

TEST DATA OF CHS1204824

Regulated DC Power Supply
Feb 27, 2019

Approved by : Takayuki Fukuda
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Prepared by : Kouhei Yoshimoto
Kouhei Yoshimoto Design Engineer

COSEL CO.,LTD.

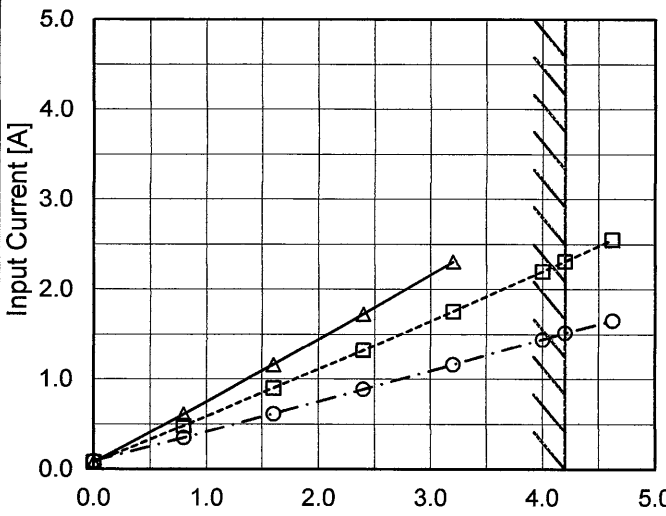
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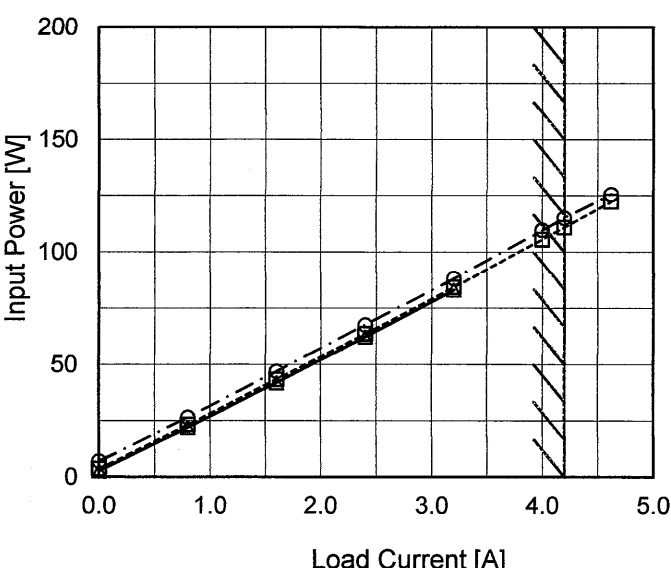
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Model		CHS1204824																																																				
Item		Input Current (by Load Current)																																																				
Object																																																						
1.Graph		2.Values																																																				
<div><div><div>—△—</div><div>Input Volt.</div><div>36V</div></div><div><div>---□---</div><div>Input Volt.</div><div>48V</div></div><div><div>-○-</div><div>Input Volt.</div><div>76V</div></div></div> 		<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>0.00</td><td>0.073</td><td>0.075</td><td>0.092</td></tr><tr><td>0.80</td><td>0.612</td><td>0.482</td><td>0.349</td></tr><tr><td>1.60</td><td>1.160</td><td>0.901</td><td>0.616</td></tr><tr><td>2.40</td><td>1.725</td><td>1.321</td><td>0.889</td></tr><tr><td>3.20</td><td>2.306</td><td>1.754</td><td>1.162</td></tr><tr><td>4.00</td><td>- ※</td><td>2.197</td><td>1.445</td></tr><tr><td>4.20</td><td>- ※</td><td>2.311</td><td>1.516</td></tr><tr><td>4.62</td><td>- ※</td><td>2.551</td><td>1.652</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]	0.00	0.073	0.075	0.092	0.80	0.612	0.482	0.349	1.60	1.160	0.901	0.616	2.40	1.725	1.321	0.889	3.20	2.306	1.754	1.162	4.00	- ※	2.197	1.445	4.20	- ※	2.311	1.516	4.62	- ※	2.551	1.652	--	-	-	-	--	-	-	-	--	-	-	-
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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 manuals for details of input derating.																																																				



Model		CHS1204824		Temperature 25°C Testing Circuitry Figure A																																																				
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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																																																				
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Model		CHS1204824	
Item		Efficiency (by Input Voltage)	
Object			

1.Graph

Load 50%

Load 100%

Efficiency [%]

100

96

92

88

84

80

76

72

20

40

60

80

Input Voltage [V]

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

2.Values

Input Voltage [V]	Efficiency [%]	
	Load 50%	Load 100%
35	92.8	- ※
36	92.6	- ※
40	92.0	91.7
48	90.5	91.0
55	89.0	90.2
60	87.8	89.7
70	85.7	88.4
76	84.3	87.6
80	83.4	87.1

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

Refer to instruction manials for details of input derating.



Model		CHS1204824	
Item		Efficiency (by Load Current)	
Object			

1.Graph

—△—

Input Volt.

36V

---□---

Input Volt.

48V

---○---

Input Volt.

76V

Efficiency [%]

100

92

84

76

68

60

52

44

0.0

1.0

2.0

3.0

4.0

5.0

Load Current [A]

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

2.Values

Load Current [A]	Efficiency [%]		
	Input Volt. 36[V]	Input Volt. 48[V]	Input Volt. 76[V]
0.00	-	-	-
0.80	87.0	82.8	72.2
1.60	91.9	88.9	81.9
2.40	92.7	90.9	85.3
3.20	92.7	91.3	87.2
4.00	- ※	91.1	87.6
4.20	- ※	91.0	87.6
4.62	- ※	90.8	87.4
--	-	-	-
--	-	-	-
--	-	-	-

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

Refer to instruction manials for details of input derating.



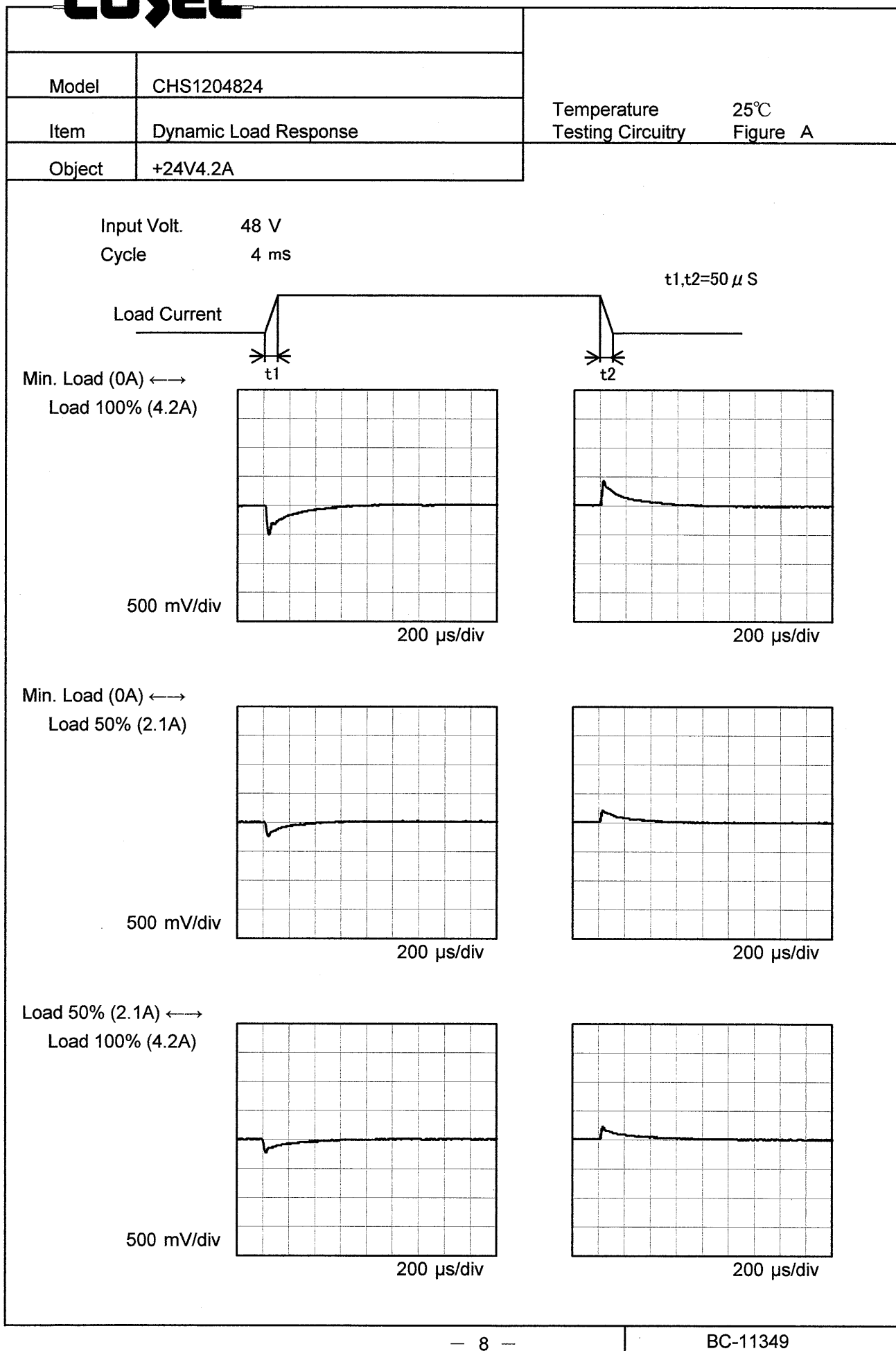
Model		CHS1204824																															
Item		Line Regulation																															
Object		+24V4.2A																															
1.Graph		2.Values																															
<div><div><div><div><div></div><div></div><div></div></div><div></div><div></div></div><div><div><div></div><div></div><div></div></div><div></div><div></div></div></div><div><div>Load 50%</div><div>Load 100%</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>24.095</td><td>-</td></tr><tr><td>36</td><td>24.095</td><td>-</td></tr><tr><td>40</td><td>24.095</td><td>24.102</td></tr><tr><td>48</td><td>24.097</td><td>24.103</td></tr><tr><td>55</td><td>24.098</td><td>24.103</td></tr><tr><td>60</td><td>24.099</td><td>24.104</td></tr><tr><td>70</td><td>24.101</td><td>24.105</td></tr><tr><td>76</td><td>24.102</td><td>24.106</td></tr><tr><td>80</td><td>24.103</td><td>24.106</td></tr></tbody></table></div> <div><div>Note: Slanted line shows the range of the rated input voltage.</div></div>		Input Voltage [V]	Output Voltage [V] Load 50%	Output Voltage [V] Load 100%	35	24.095	-	36	24.095	-	40	24.095	24.102	48	24.097	24.103	55	24.098	24.103	60	24.099	24.104	70	24.101	24.105	76	24.102	24.106	80	24.103	24.106	<div><div>※ Maximam output current at minimum input Voltage is 60% of rated current.</div><div>Refer to instruction manials for details of input derating.</div></div>	
Input Voltage [V]	Output Voltage [V] Load 50%	Output Voltage [V] Load 100%																															
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Model		CHS1204824		Temperature		25°C	
Item		Load Regulation		Testing Circuitry		Figure A	
Object		+24V4.2A					
1.Graph		<div><div><div>—△—</div><div>Input Volt.</div><div>36V</div></div><div><div>---□---</div><div>Input Volt.</div><div>48V</div></div><div><div>---○---</div><div>Input Volt.</div><div>76V</div></div></div>					
<div><div>Output Voltage [V]</div><div><div>24.40</div><div>24.30</div><div>24.20</div><div>24.10</div><div>24.00</div><div>23.90</div><div>23.80</div><div>23.70</div></div><div><div>0.0</div><div>1.0</div><div>2.0</div><div>3.0</div><div>4.0</div><div>5.0</div></div><div>Load Current [A]</div></div>							
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]		
0.00	24.098	24.098	24.102		
0.80	24.096	24.097	24.102		
1.60	24.095	24.097	24.102		
2.40	24.096	24.097	24.103		
3.20	24.097	24.099	24.104		
4.00	- ※	24.101	24.105		
4.20	- ※	24.103	24.106		
4.62	- ※	24.103	24.106		
--	-	-	-		
--	-	-	-		
--	-	-	-		

※ 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		CHS1204824		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.</p> <p>Ripple Voltage is shown as p-p in the figure below.</p> <p>Note: Slanted line shows the range of the rated load current.</p>				<p>※ Maximam output current at minimum input Voltage is 60% of rated current.</p> <p>Refer to instruction manials for details of input derating.</p>																																					
<div><div>Ripple [mVp-p]</div><p>Fig.Complex Ripple Wave Form</p></div>																																									

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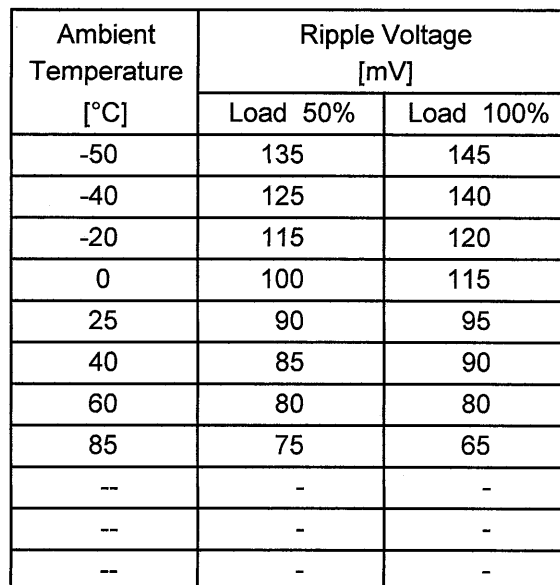
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Model		CHS1204824		Temperature 25°C																																					
Item		Ripple-Noise		Testing Circuitry Figure B																																					
Object		+24V4.2A																																							
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Testing Circuitry Figure B

2.Values



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



Model		CHS1204824	
Item		Ambient Temperature Drift	
Object		+24V4.2A	
1.Graph		<div><div><div>—△—</div>Input Volt. 36V</div><div><div>---□---</div>Input Volt. 48V</div><div><div>---○---</div>Input Volt. 76V</div></div> <div>Output Voltage [V]</div> <div>Ambient Temperature [°C]</div>	
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	23.996	24.002	23.986
-40	24.018	24.024	24.016
-20	24.054	24.060	24.071
0	24.079	24.085	24.092
25	24.095	24.103	24.106
40	24.099	24.105	24.105
60	24.098	24.104	24.103
85	24.086	24.092	24.087
--	-	-	-
--	-	-	-
--	-	-	-

Note: In case Input Volt.36V,Load 60%. Other case Load 100%.	
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		Testing Circuitry Figure A
Model	CHS1204824	
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 : 36 - 76V

Load Current : 0 - 4.2A

* 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	76	4.2	24.105	±45	±0.2
Minimum Voltage	-40	76	4.2	24.016		



Model		CHS1204824	
Item		Time Lapse Drift	
Object		+24V42A	

1.Graph

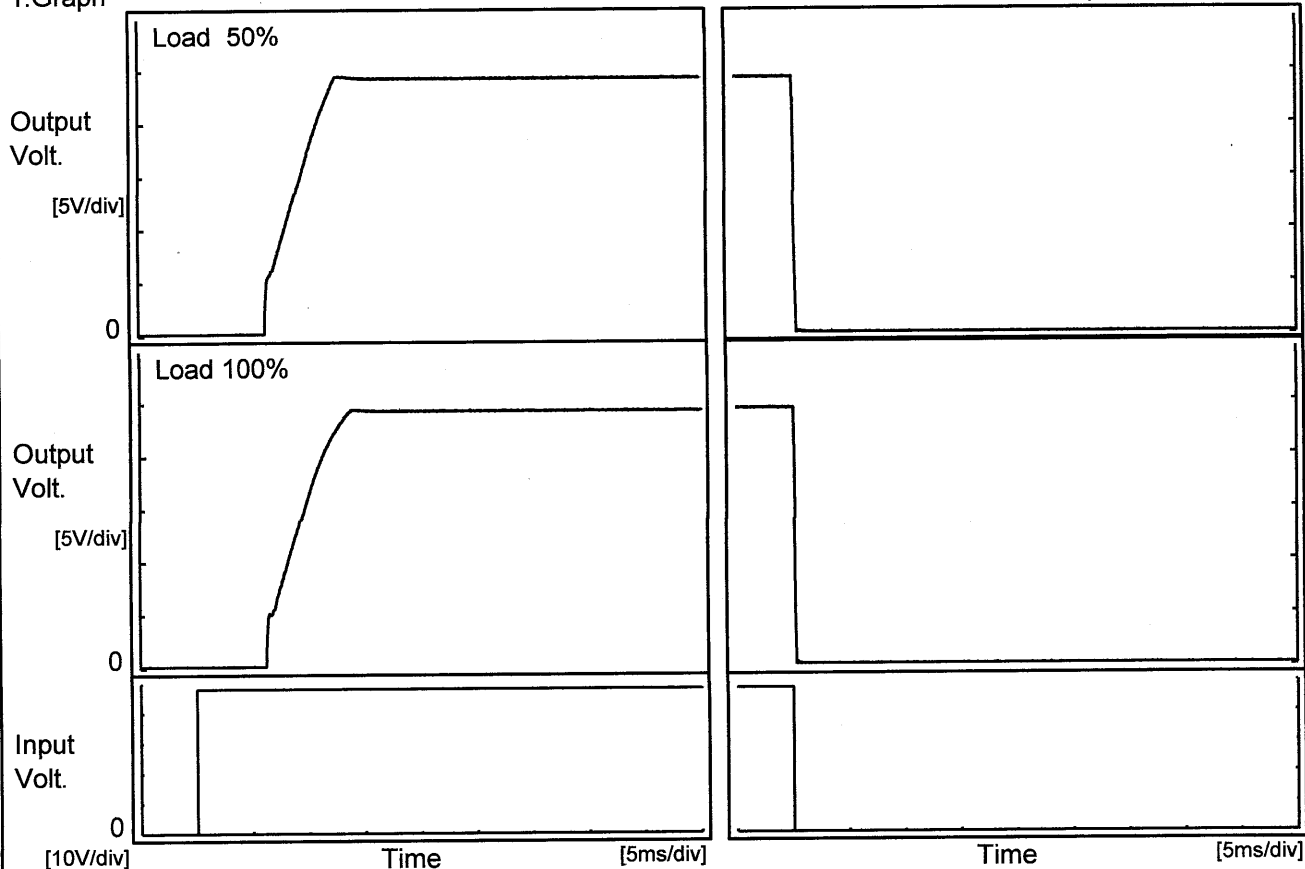
Output Voltage [V]

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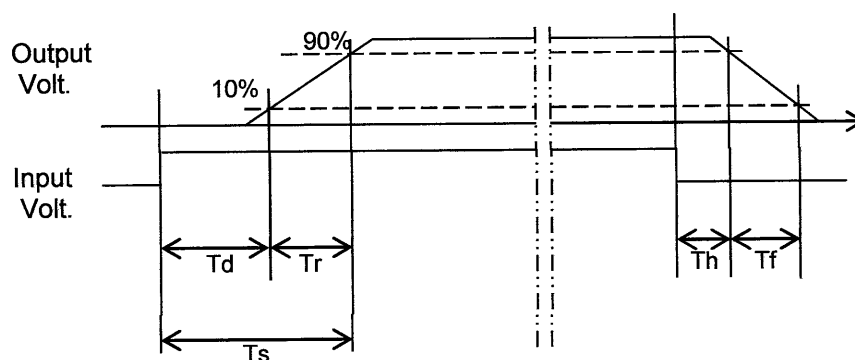
Model	CHS1204824	Temperature	25°C
Item	Rise and Fall Time	Testing Circuitry	Figure A
Object	+24V4.2A		

1. Graph



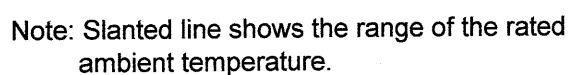
2. Values

Load	Time	Td	Tr	Ts	Th	Tf
50 %		6.3	5.2	11.5	0.2	0.3
100 %		6.3	5.7	12.0	0.1	0.2



Testing Circuitry Figure A

2.Values



Ambient Temperature [°C]	Input Voltage [V]	
	Load 50%	Load 100%
-50	33.06	33.88
-40	33.06	33.87
-20	33.06	34.05
0	33.25	34.27
25	33.26	34.29
40	33.25	34.46
60	33.45	34.66
85	33.46	34.88
--	-	-
--	-	-
--	-	-

Temperature 25°C
Testing Circuitry Figure A

2.Values

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

[illegible]



Model	CHS1204824																																								
Item	Overvoltage Protection	Testing Circuitry Figure A																																							
Object	+24V4.2A																																								
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>29.7</td><td>29.9</td></tr><tr><td>-20</td><td>29.8</td><td>29.9</td></tr><tr><td>0</td><td>29.9</td><td>29.9</td></tr><tr><td>25</td><td>29.9</td><td>30.0</td></tr><tr><td>40</td><td>30.0</td><td>30.0</td></tr><tr><td>60</td><td>30.1</td><td>30.0</td></tr><tr><td>85</td><td>30.2</td><td>30.1</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	29.7	29.9	-20	29.8	29.9	0	29.9	29.9	25	29.9	30.0	40	30.0	30.0	60	30.1	30.0	85	30.2	30.1	--	-	-	--	-	-	--	-	-	--	-	-
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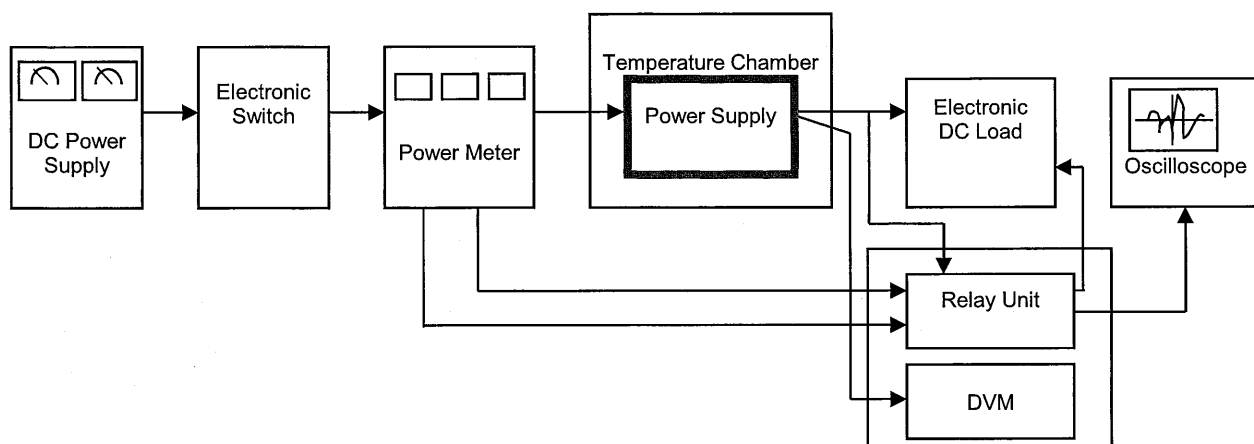


Figure A

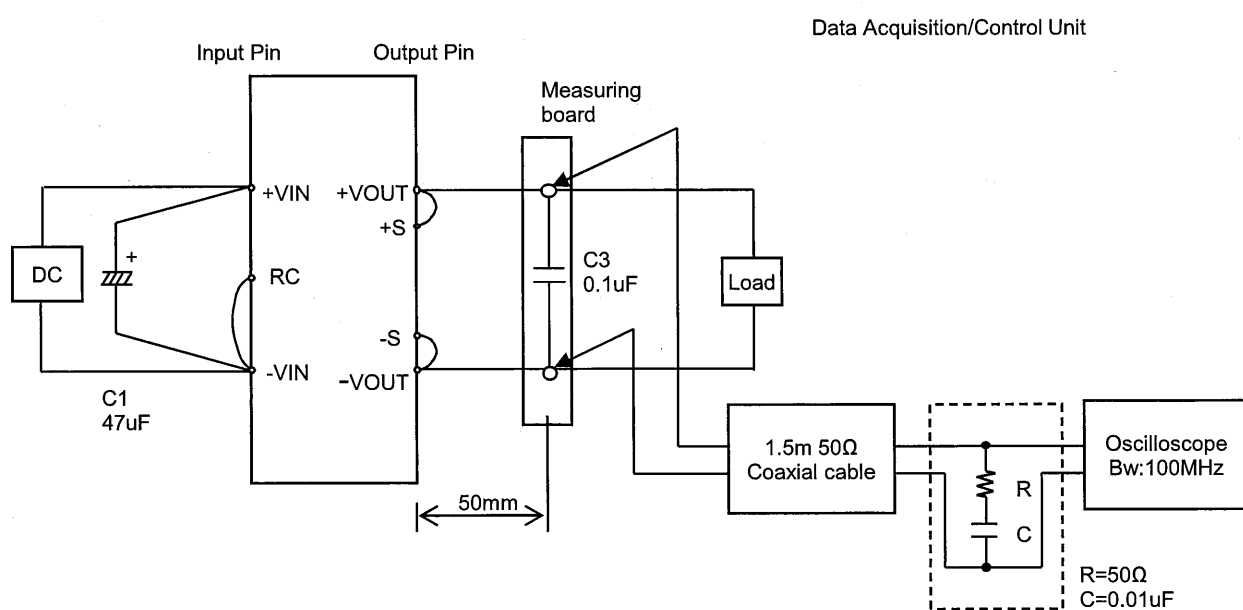


Figure B