



TEST DATA OF LCA30S-5

(100V INPUT)

Regulated DC Power Supply

Date : Aug. 4. 1999

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Design Manager

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Design Engineer

コーワセル株式会社
COSEL CO., LTD.



C O N T E N T S

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)

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Model	LCA30S-5		Temperature Testing Circuitry	25°C Figure A																																
Item	Line Regulation 静的入力変動																																			
Object	+5.0V 6A																																			
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<p>The graph shows three linear relationships between Input Current [A] (Y-axis, 0 to 1) and Load Current [A] (X-axis, 0 to 8). A solid diagonal line represents the rated load current range. The data points for each input voltage follow this line.</p> <table border="1"> <thead> <tr> <th>Load Current [A]</th> <th>Input Volt. 85[V]</th> <th>Input Volt. 100[V]</th> <th>Input Volt. 132[V]</th> </tr> </thead> <tbody> <tr><td>0.0</td><td>0.041</td><td>0.044</td><td>0.050</td></tr> <tr><td>1.0</td><td>0.165</td><td>0.153</td><td>0.140</td></tr> <tr><td>2.0</td><td>0.284</td><td>0.256</td><td>0.221</td></tr> <tr><td>3.0</td><td>0.408</td><td>0.362</td><td>0.303</td></tr> <tr><td>4.0</td><td>0.536</td><td>0.472</td><td>0.387</td></tr> <tr><td>5.0</td><td>0.667</td><td>0.585</td><td>0.475</td></tr> <tr><td>6.0</td><td>0.801</td><td>0.699</td><td>0.564</td></tr> <tr><td>6.6</td><td>0.882</td><td>0.769</td><td>0.619</td></tr> <tr><td>—</td><td>—</td><td>—</td><td>—</td></tr> <tr><td>—</td><td>—</td><td>—</td><td>—</td></tr> <tr><td>—</td><td>—</td><td>—</td><td>—</td></tr> <tr><td>—</td><td>—</td><td>—</td><td>—</td></tr> </tbody> </table>				Load Current [A]	Input Volt. 85[V]	Input Volt. 100[V]	Input Volt. 132[V]	0.0	0.041	0.044	0.050	1.0	0.165	0.153	0.140	2.0	0.284	0.256	0.221	3.0	0.408	0.362	0.303	4.0	0.536	0.472	0.387	5.0	0.667	0.585	0.475	6.0	0.801	0.699	0.564	6.6	0.882	0.769	0.619	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—			
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<p>This duration covers from Shut-off of input voltage to the moment when output voltage descends to the rated range of voltage accuracy.</p> <p>Note: Slanted line shows the range of the rated input voltage.</p> <p>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。</p>																																		

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1. Graph	<p>Legend: Input Volt. 85V (△), Input Volt. 100V (□), Input Volt. 132V (○)</p> <table border="1"> <thead> <tr> <th>Load Current [A]</th> <th>Input Volt. 85[V] [mS]</th> <th>Input Volt. 100[V] [mS]</th> <th>Input Volt. 132[V] [mS]</th> </tr> </thead> <tbody> <tr><td>0.0</td><td>—</td><td>—</td><td>—</td></tr> <tr><td>1.0</td><td>152</td><td>212</td><td>367</td></tr> <tr><td>2.0</td><td>77</td><td>111</td><td>199</td></tr> <tr><td>3.0</td><td>48</td><td>71</td><td>132</td></tr> <tr><td>4.0</td><td>31</td><td>48</td><td>93</td></tr> <tr><td>5.0</td><td>22</td><td>35</td><td>72</td></tr> <tr><td>6.0</td><td>14</td><td>23</td><td>56</td></tr> <tr><td>6.6</td><td>11</td><td>21</td><td>48</td></tr> <tr><td>—</td><td>—</td><td>—</td><td>—</td></tr> <tr><td>—</td><td>—</td><td>—</td><td>—</td></tr> <tr><td>—</td><td>—</td><td>—</td><td>—</td></tr> </tbody> </table>			Load Current [A]	Input Volt. 85[V] [mS]	Input Volt. 100[V] [mS]	Input Volt. 132[V] [mS]	0.0	—	—	—	1.0	152	212	367	2.0	77	111	199	3.0	48	71	132	4.0	31	48	93	5.0	22	35	72	6.0	14	23	56	6.6	11	21	48	—	—	—	—	—	—	—	—	—	—	—	—			
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<p>This duration covers from Shut-off of input voltage to the moment when output voltage descends to the rated range of voltage accuracy.</p> <p>Note: Slanted line shows the range of the rated load current.</p> <p>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という。</p> <p>(注) 斜線は定格負荷電流範囲を示す。</p>																																																						

COSEL

Model	LCA30S-5																																																	
Item	Load Regulation 靜的負荷変動	Temperature 25°C	Testing Circuitry Figure A																																															
Object	+5.0V 6A																																																	
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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。

COSEL

Model	LCA30S-5	Temperature Testing Circuitry 25°C Figure A																																			
Item	Ripple Voltage(by Load Current) リップル電圧(負荷電流特性)																																				
Object	+5.0V 6A																																				
1. Graph	<p style="text-align: center;">-----□----- Input Volt. 85V [mV] -----△----- Input Volt. 132V</p> <table border="1"> <caption>Data points estimated from Graph</caption> <thead> <tr> <th>Load Current [A]</th> <th>Ripple Output Volt. 85V [mV]</th> <th>Ripple Output Volt. 132V [mV]</th> </tr> </thead> <tbody> <tr><td>0.00</td><td>5</td><td>5</td></tr> <tr><td>1.00</td><td>5</td><td>5</td></tr> <tr><td>2.00</td><td>10</td><td>10</td></tr> <tr><td>3.00</td><td>10</td><td>10</td></tr> <tr><td>4.00</td><td>15</td><td>15</td></tr> <tr><td>5.00</td><td>20</td><td>15</td></tr> <tr><td>6.00</td><td>20</td><td>20</td></tr> <tr><td>6.60</td><td>20</td><td>20</td></tr> <tr><td>—</td><td>—</td><td>—</td></tr> <tr><td>—</td><td>—</td><td>—</td></tr> <tr><td>—</td><td>—</td><td>—</td></tr> </tbody> </table>	Load Current [A]	Ripple Output Volt. 85V [mV]	Ripple Output Volt. 132V [mV]	0.00	5	5	1.00	5	5	2.00	10	10	3.00	10	10	4.00	15	15	5.00	20	15	6.00	20	20	6.60	20	20	—	—	—	—	—	—	—	—	—
Load Current [A]	Ripple Output Volt. 85V [mV]	Ripple Output Volt. 132V [mV]																																			
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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
スイッチング周期

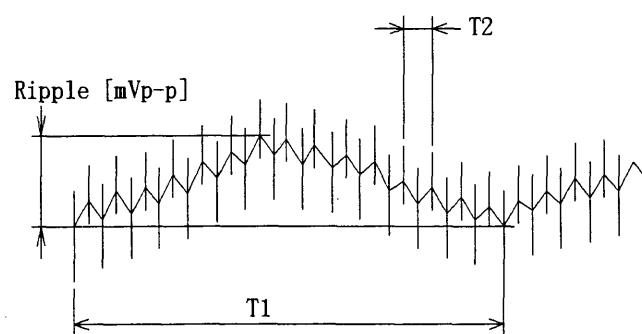


Fig. Complex Ripple Wave Form
図 リップル波形詳細図

COSSEL

Model	LCA30S-5	
Item	Ripple-Noise リップルノイズ	Temperature Testing Circuitry 25°C Figure A
Object	+5.0V 6A	
1. Graph		
<p>[mV]</p>		Input Volt. 85V Input Volt. 132V
2. Values		
Load current [A]	Input Volt. 85 [V]	Input Volt. 132 [V]
	Ripple-Noise [mV]	Ripple-Noise [mV]
0.00	10	10
1.00	10	10
2.00	15	15
3.00	15	15
4.00	20	20
5.00	25	25
6.00	25	25
6.60	25	25
—	—	—
—	—	—
—	—	—

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
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T2: Due to Switching
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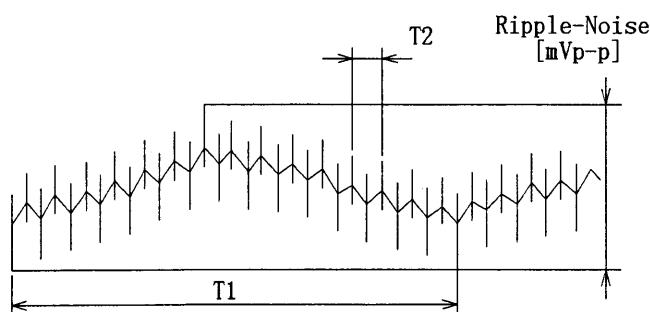


Fig. Complex Ripple Wave Form
図 リップル波形詳細図

COSEL

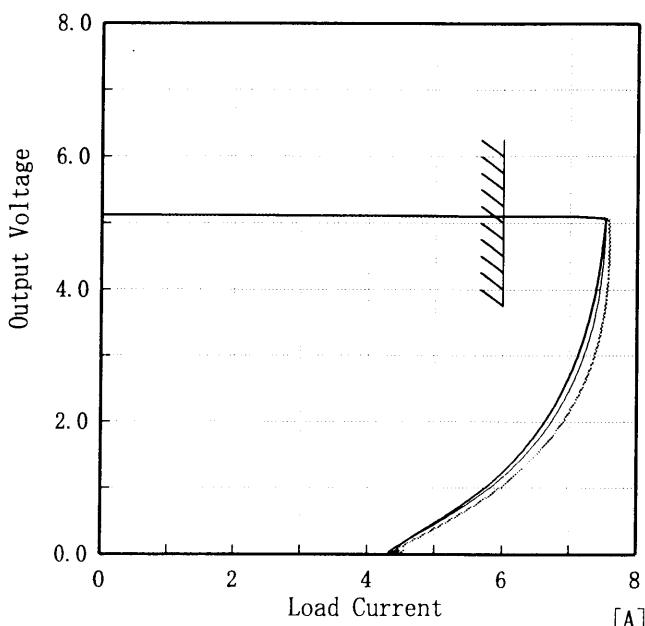
Model LCA30S-5

Item Overcurrent Protection
過電流保護

Object +5.0V6A

1. Graph

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

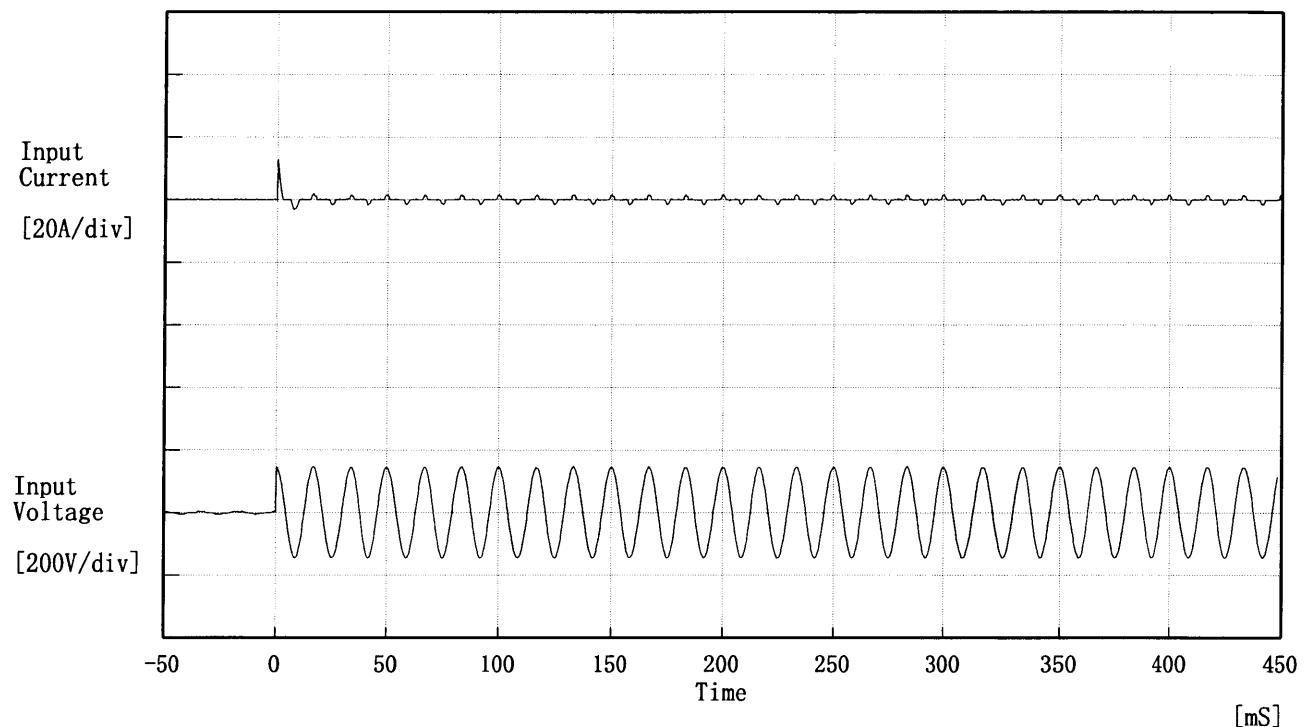
Temperature 25°C
Testing Circuitry Figure A

2. Values

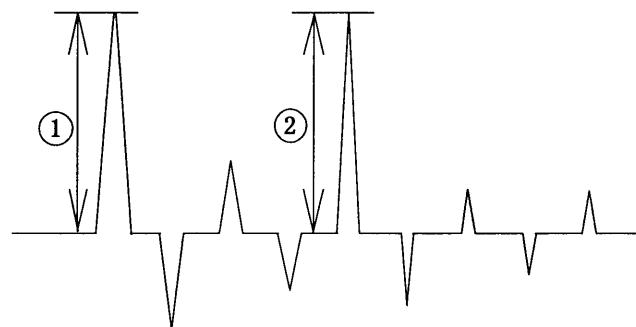
Output Voltage [V]	Load Current [A]		
	Input Volt. 85[V]	Input Volt. 100[V]	Input Volt. 132[V]
5.00	7.59	7.53	7.52
4.75	7.59	7.52	7.50
4.50	7.59	7.50	7.47
4.00	7.56	7.45	7.39
3.50	7.50	7.36	7.29
3.00	7.37	7.22	7.13
2.50	7.19	7.02	6.92
2.00	6.91	6.73	6.65
1.50	6.52	6.34	6.25
1.00	5.97	5.81	5.74
0.50	5.22	5.09	5.05
0.00	4.59	4.50	4.48

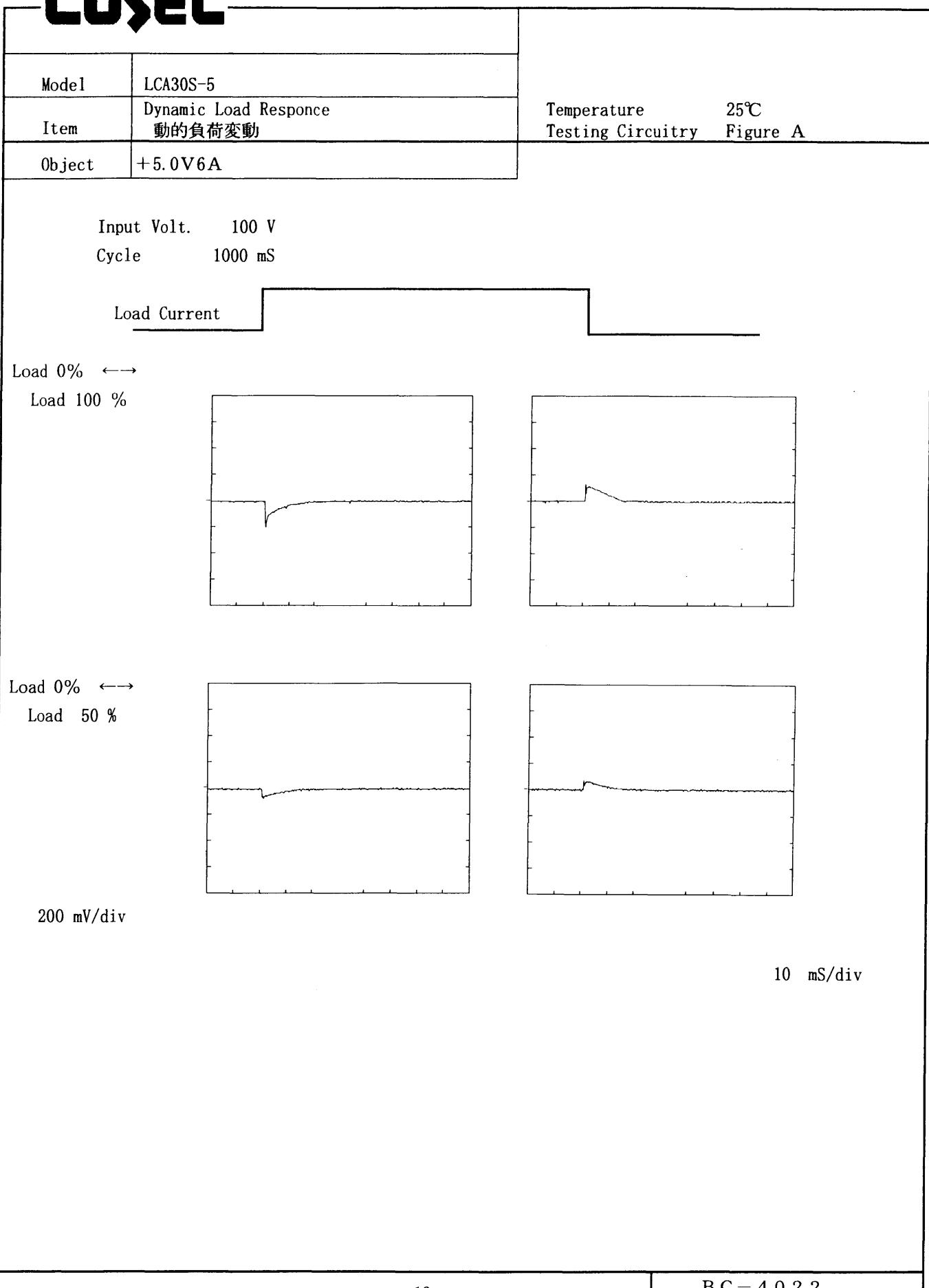
COSEL

Model	LCA30S-5	Temperature Testing Circuitry Figure A	25°C
Item	Inrush Current 突入電流		
Object	_____		



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

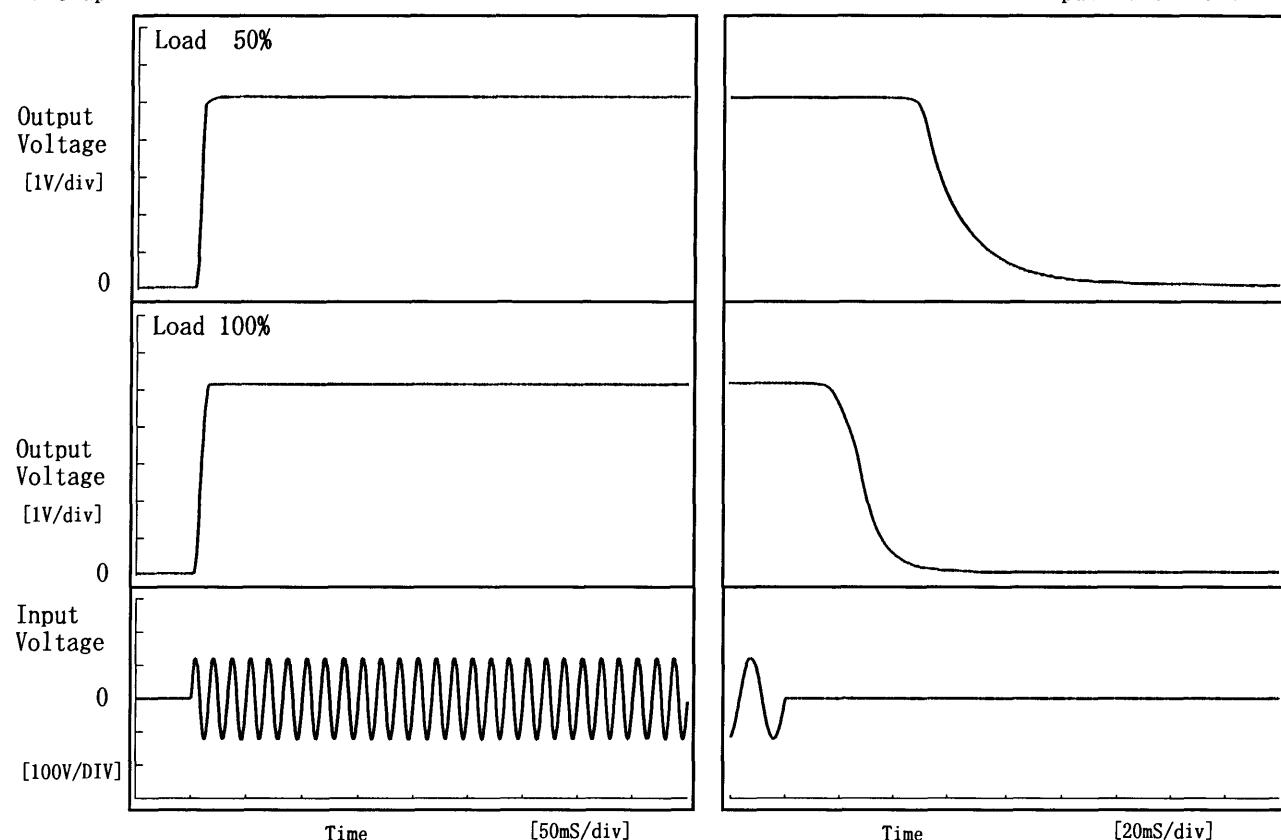


COSEL

COSEL

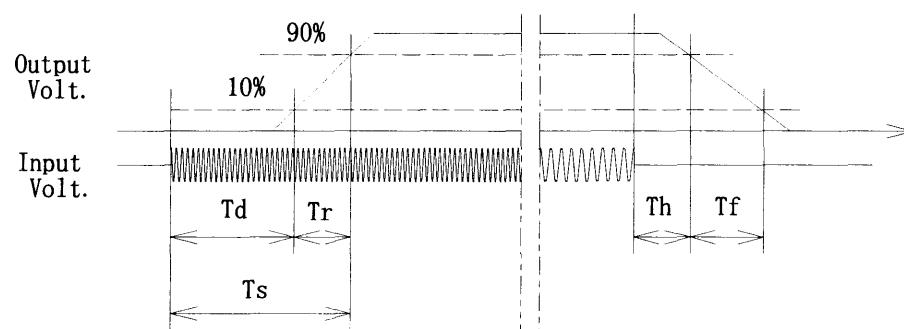
Model	LCA30S-5	Temperature Testing Circuitry Figure A	25°C Figure A
Item	Rise and Fall Time 立上り、立下り時間		
Object	+5.0V 6A		

1. Graph



2. Values

Load	Time	T d	T r	T s	T h	T f	[mS]
50 %		4.5	6.0	10.5	51.7	34.7	
100 %		4.8	8.3	13.0	20.6	20.6	



COSSEL

Model	LCA30S-5																																																					
Item	Ambient Temperature Drift 周囲温度変動																																																					
Object	+5.0V 6A																																																					
1. Graph																																																						
<p>Output Voltage [V]</p> <p>Ambient Temperature [°C]</p> <p>Load 100%</p>			2. Values																																																			
<table border="1"> <thead> <tr> <th rowspan="2">Temperature [°C]</th> <th colspan="3">Output Voltage [V]</th> </tr> <tr> <th>Input Volt. 85[V]</th> <th>Input Volt. 100[V]</th> <th>Input Volt. 132[V]</th> </tr> </thead> <tbody> <tr> <td>-20</td><td>5.122</td><td>5.123</td><td>5.124</td></tr> <tr> <td>-10</td><td>5.123</td><td>5.124</td><td>5.124</td></tr> <tr> <td>0</td><td>5.123</td><td>5.123</td><td>5.124</td></tr> <tr> <td>10</td><td>5.122</td><td>5.122</td><td>5.123</td></tr> <tr> <td>20</td><td>5.120</td><td>5.121</td><td>5.121</td></tr> <tr> <td>25</td><td>5.119</td><td>5.120</td><td>5.120</td></tr> <tr> <td>30</td><td>5.118</td><td>5.119</td><td>5.119</td></tr> <tr> <td>40</td><td>5.116</td><td>5.116</td><td>5.117</td></tr> <tr> <td>50</td><td>5.113</td><td>5.114</td><td>5.114</td></tr> <tr> <td>60</td><td>5.110</td><td>5.110</td><td>5.111</td></tr> <tr> <td>—</td><td>—</td><td>—</td><td>—</td></tr> </tbody> </table>				Temperature [°C]	Output Voltage [V]			Input Volt. 85[V]	Input Volt. 100[V]	Input Volt. 132[V]	-20	5.122	5.123	5.124	-10	5.123	5.124	5.124	0	5.123	5.123	5.124	10	5.122	5.122	5.123	20	5.120	5.121	5.121	25	5.119	5.120	5.120	30	5.118	5.119	5.119	40	5.116	5.116	5.117	50	5.113	5.114	5.114	60	5.110	5.110	5.111	—	—	—	—
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(注) 斜線は定格周囲温度範囲を示す。

Model	LCA30S-5	
Item	Minimum Input Voltage for Regulated Output Voltage 最低レギュレーション電圧	
Object	+5.0V6A	
1. Graph	[V]	Load 50% Load 100%
<p>The graph plots Input Voltage [V] against Ambient Temperature [°C]. The Y-axis ranges from 0 to 100 V, and the X-axis ranges from -30 to 70 °C. Two sets of data points are shown: Load 50% (squares) and Load 100% (triangles). A horizontal dotted line is drawn at approximately 32V. Two slanted lines indicate the rated ambient temperature range, which is between approximately -10°C and 50°C.</p>		
Testing Circuitry Figure A		2. Values
Ambient Temperature [°C]	Input Voltage [V]	
	Load 50%	Load 100%
-20	32	57
-10	31	57
0	31	56
10	31	56
20	31	56
25	31	56
30	31	56
40	32	57
50	32	57
60	32	57
—	—	—

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

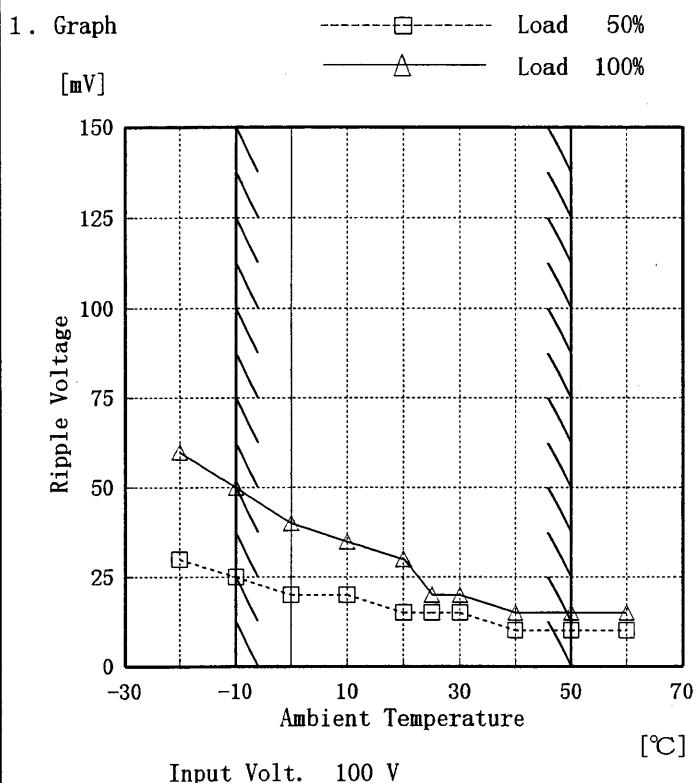
(注)斜線は定格周囲温度範囲を示す。

COSEL

Model	LCA30S-5
Item	Ripple Voltage (by Ambient Temp.) リップル電圧 (周囲温度特性)
Object	+5.0V 6A

Testing Circuitry

Figure A



2. Values

Ambient Temp. [°C]	Load 50%	Load 100%
	Ripple Output Volt. [mV]	Ripple Output Volt. [mV]
-20	30	60
-10	25	50
0	20	40
10	20	35
20	15	30
25	15	20
30	15	20
40	10	15
50	10	15
60	10	15
—	—	—

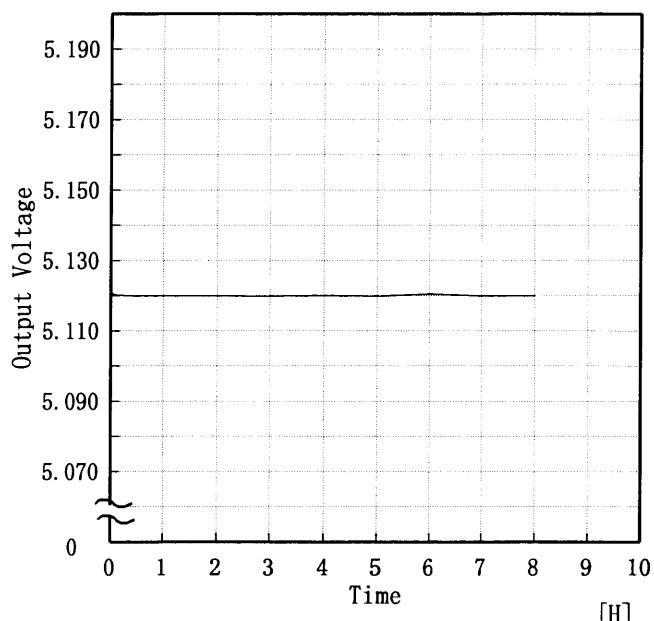
(注)斜線は定格周囲温度範囲を示す。

COSEL

Model	LCA30S-5
Item	Time Lapse Drift 経時ドリフト
Object	+5.0V 6A

1. Graph

[V]



Input Volt. 100V

Load 100%

Temperature 25°C
Testing Circuitry Figure A

2. Values

Time since start [H]	Output Voltage [V]
0.0	5.122
0.5	5.120
1.0	5.120
2.0	5.120
3.0	5.120
4.0	5.120
5.0	5.120
6.0	5.120
7.0	5.120
8.0	5.120



Model	LCA30S-5	Testing Circuitry Figure A
Item	Output Voltage Accuracy 定電圧精度	
Object	+5.0V 6A	

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 : 85~132 V

Load Current : 0~6 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 °C

入力電圧 85~132 V

負荷電流 0~6 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 [°C]	Input Voltage [V]	Output Current [A]	Output Voltage [V]	Output Voltage Accuracy [mV]	Output Voltage Accuracy(Ration) [%]
Maximum Voltage	-10	132	6	5.124		
Minimum Voltage	50	85	0	5.111	±7	±0.2

COSCEL

Model	LCA30S-5	Testing Circuitry Figure A
Item	Condensation 結露特性	
Object	+5.0V 6A	

1. Condensation test

Testing procedure is as follows.

- ① Keeping and cooling the unit in a tank at -10°C 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°C 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°C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°C、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]	5.119	Input Volt.:100V, Load Current:6A
Line Regulation [mV]	2	Input Volt.:85~132V, Load Current:6A
Load Regulation [mV]	4	Input Volt.:100V, Load Current:0~6A



Model	LCA30S-5	Temperature	25°C
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	0.09	0.10	0.14
(B) IEC60950	0.09	0.11	0.14

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。

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



Model	LCA30S-5	Temperature Testing Circuitry	25°C Figure C
Item	Line Noise Tolerance 入力雑音耐量		
Object	+5.0V6A		

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

COSEL

Model	LCA30S-5	Temperature Testing Circuitry	25°C Figure D
Item	Conducted Emission 雜音端子電圧		
Object	_____		

1. Graph

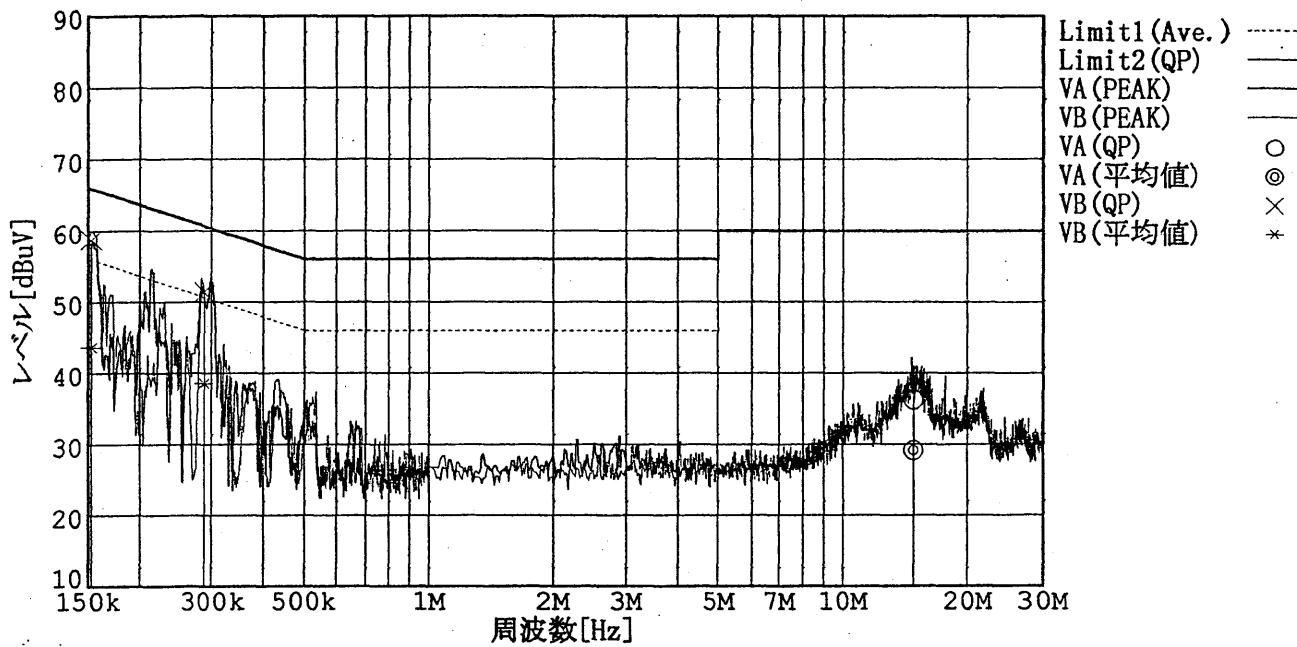
Remarks

Input Volt. 100 V (VCCI Class B)
120 V (FCC Class B)

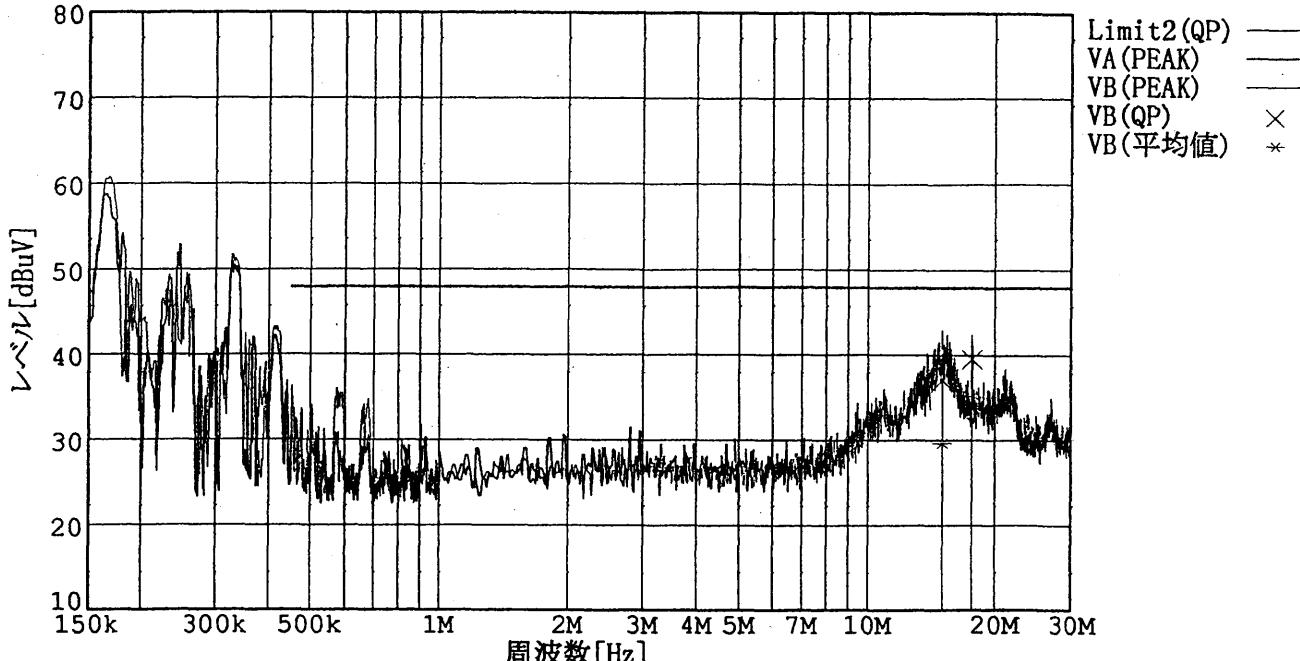
Load 100 %

規格 1 : [VCCI] Class B(平均値)

規格 2 : [VCCI] Class B(QP)



規格 2 : [FCC Part15] Class B



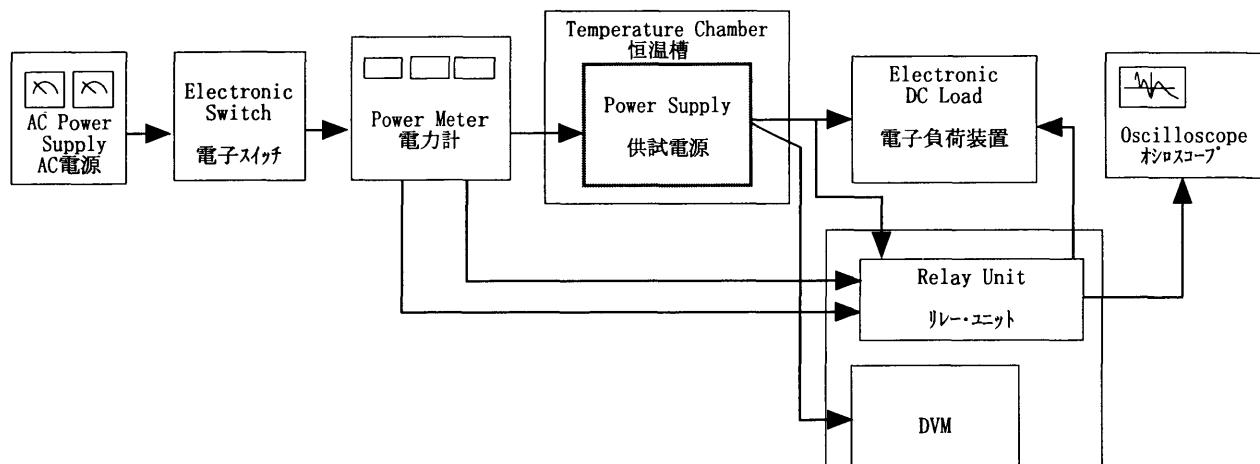


Figure A

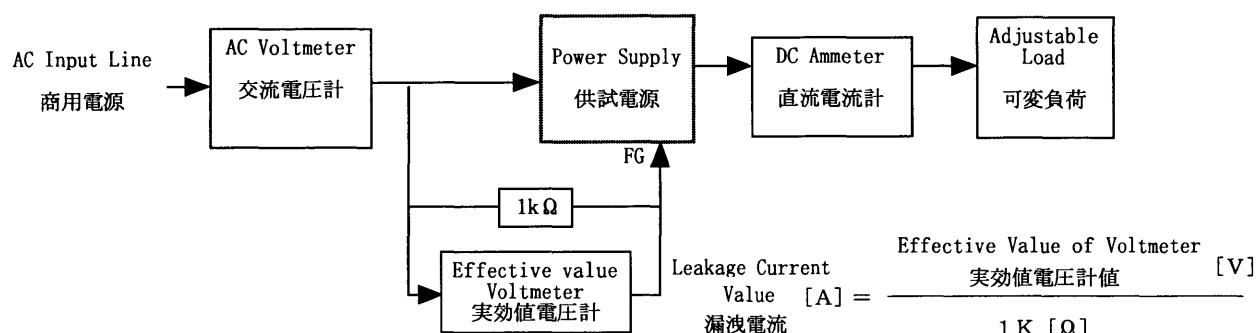
Data Acquisition/Control Unit
データ集録システム

Figure B (DENTORI)

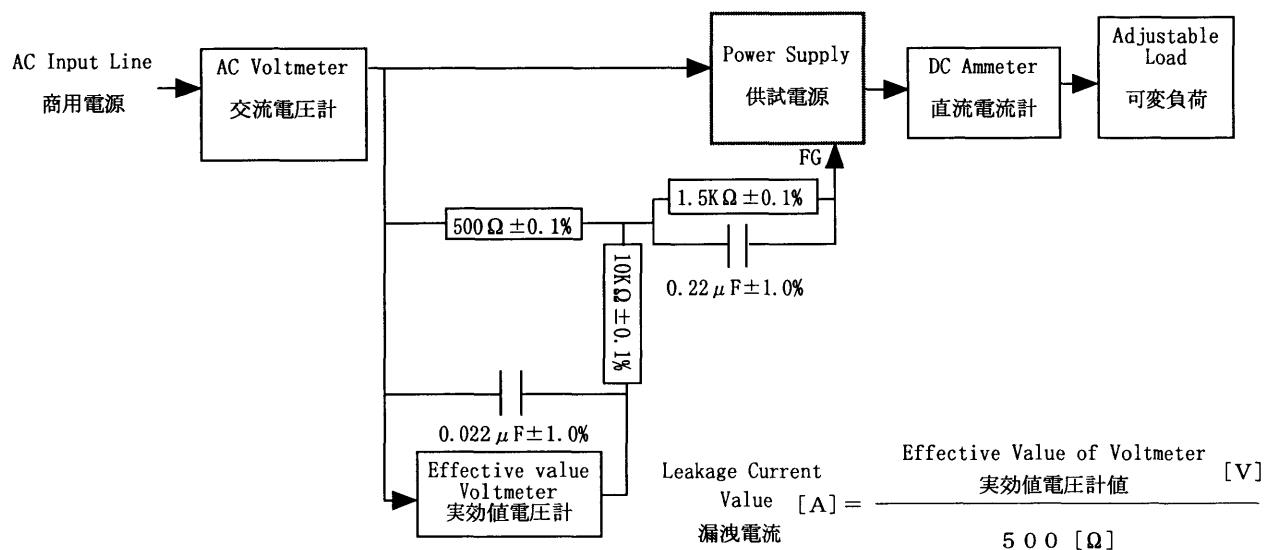


Figure B (IEC 60950)

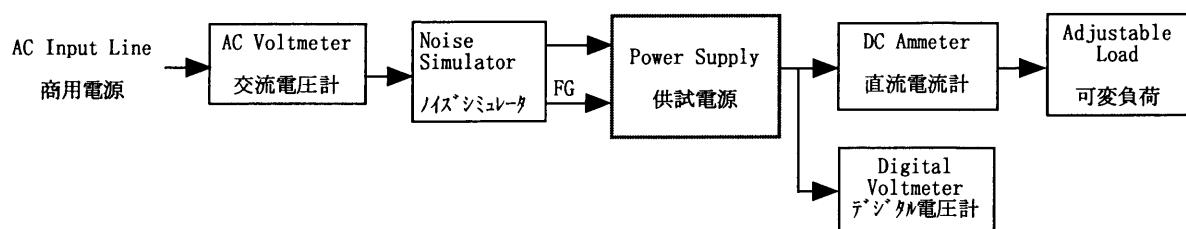


Figure C

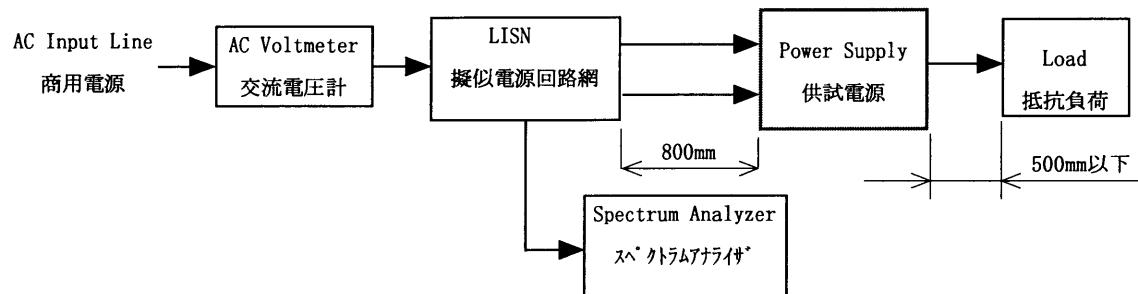


Figure D

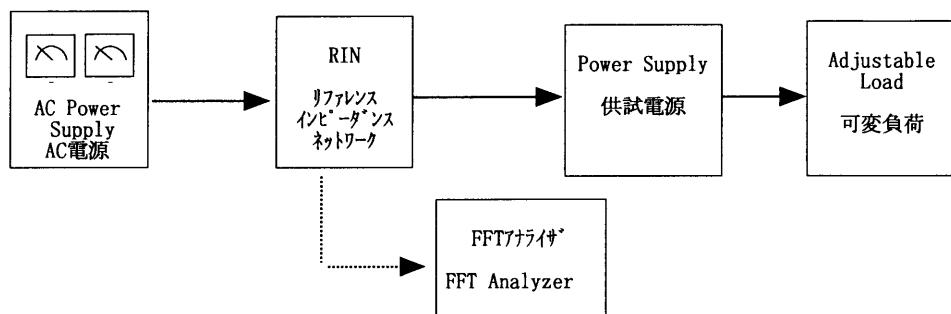


Figure E