

# TEST DATA OF DHS50A05

Regulated DC Power Supply  
April 8, 2010

Approved by : Tatsuya Mano \_\_\_\_\_  
Tatsuya Mano Design Manager

Prepared by : Tetsuro Hirata \_\_\_\_\_  
Tetsuro Hirata Design Engineer

**COSEL CO.,LTD.**

## CONTENTS

1.Input Current (by Input Voltage) . . . . .	1
2.Input Current (by Load Current) . . . . .	2
3.Input Power (by Load Current) . . . . .	3
4.Efficiency (by Input Voltage) . . . . .	4
5.Efficiency (by Load Current) . . . . .	5
6.Line Regulation . . . . .	6
7.Load Regulation . . . . .	7
8.Dynamic Load Response . . . . .	8
9.Ripple Voltage (by Load Current) . . . . .	9
10.Ripple-Noise . . . . .	10
11.Ripple Voltage (by Ambient Temperature) . . . . .	11
12.Ambient Temperature Drift . . . . .	12
13.Output Voltage Accuracy . . . . .	13
14.Time Lapse Drift . . . . .	14
15.Rise and Fall Time . . . . .	15
16.Minimum Input Voltage for Regulated Output Voltage . . . . .	16
17.Overcurrent Protection . . . . .	17
18.Overvoltage Protection . . . . .	18
19.Figure of Testing Circuitry . . . . .	19

(Final Page 19)

Model	DHS50A05	Temperature 25°C Testing Circuitry Figure A																																																																																
Item	Input Current (by Input Voltage)																																																																																	
Object	_____																																																																																	
1.Graph	<p>The graph plots Input Current [A] on the Y-axis (0.0 to 2.0) against Input Voltage [V] on the X-axis (0 to 180). Three data series are shown: Load 100% (solid triangles), Load 50% (dashed squares), and Load 0% (dotted circles). A slanted line at approximately 50V indicates the rated input voltage range.</p> <table border="1"> <thead> <tr> <th>Input Voltage [V]</th> <th>Load 0% [A]</th> <th>Load 50% [A]</th> <th>Load 100% [A]</th> </tr> </thead> <tbody> <tr><td>40</td><td>0.001</td><td>0.001</td><td>0.001</td></tr> <tr><td>45</td><td>0.002</td><td>0.002</td><td>0.002</td></tr> <tr><td>50</td><td>0.003</td><td>0.003</td><td>0.003</td></tr> <tr><td>51</td><td>0.029</td><td>0.619</td><td>1.210</td></tr> <tr><td>55</td><td>0.030</td><td>0.566</td><td>1.112</td></tr> <tr><td>60</td><td>0.027</td><td>0.516</td><td>1.014</td></tr> <tr><td>66</td><td>0.027</td><td>0.469</td><td>0.919</td></tr> <tr><td>80</td><td>0.027</td><td>0.391</td><td>0.764</td></tr> <tr><td>95</td><td>0.026</td><td>0.325</td><td>0.638</td></tr> <tr><td>110</td><td>0.026</td><td>0.276</td><td>0.545</td></tr> <tr><td>125</td><td>0.026</td><td>0.246</td><td>0.483</td></tr> <tr><td>140</td><td>0.026</td><td>0.223</td><td>0.436</td></tr> <tr><td>160</td><td>0.026</td><td>0.200</td><td>0.385</td></tr> <tr><td>170</td><td>0.026</td><td>0.191</td><td>0.365</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>	Input Voltage [V]	Load 0% [A]	Load 50% [A]	Load 100% [A]	40	0.001	0.001	0.001	45	0.002	0.002	0.002	50	0.003	0.003	0.003	51	0.029	0.619	1.210	55	0.030	0.566	1.112	60	0.027	0.516	1.014	66	0.027	0.469	0.919	80	0.027	0.391	0.764	95	0.026	0.325	0.638	110	0.026	0.276	0.545	125	0.026	0.246	0.483	140	0.026	0.223	0.436	160	0.026	0.200	0.385	170	0.026	0.191	0.365	--	-	-	-	--	-	-	-	--	-	-	-									
Input Voltage [V]	Load 0% [A]	Load 50% [A]	Load 100% [A]																																																																															
40	0.001	0.001	0.001																																																																															
45	0.002	0.002	0.002																																																																															
50	0.003	0.003	0.003																																																																															
51	0.029	0.619	1.210																																																																															
55	0.030	0.566	1.112																																																																															
60	0.027	0.516	1.014																																																																															
66	0.027	0.469	0.919																																																																															
80	0.027	0.391	0.764																																																																															
95	0.026	0.325	0.638																																																																															
110	0.026	0.276	0.545																																																																															
125	0.026	0.246	0.483																																																																															
140	0.026	0.223	0.436																																																																															
160	0.026	0.200	0.385																																																																															
170	0.026	0.191	0.365																																																																															
--	-	-	-																																																																															
--	-	-	-																																																																															
--	-	-	-																																																																															
2.Values	<table border="1"> <thead> <tr> <th rowspan="2">Input Voltage [V]</th> <th colspan="3">Input Current [A]</th> </tr> <tr> <th>Load 0%</th> <th>Load 50%</th> <th>Load 100%</th> </tr> </thead> <tbody> <tr><td>0</td><td>0.000</td><td>0.000</td><td>0.000</td></tr> <tr><td>40</td><td>0.001</td><td>0.001</td><td>0.002</td></tr> <tr><td>45</td><td>0.002</td><td>0.002</td><td>0.002</td></tr> <tr><td>50</td><td>0.003</td><td>0.003</td><td>0.003</td></tr> <tr><td>51</td><td>0.029</td><td>0.619</td><td>1.210</td></tr> <tr><td>55</td><td>0.030</td><td>0.566</td><td>1.112</td></tr> <tr><td>60</td><td>0.027</td><td>0.516</td><td>1.014</td></tr> <tr><td>66</td><td>0.027</td><td>0.469</td><td>0.919</td></tr> <tr><td>80</td><td>0.027</td><td>0.391</td><td>0.764</td></tr> <tr><td>95</td><td>0.026</td><td>0.325</td><td>0.638</td></tr> <tr><td>110</td><td>0.026</td><td>0.276</td><td>0.545</td></tr> <tr><td>125</td><td>0.026</td><td>0.246</td><td>0.483</td></tr> <tr><td>140</td><td>0.026</td><td>0.223</td><td>0.436</td></tr> <tr><td>160</td><td>0.026</td><td>0.200</td><td>0.385</td></tr> <tr><td>170</td><td>0.026</td><td>0.191</td><td>0.365</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>	Input Voltage [V]	Input Current [A]			Load 0%	Load 50%	Load 100%	0	0.000	0.000	0.000	40	0.001	0.001	0.002	45	0.002	0.002	0.002	50	0.003	0.003	0.003	51	0.029	0.619	1.210	55	0.030	0.566	1.112	60	0.027	0.516	1.014	66	0.027	0.469	0.919	80	0.027	0.391	0.764	95	0.026	0.325	0.638	110	0.026	0.276	0.545	125	0.026	0.246	0.483	140	0.026	0.223	0.436	160	0.026	0.200	0.385	170	0.026	0.191	0.365	--	-	-	-	--	-	-	-	--	-	-	-		
Input Voltage [V]	Input Current [A]																																																																																	
	Load 0%	Load 50%	Load 100%																																																																															
0	0.000	0.000	0.000																																																																															
40	0.001	0.001	0.002																																																																															
45	0.002	0.002	0.002																																																																															
50	0.003	0.003	0.003																																																																															
51	0.029	0.619	1.210																																																																															
55	0.030	0.566	1.112																																																																															
60	0.027	0.516	1.014																																																																															
66	0.027	0.469	0.919																																																																															
80	0.027	0.391	0.764																																																																															
95	0.026	0.325	0.638																																																																															
110	0.026	0.276	0.545																																																																															
125	0.026	0.246	0.483																																																																															
140	0.026	0.223	0.436																																																																															
160	0.026	0.200	0.385																																																																															
170	0.026	0.191	0.365																																																																															
--	-	-	-																																																																															
--	-	-	-																																																																															
--	-	-	-																																																																															

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

Model	DHS50A05																																																						
Item	Input Current (by Load Current)																																																						
Object	_____																																																						
1.Graph	—△— Input Volt. 60V ---□--- Input Volt. 110V ---○--- Input Volt. 160V																																																						
	<p>The graph plots Input Current [A] on the y-axis (0.0 to 2.0) against Load Current [A] on the x-axis (0 to 12). Three curves are shown for different input voltages: 60V (triangles), 110V (squares), and 160V (circles). All curves show a positive linear relationship between input current and load current. A slanted line is drawn through the origin, representing the rated load current range.</p> <table border="1"> <caption>Data points estimated from the graph</caption> <thead> <tr> <th>Load Current [A]</th> <th>Input Volt. 60V [A]</th> <th>Input Volt. 110V [A]</th> <th>Input Volt. 160V [A]</th> </tr> </thead> <tbody> <tr><td>0.0</td><td>0.028</td><td>0.026</td><td>0.026</td></tr> <tr><td>1.5</td><td>0.189</td><td>0.091</td><td>0.071</td></tr> <tr><td>3.0</td><td>0.327</td><td>0.172</td><td>0.129</td></tr> <tr><td>4.5</td><td>0.469</td><td>0.250</td><td>0.182</td></tr> <tr><td>6.0</td><td>0.613</td><td>0.329</td><td>0.236</td></tr> <tr><td>7.5</td><td>0.760</td><td>0.409</td><td>0.292</td></tr> <tr><td>9.0</td><td>0.911</td><td>0.489</td><td>0.347</td></tr> <tr><td>10.0</td><td>1.014</td><td>0.545</td><td>0.385</td></tr> <tr><td>11.0</td><td>1.115</td><td>0.600</td><td>0.422</td></tr> </tbody> </table>	Load Current [A]	Input Volt. 60V [A]	Input Volt. 110V [A]	Input Volt. 160V [A]	0.0	0.028	0.026	0.026	1.5	0.189	0.091	0.071	3.0	0.327	0.172	0.129	4.5	0.469	0.250	0.182	6.0	0.613	0.329	0.236	7.5	0.760	0.409	0.292	9.0	0.911	0.489	0.347	10.0	1.014	0.545	0.385	11.0	1.115	0.600	0.422														
Load Current [A]	Input Volt. 60V [A]	Input Volt. 110V [A]	Input Volt. 160V [A]																																																				
0.0	0.028	0.026	0.026																																																				
1.5	0.189	0.091	0.071																																																				
3.0	0.327	0.172	0.129																																																				
4.5	0.469	0.250	0.182																																																				
6.0	0.613	0.329	0.236																																																				
7.5	0.760	0.409	0.292																																																				
9.0	0.911	0.489	0.347																																																				
10.0	1.014	0.545	0.385																																																				
11.0	1.115	0.600	0.422																																																				
2.Values																																																							
		<table border="1"> <thead> <tr> <th rowspan="2">Load Current [A]</th> <th colspan="3">Input Current [A]</th> </tr> <tr> <th>Input Volt. 60[V]</th> <th>Input Volt. 110[V]</th> <th>Input Volt. 160[V]</th> </tr> </thead> <tbody> <tr><td>0.0</td><td>0.028</td><td>0.026</td><td>0.026</td></tr> <tr><td>1.5</td><td>0.189</td><td>0.091</td><td>0.071</td></tr> <tr><td>3.0</td><td>0.327</td><td>0.172</td><td>0.129</td></tr> <tr><td>4.5</td><td>0.469</td><td>0.250</td><td>0.182</td></tr> <tr><td>6.0</td><td>0.613</td><td>0.329</td><td>0.236</td></tr> <tr><td>7.5</td><td>0.760</td><td>0.409</td><td>0.292</td></tr> <tr><td>9.0</td><td>0.911</td><td>0.489</td><td>0.347</td></tr> <tr><td>10.0</td><td>1.014</td><td>0.545</td><td>0.385</td></tr> <tr><td>11.0</td><td>1.115</td><td>0.600</td><td>0.422</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 Current [A]			Input Volt. 60[V]	Input Volt. 110[V]	Input Volt. 160[V]	0.0	0.028	0.026	0.026	1.5	0.189	0.091	0.071	3.0	0.327	0.172	0.129	4.5	0.469	0.250	0.182	6.0	0.613	0.329	0.236	7.5	0.760	0.409	0.292	9.0	0.911	0.489	0.347	10.0	1.014	0.545	0.385	11.0	1.115	0.600	0.422	--	-	-	-	--	-	-	-
Load Current [A]	Input Current [A]																																																						
	Input Volt. 60[V]	Input Volt. 110[V]	Input Volt. 160[V]																																																				
0.0	0.028	0.026	0.026																																																				
1.5	0.189	0.091	0.071																																																				
3.0	0.327	0.172	0.129																																																				
4.5	0.469	0.250	0.182																																																				
6.0	0.613	0.329	0.236																																																				
7.5	0.760	0.409	0.292																																																				
9.0	0.911	0.489	0.347																																																				
10.0	1.014	0.545	0.385																																																				
11.0	1.115	0.600	0.422																																																				
--	-	-	-																																																				
--	-	-	-																																																				

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

**COSEL**

Model	DHS50A05																																																					
Item	Input Power (by Load Current)	Temperature 25°C	Testing Circuitry Figure A																																																			
Object																																																						
1.Graph	<p>Legend:</p> <ul style="list-style-type: none"> <li>Input Volt. 60V</li> <li>Input Volt. 110V</li> <li>Input Volt. 160V</li> </ul> <p>Input Power [W]</p> <p>Load Current [A]</p>																																																					
2.Values	<table border="1"> <thead> <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> </thead> <tbody> <tr> <td>0.0</td><td>1.65</td><td>2.88</td><td>4.20</td></tr> <tr> <td>1.5</td><td>11.33</td><td>10.01</td><td>11.39</td></tr> <tr> <td>3.0</td><td>19.62</td><td>18.96</td><td>20.59</td></tr> <tr> <td>4.5</td><td>28.11</td><td>27.48</td><td>29.16</td></tr> <tr> <td>6.0</td><td>36.77</td><td>36.15</td><td>37.81</td></tr> <tr> <td>7.5</td><td>45.61</td><td>44.93</td><td>46.61</td></tr> <tr> <td>9.0</td><td>54.59</td><td>53.83</td><td>55.49</td></tr> <tr> <td>10.0</td><td>60.72</td><td>59.86</td><td>61.52</td></tr> <tr> <td>11.0</td><td>66.93</td><td>65.96</td><td>67.57</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]			Input Volt. 60[V]	Input Volt. 110[V]	Input Volt. 160[V]	0.0	1.65	2.88	4.20	1.5	11.33	10.01	11.39	3.0	19.62	18.96	20.59	4.5	28.11	27.48	29.16	6.0	36.77	36.15	37.81	7.5	45.61	44.93	46.61	9.0	54.59	53.83	55.49	10.0	60.72	59.86	61.52	11.0	66.93	65.96	67.57	--	-	-	-	--	-	-	-
Load Current [A]	Input Power [W]																																																					
	Input Volt. 60[V]	Input Volt. 110[V]	Input Volt. 160[V]																																																			
0.0	1.65	2.88	4.20																																																			
1.5	11.33	10.01	11.39																																																			
3.0	19.62	18.96	20.59																																																			
4.5	28.11	27.48	29.16																																																			
6.0	36.77	36.15	37.81																																																			
7.5	45.61	44.93	46.61																																																			
9.0	54.59	53.83	55.49																																																			
10.0	60.72	59.86	61.52																																																			
11.0	66.93	65.96	67.57																																																			
--	-	-	-																																																			
--	-	-	-																																																			
Note:	Slanted line shows the range of the rated load current.																																																					

Model	DHS50A05	Temperature	25°C																																
Item	Efficiency (by Input Voltage)	Testing Circuitry	Figure A																																
Object																																			
1.Graph			2.Values																																
<p>The graph plots Efficiency [%] on the y-axis (40 to 96) against Input Voltage [V] on the x-axis (50 to 170). Two data series are shown: Load 50% (dashed line with open squares) and Load 100% (solid line with open triangles). Both series show efficiency decreasing slightly as input voltage increases. 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>60</td><td>81.4</td><td>83.2</td></tr> <tr><td>66</td><td>81.4</td><td>83.3</td></tr> <tr><td>80</td><td>80.4</td><td>82.7</td></tr> <tr><td>95</td><td>81.6</td><td>83.3</td></tr> <tr><td>110</td><td>83.1</td><td>84.4</td></tr> <tr><td>125</td><td>81.8</td><td>83.8</td></tr> <tr><td>140</td><td>80.5</td><td>83.1</td></tr> <tr><td>160</td><td>78.8</td><td>82.1</td></tr> <tr><td>170</td><td>77.8</td><td>81.6</td></tr> </tbody> </table>	Input Voltage [V]	Efficiency [%]		Load 50%	Load 100%	60	81.4	83.2	66	81.4	83.3	80	80.4	82.7	95	81.6	83.3	110	83.1	84.4	125	81.8	83.8	140	80.5	83.1	160	78.8	82.1	170	77.8	81.6
Input Voltage [V]	Efficiency [%]																																		
	Load 50%	Load 100%																																	
60	81.4	83.2																																	
66	81.4	83.3																																	
80	80.4	82.7																																	
95	81.6	83.3																																	
110	83.1	84.4																																	
125	81.8	83.8																																	
140	80.5	83.1																																	
160	78.8	82.1																																	
170	77.8	81.6																																	

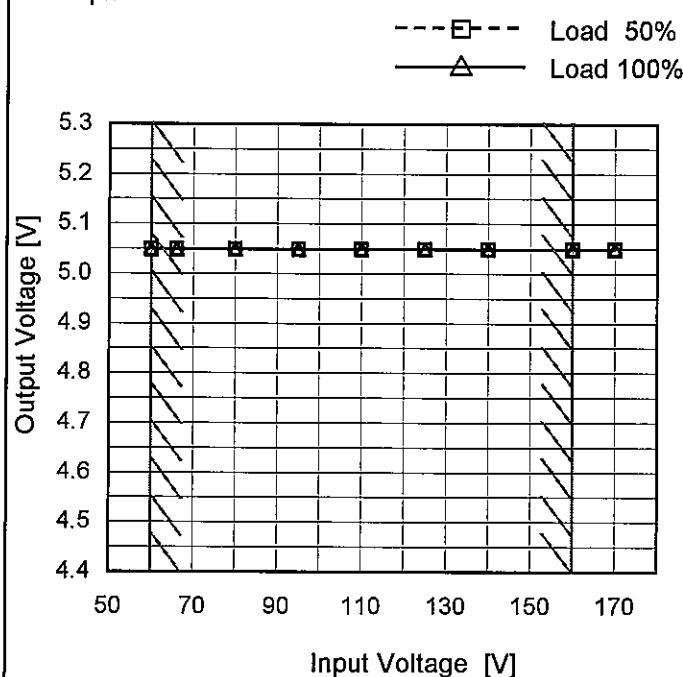
Note: Slanted line shows the range of the rated input voltage.

**COSSEL**

Model	DHS50A05	Temperature	25°C																																																			
Item	Efficiency (by Load Current)	Testing Circuitry	Figure A																																																			
Object																																																						
1.Graph	<p>—△— Input Volt. 60V        - - -□-- Input Volt. 110V        - - -○-- Input Volt. 160V</p> <table border="1"> <caption>Data points estimated from Graph</caption> <thead> <tr> <th>Load Current [A]</th> <th>Efficiency [60V] [%]</th> <th>Efficiency [110V] [%]</th> <th>Efficiency [160V] [%]</th> </tr> </thead> <tbody> <tr><td>2.0</td><td>65</td><td>75</td><td>65</td></tr> <tr><td>3.0</td><td>75</td><td>78</td><td>72</td></tr> <tr><td>4.0</td><td>80</td><td>82</td><td>78</td></tr> <tr><td>5.0</td><td>82</td><td>84</td><td>80</td></tr> <tr><td>6.0</td><td>83</td><td>85</td><td>82</td></tr> <tr><td>7.0</td><td>84</td><td>86</td><td>83</td></tr> <tr><td>8.0</td><td>85</td><td>87</td><td>84</td></tr> <tr><td>9.0</td><td>85</td><td>87</td><td>84</td></tr> <tr><td>10.0</td><td>85</td><td>87</td><td>84</td></tr> <tr><td>11.0</td><td>85</td><td>87</td><td>84</td></tr> </tbody> </table>			Load Current [A]	Efficiency [60V] [%]	Efficiency [110V] [%]	Efficiency [160V] [%]	2.0	65	75	65	3.0	75	78	72	4.0	80	82	78	5.0	82	84	80	6.0	83	85	82	7.0	84	86	83	8.0	85	87	84	9.0	85	87	84	10.0	85	87	84	11.0	85	87	84							
Load Current [A]	Efficiency [60V] [%]	Efficiency [110V] [%]	Efficiency [160V] [%]																																																			
2.0	65	75	65																																																			
3.0	75	78	72																																																			
4.0	80	82	78																																																			
5.0	82	84	80																																																			
6.0	83	85	82																																																			
7.0	84	86	83																																																			
8.0	85	87	84																																																			
9.0	85	87	84																																																			
10.0	85	87	84																																																			
11.0	85	87	84																																																			
2.Values	<table border="1"> <thead> <tr> <th rowspan="2">Load Current [A]</th> <th colspan="3">Efficiency [%]</th> </tr> <tr> <th>Input Volt. 60[V]</th> <th>Input Volt. 110[V]</th> <th>Input Volt. 160[V]</th> </tr> </thead> <tbody> <tr><td>0.0</td><td>-</td><td>-</td><td>-</td></tr> <tr><td>1.5</td><td>66.9</td><td>75.8</td><td>66.6</td></tr> <tr><td>3.0</td><td>76.9</td><td>79.6</td><td>73.3</td></tr> <tr><td>4.5</td><td>80.7</td><td>82.5</td><td>77.8</td></tr> <tr><td>6.0</td><td>82.3</td><td>83.7</td><td>80.0</td></tr> <tr><td>7.5</td><td>83.0</td><td>84.3</td><td>81.2</td></tr> <tr><td>9.0</td><td>83.3</td><td>84.4</td><td>81.9</td></tr> <tr><td>10.0</td><td>83.2</td><td>84.4</td><td>82.1</td></tr> <tr><td>11.0</td><td>83.0</td><td>84.3</td><td>82.3</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]	Efficiency [%]			Input Volt. 60[V]	Input Volt. 110[V]	Input Volt. 160[V]	0.0	-	-	-	1.5	66.9	75.8	66.6	3.0	76.9	79.6	73.3	4.5	80.7	82.5	77.8	6.0	82.3	83.7	80.0	7.5	83.0	84.3	81.2	9.0	83.3	84.4	81.9	10.0	83.2	84.4	82.1	11.0	83.0	84.3	82.3	--	-	-	-	--	-	-	-
Load Current [A]	Efficiency [%]																																																					
	Input Volt. 60[V]	Input Volt. 110[V]	Input Volt. 160[V]																																																			
0.0	-	-	-																																																			
1.5	66.9	75.8	66.6																																																			
3.0	76.9	79.6	73.3																																																			
4.5	80.7	82.5	77.8																																																			
6.0	82.3	83.7	80.0																																																			
7.5	83.0	84.3	81.2																																																			
9.0	83.3	84.4	81.9																																																			
10.0	83.2	84.4	82.1																																																			
11.0	83.0	84.3	82.3																																																			
--	-	-	-																																																			
--	-	-	-																																																			
Note:	Slanted line shows the range of the rated load current.																																																					

Model	DHS50A05
Item	Line Regulation
Object	+5V10A

## 1. Graph

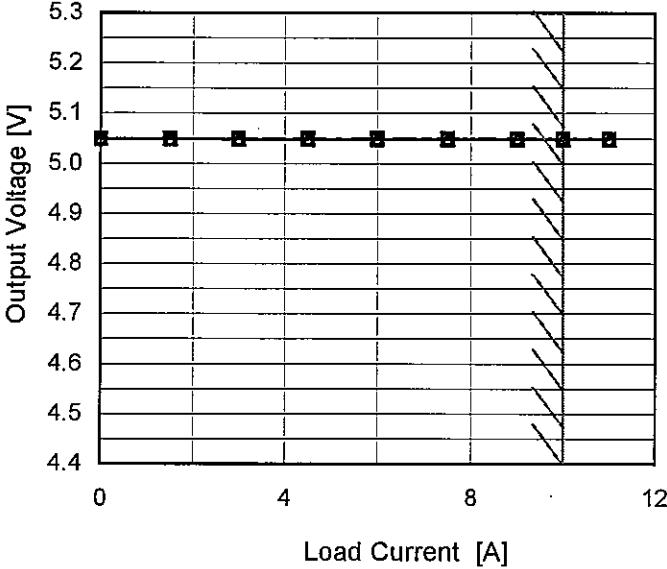


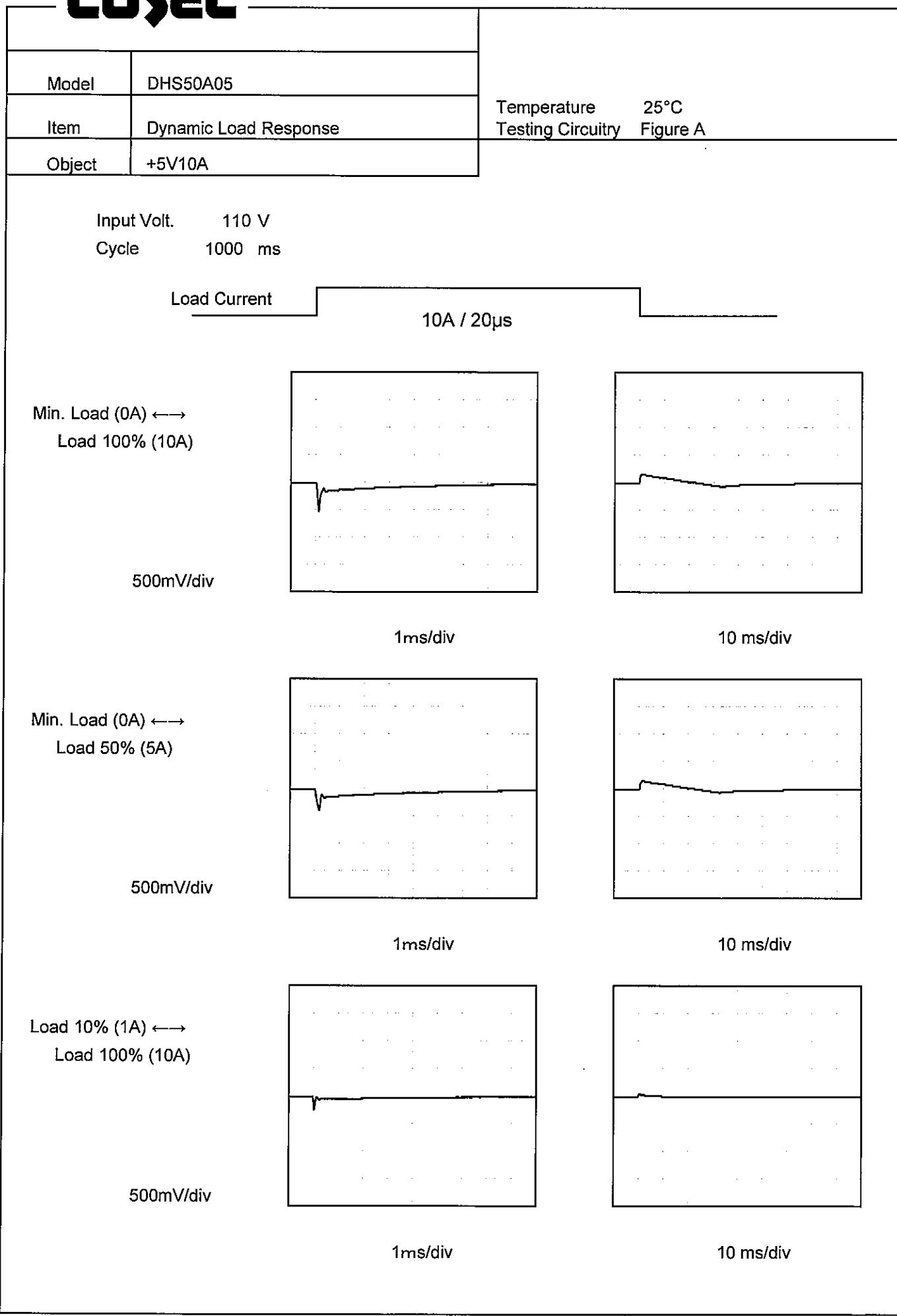
Note: Slanted line shows the range of the rated input voltage.

Temperature 25°C  
Testing Circuitry Figure A

## 2. Values

Input Voltage [V]	Output Voltage [V]	
	Load 50%	Load 100%
60	5.049	5.049
66	5.049	5.049
80	5.049	5.049
95	5.049	5.049
110	5.049	5.049
125	5.049	5.049
140	5.049	5.049
160	5.049	5.049
170	5.049	5.049

Model	DHS50A05	Temperature	25°C																																																			
Item	Load Regulation	Testing Circuitry	Figure A																																																			
Object	+5V10A																																																					
1.Graph		—△— Input Volt. 60V ---□--- Input Volt. 110V -·○-·- Input Volt. 160V																																																				
			2.Values																																																			
		<table border="1"> <thead> <tr> <th rowspan="2">Load Current [A]</th> <th colspan="3">Output Voltage [V]</th> </tr> <tr> <th>Input Volt. 60[V]</th> <th>Input Volt. 110[V]</th> <th>Input Volt. 160[V]</th> </tr> </thead> <tbody> <tr> <td>0.0</td> <td>5.050</td> <td>5.050</td> <td>5.050</td> </tr> <tr> <td>1.5</td> <td>5.049</td> <td>5.049</td> <td>5.049</td> </tr> <tr> <td>3.0</td> <td>5.049</td> <td>5.049</td> <td>5.049</td> </tr> <tr> <td>4.5</td> <td>5.049</td> <td>5.049</td> <td>5.049</td> </tr> <tr> <td>6.0</td> <td>5.049</td> <td>5.049</td> <td>5.049</td> </tr> <tr> <td>7.5</td> <td>5.049</td> <td>5.049</td> <td>5.049</td> </tr> <tr> <td>9.0</td> <td>5.049</td> <td>5.049</td> <td>5.049</td> </tr> <tr> <td>10.0</td> <td>5.049</td> <td>5.049</td> <td>5.049</td> </tr> <tr> <td>11.0</td> <td>5.049</td> <td>5.049</td> <td>5.049</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. 60[V]	Input Volt. 110[V]	Input Volt. 160[V]	0.0	5.050	5.050	5.050	1.5	5.049	5.049	5.049	3.0	5.049	5.049	5.049	4.5	5.049	5.049	5.049	6.0	5.049	5.049	5.049	7.5	5.049	5.049	5.049	9.0	5.049	5.049	5.049	10.0	5.049	5.049	5.049	11.0	5.049	5.049	5.049	--	-	-	-	--	-	-	-
Load Current [A]	Output Voltage [V]																																																					
	Input Volt. 60[V]	Input Volt. 110[V]	Input Volt. 160[V]																																																			
0.0	5.050	5.050	5.050																																																			
1.5	5.049	5.049	5.049																																																			
3.0	5.049	5.049	5.049																																																			
4.5	5.049	5.049	5.049																																																			
6.0	5.049	5.049	5.049																																																			
7.5	5.049	5.049	5.049																																																			
9.0	5.049	5.049	5.049																																																			
10.0	5.049	5.049	5.049																																																			
11.0	5.049	5.049	5.049																																																			
--	-	-	-																																																			
--	-	-	-																																																			
Note: Slanted line shows the range of the rated load current.																																																						

**COSEL**

Model	DHS50A05	Temperature	25°C																																						
Item	Ripple Voltage (by Load Current)	Testing Circuitry	Figure B																																						
Object	+5V10A																																								
1.Graph			2.Values																																						
<p>Input Volt. 60V Input Volt. 160V</p>			<table border="1"> <thead> <tr> <th rowspan="2">Load Current [A]</th> <th colspan="2">Ripple Voltage [mV]</th> </tr> <tr> <th>Input Volt. 60 [V]</th> <th>Input Volt. 160 [V]</th> </tr> </thead> <tbody> <tr><td>0.0</td><td>10</td><td>10</td></tr> <tr><td>1.5</td><td>15</td><td>20</td></tr> <tr><td>3.0</td><td>15</td><td>20</td></tr> <tr><td>4.5</td><td>15</td><td>20</td></tr> <tr><td>6.0</td><td>15</td><td>25</td></tr> <tr><td>7.5</td><td>15</td><td>25</td></tr> <tr><td>9.0</td><td>15</td><td>25</td></tr> <tr><td>10.0</td><td>15</td><td>25</td></tr> <tr><td>11.0</td><td>15</td><td>25</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. 60 [V]	Input Volt. 160 [V]	0.0	10	10	1.5	15	20	3.0	15	20	4.5	15	20	6.0	15	25	7.5	15	25	9.0	15	25	10.0	15	25	11.0	15	25	--	-	-	--	-	-
Load Current [A]	Ripple Voltage [mV]																																								
	Input Volt. 60 [V]	Input Volt. 160 [V]																																							
0.0	10	10																																							
1.5	15	20																																							
3.0	15	20																																							
4.5	15	20																																							
6.0	15	25																																							
7.5	15	25																																							
9.0	15	25																																							
10.0	15	25																																							
11.0	15	25																																							
--	-	-																																							
--	-	-																																							
<p>Measured by 500 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>Ripple [mVp-p]</p>																																									
<p>Fig.Complex Ripple Wave Form</p>																																									

Model	DHS50A05	Temperature Testing Circuitry 25°C Figure B																																						
Item	Ripple-Noise																																							
Object	+5V10A																																							
1.Graph		2.Values																																						
<p>—△— Input Volt. 60V -·○-· Input Volt. 160V</p> <p>Ripple-Noise [mV]</p> <p>Load Current [A]</p>		<table border="1"> <thead> <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> </thead> <tbody> <tr><td>0.0</td><td>10</td><td>10</td></tr> <tr><td>1.5</td><td>20</td><td>25</td></tr> <tr><td>3.0</td><td>20</td><td>25</td></tr> <tr><td>4.5</td><td>20</td><td>25</td></tr> <tr><td>6.0</td><td>20</td><td>25</td></tr> <tr><td>7.5</td><td>20</td><td>25</td></tr> <tr><td>9.0</td><td>20</td><td>25</td></tr> <tr><td>10.0</td><td>20</td><td>25</td></tr> <tr><td>11.0</td><td>20</td><td>25</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. 60 [V]	Input Volt. 160 [V]	0.0	10	10	1.5	20	25	3.0	20	25	4.5	20	25	6.0	20	25	7.5	20	25	9.0	20	25	10.0	20	25	11.0	20	25	--	-	-	--	-	-
Load Current [A]	Ripple-Noise [mV]																																							
	Input Volt. 60 [V]	Input Volt. 160 [V]																																						
0.0	10	10																																						
1.5	20	25																																						
3.0	20	25																																						
4.5	20	25																																						
6.0	20	25																																						
7.5	20	25																																						
9.0	20	25																																						
10.0	20	25																																						
11.0	20	25																																						
--	-	-																																						
--	-	-																																						

Measured by 500 MHz Oscilloscope.  
 Ripple-Noise is shown as p-p in the figure below.  
 Note: Slanted line shows the range of the rated load current.

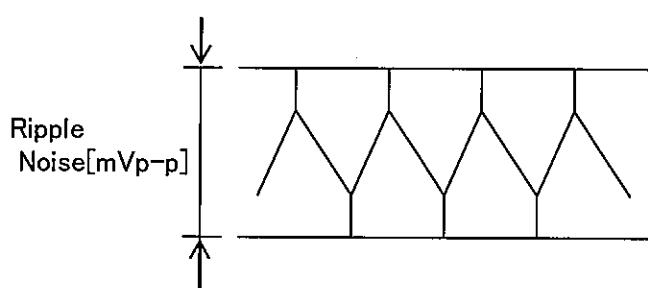
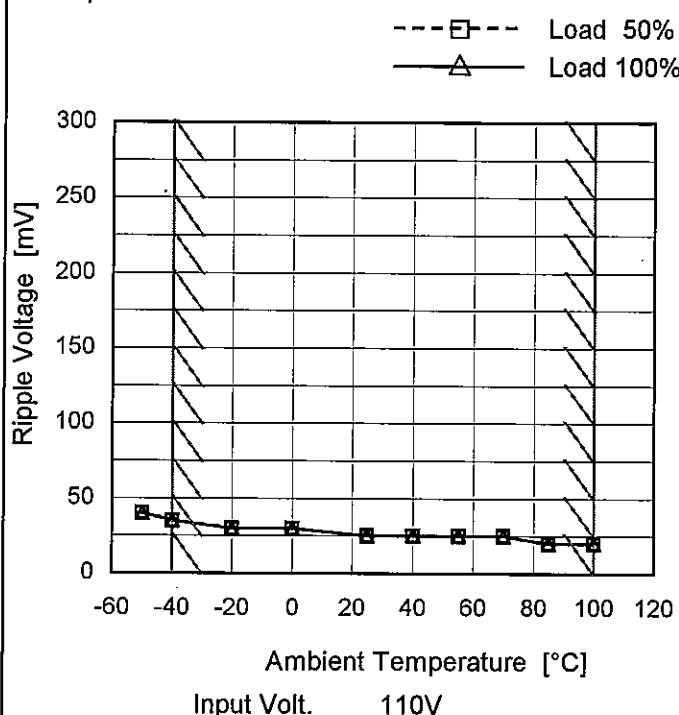


Fig.Complex Ripple Noise Wave Form

Model	DHS50A05
Item	Ripple Voltage (by Ambient Temp.)
Object	+5V10A

## Testing Circuitry Figure B

## 1.Graph



Measured by 500 MHz Oscilloscope.  
Note: Slanted line shows the range of the rated ambient temperature.

Ripple [mVp-p]

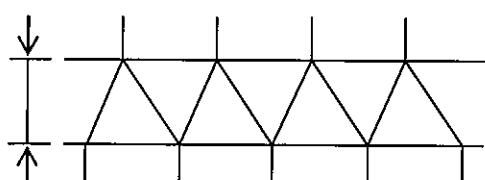
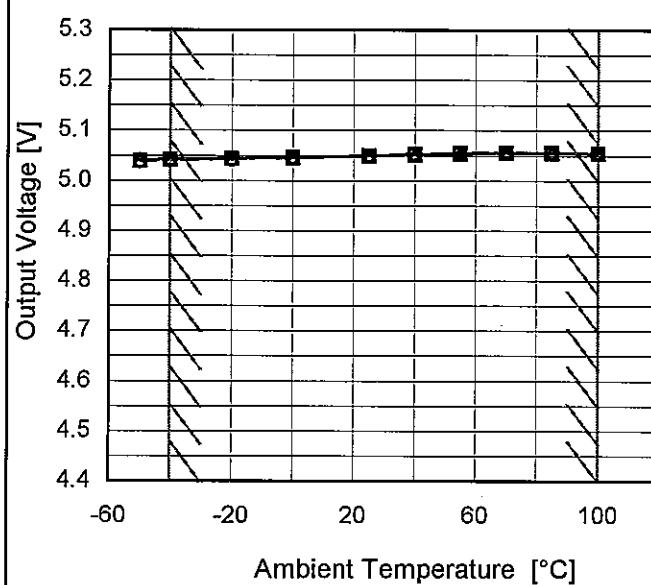


Fig.Complex Ripple Wave Form

## 2.Values

Ambient Temperature [°C]	Ripple Voltage [mV]	
	Load 50%	Load 100%
-50	40	40
-40	35	35
-20	30	30
0	30	30
25	25	25
40	25	25
55	25	25
70	25	25
85	20	20
100	20	20
---	-	-

Model	DHS50A05	Testing Circuitry Figure A																																																					
Item	Ambient Temperature Drift																																																						
Object	+5V10A																																																						
1.Graph	<p style="text-align: center;"> <span style="color: black;">— △ —</span> Input Volt. 60V  <span style="color: gray;">--- □ ---</span> Input Volt. 110V  <span style="color: gray;">--- ○ ---</span> Input Volt. 160V         </p>  <p style="text-align: center;">Output Voltage [V]</p> <p style="text-align: center;">Ambient Temperature [°C]</p> <p style="text-align: center;">Load 100%</p>	2.Values																																																					
		<table border="1"> <thead> <tr> <th rowspan="2">Ambient Temperature [°C]</th> <th colspan="3">Output Voltage [V]</th> </tr> <tr> <th>Input Volt. 60[V]</th> <th>Input Volt. 110[V]</th> <th>Input Volt. 160[V]</th> </tr> </thead> <tbody> <tr><td>-50</td><td>5.041</td><td>5.040</td><td>5.038</td></tr> <tr><td>-40</td><td>5.043</td><td>5.042</td><td>5.040</td></tr> <tr><td>-20</td><td>5.045</td><td>5.044</td><td>5.042</td></tr> <tr><td>0</td><td>5.045</td><td>5.045</td><td>5.045</td></tr> <tr><td>25</td><td>5.049</td><td>5.049</td><td>5.049</td></tr> <tr><td>40</td><td>5.053</td><td>5.053</td><td>5.053</td></tr> <tr><td>55</td><td>5.055</td><td>5.055</td><td>5.055</td></tr> <tr><td>70</td><td>5.056</td><td>5.056</td><td>5.056</td></tr> <tr><td>85</td><td>5.056</td><td>5.056</td><td>5.056</td></tr> <tr><td>100</td><td>5.055</td><td>5.055</td><td>5.055</td></tr> <tr><td>--</td><td>-</td><td>-</td><td>-</td></tr> </tbody> </table>			Ambient Temperature [°C]	Output Voltage [V]			Input Volt. 60[V]	Input Volt. 110[V]	Input Volt. 160[V]	-50	5.041	5.040	5.038	-40	5.043	5.042	5.040	-20	5.045	5.044	5.042	0	5.045	5.045	5.045	25	5.049	5.049	5.049	40	5.053	5.053	5.053	55	5.055	5.055	5.055	70	5.056	5.056	5.056	85	5.056	5.056	5.056	100	5.055	5.055	5.055	--	-	-	-
Ambient Temperature [°C]	Output Voltage [V]																																																						
	Input Volt. 60[V]	Input Volt. 110[V]	Input Volt. 160[V]																																																				
-50	5.041	5.040	5.038																																																				
-40	5.043	5.042	5.040																																																				
-20	5.045	5.044	5.042																																																				
0	5.045	5.045	5.045																																																				
25	5.049	5.049	5.049																																																				
40	5.053	5.053	5.053																																																				
55	5.055	5.055	5.055																																																				
70	5.056	5.056	5.056																																																				
85	5.056	5.056	5.056																																																				
100	5.055	5.055	5.055																																																				
--	-	-	-																																																				

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



Model	DHS50A05	Testing Circuitry Figure A
Item	Output Voltage Accuracy	
Object	+5V10A	

### 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 - 10A

\* Output Voltage Accuracy = ±(Maximum of Output Voltage - Minimum of Output Voltage) / 2

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

### 2. Values

Item	Temperature [°C]	Input Voltage[V]	Output		Output Voltage Accuracy	
			Current[A]	Voltage[V]	Value [mV]	Ration [%]
Maximum Voltage	70	60	0	5.057		
Minimum Voltage	-40	160	10	5.040	±9	±0.2

**COSEL**

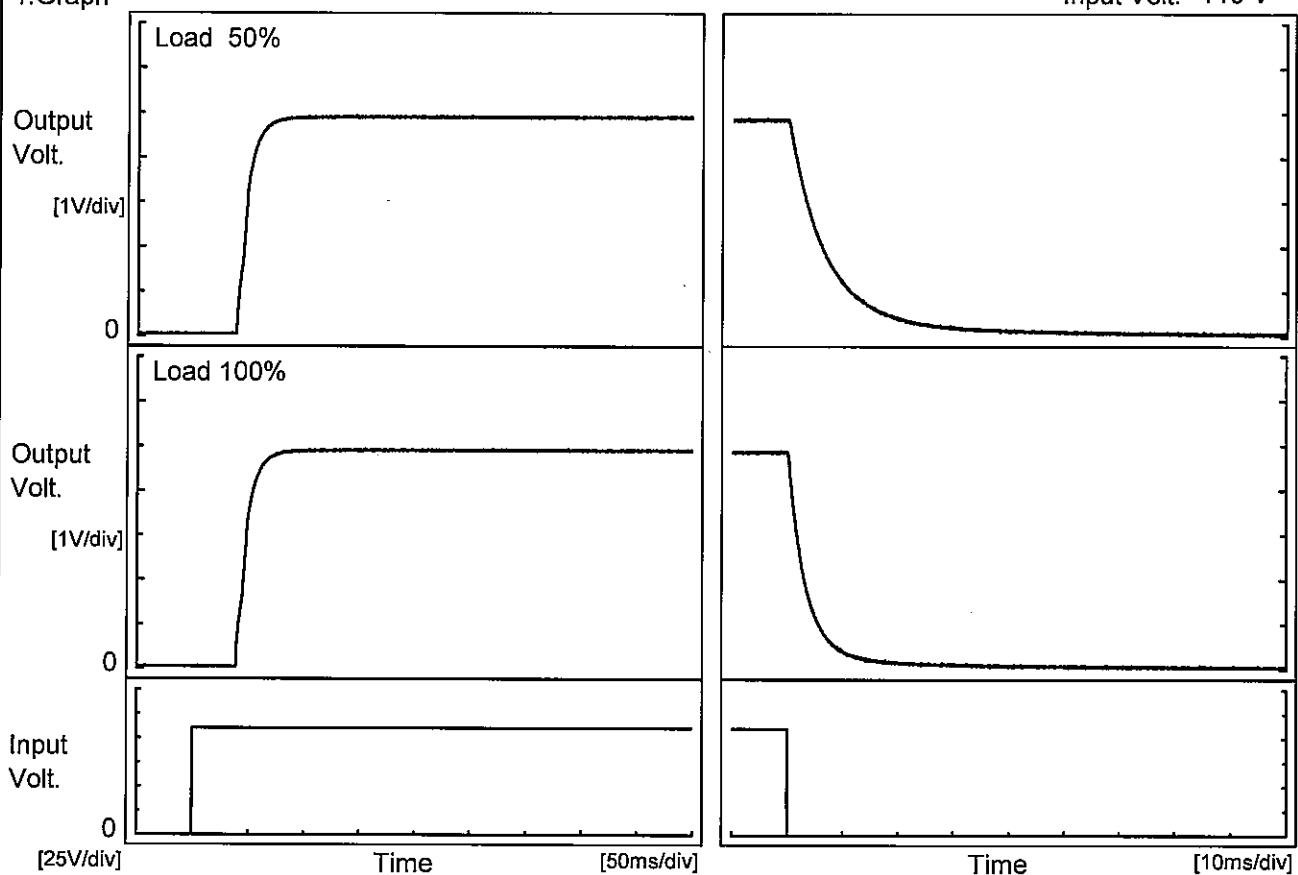
Model	DHS50A05	Temperature 25°C Testing Circuitry Figure A																						
Item	Time Lapse Drift																							
Object	+5V10A																							
1.Graph		2.Values																						
<p>Output Voltage [V]</p> <p>Time [H]</p> <p>Input Volt. 110V Load 100%</p>		<table border="1"> <thead> <tr> <th>Time since start [H]</th> <th>Output Voltage [V]</th> </tr> </thead> <tbody> <tr><td>0.0</td><td>5.049</td></tr> <tr><td>0.5</td><td>5.049</td></tr> <tr><td>1.0</td><td>5.049</td></tr> <tr><td>2.0</td><td>5.049</td></tr> <tr><td>3.0</td><td>5.049</td></tr> <tr><td>4.0</td><td>5.049</td></tr> <tr><td>5.0</td><td>5.049</td></tr> <tr><td>6.0</td><td>5.049</td></tr> <tr><td>7.0</td><td>5.049</td></tr> <tr><td>8.0</td><td>5.049</td></tr> </tbody> </table>	Time since start [H]	Output Voltage [V]	0.0	5.049	0.5	5.049	1.0	5.049	2.0	5.049	3.0	5.049	4.0	5.049	5.0	5.049	6.0	5.049	7.0	5.049	8.0	5.049
Time since start [H]	Output Voltage [V]																							
0.0	5.049																							
0.5	5.049																							
1.0	5.049																							
2.0	5.049																							
3.0	5.049																							
4.0	5.049																							
5.0	5.049																							
6.0	5.049																							
7.0	5.049																							
8.0	5.049																							

**COSEL**

Model	DHS50A05
Item	Rise and Fall Time
Object	+5V10A

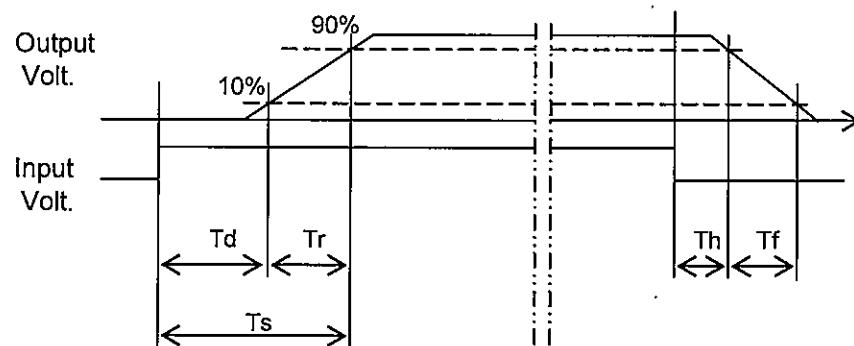
Temperature 25°C  
Testing Circuitry Figure A

## 1. Graph



## 2. Values

Load	Time	Td	Tr	Ts	Th	Tf	[ms]
50 %		39.8	22.8	62.6	0.6	18.1	
100 %		39.8	22.5	62.3	0.3	8.8	

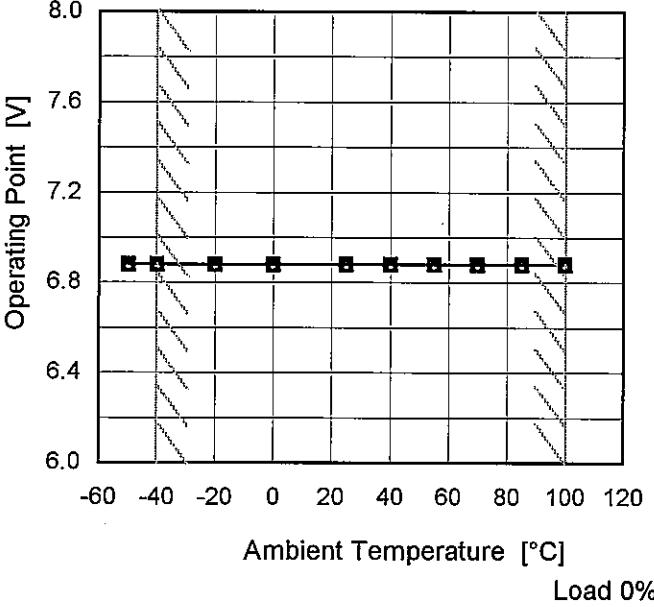


Model	DHS50A05																																								
Item	Minimum Input Voltage for Regulated Output Voltage	Testing Circuitry Figure A																																							
Object	+5V10A																																								
1.Graph																																									
<p>Input Voltage [V]</p> <p>Ambient Temperature [°C]</p> <p>---□--- Load 50%</p> <p>—△— Load 100%</p>																																									
2.Values																																									
<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>45</td> <td>46</td> </tr> <tr> <td>-40</td> <td>45</td> <td>46</td> </tr> <tr> <td>-20</td> <td>45</td> <td>47</td> </tr> <tr> <td>0</td> <td>45</td> <td>47</td> </tr> <tr> <td>25</td> <td>45</td> <td>47</td> </tr> <tr> <td>40</td> <td>45</td> <td>47</td> </tr> <tr> <td>55</td> <td>45</td> <td>47</td> </tr> <tr> <td>70</td> <td>45</td> <td>47</td> </tr> <tr> <td>85</td> <td>45</td> <td>47</td> </tr> <tr> <td>100</td> <td>45</td> <td>47</td> </tr> <tr> <td>--</td> <td>-</td> <td>-</td> </tr> </tbody> </table>				Ambient Temperature [°C]	Input Voltage [V]		Load 50%	Load 100%	-50	45	46	-40	45	46	-20	45	47	0	45	47	25	45	47	40	45	47	55	45	47	70	45	47	85	45	47	100	45	47	--	-	-
Ambient Temperature [°C]	Input Voltage [V]																																								
	Load 50%	Load 100%																																							
-50	45	46																																							
-40	45	46																																							
-20	45	47																																							
0	45	47																																							
25	45	47																																							
40	45	47																																							
55	45	47																																							
70	45	47																																							
85	45	47																																							
100	45	47																																							
--	-	-																																							
<p>Note: Slanted line shows the range of the rated ambient temperature.</p>																																									

Model	DHS50A05	Temperature	25°C																																																											
Item	Overcurrent Protection	Testing Circuitry	Figure A																																																											
Object	+5V10A																																																													
1.Graph	<p>Input Volt. 60V Input Volt. 110V Input Volt. 160V</p>																																																													
2.Values	<table border="1"> <thead> <tr> <th rowspan="2">Output Voltage [V]</th> <th colspan="3">Load Current [A]</th> </tr> <tr> <th>Input Volt. 60[V]</th> <th>Input Volt. 110[V]</th> <th>Input Volt. 160[V]</th> </tr> </thead> <tbody> <tr><td>5.00</td><td>10.02</td><td>10.01</td><td>10.06</td></tr> <tr><td>4.75</td><td>12.63</td><td>13.12</td><td>13.85</td></tr> <tr><td>4.50</td><td>12.67</td><td>13.23</td><td>13.87</td></tr> <tr><td>4.00</td><td>12.77</td><td>13.44</td><td>13.96</td></tr> <tr><td>3.50</td><td>12.91</td><td>13.64</td><td>14.29</td></tr> <tr><td>3.00</td><td>13.08</td><td>13.73</td><td>14.13</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. 60[V]	Input Volt. 110[V]	Input Volt. 160[V]	5.00	10.02	10.01	10.06	4.75	12.63	13.12	13.85	4.50	12.67	13.23	13.87	4.00	12.77	13.44	13.96	3.50	12.91	13.64	14.29	3.00	13.08	13.73	14.13	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-
Output Voltage [V]	Load Current [A]																																																													
	Input Volt. 60[V]	Input Volt. 110[V]	Input Volt. 160[V]																																																											
5.00	10.02	10.01	10.06																																																											
4.75	12.63	13.12	13.85																																																											
4.50	12.67	13.23	13.87																																																											
4.00	12.77	13.44	13.96																																																											
3.50	12.91	13.64	14.29																																																											
3.00	13.08	13.73	14.13																																																											
--	-	-	-																																																											
--	-	-	-																																																											
--	-	-	-																																																											
--	-	-	-																																																											
--	-	-	-																																																											
--	-	-	-																																																											
--	-	-	-																																																											

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

Intermittent operation occurs when the output voltage is from 3V to 0V.

Model	DHS50A05	Testing Circuitry Figure A																																																					
Item	Overvoltage Protection																																																						
Object	+5V10A																																																						
1.Graph	<p>—△— Input Volt. 60V        ---□--- Input Volt. 110V        -·○-· Input Volt. 160V</p>  <p>Operating Point [V]</p> <p>Ambient Temperature [°C]</p> <p>Load 0%</p>	2.Values																																																					
		<table border="1"> <thead> <tr> <th rowspan="2">Ambient Temperature [°C]</th> <th colspan="3">Operating Point [V]</th> </tr> <tr> <th>Input Volt. 60[V]</th> <th>Input Volt. 110[V]</th> <th>Input Volt. 160[V]</th> </tr> </thead> <tbody> <tr> <td>-50</td> <td>6.88</td> <td>6.88</td> <td>6.88</td> </tr> <tr> <td>-40</td> <td>6.88</td> <td>6.88</td> <td>6.88</td> </tr> <tr> <td>-20</td> <td>6.88</td> <td>6.88</td> <td>6.88</td> </tr> <tr> <td>0</td> <td>6.88</td> <td>6.88</td> <td>6.88</td> </tr> <tr> <td>25</td> <td>6.88</td> <td>6.88</td> <td>6.88</td> </tr> <tr> <td>40</td> <td>6.88</td> <td>6.88</td> <td>6.88</td> </tr> <tr> <td>55</td> <td>6.88</td> <td>6.88</td> <td>6.88</td> </tr> <tr> <td>70</td> <td>6.88</td> <td>6.88</td> <td>6.88</td> </tr> <tr> <td>85</td> <td>6.88</td> <td>6.88</td> <td>6.88</td> </tr> <tr> <td>100</td> <td>6.88</td> <td>6.88</td> <td>6.88</td> </tr> <tr> <td>--</td> <td>-</td> <td>-</td> <td>-</td> </tr> </tbody> </table>			Ambient Temperature [°C]	Operating Point [V]			Input Volt. 60[V]	Input Volt. 110[V]	Input Volt. 160[V]	-50	6.88	6.88	6.88	-40	6.88	6.88	6.88	-20	6.88	6.88	6.88	0	6.88	6.88	6.88	25	6.88	6.88	6.88	40	6.88	6.88	6.88	55	6.88	6.88	6.88	70	6.88	6.88	6.88	85	6.88	6.88	6.88	100	6.88	6.88	6.88	--	-	-	-
Ambient Temperature [°C]	Operating Point [V]																																																						
	Input Volt. 60[V]	Input Volt. 110[V]	Input Volt. 160[V]																																																				
-50	6.88	6.88	6.88																																																				
-40	6.88	6.88	6.88																																																				
-20	6.88	6.88	6.88																																																				
0	6.88	6.88	6.88																																																				
25	6.88	6.88	6.88																																																				
40	6.88	6.88	6.88																																																				
55	6.88	6.88	6.88																																																				
70	6.88	6.88	6.88																																																				
85	6.88	6.88	6.88																																																				
100	6.88	6.88	6.88																																																				
--	-	-	-																																																				

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

COSEL

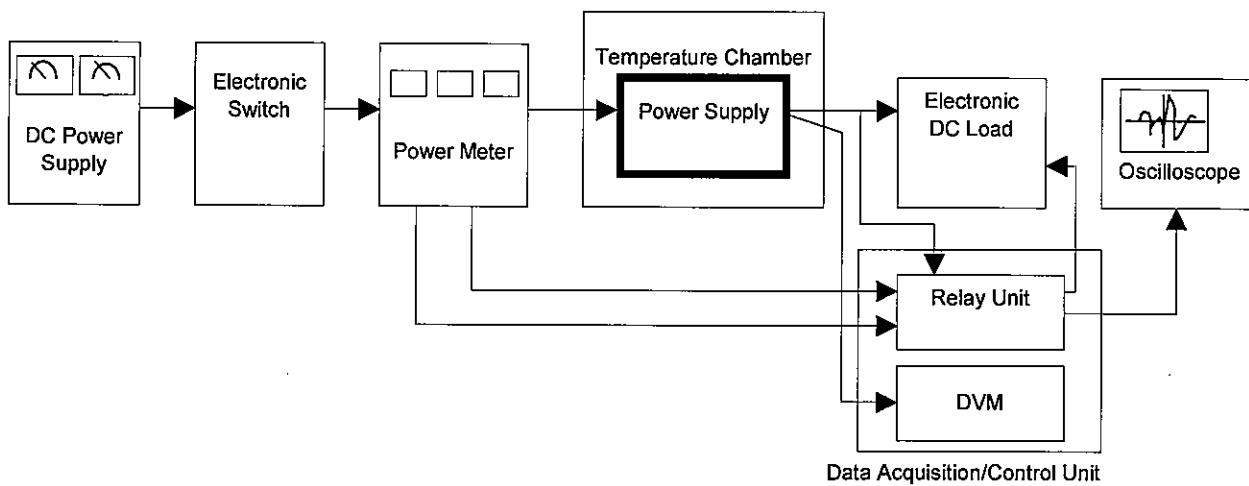
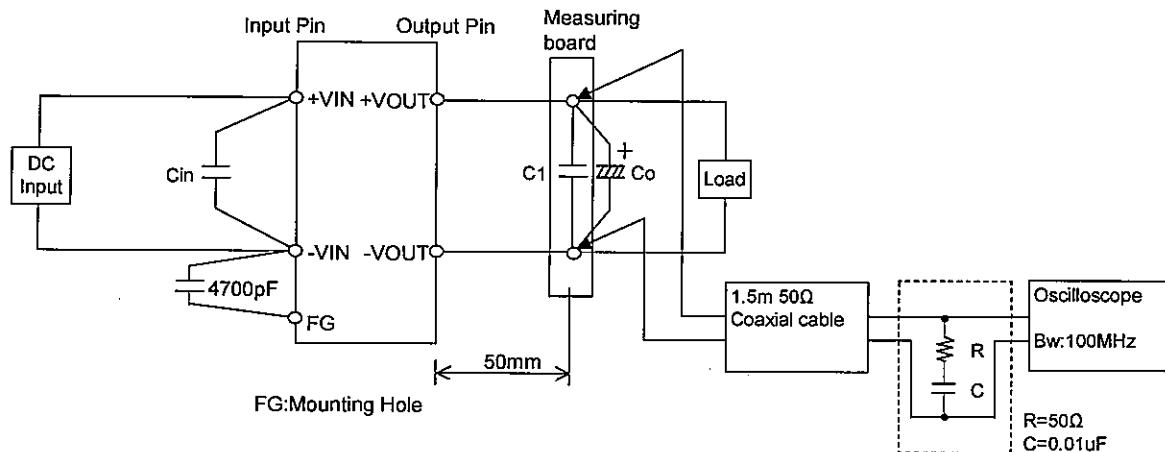


Figure A



C1 : DHS50A24 4.7uF  
 Others 10uF  
 Co : DHS50A05 2200uF  
 DHS50A12 470uF  
 DHS50A15 470uF  
 DHS50A24 220uF

Figure B