | More then 95% of total<br>area of the pins should<br>be covered with solder |

**3.4 Mechanical Test**

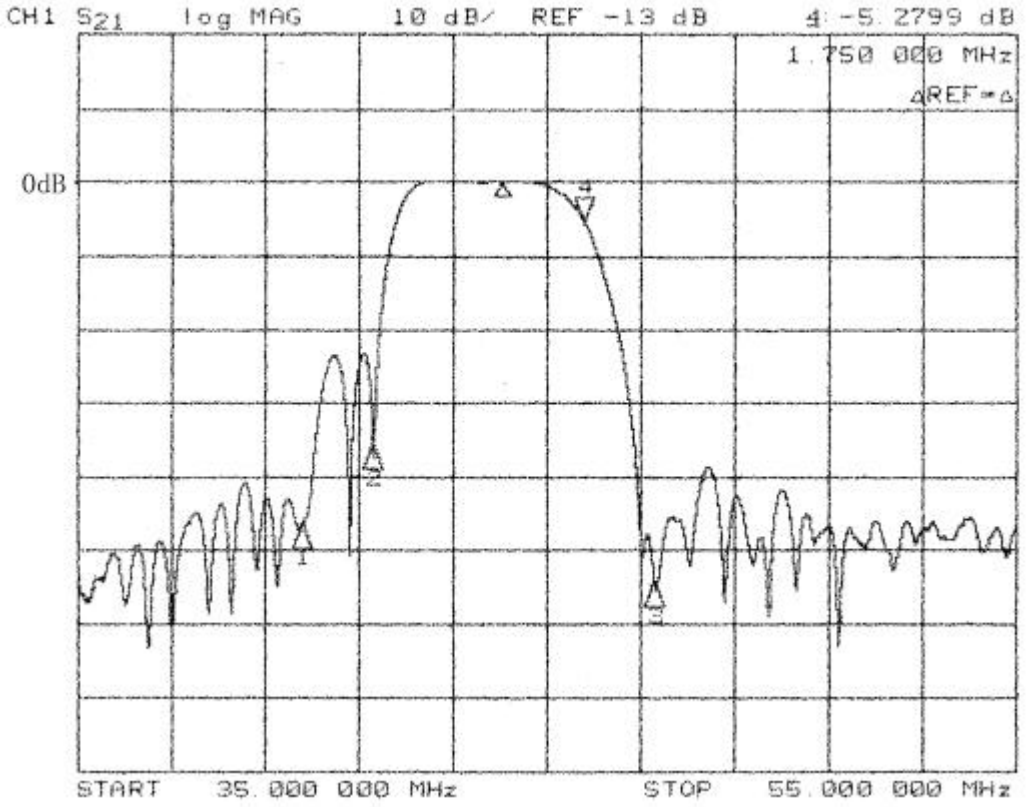
| Item<br>Test condition | Allowable change of absolute<br>Level at center frequency(dB) |
|---|---|
| Vibration test<br>600-3300rpm amplitude 1.5mm<br>3 directions 2 H each | <1.0 |
| Drop test<br>On maple plate from 1 m high 3 times | <1.0 |
| Lead pull test<br>Pull with 1 kg force for 30 seconds |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

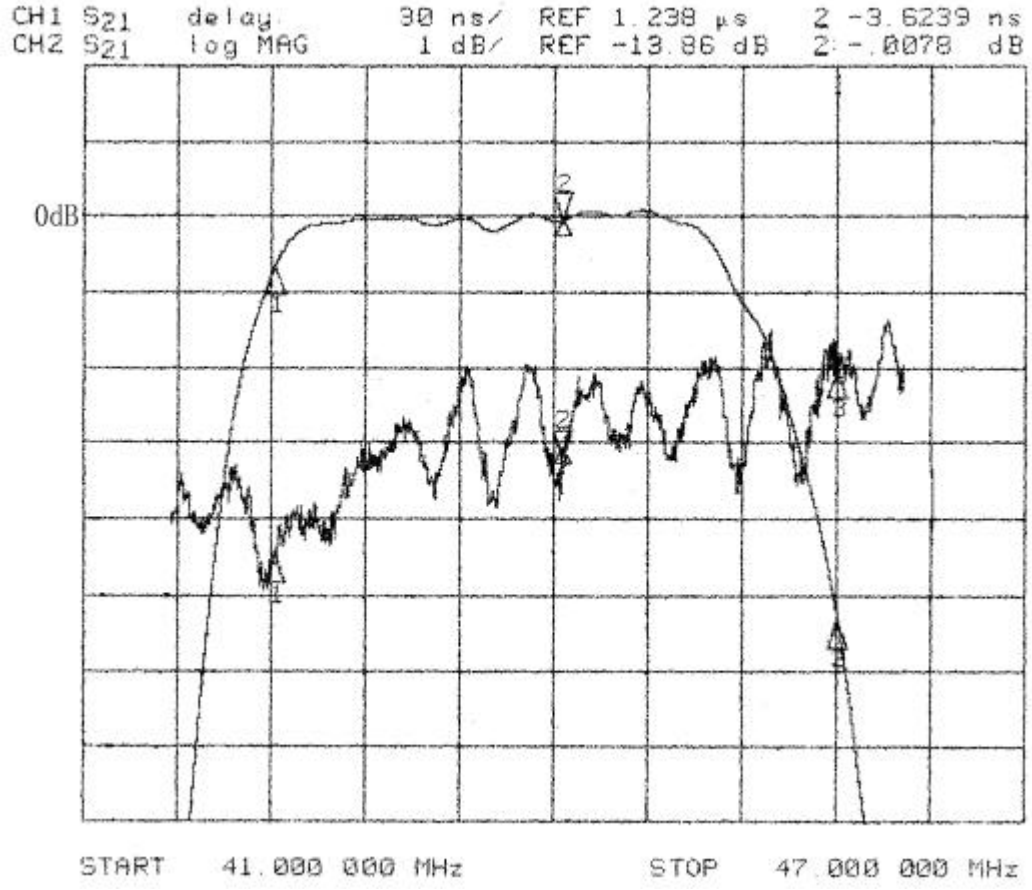
**3.5 Voltage Discharge Test**

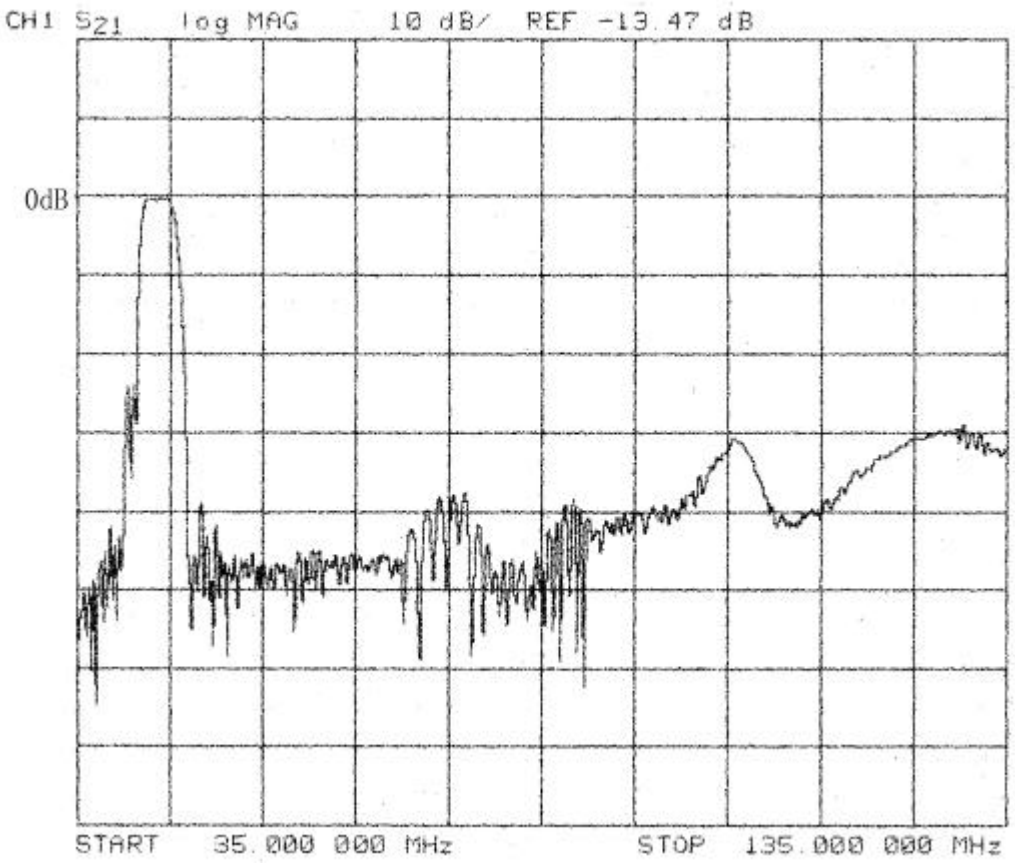
| Item<br>Test condition | Allowable change of absolute<br>Level at center frequency(dB) |
|---|---|
| Surge test<br>Between any two electrode<br>  <br> | <1.0 |

### 3.6 Frequency response

**Frequency response of picture channel**




CH1 S21 log MAG 10 dB/ REF -13.47 dB
0dB
START 35.000 000 MHz
STOP 135.000 000 MHz

**Frequency response of sound channel**