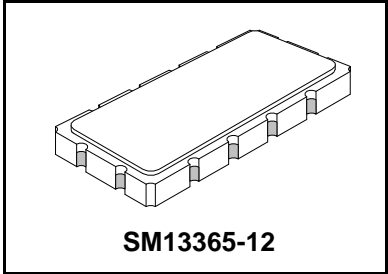




SF1093A

**175 MHz
SAW Filter**



- **Designed for GSM BTS Transmitter IF Applications**
- **Low Insertion Loss**
- **Excellent Size-to-Performance Ratio**
- **Hermetic 13.3 x 6.5 mm Surface-Mount Case**
- **Unbalanced Input and Output**
- **Complies with Directive 2002/95/EC (RoHS)**

Absolute Maximum Ratings

| Rating | Value | Units |
|---|----------------|-------|
| Maximum Incident Power in Passband | +10 | dBm |
| Max. DC voltage between any 2 terminals | 30 | VDC |
| Storage Temperature Range | -40 to +85 | °C |
| Suitable for lead-free soldering - Max. Soldering Profile | 260°C for 30 s | |

Electrical Characteristics

| Characteristic | Sym | Notes | Min | Typ | Max | Units |
|-----------------------------|---|---------|---------|-----------|-----------|-------------------|
| Nominal Center Frequency | f_c | 1 | 175.000 | | | MHz |
| Passband | Insertion Loss at f_c | IL | | 8 | 9.0 | dB |
| | 2 dB Passband | BW_2 | 1, 2 | ± 330 | ± 460 | |
| | Amplitude Ripple (peak to adjacent valley) | | | | 0.5 | dB _{P-P} |
| | Amplitude Variation over $f_c \pm 200$ kHz | | | | 1.0 | |
| | Group Delay Variation over $f_c \pm 300$ kHz | GDV | | | <200 | |
| Absolute Group Delay | GD | | | 1.3 | 1.5 | μ s |
| Rejection | $f_c - 0.9$ to $f_c - 0.6$ and $f_c + 0.6$ to $f_c + 0.9$ MHz | 1, 2, 3 | 5 | | | dB |
| | $f_c - 1.2$ to $f_c - 0.9$ and $f_c + 0.9$ to $f_c + 1.2$ MHz | | 17 | | | |
| | $f_c - 6.0$ to $f_c - 1.2$ and $f_c + 1.2$ to $f_c + 6.0$ MHz | | 30 | | | |
| | $f_c - 155$ to $f_c - 6.0$ and $f_c + 6.0$ to $f_c + 125$ MHz | | 50 | | | |
| Operating Temperature Range | T_A | 1 | -5 | | +70 | °C |

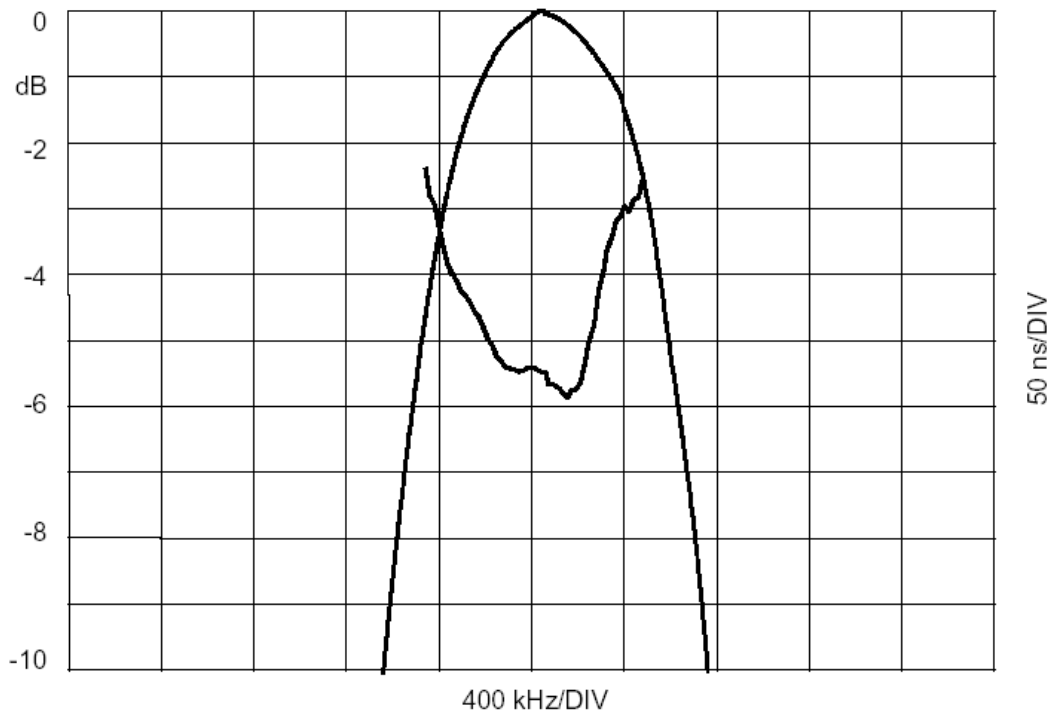
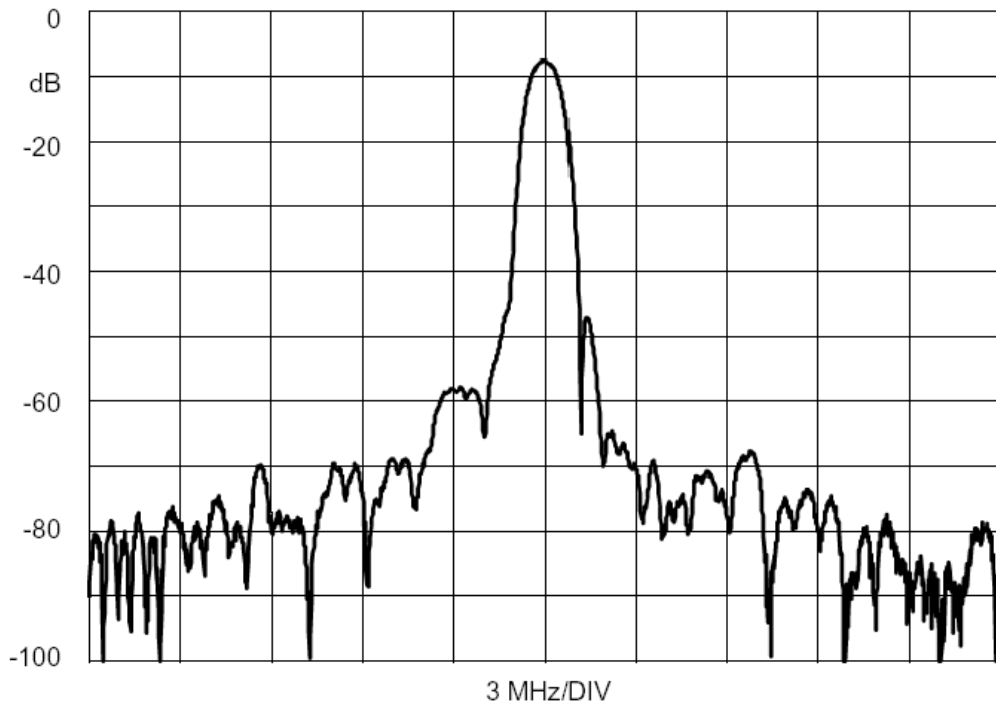
| | |
|--|--|
| Impedance Matching to 50 Ω unbalanced | External L-C |
| Case Style | SM13365-12 13.3 x 6.5 mm Nominal Footprint |
| Lid Symbolization (YY = year, WW = week) | RFM SF1093A YYWW |

Notes:

1. Unless noted otherwise, all specifications apply over the operating temperature range with filter soldered to the specified demonstration board with impedance matching to 50 Ω and measured with 50 Ω network analyzer.
2. Unless noted otherwise, all frequency specifications are referenced to the nominal center frequency, f_c .
3. Rejection is measured as attenuation below the minimum IL point in the passband. Rejection in final user application is dependent on PCB layout and external impedance matching design. See Application Note No. 42 for details.
4. "LRIP" or "L" after the part number indicates "low rate initial production" and "ENG" or "E" indicates "engineering prototypes."
5. The design, manufacturing process, and specifications of this filter are subject to change.
6. Either Port 1 or Port 2 may be used for either input or output in the design. However, impedances and impedance matching may vary between Port 1 and Port 2, so that the filter must always be installed in one direction per the circuit design.
7. US and international patents may apply.
8. Electrostatic Sensitive Device. Observe precautions for handling.

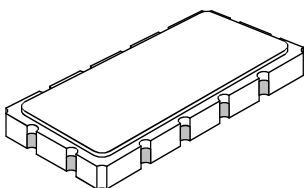
Electrical Connections

| Connection | Terminals |
|-------------------|------------|
| Port 1 Hot | 2 |
| Port 1 Gnd Return | 3 |
| Port 2 Hot | 8 |
| Port 2 Gnd Return | 9 |
| Case Ground | All others |



SM13365-12 Case

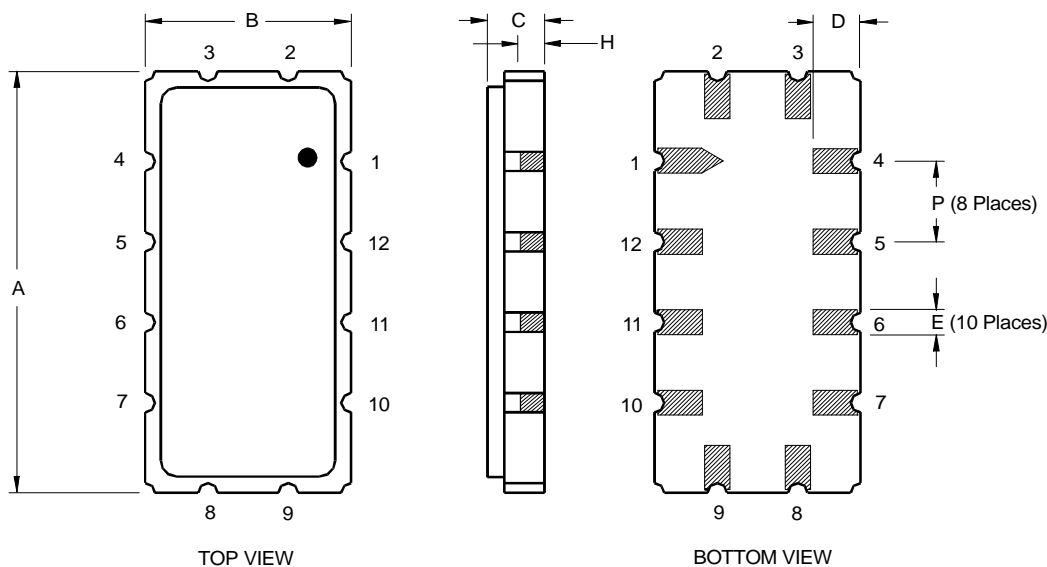
12-Terminal Ceramic Surface-Mount Case 13.3 x 6.5 mm Nominal Footprint



| Case Dimensions | | | | | | |
|-----------------|-------|-------|-------|--------|-------|-------|
| Dimension | mm | | | Inches | | |
| | Min | Nom | Max | Min | Nom | Max |
| A | 13.08 | 13.31 | 13.60 | 0.515 | 0.524 | 0.535 |
| B | 6.27 | 6.50 | 6.80 | 0.247 | 0.256 | 0.268 |
| C | | 1.91 | 2.00 | | 0.075 | 0.079 |
| D | | 1.50 | | | 0.059 | |
| E | | 0.79 | | | 0.031 | |
| H | | 1.0 | | | 0.039 | |
| P | | 2.54 | | | 0.100 | |

| Materials | |
|------------------------|--|
| Solder Pad Termination | Au plating 30 - 60 ulnches (76.2-152 uM) over 80-200 ulnches (203-508 uM) Ni. |
| Lid | Fe-Ni-Co Alloy Electroless Nickel Plate (8-11% Phosphorus) 100-200 ulnches Thick |
| Body | Al ₂ O ₃ Ceramic |
| Pb Free | |

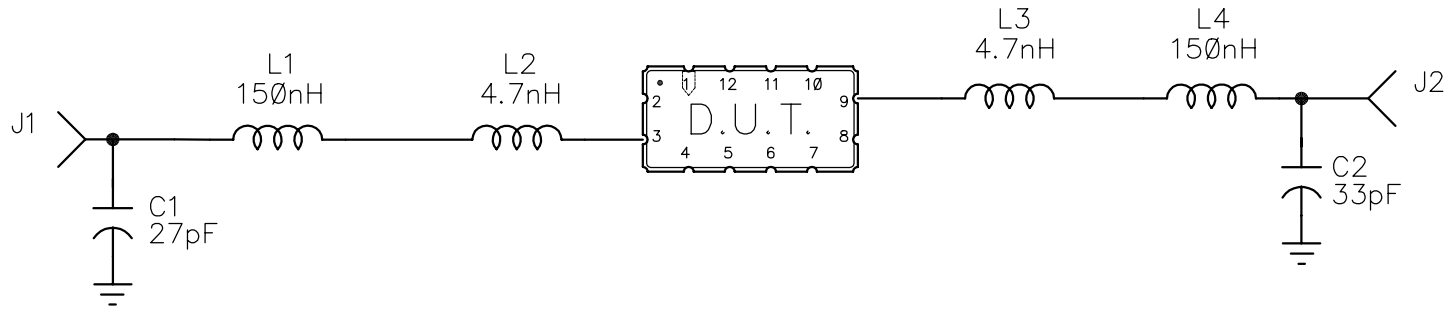
| Electrical Connections | | |
|------------------------|------------------|------------------|
| Connection | | Terminals |
| Port 1 | Input or Return | 2 |
| | Return or Input | 3 |
| Port 2 | Output or Return | 8 |
| | Return or Output | 9 |
| Ground | | All others |
| Single Ended Operation | | Return is ground |
| Differential Operation | | Return is hot |



NOTES:

1. ORIENTATION OF COMPONENTS MAY VARY FROM ASSEMBLY DIAGRAM IN ORDER TO FINE TUNE DEVICE.
2. ACTUAL COMPONENTS USED MAY VARY FOR EACH DEVICE.

| REV | ECN NO. | DESCRIPTION | DATE |
|-----|---------|-----------------------|---------|
| A | 6797 | INITIAL RELEASE | 29jun98 |
| B | 10225 | REVISED PIN NUMBERING | 04oct01 |



DRAWN BY/DATE: J.J. LAYTON

06/29/98

TITLE: ASSY DIAGRAM, DEMO BOARD, SF1093A

RF Monolithics, Inc.
DALLAS, TEXAS 75244

CHECKED/APPROVED

SIZE
A

CODE IDENT
2U874

DWG.
NO.

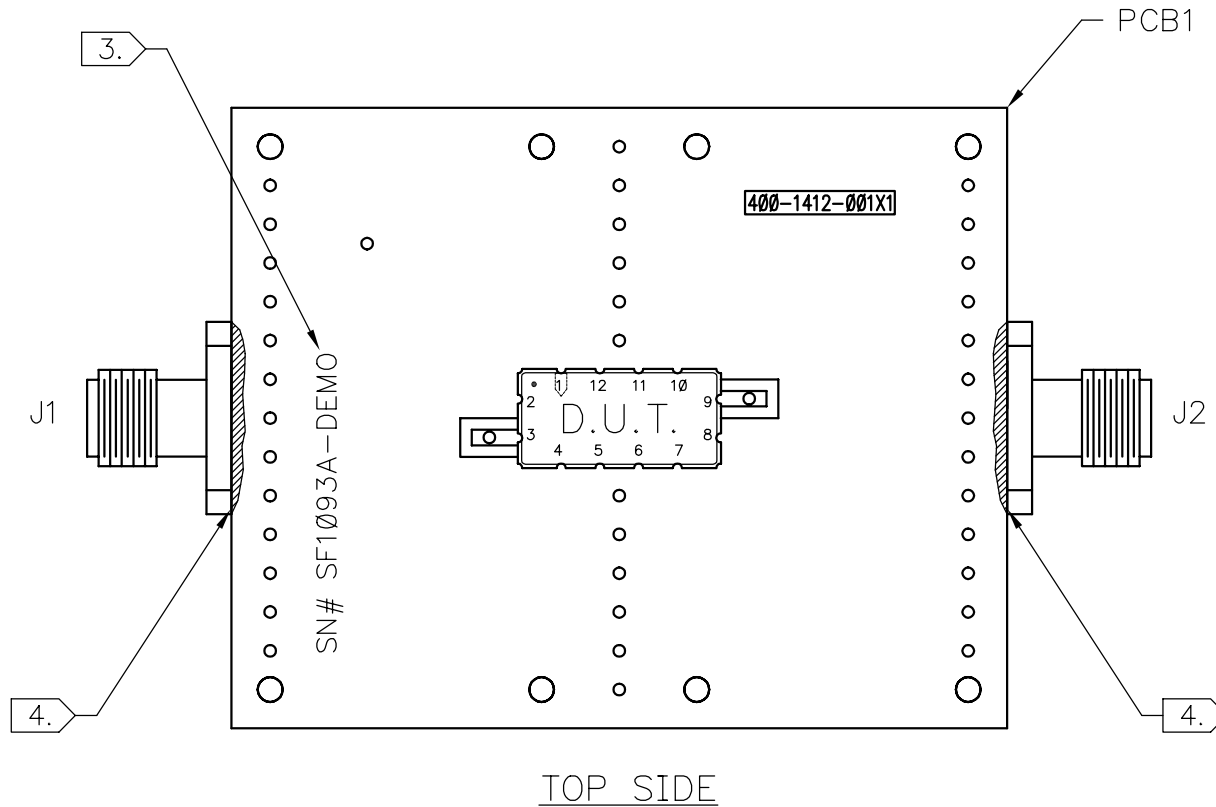
SF1093A-000

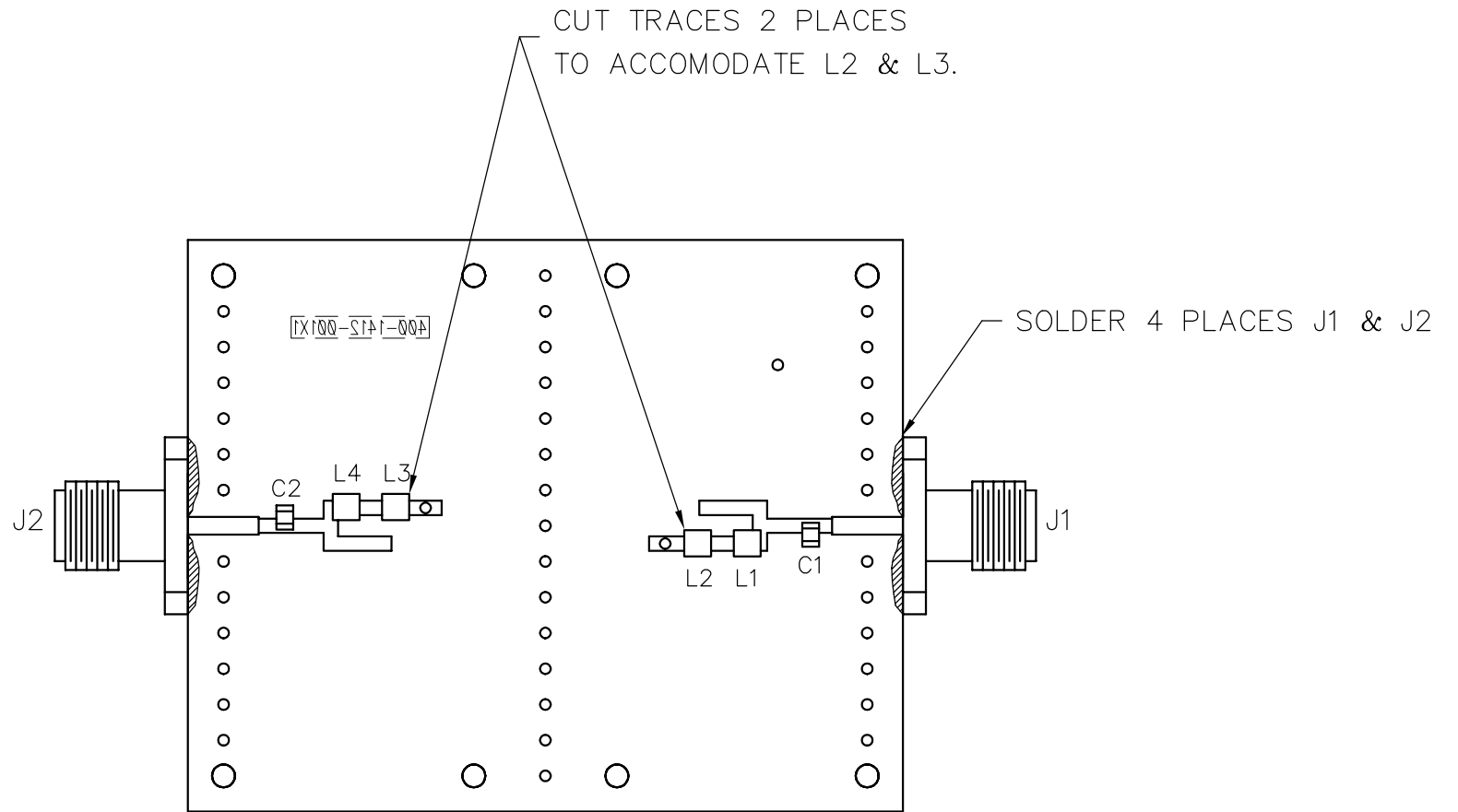
REV
B

SHEET
1/4

3. LABEL FIXTURE WITH ELECTRONIC METHOD AS SHOWN.

4. SOLDER J1 & J2 TO PCB1 AS SHOWN.



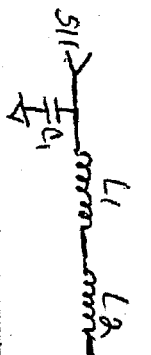
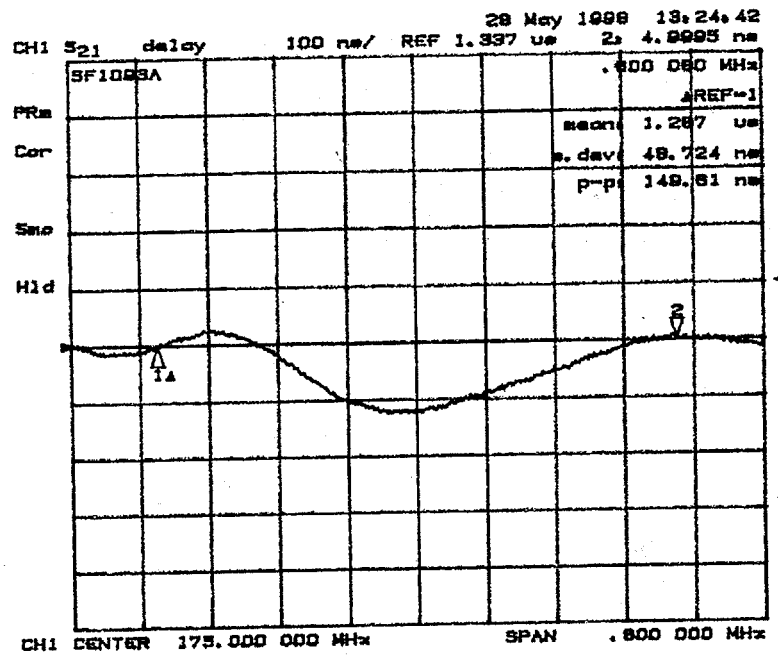
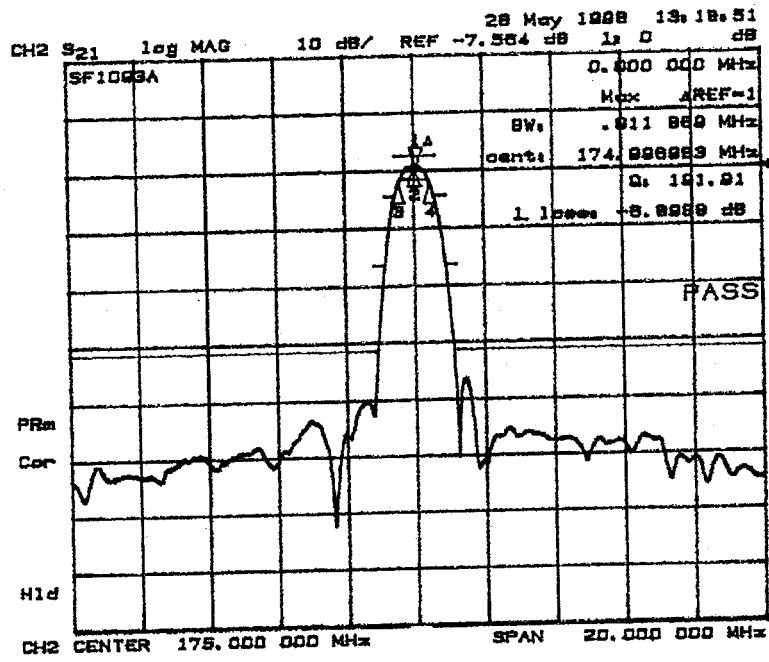


BOTTOM SIDE

Rev B

SF1093A
E# N/A
#1

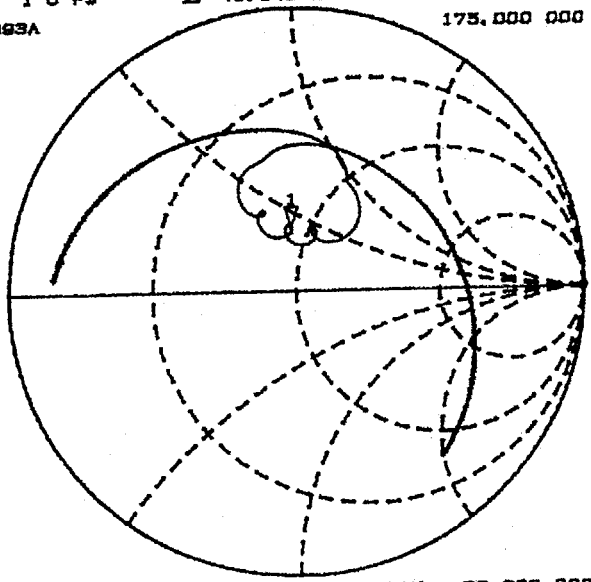
Demo
5/28/98
B.C



28 May 1998 13:20:47

CH2 S11 1 U FS 1 49.848 n 20.88 n 18.081 nH

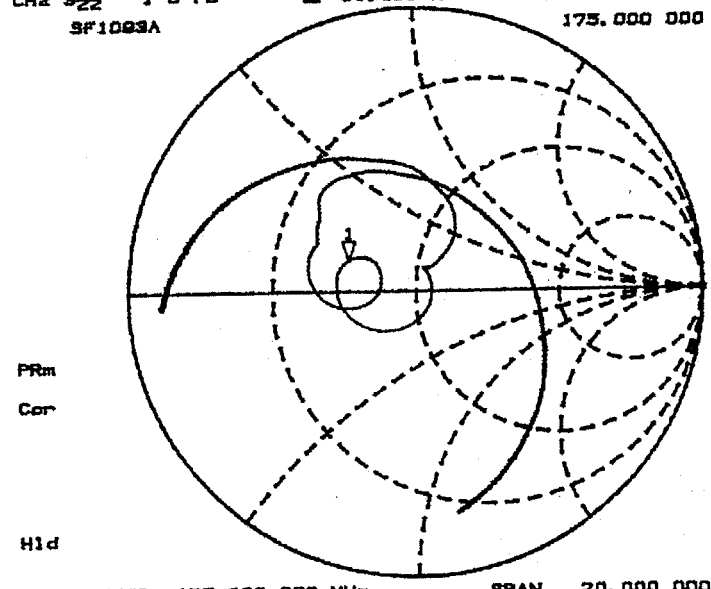
SF1093A 175.000 000 MHz



28 May 1998 13:22:45

CH2 S22 1 U FS 1 30.835 n 7.0878 n 6.4461 nH

SF1093A 175.000 000 MHz



C1=27pF
C2=33pF
L1, L4=
150nH
L2, L3=4.7pH

SF1093A-000 REV.A SA 4/4

BILL OF MATERIALS

| <u>PART IDENTIFIER</u> | <u>DESCRIPTION 1</u> | <u>DESCRIPTION 2</u> | <u>QTY/ASSY</u> | <u>REFERENCE DESCRIPTION</u> |
|------------------------|---------------------------|----------------------|-----------------|------------------------------|
| SF1093A-DEMO | DEMO BOARD,SF1093A | | | |
| SF1093A-000 | ASSY DIAGRAM,DEMO BOARD | SF1093A | 0 | |
| 400-1412-001 | PCB, DEMO, 13MM, TYPE 2 | | 1.0000 | PCB |
| 500-0003-270 | CAP,CHIP,NPO,27(J),STD | | 1.0000 | C 1 |
| 500-0003-330 | CAP,CHIP,NPO,33(J),STD | | 1.0000 | C 2 |
| 500-0248-001 | CONN,COAX,FLANGE MT.JACK | 4 HOLE | 2.0000 | J 1,2 |
| 500-0010-150 | IND,CHIP,1008CS,15NH,10% | | 2.0000 | L 1,4 |
| 500-0010-047 | IND,CHIP,1008CS,4.7NH,10% | | 2.0000 | L 2,3 |



SIZE

A

FSCM NO.

2U874

DWG NO.

SF1093A-DEMO

SCALE

NONE

W/O or ECN

6797

REV

A

SHEET

1

OF

2