



# TEST DATA OF SUCW32412

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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# COSEL

Model

SUCW32412

Item

Input Current (by Input Voltage)

Object

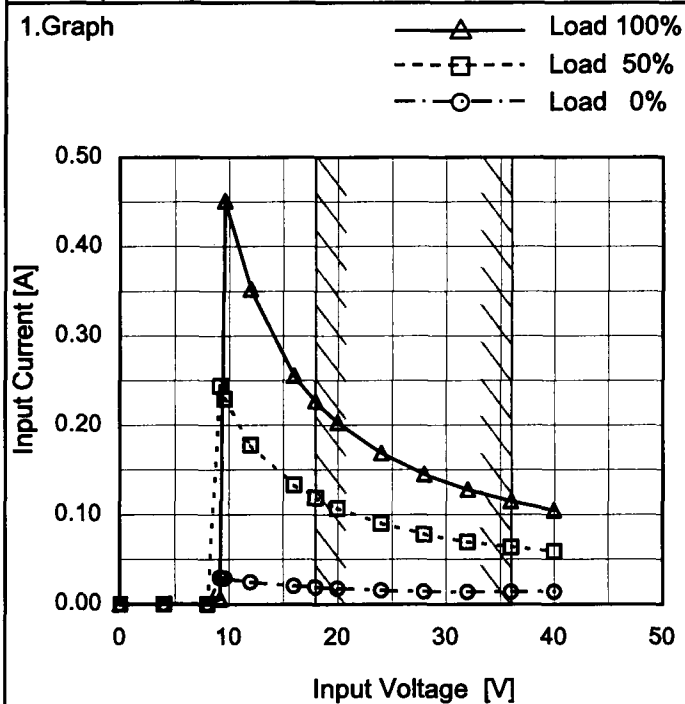
Temperature

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%
0.0	0.000	0.000	0.000
4.0	0.000	0.000	0.000
8.0	0.000	0.000	0.000
9.2	0.030	0.244	0.006
9.6	0.029	0.230	0.451
12.0	0.024	0.178	0.353
16.0	0.020	0.133	0.256
18.0	0.019	0.119	0.227
20.0	0.017	0.107	0.203
24.0	0.015	0.090	0.169
28.0	0.014	0.078	0.145
32.0	0.013	0.070	0.128
36.0	0.013	0.063	0.115
40.0	0.014	0.059	0.105
--	-	-	-
--	-	-	-
--	-	-	-
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# COSEL

Model

SUCW32412

Item

Input Current (by Load Current)

Object

Temperature

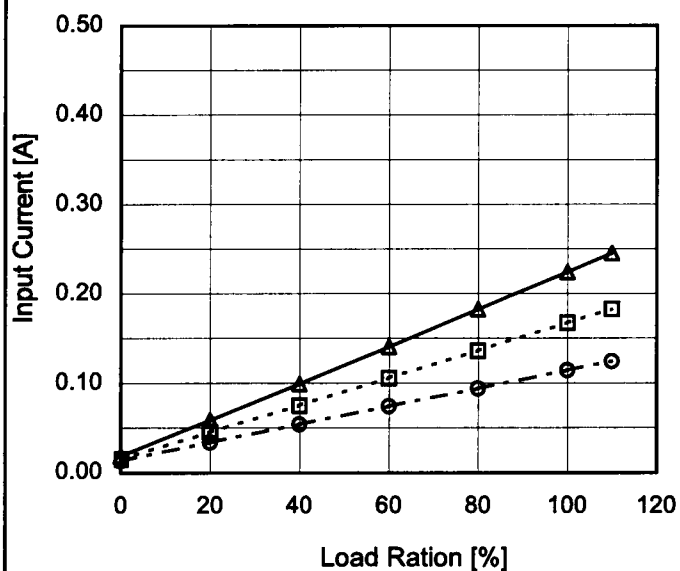
25°C

Testing Circuitry

Figure A

## 1. Graph

—△— Input Volt. 18V  
 ---□--- Input Volt. 24V  
 - - ○ - - Input Volt. 36V



## 2. Values

Load Ration [%]	Input Current [A]		
	Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]
0	0.019	0.015	0.013
20	0.059	0.045	0.034
40	0.099	0.075	0.054
60	0.140	0.106	0.074
80	0.182	0.136	0.094
100	0.224	0.167	0.114
110	0.246	0.183	0.124
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2.Values <div><table><tr><th rowspan="2">Load Ration [%]</th><th colspan="3">Input Power [W]</th></tr><tr><th>Input Volt. 18[V]</th><th>Input Volt. 24[V]</th><th>Input Volt. 36[V]</th></tr><tr><td>0</td><td>0.33</td><td>0.37</td><td>0.48</td></tr><tr><td>20</td><td>1.05</td><td>1.09</td><td>1.21</td></tr><tr><td>40</td><td>1.78</td><td>1.81</td><td>1.93</td></tr><tr><td>60</td><td>2.52</td><td>2.54</td><td>2.65</td></tr><tr><td>80</td><td>3.27</td><td>3.28</td><td>3.38</td></tr><tr><td>100</td><td>4.03</td><td>4.02</td><td>4.11</td></tr><tr><td>110</td><td>4.42</td><td>4.40</td><td>4.48</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></div>				Load Ration [%]	Input Power [W]			Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]	0	0.33	0.37	0.48	20	1.05	1.09	1.21	40	1.78	1.81	1.93	60	2.52	2.54	2.65	80	3.27	3.28	3.38	100	4.03	4.02	4.11	110	4.42	4.40	4.48	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-
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# COSEL

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<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> <table><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>16</td><td>73.5</td><td>77.6</td></tr><tr><td>18</td><td>73.2</td><td>78.0</td></tr><tr><td>20</td><td>73.2</td><td>78.2</td></tr><tr><td>24</td><td>72.4</td><td>78.2</td></tr><tr><td>30</td><td>71.1</td><td>77.7</td></tr><tr><td>36</td><td>68.8</td><td>76.5</td></tr><tr><td>40</td><td>66.6</td><td>75.4</td></tr><tr><td>--</td><td>-</td><td>-</td></tr><tr><td>--</td><td>-</td><td>-</td></tr></tbody></table> <p>Note: Slanted line shows the range of the rated input voltage.</p>		Input Voltage [V]	Efficiency [%]		Load 50%	Load 100%	16	73.5	77.6	18	73.2	78.0	20	73.2	78.2	24	72.4	78.2	30	71.1	77.7	36	68.8	76.5	40	66.6	75.4	--	-	-	--	-	-		
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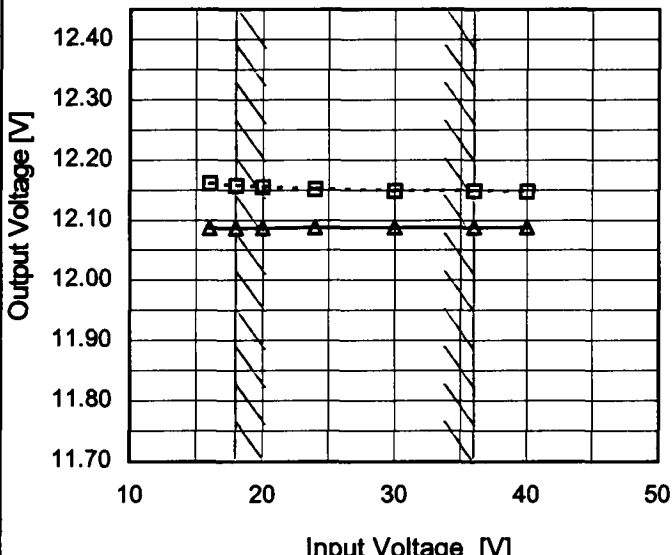
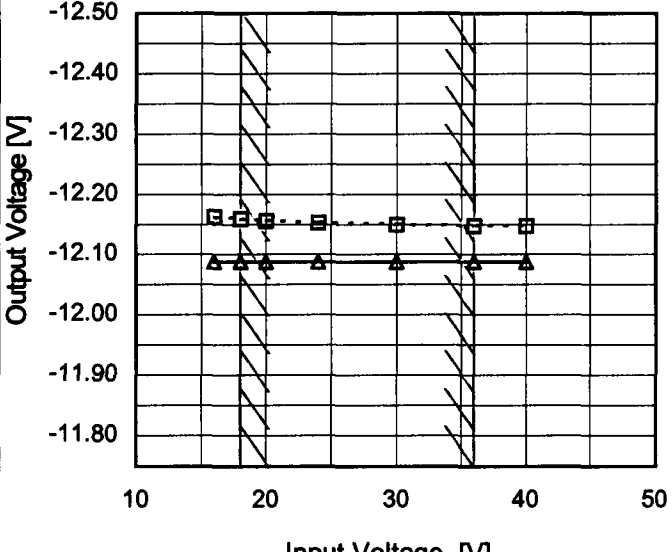
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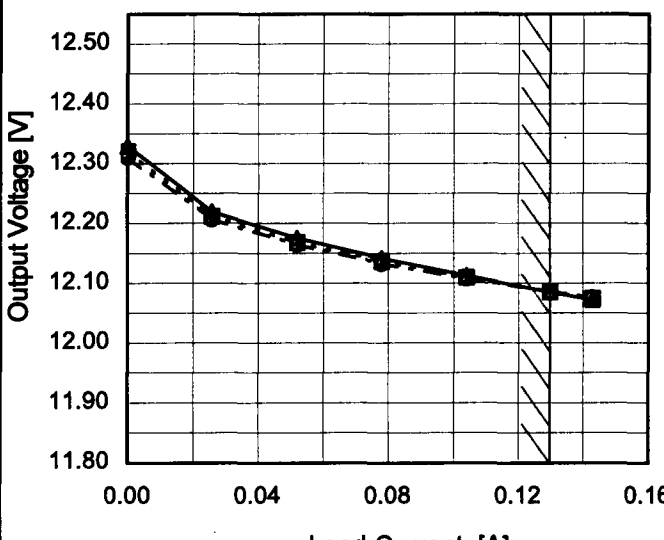
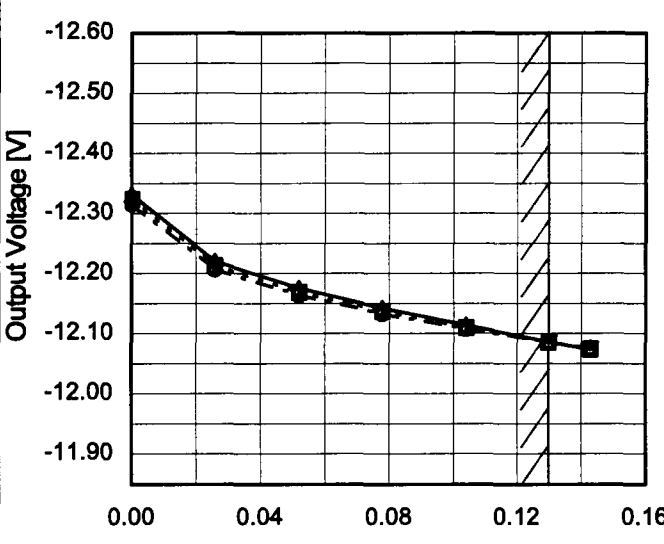
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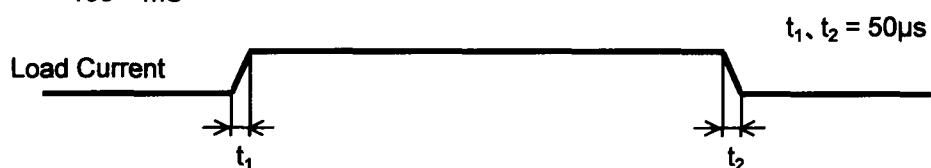
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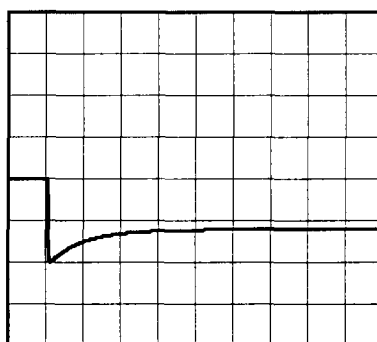
Model	SUCW32412	Temperature	25°C
Item	Dynamic Load Response	Testing Circuitry	Figure A
Object	+12V0.13A		

Input Volt. 24 V  
Cycle 100 mS

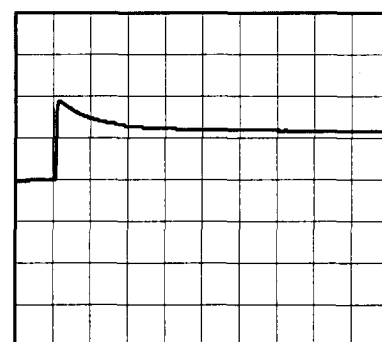


Min. Load (0A)  $\longleftrightarrow$   
Load 100% (0.13A)

200mV/div



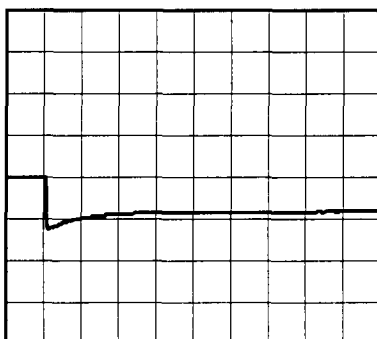
2ms/div



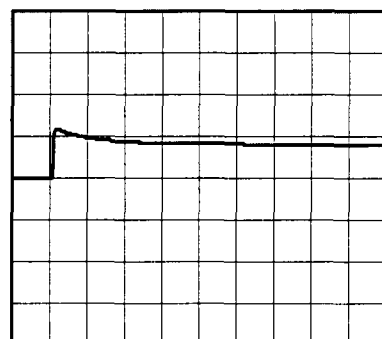
2ms/div

Min. Load (0A)  $\longleftrightarrow$   
Load 50% (0.065A)

200mV/div



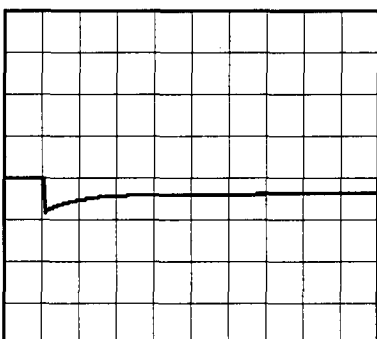
2ms/div



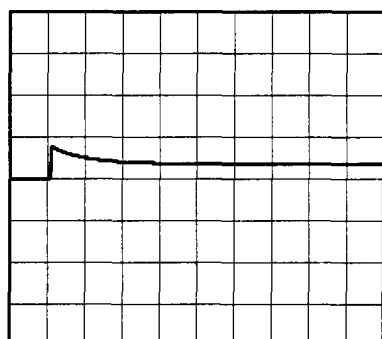
2ms/div

Load 50% (0.065A)  $\longleftrightarrow$   
Load 100% (0.13A)

200mV/div



2ms/div

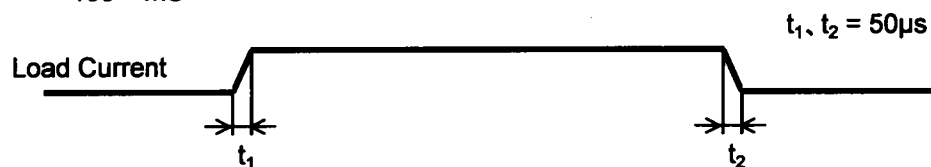


2ms/div

# COSEL

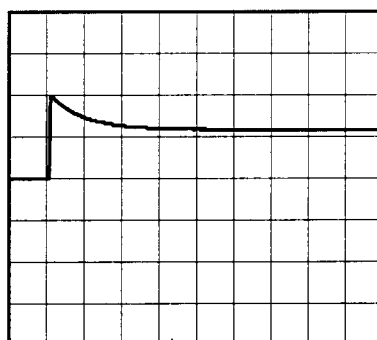
Model	SUCW32412	Temperature	25°C
Item	Dynamic Load Response	Testing Circuitry	Figure A
Object	-12V0.13A		

Input Volt. 24 V  
Cycle 100 mS

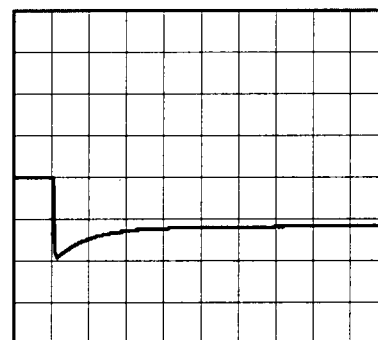


Min. Load (0A)  $\longleftrightarrow$   
Load 100% (0.13A)

200mV/div



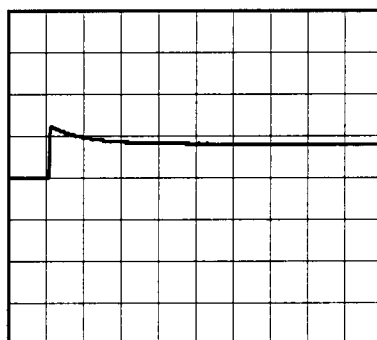
2ms/div



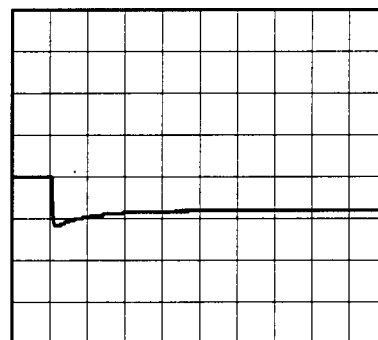
2ms/div

Min. Load (0A)  $\longleftrightarrow$   
Load 50% (0.065A)

200mV/div



2ms/div



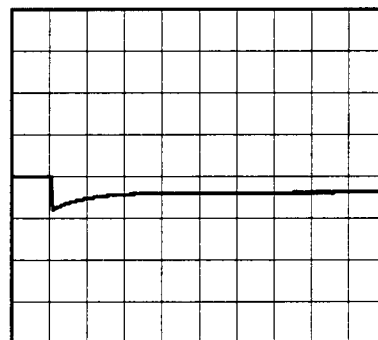
2ms/div

Load 50% (0.065A)  $\longleftrightarrow$   
Load 100% (0.13A)

200mV/div

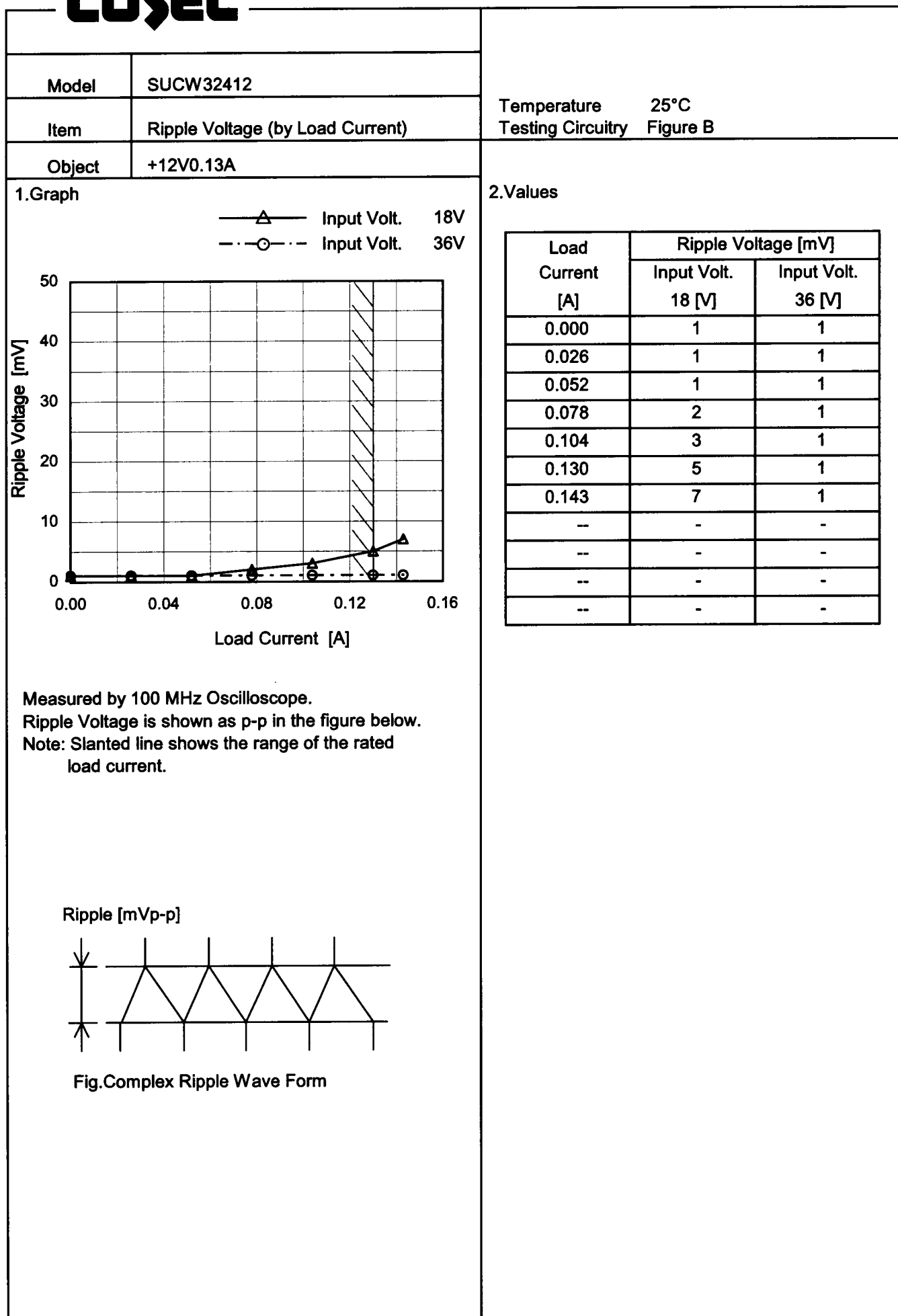


2ms/div



2ms/div

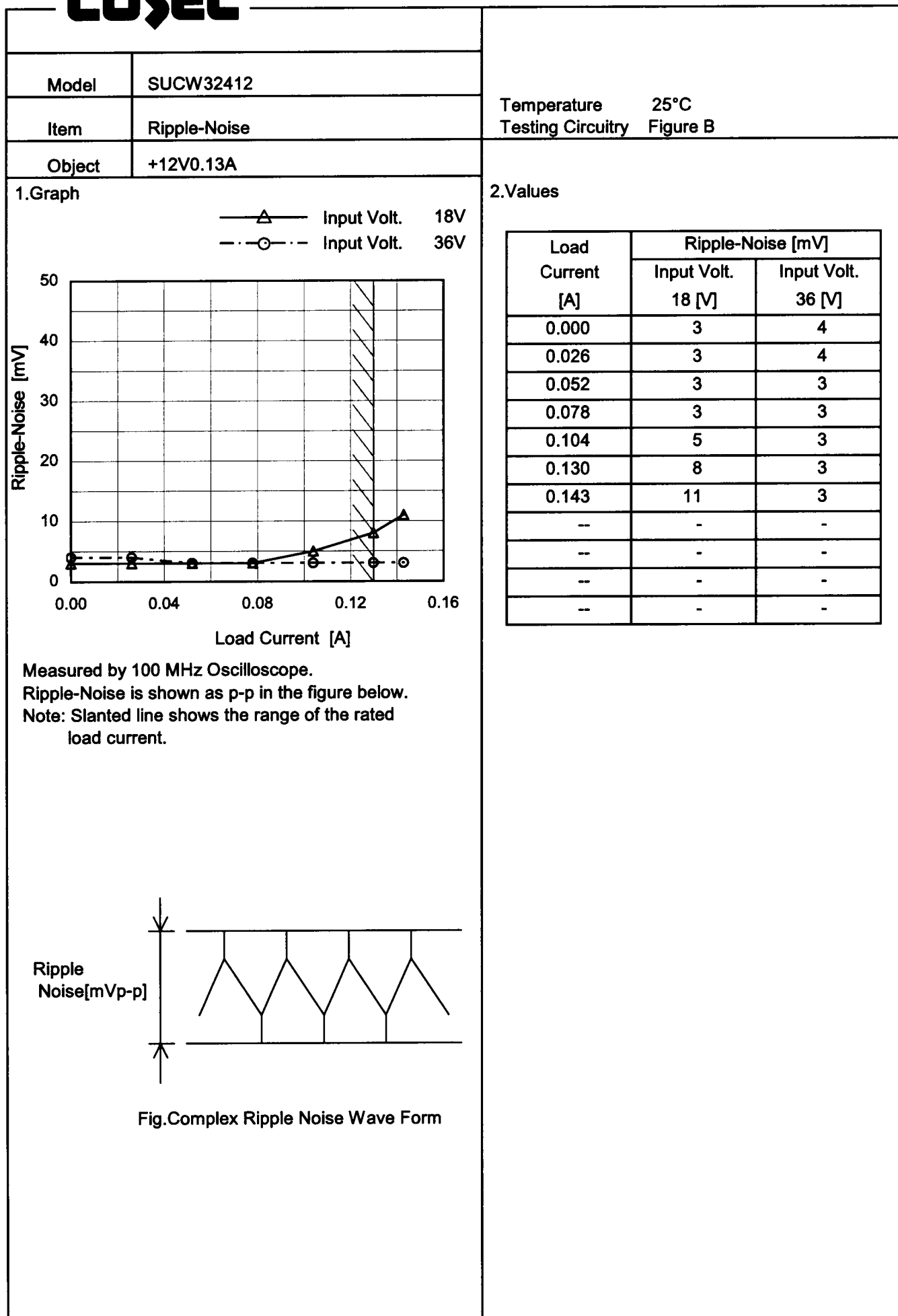
# COSEL



# COSEL

Model	SUCW32412	Temperature 25°C Testing Circuitry Figure B		
Item	Ripple Voltage (by Load Current)			
Object	-12V0.13A			
1.Graph		2.Values		
<div><div><div><div></div><div>Input Volt. 18V</div></div><div><div></div><div>Input Volt. 36V</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><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><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><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><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><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><di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# COSEL



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Model	SUCW32412	Temperature 25°C Testing Circuitry Figure B																																										
Item	Ripple-Noise																																											
Object	-12V0.13A																																											
1.Graph		2.Values																																										
<div><div><div>—△—</div><div>Input Volt. 18V</div></div><div><div>---○---</div><div>Input Volt. 36V</div></div></div> <p>Ripple-Noise [mV]</p> <p>Load Current [A]</p> <p>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.</p>		<table><tr><th rowspan="2">Load Current [A]</th><th colspan="2">Ripple-Noise [mV]</th></tr><tr><th>Input Volt. 18 [V]</th><th>Input Volt. 36 [V]</th></tr><tr><td>0.000</td><td>8</td><td>9</td></tr><tr><td>0.026</td><td>9</td><td>11</td></tr><tr><td>0.052</td><td>10</td><td>11</td></tr><tr><td>0.078</td><td>10</td><td>11</td></tr><tr><td>0.104</td><td>9</td><td>11</td></tr><tr><td>0.130</td><td>9</td><td>11</td></tr><tr><td>0.143</td><td>9</td><td>11</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><tr><td>--</td><td>-</td><td>-</td></tr></table>		Load Current [A]	Ripple-Noise [mV]		Input Volt. 18 [V]	Input Volt. 36 [V]	0.000	8	9	0.026	9	11	0.052	10	11	0.078	10	11	0.104	9	11	0.130	9	11	0.143	9	11	--	-	-	--	-	-	--	-	-	--	-	-	--	-	-
Load Current [A]	Ripple-Noise [mV]																																											
	Input Volt. 18 [V]	Input Volt. 36 [V]																																										
0.000	8	9																																										
0.026	9	11																																										
0.052	10	11																																										
0.078	10	11																																										
0.104	9	11																																										
0.130	9	11																																										
0.143	9	11																																										
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--	-	-																																										
<p>Ripple Noise[mVp-p]</p> <p>Fig.Complex Ripple Noise Wave Form</p>																																												

# COSEL

Model		SUCW32412																																																																											
Item		Ripple Voltage (by Ambient Temp.)																																																																											
Object		+12V0.13A																																																																											
1.Graph		2.Values																																																																											
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Note: Slanted line shows the range of the rated ambient temperature.																																																																													



BC-3781



		Testing Circuitry Figure A
Model	SUCW32412	
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 : 18 - 36V

Load Current (AVR 1) : 0 - 0.13A (AVR 2): 0 - 0.13A

\* Other Output : Rated Load

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

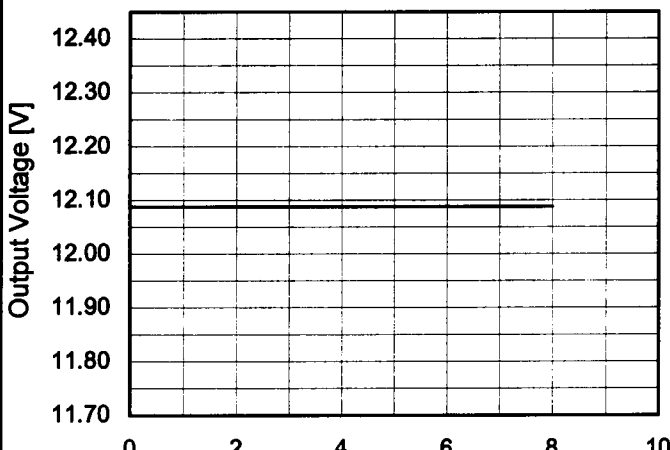
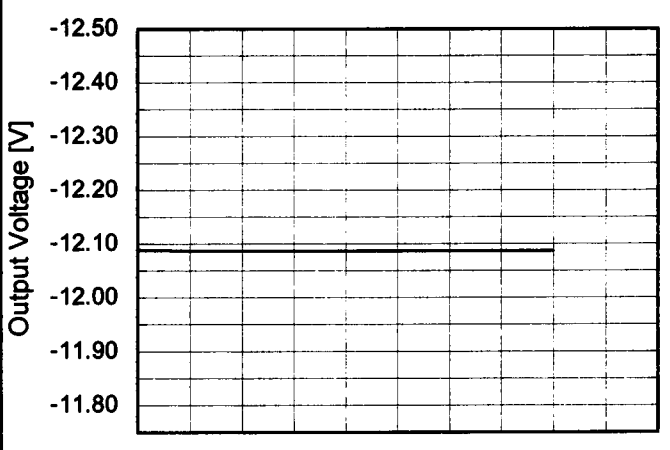
\* Output Voltage Accuracy (Ratio) =  $\frac{\text{Output Voltage Accuracy}}{\text{Rated Output Voltage}} \times 100$

### 2. Values

Object		+12V0.13A			
Item	Temperature [°C]	Input Voltage[V]	Output		Output Voltage Accuracy
			Current[A]	Voltage[V]	Value [mV]    Ration [%]
Maximum Voltage	55	18	0	12.338	±146    ±1.2
Minimum Voltage	-40	18	0.13	12.046	

Object		-12V0.13A			
Item	Temperature [°C]	Input Voltage[V]	Output		Output Voltage Accuracy
			Current[A]	Voltage[V]	Value [mV]    Ration [%]
Maximum Voltage	55	18	0	-12.338	±146    ±1.2
Minimum Voltage	-40	18	0.13	-12.046	

**COSEL**

Model	SUCW32412																								
Item	Time Lapse Drift	Temperature	25°C																						
Object	+12V0.13A	Testing Circuitry	Figure A																						
1.Graph		2.Values																							
<div><p>Output Voltage [V]</p><p>Time [H]</p><p>Input Volt. 24V Load 100%</p></div>		<table><tr><th>Time since start [H]</th><th>Output Voltage [V]</th></tr><tr><td>0.0</td><td>12.090</td></tr><tr><td>0.5</td><td>12.088</td></tr><tr><td>1.0</td><td>12.088</td></tr><tr><td>2.0</td><td>12.088</td></tr><tr><td>3.0</td><td>12.088</td></tr><tr><td>4.0</td><td>12.088</td></tr><tr><td>5.0</td><td>12.088</td></tr><tr><td>6.0</td><td>12.088</td></tr><tr><td>7.0</td><td>12.088</td></tr><tr><td>8.0</td><td>12.088</td></tr></table>		Time since start [H]	Output Voltage [V]	0.0	12.090	0.5	12.088	1.0	12.088	2.0	12.088	3.0	12.088	4.0	12.088	5.0	12.088	6.0	12.088	7.0	12.088	8.0	12.088
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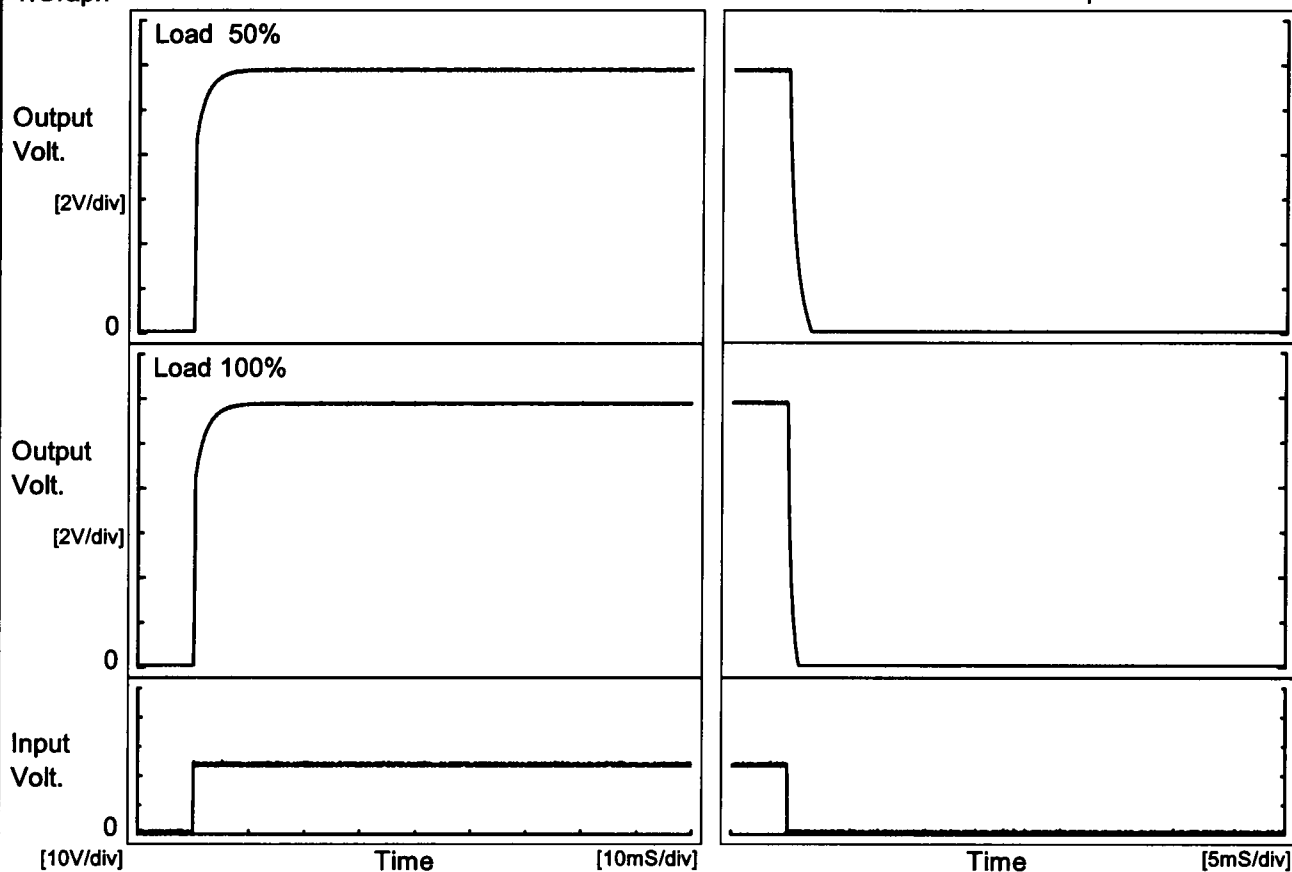
# COSEL

**Model** SUCW32412

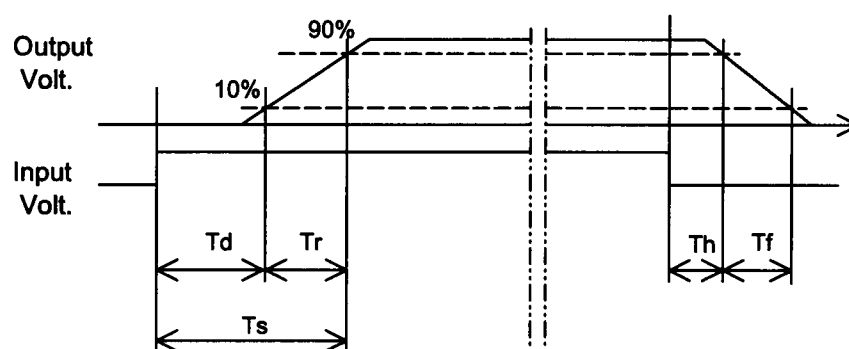
**Item** Rise and Fall Time

**Object** +12V0.13A

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

**1.Graph**
**Input Volt.** 24 V

**2.Values**
**[mS]**

Load \ Time	Td	Tr	Ts	Th	Tf
50 %	0.1	2.6	2.7	0.1	1.4
100 %	0.1	2.8	2.9	0.1	0.7

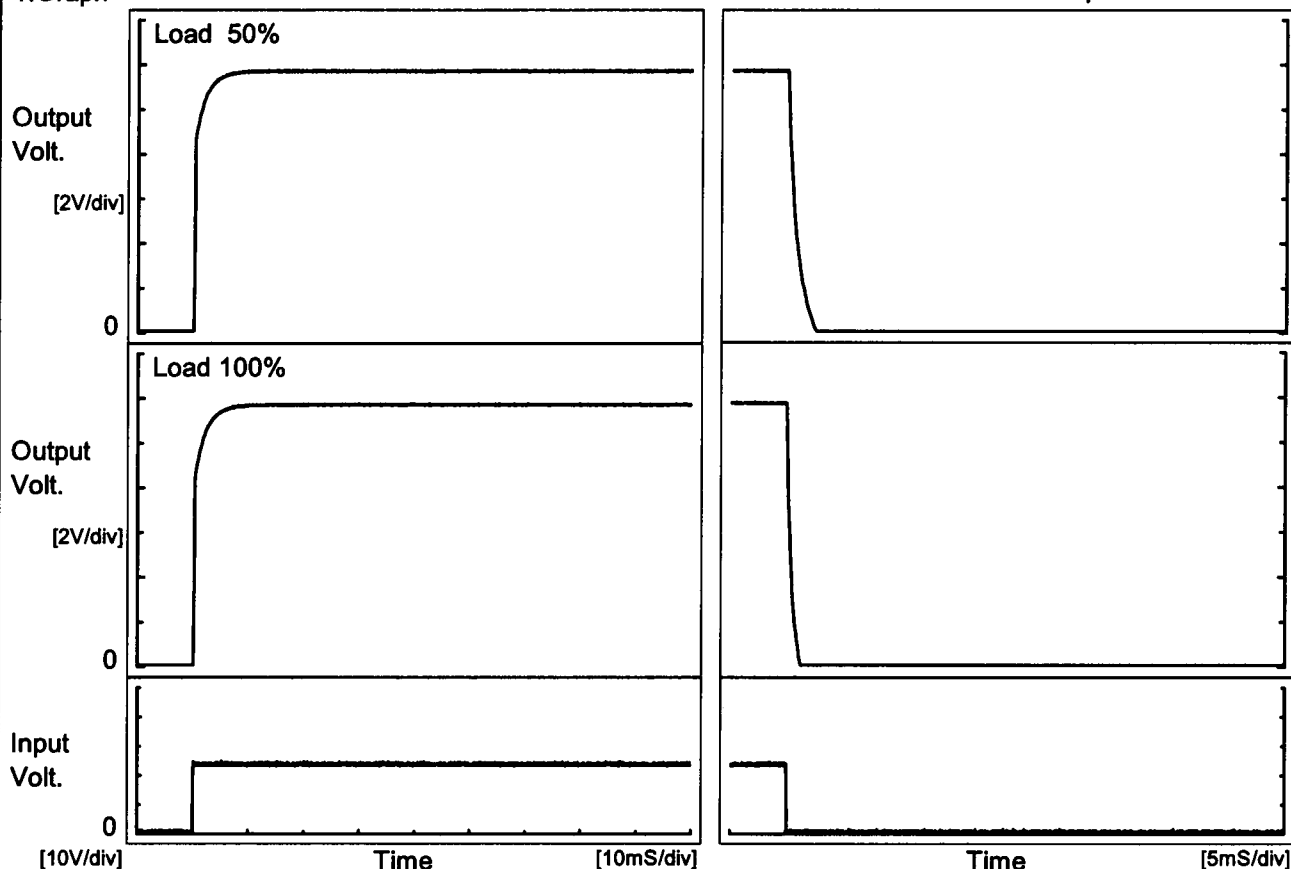


# COSEL

Model	SUCW32412	Temperature	25°C
Item	Rise and Fall Time	Testing Circuitry	Figure A
Object	-12V0.13A		

## 1.Graph

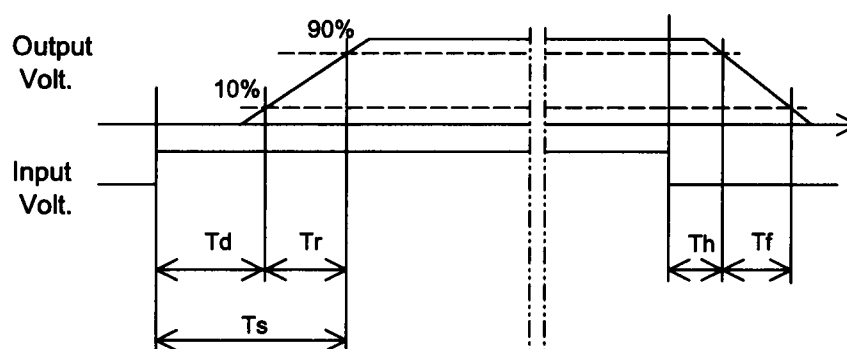
Input Volt. 24 V



## 2.Values

[mS]

Load \ Time	Td	Tr	Ts	Th	Tf
50 %	0.1	2.8	2.9	0.1	1.7
100 %	0.1	3.0	3.1	0.1	0.9



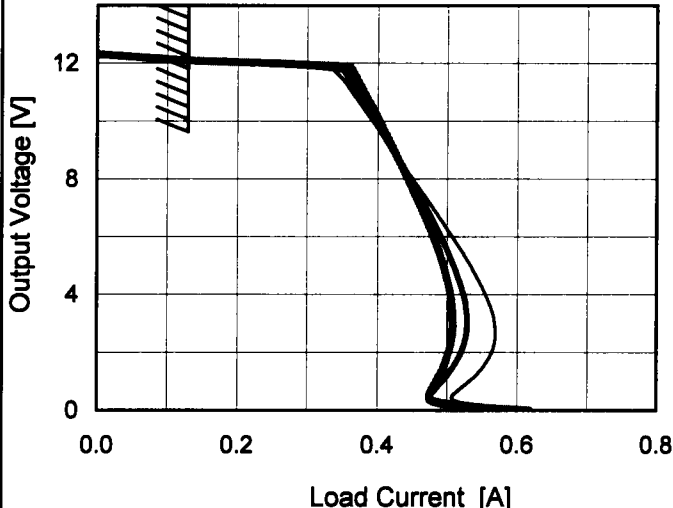
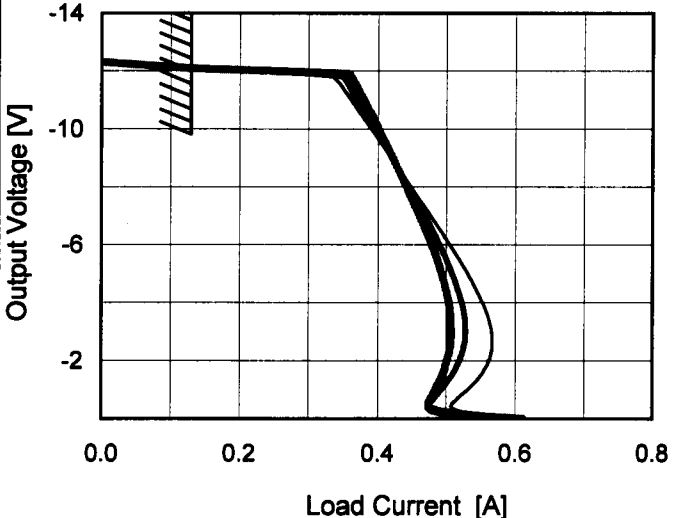
# COSEL

Model		SUCW32412																																							
Item		Minimum Input Voltage for Regulated Output Voltage																																							
Object		+12V0.13A																																							
1.Graph		2.Values																																							
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Note: Slanted line shows the range of the rated ambient temperature.																																									

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# COSEL

Model	SUCW32412																																																										
Item	Overcurrent Protection	Temperature	25°C																																																								
Object	+12V0.13A	Testing Circuitry	Figure A																																																								
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<div><div><div></div><div></div><div></div></div><div>Input Volt. 18V Input Volt. 24V Input Volt. 36V</div></div> 		<table><tr><th rowspan="2">Output Voltage [V]</th><th colspan="3">Load Current [A]</th></tr><tr><th>Input Volt. 18[V]</th><th>Input Volt. 24[V]</th><th>Input Volt. 36[V]</th></tr><tr><td>12.0</td><td>0.13</td><td>0.13</td><td>0.13</td></tr><tr><td>11.4</td><td>0.35</td><td>0.36</td><td>0.37</td></tr><tr><td>10.8</td><td>0.37</td><td>0.38</td><td>0.39</td></tr><tr><td>9.6</td><td>0.40</td><td>0.41</td><td>0.41</td></tr><tr><td>8.4</td><td>0.44</td><td>0.44</td><td>0.44</td></tr><tr><td>7.2</td><td>0.47</td><td>0.46</td><td>0.46</td></tr><tr><td>6.0</td><td>0.51</td><td>0.49</td><td>0.48</td></tr><tr><td>4.8</td><td>0.54</td><td>0.51</td><td>0.50</td></tr><tr><td>3.6</td><td>0.56</td><td>0.53</td><td>0.51</td></tr><tr><td>2.4</td><td>0.57</td><td>0.53</td><td>0.51</td></tr><tr><td>1.2</td><td>0.54</td><td>0.50</td><td>0.49</td></tr><tr><td>0.0</td><td>0.62</td><td>0.58</td><td>0.62</td></tr></table>			Output Voltage [V]	Load Current [A]			Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]	12.0	0.13	0.13	0.13	11.4	0.35	0.36	0.37	10.8	0.37	0.38	0.39	9.6	0.40	0.41	0.41	8.4	0.44	0.44	0.44	7.2	0.47	0.46	0.46	6.0	0.51	0.49	0.48	4.8	0.54	0.51	0.50	3.6	0.56	0.53	0.51	2.4	0.57	0.53	0.51	1.2	0.54	0.50	0.49	0.0	0.62	0.58	0.62
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Object	-12V0.13A	2.Values																																																									
1.Graph		<table><tr><th rowspan="2">Output Voltage [V]</th><th colspan="3">Load Current [A]</th></tr><tr><th>Input Volt. 18[V]</th><th>Input Volt. 24[V]</th><th>Input Volt. 36[V]</th></tr><tr><td>-12.0</td><td>0.13</td><td>0.13</td><td>0.13</td></tr><tr><td>-11.4</td><td>0.35</td><td>0.36</td><td>0.37</td></tr><tr><td>-10.8</td><td>0.37</td><td>0.38</td><td>0.38</td></tr><tr><td>-9.6</td><td>0.40</td><td>0.41</td><td>0.41</td></tr><tr><td>-8.4</td><td>0.44</td><td>0.44</td><td>0.43</td></tr><tr><td>-7.2</td><td>0.47</td><td>0.46</td><td>0.46</td></tr><tr><td>-6.0</td><td>0.50</td><td>0.49</td><td>0.48</td></tr><tr><td>-4.8</td><td>0.54</td><td>0.51</td><td>0.50</td></tr><tr><td>-3.6</td><td>0.56</td><td>0.53</td><td>0.51</td></tr><tr><td>-2.4</td><td>0.57</td><td>0.52</td><td>0.51</td></tr><tr><td>-1.2</td><td>0.54</td><td>0.50</td><td>0.49</td></tr><tr><td>0.0</td><td>0.62</td><td>0.57</td><td>0.61</td></tr></table>			Output Voltage [V]	Load Current [A]			Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]	-12.0	0.13	0.13	0.13	-11.4	0.35	0.36	0.37	-10.8	0.37	0.38	0.38	-9.6	0.40	0.41	0.41	-8.4	0.44	0.44	0.43	-7.2	0.47	0.46	0.46	-6.0	0.50	0.49	0.48	-4.8	0.54	0.51	0.50	-3.6	0.56	0.53	0.51	-2.4	0.57	0.52	0.51	-1.2	0.54	0.50	0.49	0.0	0.62	0.57	0.61
Output Voltage [V]	Load Current [A]																																																										
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<div><div><div></div><div></div><div></div></div><div>Input Volt. 18V Input Volt. 24V Input Volt. 36V</div></div> 		Note: Slanted line shows the range of the rated load current.																																																									

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BC-3781

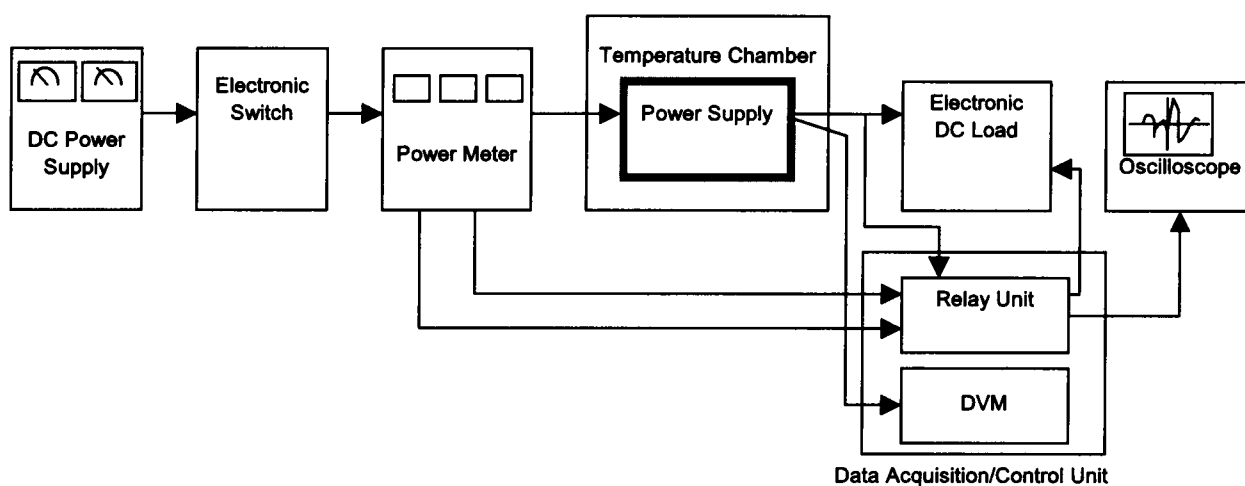


Figure A

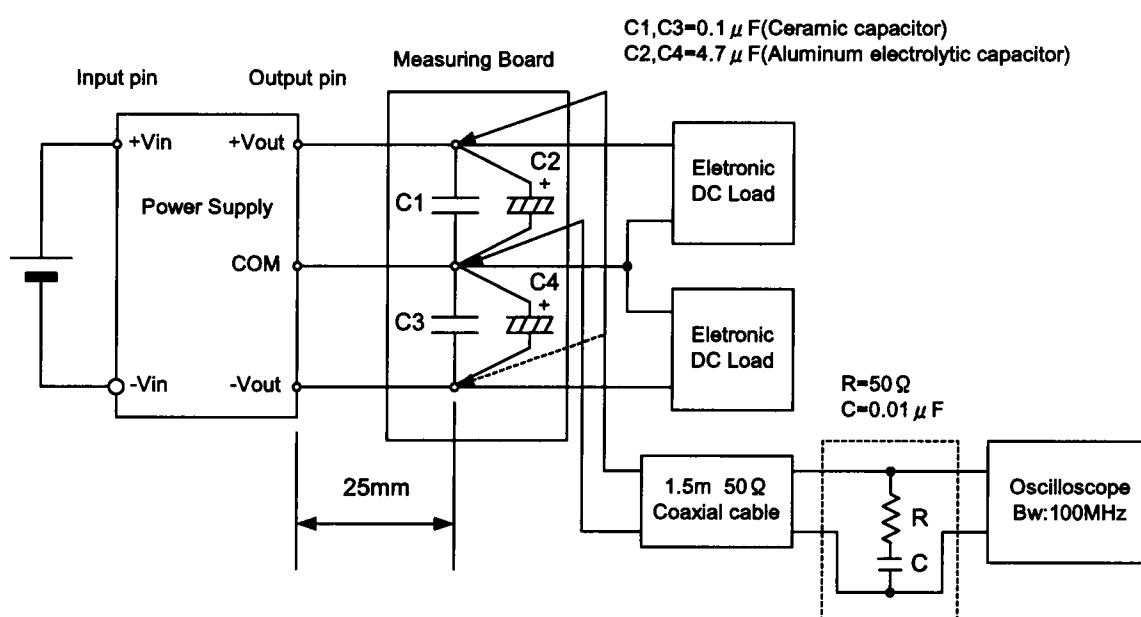


Figure B (Ripple and Ripple noise Characteristic)