

UWB: 3.3 – 7.2 GHz Chip Antenna



ACG0806U

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8.0 x 6.0 x 1.2mm
RoHS Compliant
MSL Level = 1

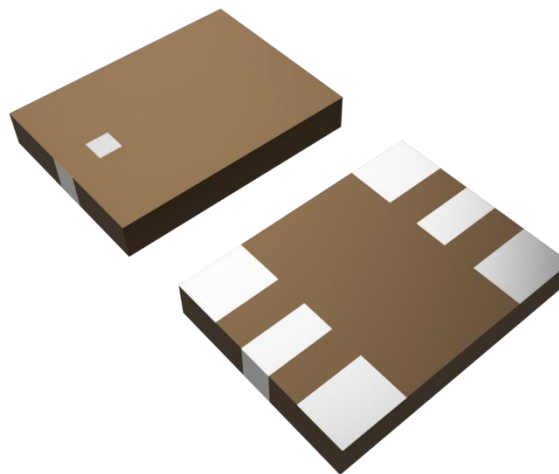
Features

- Frequency Range: 3.3-7.2 GHz
- Low Return Loss of: ≤ -15 dB
- Peak Gain: 6.0 dBi
- Average Total Efficiency: -1.2 dB (76%)
- Linear Polarization
- Surface Mount (SMD)
- Integration: PCB End Mount

Applications

- UWB Channels: (3.3-7.2 GHz)
- Real-Time Location Systems (RTLS)
- Secure Ranging (Two-Way, TDOA, etc.)
- Indoor Navigation
- Asset Tracking for Smart Homes & Mining
- Smart Access Control
- Secure Keyless Entry

Product Image



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Electrical Specifications

Parameters	Specifications		Unit
Standard	USA UWB Channel 1-4	USA UWB Channel 5-7	
Operating Frequency	3.25~5.25	6.25-7.0	GHz
VSWR	1.5	1.3	-
Peak Gain	5.0	6.0	dBi
Efficiency	80	76	%
Polarization	Linear		-
Azimuth Beam width	Omni-directional		-
Impedance	50		Ω
Max Power	5		W

Mechanical Specifications

Parameters	Specifications
Filter Dimension	8.0 x 6.0 x 1.2 mm
Evaluation board Dimension	23 x 13 mm
Mounting Type	Surface Mount
Mounting Location	PCB End Mount
Material Type	Ceramic

Environmental Specifications

Parameters	Specifications
Operating Temperature Range	-40 °C ~ +100 °C
Storage Temperature Range	-40 °C ~ +100 °C
MSL level	1
ESD	N/A
Temperature range	25±5 °C
Relative Humidity range	90 ~ 95 %

Ordering Information

Part Number	Description
ACG0806U	Antenna Component on Cut Tape
ACG0806U-T	Antenna Component on Tape & Reel
ACG0806U-EVB	Evaluation Kit



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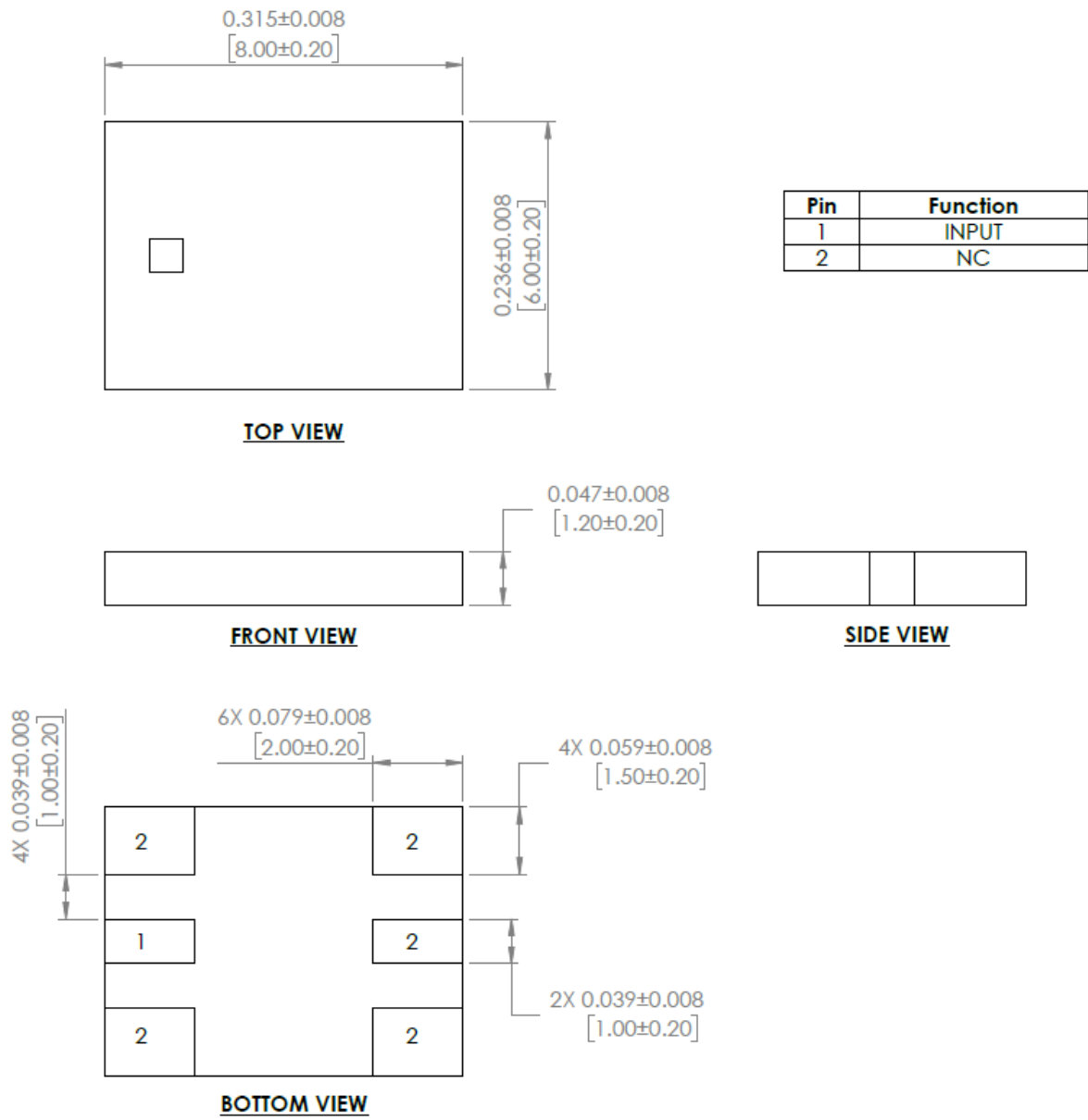
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Package Dimensions



Units: Inches[mm]

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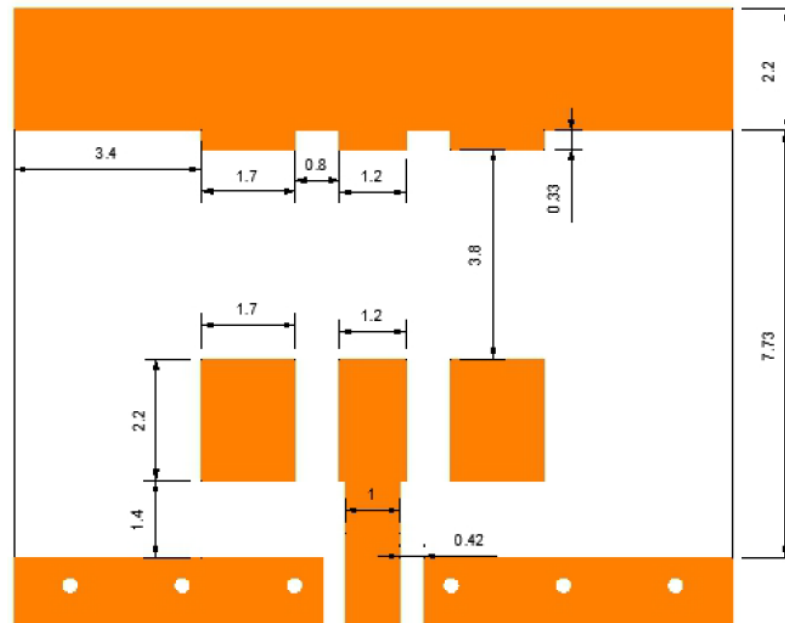


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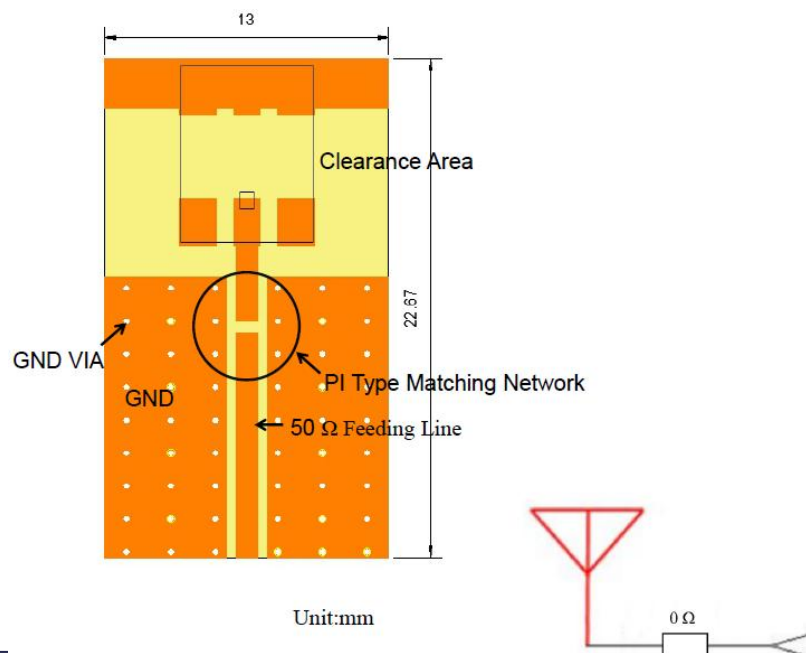
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Footprint



Unit:mm

Evaluation Board and Matching Circuits



Unit:mm

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Measurement Setup

The antenna measurements were all performed in free space with the antenna mounted on its evaluation board of size 13 x 23 mm, see image below.



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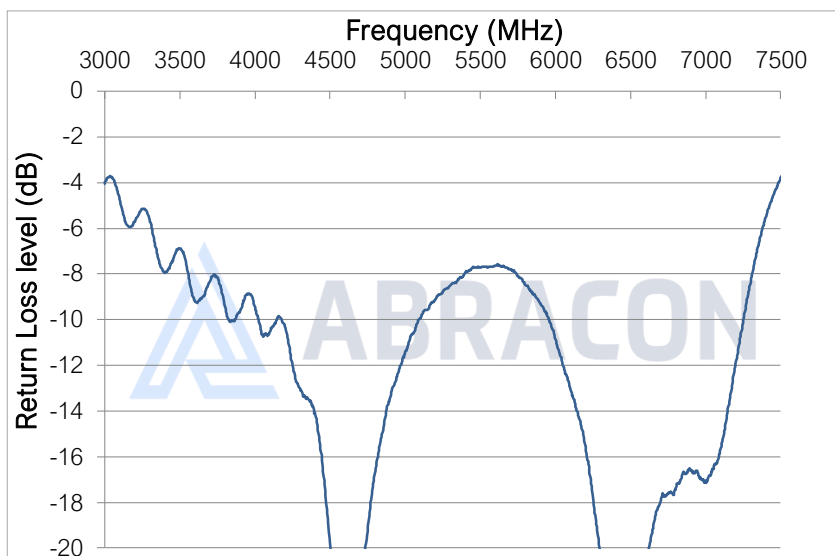
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Impedance Characteristics – Return Loss



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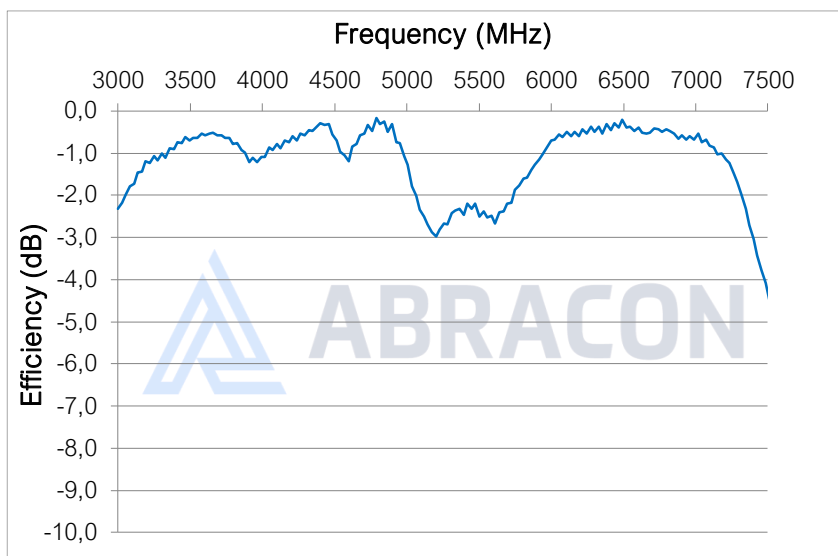


8.0 x 6.0 x 1.2mm

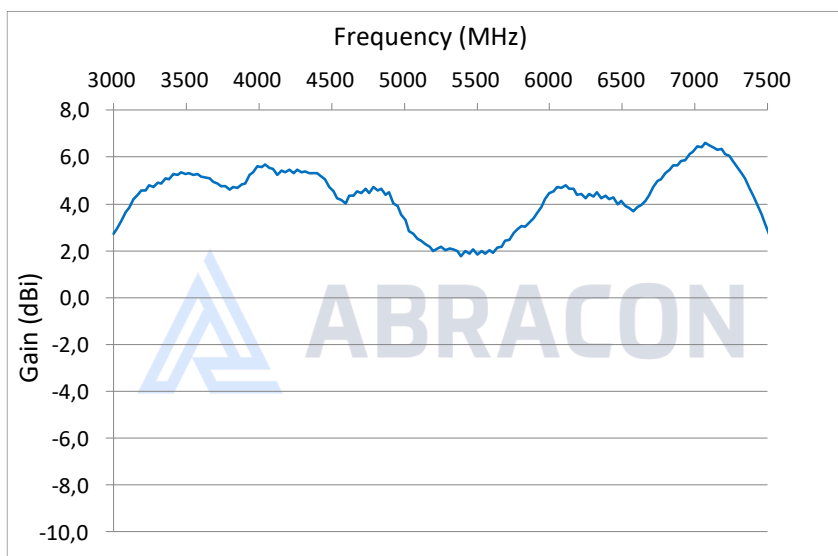
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Radiation Characteristics – Total Efficiency



Radiation Characteristics – Maximum Gain





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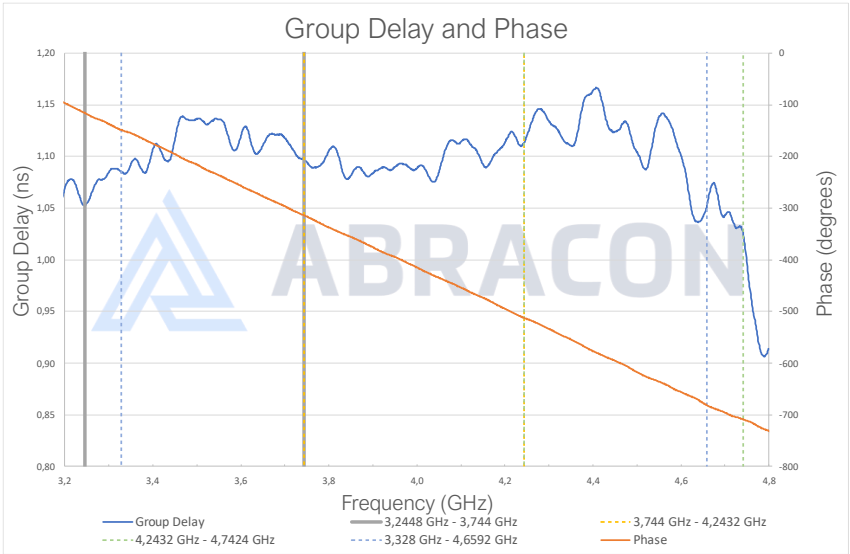
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8.0 x 6.0 x 1.2mm
RoHS Compliant
MSL Level = 1

Radiation Characteristics – Group Delay

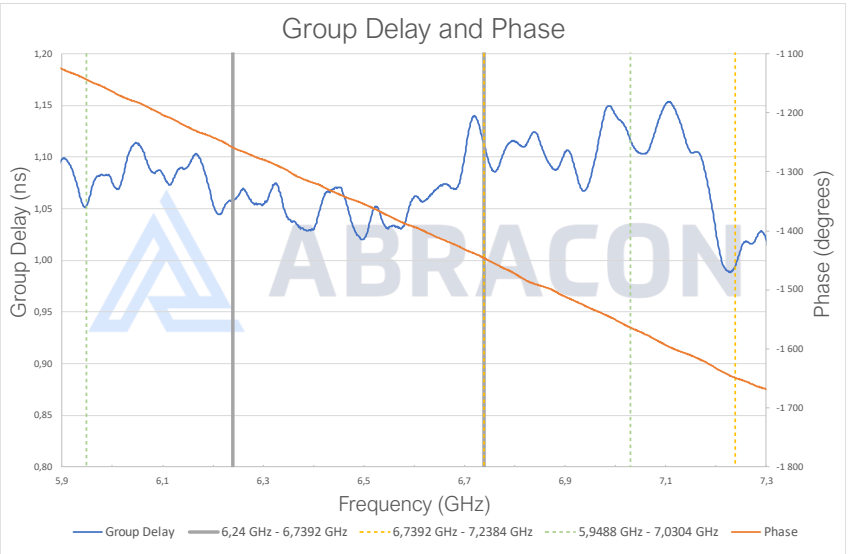
Two identical antennas were placed a distance d_{sep} apart in an anechoic chamber. The Group Delay, τ_{GD} , is then calculated from the transmission S-parameter (S12) by $\tau_{GD} = -\frac{1}{2\pi\Delta f} \frac{\Delta\phi}{\Delta f}$, where $\Delta\phi$ is the change of phase over an aperture Δf . The maximum variation in group delay per channel, $\Delta_{max}\tau_{GD}$, can be found in the table below.



Used Parameters	
Distance d_{sep} (cm)	Aperture Δf (MHz)
50	220

Maximum Group Delay Variation

UWB Ch.	Freq. Low (GHz)	Freq. High (GHz)	$\max\tau_{GD}$ (ps)
1	3,2448	3,744	86
2	3,744	4,2432	49
3	4,2432	4,7424	146
4	3,328	4,6592	130



Used Parameters	
Distance d_{sep} (cm)	Aperture Δf (MHz)
50	220

Maximum Group Delay Variation

UWB Ch.	Freq. Low (GHz)	Freq. High (GHz)	$\max\tau_{GD}$ (ps)
5	6,24	6,7392	120
6	6,7392	7,2384	165
7	5,9488	7,0304	130



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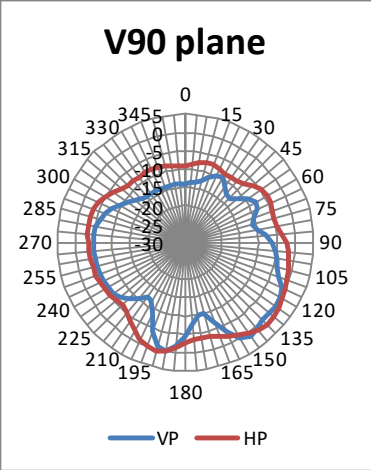
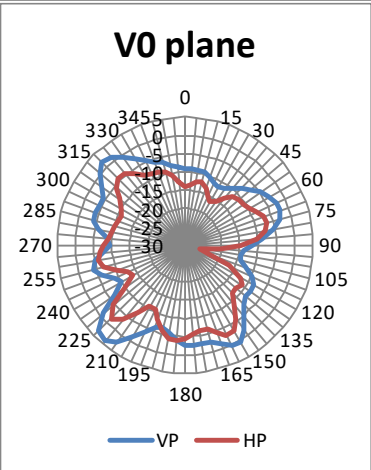
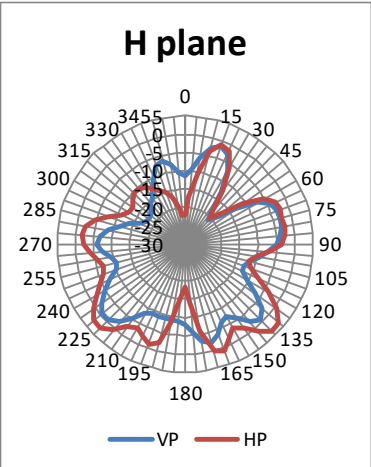


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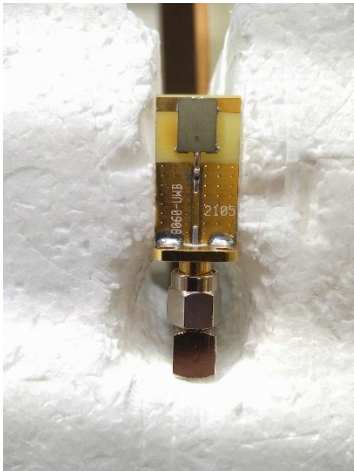


8.0 x 6.0 x 1.2mm
RoHS Compliant
MSL Level = 1

Radiation Characteristics – 2D Pattern (7.24 GHz)



VP: Vertical Polarization
HP: Horizontal Polarization



Unit: dBi



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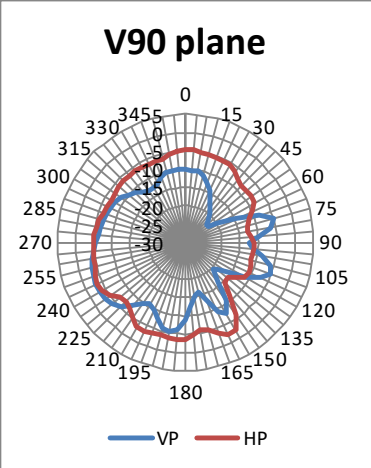
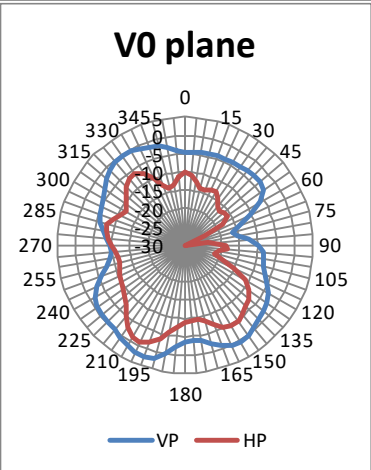
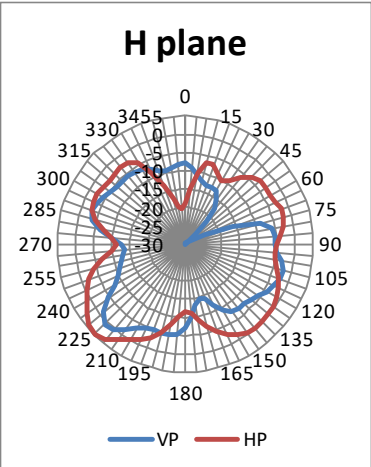


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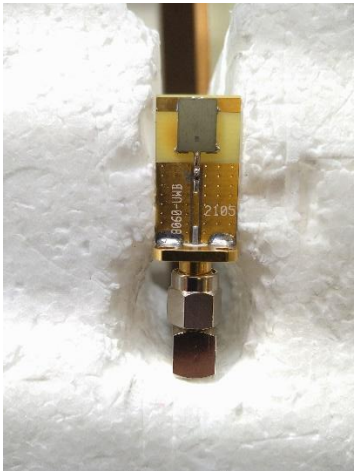


8.0 x 6.0 x 1.2mm
RoHS Compliant
MSL Level = 1

Radiation Characteristics – 2D Pattern (6.0 GHz)



VP: Vertical Polarization
HP: Horizontal Polarization



Unit: dBi



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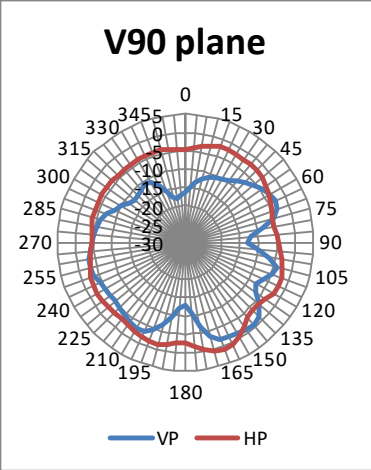
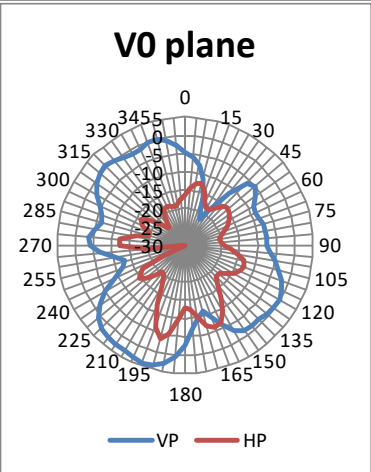
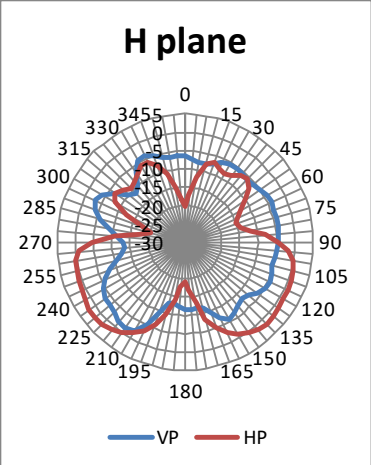


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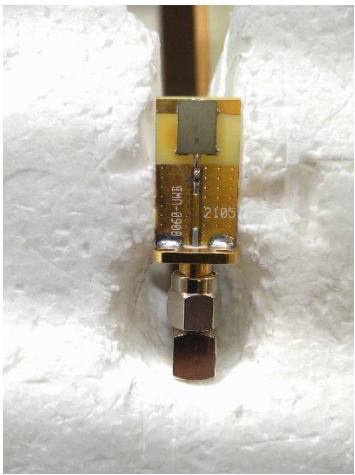


8.0 x 6.0 x 1.2mm
RoHS Compliant
MSL Level = 1

Radiation Characteristics – 2D Pattern (4.24 GHz)



VP: Vertical Polarization
HP: Horizontal Polarization



Unit: dBi



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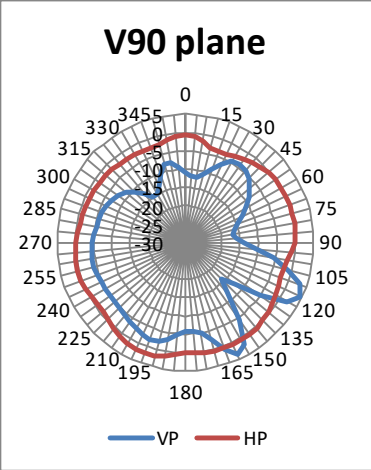
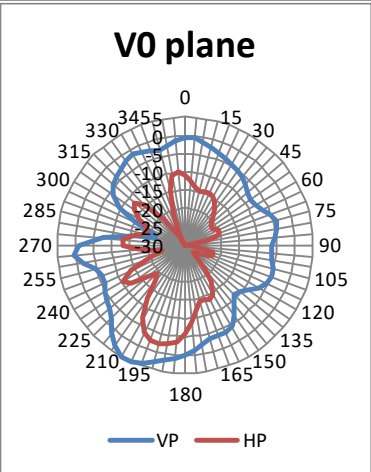
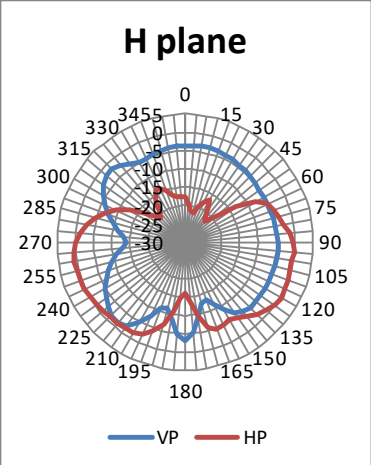


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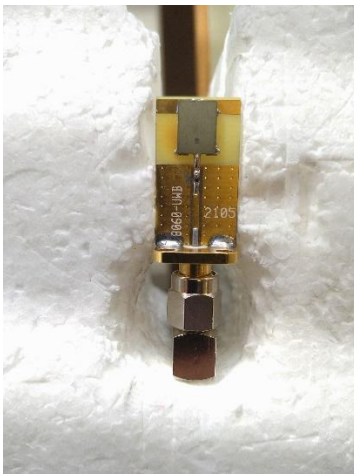


8.0 x 6.0 x 1.2mm
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Radiation Characteristics – 2D Pattern (3.25 GHz)



VP: Vertical Polarization
HP: Horizontal Polarization



Unit: dBi



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Reflow Profile [JEDEC J-STD-020]

Solder paste: Sn/3.0Ag/0.5Cu

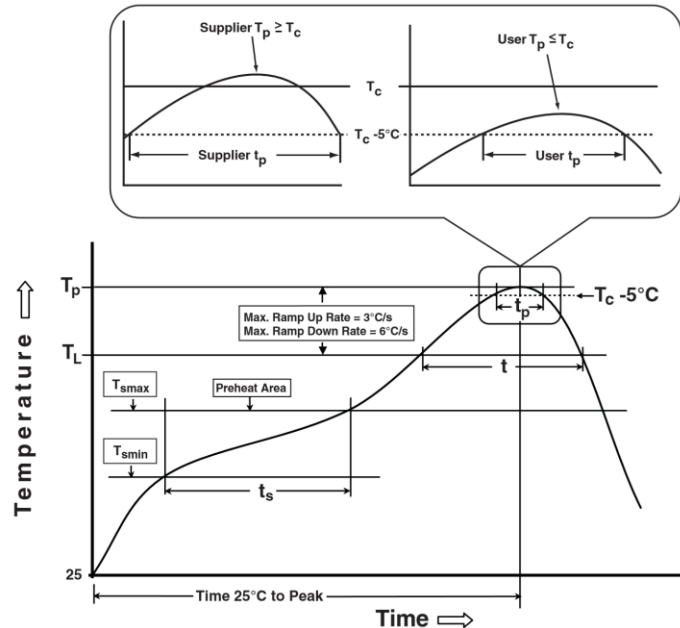


Table 1

SnPb Eutectic Process Classification Temperatures (T_c)

Package Thickness	Volume mm ³ <350	Volume mm ³ ≥350
<2.5mm	235°C	220°C
≥2.5mm	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
<1.6mm	260°C	260°C	260°C
1.6mm - 2.5mm	260°C	250°C	245°C
>2.5mm	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 – 90 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.	10 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 a supplier minimum and a user maximum.



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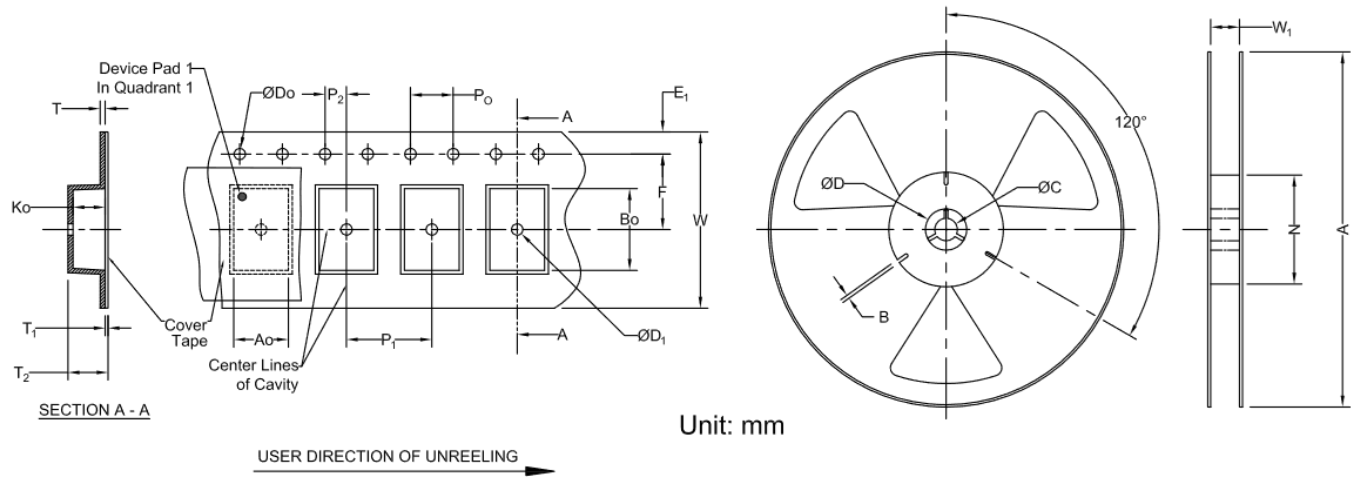
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Packaging

Tape & Reel dimensions:



Carrier Tape Specifications (mm)

D0	K0	E1	P0	T	F	P1	W	A0	B0	Reel Qty
1.50 ± 0.1	1.45 ± 0.1	1.75 ± 0.1	4.0 ± 0.1	0.25 ± 0.05	7.5 ± 0.1	8.0 ± 0.1	16.0 ± 0.2	6.2 ± 0.1	8.2 ± 0.1	1,500

Reel Specifications (mm)

A	W1	N	C
178 ± 2.0	18.0 +1.0/-1.5	60 ± 1.0	13 ± 0.5

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