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Keysight E5250A

Low Leakage Switch Mainframe

Introduction

The Keysight E5250A low-leakage switch mainframe expands a single measurement station, such as the Keysight B1500A, E5270B, 4155C, or 4156C, to an automated measurement system. Plug-in modules can be configured either as a cross-point matrix for general parametric measurements or as a multiplexer for long-term reliability measurements.

When configured as a 10 x 12 Matrix Switch, the E5250A is ideal for general IV-CV parametric measurements with up to x48 triaxial output configurations.

Because of its 384 channel capability and advanced features that are typically found only on larger, more expensive input devices, the E5250A is ideal for long-term reliability measurements when configured as a 24 (8 x 3) Channel Multiplexer. This enables the use of low-cost power supplies for consistent stressing.

A large number of channels and low-cost stress sources allow the parallel testing of hundreds of devices, saving cost and time and achieving accurate, consistent results.



KEYSIGHT

Basic Functions

Keysight Technologies, Inc. E5250A Low Leakage Switch Mainframe functions:

- Switches DC current, DC voltage, capacitance, and pulse with DC instruments and LCR meters
- Controls switching through built-in GPIB
- Performs self-test using Option 301 relay function test adapter

Configurations

- E5252A 10 x 12 matrix switch: From 10 x 12 to 10 x 48 matrix per frame. (E5252A x 1 to 4)
- E5255A 24-channel (8 x 3) multiplexer: From 24 to 96 channels per frame (E5255A x 1 to 4)
- Required cables and connector plates are available.

Specification

The Supplemental Information and Typical Data entries in the following specifications are not warranted, but they provide useful information about the functions and performance of the instruments. Specifications, typical data, and supplemental information are defined at 23º C ± 5º C < 60% relative humidity (RH).

General specifications

General Specifications	
Temperature Range	
Operating	5° C to 40° C
Storage	-40° C to 70° C
Humidity Range	
Operating	5% to 80% (no condensation)
Storage	5% to 90% RH at 65° C
Altitude	
Operating	0 to 2000 m (6500 ft)
Storage	0 to 15,240 m (50,000 ft)
Regulatory Compliance	
Safety	CSA C22.2 No. 1010.1/IEC 1010-1
EMC	CISPR 11 Group 1 class A&EN50082-1
Power requirements	
Power requirements	100/120/220/240 V ± 10%, 47 Hz to 63 Hz
Maximum VA	
Maximum VA	100 VA
No. of Slots:	
No. of Slots	4 slots for 30-mm height switch cards
Size	
Mainframe	230 mm H x 430 mm W x 600 mm D
E5252A	30 mm H x 395 mm W x 424 mm D
E5255A	30 mm H x 395 mm W x 424 mm D
Weight (approx.)	
Mainframe	11.2 kg
E5252A	2.0 kg
E5255A	2.1 kg
No. of Ports (with E5252A)	
Low leakage I-V Port	2
General I-V Port	4
C-V Port	2
HF Port	2
Output Channels	12
No. of Ports (with E5255A)	
Low leakage I-V Port	3
Bias Port	3
Output Channels	24 (8 x 3)

E5252A 10 x 12 Matrix Switch

Switch specification*

Condition	A	B	C
Max. Current rating (A)	1.0	-	-
Max. Voltage rating (V) Channel to Ground: Channel to Channel:	 200 300	 - -	 - -
Close Ch Residual R (Ω) Low Leakage I-V Port: General I-V Port: C-V, HF Port:	 0.6 1.0 1.0	 - - -	 - - -
Ch Isolation R (Ω) Low Leakage I-V Port: General I-V Port: C-V, HF Port:	1 10^{13} 10^{12} 10^{9}	 5×10^{12} 5×10^{11} 5×10^{8}	 2×10^{12} 2×10^{11} 2×10^{8}
Condition A: Condition B: Condition C:	23° C ± 5° C, 5% to 60% RH 5° C to 18° C, 28° C to 40° C, 5% to 60% RH 28° C to 40° C, 60% to 80% RH		

* This specification is defined with the module plugged into the mainframe.

Typical data

Typical data		
Offset current	< 0.1 pA[1] < 1000 pA[1]	(Low Leakage I-V Port) (General I-V Port)
Channel Crosstalk Capacitance	< 0.3 pF/ch	
Offset voltage, Electro Motive Force (EMF) at 5 min.	< 80 µV < 110 µV < 110 µV	(Low Leakage I-V Port) (General I-V Port) (C-V, HF Port)
Guard Capacitance	< 145 pF[2] < 123 pF[2]	(Low Leakage I-V Port) (General I-V Port)
Additional C measurement Error	< ±1% ±0.5 pF[3]	(C-V Port)

Supplemental information

Supplemental information		
Bandwidth (at -3 dB)	< 10 MHz	(C-V, HF Port)
Relay Contact Life	> 10^{8} times	(Dry Switching Mode)
Settling Time [4]	< 3.5 sec / 0.4 pA	(Low Leakage I-V Port)

1. The offset current when zero volts are applied to all input and output channels
2. The guard capacitance of the closed port on input and output ports when one module per frame is installed
3. The additional error using the C-Compensation program at 1 kHz ~ 1 MHz, < 1000 pF
4. The time it takes transient current level to settle below the indicated current level in response to a 10 V step applied to the inputs

E5255A 24-Channel (8x3) Multiplexer

Switch specification*

Condition	A	B	C
Max. Current rating (A)	1.0	-	-
Max. Voltage rating (V) Channel to Ground: Channel to Channel:	 200 300	 - -	 - -
Close Ch Residual R (Ω) Low Leakage I-V Port: Bias Port:	 0.6 1.0	 - -	 - -
Ch Isolation R (Ω) Low Leakage I-V Port: Bias Port:	 10^{13} 10^{9}	 5×10^{12} 5×10^{8}	 2×10^{12} 2×10^{8}
Condition A: Condition B: Condition C:	23° C ± 5° C, 5% to 60% RH 5° C to 18° C, 28° C to 40° C, 5% to 60% RH 28° C to 40° C, 60% to 80% RH		

*This specification is defined with the module plugged into the mainframe.

Typical data

Typical data		
Offset current	< 0.1 pA [1]	(Low Leakage I-V Port)
Channel Crosstalk Capacitance	< 0.4 pF/ch < 5 pF/ch	(Low Leakage I-V Port) (Bias Port)
Offset voltage (EMF) at 5 min.	< 80 µV	(Low Leakage I-V Port)
Guard Capacitance	< 180 pF [2] < 60 pF	(Low Leakage I-V Port) (Low Leakage I-V Port, when the port is open)

Supplemental information

Supplemental information		
Relay Contact Life	> 10^{8} times	(Dry Switching Mode)
Settling Time [3]	< 3.5 sec / 0.4 pA	(Low Leakage I-V Port)

1. When zero volts are applied to all input and output channels
2. The guard capacitance of the closed port on input and output ports when one module per frame is installed
3. The time it takes transient current level to settle below the indicated current level in response to a 10 V step applied to the inputs.

Accessories Specifications

Accessories Specifications	
16494A	Triaxial Cable
16494B	Kelvin Triaxial Cable
16494C	Kelvin Triaxial Cable for 4142
16494D	8 ch Shielded Coaxial Cable
16495A	Connector Plate w/12 Triax. Intlk/GNDU
16495B	Connector Plate w/24 Triax. Intlk/GNDU
16495C	Connector Plate w/6 8 ch SHLD conn
16495D	Connector Plate w/12 8 ch SHLD conn
16495E	Half Size Blank Plate

General specifications

General Specifications	
Temperature Range	
Operating	5° C to 40° C
Storage	-40° C to 70° C
Humidity Range	
Operating	5% to 80% (no condensation)
Storage	5% to 90% RH at 65° C

16494E Wide Temperature 8 ch shielded Coaxial Cable

General specifications

General Specifications	
Temperature Range	
Operating	5° C to 40° C -50° C to 200° C (for cable only)
Storage	-40° C to 70° C
Humidity Range	
Operating	5% to 80% (no condensation)
Storage	5% to 90% RH at 65° C

4155C and 4156C Supplemental Information

4155C Supplemental information

Data shows the degradation when using the 4155C with Low Leakage I-V Port.

Voltage Range and Offset Accuracy (with MPSMU)

Range	Setting	Measurement
2 V	960 µV + (0.5 x Iout) V	780 µV + (0.5 x Iout) V

Current Range and Offset Accuracy (with MPSMU)

Range	Setting	Measurement
1 nA	3 pA + (0.2 x Vout) pA	3 pA + (0.2 x Vout) pA
10 nA	7 pA + (0.2 x Vout) pA	5 pA + (0.2 x Vout) pA
100 nA	50 pA + (0.4 x Vout) pA	30 pA + (0.4 x Vout) pA

4156C Supplemental information

Data shows the degradation when using the 4156C with Low Leakage I-V Port with non-kelvin connection.

Voltage Range and Offset Accuracy (with HRSMU)

Range	Setting	Measurement
2 V	500 µV + (0.5 x Iout) V	280 µV + (0.5 x Iout) V

Current Range and Offset Accuracy (with HRSMU)

Range	Setting	Measurement
10 pA	0.4 pA + (0.2 x Vout) pA	0.1 pA + (0.2 x Vout) pA
100 pA	0.4 pA + (0.2 x Vout) pA	0.1 pA + (0.2 x Vout) pA
1 nA	0.7 pA + (0.2 x Vout) pA	0.5 pA + (0.2 x Vout) pA
10 nA	4 pA + (0.2 x Vout) pA	2 pA + (0.2 x Vout) pA
100 nA	40 pA + (0.3 x Vout) pA	20 pA + (0.3 x Vout) pA

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