

**2.92 mm, 2.4 mm, 1.85 mm**

**Withwave's End Launch connectors** are specially designed for well-used high frequency substrates to minimize electromagnetic effects including impedance discontinuities from coaxial to GCPWG (Grounded Coplanar Waveguide) and Top Ground Microstrip structure. The types of connectors are 2.92 mm, 2.4 mm and 1.85 mm. We solve your performance and cost problems.



## ■ Features

- Now available in : **2.92 mm (40 GHz), 2.40 mm (50 GHz), 1.85 mm (67 GHz)**
- **GCPWG, Top Ground Microstrip structure**
- Easy Installation on designed substrate
- No Soldering required



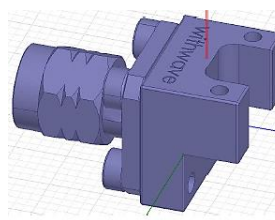
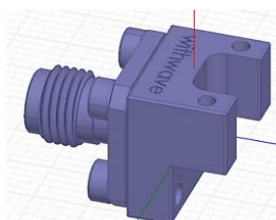
## ■ Application

- RFIC Chip set evaluation board
- High data rate ASIC and SoC evaluation module test
- Substrate Characterization



## ■ Design Assistance

- 3D Model for Mechanical Layout (STEP file)
- **ANSYS HFSS models** (version 17.0 or newer) for 3D EM(Electromagnetic) Simulation



# End Launch Connectors

**withwave**

**2.92 mm, 2.4 mm, 1.85 mm**

Versatile RF & MW Test Solutions

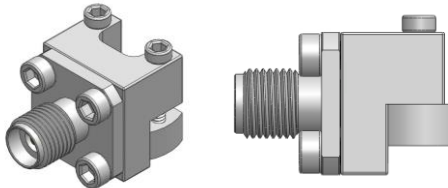
## ■ Specification

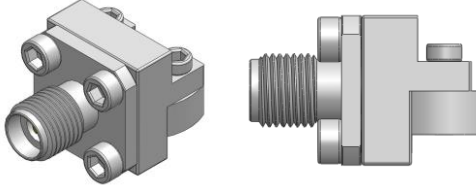
Scope	Items	Specification
Electrical	Freq. range	DC to 40 GHz (2.92 mm type) DC to 50 GHz (2.4 mm type) DC to 67 GHz (1.85 mm type)
	Impedance	50 Ohm
	VSWR(Max)	1.40 : 1 (to 40 GHz) 1.40 : 1 (to 50 GHz) 1.40 : 1 (to 67 GHz)
Material	Connector type	2.92 mm, 2.4 mm, 1.85 mm
	Body & Block	Stainless Steel
	Contact	BeCu with Gold Plated

\* RoHS Compliant



## ■ Ordering Information

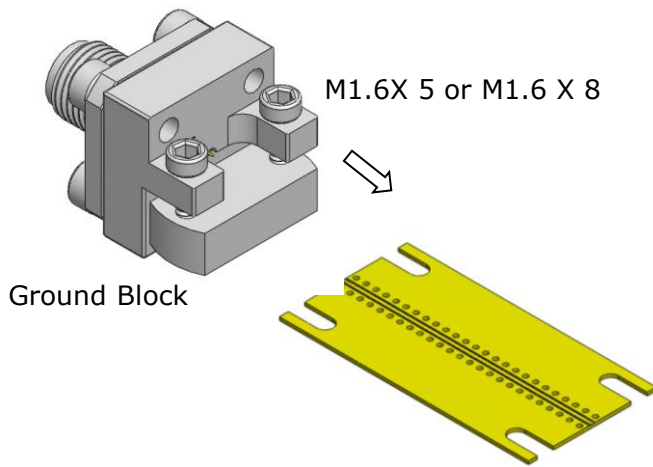
Application	Connector	Type	Part No.
<b>Standard Profile</b> 	2.92 mm	Female	EL03FS001
		Male	EL03MS001
	2.4 mm	Female	EL02FS001
		Male	EL02MS001
	1.85 mm	Female	EL01FS001
		Male	EL01MS001

Application	Connector	Type	Part No.
<b>Low Profile</b> 	2.92 mm	Female	EL03FS002
		Male	EL03MS002
	2.4 mm	Female	EL02FS002
		Male	EL02MS002
	1.85 mm	Female	EL01FS002
		Male	EL01MS002

## ■ Installation Procedure

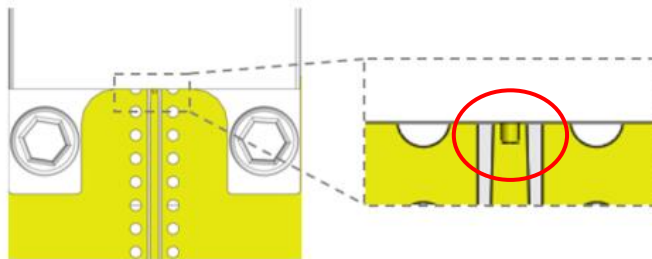
### STEP 1 :

Insert end launch connector (including block & screws) in the edge position of substrate.



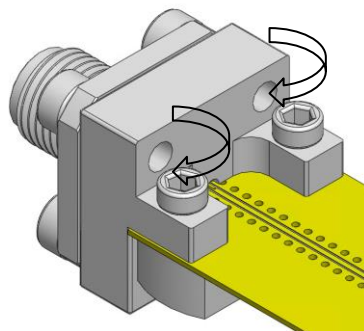
### STEP 2:

Ensure the pin is centered on the trace.



### STEP 3:

Ensure the block is tight against the substrate.

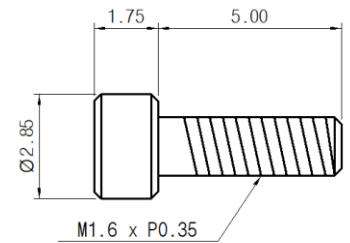
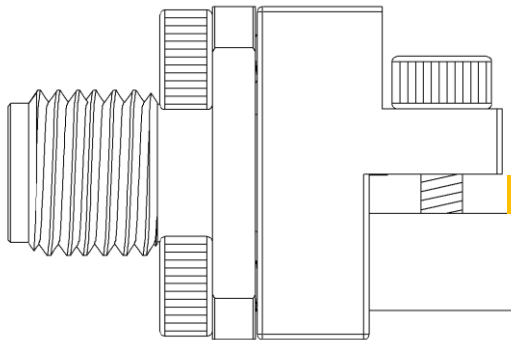


# End Launch Connectors

## ■ Maximum PCB Thickness (Low Profile type)

Unit : mm

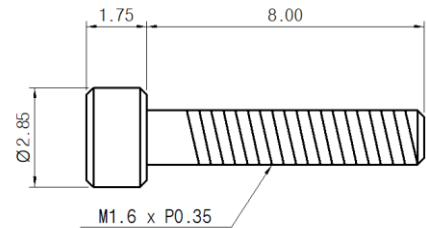
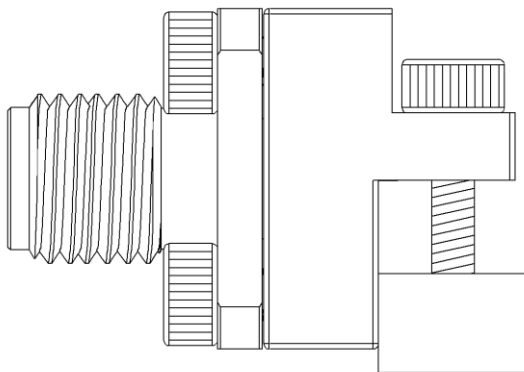
**Bolt Size: M1.6 x L5**



PCB

**Max. 1.5 mm**

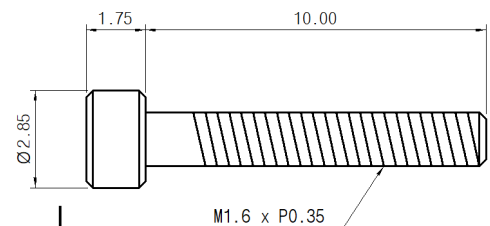
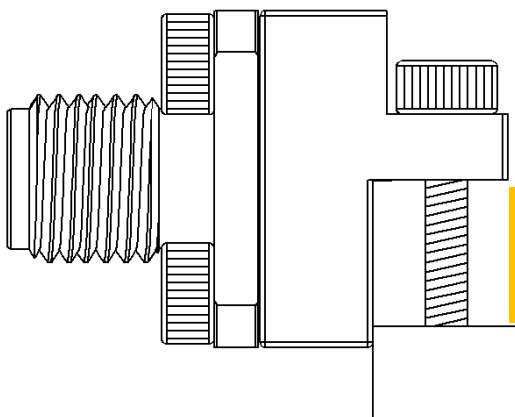
**Bolt Size: M1.6 x L8**



PCB

**Max. 3.5 mm**

**Bolt Size: M1.6 x L10**



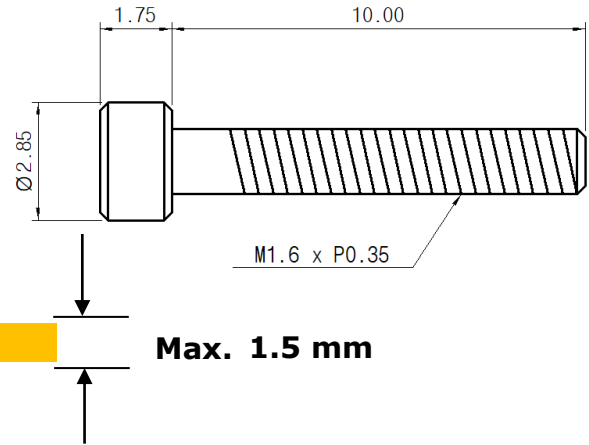
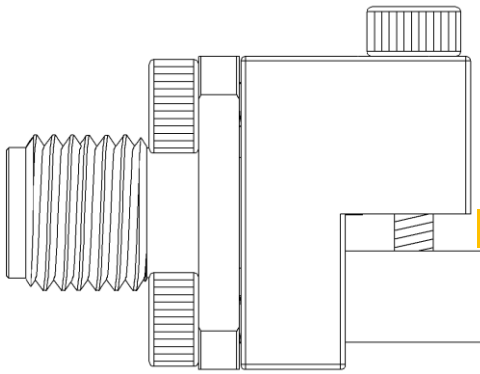
PCB

**Max. 5.5 mm**

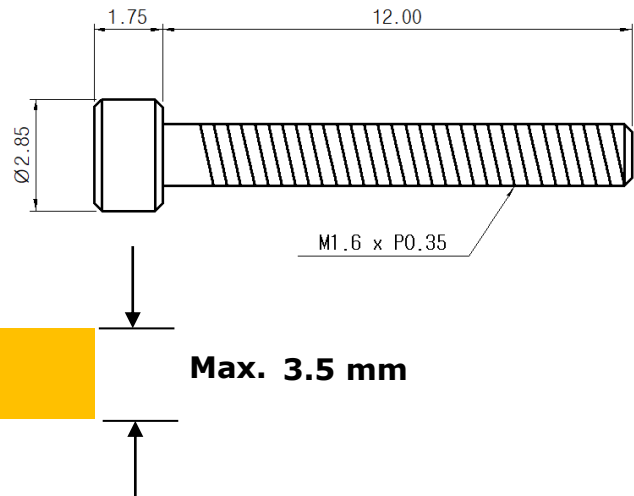
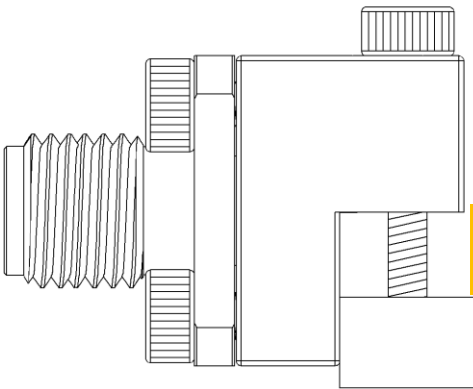
## Maximum PCB Thickness (Standard Profile type)

Unit : mm

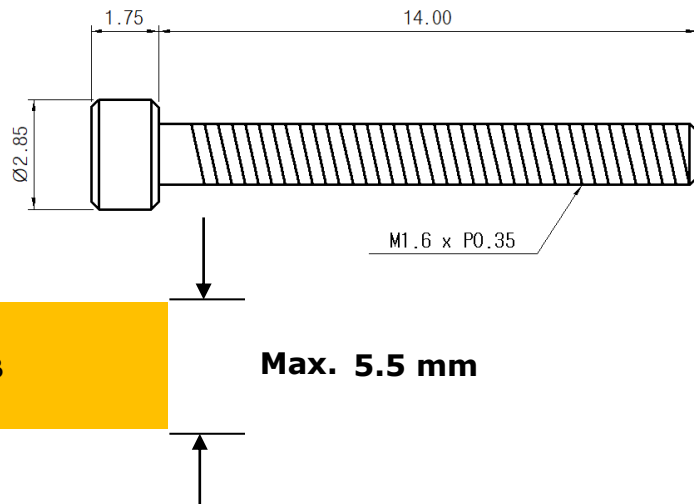
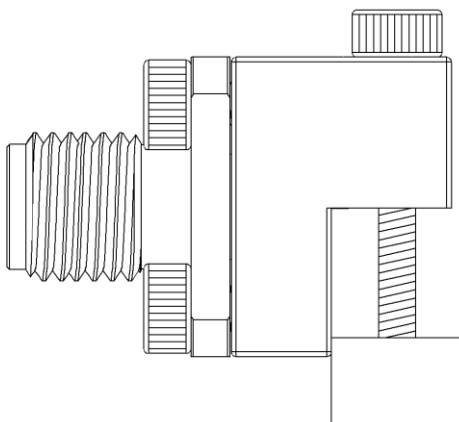
**Bolt Size: M1.6 x L10**



**Bolt Size: M1.6 x L12**



**Bolt Size: M1.6 x L14**



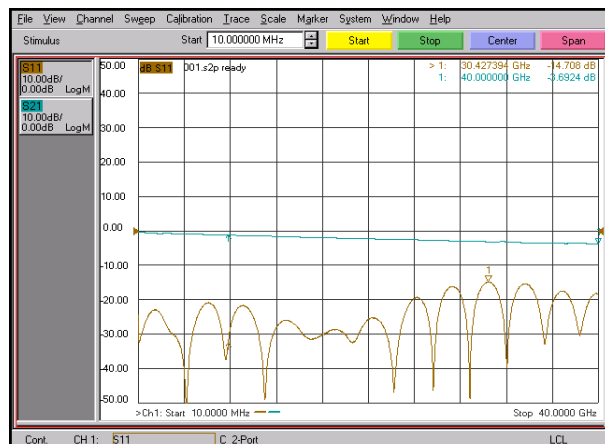
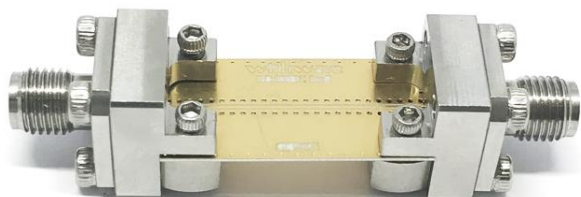
### Test Result

## 2.92mm Type GCPWG Structure

Freq. : 10 MHz to 40 GHz

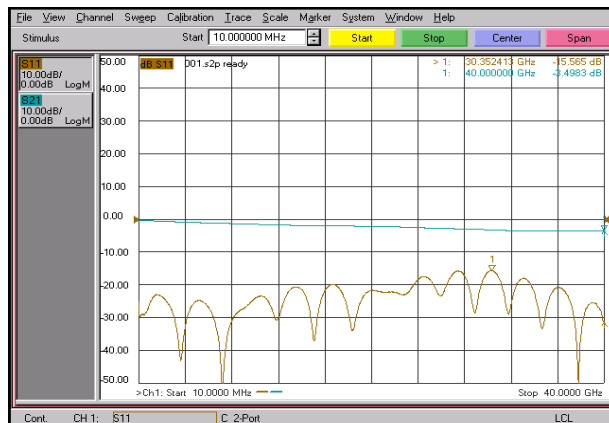
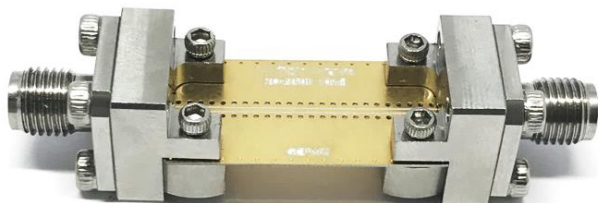
Substrate : RO4003C (8 mil)

Part No. : EL03FS002



Substrate : RO4350B (10 mil)

Part No. : EL03FS002



Substrate : Duroid 5880 (5 mil)

Part No. : EL03FS002



\* Substrate length : 1 inch (=25.4 mm)

### ■ Test Result

## 2.92mm Type

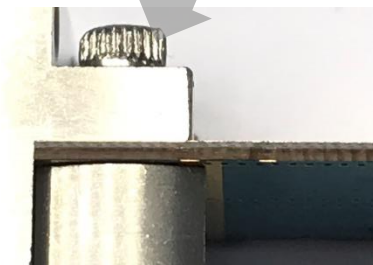
### GCPWG Structure (Multilayer)

Substrate : RO4350B (10 mil)+ FR4

Part No. : EL03FS002



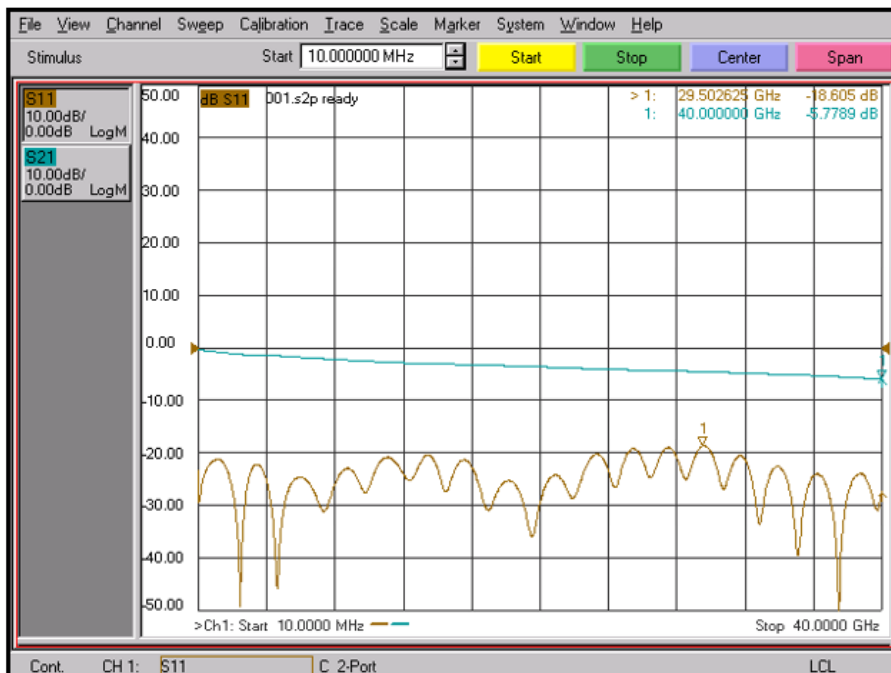
\* Substrate length : 39.9 mm



RO4350B 10 mil

FR4 (thickness: 0.45 mm)

Freq. : 10 MHz to 40 GHz





### Test Result

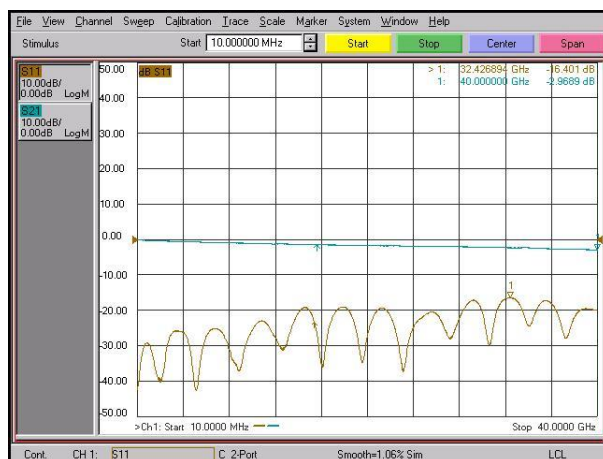
## 2.92mm Type

### Top Ground Microstrip

Freq. : 10 MHz to 40 GHz

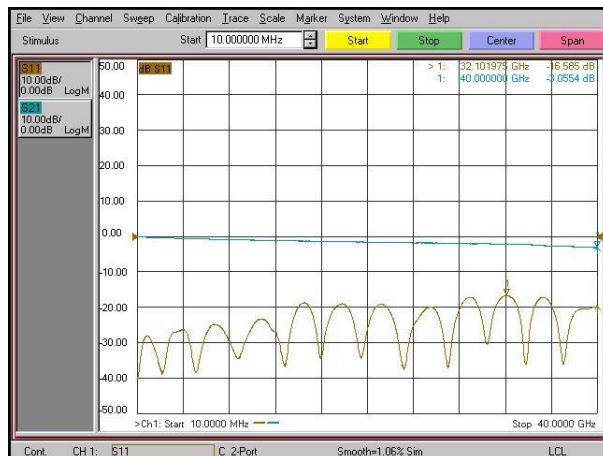
Substrate : RO4003C (8 mil)

Part No. : EL03FS002



Substrate : RO4350B (10 mil)

Part No. : EL03FS002



Substrate : Duroid 5880 (5 mil)

Part No. : EL03FS002



\* Substrate length : 1 inch (=25.4 mm)



■ **Test Result**

## 2.4 mm Type GCPWG Structure

Freq. : 10 MHz to 50 GHz

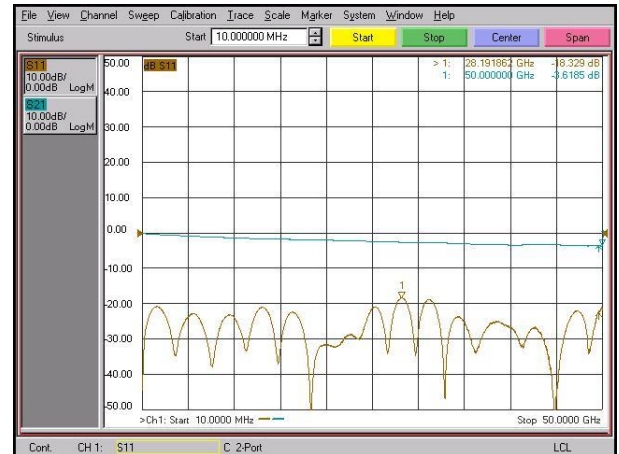
Substrate : RO4003C (8 mil)

Part No. : EL02FS002



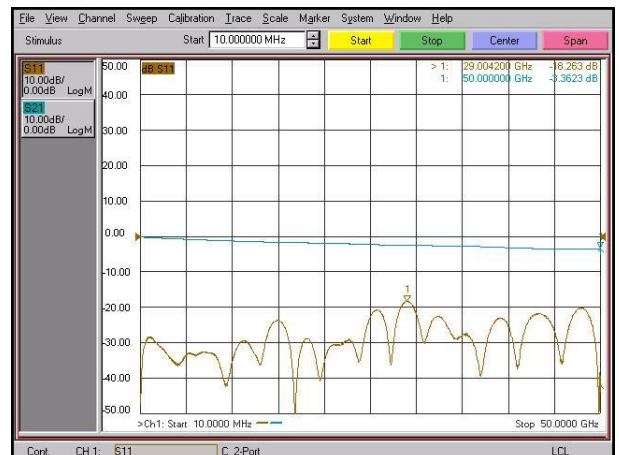
Substrate : RO4350B (10 mil)

Part No. : EL02FS002



Substrate : Duroid 5880 (5 mil)

Part No. : EL02FS002



\* Substrate length : 1 inch (=25.4 mm)

### Test Result

## 2.4 mm Type

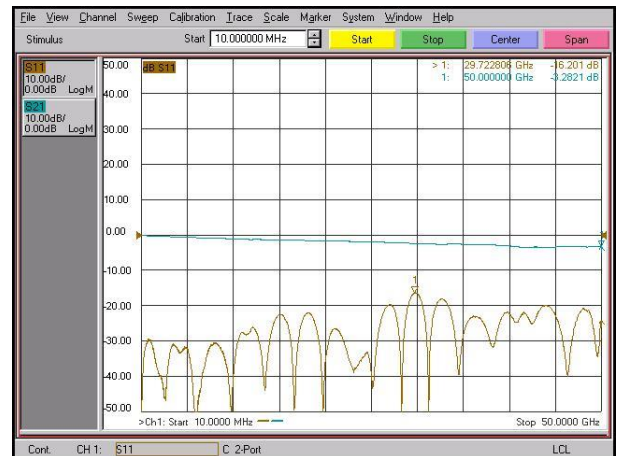
### Top Ground Microstrip

Substrate : RO4003C (8 mil)

Part No. : EL02FS002

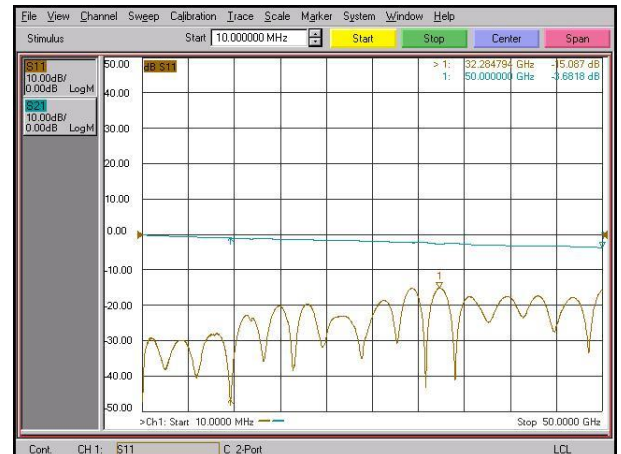
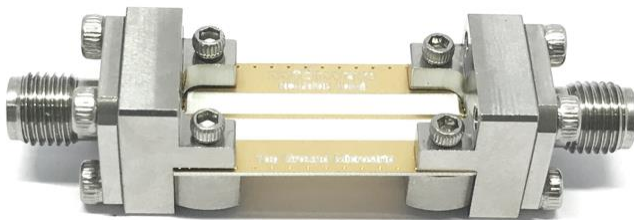


Freq. : 10 MHz to 50 GHz



Substrate : RO4350B (10 mil)

Part No. : EL02FS002



Substrate : Duroid 5880 (5 mil)

Part No. : EL02FS002



### Test Result

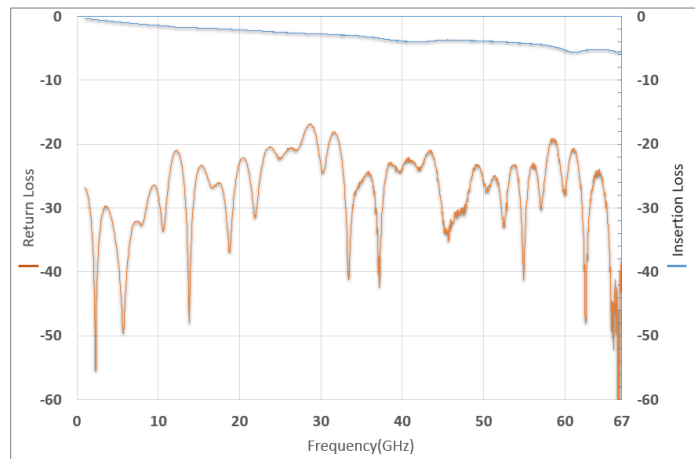
## 1.85 mm Type

### GCPWG Structure

Freq. : 10 MHz to 67 GHz

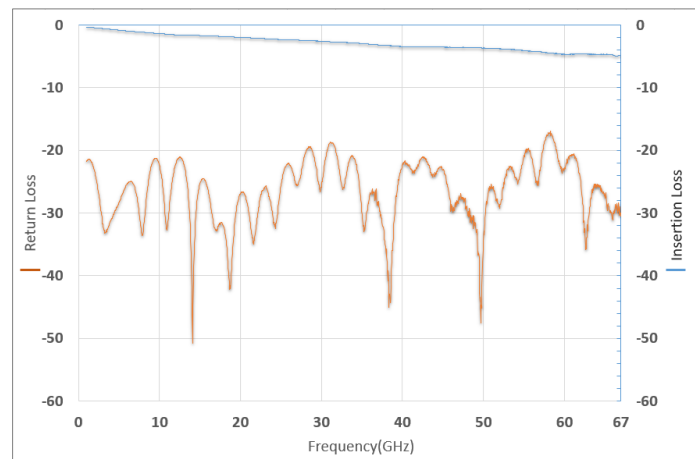
Substrate : RO4003C (8 mil)

Part No. : EL01FS002



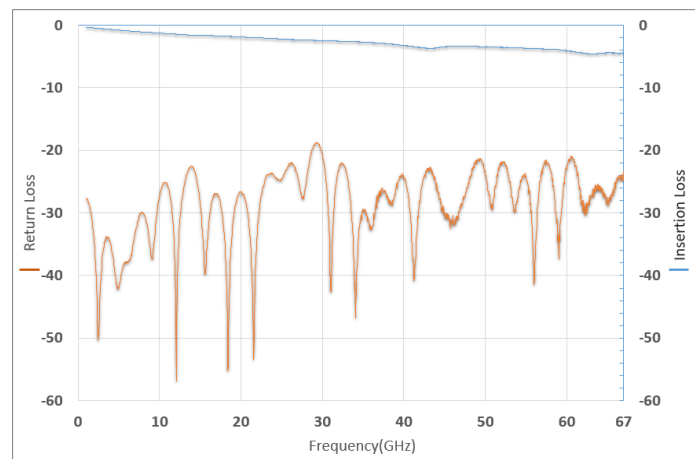
Substrate : RO4350B (10 mil)

Part No. : EL01FS002



Substrate : Duroid 5880 (5 mil)

Part No. : EL01FS002



### ■ Test Result

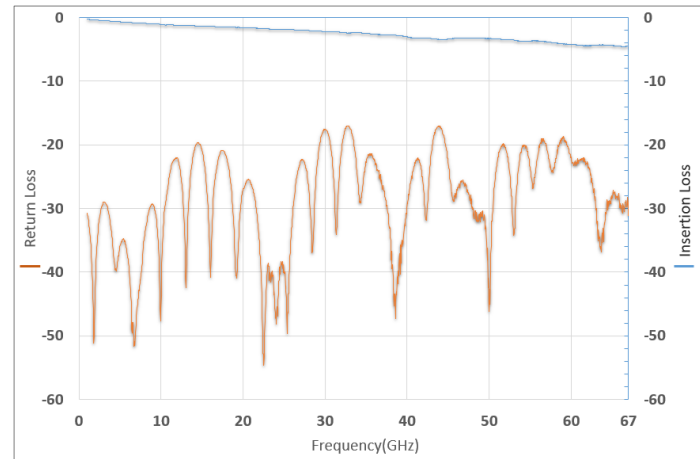
## 1.85 mm Type

### Top Ground Microstrip

Freq. : 10 MHz to 67 GHz

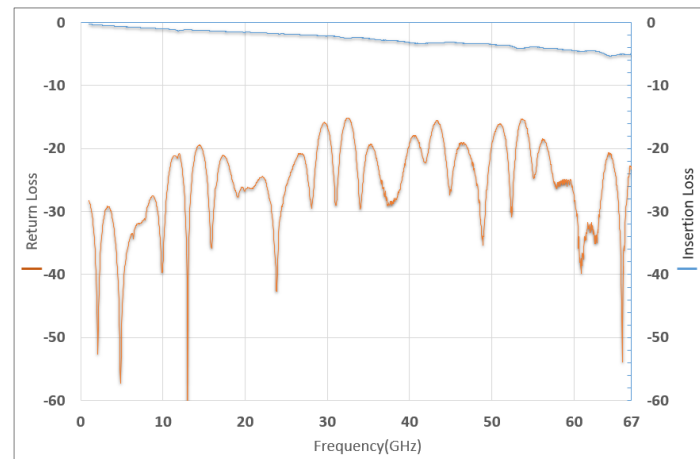
Substrate : RO4003C (8 mil)

Part No. : EL01FS002



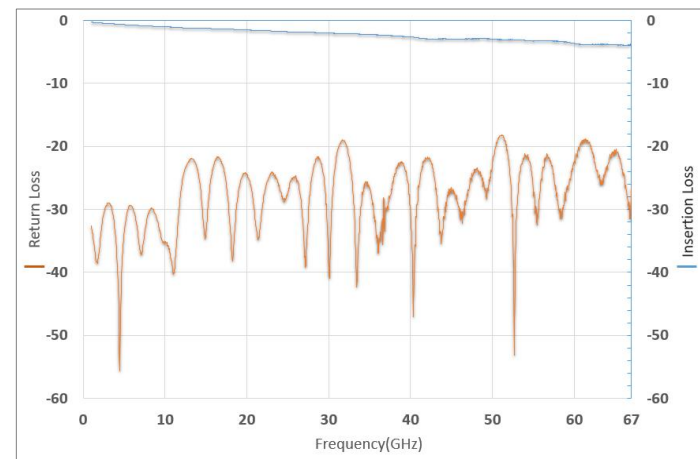
Substrate : RO4350B (10 mil)

Part No. : EL01FS002



Substrate : Duroid 5880 (5 mil)

Part No. : EL01FS002



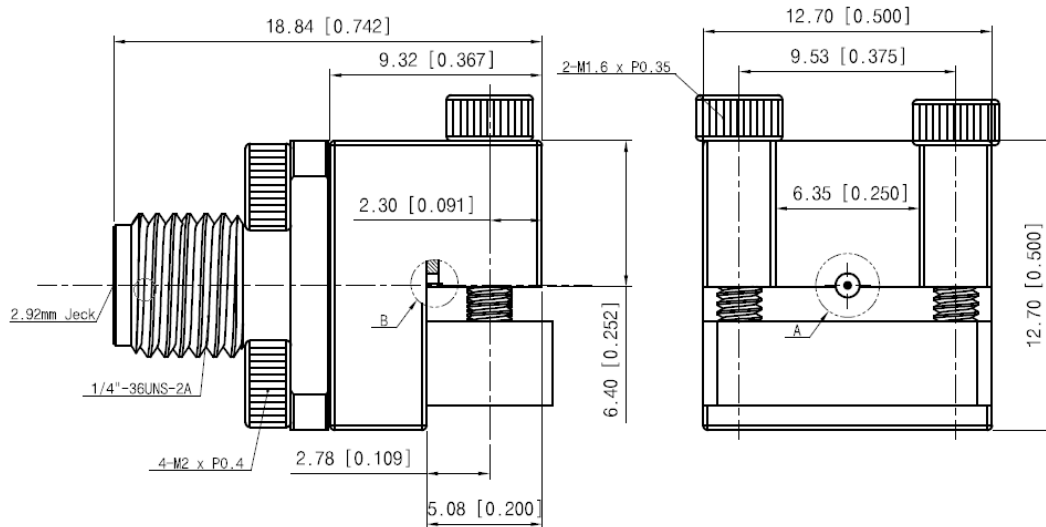
\* Substrate length : 1 inch (=25.4 mm)

### 2.92 mm Type (Female type)

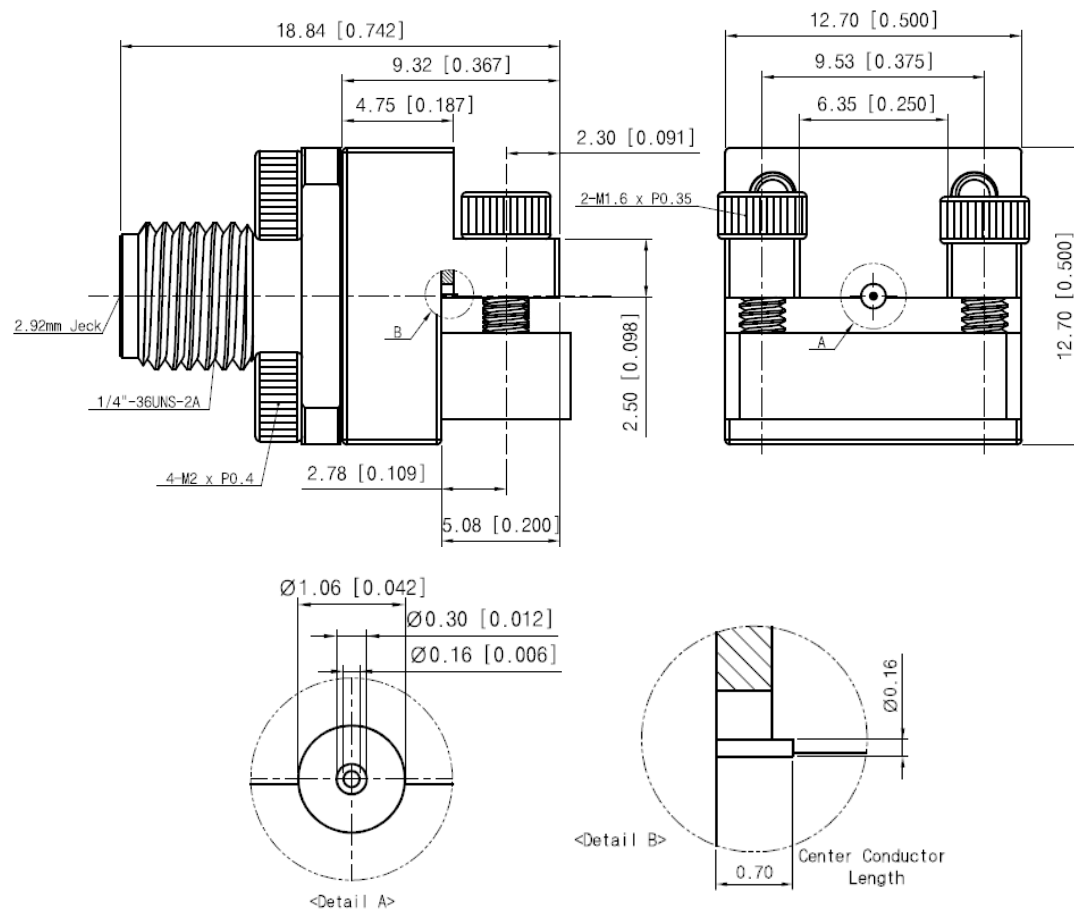
#### ■ Drawing

Unit : mm[inch]

Part No. : EL03FS001



Part No. : EL03FS002



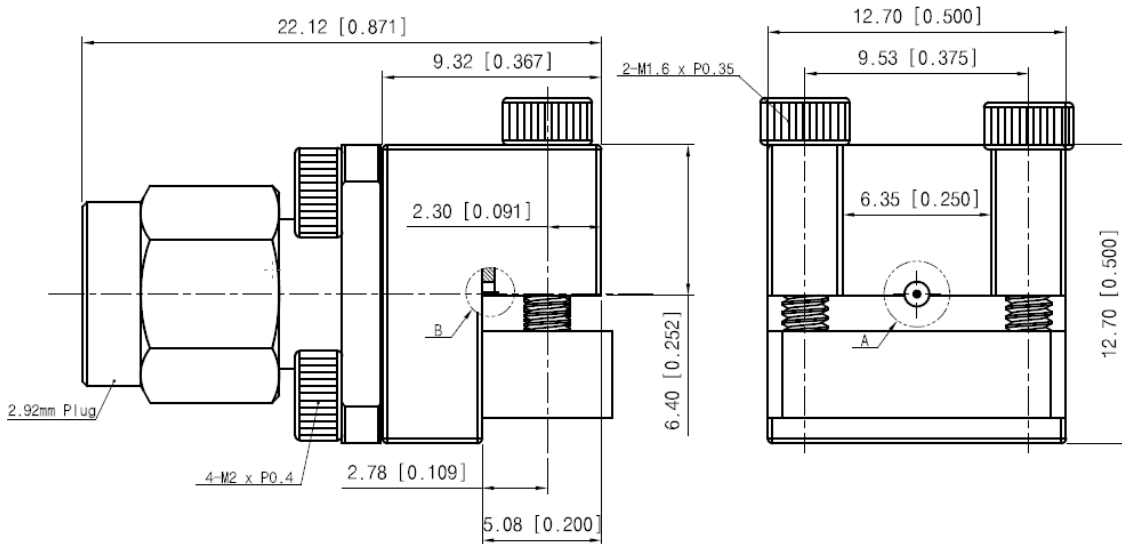


### 2.92 mm Type (Male type)

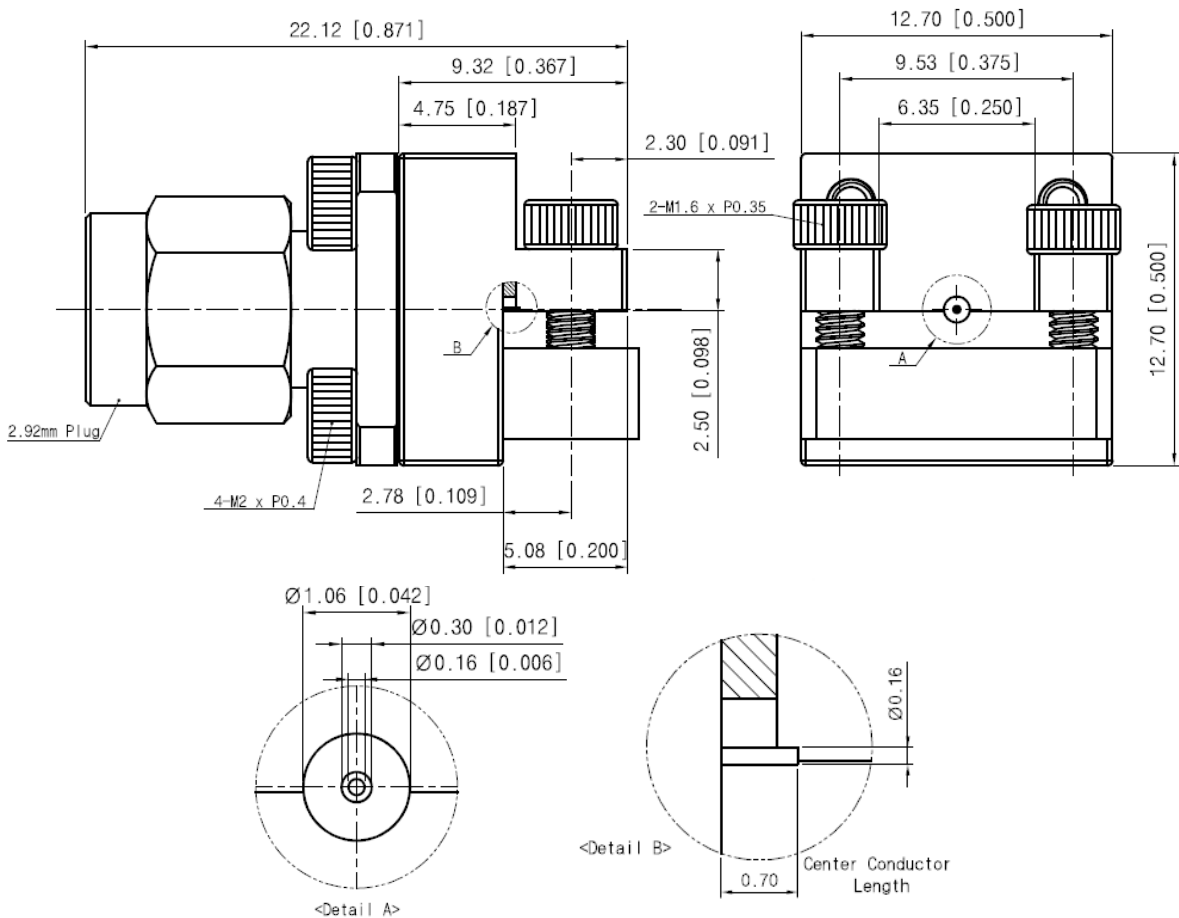
#### ■ Drawing

Unit : mm[inch]

Part No. : EL03MS001



Part No. : EL03MS002



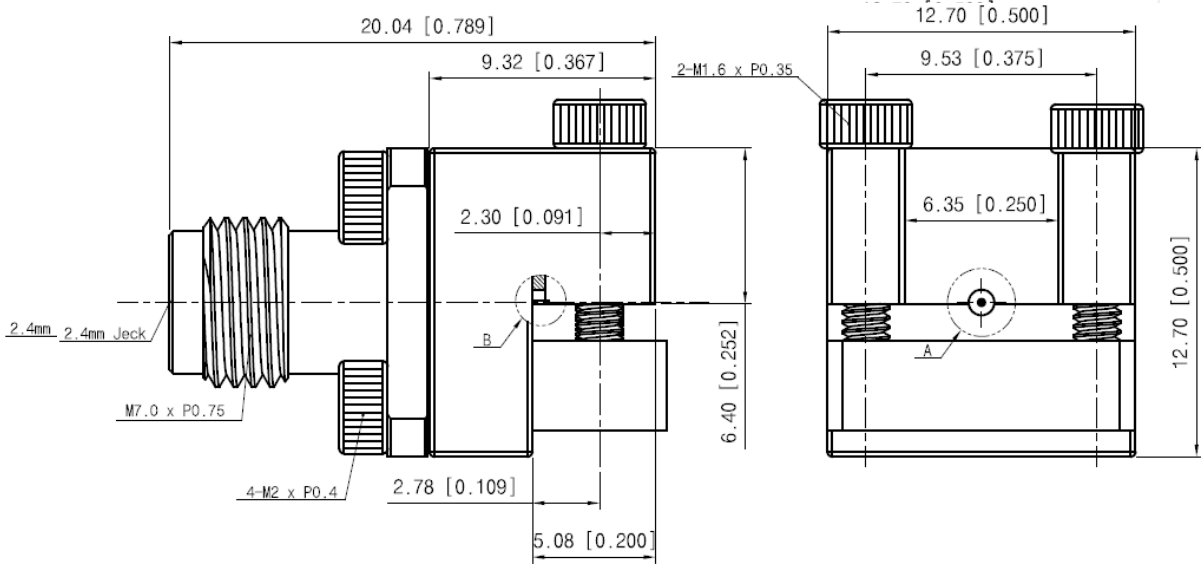


### 2.4 mm Type (Female type)

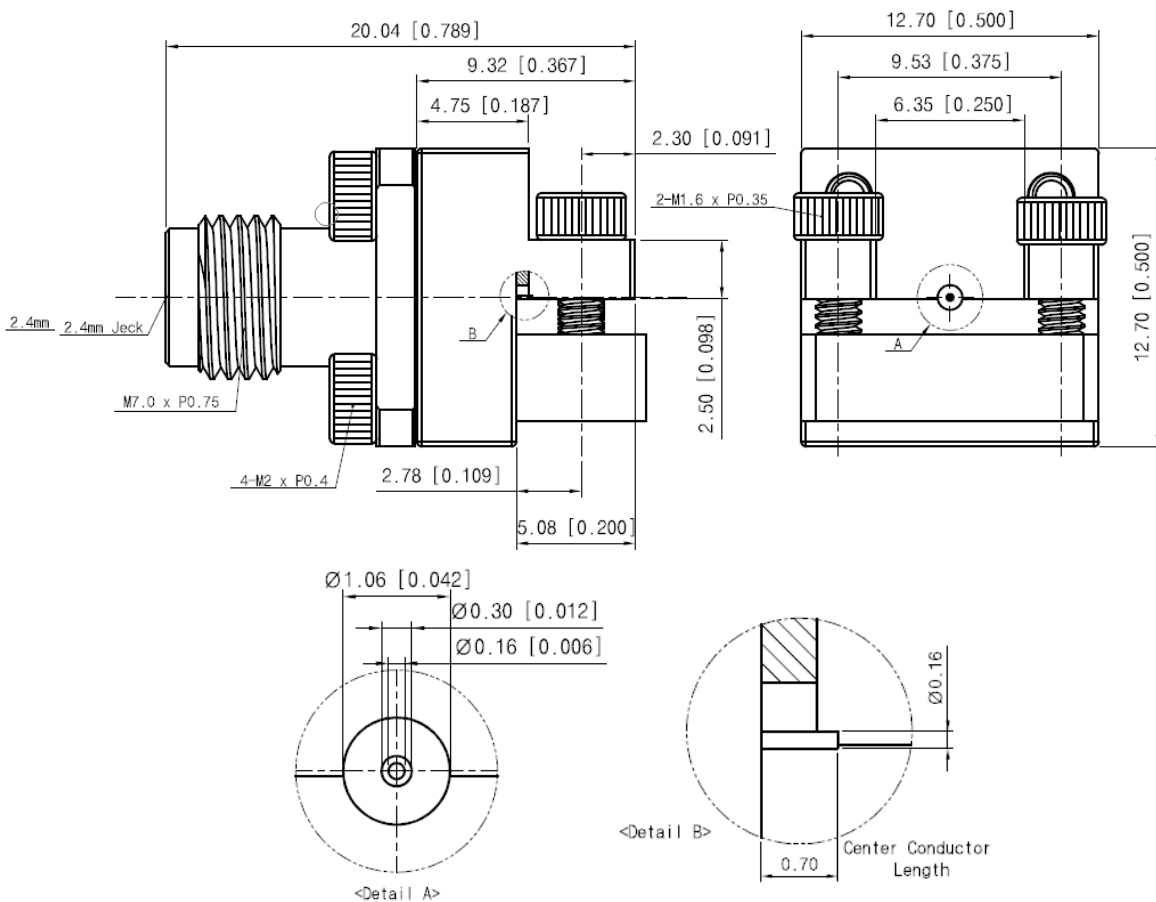
#### ■ Drawing

Unit : mm[inch]

Part No. : EL02FS001



Part No. : EL02FS002

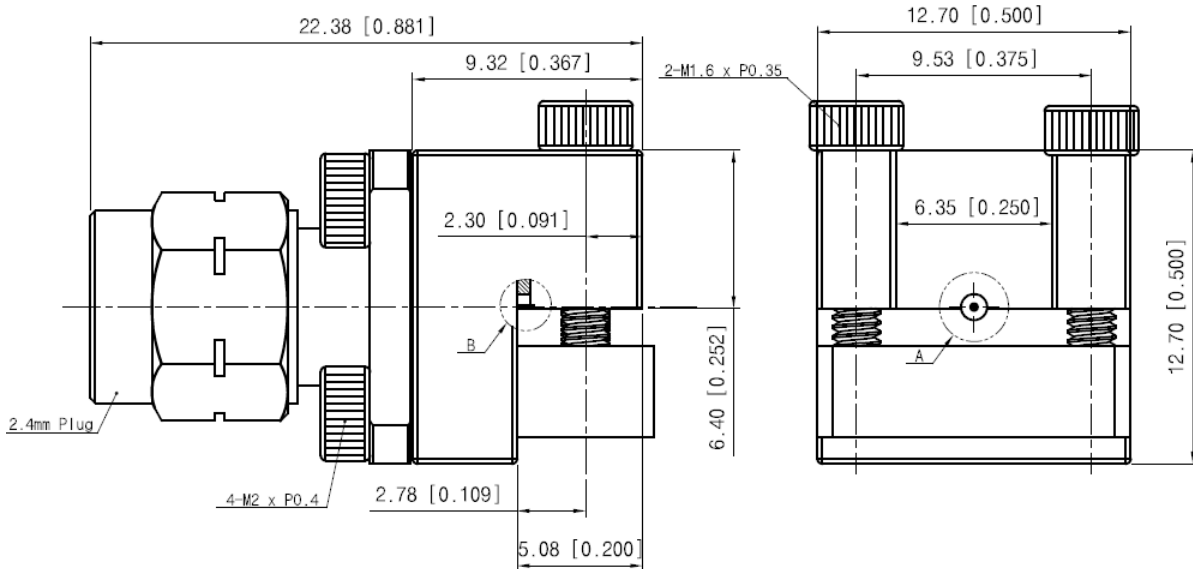


### 2.4 mm Type (Male type)

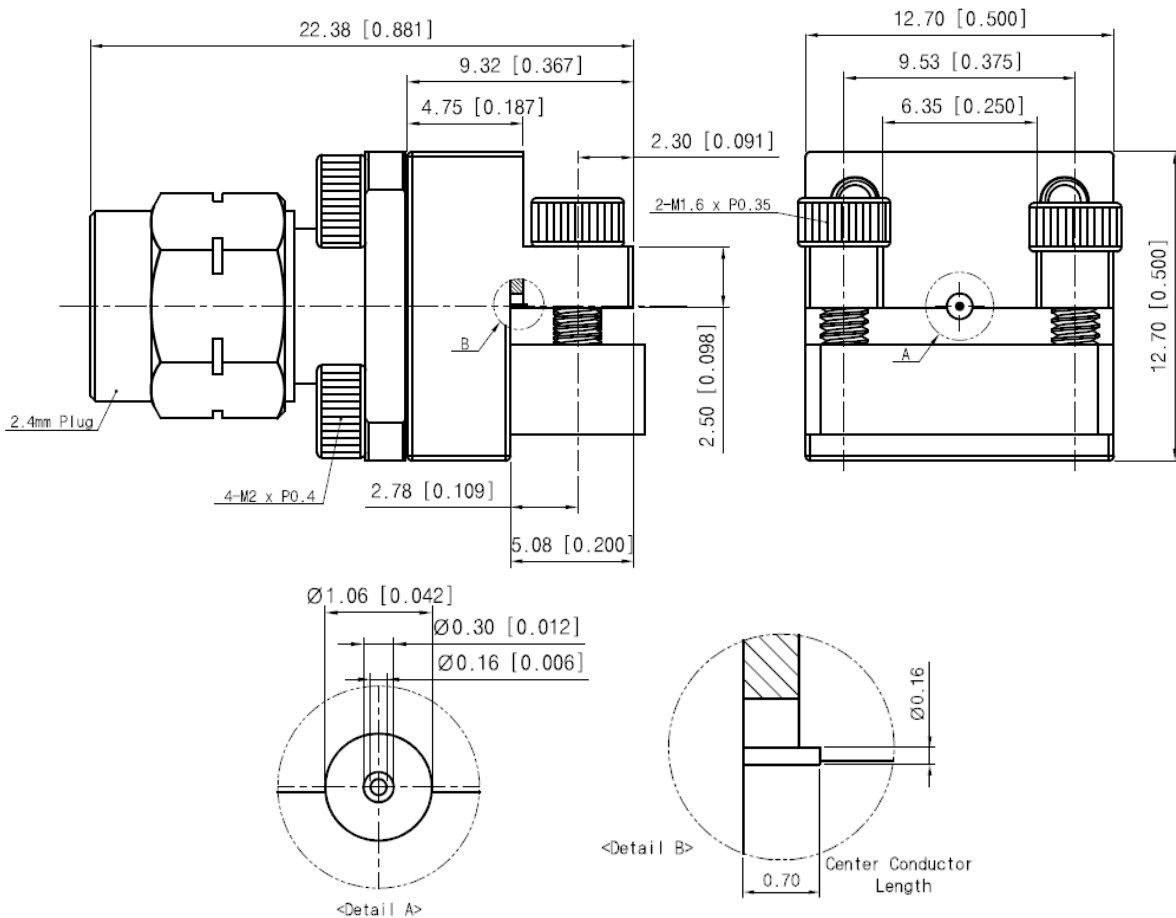
#### ■ Drawing

Unit : mm[inch]

Part No. : EL02MS001



Part No. : EL02MS002

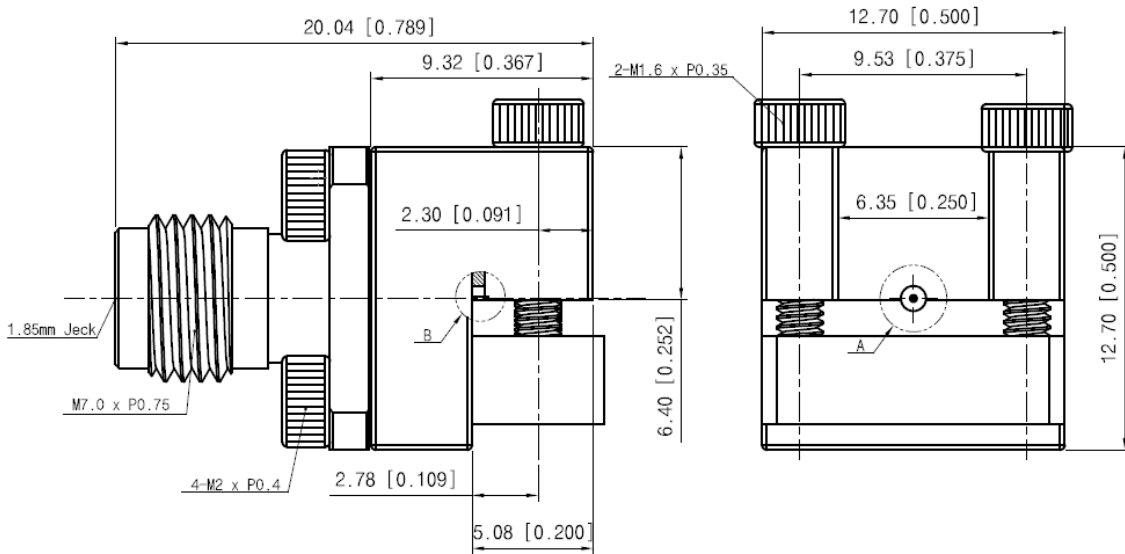


### 1.85 mm Type (Female type)

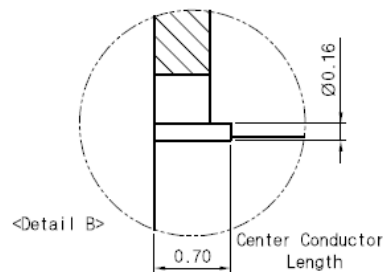
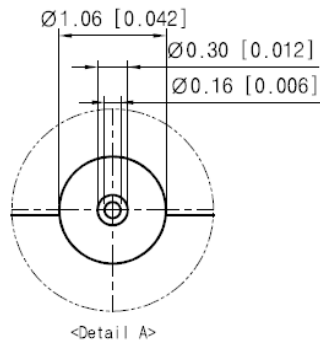
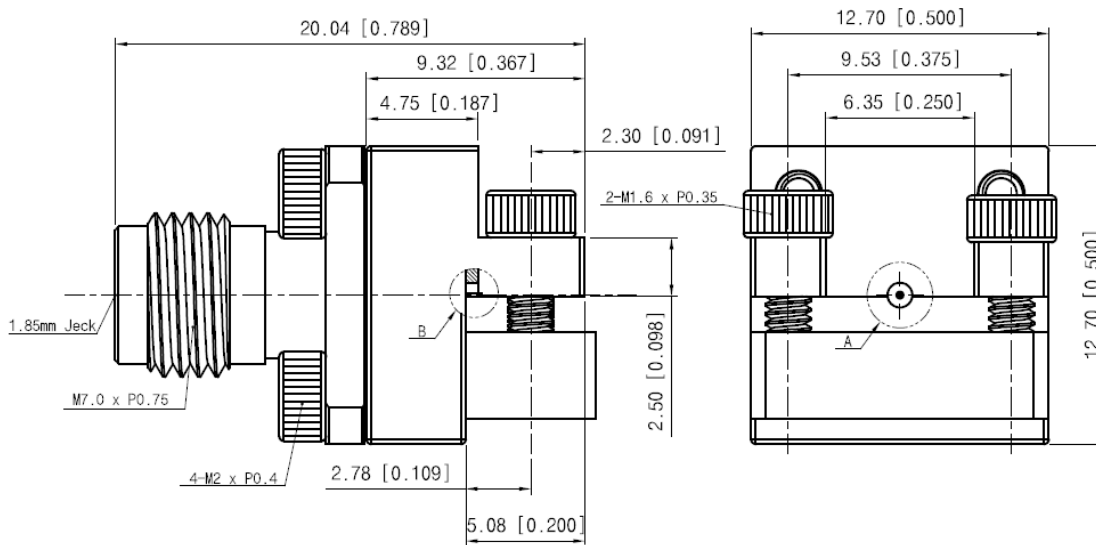
#### ■ Drawing

Unit : mm[inch]

Part No. : EL01FS001



Part No. : EL01FS002

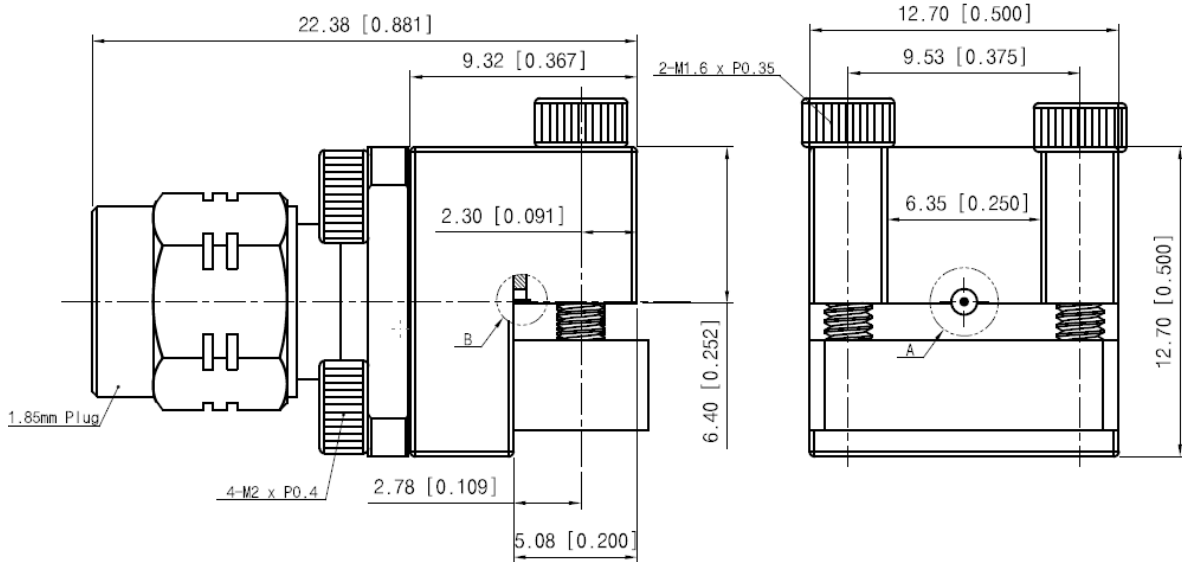


### 1.85 mm Type (Male type)

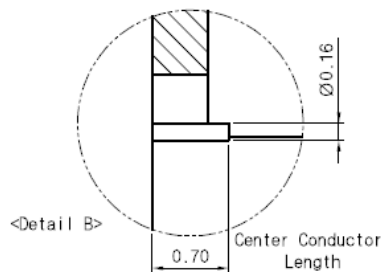
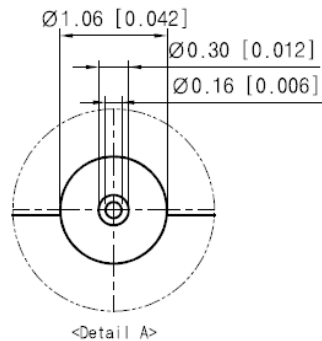
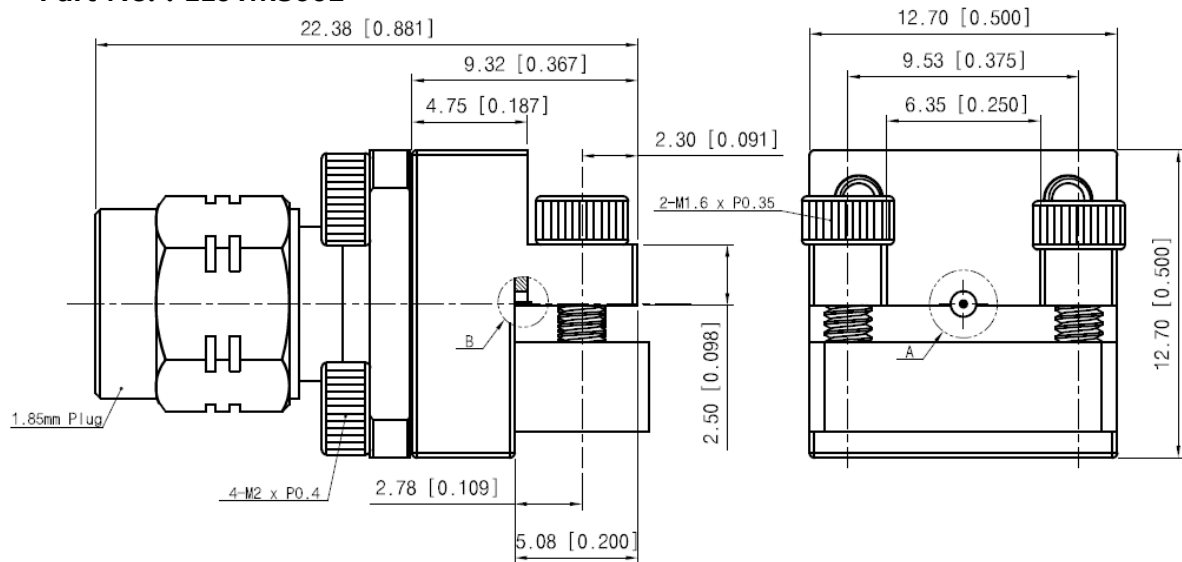
#### ■ Drawing

Unit : mm[inch]

Part No. : EL01MS001



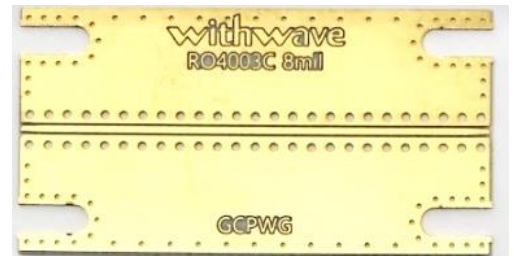
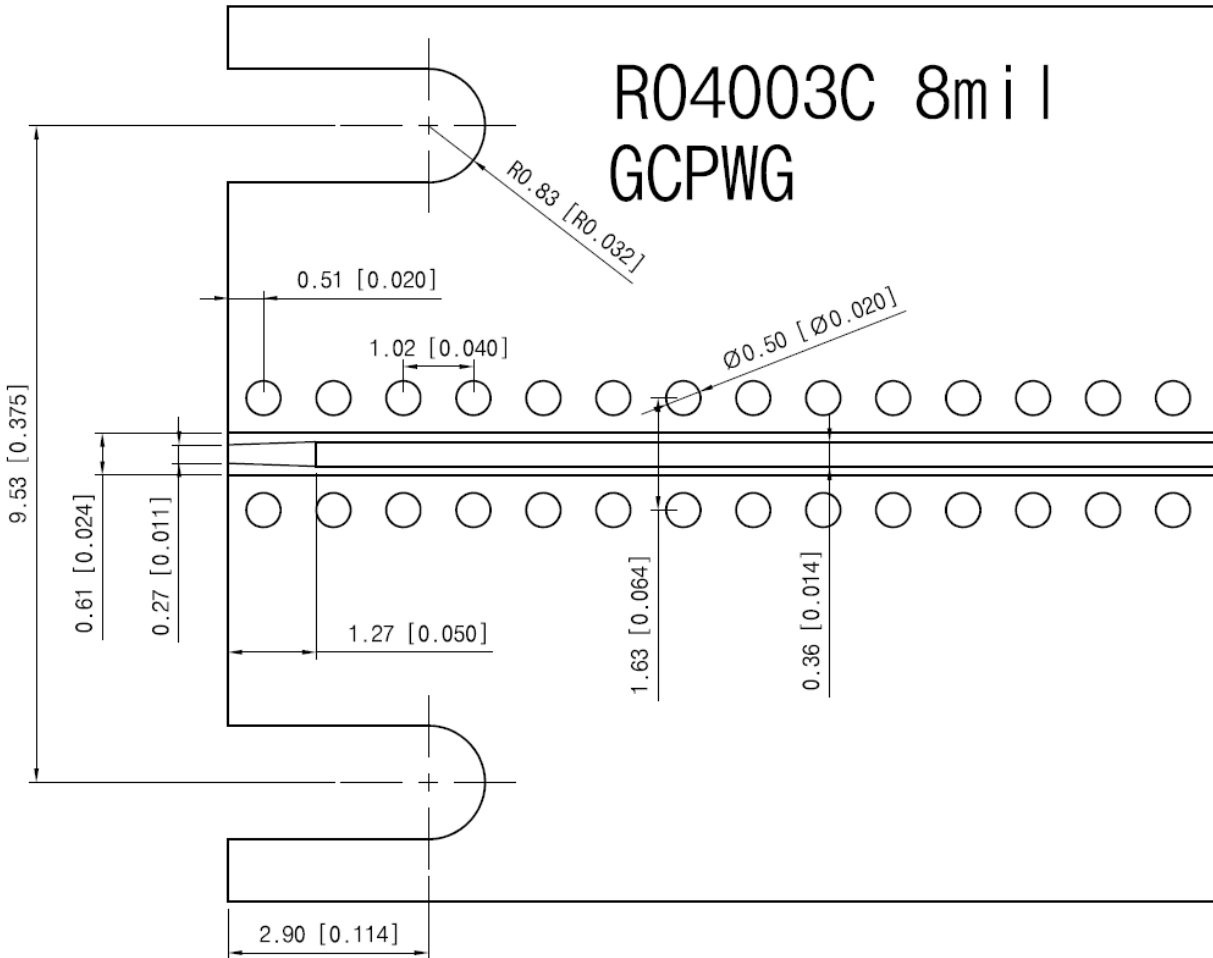
Part No. : EL01MS002



# End Launch Connectors

## PCB Layout

Unit : mm[inch]



# End Launch Connectors

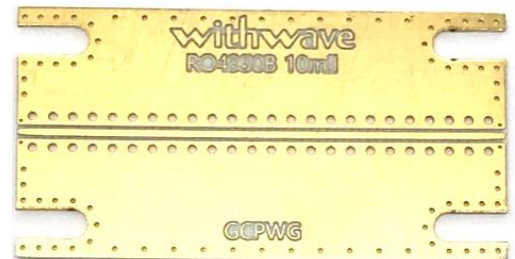
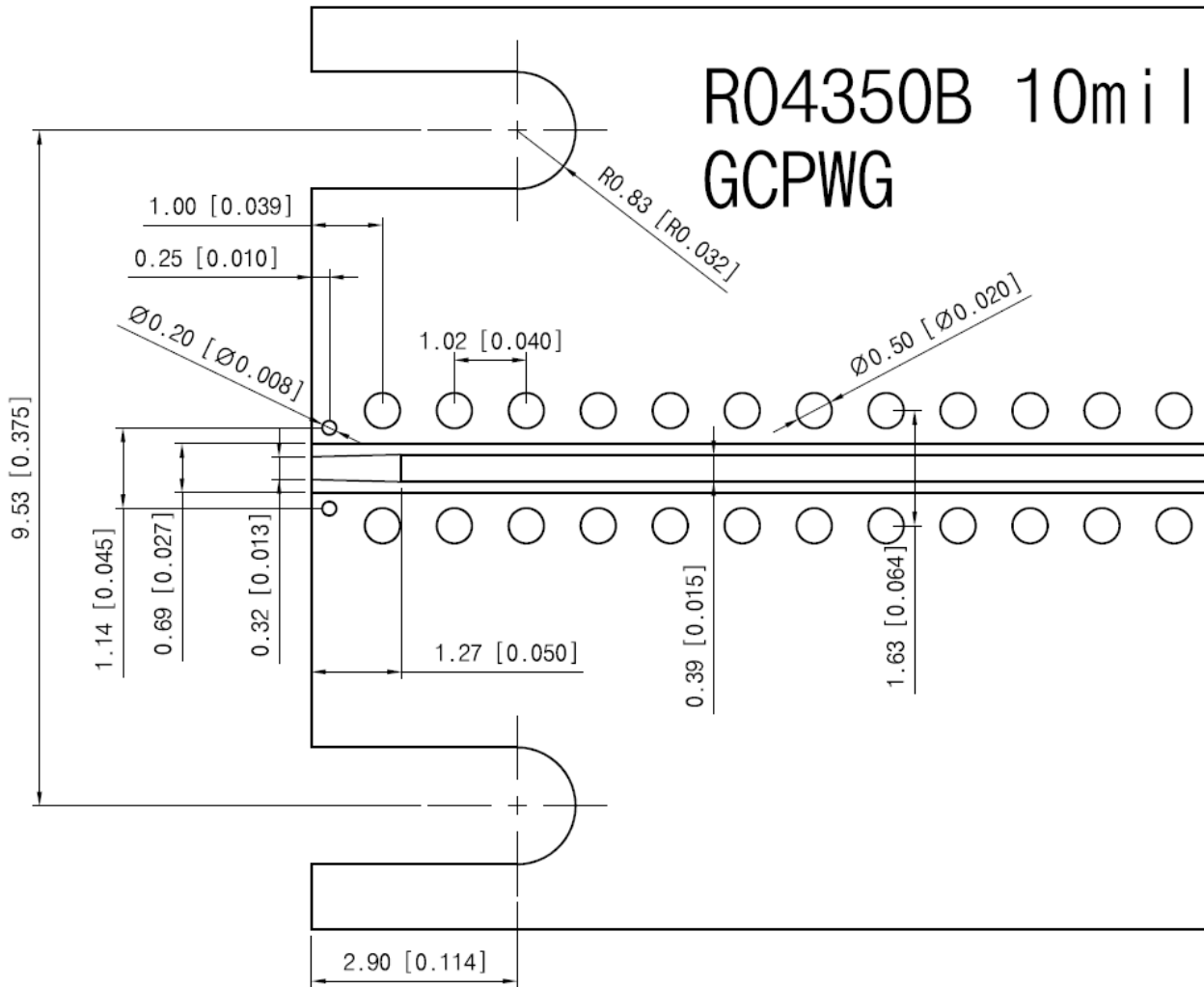
**withwave**

**2.92 mm, 2.4 mm, 1.85 mm**

Versatile RF & MW Test Solutions

■ PCB Layout

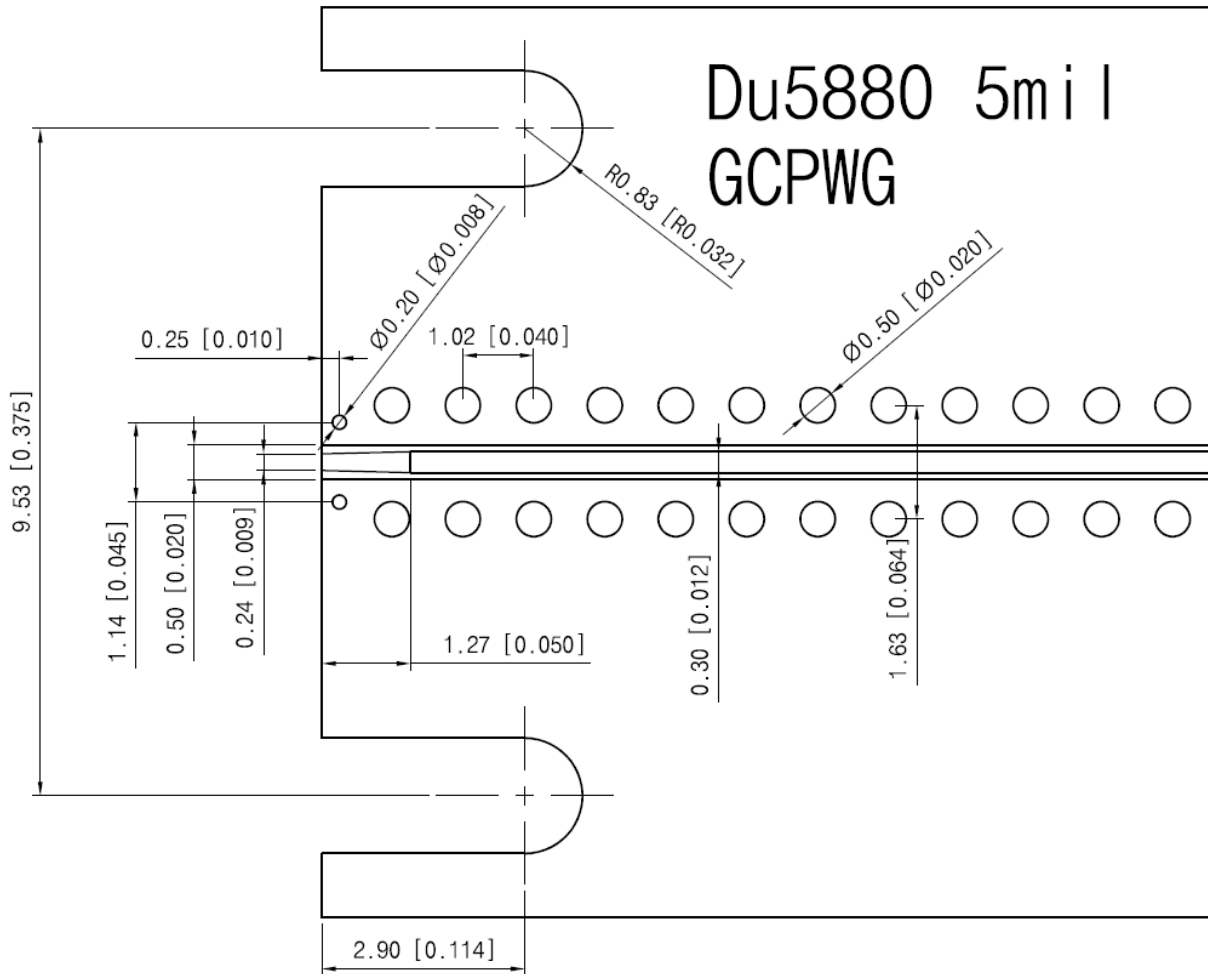
Unit : mm[inch]





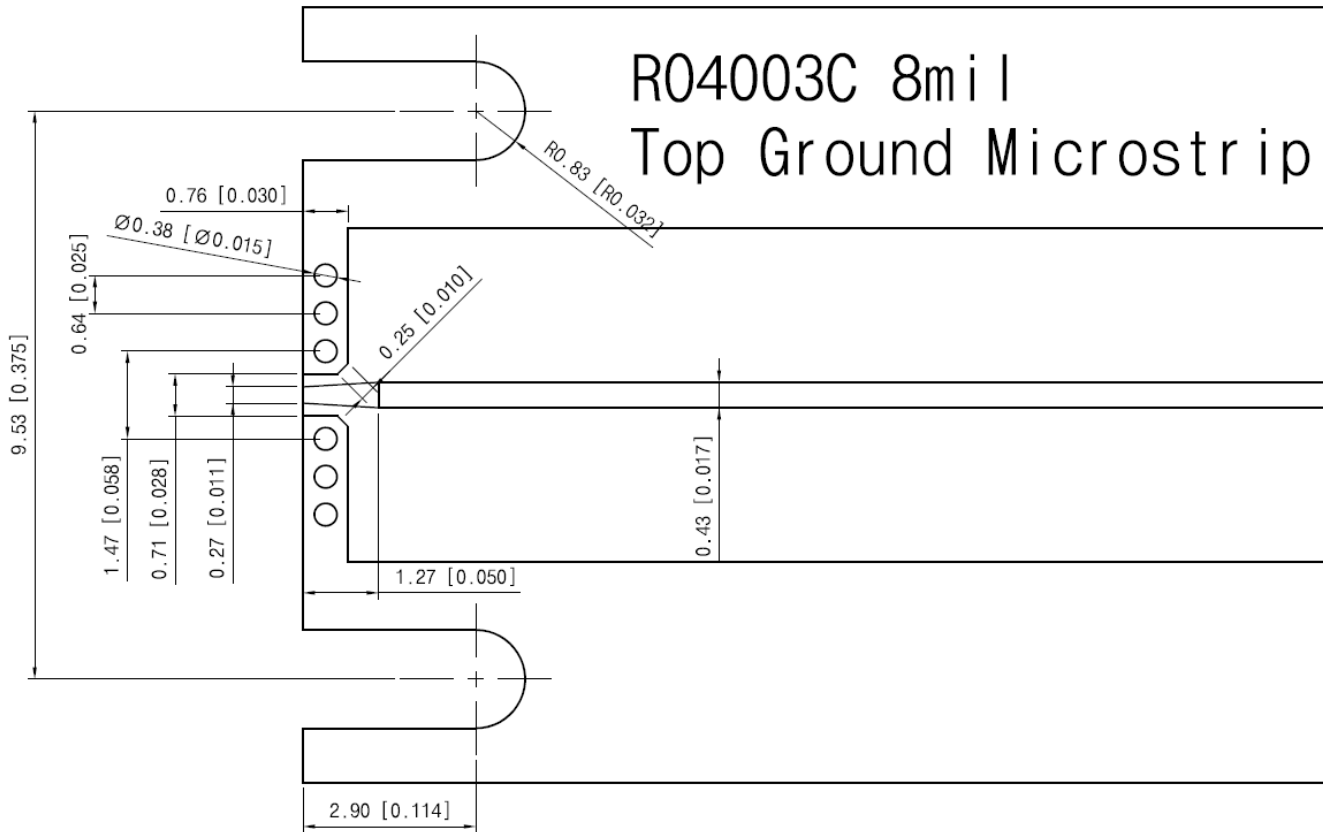
### PCB Layout

Unit : mm[inch]



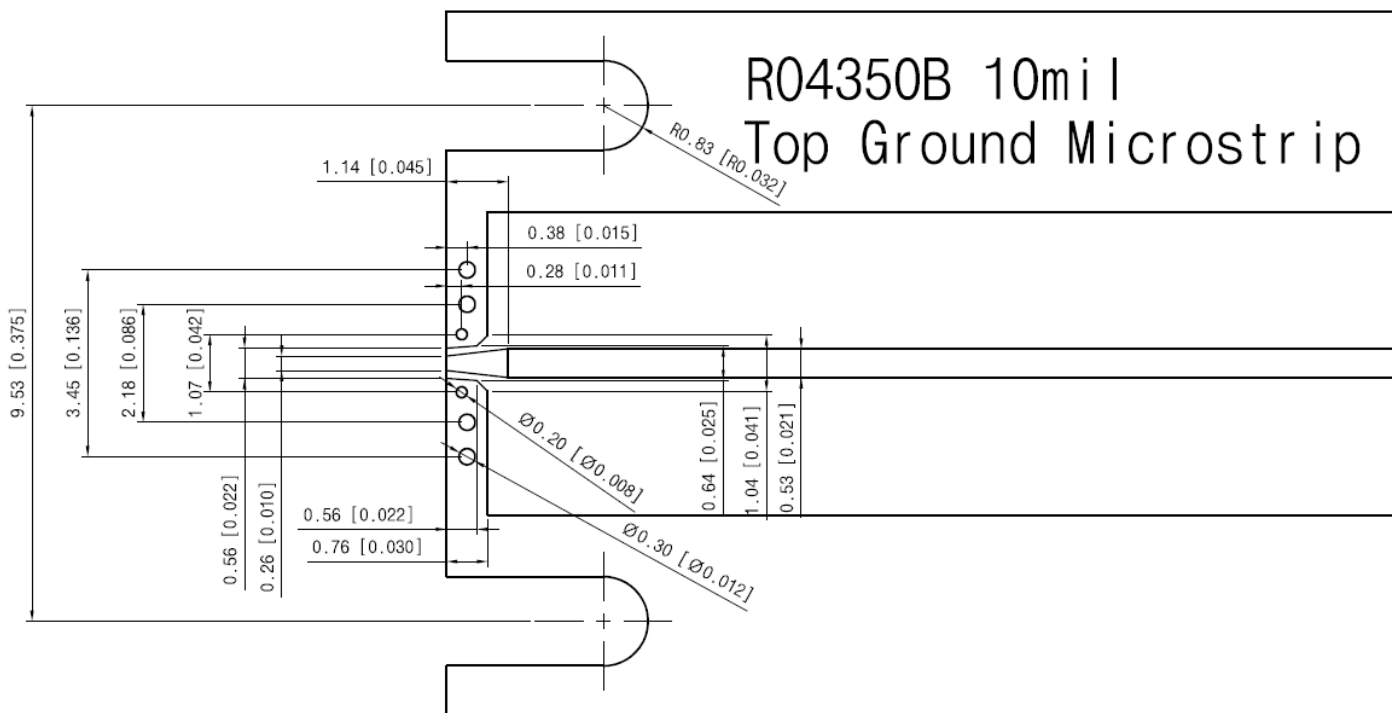
## PCB Layout

Unit : mm[inch]



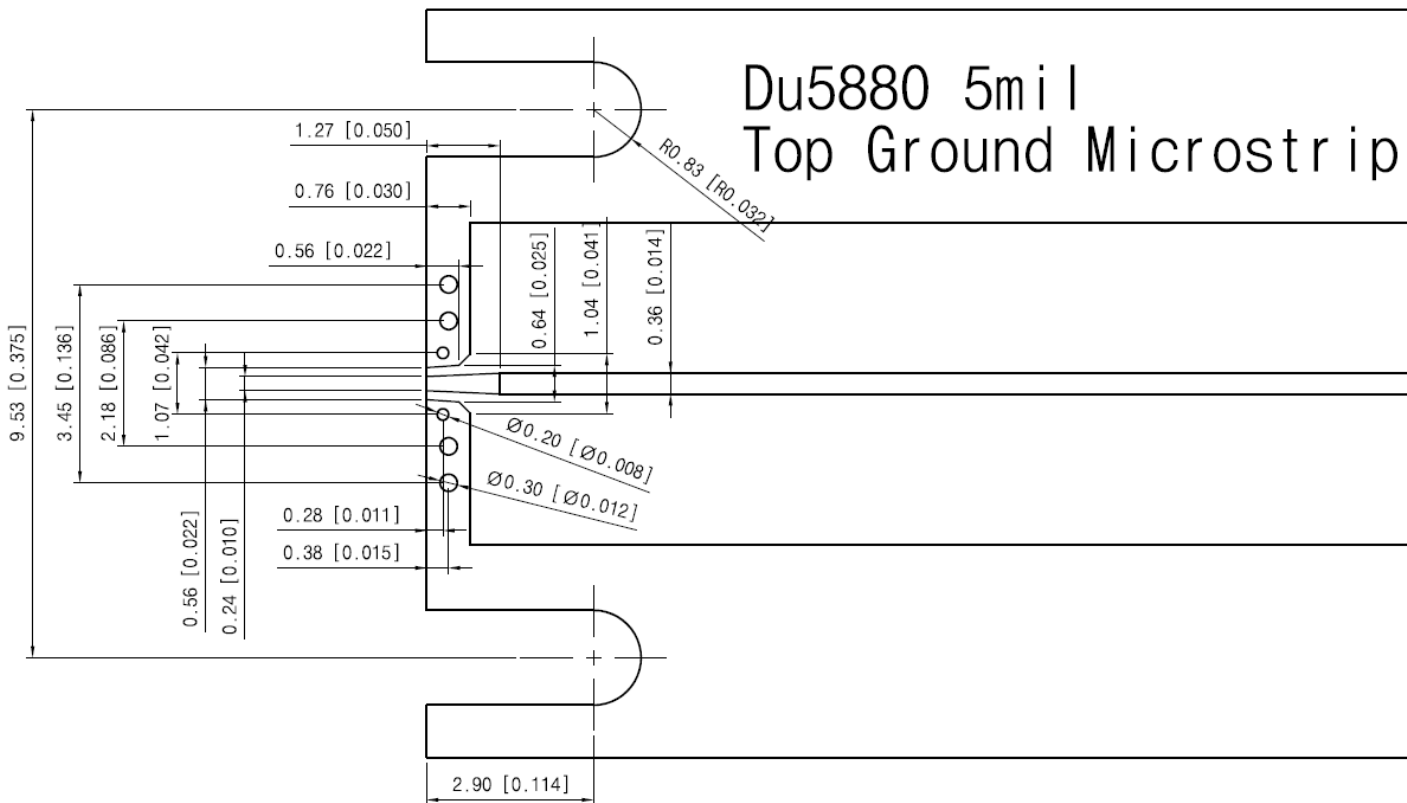
### PCB Layout

Unit : mm[inch]



## PCB Layout

Unit : mm[inch]



### ■ Revision History

Revision	Date	Changes
Ver 1.0	2018-04-05	Released End launch connectors (2.92 mm, 2.4 mm, 1.85 mm)
Ver.1.1	2018-06-21	Add drawing of Male type for End Launch connectors
Ver 1.2	2018-07-05	Adding drawing of Detail "B" for End Launch connectors
Ver 1.3	2019-09-01	Add Max. PCB thickness according to bolt size (low profile)
Ver 1.4	2019-11-11	Add Max. PCB thickness according to bolt size (standard profile)
Ver 1.5	2020-03-01	Add Design Assistance for ANSYS HFSS 3D simulation model
Ver 1.6	2020-04-20	Updated test results
Ver 1.7	2020-11-05	Add Test Result on Multilayer PCB