



Dow-Key®
Microwave
CORPORATION

Dow-Key Microwave Product Catalog

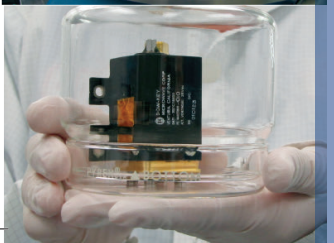
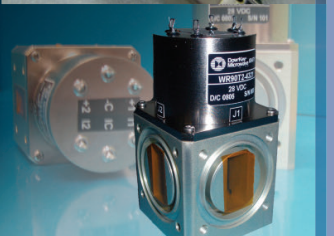
Our Experience, Your Switch Solution Since 1945



MPG

CONNECTING & PROTECTING

a **DOVER** company



Our Experience

As the world's largest manufacturer of electromechanical switches, Dow-Key Microwave Corporation is committed to providing unparalleled customer service, competitive pricing, on-time delivery, and products that are distinguished by quality and reliability. Founded in 1945, we are the oldest continuously operating switch manufacturer in the United States. Today, we are part of Microwave Products Group (MPG), a subsidiary of Dover Corporation. Dover is a multi-billion dollar, NYSE-traded, diversified manufacturer of a wide range of proprietary electronic components and systems.

Quality Assurance

Dow-Key Microwave is a world-class manufacturer with an unparalleled reputation for product quality. Indeed, our space-qualified switches have contributed to the mission success of nearly 100 satellite and launch vehicle programs since 1972. Our commitment to continuous improvement of our products and processes, along with our extensive series of internal and external assessments, ensures compliance with the AS9100 and ISO-9001:2008 standards requirements.

Advanced Capabilities

Dow-Key Microwave's 36,000-square-foot, state-of-the-art manufacturing facility includes two Class 7 clean rooms in order to support our high-reliability space and military projects. To accomplish the engineering, manufacture, and test of our products and assemblies, we invest heavily in capital equipment. This advanced equipment includes a wide array of vector network analyzers and synthesized sources, noise figure measuring equipment, passive inter-modulation (PIM) test stands, thermal/vacuum chambers, RF power sources, and shock and vibration stations for environmental screening, to name just a few.

Your Switch Solution

The best in the RF switch industry, Dow-Key Microwave's engineering team is dedicated to supporting customers through product selection, custom-designed solutions, and RF system integration. Whether your organization needs electromechanical switches, automated test equipment, or space-qualified switching arrays, our engineering team works with your specific requirements to create the optimum RF switching solution. Backed by decades of industry experience, our highly skilled technical staff is continuously improving the quality and variety of our product offering based upon customer needs as well as advances in technology. We offer customers the best value solution for their applications, on budget and on time. Since 1945, our experience is your switch solution.

Catalog No: 214 Rev A

Microwave Products Group (MPG) designs, manufactures and sells special electronic components and systems, including high-performance filters, switches, diplexers and cosite signal interference solutions. Our products are used in military, space, telecom infrastructure, medical and industrial applications where function and reliability are crucial.

www.mpgdover.com

MICROWAVE SWITCHES

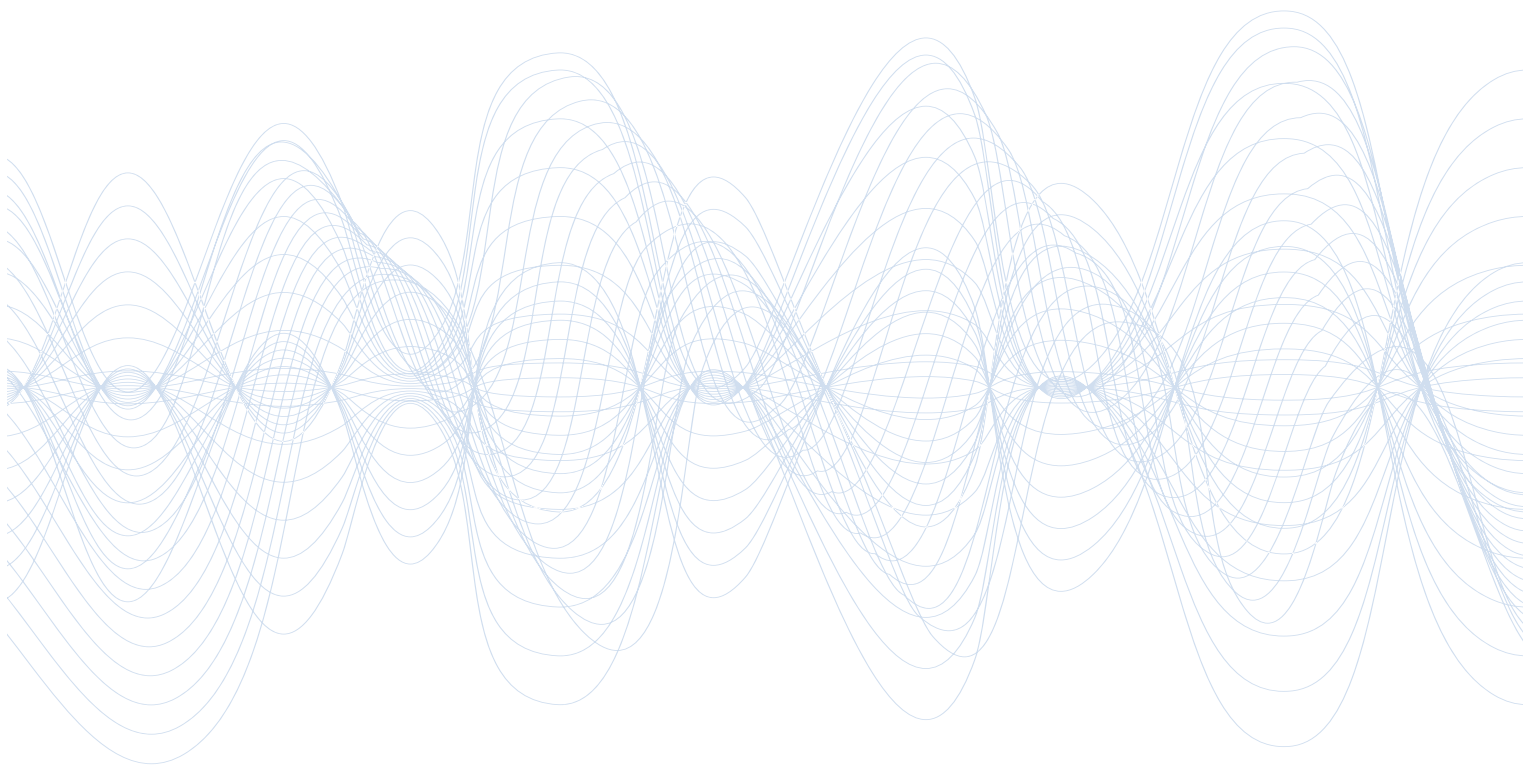


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* For more details about these product lines, see Dow-Key's Space Products brochure or Switch Matrix catalog.

ORDERING INFORMATION

At Dow-Key you are not limited to the products in this catalog, as it is intended to be used as a guide in selecting a switch product or switching matrix for a given application. Requests for modification of standard items and their specifications in order to meet specific needs are always welcome. Inquiries regarding custom integrated components or switch assemblies are also always appreciated.

The catalog is subject to change without notification at any time and new product information is constantly being added in form of press releases through the corporate website at www.dowkey.com. Please visit our website to request quotes, download product materials, for a Sales Representative, and factory contact information.

Ordering

The information found in this catalog or on www.dowkey.com should be sufficient for you to select a particular Dow-Key product. In those cases where additional information is required, call Dow-Key directly or our local Dow-Key Sales Representative who will provide you with price and delivery information.

When placing your order, please include the part number, product name, quantity, and shipping instructions. In the case of a non-standard product, a full description of desired features must accompany your order to avoid any error. Send orders to:

Dow-Key Microwave
4822 McGrath Street
Ventura, CA 93003 U.S.A.

Or send them in care of our Sales Representative for your area. A complete listing of our Representatives can be found at www.dowkey.com.

Orders will be accepted by way of U.S. mail, telephone, fax, or email. Confirmation of orders on your standard Purchase Order is required.

Telephone: 805.650.0260
Fax: 805.650.1734
Email: askdk@dowkey.com

Domestic Terms

Net 30 days, F.O.B. Dow-Key plant, Ventura, California, U.S.A. unless otherwise specified. Shipments made to firms are on a C.O.D. basis unless credit has been established or on receipt of advance payment. American Express, MasterCard and Visa are also accepted.

Export Terms

Unless other terms have been agreed upon in advance, export terms are either payment in advance of shipment or against a confirmed irrevocable letter of credit. All prices are F.O.B. Ventura, California, U.S.A.

Shipping

Orders within the United States and Canada will be shipped via United Parcel Service Ground unless other instructions are received. Shipment to all other countries will be by customer direction.

Packaging

All products shipped from Dow-Key Microwave, Ventura, California are packaged in accordance with best commercial practices unless otherwise specified in the contract or purchase order.

Delivery

Most standard products are available from stock or within our typical manufacturing lead-time of 1 to 8 weeks after receipt of order.

Source Inspection

Should Customer Source Inspection of product be required, a charge of \$300.00 per occurrence will apply.

Application and Technical Assistance

Dow-Key provides a knowledgeable and experienced engineering staff to work closely with customers in product design and application development as well as minor modifications to existing standard products. This service is also available for the design of individual specialized switching components or complex switching systems.

Warranty

Dow-Key Microwave Corporation warrants all switch products to be free of defects in material and workmanship for a period of one year after the date of initial shipment. The limit of liability under this warranty is to repair, replace or refund purchase price on any product or part thereof that is returned by the purchaser and proves to be defective after examination by Dow-Key. This warranty does not extend to any products mishandled, misused or subjected to abuse or neglect in storage, transportation or use. Repairs or alterations made without consent or knowledge of Dow-Key Microwave Corporation will invalidate this warranty. This warranty supercedes all others, either expressed or implied.

Return Material Authorization

Please contact Dow-Key to receive a Return Material Authorization (RMA) number prior to returning any item for service. Items returned to Dow-Key without a RMA number are subject to return without evaluation or any work being done. Dow Key will not accept COD freight charges for returned items.

Dow-Key Terms and Conditions

Dow-Key Microwave Corporation Terms and Conditions apply to all orders unless other provisions have been previously agreed upon. A copy of Dow-Key's Terms and Conditions can be found at www.dowkey.com.

Certificate of Compliance

If requested at order placement, a certificate of compliance is available upon shipment.

Minimum Order Amount

Dow-Key's minimum order amount is \$300.00.

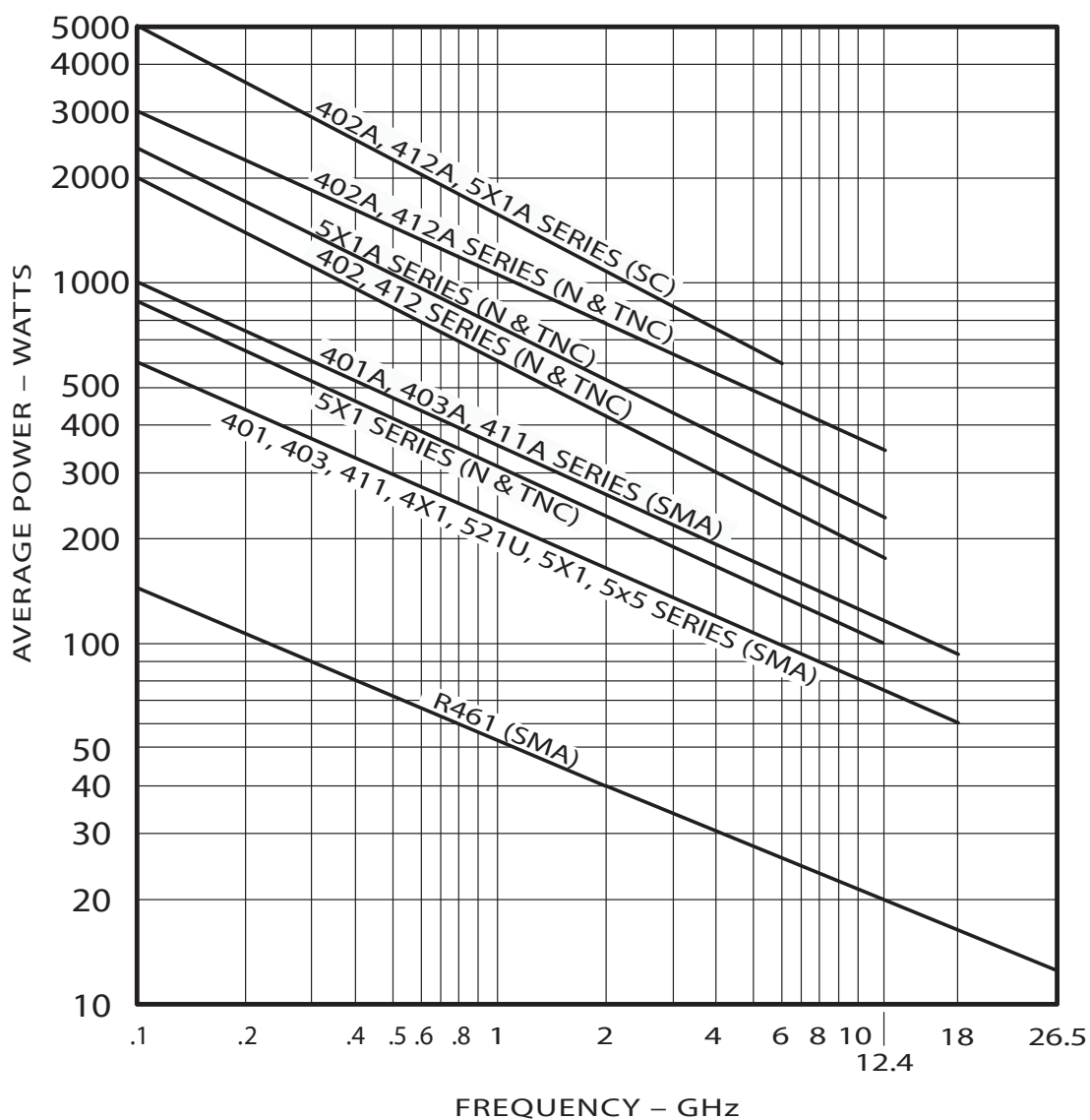
Product Changes

Dow-Key Microwave Corporation continually improves products as new technologies, materials and processes become available. We therefore reserve the right to alter, amend, discontinue, or replace any product and or specifications in this catalog at our sole discretion without prior notice.



POWER CHART

This chart is based on the following conditions:
Ambient Temperature = 40° C; Altitude = Sea Level; VSWR = 1.0:1; Non-switching



R461-Series is based on the following conditions:
Ambient Temperature = 75° C; Altitude = Sea Level; VSWR <1.2:1

For TRANSCO switches, please consult factory for additional information.

PART NUMBERING SYSTEM

X A B C - D E F G H I J

(X) RELAY FAMILY

- 4/5 50 Ohm System
- 3 50 Ohm Matrix Multipos.
- 7 70 Ohm System
- R 50 Ohm, Reliant Switch

(A) CONFIGURATION

- | | | | |
|---|----------|---|-------|
| 0 | SPDT | A | SP10T |
| 1 | Transfer | B | SP11T |
| 2 | SPST | C | SP12T |
| 3 | SP3T | E | SP14T |
| 4 | SP4T | F | SP16T |
| 5 | SP5T | | |
| 6 | SP6T | | |
| 7 | SP7T | | |
| 8 | SP8T | | |
| 9 | SP9T | | |

(B) SIZE

- 1 Std. Case, normally SMA connectors (Radial)
- 2 Std. Case, normally N Connectors
- 3 Small Case, normally SMA (Multithrow)
- 4 Intermediate Cavity, SMA/TNC
- 5 Miniature Radial
- 6 Std. Case, normally N connectors (Radial)
- 7 Microminiature Radial
- 9 Microminiature Switch

(C) SPECIAL OPTIONS

- | | | | |
|---|--------------------------|---|--------------------------------|
| A | High Power | K | 26.5 GHz |
| B | Bypass (2-4) | L | Flange Mount Cavity |
| C | Special Mounting Bracket | M | Fast Switching |
| D | Bypass (1-2) | N | Remove STD Mounting Bracket |
| E | Bypass (3-4) | P | Power Connector |
| F | Bypass (1-3) | R | Reverse Polarity |
| G | Make Before Break | S | Seal, Enhanced Epoxy or Gasket |
| H | HI-REL | T | -55°C to +85°C |
| I | Immersion Seal | U | 5 Million Cycles |
| J | "D" Type Connector | V | Laser Seal |
| | | W | Low PIM |
| | | Y | 40 GHz |

(D) ACTUATOR COIL TYPE

- 1 Manual
- 2 Failsafe, Position 1
- 3 Pulse Latching
- 4 Latching, Self Cutoff
- 5 Normally Open
- 6 Failsafe, Suppression Diodes
- 7 Pulse Latching, Suppression Diodes
- 8 Latching Reset, Suppression Diodes
- 9 Normally Open, Suppression Diodes

(J) SPECIAL OPTIONS

- A TTL HI, Commercial (2.4 - 5.5 Vdc)
- B TTL HI, Military (2.4 - 5.5 Vdc), JANTX
- E CMOS BCD Decoding Logic & MOSFET Driver, Commercial
- G RS-422
- L TTL Logic Low, Commercial (0.0 - 0.8 Vdc)
- N CANBUS
- S Single Line TTL
- T Ethernet
- U USB
- TV Thermal Vacuum

(I) TERMINATIONS

- | | | | |
|---|-------|---|-------------------|
| 1 | Short | 5 | 50Ω, 5W |
| 2 | Open | 7 | 50Ω, Term, Port 1 |
| 3 | 50 Ω | 8 | 50Ω, SMA |
| 4 | 75 Ω | | |

(H) AUXILIARY/INDICATOR CONTACTS

- 0 None
- 2 Mechanical SPST
- 3 Mechanical SPDT
- 5 Optical
- 6 Electronic

(FG) CONNECTORS

- 01 N
- 02 BNC
- 03 TNC
- 04 UHF
- 05 C
- 06 GPO*
- 07 BMA (OSP)
- 08 SMA
- 09 3.5mm (SMA Interface)
- 11 2.9mm (K)
- 12 SMB
- 14 TPS
- 19 Pins (PC Board Drop-in)
- 51 HN
- 53 SC
- 54 7/16
- 71 SMB (50 Ohm)
- 72 SMB (75 Ohm)
- 73 SMB (Mini 75 Ohm)

* GPO is a trademark of Gilbert Engineering

(E) ACTUATOR COIL VOLTAGE

- | | | | |
|---|--------|---|--------|
| 0 | Manual | 7 | 20 Vdc |
| 1 | 6 Vdc | 8 | 24 Vdc |
| 2 | 12 Vdc | 9 | 15 Vdc |
| 3 | 28 Vdc | | |
| 4 | 48 Vdc | | |
| 5 | 5 Vdc | | |

SPDT COAXIAL SWITCH



SPDT

401 Failsafe | SMA, 2.9 mm (K)



- DC-18 GHz
- DC-26.5 GHz
- DC-40 GHz
- Low/Medium Power
- 1M/5M Life Cycles

RF Characteristics

Frequency GHz	VSWR (max)	Isolation dB (min)	Ins. Loss dB (max)
DC-1	1.10	85	0.10
1-4	1.15	80	0.15
4-8	1.20	70	0.20
8-12	1.30	65	0.30
12-18	1.35	60	0.35
*18-26.5	1.50	55	0.50
*26.5-40	1.90	55	0.80

* Performance varies depending on selected options

Specifications

Operating Voltage (across temperature range):

12 Vdc (11-14 Vdc)
24 Vdc (20-28 Vdc)
28 Vdc (24-32 Vdc)

Coil Current (max. @ nom. Vdc & 25°C)*:

12 Vdc 195 mA
24 Vdc 125 mA
28 Vdc 95 mA

Switching Time:

15 ms maximum

Operating Temperature:

-25°C to +65°C (Standard)
-55°C to +85°C (Extended "T" Option)

Mechanical Life Cycles*:

1,000,000 minimum
5,000,000 minimum ("U" Option)

Vibration, Operating:

10G RMS, 20-2000 Hz

Mechanical Shock, Non-Operating:

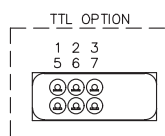
30G, 1/2 Sine, 11 ms

Nominal Weight*:

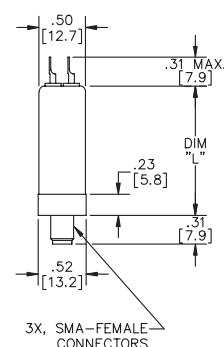
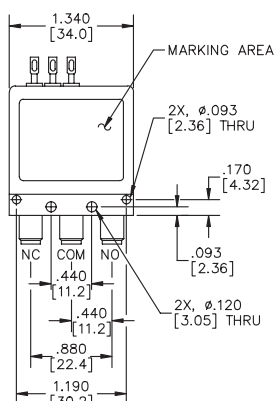
1.4 oz. (40 g.)

* Performance and weight varies depending on selected options. Values listed are for Standard 401 Failsafe model.

Mechanical



DIM "L" (MAX)	MODEL	ELEC. SCHEM.
1.40 [35.6]	401-2X08	1
1.40 [35.6]	401-2X0832	1
1.80 [45.7]	401-2X0802A	2
1.80 [45.7]	401-2X0832A	2



401-2X0832 Shown

For Electrical Schematic, see page # 1-4

Part Number Selector

401 J - 2 2 08 02 A - ROHS

Special Options	Actuator	Coil Voltage	Connectors	Indicators	Circuit Options
A = High Power	2 = Failsafe	2 = 12 Vdc	08 = SMA Female	02 = No Indicators*	A = TTL High
I = Immersion Seal	6 = Failsafe with Suppression Diode	3 = 28 Vdc	11 = 2.9 mm (K)	32 = Indicators	L = TTL Low
J = 'D' Connector		8 = 24 Vdc			
K = 26.5 GHz					
S = Epoxy Seal					
T = -55°C to + 85°C					
U = 5M Life Cycles					
Y = 40 GHz					

* Declared only with Circuit Options

TTL option includes suppression diode. Other options may be available and all combinations may not be possible. Please consult with factory.

401 Latching | SMA, 2.9 mm (K)

SPDT



- DC-18 GHz
- DC-26.5 GHz
- DC-40 GHz
- Low/Medium Power
- 1M/5M Life Cycles

RF Characteristics

Frequency GHz	VSWR (max)	Isolation dB (min)	Ins. Loss dB (max)
DC-1	1.10	85	0.10
1-4	1.15	80	0.15
4-8	1.20	70	0.20
8-12	1.30	65	0.30
12-18	1.35	60	0.35
*18-26.5	1.50	55	0.50
*26.5-40	1.90	55	0.80

* Performance varies depending on selected options

Specifications

Operating Voltage (across temperature range):

12 Vdc (11-14 Vdc)
24 Vdc (20-28 Vdc)
28 Vdc (24-32 Vdc)

Coil Current (max. @ nom. Vdc & 25°C)*:

12 Vdc 230 mA
24 Vdc 135 mA
28 Vdc 115 mA

Switching Time:

15 ms maximum

Operating Temperature:

-25°C to +65°C (Standard)
-55°C to +85°C (Extended "T" Option)

Mechanical Life Cycles*:

1,000,000 minimum
5,000,000 minimum ("U" Option)

Vibration, Operating:

10G RMS, 20-2000 Hz

Mechanical Shock, Non-Operating:

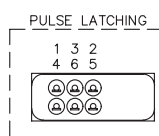
30G, 1/2 Sine, 11 ms

Nominal Weight*:

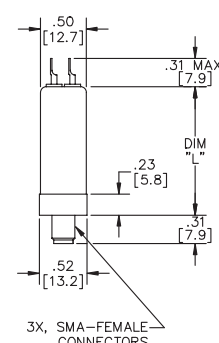
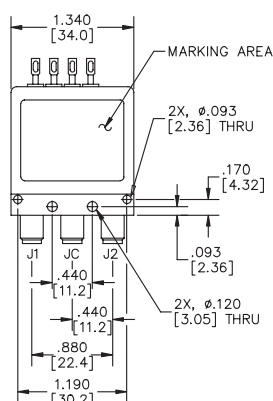
1.4 oz. (40 g.)

* Performance and weight varies depending on selected options. Values listed are for Standard 401 Latching model.

Mechanical



DIM "L" (MAX)	MODEL	ELEC. SCHEM.
1.40 [35.6]	401-3X08	3
1.40 [35.6]	401-3X0832	3
1.80 [45.7]	401-4X08	4
1.80 [45.7]	401-4X0832	4
1.80 [45.7]	401-4X0802A	5
1.80 [45.7]	401-4X0832A	5



401-4X0832 Shown

For Electrical Schematic, see page # 1-4

Part Number Selector

401 J - 4 2 08 02 A - ROHS

Special Options	Actuator	Coil Voltage	Connectors	Indicators	Circuit Options
A = High Power	3 = Pulse Latching	2 = 12 Vdc	08 = SMA Female	02 = No Indicators*	A = TTL High
I = Immersion Seal	4 = Latching Self Cutoff	3 = 28 Vdc	11 = 2.9 mm (K)	32 = Indicators	L = TTL Low
J = 'D' Connector	7 = Pulse Latching with Suppression Diode	8 = 24 Vdc			
K = 26.5 GHz					
S = Epoxy Seal					
T = -55°C to + 85°C					
U = 5M Life Cycles					
Y = 40 GHz					

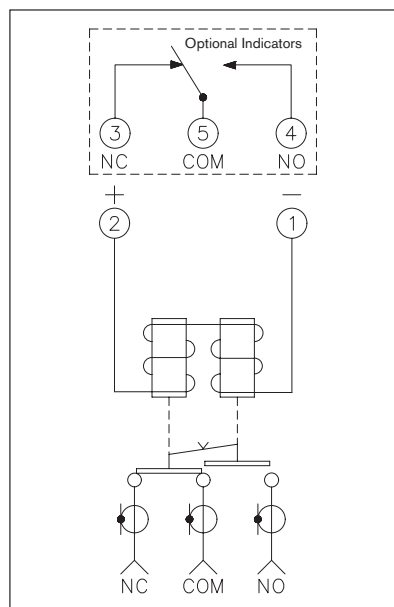
* Declared only with Circuit Options

TTL option includes suppression diode. Other options may be available and all combinations may not be possible. Please consult with factory.

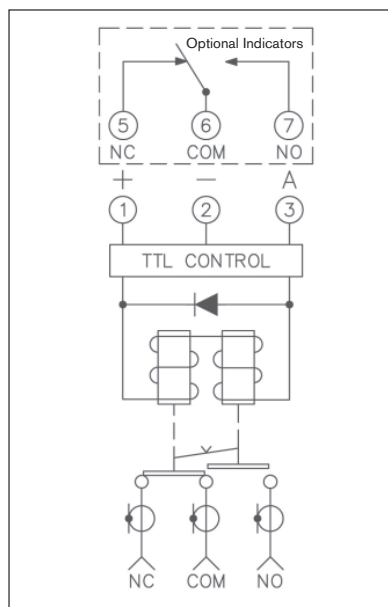
SPDT

401 | Electrical Schematics

01 401 Failsafe



02 401 Failsafe TTL



03 Logic Truth Table

FAILSAFE TTL - SCH #2

LOGIC TRUTH TABLE		
RF PATH	INDICATOR PATH	LOGIC INPUT "A"
NC-COM	NC-COM	0
NO-COM	NO-COM	1

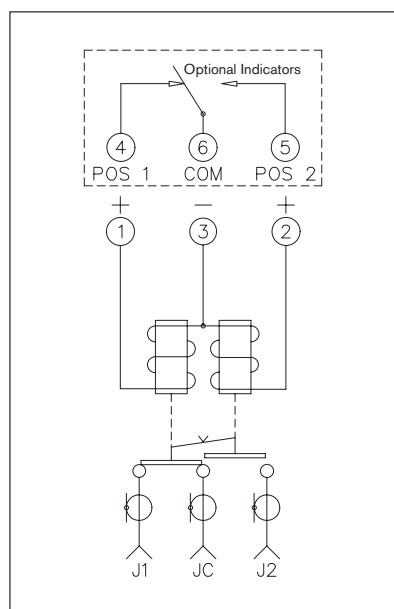
"0" = 0.0V-0.8V
"1" = 2.4V-5.5V

SELF CUTOFF TTL - SCH #6

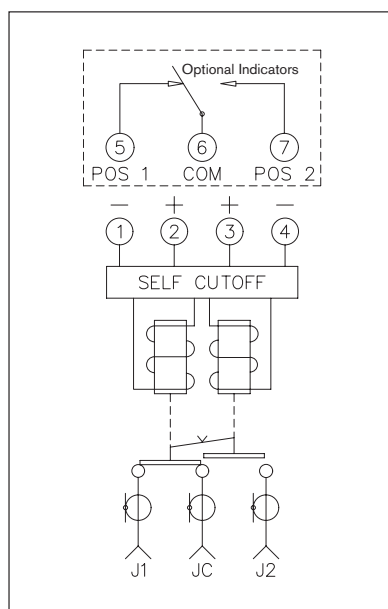
LOGIC TRUTH TABLE			
RF PATH	INDICATOR PATH	LOGIC INPUT "A"	LOGIC INPUT "B"
JC-J1	COM-1	1	0
JC-J2	COM-2	0	1

"0" = 0.0V-0.8V
"1" = 2.4V-5.5V

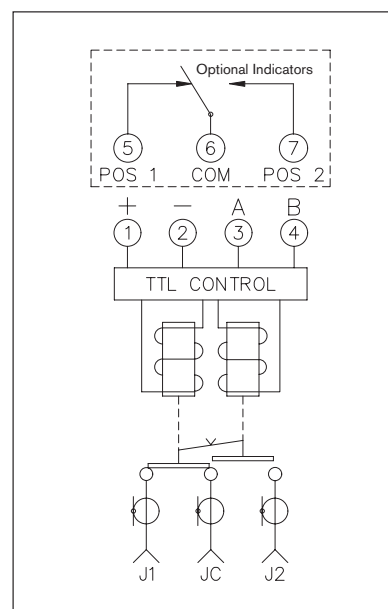
04 401 Pulse



05 401 Self Cutoff



06 401 Self Cutoff TTL



402 Failsafe | N, BNC, TNC, SC

SPDT



- DC-2 GHz
- DC-6 GHz
- DC-12.4 GHz
- Medium/High Power
- 1M Life Cycles

RF Characteristics

Frequency GHz	VSWR (max)	Isolation dB (min)	Ins. Loss dB (max)
DC-1	1.15	85	0.15
1-2	1.20	80	0.20
2-4	1.25	70	0.25
4-8	1.45	60	0.40
8-12.4	1.50	60	0.50

Performance applies to N, BNC, and TNC type connectors.
Consult with factory for SC-type connectors.

Specifications

Operating Voltage (across temperature range):

12 Vdc (11-14 Vdc)
24 Vdc (20-28 Vdc)
28 Vdc (24-32 Vdc)

Coil Current (max. @ nom. Vdc & 25°C)*:

12 Vdc 275 mA
24 Vdc 155 mA
28 Vdc 115 mA

Switching Time:

20 ms maximum

Operating Temperature:

-25°C to +65°C (Standard)
-55°C to +85°C (Extended "T" Option)

Mechanical Life Cycles*:

1,000,000 minimum

Vibration, Operating:

10G RMS, 20-2000 Hz

Mechanical Shock, Non-Operating:

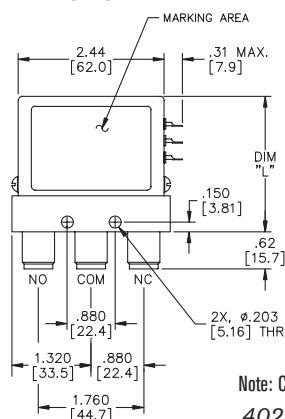
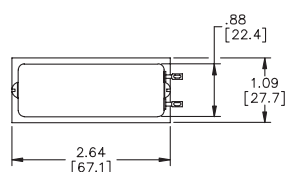
30G, 1/2 Sine, 11 ms

Nominal Weight*:

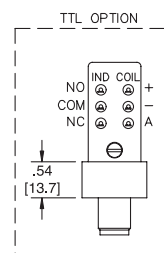
9.0 oz. (255 g.)

* Performance and weight varies depending on selected options. Values listed are for Standard 402 Failsafe model.

Mechanical



DIM "L" (MAX)	MODEL*	ELEC. SCHEM.
2.30 [58.4]	402-2X01	1
2.30 [58.4]	402-2X0132	1
2.30 [58.4]	402-2X0102A	2
2.30 [58.4]	402-2X0132A	2



Note: Chart reflects N, BNC, and TNC type of connectors only.

402-2X0132 Shown

For Electrical Schematic, see page # 1-7

Part Number Selector

402 J - 2 2 01 02 A - ROHS

Special Options	Actuator	Coil Voltage	Connectors	Indicators	Circuit Options
A = High Power	2 = Failsafe	2 = 12 Vdc	01 = N Female	02 = No Indicators**	A = TTL High
I = Immersion Seal	6 = Failsafe with Suppression Diode	3 = 28 Vdc	02 = BNC Female	32 = Indicators	L = TTL Low
J = 'D' Connector		8 = 24 Vdc	03 = TNC Female		
P = Power Connector			53 = SC Female*		
S = Epoxy Seal					
T = -55°C to + 85°C					

* Consult Dow-Key for dimensions

** Declared only with Circuit Options

TTL option includes suppression diode. Other options may be available and all combinations may not be possible. Please consult with factory.

SPDT

402 Latching | N, BNC, TNC, SC



- DC-2 GHz
- DC-6 GHz
- DC-12.4 GHz
- Medium/High Power
- 1M Life Cycles

RF Characteristics

Frequency GHz	VSWR (max)	Isolation dB (min)	Ins. Loss dB (max)
DC-1	1.15	85	0.15
1-2	1.20	80	0.20
2-4	1.25	70	0.25
4-8	1.45	60	0.40
8-12.4	1.50	60	0.50

Performance applies to N, BNC, and TNC type connectors.
Consult with factory for SC-type connectors.

Specifications

Operating Voltage (across temperature range):

12 Vdc (11-14 Vdc)
24 Vdc (20-28 Vdc)
28 Vdc (24-32 Vdc)

Coil Current (max. @ nom. Vdc & 25°C)*:

12 Vdc 320 mA
24 Vdc 180 mA
28 Vdc 135 mA

Switching Time:

20 ms maximum

Operating Temperature:

-25°C to +65°C (Standard)
-55°C to +85°C (Extended "T" Option)

Mechanical Life Cycles*:

1,000,000 minimum

Vibration, Operating:

10G RMS, 20-2000 Hz

Mechanical Shock, Non-Operating:

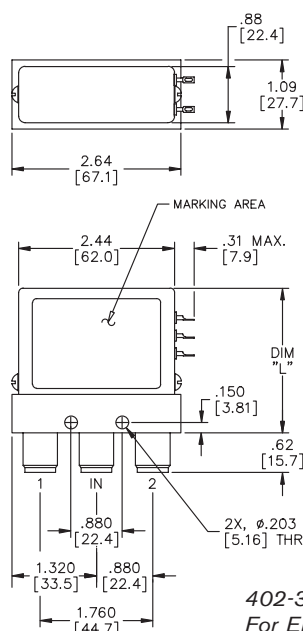
30G, 1/2 Sine, 11 ms

Nominal Weight*:

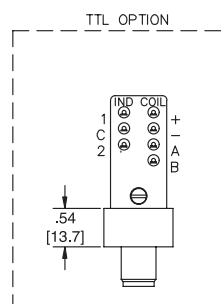
9.0 oz. (255 g.)

* Performance and weight varies depending on selected options. Values listed are for Standard 402 Latching model.

Mechanical



DIM "L" (MAX)	MODEL *	ELEC. SCHEM.
2.30 [58.4]	402-3X01	4
2.30 [58.4]	402-3X0132	4
2.40 [61.0]	402-4X01	5
2.40 [61.0]	402-4X0132	5
2.40 [61.0]	402-4X0102A	6
2.40 [61.0]	402-4X0132A	6



402-3X0132 Shown

For Electrical Schematic, see page # 1-7

Part Number Selector

402 J - 4 2 01 02 A - ROHS

Special Options	Actuator	Coil Voltage	Connectors	Indicators	Circuit Options
A = High Power	3 = Pulse Latching	2 = 12 Vdc	01 = N Female	02 = No Indicators**	A = TTL High
I = Immersion Seal	4 = Latching Self Cutoff	3 = 28 Vdc	02 = BNC Female	32 = Indicators	L = TTL Low
J = 'D' Connector	7 = Pulse Latching with Suppression Diodes	8 = 24 Vdc	03 = TNC Female		
P = Power Connector			53 = SC Female*		
S = Epoxy Seal					
T = -55°C to + 85°C					

* Consult Dow-Key for dimensions

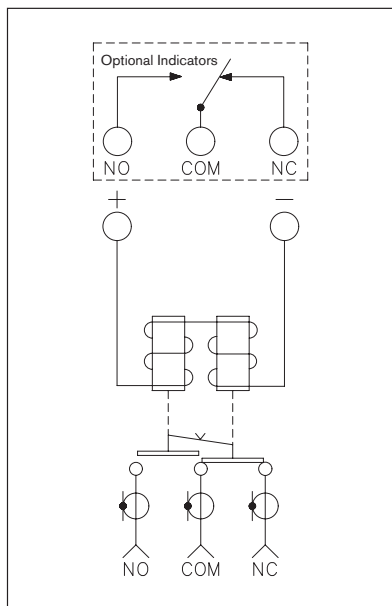
** Declared only with Circuit Options

TTL option includes suppression diode. Other options may be available and all combinations may not be possible. Please consult with factory.

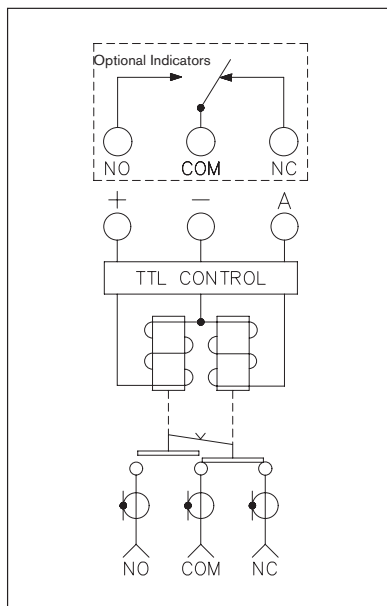
402 | Electrical Schematics

SPDT

01 402 Failsafe



02 402 Failsafe TTL



03 Logic Truth Table

FAILSAFE TTL - SCH #2

LOGIC TRUTH TABLE		
RF PATH	INDICATOR PATH	LOGIC INPUT "A"
NC-COM	NC-COM	0
NO-COM	NO-COM	1

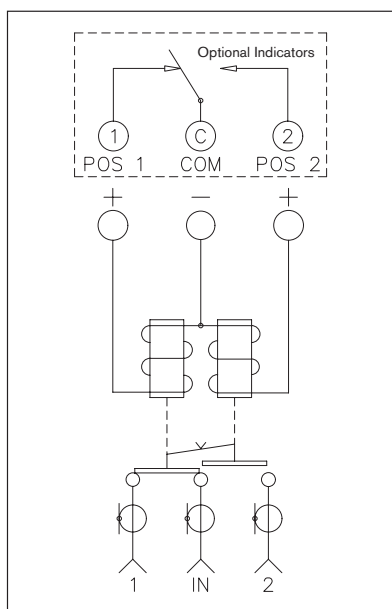
"0" = 0.0V-0.8V
"1" = 2.4V-5.5V

SELF CUTOFF TTL - SCH #6

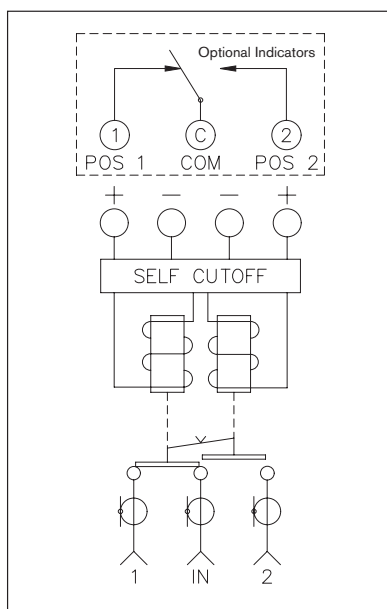
LOGIC TRUTH TABLE			
RF PATH	INDICATOR PATH	LOGIC INPUT "A"	LOGIC INPUT "B"
IN-1	COM-1	1	0
IN-2	COM-2	0	1

"0" = 0.0V-0.8V
"1" = 2.4V-5.5V

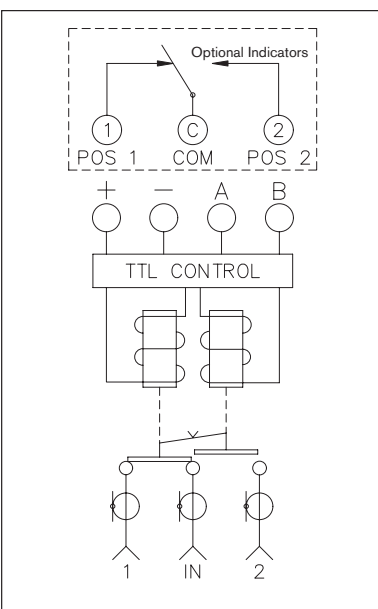
04 402 Pulse



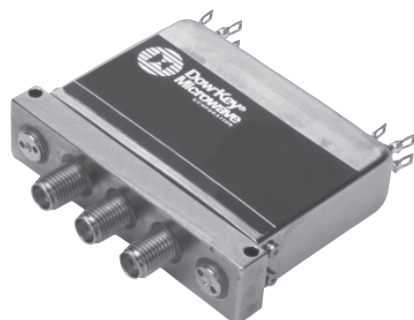
05 402 Self Cutoff



06 402 Self Cutoff TTL



SPDT or 2/3 521U Failsafe Unterminated/Terminated | SMA



- DC-18 GHz
- DC-26.5 GHz
- Low/Medium Power
- 5M Life Cycles

RF Characteristics

Frequency GHz	VSWR (max)	Isolation dB (min)	Ins. Loss dB (max)
DC-1	1.10	85	0.10
1-4	1.15	80	0.15
4-8	1.20	70	0.20
8-12	1.30	65	0.30
12-18	1.35	60	0.35
*18-26.5	1.50	55	0.50

* Performance varies depending on selected options

Specifications

Operating Voltage (across temperature range):

12 Vdc (11-14 Vdc)
24 Vdc (20-28 Vdc)
28 Vdc (24-32 Vdc)

Coil Current (max. @ nom. Vdc & 25°C)*:

12 Vdc 450 mA
24 Vdc 225 mA
28 Vdc 200 mA

Switching Time:

15 ms maximum

Operating Temperature:

-25°C to +65°C (Standard)
-55°C to +85°C (Extended "T" Option)

Mechanical Life Cycles:

5,000,000 minimum

Vibration, Operating:

10G RMS, 20-2000 Hz

Mechanical Shock, Non-Operating:

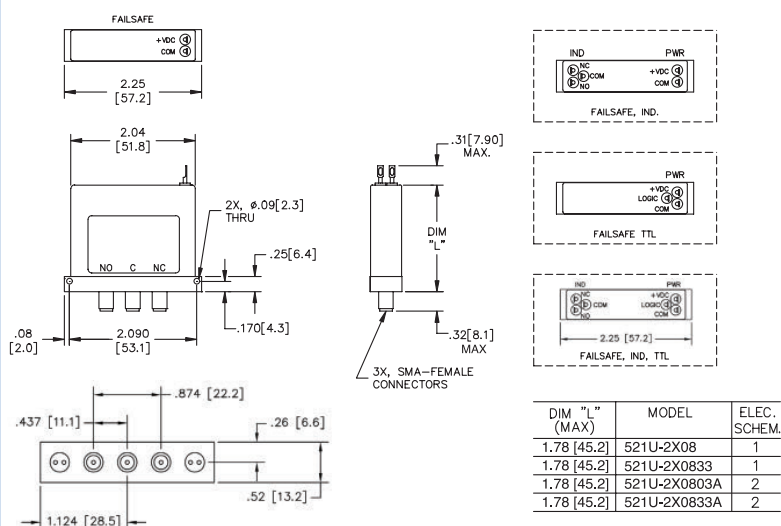
30G, 1/2 Sine, 11 ms

Nominal Weight*:

2.5 oz. (71 g.)

* Performance and weight varies depending on selected options.

Mechanical



521U-2X0803 Shown

For Electrical Schematic, see page # 1-12

Part Number Selector

521 J U - 2 2 08 03 A - ROHS

Special Options	Actuator	Coil Voltage	Connectors	Indicators	Circuit Options
I = Immersion Seal	2 = Failsafe	2 = 12 Vdc	08 = SMA Female	02 = No Indicators, Unterminated Ports*	A = TTL High
J = 'D' Connector	6 = Failsafe with Suppression Diode	3 = 28 Vdc		03 = No Indicators, 2W Terminations	L = TTL Low
K = 26.5 GHz		8 = 24 Vdc		**32 = Indicators, Unterminated Ports	* Declared only with Circuit Options
R = (+) Com				**33 = Indicators, 2W Terminations	** Offered with 1M Life Cycles 521-Series
T = -55°C to +85°C					

TTL option includes suppression diode. Other options may be available and all combinations may not be possible. Please consult with factory.

521U Latching Underminated/Terminated | SMA

SPDT or 2/3



- DC-18 GHz
- DC-26.5 GHz
- Low/Medium Power
- 5M Life Cycles

RF Characteristics

Frequency GHz	VSWR (max)	Isolation dB (min)	Ins. Loss dB (max)
DC-1	1.10	85	0.10
1-4	1.15	80	0.15
4-8	1.20	70	0.20
8-12	1.30	65	0.30
12-18	1.35	60	0.35
*18-26.5	1.50	55	0.50

* Performance varies depending on selected options

Specifications

Operating Voltage (across temperature range):

12 Vdc (11-14 Vdc)
24 Vdc (20-28 Vdc)
28 Vdc (24-32 Vdc)

Coil Current (max. @ nom. Vdc & 25°C)*:

12 Vdc 265 mA
24 Vdc 205 mA
28 Vdc 175 mA

Switching Time:

15 ms maximum

Operating Temperature:

-25°C to +65°C (Standard)
-55°C to +85°C (Extended "T" Option)

Mechanical Life Cycles*:

5,000,000 minimum

Vibration, Operating:

10G RMS, 20-2000 Hz

Mechanical Shock, Non-Operating:

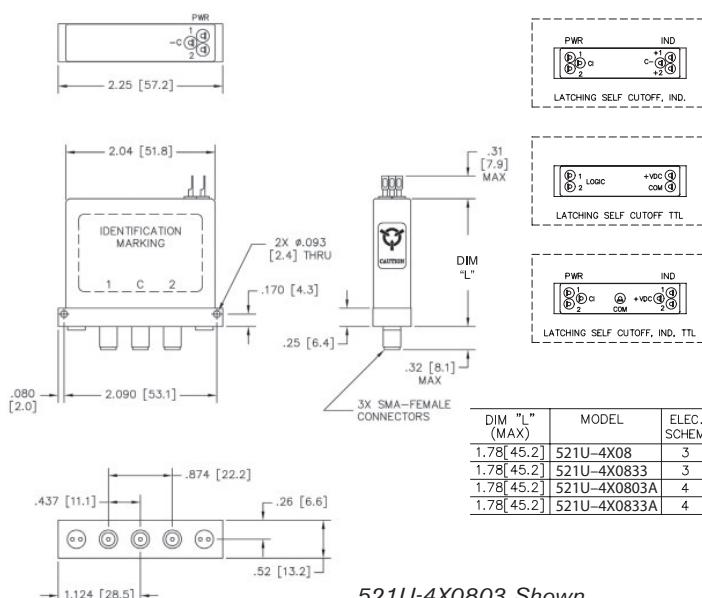
30G, 1/2 Sine, 11 ms

Nominal Weight*:

2.5 oz. (71 g.)

* Performance and weight varies depending on selected options.

Mechanical



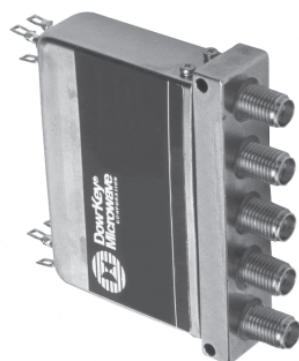
Part Number Selector

521 J U - 4 2 08 03 A - ROHS

Special Options	Actuator	Coil Voltage	Connectors	Indicators	Circuit Options
I = Immersion Seal	3 = Pulse Latching	2 = 12 Vdc	08 = SMA Female	02 = No Indicators, Underminated Ports*	A = TTL High
J = 'D' Connector	4 = Latching Self Cutoff	3 = 28 Vdc		03 = No Indicators, 2W Terminations	L = TTL Low
K = 26.5 GHz		8 = 24 Vdc		**32 = Indicators, Underminated Ports	* Declared only with Circuit Options
R = (+) Com				**33 = Indicators, 2W Terminations	** Offered with 1M Life Cycles 521-Series
T = -55°C to +85°C					

TTL option includes suppression diode. Other options may be available and all combinations may not be possible. Please consult with factory.

SPDT or 2/3 521Y Failsafe Unterminated/Terminated | 2.9 mm (K)



- DC-40 GHz
- Low Power
- 1M Life Cycles

RF Characteristics

Frequency GHz	VSWR (max)	Isolation dB (min)	Ins. Loss dB (max)
DC-6	1.30	80	0.30
6-12	1.40	70	0.40
12-18	1.50	65	0.50
18-26.5	1.70	60	0.70
26.5-40	1.80	55	0.80

Specifications

Operating Voltage (across temperature range):

12 Vdc (11-14 Vdc)
28 Vdc (24-32 Vdc)

Coil Current (max. @ nom. Vdc & 25°C)*:

12 Vdc 450 mA
24 Vdc 225 mA
28 Vdc 200 mA

Switching Time:

20 ms maximum

Operating Temperature:

-25°C to +65°C (Standard)
-55°C to +85°C (Extended "T" Option)

Mechanical Life Cycles*:

1,000,000 minimum

Vibration, Operating:

10G RMS, 20-2000 Hz

Mechanical Shock, Non-Operating:

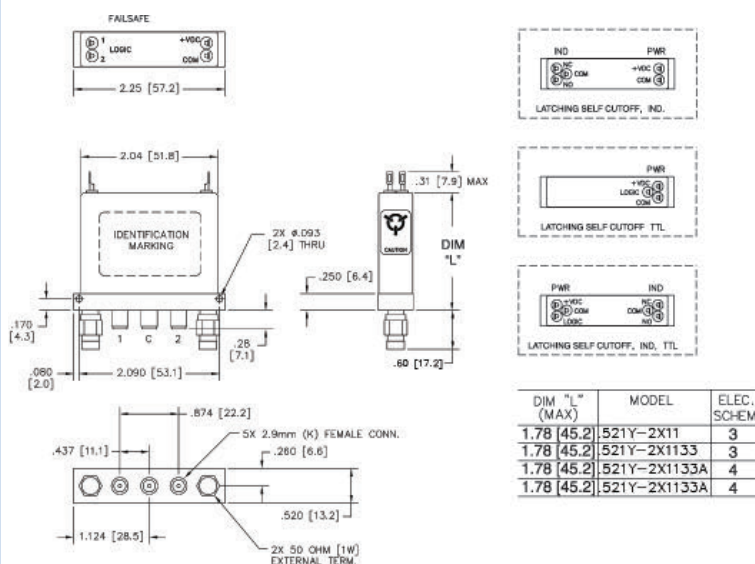
30G, 1/2 Sine, 11 ms

Nominal Weight*:

2.5 oz. (71 g.)

* Performance and weight varies depending on selected options.

Mechanical



Part Number Selector

521 J Y - 2 2 11 03 A - ROHS

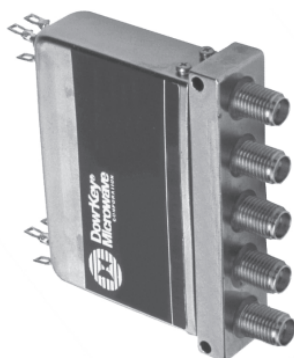
Special Options	Actuator	Coil Voltage	Connectors	Indicators	Circuit Options
I = Immersion Seal J = 'D' Connector T = -55°C to +85°C	2 = Failsafe	2 = 12 Vdc 3 = 28 Vdc 8 = 24 Vdc	11 = 2.9 mm	02 = No Indicators, Unterminated Ports* 03 = No Indicators, 1W External Terminations 32 = Indicators, Unterminated Ports 33 = Indicators, 1W External Terminations	A = TTL High L = TTL Low

* Declared only with Circuit Options

TTL option includes suppression diode. Other options may be available and all combinations may not be possible. Please consult with factory.

521Y Latching Underterminated/Terminated | SMA

SPDT or 2/3



- DC-40 GHz
- Low Power
- 1M Life Cycles

RF Characteristics

Frequency GHz	VSWR (max)	Isolation dB (min)	Ins. Loss dB (max)
DC-6	1.30	80	0.30
6-12	1.40	70	0.40
12-18	1.50	65	0.50
18-26.5	1.70	60	0.70
26.5-40	1.80	55	0.80

Specifications

Operating Voltage (across temperature range):

- 12 Vdc (11-14 Vdc)
- 28 Vdc (24-32 Vdc)

Coil Current (typ. @ nom. Vdc & 25°C)*:

- 12 Vdc 440 mA
- 24 Vdc 220 mA
- 28 Vdc 190 mA

Switching Time:

- 20 ms maximum

Operating Temperature:

- 25°C to +65°C (Standard)
- 55°C to +85°C (Extended "T" Option)

Mechanical Life Cycles:

- 1,000,000 minimum

Vibration, Operating:

- 10G RMS, 20-2000 Hz

Mechanical Shock, Non-Operating:

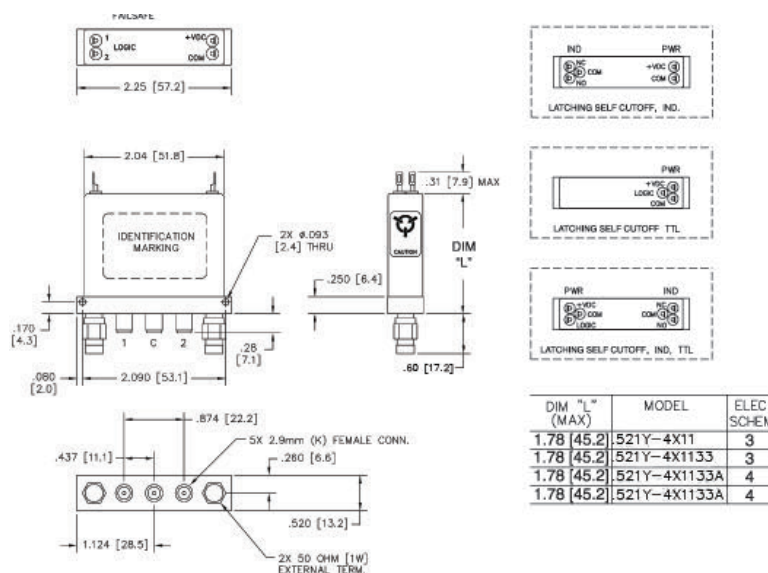
- 30G, 1/2 Sine, 11 ms

Nominal Weight*:

- 2.5 oz. (71 g.)

* Performance and weight varies depending on selected options.

Mechanical



521Y-421103A shown
For Electrical Schematic, see page # 1-12

Part Number Selector

521 J Y - 4 2 11 03 A - ROHS

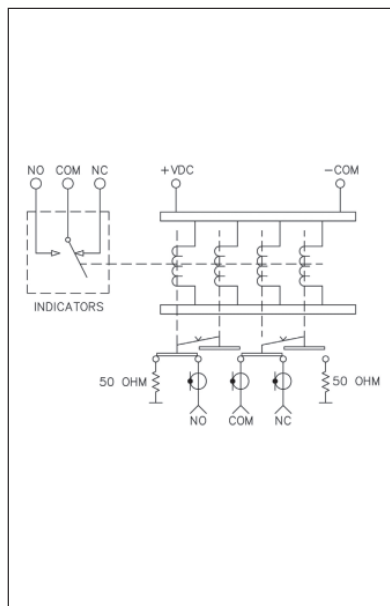
Special Options	Actuator	Coil Voltage	Connectors	Indicators	Circuit Options
I = Immersion Seal	4 = Latching Self Cutoff	2 = 12 Vdc	11 = 2.9 mm	02 = No Indicators, Underterminated Ports*	A = TTL High
J = 'D' Connector		3 = 28 Vdc		03 = No Indicators, 1W External Terminations	L = TTL Low
R = Common Positive		8 = 24 Vdc		32 = Indicators, Underterminated Ports	
T = -55°C to +85°C				33 = Indicators, 1W External Terminations	

* Declared only with Circuit Options

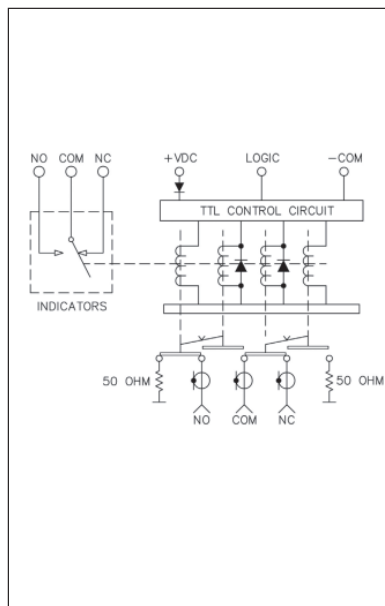
TTL option includes suppression diode. Other options may be available and all combinations may not be possible. Please consult with factory.

SPDT or 2/3 521U/521Y | Electrical Schematics

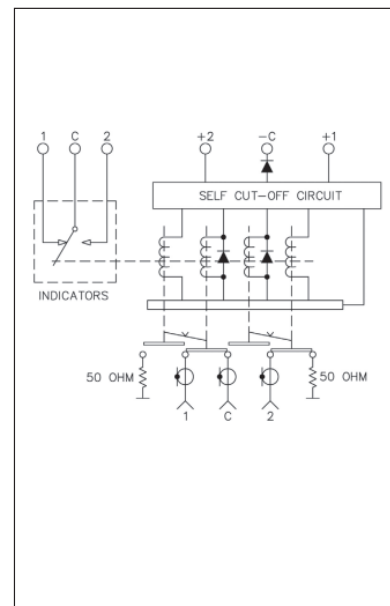
01 521U/521Y Failsafe



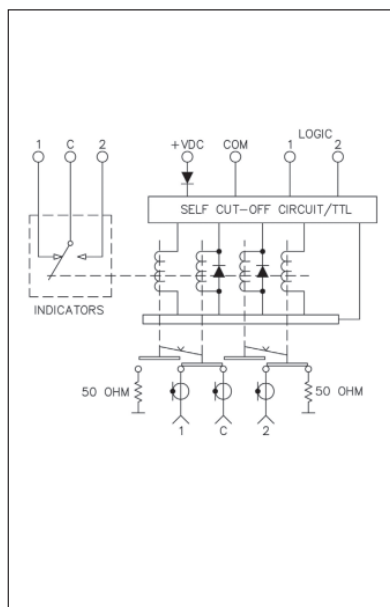
02 521U/521Y Failsafe TTL



03 521U/521Y Self Cutoff



04 521U/521Y Self Cutoff TTL



05 521U/521Y Logic Truth Table

FAILSAFE TTL - SCH #2

LOGIC TRUTH TABLE		
RF PATH	INDICATOR PATH	LOGIC INPUT
NC-COM	NC-COM	0
NO-COM	NO-COM	1

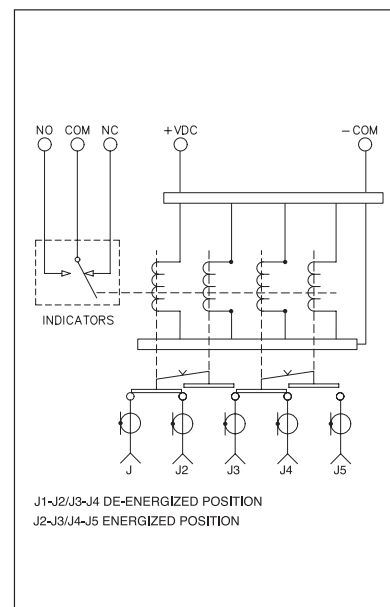
LOGIC HI (ON) 1 = 2.4-5.5Vdc
LOGIC LOW (OFF) 0 = 0-0.8Vdc

SELF CUTOFF TTL - SCH #4

LOGIC TRUTH TABLE		
RF PATH	LOGIC INPUT "1"	LOGIC INPUT "2"
C-1	1	0
C-2	0	1

LOGIC HI (ON) = 2.4-5.5Vdc
LOGIC LOW (OFF) = 0-0.8Vdc

06 521U Unterminated



J1-J2/J3-J4 DE-ENERGIZED POSITION
J2-J3/J4-J5 ENERGIZED POSITION

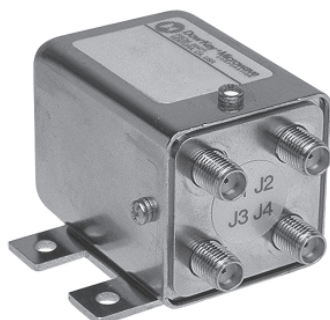
Note: Diagram shown as Failsafe Unterminated. Consult with factory for other options.

DPDT/TRANSFER COAXIAL SWITCH



DPDT

411C Failsafe | SMA, 2.9 mm (K)



- DC-18 GHz
- DC-40 GHz
- Low/Medium Power
- 1M/5M Life Cycles

RF Characteristics

Frequency GHz	VSWR (max)	Isolation dB (min)	Ins. Loss dB (max)
DC-1	1.10	85	0.10
1-4	1.20	80	0.20
4-8	1.30	70	0.30
8-12	1.40	65	0.40
12-18	1.50	60	0.50

For DC-40 GHz switches contact the factory

Specifications

Operating Voltage (across temperature range):

12 Vdc (11-14 Vdc)
24 Vdc (20-28 Vdc)
28 Vdc (24-32 Vdc)

Coil Current (max. @ nom. Vdc & 25°C)*:

12 Vdc 350 mA
24 Vdc 205 mA
28 Vdc 145 mA

Switching Time:

20 ms maximum

Operating Temperature:

-25°C to +65°C (Standard)
-55°C to +85°C (Extended "T" Option)

Mechanical Life Cycles*:

1,000,000 minimum
5,000,000 minimum ("U" Option)

Vibration, Operating:

10G RMS, 20-2000 Hz

Mechanical Shock, Non-Operating:

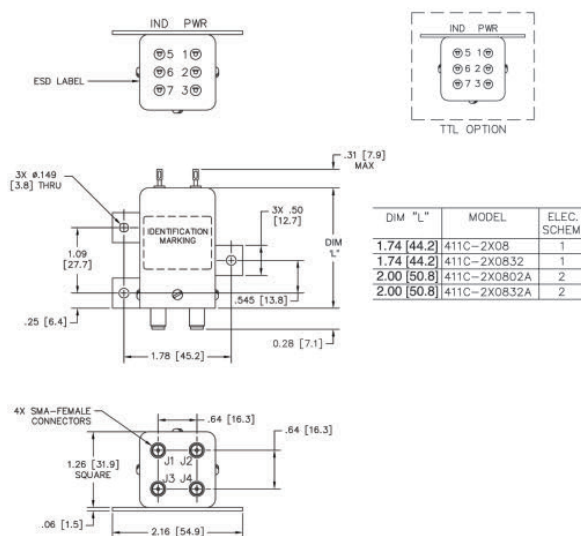
30G, 1/2 Sine, 11 ms

Nominal Weight*:

4.0 oz. (113 g.)

* Performance and weight varies depending on selected options

Mechanical



411C-2X0832A Shown

For Electrical Schematic, see page # 2-6

Part Number Selector

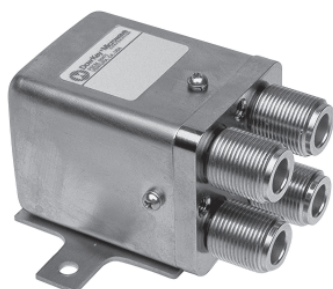
411C J - 2 2 08 02 A - ROHS					
Special Options	Actuator	Coil Voltage	Connectors	Indicators	Circuit Options
A = High Power	2 = Failsafe	2 = 12 Vdc	08 = SMA Female	02 = No Indicators*	A = TTL High
B = Bypass (J2-J4)	6 = Failsafe with Suppression Diode	3 = 28 Vdc	11 = 2.9 mm (K)	32 = Indicators	L = TTL Low
D = Bypass (J1-J2)		8 = 24 Vdc			
E = Bypass (J3-J4)					
F = Bypass (J1-J3)					
I = Immersion Seal					
J = 'D' Connector					
N = No Mounting Bracket					
S = Epoxy Seal					
T = -55°C to + 85°C					
U = 5M Life Cycles					
Y = 40 GHz					

* Declared only with Circuit Options

TTL option includes suppression diode. Other options may be available and all combinations may not be possible. Please consult with factory.

DPDT

412 Failsafe | N, BNC, TNC, SC



- DC-2 GHz
- DC-6 GHz
- DC-12.4 GHz
- Medium/High Power
- 1M Cycles

RF Characteristics

Frequency GHz	VSWR (max)	Isolation dB (min)	Ins. Loss dB (max)
DC-1	1.15	85	0.15
1-2	1.20	80	0.20
2-4	1.25	70	0.25
4-8	1.45	60	0.40
8-12.4	1.60	60	0.60

Performance applies to N and TNC type connectors.
Consult with factory for other performances.

Specifications

Operating Voltage (across temperature range):

12 Vdc (11-14 Vdc)
24 Vdc (20-28 Vdc)
28 Vdc (24-32 Vdc)

Coil Current (max. @ nom. Vdc & 25°C)*:

12 Vdc 320 mA
24 Vdc 200 mA
28 Vdc 185 mA

Switching Time:

20 ms maximum

Operating Temperature:

-25°C to +65°C (Standard)
-55°C to +85°C (Extended "T" Option)

Mechanical Life, Cycles:

1,000,000 minimum

Vibration, Operating:

10G RMS, 20-2000 Hz

Mechanical Shock, Non-Operating:

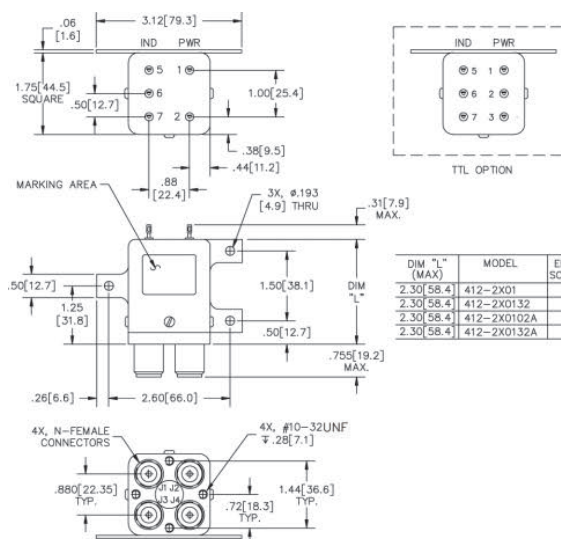
30G, 1/2 Sine, 11 ms

Nominal Weight*:

14 oz. (397 g.)

* Performance and weight varies depending on selected options.

Mechanical



412-2X0132 Shown

For Electrical Schematic, see page # 2-6

Part Number Selector

412 J - 2 2 01 02 A - ROHS

Special Options

A = High Power
C = Special Mounting Bracket
J = 'D' Connector
N = No Mounting Bracket
P = Power Plug
S = Epoxy Seal
T = -55°C to + 85°C

Actuator

2 = Failsafe
6 = Failsafe with Suppression Diode

Coil Voltage

2 = 12 Vdc
3 = 28 Vdc
8 = 24 Vdc

Connectors

01 = N Female
02 = BNC Female
03 = TNC Female
53 = SC Female*

Indicators

02 = No Indicators**
32 = Indicators
** Declared only with Circuit Options

Circuit Options

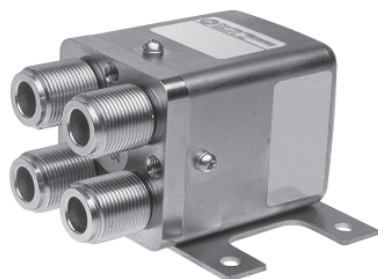
A = TTL High

* Contact Dow-Key for dimensions

TTL option includes suppression diode. Other options may be available and all combinations may not be possible. Please consult with factory.

412 Latching | N, BNC, TNC, SC

DPDT



- DC-2 GHz
- DC-6 GHz
- DC-12.4 GHz
- Medium/High Power
- 1M Cycles

RF Characteristics

Frequency GHz	VSWR (max)	Isolation dB (min)	Ins. Loss dB (max)
DC-1	1.15	85	0.15
1-2	1.20	80	0.20
2-4	1.25	70	0.25
4-8	1.45	60	0.40
8-12.4	1.60	60	0.60

Performance applies to N and TNC type connectors.
Consult with factory for other performances.

Specifications

Operating Voltage (across temperature range):

12 Vdc (11-14 Vdc)
24 Vdc (20-28 Vdc)
28 Vdc (24-32 Vdc)

Coil Current (max. @ nom. Vdc & 25°C)*:

12 Vdc 320 mA
24 Vdc 240 mA
28 Vdc 185 mA

Switching Time:

20 ms maximum

Operating Temperature:

-25°C to +65°C (Standard)
-55°C to +85°C (Extended "T" Option)

Mechanical Life, Cycles:

1,000,000 minimum

Vibration, Operating:

10G RMS, 20-2000 Hz

Mechanical Shock, Non-Operating:

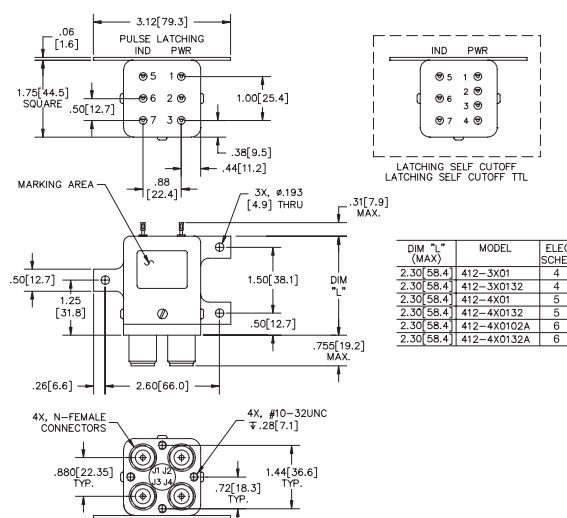
30G, 1/2 Sine, 11 ms

Nominal Weight*:

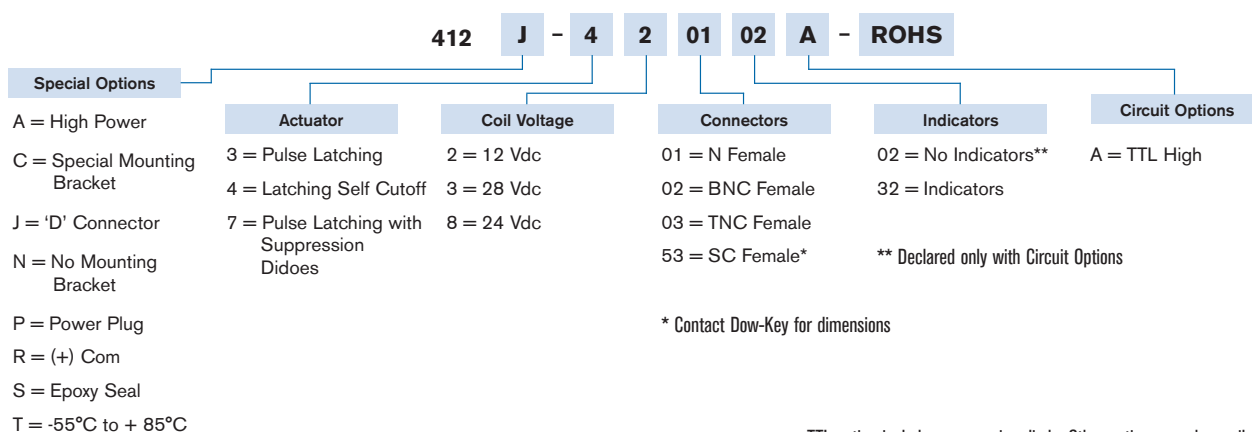
14 oz. (397 g.)

* Performance and weight varies depending on selected options.

Mechanical



Part Number Selector

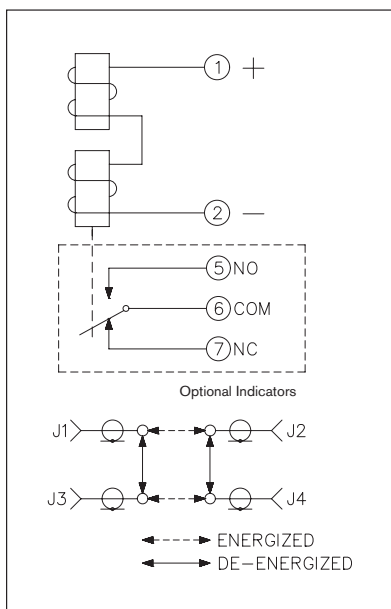


TTL option includes suppression diode. Other options may be available and all combinations may not be possible. Please consult with factory.

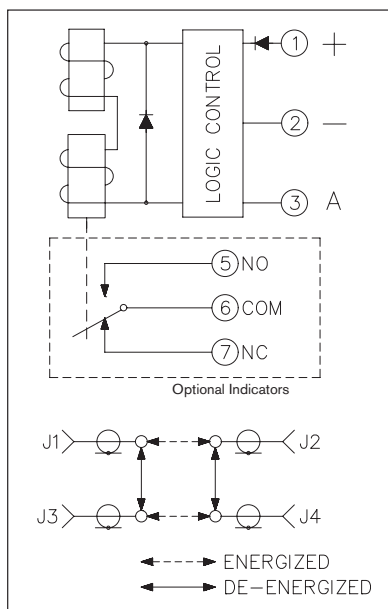
DPDT

411C/412 | Electrical Schematics

01 411C/412 Failsafe



02 411C/412 Failsafe TTL



03 Logic Truth Table

FAILSAFE TTL - SCH #2

LOGIC TRUTH TABLE		
RF PATH	INDICATOR PATH	LOGIC INPUT "A"
J1-J3/J2-J4	NC-COM	0
J1-J2/J3-J4	NO-COM	1

"0" = 0.0V-0.8V

"1" = 2.4V-5.5V

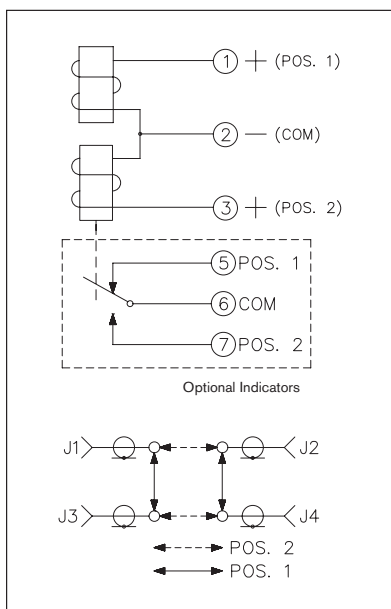
SELF CUTOFF TTL - SCH #6

LOGIC TRUTH TABLE			
RF PATH	INDICATOR PATH	LOGIC INPUT "A"	LOGIC INPUT "B"
J1-J3/J2-J4	COM-1	1	0
J1-J2/J3-J4	COM-2	0	1

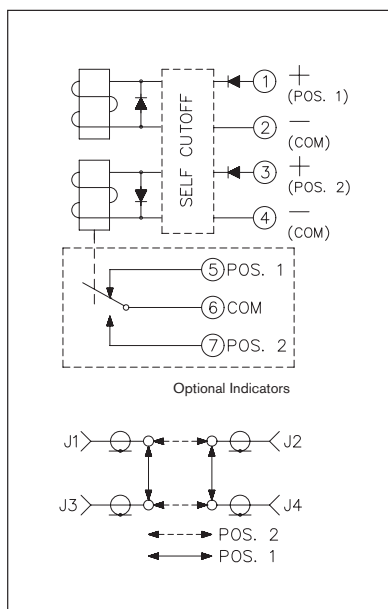
"0" = 0.0V-0.8V

"1" = 2.4V-5.5V

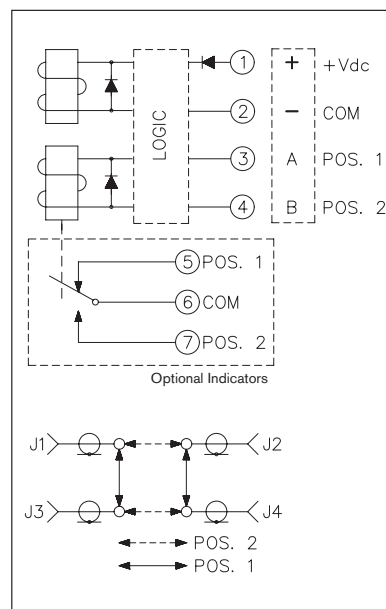
04 411C/412 Pulse



05 411C/412 Self Cutoff



06 411C/412 Self Cutoff TTL



SP3T-SP14T MULTIPOSITION COAXIAL SWITCH



SP3T-SP6T

535-565 Normally Open | SMA, 2.9mm (K)



- DC-18 GHz
- DC-26.5 GHz
- DC-40 GHz
- Low/Medium Power
- 1M Life Cycles

RF Characteristics

Frequency GHz	VSWR (max)	Isolation dB (min)	Ins. Loss dB (max)
DC-4	1.20	70	0.20
4-8	1.30	65	0.30
8-12.4	1.40	65	0.40
12.4-18	1.50	60	0.50
*18-26.5	1.80	50	0.80

* Performance varies depending on selected options

For DC-40 GHz switches contact the factory

Specifications

Operating Voltage:

12 Vdc (11-14 Vdc)
24 Vdc (20-28 Vdc)
28 Vdc (24-32 Vdc)

Coil Current (max. @ nom. Vdc & 25°C)*:

12 Vdc 335 mA
24 Vdc 190 mA
28 Vdc 160 mA

Switching Time:

20 ms maximum

Operating Temperature:

-25°C to +65°C (Standard)
-55°C to +85°C (Extended "T" Option)

Mechanical Life Cycles:

1,000,000 minimum

Vibration, Operating:

10G RMS, 20-2000 Hz

Mechanical Shock, Non-Operating:

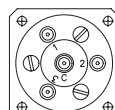
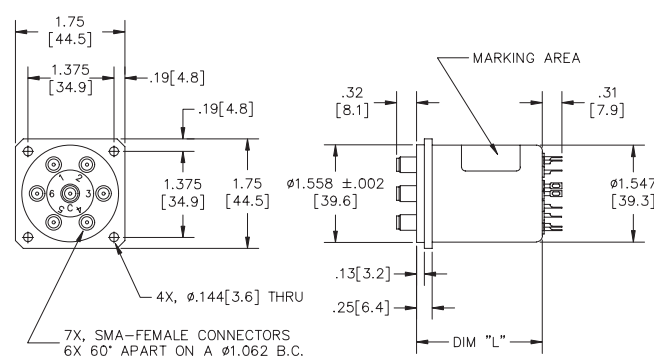
30G, 1/2 Sine, 11 ms

Nominal Weight*:

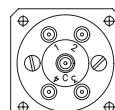
4.0 oz. (113 g.)

* Performance and weight varies depending on selected options.

Mechanical



3 POSITION



4 POSITION

DIM "L" (MAX)	MODEL	ELEC. SCHEM.
1.41 [35.8]	5X5-5X08	1
1.90 [48.3]	5X5-5X0822	1
1.70 [43.2]	5X5-5X0802A	2
2.10 [53.3]	5X5-5X0822A	2

565-530822 Shown

For Electrical Schematic, see page # 3-20

Part Number Selector

Family	Special Options	Actuator	Coil Voltage	Connectors	Indicators	Circuit Options
535 = SP3T	C = Mounting Bracket	5 = Normally Open	2 = 12 Vdc	08 = SMA Female	02 = No Indicators**	A = TTL High
545 = SP4T	J = 9 or 15 Pin 'D' Connector	9 = Normally Open Suppression Diodes	3 = 28 Vdc	11 = 2.9 mm (K)	22 = SPST Indicators	E = BCD Decoding
565 = SP6T	K = 26.5 GHz		8 = 24 Vdc			L = TTL Low
	P = Power Plug					
	R = (-) Com*					
	S = Epoxy Seal					
	T = -55° to +85° C					
	Y = 40 GHz					

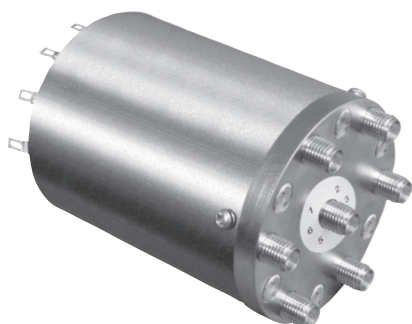
** Declared only with Circuit Options

* Only available with Normally Open Suppression Diodes

TTL option includes suppression diode. Other options may be available and all combinations may not be possible. Please consult with factory.

431-461 Normally Open Terminated | SMA

SP3T-SP6T



- DC-18 GHz
- DC-26.5 GHz
- Low/Medium Power
- 1M Life Cycles

RF Characteristics

Frequency GHz	VSWR (max)	Isolation dB (min)	Ins. Loss dB (max)
DC-4	1.20	80	0.20
4-8	1.30	70	0.30
8-12.4	1.40	65	0.40
12.4-18	1.50	60	0.50
*18-26.5	1.80	55	0.80

* Performance varies depending on selected options

Specifications

Operating Voltage:

12 Vdc (11-14 Vdc)
24 Vdc (20-28 Vdc)
28 Vdc (24-32 Vdc)

Coil Current (max. @ nom. Vdc & 25°C)*:

12 Vdc 345 mA
24 Vdc 200 mA
28 Vdc 160 mA

Switching Time:

15 ms maximum

Operating Temperature:

-25°C to +65°C (Standard)
-55°C to +85°C (Extended "T" Option)

Mechanical Life, Cycles:

1,000,000 minimum

Vibration, Operating:

10G RMS, 20-2000 Hz

Mechanical Shock, Non-Operating:

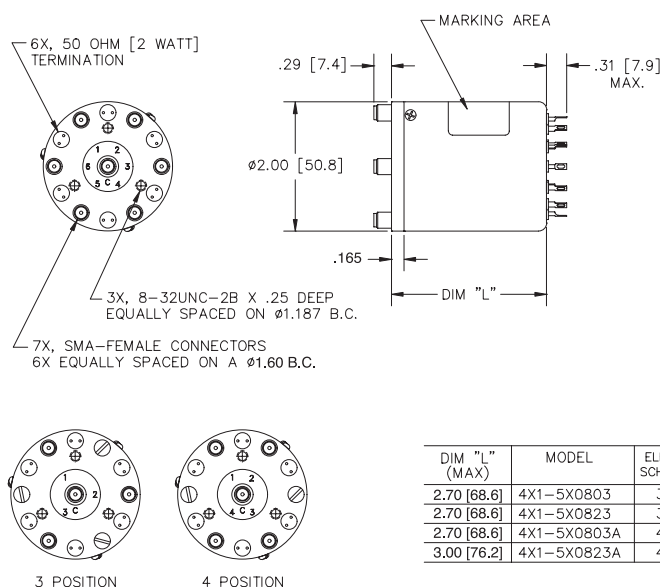
30G, 1/2 Sine, 11 ms

Nominal Weight*:

10.0 oz. (284 g.)

* Performance and weight varies depending on selected options.

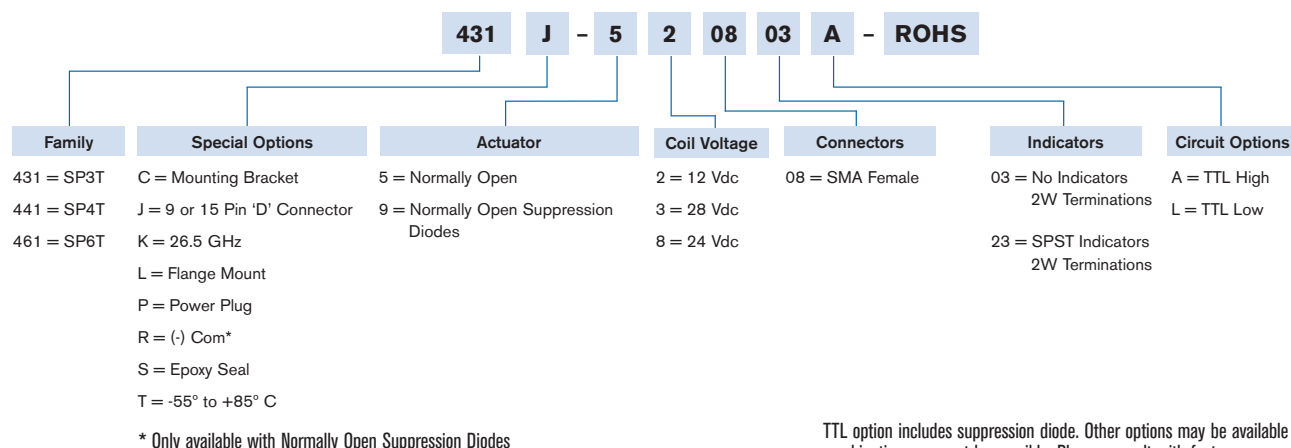
Mechanical



461-530823 Shown

For Electrical Schematic, see page # 3-20

Part Number Selector



TTL option includes suppression diode. Other options may be available and all combinations may not be possible. Please consult with factory.

SP3T-SP6T

431-461 Latching | SMA



- DC-18 GHz
- DC-26.5 GHz
- Low/Medium Power
- 1M Life Cycles

RF Characteristics

Frequency GHz	VSWR (max)	Isolation dB (min)	Ins. Loss dB (max)
DC-4	1.20	80	0.20
4-8	1.30	75	0.30
8-12.4	1.40	70	0.40
12.4-18	1.50	60	0.50
*18-26.5	1.80	55	0.80

* Performance varies depending on selected options

Specifications

Operating Voltage:

12 Vdc (11-14 Vdc)
24 Vdc (20-28 Vdc)
28 Vdc (24-32 Vdc)

Coil Current (max. @ nom. Vdc & 25°C)*:

12 Vdc 570 mA
24 Vdc 225 mA
28 Vdc 180 mA

Switching Time:

15 ms maximum

Operating Temperature:

-25°C to +65°C (Standard)
-55°C to +85°C (Extended "T" Option)

Mechanical Life Cycles:

1,000,000 minimum

Vibration, Operating:

10G RMS, 20-2000 Hz

Mechanical Shock, Non-Operating:

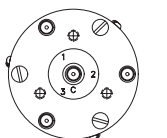
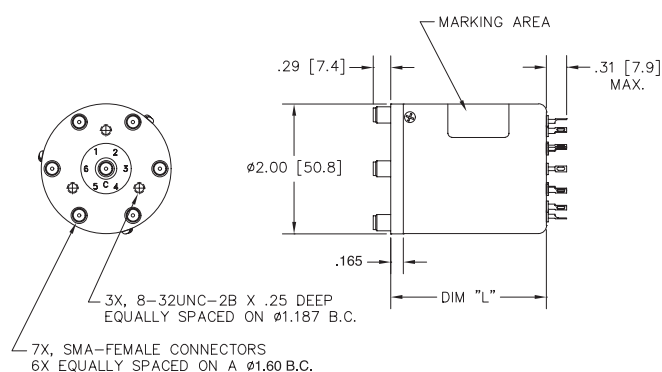
30G, 1/2 Sine, 11 ms

Nominal Weight*:

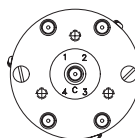
11.0 oz. (312 g.)

* Performance and weight varies depending on selected options.

Mechanical



3 POSITION



4 POSITION

DIM "L" (MAX)	MODEL	ELEC. SCHEM.
2.40 [61.0]	4X1-4X08	1
2.70 [68.6]	4X1-4X0822	1
3.00 [76.2]	4X1-4X0802A	2
3.00 [76.2]	4X1-4X0822A	2

461-430822 Shown

For Electrical Schematic, see page # 3-21

Part Number Selector

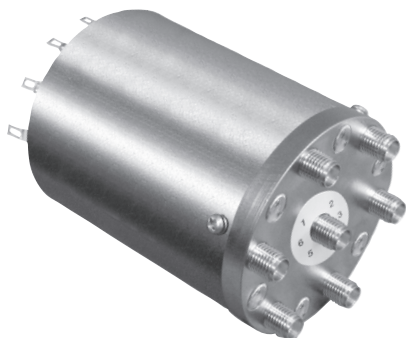
Family	Special Options	Actuator	Coil Voltage	Connectors	Indicators	Circuit Options
431 = SP3T	C = Mounting Bracket	4 = Latching Self Cutoff	2 = 12 Vdc	08 = SMA Female	02 = No Indicators*	A = TTL High
441 = SP4T	J = 9 or 15 Pin 'D' Connector		3 = 28 Vdc		22 = SPST Indicators	N = CANBus
461 = SP6T	K = 26.5 GHz		8 = 24 Vdc			
	L = Flange Mount					
	P = Power Plug					
	R = (-) Com					
	S = Epoxy Seal					
	T = -55° to +85° C					

** Declared only with Circuit Options

TTL option includes suppression diode. Other options may be available and all combinations may not be possible. Please consult with factory.

431-461 Latching Terminated | SMA

SP3T-SP6T



- DC-18 GHz
- DC-26.5 GHz
- Low/Medium Power
- 1M Life Cycles

RF Characteristics

Frequency GHz	VSWR (max)	Isolation dB (min)	Ins. Loss dB (max)
DC-4	1.20	80	0.20
4-8	1.30	75	0.30
8-12.4	1.40	70	0.40
12.4-18	1.50	60	0.50
*18-26.5	1.80	50	0.80

*Performance varies depending on selected options

Specifications

Operating Voltage:

12 Vdc (11-14 Vdc)
24 Vdc (20-28 Vdc)
28 Vdc (24-32 Vdc)

Coil Current (max. @ nom. Vdc & 25°C)*:

12 Vdc 570 mA
24 Vdc 225 mA
28 Vdc 180 mA

Switching Time:

15 ms maximum

Operating Temperature:

-25°C to +65°C (Standard)
-55°C to +85°C (Extended "T" Option)

Mechanical Life, Cycles:

1,000,000 minimum

Vibration, Operating:

10G RMS, 20-2000 Hz

Mechanical Shock, Non-Operating:

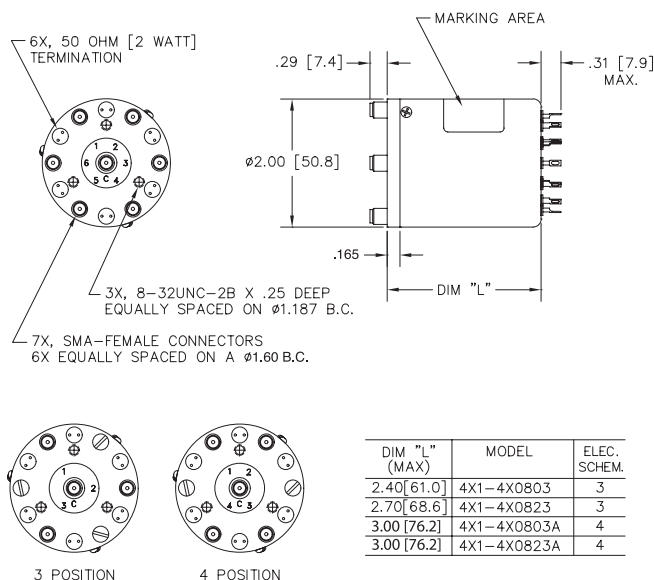
30G, 1/2 Sine, 11 ms

Nominal Weight*:

11.0 oz. (312 g.)

* Performance and weight varies depending on selected options.

Mechanical



461-430823 Shown

For Electrical Schematic, see page # 3-21

Part Number Selector

461 J - 4 2 08 03 A - ROHS						
Family	Special Options	Actuator	Coil Voltage	Connectors	Indicators	Circuit Options
431 = SP3T	C = Mounting Bracket	4 = Latching Self Cutoff	2 = 12 Vdc	08 = SMA Female	03 = No Indicators	A = TTL High
441 = SP4T	J = 9 or 15 Pin 'D' Connector		3 = 28 Vdc		2W Terminations	N = CANBus
461 = SP6T	L = Flange Mount		8 = 24 Vdc		23 = SPST Indicators	
	K = 26.5 GHz				2W Terminations	
	P = Power Plug					
	R = (-) Com					
	S = Epoxy Seal					
	T = -55° to +85° C					

TTL option includes suppression diode. Other options may be available and all combinations may not be possible. Please consult with factory.

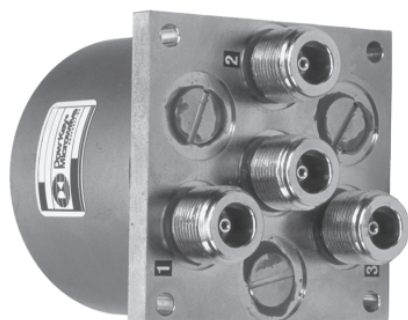
SP3T-SP6T

531-561 Normally Open | N, BNC, TNC, SC

RF Characteristics

Frequency GHz	VSWR (max)	Isolation dB (min)	Ins. Loss dB (max)
DC-4	1.25	70	0.30
4-8	1.45	60	0.40
8-12.4	1.70	55	0.70

Performance varies depending on selected options



- DC-2 GHz
- DC-6 GHz
- DC-12.4 GHz
- Medium/High Power
- 1M Life Cycles

Specifications

Operating Voltage:

12 Vdc (11-14 Vdc)
24 Vdc (20-28 Vdc)
28 Vdc (24-32 Vdc)

Coil Current (max. @ nom. Vdc & 25°C)*:

12 Vdc 105 mA
24 Vdc 70 mA
28 Vdc 60 mA

Switching Time:

20 ms maximum

Operating Temperature:

-25°C to +65°C (Standard)
-55°C to +85°C (Extended "T" Option)

Mechanical Life Cycles:

1,000,000 minimum

Vibration, Operating:

10G RMS, 20-2000 Hz

Mechanical Shock, Non-Operating:

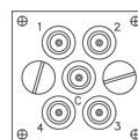
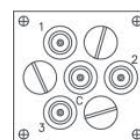
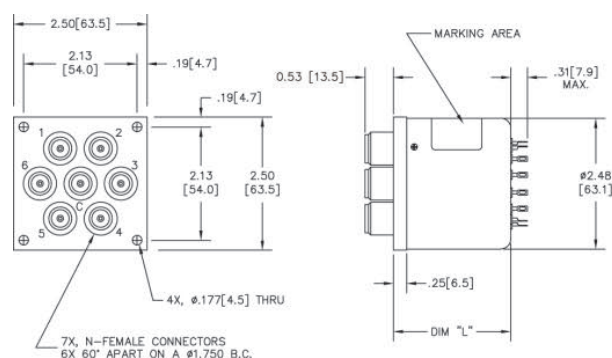
30G, 1/2 Sine, 11 ms

Nominal Weight*:

17.0 oz. (482 g.)

* Performance and weight varies depending on selected options.

Mechanical



DIM "L" (MAX)	MODEL	ELEC. SCHEM.
2.20 [55.9]	5X1-5X01	1
2.62 [66.5]	5X1-5X0122	1
2.90 [73.7]	5X1-5X0102A	2
2.90 [73.7]	5X1-5X0122A	2

561-530122 Shown

For Electrical Schematic, see page # 3-20

Part Number Selector

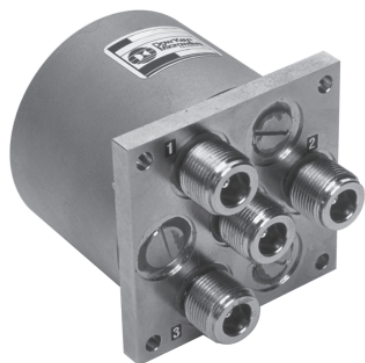
Family	Special Options	Actuator	Coil Voltage	Connectors	Indicators	Circuit Options
531 = SP3T	A = High Power	5 = Normally Open	2 = 12 Vdc	01 = N Female	02 = No Indicators*	A = TTL High
541 = SP4T	C = Mounting Bracket	9 = Normally Open Suppression Diodes	3 = 28 Vdc	02 = BNC Female	22 = SPST Indicators	
561 = SP6T	J = 9 or 15 Pin 'D' Connector		8 = 24 Vdc	03 = TNC Female		
	S = Epoxy Seal			53 = SC Female		
	T = -55° to +85° C					

** Declared only with Circuit Options

TTL option includes suppression diode. Other options may be available and all combinations may not be possible. Please consult with factory.

531-561 Latching | N, BNC, TNC, SC

SP3T-SP6T



- DC-2 GHz
- DC-6 GHz
- DC-12.4 GHz
- Medium/High Power
- 1M Life Cycles

RF Characteristics

Frequency GHz	VSWR (max)	Isolation dB (min)	Ins. Loss dB (max)
DC-4	1.25	70	0.30
4-8	1.45	60	0.40
8-12.4	1.70	55	0.70

Performance applies to N and TNC type connectors.
Consult with factory for other performances.

Specifications

Operating Voltage:

12 Vdc (11-14 Vdc)
24 Vdc (20-28 Vdc)
28 Vdc (24-32 Vdc)

Coil Current (max. @ nom. Vdc & 25°C)*:

12 Vdc 550 mA
24 Vdc 275 mA
28 Vdc 240 mA

Switching Time:

20 ms maximum

Operating Temperature:

-25°C to +65°C (Standard)
-55°C to +85°C (Extended "T" Option)

Mechanical Life, Cycles:

1,000,000 minimum

Vibration, Operating:

10G RMS, 20-2000 Hz

Mechanical Shock, Non-Operating:

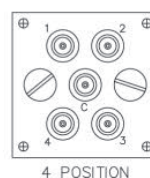
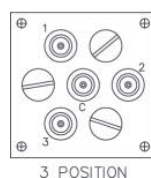
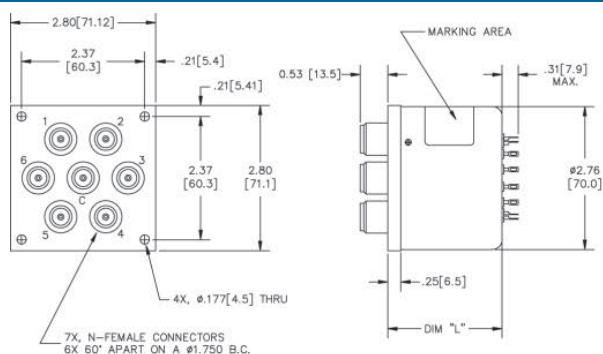
30G, 1/2 Sine, 11 ms

Nominal Weight*:

22.0 oz. (624 g.)

* Performance and weight varies depending on selected options.

Mechanical



DIM "L" (MAX)	MODEL	ELEC. SCHEM.
2.20 [55.9]	5X1-4X01	1
2.95 [74.9]	5X1-4X0122	1
2.95 [74.9]	5X1-4X0102A	2
2.95 [74.9]	5X1-4X0122A	2

561-430122A Shown

For Electrical Schematic, see page # 3-21

Part Number Selector

561 J - 4 2 01 02 A - ROHS						
Family	Special Options	Actuator	Coil Voltage	Connectors	Indicators	Circuit Options
531 = SP3T	A = High Power	4 = Latching Self Cutoff	2 = 12 Vdc	01 = N Female	02 = No Indicators*	A = TTL High
541 = SP4T	C = Mounting Bracket		3 = 28 Vdc	02 = BNC Female	22 = SPST Indicators	
561 = SP6T	J = 9 or 15 Pin 'D' Connector		8 = 24 Vdc	03 = TNC Female		
	P = Power Plug			53 = SC Female		
	R = (-) Com					
	S = Epoxy Seal					
	T = -55° to +85° C					

** Declared only with Circuit Options

TTL option includes suppression diode. Other options may be available and all combinations may not be possible. Please consult with factory.

SP3T-SP6T

531Y-561Y Latching Terminated | 2.9 mm (K)



461Y-4X11 Shown

- DC-40 GHz
- Medium/High Power
- 1M Life Cycles

RF Characteristics

Frequency GHz	VSWR (max)	Isolation dB (min)	Ins. Loss dB (max)
DC-6	1.30	70	0.30
6-12	1.40	60	0.40
12-18	1.50	60	0.50
18-26.5	1.70	55	0.70
26.5-40	1.95	50	0.95

Specifications

Operating Voltage (across temperature range):

12 Vdc (11-14 Vdc)
24 Vdc (20-28 Vdc)
28 Vdc (24-32 Vdc)

Coil Current (max. @ nom. Vdc & 25°C)*:

12 Vdc 565 mA
24 Vdc 255 mA
28 Vdc 220 mA

Switching Time:

15 ms maximum

Operating Temperature:

-25°C to +65°C (Standard)
-55°C to +85°C (Extended "T" Option)

Mechanical Life, Cycles:

1,000,000 minimum

Vibration, Operating:

10G RMS, 20-2000 Hz

Mechanical Shock, Non-Operating:

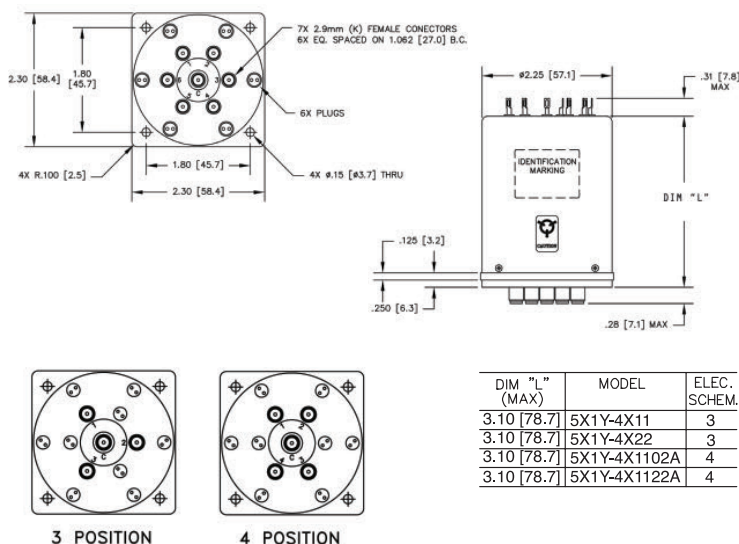
30G, 1/2 Sine, 11 ms

Nominal Weight:

11.0 oz. (312 g.)

* Performance and weight varies depending on selected options.

Mechanical



561Y-4311 Shown

For Electrical Schematic, see page # 3-21

Part Number Selector

561 J Y - 4 2 11 03 A - ROHS						
Family	Special Options	Actuator	Coil Voltage	Connectors	Indicators	Circuit Options
531 = SP3T 541 = SP4T 561 = SP6T	J = 9 or 15 Pin 'D' Connector P = Power Plug R = (-) Com S = Epoxy Seal T = -55° to +85° C	4 = Latching Self Cutoff	2 = 12 Vdc 3 = 28 Vdc 8 = 24 Vdc	11 = 2.9 mm (K)	03 = No Indicators, 1W External Terminations 23 = SPST Indicator, 1W External Terminations	A = TTL High

TTL option includes suppression diode. Other options may be available and all combinations may not be possible. Please consult with factory.

581 Normally Open | SMA

SP8T



- DC-18 GHz
- Low/Medium Power
- 1M Life Cycles

RF Characteristics

Frequency GHz	VSWR (max)	Isolation dB (min)	Ins. Loss dB (max)
DC-4	1.20	75	0.20
4-8	1.30	65	0.30
8-12.4	1.40	60	0.40
12.4-18	1.60	60	0.60

Performance varies depending on selected options

Specifications

Operating Voltage (across temperature range):

12 Vdc (11-14 Vdc)
24 Vdc (20-28 Vdc)
28 Vdc (24-32 Vdc)

Coil Current (max. @ nom. Vdc & 25°C)*:

12 Vdc 300 mA
24 Vdc 150 mA
28 Vdc 130 mA

Switching Time:

15 ms maximum

Operating Temperature:

-25°C to +65°C (Standard)
-55°C to +85°C (Extended "T" Option)

Mechanical Life Cycles:

1,000,000 minimum

Vibration, Operating:

10G RMS, 20-2000 Hz

Mechanical Shock, Non-Operating:

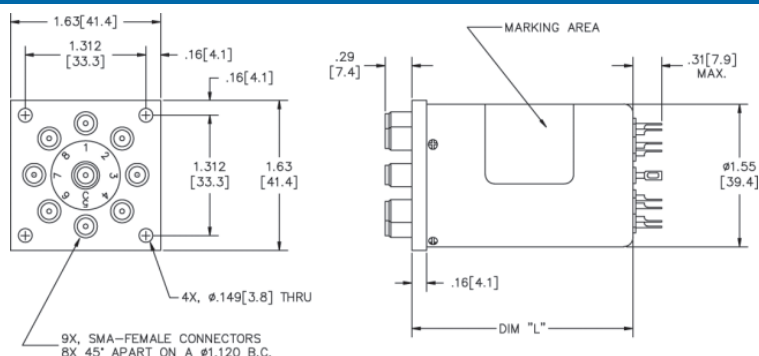
30G, 1/2 Sine, 11 ms

Nominal Weight*:

5.0 oz. (142 g.)

* Performance and weight varies depending on selected options.

Mechanical



DIM "L" (MAX)	MODEL	ELEC. SCHEM.
1.60 [40.6]	5Y1-5X08	1
2.04 [51.8]	5Y1-5X0822	1
1.91 [48.5]	5Y1-5X0802A	2
2.58 [65.5]	5Y1-5X0822A	2

581-530822 Shown

For Electrical Schematic, see page # 3-20

Part Number Selector

581 J - 5 2 08 02 A - ROHS

Special Options	Actuator	Coil Voltage	Connectors	Indicators	Circuit Options
C = Mounting Bracket	5 = Normally Open	2 = 12 Vdc	08 = SMA Female	02 = No Indicators*	A = TTL High
J = 9 or 26 Pin 'D' Connector	9 = Normally Open Suppression Diodes	3 = 28 Vdc		22 = SPST Indicators	N = CANBus
S = Epoxy Seal		8 = 24 Vdc			
T = -55° to +85° C					

* Declared only with Circuit Options

TTL option includes suppression diode. Other options may be available and all combinations may not be possible. Please consult with factory.

SP8T

581 Normally Open Terminated | SMA



- DC-18 GHz
- DC-26.5 GHz
- Low/Medium Power
- 1M Life Cycles

RF Characteristics

Frequency GHz	VSWR (max)	Isolation dB (min)	Ins. Loss dB (max)
DC-4	1.20	80	0.20
4-8	1.30	75	0.30
8-12.4	1.40	70	0.40
12.4-18	1.50	60	0.50
18-26.5	1.80	55	0.80

Performance may vary depending on selected options

Specifications

Operating Voltage:

12 Vdc (11-14 Vdc)
24 Vdc (20-28 Vdc)
28 Vdc (24-32 Vdc)

Coil Current (max. @ nom. Vdc & 25°C)*:

12 Vdc 345 mA
24 Vdc 175 mA
28 Vdc 150 mA

Switching Time:

15 ms maximum

Operating Temperature:

-25°C to +65°C (Standard)
-55°C to +85°C (Extended "T" Option)

Mechanical Life, Cycles:

1,000,000 minimum

Vibration, Operating:

10G RMS, 20-2000 Hz

Mechanical Shock, Non-Operating:

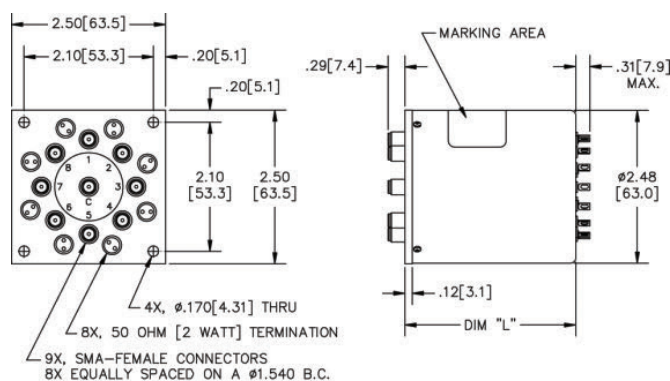
30G, 1/2 Sine, 11 ms

Nominal Weight:

16.5 oz. (468 g.)

* Performance and weight varies depending on selected options.

Mechanical



DIM "L" (MAX)	MODEL	ELEC. SCHEM.
2.00 [50.8]	5X1-5X0803	3
2.25 [57.2]	5X1-5X0823	3
2.80 [71.1]	5X1-5X0803A	4
2.80 [71.1]	5X1-5X0823A	4

581-530823 Shown

For Electrical Schematic, see page # 3-20

Part Number Selector

581 J - 5 2 08 03 A - ROHS

Special Options	Actuator	Coil Voltage	Connectors	Indicators	Circuit Options
J = 9 or 26 Pin 'D' Connector K = 26.5 GHz P = Power Plug R = (-) Com S = Epoxy Seal T = -55° to +85° C	5 = Normally Open 9 = Normally Open Suppression Diodes	2 = 12 Vdc 3 = 28 Vdc 8 = 24 Vdc	08 = SMA Female	03 = No Indicators 2W Terminations 23 = SPST Indicators 2W Terminations	A = TTL High E = BCD Decoding

TTL option includes suppression diode. Other options may be available and all combinations may not be possible. Please consult with factory.

581 Latching | SMA

SP8T



- DC-18 GHz
- Low/Medium Power
- 1M Life Cycles

RF Characteristics

Frequency GHz	VSWR (max)	Isolation dB (min)	Ins. Loss dB (max)
DC-4	1.20	80	0.20
4-8	1.30	75	0.30
8-12.4	1.40	70	0.40
12.4-18	1.50	60	0.50

Performance may vary depending on selected options

Specifications

Operating Voltage:

12 Vdc (11-14 Vdc)
24 Vdc (20-28 Vdc)
28 Vdc (24-32 Vdc)

Coil Current (max. @ nom. Vdc & 25°C)*:

12 Vdc 440 mA
24 Vdc 225 mA
28 Vdc 190 mA

Switching Time:

15 ms maximum

Operating Temperature:

-25°C to +65°C (Standard)
-55°C to +85°C (Extended "T" Option)

Mechanical Life, Cycles:

1,000,000 minimum

Vibration, Operating:

10G RMS, 20-2000 Hz

Mechanical Shock, Non-Operating:

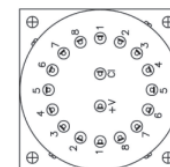
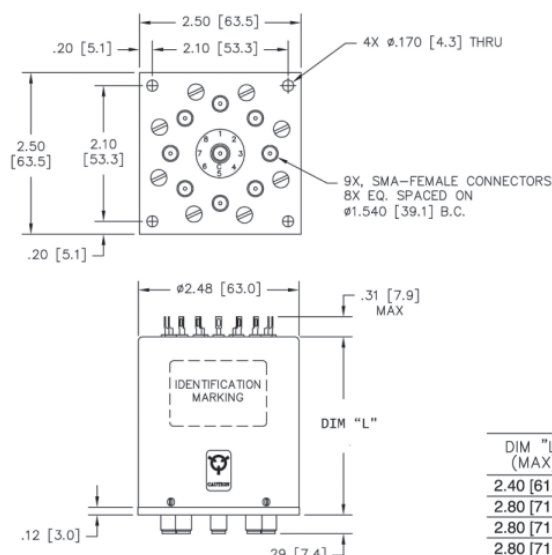
30G, 1/2 Sine, 11 ms

Nominal Weight*:

18.0 oz. (510 g.)

* Performance and weight varies depending on selected options.

Mechanical



DIM "L" (MAX)	MODEL	ELEC. SCHEM.
2.40 [61.0]	5Y1-4X08	1
2.80 [71.1]	5Y1-4X0822	1
2.80 [71.1]	5Y1-4X0102A	2
2.80 [71.1]	5Y1-4X01022A	2

581-430822 Shown

For Electrical Schematic, see page # 3-21

Part Number Selector

581 J - 4 2 08 02 A - ROHS

Special Options

J = 9 or 26 Pin 'D' Connector
P = Power Plug
R = (-) Com
S = Epoxy Seal
T = -55° to +85° C

Actuator

4 = Latching Self Cutoff

Coil Voltage

2 = 12 Vdc
3 = 28 Vdc
8 = 24 Vdc

Connectors

08 = SMA Female

Indicators

02 = No Indicators*
22 = SPST Indicators

Circuit Options

A = TTL High

* Declared only with Circuit Options

Note: TTL option includes suppression diode. Other options may be available and all combinations may not be possible. Please consult with factory.

SP8T

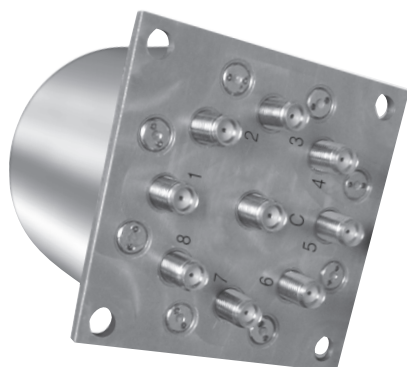
581 Latching Terminated | SMA

RF Characteristics

- DC-18 GHz
- DC-26.5 GHz
- Low/Medium Power
- 1M Life Cycles

Frequency GHz	VSWR (max)	Isolation dB (min)	Ins. Loss dB (max)
DC-4	1.20	80	0.20
4-8	1.30	75	0.30
8-12.4	1.40	70	0.40
12.4-18	1.50	60	0.50
18-26.5	1.70	55	0.70

Performance may vary depending on selected options



Specifications

Operating Voltage:

12 Vdc (11-14 Vdc)
24 Vdc (20-28 Vdc)
28 Vdc (24-32 Vdc)

Coil Current (max. @ nom. Vdc & 25°C)*:

12 Vdc 440 mA
24 Vdc 225 mA
28 Vdc 190 mA

Switching Time:

15 ms maximum

Operating Temperature:

-25°C to +65°C (Standard)
-55°C to +85°C (Extended "T" Option)

Mechanical Life, Cycles:

1,000,000 minimum

Vibration, Operating:

10G RMS, 20-2000 Hz

Mechanical Shock, Non-Operating:

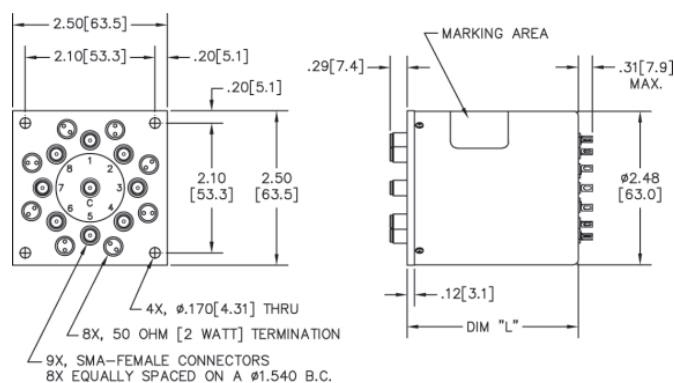
50G, 1/2 Sine, 11 ms

Nominal Weight:

18.0 oz. (510 g.)

* Performance and weight varies depending on selected options.

Mechanical



DIM "L" (MAX)	MODEL	ELEC. SCHEM.
2.40[61.0]	5Y1-4X0803	3
2.80[71.1]	5Y1-4X0823	3
2.80[71.1]	5Y1-4X0803A	4
2.80[71.1]	5Y1-4X0823A	4

581-430823 Shown

For Electrical Schematic, see page # 3-21

Part Number Selector

581 J - 4 2 08 03 A - ROHS

Special Options	Actuator	Coil Voltage	Connectors	Indicators	Circuit Options
J = 9 or 26 Pin 'D' Connector K = 26.5 GHz P = Power Plug R = (-) Com S = Epoxy Seal T = -55° to +85° C	4 = Latching Self Cutoff	2 = 12 Vdc 3 = 28 Vdc 8 = 24 Vdc	08 = SMA Female	03 = No Indicators 2W Terminations 23 = SPST Indicators 2W Terminations 53 = Indicators 2W Terminations*	A = TTL High N = CANBus

* Only used with CANBus Option

TTL option includes suppression diode. Other options may be available and all combinations may not be possible. Please consult with factory.

5A1 Normally Open | SMA

SP10T



- DC-18 GHz
- Low/Medium Power
- 1M Life Cycles

RF Characteristics

Frequency GHz	VSWR (max)	Isolation dB (min)	Ins. Loss dB (max)
DC-4	1.20	70	0.20
4-8	1.30	65	0.30
8-12.4	1.40	60	0.40
12.4-18	1.60	55	0.60

Performance may vary depending on selected options

Specifications

Operating Voltage:

12 Vdc (11-14 Vdc)
24 Vdc (20-28 Vdc)
28 Vdc (24-32 Vdc)

Coil Current (max. @ nom. Vdc & 25°C)*:

12 Vdc 300 mA
24 Vdc 150 mA
28 Vdc 135 mA

Switching Time:

15 ms maximum

Operating Temperature:

-25°C to +65°C (Standard)
-55°C to +85°C (Extended "T" Option)

Mechanical Life, Cycles:

1,000,000 minimum

Vibration, Operating:

10G RMS, 20-2000 Hz

Mechanical Shock, Non-Operating:

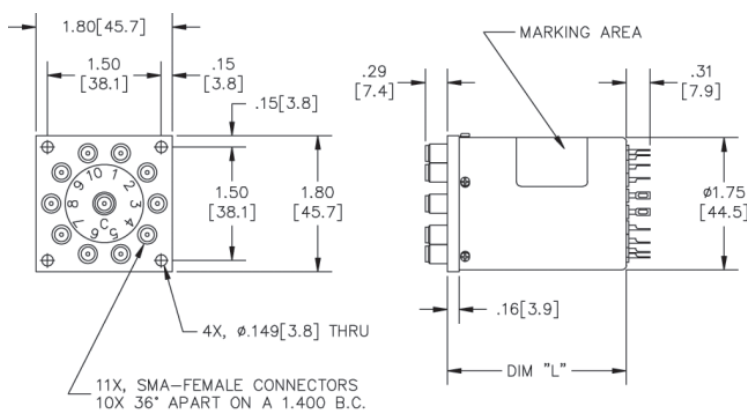
30G, 1/2 Sine, 11 ms

Nominal Weight:

5.5 oz. (156 g.)

* Performance varies depending on selected options.

Mechanical



DIM "L" (MAX)	MODEL	ELEC. SCHEM.
1.65 [41.9]	5Z1-5X08	1
2.40 [61.0]	5Z1-5X0822	1
2.25 [57.2]	5Z1-5X0802A	2
2.71 [57.2]	5Z1-5X0822A	2

5A1-530822 Shown

For Electrical Schematic, see page # 3-20

Part Number Selector

5A1 J - 5 2 08 02 A - ROHS

Special Options	Actuator	Coil Voltage	Connectors	Indicators	Circuit Options
J = 9 or 26 Pin 'D' Connector R = (-) Com* S = Epoxy Seal T = -55° to +85° C	5 = Normally Open 9 = Normally Open Suppression Diodes	2 = 12 Vdc 3 = 28 Vdc 8 = 24 Vdc	08 = SMA Female	02 = No Indicators** 22 = SPST Indicators	A = TTL High N = CANBus

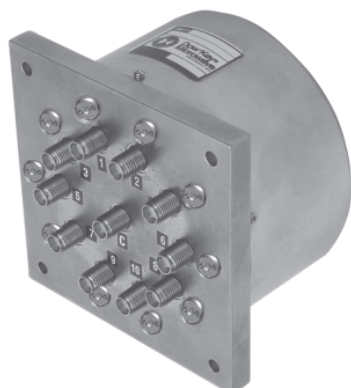
** Declared only with Circuit Options

* Only available with Normally Open Suppression Diodes

TTL option includes suppression diode. Other options may be available and all combinations may not be possible. Please consult with factory.

SP10T

5A1 Normally Open Terminated | SMA



- DC-18 GHz
- Low/Medium Power
- 1M Life Cycles

RF Characteristics

Frequency GHz	VSWR (max)	Isolation dB (min)	Ins. Loss dB (max)
DC-4	1.20	70	0.20
4-8	1.30	65	0.30
8-12.4	1.40	70	0.40
12.4-18	1.50	60	0.50

Performance may vary depending on selected options

Specifications

Operating Voltage:

12 Vdc (11-14 Vdc)
24 Vdc (20-28 Vdc)
28 Vdc (24-32 Vdc)

Coil Current (max. @ nom. Vdc & 25°C)*:

12 Vdc 345 mA
24 Vdc 175 mA
28 Vdc 150 mA

Switching Time:

20 ms maximum

Operating Temperature:

-25°C to +65°C (Standard)
-55°C to +85°C (Extended "T" Option)

Mechanical Life, Cycles:

1,000,000 minimum

Vibration, Operating:

10G RMS, 20-2000 Hz

Mechanical Shock, Non-Operating:

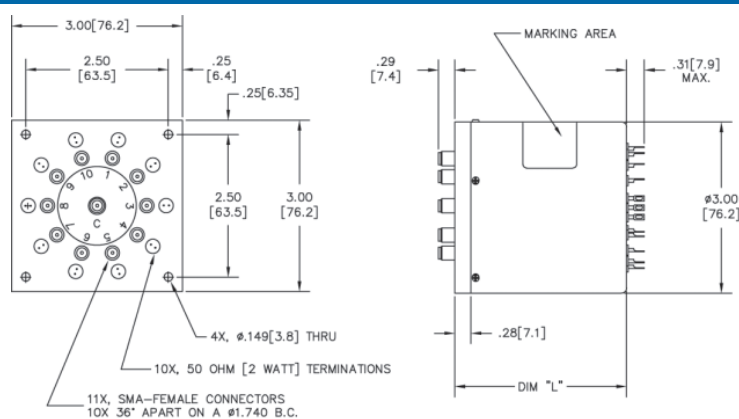
30G, 1/2 Sine, 11 ms

Nominal Weight*:

17.5 oz. (496 g.)

* Performance and weight varies depending on selected options.

Mechanical



DIM "L" (MAX)	MODEL	ELEC. SCHEM.
1.93 [49.0]	5Z1-5X0803	3
3.00 [76.2]	5Z1-5X0823	3
2.27 [57.6]	5Z1-5X0803A	4
2.80 [71.1]	5Z1-5X0823A	4

5A1-530823 Shown

For Electrical Schematic, see page # 3-20

Part Number Selector

5A1 J 5-2 08 03 A RØHS

Special Options	Actuator	Coil Voltage	Connectors	Indicators	Circuit Options
J = 15 or 26 Pin 'D' Connector R = (-) Com S = Epoxy Seal T = -55° to +85° C	5 = Normally Open	2 = 12 Vdc 3 = 28 Vdc 8 = 24 Vdc	08 = SMA Female	03 = No Indicators 2W Terminations 23 = SPST Indicators 2W Terminations	A = TTL High E = BCD Decoding

TTL option includes suppression diode. Other options may be available and all combinations may not be possible. Please consult with factory.

5A1 Latching | SMA

SP10T



- DC-18 GHz
- Low/Medium Power
- 1M Life Cycles

RF Characteristics

Frequency GHz	VSWR (max)	Isolation dB (min)	Ins. Loss dB (max)
DC-4	1.20	70	0.20
4-8	1.30	65	0.30
8-12.4	1.40	60	0.40
12.4-18	1.60	55	0.60

Performance may vary depending on selected options

Specifications

Operating Voltage:

12 Vdc (11-14 Vdc)
24 Vdc (20-28 Vdc)
28 Vdc (24-32 Vdc)

Coil Current (max. @ nom. Vdc & 25°C)*:

12 Vdc 440 mA
24 Vdc 225 mA
28 Vdc 190 mA

Switching Time*:

20 ms maximum

Operating Temperature:

-25°C to +65°C (Standard)
-55°C to +85°C (Extended "T" Option)

Mechanical Life, Cycles:

1,000,000 minimum

Vibration, Operating:

10G RMS, 20-2000 Hz

Mechanical Shock, Non-Operating:

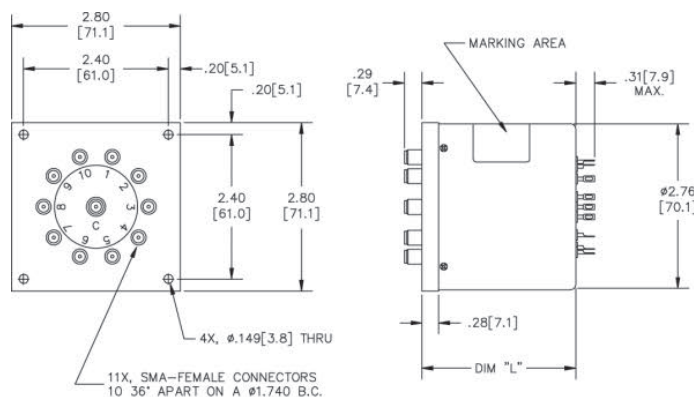
30G, 1/2 Sine, 11 ms

Nominal Weight*:

15.0 oz. (425 g.)

* Performance and weight varies depending on selected options.

Mechanical



DIM "L" (MAX)	MODEL	ELEC. SCHEM.
3.00 [76.2]	5Z1-4X08	1
3.00 [76.2]	5Z1-4X0822	1
3.00 [76.2]	5Z1-4X0802A	2
3.00 [76.2]	5Z1-4X0822A	2

5A1-430822 Shown

For Electrical Schematic, see page # 3-21

Part Number Selector

5A1 J - 4 2 08 02 A - ROHS

Special Options	Actuator	Coil Voltage	Connectors	Indicators	Circuit Options
J = 9 or 26 Pin 'D' Connector P = Power Plug R = (-) Com S = Epoxy Seal T = -55° to +85° C	4 = Latching Self Cutoff	2 = 12 Vdc 3 = 28 Vdc 8 = 24 Vdc	08 = SMA Female	02 = No Indicators* 22 = SPST Indicators	A = TTL High E = BCD Decoding

* Declared only with Circuit Options

TTL option includes suppression diode. Other options may be available and all combinations may not be possible. Please consult with factory.

SP10T

5A1 Latching Terminated | SMA



- DC-18 GHz
- Low/Medium Power
- 1M Life Cycles

RF Characteristics

Frequency GHz	VSWR (max)	Isolation dB (min)	Ins. Loss dB (max)
DC-4	1.20	70	0.20
4-8	1.30	65	0.30
8-12.4	1.40	60	0.40
12.4-18	1.60	55	0.60

Performance may vary depending on selected options

Specifications

Operating Voltage:

12 Vdc (11-14 Vdc)
24 Vdc (20-28 Vdc)
28 Vdc (24-32 Vdc)

Coil Current (max. @ nom. Vdc & 25°C)*:

12 Vdc 440 mA
24 Vdc 225 mA
28 Vdc 190 mA

Switching Time:

20 ms maximum

Operating Temperature:

-25°C to +65°C (Standard)
-55°C to +85°C (Extended "T" Option)

Mechanical Life, Cycles:

1,000,000 minimum

Vibration, Operating:

10G RMS, 20-2000 Hz

Mechanical Shock, Non-Operating:

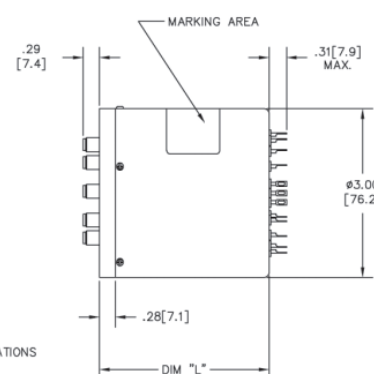
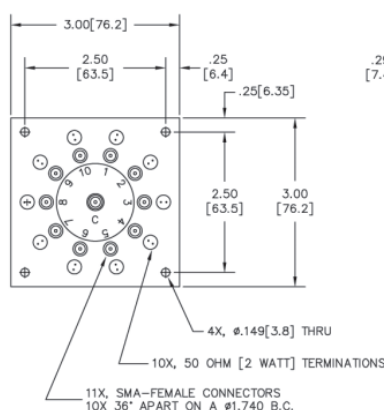
30G, 1/2 Sine, 11 ms

Nominal Weight*:

15 oz. (425 g.)

* Performance and weight varies depending on selected options.

Mechanical



DIM "L" (MAX)	MODEL	ELEC. SCHEM.
2.70 [68.6]	5Z1-4X0803	3
3.00 [76.2]	5Z1-4X0823	3
3.00 [76.2]	5Z1-4X0803A	4
3.00 [76.2]	5Z1-4X0823A	4

5A1-430823 Shown

For Electrical Schematic, see page # 3-21

Part Number Selector

5A1 J - 4 2 08 03 A - ROHS

Special Options

J = 15 or 25 Pin 'D' Connector
P = Power Plug
R = (-) Com
S = Epoxy Seal
T = -55° to +85° C

Actuator

4 = Latching Self Cutoff

Coil Voltage

2 = 12 Vdc
3 = 28 Vdc
8 = 24 Vdc

Connectors

08 = SMA Female

Indicators

03 = No Indicators
2W Terminations
23 = SPST Indicators
2W Terminations

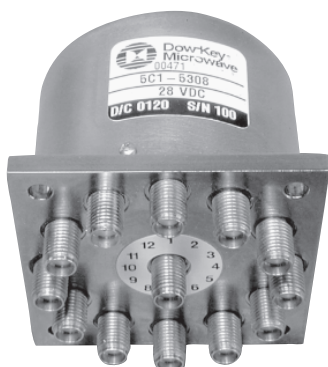
Circuit Options

A = TTL High
E = BCD Decoding

TTL option includes suppression diode. Other options may be available and all combinations may not be possible. Please consult with factory.

5C1 Normally Open | SMA

SP12T



- DC-18 GHz
- Low/Medium Power
- 1M Life Cycles

RF Characteristics

Frequency GHz	VSWR (max)	Isolation dB (min)	Ins. Loss dB (max)
DC-4	1.20	70	0.20
4-8	1.40	65	0.40
8-12.4	1.50	60	0.60
12.4-18	1.80	60	0.80

Performance may vary depending on selected options

Specifications

Operating Voltage:

12 Vdc (11-14 Vdc)
24 Vdc (20-28 Vdc)
28 Vdc (24-32 Vdc)

Coil Current (max. @ nom. Vdc & 25°C)*:

12 Vdc 300 mA
24 Vdc 150 mA
28 Vdc 135 mA

Switching Time:

15 ms maximum

Operating Temperature:

-25°C to +65°C (Standard)
-55°C to +85°C (Extended "T" Option)

Mechanical Life, Cycles:

1,000,000 minimum

Vibration, Operating:

10G RMS, 20-2000 Hz

Mechanical Shock, Non-Operating:

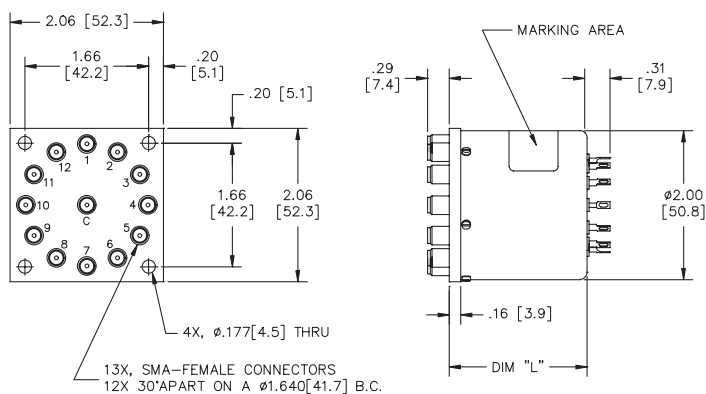
30G, 1/2 Sine, 11 ms

Nominal Weight*:

7.0 oz. (198 g.)

* Performance and weight varies depending on selected options.

Mechanical



DIM "L" (MAX)	MODEL	ELEC. SCHEM.
1.65 [41.9]	5C1-5X08	1
2.50 [63.5]	5C1-5X0802A	2

5C1-5X0822 Shown

For Electrical Schematic, see page # 3-20

Part Number Selector

5C1 J - 5 2 08 02 A - ROHS

Special Options	Actuator	Coil Voltage	Connectors	Indicators	Circuit Options
J = 15 or 25 Pin 'D' Connector S = Epoxy Seal T = -55° to +85° C	5 = Normally Open 9 = Normally Open Suppression Diodes	2 = 12 Vdc 3 = 28 Vdc 8 = 24 Vdc	08 = SMA Female	02 = No Indicators* 22 = SPST Indicators	A = TTL High E = BCD Decoding N = CANBus

* Declared only with Circuit Options

TTL option includes suppression diode. Other options may be available and all combinations may not be possible. Please consult with factory.

SP12T

5C1 Latching Underminated/Terminated | SMA



- DC-18 GHz
- Low/Medium Power
- 1M Life Cycles

RF Characteristics

Frequency GHz	VSWR (max)	Isolation dB (min)	Ins. Loss dB (max)
DC-4	1.20	70	0.20
4-8	1.40	65	0.40
8-12.4	1.50	60	0.60
12.4-18	1.80	60	0.80

Performance may vary depending on selected options

Specifications

Operating Voltage:

12 Vdc (11-14 Vdc)
24 Vdc (20-28 Vdc)
28 Vdc (24-32 Vdc)

Coil Current (max. @ nom. Vdc & 25°C)*:

12 Vdc 650 mA
24 Vdc 500 mA
28 Vdc 500 mA

Switching Time*:

30 ms maximum

Operating Temperature:

-25°C to +65°C (Standard)
-55°C to +85°C (Extended "T" Option)

Mechanical Life, Cycles:

1,000,000 minimum

Vibration, Operating:

10G RMS, 20-2000 Hz

Mechanical Shock, Non-Operating:

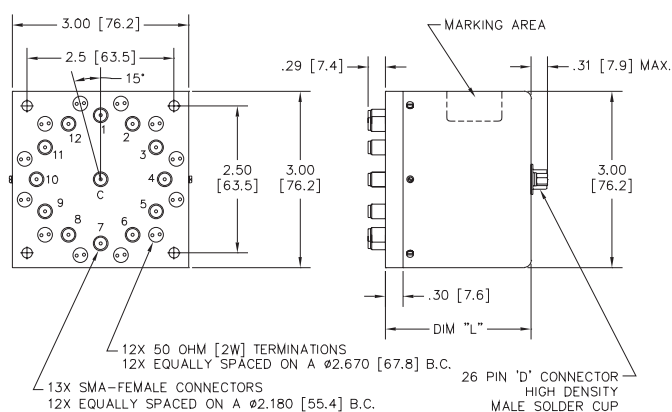
30G, 1/2 Sine, 11 ms

Nominal Weight*:

17.5 oz. (496 g.)

* Performance and weight varies depending on selected options.

Mechanical



DIM "L" (MAX)	MODEL	ELEC. SCHEM.
2.85 [72.4]	5C1-4X0803	3
3.00 [76.2]	5C1-4X0803A	4
3.85 [97.8]	5C1J-4X0803A	4

5C1J-4X0803A Shown

For Electrical Schematic, see page # 3-21

Part Number Selector

5C1 J - 4 2 08 02 A - ROHS

Special Options

J = 15 or 25 Pin 'D' Connector
S = Epoxy Seal
T = -55° to +85° C

Actuator

4 = Latching Self Cutoff

Coil Voltage

2 = 12 Vdc
3 = 28 Vdc
8 = 24 Vdc

Connectors

08 = SMA Female

Indicators

02 = No Indicators*
03 = No Indicators
2W Terminations
53 = SPST Indicators
2W Terminations**

Circuit Options

A = TTL High
E = BCD Decoding
N = CANBus

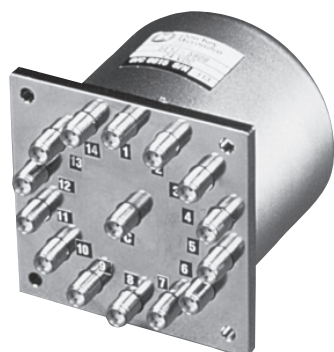
* Declared only with Circuit Options

** Only used with CANBus Option

TTL option includes suppression diode. Other options may be available and all combinations may not be possible. Please consult with factory.

5E1 Normally Open | SMA

SP14T



- DC-18 GHz
- Low/Medium Power
- 1M Life Cycles

RF Characteristics

Frequency GHz	VSWR (max)	Isolation dB (min)	Ins. Loss dB (max)
DC-4	1.30	70	0.30
4-8	1.40	65	0.41
8-12	1.60	60	0.60
12-18	2.00	55	1.00

Performance may vary depending on selected options

Specifications

Operating Voltage:

12 Vdc (11-14 Vdc)
24 Vdc (20-28 Vdc)
28 Vdc (24-32 Vdc)

Coil Current (max. @ nom. Vdc & 25°C)*:

12 Vdc 300 mA
24 Vdc 160 mA
28 Vdc 135 mA

Switching Time:

20 ms maximum

Operating Temperature:

-25°C to +65°C (Standard)
-55°C to +85°C (Extended "T" Option)

Mechanical Life, Cycles:

1,000,000 minimum

Vibration, Operating:

10G RMS, 20-2000 Hz

Mechanical Shock, Non-Operating:

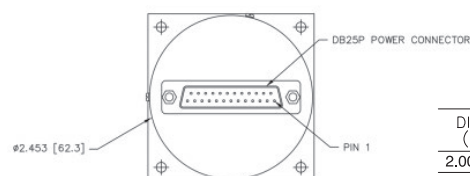
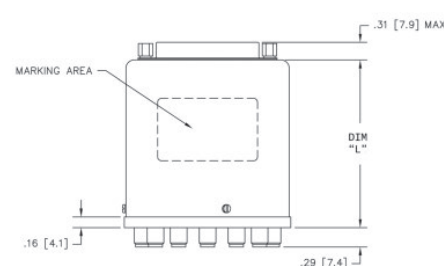
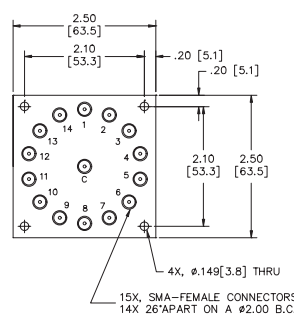
50G, 1/2 Sine, 11 ms

Nominal Weight*:

20.0 oz. (198 g.)

* Performance and weight varies depending on selected options.

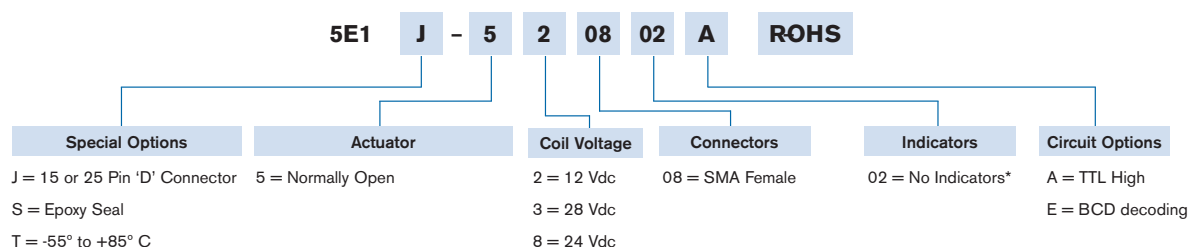
Mechanical



DIM "L" (MAX)	MODEL	ELEC. SCHEM.
2.00 [50.8]	5E1J-5X08	1
2.55 [64.8]	5E1J-5X0802A	2

5E1J-5X0802A Shown
For Electrical Schematic, see page # 3-20

Part Number Selector



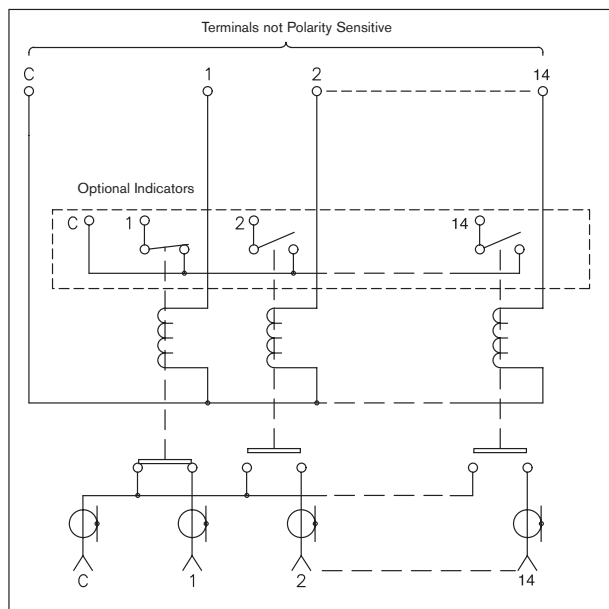
* Declared only with Circuit Options

TTL option includes suppression diode. Other options may be available and all combinations may not be possible. Please consult with factory.

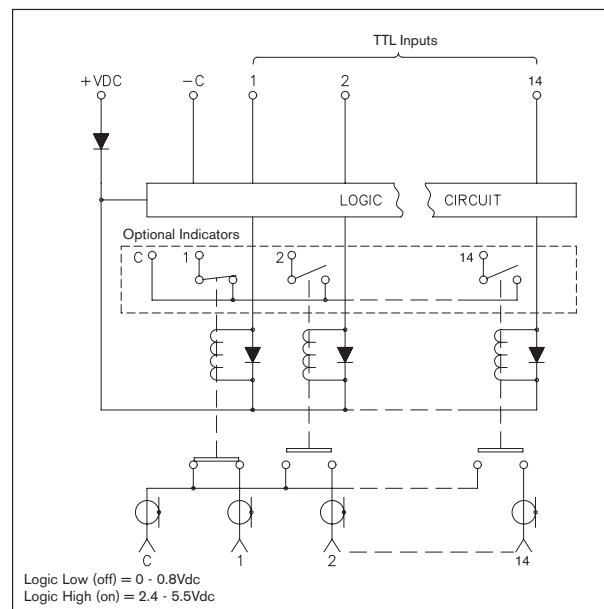
SP3T-SP14T

Normally Open, Unterminated/Terminated | Electrical Schematics

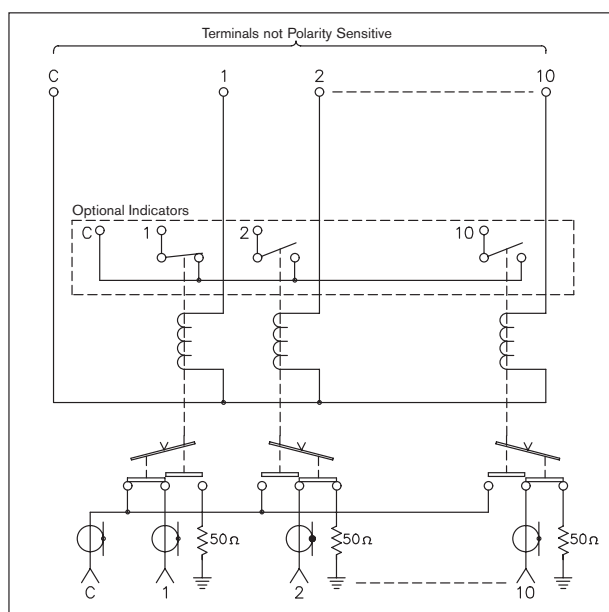
01 Normally Open



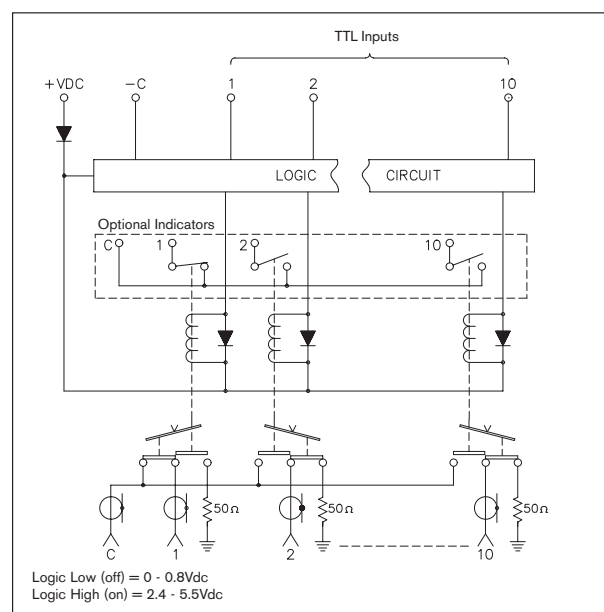
02 Normally Open TTL



03 Normally Open Terminated



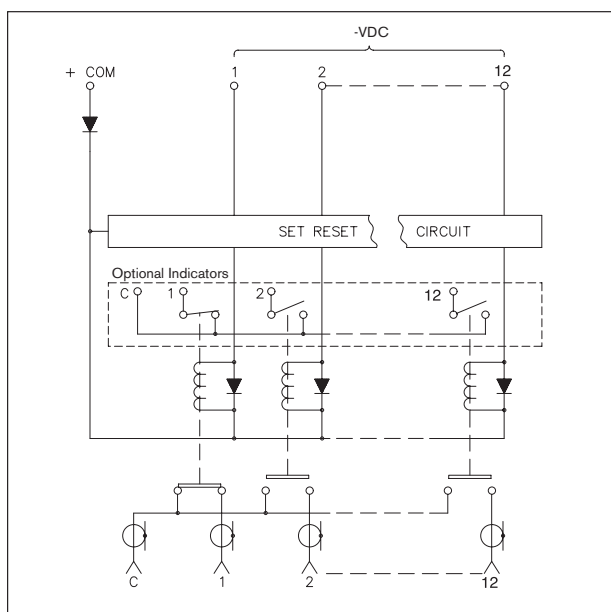
04 Normally Open Terminated TTL



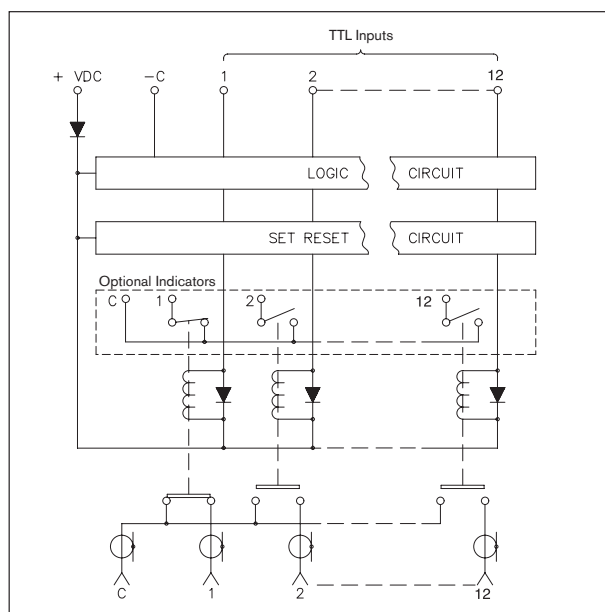
Latching, Unterminated/Terminated | Electrical Schematics

SP3T-SP14T

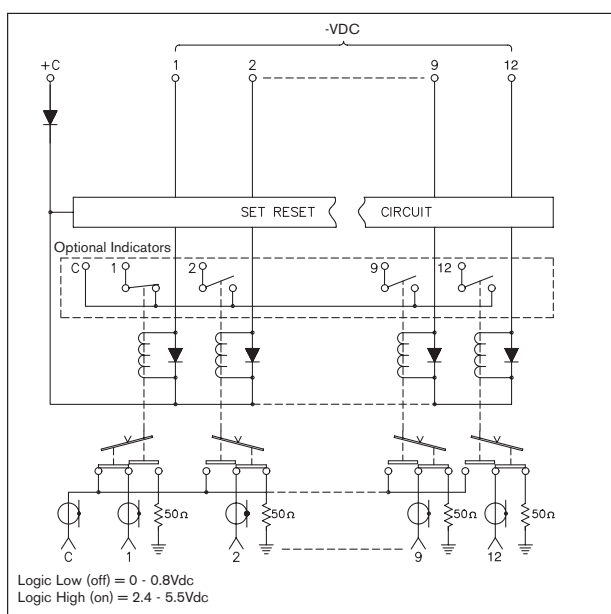
01 Latching Self Cutoff



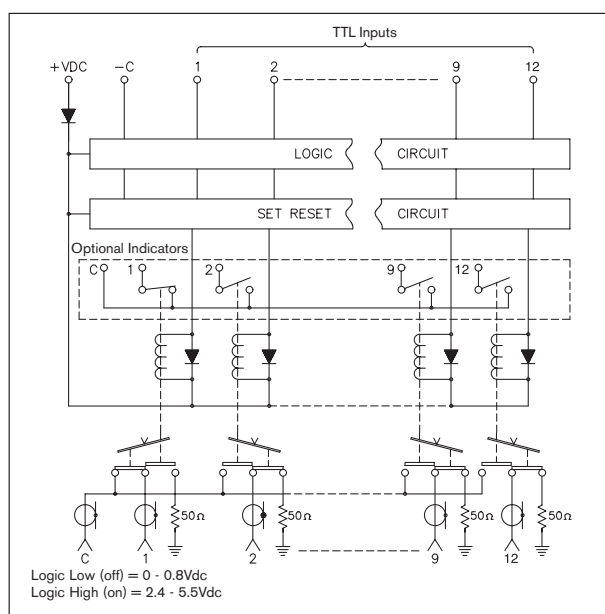
02 Latching Self Cutoff TTL



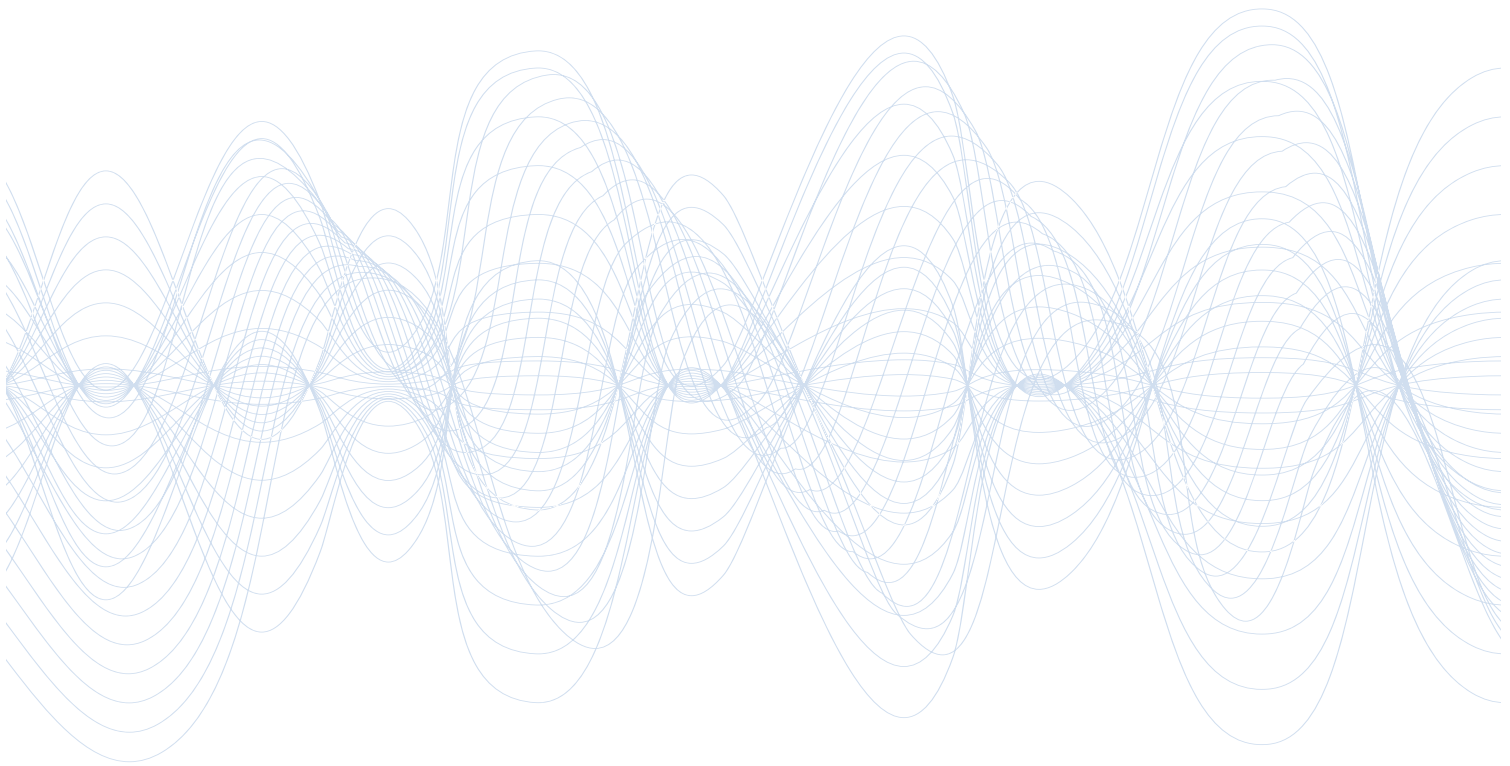
03 Latching Self Cutoff Terminated



04 Latching Self Cutoff Terminated TTL



HIGH REPEATABILITY RELIANT™ COAXIAL SWITCH



SP6T

R461 Latching Terminated | SMA

RF Characteristics

- High Repeatability
- DC-26.5 GHz
- 0.03 dB Insertion Loss Repeatability @ 25°C
- 5M Life Cycles

Frequency GHz	VSWR (max)	Isolation dB (min)	Ins. Loss dB (max)
DC-4	1.20	100	0.36*
4-12.4	1.35	80	0.49*
12.4-18	1.45	70	0.57*
18-26.5	1.70	65	0.68*

* Value calculated as follows: $0.015 \times \text{Frequency [GHz]} + 0.3$



Specifications

Operating Voltage (across temperature range):

12 Vdc (11-14 Vdc)

24 Vdc (20-32 Vdc)

Coil Current (max. @ nom. Vdc & 25°C):

12 Vdc Consult with factory

24 Vdc 195 mA

Stand-By Current (nom. Vdc @ 25°C):

CANBus: 12 Vdc 35 mA

TTL: 24 Vdc 26 mA

Stand-By Current (typ. Vdc @ 25°C):

CANBus: 32-41 mA

TTL: 23-30 mA

Switching Time:

15 ms maximum

Operating Temperature:

-25°C to +75°C

Storage Temperature:

-55°C to +85°C

Mechanical Life Cycles:

5,000,000 minimum

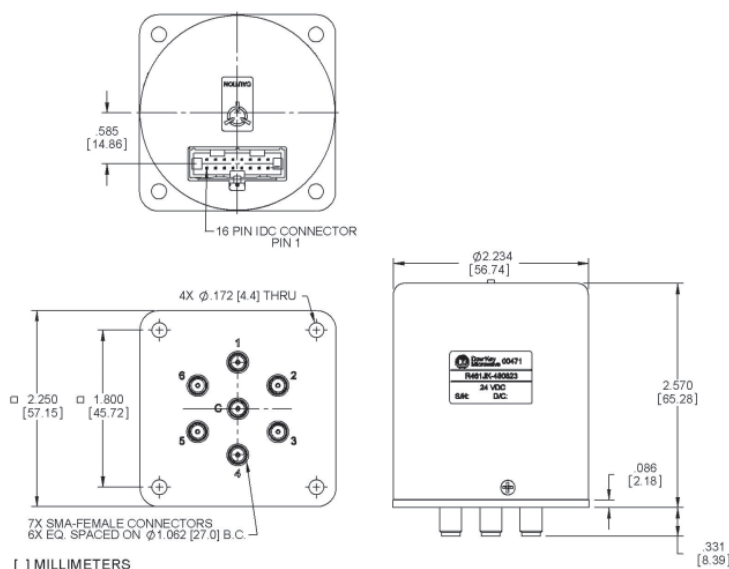
Vibration, Operating:

7G RMS, 20-2000 Hz

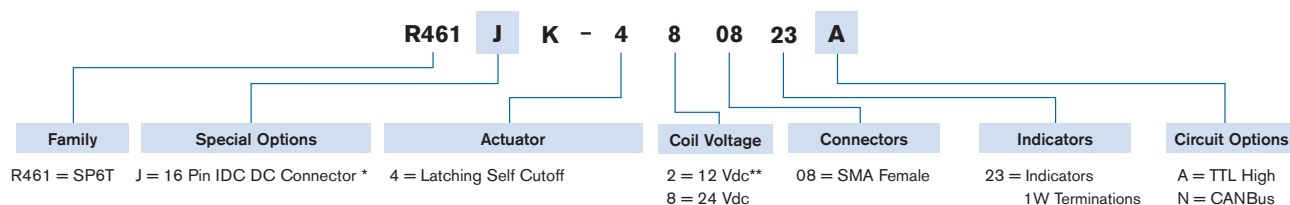
Nominal Weight:

8.8 oz. (250 g.)

Mechanical



Part Number Selector



* Not used with CANBus option

** Available with CANBus option only

LOW PIM COAXIAL SWITCH



SPDT - SP12T

LOW PIM Latching | SMA



- DC-18 GHz
- Below -160 dBc
- RoHS Compliant
- Low/Medium Power
- 1M Life Cycles

Standard Options

Switch Type	Part Number	"D" Connector	Indicator
SPDT	401JW-4X08-ROHS	9 Pin	No
SPDT	401JW-4X0832-ROHS	9 Pin	Yes
DPDT	411CJW-4X08-ROHS	9 Pin	No
DPDT	411CJW-4X0832-ROHS	9 Pin	Yes
SP6T	461JLW-4X08-ROHS	15 Pin	No
SP6T	461JLW-4X0822-ROHS	15 Pin	Yes
SP8T	581JW-4X08-ROHS	25 Pin	No
SP8T	581JW-4X0822-ROHS	25 Pin	Yes
SP12T	5C1JW-4X08-ROHS	37 Pin	No
SP12T	5C1JW-4X0852-ROHS	37 Pin	Yes

Note: X = 12 or 28 Vdc. Other options may be available. Please consult with the factory.

Specifications

Operating Voltage (across temperature range):

12 Vdc (11-14 Vdc)
28 Vdc (24-32 Vdc)

Coil Current (max. @ nom. Vdc & 25°C)*:

SPDT: 12 Vdc 75 mA
28 Vdc 120 mA
DPDT: 12 Vdc 250 mA
28 Vdc 180 mA
SP6T: 12 Vdc 570 mA
28 Vdc 180 mA
SP8T: 12 Vdc 415 mA
28 Vdc 180 mA
SP12T: 12 Vdc 650 mA
28 Vdc 500 mA

Switching Time:

SPDT, SP6T & SP8T: 15 ms maximum
DPDT: 20 ms maximum
SP12T: 30 ms maximum

Operating Temperature:

-25°C to +65°C (Standard)

Mechanical Life Cycles:

1,000,000 minimum

Vibration, Operating:

10G RMS, 20-2000 Hz

Mechanical Shock, Non-Operating:

30G, 1/2 Sine, 11 ms

Nominal Weight*:

SPDT: 1.7 oz. (48 g.)
DPDT: 3.8 oz. (108 g.)
SP6T: 8.5 oz. (240 g.)
SP8T: 10.5 oz. (298 g.)
SP12T: 18.0 oz. (510 g.)

* Performance and weight may vary. Please consult with the factory.

RF Characteristics

SPDT

Frequency GHz	VSWR (max)	Isolation dB (min)	Ins. Loss dB (max)	RF Power (Watts) *
DC-1	1.10	85	0.10	200
1-4	1.15	80	0.15	150
4-8	1.20	70	0.20	125
8-12	1.30	65	0.30	75
12-18	1.35	60	0.35	60

DPDT

Frequency GHz	VSWR (max)	Isolation dB (min)	Ins. Loss dB (max)	RF Power (Watts) *
DC-1	1.10	85	0.10	200
1-4	1.20	80	0.20	150
4-8	1.30	70	0.30	125
8-12	1.40	65	0.40	75
12-18	1.50	60	0.50	60

SP6T & SP8T

Frequency GHz	VSWR (max)	Isolation dB (min)	Ins. Loss dB (max)	RF Power (Watts) *
DC-4	1.20	85	0.20	100
4-8	1.30	75	0.30	50
8-12.4	1.40	70	0.40	35
12.4-18	1.50	60	0.50	25

SP12T

Frequency GHz	VSWR (max)	Isolation dB (min)	Ins. Loss dB (max)	RF Power (Watts) *
DC-4	1.20	70	0.20	100
4-8	1.40	65	0.40	70
8-12.4	1.50	60	0.60	60
12.4-18	1.80	60	0.80	50

* RF Power (Watts CW MAX)

LOW PIM Latching | N

SPDT - SP6T



- DC-12.4 GHz
- Below -160 dBc
- RoHS Compliant
- Low/Medium Power
- 1M Life Cycles

Standard Options

Switch Type	Part Number	"D" Connector	Indicator
SPDT	402JW-4X01-ROHS	9 Pin	No
SPDT	402JW-4X0132-ROHS	9 Pin	Yes
DPDT	412JW-4X01-ROHS	9 Pin	No
DPDT	412JW-4X0132-ROHS	9 Pin	Yes
SP6T	561JW-4X01-ROHS	15 Pin	No
SP6T	561JW-4X0122-ROHS	15 Pin	Yes

Note: X = 12 or 24 Vdc. Other options may be available. Please consult with factory.

Specifications

Operating Voltage (across temperature range):

12 Vdc (11-14 Vdc)
24 Vdc (20-28 Vdc)

Coil Current (max. @ nom. Vdc & 25°C)*:

SPDT: 12 Vdc 320 mA
24 Vdc 180 mA
DPDT: 12 Vdc 250 mA
24 Vdc 240 mA
SP6T: 12 Vdc 550 mA
24 Vdc 275 mA

Switching Time:

SPDT: 20 ms maximum
DPDT: 20 ms maximum
SP6T: 20 ms maximum

Operating Temperature:

-25°C to +65°C (Standard)

Mechanical Life Cycles:

1,000,000 minimum

Vibration, Operating:

10G RMS, 20-2000 Hz

Mechanical Shock, Non-Operating:

30G, 1/2 Sine, 11 ms

Nominal Weight*:

SPDT: 6.5 oz. (184 g.)
DPDT: 8.5 oz. (241 g.)
SP6T: 17.0 oz. (482 g.)

* Performance and weight may vary. Please consult with the factory.

RF Characteristics

SPDT

Frequency GHz	VSWR (max)	Isolation dB (min)	Ins. Loss dB (max)	RF Power (Watts) *
DC-1	1.15	85	0.15	600
1-2	1.20	80	0.20	400
2-4	1.25	70	0.25	300
4-8	1.45	60	0.40	200
8-12.4	1.50	60	0.50	175

DPDT

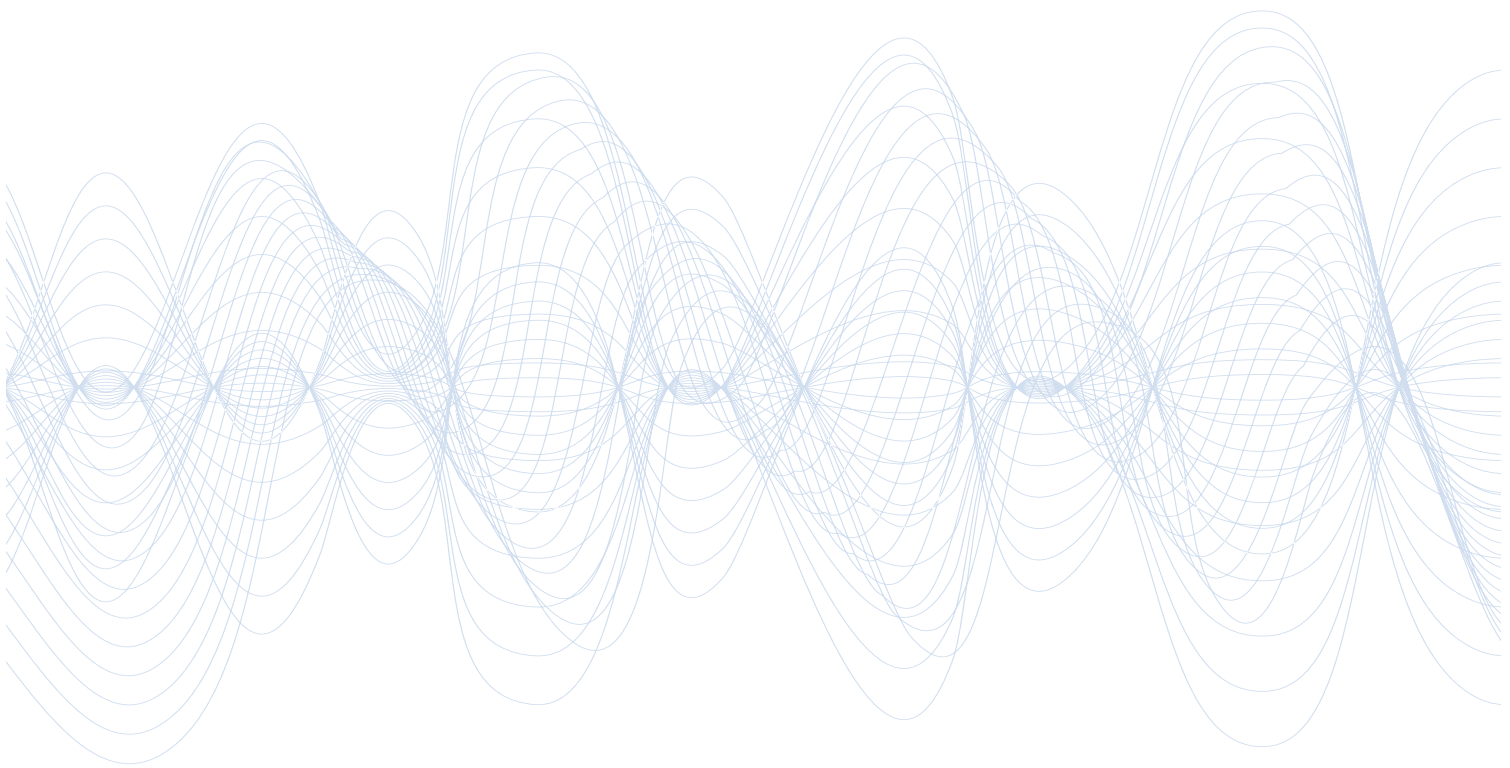
Frequency GHz	VSWR (max)	Isolation dB (min)	Ins. Loss dB (max)	RF Power (Watts) *
DC-1	1.15	85	0.15	200
1-2	1.20	80	0.20	150
2-4	1.25	70	0.25	125
4-8	1.45	60	0.40	75
8-12.4	1.60	60	0.60	60

SP6T

Frequency GHz	VSWR (max)	Isolation dB (min)	Ins. Loss dB (max)	RF Power (Watts) *
DC-4	1.25	70	0.30	175
4-8	1.35	60	0.40	125
8-12.4	1.70	55	0.70	100

* RF Power (Watts CW MAX)

MINIATURE COAXIAL SWITCH



SP3T-SP6T Miniature

537-567 Normally Open | SMA



- DC-18 GHz
- Low Power
- 1M Life Cycles

RF Characteristics

Frequency GHz	VSWR (max)	Isolation dB (min)	Ins. Loss dB (max)	RF Power Watts (CW)
DC-1	1.10	85	0.10	100
1-4	1.20	80	0.20	50
4-8	1.30	70	0.30	35
8-12	1.40	65	0.40	25
12-18	1.50	60	0.50	10

Specifications

Operating Voltage:

24 Vdc (20-28 Vdc)

Coil Current (max. @ nom. Vdc & 25°C)*:

12 Vdc 320 mA

24 Vdc 160 mA

28 Vdc 140 mA

Switching Time:

15 ms maximum

Operating Temperature:

-55 °C to +85°C

Mechanical Life Cycles:

1,000,000 minimum

Vibration, Operating:

10G RMS, 20-2000 Hz

Mechanical Shock, Non-Operating:

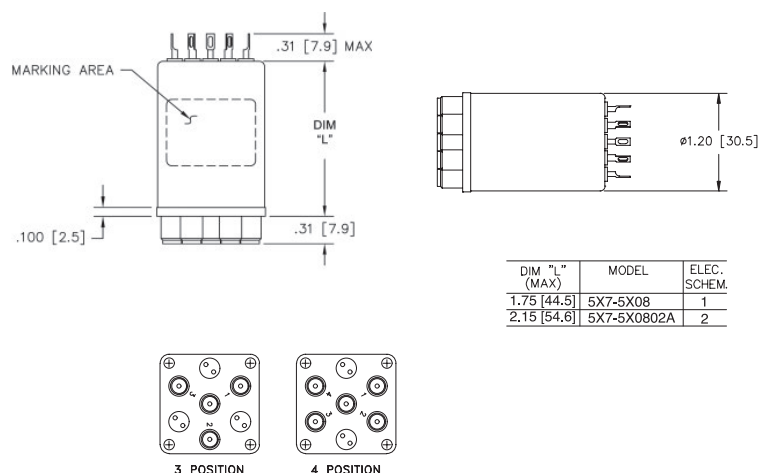
30G, 1/2 Sine, 11 ms

Nominal Weight:

3.0 oz. (85 g.)

* Performance varies depending on selected options.

Mechanical



567-5X08 Shown

Part Number Selector

Family	Special Options	Actuator	Coil Voltage	Connectors	Indicators	Circuit Options
537 = SP3T	J = 9 Pin Micro 'D' Connector	5 = Normally Open	2 = 12 Vdc	08 = SMA Female	02 = No Indicator*	A = TTL High
547 = SP4T	S = Epoxy Seal		3 = 28 Vdc			
567 = SP6T	T = -55°C to +85°C		8 = 24 Vdc			

* Declared only with Circuit Options

WAVEGUIDE



SPDT/DPDT Waveguide

Lightweight Waveguide: Latching



- WR 28 - WR 112
- 200K Cycles
- Reduced Weight
- Reduced Current Consumption

RF Characteristics

Frequency GHz	VSWR (max)	Isolation dB (min)	Ins. Loss dB (max)
WR 28 (26.5-40.0)	1.12	60	0.20
WR 34 (22.0-33.0)	1.12	60	0.15
WR 42 (18.0-26.5)	1.13	60	0.12
WR 62 (12.4-18.0)	1.10	60	0.10
WR 75 (10.0-15.0)	1.15	60	0.10
WR 90 (8.20-12.4)	1.15	60	0.10
WR 112 (7.05-10.0)	1.10	60	0.10

Specifications

Operating Voltage:

28 Vdc (24-30 Vdc)

Coil Current (max. @ nom. Vdc & 20°C)*:

28 Vdc 350 mA

Switching Time:

100 ms maximum (WR 28 thru WR 90)

200 ms maximum (WR 112)

Operating Temperature:

-54°C to +85°C

Mechanical Life Cycles:

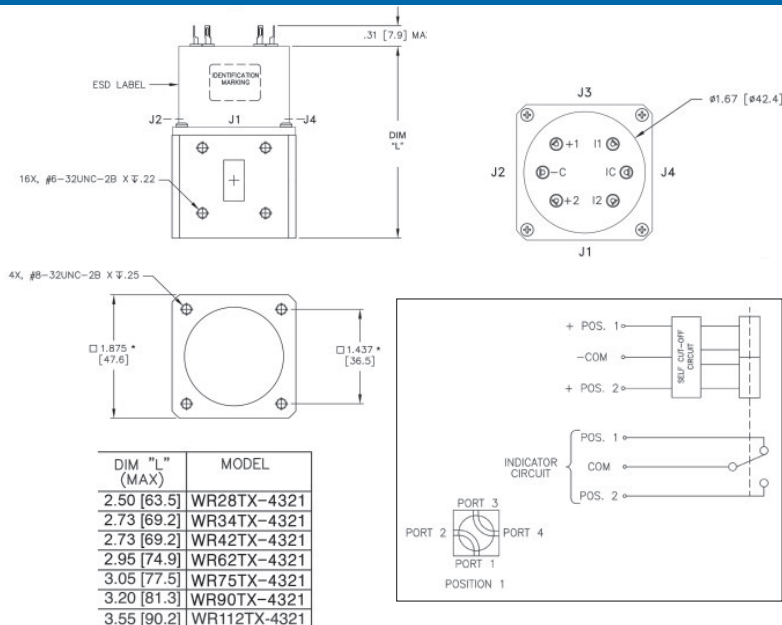
200,000 minimum

Nominal Weight:

10.58 oz. (300 g.) for WR 28 thru WR 90

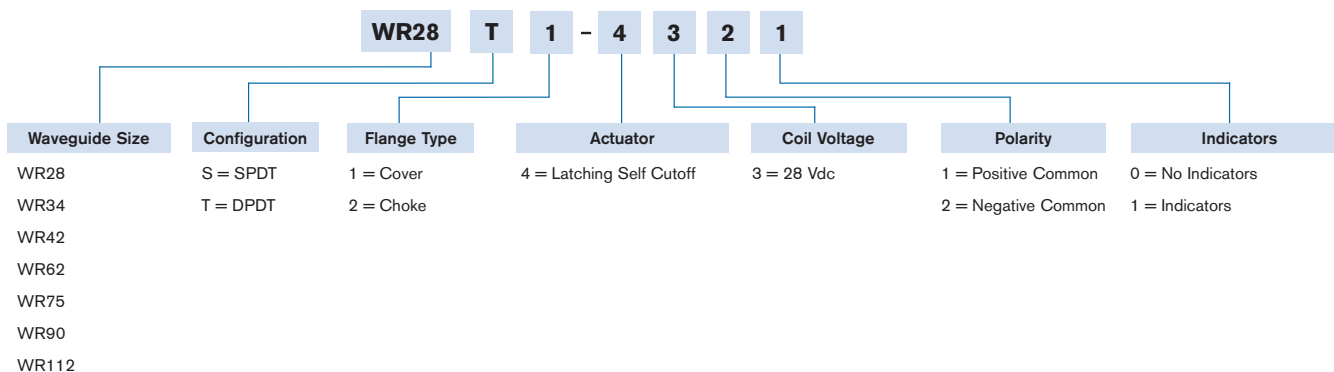
17.64 oz. (500 g.) for WR 112

Mechanical / Electrical Schematic



Dimensions are the same for WR 28 thru WR 90 but slightly larger for WR 112.

Part Number Selector



SWITCH MATRIX & SPACE PRODUCTS CAPABILITY GUIDE



**OUR EXPERTISE, YOUR SWITCH SOLUTION
SINCE 1945**

BETTER.FASTER.MODULAR NEXT GENERATION MATRIX

Commerical-Off-The-Shelf {COTS} solutions supporting the aerospace, military, transportation, and communication industries for signal routing and ATE applications.

- Highly scalable and modular
- Trouble-free maintenance for field upgrades & repair
- 1RU/2RU/3RU/4RU rack mountable enclosures
- LCD/Keypad or Touch Screen manual control
- Remote controls:
*Ethernet (TCP/IP) with HTTP Server or SNMP v1/v2
or GPIB & RS-232 and USB port*

Fiber Optic Matrix



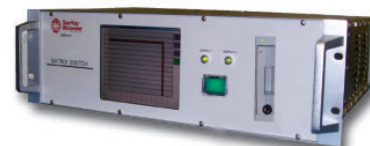
*C-band
Switching in Optical Domain
Fan-Out / Crossbar
16x16 Matrix, LCD Touch Screen & Ethernet remote control*



Electromechanical Switching Systems

*DC to 40 GHz
Faster switching time at system level
Keeps track of the life of each switch
All electronic components are RoHS compliant
Field upgradable firmware via boot loader
Switches can be mixed & matched
Configured either as a MUX, a Crossbar or individual switches
Normally Open & Latching switches
Terminated or non-terminated solutions*

Solid State Matrix



*HF to S-band
6x6 to 12x16 unidirectional, redundant power supplies,
removable hard drive, LCD Touch Screen & Ethernet remote control*

MS-Control Kit Do-It-Yourself (DIY)

*Software control via RS-232, USB with
either GPIB or Ethernet (TCP/IP) & HTTP Server.
Controls up to 20 Dow-Key CAN Bus switches.
Expansion cards available as an option*



Integrated Switching Systems & Custom Solutions



*C-band
Full Rack Modular Solution
16x32 expandable to 32x64
Non-Blocking Full Fan-Out
Manual and Remote Control*

*L-band
Duplex Transmitter & Receiver Racks
12x48 Fan-Out & 48x12 Fan-In Solution
Equipped with signal monitor panels, fiber
optic receiver, amplifiers, switching modules,
master & slave controller.
Manual and Remote Control*

*Systems are fully controlled through control-
ler module(s) with Windows based PC and
removable hard drive.*



*L-band
4x48 Solid State Fan-Out Switch
48x4 Solid State Fan-In Switch
8x2 Electromechanical Switch
LCD Touch Screen
Ethernet with SNMP protocol*

More info at http://www.dowkey.com/matrix_catalog.php

OUR HERITAGE, YOUR SWITCH SOLUTION

Space business experts stress the three most critical aspects of supplier selection: **heritage, heritage, heritage.**



411HQ DPDT



421H SPDT

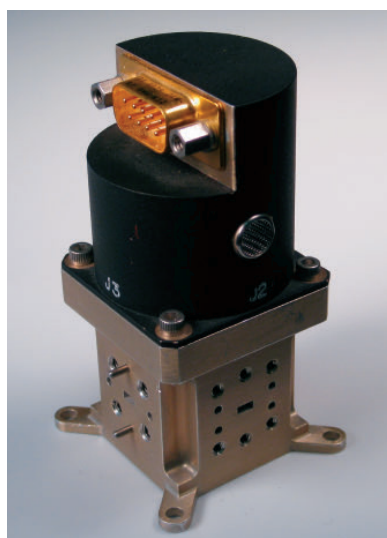
Our lightweight (less than 55 grams) and highly reliable qualified transfer switches are used in programs such as Inmarsat-4 and Galileo satellite systems.

Innovative and proven high reliability SPDT switches have played a part in hundreds of successful space missions.



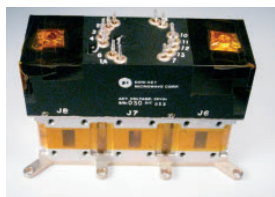
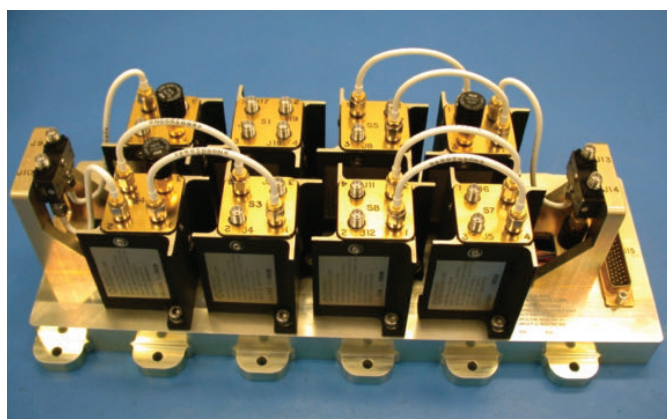
High Power T-Switch

Dow-Key distinguishes itself by introducing random drive T-Switches, which minimizes the switching time rather than forcing the application to switch RF paths in sequential order. Qualified on INSAT-3 MUOS, G-SAT and TDRS programs.



WR-15

Dow-Key WR/G is used in high profile space mission such as Kepler (flight system) and Deep Impact (NASA space probe).



222D-Series

Dow-Key's outstanding HI-Rel track record has evolved in combining space qualified switches and other components such as power dividers in a block of switches to achieve the matrix complexity needed in programs such as GPS, GOES, Inmarsat-4, and other programs.

More info at http://www.dowkey.com/space_brochure.php