



## DPDT

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**DPDT PART NUMBER SELECTION GUIDE\***

Digital Position		R 1-3	4: RF connectors										5: Type		6: Voltage			7: TTL opt.		8: Options				9: Terminals									
Series	Configuration		SMA 3 GHz	SMA 6 GHz	SMA 18 GHz	SMA 20 GHz	SMA 26.5 GHz	SMA 2.9 40 GHz	2.4 mm up to 50 GHz	QMA 6 GHz	DIN 1.6/5.6, 2.5 GHz	N 3 GHz	N 12.4 GHz	BNC 3 GHz	TNC 3 GHz	TNC 12.4 GHz	Failsafe	Latching	12 V	24 V	28 V	Without	With option	Without option	Positive common	Suppression diodes	Suppression diodes and positive common	Solder pins with bracket	Solder pins without bracket	D-Sub connector with bracket	D-Sub connector without bracket	HE 10 with bracket	HE 10 without bracket
RAMSES	DPDT	R577	3	-	4	-	F	8	J	E	9	-	-	-	-	-	1/2	3/4/5/6	2	-	3	0	1	0	1	3	4	0	2	5	7	-	-
		R577	-	-	-	-	-	-	-	-	-	0	1	2	5	6	1/2	3/4/5/6	2	-	3	0	1	0	1	3	4	0	2	5	7	-	-
TITANIUM	DPDT	R513	-	3	-	4	F	8	-	-	-	-	-	-	-	-	7	-	3	-	-	1	-	-	-	4	-	-	-	-	8	9	
PLATINUM	DPDT	R593	-	3	-	4	F	8	-	-	-	-	-	-	-	-	7	-	3	-	-	1	-	-	-	4	-	-	-	-	8	9	

Example of P/N: R577412020 is a DPDT SMA 18 GHz failsafe, 12 Vdc, without TTL driver, solder pins with bracket.

\*For part number creation and available options, see detailed part number selection for each series.

**DPDT up to 50 GHz**

SMA – SMA 2.9 - 2.4 mm - QMA – DIN 1.6/5.6



Radiall's DPDT switches offer excellent reliability, high performance and operating frequencies from DC to 50 GHz. Radiall's RAMSES concept guarantees a life span of 2.5 million cycles and provides a full array of options to respond to the needs of our customers.

These relays are well suited for applications across all markets including: Defense, Instrumentation, and Telecom.

Example of P/N:

R577F63105 is a DPDT SMA 26.5 GHz latching with Indicators, Self Cut-Off, 28 Vdc, TTL driver, D-Sub connector.

**PART NUMBER SELECTION**

**R 577**

**RF Connectors:**

- 3: SMA up to 3 GHz
- E: QMA up to 6 GHz
- 4: SMA up to 18 GHz
- F: SMA up to 26.5 GHz
- 8: SMA 2.9 up to 40 GHz <sup>(5)</sup>
- 9: DIN 1.6/5.6 up to 2.5 GHz
- J: 2.4mm up to 50 GHz

**Type:**

- 1: Failsafe
- 2: Failsafe + I.C.
- 3: Latching
- 4: Latching + I.C.
- 5: Latching + S.C.O. <sup>(1)</sup>
- 6: Latching + S.C.O. + I.C. <sup>(1)</sup>

**Actuator Voltage:**

- 2: 12 Vdc
- 3: 28 Vdc

**Actuator Terminals and fixing:**

- 0: Solder pins with bracket
- 2: Solder pins without bracket
- 5: D-Sub connector with bracket
- 7: D-Sub connector without bracket

**Options:**

- 0: Without option
- 1: Positive common <sup>(2) (3)</sup>
- 3: With suppression diodes <sup>(1)</sup>
- 4: With suppression diodes and positive common <sup>(2) (3)</sup>

**TTL Option:**

- 0: Without TTL Driver
- 1: With TTL Driver <sup>(1) (2)</sup>

**NOTE:**

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

(1): Suppression diodes are already included in self cut-off & TTL option

(2): Polarity is not relevant to application for switches with TTL driver

(3): Positive common shall be specified only with type 3,4,5 and 6 because failsafe switches can be used with both polarities



(4): The QLF trademark (Quick Lock Formula®) standard applies to QMA and QN series and guaranties the full intermateability between suppliers using this trademark. Using QLF certified connectors also guarantees the specified level of RF performance.

(5): Connector SMA 2.9 is equivalent to "K connector®", registered trademark of Anritsu.

**DPDT up to 50 GHz**

SMA – SMA 2.9 - 2.4 mm - QMA – DIN 1.6/5.6

**GENERAL SPECIFICATIONS**

Operating mode		Fail-safe		Latching	
Nominal operating voltage (across operating temperature)	Vdc	12 (10.2 / 13)	28 (24 / 30)	12 (10.2 / 13)	28 (24 / 30)
Coil resistance (+/-10%)	Ω	35	200	38	225
Nominal operating current at 23°C	mA	340	140	320	125
Average power		See Power Rating Chart page 1-13			
TTL input	High Level	2.2 to 5.5 Volts		800 μA max 5.5 Volts	
	Low Level	0 to 0.8 Volts		20 μA max 0.8 Volts	
Indicator rating		1 W / 30 V / 100 mA			
Switching time (Max)		ms		15	
Life	SMA - SMA 2.9 - QMA - DIN 1.6/5.6	2.5 million cycles			
	2.4 mm	2 million cycles			
Connectors		SMA - SMA 2.9 - QMA - DIN 1.6/5.6 – 2.4 mm			
Actuator terminals		Solder pins or male 9 pin D-Sub connector			
Operating temperature range	DIN 1.6/5.6 – 2.4 mm	-25°C to +70°C			
	SMA - SMA 2.9 - QMA	-40°C to +85°C			
Storage temperature range	DIN 1.6/5.6 – 2.4 mm	-40°C to +85°C			
	SMA - SMA 2.9 - QMA	-55°C to +85°C			
Vibration (MIL STD 202, Method 204D, Cond. C)		10-2000 Hz, 10g		operating	
Shock (MIL STD 202, Method 213B, Cond. G)		50 g / 11 ms, ½ sine		operating	

**RF PERFORMANCE**

Connectors	Frequency range GHz	V.S.W.R. (max)	Insertion loss (max) dB	Isolation (min) dB	Impedance Ω	
DIN 1.6/5/6	DC - 2.5	DC - 1	1.20	0.20	80	75
		1 - 25	1.30	0.30	70	
QMA	DC - 6	DC - 3	1.20	0.20	80	50
		3 - 6	1.20	0.30	70	
SMA	DC - 3 DC - 18 DC - 26.5	DC - 3	1.20	0.20	80	50
		3 - 8	1.30	0.30	70	
		8 - 12.4	1.40	0.40	65	
		12.4 - 18	1.50	0.50	60	
SMA 2.9	DC - 40	18 - 26.5	1.70	0.70	50	50
		DC - 6	1.30	0.30	70	
		6 - 12.4	1.40	0.40	60	
		12.4 - 18	1.50	0.50	60	
		18 - 26.5	1.70	0.70	55	
2.4 mm	DC - 50	26.5 - 40	1.90	0.80	50	50
		DC - 6	1.30	0.30	70	
		6 - 12.4	1.40	0.40	60	
		12.4 - 18	1.50	0.50	60	
		18 - 26.5	1.70	0.70	55	
		26.5 - 40	1.90	0.80	50	
		40 - 50	2.00	1.10	50	

See page 4-4 for typical RF performance.

Go online for data sheets &amp; assembly instructions.

Visit [www.radial.com](http://www.radial.com) and enter the part number.

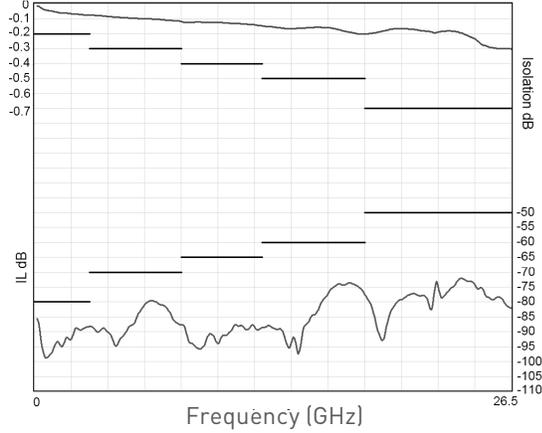
**DPDT up to 50 GHz**

SMA – SMA 2.9 - 2.4 mm – QMA – DIN 1.6/5.6

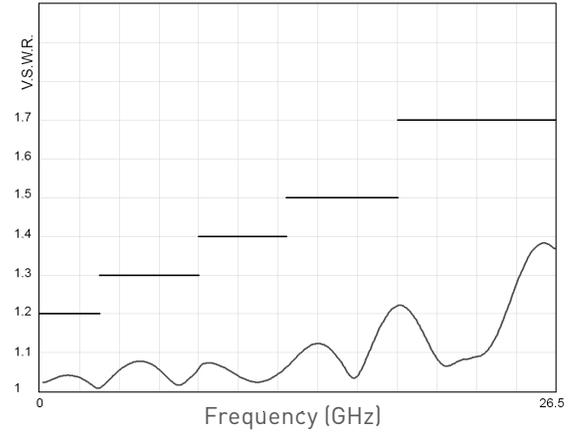
**R577 TYPICAL RF PERFORMANCE**

Example: DPDT SMA up to 26.5 GHz

**Insertion Loss and Isolation**

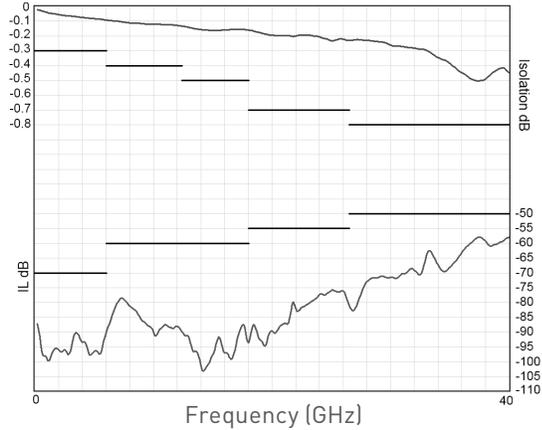


**V.S.W.R.**

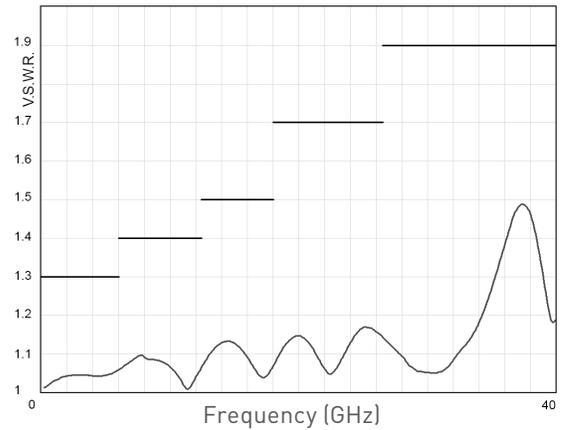


Example: DPDT SMA 2.9 up to 40 GHz

**Insertion Loss and Isolation**

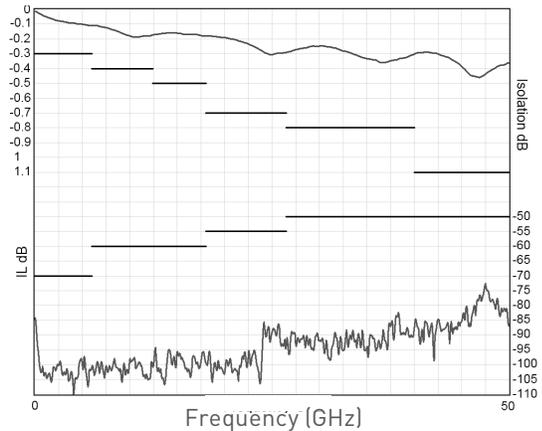


**V.S.W.R.**

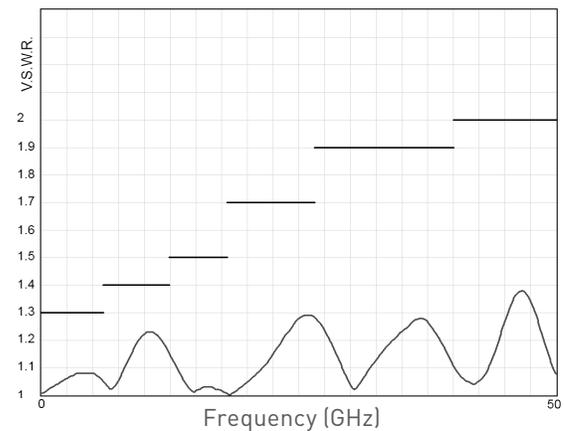


Example: DPDT 2.4 mm up to 50 GHz

**Insertion Loss and Isolation**



**V.S.W.R.**

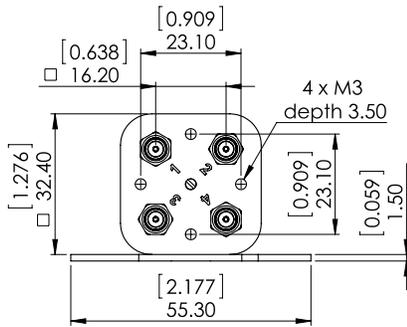


**DPDT up to 50 GHz**

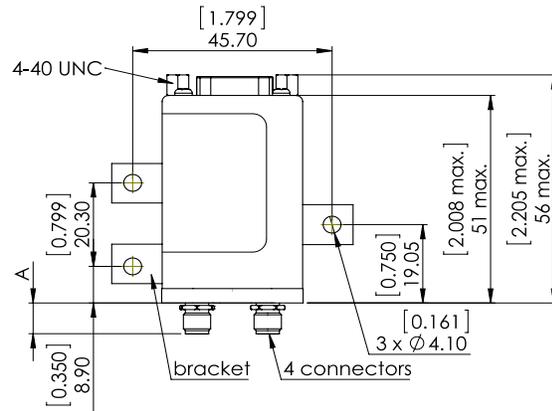
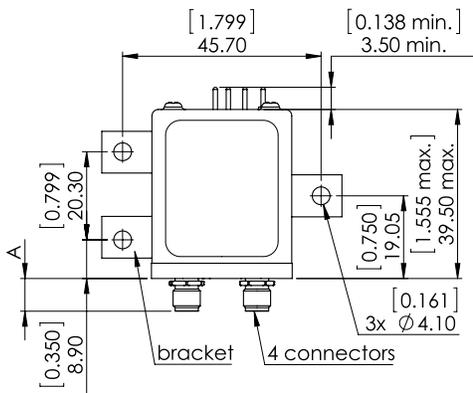
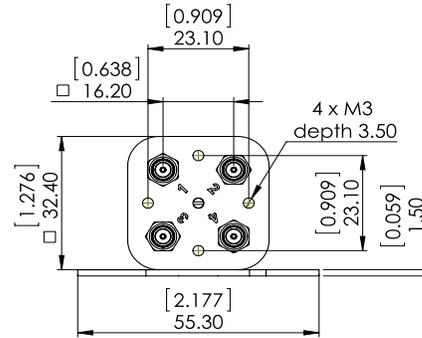
SMA – SMA 2.9 - 2.4 mm - QMA – DIN 1.6/5.6

**TYPICAL OUTLINE DRAWING**

With solder pins and bracket



With D-Sub connector and bracket

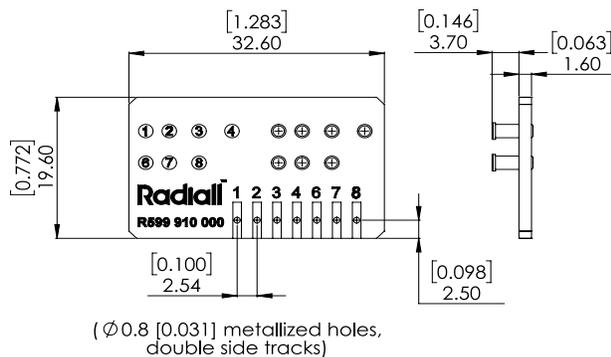


Connectors	SMA	SMA 2.9 and 2.4 mm	QMA	DIN 1.6/5.6
A max [mm [inches]]	7.7 [0.303]	6.7 [0.264]	10.8 [0.394]	11.5 [0.433]

**ACCESSORIES**

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

For DPDT model R577 series = Radiall part number: **R599 910 000**



All dimensions are in millimeters [inches].

PCB accessory pin number assignment is independent from the pin identification table of the switch.

## DPDT up to 12.4 GHz - Ramses Concept

N - BNC - TNC



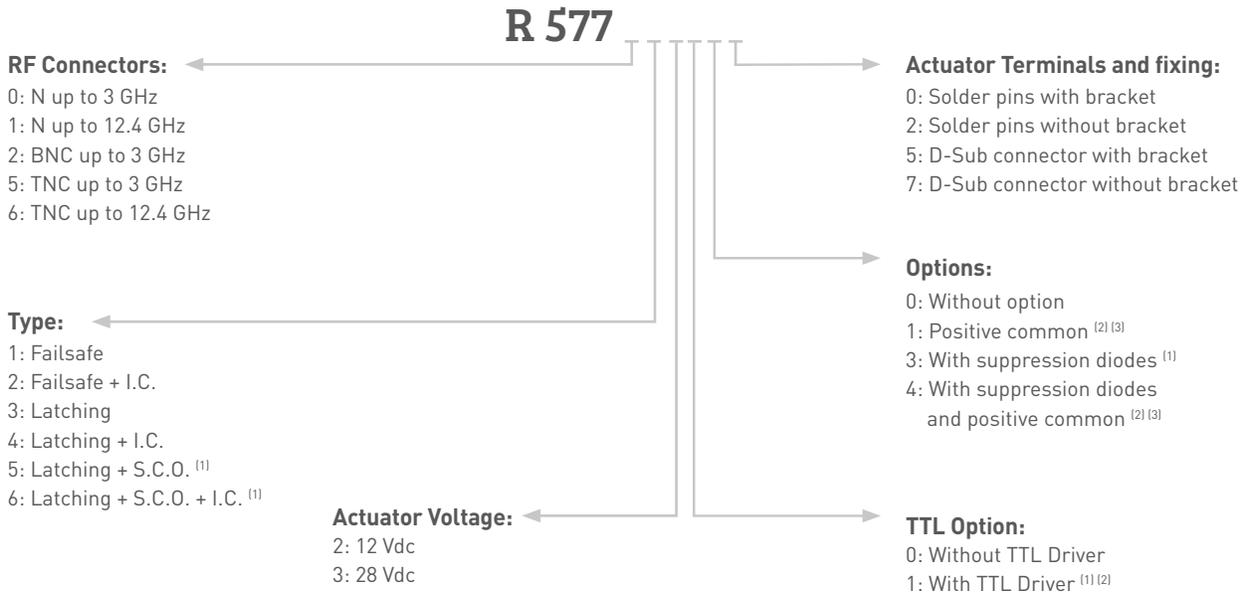
Radiall's DPDT switches offer excellent reliability, high performance and operating frequencies from DC to 12.4 GHz. Radiall's RAMSES concept guarantees a life span of 2.5 million cycles and provides a full array of options to respond to the needs of our customers.

These relays are well suited for applications across all markets including: Defense, Instrumentation, and Telecom.

Example of P/N:

R577122030 is a DPDT N 12.4 GHz, failsafe with Indicators, 12 Vdc, suppression diodes, solder pins with bracket.

### PART NUMBER SELECTION



**NOTE:**

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

(1): Suppression diodes are already included in self cut-off & TTL option

(2): Polarity is not relevant to application for switches with TTL driver

(3): Positive common shall be specified only with type 3,4,5 and 6 because failsafe switches can be used with both polarities

**DPDT up to 12.4 GHz - Ramses Concept**

N - BNC - TNC

**GENERAL SPECIFICATIONS**

Operating mode		Failsafe		Latching	
Nominal operating voltage (across operating temperature)	Vdc	12 (10.2 / 13)	28 (24 / 30)	12 (10.2 / 13)	28 (24 / 30)
Coil resistance (+/-10%)	$\Omega$	35	200	38	225
Nominal operating current at 23°C	mA	340	140	320	125
Average power		See Power Rating Chart page 1-16			
TTL input	High Level	2.2 to 5.5 Volts			
	Low Level	0 to 0.8 Volts			
Indicator rating		1 W / 30 V / 100 mA			
Switching time (Max)	ms	15			
Life		2.5 million cycles			
Connectors		N - BNC - TNC			
Actuator terminals		Solder pins or male 9 pin D-Sub connector			
Operating temperature range		-40°C to +85°C			
Storage temperature range		-55°C to +85°C			
Vibration (MIL STD 202, Method 204D, cond. C)		10-2000 Hz, 10g		operating	
Shock (MIL STD 202, Method 213B, cond. G)		50 g / 11 ms, ½ sine		operating	

**RF PERFORMANCE**

Connectors	Frequency Range GHz		V.S.W.R. (max)	Insertion Loss (max) dB	Isolation (min) dB	Impedance $\Omega$
BNC	DC - 3	DC - 1	1.15	0.15	85	50
		1 - 2	1.20	0.20	80	
		2 - 3	1.25	0.25	75	
N - TNC	DC - 3 DC - 12.4	DC - 1	1.15	0.15	85	
		1 - 2	1.20	0.20	80	
		2 - 3	1.25	0.25	75	
		3 - 8	1.35	0.35	70	
		8 - 12.4	1.50	0.50	60	

See page 4-8 for typical RF performance.

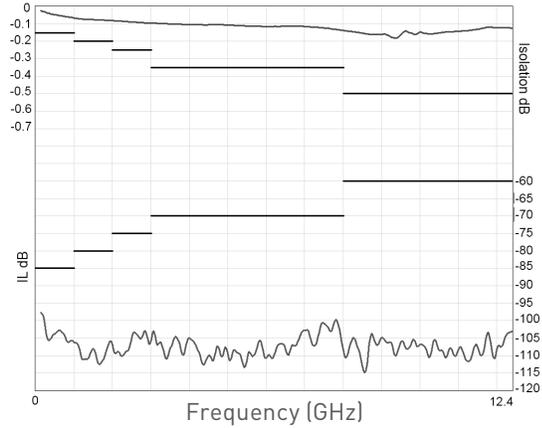
**DPDT up to 12.4 GHz - Ramses Concept**

N - BNC - TNC

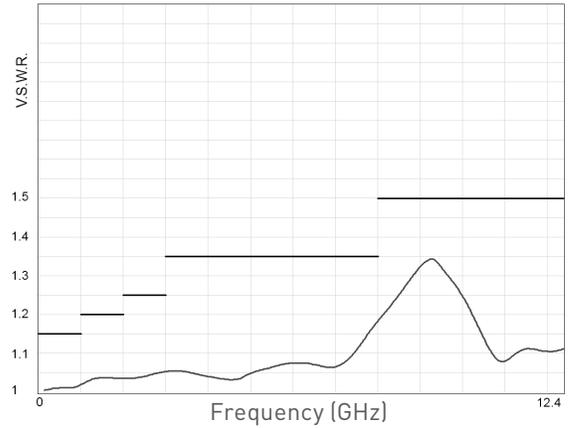
**R577 TYPICAL RF PERFORMANCE**

Example: DPDT N/TNC up to 12.4 GHz

**Insertion Loss and Isolation**

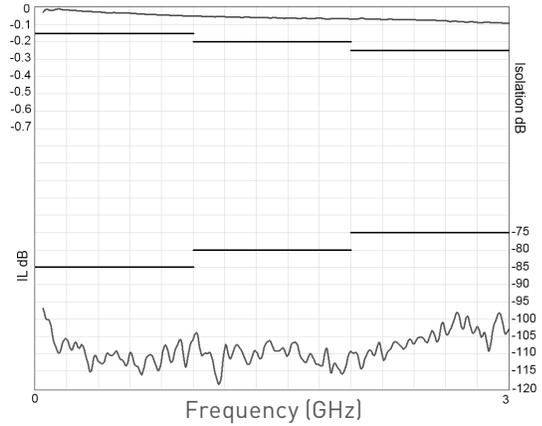


**V.S.W.R.**

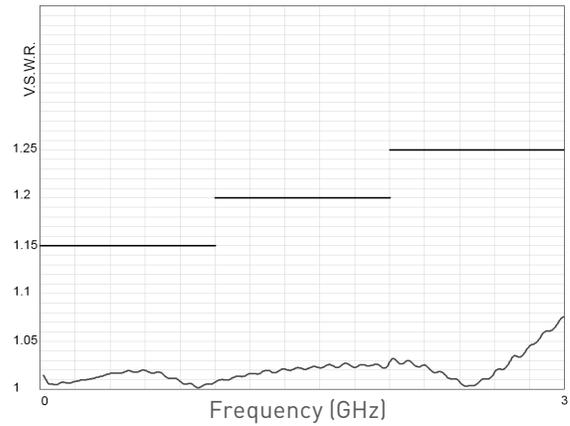


Example: DPDT BNC UP TO 3 GHz

**Insertion Loss and Isolation**



**V.S.W.R.**

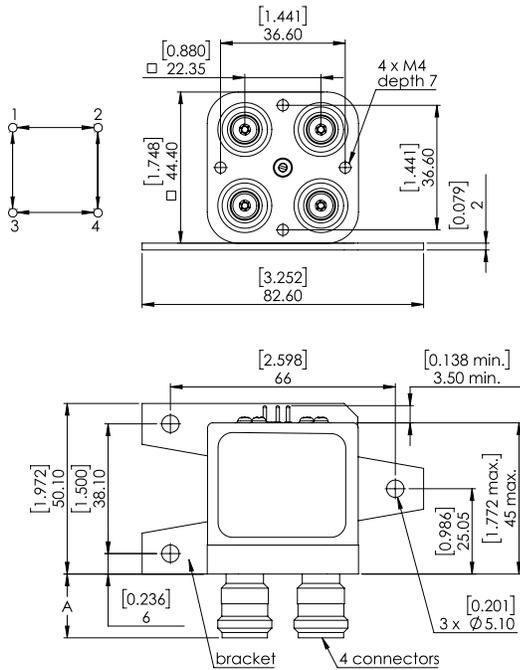


**DPDT up to 12.4 GHz - Ramses Concept**

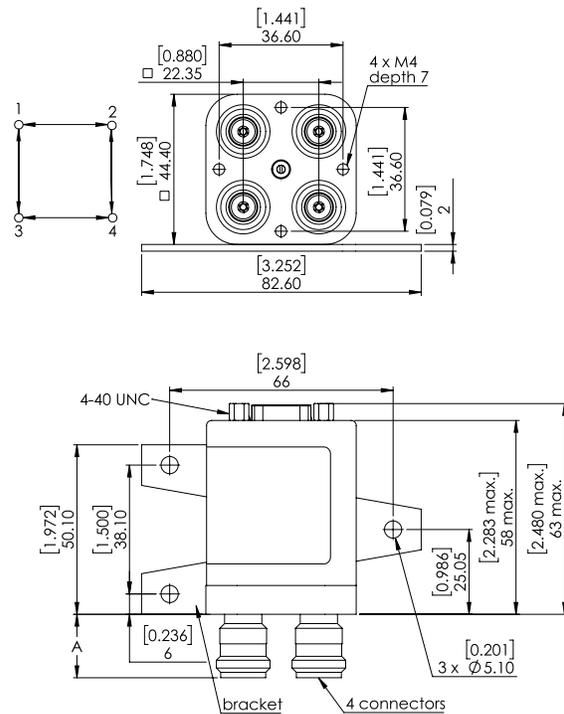
N - BNC - TNC

**TYPICAL OUTLINE DRAWING**

With solder pins and bracket



With D-Sub connector and bracket



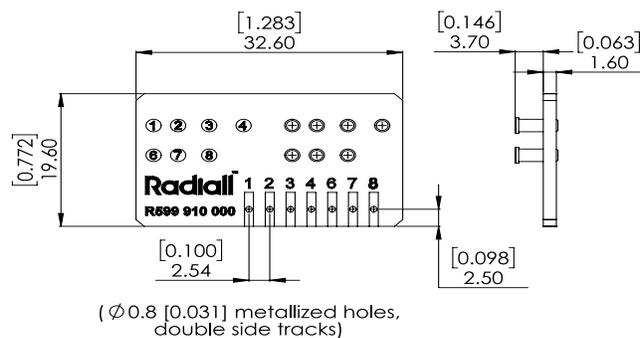
See page 4-13 for pin allocation.

Connectors	N	BNC	TNC
A max [mm [inches]]	19.5 [0.748]	12.5 [0.472]	12.5 [0.472]

**ACCESSORIES**

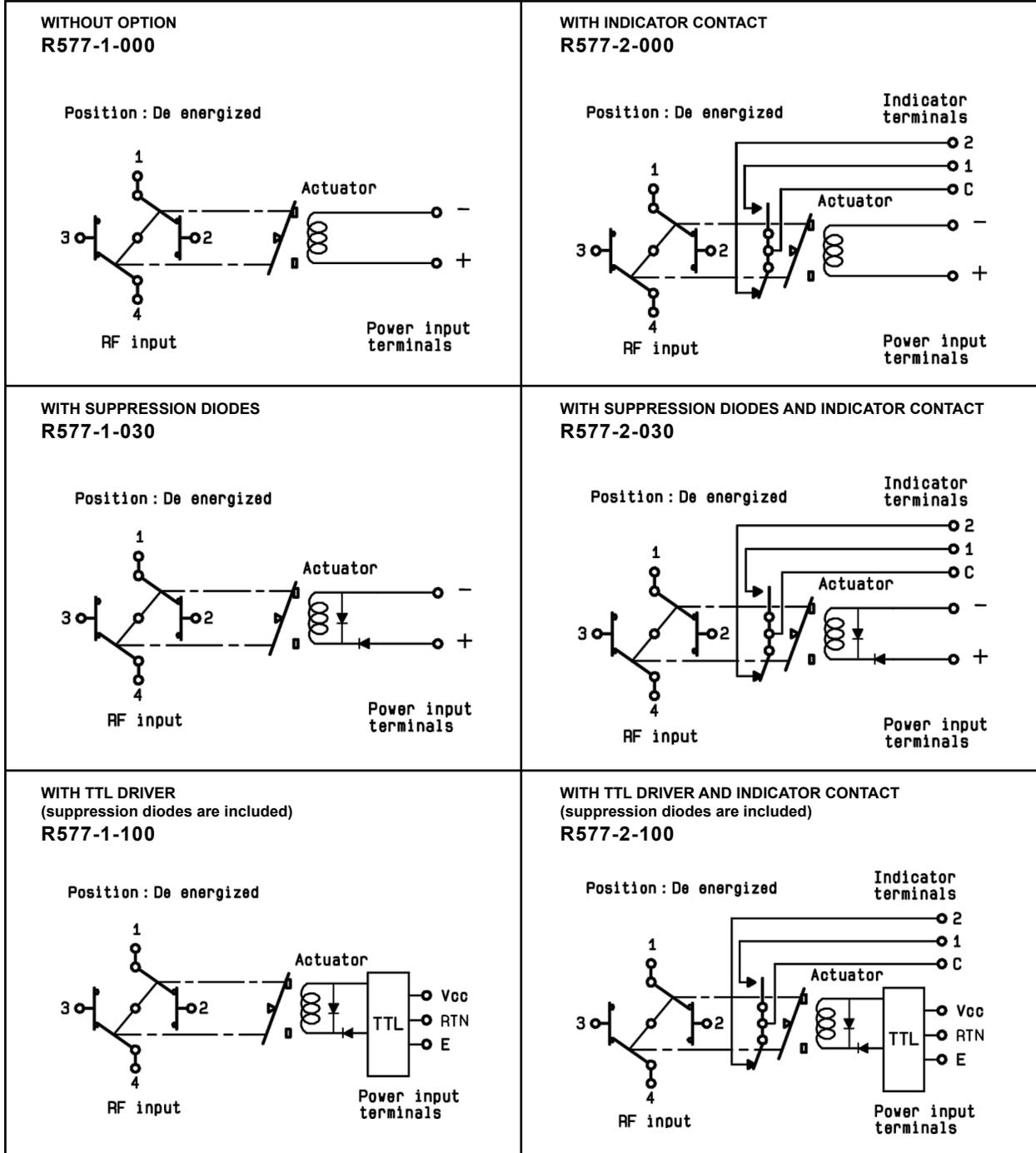
A printed circuit board interface connector (ordered separately) has been designed for easy mounting on terminals.

For DPDT model R577 series = Radiall part number: **R599 910 000**



All dimensions are in millimeters [inches].

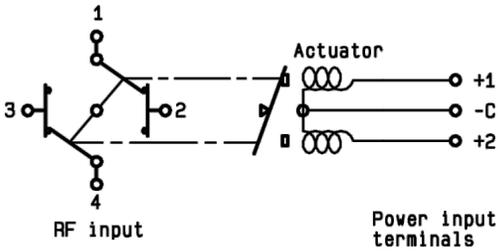
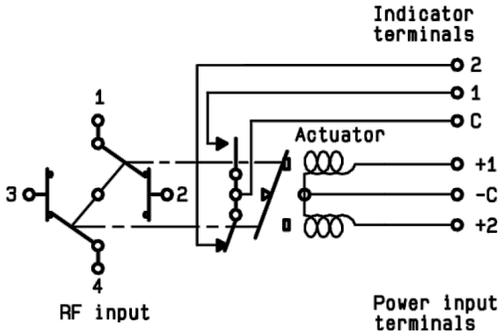
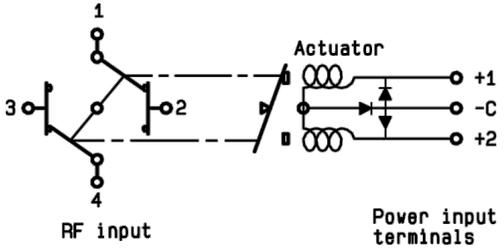
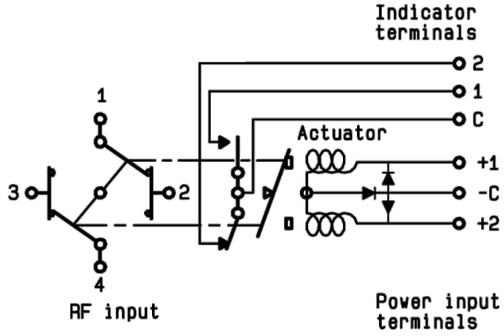
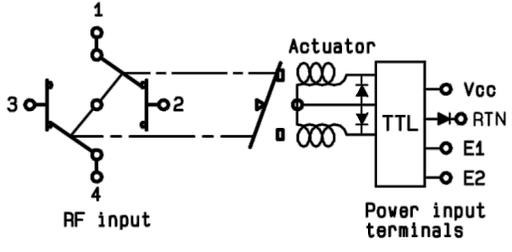
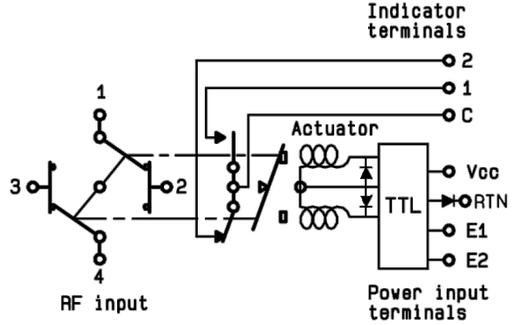
**FAILSAFE**



Coaxial DPDT - Electrical Schematics

R577 Series

LATCHING

<p><b>WITHOUT OPTION</b> <b>R577-3-000</b></p>  <p>RF input</p> <p>Power input terminals</p>	<p><b>WITH INDICATOR CONTACT</b> <b>R577-4-000</b></p>  <p>Indicator terminals</p> <p>RF input</p> <p>Power input terminals</p>
<p><b>WITH SUPPRESSION DIODES</b> <b>R577-3-030</b></p>  <p>RF input</p> <p>Power input terminals</p>	<p><b>WITH SUPPRESSION DIODES AND INDICATOR CONTACT</b> <b>R577-4-030</b></p>  <p>Indicator terminals</p> <p>RF input</p> <p>Power input terminals</p>
<p><b>WITH TTL DRIVER</b> (suppression diodes are included) <b>R577-3-100</b></p>  <p>RF input</p> <p>Power input terminals</p>	<p><b>WITH TTL DRIVER AND INDICATOR CONTACT</b> (suppression diodes are included) <b>R577-4-100</b></p>  <p>Indicator terminals</p> <p>RF input</p> <p>Power input terminals</p>

RAMSES SERIES

LATCHING

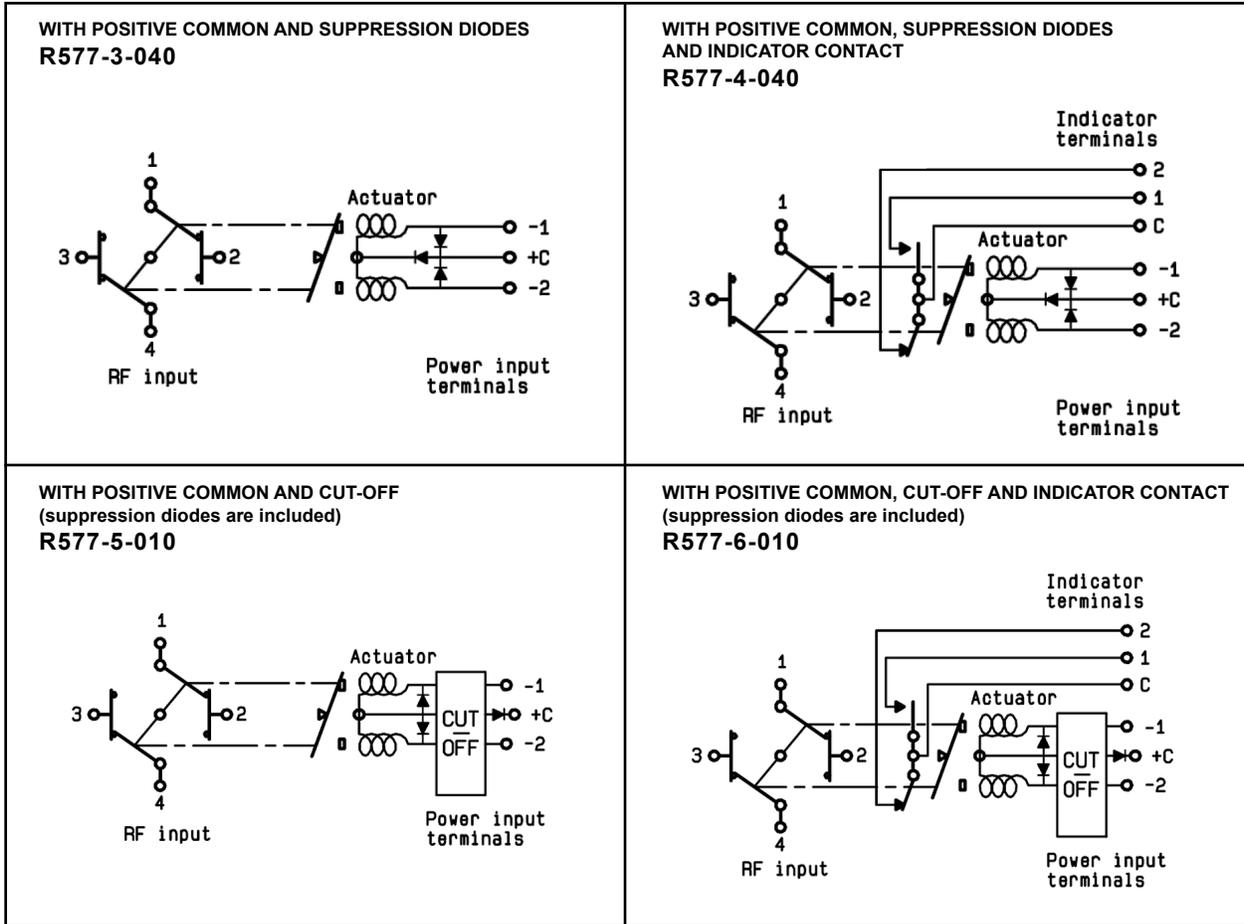
<p><b>WITH CUT-OFF</b> (suppression diodes are included) <b>R577-5-000</b></p> <p>RF input</p> <p>Actuator</p> <p>Power input terminals</p> <p>+1 -C +2</p>	<p><b>WITH CUT-OFF AND INDICATOR CONTACT</b> (suppression diodes are included) <b>R577-6-000</b></p> <p>Indicator terminals</p> <p>RF input</p> <p>Actuator</p> <p>Power input terminals</p> <p>+1 -C +2</p>
<p><b>WITH CUT-OFF AND TTL DRIVER</b> <b>R577-5-100</b></p> <p>RF input</p> <p>Actuator</p> <p>Power input terminals</p> <p>Vcc RTN E1 E2</p>	<p><b>WITH CUT-OFF AND INDICATOR CONTACT</b> (suppression diodes are included) <b>R577-6-100</b></p> <p>Indicator terminals</p> <p>RF input</p> <p>Actuator</p> <p>Power input terminals</p> <p>Vcc RTN E1 E2</p>
<p><b>WITH POSITIVE COMMON, NO OPTION</b> <b>R577-3-010</b></p> <p>RF input</p> <p>Actuator</p> <p>Power input terminals</p> <p>-1 +C -2</p>	<p><b>WITH POSITIVE COMMON AND INDICATOR CONTACT</b> <b>R577-4-010</b></p> <p>Indicator terminals</p> <p>RF input</p> <p>Actuator</p> <p>Power input terminals</p> <p>-1 +C -2</p>

Coaxial DPDT - Electrical Schematics

R577 Series

RAMSES SERIES

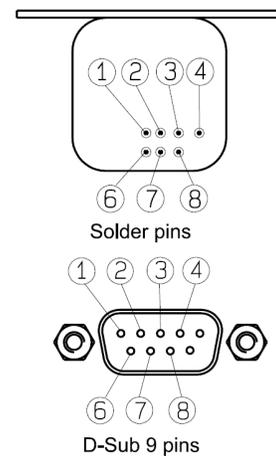
LATCHING



PIN IDENTIFICATION

Type	PIN							
	1	2	3	4	6	7	8	
Failsafe	+		-					
Failsafe + I.C.	+		-		1	2	C	
Failsafe + TTL	E		RTN	VCC				
Failsafe + I.C. + TTL	E		RTN	VCC	1	2	C	
Latching	-1 or	-2 or	+C or					
Latching + Cut-off	+1	+2	-C					
Latching + I.C.	-1 or	-2 or	+C or		1	2	C	
Latching + I.C. + Cut-off	+1	+2	-C					
Latching + Cut-off	E2	E1	RTN	VCC				
Latching + Cut-off + I.C.	E2	E1	RTN	VCC	1	2	C	
Latching + TTL + I.C.	E2	E1	RTN	VCC	1	2	C	

TOP VIEW



## High Performance DPDT

Titanium Series / DPDT up to 40 GHz



Radiall's TITANIUM series switches are optimised 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 2.5 million switching cycles. Radiall's TITANIUM switches are perfect for automated test and measurement equipment, as well as signal monitoring devices.

Example of P/N:

R513473148 is a DPDT SMA 20 GHz, latching, Self Cut-Off, diodes, positive common, TTL driver, Indicators, HE10 receptacle with bracket.

### PART NUMBER SELECTION

**R 513**

**RF Connectors:**

- 3: SMA up to 6 GHz
- 4: SMA up to 20 GHz
- F: SMA up to 26.5 GHz
- 8: SMA2.9 up to 40 GHz <sup>[2]</sup>

**Type:**

- 7: Latching + Self cut-off + Indicators

**Actuator Voltage:**

- 3: 24 Vdc

**TTL Option:**

- 1: With TTL driver

**Documentation:**

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

**Actuator Terminals and Fixing:**

- 8: HE 10 receptacle with bracket <sup>(1)</sup>
- 9: HE 10 receptacle without bracket <sup>(1)</sup>

**Option:**

- 4: With suppression diodes and positive common

**NOTE:**

- (1): Delivered with 750 mm (30 inches) ribbon cable + HE10 connector.
- (2): Connector SMA2.9 is equivalent to "K connector<sup>®</sup>" registered trademark of Anritsu.

**High Performance DPDT**

Titanium Series / DPDT up to 40 GHz

**GENERAL SPECIFICATIONS**

Operating mode		Latching	
Nominal operating voltage (across operating temperature)	Vdc	24 (20/32)	
Coil resistance (+/-10%)	$\Omega$	120	
Nominal operating current at 23°C	mA	200	
Maximum stand-by current	mA	50	
Average power		RF path Cold switching: see RF Power Rating Chart on page 4-19 Hot switching: 1 Watt CW	
TTL input	High Level	3 to 7 V	1.4 mA max at 7 V
	Low Level	0 to 0.8 Volts	-
Indicator specifications		Maximum withstanding voltage	60 V
		Maximum current capacity	150 mA
		Maximum "ON" resistance	2.5 $\Omega$
		Minimum "OFF" resistance	100 M $\Omega$
Switching time (Max)	ms	15	
Life (Min)		2.5 million cycles	
Connectors		SMA - SMA 2.9	
Actuator terminals		HE10 ribbon receptacle	
Weight (Max)	g	110	

**ENVIRONMENTAL SPECIFICATIONS**

Operating temperature range	-25°C to +75°C
Storage temperature range	-55°C to +85°C
Temperature cycling (MIL-STD-202, Method 107D, Cond.A)	-55°C to +85°C (10 cycles)
Vibration (MIL STD 202, Method 204D, Cond.D) operating	10-2000 Hz, 10 g
Shock (MIL STD 202, Method 213B, Cond.C) operating	50 g / 6 ms, 1/2 sine
Moisture resistance (MIL STD 202, Method 106E, Cond.E)	65°C, 95% RH, 10 days
Altitude storage (MIL STD 202, Method 105C, Cond.B)	50,000 feet (15,240 meters)
RFI (MIL STD 1344, Method 3008 or IEC 61726)	40 dB at 20 GHz

High Performance DPDT

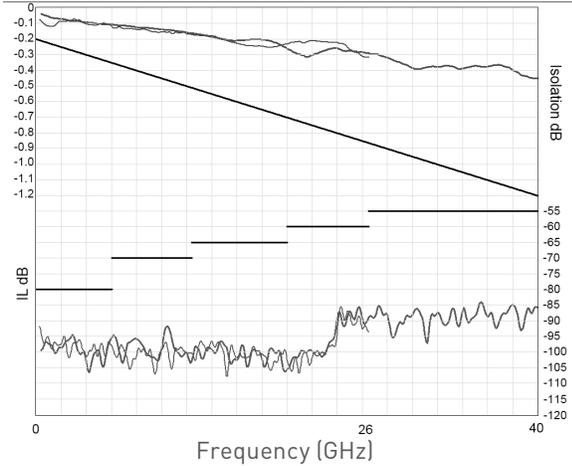
Titanium Series / DPDT up to 40 GHz

RF PERFORMANCE

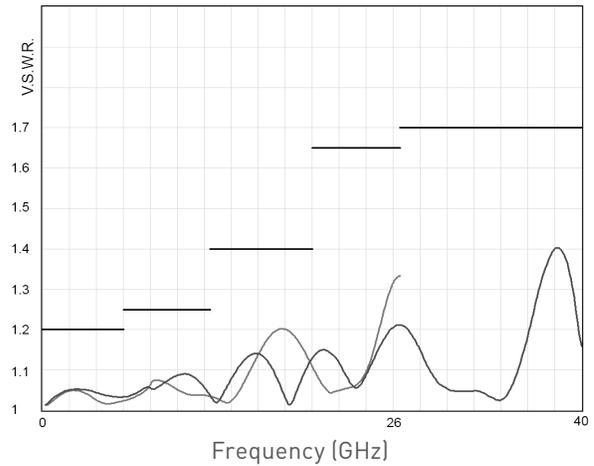
Part Number		R51337314-	R51347314-	R513F7314-	R51387314-
Frequency range	GHz	DC to 6	DC to 20	DC to 26.5	DC to 40
Impedance	$\Omega$	50			
Insertion Loss (Max)	dB	0.2 + 0.025 x frequency (GHz)			
Isolation (Min)	dB	80	DC to 6 GHz 80 6 to 12.4 GHz 70 12.4 to 20 GHz 65	DC to 6 GHz 80 6 to 12.4 GHz 70 12.4 to 20 GHz 65 20 to 26.5 GHz 60	DC to 6 GHz 80 6 to 12.4 GHz 70 12.4 to 20 GHz 65 20 to 26.5 GHz 60 26.5 to 40 GHz 55
V.S.W.R. (Max)		1.20	DC to 6 GHz 1.20 6 to 12.4 GHz 1.25 12.4 to 20 GHz 1.40	DC to 6 GHz 1.20 6 to 12.4 GHz 1.25 12.4 to 20 GHz 1.40 20 to 26.5 GHz 1.65	DC to 6 GHz 1.20 6 to 12.4 GHz 1.25 12.4 to 20 GHz 1.40 20 to 26.5 GHz 1.65 26.5 to 40 GHz 1.70
Repeatability (at 25°C)		0.03 dB			0.05 dB

TYPICAL RF PERFORMANCE

Insertion Loss and Isolation



V.S.W.R.



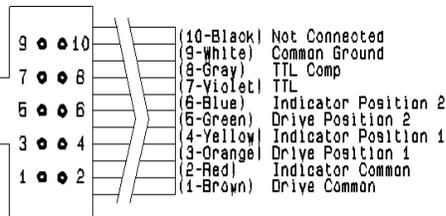
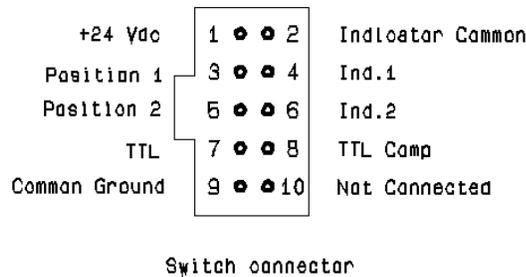
SMA — SMA 2.9 —

## High Performance DPDT

Titanium Series / DPDT up to 40 GHz

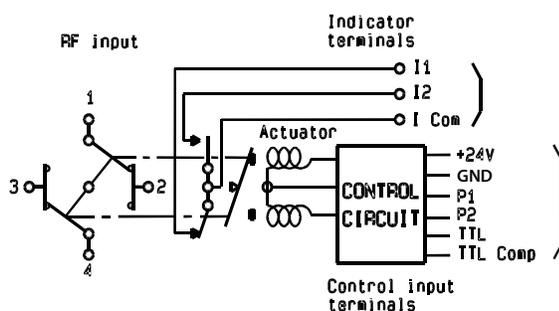
### DRIVING THE SWITCH

Transfer switches are configured with two positions. Each RF path can be closed by applying ground or TTL "High" to the corresponding "driver" pin.



Mating cable connector

### RF SCHEMATIC DIAGRAM



	RF continuity	Indicator
Position 1	1-2 / 3-4	ICom - I1
Position 2	1-3 / 2-4	ICom - I2

#### Standard drive

- Connect pin 9 to ground (See note)
- Connect pin 1 to supply (+20 VDC to +32 VDC)
- Select (close) desired RF paths by applying ground to the corresponding "drive" pin (Ex: apply ground to pin 3 to close RF path 1-2 and 3-4)
- To select the second path, ensure that the unwanted RF path "drive" pin is disconnected from ground. Apply ground to the "drive" pin which corresponds to the desired RF paths (Ex: apply ground to pin 5 to close RF path 1-3 and 2-4)

#### TTL drive (Dual line)

- Connect pin 9 to ground
- Connect pin 1 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 7 and TTL "Low" to pin 8 to close RF paths position 1)
- To select the second path, ensure that the unwanted RF path "drive" pins are in TTL "Low" position. Apply TTL "High" to the "drive" pin which correspond to the desired RF path and TTL "low" to the undesired. (Ex: apply TTL "High" to pin 8 and TTL "Low" to pin 7 to close RF paths position 2)

#### TTL drive (Single line)

- Connect pin 9 to ground
- Connect pin 1 to supply (+20 VDC to +32 VDC)
- Connect pin 8 to TTL "High"
- Select (close) position 1 by applying TTL "High" to pin 7 (Ex: apply TTL "High" to pin 7 to close RF paths 1-2 and 3-4)
- Select position 2 by applying TTL "Low" to pin 7 (Ex: apply TTL "Low" to pin 7 to close RF paths 1-3 and 2-4)

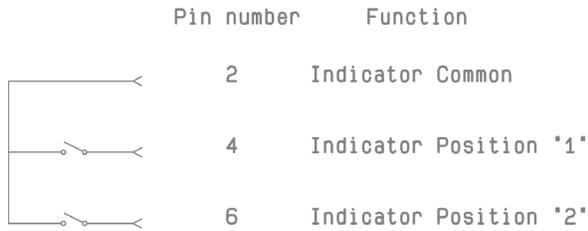
#### Note

Pin 9 does not need to be grounded for the switch to operate in standard drive. If pin 9 is not grounded, the position indicators will only function while the appropriate drive is applied. Therefore, if a pulse drive is used and continuous indicator operation is required, pin 9 must be grounded.

High Performance DPDT

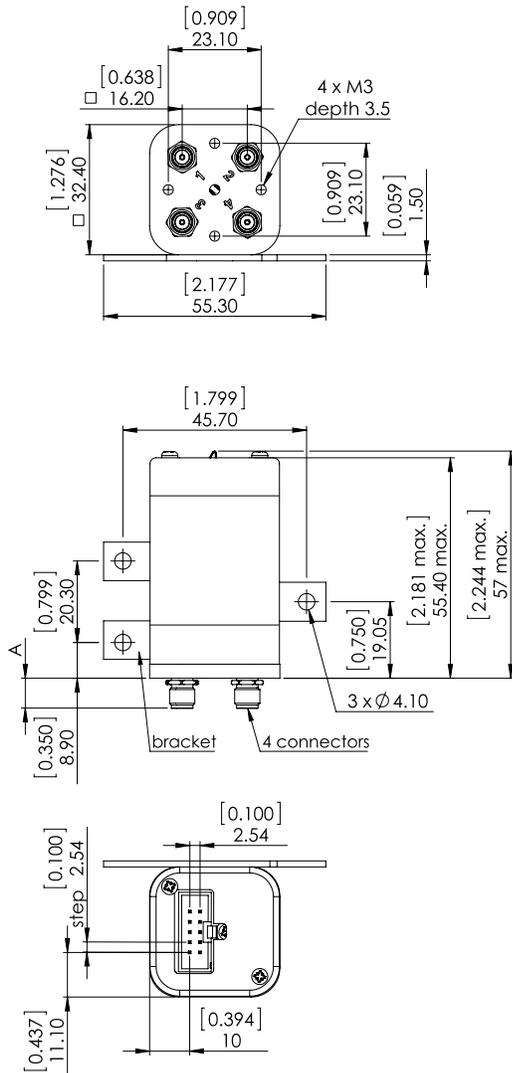
Titanium Series / DPDT up to 40 GHz

RF PERFORMANCE



The electronic position indicators use photo-MOS transistors, which are driven by the mechanical position of the RF paths moving elements. The circuitry consists of a common which can be connected to an output corresponding to selected RF path. The photo-MOS transistors are configured for AC and/or DC operation. The electronic position indicators require the supply (20 to 32 VDC) to be connected to pin 1 and ground connected to pin 9.

TYPICAL OUTLINE DRAWING



All dimensions are in millimeters [inches].

Connectors	SMA	SMA 2.9
A max (mm [inches])	7.7 [0.303]	6.7 [0.264]

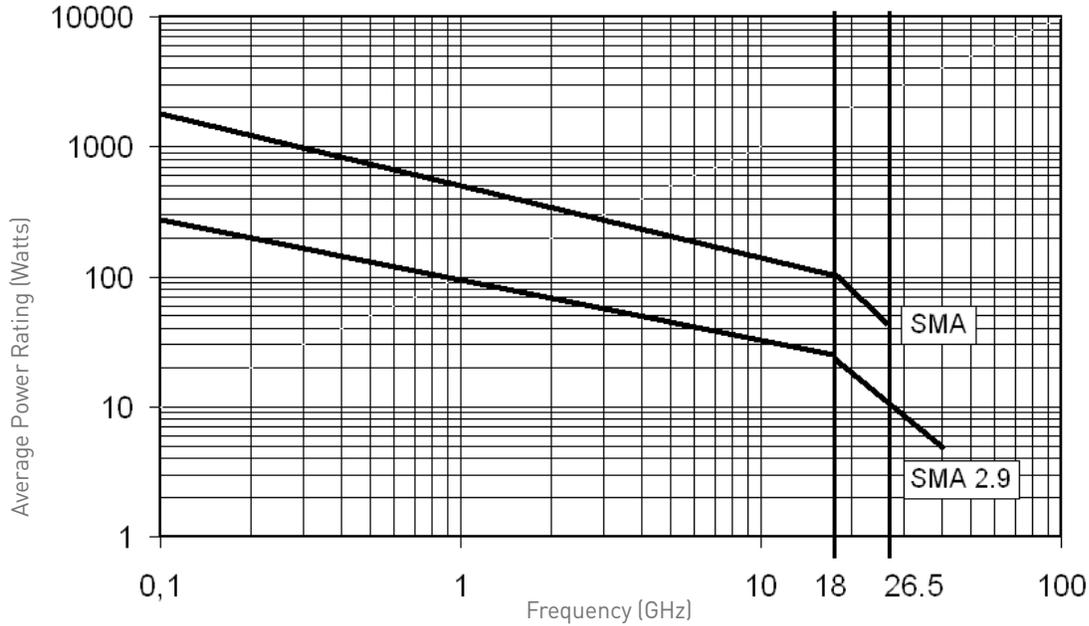
## High Performance DPDT

Titanium Series / DPDT up to 40 GHz

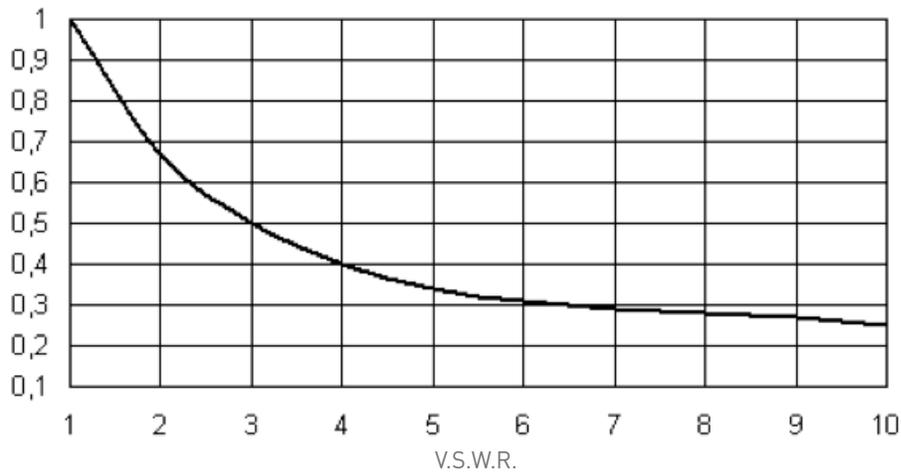
### POWER RATING CHART

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.



## High Performance DPDT

Platinum Series / DPDT up to 40 GHz



Radiall's PLATINUM series switches are optimised 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:

R593F73148 is a DPDT SMA 26.5 GHz, latching, Self Cut-Off, diodes, positive common, TTL driver, Indicators, HE10 receptacle with bracket.

### PART NUMBER SELECTION

**R 593**

**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 <sup>(2)</sup>

**Type:**

- 7: Latching + Self cut-off + Indicators

**Actuator Voltage:**

- 3: 24 Vdc

**TTL Option:**

- 1: With TTL driver

**Documentation:**

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

**Actuator Terminals and Fixing**

- 8: HE 10 receptacle with bracket <sup>(1)</sup>
- 9: HE 10 receptacle without bracket <sup>(1)</sup>

**Option:**

- 4: With suppression diodes and positive common

**NOTE:**

(1): Delivered with 750 mm (30 inches) ribbon cable + HE10 connector.

(2): Connector SMA 2.9 is equivalent to "K connector®", registered trademark of Anritsu.

**High Performance DPDT**

Platinum Series / DPDT up to 40 GHz

**GENERAL SPECIFICATIONS**

Operating mode		Latching	
Nominal operating voltage (across operating temperature)	Vdc	24 (20/32)	
Coil resistance (+/-10%)	$\Omega$	120	
Nominal operating current at 23°C	mA	200	
Maximum stand-by current	mA	50	
Average power		RF path Cold switching: see RF Power Rating Chart on page 4-25 Hot switching: 1 Watt CW	
TTL input	High Level	3 to 7 V	1.4 mA max at 7 V
	Low Level	0 to 0.8 Volts	-
Indicator specifications		Maximum withstanding voltage	60 V
		Maximum current capacity	150 mA
		Maximum "ON" resistance	2.5 $\Omega$
		Minimum "OFF" resistance	100 M $\Omega$
Switching time (Max)	ms	15	
life (Min)	SMA	10 million cycles	
	SMA 2.9	5 million cycles	
Connectors		SMA - SMA 2.9	
Actuator terminals		HE10 ribbon receptacle	
Weight (Max)	g	110	

**ENVIRONMENTAL SPECIFICATIONS**

Operating temperature range	-25°C to +75°C
Storage temperature range	-55°C to +85°C
Temperature cycling (MIL-STD-202, Method 107D, Cond.A)	-55°C to +85°C (10 cycles)
Vibration (MIL STD 202, Method 204D, Cond.D) operating	10-2000 Hz, 10 g
Shock (MIL STD 202, Method 213B, Cond.C) operating	50 g / 6 ms, 1/2 sine
Moisture resistance (MIL STD 202, Method 106E, Cond.E)	65°C, 95% RH, 10 days
Altitude storage (MIL STD 202, Method 105C, Cond.B)	50,000 feet (15,240 meters)
RFI (MIL STD 1344, Method 3008 or IEC 61726)	40 dB at 20 GHz

## High Performance DPDT

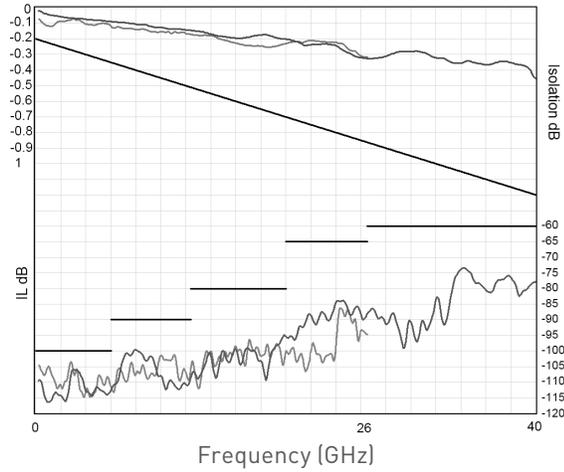
Platinum Series / DPDT up to 40 GHz

### RF PERFORMANCE

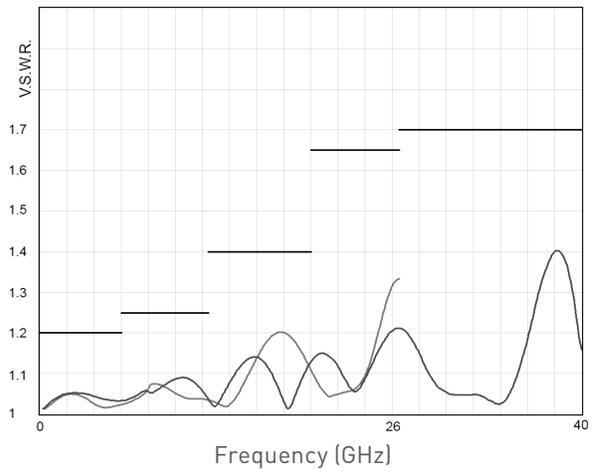
Part Number		R59337314-	R59347314-	R593F7314-	R59387314-
Frequency range	GHz	DC to 6	DC to 20	DC to 26.5	DC to 40
Impedance	Ω	50			
Insertion Loss (Max)	dB	0.2 + 0.025 x frequency (GHz)			
Isolation (Min)	dB	100	DC to 6 GHz 100 6 to 12.4 GHz 90 12.4 to 20 GHz 80	DC to 6 GHz 100 6 to 12.4 GHz 90 12.4 to 20 GHz 80 20 to 26.5 GHz 65	DC to 6 GHz 100 6 to 12.4 GHz 90 12.4 to 20 GHz 80 20 to 26.5 GHz 65 26.5 to 40 GHz 60
V.S.W.R. (Max)		1.20	DC to 6 GHz 1.20 6 to 12.4 GHz 1.25 12.4 to 20 GHz 1.40	DC to 6 GHz 1.20 6 to 12.4 GHz 1.25 12.4 to 20 GHz 1.40 20 to 26.5 GHz 1.65	DC to 6 GHz 1.20 6 to 12.4 GHz 1.25 12.4 to 20 GHz 1.40 20 to 26.5 GHz 1.65 26.5 to 40 GHz 1.70
Repeatability (at 25°C)		0.03 dB			0.05 dB

### TYPICAL RF PERFORMANCE

Insertion Loss and Isolation



V.S.W.R.



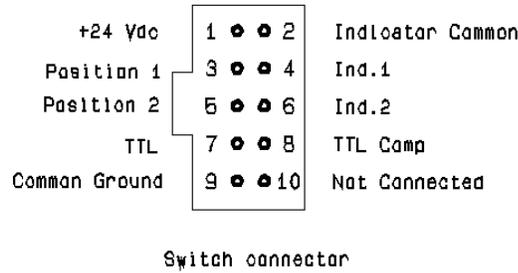
SMA — SMA 2.9 —

## High Performance DPDT

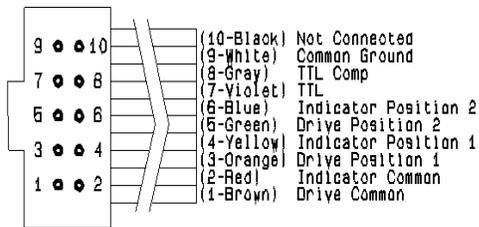
Platinum Series / DPDT up to 40 GHz

### DRIVING THE SWITCH

Transfer switches are configured with two positions. Each RF path can be closed by applying Ground or TTL "High" to the corresponding "driver" pin.

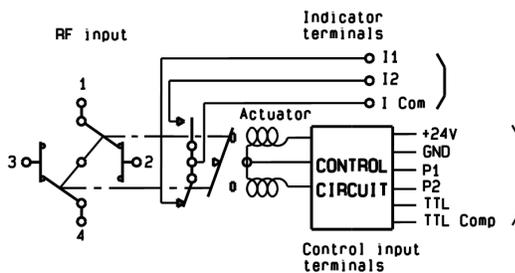


Switch connector



Mating cable connector

### RF SCHEMATIC DIAGRAM



	RF continuity	Indicator
Position 1	1-2 / 3-4	ICom - I1
Position 2	1-3 / 2-4	ICom - I2

#### Standard drive

- Connect pin 9 to ground (See note)
- Connect pin 1 to supply (+20 VDC to +32 VDC)
- Select (close) desired RF paths by applying ground to the corresponding "drive" pin (Ex: apply ground to pin 3 to close RF path 1-2 and 3-4)
- To select the second path, ensure that the unwanted RF path "drive" pin is disconnected from ground. Apply ground to the "drive" pin which corresponds to the desired RF paths (Ex: apply ground to pin 5 to close RF path 1-3 and 2-4)

#### TTL drive (Dual line)

- Connect pin 9 to ground
- Connect pin 1 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 7 and TTL "Low" to pin 8 to close RF paths position 1)
- To select the second path, ensure that the unwanted RF path "drive" pins are in TTL "Low" position. Apply TTL "High" to the "drive" pin which corresponds to the desired RF path and TTL "low" to the undesired (Ex: apply TTL "High" to pin 8 and TTL "Low" to pin 7 to close RF paths position 2)

#### TTL drive (Single line)

- Connect pin 9 to ground
- Connect pin 1 to supply (+20 VDC to +32 VDC)
- Connect pin 8 to TTL "High"
- Select (close) position 1 by applying TTL "High" to pin 7 (Ex: apply TTL "High" to pin 7 to close RF paths 1-2 and 3-4)
- Select position 2 by applying TTL "Low" to pin 7 (Ex: apply TTL "Low" to pin 7 to close RF paths 1-3 and 2-4)

#### Note

Pin 9 does not need to be grounded for the switch to operate in standard drive. If pin 9 is not grounded, the position indicators will only function while the appropriate drive is applied. Therefore, if a pulse drive is used and continuous indicator operation is required, pin 9 must be grounded.

## High Performance DPDT

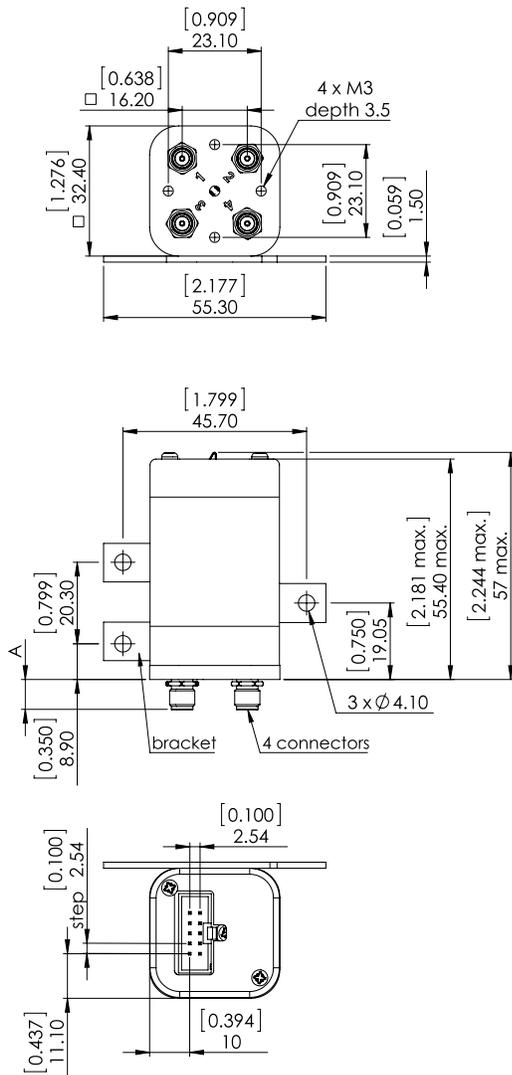
Platinum Series / DPDT up to 40 GHz

### RF PERFORMANCE

	Pin number	Function
	2	Indicator Common
	4	Indicator Position *1*
	6	Indicator Position *2*

The electronic position indicators use photo-MOS transistors, which are driven by the mechanical position of the RF paths moving elements. The circuitry consists of a common which can be connected to an output corresponding to selected RF path. The photo-MOS transistors are configured for AC and/or DC operation. The electronic position indicators require the supply (20 to 32 VDC) to be connected to pin 1 and ground connected to pin 9.

### TYPICAL OUTLINE DRAWING



All dimensions are in millimeters [inches].

Connectors	SMA	SMA2.9
A max (mm [inches])	7.7 [0.303]	6.7 [0.264]

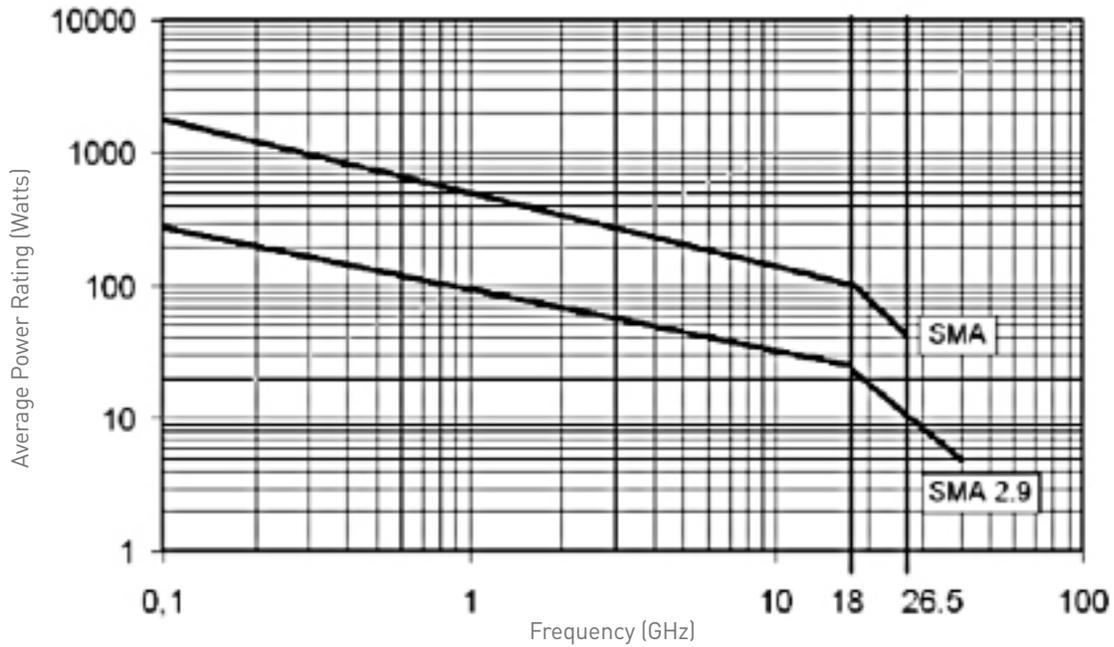
## High Performance DPDT

Platinum Series / DPDT up to 40 GHz

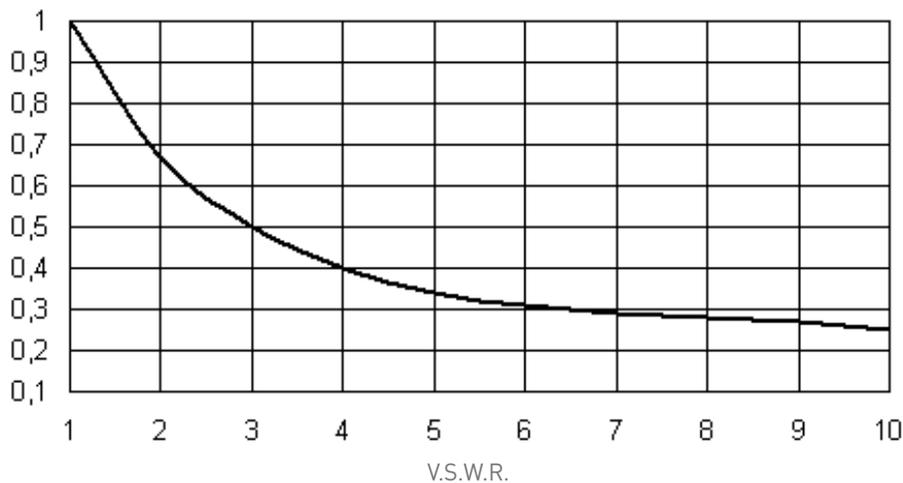
### POWER RATING CHART

This graph is based on the following conditions:

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



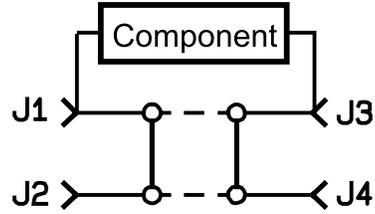
### DERATING FACTOR VERSUS V.S.W.R.



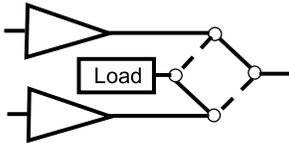
## Optional Features for DPDT Switches

### GENERAL

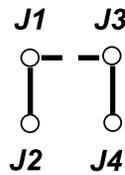
A microwave circuit or component can be inserted into a transmission line by using a DPDT switch as a bypass product. In event that the short-circuit of the microwave circuit or component is undesirable, the J1/J3 path can be left out (see application option below).



Examples of dedicated application options:



This DPDT with a cable load is used for redundancy purposes for 2 amplifiers, one working, the other one in stand-by.



This true Bypass Switch is based on a DPDT with only 3 RF ways instead of 4.

Component inserted in J2/J4  
 POS 1: J1 to J3: Direct line  
 POS 2: J1 to J3: Component line



This DPDT has been fitted with a specific bracket to fulfill a specific customer request.



This DPDT was designed with a specific flat cable for an easy integration.