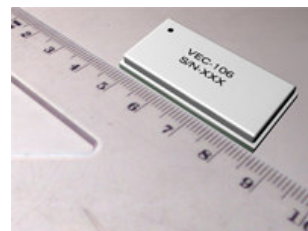


VEC-106 : Wideband SMT Digital Phase Shifter 0.8 – 1.8 GHz

Features

- 0.8 to 1.8 GHz Operation (Semicustom frequency bands are optional)
- 6 Bit SMT Phase Shifter with Driver
- 360° Coverage, LSB = 5.6°
- P1dB > +30 dBm, IP3 > +40dBm
- +5V or +3.3V Vcc/Logic Operation
- Very Low DC Power Consumption
- GaAs based, Fast switching
- SMT Package : 1.5"x0.75"x0.2"
- Coaxial SMA Package: Optional



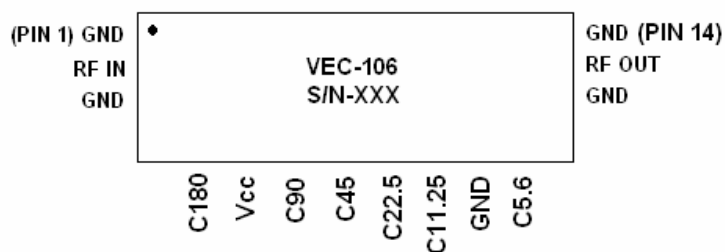
Application

- Phased Array Antenna
- Satellite Communication
- Smart Antenna Systems
- Cellular Base Stations

Description

The VEC-106 is a 6 bit miniature Digital Phase Shifter with 360° phase coverage in 5.6° Increments. This product is fully matched to 50 Ohms on both the input and output.

Pin Out (Top View)



| PIN Number | Designation |
|------------|-------------|
| 2 | RF IN |
| 13 | RF OUT |
| 4 | C180 |
| 6 | C90 |
| 7 | C45 |
| 8 | C22.5 |
| 9 | C11.25 |
| 11 | C5.6 |
| 5 | Vcc |
| 1 | GND |
| 3 | GND |
| 10 | GND |
| 12 | GND |
| 14 | GND |

**Truth Table**

| Symbol | Control Voltage | State |
|-------------------|-----------------|-------------|
| A1,A2,A3,A4,A5,A6 | Logic High | Reference |
| A1,A2,A3,A4,A5,A6 | Logic Low | Phase Shift |

Logic Low = 0 to +0.3 V

Logic High = According to Vcc Level

Recommended Operating Condition ¹

| Parameter | Symbol | Min | Typ | Max | Units |
|---------------------------|------------|----------------------|-------|--------------------|-------|
| Supply Voltage (option 1) | Vcc | + 4.5 | + 5 | + 5.5 | V |
| Supply Voltage (option 2) | Vcc | + 3 | + 3.3 | + 3.6 | V |
| Control Voltage | A1 thru A6 | | | | |
| Logic High | | $0.7 \cdot V_{cc}^2$ | Vcc | $1.1 \cdot V_{cc}$ | V |
| Logic Low | | 0 | 0 | + 0.3 | V |
| Operating Temperature | Tb | -40 | | +85 | ° C |

1. Operation at other than Recommended Condition values may result in performance outside the guaranteed limits.
2. But not less than +3V.

Maximum Ratings ³

| Parameter | Symbol | Absolute Maximum | Units |
|-----------------------|------------|------------------|-------|
| RF Input Power | Pin | +33 | dBm |
| Source Supply Voltage | Vcc | -0.2 , +7 | V |
| Control Voltage | A1 thru A6 | -0.2 , +7 | V |
| Storage Temperature | Tstg | -55 to +125 | ° C |

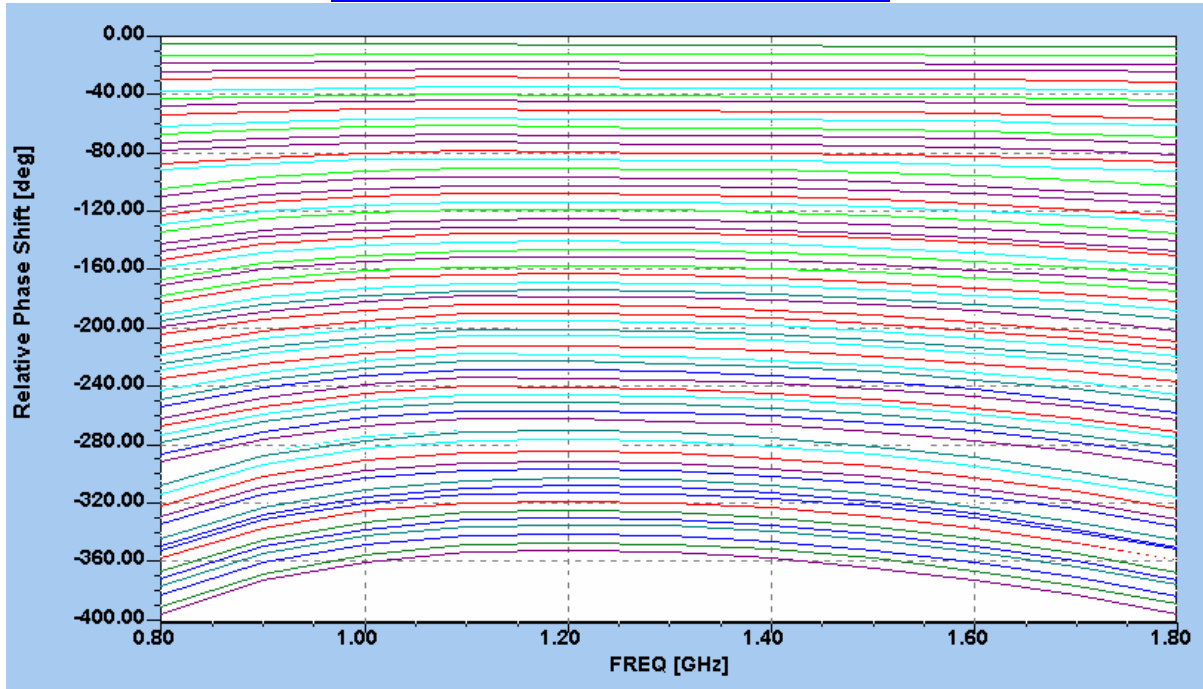
3. Operating outside of these ranges may reduce product reliability or cause damage.

**Electrical Characteristics**

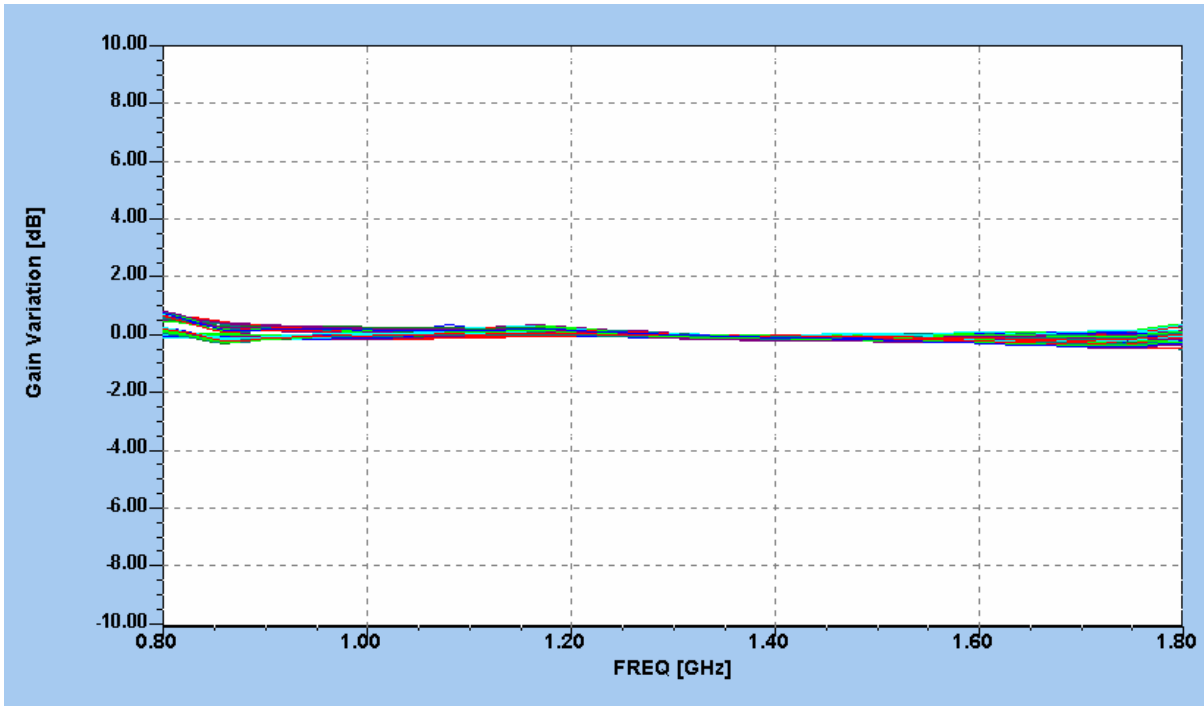
| Parameter | Typical | Typical |
|---|------------------------|-----------------------|
| Frequency Range | 1000 – 1500 MHz | 800 – 1800 MHz |
| Insertion Loss (Reference State) | 5 ± 0.1 dB | 5 ± 0.4 dB |
| Insertion Loss Temp Variation | -0.015 dB/°C | -0.015 dB/°C |
| Loss Change Between States | + 0.3/-0.2 dB | + 0.8/-0.5 dB |
| Input Return Loss (All State) | <16 dBr | <14.5dBr |
| Output Return Loss (All State) | <17.5 dBr | <16.5dBr |
| RMS Phase Error | 1.9° | 5.5° |
| <u>Absolute Phase:</u> 5.6° | 5.95° ± 0.7° | 6.3° ± 1° |
| 11.25° | 12.05° ± 0.45° | 12.25° ± 0.6° |
| 22.5° | 22.75° ± 0.35° | 23.85° ± 1.45° |
| 45° | 44.1° ± 0.6° | 45.9° ± 2.4° |
| 90° | 91.4° ± 0.9° | 96.6° ± 6.1° |
| 180° | 180.2° ± 2.6° | 189.7° ± 12.3° |
| Phase Stability Over Temp | ± 0.25° | ± 0.25° |
| Input P1dB @ Vcc = +5V | > +30 dBm | > +30 dBm |
| @ Vcc = +3.3V | +27 dBm | +27 dBm |
| Input IP3 @ Vcc = +5V | > +40 dBm | > +40 dBm |
| @ Vcc = +3.3V | +37 dBm | +37 dBm |
| Switching Speed | < 500 nsec | < 500 nsec |
| Power Supply : Vcc = +5V | I < 1.5 mA | I < 1.5 mA |



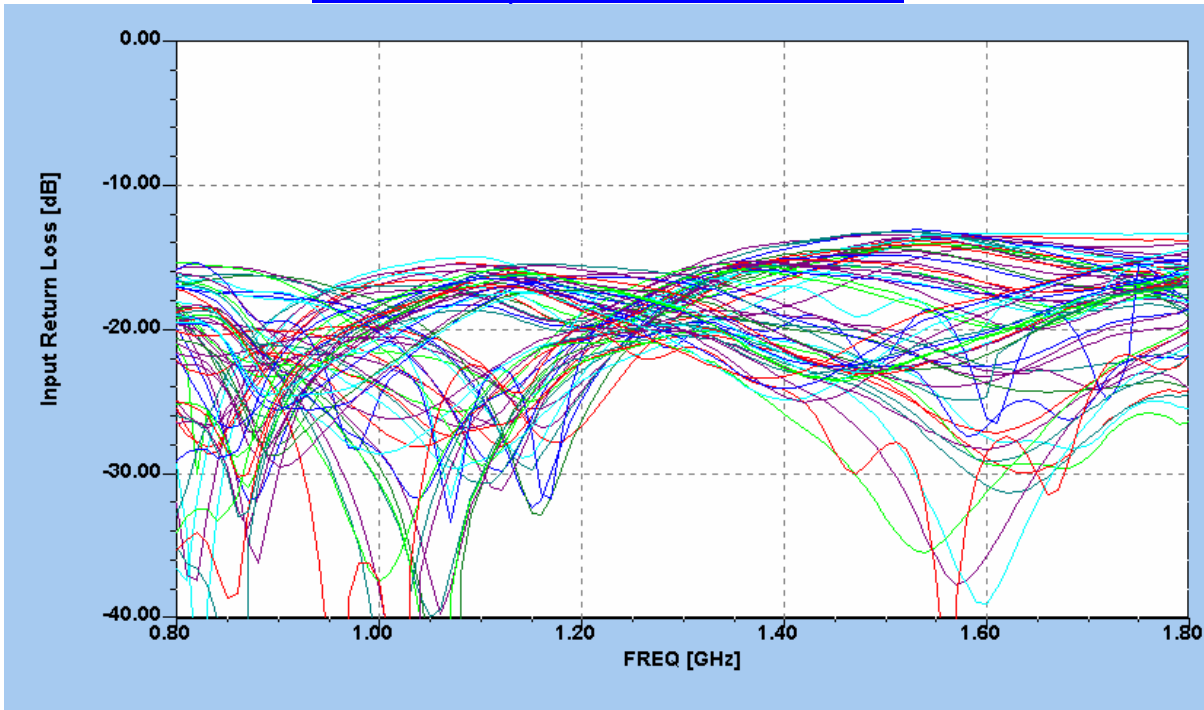
Measured Accumulated Phase Shift



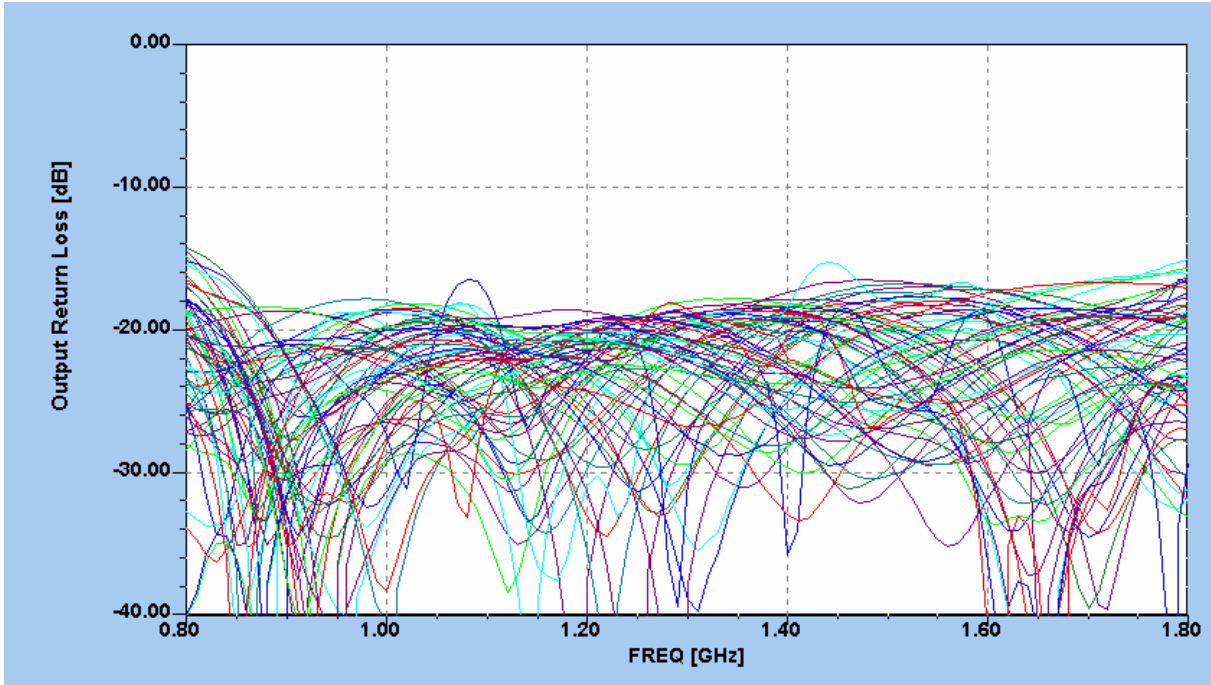
Measured Insertion Loss Variations between states



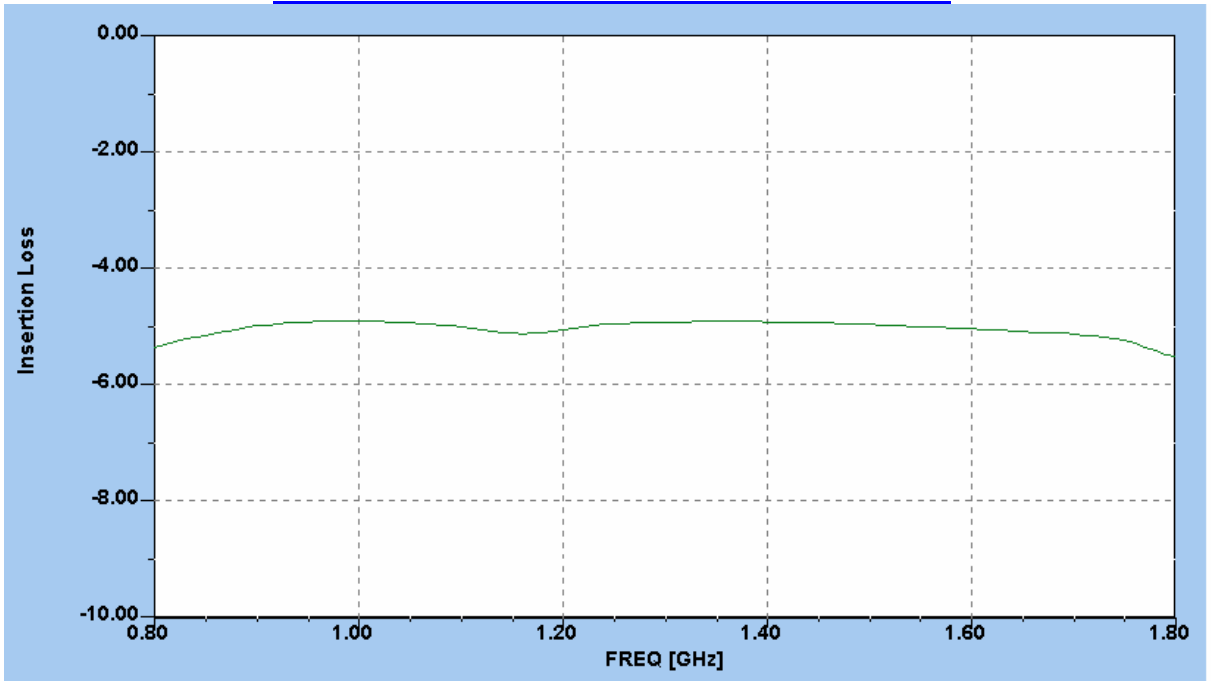
Measured Input Return Loss all states



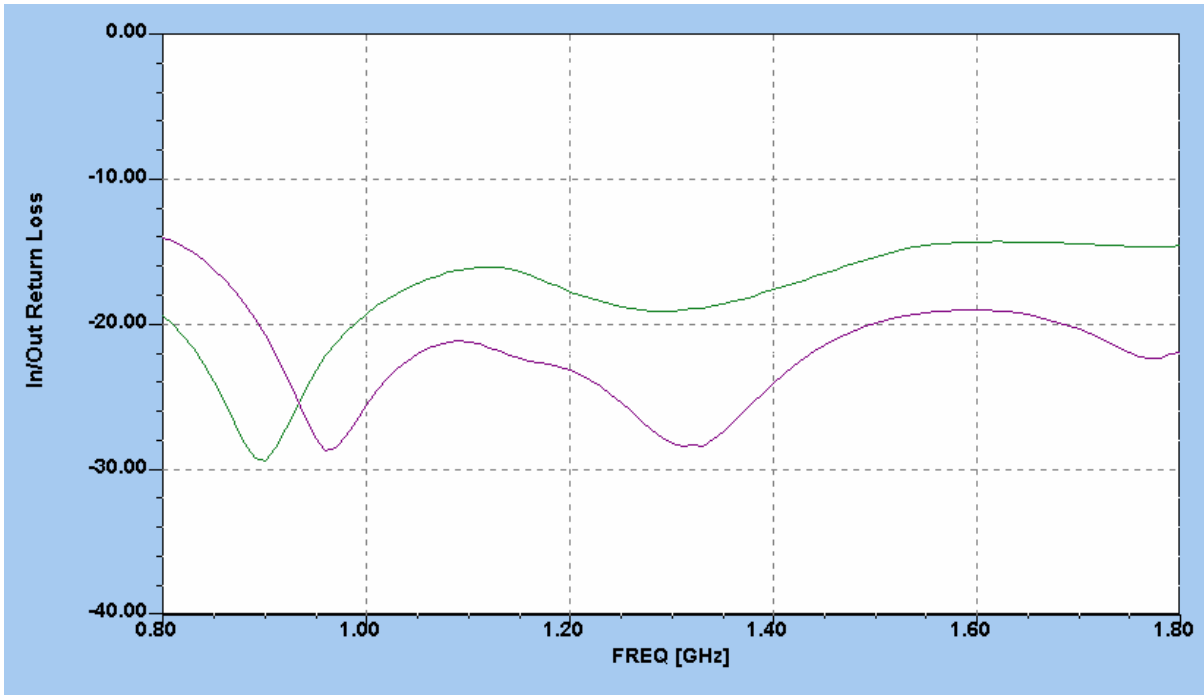
Measured Output Return Loss all states



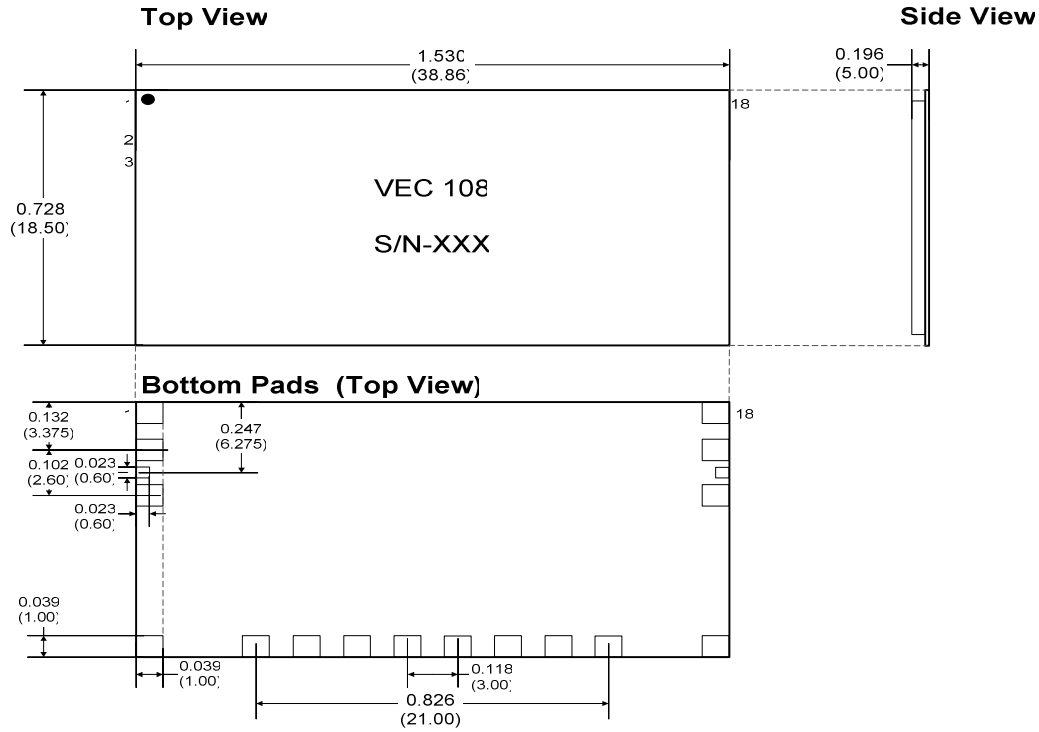
Measured Insertion Loss – Reference State



Measured Return Loss – Reference State



Nominal Package Dimensions
Dimensions in inches (millimeters)



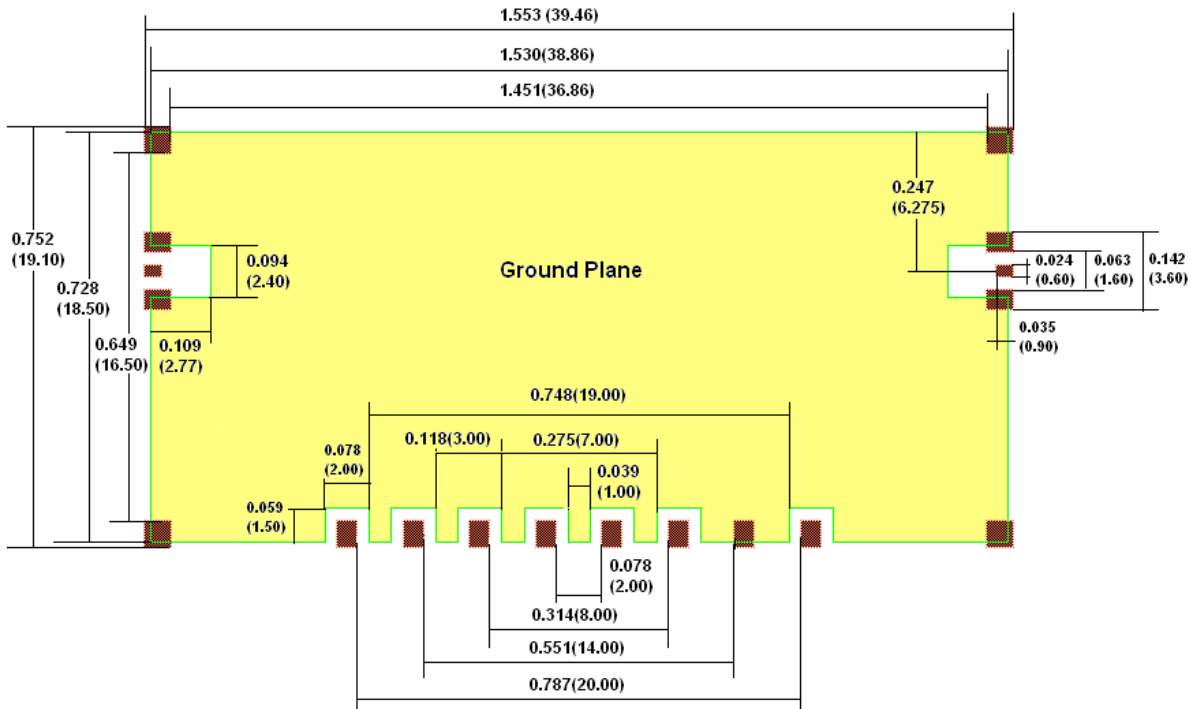
Operating Instruction

This device is static sensitive. Please handle it with care.



Surface Mount Land Pattern

Dimensions in inches (millimeters)



Contacts

Tel:+972-8-6724459 Fax:+972-8-6726559 Web: www.Vectria.co.il
 Cellular : +972-54-7538252 e-mail : Sales@vectria.co.il
 Mailing Address: Givaty 46 Ashkelon 78471 ISRAEL
 Main Facility : Shderot Hatasia 8, Northern Industrial zone, Ashke