

UWB Multi-layer Chip Antenna



ACS1006U

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10 x 6 x 1.2 mm

RoHS/RoHS II Compliant

MSL Level = N/A

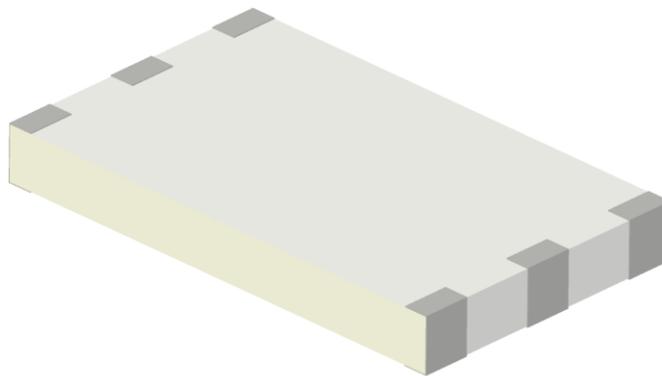
Features

- Compact & Low-Profile
- VSWR: ≤ 2.0
- Peak Gain: 2.2 dBi
- Efficiency: up to 70%
- Surface Mount (SMD)
- High efficiency across UWB bands

Applications

- UWB (Ultra-Wide Band)
- IoT
- M2M
- Secure car access
- Item Tracking
- Indoor Navigation
- Hands-Free Payment
- Smart Access
- Object Detection

Product Image



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Electrical Specification

Parameter	Specification	Unit
Operating Frequency	3100-10300	MHz
VSWR (Typ.)	< 2.0	
Peak Gain	2.2	dBi
Efficiency (Maximum)	70	%
Impedance	50	Ω
Polarization	Linear	
Radiation Pattern (Azimuth)	Omni-directional	

Note : All test measurements were conducted on 54 x 70 mm. Performance of the chip antenna will vary relative to the ground plane size in use.

Mechanical Specification

Parameter	Specification
Dimensions	10 x 6 x 1.2 mm
Antenna Clearance Space	20.7 x 14.5 mm
Evaluation Board size	70 x 54 mm
Solder Termination	Ag (Environmental-Friendly Pb-Free)

Environmental Specification

Parameter	Specification
Operating Temperature	-40°C to +85°C
Storage Temperature	-10°C to +40°C
Relative Humidity	70%
RoHS Complaint	Yes



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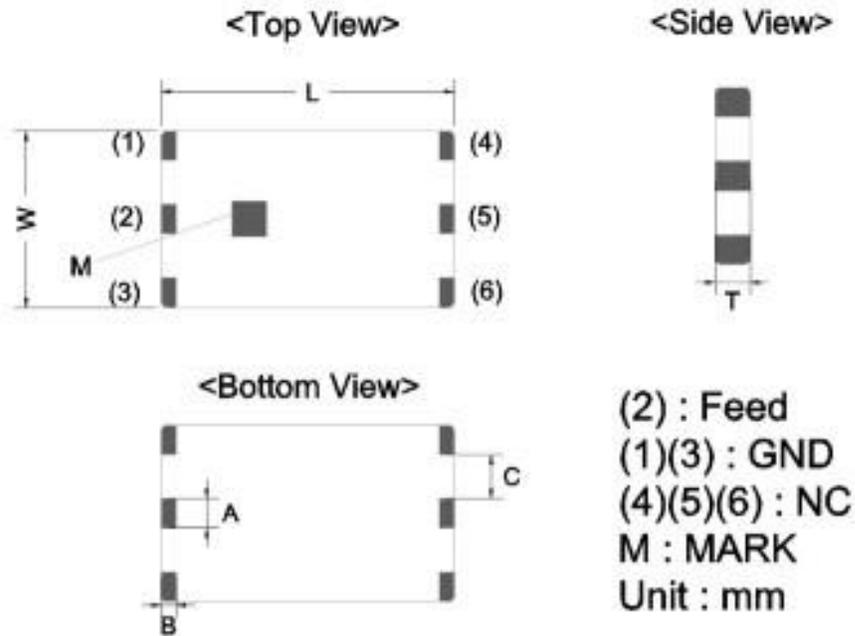


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10 x 6 x 1.2 mm
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Product Dimensions



Unit: mm

MARK	L	W	T	A	B	C
Dimensions (mm)	10.0 ±0.30	6.0 ±0.30	1.2 ±0.20	1.0 ±0.30	0.5 ±0.30	1.50 ±0.30

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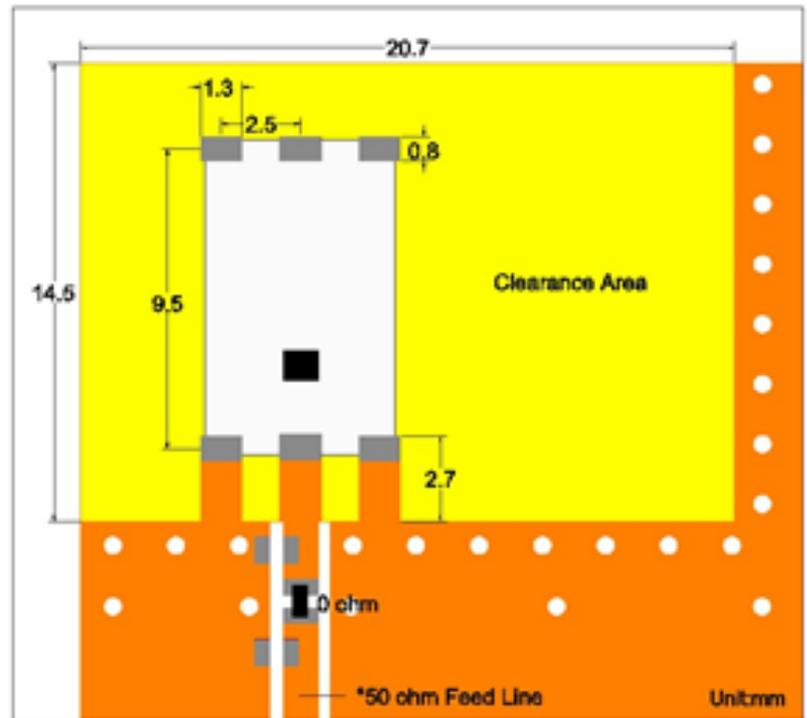
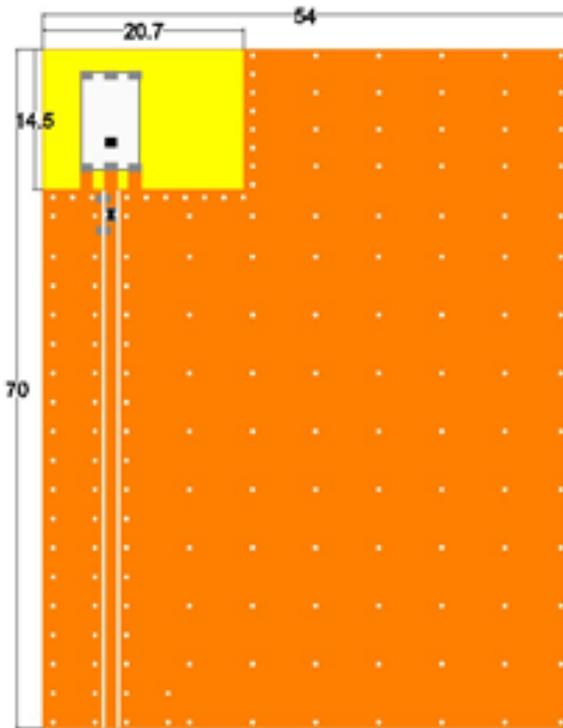


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Evaluation Board Dimensions



Unit: mm

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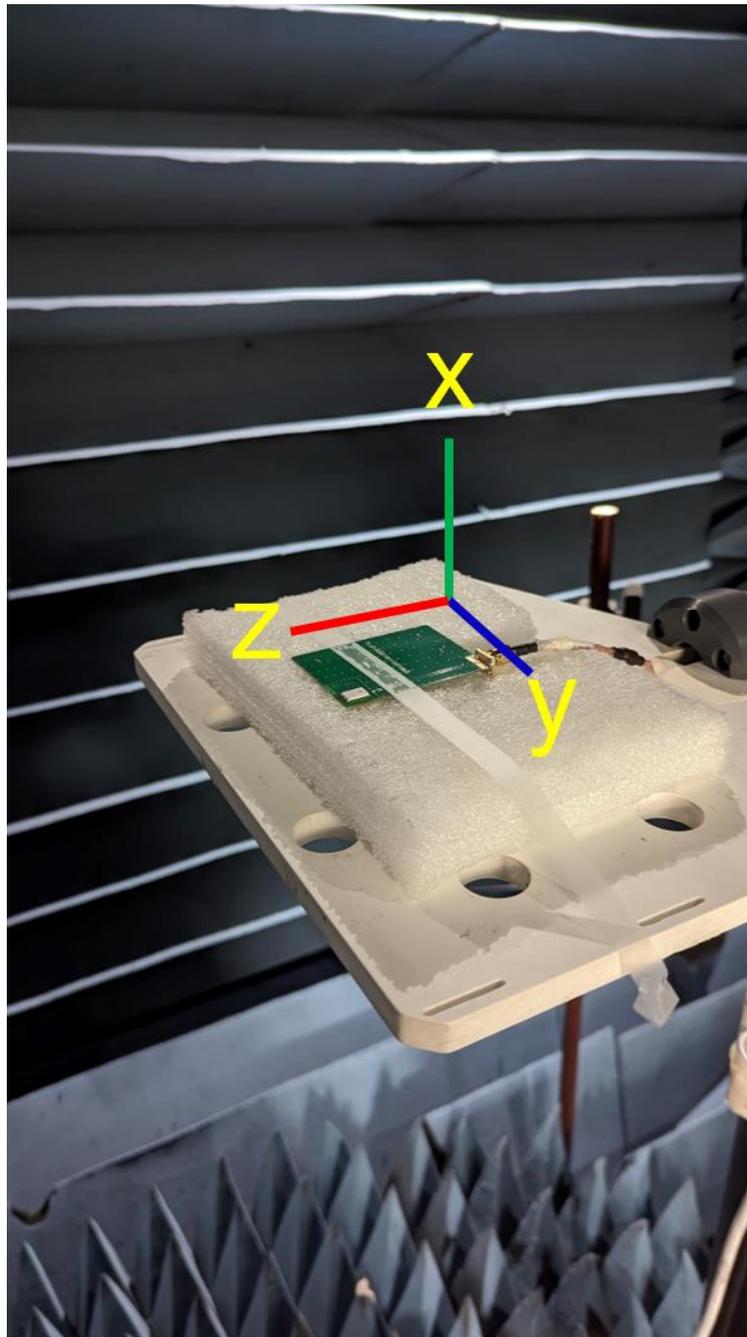


10 x 6 x 1.2 mm

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Measurement Setup photo



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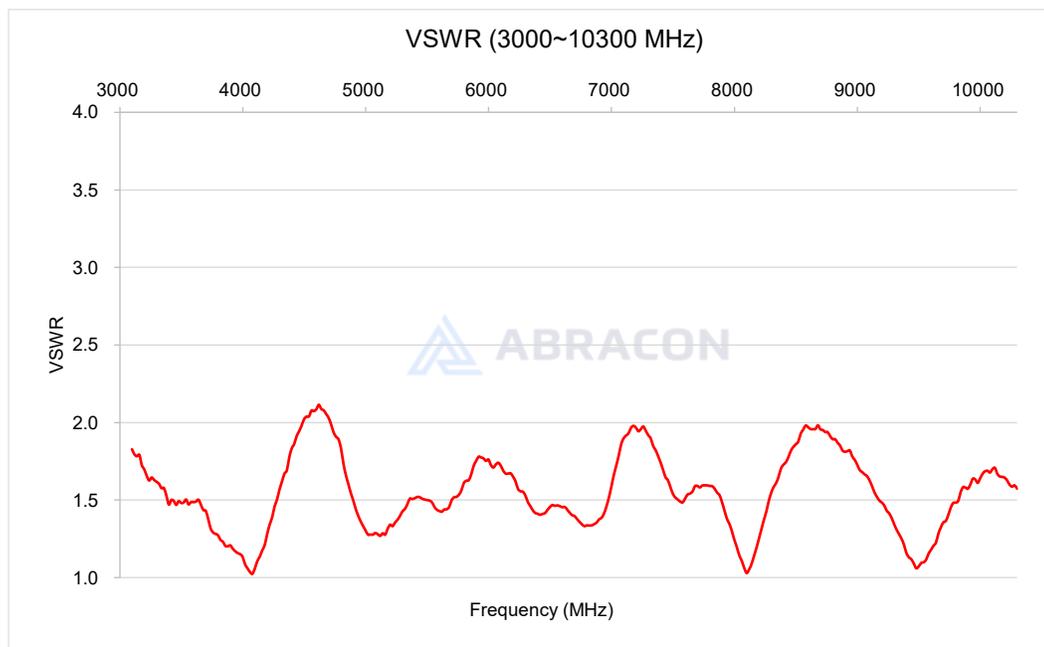
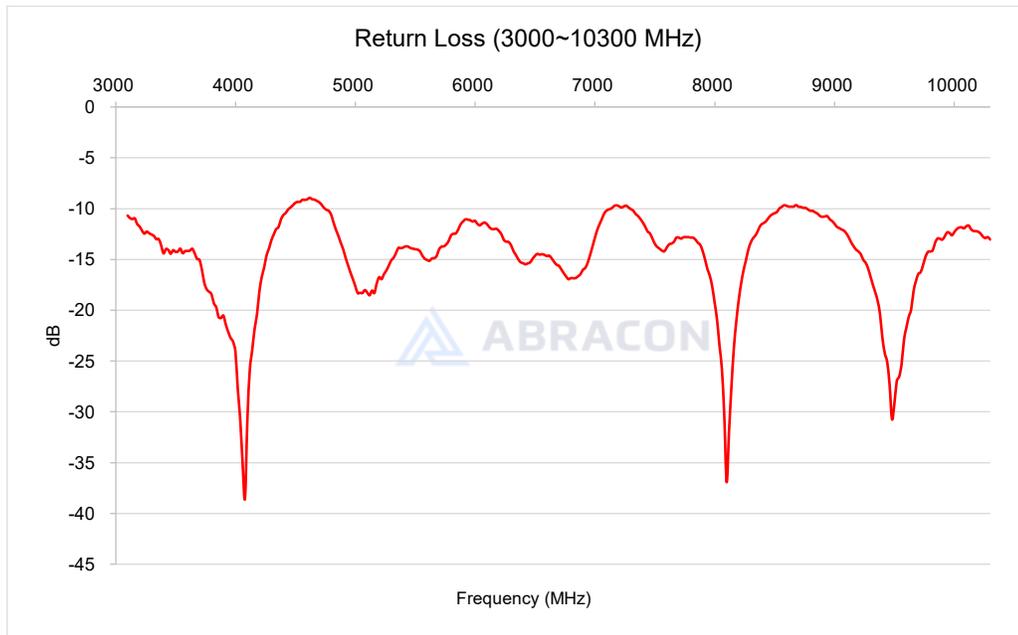


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Reflection Characteristics –Return Loss & VSWR



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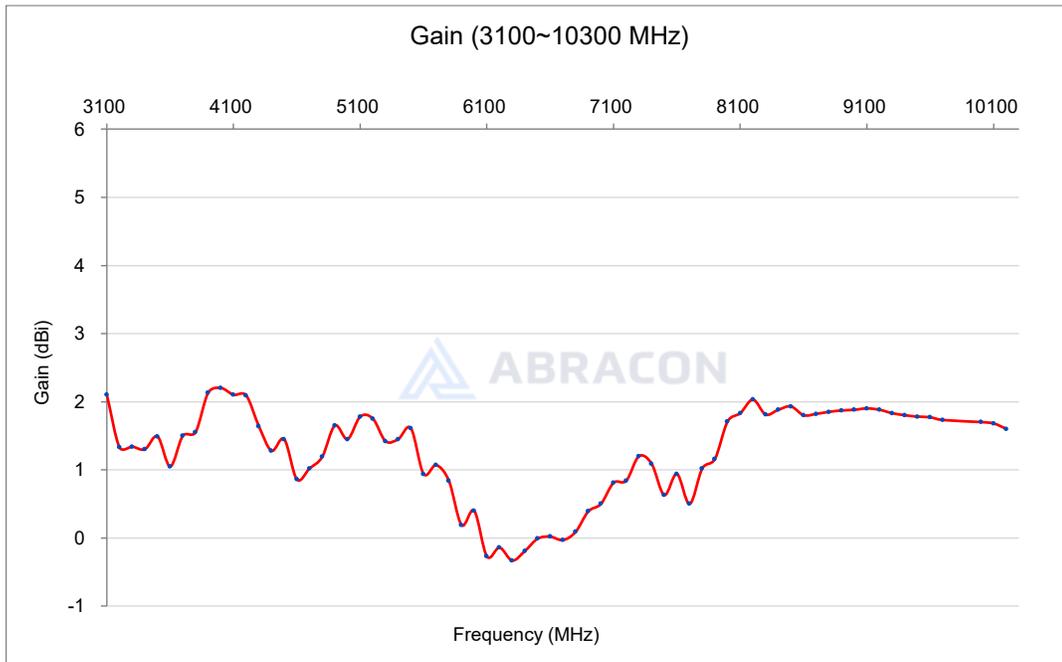


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Radiation Characteristics – Peak Gain



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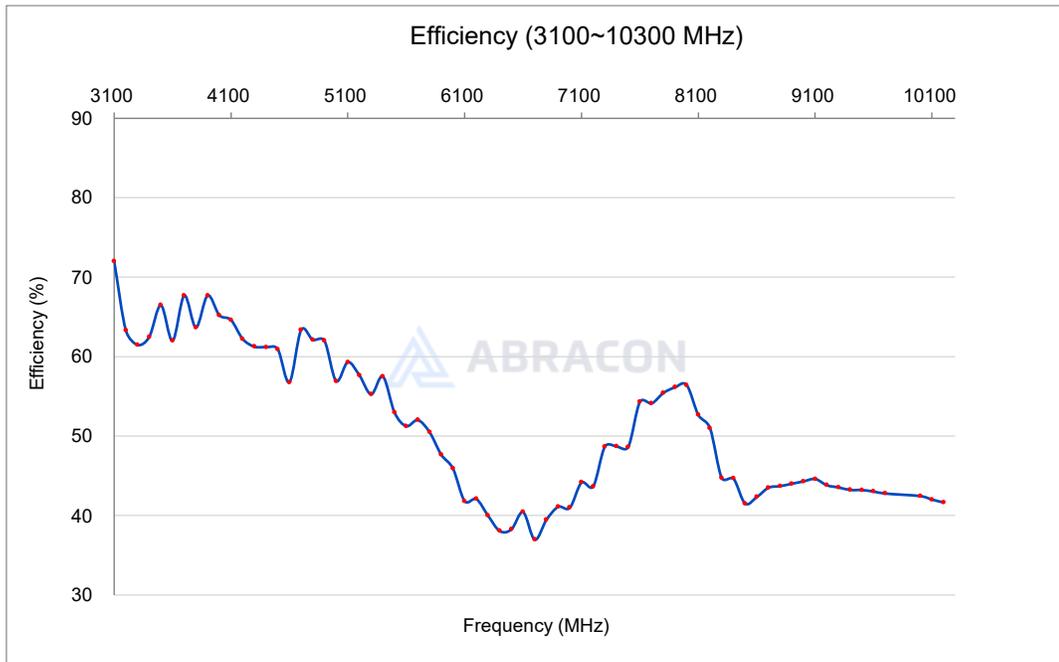


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Radiation Characteristics – Total Efficiency (%)



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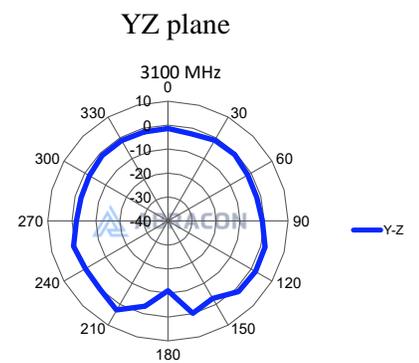
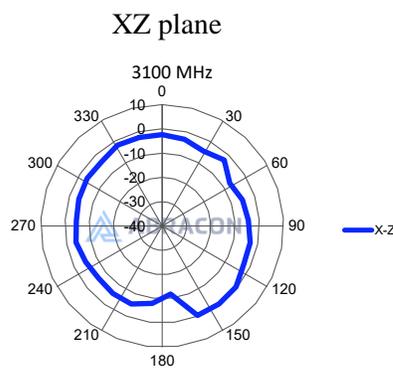
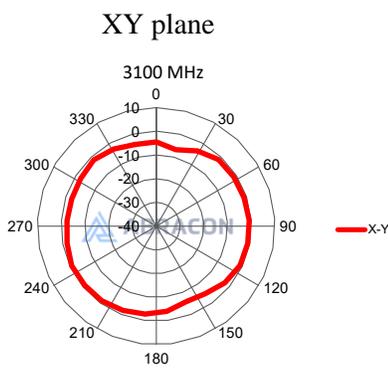
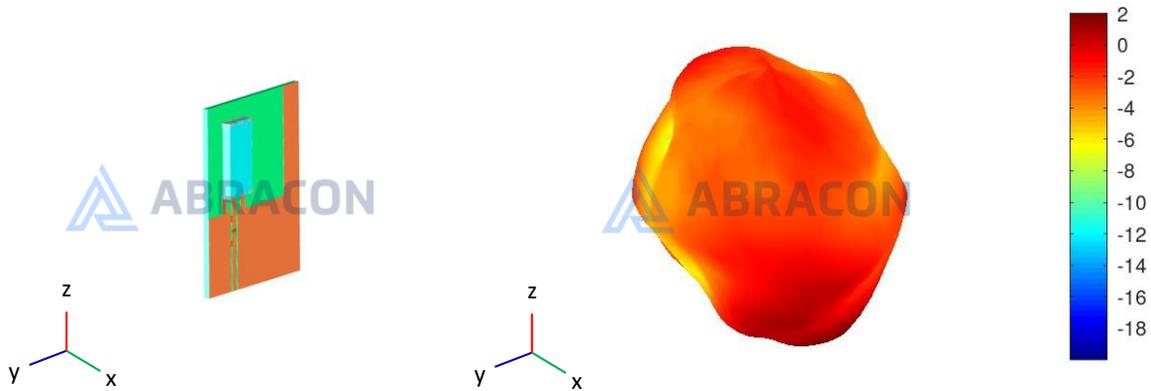
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Radiation Characteristics – 3D & 2D Pattern

3100MHz



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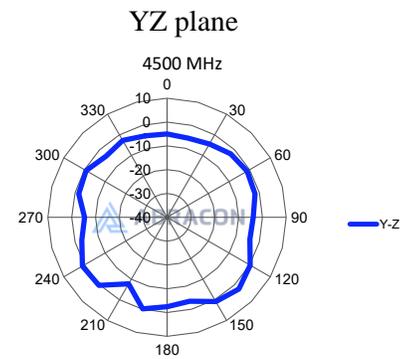
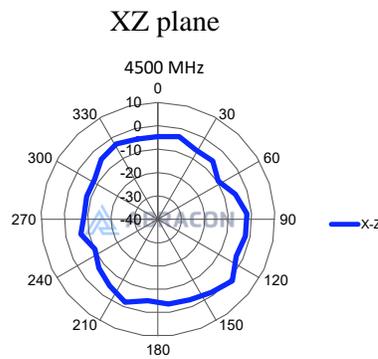
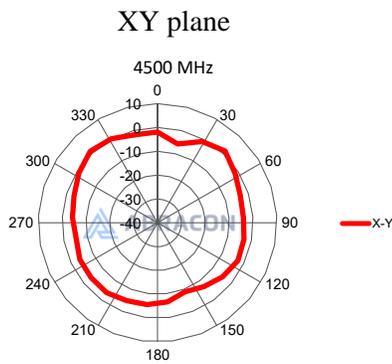
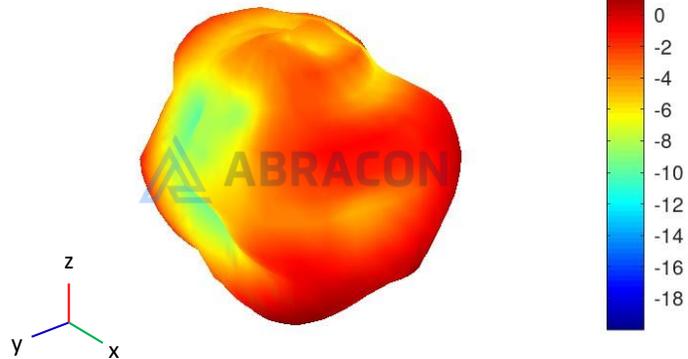
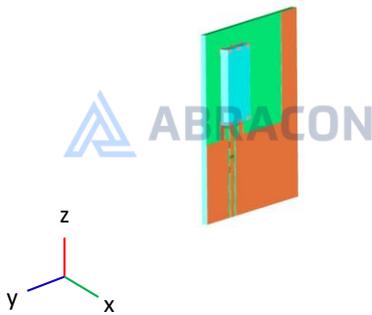


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10 x 6 x 1.2 mm
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4500MHz



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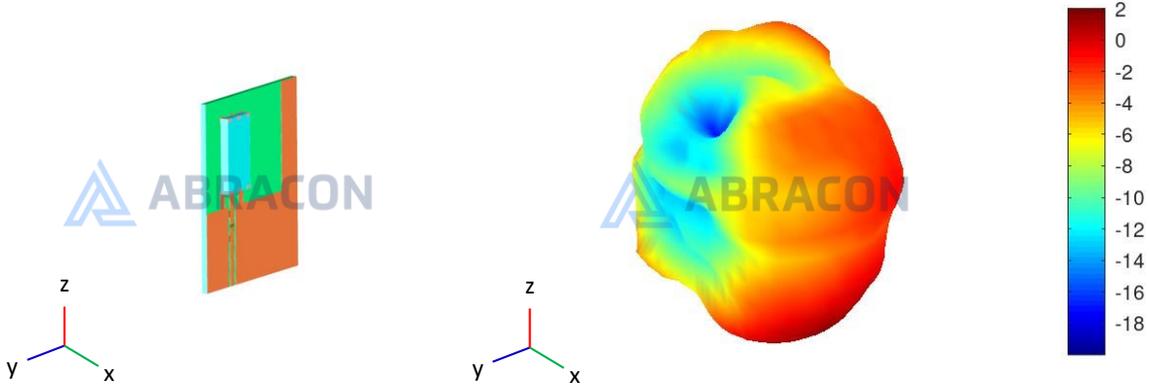


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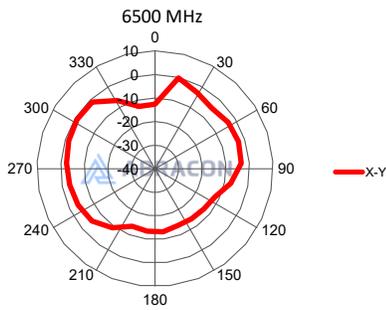


10 x 6 x 1.2 mm
RoHS/RoHS II Compliant
MSL Level = N/A

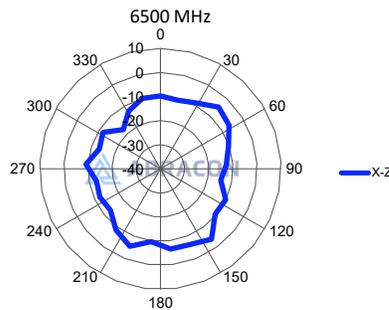
6500MHz



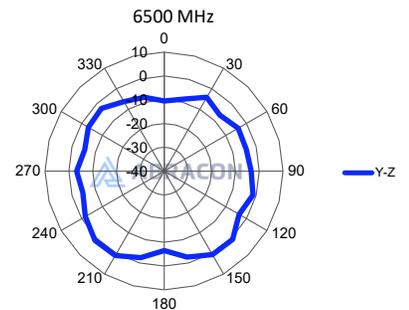
XY plane



XZ plane



YZ plane



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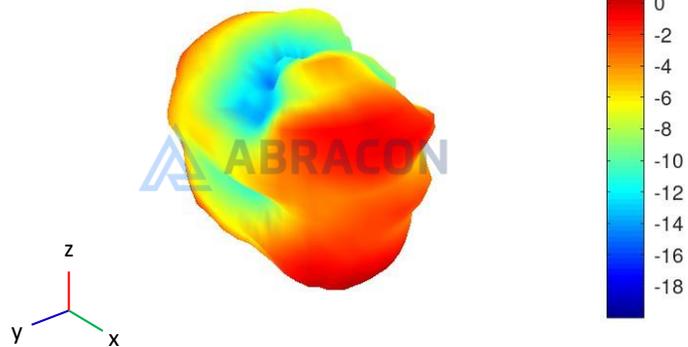
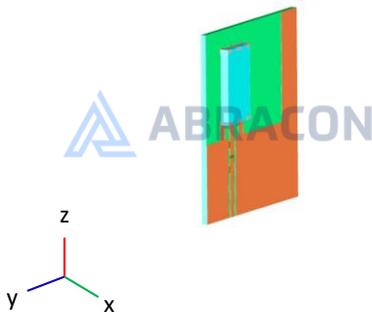


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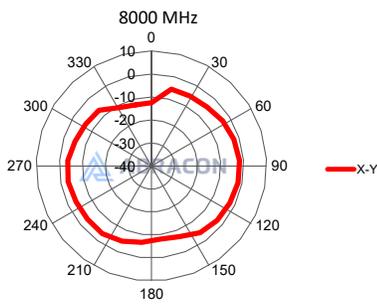


10 x 6 x 1.2 mm
RoHS/RoHS II Compliant
MSL Level = N/A

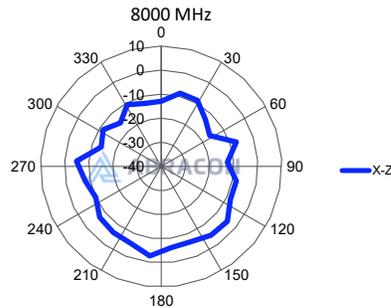
8000MHz



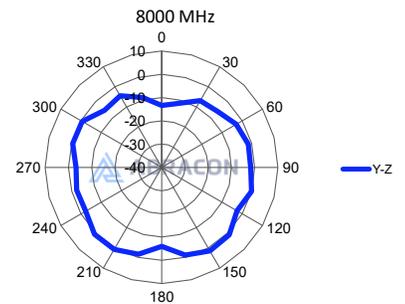
XY plane



XZ plane



YZ plane





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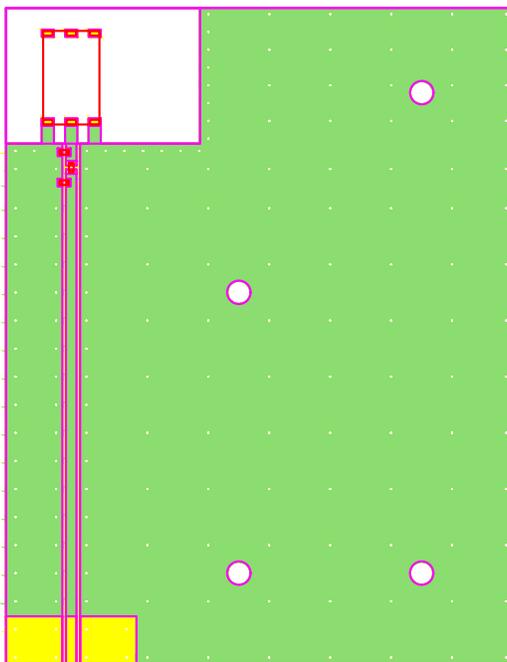
Evaluation Board Outline & Matching Circuit

The evaluation board is developed to showcase the performance of the Niche antenna on a typical PCB and to simplify antenna testing and evaluation. It has a size of 70 x 54 mm. The performance could vary with different PCB sizes and Abracon can offer support to optimize the antenna for your specific application.

The evaluation board has a matching circuit implemented next to the antenna. This is aimed to enable optimization possibilities for the user.

The standard tuning for the evaluation board is the following (can be replaced by equivalent):

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. This is further described in the General Implementation Guidelines section below.



Dimension: 54mm*70mm
Substrate material: FR4
dielectric constant: 4.4
Copper thickness: 35um
Copper layer: 2
Stacking
information: Copper_35um/FR4_730um_/Copper_35um
Data: 2023.08.10

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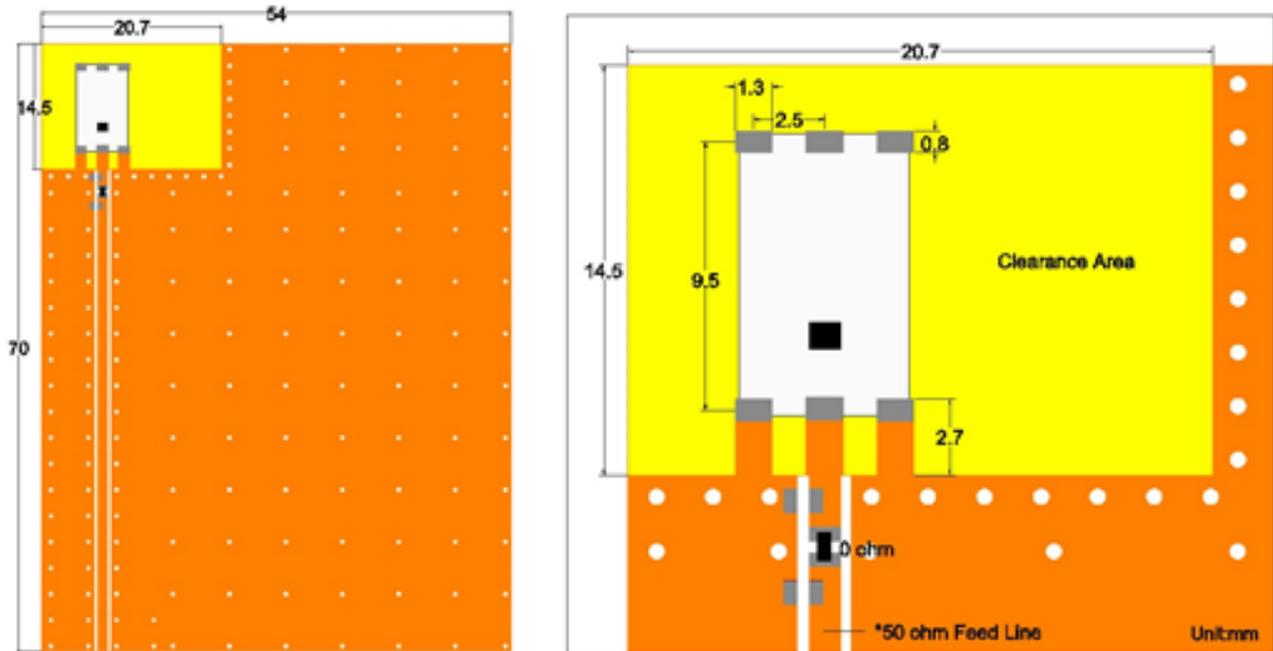
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Evaluation Board Outline & Matching Circuit

The evaluation board (<ABB7054T >) is developed to simplify antenna testing and evaluation. It has an arbitrary size of 70 x 54 mm. 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 antenna needs a matching circuit to adjust the resonant frequency balance. When delivered, the evaluation board is tuned for optimum balance at the LTE frequency bands using the following (can be replaced by equivalent):

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. This is further described in the General Implementation Guidelines section below.

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Reflow Profile [JEDEC J-STD-020]

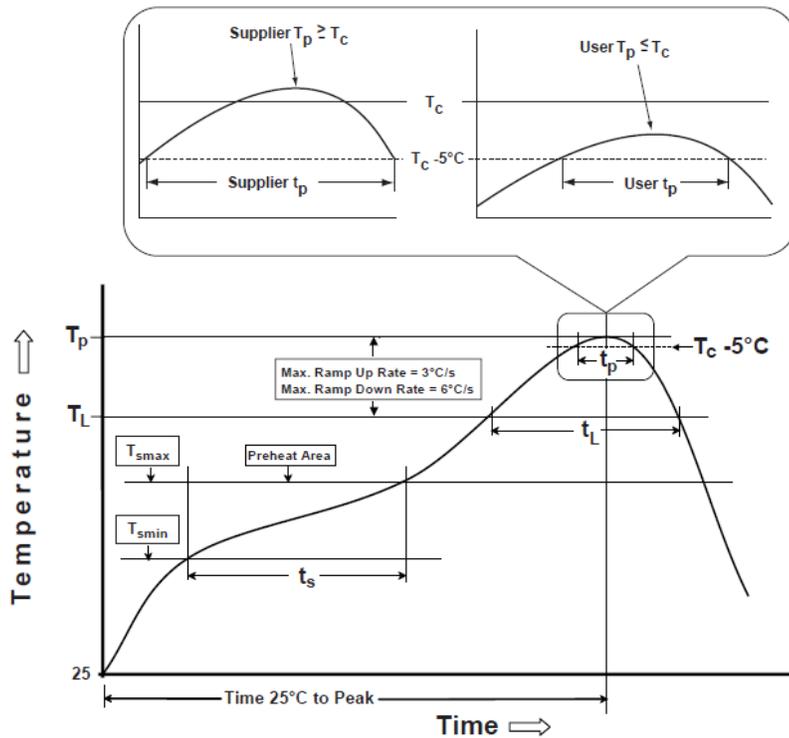


Table 1

SnPb Eutectic Process Classification Temperatures (T_c)		
Package Thickness	Volume mm^3 <350	Volume mm^3 ≥ 350
<2.5 mm	235 °C	220 °C
≥ 2.5 mm	220 °C	220 °C

Table 2

Pb-Free Process Classification Temperatures (T_c)			
Package Thickness	Volume mm^3 <350	Volume mm^3 350-2000	Volume mm^3 >2000
<1.6 mm	260 °C	260 °C	260 °C
1.6 mm - 2.5 mm	260 °C	250 °C	245 °C
>2.5 mm	250 °C	245 °C	245 °C

Profile Feature	Sn-Pb Eutectic Assembly	Pb-Free Assembly
Preheat / soak		
Temperature minimum (T_{smin})	100°C	150°C
Temperature maximum (T_{smax})	150°C	200°C
Time (T_{smin} to T_{smax}) (t_s)	60 - 120 sec.	60 - 120 sec.
Average ramp-up rate (T_{smax} to T_p)	3°C/sec. max	3°C/sec. max
Liquidous temperature (T_L)	183°C	217°C
Time at liquidous (t_L)	60 - 150 sec.	60 - 150 sec.
Peak package body temperature (T_p)*	see Table 1	see Table 2
Time (t_p)** within 5°C of the specified classification temperature (T_c)	20 sec.	30 sec.
Ramp-down rate (T_p to T_{smax})	6°C/sec. max	6°C/sec. max
Time 25°C to peak temperature	6 min. max	8 min. max
Reflow cycles	2 max	2 max

*Tolerance for peak profile temperature (T_p) is defined as a supplier minimum and a user maximum.

**Tolerance for time at peak profile temperature (t_p) is defined as supplier minimum and a user maximum.

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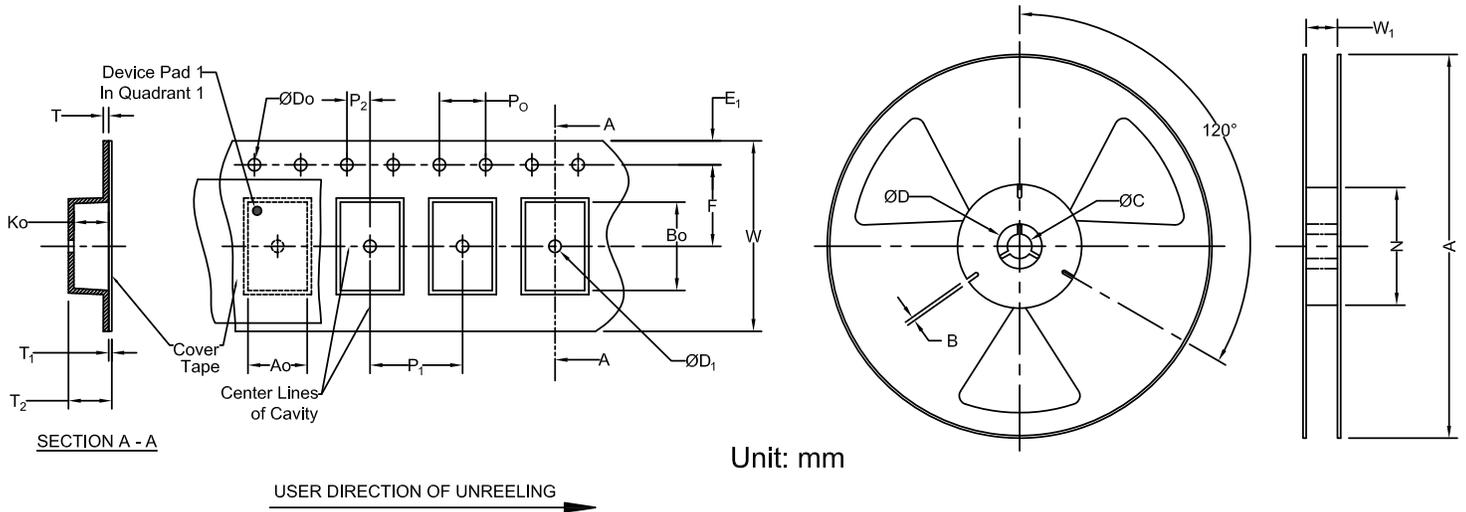
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Packaging

Tape & Reel Dimension



Carrier Tape Specifications (mm)

Do	K ₀	E ₁	P ₀	P ₂	T	F	P ₁	W	A ₀	B ₀	Reel Qty
1.50 ± 0.1	1.4 ± 0.1	1.75 ± 0.1	4.0 ± 0.1	2.0 ± 0.10	0.3 ± 0.05	7.5 ± 0.10	8.0 ± 0.1	16.0 ± 0.20	6.35 ± 0.2	10.35 ± 0.1	2,000

Reel Specifications (mm)

A	W ₁	N	B
330 ± 1.0	16.5 ± 0.2	100 ± 0.5	2.3 ± 0.2

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INTERNAL ONLY INFORMATION

1.0 Note

- i) The parts are manufactured in accordance with this specification. If other conditions and specifications which are required for this specification, please contact ABRACON for more information.
- ii) ABRACON will supply the parts in accordance with this specification unless we receive a written request to modify prior to an order placement.
- iii) In no case shall ABRACON be liable for any product failure from in appropriate handling or operation of the item beyond the scope of this specification.
- iv) When changing your production process, please notify ABRACON immediately.
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- vi) All specifications and Marking will be subject to change without notice.

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2. **Taxes:** Unless otherwise specified in the quotation, the prices do not include any taxes, import or export duties, tariffs, customs charges or any such other levies. Buyer agrees to reimburse AB the amount of any federal, state, county, municipal, or other taxes, duties, tariffs, or custom charges AB is required to pay. If Buyer is exempt from any such charges, Buyer must provide AB with appropriate documentation.
3. **Payment Terms:** For each shipment, AB will invoice Buyer for the price of the Products plus all applicable taxes, packaging, transportation, insurance and other charges. Unless otherwise stated in a separate agreement or in AB's quotation, payments are due within thirty (30) days from the date of invoice, subject to AB's approval of Buyer's credit application. All invoicing disputes must be submitted in writing to AB within ten (10) days of the receipt of the invoice accompanied by a reasonably detailed explanation of the dispute. Payment of the undisputed amounts shall be made timely. AB reserves the right to require



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payment in advance or C.O.D. and otherwise modified credit terms. When partial shipments are made, payments for such shipments shall become due in accordance with the above terms upon submission of invoices. If, at the request of Buyer, shipment is postponed for more than thirty (30) days, payment will become due thirty days after notice to Buyer that Products are ready for shipment. Any unpaid due amounts will be subject to interest at one decimal five percent (1.5%) per month, or, if less, the maximum rate allowed by law.

4. **Delivery and Shipment:** Shipment dates are estimates only. Failure to deliver by a specified date shall neither entitle Buyer to any compensation nor impose any liability on AB. AB reserves the right to ship and bill ten percent more or less than the exact quantity specified on the face hereof. All shipments will be made Ex Works as per Incoterms 2000 from AB's place of shipment. In the absence of specific instructions, AB will select the carrier. Claims against AB for shortages must be made in writing within ten (10) days after the arrival of the shipment. AB is not required to notify Buyer of the shipment. Buyer shall pay all freight charges, insurance and other shipping expenses. Freight charges, insurance and other shipping expenses itemized in advance of actual shipment, if any, are estimates only that are calculated on the basis of standard tariffs and may not reflect actual costs. Buyer must pay actual costs.
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7. **Packing:** Packaging shall be AB's standard shipping materials or as specified on the face hereof. Any cost of non-standard packaging and handling requested by Buyer shall be abided by AB provided Buyer gives reasonable prior notice and agrees in writing to pay additional costs.
8. **Security Interest:** Buyer hereby grants AB a purchase money security interest in the Products sold and in the proceeds of resale of such Products until such time as Buyer has paid all charges. AB retains all right and remedies available to AB under the Uniform Commercial Code.
9. **Specifications:** Specifications for each Product are the specifications specified in the published datasheets of such Product, as of the date of AB's quotation (the "Specifications"). Except as otherwise agreed, AB reserves the right to modify the Specifications at any time without adversely affecting the functionality.
10. **Acceptance:** Unless Buyer notifies AB in writing within ten (10) days from the date of receipt of Products that the Products fail to conform to the Specifications, the Products will be deemed accepted by Buyer. No such claim of non-conformity shall be valid if (i) the Products have been altered, modified or damaged by Buyer, (ii) the rejection notice fails to explain the non-conformance in reasonable detail and is not accompanied by a test report evidencing the non-conformity, or (iii) rejected Products are not returned to AB within thirty (30) days of rejection; provided, that no Product returns may be made without a return material authorization issued by AB.
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