



TAOGLAS®



Datasheet

GNSS Front End Module covering
L1+B1+G1/L2+L-band

Part No:

TFM.112A

Description

Surface mount GNSS front-end module covering L1+B1+G1/L2+L-band

Features:

Vin = +1.8 to +5.5 VDC

Easy to integrate surface-mount

Dimensions: 20 x 18 x 2.76mm

RoHS & Reach Compliant

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1. Introduction



The Taoglas TFM.112A is a surface-mount GNSS front-end which covers L1+B1+G1/L2+L-band for multi-band high-precision applications that require the full spectrum of GNSS constellations. The TFM.112A is a dual input single output and features a SAW/LNA/SAW/LNA topology in both the low and high band signal paths to prevent unwanted out-of-band interference from overdriving the GNSS LNAs or receiver. The SAW filters have been carefully selected and placed to provide excellent out-of-band rejection while also maintaining low noise figure.

Many currently available dual-band GNSS receivers require additional RF circuits between the antenna and the receiver to properly set the overall system noise figure. This requires additional development time for an otherwise simple module integration. Many organizations don't have the RF expertise to effectively design such a solution. The TFM.112A captures the required additional RF circuits in modular form, allowing the designer to simply place the TFM.112A between their GNSS antenna and GNSS receiver.

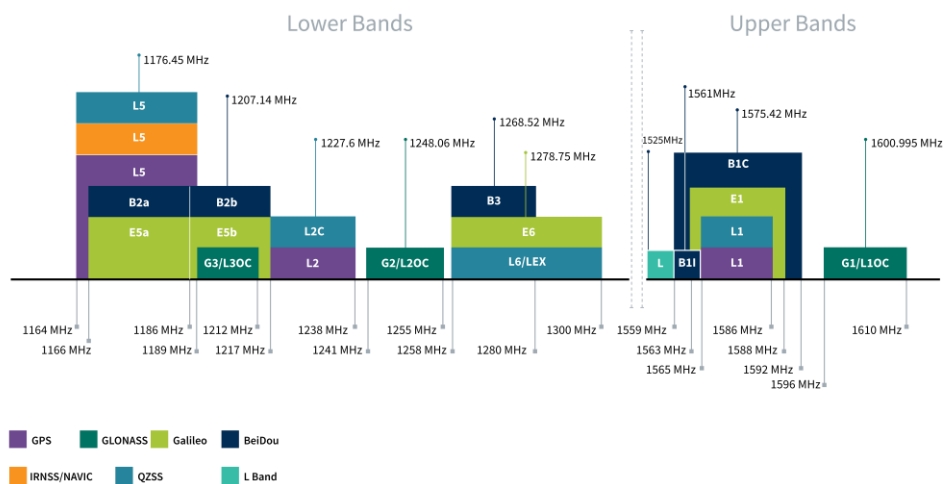
The TFM.112A offers > 25 dB gain across all applicable bands while maintaining a high Input P1dB of -25 dBm or better. Noise Figure is < 3.5 dB in the low bands and < 4.0 dB in the high bands. A wide input voltage of +1.8 to +5.5 VDC allows for easy integration in most GNSS systems.

TFM.112A Features and Benefits:

- Ease-of-integration – Single-package solution combines impedance matching, filter efficiency and low noise design for easy, drop-in use with any antenna or GNSS receiver
- Low-noise System Design – Integrated pre-filters deliver exceptional out-of-band rejection across multiple band configurations and neighboring interference to properly set noise figure
- Dual-gain Stage Architecture – Cascaded LNAs, pre-filters and optimized impedance matching deliver sufficient gain to the GNSS receiver without signal-to-noise overload
- Low-profile Form Factor – Small footprint and low-profile design saves valuable real estate without the need for external components and routing
- Accelerated Development Cycles – 2+ years of development by antenna and RF design experts, delivering the highest levels of integration, manufacturability and robustness in a single package

2. Specification

GNSS Frequency Bands					
GPS	L1 1575.42 MHz	L2 1227.6 MHz	L5 1176.45 MHz		
	■	■	□		
GLONASS	G1 1602 MHz	G2 1248 MHz	G3 1207 MHz		
	■	■	□		
Galileo	E1 1575.24 MHz	E5a 1176.45 MHz	E5b 1201.5 MHz	E6 1278.75 MHz	
	■	□	□	□	
BeiDou	B1C 1575.42 MHz	B1I 1561 MHz	B2a 1176.45 MHz	B2b 1207.14 MHz	B3 1268.52 MHz
	■	□	■	□	□
L-Band	L-Band 1542 MHz				
	■				
QZSS (Regional)	L1 1575.42 MHz	L2C 1227.6 MHz	L5 1176.45 MHz	L6 1278.75e6	
	■	■	□	□	
IRNSS (Regional)	L5 1176.45 MHz				
	□				
SBAS	L1/E1/B1 1575.42 MHz	L5/B2a/E5a 1176.45 MHz	G1 1602 MHz	G2 1248 MHz	G3 1207 MHz
	■	□	■	■	□



GNSS Bands and Constellations

Electrical						
Frequency (MHz)	1227	1248	1542	1561	1575.42	1602
Noise Figure (dB)*	3.5	3.4	2.5	2.6	2.3	2.5
Gain (dB)	29.1	26.8	27.3	28.3	28.1	26.4
Group Delay (ns)	29.6	33.9	16.3	16.4	15.9	19.9
Input Return Loss (dB)	-18.7	-11.0	-14.4	-19.6	-10.9	-15.9
Output Return Loss	-7.9	-7.8	-6.2	-7.3	-5.9	-6.1
Vin	+1.8 to +5.5 VDC					
Typical Current (@1.8V)	7.5 – 9.0mA					

***Note: Tested on an evaluation board. Board losses removed.**

Mechanical	
Height	2.76 mm max.
Planar Dimension	20 x 18 mm
Weight	2g

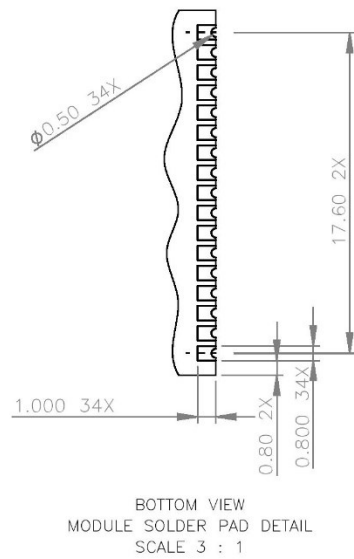
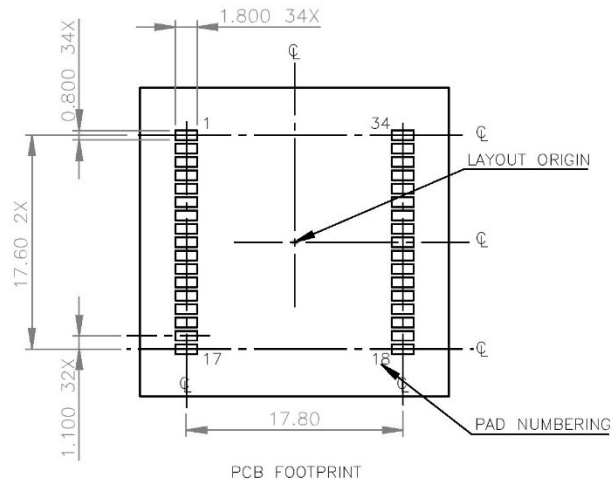
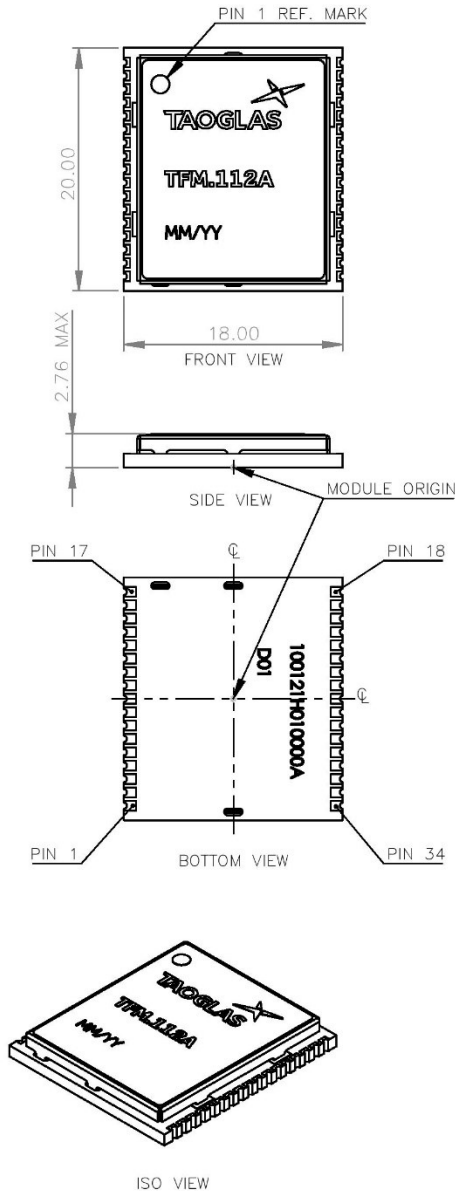
Environmental	
Temperature Range	-40°C to 85°C
RoHS Compliant	Yes
REACH Compliant	Yes
Moisture Sensitivity Level (MSL)	3

3. Mechanical Drawing

ISO NO.: EDW.001527

STATE: RELEASED

REV	ZONE	DESCRIPTION	ENG	APPROVED	DATE
D01	All	Initial Release	Z. Walji	P. Frank	02/28/24
D02	ALL	Updated Artwork	Z. Walji	P. Frank	05/21/24



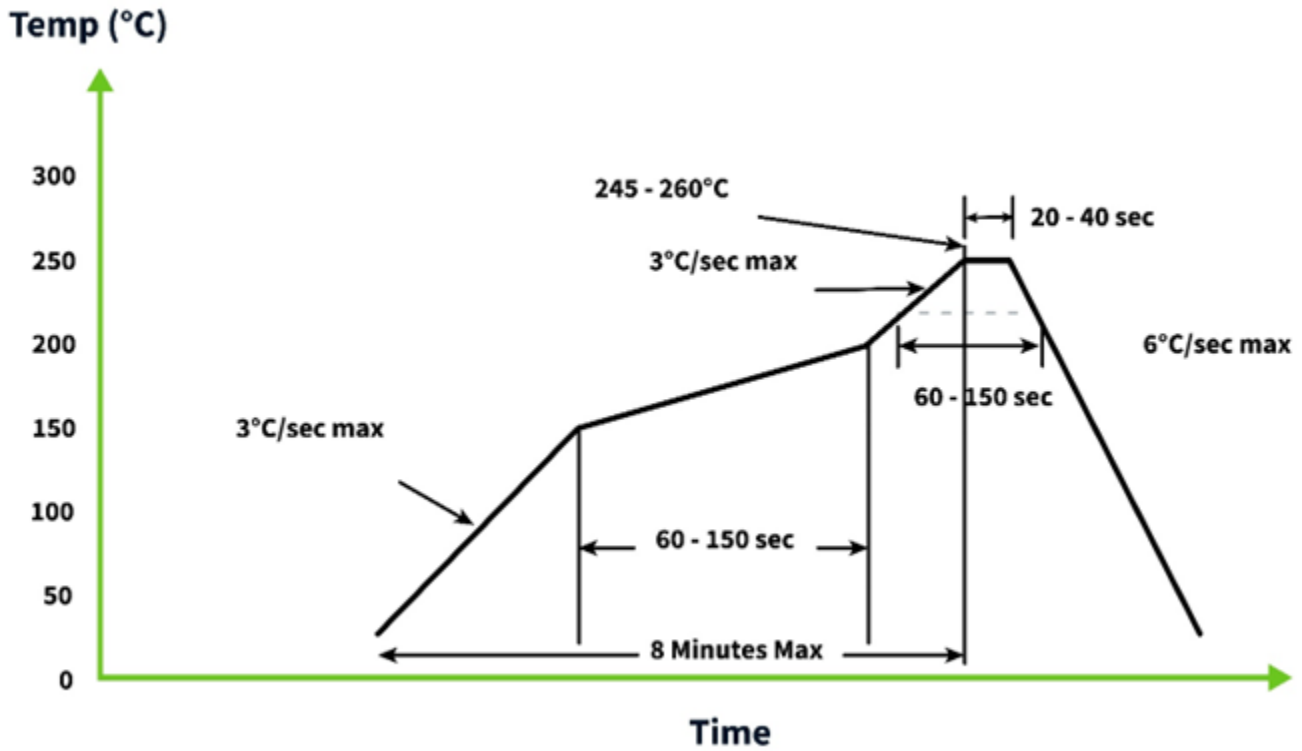
GENERAL NOTES:

1. All materials must be RoHS compliant.
2. Critical dimensions are indicated by an inspection symbol \bigcirc .

APPROVED BY: P. FRANK	 <small>EHEA Design Centre</small> <small>This drawing and its inherent design concepts are property of Taoglas. Not to be copied or given to third parties without the written consent of Taoglas.</small>
CHECK BY: P. FRANK	
DRAWN BY: Z. WALJI	
DATE: 2/28/2024	
MATERIAL:	TITLE : GNSS FRONT END MODULE FOR BANDS L1+B1+G1+L-BAND/L2
UNLESS OTHERWISE SPECIFIED TOLERANCES ON:	PART NO. : TFM.112A
THIRD ANGLE PROJECTION	UNIT: mm SCALE: 2:1 PAGES: 1/1 REVISION: D02

4. Solder Recommendations

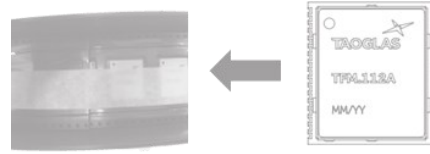
The TFM.112A can be assembled by following the recommended soldering temperatures as follows:



Smaller components are typically mounted on the first pass, however, we do advise mounting the TFM.112A when placing larger components on the board during subsequent reflows.

5. Packaging

600pcs per tape and reel
 1 pcs humidity indicator card
 2 pcs desiccant 3g



600pcs per vacuum bag



600pcs per box
 Box dimensions: 350 x 340 x 67mm
 Weight: 2Kg

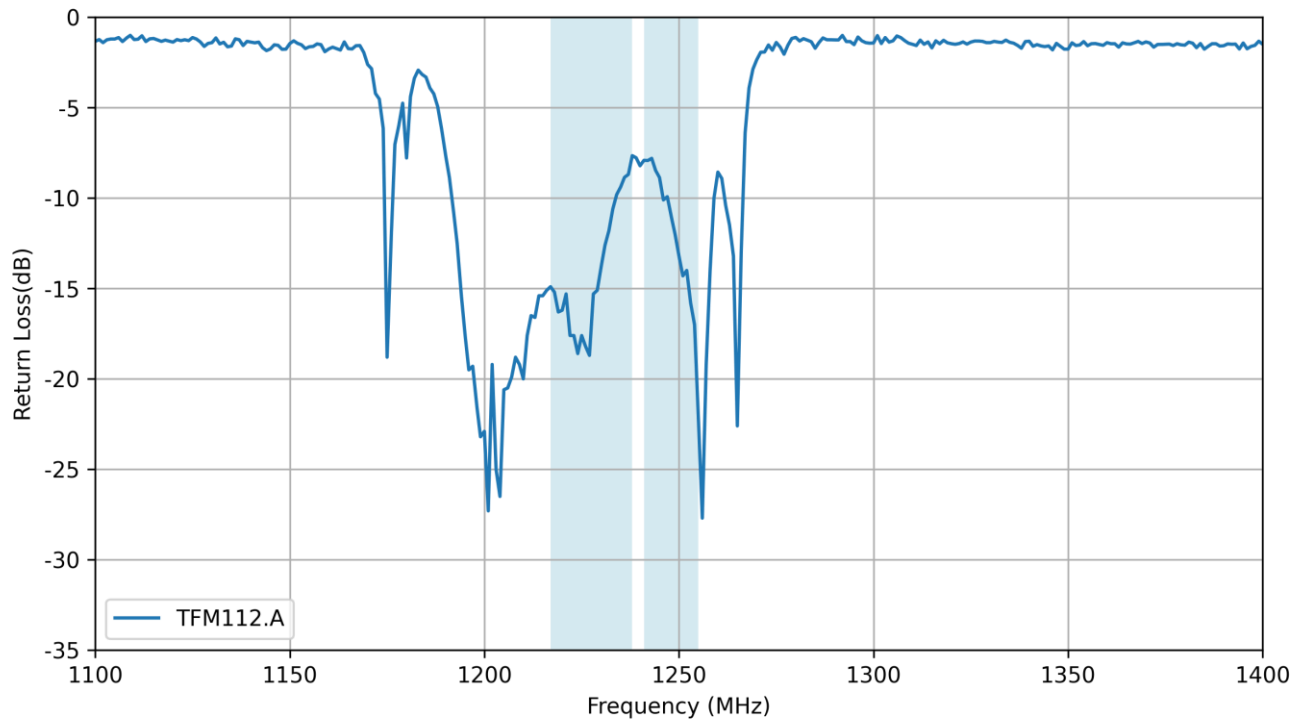


2400pcs per carton
Box dimensions: 370 x 360 x 275mm
Weight: 8.8Kg

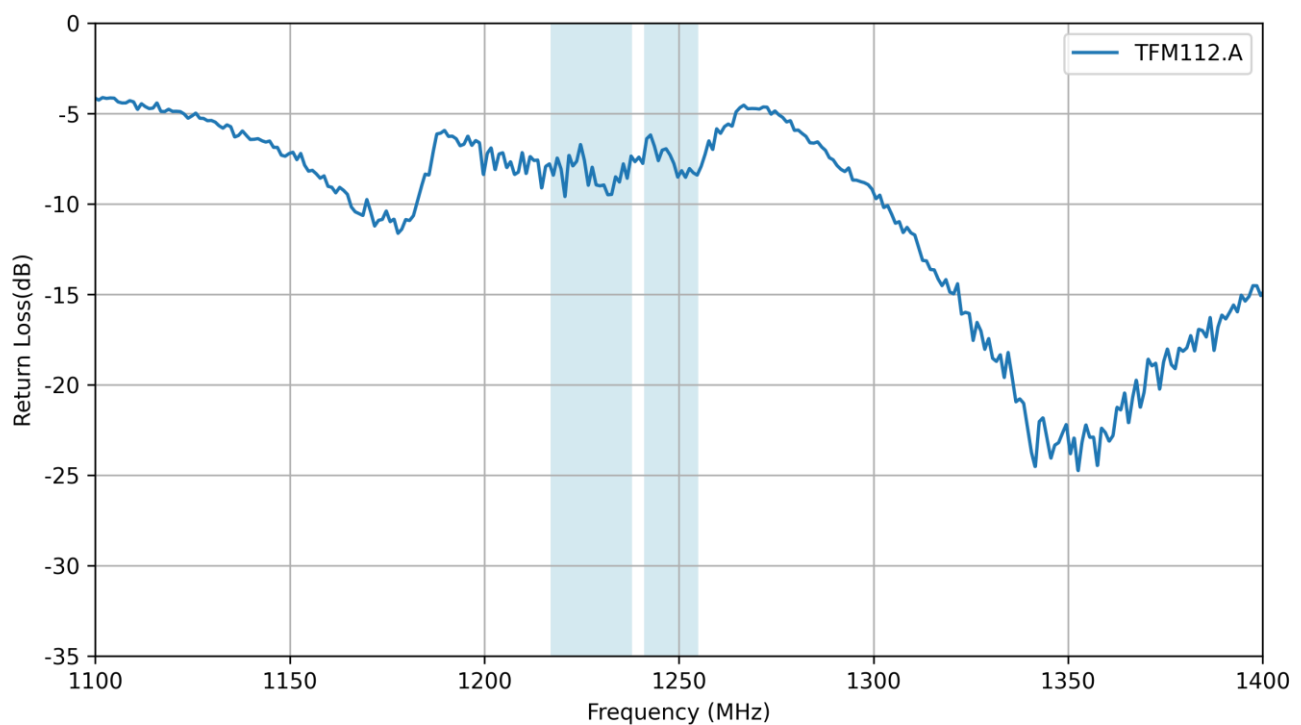


6. FEM Low Band Characteristics

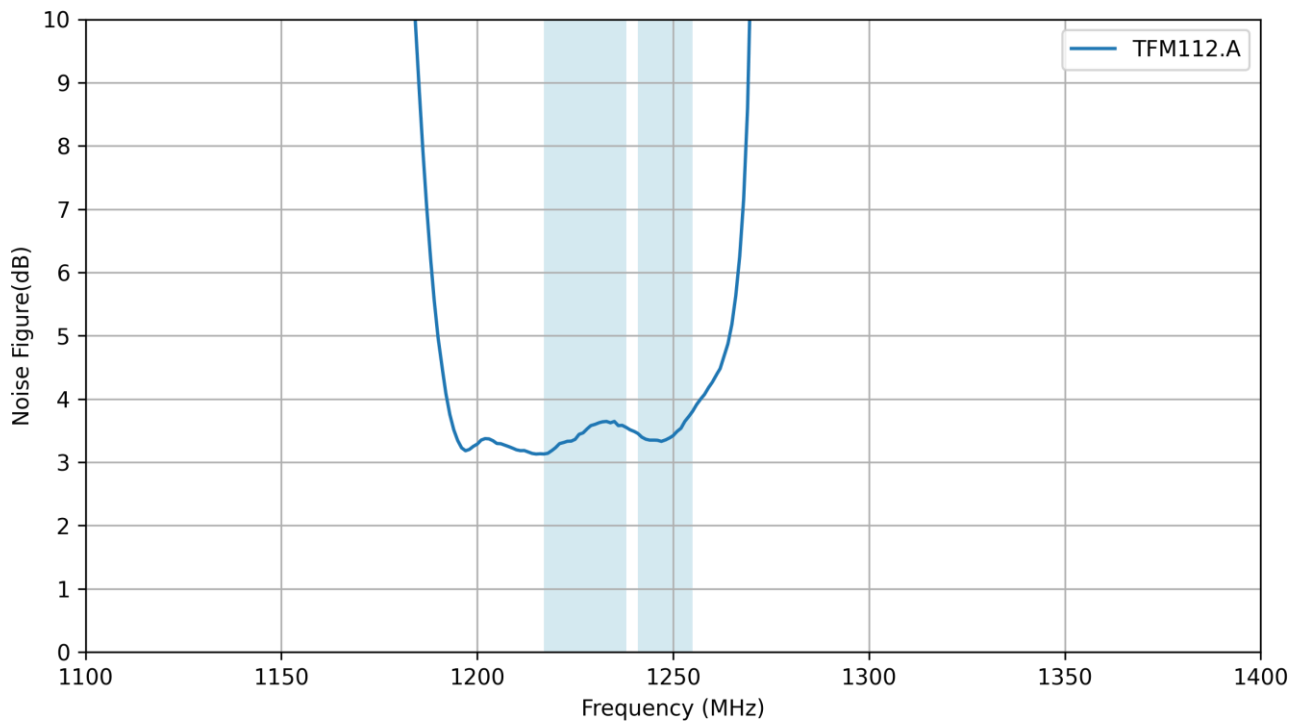
6.1 Low-Band Input Return Loss



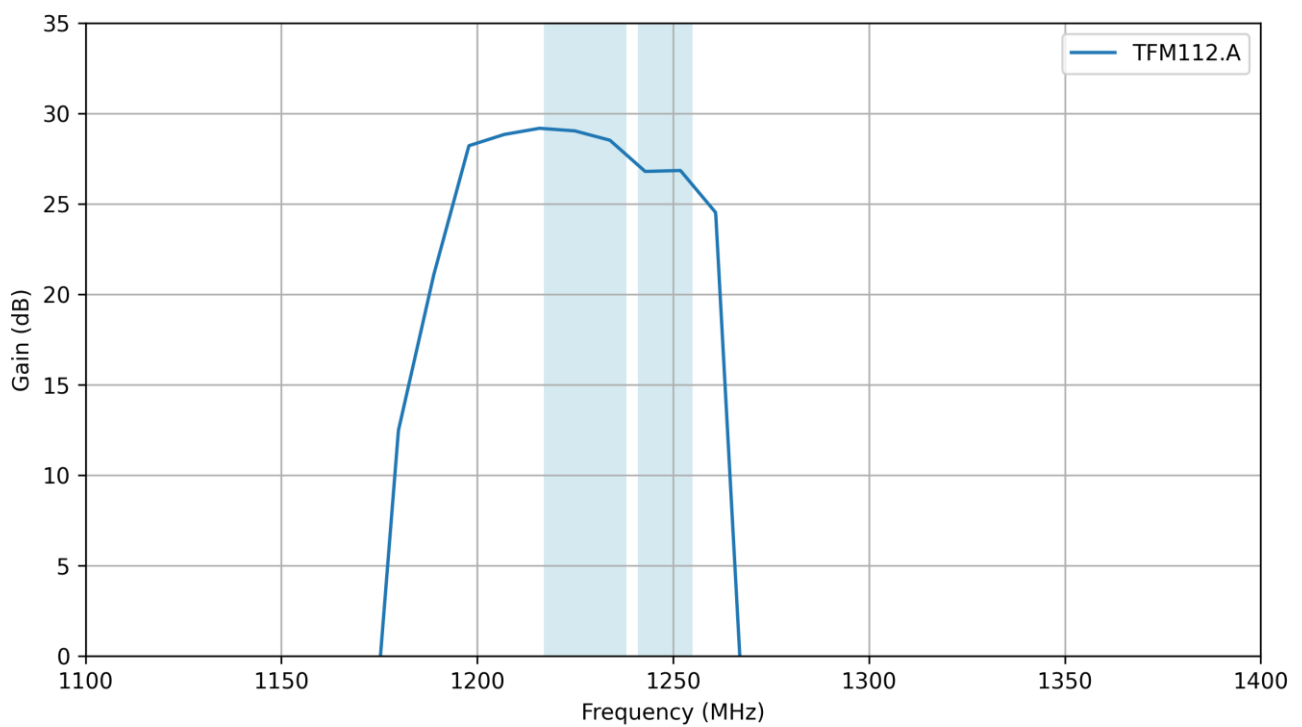
6.2 Low Band Output Return Loss



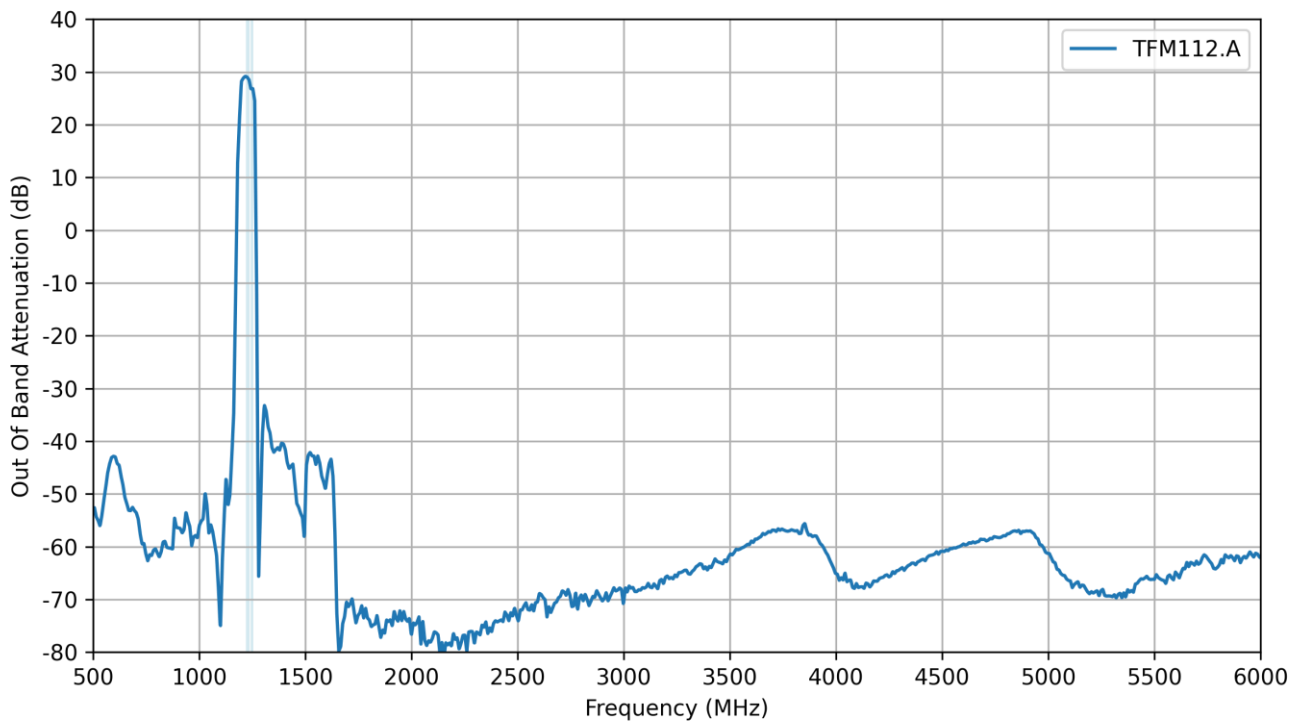
6.3 Low Band Noise Figure



6.4 Low Band Gain

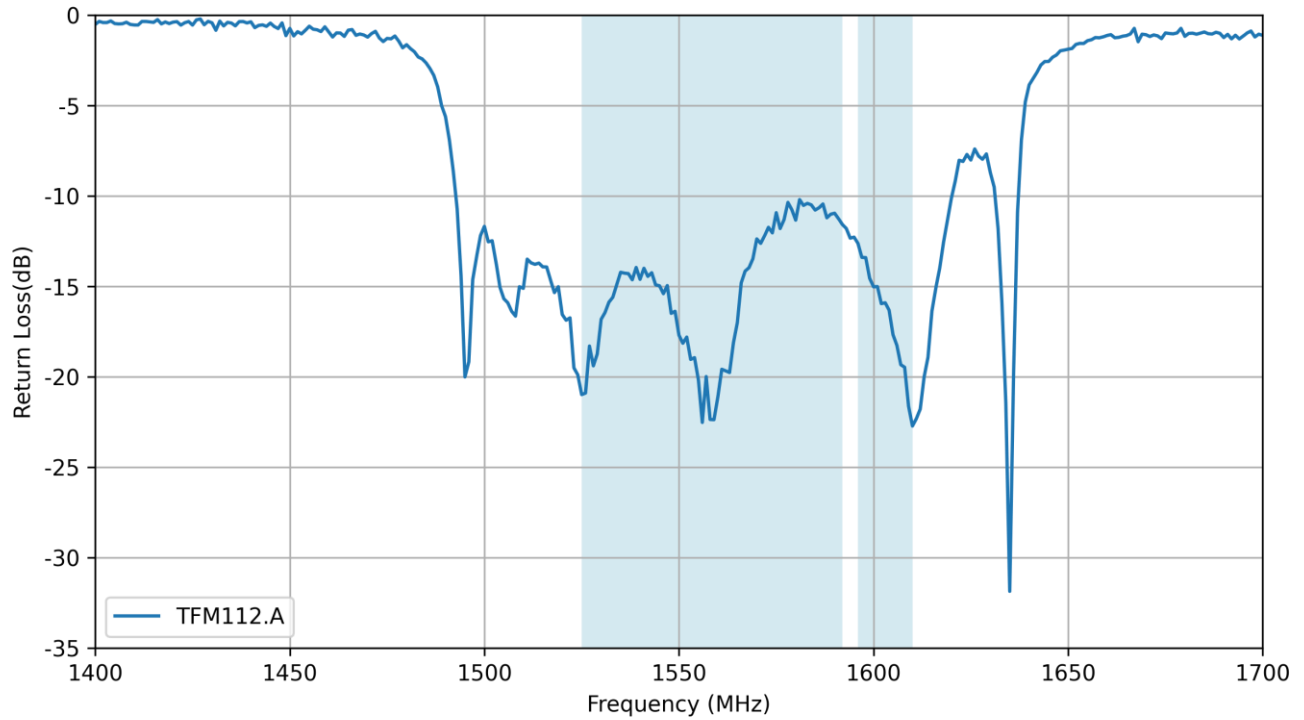


6.5 Low Band Gain and Attenuation

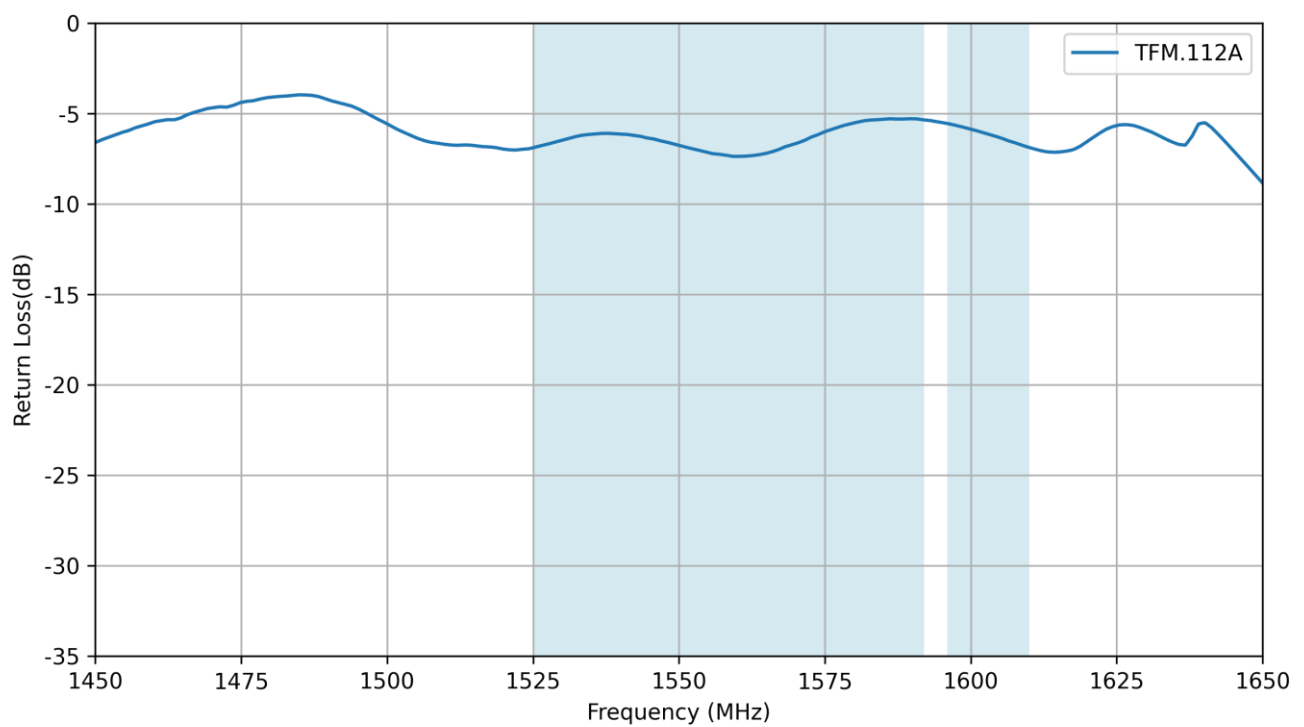


7. FEM High Band Characteristics

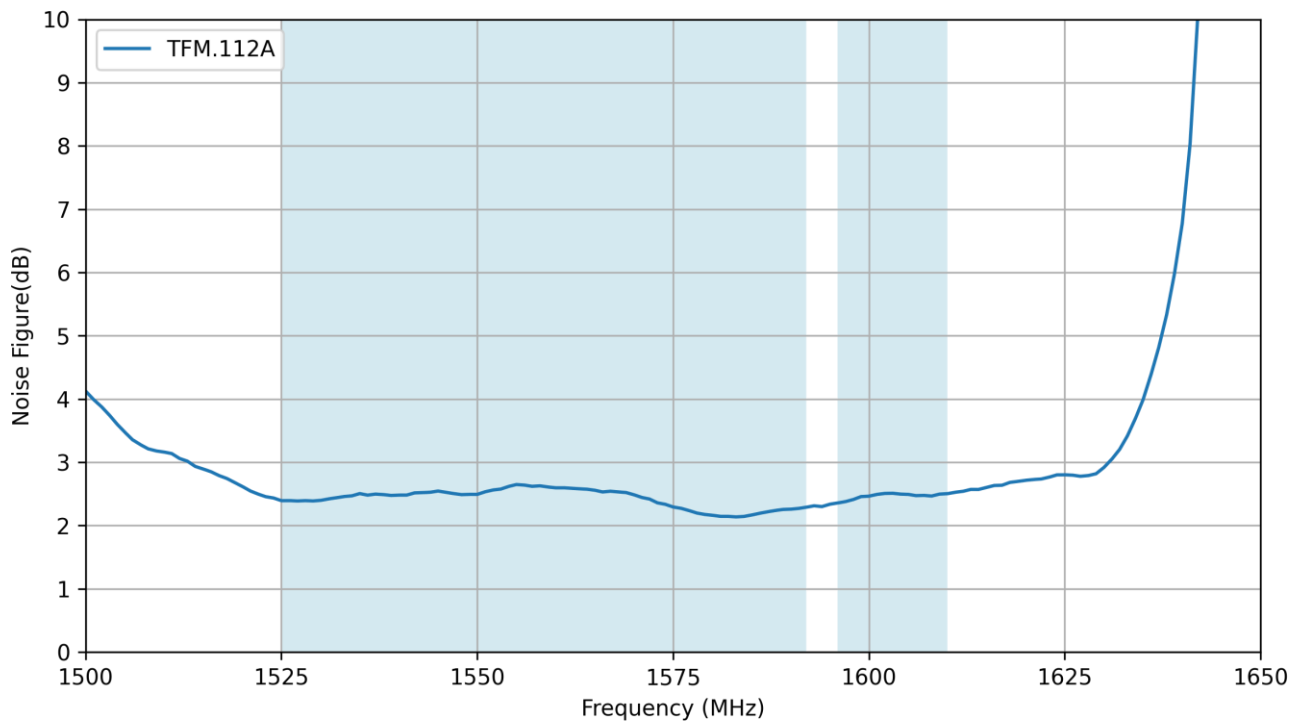
7.1 High Band Input Return Loss



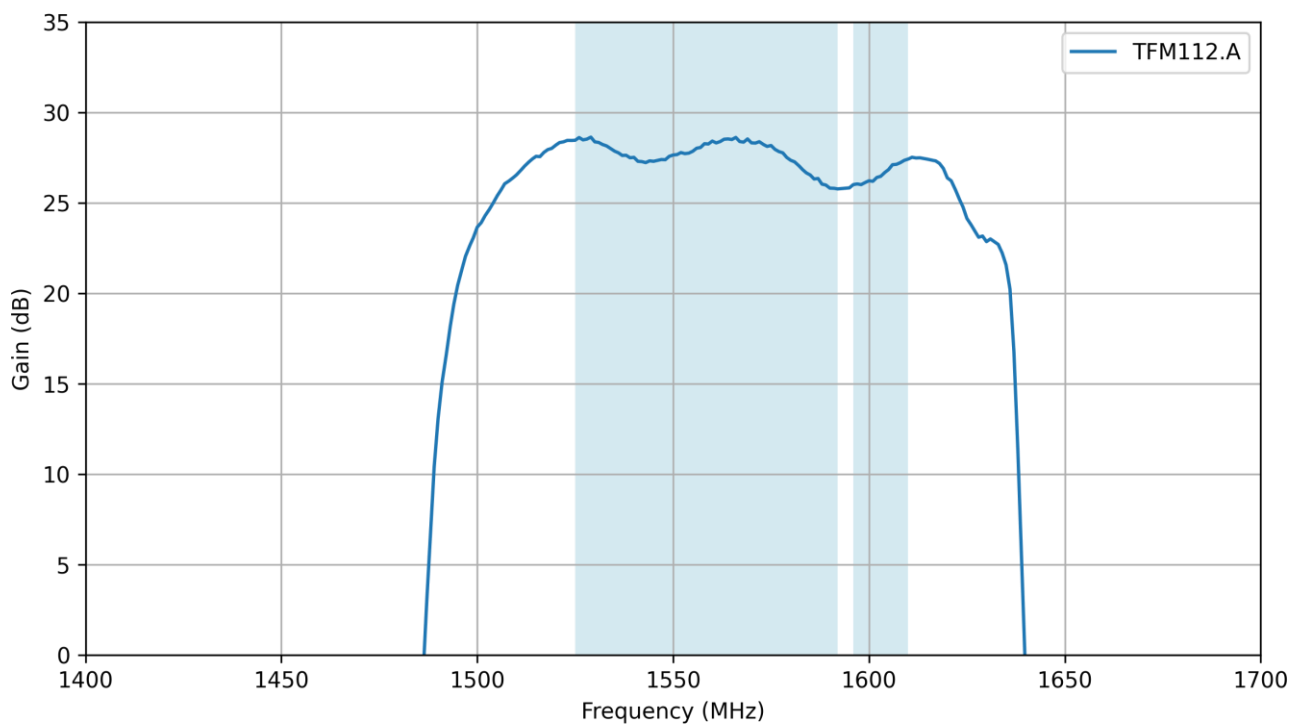
7.2 High Band Output Return Loss



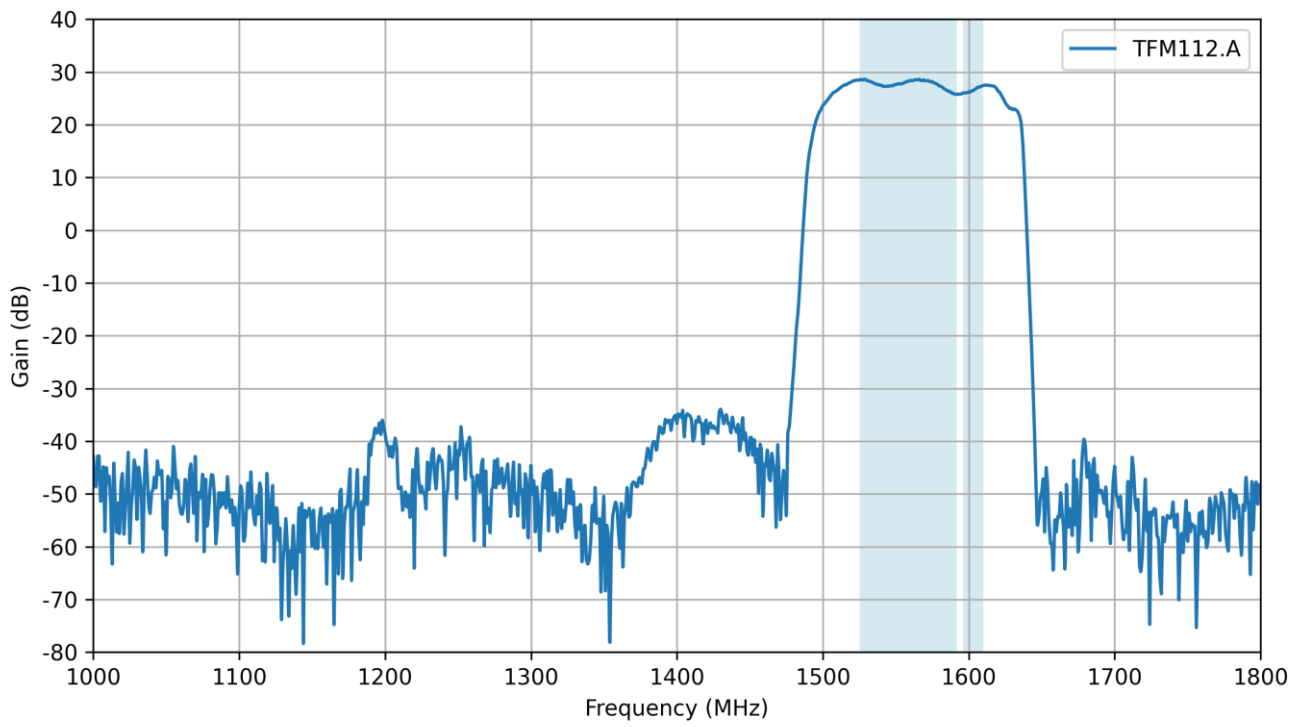
7.3 High Band Noise Figure



7.4 High Band Gain



7.5 High Band Gain and Attenuation



Changelog for the datasheet

SPE-24-8-247 – TFM112.A

Revision: A (Original First Release)	
Date:	2024-10-01
Notes:	Initial Release
Author:	Gary West

Previous Revisions



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