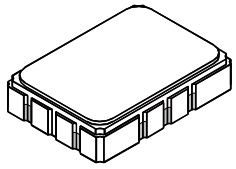
RFM products are now Murata products.

SF2094B

380.00 MHz SAW Filter

- ***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)***



SMP-03

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	

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				

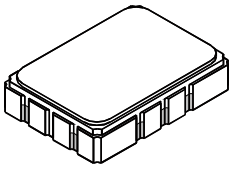
CAUTION: Electrostatic Sensitive Device. Observe precautions for handling.

NOTES:

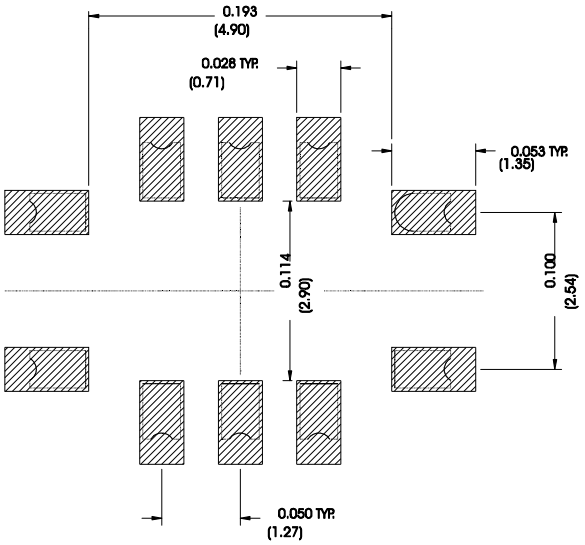
1. Unless noted otherwise, all specifications apply over the operating temperature range with filter soldered to the specified demonstration board with impedance matching to 50 Ω and measured with 50 Ω network analyzer.
2. Rejection is measured as attenuation below the minimum IL point in the passband. 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



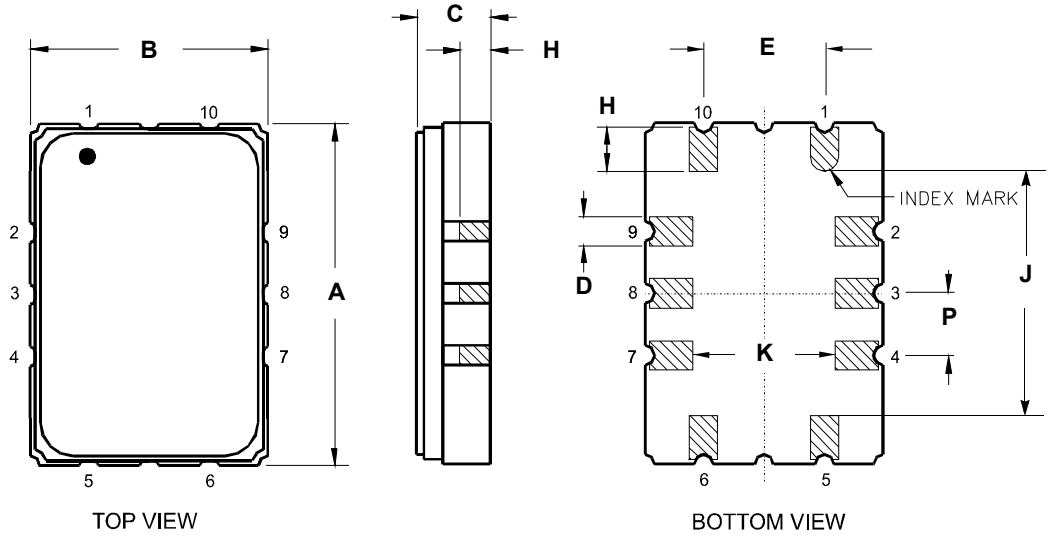
Recommended PCB Footprint



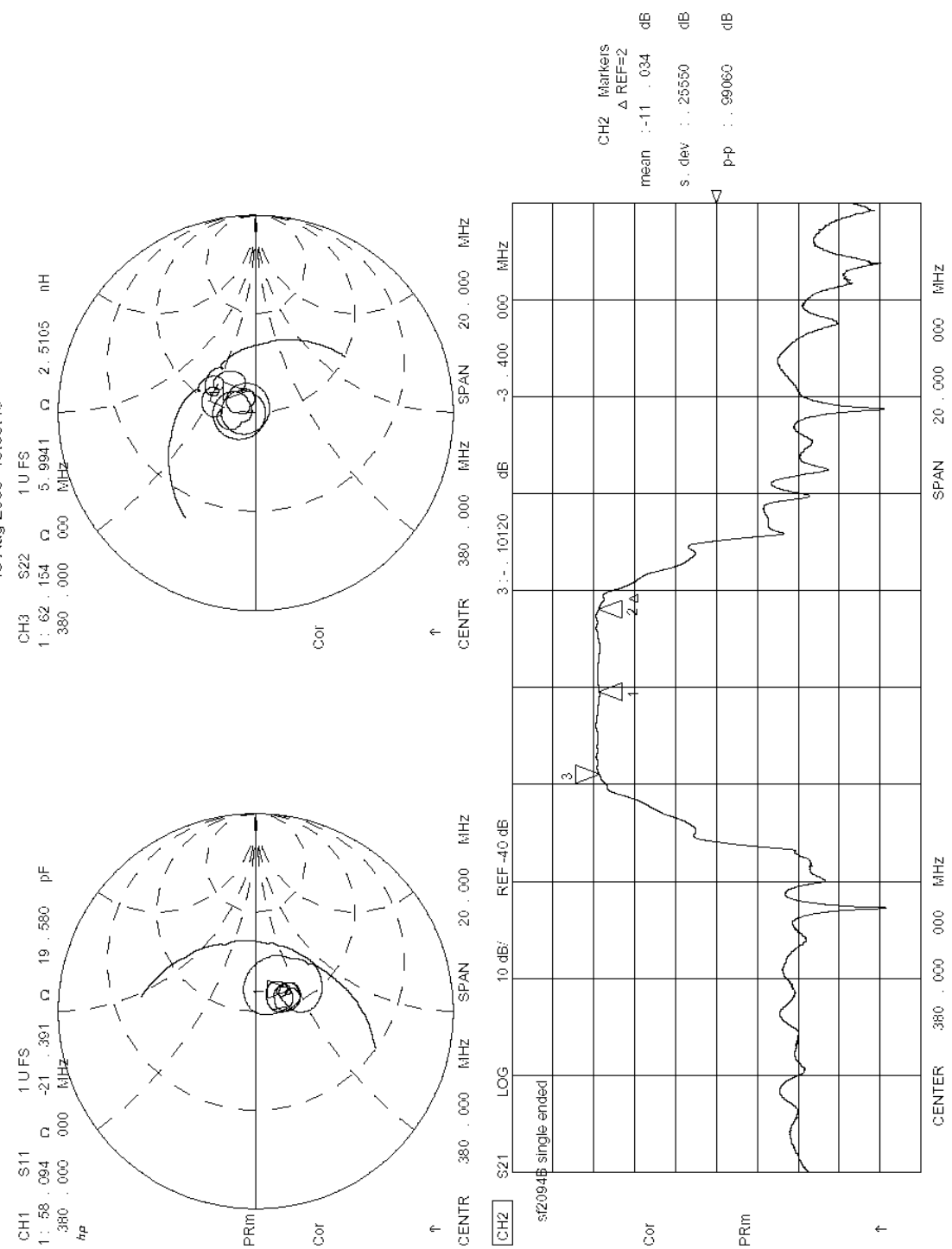
Case Dimensions						
Dimension	**mm**			**Inches**		
	Min	**Nom**	**Max**	**Min**	**Nom**	**Max**
A	6.80	7.00	7.20	0.268	0.276	0.283
B	4.80	5.00	5.20	0.189	0.197	0.205
C	1.50	1.65	2.00	0.059	0.065	0.079
D	.47	0.60	.73	0.019	0.024	0.029
E	2.41	2.54	2.67	0.095	0.100	0.105
H	0.87	1.0	1.13	0.034	0.039	0.044
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 µinches (76.2-152 µm) over 80-200 µinches (203-508 µm) Ni.
Lid	Fe-Ni-Co Alloy Electroless Nickel Plate (8-11% Phosphorus) 100-200 µinches Thick
Body	Al_2O_3 Ceramic
Pb Free	

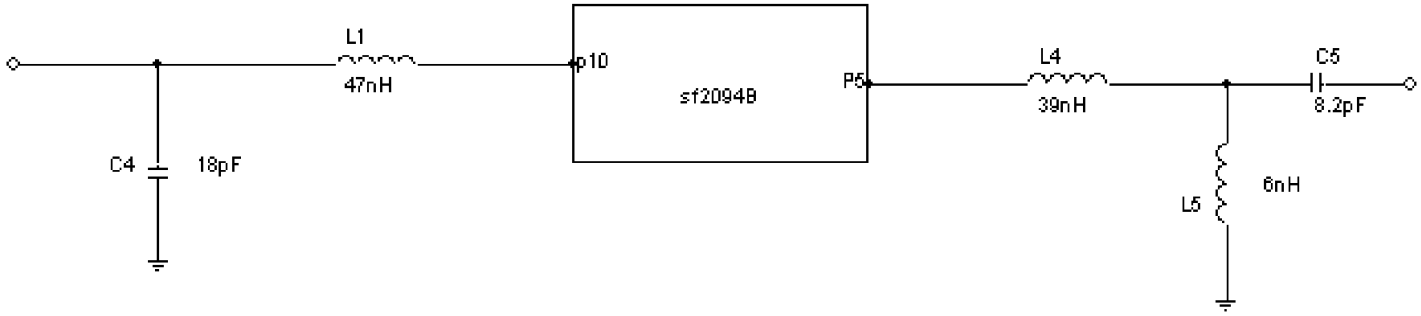
Electrical Connections		
Connection		**Terminals**
Single Ended Operation	Input	10
	Output	5
Differential Operation	Input	1, 10
	Output	5, 6
Ground		All others
RFM Matching Circuit Illustrated Seperately		



SF2094B demo board plot.
single-ended



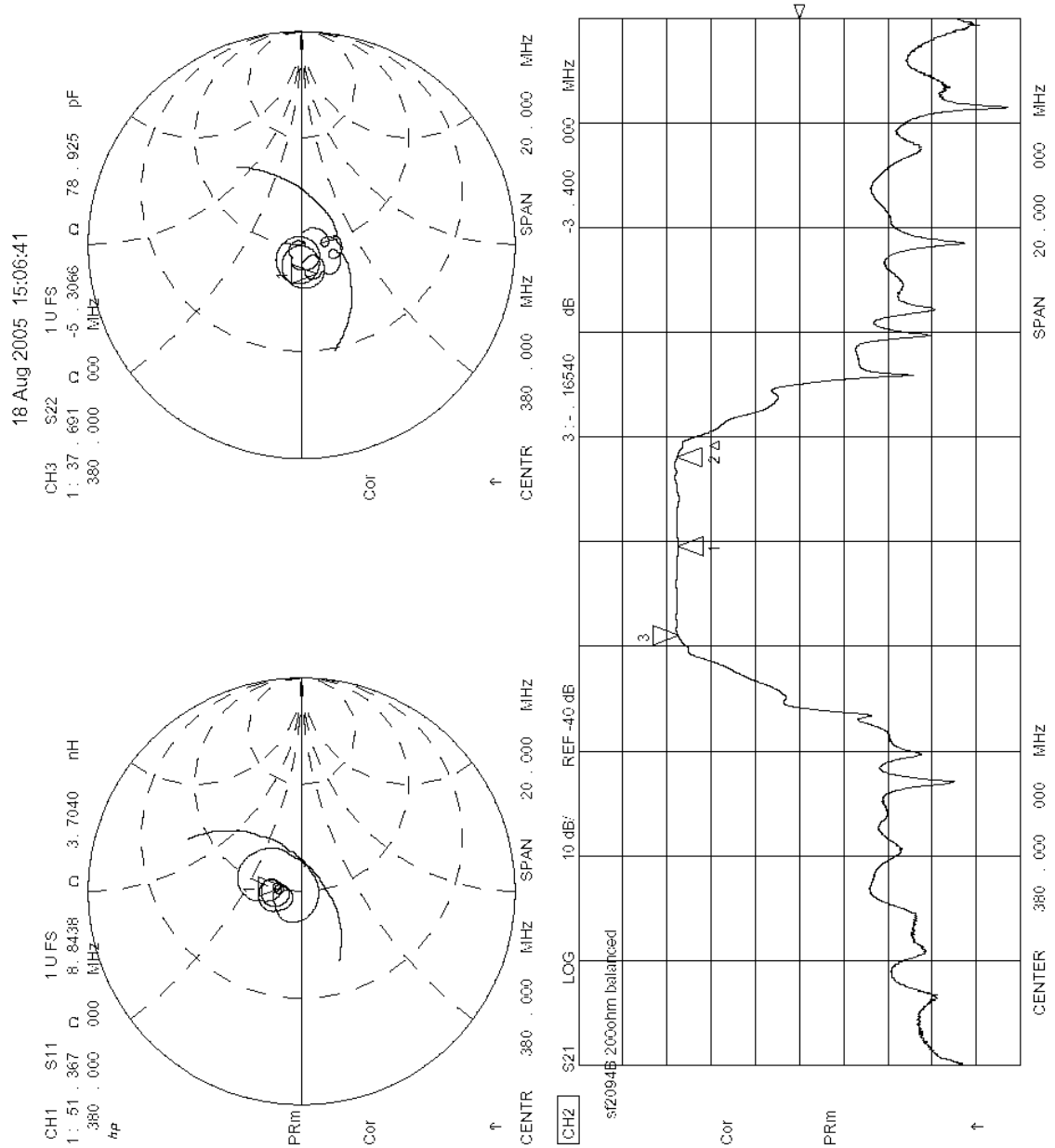
SF2094B demo board plot.
single-ended



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%

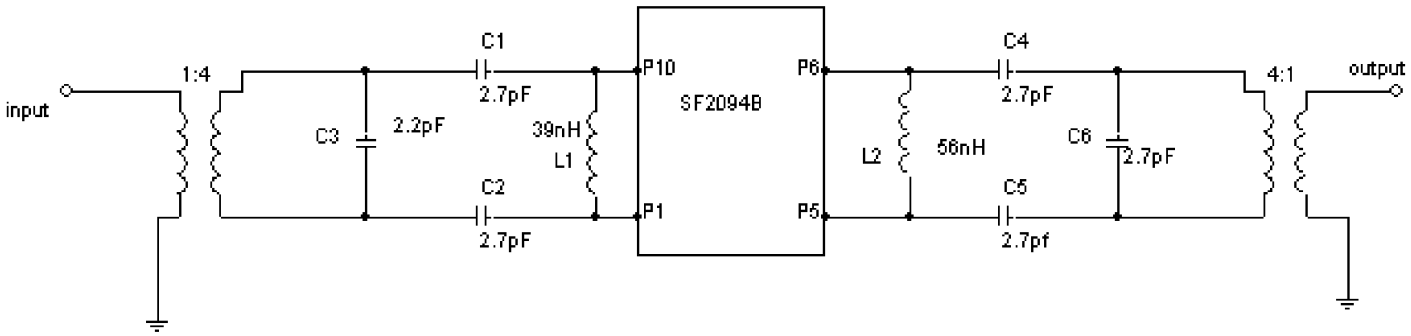
SF2094B demo board plot.

200 ohm balanced.



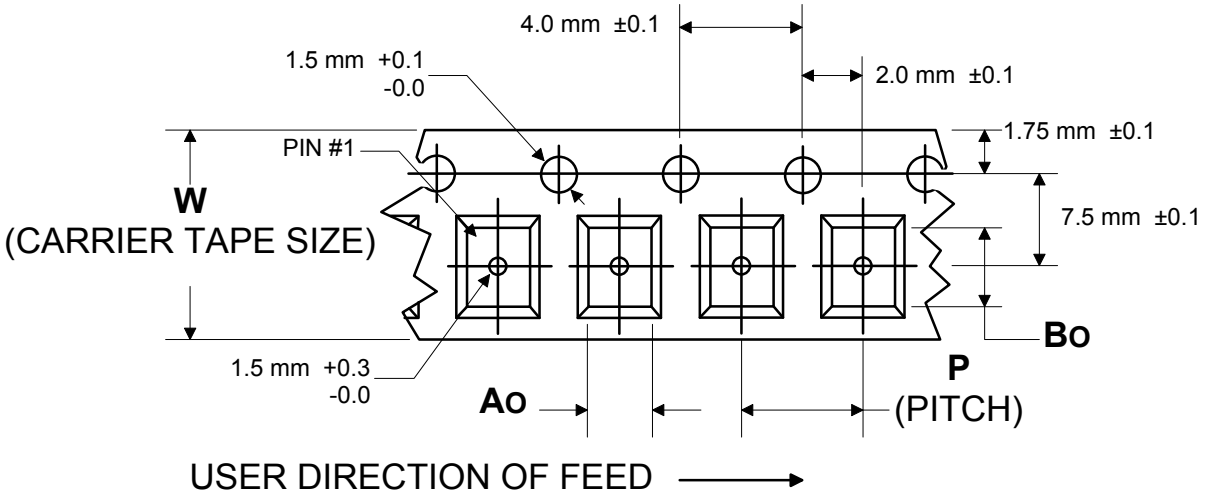
SF2094B demo board plot.

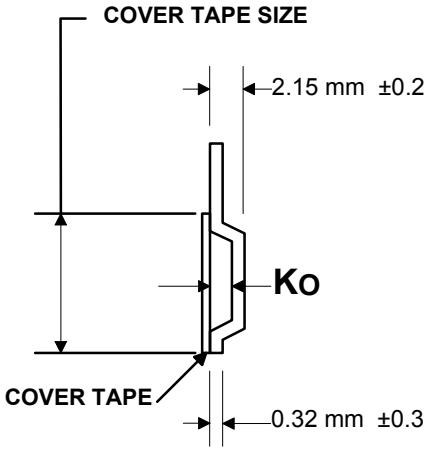
200 ohm balanced.



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

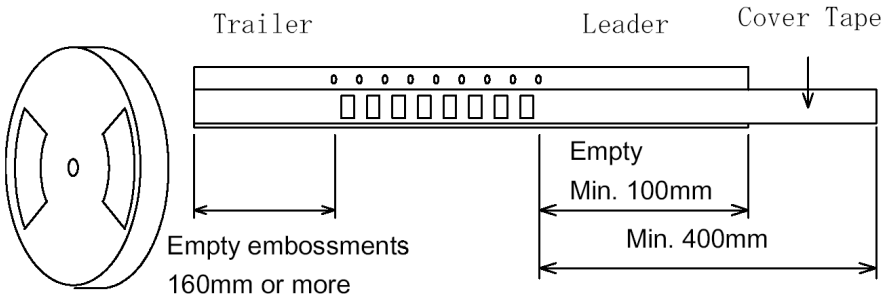




Carrier Tape Dimensions		
Ao	5.5 mm	±0.1
Bo	7.5 mm	±0.1
Ko	2.0 mm	±0.1
Pitch	8.0 mm	±0.1
W	16.0 mm	±0.3

Leader and Trailer specifications (Based upon EIA-481)

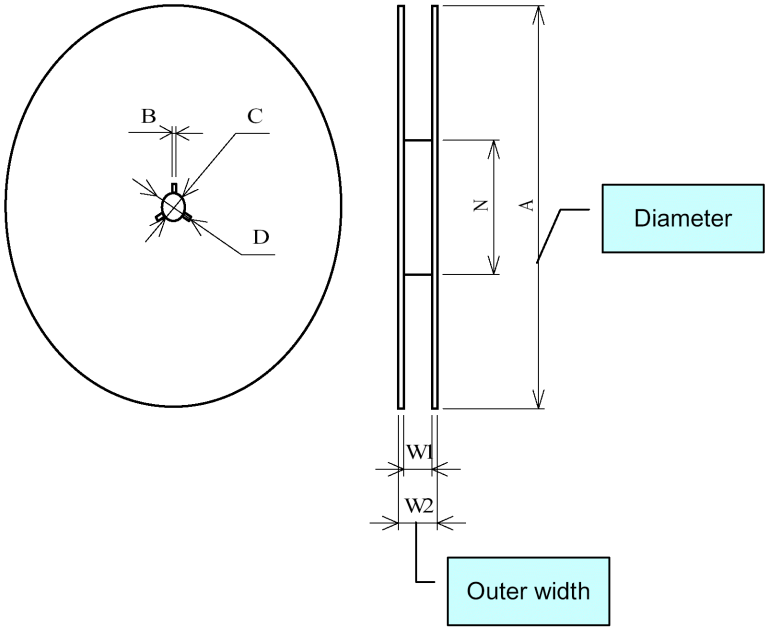
Dimensions of the leader and trailer



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



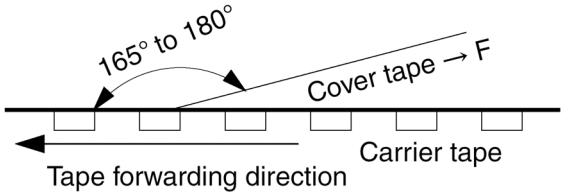
Additional items

(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 x 10^8 or less

Material: Polystyrene or Polycarbonate

(2) Cover tape material: Polyester (anti-charging treated) Surface resistivity: 1 x 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

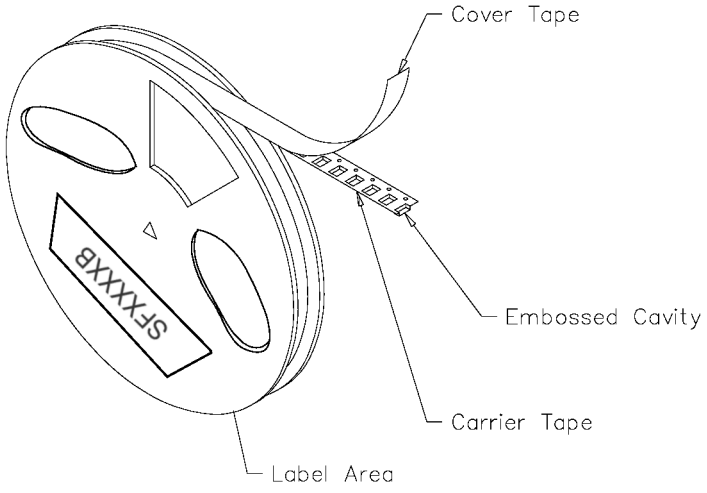
Reel labels shall follow the format shown below. The long side of the label must measure between 2.75 and 4.0 inches (68 to 100 mm). The short side of the label must measure between 1.5 and 2 inches (38 to 80 mm). Bar codes must conform to AIAG standard B10.

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

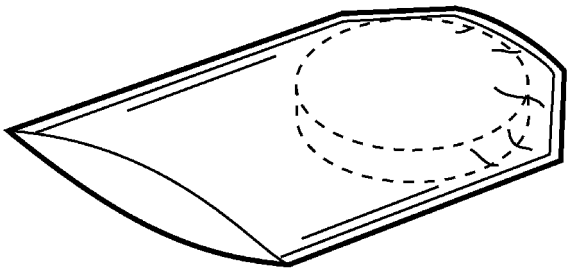
Examples of acceptable reel labels

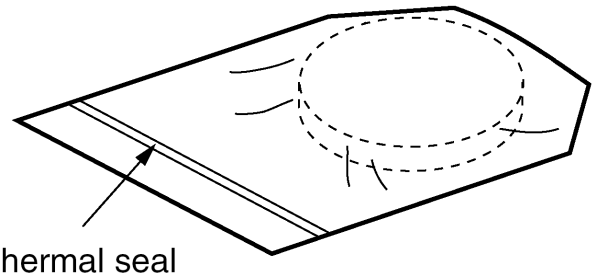
Location of label on reel is shown below. Reel labels must be placed entirely on plastic, without covering open sections of the reel. Design of reel must satisfy this requirement. Pin #1 must be located on the side opposite the reel label.

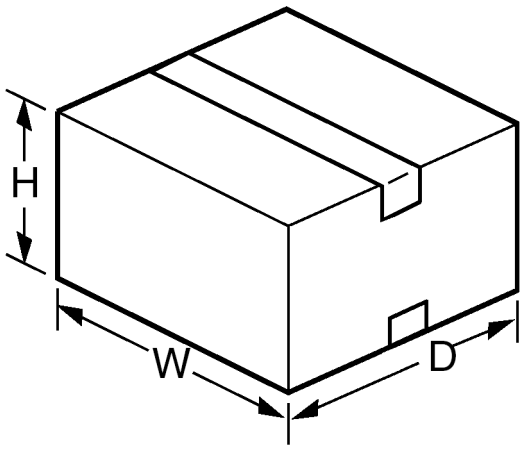


Package for Shipment

	Quanity Per Reel	Number Reels Per Carton	External Caton Dimensions	Reel Weight	Shipping Carton Weight	Total Weight
7 Inch Reel	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
	Quanity Per Reel	**Number Reels Per Carton**	**External Caton Dimensions**	**Reel Weight**	**Shipping Carton Weight**	**Total Weight**
13 Inch Reel	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







Shipment package

Sealing tape

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 ×Cto +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-833 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