

# TEST DATA OF SUW60515 SUCW60515

Regulated DC Power Supply  
Feb 24, 2005

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Tetsuo Sugimori Design Manager

Prepared by : Yoshikazu Mizuno  
Yoshikazu Mizuno Design Engineer

**COSEL CO.,LTD.**

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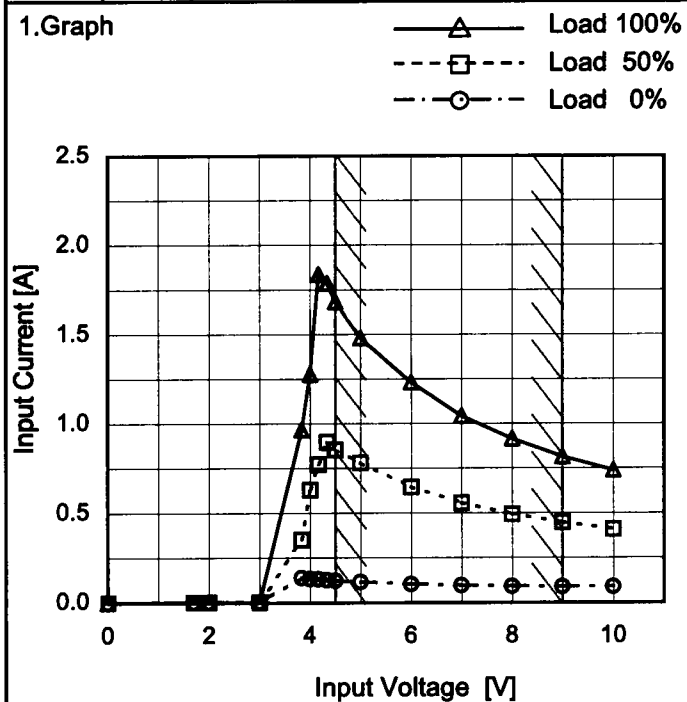
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**Model** SUW60515/SUCW60515

**Item** Input Current (by Input Voltage)

**Object**
**Temperature** 25°C  
**Testing Circuitry** Figure A

**1.Graph**


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

**2.Values**

Input Voltage [V]	Input Current [A]		
	Load 0%	Load 50%	Load 100%
0.00	0.000	0.000	0.000
1.70	0.001	0.003	0.001
2.00	0.002	0.002	0.002
3.00	0.003	0.003	0.003
3.83	0.138	0.352	0.966
4.00	0.133	0.630	1.277
4.16	0.130	0.772	1.837
4.33	0.126	0.898	1.788
4.50	0.122	0.855	1.684
5.00	0.115	0.782	1.479
6.00	0.102	0.646	1.232
7.00	0.095	0.557	1.043
8.00	0.090	0.493	0.915
9.00	0.088	0.447	0.816
10.00	0.088	0.410	0.740
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# COSEL

Model

SUW60515/SUCW60515

Item

Input Current (by Load Current)

Object

Temperature

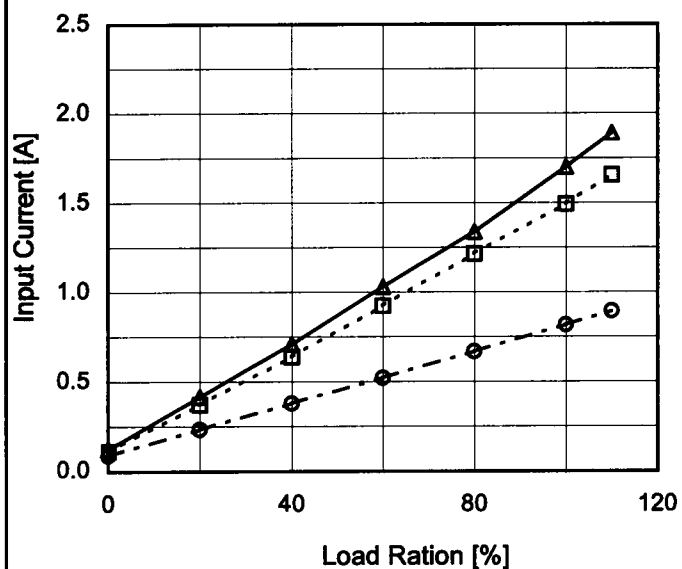
25°C

Testing Circuitry

Figure A

## 1.Graph

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



## 2.Values

Load Ration [%]	Input Current [A]		
	Input Volt. 4.5[V]	Input Volt. 5[V]	Input Volt. 9[V]
0	0.121	0.112	0.088
20	0.416	0.372	0.234
40	0.709	0.639	0.379
60	1.030	0.925	0.520
80	1.338	1.216	0.668
100	1.701	1.493	0.818
110	1.892	1.655	0.894
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

Model

SUW60515/SUCW60515

Item

Input Power (by Load Current)

Object

1.Graph

—△—

Input Volt.

4.5V

---□---

Input Volt.

5V

-·-○-·-

Input Volt.

9V

Input Power [W]

10

8

6

4

2

0

0

40

80

120

Load Ration [%]

2.Values

Load Ration [%]	Input Power [W]		
	Input Volt. 4.5[V]	Input Volt. 5[V]	Input Volt. 9[V]
0	0.54	0.57	0.79
20	1.84	1.86	2.09
40	3.18	3.18	3.37
60	4.57	4.54	4.68
80	6.01	5.97	5.98
100	7.55	7.42	7.30
110	8.34	8.18	7.97
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--	-	-	-
--	-	-	-

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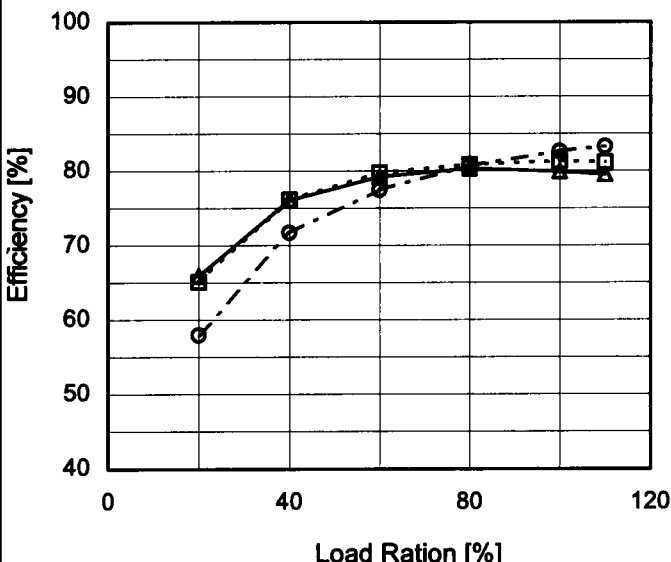
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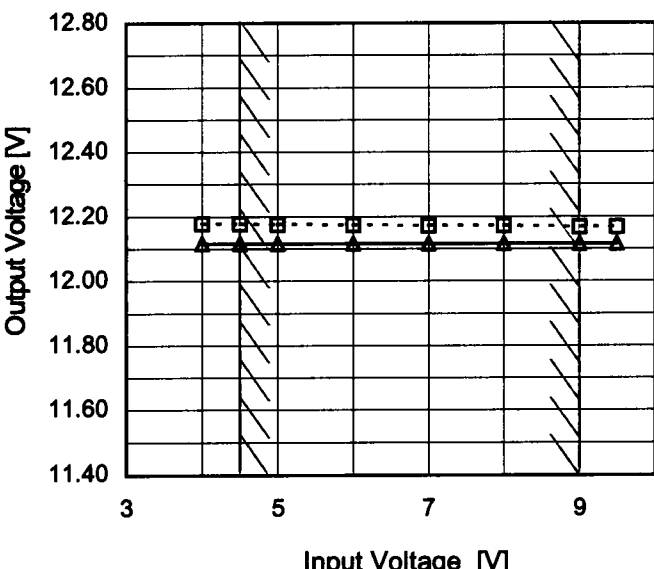
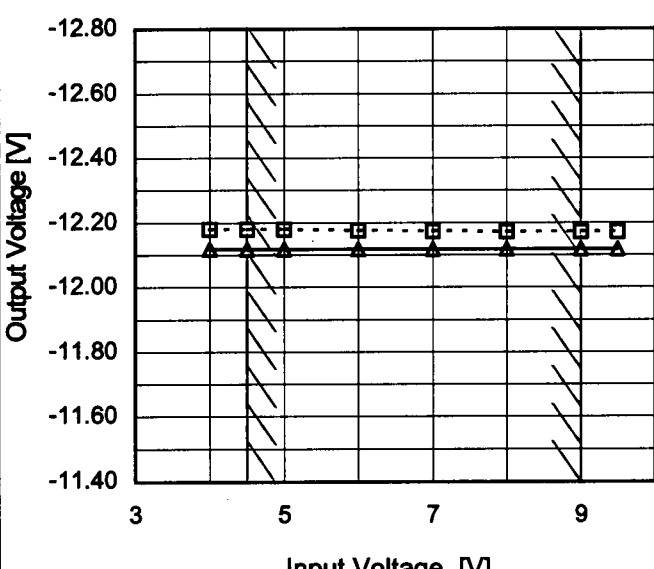
Model	SUW60515/SUCW60515		
Item	Efficiency (by Input Voltage)	Temperature	25°C
Object		Testing Circuitry	Figure A
1.Graph		2.Values	
<div> <div> <div>---</div> <div>□</div> <div>---</div> </div> <div>Load 50%</div> </div> <div> <div>---</div> <div>△</div> <div>---</div> </div> <div>Load 100%</div>			

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

  | | Input Voltage [V] | Efficiency [%] |           | |-------------------|----------------|-----------| |                   | Load 50%       | Load 100% | | 4.0               | 77.7           | 78.4      | | 4.5               | 78.4           | 80.1      | | 5.0               | 78.6           | 81.2      | | 6.0               | 78.3           | 82.6      | | 7.0               | 77.7           | 83.3      | | 8.0               | 76.4           | 83.1      | | 9.0               | 75.0           | 82.7      | | 9.5               | 74.2           | 82.3      | | --                | -              | -         | |  ||  |  |  |  |

# COSEL

Model	SUW60515/SUCW60515																																																					
Item	Efficiency (by Load Current)		Temperature 25°C																																																			
Object			Testing Circuitry Figure A																																																			
1.Graph		2.Values																																																				
<div><div><div>—△— Input Volt. 4.5V</div><div>---□--- Input Volt. 5V</div><div>-·-○-·- Input Volt. 9V</div></div><div></div></div>		<table><tr><th rowspan="2">Load Ration [%]</th><th colspan="3">Efficiency [%]</th></tr><tr><th>Input Volt. 4.5[V]</th><th>Input Volt. 5[V]</th><th>Input Volt. 9[V]</th></tr><tr><td>0</td><td>-</td><td>-</td><td>-</td></tr><tr><td>20</td><td>65.9</td><td>65.1</td><td>58.0</td></tr><tr><td>40</td><td>76.1</td><td>76.1</td><td>71.7</td></tr><tr><td>60</td><td>79.2</td><td>79.8</td><td>77.5</td></tr><tr><td>80</td><td>80.4</td><td>80.9</td><td>80.7</td></tr><tr><td>100</td><td>79.9</td><td>81.3</td><td>82.6</td></tr><tr><td>110</td><td>79.5</td><td>81.2</td><td>83.3</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>		Load Ration [%]	Efficiency [%]			Input Volt. 4.5[V]	Input Volt. 5[V]	Input Volt. 9[V]	0	-	-	-	20	65.9	65.1	58.0	40	76.1	76.1	71.7	60	79.2	79.8	77.5	80	80.4	80.9	80.7	100	79.9	81.3	82.6	110	79.5	81.2	83.3	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-
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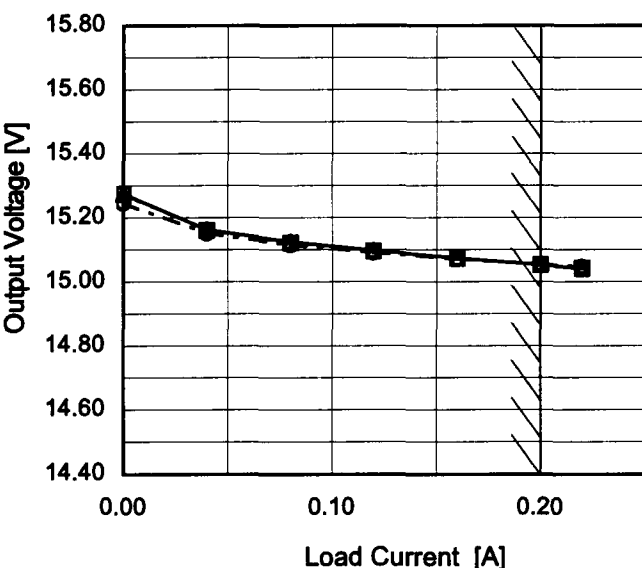
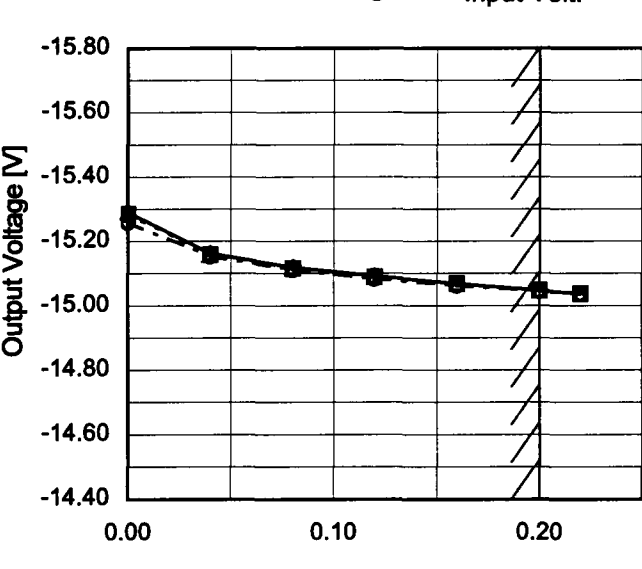
Model	SUW60512/SUCW60512	Temperature 25°C Testing Circuitry Figure A																																	
Item	Line Regulation																																		
Object	+12V0.25A																																		
1.Graph		2.Values																																	
<div><div><div>---□---</div><div>Load 50%</div></div><div><div>—△—</div><div>Load 100%</div></div></div> 		<table><tr><th rowspan="2">Input Voltage [V]</th><th colspan="2">Output Voltage [V]</th></tr><tr><th>Load 50%</th><th>Load 100%</th></tr><tr><td>4.0</td><td>12.178</td><td>12.116</td></tr><tr><td>4.5</td><td>12.178</td><td>12.116</td></tr><tr><td>5.0</td><td>12.176</td><td>12.116</td></tr><tr><td>6.0</td><td>12.173</td><td>12.117</td></tr><tr><td>7.0</td><td>12.171</td><td>12.117</td></tr><tr><td>8.0</td><td>12.171</td><td>12.117</td></tr><tr><td>9.0</td><td>12.168</td><td>12.116</td></tr><tr><td>9.5</td><td>12.168</td><td>12.116</td></tr><tr><td>--</td><td>-</td><td>-</td></tr></table>		Input Voltage [V]	Output Voltage [V]		Load 50%	Load 100%	4.0	12.178	12.116	4.5	12.178	12.116	5.0	12.176	12.116	6.0	12.173	12.117	7.0	12.171	12.117	8.0	12.171	12.117	9.0	12.168	12.116	9.5	12.168	12.116	--	-	-
Input Voltage [V]	Output Voltage [V]																																		
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5.0	12.176	12.116																																	
6.0	12.173	12.117																																	
7.0	12.171	12.117																																	
8.0	12.171	12.117																																	
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Input Voltage [V]	Output Voltage [V]																																		
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7.0	-12.174	-12.118																																	
8.0	-12.172	-12.117																																	
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Note: Slanted line shows the range of the rated input voltage.																																			

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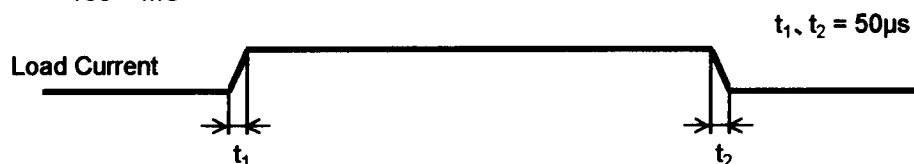


Model		SUW60515/SUCW60515		Temperature 25°C																																																				
Item		Load Regulation		Testing Circuitry Figure A																																																				
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1.Graph		<div><div>—△—</div>Input Volt. 4.5V</div> <div><div>---□---</div>Input Volt. 5V</div> <div><div>---○---</div>Input Volt. 9V</div>		2.Values																																																				
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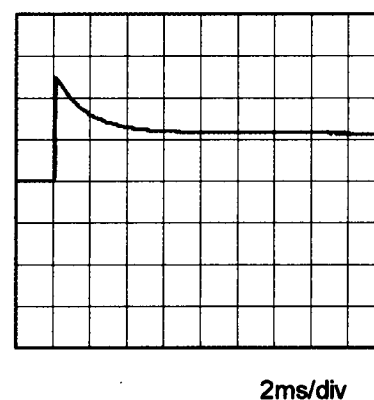
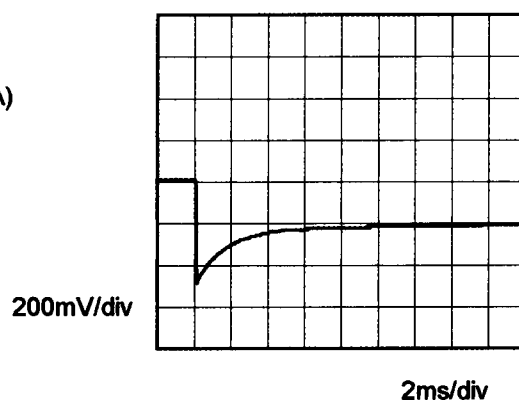


Model	SUW60515/SUCW60515	Temperature 25°C Testing Circuitry Figure A
Item	Dynamic Load Response	
Object	+15V0.2A	

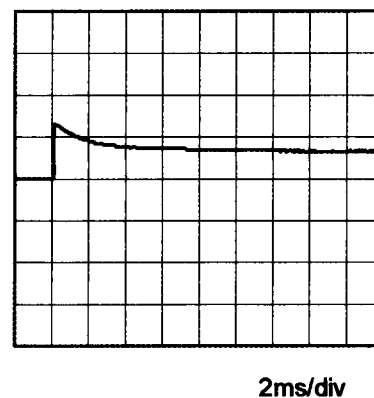
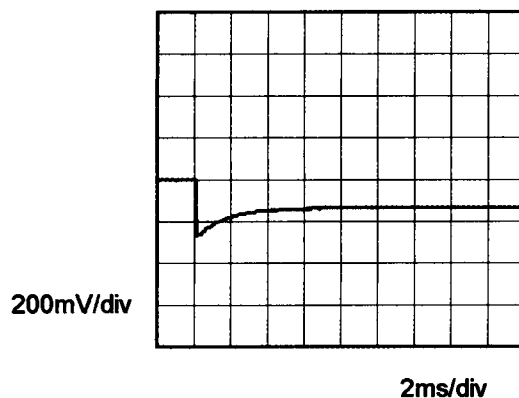
Input Volt. 5 V  
Cycle 100 mS



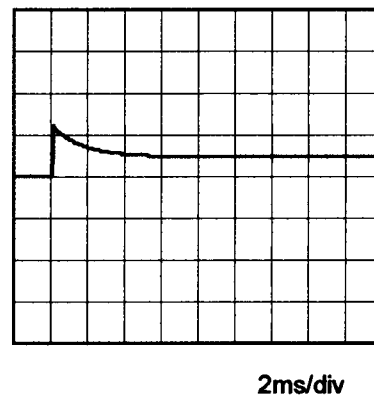
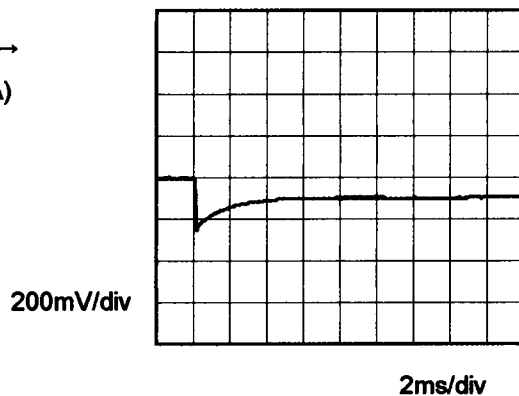
Min. Load (0A)  $\longleftrightarrow$   
Load 100% (0.2A)



Min. Load (0A)  $\longleftrightarrow$   
Load 50% (0.1A)



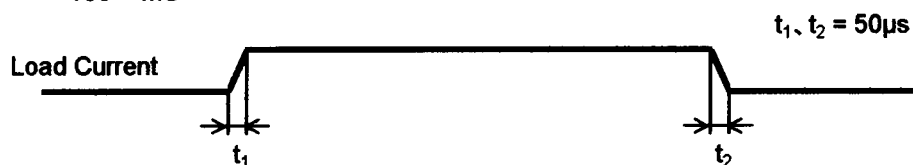
Load 50% (0.1A)  $\longleftrightarrow$   
Load 100% (0.2A)



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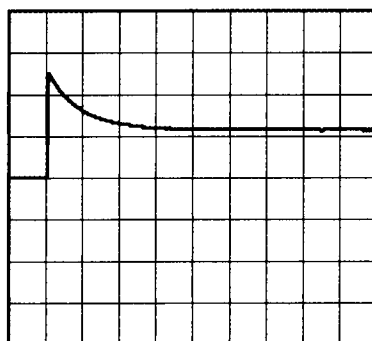
Model	SUW60515/SUCW60515	Temperature	25°C
Item	Dynamic Load Response	Testing Circuitry	Figure A
Object	-15V0.2A		

Input Volt. 5 V  
Cycle 100 mS

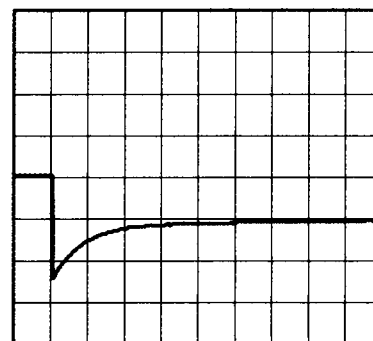


Min. Load (0A)  $\longleftrightarrow$   
Load 100% (0.2A)

200mV/div



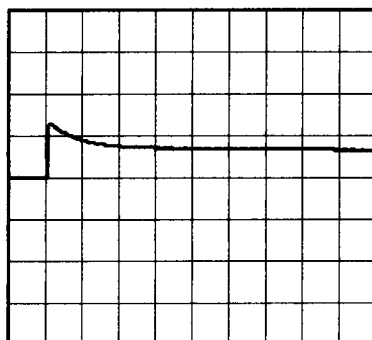
2ms/div



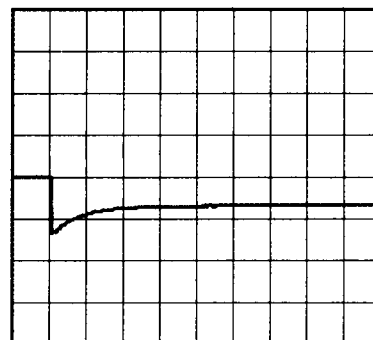
2ms/div

Min. Load (0A)  $\longleftrightarrow$   
Load 50% (0.1A)

200mV/div



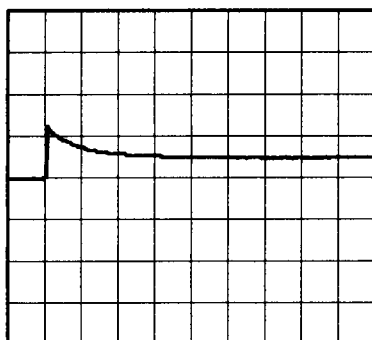
2ms/div



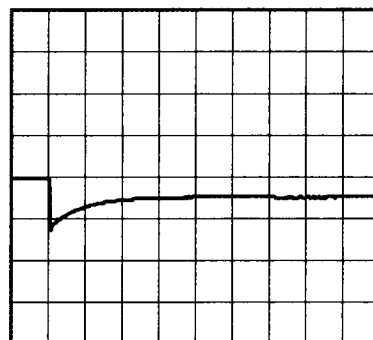
2ms/div

Load 50% (0.1A)  $\longleftrightarrow$   
Load 100% (0.2A)

200mV/div

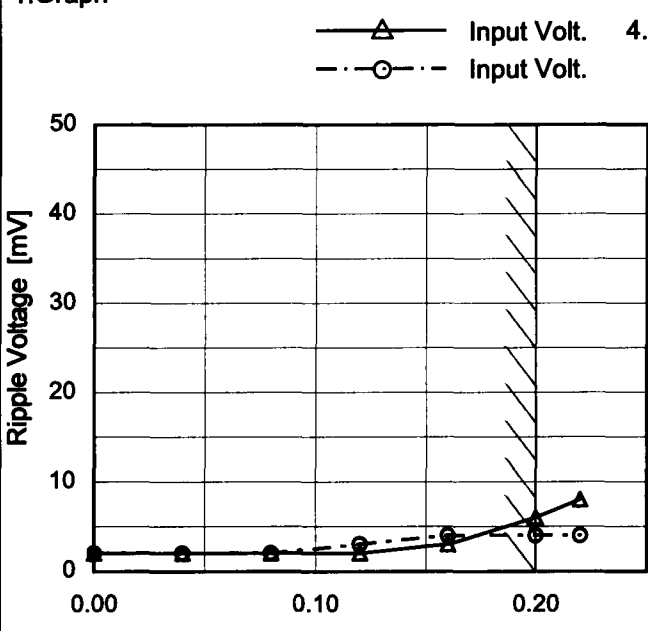
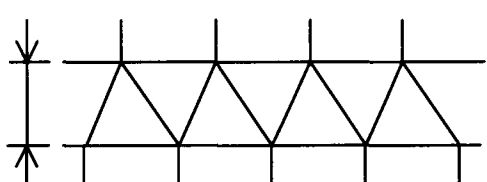


2ms/div



2ms/div

# COSEL

Model	SUW60515/SUCW60515																																								
Item	Ripple Voltage (by Load Current)	Temperature	25°C																																						
Object	+15V0.2A	Testing Circuitry	Figure B																																						
1.Graph		2.Values																																							
<div><div><div><div><div></div><div>Input Volt.</div><div>4.5V</div></div><div><div></div><div>Input Volt.</div><div>9V</div></div></div><div></div></div></div>		<table><tr><th rowspan="2">Load Current [A]</th><th colspan="2">Ripple Voltage [mV]</th></tr><tr><th>Input Volt. 4.5 [V]</th><th>Input Volt. 9 [V]</th></tr><tr><td>0.00</td><td>2</td><td>2</td></tr><tr><td>0.04</td><td>2</td><td>2</td></tr><tr><td>0.08</td><td>2</td><td>2</td></tr><tr><td>0.12</td><td>2</td><td>3</td></tr><tr><td>0.16</td><td>3</td><td>4</td></tr><tr><td>0.20</td><td>6</td><td>4</td></tr><tr><td>0.22</td><td>8</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. 4.5 [V]	Input Volt. 9 [V]	0.00	2	2	0.04	2	2	0.08	2	2	0.12	2	3	0.16	3	4	0.20	6	4	0.22	8	4	--	-	-	--	-	-	--	-	-	--	-	-
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<div><div><div><div></div><div>Ripple [mVp-p]</div></div><div></div></div><div>Fig.Complex Ripple Wave Form</div></div>																																									

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BC-3699

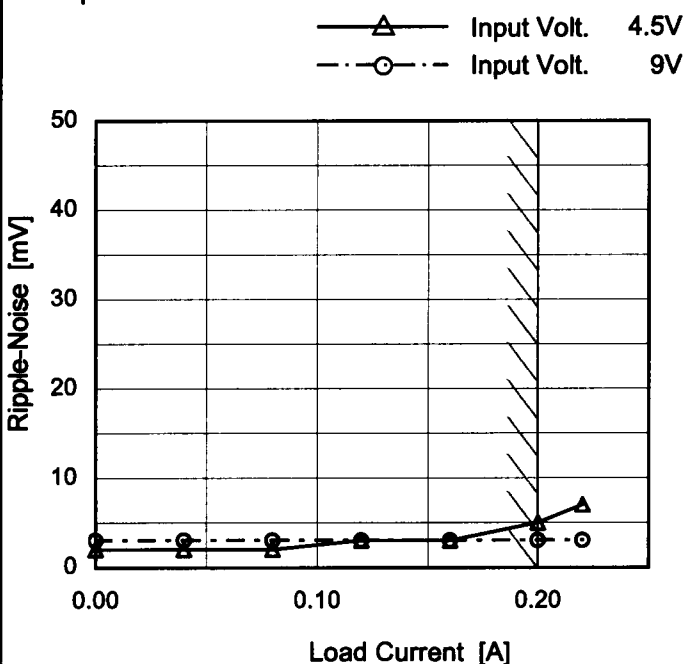
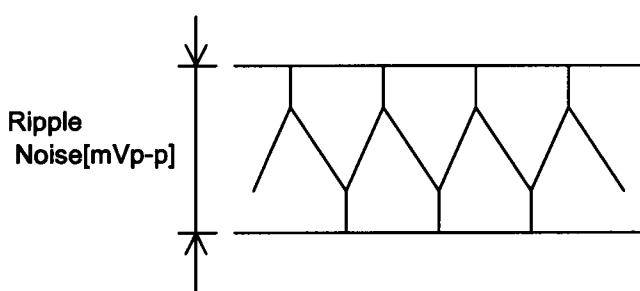
# COSEL

Model		SUW60515/SUCW60515	
Item		Ripple Voltage (by Load Current)	
Object		-15V0.2A	
1.Graph		2.Values	
<div><div><div><div><div></div><div></div></div><div><div></div><div></div></div></div><div><div></div><div></div></div><div><div></div><div></div></div></div><div><div></div><div></div></div><div><div></div><div></div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> <div><div></div><div></div></div> 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0.12	3	3																																																																											
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0.20	6	4																																																																											
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# COSEL

Model	SUW60515/SUCW60515																																								
Item	Ripple-Noise	Temperature	25°C																																						
Object	-15V0.2A	Testing Circuitry	Figure B																																						
1.Graph		2.Values																																							
<div><div><div><div><div></div><div>—△—</div><div>Input Volt. 4.5V</div></div><div><div>---○---</div><div>Input Volt. 9V</div></div></div><div></div></div></div>		<table><tr><th rowspan="2">Load Current [A]</th><th colspan="2">Ripple-Noise [mV]</th></tr><tr><th>Input Volt. 4.5 [V]</th><th>Input Volt. 9 [V]</th></tr><tr><td>0.00</td><td>2</td><td>3</td></tr><tr><td>0.04</td><td>2</td><td>3</td></tr><tr><td>0.08</td><td>2</td><td>3</td></tr><tr><td>0.12</td><td>3</td><td>3</td></tr><tr><td>0.16</td><td>3</td><td>3</td></tr><tr><td>0.20</td><td>5</td><td>3</td></tr><tr><td>0.22</td><td>7</td><td>3</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-Noise [mV]		Input Volt. 4.5 [V]	Input Volt. 9 [V]	0.00	2	3	0.04	2	3	0.08	2	3	0.12	3	3	0.16	3	3	0.20	5	3	0.22	7	3	--	-	-	--	-	-	--	-	-	--	-	-
Load Current [A]	Ripple-Noise [mV]																																								
	Input Volt. 4.5 [V]	Input Volt. 9 [V]																																							
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<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>Ripple Noise[mVp-p]</div></div><div></div></div><p>Fig.Complex Ripple Noise Wave Form</p></div>																																									

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# COSEL

Model		SUW60515/SUCW60515																																					
Item		Ripple Voltage (by Ambient Temp.)																																					
Object		+15V0.2A																																					
1.Graph																																							
<div><div><div><div><div></div><div></div><div></div></div><div><div></div><div></div><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% [mV]</th><th>Load 100% [mV]</th></tr></thead><tbody><tr><td>-60</td><td>4</td><td>8</td></tr><tr><td>-40</td><td>4</td><td>7</td></tr><tr><td>-20</td><td>4</td><td>7</td></tr><tr><td>0</td><td>3</td><td>6</td></tr><tr><td>25</td><td>2</td><td>4</td></tr><tr><td>55</td><td>1</td><td>3</td></tr><tr><td>60</td><td>1</td><td>3</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>Input Volt. 5V</div>				Ambient Temperature [°C]	Load 50% [mV]	Load 100% [mV]	-60	4	8	-40	4	7	-20	4	7	0	3	6	25	2	4	55	1	3	60	1	3	--	-	-	--	-	-	--	-	-	--	-	-
Ambient Temperature [°C]	Load 50% [mV]	Load 100% [mV]																																					
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Ambient Temperature [°C]	Load 50% [mV]	Load 100% [mV]																																					
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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%																																				
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60		1	3																																				
--		-	-																																				
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Ambient Temperature [°C]	Ripple Voltage [mV]	
	Load 50%	Load 100%
-60	3	4
-40	3	4
-20	3	4
0	2	3
25	2	3
55	1	2
60	1	2
--	-	-
--	-	-
--	-	-
--	-	-

2.Values			
Ambient Temperature [°C]		Ripple Voltage [mV]	
		Load 50%	Load 100%
-60		3	4
-40		3	4
-20		3	4
0		2	3
25		2	3
55		1	2
60		1	2
--		-	-
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Model	SUW60515/SUCW60515																																																						
Item	Ambient Temperature Drift																																																						
Object	+15V0.2A																																																						
1.Graph		Testing Circuitry Figure A																																																					
		2.Values																																																					
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Ambient Temperature [°C]	Output Voltage [V]																																																						
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Object	-15V0.2A																																																						
1.Graph		2.Values																																																					
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Note: Slanted line shows the range of the rated ambient temperature.																																																							

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		Testing Circuitry Figure A
Model	SUW60515/SUCW60515	
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 - 0.2A (AVR 2): 0 - 0.2A

\* Other Output : Rated Load

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

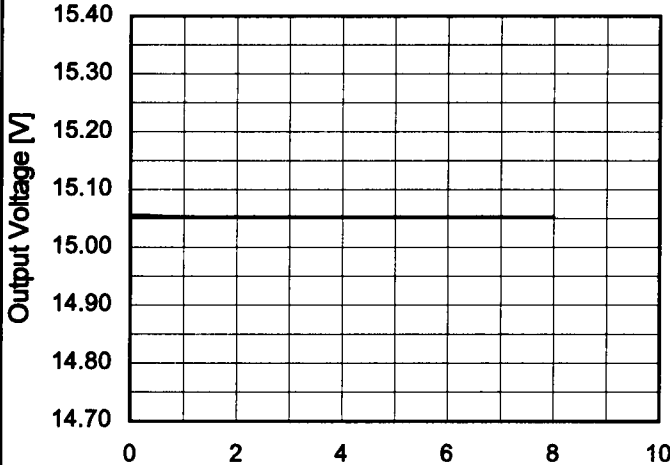
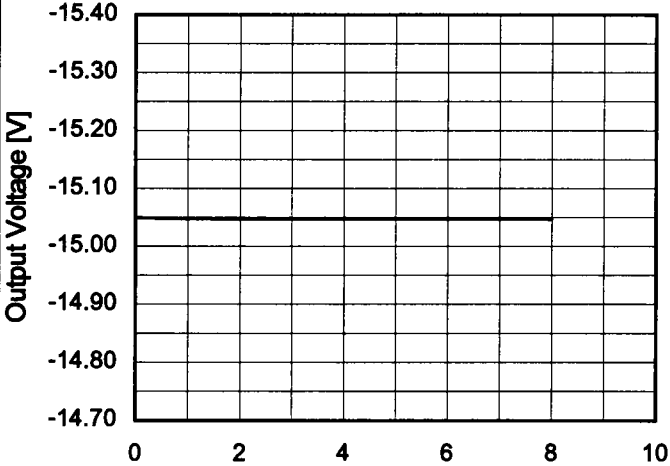
\* Output Voltage Accuracy (Ratio) =  $\frac{\text{Output Voltage Accuracy}}{\text{Rated Output Voltage}} \times 100$

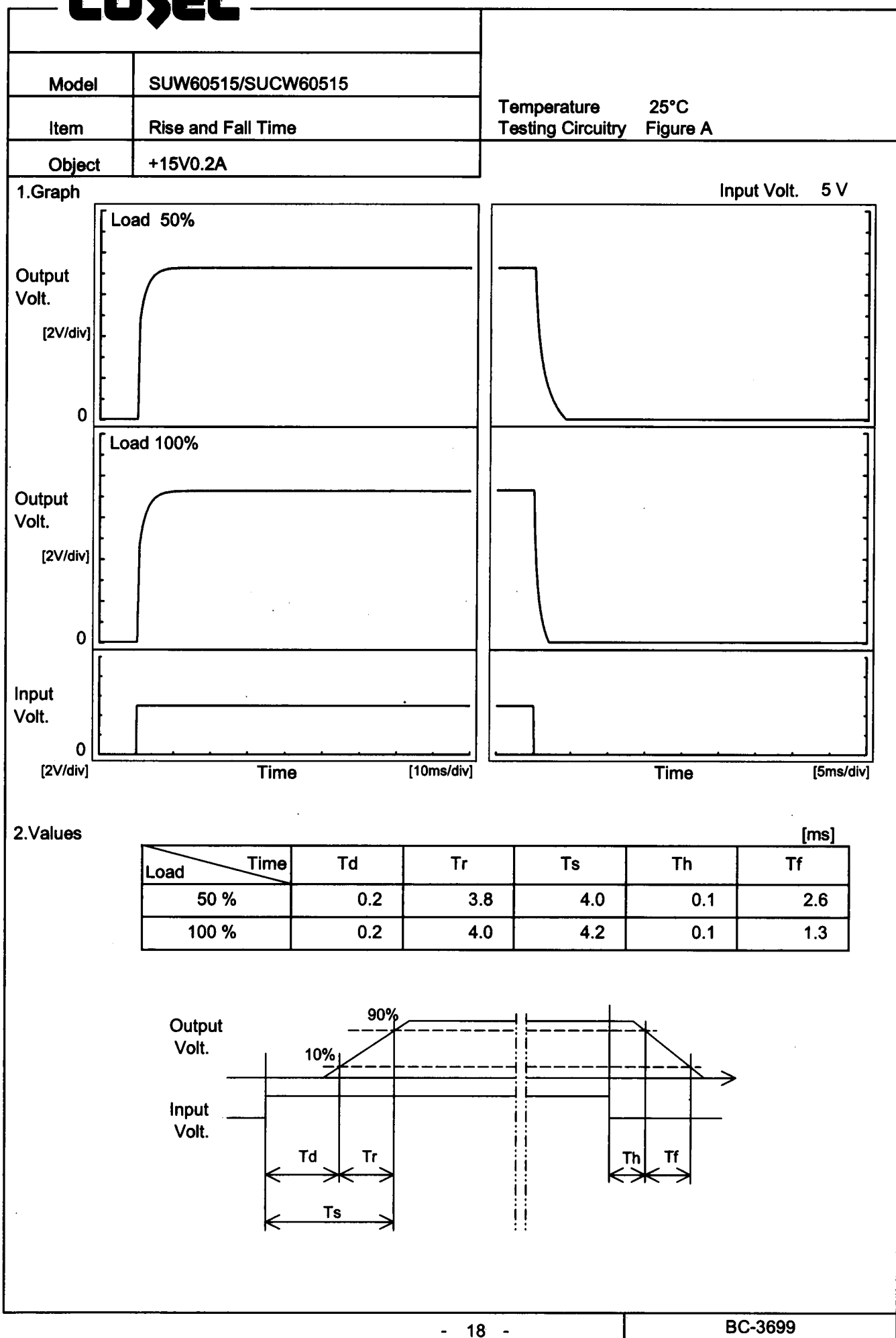
### 2. Values

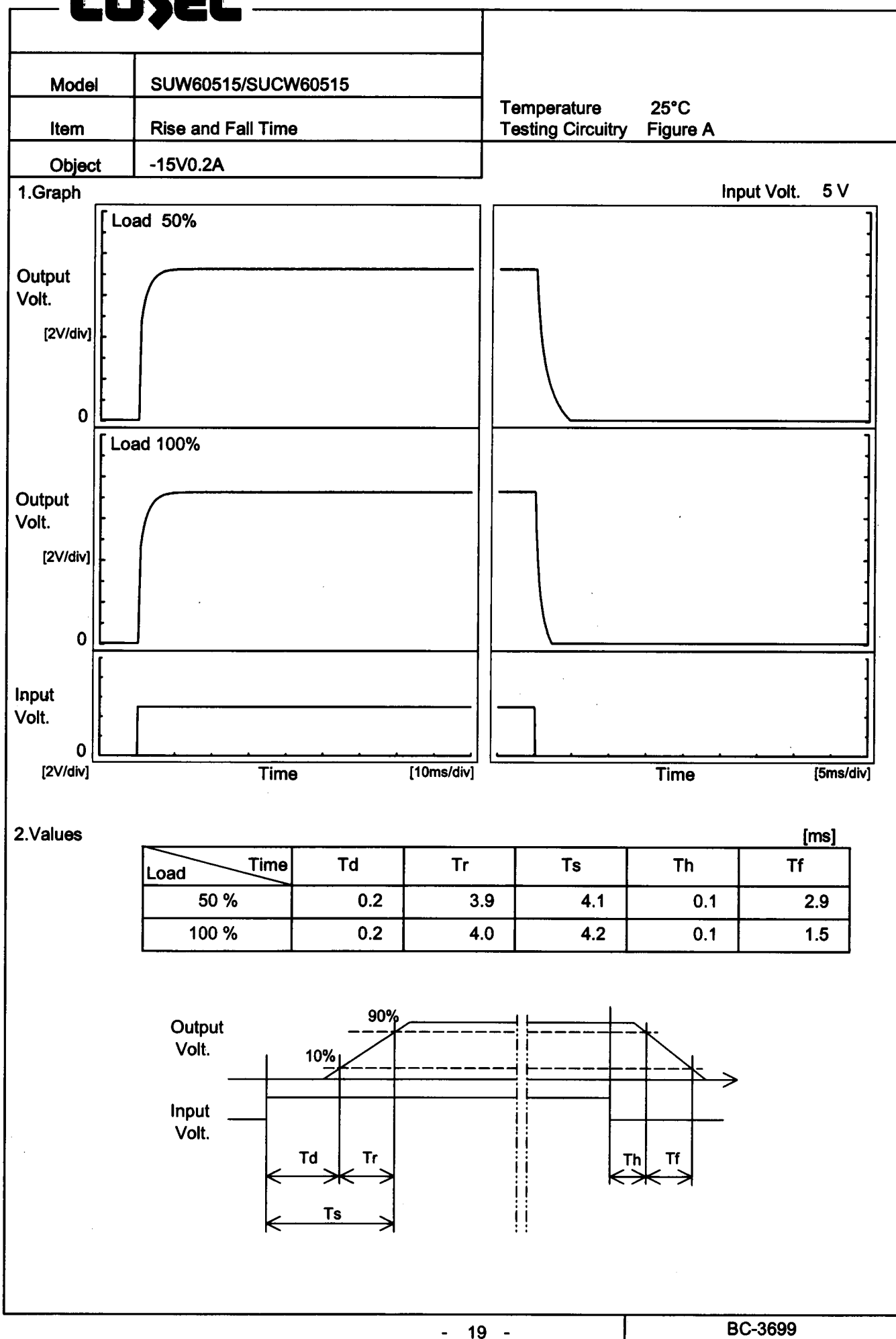
Object		+15V0.2A			
Item	Temperature [°C]	Input Voltage[V]	Output		Output Voltage Accuracy
			Current[A]	Voltage[V]	Value [mV]    Ration [%]
Maximum Voltage	55	4.5	0	15.280	±134    ±0.9
Minimum Voltage	-40	4.5	0.2	15.013	

Object		-15V0.2A			
Item	Temperature [°C]	Input Voltage[V]	Output		Output Voltage Accuracy
			Current[A]	Voltage[V]	Value [mV]    Ration [%]
Maximum Voltage	55	4.5	0	-15.296	±145    ±1.0
Minimum Voltage	-40	5	0.2	-15.006	

**COSEL**

Model	SUW60515/SUCW60515																								
Item	Time Lapse Drift																								
Object	+15V0.2A																								
1.Graph		2.Values																							
<div><p>Output Voltage [V]</p><p>Time [H]</p><p>Input Volt. 5V</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>15.056</td></tr><tr><td>0.5</td><td>15.054</td></tr><tr><td>1.0</td><td>15.053</td></tr><tr><td>2.0</td><td>15.053</td></tr><tr><td>3.0</td><td>15.053</td></tr><tr><td>4.0</td><td>15.053</td></tr><tr><td>5.0</td><td>15.053</td></tr><tr><td>6.0</td><td>15.053</td></tr><tr><td>7.0</td><td>15.053</td></tr><tr><td>8.0</td><td>15.053</td></tr></table>		Time since start [H]	Output Voltage [V]	0.0	15.056	0.5	15.054	1.0	15.053	2.0	15.053	3.0	15.053	4.0	15.053	5.0	15.053	6.0	15.053	7.0	15.053	8.0	15.053
Time since start [H]	Output Voltage [V]																								
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8.0	-15.047																								

**COSEL**

**COSEL**

# COSEL

Model	SUW60515/SUCW60515	Testing Circuitry    Figure A																																					
Item	Minimum Input Voltage for Regulated Output Voltage																																						
Object	+15V0.2A																																						
1.Graph		2.Values																																					
<div>-----□-----    Load 50%</div> <div>-----△-----    Load 100%</div> <table><thead><tr><th>Ambient Temperature [°C]</th><th>Load 50%</th><th>Load 100%</th></tr></thead><tbody><tr><td>-60</td><td>3.8</td><td>3.9</td></tr><tr><td>-40</td><td>3.7</td><td>3.8</td></tr><tr><td>-20</td><td>3.6</td><td>3.6</td></tr><tr><td>0</td><td>3.4</td><td>3.5</td></tr><tr><td>25</td><td>3.4</td><td>3.4</td></tr><tr><td>55</td><td>3.3</td><td>3.4</td></tr><tr><td>60</td><td>3.2</td><td>3.3</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>		Ambient Temperature [°C]	Load 50%	Load 100%	-60	3.8	3.9	-40	3.7	3.8	-20	3.6	3.6	0	3.4	3.5	25	3.4	3.4	55	3.3	3.4	60	3.2	3.3	--	-	-	--	-	-	--	-	-	--	-	-		
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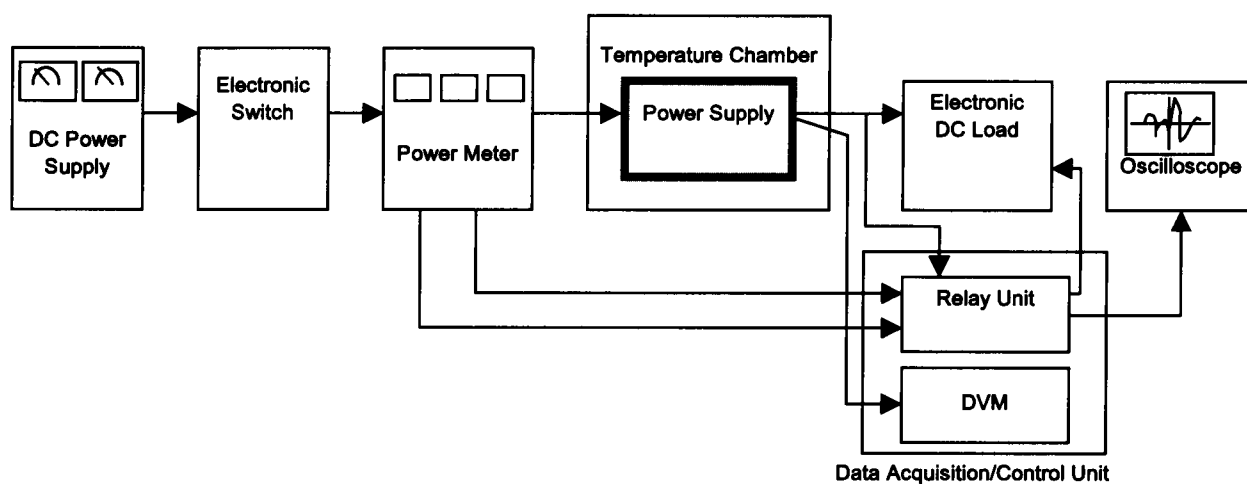


Figure A

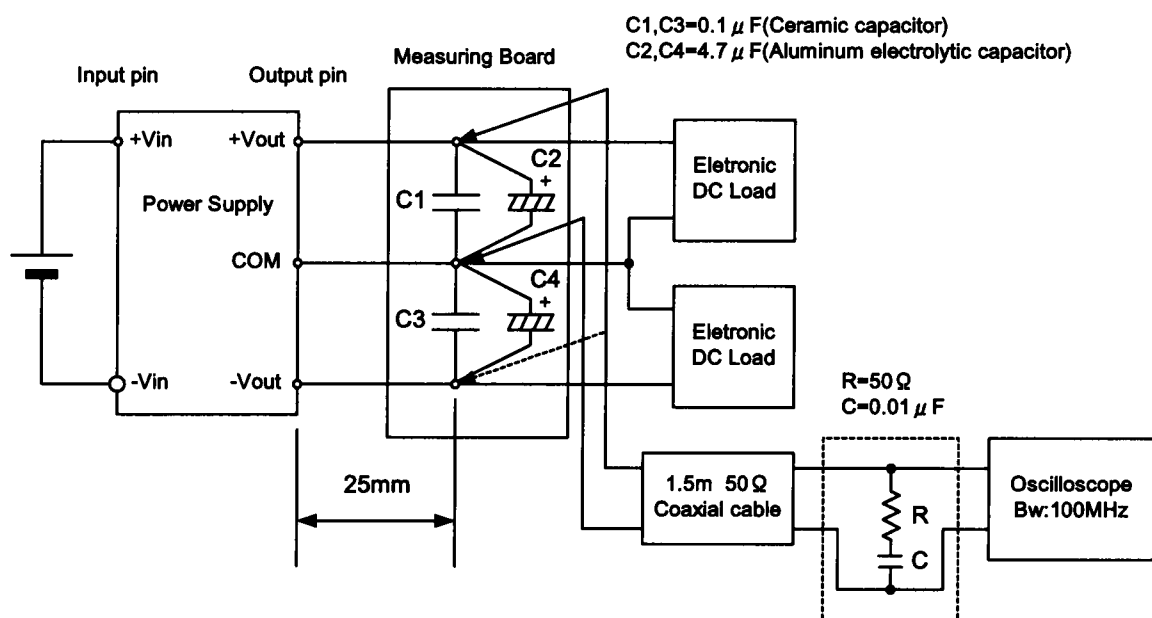


Figure B (Ripple and Ripple noise Characteristic)