



# FET Solid State Switches

U9422A/B/C: 300 kHz to 26.5/50/54 GHz, SPDT

U9424A/B/C: 300 kHz to 26.5/50/54 GHz, SP4T

## Key Features

- Broad operating frequency range from 300 kHz to 26.5/50/54 GHz
- Minimizes crosstalk with exceptionally high isolation across broad frequency
- Prevent damage to sensitive components with low video leakage
- Maintain fast throughput switch switching speed in microseconds
- USB connection that comes with multiport configuration connectivity port for PXIe and USB VNA or solder connector options provide switches configuration flexibility

## Description

The U942xA/B/C FET solid state switches offer superior performance in terms of isolation and video leakage across a broad operating frequency range of up to 26.5/50/54 GHz. These SPDT/SP4T switches are used to increase system flexibility and simplicity and are easily controlled with USB connection; that comes with the flexibility of multiport configuration connectivity port PXIe and USB VNA or through a soldering connector option

These switches offer unmatched isolation performance between ports, as high as 100 dB at 9 GHz or 70 dB up to 54 GHz. In addition, the U942xA/B/C provide low video leakage less than 50 mVpp for SPDT which ensures safe testing of sensitive components. High video leakage can degrade measurement accuracy and possibly damage sensitive components or equipment. Low video leakage makes these switches particularly suited for measuring sensitive devices and components such as mixers and amplifiers. To learn more about video leakage and how it can affect measurements and devices, see Keysight's "Video Leakage Effects on Devices in Component Test Application Note."

The switches fast switching speed in microseconds making it ideal for RF and microwave switching applications in instrumentation, communication, radar, switch matrices and various other test systems where speed and lifetime of a switch are critical parameters.

## Specifications

Specifications describe the instrument’s warranted performance. Supplemental and typical characteristics are intended to provide information useful in applying the instrument by giving typical, but not warranted performance parameters. U942xA/B/C specifications are tested at nominal voltage at 25 °C.

Specifications	U9422A/B/C, SPDT	U9424A/B/C, SP4T
Frequency range	300 kHz to 26.5/50/54 GHz	300 kHz to 26.5/50/54 GHz
Insertion loss (dB)	300 kHz to 9 GHz: 3.1 9 to 18 GHz: 3.8 18 to 26.5 GHz: 4.6 26.5 to 37 GHz: 5.6 37 to 45 GHz: 5.9 45 to 52 GHz: 7.3 52 to 54 GHz: 8.1	300 kHz to 9 GHz: 4 9 to 14 GHz: 4.8 14 to 18 GHz: 5.3 18 to 26.5 GHz: 6.2 26.5 to 33 GHz: 7.0 33 to 38 GHz: 7.7 38 to 45 GHz: 9.3 45 to 50 GHz: 10.2 50 to 54 GHz: 10.8
Isolation (dB)	300 kHz to 500 MHz: 90 500 MHz to 9 GHz: 100 9 to 18 GHz: 90 18 to 22 GHz: 88 22 to 30 GHz: 79.5 30 to 38 GHz: 80 38 to 50 GHz: 77 50 to 54 GHz: 70	300 kHz to 500 MHz: 89 500 MHz to 11 GHz: 96 11 to 26.5 GHz: 90 26.5 to 42 GHz: 78 42 to 46 GHz: 75 46 to 49 GHz: 70 50 to 54 GHz: 64
OFF port return loss, dB (VSWR)	300 kHz to 14 GHz: 13.3 (1.6) 14 to 20 GHz: 11.7 (1.7) 20 to 26.5 GHz: 12.9 (1.59) 26.5 to 40 GHz: 12.7 (1.6) 40 to 45 GHz: 7.8 (2.4) 45 to 51 GHz: 6.3 (2.9) 51 to 54 GHz: 9.5 (2.0)	300 kHz to 8 GHz: 16.3 (1.4) 8 to 13 GHz: 12.5 (1.6) 13 to 35 GHz: 10.6 (1.8) 35 to 39 GHz: 12.8 (1.6) 39 to 43 GHz: 8.7 (2.2) 43 to 50 GHz: 5.1 (3.5) 50 to 54 GHz: 6.8 (2.7)
ON port return loss, dB (VSWR)	300 kHz to 14 GHz: 14 (1.5) 14 to 20 GHz: 11 (1.79) 20 to 28 GHz: 9.5 (2.0)	300 kHz to 9 GHz: 13 (1.6) 9 to 26.5 GHz: 8.5 (2.2) 26.5 to 37 GHz: 7.5 (2.5)

	28 to 45 GHz: 8.4 (2.2) 45 to 54 GHz: 6.2 (2.9)	37 to 43 GHz: 5.8 (3.1) 43 to 51 GHz: 5.6 (3.2) 51 to 54 GHz: 7.6 (2.4)
Switching speed	Solder terminal: 120 ns Multiport configuration connectivity port: 16 us USB 3.1 300 us	Solder terminal: 3 us Multiport configuration connectivity port: 20 us USB 3.1: 300 us
Video leakage	< 50 mVpp	< 250 mVpp
Power handling (max)	25 dBm	25 dBm
Connector type	26.5 GHz: 3.5 mm, 50 GHz: 2.4 mm, 54 GHz: 1.85 mm	
Connectivity	Solder terminal or USB 3.1 with Multiport configuration connectivity port for PXIe and USB VNA	Solder terminal or USB 3.1 with Multiport configuration connectivity port for PXIe and USB VNA
Automation SW with VNA	Yes (for option 002)	Yes (for option 002)

## Typical Performance

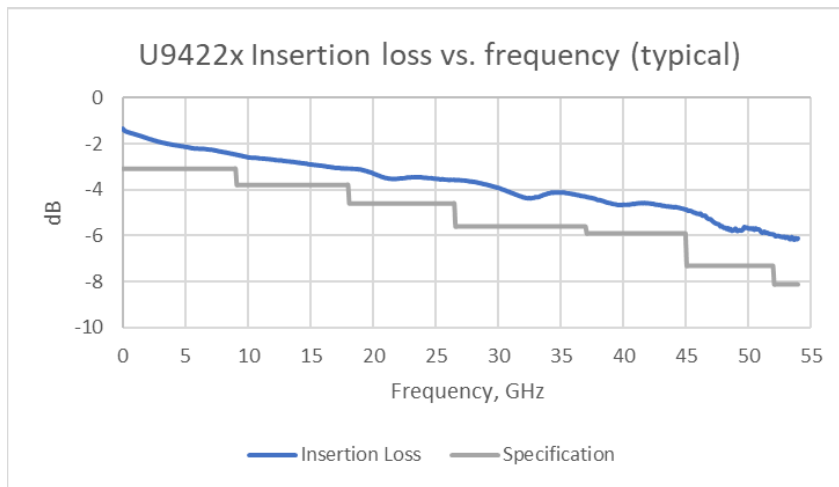


Figure 1. U9422x insertion loss vs frequency (GHz) typical

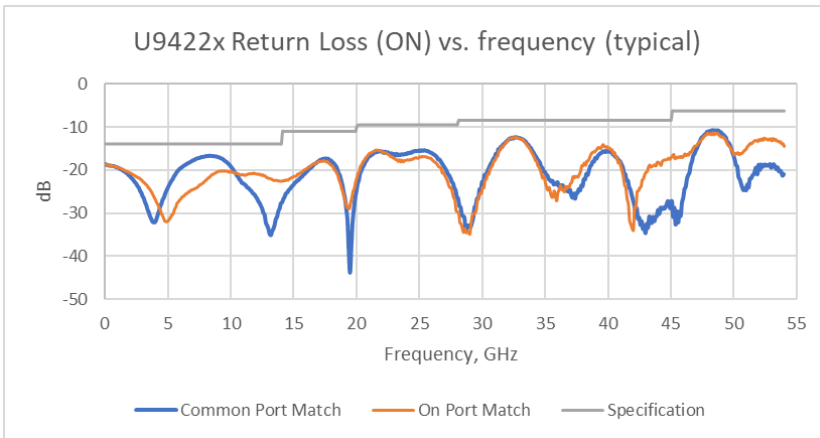


Figure 2. U9422x return loss (ON) vs frequency (GHz) typical

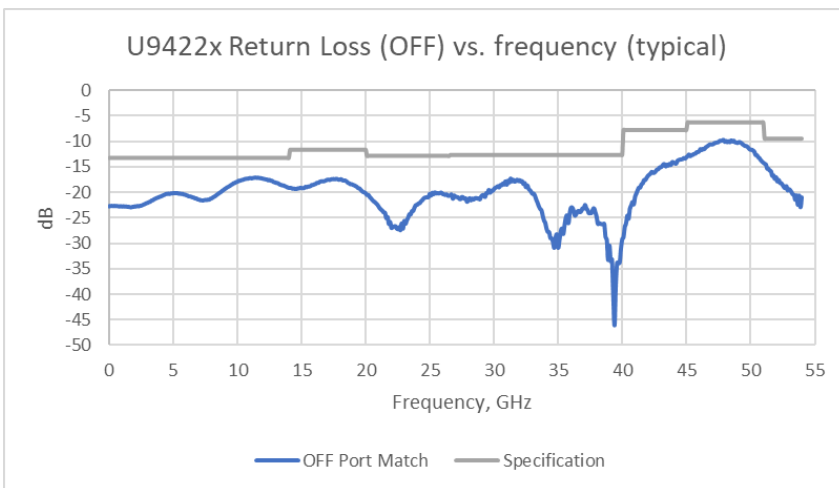


Figure 3. U9422x return loss (OFF) vs frequency (GHz) typical

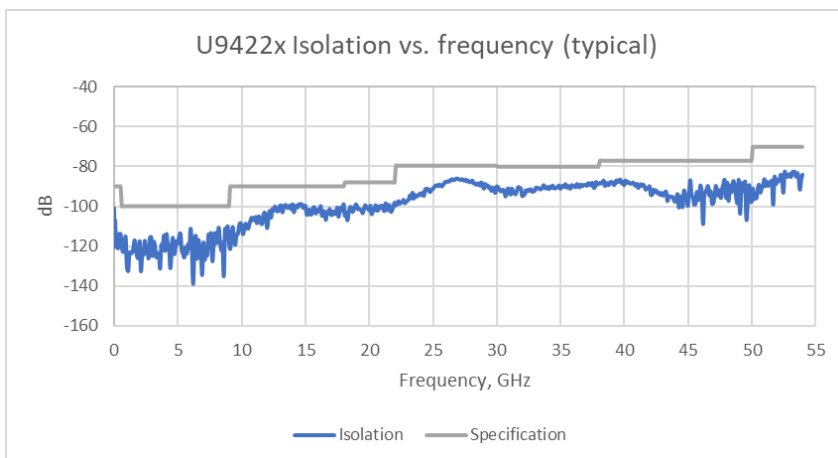


Figure 4. U9422x isolation vs frequency (GHz) typical

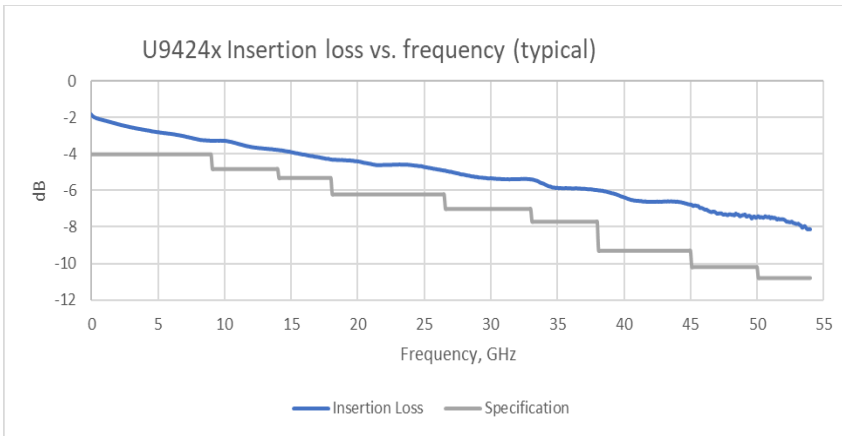


Figure 5. U9424x insertion loss vs frequency (GHz) typical

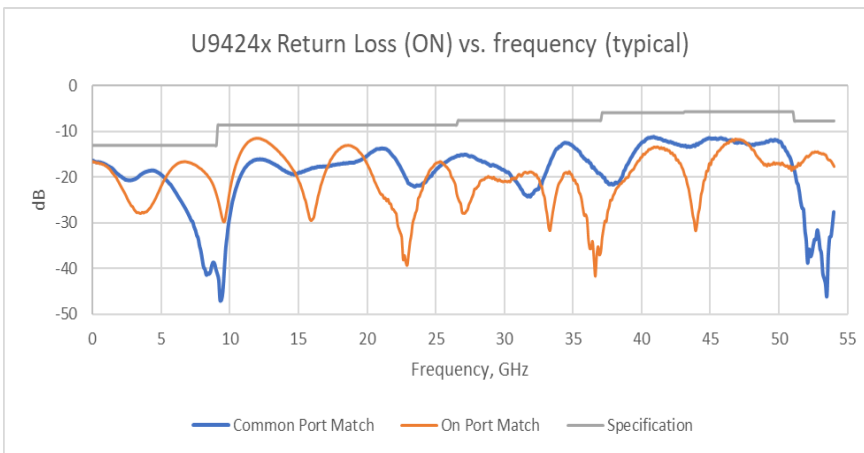


Figure 6. U9424x return loss (ON) vs frequency (GHz) typical

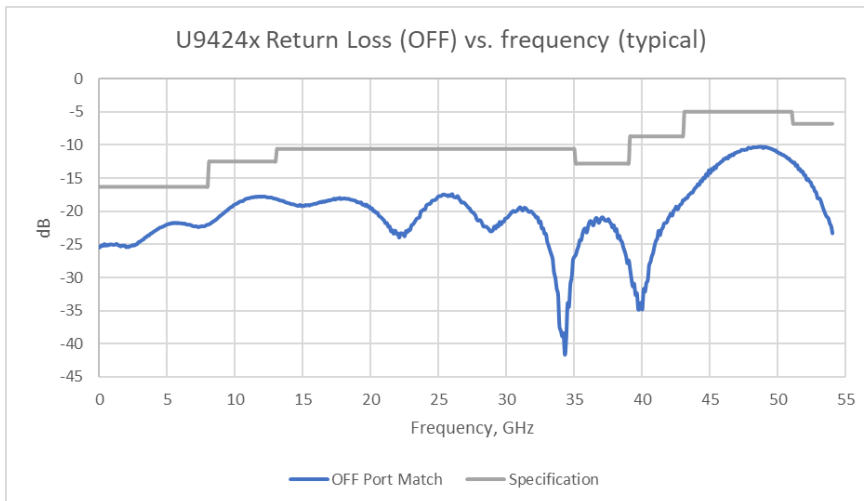


Figure 7. U9424x return loss (OFF) vs frequency (GHz) typical

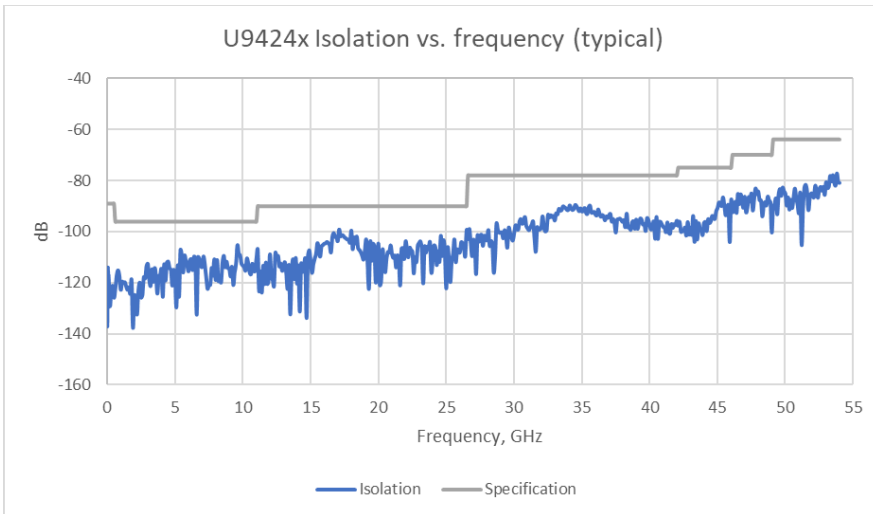


Figure 8. U9424x isolation vs frequency (GHz) typical

## Environmental Specifications

The U942xA/B/C FET solid state switches are designed to fully comply with Keysight Technologies' product operating environment specifications. The following summarizes the environmental specifications for these products.

Environment condition	U942xA/B/C
<b>Temperature</b> Operating Storage	0 °C to +55 °C - 40 °C to +70 °C
<b>Humidity</b> Operating	95% RH at 40 °C (non-condensing)
<b>Shock</b> End-user handling Transportation	Delta-V: 1.6 m/s (60 in/s) ±5%, Duration < 3ms 50G , Delta-V: 8m/s ±10% at 6 faces
<b>Vibration</b> Operating random Survival random	0.21 Grms 2.41 Grms
<b>Altitude</b> Operating Non-operating	< 4,600 meters (15,000 feet) < 4,600 meters (15,000 feet)

<b>ESD immunity</b> Direct discharge Air discharge	4 kV per IEC 61000-4-2 8 kV per IEC 61000-4-2
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## Mechanical Dimensions

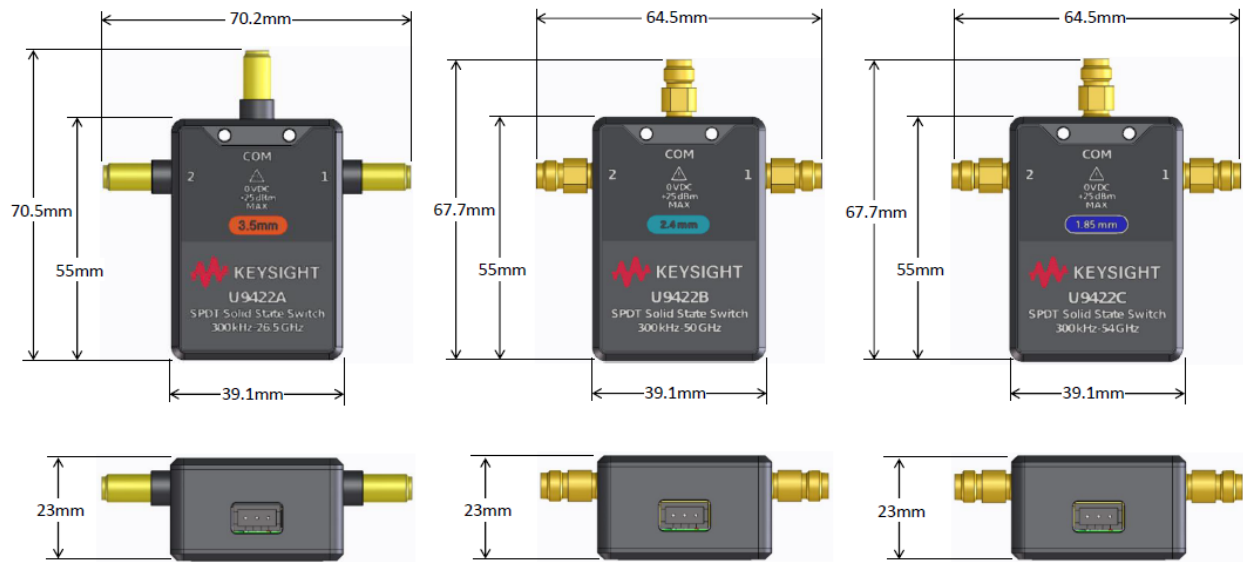


Figure 9. U9422x dimension (Option 001), SPDT

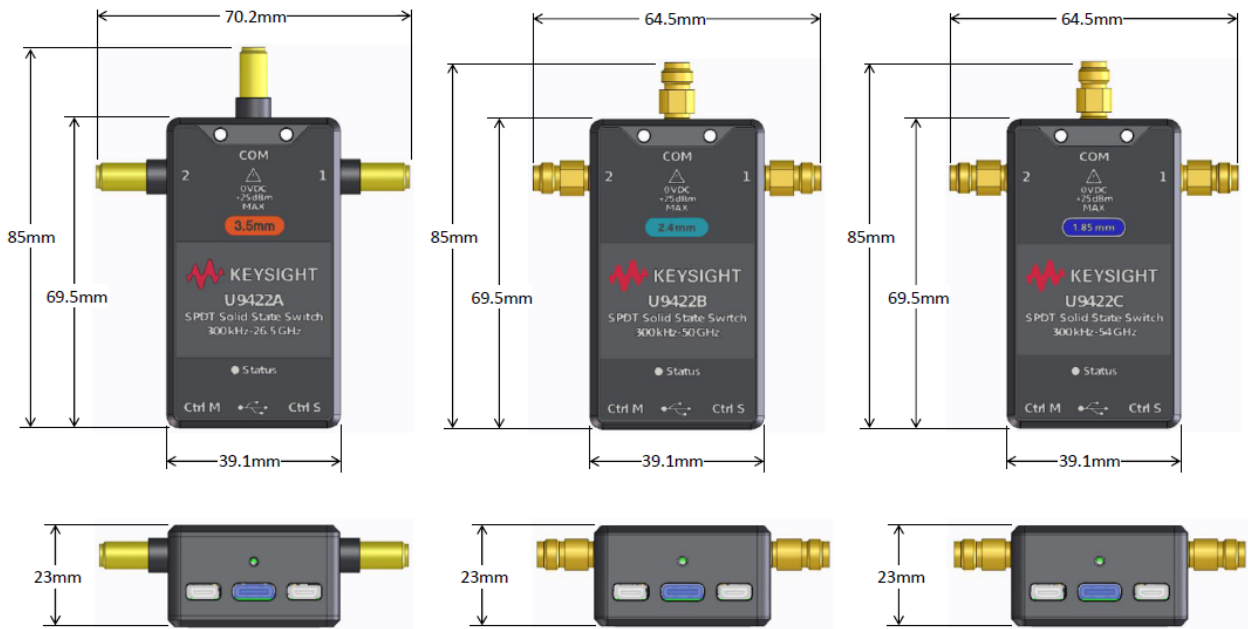


Figure 10. U9422x dimension (Option 002), SPDT

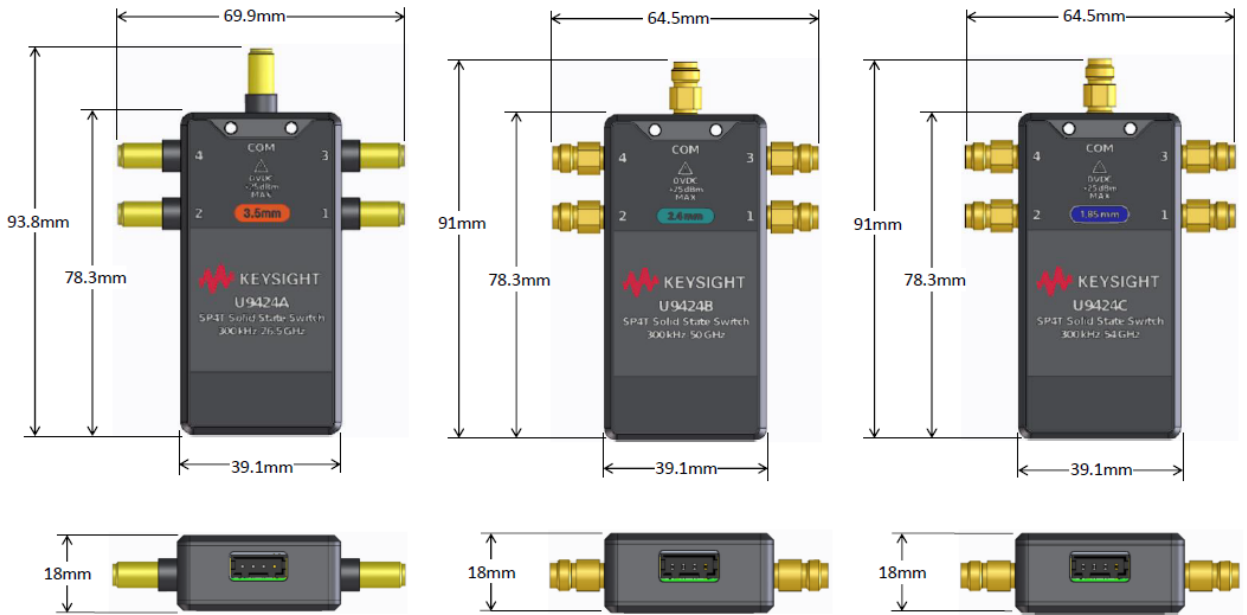


Figure 11. U9424x dimension (Option 001), SP4T

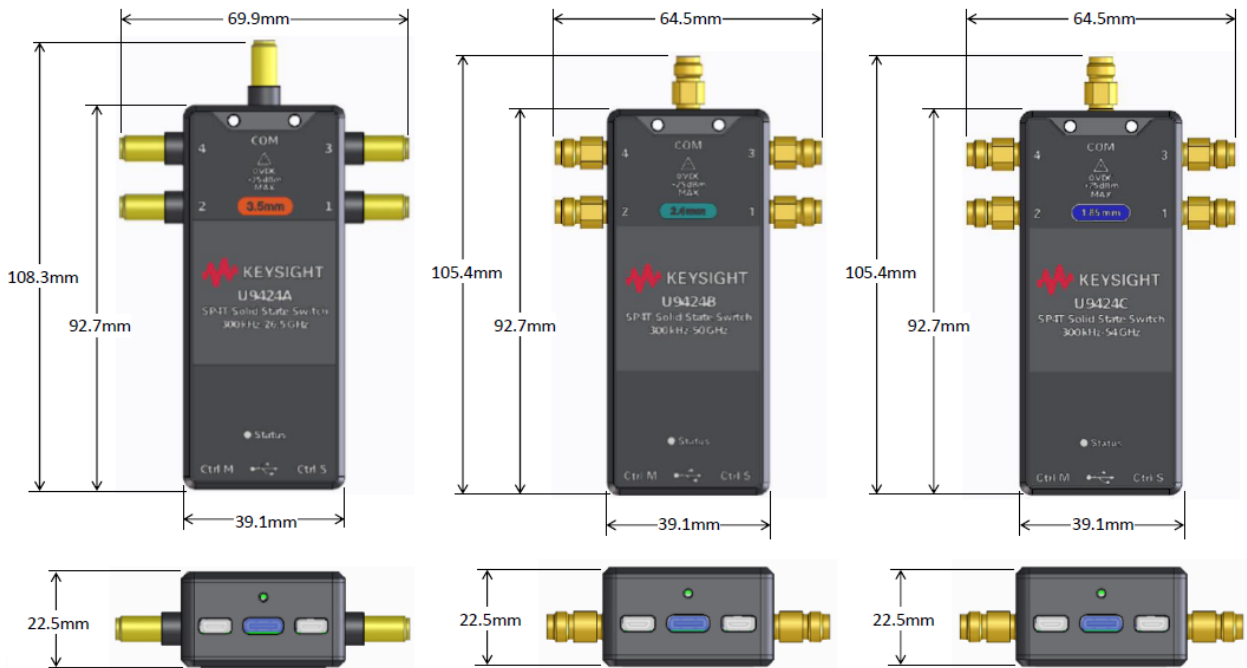


Figure 12. U9424x dimension (Option 002), SP4T



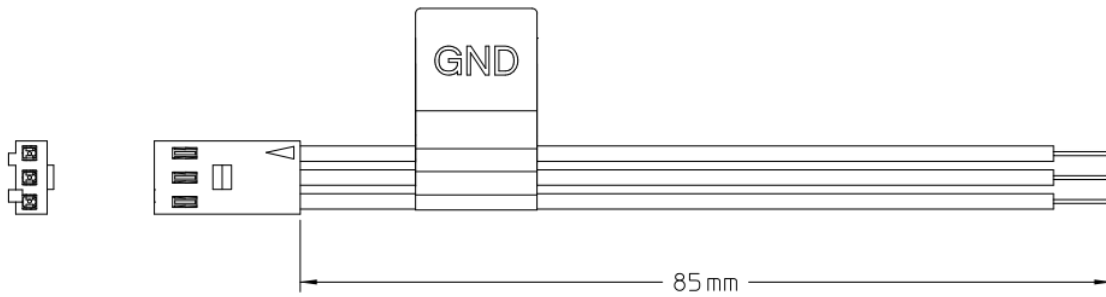


Figure 13. Option 101, 3-pins connector to bare wire, 85 mm (for SPDT Option 001 only) dimension

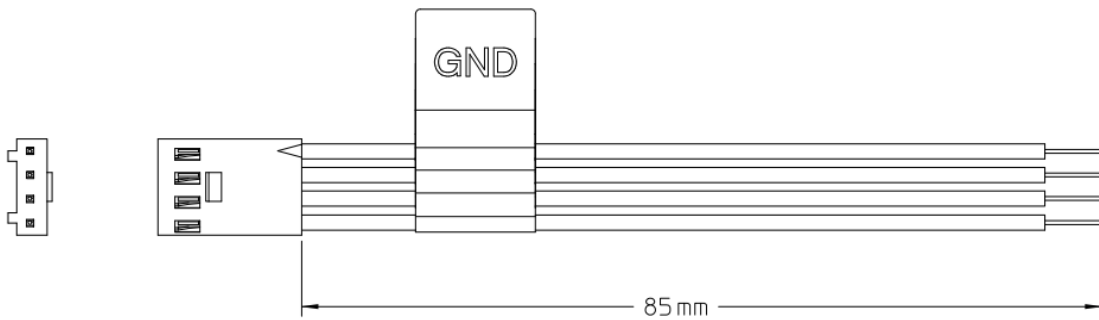


Figure 14. Option 101, 4-pins connector to bare wire, 85 mm (for SP4T Option 001 only) dimension

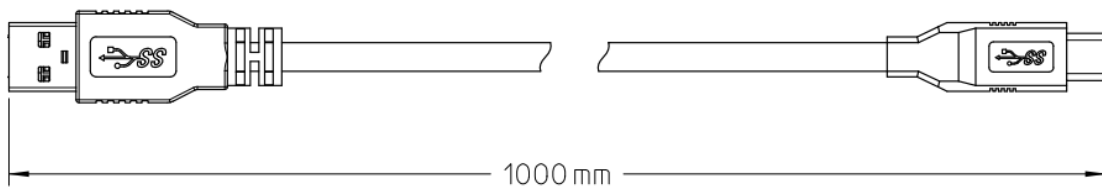


Figure 15. Option 201, USB 3.1 Type-A to Type-C, 1 meter (for Option 002 only) dimension

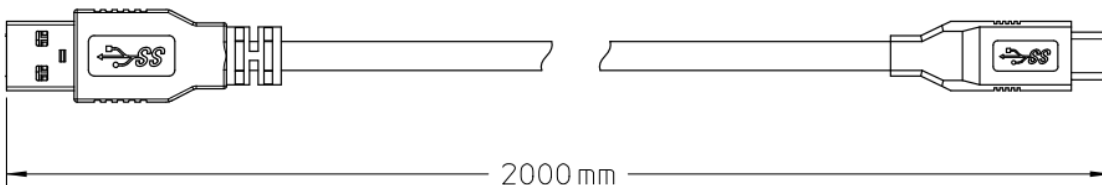


Figure 16. Option 202, USB 3.1 Type-A to Type-C, 2 meters (for Option 002 only) dimension

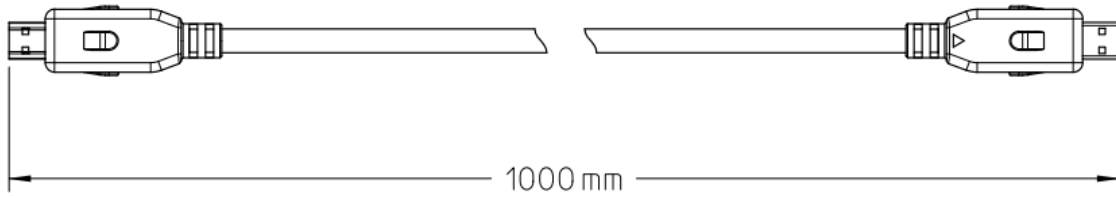


Figure 17. Option 301, interconnect cable for multiport configuration with PXIe & USB VNA (for Option 002 only), 1 meter

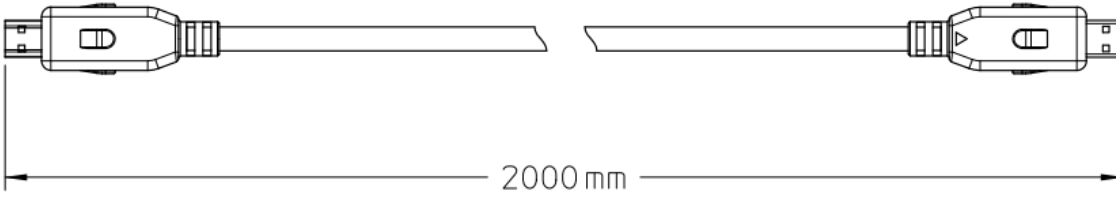


Figure 18. interconnect cable for multiport configuration with PXIe & USB VNA (for Option 002 only), 2 meters

## Ordering Information

Model	Description
U9422A	FET Solid State Switch, 300 kHz to 26.5 GHz, SPDT
U9422B	FET Solid State Switch, 300 kHz to 50 GHz, SPDT
U9422C	FET Solid State Switch, 300 kHz to 54 GHz, SPDT
U9424A	FET Solid State Switch, 300 kHz to 26.5 GHz, SP4T
U9424B	FET Solid State Switch, 300 kHz to 50 GHz, SP4T
U9424C	FET Solid State Switch, 300 kHz to 54 GHz, SP4T
Connectivity Option	Option 001: Solder terminal, Option 002: USB and multiport configuration port
Cable option	Option 101: 3-pins connector to bare wire, 85 mm (for SPDT Option 001 only) 4-pins connector to bare wire, 85 mm (for SP4T Option 001 only) Option 201: USB 3.1 Type-A to Type-C, 1 meter (for Option 002 only) Option 202: USB 3.1 Type-A to Type-C, 2 meters (for Option 002 only) Option 301: interconnect cable for multiport configuration with PXIe & USB VNA (for Option 002 only), 1 meter Option 302: interconnect cable for multiport configuration with PXIe & USB VNA (for Option 002 only), 2 meters

## More RF & microwave test accessories

For selection of more than 300 models of various type of RF and microwave test accessories with operating frequency up to 110 GHz. Go to: [www.keysight.com/find/mta](http://www.keysight.com/find/mta)

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