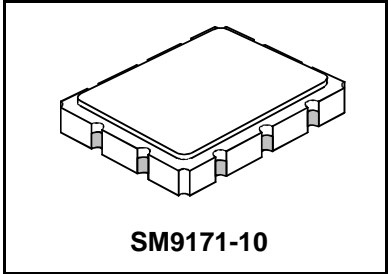


SF1115A

**199 MHz
SAW Filter**



- **Designed for GSM BTS Receiver IF Applications**
- **Compatible with National Semiconductor Chip Set**
- **Very Flexible Impedance Matching**
- **Unbalanced or Balanced Input or Output**
- **9.1 x 7.1 mm Version of the SF1115A-1**
- **Complies with Directive 2002/95/EC (RoHS)**



Absolute Maximum Ratings

Rating	Value	Units
Maximum Incident Power in Passband	+15	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	199.000			MHz
Passband	Insertion Loss at f_c 1 db Passband	IL			7.0	dB
		BW_1	± 100			kHz
	Amplitude Ripple over $f_c \pm 100$ kHz		1, 2		0.5	dB _{p-p}
	Group Delay Variation over $f_c \pm 100$ kHz	GDV			500	ns _{p-p}
Rejection	Room Temperature $f_c + 800$ to $f_c + 400$ kHz	1, 2, 3	10			dB
	Room Temperature $f_c - 800$ to $f_c - 400$ kHz		10			
	$f_c - 800$ to $f_c - 600$ and $f_c + 600$ to $f_c + 800$ kHz		20			
	$f_c - 30$ MHz to $f_c - 800$ kHz		30			
	$f_c + 800$ kHz to $f_c + 17$ MHz		30			
	$f_c - 80$ MHz to $f_c - 30$ MHz		35			
	$f_c + 17$ MHz to $f_c + 80$ MHz	35				
Operating Temperature Range	T_A	1	-35		+85	°C
Frequency Temperature Coefficient	FTC	1		0.032		ppm/°C ²
Impedance Matching to 50Ω Unbalanced	External L-C					
Impedance Matching to 200Ω Balanced	External L-C					
Impedance Matching to 50Ω Input / 400Ω Output	External L-C					
Case Style	SMP9171-10 9.1 x 7.1 mm Nominal Footprint					
Lid Symbolization (YY = year, WW = week)	RFM SF1115A YYWW					

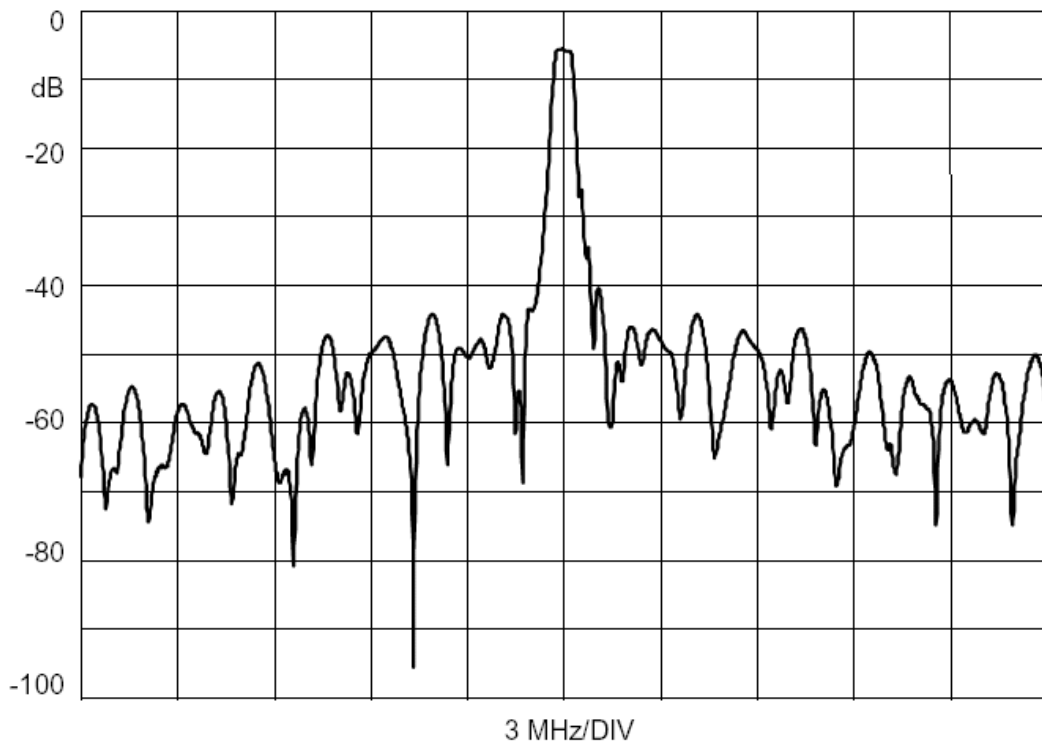
Notes:

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. 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. 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

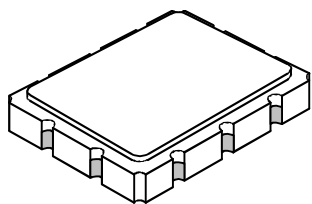
Connection	Terminals
Port 1 Hot	10
Port 1 Gnd Return	1
Port 2 Hot	5
Port 2 Gnd Return	6
Case Ground	All others

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SM9171-10 Case

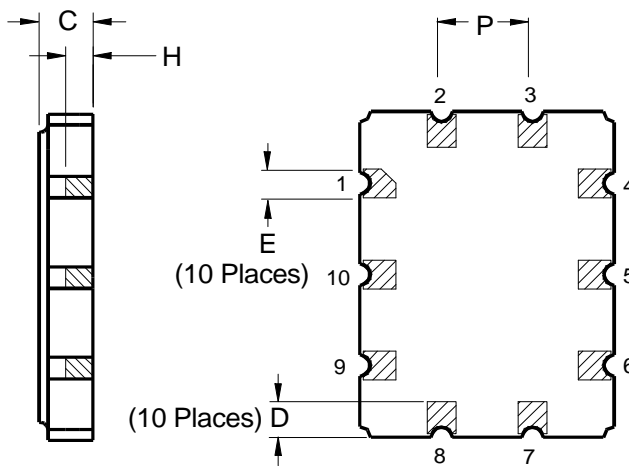
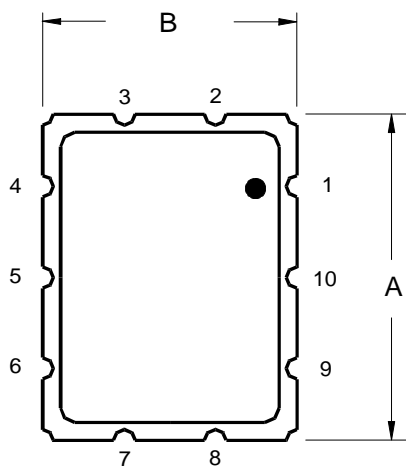
10-Terminal Ceramic Surface-Mount Case 9.1 x 7.1 mm Nominal Footprint



Case Dimensions						
Dimension	mm			Inches		
	Min	Nom	Max	Min	Nom	Max
A	8.86	9.09	9.40	0.349	0.358	0.370
B	6.88	7.11	7.40	0.271	0.280	0.291
C		1.91	2.00		0.075	0.079
D		0.99			0.039	
E		0.79			0.031	
H		1.0			0.039	
P		2.54			0.100	

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 ₂ O ₃ Ceramic
Pb Free	

Electrical Connections		
Connection		Terminals
Port 1	Input or Return	6
	Return or Input	5
Port 2	Output or Return	1
	Return or Output	10
Ground		All others
Single Ended Operation		Return is ground
Differential Operation		Return is hot



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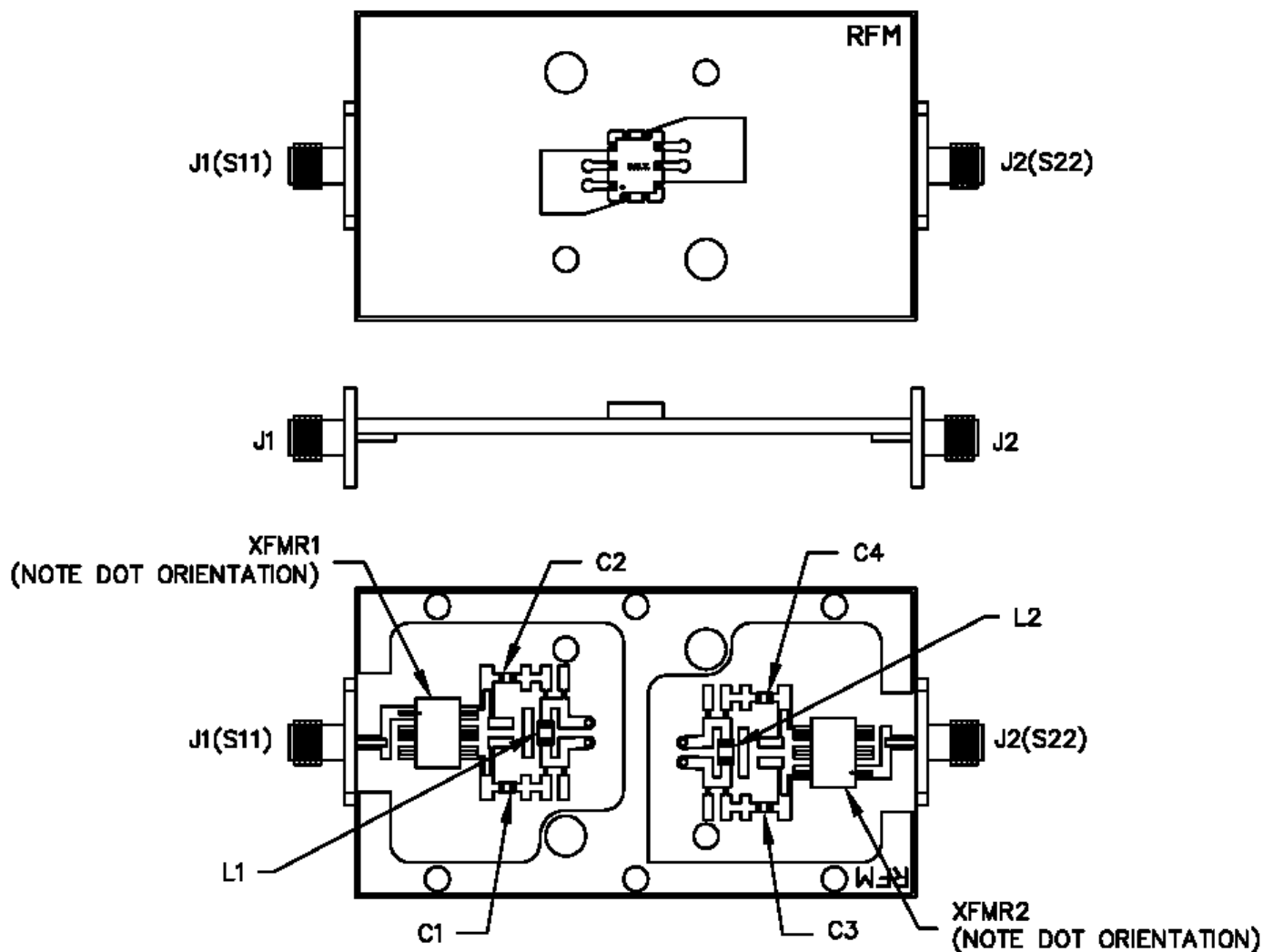
REV	ECN NO.	DESCRIPTION	DATE
A	8381	NEW DESIGN	04.jan00

NOTES:

- 1 SOLDER "TAPE" 4 PLACES ONTO COMPONENT SIDE OF PCB AS SHOWN. (EXTEND TAPE FOR C1 AND C2 PLACEMENT)
- 2 USE A WRIST STRAP WHEN SOLDERING TRANS 1, AND TRANS 2 TO PCB. (CUT LEADS .07 IN.)
- 3 MOUNT AND SOLDER ALL COMPONENTS ON PCB.
- 4 CUT CENTER CONDUCTORS FROM J1 AND J2 TO .10 IN.
- 5 MOUNT J1 AND J2 AS SHOWN (SOLDER BACKSIDE ALSO).
- 6 LABEL DEMO BOARD ACCORDINGLY.
- 7 MOUNT "FILTER" ON TOPSIDE OF PCB AS SHOWN.

DRAWN BY/DATE:	J.F.Christopherson 19aug99	TITLE:	DEMO BOARD, SF1115A
RF Monolithics, Inc. DALLAS, TEXAS 75244		CHECKED/APPROVED	DWG. NO. SF1115A-000
		SIZE A	REV A
		CODE IDENT 2U874	SHEET 1/3

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SAW Matching Components

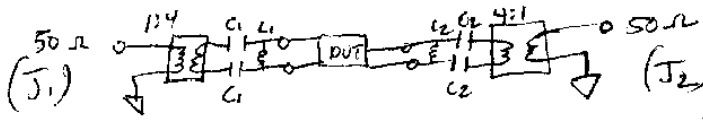
Reference Designator	Value	Additional Information
C1	4.7 pF	0805 Presido ± 0.25pF
C2	4.7 pF	0805 Presido ± 0.25pF
L1	270 nH	1008 Coilcraft Q=65 @ 350MHz 10%
L2	330 nH	1008 Coilcraft Q=65 @ 350MHz 10%
C3	18 pF	0805 Presido ± 0.25pF
C4	18 pF	0805 Presido ± 0.25pF
xfmr1	1:4	ADT 4-1UT, 300-600MHz
xfmr2	4:1	ADT 4-1UT, 300-600MHz

199 MHz

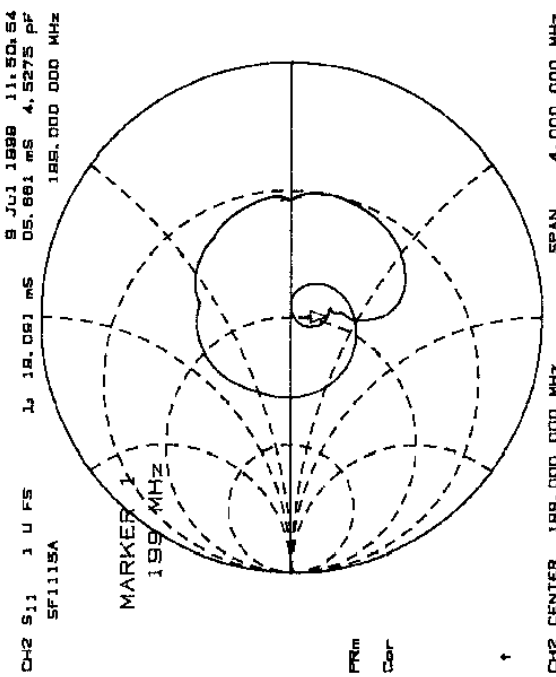
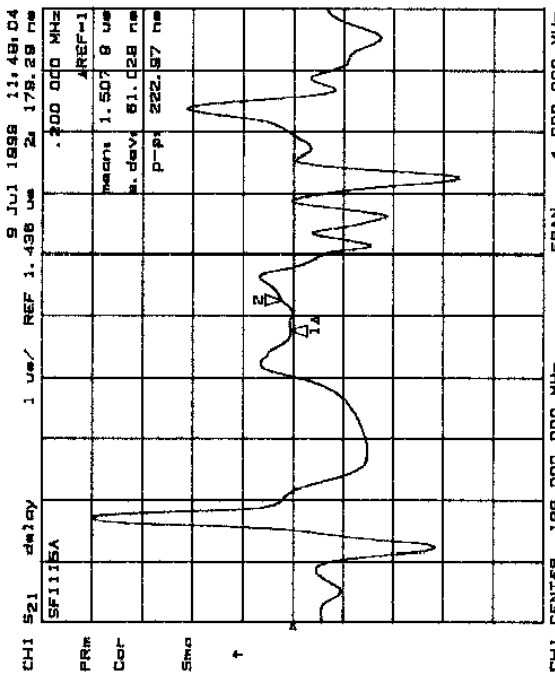
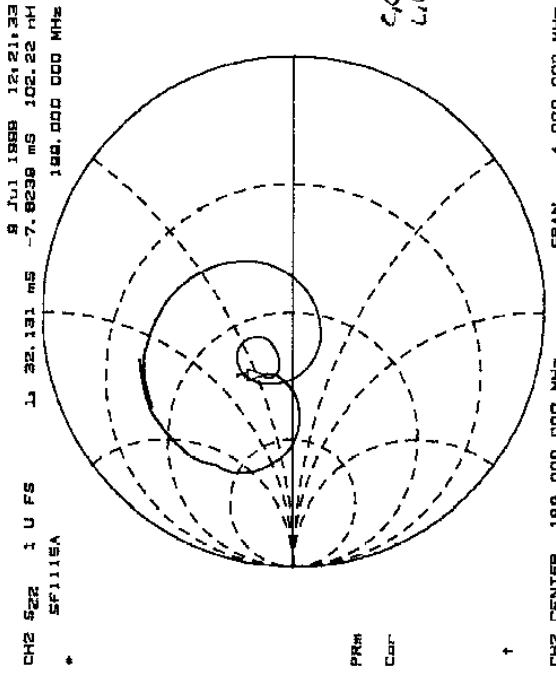
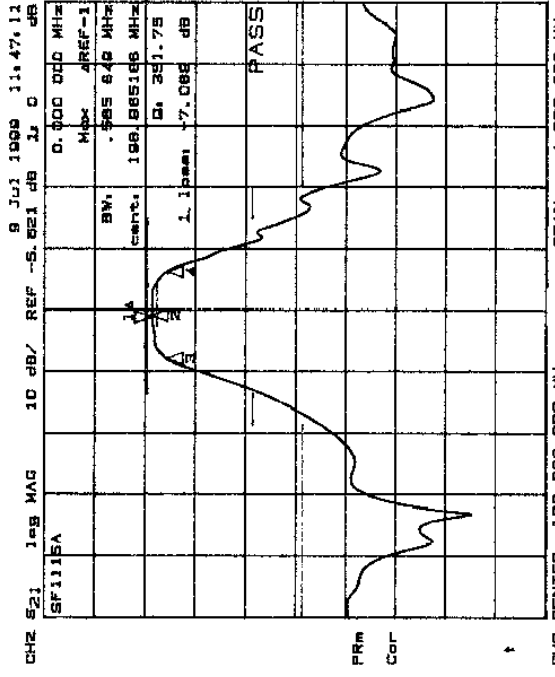
SAW Filter

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SF1115A-000
 VAFs 94
 Balanced
 Tuned
 tested at SDU
 7-9-99
 New Alum
 Duno.

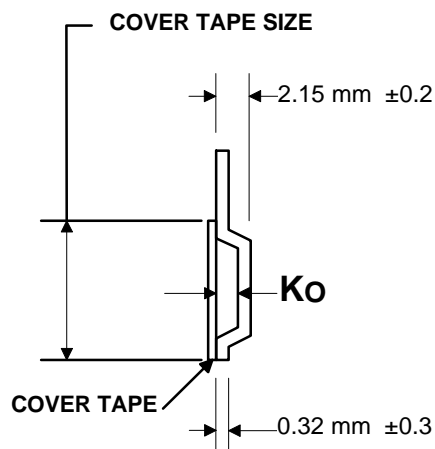
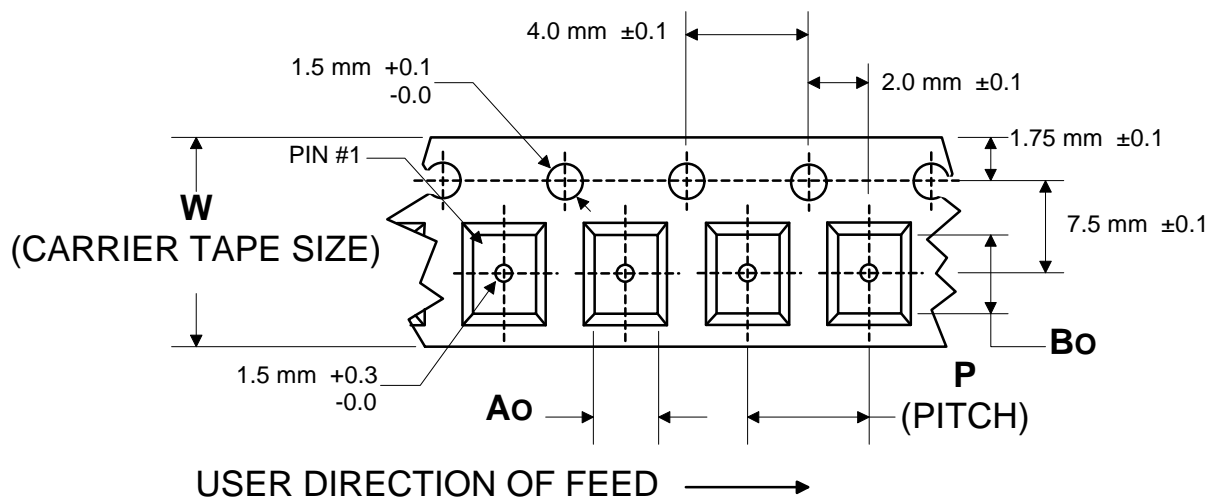


C62-47pf
 L102-50nH



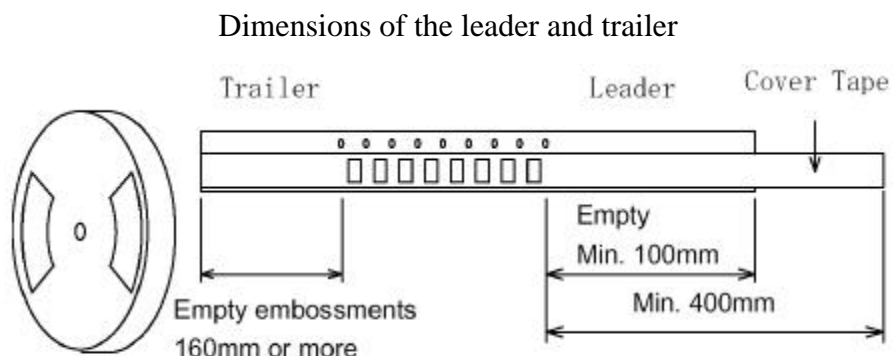
SF1115A-000 REV. XI SH.2 p3 of 3

COMPONENT ORIENTATION and DIMENSIONS



Carrier Tape Dimensions		
Ao	7.55 mm	±0.1
Bo	9.59 mm	±0.1
Ko	2.30 mm	±0.1
Pitch	12.0 mm	±0.1
W	16.0 mm	±0.3

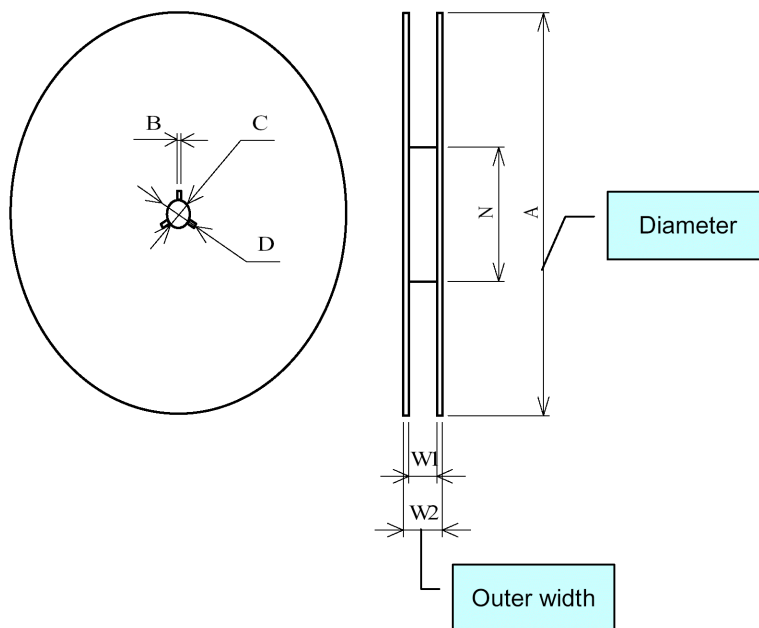
Leader and Trailer specifications (Based upon EIA-481)



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

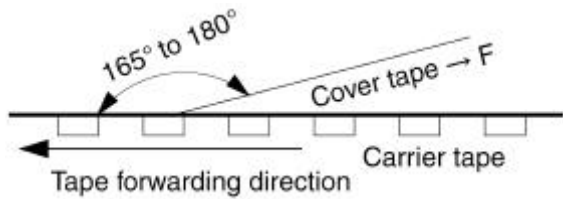


Additional items**(1) Cover tape peeling strength**

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. ± 10 mm/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 $100\mu\text{m}$ 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.

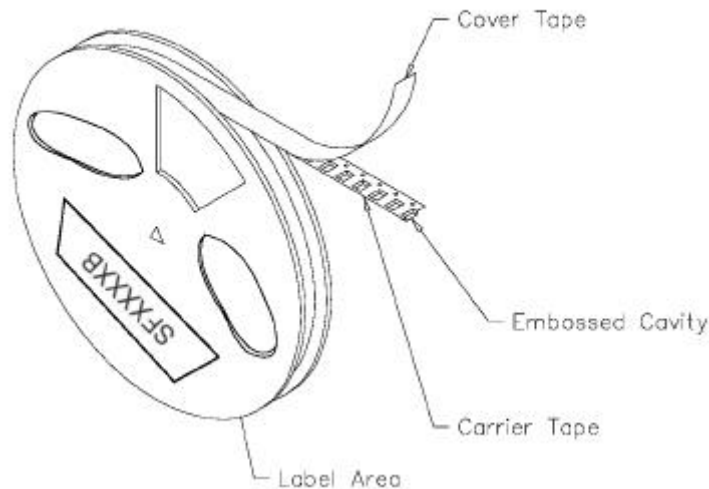
Information that is on the label:

- 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

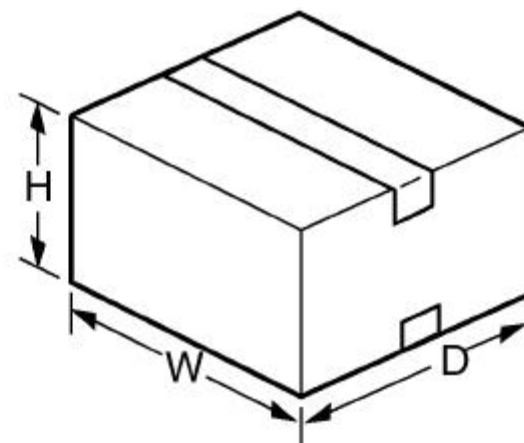
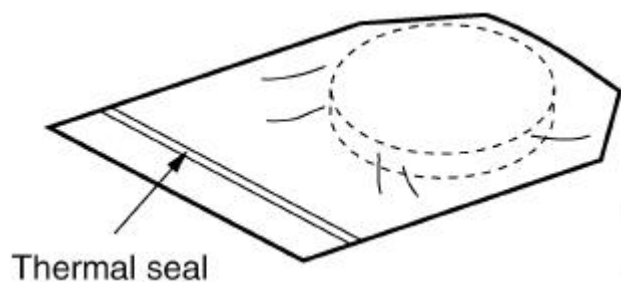
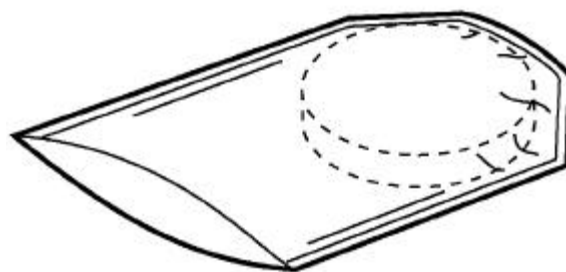
Location of label on reel is shown below. Reel labels must be placed entirely on plastic, without covering open sections of the reel. Design of reel must satisfy this requirement. Pin #1 must be located on the side opposite the reel label.



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Package for Shipment

	Quantity Per Reel	Number Reels Per Carton	External Carton 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
13 Inch Reel	Quantity Per Reel	Number Reels Per Carton	External Carton 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



Shipment package

Sealing tape

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