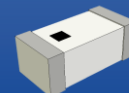




**THE DATASHEET OF
AMCA31-2R450G-S1F-T3**



WLAN Ceramic Chip Antenna 2450MHz



AMCA31-2R450G-S1F-T3

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3.2 x 1.6 x 1.2 mm
RoHS/RoHS II Compliant
MSL Level = 1

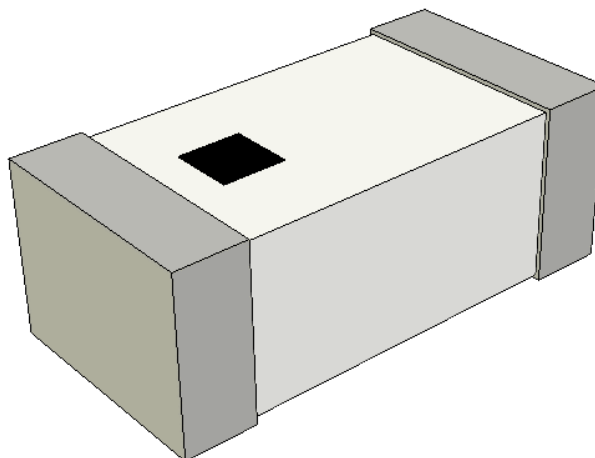
Features

- Miniaturized in size: 3.2 x 1.6 x 1.2 mm
- Compact & Low-Profile
- Low return loss of: ≤ -12.5 dB
- Peak Gain: 2.3 dBi
- Efficiency: ≥ -1.8 dB (66%)
- Linear Polarization
- Surface Mount (SMD)

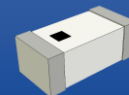
Applications

- WiFi 2.4GHz
- Bluetooth / BLE
- ZigBee
- ISM
- IoT, M2M
- Wearables
- Wireless Remote Control
- Personal Area Networks (PAN)
- Industrial/Commercial equipment

Product Image



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3.2 x 1.6 x 1.2 mm
RoHS/RoHS II Compliant
MSL Level = 1

Electrical Specification

Parameter	Specification	Unit
Operating Frequency	2400 - 2500	MHz
Return Loss	≤ -12.5	dB
Polarization	Linear	-
Peak Gain	2.3	dBi
Efficiency	≥ -1.8 (66)	dB (%)
Impedance	50	Ω
Radiation Pattern	Omni-directional	-
Input Power	< 3	W

Note: All measurements were conducted on the evaluation board in free space. Performance will vary depending on the ground plane, application, and environment.

Mechanical Specification

Parameter	Specification
Antenna Dimension	3.2 x 1.6 x 1.2 mm
Evaluation board Dimension	44 x 20 mm
Recommended Ground Clearance for Antenna	6.5 x 6.5 mm
Mounting Type	Surface Mount
Material(s)	Ceramic

Environmental Specification

Parameter	Specification
Operating and Storage Temperature (individual chip without packing)	-40°C to +85°C
Packaging Storage Temperature	-10°C to +40°C
Packaging Storage Relative Humidity	70% (Max.)

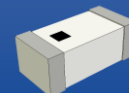


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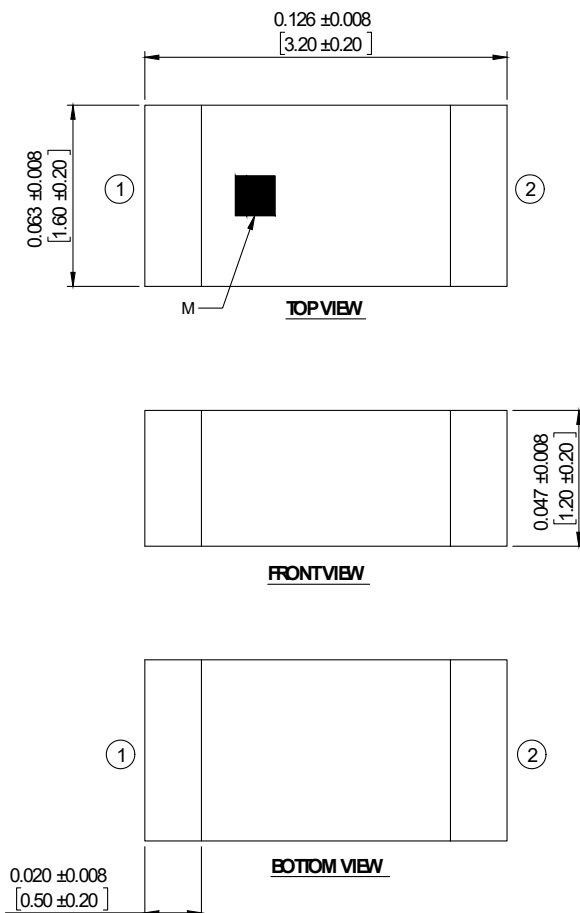


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3.2 x 1.6 x 1.2 mm
RoHS/RoHS II Compliant
 MSL Level = 1

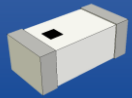
Product Dimensions and Terminal Configuration



Symbol	Description
①	Antenna Feed
②	NC (not connected)
M	Mark

Unit: Inches [mm]

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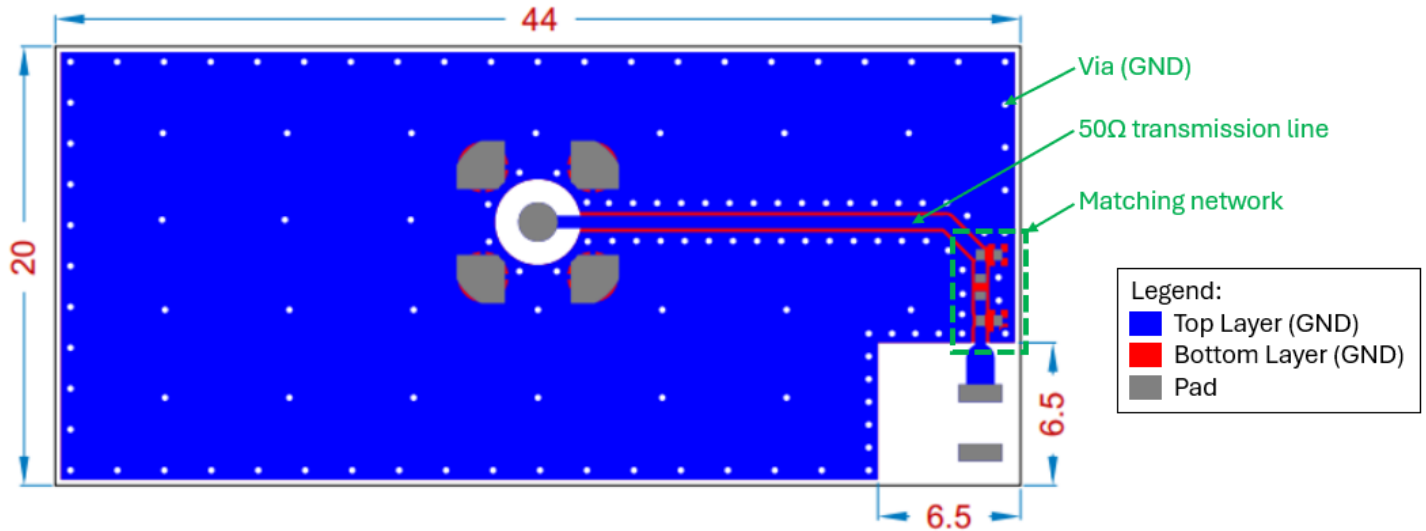


3.2 x 1.6 x 1.2 mm
RoHS/RoHS II Compliant
MSL Level = 1

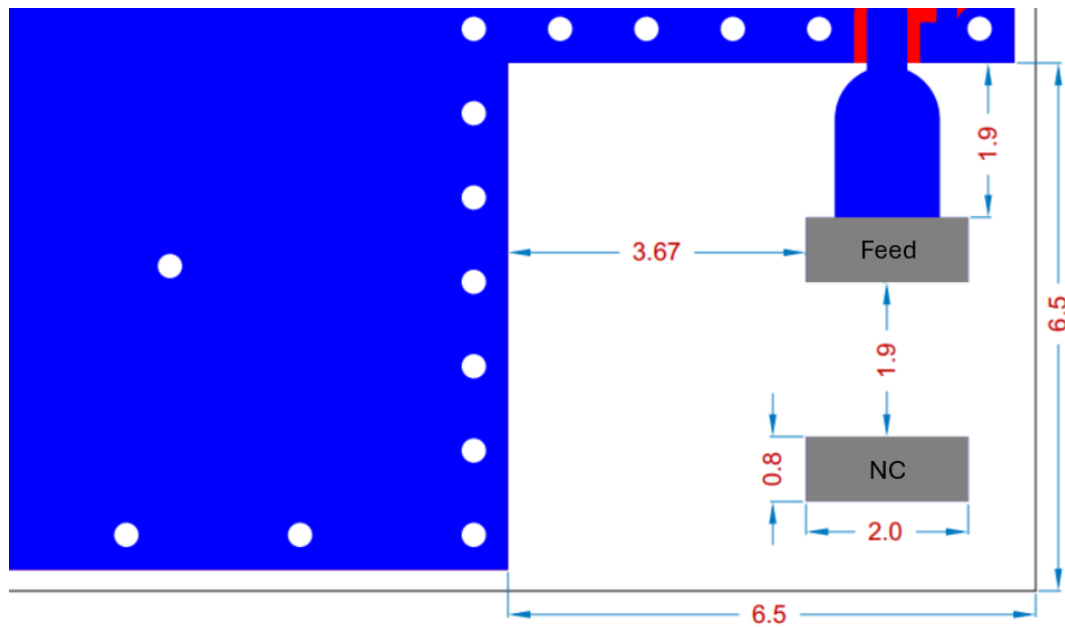
Recommended PCB layout

If there are several layers in the PCB, there is an advantage to add vias for smooth interconnection of the ground areas to avoid splits in the ground plane. It is also important that the ground clearance is respected through all layers of the PCB. It is recommended to implement a matching network to optimize the antenna impedance in your application.

The transmission line should be kept as short as possible and be designed to have a characteristic impedance of 50Ω.

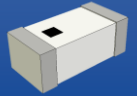


Detailed view of antenna pads and copper clearance:



Unit: mm

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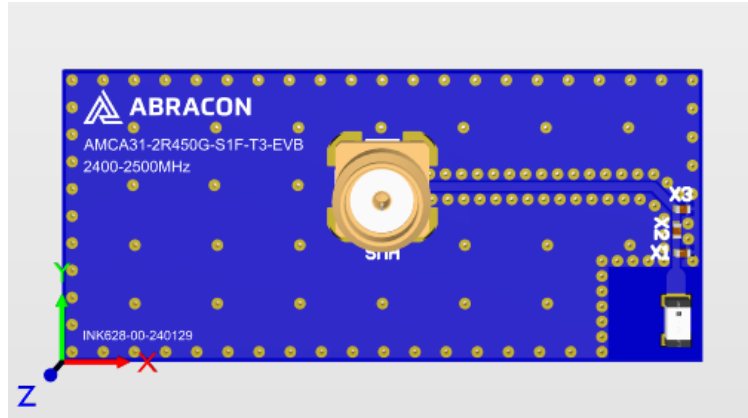
Check Inventory



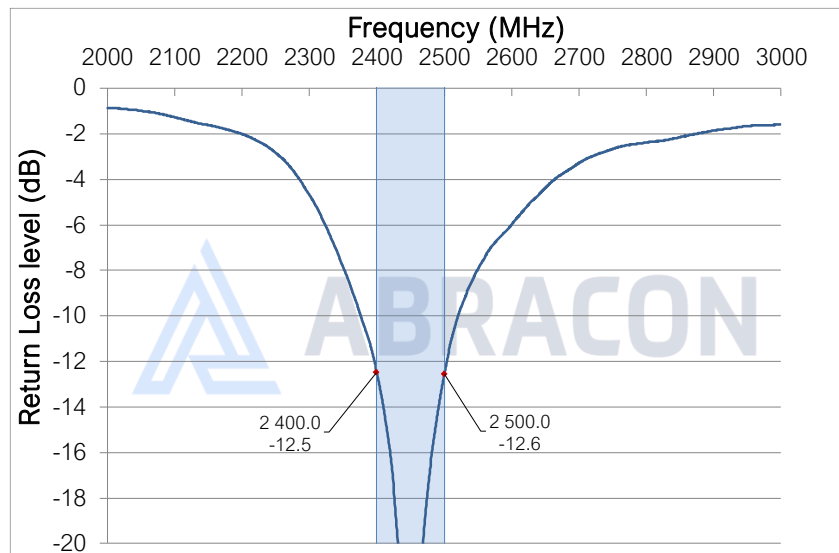
3.2 x 1.6 x 1.2 mm
RoHS/RoHS II Compliant
MSL Level = 1

Measurement Setup

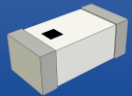
The antenna measurements were all done in free space, with the chip antenna implemented on its evaluation board (AMCA31-2R450G-S1F-T3-EVB) that has a PCB size of 44 by 20 (X by Y) mm:



Reflection Characteristics – Return Loss



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AMCA31-2R450G-S1F-T3

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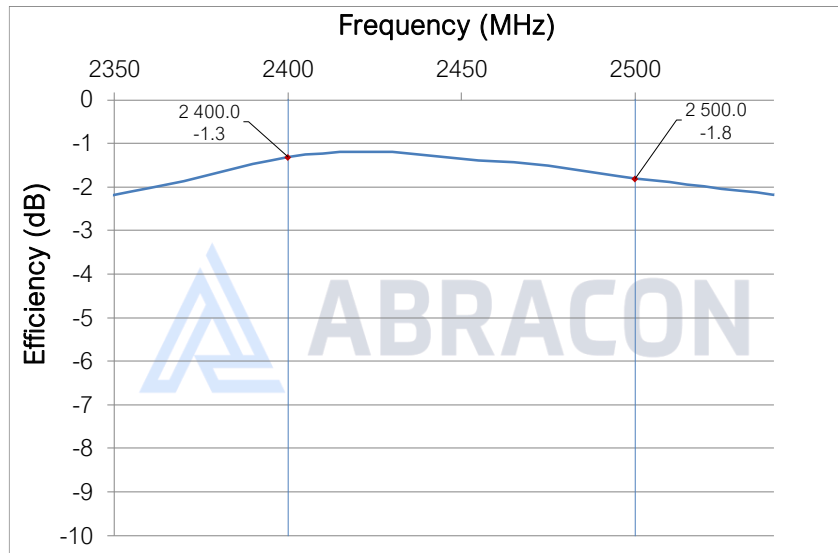


Check Inventory

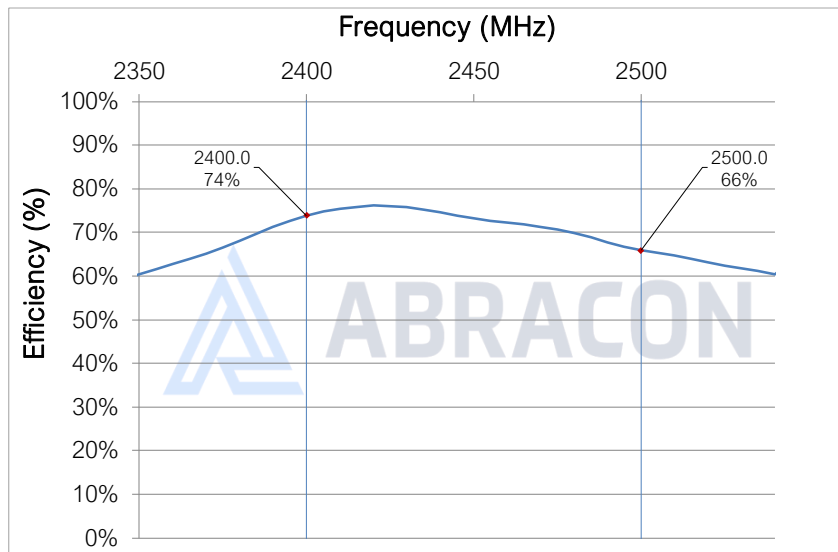


3.2 x 1.6 x 1.2 mm
RoHS/RoHS II Compliant
MSL Level = 1

Radiation Characteristics – Total Efficiency (dB)



Radiation Characteristics – Total Efficiency (%)

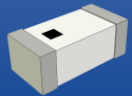


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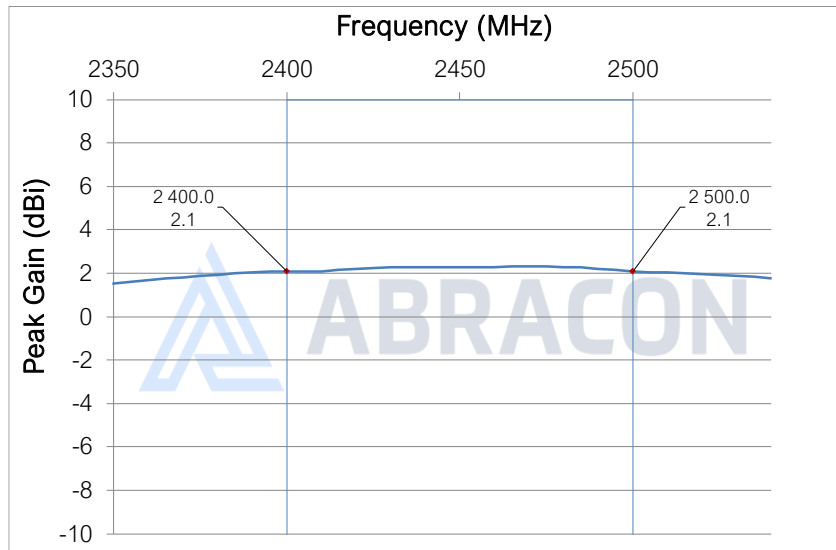


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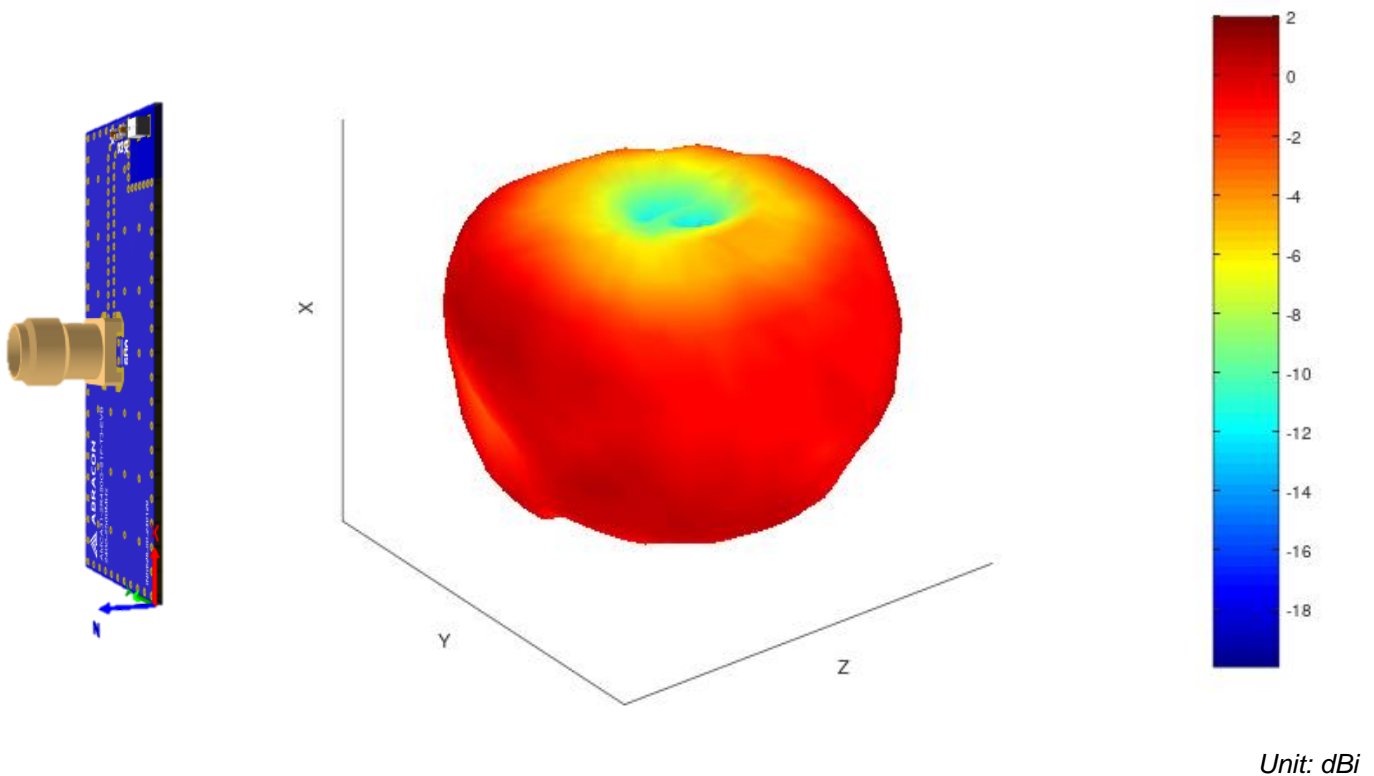


3.2 x 1.6 x 1.2 mm
RoHS/RoHS II Compliant
MSL Level = 1

Radiation Characteristics – Maximum Gain



Radiation Characteristics – 3D Pattern @ 2450 MHz

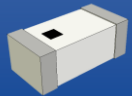


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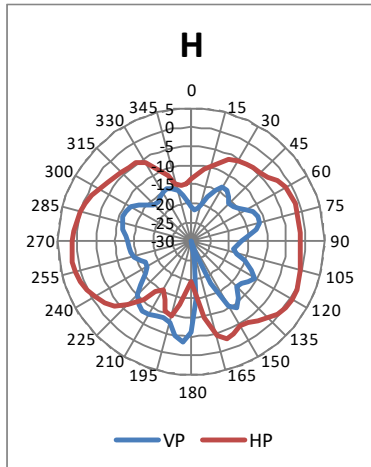
Check Inventory



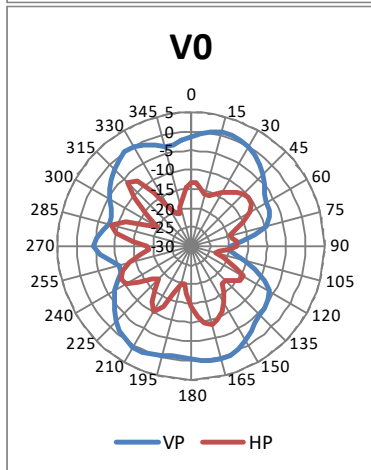
3.2 x 1.6 x 1.2 mm
RoHS/RoHS II Compliant
 MSL Level = 1

Radiation Characteristics – 2D Pattern @ 2450 MHz

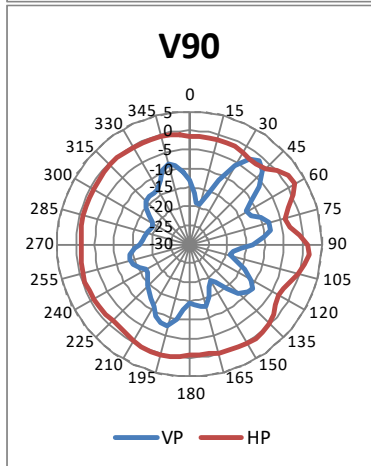
XY-plane:



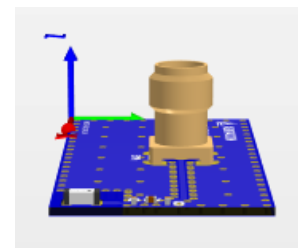
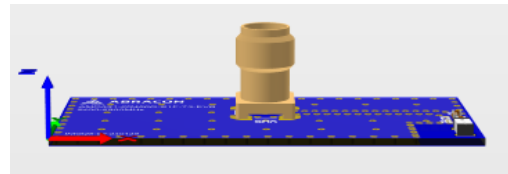
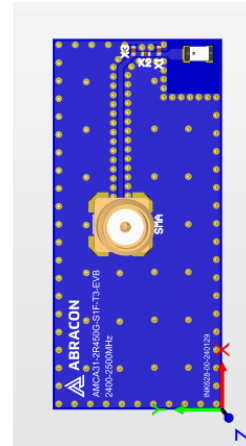
XZ-plane:



YZ-plane:



VP: Vertical Polarization
 HP: Horizontal Polarization



Unit: dBi

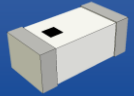


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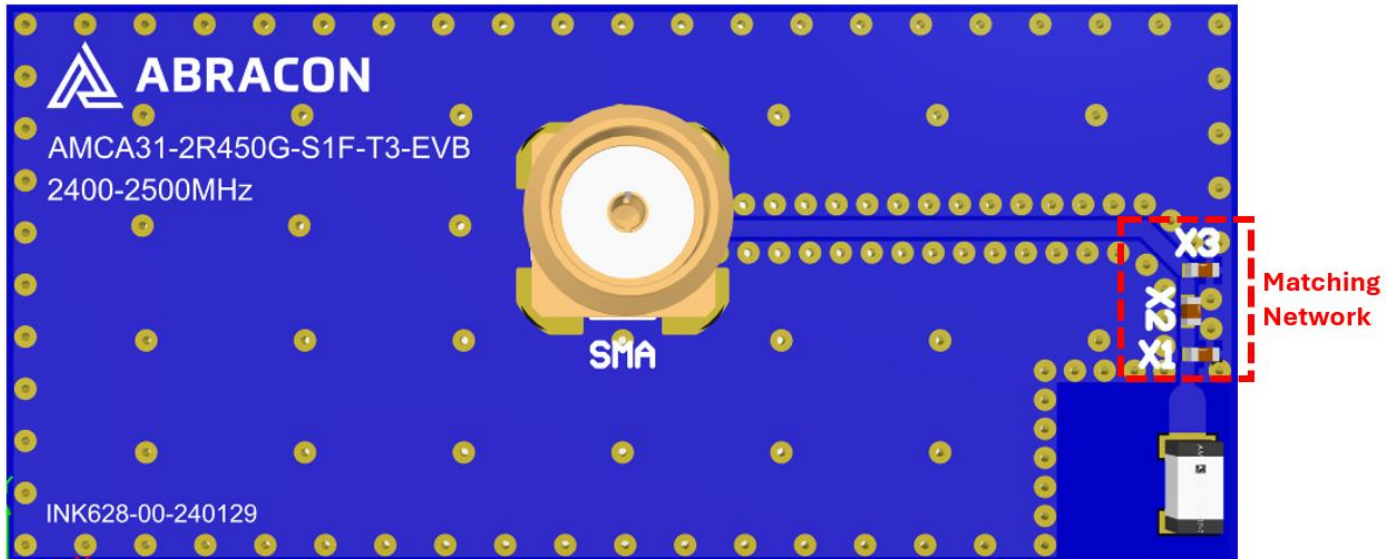
Check Inventory



3.2 x 1.6 x 1.2 mm
RoHS/RoHS II Compliant
MSL Level = 1

Evaluation Board Outline & Matching Circuit

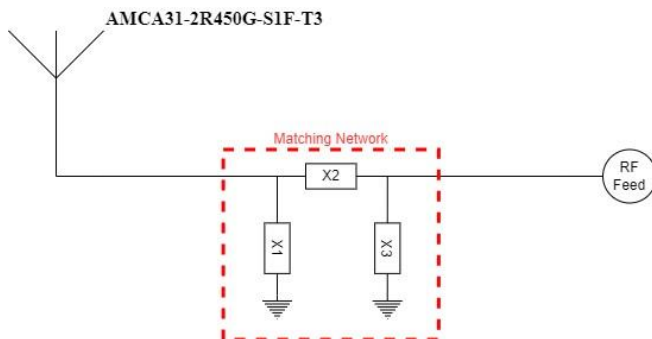
The evaluation board (AMCA31-2R450G-S1F-T3-EVB) is developed to simplify antenna testing and evaluation. It has an arbitrary size of 44 x 20 mm and includes an SMA connector. The purpose is to give a reference design for an optimal antenna implementation. The evaluation board can also be used to test other implementations by cutting and soldering the PCB into any device.



Evaluation board outline

The evaluation board has a matching circuit implemented next to the antenna. This is aimed to enable optimization possibilities for the user. The component positions are sized for 0402 (1005 metric) SMD components.

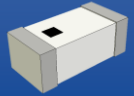
The antenna needs a matching circuit to adjust the resonant frequency balance. When delivered, the evaluation board is tuned for optimum balance at 2.4 – 2.5 GHz using the following (can be replaced by equivalent):



X1 = 9.7 nH (Murata LQW15AN9N7G00D)
X2 = 8.3 nH (Murata LQW15AN8N3C10D)
X3 = not mounted

However, it is common that the resonant frequency will shift during implementation in an arbitrary device. Therefore, this matching may be changed with other values/components/brands for compensation of such effects.

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AMCA31-2R450G-S1F-T3

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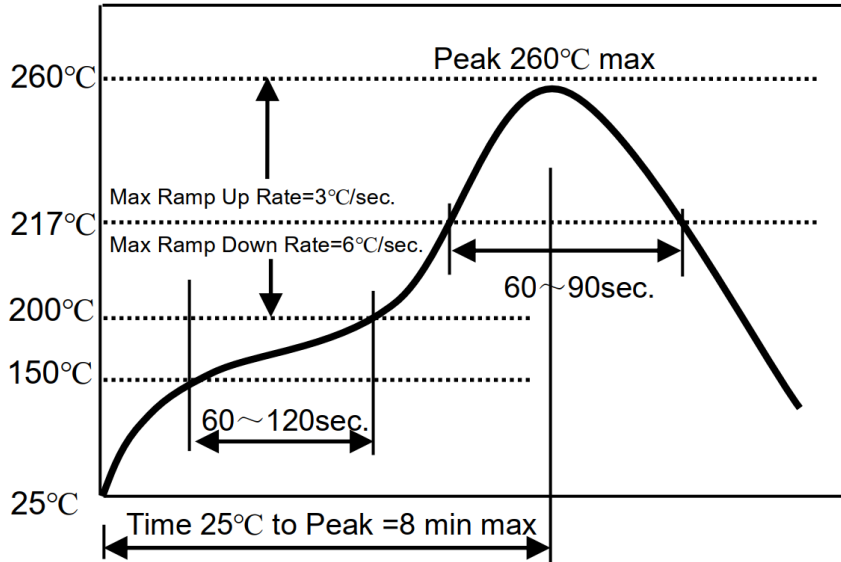


Check Inventory



3.2 x 1.6 x 1.2 mm
RoHS/RoHS II Compliant
MSL Level = 1

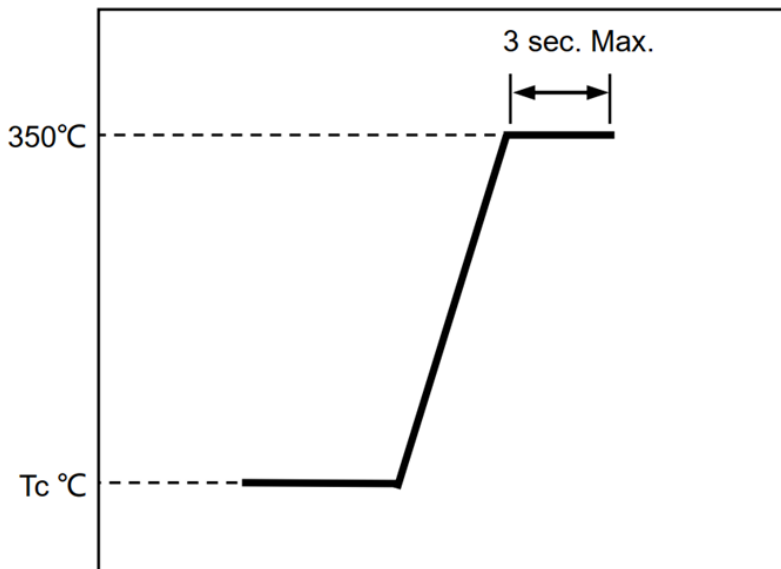
Reflow Profile



- Solder paste: Sn/3.0Ag/0.5C
- Reflow Cycles: 2 max.

Note: The reflow profile is only for qualification and is not meant to specify board assembly profiles. Actual board assembly profiles must be based on the customer's specific board design, solder paste and process, and should not exceed the parameters as the Reflow profile shows.

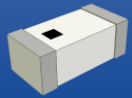
Iron Soldering Profile



- Solder paste: Sn/3.0Ag/0.5C
- Max. 1 times for iron soldering
- Pre-heating (Tc): 150 °C / 60 sec
- Maximum iron soldering power: 30W
- Diameter of soldering iron tip: 1.0 mm max.

Note: Take care not to apply the tip of the soldering iron to the terminal electrodes.

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AMCA31-2R450G-S1F-T3

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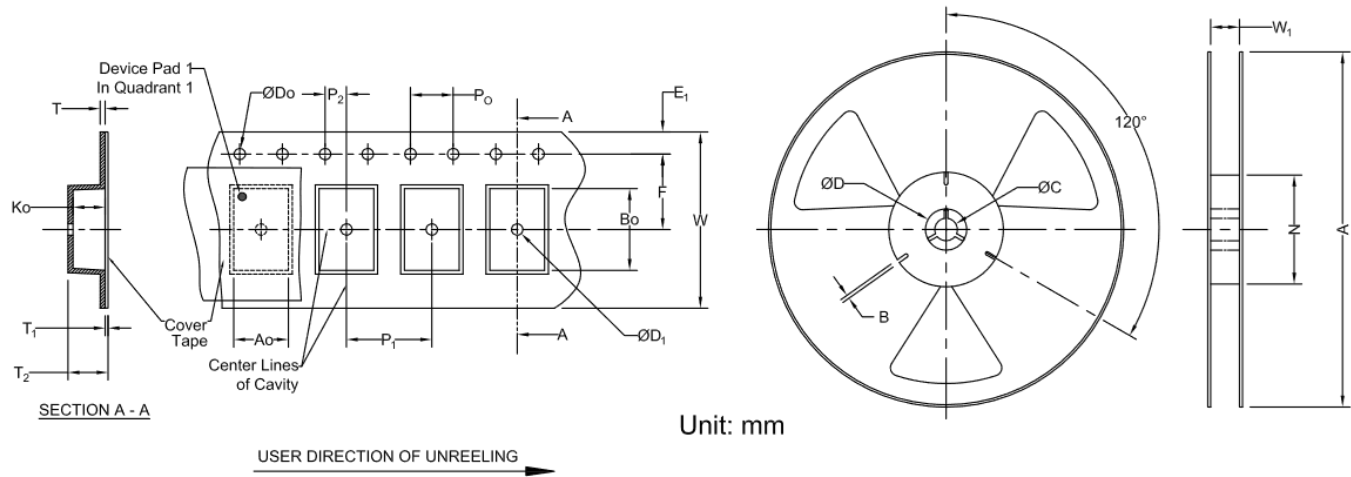
Check Inventory



3.2 x 1.6 x 1.2 mm
RoHS/RoHS II Compliant
MSL Level = 1

Packaging

Tape & Reel dimensions:



Carrier Tape Specifications (mm)

Do	K ₀	E ₁	P ₀	T	F	P ₁	W	A ₀	B ₀	Reel Qty
1.50 ± 0.1	1.5 ± 0.1	1.75 ± 0.1	4.0 ± 0.1	0.22 ± 0.05	3.5 ± 0.15	4.0 ± 0.1	8.0 ± 0.10	1.8 ± 0.1	3.5 ± 0.1	3,000

Reel Specifications (mm)

A	W ₁	N	B	C
178 ± 2.0	8.4 +1.5	58 ± 2.0	2.45 ± 0.2	13.5 ± 0.2

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