

1.SCOPE

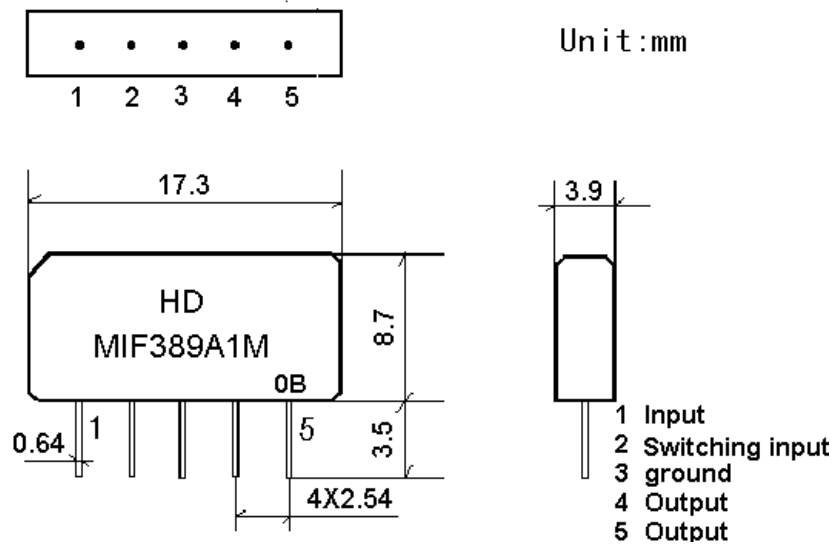
SHOULDER's SAW filter series have broad line up products meeting all broadcast standard including NTSC,PAL and SECAM systems. These filters are composed of two interdigital transducers on a single-crystal, piezoelectrical chip. they are used in electronic equipments such as TV and so on.

2.Construction

2.1 Dimension and materials

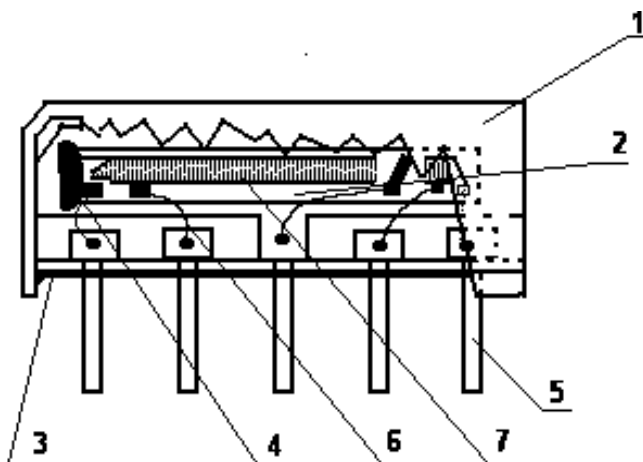
Manufacturer's name : SHOULDER ELECTRONICS Co. LTD(CHINA)

Type : MIF389A1M



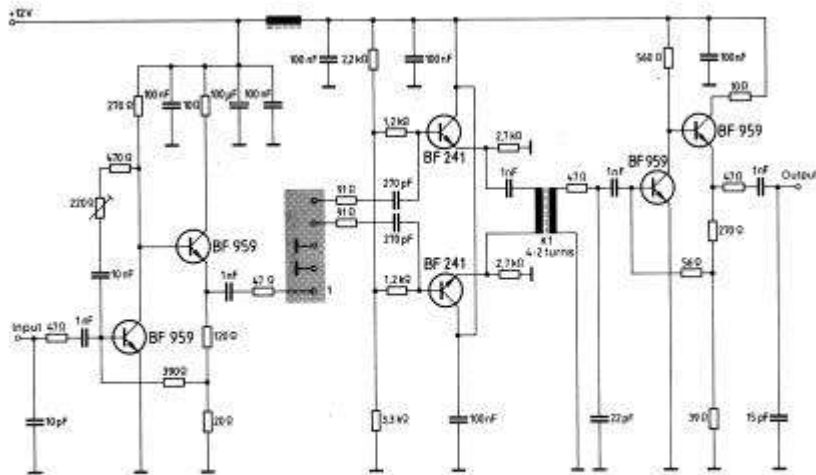
0: year(0,1,2,3,4,5,6,7,8,9)

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

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 in B/G,L/L' mode (switching input pin 2 connected to ground pin 3)

Source impedance

$Z_s=50$

Load impedance

$Z_L=2k //3pF$

$T_A=25$

| Item | Freq | min | typ | max | |
|---|----------------|------|------|------|-------|
| Insertion attenuation Reference level | 37.40MHz | 14.5 | 16.5 | 18.5 | dB |
| Relative attenuation | 38.90MHz | 4.5 | 6.0 | 7.5 | dB |
| | 33.90MHz | - | 7.9 | - | dB |
| | 34.47MHz | -1.0 | 0.5 | 2.0 | dB |
| | 33.40MHz | 28.0 | 40.0 | - | dB |
| | 33.05MHz | - | 36.0 | - | dB |
| | 30.90MHz | 42.0 | 55.0 | - | dB |
| | 31.90MHz | 42.0 | 56.0 | - | dB |
| | 32.40MHz | 42.0 | 54.0 | - | dB |
| | 40.15MHz | 35.0 | 47.0 | - | dB |
| | 40.40MHz | 40.0 | 50.0 | - | dB |
| 41.40MHz | 40.0 | 50.0 | - | dB | |
| Sidelobe | 25.00~31.90MHz | 35.0 | 44.0 | | dB |
| | 40.40~45.00MHz | 35.0 | 41.0 | | dB |
| Reflected wave signal suppression 1.2 us ...6.0 us after main pulse (test pulse 250 ns , carrier frequency 37.40 MHz) | | 40.0 | 50.0 | | dB |
| Feedthrough signal suppression 1.2 us ...6.0 us after main pulse (test pulse 250 ns , carrier frequency 37.40 MHz) | | 42.0 | 52.0 | | dB |
| Temperature coefficient | | | -72 | | ppm/k |

Characteristics in M/N mode (switching input pin 2 connected to input pin 1)

Source impedance $Z_s=50$
 Load impedance $Z_L=2k \ //3pF$ $T_A=25$

| Item | Freq | min | Typ | max | |
|---|----------------|------|------|------|-------|
| Insertion attenuation Reference level | 37.40MHz | 14.5 | 16.5 | 18.5 | dB |
| Relative attenuation | 38.90MHz | 4.9 | 6.4 | 7.9 | dB |
| | 35.32MHz | 1.1 | 2.6 | 4.1 | dB |
| | 34.40MHz | 22.0 | 35.0 | - | dB |
| | 32.90MHz | 35.0 | 42.0 | - | dB |
| | 40.40MHz | 40.0 | 47.0 | - | dB |
| Sidelobe | 25.00~32.90MHz | 33.0 | 41.0 | | dB |
| | 39.50~45.00MHz | 30.0 | 37.0 | | dB |
| Reflected wave signal suppression 1.2 us ...6.0 us after main pulse (test pulse 250 ns , carrier frequency 37.40 MHz) | | 40.0 | 50.0 | | dB |
| Feedthrough signal suppression 1.2 us ...6.0 us after main pulse (test pulse 250 ns , carrier frequency 37.40 MHz) | | - | 48.0 | | dB |
| Temperature coefficient | | | -72 | | ppm/k |

3.3 Environmental Performance Characteristics

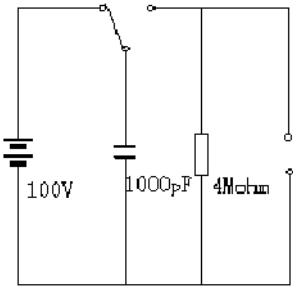
| Item Test condition | Allowable change of absolute Level at center frequency(dB) |
|--|--|
| High temperature test 70 1000H | < 1.0 |
| Low temperature test -40 1000H | < 1.0 |
| Humidity test 40 90-95% 1000H | < 1.0 |
| Thermal shock -20 ==25 ==80 20 cycle 30M 10M 30M | < 1.0 |
| Solder temperature test Sold temp.260 for 10 sec. | < 1.0 |

| | |
|--|---|
| Soldering 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 |
|--|---|

3.4 Mechanical Test

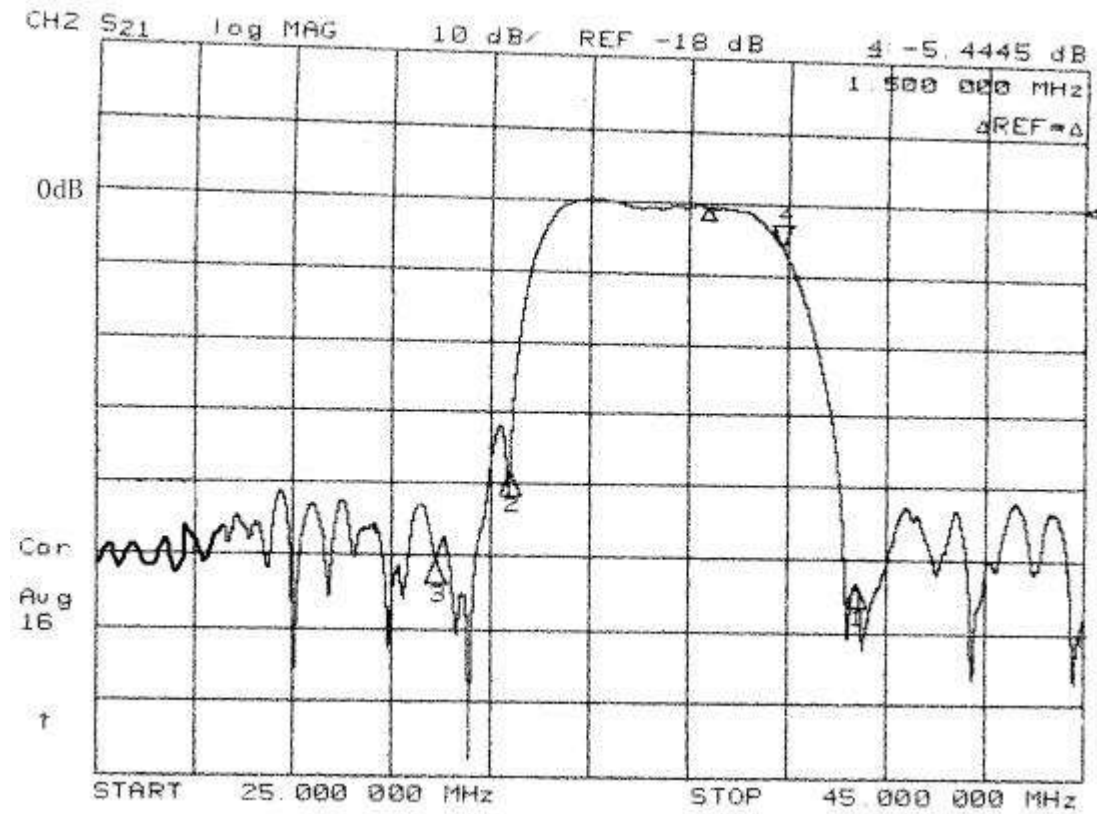
| Item Test condition | Allowable change of absolute Level at center frequency(dB) |
|--|---|
| Vibration test 600-3300rpm amplitude 1.5mm 3 directions 2 H each | <1.0 |
| Drop test On maple plate from 1 m high 3 times | <1.0 |
| Lead pull test Pull with 1 kg force for 30 seconds | <1.0 |
| Lead bend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

3.5 Voltage Discharge Test

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

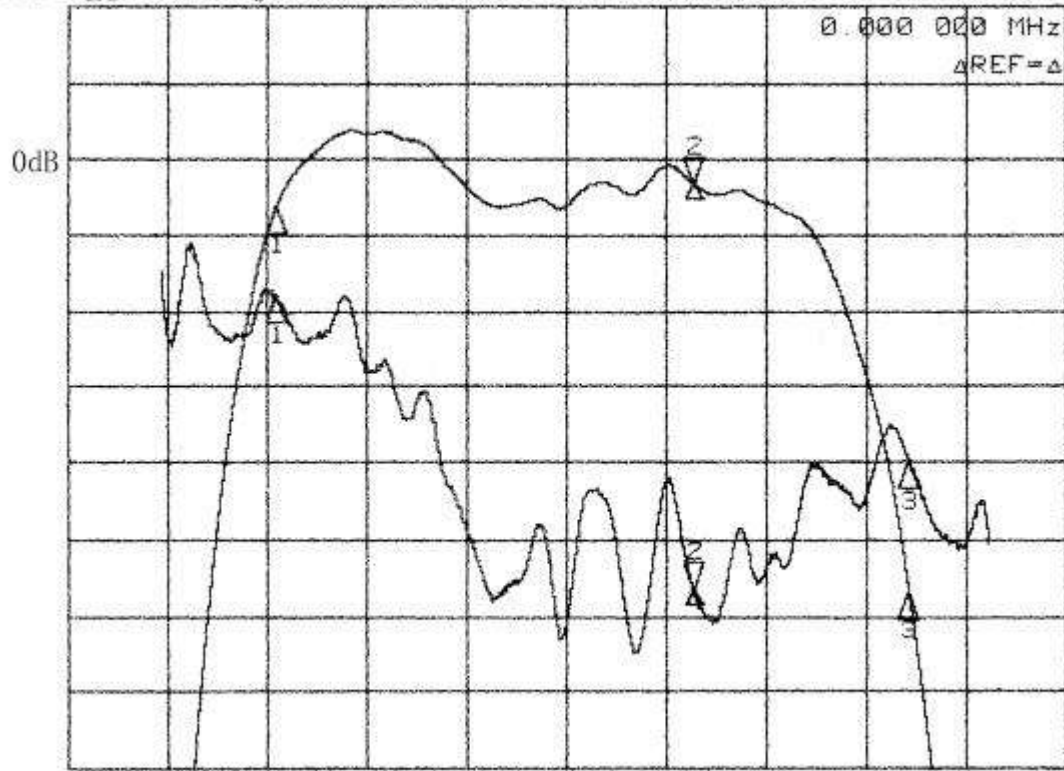
3.6 Frequency response

Frequency response in B/G,L/L' mode



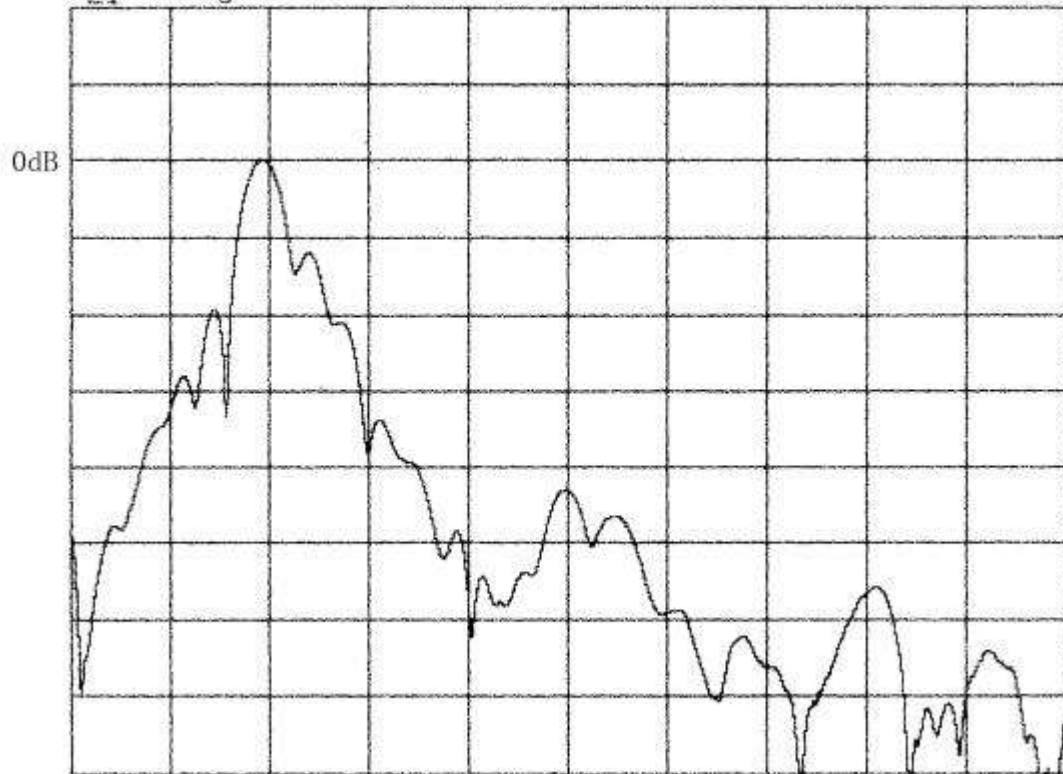
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CH1 S21 log MAG 1 dB/ REF -10 dB 2: -.0099 dB
CH2 S21 delay 30 ns/ REF 1.296 μ s 2 -389.26 ps



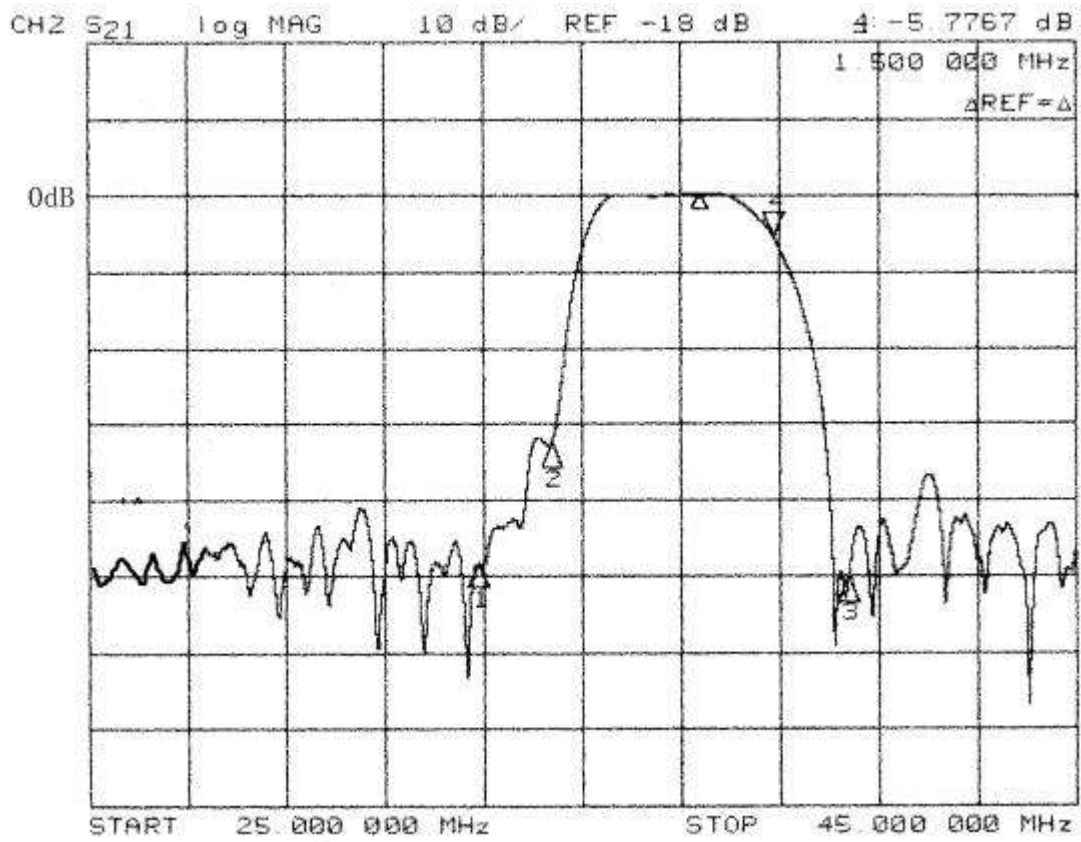
START 33.000 000 MHz STOP 40.000 000 MHz

CH2 S21 log MAG 10 dB/ REF -25.4 dB



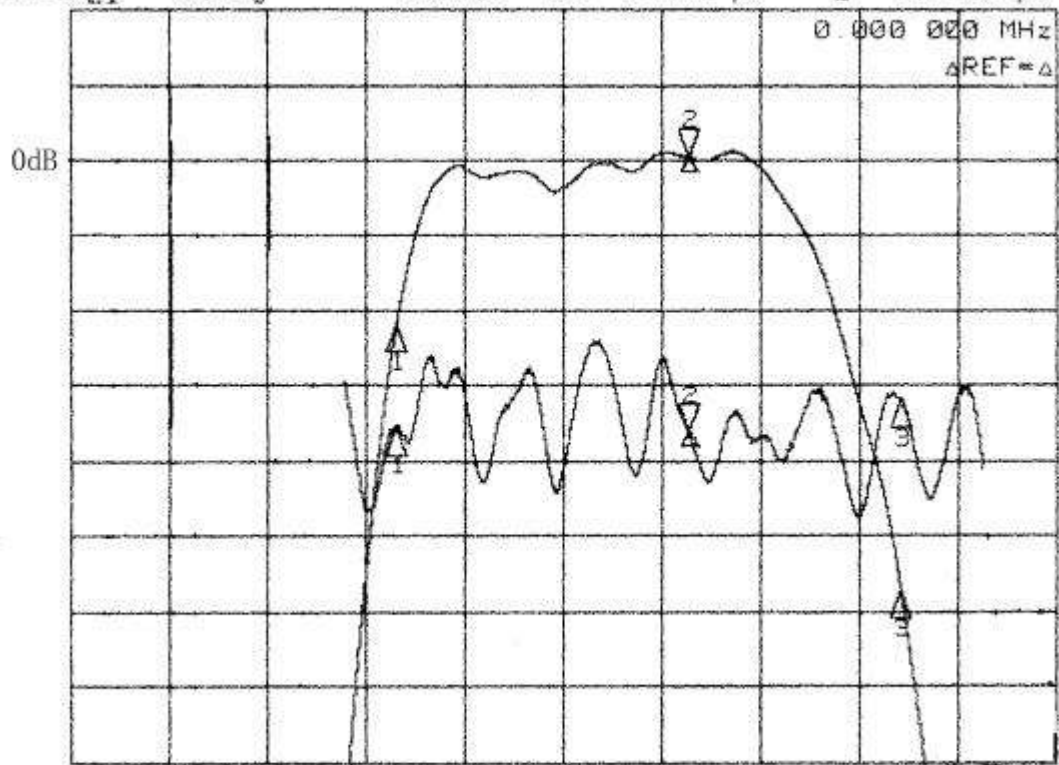
CH2 START 0 s STOP 6 μ s

Frequency response in B/G,L/L' mode



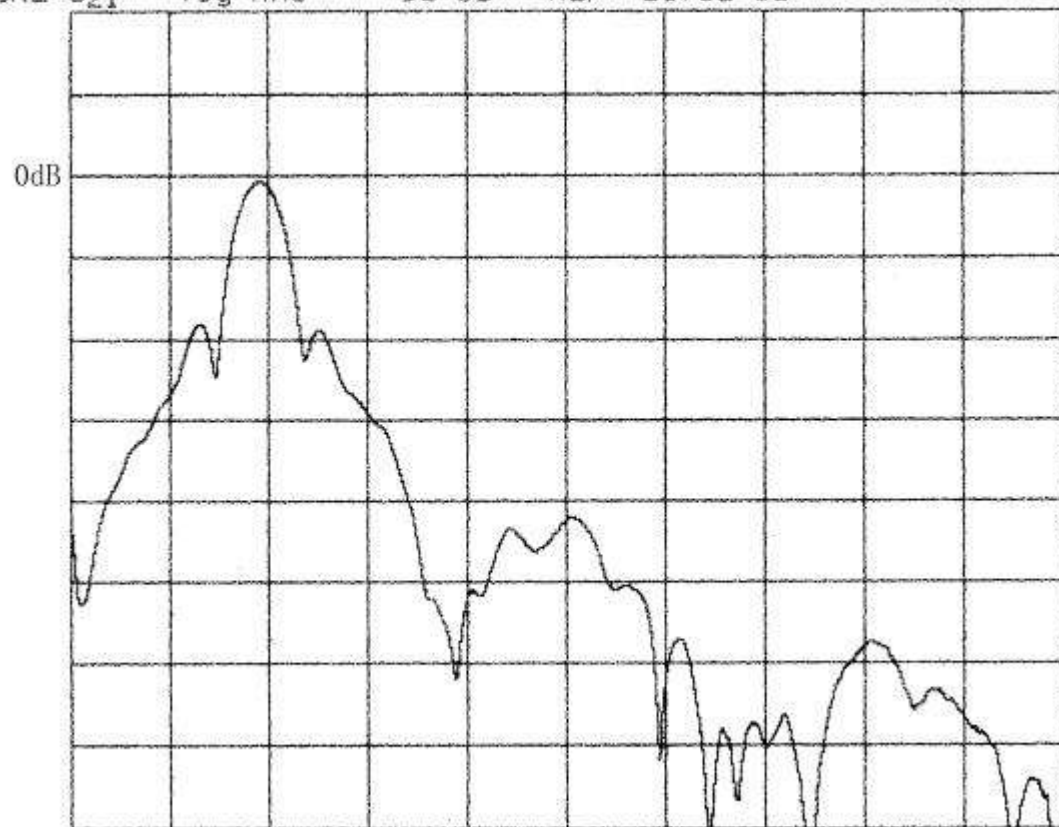
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CH1 S21 log MAG 1 dB/ REF -17.68 dB 2: .0054 dB
CH2 S21 delay 30 ns/ REF 1.254 μ s 2 -140.06 ps



START 33.000 000 MHz STOP 40.000 000 MHz

CH2 S21 log MAG 10 dB/ REF -26.62 dB



CH2 CENTER 3 μ s

SPAN 6 μ s