参考資料

COSEL

TEST DATA OF PAA300F-5

(100V　INPUT)

Regulated DC Power Supply

Date : Feb. 13. 1997

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Design Manager

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Design Engineer

コーセル株式会社

COSEL CO., LTD.

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Object	+5V60A

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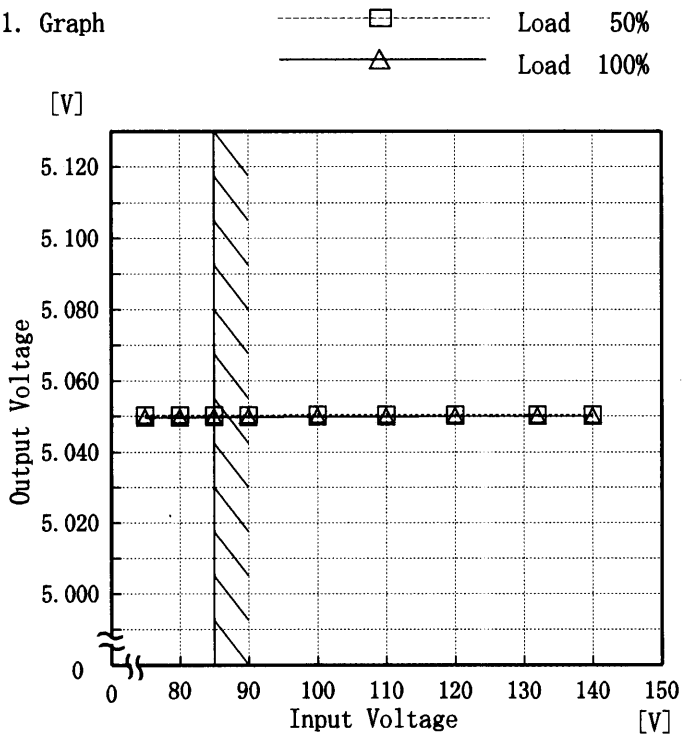
1. Graph



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

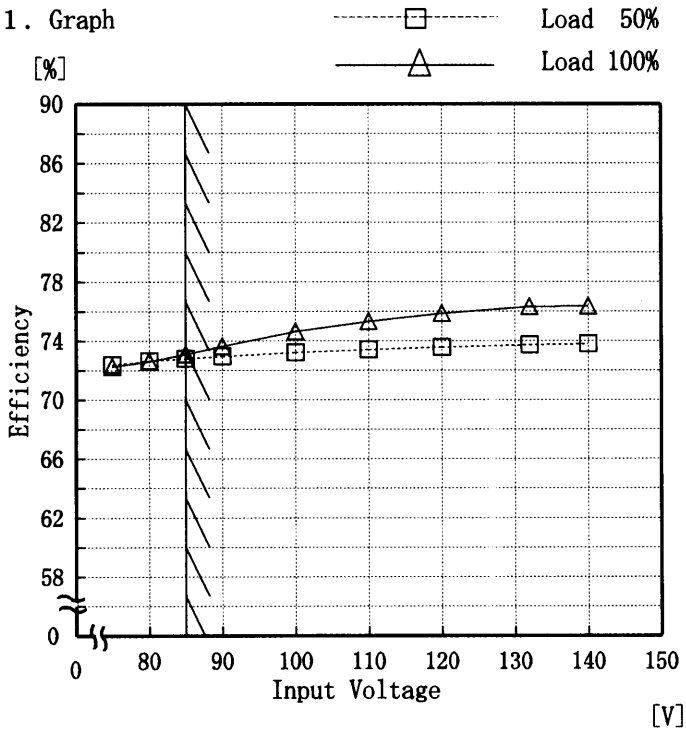
Input Voltage [V]	Load 50% Output Volt. [V]	Load 100% Output Volt. [V]
75	5.050	5.050
80	5.050	5.050
85	5.050	5.050
90	5.050	5.050
100	5.050	5.050
110	5.050	5.050
120	5.050	5.050
132	5.050	5.050
140	5.050	5.050

COSEL

Model	PAA300F-5
Item	Efficiency 効率
Object	———————

Temperature 25℃
Testing Circuitry Figure A

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

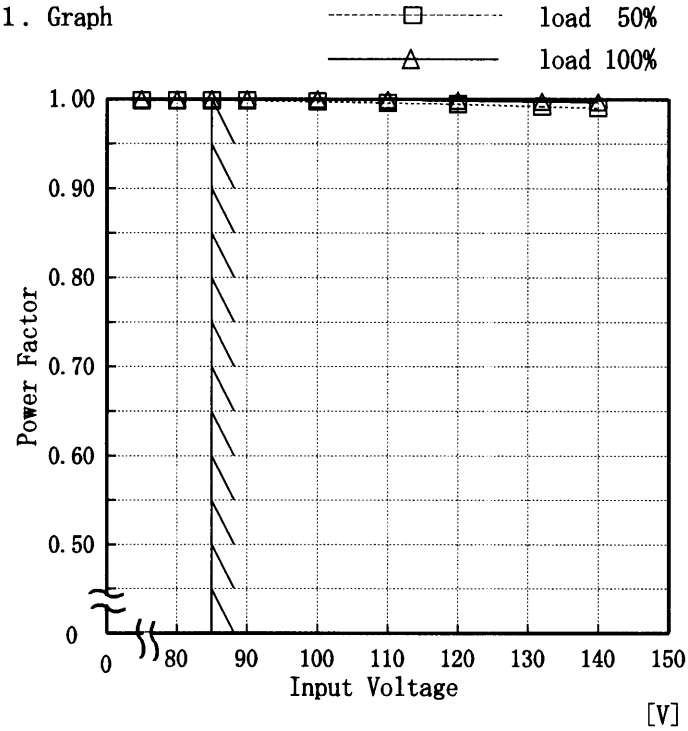
Input Voltage [V]	Load 50% Efficiency [%]	Load 100% Efficiency [%]
75	72.38	72.25
80	72.66	72.61
85	72.80	73.10
90	72.97	73.65
100	73.22	74.63
110	73.43	75.32
120	73.58	75.85
132	73.76	76.30
140	73.80	76.35

COSEL

Model	PAA300F-5
Item	Power Factor 力率
Object	———————————

Temperature 25℃
Testing Circuitry Figure A

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]	load 50% Power Factor	load 100% Power Factor
75	1.00	1.00
80	1.00	1.00
85	1.00	1.00
90	1.00	1.00
100	1.00	1.00
110	1.00	1.00
120	0.99	1.00
132	0.99	1.00
140	0.99	1.00

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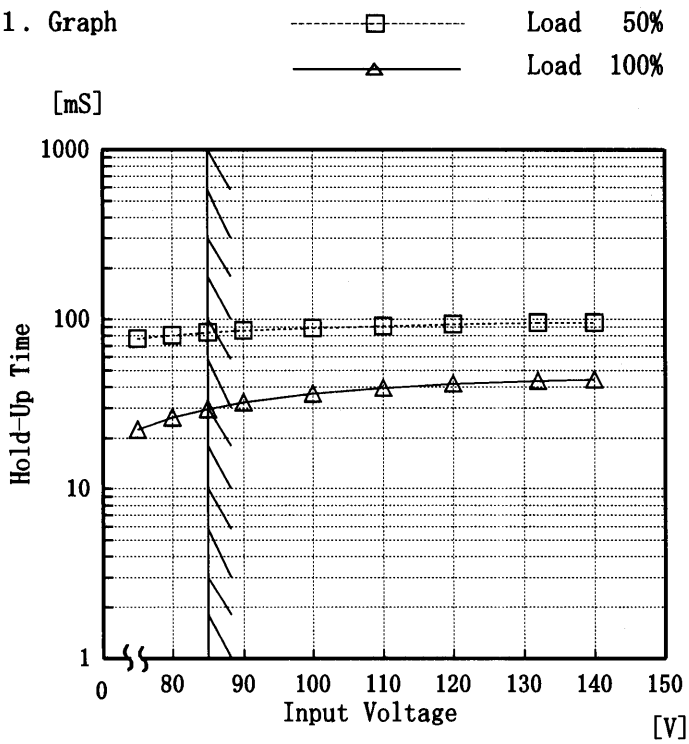
Model	PAA300F-5
Item	Hold-Up Time 出力保持時間
Object	+5V60A

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 input voltage.

出力保持時間とは、ＡＣ入力断から出力電圧が、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

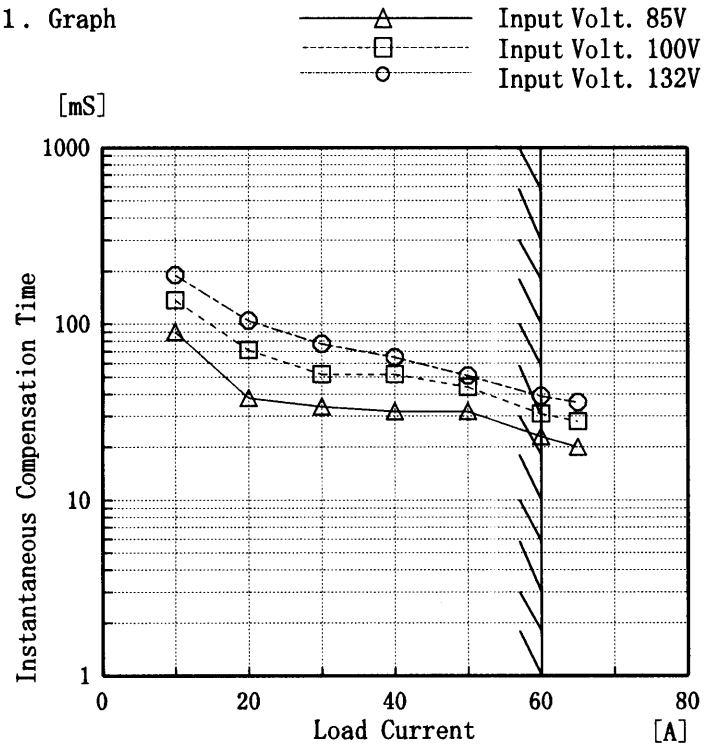
Input Voltage [V]	Load 50% Hold-Up Time [mS]	Load 100% Hold-Up Time [mS]
75	77	23
80	81	27
85	84	30
90	86	32
100	89	37
110	91	39
120	94	42
132	95	43
140	96	44

COSEL

Model	PAA300F-5
Item	Instantaneous Interruption Compensation 瞬時停電保障
Object	+5V60A

Testing Circuitry Figure A 25℃

1. Graph



This duration covers from Shut-off of AC-IN to the moment when output voltage descends to its 95% of the rated.

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

瞬時停電保障時間とは、出力電圧が定格値の９５％になる時の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

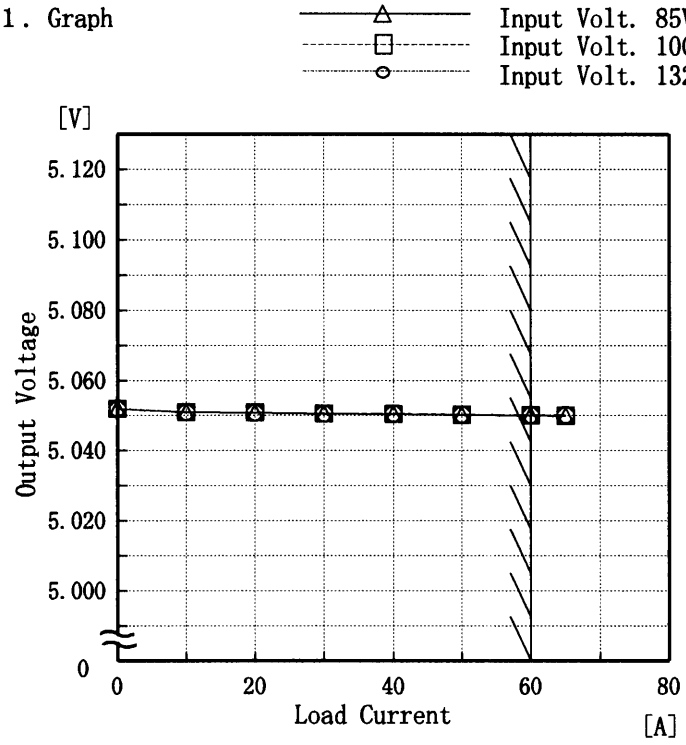
Load Current [A]	Input Volt. 85[V]	Input Volt. 100[V]	Input Volt. 132[V]
	Time [mS]		
0.0	—	—	—
10.0	90	137	190
20.0	38	71	105
30.0	34	52	77
40.0	32	52	65
50.0	32	44	51
60.0	23	31	39
65.0	20	28	36
—	—	—	—
—	—	—	—
—	—	—	—

COSEL

Model	PAA300F-5
Item	Load Regulation 静的負荷変動
Object	+5V60A

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

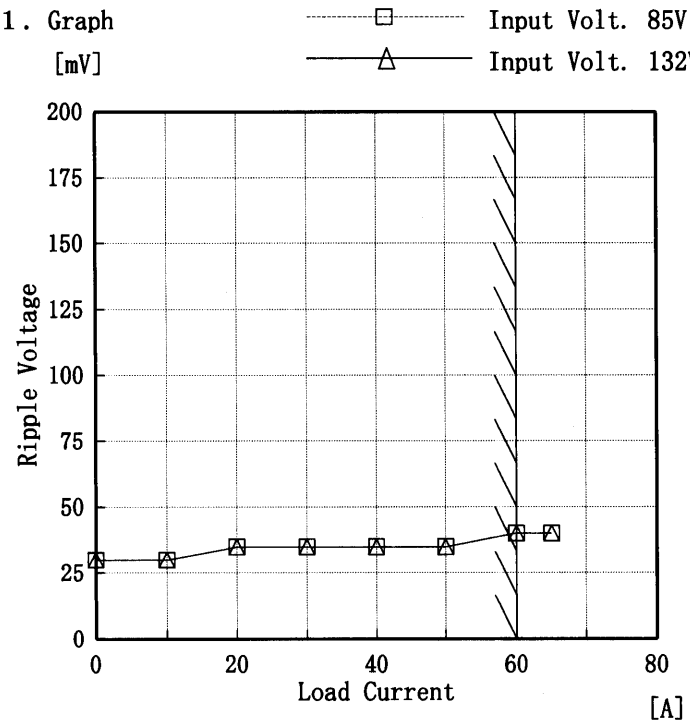
Load Current [A]	Input Volt. 85[V] Output Volt. [V]	Input Volt. 100[V] Output Volt. [V]	Input Volt. 132[V] Output Volt. [V]
0.0	5.052	5.052	5.052
10.0	5.051	5.051	5.051
20.0	5.051	5.051	5.051
30.0	5.051	5.051	5.051
40.0	5.050	5.050	5.051
50.0	5.050	5.050	5.050
60.0	5.050	5.050	5.050
65.0	5.050	5.050	5.050
—	—	—	—
—	—	—	—

COSEL

Model	PAA300F-5
Item	Ripple Voltage(by Load Current) リップル電圧(負荷電流特性)
Object	+5V60A

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

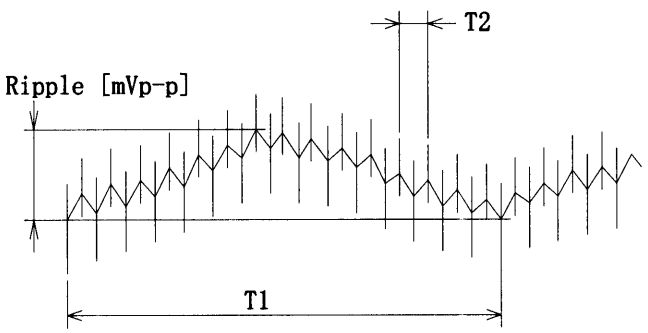


Fig. Complex Ripple Wave Form
図 リップル波形詳細図

2. Values

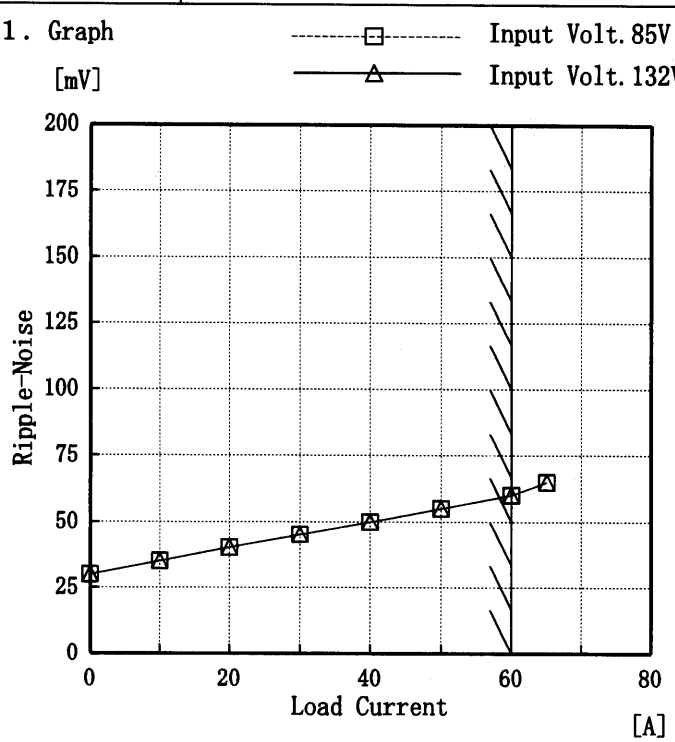
Load Current [A]	Input Volt. 85 [V] Ripple Output Volt. [mV]	Input Volt. 132 [V] Ripple Output Volt. [mV]
0.0	30	30
10.0	30	30
20.0	35	35
30.0	35	35
40.0	35	35
50.0	35	35
60.0	40	40
65.0	40	40
—	—	—
—	—	—
—	—	—

COSEL

Model	PAA300F-5
Item	Ripple-Noise　リップルノイズ
Object	+5V60A

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

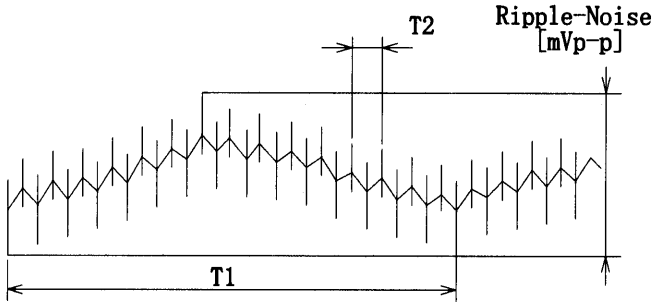


Fig. Complex Ripple Wave Form
図　リップル波形詳細図

2. Values

Load current [A]	Input Volt. 85 [V] Ripple-Noise [mV]	Input Volt. 132 [V] Ripple-Noise [mV]
0.0	30	30
10.0	35	35
20.0	40	40
30.0	45	45
40.0	50	50
50.0	55	55
60.0	60	60
65.0	65	65
—	—	—
—	—	—
—	—	—

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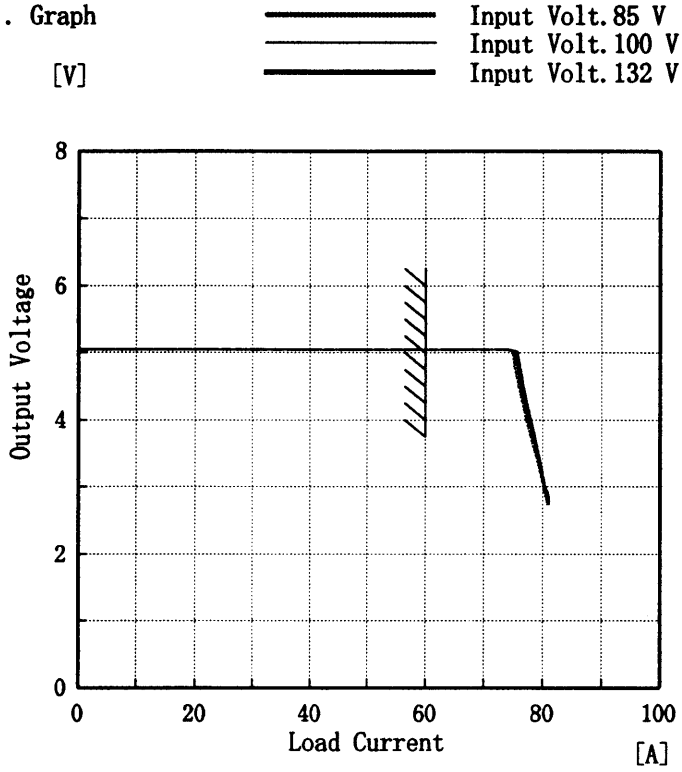
Model	PAA300F-5
Item	Overcurrent Protection 過電流保護
Object	+5V60A

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。
3V以下は間欠モードにはいる。

2. Values

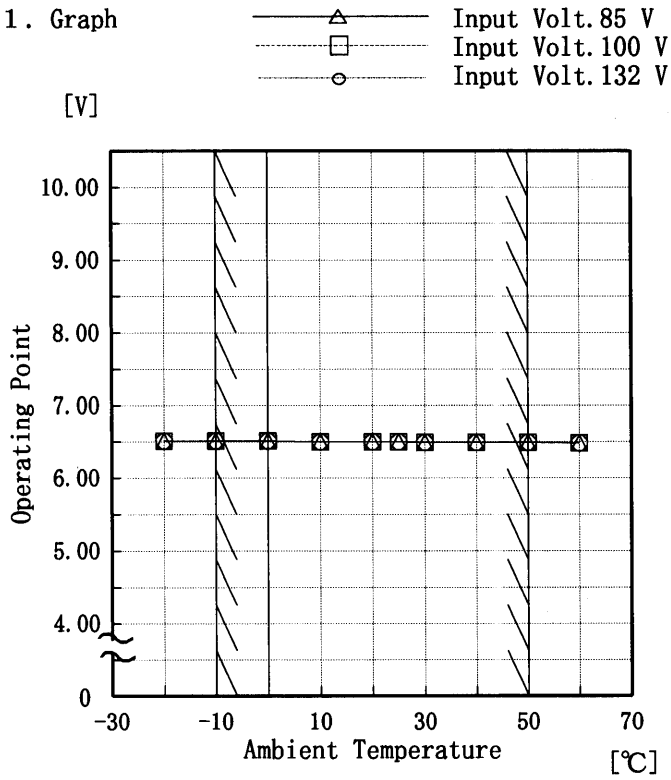
Output Voltage [V]	Input Volt. 85[V] Load Current [A]	Input Volt. 100[V] Load Current [A]	Input Volt. 132[V] Load Current [A]
5.00	74.77	75.20	75.63
4.75	75.26	75.69	76.07
4.50	75.81	76.20	76.70
4.00	77.18	77.54	77.95
3.50	78.64	78.94	79.16
3.00	80.04	80.13	80.40
2.50	——	——	——
2.00	——	——	——
1.50	——	——	——
1.00	——	——	——
0.50	——	——	——
0.00	——	——	——

COSEL

Model	PAA300F-5
Item	Overvoltage Protection 過電圧保護
Object	+5V60A

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。

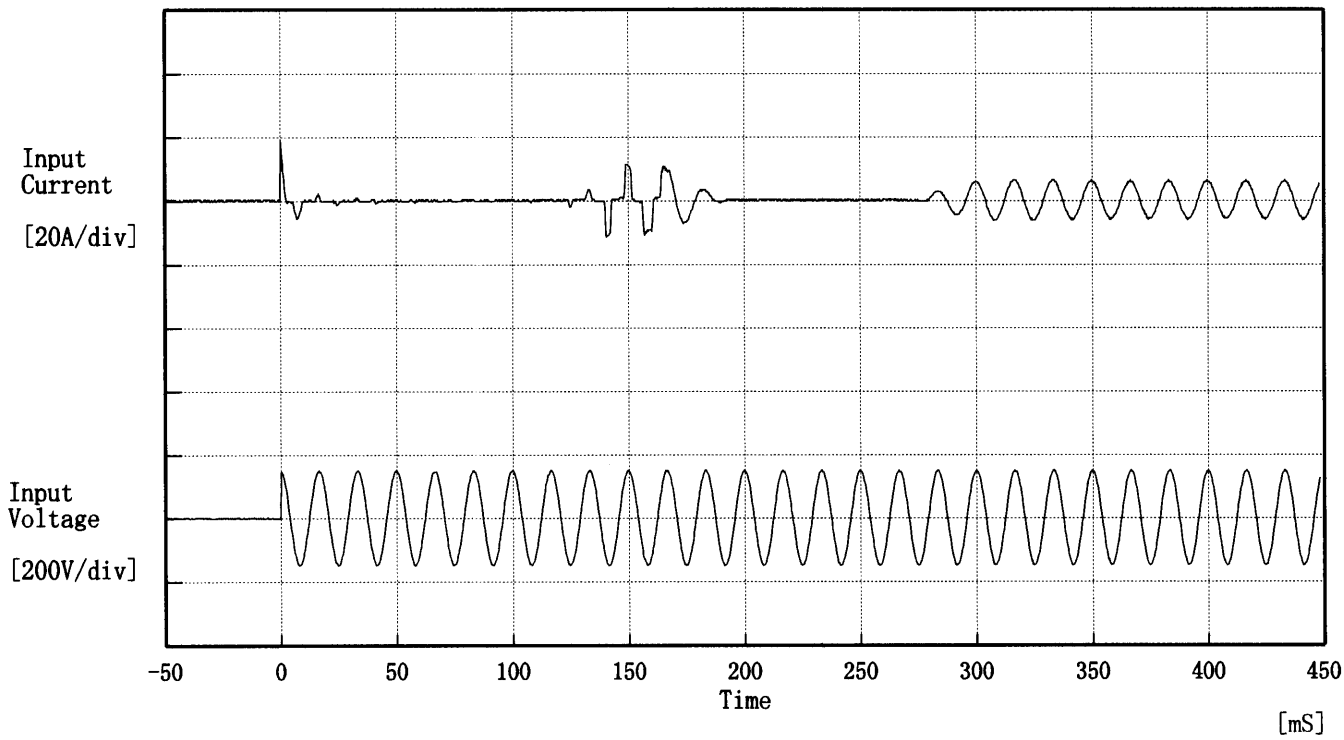
2. Values

Ambient Temp. [℃]	Input Volt. 85[V]	Input Volt. 100[V]	Input Volt. 132[V]
	Operating Point [V]		
-20	6.51	6.51	6.51
-10	6.51	6.51	6.51
0	6.51	6.51	6.51
10	6.50	6.50	6.50
20	6.50	6.50	6.50
25	6.50	6.50	6.50
30	6.49	6.49	6.49
40	6.49	6.49	6.49
50	6.49	6.49	6.49
60	6.48	6.48	6.48
—	—	—	—

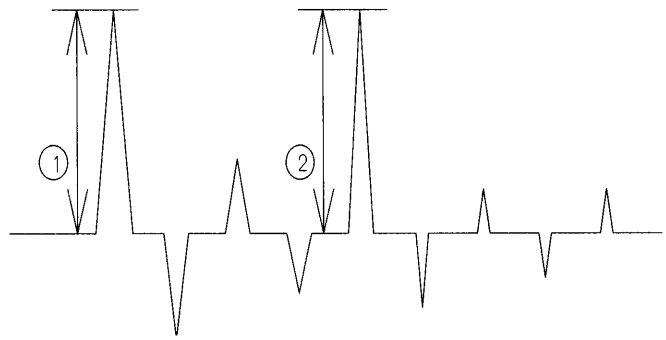
COSEL

Model	PAA300F-5
Item	Inrush Current 突入電流
Object	――――――――

Temperature 25℃
Testing Circuitry Figure A



Input Voltage 100 V
Frequency 60 Hz
Load 100 %
Inrush Current
① 19.20 [A]
② 11.40 [A]



COSEL

Model	PAA300F-5		
Item	Dynamic Load Responce 動的負荷変動	Temperature Testing Circuitry	25℃ Figure A
Object	+5V60A		

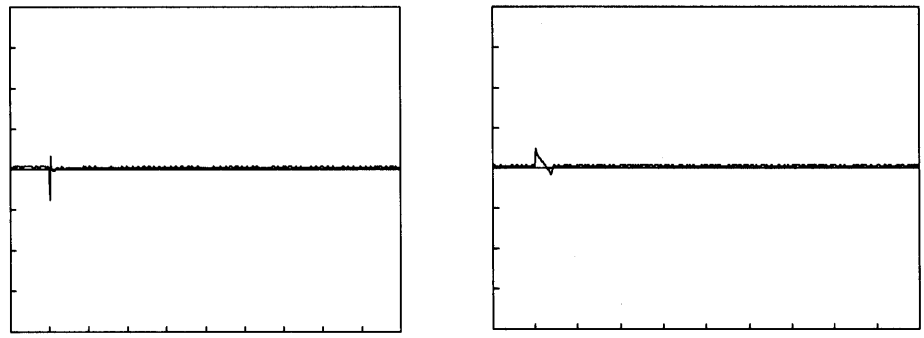
Input Volt. 100 V

Cycle 200 mS

Load Current

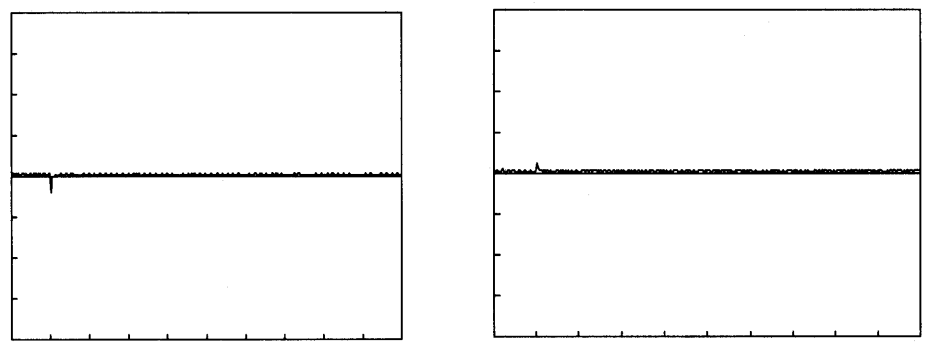
Min. Load ←→

Load 100 %



Min. Load ←→

Load 50 %



100 mV/div

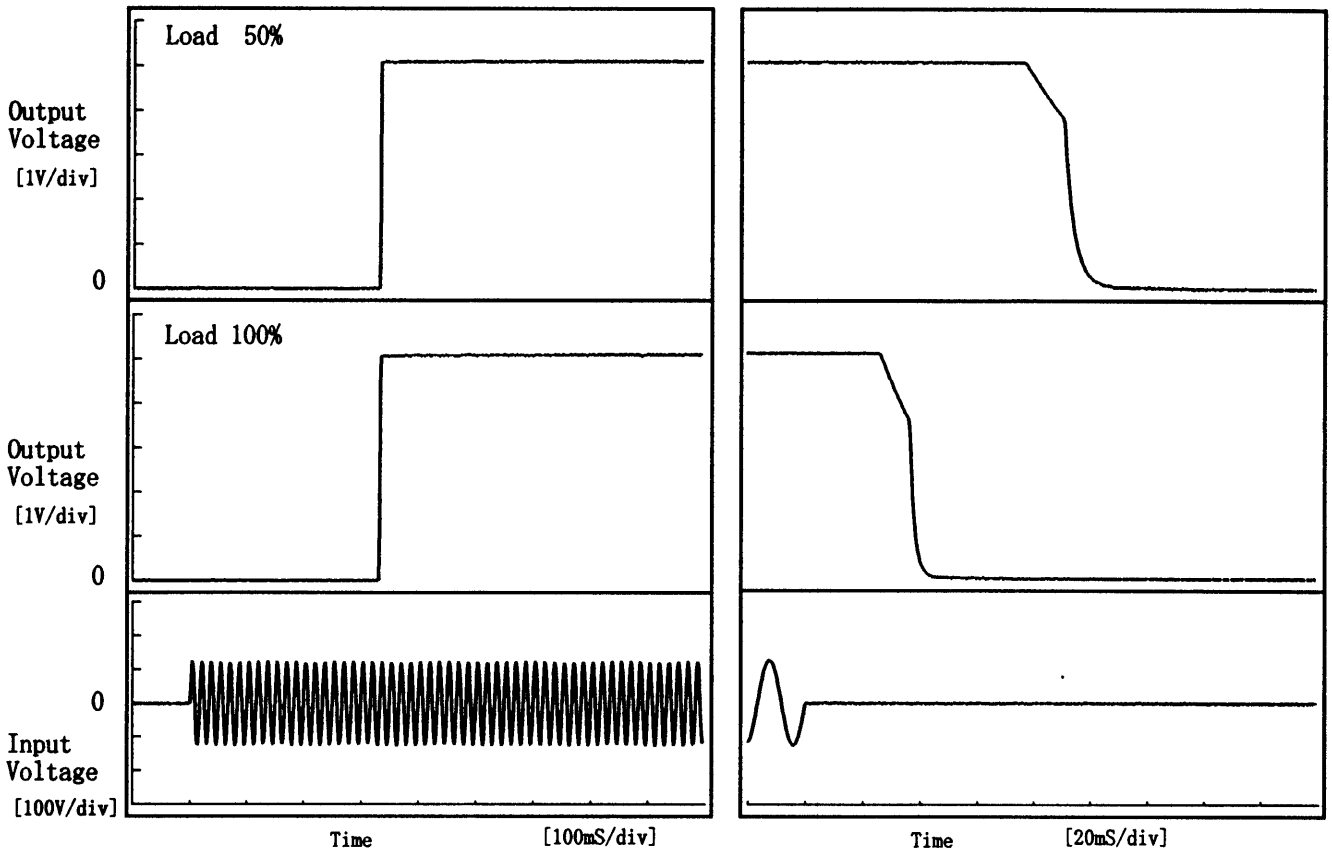
10 mS/div

COSEL

Model	PAA300F-5		
Item	Rise and Fall Time 立上り、立下り時間	Temperature	25℃
		Testing Circuitry	Figure A
Object	+5V60A		

1. Graph

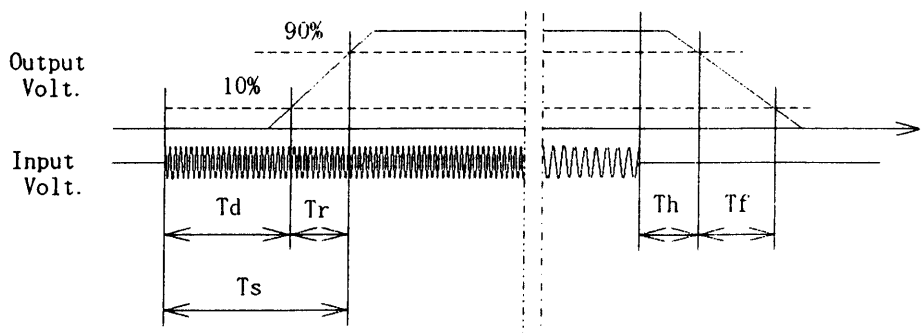
Input Volt. 85 V



2. Values

[mS]

Load \ Time	T d	T r	T s	T h	T f
50 %	332.0	1.5	333.5	82.7	15.0
100 %	332.0	2.5	334.5	29.8	10.2

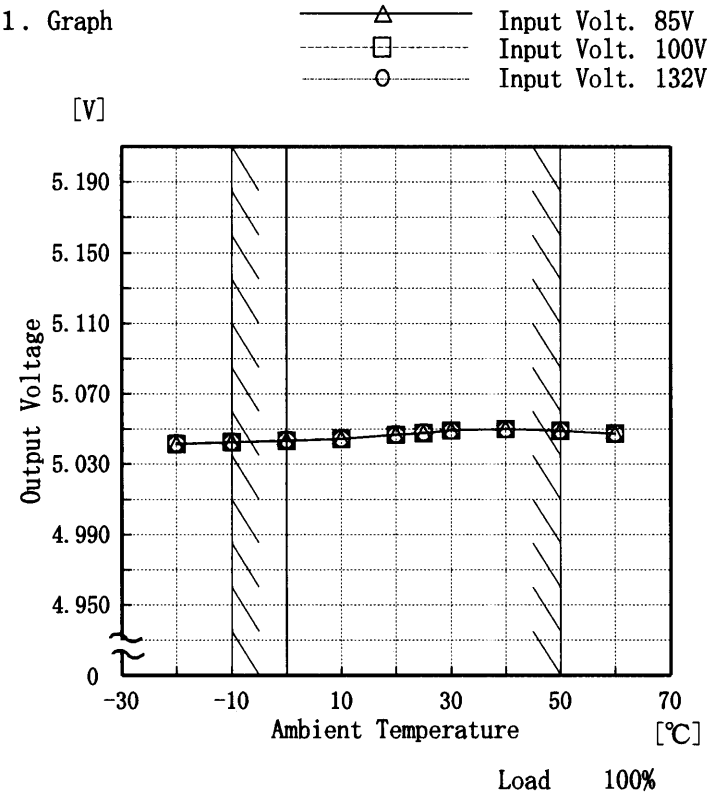


COSEL

Model	PAA300F-5
Item	Ambient Temperature Drift 周囲温度変動
Object	+5V60A

Testing Circuitry Figure A

1. Graph



Load 100%

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

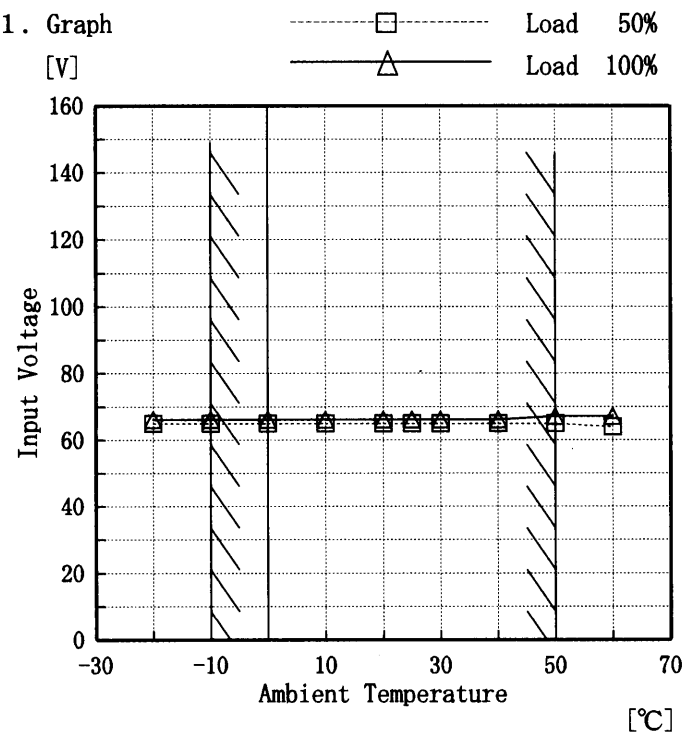
Temperature [℃]	Input Volt. 85[V] Output Volt. [V]	Input Volt. 100[V] Output Volt. [V]	Input Volt. 132[V] Output Volt. [V]
-20	5.042	5.042	5.042
-10	5.043	5.043	5.043
0	5.044	5.044	5.044
10	5.045	5.045	5.045
20	5.047	5.047	5.047
25	5.048	5.048	5.048
30	5.049	5.049	5.049
40	5.050	5.050	5.050
50	5.049	5.049	5.049
60	5.048	5.048	5.048
—	—	—	—

COSEL

Model	PAA300F-5
Item	Minimum Input Voltage for Regulated Output Voltage 最低レギュレーション電圧
Object	+5V60A

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

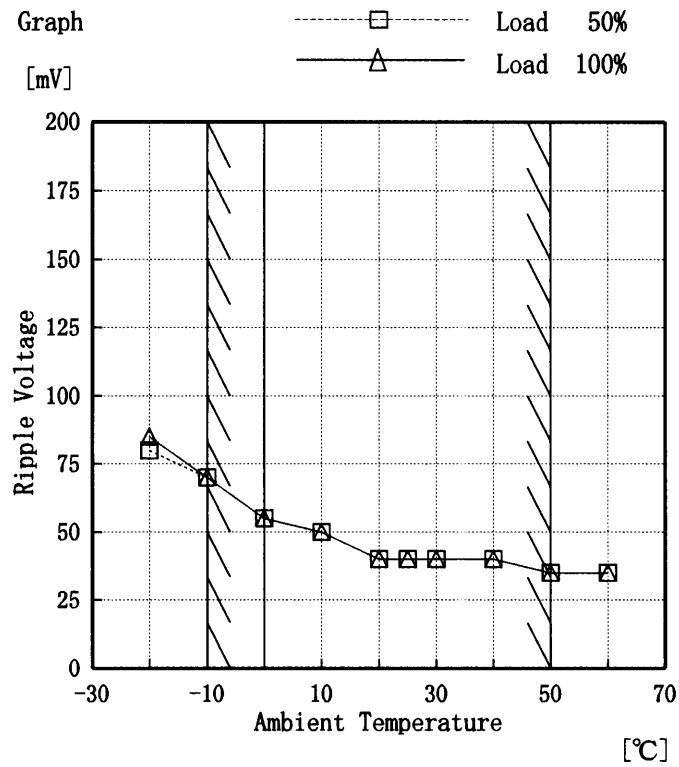
Ambient Temp. [℃]	Load 50% Input Volt. [V]	Load 100% Input Volt. [V]
-20	65	66
-10	65	66
0	65	66
10	65	66
20	65	66
25	65	66
30	65	66
40	65	66
50	65	67
60	64	67
—	—	—

COSEL

Model	PAA300F-5
Item	Ripple Voltage (by Ambient Temp.) リップル電圧 (周囲温度特性)
Object	+5V60A

Testing Circuitry Figure A

1. Graph



Input Volt. 100 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

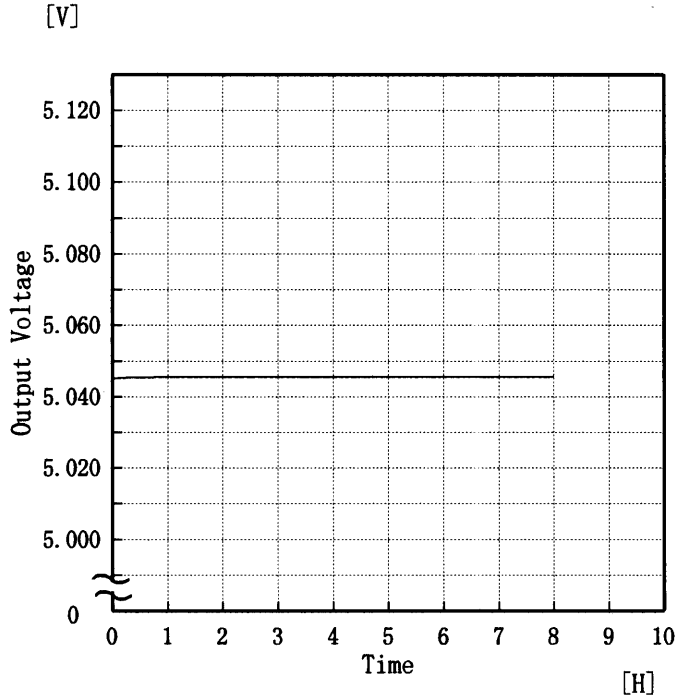
Ambient Temp. [℃]	Load 50% Ripple Output Volt. [mV]	Load 100% Ripple Output Volt. [mV]
-20	80	85
-10	70	70
0	55	55
10	50	50
20	40	40
25	40	40
30	40	40
40	40	40
50	35	35
60	35	35
—	—	—

COSEL

Model	PAA300F-5
Item	Time Lapse Drift 経時ドリフト
Object	+5V60A

Temperature 25 ℃
Testing Circuitry Figure A

1. Graph



Input Volt. 100V
Load 100%

2. Values

Time since start [H]	Output Voltage [V]
0.0	5.045
0.5	5.045
1.0	5.046
2.0	5.046
3.0	5.046
4.0	5.046
5.0	5.046
6.0	5.046
7.0	5.046
8.0	5.046

COSEL

Model	PAA300F-5	
Item	Output Voltage Accuracy 定電圧精度	Testing Circuitry Figure A
Object	+5V60A	

Output Voltage Accuracy

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

Temperature : -10～50 ℃
Input Voltage : 85～132 V
Load Current : 0～60 A

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

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

定電圧精度

温度、入力電圧、負荷を下記仕様内で、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 85～132 V
負過電流 0～60 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

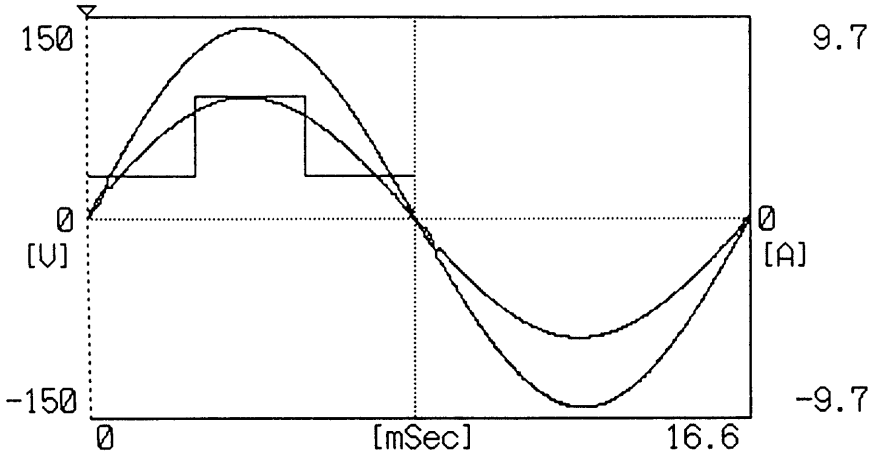
$$\text{* 定電圧精度(変動率)} = \frac{\text{変動値}}{\text{定格出力電圧}} \times 100$$

Item	Temperature [℃]	Input Voltage [V]	Output Current [A]	Output Voltage [V]	Output Voltage Accuracy [mV]	Output Voltage Accuracy (Ration) [%]
Maximum Voltage	25	132	0	5.052	±4	±0.080
Minimum Voltage	-10	85	60	5.043		

COSEL

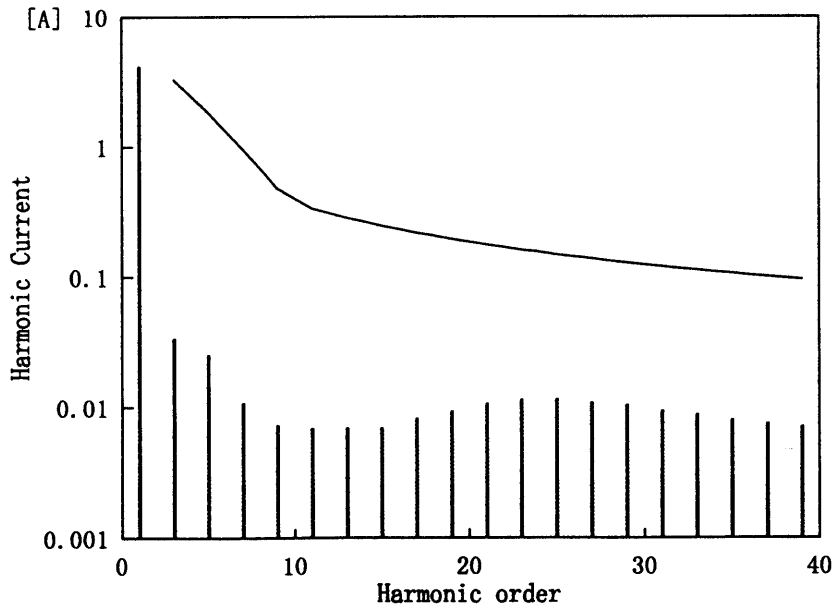
Model	PAA300F-5		
Item	Harmonic Current 高調波電流	Temperature Testing Circuitry	25℃ Figure E
Object	———		

1. Input Current Waveform



Conditions	Values
Input Voltage [V]	98.5
Input Current [A]	4.21
Active Power [W]	413.7
Apparent Power[VA]	414.4
Frequency [Hz]	60
Power Factor	0.998
Output Power [W]	300

2. Harmonic Current



——— Harmonic Current
高調波電流

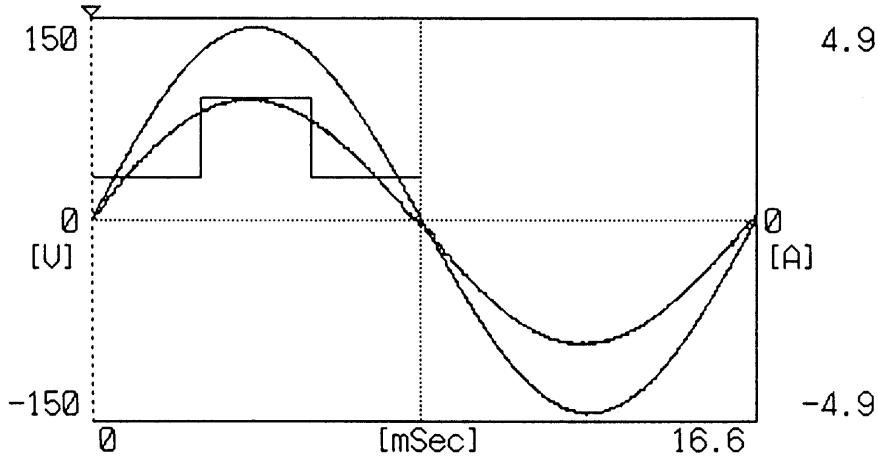
——— Limits for Class D equipment
クラスDの機器に対する限度値

Harmonics order 高調波次数	Limits 限度値 [A]	Values 測定値 [A]
1	—	4.20600
2	—	0.00082
3	3.28440	0.03420
4	—	0.00023
5	1.83540	0.02547
6	—	0.00023
7	0.96600	0.01084
8	—	0.00035
9	0.48300	0.00738
10	—	0.00036
11	0.33810	0.00692
12	—	0.00026
13	0.28608	0.00697
14	—	0.00035
15	0.24794	0.00702
16	—	0.00034
17	0.21877	0.00824
18	—	0.00030
19	0.19574	0.00938
20	—	0.00034
21	0.17710	0.01075
22	—	0.00028
23	0.16170	0.01150
24	—	0.00036
25	0.14876	0.01157
26	—	0.00025
27	0.13774	0.01092
28	—	0.00033
29	0.12824	0.01049
30	—	0.00023
31	0.11997	0.00948
32	—	0.00030
33	0.11270	0.00885
34	—	0.00021
35	0.10626	0.00808
36	—	0.00024
37	0.10052	0.00759
38	—	0.00032
39	0.09536	0.00715
40	—	0.00030

COSEL

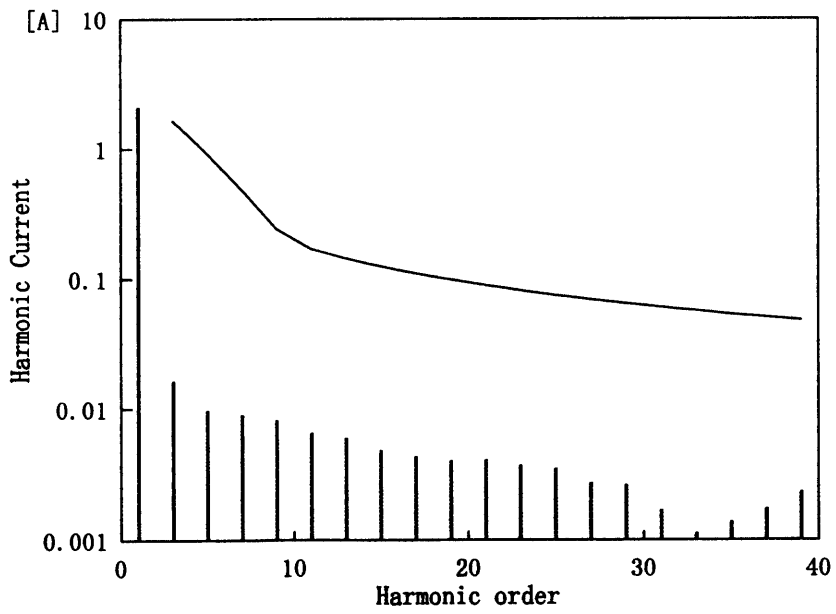
Model	PAA300F-5		
Item	Harmonic Current 高調波電流	Temperature Testing Circuitry	25℃ Figure E
Object	————		

1. Input Current Waveform



Conditions	Values
Input Voltage [V]	99.6
Input Current [A]	2.12
Active Power [W]	210.8
Apparent Power[VA]	211.4
Frequency [Hz]	60
Power Factor	0.997
Output Power [W]	150

2. Harmonic Current



——— Harmonic Current
高調波電流

——— Limits for Class D equipment
クラスDの機器に対する限度値

Harmonics order 高調波次数	Limits 限度値 [A]	Values 測定値 [A]
1	—	2.12000
2	—	0.00044
3	1.65508	0.01659
4	—	0.00045
5	0.92490	0.00980
6	—	0.00035
7	0.48679	0.00905
8	—	0.00055
9	0.24339	0.00832
10	—	0.00036
11	0.17038	0.00666
12	—	0.00049
13	0.14416	0.00605
14	—	0.00052
15	0.12494	0.00486
16	—	0.00048
17	0.11024	0.00434
18	—	0.00048
19	0.09864	0.00403
20	—	0.00052
21	0.08924	0.00411
22	—	0.00051
23	0.08148	0.00376
24	—	0.00040
25	0.07497	0.00354
26	—	0.00046
27	0.06941	0.00275
28	—	0.00047
29	0.06463	0.00265
30	—	0.00058
31	0.06046	0.00169
32	—	0.00047
33	0.05679	0.00113
34	—	0.00049
35	0.05355	0.00138
36	—	0.00072
37	0.05065	0.00174
38	—	0.00036
39	0.04805	0.00234
40	—	0.00041

COSEL

Model	PAA300F-5
Item	Condensation 結露特性
Object	+5V60A

Testing Circuitry Figure A

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.

④ Repeating ①, ② and ③ three times.

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３度行い、異常のないことを確認する。

2．Values

	Times	Output Voltage [V]	Ripple Voltage [mV]	Ripple Noise [mV]
Load 50 %	1	5.051	45	50
	2	5.051	45	50
	3	5.051	45	50
Load 100 %	1	5.050	45	60
	2	5.050	45	60
	3	5.050	45	60

Input Volt. 100 V

COSEL

Model	PAA300F-5	
Item	Leakage Current 漏洩電流	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	0.15	0.18	0.23
(B) UL	0.14	0.17	0.22
(C) CSA	0.14	0.17	0.22

Standards	Leakage Current [mA]		
	Input Volt. 170 [V]	Input Volt. 220 [V]	Input Volt. 264 [V]
(D) VDE	—	—	—

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。

Load 100 %

COSEL

Model	PAA300F-5
Item	Line Noise Tolerance 入力雑音耐量
Object	+5V60A

Testing Circuitry Figure C

1. Results

Pulse Width [nS]	MODE	Operating Point of Overvoltage Protection [V] 過電圧保護動作値	DC-like Regulation of Output Voltage 出力電圧の直流的変動
50	COMMON	6.51	no regulation
	NORMAL	6.52	no regulation
1000	COMMON	6.51	no regulation
	NORMAL	6.52	no regulation

Conditions

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

COSEL

Model	PAA300F-5
Item	Conducted Emission 雑音端子電圧
Object	————————

Testing Circuitry Figure D

1. Graph

Remarks

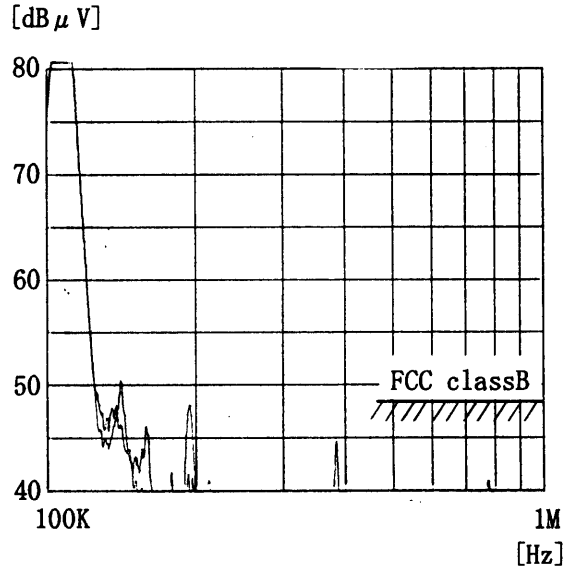
Input Volt. 120 V

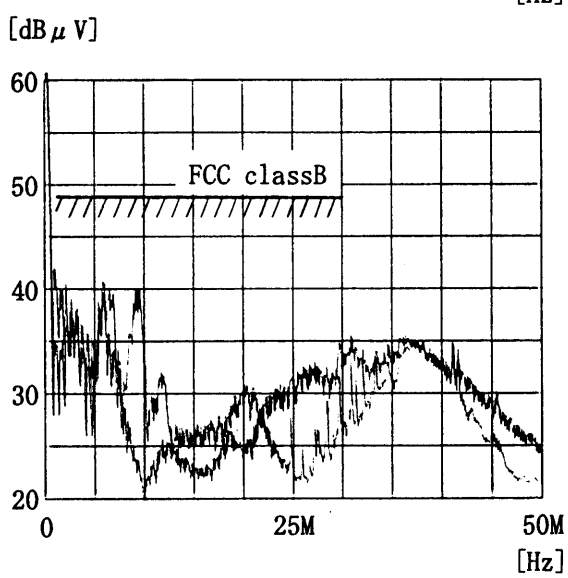
Load 100 %

Note: Slanted line shows the range of Tolerance.

(注)斜線は許容値を示す。

NO	Standards	Standards Complied	Frequency [MHz]	Tolerance [dB/μV]
1	FCC Class A		0.45～1.6	60
			1.6～30	69.5
2	FCC Class B	○	0.45～30	48
3	VCCI -1		0.15～0.5	79
			0.5～30	73
4	VCCI -2	○	0.15～0.5	66-56
			0.5～5	56
			5～30	60
5	VDE Class A		0.01～0.15	91-69.5
			0.15～0.5	66
			0.5～30	60
6	CISPR22 Class B		0.15～0.5	66-56
			0.5～5	56
			5～30	60





COSEL

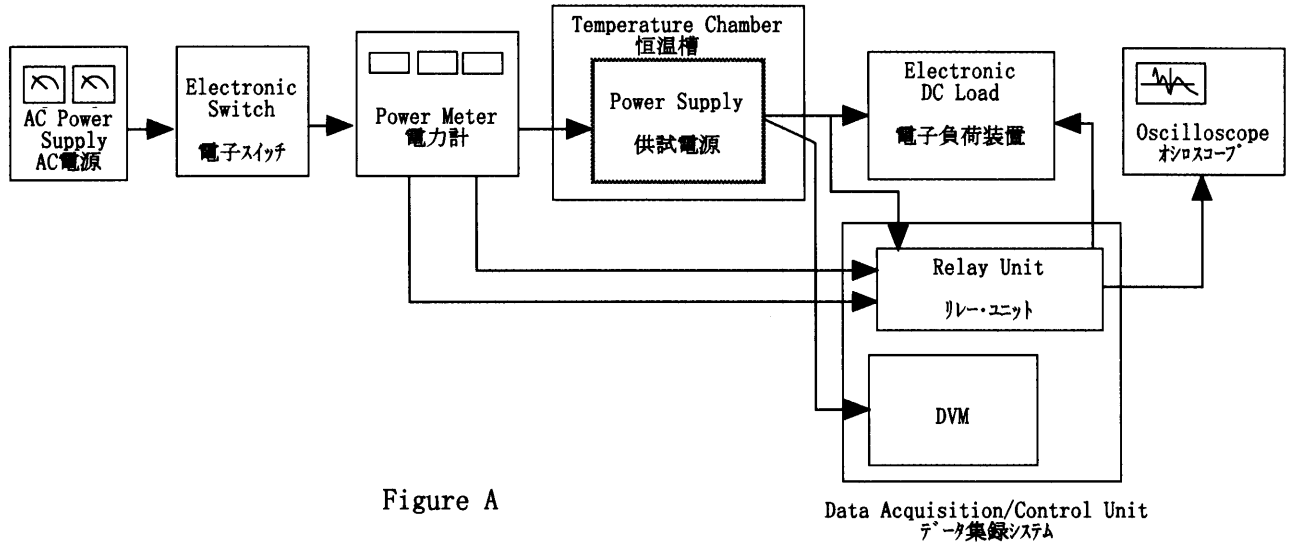


Figure A

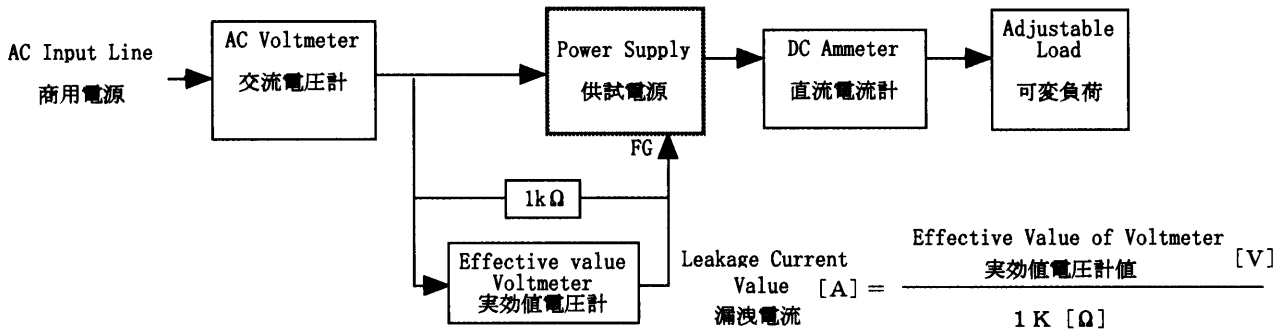


Figure B(DENTORI)

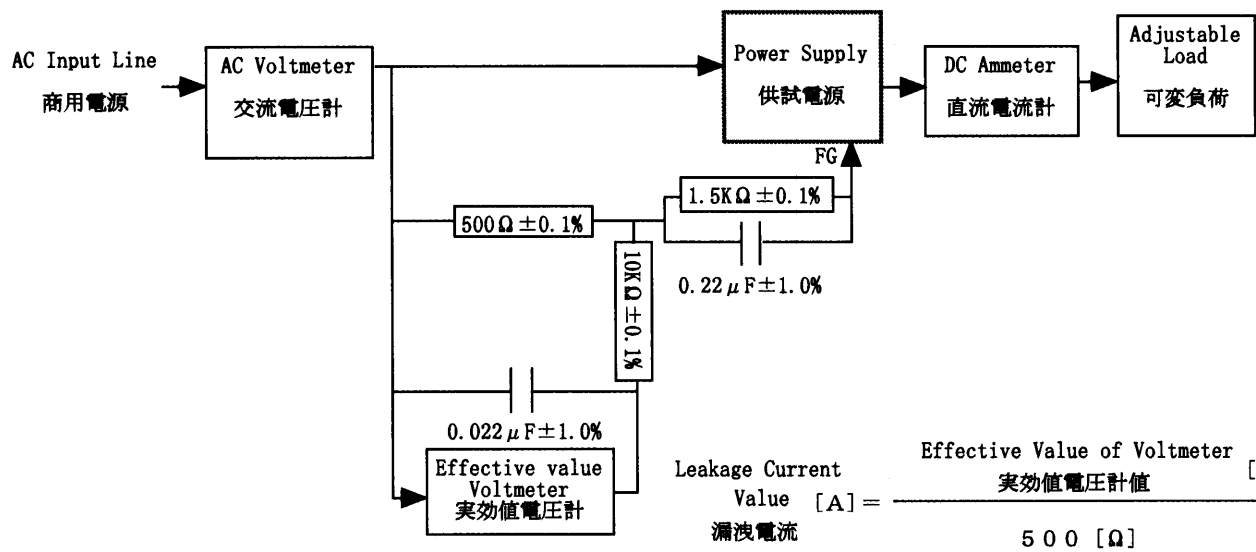


Figure B (UL, CSA, VDE)

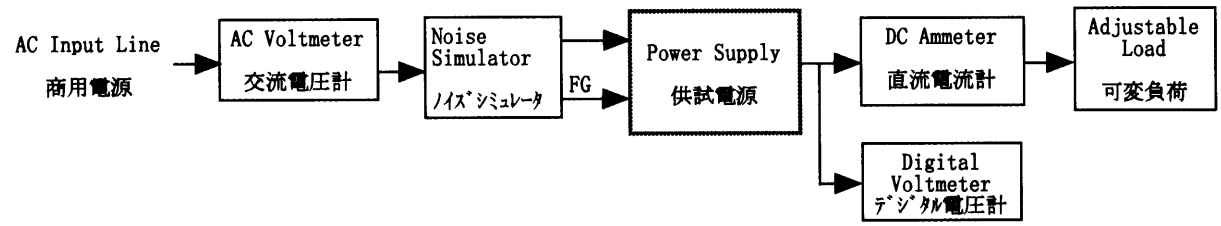


Figure C

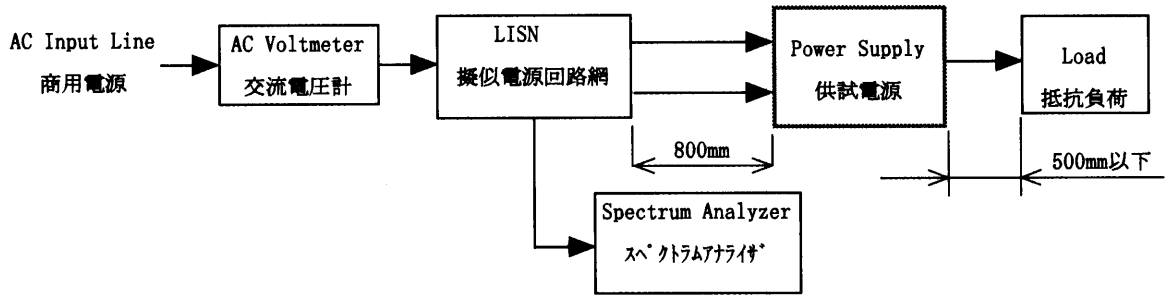


Figure D

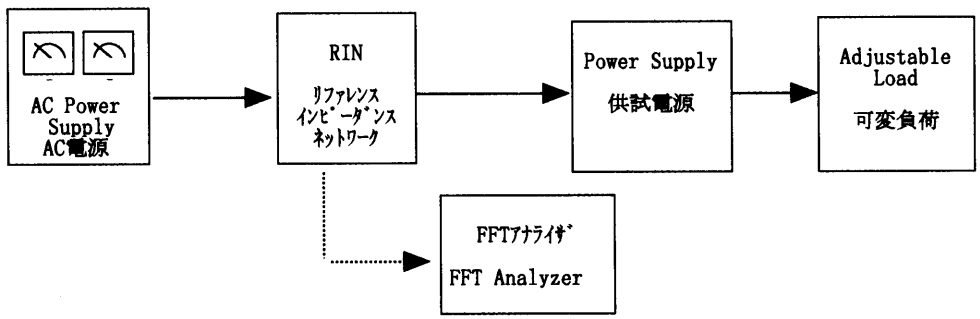


Figure E