

KEYSIGHT TECHNOLOGIES (AGILENT HP)

87104B

The Keysight 87104B is a high-performance, multiport electromechanical coaxial switch designed for RF and microwave signal routing applications. It is a single-pole four-throw (SP4T) terminated switch operating from DC to 20 GHz, delivering exceptionally low insertion loss, high isolation, and outstanding repeatability over a long operating life of more than 5 million cycles.

SPECIFICATIONS

General

Interfaces	Solder terminals (Option 100) or 16-pin ribbon cable connector (Option 161)
------------	---

Physical

Power Supply	24 VDC nominal (Option 024, range 20-30 VDC), 15 VDC nominal (Option 015, range 12-20 VDC), or 5 VDC nominal (Option 011, range 4.5-7 VDC)
Operating Temperature	-25 to +75 °C °C
Dimensions (W×H×D)	63.5 mm x 56.1 mm x 63.5 mm mm
Weight	0.227 kg kg
Mounting Hole Thread	4-40 UNC or M3 × 0.5

Mechanical & Design Characteristics

Switch Configuration	SP4T (Single Pole 4 Throw), Terminated
RF Connector Type	SMA (female)
Switching Sequence	Break-before-make
Life Cycle Rating	5,000,000 cycles (guaranteed minimum)
Life Cycle Rating (Typical)	10,000,000 cycles

RF Performance Specifications

Frequency Range	DC to 20 GHz
Characteristic Impedance	50 Ω
Insertion Loss (DC to 4 GHz)	< 0.3 dB
Insertion Loss (4 to 12.4 GHz)	< 0.4 dB
Insertion Loss (12.4 to 20 GHz)	< 0.5 dB
Isolation (DC to 12.4 GHz)	> 100 dB
Isolation (12.4 to 20 GHz)	> 90 dB
SWR (DC to 4 GHz)	< 1.15
SWR (4 to 12.4 GHz)	< 1.25
SWR (12.4 to 20 GHz)	< 1.40
Insertion Loss Repeatability	0.03 dB (maximum up to 5,000,000 cycles)
Maximum CW Input Power (Thru-path)	2 W CW (cold switching)
Maximum Peak Input Power	100 W (pulse width $\leq$ 10 μ s, 1% duty cycle)

Actuator & Control Specifications

Actuator Type	Latching
Switching Speed / Switching Time	< 15 ms
Actuation Current (at 24 VDC Nominal)	120 mA
Actuation Current (at 15 VDC Nominal)	188 mA
Actuation Current (at 5 VDC Nominal)	350 mA
Current Interrupt Feature Support	Yes, built-in current interrupt paths to prevent continuous coil dissipation

Environmental & Reliability

Storage Temperature Range	-55 to +85 $^{\circ}$ C
Relative Humidity Range	95% RH at 40 $^{\circ}$ C for 5 days
Operating Altitude	4,600 m (15,000 ft)
Storage Altitude	15,300 m (50,000 ft)
Vibration (Operating)	10 g peak, 55 to 2000 Hz
Mechanical Shock (Operating)	500 g @ 0.5 ms (half-sine)
Mechanical Shock (Non-operating)	500 g @ 0.5 ms (half-sine)

Ordering & Accessory Options

Drive Control Option 300	TTL / 5V CMOS drive compatibility
Position Indicators Option 400	Electronic position indicators

Control Options

Option 100 Actuator Voltage	Option 024
Option 150 Actuator Voltage	15 VDC (12 to 20 VDC)
Option 160 Actuator Voltage	5 VDC (4.5 to 7 VDC)
Drive Control Option 500	TTL/CMOS compatible drive
DC Connector Option 201	Solder terminals (replaces ribbon cable)

Drive Control

Standard DC Connector	ribbon cable with 16-pin DIP plug
TTL Low State Voltage	0 to 0.8 V (Option 500)
TTL High State Voltage	3.0 to 5.0 V (Option 500)

Environmental Compliance

Moisture Resistance Standard	MIL-STD-202, Method 106
Altitude Standard	MIL-STD-202, Method 105C
Vibration Standard	MIL-STD-202, Method 204D, Condition B
Shock Standard	MIL-STD-202, Method 213B, Condition G

RF Characteristics

Termination Type	50 Ω internal termination
------------------	----------------------------------

Power Handling

Internal Termination CW Power	1 W
Internal Termination Peak Power	50 W (10 μ s max pulse width, 0.01% duty cycle)
Maximum CW Input Power at 2 GHz	100 W
Maximum CW Input Power at 4 GHz	70 W
Maximum CW Input Power at 12.4 GHz	50 W
Maximum CW Input Power at 20 GHz	40 W

Position Indicators

Position Indicator Maximum Contact Current	100 mA
Position Indicator Maximum Contact Voltage	30 V

Control

TTL Control Input Current (High State)	1.4 mA (at 5.0 V)
TTL Control Input Current (Low State)	0.1 mA (at 0 V)

TECHNOLOGY

Electromechanical Coaxial Switch

APPLICATIONS

RF and Microwave Signal Routing

