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 (2)

Type:
7: Latching + Self cut-off + Indicators

Actuator Voltage:
3: 24 Vdc

TTL Option:
1: With TTL driver (high level)

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

Actuator Terminals and Fixing:
8: HE 10 receptacle with bracket (1)
9: HE 10 receptacle without bracket (1)

Option:
4: With suppression diodes and positive common

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

(2) Connector SMA2.9 is equivalent to "K connector®" 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%)	Ω	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 60V Maximum current capacity 150 mA Maximum "ON" resistance 2.5 Ω Minimum "OFF" resistance 100 mΩ	
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)	10-2000 Hz, 10g operating
Shock (MIL STD 202, Method 213B, Cond.C)	50g / 6 ms, 1/2 sine operating
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)	40dB at 20GHz

High Performance DPDT

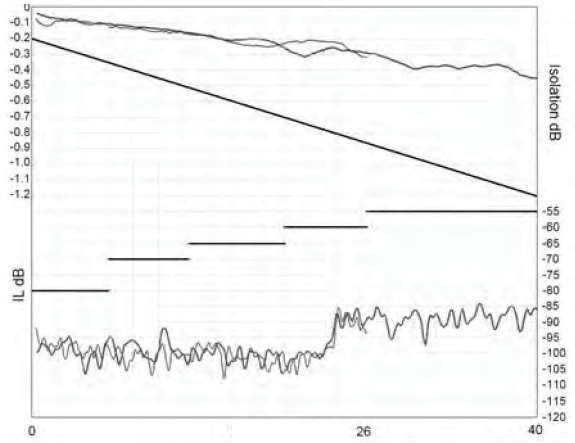
Titanium Series / DPDT up to 40 GHz

RF PERFORMANCES

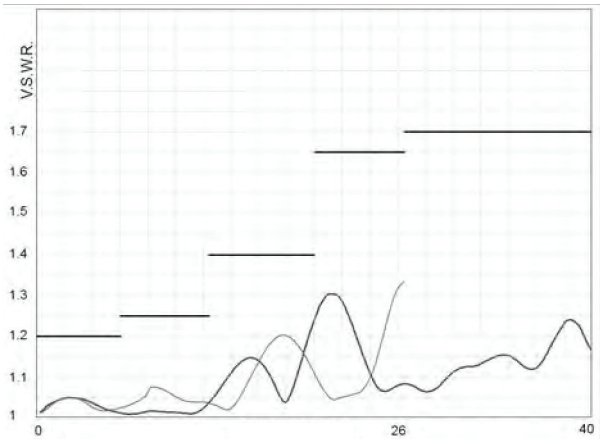
Part Number		R51337314-	R51347314-	R513F7314-	R51387314-
Frequency range	GHz	DC to 6	DC to 20	DC to 26.5	DC to 40
Impedance	Ω	50			
Insertion Loss (Max)	dB	0.2 + 0.025 x frequency (GHz)			
Isolation (Min)	dB	80	DC to 6 GHz 80 6 to 12.4 GHz 70 12.4 to 20 GHz 65	DC to 6 GHz 80 6 to 12.4 GHz 70 12.4 to 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 18 GHz 1.40 18 to 20 GHz 1.65	DC to 6 GHz 1.20 6 to 12.4 GHz 1.25 12.4 to 18 GHz 1.40 18 to 26.5 GHz 1.65	DC to 6 GHz 1.20 6 to 12.4 GHz 1.25 12.4 to 18 GHz 1.40 18 to 26.5 GHz 1.65 26.5 to 40 GHz 1.70
Repeatability (measured at 25°C)		0.03 dB			0.05 dB

TYPICAL RF PERFORMANCES

Insertion Loss and Isolation



V.S.W.R.



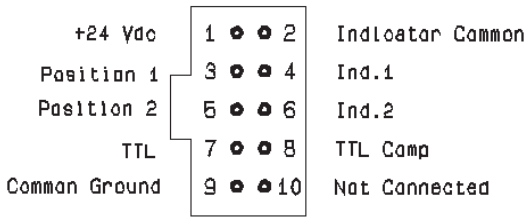
SMA —— SMA 2.9 ——

High Performance DPDT

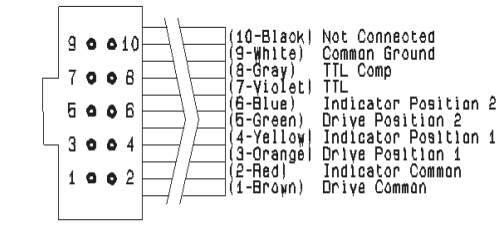
Titanium Series / DPDT up to 40 GHz

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.



Switch connector



Mating cable connector

Standard drive

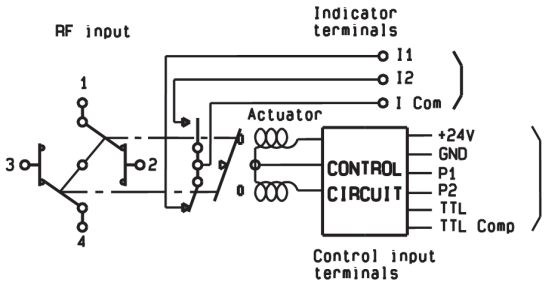
- Connect pin 9 to ground (See note)
- Connect pin 1 to supply (+20 VDC to +32 VDC)
- Select (close) desired RF paths by applying ground to the corresponding "drive" pin (Ex: apply ground to pin 3 to close RF path 1-2 and 3-4)
- To select the second path, ensure that the unwanted RF path "drive" pin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

RF SCHEMATIC DIAGRAM



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

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)

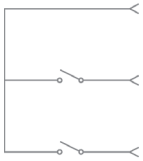
Note

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

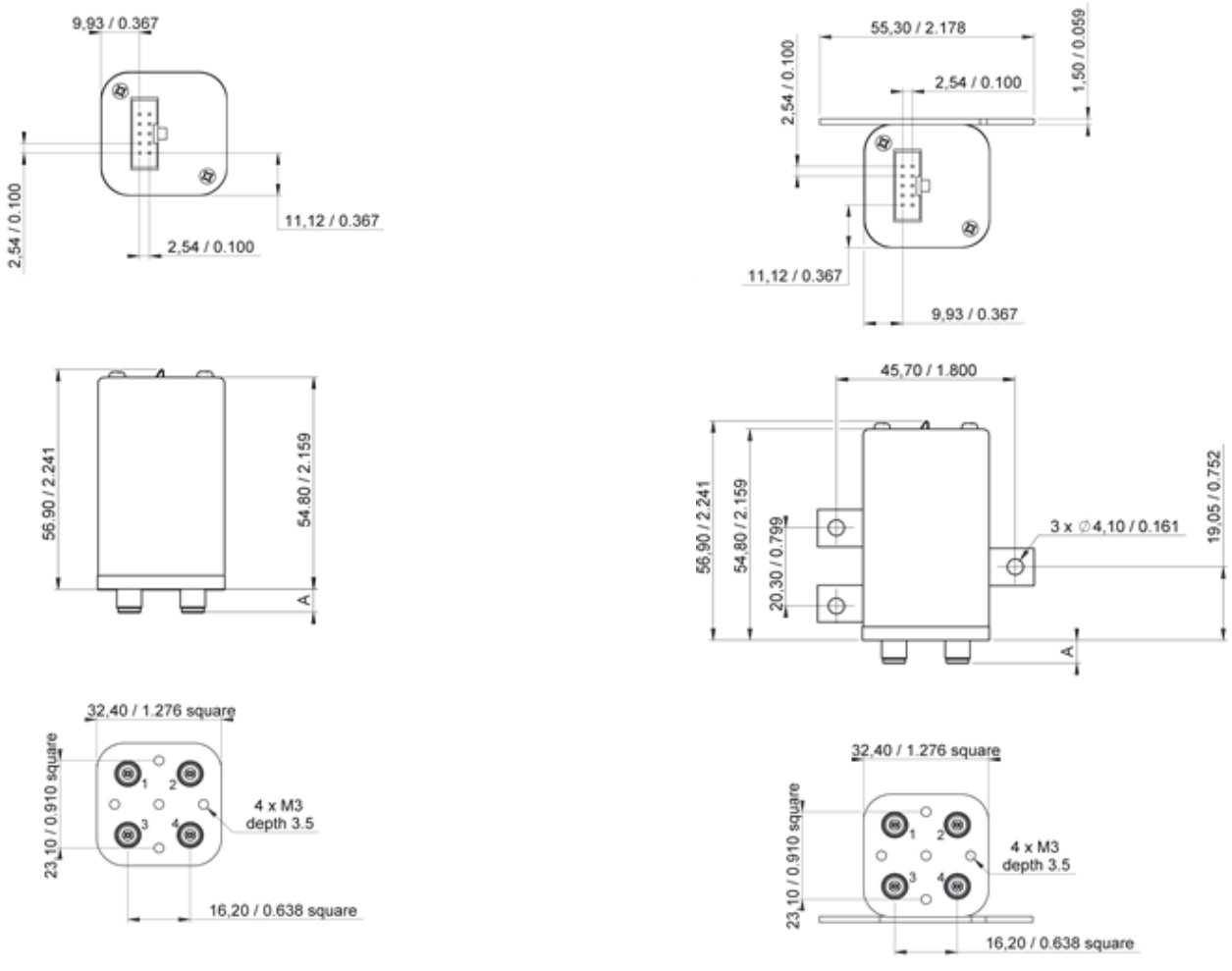
RF PERFORMANCES



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	SMA 2.9
A max (mm)	7.4	6.3

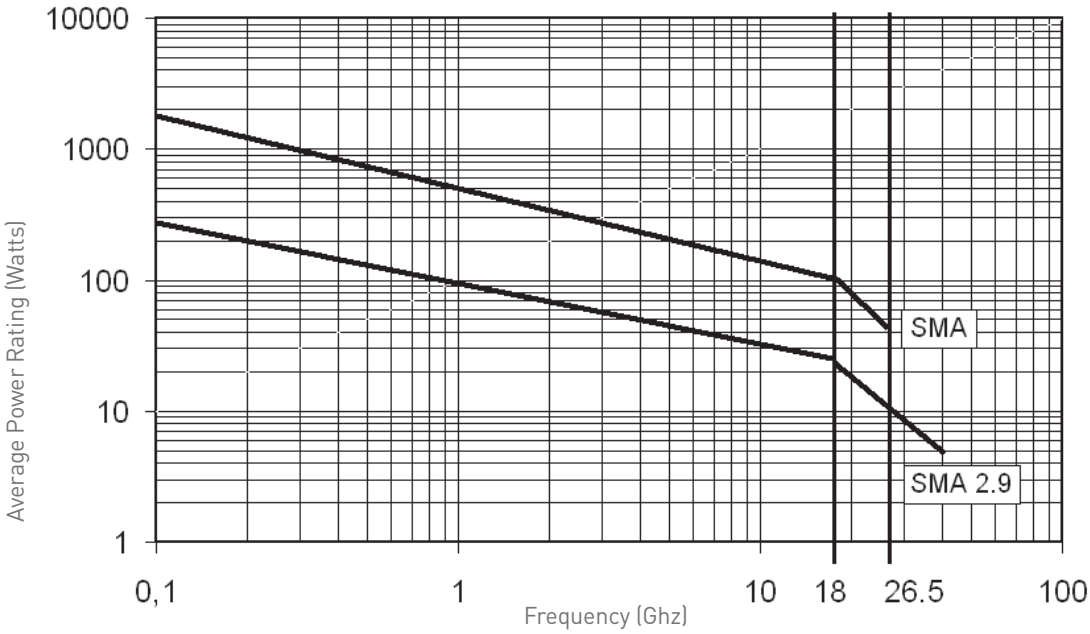
High Performance DPDT

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.