# SPECIFICATIONS

| | |
|---|---|
| **Customer** | |
| **Product Name** | **Chip Antenna** |
| **GP Part Number** | **GPDA52-2R540G-S1TF** |
| **Customer Part Number** | |

**[☒New Released, ☐Revised]** **SPEC No.: GPDA04150000**

**【This SPEC is total 8 pages including specifications and appendix.】**

**【ROHS Compliant Parts】**

| Approved By | Checked By | Issued By |
|---|---|---|
| | | |

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**【For Customer approval Only】** Date:_____

Qualification Status: Full Restricted Rejected

| Approved By | Verified By | Re-checked By | Checked By |
|---|---|---|---|
| | | | |

Comments:

【Version change history】

| Rev. | Effective Date | Changed Contents | Change reasons | Approved By |
|---|---|---|---|---|
| 01 | / | New release | / | Hai Guo |
| | | | I | |

**Specifications for Chip Antenna**

## 1. Scope

This specification applies to GPDA52-2R540G-S1TF of Multi-layer Chip Antenna.

## 2. Product Description and Identification (Part Number)

1) Description:

Multi-layer Chip Antenna

2) Product Identification (Part Number)

GPDA ① 52 ② -2R540G ③ -S1 ④ T ⑤ F ⑥

| ① Type | |
|---|---|
| GPDA | Multilayer Chip Antenna |

| ② External Dimensions (L×W) (mm) | |
|---|---|
| 52 | 5.2×2.1 |

| ③ Center Frequency | |
|---|---|
| 2R540G | 2540.0MHz |

| ④ Series Code |
|---|
| S1 |

| ⑤ Packing | |
|---|---|
| T | Tape Carrier Package |

| ⑥ Hazardous Substance Free Products |
|---|
| F |

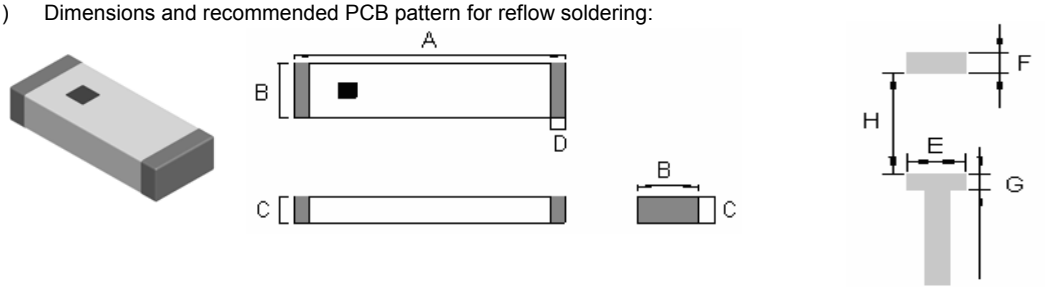
## 3. Electrical Characteristics

| Part Number | Band Width | Peak Gain | Average Gain | VSWR | Impedance | Power Capacity |
|---|---|---|---|---|---|---|
| | MHz | V-XZ | V-XZ | In BW | Ω | W |
| GPDA52-2R540G-S1 | ≥200 | 2.5 dBi typ. | 0.5 dBi typ | < 2 | 50 | 3 W max |

1) Operating and storage temperature range (individual chip without packing): -40℃ ~ +85℃.
2) Storage temperature range (packaging conditions): -10℃ ~ +40℃ and RH 70% (Max.).
3) Test equipment: Network Analyzer: HP8719ES.
4) Measuring diagram, see appendix 1.

## 4. Shape and Dimensions

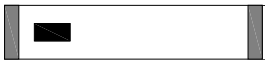
1) Dimensions and recommended PCB pattern for reflow soldering:




Unit: mm

| | A | B | C | D. | E | F | G | H |
|---|---|---|---|---|---|---|---|---|
| GPDA52 | 5.2±0.2 | 2.1±0.2 | 1.0±0.2 | 0.5±0.2 | 2.0±0.2 | 1.5±0.2 | 1.0±0.2 | 4.0±0.2 |

2) Terminal Configuration:

(1)  (2)

| No. | Terminal Name | No. | Terminal Name |
|---|---|---|---|
| (1) | Feeding Point | (2) | NC |

## 5. Test and Measurement Procedures

### 5.1 Test Conditions

Unless otherwise specified, the standard atmospheric conditions for measurement/test as:

a. Ambient Temperature: 20±15℃
b. Relative Humidity: 65±20%
c. Air Pressure: 86 Pa to 106KPa

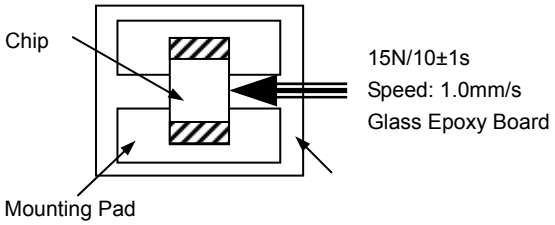
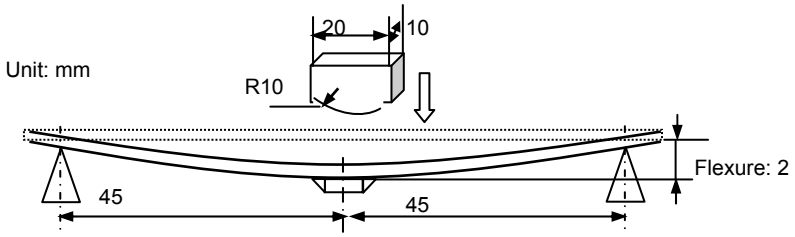
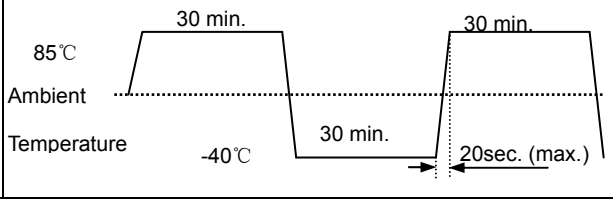
If any doubt on the results, measurements/tests should be made within the following limits:

a. Ambient Temperature: 20±2℃
b. Relative Humidity: 65±5%
c. Air Pressure: 86KPa to 106KPa

### 5.2 Visual Examination

a. Inspection Equipment: 20 X magnifier

**5.3 Reliability Test**

| Items | Requirements | Test Methods and Remarks |
|---|---|---|
| 5.3.1<br>Terminal Strength | No visible mechanical damage. | ① Solder the inductor to the testing jig (glass epoxy board shown as the following figure) using eutectic solder. Then apply a force in the direction of the arrow.<br>② 15N force for 5020 series.<br>③ Keep time: 10±1sec.<br>  <br> |
| 5.3.2<br>Resistance to Flexure | No visible mechanical damage. | ① Solder the chip to the test jig (glass epoxy board) using a eutectic solder. Then apply a force in the direction shown as the following figure. Solder the chip to the test jig (glass epoxy board) using eutectic solder. Then apply a force in the direction.<br>② Flexure: 2mm<br>③ Pressurizing Speed: 0.5mm/sec<br>④ Keep time: ≥30 sec |
| |  <br> | |
| 5.3.3<br>Dropping | No visible mechanical damage. | Drop the chip 5 times on a wood floor from a height of 50 cm. |
| 5.3.4<br>Solderability | ① No visible mechanical damage.<br>② Wetting shall be exceeded 75% coverage. | ① Solder temperature: 240±2℃<br>② Duration: 3sec<br>③ Solder: Sn/3.0Ag/0.5Cu<br>④ Flux: 25% Resin and 75% ethanol in weight |
| 5.3.5<br>Resistance to Soldering Heat | No visible mechanical damage. | ① Solder temperature: 260±5℃<br>② Duration: 5 sec<br>③ Solder: Sn/3.0Ag/0.5Cu<br>④ Flux: 25% Resin and 75% ethanol in weight<br>⑤ The chip shall be stabilized at normal condition for 1~2 hours before measuring. |
| 5.3.6<br>Thermal Shock | ① No visible mechanical damage.<br>② Satisfy electrical Characteristic. | ① Temperature and time: -40℃ for 30±3 min→85℃ for 30±3min<br>② Transforming interval: Max. 20 sec.<br>③ Tested cycle: 10 cycles.<br>④ The chip shall be stabilized at normal condition for 1~2 hours before measuring.<br>  <br> |

| | | |
|---|---|---|
| 5.3.7<br>Damp Heat<br>(Steady States) | ① No visible mechanical damage.<br>② Satisfy electrical Characteristic. | ① Temperature: 60±2℃<br>② Humidity: 90% to 95% RH<br>③ Duration: $96^{+24}$ hours<br>④ The chip shall be stabilized at normal condition for 1~2 hours before measuring. |
| 5.3.8<br>Resistance to High temperature | ① No visible mechanical damage.<br>② Satisfy electrical Characteristic. | ① Temperature: 85±2℃<br>② Duration: $96^{+24}$ hours<br>③ The chip shall be stabilized at normal condition for 1~2 hours before measuring. |

## 6. Packaging and Storage

### 6.1 Packaging

There is one type of packaging for the Multi-layer Chip Antennas. Please specify the packing code when ordering.

6.1.1 Tape Carrier Packaging:

Packaging code: T

a. Tape carrier packaging are specified in attached figure **Fig. 6.1-1~3**

b. Tape carrier packaging quantity please see the following table:

| | |
|---|---|
| Type | 5020 |
| Tape | Embossed Tape |
| Quantity | 4K |

(1) Taping Drawings (Unit: mm)

Embossed Tape

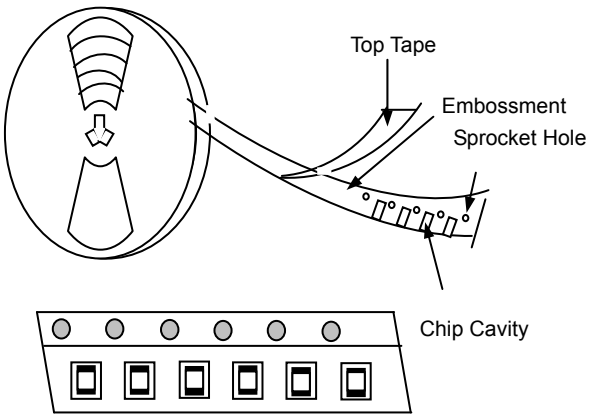



**Fig. 6.1-1**

**Remark:** The sprocket holes are to the right as the tape is pulled toward the user.

(2) Taping Dimensions (Unit: mm)

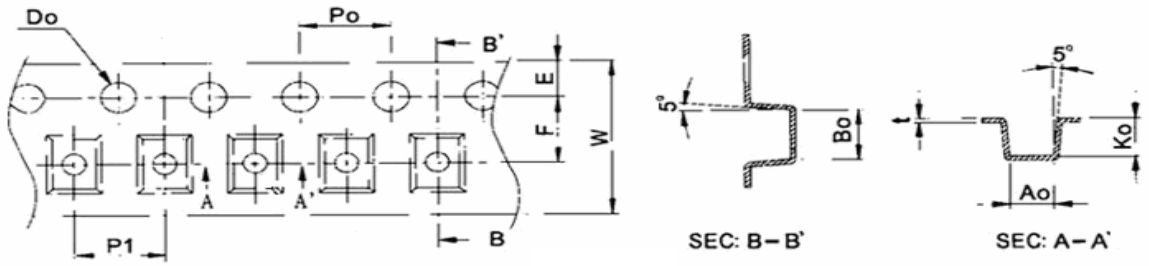
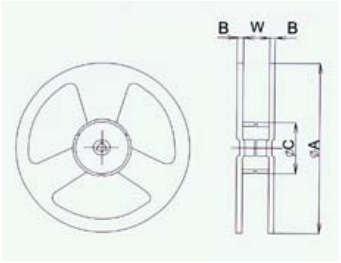



**Fig. 6.1-2**

| Type | W | P1 | E | F | D0 | P0 | K0 | A0 | B0 | t |
|---|---|---|---|---|---|---|---|---|---|---|
| Tolerance | ±0.1 | ±0.1 | ±0.1 | ±0.15 | +0.1/ -0.0 | ±0.1 | ±0.1 | ±0.1 | ±0.1 | ±0.05 |
| GPDA52 | 12.0 | 8.00 | 1.75 | 5.5 | 1.5 | 4.0 | 1.20 | 2.35 | 5.50 | 0.3 |

(3) Reel Dimensions (Unit: mm)




| Type | Spec. | Dimensions(mm) | | | |
|---|---|---|---|---|---|
| | | A | W | C | B |
| GPDA52 | 13"*12mm | 330±1 | 12.5±0.2 | 100±0.5 | 2.3±0.2 |

**Fig. 6.1-3**

**6.2 Storage**

a. The solderability of the external electrode may be deteriorated if packages are stored where they are exposed to high humidity. Package must be stored at 40℃ or less and 70% RH or less.

b. The solderability of the external electrode may be deteriorated if packages are stored where they are exposed to dust of harmful gas (e.g. HCl, sulfurous gas of $H_2S$).

c. Packaging material may be deformed if package are stored where they are exposed to heat of direct sunlight.

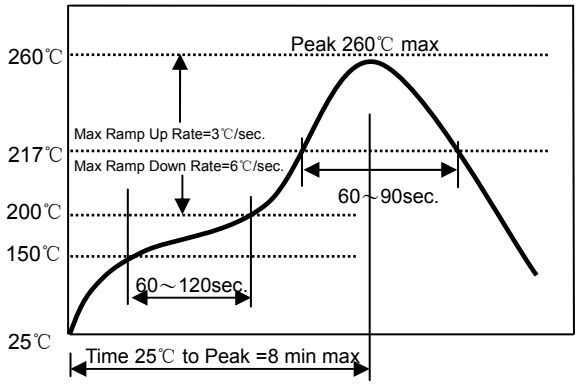
d. Solderability specified in **Clause 5.3.5** shall be guaranteed for 12 months from the date of delivery on condition that they are stored at the environment specified in **Clause 3**. For those parts, which passed more than 12 months shall be checked solder-ability before use.

## 7. Recommended Soldering Technologies

### 7.1 Reflow Profile

△ Preheat condition: 150 ~200℃/60~120sec.
△ Allowed time above 217℃: 60~90sec.
△ Max temp: 260℃
△ Max time at max temp: 10sec.
△ Solder paste: Sn/3.0Ag/0.5Cu
△ Allowed Reflow time: 2x max

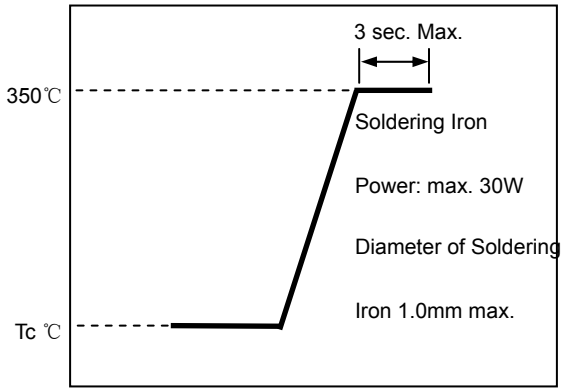
[Note: The reflow profile in the above table is only for qualification and is not meant to specify board assembly profiles. Actual board assembly profiles must be based on the customer's specific board design, solder paste and process, and should not exceed the parameters as the Reflow profile shows.]




### 7.2 Iron Soldering Profile

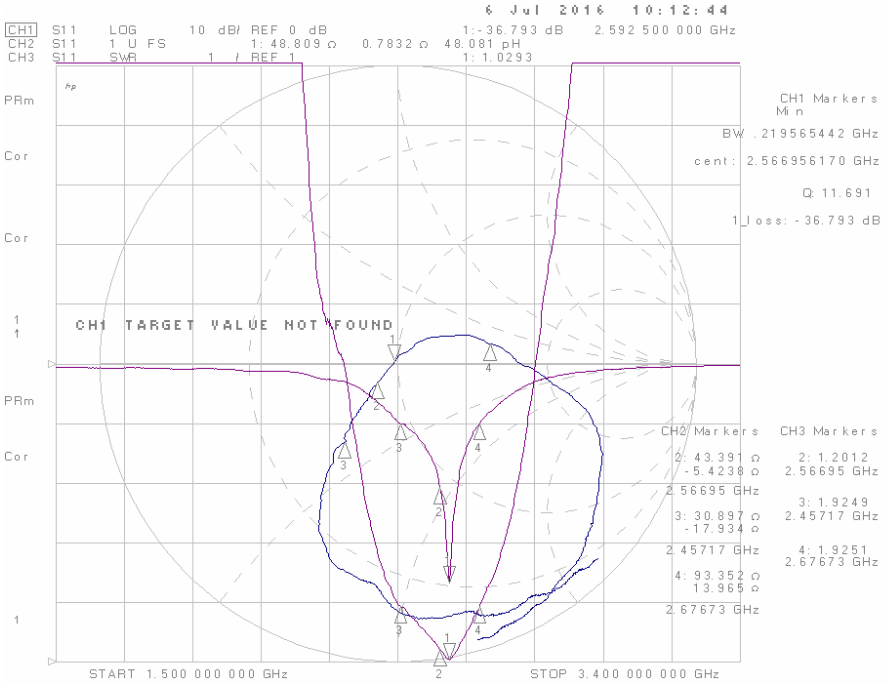
△ Iron soldering power: Max.30W
△ Pre-heating: 150 ℃ / 60 sec.
△ Soldering Tip temperature: 350℃Max.
△ Soldering time: 3 sec Max.
△ Solder paste: Sn/3.0Ag/0.5Cu
△ Max.1 times for iron soldering

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



Appendix 1

1.Without Matching circuit electrical performance:

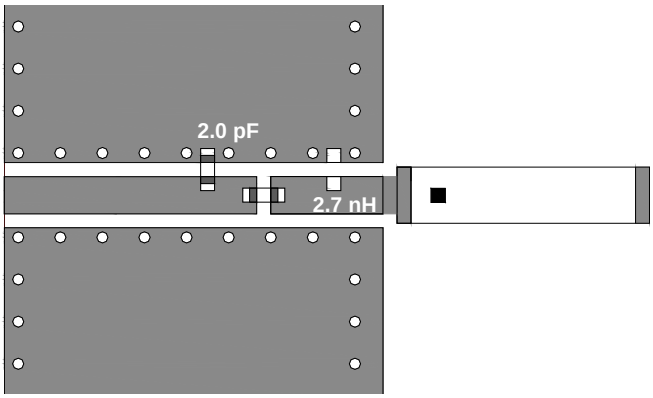



2.With Matching Circuit:

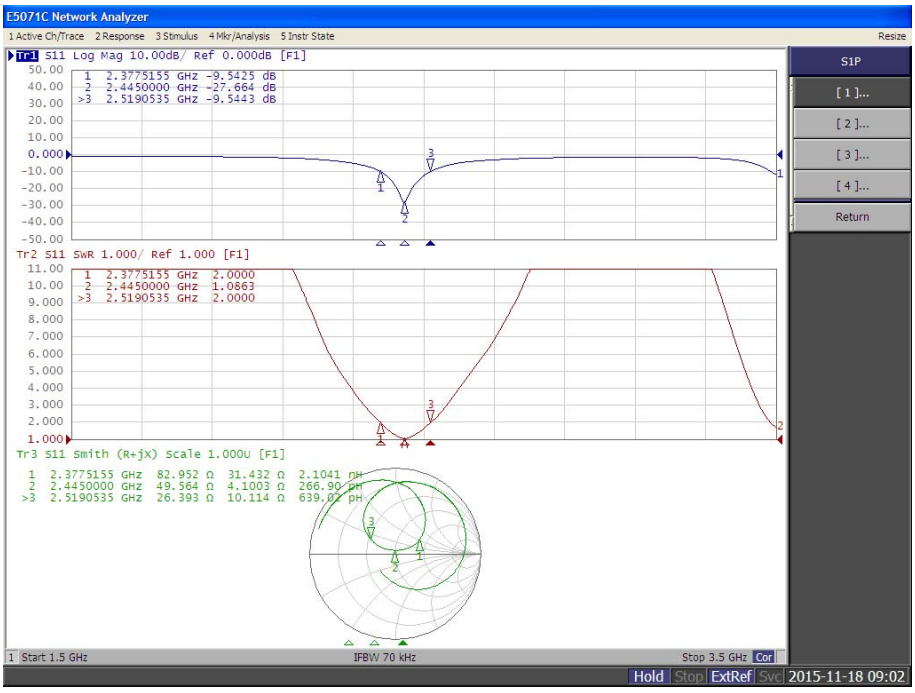
evaluation board:25*25mm

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

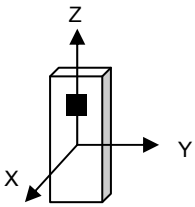
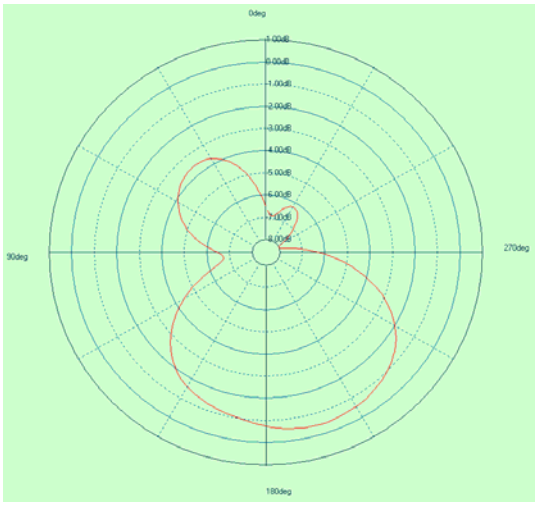
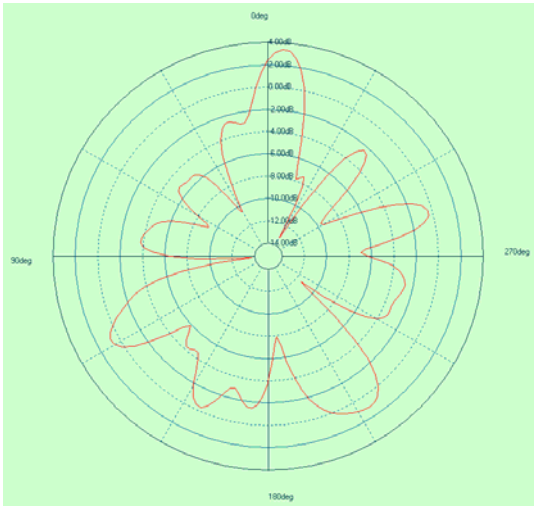
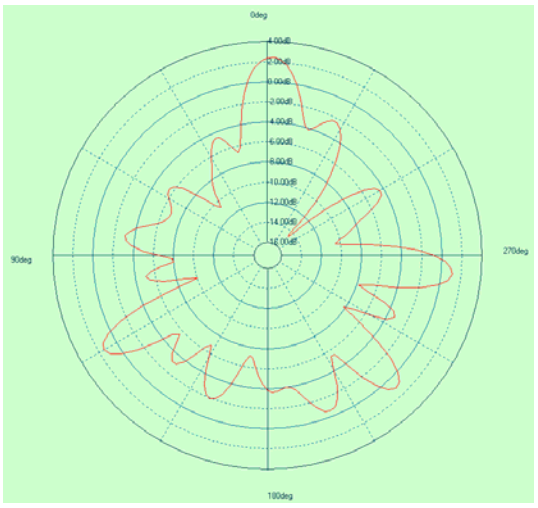
(Matching circuit and component values will be different, depending on PCB layout)




electrical performance:



Radiation pattern:

| | Direction | Radiation pattern |
|---|---|---|
|  | X-Y |  |
| | X-Z |  |
| | Y-Z |  |