参考資料

COSEL

TEST DATA OF SUW104812
SUCW104812

Regulated DC Power Supply
Mar 25, 2005

Approved by : Tetsuo Sugimori
Tetsuo Sugimori Design Manager

Prepared by : Yoshimichi Hirokawa
Yoshimichi Hirokawa Design Engineer

COSEL CO.,LTD.

参考資料

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

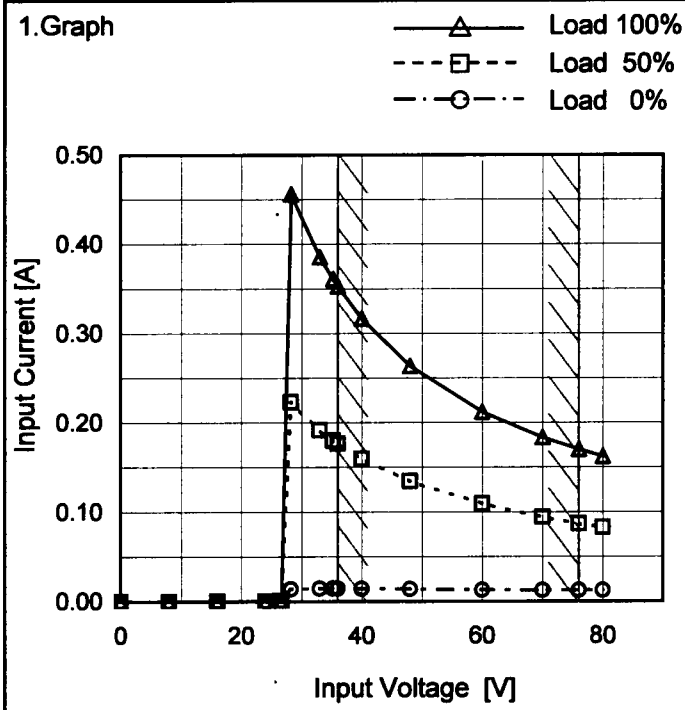
(Final Page 22)

COSEL

Model	SUW104812/SUCW104812
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

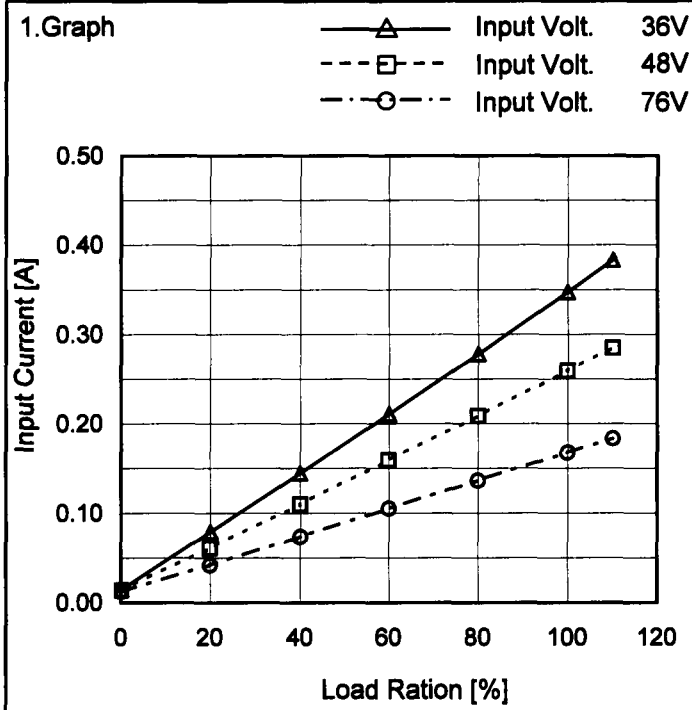
Input Voltage [V]	Input Current [A]		
	Load 0%	Load 50%	Load 100%
0.0	0.000	0.000	0.000
8.0	0.000	0.000	0.000
16.0	0.000	0.000	0.000
24.0	0.001	0.001	0.001
26.6	0.001	0.001	0.001
28.2	0.014	0.223	0.456
33.0	0.015	0.192	0.386
35.2	0.015	0.180	0.361
36.0	0.015	0.177	0.353
40.0	0.015	0.160	0.317
48.0	0.014	0.135	0.264
60.0	0.013	0.110	0.212
70.0	0.013	0.094	0.184
76.0	0.013	0.087	0.170
80.0	0.013	0.083	0.162
–	-	-	-
–	-	-	-
–	-	-	-

COSEL

Model	SUW104812/SUCW104812
Item	Input Current (by Load Current)
Object	――――――

Temperature 25°C
Testing Circuitry Figure A

1.Graph



2.Values

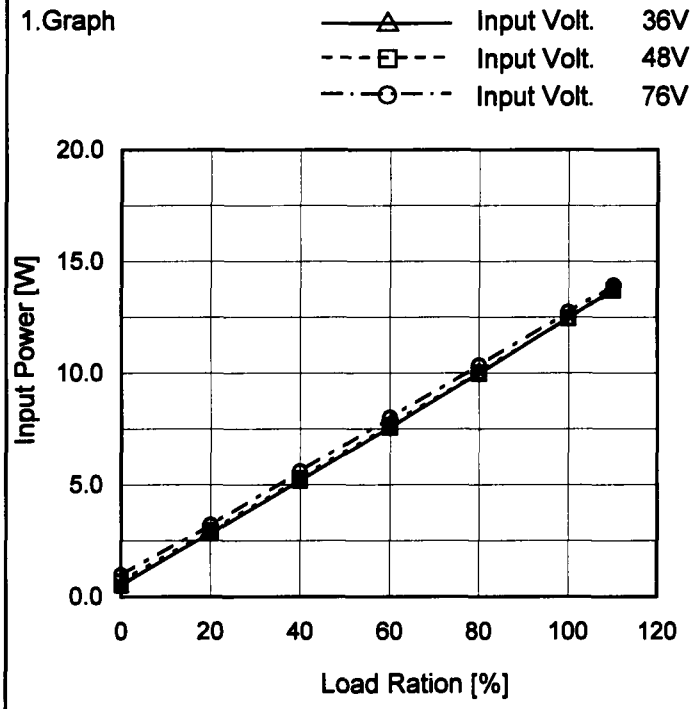
Load Ration [%]	Input Current [A]		
	Input Volt. 36[V]	Input Volt. 48[V]	Input Volt. 76[V]
0	0.015	0.014	0.013
20	0.079	0.061	0.042
40	0.145	0.110	0.074
60	0.211	0.159	0.105
80	0.278	0.209	0.136
100	0.348	0.259	0.168
110	0.383	0.285	0.184
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

COSEL

Model	SUW104812/SUCW104812
Item	Input Power (by Load Current)
Object	――――――

Temperature 25°C
Testing Circuitry Figure A

1.Graph



2.Values

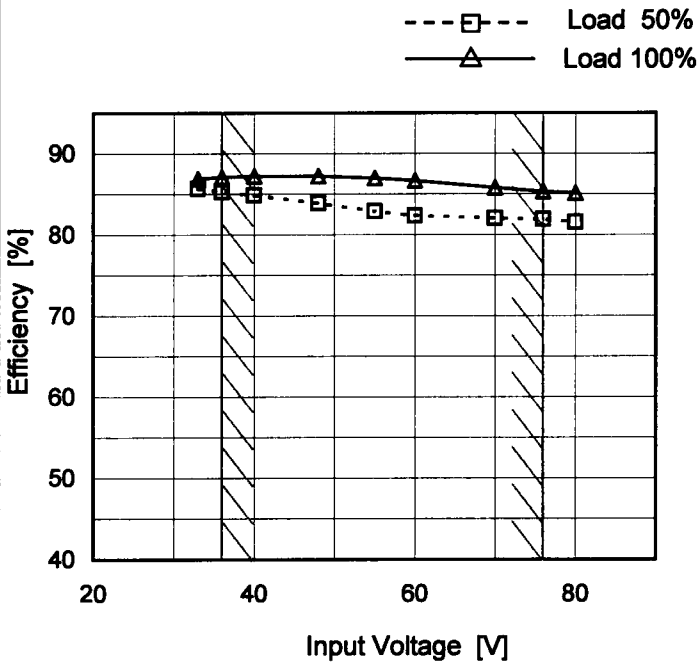
Load Ration [%]	Input Power [W]		
	Input Volt. 36[V]	Input Volt. 48[V]	Input Volt. 76[V]
0	0.54	0.67	0.97
20	2.85	2.95	3.20
40	5.20	5.28	5.60
60	7.58	7.67	8.01
80	9.99	10.04	10.35
100	12.47	12.46	12.73
110	13.75	13.69	13.93
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

COSEL

Model	SUW104812/SUCW104812
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

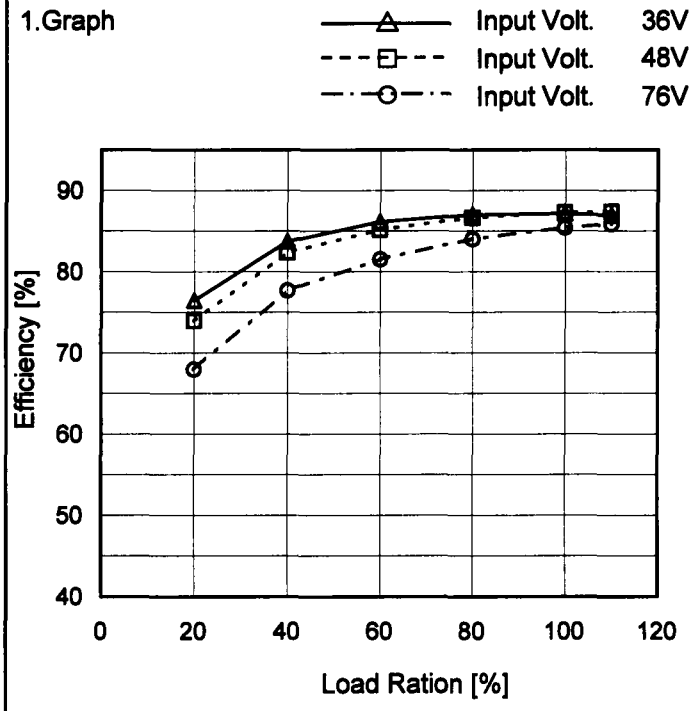
Input Voltage [V]	Efficiency [%]	
	Load 50%	Load 100%
33	85.7	86.9
36	85.3	87.1
40	84.9	87.2
48	83.9	87.2
55	82.9	87.0
60	82.3	86.7
70	82.0	85.8
76	81.9	85.3
80	81.6	85.1

COSEL

Model	SUW104812/SUCW104812
Item	Efficiency (by Load Current)
Object	――――――

Temperature 25°C
Testing Circuitry Figure A

1.Graph



2.Values

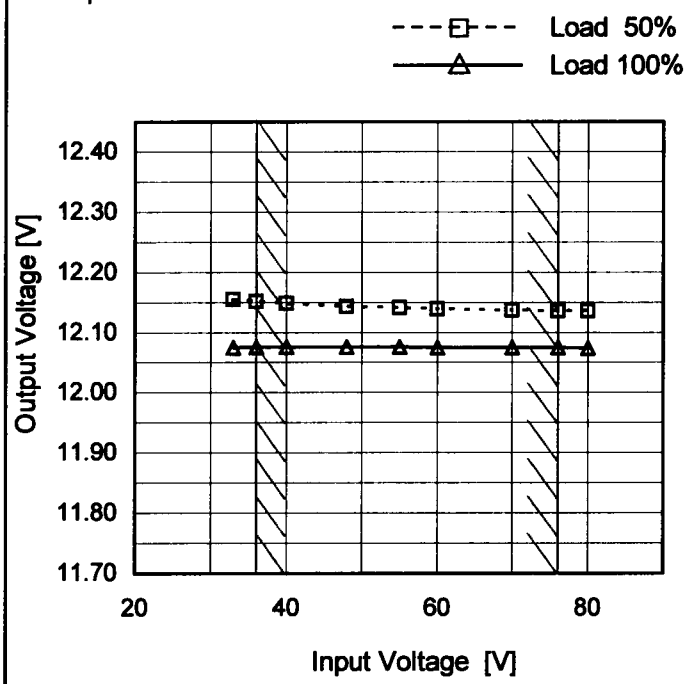
Load Ration [%]	Efficiency [%]		
	Input Volt. 36[V]	Input Volt. 48[V]	Input Volt. 76[V]
0	-	-	-
20	76.5	73.9	68.0
40	83.7	82.4	77.7
60	86.2	85.2	81.5
80	87.0	86.6	84.0
100	87.1	87.2	85.4
110	87.0	87.4	85.8
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

COSEL

Model	SUW104812/SUCW104812
Item	Line Regulation
Object	+12V0.45A

Temperature 25°C
Testing Circuitry Figure A

1.Graph

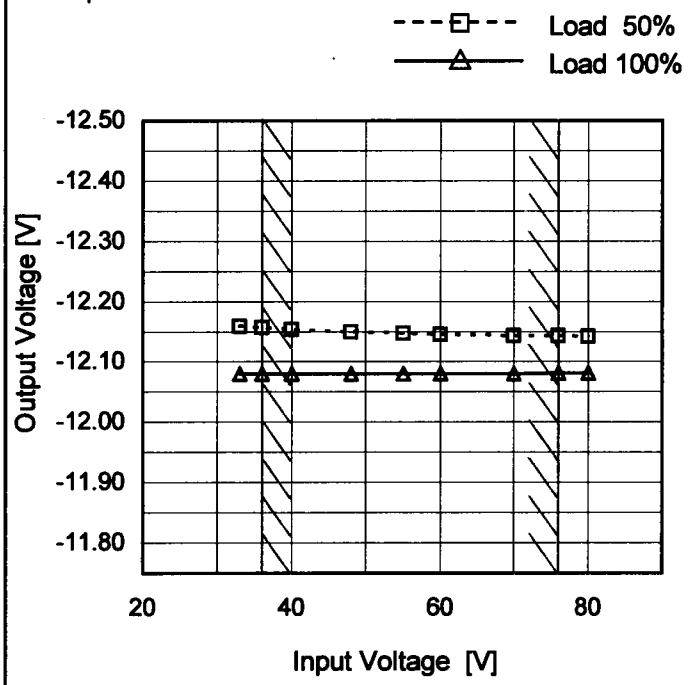


2.Values

Input Voltage [V]	Output Voltage [V]	
	Load 50%	Load 100%
33	12.155	12.075
36	12.152	12.076
40	12.149	12.076
48	12.144	12.076
55	12.141	12.076
60	12.139	12.075
70	12.137	12.075
76	12.136	12.075
80	12.136	12.074

Object	-12V0.45A

1.Graph



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

2.Values

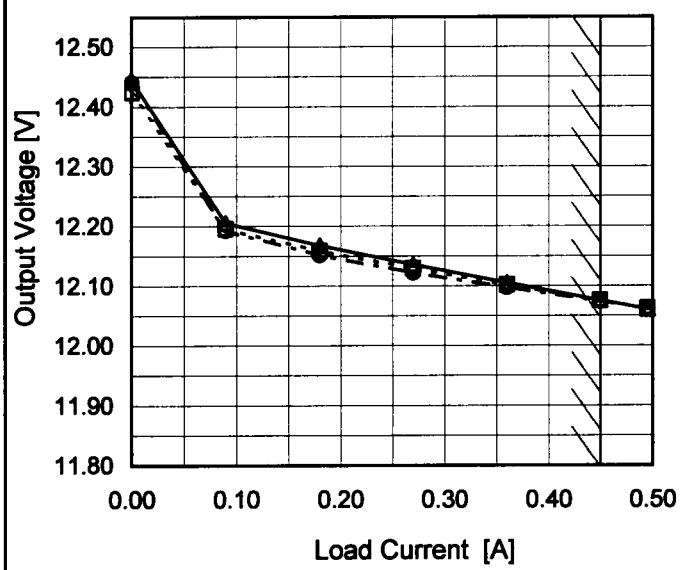
Input Voltage [V]	Output Voltage [V]	
	Load 50%	Load 100%
33	-12.159	-12.080
36	-12.157	-12.080
40	-12.154	-12.080
48	-12.149	-12.080
55	-12.147	-12.080
60	-12.145	-12.081
70	-12.144	-12.081
76	-12.143	-12.081
80	-12.142	-12.082

COSEL

Model	SUW104812/SUCW104812
Item	Load Regulation
Object	+12V0.45A

Temperature 25°C
Testing Circuitry Figure A

1.Graph

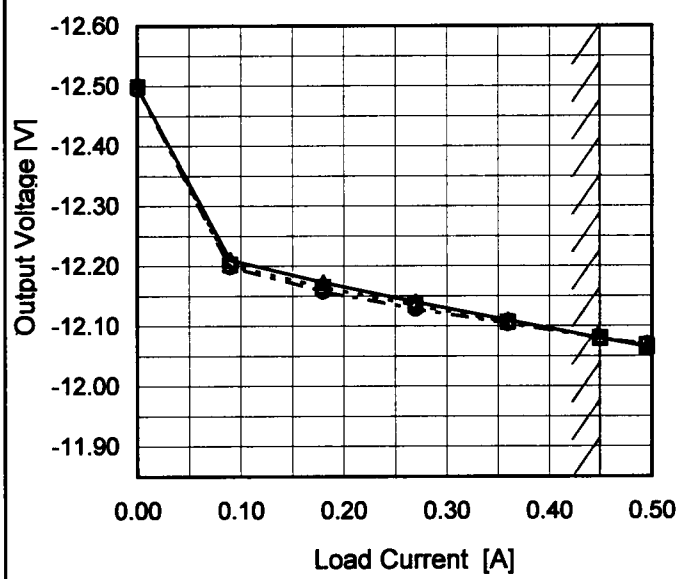


2.Values

Load Current [A]	Output Voltage [V] Input Volt. 36[V]	Input Volt. 48[V]	Input Volt. 76[V]
0.000	12.445	12.424	12.441
0.090	12.206	12.196	12.193
0.180	12.168	12.159	12.152
0.270	12.136	12.130	12.122
0.360	12.105	12.102	12.098
0.450	12.076	12.076	12.074
0.495	12.061	12.062	12.063
–	-	-	-
–	-	-	-
–	-	-	-
–	-	-	-

Object	-12V0.45A

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	-12.499	-12.499	-12.496
0.090	-12.211	-12.202	-12.199
0.180	-12.173	-12.165	-12.158
0.270	-12.140	-12.135	-12.129
0.360	-12.110	-12.107	-12.105
0.450	-12.080	-12.080	-12.081
0.495	-12.065	-12.067	-12.070
–	-	-	-
–	-	-	-
–	-	-	-
–	-	-	-

COSEL

Model	SUW104812/SUCW104812
Item	Dynamic Load Response
Object	+12V0.45A

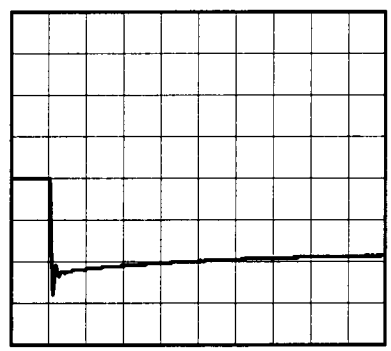
Temperature 25°C
Testing Circuitry Figure A

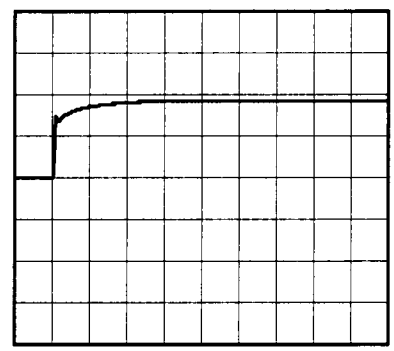
Input Volt. 48 V
Cycle 100 mS

t_1、t_2 = 50μs

Load Current

Min. Load (0A) ⟷
Load 100% (0.45A)

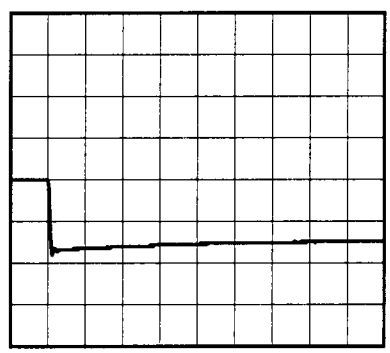


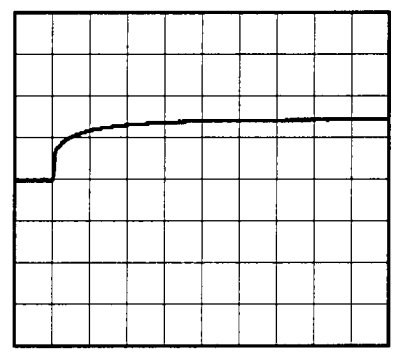


200mV/div

500μs/div 500μs/div

Min. Load (0A) ⟷
Load 50% (0.225A)

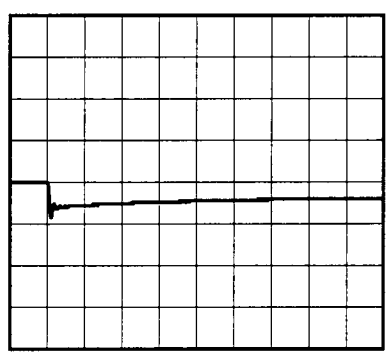


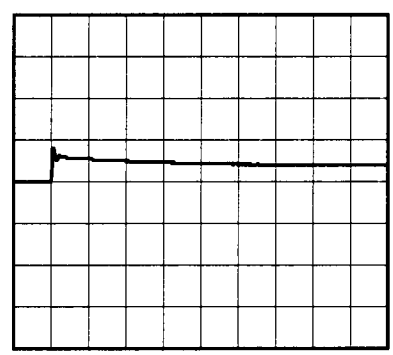


200mV/div

500μs/div 500μs/div

Load 50% (0.225A) ⟷
Load 100% (0.45A)





200mV/div

500μs/div 500μs/div

COSEL

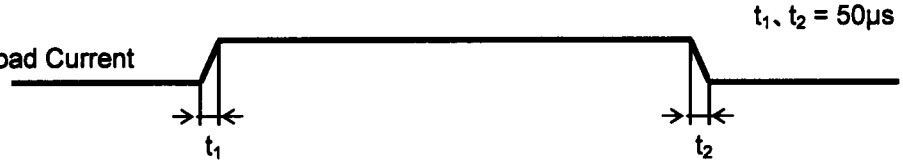
Model	SUW104812/SUCW104812
Item	Dynamic Load Response
Object	-12V0.45A

Temperature 25°C
Testing Circuitry Figure A

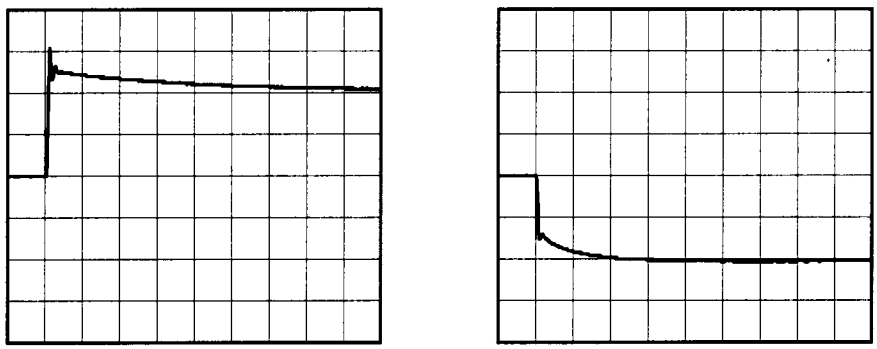
Input Volt. 48 V
Cycle 100 mS

t_1、t_2 = 50μs

Load Current



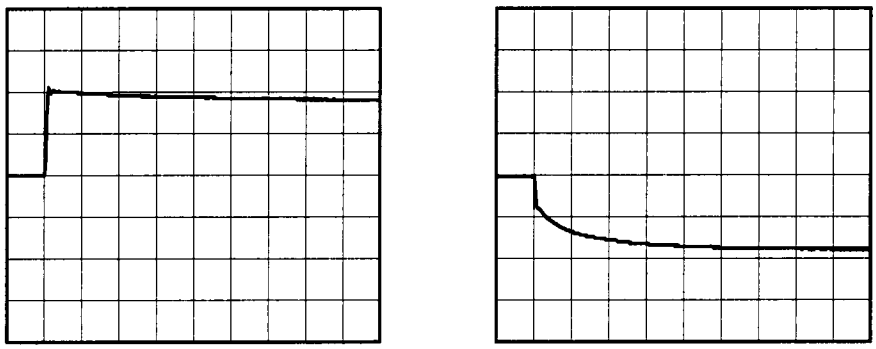
Min. Load (0A) ⟷
Load 100% (0.45A)



200mV/div

500μs/div 500μs/div

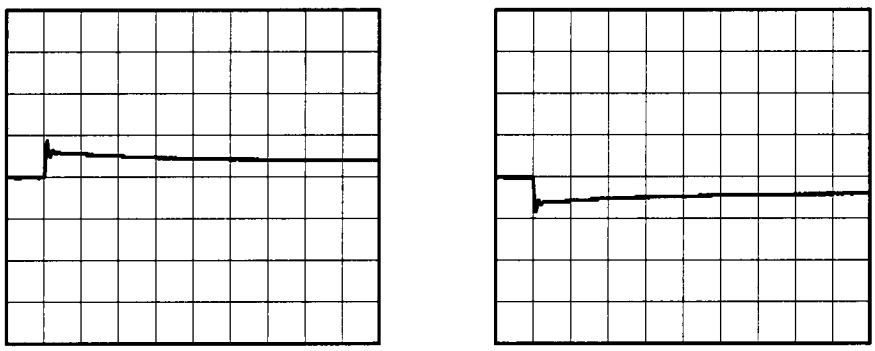
Min. Load (0A) ⟷
Load 50% (0.225A)



200mV/div

500μs/div 500μs/div

Load 50% (0.225A) ⟷
Load 100% (0.45A)



200mV/div

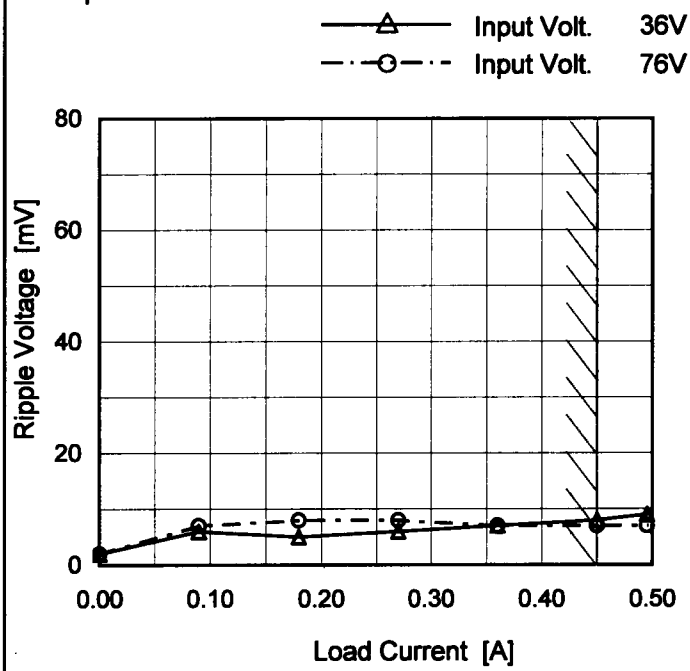
500μs/div 500μs/div

COSEL

Model	SUW104812/SUCW104812
Item	Ripple Voltage (by Load Current)
Object	+12V0.45A

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]

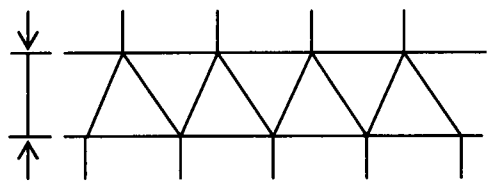


Fig.Complex Ripple Wave Form

2.Values

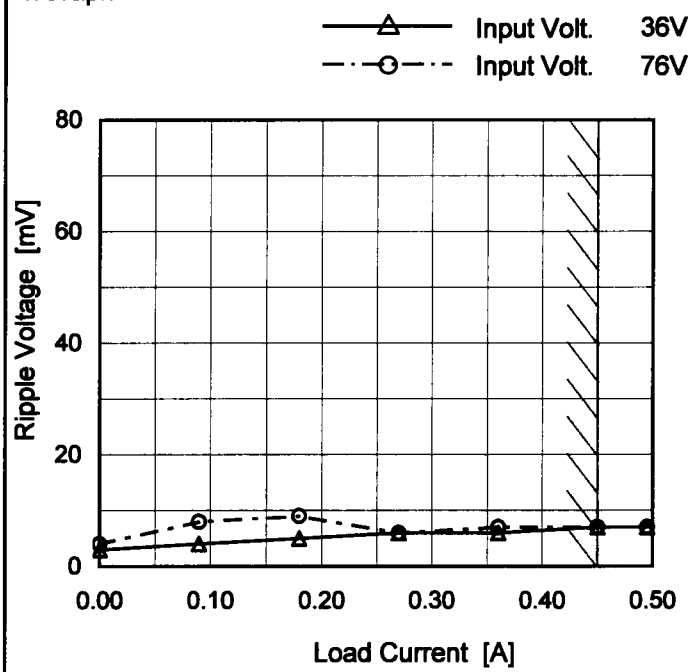
Load Current [A]	Ripple Voltage [mV]	
	Input Volt. 36 [V]	Input Volt. 76 [V]
0.000	2	2
0.090	6	7
0.180	5	8
0.270	6	8
0.360	7	7
0.450	8	7
0.495	9	7
–	-	-
–	-	-
–	-	-
–	-	-

COSEL

Model	SUW104812/SUCW104812
Item	Ripple Voltage (by Load Current)
Object	-12V0.45A

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]

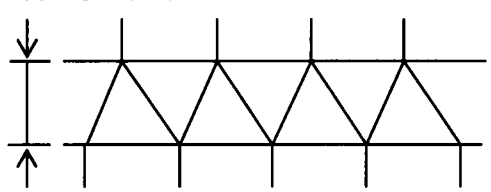


Fig.Complex Ripple Wave Form

2.Values

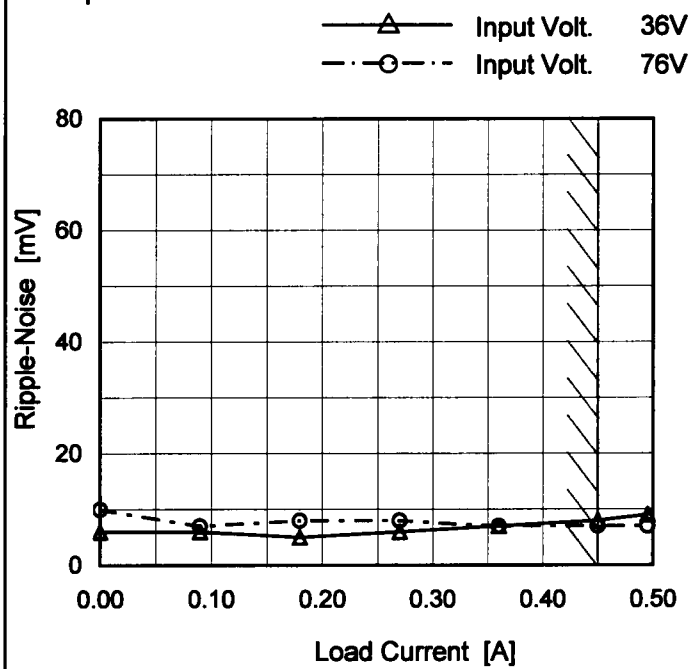
Load Current [A]	Ripple Voltage [mV]	
	Input Volt. 36 [V]	Input Volt. 76 [V]
0.000	3	4
0.090	4	8
0.180	5	9
0.270	6	6
0.360	6	7
0.450	7	7
0.495	7	7
–	-	-
–	-	-
–	-	-
–	-	-

COSEL

Model	SUW104812/SUCW104812
Item	Ripple-Noise
Object	+12V0.45A

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.

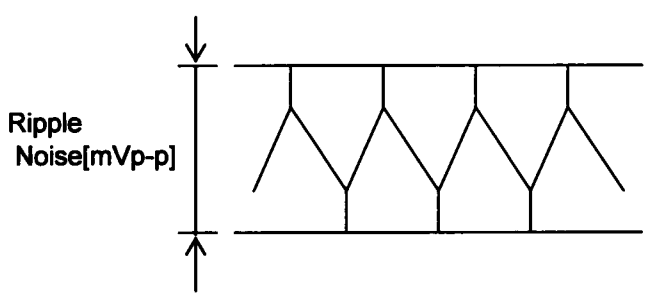


Fig.Complex Ripple Noise Wave Form

2.Values

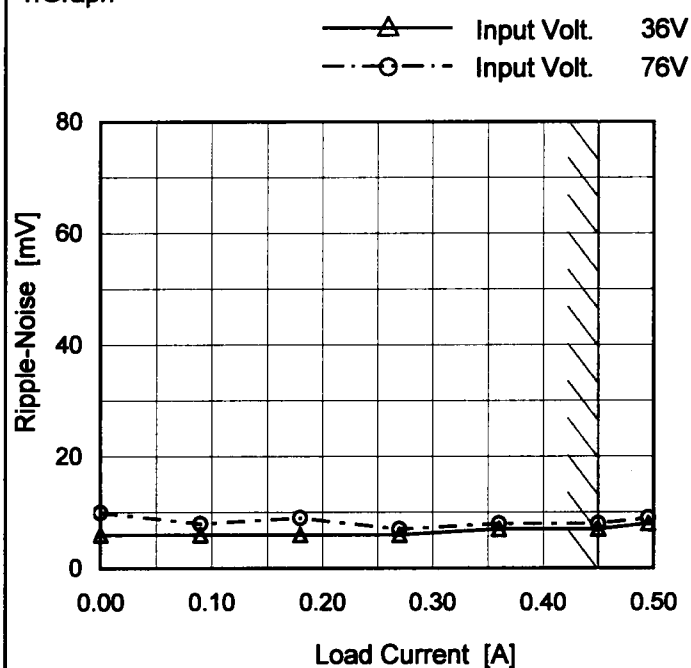
Load Current [A]	Ripple-Noise [mV]	
	Input Volt. 36 [V]	Input Volt. 76 [V]
0.000	6	10
0.090	6	7
0.180	5	8
0.270	6	8
0.360	7	7
0.450	8	7
0.495	9	7
–	-	-
–	-	-
–	-	-
–	-	-

COSEL

Model	SUW104812/SUCW104812
Item	Ripple-Noise
Object	-12V0.45A

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.

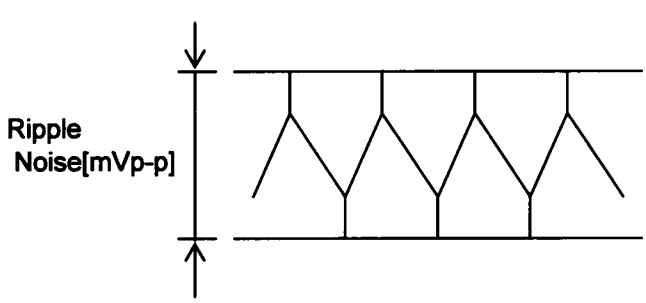


Fig.Complex Ripple Noise Wave Form

2.Values

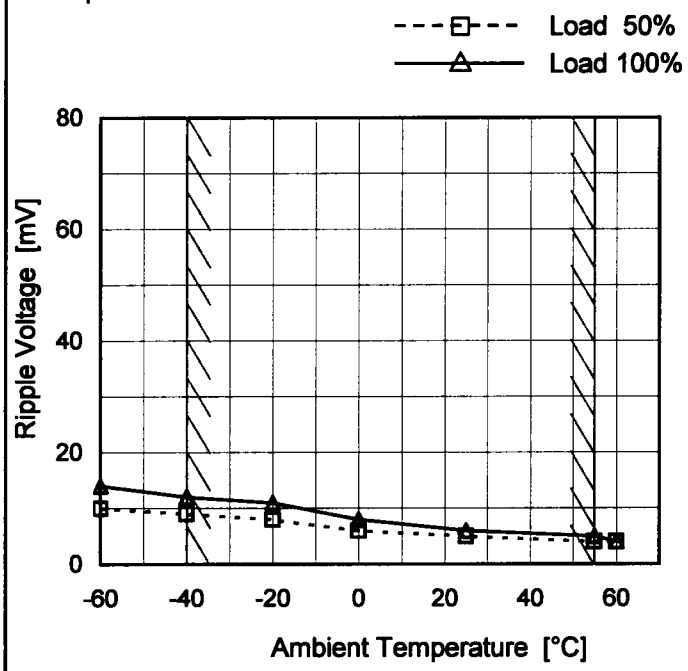
Load Current [A]	Ripple-Noise [mV]	
	Input Volt. 36 [V]	Input Volt. 76 [V]
0.000	6	10
0.090	6	8
0.180	6	9
0.270	6	7
0.360	7	8
0.450	7	8
0.495	8	9
--	-	-
--	-	-
--	-	-
--	-	-

COSEL

Model	SUW104812/SUCW104812
Item	Ripple Voltage (by Ambient Temp.)
Object	+12V0.45A

Testing Circuitry Figure B

1.Graph



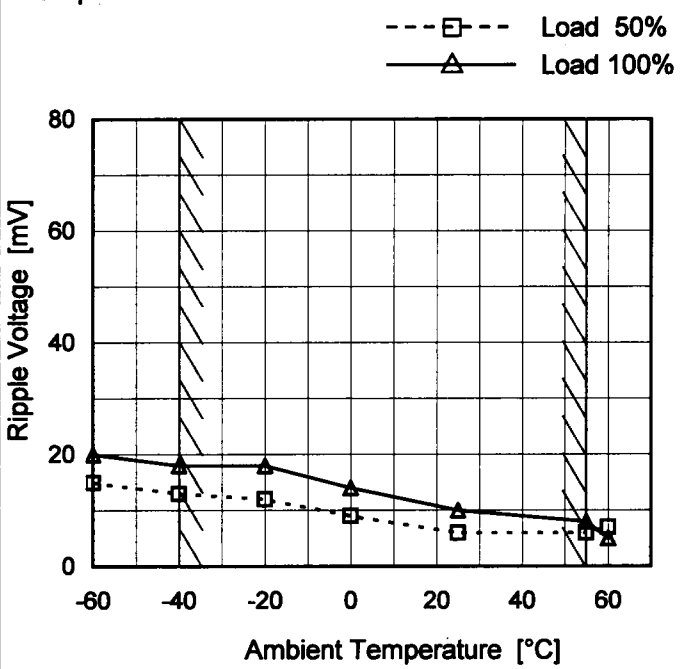
Input Volt. 48V

2.Values

Ambient Temperature [°C]	Ripple Voltage [mV]	
	Load 50%	Load 100%
-60	10	14
-40	9	12
-20	8	11
0	6	8
25	5	6
55	4	5
60	4	4
–	-	-
–	-	-
–	-	-
–	-	-

Object	-12V0.45A

1.Graph



Input Volt. 48V

Measured by 100 MHz Oscilloscope.

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

2.Values

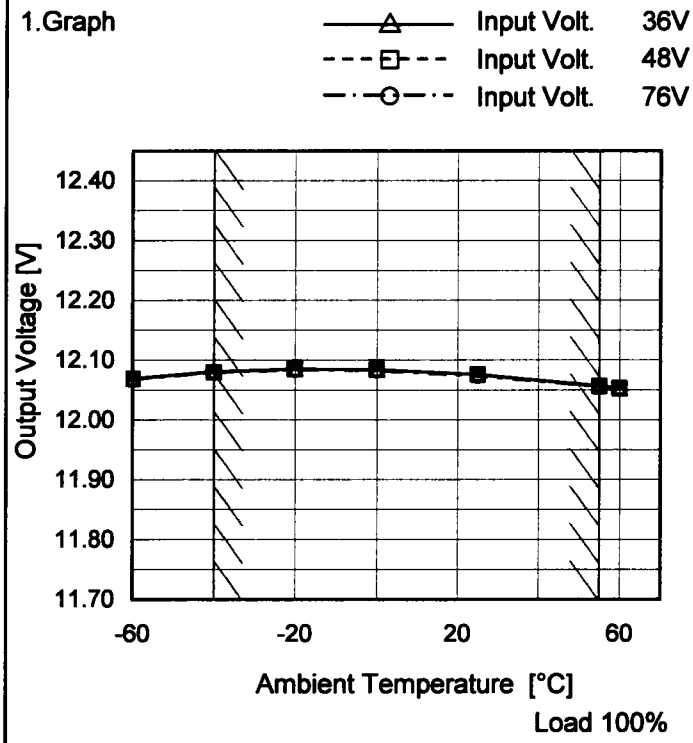
Ambient Temperature [°C]	Ripple Voltage [mV]	
	Load 50%	Load 100%
-60	15	20
-40	13	18
-20	12	18
0	9	14
25	6	10
55	6	8
60	7	5
–	-	-
–	-	-
–	-	-
–	-	-

COSEL

Model	SUW104812/SUCW104812
Item	Ambient Temperature Drift
Object	+12V0.45A

Testing Circuitry Figure A

1.Graph

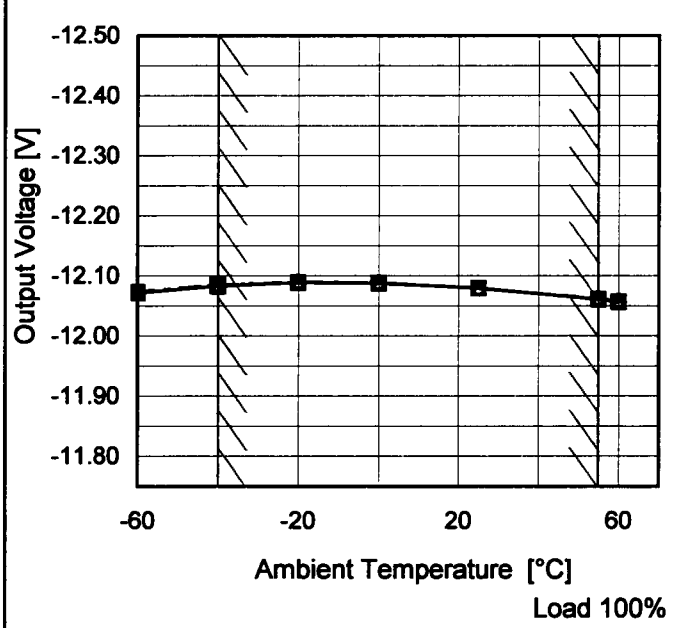


2.Values

Ambient Temperature [°C]	Output Voltage [V]		
	Input Volt. 36[V]	Input Volt. 48[V]	Input Volt. 76[V]
-60	12.069	12.069	12.068
-40	12.081	12.080	12.080
-20	12.085	12.085	12.084
0	12.084	12.084	12.083
25	12.076	12.076	12.074
55	12.057	12.057	12.056
60	12.053	12.053	12.052
–	-	-	-
–	-	-	-
–	-	-	-
–	-	-	-

Object	-12V0.45A

1.Graph



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	-12.072	-12.073	-12.074
-40	-12.083	-12.085	-12.085
-20	-12.089	-12.089	-12.090
0	-12.088	-12.088	-12.089
25	-12.080	-12.080	-12.080
55	-12.061	-12.061	-12.062
60	-12.057	-12.057	-12.058
–	-	-	-
–	-	-	-
–	-	-	-
–	-	-	-

COSEL

Model	SUW104812/SUCW104812	
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 - 0.45A (AVR 2) : 0 - 0.45A

* Other Output : Rated Load

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

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

2.Values

Object	+12V0.45A					
Item	Temperature [°C]	Input Voltage[V]	Output		Output Voltage Accuracy	
			Current[A]	Voltage[V]	Value [mV]	Ration [%]
Maximum Voltage	0	36	0	12.446	±195	±1.6
Minimum Voltage	55	76	0.45	12.056		

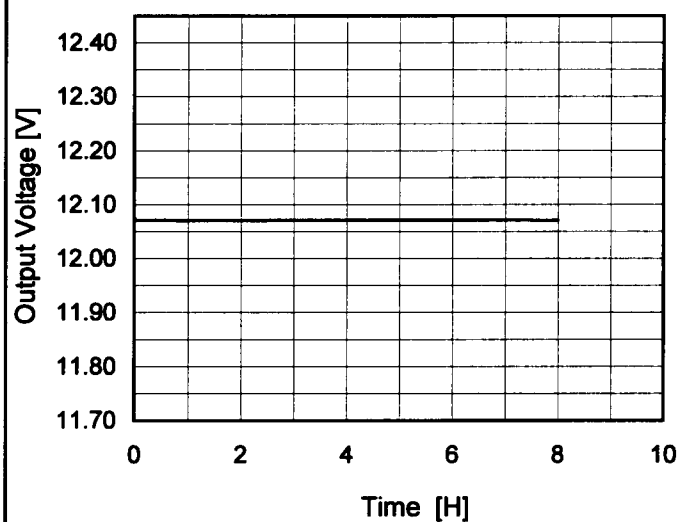
Object	-12V0.45A					
Item	Temperature [°C]	Input Voltage[V]	Output		Output Voltage Accuracy	
			Current[A]	Voltage[V]	Value [mV]	Ration [%]
Maximum Voltage	0	36	0	-12.504	±222	±1.9
Minimum Voltage	55	36	0.45	-12.061		

COSEL

Model	SUW104812/SUCW104812
Item	Time Lapse Drift
Object	+12V0.45A

Temperature 25°C
Testing Circuitry Figure A

1.Graph



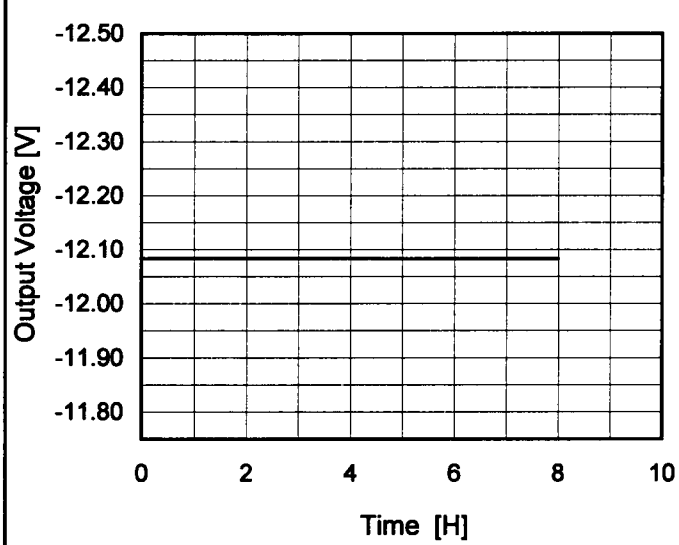
Input Volt. 48V
Load 100%

2.Values

Time since start [H]	Output Voltage [V]
0.0	12.077
0.5	12.071
1.0	12.071
2.0	12.071
3.0	12.071
4.0	12.071
5.0	12.071
6.0	12.071
7.0	12.071
8.0	12.071

Object	-12V0.45A

1.Graph



Input Volt. 48V
Load 100%

2.Values

Time since start [H]	Output Voltage [V]
0.0	-12.087
0.5	-12.084
1.0	-12.084
2.0	-12.084
3.0	-12.084
4.0	-12.084
5.0	-12.083
6.0	-12.084
7.0	-12.084
8.0	-12.084

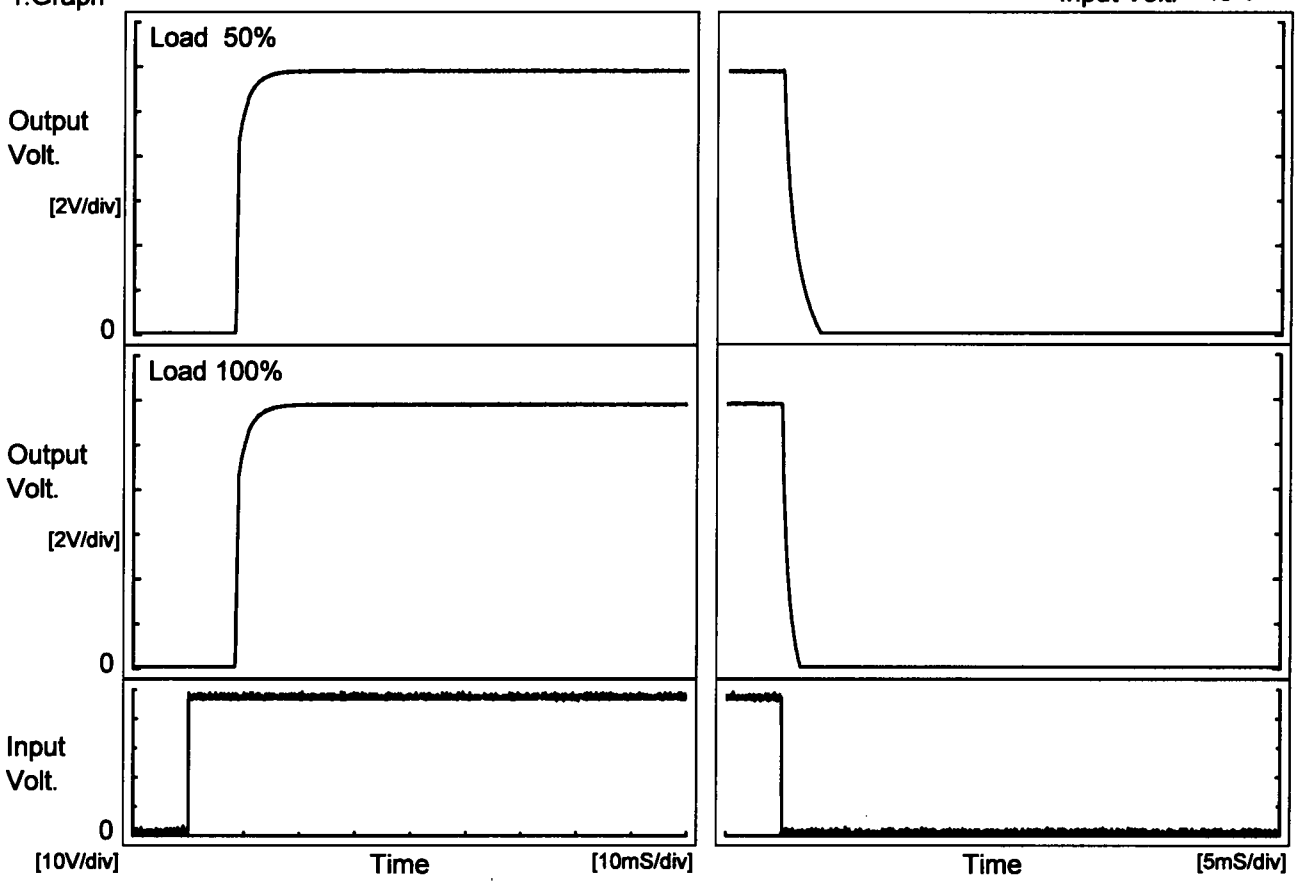
COSEL

Model	SUW104812/SUCW104812
Item	Rise and Fall Time
Object	+12V0.45A

Temperature 25°C
Testing Circuitry Figure A

1.Graph

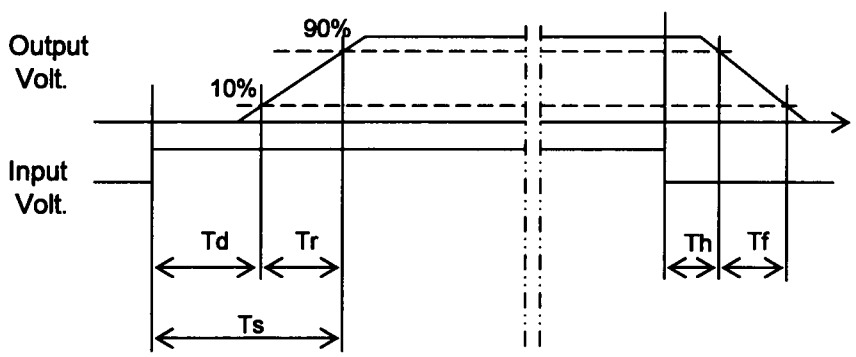
Input Volt. 48 V



2.Values

[mS]

Load \ Time	Td	Tr	Ts	Th	Tf
50 %	8.4	2.7	11.1	0.1	2.3
100 %	8.5	2.8	11.3	0.1	1.2



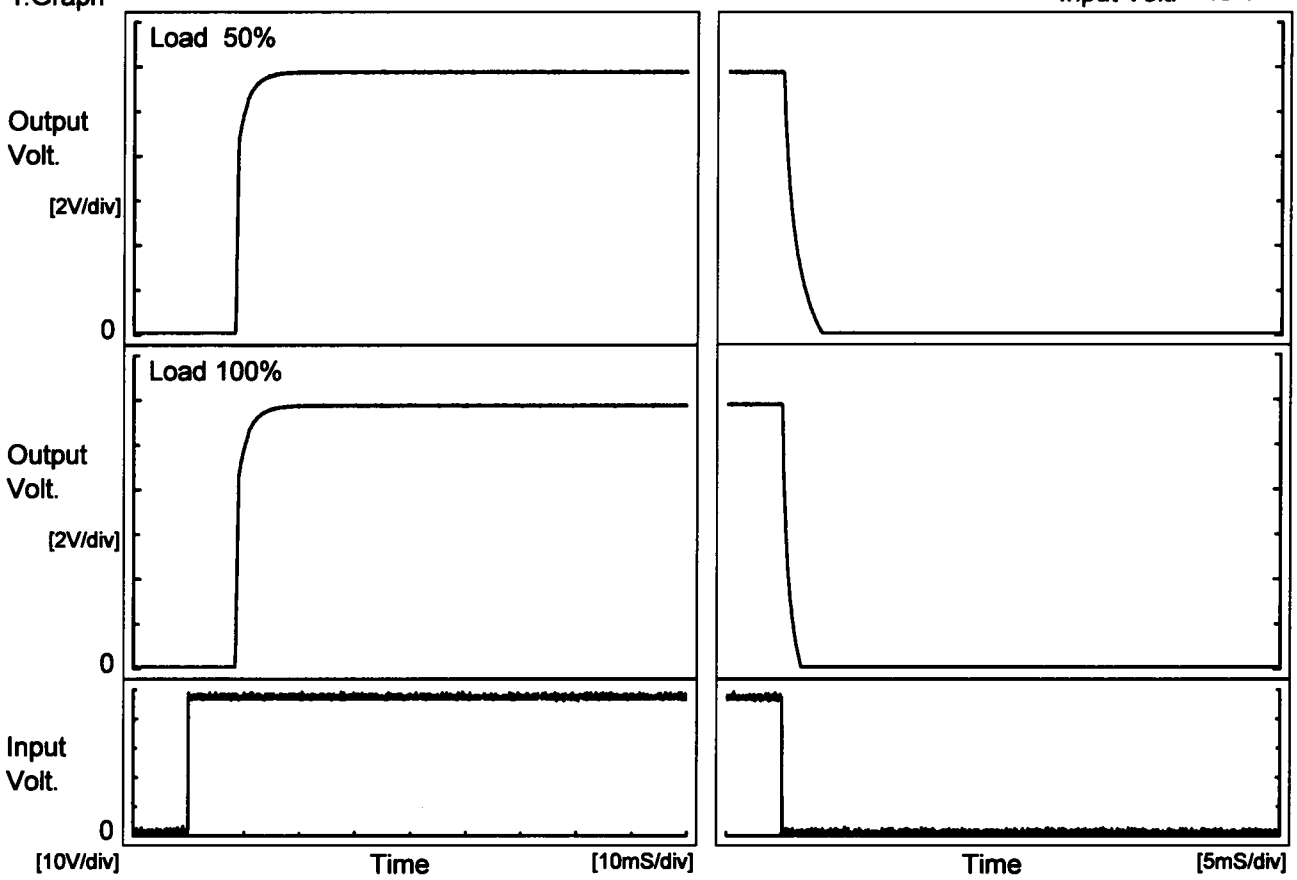
COSEL

Model	SUW104812
Item	Rise and Fall Time
Object	-12V0.45A

Temperature 25°C
Testing Circuitry Figure A

1.Graph

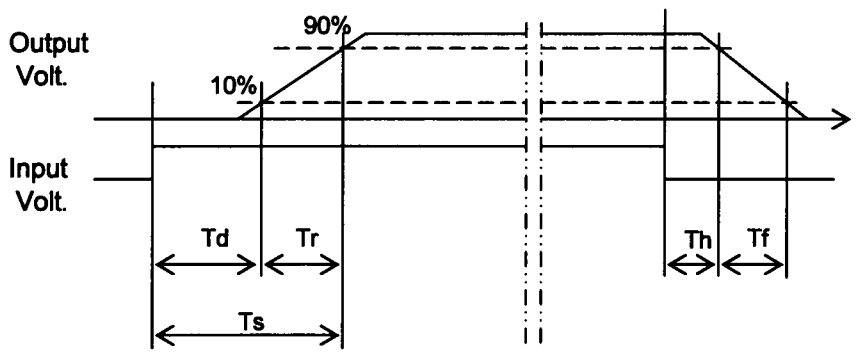
Input Volt. 48 V



2.Values

[mS]

Load \ Time	Td	Tr	Ts	Th	Tf
50 %	8.4	2.8	11.2	0.1	2.4
100 %	8.5	2.9	11.4	0.1	1.2

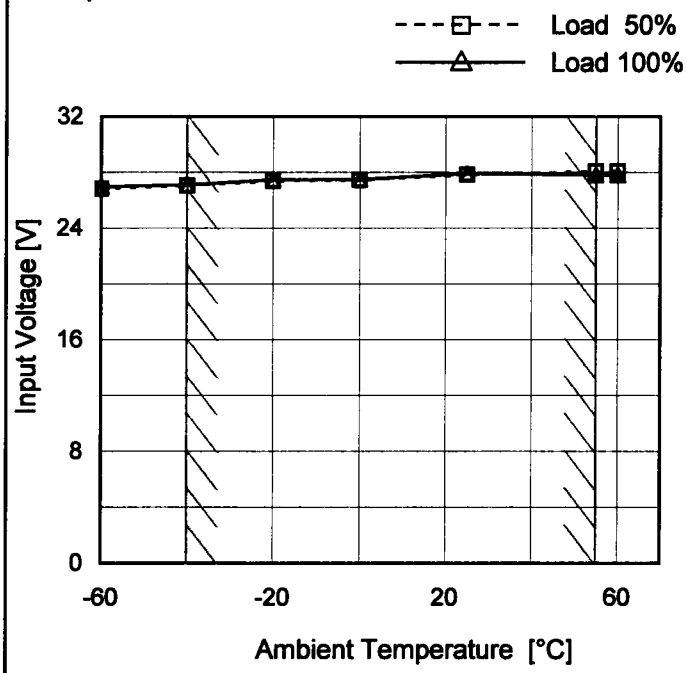


COSEL

Model	SUW104812/SUCW104812
Item	Minimum Input Voltage for Regulated Output Voltage
Object	+12V0.45A

Testing Circuitry Figure A

1.Graph

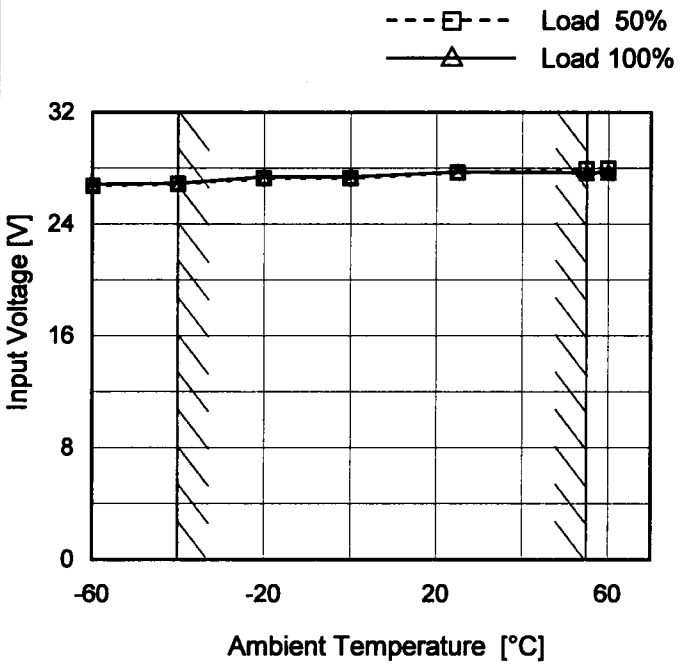


2.Values

Ambient Temperature [°C]	Input Voltage [V]	
	Load 50%	Load 100%
-60	26.9	27.0
-40	27.1	27.1
-20	27.4	27.5
0	27.5	27.5
25	27.9	27.9
55	28.1	27.9
60	28.1	27.9
–	-	-
–	-	-
–	-	-
–	-	-

Object	-12V0.45A

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	26.8	26.9
-40	26.9	27.0
-20	27.3	27.4
0	27.3	27.4
25	27.7	27.8
55	28.0	27.7
60	28.0	27.7
–	-	-
–	-	-
–	-	-
–	-	-

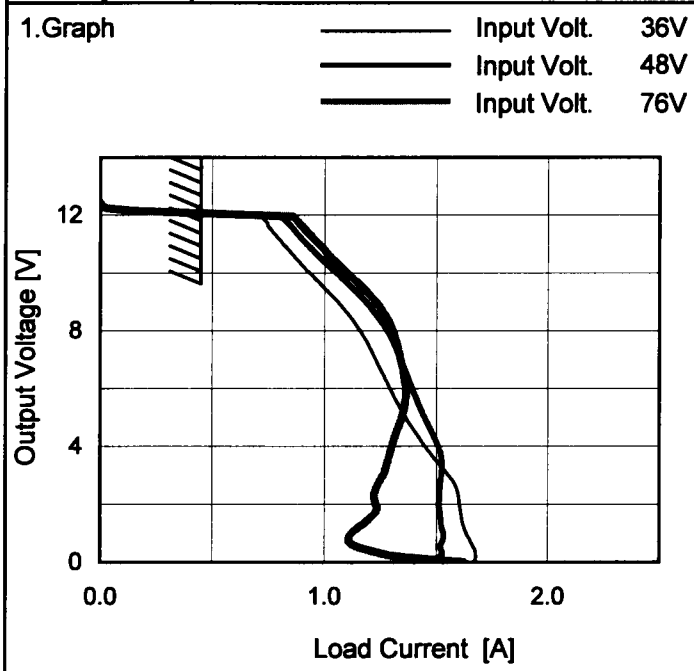
COSEL

Model	SUW104812/SUCW104812
Item	Overcurrent Protection

Temperature 25°C
Testing Circuitry Figure A

Object +12V0.45A

1.Graph

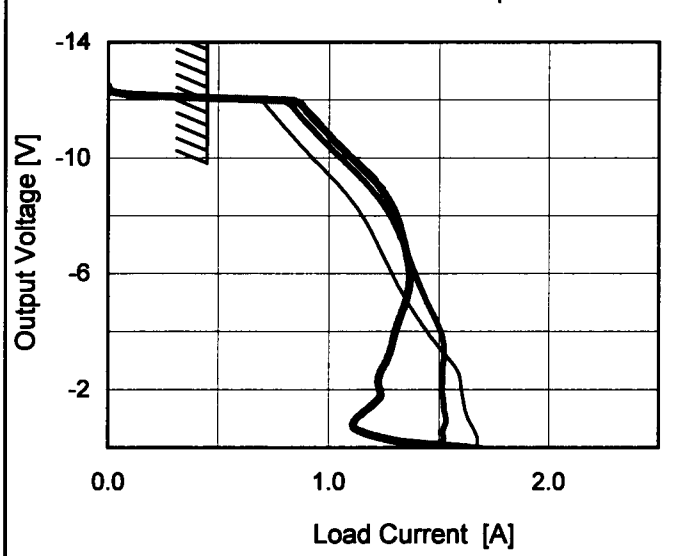


2.Values

Output Voltage [V]	Load Current [A] Input Volt. 36[V]	Input Volt. 48[V]	Input Volt. 76[V]
12.0	0.62	0.64	0.62
11.4	0.77	0.87	0.93
10.8	0.84	0.94	1.00
9.6	0.99	1.11	1.15
8.4	1.13	1.25	1.28
7.2	1.22	1.33	1.34
6.0	1.29	1.39	1.36
4.8	1.38	1.46	1.34
3.6	1.49	1.52	1.28
2.4	1.60	1.52	1.22
1.2	1.62	1.52	1.14
0.0	1.67	1.47	1.63

Object -12V0.45A

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	0.70	0.79	0.84
-11.4	0.77	0.88	0.93
-10.8	0.82	0.95	1.00
-9.6	0.98	1.10	1.15
-8.4	1.12	1.25	1.28
-7.2	1.21	1.33	1.34
-6.0	1.29	1.39	1.37
-4.8	1.38	1.46	1.34
-3.6	1.49	1.52	1.29
-2.4	1.60	1.52	1.23
-1.2	1.62	1.53	1.16
0.0	1.67	1.48	1.70

COSEL

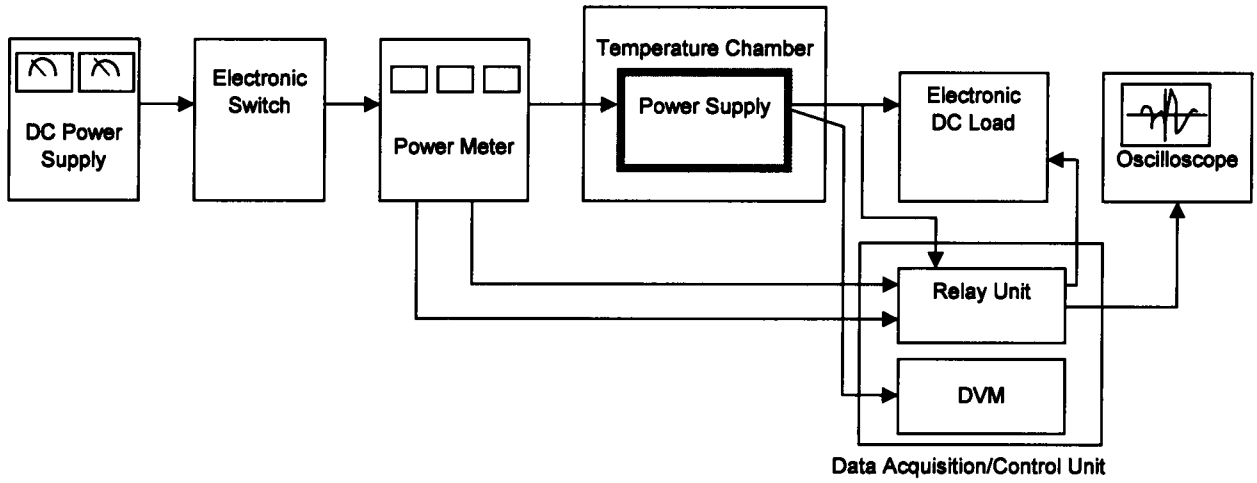


Figure A

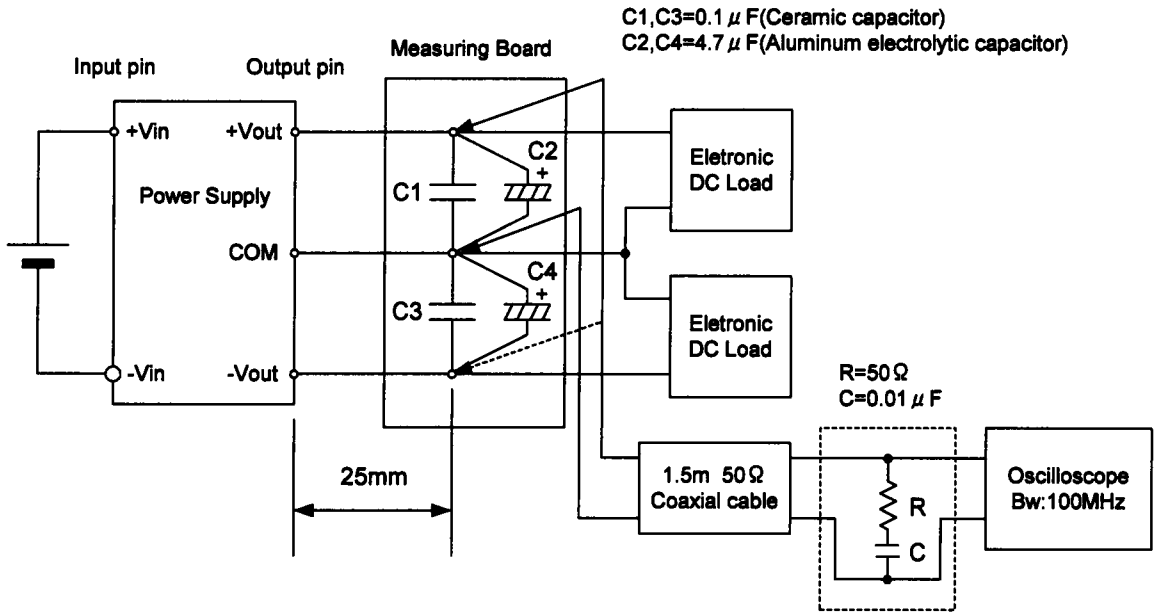


Figure B (Ripple and Ripple noise Characteristic)