



TEST DATA OF SUW102412 SUCW102412

Regulated DC Power Supply
Mar 28, 2005

Approved by : Tetsuo Sugimori
Tetsuo Sugimori Design Manager

Prepared by : Yoshimichi Hirokawa
Yoshimichi Hirokawa Design Engineer

COSEL CO.,LTD.

CONTENTS

1.Input Current (by Input Voltage)	1
2.Input Current (by Load Current)	2
3.Input Power (by Load Current)	3
4.Efficiency (by Input Voltage)	4
5.Efficiency (by Load Current)	5
6.Line Regulation	6
7.Load Regulation	7
8.Dynamic Load Response	8
9.Ripple Voltage (by Load Current)	10
10.Ripple-Noise	12
11.Ripple Voltage (by Ambient Temperature)	14
12.Ambient Temperature Drift	15
13.Output Voltage Accuracy	16
14.Time Lapse Drift	17
15.Rise and Fall Time	18
16.Minimum Input Voltage for Regulated Output Voltage	20
17.Overcurrent Protection	21
18.Figure of Testing Circuitry	22

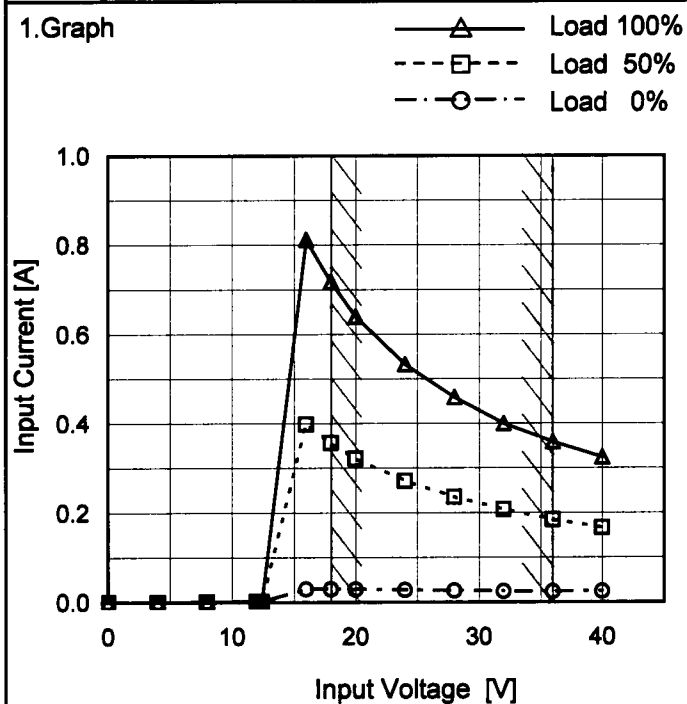
(Final Page 22)

COSEL

Model SUW102412/SUCW102412

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	0.001	0.001	0.001
12.0	0.001	0.001	0.001
12.4	0.001	0.001	0.001
16.0	0.030	0.399	0.813
18.0	0.029	0.357	0.718
20.0	0.029	0.322	0.640
24.0	0.027	0.271	0.533
28.0	0.026	0.236	0.459
32.0	0.025	0.207	0.400
36.0	0.024	0.185	0.359
40.0	0.024	0.167	0.325
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

COSEL

Model SUW102412/SUCW102412

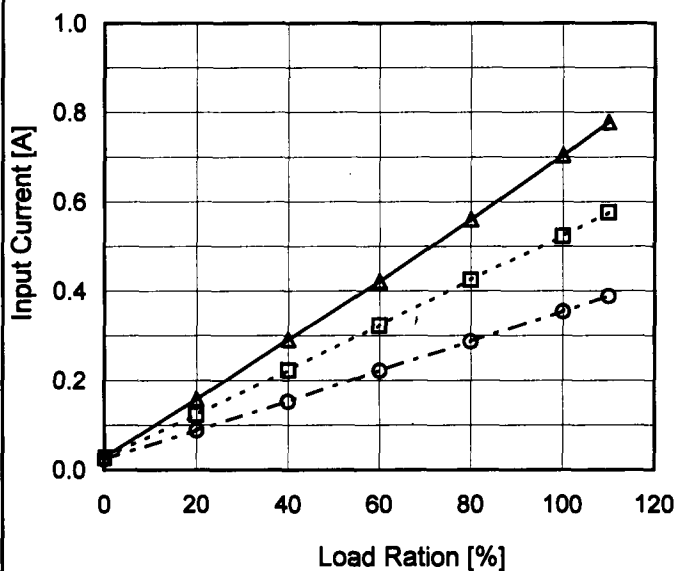
Item Input Current (by Load Current)

Object

Temperature 25°C
Testing Circuitry Figure A

1. Graph

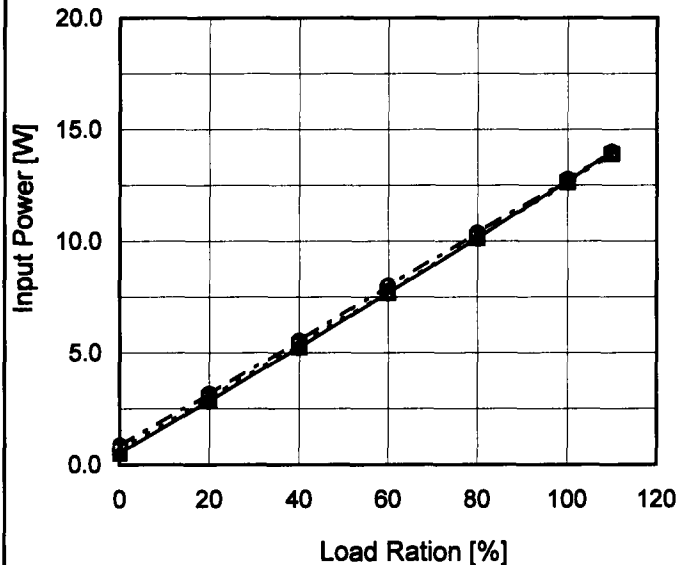
—△— Input Volt. 18V
---□--- Input Volt. 24V
---○--- Input Volt. 36V



2. Values

Load Ration [%]	Input Current [A]		
	Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]
0	0.029	0.028	0.024
20	0.158	0.124	0.088
40	0.292	0.223	0.153
60	0.422	0.323	0.222
80	0.560	0.425	0.288
100	0.704	0.523	0.355
110	0.778	0.576	0.388
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

COSEL

Model		SUW102412/SUCW102412		Temperature 25°C																																																				
Item		Input Power (by Load Current)		Testing Circuitry Figure A																																																				
Object																																																								
1. Graph		<div><div>—△—</div>Input Volt. 18V</div> <div><div>---□---</div>Input Volt. 24V</div> <div><div>-·-○-·-</div>Input Volt. 36V</div>  <p>Input Power [W]</p> <p>Load Ratio [%]</p>		2. Values																																																				
				<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>0.53</td><td>0.66</td><td>0.86</td></tr><tr><td>20</td><td>2.86</td><td>2.98</td><td>3.18</td></tr><tr><td>40</td><td>5.26</td><td>5.36</td><td>5.54</td></tr><tr><td>60</td><td>7.68</td><td>7.75</td><td>8.01</td></tr><tr><td>80</td><td>10.15</td><td>10.16</td><td>10.38</td></tr><tr><td>100</td><td>12.70</td><td>12.63</td><td>12.77</td></tr><tr><td>110</td><td>14.01</td><td>13.90</td><td>13.99</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 [%]	Input Power [W]			Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]	0	0.53	0.66	0.86	20	2.86	2.98	3.18	40	5.26	5.36	5.54	60	7.68	7.75	8.01	80	10.15	10.16	10.38	100	12.70	12.63	12.77	110	14.01	13.90	13.99	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-
Load Ration [%]	Input Power [W]																																																							
	Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]																																																					
0	0.53	0.66	0.86																																																					
20	2.86	2.98	3.18																																																					
40	5.26	5.36	5.54																																																					
60	7.68	7.75	8.01																																																					
80	10.15	10.16	10.38																																																					
100	12.70	12.63	12.77																																																					
110	14.01	13.90	13.99																																																					
--	-	-	-																																																					
--	-	-	-																																																					
--	-	-	-																																																					
--	-	-	-																																																					

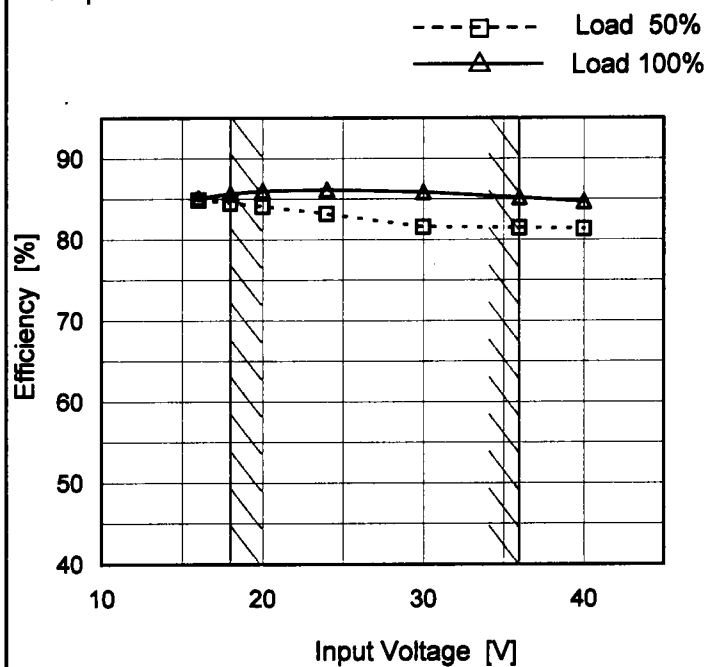
COSEL

Model SUW102412/SUCW102412

Item Efficiency (by Input Voltage)

Object
Temperature 25°C
Testing Circuitry Figure A

1. Graph

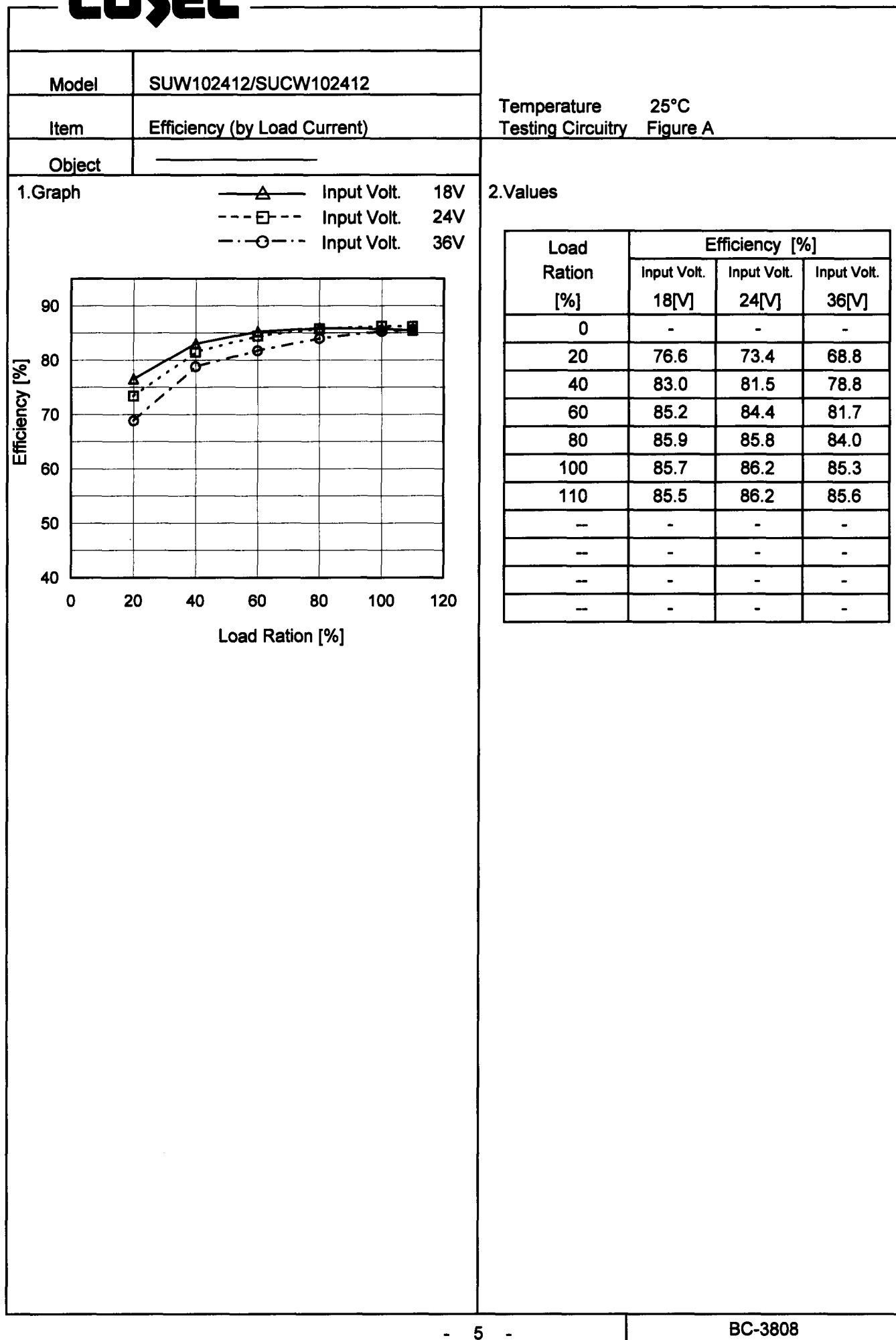


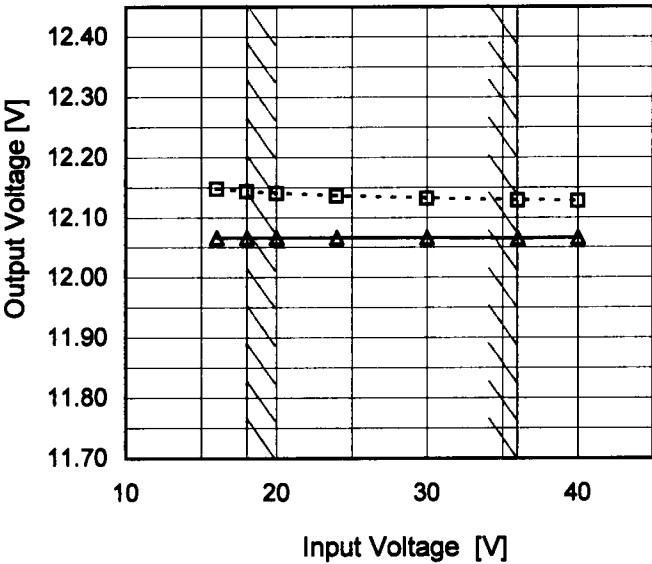
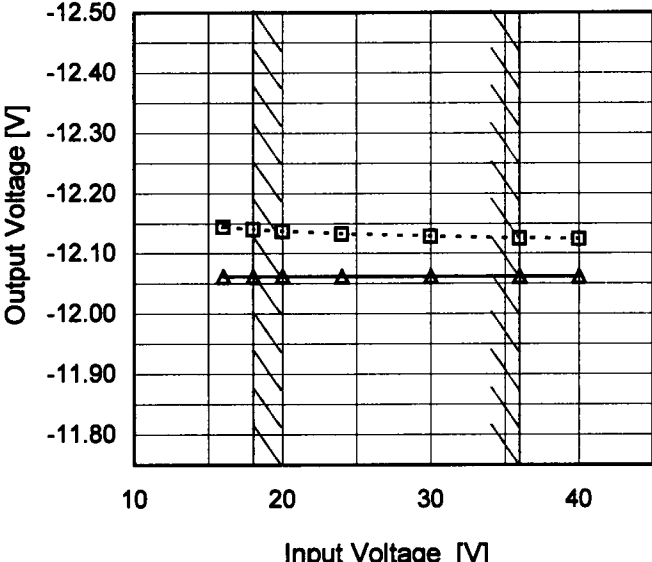
Note: Slanted line shows the range of the rated input voltage.

2. Values

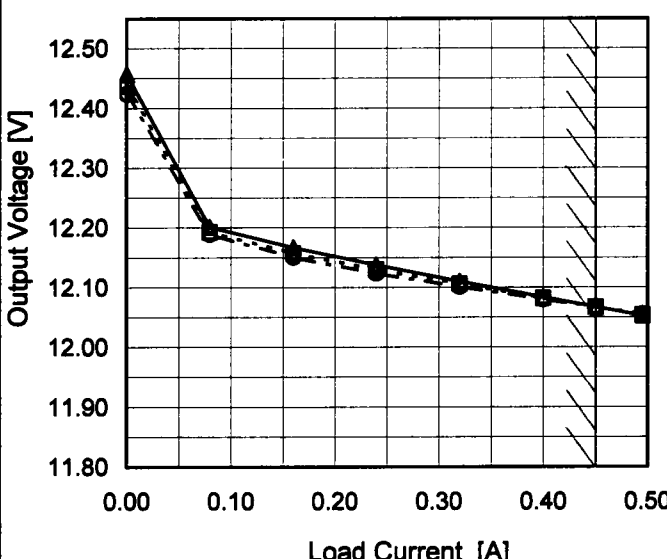
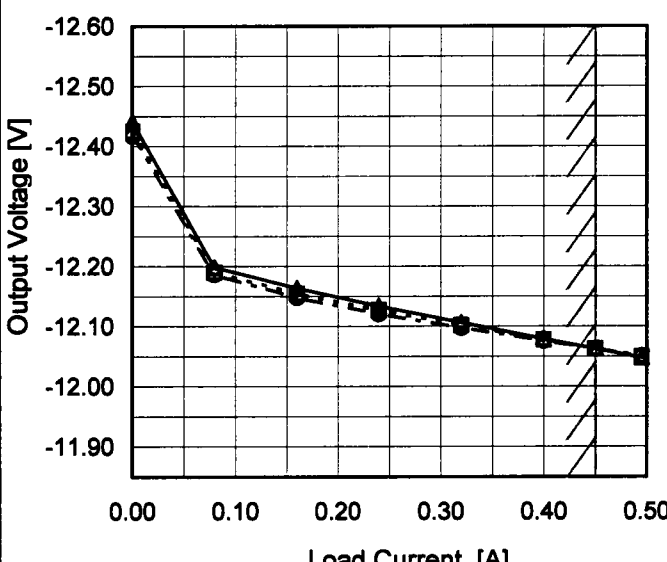
Input Voltage [V]	Efficiency [%]	
	Load 50%	Load 100%
16	84.9	85.1
18	84.5	85.7
20	84.1	86.0
24	83.2	86.1
30	81.6	85.9
36	81.4	85.2
40	81.3	84.7
--	-	-
--	-	-

COSEL



Model		SUW102412/SUCW102412																																	
Item		Line Regulation																																	
Object		+12V0.45A																																	
1.Graph		2.Values																																	
<div><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></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>16</td><td>12.148</td><td>12.067</td></tr><tr><td>18</td><td>12.143</td><td>12.067</td></tr><tr><td>20</td><td>12.140</td><td>12.066</td></tr><tr><td>24</td><td>12.135</td><td>12.066</td></tr><tr><td>30</td><td>12.131</td><td>12.066</td></tr><tr><td>36</td><td>12.129</td><td>12.066</td></tr><tr><td>40</td><td>12.128</td><td>12.066</td></tr><tr><td>--</td><td>-</td><td>-</td></tr><tr><td>--</td><td>-</td><td>-</td></tr></table>		Input Voltage [V]	Output Voltage [V]		Load 50%	Load 100%	16	12.148	12.067	18	12.143	12.067	20	12.140	12.066	24	12.135	12.066	30	12.131	12.066	36	12.129	12.066	40	12.128	12.066	--	-	-	--	-	-
Input Voltage [V]	Output Voltage [V]																																		
	Load 50%	Load 100%																																	
16	12.148	12.067																																	
18	12.143	12.067																																	
20	12.140	12.066																																	
24	12.135	12.066																																	
30	12.131	12.066																																	
36	12.129	12.066																																	
40	12.128	12.066																																	
--	-	-																																	
--	-	-																																	
Object		-12V0.45A																																	
1.Graph		2.Values																																	
<div><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></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>16</td><td>-12.144</td><td>-12.062</td></tr><tr><td>18</td><td>-12.140</td><td>-12.062</td></tr><tr><td>20</td><td>-12.137</td><td>-12.062</td></tr><tr><td>24</td><td>-12.132</td><td>-12.062</td></tr><tr><td>30</td><td>-12.128</td><td>-12.062</td></tr><tr><td>36</td><td>-12.126</td><td>-12.062</td></tr><tr><td>40</td><td>-12.124</td><td>-12.062</td></tr><tr><td>--</td><td>-</td><td>-</td></tr><tr><td>--</td><td>-</td><td>-</td></tr></table>		Input Voltage [V]	Output Voltage [V]		Load 50%	Load 100%	16	-12.144	-12.062	18	-12.140	-12.062	20	-12.137	-12.062	24	-12.132	-12.062	30	-12.128	-12.062	36	-12.126	-12.062	40	-12.124	-12.062	--	-	-	--	-	-
Input Voltage [V]	Output Voltage [V]																																		
	Load 50%	Load 100%																																	
16	-12.144	-12.062																																	
18	-12.140	-12.062																																	
20	-12.137	-12.062																																	
24	-12.132	-12.062																																	
30	-12.128	-12.062																																	
36	-12.126	-12.062																																	
40	-12.124	-12.062																																	
--	-	-																																	
--	-	-																																	
Note: Slanted line shows the range of the rated input voltage.																																			

COSEL

Model	SUW102412/SUCW102412																																																						
Item	Load Regulation		Temperature	25°C																																																			
Object	+12V0.45A		Testing Circuitry	Figure A																																																			
1.Graph		2.Values																																																					
<div><div><div>—△—</div><div>Input Volt.</div><div>18V</div></div><div><div>---□---</div><div>Input Volt.</div><div>24V</div></div><div><div>---○---</div><div>Input Volt.</div><div>36V</div></div></div> 		<table><tr><th rowspan="2">Load Current [A]</th><th colspan="3">Output Voltage [V]</th></tr><tr><th>Input Volt. 18[V]</th><th>Input Volt. 24[V]</th><th>Input Volt. 36[V]</th></tr><tr><td>0.000</td><td>12.457</td><td>12.438</td><td>12.424</td></tr><tr><td>0.080</td><td>12.202</td><td>12.193</td><td>12.189</td></tr><tr><td>0.160</td><td>12.167</td><td>12.157</td><td>12.151</td></tr><tr><td>0.240</td><td>12.138</td><td>12.130</td><td>12.124</td></tr><tr><td>0.320</td><td>12.110</td><td>12.106</td><td>12.101</td></tr><tr><td>0.400</td><td>12.084</td><td>12.082</td><td>12.079</td></tr><tr><td>0.450</td><td>12.067</td><td>12.067</td><td>12.067</td></tr><tr><td>0.495</td><td>12.053</td><td>12.054</td><td>12.055</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 Current [A]	Output Voltage [V]			Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]	0.000	12.457	12.438	12.424	0.080	12.202	12.193	12.189	0.160	12.167	12.157	12.151	0.240	12.138	12.130	12.124	0.320	12.110	12.106	12.101	0.400	12.084	12.082	12.079	0.450	12.067	12.067	12.067	0.495	12.053	12.054	12.055	--	-	-	-	--	-	-	-	--	-	-	-
Load Current [A]	Output Voltage [V]																																																						
	Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]																																																				
0.000	12.457	12.438	12.424																																																				
0.080	12.202	12.193	12.189																																																				
0.160	12.167	12.157	12.151																																																				
0.240	12.138	12.130	12.124																																																				
0.320	12.110	12.106	12.101																																																				
0.400	12.084	12.082	12.079																																																				
0.450	12.067	12.067	12.067																																																				
0.495	12.053	12.054	12.055																																																				
--	-	-	-																																																				
--	-	-	-																																																				
--	-	-	-																																																				
Object	-12V0.45A																																																						
1.Graph		2.Values																																																					
<div><div><div>—△—</div><div>Input Volt.</div><div>18V</div></div><div><div>---□---</div><div>Input Volt.</div><div>24V</div></div><div><div>---○---</div><div>Input Volt.</div><div>36V</div></div></div> 		<table><tr><th rowspan="2">Load Current [A]</th><th colspan="3">Output Voltage [V]</th></tr><tr><th>Input Volt. 18[V]</th><th>Input Volt. 24[V]</th><th>Input Volt. 36[V]</th></tr><tr><td>0.000</td><td>-12.441</td><td>-12.424</td><td>-12.417</td></tr><tr><td>0.080</td><td>-12.199</td><td>-12.190</td><td>-12.187</td></tr><tr><td>0.160</td><td>-12.164</td><td>-12.155</td><td>-12.148</td></tr><tr><td>0.240</td><td>-12.134</td><td>-12.127</td><td>-12.120</td></tr><tr><td>0.320</td><td>-12.106</td><td>-12.102</td><td>-12.098</td></tr><tr><td>0.400</td><td>-12.080</td><td>-12.078</td><td>-12.076</td></tr><tr><td>0.450</td><td>-12.063</td><td>-12.063</td><td>-12.063</td></tr><tr><td>0.495</td><td>-12.048</td><td>-12.050</td><td>-12.051</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 Current [A]	Output Voltage [V]			Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]	0.000	-12.441	-12.424	-12.417	0.080	-12.199	-12.190	-12.187	0.160	-12.164	-12.155	-12.148	0.240	-12.134	-12.127	-12.120	0.320	-12.106	-12.102	-12.098	0.400	-12.080	-12.078	-12.076	0.450	-12.063	-12.063	-12.063	0.495	-12.048	-12.050	-12.051	--	-	-	-	--	-	-	-	--	-	-	-
Load Current [A]	Output Voltage [V]																																																						
	Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]																																																				
0.000	-12.441	-12.424	-12.417																																																				
0.080	-12.199	-12.190	-12.187																																																				
0.160	-12.164	-12.155	-12.148																																																				
0.240	-12.134	-12.127	-12.120																																																				
0.320	-12.106	-12.102	-12.098																																																				
0.400	-12.080	-12.078	-12.076																																																				
0.450	-12.063	-12.063	-12.063																																																				
0.495	-12.048	-12.050	-12.051																																																				
--	-	-	-																																																				
--	-	-	-																																																				
--	-	-	-																																																				
Note: Slanted line shows the range of the rated load current.																																																							

-

7

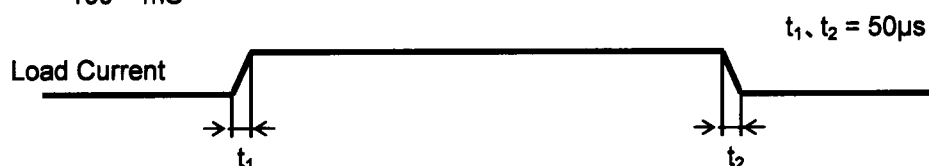
-

BC-3808

COSEL

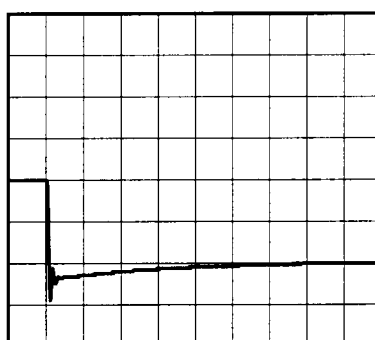
Model	SUW102412/SUCW102412	Temperature	25°C
Item	Dynamic Load Response	Testing Circuitry	Figure A
Object	+12V0.45A		

Input Volt. 24 V
Cycle 100 mS

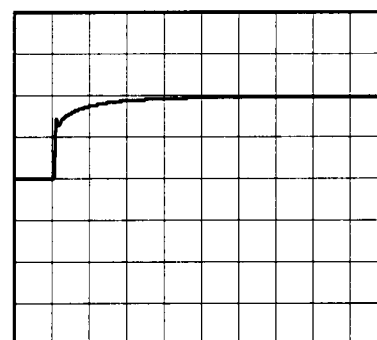


Min. Load (0A) \longleftrightarrow
Load 100% (0.45A)

200mV/div



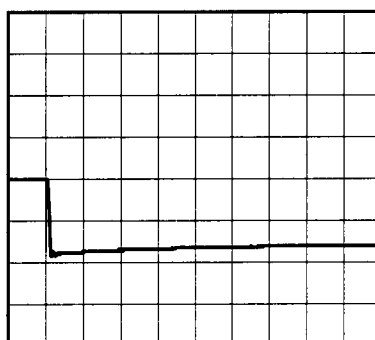
500µs/div



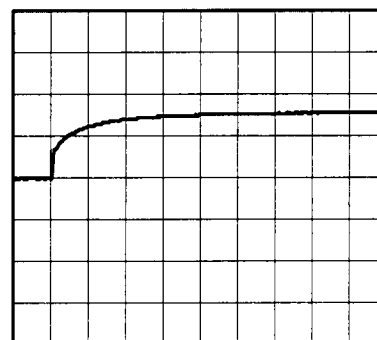
500µs/div

Min. Load (0A) \longleftrightarrow
Load 50% (0.225A)

200mV/div



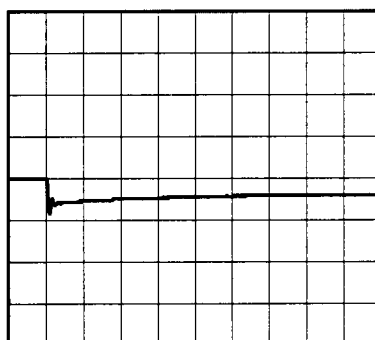
500µs/div



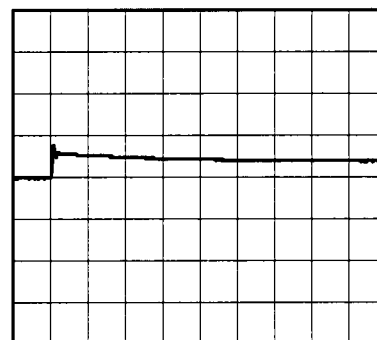
500µs/div

Load 50% (0.225A) \longleftrightarrow
Load 100% (0.45A)

200mV/div



500µs/div

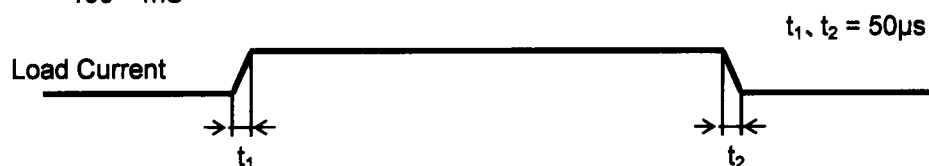


500µs/div



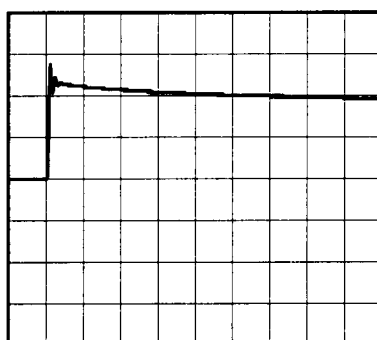
Model	SUW102412/SUCW102412	Temperature	25°C
Item	Dynamic Load Response	Testing Circuitry	Figure A
Object	-12V0.45A		

Input Volt. 24 V
Cycle 100 mS

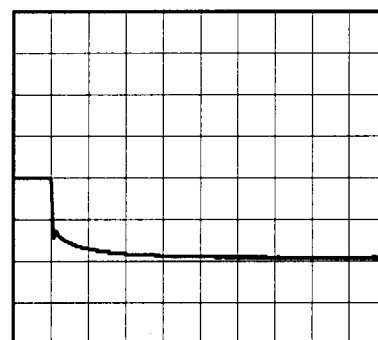


Min. Load (0A) \longleftrightarrow
Load 100% (0.45A)

200mV/div



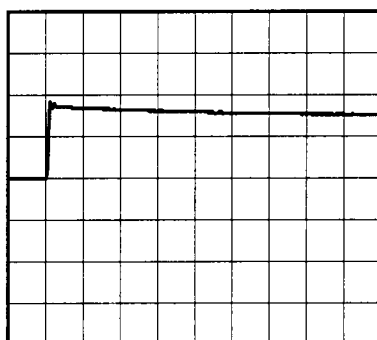
500µs/div



500µs/div

Min. Load (0A) \longleftrightarrow
Load 50% (0.225A)

200mV/div



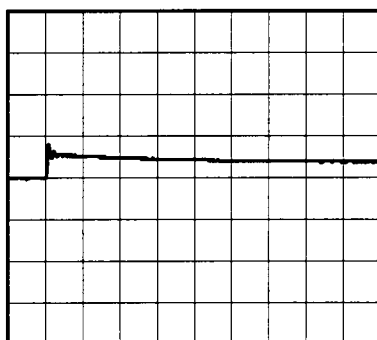
500µs/div



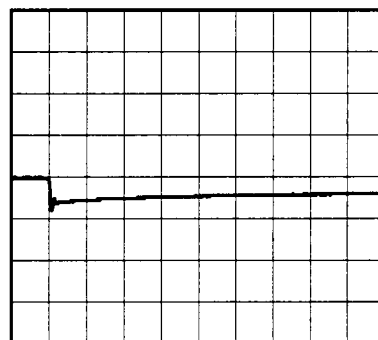
500µs/div

Load 50% (0.225A) \longleftrightarrow
Load 100% (0.45A)

200mV/div



500µs/div



500µs/div

COSEL

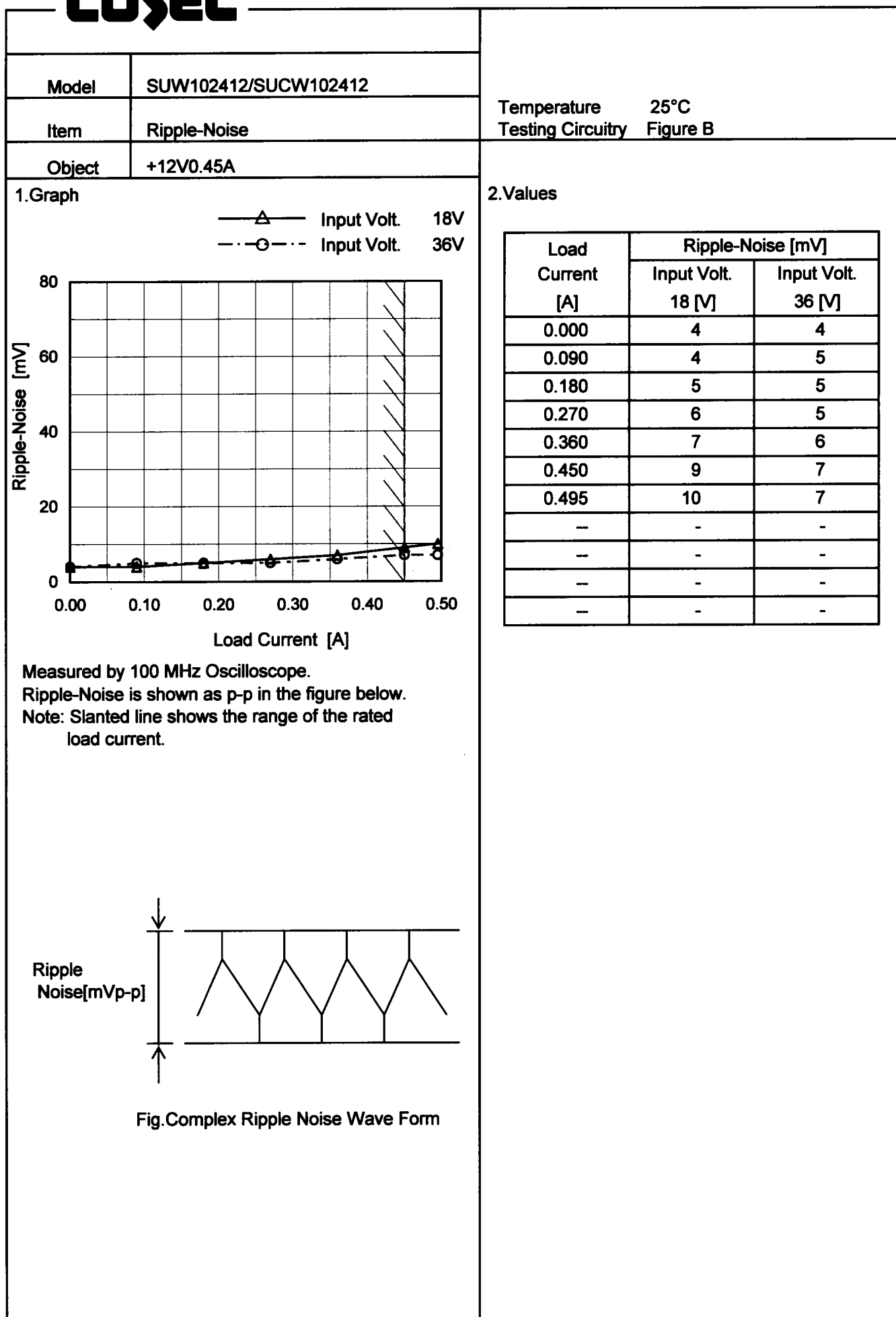
Model		SUW102412/SUCW102412		Temperature 25°C																																							
Item		Ripple Voltage (by Load Current)		Testing Circuitry Figure B																																							
Object		+12V0.45A																																									
1.Graph				2.Values																																							
<div><div><div>—△— Input Volt. 18V</div><div>- - -○- - - Input Volt. 36V</div></div><div>Ripple Voltage [mV]</div><div>Load Current [A]</div></div>				<table><tr><th rowspan="2">Load Current [A]</th><th colspan="2">Ripple Voltage [mV]</th></tr><tr><th>Input Volt. 18 [V]</th><th>Input Volt. 36 [V]</th></tr><tr><td>0.000</td><td>2</td><td>2</td></tr><tr><td>0.090</td><td>2</td><td>2</td></tr><tr><td>0.180</td><td>3</td><td>3</td></tr><tr><td>0.270</td><td>3</td><td>3</td></tr><tr><td>0.360</td><td>5</td><td>4</td></tr><tr><td>0.450</td><td>5</td><td>4</td></tr><tr><td>0.495</td><td>6</td><td>5</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. 18 [V]	Input Volt. 36 [V]	0.000	2	2	0.090	2	2	0.180	3	3	0.270	3	3	0.360	5	4	0.450	5	4	0.495	6	5	—	-	-	—	-	-	—	-	-	—	-	-
Load Current [A]	Ripple Voltage [mV]																																										
	Input Volt. 18 [V]	Input Volt. 36 [V]																																									
0.000	2	2																																									
0.090	2	2																																									
0.180	3	3																																									
0.270	3	3																																									
0.360	5	4																																									
0.450	5	4																																									
0.495	6	5																																									
—	-	-																																									
—	-	-																																									
—	-	-																																									
—	-	-																																									
<div>Measured by 100 MHz Oscilloscope.</div> <div>Ripple Voltage is shown as p-p in the figure below.</div> <div>Note: Slanted line shows the range of the rated load current.</div>																																											
<div><div>Ripple [mVp-p]</div><div>Fig.Complex Ripple Wave Form</div></div>																																											
				- 10 -																																							
				BC-3808																																							

COSEL

Model		SUW102412/SUCW102412																																							
Item		Ripple Voltage (by Load Current)																																							
Object		-12V0.45A																																							
1.Graph		2.Values																																							
<div><div><div>—△— Input Volt. 18V</div><div>- - -○- - - Input Volt. 36V</div></div><div>Ripple Voltage [mV]</div><div>Load Current [A]</div></div>		<table><tr><th rowspan="2">Load Current [A]</th><th colspan="2">Ripple Voltage [mV]</th></tr><tr><th>Input Volt. 18 [V]</th><th>Input Volt. 36 [V]</th></tr><tr><td>0.000</td><td>3</td><td>3</td></tr><tr><td>0.090</td><td>4</td><td>4</td></tr><tr><td>0.180</td><td>4</td><td>4</td></tr><tr><td>0.270</td><td>4</td><td>5</td></tr><tr><td>0.360</td><td>5</td><td>5</td></tr><tr><td>0.450</td><td>6</td><td>5</td></tr><tr><td>0.495</td><td>6</td><td>5</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. 18 [V]	Input Volt. 36 [V]	0.000	3	3	0.090	4	4	0.180	4	4	0.270	4	5	0.360	5	5	0.450	6	5	0.495	6	5	—	-	-	—	-	-	—	-	-	—	-	-
Load Current [A]	Ripple Voltage [mV]																																								
	Input Volt. 18 [V]	Input Volt. 36 [V]																																							
0.000	3	3																																							
0.090	4	4																																							
0.180	4	4																																							
0.270	4	5																																							
0.360	5	5																																							
0.450	6	5																																							
0.495	6	5																																							
—	-	-																																							
—	-	-																																							
—	-	-																																							
—	-	-																																							
<div>Measured by 100 MHz Oscilloscope.</div> <div>Ripple Voltage is shown as p-p in the figure below.</div> <div>Note: Slanted line shows the range of the rated load current.</div>																																									
<div><div>Ripple [mVp-p]</div><div>Fig.Complex Ripple Wave Form</div></div>																																									

- 11 -

BC-3808

COSEL

COSEL

Model	SUW102412/SUCW102412																																								
Item	Ripple-Noise	Temperature	25°C																																						
Object	-12V0.45A	Testing Circuitry	Figure B																																						
1.Graph		2.Values																																							
<div><div><div><div></div><div>Input Volt.</div><div>18V</div></div><div><div></div><div>Input Volt.</div><div>36V</div></div></div><div><p>Ripple-Noise [mV]</p><p>Load Current [A]</p></div><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><div><div><div></div><div>Ripple Noise[mVp-p]</div></div><div><p>Fig.Complex Ripple Noise Wave Form</p></div></div></div>		<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>4</td><td>5</td></tr><tr><td>0.090</td><td>5</td><td>5</td></tr><tr><td>0.180</td><td>6</td><td>6</td></tr><tr><td>0.270</td><td>6</td><td>6</td></tr><tr><td>0.360</td><td>7</td><td>7</td></tr><tr><td>0.450</td><td>8</td><td>7</td></tr><tr><td>0.495</td><td>9</td><td>7</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	4	5	0.090	5	5	0.180	6	6	0.270	6	6	0.360	7	7	0.450	8	7	0.495	9	7	—	-	-	—	-	-	—	-	-	—	-	-
Load Current [A]	Ripple-Noise [mV]																																								
	Input Volt. 18 [V]	Input Volt. 36 [V]																																							
0.000	4	5																																							
0.090	5	5																																							
0.180	6	6																																							
0.270	6	6																																							
0.360	7	7																																							
0.450	8	7																																							
0.495	9	7																																							
—	-	-																																							
—	-	-																																							
—	-	-																																							
—	-	-																																							

- 13 -

BC-3808

COSEL

Model		SUW102412/SUCW102412																																							
Item		Ripple Voltage (by Ambient Temp.)																																							
Object		+12V0.45A																																							
1.Graph																																									
<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><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>7</td><td>9</td></tr><tr><td>-40</td><td>6</td><td>9</td></tr><tr><td>-20</td><td>7</td><td>9</td></tr><tr><td>0</td><td>6</td><td>7</td></tr><tr><td>25</td><td>4</td><td>5</td></tr><tr><td>55</td><td>3</td><td>4</td></tr><tr><td>60</td><td>4</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></tbody></table></div></div>				Ambient Temperature [°C]	Load 50% [mV]	Load 100% [mV]	-60	7	9	-40	6	9	-20	7	9	0	6	7	25	4	5	55	3	4	60	4	4	--	-	-	--	-	-	--	-	-	--	-	-		
Ambient Temperature [°C]	Load 50% [mV]	Load 100% [mV]																																							
-60	7	9																																							
-40	6	9																																							
-20	7	9																																							
0	6	7																																							
25	4	5																																							
55	3	4																																							
60	4	4																																							
--	-	-																																							
--	-	-																																							
--	-	-																																							
--	-	-																																							
2.Values																																									
<table><thead><tr><th rowspan="2">Ambient Temperature [°C]</th><th colspan="2">Ripple Voltage [mV]</th></tr><tr><th>Load 50%</th><th>Load 100%</th></tr></thead><tbody><tr><td>-60</td><td>7</td><td>9</td></tr><tr><td>-40</td><td>6</td><td>9</td></tr><tr><td>-20</td><td>7</td><td>9</td></tr><tr><td>0</td><td>6</td><td>7</td></tr><tr><td>25</td><td>4</td><td>5</td></tr><tr><td>55</td><td>3</td><td>4</td></tr><tr><td>60</td><td>4</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></tbody></table>				Ambient Temperature [°C]	Ripple Voltage [mV]		Load 50%	Load 100%	-60	7	9	-40	6	9	-20	7	9	0	6	7	25	4	5	55	3	4	60	4	4	--	-	-	--	-	-	--	-	-	--	-	-
Ambient Temperature [°C]	Ripple Voltage [mV]																																								
	Load 50%	Load 100%																																							
-60	7	9																																							
-40	6	9																																							
-20	7	9																																							
0	6	7																																							
25	4	5																																							
55	3	4																																							
60	4	4																																							
--	-	-																																							
--	-	-																																							
--	-	-																																							
--	-	-																																							

Object		-12V0.45A																																							
1.Graph																																									
<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><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>12</td><td>15</td></tr><tr><td>-40</td><td>11</td><td>13</td></tr><tr><td>-20</td><td>10</td><td>12</td></tr><tr><td>0</td><td>9</td><td>10</td></tr><tr><td>25</td><td>7</td><td>9</td></tr><tr><td>55</td><td>5</td><td>6</td></tr><tr><td>60</td><td>5</td><td>5</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>				Ambient Temperature [°C]	Load 50% [mV]	Load 100% [mV]	-60	12	15	-40	11	13	-20	10	12	0	9	10	25	7	9	55	5	6	60	5	5	--	-	-	--	-	-	--	-	-	--	-	-		
Ambient Temperature [°C]	Load 50% [mV]	Load 100% [mV]																																							
-60	12	15																																							
-40	11	13																																							
-20	10	12																																							
0	9	10																																							
25	7	9																																							
55	5	6																																							
60	5	5																																							
--	-	-																																							
--	-	-																																							
--	-	-																																							
--	-	-																																							
2.Values																																									
<table><thead><tr><th rowspan="2">Ambient Temperature [°C]</th><th colspan="2">Ripple Voltage [mV]</th></tr><tr><th>Load 50%</th><th>Load 100%</th></tr></thead><tbody><tr><td>-60</td><td>12</td><td>15</td></tr><tr><td>-40</td><td>11</td><td>13</td></tr><tr><td>-20</td><td>10</td><td>12</td></tr><tr><td>0</td><td>9</td><td>10</td></tr><tr><td>25</td><td>7</td><td>9</td></tr><tr><td>55</td><td>5</td><td>6</td></tr><tr><td>60</td><td>5</td><td>5</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]	Ripple Voltage [mV]		Load 50%	Load 100%	-60	12	15	-40	11	13	-20	10	12	0	9	10	25	7	9	55	5	6	60	5	5	--	-	-	--	-	-	--	-	-	--	-	-
Ambient Temperature [°C]	Ripple Voltage [mV]																																								
	Load 50%	Load 100%																																							
-60	12	15																																							
-40	11	13																																							
-20	10	12																																							
0	9	10																																							
25	7	9																																							
55	5	6																																							
60	5	5																																							
--	-	-																																							
--	-	-																																							
--	-	-																																							
--	-	-																																							

Testing Circuitry Figure A



Object	-12V0.45A
--------	-----------



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



		Testing Circuitry Figure A
Model	SUW102412/SUCW102412	
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 - 0.45A (AVR 2) : 0 - 0.45A

* Other Output : Rated Load

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

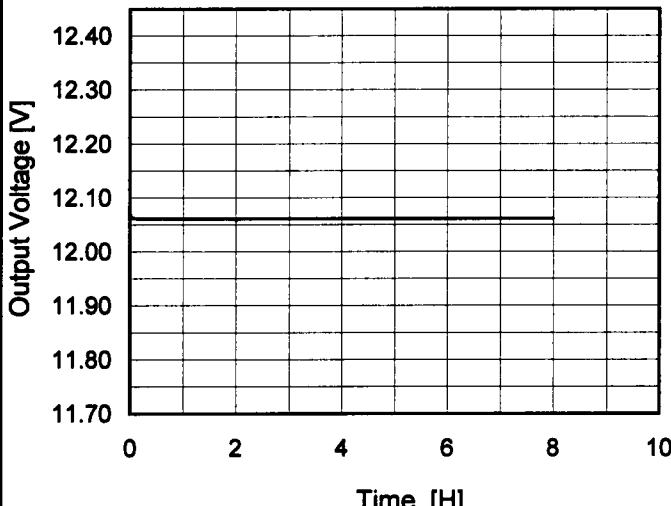
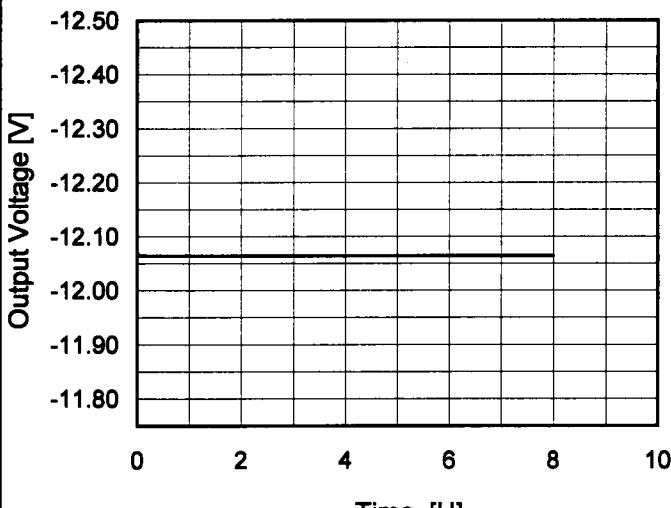
* Output Voltage Accuracy (Ratio) = $\frac{\text{Output Voltage Accuracy}}{\text{Rated Output Voltage}} \times 100$

2. Values

Object	+12V0.45A					
Item	Temperature [°C]	Input Voltage[V]	Output		Output Voltage Accuracy	
			Current[A]	Voltage[V]	Value [mV]	Ration [%]
Maximum Voltage	0	18	0	12.469	±209	±1.7
Minimum Voltage	55	36	0.45	12.051		

Object	-12V0.45A					
Item	Temperature [°C]	Input Voltage[V]	Output		Output Voltage Accuracy	
			Current[A]	Voltage[V]	Value [mV]	Ration [%]
Maximum Voltage	0	18	0	-12.451	±203	±1.7
Minimum Voltage	55	36	0.45	-12.045		

COSEL

Model	SUW102412/SUCW102412																								
Item	Time Lapse Drift		Temperature 25°C Testing Circuitry Figure A																						
Object	+12V0.45A																								
1.Graph		2.Values																							
 <p>Input Volt. 24V Load 100%</p>		<table><tr><th>Time since start [H]</th><th>Output Voltage [V]</th></tr><tr><td>0.0</td><td>12.072</td></tr><tr><td>0.5</td><td>12.062</td></tr><tr><td>1.0</td><td>12.062</td></tr><tr><td>2.0</td><td>12.061</td></tr><tr><td>3.0</td><td>12.061</td></tr><tr><td>4.0</td><td>12.061</td></tr><tr><td>5.0</td><td>12.061</td></tr><tr><td>6.0</td><td>12.061</td></tr><tr><td>7.0</td><td>12.061</td></tr><tr><td>8.0</td><td>12.061</td></tr></table>		Time since start [H]	Output Voltage [V]	0.0	12.072	0.5	12.062	1.0	12.062	2.0	12.061	3.0	12.061	4.0	12.061	5.0	12.061	6.0	12.061	7.0	12.061	8.0	12.061
Time since start [H]	Output Voltage [V]																								
0.0	12.072																								
0.5	12.062																								
1.0	12.062																								
2.0	12.061																								
3.0	12.061																								
4.0	12.061																								
5.0	12.061																								
6.0	12.061																								
7.0	12.061																								
8.0	12.061																								
Object	-12V0.45A																								
1.Graph		2.Values																							
 <p>Input Volt. 24V Load 100%</p>		<table><tr><th>Time since start [H]</th><th>Output Voltage [V]</th></tr><tr><td>0.0</td><td>-12.072</td></tr><tr><td>0.5</td><td>-12.064</td></tr><tr><td>1.0</td><td>-12.064</td></tr><tr><td>2.0</td><td>-12.064</td></tr><tr><td>3.0</td><td>-12.064</td></tr><tr><td>4.0</td><td>-12.064</td></tr><tr><td>5.0</td><td>-12.064</td></tr><tr><td>6.0</td><td>-12.065</td></tr><tr><td>7.0</td><td>-12.065</td></tr><tr><td>8.0</td><td>-12.064</td></tr></table>		Time since start [H]	Output Voltage [V]	0.0	-12.072	0.5	-12.064	1.0	-12.064	2.0	-12.064	3.0	-12.064	4.0	-12.064	5.0	-12.064	6.0	-12.065	7.0	-12.065	8.0	-12.064
Time since start [H]	Output Voltage [V]																								
0.0	-12.072																								
0.5	-12.064																								
1.0	-12.064																								
2.0	-12.064																								
3.0	-12.064																								
4.0	-12.064																								
5.0	-12.064																								
6.0	-12.065																								
7.0	-12.065																								
8.0	-12.064																								

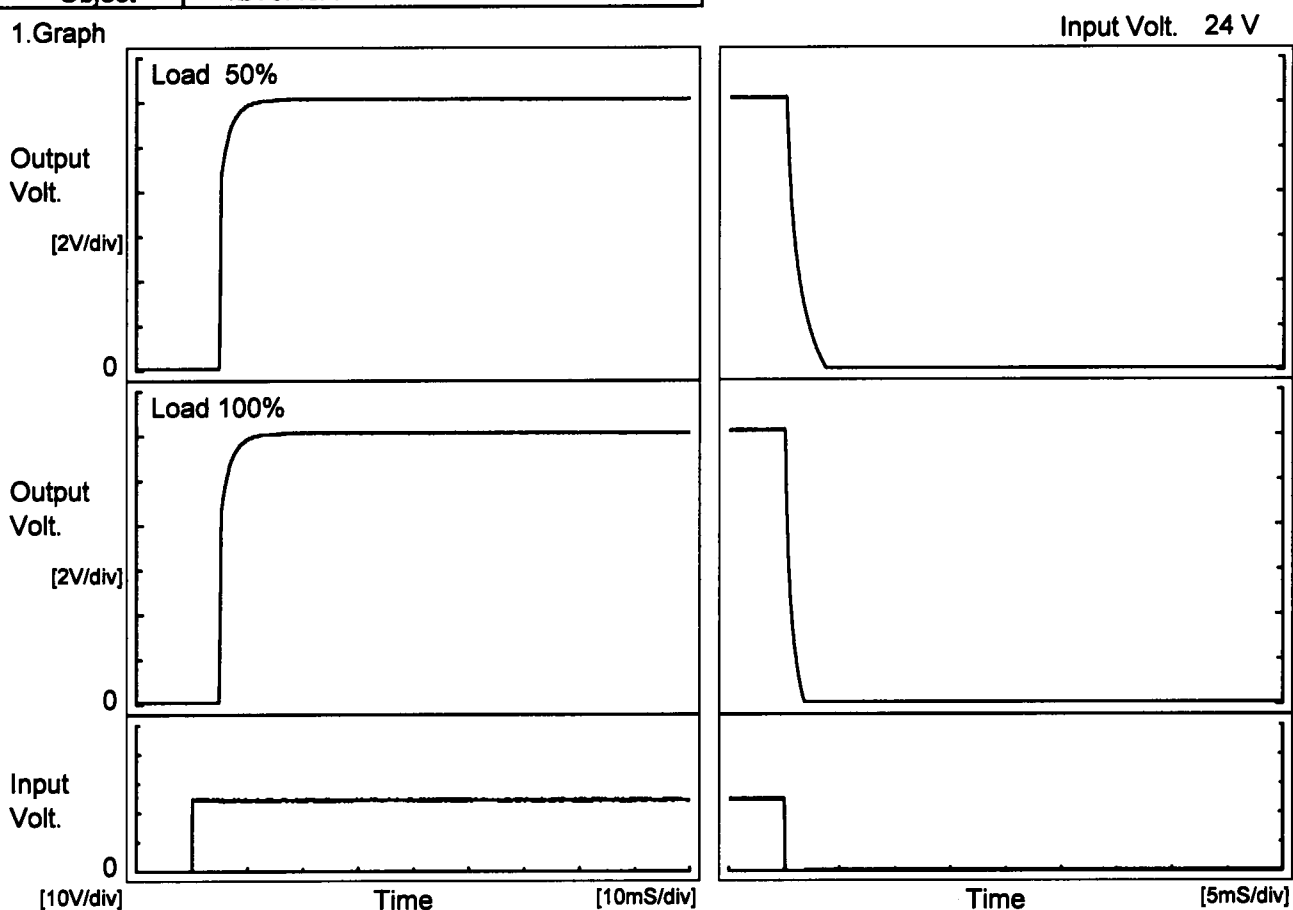
- 17 -

BC-3808

COSEL

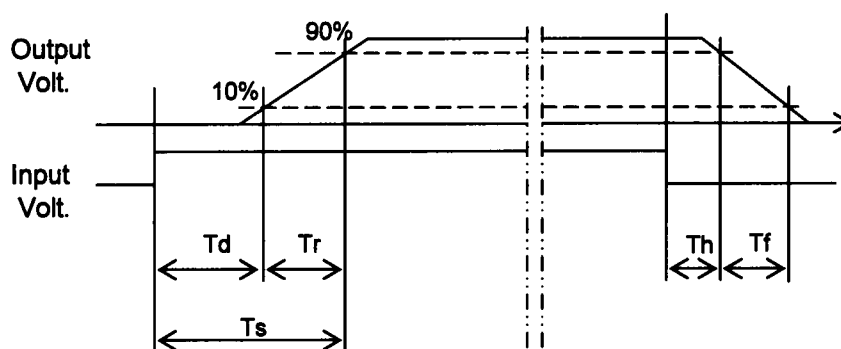
Model	SUW102412/SUCW102412	Temperature	25°C
Item	Rise and Fall Time	Testing Circuitry	Figure A
Object	+12V0.45A		

1. Graph



2. Values

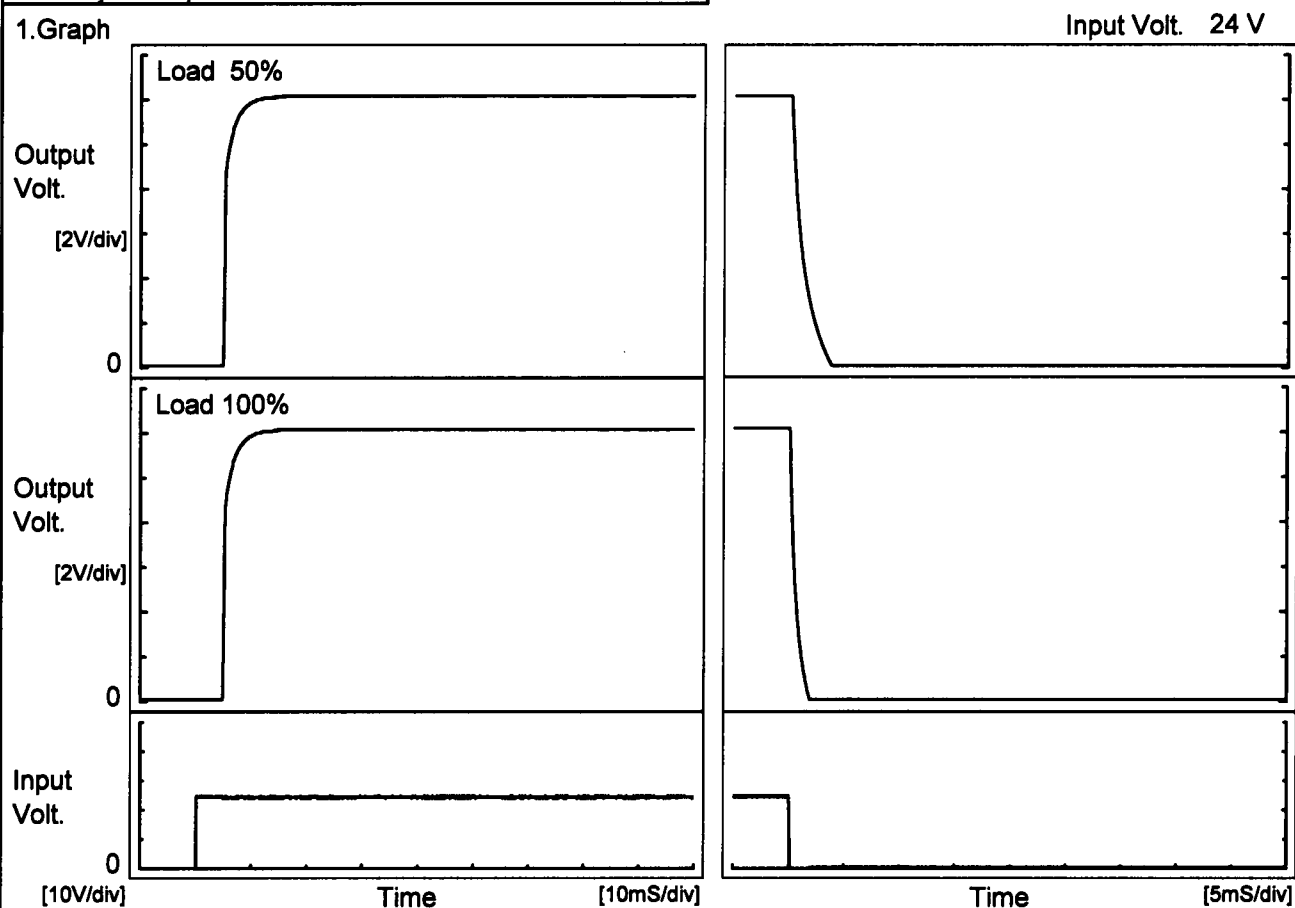
		[mS]				
Load	Time	Td	Tr	Ts	Th	Tf
50 %		5.0	2.0	7.0	0.2	2.4
100 %		4.9	2.2	7.1	0.1	1.2



COSEL

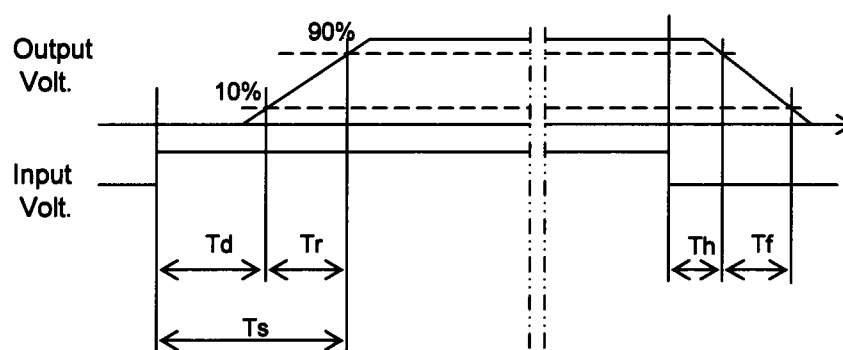
Model	SUW102412/SUCW102412	Temperature	25°C
Item	Rise and Fall Time	Testing Circuitry	Figure A
Object	-12V0.45A		

1. Graph



2. Values

		[mS]				
Load	Time	Td	Tr	Ts	Th	Tf
50 %		5.0	2.0	7.0	0.2	2.5
100 %		4.9	2.1	7.0	0.1	1.3



COSEL

Model		SUW102412/SUCW102412																																							
Item		Minimum Input Voltage for Regulated Output Voltage																																							
Object		+12V0.45A																																							
1.Graph																																									
<div><div><div><div>---□---</div><div>Load 50%</div></div><div><div>—△—</div><div>Load 100%</div></div></div><table><thead><tr><th>Ambient Temperature [°C]</th><th>Load 50% [V]</th><th>Load 100% [V]</th></tr></thead><tbody><tr><td>-60</td><td>12.0</td><td>12.1</td></tr><tr><td>-40</td><td>12.0</td><td>12.1</td></tr><tr><td>-20</td><td>11.8</td><td>11.9</td></tr><tr><td>0</td><td>11.6</td><td>11.6</td></tr><tr><td>25</td><td>11.6</td><td>11.4</td></tr><tr><td>55</td><td>11.4</td><td>11.2</td></tr><tr><td>60</td><td>11.2</td><td>11.2</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>				Ambient Temperature [°C]	Load 50% [V]	Load 100% [V]	-60	12.0	12.1	-40	12.0	12.1	-20	11.8	11.9	0	11.6	11.6	25	11.6	11.4	55	11.4	11.2	60	11.2	11.2	--	-	-	--	-	-	--	-	-	--	-	-		
Ambient Temperature [°C]	Load 50% [V]	Load 100% [V]																																							
-60	12.0	12.1																																							
-40	12.0	12.1																																							
-20	11.8	11.9																																							
0	11.6	11.6																																							
25	11.6	11.4																																							
55	11.4	11.2																																							
60	11.2	11.2																																							
--	-	-																																							
--	-	-																																							
--	-	-																																							
--	-	-																																							
2.Values																																									
<table><thead><tr><th rowspan="2">Ambient Temperature [°C]</th><th colspan="2">Input Voltage [V]</th></tr><tr><th>Load 50%</th><th>Load 100%</th></tr></thead><tbody><tr><td>-60</td><td>12.0</td><td>12.1</td></tr><tr><td>-40</td><td>12.0</td><td>12.1</td></tr><tr><td>-20</td><td>11.8</td><td>11.9</td></tr><tr><td>0</td><td>11.6</td><td>11.6</td></tr><tr><td>25</td><td>11.6</td><td>11.4</td></tr><tr><td>55</td><td>11.4</td><td>11.2</td></tr><tr><td>60</td><td>11.2</td><td>11.2</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]	Input Voltage [V]		Load 50%	Load 100%	-60	12.0	12.1	-40	12.0	12.1	-20	11.8	11.9	0	11.6	11.6	25	11.6	11.4	55	11.4	11.2	60	11.2	11.2	--	-	-	--	-	-	--	-	-	--	-	-
Ambient Temperature [°C]	Input Voltage [V]																																								
	Load 50%	Load 100%																																							
-60	12.0	12.1																																							
-40	12.0	12.1																																							
-20	11.8	11.9																																							
0	11.6	11.6																																							
25	11.6	11.4																																							
55	11.4	11.2																																							
60	11.2	11.2																																							
--	-	-																																							
--	-	-																																							
--	-	-																																							
--	-	-																																							

Object		-12V0.45A																																							
1.Graph																																									
<div><div><div><div>---□---</div><div>Load 50%</div></div><div><div>—△—</div><div>Load 100%</div></div></div><table><thead><tr><th>Ambient Temperature [°C]</th><th>Load 50% [V]</th><th>Load 100% [V]</th></tr></thead><tbody><tr><td>-60</td><td>11.9</td><td>12.0</td></tr><tr><td>-40</td><td>11.9</td><td>12.0</td></tr><tr><td>-20</td><td>11.7</td><td>11.8</td></tr><tr><td>0</td><td>11.6</td><td>11.5</td></tr><tr><td>25</td><td>11.5</td><td>11.3</td></tr><tr><td>55</td><td>11.3</td><td>11.2</td></tr><tr><td>60</td><td>11.1</td><td>11.2</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>				Ambient Temperature [°C]	Load 50% [V]	Load 100% [V]	-60	11.9	12.0	-40	11.9	12.0	-20	11.7	11.8	0	11.6	11.5	25	11.5	11.3	55	11.3	11.2	60	11.1	11.2	--	-	-	--	-	-	--	-	-	--	-	-		
Ambient Temperature [°C]	Load 50% [V]	Load 100% [V]																																							
-60	11.9	12.0																																							
-40	11.9	12.0																																							
-20	11.7	11.8																																							
0	11.6	11.5																																							
25	11.5	11.3																																							
55	11.3	11.2																																							
60	11.1	11.2																																							
--	-	-																																							
--	-	-																																							
--	-	-																																							
--	-	-																																							
2.Values																																									
<table><thead><tr><th rowspan="2">Ambient Temperature [°C]</th><th colspan="2">Input Voltage [V]</th></tr><tr><th>Load 50%</th><th>Load 100%</th></tr></thead><tbody><tr><td>-60</td><td>11.9</td><td>12.0</td></tr><tr><td>-40</td><td>11.9</td><td>12.0</td></tr><tr><td>-20</td><td>11.7</td><td>11.8</td></tr><tr><td>0</td><td>11.6</td><td>11.5</td></tr><tr><td>25</td><td>11.5</td><td>11.3</td></tr><tr><td>55</td><td>11.3</td><td>11.2</td></tr><tr><td>60</td><td>11.1</td><td>11.2</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]	Input Voltage [V]		Load 50%	Load 100%	-60	11.9	12.0	-40	11.9	12.0	-20	11.7	11.8	0	11.6	11.5	25	11.5	11.3	55	11.3	11.2	60	11.1	11.2	--	-	-	--	-	-	--	-	-	--	-	-
Ambient Temperature [°C]	Input Voltage [V]																																								
	Load 50%	Load 100%																																							
-60	11.9	12.0																																							
-40	11.9	12.0																																							
-20	11.7	11.8																																							
0	11.6	11.5																																							
25	11.5	11.3																																							
55	11.3	11.2																																							
60	11.1	11.2																																							
--	-	-																																							
--	-	-																																							
--	-	-																																							
--	-	-																																							

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

- 20 -

BC-3808

COSEL

Model		SUW102412/SUCW102412		Temperature 25°C																																																					
Item		Overcurrent Protection		Testing Circuitry Figure A																																																					
Object		+12V0.45A																																																							
1.Graph		<div><div><div></div><div></div><div></div></div><div>Input Volt. 18V</div><div>Input Volt. 24V</div><div>Input Volt. 36V</div></div> <div><table><thead><tr><th>Output Voltage [V]</th><th>Input Volt. 18[V]</th><th>Input Volt. 24[V]</th><th>Input Volt. 36[V]</th></tr></thead><tbody><tr><td>12.0</td><td>0.63</td><td>0.65</td><td>0.71</td></tr><tr><td>11.4</td><td>0.83</td><td>0.91</td><td>0.95</td></tr><tr><td>10.8</td><td>0.89</td><td>0.98</td><td>1.03</td></tr><tr><td>9.6</td><td>1.03</td><td>1.13</td><td>1.18</td></tr><tr><td>8.4</td><td>1.17</td><td>1.26</td><td>1.31</td></tr><tr><td>7.2</td><td>1.29</td><td>1.38</td><td>1.40</td></tr><tr><td>6.0</td><td>1.40</td><td>1.48</td><td>1.49</td></tr><tr><td>4.8</td><td>1.54</td><td>1.60</td><td>1.58</td></tr><tr><td>3.6</td><td>1.68</td><td>1.73</td><td>1.62</td></tr><tr><td>2.4</td><td>1.86</td><td>1.86</td><td>1.66</td></tr><tr><td>1.2</td><td>2.03</td><td>1.96</td><td>1.67</td></tr><tr><td>0.0</td><td>2.16</td><td>1.98</td><td>2.03</td></tr></tbody></table></div>		Output Voltage [V]	Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]	12.0	0.63	0.65	0.71	11.4	0.83	0.91	0.95	10.8	0.89	0.98	1.03	9.6	1.03	1.13	1.18	8.4	1.17	1.26	1.31	7.2	1.29	1.38	1.40	6.0	1.40	1.48	1.49	4.8	1.54	1.60	1.58	3.6	1.68	1.73	1.62	2.4	1.86	1.86	1.66	1.2	2.03	1.96	1.67	0.0	2.16	1.98	2.03	2.Values	
Output Voltage [V]	Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]																																																						
12.0	0.63	0.65	0.71																																																						
11.4	0.83	0.91	0.95																																																						
10.8	0.89	0.98	1.03																																																						
9.6	1.03	1.13	1.18																																																						
8.4	1.17	1.26	1.31																																																						
7.2	1.29	1.38	1.40																																																						
6.0	1.40	1.48	1.49																																																						
4.8	1.54	1.60	1.58																																																						
3.6	1.68	1.73	1.62																																																						
2.4	1.86	1.86	1.66																																																						
1.2	2.03	1.96	1.67																																																						
0.0	2.16	1.98	2.03																																																						

Output Voltage [V]	Load Current [A]		
	Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]
12.0	0.63	0.65	0.71
11.4	0.83	0.91	0.95
10.8	0.89	0.98	1.03
9.6	1.03	1.13	1.18
8.4	1.17	1.26	1.31
7.2	1.29	1.38	1.40
6.0	1.40	1.48	1.49
4.8	1.54	1.60	1.58
3.6	1.68	1.73	1.62
2.4	1.86	1.86	1.66
1.2	2.03	1.96	1.67
0.0	2.16	1.98	2.03

| Object | | -12V0.45A | | | |
| 1.Graph | | Input Volt. 18V Input Volt. 24V Input Volt. 36V | Output Voltage [V] | Input Volt. 18[V] | Input Volt. 24[V] | Input Volt. 36[V] | |--------------------|-------------------|-------------------|-------------------| | -12.0 | 0.69 | 0.76 | 0.50 | | -11.4 | 0.80 | 0.92 | 0.94 | | -10.8 | 0.86 | 0.97 | 1.02 | | -9.6 | 1.00 | 1.13 | 1.17 | | -8.4 | 1.15 | 1.27 | 1.31 | | -7.2 | 1.27 | 1.38 | 1.40 | | -6.0 | 1.38 | 1.47 | 1.49 | | -4.8 | 1.52 | 1.59 | 1.57 | | -3.6 | 1.67 | 1.73 | 1.62 | | -2.4 | 1.84 | 1.85 | 1.66 | | -1.2 | 2.02 | 1.95 | 1.67 | | 0.0 | 2.15 | 1.97 | 1.96 | | | 2.Values | |

Output Voltage [V]	Load Current [A]		
	Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]
-12.0	0.69	0.76	0.50
-11.4	0.80	0.92	0.94
-10.8	0.86	0.97	1.02
-9.6	1.00	1.13	1.17
-8.4	1.15	1.27	1.31
-7.2	1.27	1.38	1.40
-6.0	1.38	1.47	1.49
-4.8	1.52	1.59	1.57
-3.6	1.67	1.73	1.62
-2.4	1.84	1.85	1.66
-1.2	2.02	1.95	1.67
0.0	2.15	1.97	1.96

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

- 21 -

BC-3808

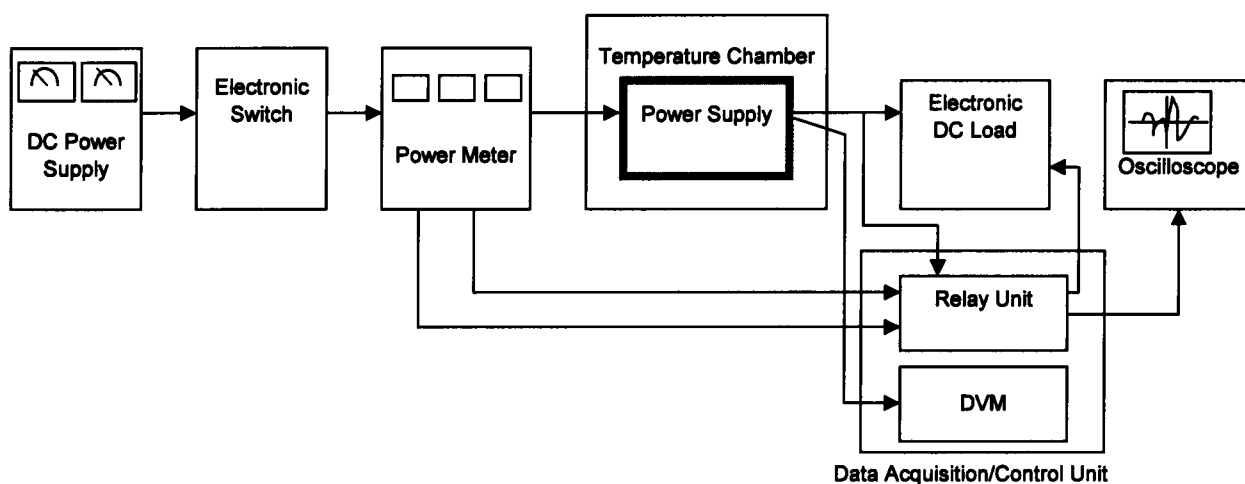


Figure A

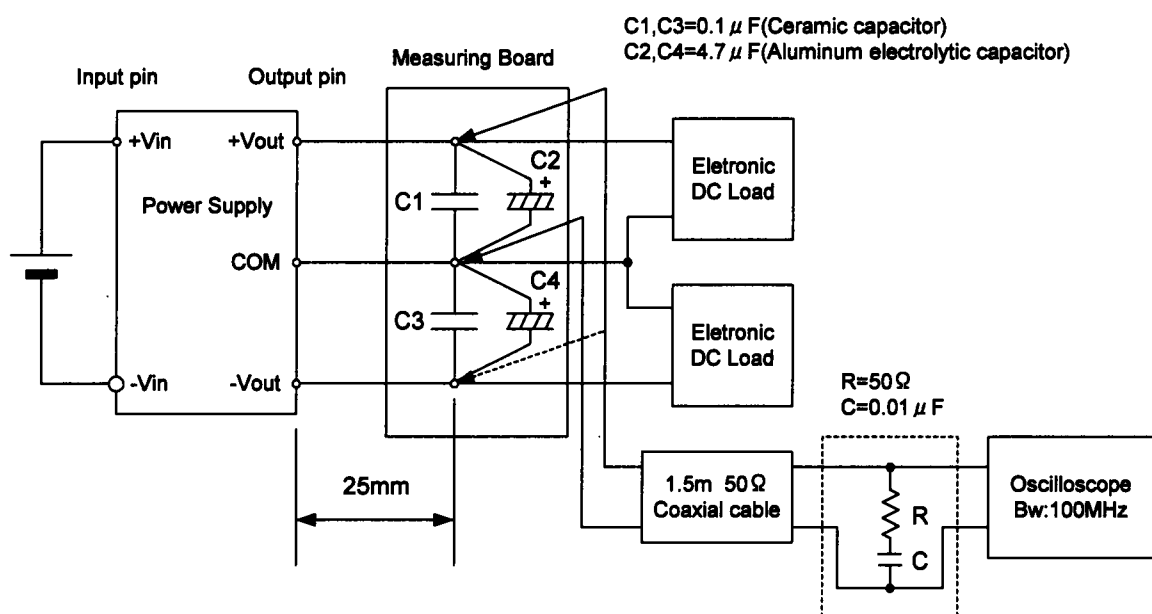


Figure B (Ripple and Ripple noise Characteristic)