

TEST DATA OF CHS1204815

Regulated DC Power Supply
March 6, 2019

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COSEL CO.,LTD.

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(Final Page 19)

COSEL

Model		CHS1204815	
Item		Input Current (by Input Voltage)	
Object			

1.Graph

—△—

Load 100%

---□---

Load 50%

---○---

Load 0%

Input Current [A]

5.0

4.0

3.0

2.0

1.0

0.0

0

20

40

60

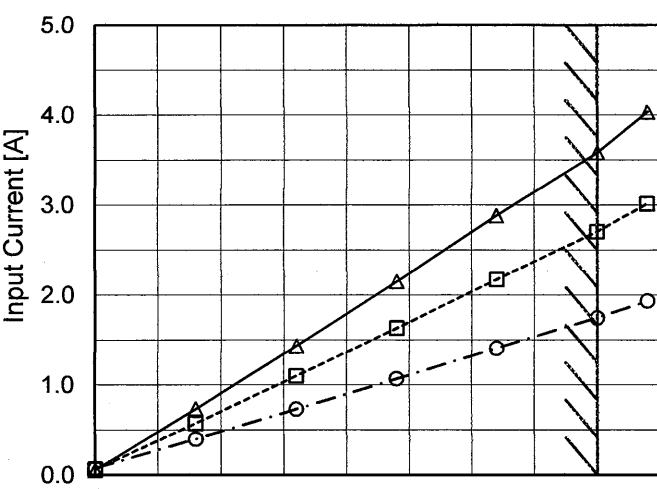
80

Input Voltage [V]

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

2.Values

Input Voltage [V]	Input Current [A]		
	Load 0%	Load 50%	Load 100%
0.0	0.000	0.000	0.000
8.0	0.007	0.007	0.007
16.0	0.007	0.007	0.007
24.0	0.008	0.008	0.008
33.0	0.009	0.009	0.009
35.2	0.056	1.806	3.659
36.0	0.057	1.768	3.582
40.0	0.059	1.607	3.224
48.0	0.065	1.355	2.704
60.0	0.072	1.106	2.179
70.0	0.076	0.962	1.882
76.0	0.078	0.895	1.746
80.0	0.079	0.855	1.665
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

Model		CHS1204815																																																				
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<table><tr><th rowspan="2">Load Current [A]</th><th colspan="3">Input Current [A]</th></tr><tr><th>Input Volt. 36[V]</th><th>Input Volt. 48[V]</th><th>Input Volt. 76[V]</th></tr><tr><td>0.0</td><td>0.056</td><td>0.064</td><td>0.077</td></tr><tr><td>1.6</td><td>0.735</td><td>0.573</td><td>0.400</td></tr><tr><td>3.2</td><td>1.434</td><td>1.100</td><td>0.732</td></tr><tr><td>4.8</td><td>2.149</td><td>1.631</td><td>1.070</td></tr><tr><td>6.4</td><td>2.884</td><td>2.173</td><td>1.409</td></tr><tr><td>8.0</td><td>3.582</td><td>2.704</td><td>1.746</td></tr><tr><td>8.8</td><td>4.035</td><td>3.014</td><td>1.933</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>				Load Current [A]	Input Current [A]			Input Volt. 36[V]	Input Volt. 48[V]	Input Volt. 76[V]	0.0	0.056	0.064	0.077	1.6	0.735	0.573	0.400	3.2	1.434	1.100	0.732	4.8	2.149	1.631	1.070	6.4	2.884	2.173	1.409	8.0	3.582	2.704	1.746	8.8	4.035	3.014	1.933	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-
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Model		CHS1204815		Temperature 25°C																																																				
Item		Input Power (by Load Current)		Testing Circuitry Figure A																																																				
Object																																																								
1.Graph		<div><div>—△—</div>Input Volt. 36V</div> <div><div>---□---</div>Input Volt. 48V</div> <div><div>---○---</div>Input Volt. 76V</div>		2.Values																																																				
<div><div>Input Power [W]</div><div><div><div>200</div><div>150</div><div>100</div><div>50</div><div>0</div></div><div><div>0</div><div>2</div><div>4</div><div>6</div><div>8</div></div></div><div>Load Current [A]</div></div> <div>Note: Slanted line shows the range of the rated load current.</div>		<table><tr><th rowspan="2">Load Current [A]</th><th colspan="3">Input Power [W]</th></tr><tr><th>Input Volt. 36[V]</th><th>Input Volt. 48[V]</th><th>Input Volt. 76[V]</th></tr><tr><td>0.0</td><td>2.0</td><td>3.1</td><td>5.9</td></tr><tr><td>1.6</td><td>26.4</td><td>27.5</td><td>30.4</td></tr><tr><td>3.2</td><td>51.4</td><td>52.7</td><td>55.6</td></tr><tr><td>4.8</td><td>76.8</td><td>78.0</td><td>81.2</td></tr><tr><td>6.4</td><td>102.8</td><td>103.7</td><td>106.9</td></tr><tr><td>8.0</td><td>129.5</td><td>130.1</td><td>133.1</td></tr><tr><td>8.8</td><td>143.1</td><td>143.6</td><td>146.5</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>		Load Current [A]	Input Power [W]			Input Volt. 36[V]	Input Volt. 48[V]	Input Volt. 76[V]	0.0	2.0	3.1	5.9	1.6	26.4	27.5	30.4	3.2	51.4	52.7	55.6	4.8	76.8	78.0	81.2	6.4	102.8	103.7	106.9	8.0	129.5	130.1	133.1	8.8	143.1	143.6	146.5	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-		
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Note: Slanted line shows the range of the rated load current.



Model		CHS1204815	Temperature25°C Testing CircuitryFigure A
Item		Efficiency (by Input Voltage)	
Object			
1.Graph			2.Values
<div><div><div><div><div></div><div></div></div><div></div><div></div></div><div><div>Load 50%</div></div></div><div><div><div><div></div><div></div></div><div></div><div></div></div><div><div>Load 100%</div></div></div></div> <div><div><div><div><div>100</div><div>96</div><div>92</div><div>88</div><div>84</div><div>80</div><div>76</div><div>72</div></div><div><div>20</div><div>40</div><div>60</div><div>80</div></div></div><div><div>Efficiency [%]</div><div>Input Voltage [V]</div></div></div><div><div>Note: Slanted line shows the range of the rated input voltage.</div></div></div>			

Model		CHS1204815		Temperature 25°C Testing Circuitry Figure A																												
Item		Efficiency (by Load Current)																														
Object																																
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<table border="1"><caption>Efficiency Data from Graph</caption><thead><tr><th>Load Current [A]</th><th>36V Input [%]</th><th>48V Input [%]</th><th>76V Input [%]</th></tr></thead><tbody><tr><td>1.6</td><td>91.1</td><td>87.6</td><td>79.3</td></tr><tr><td>3.2</td><td>93.8</td><td>91.6</td><td>86.8</td></tr><tr><td>4.8</td><td>94.1</td><td>92.7</td><td>89.1</td></tr><tr><td>6.4</td><td>93.7</td><td>92.8</td><td>90.1</td></tr><tr><td>8.0</td><td>92.9</td><td>92.5</td><td>90.4</td></tr><tr><td>8.8</td><td>92.4</td><td>92.2</td><td>90.3</td></tr></tbody></table>					Load Current [A]	36V Input [%]	48V Input [%]	76V Input [%]	1.6	91.1	87.6	79.3	3.2	93.8	91.6	86.8	4.8	94.1	92.7	89.1	6.4	93.7	92.8	90.1	8.0	92.9	92.5	90.4	8.8	92.4	92.2	90.3
Load Current [A]	36V Input [%]	48V Input [%]	76V Input [%]																													
1.6	91.1	87.6	79.3																													
3.2	93.8	91.6	86.8																													
4.8	94.1	92.7	89.1																													
6.4	93.7	92.8	90.1																													
8.0	92.9	92.5	90.4																													
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Model		CHS1204815		Temperature25°C																															
Item		Line Regulation		Testing CircuitryFigure A																															
Object		+15V8A																																	
1.Graph				2.Values																															
<div><div><div>---□---</div><div>Load 50%</div></div><div><div>—△—</div><div>Load 100%</div></div></div> <table><thead><tr><th>Input Voltage [V]</th><th>Output Voltage [V] Load 50%</th><th>Output Voltage [V] Load 100%</th></tr></thead><tbody><tr><td>35</td><td>15.031</td><td>15.024</td></tr><tr><td>36</td><td>15.032</td><td>15.024</td></tr><tr><td>40</td><td>15.032</td><td>15.024</td></tr><tr><td>48</td><td>15.031</td><td>15.023</td></tr><tr><td>55</td><td>15.030</td><td>15.022</td></tr><tr><td>60</td><td>15.029</td><td>15.022</td></tr><tr><td>70</td><td>15.028</td><td>15.021</td></tr><tr><td>76</td><td>15.027</td><td>15.020</td></tr><tr><td>80</td><td>15.026</td><td>15.019</td></tr></tbody></table>				Input Voltage [V]	Output Voltage [V] Load 50%	Output Voltage [V] Load 100%	35	15.031	15.024	36	15.032	15.024	40	15.032	15.024	48	15.031	15.023	55	15.030	15.022	60	15.029	15.022	70	15.028	15.021	76	15.027	15.020	80	15.026	15.019		
Input Voltage [V]	Output Voltage [V] Load 50%	Output Voltage [V] Load 100%																																	
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48	15.031	15.023																																	
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70	15.028	15.021																																	
76	15.027	15.020																																	
80	15.026	15.019																																	
Note: Slanted line shows the range of the rated input voltage.																																			

Model		CHS1204815	
Item		Load Regulation	
Object		+15V8A	

1.Graph

—△—

Input Volt.

36V

---□---

Input Volt.

48V

---○---

Input Volt.

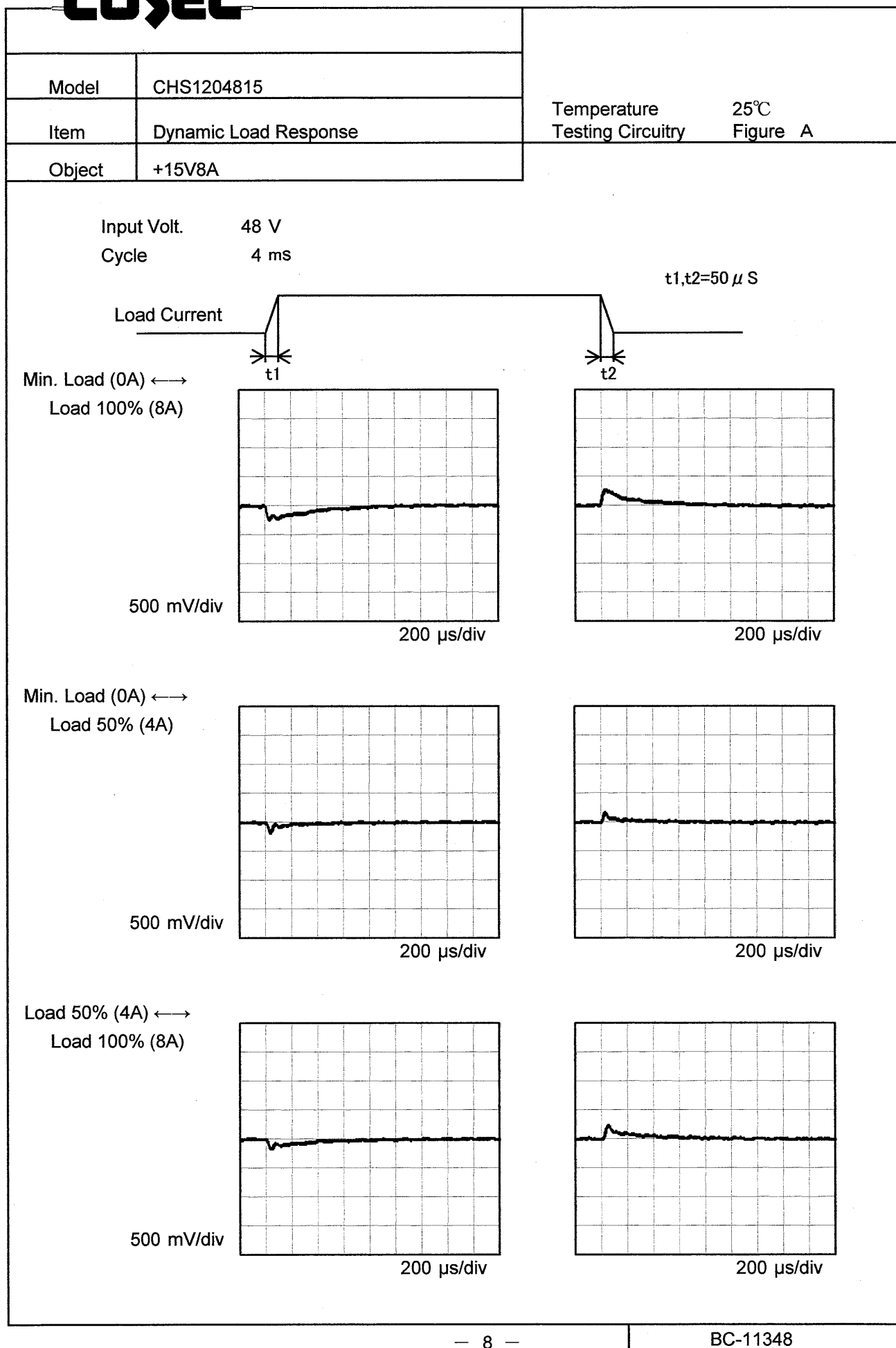
76V

Load Current [A]	Input Volt. 36[V]	Input Volt. 48[V]	Input Volt. 76[V]
0.0	15.022	15.024	15.021
1.6	15.024	15.025	15.022
3.2	15.025	15.025	15.022
4.8	15.026	15.026	15.022
6.4	15.026	15.025	15.021
8.0	15.024	15.023	15.020
8.8	15.024	15.023	15.019
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

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

2.Values

Load Current [A]	Output Voltage [V]		
	Input Volt. 36[V]	Input Volt. 48[V]	Input Volt. 76[V]
0.0	15.022	15.024	15.021
1.6	15.024	15.025	15.022
3.2	15.025	15.025	15.022
4.8	15.026	15.026	15.022
6.4	15.026	15.025	15.021
8.0	15.024	15.023	15.020
8.8	15.024	15.023	15.019
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-



COSEL

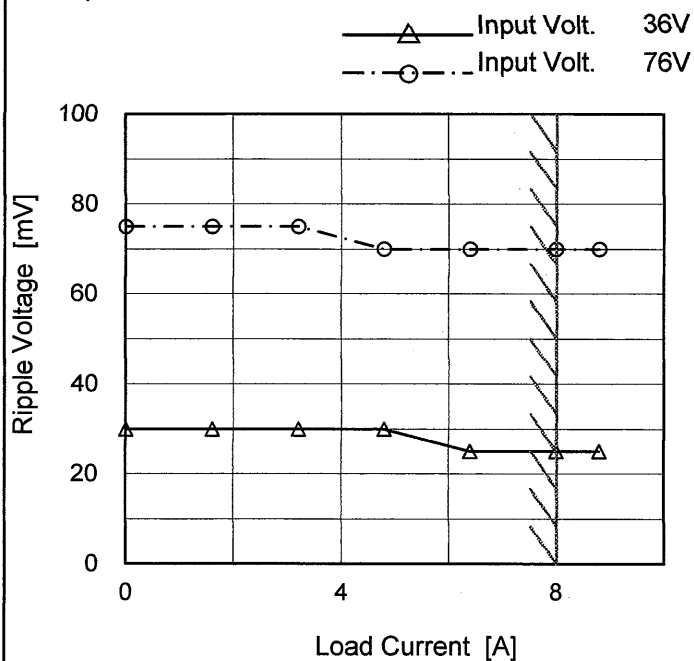
Model CHS1204815

Item Ripple Voltage (by Load Current)

Object +15V8A

Temperature 25°C
Testing Circuitry Figure B

1. Graph



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.

Ripple [mVp-p]

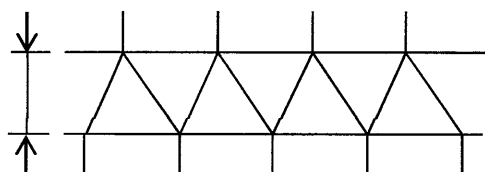


Fig. Complex Ripple Wave Form

2. Values

Load Current [A]	Ripple Voltage [mV]	
	Input Volt. 36 [V]	Input Volt. 76 [V]
0.0	30	75
1.6	30	75
3.2	30	75
4.8	30	70
6.4	25	70
8.0	25	70
8.8	25	70
--	-	-
--	-	-
--	-	-
--	-	-

COSEL

Model		CHS1204815		Temperature 25°C																																							
Item		Ripple-Noise		Testing Circuitry Figure B																																							
Object		+15V8A																																									
1.Graph				2.Values																																							
<div><div><div>—△— Input Volt. 36V</div><div>-○- Input Volt. 76V</div></div><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></div>				<table><tr><th rowspan="2">Load Current [A]</th><th colspan="2">Ripple-Noise [mV]</th></tr><tr><th>Input Volt. 36 [V]</th><th>Input Volt. 76 [V]</th></tr><tr><td>0.0</td><td>30</td><td>75</td></tr><tr><td>1.6</td><td>30</td><td>75</td></tr><tr><td>3.2</td><td>30</td><td>75</td></tr><tr><td>4.8</td><td>30</td><td>70</td></tr><tr><td>6.4</td><td>25</td><td>70</td></tr><tr><td>8.0</td><td>25</td><td>70</td></tr><tr><td>8.8</td><td>25</td><td>70</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></table>		Load Current [A]	Ripple-Noise [mV]		Input Volt. 36 [V]	Input Volt. 76 [V]	0.0	30	75	1.6	30	75	3.2	30	75	4.8	30	70	6.4	25	70	8.0	25	70	8.8	25	70	--	-	-	--	-	-	--	-	-	--	-	-
Load Current [A]	Ripple-Noise [mV]																																										
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<div><div><div>Ripple Noise[mVp-p]</div></div></div>																																											
Fig.Complex Ripple Noise Wave Form																																											

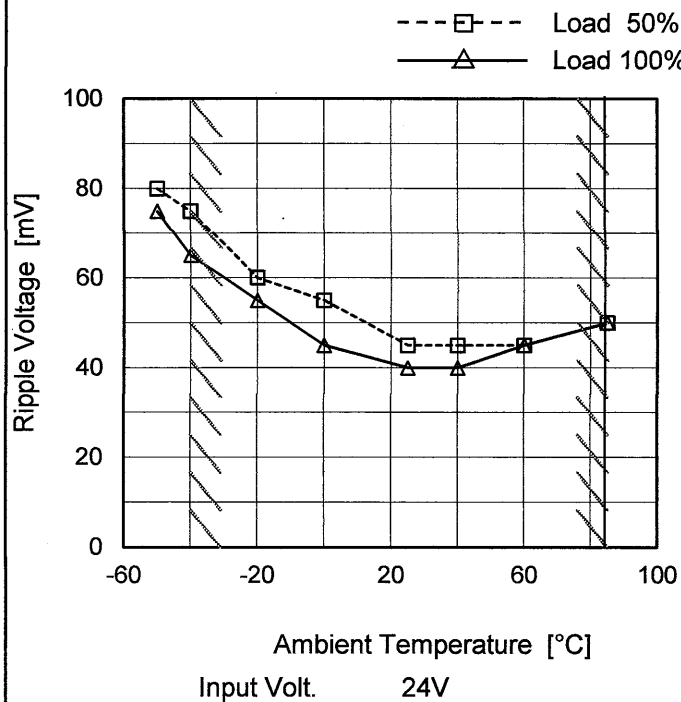
Model CHS1204815

Item Ripple Voltage (by Ambient Temp.)

Object +15V8A

Testing Circuitry Figure B

1. Graph



Measured by 100 MHz Oscilloscope.

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

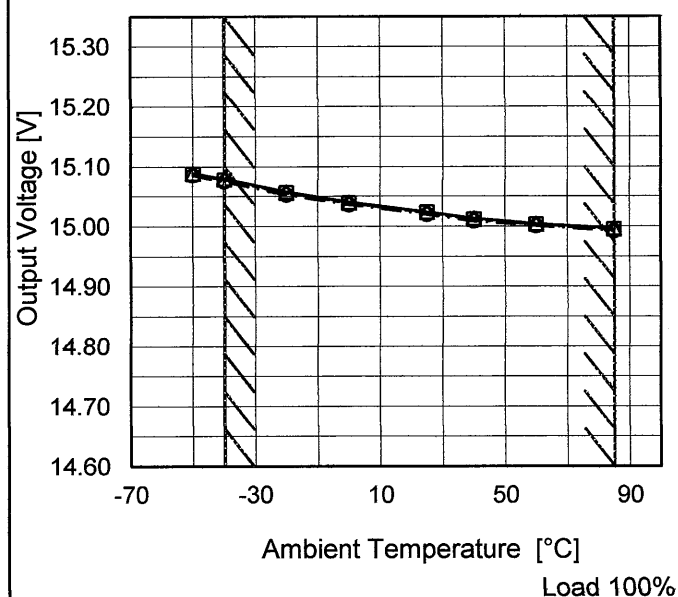
2. Values

Ambient Temperature [°C]	Ripple Voltage [mV]	
	Load 50%	Load 100%
-50	80	75
-40	75	65
-20	60	55
0	55	45
25	45	40
40	45	40
60	45	45
85	50	50
--	-	-
--	-	-
--	-	-

Model	CHS1204815
Item	Ambient Temperature Drift
Object	+15V8A

1.Graph

—△— Input Volt. 36V
 ---□--- Input Volt. 48V
 -·-○-·- Input Volt. 76V



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

Testing Circuitry Figure A

2.Values

Ambient Temperature [°C]	Output Voltage [V]		
	Input Volt. 36[V]	Input Volt. 48[V]	Input Volt. 76[V]
-50	15.090	15.088	15.086
-40	15.080	15.078	15.075
-20	15.058	15.056	15.053
0	15.040	15.039	15.036
25	15.024	15.023	15.020
40	15.014	15.012	15.009
60	15.004	15.003	15.001
85	14.997	14.995	14.992
--	-	-	-
--	-	-	-
--	-	-	-

Model		CHS1204815	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 : 36 - 76V

Load Current : 0 - 8A

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

* 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	48	0	15.081	±45	±0.3
Minimum Voltage	85	76	8	14.992		

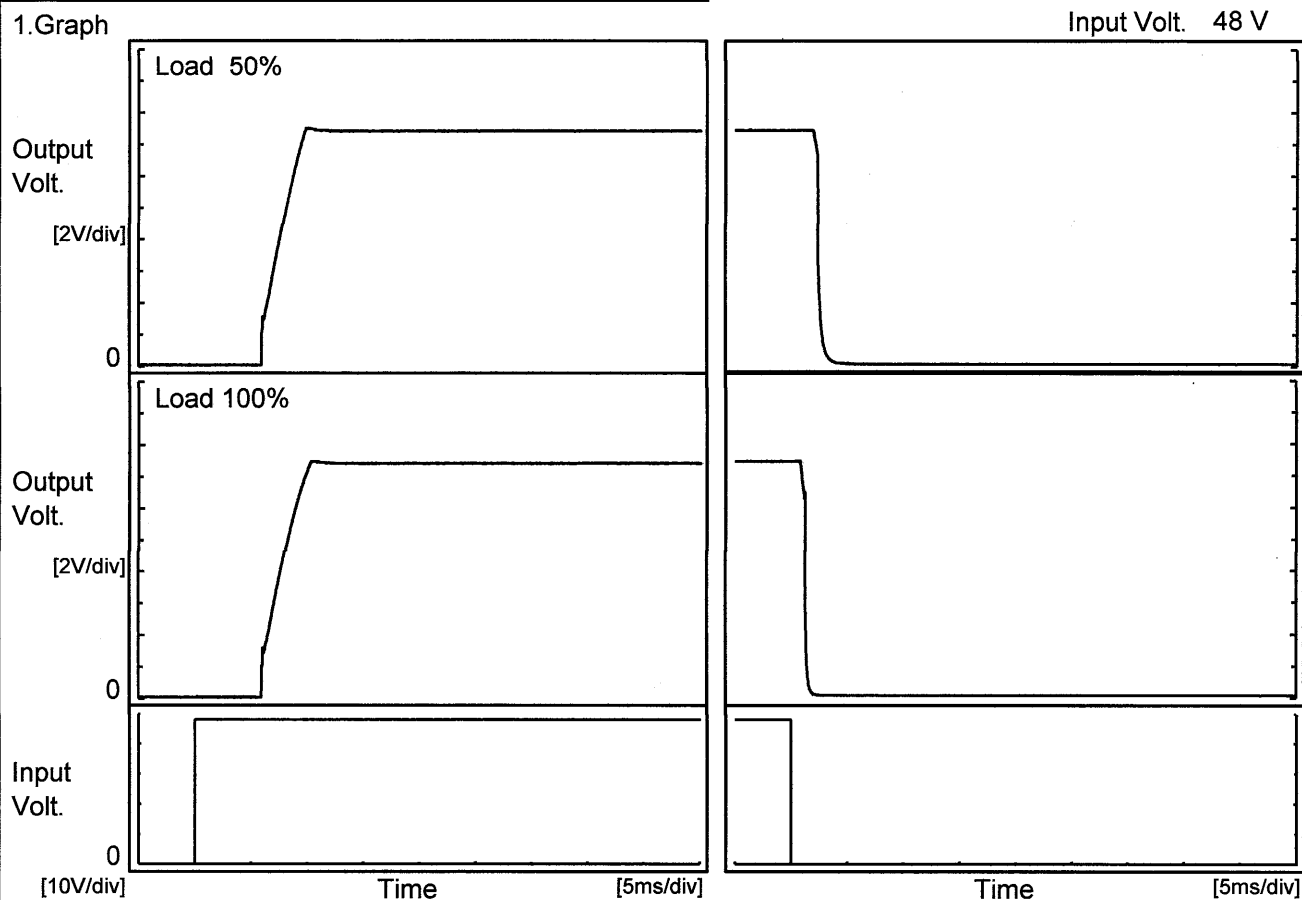
COSEL

LUCEL			
Model	CHS1204815		
Item	Time Lapse Drift	Temperature	25°C
Object	+15V8A	Testing Circuitry	Figure A
1.Graph		2.Values	
<div><div><div>Output Voltage [V]</div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><di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COSEL

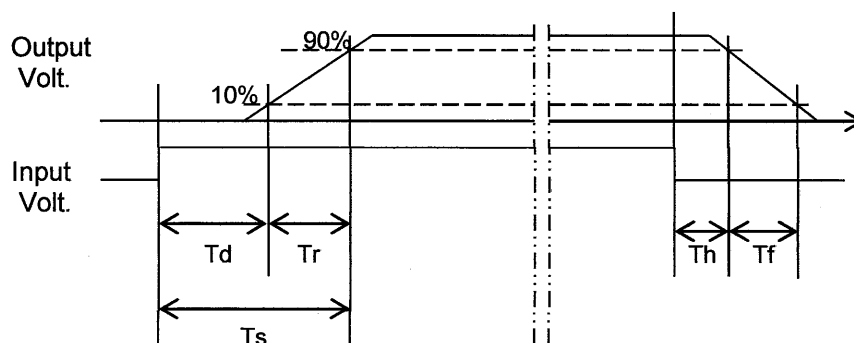
Model	CHS1204815	Temperature	25°C
Item	Rise and Fall Time	Testing Circuitry	Figure A
Object	+15V8A		

1. Graph



2. Values

		[ms]				
Load	Time	Td	Tr	Ts	Th	Tf
50 %		6.0	3.3	9.3	2.3	0.6
100 %		6.0	3.6	9.6	1.0	0.5



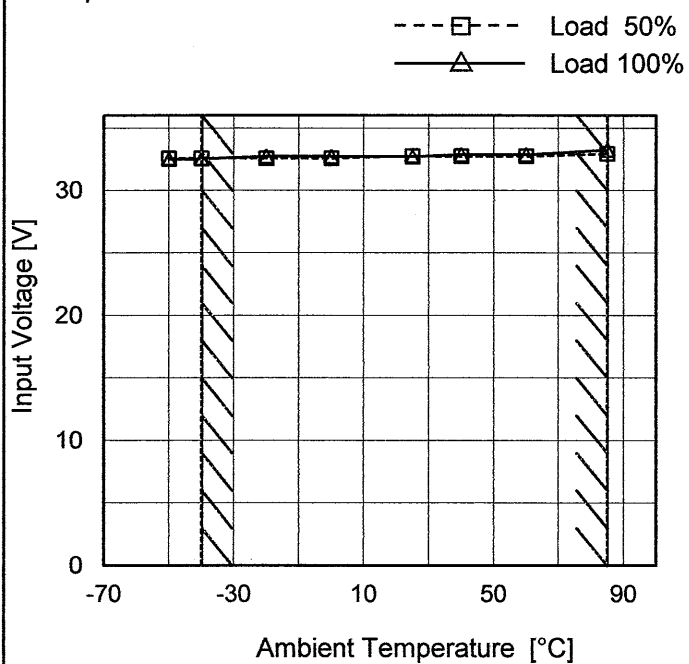
Model CHS1204815

Item Minimum Input Voltage
for Regulated Output Voltage

Object +15V8A

Testing Circuitry Figure A

1. Graph



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

2. Values

Ambient Temperature [°C]	Input Voltage [V]	
	Load 50%	Load 100%
-50	32.57	32.52
-40	32.58	32.54
-20	32.58	32.75
0	32.58	32.73
25	32.76	32.71
40	32.75	32.88
60	32.74	32.87
85	32.94	33.26
--	-	-
--	-	-
--	-	-

COSEL

Model		CHS1204815	
Item		Overcurrent Protection	
Object		+15V8A	

1.Graph

Input Volt. 36V

Input Volt. 48V

Input Volt. 76V

Output Voltage [V]

Model	CHS1204815																																								
Item	Overvoltage Protection	Testing Circuitry Figure A																																							
Object	+15V8A																																								
1.Graph		2.Values																																							
<div><div><div>—△—</div><div>Input Volt.</div><div>48V</div></div><div><div>---□---</div><div>Input Volt.</div><div>76V</div></div></div> <p>Operating Point [V]</p> <p>Ambient Temperature [°C]</p> <p>Load 0%</p> <p>Note: Slanted line shows the range of the rated ambient temperature.</p>		<table><tr><th rowspan="2">Ambient Temperature [°C]</th><th colspan="2">Operating Point [V]</th></tr><tr><th>Input Volt. 48[V]</th><th>Input Volt. 76[V]</th></tr><tr><td>-40</td><td>17.9</td><td>18.0</td></tr><tr><td>-20</td><td>17.9</td><td>18.0</td></tr><tr><td>0</td><td>17.9</td><td>18.0</td></tr><tr><td>25</td><td>18.0</td><td>18.0</td></tr><tr><td>40</td><td>18.0</td><td>18.0</td></tr><tr><td>60</td><td>18.0</td><td>18.1</td></tr><tr><td>85</td><td>18.1</td><td>18.1</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></table>		Ambient Temperature [°C]	Operating Point [V]		Input Volt. 48[V]	Input Volt. 76[V]	-40	17.9	18.0	-20	17.9	18.0	0	17.9	18.0	25	18.0	18.0	40	18.0	18.0	60	18.0	18.1	85	18.1	18.1	--	-	-	--	-	-	--	-	-	--	-	-
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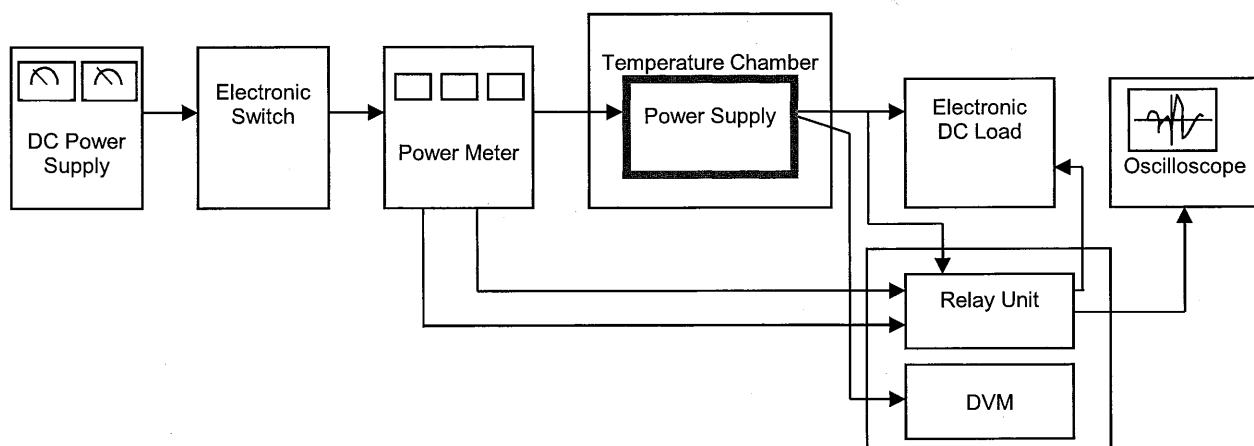


Figure A

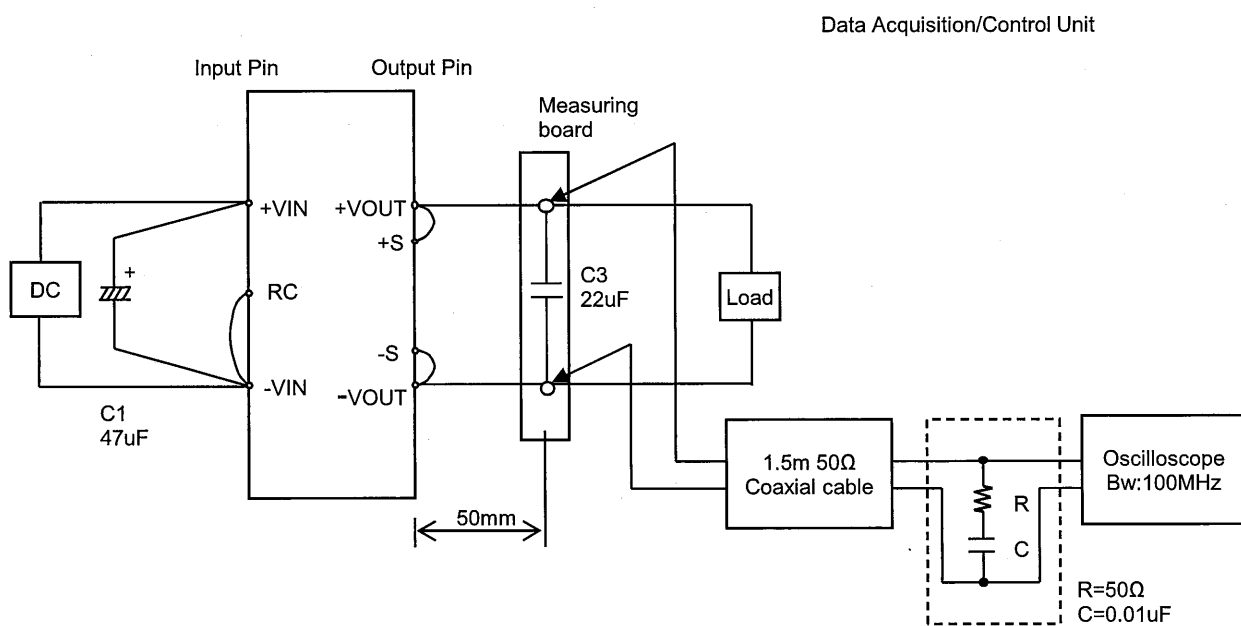


Figure B