

# TEST DATA OF CDS6002412H

(24V INPUT)

Regulated DC Power Supply  
July 17, 2002

Approved by : Kazuyoshi Shimano  
Kazuyoshi Shimano Design Manager

Prepared by : Kiyokazu Tajima  
Kiyokazu Tajima Design Engineer

**コーセル株式会社**  
**COSEL CO.,LTD.**

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(Final Page 21)

# COSEL

Model	CDS6002412H																																		
Item	Line Regulation 静的入力変動	Temperature	25℃																																
Object	+12. 5V48A	Testing Circuitry	Figure A																																
1. Graph		2. Values																																	
<div><div>---□--- Load 50%</div><div>—△— Load 100%</div></div> <p>Output Voltage [V]</p> <p>Input Voltage [V]</p>		<table><tr><th rowspan="2">Input Voltage [V]</th><th colspan="2">Output Voltage [V]</th></tr><tr><th>Load 50%</th><th>Load 100%</th></tr><tr><td>20.5</td><td>12.486</td><td>12.481</td></tr><tr><td>24.0</td><td>12.486</td><td>12.483</td></tr><tr><td>27.0</td><td>12.486</td><td>12.482</td></tr><tr><td>30.0</td><td>12.486</td><td>12.482</td></tr><tr><td>33.0</td><td>12.487</td><td>12.482</td></tr><tr><td>36.0</td><td>12.486</td><td>12.482</td></tr><tr><td>39.0</td><td>12.488</td><td>12.481</td></tr><tr><td>--</td><td>--</td><td>--</td></tr><tr><td>--</td><td>--</td><td>--</td></tr></table>		Input Voltage [V]	Output Voltage [V]		Load 50%	Load 100%	20.5	12.486	12.481	24.0	12.486	12.483	27.0	12.486	12.482	30.0	12.486	12.482	33.0	12.487	12.482	36.0	12.486	12.482	39.0	12.488	12.481	--	--	--	--	--	--
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— 1 —

BC-3445

# COSEL

Model		CDS6002412H	
Item	Input Current (by Input Voltage) 入力電流 (入力電圧特性)		
Object			

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	0.056	0.061	0.061
12.0	0.045	0.050	0.047
12.3	0.148	0.045	0.045
15.0	0.117	14.627	26.457
18.0	0.100	17.487	33.153
18.6	0.104	17.824	34.249
19.8	0.095	17.726	34.972
20.5	0.090	16.272	34.072
21.0	0.091	15.643	32.530
24.0	0.082	13.739	28.514
30.0	0.062	11.049	22.962
36.0	0.056	9.266	19.216
39.0	0.057	8.589	17.790

# COSEL

Model		CDS6002412H	Temperature		25℃																																																			
Item		Input Current (by Load Current) 入力電流（負荷特性）	Testing Circuitry		Figure A																																																			
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1. Graph		<div><div>—△—</div>Input Volt. 20.5V</div> <div><div>---□---</div>Input Volt. 24V</div> <div><div>- - -○- - -</div>Input Volt. 36V</div> <div>Input Current [A]</div> <div>Load Current [A]</div>	2. Values																																																					
			<table><tr><th rowspan="2">Load Current [A]</th><th colspan="3">Input Current [A]</th></tr><tr><th>Input Volt. 20.5[V]</th><th>Input Volt. 24[V]</th><th>Input Volt. 36[V]</th></tr><tr><td>0.0</td><td>0.084</td><td>0.082</td><td>0.062</td></tr><tr><td>8.0</td><td>5.587</td><td>4.735</td><td>3.274</td></tr><tr><td>16.0</td><td>10.807</td><td>9.215</td><td>6.216</td></tr><tr><td>24.0</td><td>16.034</td><td>13.712</td><td>9.276</td></tr><tr><td>32.0</td><td>21.581</td><td>18.604</td><td>12.447</td></tr><tr><td>40.0</td><td>27.478</td><td>23.437</td><td>15.822</td></tr><tr><td>48.0</td><td>33.601</td><td>28.785</td><td>19.202</td></tr><tr><td>52.8</td><td>37.675</td><td>31.694</td><td>21.348</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></table>			Load Current [A]	Input Current [A]			Input Volt. 20.5[V]	Input Volt. 24[V]	Input Volt. 36[V]	0.0	0.084	0.082	0.062	8.0	5.587	4.735	3.274	16.0	10.807	9.215	6.216	24.0	16.034	13.712	9.276	32.0	21.581	18.604	12.447	40.0	27.478	23.437	15.822	48.0	33.601	28.785	19.202	52.8	37.675	31.694	21.348	--	--	--	--	--	--	--	--	--	--	--	--
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Model		CDS6002412H		Temperature		25°C																																																				
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BC-3445

# COSEL

Model		CDS6002412H	
Item		Efficiency (by Input Voltage) 効率（入力電圧特性）	
Object			

1. Graph

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□

---

Load 50%

—

△

—

Load 100%

Efficiency [%]

100

96

92

88

84

80

76

72

10

20

30

40

50

Input Voltage [V]

2. Values

Input Voltage [V]	Efficiency [%]	
	Load 50%	Load 100%
16.0	89.6	84.7
18.0	90.1	85.9
20.5	90.9	86.8
24.0	90.9	87.2
27.0	90.6	87.0
30.0	90.4	86.8
33.0	90.1	86.7
36.0	89.8	86.5
39.0	89.5	86.2

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

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Object	+12.5V48A	Testing Circuitry	Figure A																																						
1. Graph		2. Values																																							
<div><div><div>—△— Input Volt. 20.5V</div><div>-·-○-·- Input Volt. 36V</div></div><div>Ripple Voltage [mV]</div><div>Load Current [A]</div></div> <div><p>Ripple Voltage is shown as p-p in the figure below.</p><p>Note: Slanted line shows the range of the rated load current.</p><p>リップル電圧は、下図 p-p 値で示される。</p><p>(注) 斜線は定格負荷電流範囲を示す。</p><div><div>Ripple [mVp-p]</div></div><div><div>Fig. Complex Ripple Wave Form</div><div>図 リップル波形詳細図</div></div></div>		<table><tr><th rowspan="2">Load Current [A]</th><th colspan="2">Ripple Voltage [mV]</th></tr><tr><th>Input Volt. 20.5 [V]</th><th>Input Volt. 36 [V]</th></tr><tr><td>0.0</td><td>20</td><td>20</td></tr><tr><td>8.0</td><td>20</td><td>20</td></tr><tr><td>16.0</td><td>20</td><td>20</td></tr><tr><td>24.0</td><td>20</td><td>30</td></tr><tr><td>32.0</td><td>30</td><td>30</td></tr><tr><td>40.0</td><td>30</td><td>30</td></tr><tr><td>48.0</td><td>30</td><td>30</td></tr><tr><td>52.8</td><td>30</td><td>30</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></table>		Load Current [A]	Ripple Voltage [mV]		Input Volt. 20.5 [V]	Input Volt. 36 [V]	0.0	20	20	8.0	20	20	16.0	20	20	24.0	20	30	32.0	30	30	40.0	30	30	48.0	30	30	52.8	30	30	---	---	---	---	---	---	---	---	---
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# COSEL

Model		CDS6002412H	
Item		Ripple-Noise リップルノイズ	
Object		+12. 5V48A	

1. Graph

△

Input Volt. 20.5V

⊖

Input Volt. 36V

140

120

100

80

60

40

0

Ripple-Noise [mV]

0

20

40

60

Load Current [A]

<

# COSEL

Model	CDS6002412H																																																													
Item	Overcurrent Protection 過電流保護	Temperature	25℃																																																											
Object	+12.5V48A	Testing Circuitry	Figure A																																																											
1. Graph		2. Values																																																												
<div><div><div></div>Input Volt. 20.5V</div><div><div></div>Input Volt. 24V</div><div><div></div>Input Volt. 36V</div></div> <p>Output Voltage [V]</p> <p>Load Current [A]</p> <p>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。</p> <p>Intermittent operation occurs when the output voltage is from 6.5V to 0V. 6.5V～0V間は、間欠モードとなる。</p>		<table><tr><th rowspan="2">Output Voltage [V]</th><th colspan="3">Load Current [A]</th></tr><tr><th>Input Volt. 20.5[V]</th><th>Input Volt. 24[V]</th><th>Input Volt. 36[V]</th></tr><tr><td>12.500</td><td>55.99</td><td>49.01</td><td>48.88</td></tr><tr><td>11.875</td><td>55.93</td><td>55.91</td><td>57.78</td></tr><tr><td>11.250</td><td>56.04</td><td>56.17</td><td>58.24</td></tr><tr><td>10.000</td><td>56.33</td><td>56.81</td><td>59.38</td></tr><tr><td>8.750</td><td>56.72</td><td>57.43</td><td>60.65</td></tr><tr><td>7.500</td><td>56.92</td><td>58.24</td><td>61.48</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><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></table>		Output Voltage [V]	Load Current [A]			Input Volt. 20.5[V]	Input Volt. 24[V]	Input Volt. 36[V]	12.500	55.99	49.01	48.88	11.875	55.93	55.91	57.78	11.250	56.04	56.17	58.24	10.000	56.33	56.81	59.38	8.750	56.72	57.43	60.65	7.500	56.92	58.24	61.48	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
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# COSEL

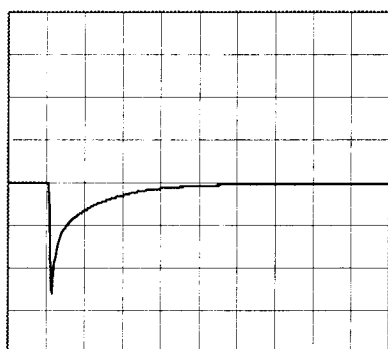
Model	CDS6002412H	Temperature	25°C
Item	Dynamic Load Response 動的負荷変動	Testing Circuitry	Figure A
Object	+12.5V 48A		

Input Volt. 24 V  
Cycle 1000 ms

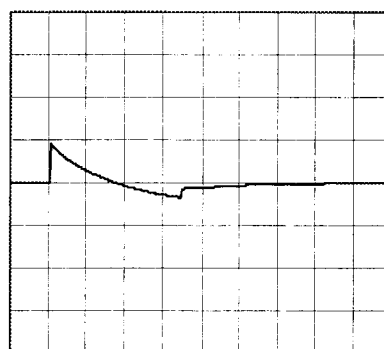
Load Current

Min. Load (0A)  $\longleftrightarrow$   
Load 100% (48A)

500 mV/div



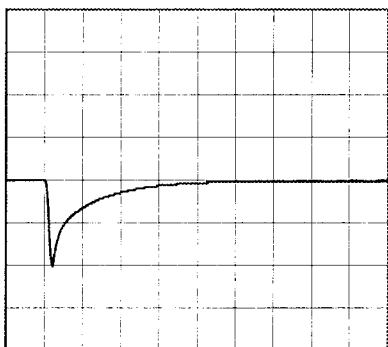
500  $\mu$ s/div



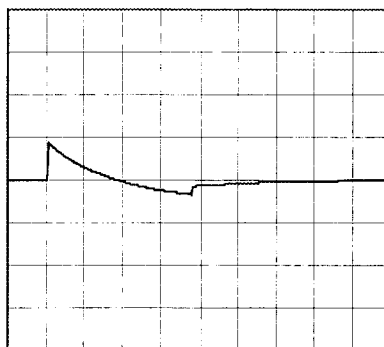
100 ms/div

Min. Load (0A)  $\longleftrightarrow$   
Load 50% (24A)

500 mV/div



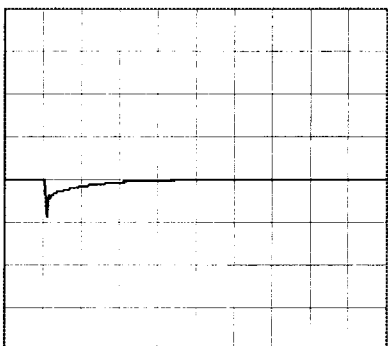
500  $\mu$ s/div



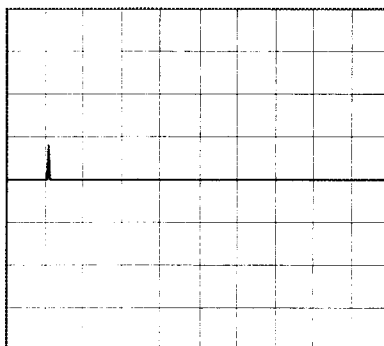
100 ms/div

Load 10% (4.8A)  $\longleftrightarrow$   
Load 100% (48A)

500 mV/div



500  $\mu$ s/div



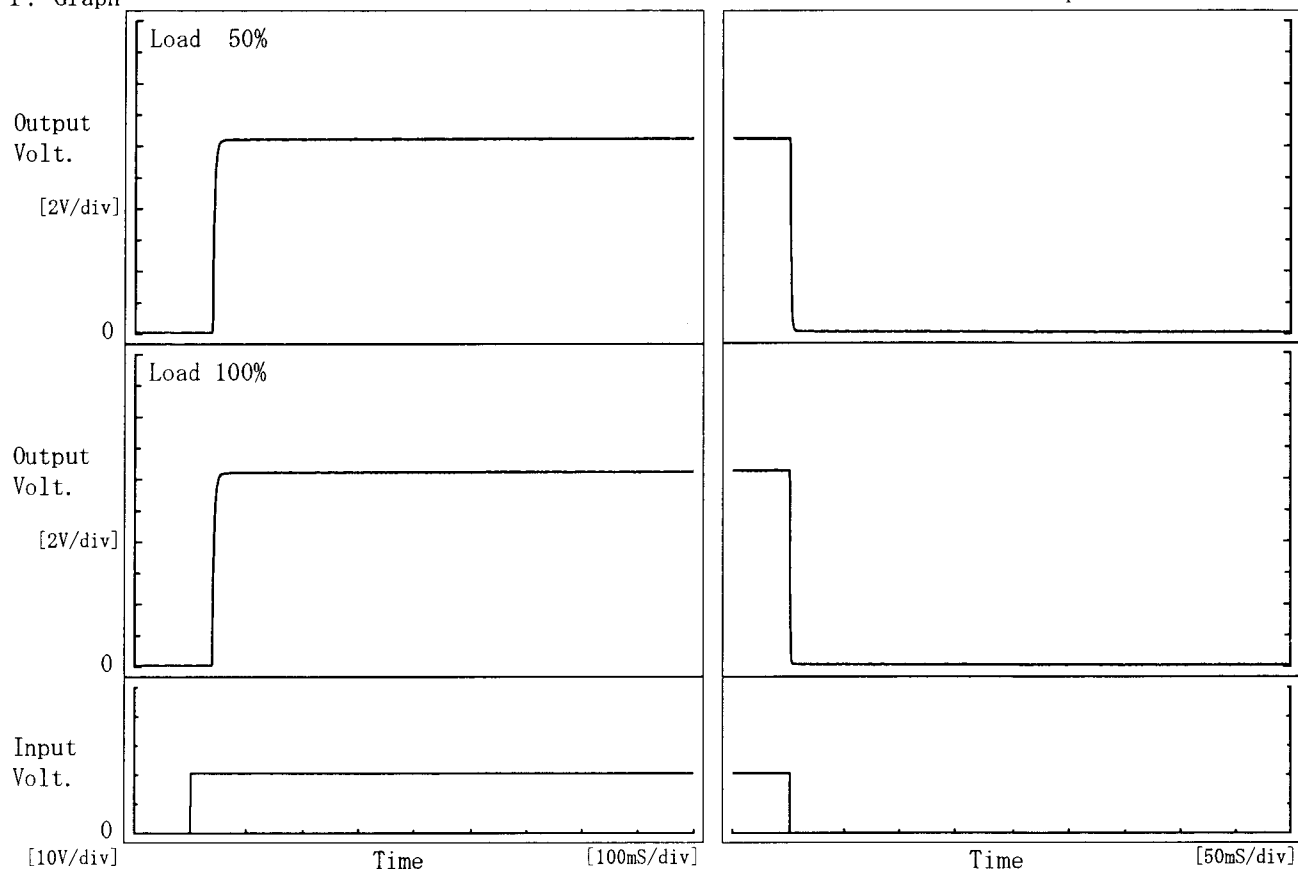
100 ms/div

# COSEL

Model	CDS6002412H	Temperature	25°C
Item	Rise and Fall Time 立上り、立下り時間	Testing Circuitry	Figure A
Object	+12.5V48A		

## 1. Graph

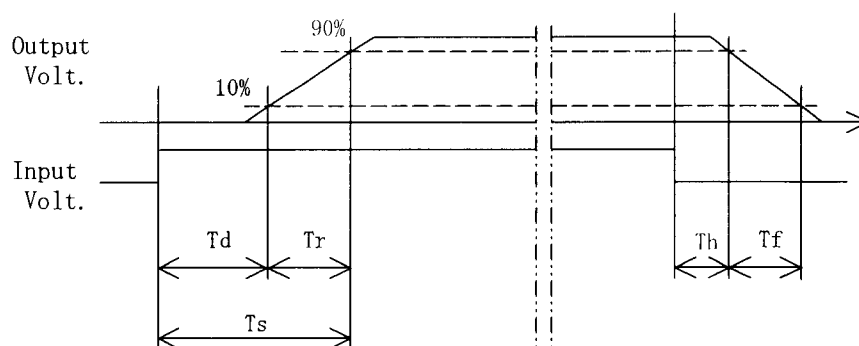
Input Volt. 20.5 V



## 2. Values

[mS]

Load \ Time	T d	T r	T s	T h	T f
50 %	39.0	7.5	46.5	0.5	1.8
100 %	39.5	7.0	46.5	0.5	1.0



# COSEL

Model		CDS6002412H		Testing Circuitry      Figure A																																																		
Item		Ambient Temperature Drift 周囲温度変動																																																				
Object		+12.5V48A																																																				
1. Graph		<div><div><div>—△—</div><div>Input Volt. 20.5V</div></div><div><div>---□---</div><div>Input Volt. 24V</div></div><div><div>---○---</div><div>Input Volt. 36V</div></div></div> <div>Output Voltage [V]</div> <div>Ambient Temperature [°C]</div> <div>Load 100%</div>		2. Values																																																		
		<table><tr><th rowspan="2">Ambient Temperature [°C]</th><th colspan="3">Output Voltage [V]</th></tr><tr><th>Input Volt. 20.5[V]</th><th>Input Volt. 24[V]</th><th>Input Volt. 36[V]</th></tr><tr><td>-35</td><td>12.492</td><td>12.493</td><td>12.490</td></tr><tr><td>-20</td><td>12.496</td><td>12.496</td><td>12.495</td></tr><tr><td>0</td><td>12.501</td><td>12.501</td><td>12.500</td></tr><tr><td>25</td><td>12.501</td><td>12.501</td><td>12.500</td></tr><tr><td>40</td><td>12.495</td><td>12.495</td><td>12.494</td></tr><tr><td>55</td><td>12.482</td><td>12.481</td><td>12.481</td></tr><tr><td>70</td><td>12.466</td><td>12.466</td><td>12.465</td></tr><tr><td>85</td><td>12.447</td><td>12.446</td><td>12.445</td></tr><tr><td>90</td><td>12.436</td><td>12.436</td><td>12.435</td></tr><tr><td>100</td><td>12.425</td><td>12.425</td><td>12.423</td></tr><tr><td>—</td><td>—</td><td>—</td><td>—</td></tr></table>		Ambient Temperature [°C]	Output Voltage [V]			Input Volt. 20.5[V]	Input Volt. 24[V]	Input Volt. 36[V]	-35	12.492	12.493	12.490	-20	12.496	12.496	12.495	0	12.501	12.501	12.500	25	12.501	12.501	12.500	40	12.495	12.495	12.494	55	12.482	12.481	12.481	70	12.466	12.466	12.465	85	12.447	12.446	12.445	90	12.436	12.436	12.435	100	12.425	12.425	12.423	—	—	—	—
Ambient Temperature [°C]	Output Voltage [V]																																																					
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Note: Slanted line shows the range of the rated ambient temperature.																																																						
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Model		CDS6002412H	
Item		Minimum Input Voltage for Regulated Output Voltage 最低レギュレーション電圧	
Object		+12.5V48A	
1. Graph		2. Values	

---□--- Load 50%

—△— Load 100%

Input Voltage [V]

Ambient Temperature [°C]

Ambient Temperature [°C]	Input Voltage [V]	
	Load 50%	Load 100%
-35	16.8	17.5
-20	16.8	17.6
0	16.9	17.7
25	16.9	17.8
40	17.0	17.7
55	17.0	17.7
70	17.0	17.8
85	17.0	17.8
90	16.9	17.8
100	16.9	17.8
—	—	—

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

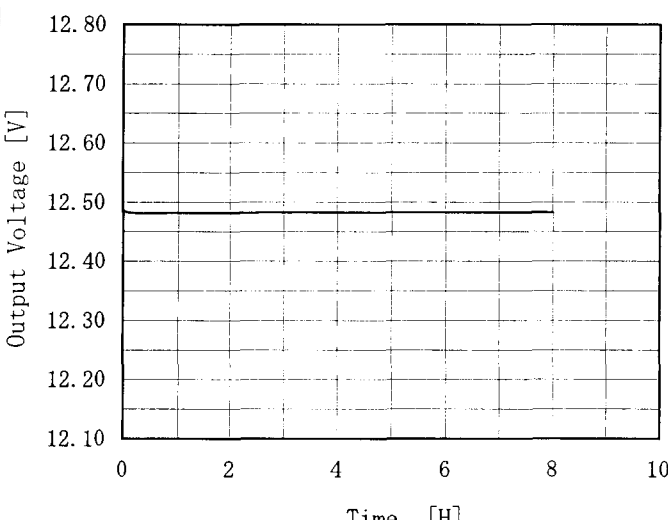
(注) 斜線は定格周囲温度範囲を示す。

BC-3445

# COSEL

		Testing Circuitry      Figure A																																						
Model	CDS6002412H																																							
Item	Ripple Voltage (by Ambient Temp.) リップル電圧 (周囲温度特性)																																							
Object	+12. 5V48A																																							
1. Graph		2. Values																																						
<div>-----□----- Load 50%</div> <div>-----△----- Load 100%</div> <div><p style="text-align: center;">Ambient Temperature [°C]</p><p style="text-align: center;">Input Volt.      24V</p></div>																																								
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		<table><tr><th rowspan="2">Ambient Temperature [°C]</th><th colspan="2">Ripple Voltage [mV]</th></tr><tr><th>Load 50%</th><th>Load 100%</th></tr><tr><td>-35</td><td>30</td><td>30</td></tr><tr><td>-20</td><td>30</td><td>30</td></tr><tr><td>0</td><td>30</td><td>30</td></tr><tr><td>15</td><td>30</td><td>30</td></tr><tr><td>25</td><td>30</td><td>30</td></tr><tr><td>40</td><td>20</td><td>30</td></tr><tr><td>55</td><td>20</td><td>30</td></tr><tr><td>70</td><td>20</td><td>20</td></tr><tr><td>85</td><td>20</td><td>20</td></tr><tr><td>90</td><td>20</td><td>20</td></tr><tr><td>100</td><td>20</td><td>20</td></tr></table>	Ambient Temperature [°C]	Ripple Voltage [mV]		Load 50%	Load 100%	-35	30	30	-20	30	30	0	30	30	15	30	30	25	30	30	40	20	30	55	20	30	70	20	20	85	20	20	90	20	20	100	20	20
Ambient Temperature [°C]	Ripple Voltage [mV]																																							
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70	20	20																																						
85	20	20																																						
90	20	20																																						
100	20	20																																						

# COSEL

Model	CDS6002412H																								
Item	Time Lapse Drift 経時ドリフト	Temperature	25℃																						
Object	+12.5V48A	Testing Circuitry	Figure A																						
1. Graph		2. Values																							
<div><p>Output Voltage [V]</p><p>Time [H]</p><p>Input Volt. 24V</p><p>Load 100%</p></div>		<table><tr><th>Time since start [H]</th><th>Output Voltage [V]</th></tr><tr><td>0.0</td><td>12.487</td></tr><tr><td>0.5</td><td>12.481</td></tr><tr><td>1.0</td><td>12.482</td></tr><tr><td>2.0</td><td>12.482</td></tr><tr><td>3.0</td><td>12.483</td></tr><tr><td>4.0</td><td>12.483</td></tr><tr><td>5.0</td><td>12.483</td></tr><tr><td>6.0</td><td>12.483</td></tr><tr><td>7.0</td><td>12.483</td></tr><tr><td>8.0</td><td>12.483</td></tr></table>		Time since start [H]	Output Voltage [V]	0.0	12.487	0.5	12.481	1.0	12.482	2.0	12.482	3.0	12.483	4.0	12.483	5.0	12.483	6.0	12.483	7.0	12.483	8.0	12.483
Time since start [H]	Output Voltage [V]																								
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6.0	12.483																								
7.0	12.483																								
8.0	12.483																								

# COSEL

Model		CDS6002412H	Testing Circuitry    Figure A
Item		Output Voltage Accuracy 定電圧精度	
Object		+12.5V48A	

## 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 : -10 ~ 85°C

Input Voltage : 20.5 ~ 36V

Load Current : 0 ~ 48A

\* Output Voltage Accuracy =  $\pm (\text{Maximum of Output Voltage} - \text{Minimum of Output Voltage}) / 2$

\* 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 : -10 ~ 85°C

入力電圧 : 20.5 ~ 36V

負荷電流 : 0 ~ 48A

\* 定電圧精度(変動値) =  $\pm (\text{出力電圧の最高値} - \text{出力電圧の最低値}) / 2$

\* 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 [°C]	Input Voltage[V]	Output		Output Voltage Accuracy	
			Current[A]	Voltage[V]	Value [mV]	Ration [%]
Maximum Voltage	25	24	0	12.504	±33	±0.3
Minimum Voltage	85	36	48	12.438		

# COSEL

Model		CDS6002412H	Testing Circuitry    Figure A
Item		Condense 結露特性	
Object		+12.5V48A	

## 1. Condensation test

Testing procedure is as follows.

- ① Keeping and cooling the unit in a tank at  $-10^{\circ}\text{C}$  for an hour with the input off.
- ② Taking it out of the tank and dewing itself in a room where the temperature is  $25^{\circ}\text{C}$  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 $-10^{\circ}\text{C}$ に冷却しておき、約1時間後に恒温槽から取り出し、室温 $25^{\circ}\text{C}$ 、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]	12.531	Input Volt. :24V, Load Current. :48A
Line Regulation [mV]	1	Input Volt. :20.5~36V, Load Current. :48A
Load Regulation [mV]	30	Input Volt. :24V, Load Current. :0~48A

**COSEL**

Model	CDS6002412H		
Item	Line Noise Tolerance 入力雑音耐量	Temperature Testing Circuitry	25°C Figure B
Object	+12.5V48A		

## 1. Conditions

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

## 2. Results

Pulse Width [nS]	MODE		No protection failure should occur	DC-like Regulation of Output Voltage
		POLARITY	保護回路の誤動作がない	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

COSEL

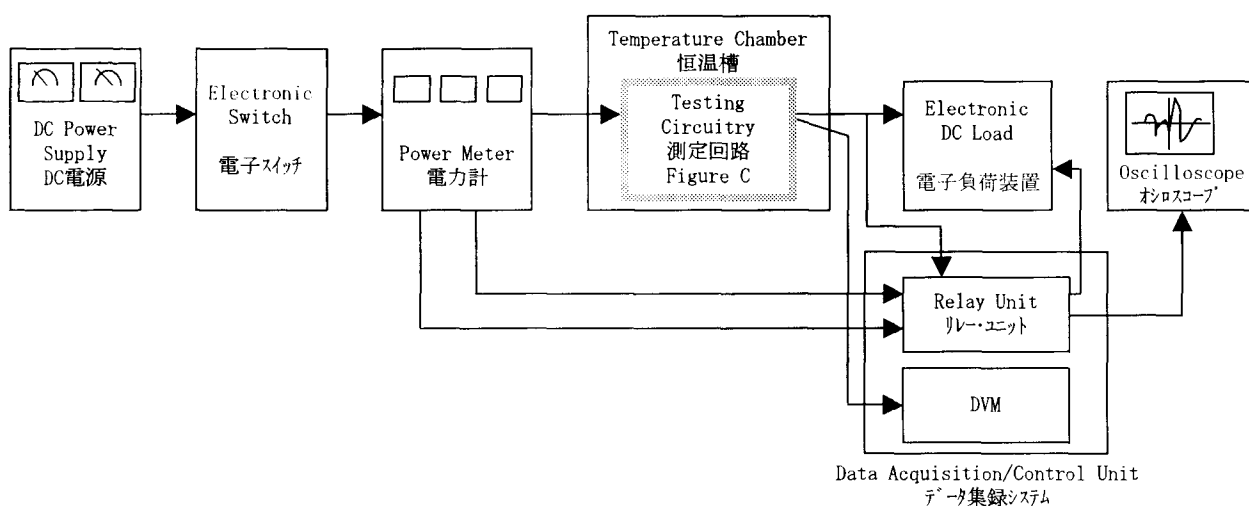


Figure A

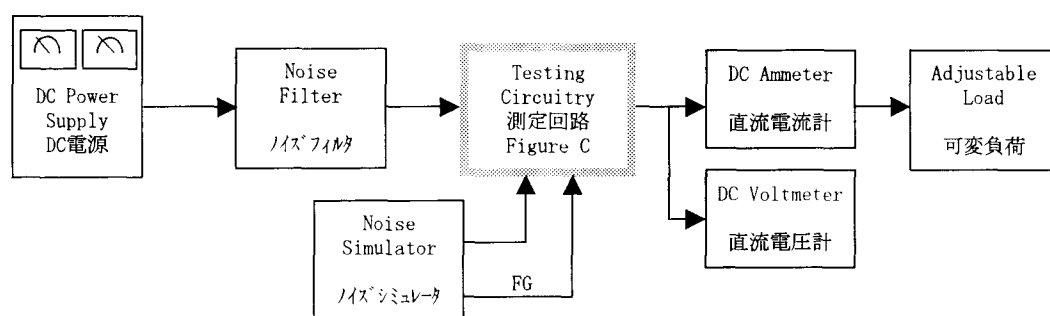


Figure B

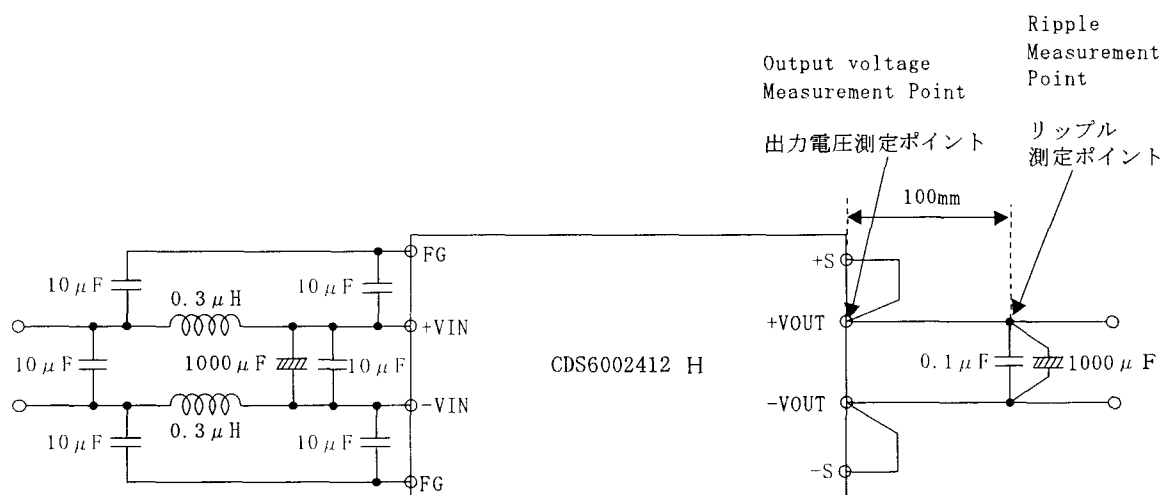


Figure C (General Electric Characteristic)  
一般電気特性