COSEL

参考資料

TEST DATA OF SPLFA150F-24

Regulated DC Power Supply
October 19, 2011

Approved by : Takahiro Yoneda
Takahiro Yoneda Design Manager

Prepared by : Satoshi Kinoshita
Satoshi Kinoshita Design Engineer

COSEL CO.,LTD.

COSEL

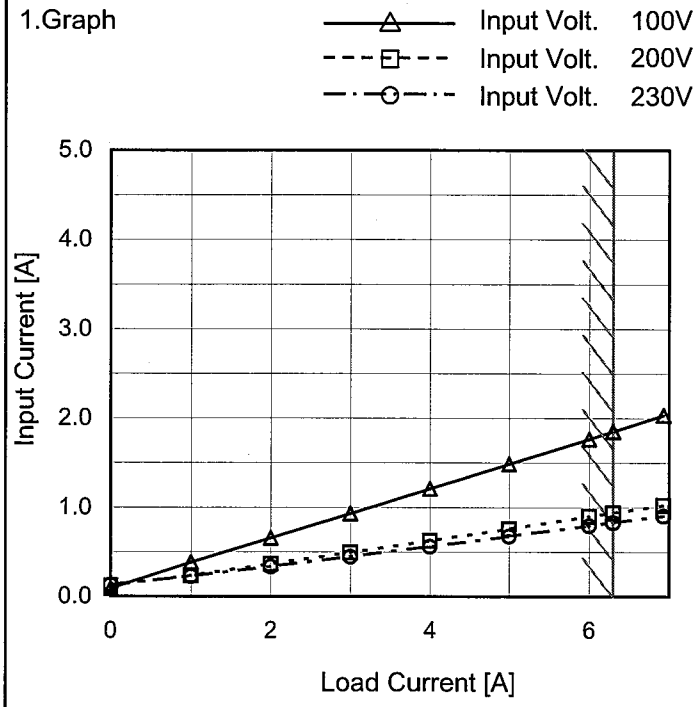
CONTENTS

COSEL

Model	SPLFA150F-24
Item	Input Current (by Load Current)
Object	————————

Temperature 25°C
Testing Circuitry Figure A

1.Graph



Note: Slanted line shows the range of the rated load current.

2.Values

Load Current [A]	Input Current [A]		
	Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]
0.00	0.091	0.117	0.130
1.00	0.385	0.235	0.226
2.00	0.657	0.362	0.334
3.00	0.932	0.491	0.447
4.00	1.210	0.625	0.561
5.00	1.487	0.759	0.677
6.00	1.768	0.897	0.795
6.30	1.853	0.937	0.831
6.93	2.037	1.023	0.905
--	-	-	-
--	-	-	-

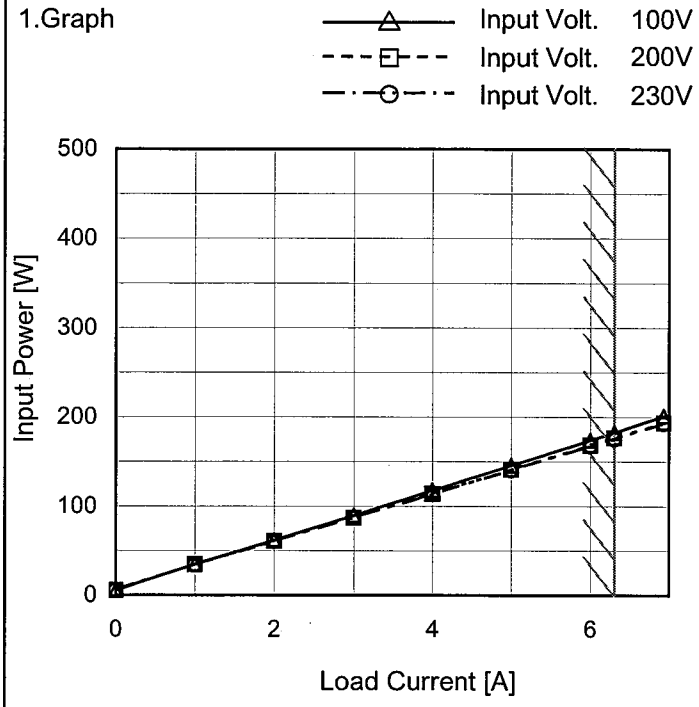
BC-10626

COSEL

Model	SPLFA150F-24
Item	Input Power (by Load Current)
Object	————————

Temperature 25°C
Testing Circuitry Figure A

1.Graph



Note: Slanted line shows the range of the rated load current.

2.Values

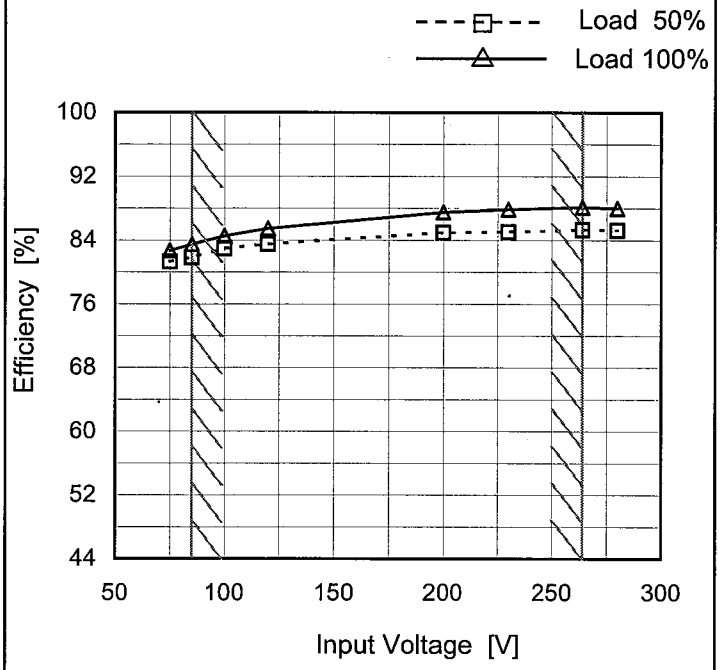
Load Current [A]	Input Power [W]		
	Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]
0.00	5.4	5.5	5.7
1.00	35.0	34.4	34.3
2.00	61.9	60.7	60.5
3.00	89.5	87.1	86.9
4.00	117.7	113.9	113.6
5.00	145.9	141.0	140.4
6.00	174.2	168.3	167.6
6.30	182.8	176.6	175.8
6.93	201.3	193.7	192.8
--	-	-	-
--	-	-	-

COSEL

Model	SPLFA150F-24
Item	Efficiency (by Input Voltage)
Object	———————————

Temperature 25°C
Testing Circuitry Figure A

1.Graph



Note: Slanted line shows the range of the rated input voltage.

2.Values

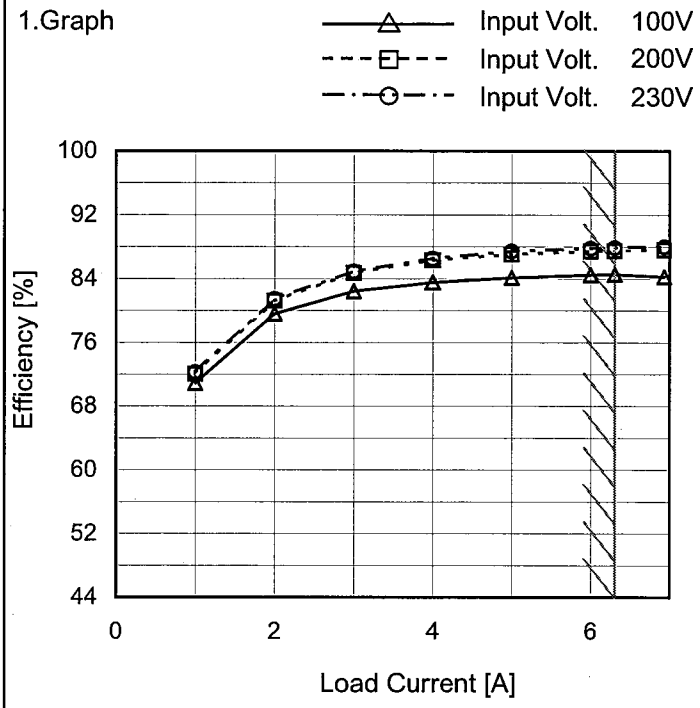
Input Voltage [V]	Efficiency [%]	
	Load 50%	Load 100%
75	81.3	82.7
85	81.8	83.5
100	82.9	84.6
120	83.5	85.5
200	85.0	87.5
230	85.0	87.9
264	85.3	88.2
280	85.2	88.0
--	-	-

COSEL

Model	SPLFA150F-24
Item	Efficiency (by Load Current)
Object	————————

Temperature 25°C
Testing Circuitry Figure A

1.Graph



Note: Slanted line shows the range of the rated load current.

2.Values

Load Current [A]	Efficiency [%]		
	Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]
0.00	-	-	-
1.00	70.9	72.1	72.3
2.00	79.6	81.2	81.5
3.00	82.4	84.7	84.9
4.00	83.5	86.3	86.5
5.00	84.1	87.1	87.4
6.00	84.5	87.5	87.8
6.30	84.5	87.5	87.9
6.93	84.3	87.6	88.0
--	-	-	-
--	-	-	-

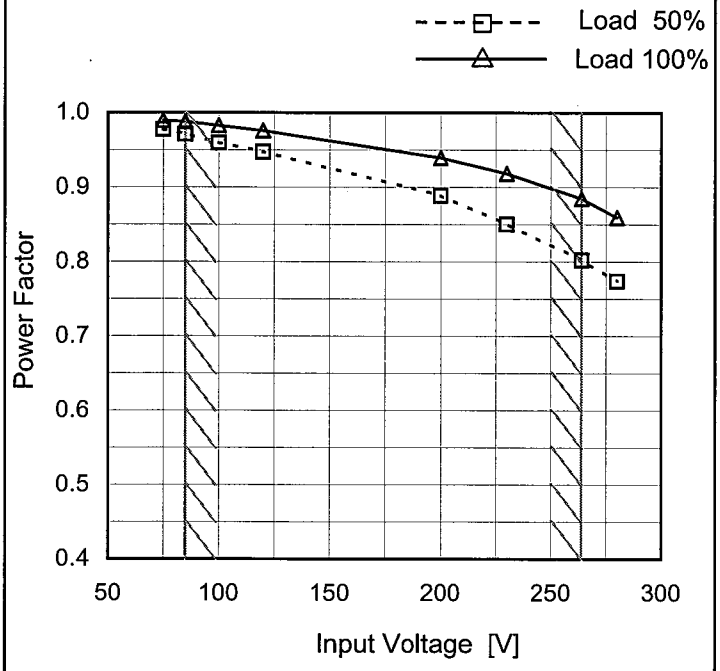
BC-10626

COSEL

Model	SPLFA150F-24
Item	Power Factor (by Input Voltage)
Object	———————

Temperature 25°C
Testing Circuitry Figure A

1.Graph



Note: Slanted line shows the range of the rated input voltage.

2.Values

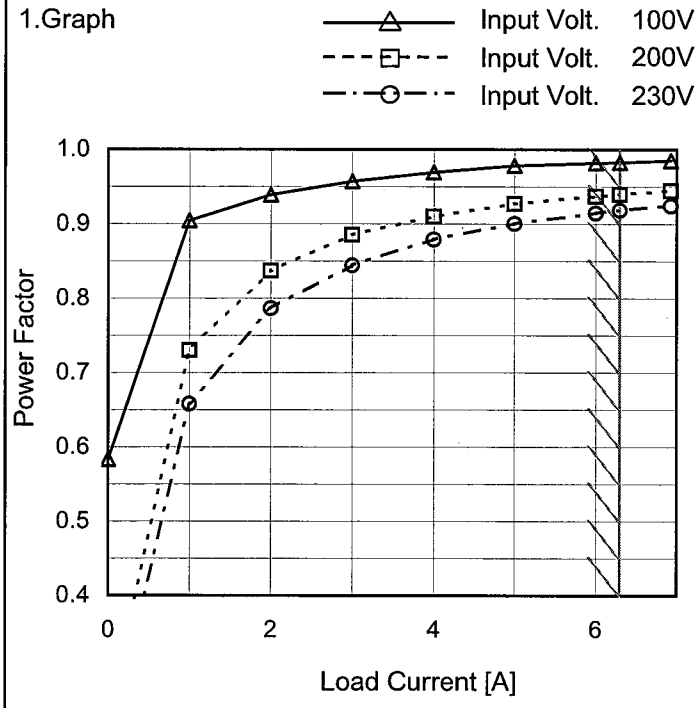
Input Voltage [V]	Power Factor	
	Load 50%	Load 100%
75	0.977	0.990
85	0.971	0.988
100	0.959	0.983
120	0.948	0.976
200	0.889	0.940
230	0.851	0.918
264	0.802	0.885
280	0.774	0.859
--	-	-

COSEL

Model	SPLFA150F-24
Item	Power Factor (by Load Current)
Object	————————

Temperature 25°C
Testing Circuitry Figure A

1.Graph



Note: Slanted line shows the range of the rated load current.

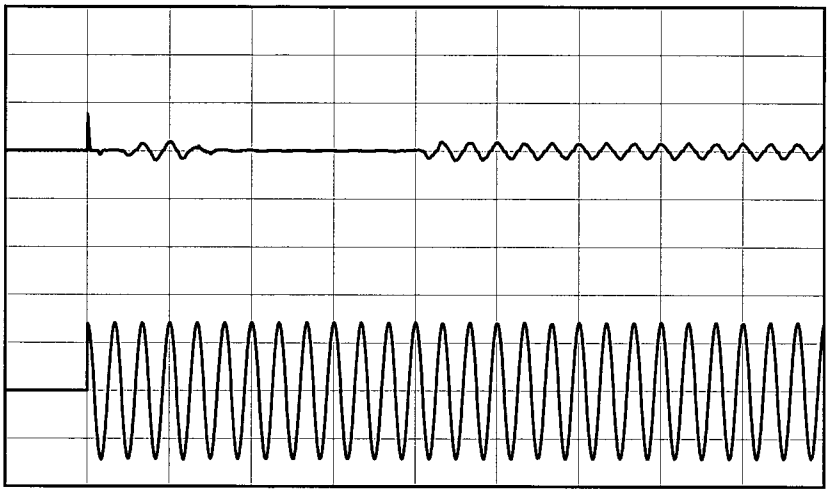
2.Values

Load Current [A]	Power Factor		
	Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]
0.00	0.583	0.234	0.191
1.00	0.905	0.730	0.658
2.00	0.939	0.837	0.787
3.00	0.958	0.885	0.845
4.00	0.969	0.910	0.879
5.00	0.978	0.927	0.901
6.00	0.982	0.937	0.915
6.30	0.983	0.940	0.918
6.93	0.985	0.945	0.925
--	-	-	-
--	-	-	-

COSEL

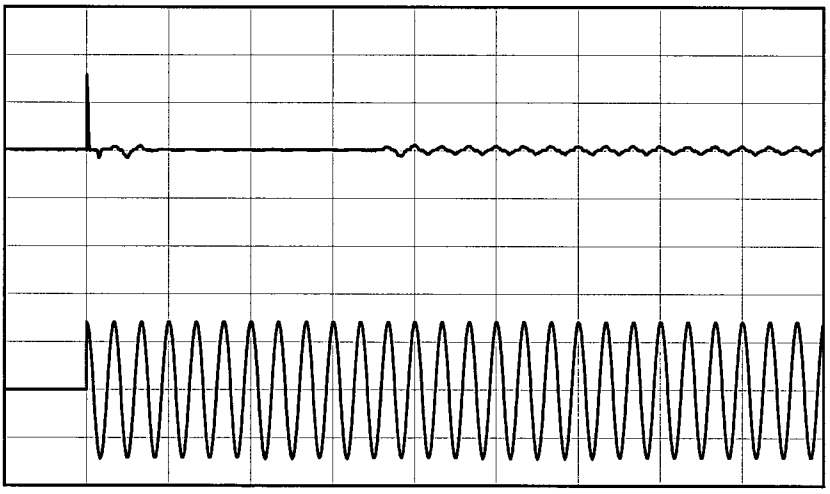
Model	SPLFA150F-24
Item	Inrush Current
Object	———————

Temperature 25°C
Testing Circuitry Figure A



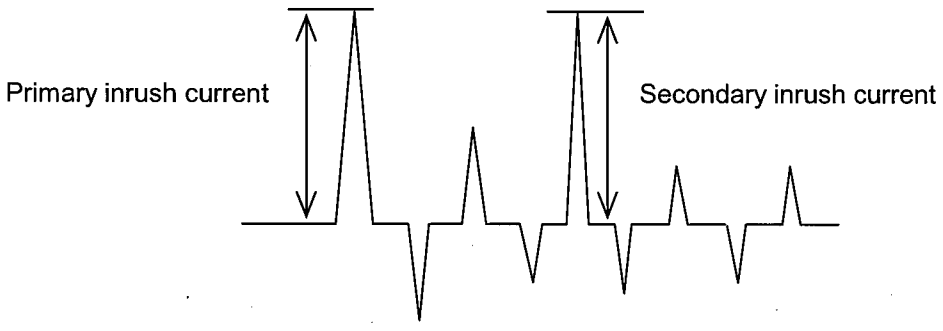
Input Voltage 100 V
Frequency 60 Hz
Load 100 %

Primary inrush current :
15.1 A
Secondary inrush current :
4.0 A



Input Voltage 200 V
Frequency 60 Hz
Load 100 %

Primary inrush current :
31.3 A
Secondary inrush current :
2.7 A



BC-10626

COSEL

Model	SPLFA150F-24	
Item	Leakage Current	Temperature 25°C Testing Circuitry Figure B
Object	———————————	

1.Results

[mA]

Standards		Input Volt.			Note
		100 [V]	200 [V]	230 [V]	
DEN-AN	Both phases	0.27	0.40	0.44	Operation
	One of phases	0.23	0.51	0.60	Stand by
IEC60950-1	Both phases	0.16	0.35	0.41	Operation
	One of phases	0.24	0.52	0.61	Stand by

The value for "One of phases" is the reference value only.

2.Condition

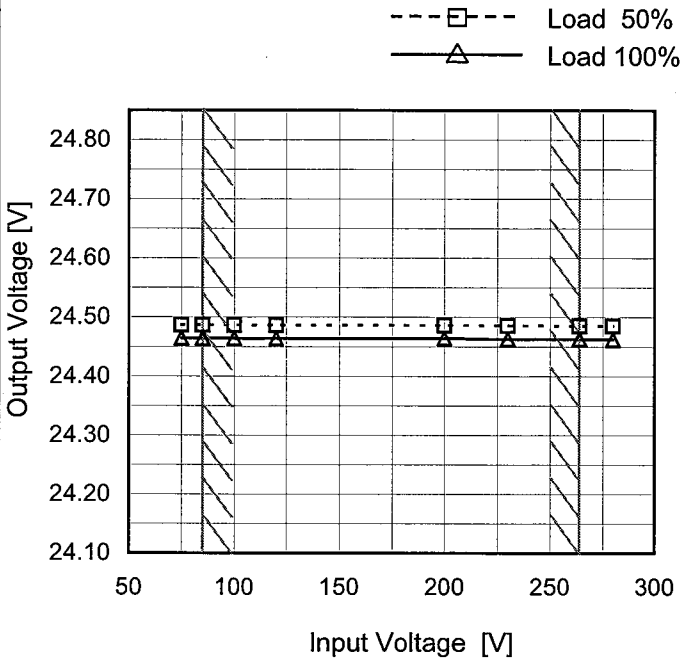
Leakage current value is concluded after measuring both phases of AC input and by choosing the larger one.

COSEL

Model	SPLFA150F-24
Item	Line Regulation
Object	+24V6.3A

Temperature 25°C
Testing Circuitry Figure A

1.Graph



Note: Slanted line shows the range of the rated input voltage.

2.Values

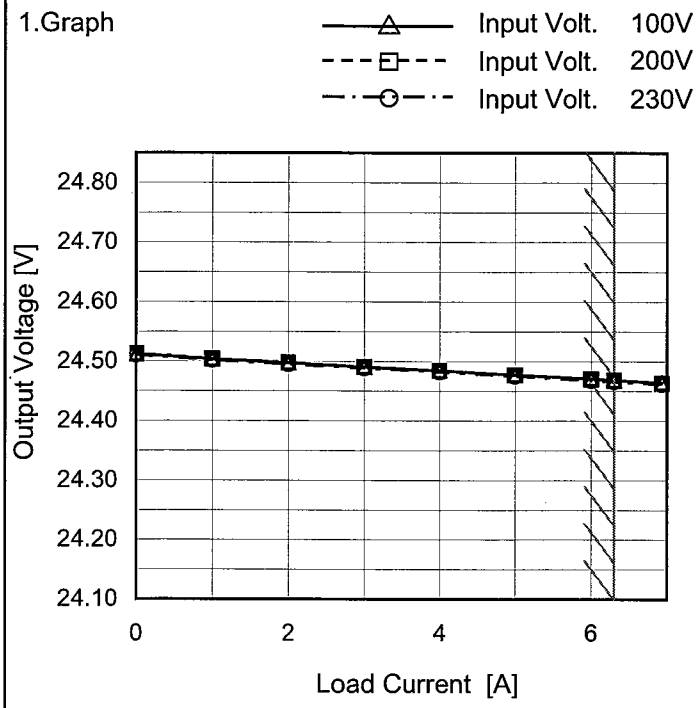
Input Voltage [V]	Output Voltage [V]	
	Load 50%	Load 100%
75	24.487	24.465
85	24.487	24.465
100	24.487	24.464
120	24.486	24.464
200	24.486	24.464
230	24.486	24.463
264	24.485	24.463
280	24.485	24.462
--	-	-

COSEL

Model	SPLFA150F-24
Item	Load Regulation
Object	+24V6.3A

Temperature 25°C
Testing Circuitry Figure A

1.Graph



Note: Slanted line shows the range of the rated load current.

2.Values

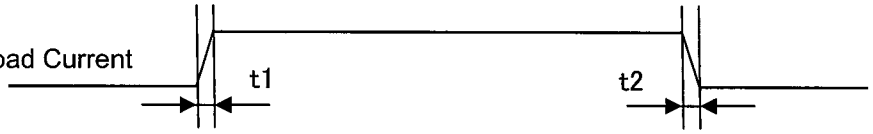
Load Current [A]	Output Voltage [V]		
	Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]
0.00	24.512	24.513	24.511
1.00	24.504	24.504	24.502
2.00	24.497	24.498	24.495
3.00	24.491	24.491	24.489
4.00	24.485	24.484	24.482
5.00	24.478	24.477	24.475
6.00	24.471	24.470	24.468
6.30	24.469	24.468	24.466
6.93	24.465	24.463	24.461
--	-	-	-
--	-	-	-

COSEL

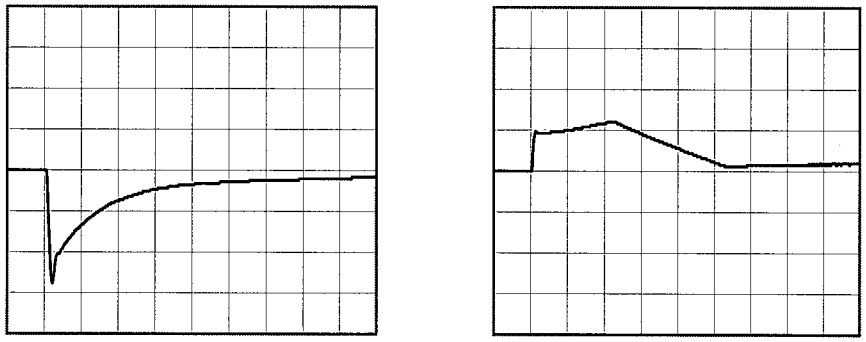
Model	SPLFA150F-24		
Item	Dynamic Load Response	Temperature Testing Circuitry	25°C Figure A
Object	+24V6.3A		

Input Volt. 100 V
Cycle 1000 ms

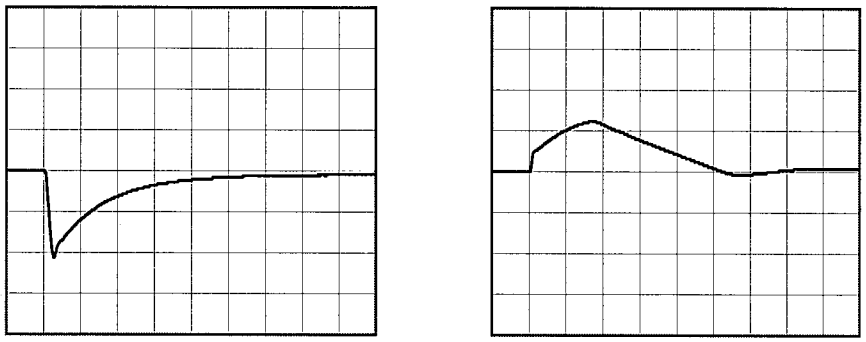
Response. t1=t2=50us.typ



Min. Load (0A) ⟷
Load 100% (6.3A)



Min. Load (0A) ⟷
Load 50% (3.15A)

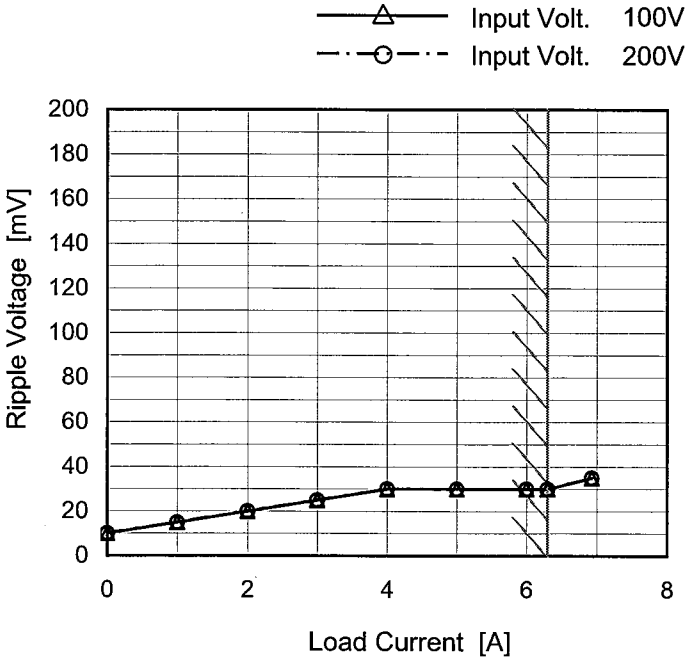


COSEL

Model	SPLFA150F-24
Item	Ripple Voltage (by Load Current)
Object	+24V6.3A

Temperature 25°C
Testing Circuitry Figure C

1.Graph



Measured by 20 MHz Oscilloscope.
Ripple Voltage is shown as p-p in the figure below.
Note: Slanted line shows the range of the rated load current.

T1: Due to AC Input Line
T2: Due to Switching

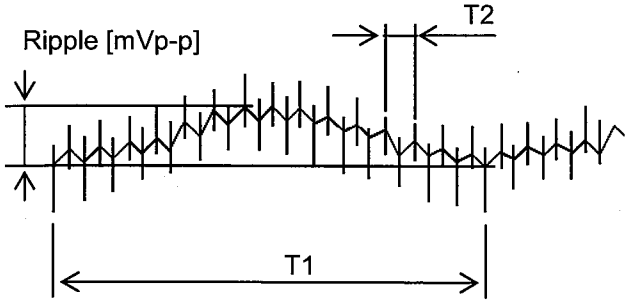


Fig. Complex Ripple Wave Form

2.Values

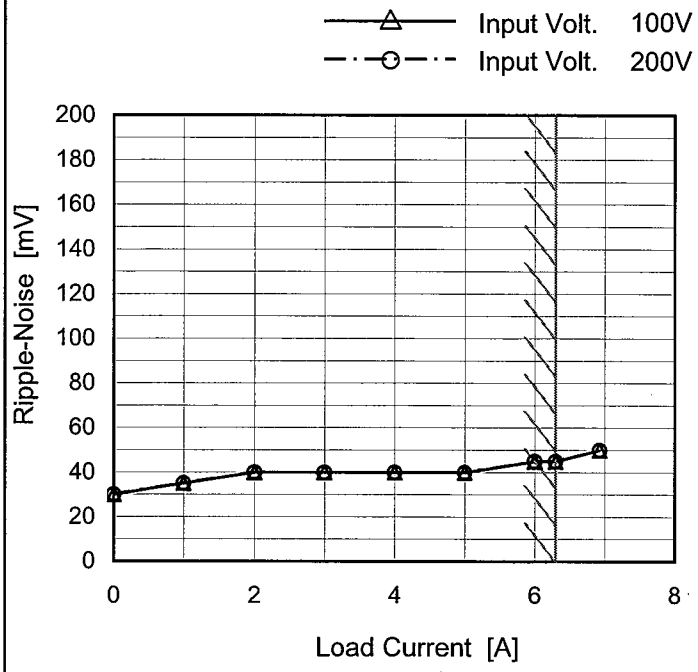
Load Current [A]	Ripple Voltage [mV]	
	Input Volt. 100 [V]	Input Volt. 200 [V]
0.00	10	10
1.00	15	15
2.00	20	20
3.00	25	25
4.00	30	30
5.00	30	30
6.00	30	30
6.30	30	30
6.93	35	35
--	-	-
--	-	-

COSEL

Model	SPLFA150F-24
Item	Ripple-Noise
Object	+24V6.3A

Temperature 25°C
Testing Circuitry Figure C

1.Graph



Measured by 20 MHz Oscilloscope.
Ripple-Noise is shown as p-p in the figure below.
Note: Slanted line shows the range of the rated load current.

2.Values

Load Current [A]	Ripple-Noise [mV]	
	Input Volt. 100 [V]	Input Volt. 200 [V]
0.00	30	30
1.00	35	35
2.00	40	40
3.00	40	40
4.00	40	40
5.00	40	40
6.00	45	45
6.30	45	45
6.93	50	50
--	-	-
--	-	-

T1: Due to AC Input Line
T2: Due to Switching

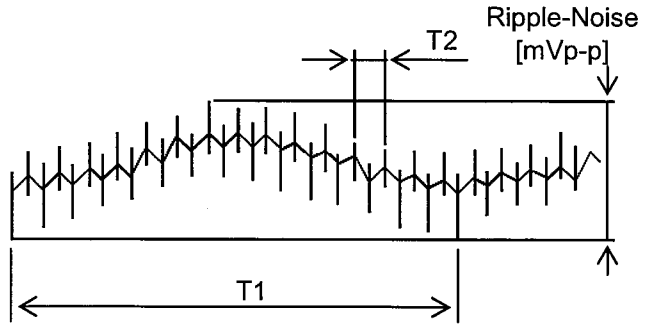


Fig. Complex Ripple Wave Form

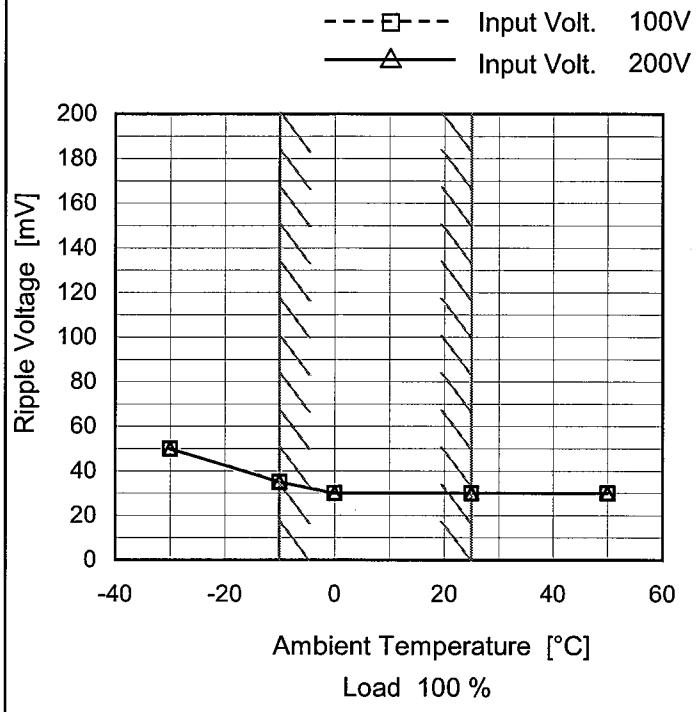
BC-10626

COSEL

Model	SPLFA150F-24
Item	Ripple Voltage (by Ambient Temp.)
Object	+24V6.3A

Testing Circuitry Figure C

1.Graph



Measured by 20 MHz Oscilloscope.

Note: Slanted line shows the range of the rated ambient temperature.

2.Values

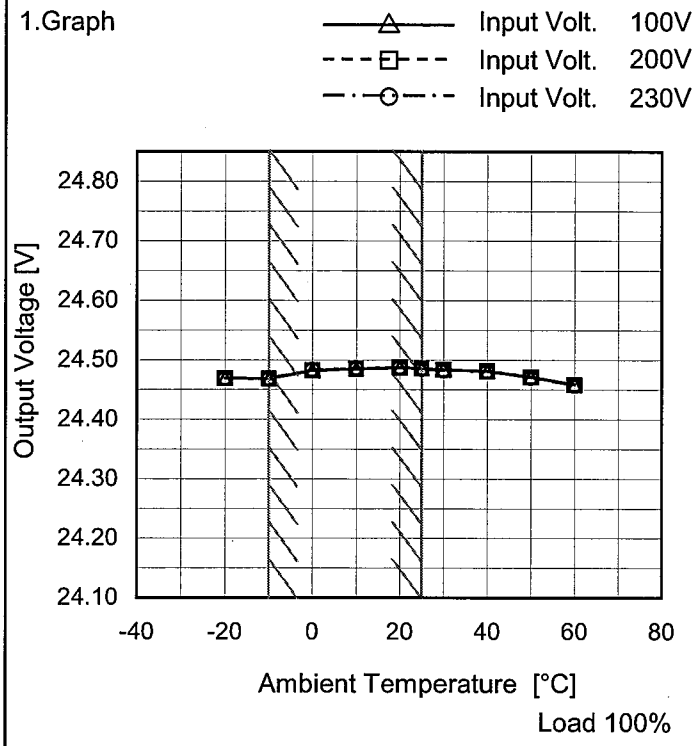
Ambient Temperature [°C]	Ripple Voltage [mV]	
	Input Volt. 100 [V]	Input Volt. 200 [V]
-30	50	50
-10	35	35
0	30	30
25	30	30
50	30	30
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-

COSEL

Model	SPLFA150F-24
Item	Ambient Temperature Drift
Object	+24V6.3A

Testing Circuitry Figure A

1.Graph



Note: Slanted line shows the range of the rated ambient temperature.

2.Values

Ambient Temperature [°C]	Output Voltage [V]		
	Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]
-20	24.469	24.469	24.469
-10	24.469	24.468	24.469
0	24.483	24.483	24.483
10	24.485	24.485	24.486
20	24.487	24.487	24.488
25	24.486	24.486	24.485
30	24.484	24.483	24.483
40	24.482	24.481	24.481
50	24.472	24.471	24.471
60	24.459	24.459	24.458
--	-	-	-

BC-10626

COSEL

Model	SPLFA150F-24	
Item	Output Voltage Accuracy	Testing Circuitry Figure A
Object	+24V6.3A	

1.Output Voltage Accuracy

This is defined as the value of the output voltage, regulation load, ambient temperature and input voltage varied at random in the range as specified below.

Temperature : -10 - 50°C
Input Voltage : 85 - 264V
Load Current : 0 - 6.3A

* Output Voltage Accuracy = ±(Maximum of Output Voltage - Minimum of Output Voltage) / 2

$$\text{* Output Voltage Accuracy (Ration)} = \frac{\text{Output Voltage Accuracy}}{\text{Rated Output Voltage}} \times 100$$

2.Values

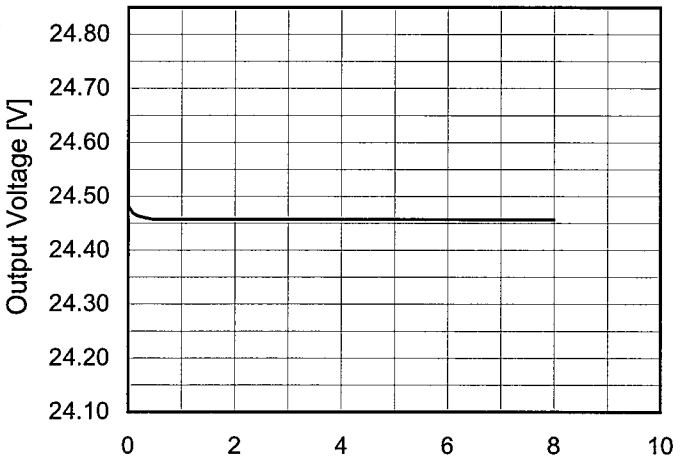
Item	Temperature [°C]	Input Voltage[V]	Output		Output Voltage Accuracy	
			Current[A]	Voltage[V]	Value [mV]	Ration [%]
Maximum Voltage	25	85	0	24.533	±33	±0.1
Minimum Voltage	-10	200	6.3	24.468		

COSEL

Model	SPLFA150F-24
Item	Time Lapse Drift
Object	+24V6.3A

Temperature 25°C
Testing Circuitry Figure A

1.Graph



Input Volt. 100V
Load 100%

* The characteristic of AC200V is equal.

2.Values

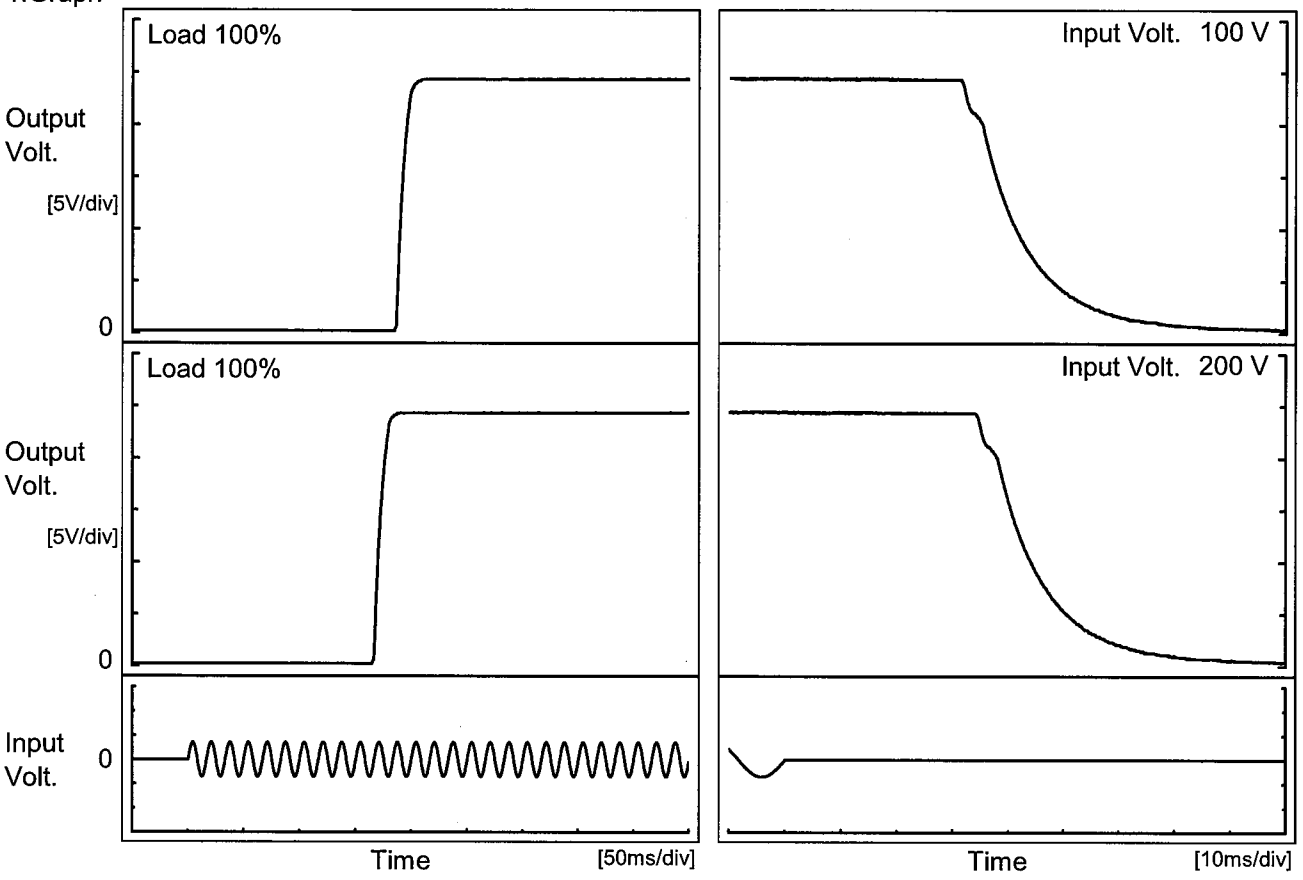
Time since start [H]	Output Voltage [V]
0.0	24.484
0.5	24.457
1.0	24.457
2.0	24.457
3.0	24.457
4.0	24.457
5.0	24.457
6.0	24.457
7.0	24.457
8.0	24.457

COSEL

Model	SPLFA150F-24
Item	Rise and Fall Time
Object	+24V6.3A

Temperature 25°C
Testing Circuitry Figure A

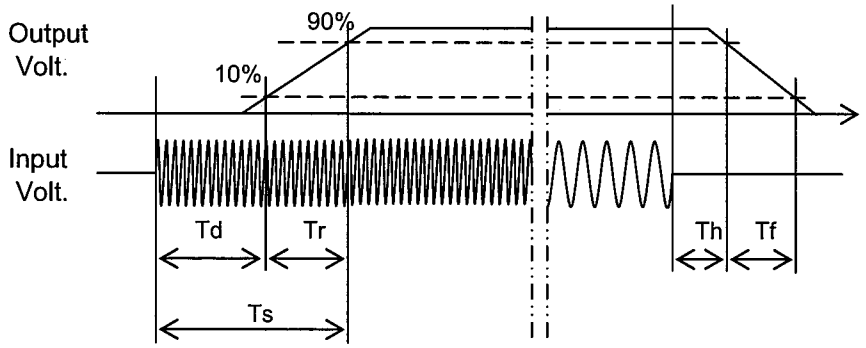
1.Graph



2.Values

[ms]

Input Volt. \ Time	Td	Tr	Ts	Th	Tf
100 V	187.5	10.8	198.3	32.9	21.9
200 V	167.5	10.8	178.3	35.6	21.9

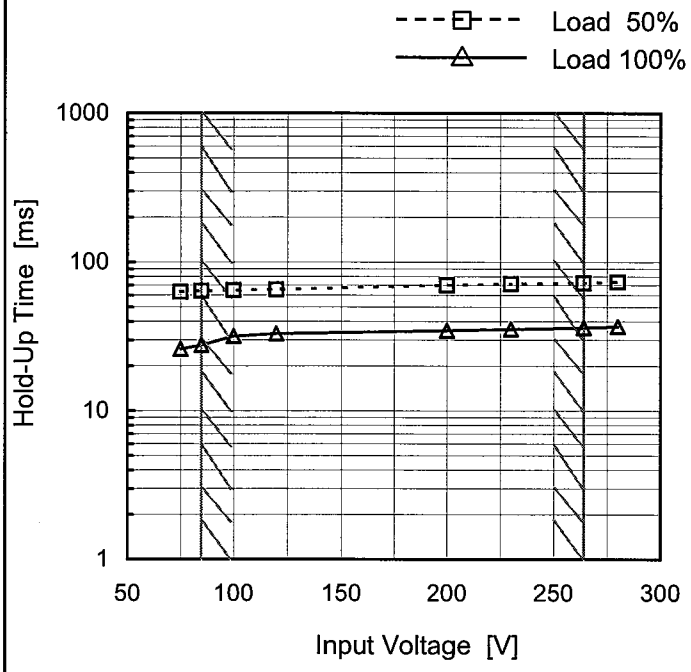


COSEL

Model	SPLFA150F-24
Item	Hold-Up Time
Object	+24V6.3A

Temperature 25°C
Testing Circuitry Figure A

1.Graph



This duration covers from Shut-off of input voltage to the moment when output voltage descends to the rated range of voltage accuracy.
Note: Slanted line shows the range of the rated input voltage.

2.Values

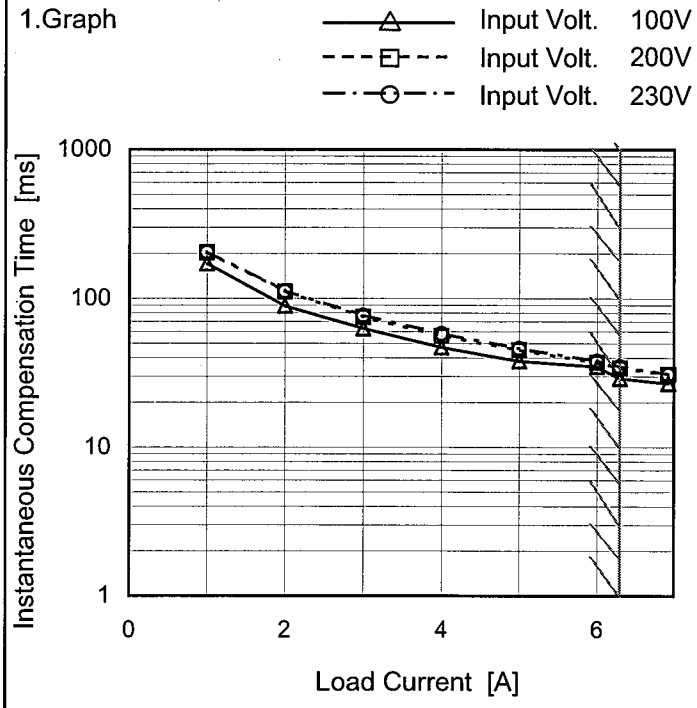
Input Voltage [V]	Hold-Up Time [ms]	
	Load 50%	Load 100%
75	63	26
85	64	28
100	65	32
120	65	33
200	70	35
230	71	36
264	73	36
280	73	37
--	-	-

COSEL

Model	SPLFA150F-24
Item	Instantaneous Interruption Compensation
Object	+24V6.3A

Temperature 25°C
Testing Circuitry Figure A

1.Graph



Note: Slanted line shows the range of the rated load current.

2.Values

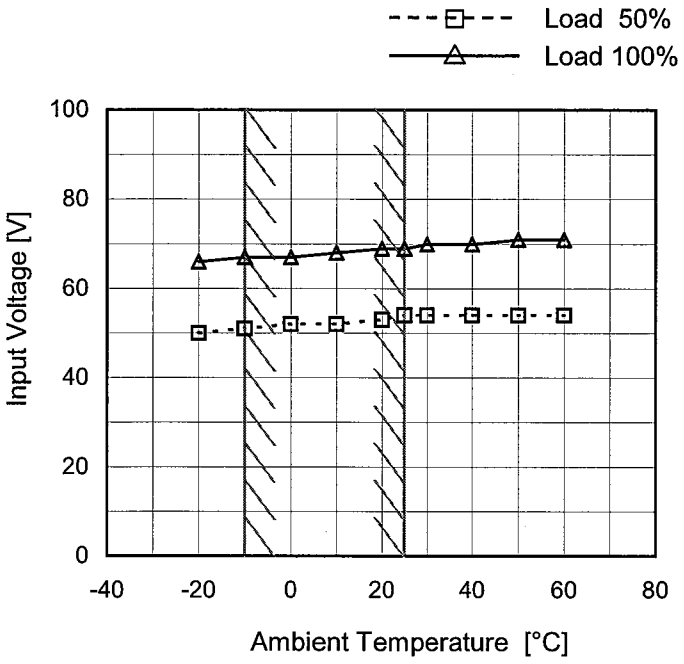
Load Current [A]	Time [ms]		
	Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]
0.00	-	-	-
1.00	172	203	205
2.00	89	111	112
3.00	63	75	77
4.00	47	56	58
5.00	38	45	46
6.00	35	37	38
6.30	29	34	35
6.93	27	31	31
--	-	-	-
--	-	-	-

COSEL

Model	SPLFA150F-24
Item	Minimum Input Voltage for Regulated Output Voltage
Object	+24V6.3A

Testing Circuitry Figure A

1.Graph



Note: Slanted line shows the range of the rated ambient temperature.

2.Values

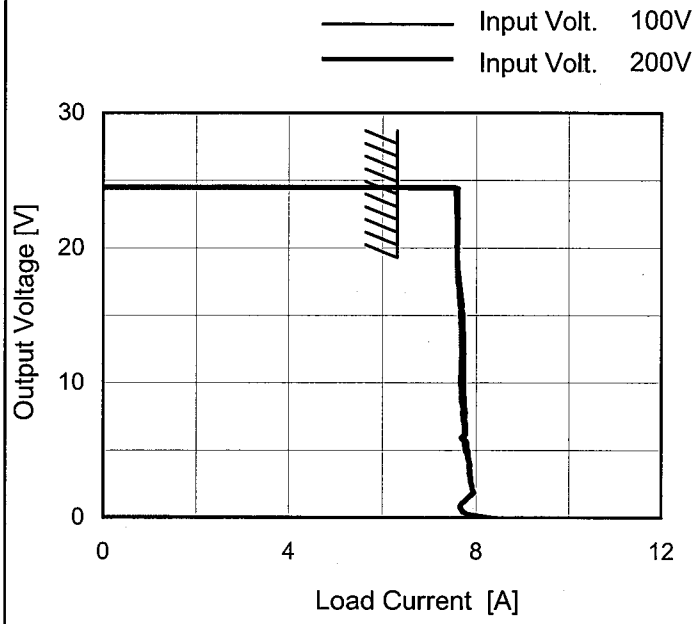
Ambient Temperature [°C]	Input Voltage [V]	
	Load 50%	Load 100%
-20	50	66
-10	51	67
0	52	67
10	52	68
20	53	69
25	54	69
30	54	70
40	54	70
50	54	71
60	54	71
--	-	-

COSEL

Model	SPLFA150F-24
Item	Overcurrent Protection
Object	+24V6.3A

Temperature 25°C
Testing Circuitry Figure A

1.Graph



Note: Slanted line shows the range of the rated load current.

2.Values

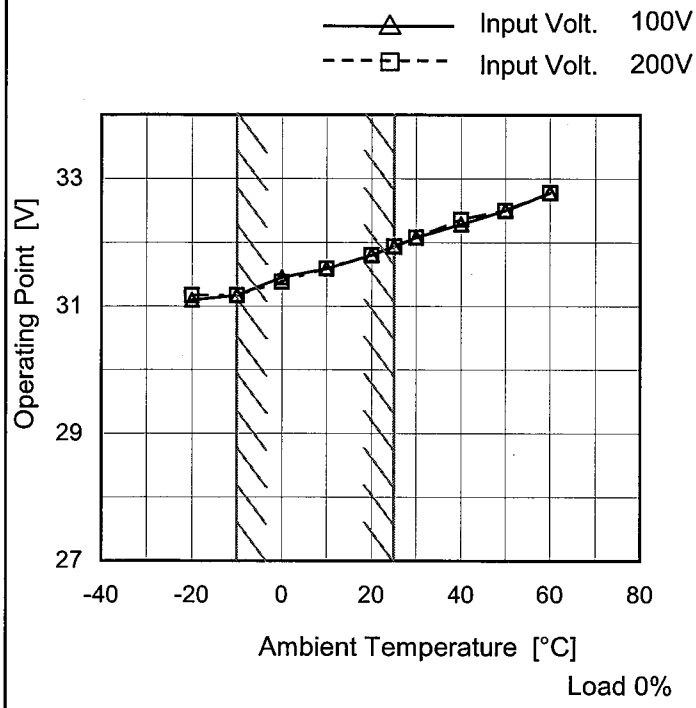
Output Voltage [V]	Load Current [A]	
	Input Volt. 100[V]	Input Volt. 200[V]
22.8	7.63	7.59
21.6	7.64	7.60
19.2	7.63	7.60
16.8	7.69	7.64
14.4	7.75	7.68
12.0	7.76	7.70
9.6	7.76	7.69
7.2	7.78	7.73
4.8	7.85	7.79
2.4	7.93	7.91
0.0	8.73	8.60
--	-	-

COSEL

Model	SPLFA150F-24
Item	Overvoltage Protection
Object	+24V6.3A

Testing Circuitry Figure A

1.Graph



Note: Slanted line shows the range of the rated ambient temperature.

2.Values

Ambient Temperature [°C]	Operating Point [V]	
	Input Volt. 100[V]	Input Volt. 200[V]
-20	31.10	31.17
-10	31.17	31.17
0	31.45	31.38
10	31.59	31.59
20	31.80	31.80
25	31.94	31.94
30	32.08	32.08
40	32.29	32.36
50	32.50	32.50
60	32.78	32.78
--	-	-

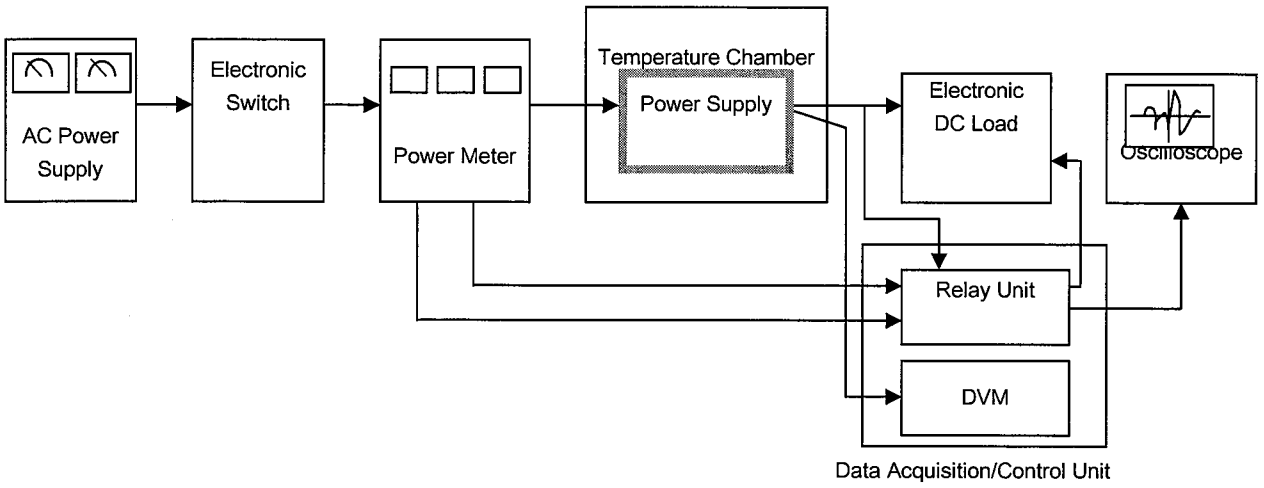


Figure A

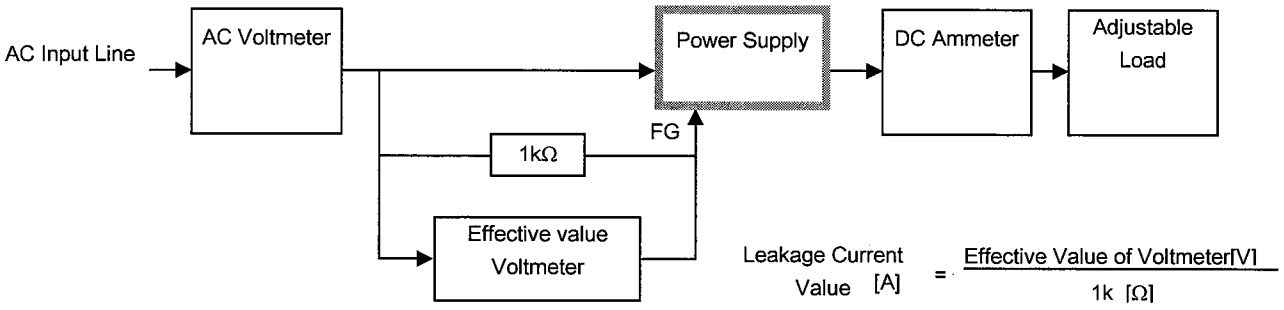


Figure B (DEN-AN)

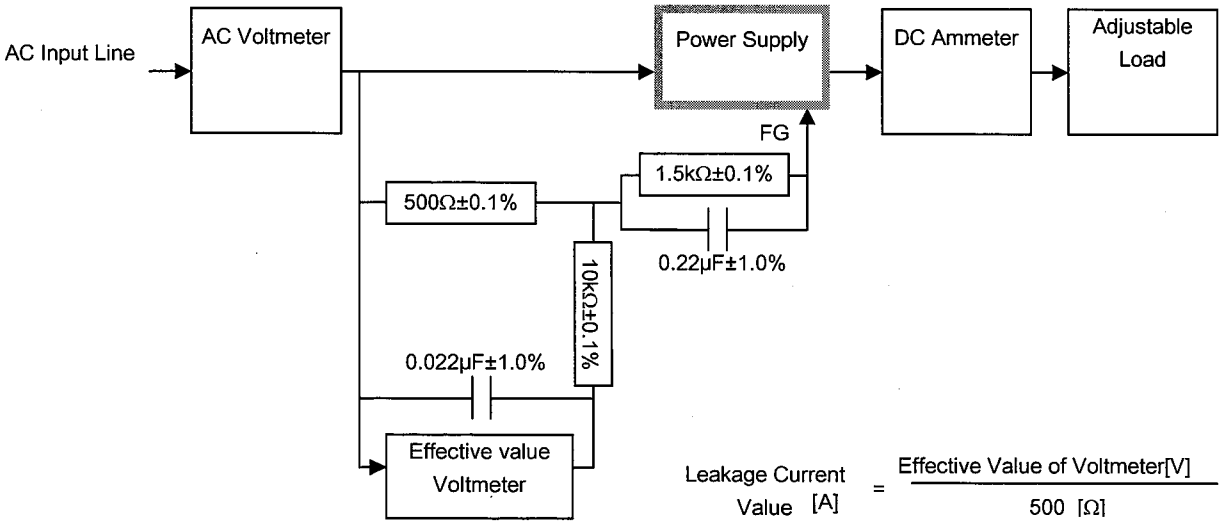


Figure B (IEC60950-1)

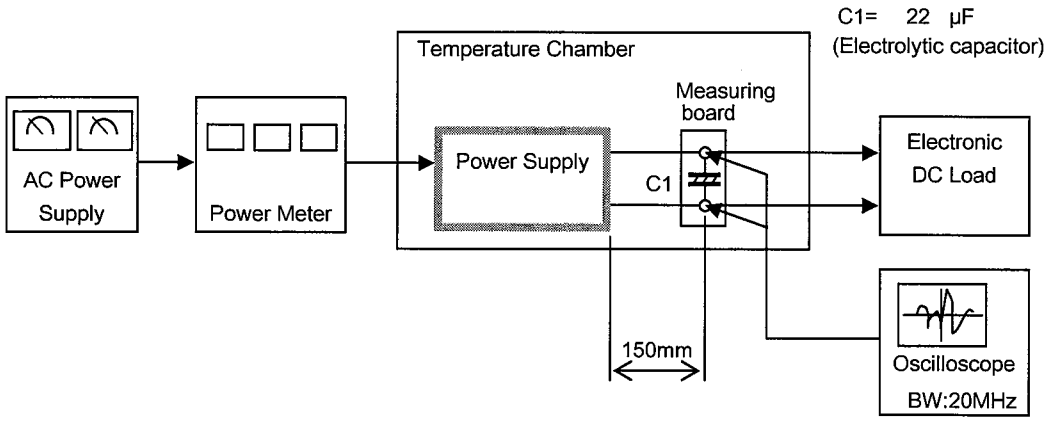

C1= 22 μF
(Electrolytic capacitor)
Temperature Chamber
Measuring board
AC Power Supply
Power Meter
Power Supply
C1
Electronic DC Load
150mm
Oscilloscope
BW:20MHz

Figure C