



TEST DATA OF CHS3002432

Regulated DC Power Supply
July 23, 2019

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Yukihiro Takehashi Design Manager

Prepared by : Kohei Yoshimoto
Kohei Yoshimoto Design Engineer

COSEL CO.,LTD.



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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>93.5</td><td>93.5</td></tr> <tr><td>18</td><td>95.2</td><td>93.6</td></tr> <tr><td>19</td><td>94.9</td><td>93.5</td></tr> <tr><td>20</td><td>94.8</td><td>93.5</td></tr> <tr><td>24</td><td>94.3</td><td>93.7</td></tr> <tr><td>30</td><td>93.3</td><td>93.3</td></tr> <tr><td>36</td><td>92.3</td><td>93.0</td></tr> <tr><td>40</td><td>91.6</td><td>92.5</td></tr> <tr><td>--</td><td>-</td><td>-</td></tr> </tbody> </table>				Input Voltage [V]	Efficiency Load 50% [%]	Efficiency Load 100% [%]	17	93.5	93.5	18	95.2	93.6	19	94.9	93.5	20	94.8	93.5	24	94.3	93.7	30	93.3	93.3	36	92.3	93.0	40	91.6	92.5	--	-	-
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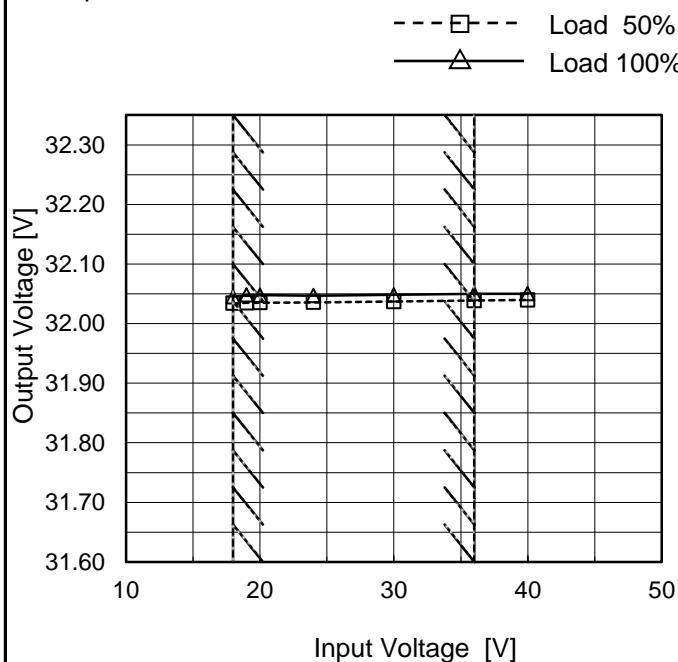
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1. Graph



2. Values

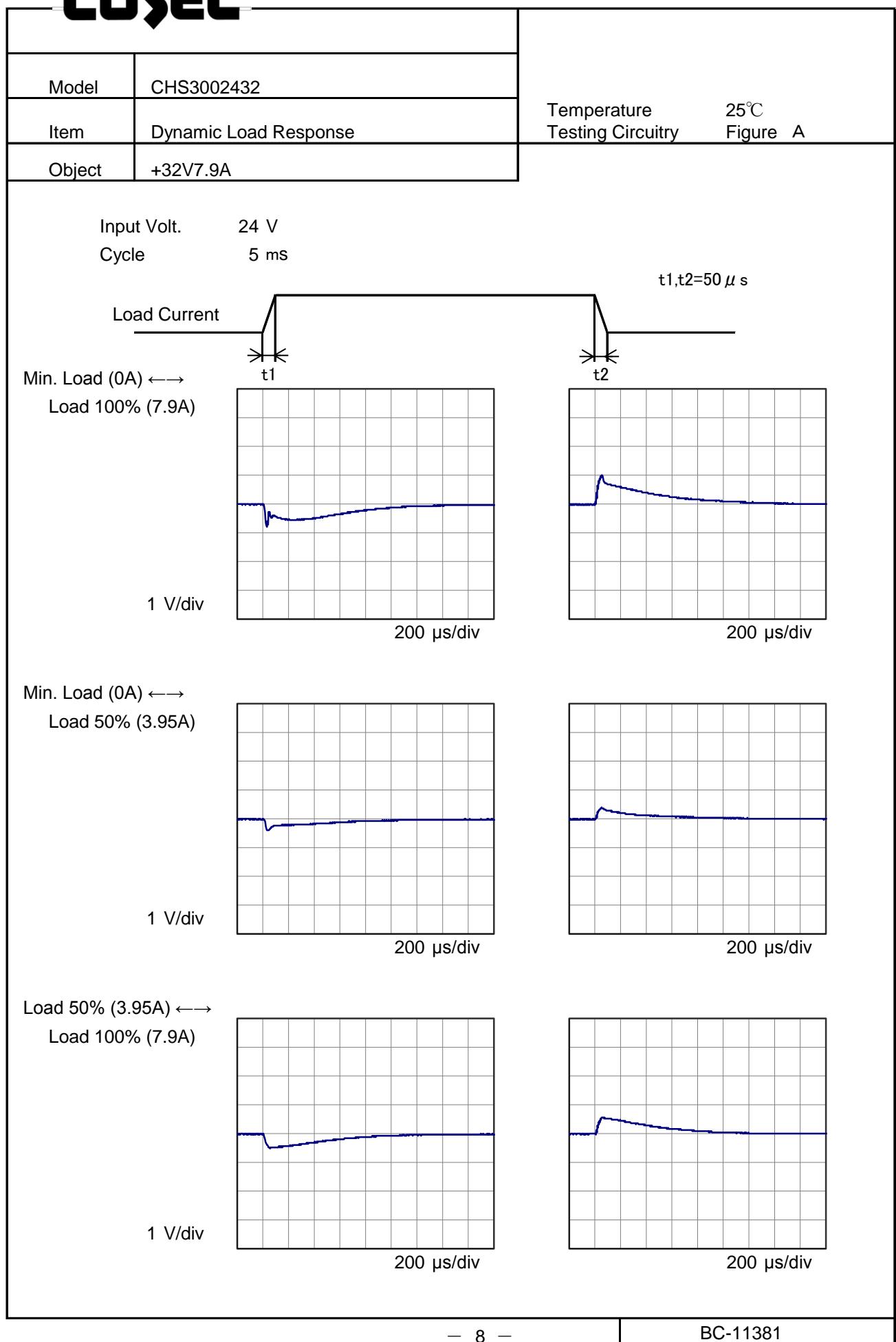
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40	32.040	32.050
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Note: Slanted line shows the range of the rated input voltage.

COSEL

Model	CHS3002432	Temperature Testing Circuitry	25°C Figure A																																																			
Item	Load Regulation																																																					
Object	+32V7.9A																																																					
1.Graph		2.Values																																																				
<p>The graph plots Output Voltage [V] on the Y-axis (31.60 to 32.30) against Load Current [A] on the X-axis (0 to 10). Three data series are shown for Input Voltages of 18V, 24V, and 36V. All series show a horizontal line at approximately 32.05V until a load current of about 7.9A, after which the output voltage begins to drop linearly towards the input voltage. A vertical dashed line marks the rated load current of 7.9A.</p>		<table border="1"> <thead> <tr> <th rowspan="2">Load Current [A]</th> <th colspan="3">Output Voltage [V]</th> </tr> <tr> <th>Input Volt. 18[V]</th> <th>Input Volt. 24[V]</th> <th>Input Volt. 36[V]</th> </tr> </thead> <tbody> <tr><td>0.00</td><td>32.046</td><td>32.048</td><td>32.047</td></tr> <tr><td>2.00</td><td>32.044</td><td>32.046</td><td>32.047</td></tr> <tr><td>4.00</td><td>32.042</td><td>32.044</td><td>32.046</td></tr> <tr><td>6.00</td><td>32.042</td><td>32.044</td><td>32.046</td></tr> <tr><td>7.90</td><td>32.045</td><td>32.047</td><td>32.050</td></tr> <tr><td>8.69</td><td>32.047</td><td>32.047</td><td>32.049</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> </tbody> </table>		Load Current [A]	Output Voltage [V]			Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]	0.00	32.046	32.048	32.047	2.00	32.044	32.046	32.047	4.00	32.042	32.044	32.046	6.00	32.042	32.044	32.046	7.90	32.045	32.047	32.050	8.69	32.047	32.047	32.049	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-
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Note: Slanted line shows the range of the rated load current.

COSEL

COSEL

Model	CHS3002432																																							
Item	Ripple Voltage (by Load Current)	Temperature 25°C Testing Circuitry Figure B																																						
Object	+32V7.9A																																							
1.Graph																																								
		2.Values																																						
<table border="1"> <thead> <tr> <th rowspan="2">Load Current [A]</th> <th colspan="2">Ripple Voltage [mV]</th> </tr> <tr> <th>Input Volt. 18 [V]</th> <th>Input Volt. 36 [V]</th> </tr> </thead> <tbody> <tr><td>0.000</td><td>75</td><td>145</td></tr> <tr><td>1.975</td><td>75</td><td>150</td></tr> <tr><td>3.950</td><td>70</td><td>150</td></tr> <tr><td>5.925</td><td>65</td><td>150</td></tr> <tr><td>7.900</td><td>65</td><td>155</td></tr> <tr><td>8.690</td><td>65</td><td>155</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. 18 [V]	Input Volt. 36 [V]	0.000	75	145	1.975	75	150	3.950	70	150	5.925	65	150	7.900	65	155	8.690	65	155	--	-	-	--	-	-	--	-	-	--	-	-	--	-	-
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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>Fig.Complex Ripple Wave Form</p>																																								

COSEL

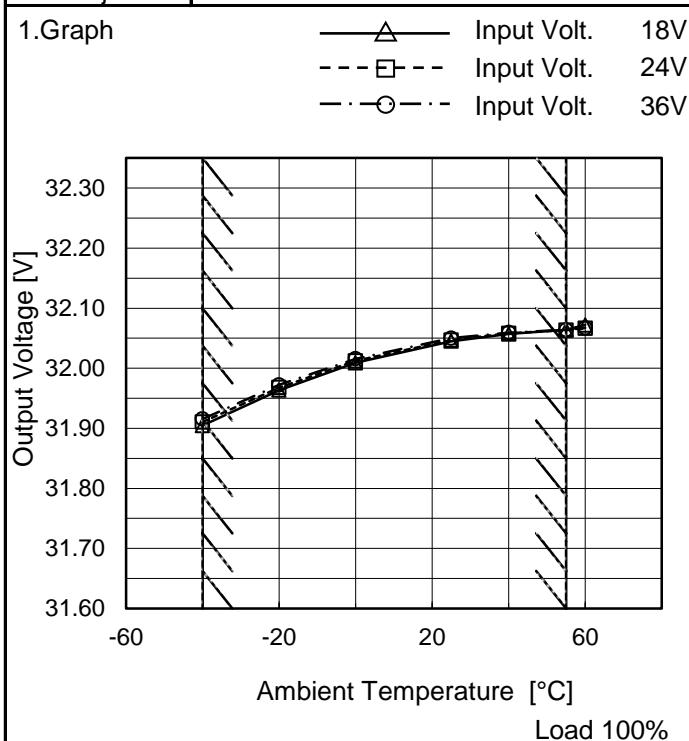
Model	CHS3002432																																							
Item	Ripple-Noise	Temperature 25°C Testing Circuitry Figure B																																						
Object	+32V7.9A																																							
1.Graph																																								
<p>Y-axis: Ripple Voltage [mV]</p> <p>X-axis: Load Current [A]</p> <p>Legend:</p> <ul style="list-style-type: none"> Input Volt. 18V (Solid line with open triangles) Input Volt. 36V (Dashed line with open circles) 																																								
2.Values																																								
<table border="1"> <thead> <tr> <th rowspan="2">Load Current [A]</th> <th colspan="2">Ripple-Noise [mV]</th> </tr> <tr> <th>Input Volt. 18 [V]</th> <th>Input Volt. 36 [V]</th> </tr> </thead> <tbody> <tr> <td>0.000</td><td>100</td><td>160</td></tr> <tr> <td>1.975</td><td>100</td><td>170</td></tr> <tr> <td>3.950</td><td>90</td><td>170</td></tr> <tr> <td>5.925</td><td>90</td><td>170</td></tr> <tr> <td>7.900</td><td>90</td><td>170</td></tr> <tr> <td>8.690</td><td>85</td><td>170</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-Noise [mV]		Input Volt. 18 [V]	Input Volt. 36 [V]	0.000	100	160	1.975	100	170	3.950	90	170	5.925	90	170	7.900	90	170	8.690	85	170	--	-	-	--	-	-	--	-	-	--	-	-	--	-	-
Load Current [A]	Ripple-Noise [mV]																																							
	Input Volt. 18 [V]	Input Volt. 36 [V]																																						
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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>Y-axis: Ripple Noise[mVp-p]</p>																																								
<p>Fig.Complex Ripple Noise Wave Form</p>																																								

COSEL

Model	CHS3002432	Testing Circuitry Figure B																																			
Item	Ripple Voltage (by Ambient Temp.)																																				
Object	+32V7.9A																																				
1.Graph		2.Values																																			
<p>Graph showing Ripple Voltage [mV] vs Ambient Temperature [°C]. The Y-axis ranges from 0 to 300 mV, and the X-axis ranges from -60 to 100 °C. Two data series are plotted: Load 50% (dashed line with square markers) and Load 100% (solid line with triangle markers). Both series show a slight decrease in ripple voltage as ambient temperature increases. A slanted line indicates the rated ambient temperature range.</p> <table border="1"> <thead> <tr> <th>Ambient Temperature [°C]</th> <th>Ripple Voltage [mV] (Load 50%)</th> <th>Ripple Voltage [mV] (Load 100%)</th> </tr> </thead> <tbody> <tr><td>-60</td><td>110</td><td>110</td></tr> <tr><td>-40</td><td>100</td><td>105</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>100</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%)	Ripple Voltage [mV] (Load 100%)	-60	110	110	-40	100	105	-20	100	100	0	100	100	25	100	100	40	100	100	55	95	100	60	95	100	--	-	-	--	-	-	--	-	-
Ambient Temperature [°C]	Ripple Voltage [mV] (Load 50%)	Ripple Voltage [mV] (Load 100%)																																			
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<p>Input Volt. 24V</p> <p>Measured by 100 MHz Oscilloscope. Note: Slanted line shows the range of the rated ambient temperature.</p>																																					

COSEL

Model	CHS3002432
Item	Ambient Temperature Drift
Object	+32V7.9A



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	31.905	31.910	31.916
-20	31.963	31.968	31.972
0	32.009	32.012	32.016
25	32.045	32.047	32.050
40	32.057	32.058	32.059
55	32.064	32.063	32.064
60	32.072	32.066	32.067
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

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



Model	CHS3002432	Testing Circuitry Figure A
Item	Output Voltage Accuracy	
Object	+32V7.9A	

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 - 7.9A

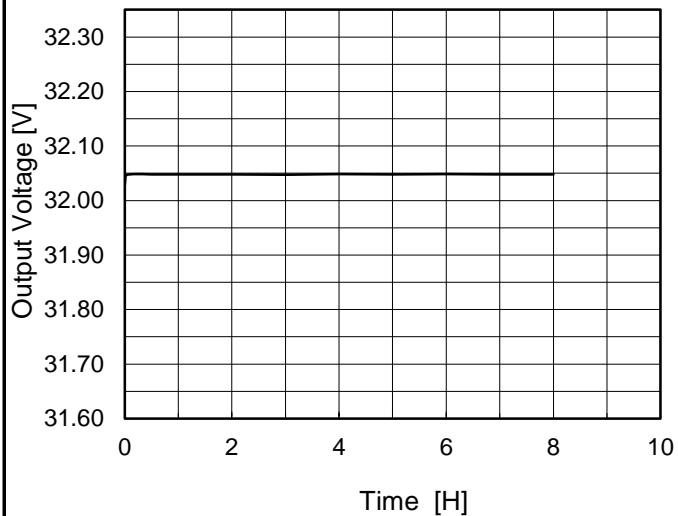
* Output Voltage Accuracy = $\pm(\text{Maximum of Output Voltage} - \text{Minimum of Output Voltage}) / 2$

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

2. Values

Item	Temperature [°C]	Input Voltage[V]	Output		Output Voltage Accuracy	
			Current[A]	Voltage[V]	Value [mV]	Ratio [%]
Maximum Voltage	55	18	7.9	32.064	± 86	± 0.3
Minimum Voltage	-40	36	0	31.893		

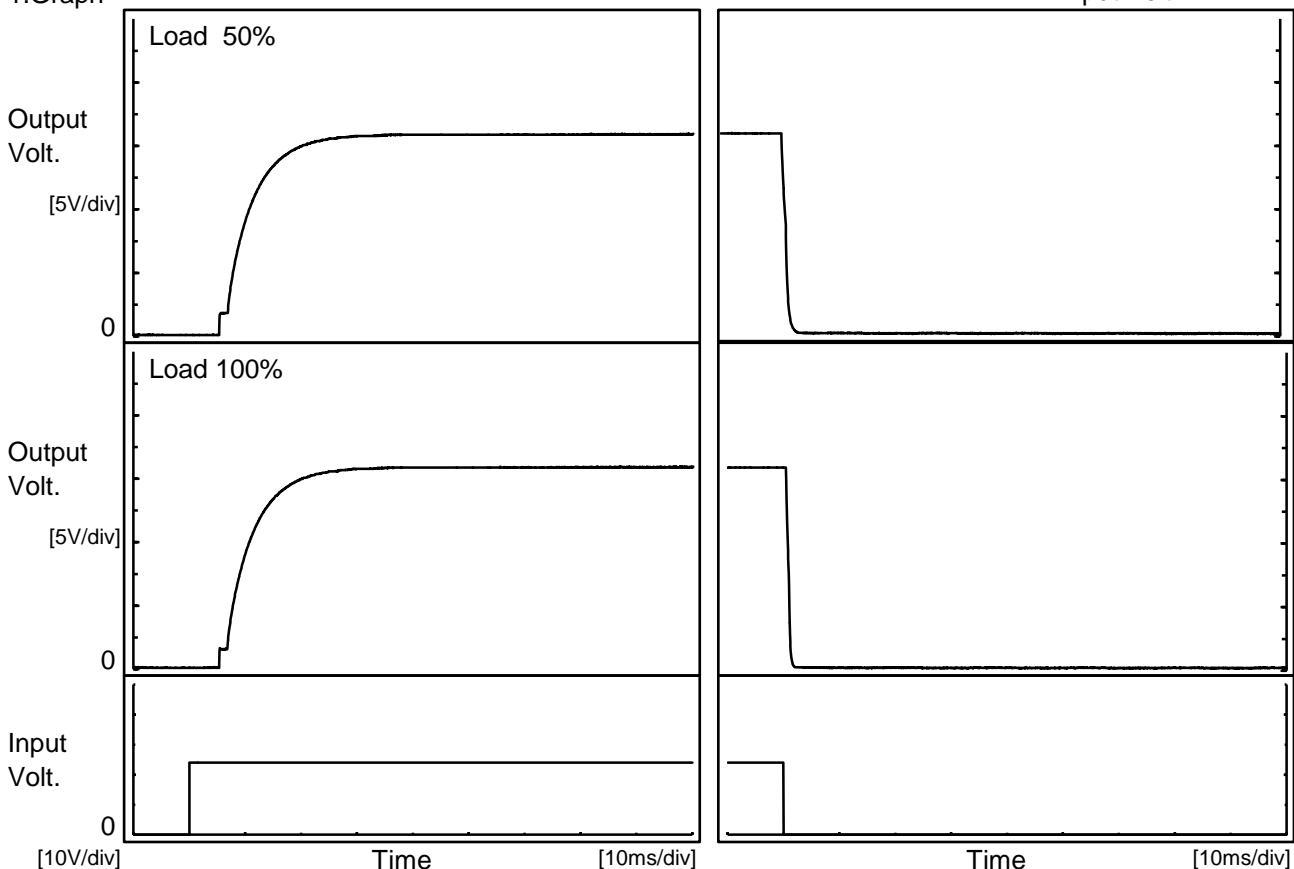
COSEL

Model	CHS3002432	Temperature	25°C																						
Item	Time Lapse Drift	Testing Circuitry	Figure A																						
Object	+32V7.9A																								
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>32.028</td></tr> <tr><td>0.5</td><td>32.048</td></tr> <tr><td>1.0</td><td>32.048</td></tr> <tr><td>2.0</td><td>32.048</td></tr> <tr><td>3.0</td><td>32.047</td></tr> <tr><td>4.0</td><td>32.049</td></tr> <tr><td>5.0</td><td>32.048</td></tr> <tr><td>6.0</td><td>32.048</td></tr> <tr><td>7.0</td><td>32.048</td></tr> <tr><td>8.0</td><td>32.048</td></tr> </tbody> </table>	Time since start [H]	Output Voltage [V]	0.0	32.028	0.5	32.048	1.0	32.048	2.0	32.048	3.0	32.047	4.0	32.049	5.0	32.048	6.0	32.048	7.0	32.048	8.0	32.048
Time since start [H]	Output Voltage [V]																								
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COSEL

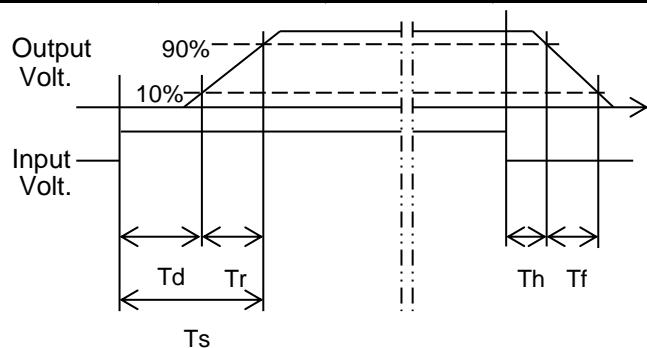
Model	CHS3002432	Temperature Testing Circuitry	25°C
Item	Rise and Fall Time		Figure A
Object	+32V7.9A		

1. Graph



2. Values

Load	Time	Td	Tr	Ts	Th	Tf	[ms]
50 %		5.5	12.5	18.0	1.0	1.3	
100 %		6.8	11.2	18.0	0.5	0.8	



COSEL

Model	CHS3002432																																							
Item	Minimum Input Voltage for Regulated Output Voltage																																							
Object	+32V7.9A																																							
1.Graph																																								
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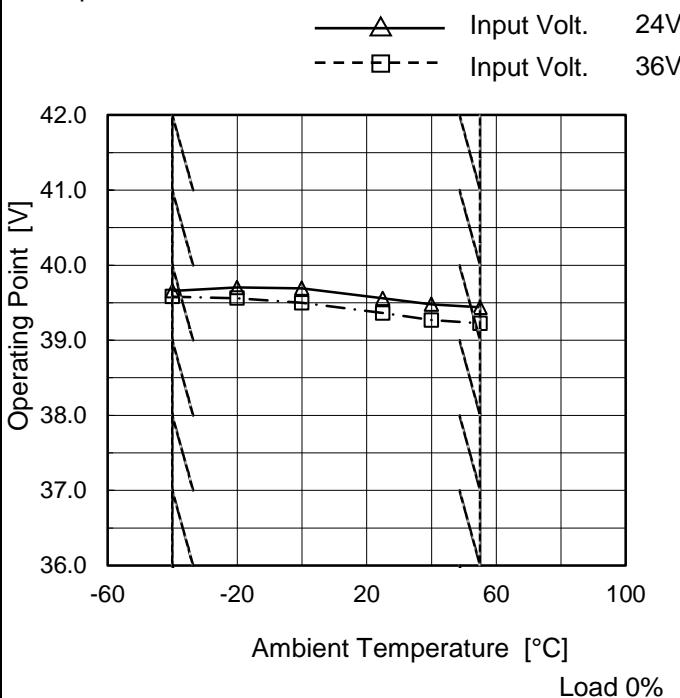
COSEL

Model	CHS3002432	Temperature Testing Circuitry	25°C Figure A																																																											
Item	Overcurrent Protection																																																													
Object	+32V7.9A																																																													
1.Graph		2.Values																																																												
<p>The graph plots Output Voltage [V] on the y-axis (0 to 40) against Load Current [A] on the x-axis (0 to 16). Three curves are shown for Input Voltages of 18V, 24V, and 36V. All curves remain flat at 32V until about 11.5A, then drop to approximately 23V at 12.5A. A slanted line from (0, 32) to (11.5, 32) marks the rated load current range.</p>		<table border="1"> <thead> <tr> <th rowspan="2">Output Voltage [V]</th> <th colspan="3">Load Current [A]</th> </tr> <tr> <th>Input Volt. 18[V]</th> <th>Input Volt. 24[V]</th> <th>Input Volt. 36[V]</th> </tr> </thead> <tbody> <tr><td>32.0</td><td>11.17</td><td>11.27</td><td>11.07</td></tr> <tr><td>30.4</td><td>11.43</td><td>11.55</td><td>11.25</td></tr> <tr><td>28.8</td><td>11.54</td><td>11.60</td><td>11.36</td></tr> <tr><td>27.2</td><td>11.65</td><td>11.77</td><td>11.50</td></tr> <tr><td>25.6</td><td>11.74</td><td>11.96</td><td>11.78</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> <tr><td>--</td><td>-</td><td>-</td><td>-</td></tr> </tbody> </table>		Output Voltage [V]	Load Current [A]			Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]	32.0	11.17	11.27	11.07	30.4	11.43	11.55	11.25	28.8	11.54	11.60	11.36	27.2	11.65	11.77	11.50	25.6	11.74	11.96	11.78	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-
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Note: Slanted line shows the range of the rated load current.

Model	CHS3002432
Item	Overvoltage Protection
Object	+32V7.9A

1. Graph

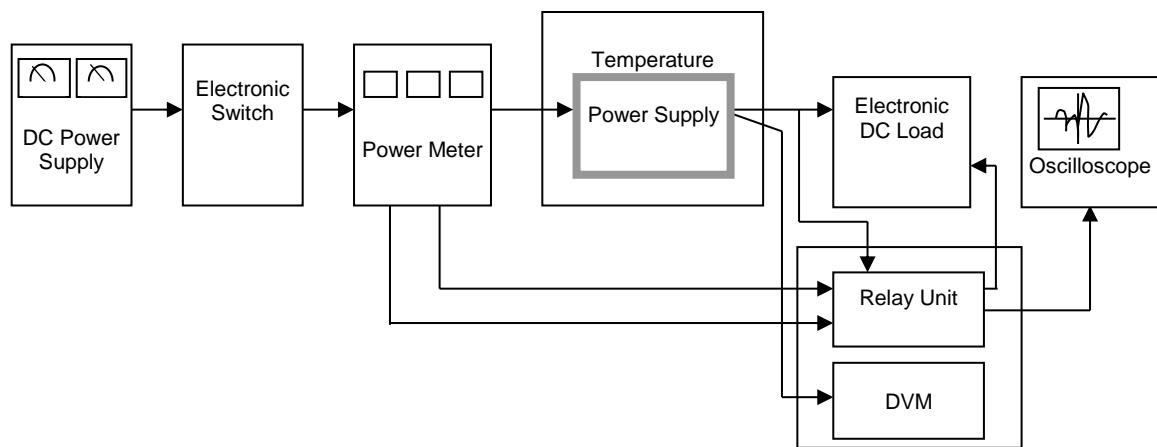


Note: Slanted line shows the range of the rated ambient temperature.

Testing Circuitry Figure A

2. Values

Ambient Temperature [°C]	Operating Point [V]	
	Input Volt. 24[V]	Input Volt. 36[V]
-40	39.7	39.6
-20	39.7	39.6
0	39.7	39.5
25	39.6	39.4
40	39.5	39.3
55	39.4	39.2
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-



Data Acquisition/Control Unit

Figure A

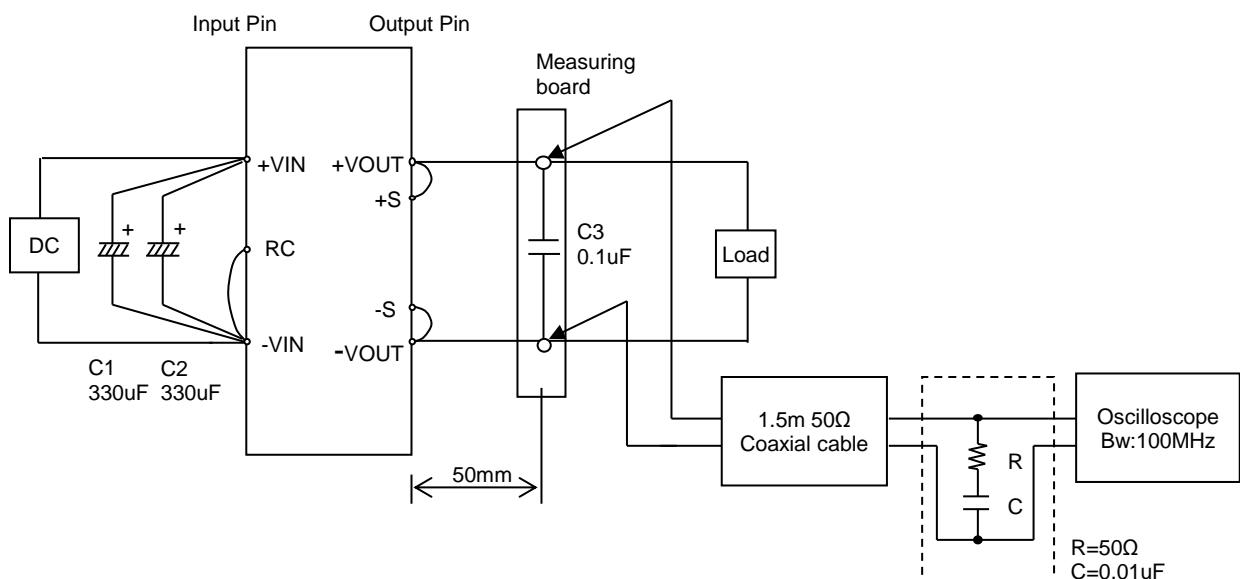


Figure B