

TEST DATA OF CHS1202424

Regulated DC Power Supply

Feb 27, 2019

Approved by : Takayuki Fukuda Design Manager

Prepared by : Kouhei Yoshimoto
Kouhei Yoshimoto Design Engineer

COSEL CO.,LTD.



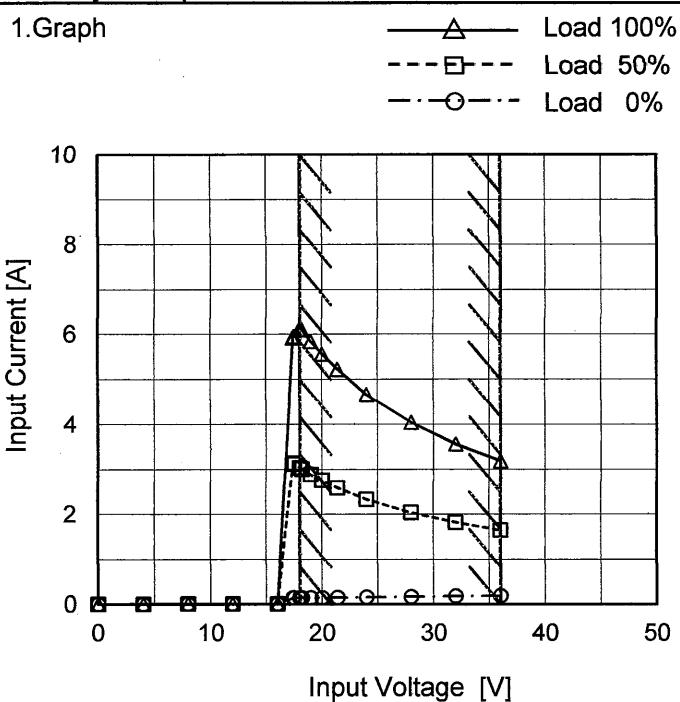
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Model	CHS1202424
Item	Input Current (by Input Voltage)
Object	_____



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

Temperature 25°C
Testing Circuitry Figure A

2. Values

Input Voltage [V]	Input Current [A]		
	Load 0%	Load 50%	Load 100%
0.0	0.000	0.000	0.000
4.0	0.003	0.003	0.003
8.0	0.007	0.007	0.007
12.0	0.008	0.008	0.008
16.0	0.008	0.008	0.008
17.4	0.144	3.136	5.923
17.5	0.144	3.119	5.947
18.0	0.145	3.036	6.115
18.2	0.145	3.005	6.106
19.0	0.146	2.884	5.844
20.0	0.147	2.761	5.567
21.4	0.150	2.592	5.227
24.0	0.156	2.333	4.661
28.0	0.166	2.041	4.045
32.0	0.177	1.823	3.560
36.0	0.187	1.650	3.189
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Model	CHS1202424	Temperature Testing Circuitry	25°C Figure A																																																		
Item	Input Current (by Load Current)																																																				
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<p>The graph plots Efficiency [%] on the y-axis (44 to 100) against Input Voltage [V] on the x-axis (10 to 50). Two data series are shown: Load 50% (dashed line with square markers) and Load 100% (solid line with triangle markers). Both series show a general downward trend as input voltage increases. A slanted line on the graph indicates the rated input voltage range.</p> <table border="1"> <thead> <tr> <th>Input Voltage [V]</th> <th>Efficiency Load 50% [%]</th> <th>Efficiency Load 100% [%]</th> </tr> </thead> <tbody> <tr><td>17</td><td>92.6</td><td>-</td></tr> <tr><td>18</td><td>92.3</td><td>-</td></tr> <tr><td>19</td><td>92.0</td><td>-</td></tr> <tr><td>20</td><td>91.6</td><td>91.0</td></tr> <tr><td>24</td><td>90.0</td><td>90.5</td></tr> <tr><td>30</td><td>87.5</td><td>89.2</td></tr> <tr><td>36</td><td>85.1</td><td>87.9</td></tr> <tr><td>40</td><td>83.4</td><td>86.9</td></tr> <tr><td>--</td><td>-</td><td>-</td></tr> </tbody> </table>			Input Voltage [V]	Efficiency Load 50% [%]	Efficiency Load 100% [%]	17	92.6	-	18	92.3	-	19	92.0	-	20	91.6	91.0	24	90.0	90.5	30	87.5	89.2	36	85.1	87.9	40	83.4	86.9	--	-	-		
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Model	CHS1202424	Temperature	25°C																																																			
Item	Efficiency (by Load Current)	Testing Circuitry	Figure A																																																			
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1.Graph	<p>Graph showing Efficiency [%] vs Load Current [A]. The Y-axis ranges from 44 to 100 in increments of 8. The X-axis ranges from 0.0 to 5.0 in increments of 1.0. Three curves are shown for Input Volt. 18V (solid line with triangles), Input Volt. 24V (dashed line with squares), and Input Volt. 36V (dash-dot line with circles). A slanted line indicates the rated load current range.</p> <table border="1"> <thead> <tr> <th>Load Current [A]</th> <th>Input Volt. 18V [%]</th> <th>Input Volt. 24V [%]</th> <th>Input Volt. 36V [%]</th> </tr> </thead> <tbody> <tr><td>1.0</td><td>88</td><td>85</td><td>75</td></tr> <tr><td>2.0</td><td>92</td><td>88</td><td>82</td></tr> <tr><td>3.0</td><td>92</td><td>90</td><td>85</td></tr> <tr><td>4.0</td><td>92</td><td>89</td><td>86</td></tr> <tr><td>5.0</td><td>-</td><td>-</td><td>85</td></tr> </tbody> </table>			Load Current [A]	Input Volt. 18V [%]	Input Volt. 24V [%]	Input Volt. 36V [%]	1.0	88	85	75	2.0	92	88	82	3.0	92	90	85	4.0	92	89	86	5.0	-	-	85																											
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Note: Slanted line shows the range of the rated load current.

※ Maximum output current at minimum input Voltage is 60% of rated current.

Refer to instruction manials for details of input derating.

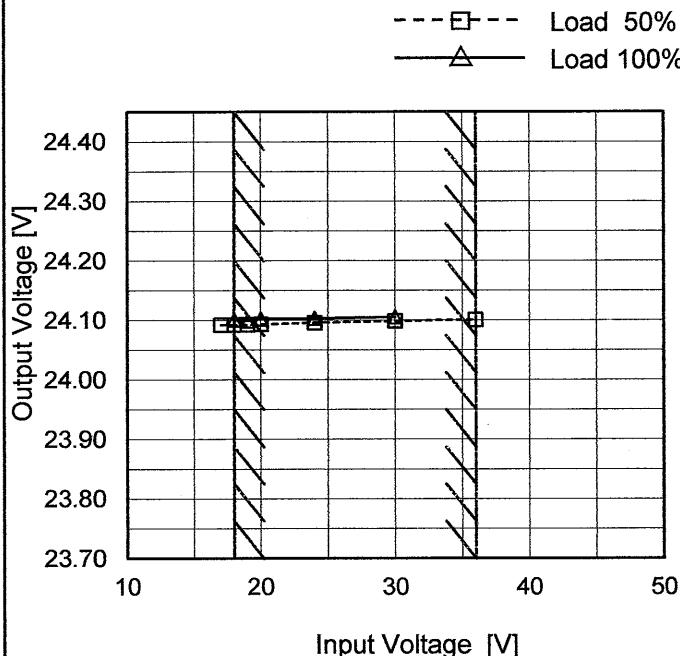
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Model CHS1202424

Item Line Regulation

Object +24V4.2A

1. Graph



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

 Temperature 25°C
 Testing Circuitry Figure A

2. Values

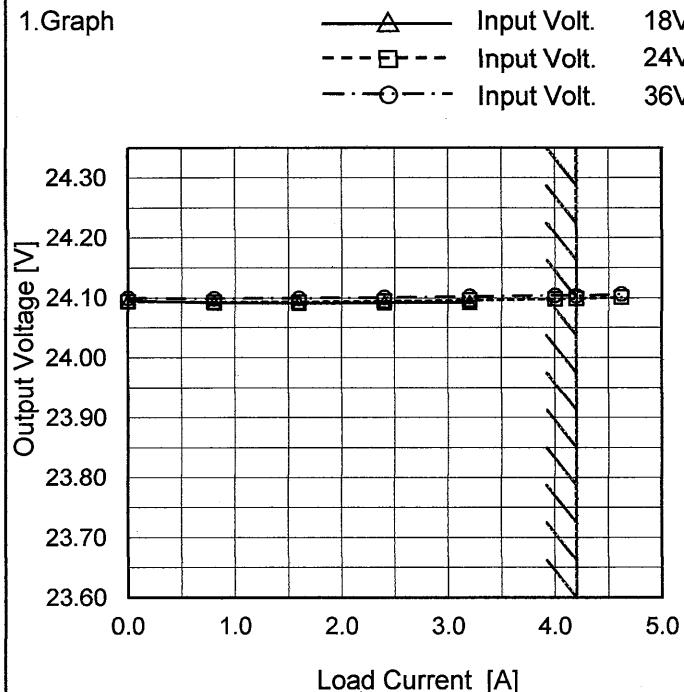
Input Voltage [V]	Output Voltage [V]	
	Load 50%	Load 100%
17	23.549	-
18	24.092	-
19	24.092	-
20	24.092	24.101
24	24.093	24.099
30	24.096	24.103
36	24.099	24.103
40	24.101	24.106
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※ Maximum output current at minimum input Voltage is 60% of rated current.

Refer to instruction manuals for details of input derating.

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Model	CHS1202424
Item	Load Regulation
Object	+24V4.2A



Note: Slanted line shows the range of the rated load current.

Temperature 25°C
Testing Circuitry Figure A

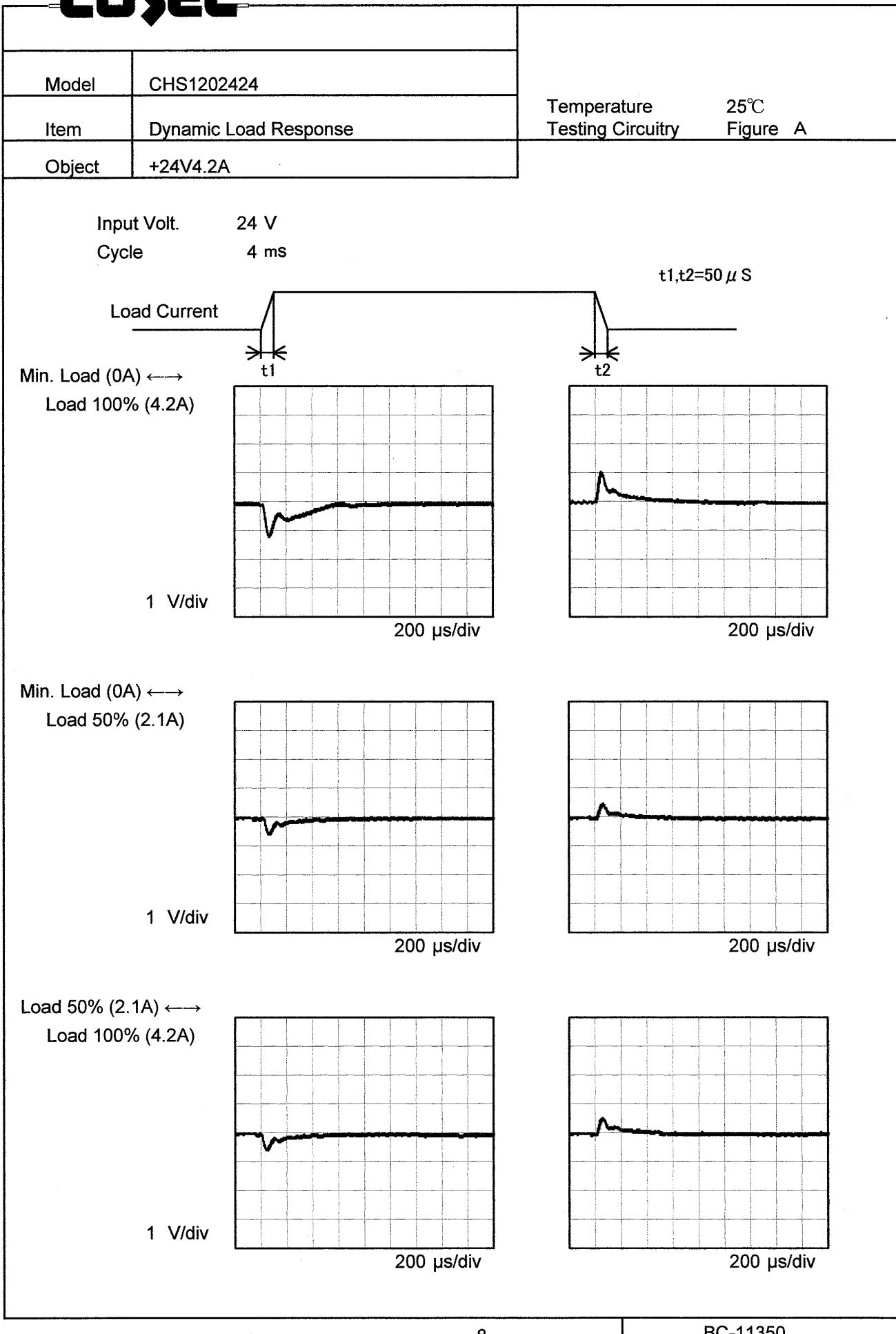
2.Values

Load Current [A]	Output Voltage [V]		
	Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]
0.00	24.095	24.094	24.100
0.80	24.092	24.093	24.099
1.60	24.091	24.093	24.100
2.40	24.092	24.095	24.101
3.20	24.093	24.096	24.103
4.00	-	24.098	24.104
4.20	-	24.099	24.103
4.62	-	24.101	24.106
--	-	-	-
--	-	-	-
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Refer to instruction manuals for details of input derating.

COSEL



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Model	CHS1202424	Temperature	25°C																																						
Item	Ripple Voltage (by Load Current)	Testing Circuitry	Figure B																																						
Object	+24V4.2A																																								
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<p>Measured by 100 MHz Oscilloscope. Ripple Voltage is shown as p-p in the figure below. Note: Slanted line shows the range of the rated load current.</p>			<p>* Maximum output current at minimum input Voltage is 60% of rated current. Refer to instruction manials for details of input derating.</p>																																						
<p>Ripple [mVp-p]</p>																																									
<p>Fig.Complex Ripple Wave Form</p>																																									

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Item	Ripple-Noise	Temperature 25°C Testing Circuitry Figure B																																						
Object	+24V4.2A																																							
1.Graph																																								
<p>Graph showing Ripple Voltage [mV] vs Load Current [A]. The graph shows two sets of data points: Input Volt. 18V (solid line with triangle markers) and Input Volt. 36V (dashed line with circle markers). The x-axis represents Load Current [A] from 0 to 4. The y-axis represents Ripple Voltage [mV] from 0 to 200. A slanted line indicates the range of the rated load current.</p> <table border="1"> <thead> <tr> <th>Load Current [A]</th> <th>Ripple Voltage [mV] (18V)</th> <th>Ripple Voltage [mV] (36V)</th> </tr> </thead> <tbody> <tr><td>0.00</td><td>~45</td><td>~135</td></tr> <tr><td>0.84</td><td>~45</td><td>~135</td></tr> <tr><td>1.68</td><td>~45</td><td>~135</td></tr> <tr><td>2.52</td><td>~45</td><td>~135</td></tr> <tr><td>3.36</td><td>-</td><td>~135</td></tr> <tr><td>4.20</td><td>-</td><td>~135</td></tr> <tr><td>4.62</td><td>-</td><td>~135</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> <tr><td>--</td><td>-</td><td>-</td></tr> </tbody> </table>		Load Current [A]	Ripple Voltage [mV] (18V)	Ripple Voltage [mV] (36V)	0.00	~45	~135	0.84	~45	~135	1.68	~45	~135	2.52	~45	~135	3.36	-	~135	4.20	-	~135	4.62	-	~135	--	-	-	--	-	-	--	-	-	--	-	-			
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<p>Measured by 100 MHz Oscilloscope. Ripple-Noise is shown as p-p in the figure below. Note: Slanted line shows the range of the rated load current.</p> <p>Fig.Complex Ripple Noise Wave Form</p>																																								
<p>※ Maximum output current at minimum input Voltage is 60% of rated current. Refer to instruction manials for details of input derating.</p>																																								

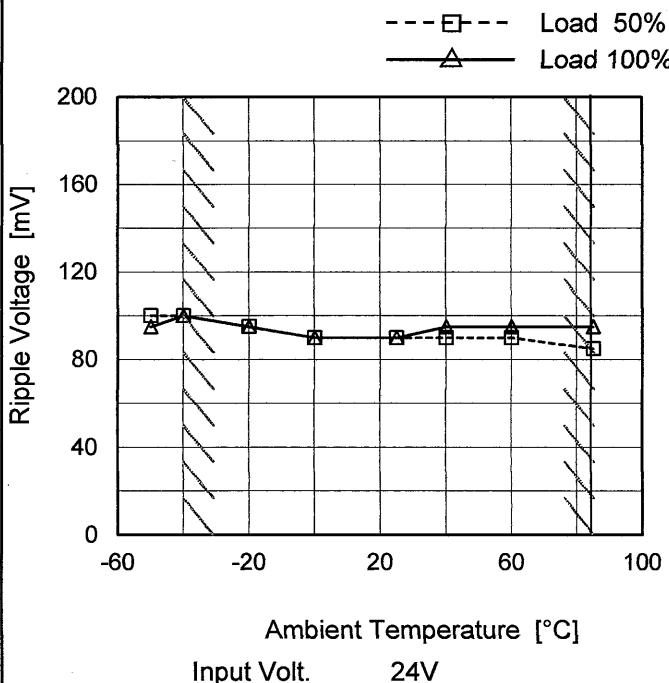
COSEL

Model CHS1202424

Item Ripple Voltage (by Ambient Temp.)

Object +24V4.2A

1. Graph



Measured by 100 MHz Oscilloscope.

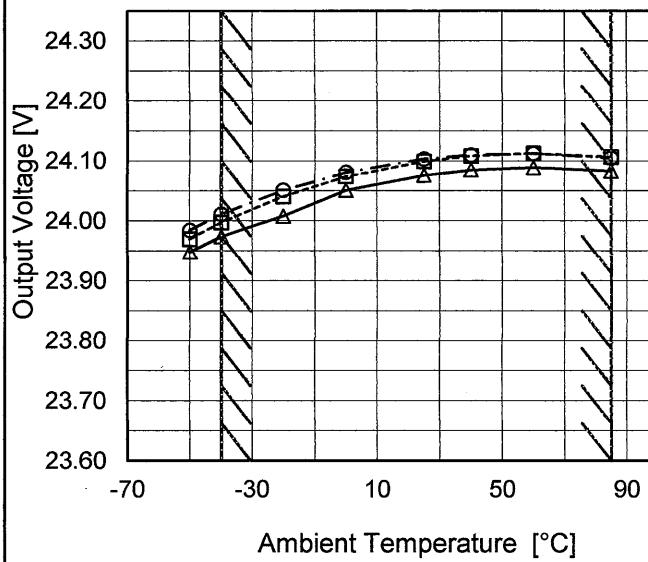
Note: Slanted line shows the range of the rated ambient temperature.

Testing Circuitry Figure B

2. Values

Ambient Temperature [°C]	Ripple Voltage [mV]	
	Load 50%	Load 100%
-50	100	95
-40	100	100
-20	95	95
0	90	90
25	90	90
40	90	95
60	90	95
85	85	95
--	-	-
--	-	-
--	-	-

COSEL

Model	CHS1202424																																																					
Item	Ambient Temperature Drift																																																					
Object	+24V4.2A																																																					
1.Graph	—△— Input Volt. 18V - - -□--- Input Volt. 24V - - -○--- Input Volt. 36V																																																					
																																																						
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Model	CHS1202424	Testing Circuitry Figure A
Item	Output Voltage Accuracy	
Object	+24V4.2A	

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 : -40 - 85°C

Input Voltage : 18 - 36V

Load Current : 0 - 4.2A

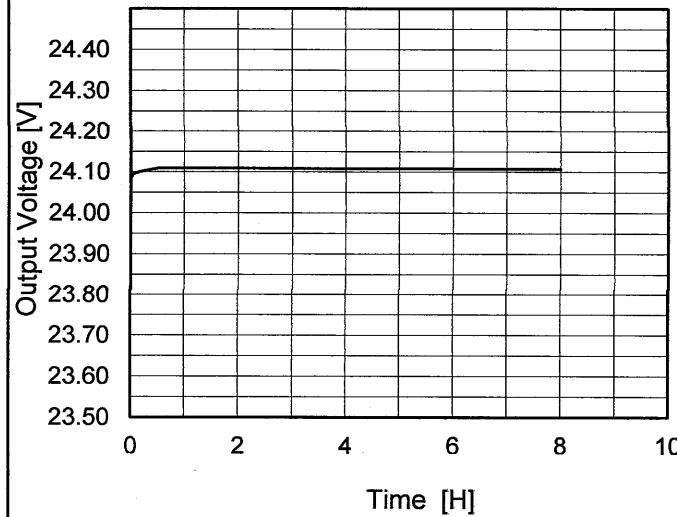
* Output Voltage Accuracy = $\pm(\text{Maximum of Output Voltage} - \text{Minimum of Output Voltage}) / 2$

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

2. Values

Item	Temperature [°C]	Input Voltage[V]	Output		Output Voltage Accuracy	
			Current[A]	Voltage[V]	Value [mV]	Ratio [%]
Maximum Voltage	60	36	4.2	24.112	± 69	± 0.3
Minimum Voltage	-40	18	2.52	23.974		

COSEL

Model	CHS1202424	Temperature	25°C																						
Item	Time Lapse Drift	Testing Circuitry	Figure A																						
Object	+24V4.2A																								
1. Graph			2. Values																						
 <p>Output Voltage [V]</p> <p>Time [H]</p> <p>Input Volt. 24V Load 100%</p>			<table border="1"> <thead> <tr> <th>Time since start [H]</th> <th>Output Voltage [V]</th> </tr> </thead> <tbody> <tr><td>0.0</td><td>24.087</td></tr> <tr><td>0.5</td><td>24.109</td></tr> <tr><td>1.0</td><td>24.109</td></tr> <tr><td>2.0</td><td>24.109</td></tr> <tr><td>3.0</td><td>24.109</td></tr> <tr><td>4.0</td><td>24.108</td></tr> <tr><td>5.0</td><td>24.108</td></tr> <tr><td>6.0</td><td>24.108</td></tr> <tr><td>7.0</td><td>24.108</td></tr> <tr><td>8.0</td><td>24.107</td></tr> </tbody> </table>	Time since start [H]	Output Voltage [V]	0.0	24.087	0.5	24.109	1.0	24.109	2.0	24.109	3.0	24.109	4.0	24.108	5.0	24.108	6.0	24.108	7.0	24.108	8.0	24.107
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COSEL

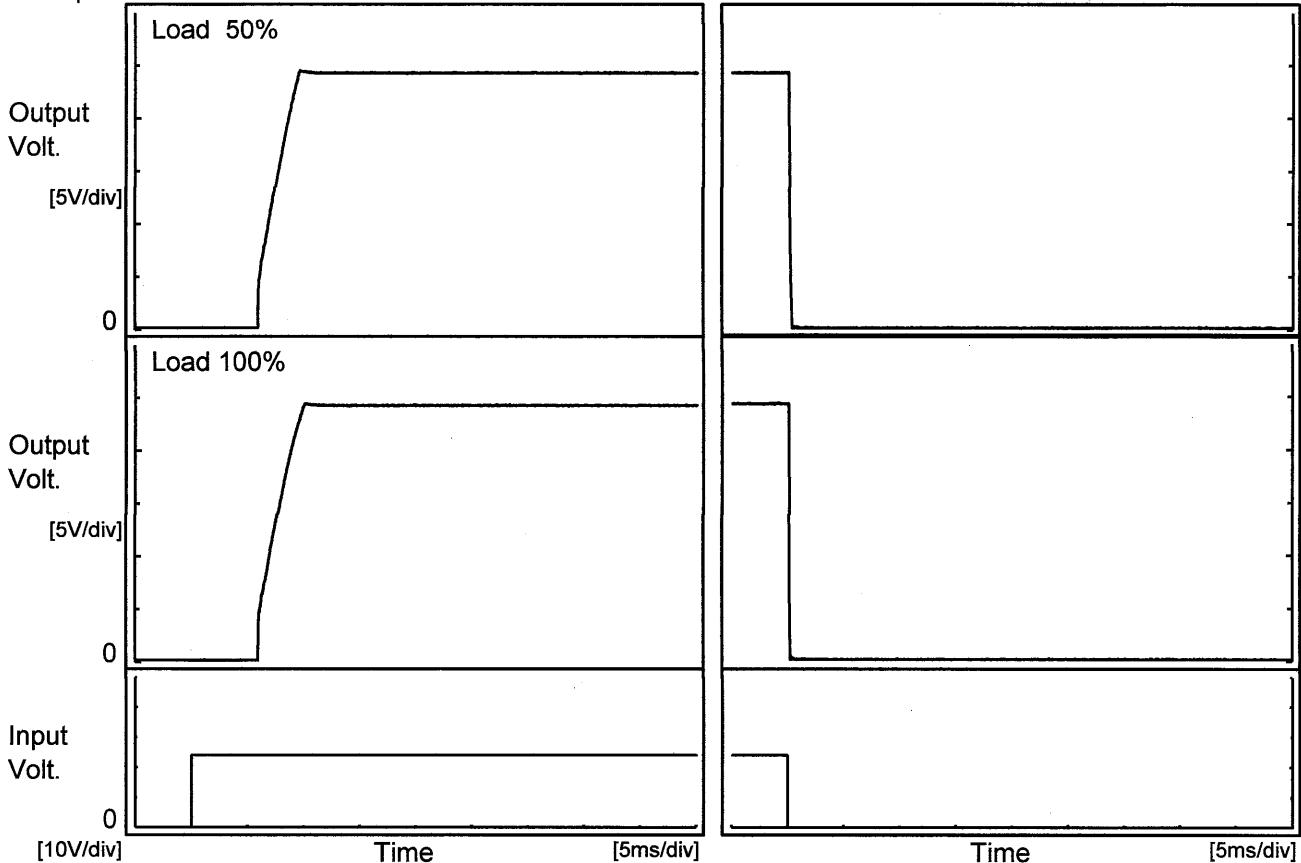
Model CHS1202424

Item Rise and Fall Time

Object +24V4.2A

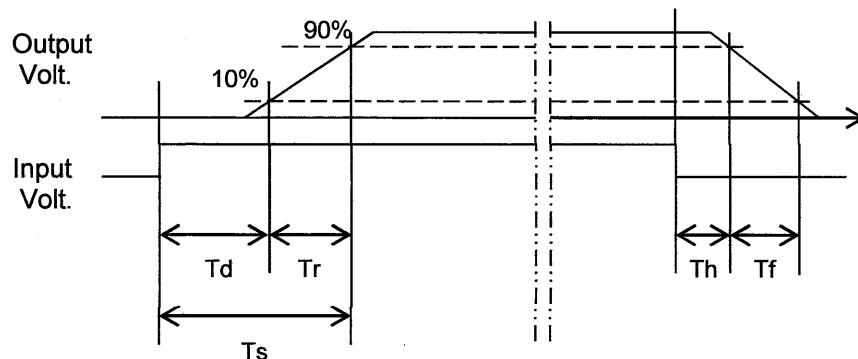
Temperature 25°C
Testing Circuitry Figure A

1. Graph



2. Values

Load	Time	Td	Tr	Ts	Th	Tf	[ms]
50 %		6.0	3.0	9.0	0.1	0.3	
100 %		6.0	3.3	9.3	0.1	0.1	



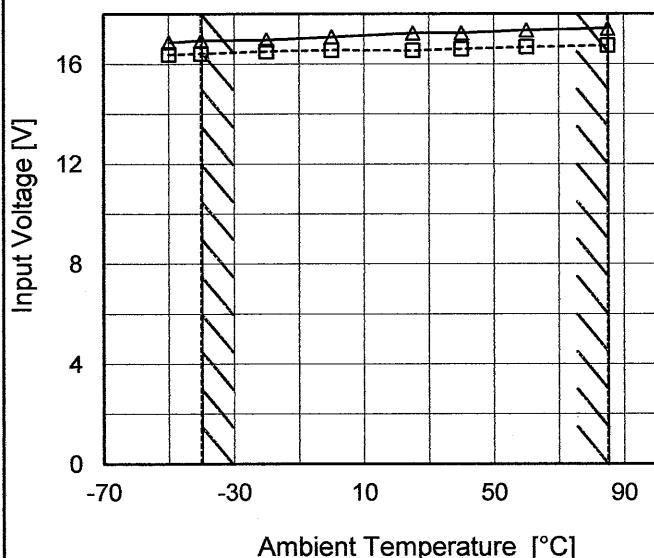
COSEL

Model CHS1202424

Item Minimum Input Voltage
for Regulated Output Voltage

Object +24V4.2A

1. Graph

 --- □ --- Load 50%
 —△— Load 100%


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

Testing Circuitry Figure A

2. Values

Ambient Temperature [°C]	Input Voltage [V]	
	Load 50%	Load 100%
-50	16.39	16.88
-40	16.42	16.94
-20	16.51	16.98
0	16.56	17.09
25	16.54	17.25
40	16.61	17.25
60	16.68	17.36
85	16.75	17.43
--	-	-
--	-	-
--	-	-

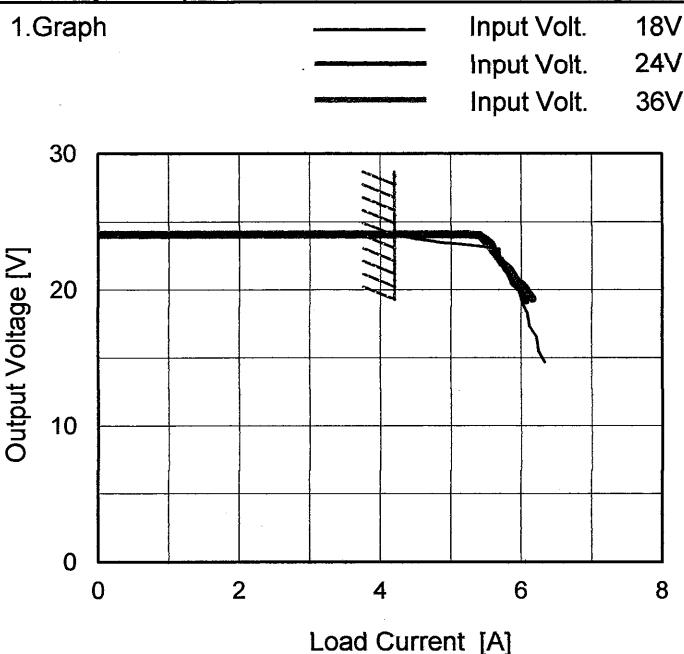
COSEL

Model CHS1202424

Item Overcurrent Protection

Object +24V4.2A

1. Graph



Note: Slanted line shows the range of the rated load current.

Temperature 25°C
Testing Circuitry Figure A

2. Values

Output Voltage [V]	Load Current [A]		
	Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]
24.0	4.20	4.23	4.24
22.8	5.68	5.64	5.62
21.6	5.76	5.78	5.82
20.4	5.88	5.86	5.92
19.2	6.01	6.07	6.15
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

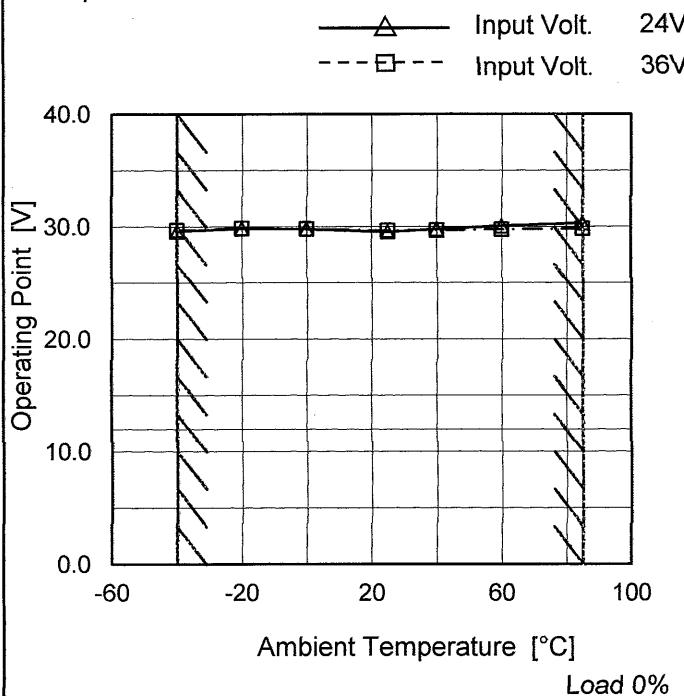
COSEL

Model CHS1202424

Item Overvoltage Protection

Object +24V4.2A

1. Graph



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

Testing Circuitry Figure A

2. Values

Ambient Temperature [°C]	Operating Point [V]	
	Input Volt. 24[V]	Input Volt. 36[V]
-40	29.6	29.7
-20	29.9	29.9
0	29.8	29.8
25	29.6	29.7
40	29.8	29.7
60	30.1	29.8
85	30.3	29.8
--	-	-
--	-	-
--	-	-
--	-	-

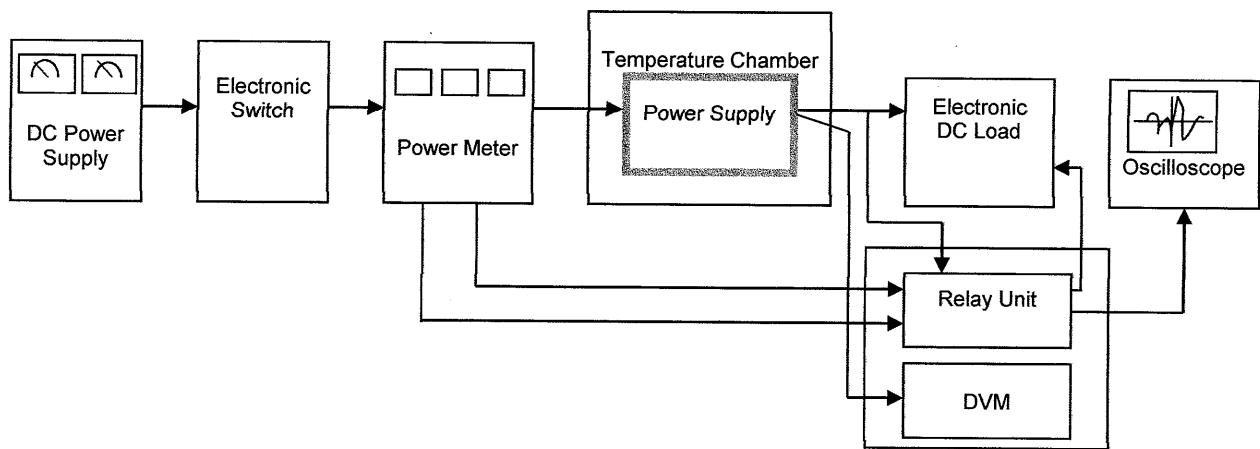


Figure A

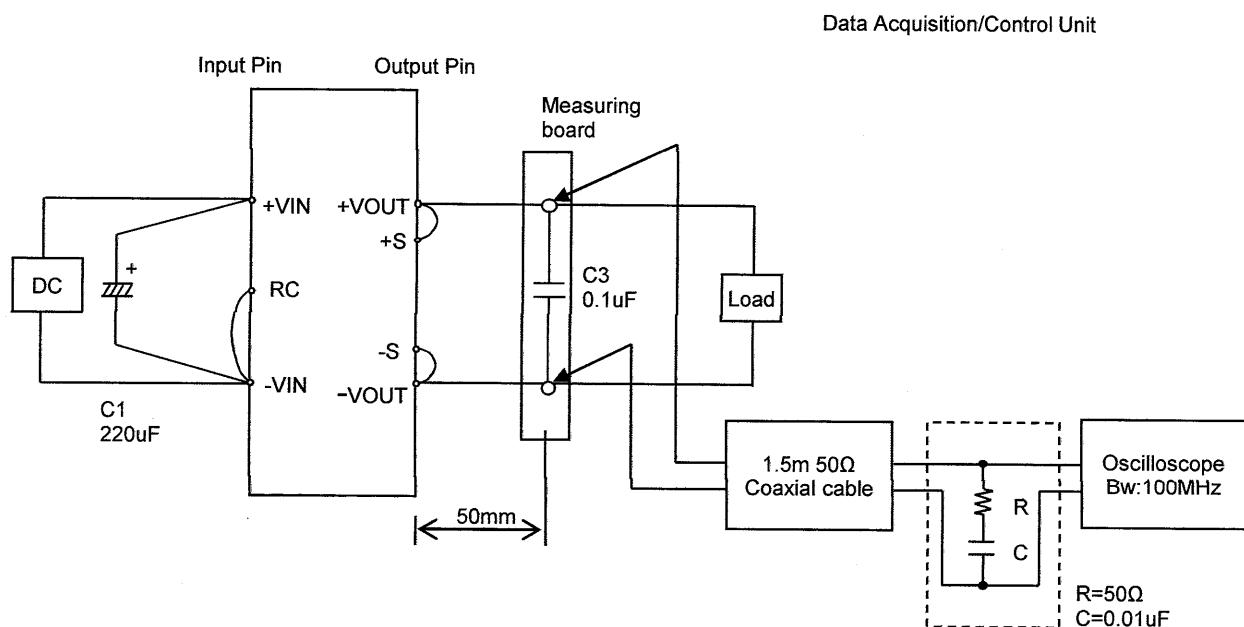


Figure B