SEMI F47
Voltage Sag Immunity Test Report
for
Power Supply FPS100.241-009

Other devices covered by this report:

FPS100.24b-ccc-ddd

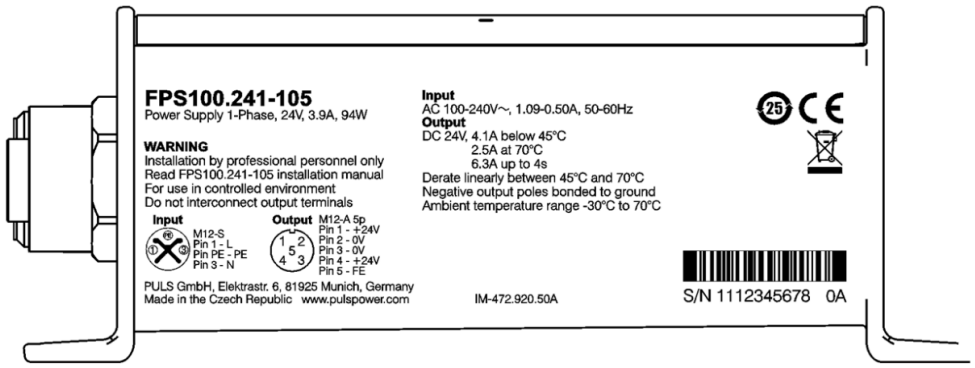
b:	1	Basic device - not adjustable, fixed current limitation
	2	Device with adjustable voltage and/or current limited outputs and individual switch off
ccc:	000-999	Consecutive number
ddd:	blank	No communication provided
	IOL	IO-Link
	DCOK	DC-OK relay contact

SEMI F47 Test Report

Document number	FPS100.241-009 Semi F47 Rev1
Standards	**SEMI F47-0706** (July 2006) SPECIFICATION FOR SEMICONDUCTOR PROCESSING EQUIPMENT - Voltage Sag Immunity Compliance Tests **IEC 61000-4-11** 2004 +A1:2017 Electromagnetic compatibility (EMC) - Part 4-11: Testing and measurement techniques - Voltage dips, short interruptions and voltage variations immunity tests for equipment with input current up to 16 A per phase
Applicant	PULS GmbH Elektrastraße 6 81925 Munich, Germany
Test Laboratory	PULS Vario GmbH Kranichberggasse 6 1120 Vienna, Austria
Test Engineer	Benjamin Blazevic
Test Date	21.04.2025
Description of Test Device:	Stand-alone power supply
Devices under Evaluation:	FPS100.241-009 Input: AC 100-240V, Output: DC 24V, 95W
S/N of Devices:	FPS100.241-009: S/N: 1100764928
Application Details:	Input voltage: 1-Phase AC 208V Input frequency: 50 or 60Hz Output load: 95W

PASS/FAIL Criterions:	In accordance with paragraph 7.8.2 a) of SEMI F47-0706 The output voltage is not allowed to deviate more than 5% of the initial value.
Test Result:	**PASS** The test device passed all essential SEMI F47-0706 tests according to the defined application details without any limitations and is qualified to bear the following approval mark: SEMI F47 Since DC power supplies, as covered in this test report, are only components of a semiconductor processing equipment, the tests of the SEMI F47 standard were conducted with selected rated characteristics of the DC power supply. The system integrator of the final semiconductor processing equipment needs to judge if the results of this test report are compatible with the SEMI F47 requirements of his system or if test data under other operating conditions are additionally required. The system integrator also needs to judge if the results of the inrush current peaks are compatible with the selected external fuses for input protection. The system integrator also needs to be aware about aging effects. It is expected that the ride through time can be reduced by 15% at end of the specified lifetime expectancy. A SEMI F47 certificate is not intended for this type of component, however the product fulfils the general requirements and can be marked with the symbol above.
Approved	Milan Maksimovic Team Leader DVT PULS Vario GmbH, Vienna
Date of Approval	**23.04.2026**

Copy of marking plate



List of Test Equipment

Type	Model	Inventory number
Test generator	Chroma 6560	10007
Load	ITECH IT8904E-600-280	10594
Oscilloscope	Siglent SDS3034X HD	10565
Diffential probe	AP031	10259
Current Probe	DPB5150A	10588
Climatic Chamber	CTS C-70/350	10428

The test equipment complies with the requirements of IEC 61000-4-11.

The peak current capability of the test generator was evaluated according Annex A of IEC 61000-4-11 and is able to deliver minimum 134A.

Test Specification for SEMI F47 compliance

Voltage Sag Immunity according to the following table:

Sag depth#1	Duration	Duration at 50 Hz	Duration at 60 Hz
50%	200ms	10 cycles	12 cycles
70%	500ms	25 cycles	30 cycles
80%	1000ms	50 cycles	60 cycles

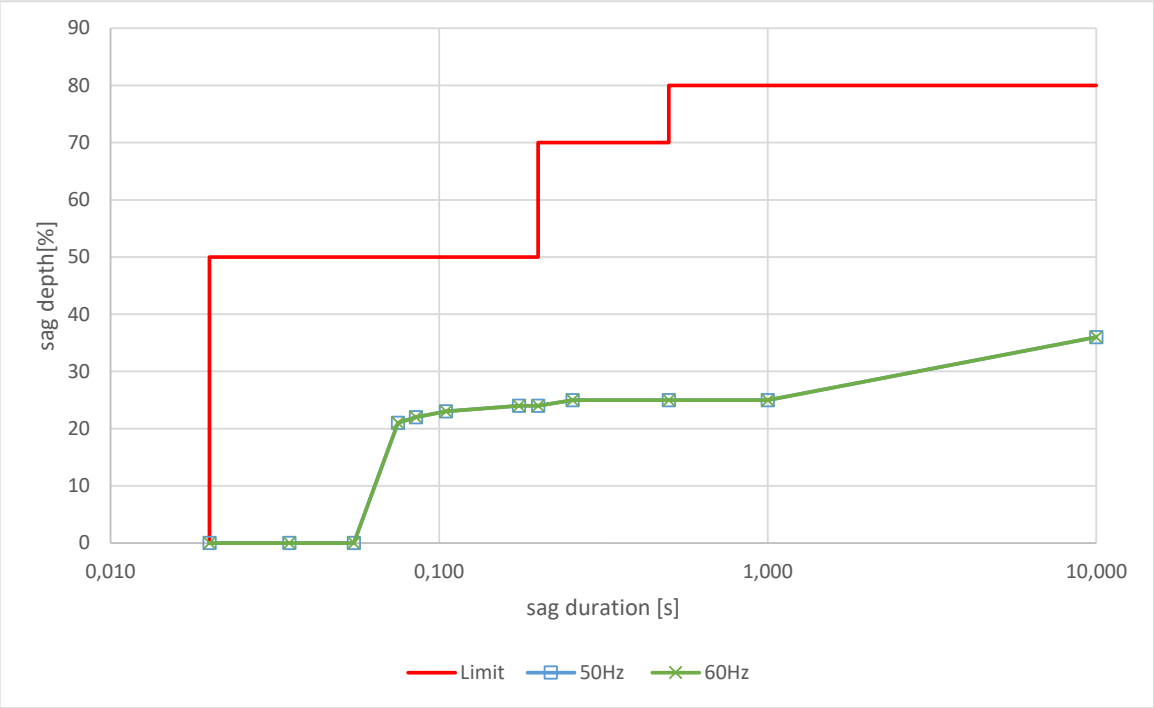
#1 Sag depth is expressed in percent of remaining nominal voltage. For example, during a 70% voltage sag on a 200 volt nominal system, the voltage is reduced during the sag to 140 volts and not 60 volts.

Test Setup

The unit under test in normal operating condition is mounted in a climate chamber.
The input is connected to an AC Source. The input voltage is measured with a 100:1 differential probe and the input current is measured with a current probe. These probes are connected to oscilloscope.

The output is connected to an active load. The output voltage is connected directly to the oscilloscope.

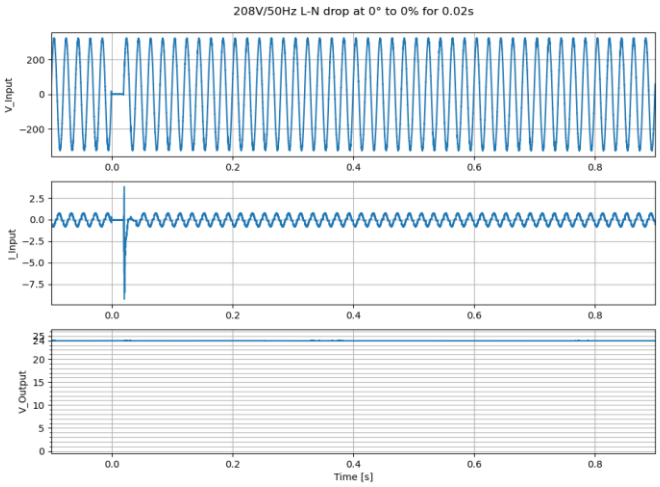
Voltage Sag Results L-N @ 208VAC; 24VDC/3.95A



Conducted Tests at 208V 50Hz

Input voltage	208Vac
Input Frequency	50Hz
Output voltage	24V
Output current	3.95A
Ambient temperature	25°C

Sag duration [s]	Voltage remaining [%]	Peak current [A]
0,020	0	9,26
0,200	50	5,45
0,500	70	2,58
1	80	1,68
10	80	1,26



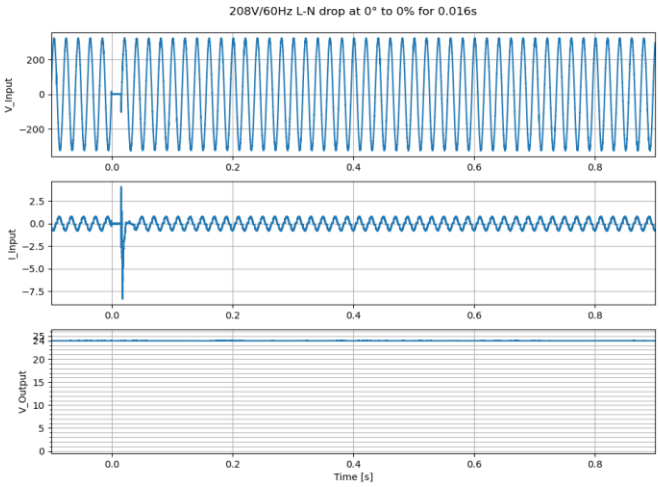
Informational measurements:

Sag duration [s]	Voltage remaining [%]	Peak current [A]
0,020	0	10,37
0,035	0	18,70
0,055	0	18,56
0,075	21	23,17
0,085	22	23,92
0,105	23	23,91
0,175	24	23,46
0,200	24	8,75
0,255	25	22,82
0,500	25	7,76
1	25	7,75
10	36	4,60

Conducted Tests at 208V 60Hz

Input voltage	208Vac
Input Frequency	60Hz
Output voltage	24V
Output current	3.95A
Ambient temperature	25°C

Sag duration [s]	Voltage remaining [%]	Peak current [A]
0,016	0	8,40
0,200	50	5,24
0,500	70	2,32
1	80	1,46
10	80	1,67



Informational measurements:

Sag duration [s]	Voltage remaining [%]	Peak current [A]
0,016	0	8,36
0,035	0	19,87
0,055	0	18,61
0,075	21	9,21
0,085	22	20,59
0,105	23	23,42
0,175	24	8,67
0,200	24	8,71
0,255	25	22,72
0,500	25	7,66
1	25	7,79
10	36	4,70

Inrush current measurements according 61000-4-11 at 208V 50Hz

Input voltage	208Vac
Input Frequency	50Hz
Output voltage	24V
Output current	3.95A
Ambient temperature	25°C

Peak input current measurements on unit under test:

First two measurements turn off input power for EUT for 5 minutes and then

Measure peak input current when AC turned on at 90°: 3,3 A

Measure peak input current when AC turned on at 270°: 2,5 A

Next two measurements turn on the input power for EUT for at least 1 minute then turn off input power for 5s and on again.

Measure peak input current when AC turned on at 90°: 5,2 A

Measure peak input current when AC turned on at 270°: 5,2 A

Inrush current measurements according 61000-4-11 at 208V 60Hz

Input voltage	208Vac
Input Frequency	60Hz
Output voltage	24V
Output current	3.95A
Ambient temperature	25°C

Peak input current measurements on unit under test:

First two measurements turn off input power for EUT for 5 minutes and then

Measure peak input current when AC turned on at 90°: 3,4 A

Measure peak input current when AC turned on at 270°: 2,8 A

Next two measurements turn on the input power for EUT for at least 1 minute then turn off input power for 5s and on again.

Measure peak input current when AC turned on at 90°: 5,2 A

Measure peak input current when AC turned on at 270°: 5,3 A

Operating conditions and their influence in test results:

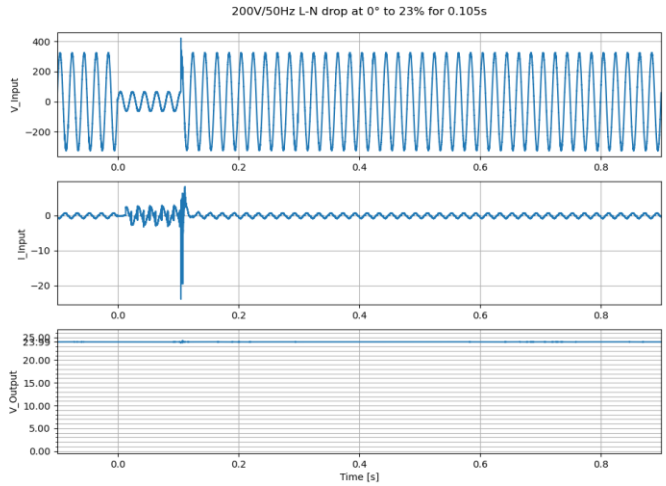
a) Ambient temperature:
Control measurements show that the ambient temperature has only a minor influence in the ride-through time test results.
It is assumed that semiconductor processing equipment is never used at lower temperatures than +25°C. Although the power supply itself is specified down to -30°C and up to +70°C, a test at such low or high temperatures is not performed.

b) Mains frequency 50Hz vs. 60Hz:
Control measurements show that 50Hz testing is more critical than 60Hz testing.
Therefore, unless otherwise noted, all tests were performed with a mains frequency of 50Hz.

APPENDIX

Informational measurements at 200V

Input voltage	200Vac
Input Frequency	50Hz
Output voltage	24V
Output current	3.95A
Ambient temperature	25°C



Informational measurements:

Sag duration [s]	Voltage remaining [%]	Peak current [A]
0,020	0	8,59
0,035	0	19,13
0,055	0	18,76
0,075	22	23,73
0,085	23	23,62
0,105	23	23,86
0,175	25	23,36
0,200	26	8,37
0,255	26	23,15
0,500	26	7,65
1	26	7,68
10	37	4,56

Informational measurements at 230V

Input voltage	230Vac
Input Frequency	50Hz
Output voltage	24V
Output current	3.95A
Ambient temperature	25°C

Informational measurements:

Sag duration [s]	Voltage remaining [%]	Peak current [A]
0,020	0	9,10
0,035	0	19,47
0,055	0	18,80
0,075	19	23,59
0,085	20	23,65
0,105	21	23,83
0,175	22	23,48
0,200	22	8,66
0,255	23	22,88
0,500	23	7,50
1	23	7,51
10	32	4,62