

TEST DATA OF SFLS30481R5

Regulated DC Power Supply
May 16, 2007

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Isao Yasuda Design Manager

Prepared by : Toshiyuki Tsuru Tsuru
Toshiyuki Tsuru Design Engineer

COSEL CO.,LTD.

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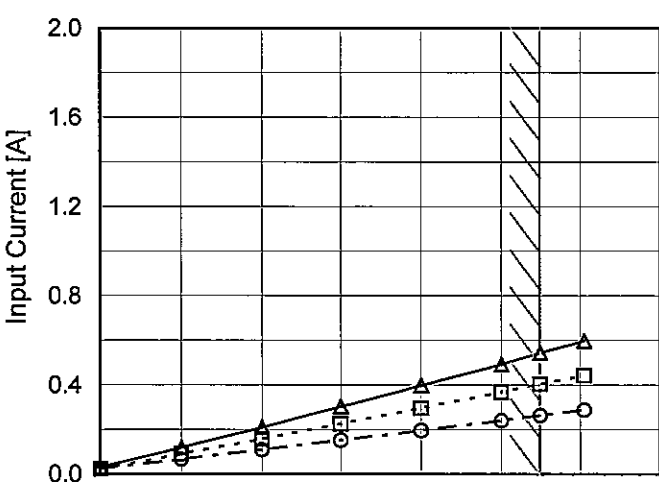
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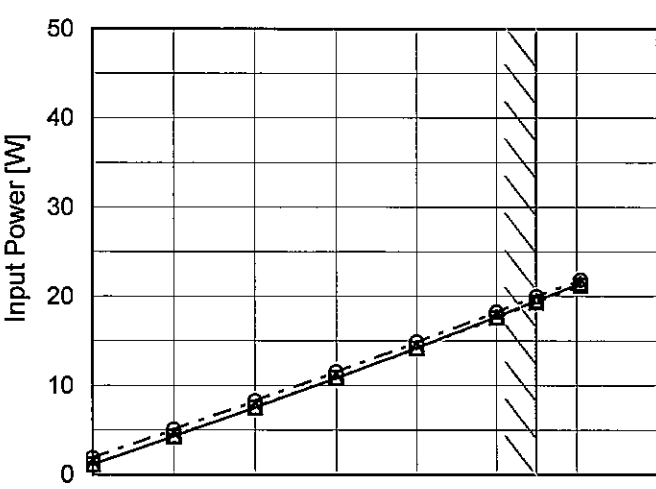
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				<table><tr><th rowspan="2">Input Voltage [V]</th><th colspan="3">Input Current [A]</th></tr><tr><th>Load 0%</th><th>Load 50%</th><th>Load 100%</th></tr><tr><td>0</td><td>0.000</td><td>0.000</td><td>0.000</td></tr><tr><td>8</td><td>0.001</td><td>0.001</td><td>0.001</td></tr><tr><td>16</td><td>0.001</td><td>0.001</td><td>0.001</td></tr><tr><td>24</td><td>0.001</td><td>0.001</td><td>0.001</td></tr><tr><td>33</td><td>0.002</td><td>0.002</td><td>0.002</td></tr><tr><td>34</td><td>0.037</td><td>0.294</td><td>0.572</td></tr><tr><td>36</td><td>0.032</td><td>0.278</td><td>0.544</td></tr><tr><td>40</td><td>0.025</td><td>0.247</td><td>0.480</td></tr><tr><td>48</td><td>0.023</td><td>0.208</td><td>0.403</td></tr><tr><td>60</td><td>0.024</td><td>0.171</td><td>0.324</td></tr><tr><td>70</td><td>0.025</td><td>0.151</td><td>0.282</td></tr><tr><td>76</td><td>0.025</td><td>0.141</td><td>0.263</td></tr><tr><td>80</td><td>0.026</td><td>0.135</td><td>0.249</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></table>		Input Voltage [V]	Input Current [A]			Load 0%	Load 50%	Load 100%	0	0.000	0.000	0.000	8	0.001	0.001	0.001	16	0.001	0.001	0.001	24	0.001	0.001	0.001	33	0.002	0.002	0.002	34	0.037	0.294	0.572	36	0.032	0.278	0.544	40	0.025	0.247	0.480	48	0.023	0.208	0.403	60	0.024	0.171	0.324	70	0.025	0.151	0.282	76	0.025	0.141	0.263	80	0.026	0.135	0.249	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-
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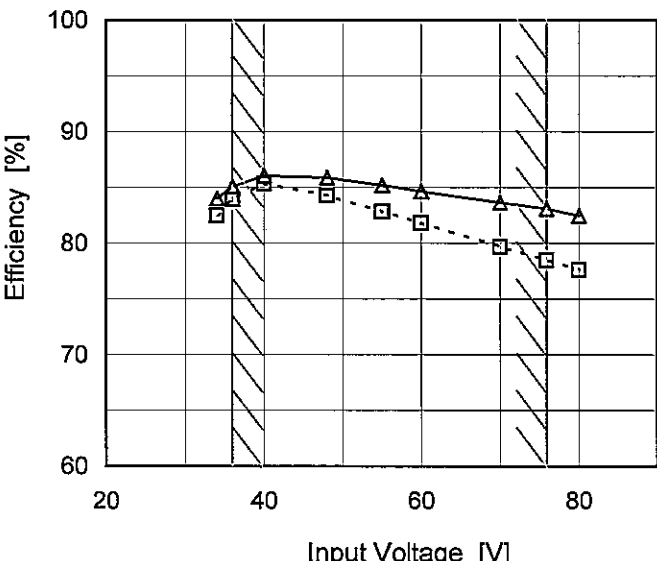
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BC-10096

Model		SFLS30481R5	
Item		Input Current (by Load Current)	
Object			
1.Graph			
		—△—	Input Volt. 36V
		---□---	Input Volt. 48V
		---○---	Input Volt. 76V
			
Note: Slanted line shows the range of the rated load current.			

Temperature		25°C	
Testing Circuitry		Figure A	
2.Values			
Load Current [A]	Input Current [A]		
	Input Volt. 36[V]	Input Volt. 48[V]	Input Volt. 76[V]
0.0	0.032	0.023	0.025
2.0	0.120	0.090	0.067
4.0	0.210	0.157	0.109
6.0	0.303	0.226	0.152
8.0	0.398	0.296	0.196
10.0	0.493	0.367	0.240
11.0	0.544	0.403	0.263
12.1	0.598	0.443	0.287
--	-	-	-
--	-	-	-
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Model		SFLS30481R5		Temperature 25°C																																																				
Item		Input Power (by Load Current)		Testing Circuitry Figure A																																																				
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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> 		2.Values																																																				
		<table><tr><th rowspan="2">Load Current [A]</th><th colspan="3">Input Power [W]</th></tr><tr><th>Input Volt. 36[V]</th><th>Input Volt. 48[V]</th><th>Input Volt. 76[V]</th></tr><tr><td>0.0</td><td>1.14</td><td>1.10</td><td>1.88</td></tr><tr><td>2.0</td><td>4.30</td><td>4.31</td><td>5.07</td></tr><tr><td>4.0</td><td>7.54</td><td>7.54</td><td>8.28</td></tr><tr><td>6.0</td><td>10.86</td><td>10.84</td><td>11.54</td></tr><tr><td>8.0</td><td>14.27</td><td>14.19</td><td>14.87</td></tr><tr><td>10.0</td><td>17.75</td><td>17.60</td><td>18.25</td></tr><tr><td>11.0</td><td>19.53</td><td>19.33</td><td>19.96</td></tr><tr><td>12.1</td><td>21.48</td><td>21.23</td><td>21.83</td></tr><tr><td>--</td><td>-</td><td>-</td><td>-</td></tr><tr><td>--</td><td>-</td><td>-</td><td>-</td></tr><tr><td>--</td><td>-</td><td>-</td><td>-</td></tr></table>				Load Current [A]	Input Power [W]			Input Volt. 36[V]	Input Volt. 48[V]	Input Volt. 76[V]	0.0	1.14	1.10	1.88	2.0	4.30	4.31	5.07	4.0	7.54	7.54	8.28	6.0	10.86	10.84	11.54	8.0	14.27	14.19	14.87	10.0	17.75	17.60	18.25	11.0	19.53	19.33	19.96	12.1	21.48	21.23	21.83	--	-	-	-	--	-	-	-	--	-	-	-
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Object																																			
1.Graph		2.Values																																	
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Input Voltage [V]	Efficiency [%]																																		
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76	78.5	83.1																																	
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Model SFLS30481R5

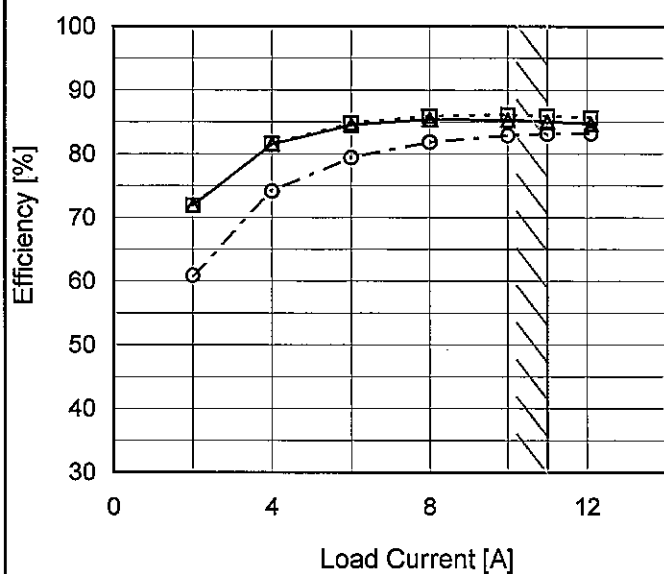
Item Efficiency (by Load Current)

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]	Efficiency [%]		
	Input Volt. 36[V]	Input Volt. 48[V]	Input Volt. 76[V]
0.0	-	-	-
2.0	71.9	71.9	60.9
4.0	81.6	81.6	74.2
6.0	84.5	84.8	79.4
8.0	85.4	85.9	81.8
10.0	85.4	86.1	82.9
11.0	85.1	85.9	83.1
12.1	84.7	85.7	83.2
--	-	-	-
--	-	-	-
--	-	-	-

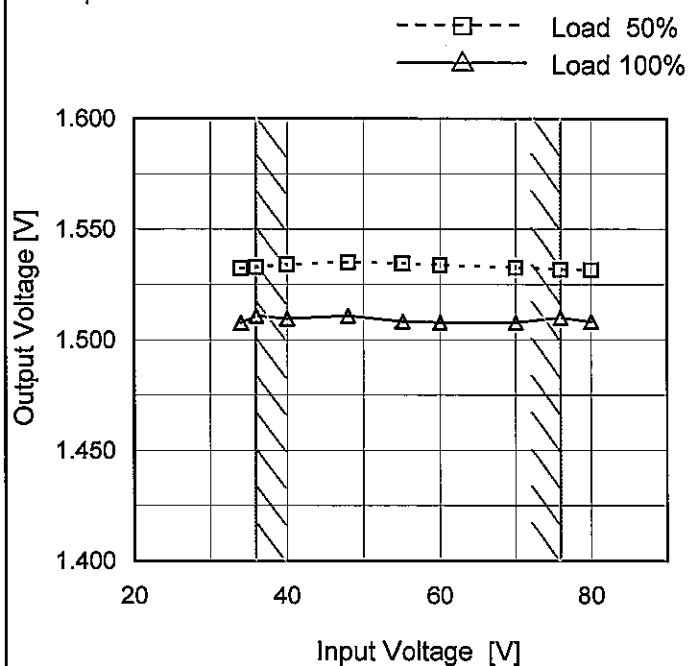
Model SFLS30481R5

Item Line Regulation

Object +1.5V11A

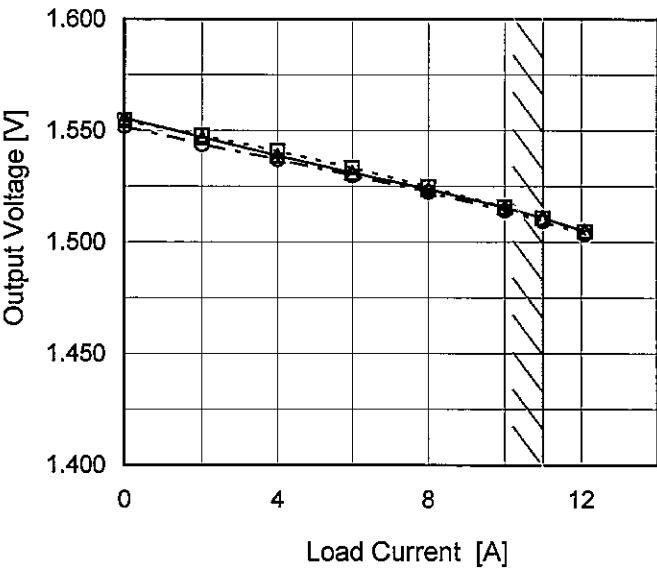
Temperature 25°C
Testing Circuitry Figure A

1. Graph



2. Values

Input Voltage [V]	Output Voltage [V]	
	Load 50%	Load 100%
34	1.532	1.508
36	1.533	1.511
40	1.534	1.510
48	1.535	1.511
55	1.535	1.508
60	1.534	1.508
70	1.533	1.508
76	1.532	1.510
80	1.532	1.508

Model		SFLS30481R5		Temperature Testing Circuitry	25°C Figure A																																																			
Item		Load Regulation																																																						
Object		+1.5V11A																																																						
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>Output Voltage [V]</div> <div>Load Current [A]</div>		2.Values																																																				
		<table><tr><th rowspan="2">Load Current [A]</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><tr><td>0.0</td><td>1.556</td><td>1.555</td><td>1.552</td></tr><tr><td>2.0</td><td>1.547</td><td>1.548</td><td>1.544</td></tr><tr><td>4.0</td><td>1.539</td><td>1.541</td><td>1.537</td></tr><tr><td>6.0</td><td>1.531</td><td>1.533</td><td>1.530</td></tr><tr><td>8.0</td><td>1.524</td><td>1.525</td><td>1.523</td></tr><tr><td>10.0</td><td>1.516</td><td>1.516</td><td>1.514</td></tr><tr><td>11.0</td><td>1.511</td><td>1.511</td><td>1.510</td></tr><tr><td>12.1</td><td>1.505</td><td>1.505</td><td>1.504</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]	Output Voltage [V]			Input Volt. 36[V]	Input Volt. 48[V]	Input Volt. 76[V]	0.0	1.556	1.555	1.552	2.0	1.547	1.548	1.544	4.0	1.539	1.541	1.537	6.0	1.531	1.533	1.530	8.0	1.524	1.525	1.523	10.0	1.516	1.516	1.514	11.0	1.511	1.511	1.510	12.1	1.505	1.505	1.504	--	-	-	-	--	-	-	-	--	-	-	-
Load Current [A]	Output Voltage [V]																																																							
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Note: Slanted line shows the range of the rated load current.																																																								

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Model	SFLS30481R5	Temperature	25°C
Item	Dynamic Load Response	Testing Circuitry	Figure A
Object	+1.5V/11A		

Input Volt. 48 V
Cycle 1000 mS

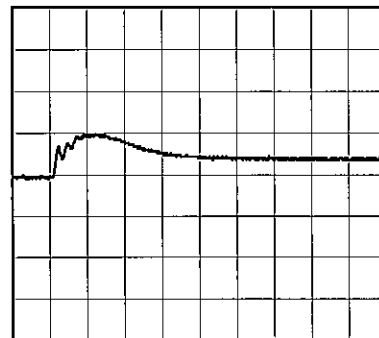
Load Current 11A / 200 μ sec

Min. Load (0A) \longleftrightarrow
Load 100% (11A)

100mV/div



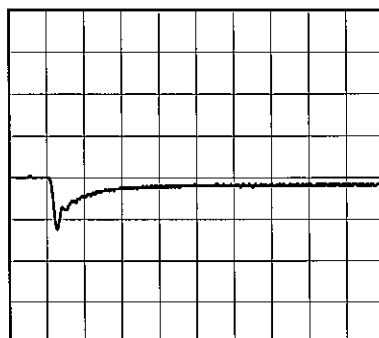
200 μ s/div



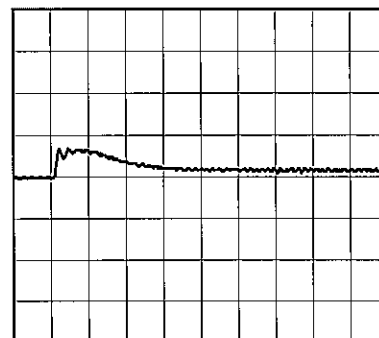
200 μ s/div

Min. Load (0A) \longleftrightarrow
Load 50% (5.5A)

100mV/div



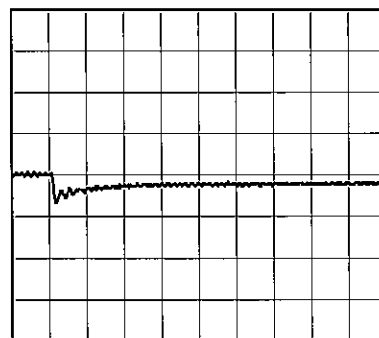
200 μ s/div



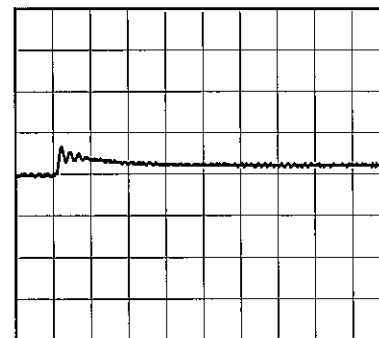
200 μ s/div

Load 50% (5.5A) \longleftrightarrow
Load 100% (11A)

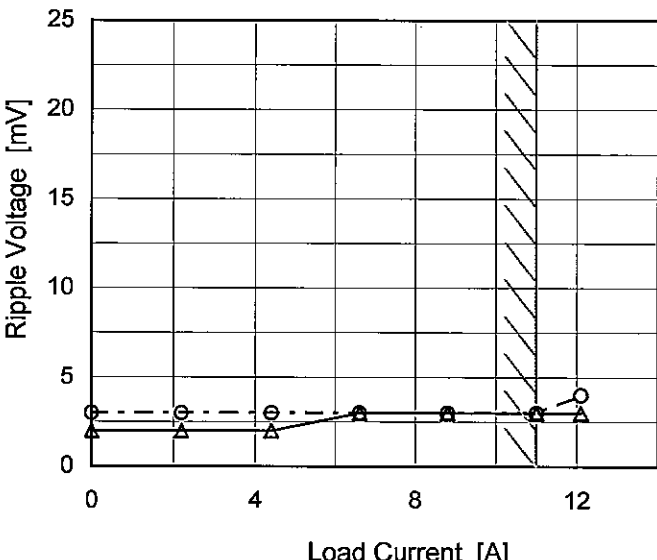
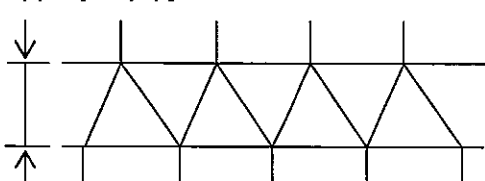
100mV/div



200 μ s/div



200 μ s/div

Model		SFLS30481R5		Temperature 25°C																																							
Item		Ripple Voltage (by Load Current)		Testing Circuitry Figure C																																							
Object		+1.5V11A																																									
1.Graph				2.Values																																							
<div><div><div>—△— Input Volt. 36V</div><div>- - -○- - - Input Volt. 76V</div></div></div>				<table><tr><th rowspan="2">Load Current [A]</th><th colspan="2">Ripple Voltage [mV]</th></tr><tr><th>Input Volt. 36 [V]</th><th>Input Volt. 76 [V]</th></tr><tr><td>0.0</td><td>2</td><td>3</td></tr><tr><td>2.2</td><td>2</td><td>3</td></tr><tr><td>4.4</td><td>2</td><td>3</td></tr><tr><td>6.6</td><td>3</td><td>3</td></tr><tr><td>8.8</td><td>3</td><td>3</td></tr><tr><td>11.0</td><td>3</td><td>3</td></tr><tr><td>12.1</td><td>3</td><td>4</td></tr><tr><td>--</td><td>-</td><td>-</td></tr><tr><td>--</td><td>-</td><td>-</td></tr><tr><td>--</td><td>-</td><td>-</td></tr><tr><td>--</td><td>-</td><td>-</td></tr></table>		Load Current [A]	Ripple Voltage [mV]		Input Volt. 36 [V]	Input Volt. 76 [V]	0.0	2	3	2.2	2	3	4.4	2	3	6.6	3	3	8.8	3	3	11.0	3	3	12.1	3	4	--	-	-	--	-	-	--	-	-	--	-	-
Load Current [A]	Ripple Voltage [mV]																																										
	Input Volt. 36 [V]	Input Volt. 76 [V]																																									
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--	-	-																																									
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<div>Measured by 100 MHz Oscilloscope.</div> <div>Ripple Voltage is shown as p-p in the figure below.</div> <div>Note: Slanted line shows the range of the rated load current.</div>																																											
<div><div>Ripple [mVp-p]</div></div> <div>Fig.Complex Ripple Wave Form</div>																																											

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BC-10096

Model	SFLS30481R5																																																																												
Item	Ripple-Noise	Temperature	25°C																																																																										
Object	+1.5V11A	Testing Circuitry	Figure C																																																																										
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<div><div><div><div><div></div><div>—△—</div><div>Input Volt. 36V</div></div><div><div>---○---</div><div>Input Volt. 76V</div></div></div><div><table><thead><tr><th>Load Current [A]</th><th>Input Volt. 36 [V]</th><th>Input Volt. 76 [V]</th></tr></thead><tbody><tr><td>0.0</td><td>7</td><td>9</td></tr><tr><td>2.2</td><td>6</td><td>9</td></tr><tr><td>4.4</td><td>5</td><td>11</td></tr><tr><td>6.6</td><td>7</td><td>11</td></tr><tr><td>8.8</td><td>6</td><td>13</td></tr><tr><td>11.0</td><td>6</td><td>13</td></tr><tr><td>12.1</td><td>7</td><td>14</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></tbody></table></div></div><div><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><div><div><div></div><div>Ripple Noise[mVp-p]</div><div></div></div><div></div></div><div>Fig.Complex Ripple Noise Wave Form</div></div></div>		Load Current [A]	Input Volt. 36 [V]	Input Volt. 76 [V]	0.0	7	9	2.2	6	9	4.4	5	11	6.6	7	11	8.8	6	13	11.0	6	13	12.1	7	14	--	-	-	--	-	-	--	-	-	--	-	-	<table><thead><tr><th rowspan="2">Load Current [A]</th><th colspan="2">Ripple-Noise [mV]</th></tr><tr><th>Input Volt. 36 [V]</th><th>Input Volt. 76 [V]</th></tr></thead><tbody><tr><td>0.0</td><td>7</td><td>9</td></tr><tr><td>2.2</td><td>6</td><td>9</td></tr><tr><td>4.4</td><td>5</td><td>11</td></tr><tr><td>6.6</td><td>7</td><td>11</td></tr><tr><td>8.8</td><td>6</td><td>13</td></tr><tr><td>11.0</td><td>6</td><td>13</td></tr><tr><td>12.1</td><td>7</td><td>14</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></tbody></table>		Load Current [A]	Ripple-Noise [mV]		Input Volt. 36 [V]	Input Volt. 76 [V]	0.0	7	9	2.2	6	9	4.4	5	11	6.6	7	11	8.8	6	13	11.0	6	13	12.1	7	14	--	-	-	--	-	-	--	-	-	--	-	-
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BC-10096

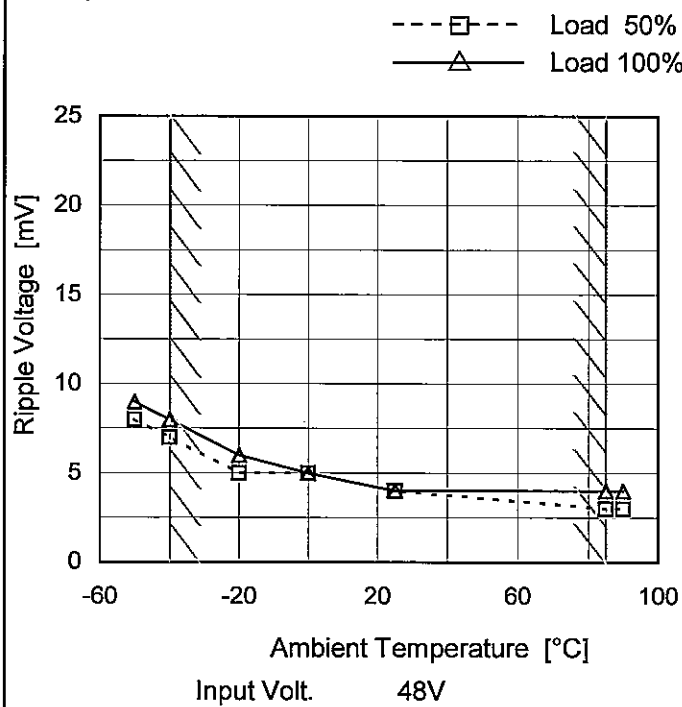
Model SFLS30481R5

Item Ripple Voltage (by Ambient Temp.)

Object +1.5V11A

Testing Circuitry Figure C

1. Graph

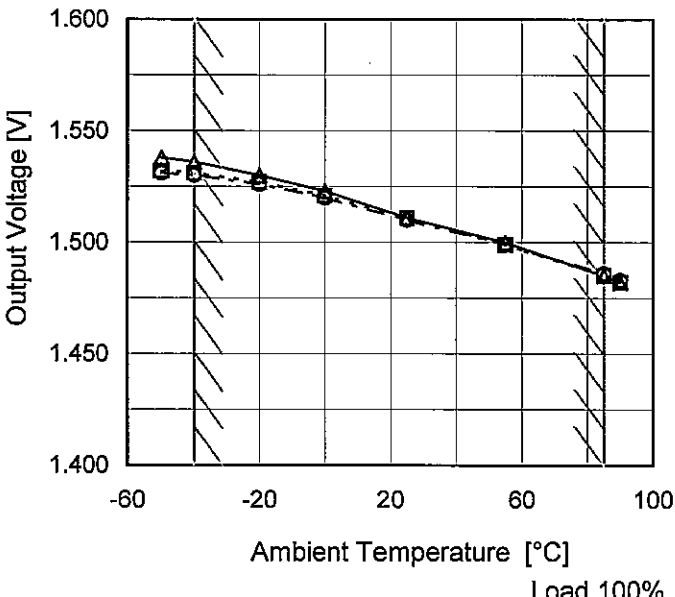


Measured by 100 MHz Oscilloscope.

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

2. Values

Ambient Temperature [°C]	Ripple Voltage [mV]	
	Load 50%	Load 100%
-50	8	9
-40	7	8
-20	5	6
0	5	5
25	4	4
85	3	4
90	3	4
--	-	-
--	-	-
--	-	-
--	-	-

Model		SFLS30481R5	
Item		Ambient Temperature Drift	
Object		+1.5V11A	
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>  <p>Output Voltage [V]</p> <p>Ambient Temperature [°C]</p> <p>Load 100%</p>	
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	1.538	1.532	1.531
-40	1.536	1.531	1.530
-20	1.530	1.527	1.526
0	1.523	1.521	1.520
25	1.511	1.511	1.510
55	1.500	1.499	1.499
85	1.485	1.485	1.486
90	1.482	1.482	1.483
--	-	-	-
--	-	-	-
--	-	-	-

		Testing Circuitry Figure A
Model	SFLS30481R5	
Item	Output Voltage Accuracy	
Object	+1.5V11A	

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

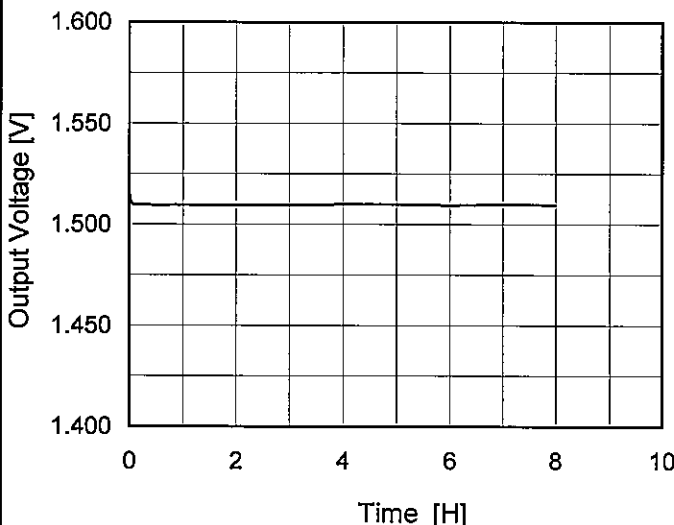
Load Current : 0 - 11A

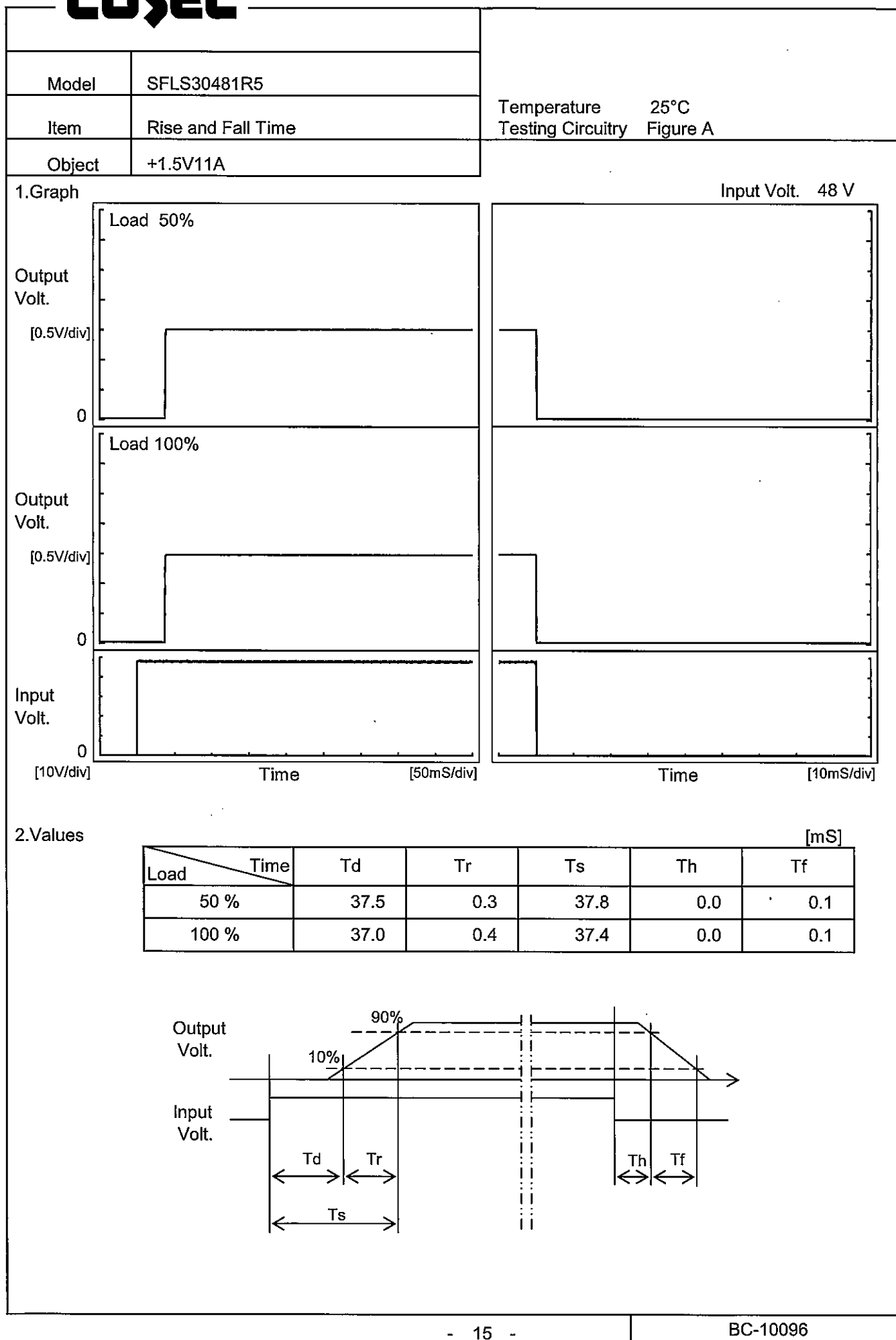
* Output Voltage Accuracy = $\pm(\text{Maximum of Output Voltage} - \text{Minimum of Output Voltage}) / 2$

* 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	0	36	0	1.556	±36	±2.4
Minimum Voltage	85	36	11	1.485		

Model	SFLS30481R5																								
Item	Time Lapse Drift	Temperature	25°C																						
		Testing Circuitry	Figure A																						
Object	+1.5V11A																								
1.Graph		2.Values																							
<div><p>Output Voltage [V]</p><p>Time [H]</p><p>Input Volt. 48V</p><p>Load 100%</p></div>		<table><tr><th>Time since start [H]</th><th>Output Voltage [V]</th></tr><tr><td>0.0</td><td>1.516</td></tr><tr><td>0.5</td><td>1.510</td></tr><tr><td>1.0</td><td>1.510</td></tr><tr><td>2.0</td><td>1.510</td></tr><tr><td>3.0</td><td>1.510</td></tr><tr><td>4.0</td><td>1.510</td></tr><tr><td>5.0</td><td>1.510</td></tr><tr><td>6.0</td><td>1.510</td></tr><tr><td>7.0</td><td>1.510</td></tr><tr><td>8.0</td><td>1.510</td></tr></table>		Time since start [H]	Output Voltage [V]	0.0	1.516	0.5	1.510	1.0	1.510	2.0	1.510	3.0	1.510	4.0	1.510	5.0	1.510	6.0	1.510	7.0	1.510	8.0	1.510
Time since start [H]	Output Voltage [V]																								
0.0	1.516																								
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6.0	1.510																								
7.0	1.510																								
8.0	1.510																								

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Model		SFLS30481R5	Testing Circuitry Figure A																																				
Item		Minimum Input Voltage for Regulated Output Voltage																																					
Object		+1.5V11A																																					
1.Graph																																							
<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></div><table><thead><tr><th>Ambient Temperature [°C]</th><th>Load 50% [V]</th><th>Load 100% [V]</th></tr></thead><tbody><tr><td>-50</td><td>32.4</td><td>32.6</td></tr><tr><td>-40</td><td>32.4</td><td>32.6</td></tr><tr><td>-20</td><td>32.4</td><td>32.4</td></tr><tr><td>0</td><td>32.4</td><td>32.4</td></tr><tr><td>25</td><td>32.2</td><td>32.4</td></tr><tr><td>55</td><td>32.2</td><td>32.3</td></tr><tr><td>85</td><td>32.0</td><td>32.1</td></tr><tr><td>90</td><td>32.2</td><td>32.2</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></tbody></table><div>Ambient Temperature [°C]</div></div>				Ambient Temperature [°C]	Load 50% [V]	Load 100% [V]	-50	32.4	32.6	-40	32.4	32.6	-20	32.4	32.4	0	32.4	32.4	25	32.2	32.4	55	32.2	32.3	85	32.0	32.1	90	32.2	32.2	--	-	-	--	-	-	--	-	-
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90		32.2	32.2																																				
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Note: Slanted line shows the range of the rated ambient temperature.

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BC-10096

Model	SFLS30481R5																																																													
Item	Overcurrent Protection	Temperature	25°C																																																											
Object	+1.5V11A	Testing Circuitry	Figure A																																																											
1.Graph		2.Values																																																												
<div><div><div></div>Input Volt. 36V</div><div><div></div>Input Volt. 48V</div><div><div></div>Input Volt. 76V</div></div> <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 1.40V ,the unit shuts off the output by operating low voltage protection .</p>		<table><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><tr><td>1.50</td><td>12.76</td><td>12.67</td><td>12.57</td></tr><tr><td>1.43</td><td>13.03</td><td>13.07</td><td>12.74</td></tr><tr><td>1.35</td><td>13.11</td><td>13.16</td><td>12.89</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></table>		Output Voltage [V]	Load Current [A]			Input Volt. 36[V]	Input Volt. 48[V]	Input Volt. 76[V]	1.50	12.76	12.67	12.57	1.43	13.03	13.07	12.74	1.35	13.11	13.16	12.89	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-
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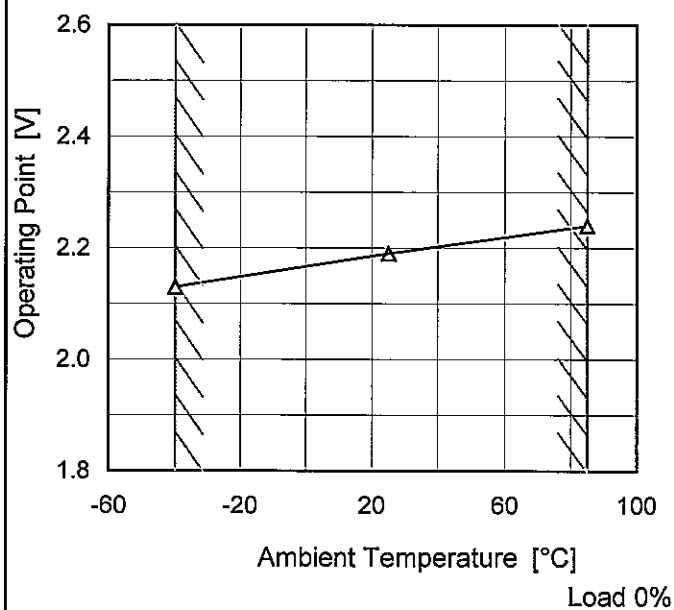
Model SFLS30481R5

Item Overvoltage Protection

Object +1.5V11A

Testing Circuitry Figure A

1.Graph —△— Input Volt. 48V



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

2.Values

Ambient Temperature [°C]	Operating Point [V]		
	Input Volt. 48[V]	Input Volt.	Input Volt.
-40	2.13	-	-
25	2.19	-	-
85	2.24	-	-
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-
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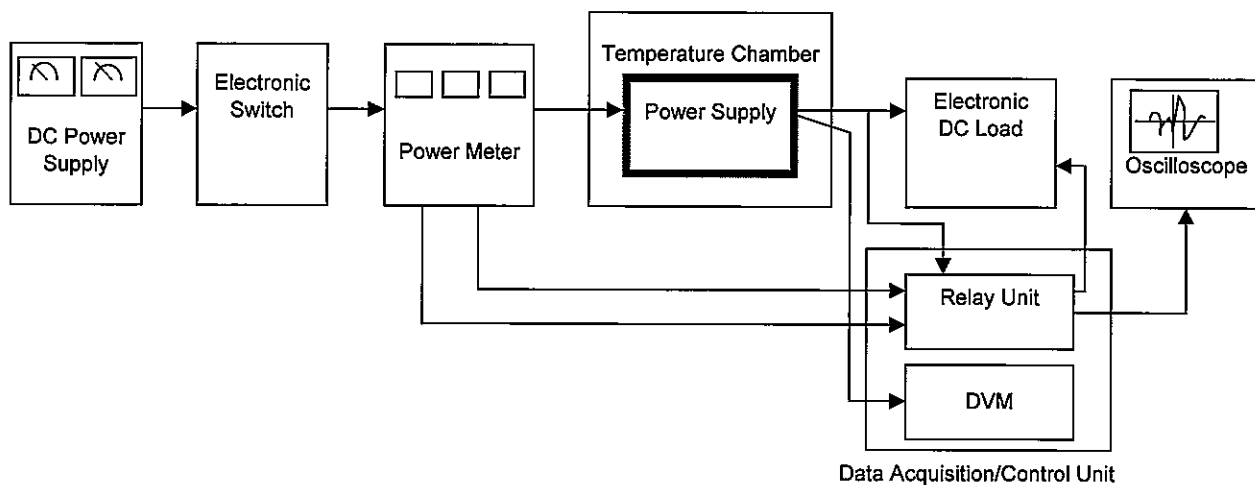


Figure A

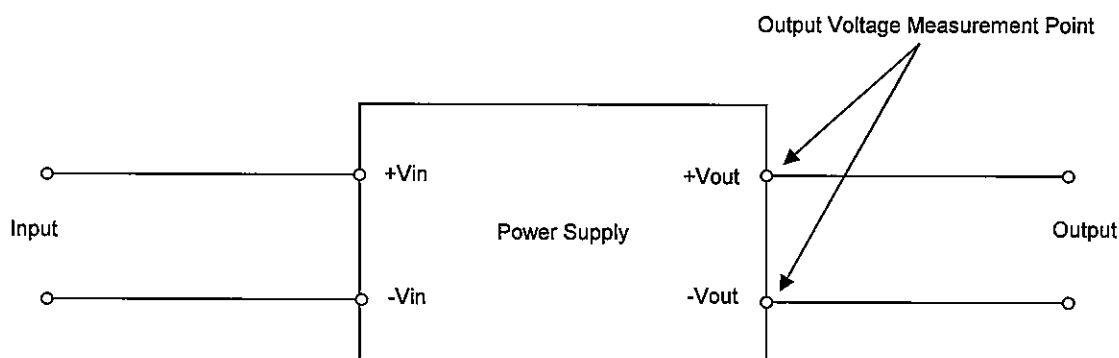


Figure B (General Electric Characteristic)

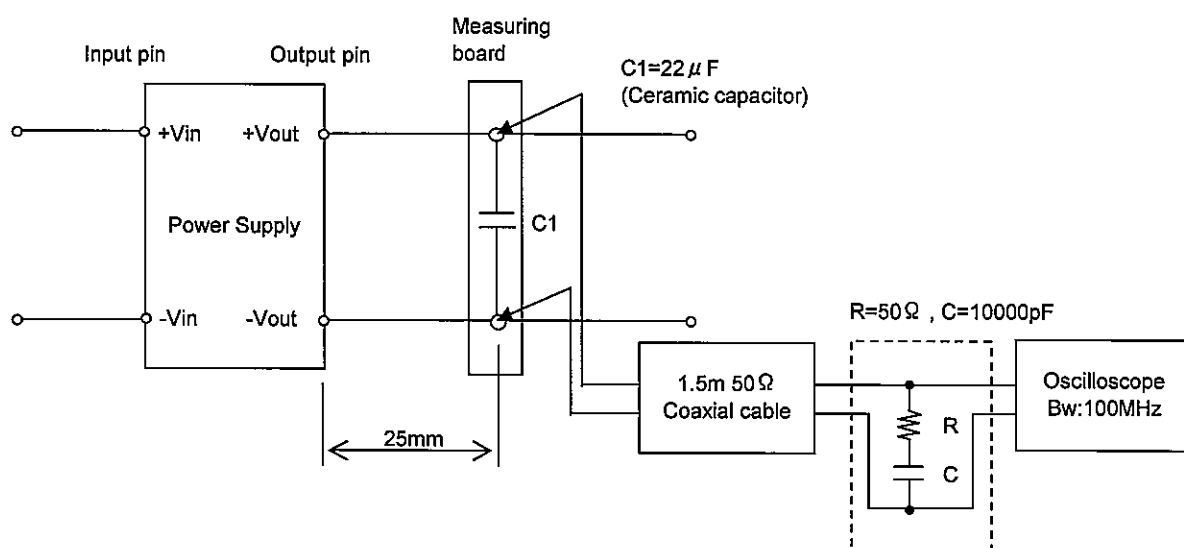


Figure C (Ripple and Ripple noise Characteristic)