

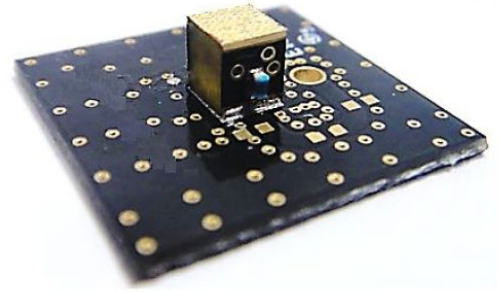
Features

- No ground clearance requirement
- Stable and reliable performances
- Vertical Polarization
- SMT processes compatible
- Ideal for hearing aid applications*
- RoHS Complaint

Applications

- Wireless earbuds
- Wearable device
- ISM 2.4 GHz
- ZigBee / BLE

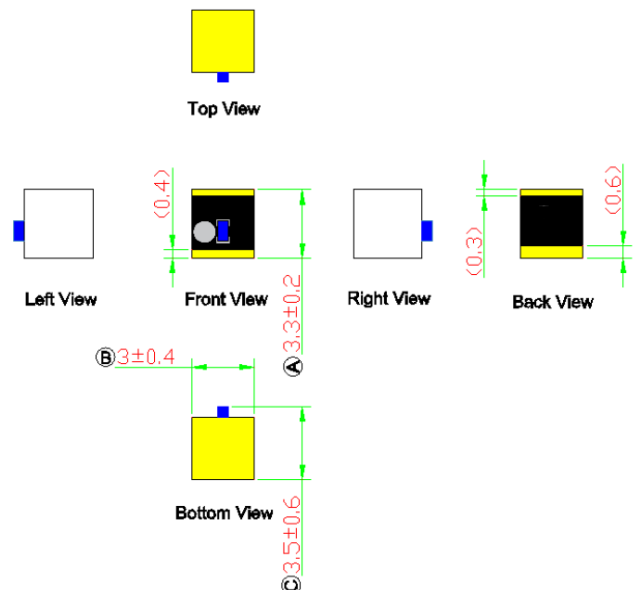
Specifications

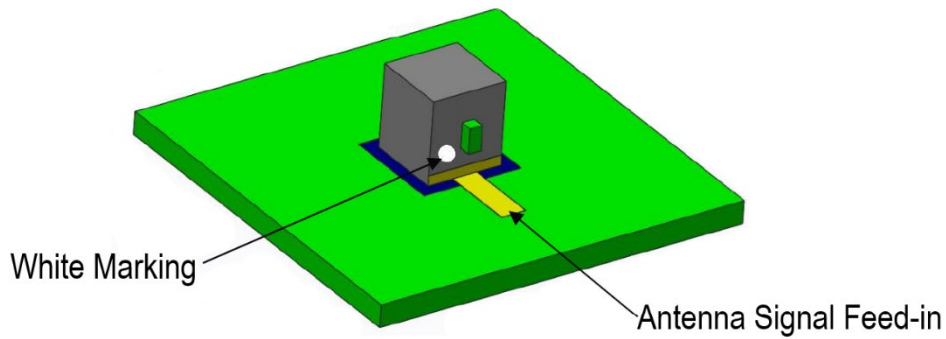


Electrical	
Frequency Range	2400 ~ 2500MHz
Center Frequency	2442 MHz
Peak Gain @ CF	-0.4 dBi typ.
Efficiency @ CF	25.6% typ.
V.S.W.R @ CF	2 Max.
Impedance	50Ω
Polarization	Vertical
Dimensions (mm):	
Body Length	3.0 ± 0.4
Width	3.0 ± 0.4
Height	3.3 ± 0.2
Connection Type	SMT
Ground Plane	15 mm x 15 mm

*- Less interference from human body shadowing effects

NAN-C P 1B 303033 A F
 F = RoHS compliant
 A = Version Code (See page 10)
 303033 = Size (3.0 x 3.0 x 3.3 mm)
 1B = One Frequency Bands
 P = Pillar Antenna
 NAN-C = Series

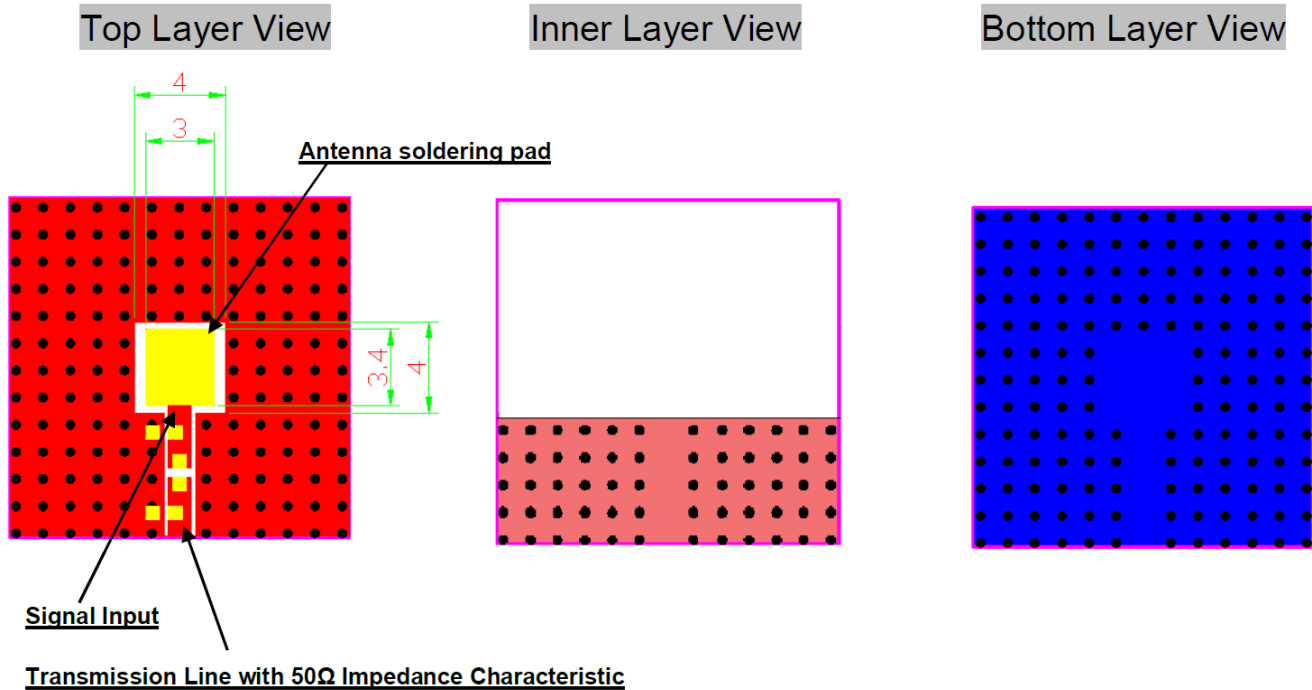


Signal Feed-in Direction**Operating & Storage Conditions**

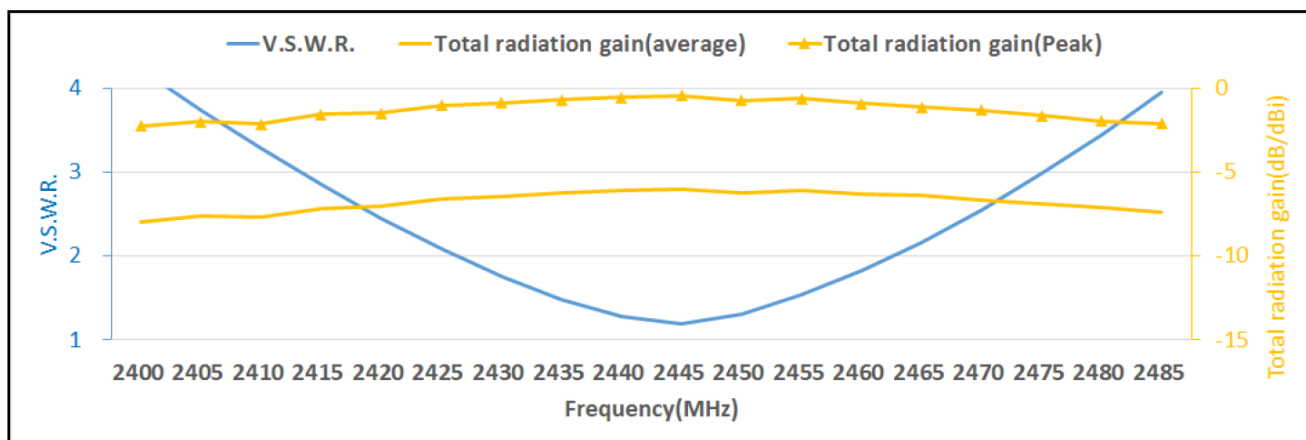
Operating	
Maximum Input Power	2W
Operating Temperature	-40°C to 85°C
Relative Humidity	10% to 75%
Storage (Sealed)	
Storage Temperature	-5°C to 40°C
Relative Humidity	20% to 75%
Shelf Life	1 Year
Storage (Unsealed)	
Meets Criteria	J-STD-033 MSL2a
Storage (After mounted on customer's PCB with SMT process)	
Storage Temperature:	-40°C to 85°C
Relative Humidity	10% to 75%

Solder Ground Pattern

The gold areas represent the solder land pattern. Any recommendations on the matching circuit will be provided according to the customer's installation conditions.

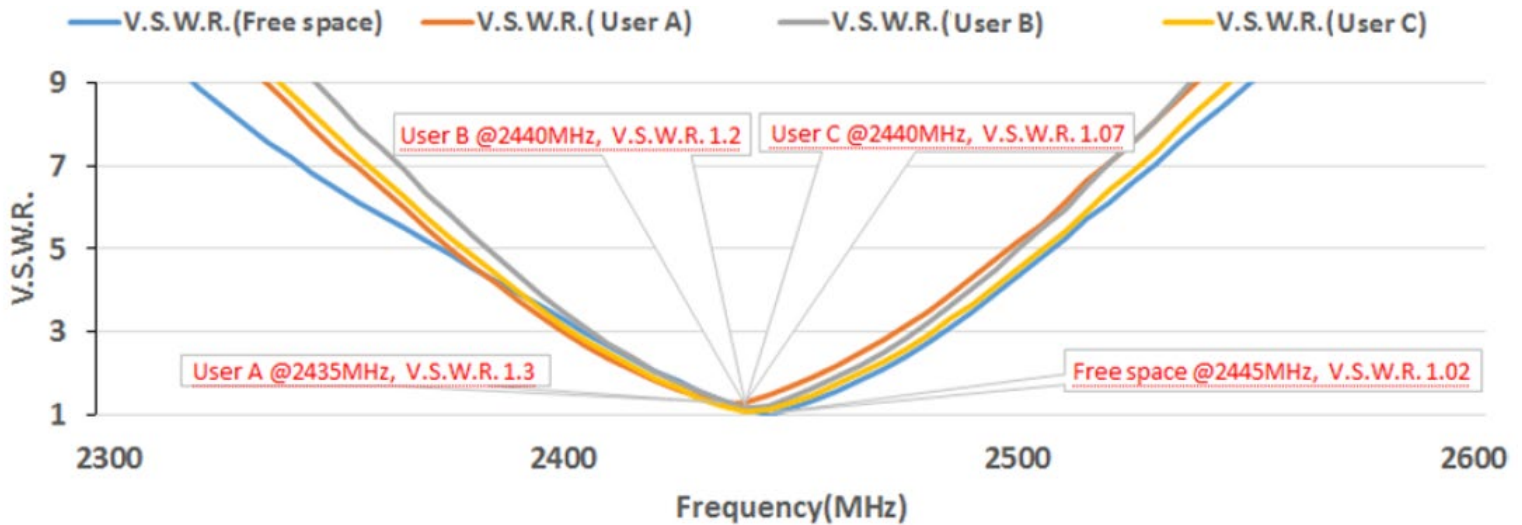


Frequency vs. V.S.W.R. and Total Radiation Gain

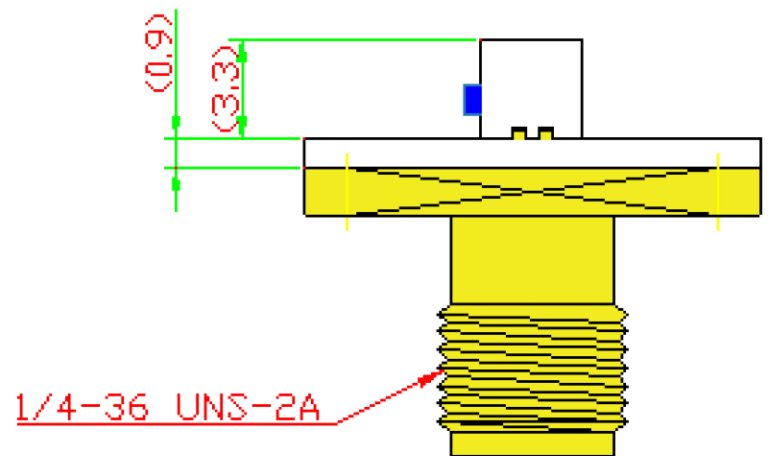
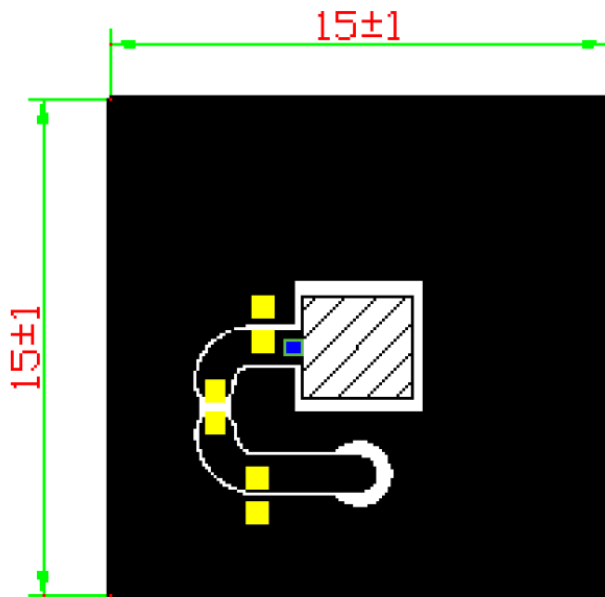


The Effects of Human Body Influence on Resonate Frequency and VSWR

- This pillar antenna shows lower VSWR, and more consistent performance compared to a monopole antenna.

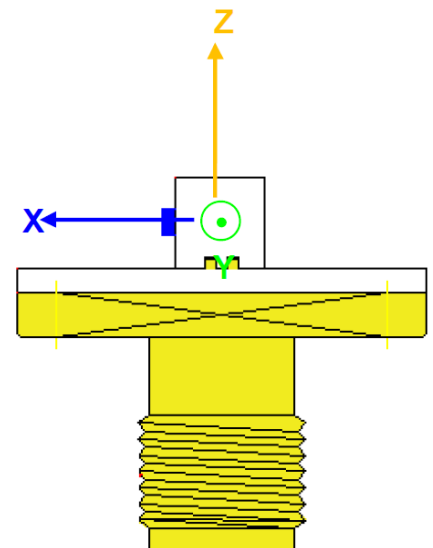
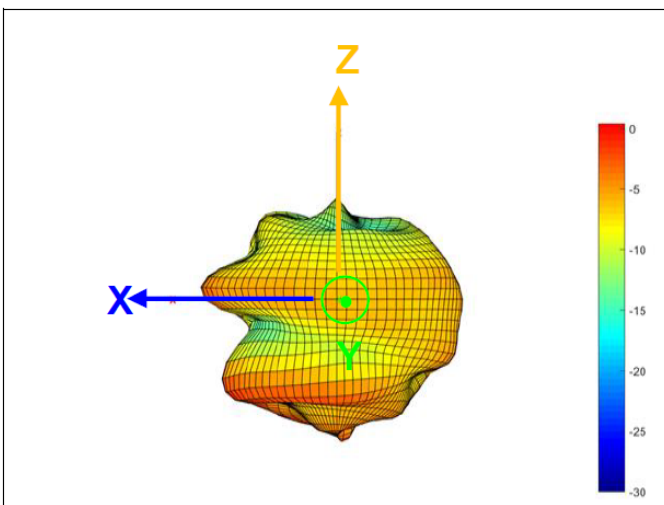
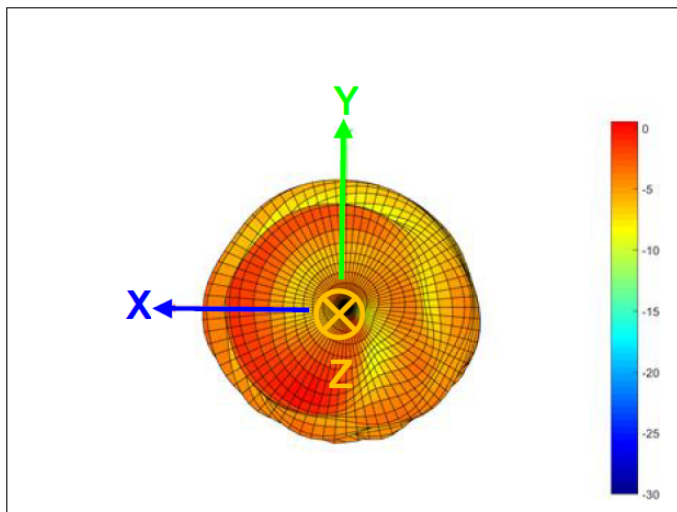
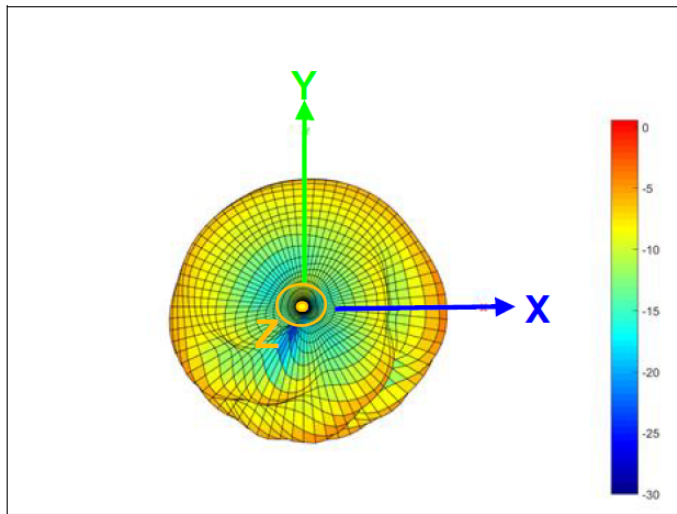


Evaluation Board with Antenna



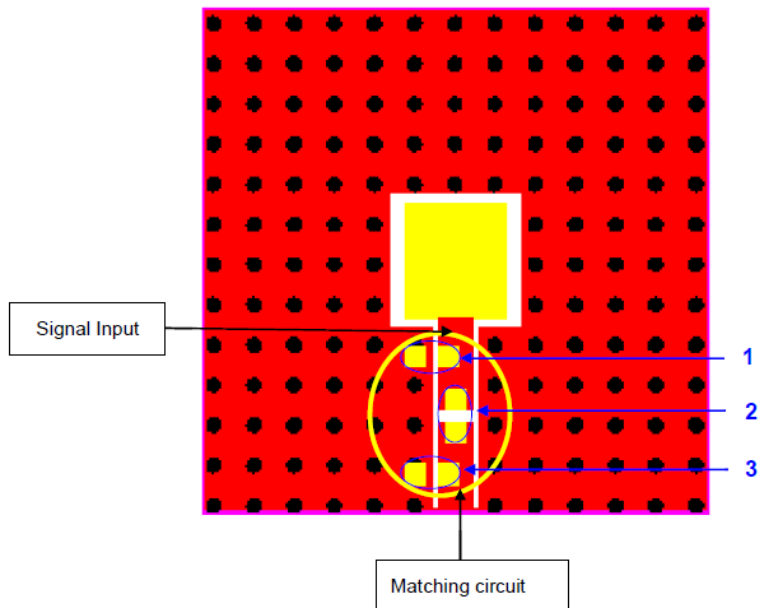
3D Radiation Gain Pattern

3D Radiation Gain Pattern @ 2442 MHz (unit: dBi)



Frequency tuning and Matching circuit

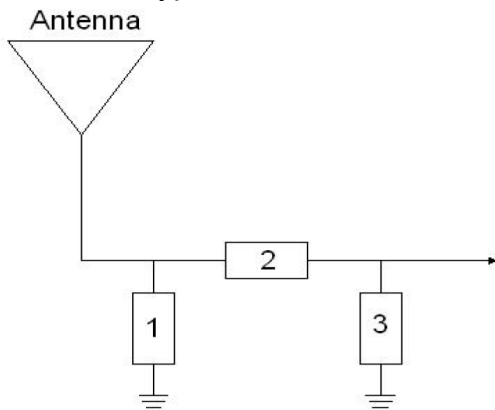
Chip antenna tuning scenario :



Matching circuit :

The center frequency will be about 2442 MHz at the standard 15 x 15 mm evaluation board, with the following recommended values of matching and tuning components. *

* = These are typical reference values

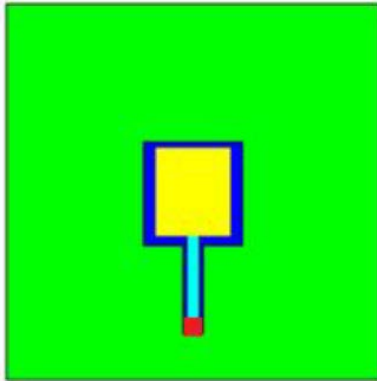


System Matching Circuit Components				
Location	Description	Tolerance	Vendor	Part #
1	1.8nH, (0201)	±0.1	NIC	NML-HQ02B1N8TR650F
2	4.7nH, (0201)	±0.1	NIC	NML-HQ02B4N7TR350F
3	N/A	-	-	N/A

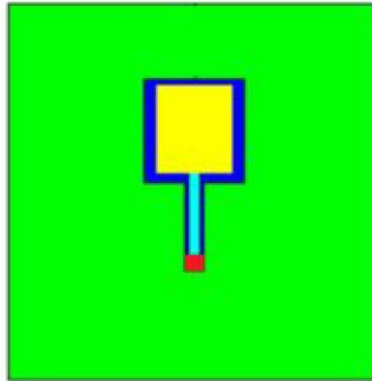
Typical Efficiency Values @ 2442 MHz for Various Placements

The below typical efficiency value represented antenna's performance when antenna was installed at various placements on the evaluation board which has no ground clearance on opposite side

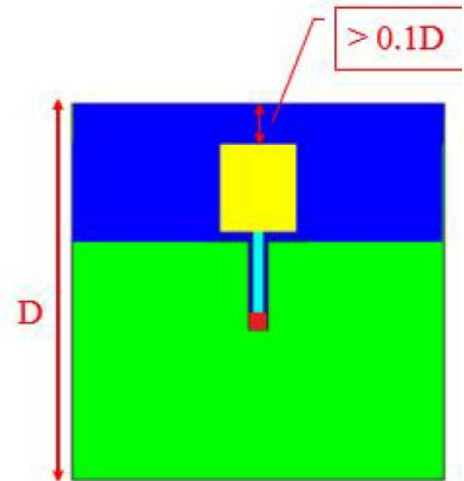
Placement A



Placement B



Placement C



Placement	Efficiency (%)	Recommended scenario of installation
A	25.6*	IoT, ISM, BLE, ZigBee device
B	29.4*	
C	36.2*	Wireless earbud, smart watch

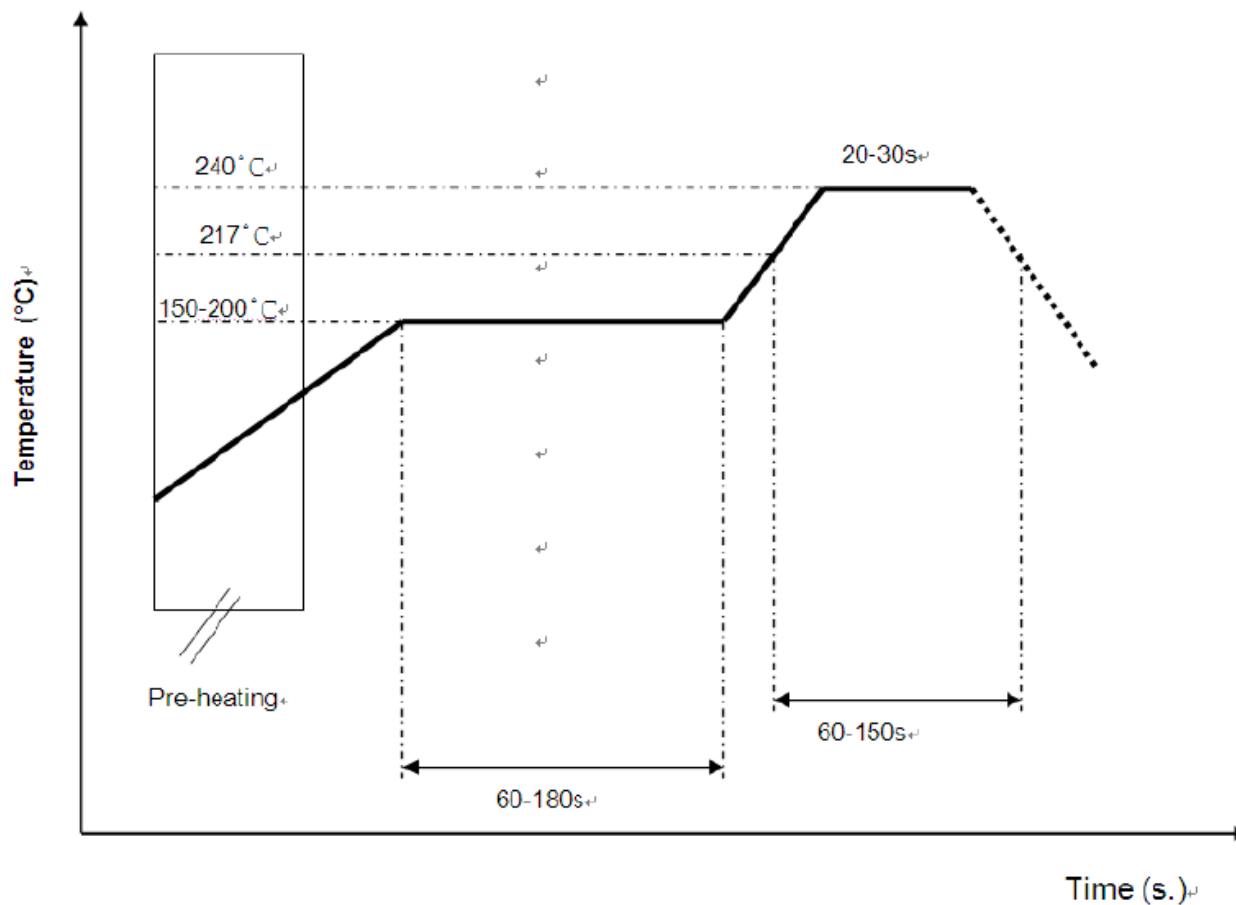
*Measured with a 15x15 mm evaluation board.

For placement A & B, the antenna is polarized in vertical polarization. We encourage you to use antenna for this placement when antenna is installed on a PCB which is not available to have antenna ground clearance, i.e. IoT, ISM, BLE, ZigBee devices, etc. where metal/battery/display covers entire area of opposite side of PCB.

For placement C, we encourage you to use antenna for this placement when antenna is installed in wearable devices, i.e. wireless earbud, smart watch, etc.

Soldering Conditions

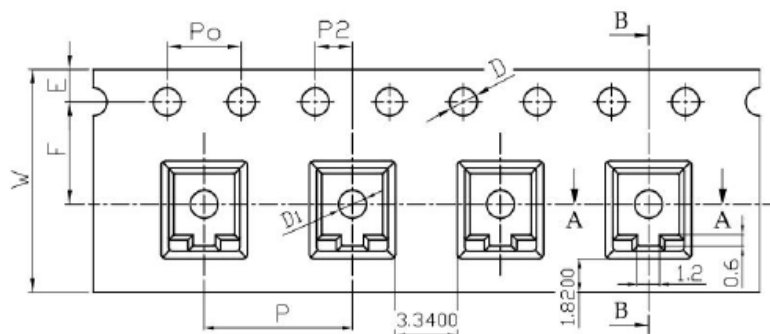
Typical Soldering Profile for Lead-free Process



Packing

- (1) Quantity/Reel: 2000 pcs/Reel
- (2) Plastic tape: Black conductive polystyrene.

a. Tape Drawing



b. Tape Dimensions (unit: mm)

Feature	Specifications	Tolerances
W	12.00	±0.30
P	8.00	±0.10
E	1.75	±0.10
F	5.50	±0.10
P2	2.00	±0.10
D	1.50	+0.10 -0.00
D1	1.50	±0.10
Po	4.00	±0.10
10Po	40.00	±0.20

Version History and Status

Version	Date Issued	Details	Status
A	July 22 nd 2021	Initial Release	Supported

Please reach out to NIC for any customization requests and other inquiries:

- NIC Technical Support: tpmg@niccomp.com
- Compliance Support: rohs@niccomp.com