



Series 91 and 92 Miniature Broadband SPST Switches

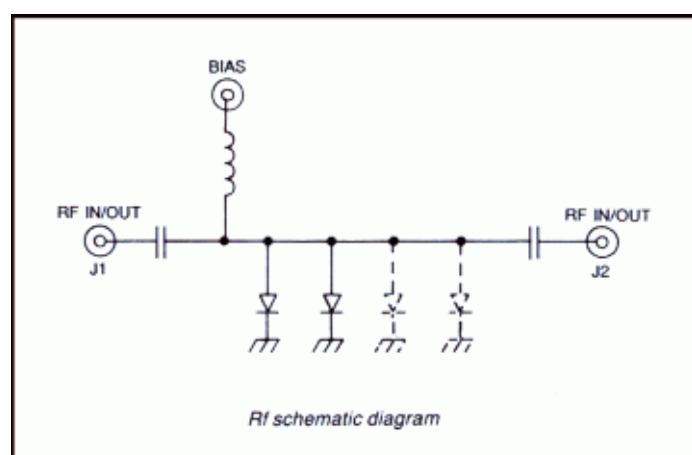
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Application Notes for [RF Switch](#)

SERIES 91 and 92

Series 91 and 92 switches provide high performance characteristics over a multi-octave range. Series 91 models cover the frequency range of 1 to 18 GHz, while Series 92 models cover the range from 0.2 to 4.0 GHz. These miniature switches measure only 0.75 x 0.69 x 0.38 inches.

Both series use an integrated circuit assembly of up to four PIN diodes mounted in a microstrip transmission line. The circuit configuration is shown below.



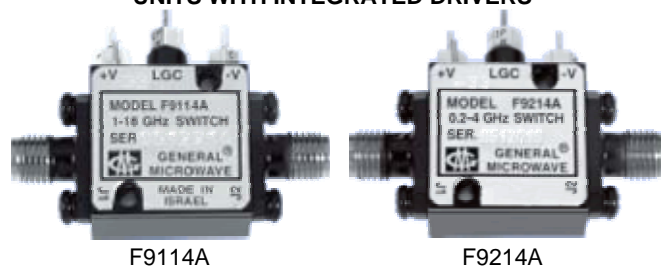
Application of a positive current to the bias terminal switches the unit OFF since the diodes are biased to a low resistance value. With zero or negative voltage at the bias terminal, the diodes are biased to high resistances and the unit is switched ON. Maximum rise and fall times are less than 10 nsec.

SERIES F91 AND F92

The Series F91 and F92 switches are the same as the corresponding Series 91 and 92 models except the units are equipped with integrated drivers, and the dimensions of the units are 0.75 x 0.75 x 0.38 inches. The proper current required to switch the unit ON or OFF is provided by the integral driver which requires +5 and -12 to -15 volt power supplies and is controlled by an external logic signal.

- Frequency range (Series 91): 1 to 18 GHz
- Frequency range (Series 92): 0.2 to 4 GHz
- Low VSWR and insertion loss
- Up to 80 dB isolation
- Less than 10 nsec rise and fall time
- Miniature size, light weight

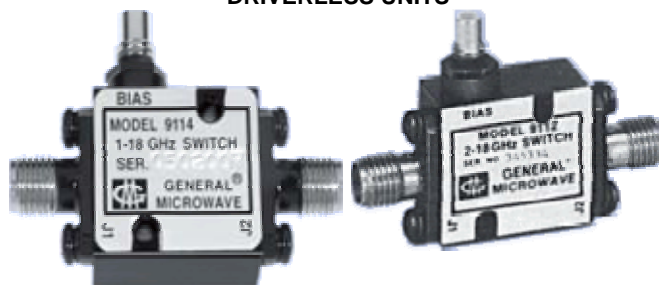
UNITS WITH INTEGRATED DRIVERS



F9114A

F9214A

DRIVERLESS UNITS



9114

9112

PERFORMANCE CHARACTERISTICS

MODEL NO. ⁽¹⁾	CHARACTERISTIC	FREQUENCY (GHz)						
		0.2 to 0.5	0.5 to 1.0	1.0 to 2.0	2.0 to 4.0	4.0 to 8.0	8.0 to 12.4	12.4 to 18.0
9112*, F9112A*	Min. Isolation (dB)	--	--	36	40	45	45	45
	Max. Insertion Loss (dB)	--	--	0.8	0.8	0.9	1.1	1.8
	Max. VSWR (ON)	--	--	1.3	1.3	1.6	1.75	1.75
9114, F9114A	Min. Isolation (dB)	--	--	60	74	80	80	80
	Max. Insertion Loss (dB)	--	--	0.9	0.9	1.0	1.6	2.5
	Max. VSWR (ON)	--	--	1.4	1.4	1.75	1.75	2.0

9214*, F9214A	Min. Isolation (dB)	40	45	50	50	--	--	--
	Max. Insertion Loss (dB)	1.0	1.0	1.0	1.0	--	--	--
	Max. VSWR (ON)	1.5	1.5	1.5	1.5	--	--	--

*Special-order product. Consult factory before ordering.

**9112, F9112A,
9114, F9114A**

Switching Speed⁽²⁾

Rise Time	10 nsec max.
Fall Time	10 nsec max.
ON Time ⁽⁴⁾	20 nsec max.
OFF Time ⁽⁴⁾	20 nsec max.
Repetition Rate ⁽⁴⁾	20 MHz max.

9214, F9114A

Switching Speed⁽²⁾

Rise Time	10 nsec max.
Fall Time	10 nsec max.
ON Time ⁽⁴⁾	40 nsec max.
OFF Time ⁽⁴⁾	40 nsec max.
Repetition Rate ⁽⁴⁾	10 MHz max.

Power Supply Requirements

Driverless Units

For rated isolation: +35 mA
For rated insertion loss: -10V

Units With Integrated Drivers

+5V ±5%, 65 mA
-12 to -15V, 20 mA

(1) Models prefixed with 'F' are equipped with integrated TTL-compatible drivers; models without the 'F' prefix are current-controlled units and are furnished without drivers.

(2) For driverless units, shaped current pulses must be provided by the user.

(3) 2W cw or peak with -20V back bias.

(4) ON and OFF time and repetition rate specifications are only applicable to Series F91 and F92 units.

Power Handling Capability

Without Performance Degradation

Without integrated drivers.....	1 W cw or peak ⁽³⁾
With integrated drivers	1W cw or peak
Survival Power.....	2W average, 75 W peak (1 µsec max. pulse width)

Control Characteristics

Control Input

Impedance..... TTL, two-unit load. (A unit load is 1.6 mA sink current and 40 µA source current.)

Control Logic Logic "0" (-0.3 to +0.8V) for switch ON and logic "1" (+2.0 to +5.0V) for switch OFF.

ENVIRONMENTAL RATINGS

Operating Temperature Range

Series 91 and 92	-54°C to +125°C
Series F91 and F92	-65°C to +110°C

Non-Operating

Temperature Range . . . -65°C to +125°C

Humidity MIL-STD-202F, Method 103B, Cond. B (96 hrs. at 95%)

Shock MIL-STD-202F, Method 213B, Cond. B (75G, 6 msec)

Vibration MIL-STD-202F, Method 204D, Cond. B (.06" double amplitude or 15G, whichever is less)

Altitude..... MIL-STD-202F, Method 105C, Cond. B (50,000 ft.)

Temp. Cycling MIL-STD-202F, Method 107D, Cond. A, 5 cycles

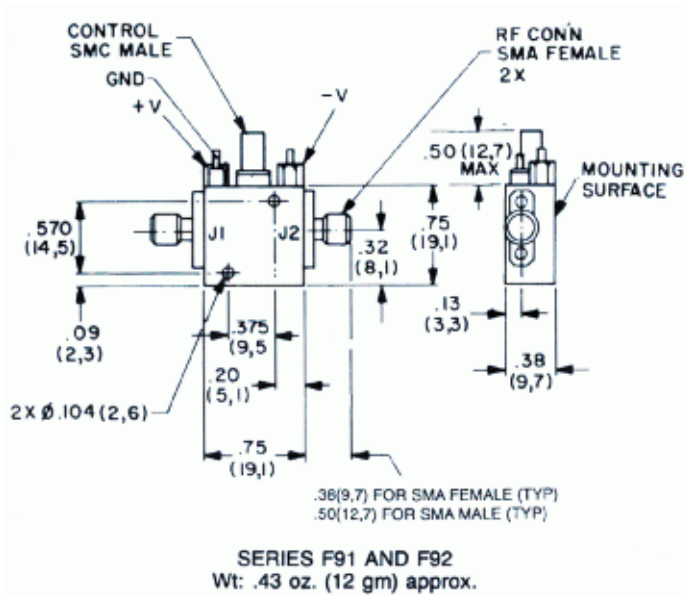
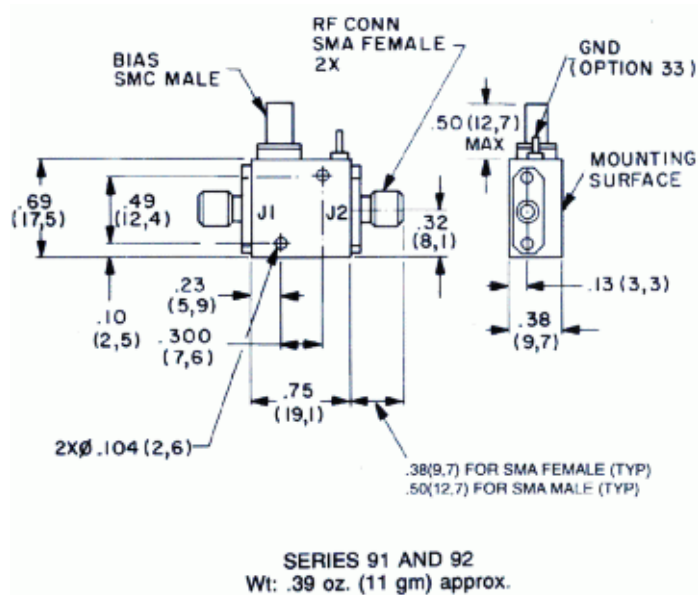
AVAILABLE OPTIONS

Option No.	Description
3	SMA female bias/control connector
7	Two SMA male RF connectors
9	Inverse control logic; logic "0" for switch OFF, logic "1" for switch ON (Not applicable to Series 91/92)
10	One SMA male (J1) and one SMA female (J2) RF connector
33	EMI filter solder-type bias/control terminal
41 . ⁽¹⁾	Internal video filter, port J1 only
42 . ⁽¹⁾	Internal video filter, port J2 only
43 . ⁽¹⁾	Internal video filter, both ports
55 . ⁽²⁾	Frequency operation 0.5 to 18 GHz.
64A	SMB male bias/control connector

(1) Not applicable to models 9214 & F9214. [See Video Filter Options on Switches Applications Notes.](#)

(2) Applicable only to 1 to 18 GHz switches. [See impact of Option 55 on specifications](#)

DIMENSIONS AND WEIGHTS



Dimensional Tolerances, unless otherwise indicated: .XX \pm .02; .XXX \pm .005

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