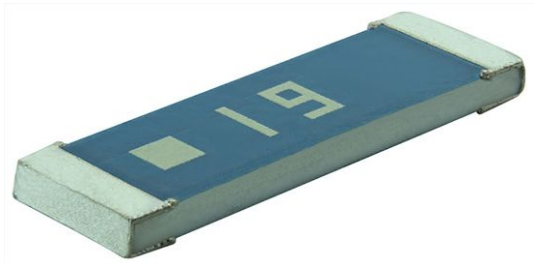
Surface Mount Ceramic Chip Antennas for 1.575 GHz



VJ5101W157GXCMT chip antenna

The VJ5101W157 series are small form-factor, high-performance chip-antennas optimized for GPS applications.

Designed for GPS applications, the VJ5101W157GXCMT antenna shows a superb performance and excellent peak/ average gain, allowing longer ranges than similar GPS patch antennas.

DESCRIPTION

The VJ5101W157GXCMT ceramic chip antenna is a small form-factor, high-performance, chip-antenna designed for operation at 1.575 GHz. It allows manufacturers to design high quality products that do not bear the penalty of a large external antenna, and is designed to be assembled onto a PC board using a standard reflow process.

FEATURES

RoHS COMPLIANT

- Small outline (10 mm x 3.2 mm x 0.8 mm)
- 50 Ω unbalanced tuning interface
- Linear polarization
- Assembled onto a PCB in the standard reflow process
- Wide transmit / receive range
- High stability in temperature / humidity changes
- Excellent peak / average gain
- Wide operating temperature range (- 40 °C to + 85 °C)
- Material categorization: For definitions of compliance please see www.vishay.com/doc?99912

APPLICATIONS

- GPS L1 band
- Transmission / reception at 1.575 GHz

ELECTRICAL SPECIFICATIONS

Operating temperature: - 40 °C to + 85 °C

Frequency range (transmission / reception): 1575 MHz ± 50 MHz

Note

- Electrical characteristics at + 25 °C unless otherwise specified.

QUICK REFERENCE DATA

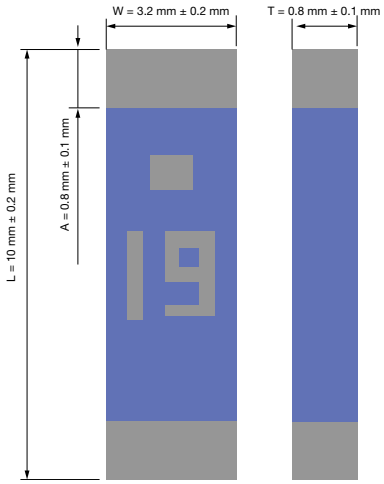
SERIES	FREQUENCY (MHz)	MAX. GAIN (dBi)	AVERAGE GAIN (dBi)	BANDWIDTH (- 10 dB) (MHz)	BANDWIDTH (- 3 dB) (MHz)
VJ5101W157GXCMT	1575	+ 2.5	- 1.60	50	110

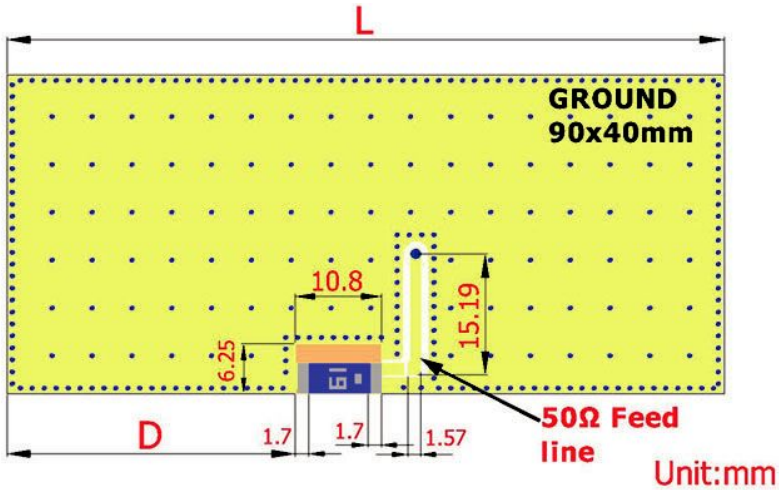
CHIP ANTENNA PERFORMANCE

NOMINAL FREQUENCY (MHz)	NOMINAL IMPEDANCE (Ω)	1.575 GHz PEAK GAIN (dBi)	1.575 GHz AVERAGE GAIN (dBi)	1.575 GHz REFLECTED POWER LOSS	1.575 GHz INSERTION POWER LOSS	- 3 dB BANDWIDTH 1.575 GHz	- 3 dB REFLECTED POWER LOSS	- 10 dB BANDWIDTH 1.575 GHz	- 10 dB REFLECTED POWER LOSS
1575	50	- 1.60	+ 2.5	< - 15 dB	< 4 %	110	50 %	50	10 %
				< 3.2 %	< 0.14 dB		3 dB		0.46 dB

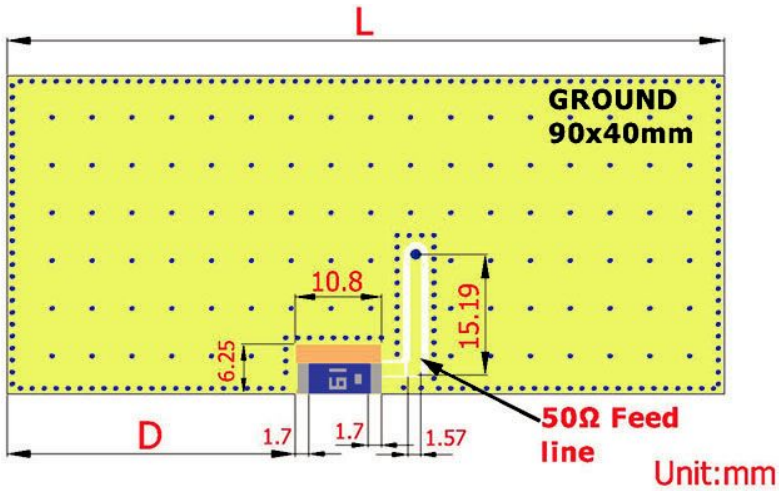
FOOTPRINT, MECHANICAL, AND PCB DIMENSIONS

The antenna footprint and mechanical dimensions are presented in figure 7. Optimal tuning is adjusted according to PCB layout.

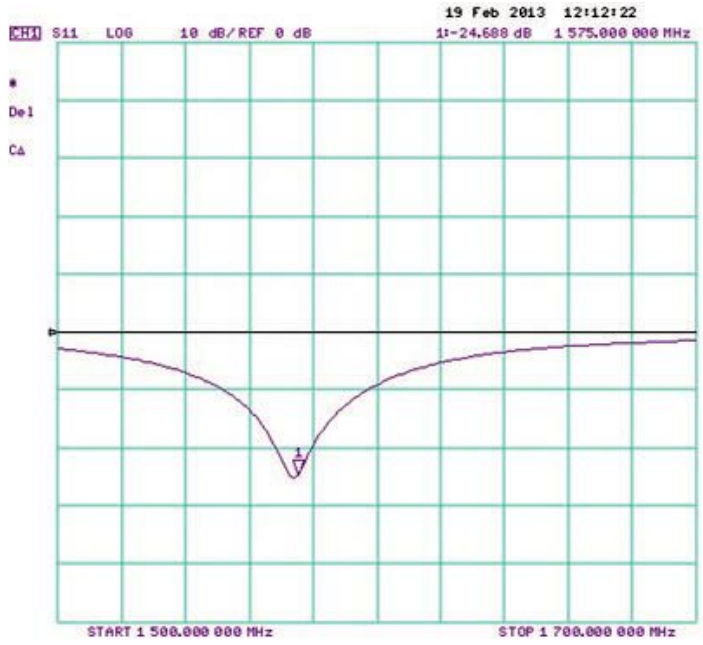
FIGURE	SYMBOL	DIMENSION (mm)
	L	10 ± 0.20
	W	3.2 ± 0.20
	T	0.80 ± 0.10
	A	0.80 ± 0.10



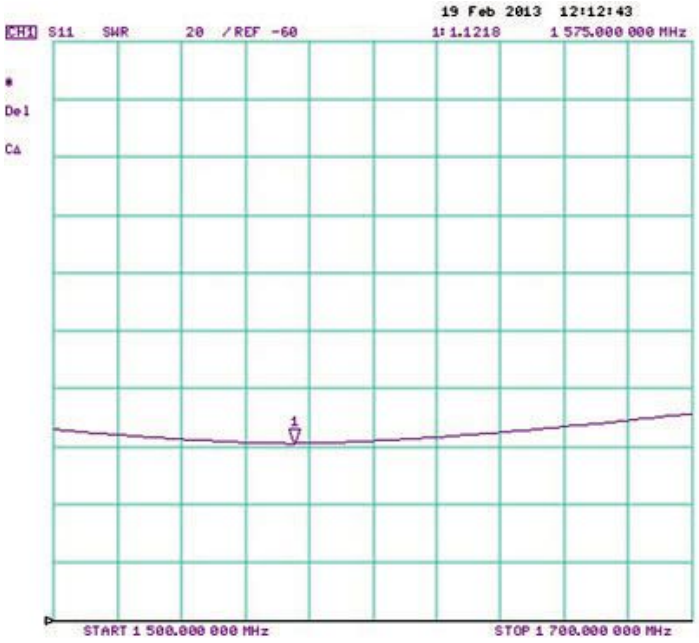
Layout Design



Antenna on Test Board (thickness 0.8 mm)



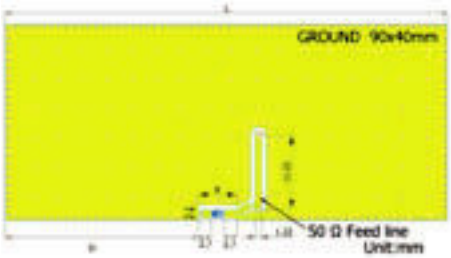
Antenna S11 on Test Board



Antenna VSWR on Test Board

RADIATION PATTERN

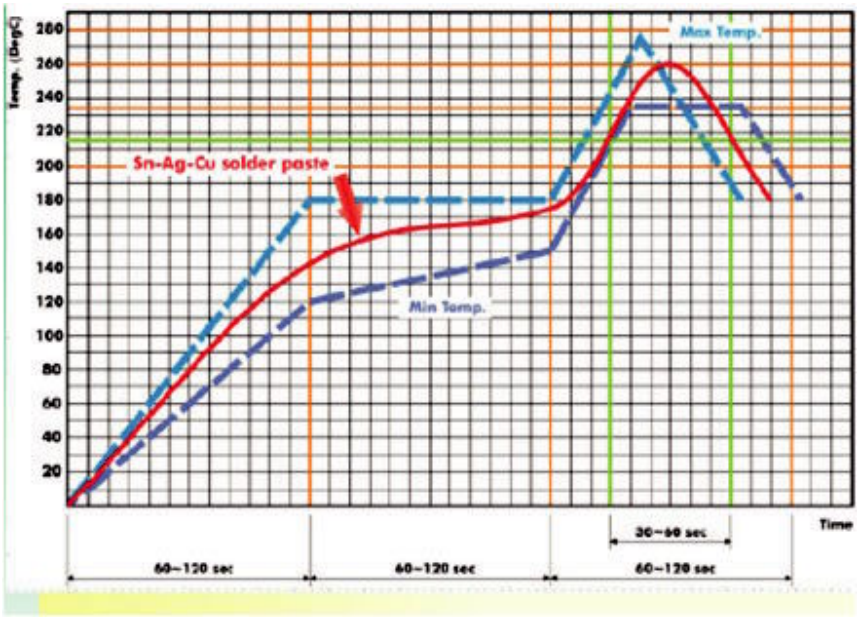
Radiation pattern and gain were dependent on measurement board design. The specification of VJ5101W157GXCMT antenna was measured based on the PCB size and installation position as shown in the below figure test board



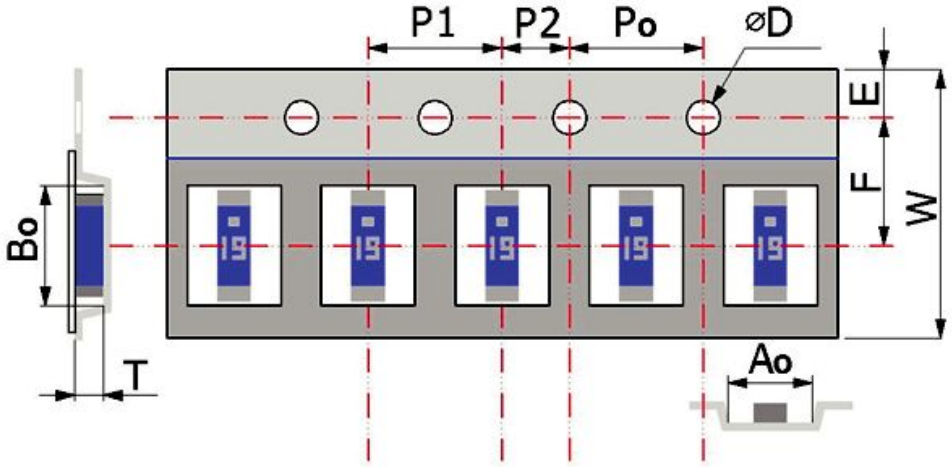
	VERTICAL	HORIZONTAL
Y - Z Plane Average Gain = 0.651 dBi	Peak Gain = - 6.92 dBi, Average Gain = - 12.58 dBi	Peak Gain = 2.49 dBi, Average Gain = 0.44 dBi
X - Z Plane Average Gain = - 3.82 dBi	Peak Gain = 1.27 dBi, Average Gain = - 4.23 dBi	Peak Gain = - 8.51 dBi, Average Gain = - 14.30 dBi
X - Y Plane Average Gain = - 2.93 dBi	Peak Gain = 1.42 dBi, Average Gain = - 3.37 dBi	Peak Gain = - 7.87 dBi, Average Gain = - 13.13 dBi

SOLDERING CONDITION

Typical examples of soldering processes that provide reliable joints without any damage are given in figure 2.



PACKAGING



PLASTIC TAPE SPECIFICATIONS (Dimensions in mm)									
A_O	B_O	ØD	T	W	E	F	P_O	P_1	P_2
3.40 ± 0.10	10.20 ± 0.10	1.50 ± 0.10	1.00 ± 0.10	24 ± 0.30	1.75 ± 0.10	11.50 ± 0.10	4.00 ± 0.10	8.00 ± 0.10	2.00 ± 0.10

ORDERING INFORMATION	VISHAY MATERIAL	PACKAGING QUANTITY
VJ5101W157 Chip Antenna	VJ5101W157GXCMT	2000 pieces

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