



# TEST DATA OF CHS3002424

Regulated DC Power Supply  
July 23, 2019

Approved by : Yukihiro Takehashi  
Yukihiro Takehashi                                  Design Manager

Prepared by : Kohei Yoshimoto  
Kohei Yoshimoto                                  Design Engineer

**COSEL CO.,LTD.**



## CONTENTS

1.Input Current (by Input Voltage) · · · · ·	1
2.Input Current (by Load Current) · · · · ·	2
3.Input Power (by Load Current) · · · · ·	3
4.Efficiency (by Input Voltage) · · · · ·	4
5.Efficiency (by Load Current) · · · · ·	5
6.Line Regulation · · · · ·	6
7.Load Regulation · · · · ·	7
8.Dynamic Load Response · · · · ·	8
9.Ripple Voltage (by Load Current) · · · · ·	9
10.Ripple-Noise · · · · ·	10
11.Ripple Voltage (by Ambient Temperature) · · · · ·	11
12.Ambient Temperature Drift · · · · ·	12
13.Output Voltage Accuracy · · · · ·	13
14.Time Lapse Drift · · · · ·	14
15.Rise and Fall Time · · · · ·	15
16.Minimum Input Voltage for Regulated Output Voltage · · · · ·	16
17.Overcurrent Protection · · · · ·	17
18.Overvoltage Protection · · · · ·	18
19.Figure of Testing Circuitry · · · · ·	19

(Final Page 19)

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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 slight decrease in efficiency 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>-</td><td>-</td></tr> <tr><td>18</td><td>95.5</td><td>94.1</td></tr> <tr><td>19</td><td>95.4</td><td>93.9</td></tr> <tr><td>20</td><td>95.3</td><td>93.9</td></tr> <tr><td>24</td><td>94.6</td><td>94.1</td></tr> <tr><td>30</td><td>93.7</td><td>93.7</td></tr> <tr><td>36</td><td>92.7</td><td>93.4</td></tr> <tr><td>40</td><td>92.0</td><td>92.9</td></tr> <tr><td>--</td><td>-</td><td>-</td></tr> </tbody> </table>				Input Voltage [V]	Efficiency Load 50% [%]	Efficiency Load 100% [%]	17	-	-	18	95.5	94.1	19	95.4	93.9	20	95.3	93.9	24	94.6	94.1	30	93.7	93.7	36	92.7	93.4	40	92.0	92.9	--	-	-
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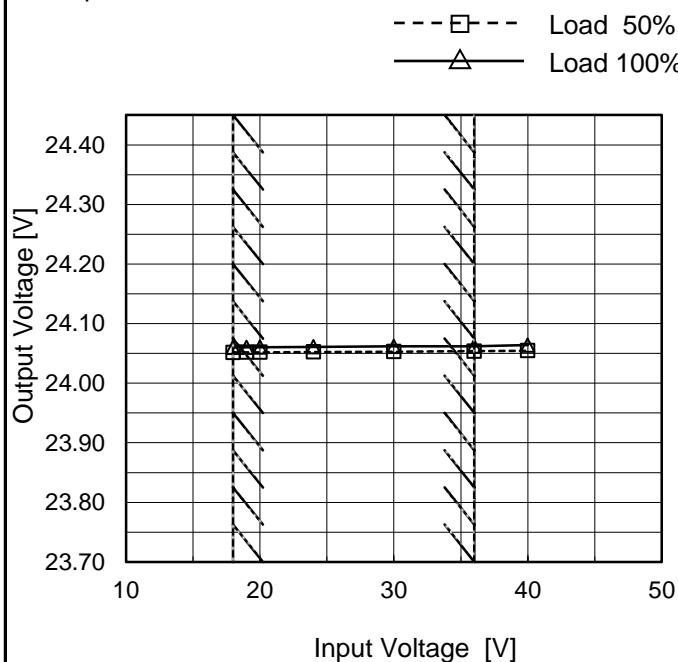
Note: Slanted line shows the range of the rated load current.

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Model	CHS3002424
Item	Line Regulation
Object	+24V10.5A

Temperature 25°C  
Testing Circuitry Figure A

## 1.Graph



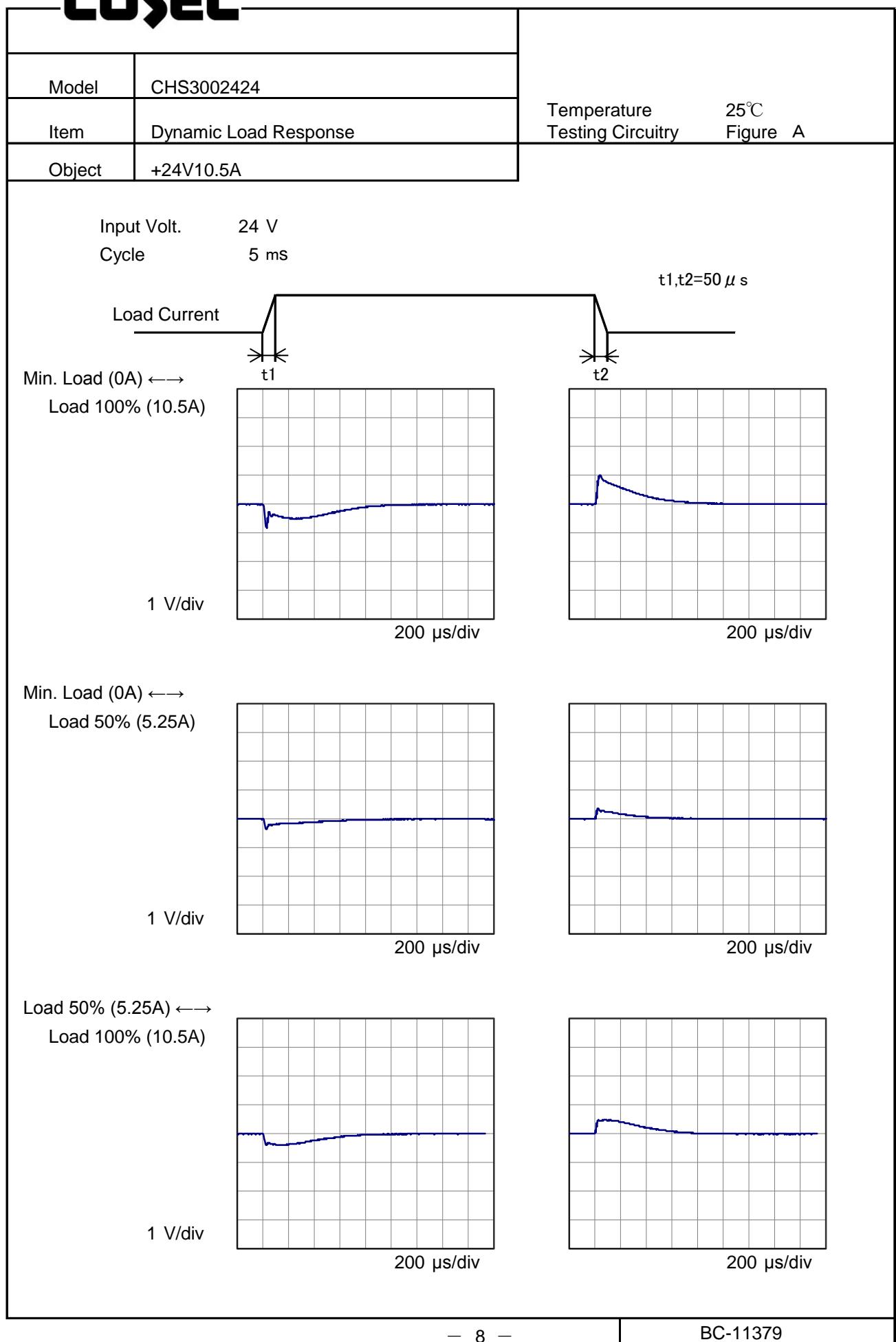
## 2.Values

Input Voltage [V]	Output Voltage [V]	
	Load 50%	Load 100%
17	-	-
18	24.052	24.060
19	24.052	24.060
20	24.052	24.060
24	24.052	24.061
30	24.053	24.062
36	24.054	24.062
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<p>Graph showing Ripple Voltage [mV] vs Load Current [A]. The graph plots Ripple Voltage [mV] on the Y-axis (0 to 200) against Load Current [A] on the X-axis (0 to 12). Two sets of data points are shown: Input Volt. 18V (triangles) and Input Volt. 36V (circles). 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] (Input Volt. 18V)</th> <th>Ripple Voltage [mV] (Input Volt. 36V)</th> </tr> </thead> <tbody> <tr><td>0.0</td><td>80</td><td>160</td></tr> <tr><td>2.6</td><td>80</td><td>160</td></tr> <tr><td>5.3</td><td>80</td><td>160</td></tr> <tr><td>7.9</td><td>80</td><td>160</td></tr> <tr><td>10.5</td><td>80</td><td>165</td></tr> <tr><td>11.6</td><td>85</td><td>165</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> <tr><td>--</td><td>-</td><td>-</td></tr> </tbody> </table>			Load Current [A]	Ripple Voltage [mV] (Input Volt. 18V)	Ripple Voltage [mV] (Input Volt. 36V)	0.0	80	160	2.6	80	160	5.3	80	160	7.9	80	160	10.5	80	165	11.6	85	165	--	-	-	--	-	-	--	-	-	--	-	-	--	-	-		
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**COSEL**

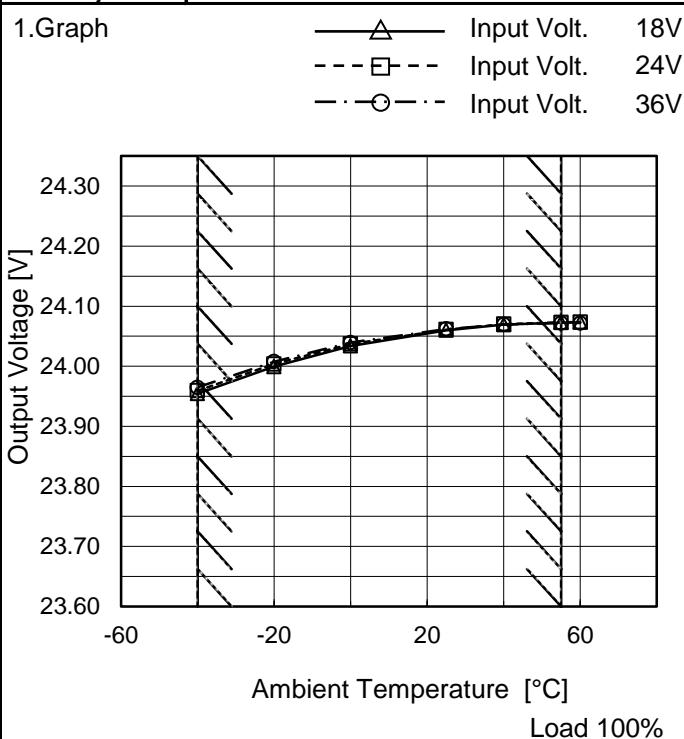
Model	CHS3002424																																							
Item	Ripple-Noise	Temperature 25°C Testing Circuitry Figure B																																						
Object	+24V10.5A																																							
1.Graph																																								
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**COSEL**

Model	CHS3002424	Testing Circuitry    Figure B																																						
Item	Ripple Voltage (by Ambient Temp.)																																							
Object	+24V10.5A																																							
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<p>Ambient Temperature [°C]</p> <p>Input Volt. 24V</p>		<table border="1"> <thead> <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> </thead> <tbody> <tr><td>-50</td><td>100</td><td>100</td></tr> <tr><td>-40</td><td>100</td><td>100</td></tr> <tr><td>-20</td><td>100</td><td>100</td></tr> <tr><td>0</td><td>100</td><td>100</td></tr> <tr><td>25</td><td>100</td><td>100</td></tr> <tr><td>40</td><td>95</td><td>100</td></tr> <tr><td>55</td><td>95</td><td>100</td></tr> <tr><td>60</td><td>95</td><td>100</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>	Ambient Temperature [°C]	Ripple Voltage [mV]		Load 50%	Load 100%	-50	100	100	-40	100	100	-20	100	100	0	100	100	25	100	100	40	95	100	55	95	100	60	95	100	--	-	-	--	-	-	--	-	-
Ambient Temperature [°C]	Ripple Voltage [mV]																																							
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**COSEL**

Model	CHS3002424
Item	Ambient Temperature Drift
Object	+24V10.5A



Testing Circuitry Figure A

## 2.Values

Ambient Temperature [°C]	Output Voltage [V]		
	Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]
-40	23.955	23.959	23.965
-20	24.000	24.004	24.008
0	24.034	24.037	24.040
25	24.060	24.061	24.062
40	24.069	24.070	24.070
55	24.073	24.073	24.072
60	24.073	24.073	24.072
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

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



Model	CHS3002424	Testing Circuitry Figure A
Item	Output Voltage Accuracy	
Object	+24V10.5A	

### 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 - 55°C

Input Voltage : 18 - 36V

Load Current : 0 - 10.5A

\* 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	55	24	10.5	24.073	±64	±0.3
Minimum Voltage	-40	36	0	23.945		

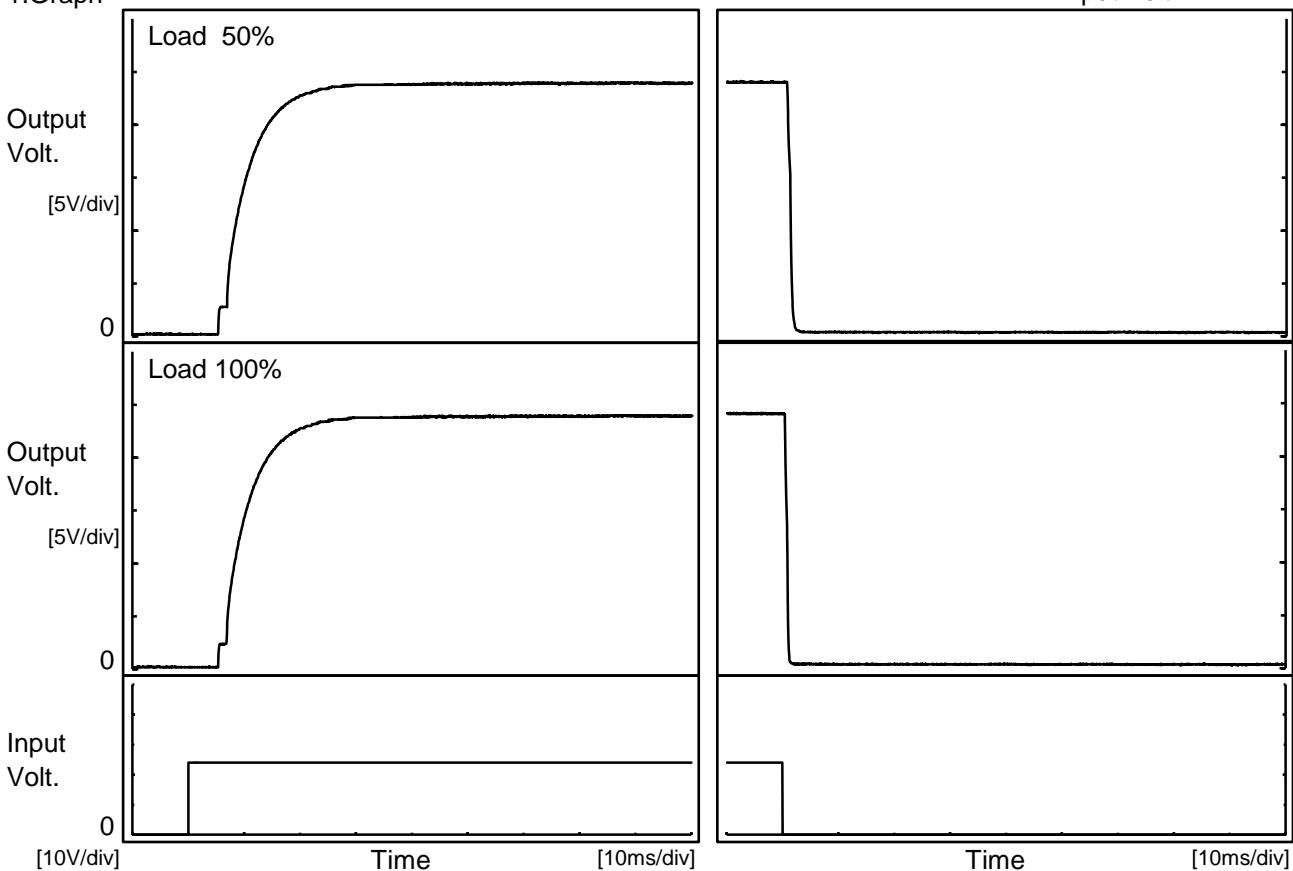
**COSEL**

Model	CHS3002424	Temperature	25°C																						
Item	Time Lapse Drift	Testing Circuitry	Figure A																						
Object	+24V10.5A																								
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>24.047</td></tr> <tr><td>0.5</td><td>24.061</td></tr> <tr><td>1.0</td><td>24.061</td></tr> <tr><td>2.0</td><td>24.060</td></tr> <tr><td>3.0</td><td>24.061</td></tr> <tr><td>4.0</td><td>24.062</td></tr> <tr><td>5.0</td><td>24.061</td></tr> <tr><td>6.0</td><td>24.061</td></tr> <tr><td>7.0</td><td>24.061</td></tr> <tr><td>8.0</td><td>24.061</td></tr> </tbody> </table>	Time since start [H]	Output Voltage [V]	0.0	24.047	0.5	24.061	1.0	24.061	2.0	24.060	3.0	24.061	4.0	24.062	5.0	24.061	6.0	24.061	7.0	24.061	8.0	24.061
Time since start [H]	Output Voltage [V]																								
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**COSEL**

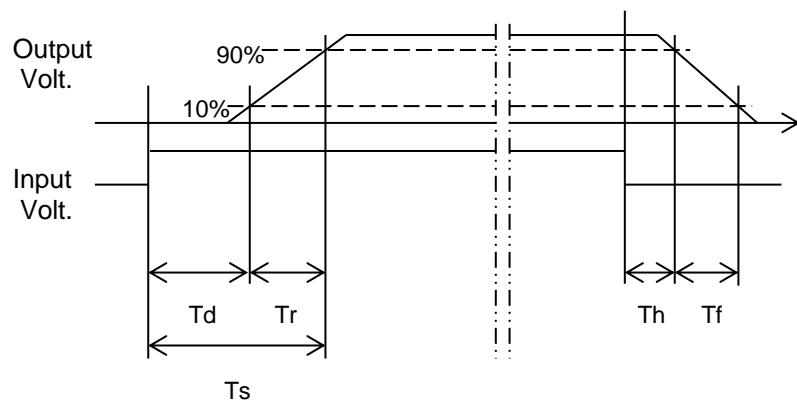
Model	CHS3002424	Temperature Testing Circuitry Figure A	25°C
Item	Rise and Fall Time		
Object	+24V10.5A		

## 1. Graph



## 2. Values

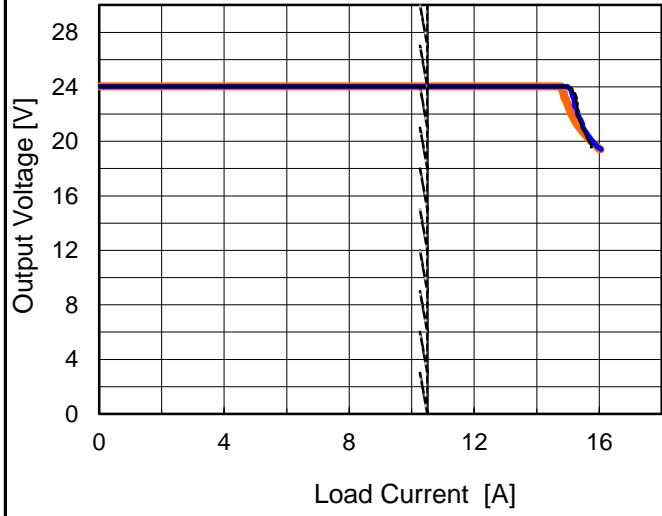
Load	Time	Td	Tr	Ts	Th	Tf	[ms]
50 %		5.6	11.7	17.3	0.9	0.9	
100 %		6.9	10.5	17.4	0.5	0.6	



**COSEL**

Model	CHS3002424																																							
Item	Minimum Input Voltage for Regulated Output Voltage																																							
Object	+24V10.5A																																							
1.Graph																																								
<p>Input Voltage [V]</p> <p>Ambient Temperature [°C]</p> <p>Legend:</p> <ul style="list-style-type: none"> <li>--□-- Load 50%</li> <li>—△— Load 100%</li> </ul>																																								
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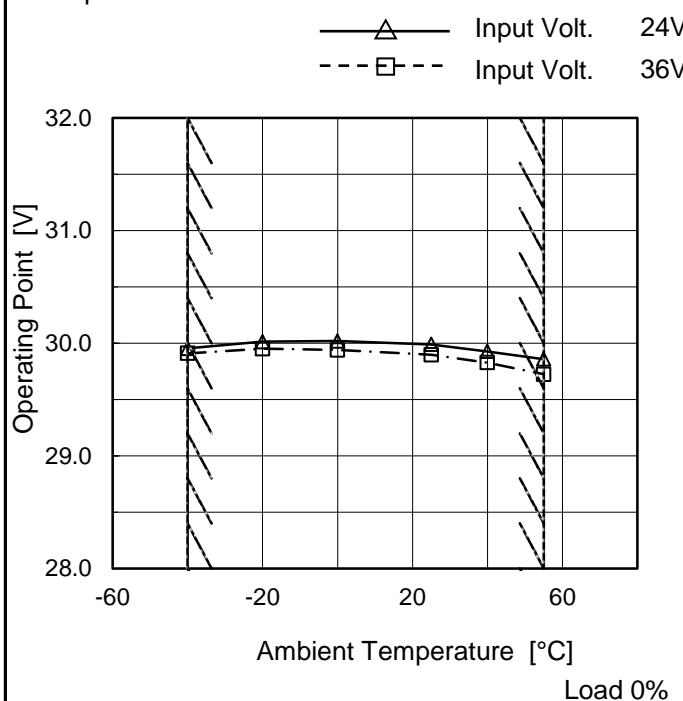
**COSEL**

Model	CHS3002424	Temperature Testing Circuitry	25°C Figure A																																																											
Item	Overcurrent Protection																																																													
Object	+24V10.5A																																																													
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Model	CHS3002424
Item	Ovvoltage Protection
Object	+24V10.5A

Testing Circuitry Figure A

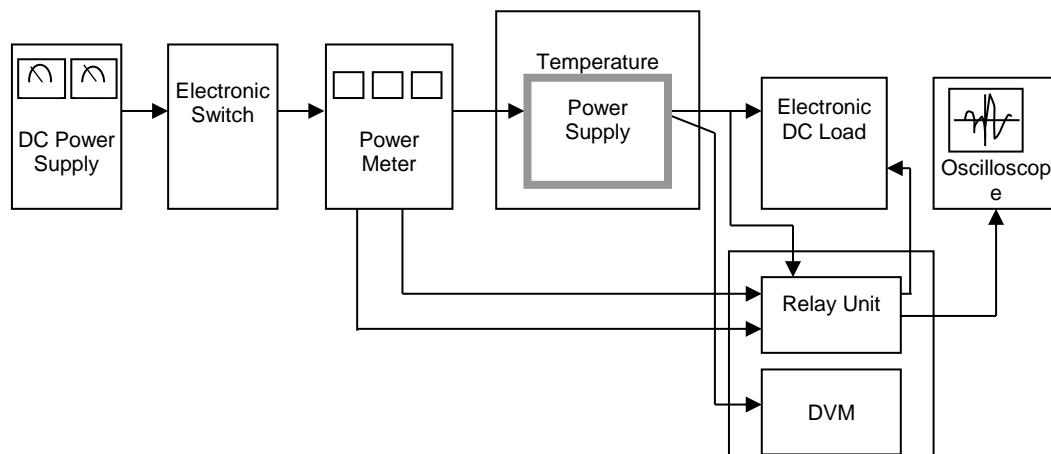
## 1.Graph



## 2.Values

Ambient Temperature [°C]	Operating Point [V]	
	Input Volt. 24[V]	Input Volt. 36[V]
-40	30.0	29.9
-20	30.0	30.0
0	30.0	29.9
25	30.0	29.9
40	29.9	29.8
55	29.9	29.7
--	-	-
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--	-	-
--	-	-
--	-	-

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



Data Acquisition/Control Unit

Figure A

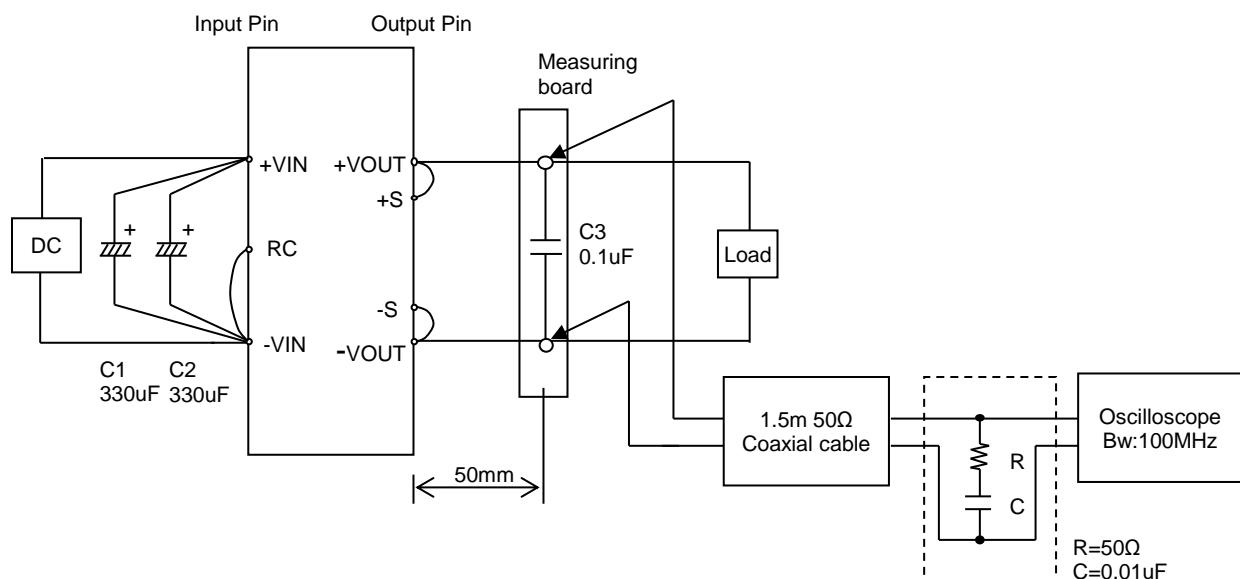


Figure B