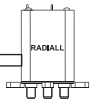


SPACE section

General Information

See Page Space - 2

Low Power models

See Page Space - 3

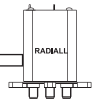
High Power models

See Page Space - 11

ROJONE PTY. LTD.

Australian Representatives
ROJONE, PTY LTD.
Tel: 02 9829 1555
E: sales@rojone.com.au
www.rojone.com.au

For more technical information, consult us / E-mail : ***spaceproducts@radiall.com***



GENERAL INFORMATION / SPECIFICATIONS

Radiall Hi-Rel switches are based on RADIALL's 40+ years heritage of hundreds of thousands of products designed, manufactured, qualified & delivered for commercial & military markets.

A 20+ years heritage for space coaxial switches based on more than 180 satellites worldwide using our products on board can ensure to our customers, the highest level of quality & reliability.

RADIALL Hi-Rel coaxial switches have been fully evaluated & approved by European Space Agency for Space use according to ESCC3603 generic specification and following detail specifications

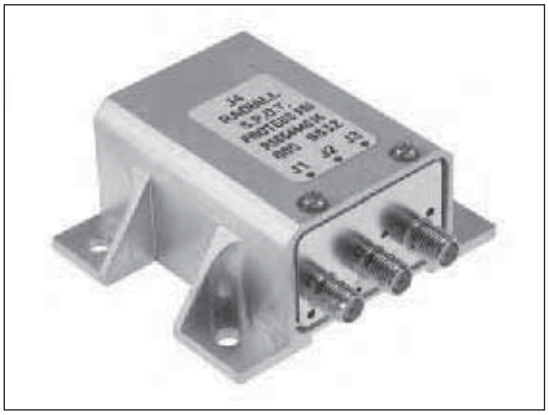
Product	Power cap.	Frequency	Connectors	Drive	Detail specification
SPDT	Low power	DC - 18 GHz	SMA	Latching	**ESCC3603002**
SPDT	Low power	Up to 31 GHz	SMA2.9	Latching	**ESCC3603007**
DPDT	Low power	Up to 31 GHz	SMA2.9	Latching	**ESCC3603008**
T-Switch	Low power	Up to 31 GHz	SMA2.9	Sequential	**ESCC3603009**
T-Switch	Low power	Up to 31 GHz	SMA2.9	Random	**ESCC3603009**
T-Switch	High power	Up to 8 GHz	TNC	Random	**ESCC3603010**

RADIALL also provides a full range of Hi-Rel switches for space use which offers our customers significant cost saving, while satisfying most typical requirements for communication satellite applications according to RAD-GEN-SWIT-001 and following detail specifications :

Product	Power cap.	Frequency	Connectors	Drive	Detail specification
SPDT	Low power	DC - 18 GHz	SMA	Latching	**RAD-DET-SPDT-003**
SPDT	Low power	Up to 31 GHz	SMA2.9	Latching	**RAD-DET-SPDT-001**
SPDT	High power	Up to 4.8 GHz	TNC	Latching	**RAD-DET-SPDT-002**
DPDT	Low power	DC - 18 GHz	SMA	Latching	**RAD-DET-DPDT-001**
DPDT	Low power	Up to 31 GHz	SMA2.9	Latching	**RAD-DET-DPDT-001**
T-Switch	Low power	DC - 18 GHz	SMA	Sequential	**RAD-DET-TSSD-001**
T-Switch	Low power	Up to 31 GHz	SMA2.9	Sequential	**RAD-DET-TSSD-001**
T-Switch	Low power	DC - 18 GHz	SMA	Random	**RAD-DET-TSRD-001**
T-Switch	Low power	Up to 31 GHz	SMA2.9	Random	**RAD-DET-TSRD-001**
T-Switch	High power	Up to 8 GHz	TNC	Random	**RAD-DET-TSRD-001**
DP3T	Low power	DC - 18 GHz	SMA	Latching	
DP3T	High power	DC - 4.8 GHz	TNC	Latching	**RAD-DET-DP3T-002**

LOW POWER COAXIAL SPDT SWITCH

LOW-POWER LATCHING COAXIAL SPDT SWITCH according to RADIALL Specification RAD-DET-SPDT-001



- S switch configuration
- DC to 22 GHz with SMA connectors
- Up to 31 GHz with SMA 2.9 connectors
- Telemetry circuit
- D-Sub or solder pins
- Suppression diodes
- From 49 grams

RF PERFORMANCES

DC - 18 GHz

Frequency (GHz)	DC - 1.8	1.8 - 4.2	4.2 - 8.4	8.4 - 14.5	14.5 - 18
Insertion loss (max) (dB)	0.15		0.25	0.30	0.40
V.S.W.R (max)	1.10	1.20	1.25		1.40
Isolation (min) (dB)	70				60

Ka-band

Frequency (GHz)	17.5 - 21.5	27.5 - 31
Insertion loss (max) (dB)	0.40	0.50
V.S.W.R (max)	1.30	1.40
Isolation (min) (dB)	70	55

ELECTRICAL CHARACTERISTICS

	RAD-DET-SPDT-001 latching	RAD-DET-SPDT-003 latching
Actuator	latching	latching
Control signal voltage	22/ 26 / 29 VDC (Min / Nominal / Max)	22 / 26 / 29 VDC
Actuator current	361 mA max 29VDC / 25°	63 mA

MECHANICAL CHARACTERISTICS

Command and DC interface	9 Pin D-Sub connector or solder Pins
Life	100 000 cycles (200 000 actuations)
Switching time	20 ms max
Mass	From 49 grams

ENVIRONMENTAL CHARACTERISTICS

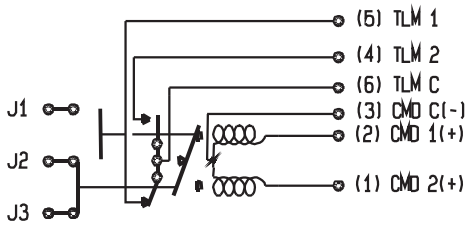
Operation temperature range	- 25°C / + 80°C
Non operating temperature range	- 35°C / 80°C
Vibration Sinus Random	5 - 100 Hz / 20g QM level 20 - 2000 Hz / 28.57 grms QM level / 19 grms FM level
Shocks	½ sinus / 1200g / 0.25 ms QM level
Pressure	Free space vacuum

For more technical information, consult us / E-mail : ***spaceproducts@radiall.com***

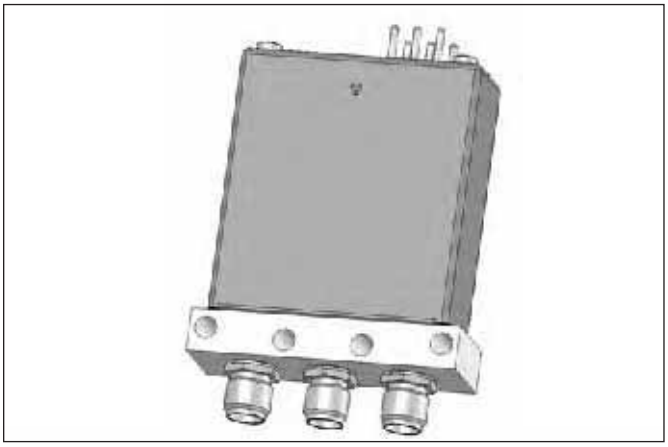
LOW POWER COAXIAL SPDT SWITCH

SCHEMATICS & DRAWINGS given for examples

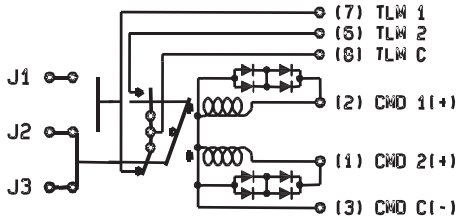
SPDT, RF body fixing, pins



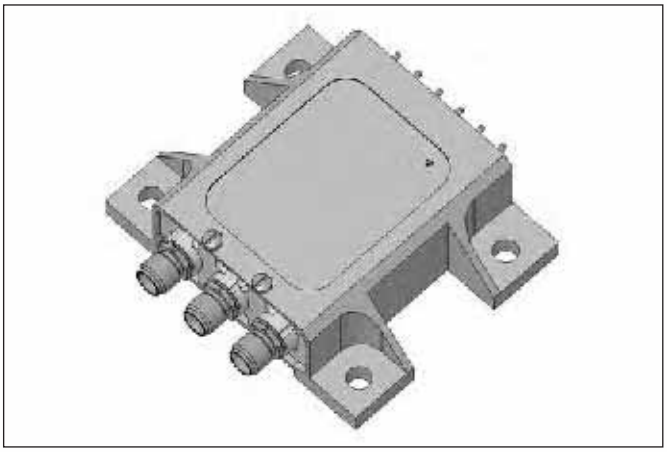
Position 1 : J1-J2
Position 2 : J2-J3



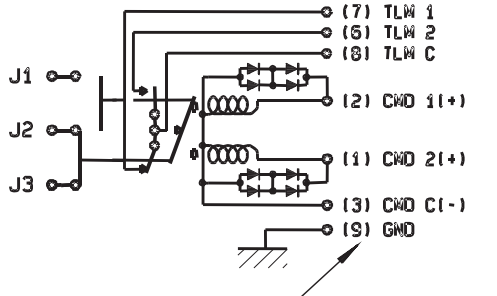
SPDT, lay down, pins



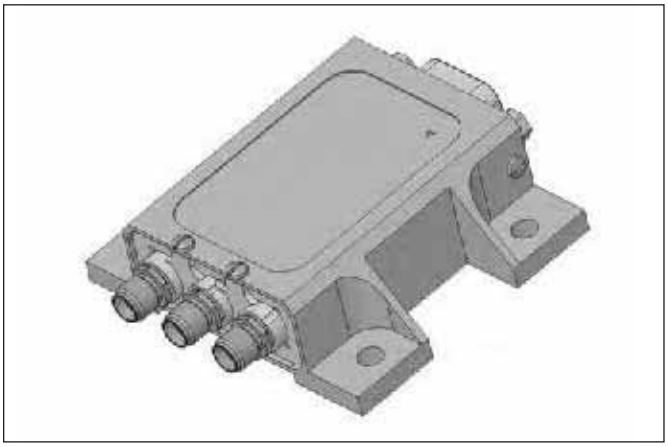
Position 1 : J1-J2
Position 2 : J2-J3



SPDT, lay down, pins



Position 1 : J1-J2
Position 2 : J2-J3

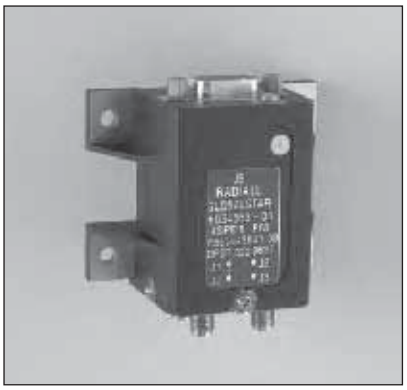


For more technical information, consult us / E-mail : ***spaceproducts@radiall.com***

LOW POWER COAXIAL DPDT SWITCH

LOW-POWER LATCHING COAXIAL DPDT SWITCH according to RADIALL Specification RAD-DET-DPDT-006

- C switch configuration
- DC to 22 GHz with SMA connectors
- Up to 31 GHz with SMA 2.9 connectors
- Telemetry circuit
- D-Sub or solder pins
- Suppression diodes
- From 55 grams



RF PERFORMANCES

DC - 18 GHz

Frequency (GHz)	DC - 1.8	1.8 - 4.2	4.2 - 8.4	8.4 - 14.5	14.5 - 18
Insertion loss (max) (dB)	0.15		0.25	0.30	0.40
V.S.W.R (max)	1.10	1.20	1.25		1.40
Isolation (min) (dB)	70				60

Ka-band

Frequency (GHz)	17.5 - 21.5	27.5 - 31
Insertion loss (max) (dB)	0.40	0.50
V.S.W.R (max)	1.30	1.40
Isolation (min) (dB)	70	55

ELECTRICAL CHARACTERISTICS

Actuator	Latching
Control signal voltage	22 / 26 / 29 VDC (Min / Nominal / Max)
Actuator current	63 mA max @ 29VDC / 25°C 361 mA max @ 29VDC / 25°C for Ka-band models

MECHANICAL CHARACTERISTICS

Command and DC interface	9 Pin D-Sub connector or solder Pins
Life	100 000 cycles (200 000 actuations)
Switching time	20 ms max
Mass	From 55 grams

ENVIRONMENTAL CHARACTERISTICS

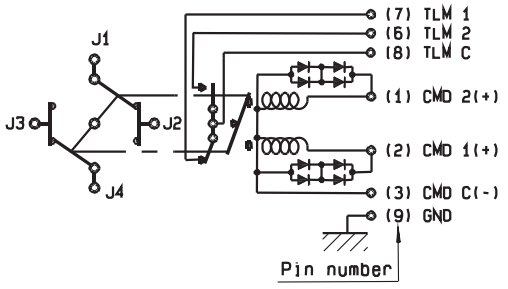
Operation temperature range	- 25°C / + 80°C
Non operating temperature range	- 35°C / 80°C
Vibration Sinus Random	5 - 100 Hz / 20g QM level 20 - 2000 Hz / 28.57 grms QM level / 19 grms FM level
Shocks	½ sinus / 1200g / 0.25 ms QM level
Pressure	Free space vacuum

For more technical information, consult us / E-mail : ***spaceproducts@radiall.com***

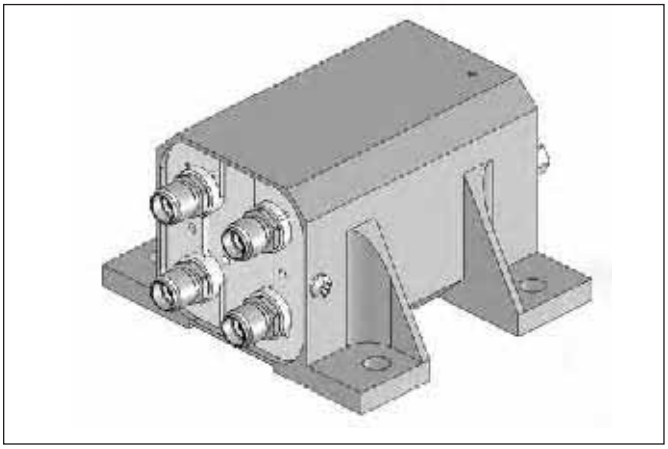
LOW POWER COAXIAL DPDT SWITCH

SCHEMATICS & DRAWINGS given for examples

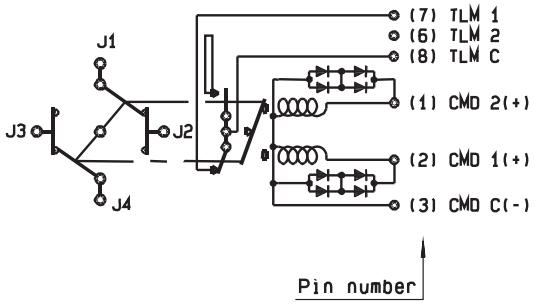
C-Switch, Lay-down, D-Sub



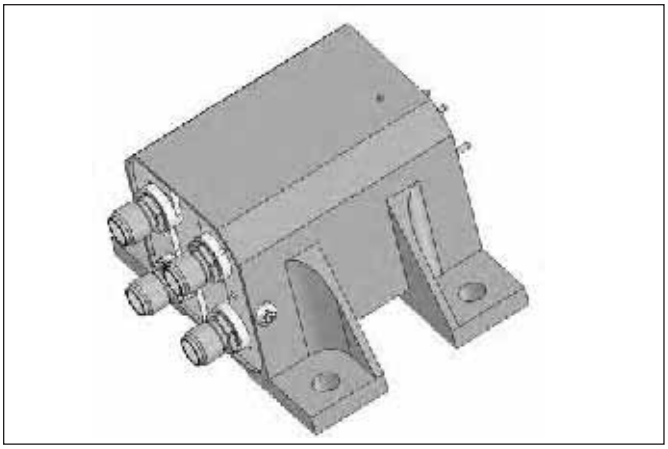
Pos.1: J1-J2 & J3-J4
Pos.2: J1-J3 & J2-J4



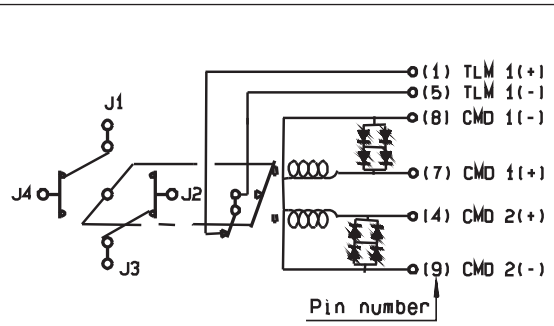
C-Switch, Lay-down, D-Sub



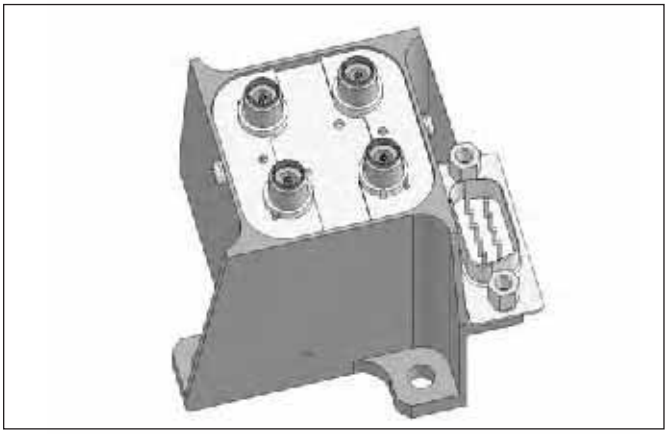
Pos.1: J1-J2 & J3-J4
Pos.2: J1-J3 & J2-J4



C-Switch, Stand-up, D-Sub



Pos.1: J1-J4 & J2-J3
Pos.2: J1-J2 & J3-J4



LOW POWER COAXIAL T SWITCH

LOW-POWER LATCHING COAXIAL T SWITCH
according to RADIALL Specification : RAD-DET-TSSD-002 & RAD-DET-TSRD-003

- Random or Sequential drive
- DC to 22 GHz with SMA connectors
- Up to 31 GHz with SMA 2.9 connectors
- Telemetry circuit
- D-Sub or solder pins
- Suppression diodes
- From 58 grams

RF PERFORMANCES

DC - 18 GHz

Frequency (GHz)	DC - 1.8	1.8 - 4.2	4.2 - 8.4	8.4 - 14.5	14.5 - 18
Insertion loss (max) (dB)	0.17	0.20	0.25	0.35	0.50
V.S.W.R (max)	1.10	1.20	1.25	1.30	1.60
Isolation (min) (dB)	70				60

Ka-band

Frequency (GHz)	17.5 - 21.5	27.5 - 31
Insertion loss (max) (dB)	0.40	0.50
V.S.W.R (max)	1.30	1.40
Isolation (min) (dB)	70	55

ELECTRICAL CHARACTERISTICS

Actuator	Sequential drive	Random drive
Application specification	RAD-DET-TSSD-002	RAD-DET-TSRD-003
Control signal voltage	22 / 26 / 29 VDC (Min / Nominal / Max)	22 / 26 / 29 VDC (Min / Nominal / Max)
Actuator current	416 mA max @ 29VDC / 25°C	373 mA max @ 29VDC / 25°C

MECHANICAL CHARACTERISTICS

Command and DC interface	9 Pin D-Sub connector or solder Pins
Life	100 000 cycles (200 000 actuations)
Switching time	20 ms max
Mass	From 58 grams

ENVIRONMENTAL CHARACTERISTICS

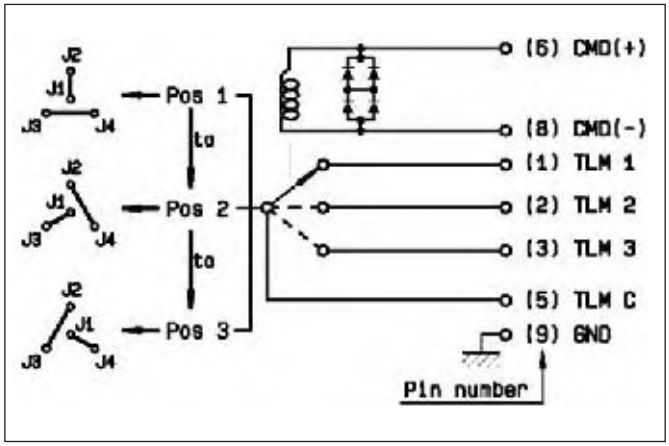
Operation temperature range	- 25°C / + 80°C
Non operating temperature range	- 35°C / 80°C
Vibration Sinus Random	5 - 100 Hz / 20g QM level 20 - 2000 Hz / 28.57 grms QM level / 19 grms FM level
Shocks	½ sinus / 1200g / 0.25 ms QM level
Pressure	Free space vacuum

For more technical information, consult us / E-mail : ***spaceproducts@radiall.com***

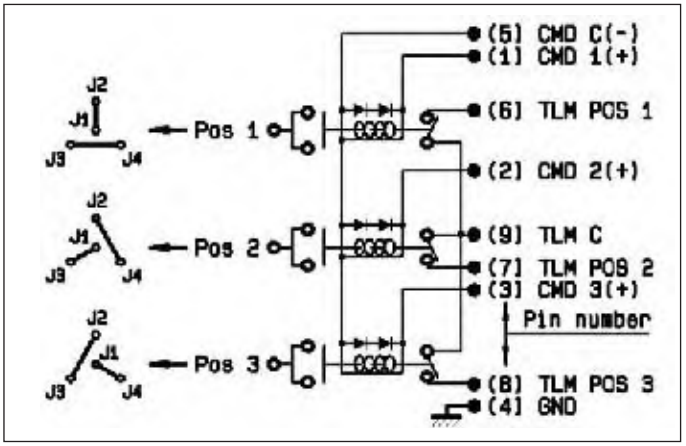
LOW POWER COAXIAL T SWITCH

SCHEMATICS & DRAWINGS given for examples

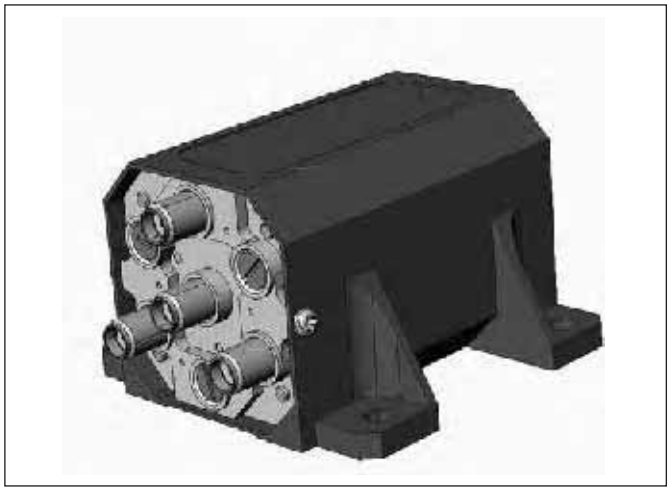
Sequential Drive



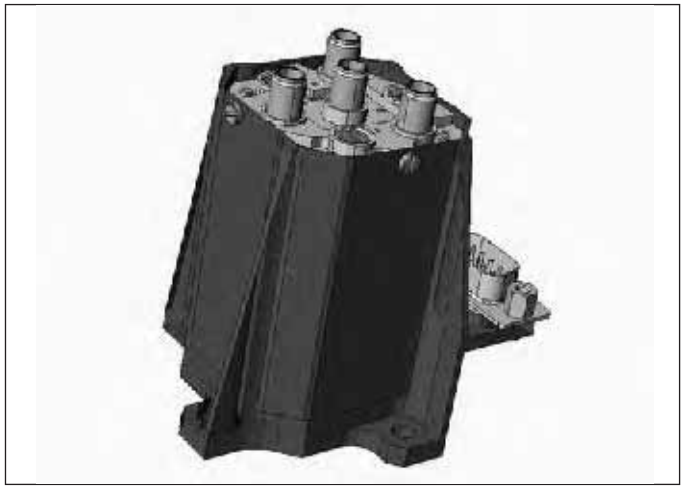
Random Drive



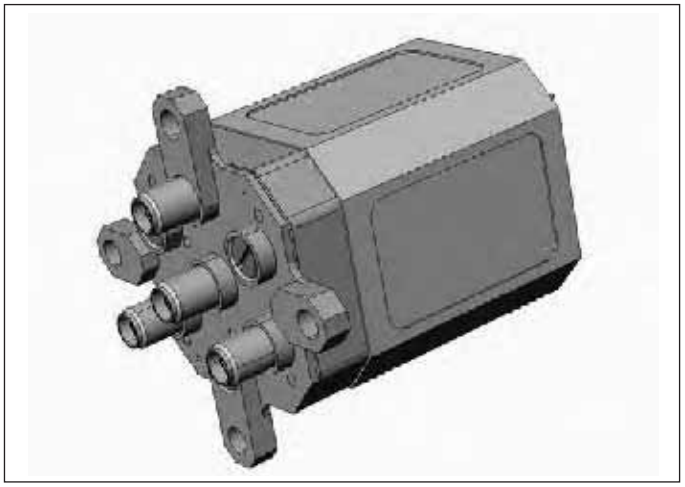
T-Switch, Lay-down, D-Sub



T-Switch, Stand-up D-Sub



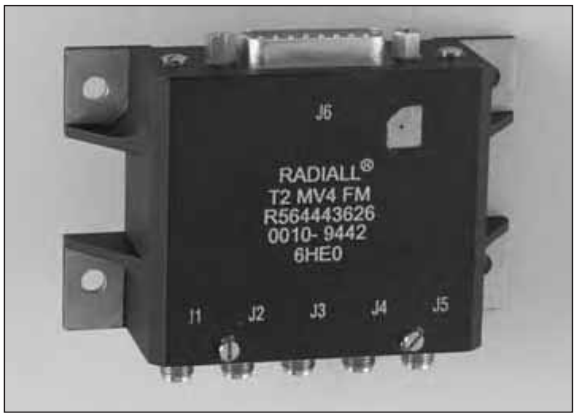
T-Switch, Fixing Plate Pins



LOW POWER COAXIAL DP3T SWITCH

LOW-POWER LATCHING COAXIAL DP3T SWITCH

- DC to 18 GHz with SMA connectors
- Telemetry circuit
- D-Sub
- Suppression diodes
- From 125 grams



RF PERFORMANCES

DC - 18 GHz

Frequancy (GHz)	1.0 - 4.2	5.5 - 8.8	10.5 - 13	13 - 18
Insertion loss (max) (dB)	0.12	0.20	0.25	0.40
V.S.W.R. (max)	1.12	1.20	1.22	1.33
Isolation (min) (dB)	70	65	60	

ELECTRICAL CHARACTERISTICS

Actuator	Latching
Control signal voltage	24 / 26 / 32 VDC (Min / Nominal / Max)
Actuator current	92 mA max @29VDC / 25°C 143 mA max @32VDC / -30°C

MECHANICAL CHARACTERISTICS

Command and DC interface	9 Pin D-Sub connector or solder Pins
Life	100 000 cycles (200 000 actuations)
Switching time	35 ms max
Mass	From 265 grams

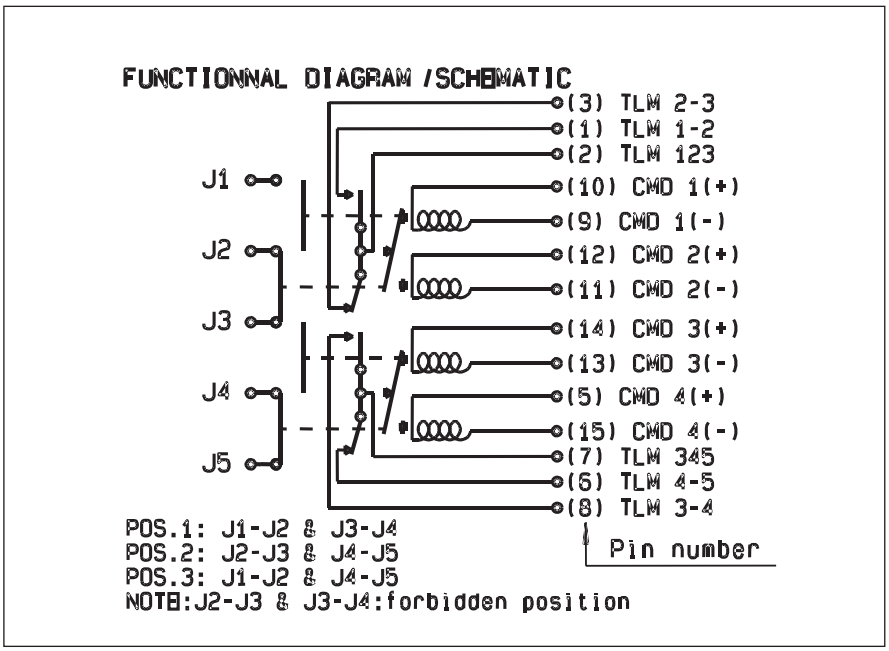
ENVIRONMENTAL CHARACTERISTICS

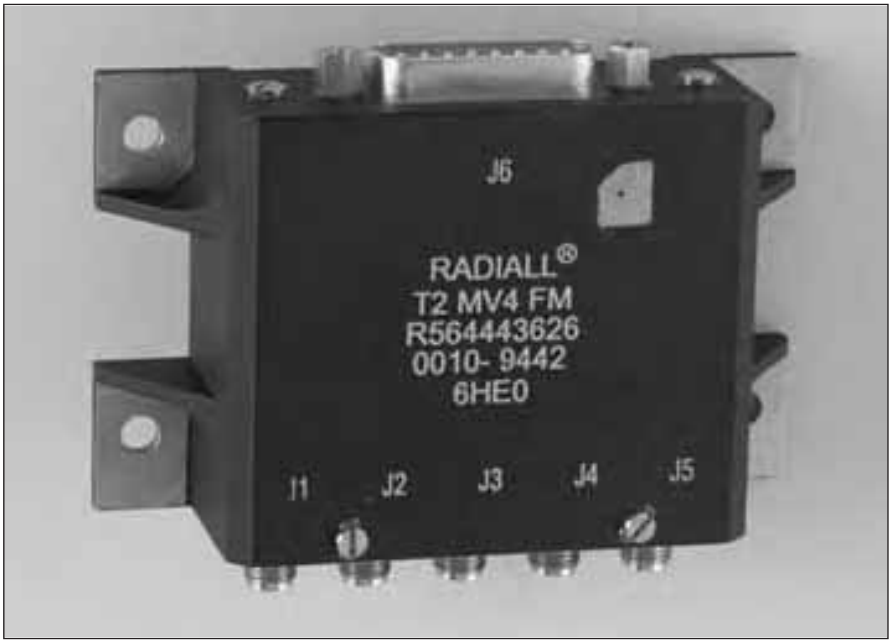
Operation temperature range	- 25°C / + 80°C
Non operating temperature range	- 35°C / 80°C
Vibration Sinus Random	5 - 100 Hz / 20g QM level 20 - 2000 Hz / 27 grms QM level / 18 grms FM level
Shocks	½ sinus / 1200g / 0.25 ms QM level
Pressure	Free space vacuum

For more technical information, consult us / E-mail : ***spaceproducts@radiall.com***

LOW POWER COAXIAL DP3T SWITCH

SCHEMATICS & DRAWINGS given for examples





HIGH POWER COAXIAL SPDT SWITCH

HIGH-POWER LATCHING COAXIAL SPDT SWITCH according to RADIALL Specification RAD-DET-SPDT-002

- S switch configuration
- TNC connectors
- Up to 2.2 GHz, up to 190 Watts CW
- Up to 4.8 GHz, up to 102 Watts CW
- Telemetry circuit
- D-Sub
- Suppression diodes

RF PERFORMANCES

DC - 2.2 GHz Variant 001

Frequency (GHz)	0.04 - 1	1 - 1.6	1. 6 - 2.2
Insertion Loss (max) (dB)	0.12		
V.S.W.R. (max)	1.2		
Isolation (min) (dB)	70		
Power handing multipactor free (6 dB margin)	40 Watts @ 1 GHz	100 Watts @ 1.6 GHz	190 Watts @ 2.2 GHz

DC - 4.8 GHz Variant 002

Frequency (GHz)	0.04 - 1	1 - 1.6	1.6 - 2.2	2.2 - 4.8
Insertion Loss (max) (dB)	0.12			0.22
V.S.W.R. (max)	1.2			1.38
Isolation (min) (dB)	70			60
Power Handling multipactor free (6 dB margin)	5 Watts @ 1 GHz	29 Watts @ 1.6 GHz	55 Watts @ 2.2 GHz	102 Watts @ 3 GHz

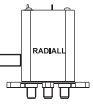
ELECTRICAL CHARACTERISTICS

Actuator	Latching
Control signal voltage	20 / 26 / 30 VDC (Min / Nominal / Max)
Actuator current	198 mA max @30VDC / 25°C

MECHANICAL CHARACTERISTICS

Command and DC interface	9 Pin D-Sub connector or solder Pins
Life	100 000 cycles (200 000 actuations)
Switching time	35 ms max
Mass	From 265 grams

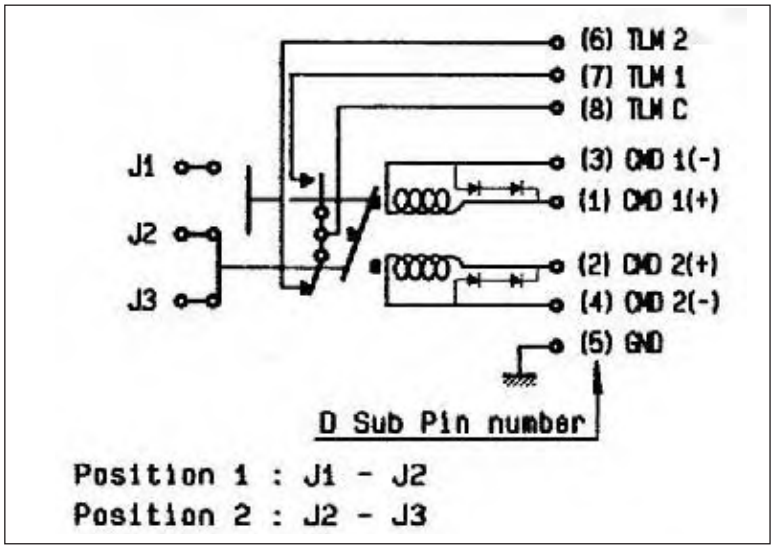
HIGH POWER COAXIAL SPDT SWITCH



ENVIRONMENTAL CHARACTERISTICS

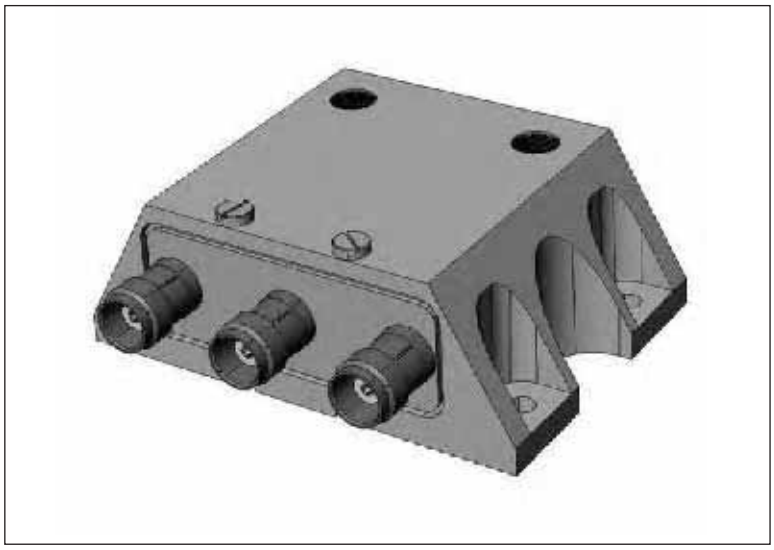
Operation temperature range	- 25°C / + 80°C
Non operating temperature range	- 35°C / 80°C
Vibration Sinus **Random**	5 - 100 Hz / 20g QM level 20 - 2000 Hz / 27 grms QM level / 18 grms FM level
Shocks	½ sinus / 1200g / 0.25 ms QM level
Pressure	Free space vacuum

SCHEMATICS given for examples



DRAWING

SPDT Switch, lay Down D-Sub - variant 001 & 002

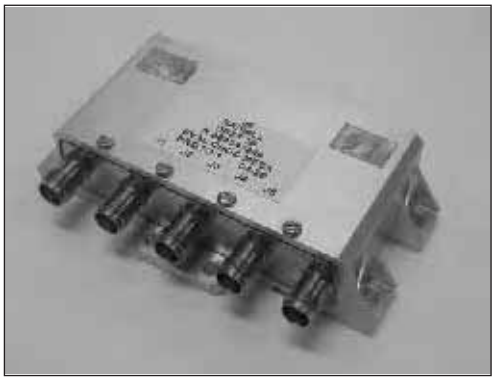


For more technical information, consult us / E-mail : ***spaceproducts@radiall.com***

HIGH POWER COAXIAL DP3T SWITCH

HIGH-POWER LATCHING COAXIAL DP3T SWITCH according to RADIALL Specification RAD-DET-DP3T-002

- TNC connectors
- DC to 2.2 GHz, up to 160 Watts CW
- DC to 4.8 GHz, up to 102 Watts CW
- Telemetry circuit
- D-Sub
- Suppression diodes



RF PERFORMANCES

DC - 2.2 GHz Variant 001

Frequency (GHz)	0.04 - 1	1 - 1.6	1. 6 - 2.2
Insertion Loss (max) (dB)	0.12		
V.S.W.R. (max)	1.2		
Isolation (min) (dB)	70		
Power handing multipactor free (6 dB margin)	33 Watts @ 1 GHz	85 Watts @ 1.6 GHz	160 Watts @ 2.2 GHz

DC - 4.8 GHz Variant 002

Frequency (GHz)	0.04 - 1	1 - 1.6	1.6 - 2.2	2.2 - 4.8
Insertion Loss (max) (dB)	0.12			0.22
V.S.W.R. (max)	1.2			1.38
Isolation (min) (dB)	70			60
Power Handling multipactor free (6 dB margin)	5 Watts @ 1 GHz	29 Watts @ 1.6 GHz	55 Watts @ 2.2 GHz	102 Watts @ 3 GHz

ELECTRICALCHARACTERISTICS

Actuator	Latching
Control signal voltage	20 / 26 / 30 VDC (Min / Nominal / Max)
Actuator current	198 mA max @30VDC / 25°C

MECHANICAL CHARACTERISTICS

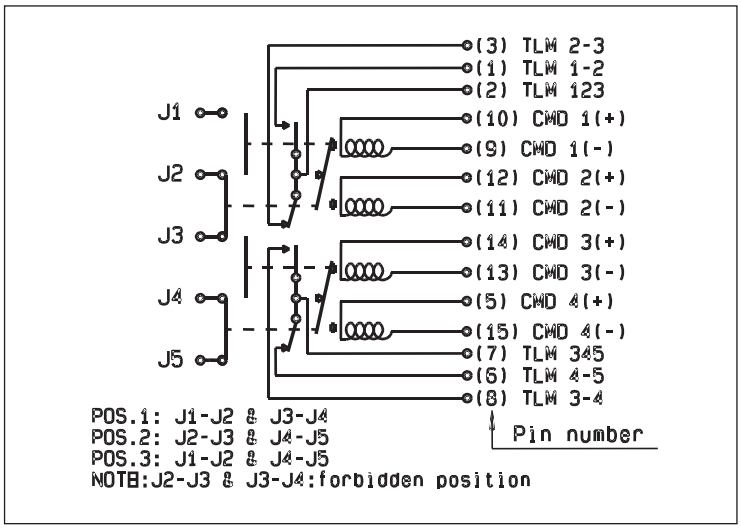
Command and DC interface	9 Pin D-Sub connector or solder Pins
Life	100 000 cycles (200 000 actuations)
Switching time	35 ms max
Mass	From 390 grams

HIGH POWER COAXIAL DP3T SWITCH

ENVIRONMENTAL CHARACTERISTICS

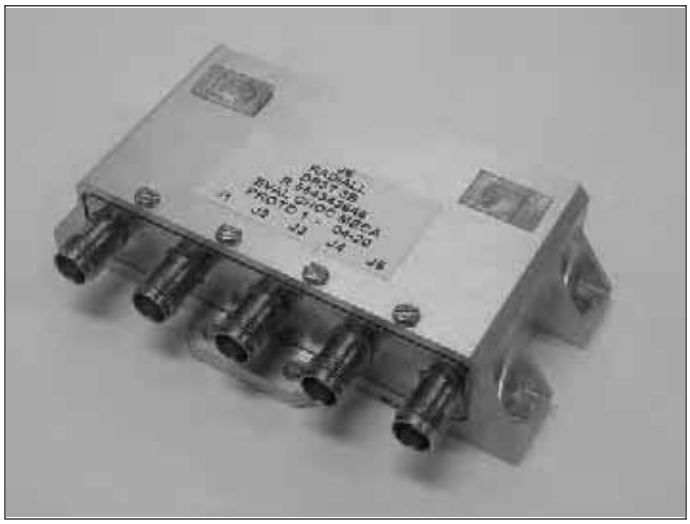
Operation temperature range	- 25°C / + 80°C
Non operating temperature range	- 35°C / 80°C
Vibration Sinus **Random**	5 - 100 Hz / 20g QM level 20 - 2000 Hz / 27 grms QM level / 18 grms FM level
Shocks	½ sinus / 1200g / 0.25 ms QM level
Pressure	Free space vacuum

SCHEMATICS given for example



DRAWING

DP3T Switch, lay Down D-Sub - variant 001 & 002



For more technical information, consult us / E-mail : ***spaceproducts@radiall.com***

HIGH POWER COAXIAL T SWITCH

HIGH-POWER LATCHING COAXIAL SWITCH according to RADIALL Specification : RAD-DET-TSRD-002

TNC connectors

- DC to 8 GHz
- Up to 120 Watts CW @ 4 GHz
- Random Drive
- Telemetry circuit
- D-Sub or solder pins
- Suppression diodes
- Stand-up or Lay down mounting
- From 340 grams

RF PERFORMANCES

DC - 2.2 GHz Variant 001

Frequency (GHz)	DC - 2	2 - 4.8	4.8 - 6	6 - 8
Insertion Loss (max) (dB)	0.17	0.20	0.30	0.40
V.S.W.R. (min) (dB)	1.10	1.25	1.35	1.50
Isolation (min) (dB)	70			
Power Handling multipactor free (6 dB margin)	48 Watts @ 2 GHz	120 Watts @ 4 GHz	110 Watts @ 6 GHz	95 Watts @ 8 GHz

ELECTRICAL CHARACTERISTICS

Actuator	Latching
Control signal voltage	20 / 26 / 29 VDC (Min / Nominal / Max)
Actuator current	490 mA max @ 29VDC / 25°C

MECHANICAL CHARACTERISTICS

Command and DC interface	9 Pin D-Sub connector or solder Pins
Life	100 000 cycles (300 000 actuations)
Switching time	35 ms max
Mass	From 340 grams

ENVIRONMENTAL CHARACTERISTICS

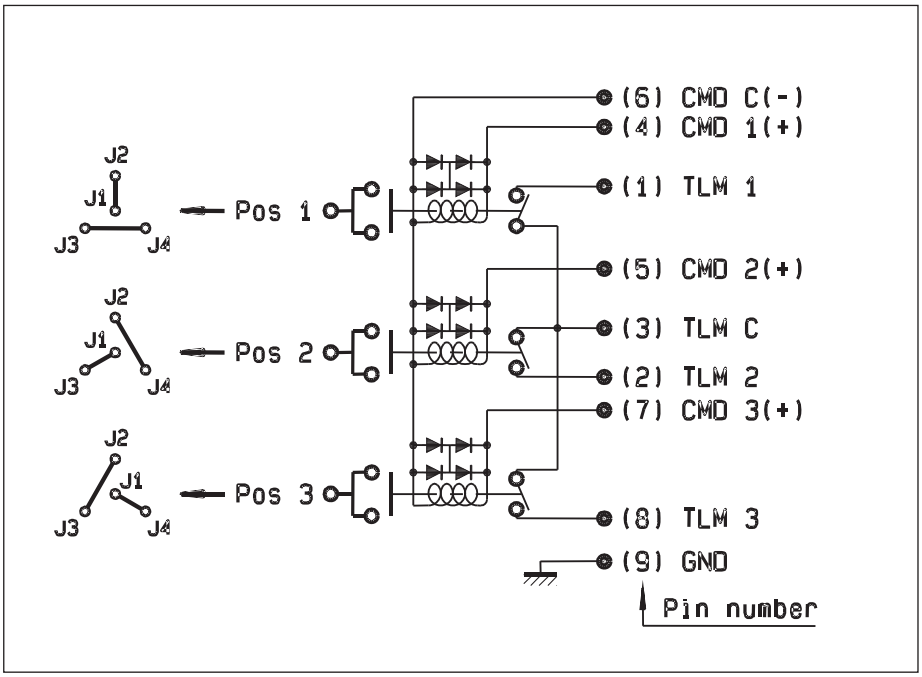
Operation temperature range	- 25°C / + 80°C
Non operating temperature range	- 35°C / 80°C
Vibration	
Sinus	5 - 100 Hz / 20g QM level
Random	20 - 2000 Hz / 27 grms QM level / 18 grms FM level
Shocks	½ sinus / 1200g / 0.25 ms QM level
Pressure	Free space vacuum

For more technical information, consult us / E-mail : ***spaceproducts@radiall.com***

HIGH POWER COAXIAL T SWITCH

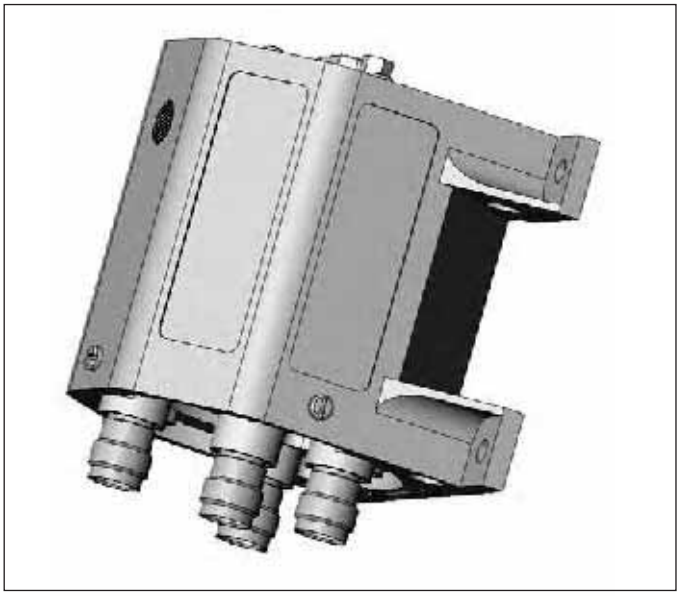
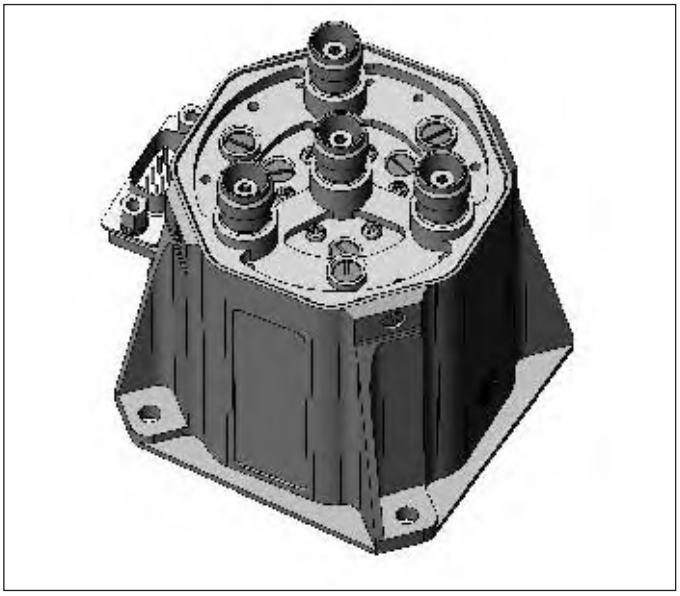
SCHEMATIC given for examples

T-Switch, TNC, D-Sub - variant 001 & 002



DRAWING

T Switch, Lay down D-Sub - variant 001



T-Switch, Stand-up, D-Sub - variant 002