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Approved by: Checked by: Issued by:

SPECIFICATION

PRODUCT: SAW FILTER

MODEL: HDVF389A4M

SHOULDER ELECTRONICS LIMITED

1.SCOPE

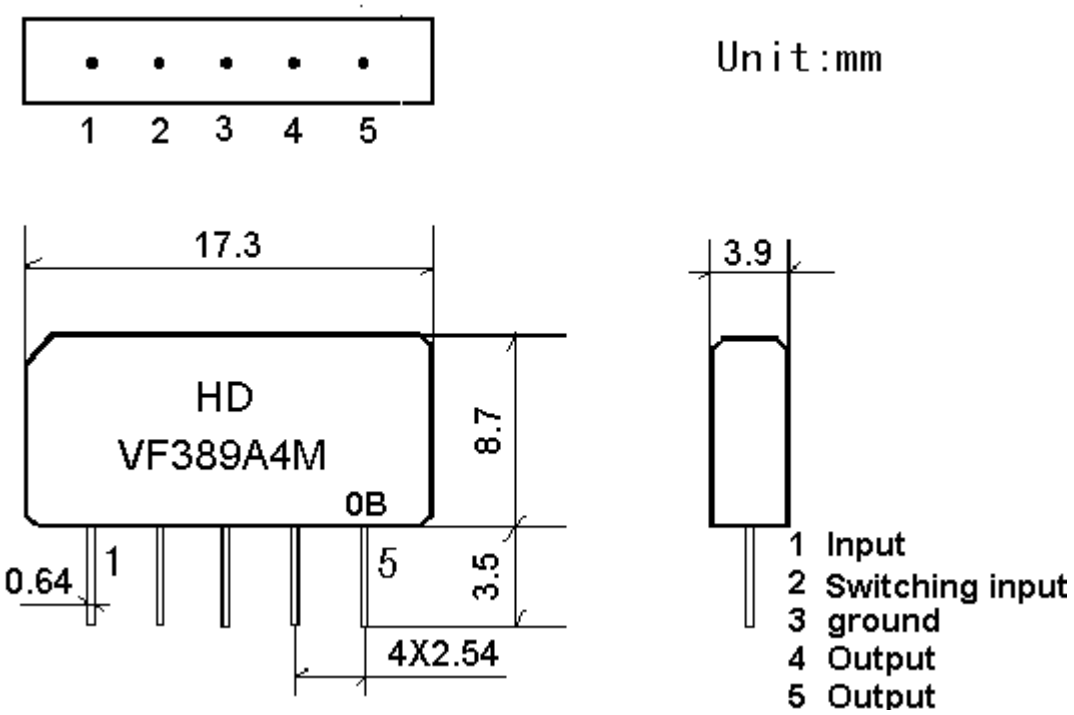
SHOULDER's SAW filter series have broad line up products meeting all broadcast standard including NTSC,PAL and SECAM systems. These filters are composed of two interdigital transducers on a single-crystal. piezoelectrical chip. they are used in electronic equipments such as TV and so on.

2.Construction

2.1 Dimension and materials

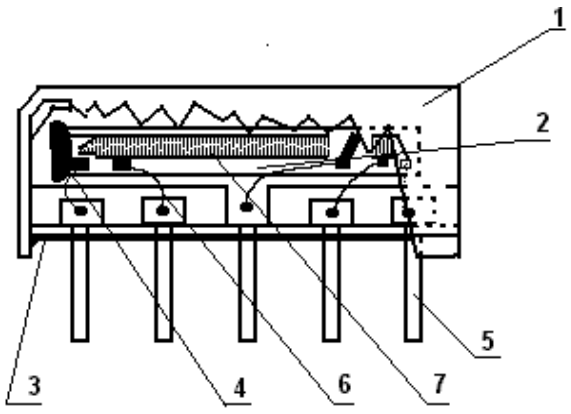
Manufacturer's name : SHOULDER ELECTRONICS Co. LTD(CHINA)

Type : VF389A4M



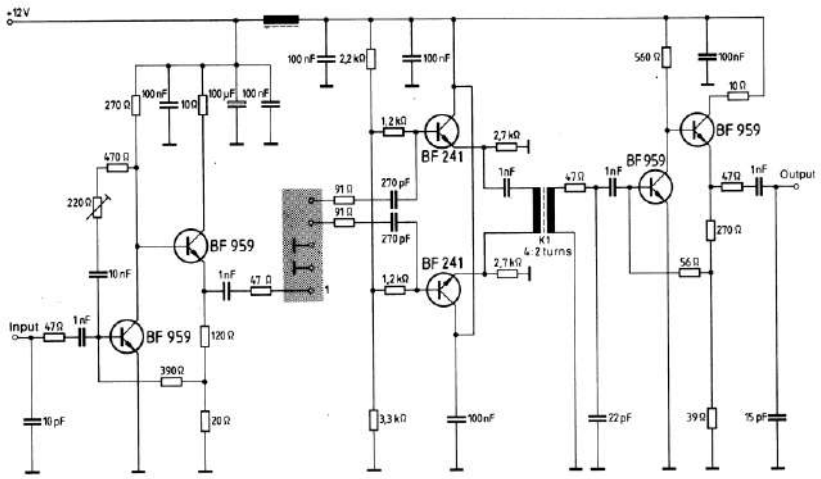
0: year(0,1,2,3,4,5,6,7,8,9)

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

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

Source impedance Zs=50Ω

Load impedance Z_L=2kΩ//3pF T_A=25℃

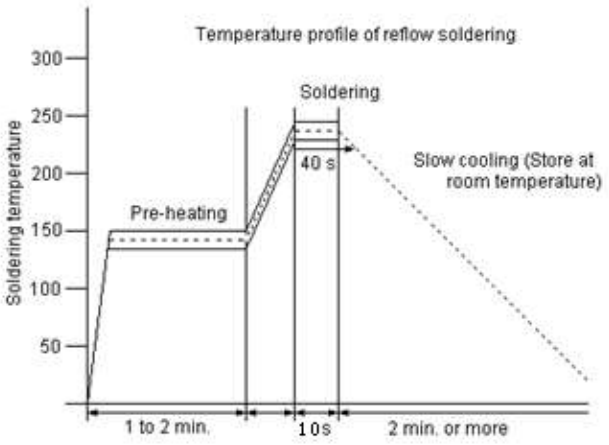
Item		Freq	min	typ	max	
Insertion attenuation Reference level		37.40MHz	11.8	13.8	15.8	dB
Relative attenuation		38.90MHz	4.6	6.1	7.6	dB
		34.47MHz	-0.5	1.0	2.5	dB
		33.40MHz	24.0	39.0	-	dB
		33.15MHz	-	25.0	-	dB
		33.90MHz	-	7.0	-	dB
		30.90MHz	42.0	55.0	-	dB
		31.90MHz	42.0	55.0	-	dB
		31.40MHz	40.0	52.0	-	dB
		32.40MHz	42.0	50.0	-	dB
		40.15MHz	38.0	50.0	-	dB
		40.40MHz	42.0	50.0	-	dB
		41.40MHz	42.0	47.0	-	dB
Sidelobe	25.00~31.90MHz		35.0	42.0	-	dB
	40.40~45.00MHz		33.0	38.0	-	dB
Temperature coefficient			-72			ppm/k

3.3 Environmental 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="4">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.

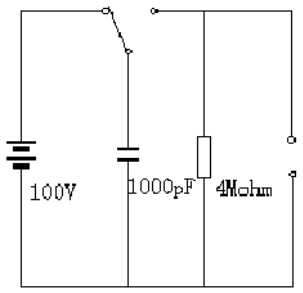
 
</td></tr>
</table>

	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

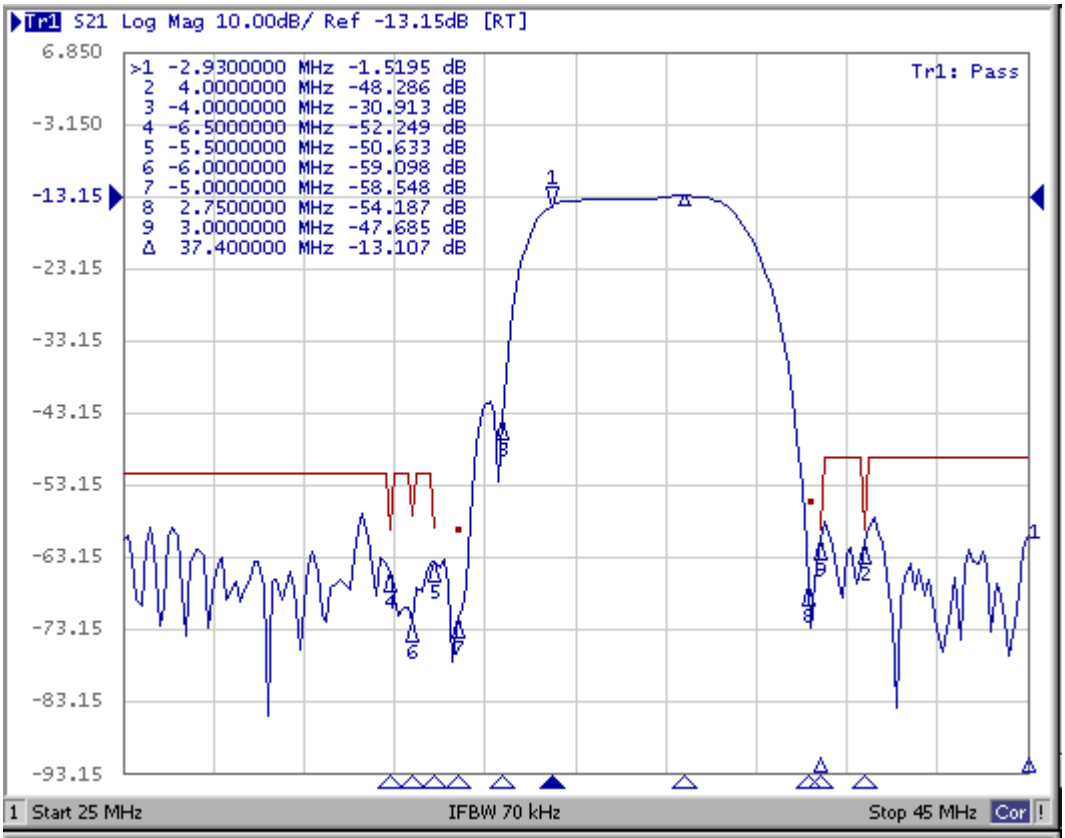
3.4 Mechanical Test

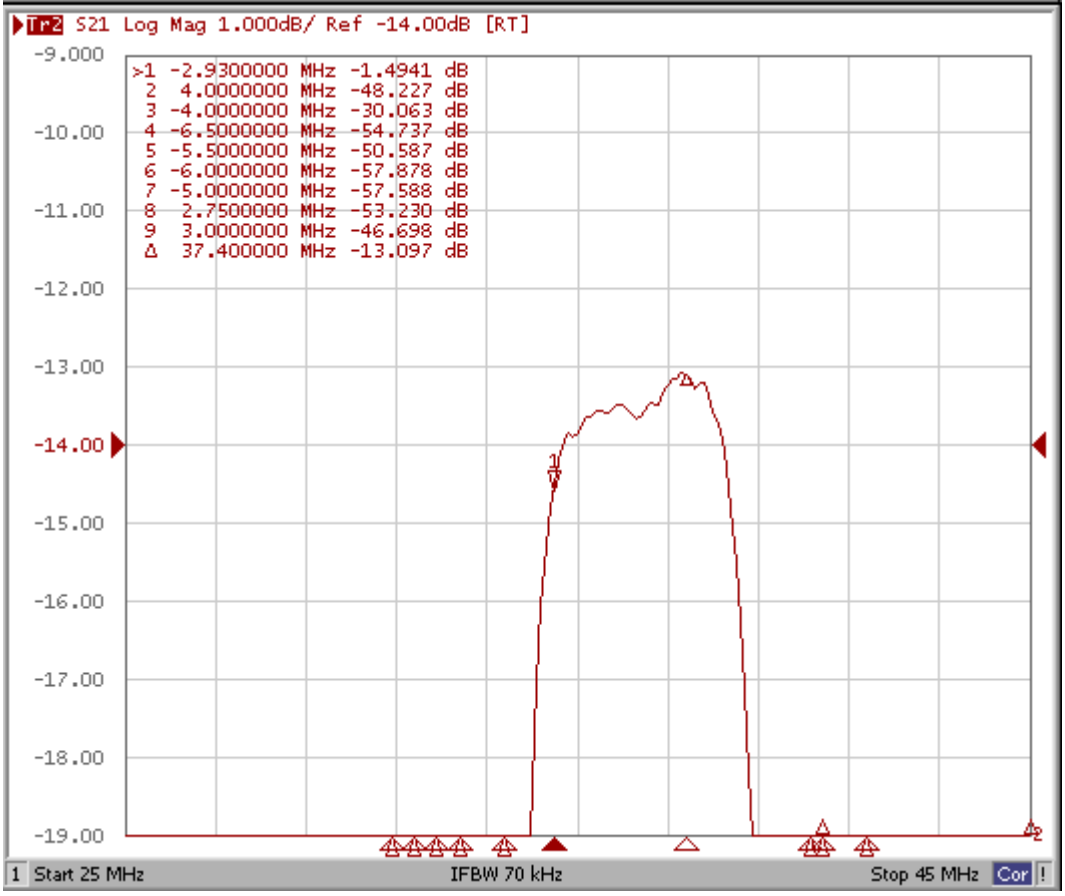
Items	Conditions	Specifications
Vibration	600-3300rpm amplitude 1.5mm 3 directions 2 H each	There shall be no damage.
Drop	On maple plate from 1 m high 3 times	
Lead pull	Pull with 1 kg force for 30 seconds	
Lead bend	90^{o} bending with 500g weigh 2 times	

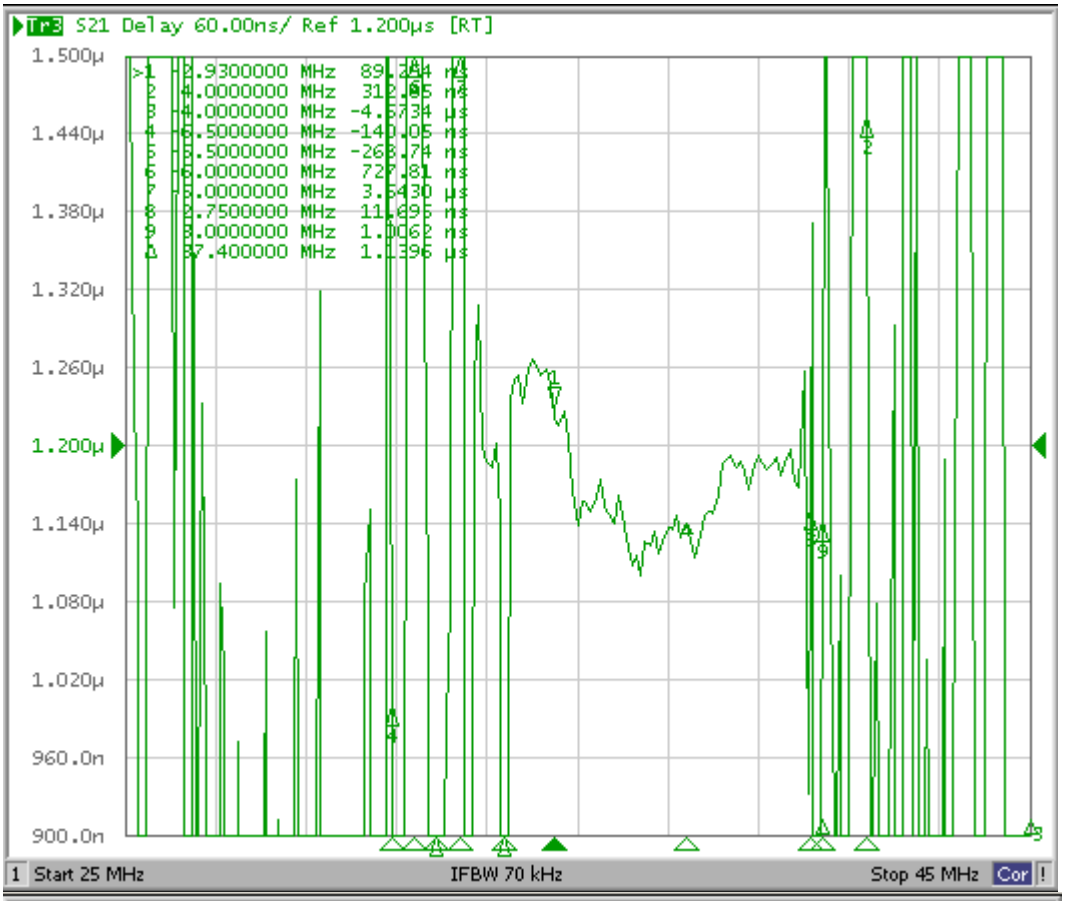
3.5 Voltage Discharge Test

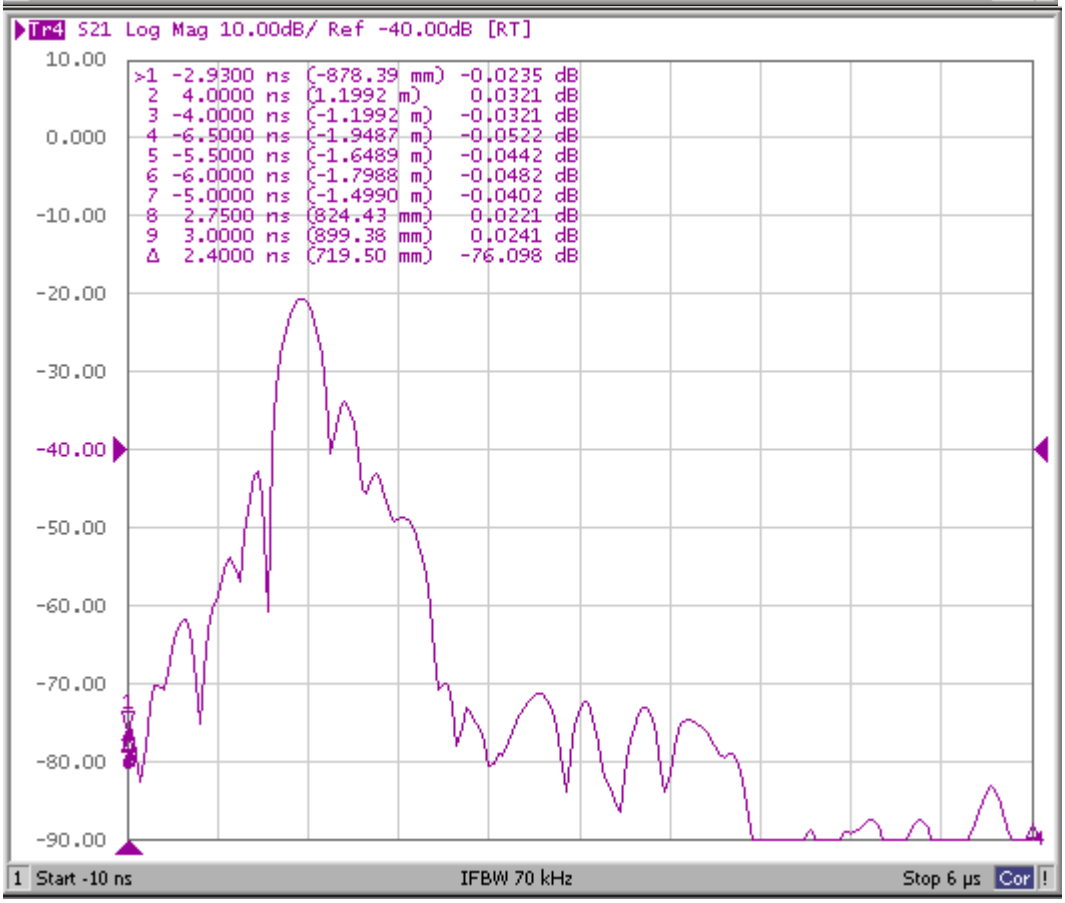
Item	Condition	Specifications
Surge	Between any two electrode  	There shall be no damage

3.6 Frequency response






Tr3 S21 Delay 60.00ns/ Ref 1.200µs [RT]
1.500µ
1.440µ
1.380µ
1.320µ
1.260µ
1.200µ
1.140µ
1.080µ
1.020µ
960.0n
900.0n
>1 -2.9300000 MHz 89.284 ns
2 4.0000000 MHz 312.05 ns
3 -4.0000000 MHz -4.6734 µs
4 -6.5000000 MHz -140.05 ns
5 -5.5000000 MHz -263.74 ns
6 -6.0000000 MHz 727.81 ns
7 -5.0000000 MHz 3.5430 µs
8 2.7500000 MHz 111.96 ns
9 3.0000000 MHz 1.0062 ns
Δ 37.400000 MHz 1.1396 µs
1 Start 25 MHz
IFBW 70 kHz
Stop 45 MHz
Cor


Tr4 S21 Log Mag 10.00dB/ Ref -40.00dB [RT]
10.00
0.000
-10.00
-20.00
-30.00
-40.00
-50.00
-60.00
-70.00
-80.00
-90.00
>1 -2.9300 ns (-878.39 mm) -0.0235 dB
2 4.0000 ns (1.1992 m) 0.0321 dB
3 -4.0000 ns (-1.1992 m) -0.0321 dB
4 -6.5000 ns (-1.9487 m) -0.0522 dB
5 -5.5000 ns (-1.6489 m) -0.0442 dB
6 -6.0000 ns (-1.7988 m) -0.0482 dB
7 -5.0000 ns (-1.4990 m) -0.0402 dB
8 2.7500 ns (824.43 mm) 0.0221 dB
9 3.0000 ns (899.38 mm) 0.0241 dB
Δ 2.4000 ns (719.50 mm) -76.098 dB
1 Start -10 ns
IFBW 70 kHz
Stop 6 µs
Cor