

SECTION 6



Low Pim



Contents

RAMSES Series

SPDT up to 18 GHz: R570xxxxxLP Series6-2 to 6-6
 DPDT up to 18 GHz: R577xxxxxLP Series6-7 to 6-11
 SPnT up to 18 GHz: R573xxxxxLP Series.....6-12 to 6-16

LOW PIM PART NUMBER SELECTION GUIDE*

Digital Position		R 1-3:	4: RF connectors		5: Type			6: Voltage		7: TTL Option/Position			8: Options			9: Terminals		LP10-11:	
Series	Configuration		N 12.4 GHz	SMA 18GHz	Failsafe*	Latching*	Normally open*	12V	28V	Without TTL driver	With TTL driver	Number of positions	Without option	Positive common	Suppression diodes	Positive common and suppression diodes	Solder pins	D-Sub connector	Low Pim
RAMSES	SPDT	R570	1	4	1/2	3/4/5/6	-	2	3	0	1	-	0	1	3	4	0	5	LP
	DPDT	R577	1	4	1/2	3/4/5/6	-	2	3	0	1	-	0	1	3	4	0	5	LP
	SPnT	R573	1	4	-	2/3	0/1	2	3	-	-	4/6	0	1	3	4	0	5	LP

Example of P/N: R573423600LP is a SP6T SMA 18 GHz, latching, 28 Vdc, without option, solder pins.

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

SPDT Low PIM up to 18 GHz



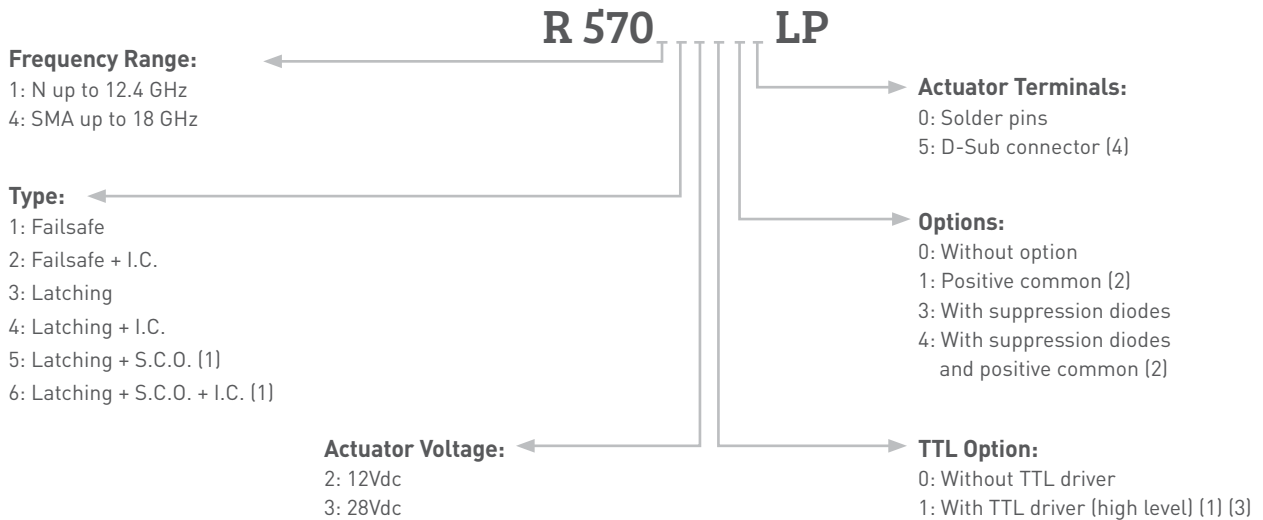
To meet growing market demands created by the deployment of 4G/LTE networks, Radiall has introduced a new range of Low PIM switches. RAMSES SPDT Low PIM switches are perfectly suited for RF test systems and test benches requiring excellent passive intermodulation performance up to 18 GHz, with a guarantee PIM performance of -160 dBc @ +43 dBm over a life span of 2 million switching cycles.

These products are specific to instrumentation and telecommunication applications.

Example of P/N:

R570413030LP is a SPDT SMA 18 GHz, failsafe, 28 Vdc, with suppression diodes, solder pins.

PART NUMBER SELECTION



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

(1): Suppression diodes are already included in Self Cut-OFF & TTL option

(2): Positive common shall be specified only with type 2, 3, 5 & 6 because failsafe models can be used with both polarities

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

(4): Available only for N models

SPDT Low PIM up to 18 GHz

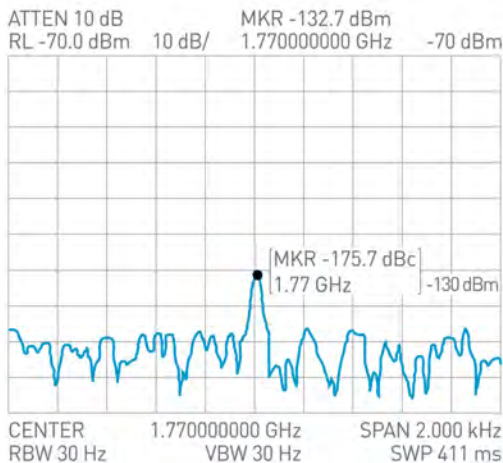
GENERAL SPECIFICATIONS

Operating mode		Failsafe		Latching	
Nominal operating voltage (across operating temperature)	Vdc	12 (10.2 to 13)	28 (24 to 30)	12 (10.2 to 13)	28 (24 to 30)
Coil resistance at 23°C (+/-10%)	Ω	47.5	275	58	350
Operating current at 23°C	mA	250	102	210	80
Average power		See Power Rating Chart on page 1-13			
TTL input	High Level	2.2 to 5.5 Volts		800µA max 5.5 Volts	
	Low Level	0 to 0.8 Volts		20µA max 5.5 Volts	
Indicator rating		1 W / 30 V / 100 mA			
Switching time		ms			
Life (Min)		2 million cycles			
Connectors		SMA - N			
Operating temperature range		-40°C to +85°C			
Storage temperature range		-55°C to +85°C			
Vibration (MIL STD 202, method 204D, cond.D)		10-2000 Hz, 20g		operating	
Shock (MIL STD 202, method 213B, cond.C)		100g / 6 ms, ½ sine		operating	

RF PERFORMANCES

Connectors	Frequency range GHz	V.S.W.R. (max)	Insertion loss (max) dB	Isolation (min) dB	Impedance Ω	Third order intermodulation
N	DC - 12.4	DC - 1	1.15	0.15	85	-160 dBc @ +43 dBm (2 carriers 20W)
		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	
SMA	DC - 8	DC - 3	1.10	0.15	80	
		3 - 8	1.20	0.20	75	
		8 - 12.4	1.20	0.25	65	
		12.4 - 18	1.40	0.35	60	

OUTSTANDING PIM PERFORMANCE



Passive Intermodulation

Tone 1	1810 MHz, approximately 43 dBm
Tone 2	1850 MHz, approximately 43 dBm
3rd order PIM	160 dBc at 1770 MHz

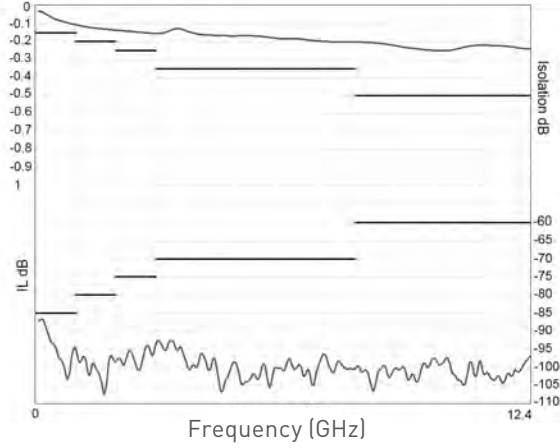
Depending on application, carrier powers and frequencies, PIM measurements can vary. PIM testing is not measured during product acceptance test.

SPDT Low PIM up to 18 GHz

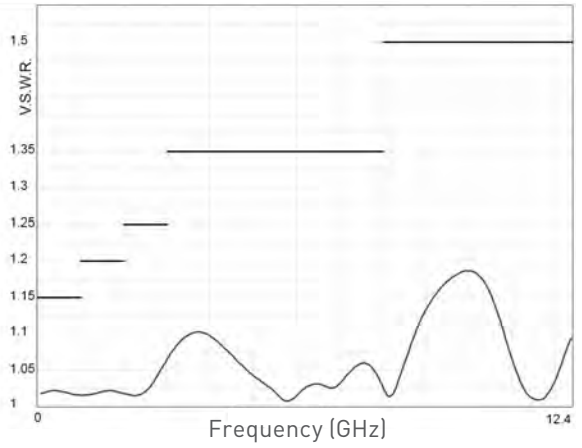
TYPICAL RF PERFORMANCES

Example: SPDT N up to 12.4 GHz

Insertion Loss and Isolation

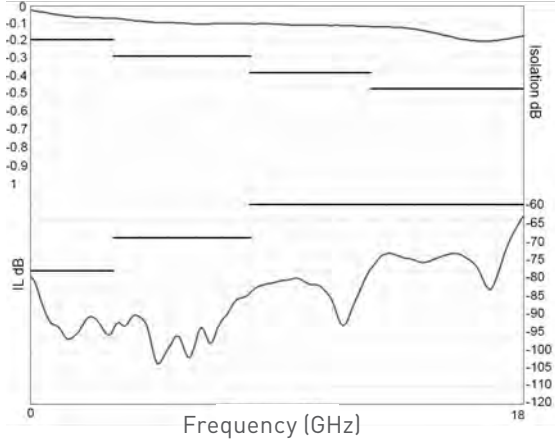


V.S.W.R.

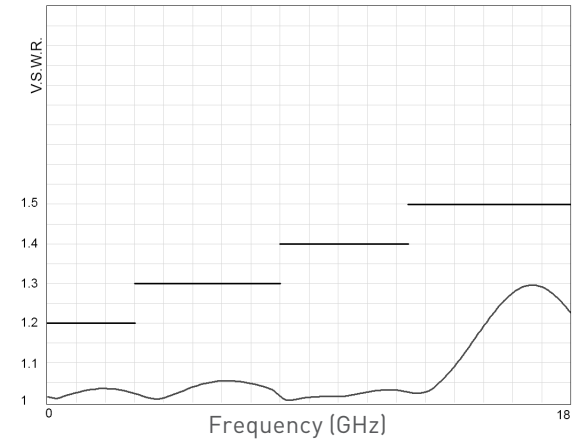


Example: SPDT SMA up to 18 GHz

Insertion Loss and Isolation



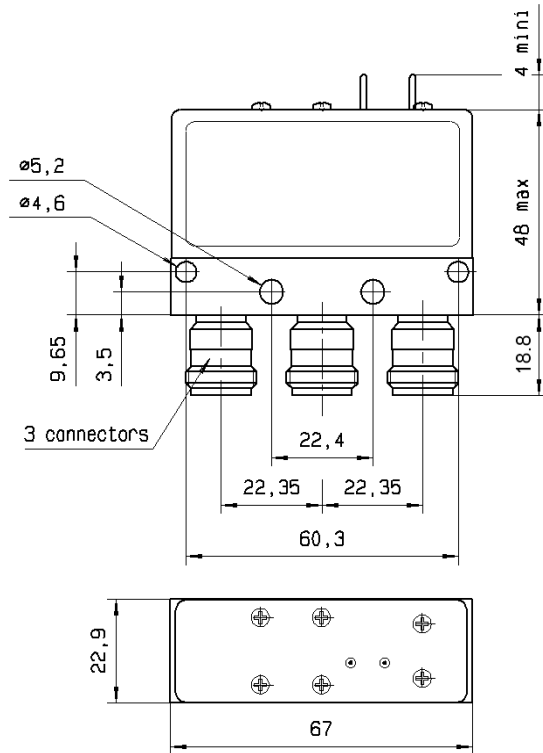
V.S.W.R.



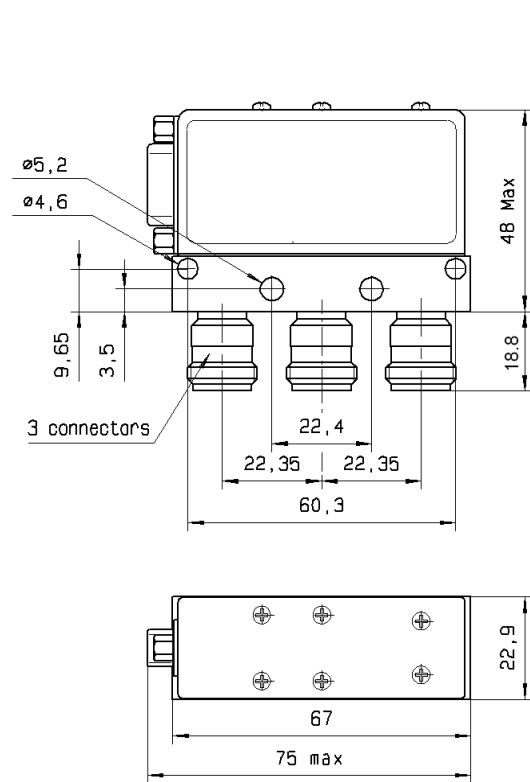
SPDT Low PIM up to 18 GHz

TYPICAL OUTLINE DRAWING

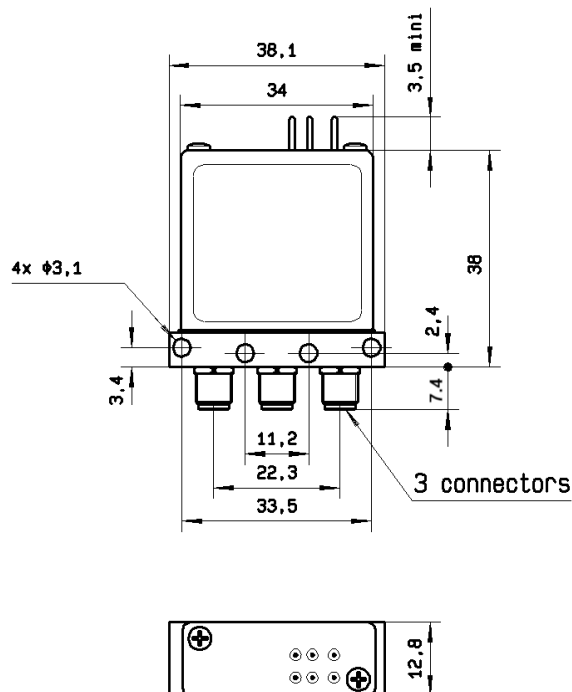
Example: SPDT N up to 12.4 GHz with pins



Example: SPDT N up to 12.4 GHz with D-sub



Example: SPDT SMA up to 18 GHz



LOW PIM

DPDT Low PIM up to 18 GHz



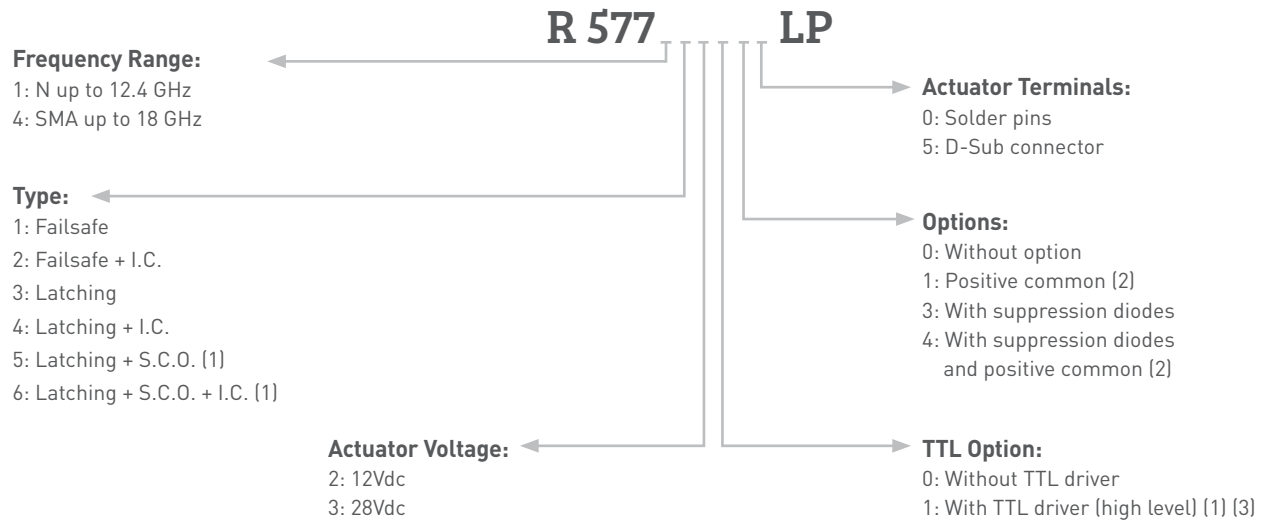
To meet growing market demands created by the deployment of 4G/LTE networks, Radiall has introduced a new range of Low PIM switches. RAMSES DPDT Low PIM switches are perfectly suited for RF test systems and test benches requiring excellent passive intermodulation performance up to 18 GHz, with a guarantee PIM performance of -160 dBc @ +43 dBm over a life span of 2 million switching cycles.

These products are specific to instrumentation and telecommunication applications.

Example of P/N:

R577163105 is a DPDT N 12.4 GHz latching with Indicators, Self Cut-Off, 28 Vdc, TTL driver, D-Sub connector.

PART NUMBER SELECTION



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

(1): Suppression diodes are already included in Self Cut-OFF & TTL option

(2): Positive common shall be specified only with type 2, 3, 5 & 6 because failsafe models can be used with both polarities

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

DPDT Low PIM up to 18 GHz

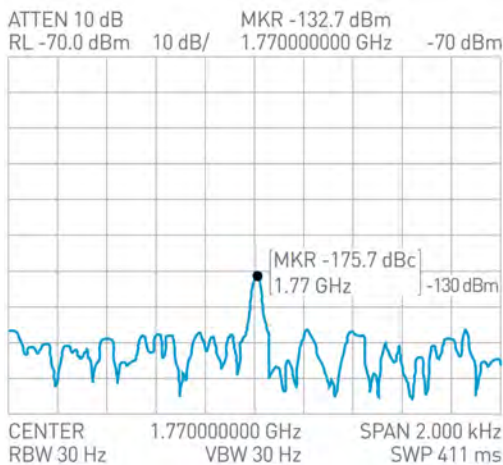
GENERAL SPECIFICATIONS

Operating mode		Normally open		Latching	
Nominal operating voltage (across operating temperature)	Vdc	12 (10.2 to 13)	28 (24 to 30)	12 (10.2 to 13)	28 (24 to 30)
Coil resistance at 23°C (+/-10%)	Ω	35	200	38	225
Nominal operating current at 23°C	mA	340	140	320	125
Average power		See Power Rating Chart on page 1-13			
TTL input	High Level	2.2 to 5.5 Volts		800µA max 5.5 Volts	
	Low Level	0 to 0.8 Volts		20µA max 0.8 Volts	
Switching time (Max)	ms	15			
Life (Min)		2 million cycles			
Connectors		SMA - N			
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)		50g / 11 ms, ½ sine		operating	

RF PERFORMANCES

Connectors	Frequency range GHz	V.S.W.R. (max)	Insertion loss (max) dB	Isolation (min) dB	Impedance Ω	Third order intermodulation
N	DC - 3 DC - 12.4	DC - 1	1.15	0.15	85	-160 dBc @ +43 dBm (2 carriers 20W)
		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	
SMA	DC - 3 DC - 18	DC - 3	1.20	0.20	80	
		3 - 8	1.30	0.30	70	
		8 - 12.4	1.40	0.40	65	
		12.4 - 18	1.50	0.50	60	

OUTSTANDING PIM PERFORMANCE



Passive Intermodulation

Tone 1	1810 MHz, approximately 43 dBm
Tone 2	1850 MHz, approximately 43 dBm
3rd order PIM	160 dBc at 1770 MHz

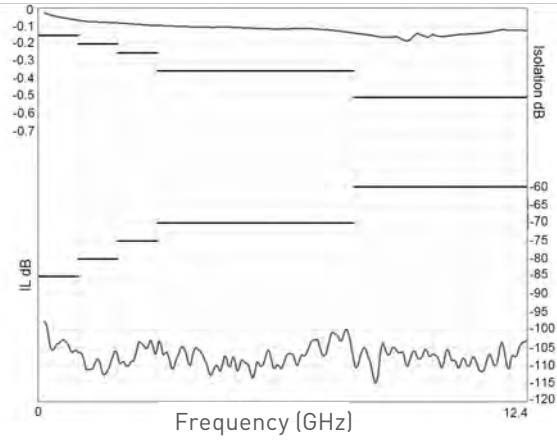
Depending on application, carrier powers and frequencies, PIM measurements can vary. PIM testing is not measured during product acceptance test.

DPDT Low PIM up to 18 GHz

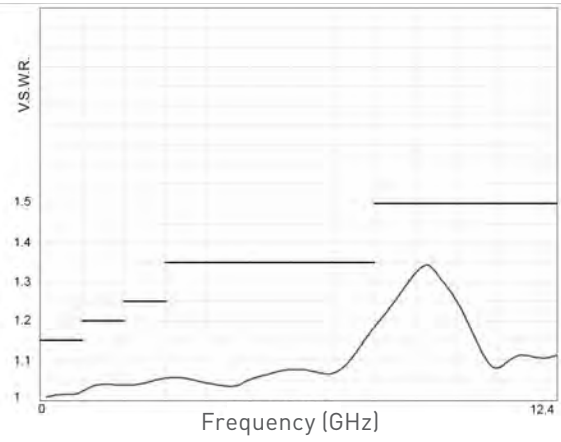
TYPICAL RF PERFORMANCES

Example: DPDT N up to 12.4 GHz

Insertion Loss and Isolation

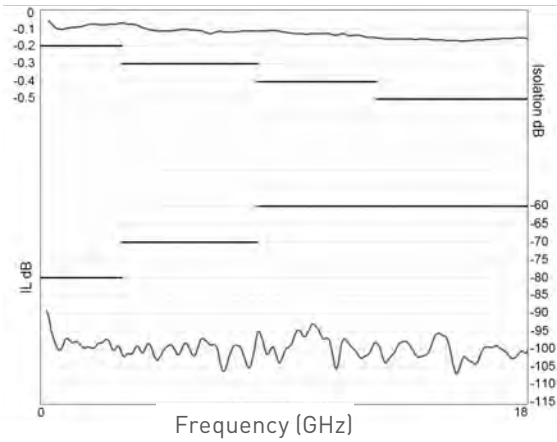


V.S.W.R.

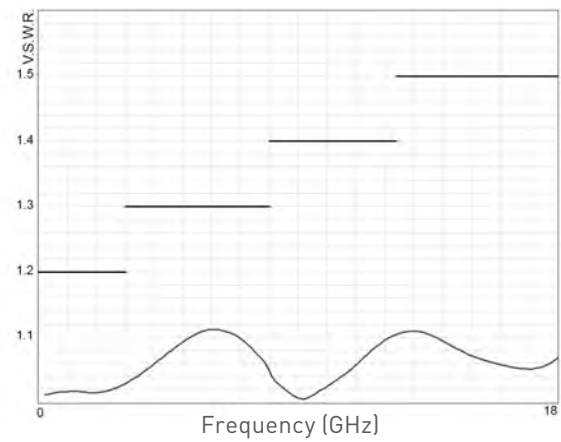


Example: DPDT N up to 18 GHz

Insertion Loss and Isolation



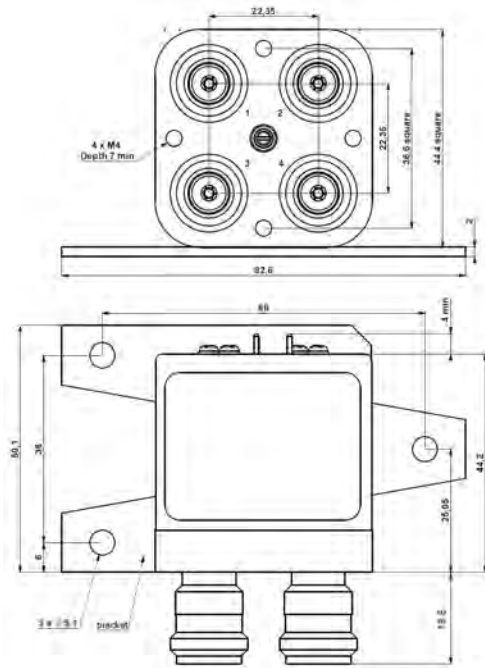
V.S.W.R.



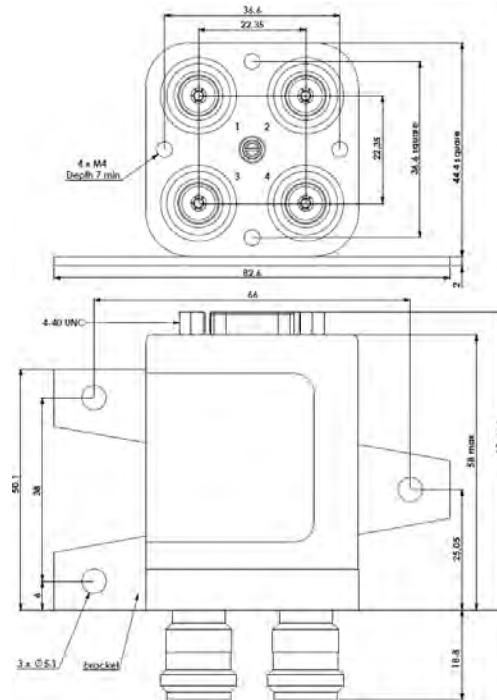
DPDT Low PIM up to 18 GHz

TYPICAL OUTLINE DRAWING

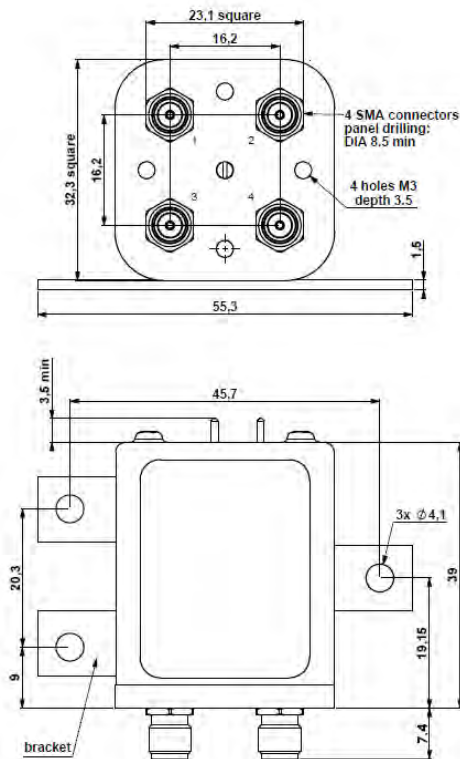
Example: DPDT N up to 12.4 GHz with pins



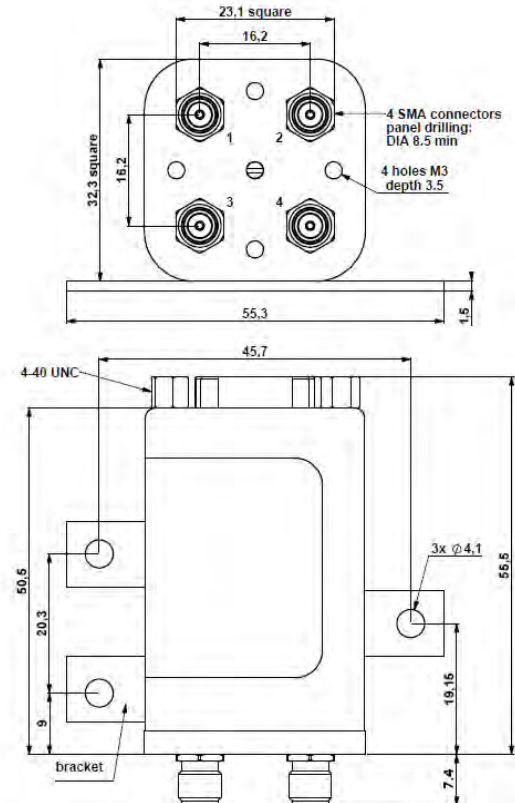
Example: DPDT N up to 12.4 GHz with D-sub



Example: DPDT SMA up to 18 GHz with pins



Example: DPDT SMA up to 18 GHz with pins



SPnT Low PIM up to 18 GHz

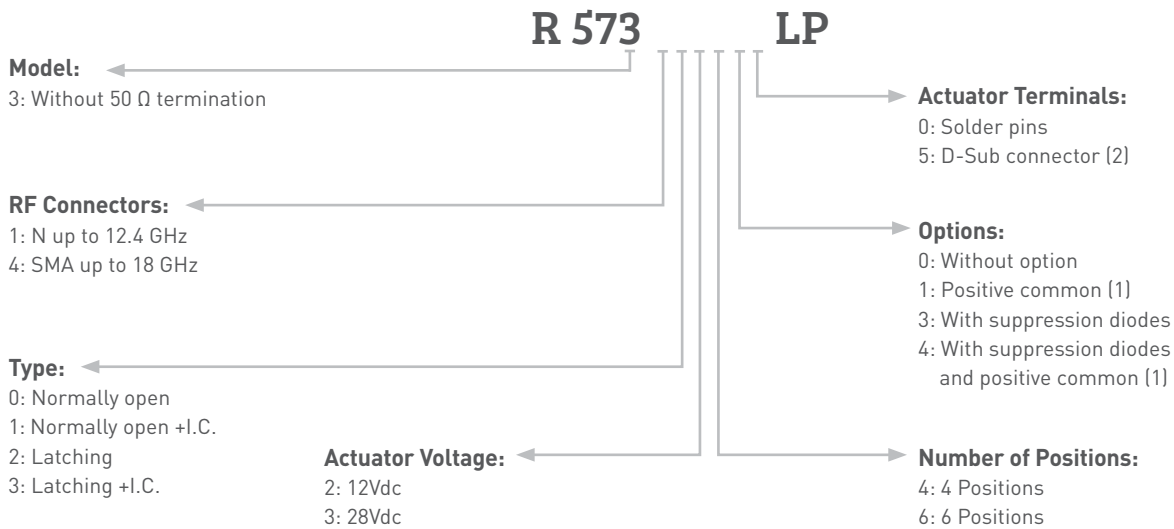


To meet growing market demands created by the deployment of 4G/LTE networks, Radiall has introduced a new range of Low PIM switches. RAMSES SPnT Low PIM switches are perfectly suited for RF test systems and test benches requiring excellent passive intermodulation performance up to 18 GHz, with a guarantee PIM performance of -160 dBc @ +43 dBm over a life span of 2 million switching cycles.

These products are specific to instrumentation and telecommunication applications.

Example of P/N:
R573403600LP is a SP6T SMA up to 18 GHz, Normally Open, 28 Vdc, without option and solder pins.

PART NUMBER SELECTION



I.C.: Indicator contact
(1) Standard products are equipped with negative common
(2) Only for N models

SPnT Low PIM up to 18 GHz

GENERAL SPECIFICATIONS

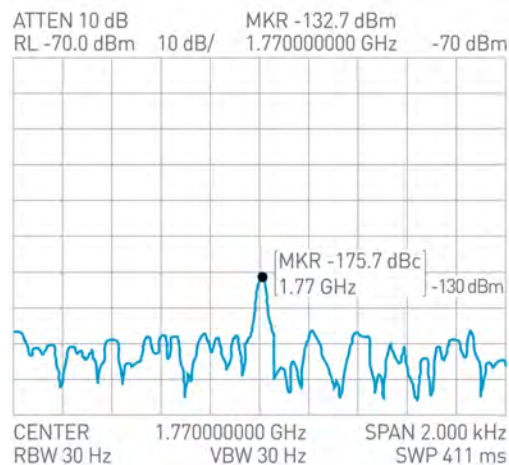
Operating mode		Normally open		Latching	
Nominal operating voltage [across operating temperature]	Vdc	12 (10.2 to 13)	28 (24 to 30)	12 (10.2 to 13)	28 (24 to 30)
Coil resistance at 23°C (+/-10%)	Ω	47.5	275	38	225
Nominal operating current at 23°C	mA	250	102	320 Reset SP4T: 1280 mA* Reset SP6T: 1920 mA*	125 Reset SP4T: 500 mA* Reset SP6T: 750 mA*
Average power		See Power Rating Chart on page 1-13			
TTL input	High Level	2.2 to 5.5 V [TTL Option] / 3.5 to 5.5 V [BCD Option]			
	Low Level	0 to 0.8 V [TTL Option] / 0 to 1.5 V [BCD Option]			
Indicator rating		1 Watt / 30 V / 100 mA			
Switching time (Max)	ms	15			
Life (Min)		2 million cycles			
Connectors		SMA - N			
Actuator terminals		Solder pins or male 25 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.D)		10-2000 Hz , 20g operating for SP3 to 6T			
Shock (MIL STD 202, method 213B, cond.C)		100g / 6 ms, ½ sine operating for SP3 to 6T			

*Reset: supply voltage time 1 sec. max./duty cycle 10%

RF PERFORMANCES

Connectors	Number of positions	Frequency range GHz	V.S.W.R. (max)	Insertion loss (max) dB	Isolation (min) dB	Impedance Ω	Third order intermodulation
SMA	4 and 6	DC - 18	DC - 3	1.20	0.20	80	-160 dBc @ +43 dBm (2 carriers 20W)
			3 - 8	1.30	0.30	70	
			8 - 12.4	1.40	0.40	60	
			12.4 - 18	1.50	0.50	60	
N	DC - 12.4	DC - 3	1.20	0.20	80		
		3 - 8	1.35	0.35	70		
		8 - 12.4	1.50	0.50	60		

OUTSTANDING PIM PERFORMANCE



Passive Intermodulation

Tone 1	1810 MHz, approximately 43 dBm
Tone 2	1850 MHz, approximately 43 dBm
3rd order PIM	160 dBc at 1770 MHz

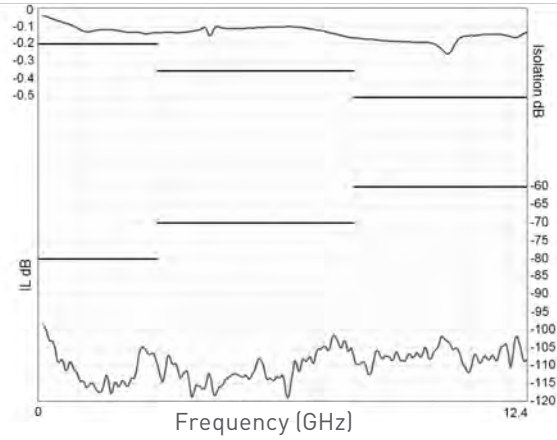
Depending on application, carrier powers and frequencies, PIM measurements can vary. PIM testing is not measured during product acceptance test.

SPnt Low PIM up to 18 GHz

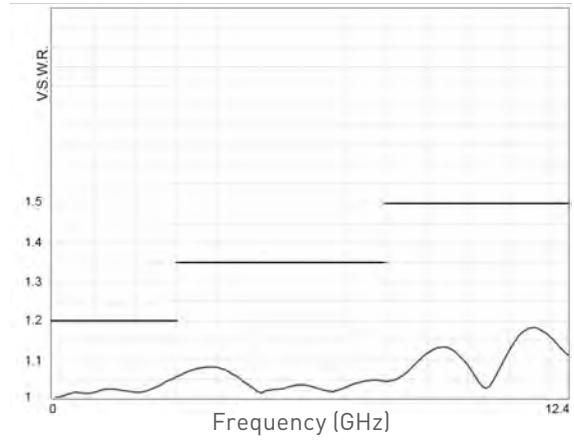
TYPICAL RF PERFORMANCES

Example: SP6T N up to 12.4 GHz

Insertion Loss and Isolation

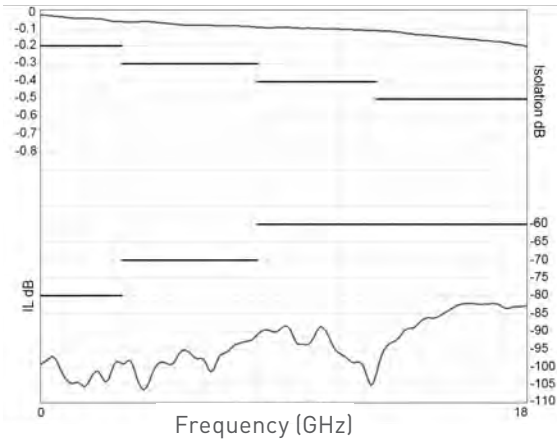


V.S.W.R.

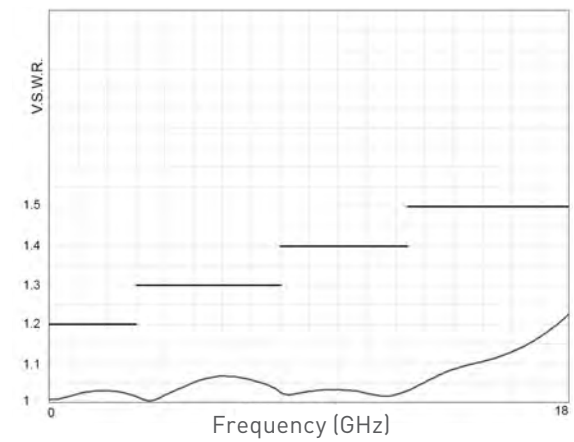


Example: SP6T SMA up to 18 GHz

Insertion Loss and Isolation



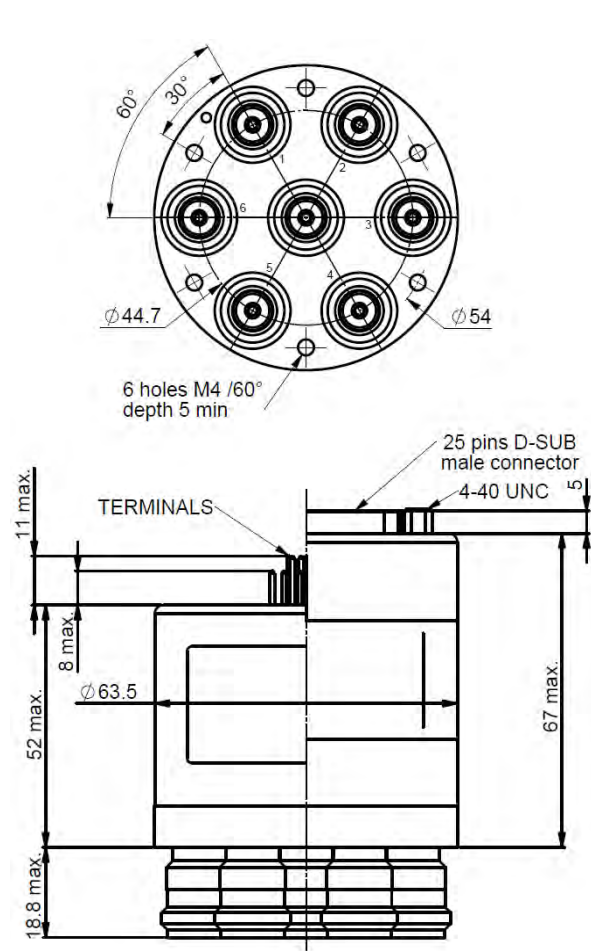
V.S.W.R.



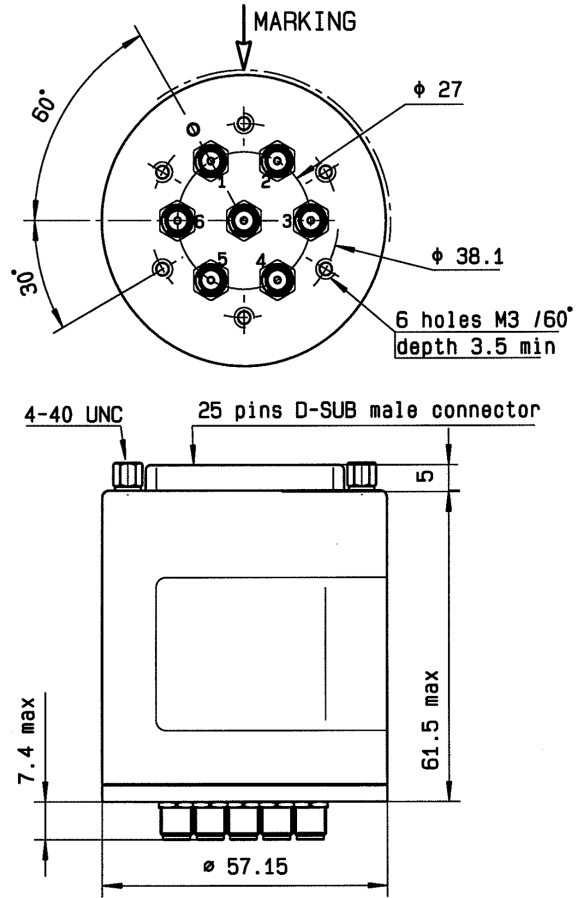
SPnT Low PIM up to 18 GHz

TYPICAL OUTLINE DRAWING

Example: SPnT N up to 12.4 GHz

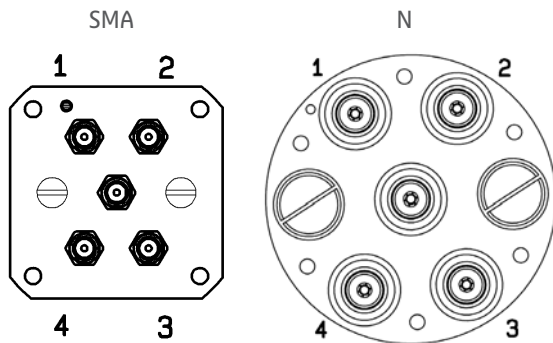


Example: SPnT SMA up to 18 GHz

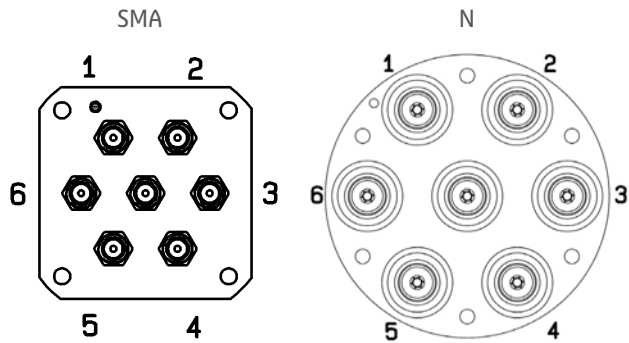


RF CONNECTORS ALLOCATION

SP4T



SP6T



Coaxial Low PIM switches - Electrical schematics

Type		Failsafe	Latching		
Options		Without option	Without option	Cut-off	C+ and suppression diodes
		Indicator contact	Indicator contact	Cut-off and I.C.	C+, suppression diodes and I.C.
		Suppression diodes	Suppression diodes	Cut-off and TTL Driver	C+ and cut-off
		Suppression diodes and I.C.	Suppression diodes and I.C.	Cut-off, TTL and I.C.	C+, cut-off and I.C.
		TTL Driver	TTL Driver	C+	
		TTL Driver and I.C.	TTL Driver and I.C.	C+ and I.C.	
Page Number	SPDT	see page 2-24	see page 2-25	see page 2-26	see page 2-27
	DPDT	see page 4-10	see page 4-11	see page 4-12	see page 4-13

Type		Normally open		Latching		
Options		Without option	C+	Without option	C+	C+ and suppression diodes
		Indicator contact	C+ and I.C.	Indicator contact	C+ and I.C.	C+, suppression diodes and I.C.
		Suppression diodes	C+ and suppression diodes	Suppression diodes		
		Suppression diodes and I.C.	C+, suppression diodes and I.C.	Suppression diodes and I.C.		
Page Number	SPnT	see page 5-32	see page 5-33	see page 5-34	see page 5-35	see page 5-36