



Series 91 and 92 Miniature Broadband SP5T Switches



Application Notes for [RF Switch](#)

MODELS 9150-500 AND 9250-500

These switches provide high-performance characteristics over a multi-octave frequency range. The Model 9150-500 covers the 1 to 18 GHz frequency range while the Model 9250-500 covers the 0.2 to 4 GHz range. This description and operation are the same as that for the Models 9120-500 and 9220-500 SP2T switches.

- Frequency range (Series 91): 1 to 18 GHz
- Frequency range (Series 92): 0.2 to 4 GHz
- Reflective and Non-reflective models
- Low VSWR and insertion loss
- Isolation: up to 60 dB
- Miniature size, light weight

MODELS 9150T-500, 9150W-500, AND 9250T-500

These switches are non-reflective versions of the switches described above.

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.

SERIES G91 AND G92

These switches are the same as the Series G91 and G92 SP2T switches except for the number of ports.



F9150
(WITH INTEGRATED DRIVER)



9150-500
(DRIVERLESS)

MODEL NO. ⁽¹⁾	CHARACTERISTIC	FREQUENCY (GHz)					
		0.2-1	1-2	2-4	4-8	8-12.4	12.4-18
9150-500* F9150*	Min. Isolation (dB)	-	60	60	55	50	50
	Max. Insertion Loss (dB)	-	1.5	1.5	1.5	2.0	3.0
	Max. VSWR (ON)	-	1.5	1.5	1.75	1.75	2.0
G9150*	Min. Isolation (dB)	-	60	60	60	60	50
	Max. Insertion Loss (dB)	-	2.2	2.2	2.4	3.0	3.3
	Max. VSWR (ON)	-	1.5	1.5	1.8	2.0	2.2
9250-500* F9250*	Min. Isolation (dB)	60	60	60	-	-	-
	Max. Insertion Loss (dB)	1.5	1.5	1.5	-	-	-
	Max. VSWR (ON)	1.6	1.6	1.6	-	-	-
G9250*	Min. Isolation (dB)	60	60	60	-	-	-
	Max. Insertion Loss (dB)	2.2	2.2	2.2	-	-	-
	Max. VSWR (ON)	1.5	1.5	1.5	-	-	-
9150T-500* F9150T* G9150T*	Min. Isolation (dB)	-	50	50	45	40	40
	Max. Insertion Loss (dB)	-	1.5	1.5	2.0	2.5	3.0
	Max. VSWR (ON or OFF)	-	1.5	1.5	1.7	2.0	2.2

9250T-500*	Min. Isolation (dB)	60	60	50	-	-	-
F9250T*	Max. Insertion Loss (dB)	1.4	1.4	1.5	-	-	-
G9250T*	Max. VSWR (ON or OFF)	1.5	1.5	1.5	-	-	-
9150W-500*	Min. Isolation (dB)	-	60	60	60	60	55
F9150W	Max. Insertion Loss (dB)	-	2.2	2.2	2.4	3.0	3.3
G9150W*	Max. VSWR (ON or OFF)	-	1.5	1.7	1.8	2.0	2.2

*Special-order product. Consult factory before ordering.

(1) Models prefixed with "F" or "G" are equipped with integrated TTL-compatible drivers; models without the "F" or "G" prefix are current-controlled units and are furnished without drivers; models suffixed with "T" or "W" are non-reflective except a high VSWR will be present at the common port if all other ports are OFF.

PERFORMANCE CHARACTERISTICS

Power Handling Capability

Without Performance Degradation

Units without "T" or "W" suffix: 1W cw or peak

Units with "T" or "W" suffix

Input to any "OFF" port: 100 mW cw or peak

Input to any "ON" port: 1W cw or peak

Input to common port: 1W cw or peak

Survival Power

Units without "T" or "W" suffix: 1W average,

75W peak (1µsec max. pulse width)

Units with "T" or "W" suffix:

Input to any "OFF" port: 1W average,
10W peak (1µsec max. pulse width)

Input to any "ON" port: 1W average,
75W peak (1µsec max. pulse width)

Input to common port: 1W average,
75W peak (1µsec max. pulse width)

Switching Time⁽²⁾

SERIES 91/F91/G91

ON time..... 250 nsec max.

OFF time..... 250 nsec max.

With Option C37 100 nsec max.

SERIES 91/F91/G91

ON time..... 250 nsec max.

OFF time..... 250 nsec max.

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

Power Supply Requirements

SERIES 91/92/F91/F92

Driverless Units

Bias current required at each port for rated isolation and insertion loss.

Port OFF..... +50 mA

Port ON..... -50 mA

Units With Integrated Drivers

(For one port ON) +5V ±5%, 250 mA

-12 to -15V, 80 mA

SERIES G91/G92

(For one port ON) +5V ±5%, 150 mA

+15V ±5%, 60 mA

Control Characteristics

SERIES 91/92/F91/F92

Units With Integrated Drivers

Control Input

Impedance..... TTL, low power Schottky, one unit load.
(A unit load is 0.8 mA sink current and 40 µA source current.)

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

SERIES G91/G92

Control Input

Impedance..... Schottky TTL, one unit load. (A unit load
is 2.0 mA sink current and 50 µA source current.)

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

ENVIRONMENTAL RATINGS

Temperature Range

Units With Integrated Drivers

Operating..... -54°C to +110°C

Non-Operating..... -65°C to +125°C

Driverless Units Operating and

Non-Operating..... -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

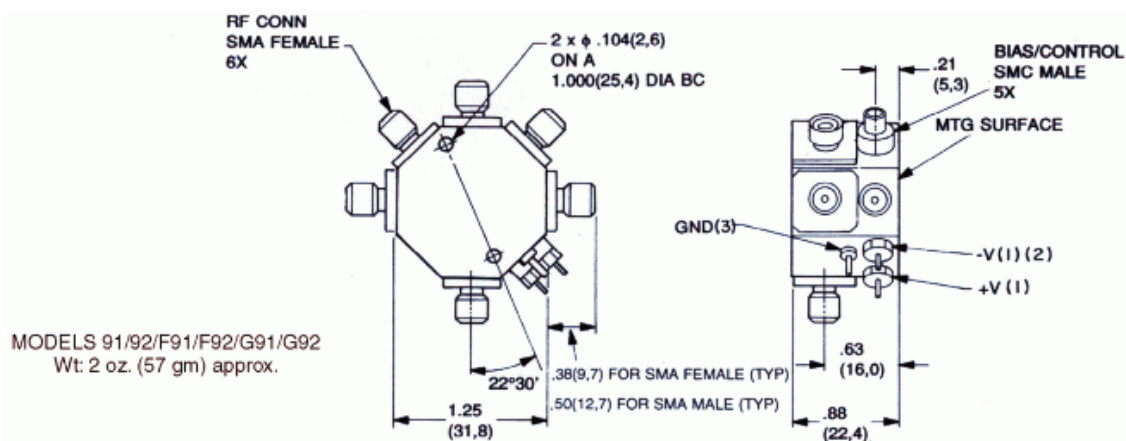
Option No.	Description
3	SMA female bias/control connectors
7	SMA male RF connectors
9	Inverse control logic; logic "0" for port OFF and logic "1" for port ON (Not applicable to Series 91/92)
33	EMI filter solder-type bias/control terminals
41*	Internal video filter, common port only
42*	Internal video filter, output ports only
43*	Internal video filter, all ports
55	Frequency range 0.5 to 18 GHz. See impact of this Option on the specifications.
64A	SMB male bias/control connectors
C37**	100 nsec. switching time
Z02***	70 dB min. Isolation (2 to 18 GHz)

*Not applicable to Series 92/F92/G92. [See Video Filter Options on Switches](#)

**Not applicable to series 92/F92/C92. Minimum order buy of 100 switches

*** The Insertion Loss will increase by about 0.5 to 1.5 dB (depends on the specific model). Some minor impacts on other specifications too.

DIMENSIONS AND WEIGHTS



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

Contact us

Herley - General Microwave specializes in developing and producing customized [microwave components](#) and [millimeter wave products](#) for the defense and aerospace industries as well as for non-defense applications such as communication systems. Herley General Microwave produces the industry standard General Microwave line of off-the-shelf catalog RF components. If you are looking for a [solid state power amplifier](#), [microwave synthesizer](#) or other [microwave oscillators](#), microwave receiver, [microwave switches](#), [microwave attenuator](#), microwave limiter, [microwave phase shifter](#), or [microwave IQ vector modulator](#); we can produce components meeting your requirements at a very competitive price. We also produce high quality customized [integrated microwave assemblies](#) such as up and down converters, DLVAs, beam forming networks, front ends, or switched bank filters, that can be used in a wide variety of demanding applications. [Herley General Microwave \(HGMI\)](#), a subsidiary of [Herley Industries](#) provides solutions for electronic warfare systems, phased array radar systems, electronic warfare simulators, test equipment and test systems and other defense and non-defense systems. We look forward to working with you, so please [contact us](#) today.