RADIALL | TECHNICAL DATA SHEET | R 591 - - - - - -

# COAXIAL SUBMINIATURE SPnT up to 40 GHz

*Issue: Feb-3-2011*

R591 RADIALL coaxial subminiature switches have a typical operating life exceeding 25 million cycles. Excellent RF & repeatability characteristics along with a guaranteed life of 10 million cycles make these switches ideal for Automated Test Equipment (ATE) and other measurement applications. These miniature switches are also an excellent choice for Mil/Aero applications due to their small size, light weight, as well as outstanding shock and vibration handling capabilities.

## PART NUMBER SELECTION

**R 591 . . . . . .** *Updated revision*

**RF connectors :**
- 3 : SMA up to 6 GHz
- 7 : SMA up to 26.5 GHz
- 8 : SMA 2.9 up to 40GHz (5)
- E : QMA up to 6 GHz (4)

**Actuator Terminal :**
- 0 : Solder pins
- 5 : Micro-D connector

**Type :**
- 0 : Normally open
- 2 : Latching, global reset
- 6 : Latching, separated reset (1)

**Options :**
- 0 : Without option
- 1 : Positive common
- 2 : Normaly open with TTL driver (high level) (2)&(3)
- 3 : With suppression diodes
- 4 : With suppression diodes and positive common

**Actuator voltage :**
- 2 : 12 Vdc
- 3 : 28 Vdc

**Number of positions :**
- 4 : 4 positions
- 6 : 6 positions

(1) : Available with "solder pins " models only
(2) : Polarity is not relevant to application for switches with TTL driver
(3) : Suppression diodes are already included with TTL option

**(4) :** *The "QLF" trademark (quick lock formula®) standard applies to QMA and QN series and guarantees the full intermateability between suppliers using this trademark.Using QLF certified connectors also guarantees the specified level of RF performances.*

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

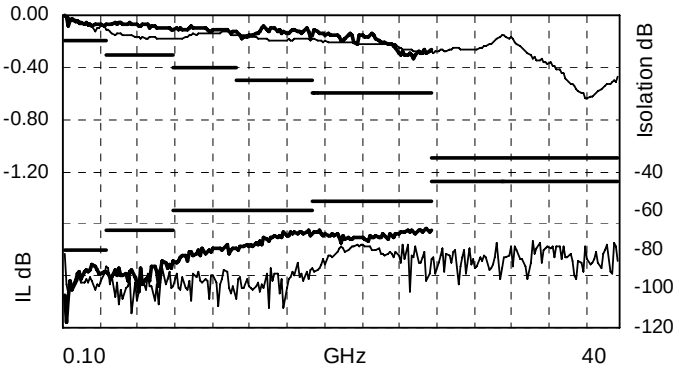
## GENERAL SPECIFICATIONS

| | | | | | |
|---|---|---|---|---|---|
| **Operating mode** | | | **Normally open** | **Latching** | |
| **Nominal operating voltage** (across operating temperature) | Vdc | **12** (10.2 / 13) | **28** (21 / 30) | **12** (10.2 / 13) | **28** (21 / 30) |
| **Coil resistance (+/-10%)** | Ohms | 48 | 250 | 60 | 285 |
| **Operating current at 23°C** | mA | 250 | 110 | 200 | 98 |
| **Average power** | | See Power Rating Chart on general catalog | | | |
| **TTL input** | High Level | 2.2 to 5.5 Volts | | | |
| | Low Level | 0 to 0.8 Volts | | | |
| **Switching time (max)** | ms | 10 | | | |
| **Life** | | 10 million cycles (SMA, QMA) / 2 million cycles (SMA 2.9) | | | |
| **Connectors** | | SMA / QMA / SMA 2.9 | | | |
| **Actuator terminals** | | **Solder Pins** : double row connector for wrapping, soldering (250°C max / 30 sec), or connecting to 2.54 mm pitch female connector. **9 pin micro-D** receptacle M83513/07-A according to MIL-C-85513. | | | |
| **Operating temperature range** | °C | -40 to +85 | | | |
| **Storage temperature range** | °C | -55 to +85 | | | |
| **Sine vibration** (According to MIL STD 202, Method 204D, Cond. D) | | 10-2000 Hz, 20g operating | | | |
| **Random vibration** (According to MIL STD 202, Method 214A, Profile I, Cond. F) | | 50-2000 Hz, 20.71grms operating | | | |
| **Shock** (According to MIL STD 202, Method 213B, Cond. C) | | 100g / 6 ms, ½ sine operating | | | |

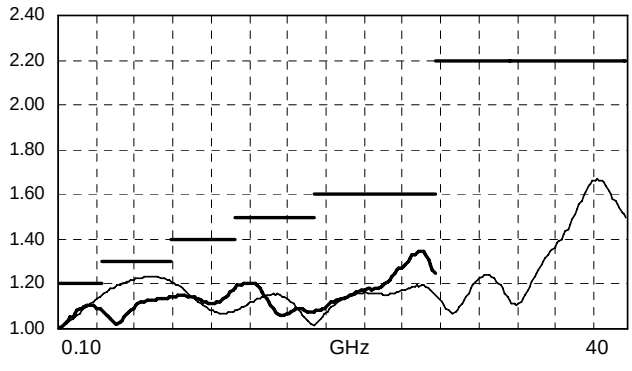
## RF PERFORMANCES

| **Connectors** | **Frequency Range GHz** | | **V.S.W.R. (max)** | **Insertion Loss (max) dB** | **Isolation (min) dB** | **Impedance Ohms** |
|---|---|---|---|---|---|---|
| SMA / QMA | DC – 6 | DC – 3 | 1.20 | 0.20 | 80 | 50 |
| | | 3 – 6 | 1.30 | 0.30 | 70 | |
| SMA | 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 | 60 | |
| | | 12.4 – 18 | 1.50 | 0.50 | 60 | |
| | | 18 – 26.5 | 1.60 | 0.60 | 55 | |
| SMA2.9 | DC – 40 | DC – 3 | 1.20 | 0.20 | 80 | 50 |
| | | 3 – 8 | 1.30 | 0.30 | 70 | |
| | | 8 – 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 | 2.20 | 1.10 | 45 | |

## TYPICAL RF PERFORMANCES



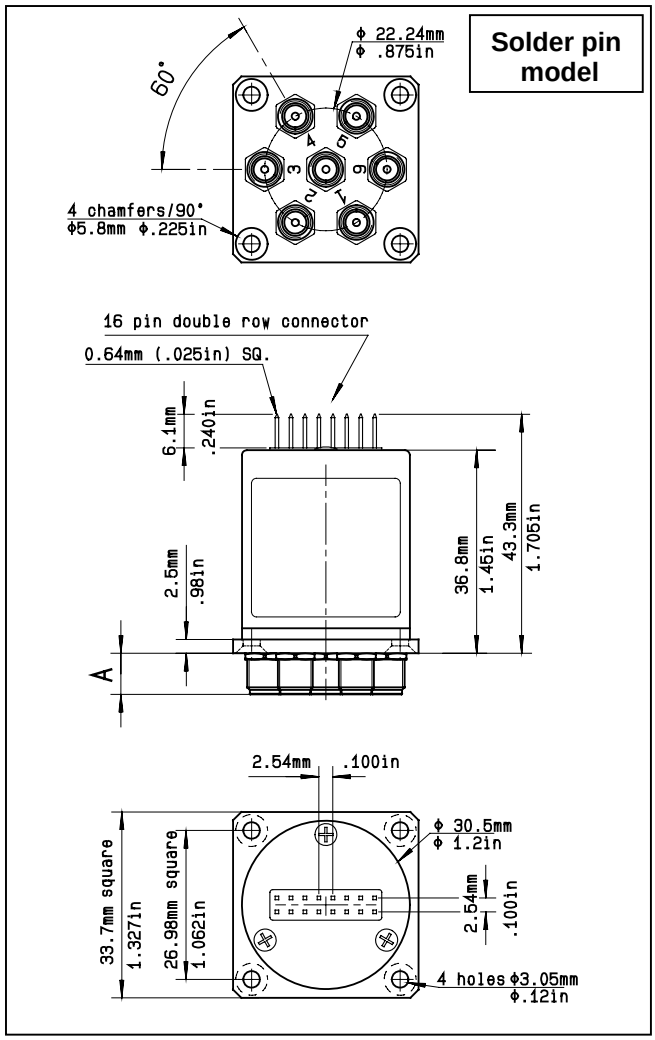

Insertion loss and Isolation

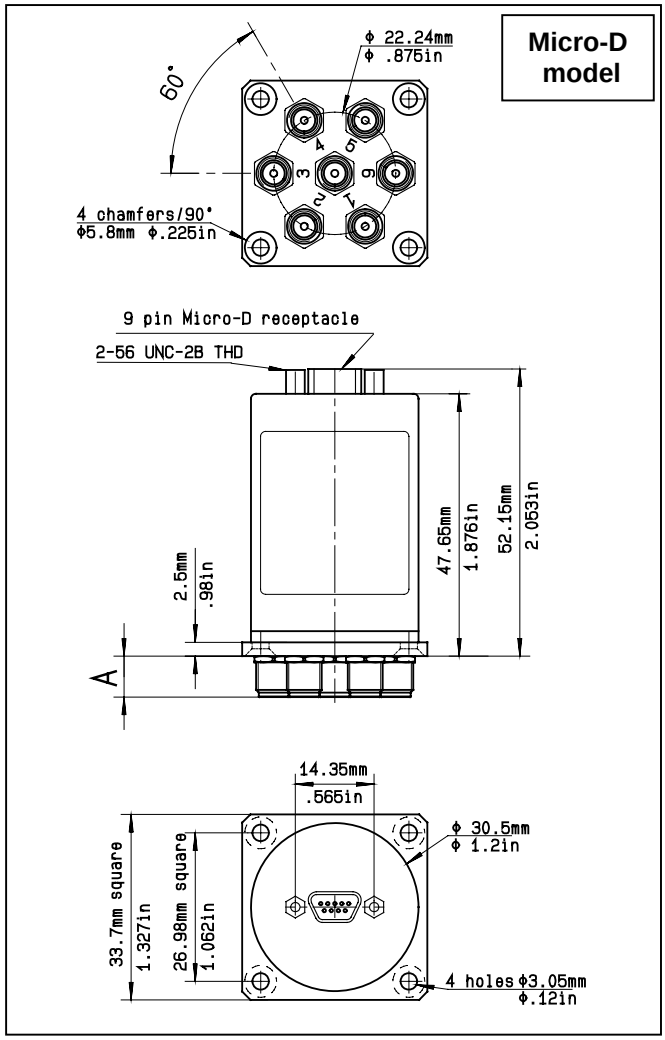



V.S.W.R.

## TYPICAL OUTLINE DRAWING (1)

| Connectors | SMA | SMA 2.9 | QMA |
|---|---|---|---|
| A max (mm/ inches) | 7.4/ 0.291 | 6.5/0.26 | 10.8/ 0.425 |



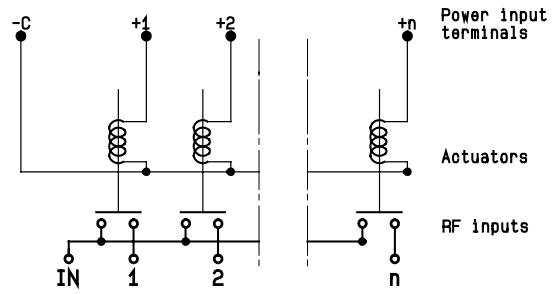

(1) : For SP4T, ways 3 and 6 not connected

all dimensions are in mm/ inches

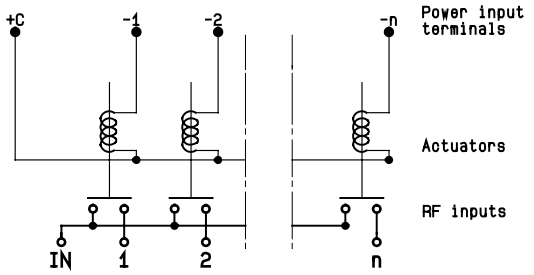
In the continual goal to improve our products, we reserve the right to make any modification judjed necessary.

## R591 series electrical schematics

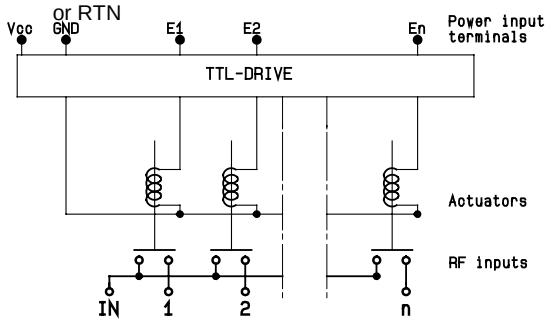
**NORMALY OPEN WITHOUT OPTION**
**R591 -0- -0-**



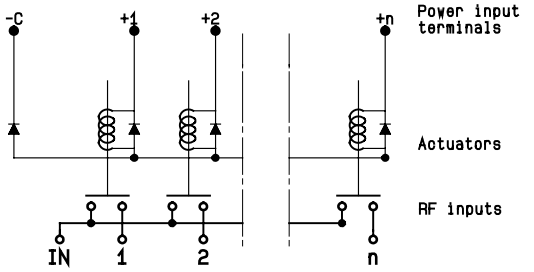

**NORMALLY OPEN WITH POSITIVE COMMON**
**R591 -0- -1-**



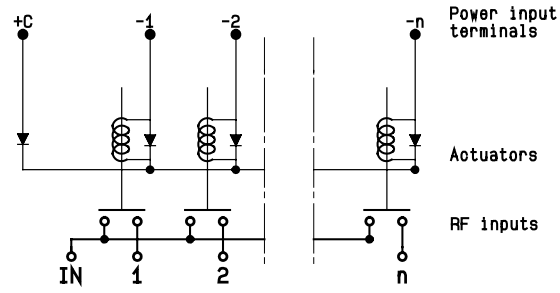

**NORMALLY OPEN WITH TTL DRIVE**
**R591 -0- -2-**



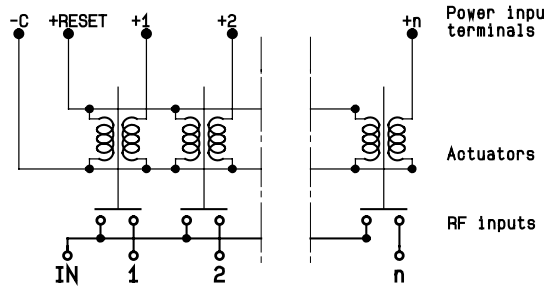

**NORMALLY OPEN WITH SUPPRESSION DIODES**
**R591 -0- -3-**




**NORMALLY OPEN WITH POSITIVE COMMON AND SUPPRESSION DIODES**
**R591 -0- -4-**

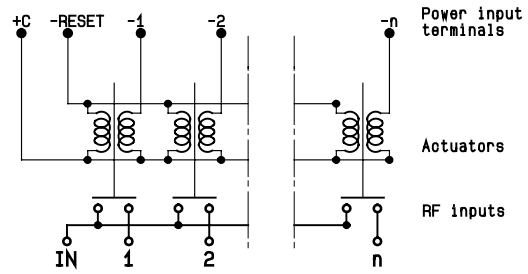



**LATCHING GLOBAL RESET WITHOUT OPTION**
**R591 -2- -0-**

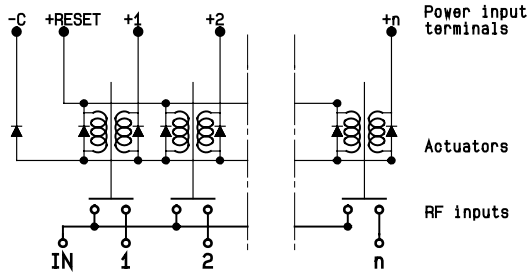


## R591 series electrical schematics

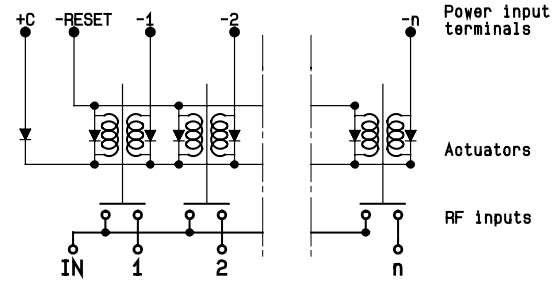
### LATCHING GLOBAL RESET WITH POSITIVE COMMON
**R591 -2- -1-**



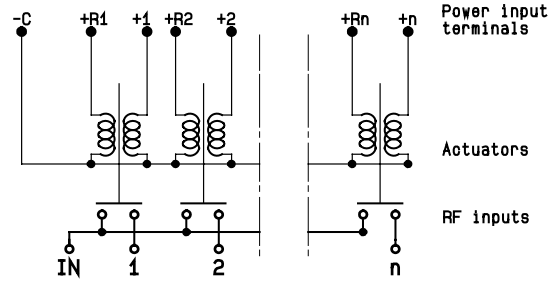

### LATCHING GLOBAL RESET WITH SUPPRESSION DIODES
**R591 -2- -3-**



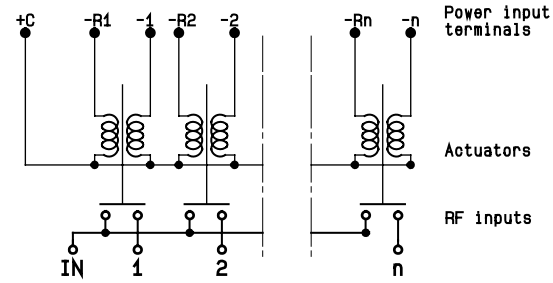

### LATCHING GLOBAL RESET WITH POSITIVE COMMON AND SUPPRESSION DIODES
**R591 -2- -4-**



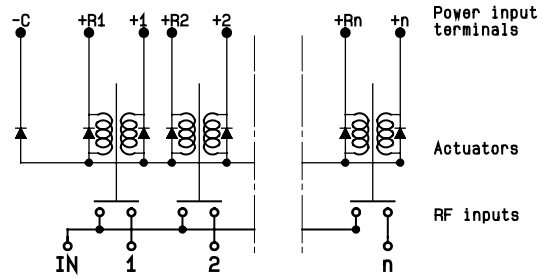

### LATCHING SEPARATED RESET WITHOUT OPTION
**R591 -6- -0-**




### LATCHING SEPARATED RESET WITH POSITIVE COMMON
**R591 -6- -1-**

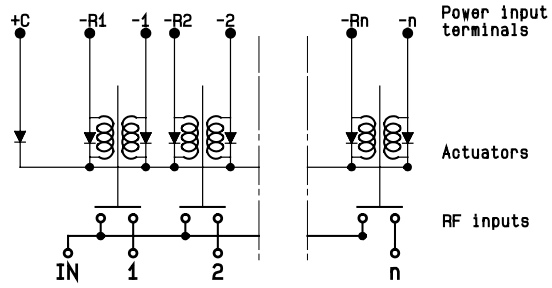



### LATCHING SEPARATED RESET WITH SUPPRESSION DIODES
**R591 -6- -3-**



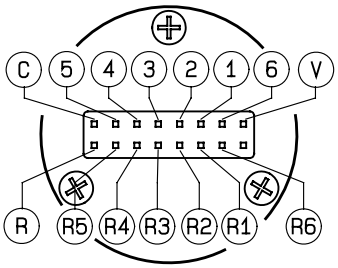
## R591 series electrical schematics

**LATCHING SEPARATED RESET WITH POSITIVE COMMON AND SUPPRESSION DIODES**
**R591 -6- -4-**

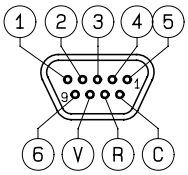



## Pin identification

Solder pins (top view)*




9 pin Micro-D (top view )



- NC : not connected
- For SP4T, ways 3 and 6 not connected
- Pin R = reset of all paths

* : compatible with 2.54 mm pitch double row 16 contact femelle connector

| Type | | PIN | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | C | V | 1 | 2 | 3 | 4 | 5 | 6 | R | R1 | R2 | R3 | R4 | R5 | R6 |
| **Normally open** | negative common | -C | NC | +1 | +2 | +3 | +4 | +5 | +6 | NC | NC | NC | NC | NC | NC | NC |
| | positive common | +C | NC | -1 | -2 | -3 | -4 | -5 | -6 | NC | NC | NC | NC | NC | NC | NC |
| **Latching** | negative common | -C | NC | +1 | +2 | +3 | +4 | +5 | +6 | +reset | NC | NC | NC | NC | NC | NC |
| **global reset** | positive common | +C | NC | -1 | -2 | -3 | -4 | -5 | -6 | -reset | NC | NC | NC | NC | NC | NC |
| **Latching** | negative common | -C | NC | +1 | +2 | +3 | +4 | +5 | +6 | NC | +res.1 | +res.2 | +res.3 | +res.4 | +res.5 | +res.6 |
| **individual reset** | positive common | +C | NC | -1 | -2 | -3 | -4 | -5 | -6 | NC | -res.1 | -res.2 | -res.3 | -res.4 | -res.5 | -res.6 |
| **Normally open with TTL drive** | | Gnd or RTN | Vcc | E1 | E2 | E3 | E4 | E5 | E6 | NC | NC | NC | NC | NC | NC | NC |

LifeElectronics
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**ООО «ЛайфЭлектроникс»** **“LifeElectronics” LLC**

*ИНН 7805602321 КПП 780501001 Р/С 40702810122510004610 ФАКБ "АБСОЛЮТ БАНК" (ЗАО) в г.Санкт-Петербурге К/С 30101810900000000703 БИК 044030703*

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