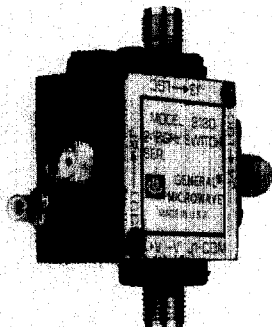
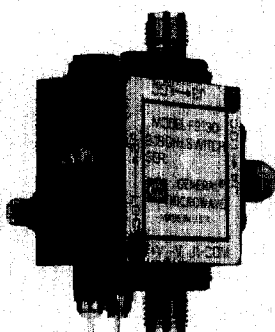


# Series 91 and 92 Miniature Broadband SP3T Switches

- Frequency range (Series 91): 1 to 18 GHz
- Frequency range (Series 92): 0.2 to 4 GHz
- Rise and fall times as fast as 10 nsec
- Reflective and nonreflective models
- Low VSWR and insertion loss
- Isolation: up to 60 dB
- Miniature size, light weight



9130-500 (DRIVERLESS)



F9130  
(WITH INTEGRATED  
DRIVER)

## MODELS 9130-500 AND 9230-500

These switches provide high-performance characteristics over a multi-octave frequency range. The Model 9130-500 covers the 1 to 18 GHz frequency range while the Model 9230-500 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.

## MODELS 9130T-500, 9130W-500 AND 9230T-500

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

## MODELS 9130AH-500 AND 9130AHT-500

These switches are the same as the 9120AH-500 and 9120AHT-500 except for the number of ports.

## 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.



# Series 91 and 92 SP3T Switches Specifications

MODEL NO. <sup>(1)</sup>	CHARACTERISTIC	FREQUENCY (GHz)					
		0.2-1	1-2	2-4	4-8	8-12.4	12.4-18
9130-500 F9130	Min Isolation (dB)	-	60	60	60	60	50
	Max Insertion Loss (dB)	-	1.5	1.5	1.5	2.0	2.5
	Max VSWR (ON)	-	1.75	1.75	1.75	1.75	2.0
G9130	Min Isolation (dB)	-	60	60	60	60	50
	Max Insertion Loss (dB)	-	1.8	1.8	2.0	2.5	2.8
	Max VSWR (ON)	-	1.5	1.5	1.7	1.7	2.0
9230-500 F9230	Min Isolation (dB)	60	60	60	-	-	-
	Max Insertion Loss (dB)	1.5	1.5	1.5	-	-	-
	Max VSWR (ON)	1.5	1.5	1.5	-	-	-
G9230	Min Isolation (dB)	60	60	60	-	-	-
	Max Insertion Loss (dB)	1.8	1.8	1.8	-	-	-
	Max VSWR (ON)	1.5	1.5	1.5	-	-	-
9130T-500 F9130T G9130T	Min Isolation (dB)	-	50	50	45	40	40
	Max Insertion Loss (dB)	-	1.4	1.4	1.6	1.8	2.5
	Max VSWR (ON or OFF)	-	1.5	1.5	1.7	1.7	2.0
9230T-500 F9230T G9230T	Min Isolation (dB)	60	60	50	-	-	-
	Max Insertion Loss (dB)	1.2	1.2	1.4	-	-	-
	Max VSWR (ON or OFF)	1.5	1.5	1.5	-	-	-
9130W-800 F9130W G9130W	Min Isolation (dB)	-	60	60	60	60	55
	Max Insertion Loss (dB)	-	1.8	1.8	2.0	2.5	2.8
	Max VSWR (ON or OFF)	-	1.5	1.5	1.7	1.7	2.0
9130AH-500 F9130AH	Min Isolation (dB)	-	60	60	60	60	50
	Max Insertion Loss (dB)	-	1.2	1.2	1.5	2.0	2.6
	Max VSWR (ON)	-	1.75	1.75	1.75	1.75	2.0
9130AHT-500 F9130AHT	Min Isolation (dB)	-	60	60	60	60	50
	Max Insertion Loss (dB)	-	1.6	1.6	1.8	2.5	3.3
	Max VSWR (ON)	-	1.75	1.75	1.9	2.0	2.0
	Max VSWR (OFF)	-	1.75	1.75	2.0	2.2	2.3

## 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 (1  $\mu$ sec max. pulse width)

Units with "T" or "W" suffix

Input to any "OFF" port: 1W average, 10W peak (1  $\mu$ sec max. pulse width)

Input to any "ON" port: 1W average, 75W peak (1  $\mu$ sec max. pulse width)

Input to common port: 1W average, 75W peak (1  $\mu$ sec max. pulse width)

(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; models suffixed with "H" are high-speed units.



# Series 91 and 92 SP3T Switches Specifications

## Switching Characteristics<sup>(1)</sup>

### SERIES 91/92/F91/F92

Units without "H" suffix

ON time . . . . . 500 nsec max.  
OFF time . . . . . 500 nsec max.

Units with "H" suffix

Rise time . . . . . 10 nsec max.  
Fall time . . . . . 10 nsec max.  
ON time . . . . . 25 nsec max.  
OFF time . . . . . 20 nsec max.  
Repetition rate . . . . . 20 MHz max.

### SERIES G91/G92

ON time . . . . . 500 nsec max.  
OFF time . . . . . 500 nsec max.

## Power Supply Requirements

### SERIES 91/92/F91/F92

#### Driverless Units

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

Port OFF  
Units without "H" suffix . . . . . + 50 mA  
Units with "H" suffix . . . . . + 30 mA  
Port ON  
Units without "H" suffix . . . . . - 50 mA  
Units with "H" suffix . . . . . - 35 mA

#### Units With Integrated Drivers

(For one port ON)

	+5V ± 5%	-12 to -15V
Units Without "H" Suffix	130 mA	60 mA
Units With "H" Suffix	75 mA	55 mA
Units With "HT" Suffix	105 mA	55 mA

**SERIES G91/G92**  
(For one port ON)  
+5V ± 5%, 100 mA  
+15V ± 5%, 40 mA

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

## Control Characteristics

### SERIES 91/92/F91/F92

#### Units With Integrated Drivers

##### Control Input Impedance

Units without "H" suffix . . . . . TTL, low power Schottky, one unit load. (A unit load is 0.8 mA sink current and 40  $\mu$ A source current.)

Units with "H" suffix . . . . . TTL, advanced Schottky, one unit load. (A unit load is 0.6 mA sink current and 20  $\mu$ A source current.)

**Control Logic** . . . . . Logic "0" (-0.3 to +0.8 V) for port ON and logic "1" (+2.0 to +5.0 V) 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  $\mu$ A source current.)

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



# Series 91 and 92 SP3T Switches Specifications

## ENVIRONMENTAL RATINGS

### Temperature Range

#### Units With Integrated Drivers

Operating ..... -65°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.)

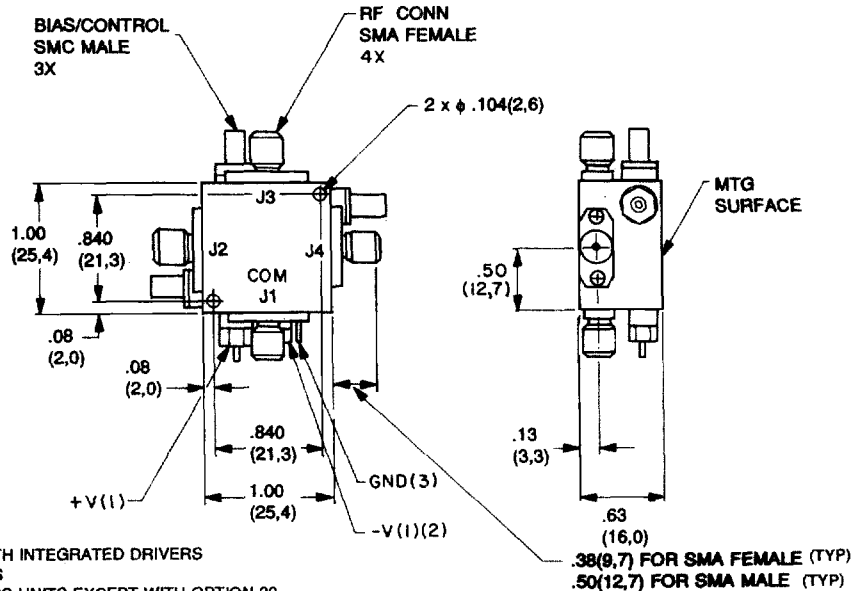
Temp. Cycling ..... MIL-STD-202F, Method 107D,  
 Cond. A, 5 cycles

## 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
64A	SMB male bias/control connectors

\*Not applicable to Series 92/F92/G92. See chart following the power handling discussion on page 98.

## DIMENSIONS AND WEIGHT



(1) USED ONLY ON UNITS WITH INTEGRATED DRIVERS  
 (2) +15V FOR G91/G92 SERIES  
 (3) NOT USED ON DRIVERLESS UNITS EXCEPT WITH OPTION 33

MODELS 91/92/F91/F92/G91/G92  
 Wt: 1.1 oz. (31 gm) approx.

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

