COSEL

参考資料

TEST DATA OF SUTW34812

Regulated DC Power Supply
March 12, 2009

Approved by : Kazunari Asano

Kazunari Asano　　Design Manager

Prepared by : Sho Saito

Sho Saito　　Design Engineer

COSEL CO.,LTD.

COSEL

CONTENTS

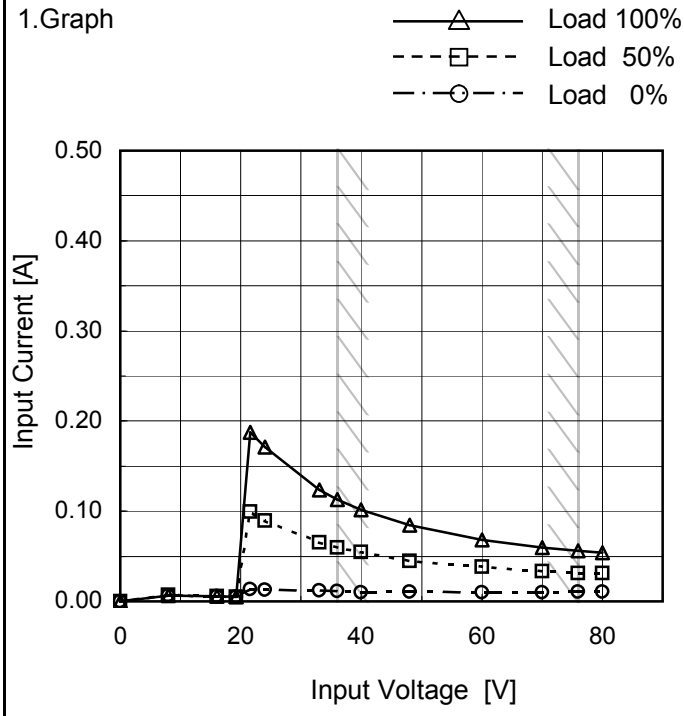
1.Input Current (by Input Voltage) ・・・・・・・・・・・・・・・・・・・・・・・・・ 1
2.Input Current (by Load Current) ・・・・・・・・・・・・・・・・・・・・・・・・ 2
3.Input Power (by Load Current) ・・・・・・・・・・・・・・・・・・・・・・・・・ 3
4.Efficiency (by Input Voltage) ・・・・・・・・・・・・・・・・・・・・・・・・・ 4
5.Efficiency (by Load Current) ・・・・・・・・・・・・・・・・・・・・・・・・・・ 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	SUTW34812
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

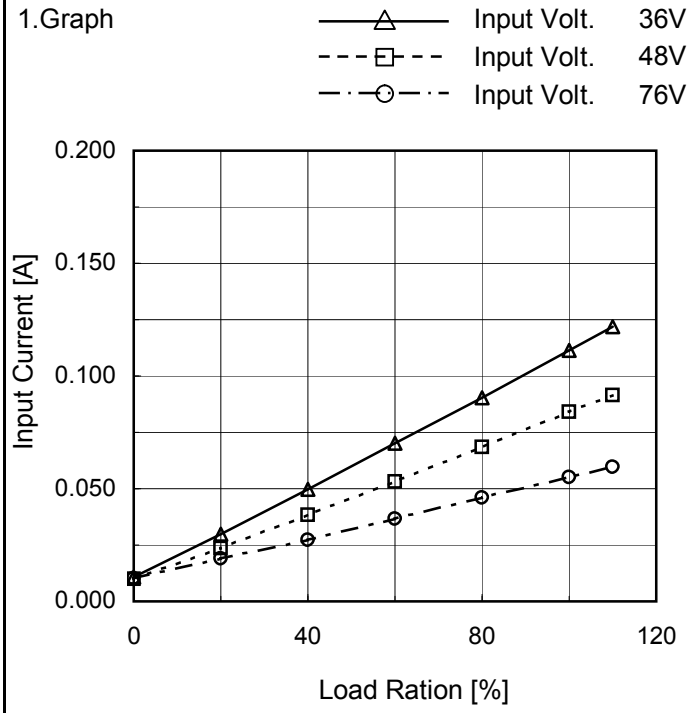
Input Voltage [V]	Input Current [A]		
	Load 0%	Load 50%	Load 100%
0.0	0.000	0.000	0.000
8.0	0.007	0.007	0.007
16.0	0.005	0.006	0.006
19.2	0.005	0.005	0.005
21.6	0.013	0.099	0.187
24.0	0.013	0.089	0.171
33.0	0.012	0.065	0.123
36.0	0.011	0.060	0.113
40.0	0.010	0.055	0.102
48.0	0.010	0.045	0.085
60.0	0.010	0.038	0.068
70.0	0.010	0.033	0.060
76.0	0.010	0.031	0.056
80.0	0.011	0.031	0.054
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

COSEL

Model	SUTW34812
Item	Input Current (by Load Current)
Object	————————

Temperature 25°C
Testing Circuitry Figure A

1.Graph



2.Values

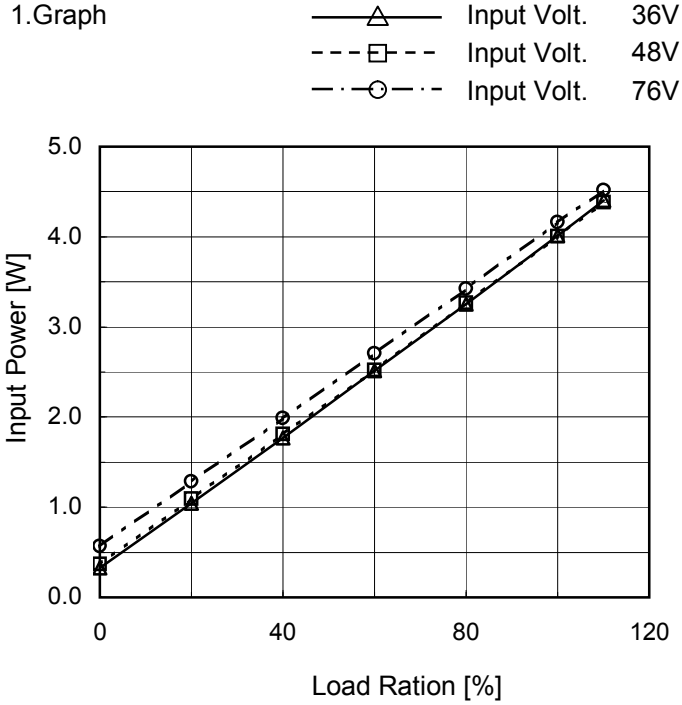
Load Ration [%]	Input Current [A]		
	Input Volt. 36[V]	Input Volt. 48[V]	Input Volt. 76[V]
0	0.011	0.010	0.010
20	0.030	0.024	0.019
40	0.050	0.038	0.027
60	0.070	0.053	0.037
80	0.090	0.068	0.046
100	0.111	0.084	0.055
110	0.122	0.092	0.060
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

COSEL

Model	SUTW34812
Item	Input Power (by Load Current)
Object	————————

Temperature 25°C
Testing Circuitry Figure A

1.Graph



2.Values

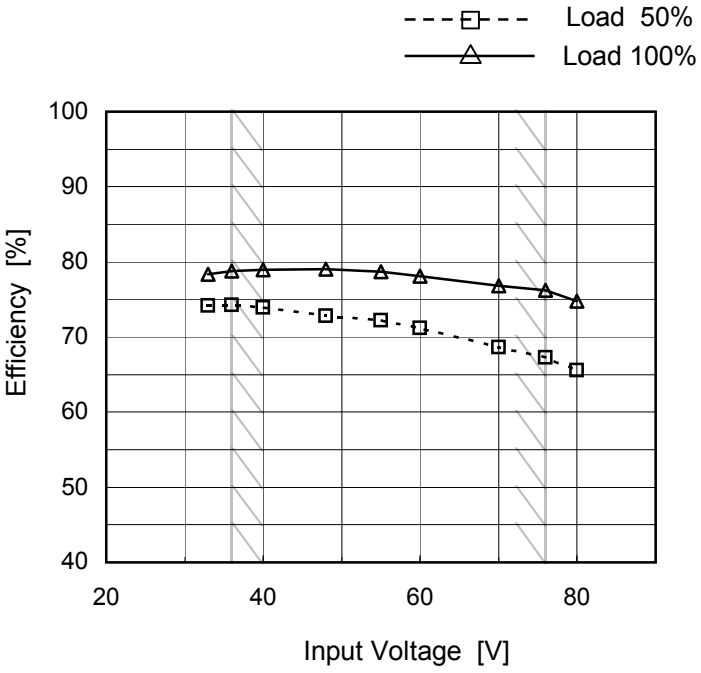
Load Ration [%]	Input Power [W] Input Volt. 36[V]	Input Volt. 48[V]	Input Volt. 76[V]
0	0.33	0.37	0.57
20	1.05	1.09	1.29
40	1.77	1.81	1.99
60	2.51	2.52	2.71
80	3.25	3.27	3.43
100	4.01	4.01	4.16
110	4.40	4.38	4.51
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

COSEL

Model	SUTW34812
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

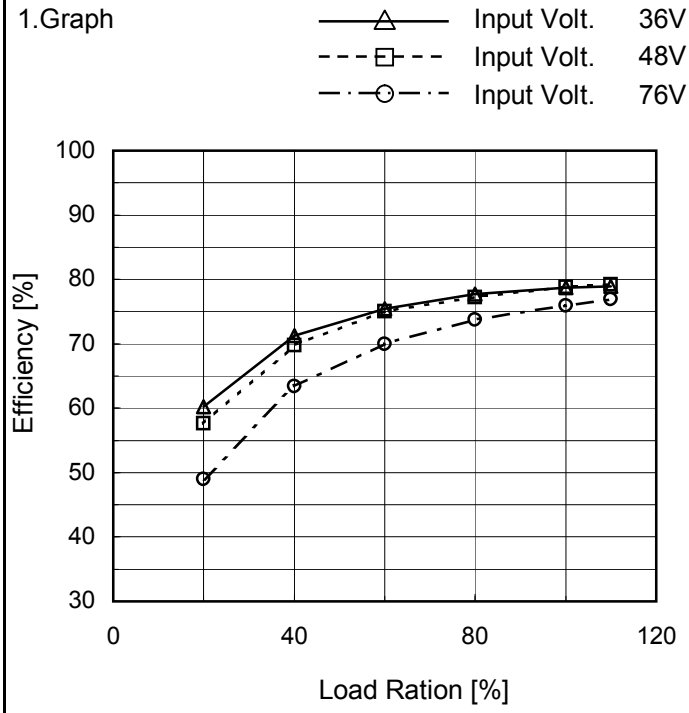
Input Voltage [V]	Efficiency [%]	
	Load 50%	Load 100%
33	74.2	78.3
36	74.2	78.8
40	73.9	78.9
48	72.8	79.0
55	72.2	78.7
60	71.2	78.1
70	68.7	76.8
76	67.2	76.3
80	65.6	74.8

COSEL

Model	SUTW34812
Item	Efficiency (by Load Current)
Object	————————

Temperature 25°C
Testing Circuitry Figure A

1.Graph



2.Values

Load Ration [%]	Efficiency [%]		
	Input Volt. 36[V]	Input Volt. 48[V]	Input Volt. 76[V]
0	-	-	-
20	60.3	57.7	49.0
40	71.3	69.8	63.5
60	75.4	75.0	70.0
80	77.7	77.3	73.7
100	78.7	78.8	75.9
110	78.9	79.3	76.9
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

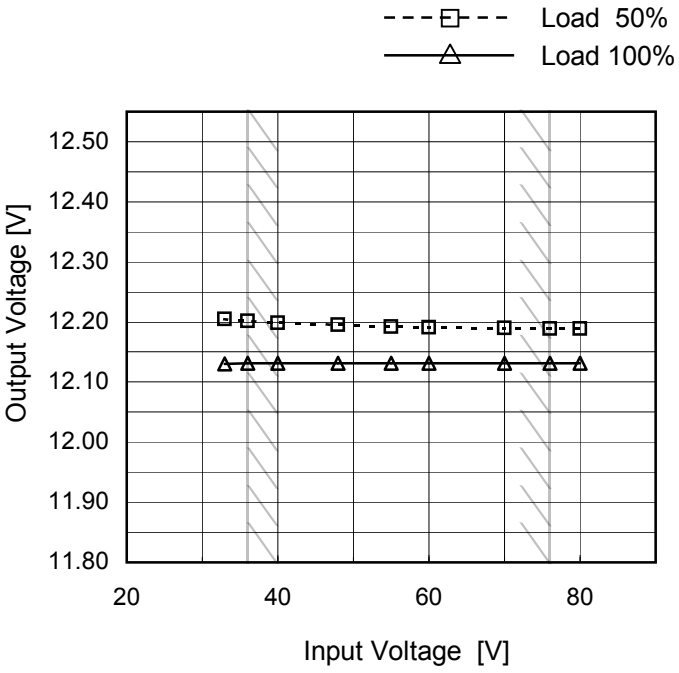
COSEL

Model	SUTW34812
Item	Line Regulation

Temperature 25°C
Testing Circuitry Figure A

Object +12V0.13A

1.Graph

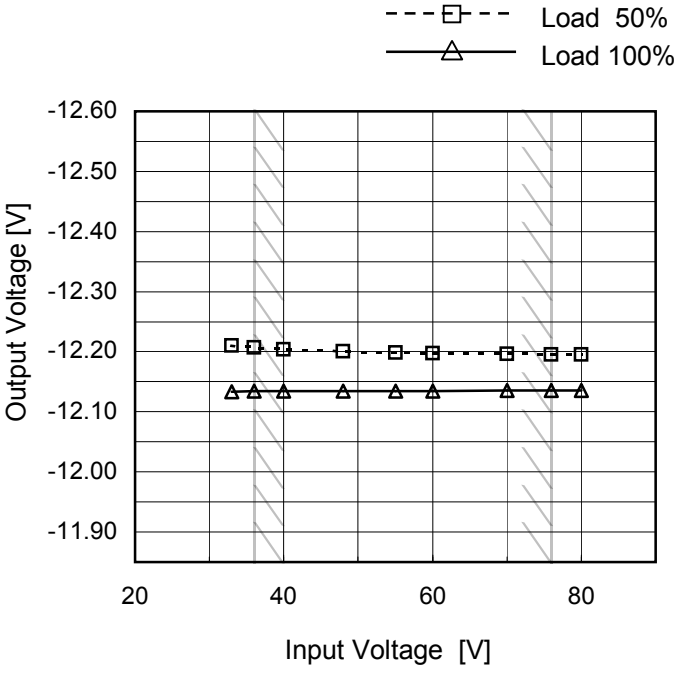


2.Values

Input Voltage [V]	Output Voltage [V]	
	Load 50%	Load 100%
33	12.205	12.131
36	12.202	12.131
40	12.199	12.132
48	12.195	12.132
55	12.192	12.132
60	12.191	12.132
70	12.189	12.132
76	12.189	12.132
80	12.188	12.132

Object -12V0.13A

1.Graph



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

2.Values

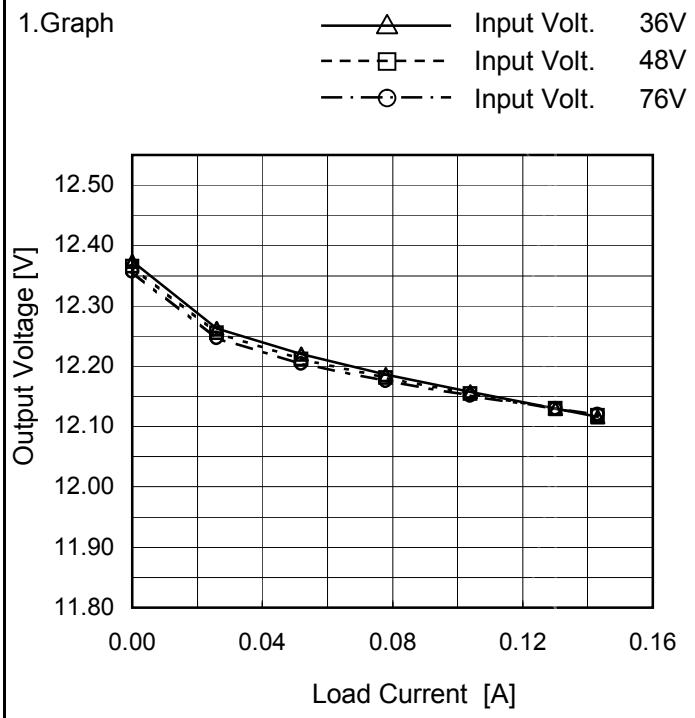
Input Voltage [V]	Output Voltage [V]	
	Load 50%	Load 100%
33	-12.210	-12.134
36	-12.207	-12.134
40	-12.204	-12.134
48	-12.200	-12.135
55	-12.198	-12.135
60	-12.197	-12.135
70	-12.196	-12.135
76	-12.195	-12.135
80	-12.195	-12.136

COSEL

Model	SUTW34812
Item	Load Regulation
Object	+12V0.13A

Temperature 25°C
Testing Circuitry Figure A

1.Graph

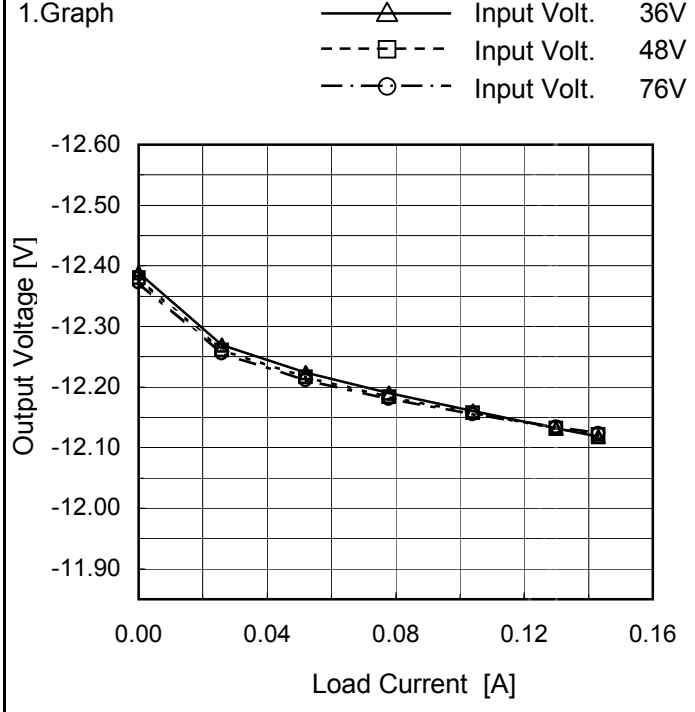


2.Values

Load Current [A]	Output Voltage [V] Input Volt. 36[V]	Input Volt. 48[V]	Input Volt. 76[V]
0.000	12.374	12.365	12.357
0.026	12.263	12.255	12.247
0.052	12.220	12.212	12.205
0.078	12.186	12.180	12.175
0.104	12.158	12.154	12.151
0.130	12.130	12.130	12.130
0.143	12.116	12.118	12.120
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

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. 36[V]	Input Volt. 48[V]	Input Volt. 76[V]
0.000	-12.389	-12.380	-12.372
0.026	-12.269	-12.261	-12.256
0.052	-12.224	-12.216	-12.211
0.078	-12.190	-12.184	-12.181
0.104	-12.161	-12.157	-12.156
0.130	-12.132	-12.132	-12.134
0.143	-12.119	-12.121	-12.124
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

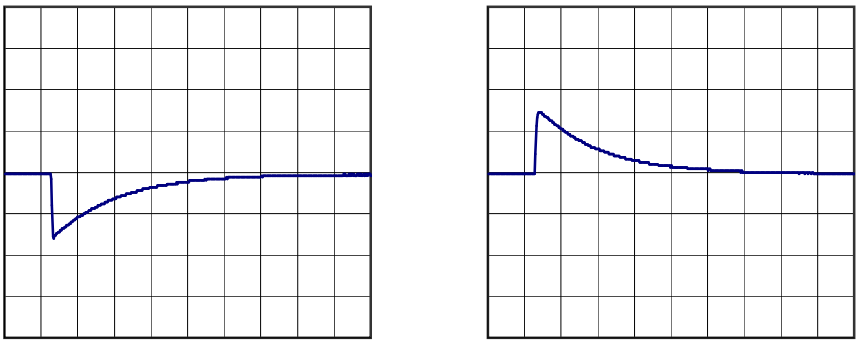
COSEL

Model	SUTW34812
Item	Dynamic Load Response
Object	+12V0.13A

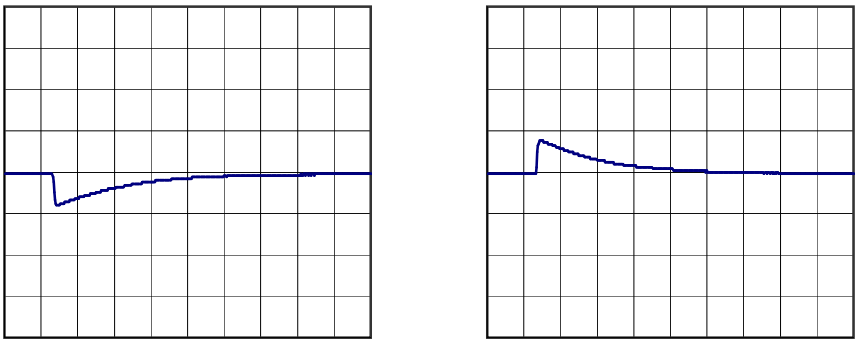
Temperature 25°C
Testing Circuitry Figure A

Input Volt. 48 V
Cycle 100 mS

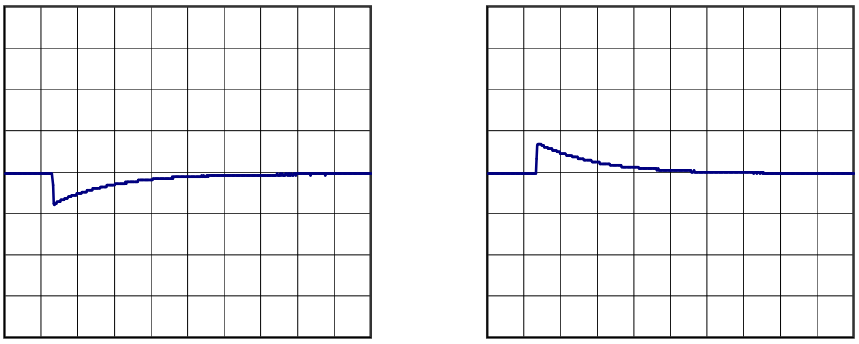
Min. Load (0A) ⟷
Load 100% (0.13A)



Min. Load (0A) ⟷
Load 50% (0.065A)



Load 50% (0.065A) ⟷
Load 100% (0.13A)



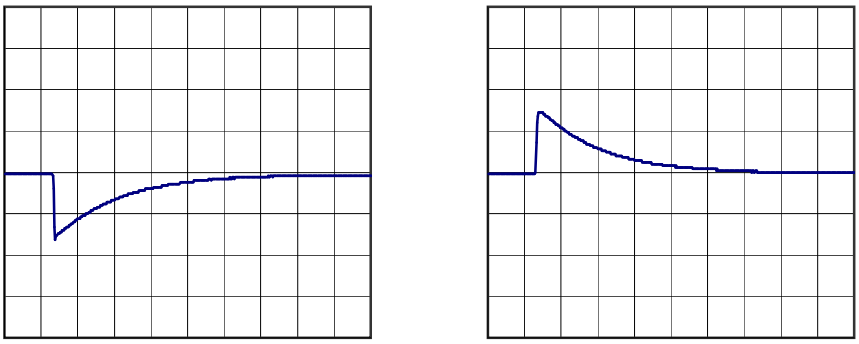
COSEL

Model	SUTW34812
Item	Dynamic Load Response
Object	-12V0.13A

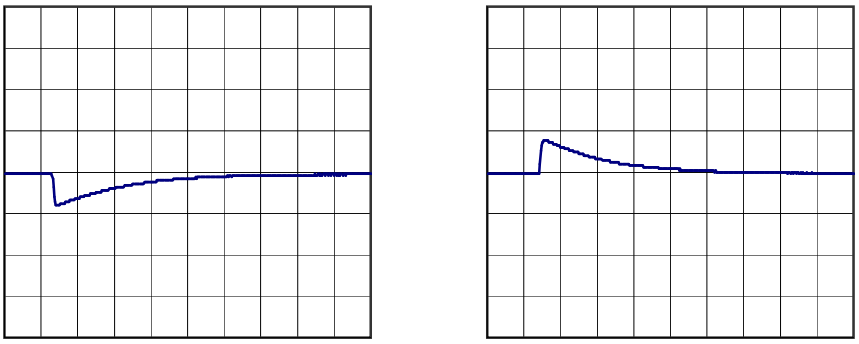
Temperature 25°C
Testing Circuitry Figure A

Input Volt. 48 V
Cycle 100 mS

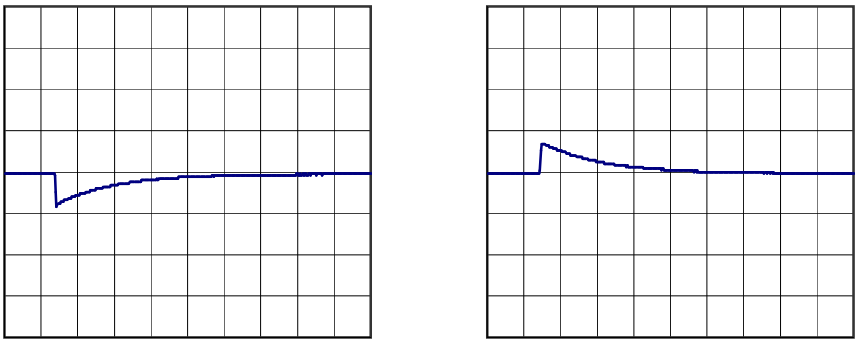
Min. Load (0A) ⟷
Load 100% (0.13A)



Min. Load (0A) ⟷
Load 50% (0.065A)



Load 50% (0.065A) ⟷
Load 100% (0.13A)

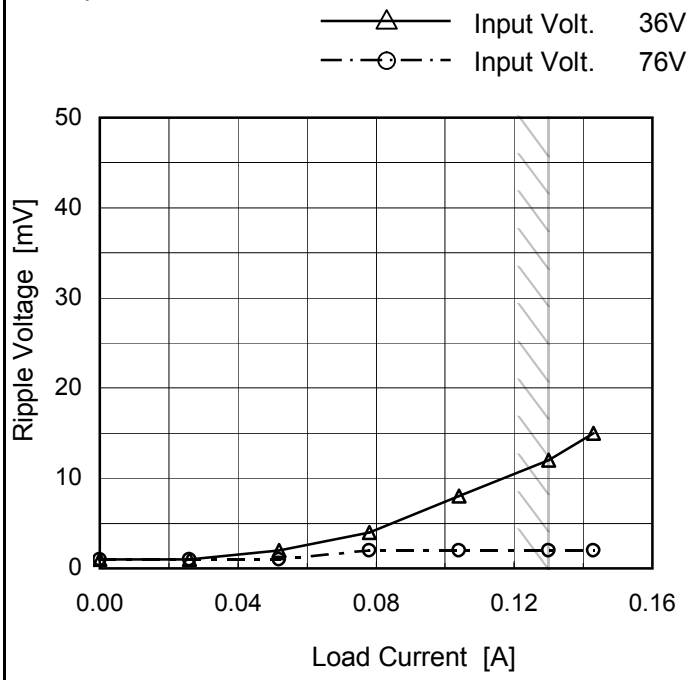


COSEL

Model	SUTW34812
Item	Ripple Voltage (by Load Current)
Object	+12V0.13A

Temperature 25°C
Testing Circuitry Figure B

1.Graph



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]

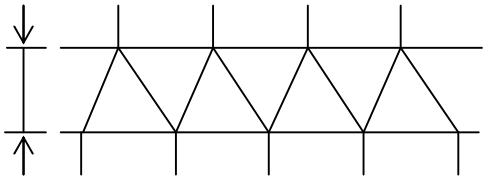


Fig.Complex Ripple Wave Form

2.Values

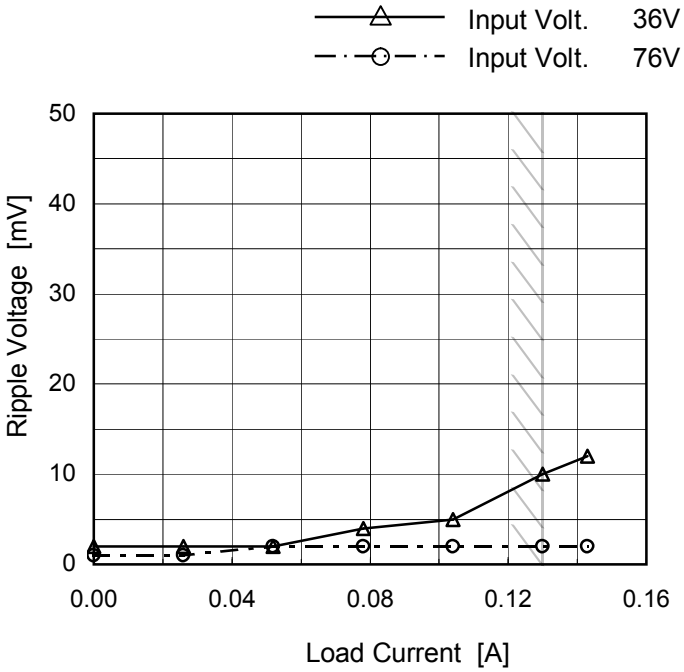
Load Current [A]	Ripple Voltage [mV]	
	Input Volt. 36 [V]	Input Volt. 76 [V]
0.000	1	1
0.026	1	1
0.052	2	1
0.078	4	2
0.104	8	2
0.130	12	2
0.143	15	2
--	-	-
--	-	-
--	-	-
--	-	-

COSEL

Model	SUTW34812
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]

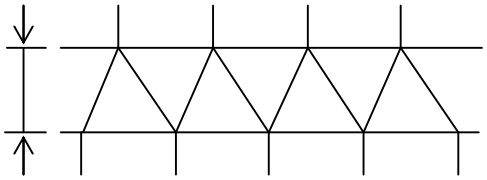


Fig.Complex Ripple Wave Form

2.Values

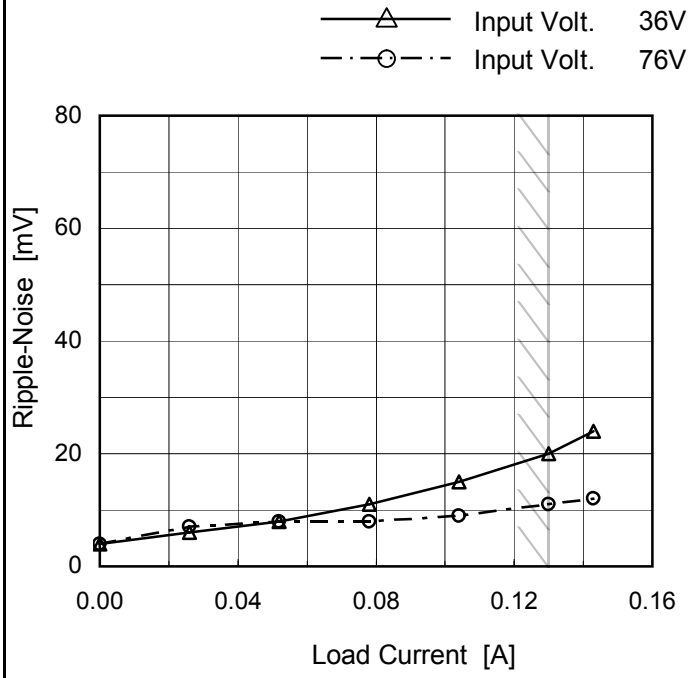
Load Current [A]	Ripple Voltage [mV]	
	Input Volt. 36 [V]	Input Volt. 76 [V]
0.000	2	1
0.026	2	1
0.052	2	2
0.078	4	2
0.104	5	2
0.130	10	2
0.143	12	2
--	-	-
--	-	-
--	-	-
--	-	-

COSEL

Model	SUTW34812
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.

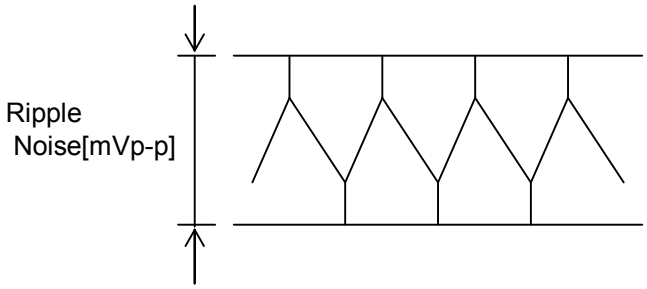


Fig.Complex Ripple Noise Wave Form

2.Values

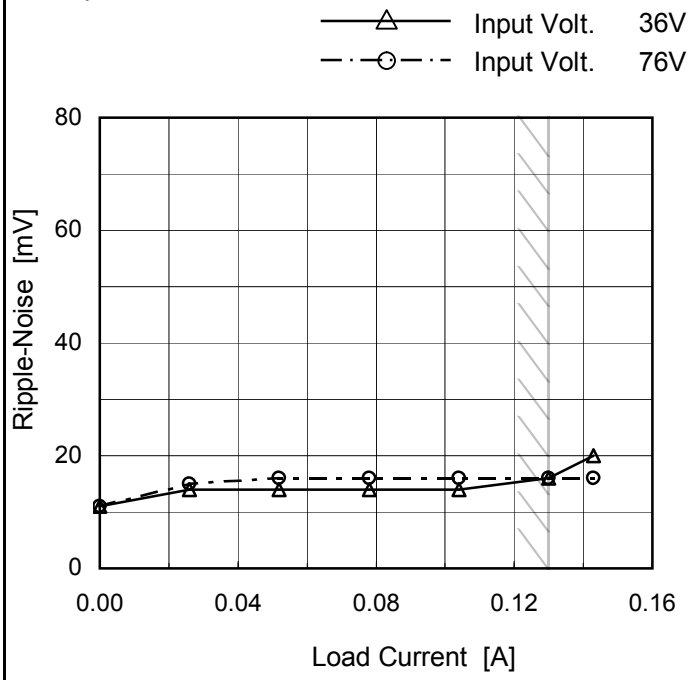
Load Current [A]	Ripple-Noise [mV]	
	Input Volt. 36 [V]	Input Volt. 76 [V]
0.000	4	4
0.026	6	7
0.052	8	8
0.078	11	8
0.104	15	9
0.130	20	11
0.143	24	12
--	-	-
--	-	-
--	-	-
--	-	-

COSEL

Model	SUTW34812
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.

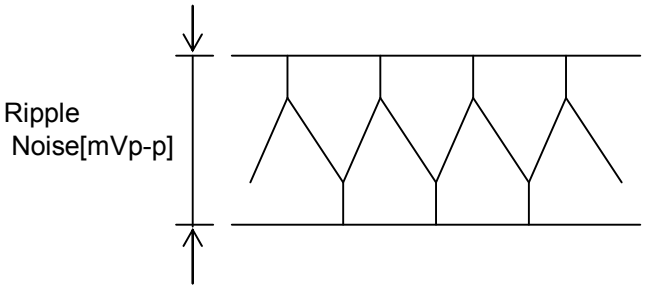


Fig.Complex Ripple Noise Wave Form

2.Values

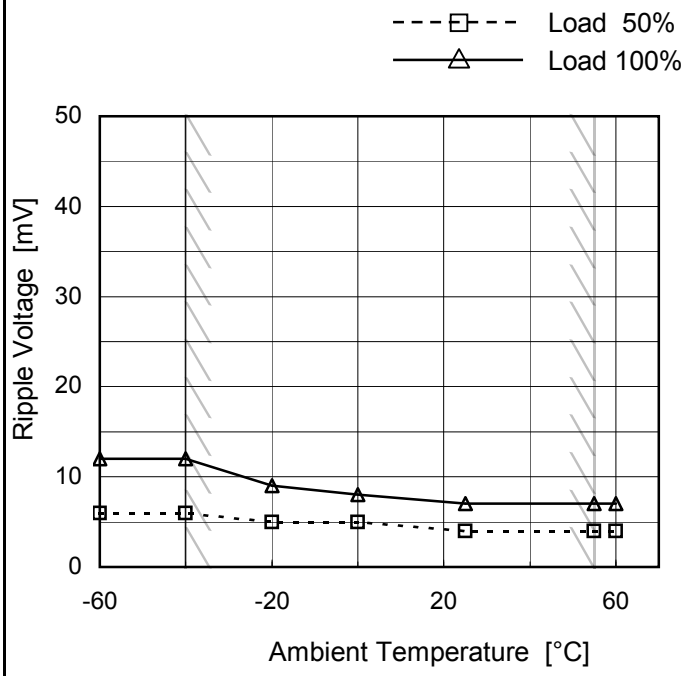
Load Current [A]	Ripple-Noise [mV]	
	Input Volt. 36 [V]	Input Volt. 76 [V]
0.000	11	11
0.026	14	15
0.052	14	16
0.078	14	16
0.104	14	16
0.130	16	16
0.143	20	16
--	-	-
--	-	-
--	-	-
--	-	-

COSEL

Model	SUTW34812
Item	Ripple Voltage (by Ambient Temp.)
Object	+12V0.13A

Testing Circuitry Figure B

1.Graph



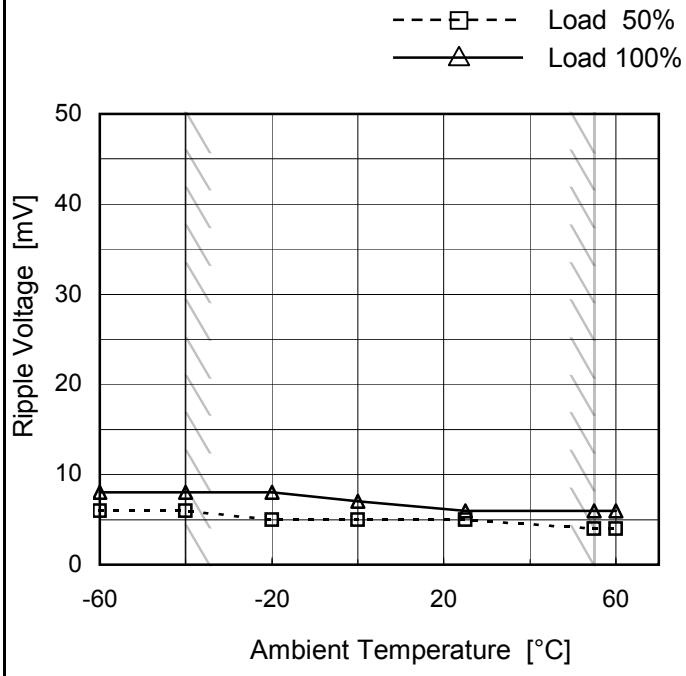
Input Volt. 48V

2.Values

Ambient Temperature [°C]	Ripple Voltage [mV]	
	Load 50%	Load 100%
-60	6	12
-40	6	12
-20	5	9
0	5	8
25	4	7
55	4	7
60	4	7
--	-	-
--	-	-
--	-	-
--	-	-

Object	-12V0.13A

1.Graph



Input Volt. 48V

Measured by 100 MHz Oscilloscope.

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

2.Values

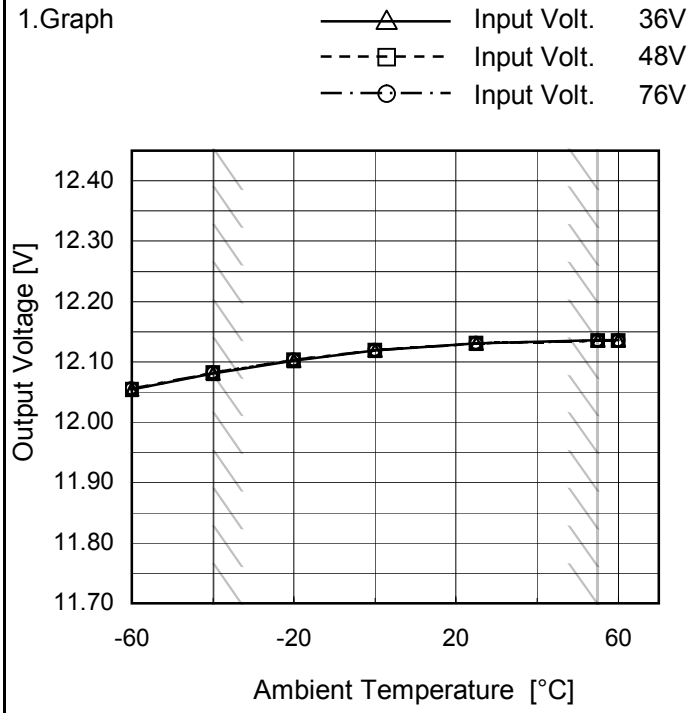
Ambient Temperature [°C]	Ripple Voltage [mV]	
	Load 50%	Load 100%
-60	6	8
-40	6	8
-20	5	8
0	5	7
25	5	6
55	4	6
60	4	6
--	-	-
--	-	-
--	-	-
--	-	-

COSEL

Model	SUTW34812
Item	Ambient Temperature Drift
Object	+12V0.13A

Testing Circuitry Figure A

1.Graph



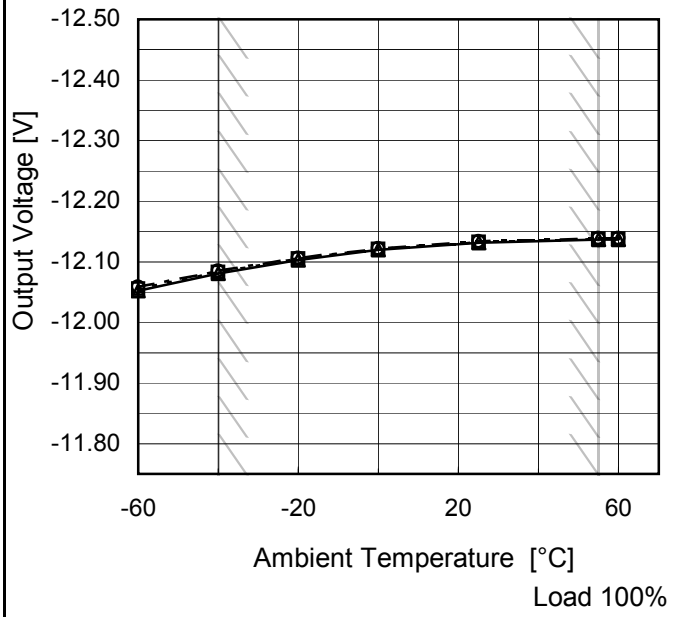
Load 100%

2.Values

Ambient Temperature [°C]	Output Voltage [V] Input Volt. 36[V]	Input Volt. 48[V]	Input Volt. 76[V]
-60	12.054	12.055	12.055
-40	12.081	12.082	12.082
-20	12.102	12.103	12.103
0	12.119	12.119	12.119
25	12.131	12.131	12.131
55	12.136	12.135	12.135
60	12.136	12.135	12.135
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

Object -12V0.13A

1.Graph



Load 100%

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

2.Values

Ambient Temperature [°C]	Output Voltage [V] Input Volt. 36[V]	Input Volt. 48[V]	Input Volt. 76[V]
-60	-12.052	-12.056	-12.058
-40	-12.081	-12.083	-12.085
-20	-12.102	-12.105	-12.106
0	-12.119	-12.121	-12.122
25	-12.132	-12.133	-12.134
55	-12.137	-12.138	-12.139
60	-12.137	-12.138	-12.138
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

COSEL

Model	SUTW34812	
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 : 36 - 76V

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

* 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	36	0	12.386	±273	±2.3
Minimum Voltage	-40	36	0.13	11.841		

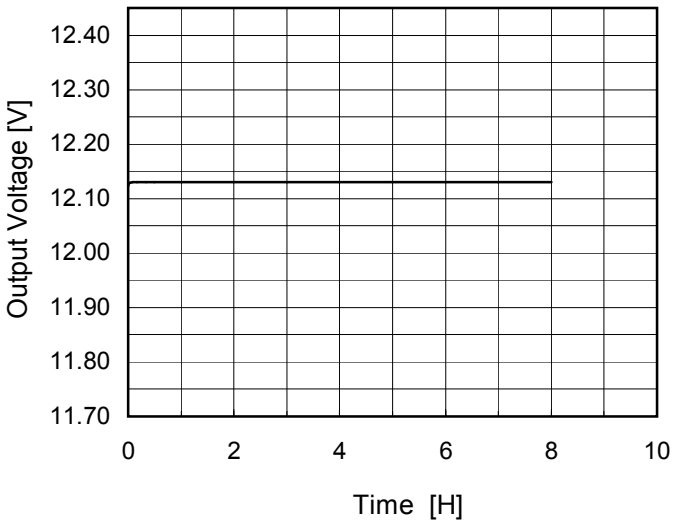
Object	-12V0.13A					
Item	Temperature [°C]	Input Voltage[V]	Output		Output Voltage Accuracy	
			Current[A]	Voltage[V]	Value [mV]	Ration [%]
Maximum Voltage	55	36	0	-12.402	±271	±2.3
Minimum Voltage	-40	36	0.13	-11.861		

COSEL

Model	SUTW34812
Item	Time Lapse Drift
Object	+12V0.13A

Temperature 25°C
Testing Circuitry Figure A

1.Graph



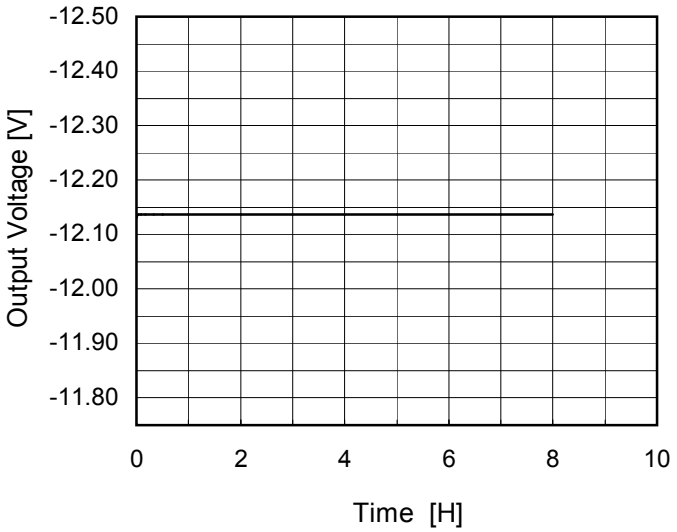
Input Volt. 48V
Load 100%

2.Values

Time since start [H]	Output Voltage [V]
0.0	12.123
0.5	12.131
1.0	12.131
2.0	12.131
3.0	12.131
4.0	12.131
5.0	12.131
6.0	12.131
7.0	12.131
8.0	12.131

Object	-12V0.13A

1.Graph



Input Volt. 48V
Load 100%

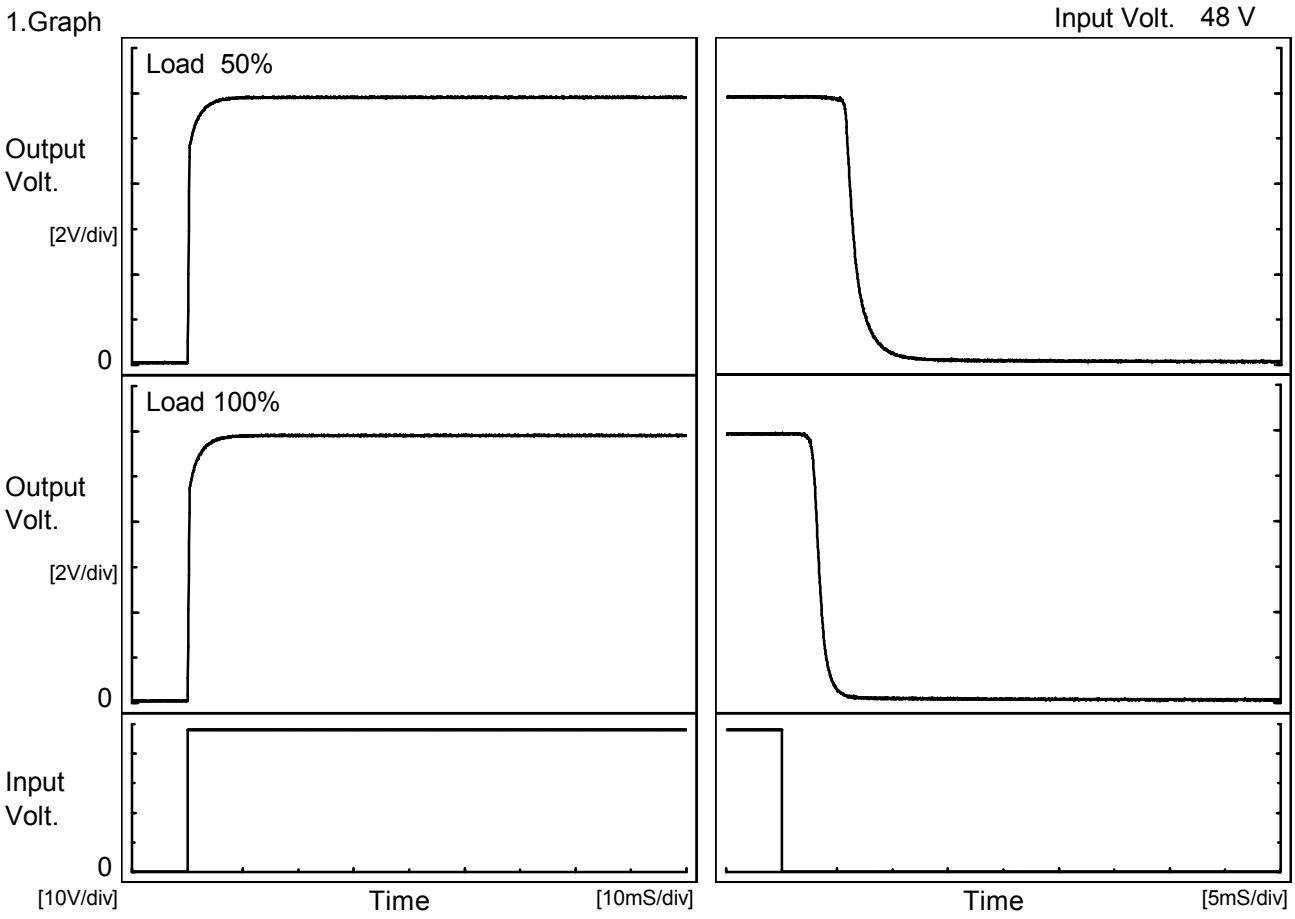
2.Values

Time since start [H]	Output Voltage [V]
0.0	-12.131
0.5	-12.137
1.0	-12.137
2.0	-12.137
3.0	-12.137
4.0	-12.137
5.0	-12.137
6.0	-12.137
7.0	-12.137
8.0	-12.137

COSEL

Model	SUTW34812	
Item	Rise and Fall Time	Temperature 25°C Testing Circuitry Figure A
Object	+12V0.13A	

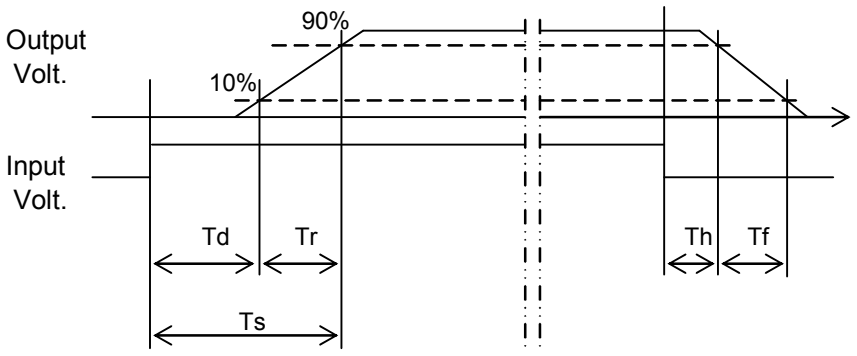
1.Graph



2.Values

[mS]

Load \ Time	Td	Tr	Ts	Th	Tf
50 %	0.2	1.8	2.0	5.7	2.5
100 %	0.2	1.9	2.1	2.8	1.5



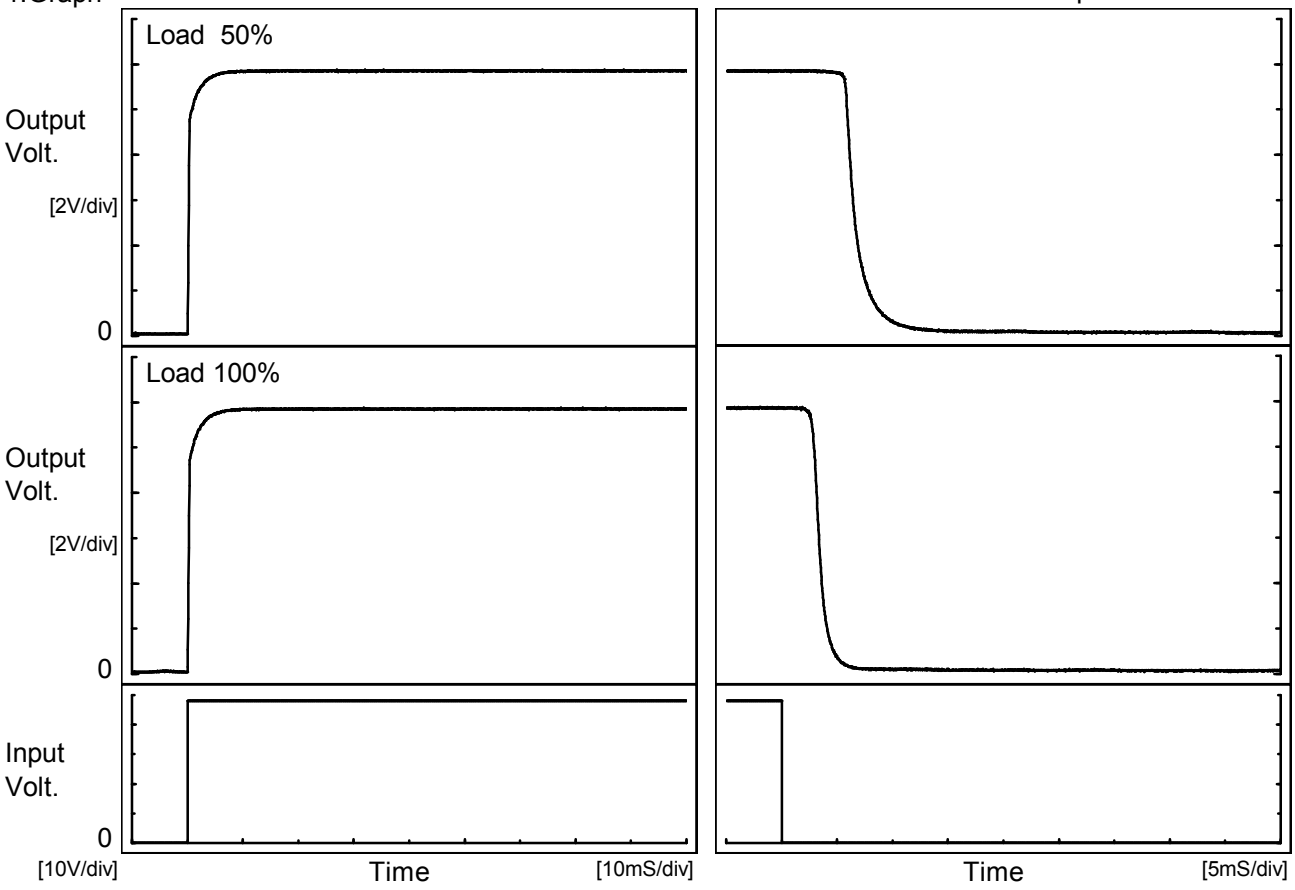
COSEL

Model	SUTW34812
Item	Rise and Fall Time
Object	-12V0.13A

Temperature 25°C
Testing Circuitry Figure A

1.Graph

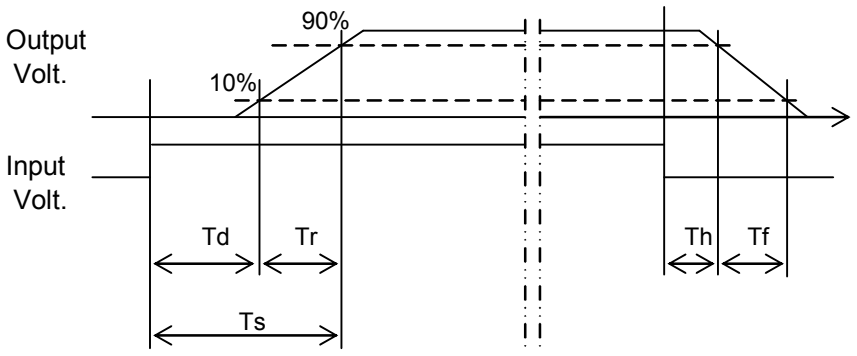
Input Volt. 48 V



2.Values

[mS]

Load \ Time	Td	Tr	Ts	Th	Tf
50 %	0.2	2.0	2.2	5.7	2.8
100 %	0.2	2.2	2.4	2.7	1.7

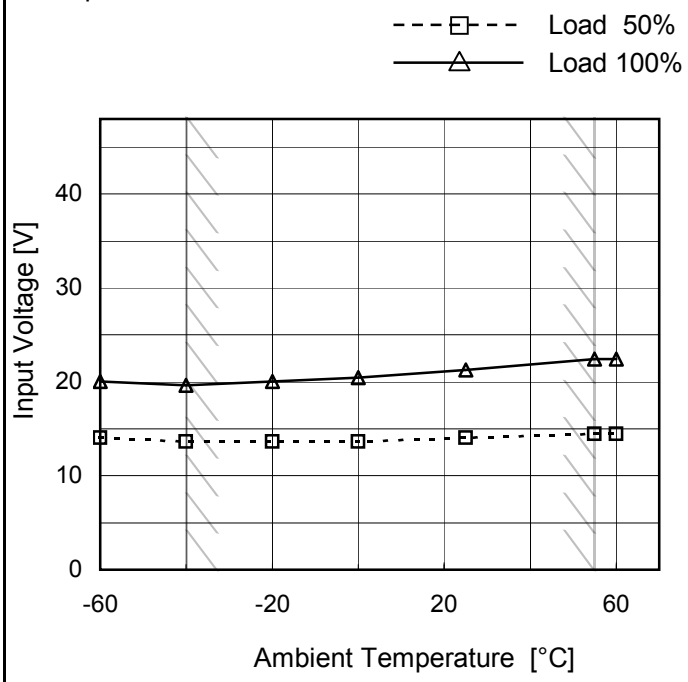


COSEL

Model	SUTW34812
Item	Minimum Input Voltage for Regulated Output Voltage
Object	+12V0.13A

Testing Circuitry Figure A

1.Graph

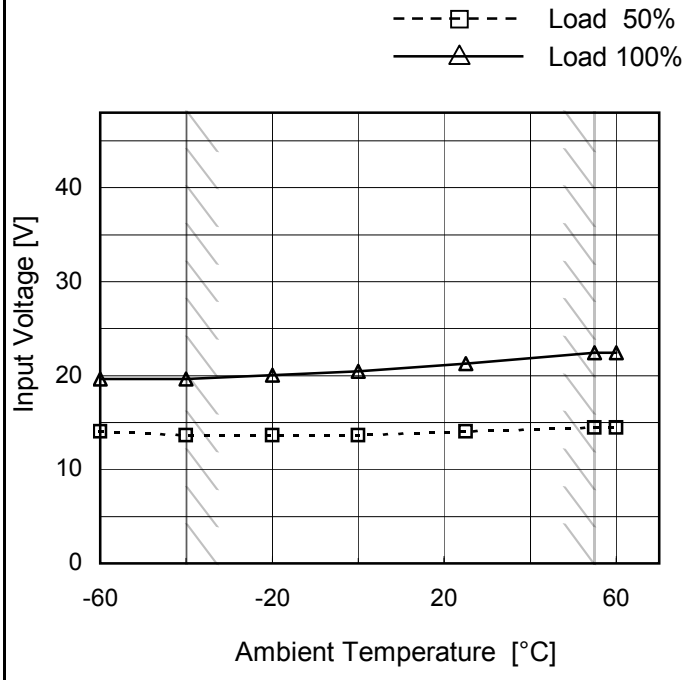


2.Values

Ambient Temperature [°C]	Input Voltage [V]	
	Load 50%	Load 100%
-60	14.1	20.1
-40	13.7	19.7
-20	13.7	20.1
0	13.7	20.5
25	14.1	21.3
55	14.5	22.5
60	14.5	22.5
--	-	-
--	-	-
--	-	-
--	-	-

Object	-12V0.13A

1.Graph



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

2.Values

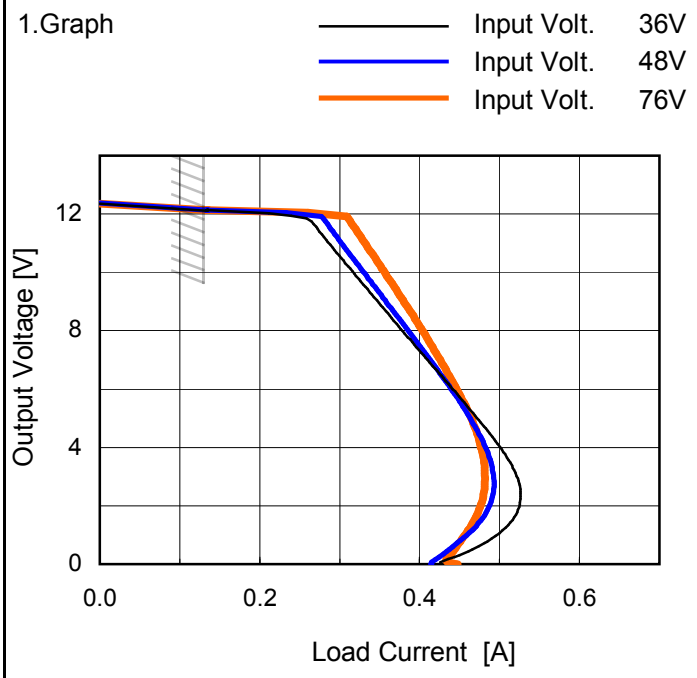
Ambient Temperature [°C]	Input Voltage [V]	
	Load 50%	Load 100%
-60	14.1	19.7
-40	13.7	19.7
-20	13.7	20.1
0	13.7	20.5
25	14.1	21.3
55	14.5	22.5
60	14.5	22.5
--	-	-
--	-	-
--	-	-
--	-	-

COSEL

Model	SUTW34812
Item	Overcurrent Protection
Object	+12V0.13A

Temperature 25°C
Testing Circuitry Figure A

1.Graph

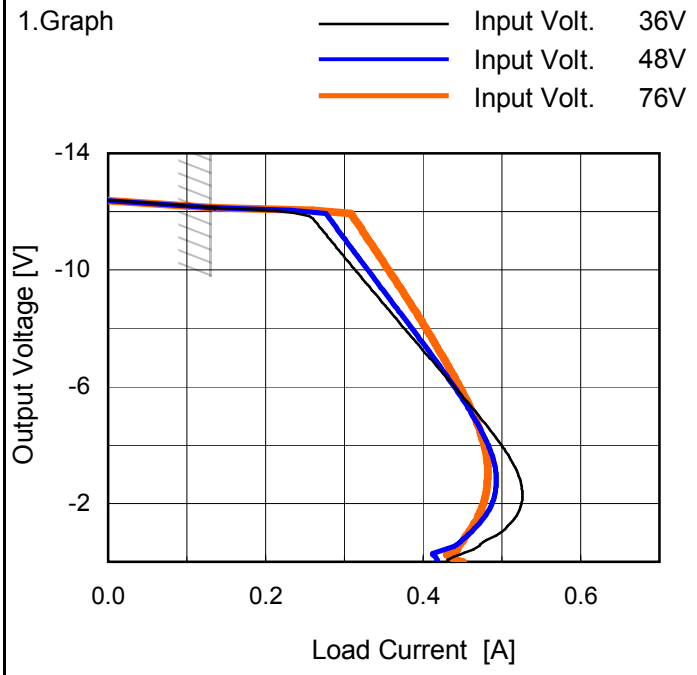


2.Values

Output Voltage [V]	Load Current [A]		
	Input Volt. 36[V]	Input Volt. 48[V]	Input Volt. 76[V]
12.0	0.13	0.13	0.13
11.4	0.28	0.29	0.32
10.8	0.29	0.31	0.33
9.6	0.33	0.34	0.37
8.4	0.37	0.37	0.39
7.2	0.40	0.41	0.42
6.0	0.44	0.44	0.45
4.8	0.48	0.47	0.47
3.6	0.51	0.49	0.48
2.4	0.53	0.49	0.48
1.2	0.51	0.47	0.46
0.0	0.43	0.41	0.45

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. 36[V]	Input Volt. 48[V]	Input Volt. 76[V]
-12.0	0.13	0.13	0.13
-11.4	0.27	0.29	0.32
-10.8	0.29	0.31	0.34
-9.6	0.32	0.34	0.36
-8.4	0.36	0.37	0.39
-7.2	0.40	0.41	0.42
-6.0	0.44	0.44	0.44
-4.8	0.48	0.47	0.47
-3.6	0.51	0.49	0.48
-2.4	0.53	0.49	0.48
-1.2	0.51	0.47	0.46
0.0	0.43	0.42	0.45

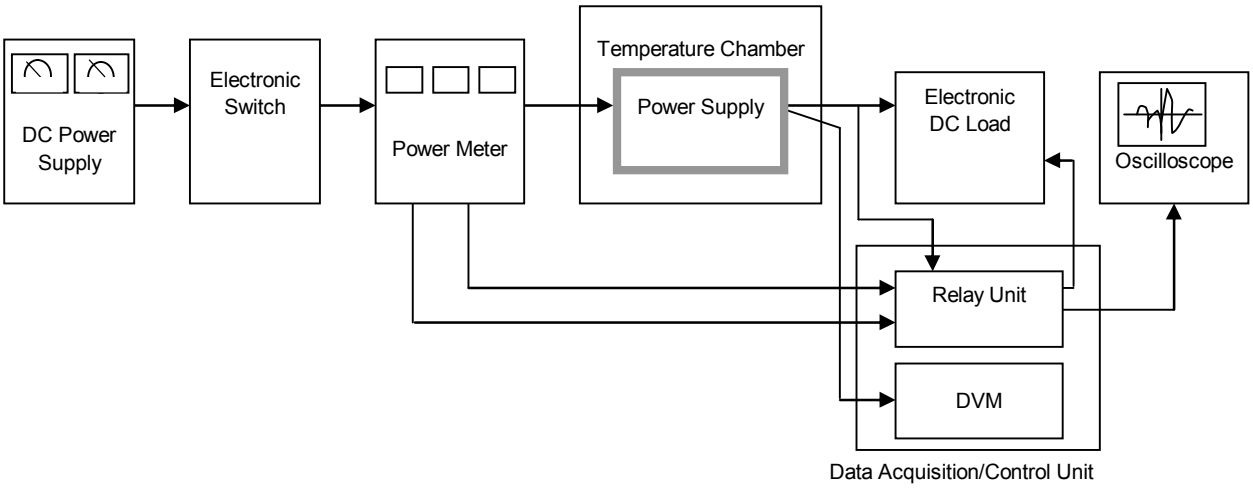


Figure A

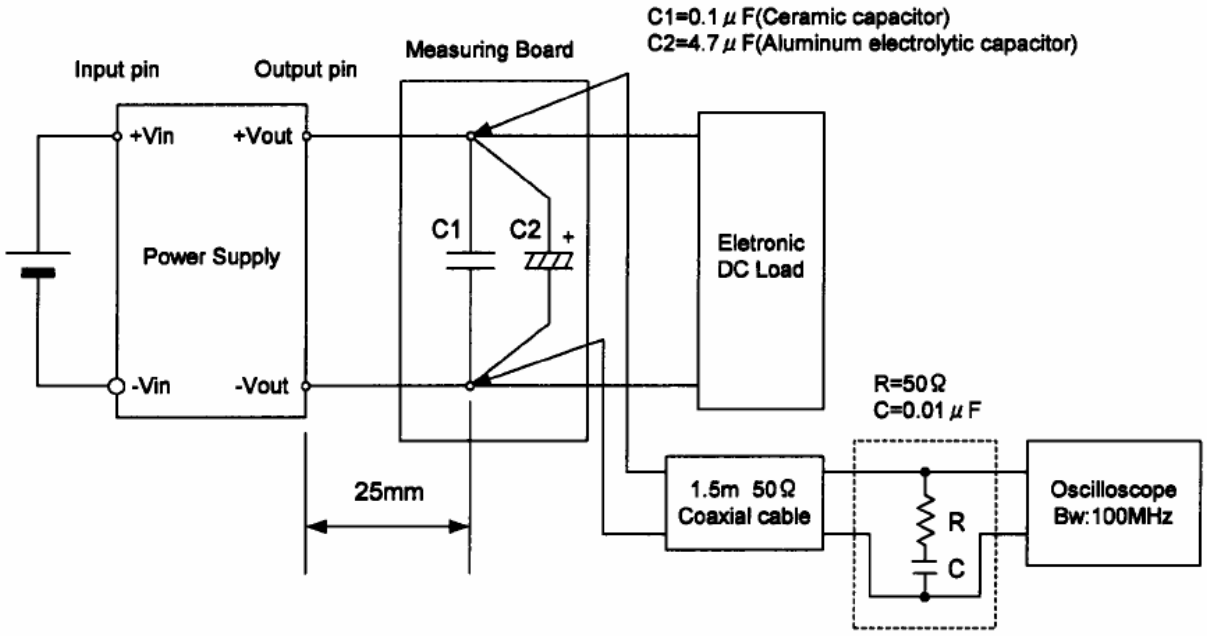


Figure B (Ripple and Ripple noise Characteristic)