

# TEST DATA OF CHS1202415

Regulated DC Power Supply  
June 8, 2017

Approved by : Junichi Hatagishi  
Junichi Hatagishi Design Manager

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Ryosuke Kawai Design Engineer

**COSEL CO.,LTD.**



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<p>The graph plots Input Power [W] on the y-axis against Load Current [A] on the x-axis. Three data series are shown for different input voltages: 18V (solid line with triangle markers), 24V (dashed line with square markers), and 36V (dash-dot line with circle markers). All three series show a linear relationship. A slanted line is drawn across the graph, starting from approximately (1.5, 10) and ending at (8.5, 190), indicating the range of the rated load current.</p> <table border="1"> <thead> <tr> <th>Load Current [A]</th> <th>Input Power [W] (18V)</th> <th>Input Power [W] (24V)</th> <th>Input Power [W] (36V)</th> </tr> </thead> <tbody> <tr><td>0.0</td><td>1.4</td><td>2.5</td><td>4.4</td></tr> <tr><td>1.6</td><td>25.9</td><td>27.0</td><td>29.0</td></tr> <tr><td>3.2</td><td>51.2</td><td>52.3</td><td>54.3</td></tr> <tr><td>4.8</td><td>77.0</td><td>78.0</td><td>80.2</td></tr> <tr><td>6.4</td><td>103.7</td><td>104.3</td><td>106.3</td></tr> <tr><td>8.0</td><td>131.7</td><td>132.2</td><td>133.7</td></tr> <tr><td>8.8</td><td>145.7</td><td>145.4</td><td>146.8</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]	Input Power [W] (18V)	Input Power [W] (24V)	Input Power [W] (36V)	0.0	1.4	2.5	4.4	1.6	25.9	27.0	29.0	3.2	51.2	52.3	54.3	4.8	77.0	78.0	80.2	6.4	103.7	104.3	106.3	8.0	131.7	132.2	133.7	8.8	145.7	145.4	146.8	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-
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<p>The graph plots Efficiency [%] on the y-axis (70 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 initial decrease in efficiency as input voltage increases from 18V to 36V, followed by a more significant drop-off. A slanted line indicates the rated input voltage range.</p>			<table border="1"> <thead> <tr> <th rowspan="2">Input Voltage [V]</th> <th colspan="2">Efficiency [%]</th> </tr> <tr> <th>Load 50%</th> <th>Load 100%</th> </tr> </thead> <tbody> <tr> <td>17</td> <td>94.0</td> <td>90.4</td> </tr> <tr> <td>18</td> <td>93.8</td> <td>91.1</td> </tr> <tr> <td>19</td> <td>93.6</td> <td>90.9</td> </tr> <tr> <td>20</td> <td>93.3</td> <td>91.0</td> </tr> <tr> <td>24</td> <td>92.2</td> <td>90.8</td> </tr> <tr> <td>30</td> <td>90.6</td> <td>90.4</td> </tr> <tr> <td>36</td> <td>89.3</td> <td>89.8</td> </tr> <tr> <td>40</td> <td>88.5</td> <td>89.4</td> </tr> <tr> <td>--</td> <td>-</td> <td>-</td> </tr> </tbody> </table>	Input Voltage [V]	Efficiency [%]		Load 50%	Load 100%	17	94.0	90.4	18	93.8	91.1	19	93.6	90.9	20	93.3	91.0	24	92.2	90.8	30	90.6	90.4	36	89.3	89.8	40	88.5	89.4	--	-	-
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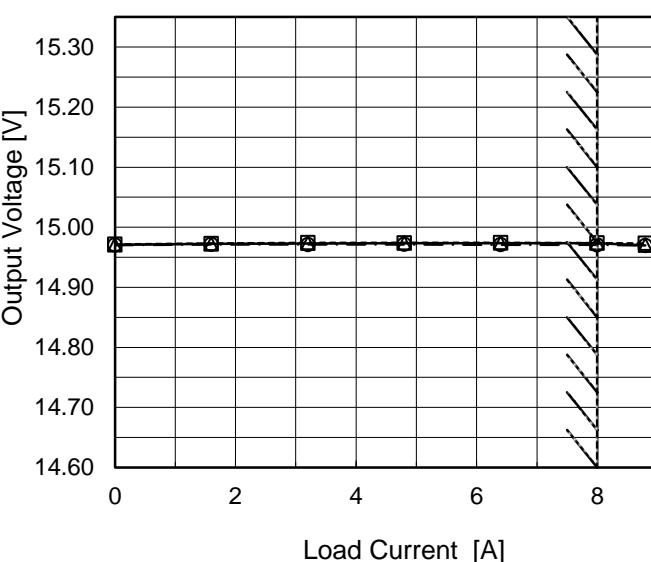
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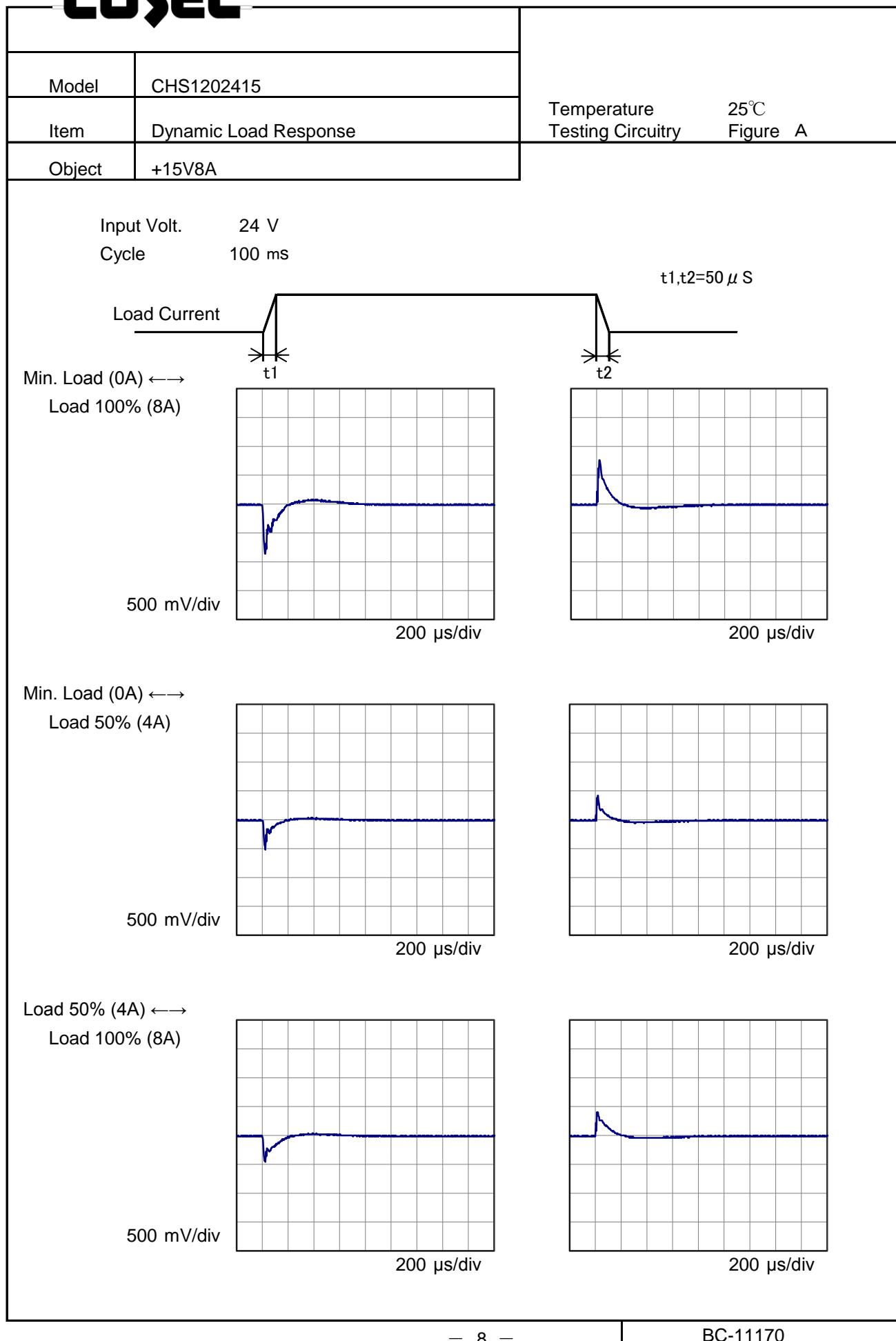
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8.0	14.974	14.974	14.971																																																			
8.8	14.970	14.973	14.970																																																			
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Note:	Slanted line shows the range of the rated load current.																																																					

COSEL



**COSSEL**

Model	CHS1202415																																							
Item	Ripple Voltage (by Load Current)	Temperature 25°C Testing Circuitry Figure B																																						
Object	+15V8A																																							
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>0.0</td><td>35</td><td>115</td></tr> <tr> <td>1.6</td><td>35</td><td>105</td></tr> <tr> <td>3.2</td><td>30</td><td>100</td></tr> <tr> <td>4.8</td><td>30</td><td>100</td></tr> <tr> <td>6.4</td><td>30</td><td>100</td></tr> <tr> <td>8.0</td><td>30</td><td>100</td></tr> <tr> <td>8.8</td><td>35</td><td>120</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]	0.0	35	115	1.6	35	105	3.2	30	100	4.8	30	100	6.4	30	100	8.0	30	100	8.8	35	120	--	-	-	--	-	-	--	-	-	--	-	-
Load Current [A]	Ripple Voltage [mV]																																							
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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>																																								
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<p>Fig.Complex Ripple Wave Form</p>																																								

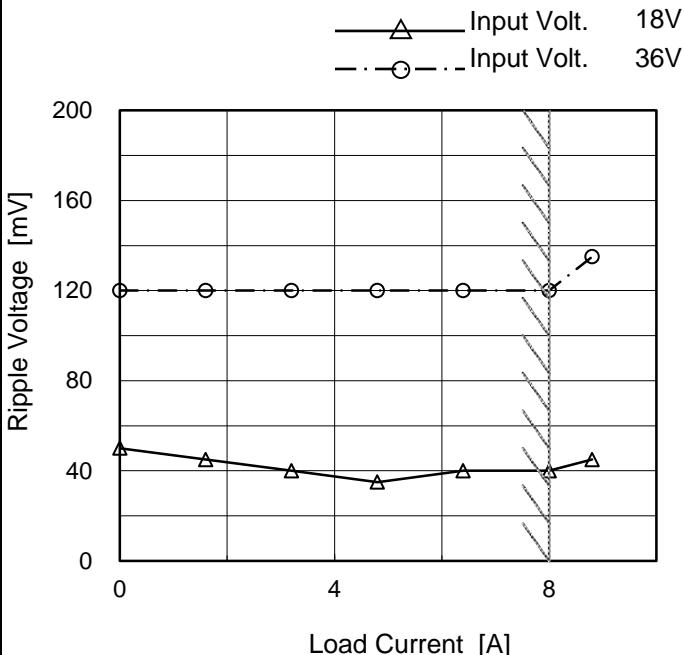
**COSEL**

Model CHS1202415

Item Ripple-Noise

Object +15V8A

## 1. Graph



Measured by 100 MHz Oscilloscope.

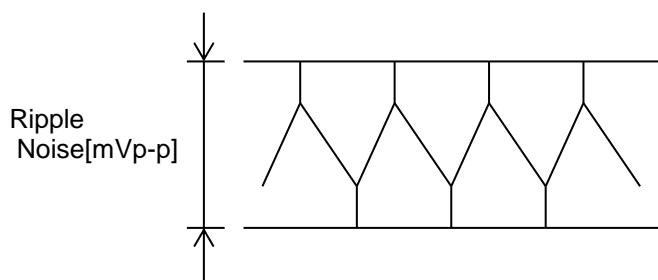
Ripple-Noise is shown as p-p in the figure below.

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

Temperature 25°C  
Testing Circuitry Figure B

## 2. Values

Load Current [A]	Ripple-Noise [mV]	
	Input Volt. 18 [V]	Input Volt. 36 [V]
0.0	50	120
1.6	45	120
3.2	40	120
4.8	35	120
6.4	40	120
8.0	40	120
8.8	45	135
--	-	-
--	-	-
--	-	-
--	-	-





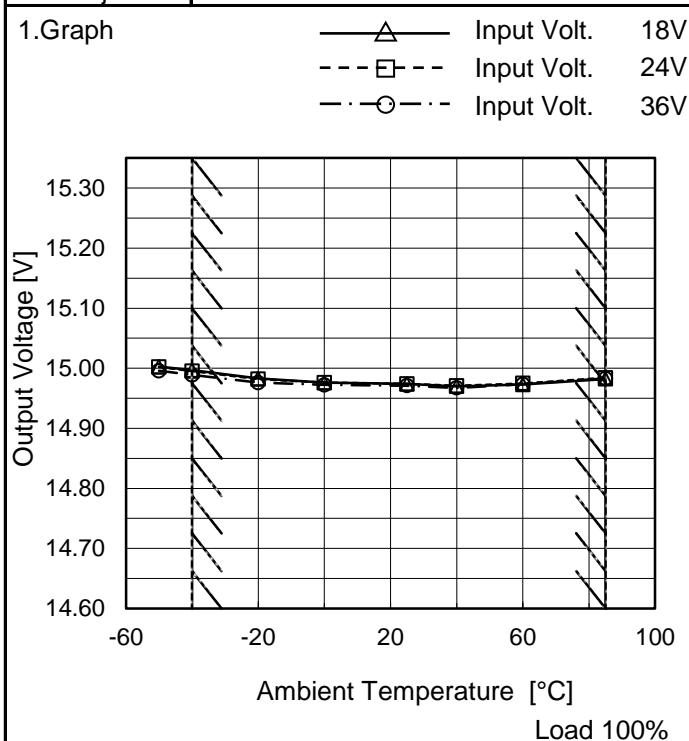
Model	CHS1202415	Testing Circuitry Figure B																																						
Item	Ripple Voltage (by Ambient Temp.)																																							
Object	+15V8A																																							
1.Graph		2.Values																																						
<p>Graph showing Ripple Voltage [mV] vs Ambient Temperature [°C] for CHS1202415 at Input Volt. 24V. The graph shows two data series: Load 50% (dashed line with square markers) and Load 100% (solid line with triangle markers). Both series show a minimum ripple voltage around 0°C. A slanted line indicates the rated ambient temperature range from -40°C to 85°C.</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>125</td><td>130</td> </tr> <tr> <td>-40</td><td>115</td><td>115</td> </tr> <tr> <td>-20</td><td>90</td><td>90</td> </tr> <tr> <td>0</td><td>80</td><td>80</td> </tr> <tr> <td>25</td><td>70</td><td>75</td> </tr> <tr> <td>40</td><td>70</td><td>70</td> </tr> <tr> <td>60</td><td>80</td><td>80</td> </tr> <tr> <td>85</td><td>90</td><td>95</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	125	130	-40	115	115	-20	90	90	0	80	80	25	70	75	40	70	70	60	80	80	85	90	95	--	-	-	--	-	-	--	-	-
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Measured by 100 MHz Oscilloscope.

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

**COSEL**

Model	CHS1202415
Item	Ambient Temperature Drift
Object	+15V8A



Testing Circuitry Figure A

## 2.Values

Ambient Temperature [°C]	Output Voltage [V]		
	Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]
-50	15.003	15.002	14.996
-40	14.997	14.995	14.989
-20	14.983	14.982	14.976
0	14.976	14.976	14.972
25	14.974	14.974	14.971
40	14.970	14.971	14.967
60	14.973	14.975	14.973
85	14.982	14.984	14.983
--	-	-	-
--	-	-	-
--	-	-	-

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



Model	CHS1202415	Testing Circuitry Figure A
Item	Output Voltage Accuracy	
Object	+15V8A	

### 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 - 8A

\* 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	-40	24	0	14.999	$\pm 32$	$\pm 0.2$
Minimum Voltage	40	36	8	14.967		

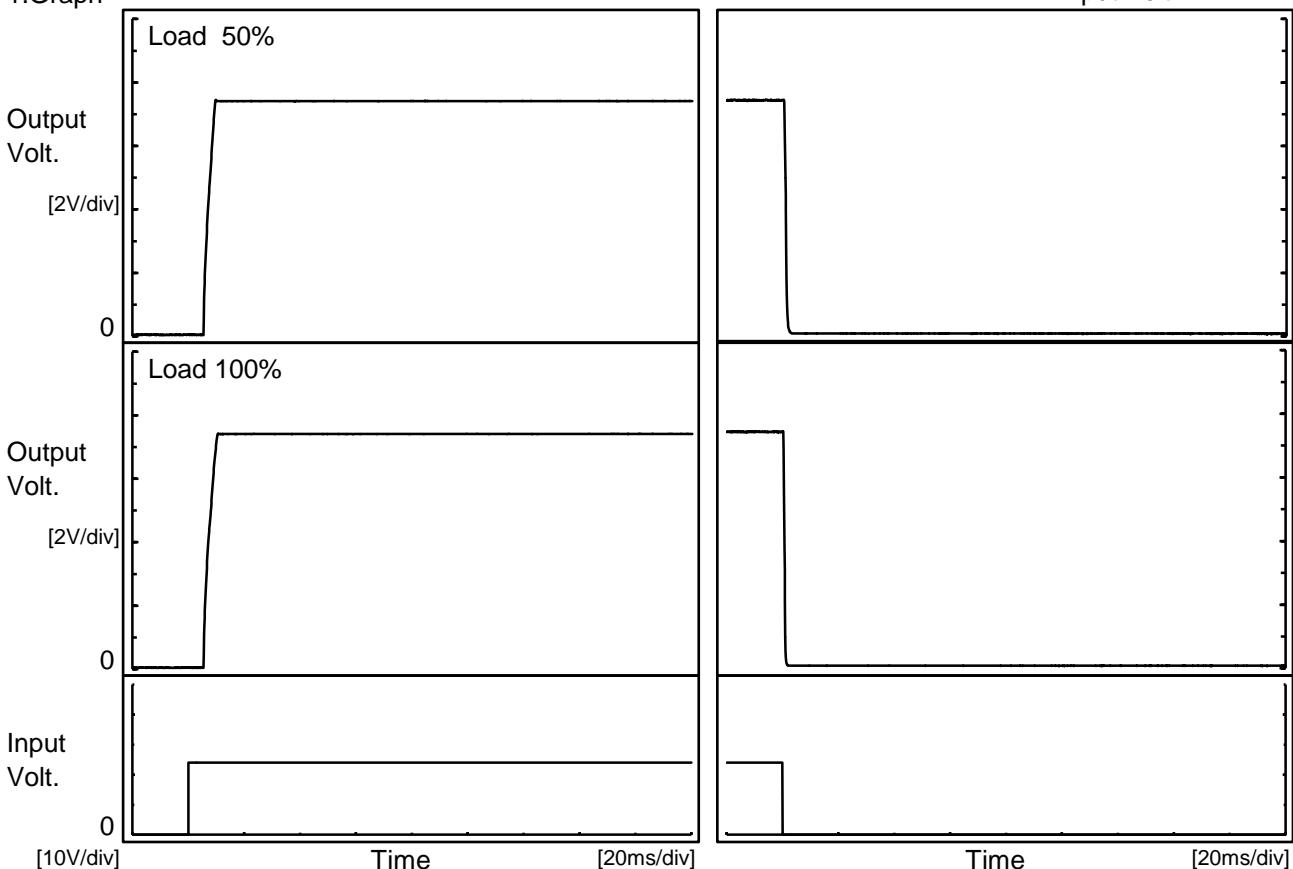
**COSEL**

Model	CHS1202415	Temperature	25°C																						
Item	Time Lapse Drift	Testing Circuitry	Figure A																						
Object	+15V8A																								
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>14.974</td></tr> <tr><td>0.5</td><td>14.969</td></tr> <tr><td>1.0</td><td>14.969</td></tr> <tr><td>2.0</td><td>14.969</td></tr> <tr><td>3.0</td><td>14.968</td></tr> <tr><td>4.0</td><td>14.968</td></tr> <tr><td>5.0</td><td>14.968</td></tr> <tr><td>6.0</td><td>14.968</td></tr> <tr><td>7.0</td><td>14.968</td></tr> <tr><td>8.0</td><td>14.968</td></tr> </tbody> </table>	Time since start [H]	Output Voltage [V]	0.0	14.974	0.5	14.969	1.0	14.969	2.0	14.969	3.0	14.968	4.0	14.968	5.0	14.968	6.0	14.968	7.0	14.968	8.0	14.968
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**COSEL**

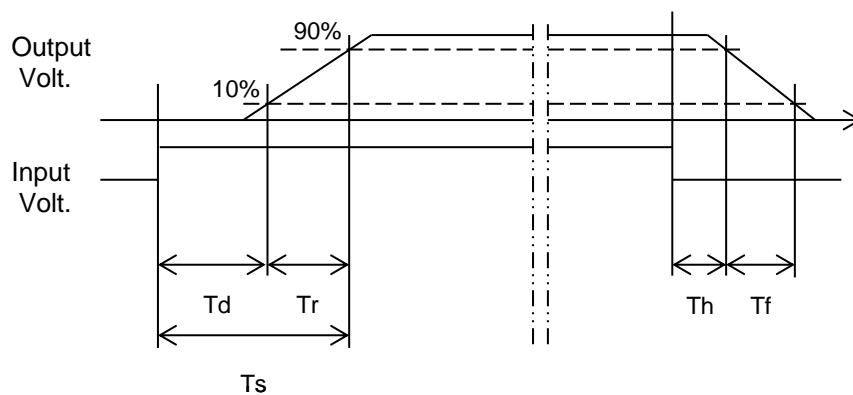
Model	CHS1202415	Temperature Testing Circuitry	25°C
Item	Rise and Fall Time	Figure A	
Object	+15V8A		

## 1. Graph



## 2. Values

Load	Time	Td	Tr	Ts	Th	Tf	[ms]
50 %		5.6	3.5	9.1	0.7	0.9	
100 %		5.6	4.0	9.6	0.4	0.6	



**COSEL**

Model	CHS1202415	Testing Circuitry Figure A																																							
Item	Minimum Input Voltage for Regulated Output Voltage																																								
Object	+15V8A																																								
1.Graph			2.Values																																						
<p>Input Voltage [V]</p> <p>Ambient Temperature [°C]</p> <p>Load 50%</p> <p>Load 100%</p>			<table border="1"> <thead> <tr> <th rowspan="2">Ambient Temperature [°C]</th> <th colspan="2">Input Voltage [V]</th> </tr> <tr> <th>Load 50%</th> <th>Load 100%</th> </tr> </thead> <tbody> <tr><td>-50</td><td>15.51</td><td>16.01</td></tr> <tr><td>-40</td><td>15.52</td><td>16.02</td></tr> <tr><td>-20</td><td>15.53</td><td>16.16</td></tr> <tr><td>0</td><td>15.54</td><td>16.27</td></tr> <tr><td>25</td><td>15.64</td><td>16.37</td></tr> <tr><td>40</td><td>15.74</td><td>16.47</td></tr> <tr><td>60</td><td>15.73</td><td>16.56</td></tr> <tr><td>85</td><td>15.83</td><td>16.65</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]	Input Voltage [V]		Load 50%	Load 100%	-50	15.51	16.01	-40	15.52	16.02	-20	15.53	16.16	0	15.54	16.27	25	15.64	16.37	40	15.74	16.47	60	15.73	16.56	85	15.83	16.65	--	-	-	--	-	-	--	-	-
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Note: Slanted line shows the range of the rated ambient temperature.

**COSEL**

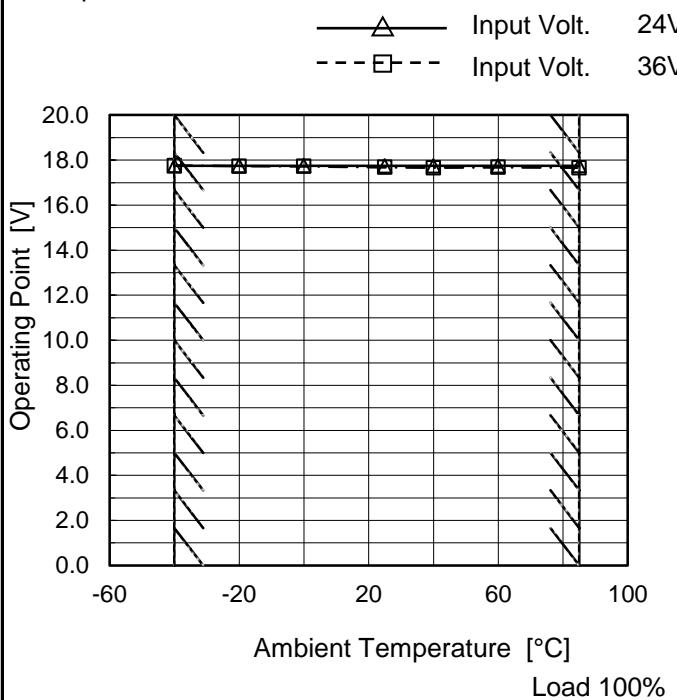
Model	CHS1202415	Temperature Testing Circuitry	25°C Figure A																																																											
Item	Overcurrent Protection																																																													
Object	+15V8A																																																													
1.Graph		2.Values																																																												
<p>The graph plots Output Voltage [V] on the Y-axis (0 to 20) against Load Current [A] on the X-axis (0 to 12). Three curves are shown for Input Voltages of 18V, 24V, and 36V. Each curve is flat at approximately 15V until a certain load current is reached, after which it drops sharply. A slanted line on each curve indicates the range of the rated load current.</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>15.00</td><td>8.89</td><td>8.82</td><td>8.63</td></tr> <tr><td>14.25</td><td>10.07</td><td>10.28</td><td>10.46</td></tr> <tr><td>13.50</td><td>10.12</td><td>10.28</td><td>10.54</td></tr> <tr><td>12.75</td><td>10.17</td><td>10.35</td><td>10.69</td></tr> <tr><td>12.00</td><td>10.01</td><td>10.37</td><td>10.65</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]	15.00	8.89	8.82	8.63	14.25	10.07	10.28	10.46	13.50	10.12	10.28	10.54	12.75	10.17	10.35	10.69	12.00	10.01	10.37	10.65	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-
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Note: Slanted line shows the range of the rated load current.

Model	CHS1202415
Item	Overvoltage Protection
Object	+15V8A

Testing Circuitry Figure A

## 1. Graph



## 2.Values

Ambient Temperature [°C]	Operating Point [V]	
	Input Volt. 24[V]	Input Volt. 36[V]
-40	17.7	17.8
-20	17.8	17.7
0	17.8	17.7
25	17.7	17.7
40	17.7	17.7
60	17.7	17.7
85	17.8	17.7
--	-	-
--	-	-
--	-	-
--	-	-

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

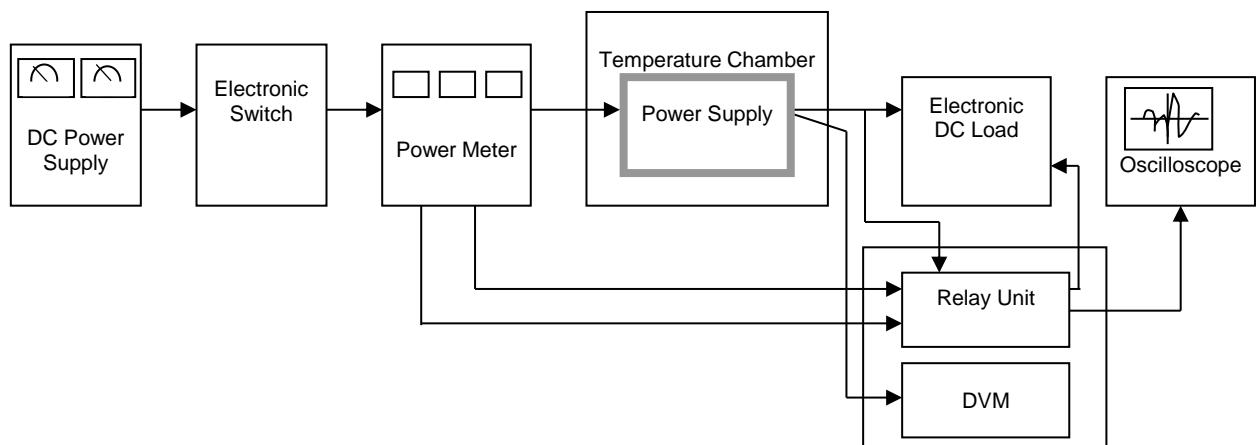


Figure A

Data Acquisition/Control Unit

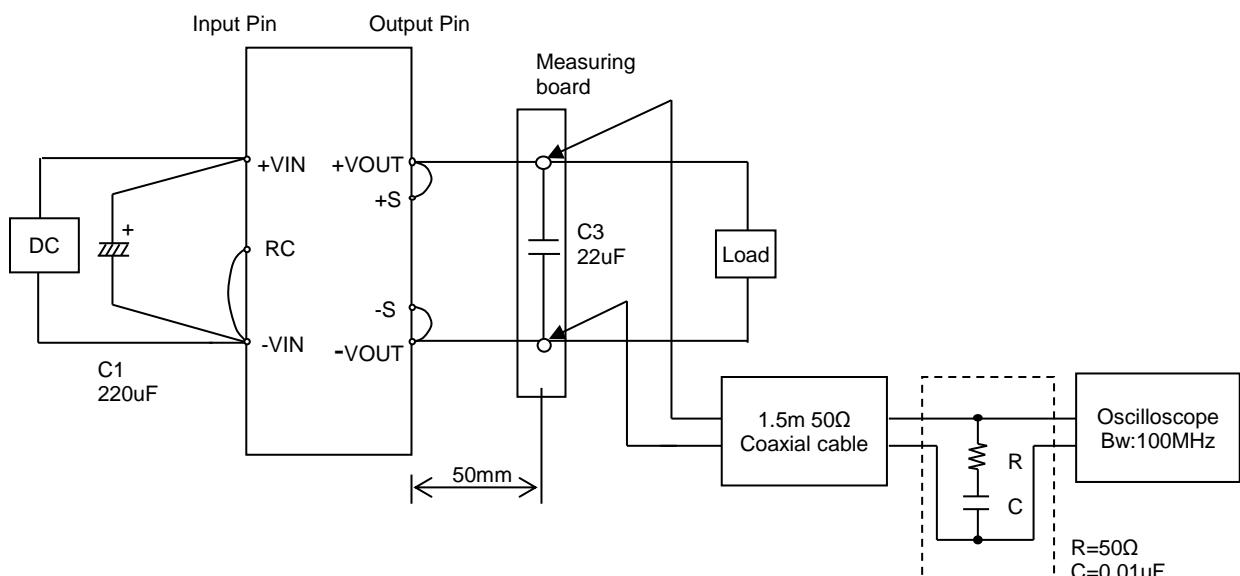


Figure B