

TEST DATA OF DHS200A24

Regulated DC Power Supply
Aug 3, 2010

Approved by : Takayuki Fukuda Design Manager

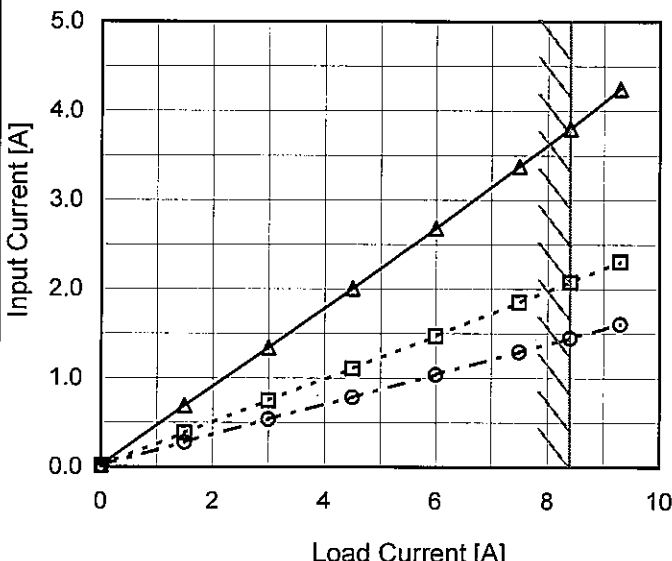
Prepared by : Hou Ryou Design Engineer

COSEL CO.,LTD.

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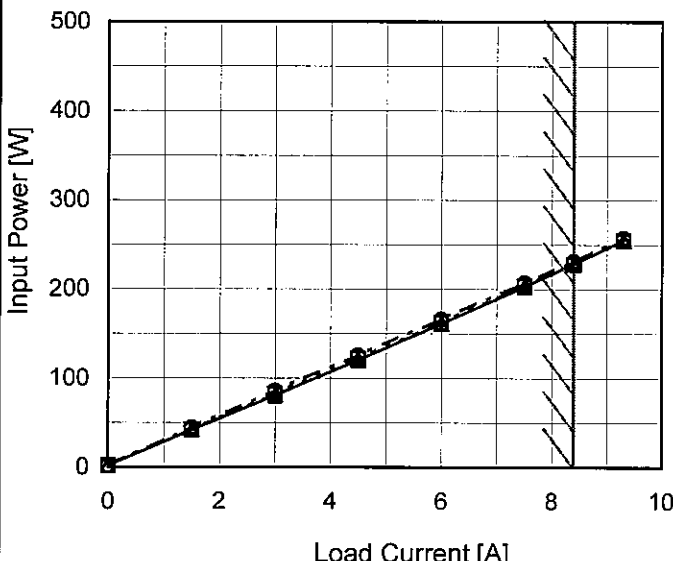
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Model		DHS200A24																																																				
Item		Input Current (by Load Current)																																																				
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1.Graph																																																						
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Model		DHS200A24																																																				
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1.Graph		2.Values																																																				
<div><div><div>—△—</div><div>Input Volt.</div><div>60V</div></div><div><div>---□---</div><div>Input Volt.</div><div>110V</div></div><div><div>---○---</div><div>Input Volt.</div><div>160V</div></div></div>  <p>Note: Slanted line shows the range of the rated load current.</p>		<table><tr><th rowspan="2">Load Current [A]</th><th colspan="3">Input Power [W]</th></tr><tr><th>Input Volt. 60[V]</th><th>Input Volt. 110[V]</th><th>Input Volt. 160[V]</th></tr><tr><td>0.0</td><td>1.3</td><td>1.6</td><td>1.3</td></tr><tr><td>1.5</td><td>41.6</td><td>41.8</td><td>44.2</td></tr><tr><td>3.0</td><td>80.5</td><td>82.3</td><td>85.8</td></tr><tr><td>4.5</td><td>120.5</td><td>122.2</td><td>125.7</td></tr><tr><td>6.0</td><td>161.2</td><td>162.4</td><td>166.2</td></tr><tr><td>7.5</td><td>203.0</td><td>204.0</td><td>207.3</td></tr><tr><td>8.4</td><td>228.8</td><td>228.2</td><td>231.5</td></tr><tr><td>9.3</td><td>255.1</td><td>254.6</td><td>257.6</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. 60[V]	Input Volt. 110[V]	Input Volt. 160[V]	0.0	1.3	1.6	1.3	1.5	41.6	41.8	44.2	3.0	80.5	82.3	85.8	4.5	120.5	122.2	125.7	6.0	161.2	162.4	166.2	7.5	203.0	204.0	207.3	8.4	228.8	228.2	231.5	9.3	255.1	254.6	257.6	--	-	-	-	--	-	-	-	--	-	-	-
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Model DHS200A24

Item Efficiency (by Input Voltage)

Object

Temperature 25°C
Testing Circuitry Figure A

1.Graph

Input Voltage [V]	Efficiency [%]	
	Load 50%	Load 100%
56	89.1	87.7
60	89.6	88.3
66	90.4	88.7
90	89.5	88.7
110	88.8	88.4
125	87.9	88.3
140	87.1	87.8
160	86.0	87.1
170	85.2	86.7

2.Values

Input Voltage [V]	Efficiency [%]	
	Load 50%	Load 100%
56	89.1	87.7
60	89.6	88.3
66	90.4	88.7
90	89.5	88.7
110	88.8	88.4
125	87.9	88.3
140	87.1	87.8
160	86.0	87.1
170	85.2	86.7

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

Model DHS200A24

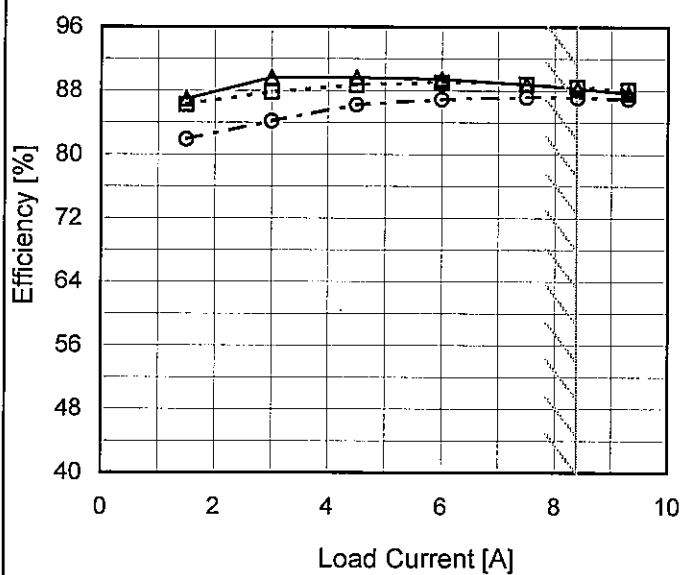
Item Efficiency (by Load Current)

Object

 Temperature 25°C
 Testing Circuitry Figure A

1. Graph

—△— Input Volt. 60V
 ---□--- Input Volt. 110V
 - -○- - Input Volt. 160V



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

2. Values

Load Current [A]	Efficiency [%]		
	Input Volt. 60[V]	Input Volt. 110[V]	Input Volt. 160[V]
0.0	-	-	-
1.5	87.0	86.2	81.9
3.0	89.7	87.8	84.2
4.5	89.6	88.7	86.2
6.0	89.4	89.0	86.9
7.5	88.8	88.8	87.2
8.4	88.3	88.4	87.1
9.3	87.7	88.1	86.9
--	-	-	-
--	-	-	-
--	-	-	-

Model	DHS200A24																																
Item	Line Regulation	Temperature	25°C																														
Object	+24V8.4A	Testing Circuitry	Figure A																														
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>56</td><td>24.037</td><td>24.036</td></tr><tr><td>60</td><td>24.037</td><td>24.038</td></tr><tr><td>66</td><td>24.037</td><td>24.037</td></tr><tr><td>90</td><td>24.037</td><td>24.037</td></tr><tr><td>110</td><td>24.037</td><td>24.038</td></tr><tr><td>125</td><td>24.037</td><td>24.037</td></tr><tr><td>140</td><td>24.037</td><td>24.038</td></tr><tr><td>160</td><td>24.037</td><td>24.038</td></tr><tr><td>170</td><td>24.037</td><td>24.037</td></tr></tbody></table>		Input Voltage [V]	Output Voltage [V] Load 50%	Output Voltage [V] Load 100%	56	24.037	24.036	60	24.037	24.038	66	24.037	24.037	90	24.037	24.037	110	24.037	24.038	125	24.037	24.037	140	24.037	24.038	160	24.037	24.038	170	24.037	24.037		
Input Voltage [V]	Output Voltage [V] Load 50%	Output Voltage [V] Load 100%																															
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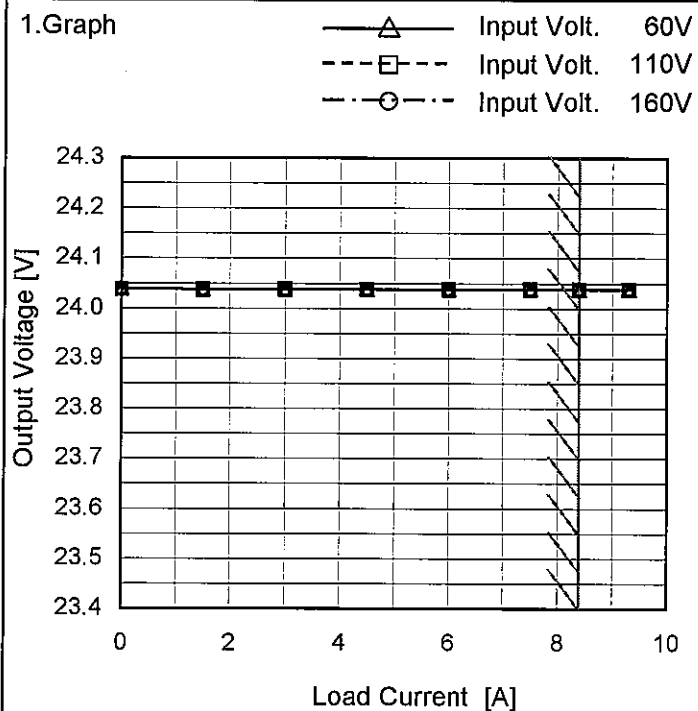
Model DHS200A24

Item Load Regulation

Object +24V8.4A

Temperature 25°C
Testing Circuitry Figure A

1. Graph



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

2. Values

Load Current [A]	Output Voltage [V]		
	Input Volt. 60[V]	Input Volt. 110[V]	Input Volt. 160[V]
0.0	24.039	24.039	24.038
1.5	24.038	24.038	24.038
3.0	24.038	24.039	24.038
4.5	24.038	24.038	24.038
6.0	24.038	24.038	24.038
7.5	24.038	24.038	24.038
8.4	24.038	24.038	24.038
9.3	24.038	24.038	24.038
--	-	-	-
--	-	-	-
--	-	-	-

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Model	DHS200A24	Temperature 25°C Testing Circuitry Figure A
Item	Dynamic Load Response	
Object	+24V8.4A	

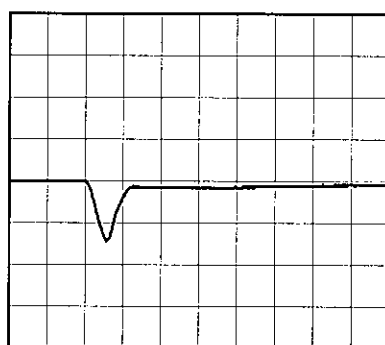
Input Volt. 110 V
Cycle 1000 ms

Load Current

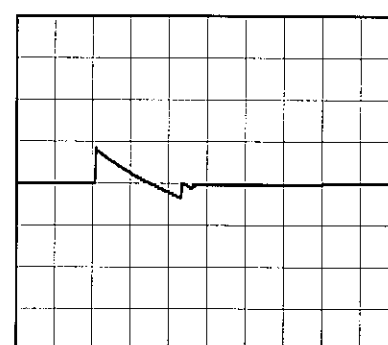
16.7A / 50 μ s

Min. Load (0A) \longleftrightarrow
Load 100% (8.4A)

1V/div



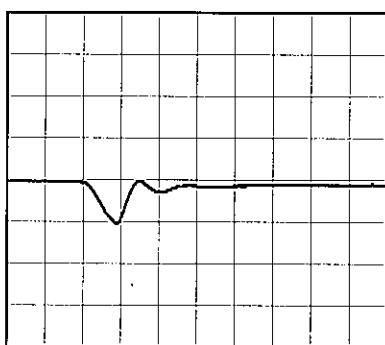
200 μ s/div



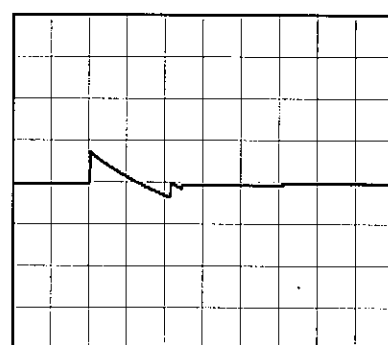
50 ms/div

Min. Load (0A) \longleftrightarrow
Load 50% (4.2A)

1V/div



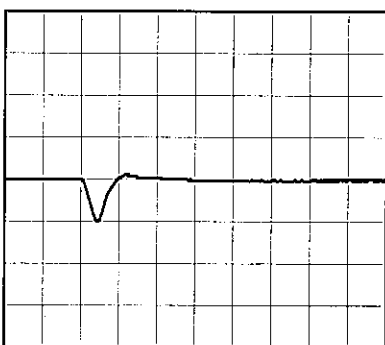
200 μ s/div



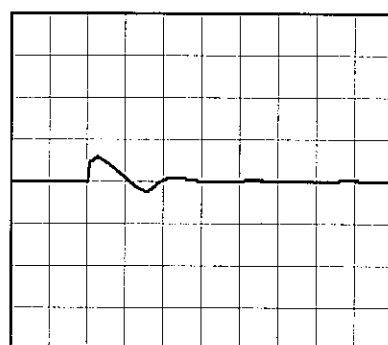
50 ms/div

Load 10% (0.84A) \longleftrightarrow
Load 100% (8.4A)

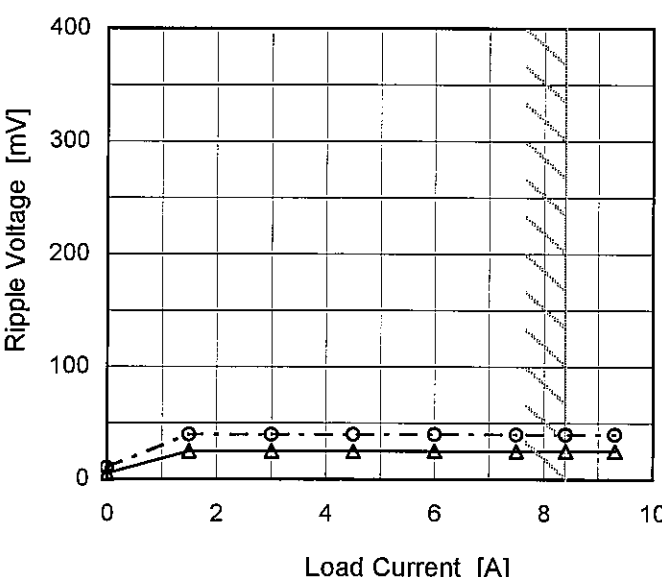
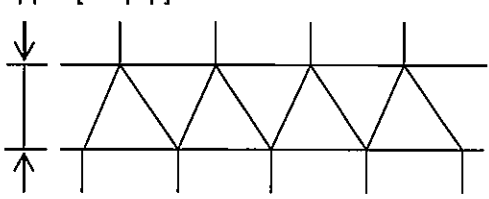
1V/div



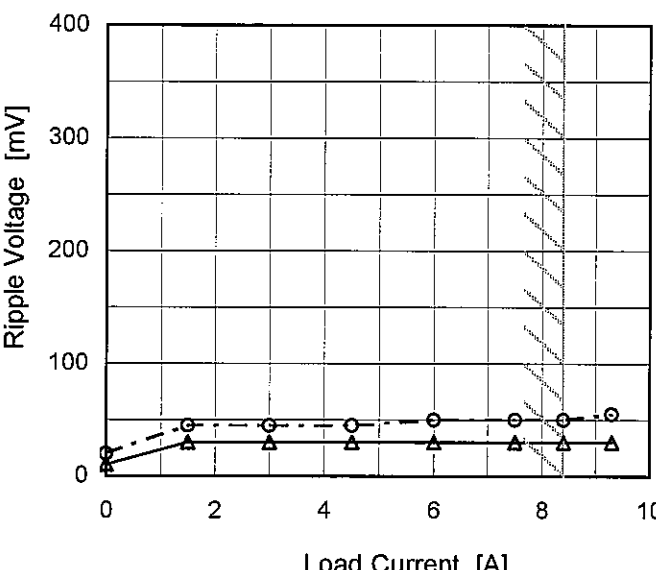
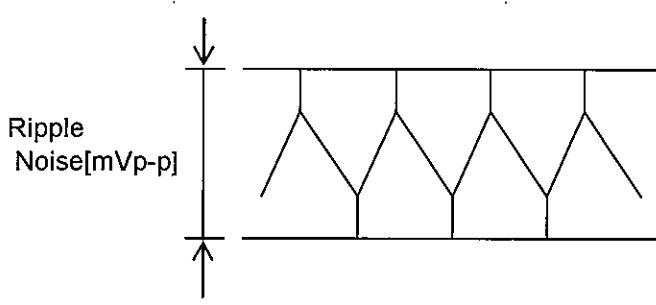
200 μ s/div



500 μ s/div

Model		DHS200A24	Temperature 25°C Testing Circuitry Figure B
Item		Ripple Voltage (by Load Current)	
Object		+24V8.4A	
1.Graph			2.Values
<div><div><div></div><div>Input Volt. 60V</div></div><div><div></div><div>Input Volt. 160V</div></div></div> 			
<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> <div><div>Ripple [mVp-p]</div></div>			
Fig.Complex Ripple Wave Form			

Load Current [A]	Ripple Voltage [mV]	
	Input Volt. 60 [V]	Input Volt. 160 [V]
0.0	5	10
1.5	25	40
3.0	25	40
4.5	25	40
6.0	25	40
7.5	25	40
8.4	25	40
9.3	25	40
--	-	-
--	-	-
--	-	-

Model		DHS200A24																																							
Item		Ripple-Noise																																							
Object		+24V8.4A																																							
1.Graph		2.Values																																							
<div><div><div>△</div>Input Volt. 60V</div><div><div>○</div>Input Volt. 160V</div></div> 		<table><tr><th rowspan="2">Load Current [A]</th><th colspan="2">Ripple-Noise [mV]</th></tr><tr><th>Input Volt. 60 [V]</th><th>Input Volt. 160 [V]</th></tr><tr><td>0.0</td><td>10</td><td>20</td></tr><tr><td>1.5</td><td>30</td><td>45</td></tr><tr><td>3.0</td><td>30</td><td>45</td></tr><tr><td>4.5</td><td>30</td><td>45</td></tr><tr><td>6.0</td><td>30</td><td>50</td></tr><tr><td>7.5</td><td>30</td><td>50</td></tr><tr><td>8.4</td><td>30</td><td>50</td></tr><tr><td>9.3</td><td>30</td><td>55</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. 60 [V]	Input Volt. 160 [V]	0.0	10	20	1.5	30	45	3.0	30	45	4.5	30	45	6.0	30	50	7.5	30	50	8.4	30	50	9.3	30	55	--	-	-	--	-	-	--	-	-
Load Current [A]	Ripple-Noise [mV]																																								
	Input Volt. 60 [V]	Input Volt. 160 [V]																																							
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<p>Measured by 100 MHz Oscilloscope.</p> <p>Ripple-Noise is shown as p-p in the figure below.</p> <p>Note: Slanted line shows the range of the rated load current.</p> <div></div> <p>Fig.Complex Ripple Noise Wave Form</p>																																									

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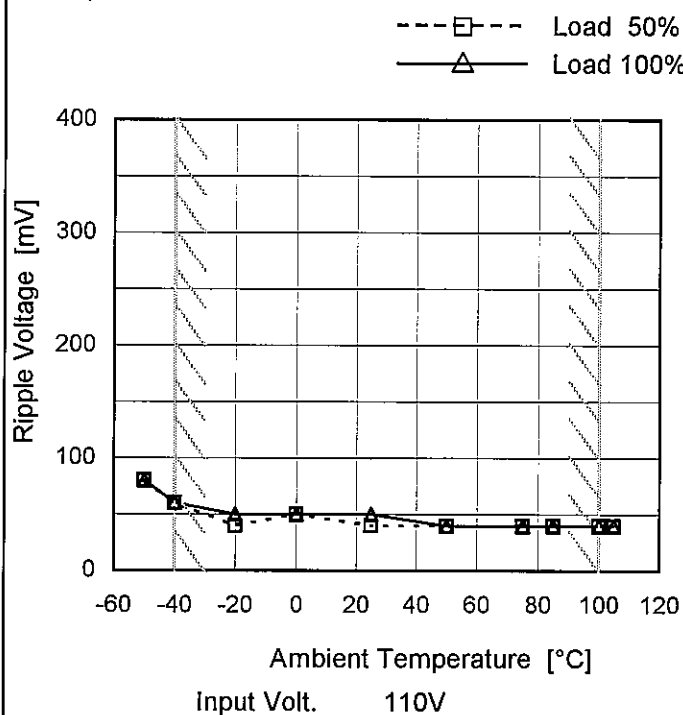
Model DHS200A24

Item Ripple Voltage (by Ambient Temp.)

Object +24V8.4A

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	80
-40	60	60
-20	40	50
0	50	50
25	40	50
50	40	40
75	40	40
85	40	40
100	40	40
105	40	40
---	-	-

Model		DHS200A24	
Item		Ambient Temperature Drift	
Object		+24V8.4A	

1.Graph

—△—

Input Volt. 60V

---□---

Input Volt. 110V

---○---

Input Volt. 160V

Output Voltage [V]

Ambient Temperature [°C]

Load 100%

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

2.Values

Ambient Temperature [°C]	Output Voltage [V]		
	Input Volt. 60[V]	Input Volt. 110[V]	Input Volt. 160[V]
-50	23.913	23.916	23.916
-40	23.939	23.941	23.942
-20	23.983	23.985	23.985
0	24.019	24.020	24.021
25	24.038	24.038	24.038
50	24.050	24.050	24.050
75	24.042	24.042	24.042
85	24.039	24.039	24.039
100	24.039	24.039	24.039
105	24.042	24.042	24.042
--	-	-	-

		Testing Circuitry Figure A
Model	DHS200A24	
Item	Output Voltage Accuracy	
Object	+24V8.4A	

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 - 100°C

Input Voltage : 60 - 160V

Load Current : 0 - 8.4A

* 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

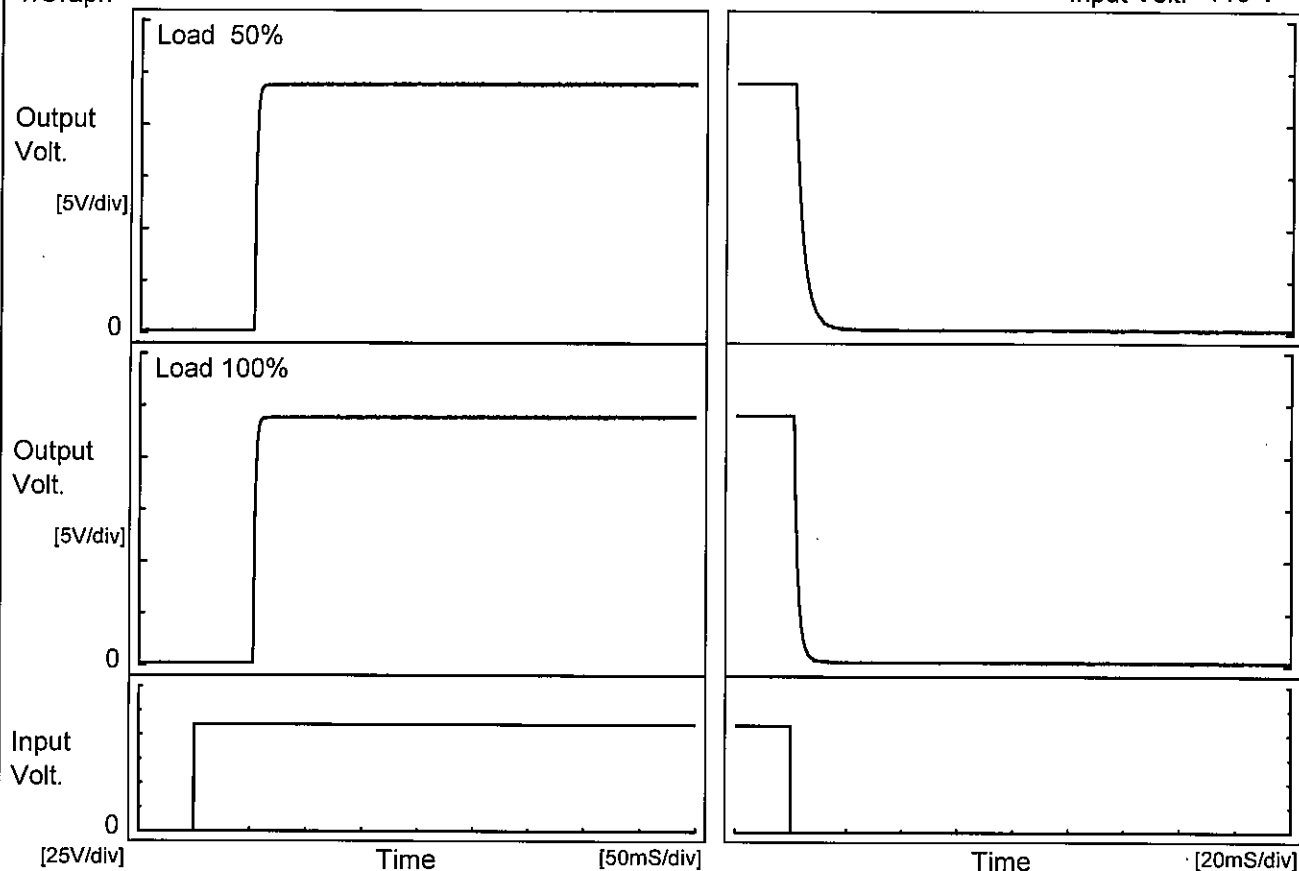
Item	Temperature [°C]	Input Voltage[V]	Output		Output Voltage Accuracy	
			Current[A]	Voltage[V]	Value [mV]	Ration [%]
Maximum Voltage	50	60	0	24.050	±56	±0.2
Minimum Voltage	-40	60	8.4	23.939		

Model	DHS200A24		
Item	Time Lapse Drift	Temperature	25°C
Object	+24V8.4A	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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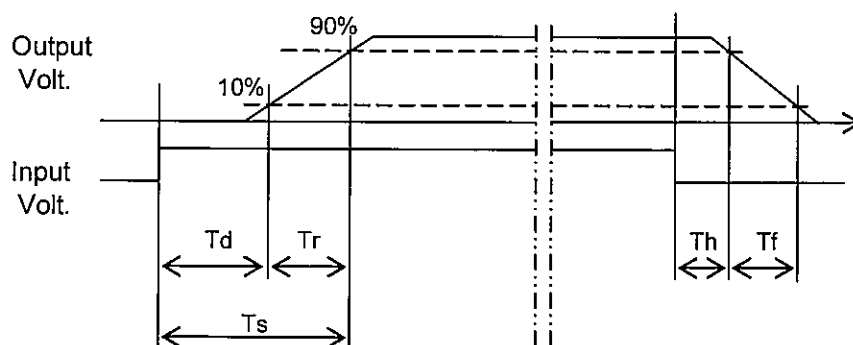
Model	DHS200A24	Temperature	25°C
Item	Rise and Fall Time	Testing Circuitry	Figure A
Object	+24V8.4A		

1. Graph



2. Values

Load \ Time	Td	Tr	Ts	Th	Tf
50 %	53.3	3.3	56.6	1.3	6.5
100 %	53.3	3.3	56.6	1.1	3.3



Model		DHS200A24
Item		Minimum Input Voltage for Regulated Output Voltage
Object		+24V8.4A

1.Graph

Load 50%

Load 100%

Input Voltage [V]

Ambient Temperature [°C]

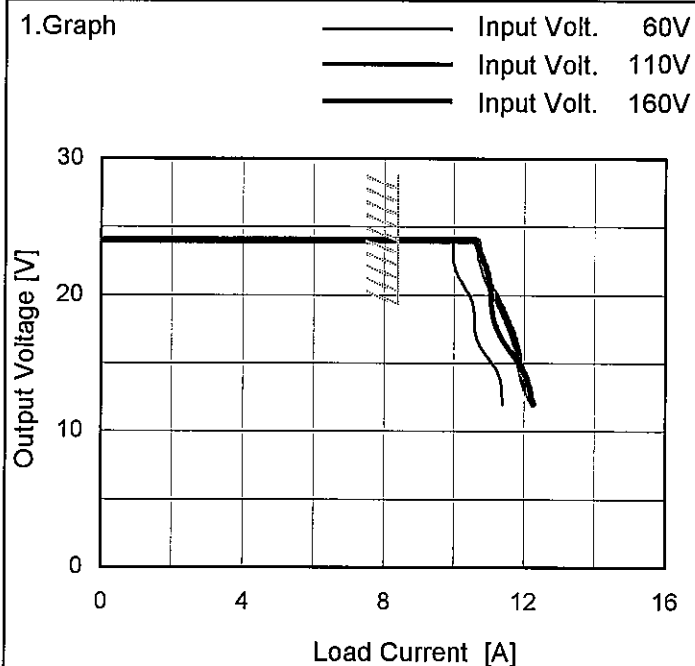
Model DHS200A24

Item Overcurrent Protection

Object +24V8.4A

Temperature 25°C
Testing Circuitry Figure A

1.Graph



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

Intermittent operation occurs when the output voltage is from 12V to 0V.

2.Values

Output Voltage [V]	Load Current [A]		
	Input Volt. 60[V]	Input Volt. 110[V]	Input Volt. 160[V]
22.8	9.97	10.81	10.75
21.6	10.06	10.96	10.87
19.2	10.55	11.05	11.31
16.8	10.64	11.36	11.71
14.4	11.21	11.98	11.90
12.0	11.39	12.23	12.26
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

Model

DHS200A24

Item

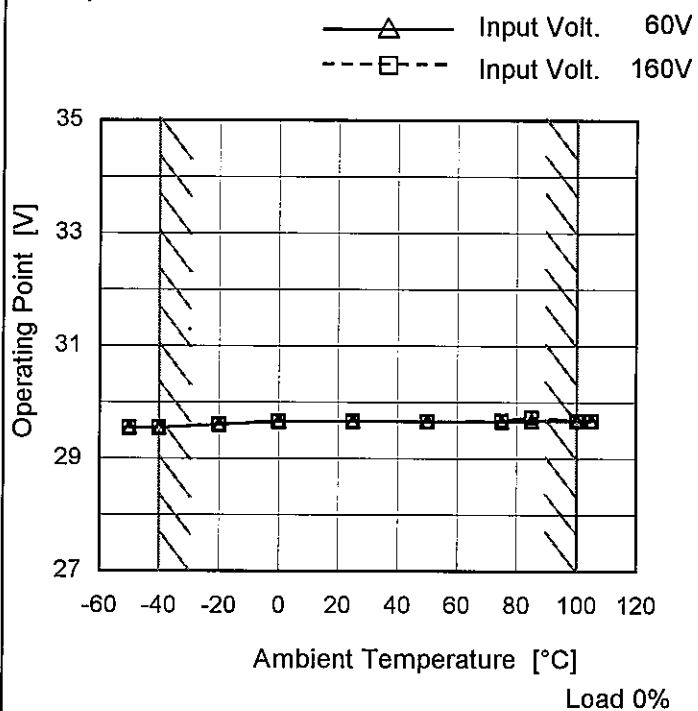
Overvoltage Protection

Object

+24V8.4A

Testing Circuitry Figure A

1. Graph



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

2. Values

Ambient Temperature [°C]	Operating Point [V]	
	Input Volt. 60[V]	Input Volt. 160[V]
-50	29.55	29.55
-40	29.55	29.55
-20	29.60	29.60
0	29.66	29.66
25	29.66	29.66
50	29.66	29.66
75	29.66	29.67
85	29.67	29.73
100	29.67	29.67
105	29.67	29.67
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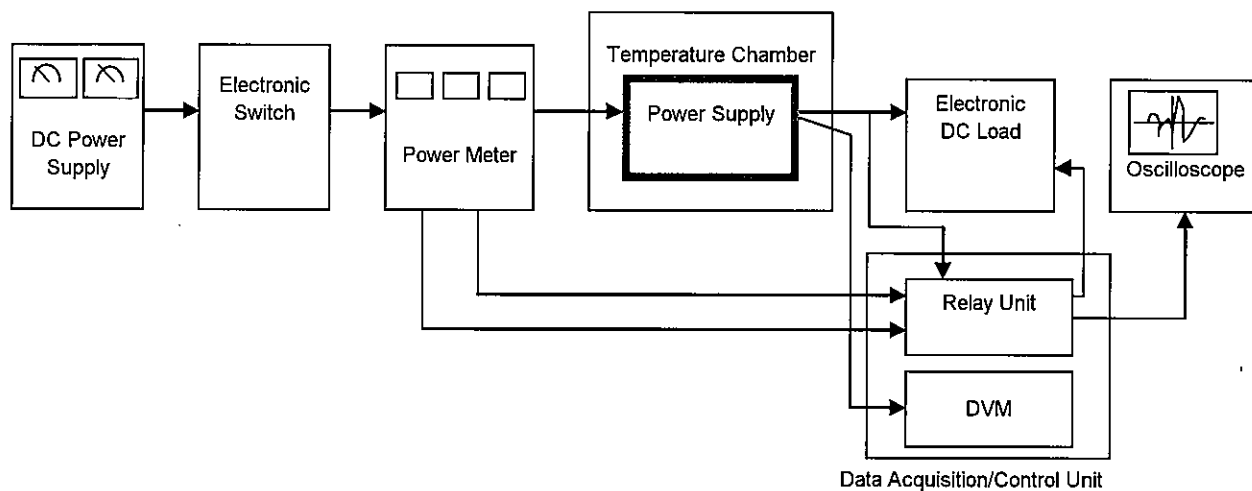


Figure A

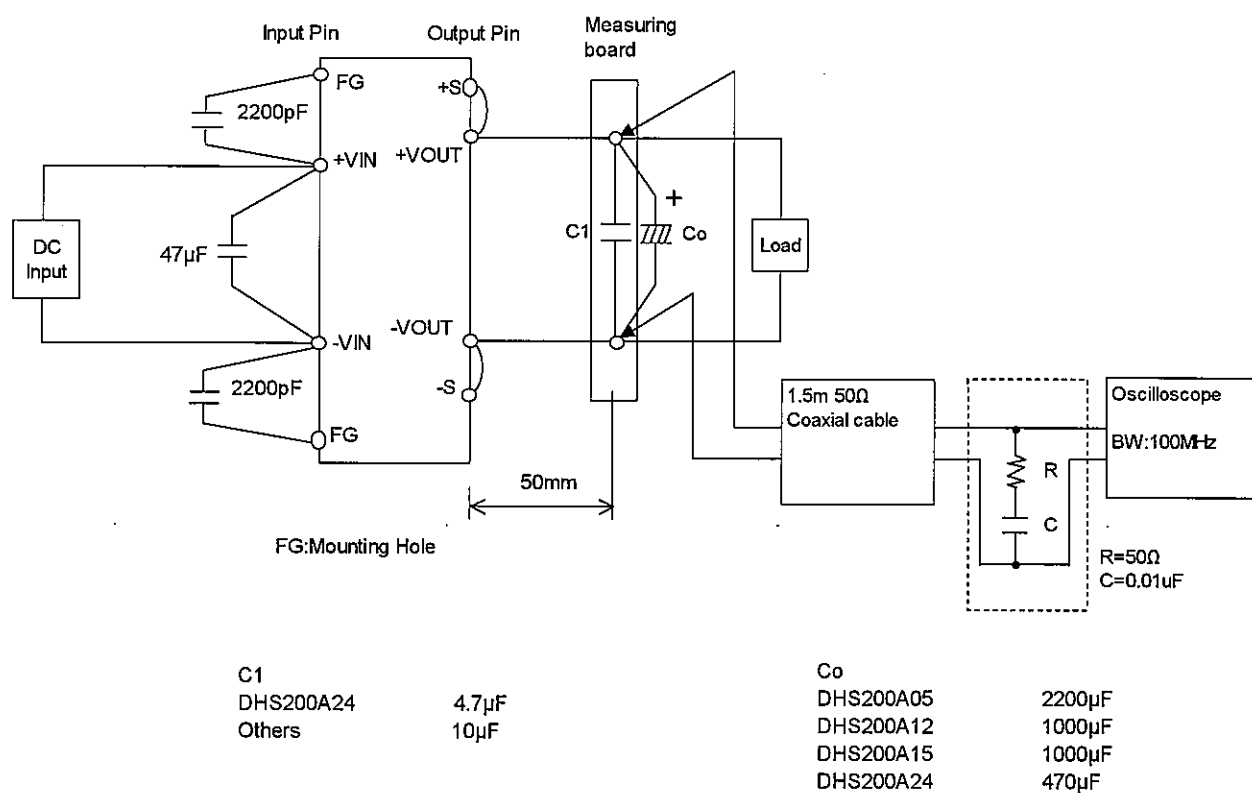


Figure B