CO$EL

TEST DATA OF CDS4004824
(48V INPUT)

Regulated DC Power Supply
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Temperature	25℃
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1. Graph

- - - ⊟ - - - Load 50%
———△——— Load 100%

Output Voltage [V] vs Input Voltage [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]	Output Voltage [V]	
	Load 50%	Load 100%
33	24.131	24.108
36	24.131	24.107
40	24.129	24.105
48	24.128	24.104
54	24.128	24.105
60	24.128	24.103
68	24.127	24.102
76	24.126	24.103
80	24.126	24.102

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Model	CDS4004824
Item	Input Current (by Input Voltage) 入力電流（入力電圧特性）
Object	

Temperature   25℃
Testing Circuitry   Figure A

1．Graph

       △ ——— Load 100%
       ---□--- Load 50%
       -·-○-·- Load 0%

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]	Input Current [A]		
	Load 0%	Load 50%	Load 100%
0	0.000	0.000	0.000
25	0.016	0.016	0.016
30	0.095	9.561	18.294
33	0.087	8.555	17.308
36	0.081	7.801	15.770
40	0.073	6.984	14.086
48	0.065	5.837	11.711
54	0.061	5.209	10.431
60	0.058	4.703	9.389
68	0.053	4.176	8.294
76	0.050	3.763	7.452
80	0.049	3.588	7.088
--	—	—	—
--	—	—	—
--	—	—	—
--	—	—	—

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Model	CDS4004824
Item	Input Current (by Load Current) 入力電流（負荷特性）
Object	————————

Temperature　　　　25℃
Testing Circuitry　　Figure A

1. Graph

△——— Input Volt.　36V
·-·☐·-· Input Volt.　48V
-·-○-·- Input Volt.　76V

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 [A]	Input Current [A]		
	Input Volt. 36[V]	Input Volt. 48[V]	Input Volt. 76[V]
0.0	0.081	0.065	0.051
4.0	3.094	2.295	1.530
8.0	5.979	4.445	2.893
12.0	8.880	6.642	4.274
16.0	11.923	8.899	5.680
20.0	15.120	11.191	7.132
21.0	15.844	11.786	7.480
23.1	17.589	13.042	8.256
—	—	—	—
—	—	—	—
—	—	—	—

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Model	CDS4004824
Item	Input Power (by Load Current) 入力電力（負荷特性）
Object	————————

Temperature　　　25℃
Testing Circuitry　　Figure A

1. Graph

——△—— Input Volt. 36V
---🗗--- Input Volt. 48V
—·—○—·— Input Volt. 76V

Input Power [W] vs 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 [A]	Input Power [W]		
	Input Volt. 36[V]	Input Volt. 48[V]	Input Volt. 76[V]
0.0	2.9	3.1	3.9
4.0	111.1	110.3	116.2
8.0	214.3	213.2	219.6
12.0	319.8	318.1	324.3
16.0	428.2	425.5	430.7
20.0	541.5	536.5	540.4
21.0	570.1	564.8	568.2
23.1	631.9	624.4	626.9
——	—	—	—
——	—	—	—
——	—	—	—

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Model	CDS4004824
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]	Efficiency [%]	
	Load 50%	Load 100%
33	89.3	87.9
36	89.9	88.6
40	90.4	89.0
48	90.5	89.3
54	90.1	89.3
60	89.7	89.2
68	89.1	89.1
76	88.5	88.8
80	88.1	88.7

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Model	CDS4004824
Item	Efficiency (by Load Current) 効率（負荷特性）
Object	————————

Temperature   25℃
Testing Circuitry   Figure A

1. Graph

— △ — Input Volt.   36V
--- ▭ --- Input Volt.   48V
—·— ○ —·— Input Volt.   76V

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 [A]	Efficiency [%]		
	Input Volt. 36[V]	Input Volt. 48[V]	Input Volt. 76[V]
0.0	—	—	—
4.0	86.1	86.8	82.4
8.0	89.5	90.0	87.4
12.0	90.1	90.5	88.8
16.0	89.7	90.3	89.2
20.0	88.8	89.6	89.0
21.0	88.5	89.4	88.8
23.1	87.9	88.9	88.5
——	—	—	—
——	—	—	—
——	—	—	—

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Model	CDS4004824
Item	Load Regulation 静的負荷変動
Object	+24V21A

Temperature　　　　25℃
Testing Circuitry　　Figure A

1．Graph

　　──△── Input Volt.　36V
　　---□--- Input Volt.　48V
　　─·─○─·─ Input Volt.　76V

Output Voltage [V] vs Load Current [A]
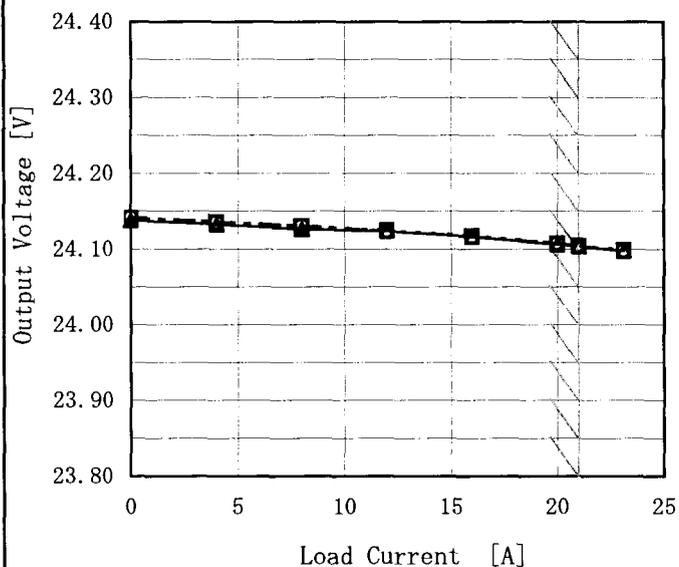
2．Values

Load Current [A]	Output Voltage [V]		
	Input Volt. 36[V]	Input Volt. 48[V]	Input Volt. 76[V]
0.0	24.138	24.141	24.142
4.0	24.133	24.136	24.136
8.0	24.126	24.131	24.131
12.0	24.124	24.125	24.124
16.0	24.116	24.118	24.116
20.0	24.106	24.108	24.108
21.0	24.104	24.104	24.104
23.1	24.098	24.099	24.098
---	—	—	—
--	—	—	—

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。

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Model	CDS4004824
Item	Ripple Voltage (by Load Current) リップル電圧（負荷特性）
Object	+24V21A

Temperature   25℃
Testing Circuitry   Figure A

1. Graph

———△——— Input Volt. 36V
—·—○—·— Input Volt. 76V

Ripple Voltage [mV] vs 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.

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。

Ripple [mVp-p]

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

2. Values

Load Current [A]	Ripple Voltage [mV]	
	Input Volt. 36 [V]	Input Volt. 76 [V]
0.0	20	30
3.0	30	30
7.0	30	30
10.5	30	30
14.0	30	35
17.0	30	35
21.0	30	35
23.1	30	35
—	—	—
—	—	—
—	—	—

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Model	CDS4004824
Item	Ripple-Noise リップルノイズ
Object	+24V21A

Temperature   25℃
Testing Circuitry   Figure A

1. Graph

⎯⎯△⎯⎯ Input Volt. 36V
⎯・⎯○⎯・⎯ Input Volt. 76V

Load Current [A]

2. Values

Load Current [A]	Ripple-Noise [mV]	
	Input Volt. 36 [V]	Input Volt. 76 [V]
0.0	30	35
3.0	35	45
7.0	35	45
10.5	50	50
14.0	50	50
17.0	50	50
21.0	60	60
23.1	60	60
—	—	—
—	—	—
—	—	—

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。

Ripple
Noise[mVp-p]

Fig.Complex Ripple Noise Wave Form
図 リップルノイズ波形

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Model	CDS4004824
Item	Overcurrent Protection 過電流保護
Object	+24V21A

Temperature   25℃
Testing Circuitry   Figure A

1. Graph

—————— Input Volt. 36V
.... Input Volt. 48V
.... Input Volt. 76V
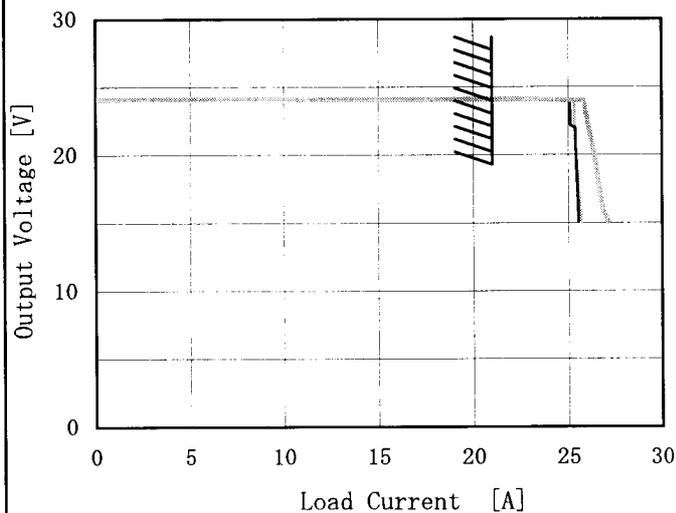
Note: Slanted line shows the range of the rated
      load current.
(注) 斜線は定格負荷電流範囲を示す。

Intermittent operation occurs when the output
voltage is from 15V to 0V.
15V～0V間は、間欠モードとなる。

2. Values

Output Voltage [V]	Load Current [A]		
	Input Volt. 36[V]	Input Volt. 48[V]	Input Volt. 76[V]
24.0	25.09	25.30	25.82
22.8	25.10	25.34	25.98
21.6	25.38	25.37	26.13
19.2	25.43	25.46	26.47
16.8	25.50	25.59	26.73
――	―	―	―
――	―	―	―
――	―	―	―
――	―	―	―
――	―	―	―
―――	―	―	―
――	―	―	―

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Model	CDS4004824
Item	Overvoltage Protection 過電圧保護
Object	+24V21A

Testing Circuitry　　Figure A

1. Graph
　　———△——— Input Volt. 36V
　　----□---- Input Volt. 48V
　　—·—○—·— Input Volt. 76V

Operating Point [V] vs Ambient Temperature [℃]

Load 0%

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 [℃]	Operating Point [V]		
	Input Volt. 36[V]	Input Volt. 48[V]	Input Volt. 76[V]
-35	29.46	29.46	29.46
-20	29.75	29.75	29.75
0	30.18	30.06	30.06
15	30.47	30.35	30.35
25	30.65	30.65	30.65
40	30.94	30.88	30.88
55	31.17	31.17	31.17
70	31.46	31.46	31.46
85	31.75	31.64	31.75
90	31.87	31.87	31.87
——	—	—	—

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Model	CDS4004824
Item	Dynamic Load Response 動的負荷変動
Object	+24V21A

Temperature	25℃
Testing Circuitry	Figure A

Input Volt.   48 V

Cycle   1000 ms

Load Current

Min. Load (0A) ←→
Load 100% (21A)

500 mV/div

5 ms/div   5 ms/div
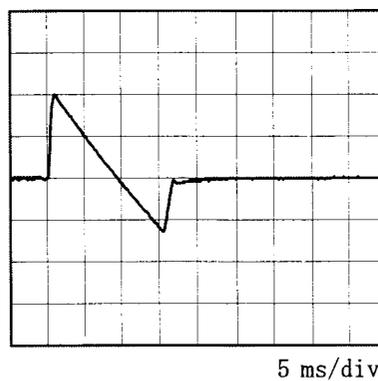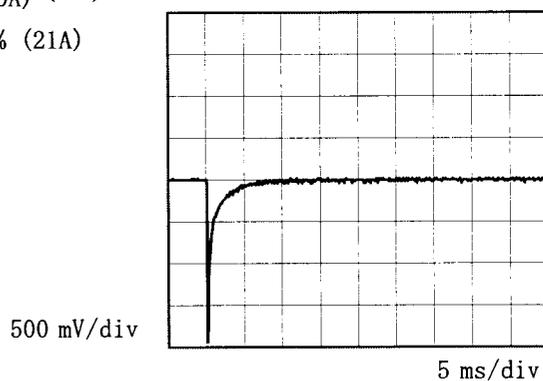
Min. Load (0A) ←→
Load 50% (10.5A)

500 mV/div

5 ms/div   5 ms/div
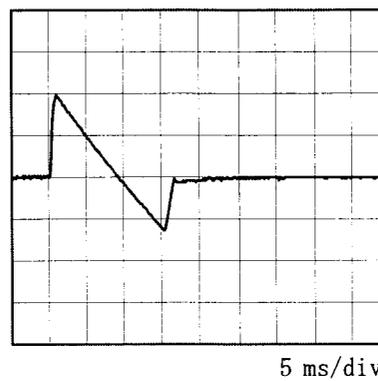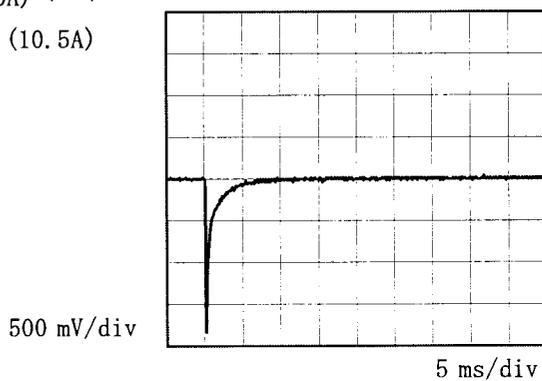
Load 10% (2.1A) ←→
Load 100% (21A)

500 mV/div

5 ms/div   5 ms/div

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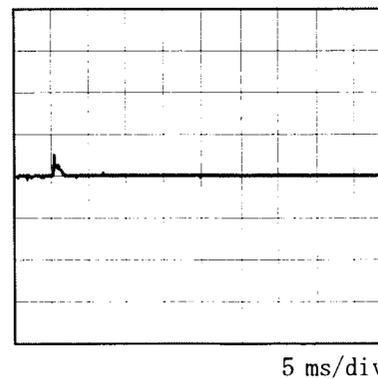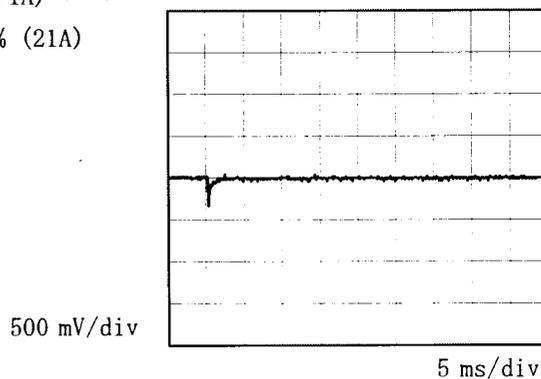
Model	CDS4004824		
Item	Rise and Fall Time 立上り、立下り時間	Temperature	25℃
		Testing Circuitry	Figure A
Object	+24V21A		

1. Graph

Input Volt. 36 V

Output Volt. [5V/div]

Load 50%

Output Volt. [5V/div]

Load 100%

Input Volt. [10V/div]

Time [100mS/div]

Time [50mS/div]

2. Values

[mS]
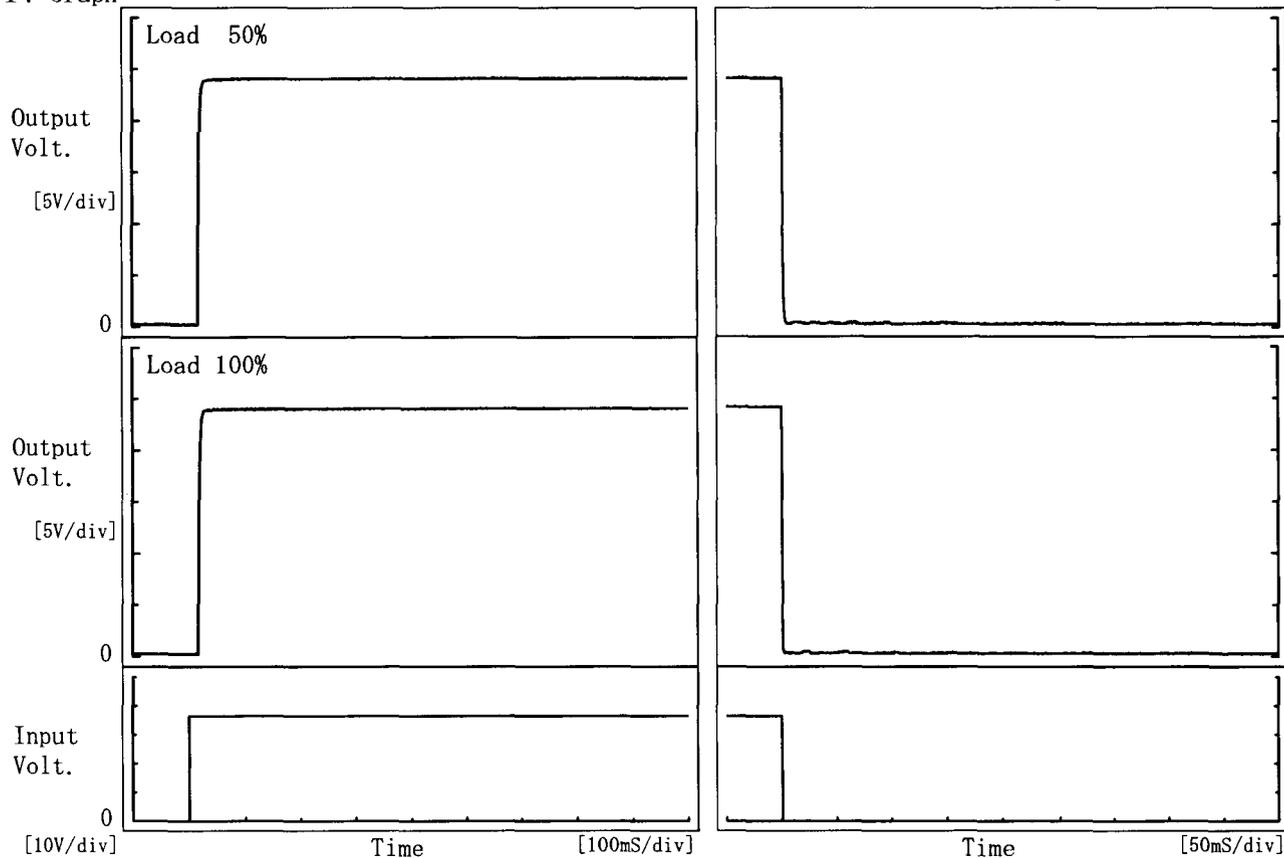
Time Load	T d	T r	T s	T h	T f
50 %	16.0	5.5	21.5	0.5	1.5
100 %	16.0	5.5	21.5	0.3	1.0

Output Volt.
90%
10%

Input Volt.

Td Tr   Th Tf

Ts

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Model	CDS4004824
Item	Ambient Temperature Drift 周囲温度変動
Object	+24V21A

Testing Circuitry　　Figure A

1．Graph

—△— Input Volt. 36V
‐‐‐◻‐‐‐ Input Volt. 48V
—・—○—・— Input Volt. 76V

Output Voltage [V] vs Ambient Temperature [℃]

Ambient Temperature [℃]

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

Ambient Temperature [℃]	Output Voltage [V]		
	Input Volt. 36[V]	Input Volt. 48[V]	Input Volt. 76[V]
−35	24.187	24.184	24.183
−20	24.175	24.173	24.170
0	24.158	24.156	24.153
15	24.145	24.144	24.144
25	24.136	24.134	24.133
40	24.117	24.118	24.118
55	24.094	24.094	24.092
70	24.046	24.050	24.048
85	23.985	23.991	23.987
90	23.947	23.953	23.944
—	—	—	—

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Model	CDS4004824
Item	Minimum Input Voltage for Regulated Output Voltage 最低レギュレーション電圧
Object	+24V21A

Testing Circuitry   Figure A

1. Graph

- - -☐- - - Load 50%
————△———— 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

Ambient Temperature [℃]	Input Voltage [V]	
	Load 50%	Load 100%
−35	27.8	29.0
−20	27.9	29.1
0	28.0	29.4
15	28.2	29.6
25	28.2	29.7
40	28.2	29.9
55	28.3	30.0
70	28.3	30.2
85	28.3	30.5
90	28.3	30.7
−−	−	−

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参考資料

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Model	CDS4004824
Item	Ripple Voltage (by Ambient Temp.) リップル電圧 (周囲温度特性)
Object	+24V21A

Testing Circuitry   Figure A
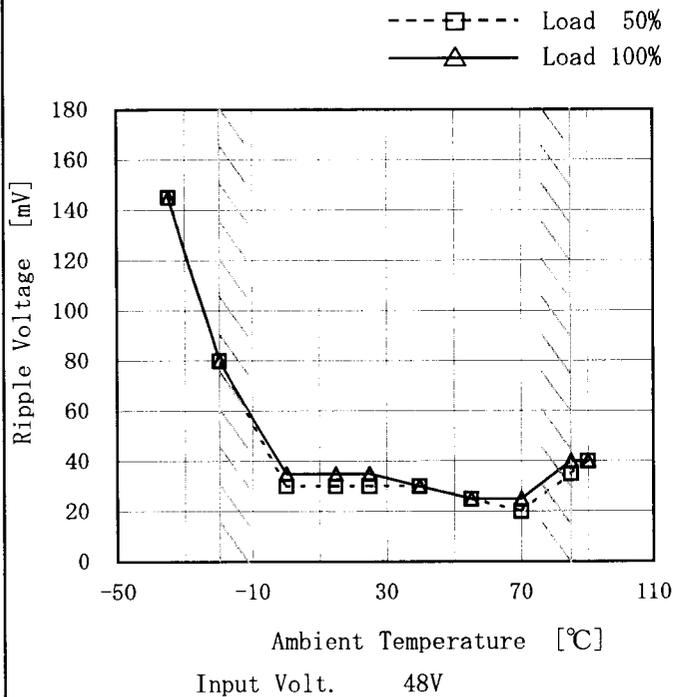
1. Graph

- - -□- - - Load 50%
——△—— Load 100%

Ambient Temperature [℃]

Input Volt.   48V

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 [℃]	Ripple Voltage [mV]	
	Load 50%	Load 100%
−35	145	145
−20	80	80
0	30	35
15	30	35
25	30	35
40	30	30
55	25	25
70	20	25
85	35	40
90	40	40
―	―	―

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Model	CDS4004824
Item	Time Lapse Drift 経時ドリフト
Object	+24V21A

Temperature	25℃
Testing Circuitry	Figure A

1. Graph

Input Volt.　　48V
Load　　　　　100%

2. Values

Time since start [H]	Output Voltage [V]
0.0	24.126
0.5	24.113
1.0	24.113
2.0	24.113
3.0	24.113
4.0	24.114
5.0	24.114
6.0	24.114
7.0	24.114
8.0	24.114

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Model	CDS4004824
Item	Output Voltage Accuracy 定電圧精度
Object	+24V21A

Testing Circuitry　　Figure A

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　　:　-20 ～ 85℃

Input Voltage　:　36 ～ 76V

Load Current　　:　0 ～ 21A

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

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

1．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　　　　:　-20 ～ 85℃

入力電圧　　　　:　36 ～ 76V

負荷電流　　　　:　0 ～ 21A

＊ 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

2．Values

Item	Temperature [℃]	Input Voltage[V]	Output		Output Voltage Accuracy	
			Current[A]	Voltage[V]	Value [mV]	Ration [%]
Maximum Voltage	-20	76	0	24.210	±115	±0.5
Minimum Voltage	85	76	21	23.981		

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Model	CDS4004824
Item	Condense 結露特性
Object	+24V21A

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.

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]	24.104	Input Volt.:48V,Load Current.:21A
Line Regulation [mV]	4	Input Volt.:36〜76V,Load Current.:21A
Load Regulation [mV]	37	Input Volt.:48V,Load Current.:0〜21A

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Model	CDS4004824		
Item	Line Noise Tolerance 入力雑音耐量	Temperature	25℃
		Testing Circuitry	Figure B
Object	+24V21A		

1. Conditions

　　・Input Voltage　　：　48 V　　　・Pulse Input Duration　：1 min. or more
　　・Pulse Voltage　　：　2000 V　　・Load　　　　　　　　：　100 %
　　・Pulse Cycle　　　：　10 mS

2. Results

Pulse Width [nS]	MODE	POLARITY	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
		−	OK	no fluctuation
	NORMAL	+	OK	no fluctuation
		−	OK	no fluctuation
1000	COMMON	+	OK	no fluctuation
		−	OK	no fluctuation
	NORMAL	+	OK	no fluctuation
		−	OK	no fluctuation

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COSEL
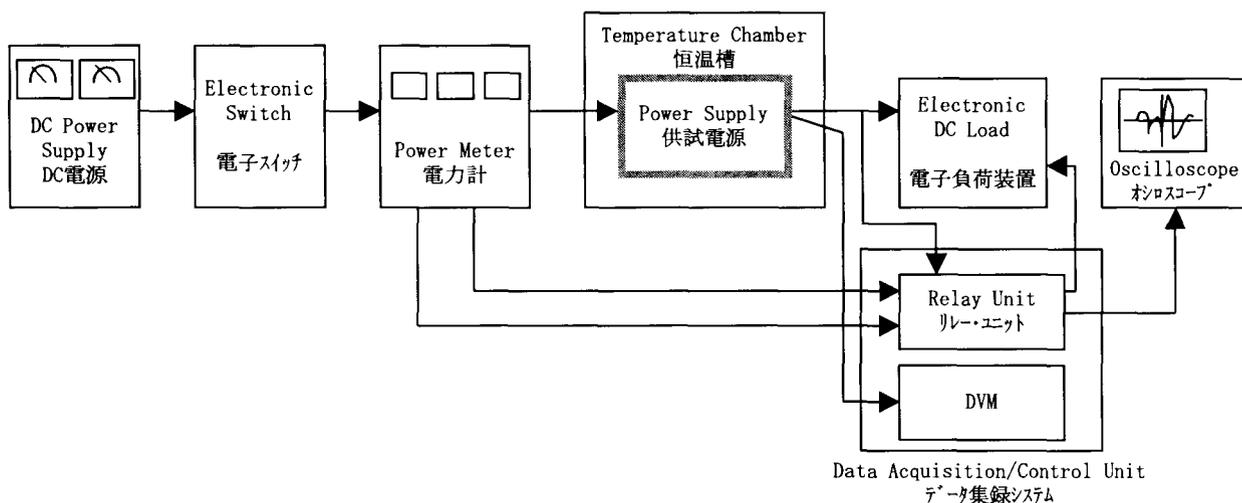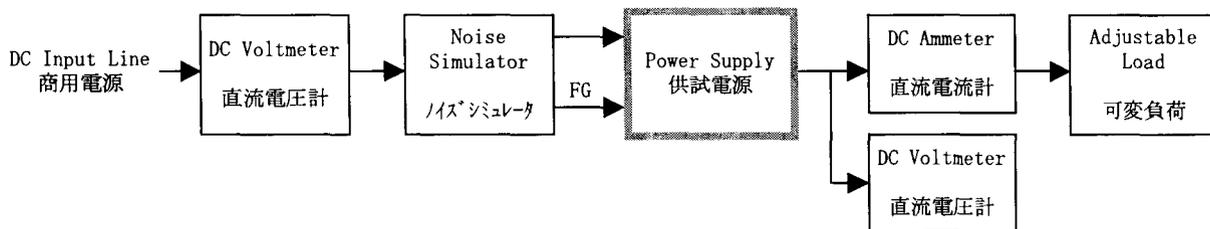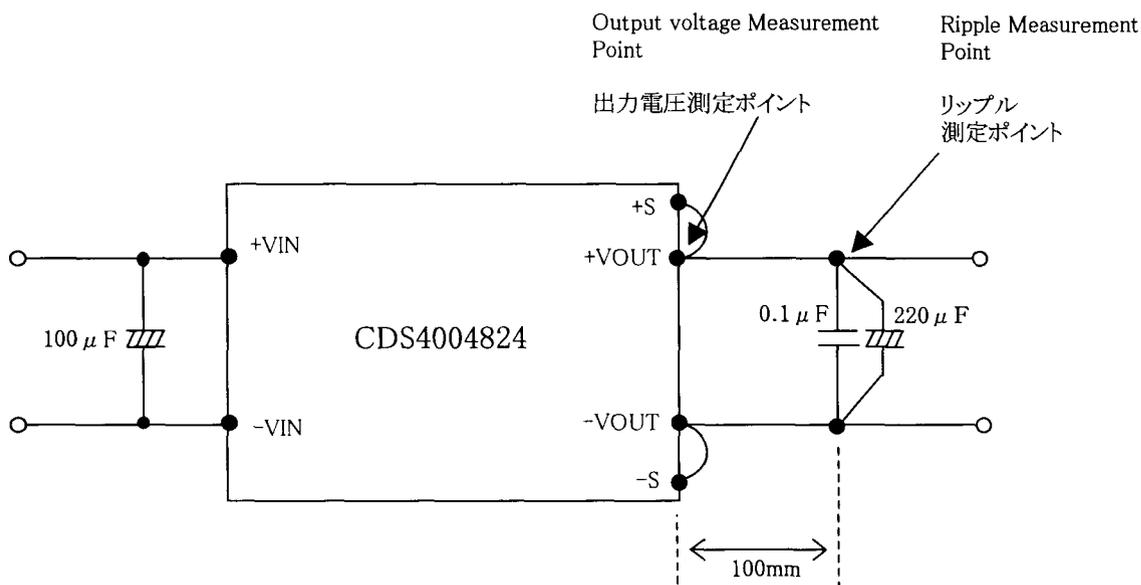
Figure A

Figure B

Figure C (General Electric Characteristic)
一般電気特性

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