参考資料

COSEL

TEST DATA OF LDA10F-5

(200V INPUT)

Regulated DC Power Supply

Date : June 18. 1999

Approved by : H. Yamaguchi
Design Manager

Prepared by : T. Ashihara
Design Engineer

コーセル株式会社

COSEL CO., LTD.

COSEL

CONTENTS

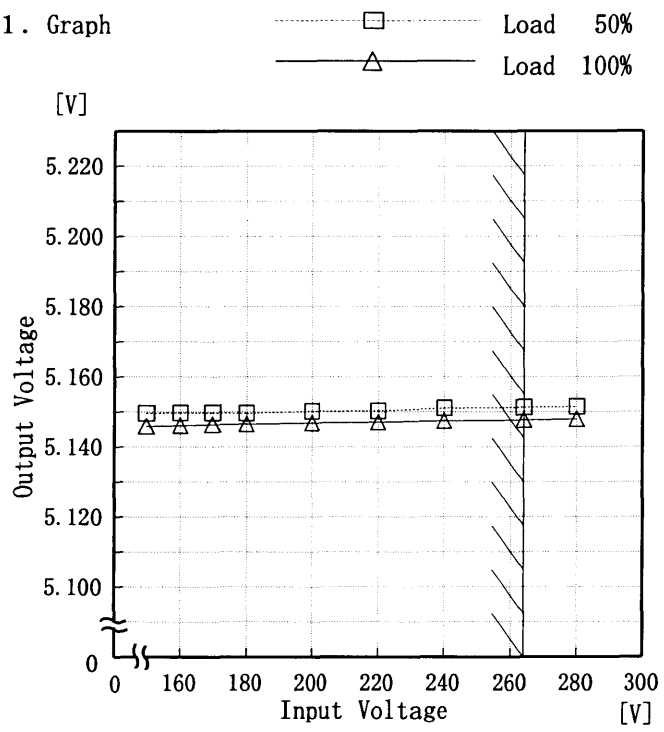
1. Line Regulation ・・・・・・・・・・・・・・・・・・・・ 1
静的入力変動
2. Input Current (by Load Current) ・・・・・・・・・・・・ 2
入力電流（負荷特性）
3. Input Power (by Load Current) ・・・・・・・・・・・・・ 3
入力電力（負荷特性）
4. Efficiency (by Input Voltage) ・・・・・・・・・・・・・ 4
効率（入力電圧特性）
5. Efficiency (by Load Current)・・・・・・・・・・・・・・ 5
効率（負荷特性）
6. Hold-Up Time・・・・・・・・・・・・・・・・・・・・・・ 6
出力保持時間
7. Instantaneous Interruption Compensation ・・・・・・・ 7
瞬時停電保障
8. Load Regulation ・・・・・・・・・・・・・・・・・・・・ 8
静的負荷変動
9. Ripple Voltage (by Load Current)・・・・・・・・・・・・ 9
リップル電圧（負荷特性）
10. Ripple-Noise・・・・・・・・・・・・・・・・・・・・・・ 10
リップルノイズ
11. Overcurrent Protection・・・・・・・・・・・・・・・・・ 11
過電流保護
12. Inrush Current・・・・・・・・・・・・・・・・・・・・・ 12
突入電流
13. Dynamic Load Responce ・・・・・・・・・・・・・・・・ 13
動的負荷変動
14. Rise and Fall Time・・・・・・・・・・・・・・・・・・・ 14
立上り、立下がり時間
15. Ambient Temperature Drift ・・・・・・・・・・・・・・ 15
周囲温度変動
16. Minimum Input Voltage for Regulated Output Voltage・ 16
最低レギュレーション電圧
17. Ripple Voltage (by Ambient Temperature) ・・・・・・・ 17
リップル電圧（周囲温度特性）
18. Time Lapse Drift・・・・・・・・・・・・・・・・・・・・ 18
経時ドリフト
19. Output Voltage Accuracy ・・・・・・・・・・・・・・・ 19
定電圧精度
20. Condensation・・・・・・・・・・・・・・・・・・・・・・ 20
結露特性
21. Leakage Current ・・・・・・・・・・・・・・・・・・・・ 21
漏洩電流
22. Line Noise Tolerance・・・・・・・・・・・・・・・・・・ 22
入力雑音耐量
23. Conducted Emission・・・・・・・・・・・・・・・・・・・ 23
雑音端子電圧
24. Figure of Testing Circuitry ・・・・・・・・・・・・・・ 24
測定回路図

(Final Page 25)

COSEL

Model	LDA10F-5		
Item	Line Regulation 静的入力変動	Temperature	25℃
		Testing Circuitry	Figure A
Object	+5.0V2A		

1. Graph



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

(注)斜線は定格入力電圧範囲を示す。

2. Values

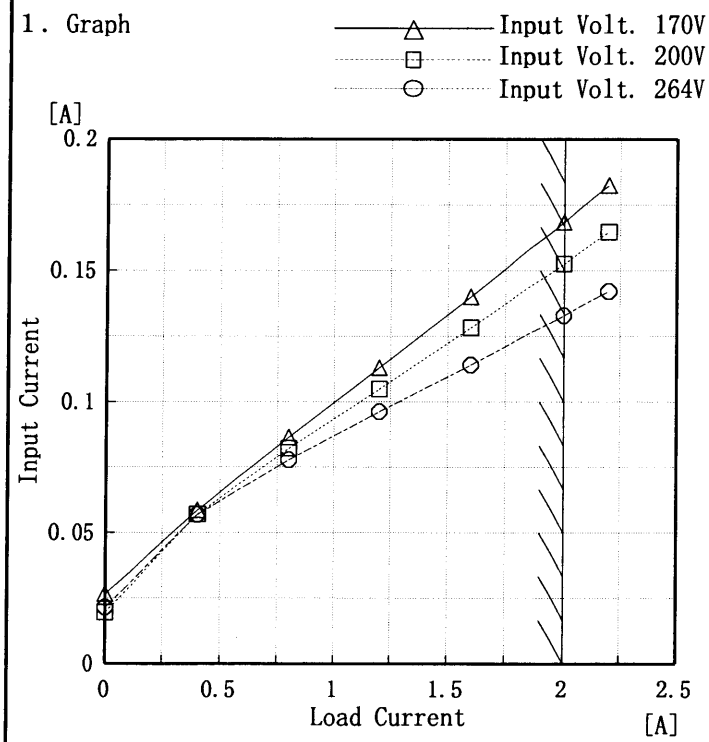
Input Voltage [V]	Output Voltage [V]	
	Load 50%	Load 100%
150	5.150	5.146
160	5.150	5.146
170	5.150	5.146
180	5.150	5.147
200	5.150	5.147
220	5.150	5.147
240	5.151	5.147
264	5.151	5.148
280	5.151	5.148

COSEL

Model	LDA10F-5
Item	Input Current (by Load Current) 入力電流 (負荷特性)
Output	————

Temperature 25℃
Testing Circuitry Figure A

1. Graph



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

(注)斜線は定格負荷電流範囲を示す。

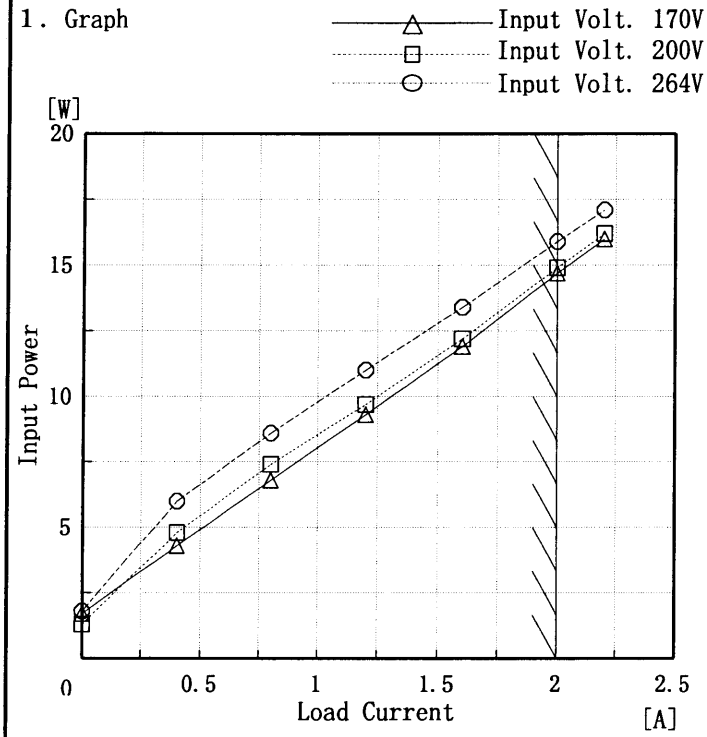
2. Values

Load Current [A]	Input Current [A]		
	Input Volt. 170[V]	Input Volt. 200[V]	Input Volt. 264[V]
0.0	0.027	0.020	0.021
0.4	0.059	0.057	0.057
0.8	0.087	0.082	0.078
1.2	0.113	0.105	0.096
1.6	0.140	0.128	0.114
2.0	0.169	0.153	0.133
2.2	0.183	0.165	0.142
—	—	—	—
—	—	—	—
—	—	—	—
—	—	—	—
—	—	—	—

COSEL

Model	LDA10F-5	
Item	Input Power (by Load Current) 入力電力 (負荷特性)	Temperature 25℃ Testing Circuitry Figure A
Output	————	

1. Graph



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

(注)斜線は定格負荷電流範囲を示す。

2. Values

Load Current [A]	Input Power [W] Input Volt. 170[V]	Input Volt. 200[V]	Input Volt. 264[V]
0.0	1.70	1.30	1.80
0.4	4.30	4.80	6.00
0.8	6.80	7.40	8.60
1.2	9.30	9.70	11.00
1.6	11.90	12.20	13.40
2.0	14.70	14.90	15.90
2.2	16.00	16.20	17.10
—	—	—	—
—	—	—	—
—	—	—	—
—	—	—	—
—	—	—	—

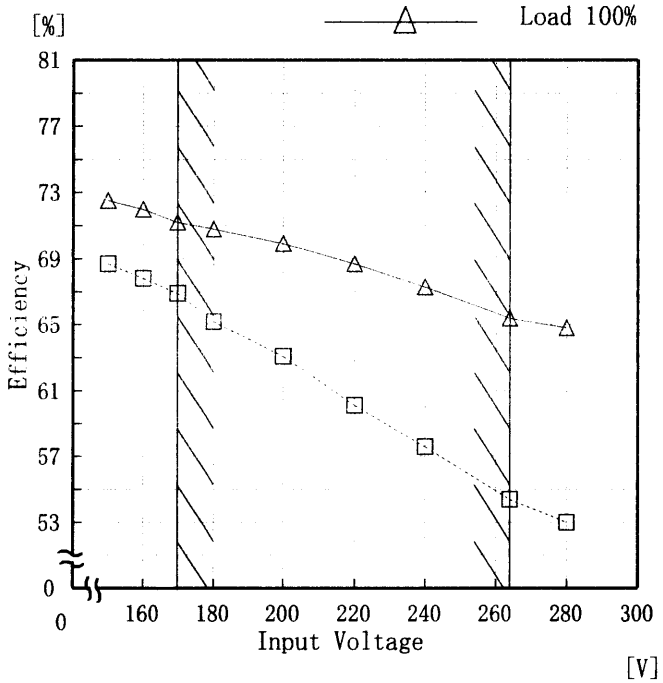
COSEL

Model	LDA10F-5
Item	Efficiency 効率
Object	――――――――――

Temperature 25℃
Testing Circuitry Figure A

1. Graph

□ Load 50%
△ Load 100%



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

(注)斜線は定格入力電圧範囲を示す。

2. Values

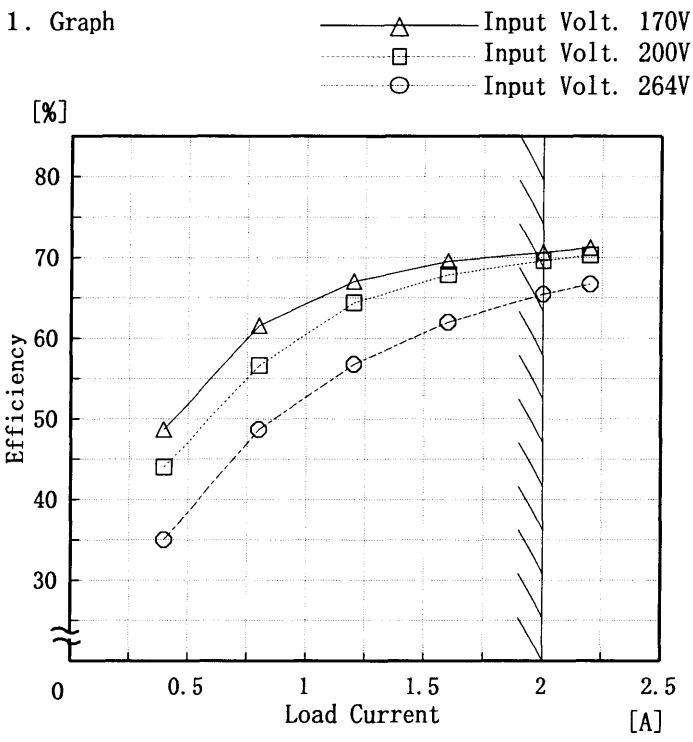
Input Voltage [V]	Efficiency [%]	
	Load 50%	Load 100%
150	68.7	72.5
160	67.8	72.0
170	66.9	71.2
180	65.2	70.8
200	63.1	69.9
220	60.1	68.7
240	57.6	67.3
264	54.4	65.4
280	53.0	64.8

COSEL

Model	LDA10F-5
Item	Efficiency (by Load Current) 効率 (負荷電流特性)
Output	————

Temperature 25℃
Testing Circuitry Figure A

1. Graph



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

(注)斜線は定格負荷電流範囲を示す。

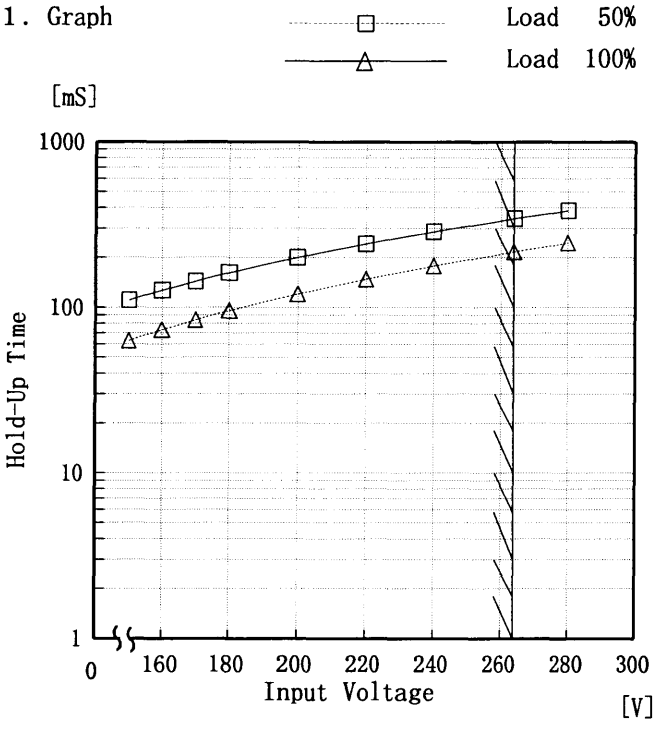
2. Values

Load Current [A]	Efficiency [%] Input Volt. 170[V]	Input Volt. 200[V]	Input Volt. 264[V]
0.4	48.7	44.0	35.0
0.8	61.6	56.6	48.7
1.2	67.1	64.4	56.8
1.6	69.6	67.9	62.0
2.0	70.7	69.6	65.5
2.2	71.2	70.3	66.7
—	—	—	—
—	—	—	—
—	—	—	—
—	—	—	—
—	—	—	—
—	—	—	—

COSEL

Model	LDA10F-5	Temperature	25℃
Item	Hold-Up Time 出力保持時間	Testing Circuitry	Figure A
Object	+5.0V2A		

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.

出力保持時間とは、入力電圧断から出力電圧が、定電圧精度の規格範囲を保持しているところまでの時間。

(注)斜線は定格入力電圧範囲を示す。

2. Values

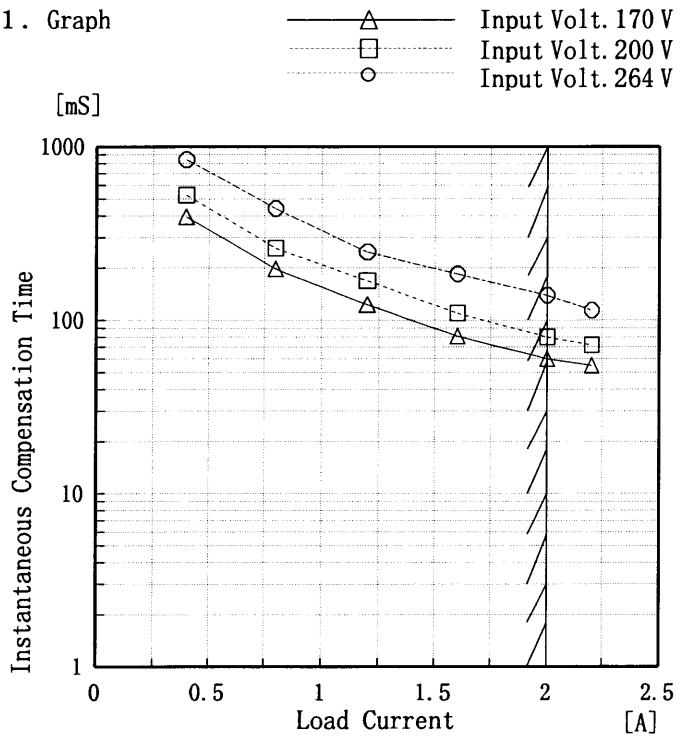
Input Voltage [V]	Hold-Up Time [mS]	
	Load 50%	Load 100%
150	111	63
160	127	73
170	144	84
180	162	96
200	201	121
220	242	148
240	287	179
264	345	218
280	386	246

COSEL

Model	LDA10F-5
Item	Instantaneous Interruption Compensation 瞬時停電保障
Object	+5.0V2A

Temperature 25℃
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 load current.

瞬時停電保障時間とは、出力電圧が定電圧精度の規格範囲を保持している瞬時停電時間をいう。
(注)斜線は定格負荷電流範囲を示す。

2. Values

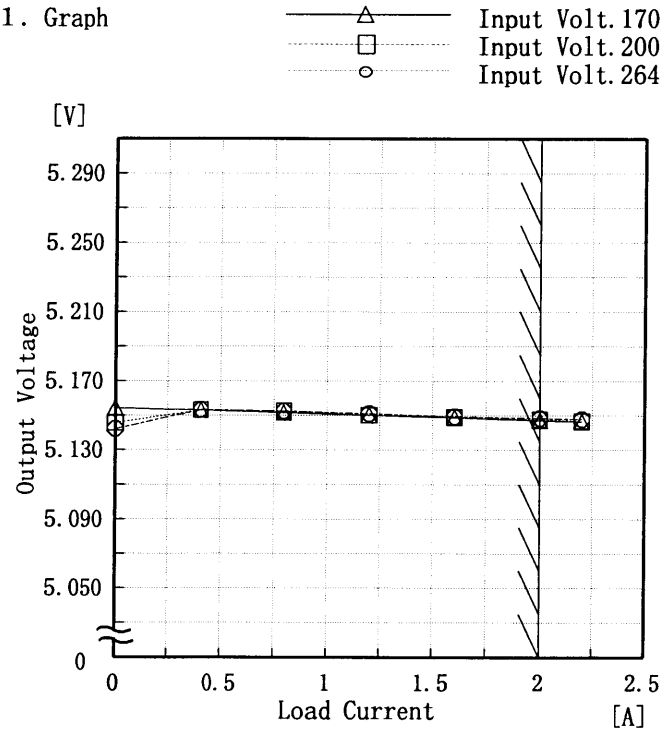
Load Current [A]	Time [mS]		
	Input Volt. 170[V]	Input Volt. 200[V]	Input Volt. 264[V]
0.0	—	—	—
0.4	393	525	841
0.8	198	260	440
1.2	123	169	248
1.6	81	110	185
2.0	60	80	139
2.2	55	72	114
—	—	—	—
—	—	—	—
—	—	—	—
—	—	—	—

COSEL

Model	LDA10F-5
Item	Load Regulation 静的負荷変動
Object	+5.0V2A

Temperature 25℃
Testing Circuitry Figure A

1. Graph



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

(注)斜線は定格負荷電流範囲を示す。

2. Values

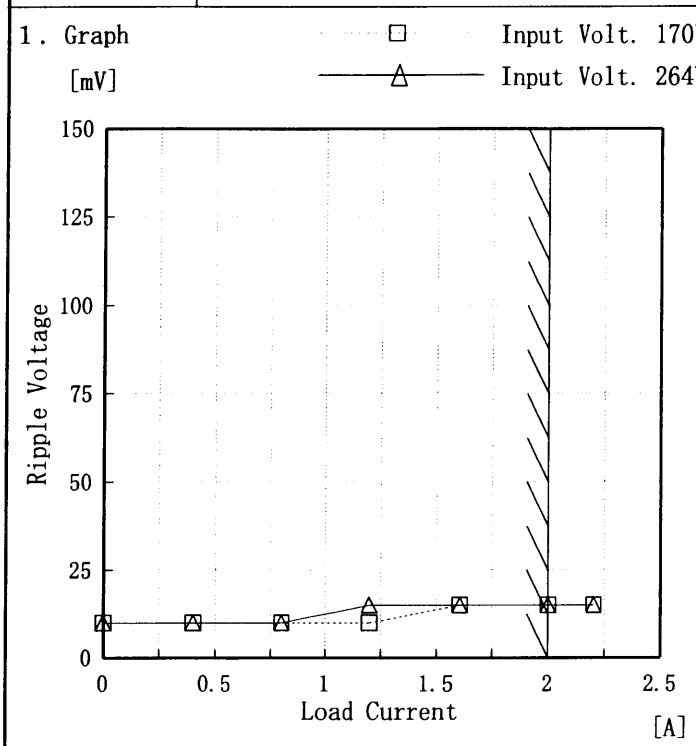
Load Current [A]	Output Voltage [V]		
	Input Volt. 170[V]	Input Volt. 200[V]	Input Volt. 264[V]
0.0	5.154	5.146	5.142
0.4	5.153	5.153	5.153
0.8	5.152	5.153	5.153
1.2	5.150	5.150	5.151
1.6	5.149	5.149	5.150
2.0	5.147	5.148	5.149
2.2	5.146	5.147	5.148
—	—	—	—
—	—	—	—
—	—	—	—

COSEL

Model	LDA10F-5
Item	Ripple Voltage(by Load Current) リップル電圧(負荷電流特性)
Object	+5.0V2A

Temperature 25℃
Testing Circuitry Figure A

1. Graph



Ripple Voltage is shown as p-p in the figure below.

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

リップル電圧は、下図ｐ－ｐ値で示される。

(注)斜線は定格負荷電流範囲を示す。

T1: Due to AC Input Line
入力商用周期
T2: Due to Switching
ｽｲｯﾁﾝｸﾞ周期

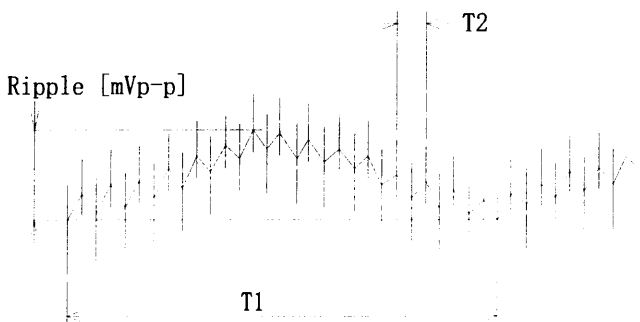


Fig. Complex Ripple Wave Form
図 リップル波形詳細図

2. Values

Load Current [A]	Input Volt. 170 [V] Ripple Output Volt. [mV]	Input Volt. 264 [V] Ripple Output Volt. [mV]
0.00	10	10
0.40	10	10
0.80	10	10
1.20	10	15
1.60	15	15
2.00	15	15
2.20	15	15
—	—	—
—	—	—
—	—	—
—	—	—

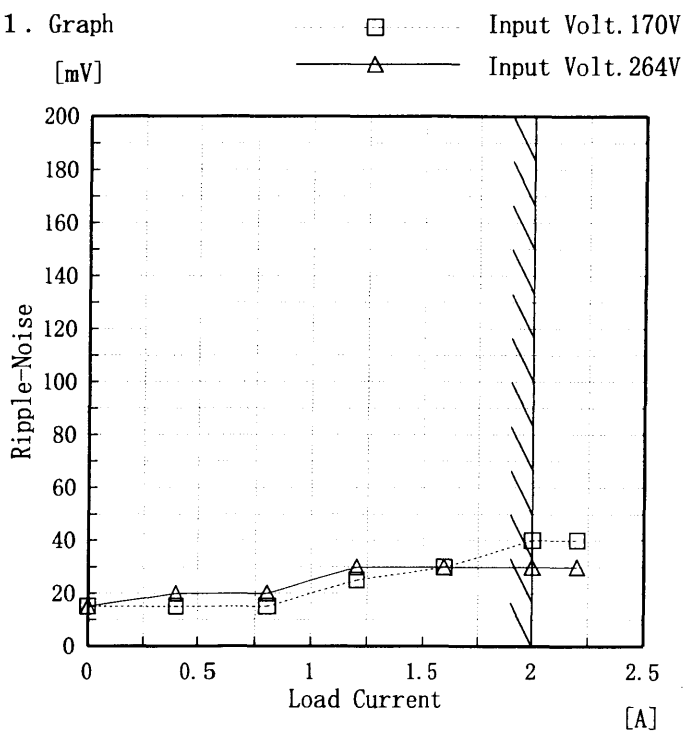
BC－4035

COSEL

Model	LDA10F-5
Item	Ripple-Noise　リップルノイズ
Object	+5.0V2A

Temperature　25℃
Testing Circuitry　Figure A

1. Graph



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

リップルノイズは、下図ｐ－ｐ値で示される。
(注)斜線は定格負荷電流範囲を示す。

T1: Due to AC Input Line
入力商用周期
T2: Due to Switching
ｽｲｯﾁﾝｸﾞ周期

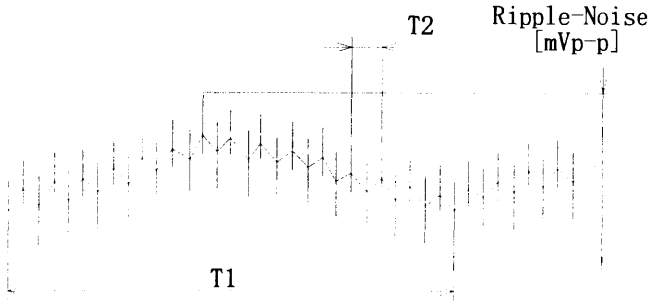


Fig. Complex Ripple Wave Form
図　リップル波形詳細図

2. Values

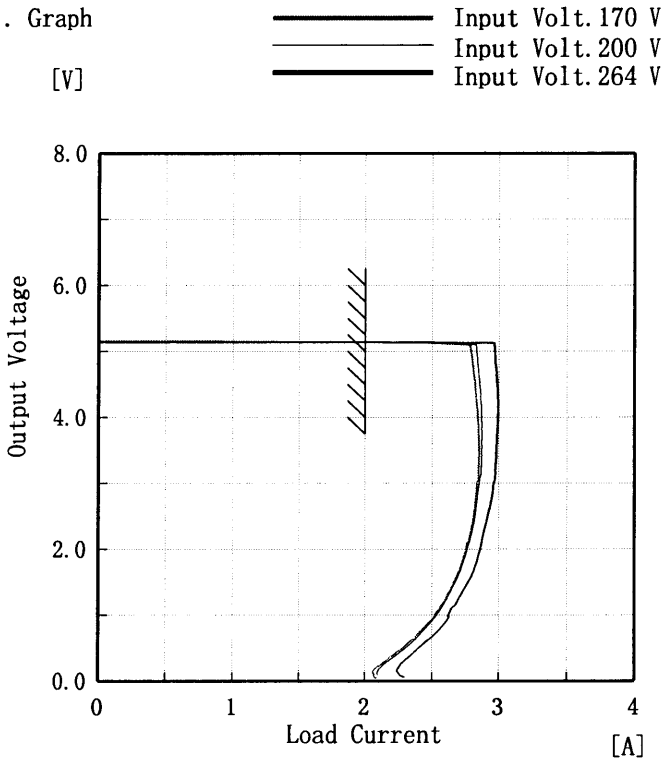
Load current [A]	Input Volt. 170 [V] Ripple-Noise [mV]	Input Volt. 264 [V] Ripple-Noise [mV]
0.00	15	15
0.40	15	20
0.80	15	20
1.20	25	30
1.60	30	30
2.00	40	30
2.20	40	30
—	—	—
—	—	—
—	—	—
—	—	—

COSEL

Model	LDA10F-5
Item	Overcurrent Protection 過電流保護
Object	+5.0V2A

Temperature 25℃
Testing Circuitry Figure A

1. Graph



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

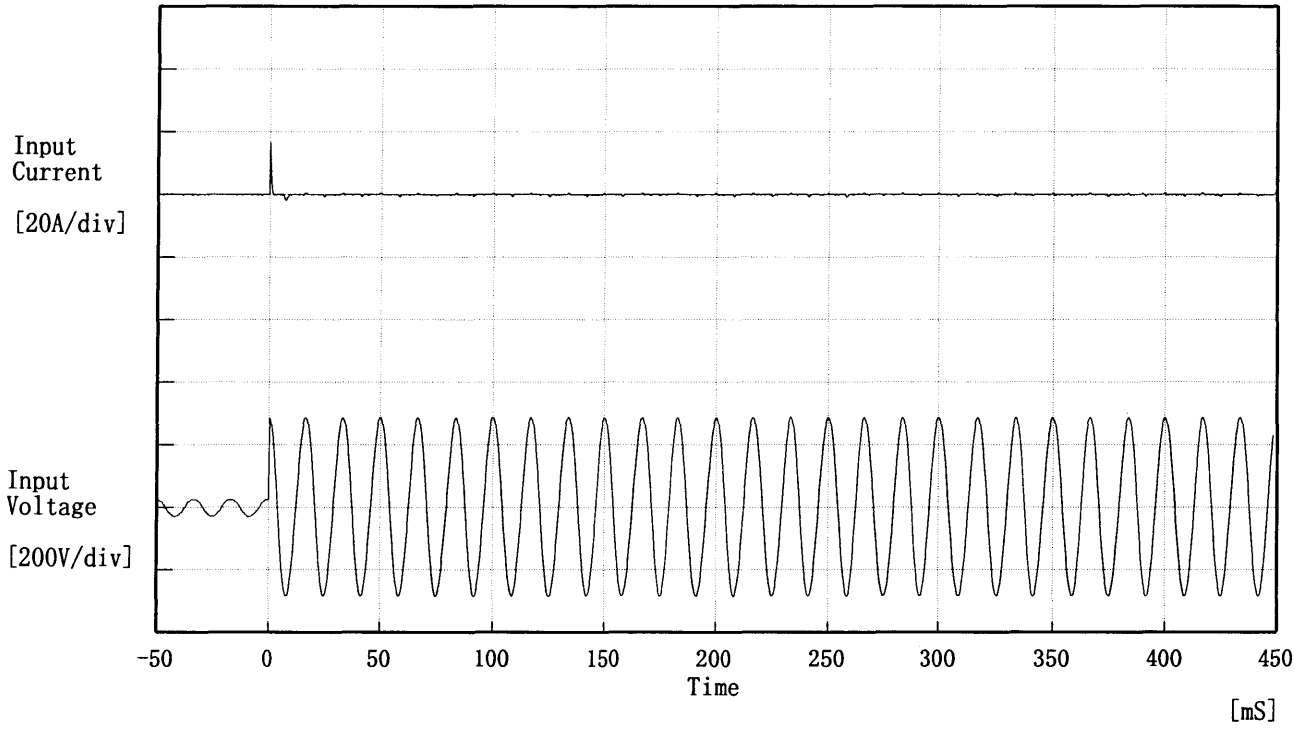
(注)斜線は定格負荷電流範囲を示す。

2. Values

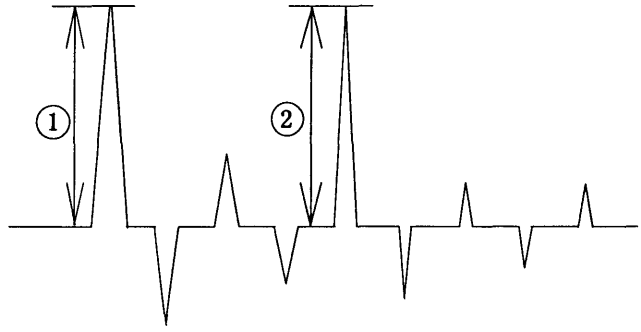
Output Voltage [V]	Load Current [A]		
	Input Volt. 170[V]	Input Volt. 200[V]	Input Volt. 264[V]
5.00	2.80	2.84	2.97
4.75	2.81	2.85	2.98
4.50	2.83	2.86	2.99
4.00	2.85	2.88	2.99
3.50	2.86	2.88	2.98
3.00	2.84	2.86	2.97
2.50	2.82	2.83	2.93
2.00	2.76	2.77	2.87
1.50	2.67	2.69	2.78
1.00	2.53	2.55	2.65
0.50	2.31	2.32	2.41
0.00	2.09	2.10	2.30

COSEL

Model	LDA10F-5	
Item	Inrush Current 突入電流	Temperature 25℃ Testing Circuitry Figure A
Object	――――――――	



Input Voltage 200 V
Frequency 60 Hz
Load 100 %
Inrush Current
① 16.81 [A]
② 0.79 [A]



BC－4035

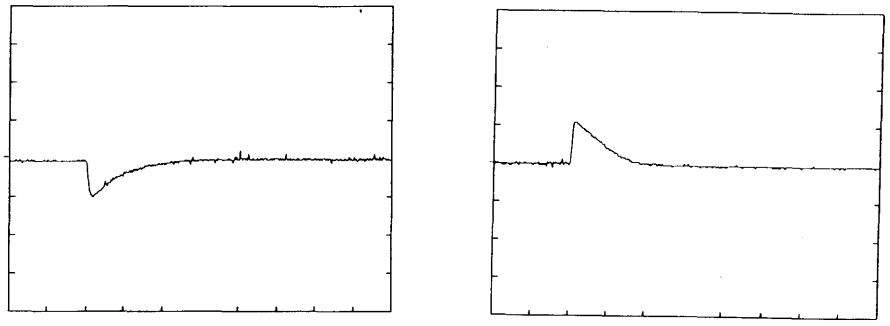
COSEL

Model	LDA10F-5
Item	Dynamic Load Responce 動的負荷変動
Object	+5.0V2A

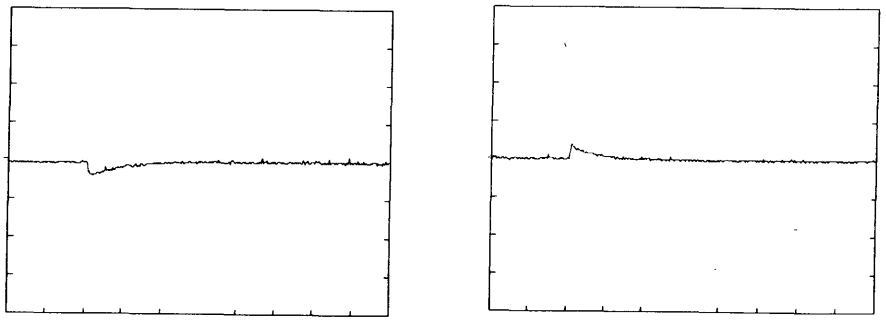
Temperature 25℃
Testing Circuitry Figure A

Input Volt. 200 V
Cycle 1000 mS

Load 0% ⟷
Load 100 %



Load 0% ⟷
Load 50 %



200 mV/div

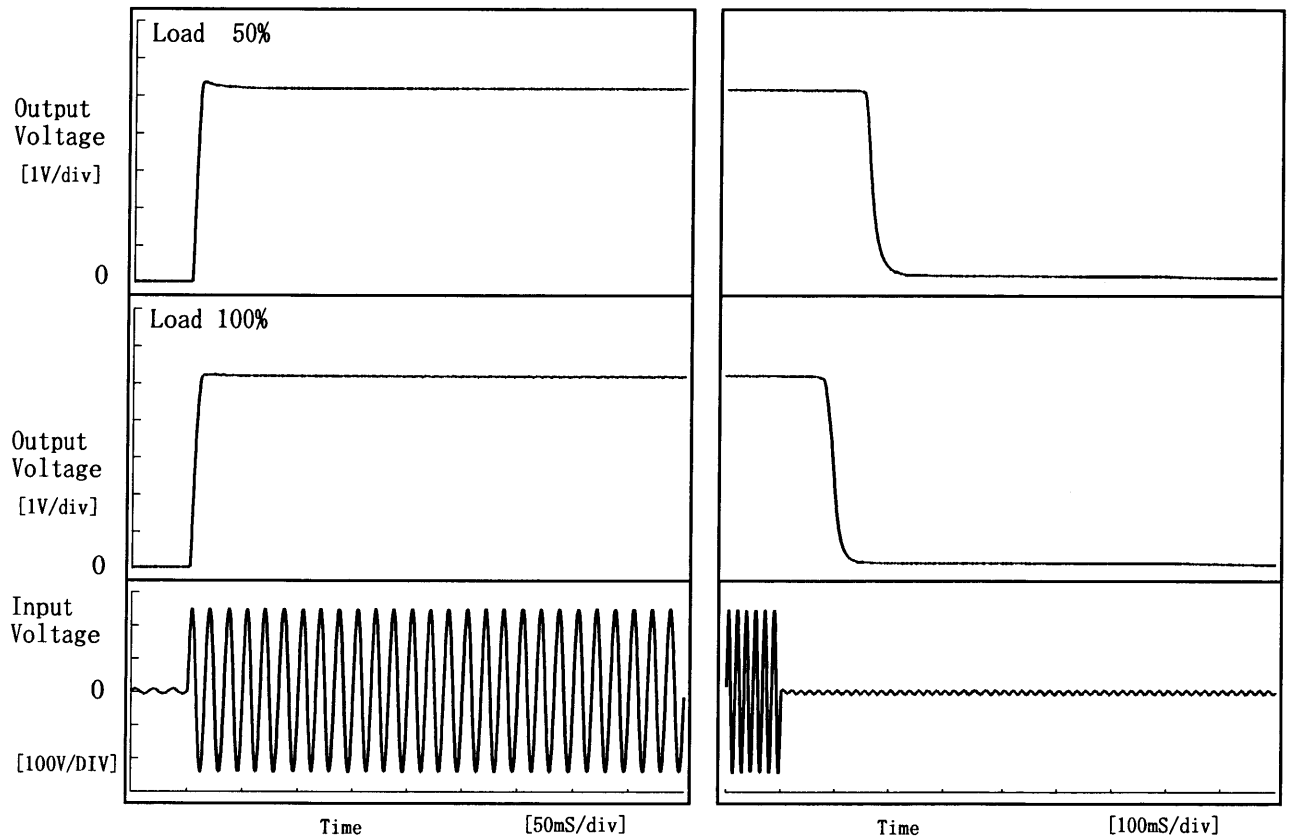
10 mS/div

COSEL

Model	LDA10F-5		
Item	Rise and Fall Time 立上り、立下り時間	Temperature Testing Circuitry	25℃ Figure A
Object	+5.0V2A		

1. Graph

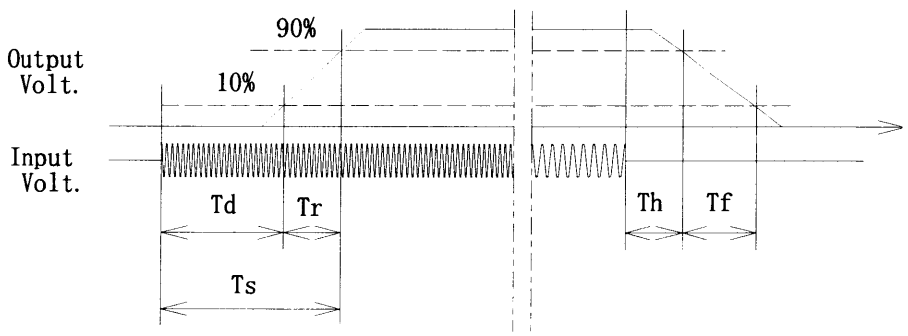
Input Volt. 170 V



2. Values

[mS]

Load \ Time	T d	T r	T s	T h	T f
50 %	2.3	6.3	8.5	157.0	36.5
100 %	2.3	7.3	9.5	87.0	30.0



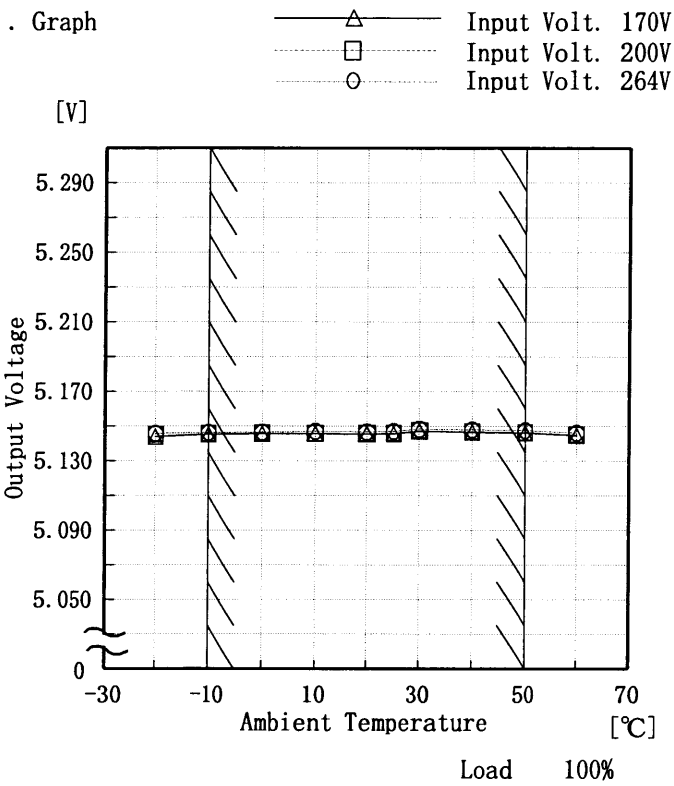
BC−4035

COSEL

Model	LDA10F-5
Item	Ambient Temperature Drift 周囲温度変動
Object	+5.0V2A

Testing Circuitry Figure A

1. Graph



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

(注)斜線は定格周囲温度範囲を示す。

2. Values

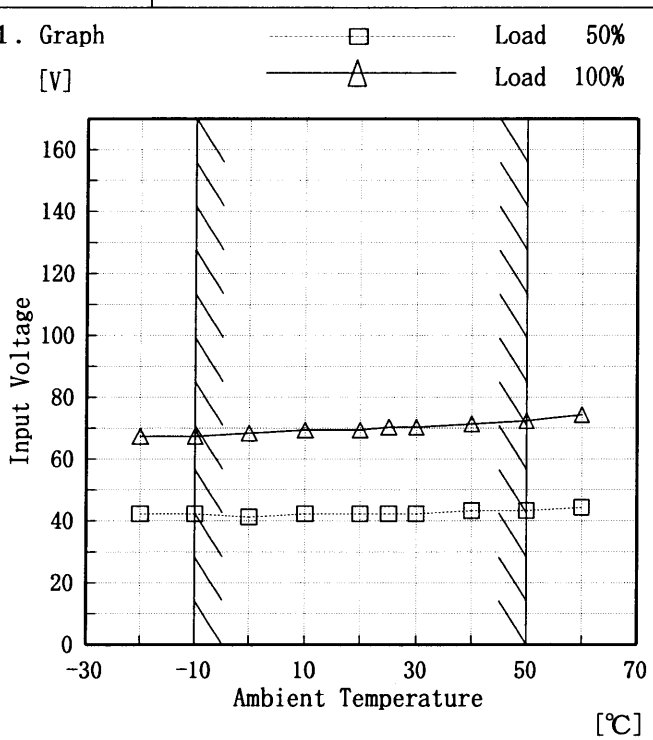
Temperature [℃]	Output Voltage [V]		
	Input Volt. 170[V]	Input Volt. 200[V]	Input Volt. 264[V]
-20	5.144	5.145	5.146
-10	5.145	5.146	5.146
0	5.145	5.146	5.147
10	5.145	5.146	5.147
20	5.145	5.146	5.147
25	5.146	5.146	5.147
30	5.147	5.147	5.148
40	5.147	5.147	5.148
50	5.146	5.147	5.148
60	5.145	5.145	5.146
—	—	—	—

COSEL

Model	LDA10F-5
Item	Minimum Input Voltage for Regulated Output Voltage 最低レギュレーション電圧
Object	+5.0V2A

Testing Circuitry Figure A

1. Graph



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

(注)斜線は定格周囲温度範囲を示す。

2. Values

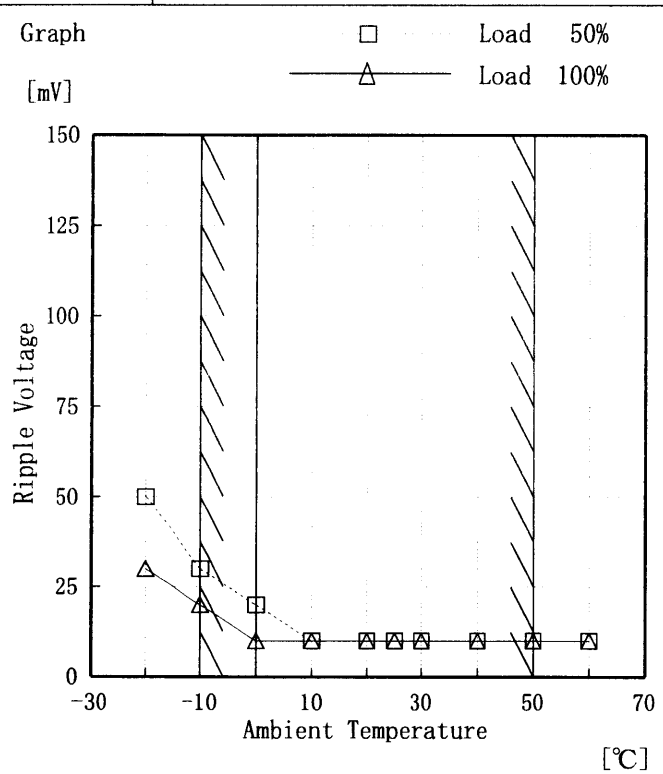
Ambient Temperature [℃]	Input Voltage [V]	
	Load 50%	Load 100%
-20	42	67
-10	42	67
0	41	68
10	42	69
20	42	69
25	42	70
30	42	70
40	43	71
50	43	72
60	44	74
—	—	—

COSEL

Model	LDA10F-5
Item	Ripple Voltage (by Ambient Temp.) リップル電圧 (周囲温度特性)
Object	+5.0V2A

Testing Circuitry Figure A

1. Graph



Input Volt. 200 V

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

(注)斜線は定格周囲温度範囲を示す。

2. Values

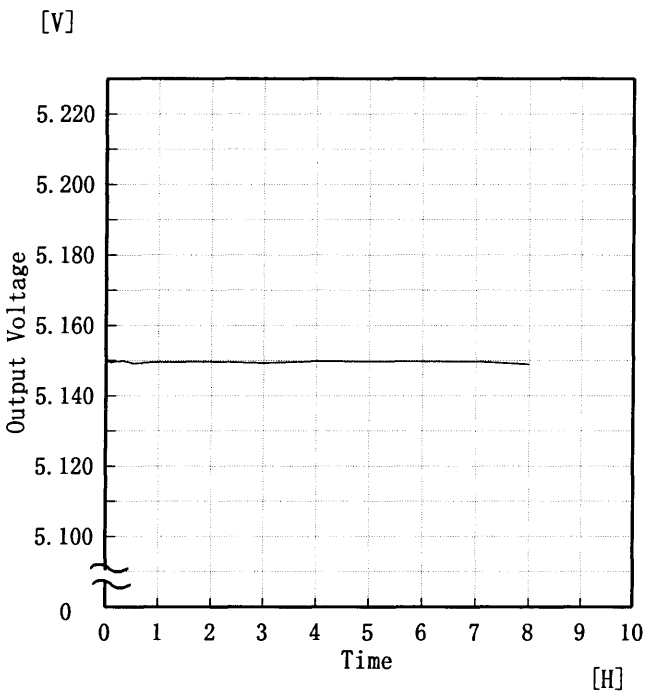
Ambient Temp. [℃]	Load 50% Ripple Output Volt. [mV]	Load 100% Ripple Output Volt. [mV]
-20	50	30
-10	30	20
0	20	10
10	10	10
20	10	10
25	10	10
30	10	10
40	10	10
50	10	10
60	10	10
—	—	—

COSEL

Model	LDA10F-5
Item	Time Lapse Drift 経時ドリフト
Object	+5.0V2A

Temperature 25℃
Testing Circuitry Figure A

1. Graph



Input Volt. 200V
Load 100%

2.Values

Time since start [H]	Output Voltage [V]
0.0	5.152
0.5	5.149
1.0	5.150
2.0	5.150
3.0	5.149
4.0	5.150
5.0	5.150
6.0	5.150
7.0	5.150
8.0	5.149

COSEL

Model	LDA10F-5	
Item	Output Voltage Accuracy　定電圧精度	Testing Circuitry　Figure A
Object	+5.0V2A	

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 ℃
Input Voltage：170～264 V
Load Current ：0～2 A

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

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

定電圧精度

周囲温度、入力電圧、負荷電流を下記仕様内で、任意に変動させたときの出力電圧の変動をいう。

周囲温度　-10～50 ℃
入力電圧　170～264 V
負荷電流　0～2 A

* 定電圧精度(変動値) ＝ ±(出力電圧の最高値−出力電圧の最低値)／2

$$\text{* 定電圧精度(変動率)} = \frac{\text{変動値}}{\text{定格出力電圧}} \times 100$$

Item	Temperature [℃]	Input Voltage [V]	Output Current [A]	Output Voltage [V]	Output Voltage Accuracy [mV]	Output Voltage Accuracy (Ration) [%]
Maximum Voltage	50	170	0	5.154	±8	±0.2
Minimum Voltage	-10	264	0	5.140		

COSEL

Model	LDA10F-5	
Item	Condensation 結露特性	Testing Circuitry Figure A
Object	+5.0V2A	

1. Condensation test

Testing procedure is as follows.

① Keeping and cooling the unit in a tank at -10℃ for an hour with the input off.

② Taking it out of the tank and dewing itself in a room where the temperature is 25℃ and the humidity is 40%RH.

③ Testing electrical characteristics of the unit to confirm there be no fault.

1．結露特性試験

入力を切った状態で、恒温槽で－１０℃に冷却しておき、約１時間後に恒温槽から取り出し、室温２５℃、湿度４０%RHの状態におき結露させ、その電気的特性の測定を行い、異常のないことを確認する。

2. Values

Item	Data	Testing Conditions
Output Voltage [V]	5.14	Input Volt.: 200V, Load Current:2A
Line Regulation [mV]	5	Input Volt.: 170～264V, Load Current:2A
Load Regulation [mV]	12	Input Volt.: 200V, Load Current:0～2A

COSEL

Model	LDA10F-5		
Item	Leakage Current 漏洩電流	Temperature	25℃
		Testing Circuitry	Figure B
Object	――――――		

1. Results

Standards	Leakage Current [mA]		
	Input Volt. 85 [V]	Input Volt. 100 [V]	Input Volt. 132 [V]
(A) DENTORI	—	—	—
(B) IEC60950	—	—	—

Standards	Leakage Current [mA]		
	Input Volt. 170 [V]	Input Volt. 230 [V]	Input Volt. 264 [V]
(B) IEC60950	0.23	0.26	0.28

2. Condition

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

交流入力の両相について測定し、その大きい方を漏洩電流測定値とする。

COSEL

Model	LDA10F-5		
Item	Line Noise Tolerance 入力雑音耐量	Temperature Testing Circuitry	25℃ Figure C
Object	+5.0V2A		

1. Results

Pulse Width [nS]	MODE	No protection failure should occur 保護回路の誤動作がない	DC-like Regulation of Output Voltage 出力電圧の直流的変動
50	COMMON	OK	no fluctuation
	NORMAL	OK	no fluctuation
1000	COMMON	OK	no fluctuation
	NORMAL	OK	no fluctuation

2. Conditions

Input Voltage : 200 V
Pulse Voltage : 2000 V
Pulse Cycle : 10 mS
Pulse Input Duration : 1 min. or more
Load : 100 %

COSEL

Model	LDA10F-5		
Item	Conducted Emission 雑音端子電圧	Temperature Testing Circuitry	25℃ Figure D
Object	————————		

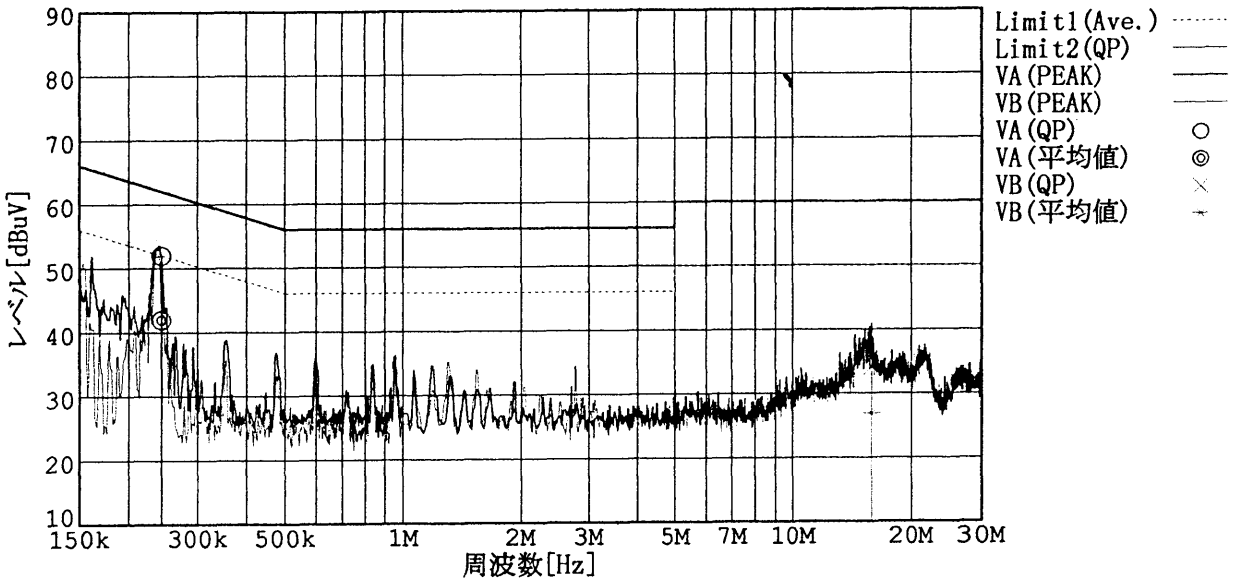
1. Graph

Remarks

Input Volt. 230 V

Load 100 %

規格1：[EN 55022] Class B(平均値)
規格2：[EN 55022] Class B(QP)



COSEL

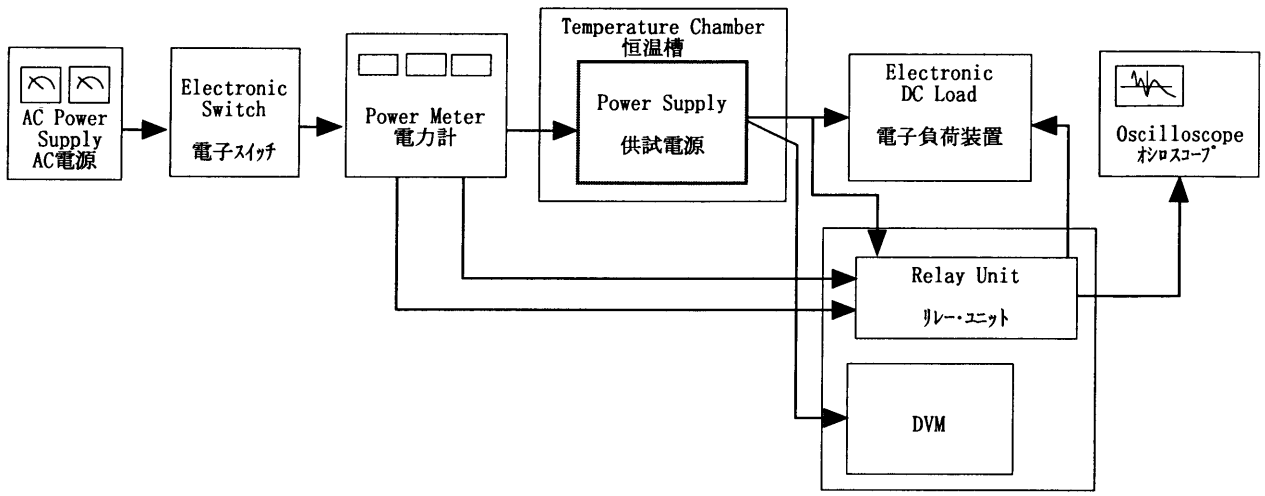


Figure A

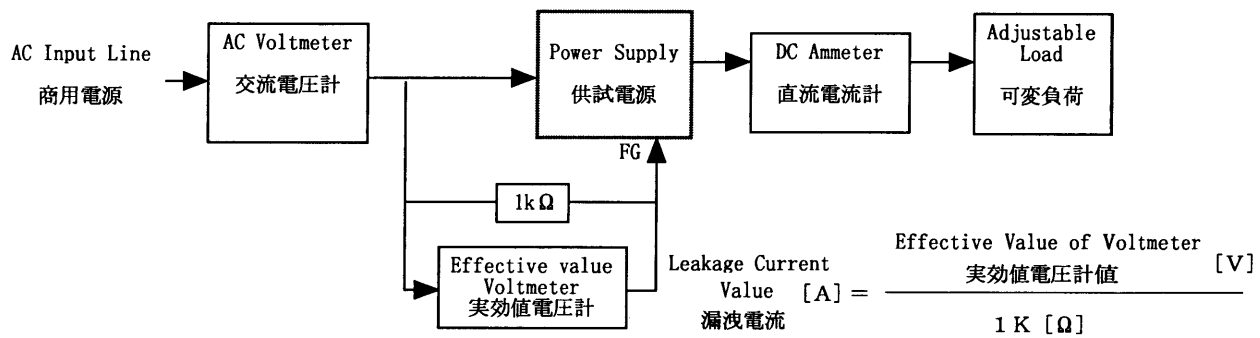


Figure B(DENTORI)

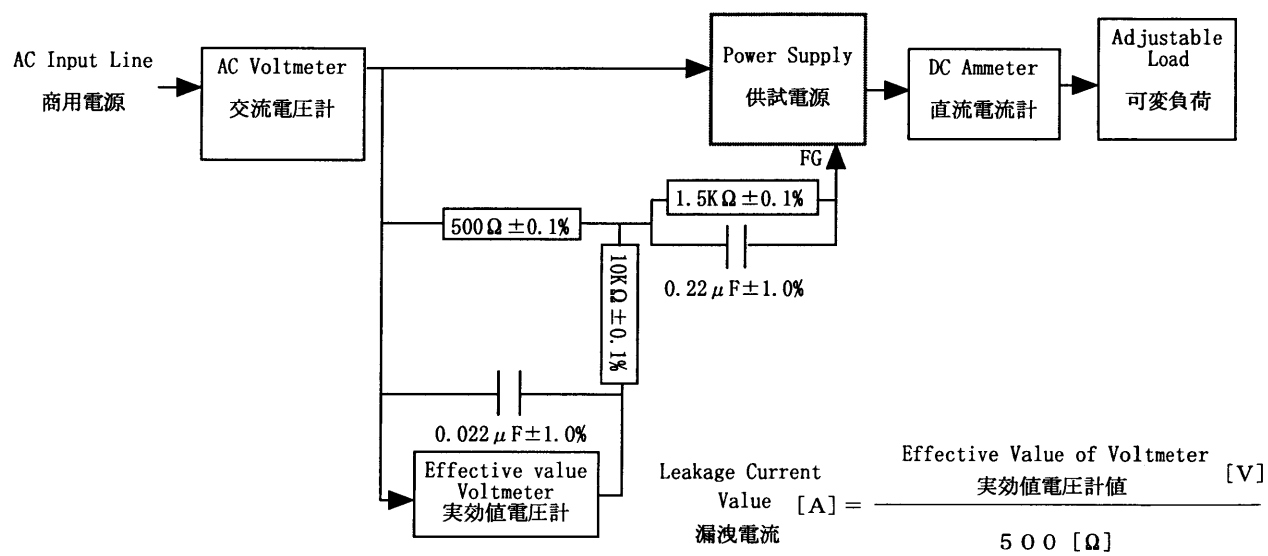


Figure B（ＩＥＣ６０９５０）

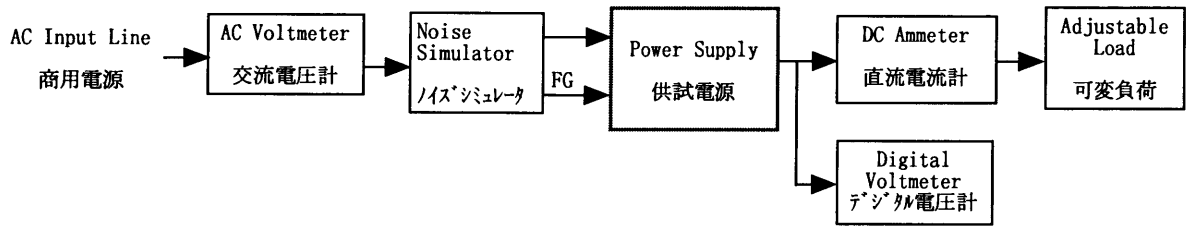


Figure C

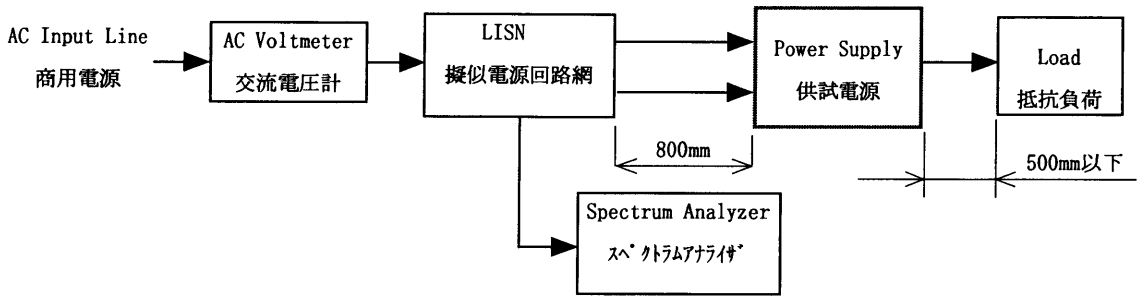


Figure D

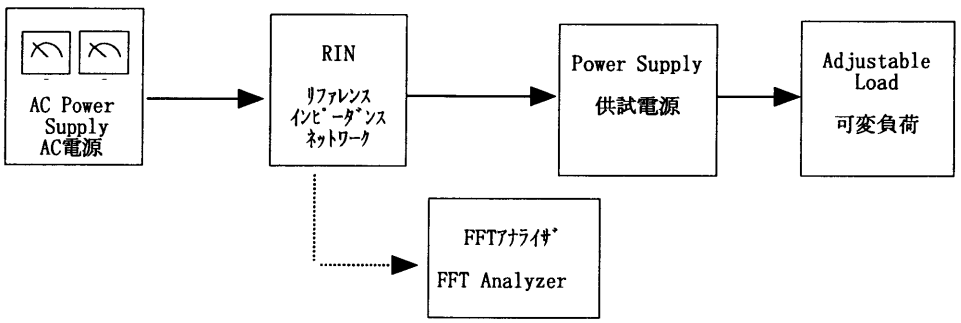


Figure E