

### Product Description

The BSW6553 is a 50-ohm matched absorptive SP5T RF switch that provides ultra-high isolation with frequency coverage up to 9 GHz.

The BSW6553 is designed with high linearity and reliability, making it suitable for wireless communication applications such as 4G/5G/6G infrastructure.

The BSW6553 operates over a wide VDD range of 2.7V to 5.5V and is controlled via 3 logic pins.

The BSW6553 is designed with ESD protection circuits at all pins and packaged in an industry standard, fully RoHS2-compliant, 20-Lead, 3mm x 3mm x 0.55mm QFN thin package.

The BSW6553 does not require blocking capacitors. If DC is presented at the RF port, add a blocking capacitor.

### Package Type



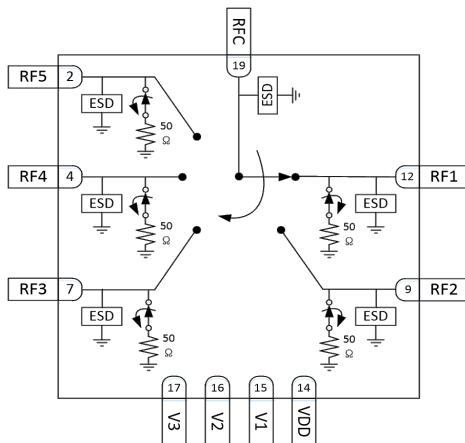
3mm x 3mm x 0.55mm, 20-Lead QFN Package

**Figure 2. Package Type**

### Device Features

- Output frequency range : 5 MHz to 9.0 GHz
- Supply Voltage : 2.7V to 5.5V
- Low Insertion Loss
  - : 0.72dB @ 2GHz
  - : 0.93dB @ 4GHz
  - : 1.13dB @ 6GHz
- High Isolation
  - RFC to RFx
    - : 68dB @ 2GHz
    - : 58dB @ 4GHz
    - : 50dB @ 6GHz
  - RFx to RFx
    - : 61dB @ 2GHz
    - : 55dB @ 4GHz
    - : 53dB @ 6GHz
- High Input 1dB Compression
  - : 35.7dBm @ 2.35GHz
  - : 35.5dBm @ 3.5GHz
  - : 35.3dBm @ 5.75GHz
- High IIP3
  - : 65.4dBm @ 2.35GHz
  - : 62.9dBm @ 3.5GHz
  - : 62.7dBm @ 5.75GHz
- Fast Switching Time : 180ns
- Operating temperature range : -40°C to +125°C
- ESD, HBM : 1.0kV
- 20-Lead QFN package : 3.0mm x 3.0mm x 0.55mm
- Lead-free/RoHS2-compliant QFN SMT package

### Block Diagram



**Figure 1. Functional Block Diagram**

### Applications

- Wireless Communication such as 4G/5G/6G
- Massive MIMO active Antenna Systems
- Repeaters
- Digital Pre-Distortion
- Military Systems
- UWB
- Test & Measurement

**Electrical Specifications**

Typical conditions are VDD = 5V, T<sub>A</sub> = 25°C, Control Logic V1/V2/V3 Low = 0V, V1/V2/V3 High = 3.3V, Z<sub>L</sub> = 50Ω, PCB and RF Connector loss are de-embedded, unless otherwise noted.

**Table 1. Electrical Specifications**

| Parameter           | Path      | Conditions | Min | Typ  | Max  | Unit |
|---------------------|-----------|------------|-----|------|------|------|
| Operating Frequency |           |            | 5   |      | 9000 | MHz  |
| Insertion Loss      | RFC - RF1 | 1GHz       |     | 0.60 |      | dB   |
|                     |           | 2GHz       |     | 0.72 |      |      |
|                     |           | 3GHz       |     | 0.86 |      |      |
|                     |           | 4GHz       |     | 0.93 |      |      |
|                     |           | 5GHz       |     | 1.04 |      |      |
|                     |           | 6GHz       |     | 1.13 |      |      |
|                     |           | 7GHz       |     | 1.48 |      |      |
|                     |           | 8GHz       |     | 2.29 |      |      |
|                     |           | 9GHz       |     | 2.57 |      |      |
|                     | RFC - RF2 | 1GHz       |     | 0.58 |      | dB   |
|                     |           | 2GHz       |     | 0.71 |      |      |
|                     |           | 3GHz       |     | 0.86 |      |      |
|                     |           | 4GHz       |     | 0.96 |      |      |
|                     |           | 5GHz       |     | 1.10 |      |      |
|                     |           | 6GHz       |     | 1.20 |      |      |
|                     |           | 7GHz       |     | 1.51 |      |      |
|                     |           | 8GHz       |     | 2.33 |      |      |
|                     |           | 9GHz       |     | 2.72 |      |      |
|                     | RFC - RF3 | 1GHz       |     | 0.59 |      | dB   |
|                     |           | 2GHz       |     | 0.72 |      |      |
|                     |           | 3GHz       |     | 0.86 |      |      |
|                     |           | 4GHz       |     | 0.92 |      |      |
|                     |           | 5GHz       |     | 1.08 |      |      |
|                     |           | 6GHz       |     | 1.26 |      |      |
|                     |           | 7GHz       |     | 1.55 |      |      |
|                     |           | 8GHz       |     | 2.24 |      |      |
|                     |           | 9GHz       |     | 2.68 |      |      |
|                     | RFC - RF4 | 1GHz       |     | 0.59 |      | dB   |
|                     |           | 2GHz       |     | 0.70 |      |      |
|                     |           | 3GHz       |     | 0.83 |      |      |
|                     |           | 4GHz       |     | 0.90 |      |      |
|                     |           | 5GHz       |     | 1.02 |      |      |
|                     |           | 6GHz       |     | 1.15 |      |      |
|                     |           | 7GHz       |     | 1.48 |      |      |
|                     |           | 8GHz       |     | 2.26 |      |      |
|                     |           | 9GHz       |     | 2.60 |      |      |
|                     | RFC - RF5 | 1GHz       |     | 0.60 |      | dB   |
|                     |           | 2GHz       |     | 0.72 |      |      |
|                     |           | 3GHz       |     | 0.85 |      |      |
|                     |           | 4GHz       |     | 0.90 |      |      |
|                     |           | 5GHz       |     | 1.01 |      |      |
|                     |           | 6GHz       |     | 1.15 |      |      |
|                     |           | 7GHz       |     | 1.37 |      |      |
|                     |           | 8GHz       |     | 1.99 |      |      |
|                     |           | 9GHz       |     | 2.38 |      |      |

**Table 1. Electrical Specifications (Cont.)**

| Parameter                             | Path      | Conditions                                                                                | Min | Typ                  | Max | Unit     |
|---------------------------------------|-----------|-------------------------------------------------------------------------------------------|-----|----------------------|-----|----------|
| Return Loss<br>(Active port)          | RFC, RFx  | 5MHz - 6GHz<br>6GHz - 9GHz                                                                |     | 15<br>8              |     | dB       |
| Return Loss<br>(Terminated port)      | RFC, RFx  | 5MHz - 9GHz                                                                               |     | 20                   |     | dB       |
| Input P1dB                            | RFC - RFx | 2.35GHz<br>3.5GHz<br>5.75GHz                                                              |     | 35.7<br>35.5<br>35.3 |     | dBm      |
| Input IP2 <sup>1</sup>                | RFC - RFx | 2.35GHz<br>3.5GHz<br>5.75GHz                                                              |     | 117<br>105<br>110    |     | dBm      |
| Input IP3 <sup>1</sup>                | RFC - RFx | 2.35GHz<br>3.5GHz<br>5.75GHz                                                              |     | 65<br>63<br>63       |     | dBm      |
| 2 <sup>nd</sup> Harmonic <sup>2</sup> | RFC - RFx | 2.35GHz<br>3.5GHz<br>5.75GHz                                                              |     | 106<br>92<br>95      |     | dBc      |
| 3 <sup>rd</sup> Harmonic <sup>2</sup> | RFC - RFx | 2.35GHz<br>3.5GHz<br>5.75GHz                                                              |     | 104<br>100<br>98     |     | dBc      |
| Rising Time<br>Falling Time           | RFC - RFx | 10% RF to 90% RF<br>90% RF to 10% RF                                                      |     | 40<br>40             |     | ns       |
| Switching Time                        | RFC - RFx | 50% CTRL to 90% RF<br>50% CTRL to 10% RF                                                  |     | 180<br>100           |     | ns       |
| Settling Time                         | RFC - RFx | 50% CTRL to 0.05dB final value Rising Edge<br>50% CTRL to 0.05dB final value Falling Edge |     | 190<br>105           |     | ns       |
| Maximum Spurious Level                |           | 1MHz - 10MHz<br>>10MHz <sup>3</sup>                                                       |     | -127<br>< -140       |     | dBm/10Hz |

1. Tone Power is +18dBm and Tone spacing is 20kHz .

2. Tone Power is +18dBm.

3. No spurious signals were detected above 10MHz.

**Isolation Matrix**

Typical conditions are VDD = 5V, T<sub>A</sub> = 25°C, Control Logic V1/V2/V3 Low = 0V, V1/V2/V3 High = 3.3V, Z<sub>L</sub> = 50Ω, unless otherwise noted.

**Table 2. RFC-to-RFx Isolation**

| "ON" Port | Frequency | RFC to RFX Isolation |     |     |     |     | Unit |
|-----------|-----------|----------------------|-----|-----|-----|-----|------|
|           |           | RF1                  | RF2 | RF3 | RF4 | RF5 |      |
| RF1       | 1GHz      | -                    | 76  | 69  | 73  | 77  |      |
|           | 2GHz      | -                    | 68  | 63  | 68  | 72  |      |
|           | 3GHz      | -                    | 62  | 60  | 65  | 68  |      |
|           | 4GHz      | -                    | 58  | 59  | 62  | 63  |      |
|           | 5GHz      | -                    | 54  | 58  | 57  | 57  |      |
|           | 6GHz      | -                    | 50  | 58  | 53  | 51  |      |
|           | 7GHz      | -                    | 47  | 55  | 49  | 47  |      |
|           | 8GHz      | -                    | 44  | 52  | 45  | 43  |      |
|           | 9GHz      | -                    | 41  | 49  | 42  | 40  |      |
| RF2       | 1GHz      | 82                   | -   | 79  | 75  | 79  |      |
|           | 2GHz      | 78                   | -   | 71  | 69  | 73  |      |
|           | 3GHz      | 71                   | -   | 64  | 65  | 68  |      |
|           | 4GHz      | 64                   | -   | 61  | 61  | 62  |      |
|           | 5GHz      | 57                   | -   | 56  | 57  | 56  |      |
|           | 6GHz      | 51                   | -   | 52  | 52  | 51  |      |
|           | 7GHz      | 48                   | -   | 50  | 48  | 46  |      |
|           | 8GHz      | 44                   | -   | 47  | 45  | 43  |      |
|           | 9GHz      | 41                   | -   | 46  | 42  | 40  |      |
| RF3       | 1GHz      | 80                   | 77  | -   | 76  | 81  | dB   |
|           | 2GHz      | 76                   | 69  | -   | 70  | 74  |      |
|           | 3GHz      | 76                   | 63  | -   | 64  | 67  |      |
|           | 4GHz      | 71                   | 60  | -   | 59  | 61  |      |
|           | 5GHz      | 60                   | 55  | -   | 54  | 54  |      |
|           | 6GHz      | 55                   | 50  | -   | 49  | 50  |      |
|           | 7GHz      | 50                   | 48  | -   | 46  | 46  |      |
|           | 8GHz      | 47                   | 47  | -   | 43  | 42  |      |
|           | 9GHz      | 43                   | 46  | -   | 40  | 39  |      |
| RF4       | 1GHz      | 77                   | 69  | 76  | -   | 62  |      |
|           | 2GHz      | 74                   | 63  | 69  | -   | 55  |      |
|           | 3GHz      | 74                   | 60  | 63  | -   | 51  |      |
|           | 4GHz      | 75                   | 59  | 59  | -   | 48  |      |
|           | 5GHz      | 63                   | 58  | 54  | -   | 44  |      |
|           | 6GHz      | 56                   | 56  | 51  | -   | 42  |      |
|           | 7GHz      | 51                   | 54  | 48  | -   | 39  |      |
|           | 8GHz      | 47                   | 51  | 45  | -   | 37  |      |
|           | 9GHz      | 43                   | 48  | 42  | -   | 35  |      |
| RF5       | 1GHz      | 76                   | 70  | 73  | 72  | -   |      |
|           | 2GHz      | 72                   | 64  | 68  | 65  | -   |      |
|           | 3GHz      | 72                   | 61  | 63  | 60  | -   |      |
|           | 4GHz      | 75                   | 59  | 60  | 56  | -   |      |
|           | 5GHz      | 64                   | 58  | 57  | 52  | -   |      |
|           | 6GHz      | 56                   | 56  | 53  | 48  | -   |      |
|           | 7GHz      | 51                   | 53  | 50  | 45  | -   |      |
|           | 8GHz      | 47                   | 50  | 47  | 43  | -   |      |
|           | 9GHz      | 43                   | 46  | 44  | 41  | -   |      |

**Isolation Matrix**

Typical conditions are VDD = 5V, T<sub>A</sub> = 25°C, Control Logic V1/V2/V3 Low = 0V, V1/V2/V3 High = 3.3V, Z<sub>L</sub> = 50Ω, unless otherwise noted.

**Table 3. RFx-to-RFx Isolation**

| "ON" Port | Frequency | RFx to RFx Isolation |     |     |     |     | Unit |
|-----------|-----------|----------------------|-----|-----|-----|-----|------|
|           |           | RF1                  | RF2 | RF3 | RF4 | RF5 |      |
| RF1       | 1GHz      | -                    | 66  | 75  | 70  | 67  | dB   |
|           | 2GHz      | -                    | 61  | 70  | 65  | 62  |      |
|           | 3GHz      | -                    | 57  | 66  | 62  | 60  |      |
|           | 4GHz      | -                    | 55  | 62  | 61  | 59  |      |
|           | 5GHz      | -                    | 54  | 58  | 60  | 60  |      |
|           | 6GHz      | -                    | 53  | 54  | 58  | 66  |      |
|           | 7GHz      | -                    | 53  | 50  | 53  | 64  |      |
|           | 8GHz      | -                    | 51  | 46  | 48  | 52  |      |
|           | 9GHz      | -                    | 52  | 43  | 44  | 46  |      |
| RF2       | 1GHz      | 66                   | -   | 59  | 69  | 67  |      |
|           | 2GHz      | 61                   | -   | 53  | 64  | 61  |      |
|           | 3GHz      | 58                   | -   | 49  | 61  | 59  |      |
|           | 4GHz      | 57                   | -   | 46  | 60  | 58  |      |
|           | 5GHz      | 58                   | -   | 43  | 59  | 59  |      |
|           | 6GHz      | 61                   | -   | 41  | 57  | 63  |      |
|           | 7GHz      | 64                   | -   | 38  | 54  | 67  |      |
|           | 8GHz      | 54                   | -   | 36  | 49  | 53  |      |
|           | 9GHz      | 49                   | -   | 34  | 45  | 47  |      |
| RF3       | 1GHz      | 69                   | 59  | -   | 66  | 66  |      |
|           | 2GHz      | 64                   | 53  | -   | 60  | 60  |      |
|           | 3GHz      | 61                   | 49  | -   | 58  | 58  |      |
|           | 4GHz      | 61                   | 46  | -   | 56  | 57  |      |
|           | 5GHz      | 62                   | 43  | -   | 56  | 58  |      |
|           | 6GHz      | 65                   | 40  | -   | 55  | 61  |      |
|           | 7GHz      | 60                   | 38  | -   | 54  | 69  |      |
|           | 8GHz      | 52                   | 36  | -   | 50  | 54  |      |
|           | 9GHz      | 47                   | 34  | -   | 47  | 48  |      |
| RF4       | 1GHz      | 70                   | 75  | 66  | -   | 54  |      |
|           | 2GHz      | 65                   | 69  | 60  | -   | 48  |      |
|           | 3GHz      | 63                   | 65  | 57  | -   | 45  |      |
|           | 4GHz      | 62                   | 61  | 55  | -   | 43  |      |
|           | 5GHz      | 65                   | 57  | 54  | -   | 41  |      |
|           | 6GHz      | 66                   | 54  | 53  | -   | 40  |      |
|           | 7GHz      | 58                   | 50  | 53  | -   | 39  |      |
|           | 8GHz      | 50                   | 46  | 51  | -   | 37  |      |
|           | 9GHz      | 45                   | 42  | 53  | -   | 36  |      |
| RF5       | 1GHz      | 70                   | 74  | 70  | 57  | -   |      |
|           | 2GHz      | 65                   | 68  | 64  | 51  | -   |      |
|           | 3GHz      | 63                   | 65  | 61  | 47  | -   |      |
|           | 4GHz      | 63                   | 61  | 58  | 44  | -   |      |
|           | 5GHz      | 66                   | 58  | 57  | 42  | -   |      |
|           | 6GHz      | 66                   | 54  | 55  | 40  | -   |      |
|           | 7GHz      | 57                   | 50  | 53  | 37  | -   |      |
|           | 8GHz      | 49                   | 46  | 50  | 35  | -   |      |
|           | 9GHz      | 44                   | 43  | 48  | 33  | -   |      |

### Product Description

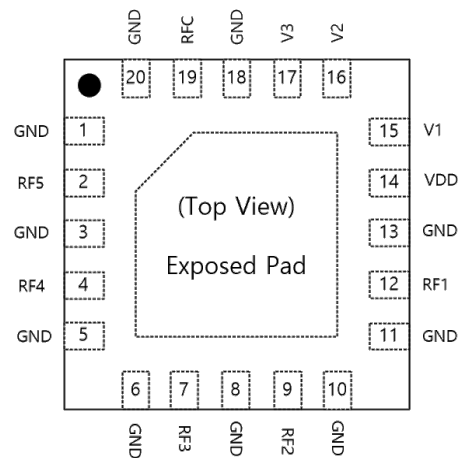


Figure 3. Pin Description

Table 4. Pin Descriptions

| No.                      | Pin Name    | Descriptions           |
|--------------------------|-------------|------------------------|
| 14                       | VDD         | Supply Voltage         |
| 17                       | V3          | Switch control input 3 |
| 16                       | V2          | Switch control input 2 |
| 15                       | V1          | Switch control input 1 |
| 2                        | RF5         | RF5 Port               |
| 4                        | RF4         | RF4 Port               |
| 7                        | RF3         | RF3 Port               |
| 9                        | RF2         | RF2 Port               |
| 12                       | RF1         | RF1 Port               |
| 19                       | RFC         | RFC Port               |
| 1,3,5,6,8,10,11,13,18,20 | GND         | Ground                 |
| Pad                      | Exposed Pad | Ground                 |

Table 5. Control Truth Table

| V3 | V2 | V1 | RFC-RF1          | RFC-RF2          | RFC-RF3          | RFC-RF4          | RFC-RF5          |
|----|----|----|------------------|------------------|------------------|------------------|------------------|
| 0  | 0  | 0  | OFF <sup>1</sup> | OFF <sup>1</sup> | OFF <sup>1</sup> | OFF <sup>1</sup> | OFF <sup>1</sup> |
| 0  | 0  | 1  | ON               | OFF              | OFF              | OFF              | OFF              |
| 0  | 1  | 0  | OFF              | ON               | OFF              | OFF              | OFF              |
| 0  | 1  | 1  | OFF              | OFF              | ON               | OFF              | OFF              |
| 1  | 0  | 0  | OFF              | OFF              | OFF              | ON               | OFF              |
| 1  | 0  | 1  | OFF              | OFF              | OFF              | OFF              | ON               |
| 1  | 1  | 0  | OFF <sup>1</sup> | OFF <sup>1</sup> | OFF <sup>1</sup> | OFF <sup>1</sup> | OFF <sup>1</sup> |
| 1  | 1  | 1  | OFF <sup>1</sup> | OFF <sup>1</sup> | OFF <sup>1</sup> | OFF <sup>1</sup> | OFF <sup>1</sup> |

1. Logic state 000, 110 and 111 are all path OFF mode.

**Table 6. Recommended Operating Conditions**

| Parameter                                    | Symbol                         | Min  | Typ | Max  | Unit |
|----------------------------------------------|--------------------------------|------|-----|------|------|
| Supply Voltage                               | VDD                            | 2.7  | 5   | 5.5  | V    |
| Supply Current                               | IDD                            | -    | 200 |      | μA   |
| Digital Input Voltage (V1/V2/V3)             | VIH                            | 1.17 | -   | 3.6  | V    |
|                                              | VIL                            | 0    | -   | 0.6  | V    |
| Digital Input Current (V1/V2/V3)             | ICTRL                          | -    | -   | 10   | uA   |
| Operating Temperature Range                  | T <sub>A</sub>                 | -40  | +25 | +125 | °C   |
| RF Input Power, CW (Active Port, +25°C)      | P <sub>Max,Active_+25°C</sub>  | -    | -   | 31   | dBm  |
| RF Input Power, CW (Active Port, +125°C)     | P <sub>Max,Active_+125°C</sub> | -    | -   | 31   | dBm  |
| RF Input Power, CW (Terminated Port, +25°C)  | P <sub>Max,Term_+25°C</sub>    | -    | -   | 27   | dBm  |
| RF Input Power, CW (Terminated Port, +125°C) | P <sub>Max,Term_+125°C</sub>   | -    | -   | 24   | dBm  |

**Table 7. Absolute Maximum Ratings**

| Parameter                        |                  |          | Symbol                      | Min  | Max  | Unit |
|----------------------------------|------------------|----------|-----------------------------|------|------|------|
| Supply Voltage                   |                  |          | VDD                         | -0.3 | 5.5  | V    |
| Digital Input Voltage            |                  |          | V1/V2/V3                    | -0.3 | 3.6  | V    |
| Maximum Input Power, CW (+25°C)  |                  |          | P <sub>max_abs_+25°C</sub>  | -    | 35   | dBm  |
| Maximum Input Power, CW (+125°C) |                  |          | P <sub>max_abs_+125°C</sub> | -    | 33   | dBm  |
| Storage Temperature range        |                  |          | -                           | -65  | +150 | °C   |
| ESD                              | HBM <sup>1</sup> | All pins | -                           | -    | 1000 | V    |
|                                  | CDM <sup>2</sup> | All pins | -                           | -    | 1000 | V    |

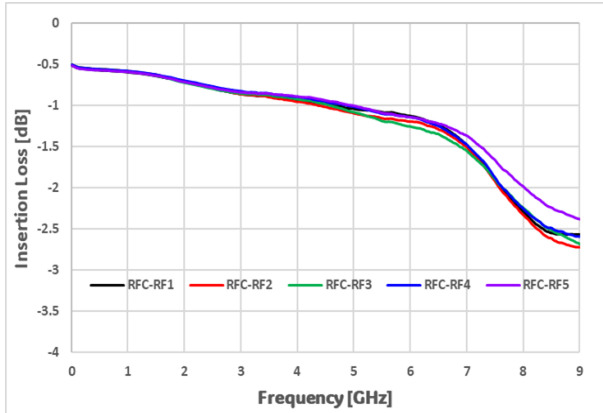
1. HBM Standard : JS-001-2017

2. CDM Standard : JS-002-2018

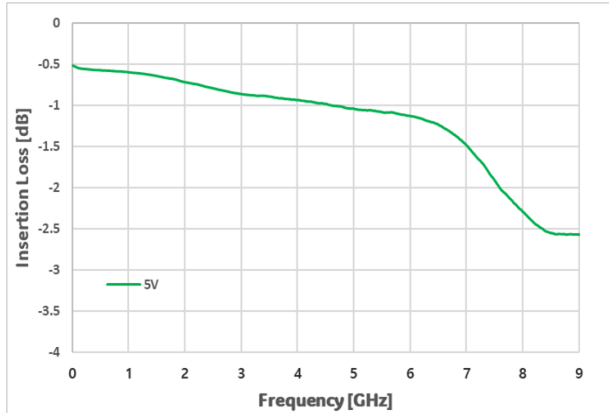
### Typical Performances

Typical conditions are VDD = 5V, T<sub>A</sub> = 25°C, V1/V2/V3 Low = 0V, V1/V2/V3 High = 3.3V, Z<sub>L</sub> = 50Ω, PCB and RF Connector loss are de-embedded, unless otherwise noted.

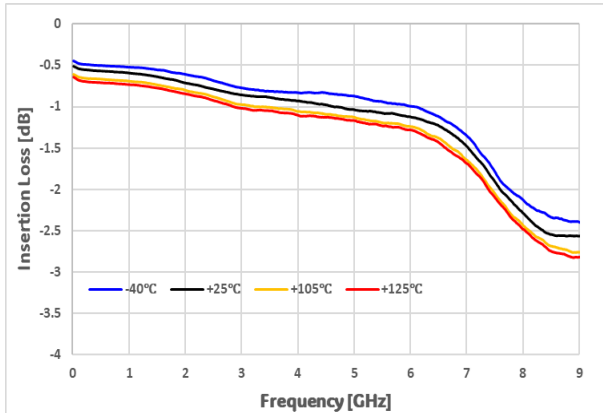
**Figure 4. Insertion Loss vs Frequency**



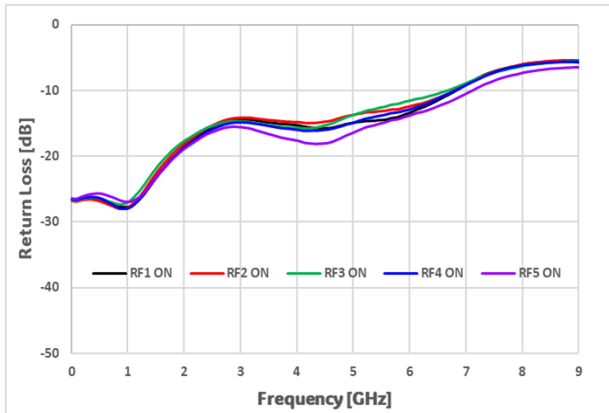
**Figure 5. Insertion Loss vs VDD (RFC-RF1)**



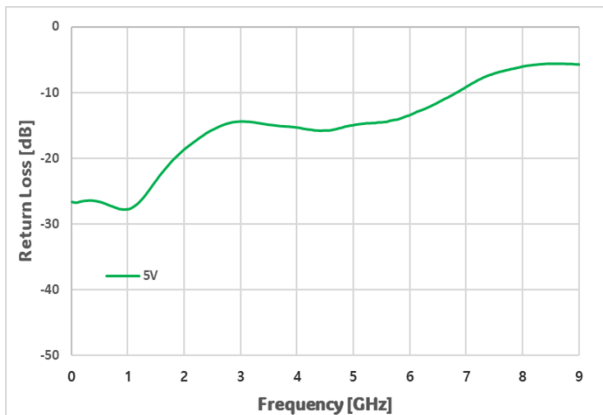
**Figure 6. Insertion Loss vs Temp (RFC-RF1)**



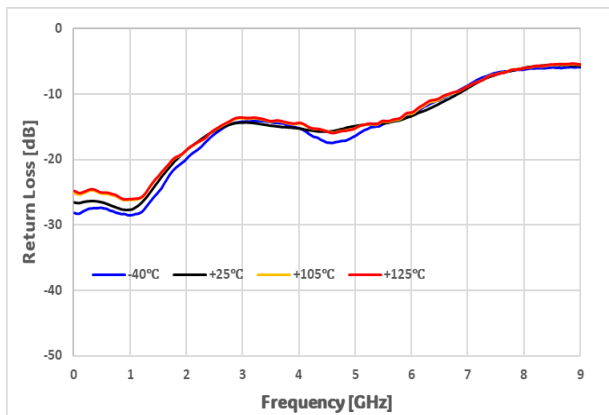
**Figure 7. Return Loss vs Frequency (RFC Port)**



**Figure 8. Return Loss vs VDD (RFC Port)**



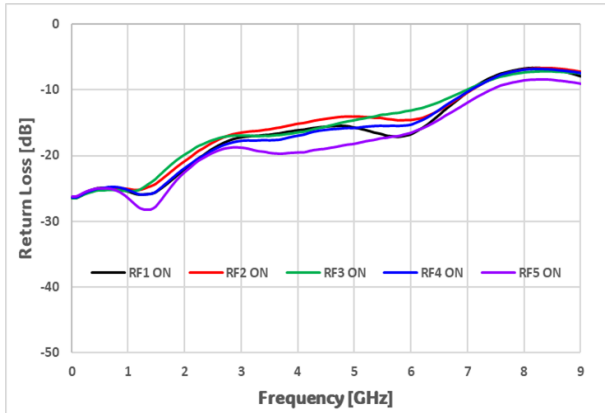
**Figure 9. Return Loss vs Temp (RFC Port)**



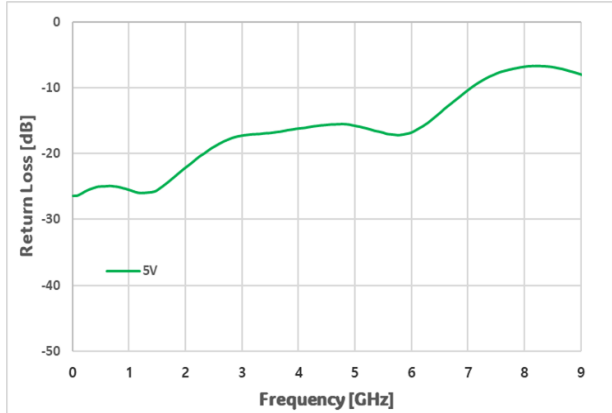
### Typical Performances

Typical conditions are VDD = 5V, T<sub>A</sub> = 25°C, V1/V2/V3 Low = 0V, V1/V2/V3 High = 3.3V, Z<sub>L</sub> = 50Ω, PCB and RF Connector loss are de-embedded, unless otherwise noted.

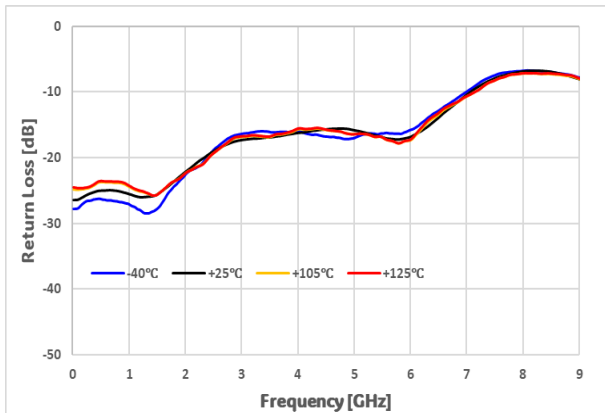
**Figure 10. Return Loss vs Frequency (Active Port)**



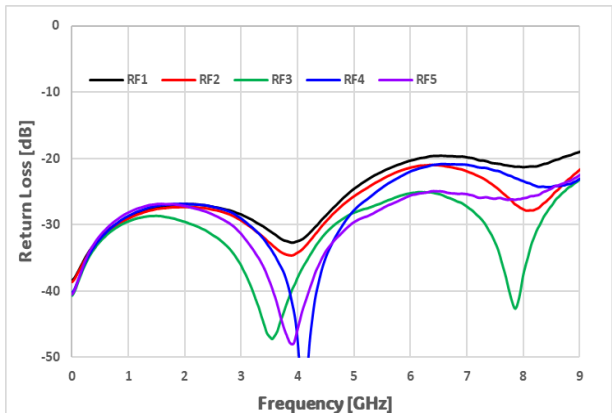
**Figure 11. Return Loss vs VDD (Active Port)**



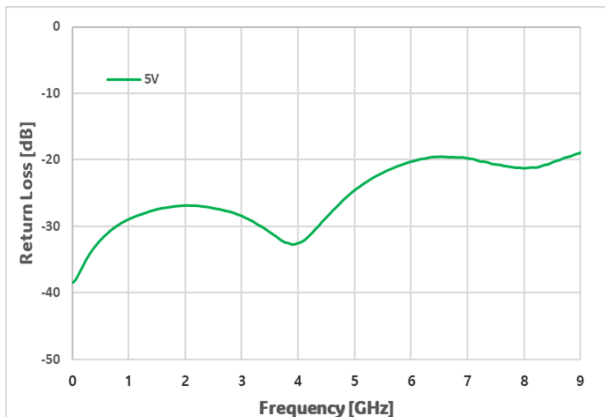
**Figure 12. Return Loss vs Temp (Active Port)**



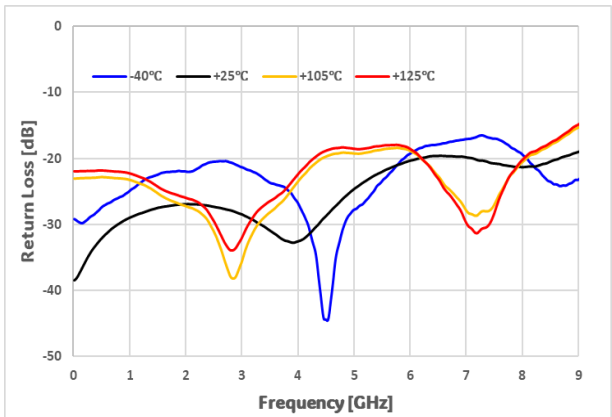
**Figure 13. Return Loss vs Frequency (Terminated Port)**



**Figure 14. Return Loss vs VDD (Terminated Port)**



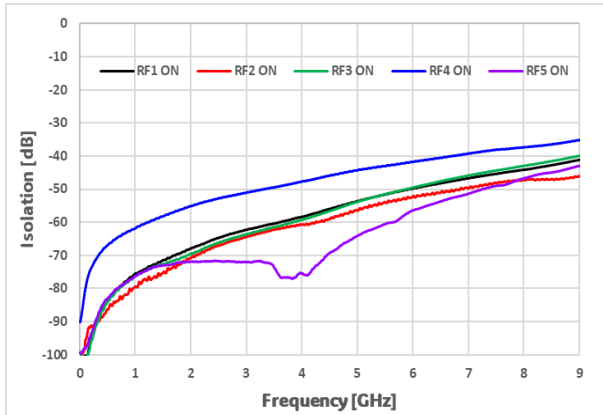
**Figure 15. Return Loss vs Temp (Terminated Port)**



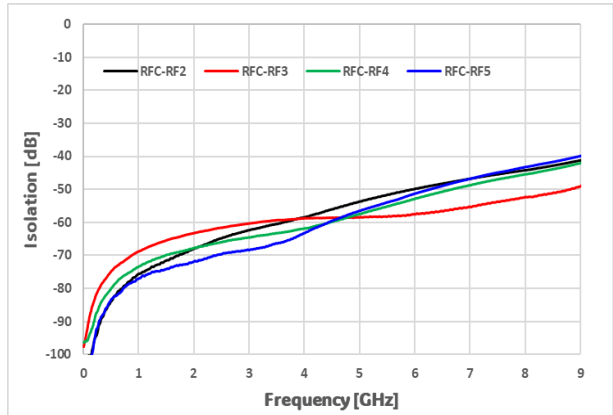
### Typical Performances

Typical conditions are  $V_{DD} = 5V$ ,  $T_A = 25^\circ C$ ,  $V_1/V_2/V_3$  Low = 0V,  $V_1/V_2/V_3$  High = 3.3V,  $Z_L = 50\Omega$ , PCB and RF Connector loss are de-embedded, unless otherwise noted.

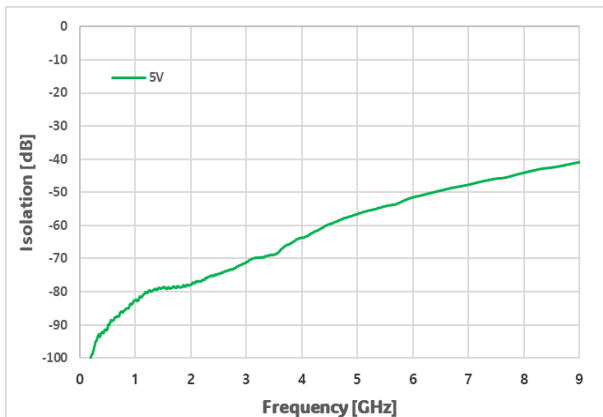
**Figure 16. Isolation vs Frequency (RFC to RFx)**



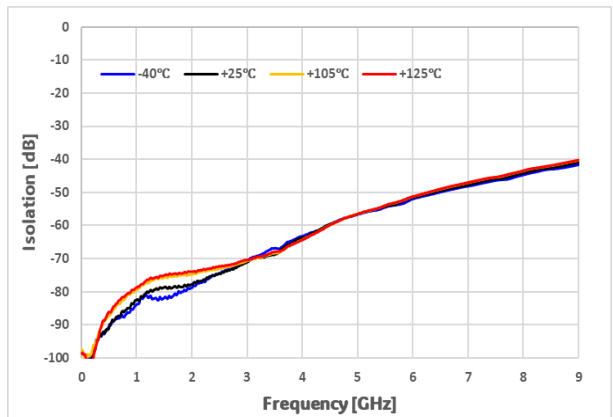
**Figure 17. Isolation vs Frequency (RFC to RFx, RF1 ON)**



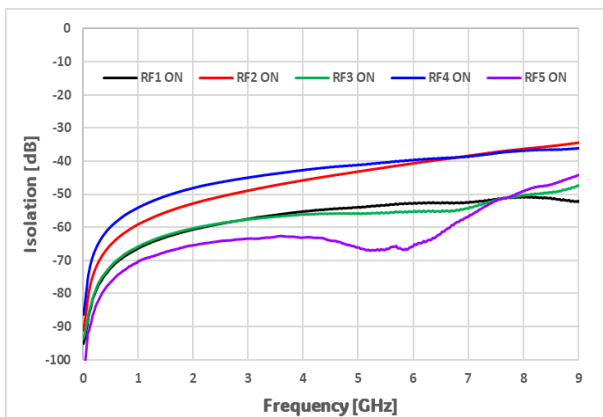
**Figure 18. Isolation vs VDD (RFC to RF1, RF2 ON)**



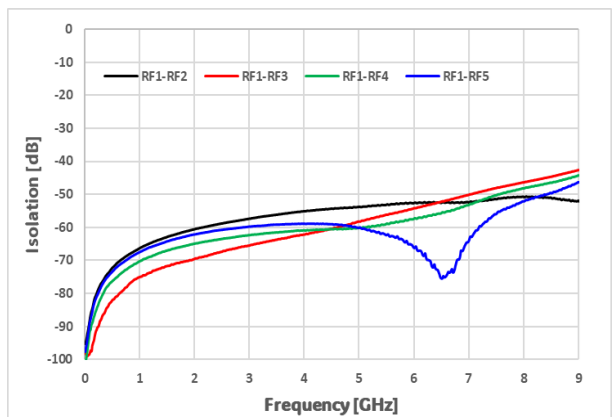
**Figure 19. Isolation vs Temp (RFC to RF1, RF2 ON)**



**Figure 20. Isolation vs Frequency (RFx to RFx)**



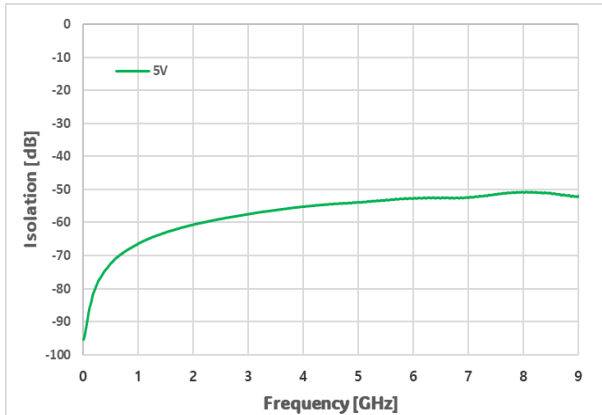
**Figure 21. Isolation vs Frequency (RF1 to RFx, RF1 ON)**



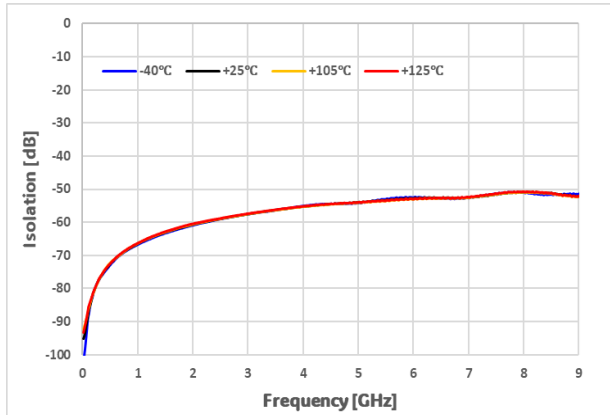
### Typical Performances

Typical conditions are  $V_{DD} = 5V$ ,  $T_A = 25^\circ C$ ,  $V_1/V_2/V_3$  Low = 0V,  $V_1/V_2/V_3$  High = 3.3V,  $Z_L = 50\Omega$ , PCB and RF Connector loss are de-embedded, unless otherwise noted.

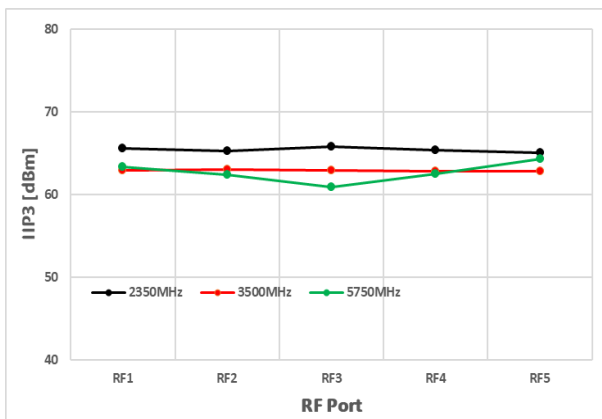
**Figure 22. Isolation vs VDD (RF1 to RF2, RF1 ON)**



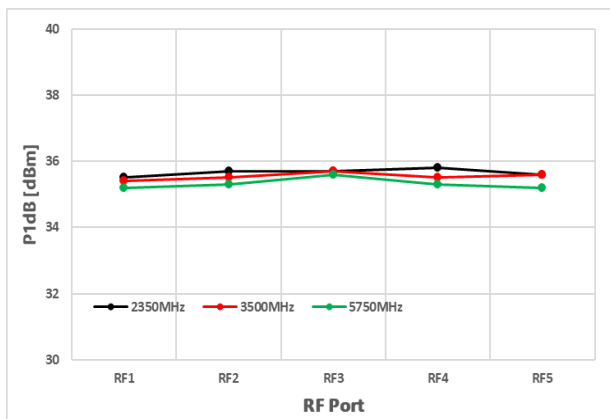
**Figure 23. Isolation vs Temp (RF1 to RF2, RF1 ON)**



**Figure 24. IIP3 vs RF Port**



**Figure 25. P1dB vs RF Port**



### Evaluation Board

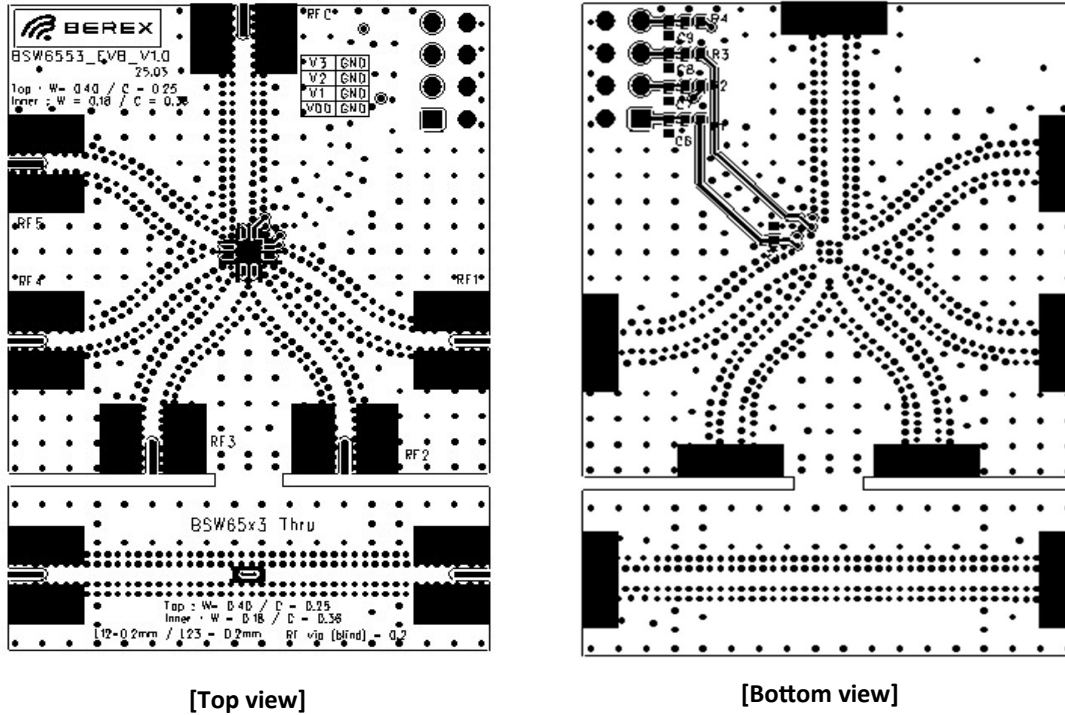
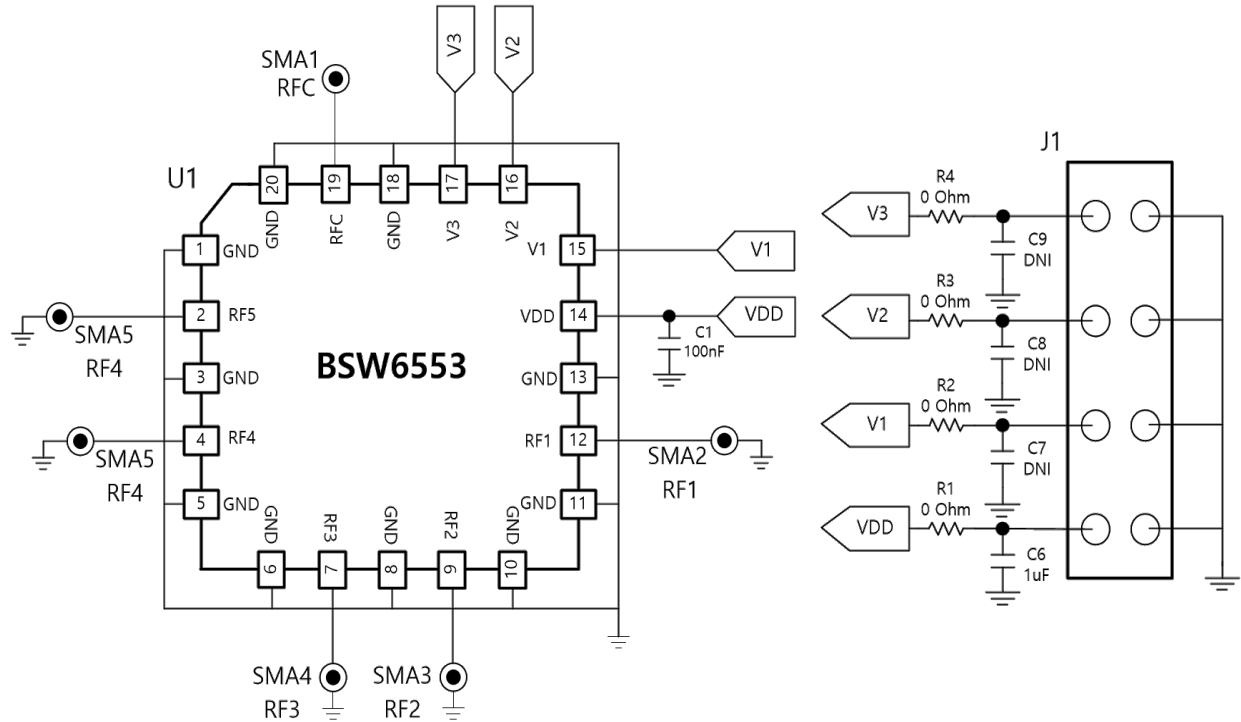


Figure 26. Evaluation Board Layout

|                   |                                       |                          |
|-------------------|---------------------------------------|--------------------------|
|                   | COPPER : 1oz (0.035mm), Top Layer     | FINISH THICKNESS : 1.64T |
| RO4003C Er : 3.38 | RO4003C / 0.2mm                       |                          |
|                   | COPPER : 1oz (0.035mm), Inner 1 Layer |                          |
| RO4450T Er : 3.35 | RO4450T / 0.2mm                       |                          |
|                   | COPPER : 1oz (0.035mm), Inner 2 Layer |                          |
| FR-4 Er : 4.5~4.8 | FR-4 / 1.1mm                          |                          |
|                   | COPPER : 1oz (0.035mm), Bottom Layer  |                          |

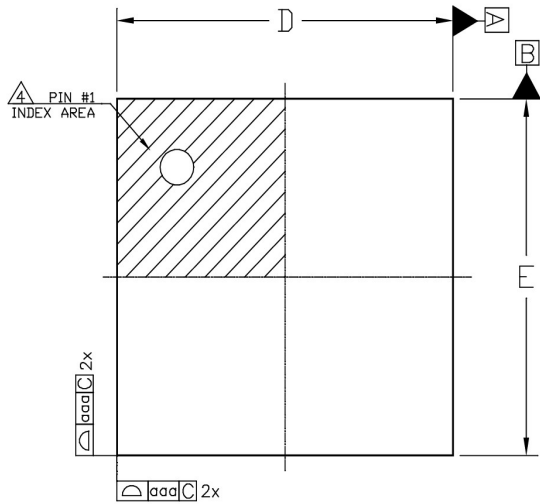
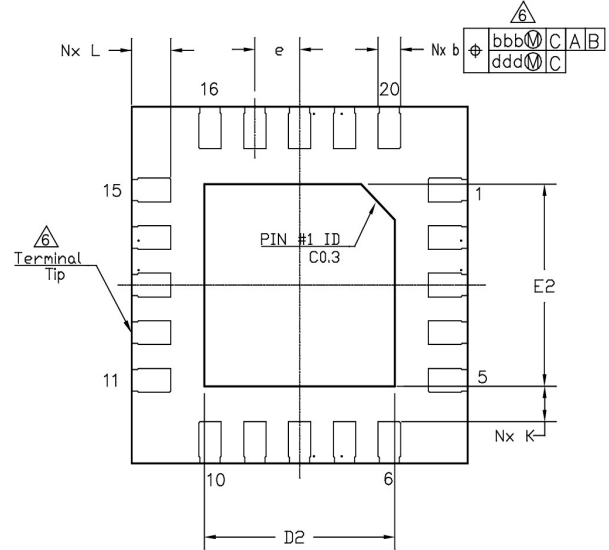
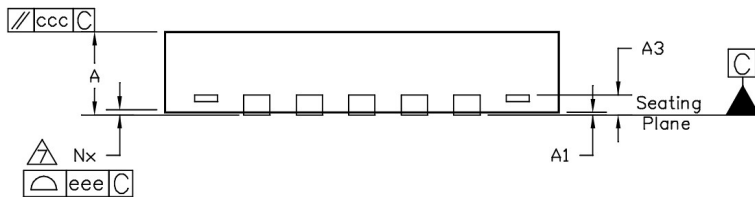
Figure 27. Evaluation Board PCB Layer Information



**Figure 28. Evaluation Board Schematic**

**Table 8. Bill of Material - Evaluation Board**

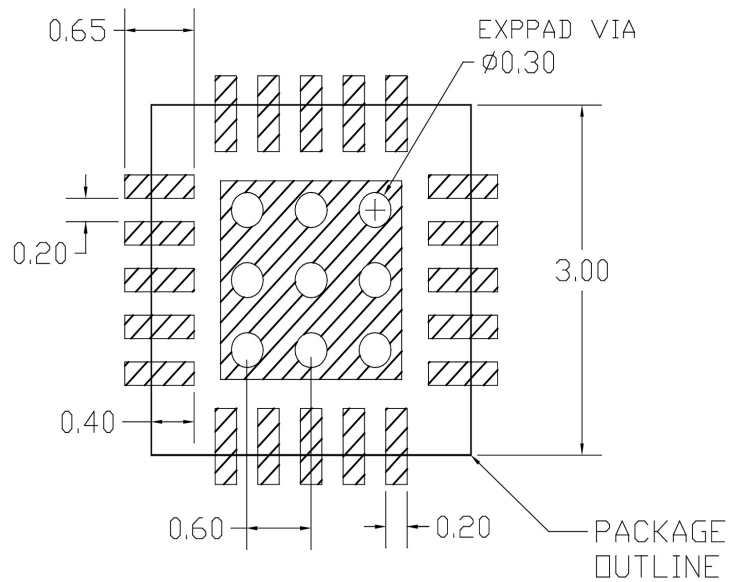
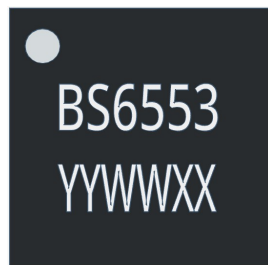
| No. | Ref Des                 | Part Qty | Part Number          | Remark                               |
|-----|-------------------------|----------|----------------------|--------------------------------------|
| 1   | C1                      | 1        | CAP 1005 100nF J 50V | C1 should be placed near the BSW6553 |
| 2   | C6                      | 1        | CAP 1005 1uF J 50V   |                                      |
| 3   | C7,C8,C9                | 3        | CAP 1005 DNI         |                                      |
| 4   | R1,R2,R3,R4             | 4        | RES 1005 0 ohm J 50V |                                      |
| 5   | J1                      | 1        | 2x4 Pin Header       | 2.54mm pitch                         |
| 6   | RFC,RF1,RF2,RF3,RF4,RF5 | 5        | SMA_END_LAUNCH       |                                      |
| 7   | U1                      | 1        | BSW6553              |                                      |

**Package Outline Drawing**

**[ Top View ]**

**[ Bottom View ]**

**[ Side View ]**
**NOTES:**

1. Dimensioning and tolerancing conform to ASME Y14.5-2009.
2. All dimensions are in millimeters.
3. N is the total number of terminals.
4. The location of the marked terminal #1 identifier is within the hatched area.
5. ND and NE refer to the number of terminals each D and E side respectively.
6. Dimension b applies to the metallized terminal and is measured between 0.15mm and 0.3mm from the terminal tip. If the terminal has a radius on the other end of it, dimension b should not be measured in that radius area.
7. Coplanarity applies to the terminals and all other bottom surface metallization.

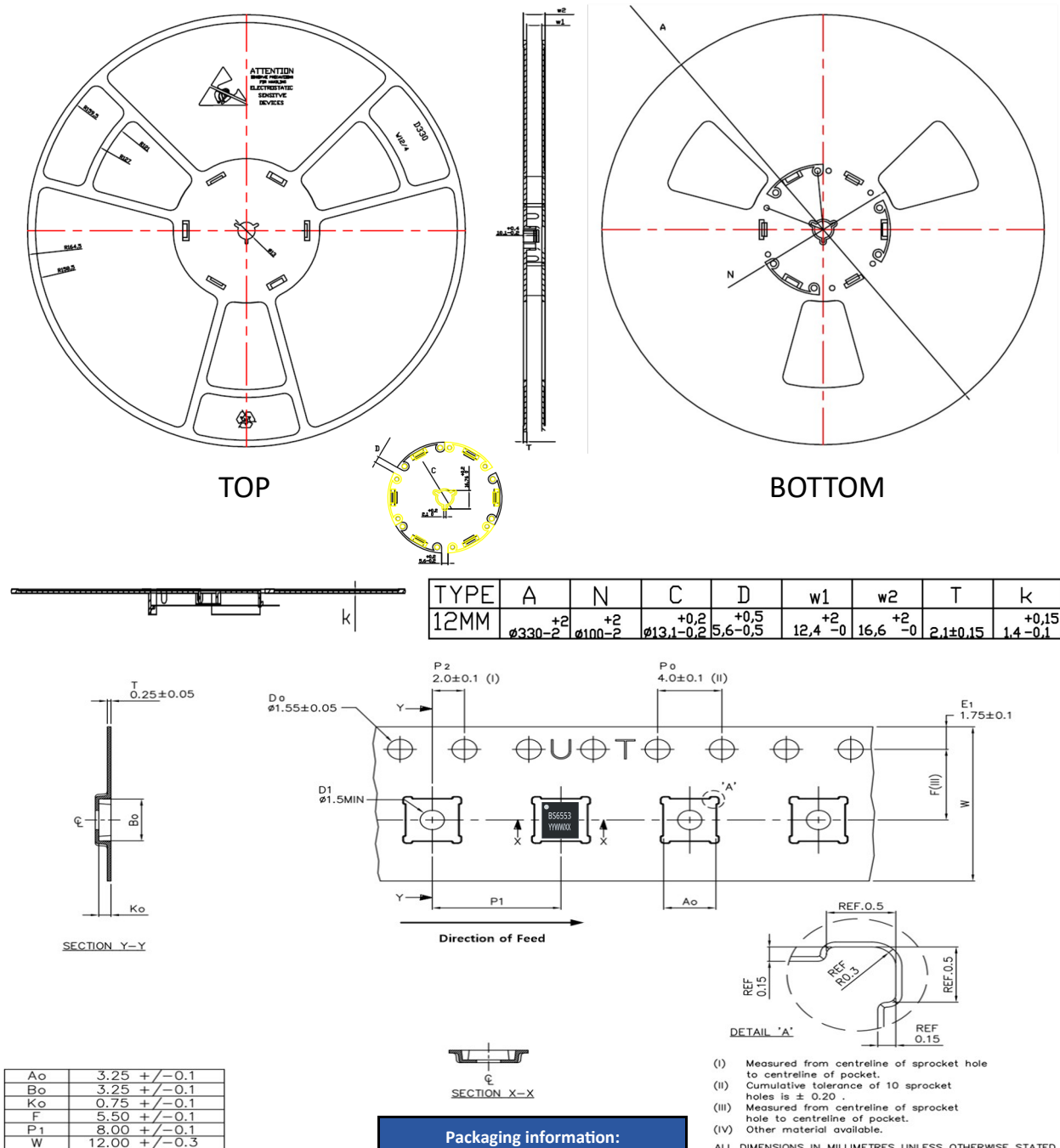
| Dimension Table     |          |            |      |      |
|---------------------|----------|------------|------|------|
| Thickness<br>Symbol | Min      | Nominal    | Max  | Note |
| A                   | 0.51     | 0.55       | 0.60 |      |
| A1                  | 0.00     | 0.02       | 0.05 |      |
| A3                  | ---      | 0.152 Ref. | ---  |      |
| b                   | 0.15     | 0.20       | 0.25 | 6    |
| D                   | 3.00 BSC |            |      |      |
| E                   | 3.00 BSC |            |      |      |
| e                   | 0.40 BSC |            |      |      |
| D2                  | 1.60     | 1.70       | 1.80 |      |
| E2                  | 1.60     | 1.70       | 1.80 |      |
| K                   | 0.2      | ---        | ---  |      |
| L                   | 0.25     | 0.35       | 0.45 |      |
| aaa                 | 0.05     |            |      |      |
| bbb                 | 0.10     |            |      |      |
| ccc                 | 0.10     |            |      |      |
| ddd                 | 0.05     |            |      |      |
| eee                 | 0.08     |            |      |      |
| N                   | 20       |            |      | 3    |
| ND                  | 5        |            |      | 5    |
| NE                  | 5        |            |      | 5    |

**Figure 29. Package Outline Drawing**

**Recommended Land Pattern**

**Figure 30. Recommended Land Pattern**
**Package Marking**


| Marking information: |                    |
|----------------------|--------------------|
| BS                   | BeRex RF Switch    |
| 6553                 | The name of switch |
| YY                   | Year               |
| WW                   | Work Week          |
| XX                   | Wafer Run Number   |

**Figure 31. Package Marking**

**Tape & Reel**

**Figure 32. Tape & Reel**

### Lead plating finish

#### 100% Tin Matte finish

(All BeRex products undergoes a 1 hour, 150 degree C, Anneal bake to eliminate thin whisker growth concerns.)

### ESD / MSL Rating

| ESD information1 : |                        |
|--------------------|------------------------|
| Rating             | Class 1C (1000V)       |
| Test               | Human Body Model (HBM) |
| Standard           | JS-001-2017            |

| ESD information2 : |                            |
|--------------------|----------------------------|
| Rating             | Class C3 (1000V)           |
| Test               | Charged Device Model (CDM) |
| Standard           | JS-002-2018                |

| MSL information: |                                     |
|------------------|-------------------------------------|
| Rating           | Level 1 at +260°C convection reflow |
| Standard         | JEDEC Standard J-STD-020            |



Proper ESD procedures should be followed when handling the device.

### RoHS Compliance

This part is compliant with Restrictions on the use of certain Hazardous Substances in Electrical and Electronic Equipment (RoHS) Directive 2011/65/EU as amended by Directive 2015/863/EU.

This product also is compliant with a concentration of the Substances of Very High Concern (SVHC) candidate list which are contained in a quantity of less than 0.1%(w/w) in each components of a product and/or its packaging placed on the European Community market by the BeRex and Suppliers.

### NATO CAGE code:

|   |   |   |   |   |
|---|---|---|---|---|
| 2 | N | 9 | 6 | F |
|---|---|---|---|---|