

# High Pass Filter

**50Ω 7900 to 11000 MHz**

# NON-CATALOG

**HFCN-7150D+**

CASE STYLE: FV1206-1  
PRICE: Contact Sales Dept.

## Maximum Ratings

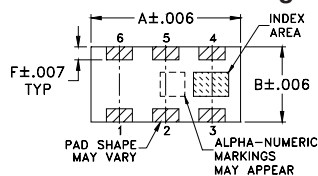
|                             |                 |
|-----------------------------|-----------------|
| Operating Temperature       | -55°C to 100°C  |
| Storage Temperature         | -55°C to 100°C  |
| RF Power Input*             | 6W max. at 25°C |
| Max. DC Voltage at pins 1&3 | 25 VDC          |

\*Passband rating, derate linearly to 3W at 100°C ambient.  
Permanent damage may occur if any of these limits are exceeded.

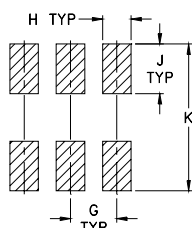
## Pin Connections

|        |         |
|--------|---------|
| RF IN  | 1       |
| RF OUT | 3       |
| GROUND | 2,4,5,6 |

## Outline Drawing



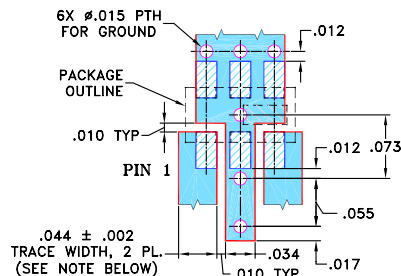
## PCB Land Pattern


Suggested Layout,  
Tolerance to be within ±.002

## Outline Dimensions (inch mm)

| A    | B    | C    | D    | E     | F    |
|------|------|------|------|-------|------|
| .126 | .063 | .035 | .024 | .022  | .011 |
| 3.20 | 1.60 | 0.89 | 0.61 | 0.56  | 0.28 |
| G    | H    | J    | K    | L     | M    |
| .039 | .024 | .042 | .123 |       |      |
| 0.99 | 0.61 | 1.07 | 3.12 |       |      |
|      |      |      |      | wt    |      |
|      |      |      |      | grams |      |
|      |      |      |      | .020  |      |

## Demo Board MCL P/N: TB-285 Suggested PCB Layout (PL-158)



NOTE: 1. TRACE WIDTH IS SHOWN FOR ROGERS RO4350 WITH DIELECTRIC THICKNESS: .020 ± .0015; COPPER: 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH MAY NEED TO BE MODIFIED.

2. BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.

- 6X .015 PTH FOR GROUND
- PACKAGE OUTLINE
- PIN 1
- .044 ± .002 TRACE WIDTH, 2 PL. (SEE NOTE BELOW)
- .010 TYP
- .012
- .012
- .073
- .055
- .034
- .017

## Features

- Low cost
- Small size
- 5 sections
- Temperature stable
- Excellent power handling, 6W
- Hermetically sealed
- LTCC construction
- Protected by US Patent 7,760,485

## Applications

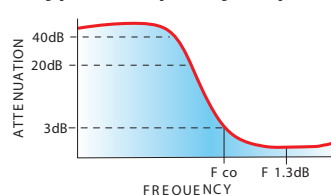
- Sub-harmonic rejection and DC blocking
- Transmitters / receivers

## Electrical Specifications<sup>1</sup> at 25°C

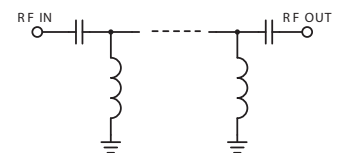
| STOPBAND (MHz)                        | fco, MHz Nom.    | PASSBAND (MHz)                        | VSWR Typ.                      | POWER INPUT (W) | NO. OF SECTIONS |
|---------------------------------------|------------------|---------------------------------------|--------------------------------|-----------------|-----------------|
| (Loss > 30dB) (Loss > 20dB) Typ. Min. | (Loss 3 dB) Typ. | (Loss < 1.5dB) (Loss < 2dB) Typ. Max. | Frequency (MHz) Stopband 1.5:1 | Max.            |                 |
| 5100 6150                             | 7150             | 8500-10500 7900-11000                 | 20:1 7250-11000                | 6               | 5               |

1. DC Resistance to ground is 100 Mohms min.

## typical frequency response

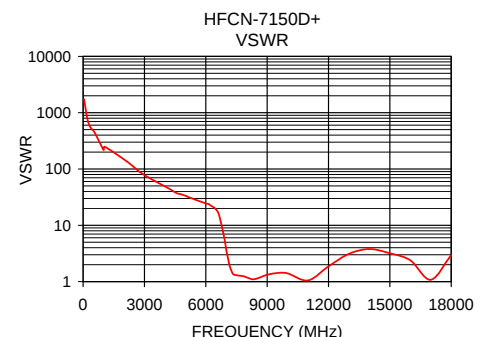
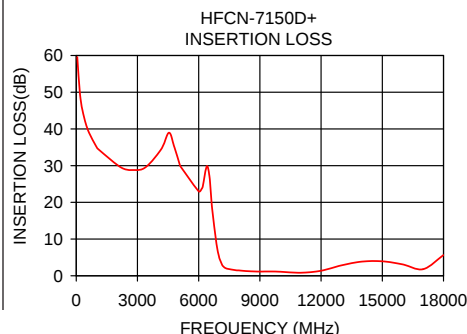


## electrical schematic



## Typical Performance Data at 25°C

| Frequency (MHz) | Insertion Loss (dB) | VSWR (:1) |
|-----------------|---------------------|-----------|
| 50              | 59.58               | 1737.18   |
| 1000            | 35.04               | 217.15    |
| 2800            | 28.81               | 86.86     |
| 4540            | 38.96               | 37.77     |
| 5100            | 29.87               | 32.18     |
| 6150            | 23.72               | 23.81     |
| 6650            | 18.85               | 15.26     |
| 7020            | 4.74                | 3.34      |
| 7150            | 2.97                | 2.01      |
| 7250            | 2.31                | 1.56      |
| 7900            | 1.46                | 1.23      |
| 8500            | 1.24                | 1.14      |
| 10500           | 0.92                | 1.29      |
| 11000           | 0.82                | 1.05      |
| 12000           | 1.37                | 1.87      |
| 15000           | 3.95                | 3.19      |
| 18000           | 5.64                | 2.95      |



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REV. B  
M132298  
EDR-7909/3  
HFCN-7150D+  
RAV/CP/AM  
110708  
page 1

# Ceramic High Pass Filter

# HFCN-7150D+

## Typical Performance Data

| FREQ.<br>(MHz) | INSERTION LOSS<br>(dB) |          |           | INPUT RETURN LOSS<br>(dB) |          |           | OUTPUT RETURNLOSS<br>(dB) |          |           |
|----------------|------------------------|----------|-----------|---------------------------|----------|-----------|---------------------------|----------|-----------|
|                | @ -55° C               | @ +25° C | @ +100° C | @ -55° C                  | @ +25° C | @ +100° C | @ -55° C                  | @ +25° C | @ +100° C |
| 40             | 62.26                  | 63.49    | 70.69     | 0.02                      | 0.01     | 0.04      | 0.01                      | 0.01     | 0.02      |
| 100            | 55.27                  | 55.76    | 54.52     | 0.00                      | 0.02     | 0.01      | 0.01                      | 0.04     | 0.01      |
| 200            | 49.46                  | 49.25    | 48.83     | 0.01                      | 0.04     | 0.03      | 0.02                      | 0.04     | 0.04      |
| 400            | 43.30                  | 43.27    | 43.17     | 0.03                      | 0.05     | 0.06      | 0.02                      | 0.06     | 0.07      |
| 500            | 41.32                  | 41.30    | 41.23     | 0.03                      | 0.00     | 0.01      | 0.02                      | 0.02     | 0.03      |
| 600            | 39.81                  | 39.79    | 39.73     | 0.00                      | 0.04     | 0.05      | 0.01                      | 0.07     | 0.08      |
| 700            | 38.48                  | 38.46    | 38.46     | 0.01                      | 0.04     | 0.05      | 0.01                      | 0.04     | 0.06      |
| 800            | 37.35                  | 37.33    | 37.35     | 0.02                      | 0.03     | 0.04      | 0.01                      | 0.07     | 0.09      |
| 900            | 36.41                  | 36.42    | 36.45     | 0.04                      | 0.09     | 0.12      | 0.02                      | 0.06     | 0.08      |
| 1000           | 35.45                  | 35.45    | 35.49     | 0.04                      | 0.01     | 0.03      | 0.01                      | 0.07     | 0.10      |
| 1200           | 34.01                  | 34.00    | 34.04     | 0.02                      | 0.05     | 0.07      | 0.01                      | 0.06     | 0.10      |
| 1400           | 32.86                  | 32.88    | 32.88     | 0.04                      | 0.10     | 0.13      | 0.01                      | 0.06     | 0.10      |
| 1500           | 32.35                  | 32.35    | 32.33     | 0.02                      | 0.09     | 0.12      | 0.03                      | 0.11     | 0.15      |
| 1600           | 31.96                  | 31.95    | 31.93     | 0.07                      | 0.14     | 0.17      | 0.01                      | 0.09     | 0.12      |
| 1700           | 31.42                  | 31.41    | 31.40     | 0.04                      | 0.03     | 0.07      | 0.05                      | 0.14     | 0.17      |
| 1800           | 31.11                  | 31.12    | 31.10     | 0.04                      | 0.12     | 0.15      | 0.08                      | 0.16     | 0.20      |
| 1900           | 30.73                  | 30.76    | 30.75     | 0.03                      | 0.11     | 0.15      | 0.06                      | 0.13     | 0.16      |
| 2000           | 30.37                  | 30.41    | 30.44     | 0.02                      | 0.10     | 0.14      | 0.13                      | 0.21     | 0.24      |
| 2200           | 29.85                  | 29.94    | 29.99     | 0.02                      | 0.07     | 0.11      | 0.12                      | 0.20     | 0.23      |
| 2400           | 29.52                  | 29.66    | 29.69     | 0.02                      | 0.11     | 0.17      | 0.12                      | 0.21     | 0.25      |
| 2500           | 29.41                  | 29.50    | 29.61     | 0.06                      | 0.14     | 0.18      | 0.11                      | 0.20     | 0.25      |
| 2600           | 29.35                  | 29.46    | 29.54     | 0.08                      | 0.17     | 0.20      | 0.11                      | 0.21     | 0.26      |
| 2700           | 29.24                  | 29.32    | 29.48     | 0.04                      | 0.14     | 0.19      | 0.16                      | 0.25     | 0.31      |
| 2800           | 29.30                  | 29.43    | 29.52     | 0.10                      | 0.19     | 0.22      | 0.09                      | 0.20     | 0.27      |
| 2900           | 29.27                  | 29.39    | 29.54     | 0.06                      | 0.17     | 0.22      | 0.16                      | 0.27     | 0.34      |
| 3000           | 29.31                  | 29.47    | 29.56     | 0.10                      | 0.20     | 0.24      | 0.13                      | 0.26     | 0.34      |
| 3200           | 29.66                  | 29.90    | 29.90     | 0.11                      | 0.22     | 0.28      | 0.12                      | 0.27     | 0.36      |
| 3400           | 30.18                  | 30.35    | 30.50     | 0.14                      | 0.25     | 0.32      | 0.17                      | 0.30     | 0.42      |
| 3500           | 30.67                  | 30.74    | 30.94     | 0.15                      | 0.26     | 0.29      | 0.14                      | 0.29     | 0.41      |
| 3600           | 30.98                  | 31.27    | 31.33     | 0.17                      | 0.29     | 0.34      | 0.18                      | 0.33     | 0.43      |
| 3700           | 31.51                  | 31.93    | 31.82     | 0.17                      | 0.28     | 0.33      | 0.15                      | 0.30     | 0.43      |
| 3800           | 32.21                  | 32.68    | 32.60     | 0.18                      | 0.29     | 0.36      | 0.17                      | 0.32     | 0.45      |
| 4000           | 34.01                  | 34.37    | 34.57     | 0.17                      | 0.29     | 0.35      | 0.21                      | 0.35     | 0.48      |
| 5000           | 31.67                  | 31.66    | 31.15     | 0.29                      | 0.46     | 0.59      | 0.33                      | 0.51     | 0.66      |
| 5100           | 29.66                  | 29.65    | 29.23     | 0.32                      | 0.49     | 0.62      | 0.33                      | 0.52     | 0.71      |
| 6000           | 22.77                  | 23.00    | 23.23     | 0.50                      | 0.70     | 0.91      | 0.52                      | 0.73     | 1.01      |
| 6150           | 23.42                  | 23.81    | 24.27     | 0.53                      | 0.75     | 0.97      | 0.54                      | 0.76     | 1.06      |
| 7000           | 6.63                   | 5.91     | 5.30      | 3.30                      | 4.34     | 5.55      | 3.02                      | 3.92     | 4.85      |
| 7150           | 3.52                   | 3.38     | 3.24      | 7.07                      | 8.49     | 10.25     | 6.51                      | 7.62     | 8.72      |
| 7900           | 1.28                   | 1.55     | 1.74      | 23.05                     | 23.18    | 22.30     | 18.88                     | 19.76    | 20.67     |
| 8000           | 1.23                   | 1.45     | 1.70      | 23.70                     | 23.69    | 21.75     | 20.33                     | 21.41    | 22.82     |
| 8500           | 1.11                   | 1.38     | 1.61      | 18.00                     | 18.92    | 17.98     | 21.87                     | 25.23    | 24.23     |
| 9000           | 1.08                   | 1.33     | 1.58      | 14.35                     | 14.74    | 15.64     | 17.61                     | 17.32    | 16.74     |
| 10000          | 0.90                   | 1.18     | 1.44      | 13.13                     | 13.39    | 13.37     | 14.48                     | 14.09    | 12.56     |
| 10500          | 0.76                   | 0.98     | 1.23      | 14.22                     | 15.78    | 15.16     | 14.16                     | 16.17    | 15.04     |
| 11000          | 0.55                   | 0.80     | 1.06      | 20.07                     | 24.90    | 25.05     | 18.69                     | 23.76    | 26.84     |
| 12000          | 0.84                   | 1.28     | 1.61      | 12.07                     | 11.17    | 11.34     | 11.70                     | 11.43    | 12.25     |
| 13000          | 2.39                   | 3.02     | 3.79      | 5.71                      | 5.64     | 4.86      | 5.75                      | 5.43     | 4.92      |
| 14000          | 5.03                   | 4.53     | 4.34      | 3.07                      | 4.34     | 5.03      | 2.86                      | 3.81     | 4.74      |
| 15000          | 4.41                   | 4.79     | 4.46      | 4.29                      | 4.58     | 5.84      | 4.02                      | 3.95     | 4.76      |
| 16000          | 3.66                   | 3.40     | 3.73      | 5.47                      | 6.10     | 6.17      | 3.96                      | 5.52     | 6.37      |
| 17000          | 1.71                   | 2.11     | 2.83      | 13.90                     | 43.10    | 19.20     | 10.12                     | 13.74    | 19.37     |
| 18000          | 5.12                   | 6.29     | 7.91      | 5.81                      | 6.56     | 5.51      | 8.92                      | 6.38     | 5.69      |
| 19000          | 8.58                   | 9.08     | 9.82      | 3.03                      | 4.19     | 4.34      | 4.82                      | 4.52     | 4.67      |
| 20000          | 10.47                  | 11.82    | 12.21     | 2.17                      | 2.83     | 3.98      | 3.19                      | 2.75     | 2.93      |

REV. X1

HFCN-7150D+

080729

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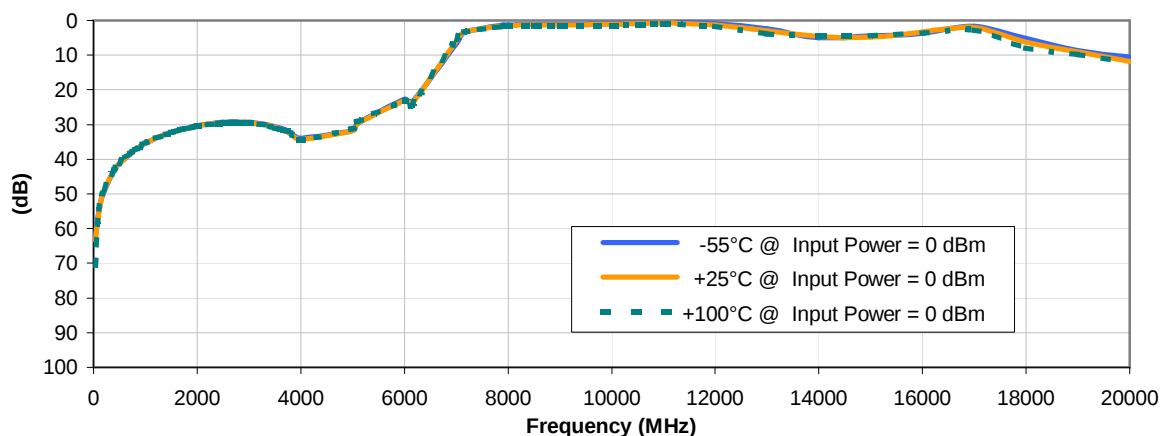
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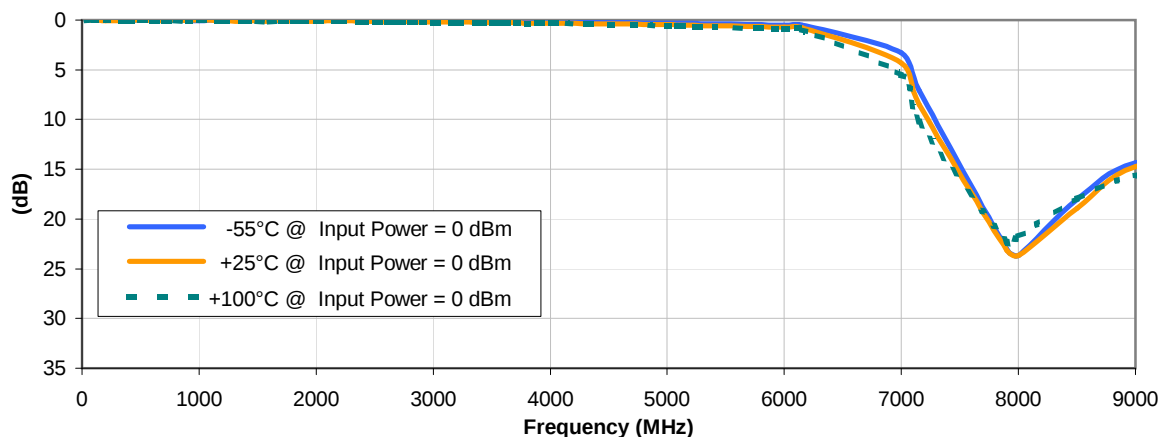


## Typical Performance Curves

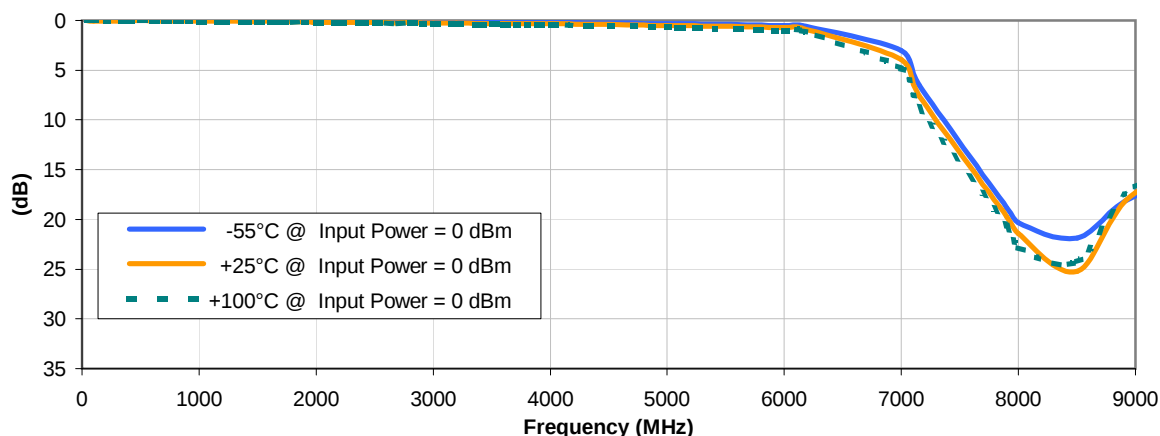
INSERTION LOSS vs. TEMPERATURE



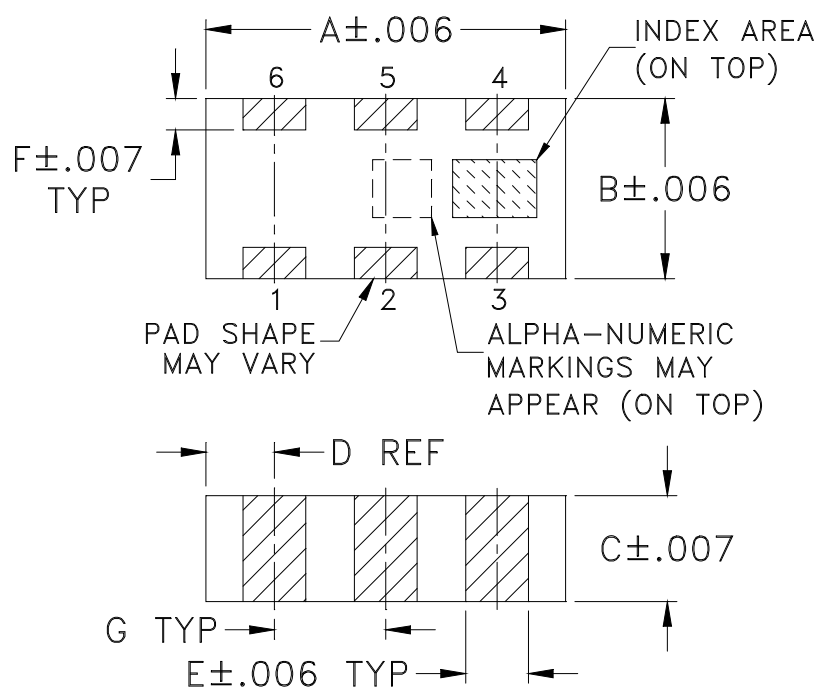
INPUT RETURN LOSS vs. TEMPERATURE



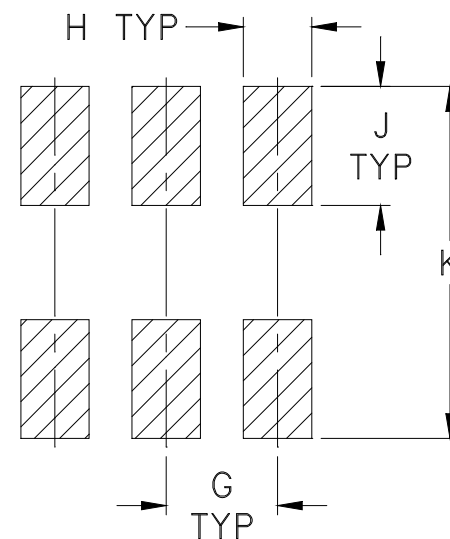
OUTPUT RETURN LOSS vs. TEMPERATURE



### Outline Dimensions



### PCB Land Pattern



Suggested Layout,  
Tolerance to be within  $\pm .002$

| CASE #   | A              | B              | C              | D              | E              | F              | G              | H              | J              | K              | L  | M  | N  | P  | WT. GRAM |
|----------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----|----|----|----|----------|
| FV1206-1 | .126<br>(3.20) | .063<br>(1.60) | .035<br>(0.89) | .024<br>(0.61) | .022<br>(0.56) | .011<br>(0.28) | .039<br>(0.99) | .024<br>(0.61) | .042<br>(1.07) | .123<br>(3.12) | -- | -- | -- | -- | .020     |

Dimensions are in inches (mm). Tolerances: 2 PL.  $\pm .01$ ; 3 PL.  $\pm .005$

#### Notes:

- Open style, ceramic base.
- Termination finish: **as shown below or indicated on Data Sheet.**  
 For RoHS Case Styles: Tin plate over Nickel plate. All models, (+) suffix.  
 For RoHS-5 Case Styles: Tin-Lead plate. All models, no (+) suffix.



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# Tape & Reel Packaging

# TR-F75

## DEVICE ORIENTATION IN T&R

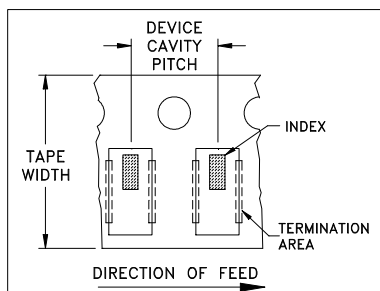


ILLUSTRATION 1

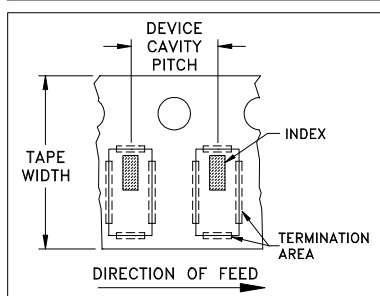


ILLUSTRATION 2

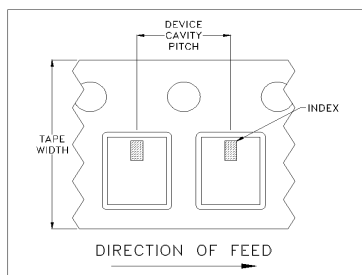


ILLUSTRATION 3

| Applicable Case Styles |
|------------------------|
| FV1206-1               |
| FV1206-3               |

| Applicable Case Styles |
|------------------------|
| FV1206-4               |
| FV1206-5               |
| FV1206-6               |
| FV1206-7               |
| FV1206-9               |
| JC0603C-1              |

| Applicable Case Styles |
|------------------------|
| NL1008C-6              |
| FV1206-12              |
| NL1008C-9              |
| NL1008C-10             |

| Tape Width, mm | Device Cavity Pitch, mm | Reel Size, inches | Devices per Reel                    |      |
|----------------|-------------------------|-------------------|-------------------------------------|------|
| 8              | 4                       | 7                 | Small quantity standards (see note) | 20   |
|                |                         |                   |                                     | 50   |
|                |                         |                   |                                     | 100  |
|                |                         |                   |                                     | 200  |
|                |                         |                   |                                     | 500  |
|                |                         |                   |                                     | 1000 |
|                |                         |                   | Standard                            | 3000 |

Note: Please consult individual model data sheet to determine device per reel availability.

Mini-Circuits carrier tape materials provide protection from ESD (Electro-Static Discharge) during handling and transportation. Tapes are static dissipative and comply with industry standards EIA-481/EIA-541.

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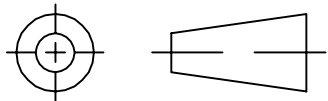
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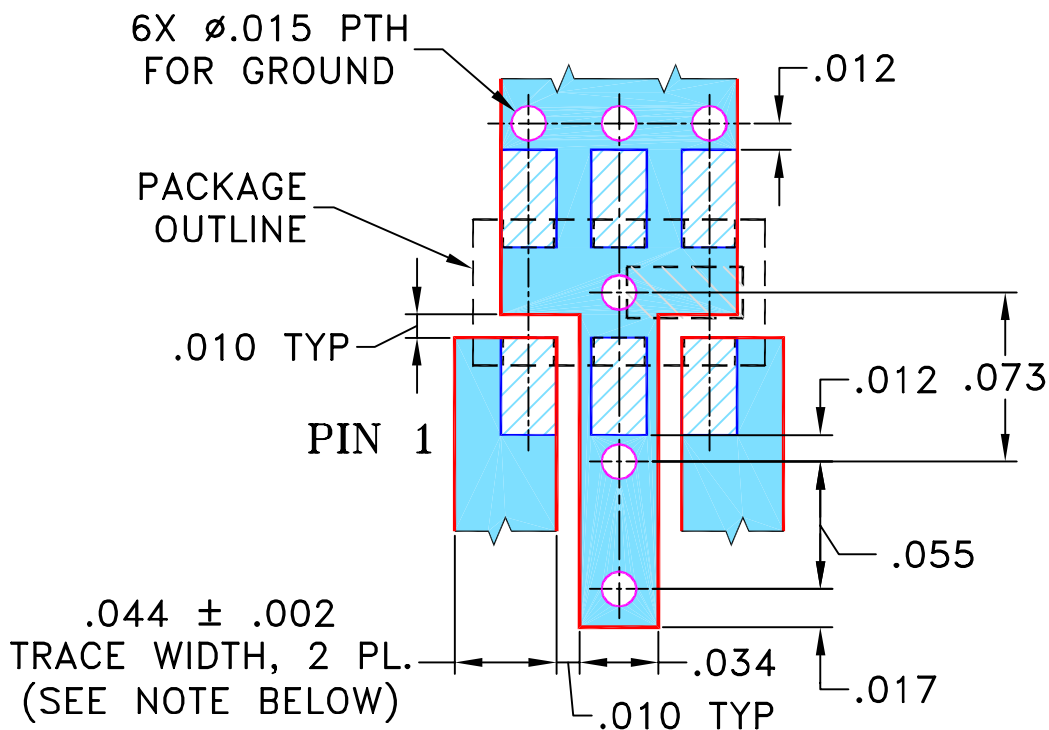
## THIRD ANGLE PROJECTION



## REVISIONS

| REV | ECN No. | DESCRIPTION           | DATE     | DR | AUTH |
|-----|---------|-----------------------|----------|----|------|
| OR  | M92199  | NEW RELEASE           | 05/24/04 | AV | ABD  |
| A   | M99247  | ADD GROUND PTH        | 06/05    | RZ | RZ   |
| A   | R60782  | ADD GROUND PTH        | 06/05    | RZ | RZ   |
| B   | M102713 | ADDED "...WITH SMOBC" | 01/12/06 | GF | IL   |

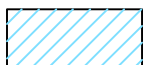
SUGGESTED MOUNTING CONFIGURATION  
FOR FV1206-1 CASE STYLE, "pr" PIN CONNECTION.



- NOTE: 1. TRACE WIDTH IS SHOWN FOR ROGERS RO4350B WITH DIELECTRIC THICKNESS .020"  $\pm$  .0015". COPPER: 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH MAY NEED TO BE MODIFIED.
2. BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.



DENOTES PCB COPPER LAYOUT WITH SMOBC (SOLDER MASK OVER BARE COPPER)



DENOTES COPPER LAND PATTERN FREE OF SOLDER MASK

UNLESS OTHERWISE SPECIFIED

INITIALS

DATE

DIMENSIONS ARE IN INCHES

TOLERANCES ON:

2 PL DECIMALS  $\pm$ 3 PL DECIMALS  $\pm$  .005ANGLES  $\pm$ FRACTIONS  $\pm$ 

DRAWN

AV

05/03/04

CHECKED

IL

05/24/04

APPROVED

ABD

05/24/04

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ASHEETA1.DWG REV:A DATE:01/12/95



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PL, pr, FV1206-1, HFCN, TB-285

SIZE

A

CODE IDENT

15542

DRAWING NO:

98-PL-158

REV:

B

FILE:

98PL158

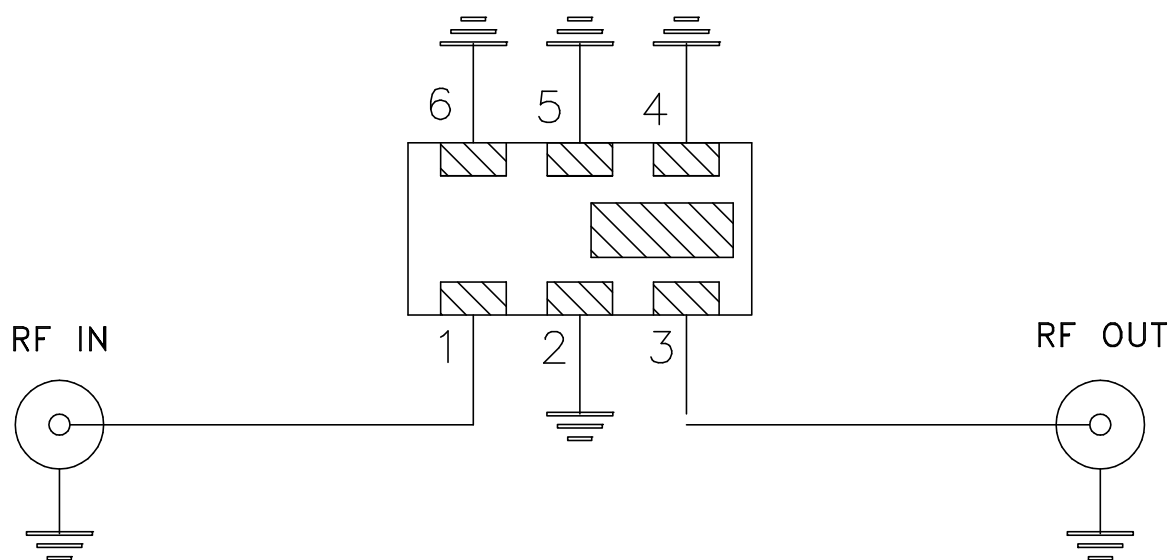
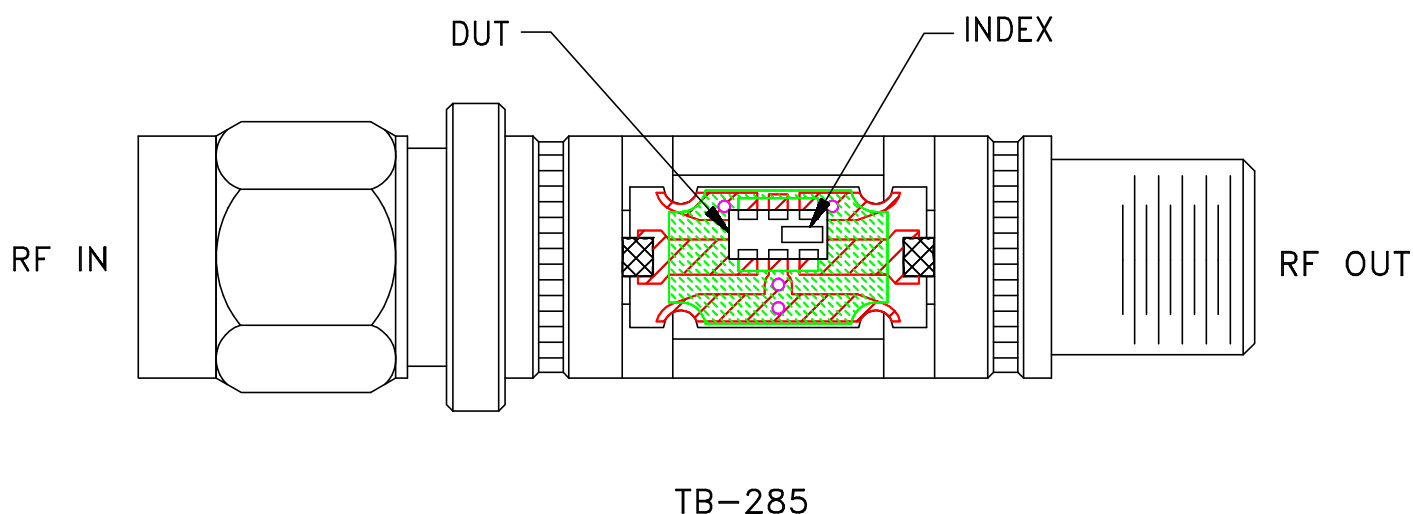
SCALE:

12:1

SHEET:

1 OF 1

# Evaluation Board and Circuit



Schematic Diagram

## Notes:

1. SMA Female connectors.
2. PCB Material: Rogers R04350 or equivalent,  
Dielectric Constant=3.5, Thickness=.020 inch.

 **Mini-Circuits®**



All Mini-Circuits products are manufactured under exacting quality assurance and control standards, and are capable of meeting published specifications after being subjected to any or all of the following physical and environmental test.

| Specification              | Test/Inspection Condition                                                           | Reference/Spec                                                                                       |
|----------------------------|-------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|
| Operating Temperature      | -55° to 100°C<br>Ambient Environment                                                | Individual Model Data Sheet                                                                          |
| Storage Temperature        | -55° to 100° C<br>Ambient Environment                                               | Individual Model Data Sheet                                                                          |
| Humidity                   | 90 to 95% RH, 240 hours, 50°C                                                       | MIL-STD-202, Method 103, Condition A, Except 50°C and end-point electrical test done within 12 hours |
| Solder Reflow Heat         | Sn-Pb Eutetic Process: 225°C peak<br>Pb-Free Process 245° - 250°C peak              | J-STD-020, Table 4-1, 4-2 and 5-2, Figure 5-1                                                        |
| Solderability              | 10X Magnification                                                                   | J-STD-002, Para 4.2.5, Test S, 95% Coverage                                                          |
| Vibration (High Frequency) | 20g peak, 10-2000 Hz, 12 times in each of three perpendicular directions (total 36) | MIL-STD-202, Method 204, Condition D                                                                 |
| Mechanical Shock           | 50g, 11 ms, 1/2-sine, 18 shocks: 3 each direction, each of 3 axes                   | MIL-STD-202, Method 213, Condition A                                                                 |