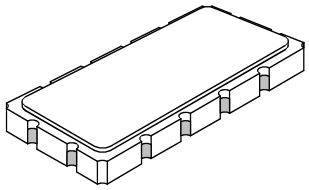
Preliminary

For prototype or pre-production sample please contact RFM Sales.

SF2066B

176.00 MHz SAW Filter

- ***Excellent Size-to-Performance Ratio***
- ***Hermetic 13.3 x 6.5 mm Surface-mount Case***
- ***Complies with Directive 2002/95/EC (RoHS)***



SMP-53

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		176.00		MHz
Passband	Insertion Loss at fc	IL			8	11	dB
	1 db Bandwidth	BW_1		3.3	4.0		
	3 db Bandwidth	BW_3			4.7	5.0	
	20 db Bandwidth	BW_{20}	1, 2		5.9	6.2	MHz
	30 db Bandwidth	BW_{30}			6.2	6.5	
	40 db Bandwidth	BW_{40}			6.5	6.8	
Passband Variation	CF±1.7 MHz				0.4	1.0	dB
Group Delay Variation					55	150	nsec
Ultimate Rejection	at CF±3.5 MHz			35	43		
	at CF±7 MHz			45	51		
	at CF±30 MHz			40	49		dB
	12 MHz			70	81		
	100 MHz			60	70		
	376 MHz			60	70		
Operating Temperature Range		T_A		-40		80	°C
Frequency Temperature Coefficient		FTC	1		0.32		ppm/°C^2

Impedance Matching to 50Ω Unbalanced	External L-C
Case Style	SMP-53 13.3 x 6.5 mm Nominal Footprint
Lid Symbolization (YY = year, WW = week)	RFM SF2066B 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, fc.
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. US and international patents may apply.
6. Electrostatic Sensitive Device. Observe precautions for handling.

Electrical Connections

Connection	Terminals
Input	11
Return Ground	12
Output	5
Return Ground	6
Case Ground	All others

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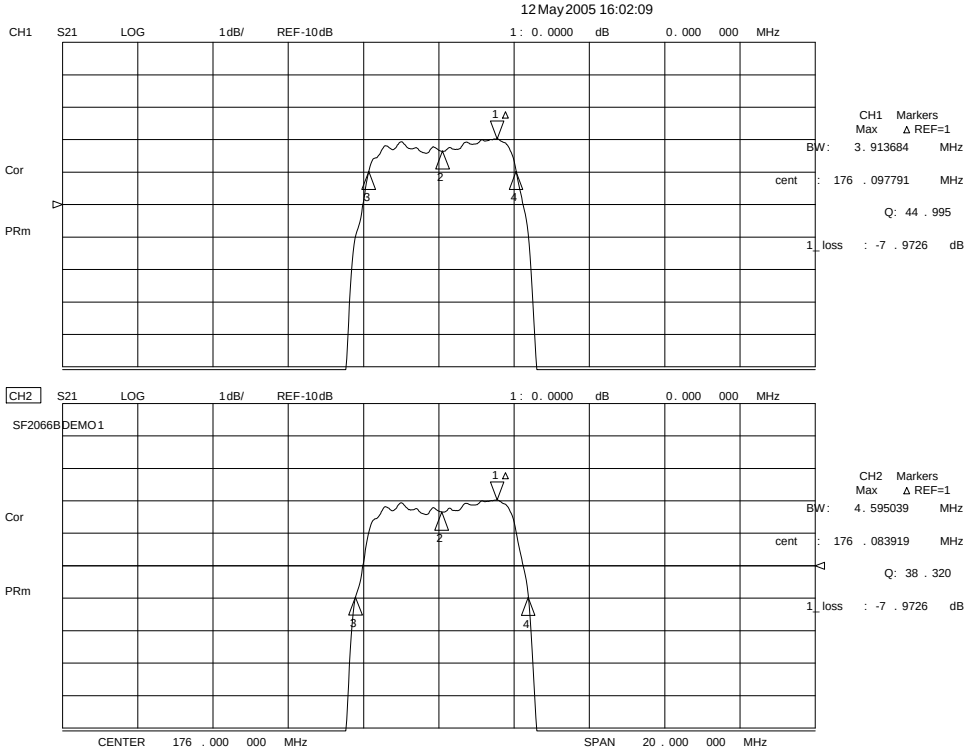
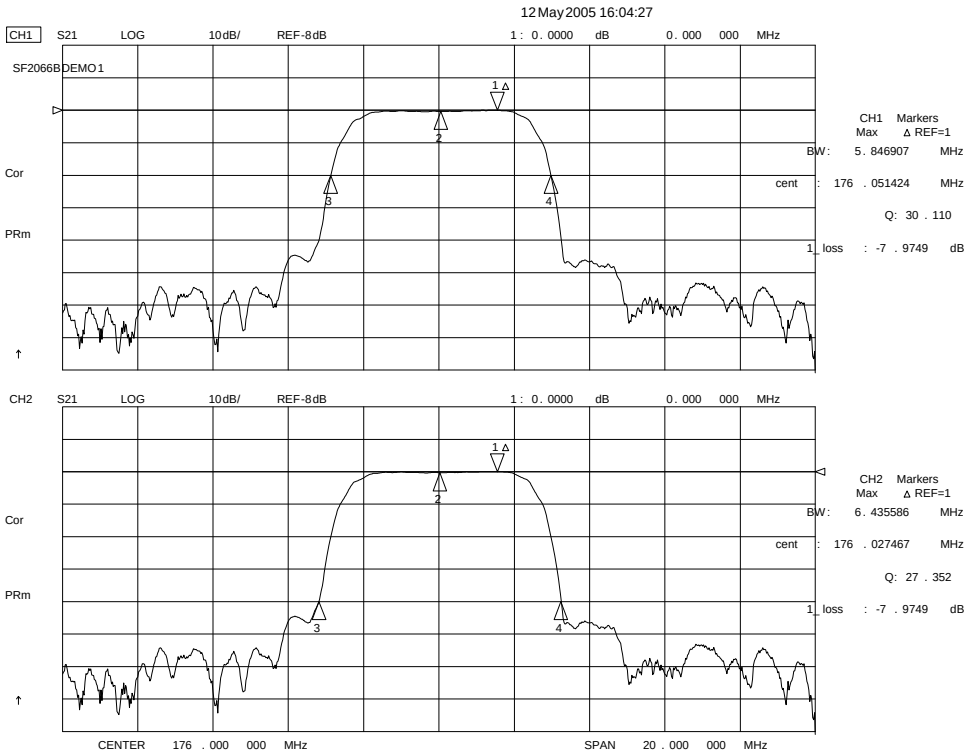
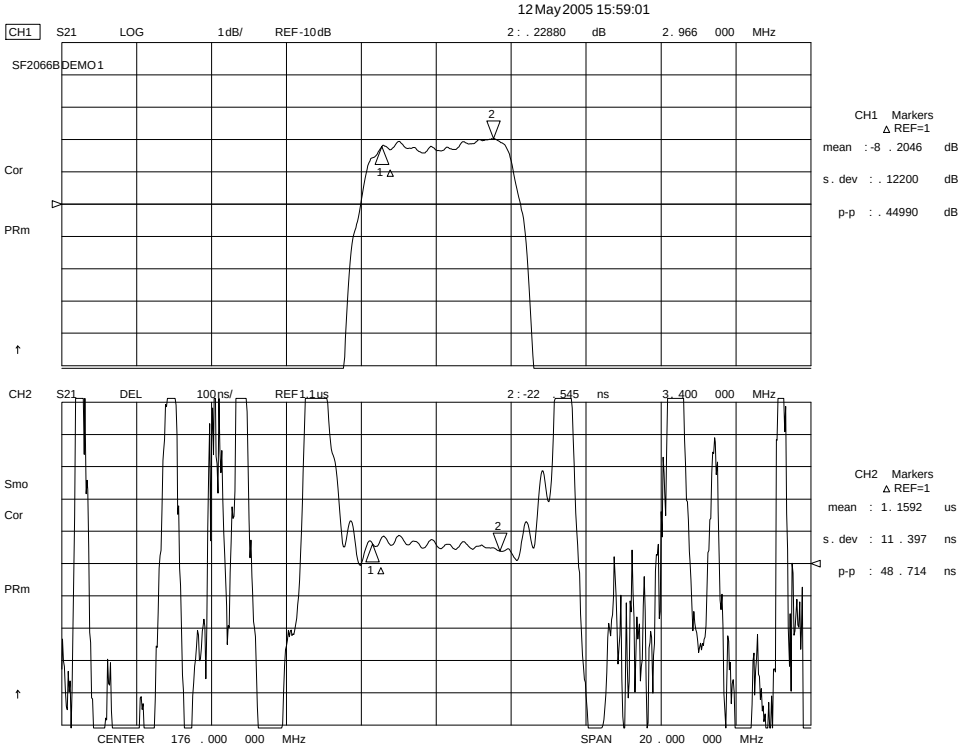
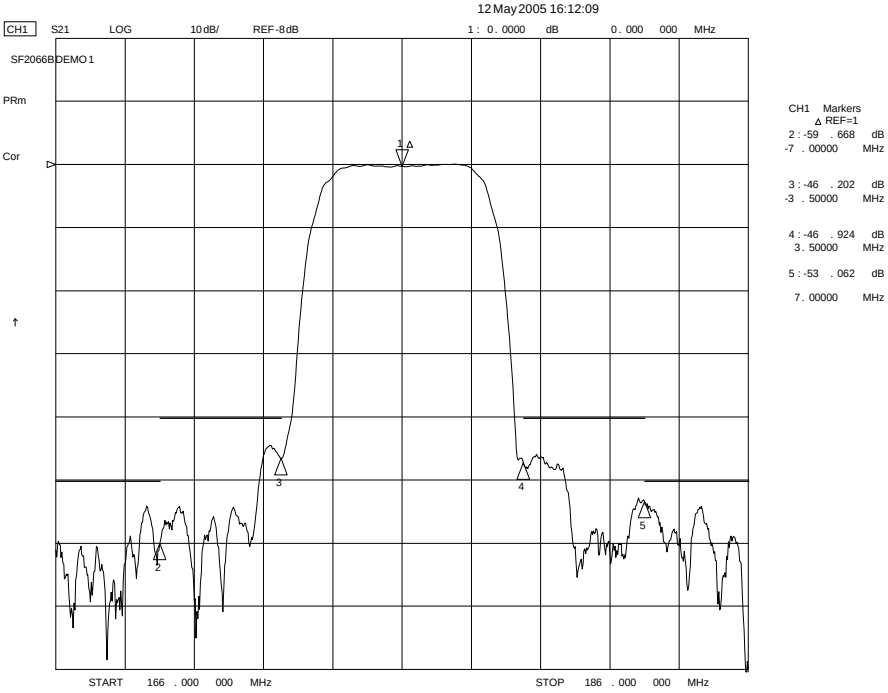
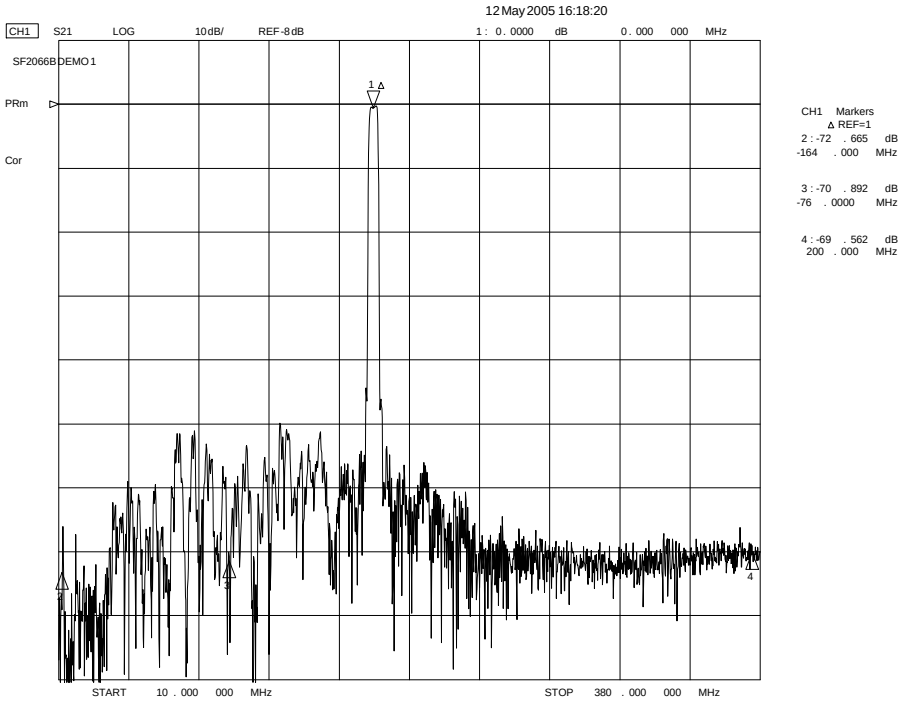
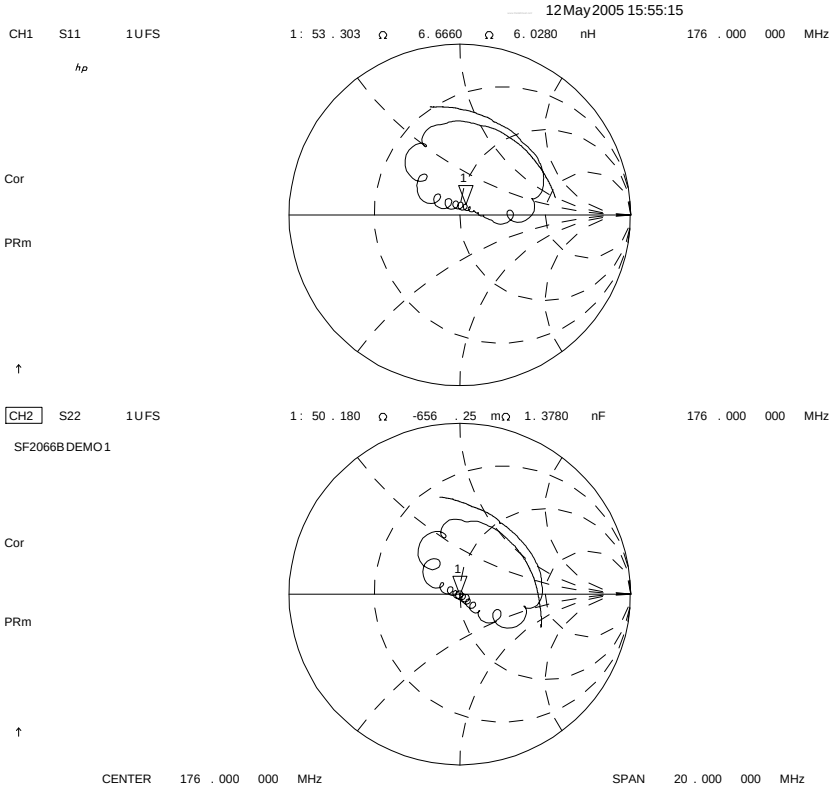


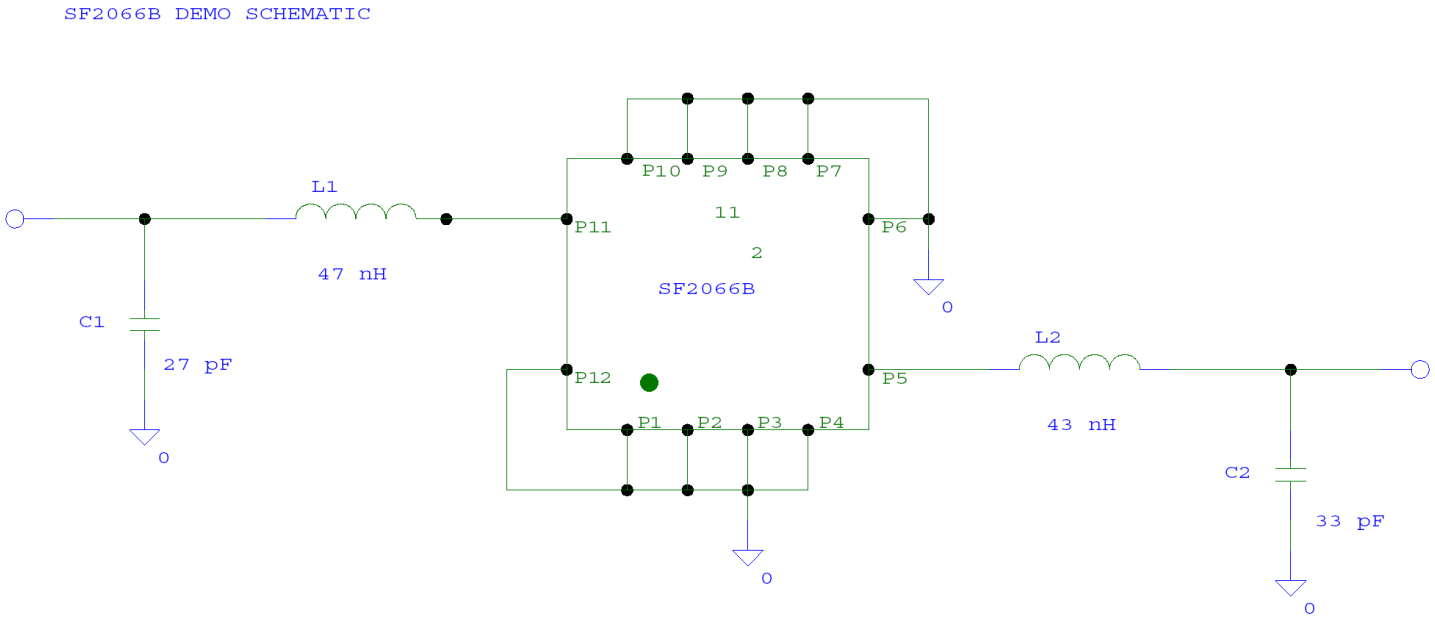








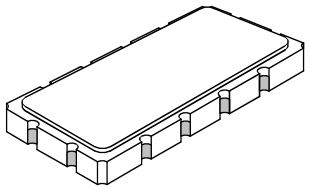




Supplier	Size	Q	Value	Tolerance
Coilcraft	0805	50	47 nH	5%
Coilcraft	0805	50	43 nH	5%
Presidio	0603	-	27 pF	5%
Presidio	0603	-	3 pF	5%

SMP-53 Case

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



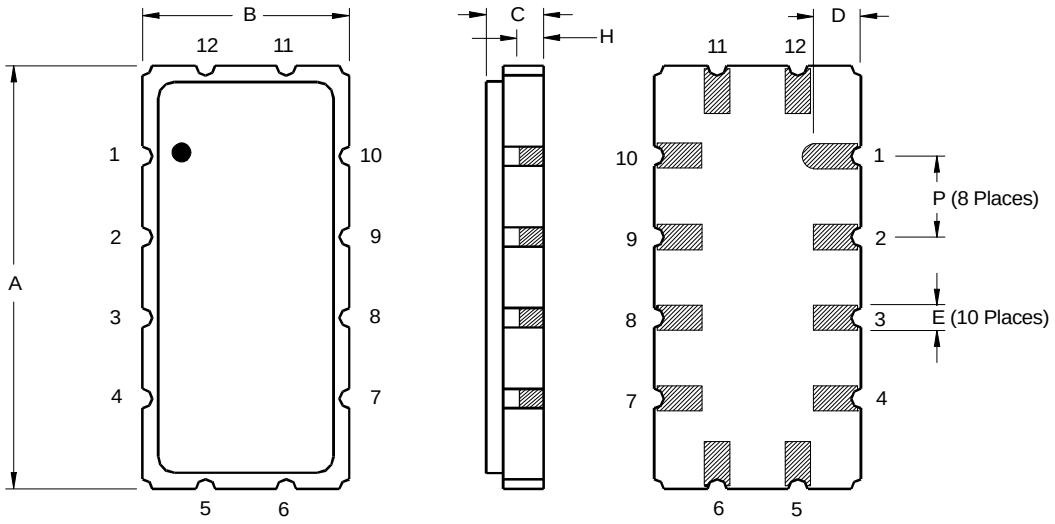
Case Dimensions

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	

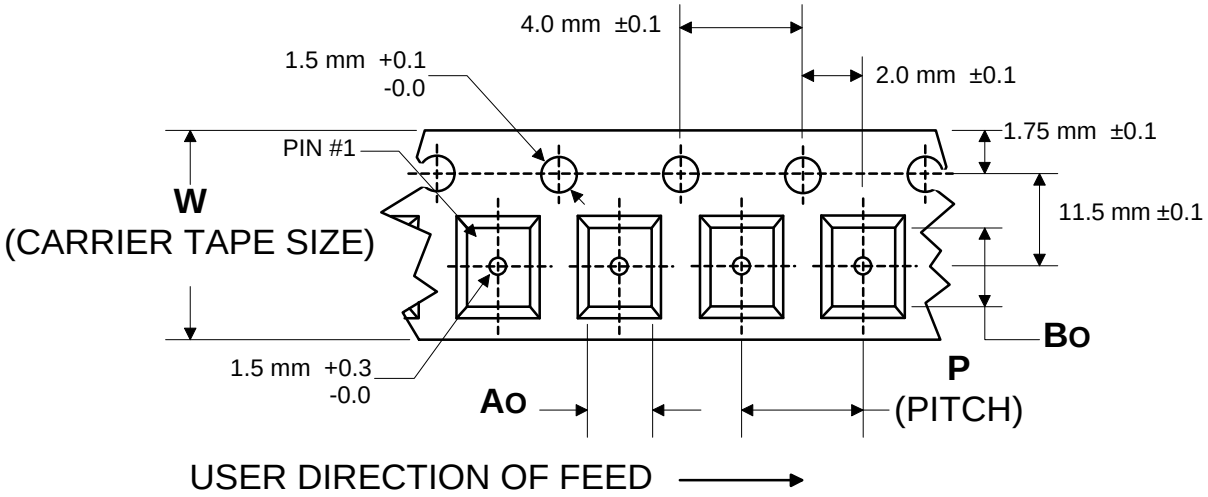
Materials	
Solder Pad Termination	Au plating 30 - 60 uInches (76.2-152 uM) over 80-200 uInches (203-508 uM) Ni.
Lid	Fe-Ni-Co Alloy Electroless Nickel Plate (8-11% Phosphorus) 100-200 uInches Thick
Body	Al_2O_3 Ceramic
Pb Free	

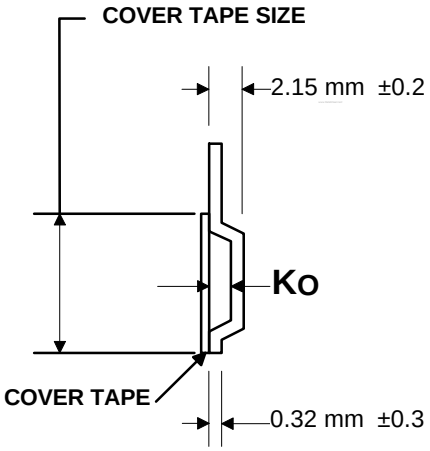
Electrical Connections

Connection	Terminals
Input	11
Return Ground	12
Output	5
Return Ground	6
Ground	All others
Single Ended Operation	**Return is ground**
Differential Operation	**Return is hot**
Dot Indicates Pin 1	



COMPONENT ORIENTATION and DIMENSIONS

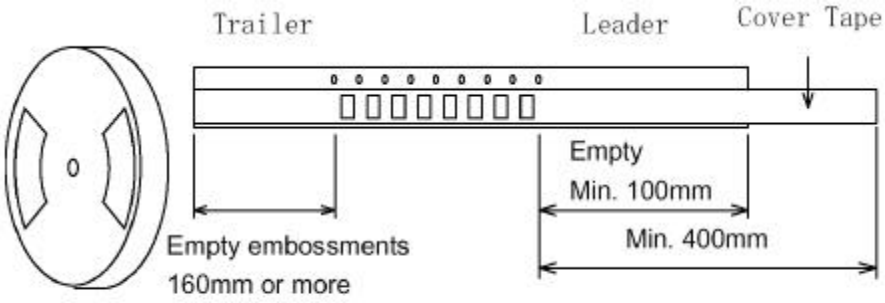




Carrier Tape Dimensions		
Ao	7.0 mm	±0.1
Bo	13.8 mm	±0.1
Ko	2.2 mm	±0.1
Pitch	12.0 mm	±0.1
W	24.0 mm	±0.3

Leader and Trailer specifications (Based upon EIA-481)

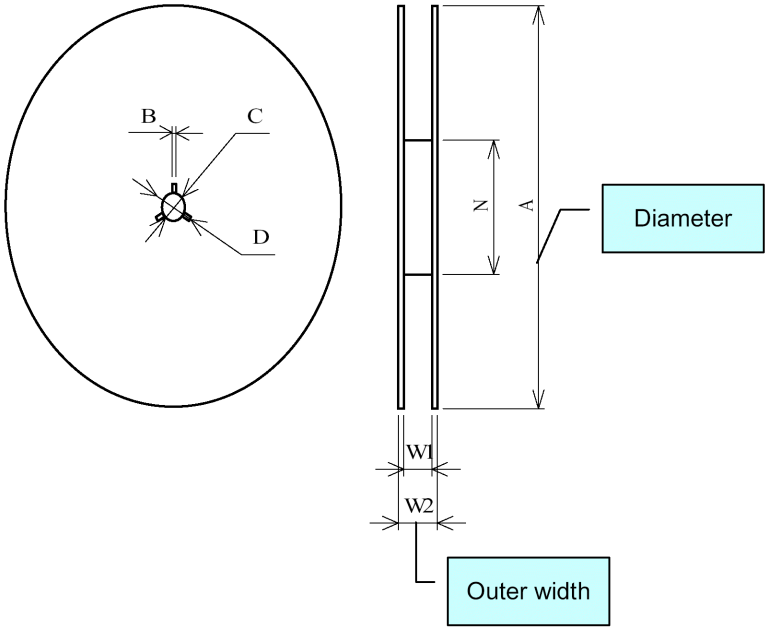
Dimensions of the leader and trailer



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	24.4	+2 -0	30.4	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	24.4	+2 -0	30.4	MAX

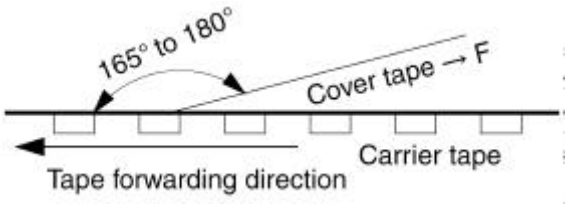
Dimensional drawing of the reel



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

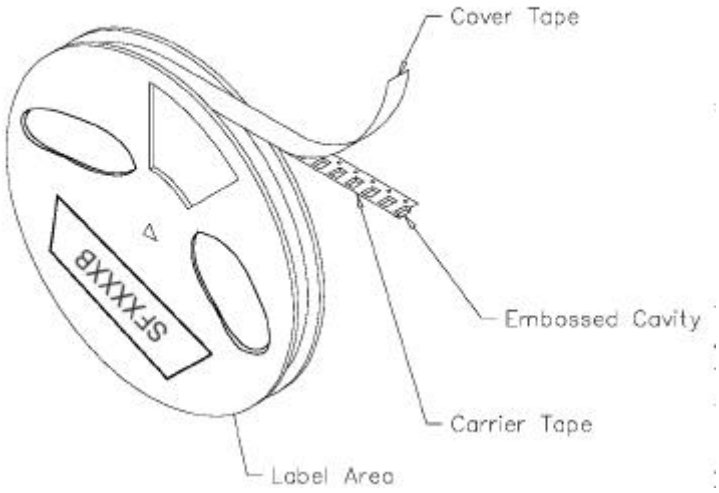
Reel labels shall follow the format shown below. The long side of the label must measure between 2.75 and 4.0 inches (68 to 100 mm). The short side of the label must measure between 1.5 and 2 inches (38 to 80 mm). Bar codes must conform to AIAG standard B10.

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

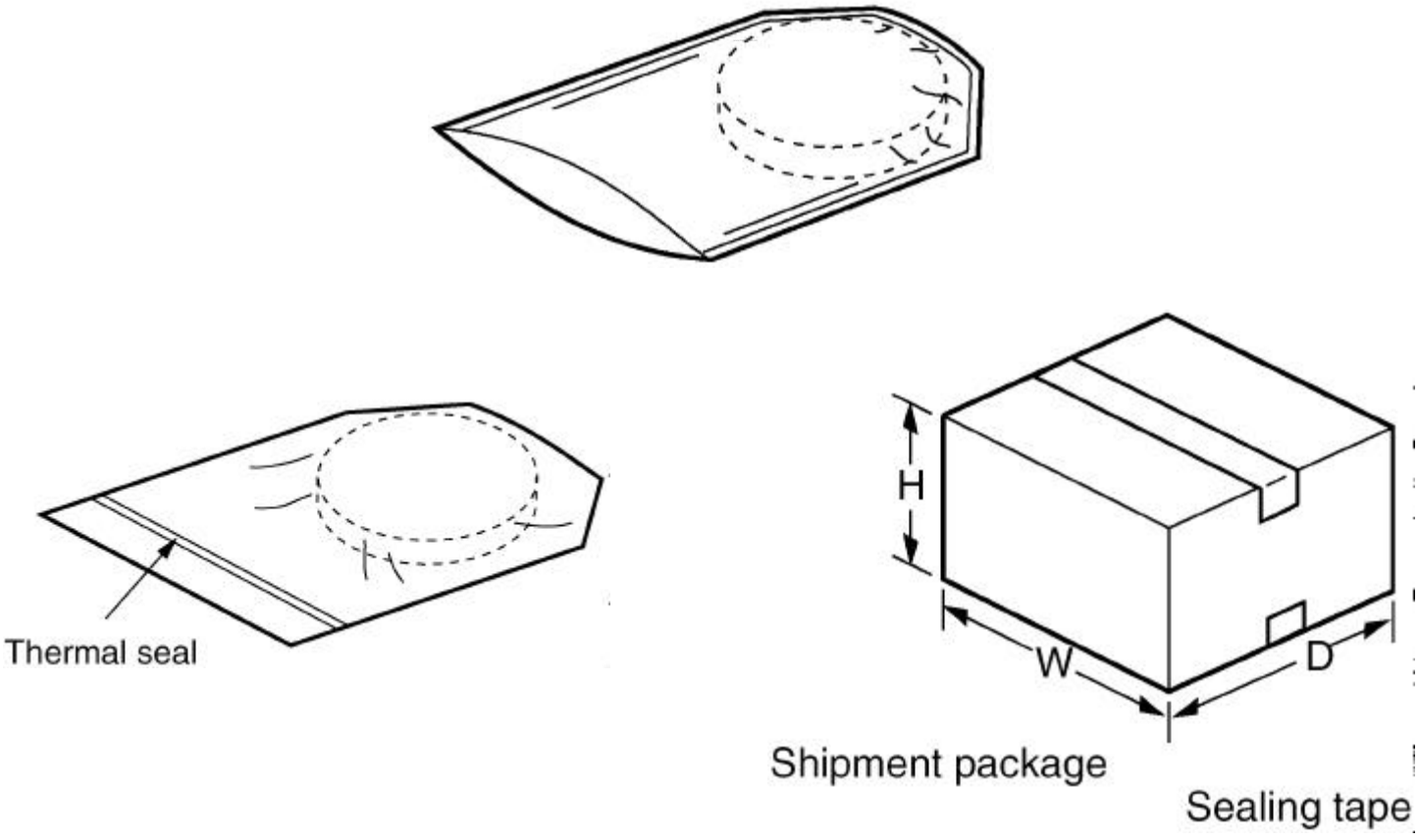
Examples of acceptable reel labels

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
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



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