DP31 SECTION	SECTION 3 Pages
RAMSES series DP3T and Terminated SPDT up to 40 GHz: R585 Series	
Electrical Schematics R585 Series	
PLATINUM Series	
OPTIONAL FEATURES	3-22

DP3T PRODUCTS SELECTION GUIDE

Quick access to the right page:

	Frequency						
Connector	DC - 3	DC - 6	DC - 18	DC - 26.5	DC - 40		
SMA				3-2 / 3-12			
SMA2.9					3-2		

 $For more \ detailed \ technical \ information \ please \ consult \ Radiall \ customer \ support.$



DP3T and Terminated SPDT up to 40 GHz

SMA - SMA2.9

COAXIAL DP3T **RELAYS**



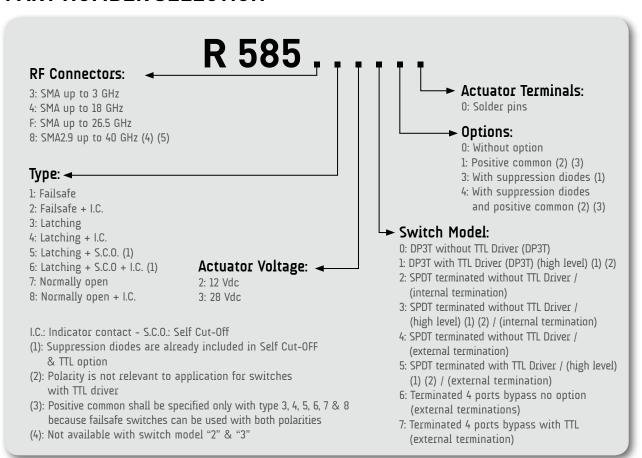
Radiall's RAMSES DP3T and Terminated SPDT switches offer excellent reliability, high performance and operating frequencies from DC to 40 GHz. A full range of options are available with RADIALL RAMSES concept to offer customers complete solutions.

These relays are dedicated to market applications including: Defense Instrumentation and Telecommunications.

Example of P/N:

R585423300 is a SPDT terminated SMA 18GHz, failsafe, 28Vdc, indicator contacts, internal terminations without TTL drivers and solder pins.

PART NUMBER SELECTION



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



DP3T and Terminated SPDT up to 40 GHz SMA-SMA2.9

GENERAL SPECIFICATIONS

Operating mode		Failsafe Latch		hing Normally open		ly open			
Nominal operating v	oltage	Vdc	12	28	12	28	12	28	
(across operating ten	nperature)	Vuc	(10.2 to 13)	(24 to 30)	(10.2 to 13)	(24 to 30)	(10.2 to 13)	(24 to 32)	
Coil resistance (+/-	-10%)	Ω	24	138	29	175	47.5	275	
Nominal operating	current at 23°C	mΑ	500	205	420	160	250	102	
Average power				RF path	: see power ra	ating chart pa	age 1-16		
Average bower				Internal t	terminations: 1	Watt CW into	50 Ohms		
TTL Input	High level			2.5 to 5.5	Volts	800μΑ	max 5.5 Volts		
TTE IIIput	Low level			O to 0.8 Volts 20µA max 0.8 Volts					
Switching time (ma	ax)	ms	10						
Life (min)			2 million cycles for products with internal terminations and 40 GHz models						
Life (IIIIII)			10 million cycles for all other products						
Connectors					SMA - S	SMA2.9			
Actuator terminals					Solder	r pins			
Operating temperat	ture range	SMA SMA2.9	-40°C, +85°C						
Storage temperatur	re range	SMA SMA2.9	-55°C +85°C						
Vibration (MIL STD 202, Method 204D, cond.D) 10-2000 Hz, 20g Operating									
Shock (MIL STD 202	, Method 213B, c	ond.C)	100g / 6ms, ½ sine Operating						

RF PERFORMANCES

Connectors	Frequency Range GHz		V.S.W.R. (max)	Insertion Loss (max) dB	Isolation (min) dB	Impedance Ohms
		DC - 3	1.20	0.20	80	
	DC - 3	3 - 8	1.30	0.30	70	
SMA	DC - 18	8 - 12.4	1.40	0.40	60	50
	DC - 26.5	12.4 - 18	1.50	0.50	60	
	18 - 26.5	1.80	0.70	50		
		DC - 6	1.30	0.30	70	
		6 - 12.4	1.40	0.40	60	
SMA2.9	DC - 40	12.4 - 18	1.50	0.50	60	50
		18 - 26.5	1.70	0.70	55	
		26.5 - 40	1.90	0.80	50	

See page 3-4 for typical RF performances

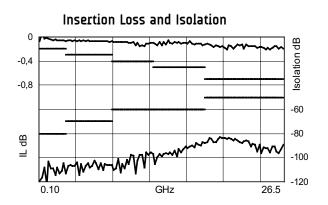
RADIALLS
The next connexion

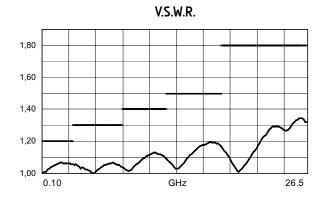
DP3T and Terminated SPDT up to 40 GHz SMA - SMA2.9

COAXIAL DP3T
RELAYS

R585 TYPICAL RF PERFORMANCES

Example: DP3T SMA up to 26.5 GHz

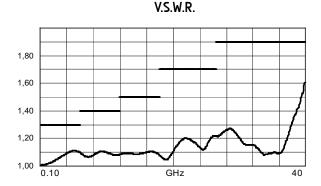




Example: DP3T SMA2.9 up to 40 GHz

Insertion Loss and Isolation

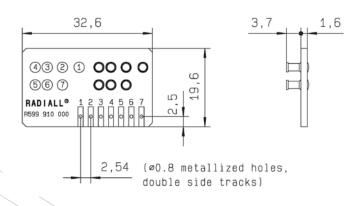
O -0,4
-0,8
O -60
-80
-100
-120



ACCESSORIES

A printed circuit board interface connector (ordered separately) has been designed for easy mounting on terminals.

For DP3T model R585 series => Radiall part number: **R599910000**





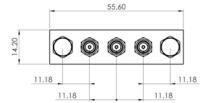


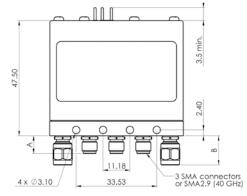
DP3T and Terminated SPDT up to 40 GHz SMA - SMA2.9

See page

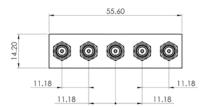
for pin indentification

TYPICAL OUTLINE DRAWING





SPDT with external terminations R585 --- 4--R585 --- 5--

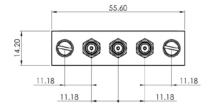


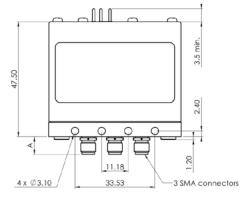
4 x Ø 3.10

33.53

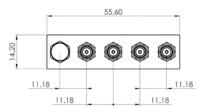
5 SMA connectors or SMA2.9 (40 GHz)

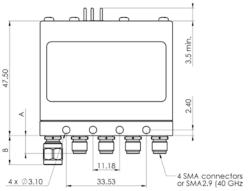
DP3T R585---0--R585---1--





SPDT with internal terminations R585 --- 2--R585 --- 3--



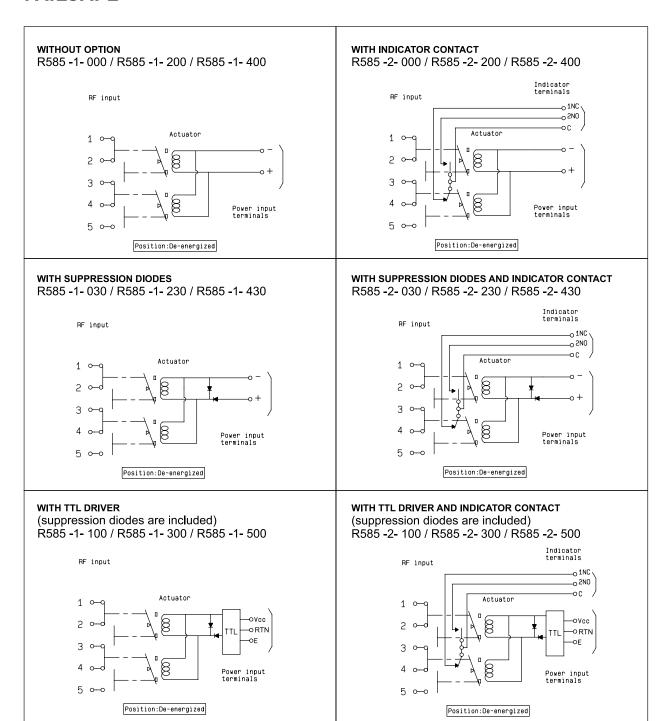


Terminated 4 ports BYPASS relay R585 --- 6--R585 --- 7--

Connectors	A (mm)	B max (mm) If applicable
SMA up to 18 GHz	7.4	13.5
SMA up to 26.5 GHz	7.4	21
SMA 2.9 up to 40 GHz	6.3	21

COAXIAL DP3T RELAYS

FAILSAFE



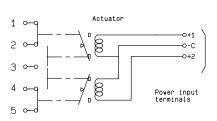


NORMALLY OPEN

WITHOUT OPTION

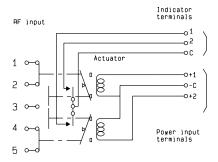
R585 -7- 000 / R585 -7- 200 / R585 -7- 400

RF input



WITH INDICATOR CONTACT

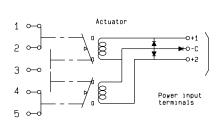
R585 -8- 000 / R585 -8- 200 / R585 -8- 400



WITH SUPPRESSION DIODES

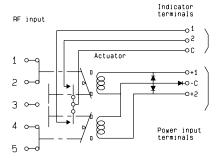
R585 -7- 030 / R585 -7- 230 / R585 -7- 430

RF input



WITH SUPPRESSION DIODES AND INDICATOR CONTACT

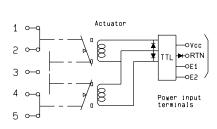
R585 -8- 030 / R585 -8- 230 / R585 -8- 430



WITH TTL DRIVER

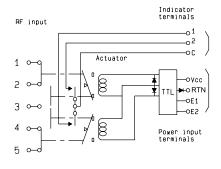
(suppression diodes are included) R585 -7- 100 / R585 -7- 300 / R585 -7- 500

RF input



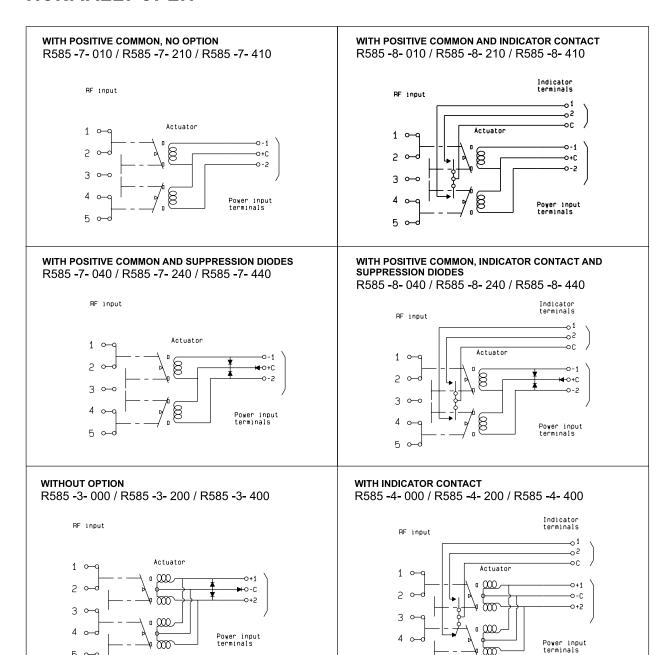
WITH TTL DRIVER AND INDICATOR CONTACT

(suppression diodes are included) R585 -8- 100 / R585 -8- 300 / R585 -8- 500



COAXIAL DP3T RELAYS

NORMALLY OPEN



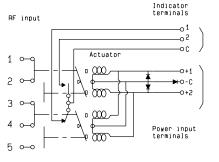


LATCHING

WITH SUPPRESSION DIODES

R585 -3- 030 / R585 -3- 230 / R585 -3- 430

WITH SUPPRESSION DIODES AND INDICATOR CONTACT R585 -4- 030 / R585 -4- 230 / R585 -4- 430



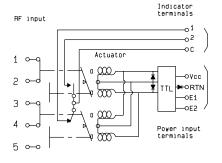
WITH TTL DRIVER

RF input

(suppression diodes are included) R585 -3- 100 / R585 -3- 300 / R585 -3- 500

WITH TTL DRIVER AND INDICATOR CONTACT

(suppression diodes are included) R585 -4- 100 / R585 -4- 300 / R585 -4- 500



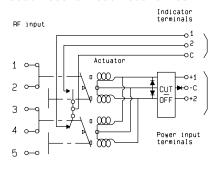
WITH CUT-OFF

RF input

(suppression diodes are included) R585 -5- 000 / R585 -5- 200 / R585 -5- 400

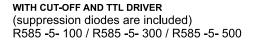
WITH CUT-OFF AND INDICATOR CONTACT

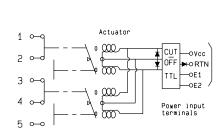
(suppression diodes are included) R585 -6- 000 / R585 -6- 200 / R585 -6- 400



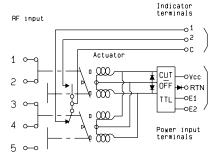
COAXIAL DP3T RELAYS

LATCHING



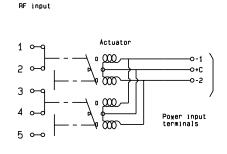


WITH CUT-OFF, TTL DRIVER AND INDICATOR CONTACT (suppression diodes are included) R585 -6- 100 / R585 -6- 300 / R585 -6- 500

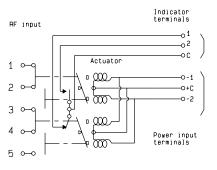


WITH POSITIVE COMMON, NO OPTION

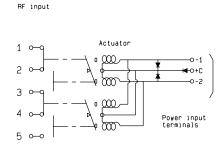
R585 -3- 010 / R585 -3- 210 / R585 -3- 410



WITH POSITIVE COMMON AND INDICATOR CONTACT R585 -4- 010 / R585 -4- 210 / R585 -4- 410

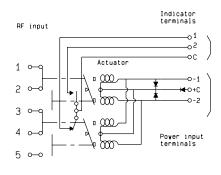


WITH POSITIVE COMMON AND SUPPRESSION DIODES R585 -3- 040 / R585 -3- 240 / R585 -3- 440



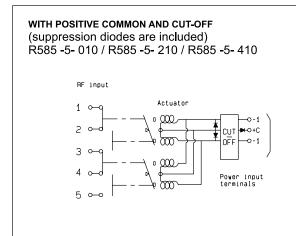
WITH POSITIVE COMMON, SUPPRESSION DIODES AND INDICATOR CONTACT $% \left(1,0\right) =0$

R585 -4- 040 / R585 -4- 240 / R585 -4- 440



5 0→0

LATCHING

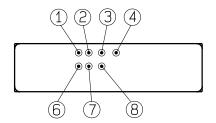


WITH POSITIVE COMMON, CUT-OFF AND INDICATOR CONTACT (suppression diodes are included) R585 -6- 010 / R585 -6- 210 / R585 -6- 410

PIN IDENTIFICATION

Tue	PIN						
Туре	1	2	3	4	6	7	8
Failsafe	+		-				
Failsafe + I.C.	+		-		2N0	1NC	С
Failsafe + TTL	Е		RTN	VCC			
Failsafe + I.C. + TTL	Е		RTN	VCC	2N0	1NC	С
Latching Latching + Cut-off	-2 or +2	-l or +l	+C or -C				
Latching + I.C. Latching + I.C. + Cut-off	-2 or +2	-l or +l	+C or -C		2	1	С
Latching + TTL Latching + TTL + Cut-off	E2	E1	RTN	VCC			
Latching + TTL + I.C. Latching + TTL + I.C. + Cut-off	E2	E1	RTN	VCC	2	1	С
Normally open	-2	-1	+C				
Normally open + I.C.	-2	-1	+C				
Normally open + TTL	E2	E1	RTN	VCC			
Normally open + TTL + I.C.	E2	E1	RTN	VCC	2	1	С

Bottom view



COAXIAL DP3T RELAYS

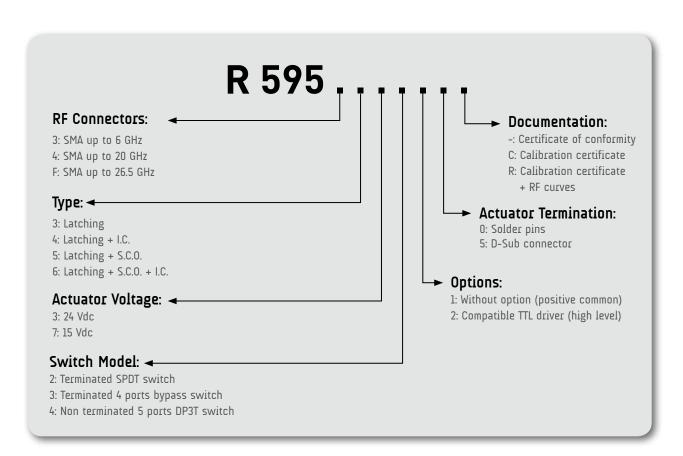


Radiall's PLATINUM series switches are optimised to perform at a high level over an extended life span. With outstanding RF performances, and a guaranteed Insertion Loss repeatability of 0.03 dB over a life span of 10 million switching cycles. PLATINUM SERIES switches are perfect for automated test and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

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





GENERAL SPECIFICATIONS

Operating mode			Latching					
Nominal operating (across operating t	perating voltage operating temperature)		24 (20 to 32)	15 (12 to 20)				
Coil resistance (+/-	-10%)	Ω	175	60				
Operating current a	at 23°C	mΑ	140	250				
Average Power			RF Path Cold switching: see Power Chart on page 3-21 Hot switching: 1 Watt CW					
J			Internal terminations	1 Watt average into 50 Ohms				
TII input	High level		3 to 7 Volts: 800µA max at 7 Volts					
TTL input	Low level		0 to 0.8 Volts: 20μA max at 0.8 Volts					
Switching time (ma	x)	ms	1	5				
Life (min)			10 millio	n cycles				
Connectors			SMA			SMA		
Actuator terminal	al		D-Sub 9 pin female Solder pins					
Weight		g	10	0				

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)



COAXIAL DP3T RELAYS

RF PERFORMANCES

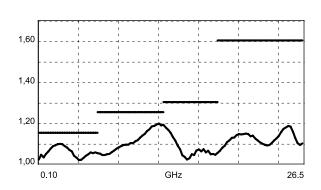
Part Number		R5953	R5954	-	R595F		
Frequency range	GHz	DC to 6 DC to 20 DC to 26.5					
Impedance	Ω		50				
Insertion Loss (max)	dB	0.20 + (0.45 / 26.5) x frequency (GHz)					
			DC to 6 GHz	85	DC to 6 GHz	85	
Icolation (min)		85 -	6 to 12.4 GHz	75	6 to 12.4 GHz	75	
Isolation (min)			12.4 to 20 GHz	65	12.4 to 20 GHz	65	
			12.4 (0 20 0112	03	20 to 26.5 GHz	60	
			DC to 6 GHz	1.15	DC to 6 GHz	1.15	
MCMD (max)		115	6 to 12.4 GHz	1.25	6 to 12.4 GHz	1.25	
V.S.W.R. (max)		1.15	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	
Repeatability (up to 10 million cycles mesured at 25°C)		0.03 dB maximun					

TYPICAL RF PERFORMANCES





V.S.W.R.



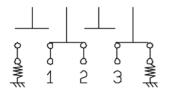


SWITCH MODEL: TERMINATED SPDT SWITCH

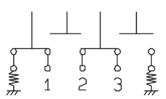
The terminated SPDT switch is a single pole double throw switch. The unused ports are terminated into 50 ohms. This switch is "break before make".

RF SCHEMATIC DIAGRAM

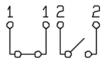
POSITION E1



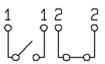
POSITION E2



POSITION INDICATORS



STATE "11"



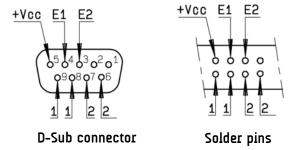
STATE "22"

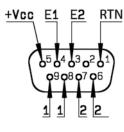
Standard drive option "1" (Positive common):

- 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).

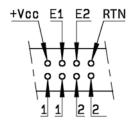
TTL drive option "2"

- · Connect pin RTN 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

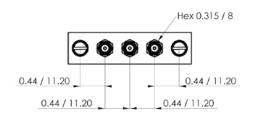
To download technical data sheets, visit www.radiall.com & enter the part number in the Search box. For more detailed technical information please consult Radiall customer support.

3-15

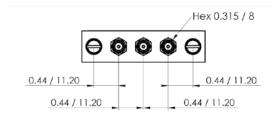
COAXIAL DP3T RELAYS

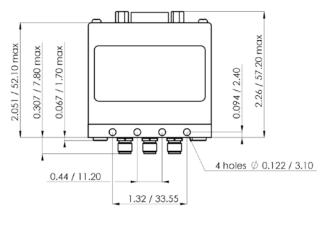
SWITCH MODEL: TERMINATED SPDT SWITCH

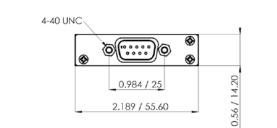
With D-Sub connector

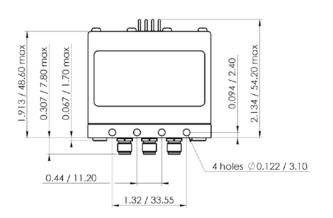


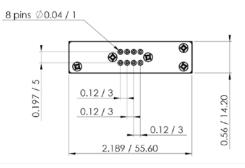
With solder pins











All dimensions are in inches/millimeters

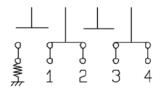


SWITCH MODEL: TERMINATED 4 PORT BYPASS SWITCH

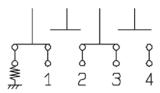
The terminated 4 port bypass switch can terminate into the 50 ohms device under test. These switches are "break before make".

RF SCHEMATIC DIAGRAM

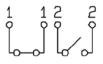
POSITION E1



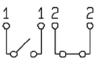
POSITION E2



POSITION INDICATORS



STATE "11"



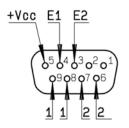
STATE "22"

Standard drive option "1" (Positive common):

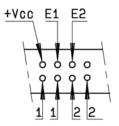
- Connect pin +Vcc to supply (+20 Vdc to +32 Vdc).
- Select desired RF path by applying ground to the corresponding "close" pin (Ex: ground pin E1 to switch to position E1. RF path 1-2 and RF path 3-4 closed and RF path 2-3 open).
- To open desired path and close the new RF path, connect ground to the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

TTL drive option "2":

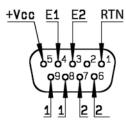
- . Connect pin RTN to ground.
- Connect pin +Vcc to supply (+20 Vdc to +32 Vdc).
- Select (close) desired RF path by applying TTL "High" to the corresponding "drive" pin (Ex: apply TTL "High" to pin E1 to switch to position E1. RF path 1-2 and 3-4 closed and RF path 2-3 open).
- To open desired path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



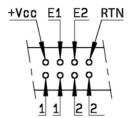
D-Sub connector



Solder pins



D-Sub connector

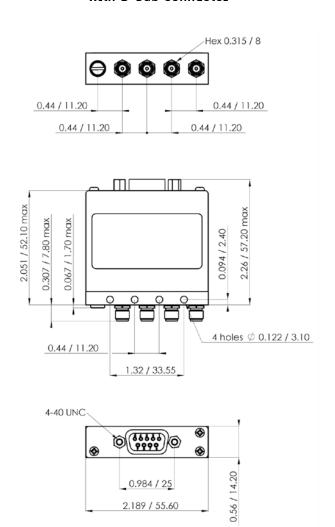


Solder pins

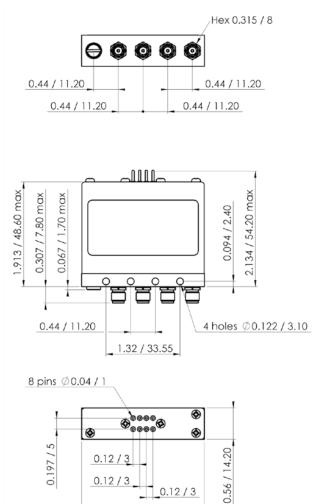
COAXIAL DP3T RELAYS

SWITCH MODEL: TERMINATED 4 PORT BYPASS SWITCH

With D-Sub connector



With solder pins



2.189 / 55.60

All dimensions are in inches/millimeters

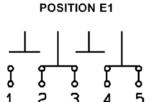


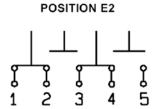
SWITCH MODEL: 5 PORT DP3T SWITCH

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 "break before make".

RF SCHEMATIC DIAGRAM

COAXIAL DP3T RELAYS





POSITION INDICATORS

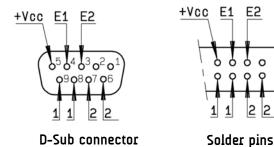




STATE "22"

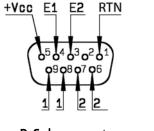
Standard drive option "1" (Positive common):

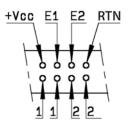
- Connect pin +Vcc to supply (+20 Vdc to +32 Vdc).
- Select desired RF path by applying ground to the corresponding "close" pin (Ex: ground pin E1 to switch to position E1. RF path 2-3 and RF path 4-5 closed and RF path 1-2 and RF path 3-4 open).
- To open desired path and close the new RF path, connect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





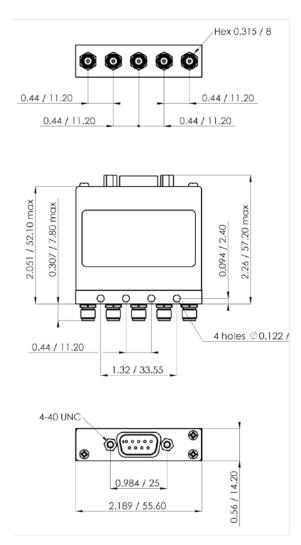
D-Sub connector

Solder pins

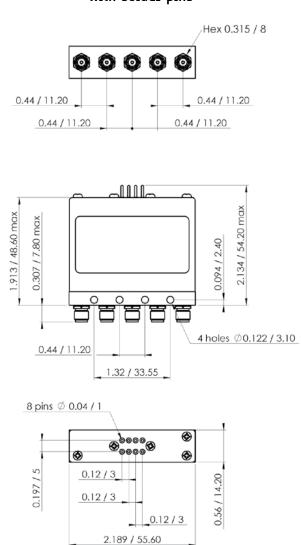
COAXIAL DP3T RELAYS

SWITCH MODEL: 5 PORT DP3T SWITCH

With D-Sub connector



With solder pins



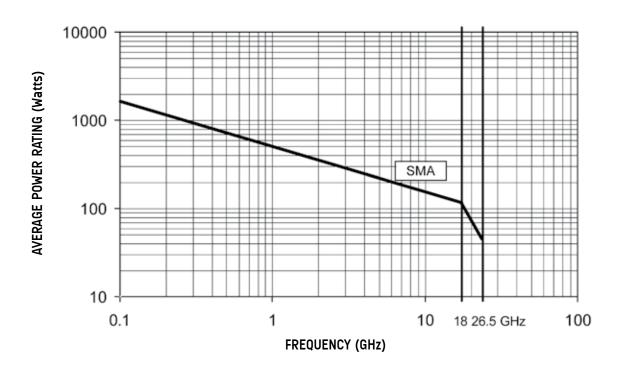
All dimensions are in inches/millimeters



POWER RATING CHART

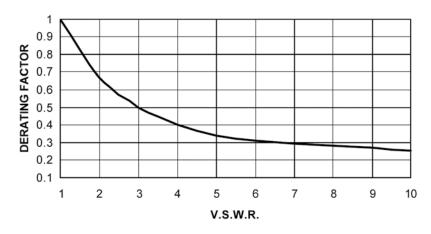
This graph is based on the following conditions:

- 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

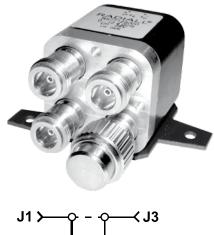
COAXIAL DP3T RELAYS

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 Teminated is composed of a DP3T with SMA connectors and 2 RADIALL cable loads used as medium power terminations. The Key advantage of this solution is the ability to mount the switch with external terminations at power level desired.



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

