



DP3T - SPDT Coaxial Switches DC to 6 GHz, DC to 20 GHz, DC to 26.5 GHz

Radiall's PLATINUM SERIES switches are optimised to perform at a high level over an extended life span. With outstanding RF performances, 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.

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

Type :
3 : Latching
4 : Latching + Indicators
5 : Latching + Self Cut-Off
6 : Latching + Self Cut-Off + Indicators

Actuator Voltage :
3 : 24 Vdc
7 : 15 Vdc

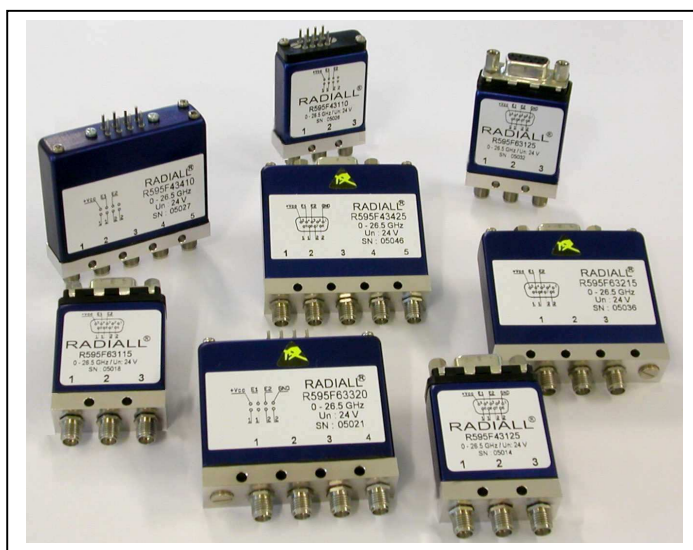
Documentation :
- : Certificate Of Conformity
C : Calibration certificate
R : Calibration certificate + RF curves

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

Options :
1 : Without option (Positive common)
2 : Compatible TTL driver (high level)

Switch model :
1 : Non terminated SPDT switch
2 : Terminated SPDT switch
3 : Terminated 4 port bypass switch
4 : Non terminated 5 port DP3T switch

PICTURE



**RF PERFORMANCES**

| PART NUMBER | R5953----- | R5954----- | R595F----- |
|--|--|--|--|
| Frequency Range GHz | DC to 6 | DC to 20 | DC to 26.5 |
| Impedance Ohms | 50 | | |
| Insertion Loss dB (Maximum) | 0.20 + (0.45 / 26.5) x frequency (GHz) | | |
| Isolation dB (Minimum) | 85 | DC to 6 GHz : 85 6 to 12.4 GHz : 75 12.4 to 20 GHz : 65 | DC to 6 GHz : 85 6 to 12.4 GHz : 75 12.4 to 20 GHz : 65 20 to 26.5 GHz : 60 |
| V.S.W.R. (Maximum) | 1.15 | DC to 6 GHz : 1.15 6 to 12.4 GHz : 1.25 12.4 to 18 GHz : 1.30 18 to 20 GHz : 1.60 | DC to 6 GHz : 1.15 6 to 12.4 GHz : 1.25 12.4 to 18 GHz : 1.30 18 to 26.5 GHz : 1.60 |
| Repeatability (Up to 10 million cycles measured at 25°C) | 0.03 dB maximum | 0.03 dB maximum | 0.03 dB maximum |

TYPICAL RF PERFORMANCES**Insertion Loss and Isolation****V.S.W.R.**

**ADDITIONAL SPECIFICATIONS**

| Operating mode | | Latching | |
|--|------------|--|--------------------------------|
| Nominal operating voltage (across operating temperature) Vdc | | | 24 (20 / 32) 15 (12 / 20) |
| Coil resistance (+/-10%) | Ohms | SPDT | 350 120 |
| | | Terminated SPDT, DP3T, Bypass | 175 60 |
| Nominal operating current at 23°C | mA | SPDT | 68 125 |
| | | Terminated SPDT, DP3T, Bypass | 140 250 |
| Average power | | RF path Cold switching : see Power Rating Chart on page 12 Hot switching : 1 Watt CW | |
| | | Internal terminations 1 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) | | 10 million cycles | |
| Connectors | | SMA | |
| Actuator terminals | | D-Sub 9 pin female Solder pins | |
| Weight (max) | g | SPDT | < 60 |
| | | Terminated SPDT, DP3T, Bypass | < 100 |

ENVIRONMENTAL SPECIFICATIONS

| | | |
|---|----|-----------------------------------|
| Operating temperature range | °C | -25 to +75 |
| Storage temperature range | °C | -55 to +85 |
| Temperature cycling (MIL-STD-202F , Method 107D , Cond.A) | °C | -55 to +85 (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 / 11 ms, 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) |





SWITCH MODEL 1 : NON TERMINATED SPDT SWITCH

The non terminated SPDT switch is a single pole double throw switch. This switch is "break before make".

RF SCHEMATIC DIAGRAM

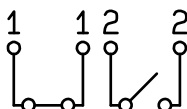
POSITION E1



POSITION E2



POSITION INDICATORS



STATE "11"



STATE "22"

Standard drive option "1" (Positive common):

- Connect pin +Vcc to supply.
- 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).

TTL drive option "2"

- Connect pin GND to ground.
- Connect pin +Vcc to supply
- 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).



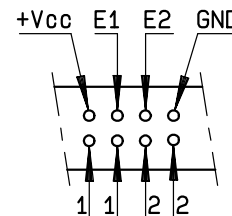
D-Sub connector



Solder pins



D-Sub connector



Solder pins



All dimensions are in inches/millimetres.

With D-Sub connector



With solder pins





HIGH PERFORMANCE DP3T - SPDT SWITCHES

SWITCH MODEL 2 : TERMINATED SPDT SWITCH

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

RF SCHEMATIC DIAGRAM



POSITION INDICATORS



STATE "11"



STATE "22"

Standard drive option "1" (Positive common):

- Connect pin +Vcc to supply.
- 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).

TTL drive option "2"

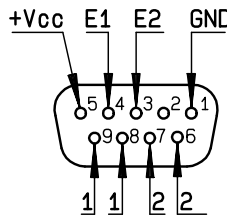
- Connect pin GND to ground.
- Connect pin +Vcc to supply
- Select (close) desired RF path by applying TTL "High" to the corresponding "drive" pin (Ex: apply TTL "High" to pin E1 to switch to position E1. RF path 1-2 closed and RF path 2-3 open).
- To open desired path and close the new RF path, apply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



D-Sub connector



Solder pins





All dimensions are in inches/millimetres.

With D-Sub connector

With solder pins

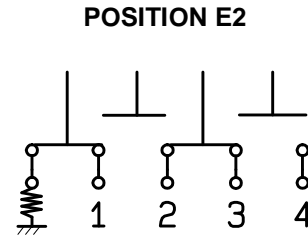
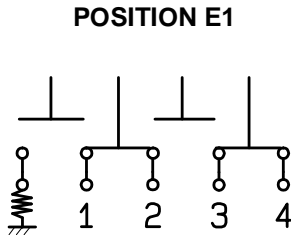




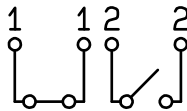
SWITCH MODEL 3 : TERMINATED 4 PORT BYPASS SWITCH

The terminated 4 port bypass switch can terminate into 50 ohms the device under test. These switches are "break before make".

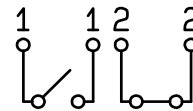
RF SCHEMATIC DIAGRAM



POSITION INDICATORS



STATE "11"



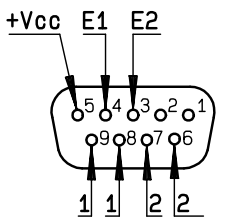
STATE "22"

Standard drive option "1" (Positive common):

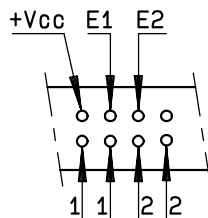
- Connect pin +Vcc to supply.
- Select desired RF path by applying ground to the corresponding "close" pin (Ex: ground pin E1 to switch to position E1. RF path 1-2 and RF path 3-4 closed and RF path 2-3 open).
- To open desired path and close the new RF path, connect ground to the corresponding "close"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

TTL drive option "2"

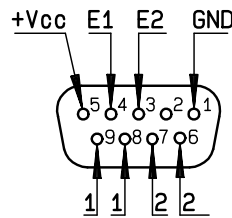
- Connect pin GND to ground.
- Connect pin +Vcc to supply.
- Select (close) desired RF path by applying TTL "High" to the corresponding "drive" pin (Ex: apply TTL "High" to pin E1 to switch to position E1. RF path 1-2 and 3-4 closed and RF path 2-3 open).
- To open desired path and close the new RF path,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



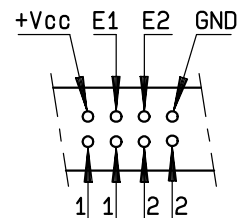
D-Sub connector



Solder pins



D-Sub connector



Solder pins



All dimensions are in inches/millimetres.

With D-Sub connector

With solder pins





SWITCH MODEL 4 : NON TERMINATED 5 PORT DP3T SWITCH

The non terminated 5 port DP3T switch can 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 "break before make".

RF SCHEMATIC DIAGRAM



POSITION INDICATORS

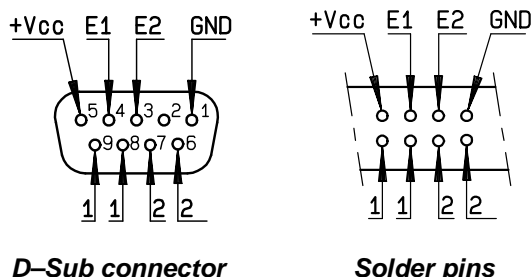
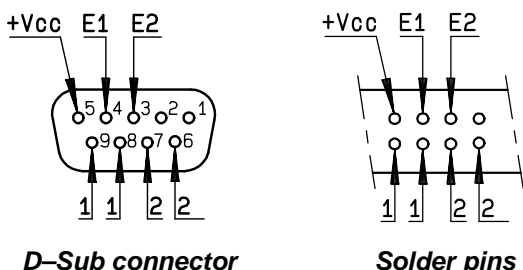


Standard drive option "1" (Positive common):

- Connect pin +Vcc to supply.
- 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.
- 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).

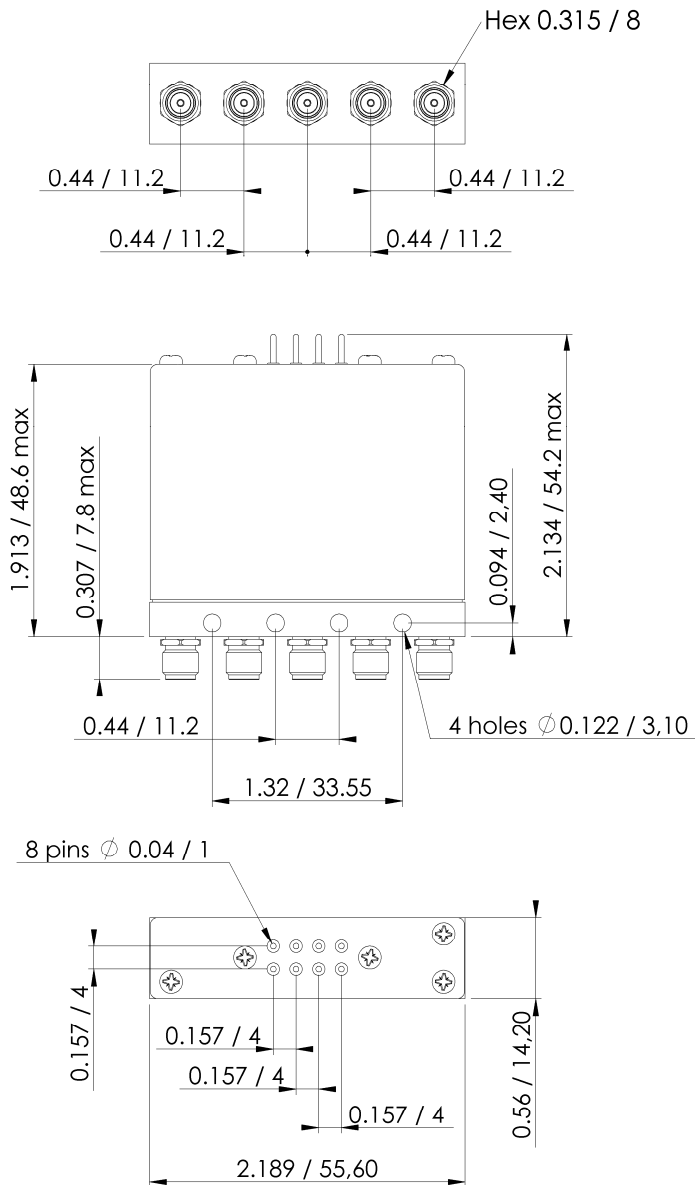
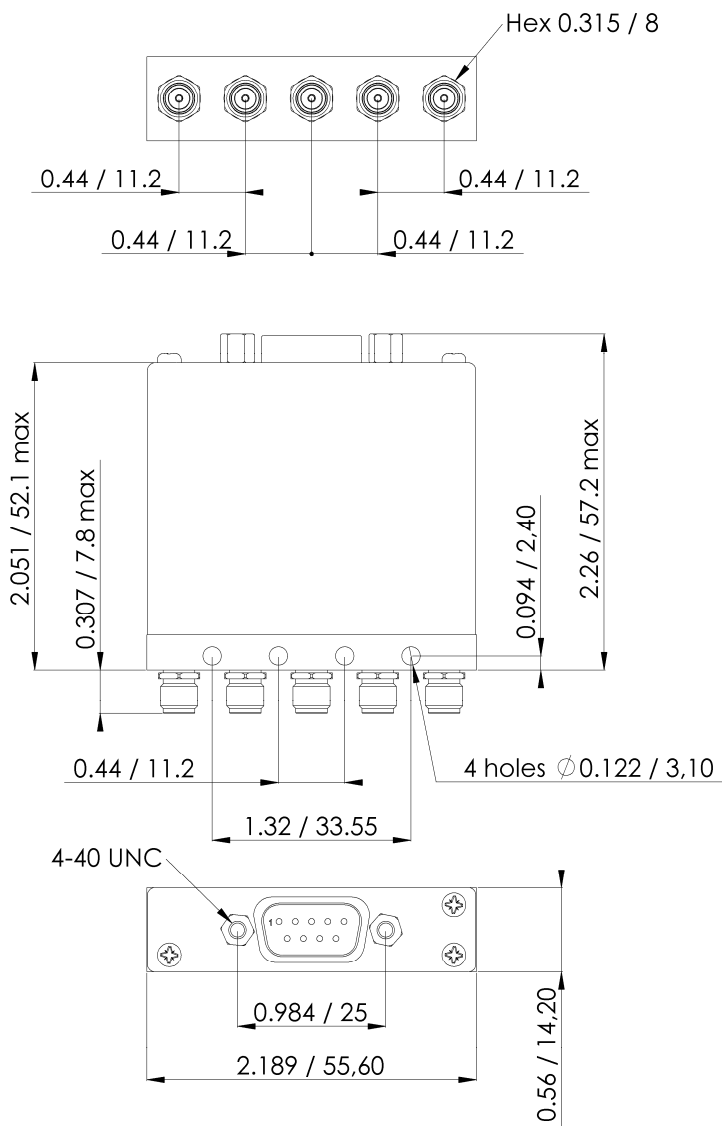




All dimensions are in inches/millimetres.

With D-Sub connector

With solder pins





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



The average power input must be reduced for load V.S.W.R. above 1.

