

High performance DP3T & Terminated SPDT up to 40 GHz

SMA - SMA 2.9



Radiall's PLATINUM series switches are optimized to perform at a high level over an extended life cycle. With outstanding RF performance, and a guaranteed insertion loss repeatability of 0.03 dB over a life span of 10 million switching cycles. PLATINUM series switches are perfect for automated test and measurement equipment, as well as signal monitoring devices.

Example of P/N:

R595F63215 is a Terminated SPDT SMA 26.5 GHz, latching with Self Cut-Off, 24Vdc, Indicators, D-Sub connector.

PART NUMBER SELECTION

R 595

RF Connectors:

- 3: SMA up to 6 GHz
- 4: SMA up to 20 GHz
- F: SMA up to 26.5 GHz
- 8: SMA 2.9 up to 40 GHz (1)

Type:

- 3: Latching
- 4: Latching + I.C.
- 5: Latching + S.C.O.
- 6: Latching + S.C.O. + I.C.

Actuator Voltage:

- 3: 24 Vdc
- 7: 15 Vdc

Switch Model:

- 2: Terminated SPDT switch
- 3: Terminated 4 ports bypass switch
- 4: Non terminated 5 ports DP3T switch

Documentation:

- : Certificate of conformity
- C: Calibration certificate
- R: Calibration certificate + RF curves

Actuator Terminals:

- 0: Solder pins
- 5: D-Sub connector

Options:

- 1: Without option (positive common)
- 2: Compatible TTL driver (high level)

I.C.: Indicator contact/S.C.O.: Self Cut-Off

(1): Connector SMA2.9 is equivalent to "K connector®", registered trademark of Anritsu

High performance DP3T & Terminated SPDT up to 40 GHz**SMA - SMA 2.9****GENERAL SPECIFICATIONS**

Operating mode		Latching	
Nominal operating voltage (across operating temperature)	Vdc	24 (20 to 32)	15 (12 to 20)
Coil resistance (+/-10%)	Ω	175	60
Nominal operating current at 23°C	mA	140	250
Average power		RF path	Cold switching: see Power Chart on page 3-21 Hot switching: 1 Watt CW
		Internal terminations	1 Watt average into 50 Ω
		External terminations	0.5 Watt average into 50 Ω
TTL input	High Level	3 to 7 V; 800 μA max at 7 V	
	Low Level	0 to 0.8 V; 20 μA max at 0.8V	
Switching time (Max)	ms	15	
Life (Min)	SMA	10 million cycles	
	SMA2.9	5 million cycles	
Connectors		SMA - SMA2.9	
Actuator terminals		D-Sub 9 pin female Solder pins	
Weight	g	<100	

ENVIRONMENTAL SPECIFICATIONS

Operating temperature range	-25°C to +75°C
Storage temperature range	-55°C to +85°C
Temperature cycling (MIL STD 202F, Method 107D, Cond.A)	-55°C to +85°C (10 cycles)
Sine vibration operating (MIL STD 202, Method 204D, Cond.D)	10-2000 Hz, 20g
Random vibration operating	16.91G (rms) 50-2000 Hz 3min/axis
Shock operating (MIL STD 202, Method 213B, Cond.G)	50g / 11ms, sawtooth
Humidity operating	15 to 95% relative humidity
Humidity storage (MIL STD 202, Method 106E, Cond.E)	65°C, 95% RH, 10 days
Altitude operating	15,000 feet (4,600 meters)
Altitude storage (MIL STD 202, Method 105C, Cond.B)	50,000 feet (15,240 meters)

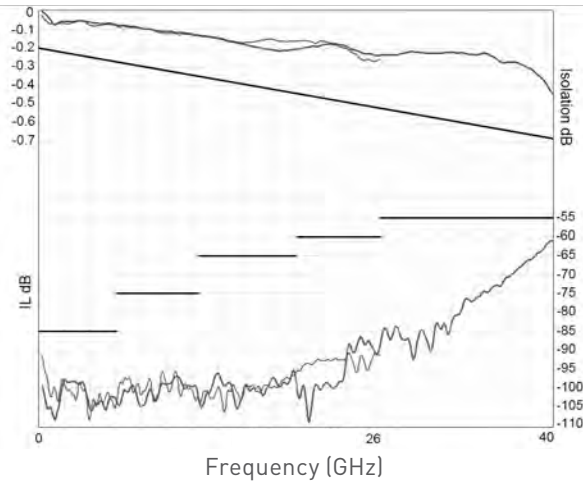
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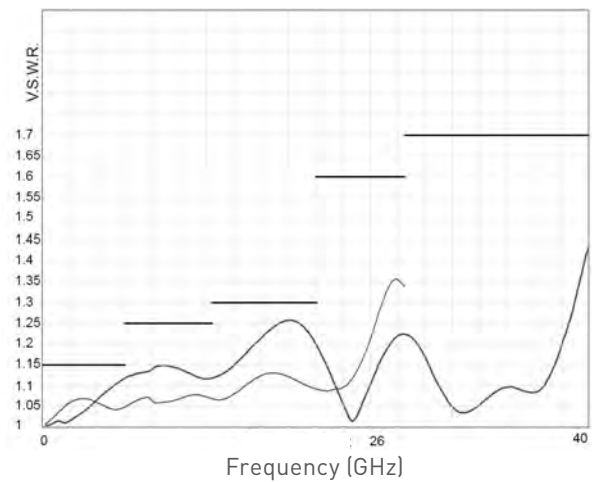
RF PERFORMANCES

Part Number		R5953-----	R5954-----		R595F-----		R5958-----		
Frequency Range	GHz	DC to 6		DC to 20		DC to 26.5		DC to 40	
Impedance	Ω	50							
Insertion Loss (max)	dB	0.20 + (0.45 / 26.5) x frequency (GHz)							
Isolation (Min)		85	DC to 6 GHz	85	DC to 6 GHz	85	DC to 6 GHz	85	
			6 to 12.4 GHz	75	6 to 12.4 GHz	75	6 to 12.4 GHz	75	
			12.4 to 20 GHz	65	12.4 to 20 GHz	65	12.4 to 20 GHz	65	
			20 to 26.5 GHz	60w	20 to 26.5 GHz	60w	20 to 26.5 GHz	60	
	26.5 to 40 GHz			26.5 to 40 GHz		26.5 to 40 GHz	55		
V.S.W.R. (Max)		1.15	DC to 6 GHz	1.15	DC to 6 GHz	1.15	DC to 6 GHz	1.15	
			6 to 12.4 GHz	1.25	6 to 12.4 GHz	1.25	6 to 12.4 GHz	1.25	
			12.4 to 18 GHz	1.30	12.4 to 18 GHz	1.30	12.4 to 18 GHz	1.30	
			18 to 20 GHz	1.60	18 to 26.5 GHz	1.60	18 to 26.5 GHz	1.60	
			26.5 to 40 GHz		26.5 to 40 GHz		26.5 to 40 GHz	1.80	
Repeatability (Up to 10 million cycles measured at 25°C)		0.03 dB maximum					0.05 dB maximum		

Insertion Loss and Isolation



V.S.W.R.



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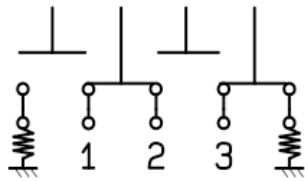
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SWITCH MODEL: TERMINATED SPDT SWITCH

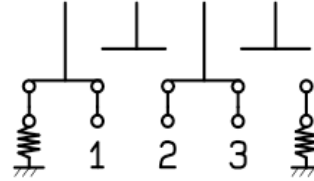
The terminated SPDT switch is a single pole double throw switch where unused ports are terminated into 50 ohms. This switch is considered a “break before make”.

RF SCHEMATIC DIAGRAM

Position E1

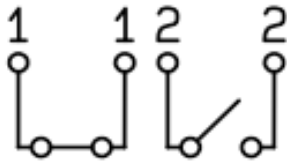


Position E2

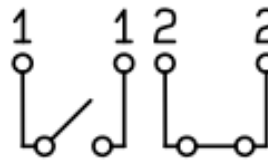


POSITION INDICATORS

State 11



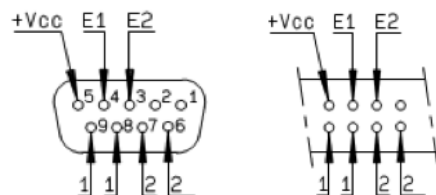
State 22



Standard drive option “1”

(Positive common):

- Connect pin +Vcc to supply (+20 Vdc to +32 Vdc)
- Select desired RF path by applying ground to the corresponding "close" pin (Ex: ground pin E1 to switch to position E1. RF path 1-2 closed and RF path 2-3 open)
- To open desired path and close the new RF path, connect ground to the corresponding "close" pin (Ex: ground pin E2 to open RF path 1-2 and close RF path 2-3)

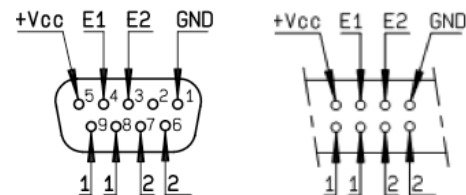


D-sub Connector

Solder Pins

TTL drive option “2”

- Connect pin GND to ground
- Connect pin +Vcc to supply (+20 Vdc to +32 Vdc)
- Select (close) desired RF path by applying TTL "High" to the corresponding "drive" pin. (Ex: apply TTL "High" to pin E1 to switch to position E1. RF path 1-2 closed and RF path 2-3 open)
- To open desired path and close the new RF path, apply TTL "High" to the "drive" pin which corresponds to the desired RF path. (Ex: apply TTL "High" to pin E2 to open RF path 1-2 and close RF path 2-3)



D-sub Connector

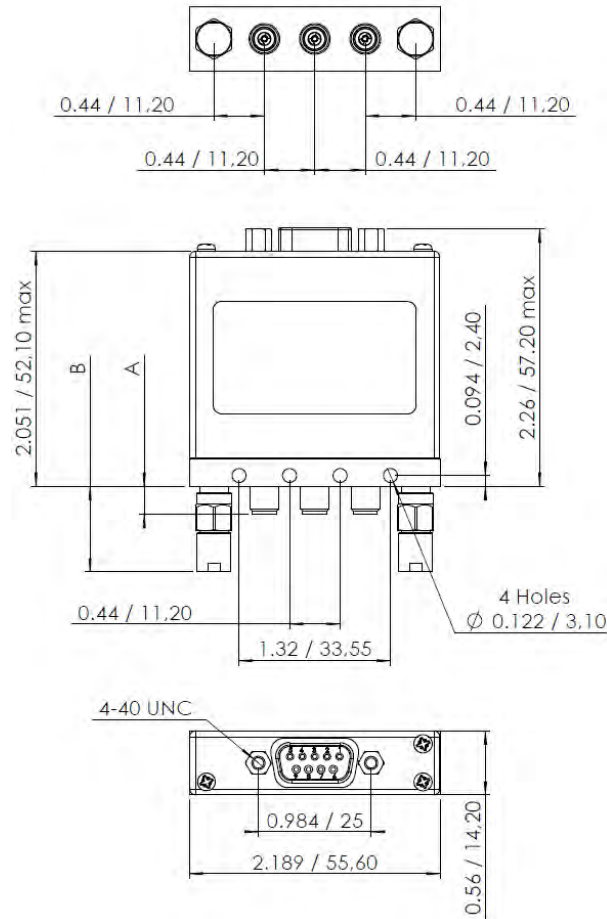
Solder Pins

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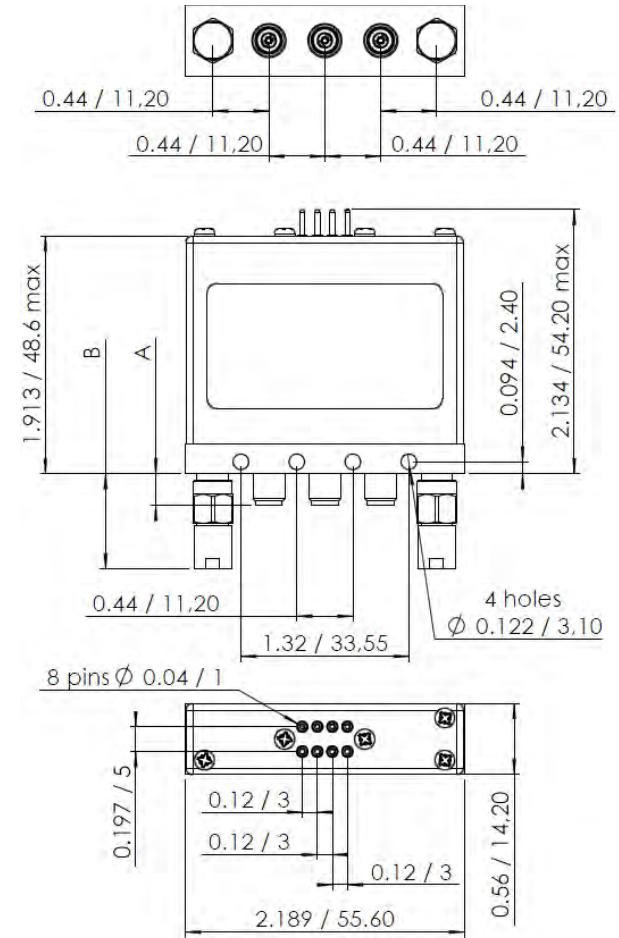
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SWITCH MODEL: TERMINATED SPDT SWITCH

With D-Sub connector



With solder pins



All dimensions are in inches/millimeters

Connectors	A max (inches / mm)	B max (inches / mm)	Terminations
SMA up to 26.5 GHz	0.291 / 7.40	0.067 / 1.70	Internal
SMA 2.9 up to 40 GHz	0.248 / 6.30	0.748 / 19.0	External

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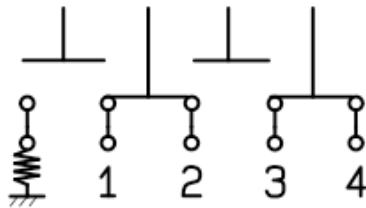
SWITCH MODEL: TERMINATED 4 PORT SWITCH

The terminated 4 port bypass switch can terminate into the 50 ohms device under test.

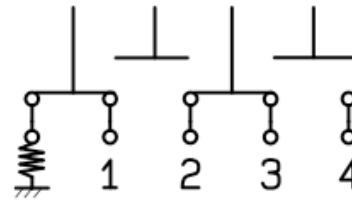
This switch is considered a “break before make”.

RF SCHEMATIC DIAGRAM

Position E1

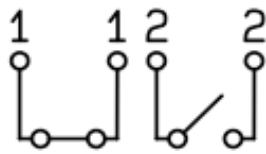


Position E2

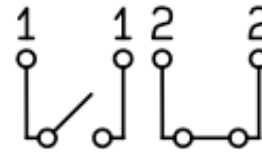


POSITION INDICATORS

State 11



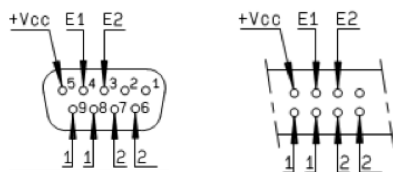
State 22



Standard drive option “1”

(Positive common):

- Connect pin +Vcc to supply (+20 Vdc to +32 Vdc)
- Select desired RF path by applying ground to the corresponding "close" pin (Ex: ground pin E1 to switch to position E1. RF path 1-2 and RF path 3-4 closed and RF path 2-3 open)
- To open desired path and close the new RF path, connect ground to the corresponding "close" pin (Ex: ground pin E2 to open RF path 1-2 and 3-4 and close RF path 2-3)

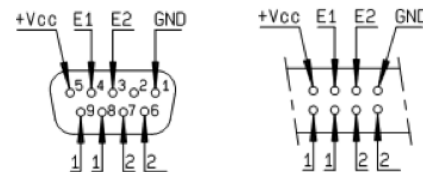


D-Sub connector

Solder pins

TTL drive option “2”:

- Connect pin GND to ground
- Connect pin +Vcc to supply (+20 Vdc to +32 Vdc)
- Select (close) desired RF path by applying TTL "High" to the corresponding "drive" pin (Ex: apply TTL "High" to pin E1 to switch to position E1. RF path 1-2 and 3-4 closed and RF path 2-3 open)
- To open desired path and close the new RF path, apply TTL "High" to the "drive" pin which corresponds to the desired RF path (Ex: apply TTL "High" to pin E2 to open RF path 1-2 and 3-4 and close RF path 2-3)



D-Sub connector

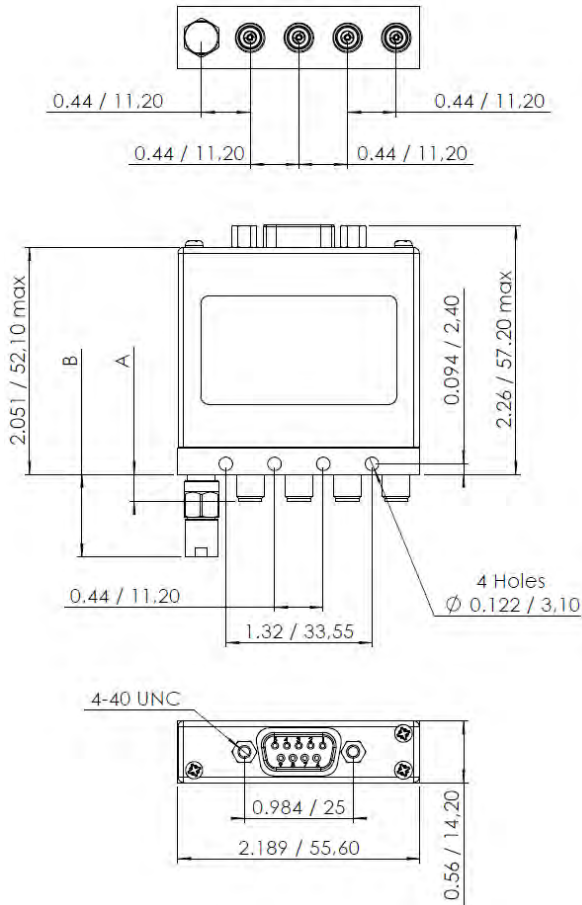
Solder pins

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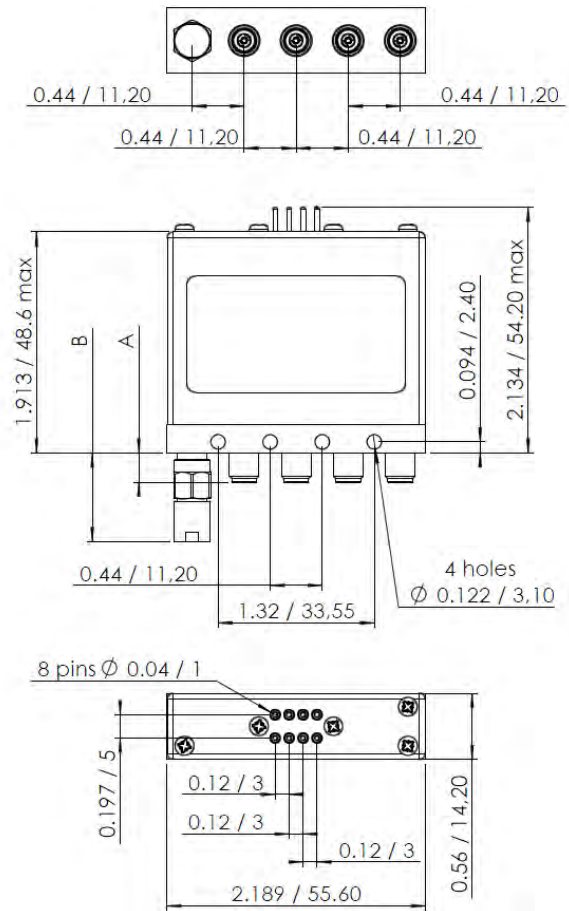
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SWITCH MODEL: TERMINATED 4 PORT BYPASS SWITCH

With D-Sub connector



With solder pins



All dimensions are in inches/millimeters

Connectors	A max (inches / mm)	B max (inches / mm)	Terminations
SMA up to 26.5 GHz	0.291 / 7.40	0.067 / 1.70	Internal
SMA 2.9 up to 40 GHz	0.248 / 6.30	0.748 / 19.0	External

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SWITCH MODEL: 5 PORT DP3T SWITCH

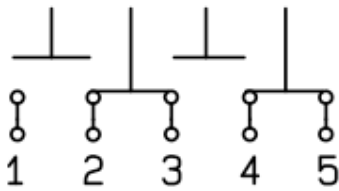
The non terminated 5 port DP3T switch can be used as SPDT with high power terminations, as a bypass switch.

In this application, the fifth port can be terminated externally with a high power termination.

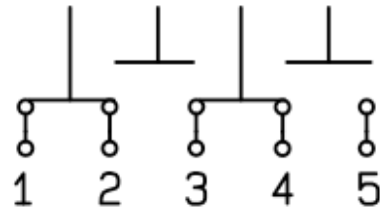
These switches are considered a "break before make".

RF SCHEMATIC DIAGRAM

Position E1

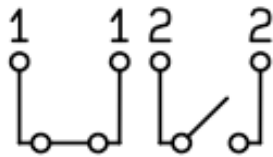


Position E2

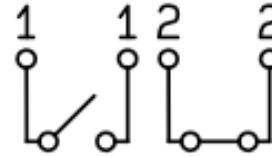


POSITION INDICATORS

State 11



State 22



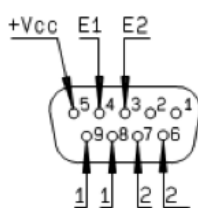
Standard drive option "1"

(Positive common):

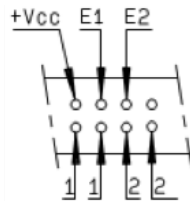
- Connect pin +Vcc to supply (+20 Vdc to +32 Vdc)
- Select desired RF path by applying ground to the corresponding "close" pin (Ex: ground pin E1 to switch to position E1. RF path 2-3 and RF path 4-5 closed and RF path 1-2 and RF path 3-4 open)
- To open desired path and close the new RF path, connect ground to the corresponding "close" pin (Ex: ground pin E2 to open RF path 2-3 and 4-5 and close RF path 1-2 and 3-4)

TTL drive option "2":

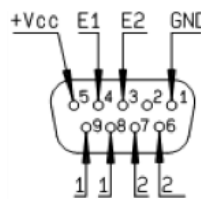
- Connect pin GND to ground
- Connect pin +Vcc to supply (+20 Vdc to +32 Vdc)
- Select (close) desired RF path by applying TTL "High" to the corresponding "drive" pin (Ex: apply TTL "High" to pin E1 to switch to position E1. RF path 2-3 and RF path 4-5 closed and RF path 1-2 and 3-4 open)
- To open desired path and close the new RF path, apply TTL "High" to the "drive" pin which corresponds to the desired RF path. (Ex: apply TTL "High" to pin E2 to open RF path 2-3 and 4-5 and close RF path 1-2 and 3-4)



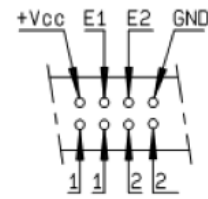
D-Sub connector



Solder pins



D-Sub connector



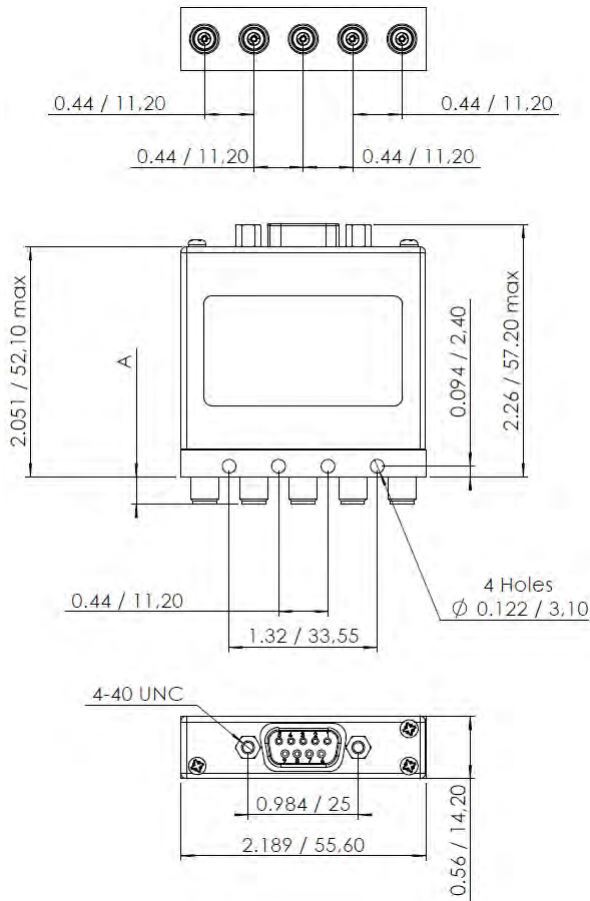
Solder pins

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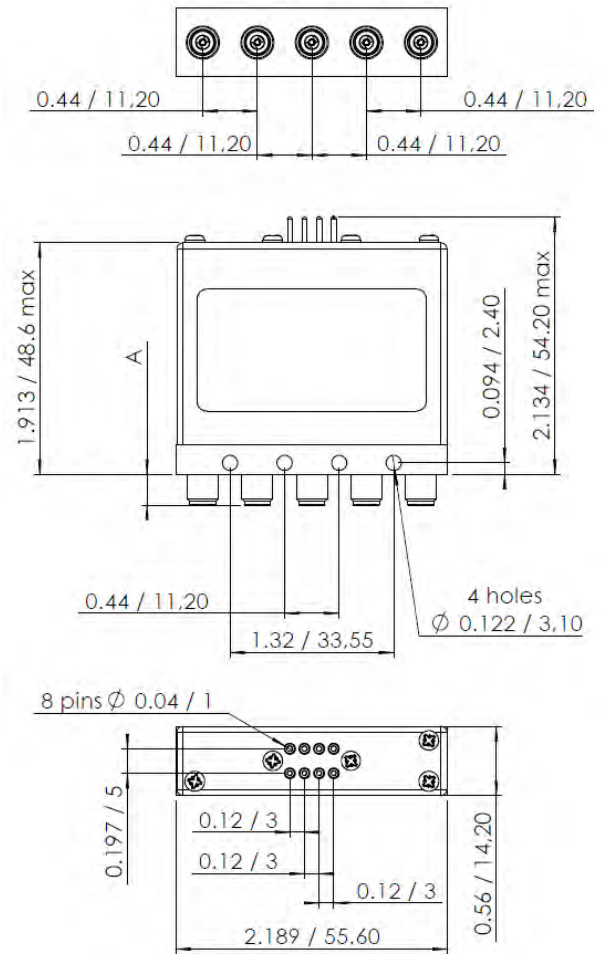
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SWITCH MODEL: 5 PORT DP3T SWITCH

With D-Sub connector



With solder pins



All dimensions are in inches/millimeters

Connectors	A max (inches / mm)
SMA up to 26.5 GHz	0.291 / 7.40
SMA 2.9 up to 40 GHz	0.248 / 6.30

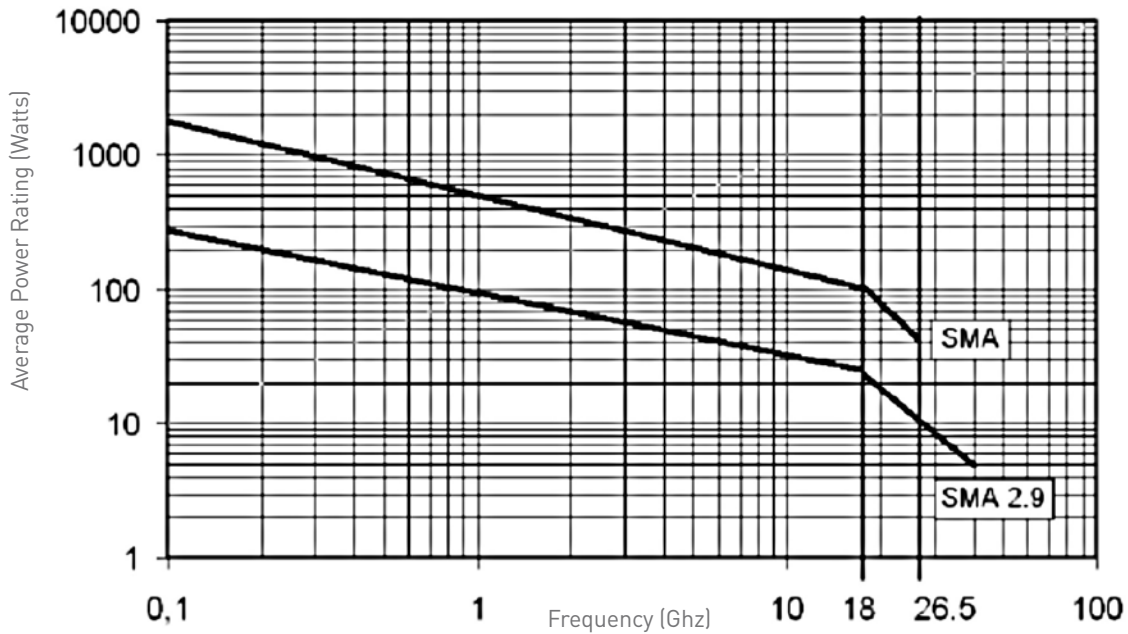
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POWER RATING CHART

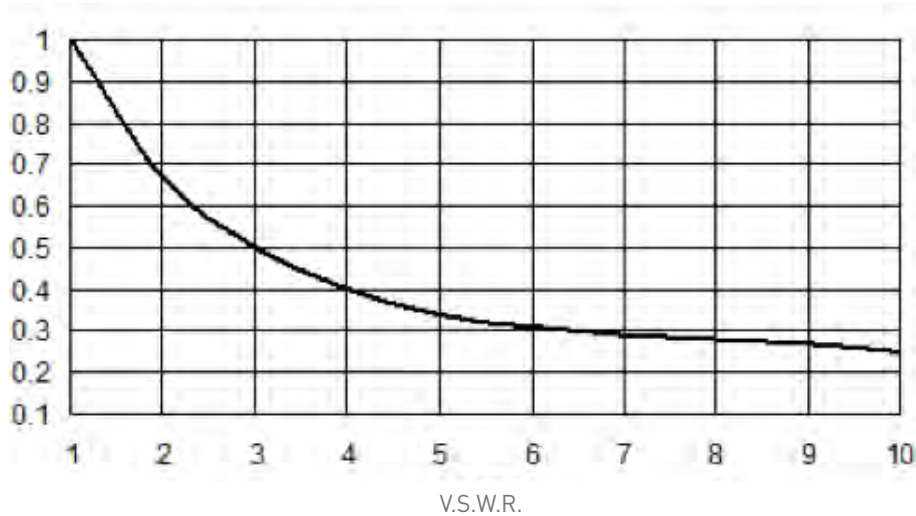
This graph is based on the following conditions:

- Ambient temperature: + 25°C
- Sea level
- V.S.W.R.: 1 and cold switching



DERATING FACTOR VERSUS V.S.W.R.

The average power input must be reduced for load V.S.W.R. above 1.1

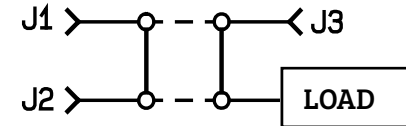


Optional features for DP3T switches

GENERAL

RADIALL DP3T / SPDT terminated are designed only with SMA connectors.

For all other connectors (N, BNC etc.), the same function as SPDT terminated can be easily performed with a standard DPDT and an external load.



POS 1 : J1 to J2 / J3 to load

Examples of dedicated applications



This SPDT terminated switch is composed of a DP3T with SMA connectors, and cable load for medium power terminations. The Key advantage of this solution is the ability to mount the switch with external terminations at the desired power level.



This is an example of an SPDT terminated switch that was designed with 2 separate coils for a specific test network application.