

# TEST DATA OF SUCS1R5123R3

Regulated DC Power Supply  
Sep 17, 2004

Approved by : Tetsuo Sugimori  
Tetsuo Sugimori Design Manager

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Masahiro Shima Design Engineer

**COSEL CO.,LTD.**



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Model	SUCS1R5123R3	Temperature 25°C																																																																							
Item	Input Current (by Input Voltage)	Testing Circuitry Figure A																																																																							
Object	_____	_____																																																																							
1.Graph																																																																									
<p style="text-align: center;"> <span style="margin-right: 10px;">—△— Load 100%</span> <span style="margin-right: 10px;">---□--- Load 50%</span> <span style="margin-right: 10px;">---○--- Load 0%</span> </p> <p>The graph plots Input Current [A] on the y-axis (0.00 to 0.50) against Input Voltage [V] on the x-axis (0 to 20). Three curves are shown: Load 100% (solid triangles), Load 50% (open squares), and Load 0% (open circles). All curves start at (0,0) and increase to a peak around 4V before decreasing. A slanted line from approximately (4, 0.35) to (18, 0) indicates the rated input voltage range.</p>																																																																									
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<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>2.0</td><td>0.000</td><td>0.000</td><td>0.000</td></tr> <tr><td>2.2</td><td>0.036</td><td>0.001</td><td>0.001</td></tr> <tr><td>3.6</td><td>0.020</td><td>0.326</td><td>0.314</td></tr> <tr><td>4.0</td><td>0.018</td><td>0.285</td><td>0.313</td></tr> <tr><td>6.0</td><td>0.016</td><td>0.158</td><td>0.335</td></tr> <tr><td>8.0</td><td>0.014</td><td>0.118</td><td>0.232</td></tr> <tr><td>9.0</td><td>0.014</td><td>0.106</td><td>0.205</td></tr> <tr><td>10.0</td><td>0.013</td><td>0.095</td><td>0.184</td></tr> <tr><td>12.0</td><td>0.013</td><td>0.081</td><td>0.153</td></tr> <tr><td>14.0</td><td>0.012</td><td>0.071</td><td>0.132</td></tr> <tr><td>16.0</td><td>0.012</td><td>0.064</td><td>0.117</td></tr> <tr><td>18.0</td><td>0.012</td><td>0.059</td><td>0.106</td></tr> <tr><td>20.0</td><td>0.013</td><td>0.055</td><td>0.097</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	2.0	0.000	0.000	0.000	2.2	0.036	0.001	0.001	3.6	0.020	0.326	0.314	4.0	0.018	0.285	0.313	6.0	0.016	0.158	0.335	8.0	0.014	0.118	0.232	9.0	0.014	0.106	0.205	10.0	0.013	0.095	0.184	12.0	0.013	0.081	0.153	14.0	0.012	0.071	0.132	16.0	0.012	0.064	0.117	18.0	0.012	0.059	0.106	20.0	0.013	0.055	0.097	—	-	-	-	—	-	-	-
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Note: Slanted line shows the range of the rated input voltage.

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Item	Input Current (by Load Current)	Temperature 25°C Testing Circuitry Figure A																																																		
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1.Graph	—△— Input Volt. 9V ---□--- Input Volt. 12V —○— Input Volt. 18V	2.Values																																																		
<p>The graph shows three curves representing different input voltages: 9V (solid line with triangles), 12V (dashed line with squares), and 18V (dash-dot line with circles). The curves show that as input voltage increases, the input current also increases for a given load current. A slanted line is drawn across the graph, starting from approximately (0.05, 0.02) and ending at (0.40, 0.20), indicating the range of the rated load current.</p>																																																				
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Note: Slanted line shows the range of the rated load current.

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Model	SUCS1R5123R3
Item	Input Power (by Load Current)
Object	_____

1.Graph

Load Current [A]	Input Volt. 9V	Input Volt. 12V	Input Volt. 18V
0.10	0.45	0.78	1.12
0.20	0.90	1.56	2.24
0.30	1.35	2.34	3.36
0.40	1.80	3.12	4.48

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

Temperature 25°C  
Testing Circuitry Figure A

## 2.Values

Load Current [A]	Input Power [W]		
	Input Volt. 9[V]	Input Volt. 12[V]	Input Volt. 18[V]
0.00	0.13	0.15	0.23
0.08	0.45	0.49	0.57
0.16	0.78	0.81	0.91
0.24	1.12	1.15	1.23
0.32	1.47	1.48	1.56
0.40	1.83	1.83	1.89
0.44	2.01	2.00	2.06
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-

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Model	SUCS1R5123R3	Temperature Testing Circuitry	25°C Figure A																														
Item	Efficiency (by Input Voltage)																																
Object	—																																
1. Graph			2. Values																														
<p>The graph plots Efficiency [%] on the y-axis (30 to 80) against Input Voltage [V] on the x-axis (6 to 22). Two data series are shown: Load 50% (dashed line with square markers) and Load 100% (solid line with triangle markers). Both series show a general downward trend as input voltage increases. A slanted line on the graph indicates the rated input voltage range.</p> <table border="1"> <thead> <tr> <th>Input Voltage [V]</th> <th>Efficiency Load 50% [%]</th> <th>Efficiency Load 100% [%]</th> </tr> </thead> <tbody> <tr><td>8</td><td>69.7</td><td>71.5</td></tr> <tr><td>9</td><td>69.3</td><td>72.0</td></tr> <tr><td>10</td><td>68.8</td><td>72.3</td></tr> <tr><td>12</td><td>67.5</td><td>72.2</td></tr> <tr><td>15</td><td>64.9</td><td>71.2</td></tr> <tr><td>18</td><td>61.7</td><td>69.6</td></tr> <tr><td>20</td><td>59.4</td><td>68.1</td></tr> <tr><td>—</td><td>-</td><td>-</td></tr> <tr><td>—</td><td>-</td><td>-</td></tr> </tbody> </table>				Input Voltage [V]	Efficiency Load 50% [%]	Efficiency Load 100% [%]	8	69.7	71.5	9	69.3	72.0	10	68.8	72.3	12	67.5	72.2	15	64.9	71.2	18	61.7	69.6	20	59.4	68.1	—	-	-	—	-	-
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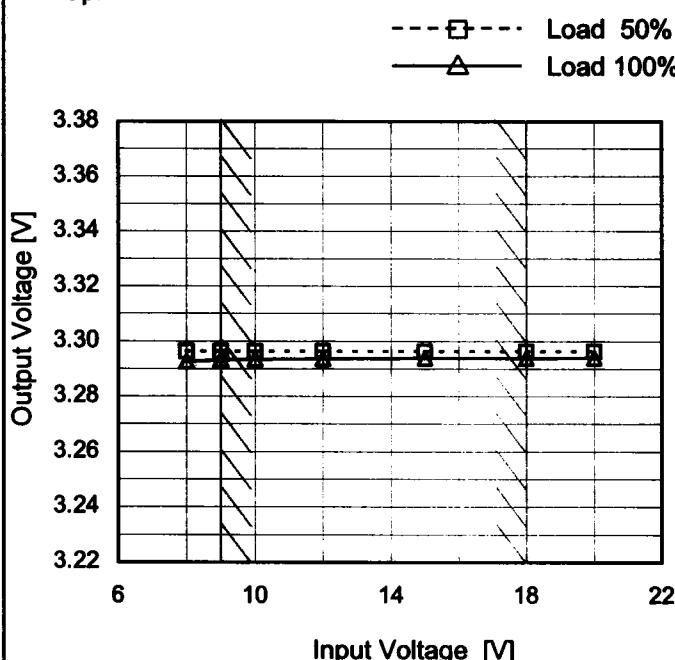
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1.Graph	<p>The graph shows efficiency increasing with load current for all input voltages. The 9V curve is the highest, followed by 12V, and then 18V. A slanted line from the top-left to the bottom-right of the graph area indicates the rated load current range.</p> <table border="1"> <thead> <tr> <th>Load Current [A]</th> <th>9V [%]</th> <th>12V [%]</th> <th>18V [%]</th> </tr> </thead> <tbody> <tr><td>0.00</td><td>58.2</td><td>54.5</td><td>46.2</td></tr> <tr><td>0.08</td><td>67.2</td><td>64.8</td><td>58.2</td></tr> <tr><td>0.16</td><td>70.5</td><td>69.0</td><td>64.4</td></tr> <tr><td>0.24</td><td>71.6</td><td>71.2</td><td>67.4</td></tr> <tr><td>0.32</td><td>71.9</td><td>72.1</td><td>69.5</td></tr> <tr><td>0.40</td><td>71.8</td><td>72.4</td><td>70.1</td></tr> </tbody> </table>			Load Current [A]	9V [%]	12V [%]	18V [%]	0.00	58.2	54.5	46.2	0.08	67.2	64.8	58.2	0.16	70.5	69.0	64.4	0.24	71.6	71.2	67.4	0.32	71.9	72.1	69.5	0.40	71.8	72.4	70.1																							
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Model	SUCS1R5123R3
Item	Line Regulation
Object	+3.3V0.4A

## 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%
8	3.296	3.293
9	3.296	3.293
10	3.296	3.294
12	3.296	3.294
15	3.296	3.294
18	3.296	3.294
20	3.296	3.294
-	-	-
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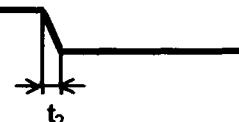
COSEL

Model SUCS1R5123R3

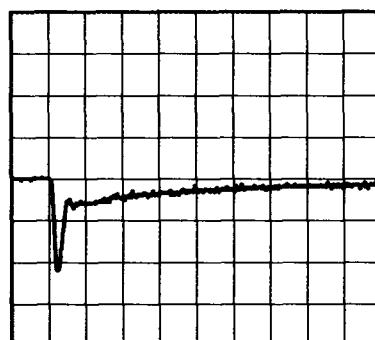
Temperature 25°C  
Testing Circuitry Figure A

Item Dynamic Load Response

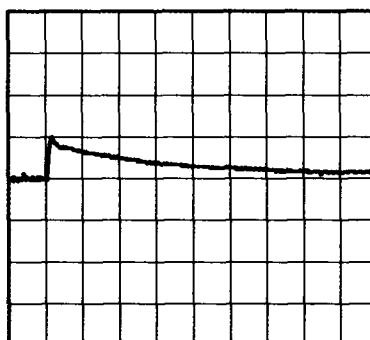
Object +3.3V0.4A

Input Volt. 12 V  
Cycle 100 mS $t_1, t_2 = 50\mu s$ Min. Load (0A) ←→  
Load 100% (0.4A)

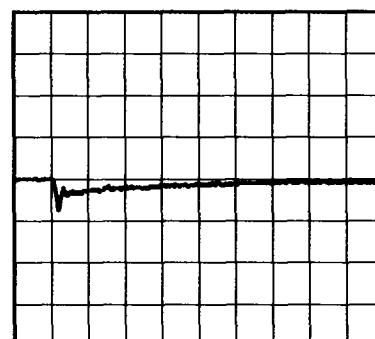
100mV/div



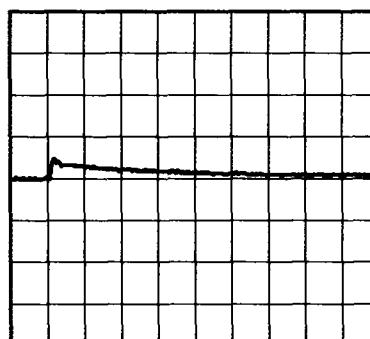
200μs/div

Min. Load (0A) ←→  
Load 50% (0.2A)

100mV/div



200μs/div

Load 50% (0.2A) ←→  
Load 100% (0.4A)

100mV/div



200μs/div

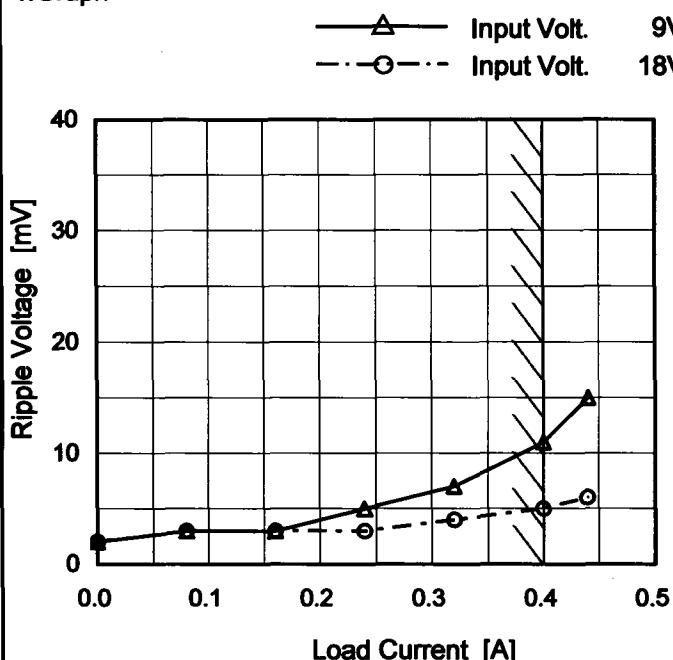


# COSEL

Model	SUCS1R5123R3
Item	Ripple Voltage (by Load Current)
Object	+3.3V0.4A

Temperature 25°C  
Testing Circuitry Figure B

## 1. Graph



## 2. Values

Load Current [A]	Ripple Voltage [mV]	
	Input Volt. 9 [V]	Input Volt. 18 [V]
0.00	2	2
0.08	3	3
0.16	3	3
0.24	5	3
0.32	7	4
0.40	11	5
0.44	15	6
-	-	-
-	-	-
-	-	-
-	-	-

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.

Ripple [mVp-p]

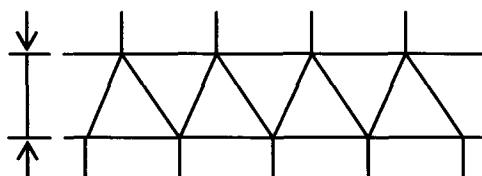


Fig.Complex Ripple Wave Form

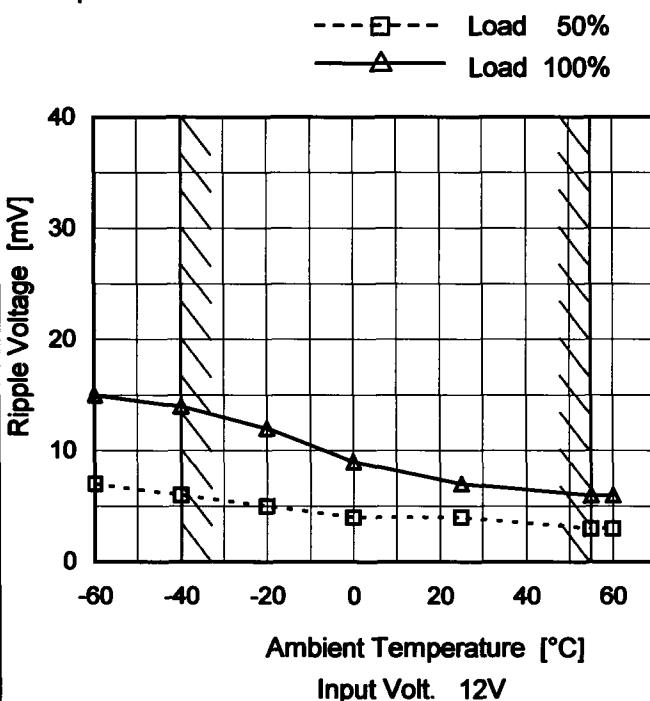
**COSEL**

Model	SUCS1R5123R3	Temperature	25°C																																						
Item	Ripple-Noise	Testing Circuitry	Figure B																																						
Object	+3.3V0.4A																																								
1.Graph	<p>—△— Input Volt. 9V        -○- Input Volt. 18V</p> <table border="1"> <caption>Data points estimated from Figure 1 Graph</caption> <thead> <tr> <th>Load Current [A]</th> <th>Ripple-Noise [mV] (9V)</th> <th>Ripple-Noise [mV] (18V)</th> </tr> </thead> <tbody> <tr><td>0.00</td><td>4</td><td>6</td></tr> <tr><td>0.08</td><td>6</td><td>7</td></tr> <tr><td>0.16</td><td>9</td><td>8</td></tr> <tr><td>0.24</td><td>11</td><td>9</td></tr> <tr><td>0.32</td><td>13</td><td>11</td></tr> <tr><td>0.40</td><td>15</td><td>12</td></tr> <tr><td>0.44</td><td>17</td><td>13</td></tr> </tbody> </table>			Load Current [A]	Ripple-Noise [mV] (9V)	Ripple-Noise [mV] (18V)	0.00	4	6	0.08	6	7	0.16	9	8	0.24	11	9	0.32	13	11	0.40	15	12	0.44	17	13														
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<p>Fig.Complex Ripple Noise Wave Form</p>																																									

**COSSEL**

Model	SUCS1R5123R3
Item	Ripple Voltage (by Ambient Temp.)
Object	+3.3V0.4A

## 1. Graph



Measured by 100 MHz Oscilloscope.

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

## Testing Circuitry Figure B

## 2. Values

Ambient Temperature [°C]	Ripple Voltage [mV]	
	Load 50%	Load 100%
-60	7	15
-40	6	14
-20	5	12
0	4	9
25	4	7
55	3	6
60	3	6
-	-	-
-	-	-
-	-	-
-	-	-

**COSEL**

Model	SUCS1R5123R3	Testing Circuitry Figure A																																																					
Item	Ambient Temperature Drift																																																						
Object	+3.3V0.4A																																																						
1.Graph	<p>Output Voltage [V]</p> <p>Ambient Temperature [°C]</p> <p>Load 100%</p> <ul style="list-style-type: none"> <li>— ▲ — Input Volt. 9V</li> <li>--- □ --- Input Volt. 12V</li> <li>--- ○ --- Input Volt. 18V</li> </ul>																																																						
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. 9[V]</th> <th>Input Volt. 12[V]</th> <th>Input Volt. 18[V]</th> </tr> </thead> <tbody> <tr> <td>-60</td><td>3.279</td><td>3.280</td><td>3.281</td></tr> <tr> <td>-40</td><td>3.286</td><td>3.286</td><td>3.287</td></tr> <tr> <td>-20</td><td>3.290</td><td>3.290</td><td>3.291</td></tr> <tr> <td>0</td><td>3.293</td><td>3.293</td><td>3.293</td></tr> <tr> <td>25</td><td>3.294</td><td>3.294</td><td>3.295</td></tr> <tr> <td>55</td><td>3.292</td><td>3.292</td><td>3.292</td></tr> <tr> <td>60</td><td>3.291</td><td>3.291</td><td>3.292</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>				Ambient Temperature [°C]	Output Voltage [V]			Input Volt. 9[V]	Input Volt. 12[V]	Input Volt. 18[V]	-60	3.279	3.280	3.281	-40	3.286	3.286	3.287	-20	3.290	3.290	3.291	0	3.293	3.293	3.293	25	3.294	3.294	3.295	55	3.292	3.292	3.292	60	3.291	3.291	3.292	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
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Model	SUCS1R5123R3	Testing Circuitry Figure A
Item	Output Voltage Accuracy	
Object	+3.3V0.4A	

### 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 - 55°C

Input Voltage : 9 - 18V

Load Current : 0 - 0.4A

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

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

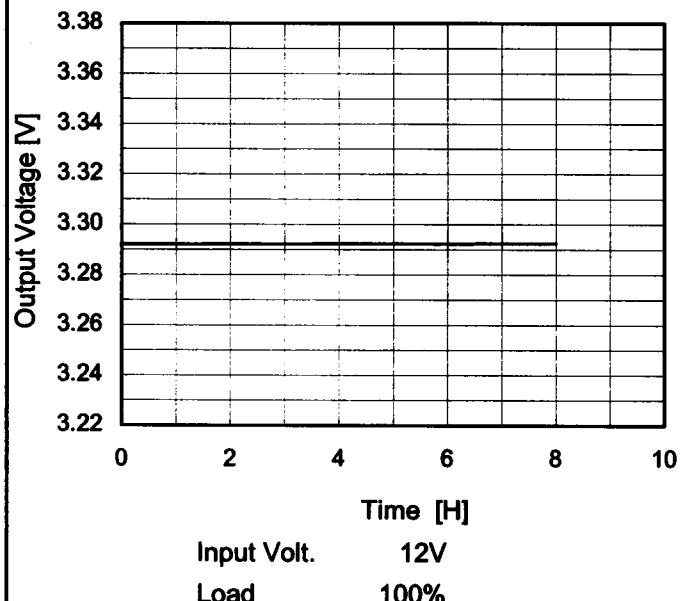
### 2. Values

Item	Temperature [°C]	Input Voltage[V]	Output		Output Voltage Accuracy	
			Current[A]	Voltage[V]	Value [mV]	Ration [%]
Maximum Voltage	25	18	0	3.299	$\pm 7$	$\pm 0.2$
Minimum Voltage	-40	9	0.4	3.286		

**COSEL**

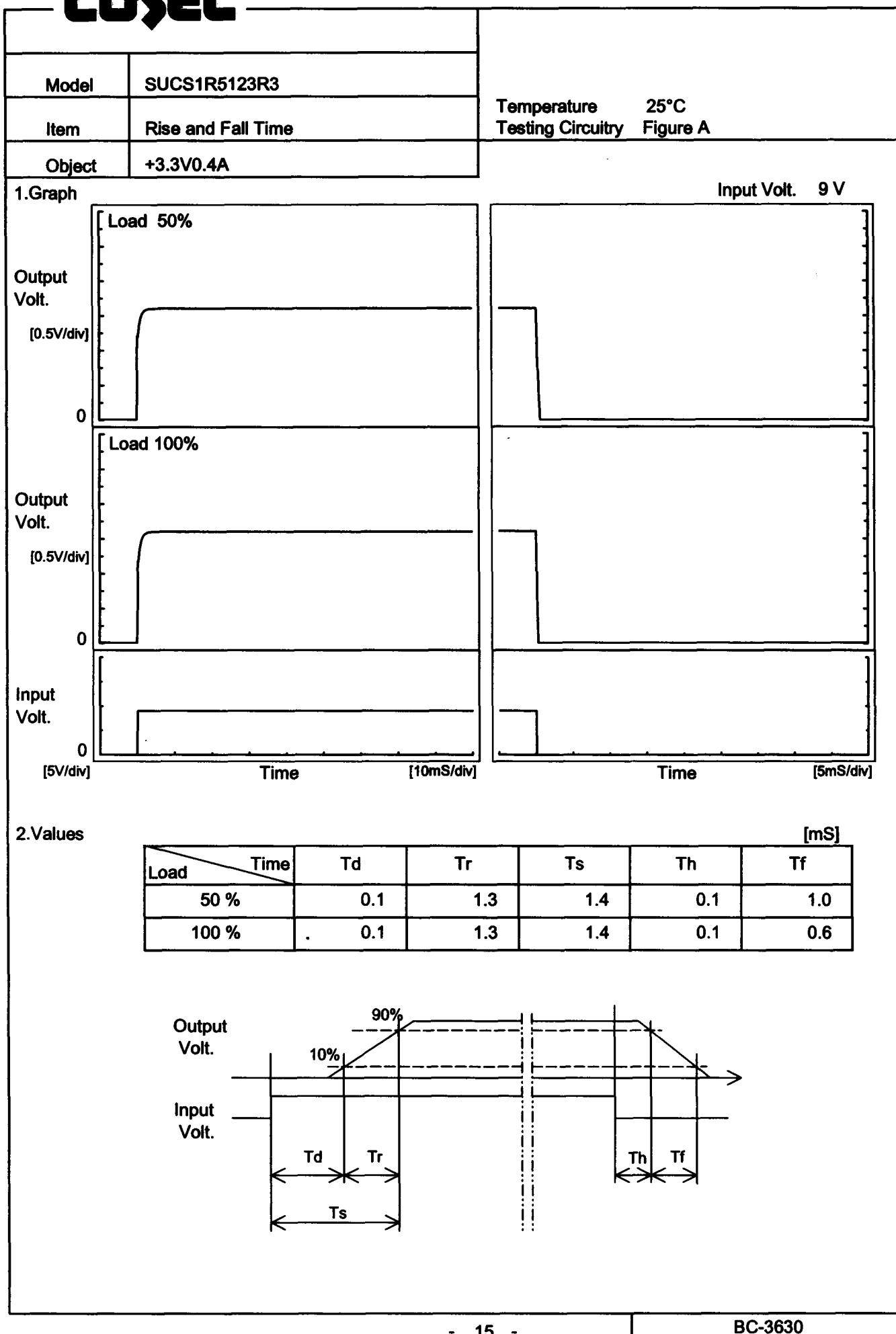
Model	SUCS1R5123R3
Item	Time Lapse Drift
Object	+3.3V0.4A

## 1.Graph


 Temperature 25°C  
 Testing Circuitry Figure A

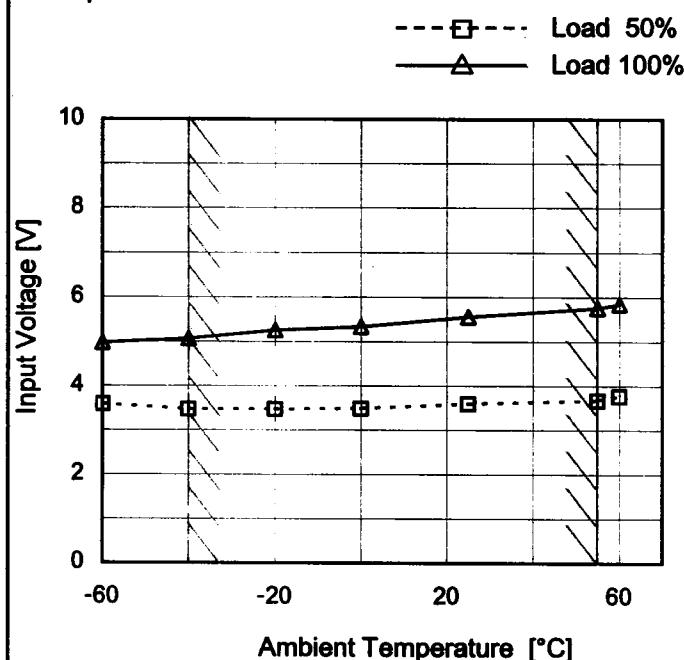
## 2.Values

Time since start [H]	Output Voltage [V]
0.0	3.292
0.5	3.292
1.0	3.292
2.0	3.292
3.0	3.292
4.0	3.292
5.0	3.292
6.0	3.292
7.0	3.293
8.0	3.293

**COSEL**

**COSEL**

Model	SUCS1R5123R3
Item	Minimum Input Voltage for Regulated Output Voltage
Object	+3.3V0.4A

**1. Graph**

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

**Testing Circuitry Figure A****2. Values**

Ambient Temperature [°C]	Input Voltage [V]	
	Load 50%	Load 100%
-60	3.6	5.0
-40	3.5	5.1
-20	3.5	5.3
0	3.5	5.4
25	3.6	5.6
55	3.7	5.8
60	3.8	5.9
-	-	-
-	-	-
-	-	-
-	-	-

**COSEL**

Model	SUCS1R5123R3	Temperature Testing Circuitry 25°C Figure A																																																							
Item	Overcurrent Protection																																																								
Object	+3.3V0.4A																																																								
1.Graph	<p style="text-align: right;">Input Volt. 9V Input Volt. 12V Input Volt. 18V</p> <p>The graph plots Output Voltage [V] on the Y-axis (0.0 to 4.0) against Load Current [A] on the X-axis (0.0 to 1.2). Three curves are shown for different input voltages: 9V (top), 12V (middle), and 18V (bottom). All curves show a sharp drop in output voltage as load current increases beyond approximately 0.4A. A slanted line is drawn across the graph, starting from the 9V curve at ~0.35A and ending at the 18V curve at ~0.8A, indicating the range of the rated load current.</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>9[V]</th> <th>12[V]</th> <th>18[V]</th> </tr> </thead> <tbody> <tr><td>3.30</td><td>0.40</td><td>0.40</td><td>0.40</td></tr> <tr><td>3.14</td><td>0.64</td><td>0.65</td><td>0.62</td></tr> <tr><td>2.97</td><td>0.65</td><td>0.67</td><td>0.64</td></tr> <tr><td>2.64</td><td>0.69</td><td>0.69</td><td>0.66</td></tr> <tr><td>2.31</td><td>0.72</td><td>0.72</td><td>0.68</td></tr> <tr><td>1.98</td><td>0.76</td><td>0.75</td><td>0.70</td></tr> <tr><td>1.65</td><td>0.80</td><td>0.78</td><td>0.72</td></tr> <tr><td>1.32</td><td>0.84</td><td>0.80</td><td>0.73</td></tr> <tr><td>0.99</td><td>0.87</td><td>0.82</td><td>0.74</td></tr> <tr><td>0.66</td><td>0.90</td><td>0.82</td><td>0.74</td></tr> <tr><td>0.33</td><td>0.90</td><td>0.81</td><td>0.73</td></tr> <tr><td>0.00</td><td>0.97</td><td>0.83</td><td>0.76</td></tr> </tbody> </table>	Output Voltage [V]	Load Current [A]			9[V]	12[V]	18[V]	3.30	0.40	0.40	0.40	3.14	0.64	0.65	0.62	2.97	0.65	0.67	0.64	2.64	0.69	0.69	0.66	2.31	0.72	0.72	0.68	1.98	0.76	0.75	0.70	1.65	0.80	0.78	0.72	1.32	0.84	0.80	0.73	0.99	0.87	0.82	0.74	0.66	0.90	0.82	0.74	0.33	0.90	0.81	0.73	0.00	0.97	0.83	0.76
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COSEL

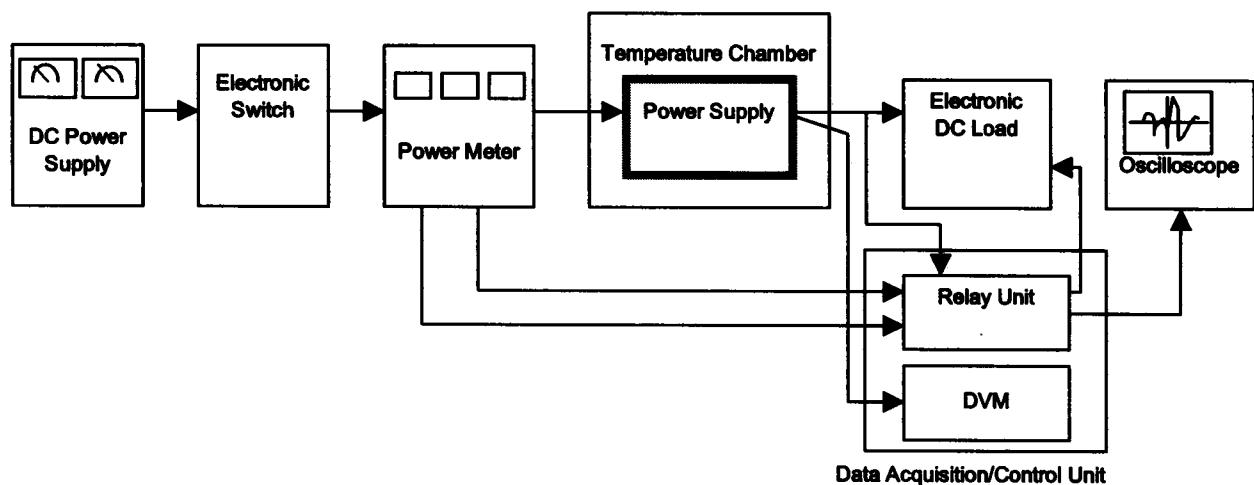


Figure A

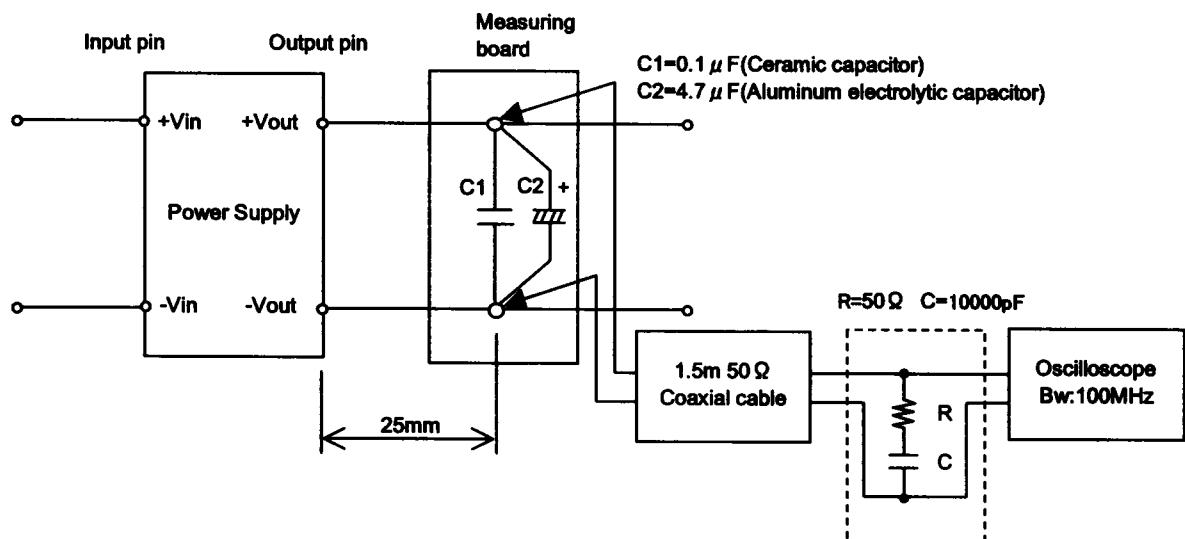


Figure B (Ripple and Ripple noise Characteristic)