参考資料

COSEL

TEST DATA OF SUW31212

Regulated DC Power Supply
Mar 18, 2005

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Hayato Nakatsubo Design Engineer

COSEL CO.,LTD.

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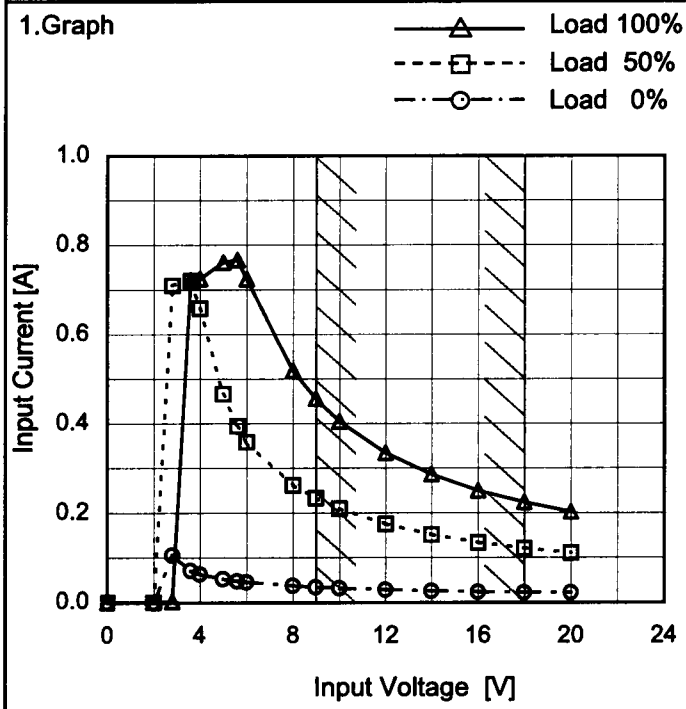
COSEL

Model	SUW31212
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

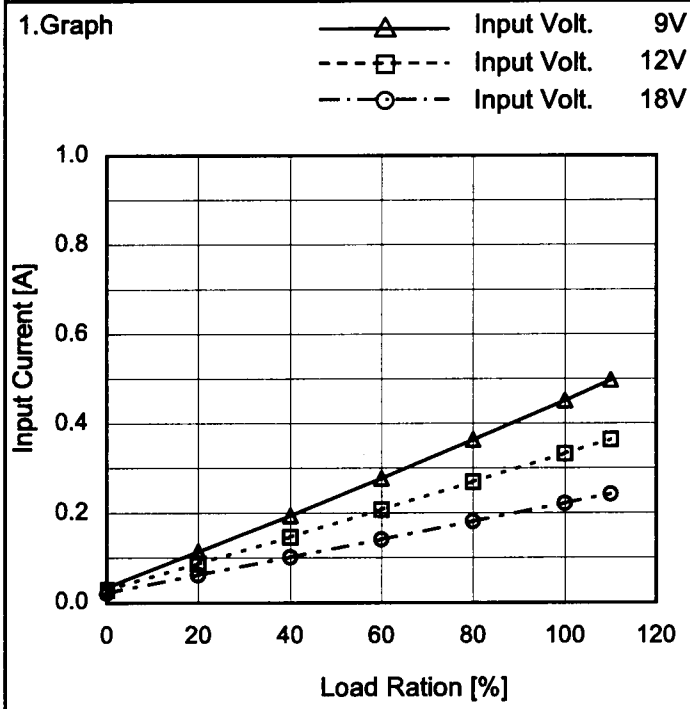
Input Voltage [V]	Input Current [A]		
	Load 0%	Load 50%	Load 100%
0.0	0.000	0.000	0.000
2.0	0.000	0.000	0.000
2.8	0.106	0.710	0.003
3.6	0.071	0.721	0.722
4.0	0.063	0.659	0.725
5.0	0.052	0.467	0.762
5.6	0.048	0.395	0.767
6.0	0.045	0.360	0.724
8.0	0.037	0.262	0.519
9.0	0.034	0.233	0.456
10.0	0.032	0.210	0.405
12.0	0.028	0.175	0.335
14.0	0.025	0.152	0.286
16.0	0.023	0.134	0.250
18.0	0.022	0.121	0.224
20.0	0.022	0.111	0.203
--	-	-	-
--	-	-	-

COSEL

Model	SUW31212
Item	Input Current (by Load Current)
Object	————————

Temperature 25°C
Testing Circuitry Figure A

1.Graph



2.Values

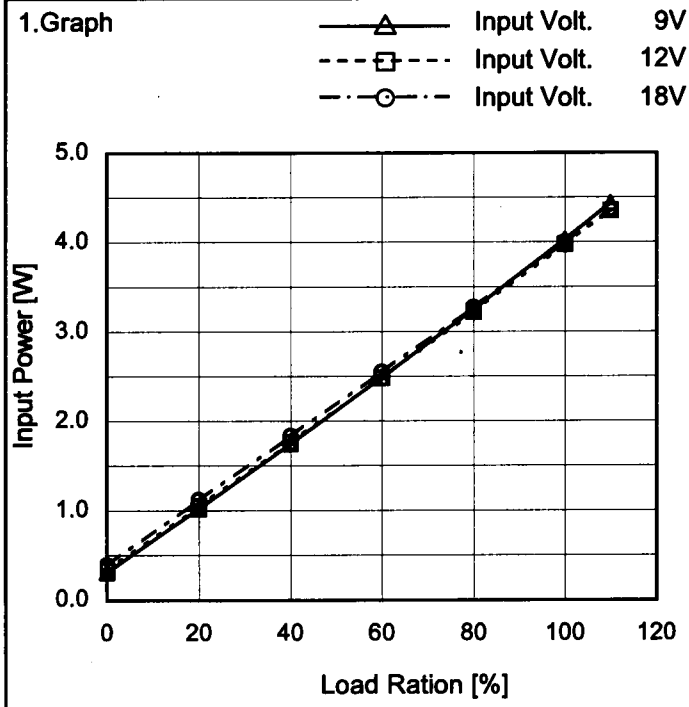
Load Ration [%]	Input Current [A]		
	Input Volt. 9[V]	Input Volt. 12[V]	Input Volt. 18[V]
0	0.034	0.028	0.022
20	0.113	0.087	0.062
40	0.194	0.147	0.102
60	0.278	0.207	0.141
80	0.364	0.270	0.181
100	0.451	0.332	0.222
110	0.497	0.364	0.242
---	-	-	-
---	-	-	-
---	-	-	-
---	-	-	-

COSEL

Model	SUW31212
Item	Input Power (by Load Current)
Object	———————

Temperature 25°C
Testing Circuitry Figure A

1.Graph



2.Values

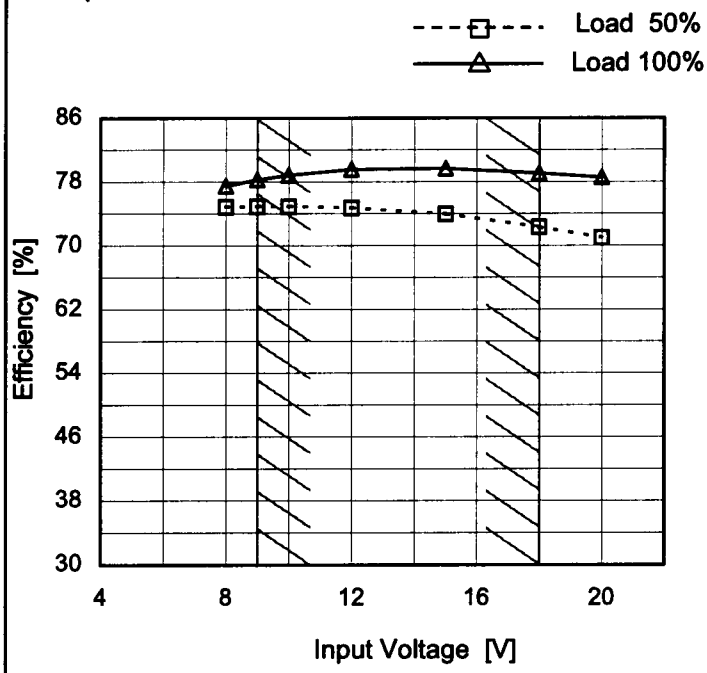
Load Ration [%]	Input Power [W]		
	Input Volt. 9[V]	Input Volt. 12[V]	Input Volt. 18[V]
0	0.31	0.33	0.39
20	1.02	1.05	1.12
40	1.75	1.76	1.84
60	2.49	2.49	2.55
80	3.25	3.22	3.27
100	4.03	3.97	4.00
110	4.44	4.35	4.36
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

COSEL

Model	SUW31212
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

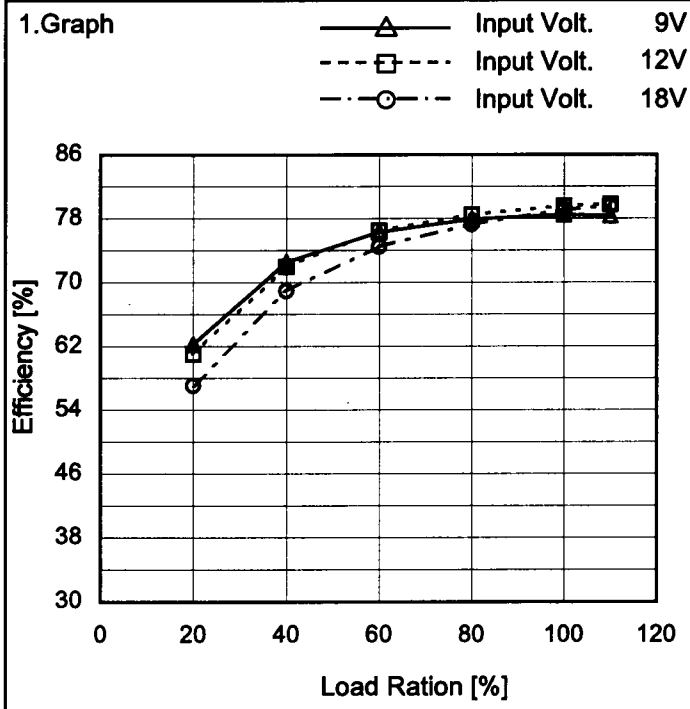
Input Voltage [V]	Efficiency [%]	
	Load 50%	Load 100%
8	74.8	77.5
9	74.9	78.3
10	74.9	78.9
12	74.7	79.6
15	74.0	79.7
18	72.3	79.1
20	71.0	78.5
--	-	-
--	-	-

COSEL

Model	SUW31212
Item	Efficiency (by Load Current)
Object	———————

Temperature 25°C
Testing Circuitry Figure A

1.Graph



2.Values

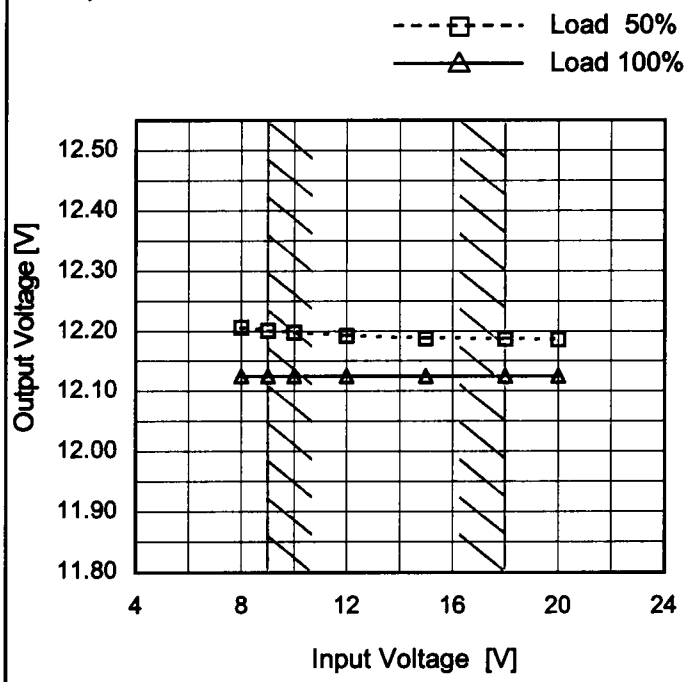
Load Ration [%]	Efficiency [%]		
	Input Volt. 9[V]	Input Volt. 12[V]	Input Volt. 18[V]
0	-	-	-
20	62.3	61.0	57.1
40	72.6	72.0	69.0
60	76.3	76.5	74.5
80	77.9	78.5	77.3
100	78.5	79.6	79.1
110	78.3	79.8	79.6
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

COSEL

Model	SUW31212
Item	Line Regulation
Object	+12V0.13A

Temperature 25°C
Testing Circuitry Figure A

1.Graph

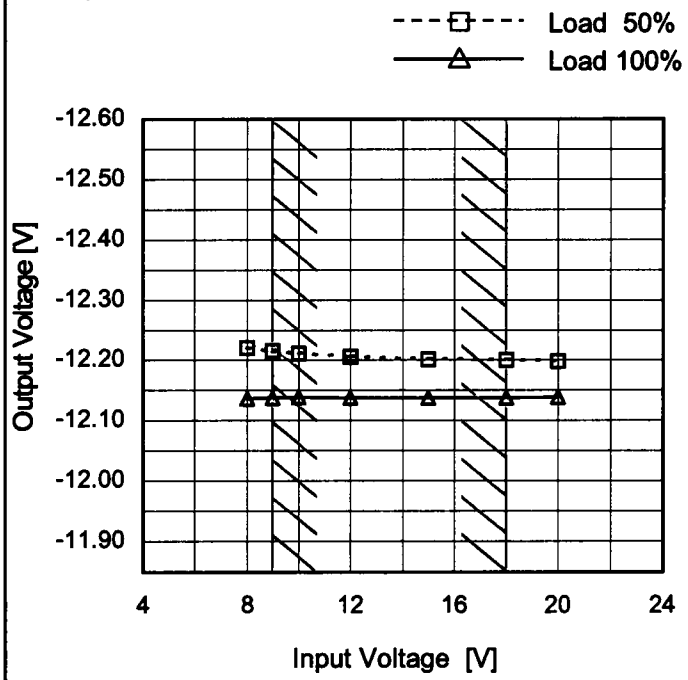


2.Values

Input Voltage [V]	Output Voltage [V]	
	Load 50%	Load 100%
8	12.206	12.125
9	12.201	12.125
10	12.197	12.125
12	12.192	12.125
15	12.188	12.125
18	12.186	12.125
20	12.185	12.125
--	-	-
--	-	-

Object	-12V0.13A

1.Graph



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

2.Values

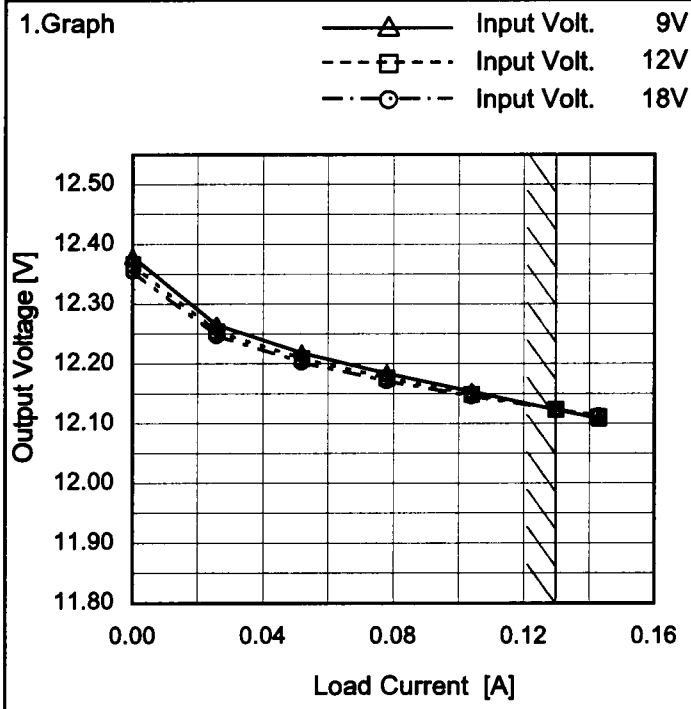
Input Voltage [V]	Output Voltage [V]	
	Load 50%	Load 100%
8	-12.221	-12.137
9	-12.215	-12.138
10	-12.212	-12.138
12	-12.206	-12.138
15	-12.202	-12.138
18	-12.201	-12.138
20	-12.199	-12.138
--	-	-
--	-	-

COSEL

Model	SUW31212
Item	Load Regulation
Object	+12V0.13A

Temperature 25°C
Testing Circuitry Figure A

1.Graph

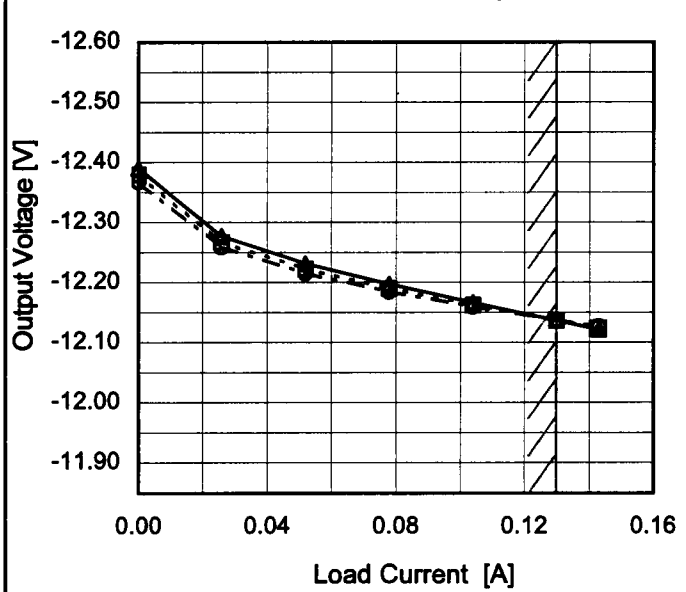


2.Values

Load Current [A]	Output Voltage [V]		
	Input Volt. 9[V]	Input Volt. 12[V]	Input Volt. 18[V]
0.000	12.380	12.367	12.355
0.026	12.265	12.254	12.247
0.052	12.219	12.209	12.203
0.078	12.184	12.176	12.171
0.104	12.154	12.149	12.145
0.130	12.123	12.124	12.123
0.143	12.109	12.111	12.113
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

Object	-12V0.13A

1.Graph



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

2.Values

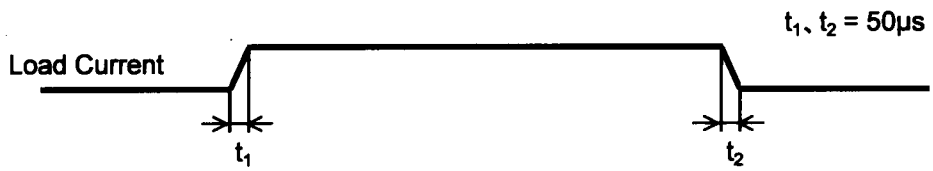
Load Current [A]	Output Voltage [V]		
	Input Volt. 9[V]	Input Volt. 12[V]	Input Volt. 18[V]
0.000	-12.391	-12.380	-12.367
0.026	-12.277	-12.267	-12.259
0.052	-12.232	-12.223	-12.215
0.078	-12.198	-12.190	-12.185
0.104	-12.166	-12.162	-12.159
0.130	-12.137	-12.137	-12.137
0.143	-12.122	-12.124	-12.126
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

COSEL

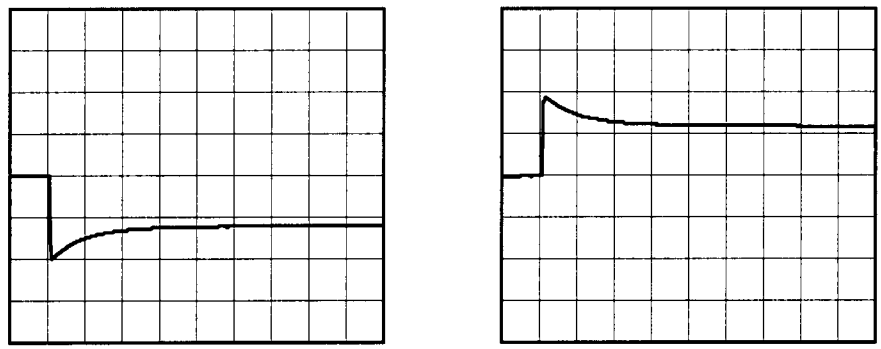
Model	SUW31212
Item	Dynamic Load Response
Object	+12V0.13A

Temperature 25°C
Testing Circuitry Figure A

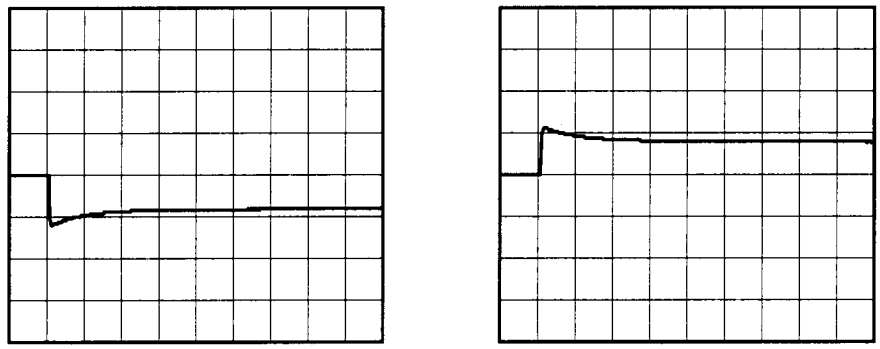
Input Volt. 12 V
Cycle 100 mS



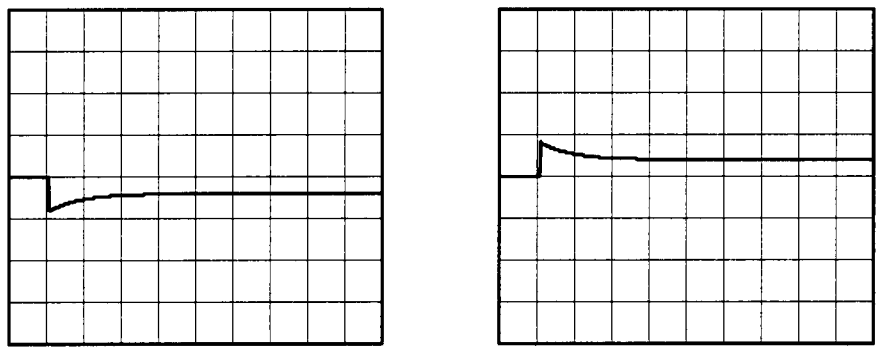
Min. Load (0A) ⟷
Load 100% (0.13A)



Min. Load (0A) ⟷
Load 50% (0.065A)



Load 50% (0.065A) ⟷
Load 100% (0.13A)

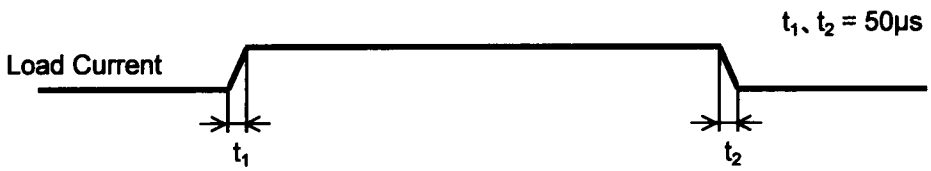


COSEL

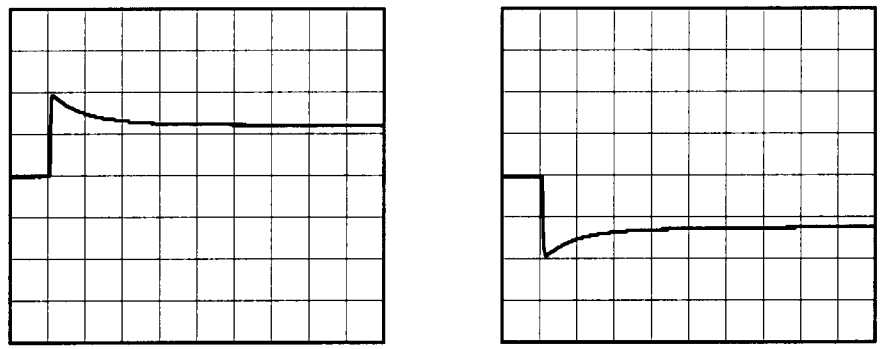
Model	SUW31212
Item	Dynamic Load Response
Object	-12V0.13A

Temperature 25°C
Testing Circuitry Figure A

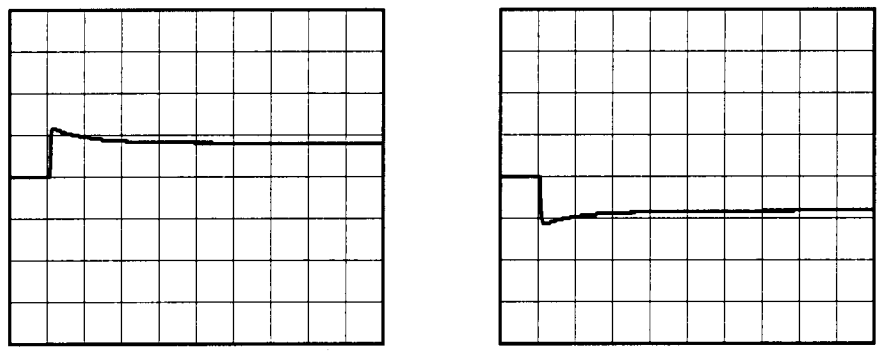
Input Volt. 12 V
Cycle 100 mS



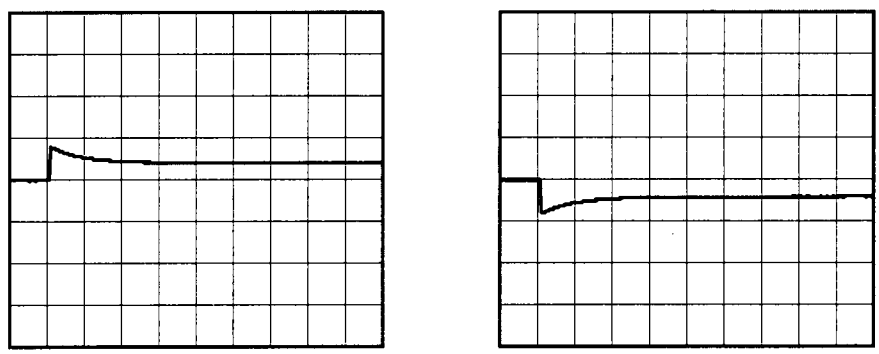
Min. Load (0A) ⟷
Load 100% (0.13A)



Min. Load (0A) ⟷
Load 50% (0.065A)



Load 50% (0.065A) ⟷
Load 100% (0.13A)

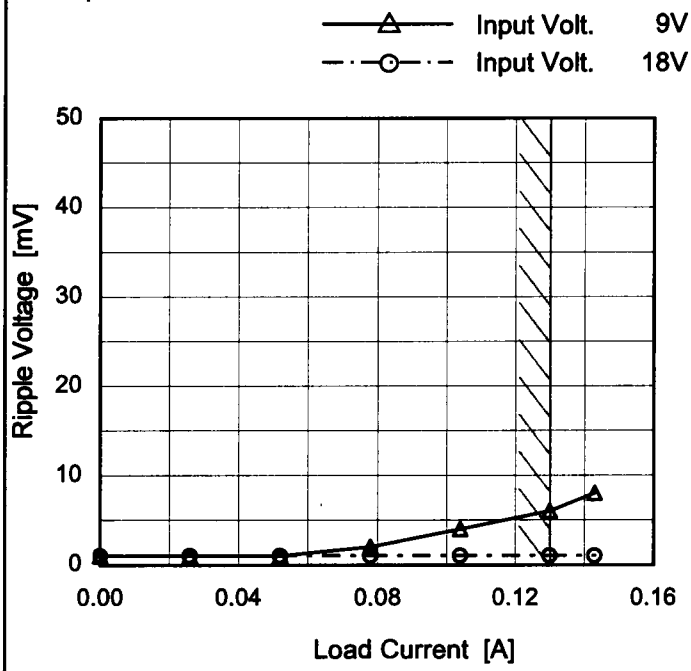


COSEL

Model	SUW31212
Item	Ripple Voltage (by Load Current)
Object	+12V0.13A

Temperature 25°C
Testing Circuitry Figure B

1.Graph



Measured by 100 MHz Oscilloscope.
Ripple Voltage is shown as p-p in the figure below.
Note: Slanted line shows the range of the rated load current.

Ripple [mVp-p]

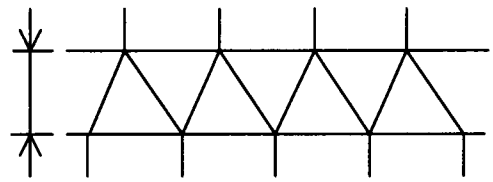


Fig.Complex Ripple Wave Form

2.Values

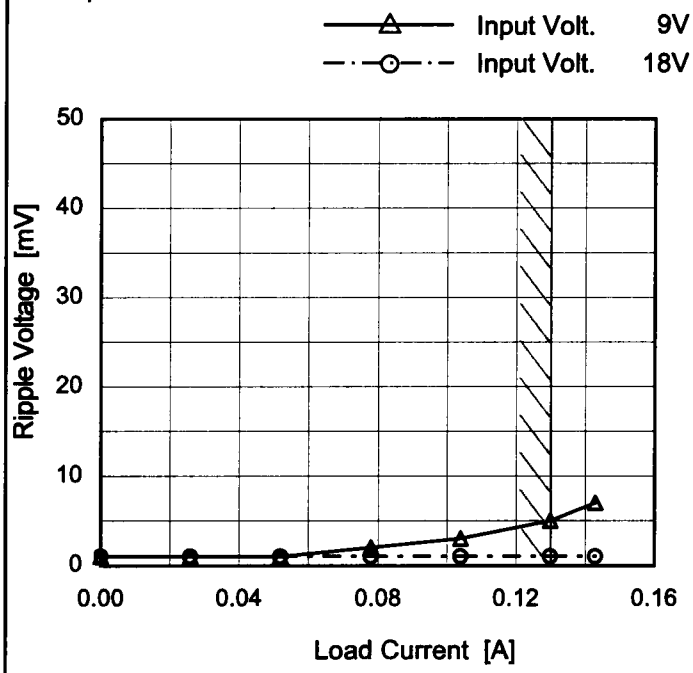
Load Current [A]	Ripple Voltage [mV]	
	Input Volt. 9 [V]	Input Volt. 18 [V]
0.000	1	1
0.026	1	1
0.052	1	1
0.078	2	1
0.104	4	1
0.130	6	1
0.143	8	1
--	-	-
--	-	-
--	-	-
--	-	-

COSEL

Model	SUW31212
Item	Ripple Voltage (by Load Current)
Object	-12V0.13A

Temperature 25°C
Testing Circuitry Figure B

1.Graph



Measured by 100 MHz Oscilloscope.
Ripple Voltage is shown as p-p in the figure below.
Note: Slanted line shows the range of the rated load current.

Ripple [mVp-p]

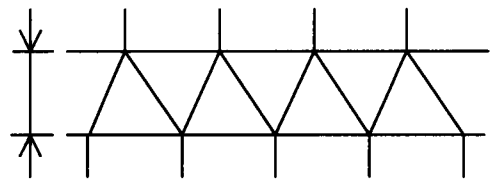


Fig.Complex Ripple Wave Form

2.Values

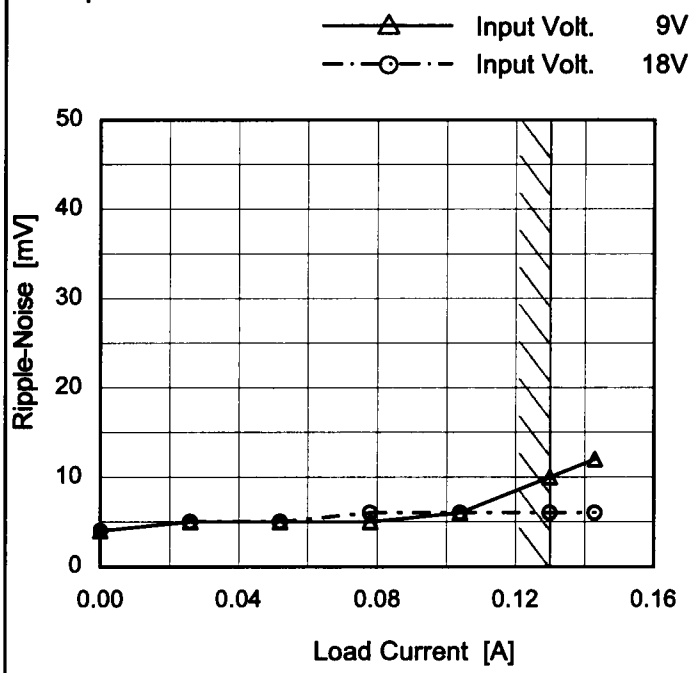
Load Current [A]	Ripple Voltage [mV]	
	Input Volt. 9 [V]	Input Volt. 18 [V]
0.000	1	1
0.026	1	1
0.052	1	1
0.078	2	1
0.104	3	1
0.130	5	1
0.143	7	1
--	-	-
--	-	-
--	-	-
--	-	-

COSEL

Model	SUW31212
Item	Ripple-Noise
Object	+12V0.13A

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

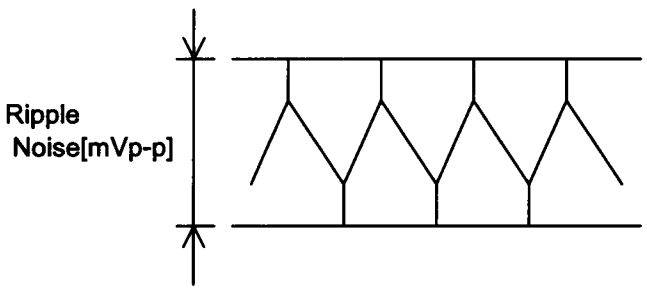


Fig.Complex Ripple Noise Wave Form

2.Values

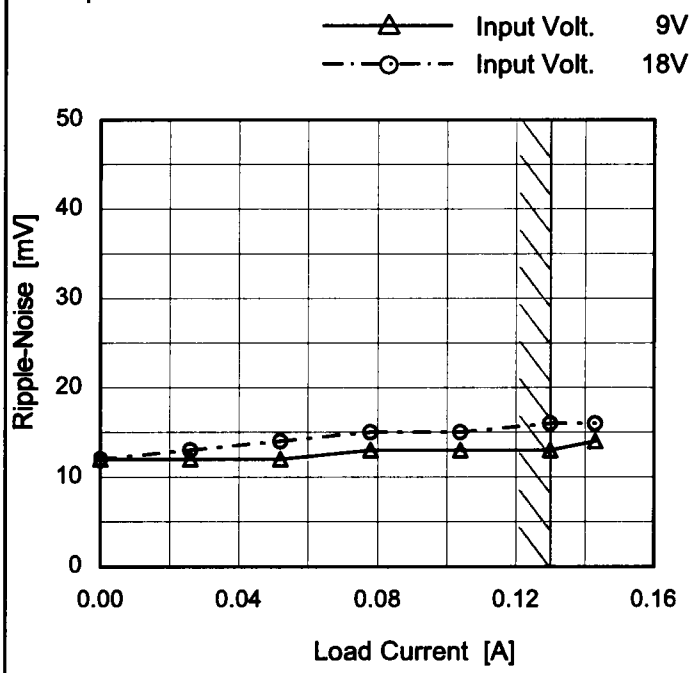
Load Current [A]	Ripple-Noise [mV] Input Volt. 9 [V]	Ripple-Noise [mV] Input Volt. 18 [V]
0.000	4	4
0.026	5	5
0.052	5	5
0.078	5	6
0.104	6	6
0.130	10	6
0.143	12	6
--	-	-
--	-	-
--	-	-
--	-	-

COSEL

Model	SUW31212
Item	Ripple-Noise
Object	-12V0.13A

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

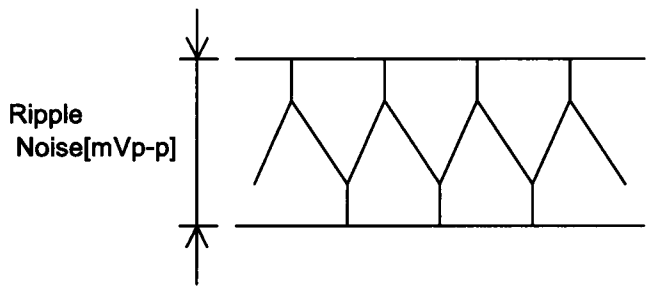


Fig.Complex Ripple Noise Wave Form

2.Values

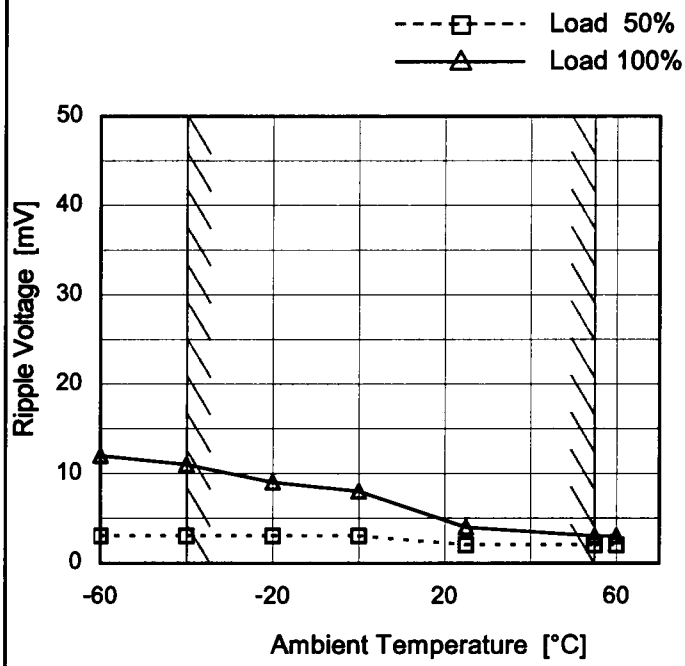
Load Current [A]	Ripple-Noise [mV] Input Volt. 9 [V]	Ripple-Noise [mV] Input Volt. 18 [V]
0.000	12	12
0.026	12	13
0.052	12	14
0.078	13	15
0.104	13	15
0.130	13	16
0.143	14	16
--	-	-
--	-	-
--	-	-
--	-	-

COSEL

Model	SUW31212
Item	Ripple Voltage (by Ambient Temp.)
Object	+12V0.13A

Testing Circuitry Figure B

1.Graph



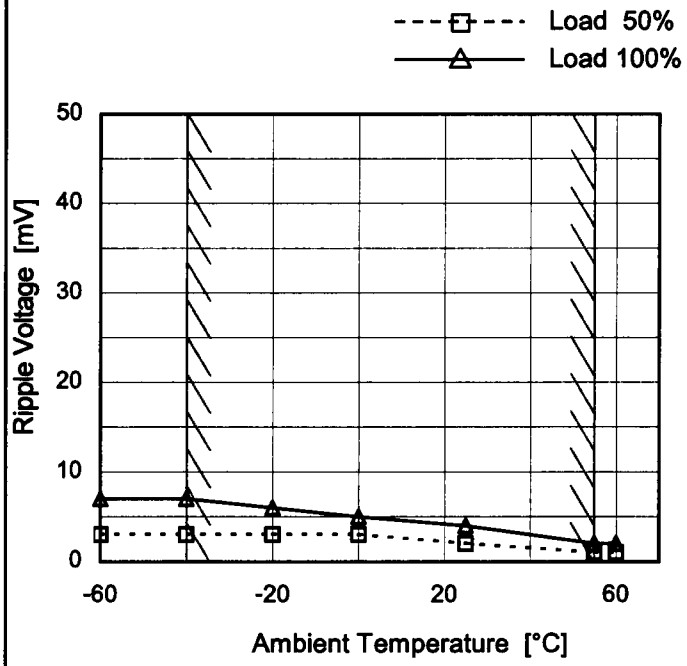
Input Volt. 12V

2.Values

Ambient Temperature [°C]	Ripple Voltage [mV]	
	Load 50%	Load 100%
-60	3	12
-40	3	11
-20	3	9
0	3	8
25	2	4
55	2	3
60	2	3
--	-	-
--	-	-
--	-	-
--	-	-

Object	-12V0.13A

1.Graph



Input Volt. 12V

Measured by 100 MHz Oscilloscope.

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

2.Values

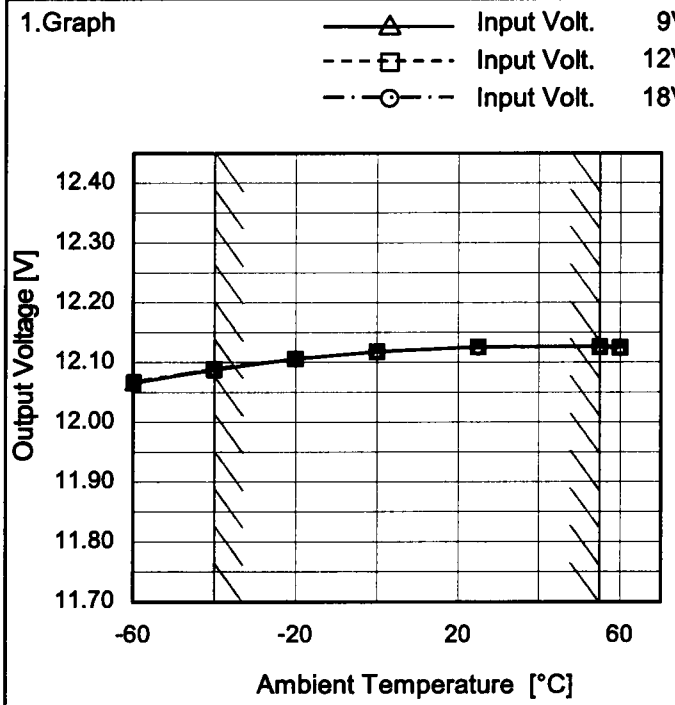
Ambient Temperature [°C]	Ripple Voltage [mV]	
	Load 50%	Load 100%
-60	3	7
-40	3	7
-20	3	6
0	3	5
25	2	4
55	1	2
60	1	2
--	-	-
--	-	-
--	-	-
--	-	-

COSEL

Model	SUW31212
Item	Ambient Temperature Drift
Object	+12V0.13A

Testing Circuitry Figure A

1.Graph

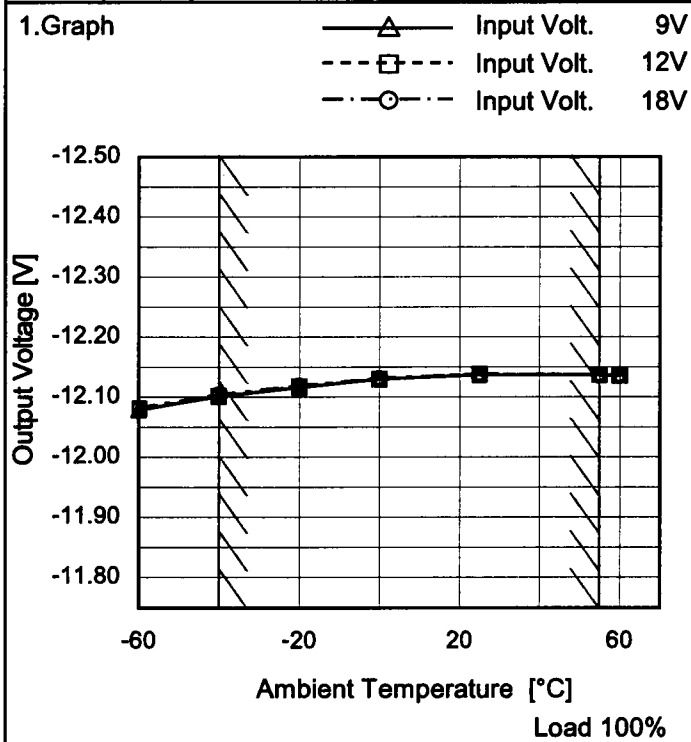


2.Values

Ambient Temperature [°C]	Output Voltage [V] Input Volt. 9[V]	Input Volt. 12[V]	Input Volt. 18[V]
-60	12.066	12.067	12.067
-40	12.088	12.089	12.089
-20	12.106	12.106	12.106
0	12.118	12.118	12.118
25	12.126	12.126	12.125
55	12.127	12.126	12.126
60	12.126	12.125	12.124
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

Object	-12V0.13A

1.Graph



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

2.Values

Ambient Temperature [°C]	Output Voltage [V] Input Volt. 9[V]	Input Volt. 12[V]	Input Volt. 18[V]
-60	-12.079	-12.081	-12.082
-40	-12.101	-12.102	-12.104
-20	-12.116	-12.118	-12.119
0	-12.130	-12.130	-12.131
25	-12.137	-12.138	-12.138
55	-12.137	-12.137	-12.137
60	-12.136	-12.136	-12.136
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

COSEL

Model	SUW31212	
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 - 0.13A (AVR 2):0 - 0.13A
* Other Output : Rated Load

* Output Voltage Accuracy = ±(Maximum of Output Voltage - Minimum of Output Voltage) / 2

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

2.Values

Object	+12V0.13A					
Item	Temperature [°C]	Input Voltage[V]	Output		Output Voltage Accuracy	
			Current[A]	Voltage[V]	Value [mV]	Ration [%]
Maximum Voltage	55	9	0	12.384	±148	±1.2
Minimum Voltage	-40	9	0.13	12.088		

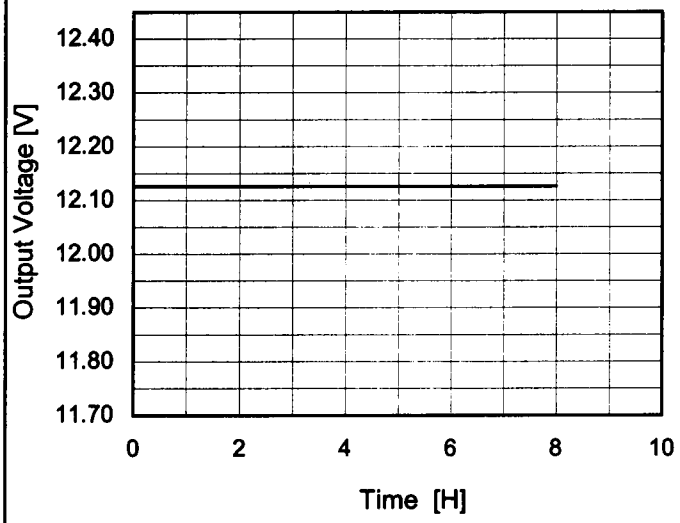
Object	-12V0.13A					
Item	Temperature [°C]	Input Voltage[V]	Output		Output Voltage Accuracy	
			Current[A]	Voltage[V]	Value [mV]	Ration [%]
Maximum Voltage	55	9	0	-12.397	±148	±1.2
Minimum Voltage	-40	9	0.13	-12.101		

COSEL

Model	SUW31212
Item	Time Lapse Drift
Object	+12V0.13A

Temperature 25°C
Testing Circuitry Figure A

1.Graph



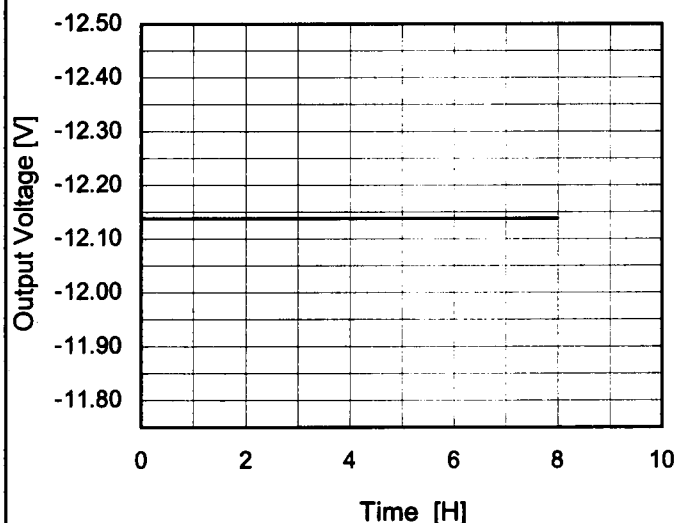
Input Volt. 12V
Load 100%

2.Values

Time since start [H]	Output Voltage [V]
0.0	12.126
0.5	12.126
1.0	12.126
2.0	12.126
3.0	12.126
4.0	12.126
5.0	12.126
6.0	12.126
7.0	12.126
8.0	12.126

Object	-12V0.13A

1.Graph



Input Volt. 12V
Load 100%

2.Values

Time since start [H]	Output Voltage [V]
0.0	-12.140
0.5	-12.138
1.0	-12.138
2.0	-12.138
3.0	-12.138
4.0	-12.138
5.0	-12.138
6.0	-12.138
7.0	-12.138
8.0	-12.138

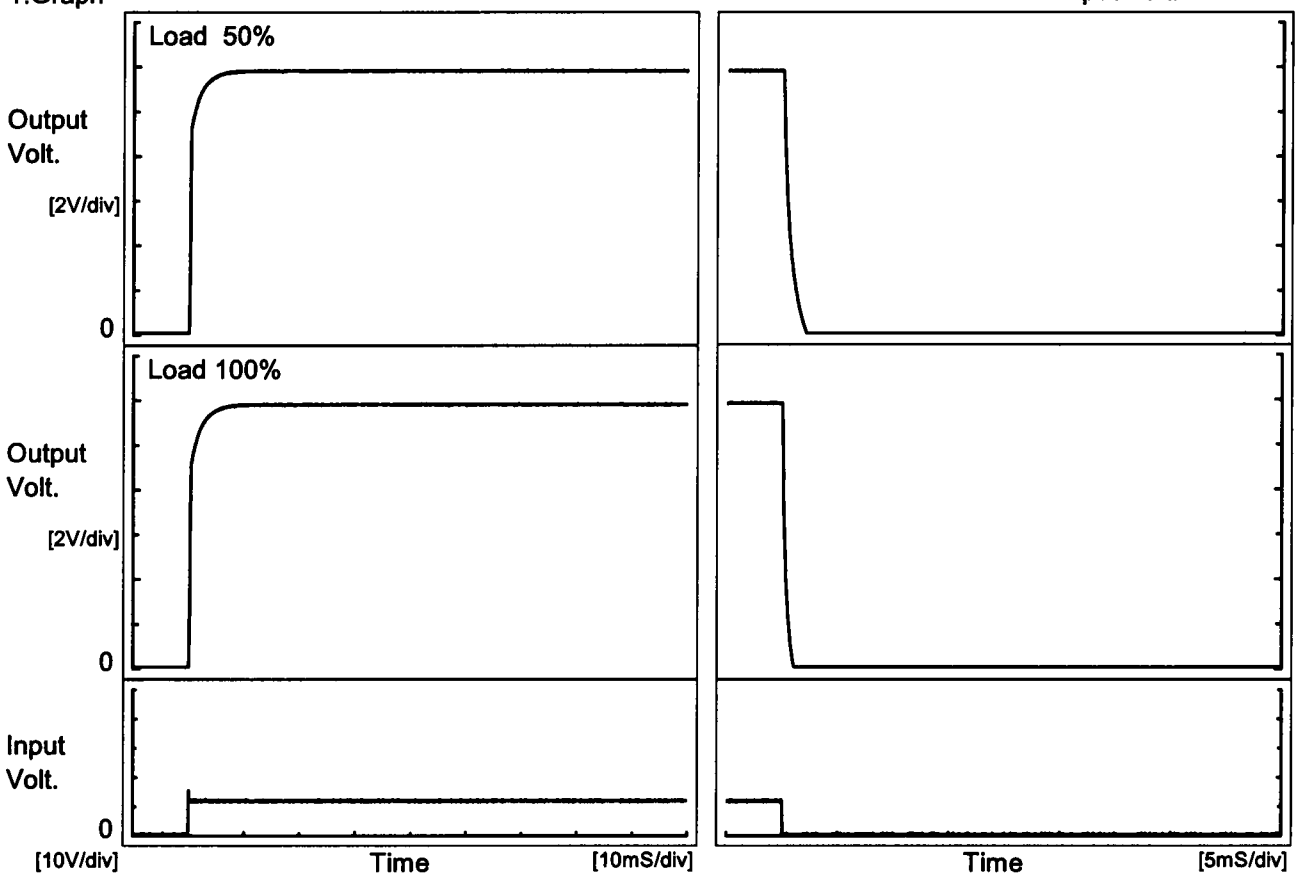
COSEL

Model	SUW31212
Item	Rise and Fall Time
Object	+12V0.13A

Temperature 25°C
Testing Circuitry Figure A

1.Graph

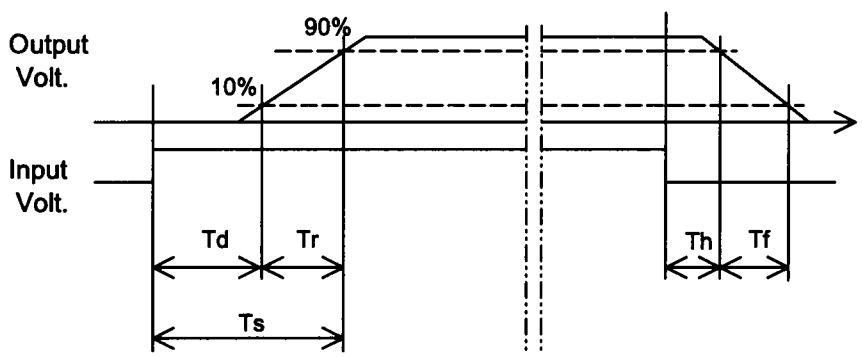
Input Volt. 12 V



2.Values

[mS]

Load \ Time	Td	Tr	Ts	Th	Tf
50 %	0.1	2.2	2.3	0.1	1.4
100 %	0.1	2.3	2.4	0.1	0.7

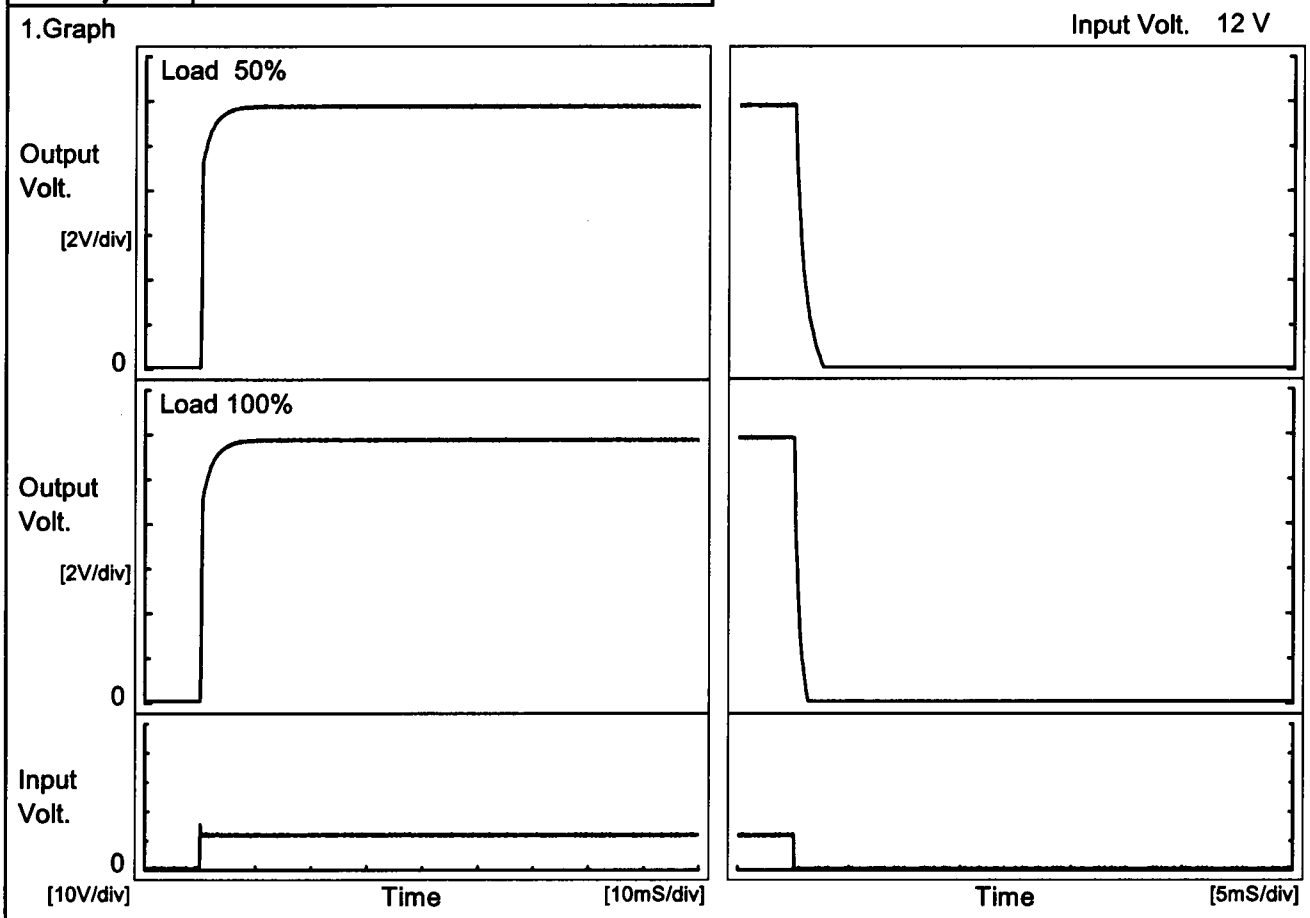


COSEL

Model	SUW31212
Item	Rise and Fall Time
Object	-12V0.13A

Temperature 25°C
Testing Circuitry Figure A

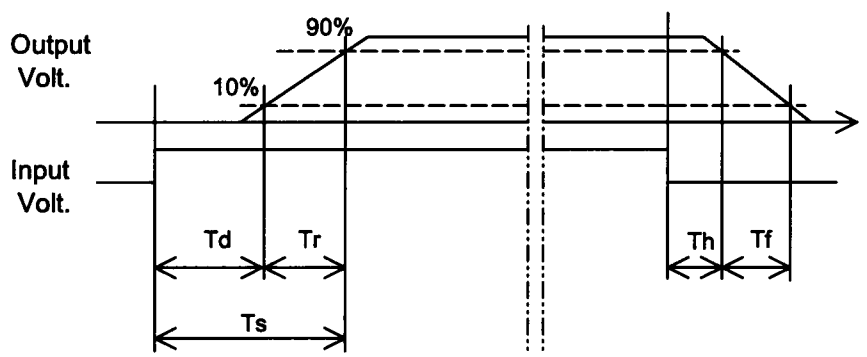
1.Graph



2.Values

[mS]

Load \ Time	Td	Tr	Ts	Th	Tf
50 %	0.1	2.3	2.4	0.1	1.7
100 %	0.1	2.4	2.5	0.1	0.9

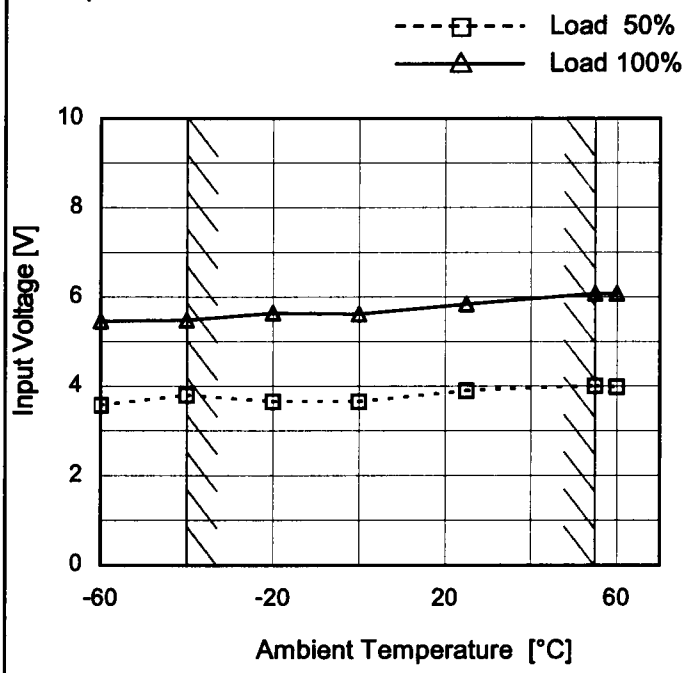


COSEL

Model	SUW31212
Item	Minimum Input Voltage for Regulated Output Voltage
Object	+12V0.13A

Testing Circuitry Figure A

1.Graph

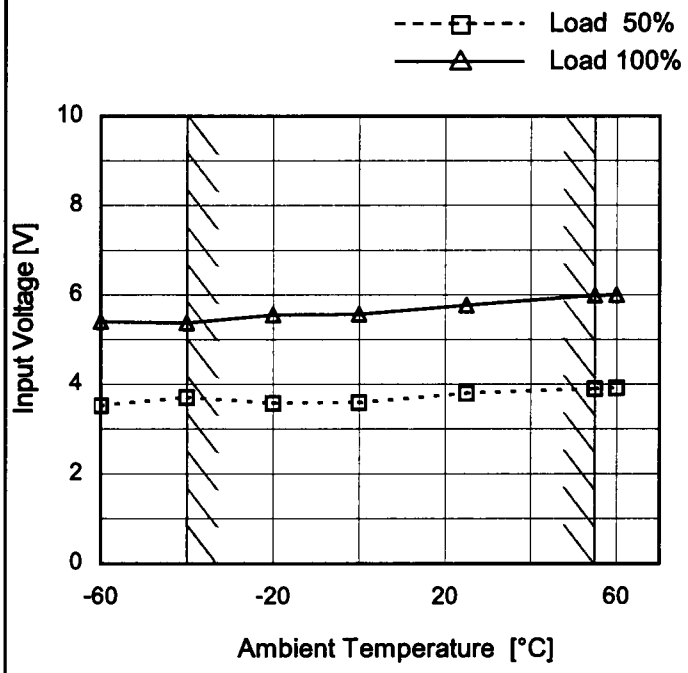


2.Values

Ambient Temperature [°C]	Input Voltage [V]	
	Load 50%	Load 100%
-60	3.6	5.5
-40	3.8	5.5
-20	3.7	5.7
0	3.7	5.7
25	3.9	5.9
55	4.1	6.1
60	4.0	6.1
--	-	-
--	-	-
--	-	-
--	-	-

Object	-12V0.13A

1.Graph



2.Values

Ambient Temperature [°C]	Input Voltage [V]	
	Load 50%	Load 100%
-60	3.6	5.4
-40	3.8	5.4
-20	3.6	5.6
0	3.6	5.6
25	3.8	5.8
55	3.9	6.0
60	4.0	6.0
--	-	-
--	-	-
--	-	-
--	-	-

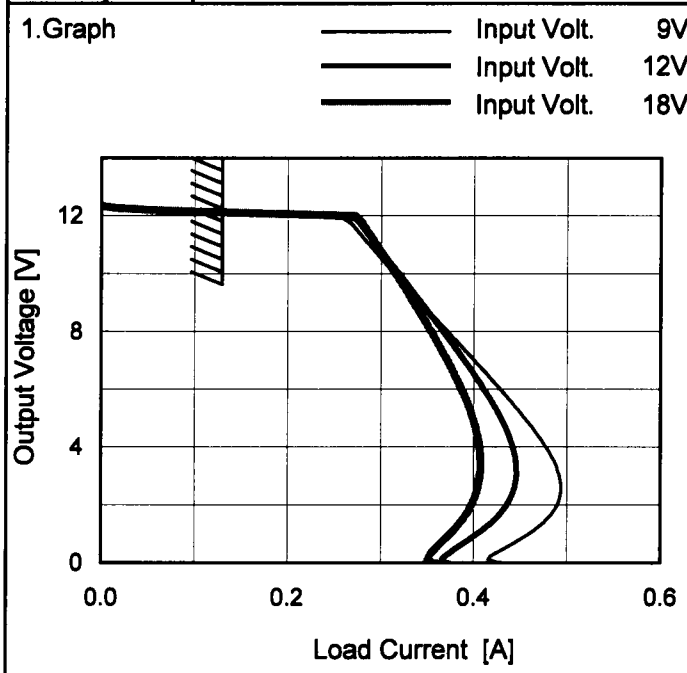
Note: Slanted line shows the range of the rated ambient temperature.

COSEL

Model	SUW31212
Item	Overcurrent Protection
Object	+12V0.13A

Temperature 25°C
Testing Circuitry Figure A

1.Graph

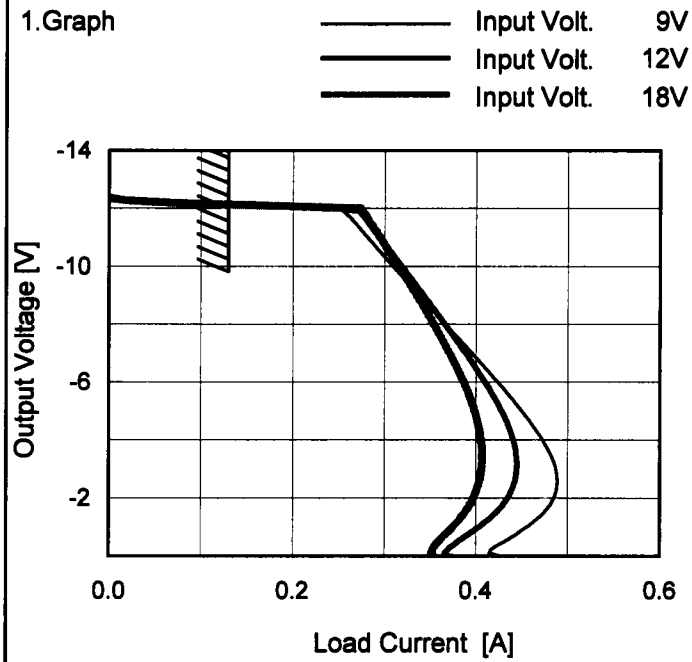


2.Values

Output Voltage [V]	Load Current [A]		
	Input Volt. 9[V]	Input Volt. 12[V]	Input Volt. 18[V]
12.0	0.22	0.24	0.27
11.4	0.28	0.29	0.29
10.8	0.29	0.30	0.30
9.6	0.33	0.33	0.32
8.4	0.36	0.36	0.35
7.2	0.39	0.39	0.37
6.0	0.43	0.41	0.39
4.8	0.46	0.43	0.40
3.6	0.48	0.44	0.41
2.4	0.49	0.44	0.40
1.2	0.47	0.41	0.38
0.0	0.45	0.39	0.37

Object	-12V0.13A

1.Graph



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

2.Values

Output Voltage [V]	Load Current [A]		
	Input Volt. 9[V]	Input Volt. 12[V]	Input Volt. 18[V]
-12.0	0.21	0.25	0.27
-11.4	0.27	0.28	0.29
-10.8	0.29	0.30	0.30
-9.6	0.32	0.33	0.32
-8.4	0.35	0.36	0.35
-7.2	0.39	0.38	0.37
-6.0	0.42	0.41	0.39
-4.8	0.46	0.43	0.40
-3.6	0.48	0.44	0.41
-2.4	0.49	0.44	0.40
-1.2	0.47	0.41	0.38
0.0	0.46	0.39	0.35

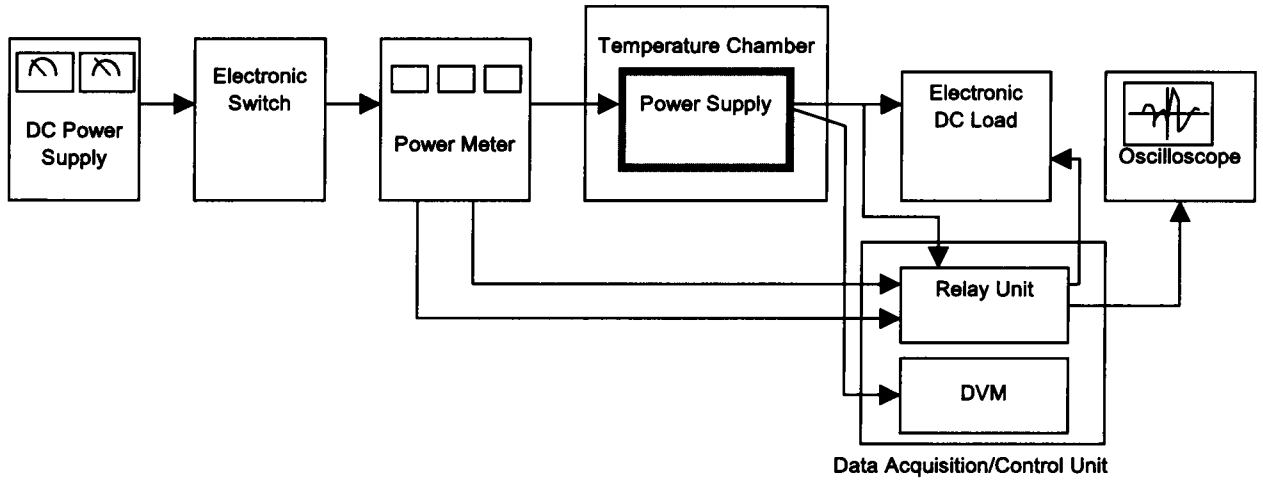


Figure A

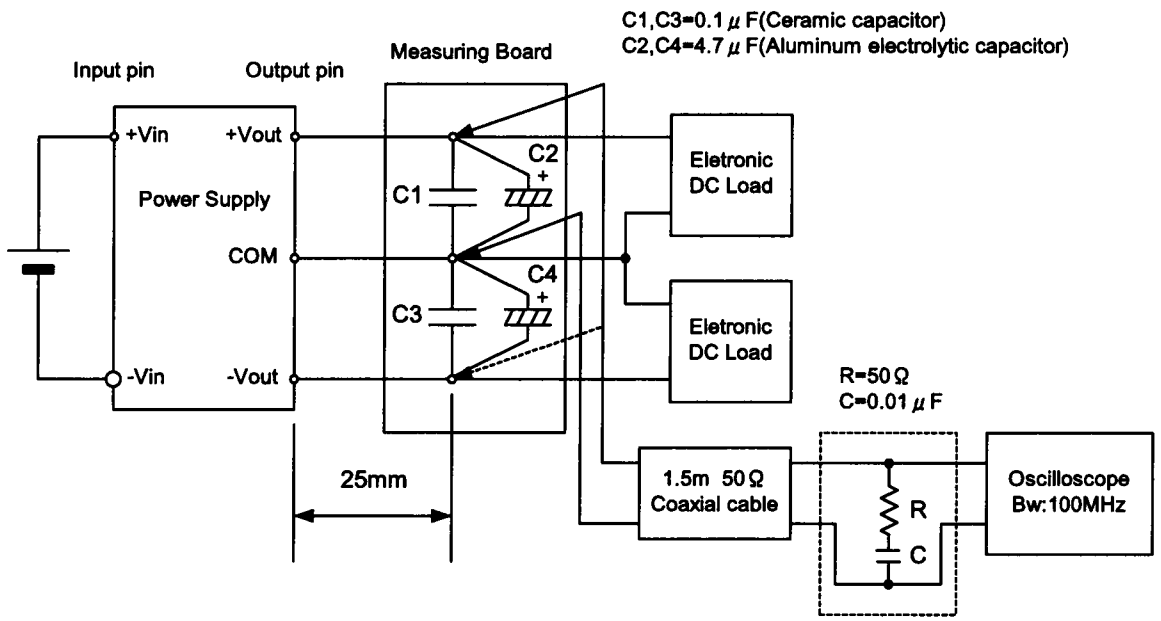


Figure B (Ripple and Ripple noise Characteristic)