

TEST DATA OF SUCW1R51212

Regulated DC Power Supply
Sep 17, 2004

Approved by : Tetsuo Sugimori
Tetsuo Sugimori Design Manager

Prepared by : Masahiro Shima
Masahiro Shima Design Engineer

COSEL CO.,LTD.

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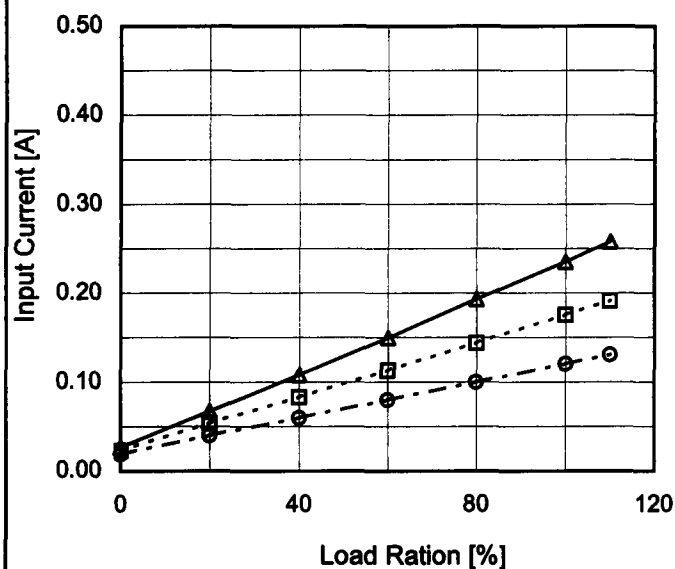
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Model	SUCW1R51212
Item	Input Current (by Load Current)
Object	_____

1.Graph

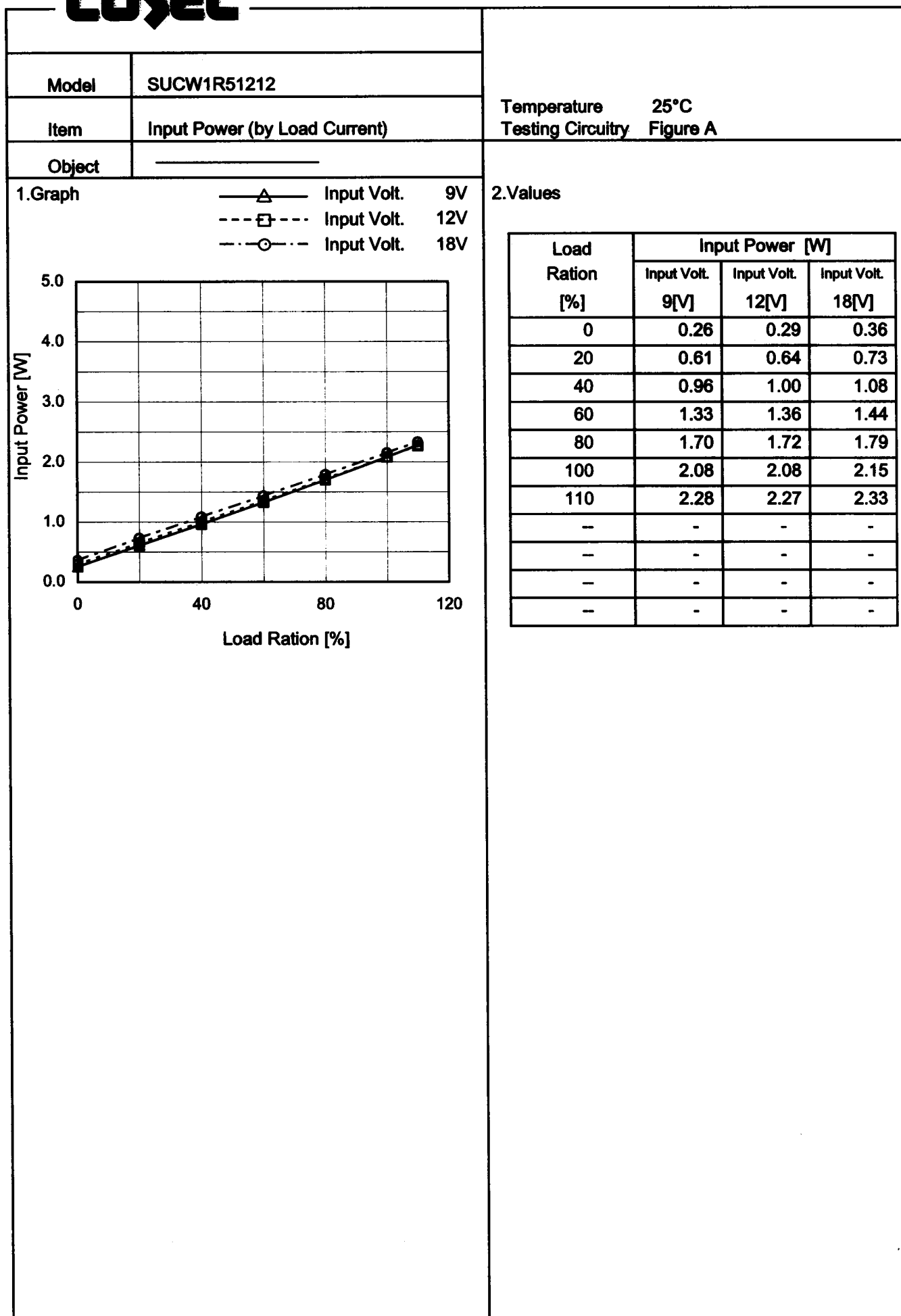
—△— Input Volt. 9V
 ---□--- Input Volt. 12V
 - -○- - Input Volt. 18V



Temperature 25°C
 Testing Circuitry Figure A

2.Values

Load Ration [%]	Input Current [A]		
	Input Volt. 9[V]	Input Volt. 12[V]	Input Volt. 18[V]
0	0.027	0.023	0.019
20	0.067	0.054	0.040
40	0.108	0.083	0.060
60	0.150	0.113	0.080
80	0.193	0.144	0.100
100	0.235	0.176	0.120
110	0.258	0.192	0.131
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

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Item		Efficiency (by Input Voltage)																																	
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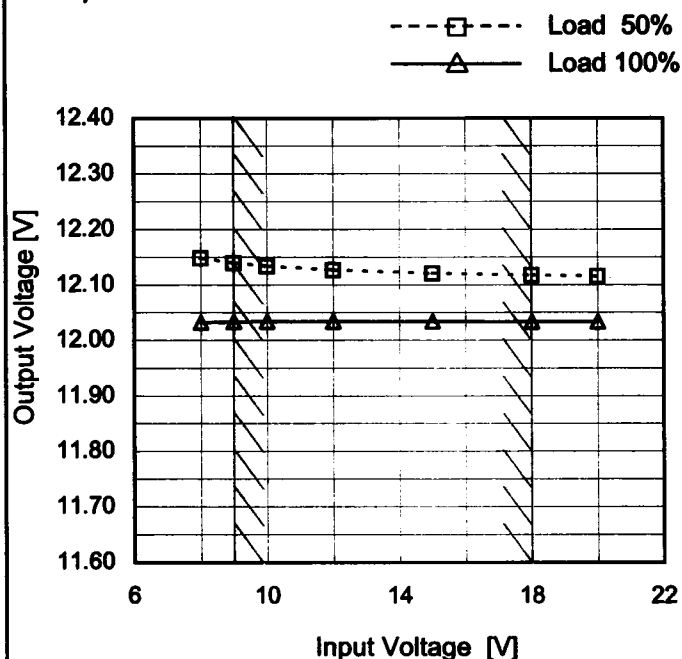
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Load Ration [%]	9V	12V	18V																																																
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Model	SUCW1R51212
Item	Line Regulation
Object	+12V0.065A

1.Graph



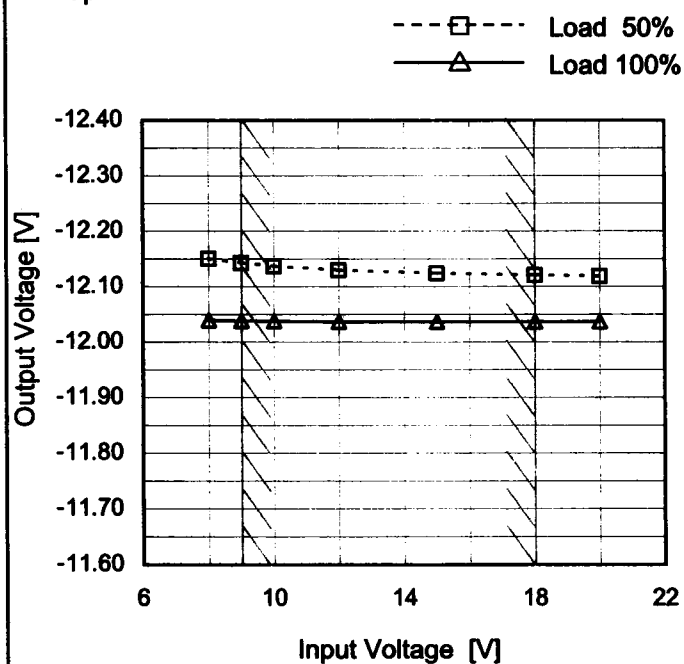
Temperature 25°C
Testing Circuitry Figure A

2.Values

Input Voltage [V]	Output Voltage [V]	
	Load 50%	Load 100%
8	12.148	12.032
9	12.140	12.033
10	12.134	12.034
12	12.127	12.034
15	12.121	12.034
18	12.117	12.033
20	12.115	12.034
—	—	—
—	—	—

Object	-12V0.065A
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1.Graph



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

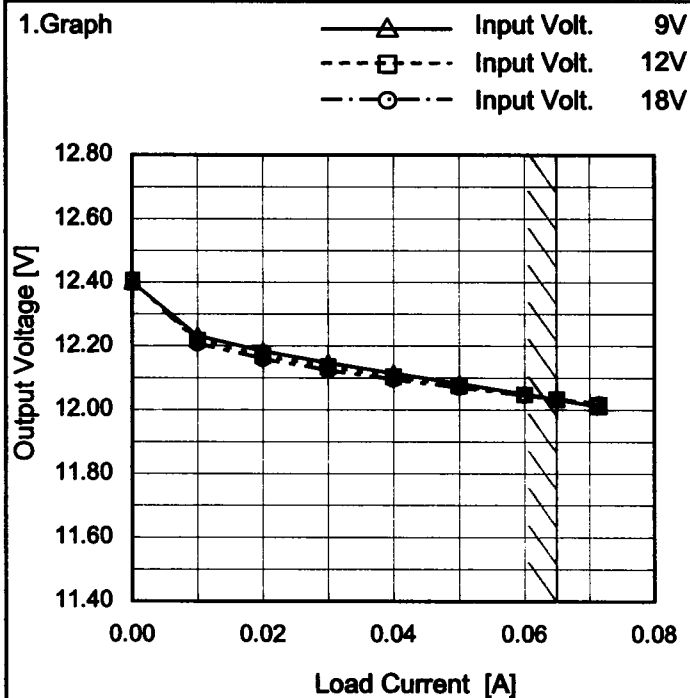
2.Values

Input Voltage [V]	Output Voltage [V]	
	Load 50%	Load 100%
8	-12.151	-12.040
9	-12.143	-12.039
10	-12.137	-12.038
12	-12.130	-12.037
15	-12.124	-12.037
18	-12.121	-12.037
20	-12.119	-12.037
—	—	—
—	—	—

COSEL

Model	SUCW1R51212
Item	Load Regulation
Object	+12V0.065A

1.Graph



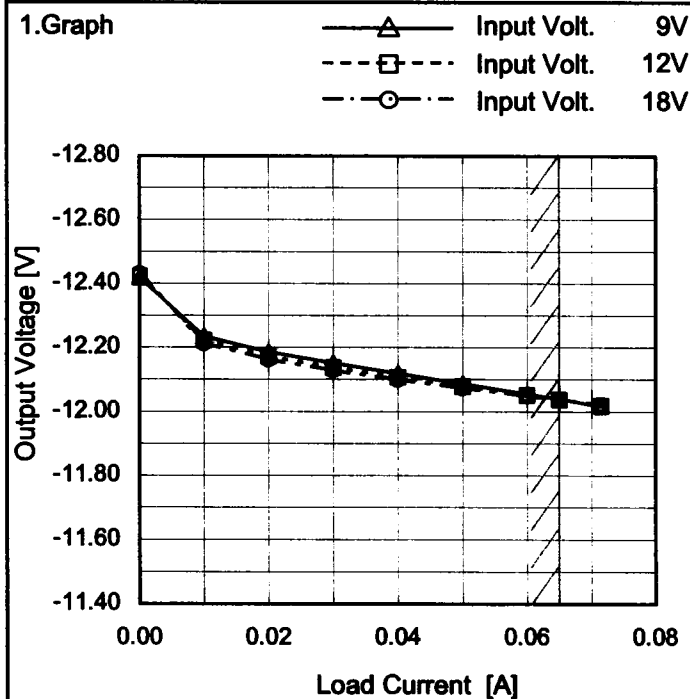
Temperature 25°C
Testing Circuitry Figure A

2.Values

Load Current [A]	Output Voltage [V]		
	Input Volt. 9[V]	Input Volt. 12[V]	Input Volt. 18[V]
0.000	12.401	12.406	12.409
0.010	12.232	12.218	12.207
0.020	12.184	12.169	12.159
0.030	12.148	12.135	12.125
0.040	12.115	12.105	12.095
0.050	12.083	12.075	12.070
0.060	12.050	12.048	12.045
0.065	12.033	12.034	12.034
0.072	12.011	12.016	12.019
—	—	—	—
—	—	—	—

Object	-12V0.065A
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1.Graph



2.Values

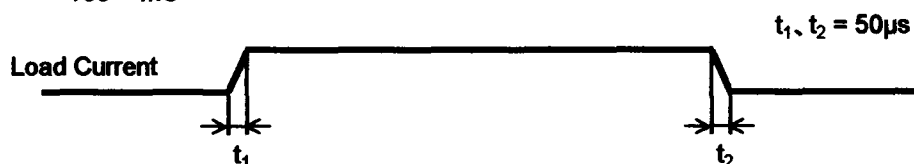
Load Current [A]	Output Voltage [V]		
	Input Volt. 9[V]	Input Volt. 12[V]	Input Volt. 18[V]
0.000	-12.419	-12.423	-12.431
0.010	-12.235	-12.222	-12.212
0.020	-12.187	-12.173	-12.163
0.030	-12.153	-12.138	-12.128
0.040	-12.119	-12.107	-12.099
0.050	-12.087	-12.079	-12.073
0.060	-12.055	-12.051	-12.049
0.065	-12.039	-12.038	-12.037
0.072	-12.017	-12.020	-12.022
—	—	—	—
—	—	—	—

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

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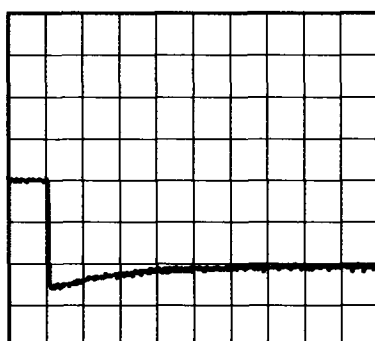
Model	SUCW1R51212	Temperature	25°C
Item	Dynamic Load Response	Testing Circuitry	Figure A
Object	+12V0.065A		

Input Volt. 12 V
Cycle 100 mS

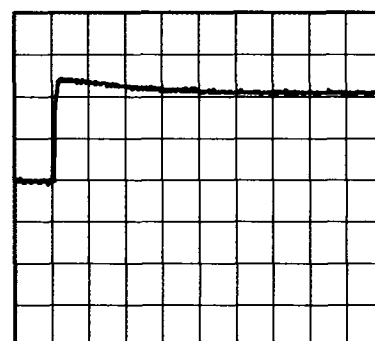


Min. Load (0A) \longleftrightarrow
Load 100% (0.065A)

200mV/div



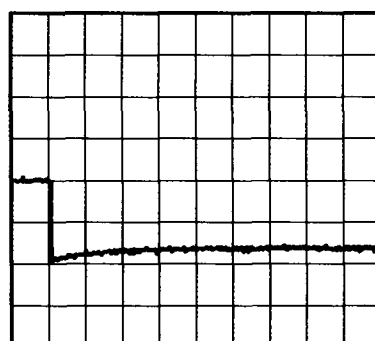
2ms/div



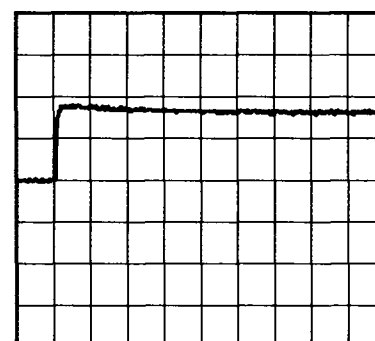
2ms/div

Min. Load (0A) \longleftrightarrow
Load 50% (0.0325A)

200mV/div



2ms/div



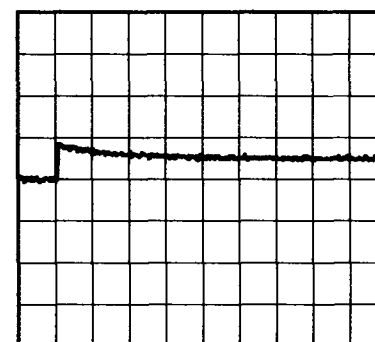
2ms/div

Load 50% (0.0325A) \longleftrightarrow
Load 100% (0.065A)

200mV/div



2ms/div

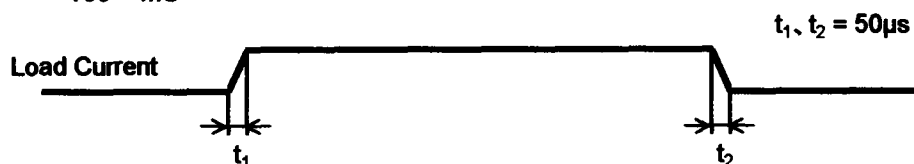


2ms/div

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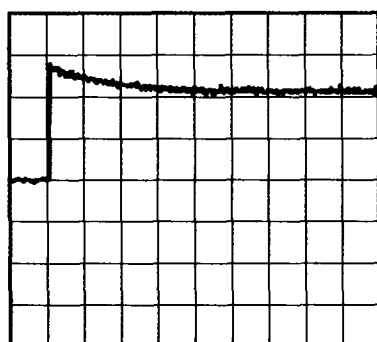
Model	SUCW1R51212	Temperature	25°C
Item	Dynamic Load Response	Testing Circuitry	Figure A
Object	-12V0.065A		

Input Volt. 12 V
Cycle 100 mS

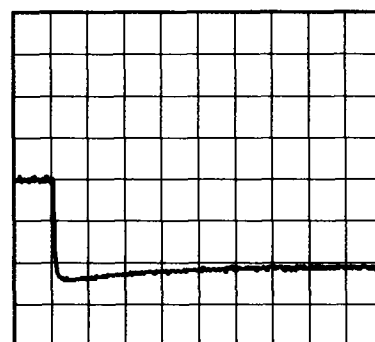


Min. Load (0A) \longleftrightarrow
Load 100% (0.065A)

200mV/div



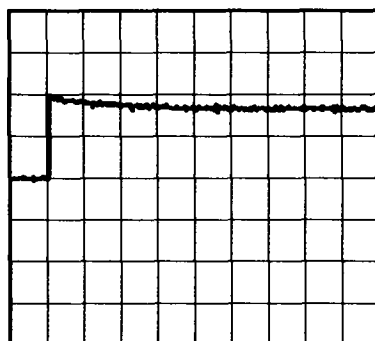
2ms/div



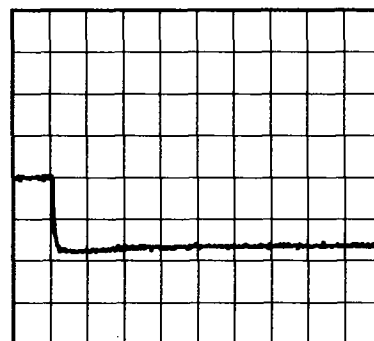
2ms/div

Min. Load (0A) \longleftrightarrow
Load 50% (0.0325A)

200mV/div



2ms/div



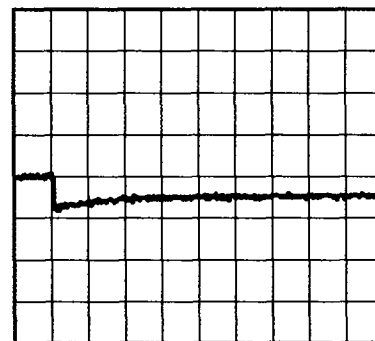
2ms/div

Load 50% (0.0325A) \longleftrightarrow
Load 100% (0.065A)

200mV/div



2ms/div



2ms/div

COSEL

Model	SUCW1R51212	Temperature 25°C Testing Circuitry Figure B																																							
Item	Ripple Voltage (by Load Current)																																								
Object	+12V0.065A																																								
1.Graph		2.Values																																							
<div><div><div>—△—</div><div>Input Volt.</div><div>9V</div></div><div><div>- - ○ - -</div><div>Input Volt.</div><div>18V</div></div></div> <p>Ripple Voltage [mV]</p> <p>Load Ration [%]</p>		<table><tr><th rowspan="2">Load Ration [%]</th><th colspan="2">Ripple Voltage [mV]</th></tr><tr><th>Input Volt. 9 [V]</th><th>Input Volt. 18 [V]</th></tr><tr><td>0</td><td>1</td><td>2</td></tr><tr><td>20</td><td>1</td><td>2</td></tr><tr><td>40</td><td>2</td><td>2</td></tr><tr><td>60</td><td>2</td><td>2</td></tr><tr><td>80</td><td>2</td><td>2</td></tr><tr><td>100</td><td>3</td><td>2</td></tr><tr><td>110</td><td>3</td><td>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></table>		Load Ration [%]	Ripple Voltage [mV]		Input Volt. 9 [V]	Input Volt. 18 [V]	0	1	2	20	1	2	40	2	2	60	2	2	80	2	2	100	3	2	110	3	2	--	-	-	--	-	-	--	-	-	--	-	-
Load Ration [%]	Ripple Voltage [mV]																																								
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Measured by 100 MHz Oscilloscope. Ripple Voltage is shown as p-p in the figure below.																																									
<p>Ripple [mVp-p]</p> <p>Fig.Complex Ripple Wave Form</p>																																									

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Model	SUCW1R51212																																								
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COSEL

Model		SUCW1R51212	
Item		Ripple-Noise	
Object		+12V0.065A	
1.Graph		2.Values	

COSEL

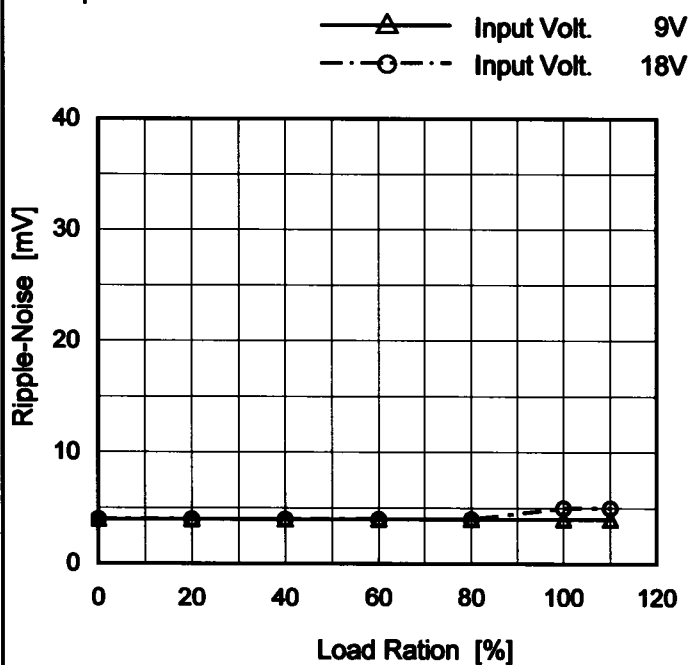
Model SUCW1R51212

Item Ripple-Noise

Object -12V0.065A

Temperature 25°C
Testing Circuitry Figure B

1.Graph



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

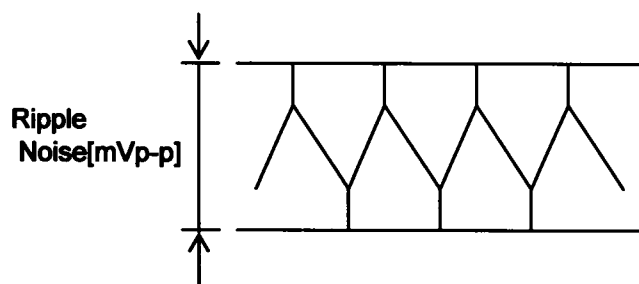


Fig.Complex Ripple Noise Wave Form

2.Values

Load Ration [%]	Ripple-Noise [mV]	
	Input Volt. 9 [V]	Input Volt. 18 [V]
0	4	4
20	4	4
40	4	4
60	4	4
80	4	4
100	4	5
110	4	5
—	—	—
—	—	—
—	—	—
—	—	—

COSEL

Model		SUCW1R51212																																							
Item		Ripple Voltage (by Ambient Temp.)																																							
Object		+12V0.065A																																							
1.Graph																																									
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- 14 -

BC-3638

Model		SUCW1R51212																																																				
Item		Ambient Temperature Drift																																																				
Object		+12V0.065A																																																				
1.Graph		<div><div><div>—△—</div><div>Input Volt.</div><div>9V</div></div><div><div>---□---</div><div>Input Volt.</div><div>12V</div></div><div><div>---○---</div><div>Input Volt.</div><div>18V</div></div></div> <p>Output Voltage [V]</p> <p>Ambient Temperature [°C]</p> <p>Load 100%</p>																																																				
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Object		-12V0.065A																																																				
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Note: Slanted line shows the range of the rated ambient temperature.

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BC-3638



Model		SUCW1R51212			
Item		Output Voltage Accuracy		Testing Circuitry Figure A	

1. Output Voltage Accuracy

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

Temperature : -40 - 55°C
Input Voltage : 9 - 18V
Load Current (AVR 1) : 0 - 0.065A (AVR 2) : 0 - 0.065A

* 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

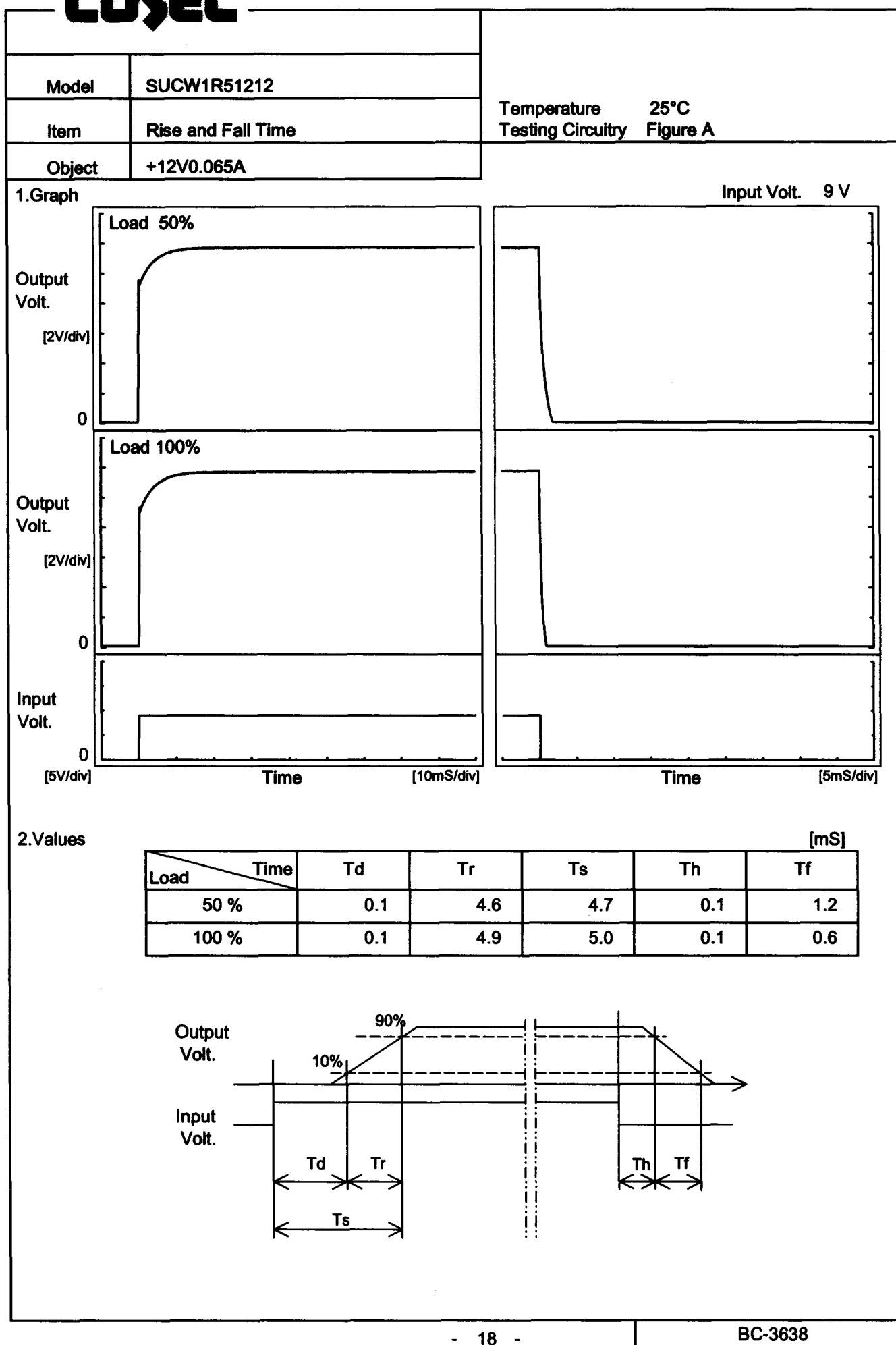
Object		+12V0.065A				
Item	Temperature [°C]	Input Voltage[V]	Output		Output Voltage Accuracy	
			Current[A]	Voltage[V]	Value [mV]	Ration [%]
Maximum Voltage	-20	18	0	12.430	±209	±1.7
Minimum Voltage	55	18	0.065	12.012		

Object		-12V0.065A				
Item	Temperature [°C]	Input Voltage[V]	Output		Output Voltage Accuracy	
			Current[A]	Voltage[V]	Value [mV]	Ration [%]
Maximum Voltage	-20	18	0	-12.455	±220	±1.8
Minimum Voltage	55	18	0.065	-12.015		

COSEL

Model	SUCW1R51212	Temperature 25°C Testing Circuitry Figure A	
Item	Time Lapse Drift		
Object	+12V0.065A		
1.Graph		2.Values	
<div><div><div>Output Voltage [V]</div><div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></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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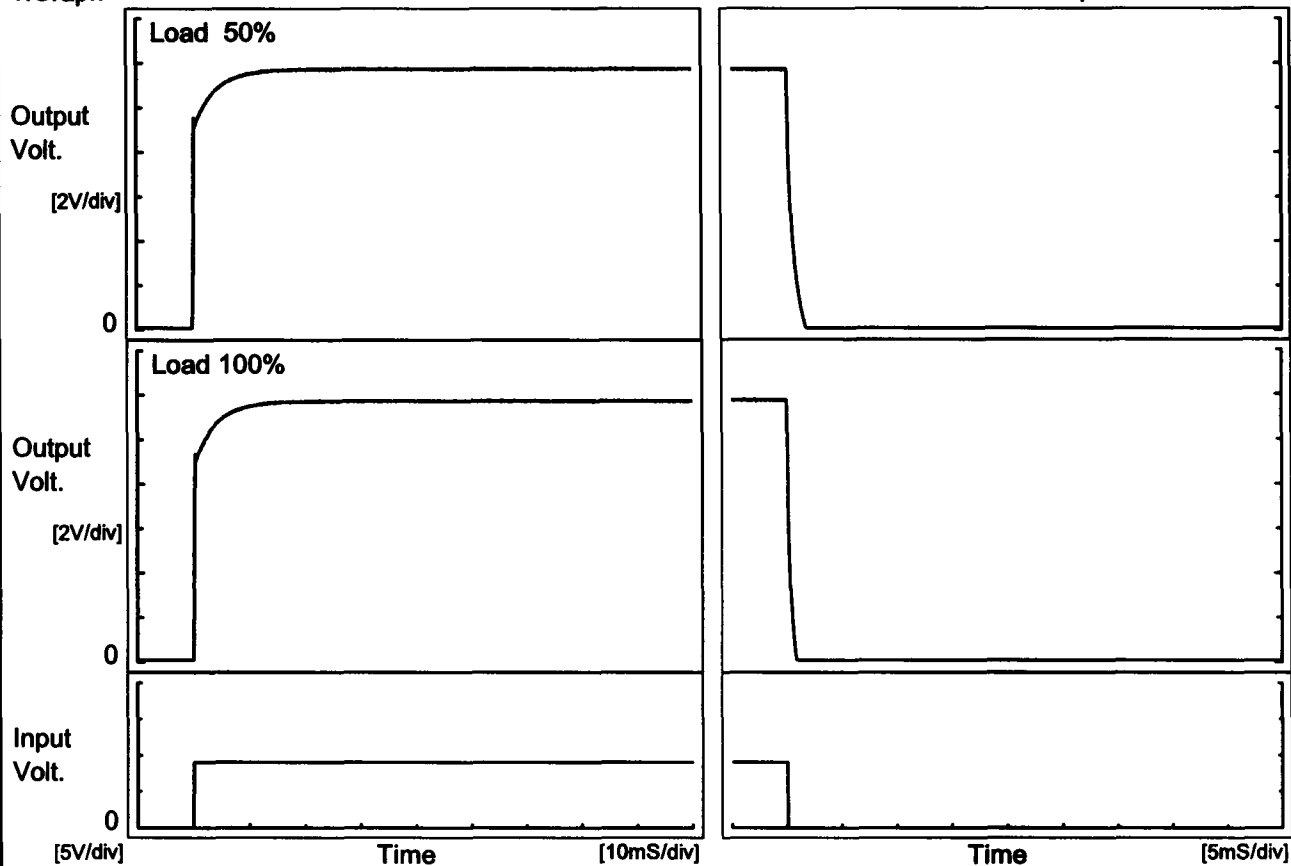
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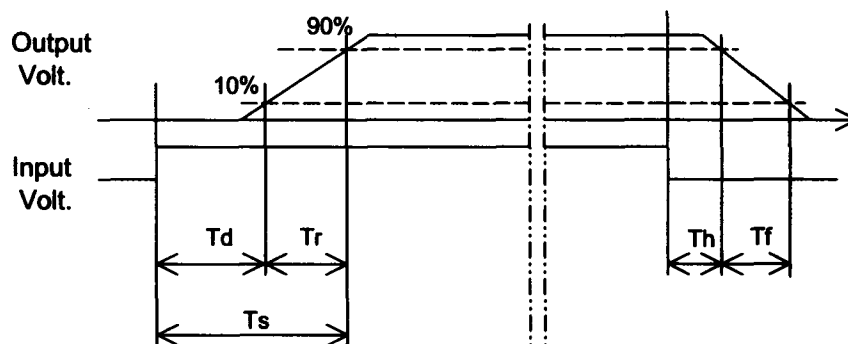
Model	SUCW1R51212	Temperature	25°C
Item	Rise and Fall Time	Testing Circuitry	Figure A
Object	-12V0.065A		

1. Graph



2. Values

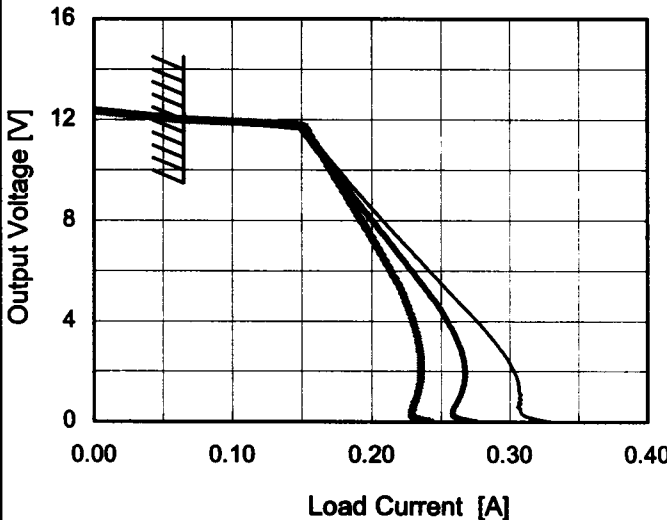
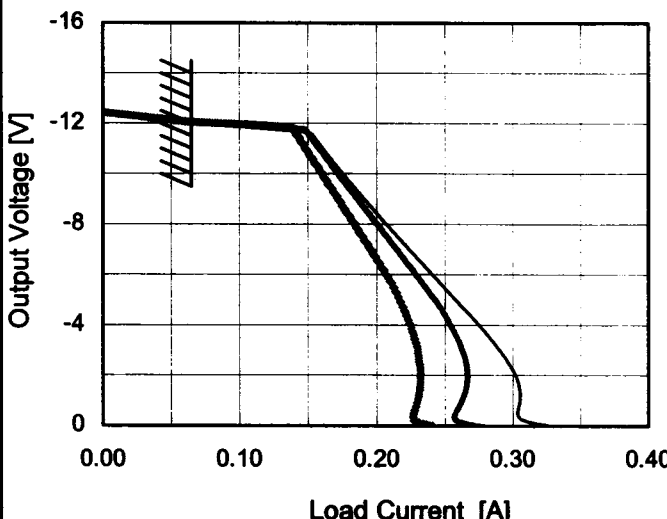
Load \ Time	[mS]				
	Td	Tr	Ts	Th	Tf
50 %	0.1	4.6	4.7	0.1	1.2
100 %	0.1	4.9	5.0	0.1	0.6



COSEL

Model	SUCW1R51212	Testing Circuitry Figure A																																					
Item	Minimum Input Voltage for Regulated Output Voltage																																						
Object	+12V0.065A																																						
1.Graph		2.Values																																					
<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%</th><th>Load 100%</th></tr></thead><tbody><tr><td>-60</td><td>3.5</td><td>5.0</td></tr><tr><td>-40</td><td>3.5</td><td>5.1</td></tr><tr><td>-20</td><td>3.6</td><td>5.2</td></tr><tr><td>0</td><td>3.6</td><td>5.4</td></tr><tr><td>25</td><td>3.7</td><td>5.6</td></tr><tr><td>55</td><td>3.9</td><td>5.8</td></tr><tr><td>60</td><td>3.9</td><td>5.8</td></tr><tr><td>—</td><td>—</td><td>—</td></tr><tr><td>—</td><td>—</td><td>—</td></tr><tr><td>—</td><td>—</td><td>—</td></tr><tr><td>—</td><td>—</td><td>—</td></tr></tbody></table>		Ambient Temperature [°C]	Load 50%	Load 100%	-60	3.5	5.0	-40	3.5	5.1	-20	3.6	5.2	0	3.6	5.4	25	3.7	5.6	55	3.9	5.8	60	3.9	5.8	—	—	—	—	—	—	—	—	—	—	—	—		
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Note: Slanted line shows the range of the rated ambient temperature.																																							

COSEL

Model	SUCW1R51212																																																									
Item	Overcurrent Protection	Temperature	25°C																																																							
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<div><div><div></div><div></div><div></div></div><div>Input Volt. 9V Input Volt. 12V Input Volt. 18V</div></div> 		<table><tr><th rowspan="2">Output Voltage [V]</th><th colspan="3">Load Current [A]</th></tr><tr><th>Input Volt. 9[V]</th><th>Input Volt. 12[V]</th><th>Input Volt. 18[V]</th></tr><tr><td>12.0</td><td>0.07</td><td>0.07</td><td>0.07</td></tr><tr><td>11.4</td><td>0.16</td><td>0.15</td><td>0.16</td></tr><tr><td>10.8</td><td>0.16</td><td>0.16</td><td>0.16</td></tr><tr><td>9.6</td><td>0.18</td><td>0.18</td><td>0.18</td></tr><tr><td>8.4</td><td>0.20</td><td>0.20</td><td>0.19</td></tr><tr><td>7.2</td><td>0.22</td><td>0.21</td><td>0.20</td></tr><tr><td>6.0</td><td>0.24</td><td>0.23</td><td>0.21</td></tr><tr><td>4.8</td><td>0.26</td><td>0.25</td><td>0.22</td></tr><tr><td>3.6</td><td>0.28</td><td>0.26</td><td>0.23</td></tr><tr><td>2.4</td><td>0.30</td><td>0.27</td><td>0.24</td></tr><tr><td>1.2</td><td>0.31</td><td>0.27</td><td>0.23</td></tr><tr><td>0.0</td><td>0.33</td><td>0.28</td><td>0.24</td></tr></table>		Output Voltage [V]	Load Current [A]			Input Volt. 9[V]	Input Volt. 12[V]	Input Volt. 18[V]	12.0	0.07	0.07	0.07	11.4	0.16	0.15	0.16	10.8	0.16	0.16	0.16	9.6	0.18	0.18	0.18	8.4	0.20	0.20	0.19	7.2	0.22	0.21	0.20	6.0	0.24	0.23	0.21	4.8	0.26	0.25	0.22	3.6	0.28	0.26	0.23	2.4	0.30	0.27	0.24	1.2	0.31	0.27	0.23	0.0	0.33	0.28	0.24
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<div><div><div></div><div></div><div></div></div><div>Input Volt. 9V Input Volt. 12V Input Volt. 18V</div></div> 		<table><tr><th rowspan="2">Output Voltage [V]</th><th colspan="3">Load Current [A]</th></tr><tr><th>Input Volt. 9[V]</th><th>Input Volt. 12[V]</th><th>Input Volt. 18[V]</th></tr><tr><td>-12.0</td><td>0.07</td><td>0.07</td><td>0.07</td></tr><tr><td>-11.4</td><td>0.16</td><td>0.15</td><td>0.14</td></tr><tr><td>-10.8</td><td>0.16</td><td>0.16</td><td>0.15</td></tr><tr><td>-9.6</td><td>0.18</td><td>0.18</td><td>0.16</td></tr><tr><td>-8.4</td><td>0.20</td><td>0.20</td><td>0.18</td></tr><tr><td>-7.2</td><td>0.22</td><td>0.21</td><td>0.19</td></tr><tr><td>-6.0</td><td>0.24</td><td>0.23</td><td>0.21</td></tr><tr><td>-4.8</td><td>0.26</td><td>0.25</td><td>0.22</td></tr><tr><td>-3.6</td><td>0.28</td><td>0.26</td><td>0.23</td></tr><tr><td>-2.4</td><td>0.30</td><td>0.27</td><td>0.23</td></tr><tr><td>-1.2</td><td>0.31</td><td>0.26</td><td>0.23</td></tr><tr><td>0.0</td><td>0.33</td><td>0.28</td><td>0.24</td></tr></table>		Output Voltage [V]	Load Current [A]			Input Volt. 9[V]	Input Volt. 12[V]	Input Volt. 18[V]	-12.0	0.07	0.07	0.07	-11.4	0.16	0.15	0.14	-10.8	0.16	0.16	0.15	-9.6	0.18	0.18	0.16	-8.4	0.20	0.20	0.18	-7.2	0.22	0.21	0.19	-6.0	0.24	0.23	0.21	-4.8	0.26	0.25	0.22	-3.6	0.28	0.26	0.23	-2.4	0.30	0.27	0.23	-1.2	0.31	0.26	0.23	0.0	0.33	0.28	0.24
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Note: Slanted line shows the range of the rated load current.																																																										

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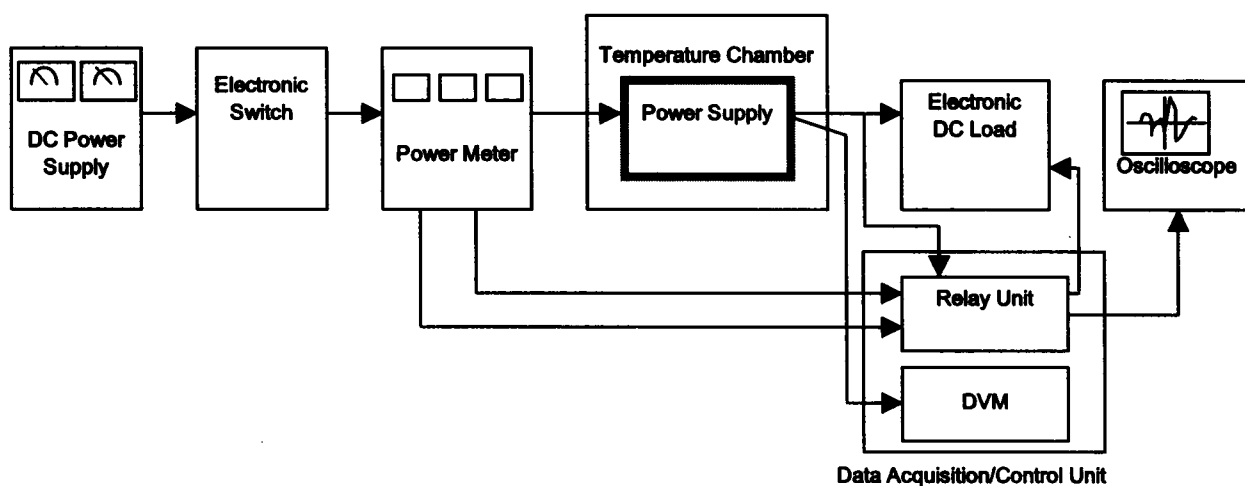


Figure A

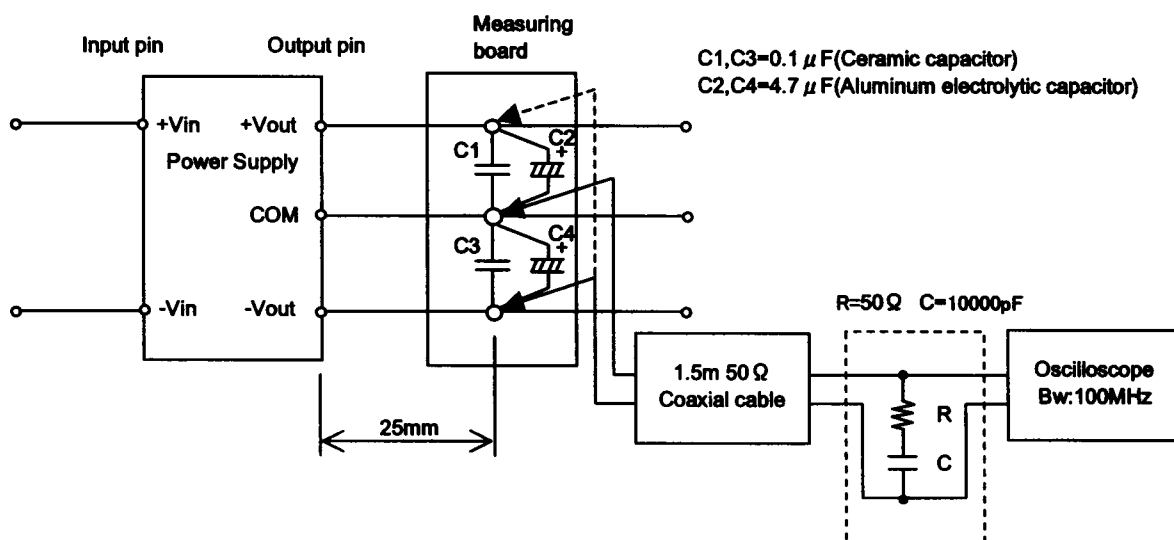


Figure B (Ripple and Ripple noise Characteristic)