

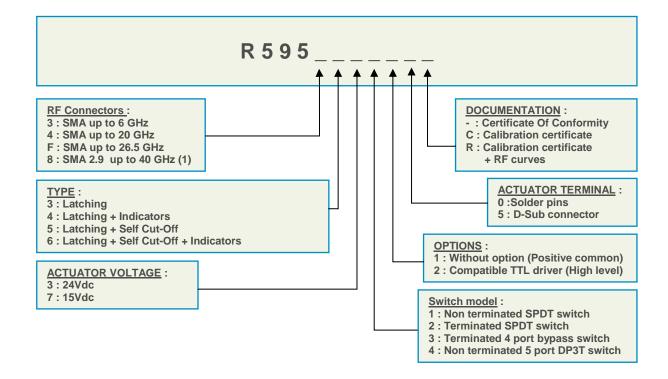
HIGH PERFORMANCE DP3T-SPDT SWITCHES PLATINUM Series

PAGE 1/12 ISSUE 05-11-18 SERIES DP3T/SPDT PART NUMBER R595 XXX XXX

DP3T-SPDT Coaxial Switches DC to 6 GHz, DC to 20 GHz, DC to 26.5 GHz, DC to 40 GHz

Radiall's PLATINUM SERIES switches are optimized 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



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

PICTURE





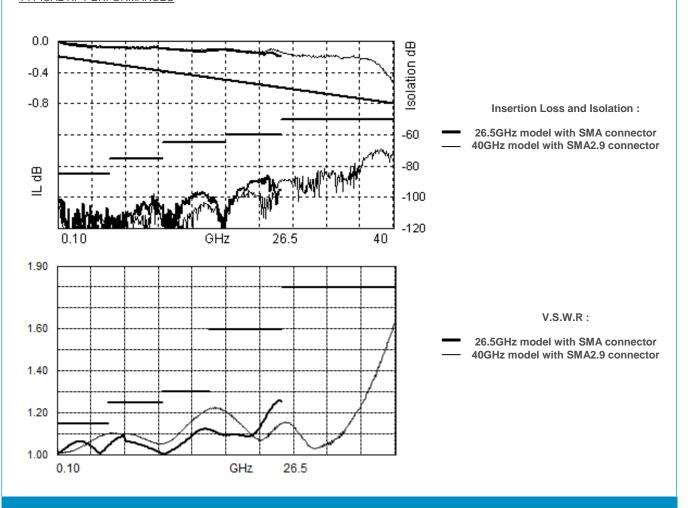


PAGE 2/12 ISSUE 05-11-18 SERIES DP3T/SPDT PART NUMBER R595 XXX XXX

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 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	DC to 6 GHz : 85 6 to 12.4 GHz : 75 12.4 to 20 GHz : 65 20 to 26.5 GHz : 60 26.5 to 40 GHz : 55	
V.S.W.R. (Maximum)	1.15	DC to 6 GHz : 1.15 6 to 12.4 GHz : 1.25 12.4 to 20 GHz : 1.30	DC to 6 GHz : 1.15 6 to 12.4 GHz : 1.25 12.4 to 20 GHz : 1.30 20 to 26.5 GHz : 1.60	DC to 6 GHz : 1.15 6 to 12.4 GHz : 1.25 12.4 to 20 GHz : 1.30 18 to 26.5 GHz : 1.60 26.5 to 40 GHz : 1.80	
Third order Inter Modulation	-120 dBc typical (2 carriers 20W)				
Repeatability (up to 10 million cycles measured at 25°C)	0.03 dB maximum			0.05 dB maximum	

TYPICAL RF PERFORMANCES





HIGH PERFORMANCE DP3T-SPDT SWITCHES PLATINUM Series

PAGE 3/12 ISSUE 05-11-18 SERIES DP3T/SPDT PART NUMBER R595 XXX XXX

ADDITIONAL SPECIFICATIONS

Operating mode		Latching			
Nominal operating voltage (Vdc) (across operating temperature)			2	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
	All models RF path Cold switching : See Power Rating Ch Hot switching : 1 Watt CW		g Chart on final page		
Average power	Terminated model	Internal terminations 1 Watt average into 50Ω			
		External terminations 0.5 Watt average into 50Ω			
	High Level	3 to 7 V		800 μA max at 7 V	
TTL input	Low Level	0 to 0.8 V		20 μA max at 0.8V	
Switching time max (ms)		15			
I if a males for a	SMA	10 million cycles			
Life min for SMA 2.9		5 million cycles			
Connectors		SMA – SMA 2.9			
Actuator terminal		D-Sub pin female Solder pins			
	SPDT < 60		_		
Weight max (g)	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-202 , 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)	





PAGE 4/12

ISSUE **05-11-18**

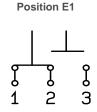
SERIES DP3T/SPDT

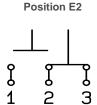
PART NUMBER R595 XXX XXX

SWITCH MODEL 1: NON TERMINATED SPDT SWITCH

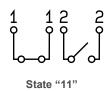
The non-terminated SPDT switch is a single pole double throw switch. This switch is "break before make".

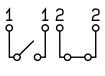
RF SCHEMATIC DIAGRAM





INDICATORS POSITION





State "22"

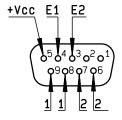
Standard drive option "1" (Positive common):

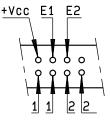
- Connect pin +Vcc to supply
- Select desired RF path by applying ground to the corresponding "Close" pin (Ex. ground pin E1 to switch to position E1. RF path 1-2 closed and RF path 2-3 open).
- To open desired path and close the new RF path, connect ground to the corresponding "close" pin (Ex: ground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

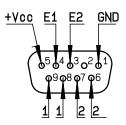
desired RF path. (Ex: apply TTL "High" to pin E2 to open RF path 1-2 and close RF path 2-3).



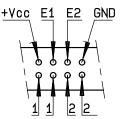


D-Sub connector

Solder pins



D-Sub connector



Solder pins



HIGH PERFORMANCE DP3T-SPDT SWITCHES PLATINUM Series

PAGE **5/12** SERIES DP3T/SPDT ISSUE **05-11-18** PART NUMBER R595 XXX XXX All dimensions are in millimeters [inches]. With D-Sub connector With solder pins [0.440] 0.440 0.440 0.440 11.18 11.18 11.18 11.18 [0.138 min.] 3.50 min. 2.087 max. 1.850 max. 53 max 0.122 47 max. $\begin{bmatrix} 0.122 \\ 2 \times \emptyset \ 3.10 \end{bmatrix}$ $2 \times \bigcirc 3.10$ 3 \oplus \oplus \oplus 0.441 3 connectors 11.20 3 connectors 0.441 11.20 1.339 [1.339] 34 34 4-40 UNC 86888 0.360 [0.118] 9.15 3 step

Connectors	A max mm [inches]		
SMA up to 26.5GHz	7.7 [0.303]		
SMA 2.9 up to 40GHz	6.7 [0.264]		





PAGE **6/12**

ISSUE **05-11-18**

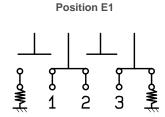
SERIES DP3T/SPDT

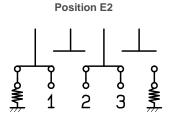
PART NUMBER R595 XXX XXX

SWITCH MODEL 2: TERMINATED SPDT SWITCH

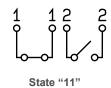
The-terminated SPDT switch is a single pole double throw switch. The unused ports are terminated into 50ohms. This switch is "break before make".

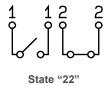
RF SCHEMATIC DIAGRAM





INDICATORS POSITION





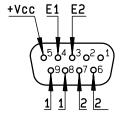
Standard drive option "1" (Positive common):

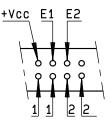
- Connect pin +Vcc to supply
- Select desired RF path by applying ground to the corresponding "Close" pin (Ex. ground pin E1 to switch to position E1. RF path 1-2 closed and RF path 2-3 open).
- To open desired path and close the new RF path, connect ground to the corresponding "close" pin (Ex: ground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

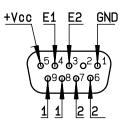
(Ex: apply $\dot{\text{TTL}}$ "High" to pin E2 to open RF path 1-2 and close RF path 2-3).



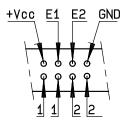


D-Sub connector

Solder pins







Solder pins





SERIES DP3T/SPDT PAGE **7/12** ISSUE **05-11-18** PART NUMBER R595 XXX XXX All dimensions are in millimeters [inches]. Model SMA with D-Sub connector Model SMA with solder pins [0.440] [0.440] [0.440] _11.18 [0.440] 11,18 11.18 11.18 [0.440] _11.18 [0.440] 0.440 0.440 <u>11.1</u>8 11.18 11.18 $\prod \prod$ Ë [2.248 max.] 57.10 max. [2.051 max.] 52.10 max. 3.50 [0.059 max.] 1.50 max. [1.890 max.] 48 max. [0.059 max.] 1.50 max. [0.094] 2.40 2 2 3 0.094 4 [0.122][0.441 11.20 [0.303 max.] 7.70 max. [0.441] [0.303 max.] 7.70 max. 4 x ♥3.10 0.122 [1.321] 33.55 [1.321] x Ø3.10 Model SMA2.9 with D-Sub connector Model SMA2.9with solder pins 0 [0.440] 11.18 [0.440] 11.18 [0.440] [0.440] 11.18 [0.440][0.440] 11.18 [0.440] <u>11.18</u> 11.18 $\prod \prod$ [2.248 max.] 57.10 max. [0.138 min.] 3.50 min. [2.051 max.] 52.10 max. [0.122] 4 x Ø 3.10 [1.890 max.] 48 max. [0.122] 4 x Ø 3.10 [0.094] [0.094] 8 [0.827 max.] 21 max. [0.264 max.] 6.70 max. [0.2**6**4 max.] 6.70 max. [0.441] 0.441 11.20 [1.321] [1.321] **TOP view - D-Sub connector** TOP view - solder pins [2.189] [2.189] 55.60 55.60 4-40 UNC **©**0000@ O (****)O [0.197] 5 [0.118]

[0.039]

8 pins





PAGE **8/12**

ISSUE **05-11-18**

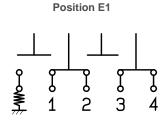
SERIES DP3T/SPDT

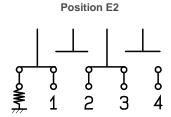
PART NUMBER R595 XXX XXX

SWITCH MODEL 3: TERMINATED 4 PORT BYPASS SWITCH

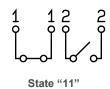
The terminated 4 port bypass switch can terminate into 50 ohms the device under test. These switches are "break before make".

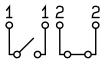
RF SCHEMATIC DIAGRAM





INDICATORS POSITION





State "22"

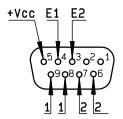
Standard drive option "1" (Positive common):

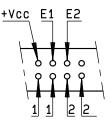
- Connect pin +Vcc to supply
- Select desired RF path by applying ground to the corresponding "Close" pin (Ex. ground pin E1 to switch to position E1. RF path 1-2 closed and RF path 2-3 open).
- To open desired path and close the new RF path, connect ground to the corresponding "close" pin (Ex: ground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

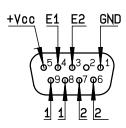
(Ex: apply $\dot{\text{TTL}}$ "High" to pin E2 to open RF path 1-2 and close RF path 2-3).



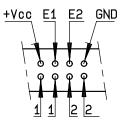


D-Sub connector

Solder pins







Solder pins





SERIES DP3T/SPDT PAGE 9/12 ISSUE **05-11-18** PART NUMBER R595 XXX XXX All dimensions are in millimeters [inches]. Model 26.5 GHz with D-Sub connector Model 26.5 GHz with solder pins 0 0 [0.440] [0.440] 0.440 0.440 11.18 11.18 [0.440] [0.440] [0.440] 0.440 11.18 11.18 11,18 11,18 \prod 1111 [0.138 min.] 3.50 min. [2.248 max.] 57.10 max. [2.051 max.] 52.10 max. [0.059 max.] 1.50 max. - [0.059 max.] 1.50 max. .890 max. [0.094]2 3 2 3 4 [0.094] 2.40 [0.122][0,303 max.] 7.70 max. [0.303 max.] 7.70 max. 0.441 [0.441] x Ø 3.10 11.20 11.20 0.122 [1.321] [1.321] Model 40 GHz with D-Sub connector Model 40 GHz with solder pins 0 0 [0.440] 11.18 [0.440] [0.440] [0.440]11.18 11.18 [0.440] [0.440][0.440][0.440] <u>11.1</u>8 <u>11.18</u> ПП [0.138 min.] 3.50 min. [2.248 max.] 57.10 max. [2.051 max.] 52.10 max. [0.122] 4 x Ø 3.10 [1.890 max.] 48 max. [0.122] 4 x Ø 3.10 [0.827 max.] 21 max. 2.40 [0.094] 8 2 3 3 2 [0.827 max.] .<u>2</u>1 ma<u>x.</u> [0.264 max.] 6.70 max. [0.264 max.] 6.70 max. [0.441] 11.20 [1.321] [1.321] **TOP view - D-Sub connector** TOP view - solder pins [2.189] 55.60 [2.189] 4-40 UNC (8888) (88889) (2) [0.197] 5 [0.118] step [0.039] 8 pins 01





PAGE 10/12

ISSUE **05-11-18**

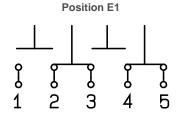
SERIES DP3T/SPDT

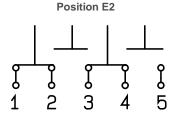
PART NUMBER R595 XXX XXX

SWITCH MODEL 4: NON TERMINATED 5 PORT DP3T SWITCH

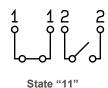
The non-terminated 5 port DP3T switch can used as SPDT with high power terminations, as a bypass switch. In this application, the fifth port can be terminated externally with a high power termination. These switches are "break before make".

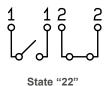
RF SCHEMATIC DIAGRAM





INDICATORS POSITION





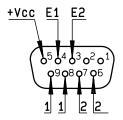
Standard drive option "1" (Positive common):

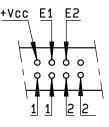
- Connect pin +Vcc to supply
- Select desired RF path by applying ground to the corresponding "Close" pin (Ex: ground pin E1 to switch to position E1. RF path 2-3and RF path 4-5 open).
- To open desired path and close the new RF path, connect ground to the corresponding "close" pin (Ex: ground pin E2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

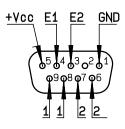
(Ex: apply TTL "High" to pin E2 to open RF path 2-3 and 4-5 and close RF path 1-2 and 3-4).

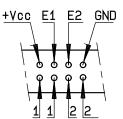




D-Sub connector

Solder pins





D-Sub connector

Solder pins

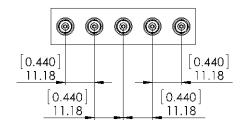


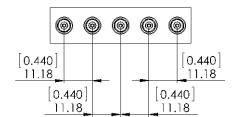


PAGE 11/12 ISSUE 05-11-18 SERIES DP3T/SPDT PART NUMBER R595 XXX XXX

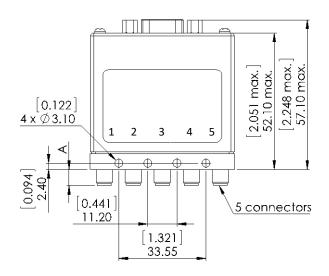
All dimensions are in millimeters [inches].

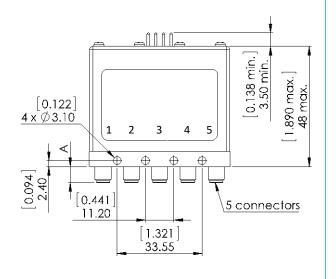
With D-Sub connector

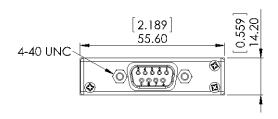


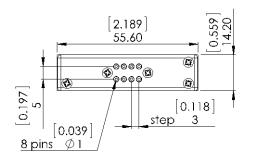


With solder pins









Connectors	A max mm [inches]		
SMA up to 26.5GHz	7.7 [0.303]		
SMA 2.9 up to 40GHz	6.7 [0.264]		



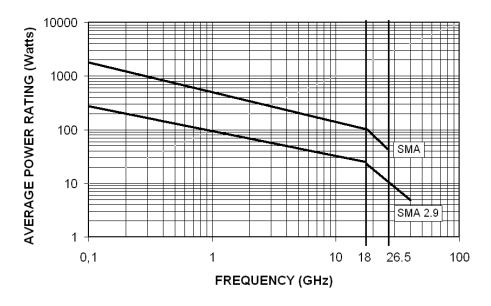
HIGH PERFORMANCE DP3T-SPDT SWITCHES PLATINUM Series

PAGE 12/12 ISSUE 05-11-18 SERIES DP3T/SPDT PART NUMBER R595 XXX XXX

POWER RATING CHART

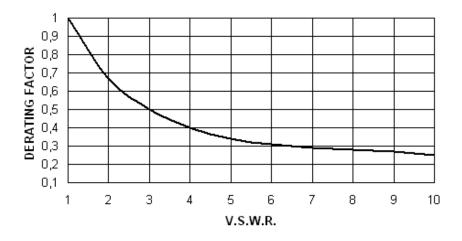
This graph is based on the following conditions:

- 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.



Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

Radiall:

<u>R595863315R</u> <u>R595837210R</u> <u>R595F53215</u> <u>R595F33315</u> <u>R595863115R</u> <u>R595863415R</u> <u>R595F63120</u> R595867125 R595863215 R595433110 R595453225