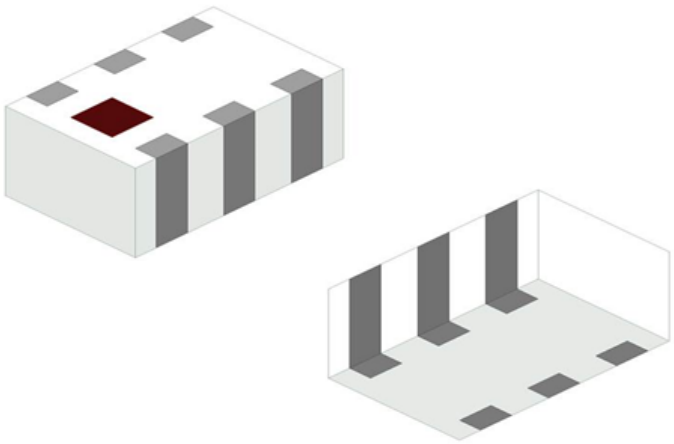
2.4 GHz Filter, Impedance-matched Balun and Filter for Nordic Semiconductor nRF24 Series Chipsets

- 2400 - 2500 MHz passband
- Designed for Nordic Semiconductor chipsets:
  - nRF24L01
  - nRF24L01+
  - nRF24LE1
  - nRF24LU1
  - nRF24AP2
  - nRF8001
- For 2.4GHz applications such as WiFi, Bluetooth, Zigbee, etc.
- EIA 0603 SMD (1.6mm x 0.8mm x 0.6mm)



General Specifications[1]

		Impedance match for:	
Balanced Impedance, Transceiver Side (Ω)	2400 - 2500 MHz	nRF24L01 nRF24L01+ nRF24LE1 nRF24LU1 nRF24AP2 nRF8001	
Unbalanced Impedance, Antenna Side (Ω)	2400 - 2500 MHz	50	
Insertion Loss (dB)	2400 - 2500 MHz		2.0 Max.
Return Loss (dB)	2400 - 2500 MHz	9.5 Min.	
Phase Difference (Deg)	2400 - 2500 MHz	160 ± 15	
Amplitude Difference (dB)	2400 - 2500 MHz	3.5 ± 1.5	
Attenuation (dB)	4800 - 5000 MHz	15 Min.	
	7200 - 7500 MHz	15 Min.	

[1] Typical value represents average measurement at 25°C. Min./Max. values represent measurements over specified operating temperature.

johansontechnology.com
4001 Calle Tecate • Camarillo, CA 93012, USA • +1.805.389.1166
2025 Johanson Technology, Inc. All Rights Reserved

Maximum Ratings

Power Capacity (W)	1 Max. (CW)
Operating Temperature (°C)	-40 to +85
Recommended Storage Conditions Post-installation (°C)	-40 to +85
Recommended Storage Conditions and Period for Unused T&R Product[2]	45% - 75% RH +5 to +35 °C 18 Months Max.

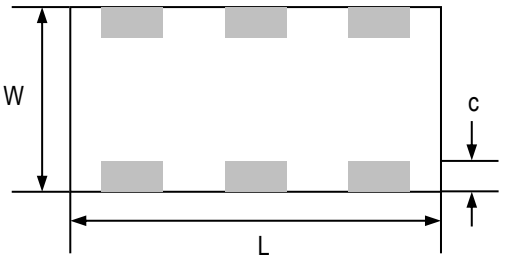
[2] The termination type is Nickel Tin. Go to: https://www.johansontechnology.com/ipcsoldering-profile for Typical Soldering Profile.

johansontechnology.com
4001 Calle Tecate • Camarillo, CA 93012, USA • +1.805.389.1166
2025 Johanson Technology, Inc. All Rights Reserved

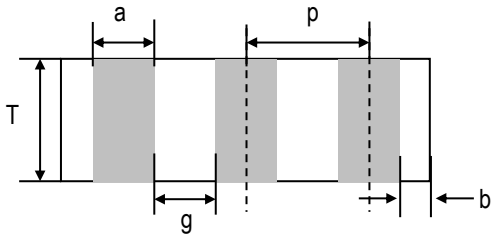
Mechanical Dimensions

	Inches			Millimeters		
L	0.063	±	0.004	1.60	±	0.10
W	0.031	±	0.004	0.80	±	0.10
T	0.024	±	0.004	0.60	±	0.10
a	0.008	±	0.002	0.20	±	0.05
b	0.008		+0.004/-0.006	0.20		+0.1/-0.15
c	0.006	±	0.004	0.15	±	0.1
g	0.012	±	0.004	0.30	±	0.1
p	0.020	±	0.002	0.50	±	0.05

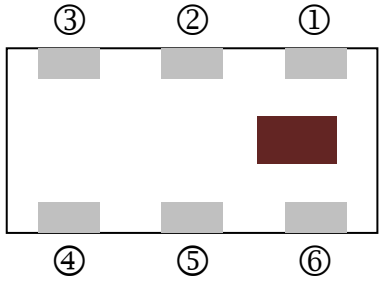
Top view



Side view



Bottom view



Terminal Configuration[3]

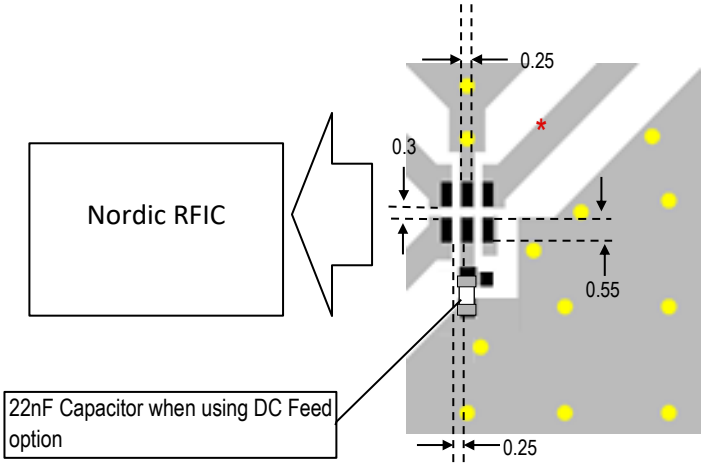
Pin Number	Function
1	Unbalanced Port
2	GND
3	Balanced Port
4	Balanced Port
5	DC Feed + RF GND or GND
6	NC

[3] The termination type is Nickel Tin. Go to: https://www.johansontechnology.com/ipcsoldering-profile for Typical Soldering Profile.

johansontechnology.com
4001 Calle Tecate • Camarillo, CA 93012, USA • +1.805.389.1166
2025 Johanson Technology, Inc. All Rights Reserved

Recommended PCB Layout

Note: Mount device with colored mark facing up.



Units in mm

Solder Resist

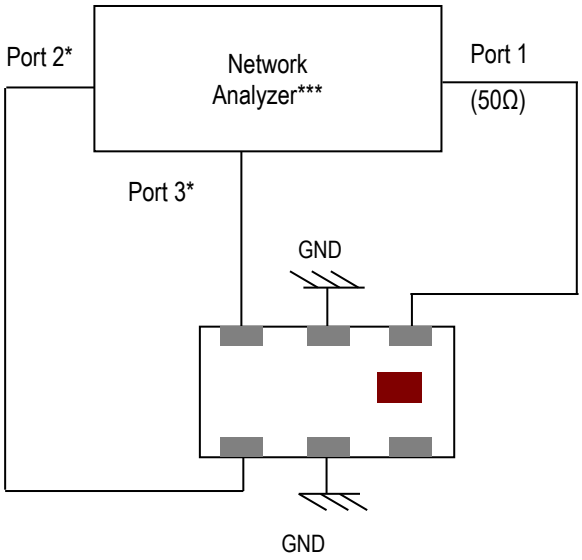
Land

Through-hole (ϕ0.35)

* Transmission line width should be designed to match 50Ω characteristic impedance, depending on PCB material and thickness.

If you'd like the CAD PCB layout or have any questions,
contact our application engineers at https://www.johansontechnology.com/ask-a-question

Measuring Diagram



Port 1: Unbalanced Port

Ports 2 and 3: Balanced Port

IL=S_{ds21}

RL=S_{ss11}

Amp_balance = dB(S(2,1)/S(3,1))

Phase_balance = Phase(S(2,1)/S(3,1))

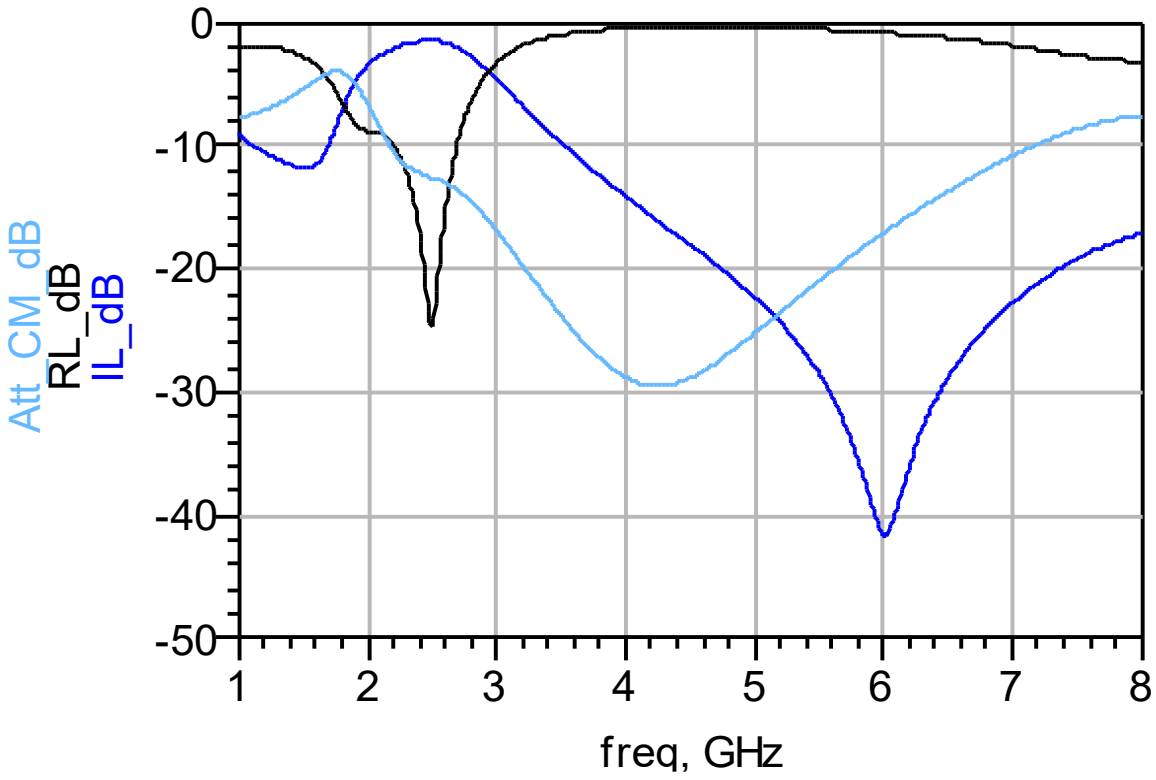
*Impedance for ports 2 and 3

= Conjugate to Balanced Impedance/2

johansontechnology.com
4001 Calle Tecate • Camarillo, CA 93012, USA • +1.805.389.1166
2025 Johanson Technology, Inc. All Rights Reserved

RF Measurement (T = 25°C)

Insertion Loss, Return Loss, Attenuation, Common-mode Rejection

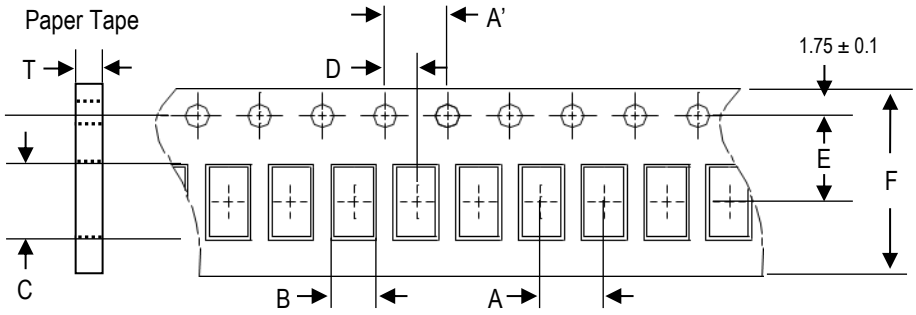


S-parameter and layout file available upon request. Please contact us at https://www.johansontechnology.com/ask-a-question.

johansontechnology.com
4001 Calle Tecate • Camarillo, CA 93012, USA • +1.805.389.1166
2025 Johanson Technology, Inc. All Rights Reserved

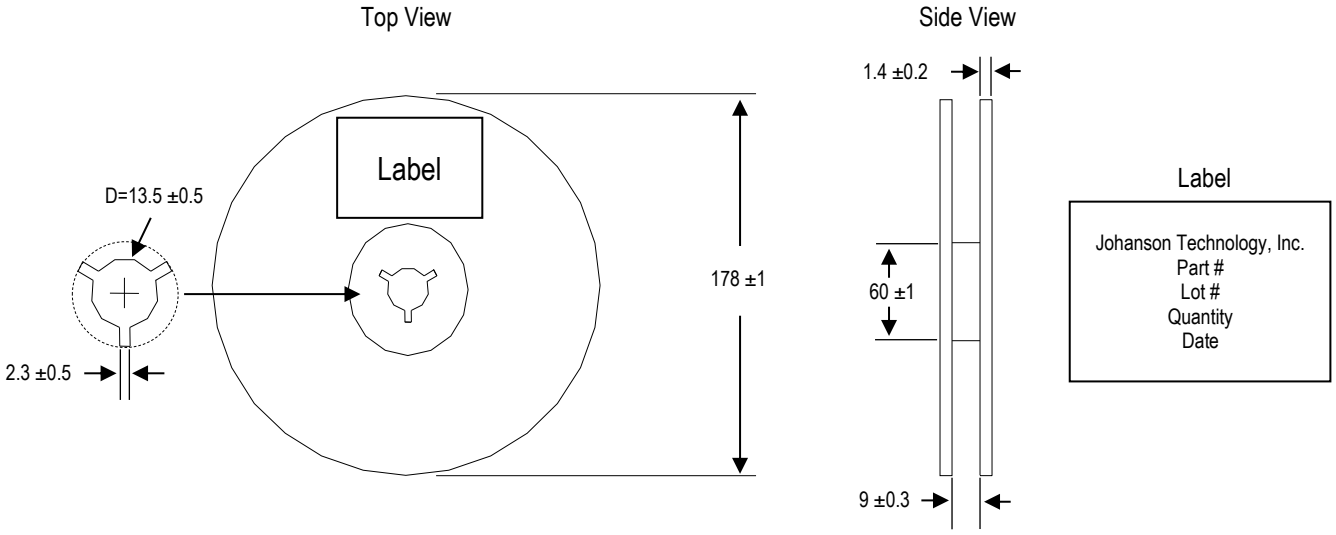
Tape and Reel Specification (Units in mm)

Tape Dimensions

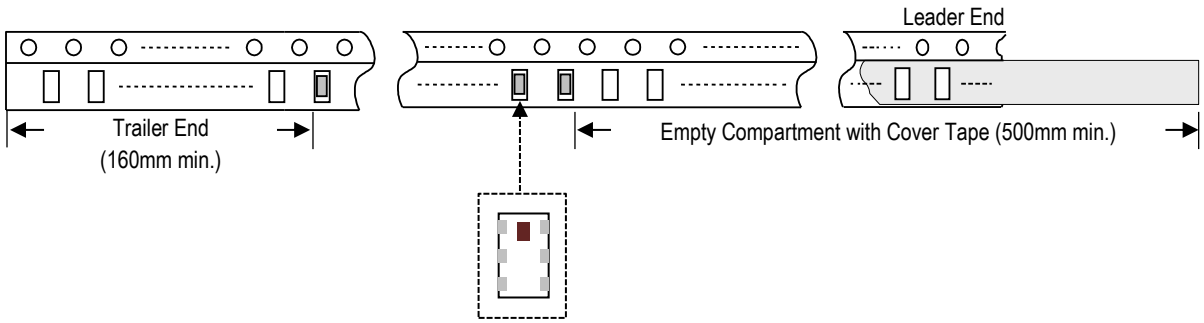


A	A'	B	C	D	E	F	T	Quantity/reel	Tape material
4.0 ±0.1	4.0 ±0.1	1.1 ±0.1	1.92 ±0.1	2.0 ±0.1	3.5 ±0.1	8.0 ±0.1	0.75 ±0.05	4,000pcs	Paper

Reel Dimensions



Leader and Trailer Dimensions



johansontechnology.com
4001 Calle Tecate • Camarillo, CA 93012, USA • +1.805.389.1166
2025 Johanson Technology, Inc. All Rights Reserved

Orderable Part Number

Packaging Style	Part Number	Termination
Bulk (loose pcs.)	2450BM14A0002001B	Nickel Tin
T & R (7" Reel Paper Tape)	2450BM14A0002001T (Qty: 4,000 pcs/reel)	

Important Links

2450BM14A0002001T Product Page

More Nordic Semiconductor Reference Designs

2.4GHz Antennas

Antenna Tuning, Optimization, and Validation Services

Soldering Information

MSL Information

Packaging Information

Recommended Storage Condition and Max Shelf Life

RoHS Compliance

Johanson Technology, Inc. reserves the right to make design changes without notice.
All sales are subject to Johanson Technology, Inc. terms and conditions.

johansontechnology.com
4001 Calle Tecate • Camarillo, CA 93012, USA • +1.805.389.1166
2025 Johanson Technology, Inc. All Rights Reserved