

TEST DATA OF SUW62412 SUCW62412

Regulated DC Power Supply
Feb 24, 2005

Approved by : Tetsuo Sugimori
Tetsuo Sugimori Design Manager

Prepared by : Yoshikazu Mizuno
Yoshikazu Mizuno Design Engineer

COSEL CO.,LTD.

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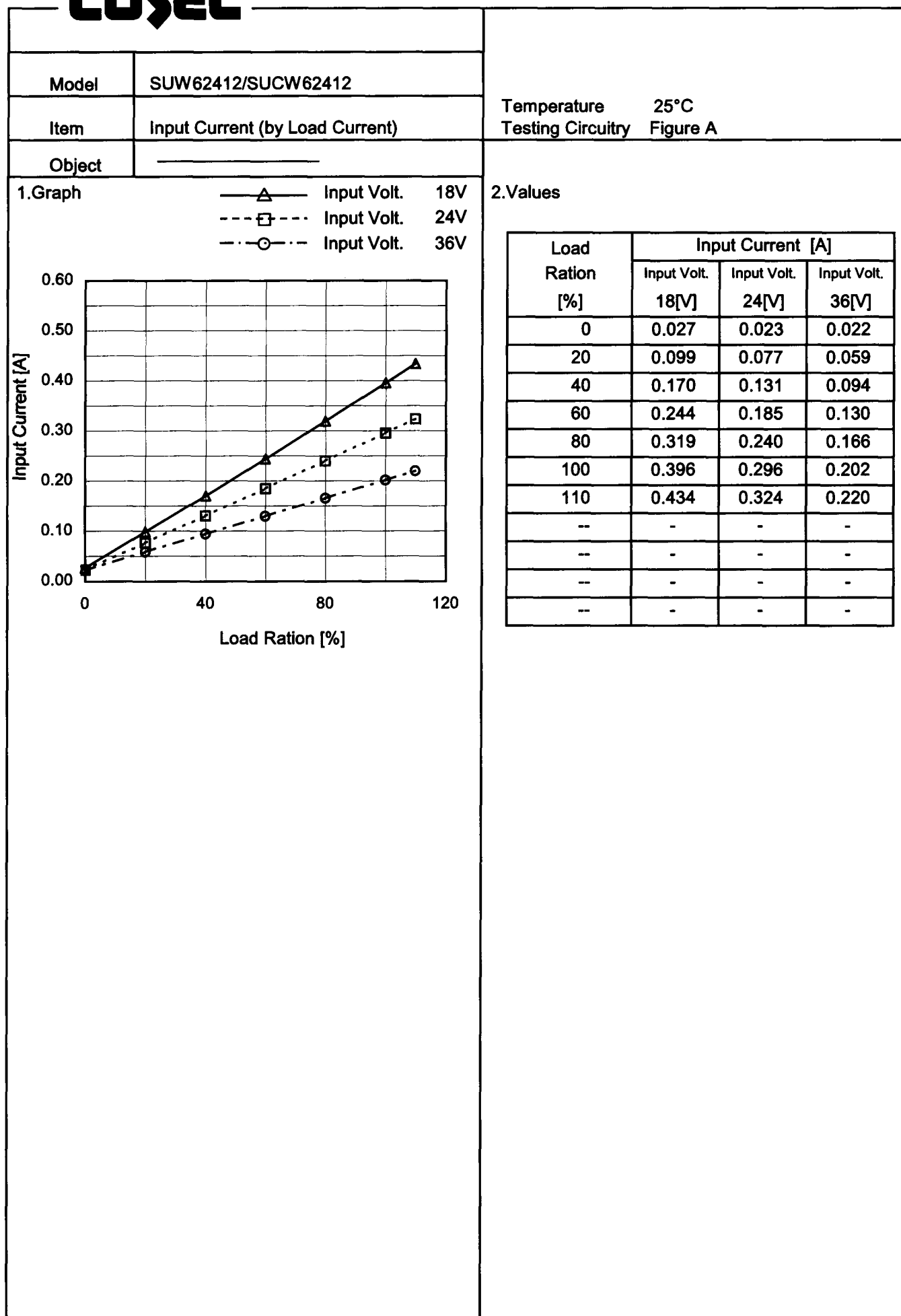
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Model		SUW62412/SUCW62412																																																																								
Item		Input Current (by Input Voltage)																																																																								
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1.Graph <div><div><div><div></div><div>—△—</div><div>Load 100%</div></div><div><div></div><div>---□---</div><div>Load 50%</div></div><div><div></div><div>-·-○-·-</div><div>Load 0%</div></div></div><div><p>Input Current [A]</p><p>Input Voltage [V]</p></div><div>Note: Slanted line shows the range of the rated input voltage.</div></div>																																																																										
2.Values <div><table><tr><th rowspan="2">Input Voltage [V]</th><th colspan="3">Input Current [A]</th></tr><tr><th>Load 0%</th><th>Load 50%</th><th>Load 100%</th></tr><tr><td>0.0</td><td>0.000</td><td>0.000</td><td>0.000</td></tr><tr><td>4.0</td><td>0.000</td><td>0.000</td><td>0.000</td></tr><tr><td>8.0</td><td>0.001</td><td>0.001</td><td>0.001</td></tr><tr><td>12.0</td><td>0.001</td><td>0.001</td><td>0.001</td></tr><tr><td>15.2</td><td>0.029</td><td>0.244</td><td>0.476</td></tr><tr><td>16.0</td><td>0.028</td><td>0.232</td><td>0.450</td></tr><tr><td>18.0</td><td>0.027</td><td>0.207</td><td>0.399</td></tr><tr><td>20.0</td><td>0.025</td><td>0.187</td><td>0.358</td></tr><tr><td>24.0</td><td>0.023</td><td>0.158</td><td>0.299</td></tr><tr><td>28.0</td><td>0.022</td><td>0.137</td><td>0.258</td></tr><tr><td>32.0</td><td>0.022</td><td>0.123</td><td>0.227</td></tr><tr><td>36.0</td><td>0.022</td><td>0.112</td><td>0.204</td></tr><tr><td>40.0</td><td>0.023</td><td>0.103</td><td>0.186</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>				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	15.2	0.029	0.244	0.476	16.0	0.028	0.232	0.450	18.0	0.027	0.207	0.399	20.0	0.025	0.187	0.358	24.0	0.023	0.158	0.299	28.0	0.022	0.137	0.258	32.0	0.022	0.123	0.227	36.0	0.022	0.112	0.204	40.0	0.023	0.103	0.186	--	-	-	-	--	-	-	-	--	-	-	-
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Model SUW62412/SUCW62412

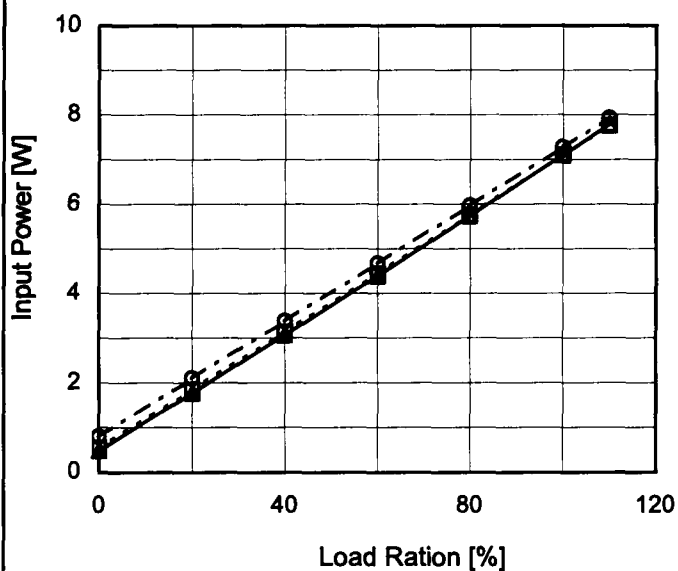
Item Input Power (by Load Current)

Object

Temperature 25°C
Testing Circuitry Figure A

1. Graph

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



2. Values

Load Ration [%]	Input Power [W]		
	Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]
0	0.48	0.55	0.80
20	1.77	1.85	2.10
40	3.07	3.14	3.39
60	4.39	4.44	4.68
80	5.73	5.76	5.97
100	7.10	7.10	7.27
110	7.79	7.77	7.93
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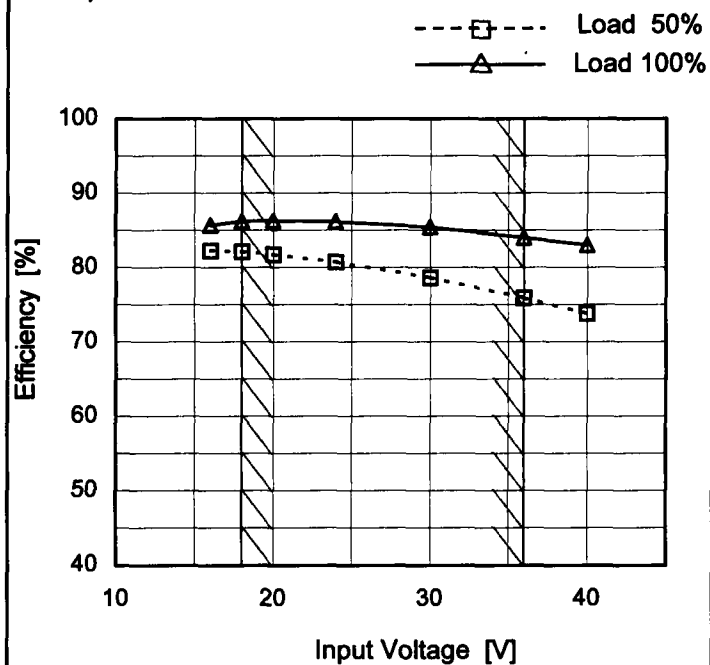
Model SUW62412/SUCW62412

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.

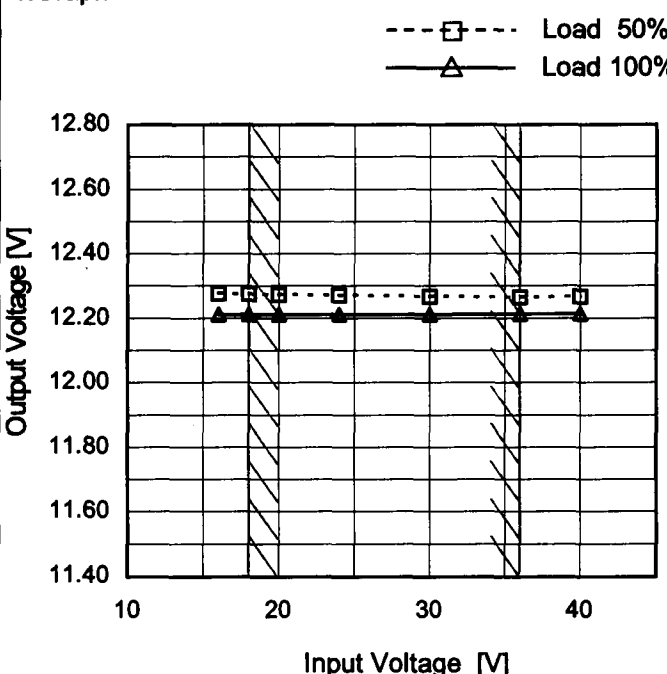
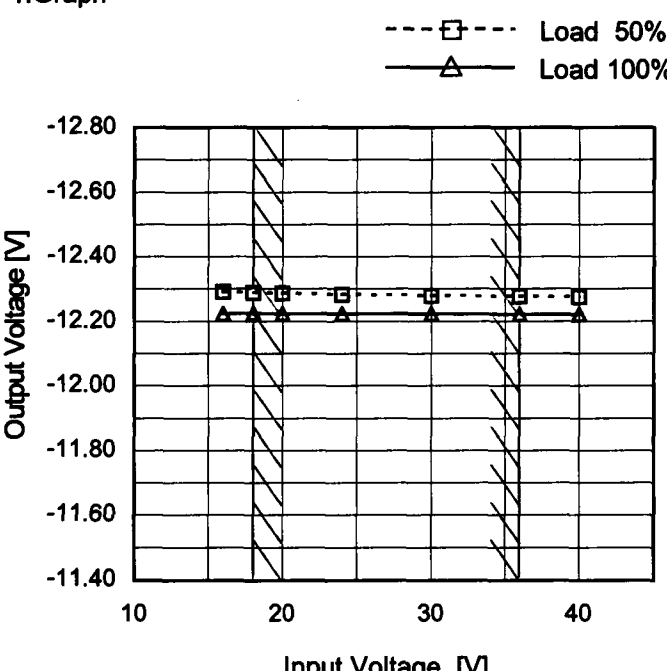
2. Values

Input Voltage [V]	Efficiency [%]	
	Load 50%	Load 100%
16	82.2	85.7
18	82.1	86.2
20	81.7	86.3
24	80.8	86.2
30	78.6	85.4
36	75.9	84.0
40	73.8	83.0
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Object		+12V0.25A																																	
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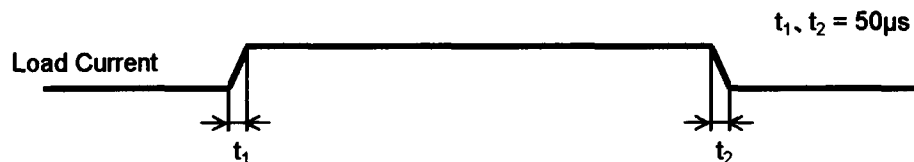
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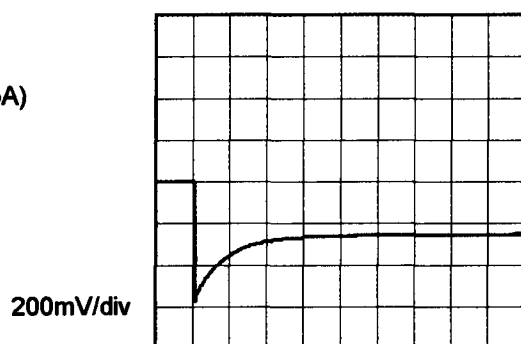
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Item	Dynamic Load Response	Testing Circuitry	Figure A
Object	+12V0.25A		

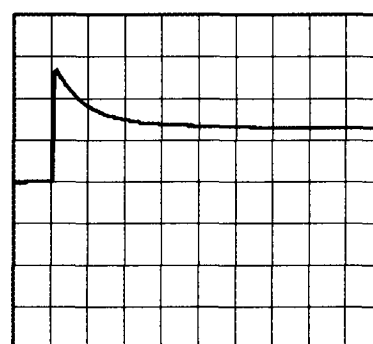
Input Volt. 24 V
Cycle 100 ms



Min. Load (0A) \longleftrightarrow
Load 100% (0.25A)

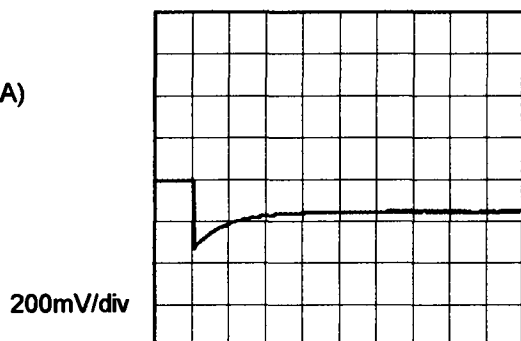


2ms/div

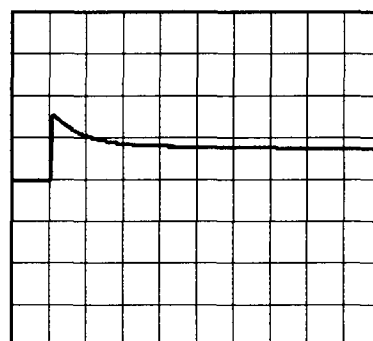


2ms/div

Min. Load (0A) \longleftrightarrow
Load 50% (0.125A)

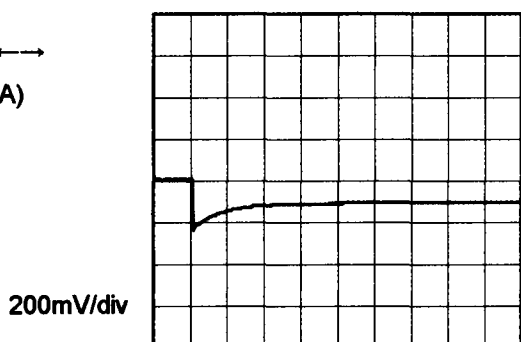


2ms/div

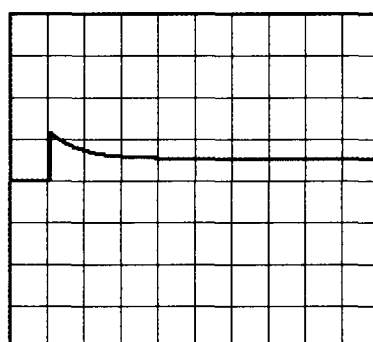


2ms/div

Load 50% (0.125A) \longleftrightarrow
Load 100% (0.25A)



2ms/div

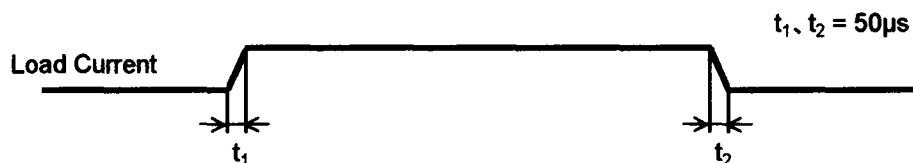


2ms/div

COSEL

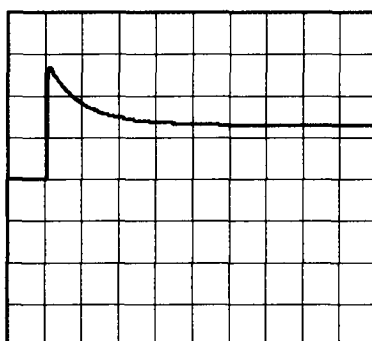
Model	SUW62412/SUCW62412	Temperature	25°C
Item	Dynamic Load Response	Testing Circuitry	Figure A
Object	-12V0.25A		

Input Volt. 24 V
Cycle 100 mS

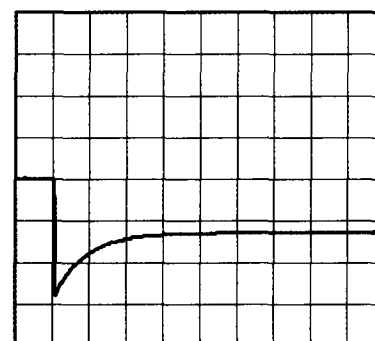


Min. Load (0A) \longleftrightarrow
Load 100% (0.25A)

200mV/div



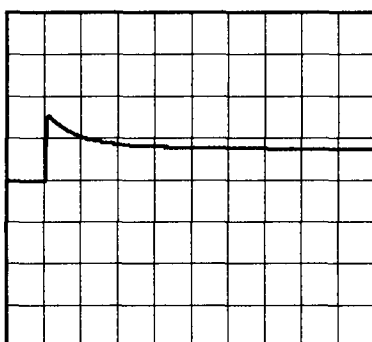
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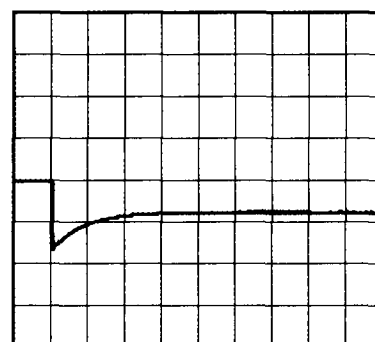
2ms/div

Min. Load (0A) \longleftrightarrow
Load 50% (0.125A)

200mV/div



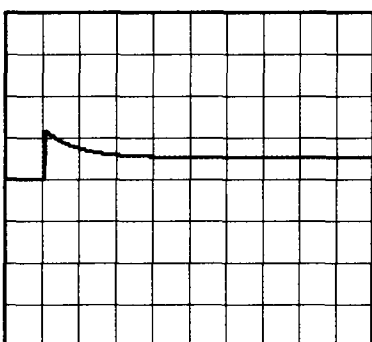
2ms/div



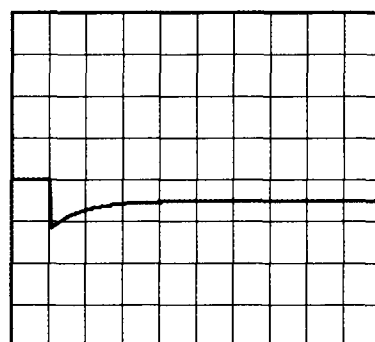
2ms/div

Load 50% (0.125A) \longleftrightarrow
Load 100% (0.25A)

200mV/div



2ms/div



2ms/div

COSEL

Model	SUW62412/SUCW62412																																								
Item	Ripple Voltage (by Load Current)	Temperature	25°C																																						
		Testing Circuitry	Figure B																																						
Object	+12V0.25A																																								
1.Graph		2.Values																																							
<div><div><div><div><div></div><div>—△—</div><div>Input Volt. 18V</div></div><div><div></div><div>---○---</div><div>Input Volt. 36V</div></div></div><div><div><div>Ripple Voltage [mV]</div><div>50</div><div>40</div><div>30</div><div>20</div><div>10</div><div>0</div><div>0.00</div><div>0.10</div><div>0.20</div><div>0.30</div><div>Load Current [A]</div></div></div></div><div><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><div>Ripple [mVp-p]</div><div></div><div>Fig.Complex Ripple Wave Form</div></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>0.050</td><td>2</td><td>2</td></tr><tr><td>0.100</td><td>3</td><td>3</td></tr><tr><td>0.150</td><td>4</td><td>3</td></tr><tr><td>0.200</td><td>5</td><td>4</td></tr><tr><td>0.250</td><td>8</td><td>5</td></tr><tr><td>0.275</td><td>8</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	0.050	2	2	0.100	3	3	0.150	4	3	0.200	5	4	0.250	8	5	0.275	8	5	--	-	-	--	-	-	--	-	-	--	-	-
Load Current [A]	Ripple Voltage [mV]																																								
	Input Volt. 18 [V]	Input Volt. 36 [V]																																							
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COSEL

Model		SUW62412/SUCW62412		Temperature Testing Circuitry	25°C Figure B																																						
Item		Ripple Voltage (by Load Current)																																									
Object		-12V0.25A																																									
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>0.050</td><td>3</td><td>3</td></tr><tr><td>0.100</td><td>3</td><td>3</td></tr><tr><td>0.150</td><td>3</td><td>3</td></tr><tr><td>0.200</td><td>4</td><td>3</td></tr><tr><td>0.250</td><td>5</td><td>4</td></tr><tr><td>0.275</td><td>7</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. 18 [V]	Input Volt. 36 [V]	0.000	3	3	0.050	3	3	0.100	3	3	0.150	3	3	0.200	4	3	0.250	5	4	0.275	7	4	--	-	-	--	-	-	--	-	-	--	-	-
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<div><div>Ripple [mVp-p]</div><div>Fig.Complex Ripple Wave Form</div></div>																																											

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COSEL

Model		SUW62412/SUCW62412																																							
Item		Ripple-Noise																																							
Object		+12V0.25A																																							
1.Graph		2.Values																																							
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Load Current [A]	Ripple-Noise [mV]																																								
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		Temperature 25°C																																							
		Testing Circuitry Figure B																																							

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BC-3710

COSEL

Model		SUW62412/SUCW62412		Temperature 25°C																																																																											
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COSEL

Model		SUW62412/SUCW62412																																					
Item		Ripple Voltage (by Ambient Temp.)																																					
Object		+12V0.25A																																					
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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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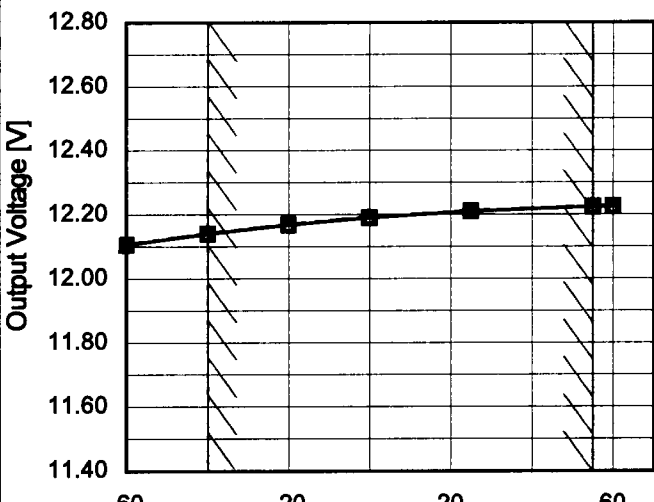
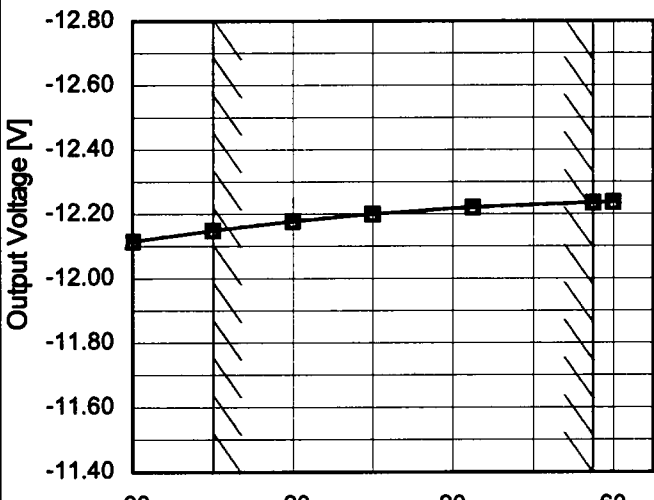
Testing Circuitry		Figure B	
2.Values			
Ambient Temperature [°C]	Ripple Voltage [mV]		
	Load 50%	Load 100%	
-60	5	7	
-40	5	7	
-20	5	7	
0	4	6	
25	3	5	
55	2	4	
60	2	4	
--	-	-	
--	-	-	
--	-	-	
--	-	-	

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

Model	SUW62412/SUCW62412																																																						
Item	Ambient Temperature Drift			Testing Circuitry Figure A																																																			
Object	+12V0.25A																																																						
1.Graph		2.Values																																																					
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-20	12.168	12.169	12.169																																																				
0	12.190	12.191	12.192																																																				
25	12.210	12.211	12.211																																																				
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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>—△— Input Volt. 18V ---□--- Input Volt. 24V -·-○-·- Input Volt. 36V</div></div> <div><p>Output Voltage [V]</p><p>Ambient Temperature [°C]</p><p>Load 100%</p></div>		<table><tr><th rowspan="2">Ambient Temperature [°C]</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>-60</td><td>-12.115</td><td>-12.115</td><td>-12.114</td></tr><tr><td>-40</td><td>-12.149</td><td>-12.149</td><td>-12.149</td></tr><tr><td>-20</td><td>-12.177</td><td>-12.178</td><td>-12.178</td></tr><tr><td>0</td><td>-12.200</td><td>-12.200</td><td>-12.200</td></tr><tr><td>25</td><td>-12.222</td><td>-12.221</td><td>-12.220</td></tr><tr><td>55</td><td>-12.236</td><td>-12.235</td><td>-12.234</td></tr><tr><td>60</td><td>-12.238</td><td>-12.237</td><td>-12.236</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>			Ambient Temperature [°C]	Output Voltage [V]			Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]	-60	-12.115	-12.115	-12.114	-40	-12.149	-12.149	-12.149	-20	-12.177	-12.178	-12.178	0	-12.200	-12.200	-12.200	25	-12.222	-12.221	-12.220	55	-12.236	-12.235	-12.234	60	-12.238	-12.237	-12.236	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-
Ambient Temperature [°C]	Output Voltage [V]																																																						
	Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]																																																				
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-40	-12.149	-12.149	-12.149																																																				
-20	-12.177	-12.178	-12.178																																																				
0	-12.200	-12.200	-12.200																																																				
25	-12.222	-12.221	-12.220																																																				
55	-12.236	-12.235	-12.234																																																				
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Note: Slanted line shows the range of the rated ambient temperature.																																																							

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Model		SUW62412/SUCW62412	Testing Circuitry Figure A			
Item		Output Voltage Accuracy				

1. Output Voltage Accuracy

This is defined as the value of the output voltage, regulation load, ambient temperature and input voltage varied at random in the range as specified below.

Temperature : -40 - 55°C
Input Voltage : 18 - 36V
Load Current (AVR 1) : 0 - 0.25A (AVR 2): 0 - 0.25A

* Other Output : Rated Load

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

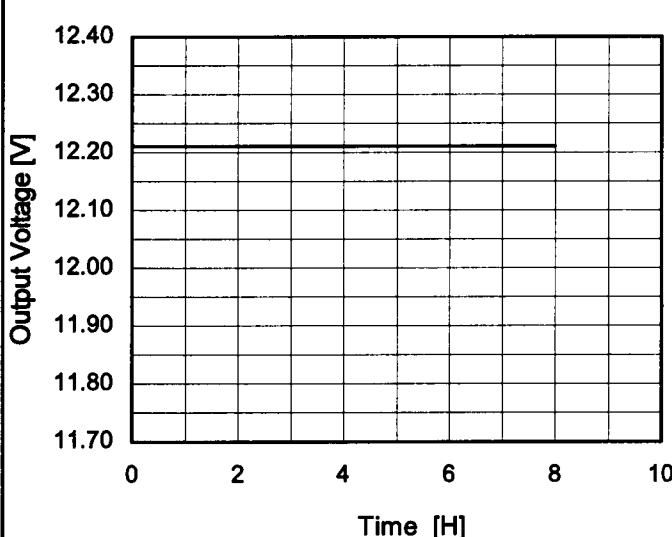
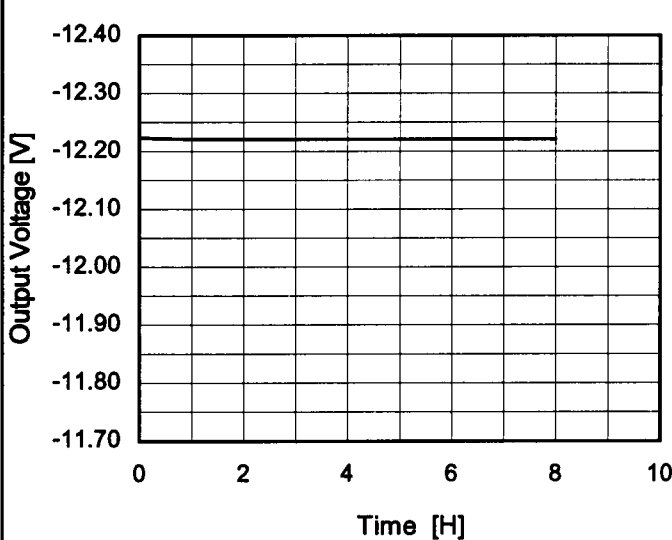
* Output Voltage Accuracy (Ration) = $\frac{\text{Output Voltage Accuracy}}{\text{Rated Output Voltage}} \times 100$

2. Values

Object		+12V0.25A				
Item	Temperature [°C]	Input Voltage[V]	Output		Output Voltage Accuracy	
			Current[A]	Voltage[V]	Value [mV]	Ration [%]
Maximum Voltage	55	18	0	12.502	±181	±1.5
Minimum Voltage	-40	18	0.25	12.140		

Object		-12V0.25A				
Item	Temperature [°C]	Input Voltage[V]	Output		Output Voltage Accuracy	
			Current[A]	Voltage[V]	Value [mV]	Ration [%]
Maximum Voltage	55	18	0	-12.528	±190	±1.6
Minimum Voltage	-40	18	0.25	-12.149		

COSEL

Model	SUW62412/SUCW62412																								
Item	Time Lapse Drift																								
Object	+12V0.25A																								
1.Graph		2.Values																							
<div><p>Output Voltage [V]</p><p>Time [H]</p><p>Input Volt. 24V</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>12.213</td></tr><tr><td>0.5</td><td>12.211</td></tr><tr><td>1.0</td><td>12.211</td></tr><tr><td>2.0</td><td>12.211</td></tr><tr><td>3.0</td><td>12.211</td></tr><tr><td>4.0</td><td>12.211</td></tr><tr><td>5.0</td><td>12.211</td></tr><tr><td>6.0</td><td>12.211</td></tr><tr><td>7.0</td><td>12.211</td></tr><tr><td>8.0</td><td>12.211</td></tr></table>		Time since start [H]	Output Voltage [V]	0.0	12.213	0.5	12.211	1.0	12.211	2.0	12.211	3.0	12.211	4.0	12.211	5.0	12.211	6.0	12.211	7.0	12.211	8.0	12.211
Time since start [H]	Output Voltage [V]																								
0.0	12.213																								
0.5	12.211																								
1.0	12.211																								
2.0	12.211																								
3.0	12.211																								
4.0	12.211																								
5.0	12.211																								
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Object	-12V0.25A																								
1.Graph		2.Values																							
<div><p>Output Voltage [V]</p><p>Time [H]</p><p>Input Volt. 24V</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>-12.223</td></tr><tr><td>0.5</td><td>-12.222</td></tr><tr><td>1.0</td><td>-12.221</td></tr><tr><td>2.0</td><td>-12.221</td></tr><tr><td>3.0</td><td>-12.221</td></tr><tr><td>4.0</td><td>-12.221</td></tr><tr><td>5.0</td><td>-12.221</td></tr><tr><td>6.0</td><td>-12.221</td></tr><tr><td>7.0</td><td>-12.221</td></tr><tr><td>8.0</td><td>-12.221</td></tr></table>		Time since start [H]	Output Voltage [V]	0.0	-12.223	0.5	-12.222	1.0	-12.221	2.0	-12.221	3.0	-12.221	4.0	-12.221	5.0	-12.221	6.0	-12.221	7.0	-12.221	8.0	-12.221
Time since start [H]	Output Voltage [V]																								
0.0	-12.223																								
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COSEL

Model SUW62412/SUCW62412

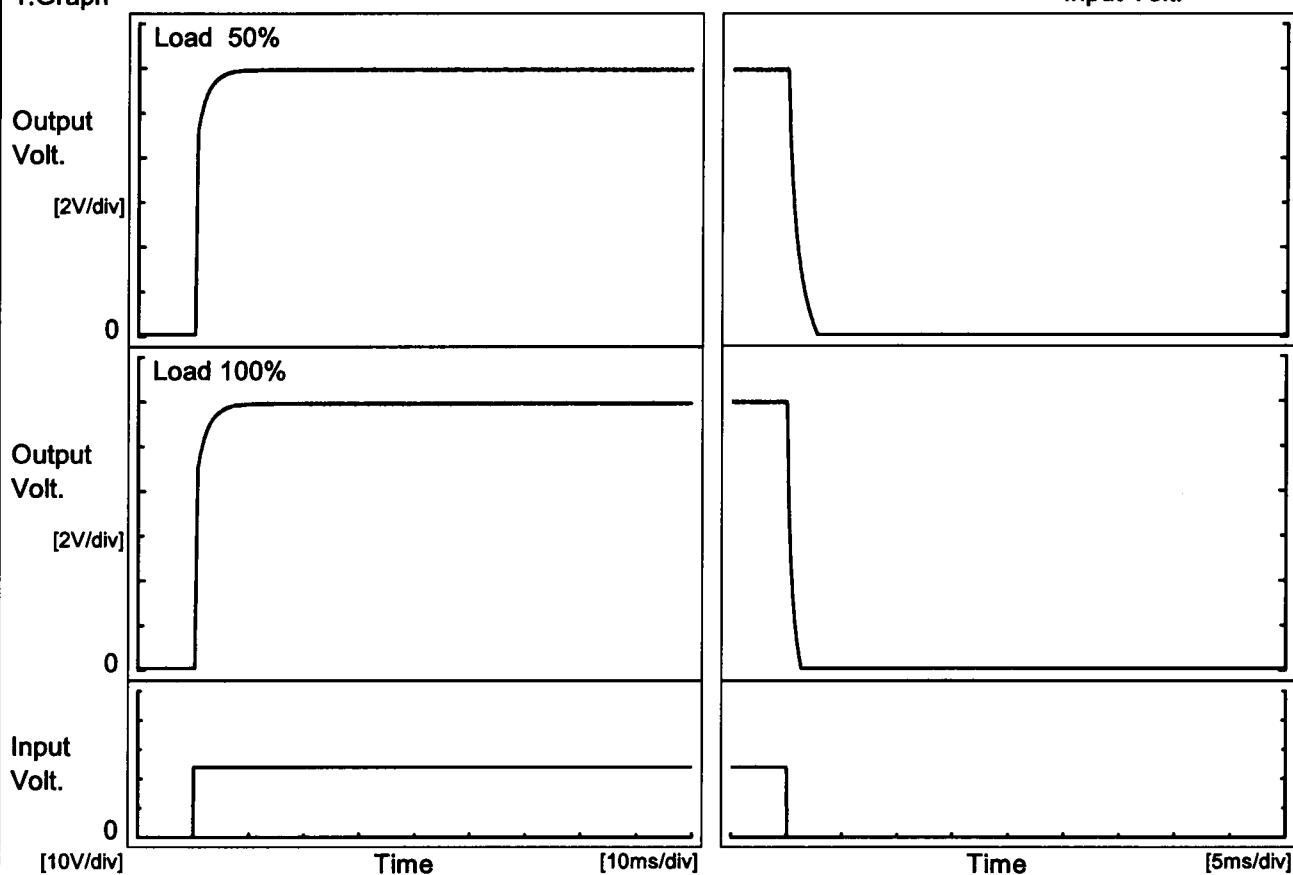
Item Rise and Fall Time

Temperature 25°C
Testing Circuitry Figure A

Object +12V0.25A

1.Graph

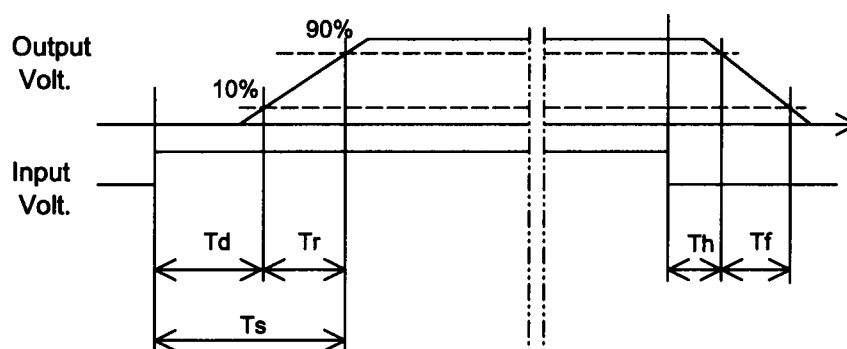
Input Volt. 24 V



2.Values

[ms]

Load \ Time	Td	Tr	Ts	Th	Tf
50 %	0.3	2.1	2.4	0.1	1.8
100 %	0.3	2.4	2.7	0.1	0.9



COSEL

Model

SUW62412/SUCW62412

Item

Rise and Fall Time

Temperature

25°C

Testing Circuitry

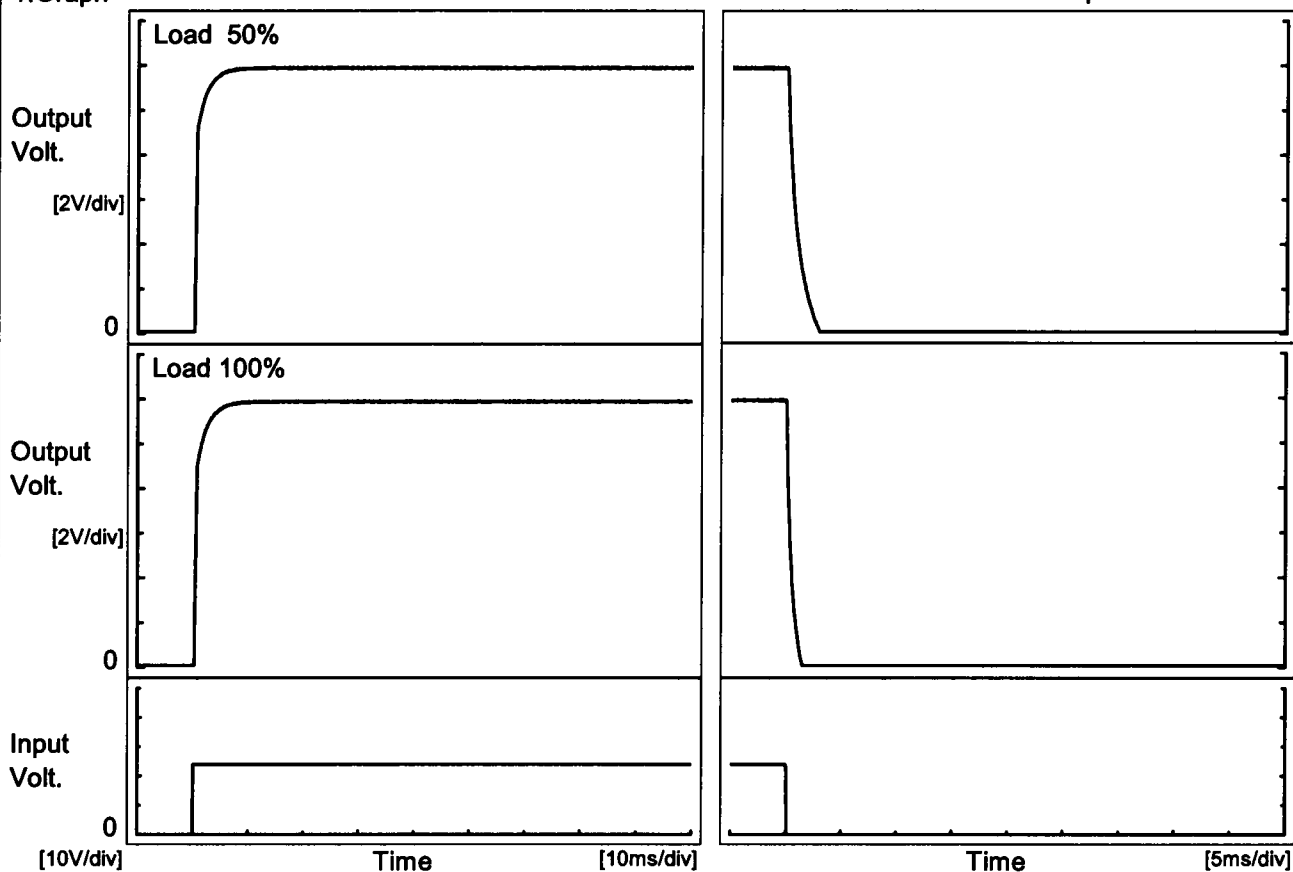
Figure A

Object

-12V0.25A

1.Graph

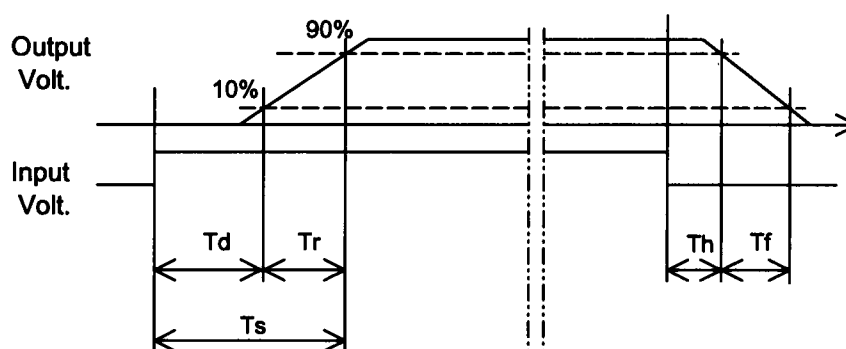
Input Volt. 24 V



2.Values

[ms]

Load \ Time	Td	Tr	Ts	Th	Tf
50 %	0.3	2.2	2.5	0.1	2.0
100 %	0.3	2.5	2.8	0.1	1.0



COSEL

Model		SUW62412/SUCW62412																																					
Item		Minimum Input Voltage for Regulated Output Voltage																																					
Object		+12V0.25A																																					
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>Load 50%</div></div><div><div><div><div><div></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 100%</div></div></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>15.5</td><td>15.7</td></tr><tr><td>-40</td><td>15.5</td><td>15.5</td></tr><tr><td>-20</td><td>15.2</td><td>15.3</td></tr><tr><td>0</td><td>15.1</td><td>15.3</td></tr><tr><td>25</td><td>15.1</td><td>15.3</td></tr><tr><td>55</td><td>15.1</td><td>15.1</td></tr><tr><td>60</td><td>14.9</td><td>15.1</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%	Load 100%	-60	15.5	15.7	-40	15.5	15.5	-20	15.2	15.3	0	15.1	15.3	25	15.1	15.3	55	15.1	15.1	60	14.9	15.1	--	-	-	--	-	-	--	-	-	--	-	-
Ambient Temperature [°C]	Load 50%	Load 100%																																					
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2.Values																																							

Object		-12V0.25A																																					
1.Graph																																							
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Ambient Temperature [°C]	Load 50%	Load 100%																																					
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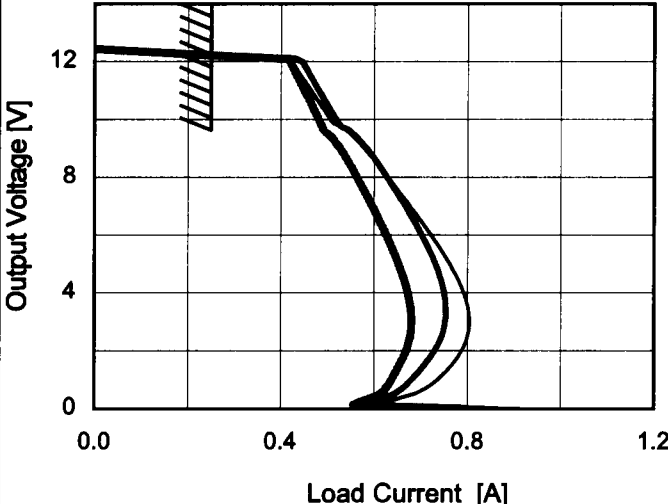
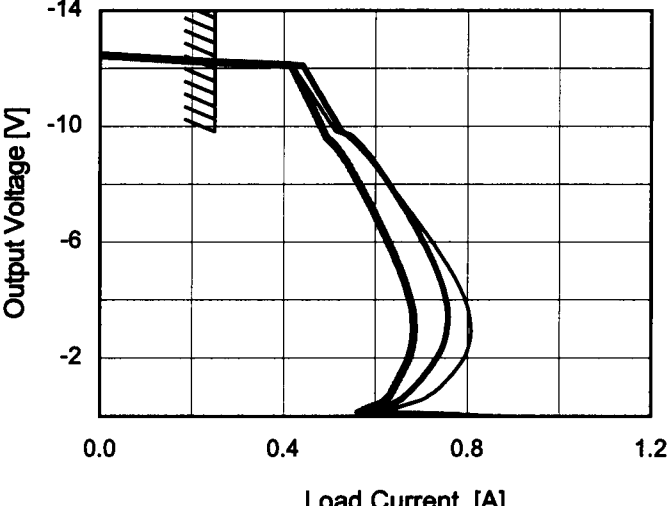
Ambient Temperature [°C]		Input Voltage [V]	
		Load 50%	Load 100%
-60		15.6	15.6
-40		15.4	15.4
-20		15.1	15.5
0		15.0	15.3
25		15.0	15.3
55		15.0	15.0
60		14.8	15.0
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Note: Slanted line shows the range of the rated ambient temperature.

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COSEL

Model		SUW62412/SUCW62412		Temperature 25°C																																																								
Item		Overcurrent Protection		Testing Circuitry Figure A																																																								
Object		+12V0.25A																																																										
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				<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>0.25</td><td>0.25</td><td>0.25</td></tr><tr><td>11.4</td><td>0.45</td><td>0.47</td><td>0.44</td></tr><tr><td>10.8</td><td>0.47</td><td>0.49</td><td>0.46</td></tr><tr><td>9.6</td><td>0.55</td><td>0.55</td><td>0.49</td></tr><tr><td>8.4</td><td>0.61</td><td>0.61</td><td>0.55</td></tr><tr><td>7.2</td><td>0.67</td><td>0.66</td><td>0.59</td></tr><tr><td>6.0</td><td>0.72</td><td>0.70</td><td>0.63</td></tr><tr><td>4.8</td><td>0.77</td><td>0.74</td><td>0.66</td></tr><tr><td>3.6</td><td>0.80</td><td>0.75</td><td>0.68</td></tr><tr><td>2.4</td><td>0.80</td><td>0.74</td><td>0.68</td></tr><tr><td>1.2</td><td>0.75</td><td>0.69</td><td>0.65</td></tr><tr><td>0.0</td><td>0.91</td><td>0.84</td><td>0.80</td></tr></table>		Output Voltage [V]	Load Current [A]			Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]	12.0	0.25	0.25	0.25	11.4	0.45	0.47	0.44	10.8	0.47	0.49	0.46	9.6	0.55	0.55	0.49	8.4	0.61	0.61	0.55	7.2	0.67	0.66	0.59	6.0	0.72	0.70	0.63	4.8	0.77	0.74	0.66	3.6	0.80	0.75	0.68	2.4	0.80	0.74	0.68	1.2	0.75	0.69	0.65	0.0	0.91	0.84	0.80
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Output Voltage [V]	Load Current [A]																																																											
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Note: Slanted line shows the range of the rated load current.																																																												

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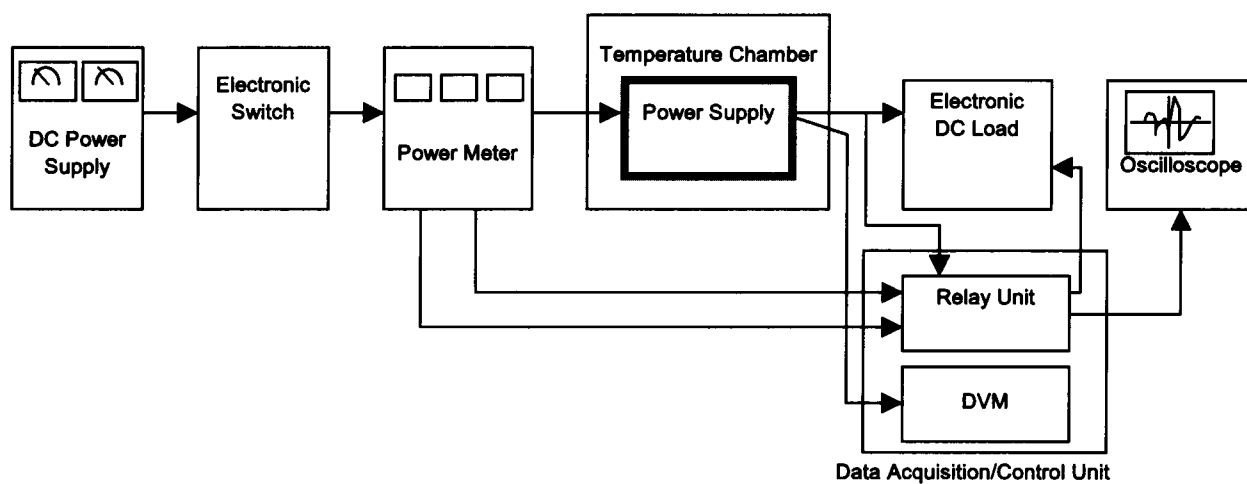


Figure A

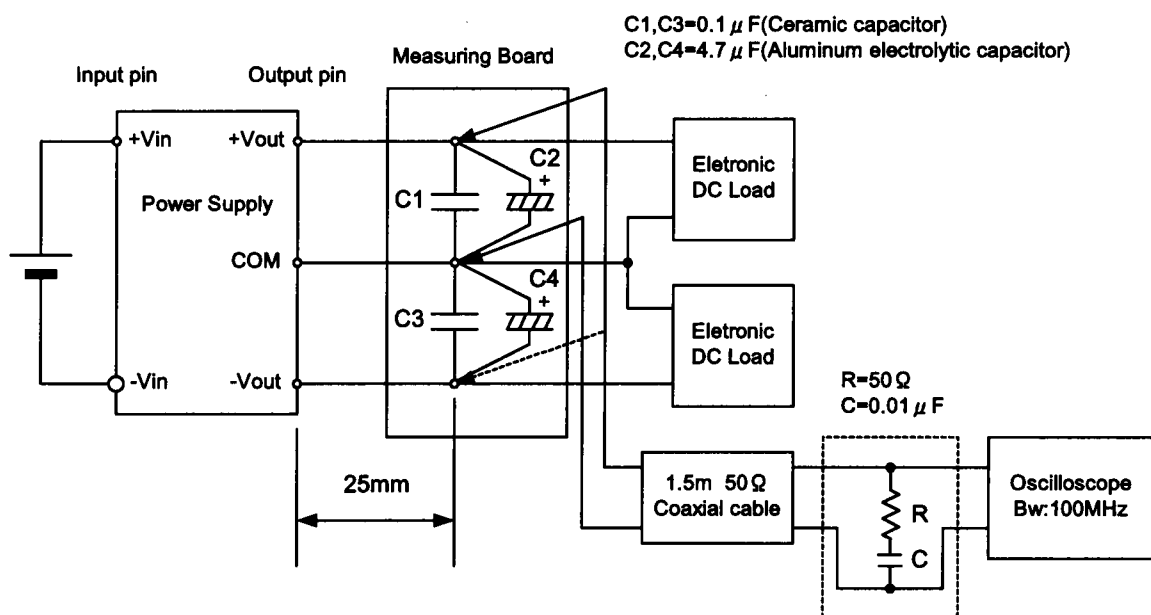


Figure B (Ripple and Ripple noise Characteristic)