

# **TEST DATA OF SUCW1R50515**

# Regulated DC Power Supply

## Sep 14, 2004

Approved by : Tetsuo Sugimori Tetsuo Sugimori Design Manager

Prepared by : Masahiro Shima Design Engineer

**COSEL CO.,LTD.**



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Model	SUCW1R50515	Temperature	25°C																																																																							
Item	Input Current (by Input Voltage)	Testing Circuitry	Figure A																																																																							
Object	—	—	—																																																																							
1.Graph																																																																										
<p>The graph shows the relationship between Input Current [A] on the Y-axis (0.0 to 1.0) and Input Voltage [V] on the X-axis (0 to 10). Three curves are plotted: Load 0% (solid circles), Load 50% (dashed squares), and Load 100% (open triangles). All curves show a general decrease in current as input voltage increases. A slanted line is drawn across the graph, starting from approximately (2.0, 0.0) and ending at (10.0, 0.2), representing 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>2.0</td><td>0.05</td><td>0.05</td><td>0.05</td></tr> <tr><td>3.0</td><td>0.05</td><td>0.05</td><td>0.05</td></tr> <tr><td>4.0</td><td>0.05</td><td>0.05</td><td>0.05</td></tr> <tr><td>5.0</td><td>0.05</td><td>0.05</td><td>0.05</td></tr> <tr><td>6.0</td><td>0.05</td><td>0.05</td><td>0.05</td></tr> <tr><td>7.0</td><td>0.05</td><td>0.05</td><td>0.05</td></tr> <tr><td>8.0</td><td>0.05</td><td>0.05</td><td>0.05</td></tr> <tr><td>9.0</td><td>0.05</td><td>0.05</td><td>0.05</td></tr> <tr><td>10.0</td><td>0.05</td><td>0.05</td><td>0.05</td></tr> </tbody> </table>				Input Voltage [V]	Load 0% [A]	Load 50% [A]	Load 100% [A]	2.0	0.05	0.05	0.05	3.0	0.05	0.05	0.05	4.0	0.05	0.05	0.05	5.0	0.05	0.05	0.05	6.0	0.05	0.05	0.05	7.0	0.05	0.05	0.05	8.0	0.05	0.05	0.05	9.0	0.05	0.05	0.05	10.0	0.05	0.05	0.05																															
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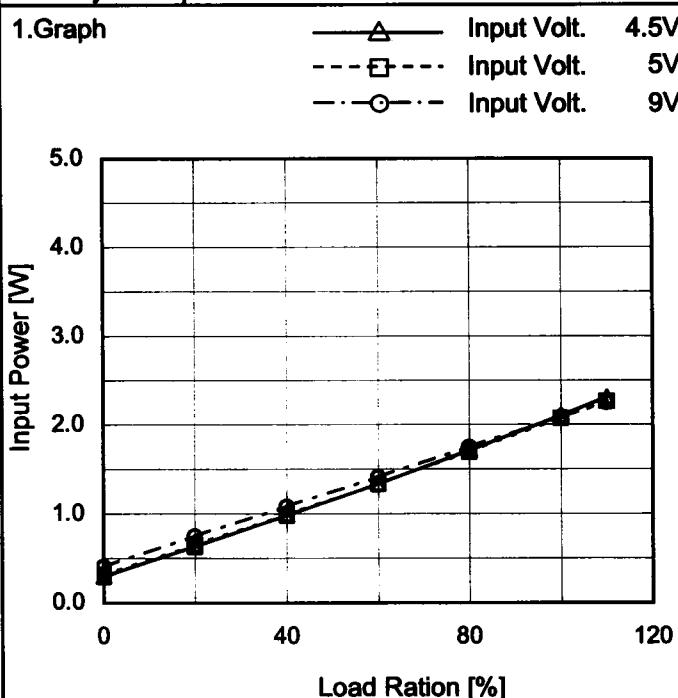
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<p>The graph plots Input Current [A] on the Y-axis (0.0 to 1.0) against Load Ration [%] on the X-axis (0 to 120). Three data series are shown for input voltages of 4.5V, 5V, and 9V. The 4.5V series (solid triangles) starts at ~0.06A at 0% load and rises to ~0.52A at 110% load. The 5V series (dashed squares) starts at ~0.06A and rises to ~0.45A. The 9V series (dotted circles) starts at ~0.06A and rises to ~0.25A.</p> <table border="1"> <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>0.066</td><td>0.063</td><td>0.045</td></tr> <tr><td>20</td><td>0.140</td><td>0.129</td><td>0.083</td></tr> <tr><td>40</td><td>0.219</td><td>0.198</td><td>0.120</td></tr> <tr><td>60</td><td>0.303</td><td>0.271</td><td>0.157</td></tr> <tr><td>80</td><td>0.383</td><td>0.341</td><td>0.195</td></tr> <tr><td>100</td><td>0.471</td><td>0.422</td><td>0.234</td></tr> <tr><td>110</td><td>0.522</td><td>0.453</td><td>0.253</td></tr> </tbody> </table>	Load Ration [%]	4.5V [A]	5V [A]	9V [A]	0	0.066	0.063	0.045	20	0.140	0.129	0.083	40	0.219	0.198	0.120	60	0.303	0.271	0.157	80	0.383	0.341	0.195	100	0.471	0.422	0.234	110	0.522	0.453	0.253																					
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**COSEL**

Model	SUCW1R50515
Item	Input Power (by Load Current)
Object	_____



Temperature 25°C  
Testing Circuitry Figure A

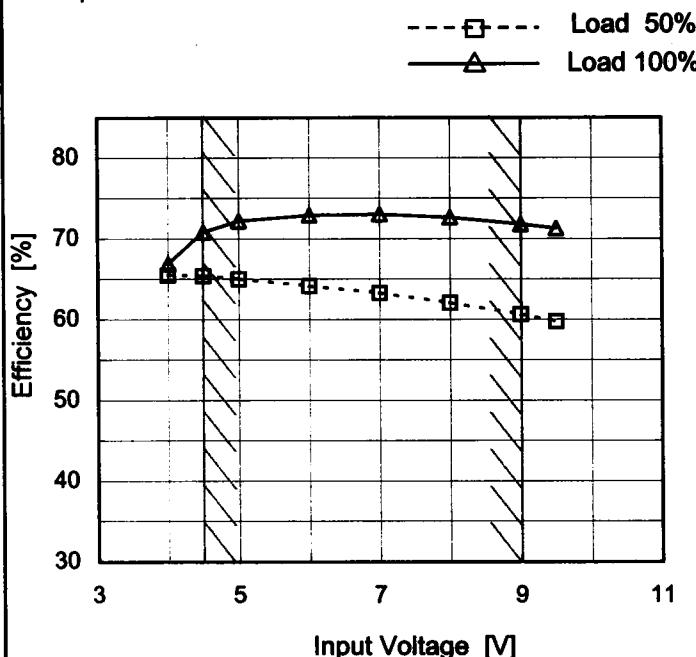
## 2.Values

Load Ration [%]	Input Power [W]		
	Input Volt. 4.5[V]	Input Volt. 5[V]	Input Volt. 9[V]
0	0.30	0.31	0.40
20	0.63	0.65	0.75
40	0.98	0.99	1.08
60	1.34	1.34	1.41
80	1.71	1.69	1.75
100	2.10	2.07	2.08
110	2.31	2.26	2.25
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-

**COSEL**

Model	SUCW1R50515
Item	Efficiency (by Input Voltage)
Object	_____

## 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]	Efficiency [%]	
	Load 50%	Load 100%
4.0	65.5	66.9
4.5	65.4	70.8
5.0	65.0	72.2
6.0	64.1	72.9
7.0	63.3	73.0
8.0	62.1	72.6
9.0	60.6	71.8
9.5	59.7	71.3
-	-	-

**COSEL**

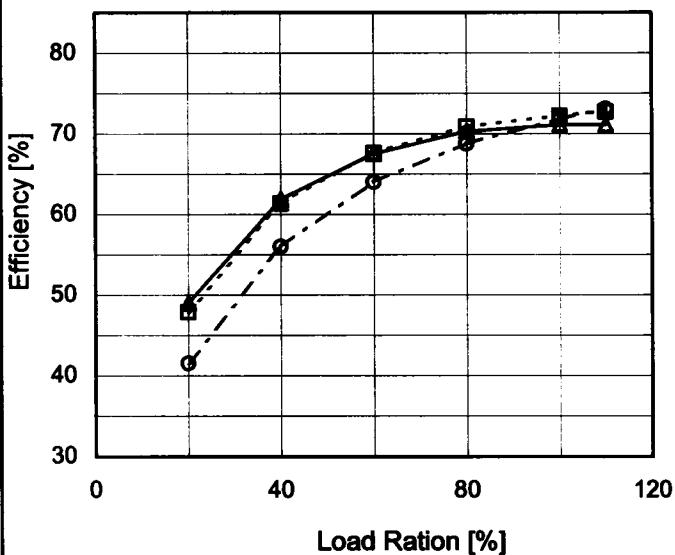
Model SUCW1R50515

Item Efficiency (by Load Current)

Object \_\_\_\_\_

## 1. Graph

—△— Input Volt. 4.5V  
 -□--- Input Volt. 5V  
 -○--- Input Volt. 9V

Temperature 25°C  
Testing Circuitry Figure A

## 2. Values

Load Ration [%]	Efficiency [%]		
	Input Volt. 4.5[V]	Input Volt. 5[V]	Input Volt. 9[V]
0	-	-	-
20	49.0	47.9	41.5
40	61.9	61.4	56.0
60	67.6	67.6	64.0
80	70.3	70.9	68.8
100	71.1	72.2	71.8
110	71.1	72.7	73.1
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-

**COSEL**

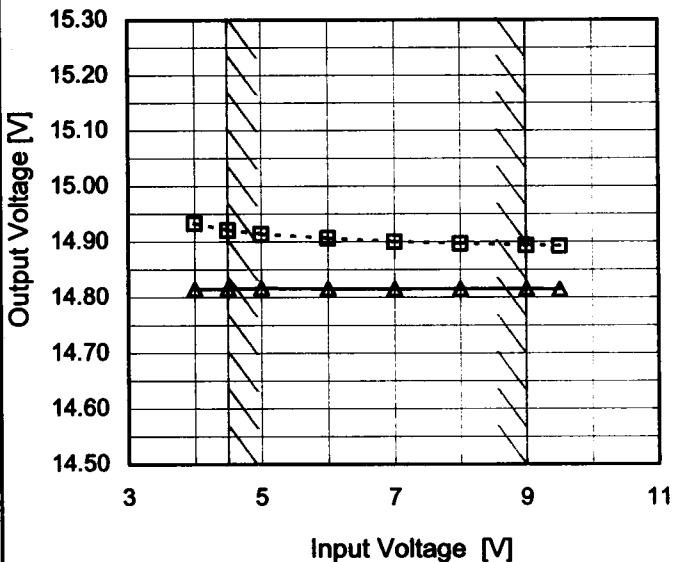
Model SUCW1R50515

Item Line Regulation

Object +15V0.05A

## 1.Graph

---□--- Load 50%  
—△— Load 100%

Temperature 25°C  
Testing Circuitry Figure A

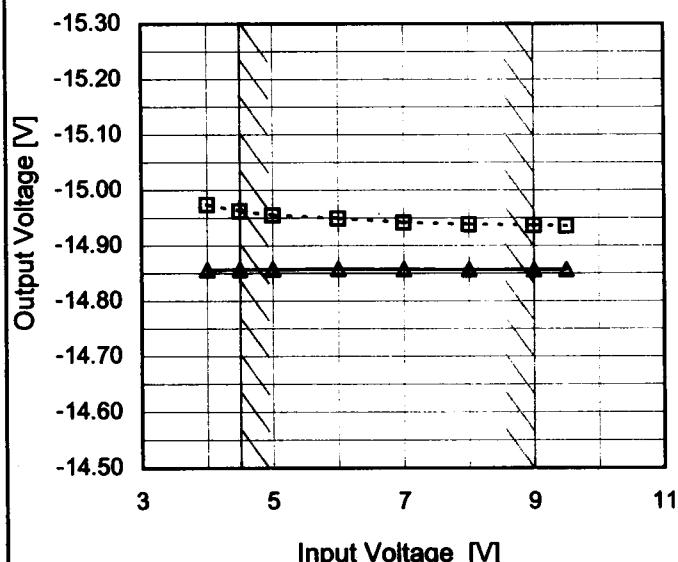
## 2.Values

Input Voltage [V]	Output Voltage [V]	
	Load 50%	Load 100%
4.0	14.933	14.815
4.5	14.921	14.816
5.0	14.914	14.817
6.0	14.906	14.816
7.0	14.900	14.815
8.0	14.896	14.816
9.0	14.894	14.815
9.5	14.893	14.815
-	-	-

Object -15V0.05A

## 1.Graph

---□--- Load 50%  
—△— Load 100%

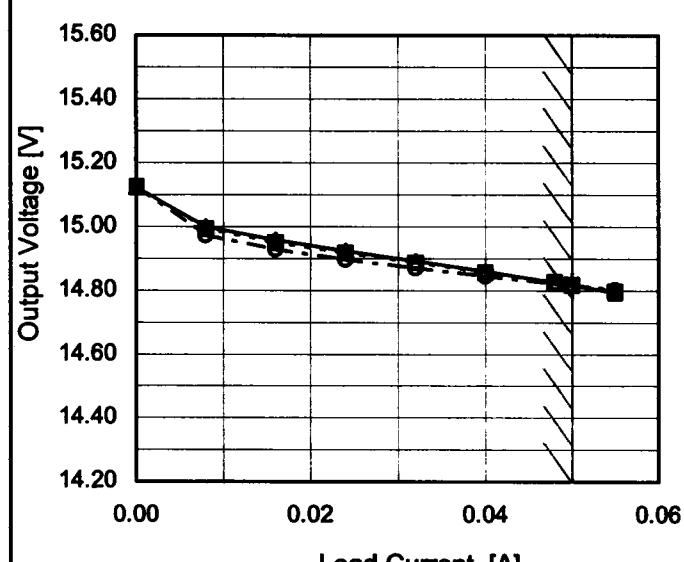
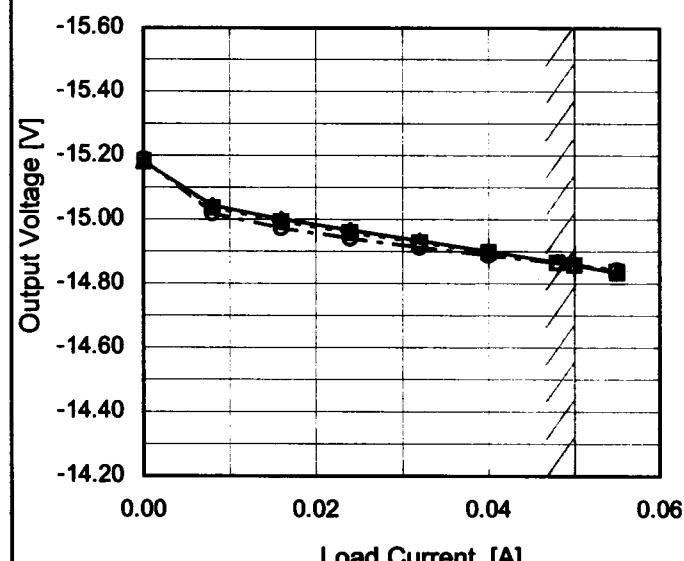


## 2.Values

Input Voltage [V]	Output Voltage [V]	
	Load 50%	Load 100%
4.0	-14.974	-14.856
4.5	-14.962	-14.857
5.0	-14.955	-14.857
6.0	-14.949	-14.858
7.0	-14.942	-14.858
8.0	-14.938	-14.857
9.0	-14.937	-14.857
9.5	-14.936	-14.857
-	-	-

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

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COSEL

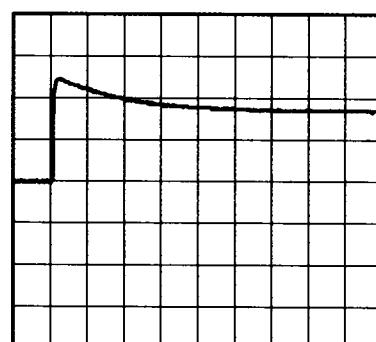
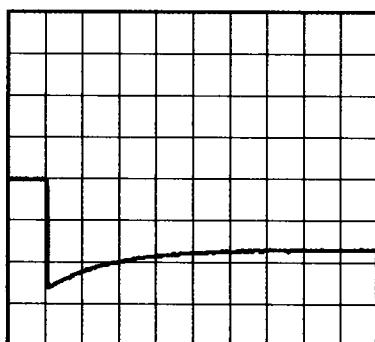
Model SUCW1R50515

Item Dynamic Load Response

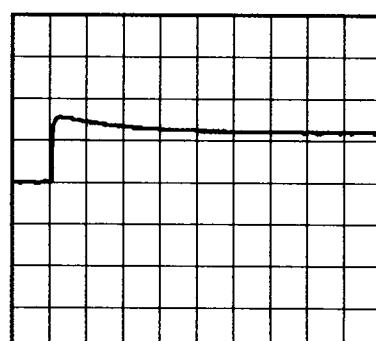
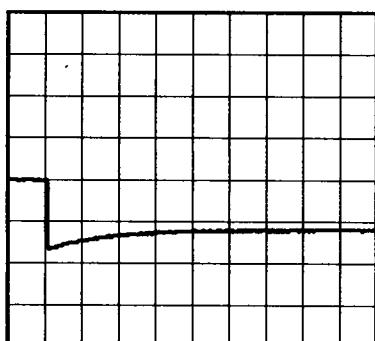
Object +15V0.05A

Temperature 25°C  
Testing Circuitry Figure AInput Volt. 5 V  
Cycle 100 mSMin. Load (0A)  $\longleftrightarrow$   
Load 100% (0.05A)

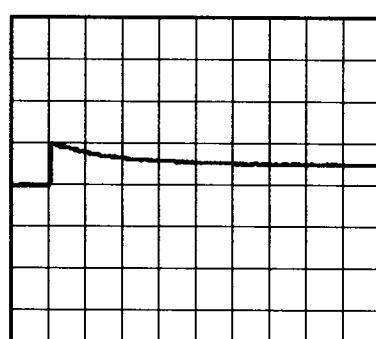
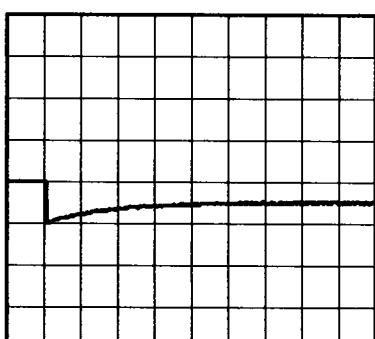
200mV/div

Min. Load (0A)  $\longleftrightarrow$   
Load 50% (0.025A)

200mV/div

Load 50% (0.025A)  $\longleftrightarrow$   
Load 100% (0.05A)

200mV/div

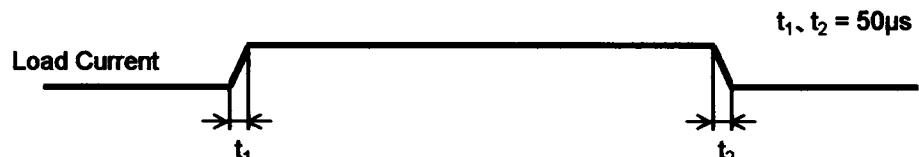


coSEL

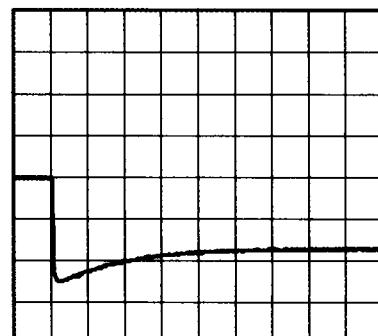
Model SUCW1R50515

Item Dynamic Load Response

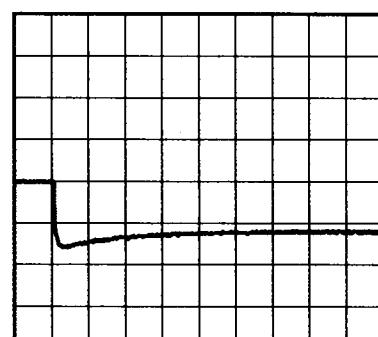
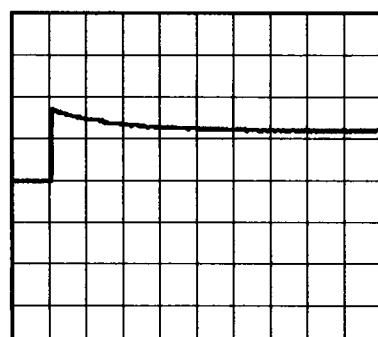
Object -15V0.05A

Temperature 25°C  
Testing Circuitry Figure AInput Volt. 5 V  
Cycle 100 mSMin. Load (0A)  $\longleftrightarrow$   
Load 100% (0.05A)

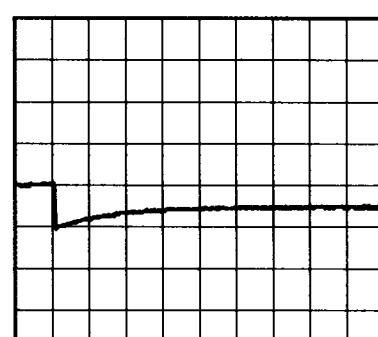
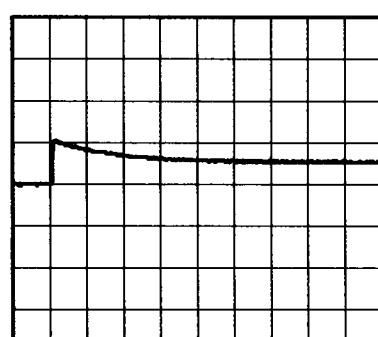
200mV/div

Min. Load (0A)  $\longleftrightarrow$   
Load 50% (0.025A)

200mV/div

Load 50% (0.025A)  $\longleftrightarrow$   
Load 100% (0.05A)

200mV/div



COSEL

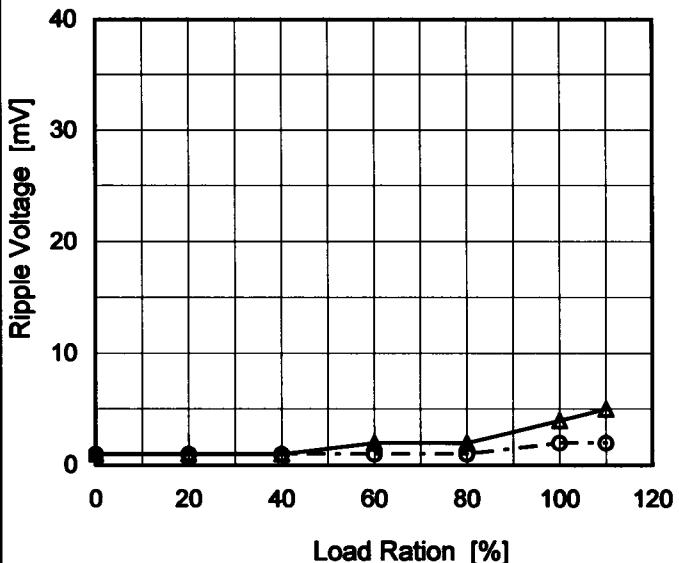
Model SUCW1R50515

Item Ripple Voltage (by Load Current)

Object +15V0.05A

## 1.Graph

—△— Input Volt. 4.5V  
 - -○--- Input Volt. 9V



Measured by 100 MHz Oscilloscope.  
 Ripple Voltage is shown as p-p in the figure below.

Ripple [mVp-p]

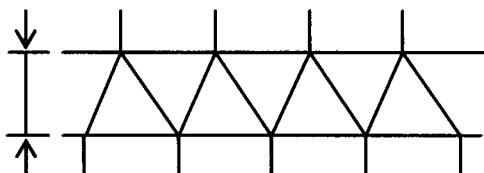


Fig.Complex Ripple Wave Form

Temperature 25°C  
 Testing Circuitry Figure B

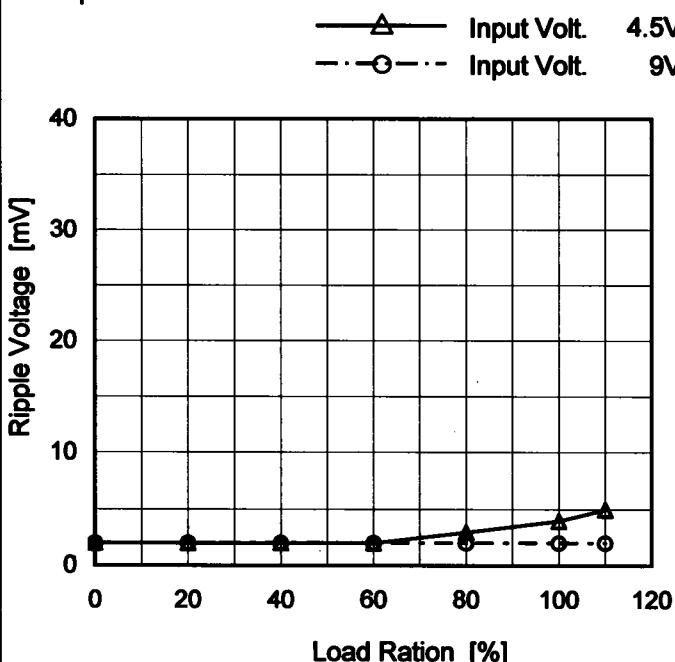
## 2.Values

Load Ration [%]	Ripple Voltage [mV]	
	Input Volt. 4.5 [V]	Input Volt. 9 [V]
0	1	1
20	1	1
40	1	1
60	2	1
80	2	1
100	4	2
110	5	2
-	-	-
-	-	-
-	-	-
--	-	-

**COSEL**

Model	SUCW1R50515
Item	Ripple Voltage (by Load Current)
Object	-15V0.05A

## 1. Graph



Measured by 100 MHz Oscilloscope.  
Ripple Voltage is shown as p-p in the figure below.

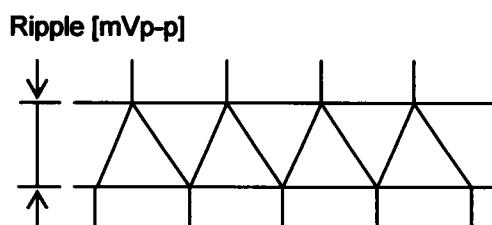


Fig.Complex Ripple Wave Form

Temperature 25°C  
Testing Circuitry Figure B

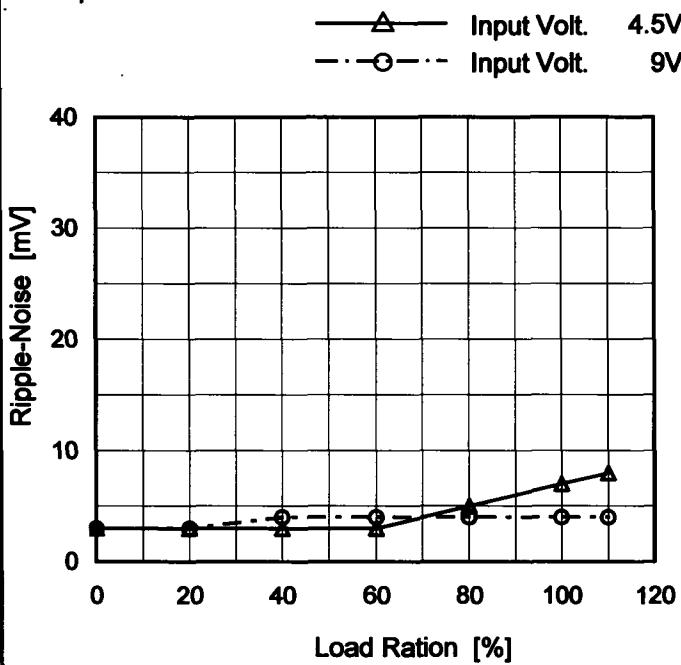
## 2. Values

Load Ration [%]	Ripple Voltage [mV]	
	Input Volt. 4.5 [V]	Input Volt. 9 [V]
0	2	2
20	2	2
40	2	2
60	2	2
80	3	2
100	4	2
110	5	2
-	-	-
-	-	-
-	-	-
-	-	-

**COSEL**

Model	SUCW1R50515
Item	Ripple-Noise
Object	+15V0.05A

## 1. Graph



Measured by 100 MHz Oscilloscope.  
Ripple-Noise is shown as p-p in the figure below.

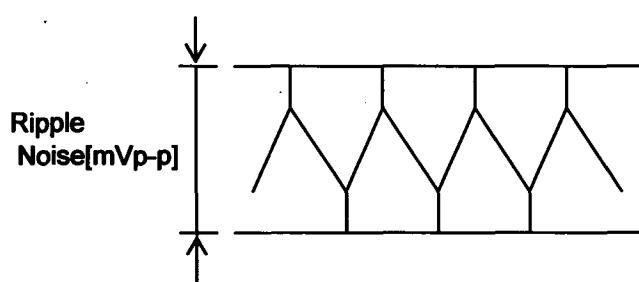


Fig.Complex Ripple Noise Wave Form

Temperature 25°C  
Testing Circuitry Figure B

## 2. Values

Load Ration [%]	Ripple-Noise [mV]	
	Input Volt. 4.5 [V]	Input Volt. 9 [V]
0	3	3
20	3	3
40	3	4
60	3	4
80	5	4
100	7	4
110	8	4
-	-	-
-	-	-
--	-	-
--	-	-

**COSEL**

Model	SUCW1R50515	Temperature	25°C																						
Item	Ripple-Noise	Testing Circuitry	Figure B																						
Object	-15V0.05A																								
1.Graph		2.Values																							
<p>—▲— Input Volt. 4.5V -○- Input Volt. 9V</p> <table border="1"> <thead> <tr> <th>Load Ration [%]</th> <th>Input Volt. 4.5 [mV]</th> <th>Input Volt. 9 [mV]</th> </tr> </thead> <tbody> <tr><td>0</td><td>4</td><td>4</td></tr> <tr><td>20</td><td>4</td><td>5</td></tr> <tr><td>40</td><td>5</td><td>5</td></tr> <tr><td>60</td><td>5</td><td>5</td></tr> <tr><td>80</td><td>5</td><td>5</td></tr> <tr><td>100</td><td>6</td><td>5</td></tr> <tr><td>110</td><td>8</td><td>6</td></tr> </tbody> </table>		Load Ration [%]	Input Volt. 4.5 [mV]	Input Volt. 9 [mV]	0	4	4	20	4	5	40	5	5	60	5	5	80	5	5	100	6	5	110	8	6
Load Ration [%]	Input Volt. 4.5 [mV]	Input Volt. 9 [mV]																							
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100	6	5																							
110	8	6																							
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<p>Fig.Complex Ripple Noise Wave Form</p>																									

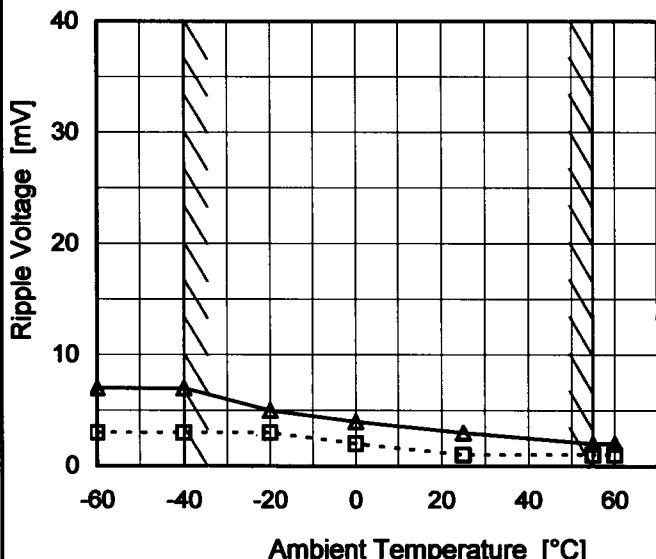
**COSEL**

Model	SUCW1R50515
Item	Ripple Voltage (by Ambient Temp.)
Object	+15V0.05A

## Testing Circuitry Figure B

## 1.Graph

---□--- Load 50%  
—△— Load 100%



## 2.Values

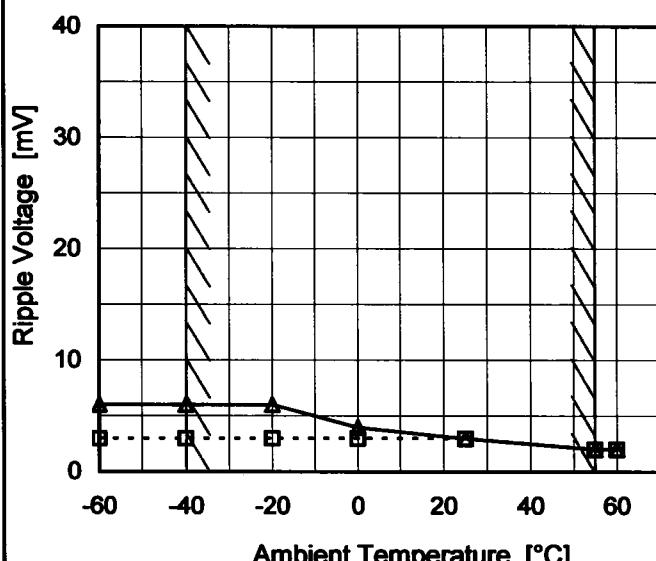
Ambient Temperature [°C]	Ripple Voltage [mV]	
	Load 50%	Load 100%
-60	3	7
-40	3	7
-20	3	5
0	2	4
25	1	3
55	1	2
60	1	2
—	—	—
—	—	—
—	—	—
—	—	—

## Object

-15V0.05A

## 1.Graph

---□--- Load 50%  
—△— Load 100%



## 2.Values

Ambient Temperature [°C]	Ripple Voltage [mV]	
	Load 50%	Load 100%
-60	3	6
-40	3	6
-20	3	6
0	3	4
25	3	3
55	2	2
60	2	2
—	—	—
—	—	—
—	—	—
—	—	—

Measured by 100 MHz Oscilloscope.

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

**COSEL**

		Testing Circuitry Figure A		
Model	SUCW1R50515			
Item	Ambient Temperature Drift			
Object	+15V0.05A			
1.Graph	<p>Output Voltage [V]</p> <p>Ambient Temperature [°C]</p> <p>Load 100%</p> <p>Legend: Input Volt. 4.5V, Input Volt. 5V, Input Volt. 9V</p>	2.Values		
Object	-15V0.05A			
1.Graph	<p>Output Voltage [V]</p> <p>Ambient Temperature [°C]</p> <p>Load 100%</p> <p>Legend: Input Volt. 4.5V, Input Volt. 5V, Input Volt. 9V</p>	2.Values		
Note: Slanted line shows the range of the rated ambient temperature.				



Model	SUCW1R50515	
Item	Output Voltage Accuracy	Testing Circuitry Figure A

### 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 - 0.05A (AVR 2) : 0 - 0.05A

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

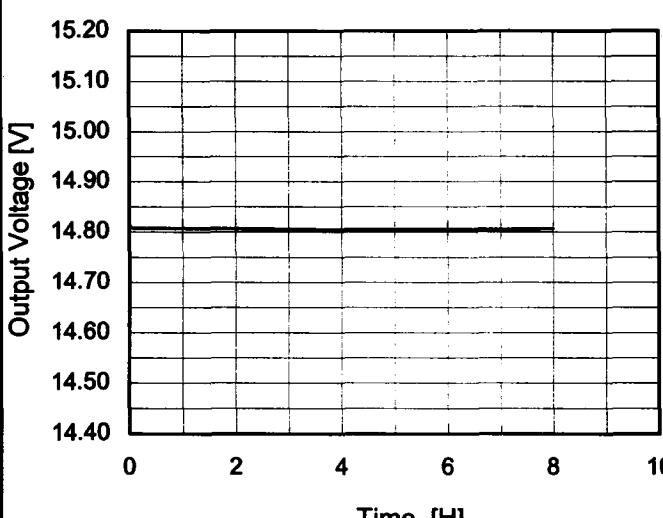
$$\text{* Output Voltage Accuracy (Ratio)} = \frac{\text{Output Voltage Accuracy}}{\text{Rated Output Voltage}} \times 100$$

### 2. Values

Object	+15V0.05A		Output		Output Voltage Accuracy	
Item	Temperature [°C]	Input Voltage[V]	Current[A]	Voltage[V]	Value [mV]	Ration [%]
Maximum Voltage	-20	9	0	15.160	±190	±1.3
Minimum Voltage	55	9	0.05	14.781		

Object	-15V0.05A		Output		Output Voltage Accuracy	
Item	Temperature [°C]	Input Voltage[V]	Current[A]	Voltage[V]	Value [mV]	Ration [%]
Maximum Voltage	-20	9	0	-15.224	±201	±1.3
Minimum Voltage	55	9	0.05	-14.822		

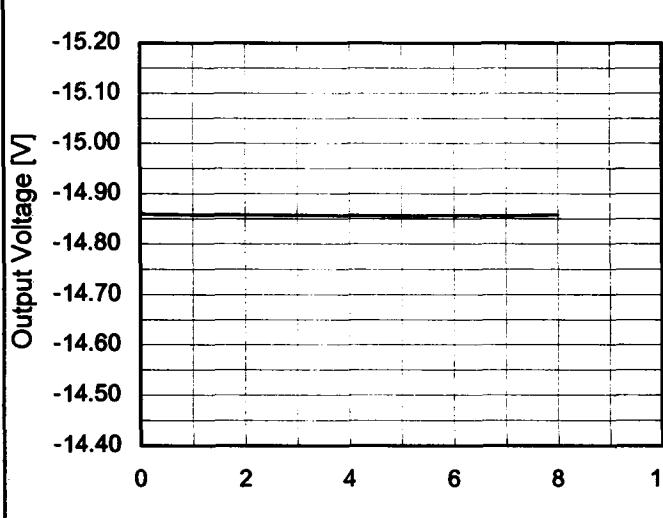
**COSEL**

Model	SUCW1R50515
Item	Time Lapse Drift
Object	+15V0.05A
1.Graph	
 <p>Output Voltage [V]</p> <p>Time [H]</p> <p>Input Volt. 5V Load 100%</p>	
Object	

Temperature 25°C  
Testing Circuitry Figure A

## 2.Values

Time since start [H]	Output Voltage [V]
0.0	14.819
0.5	14.807
1.0	14.807
2.0	14.807
3.0	14.806
4.0	14.805
5.0	14.805
6.0	14.806
7.0	14.806
8.0	14.807

Model	SUCW1R50515
Item	Time Lapse Drift
Object	-15V0.05A
1.Graph	
 <p>Output Voltage [V]</p> <p>Time [H]</p> <p>Input Volt. 5V Load 100%</p>	
Object	

## 2.Values

Time since start [H]	Output Voltage [V]
0.0	-14.868
0.5	-14.859
1.0	-14.859
2.0	-14.858
3.0	-14.858
4.0	-14.857
5.0	-14.857
6.0	-14.857
7.0	-14.857
8.0	-14.858

**COSEL**

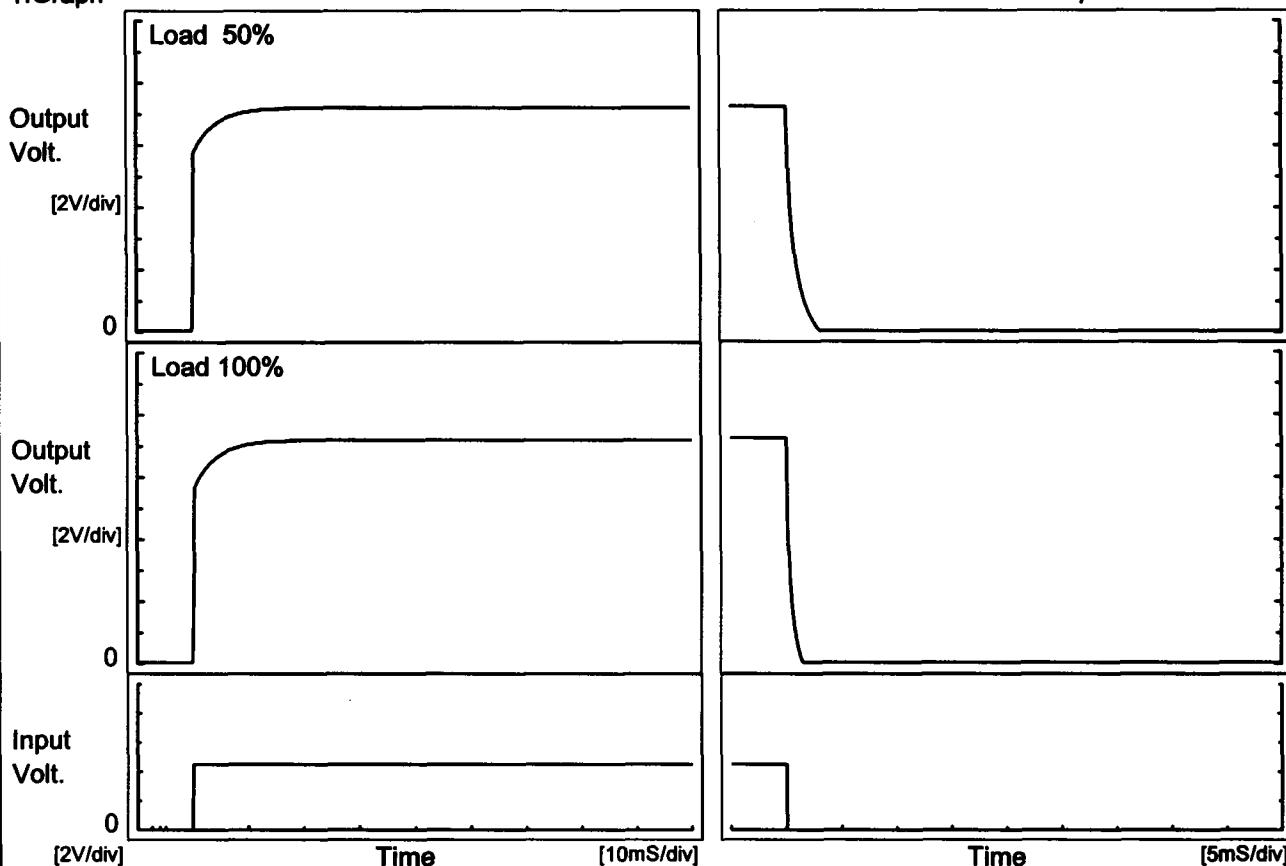
Model SUCW1R50515

Item Rise and Fall Time

Object +15V0.05A

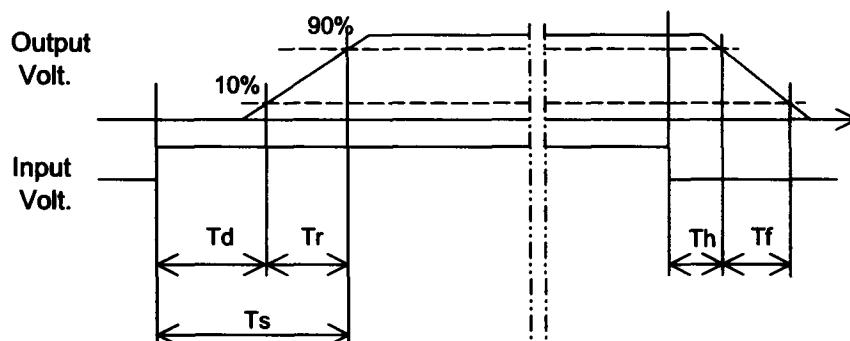
Temperature 25°C  
Testing Circuitry Figure A

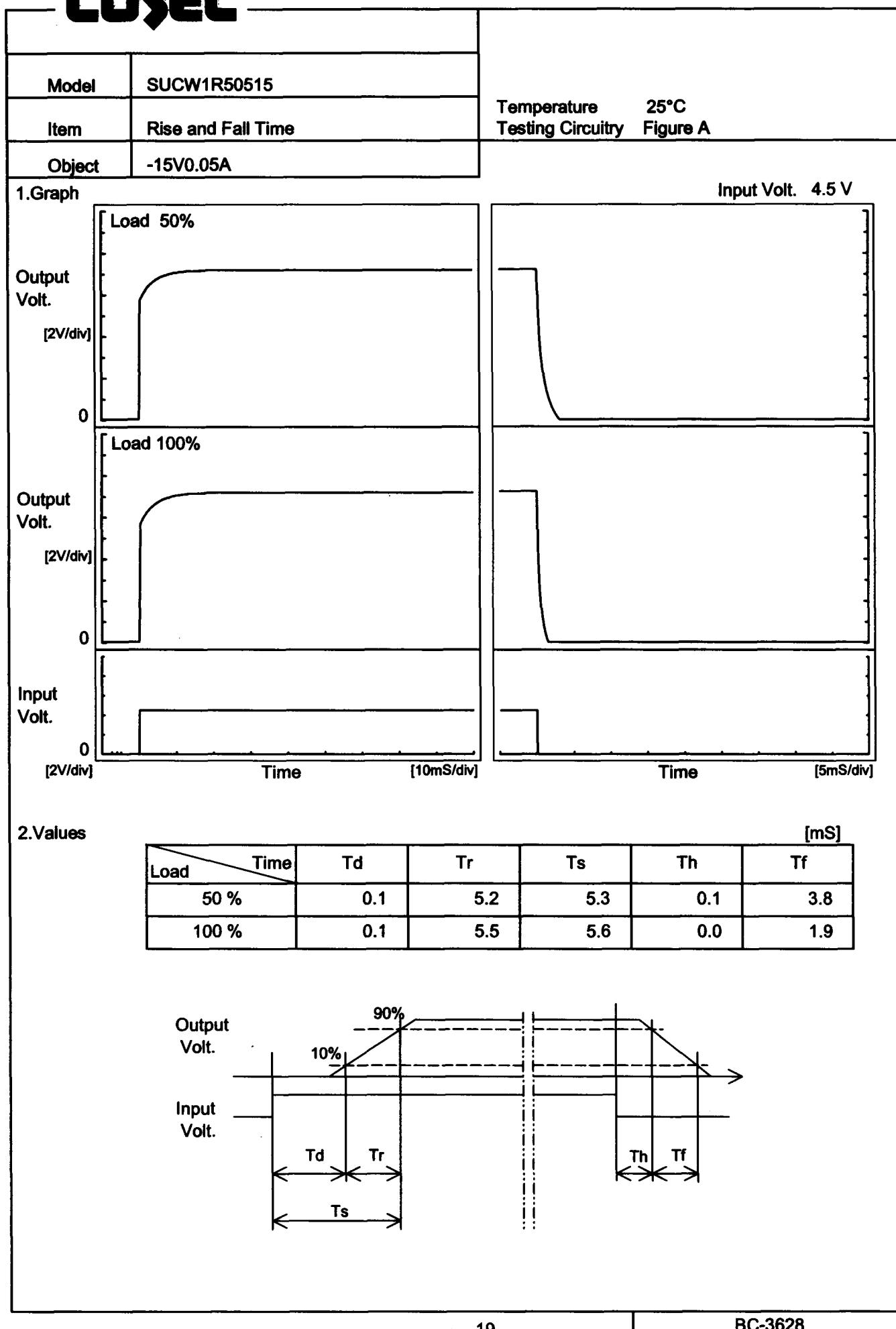
## 1. Graph



## 2. Values

Load	Time	Td	Tr	Ts	Th	Tf	[mS]
50 %		0.1	5.2	5.3	0.1	3.8	
100 %		0.1	5.5	5.6	0.0	1.9	

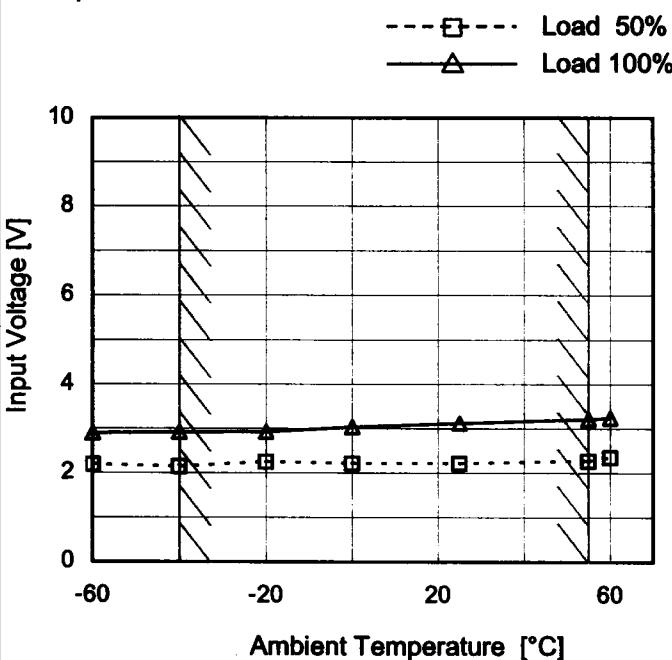


**COSEL**

**COSEL**

Model	SUCW1R50515
Item	Minimum Input Voltage for Regulated Output Voltage
Object	+15V0.05A

## 1.Graph



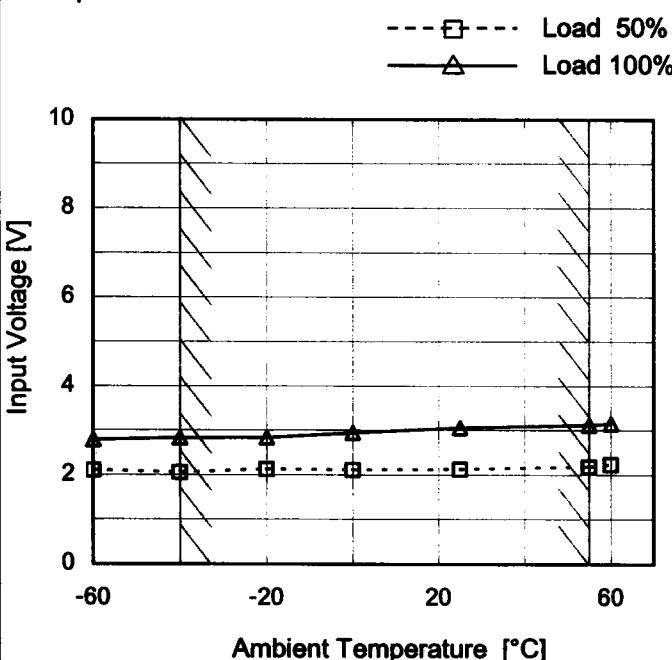
## Testing Circuitry Figure A

## 2.Values

Ambient Temperature [°C]	Input Voltage [V]	
	Load 50%	Load 100%
-60	2.2	2.9
-40	2.2	3.0
-20	2.3	3.0
0	2.3	3.1
25	2.3	3.2
55	2.3	3.3
60	2.4	3.3
-	-	-
-	-	-
-	-	-
-	-	-

Object	-15V0.05A
--------	-----------

## 1.Graph



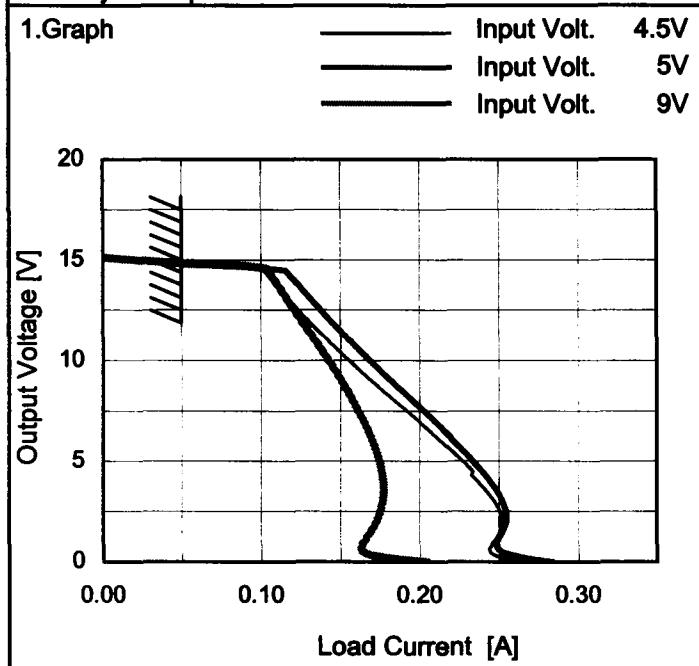
## 2.Values

Ambient Temperature [°C]	Input Voltage [V]	
	Load 50%	Load 100%
-60	2.1	2.8
-40	2.1	2.9
-20	2.2	2.9
0	2.2	3.0
25	2.2	3.1
55	2.2	3.2
60	2.3	3.2
-	-	-
-	-	-
-	-	-
-	-	-

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

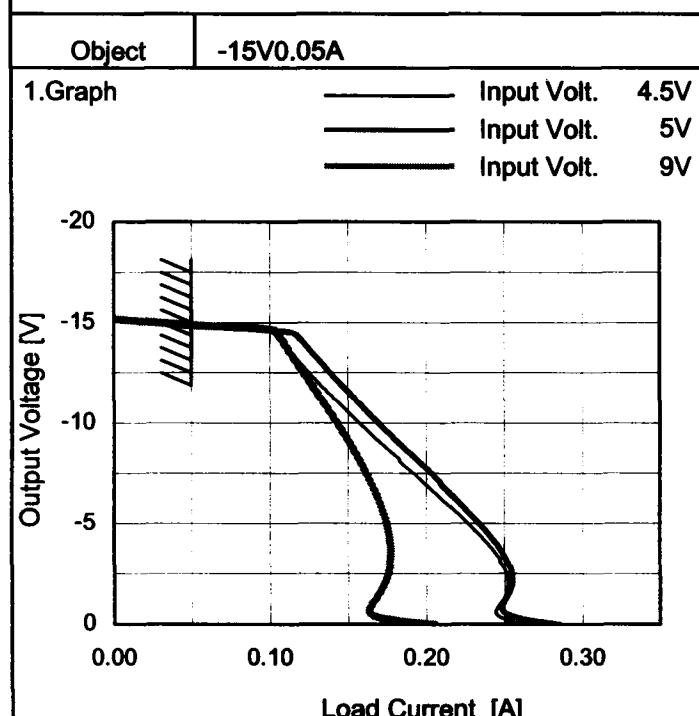
**COSEL**

Model	SUCW1R50515
Item	Overcurrent Protection
Object	+15V0.05A

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	0.05	0.05	0.05
14.3	0.10	0.12	0.11
13.5	0.11	0.13	0.11
12.0	0.13	0.14	0.13
10.5	0.15	0.16	0.14
9.0	0.17	0.18	0.15
7.5	0.19	0.20	0.16
6.0	0.21	0.22	0.17
4.5	0.23	0.24	0.18
3.0	0.25	0.25	0.18
1.5	0.25	0.25	0.17
0.0	0.27	0.28	0.20



## 2.Values

Output Voltage [V]	Load Current [A]		
	Input Volt. 4.5[V]	Input Volt. 5[V]	Input Volt. 9[V]
-15.00	0.05	0.05	0.05
-14.25	0.10	0.12	0.11
-13.50	0.11	0.13	0.11
-12.00	0.13	0.14	0.13
-10.50	0.15	0.16	0.14
-9.00	0.17	0.18	0.15
-7.50	0.19	0.20	0.16
-6.00	0.21	0.22	0.17
-4.50	0.23	0.24	0.18
-3.00	0.25	0.25	0.18
-1.50	0.25	0.25	0.17
0.00	0.26	0.28	0.21

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

COSEL

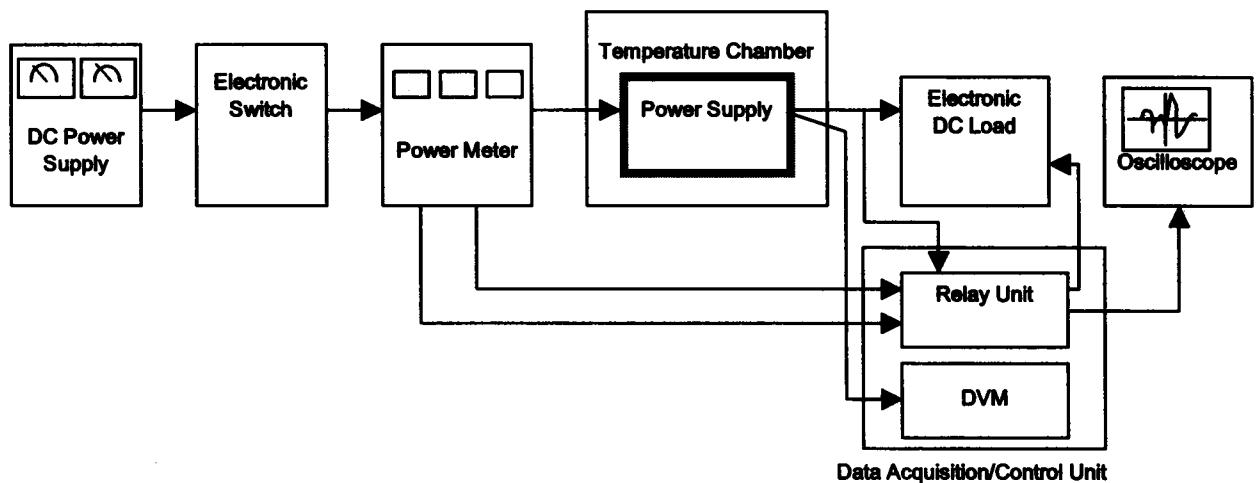


Figure A

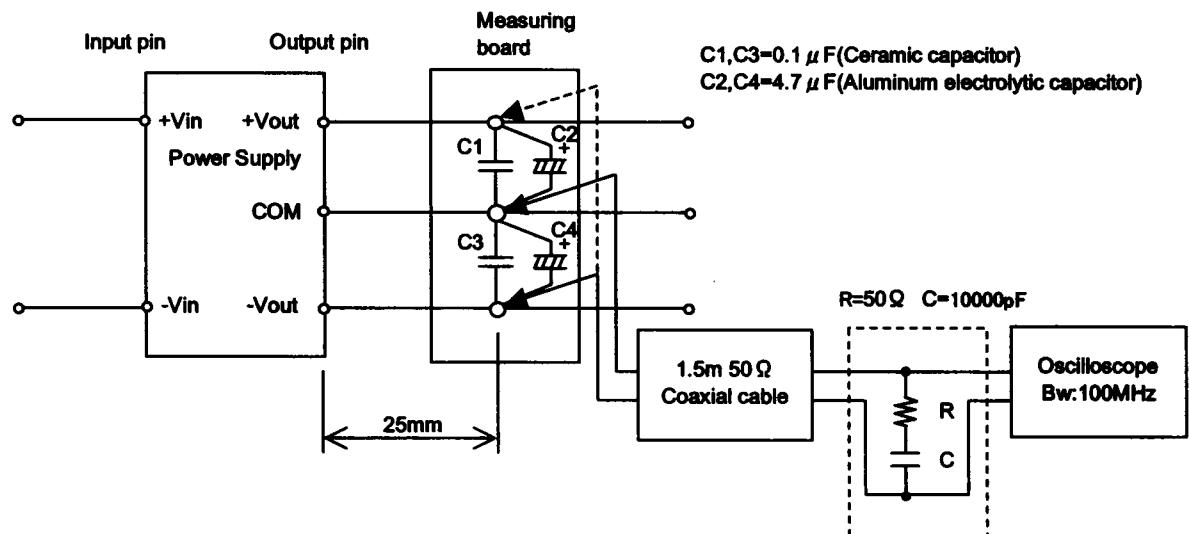


Figure B (Ripple and Ripple noise Characteristic)