参考資料

COSEL

TEST DATA OF CDS6002412

(24V INPUT)

Regulated DC Power Supply

Sep. 7, 2001

Approved by : Kazuyoshi Shimano
Design Manager

Prepared by : Katsumi Mizui
Design Engineer

コーセル株式会社

COSEL CO., LTD.

COSEL

CONTENTS

1. Line Regulation ・・・・・・・・・・・・・・・・・・・・・・・ 1
静的入力変動
2. Input Current (by Input Voltage) ・・・・・・・・・・・・・・ 2
入力電流（入力電圧特性）
3. Input Current (by Load Current) ・・・・・・・・・・・・・・ 3
入力電流（負荷特性）
4. Input Power (by Load Current) ・・・・・・・・・・・・・・・ 4
入力電力（負荷特性）
5. Efficiency (by Input Voltage) ・・・・・・・・・・・・・・・ 5
効率（入力電圧特性）
6. Efficiency (by Load Current) ・・・・・・・・・・・・・・・・ 6
効率（負荷特性）
7. Load Regulation ・・・・・・・・・・・・・・・・・・・・・・・ 7
静的負荷変動
8. Ripple Voltage (by Load Current) ・・・・・・・・・・・・・・ 8
リップル電圧（負荷特性）
9. Ripple-Noise ・・・・・・・・・・・・・・・・・・・・・・・・ 9
リップルノイズ
10. Overcurrent Protection ・・・・・・・・・・・・・・・・・・・ 10
過電流保護
11. Overvoltage Protection ・・・・・・・・・・・・・・・・・・・ 11
過電圧保護
12. Dynamic Load Responce ・・・・・・・・・・・・・・・・・・・ 12
動的負荷変動
13. Rise and Fall Time ・・・・・・・・・・・・・・・・・・・・・ 13
立上り、立下り時間
14. Ambient Temperature Drift ・・・・・・・・・・・・・・・・・ 14
周囲温度変動
15. Minimum Input Voltage for Regulated Output Voltage ・・・・ 15
最低レギュレーション電圧
16. Ripple Voltage (by Ambient Temperature) ・・・・・・・・・・ 16
リップル電圧（周囲温度特性）
17. Time Lapse Drift ・・・・・・・・・・・・・・・・・・・・・・ 17
経時ドリフト
18. Output Voltage Accuracy ・・・・・・・・・・・・・・・・・・ 18
定電圧精度
19. Condensation ・・・・・・・・・・・・・・・・・・・・・・・・ 19
結露特性
20. Line Noise Tolerance ・・・・・・・・・・・・・・・・・・・・ 20
入力雑音耐量
21. Figure of Testing Circuitry ・・・・・・・・・・・・・・・・・ 21
測定回路図

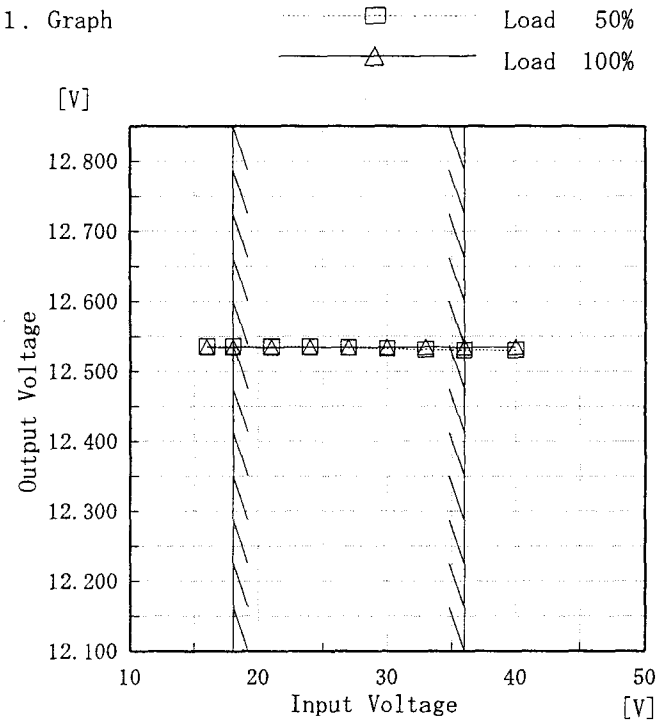
(Final Page 21)

COSEL

Model	CDS6002412
Item	Line Regulation 静的入力変動
Object	+12.5V48A

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]	Output Voltage [V]	
	Load 50%	Load 100%
16	12.536	12.535
18	12.536	12.535
21	12.536	12.534
24	12.535	12.534
27	12.534	12.534
30	12.533	12.534
33	12.531	12.535
36	12.531	12.535
40	12.531	12.535

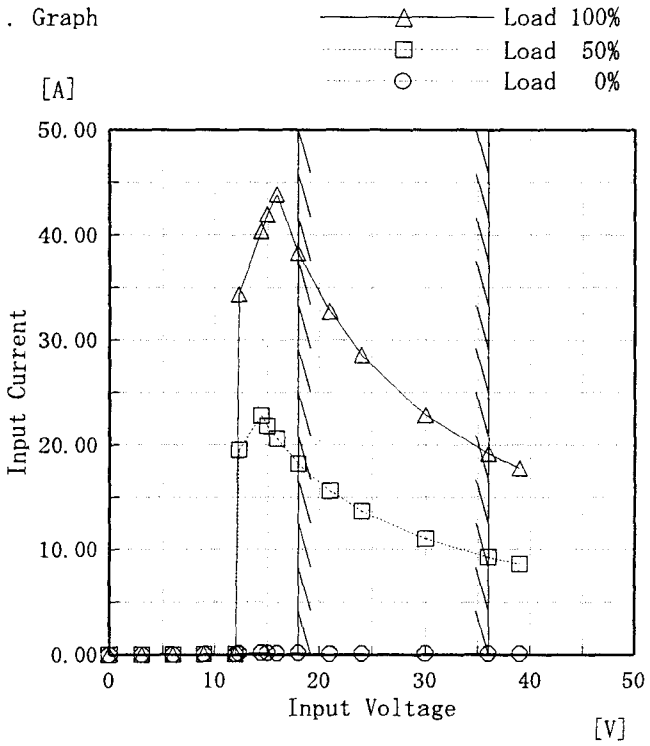
BC－3395

COSEL

Model	CDS6002412
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



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

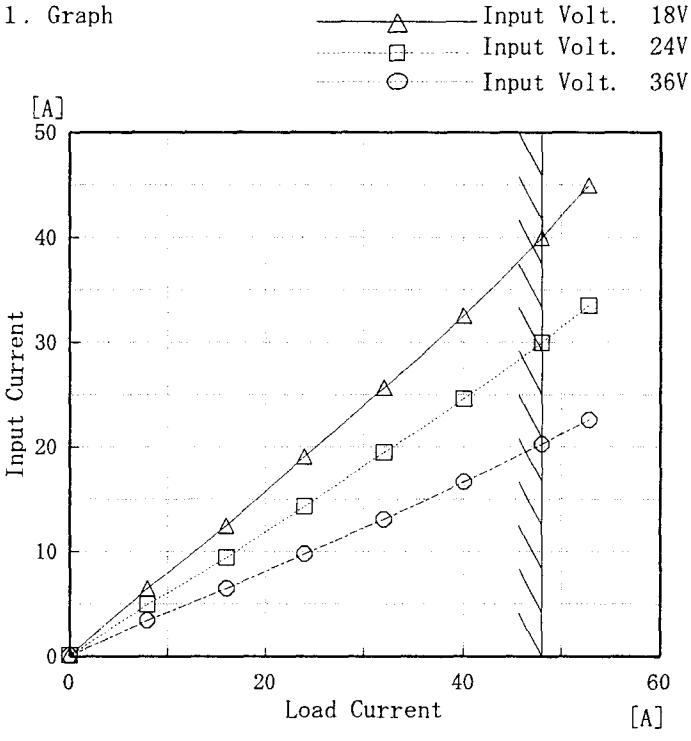
Input Voltage [V]	Input Current [A]		
	Load 0%	Load 50%	Load 100%
0.0	0.000	0.000	0.000
3.0	0.000	0.000	0.000
6.0	0.000	0.000	0.000
9.0	0.055	0.057	0.064
12.0	0.045	0.046	0.049
12.3	0.179	19.524	34.344
14.4	0.158	22.790	40.363
15.0	0.156	21.773	41.976
15.9	0.151	20.592	43.881
18.0	0.128	18.177	38.260
21.0	0.121	15.630	32.704
24.0	0.115	13.690	28.577
30.0	0.105	11.037	22.846
36.0	0.095	9.289	19.163
39.0	0.083	8.616	17.751
—	—	—	—

COSEL

Model	CDS6002412
Item	Input Current (by Load Current) 入力電流（負荷特性）
Object	――――

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

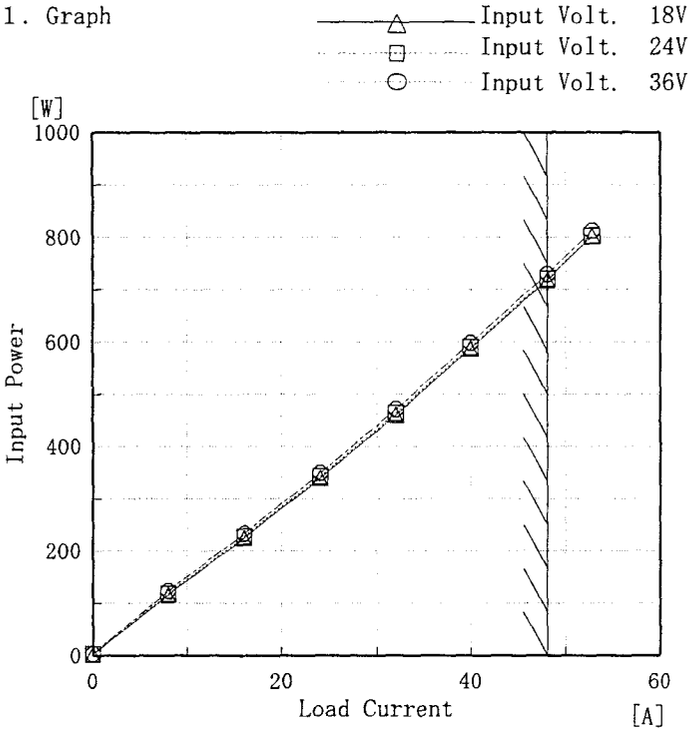
Load Current [A]	Input Current [A]		
	Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]
0.00	0.132	0.120	0.094
8.00	6.491	4.957	3.440
16.00	12.484	9.433	6.496
24.00	19.077	14.295	9.761
32.00	25.642	19.489	13.100
40.00	32.544	24.597	16.673
48.00	39.949	29.986	20.276
52.80	44.965	33.538	22.599
—	—	—	—
—	—	—	—
—	—	—	—
—	—	—	—

COSEL

Model	CDS6002412
Item	Input Power (by Load Current) 入力電力（負荷特性）
Object	――――

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

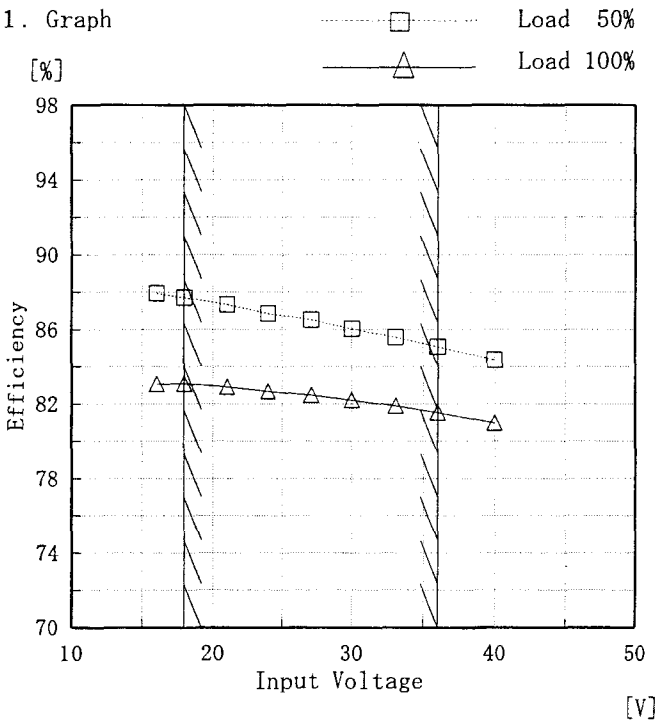
Load Current [A]	Input Power [W] Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]
0.00	2.37	2.88	3.38
8.00	115.59	118.55	123.79
16.00	224.78	227.61	233.05
24.00	339.57	342.63	349.26
32.00	460.58	463.83	471.21
40.00	587.26	590.10	597.78
48.00	718.69	720.95	729.96
52.80	801.60	802.27	811.96
—	—	—	—
—	—	—	—
—	—	—	—
—	—	—	—

COSEL

Model	CDS6002412
Item	Efficiency (by Input Voltage) 効率（入力電圧特性）
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

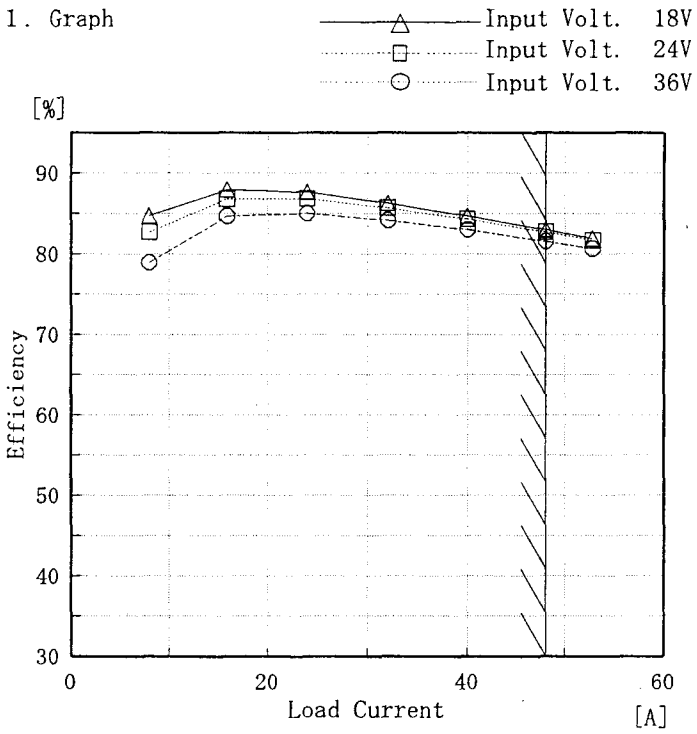
Input Voltage [V]	Efficiency [%]	
	Load 50%	Load 100%
16	87.9	83.1
18	87.7	83.1
21	87.3	82.9
24	86.8	82.7
27	86.5	82.5
30	86.0	82.2
33	85.6	81.9
36	85.1	81.5
40	84.4	81.0

COSEL

Model	CDS6002412
Item	Efficiency (by Load Current) 効率（負荷特性）
Object	――――

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

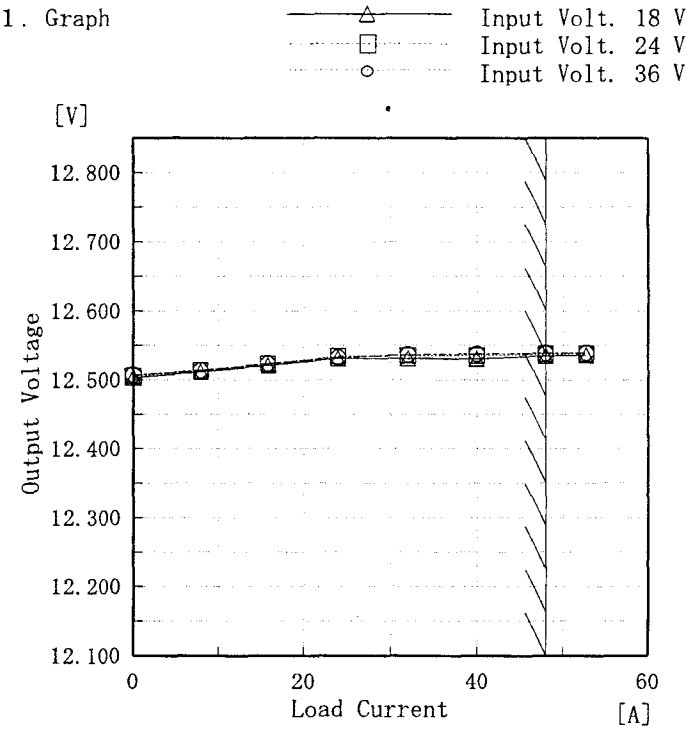
Load Current [A]	Efficiency [%] Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]
8.00	84.7	82.7	78.9
16.00	87.9	86.8	84.7
24.00	87.7	86.8	85.0
32.00	86.3	85.7	84.2
40.00	84.7	84.3	83.0
48.00	83.0	82.7	81.6
52.80	81.9	81.7	80.7
—	—	—	—
—	—	—	—
—	—	—	—
—	—	—	—
—	—	—	—

COSEL

Model	CDS6002412
Item	Load Regulation 静的負荷変動
Object	+12.5V48A

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

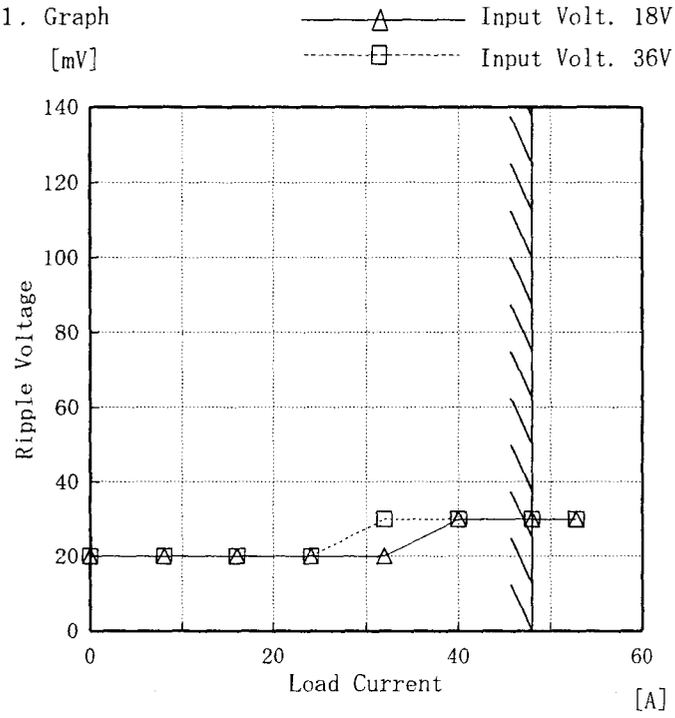
Load Current [A]	Output Voltage [V]		
	Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]
0.00	12.503	12.506	12.507
8.00	12.512	12.514	12.514
16.00	12.521	12.523	12.524
24.00	12.531	12.535	12.532
32.00	12.531	12.535	12.537
40.00	12.531	12.535	12.538
48.00	12.535	12.537	12.539
52.80	12.536	12.538	12.539
—	—	—	—
—	—	—	—

COSEL

Model	CDS6002412
Item	Ripple Voltage(by Load Current) リップル電圧(負荷特性)
Object	+12.5V48A

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。

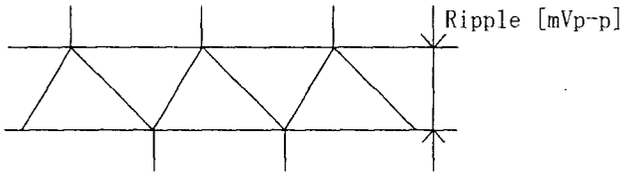


図　リップル波形図

2. Values

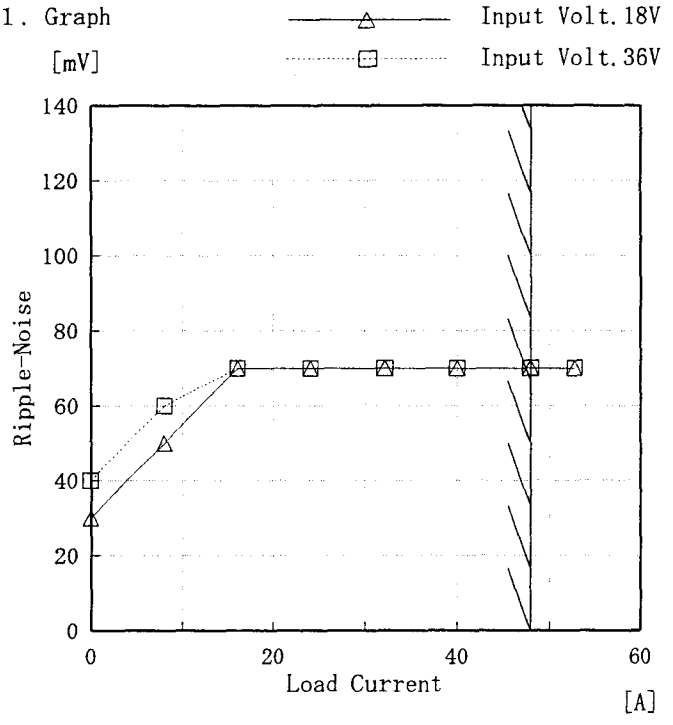
Load Current [A]	Ripple Output Volt. [mV]	
	Input Volt. 18 [V]	Input Volt. 36 [V]
0.0	20	20
8.0	20	20
16.0	20	20
24.0	20	20
32.0	20	30
40.0	30	30
48.0	30	30
52.8	30	30
—	—	—
—	—	—
—	—	—

COSEL

Model	CDS6002412
Item	Ripple-Noise　リップルノイズ
Object	+12.5V48A

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。

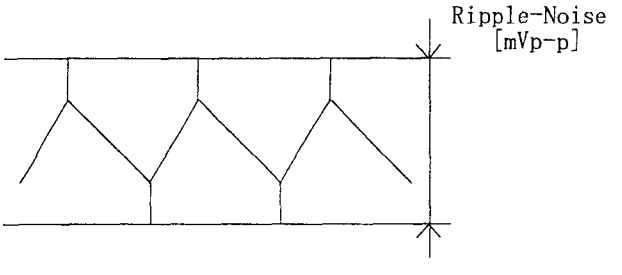


図　リップルノイズ波形図

2. Values

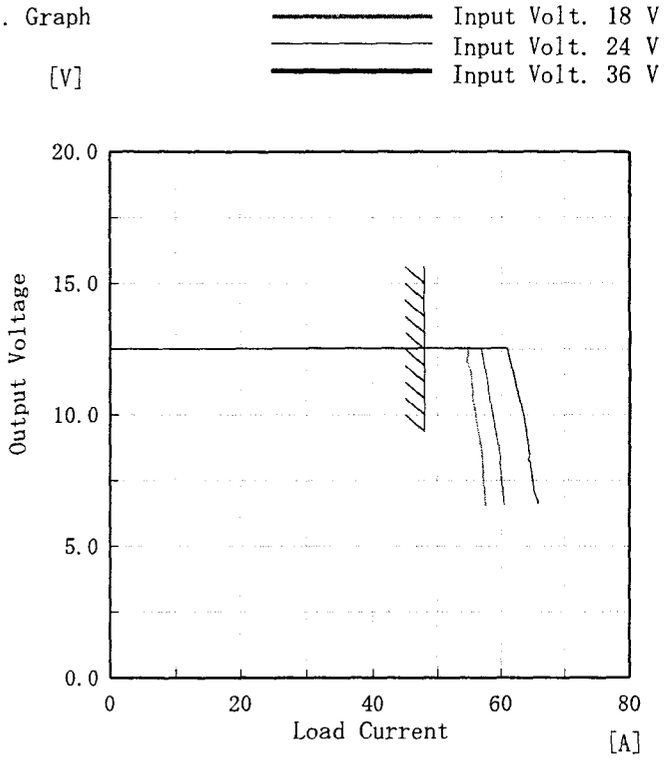
Load current [A]	Ripple-Noise [mV] Input Volt. 18 [V]	Ripple-Noise [mV] Input Volt. 36 [V]
0.0	30	40
8.0	50	60
16.0	70	70
24.0	70	70
32.0	70	70
40.0	70	70
48.0	70	70
52.8	70	70
—	—	—
—	—	—
—	—	—

COSEL

Model	CDS6002412
Item	Overcurrent Protection 過電流保護
Object	+12.5V48A

Temperature 25℃
Testing Circuitry Figure A

1. Graph



Note: Slanted line shows the range of the rated load current.
Intermittent operation occurs when the output voltage is from 6.5V to 0V.

(注)斜線は定格負荷電流範囲を示す。
6.5V～0V間は、間欠モードとなる。

2. Values

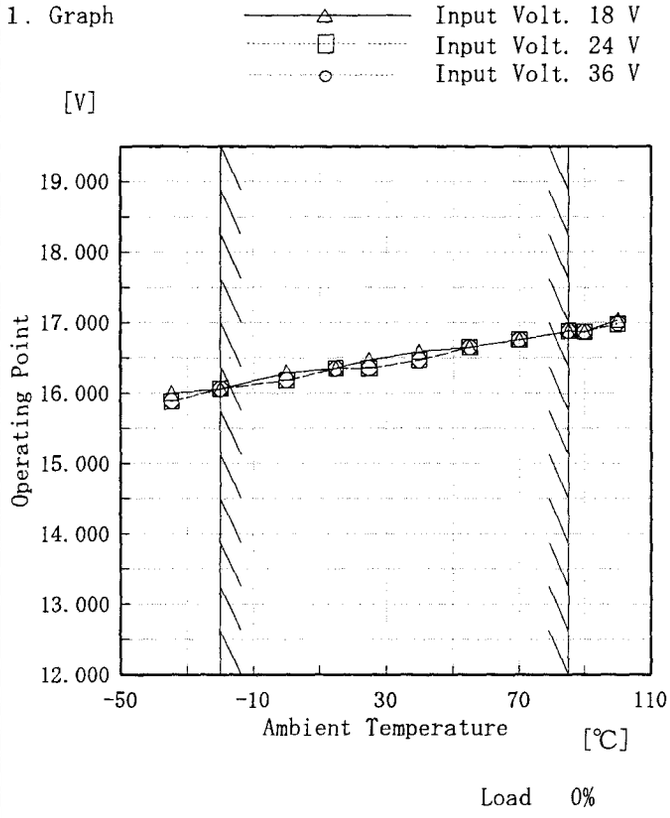
Output Voltage [V]	Load Current [A]		
	Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]
12.50	54.83	56.94	48.50
11.88	54.97	57.42	61.57
11.25	55.46	57.90	62.14
10.00	56.05	58.72	63.37
8.75	56.92	59.58	64.18
7.50	57.34	60.06	64.93
6.25	—	—	—
5.00	—	—	—
3.75	—	—	—
2.50	—	—	—
1.25	—	—	—
0.00	—	—	—

COSEL

Model	CDS6002412
Item	Overvoltage Protection 過電圧保護
Object	+12.5V48A

Testing Circuitry Figure A

1. Graph



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	16.00	15.88	15.88
-20	16.06	16.06	16.06
0	16.29	16.18	16.18
15	16.35	16.35	16.35
25	16.47	16.35	16.35
40	16.59	16.47	16.47
55	16.65	16.65	16.65
70	16.76	16.76	16.76
85	16.88	16.88	16.88
90	16.87	16.87	16.87
100	17.04	16.98	16.99

COSEL

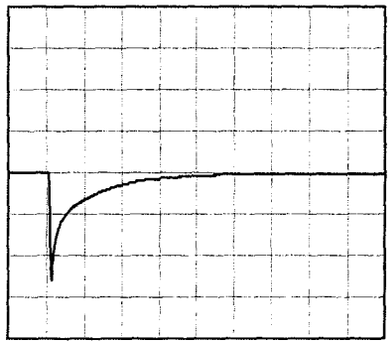
Model	CDS6002412		
Item	Dynamic Load Response 動的負荷変動	Temperature Testing Circuitry	25℃ Figure A
Object	+12.5V48A		

Input Volt. 24 V

Cycle 1000 ms

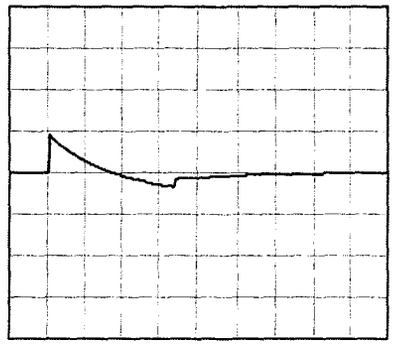
Load Current

Min. Load (0A) ←→
Load 100% (48A)



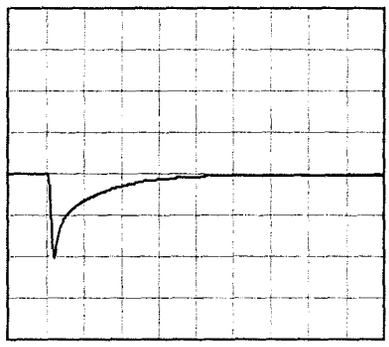
500 mV/div

500 μs/div



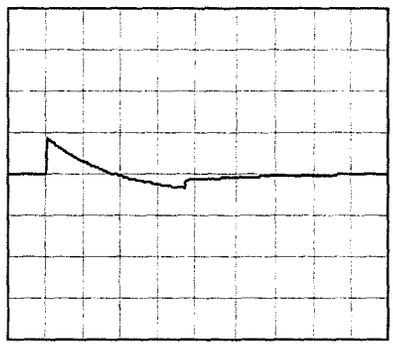
100 ms/div

Min. Load (0A) ←→
Load 50% (24A)



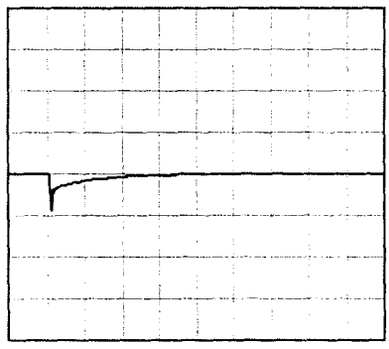
500 mV/div

500 μs/div



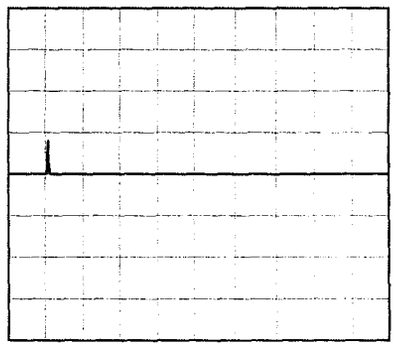
100 ms/div

Load 10% (4.8A) ←→
Load 100% (48A)



500 mV/div

500 μs/div



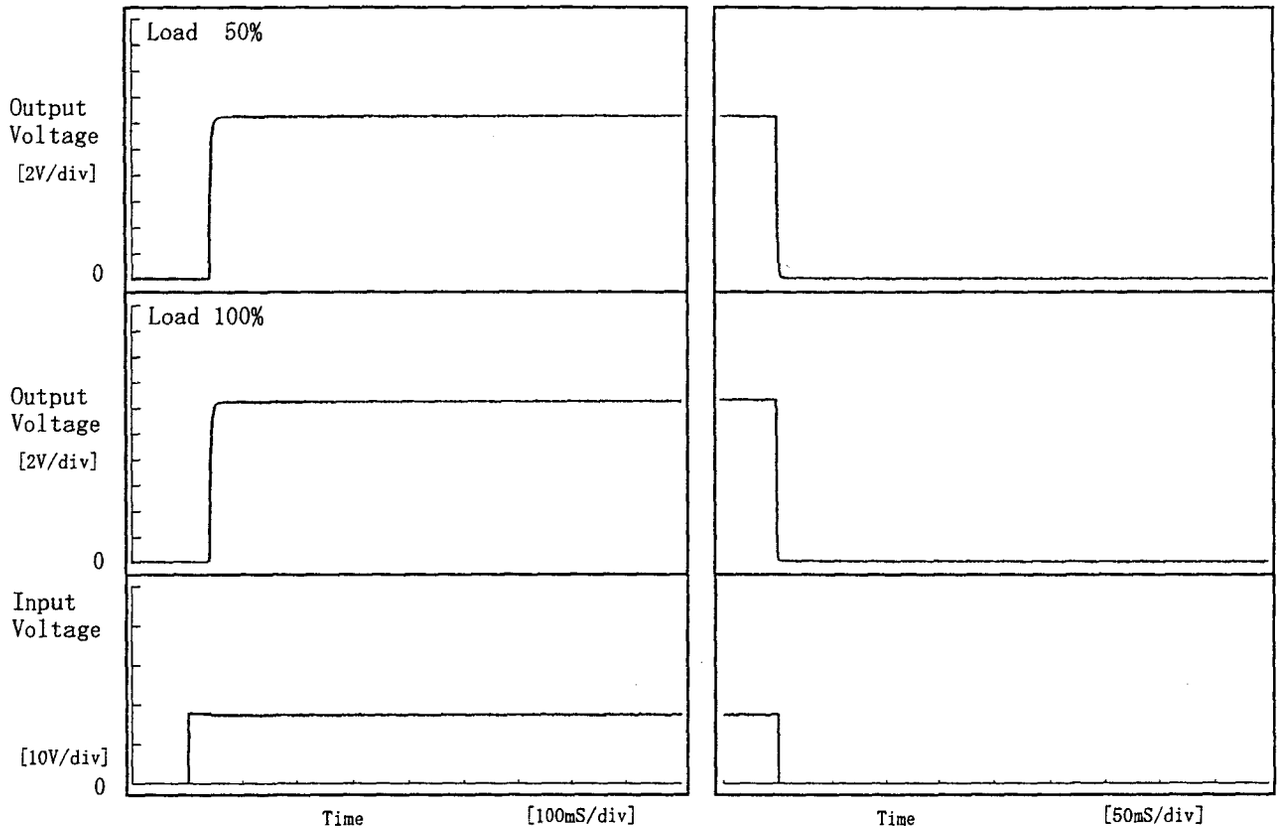
100 ms/div

COSEL

Model	CDS6002412		
Item	Rise and Fall Time 立上り、立下り時間	Temperature Testing Circuitry	25℃ Figure A
Object	+12.5V48A		

1. Graph

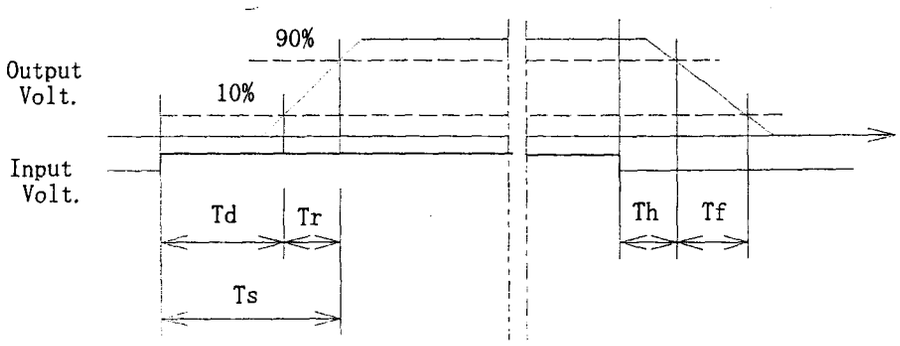
Input Volt. 18 V



2. Values

[mS]

Load \ Time	Td	Tr	Ts	Th	Tf
50 %	40.00	7.00	47.00	0.50	2.00
100 %	40.00	6.50	46.50	0.50	1.00

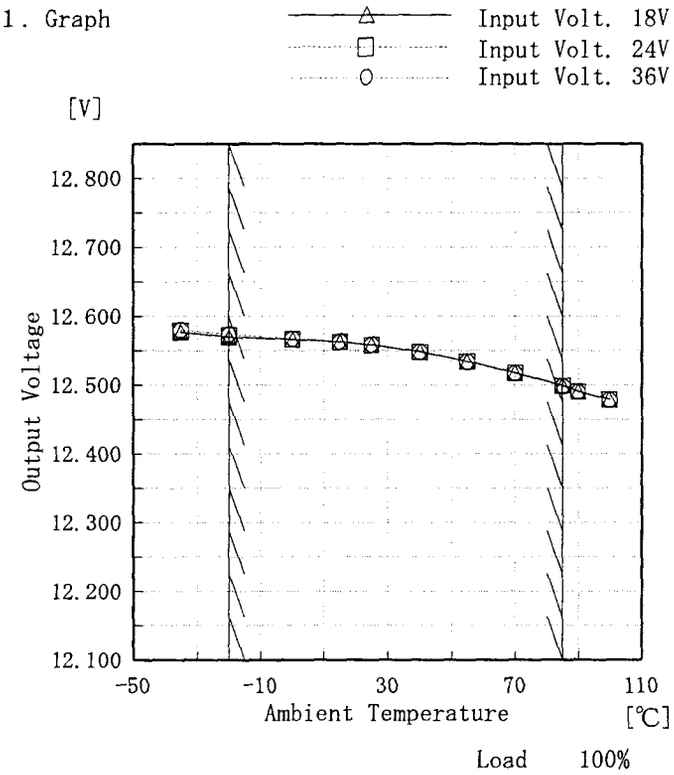


COSEL

Model	CDS6002412
Item	Ambient Temperature Drift 周囲温度変動
Object	+12.5V48A

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

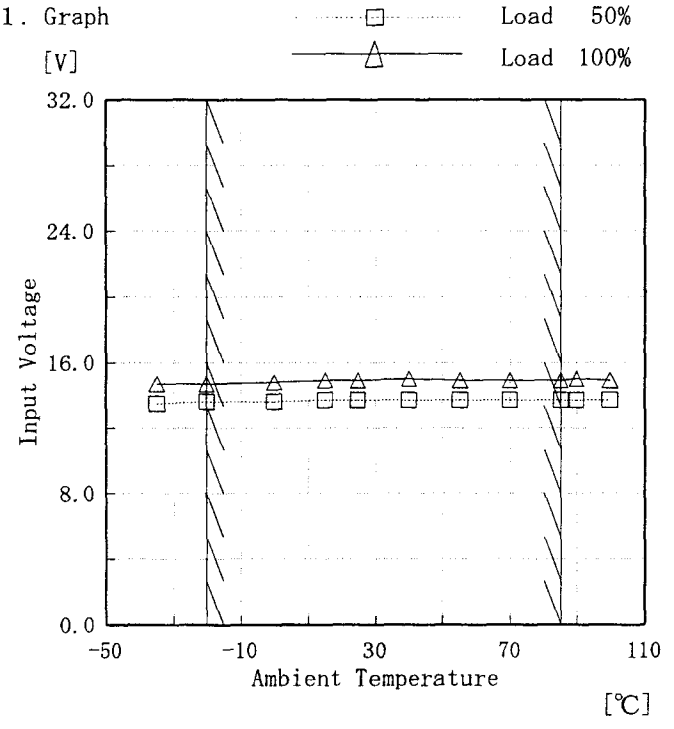
Ambient Temperature [℃]	Output Voltage [V]		
	Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]
-35	12.577	12.579	12.580
-20	12.570	12.572	12.574
0	12.566	12.566	12.567
15	12.563	12.562	12.563
25	12.558	12.558	12.559
40	12.548	12.548	12.548
55	12.534	12.534	12.534
70	12.518	12.517	12.517
85	12.500	12.499	12.498
90	12.491	12.490	12.490
100	12.479	12.478	12.478

COSEL

Model	CDS6002412
Item	Minimum Input Voltage for Regulated Output Voltage 最低レギュレーション電圧
Object	+12.5V48A

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

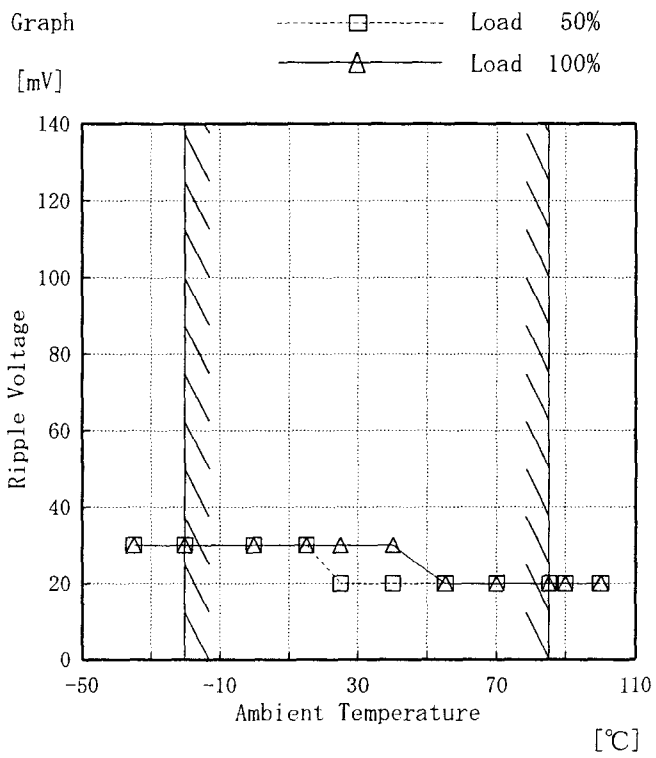
Ambient Temperature [℃]	Input Voltage [V]	
	Load 50%	Load 100%
-35	13.5	14.7
-20	13.6	14.7
0	13.6	14.8
15	13.7	14.9
25	13.7	14.9
40	13.7	15.0
55	13.7	14.9
70	13.7	14.9
85	13.7	14.9
90	13.7	15.0
100	13.7	14.9

COSEL

Model	CDS6002412
Item	Ripple Voltage (by Ambient Temp.) リップル電圧（周囲温度特性）
Object	+12.5V48A

Testing Circuitry Figure A

1. Graph



Input Volt. 24 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

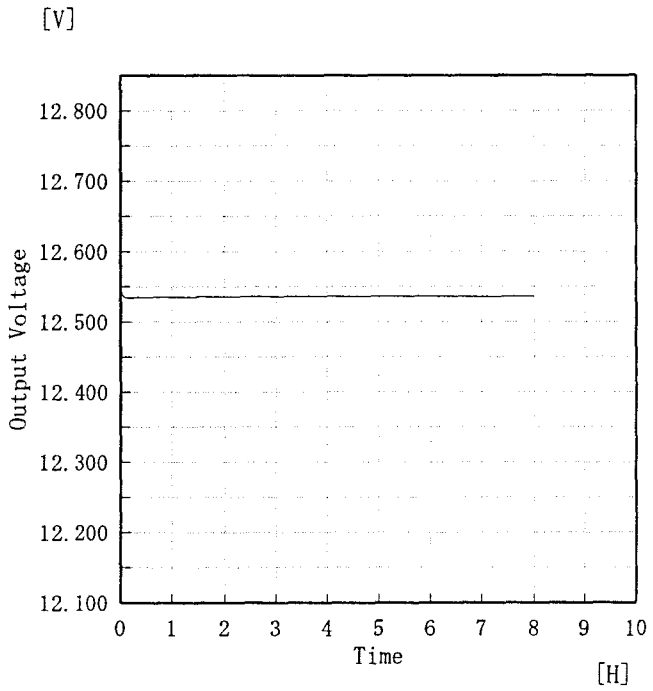
Ambient Temp. [℃]	Ripple Voltage [mV]	
	Load 50%	Load 100%
-35	30	30
-20	30	30
0	30	30
15	30	30
25	20	30
40	20	30
55	20	20
70	20	20
85	20	20
90	20	20
100	20	20

COSEL

Model	CDS6002412
Item	Time Lapse Drift 経時ドリフト
Object	+12.5V48A

Temperature 25℃
Testing Circuitry Figure A

1. Graph



Input Volt. 24V
Load 100%

2. Values

Time since start [H]	Output Voltage [V]
0.0	12.553
0.5	12.535
1.0	12.535
2.0	12.536
3.0	12.536
4.0	12.536
5.0	12.536
6.0	12.536
7.0	12.536
8.0	12.536

COSEL

Model	CDS6002412
Item	Output Voltage Accuracy 定電圧精度
Object	+12.5V48A

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 : 18～ 36 V
Load Current : 0～48 A

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

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

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　18～ 36 V
負荷電流　0～48 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

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

2. Values

Item	Temperature [℃]	Input Voltage [V]	Output Current [A]	Output Voltage [V]	Output Voltage Accuracy [mV]	Output Voltage Accuracy(Ration)[%]
Maximum Voltage	-20	36	48	12.574	±55	±0.5
Minimum Voltage	85	36	0	12.464		

COSEL

Model	CDS6002412	
Item	Condensation 結露特性	Testing Circuitry Figure A
Object	+12.5V48A	

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]	12.534	Input Volt.: 24V, Load Current:48A
Line Regulation [mV]	1	Input Volt.: 18～36V, Load Current:48A
Load Regulation [mV]	32	Input Volt.: 24V, Load Current:0～48A

COSEL

Model	CDS6002412		
Item	Line Noise Tolerance 入力雑音耐量	Temperature Testing Circuitry	25℃ Figure B
Object	+12.5V48A		

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

Conditions

Input Voltage :24 V
Pulse Voltage :±2000 V
Pulse Cycle :10 mS
Pulse Input Duration:1 min. or more
Load :100 %

COSEL

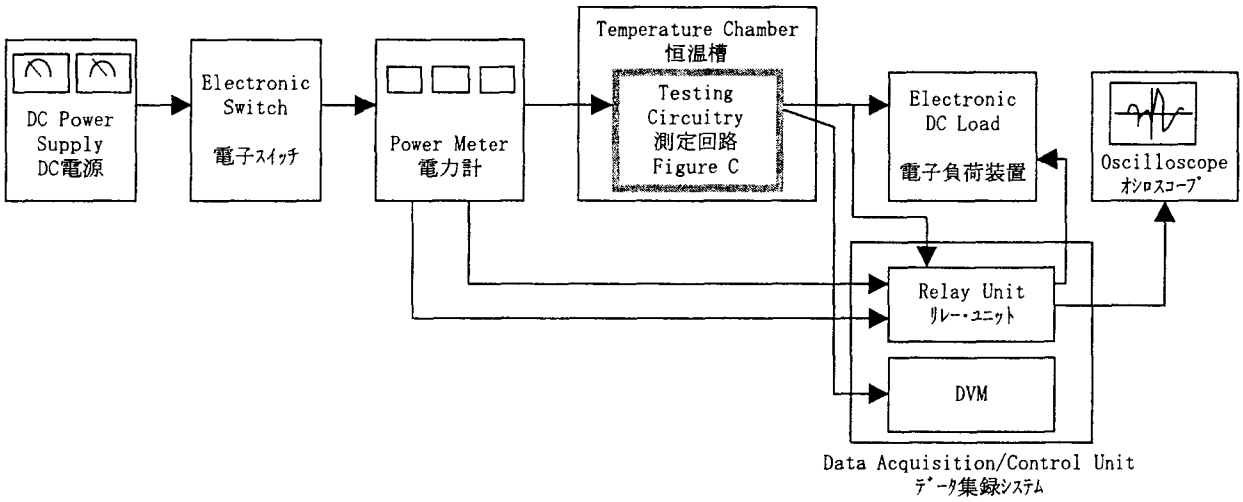


Figure A

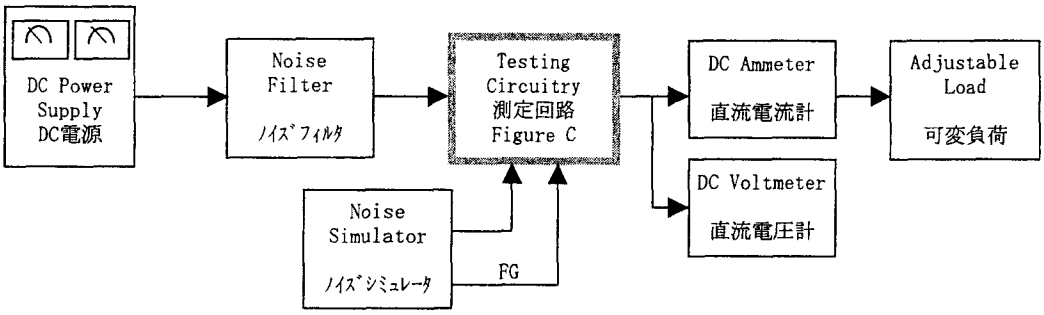


Figure B

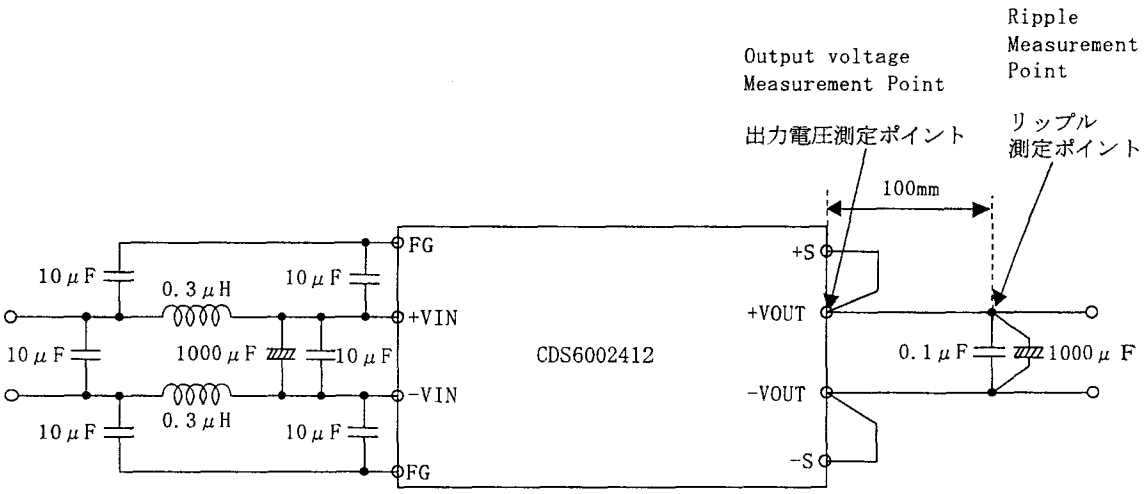


Figure C (General Electric Characteristic)
一般電気特性