参考資料

COSEL

TEST DATA OF LFA50F-5

Regulated DC Power Supply
August 10, 2009

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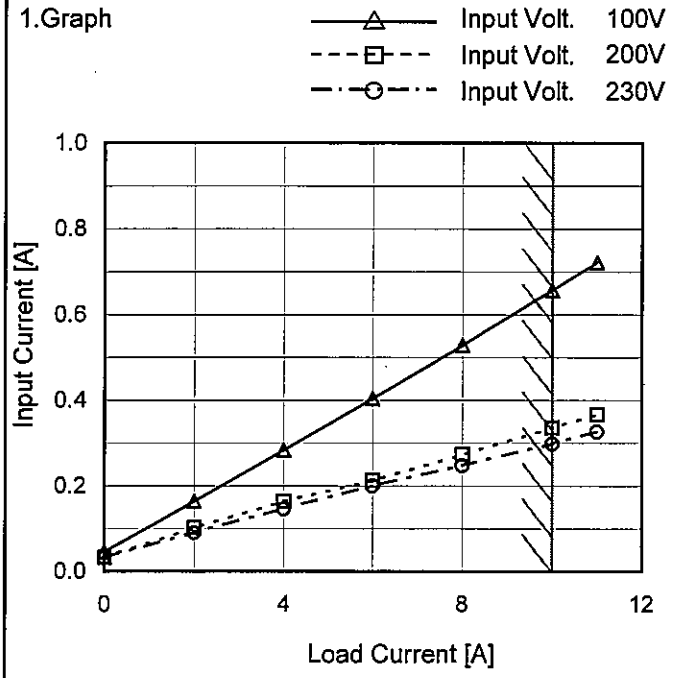
COSEL

Model	LFA50F-5
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	0.046	0.032	0.032
2	0.165	0.101	0.091
4	0.284	0.164	0.147
6	0.404	0.212	0.201
8	0.529	0.273	0.248
10	0.656	0.335	0.299
11	0.722	0.367	0.327
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

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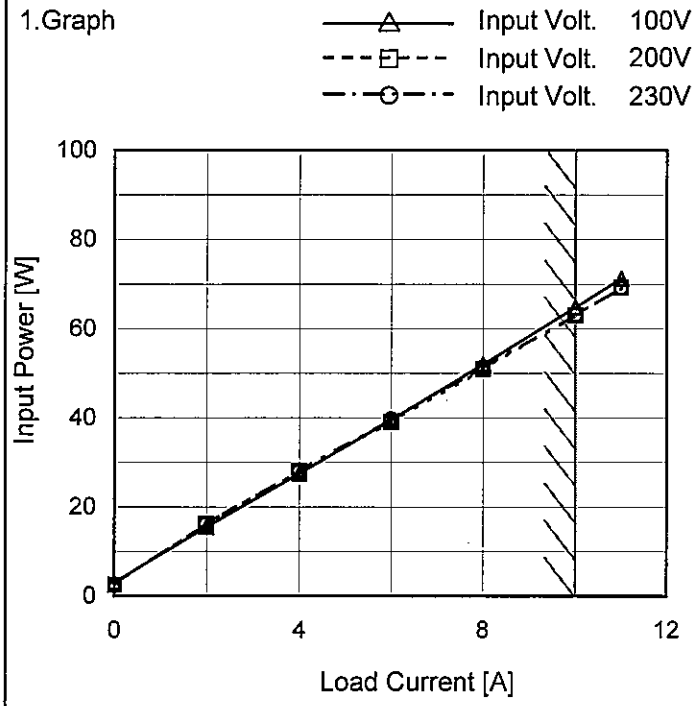
Model	LFA50F-5
Item	Input Power (by Load Current)
Object	———————

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	3.04	2.50	2.60
2	15.52	16.20	16.20
4	27.51	28.00	28.10
6	39.57	39.10	39.70
8	51.99	50.90	51.30
10	64.77	63.00	63.10
11	71.28	69.20	69.20
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

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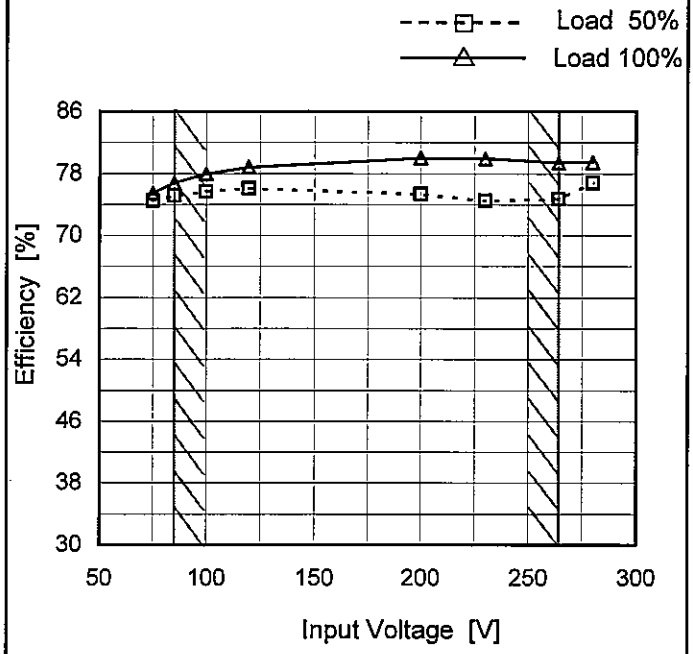
COSEL

Model	LFA50F-5
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	74.5	75.5
85	75.1	76.8
100	75.6	77.9
120	76.0	78.8
200	75.4	80.0
230	74.4	80.0
264	74.7	79.4
280	76.7	79.5
--	-	-

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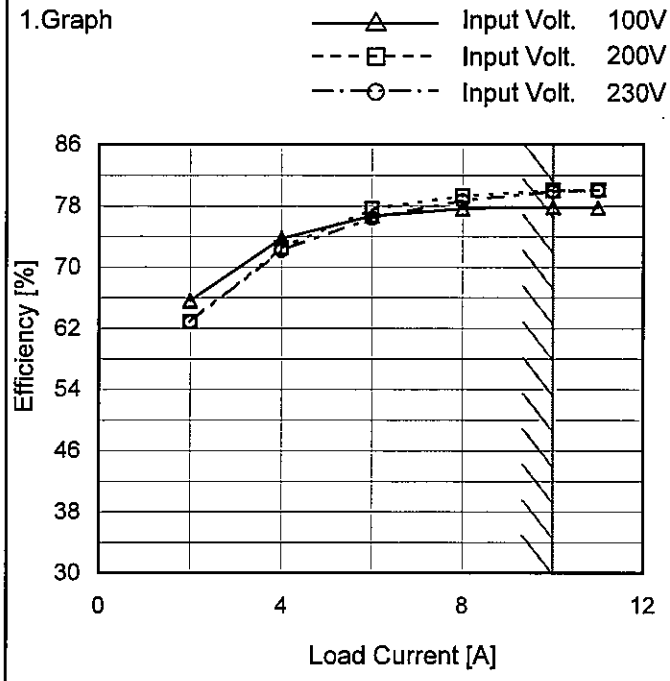
Model	LFA50F-5
Item	Efficiency (by Load Current)
Object	————————

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	-	-	-
2	65.6	62.9	62.9
4	73.8	72.5	72.2
6	76.7	77.6	76.4
8	77.7	79.3	78.7
10	77.8	80.0	79.9
11	77.8	80.1	80.1
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

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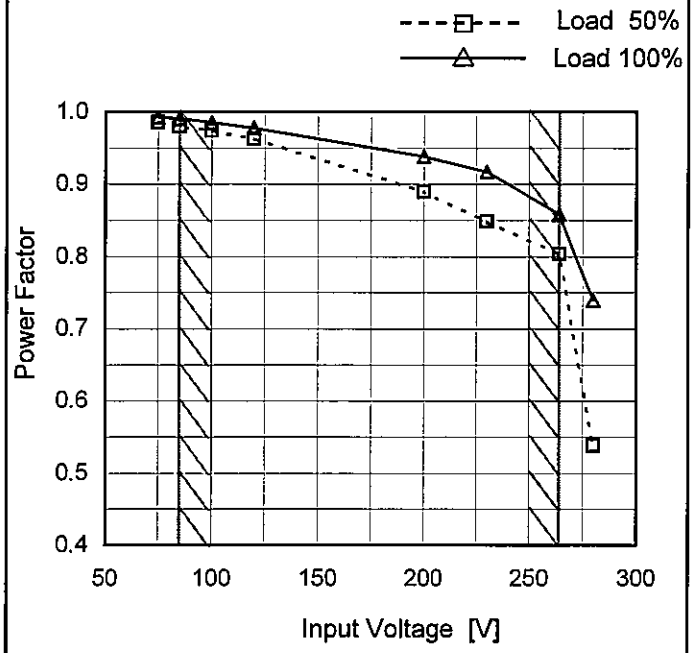
Model	LFA50F-5
Item	Power Factor (by Input Voltage)
Object	———————

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	0.986	0.993
85	0.980	0.990
100	0.973	0.986
120	0.962	0.978
200	0.889	0.939
230	0.848	0.917
264	0.803	0.858
280	0.538	0.739
--	-	-

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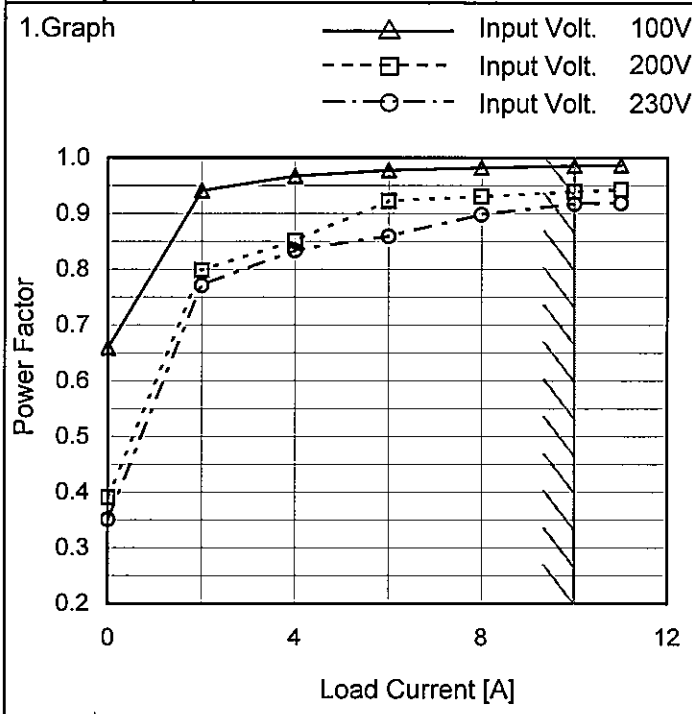
Model	LFA50F-5
Item	Power Factor (by Load Current)
Object	————————

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	0.659	0.391	0.351
2	0.941	0.798	0.771
4	0.967	0.851	0.834
6	0.978	0.922	0.859
8	0.982	0.931	0.898
10	0.986	0.939	0.917
11	0.987	0.943	0.919
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

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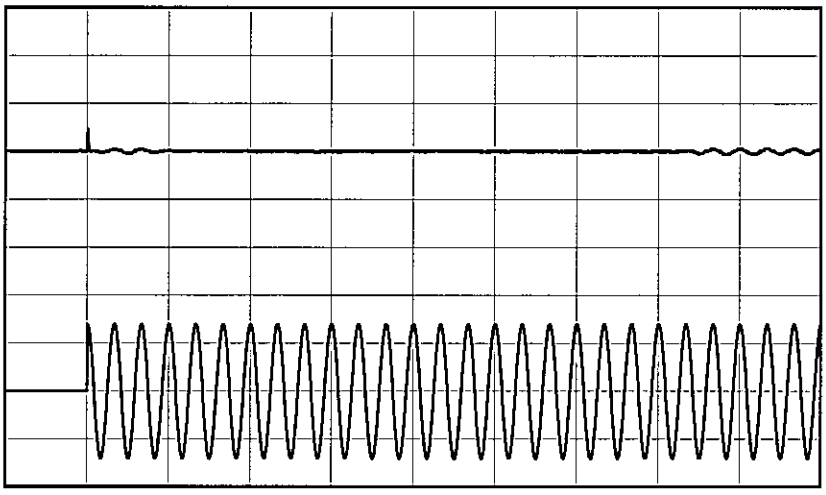
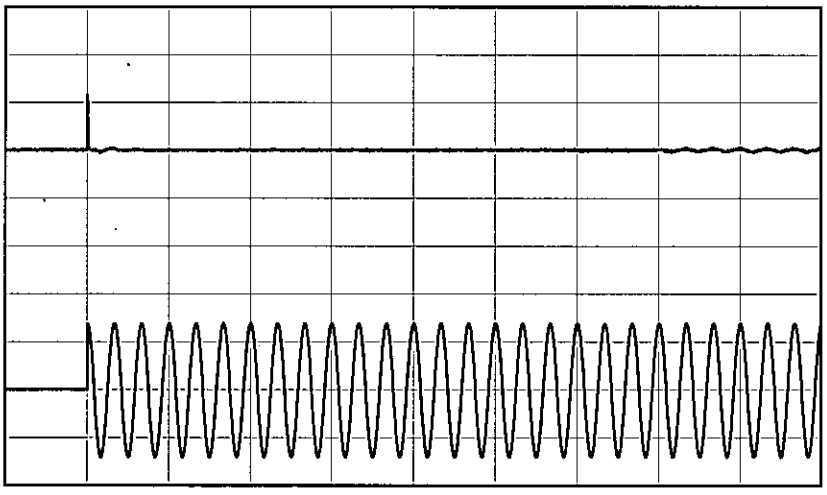
Model	LFA50F-5
Item	Inrush Current
Object	———————

Temperature 25°C
Testing Circuitry Figure A



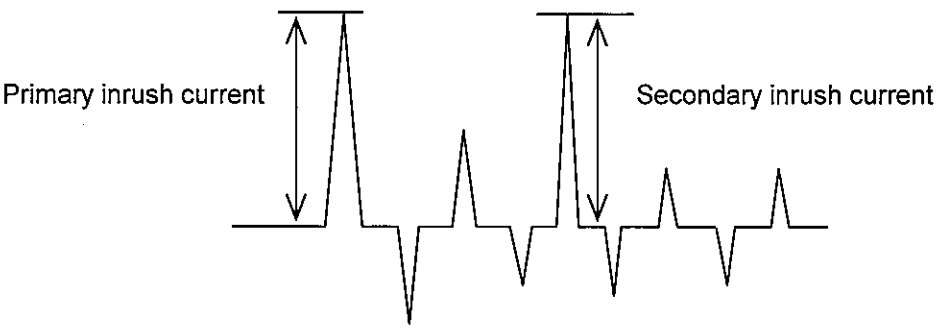
Input Voltage 100 V
Frequency 60 Hz
Load 100 %

Primary inrush current :
9.2 A
Secondary inrush current :
1.2 A



Input Voltage 200 V
Frequency 60 Hz
Load 100 %

Primary inrush current :
23.0 A
Secondary inrush current :
1.2 A



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Model	LFA50F-5		
Item	Leakage Current	Temperature	25°C
Object	———————	Testing Circuitry	Figure B

1.Results

[mA]

Standards		Input Volt.			Note
		100 [V]	200 [V]	240 [V]	
DEN-AN	Both phases	0.13	0.25	0.31	Operation
	One of phases	0.19	0.48	0.57	Stand by
IEC60950	Both phases	0.14	0.29	0.34	Operation
	One of phases	0.22	0.43	0.50	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.

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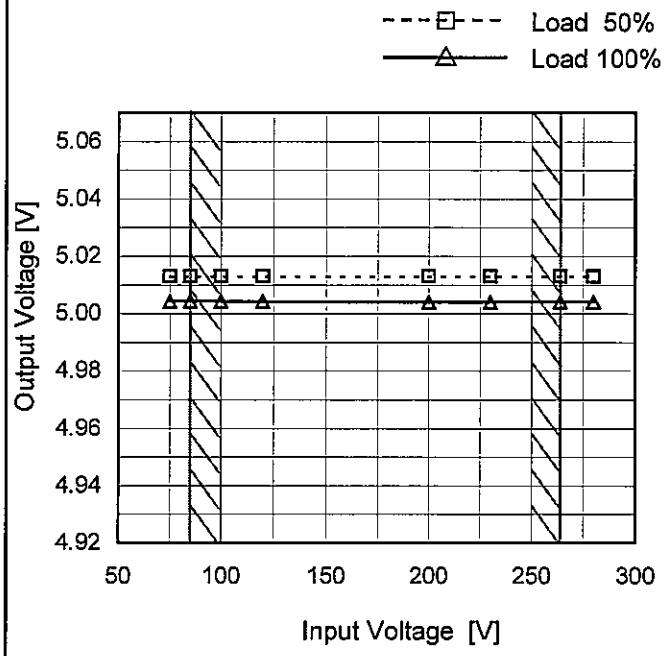
Model	LFA50F-5
Item	Line Regulation
Object	+5V10A

Temperature 25°C
Testing Circuitry Figure A

1.Graph



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

2.Values

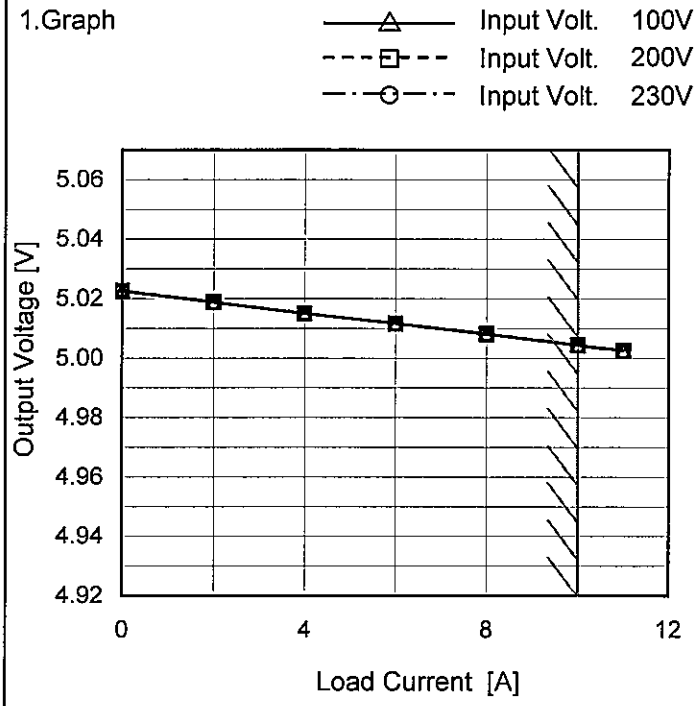
Input Voltage [V]	Output Voltage [V]	
	Load 50%	Load 100%
75	5.013	5.004
85	5.013	5.004
100	5.013	5.004
120	5.013	5.004
200	5.013	5.004
230	5.013	5.004
264	5.013	5.004
280	5.013	5.004
--	-	-

COSEL

Model	LFA50F-5
Item	Load Regulation
Object	+5V10A

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	5.023	5.023	5.023
2	5.019	5.019	5.019
4	5.015	5.015	5.015
6	5.012	5.012	5.012
8	5.008	5.008	5.008
10	5.004	5.004	5.004
11	5.003	5.003	5.002
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

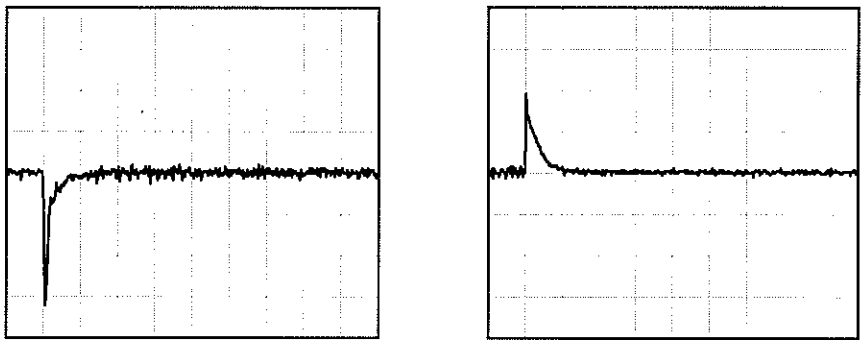
COSEL

Model	LFA50F-5		
Item	Dynamic Load Response	Temperature Testing Circuitry	25℃ Figure A
Object	+5V10A		

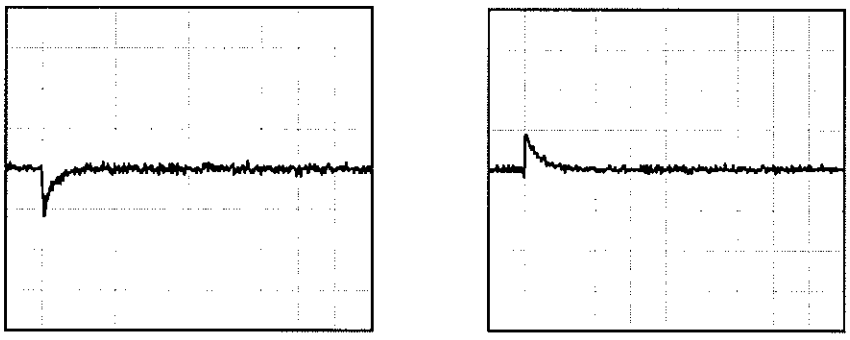
Input Volt. 100 V
Cycle 1000 ms

Response. t1=t2=50us. Typ

Min. Load (0A) ⟷
Load 100% (10A)



Min. Load (0A) ⟷
Load 50% (5A)



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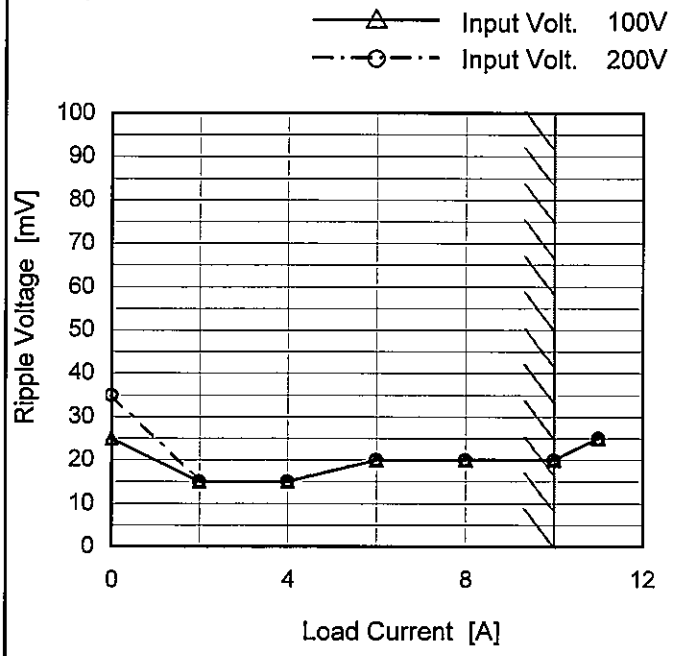
Model	LFA50F-5
Item	Ripple Voltage (by Load Current)
Object	+5V10A

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

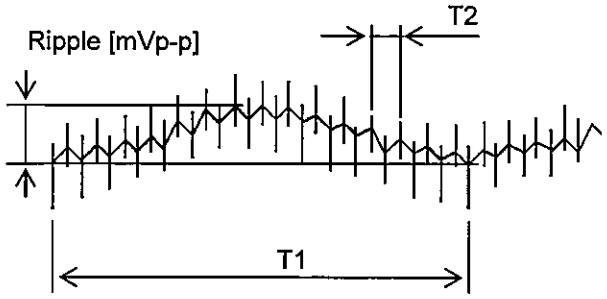


Fig. Complex Ripple Wave Form

2.Values

Load Current [A]	Ripple Voltage [mV]	
	Input Volt. 100 [V]	Input Volt. 200 [V]
0	25	35
2	15	15
4	15	15
6	20	20
8	20	20
10	20	20
11	25	25
--	-	-
--	-	-
--	-	-
--	-	-

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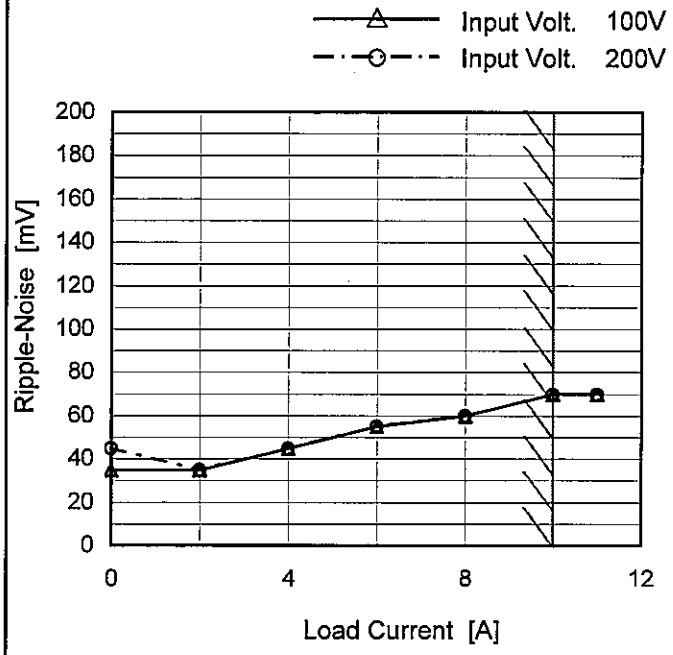
Model	LFA50F-5
Item	Ripple-Noise
Object	+5V10A

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	35	45
2	35	35
4	45	45
6	55	55
8	60	60
10	70	70
11	70	70
--	-	-
--	-	-
--	-	-
--	-	-

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

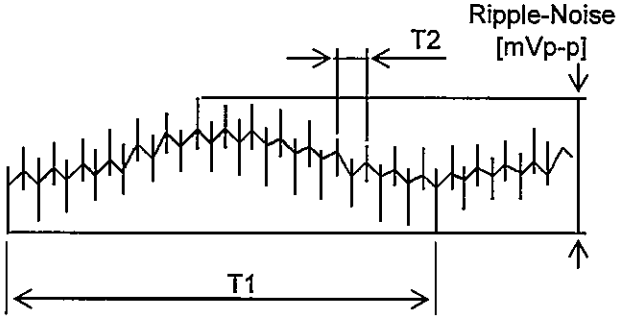


Fig. Complex Ripple Wave Form

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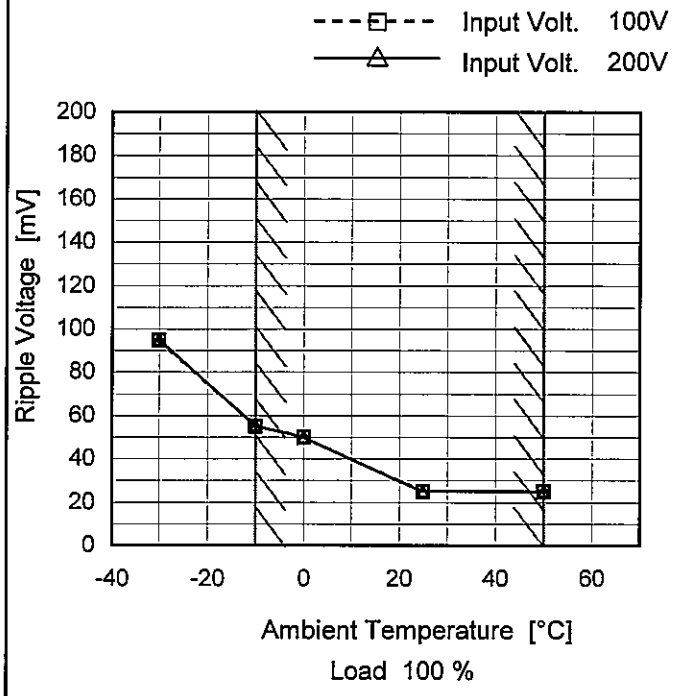
Model	LFA50F-5
Item	Ripple Voltage (by Ambient Temp.)
Object	+5V10A

Testing Circuitry Figure C

1.Graph



Measured by 20 MHz Oscilloscope.
Note: Slanted line shows the range of the rated ambient temperature.

2.Values

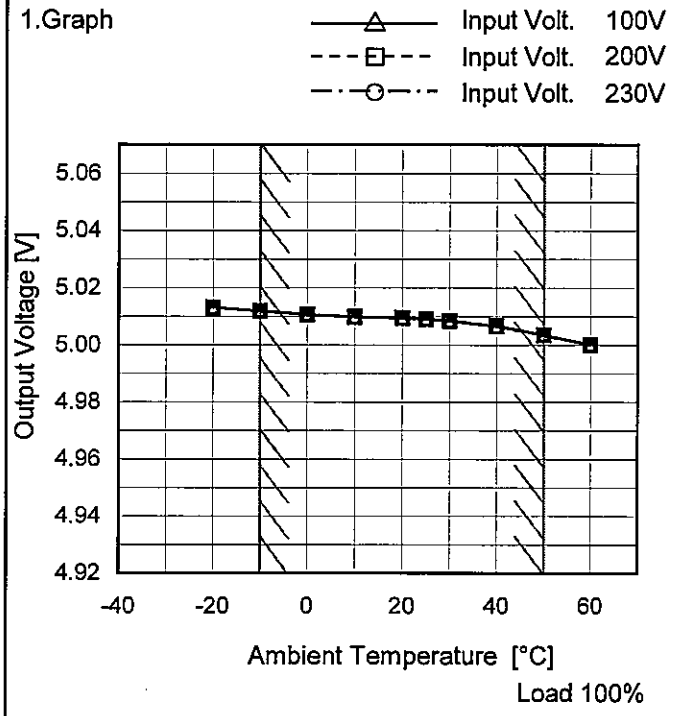
Ambient Temperature [°C]	Ripple Voltage [mV]	
	Input Volt. 100 [V]	Input Volt. 200 [V]
-30	95	95
-10	55	55
0	50	50
25	25	25
50	25	25
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-

COSEL

Model	LFA50F-5
Item	Ambient Temperature Drift
Object	+5V10A

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	5.013	5.013	5.013
-10	5.012	5.012	5.012
0	5.011	5.011	5.011
10	5.010	5.010	5.010
20	5.009	5.009	5.009
25	5.009	5.009	5.009
30	5.009	5.009	5.009
40	5.007	5.007	5.007
50	5.004	5.004	5.003
60	5.000	5.000	5.000
--	-	-	-

COSEL

Model	LFA50F-5	
Item	Output Voltage Accuracy	Testing Circuitry Figure A
Object	+5V10A	

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 - 10A

* 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	-10	85	0	5.029	±13	±0.3
Minimum Voltage	50	264	15	5.003		

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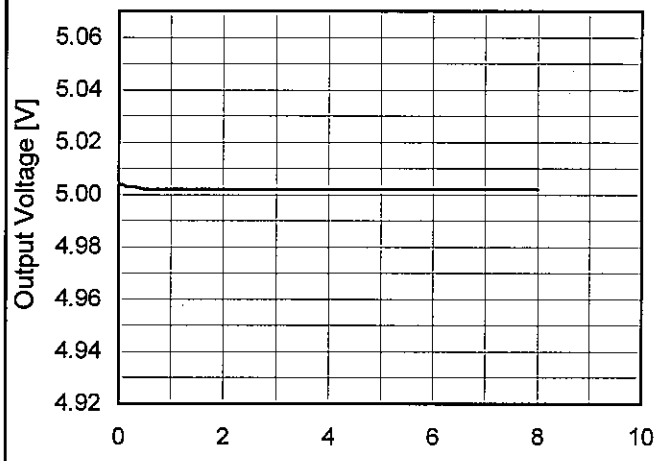
Model	LFA50F-5
Item	Time Lapse Drift
Object	+5V10A

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	5.004
0.5	5.002
1.0	5.002
2.0	5.002
3.0	5.002
4.0	5.002
5.0	5.002
6.0	5.002
7.0	5.002
8.0	5.002

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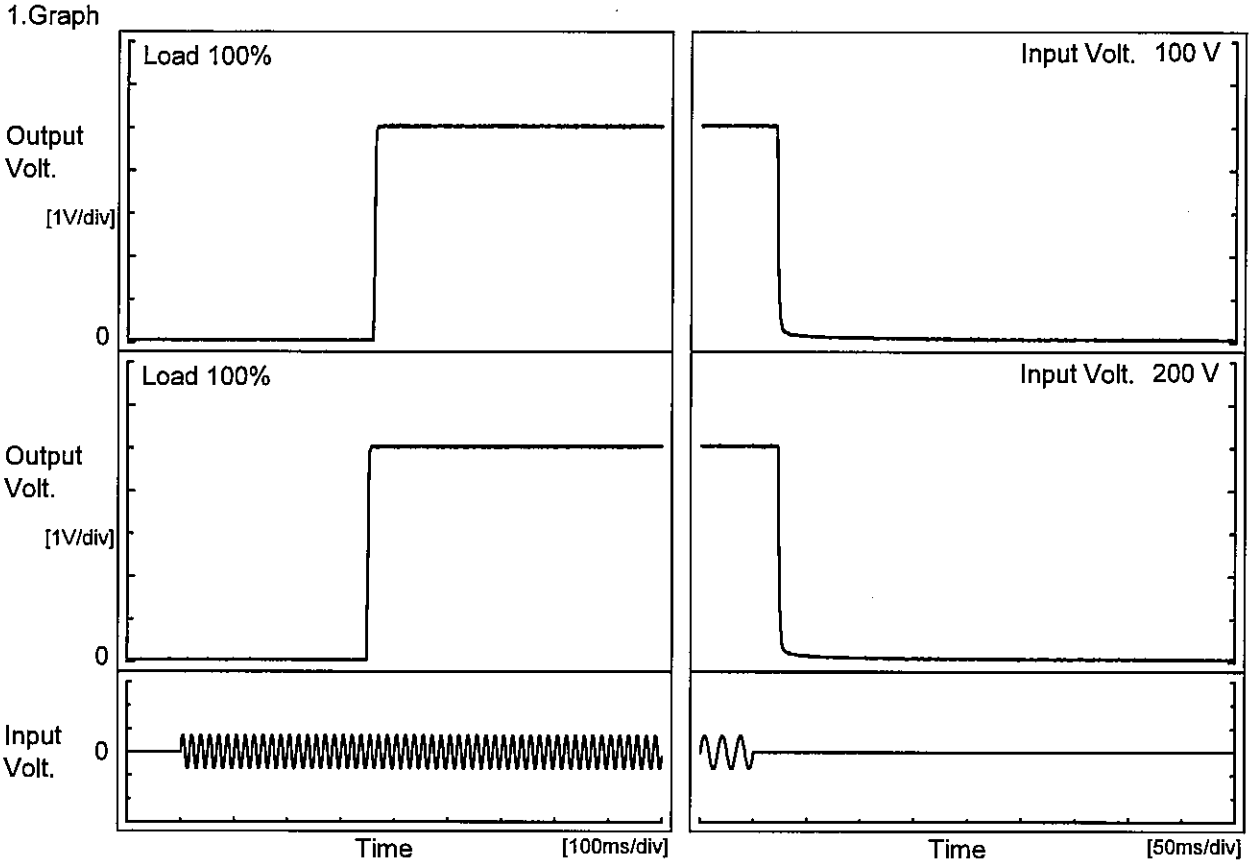
Model	LFA50F-5	
Item	Rise and Fall Time	Temperature 25°C Testing Circuitry Figure A
Object	+5V10A	

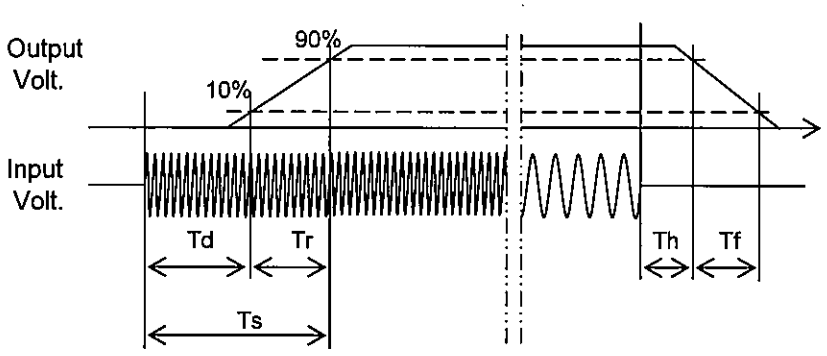
1.Graph



2.Values

[ms]

Input Volt. \ Time	Td	Tr	Ts	Th	Tf
100 V	360.5	4.0	364.5	21.0	3.3
200 V	348.5	3.5	352.0	22.8	3.5



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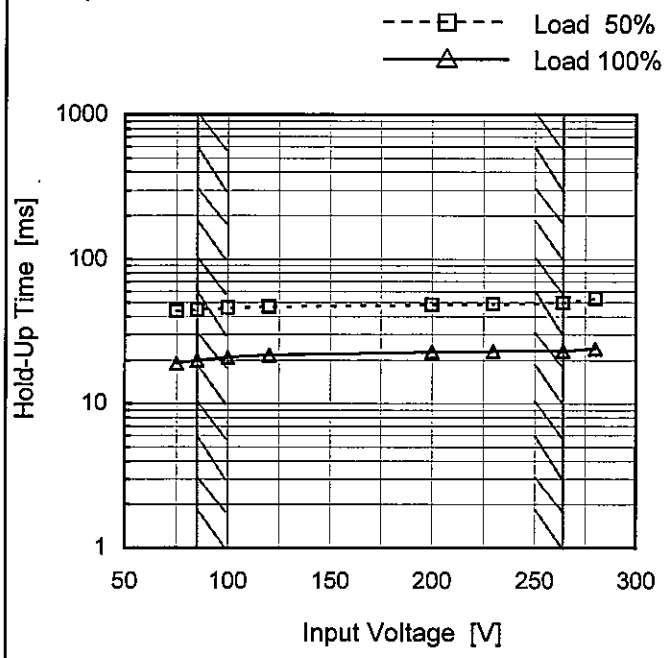
COSEL

Model	LFA50F-5
Item	Hold-Up Time
Object	+5V10A

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	44	19
85	45	20
100	46	21
120	47	22
200	48	23
230	49	23
264	50	23
280	53	24
--	-	-

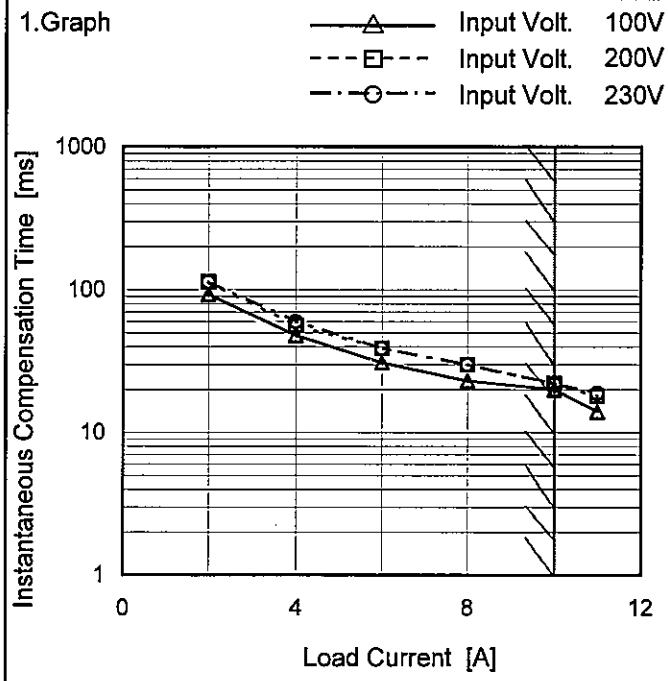
BC-10363

COSEL

Model	LFA50F-5
Item	Instantaneous Interruption Compensation
Object	+5V10A

Temperature 25°C
Testing Circuitry Figure A

1.Graph



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

2.Values

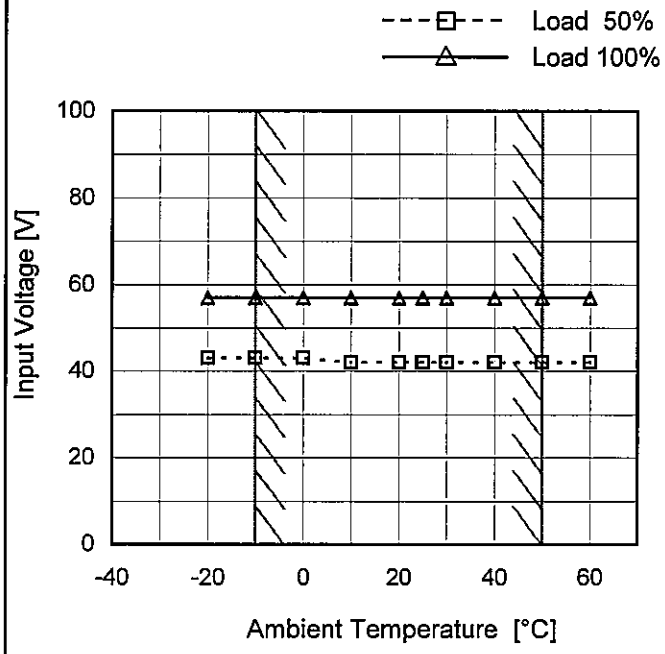
Load Current [A]	Time [ms] Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]
0	-	-	-
2	93	113	114
4	48	56	60
6	31	39	39
8	23	30	30
10	20	22	22
11	14	18	19
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

COSEL

Model	LFA50F-5
Item	Minimum Input Voltage for Regulated Output Voltage
Object	+5V10A

Testing Circuitry Figure A

1.Graph



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

2.Values

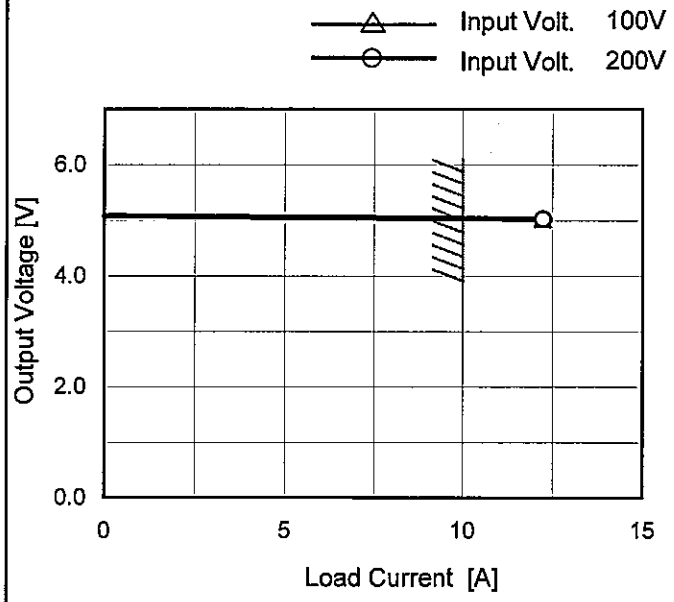
Ambient Temperature [°C]	Input Voltage [V]	
	Load 50%	Load 100%
-20	43	57
-10	43	57
0	43	57
10	42	57
20	42	57
25	42	57
30	42	57
40	42	57
50	42	57
60	42	57
---	-	-

COSEL

Model	LFA50F-5
Item	Overcurrent Protection
Object	+5V10A

Temperature 25°C
Testing Circuitry Figure A

1.Graph



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

Intermittent operation occurs when the output voltage is less than rated output voltage.

2.Values

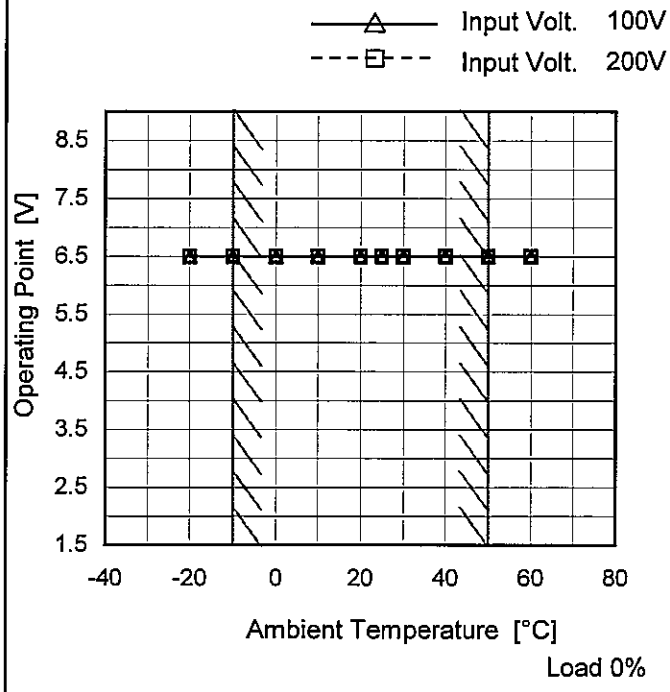
Output Voltage [V]	Load Current [A]	
	Input Volt. 100[V]	Input Volt. 200[V]
5.00	12.22	12.24
4.75	-	-
4.50	-	-
4.00	-	-
3.50	-	-
3.00	-	-
2.50	-	-
2.00	-	-
1.50	-	-
1.00	-	-
0.50	-	-
0.00	-	-

COSEL

Model	LFA50F-5
Item	Overvoltage Protection
Object	+5V10A

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	6.53	6.53
-10	6.53	6.53
0	6.53	6.53
10	6.53	6.53
20	6.53	6.53
25	6.53	6.53
30	6.53	6.53
40	6.53	6.53
50	6.53	6.53
60	6.53	6.53
--	-	-

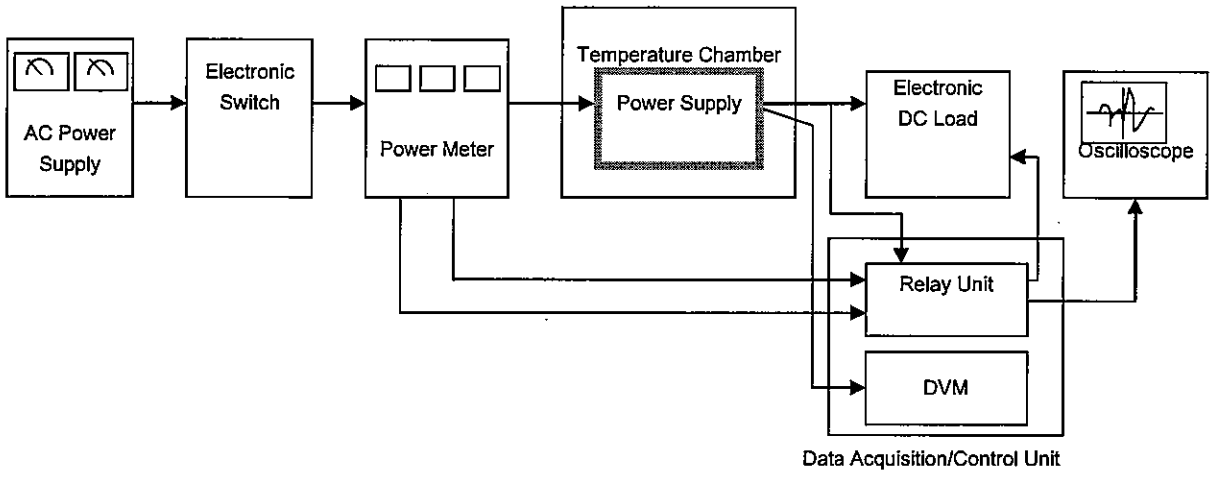


Figure A

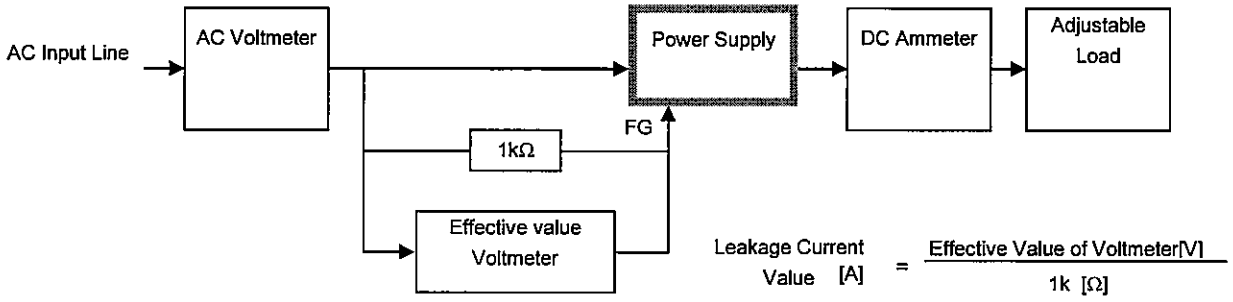


Figure B (DEN-AN)

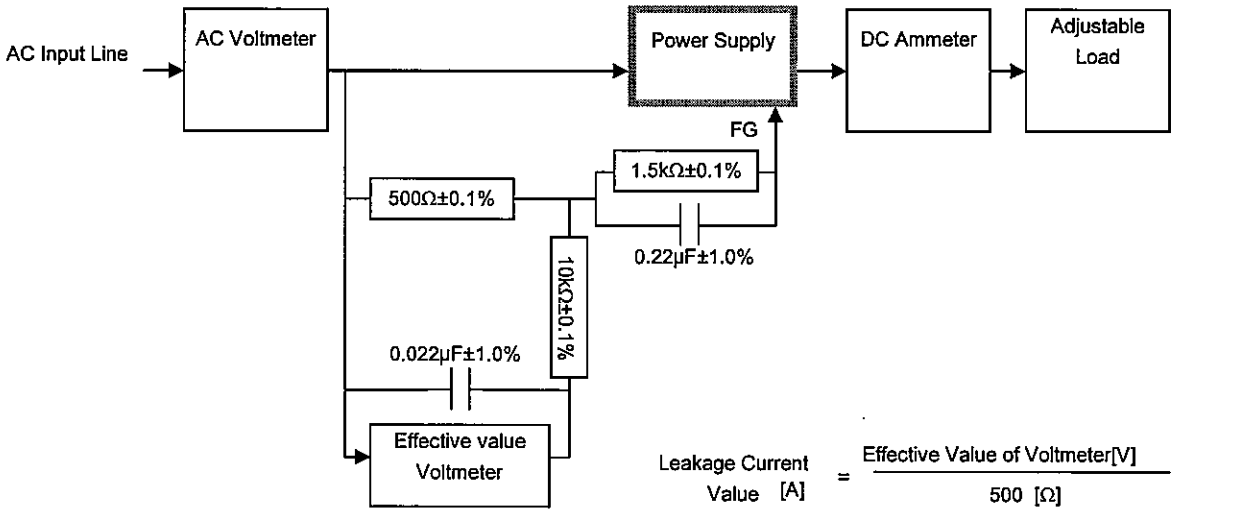


Figure B (IEC60950-1)

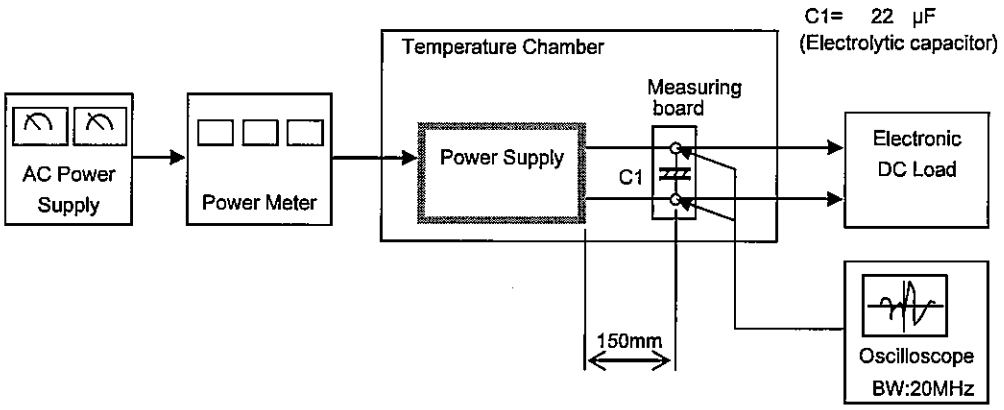

C1= 22 μF
(Electrolytic capacitor)
Temperature Chamber
Measuring board
AC Power Supply
Power Meter
Power Supply
C1
Electronic DC Load
150mm
Oscilloscope
BW:20MHz

Figure C