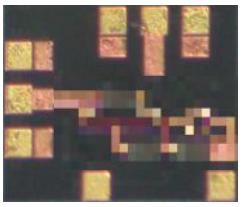
# VRFC0010-BD

## 8-15 GHz Single Bit GaAs MMIC Phase Shifters

*Preliminary Datasheet v2*

### Features

- Frequency Range: 8-15GHz
- Single Bit 45°, 90° and 180° Phase Shifters
- 50Ω Matched RF Ports

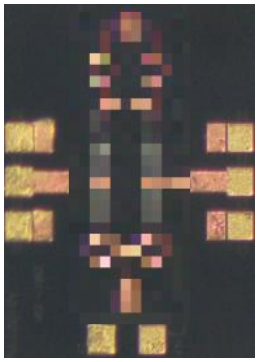


*45° Phase Shifter*

*90° Phase Shifter*

### Description

The VRFC00010-BD are a set of 8-15 GHz single bit phase shifters. Typical applications include Defence and Instrumentation markets.



*180° Phase Shifter*

### Electrical Specifications

*T=+25°C baseplate, $V_{ctrl}$ = 0/-5V*

| Parameter | Specification | | | Unit |
|---|---|---|---|---|
| | Typ. @8GHz | Typ. @11.5GHz | Typ. @15GHz | |
| 45º Phase Shifter | 43.8 | 45.2 | 50.4 | deg |
| 90º Phase Shifter | 95.7 | 87.9 | 96.9 | deg |
| 180º Phase Shifter | 183.2 | 181.4 | 177 | deg |
| Return Loss of 45º Phase shifter (I/O) | 10.12/7.6 | 13.2/14.2 | 16.8/17 | dB |
| Return Loss of 90º Phase shifter (I/O) | 17.6/21.8 | 21.5/20.7 | 16.5/15.7 | dB |
| Return Loss of 180º Phase shifter (I/O) | 7.4/7.4 | 12.7/12.7 | 9.4/9.4 | dB |
| Insertion Loss of 45º Phase shifter | 3 | 1.1 | 0.6 | dB |
| Insertion Loss of 90º Phase shifter | 1.7 | 1.4 | 1.8 | dB |
| Insertion Loss of 180º Phase shifter | 2.4 | 1.6 | 2.3 | dB |

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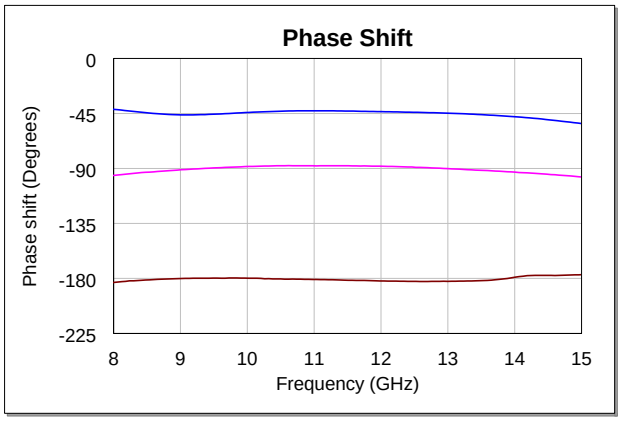
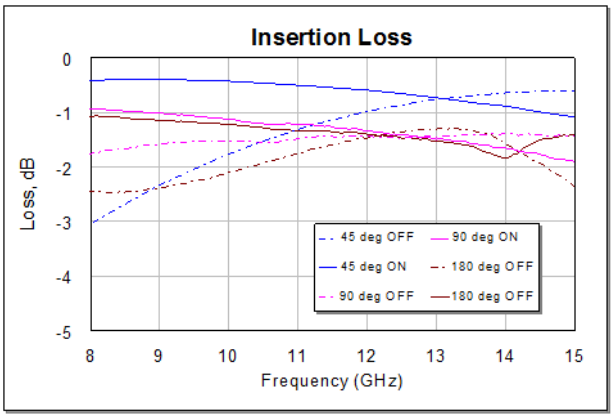
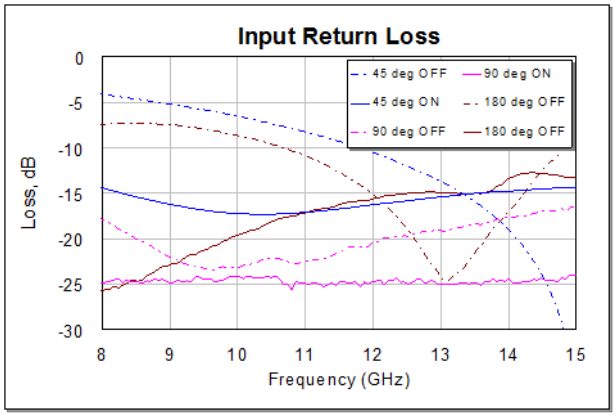
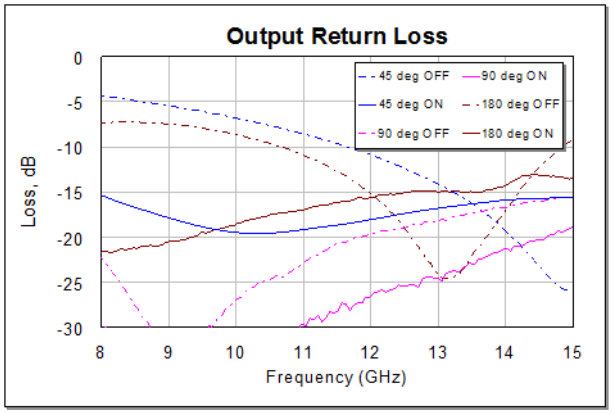
### Measured Performance (On-wafer)

*T=+25°C baseplate, $V_{ctrl}$ = 0/-5V*



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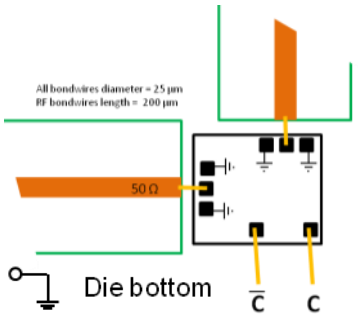
### Recommended Absolute Maximum Ratings [1]

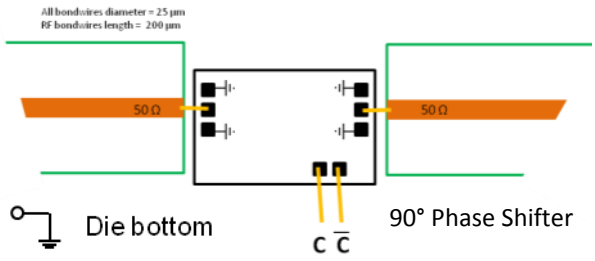
| Parameter | Symbol | Value | Notes |
|---|---|---|---|
| Control Voltage (+) | $V_{ctrl+}$ | +0.5 V | |
| Control Voltage (-) | $V_{ctrl-}$ | -7 V | |
| Control Current | $I_{ctrl}$ | 100 µA | |
| RF Input Power | $RF_{in}$ | 27 dBm | |
| Junction Temperature | $T_j$ | 175°C | For maximum median device lifetime, $T_j$ should be minimised |
| Storage Temperature | $T_{storage}$ | -55 to 150°C | |

*[1] Operation outside these conditions may cause permanent damage to the device. Combination of maximum rating conditions may reduce the values. Device performance at these ratings is not implied.*

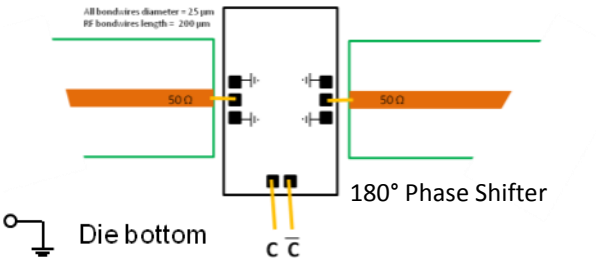
### Assembly & Bonding Diagram




45° Phase Shifter




90° Phase Shifter




180° Phase Shifter

| | 45° | 90° | 180° |
|---|---|---|---|
| Engineering Die Size | 2mm x 1mm | 2mm x 1.5mm | 2mm x 1.5mm |
| Est. Production Die Size | 0.9mm x 0.6mm | 1.3mm x 0.75mm | 0.9mm x 1.3mm |
| Die Thickness | 100µm | 100µm | 100µm |
| Minimum Bondpad Opening | 70µm x 70µm | 70µm x 70µm | 70µm x 70µm |

Minimal length (0.15nH) are recommended for RF bondwires. The RF input and output ports are DC blocked.

GaAs devices are ESD sensitive and precautions should be observed during storage, handling, assembly and testing.