COSEL

TEST DATA OF CDS5002428H
(24V INPUT)

Regulated DC Power Supply
Oct. 7. 2002

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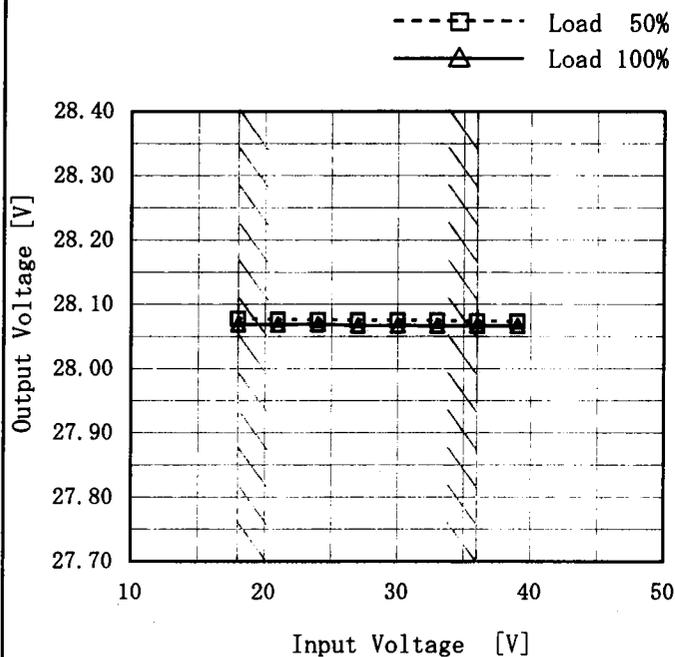
1. Graph

- - -☐- - - Load 50%
———△——— Load 100%

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%
18	28.078	28.069
21	28.076	28.069
24	28.076	28.069
27	28.075	28.068
30	28.075	28.068
33	28.075	28.067
36	28.074	28.067
39	28.073	28.067
--	—	—

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参考資料

COSEL

Model	CDS5002428H
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%
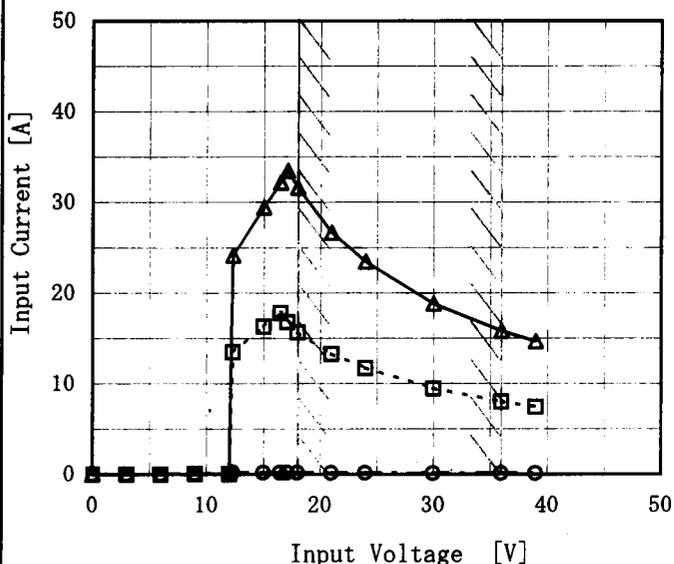
Note: Slanted line shows the range of the rated input voltage.

（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
3.0	0.000	0.000	0.000
6.0	0.000	0.000	0.000
9.0	0.059	0.060	0.060
12.0	0.047	0.041	0.046
12.3	0.222	13.478	24.149
15.0	0.185	16.304	29.437
16.5	0.179	17.815	32.198
17.1	0.170	16.786	33.498
18.0	0.163	15.647	31.639
21.0	0.150	13.272	26.670
24.0	0.141	11.707	23.459
30.0	0.116	9.463	18.836
36.0	0.097	7.999	15.838
39.0	0.099	7.428	14.678
--	—	—	—

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Model	CDS5002428H
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. 18V
    --□-- Input Volt. 24V
    -·○-·- Input Volt. 36V

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。
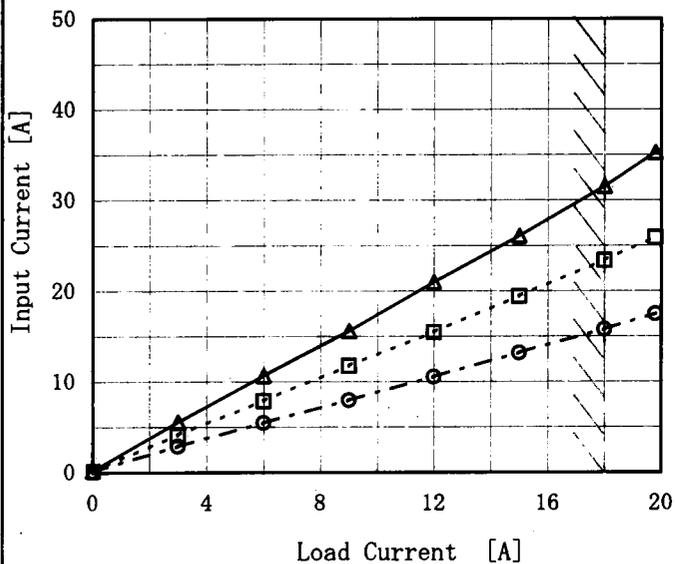
2. Values

Load Current [A]	Input Current [A]		
	Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]
0.0	0.164	0.135	0.104
3.0	5.564	4.170	2.890
6.0	10.650	7.880	5.468
9.0	15.589	11.737	7.957
12.0	20.961	15.439	10.522
15.0	26.062	19.416	13.148
18.0	31.538	23.367	15.780
19.8	35.245	25.892	17.435
--	—	—	—
--	—	—	—
--	—	—	—

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Model	CDS5002428H
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. 18V
---☐--- Input Volt. 24V
—·—○—·— Input Volt. 36V

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。
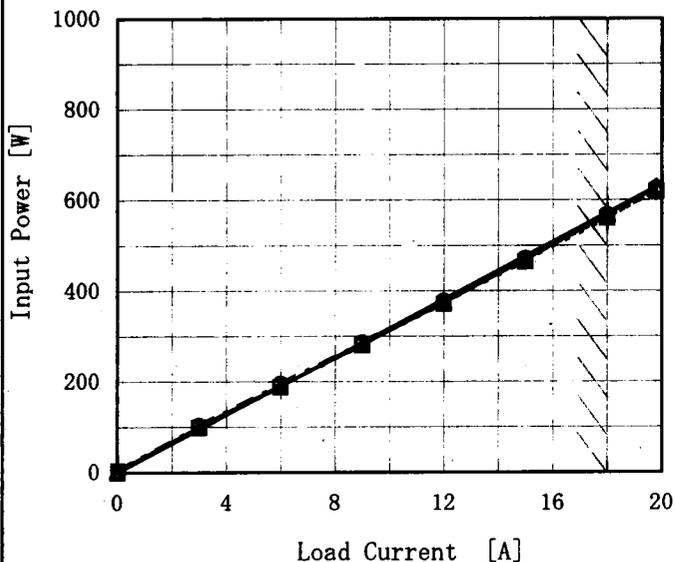
2. Values

Load Current [A]	Input Power [W]		
	Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]
0.0	2.9	3.2	3.7
3.0	100.4	99.4	103.7
6.0	190.5	188.2	195.9
9.0	280.9	280.2	286.8
12.0	374.0	371.1	378.2
15.0	468.4	464.2	471.5
18.0	567.4	560.5	567.8
19.8	629.5	619.0	626.4
--	—	—	—
--	—	—	—
--	—	—	—

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Model	CDS5002428H
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%

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。
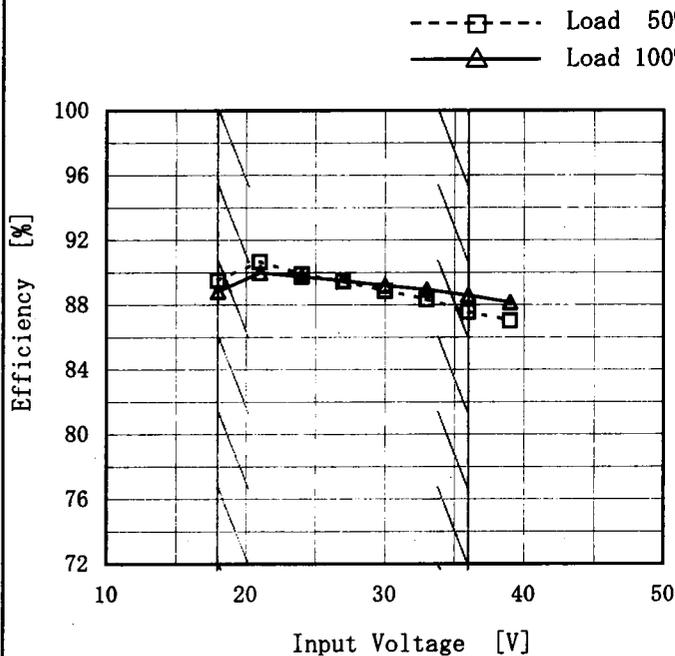
2. Values

Input Voltage [V]	Efficiency [%]	
	Load 50%	Load 100%
18	89.5	88.8
21	90.7	90.0
24	89.9	89.8
27	89.4	89.5
30	88.9	89.2
33	88.3	88.9
36	87.6	88.6
39	87.0	88.2
—	—	—

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COSEL

Model	CDS5002428H
Item	Efficiency (by Load Current) 効率（負荷特性）
Object	

Temperature	25℃
Testing Circuitry	Figure A

1. Graph

━━△━━ Input Volt. 18V
---☐--- Input Volt. 24V
—·—○—·— Input Volt. 36V

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。
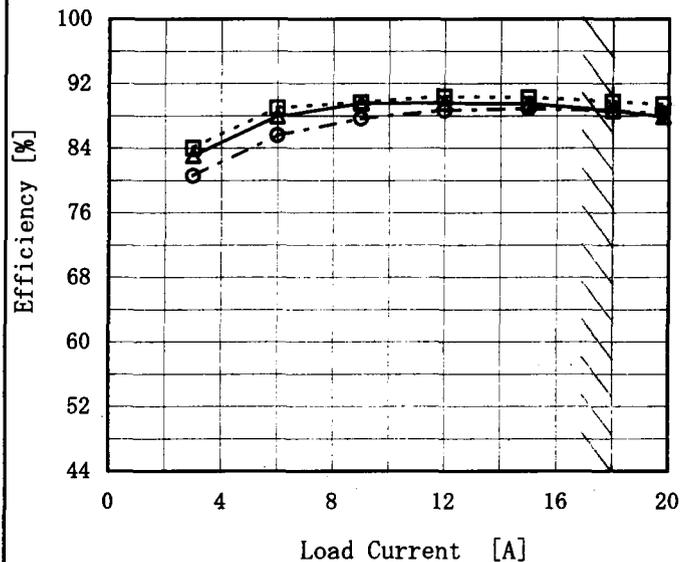
2. Values

Load Current [A]	Efficiency [%]		
	Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]
3.0	83.1	84.1	80.6
6.0	87.9	89.0	85.6
9.0	89.6	89.7	87.6
12.0	89.6	90.4	88.6
15.0	89.5	90.3	88.9
18.0	88.7	89.7	88.6
19.8	87.9	89.4	88.3
--	—	—	—
--	—	—	—
--	—	—	—

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Model	CDS5002428H
Item	Load Regulation 静的負荷変動
Object	+28V18A

Temperature   25℃
Testing Circuitry   Figure A

1. Graph

——△—— Input Volt. 18V
---□--- Input Volt. 24V
—·—○—·— Input Volt. 36V

Output Voltage [V] vs Load Current [A]

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。
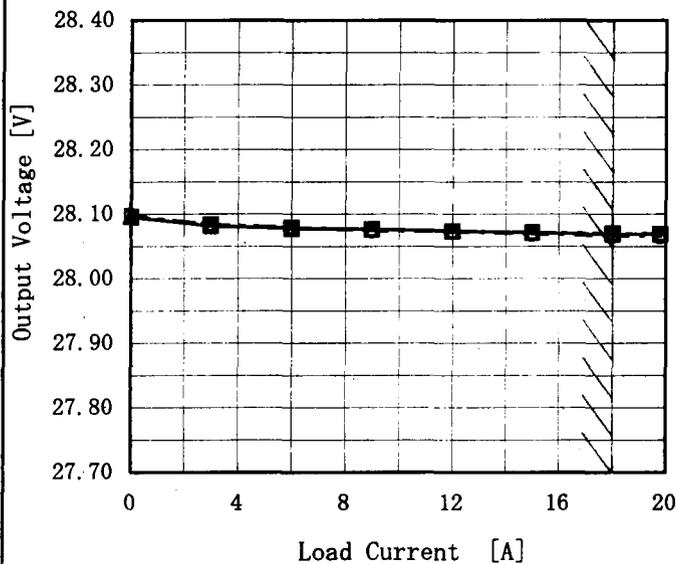
2. Values

Load Current [A]	Output Voltage [V]		
	Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]
0.0	28.096	28.097	28.098
3.0	28.082	28.084	28.084
6.0	28.078	28.079	28.079
9.0	28.077	28.077	28.074
12.0	28.074	28.074	28.072
15.0	28.072	28.072	28.069
18.0	28.069	28.070	28.067
19.8	28.069	28.069	28.066
--	—	—	—
--	—	—	—

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Model	CDS5002428H
Item	Ripple Voltage (by Load Current) リップル電圧 (負荷特性)
Object	+28V18A

Temperature 25℃
Testing Circuitry Figure A

1. Graph

―――△――― Input Volt. 18V
―・―○―・― Input Volt. 36V

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. 18 [V]	Input Volt. 36 [V]
0.0	20	20
3.5	30	30
7.0	30	30
11.0	30	30
14.5	30	30
18.0	30	30
22.0	30	30
--	-	-
--	-	-
--	-	-
--	-	-

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Model	CDS5002428H
Item	Ripple-Noise リップルノイズ
Object	+28V18A

Temperature   25℃
Testing Circuitry   Figure A

1. Graph

———△——— Input Volt. 18V
—·—○—·— Input Volt. 36V

Ripple-Noise [mV] vs Load Current [A]

2. Values

Load Current [A]	Ripple-Noise [mV]	
	Input Volt. 18 [V]	Input Volt. 36 [V]
0.0	40	40
3.5	50	60
7.0	60	60
11.0	60	60
14.5	60	60
18.0	60	60
22.0	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	CDS5002428H
Item	Overcurrent Protection 過電流保護
Object	+28V18A

Temperature　　　　25℃
Testing Circuitry　　Figure A

1. Graph

——————　Input Volt.　18V
——————　Input Volt.　24V
——————　Input Volt.　36V

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. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]
28.0	21.55	21.32	22.15
26.6	21.35	21.47	22.39
25.2	21.28	21.60	22.60
22.4	21.52	21.90	23.09
19.6	21.69	22.21	23.59
16.8	22.00	22.64	24.13
——	—	—	—
——	—	—	—
——	—	—	—
——	—	—	—
——	—	—	—
——	—	—	—

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CO$EL

Model	CDS5002428H
Item	Overvoltage Protection 過電圧保護
Object	+28V18A

Testing Circuitry   Figure A

1. Graph

```
——△——  Input Volt.  18V
---□---  Input Volt.  24V
—·—○—·—  Input Volt.  36V
```

Ambient Temperature [℃]
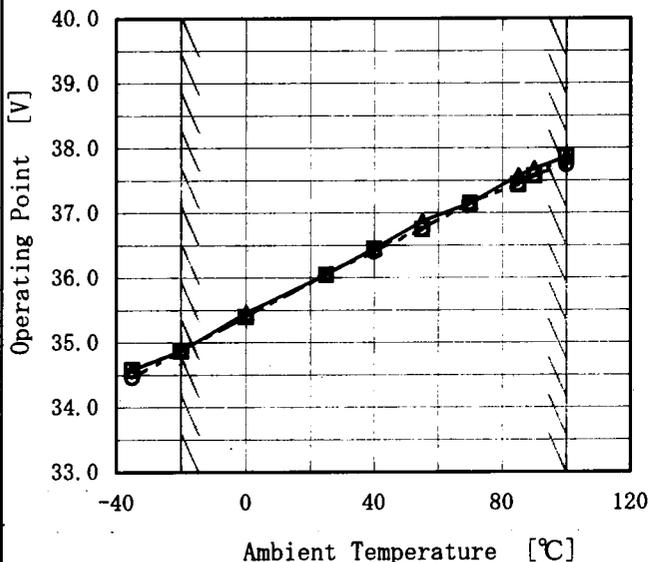
Load 0%

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. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]
-35	34.58	34.58	34.46
-20	34.87	34.87	34.87
0	35.46	35.40	35.40
25	36.05	36.05	36.05
40	36.45	36.45	36.40
55	36.87	36.75	36.75
70	37.15	37.15	37.15
85	37.57	37.44	37.44
90	37.68	37.57	37.57
100	37.86	37.86	37.74
--	—	—	—

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Model	CDS5002428H
Item	Dynamic Load Response 動的負荷変動
Object	＋28 V 18 A

Temperature	25℃
Testing Circuitry	Figure A

Input Volt.　　24 V

Cycle　　　　1000 ms

Load Current

Min. Load (0 A) ←→
Load 100% (18 A)

500 mV/div
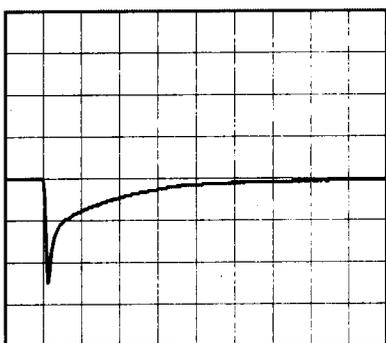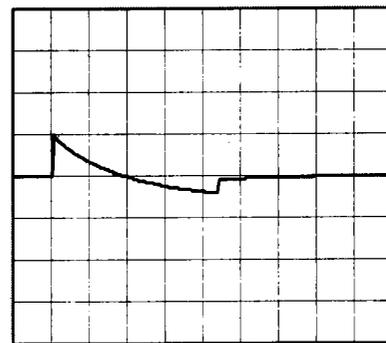
500 μs/div

100 ms/div

Min. Load (0 A) ←→
Load 50% (9 A)

500 mV/div
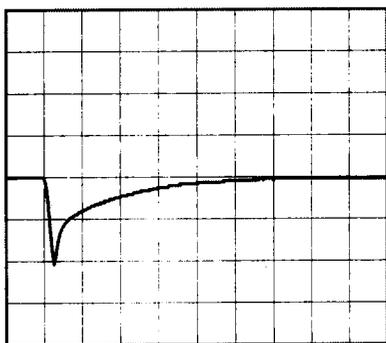
500 μs/div
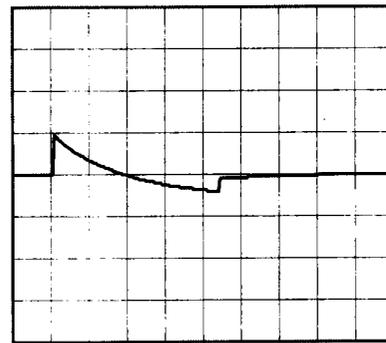
100 ms/div

Load 10% (1.8 A) ←→
Load 100% (18 A)

500 mV/div

500 μs/div

100 ms/div

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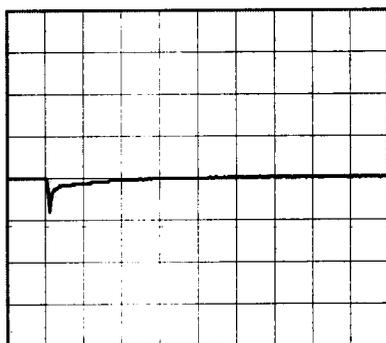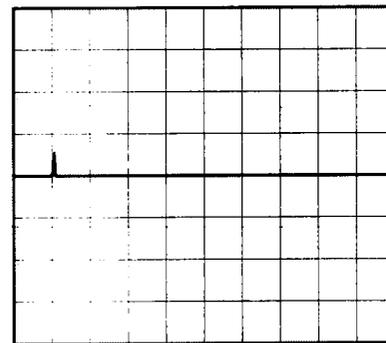
Model	CDS5002428H
Item	Rise and Fall Time 立上り、立下り時間
Object	+28V18A

Temperature	25℃
Testing Circuitry	Figure A

1. Graph

Input Volt.　18 V

Load　50%

Output Volt. [5V/div]

Load 100%

Output Volt. [5V/div]

Input Volt. [10V/div]　　Time　[100mS/div]

Time　[50mS/div]

2. Values

[mS]
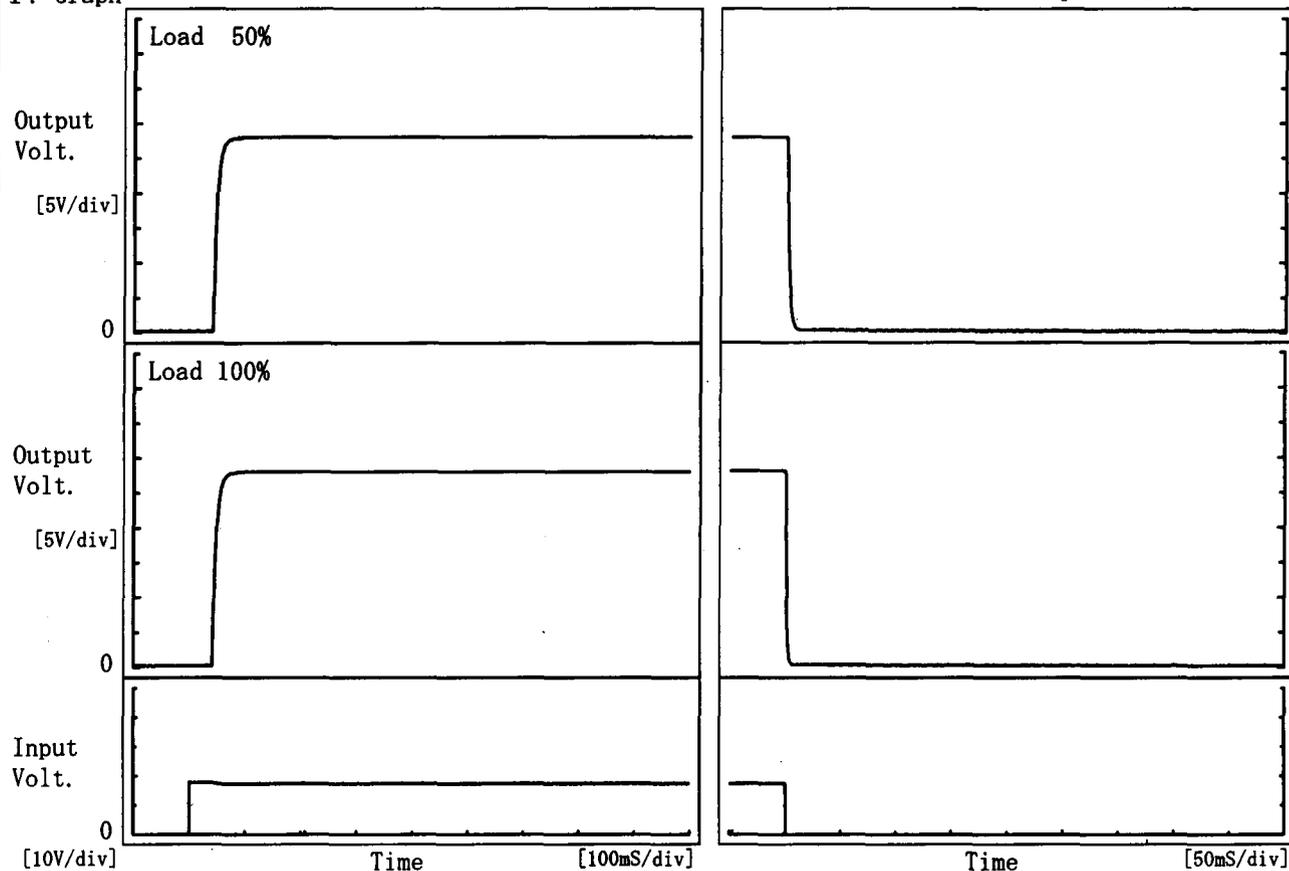
Load / Time	T d	T r	T s	T h	T f
50 %	41.5	14.5	56.0	0.5	4.0
100 %	41.5	14.5	56.0	0.5	2.0

Output Volt.
90%
10%

Input Volt.

Td　Tr　Th　Tf

Ts

— 13 —

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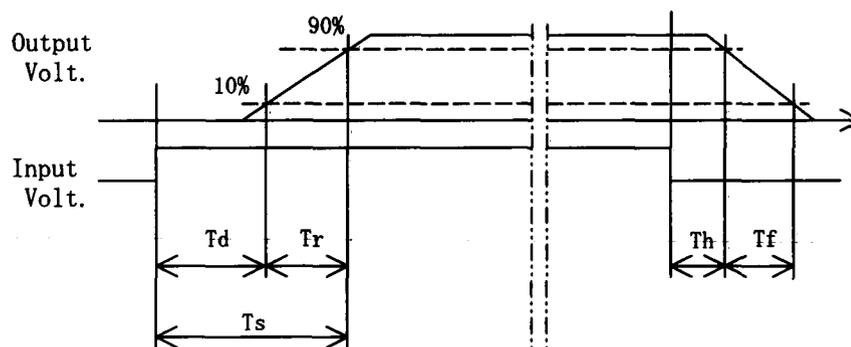
Model	CDS5002428H
Item	Ambient Temperature Drift 周囲温度変動
Object	+28V18A

Testing Circuitry　　Figure A

1. Graph

```
────△──── Input Volt. 18V
──-☐-──- Input Volt. 24V
—·—○—·— Input Volt. 36V
```

Output Voltage [V] vs Ambient Temperature [°C]

Load 100%
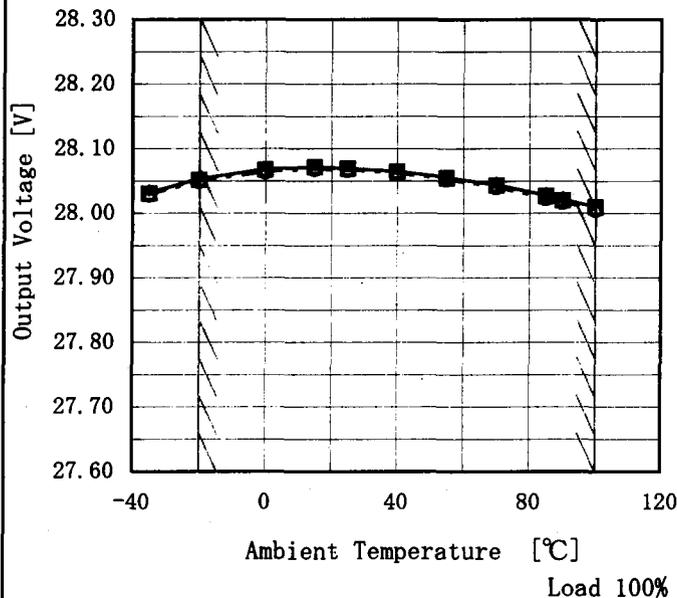
Note: Slanted line shows the range of the rated ambient temperature.

（注）斜線は定格周囲温度範囲を示す。

2. Values

Ambient Temperature [℃]	Output Voltage [V]		
	Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]
-35	28.032	28.030	28.028
-20	28.054	28.052	28.049
0	28.068	28.067	28.064
15	28.072	28.072	28.069
25	28.070	28.070	28.067
40	28.065	28.065	28.062
55	28.056	28.055	28.053
70	28.044	28.043	28.041
85	28.028	28.027	28.023
90	28.022	28.020	28.017
100	28.010	28.009	28.005

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参考資料

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Model	CDS5002428H
Item	Minimum Input Voltage for Regulated Output Voltage 最低レギュレーション電圧
Object	+28V18A

Testing Circuitry　　Figure A
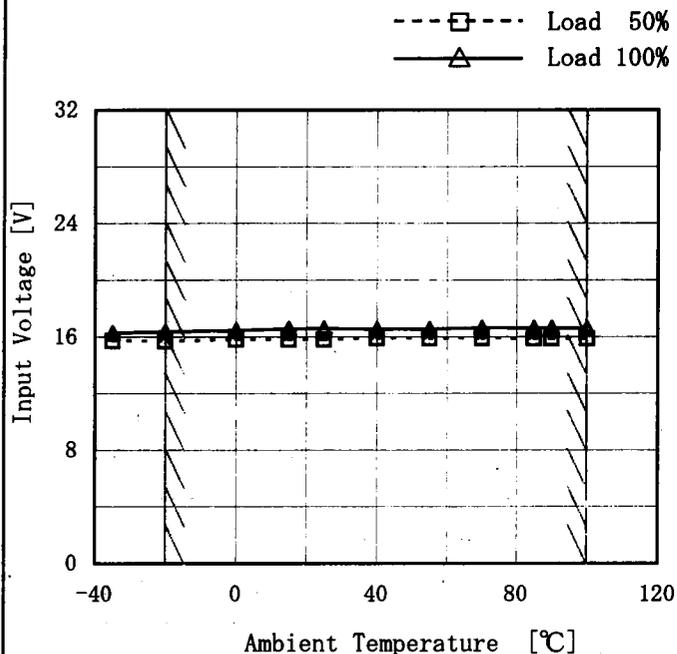
1. Graph

- - -☐- - - Load 50%
——△—— Load 100%

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 Temperature [℃]	Input Voltage [V]	
	Load 50%	Load 100%
-35	15.8	16.3
-20	15.7	16.4
0	15.8	16.5
15	15.8	16.6
25	15.9	16.6
40	15.9	16.6
55	15.9	16.6
70	15.9	16.7
85	15.9	16.7
90	15.9	16.7
100	15.9	16.6

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Model	CDS5002428H
Item	Ripple Voltage (by Ambient Temp.) リップル電圧（周囲温度特性）
Object	+28V18A

Testing Circuitry   Figure A
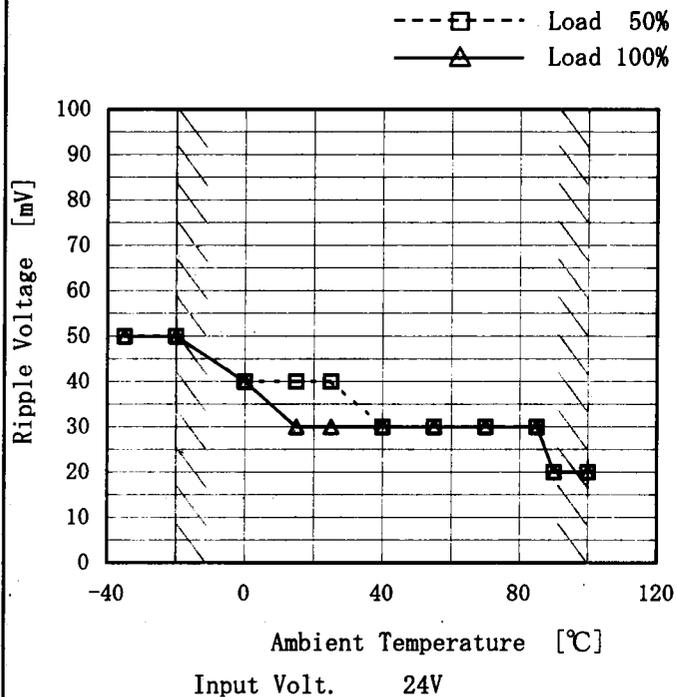
1．Graph

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

Ambient Temperature [℃]

Input Volt.   24V

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	50	50
−20	50	50
0	40	40
15	40	30
25	40	30
40	30	30
55	30	30
70	30	30
85	30	30
90	20	20
100	20	20

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Model	CDS5002428H
Item	Time Lapse Drift 経時ドリフト
Object	+28V18A

Temperature　　　25℃
Testing Circuitry　　Figure A

1. Graph

Input Volt.　　24V
Load　　　　　100%

2. Values

Time since start [H]	Output Voltage [V]
0.0	28.035
0.5	27.998
1.0	27.999
2.0	27.999
3.0	28.000
4.0	28.000
5.0	28.001
6.0	28.000
7.0	28.001
8.0	28.001

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Model	CDS5002428H
Item	Output Voltage Accuracy 定電圧精度
Object	+28V18A

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 ～ 100℃

Input Voltage　 : 18 ～ 36V

Load Current　　 : 0 ～ 18A

* 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 ～ 100℃

入力電圧　　　 : 18 ～ 36V

負荷電流　　　 : 0 ～ 18A

* 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	25	36	0	28.098	±50	±0.2
Minimum Voltage	100	36	18	27.998		

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参考資料

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Model	CDS5002428H
Item	Condense 結露特性
Object	+28V18A

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]	28.071	Input Volt.:24V,Load Current.:18A
Line Regulation [mV]	2	Input Volt.:18〜36V,Load Current.:18A
Load Regulation [mV]	27	Input Volt.:24V,Load Current.:0〜18A

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CO$EL

Model	CDS5002428H
Item	Line Noise Tolerance 入力雑音耐量
Object	+28V18A

Temperature	25℃
Testing Circuitry	Figure B

1. Conditions

- Input Voltage : 24 V
- Pulse Voltage : 2000 V
- Pulse Cycle : 10 mS

- Pulse Input Duration : 1 min. or more
- Load : 100 %

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

Temperature Chamber
恒温槽

DC Power Supply DC電源 → Electronic Switch 電子スイッチ → Power Meter 電力計 → Testing Circuitry 測定回路 Figure C → Electronic DC Load 電子負荷装置 → Oscilloscope オシロスコープ

Relay Unit リレー・ユニット

DVM

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

Figure A

DC Power Supply DC電源 → Noise Filter ノイズ フィルタ → Testing Circuitry 測定回路 Figure C → DC Ammeter 直流電流計 → Adjustable Load 可変負荷

Noise Simulator ノイズ シミュレータ — FG → Testing Circuitry

DC Voltmeter 直流電圧計

Figure B

Out Measurement Point
出力電圧測定ポイント

Ripple Measuremen Point
リップル測定ポイント

100mm

10μF   0.3μH   10μF   FG   +S   +VOUT

10μF   1000μF   10μF   +VIN   CDS5002428H   0.1μF   470μF

-VIN   -VOUT

10μF   0.3μH   10μF   FG   -S

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