COSEL

TEST DATA OF VAA505
(100V   INPUT)

Regulated DC Power Supply

Date : Dec. 26. 1997

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COSEL CO., LTD.

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Model	VAA505.
Item	Line Regulation　静的入力変動
Object	＋5.0Ｖ1.00Ａ

Temperature　　　　25℃
Testing Circuitry　　Figure A

1. Graph

```
-----□----- Load  50%
———△——— Load  100%
```

[V]

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	5.141	5.139
80	5.141	5.139
85	5.141	5.139
90	5.141	5.139
100	5.141	5.139
110	5.141	5.139
120	5.141	5.139
132	5.141	5.139
140	5.141	5.139

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Model	VAA505.
Item	Input Current (by Load Current) 入力電流（負荷特性）
Output	————

Temperature	25℃
Humidity	40%RH
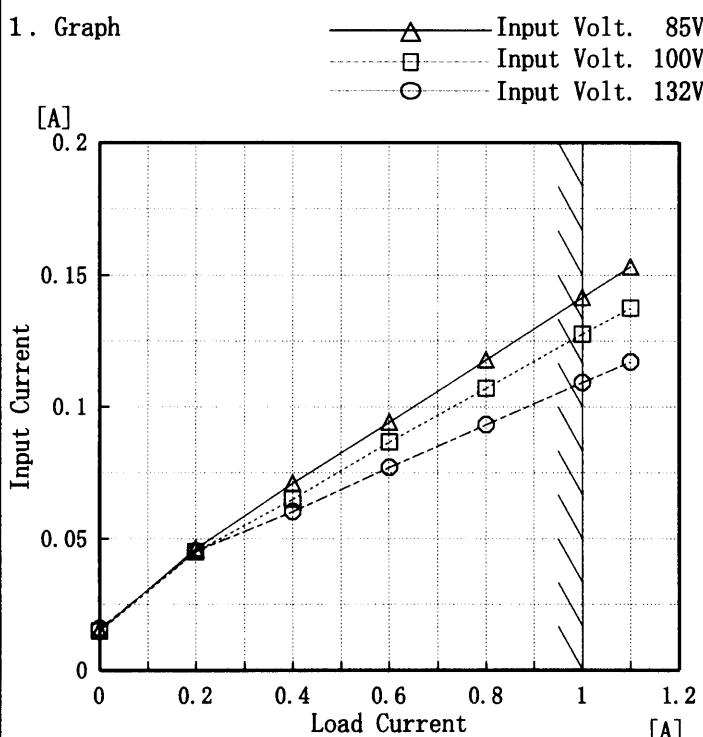
1．Graph

———△——— Input Volt. 85V
·······□······· Input Volt. 100V
—·—○—·— Input Volt. 132V

[A]

Input Current

Load Current [A]

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	Input Current		[A]
[A]	Input Volt. 85[V]	Input Volt. 100[V]	Input Volt. 132[V]
0.0	0.015	0.015	0.016
0.2	0.046	0.045	0.045
0.4	0.071	0.065	0.060
0.6	0.094	0.087	0.077
0.8	0.118	0.107	0.093
1.0	0.142	0.128	0.109
1.1	0.153	0.138	0.117
—	—	—	—
—	—	—	—
—	—	—	—
—	—	—	—
—	—	—	—

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Model	VAA505.
Item	Input Power (by Load Current) 入力電力 (負荷特性)
Output	————

Temperature	25℃
Humidity	40%RH

1. Graph

Input Volt. 85V (△)
Input Volt. 100V (□)
Input Volt. 132V (○)

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。
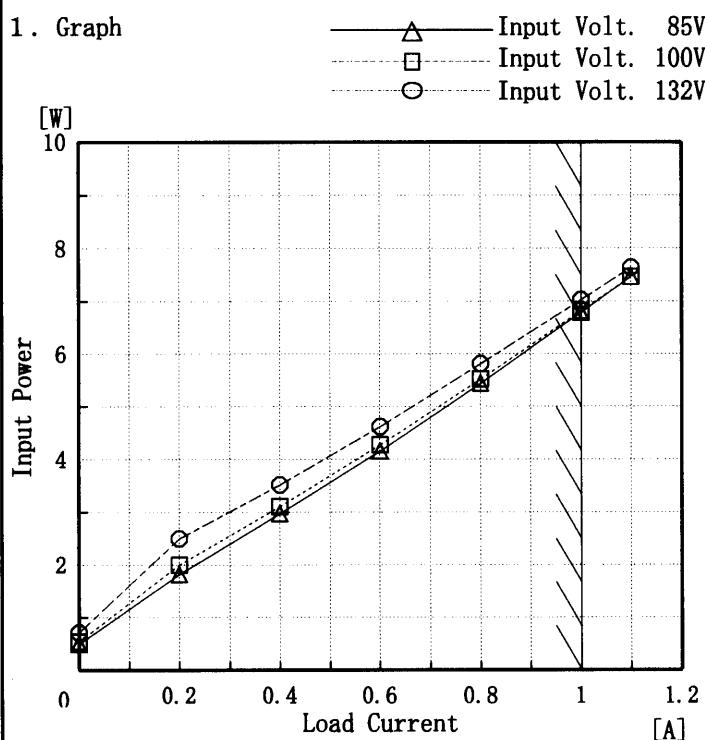
2. Values

Load Current	Input Power		[W]
	Input Volt.	Input Volt.	Input Volt.
[A]	85[V]	100[V]	132[V]
0.0	0.49	0.54	0.71
0.2	1.81	2.00	2.50
0.4	2.97	3.11	3.52
0.6	4.15	4.27	4.62
0.8	5.44	5.52	5.81
1.0	6.78	6.81	7.02
1.1	7.46	7.46	7.63
—	—	—	—
—	—	—	—
—	—	—	—
—	—	—	—
—	—	—	—

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Model	VAA505.
Item	Efficiency (by Input Voltage) 効率（入力電圧特性）
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]	Load 50% Efficiency [%]	Load 100% Efficiency [%]
75	73.3	74.7
80	72.4	75.1
85	71.7	75.2
90	70.9	75.2
100	69.2	75.0
110	67.3	74.4
120	65.3	73.7
132	62.9	72.7
140	61.1	71.9

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Model	VAA505.
Item	Efficiency (by Load Current) 効率（負荷電流特性）
Output	

Temperature	25℃
Humidity	40%RH

1. Graph

Input Volt. 85V
Input Volt. 100V
Input Volt. 132V

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	Efficiency	[%]	
	Input Volt.	Input Volt.	Input Volt.
[A]	85[V]	100[V]	132[V]
0.2	55.6	50.4	40.3
0.4	68.7	65.7	58.0
0.6	73.6	71.5	66.1
0.8	75.2	74.1	70.4
1.0	75.2	74.9	72.7
1.1	75.0	75.0	73.3
―	―	―	―
―	―	―	―
―	―	―	―
―	―	―	―
―	―	―	―
―	―	―	―

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Model	VAA505.
Item	Power Factor (by Input Voltage) 力率（入力電圧特性）
Object	
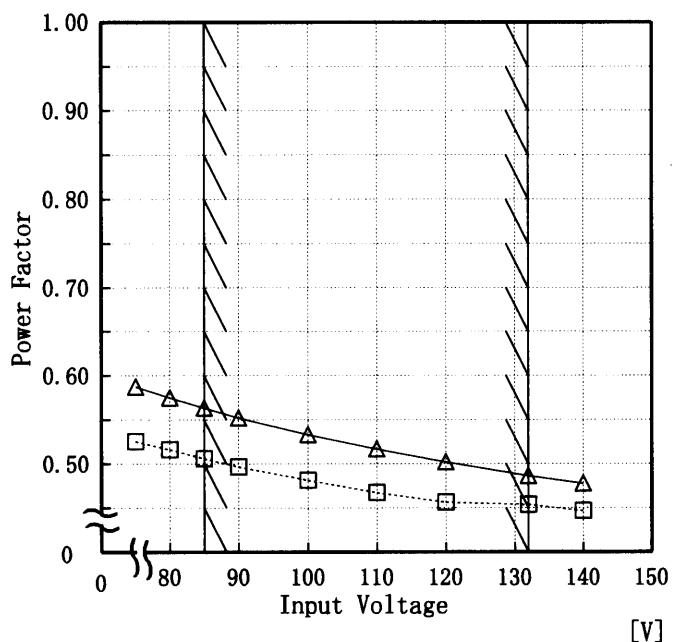
Temperature	25℃
Testing Circuitry	Figure A

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]	load 50% Power Factor	load 100% Power Factor
75	0.53	0.59
80	0.52	0.57
85	0.51	0.56
90	0.50	0.55
100	0.48	0.53
110	0.47	0.52
120	0.46	0.50
132	0.45	0.49
140	0.45	0.48

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Model	VAA505.
Item	Power Factor (by Load Current) 力率（負荷電流特性）
Output	————

Temperature   25℃
Humidity   40%RH

1. Graph

———△——— Input Volt. 85V
······□······ Input Volt. 100V
——○—— Input Volt. 132V

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	Power Factor		
	Input Volt.	Input Volt.	Input Volt.
[A]	85[V]	100[V]	132[V]
—	0.38	0.36	0.34
0.2	0.46	0.44	0.42
0.4	0.49	0.48	0.44
0.6	0.52	0.49	0.45
0.8	0.54	0.51	0.47
1.0	0.56	0.53	0.49
1.1	0.57	0.54	0.49
—	—	—	—
—	—	—	—
—	—	—	—
—	—	—	—
—	—	—	—

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Model	VAA505.
Item	Hold-Up Time　出力保持時間
Object	＋5.0V1.00A

Temperature　　　　　25℃
Testing Circuitry　　Figure A

1. Graph
　　────△──── Load　50%
　　┄┄┄□┄┄┄ Load　100%

[mS]

Hold-Up Time

Input Voltage [V]

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]	Load　50% Hold-Up Time [mS]	Load　100% Hold-Up Time [mS]
75	39	13
80	46	16
85	53	20
90	60	24
100	75	32
110	92	42
120	110	52
132	134	65
140	150	74

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参考資料

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Model	VAA505.
Item	Instantaneous Interruption Compensation 瞬時停電保障
Object	＋5.0V1.00A
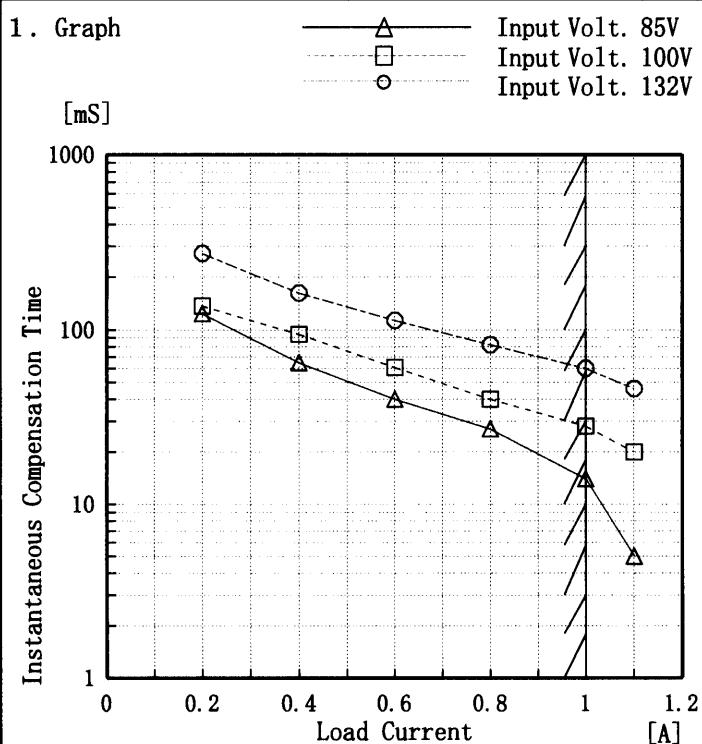
Testing Circuitry　Figure A

1．Graph

△ Input Volt. 85V
□ Input Volt. 100V
○ Input Volt. 132V

Instantaneous Compensation Time [mS] vs Load Current [A]

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]	Input Volt. 85[V]	Input Volt. 100[V]	Input Volt. 132[V]
	Time [mS]		
0.0	—	—	—
0.2	124	137	273
0.4	65	94	163
0.6	40	61	113
0.8	27	40	82
1.0	14	28	60
1.1	5	20	46
—	—	—	—
—	—	—	—
—	—	—	—
—	—	—	—

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Model	VAA505.
Item	Load Regulation 静的負荷変動
Object	＋5.0V1.00A
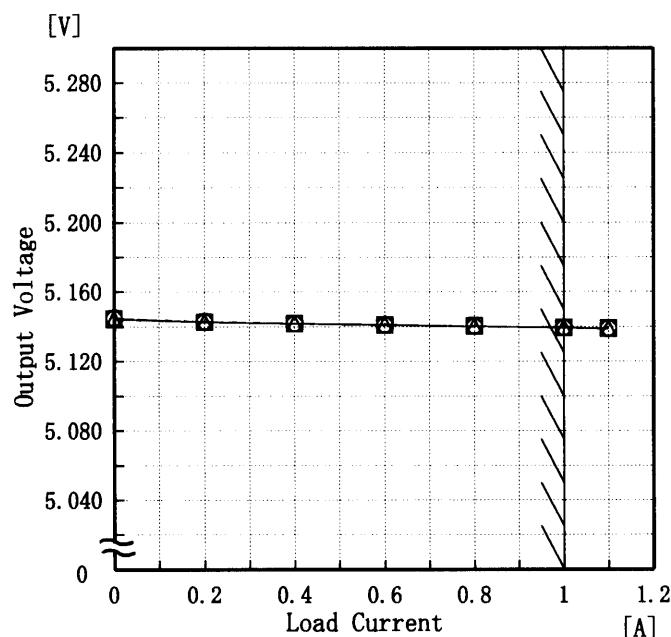
Temperature　　　　25℃
Testing Circuitry　　Figure A

1. Graph

Input Volt. 85V
Input Volt. 100V
Input Volt. 132V

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	5.144	5.145	5.145
0.2	5.143	5.143	5.143
0.4	5.142	5.142	5.142
0.6	5.141	5.141	5.141
0.8	5.140	5.140	5.140
1.0	5.139	5.140	5.139
1.1	5.139	5.139	5.139
—	—	—	—
—	—	—	—
—	—	—	—

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Model	VAA505
Item	Ripple Voltage(by Load Current) リップル電圧(負荷電流特性)
Object	+5V1.0A

Temperature	25℃
Testing Circuitry	Figure A

1. Graph

```
--------□--------  Input Volt. 85V
--------△--------  Input Volt. 132V
```

[mV]

Load Current [A]

Ripple Voltage 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]	Input Volt. 85 [V] Ripple Output Volt. [mV]	Input Volt. 132 [V] Ripple Output Volt. [mV]
0.0	23	42
0.1	12	13
0.2	15	15
0.4	16	17
0.6	18	19
0.8	19	20
1.0	28	20
1.2	47	20
—	—	—
—	—	—
—	—	—

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
    スイッチング周期
```


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

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Model	VAA505
Item	Ripple-Noise　リップルノイズ
Object	＋5V1.0A

Temperature　　　　25℃
Testing Circuitry　　Figure A

1．Graph

- - - - - ⊡ - - - - - 　Input Volt. 85V

———△———　Input Volt. 132V

[mV]

Ripple-Noise

Load Current　　　[A]

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。
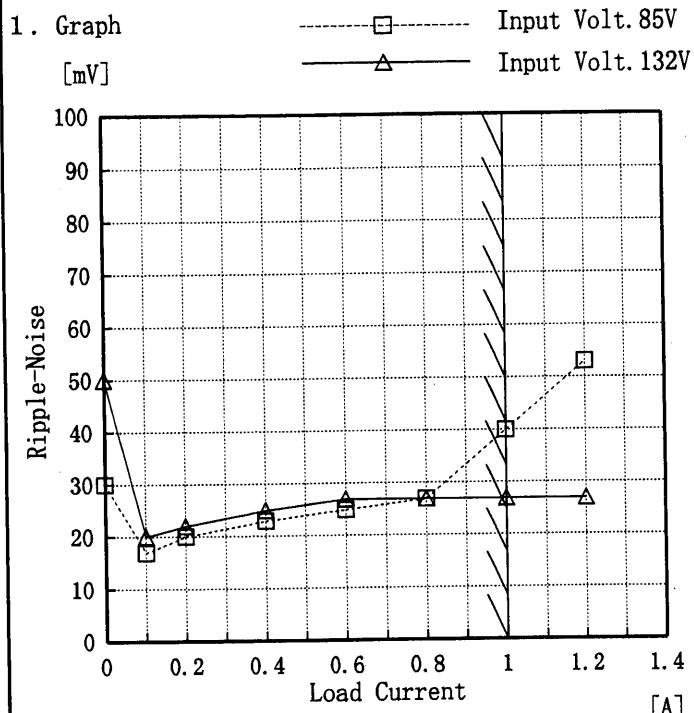
2．Values

Load current [A]	Input Volt. 85 [V] Ripple-Noise [mV]	Input Volt. 132 [V] Ripple-Noise [mV]
0.0	30	50
0.1	17	20
0.2	20	22
0.4	23	25
0.6	25	27
0.8	27	27
1.0	40	27
1.2	53	27
—	—	—
—	—	—
—	—	—

T1: Due to AC Input Line
　　入力商用周期
T2: Due to Switching
　　スイッチング周期

Ripple-Noise
[mVp-p]

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

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Model	VAA505.
Item	Overcurrent Protection 過電流保護
Object	＋5.0V1.00A

Temperature　　　25℃
Testing Circuitry　Figure A

1. Graph

　　　　　　　　　　·········· Input Volt. 85 V
　　　　　　　　　　────── Input Volt. 100 V
　　　　　　　　　　━━━━ Input Volt. 132 V

[V]

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。
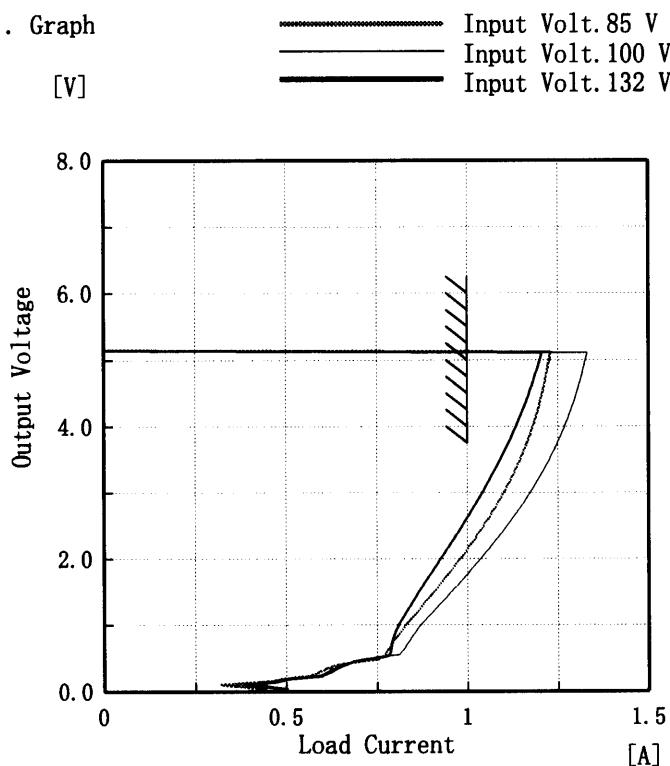
2. Values

Output Voltage [V]	Input Volt. 85[V] Load Current [A]	Input Volt. 100[V] Load Current [A]	Input Volt. 132[V] Load Current [A]
5.00	1.22	1.33	1.20
4.75	1.22	1.32	1.19
4.50	1.21	1.30	1.17
4.00	1.18	1.27	1.13
3.50	1.15	1.23	1.09
3.00	1.10	1.18	1.04
2.50	1.05	1.11	0.99
2.00	0.98	1.04	0.93
1.50	0.91	0.96	0.87
1.00	0.84	0.88	0.81
0.50	0.77	0.77	0.78
0.00	0.45	0.49	0.50

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Model	VAA505.		
Item	Inrush Current 突入電流	Temperature	25℃
		Testing Circuitry	Figure A
Object			

Input
Current

[20A/div]

Input
Voltage

[200V/div]

-50   0   50   100   150   200   250   300   350   400   450
Time

[mS]
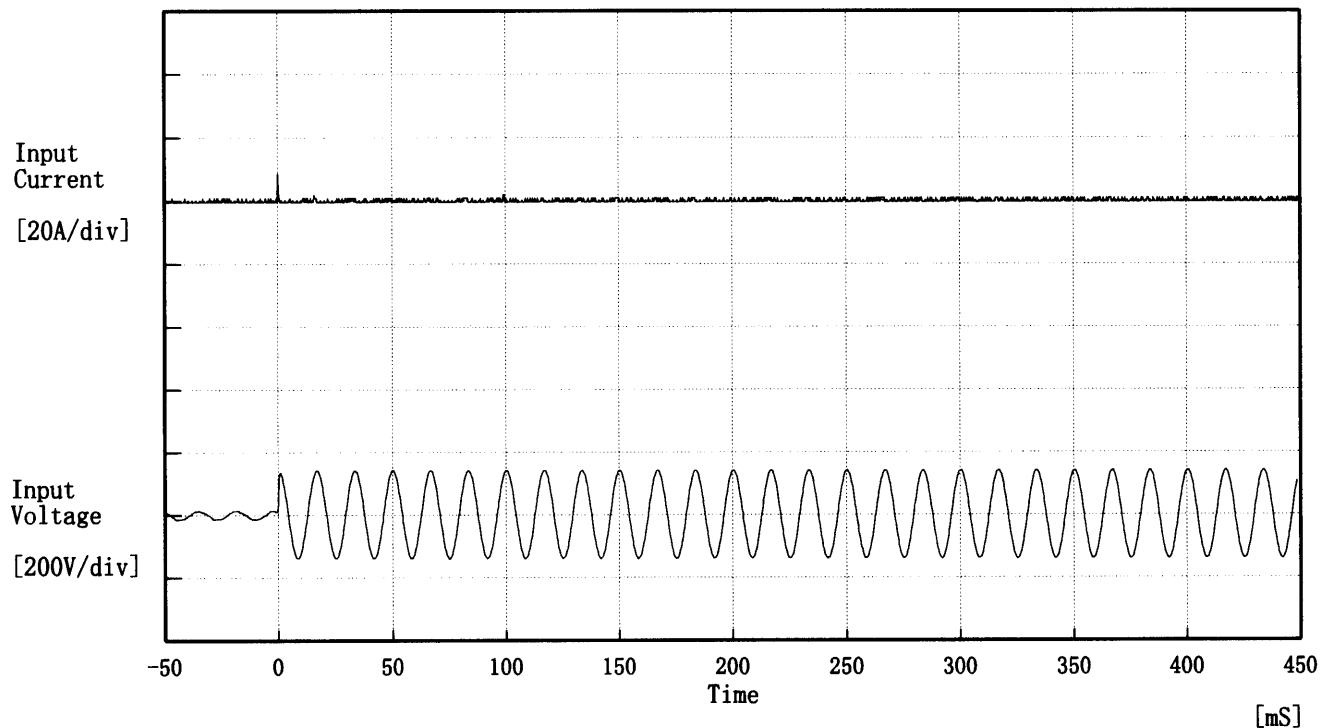
Input Voltage   100 V
Frequency   60 Hz
Load   100 %
Inrush Current
① 8.64 [A]
② 1.91 [A]

—14—

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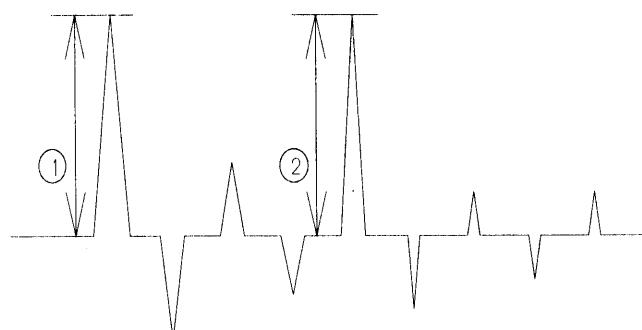
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Model	VAA505		Temperature	25℃
Item	Dynamic Load Responce 動的負荷変動		Testing Circuitry	Figure A
Object	+5V 1A			

Input Volt.　　100 V

Cycle　　　　1000 mS

Load Current

Load 0%　←→

Load 100 %
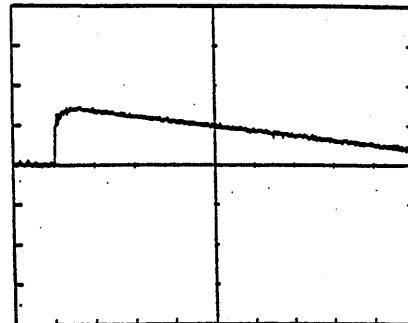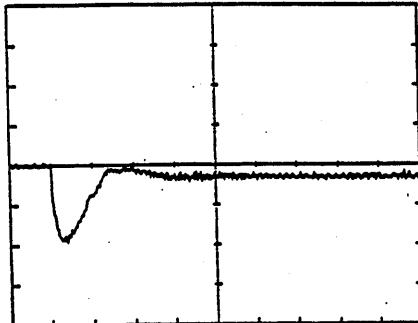
Load 0%　←→

Load 50 %

200 mV/div

0.5ms/div

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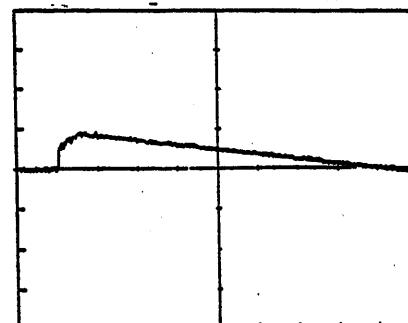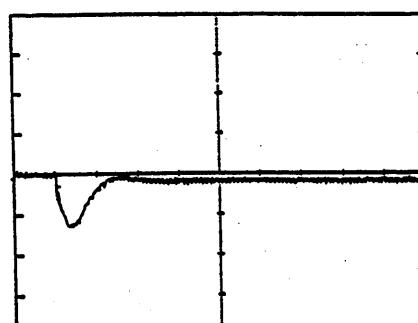
Model	VAA505.
Item	Rise and Fall Time 立上り、立下り時間
Object	＋5.0V1.00A

Temperature	25℃
Testing Circuitry	Figure A

1．Graph

Input Volt. 85 V

Load 50%

Output Voltage [1V/div]

0

Load 100%

Output Voltage [1V/div]

0

Input Voltage

0

[100V/DIV]

Time [50mS/div]

Time [20mS/div]
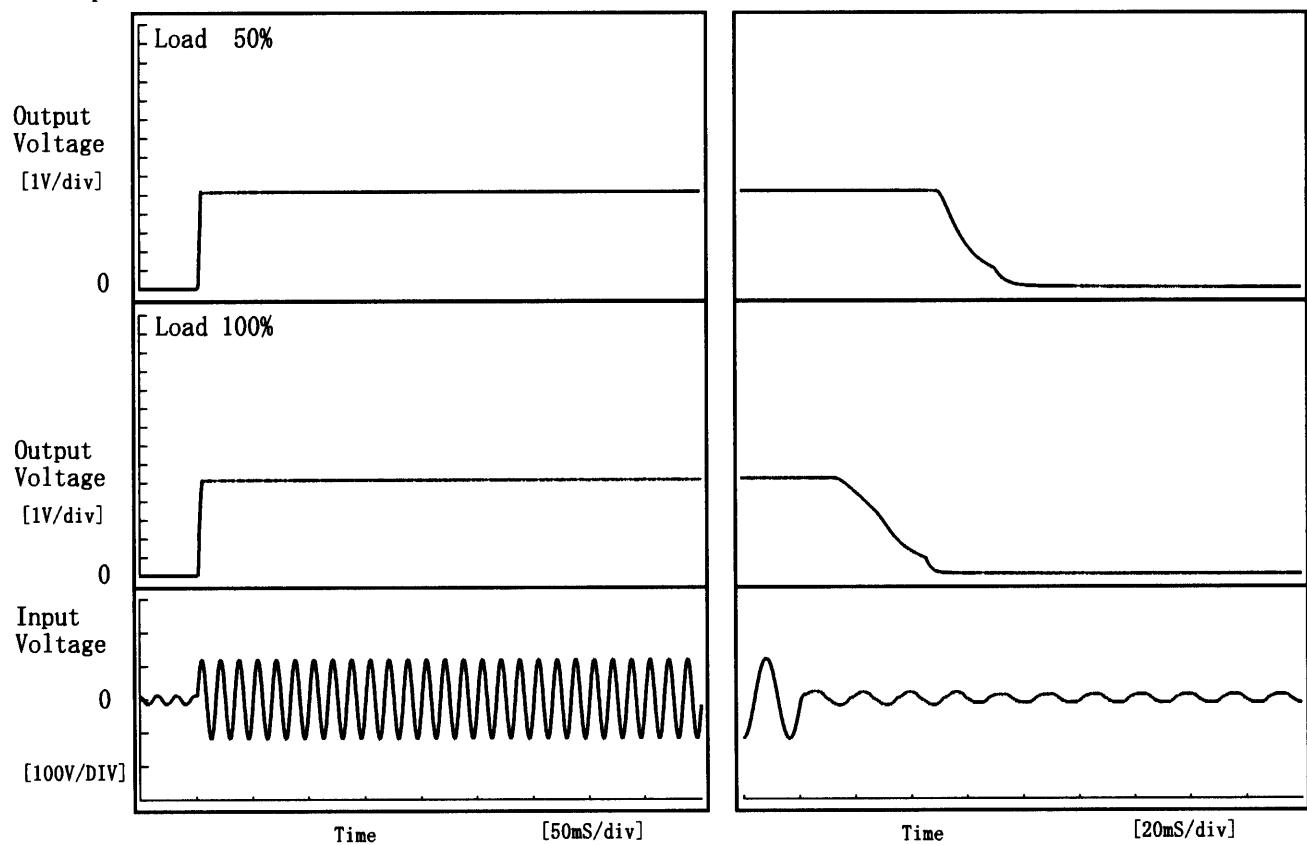
2．Values

[mS]

Load \ Time	T d	T r	T s	T h	T f
50 ％	1.5	2.5	4.0	52.7	21.0
100 ％	1.5	3.0	4.5	20.0	27.0

Output Volt.

90%

10%

Input Volt.

Td   Tr

Th   Tf

Ts

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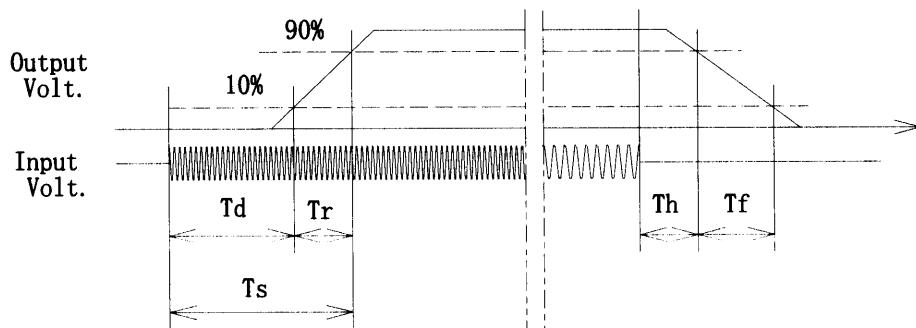
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Model	VAA505.
Item	Ambient Temperature Drift 周囲温度変動
Object	+5.0V1.00A
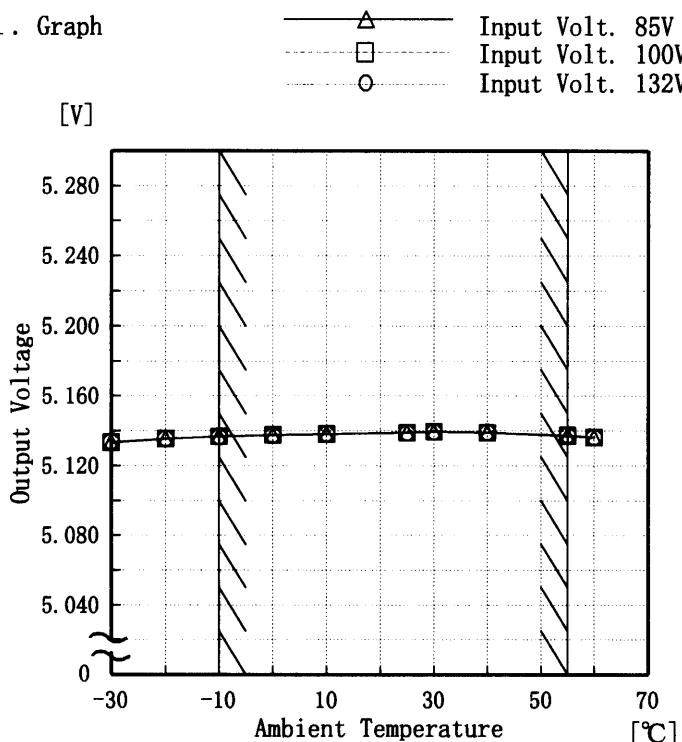
Testing Circuitry   Figure A

1. Graph

△ Input Volt. 85V
□ Input Volt. 100V
○ Input Volt. 132V

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]
−30	5.133	5.133	5.134
−20	5.135	5.136	5.136
−10	5.137	5.137	5.137
0	5.138	5.138	5.138
10	5.138	5.138	5.138
25	5.139	5.139	5.139
30	5.139	5.140	5.140
40	5.139	5.139	5.139
55	5.137	5.138	5.137
60	5.136	5.136	5.136
—	—	—	—

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Model	VAA505.
Item	Minimum Input Voltage for Regulated Output Voltage 最低レギュレーション電圧
Object	＋5.0V1.00A
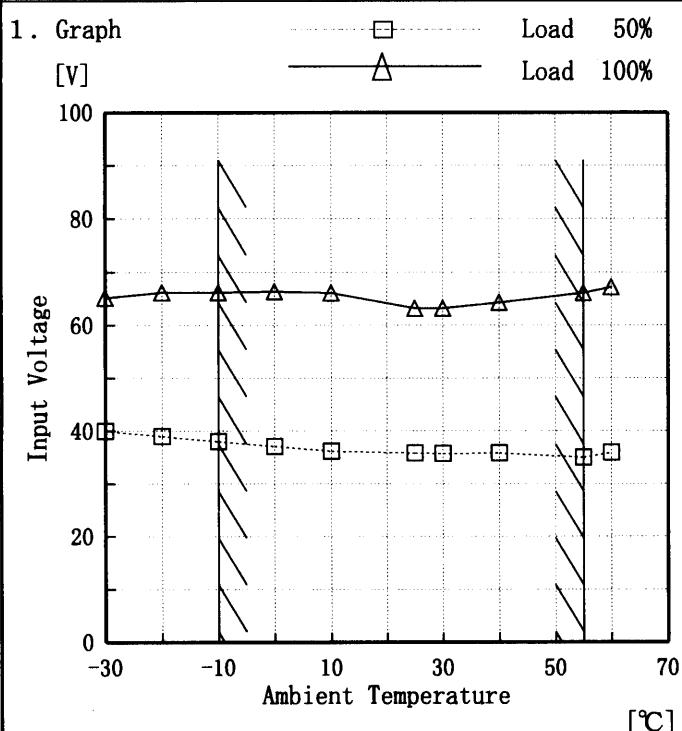
Testing Circuitry   Figure A

1. Graph

⊡ ······ Load 50%
△ —— Load 100%

[V]

Input Voltage vs Ambient Temperature

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]
−30	40	65
−20	39	66
−10	38	66
0	37	66
10	36	66
25	36	63
30	36	63
40	36	64
55	35	66
60	36	67
—	—	—

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Model	VAA505
Item	Ripple Voltage (by Ambient Temp.) リップル電圧 (周囲温度特性)
Object	＋5V1.0A

Testing Circuitry   Figure A

1. Graph

--------□-------- Load 50%

———△——— Load 100%

[mV]

Ambient Temperature [℃]
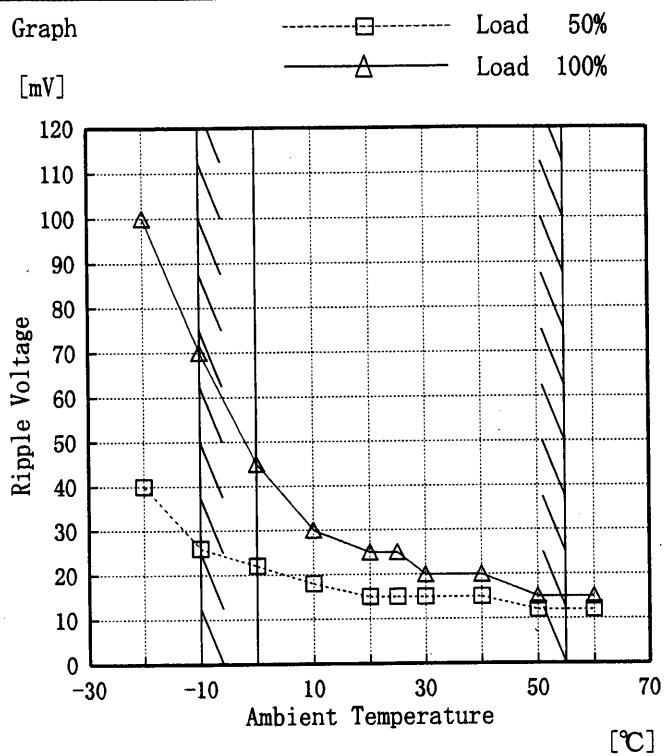
Input Volt. 85 V

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	40	100
−10	26	70
0	22	45
10	18	30
20	15	25
25	15	25
30	15	20
40	15	20
50	12	15
60	12	15
—	—	—

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Model	VAA505
Item	Time Lapse Drift 経時ドリフト
Object	＋5V1.0A

Temperature　　　25 ℃
Testing Circuitry　Figure A

1. Graph

[V]

Input Volt.　　100V
Load　　　　　100%
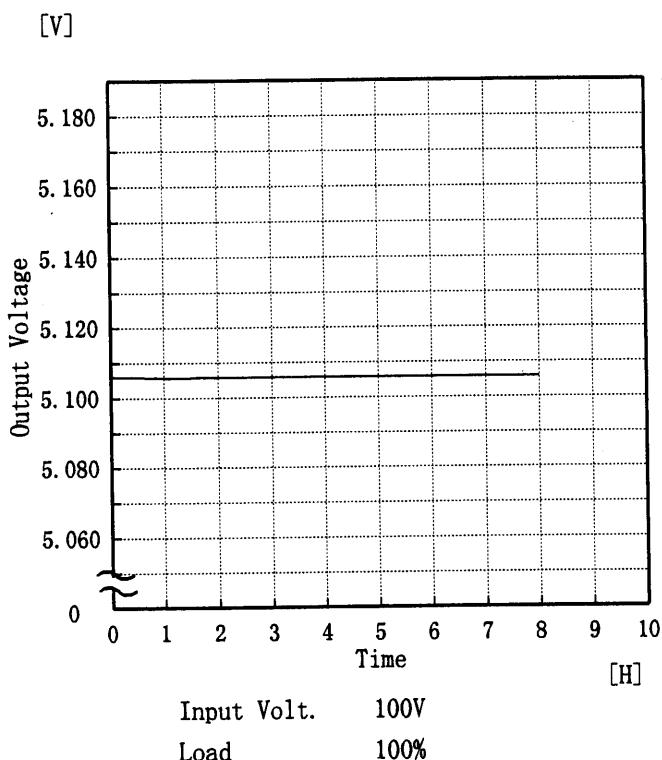
2.Values

Time since start [H]	Output Voltage [V]
0.0	5.107
0.5	5.106
1.0	5.106
2.0	5.106
3.0	5.106
4.0	5.106
5.0	5.106
6.0	5.106
7.0	5.106
8.0	5.106

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COSEL

Model	VAA505.
Item	Output Voltage Accuracy　定電圧精度
Object	＋5.0V1.00A

Testing Circuitry　Figure A

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　:　-10～55 ℃
Input Voltage：　85～132 V
Load Current　:　0.00～1.00 A

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

＊ Output Voltage Accuracy (Ration)　= $\dfrac{\text{Voltage Accuracy}}{\text{Rated Output Voltage}}$ ×100

定電圧精度

周囲温度、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　　　　-10～55 ℃
入力電圧　　　　85～132 V
負荷電流　　　　0.00～1.00 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

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

Item	Temperature [℃]	Input Voltage [V]	Output Current [A]	Output Voltage [V]	Output Voltage Accuracy [mV]	Output Voltage Accuracy(Ration) [%]
Maximum Voltage	25	132	0.00	5.145	±5	±0.1
Minimum Voltage	-10	85	1.00	5.137		

BC−3100

COSEL

Model	VAA505
Item	Oscillator Frequency 発振周波数
Object	+5.0V1A
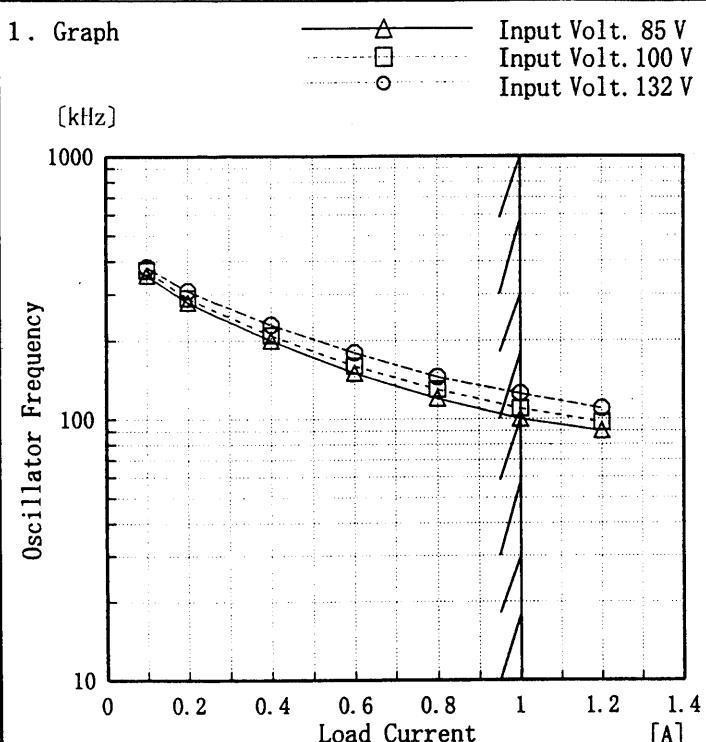
Testing Circuitry　　Figure A

1. Graph

　　　　△　　　Input Volt. 85 V
　　　　□　　　Input Volt. 100 V
　　　　○　　　Input Volt. 132 V

[kHz]

Oscillator Frequency

Load Current　　　　[A]

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 Curre-nt [A]	Input Volt. 85[V]	Input Volt. 100[V]	Input Volt. 132[V]
	Oscillator Frequency [kHz]		
0.1	355	370	380
0.2	280	290	310
0.4	200	210	230
0.6	150	160	180
0.8	120	130	145
1.0	100	110	125
1.2	90	97	110
—	—	—	—
—	—	—	—
—	—	—	—
—	—	—	—

BC-3100

COSEL

Model	VAA505
Item	Condensation　結露特性
Object	＋5V1.0A

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	5.120	15	25
	2	5.117	15	25
	3	5.119	15	25
Load 100 %	1	5.110	25	35
	2	5.112	25	35
	3	5.113	25	35

Input Volt. 100　V

BC−3100

CO$EL

Model	VAA505
Item	Leakage Current 漏洩電流
Object	———————

Testing Circuitry   Figure B

1. Results

	Leakage Current [mA]		
Standards	Input Volt. 85 [V]	Input Volt. 100 [V]	Input Volt. 132 [V]
(A) DENTORI	0.09	0.10	0.13
(B) U L	0.08	0.09	0.11
(C) C S A	0.08	0.09	0.11

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

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。

BC-3100

COSEL

Model	VAA505		
Item	Line Noise Tolerance 入力雑音耐量	Testing Circuitry	Figure C
Object	+5V1.0A		

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		no regulation
	NORMAL		no regulation
1000	COMMON		no regulation
	NORMAL		no regulation

Conditions

Input Voltage   :100 V

Pulse Voltage   :2000 V

Pulse Cycle   :10 mS

Pulse Input Duration:1 min. or more

Load   :100 %

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COSEL

Model	VAA505
Item	Conducted Emission 雑音端子電圧
Object	————————

Testing Circuitry　　　Figure D

1. Graph

Remarks

Input Volt. 　　100V 　　(VCCI-A, B)
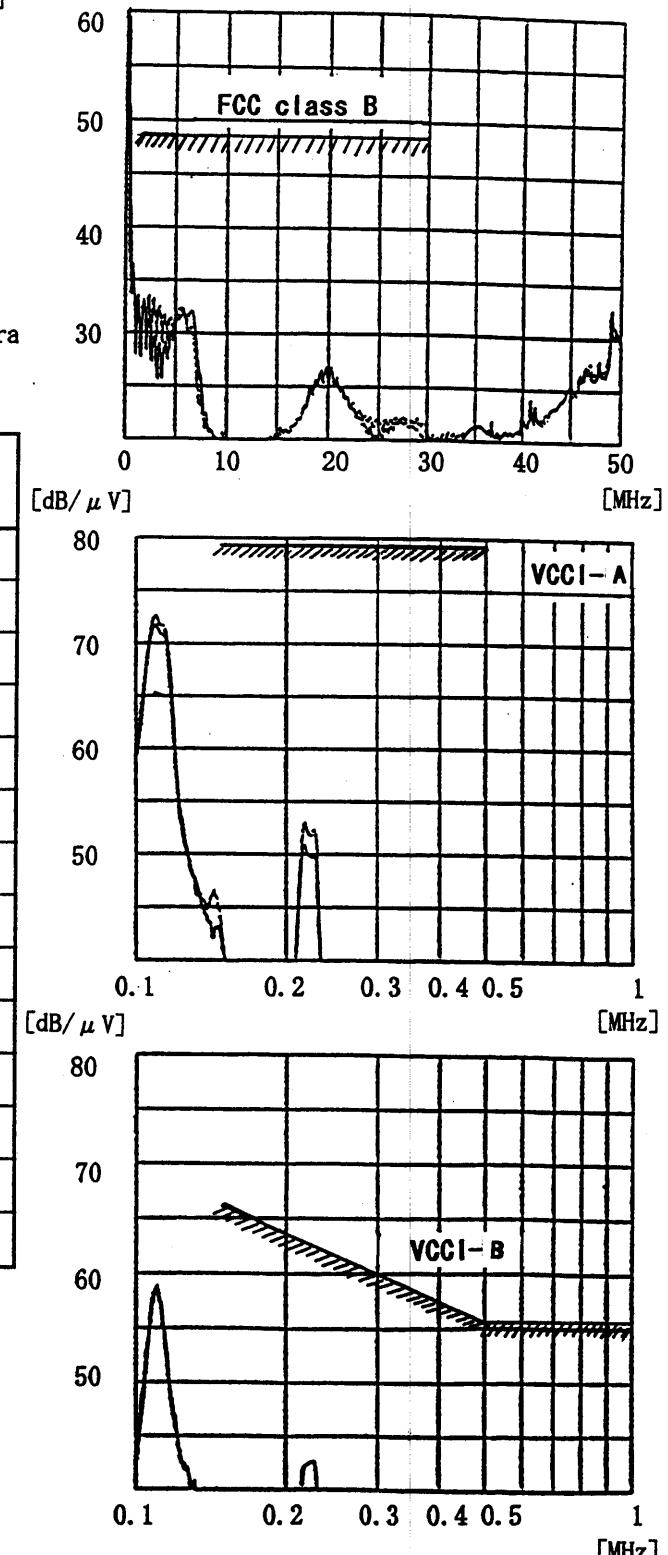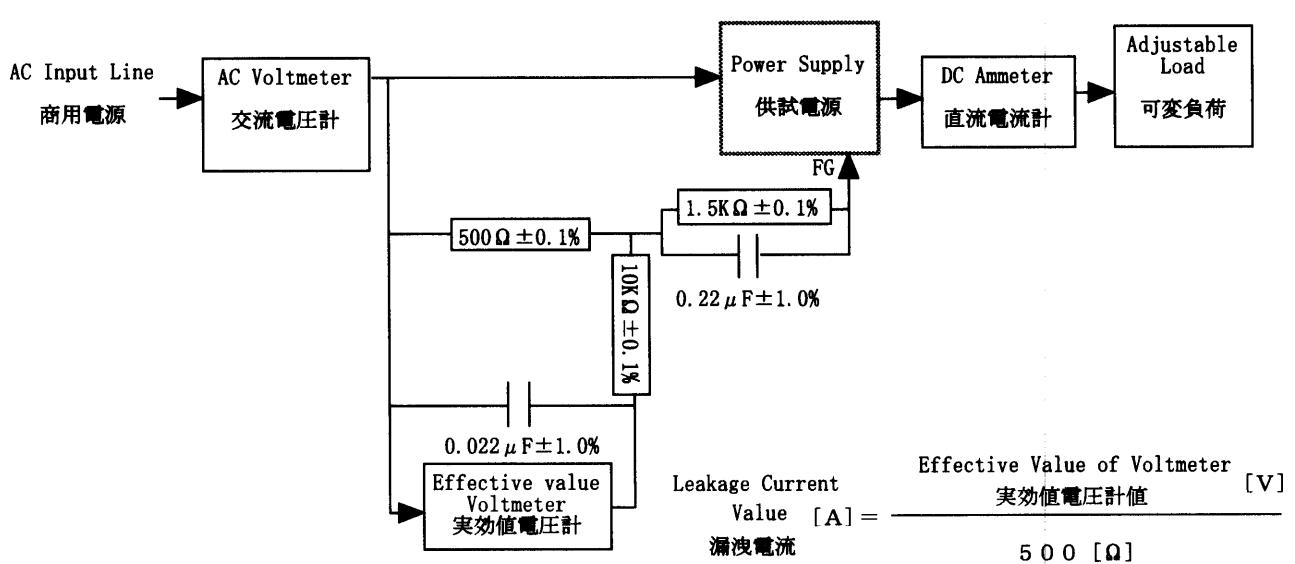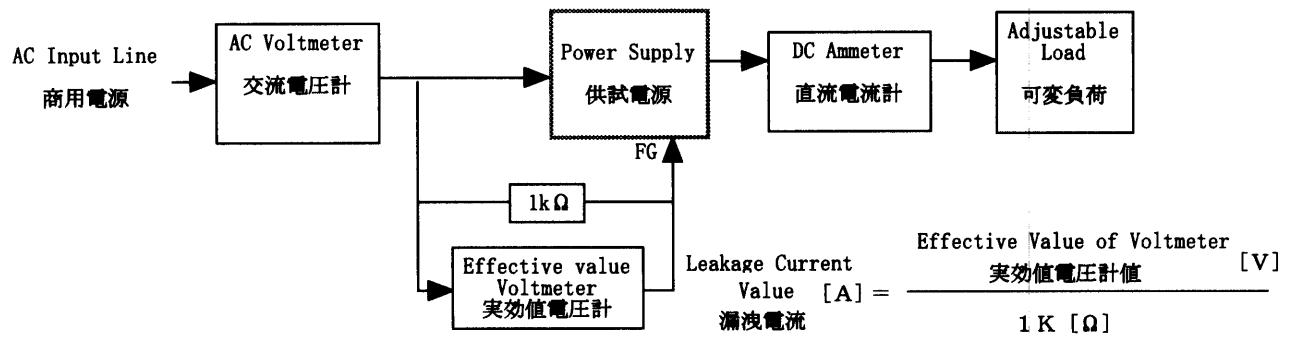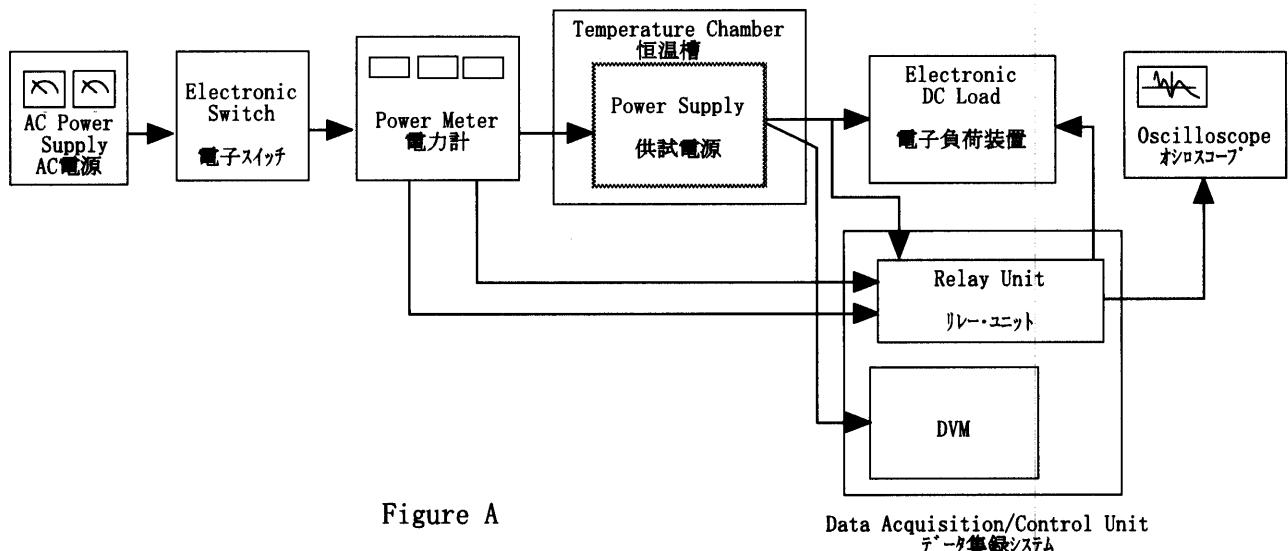
　　　　　　　　120V 　　(FCC class B)

Load 　　　　　100 %

Note: Slanted line shows the range of Tolera

(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 - A	○	0.15～0.5	79
			0.5～30	73
4	VCCI - B	○	0.15～0.5	66-56
			0.5～5	56
			5～30	60
5	CISPR Pub. 22 class A (EN55022)		0.15～0.5	79
			0.5～30	73
			–	–
6	CISPR Pub. 22 class B (EN55022)		0.15～0.5	66-56
			0.5～5	56
			5～30	60

注：外付けコンデンサでVCCI-B　対応可

　　　(0.47μF)

[dB/μV]

[dB/μV]

[dB/μV]

BC－3100

Figure A

$$\text{Leakage Current Value [A]} = \frac{\text{Effective Value of Voltmeter 実効値電圧計値 [V]}}{1\text{K}\,[\Omega]}$$

Figure B(DENTORI)

$$\text{Leakage Current Value [A]} = \frac{\text{Effective Value of Voltmeter 実効値電圧計値 [V]}}{500\,[\Omega]}$$

Figure B (UL, CSA, VDE)

BC-3100

COSEL

AC Input Line
商用電源
→ AC Voltmeter
交流電圧計
→ Noise
Simulator
ノイズシミュレータ
→ FG → Power Supply
供試電源
→ DC Ammeter
直流電流計
→ Adjustable
Load
可変負荷

Digital
Voltmeter
デジタル電圧計

Figure C

AC Input Line
商用電源
→ AC Voltmeter
交流電圧計
→ LISN
擬似電源回路網
→ Power Supply
供試電源
→ Load
抵抗負荷

800mm   500mm以下

Spectrum Analyzer
スペクトラムアナライザ

Figure D

AC Power
Supply
AC電源
→ RIN
リファレンス
インピーダンス
ネットワーク
→ Power Supply
供試電源
→ Adjustable
Load
可変負荷

FFTアナライザ
FFT Analyzer

Figure E