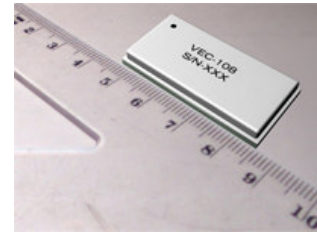




VEC-108: Wideband SMT Digital Phase Shifter 2.4 – 4.2 GHz

Features

- 2.4 to 4.2 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

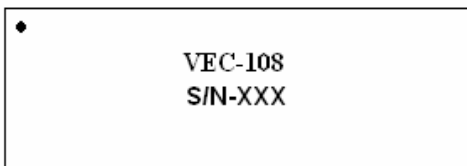
- Phased Array Antenna
- Satellite Communication
- Smart Antenna Systems
- WLAN, WIMAX Base Stations

Description

The VEC-108 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 1) GND
 (PIN 2) GND
 (PIN 3) RF IN
 (PIN 4) GND



(PIN 5) GND

(PIN 6) C180 (PIN 7) VCC (PIN 8) C90 (PIN 9) C45
 (PIN 10) C22.5 (PIN 11) C11.25 (PIN 12) GND (PIN 13) C5.6

(PIN 18) GND
 (PIN 17) GND
 (PIN 16) RF OUT
 (PIN 15) GND

(PIN 14) GND

PIN Number	Designation
3	RF IN
16	RF OUT
6	C180
8	C90
9	C45
10	C22.5
11	C11.25
13	C5.6
7	VCC
1	GND
2	GND
4	GND
5	GND
12	GND
14	GND
15	GND
17	GND
18	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 Temp.	Ts	-55, +125	° C

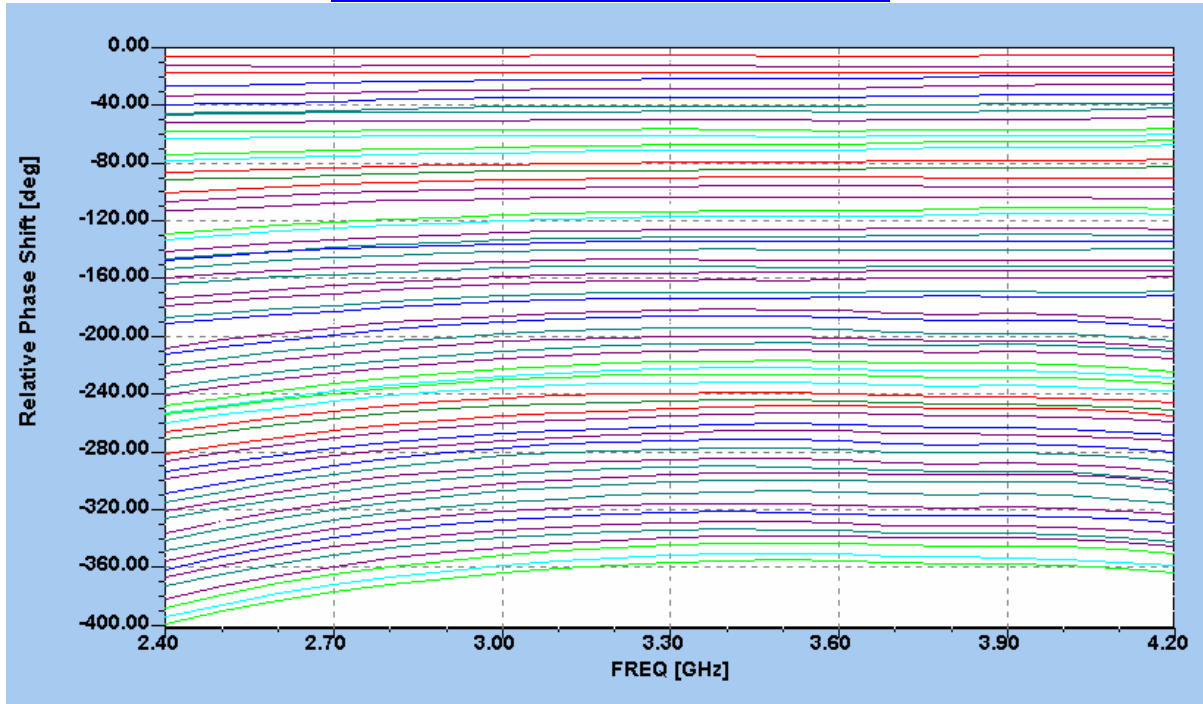
3. Operating outside of these ranges may reduce product reliability or cause damage.

**Electrical Characteristics**

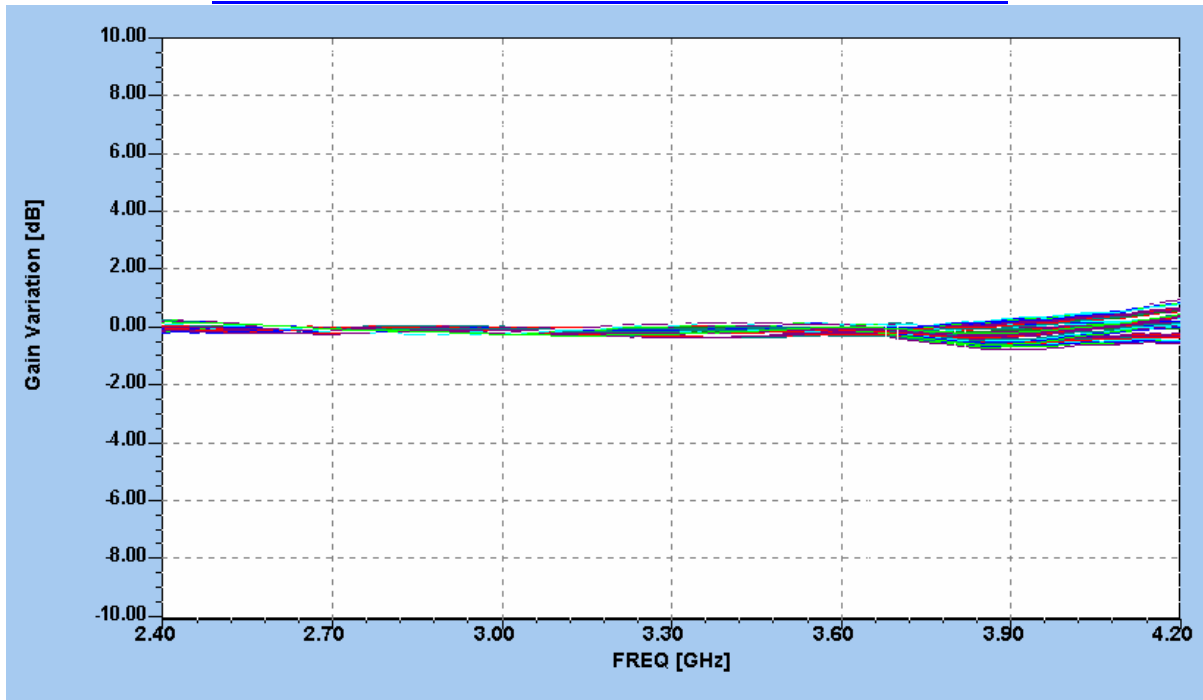
Parameter	Typical	Typical
Frequency Range	3000 – 3600 MHz	2400 – 4200 MHz
Insertion Loss (Reference State)	6.5 ± 0.3 dB	6.9 ± 1.2 dB
Insertion Loss Temp Variation	-0.015 dB/°C	-0.015 dB/°C
Loss Change Between States	± 0.2 dB	± 0.8 dB
Input Return Loss (All State)	< 14 dB _r	< 12 dB _r
Output Return Loss (All State)	< 14.5dB _r	< 14.5 dB _r
RMS Phase Shift	1.8°	5°
<u>Absolute Phase:</u> 5.6°	5.52° ± 0.075°	5.53° ± 0.23°
11.25°	12.55° ± 0.45°	12.55° ± 0.45°
22.5°	22° ± 0.6°	22.4° ± 4.1°
45°	44.1° ± 0.32°	43.85° ± 2.15°
90°	90.25° ± 1°	94.55° ± 5.35°
180°	182.15° ± 1.85°	190.65° ± 10.35°
Phase Stability Over Temp	± 0.25°	± 0.25°
Input P1dB @ Vcc = +5V	> +30 dBm	> +30 dBm
@ Vcc = +3V	+27 dBm	+27 dBm
Input IP3 @ Vcc = +5V	> +40 dBm	> +40 dBm
@ Vcc = +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

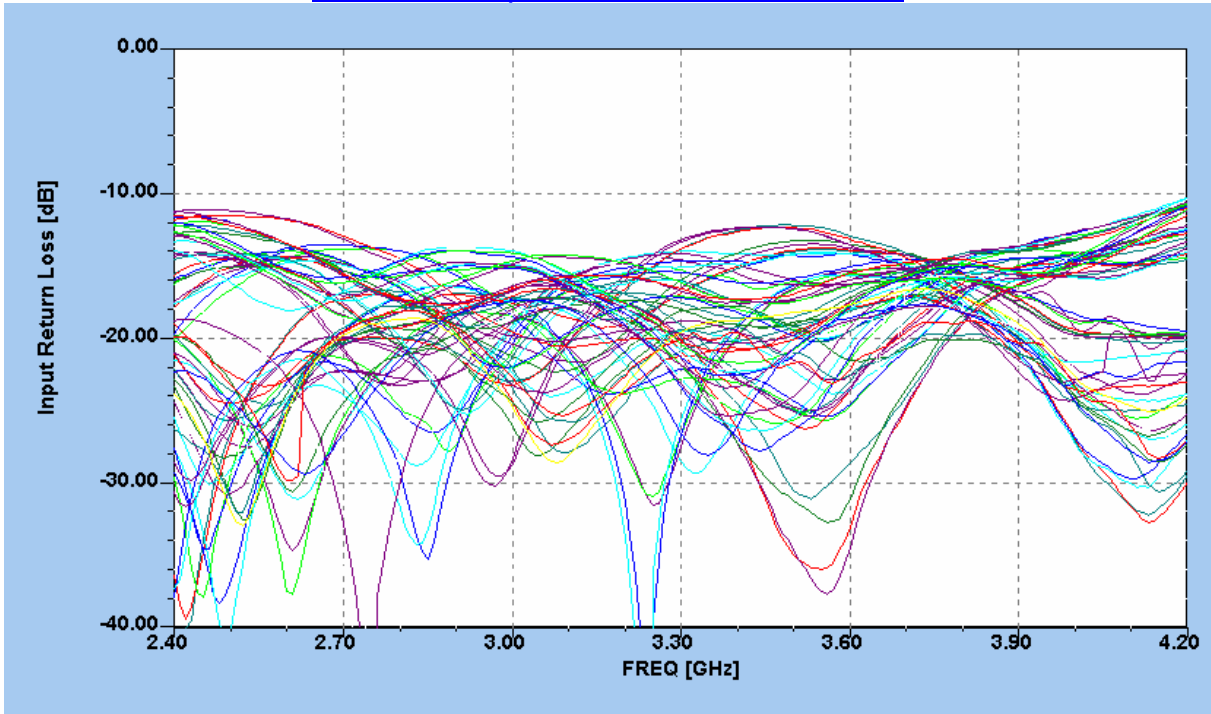


Measured Insertion Loss Variations between states

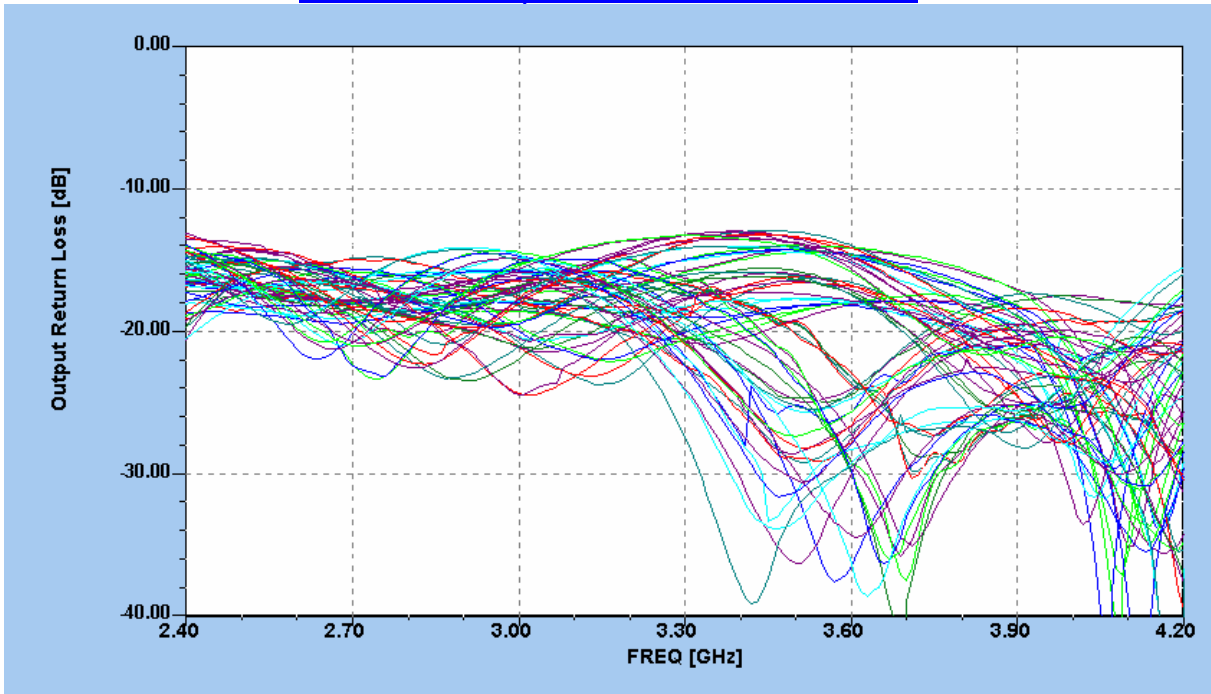




Measured Input Return Loss all states

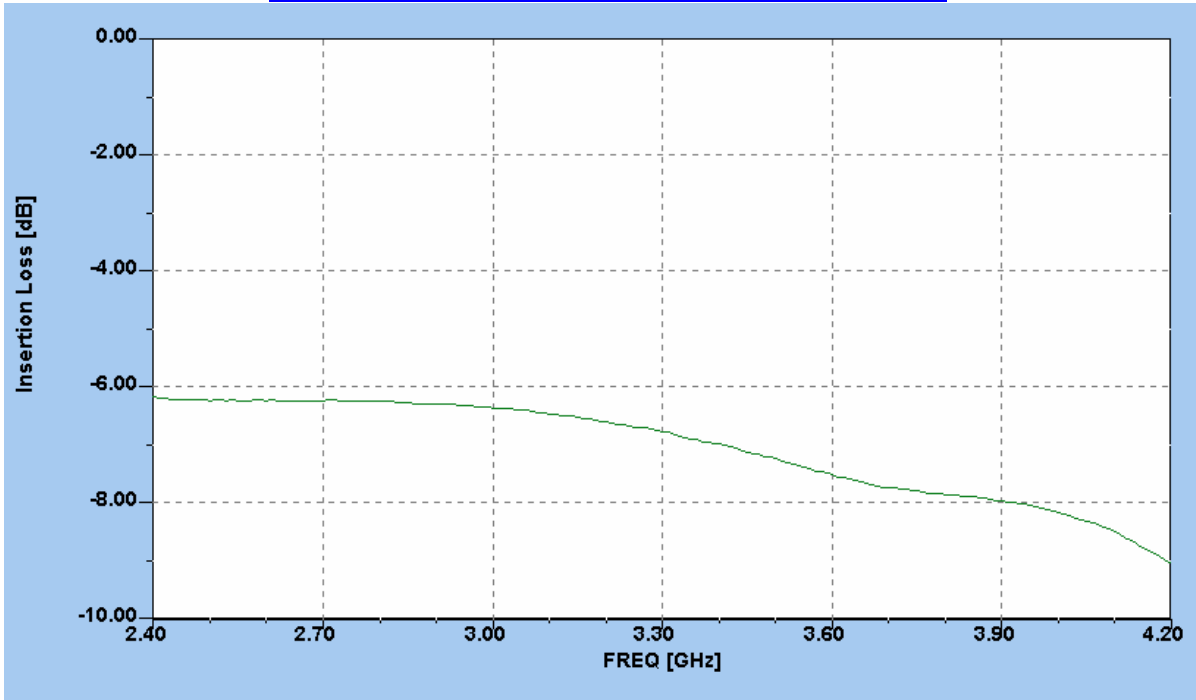


Measured Output Return Loss all states

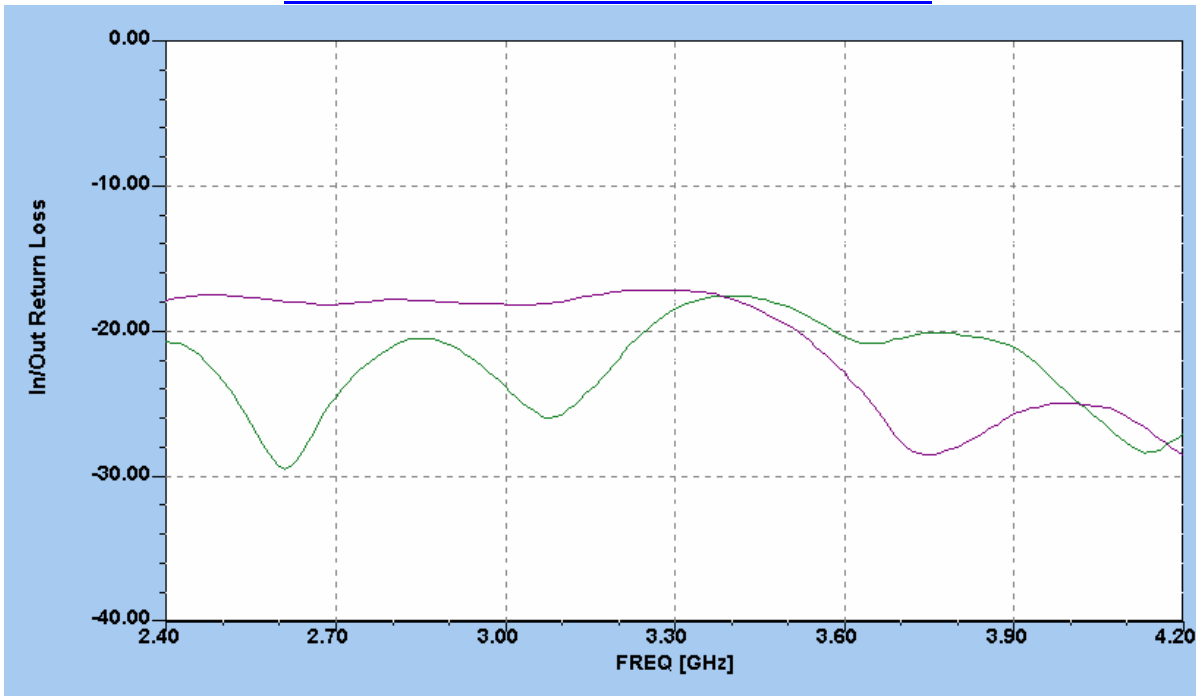




Measured Insertion Loss – Reference State

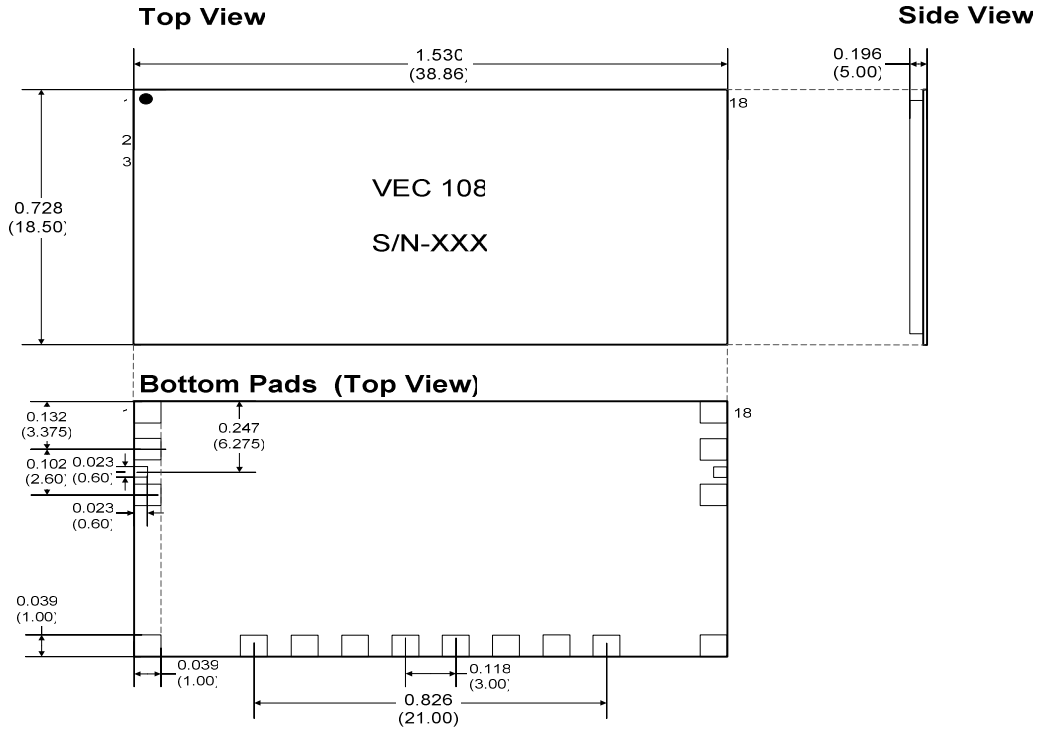


Measured Return Loss – Reference State





Nominal Package Dimensions Dimensions in inches (millimeters)



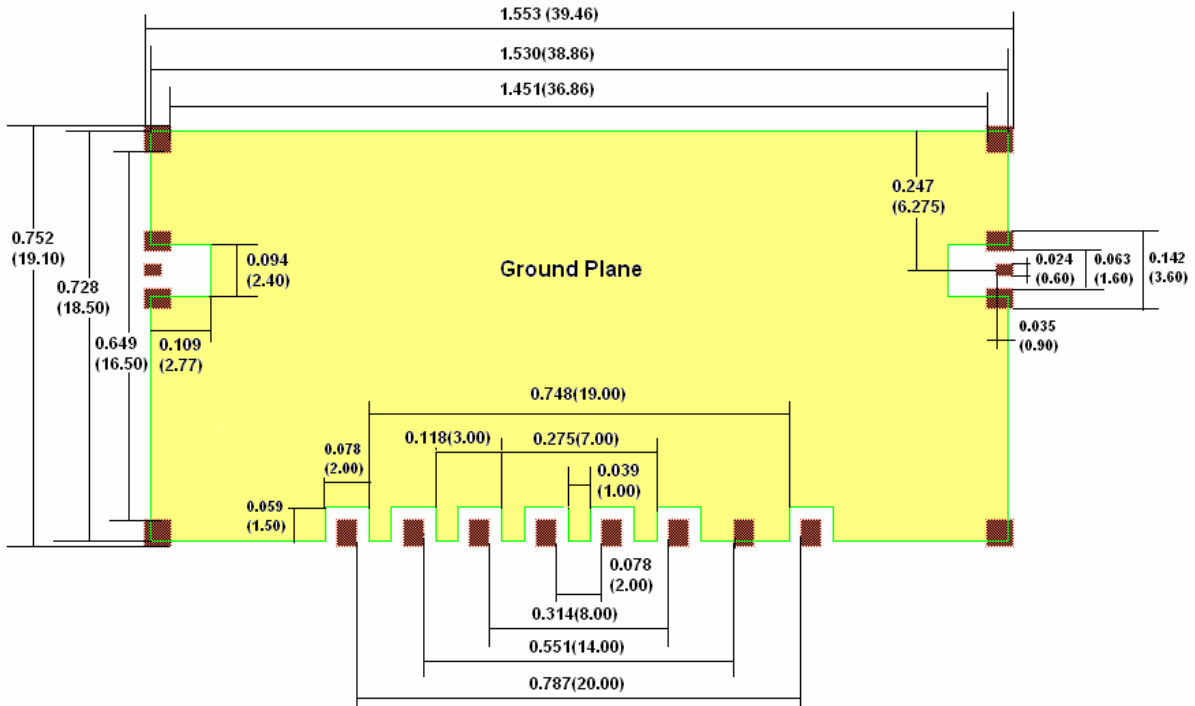
Operating Instruction

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





Surface Mount Land Pattern Dimensions in inches (millimeters)



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