

# TEST DATA OF SFS304802

Regulated DC Power Supply  
Apr.5. 2004

Approved by : Isao Yasuda  
Isao Yasuda Design Manager

Prepared by : Tatsuya Mano  
Tatsuya Mano Design Engineer

**COSEL CO.,LTD.**

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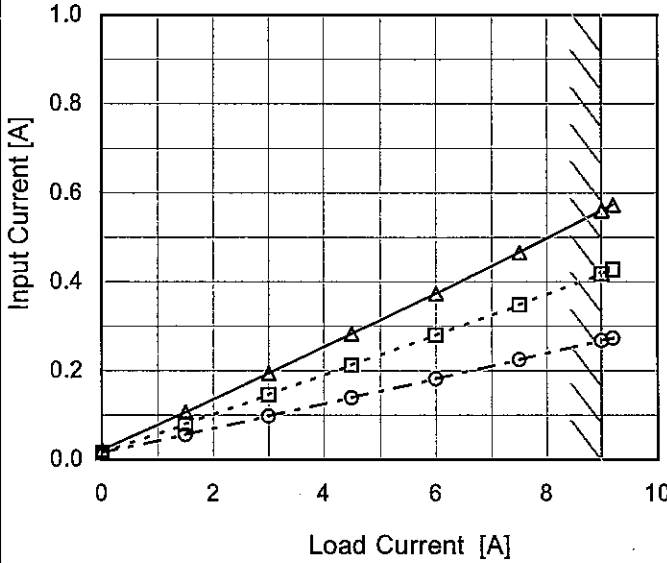
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<p>1.Graph</p> <div style="text-align: right; margin-bottom: 10px;"> <span style="margin-right: 20px;">—△— Load 100%</span>  <span style="margin-right: 20px;">- - -□- - - Load 50%</span>  <span style="margin-right: 20px;">- - -○- - - Load 0%</span> </div> <p style="margin-top: 20px;">Note: Slanted line shows the range of the rated input voltage.</p>	<p>2.Values</p> <table border="1" style="width:100%; border-collapse: collapse; text-align: center;"> <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>8</td><td>0.003</td><td>0.003</td><td>0.003</td></tr> <tr><td>16</td><td>0.002</td><td>0.002</td><td>0.002</td></tr> <tr><td>24</td><td>0.002</td><td>0.002</td><td>0.002</td></tr> <tr><td>33</td><td>0.002</td><td>0.002</td><td>0.002</td></tr> <tr><td>34</td><td>0.023</td><td>0.296</td><td>0.584</td></tr> <tr><td>36</td><td>0.021</td><td>0.283</td><td>0.561</td></tr> <tr><td>40</td><td>0.018</td><td>0.254</td><td>0.501</td></tr> <tr><td>48</td><td>0.015</td><td>0.212</td><td>0.418</td></tr> <tr><td>60</td><td>0.015</td><td>0.173</td><td>0.335</td></tr> <tr><td>70</td><td>0.015</td><td>0.150</td><td>0.289</td></tr> <tr><td>76</td><td>0.015</td><td>0.140</td><td>0.268</td></tr> <tr><td>80</td><td>0.016</td><td>0.133</td><td>0.254</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	8	0.003	0.003	0.003	16	0.002	0.002	0.002	24	0.002	0.002	0.002	33	0.002	0.002	0.002	34	0.023	0.296	0.584	36	0.021	0.283	0.561	40	0.018	0.254	0.501	48	0.015	0.212	0.418	60	0.015	0.173	0.335	70	0.015	0.150	0.289	76	0.015	0.140	0.268	80	0.016	0.133	0.254	--	-	-	-	--	-	-	-	--	-	-	-
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Model	SFS304802
Item	Input Current (by Load Current)
Object	_____

Temperature 25°C  
Testing Circuitry Figure A

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



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

2.Values

Load Current [A]	Input Current [A]		
	Input Volt. 36[V]	Input Volt. 48[V]	Input Volt. 76[V]
0.0	0.021	0.015	0.015
1.5	0.106	0.080	0.056
3.0	0.194	0.146	0.098
4.5	0.283	0.212	0.140
6.0	0.374	0.280	0.182
7.5	0.466	0.349	0.225
9.0	0.561	0.418	0.268
9.2	0.573	0.428	0.274
--	-	-	-
--	-	-	-
--	-	-	-



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<p> <span style="border-bottom: 1px solid black; display: inline-block; width: 1em; margin-right: 0.5em;"></span> <math>\triangle</math> Input Volt. 36V  <span style="border-bottom: 1px dashed black; display: inline-block; width: 1em; margin-right: 0.5em;"></span> <math>\square</math> Input Volt. 48V  <span style="border-bottom: 1px dash-dot black; display: inline-block; width: 1em; margin-right: 0.5em;"></span> <math>\circ</math> Input Volt. 76V                 </p> <p style="text-align: center;">Input Power [W]</p> <p style="text-align: center;">Load Current [A]</p>			<table border="1"> <thead> <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> </thead> <tbody> <tr><td>0.0</td><td>0.77</td><td>0.74</td><td>1.17</td></tr> <tr><td>1.5</td><td>3.83</td><td>3.83</td><td>4.27</td></tr> <tr><td>3.0</td><td>6.97</td><td>7.00</td><td>7.41</td></tr> <tr><td>4.5</td><td>10.17</td><td>10.21</td><td>10.59</td></tr> <tr><td>6.0</td><td>13.43</td><td>13.45</td><td>13.81</td></tr> <tr><td>7.5</td><td>16.76</td><td>16.74</td><td>17.05</td></tr> <tr><td>9.0</td><td>20.14</td><td>20.09</td><td>20.33</td></tr> <tr><td>9.2</td><td>20.60</td><td>20.54</td><td>20.77</td></tr> <tr><td>--</td><td>-</td><td>-</td><td>-</td></tr> <tr><td>--</td><td>-</td><td>-</td><td>-</td></tr> <tr><td>--</td><td>-</td><td>-</td><td>-</td></tr> </tbody> </table>			Load Current [A]	Input Power [W]			Input Volt. 36[V]	Input Volt. 48[V]	Input Volt. 76[V]	0.0	0.77	0.74	1.17	1.5	3.83	3.83	4.27	3.0	6.97	7.00	7.41	4.5	10.17	10.21	10.59	6.0	13.43	13.45	13.81	7.5	16.76	16.74	17.05	9.0	20.14	20.09	20.33	9.2	20.60	20.54	20.77	--	-	-	-	--	-	-	-	--	-	-	-
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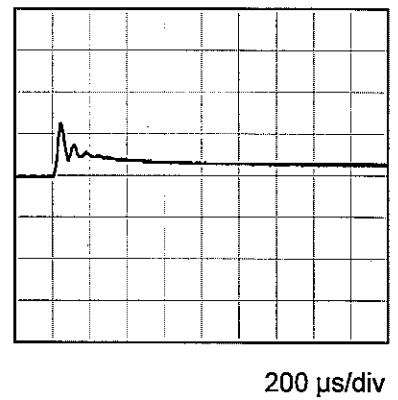
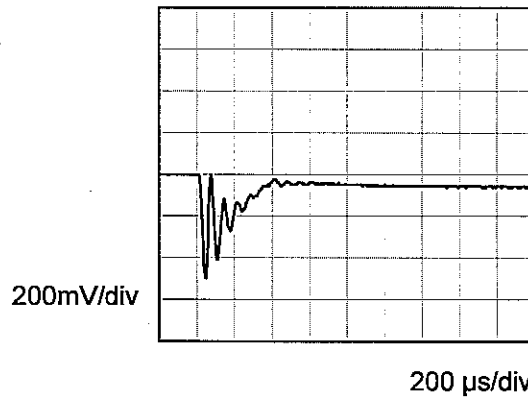


Model		SFS304802	Temperature		25°C
Item		Dynamic Load Response	Testing Circuitry		Figure A
Object		+2V9A			

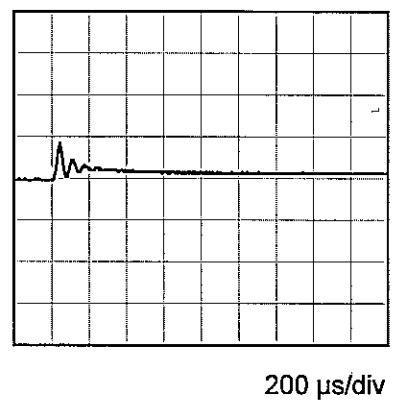
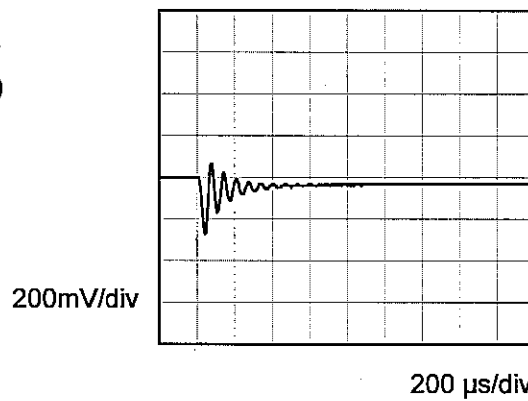
Input Volt. 48 V  
 Cycle 1000 mS

Load Current 9A / 200 μs

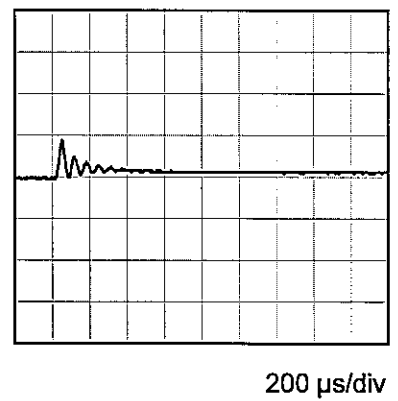
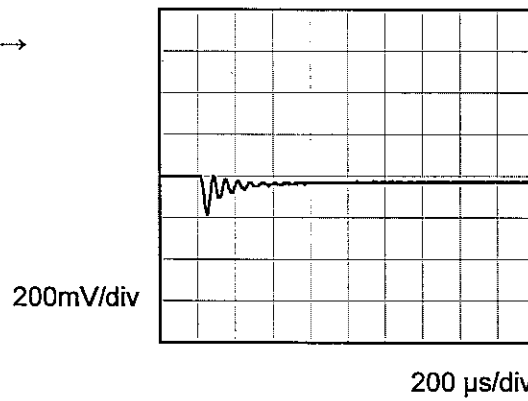
Min. Load (0A) ↔  
 Load 100% (9A)



Min. Load (0A) ↔  
 Load 50% (4.5A)



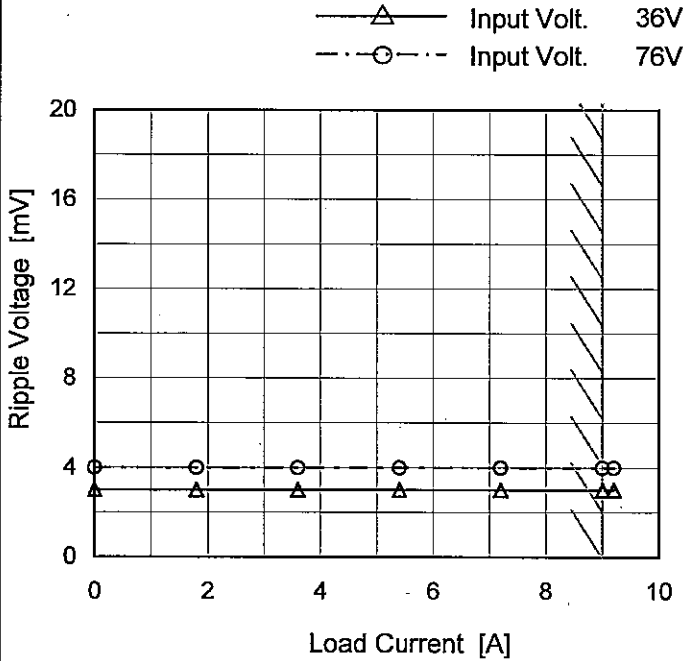
Load 50% (4.5A) ↔  
 Load 100% (9A)



Model	SFS304802
Item	Ripple Voltage (by Load Current)
Object	+2V9A

Temperature 25°C  
Testing Circuitry Figure C

1. Graph



2. Values

Load Current [A]	Ripple Voltage [mV]	
	Input Volt. 36 [V]	Input Volt. 76 [V]
0.00	3	4
1.80	3	4
3.6	3	4
5.4	3	4
7.2	3	4
9.0	3	4
9.2	3	4
-	-	-
-	-	-
-	-	-
-	-	-

Measured by 100MHz Oscilloscope.  
Ripple Voltage is shown as p-p in the figure below.  
Note: Slanted line shows the range of the rated load current.

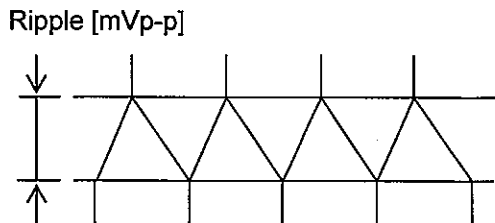
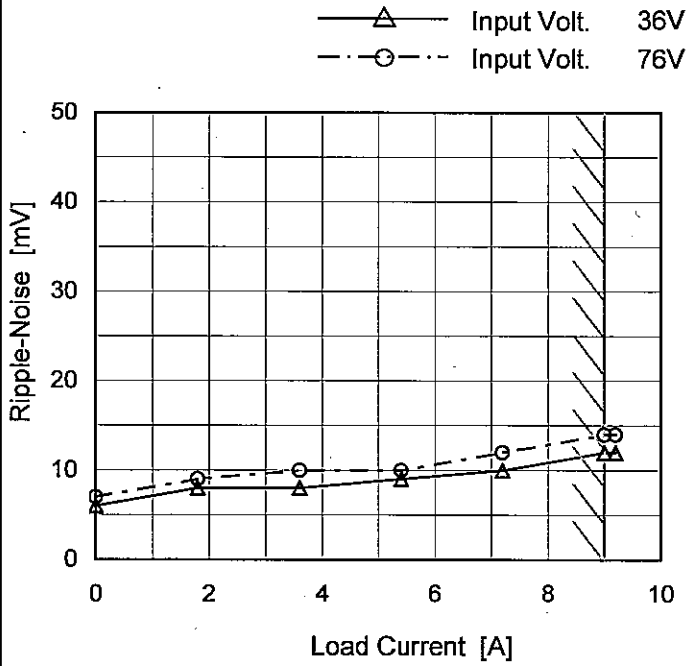


Fig. Complex Ripple Wave Form

Model	SFS304802	Temperature	25°C
Item	Ripple-Noise	Testing Circuitry	Figure C
Object	+2V9A		

1. Graph



2. Values

Load Current [A]	Ripple-Noise [mV]	
	Input Volt. 36 [V]	Input Volt. 76 [V]
0.0	6	7
1.8	8	9
3.6	8	10
5.4	9	10
7.2	10	12
9.0	12	14
9.2	12	14
--	-	-
--	-	-
--	-	-
--	-	-

Measured by 100MHz Oscilloscope.  
 Ripple-Noise is shown as p-p in the figure below.  
 Note: Slanted line shows the range of the rated load current.

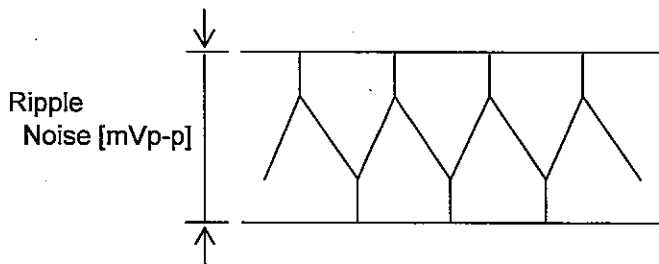


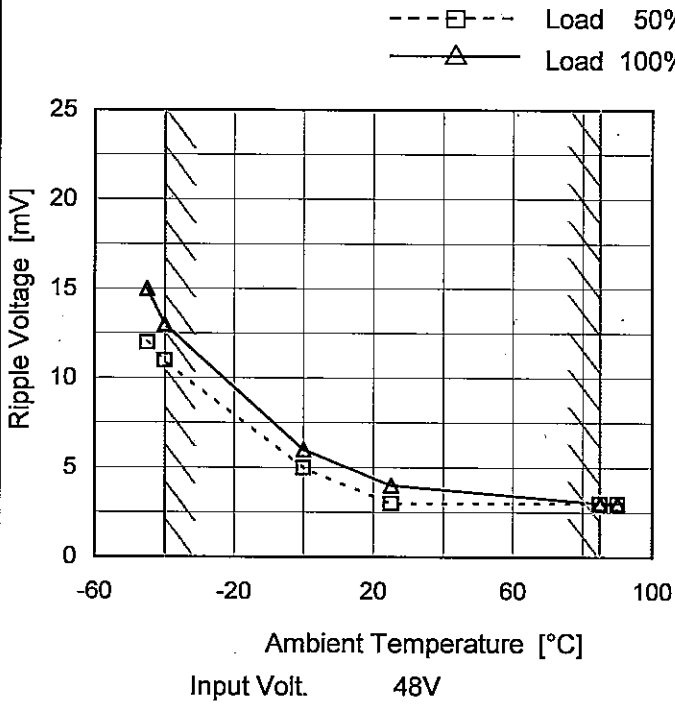
Fig. Complex Ripple Wave Form



Model	SFS304802
Item	Ripple Voltage (by Ambient Temp.)
Object	+2V9A

Testing Circuitry Figure C

1. Graph



2. Values

Ambient Temperature [°C]	Ripple Voltage [mV]	
	Load 50%	Load 100%
-45	12	15
-40	11	13
0	5	6
25	3	4
85	3	3
90	3	3
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-

Measured by 100MHz Oscilloscope.  
 Note: Slanted line shows the range of the rated ambient temperature.

Model		SFS304802		Testing Circuitry Figure A																																																				
Item		Ambient Temperature Drift																																																						
Object		+2V9A																																																						
1.Graph		<p>                 —△— Input Volt. 36V                  ---□--- Input Volt. 48V                  -·-○-·- Input Volt. 76V             </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. 36[V]</th> <th>Input Volt. 48[V]</th> <th>Input Volt. 76[V]</th> </tr> </thead> <tbody> <tr><td>-50</td><td>2.003</td><td>1.999</td><td>1.989</td></tr> <tr><td>-40</td><td>2.003</td><td>2.000</td><td>1.990</td></tr> <tr><td>-20</td><td>2.002</td><td>2.002</td><td>1.991</td></tr> <tr><td>0</td><td>2.001</td><td>2.003</td><td>1.993</td></tr> <tr><td>25</td><td>2.000</td><td>2.003</td><td>1.993</td></tr> <tr><td>40</td><td>1.999</td><td>2.002</td><td>1.992</td></tr> <tr><td>55</td><td>1.997</td><td>2.001</td><td>1.991</td></tr> <tr><td>70</td><td>1.995</td><td>1.999</td><td>1.988</td></tr> <tr><td>85</td><td>1.994</td><td>1.996</td><td>1.985</td></tr> <tr><td>90</td><td>1.993</td><td>1.995</td><td>1.984</td></tr> <tr><td>--</td><td>-</td><td>-</td><td>-</td></tr> </tbody> </table>				Ambient Temperature [°C]	Output Voltage [V]			Input Volt. 36[V]	Input Volt. 48[V]	Input Volt. 76[V]	-50	2.003	1.999	1.989	-40	2.003	2.000	1.990	-20	2.002	2.002	1.991	0	2.001	2.003	1.993	25	2.000	2.003	1.993	40	1.999	2.002	1.992	55	1.997	2.001	1.991	70	1.995	1.999	1.988	85	1.994	1.996	1.985	90	1.993	1.995	1.984	--	-	-	-
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Note: Slanted line shows the range of the rated ambient temperature.																																																								



		Testing Circuitry Figure A
Model	SFS304802	
Item	Output Voltage Accuracy	
Object	+2V9A	

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

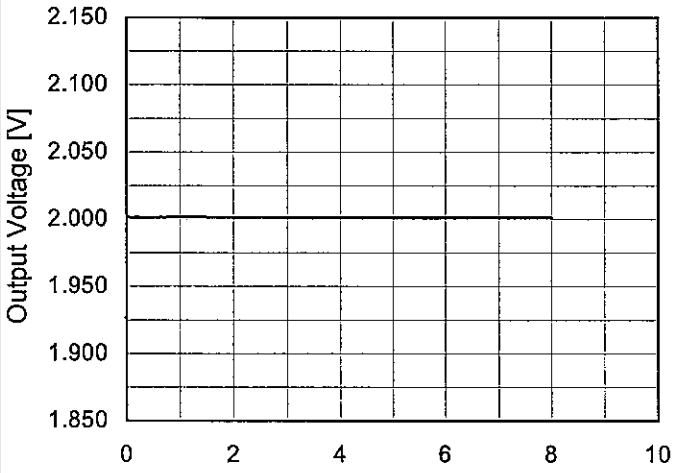
Load Current : 0 - 9A

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

\* 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	85	36	0	2.062	±39	±2.0
Minimum Voltage	85	76	9	1.985		

<p>Model      SFS304802</p>		<p>Temperature      25°C Testing Circuitry      Figure A</p>																						
<p>Item      Time Lapse Drift</p>																								
<p>Object      +2V9A</p>																								
<p>1.Graph</p>  <p style="text-align: center;">Time [H]</p> <p>Input Volt.      48V Load      100%</p>		<p>2.Values</p> <table border="1" data-bbox="909 448 1284 996"> <thead> <tr> <th>Time since start [H]</th> <th>Output Voltage [V]</th> </tr> </thead> <tbody> <tr><td>0.0</td><td>2.003</td></tr> <tr><td>0.5</td><td>2.002</td></tr> <tr><td>1.0</td><td>2.002</td></tr> <tr><td>2.0</td><td>2.002</td></tr> <tr><td>3.0</td><td>2.002</td></tr> <tr><td>4.0</td><td>2.002</td></tr> <tr><td>5.0</td><td>2.002</td></tr> <tr><td>6.0</td><td>2.002</td></tr> <tr><td>7.0</td><td>2.002</td></tr> <tr><td>8.0</td><td>2.002</td></tr> </tbody> </table>	Time since start [H]	Output Voltage [V]	0.0	2.003	0.5	2.002	1.0	2.002	2.0	2.002	3.0	2.002	4.0	2.002	5.0	2.002	6.0	2.002	7.0	2.002	8.0	2.002
Time since start [H]	Output Voltage [V]																							
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7.0	2.002																							
8.0	2.002																							

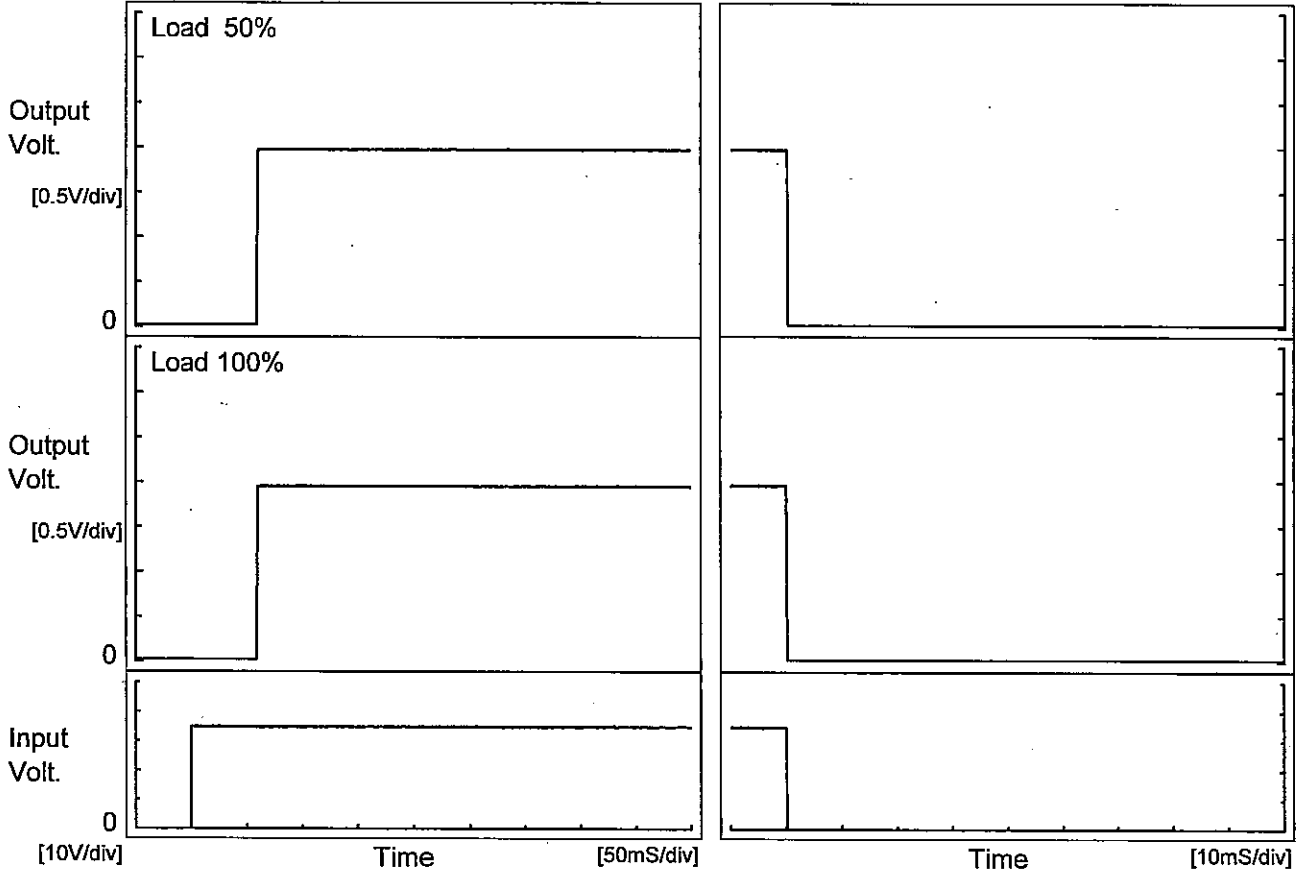




Model	SFS304802	Temperature	25°C
Item	Rise and Fall Time	Testing Circuitry	Figure A
Object	+2V9A		

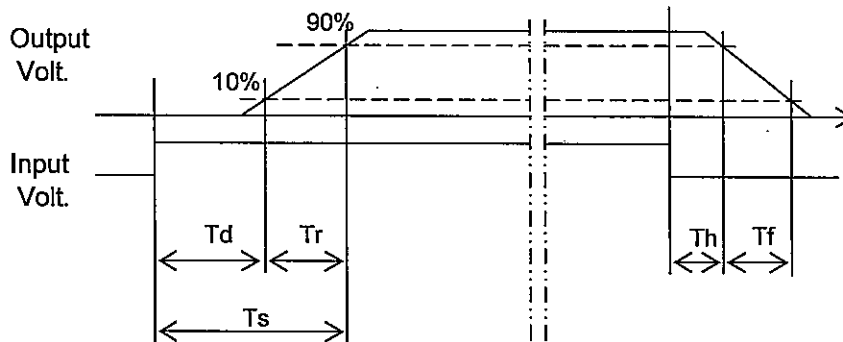
1. Graph

Input Volt. 36 V



2. Values

		[mS]				
Load	Time	Td	Tr	Ts	Th	Tf
50 %		58.8	1.1	59.9	0.1	0.2
100 %		58.8	1.2	60.0	0.1	0.2



Model		SFS304802																																								
Item		Minimum Input Voltage for Regulated Output Voltage	Testing Circuitry Figure A																																							
Object		+2V9A																																								
1.Graph			2.Values																																							
<p>Legend:              ---□--- Load 50%              ---△--- Load 100%</p>			<table border="1"> <thead> <tr> <th rowspan="2">Ambient Temperature [°C]</th> <th colspan="2">Input Voltage [V]</th> </tr> <tr> <th>Load 50%</th> <th>Load 100%</th> </tr> </thead> <tbody> <tr><td>-50</td><td>31.6</td><td>31.8</td></tr> <tr><td>-40</td><td>31.7</td><td>31.8</td></tr> <tr><td>-20</td><td>31.8</td><td>31.8</td></tr> <tr><td>0</td><td>31.9</td><td>31.8</td></tr> <tr><td>25</td><td>31.9</td><td>32.0</td></tr> <tr><td>40</td><td>32.1</td><td>32.0</td></tr> <tr><td>55</td><td>32.1</td><td>32.0</td></tr> <tr><td>70</td><td>32.1</td><td>32.2</td></tr> <tr><td>85</td><td>32.1</td><td>32.2</td></tr> <tr><td>90</td><td>32.1</td><td>32.2</td></tr> <tr><td>--</td><td>-</td><td>-</td></tr> </tbody> </table>		Ambient Temperature [°C]	Input Voltage [V]		Load 50%	Load 100%	-50	31.6	31.8	-40	31.7	31.8	-20	31.8	31.8	0	31.9	31.8	25	31.9	32.0	40	32.1	32.0	55	32.1	32.0	70	32.1	32.2	85	32.1	32.2	90	32.1	32.2	--	-	-
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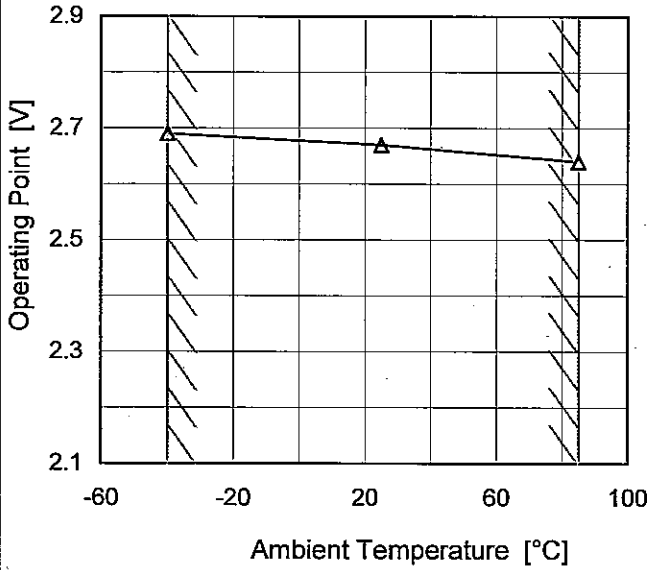
Model		SFS304802		Temperature 25°C																																																												
Item		Overcurrent Protection		Testing Circuitry Figure A																																																												
Object		+2V9A																																																														
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<p>Output Voltage [V]</p> <p>Load Current [A]</p> <p>Note: Slanted line shows the range of the rated load current.</p> <p>When the output voltage fell to less than 1.8V ,the unit shuts off the output by operating low voltage protection.</p>		<table border="1"> <thead> <tr> <th rowspan="2">Output Voltage [V]</th> <th colspan="3">Load Current [A]</th> </tr> <tr> <th>Input Volt. 36[V]</th> <th>Input Volt. 48[V]</th> <th>Input Volt. 76[V]</th> </tr> </thead> <tbody> <tr> <td>2.0</td> <td>9.68</td> <td>9.23</td> <td>9.99</td> </tr> <tr> <td>1.9</td> <td>9.69</td> <td>9.82</td> <td>10.00</td> </tr> <tr> <td>1.8</td> <td>9.68</td> <td>9.80</td> <td>10.01</td> </tr> <tr> <td>--</td> <td>-</td> <td>-</td> <td>-</td> </tr> <tr> <td>--</td> <td>-</td> <td>-</td> <td>-</td> </tr> <tr> <td>--</td> <td>-</td> <td>-</td> <td>-</td> </tr> <tr> <td>--</td> <td>-</td> <td>-</td> <td>-</td> </tr> <tr> <td>--</td> <td>-</td> <td>-</td> <td>-</td> </tr> <tr> <td>--</td> <td>-</td> <td>-</td> <td>-</td> </tr> <tr> <td>--</td> <td>-</td> <td>-</td> <td>-</td> </tr> <tr> <td>--</td> <td>-</td> <td>-</td> <td>-</td> </tr> <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. 36[V]	Input Volt. 48[V]	Input Volt. 76[V]	2.0	9.68	9.23	9.99	1.9	9.69	9.82	10.00	1.8	9.68	9.80	10.01	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-
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Model	SFS304802
Item	Overvoltage Protection
Object	+2V9A

Testing Circuitry Figure A

1. Graph —△— Input Volt. 48V



2. Values

Ambient Temperature [°C]	Operating Point [V]		
	Input Volt. 48[V]	Input Volt.	Input Volt.
-40	2.69	-	-
25	2.67	-	-
85	2.64	-	-
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

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

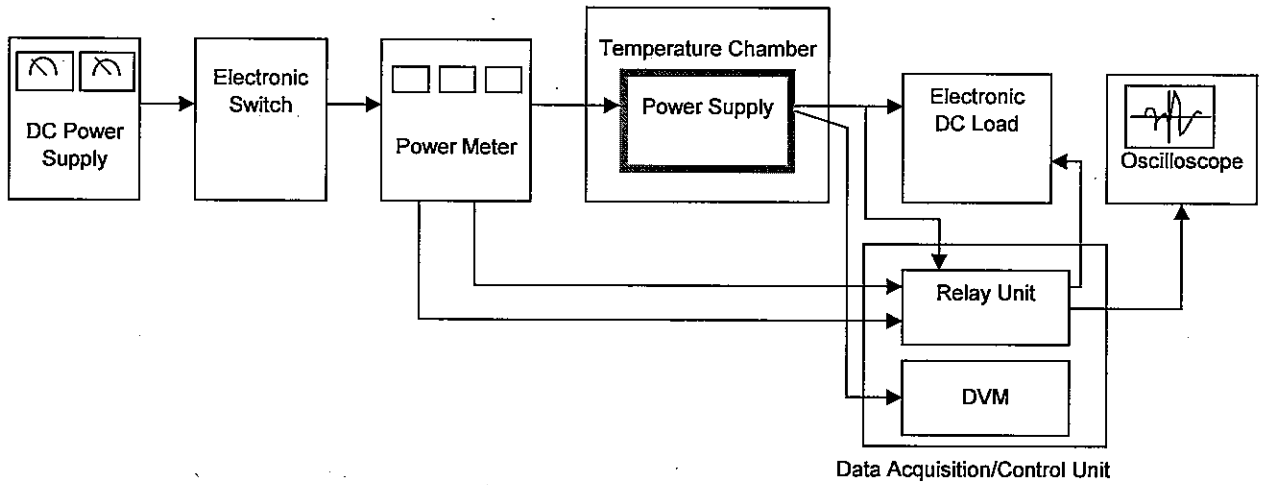


Figure A

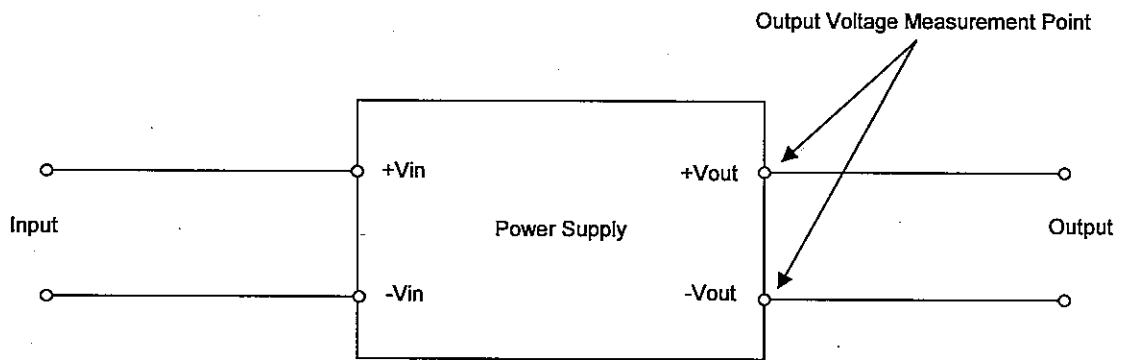


Figure B (General Electric Characteristic)

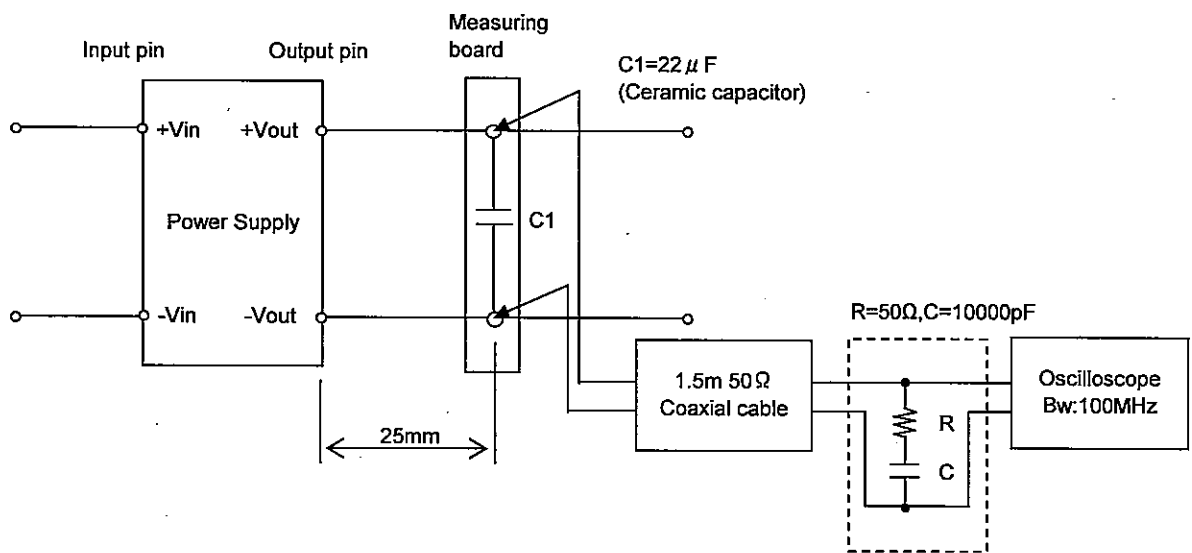


Figure C (Ripple and Ripple noise Characteristic)