



# TEST DATA OF SUW30515

Regulated DC Power Supply  
Mar 16, 2005

Approved by : Tetsuo Sugimori  
Tetsuo Sugimori Design Manager

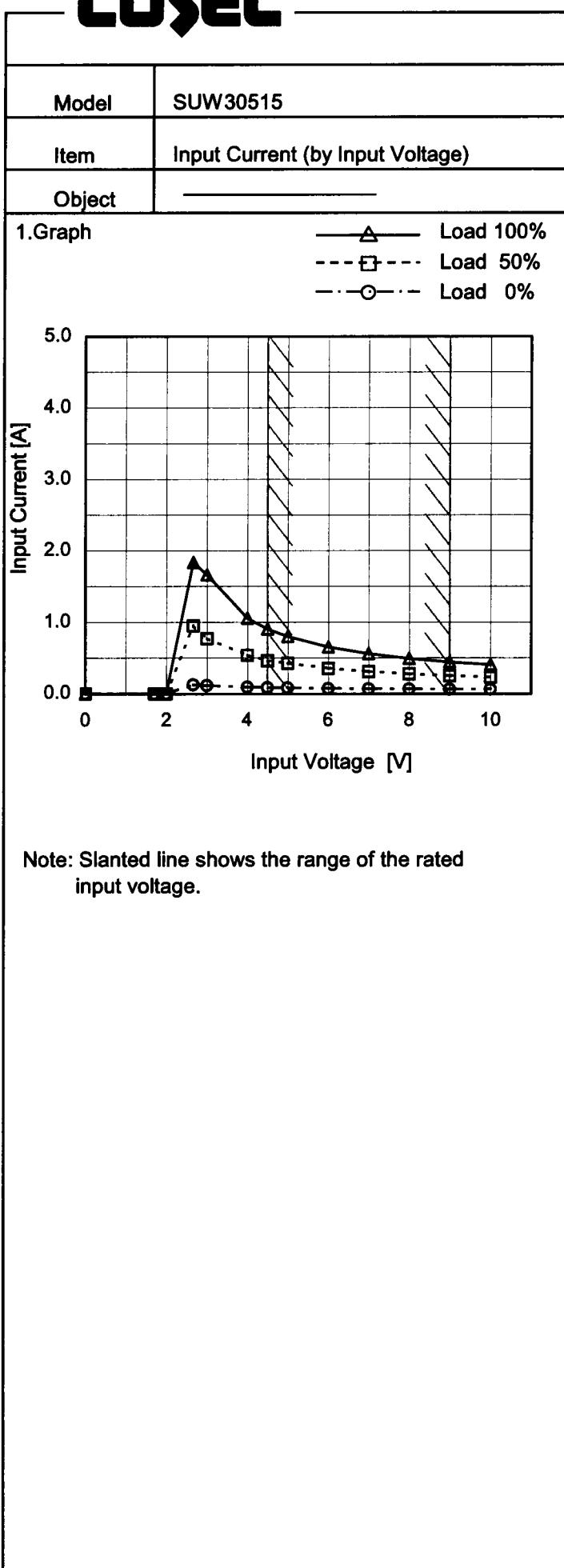
Prepared by : Hayato Nakatsubo  
Hayato Nakatsubo Design Engineer

**COSEL CO.,LTD.**

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Temperature 25°C  
Testing Circuitry Figure A

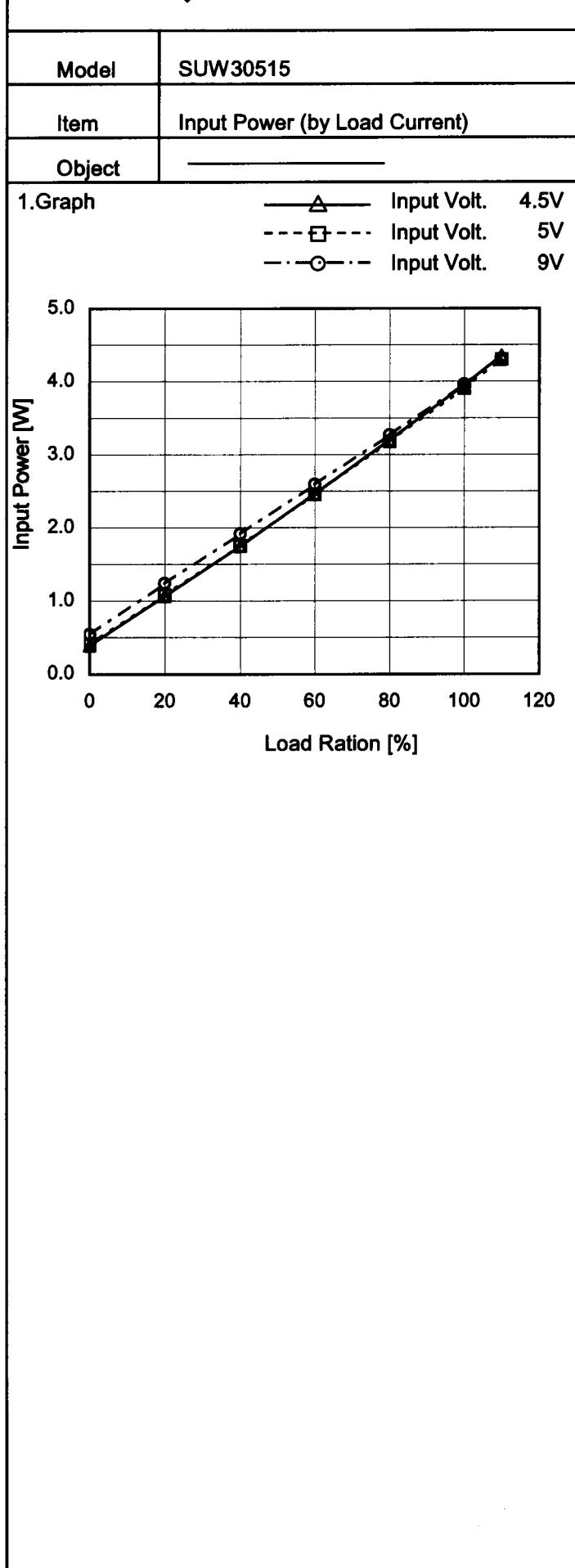
## 2. Values

Input Voltage [V]	Input Current [A]		
	Load 0%	Load 50%	Load 100%
0.00	0.000	0.000	0.000
1.70	0.000	0.000	0.000
2.00	0.000	0.000	0.000
2.66	0.126	0.952	1.839
3.00	0.116	0.772	1.663
4.00	0.094	0.538	1.057
4.50	0.087	0.465	0.905
5.00	0.082	0.427	0.800
6.00	0.073	0.357	0.654
7.00	0.067	0.311	0.560
8.00	0.063	0.276	0.492
9.00	0.061	0.250	0.442
10.00	0.060	0.231	0.404
--	-	-	-
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--	-	-	-

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Model	SUW30515	Temperature Testing Circuitry	25°C Figure A																															
Item	Input Current (by Load Current)																																	
Object	_____																																	
1.Graph	<p style="text-align: center;">—△— Input Volt. 4.5V            - -□--- Input Volt. 5V            - -○--- Input Volt. 9V</p> <table border="1"> <caption>Data points estimated from Figure A</caption> <thead> <tr> <th>Load Ration [%]</th> <th>4.5V [A]</th> <th>5V [A]</th> <th>9V [A]</th> </tr> </thead> <tbody> <tr><td>0</td><td>0.087</td><td>0.082</td><td>0.061</td></tr> <tr><td>20</td><td>0.240</td><td>0.219</td><td>0.139</td></tr> <tr><td>40</td><td>0.400</td><td>0.359</td><td>0.215</td></tr> <tr><td>60</td><td>0.551</td><td>0.496</td><td>0.288</td></tr> <tr><td>80</td><td>0.724</td><td>0.645</td><td>0.365</td></tr> <tr><td>100</td><td>0.880</td><td>0.783</td><td>0.442</td></tr> <tr><td>110</td><td>0.976</td><td>0.866</td><td>0.480</td></tr> </tbody> </table>	Load Ration [%]	4.5V [A]	5V [A]	9V [A]	0	0.087	0.082	0.061	20	0.240	0.219	0.139	40	0.400	0.359	0.215	60	0.551	0.496	0.288	80	0.724	0.645	0.365	100	0.880	0.783	0.442	110	0.976	0.866	0.480	
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2.Values																																		

Load Ration [%]	Input Current [A]		
	Input Volt. 4.5[V]	Input Volt. 5[V]	Input Volt. 9[V]
0	0.087	0.082	0.061
20	0.240	0.219	0.139
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--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

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Temperature 25°C  
Testing Circuitry Figure A

## 2. Values

Load Ration [%]	Input Power [W]		
	Input Volt. 4.5[V]	Input Volt. 5[V]	Input Volt. 9[V]
0	0.39	0.41	0.54
20	1.06	1.08	1.24
40	1.75	1.76	1.92
60	2.46	2.46	2.59
80	3.20	3.18	3.27
100	3.95	3.91	3.96
110	4.35	4.30	4.30
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

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Model	SUW30515																																	
Item	Efficiency (by Input Voltage)	Temperature 25°C Testing Circuitry Figure A																																
Object	—	—																																
1. Graph																																		
<p>Efficiency [%]</p> <p>Input Voltage [V]</p> <p>Legend:</p> <ul style="list-style-type: none"> <li>Load 50% (Dashed line with squares)</li> <li>Load 100% (Solid line with triangles)</li> </ul>																																		
Note: Slanted line shows the range of the rated input voltage.																																		
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<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>4.0</td> <td>71.4</td> <td>74.3</td> </tr> <tr> <td>4.5</td> <td>71.4</td> <td>75.9</td> </tr> <tr> <td>5.0</td> <td>71.2</td> <td>76.9</td> </tr> <tr> <td>6.0</td> <td>70.6</td> <td>77.3</td> </tr> <tr> <td>7.0</td> <td>69.3</td> <td>77.2</td> </tr> <tr> <td>8.0</td> <td>68.0</td> <td>76.7</td> </tr> <tr> <td>9.0</td> <td>66.5</td> <td>75.9</td> </tr> <tr> <td>9.5</td> <td>65.7</td> <td>75.3</td> </tr> <tr> <td>-</td> <td>-</td> <td>-</td> </tr> </tbody> </table>			Input Voltage [V]	Efficiency [%]		Load 50%	Load 100%	4.0	71.4	74.3	4.5	71.4	75.9	5.0	71.2	76.9	6.0	70.6	77.3	7.0	69.3	77.2	8.0	68.0	76.7	9.0	66.5	75.9	9.5	65.7	75.3	-	-	-
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1. Graph			2. Values																																																			
<p>Graph showing Efficiency [%] vs Load Ration [%]. The Y-axis ranges from 30 to 86 in increments of 2. The X-axis ranges from 0 to 120 in increments of 20. Three curves are plotted for Input Volt. 4.5V (solid line with squares), Input Volt. 5V (dashed line with open squares), and Input Volt. 9V (dash-dot line with circles). All curves show efficiency increasing with load ratio, with the 9V curve being the highest and the 4.5V curve being the lowest.</p> <table border="1"> <thead> <tr> <th>Load Ration [%]</th> <th>Input Volt. 4.5V [%]</th> <th>Input Volt. 5V [%]</th> <th>Input Volt. 9V [%]</th> </tr> </thead> <tbody> <tr><td>20</td><td>55</td><td>52</td><td>48</td></tr> <tr><td>40</td><td>68</td><td>65</td><td>62</td></tr> <tr><td>60</td><td>72</td><td>70</td><td>68</td></tr> <tr><td>80</td><td>75</td><td>73</td><td>71</td></tr> <tr><td>100</td><td>76</td><td>75</td><td>74</td></tr> <tr><td>110</td><td>75.8</td><td>76.7</td><td>76.7</td></tr> </tbody> </table>				Load Ration [%]	Input Volt. 4.5V [%]	Input Volt. 5V [%]	Input Volt. 9V [%]	20	55	52	48	40	68	65	62	60	72	70	68	80	75	73	71	100	76	75	74	110	75.8	76.7	76.7																							
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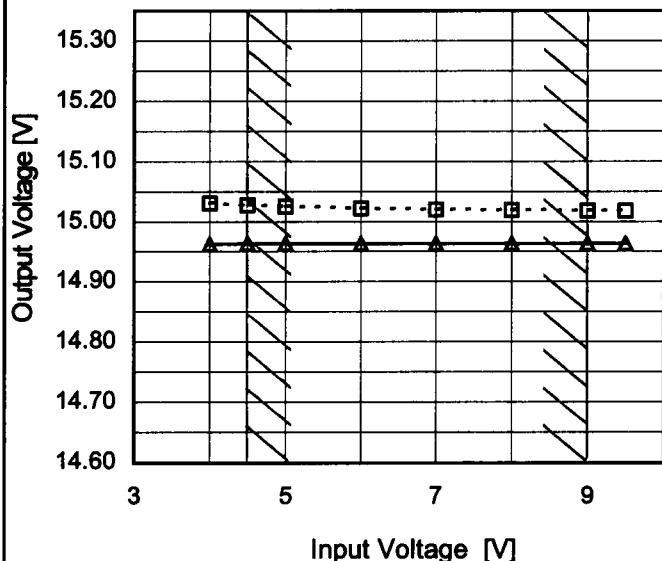
Model SUW30515

Item Line Regulation

Object +15V0.1A

## 1.Graph

---□--- Load 50%  
—△— Load 100%

Temperature 25°C  
Testing Circuitry Figure A

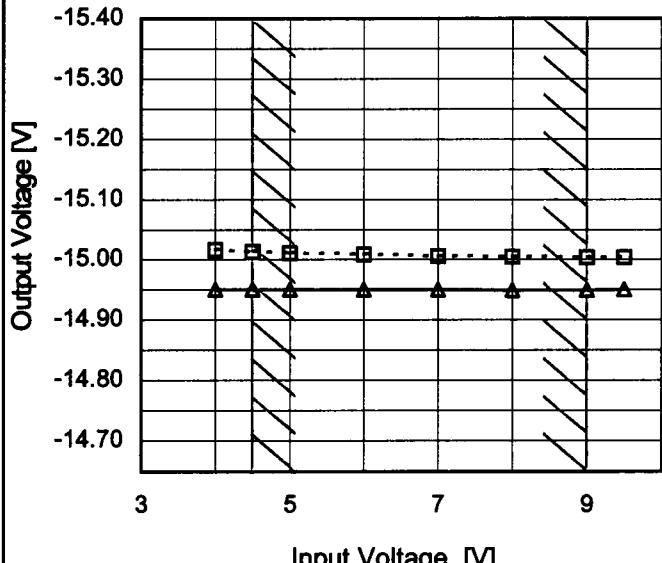
## 2.Values

Input Voltage [V]	Output Voltage [V]	
	Load 50%	Load 100%
4.0	15.031	14.963
4.5	15.027	14.963
5.0	15.025	14.964
6.0	15.022	14.964
7.0	15.020	14.964
8.0	15.019	14.964
9.0	15.018	14.964
9.5	15.018	14.963
--	-	-

Object -15V0.1A

## 1.Graph

---□--- Load 50%  
—△— Load 100%



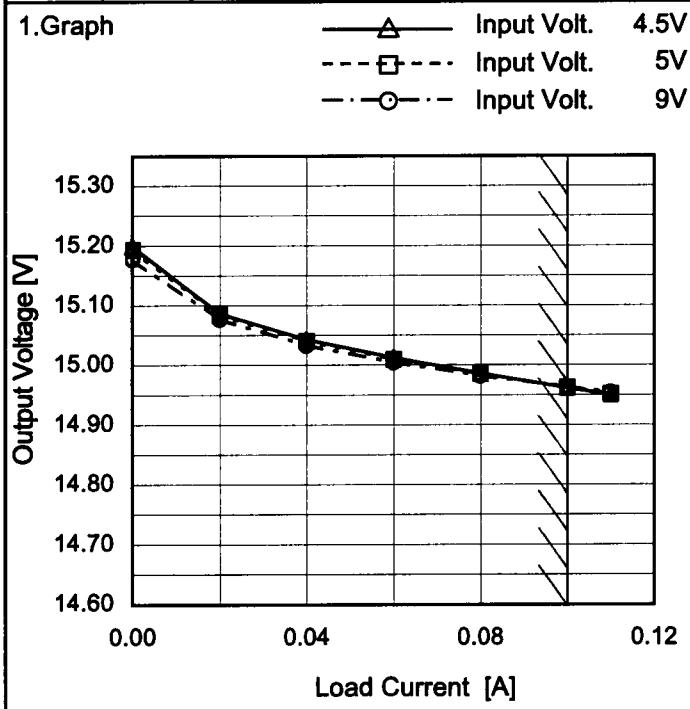
## 2.Values

Input Voltage [V]	Output Voltage [V]	
	Load 50%	Load 100%
4.0	-15.017	-14.950
4.5	-15.014	-14.950
5.0	-15.011	-14.950
6.0	-15.009	-14.950
7.0	-15.006	-14.950
8.0	-15.005	-14.950
9.0	-15.004	-14.950
9.5	-15.003	-14.950
--	-	-

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

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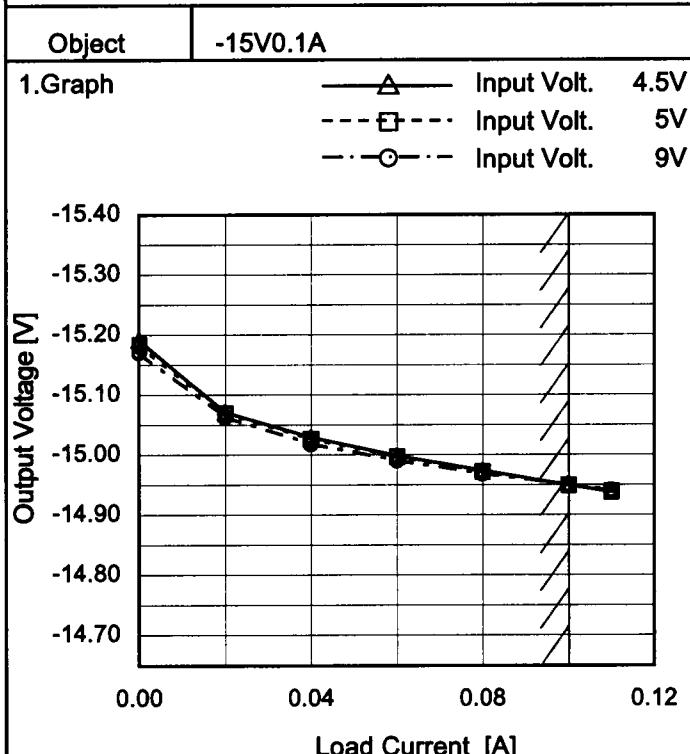
Model	SUW30515
Item	Load Regulation
Object	+15V0.1A



Temperature 25°C  
Testing Circuitry Figure A

## 2.Values

Load Current [A]	Output Voltage [V]		
	Input Volt. 4.5[V]	Input Volt. 5[V]	Input Volt. 9[V]
0.00	15.199	15.193	15.177
0.02	15.086	15.084	15.077
0.04	15.043	15.041	15.033
0.06	15.012	15.010	15.005
0.08	14.987	14.985	14.982
0.10	14.962	14.962	14.963
0.11	14.950	14.952	14.954
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

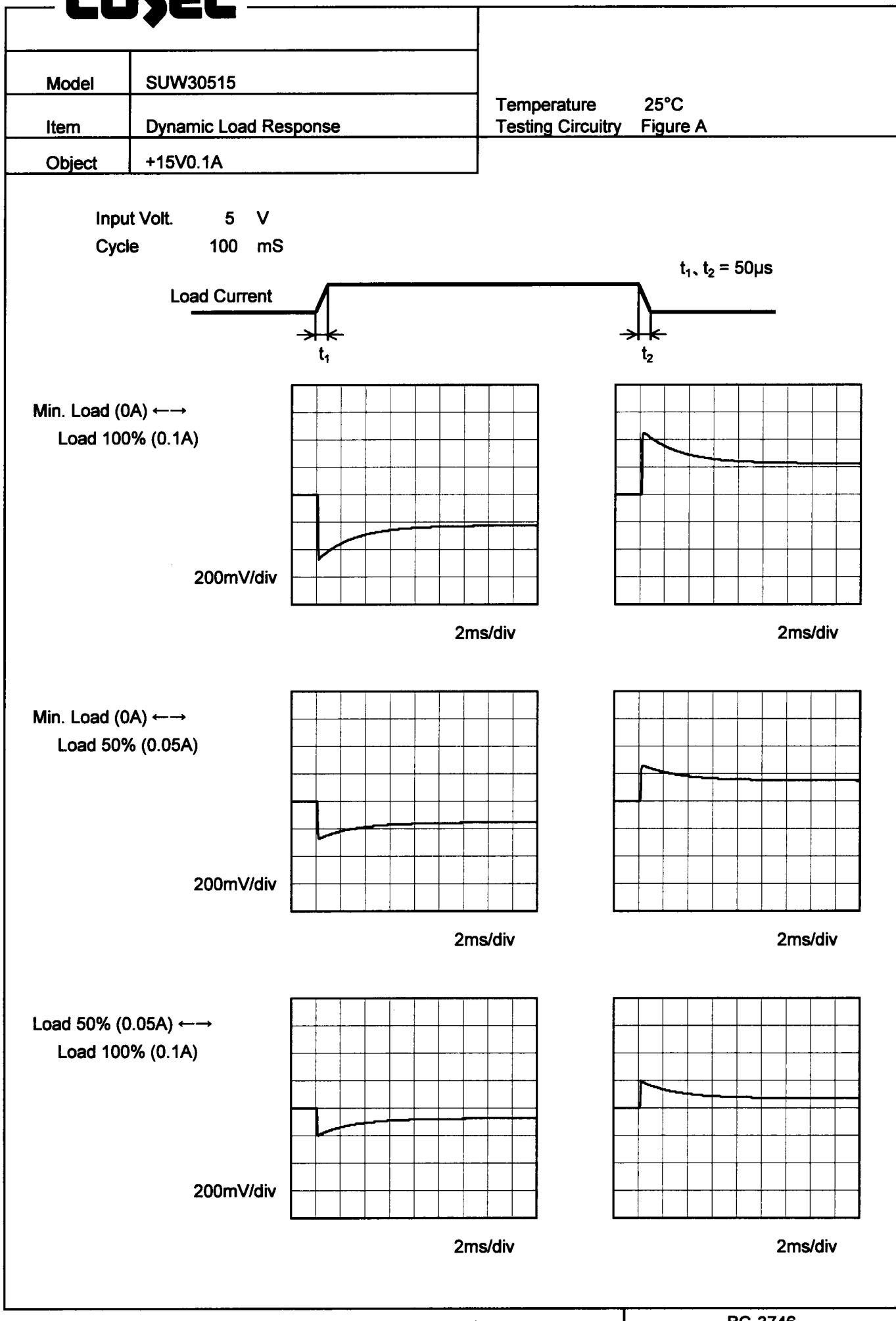


## 2.Values

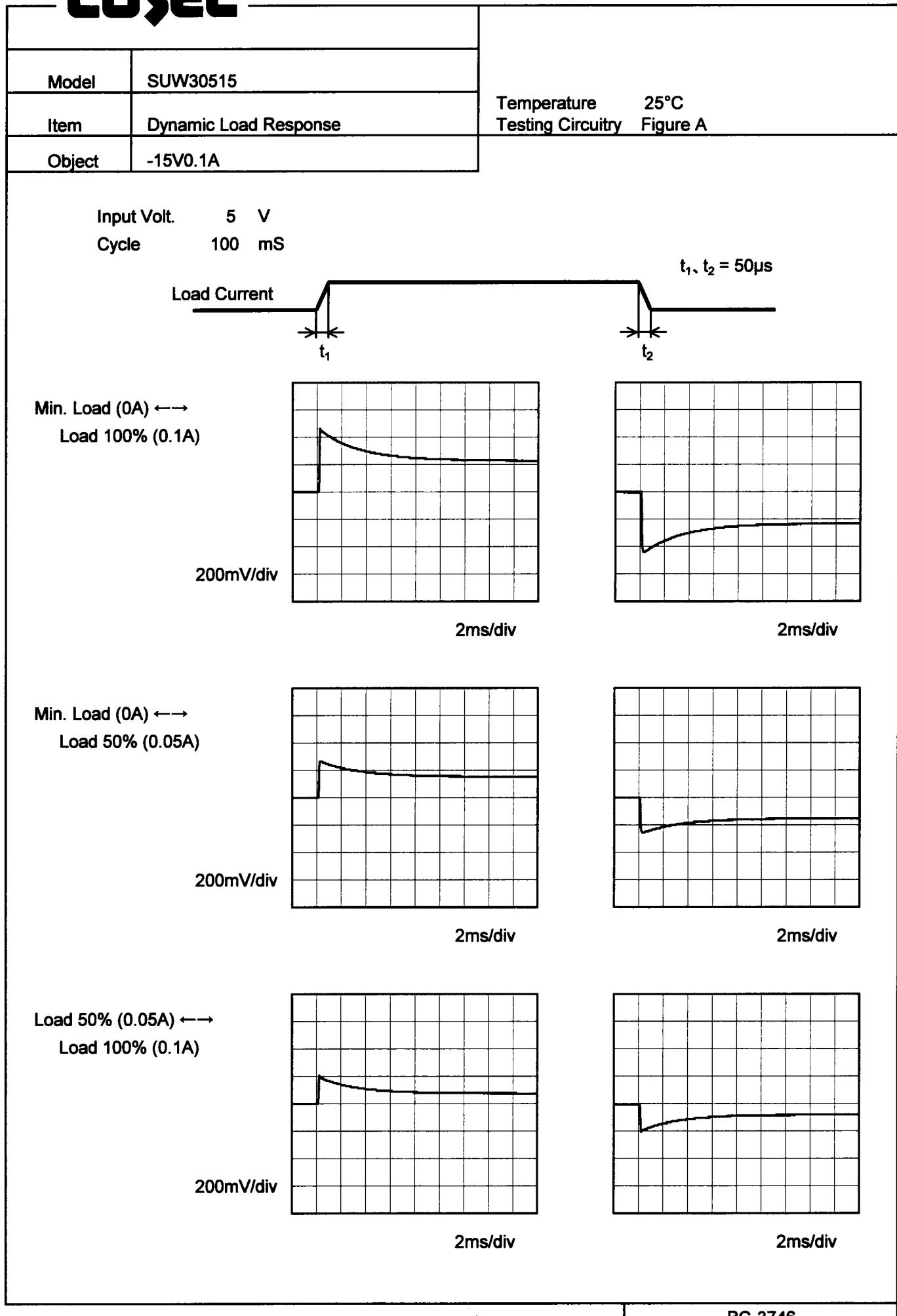
Load Current [A]	Output Voltage [V]		
	Input Volt. 4.5[V]	Input Volt. 5[V]	Input Volt. 9[V]
0.00	-15.191	-15.184	-15.171
0.02	-15.071	-15.070	-15.063
0.04	-15.029	-15.026	-15.018
0.06	-14.999	-14.997	-14.991
0.08	-14.974	-14.972	-14.969
0.10	-14.950	-14.949	-14.950
0.11	-14.938	-14.939	-14.941
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

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

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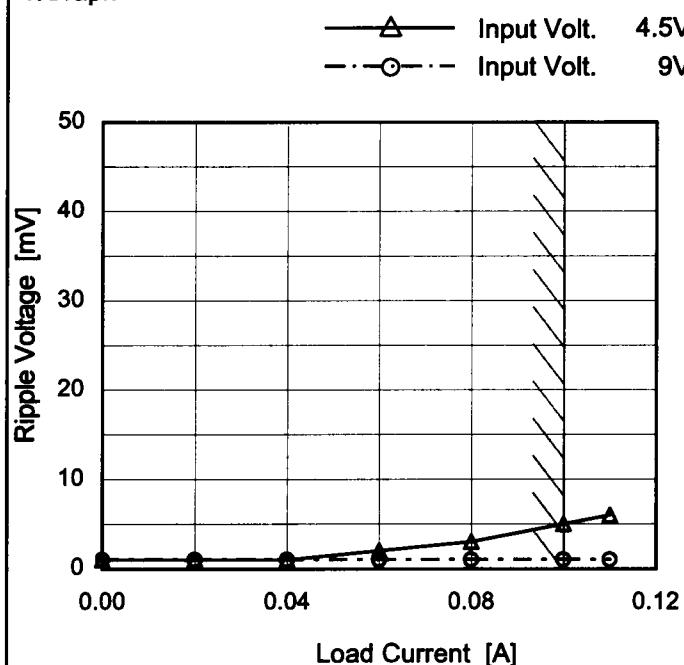


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Model	SUW30515
Item	Ripple Voltage (by Load Current)
Object	+15V0.1A

Temperature 25°C  
 Testing Circuitry Figure B

## 1.Graph



## 2.Values

Load Current [A]	Ripple Voltage [mV]	
	Input Volt. 4.5 [V]	Input Volt. 9 [V]
0.00	1	1
0.02	1	1
0.04	1	1
0.06	2	1
0.08	3	1
0.10	5	1
0.11	6	1
--	-	-
--	-	-
--	-	-
--	-	-

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]

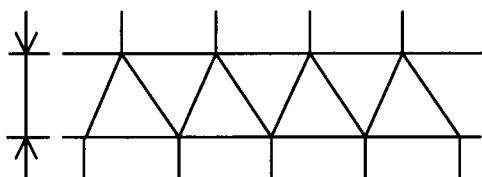


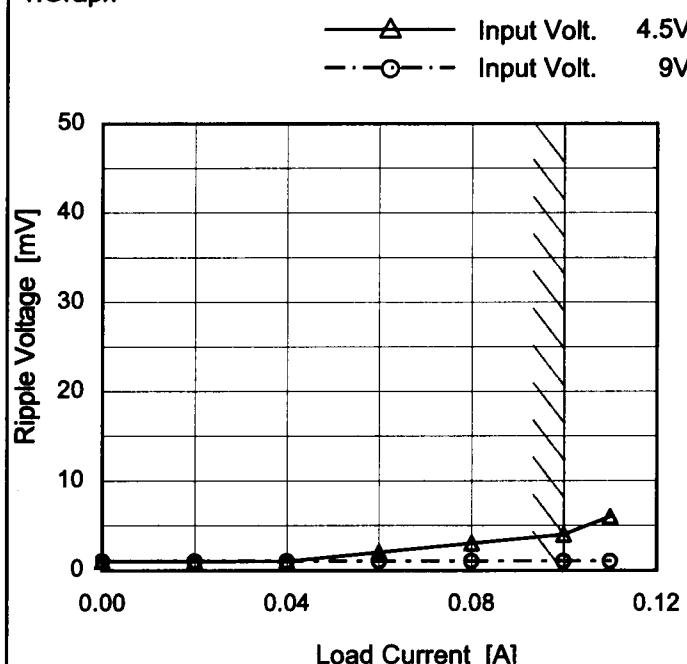
Fig.Complex Ripple Wave Form

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Model	SUW30515
Item	Ripple Voltage (by Load Current)
Object	-15V0.1A

Temperature 25°C  
 Testing Circuitry Figure B

## 1.Graph



## 2.Values

Load Current [A]	Ripple Voltage [mV]	
	Input Volt. 4.5 [V]	Input Volt. 9 [V]
0.00	1	1
0.02	1	1
0.04	1	1
0.06	2	1
0.08	3	1
0.10	4	1
0.11	6	1
--	-	-
--	-	-
--	-	-
--	-	-

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]

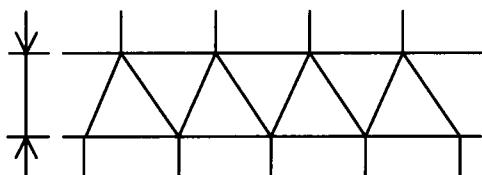


Fig.Complex Ripple Wave Form

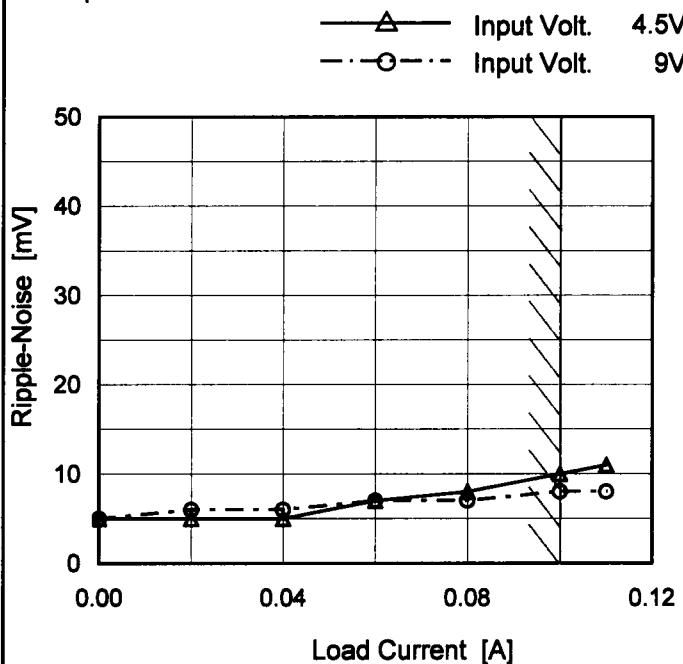
**COSEL**

Model SUW30515

Item Ripple-Noise

Object +15V0.1A

## 1. Graph



Measured by 100 MHz Oscilloscope.

Ripple-Noise is shown as p-p in the figure below.

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

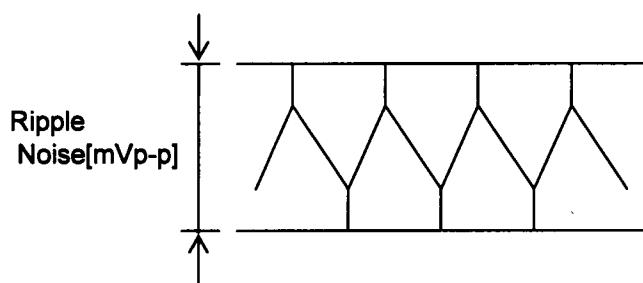


Fig.Complex Ripple Noise Wave Form

Temperature 25°C  
Testing Circuitry Figure B

## 2. Values

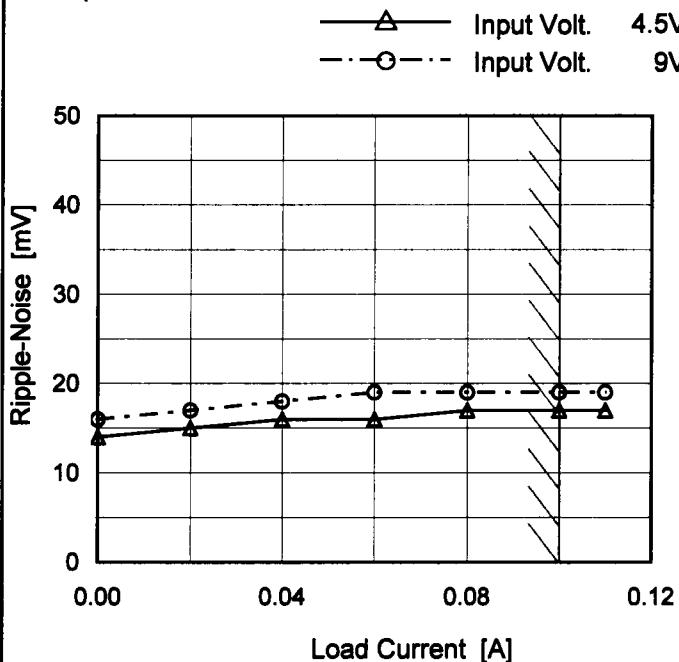
Load Current [A]	Ripple-Noise [mV]	
	Input Volt. 4.5 [V]	Input Volt. 9 [V]
0.00	5	5
0.02	5	6
0.04	5	6
0.06	7	7
0.08	8	7
0.10	10	8
0.11	11	8
—	-	-
—	-	-
—	-	-
—	-	-

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Model	SUW30515
Item	Ripple-Noise
Object	-15V0.1A

Temperature 25°C  
 Testing Circuitry Figure B

## 1. Graph



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

## 2. Values

Load Current [A]	Ripple-Noise [mV]	
	Input Volt. 4.5 [V]	Input Volt. 9 [V]
0.00	14	16
0.02	15	17
0.04	16	18
0.06	16	19
0.08	17	19
0.10	17	19
0.11	17	19
-	-	-
-	-	-
-	-	-
-	-	-

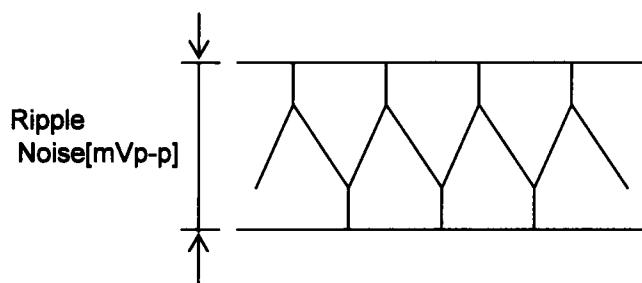
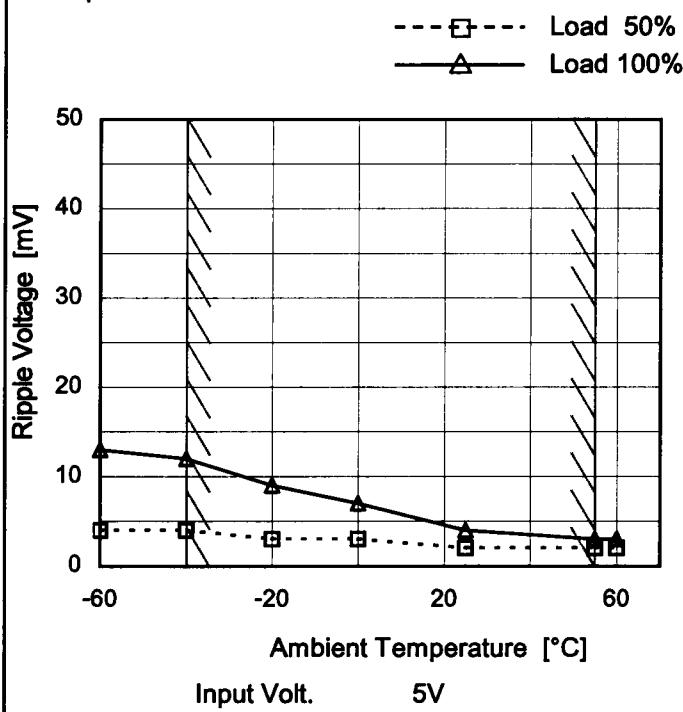


Fig.Complex Ripple Noise Wave Form

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Model	SUW30515
Item	Ripple Voltage (by Ambient Temp.)
Object	+15V0.1A

## 1.Graph

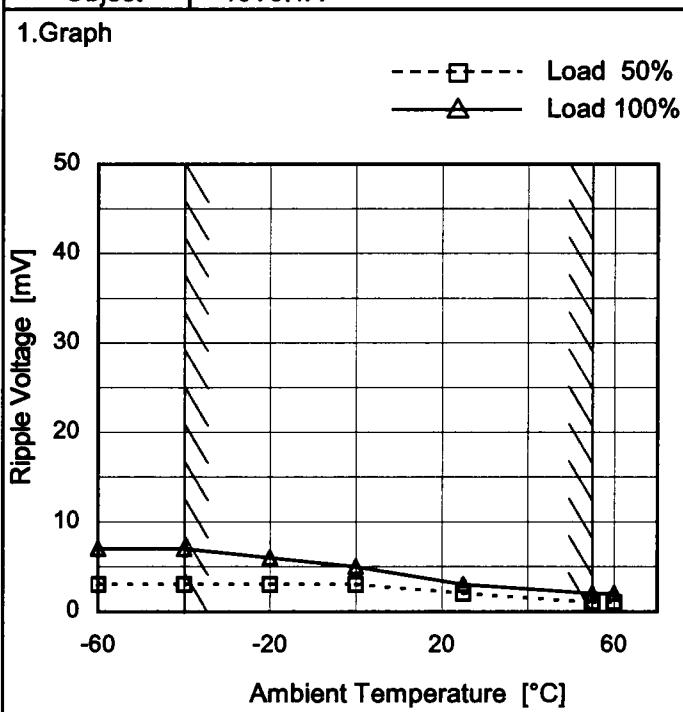


## Testing Circuitry Figure B

## 2.Values

Ambient Temperature [°C]	Ripple Voltage [mV]	
	Load 50%	Load 100%
-60	4	13
-40	4	12
-20	3	9
0	3	7
25	2	4
55	2	3
60	2	3
--	-	-
--	-	-
--	-	-
--	-	-

## 1.Graph



## 2.Values

Ambient Temperature [°C]	Ripple Voltage [mV]	
	Load 50%	Load 100%
-60	3	7
-40	3	7
-20	3	6
0	3	5
25	2	3
55	1	2
60	1	2
--	-	-
--	-	-
--	-	-
--	-	-

Measured by 100 MHz Oscilloscope.

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

**COSEL**

Model	SUW30515																																																					
Item	Ambient Temperature Drift		Testing Circuitry Figure A																																																			
Object	+15V0.1A																																																					
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<p>Note: Slanted line shows the range of the rated ambient temperature.</p>																																																						



Model	SUW30515	Testing Circuitry Figure A
Item	Output Voltage Accuracy	

### 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 : 4.5 - 9V

Load Current (AVR 1) : 0 - 0.1A (AVR 2) : 0 - 0.1A

\* Other Output : Rated Load

\* 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

Object	+15V0.1A		Output		Output Voltage Accuracy	
Item	Temperature [°C]	Input Voltage[V]	Current[A]	Voltage[V]	Value [mV]	Ration [%]
Maximum Voltage	25	4.5	0	15.203	±128	±0.9
Minimum Voltage	-40	4.5	0.1	14.947		

Object	-15V0.1A		Output		Output Voltage Accuracy	
Item	Temperature [°C]	Input Voltage[V]	Current[A]	Voltage[V]	Value [mV]	Ration [%]
Maximum Voltage	25	4.5	0	-15.194	±131	±0.9
Minimum Voltage	-40	4.5	0.1	-14.933		

**COSEL**

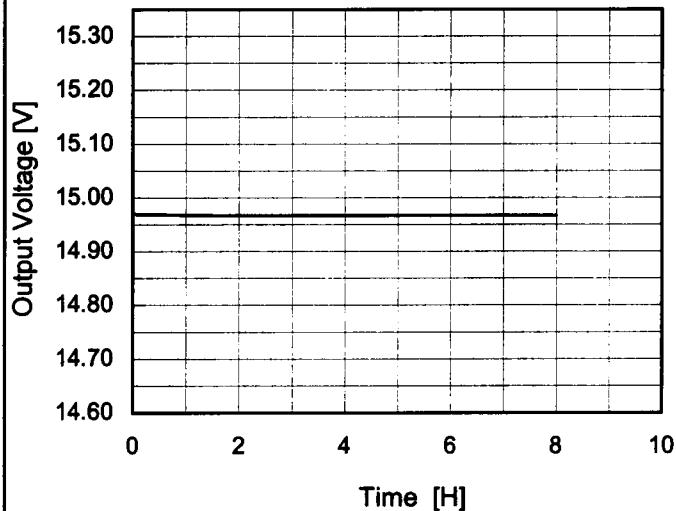
Model SUW30515

Item Time Lapse Drift

Object +15V0.1A

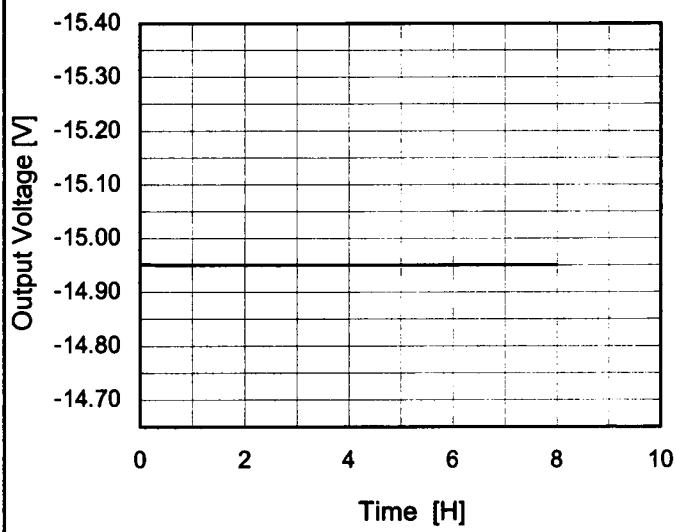
Temperature 25°C  
Testing Circuitry Figure A

## 1.Graph

Input Volt. 5V  
Load 100%

Object -15V0.1A

## 1.Graph

Input Volt. 5V  
Load 100%

## 2.Values

Time since start [H]	Output Voltage [V]
0.0	14.971
0.5	14.969
1.0	14.968
2.0	14.967
3.0	14.967
4.0	14.967
5.0	14.967
6.0	14.967
7.0	14.967
8.0	14.967

## 2.Values

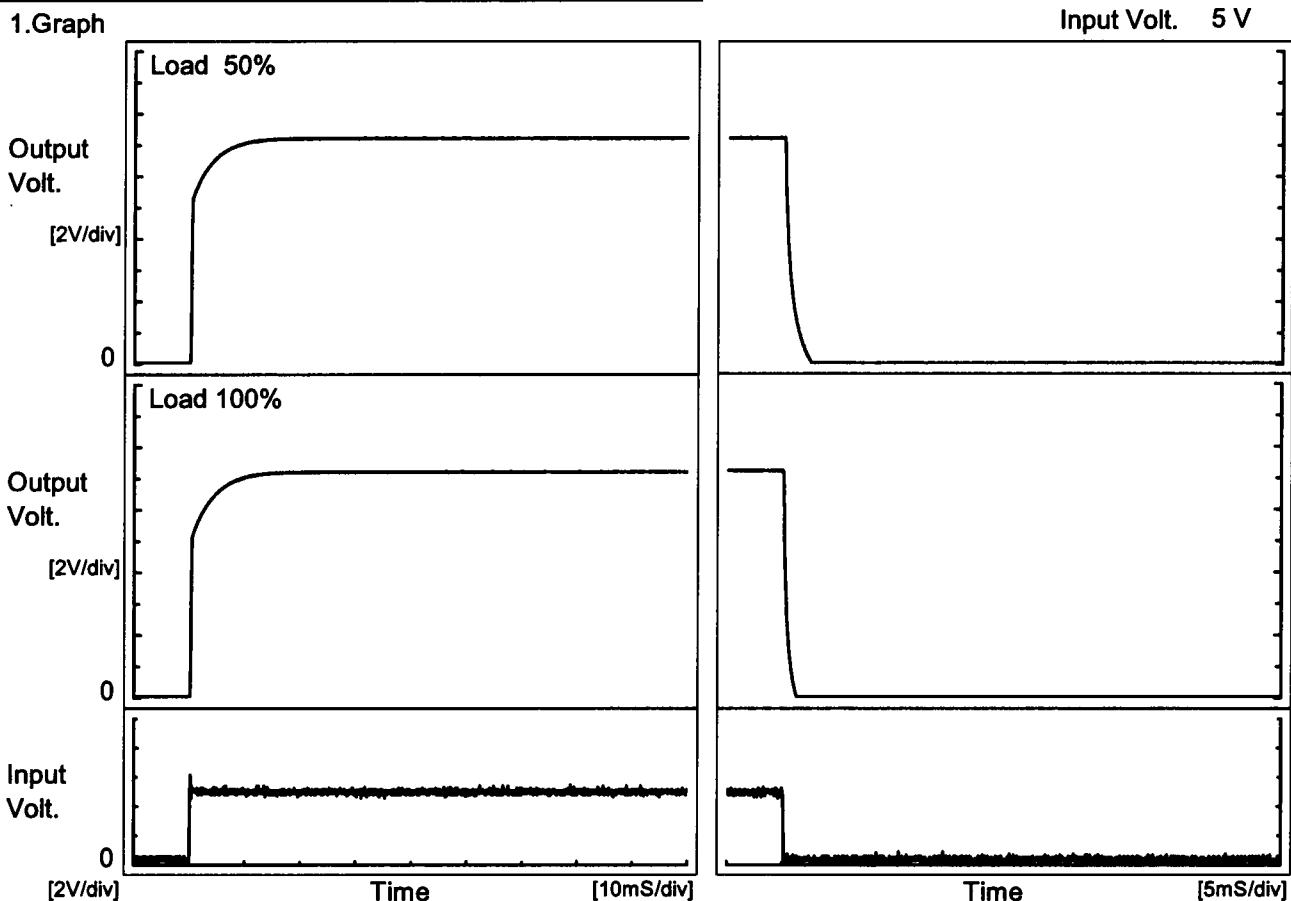
Time since start [H]	Output Voltage [V]
0.0	-14.953
0.5	-14.951
1.0	-14.951
2.0	-14.951
3.0	-14.951
4.0	-14.951
5.0	-14.951
6.0	-14.951
7.0	-14.951
8.0	-14.951

**COSEL**

Model	SUW30515
Item	Rise and Fall Time
Object	+15V0.1A

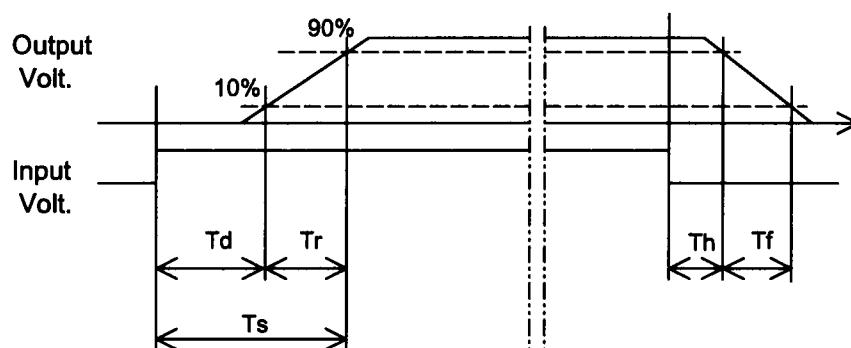
Temperature 25°C  
Testing Circuitry Figure A

## 1.Graph



## 2.Values

Load	Time	Td	Tr	Ts	Th	Tf	[mS]
50 %		0.2	6.1	6.3	0.1	1.5	
100 %		0.2	6.5	6.7	0.1	0.8	



**COSEL**

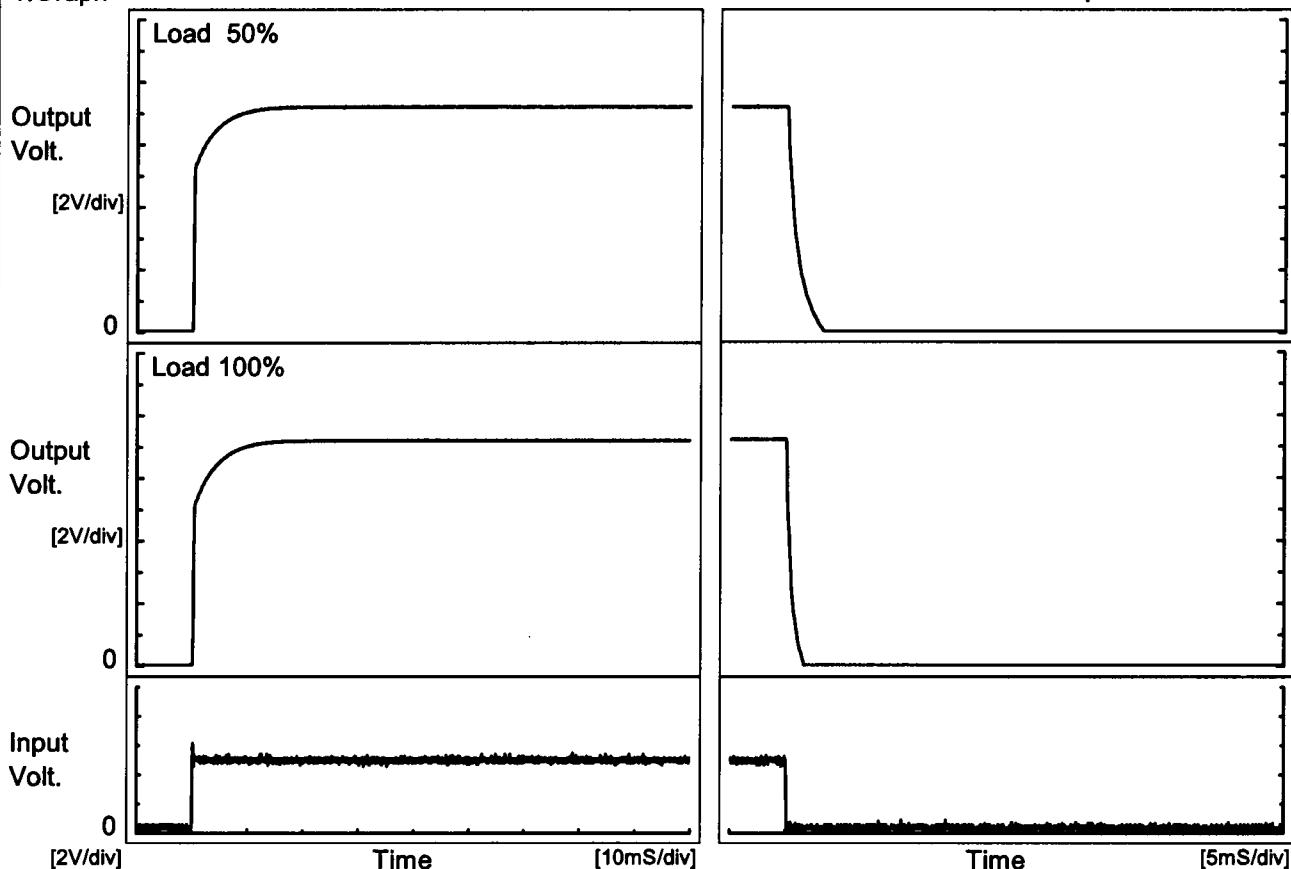
Model SUW30515

Item Rise and Fall Time

Object -15V0.1A

Temperature 25°C  
Testing Circuitry Figure A

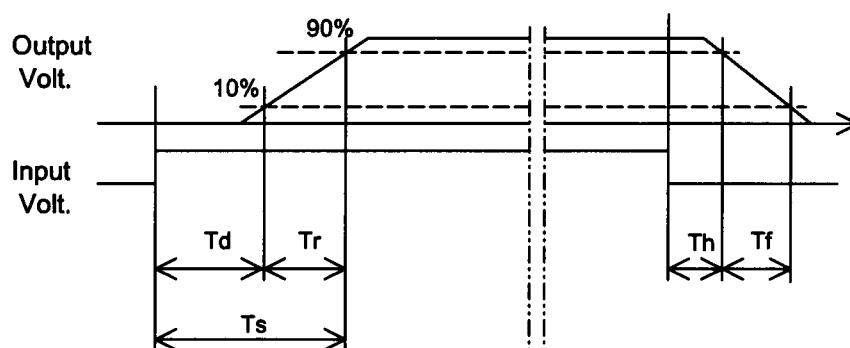
## 1. Graph



## 2. Values

[mS]

Load	Time	Td	Tr	Ts	Th	Tf
50 %		0.2	6.4	6.6	0.1	2.1
100 %		0.2	6.8	7.0	0.1	1.1



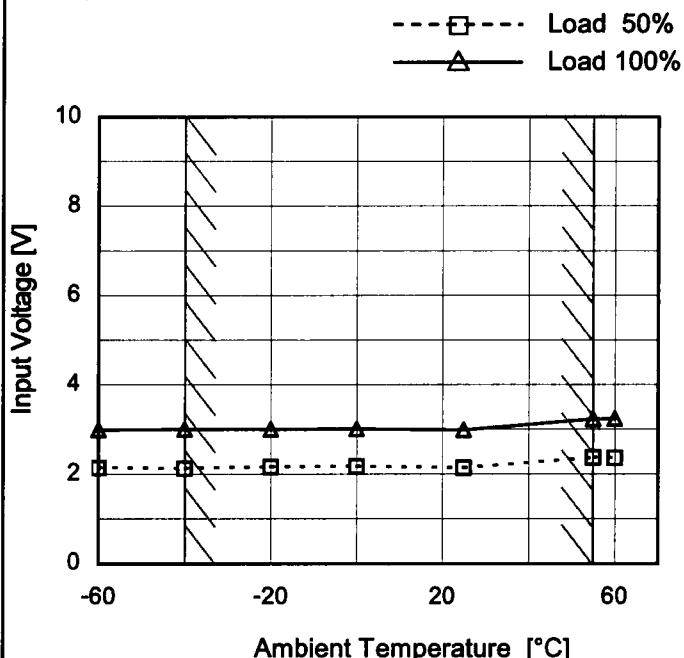
**COSEL**

Model SUW30515

Item Minimum Input Voltage  
for Regulated Output Voltage

Object +15V0.1A

## 1. Graph



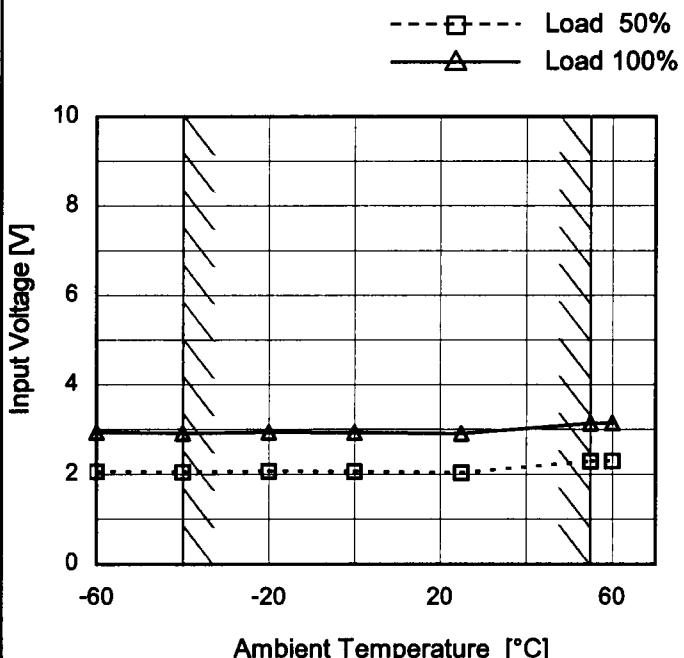
Testing Circuitry Figure A

## 2. Values

Ambient Temperature [°C]	Input Voltage [V]	
	Load 50%	Load 100%
-60	2.2	3.0
-40	2.2	3.0
-20	2.2	3.0
0	2.2	3.1
25	2.2	3.0
55	2.4	3.3
60	2.4	3.3
--	-	-
--	-	-
--	-	-
--	-	-

Object -15V0.1A

## 1. Graph



## 2. Values

Ambient Temperature [°C]	Input Voltage [V]	
	Load 50%	Load 100%
-60	2.1	3.0
-40	2.1	3.0
-20	2.1	3.0
0	2.1	3.0
25	2.1	3.0
55	2.3	3.2
60	2.3	3.2
--	-	-
--	-	-
--	-	-
--	-	-

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

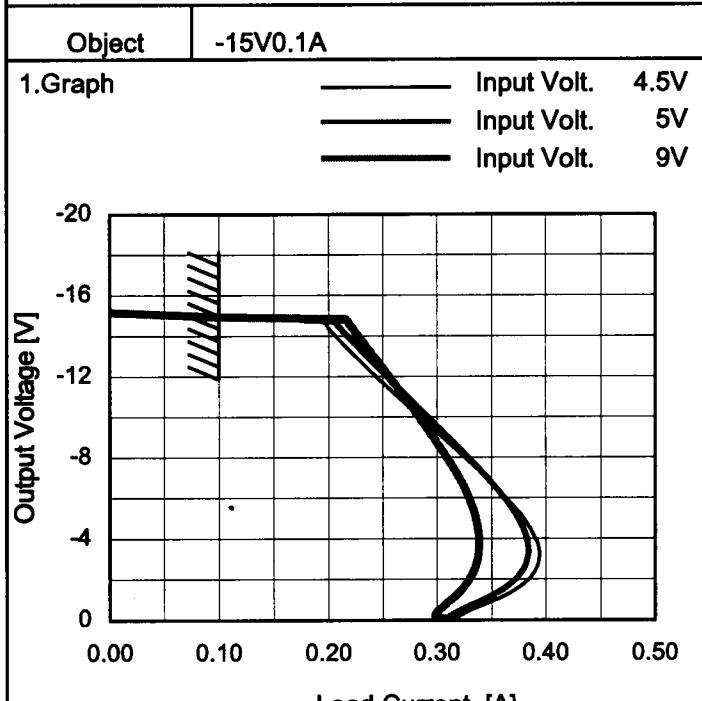
**COSEL**

Model	SUW30515																																				
Item	Overcurrent Protection																																				
Object	+15V0.1A																																				
1.Graph	<p>Input Volt. 4.5V Input Volt. 5V Input Volt. 9V</p> <table border="1"> <caption>Estimated data points for +15V0.1A graph</caption> <thead> <tr> <th>Load Current [A]</th> <th>4.5V [V]</th> <th>5V [V]</th> <th>9V [V]</th> </tr> </thead> <tbody> <tr><td>0.00</td><td>15.0</td><td>15.0</td><td>15.0</td></tr> <tr><td>0.10</td><td>15.0</td><td>15.0</td><td>15.0</td></tr> <tr><td>0.20</td><td>15.0</td><td>15.0</td><td>15.0</td></tr> <tr><td>0.30</td><td>15.0</td><td>15.0</td><td>15.0</td></tr> <tr><td>0.35</td><td>15.0</td><td>15.0</td><td>15.0</td></tr> <tr><td>0.40</td><td>15.0</td><td>15.0</td><td>15.0</td></tr> <tr><td>0.45</td><td>15.0</td><td>15.0</td><td>15.0</td></tr> <tr><td>0.50</td><td>15.0</td><td>15.0</td><td>15.0</td></tr> </tbody> </table>	Load Current [A]	4.5V [V]	5V [V]	9V [V]	0.00	15.0	15.0	15.0	0.10	15.0	15.0	15.0	0.20	15.0	15.0	15.0	0.30	15.0	15.0	15.0	0.35	15.0	15.0	15.0	0.40	15.0	15.0	15.0	0.45	15.0	15.0	15.0	0.50	15.0	15.0	15.0
Load Current [A]	4.5V [V]	5V [V]	9V [V]																																		
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0.45	15.0	15.0	15.0																																		
0.50	15.0	15.0	15.0																																		

Temperature 25°C  
Testing Circuitry Figure A

## 2.Values

Output Voltage [V]	Load Current [A]		
	Input Volt. 4.5[V]	Input Volt. 5[V]	Input Volt. 9[V]
15.0	0.10	0.10	0.10
14.3	0.20	0.21	0.22
13.5	0.22	0.23	0.24
12.0	0.25	0.25	0.26
10.5	0.28	0.28	0.28
9.0	0.31	0.31	0.30
7.5	0.34	0.34	0.31
6.0	0.37	0.36	0.33
4.5	0.39	0.38	0.34
3.0	0.39	0.39	0.34
1.5	0.37	0.36	0.32
0.0	0.32	0.31	0.32



## 2.Values

Output Voltage [V]	Load Current [A]		
	Input Volt. 4.5[V]	Input Volt. 5[V]	Input Volt. 9[V]
-15.0	0.10	0.10	0.10
-14.3	0.20	0.21	0.22
-13.5	0.22	0.23	0.23
-12.0	0.25	0.25	0.26
-10.5	0.27	0.28	0.28
-9.0	0.30	0.31	0.30
-7.5	0.34	0.34	0.32
-6.0	0.36	0.36	0.33
-4.5	0.39	0.38	0.34
-3.0	0.39	0.38	0.34
-1.5	0.37	0.36	0.32
0.0	0.32	0.31	0.32

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

COSEL

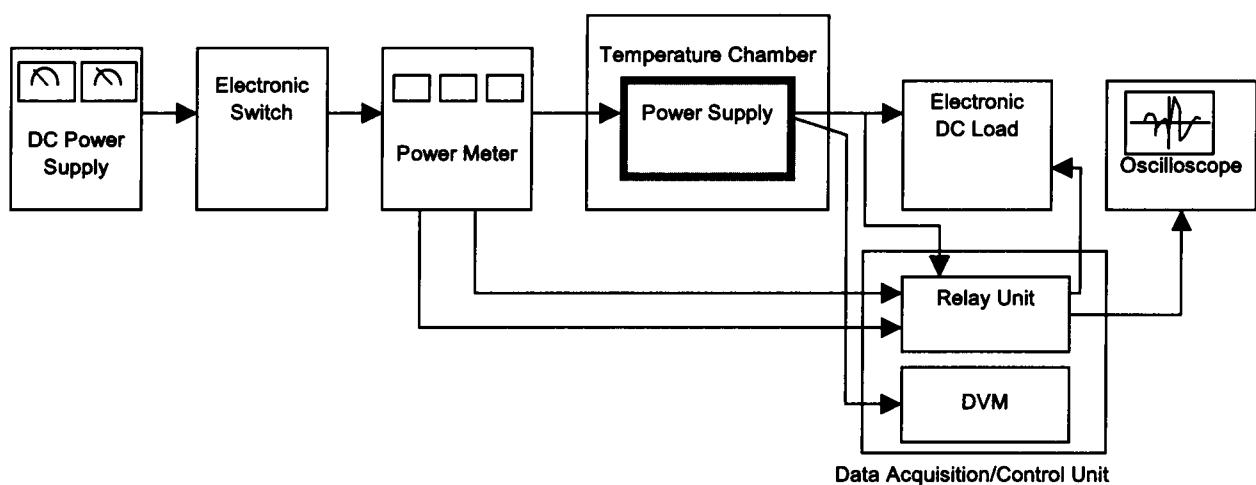


Figure A

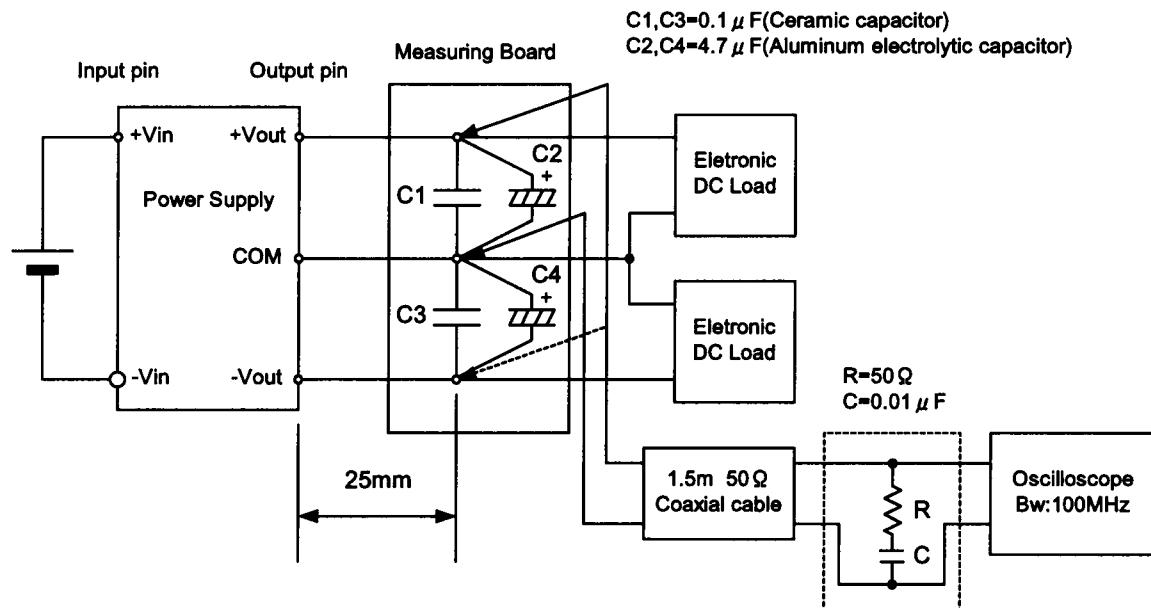


Figure B (Ripple and Ripple noise Characteristic)