

SP4T Electromechanical Relay Normally Open Switch, DC to 40 GHz, up to 10W, 2M Lifecycles, 12V, Indicators, TTL, Suppression Diodes, 2.92mm

The FMSW6456 is a Single Pole four Throw (SP4T) electromechanical relay switch that operates across a wide frequency range of DC to 40 GHz and can handle up to 10 Watts of Average power in a break before make condition. The 50 Ohm design is rated for 2 million lifecycles and features a Normally Open Actuator where the selected position remains active with constant voltage, all positions are open when voltage is removed. Additional features include TTL control logic, suppression diodes which limit voltage spikes or reverse current, and indicators. Impressive typical performance includes 0.5 dB insertion loss and isolation greater than 85 dB. This switch requires +12Vdc bias voltage and operates over a temperature range of -25°C to +65°C. The rugged and compact package assembly supports 2.92mm female connectors and a 15 pin D-Sub Connector for DC command control functions. And for highly reliable operation, the model is guaranteed to meet MIL-STD-202 environmental test conditions for shock and random vibration.

Electrical Specifications

Switch Type	SP4T
Actuator Type	Normally Open
Switching Sequence	Break Before Make
Actuator Options	Indicators, TTL Logic
TTL Control	on: 2.4 to 5 Volts off: 0 to 0.8 Volts

Description	Min	Typ	Max	Units
Frequency Range	DC		40	GHz
Impedance		50		Ohms
Operating Voltage	11	12	13	Volts
Actuating Current @ 12 Volts			250	mA
VSWR		1.8:1	1.95:1	
Insertion Loss		0.5	1.3	dB
Isolation	50	85		dB
Switching Time			20	ms

Performance by Frequency

Description	F1	F2	F3	F4	F5	Units
Frequency Range	DC - 6	6 - 12	12 - 18	18 - 28	28 - 40	GHz
VSWR, Max	1.25:1	1.4:1	1.5:1	1.8:1	1.95:1	
Insertion Loss, Max	0.2	0.4	0.5	0.9	1.3	dB
Isolation, Min	70	60	60	60	50	dB



Features:

- Single Pole Four Throw Electromechanical Relay Switch
- DC to 40 GHz Frequency Range
- Normally Open Actuator
- TTL Logic Control
- Suppression Diodes
- Indicators
- 2M Lifecycle Rating
- Insertion Loss 0.5 dB typ
- Isolation > 85 dB typ
- VSWR as low as 1.25:1 max
- +12 Volt DC Bias
- 15 Pin D-Sub Connector for DC Command Control
- 2.92mm Female Connectors
- -25°C to +65°C Operating Temperature
- Up to 10 Watt Average Power Handling
- 50 Ohm Design
- Hot Switching Capability - Consult Factory
- S-Parameter Data available upon request
- Rugged Design meets Mil-STD-202 Test Conditions

Applications:

- Aerospace & Defense
- Test & Measurement
- Microwave Radio Systems
- Military & Commercial Communication Systems
- Research & Development
- SATCOM
- Wireless Communications
- Enterprise
- IoT

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Mechanical Specifications

Size

Length 2.62 in [66.55 mm]
Width/Diameter 1.75 in [44.45 mm]
Height 1.75 in [44.45 mm]

Finish NICKEL
Package Type Connectorized

Operating Life 2,000,000 Cycles

Connectors

RF Connector Type 2.92mm Female

Environmental Specifications

Temperature

Operating Range -25 to +65 deg C
Storage Range -55 to +100 deg C

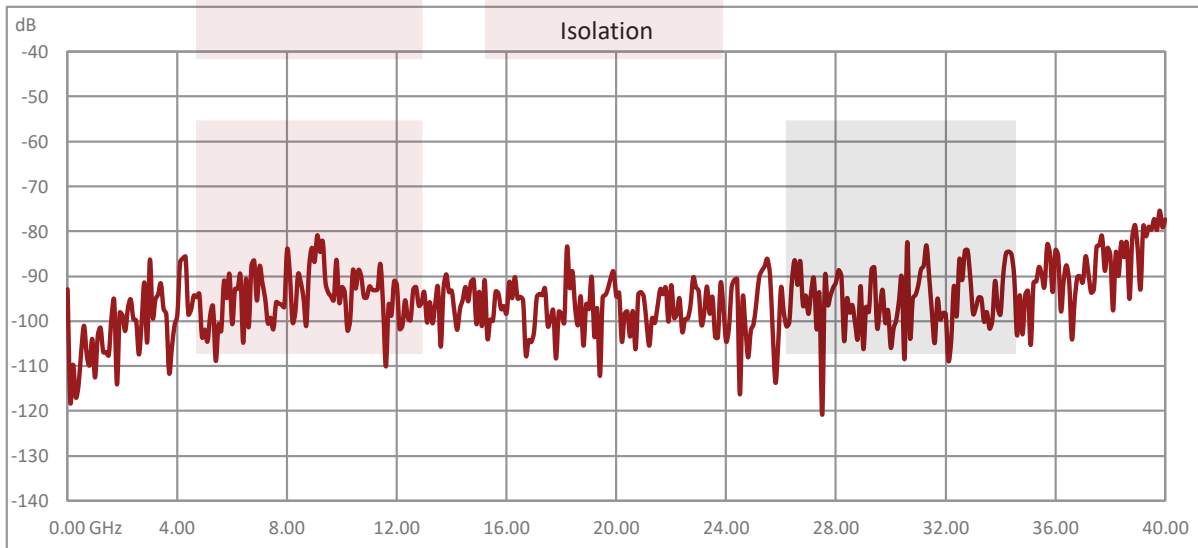
Humidity Moisture resistant or immersion sealing available
Shock MIL-STD-202 Method 213, Condition D, 500G (non oper)
Vibration MIL-STD-202 Method 214, Condition D, 10G RMS (non oper)

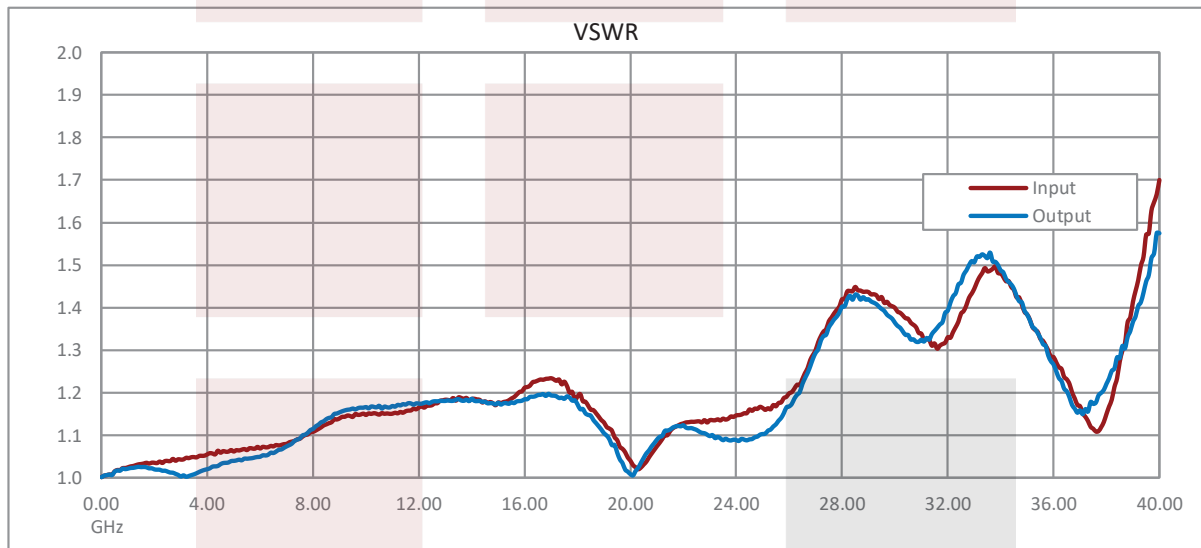
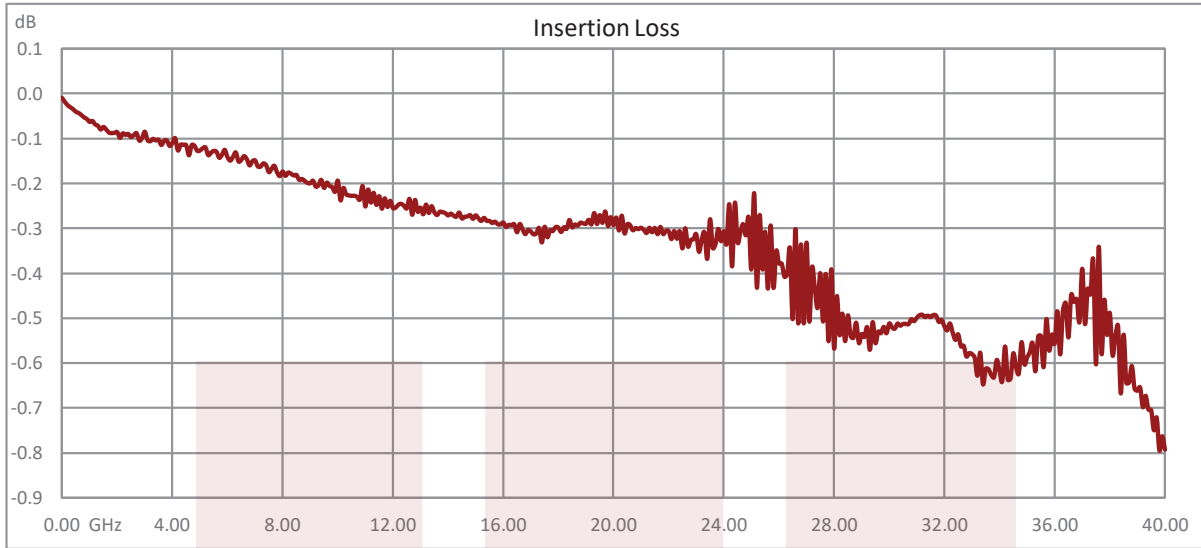
Compliance Certifications (see [product page](#) for current document)

Plotted and Other Data

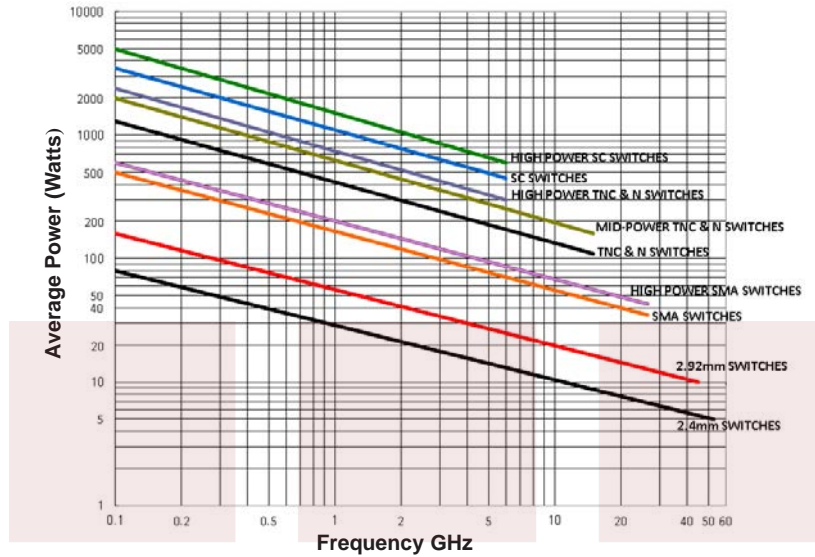
Notes:

Typical Performance Data

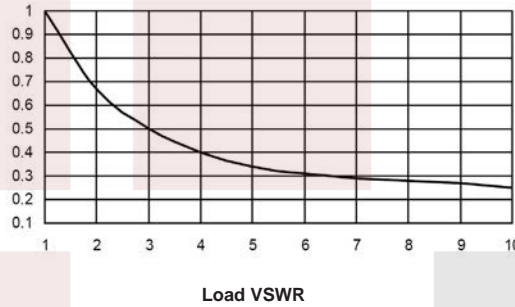




Power Handling vs. Frequency



Power Handling De-rating vs. Load VSWR



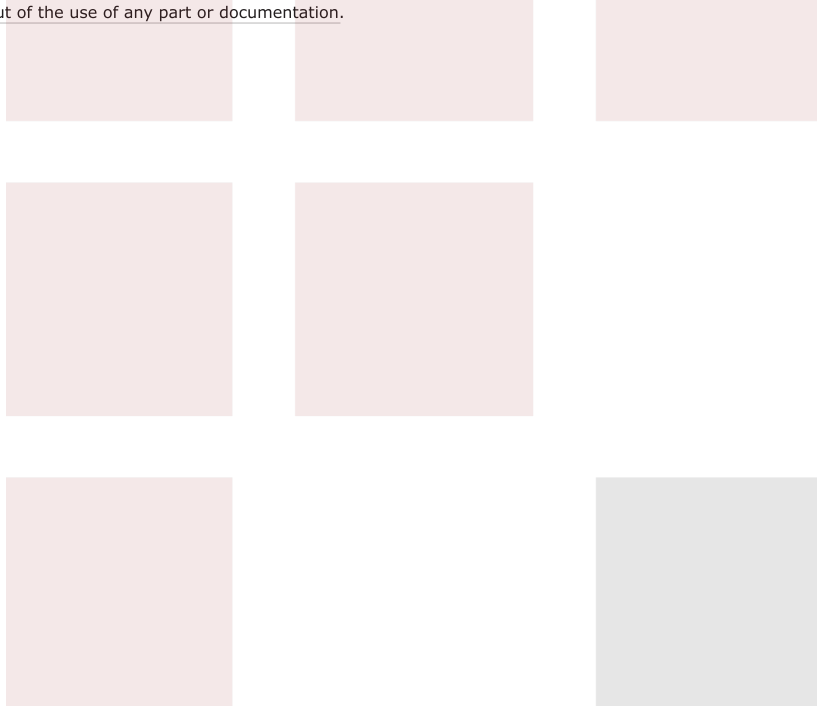
Power Handling Chart and Derating Curves based on the following Test and Environmental Conditions:
 Ambient temperature: 20 - 25°C
 Altitude: Sea Level to 1,000 feet
 Relative Humidity: 50 - 55%
 Load VSWR: ≤ 1.20:1
 Operation: Cold Switching

SP4T Electromechanical Relay Normally Open Switch, DC to 40 GHz, up to 10W, 2M Lifecycles, 12V, Indicators, TTL, Suppression Diodes, 2.92mm from Fairview Microwave is in-stock and available to ship same-day. All of our RF/microwave products are available off-the-shelf from our ISO 9001:2008 certified facilities in Lewisville, Texas. Fairview Microwave is RF on-demand.

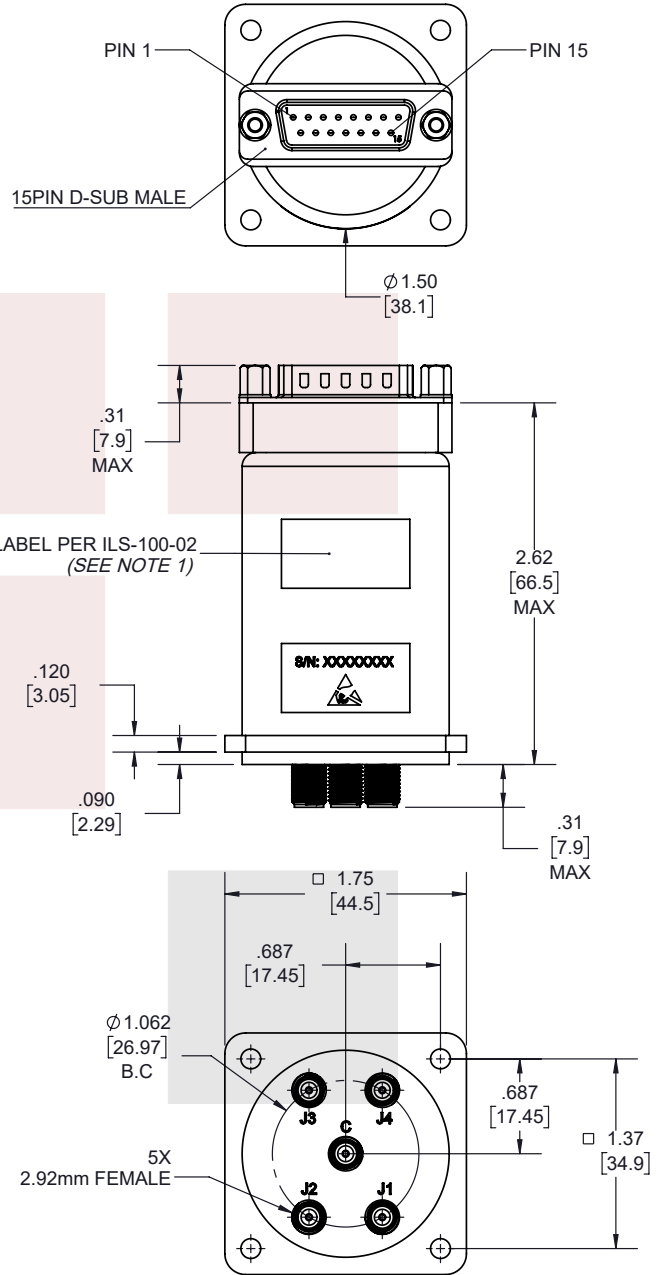
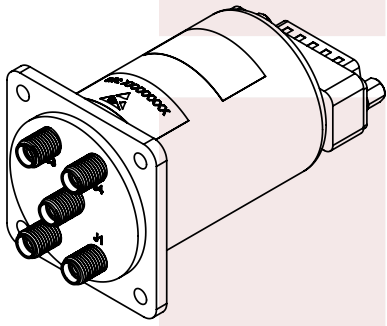
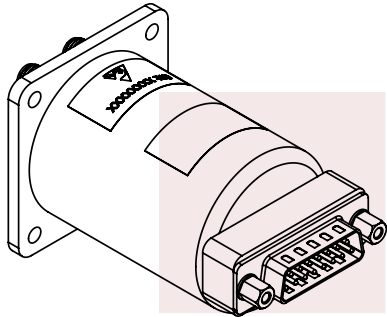
For additional information on this product, please click the following link: [SP4T Electromechanical Relay Normally Open Switch, DC to 40 GHz, up to 10W, 2M Lifecycles, 12V, Indicators, TTL, Suppression Diodes, 2.92mm FMSW6456](#)

URL: <https://www.fairviewmicrowave.com/sp4t-normally-open-40-ghz-electro-mechanical-relay-switch-indicators-12v-2.92mm-fmsw6456-p.aspx>

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REVISIONS			
REV.	DESCRIPTION	DATE	APPROVED
A	INITIAL RELEASE	2/22/2021	T.GALLA



NOTES:

- LABEL PER ILS-100-02. FOR INTERNAL REFERENCE ONLY. LABEL LOCATION FOR REFERENCE ONLY.

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TITLE
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UNLESS OTHERWISE SPECIFIED LEADING DIMENSIONS ARE INCHES
DIMENSIONS IN [] ARE MILLIMETERS

TOLERANCES: CABLE LENGTH (L) TOLERANCES:

.X = ±.2 [5.08]	FRACTIONS	L ≤ 12 [305] = +1 [25] / -0
.XX = ±.02 [.51]	± 1/32	12 [305] < L ≤ 60 [1524] = +2 [51] / -0
.XXX = ±.005 [.13]	ANGLES ± 1°	60 [1524] < L ≤ 120 [3048] = +4 [102] / -0
		120 [3048] < L ≤ 300 [7620] = +6 [152] / -0
		300 [7620] < L = +5%L / -0

THIRD-ANGLE PROJECTION



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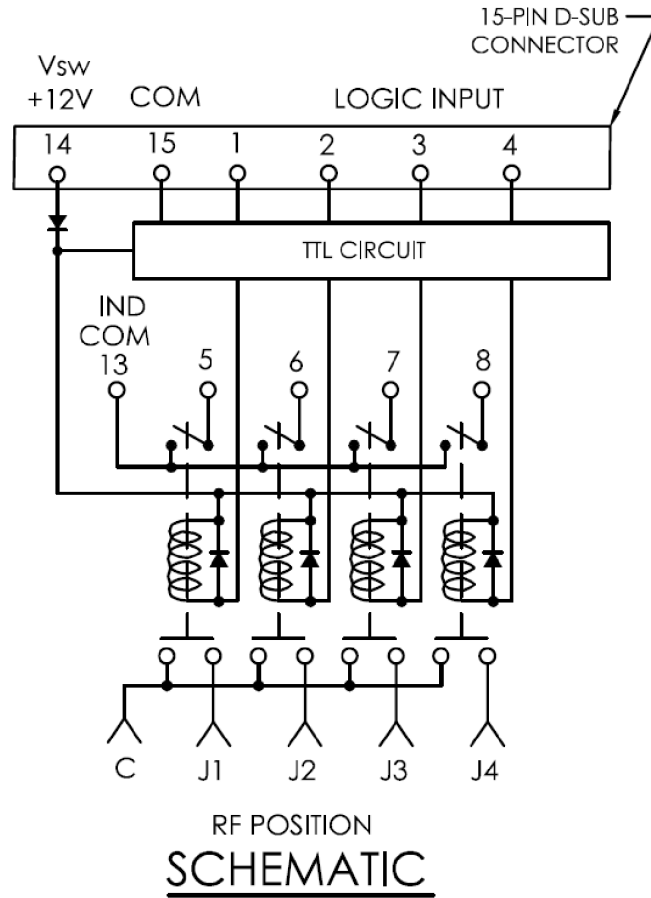
SHEET 1 OF 2

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SCALE N/A

SIZE A	CAGE CODE 3FKR5	DRAWN BY K.DANG	ITEM NO. FMSW6456	REV A
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T-Rev.D



RF POSITION SCHEMATIC

TRUTH TABLE/PIN ASSIGNMENT:

LOGIC INPUT PINS	RF PATH				INDICATOR			
	J1	J2	J3	J4	5	6	7	8
1("1")	ON	OFF	OFF	OFF	ON	OFF	OFF	OFF
2("1")	OFF	ON	OFF	OFF	OFF	ON	OFF	OFF
3("1")	OFF	OFF	ON	OFF	OFF	OFF	ON	OFF
4("1")	OFF	OFF	OFF	ON	OFF	OFF	OFF	ON

PIN 15. COM
PIN 14. Vsw +12VDC
PIN 13. IND COM

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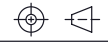
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THIRD-ANGLE PROJECTION



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SHEET 2 OF 2

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SCALE N/A

SIZE A	CAGE CODE 3FKR5	DRAWN BY K.DANG	ITEM NO. FMSW6456	REV A
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T-Rev.D