

- **Low Insertion Loss**
- **5.0 X 7.0 mm Surface-Mount Case**
- **Differential Input and Output or Single Ended Input and Output**
- **Complies with Directive 2002/95/EC (RoHS)**

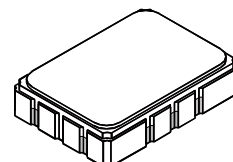


Absolute Maximum Ratings

Rating	Value	Units
Maximum Incident Power in Passband	+13	dBm
Max. DC voltage between any 2 terminals	30	VDC
Storage Temperature Range	-40 to +85	°C
Suitable for lead-free soldering - Max Soldering Temperature	260°C for 30 s	

SF2094B

**380.00 MHz
SAW Filter**



SMP-03

Electrical Characteristics

Characteristic	Sym	Notes	Min	Typ	Max	Units
Nominal Center Frequency	f_c	1	379.9	380.00	380.1	MHz
Insertion Loss					13.5	dB
3 dB Bandwidth	BW_3			4.0		MHz
Passband Variation	CF ± 1.7 MHz			0.5	1.5	dB
	CF ± 1.85 MHz			2.3	3.5	dB
Group Delay Variation	CF ± 1.7 MHz			250		nsec
Reflected						dB
Return Loss			10			
Triple Transit			35			
After 1-2us					20	
After 2-3us					35	
After >3us					45	
Ultimate Rejection	DC to 180 MHz		30			dB
	180 to 284 MHz		40			
	284 to 340 MHz		50			
	340 to 376.15 MHz		36			
	383.4 to 580 MHz		36			
	580 to 870 MHz		30			
Maximum Peak RF Input Power					13	dBm
Maximum RF Input Power Over Life					10	dBm
Temperature Range	Operating		-15		85	°C
	Storage		-40		85	
Frequency Temperature Coefficient	FTC			0.032		ppm/°C ²
Case Style		SMP-03 7 x 5 mm Nominal Footprint				
Lid Symbolization (YY=year, WW=week, S=shift)		RFM SF2094B YYWWS				

CAUTION: Electrostatic Sensitive Device. Observe precautions for handling.

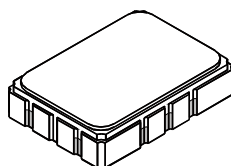
NOTES:

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. 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.
3. The design, manufacturing process, and specifications of this filter are subject to change.
4. The turnover temperature, T_O , is the temperature of maximum (or turnover) frequency, f_o . The nominal frequency at any case temperature, T_c , may be calculated from: $f = f_o[1 - FTC(T_o - T_c)^2]$.
5. Tape and Reel Standard ANSI / EIA 481.
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. Murata, stylized Murata logo, and Murata N.A., Inc. are registered trademarks of Murata Manufacturing Co., Ltd.

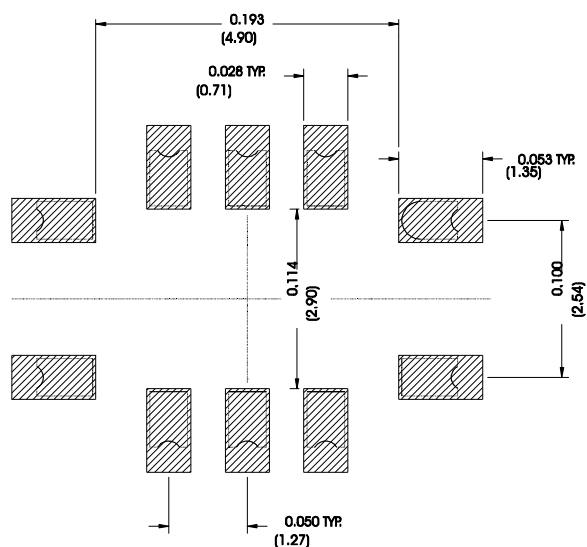
SMP-03 Case

10-Terminal Ceramic Surface-Mount Case

7 x 5 mm Nominal Footprint



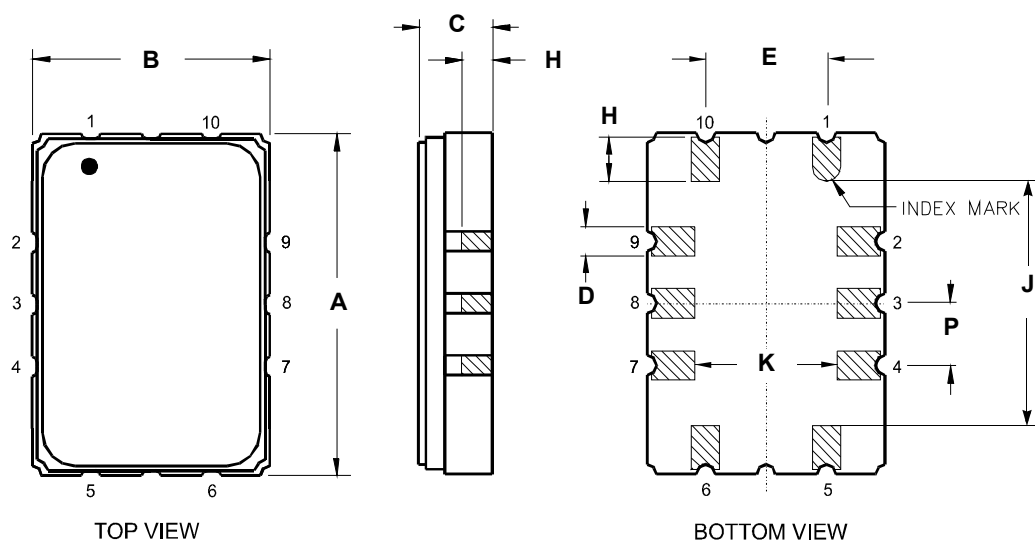
Recommended PCB Footprint



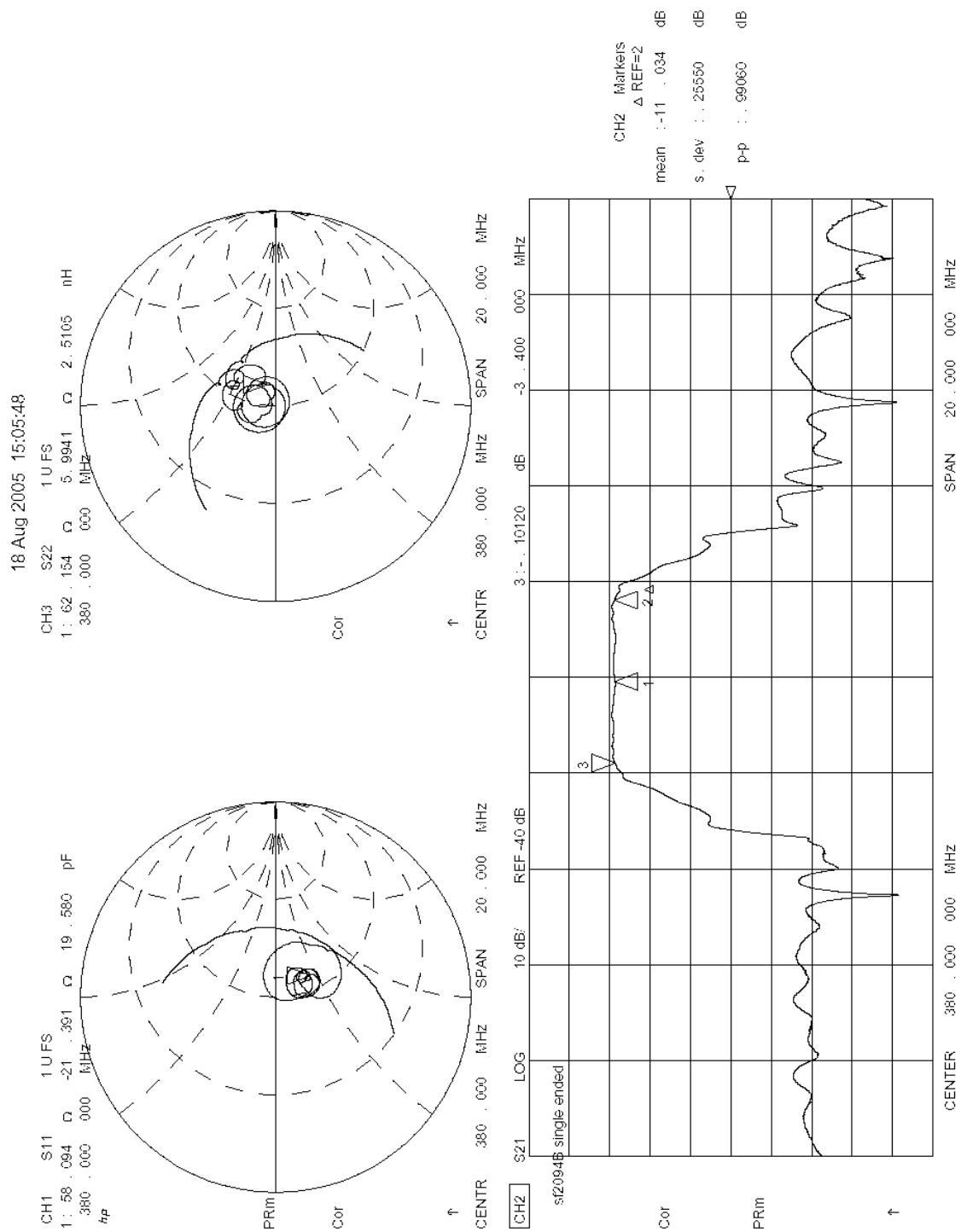
Case Dimensions						
Dimension	mm			Inches		
	Min	Nom	Max	Min	Nom	Max
A	6.80	7.00	7.20	0.268	0.276	0.283
B	4.80	5.00	5.20	0.189	0.197	0.205
C	1.50	1.65	2.00	0.059	0.065	0.079
D	.47	0.60	.73	0.019	0.024	0.029
E	2.41	2.54	2.67	0.095	0.100	0.105
H	0.87	1.0	1.13	0.034	0.039	0.044
J	4.87	5.00	5.13	0.192	0.197	0.202
K	2.87	3.00	3.13	0.113	0.118	0.123
P	1.14	1.27	1.40	0.045	0.050	0.055

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

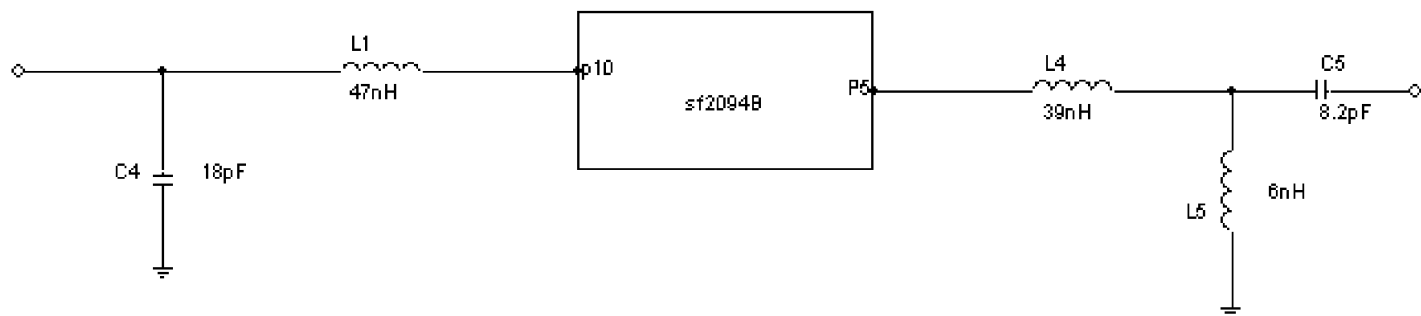
Electrical Connections		
Connection		Terminals
Single Ended Operation	Input	10
	Output	5
Differential Operation	Input	1, 10
	Output	5, 6
Ground		All others
RFM Matching Circuit Illustrated Separately		



SF2094B demo board plot. single-ended



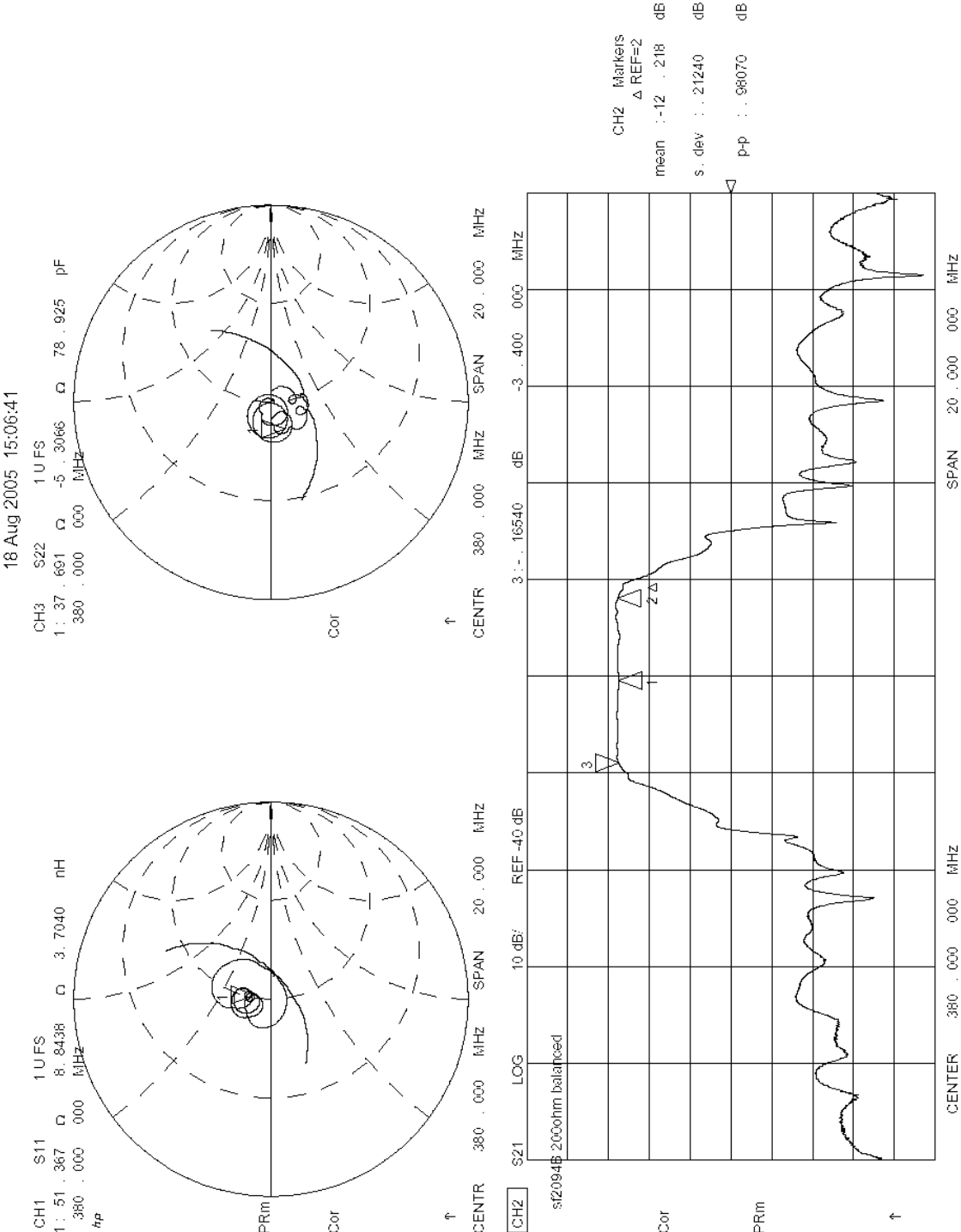
SF2094B demo board plot.
single-ended



Supplier	Size	Q	Value	Tolerance
Coilcraft	0805	60	47 nH	5%
Coilcraft	0805	60	39 nH	5%
Coilcraft	0805	60	6 nH	5%
Presidio	0603	-	18 pF	5%
Presidio	0603	-	8.2 pF	5%

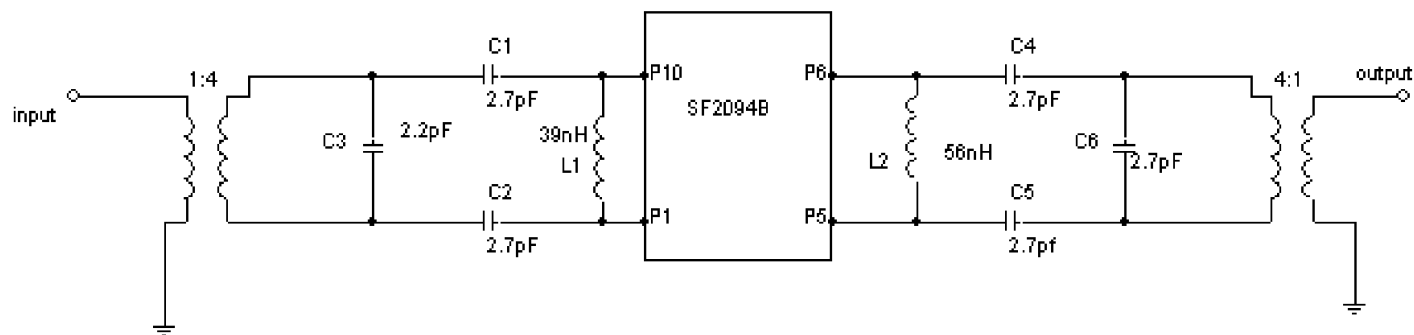
SF2094B demo board plot.

200 ohm balanced.



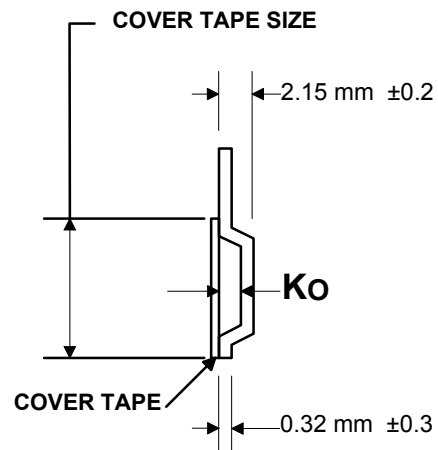
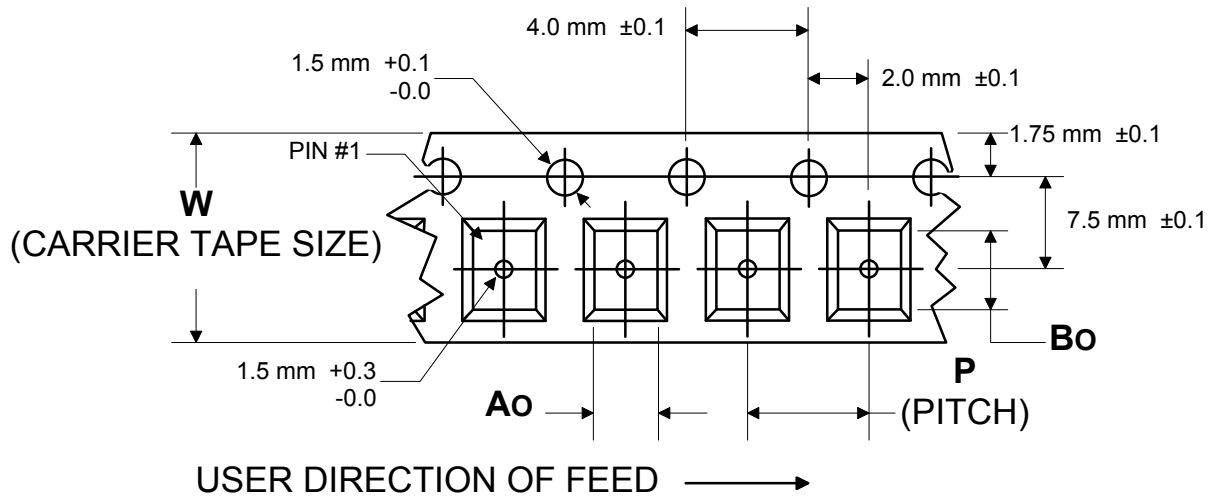
SF2094B demo board plot.

200 ohm balanced.



Supplier	Size	Q	Value	Tolerance
Coilcraft	0805	40	39 nH	5%
Coilcraft	0805	38	56 nH	5%
Presidio	0603	-	2.2 pF	5%
Presidio	0603	-	2.7 pF	5%

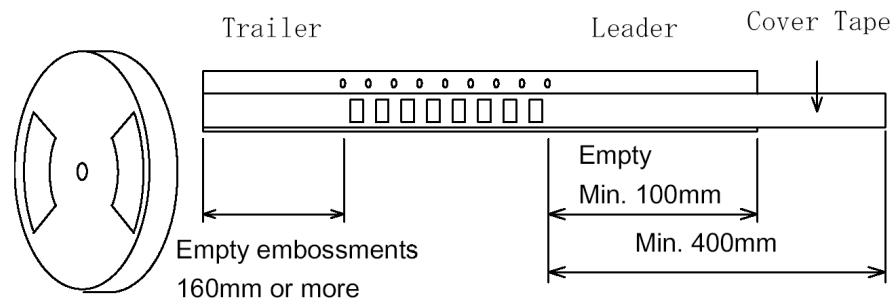
COMPONENT ORIENTATION and DIMENSIONS



Carrier Tape Dimensions		
Ao	5.5 mm	± 0.1
Bo	7.5 mm	± 0.1
Ko	2.0 mm	± 0.1
Pitch	8.0 mm	± 0.1
W	16.0 mm	± 0.3

Leader and Trailer specifications (Based upon EIA-481)

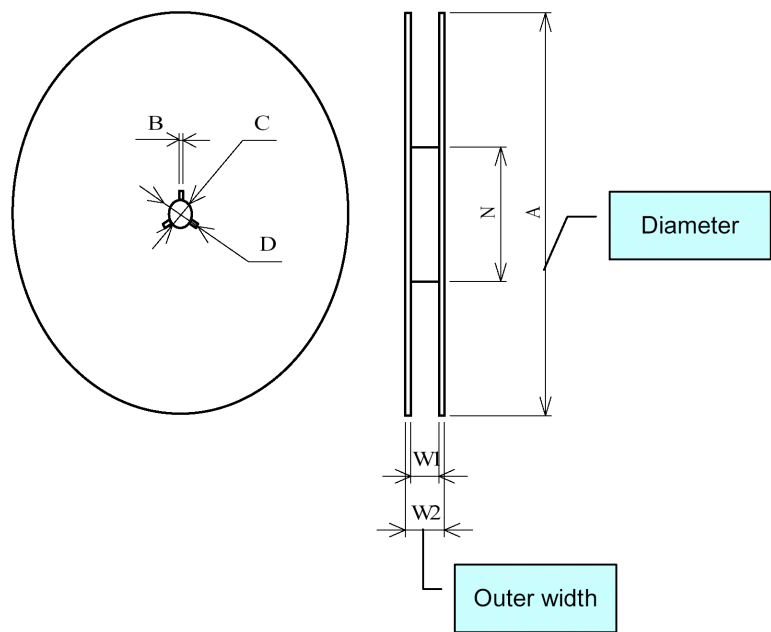
Dimensions of the leader and trailer



7 Inch Reel Quantity 500														
Symbol	A		N	C		D		B	W ₁		W ₂			
Dimension	178	+0 -4	60	±1	13	+0.5 -0.2	20.2	+1.5 -0	2	±0.5	16.4	+2 -0	22.4	MAX

13 Inch Reel Quantity 2000														
Symbol	A		N		C		D		B		W ₁		W ₂	
Dimension	330	+0 -4	100	±2	13	+0.5 -0.2	20.2	+1.5 -0	2	±0.5	16.4	+2 -0	22.4	MAX

Dimensional drawing of the reel



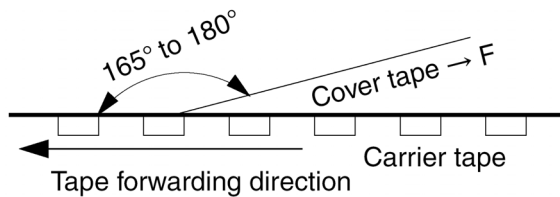
Additional items

(1) Cover tape peeling strength

The cover tape shall be adhered evenly to the carrier tape along both sides in the pulling direction.

The cover tape peeling strength shall be as follows for an angle between the cover tape and the pulling direction of 165° to 180° (see the figure) and a peeling speed of 300mm/min. ±10mm/min.

[EIA-481] 0.1N to 1.3N for a tape width of 12 to 56mm



Fixing method

1. Insert the tip of the carrier tape into the groove.
2. Fix the tip of the cover tape with adhesive tape.

Tape material

- (1) Carrier tape [anti-charging treatment: carbon used] Surface resistivity: 1×10^8 or less

Material: Polystyrene or Polycarbonate

- (2) Cover tape material: Polyester (anti-charging treated) Surface resistivity: 1×10^{12} or less

t = 50 to 100μm width = 13.3mm

Warranty periods

Cover tape peeling strength and mounting performance of stored components.

2-1. Cover tape peeling strength: One year after delivery (Peeling strength: 0.1N to 1.3N)

Number of missing components

There shall not be two or more consecutive missing components. Also, the maximum number of missing components shall be the larger of one piece or 0.1%.

Storage environment

Keep the product on which taping has been performed to a temperature below 40°C and a humidity within 80% RH. Do not subject in the direct sun.

Labeling

The following items are labeled on the surface of a reel.

Product Part Number, Date Code, Quantity

Reel labels shall follow the format shown below. The long side of the label must measure between 2.75 and 4.0 inches (68 to 100 mm). The short side of the label must measure between 1.5 and 2 inches (38 to 80 mm). Bar codes must conform to AIAG standard B10.

Information that is on the label:

Device Type: RFM part number

Code: RFM designated part ID or part date code

Reel ID: Manufacturing reel identification

Reel Qty: Quantity of parts on the reel

Work Order: Manufacturing work order number

Date: Date product was loaded on tape and reel.

Company Identification: R. F. Monolithics, Inc.

*Q. C.: Area for QA stamps, other information is required

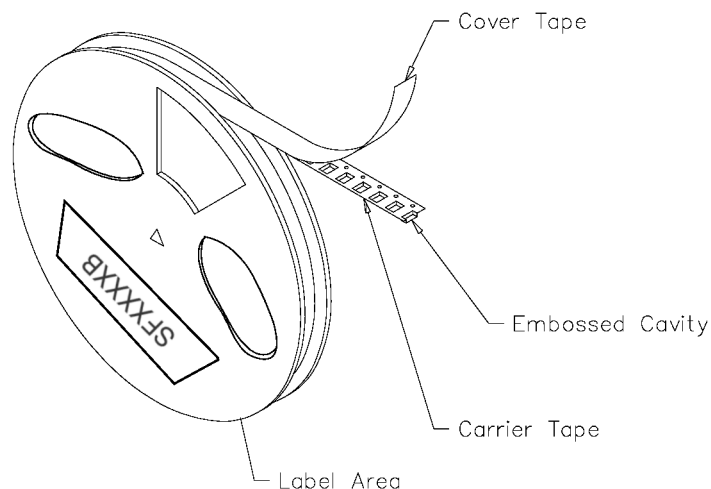
Country of assembly

Dev. Type: R02053A - 1	Code: 0308
Reel ID: 192086	Reel Qty: 500
Work Order: 560270	R.F. Monolithics, Inc.
Date: 03/26/03	* Q.C.

DevType: TR1000	ReelQty: 250
ReelID: 600253	R.F. Monolithics, Inc.
WorkOrder: 780211	Date: 03/25/03
	Q.C. RFM INSP 111
	Assembled in Japan

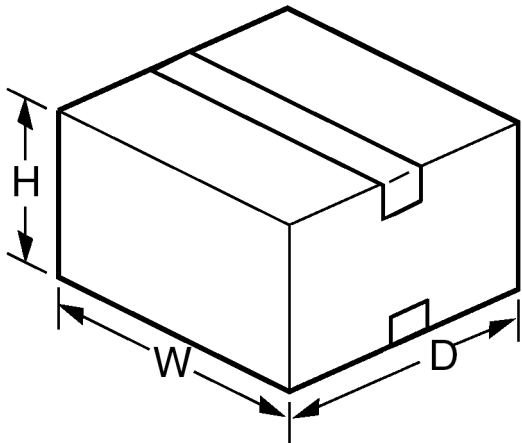
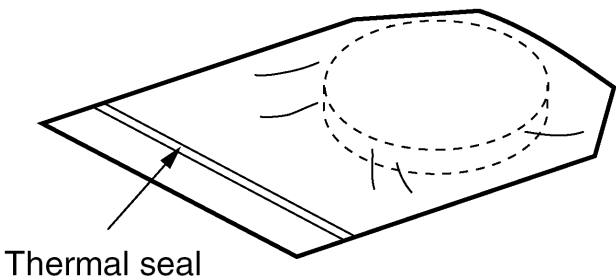
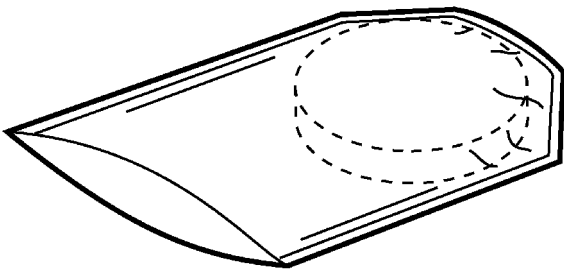
Examples of acceptable reel labels

Location of label on reel is shown below. Reel labels must be placed entirely on plastic, without covering open sections of the reel. Design of reel must satisfy this requirement. Pin #1 must be located on the side opposite the reel label.



Package for Shipment

7 Inch Reel	Quantity Per Reel	Number Reels Per Carton	External Caton Dimensions	Reel Weight	Shipping Carton Weight	Total Weight
	500	4	254 x 254 x 127 mm 10 x 10 x 5 inches	896 g	448 g	1344 g
	500	10	254 x 254 x 203 mm 10 x 10 x 8 inches	2240 g	448 g	2688 g
13 Inch Reel	Quantity Per Reel	Number Reels Per Carton	External Caton Dimensions	Reel Weight	Shipping Carton Weight	Total Weight
	2000	2	356 x 356 x 102 mm 14 x 14 x 4 inches	1288 g	448 g	1736 g
	2000	4	356 x 356 x 178 mm 14 x 14 x 7 inches	2576 g	448 g	3024 g
	2000	8	356 x 356 x 356 mm 14 x 14 x 14 inches	5152 g	448 g	5600 g



RFM Qualification and Reliability Test					
Test		Standard	Test Parameters	Measurement Criteria	Results
1	Life at Elevated Temperature	MIL-STD-202 Method 108 Condition C	1,000 Hours 125°C Unbiased	Within Electrical & Hermetic Spec. (Note 1)	Pass
2	Temperature Cycling	JESD22 Method JA-104 Air-to-Air	-55 × C to +125 × C 20 min. Dwell 1,000 cycles		Pass
3	Vibration, Variable Frequency	MIL-STD-883 Method 2007 Condition B	50g Max. 4 Cycles, 3 Axis 20 Hz to 2 kHz to 20 Hz		Pass
4	Mechanical Shock	MIL-STD-883 Method 2002 Condition B	1,500g Max. 5 Shocks ±3 Axis		Pass
5	Destructive Bond Strength	MIL-STD-883 Method 2011 Condition C	Wire Bond Pull Strength	2.0 grams (After Seal)	Pass
6	Die Shear Strength	MIL-STD-883 Method 2019	Shear Strength	0.6 kg (Strength/area limit in development)	Pass
7	Solderability (Note 2)	J-STD-002 Method B	8 hr. steam age 245 × C solder temperature 5 second dwell	>95% wetted surface	Pass
8	Physical Dimensions	JESD22 Method JB-100	Critical Dimensions	Within specifications	Pass
9	Temperature Characteristics	RFM Procedure	Frequency over Temperature	Within specifications	Pass
10	Terminal Strength (Note 2)	MIL-STD-883 Method 2004 Condition A & D	Cond. A-Lead Tension Cond. B -Pad Adhesionr 24	8 oz. - 30 sec. Visual Requirements & meets Hermetic Spec.	Pass
11	Resistance to Solvents	MIL-STD-883 Method 2015	Solvents a, b, d	Visual Requirements	Pass
12	Steady State Life	MIL-STD-883 Method 1005	1,000 Hours Max. Operating Temperature Rated Voltage	Within Electrical & Hermetic Spec. (Note 1)	Pass
13	Internal Water-Vapor Content	MIL-STD-883 Method 1018		< 5,001 PPM	Pass
14	Constant Acceleration	MIL-STD-883 Method 2001 Y1 Direction	30,000g	Within Electrical & Hermetic Spec. (Note 1)	Pass
15	Substrate Attach Strength	MIL-STD-883 Method 2027	Tensile Strength of Die Attachment	Custom per Device	Pass