COSEL

参考資料

TEST DATA OF SUCW1R54815

Regulated DC Power Supply
Sep 29, 2004

Approved by : Tetsuo Sugimori
Tetsuo Sugimori Design Manager

Prepared by : Masahiro Shima
Masahiro Shima Design Engineer

COSEL CO.,LTD.

COSEL

CONTENTS

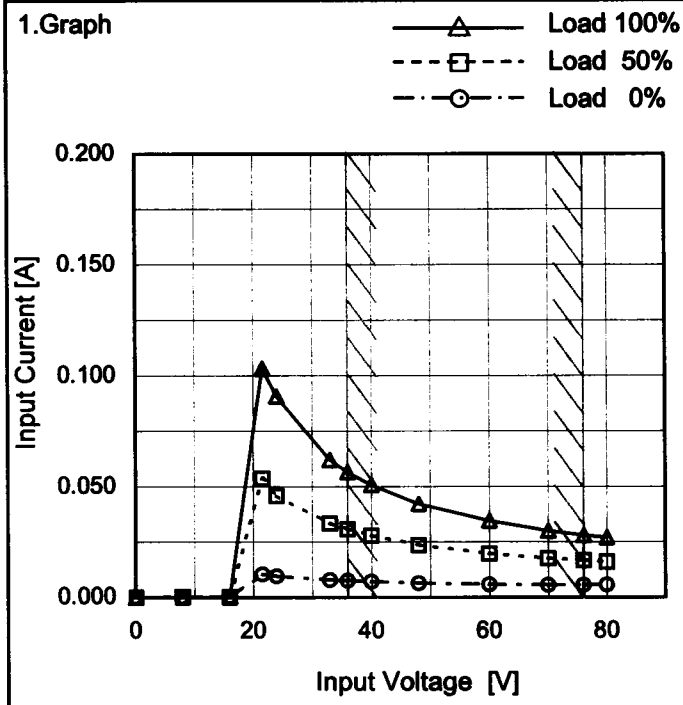
1.Input Current (by Input Voltage) 1
2.Input Current (by Load Current) 2
3.Input Power (by Load Current) 3
4.Efficiency (by Input Voltage) 4
5.Efficiency (by Load Current) 5
6.Line Regulation 6
7.Load Regulation 7
8.Dynamic Load Response 8
9.Ripple Voltage (by Load Current) 10
10.Ripple-Noise 12
11.Ripple 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	SUCW1R54815
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

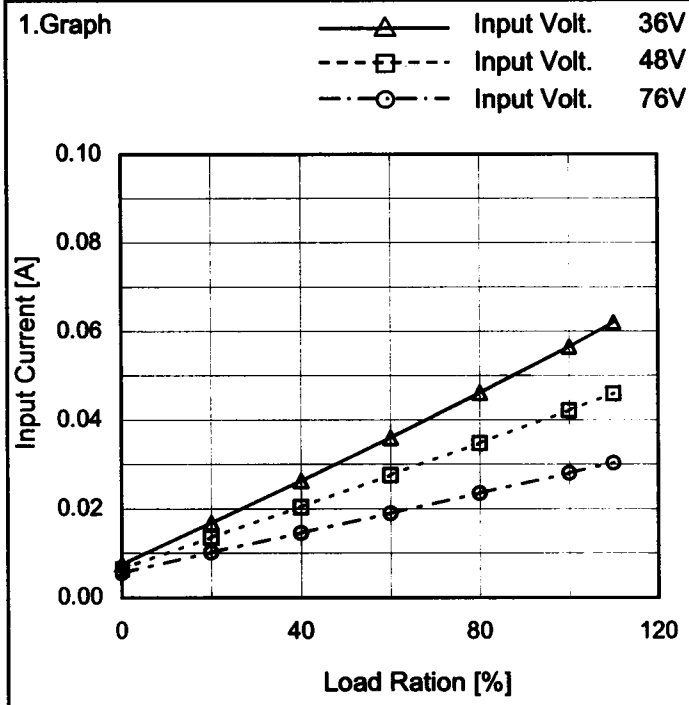
Input Voltage [V]	Input Current [A]		
	Load 0%	Load 50%	Load 100%
0	0.000	0.000	0.000
8.0	0.000	0.000	0.000
16.0	0.000	0.000	0.000
21.6	0.010	0.054	0.103
24.0	0.010	0.046	0.091
33.0	0.008	0.033	0.062
36.0	0.008	0.031	0.057
40.0	0.007	0.028	0.051
48.0	0.006	0.024	0.042
60.0	0.006	0.020	0.035
70.0	0.006	0.018	0.030
76.0	0.006	0.017	0.028
80.0	0.006	0.016	0.027
–	-	-	-
–	-	-	-
–	-	-	-

COSEL

Model	SUCW1R54815
Item	Input Current (by Load Current)
Object	———————

Temperature 25°C
Testing Circuitry Figure A

1.Graph



2.Values

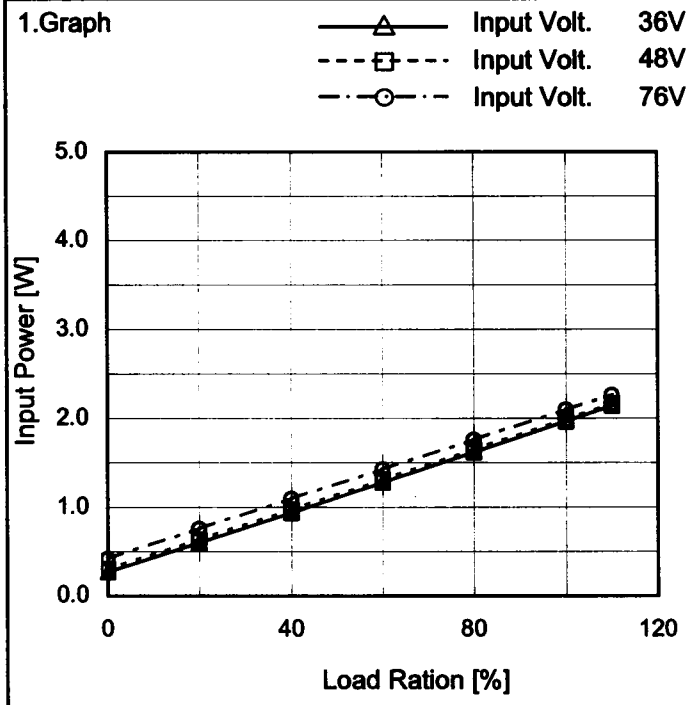
Load Ration [%]	Input Current [A]		
	Input Volt. 36[V]	Input Volt. 48[V]	Input Volt. 76[V]
0	0.008	0.006	0.006
20	0.017	0.014	0.010
40	0.026	0.020	0.015
60	0.036	0.028	0.019
80	0.046	0.035	0.024
100	0.057	0.042	0.028
110	0.062	0.046	0.030
—	-	-	-
—	-	-	-
—	-	-	-
—	-	-	-

COSEL

Model	SUCW1R54815
Item	Input Power (by Load Current)
Object	————————

Temperature 25°C
Testing Circuitry Figure A

1.Graph



2.Values

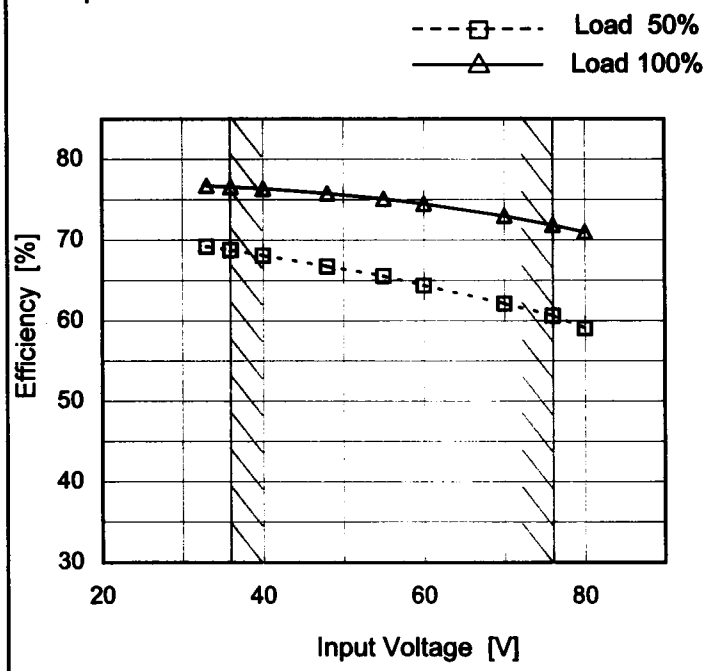
Load Ration [%]	Input Power [W]		
	Input Volt. 36[V]	Input Volt. 48[V]	Input Volt. 76[V]
0	0.27	0.30	0.42
20	0.60	0.64	0.76
40	0.94	0.97	1.09
60	1.28	1.31	1.43
80	1.62	1.65	1.76
100	1.97	1.99	2.10
110	2.15	2.16	2.26
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

COSEL

Model	SUCW1R54815
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

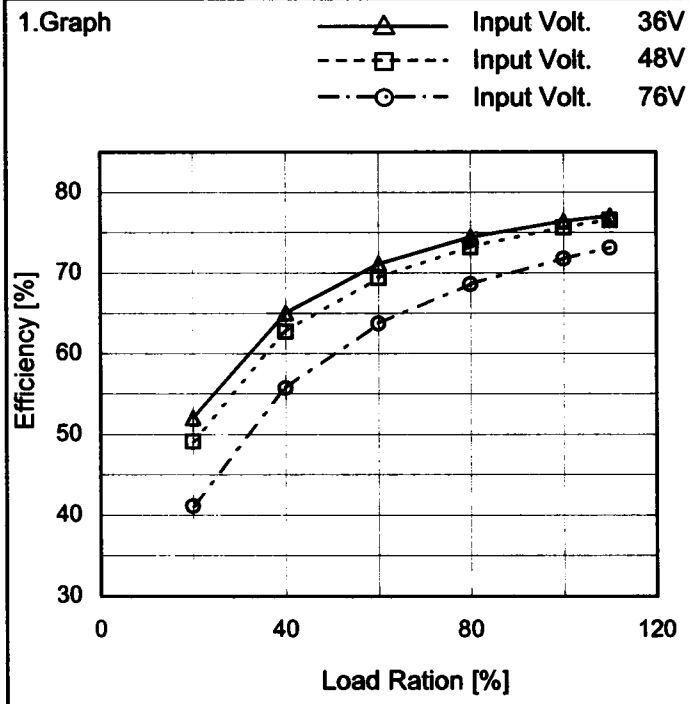
Input Voltage [V]	Efficiency [%]	
	Load 50%	Load 100%
33	69.2	76.7
36	68.7	76.6
40	68.1	76.4
48	66.7	75.8
55	65.6	75.1
60	64.4	74.5
70	62.1	73.0
76	60.6	71.9
80	59.1	71.0

COSEL

Model	SUCW1R54815
Item	Efficiency (by Load Current)
Object	————————

Temperature 25°C
Testing Circuitry Figure A

1.Graph



2.Values

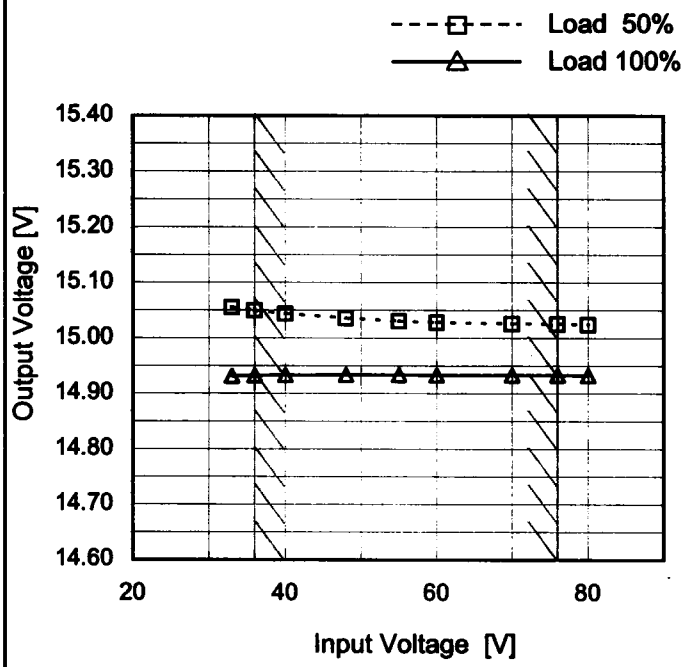
Load Ration [%]	Efficiency [%] Input Volt. 36[V]	Input Volt. 48[V]	Input Volt. 76[V]
0	-	-	-
20	52.0	49.2	41.1
40	65.0	62.8	55.7
60	71.1	69.4	63.7
80	74.5	73.2	68.6
100	76.4	75.7	71.7
110	77.1	76.5	73.1
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

COSEL

Model	SUCW1R54815
Item	Line Regulation
Object	+15V0.05A

Temperature 25°C
Testing Circuitry Figure A

1.Graph

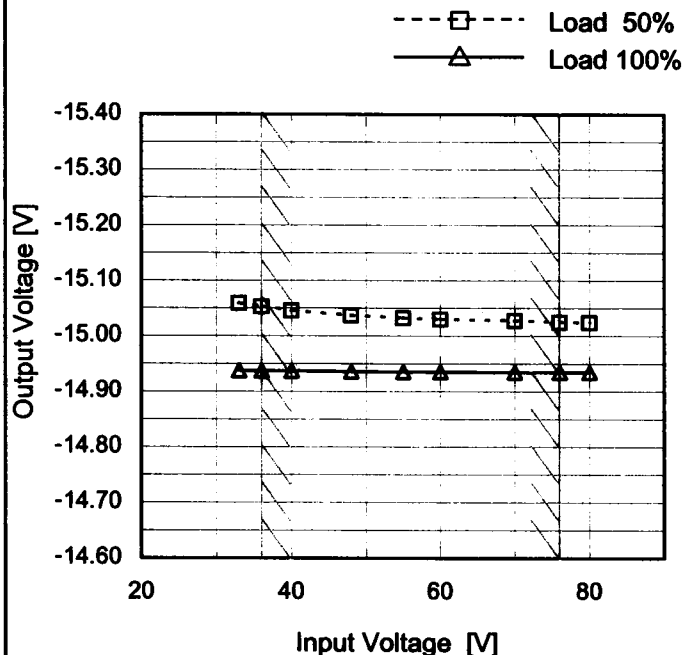


2.Values

Input Voltage [V]	Output Voltage [V]	
	Load 50%	Load 100%
33	15.055	14.932
36	15.050	14.933
40	15.044	14.933
48	15.035	14.934
55	15.031	14.934
60	15.028	14.934
70	15.026	14.934
76	15.025	14.933
80	15.024	14.933

Object	-15V0.05A

1.Graph



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

2.Values

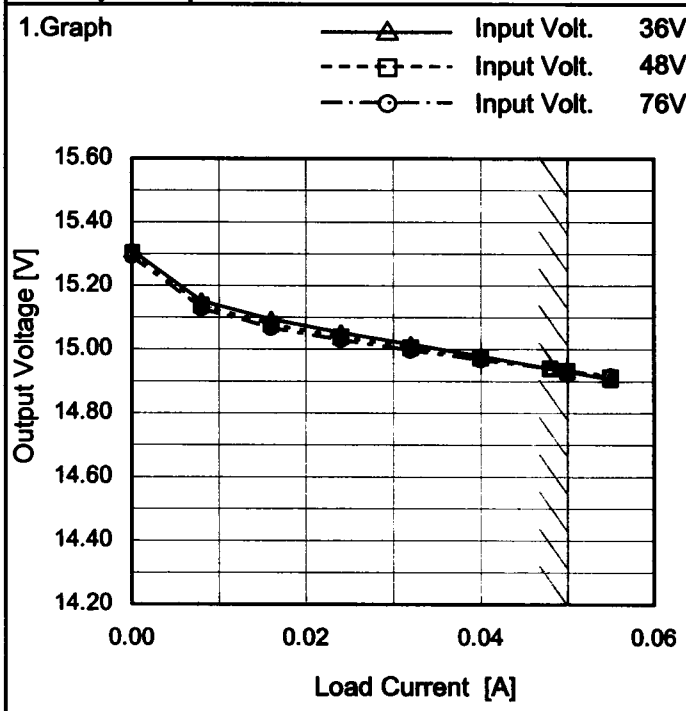
Input Voltage [V]	Output Voltage [V]	
	Load 50%	Load 100%
33	-15.059	-14.938
36	-15.053	-14.937
40	-15.046	-14.937
48	-15.037	-14.936
55	-15.032	-14.935
60	-15.030	-14.935
70	-15.028	-14.935
76	-15.025	-14.935
80	-15.024	-14.935

COSEL

Model	SUCW1R54815
Item	Load Regulation
Object	+15V0.05A

Temperature 25°C
Testing Circuitry Figure A

1.Graph

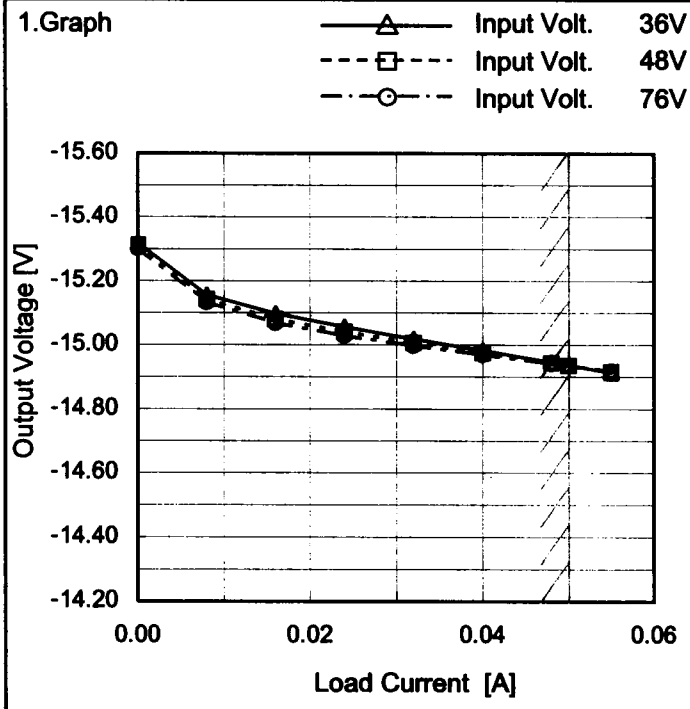


2.Values

Load Current [A]	Output Voltage [V] Input Volt. 36[V]	Input Volt. 48[V]	Input Volt. 76[V]
0.000	15.311	15.304	15.292
0.008	15.153	15.139	15.128
0.016	15.095	15.078	15.067
0.024	15.054	15.039	15.029
0.032	15.016	15.005	14.996
0.040	14.979	14.973	14.967
0.048	14.941	14.941	14.940
0.050	14.932	14.933	14.934
0.055	14.908	14.914	14.917
--	-	-	-
--	-	-	-

Object	-15V0.05A

1.Graph



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

2.Values

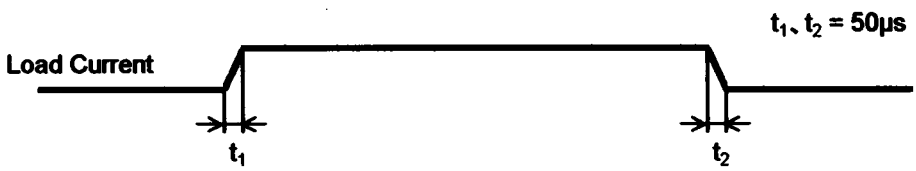
Load Current [A]	Output Voltage [V] Input Volt. 36[V]	Input Volt. 48[V]	Input Volt. 76[V]
0.000	-15.319	-15.313	-15.302
0.008	-15.156	-15.142	-15.132
0.016	-15.098	-15.080	-15.068
0.024	-15.057	-15.041	-15.029
0.032	-15.019	-15.007	-14.998
0.040	-14.984	-14.975	-14.969
0.048	-14.947	-14.944	-14.942
0.050	-14.938	-14.936	-14.935
0.055	-14.914	-14.917	-14.919
--	-	-	-
--	-	-	-

COSEL

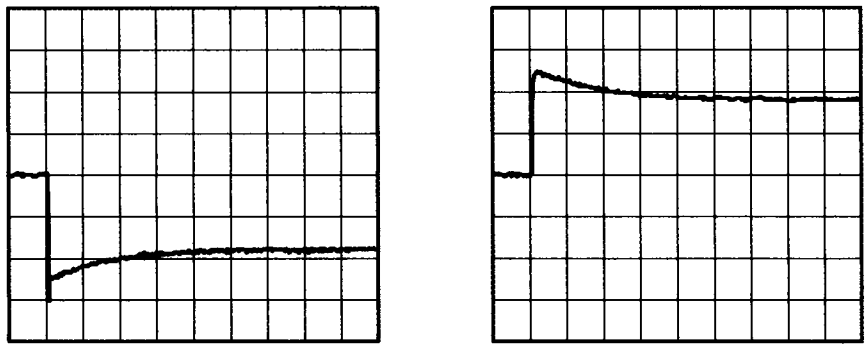
Model	SUCW1R54815
Item	Dynamic Load Response
Object	+15V0.05A

Temperature 25°C
Testing Circuitry Figure A

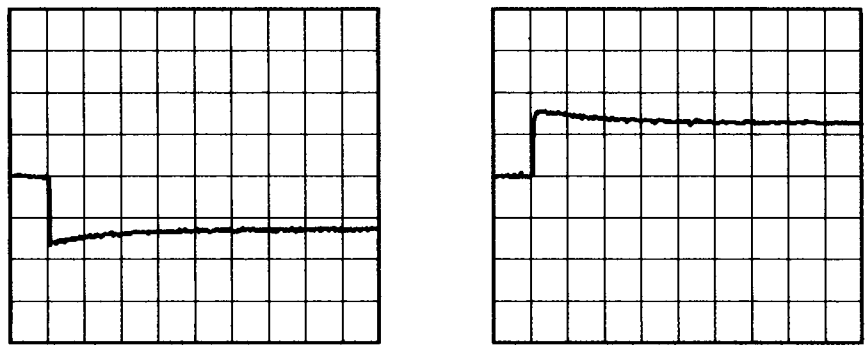
Input Volt. 48 V
Cycle 100 mS



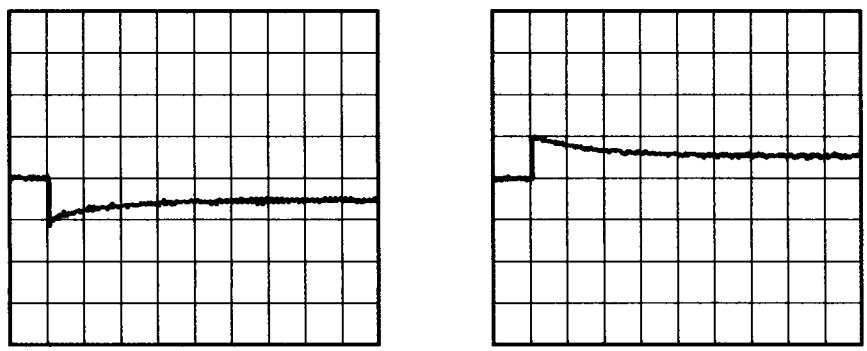
Min. Load (0A) ⟷
Load 100% (0.05A)



Min. Load (0A) ⟷
Load 50% (0.025A)



Load 50% (0.025A) ⟷
Load 100% (0.05A)

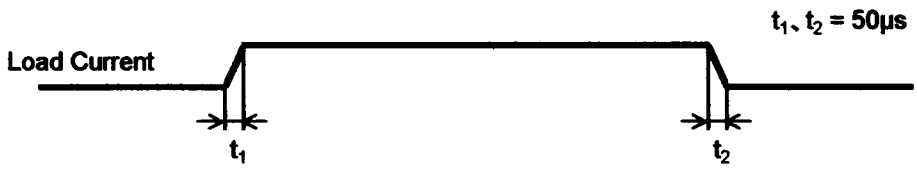


COSEL

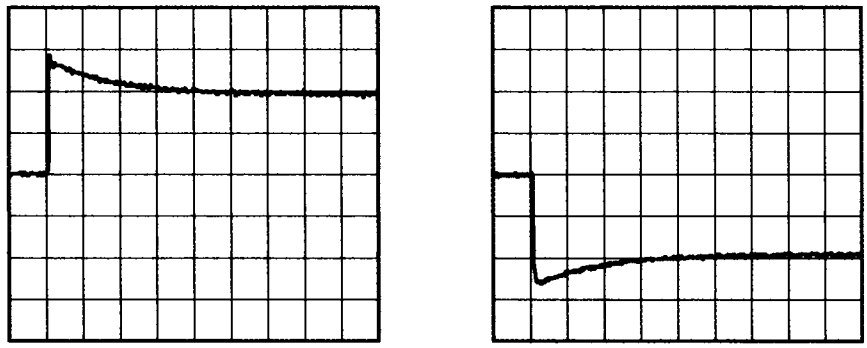
Model	SUCW1R54815
Item	Dynamic Load Response
Object	-15V0.05A

Temperature 25°C
Testing Circuitry Figure A

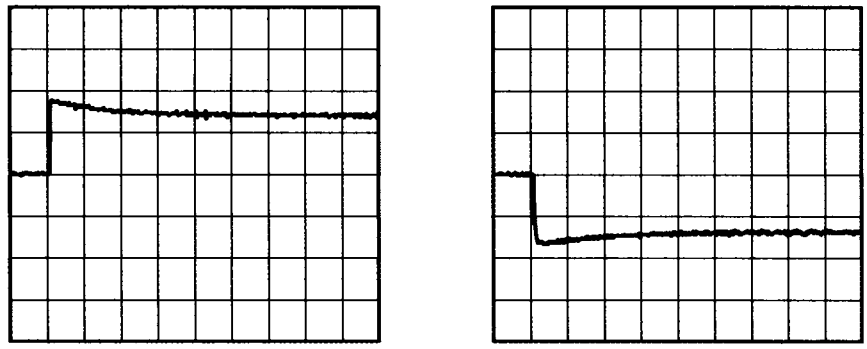
Input Volt. 48 V
Cycle 100 mS



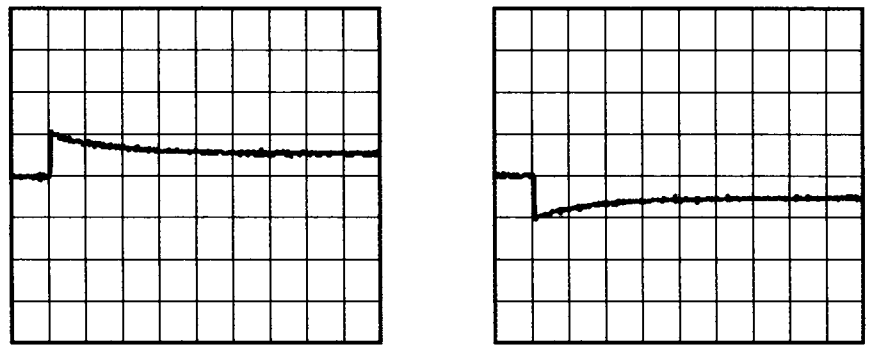
Min. Load (0A) ⟷ Load 100% (0.05A)



Min. Load (0A) ⟷ Load 50% (0.025A)



Load 50% (0.025A) ⟷ Load 100% (0.05A)

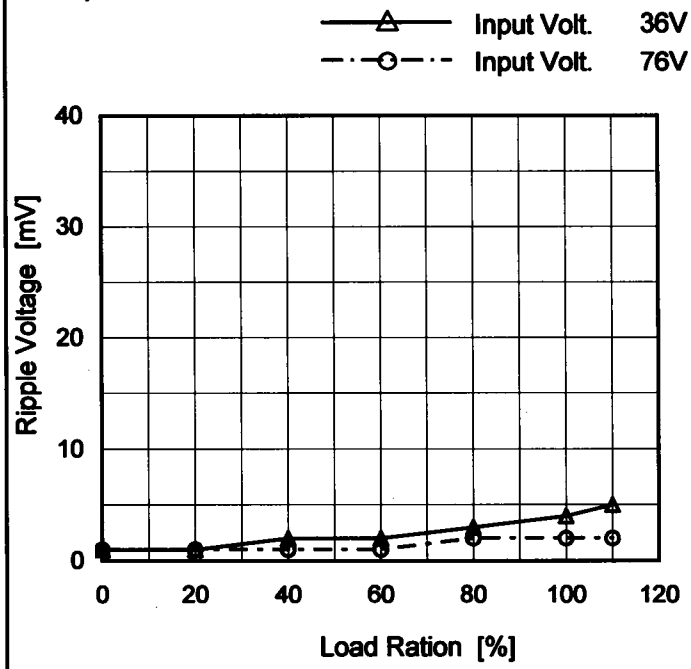


COSEL

Model	SUCW1R54815
Item	Ripple Voltage (by Load Current)
Object	+15V0.05A

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.

2.Values

Load Ration [%]	Ripple Voltage [mV]	
	Input Volt. 36 [V]	Input Volt. 76 [V]
0	1	1
20	1	1
40	2	1
60	2	1
80	3	2
100	4	2
110	5	2
--	-	-
--	-	-
--	-	-
--	-	-

Ripple [mVp-p]

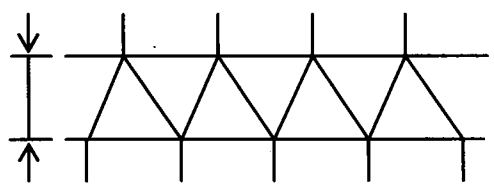


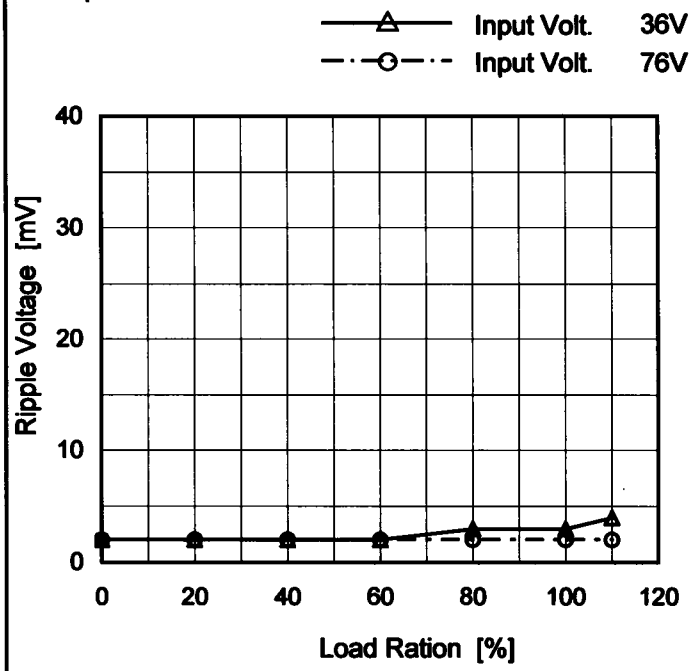
Fig.Complex Ripple Wave Form

COSEL

Model	SUCW1R54815
Item	Ripple Voltage (by Load Current)
Object	-15V0.05A

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.

2.Values

Load Ration [%]	Ripple Voltage [mV]	
	Input Volt. 36 [V]	Input Volt. 76 [V]
0	2	2
20	2	2
40	2	2
60	2	2
80	3	2
100	3	2
110	4	2
--	-	-
--	-	-
--	-	-
--	-	-

Ripple [mVp-p]

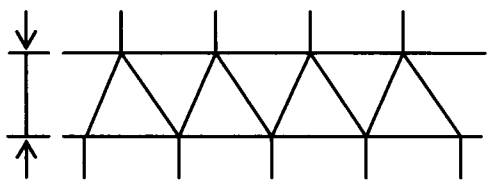


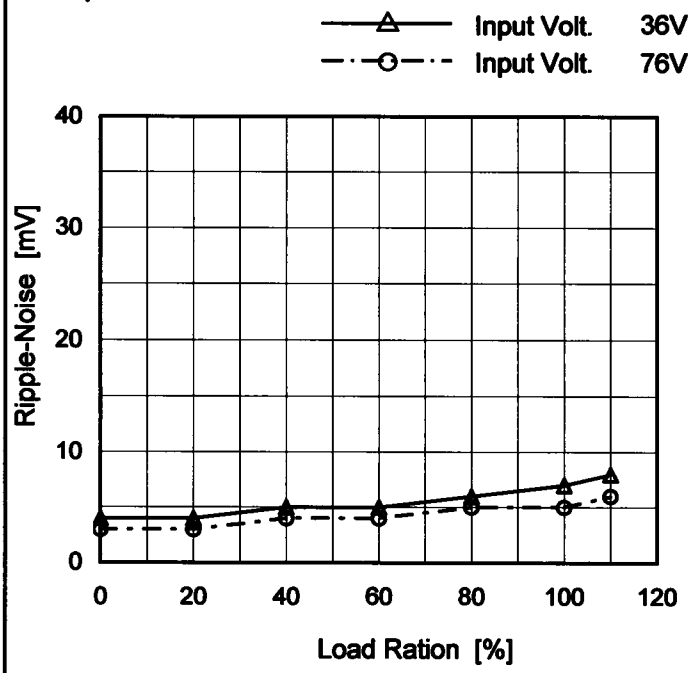
Fig.Complex Ripple Wave Form

COSEL

Model	SUCW1R54815
Item	Ripple-Noise
Object	+15V0.05A

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.

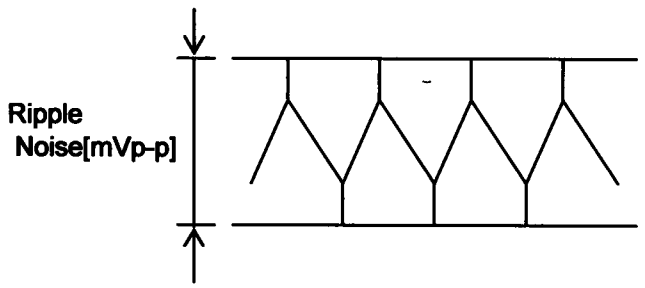


Fig.Complex Ripple Noise Wave Form

2.Values

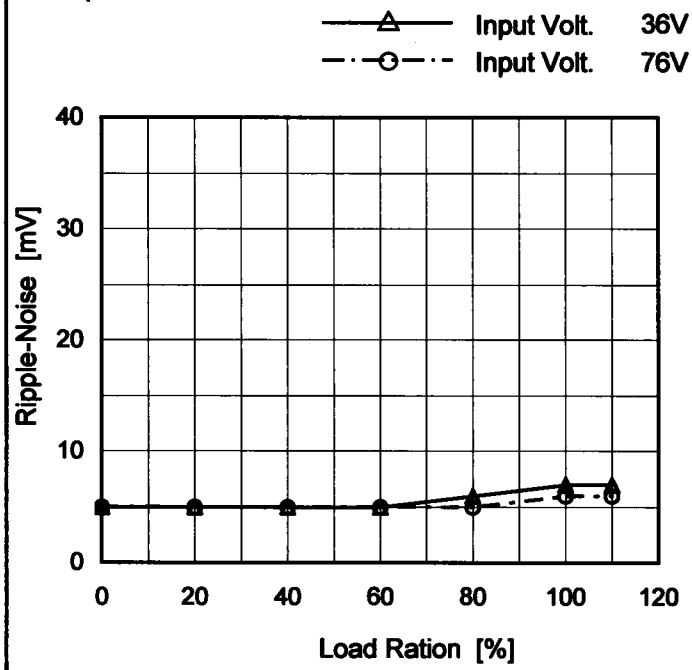
Load Ration [%]	Ripple-Noise [mV] Input Volt. 36 [V]	Ripple-Noise [mV] Input Volt. 76 [V]
0	4	3
20	4	3
40	5	4
60	5	4
80	6	5
100	7	5
110	8	6
–	-	-
–	-	-
–	-	-
–	-	-

COSEL

Model	SUCW1R54815
Item	Ripple-Noise
Object	-15V0.05A

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.

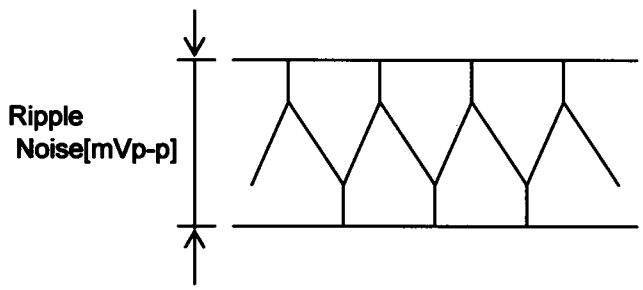


Fig.Complex Ripple Noise Wave Form

2.Values

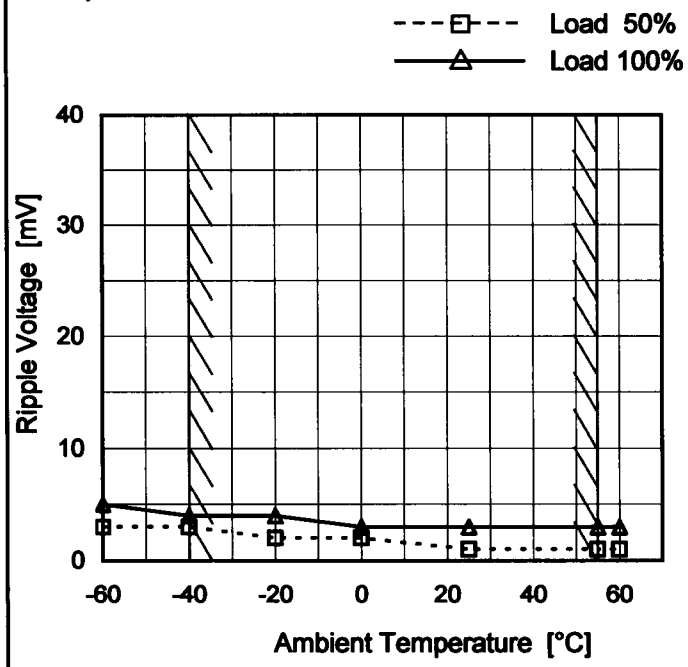
Load Ration [%]	Ripple-Noise [mV]	
	Input Volt. 36 [V]	Input Volt. 76 [V]
0	5	5
20	5	5
40	5	5
60	5	5
80	6	5
100	7	6
110	7	6
–	-	-
–	-	-
–	-	-
–	-	-

COSEL

Model	SUCW1R54815
Item	Ripple Voltage (by Ambient Temp.)
Object	+15V0.05A

Testing Circuitry Figure B

1.Graph



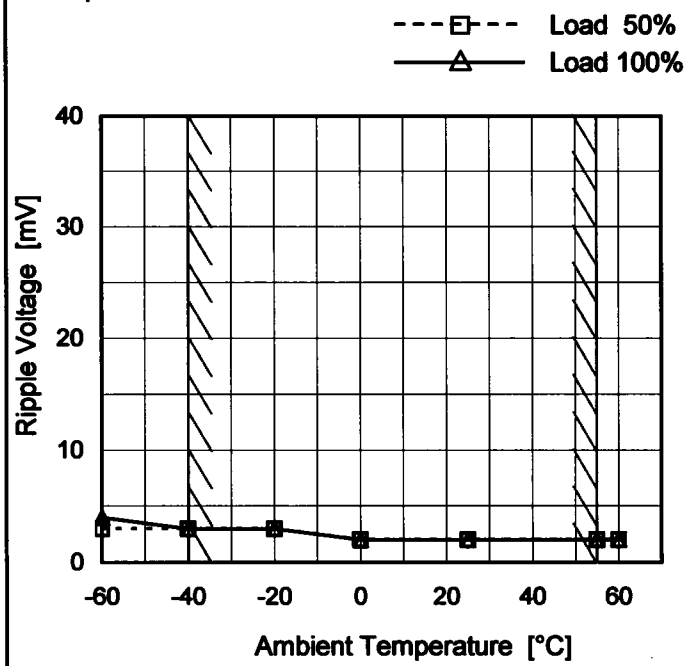
Input Volt. 48V

2.Values

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

Object	-15V0.05A

1.Graph



Input Volt. 48V

Measured by 100 MHz Oscilloscope.

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

2.Values

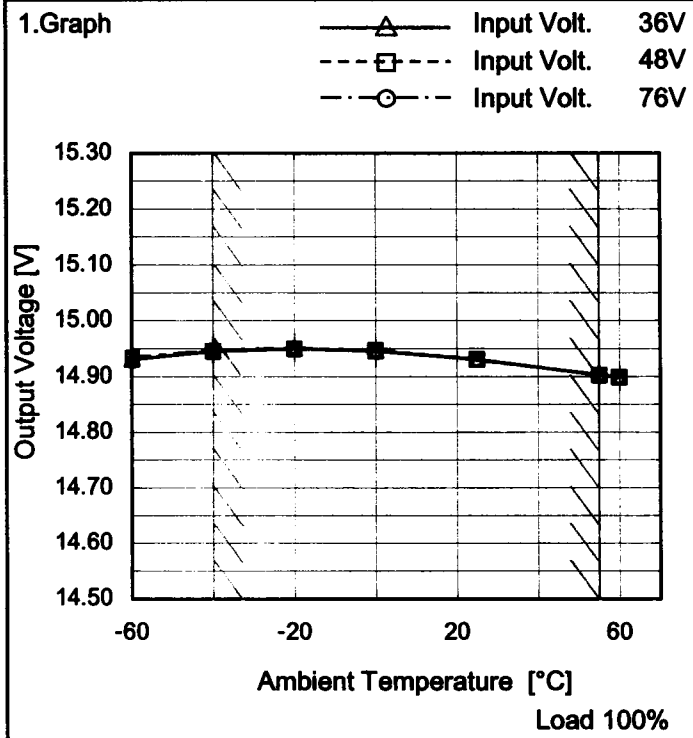
Ambient Temperature [°C]	Ripple Voltage [mV]	
	Load 50%	Load 100%
-60	3	4
-40	3	3
-20	3	3
0	2	2
25	2	2
55	2	2
60	2	2
–	-	-
–	-	-
–	-	-
–	-	-

COSEL

Model	SUCW1R54815
Item	Ambient Temperature Drift
Object	+15V0.05A

Testing Circuitry Figure A

1.Graph



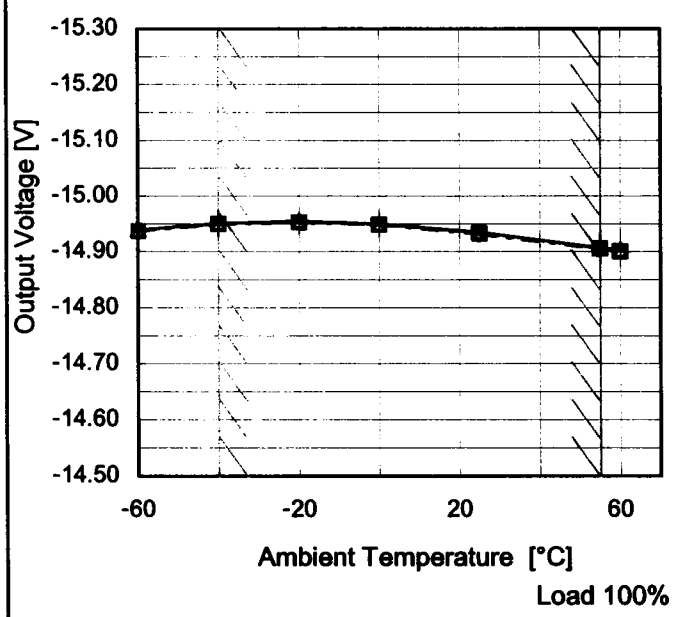
Load 100%

2.Values

Ambient Temperature [°C]	Output Voltage [V] Input Volt. 36[V]	Input Volt. 48[V]	Input Volt. 76[V]
-60	14.931	14.933	14.934
-40	14.945	14.946	14.947
-20	14.950	14.950	14.951
0	14.946	14.947	14.946
25	14.931	14.931	14.930
55	14.903	14.903	14.903
60	14.899	14.899	14.899
—	-	-	-
—	-	-	-
—	-	-	-
—	-	-	-

Object -15V0.05A

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	-14.939	-14.937	-14.936
-40	-14.951	-14.950	-14.949
-20	-14.955	-14.953	-14.952
0	-14.950	-14.949	-14.948
25	-14.935	-14.933	-14.931
55	-14.907	-14.906	-14.904
60	-14.903	-14.901	-14.900
—	-	-	-
—	-	-	-
—	-	-	-
—	-	-	-

COSEL

Model	SUCW1R54815	
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 - 0.05A (AVR 2) : 0 - 0.05A

* 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	+15V0.05A					
Item	Temperature [°C]	Input Voltage[V]	Output		Output Voltage Accuracy	
			Current[A]	Voltage[V]	Value [mV]	Ration [%]
Maximum Voltage	0	36	0	15.310	±204	±1.4
Minimum Voltage	55	76	0.05	14.903		

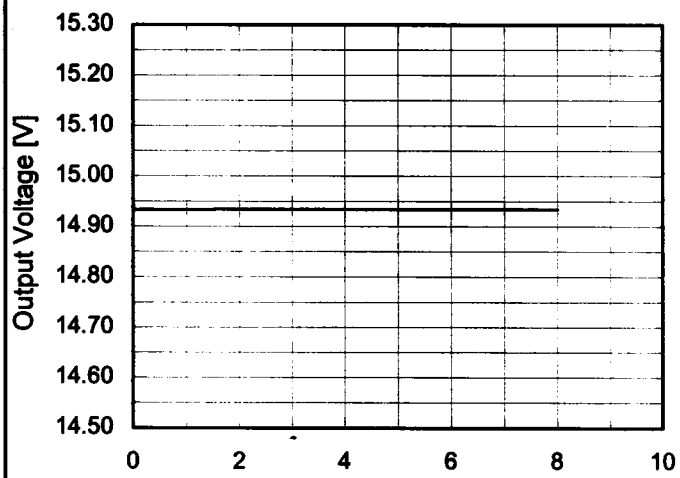
Object	-15V0.05A					
Item	Temperature [°C]	Input Voltage[V]	Output		Output Voltage Accuracy	
			Current[A]	Voltage[V]	Value [mV]	Ration [%]
Maximum Voltage	0	36	0	-15.318	±207	±1.4
Minimum Voltage	55	76	0.05	-14.904		

COSEL

Model	SUCW1R54815
Item	Time Lapse Drift
Object	+15V0.05A

Temperature 25°C
Testing Circuitry Figure A

1.Graph



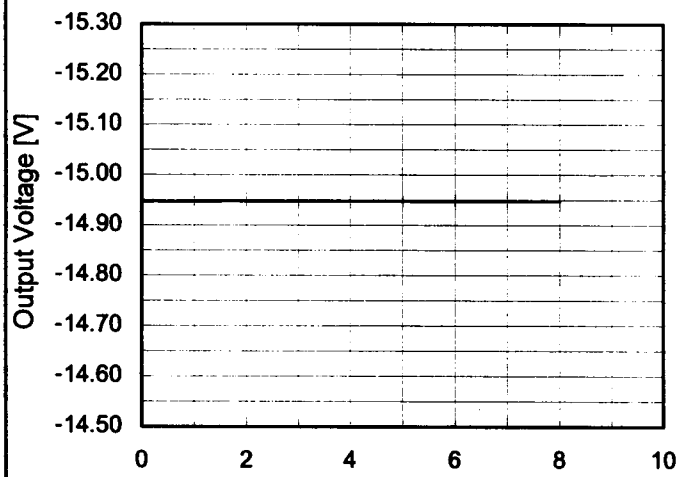
Input Volt. 48V
Load 100%

2.Values

Time since start [H]	Output Voltage [V]
0.0	14.942
0.5	14.933
1.0	14.934
2.0	14.934
3.0	14.934
4.0	14.934
5.0	14.934
6.0	14.934
7.0	14.934
8.0	14.934

Object	-15V0.05A

1.Graph



Input Volt. 48V
Load 100%

2.Values

Time since start [H]	Output Voltage [V]
0.0	-14.955
0.5	-14.947
1.0	-14.948
2.0	-14.948
3.0	-14.948
4.0	-14.948
5.0	-14.948
6.0	-14.948
7.0	-14.948
8.0	-14.948

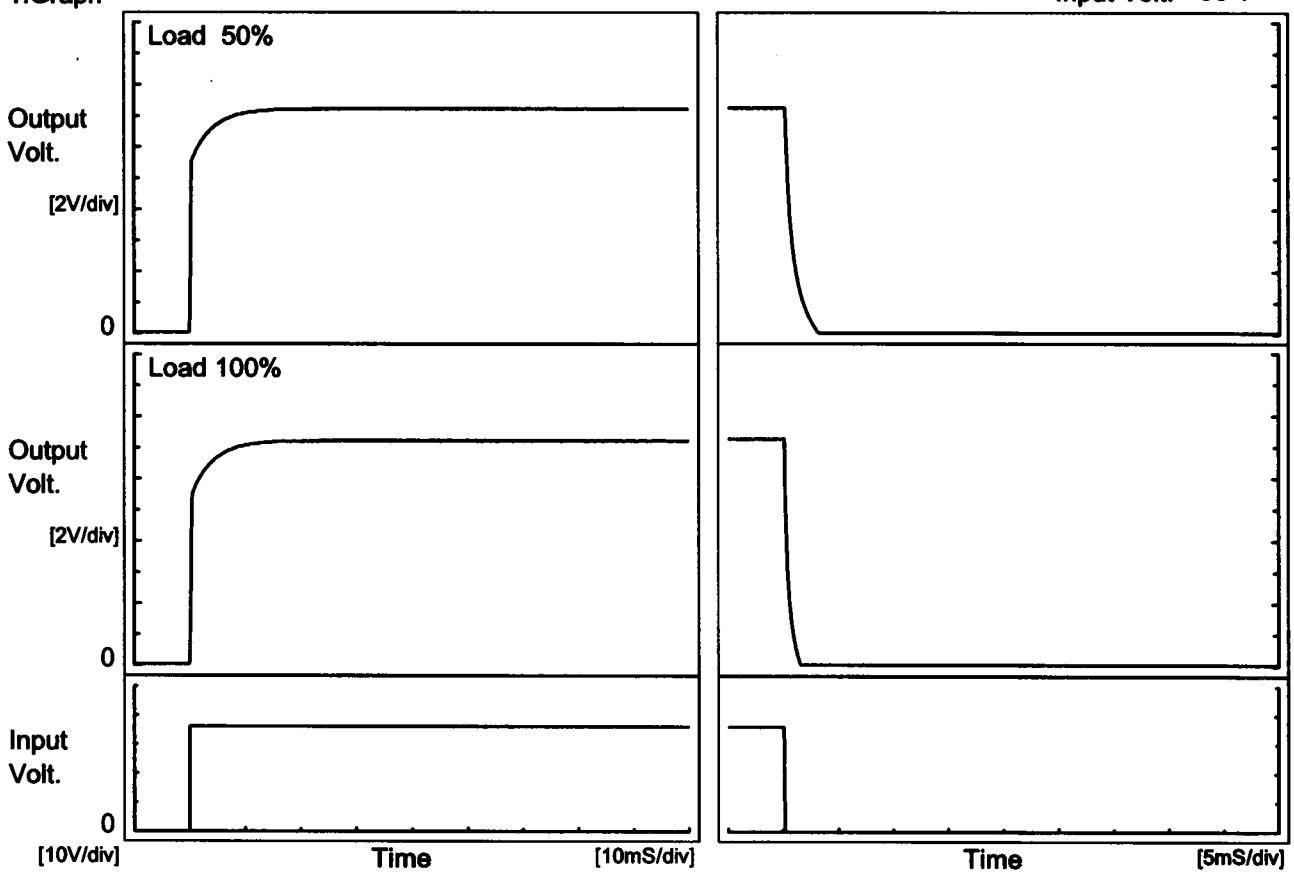
COSEL

Model	SUCW1R54815
Item	Rise and Fall Time
Object	+15V0.05A

Temperature 25°C
Testing Circuitry Figure A

1.Graph

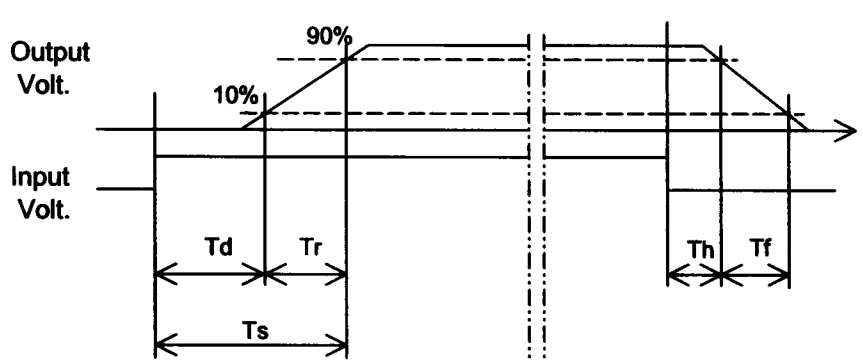
Input Volt. 36 V



2.Values

[mS]

Load \ Time	Td	Tr	Ts	Th	Tf
50 %	0.1	5.6	5.7	0.2	1.8
100 %	0.1	5.8	5.9	0.1	0.9

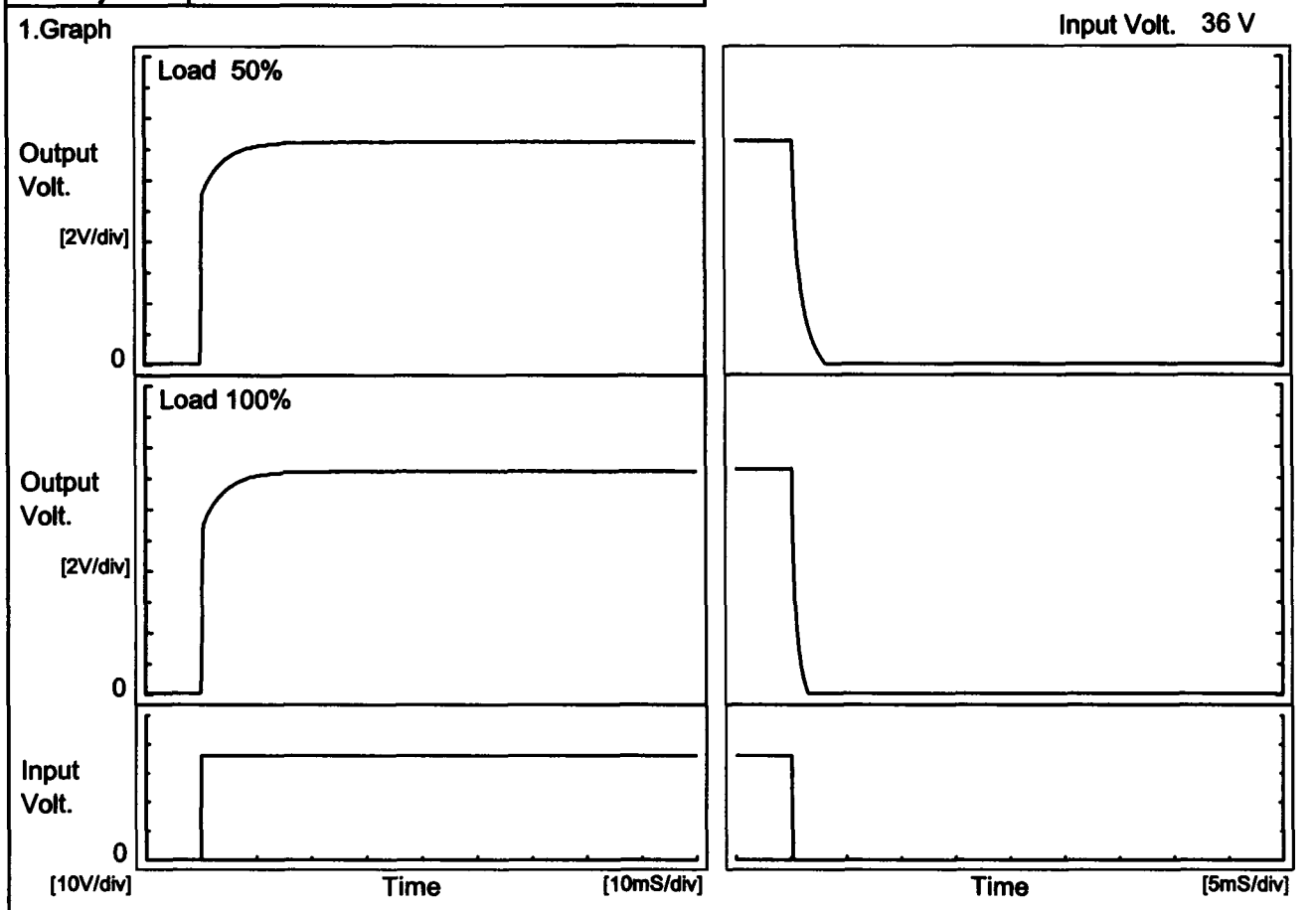


COSEL

Model	SUCW1R54815
Item	Rise and Fall Time
Object	-15V0.05A

Temperature 25°C
Testing Circuitry Figure A

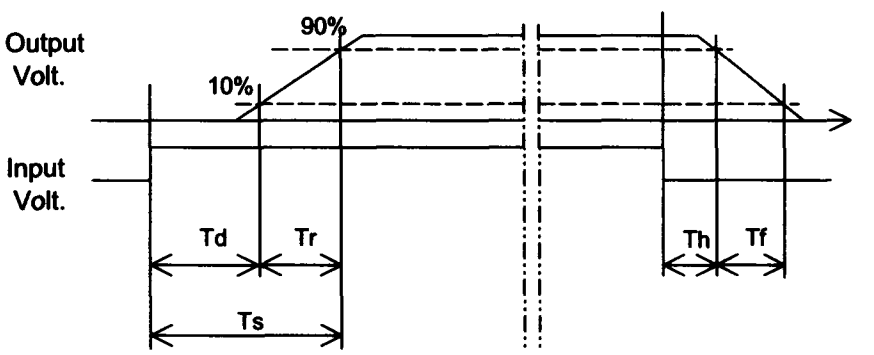
1.Graph



2.Values

[mS]

Load \ Time	Td	Tr	Ts	Th	Tf
50 %	0.1	5.6	5.7	0.2	1.8
100 %	0.1	5.8	5.9	0.1	0.9

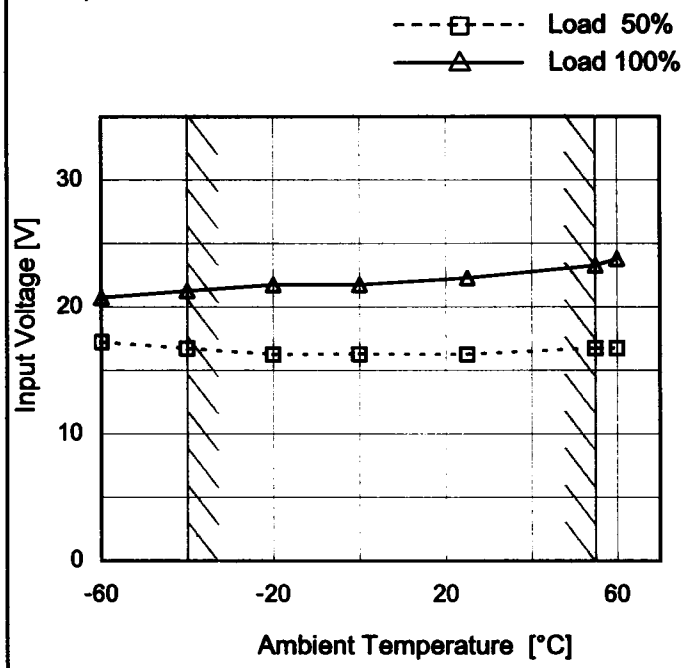


COSEL

Model	SUCW1R54815
Item	Minimum Input Voltage for Regulated Output Voltage
Object	+15V0.05A

Testing Circuitry Figure A

1.Graph

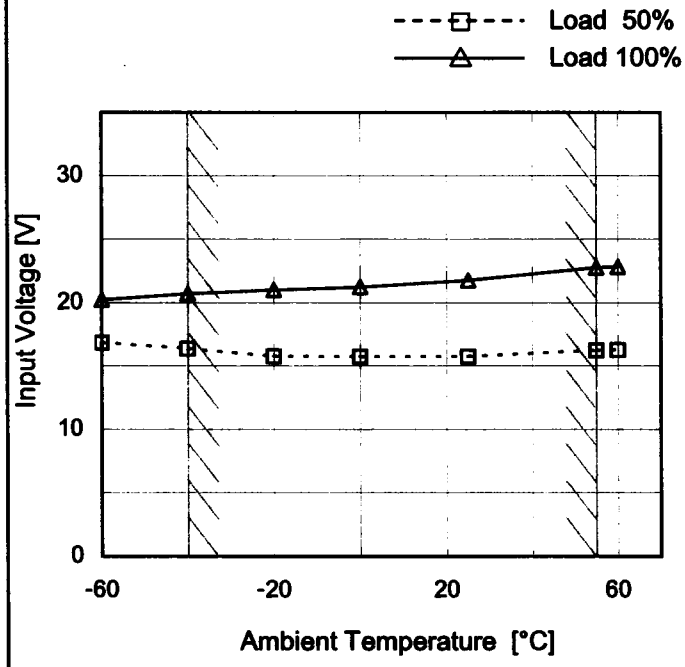


2.Values

Ambient Temperature [°C]	Input Voltage [V]	
	Load 50%	Load 100%
-60	17.3	20.8
-40	16.8	21.3
-20	16.3	21.8
0	16.3	21.8
25	16.3	22.3
55	16.8	23.3
60	16.8	23.8
--	-	-
--	-	-
--	-	-
--	-	-

Object	-15V0.05A

1.Graph



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

2.Values

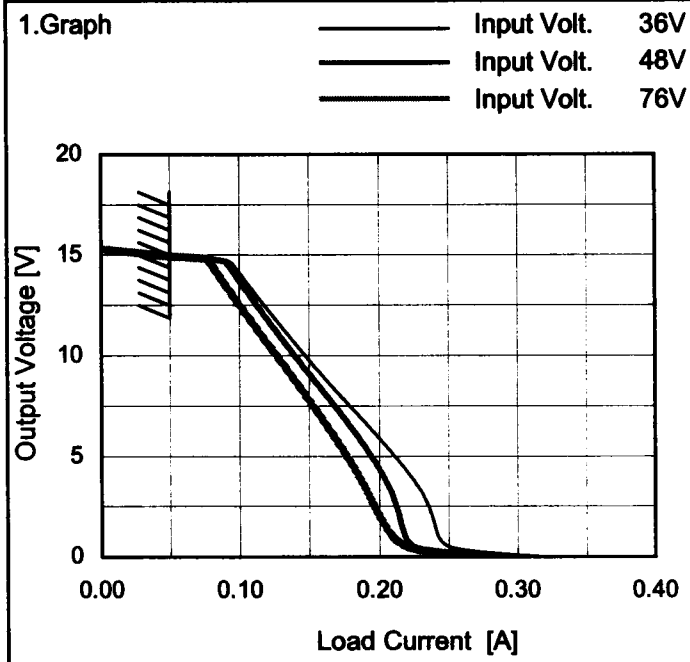
Ambient Temperature [°C]	Input Voltage [V]	
	Load 50%	Load 100%
-60	16.9	20.3
-40	16.4	20.8
-20	15.8	21.1
0	15.8	21.3
25	15.8	21.8
55	16.3	22.8
60	16.3	22.9
--	-	-
--	-	-
--	-	-
--	-	-

COSEL

Model	SUCW1R54815
Item	Overcurrent Protection
Object	+15V0.05A

Temperature 25°C
Testing Circuitry Figure A

1.Graph

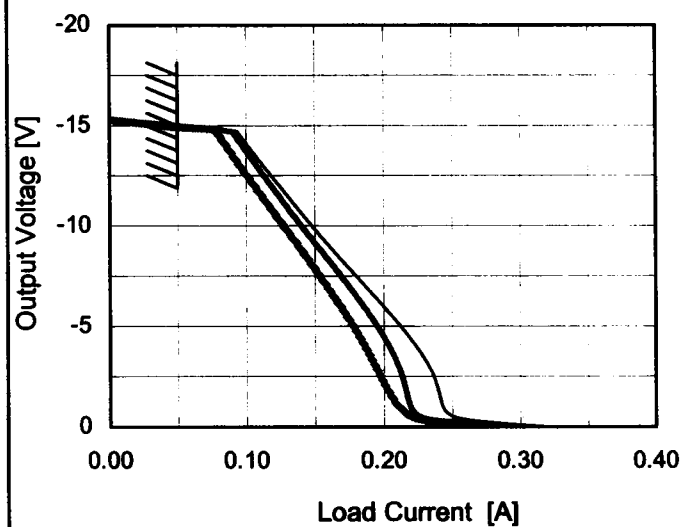


2.Values

Output Voltage [V]	Load Current [A]		
	Input Volt. 36[V]	Input Volt. 48[V]	Input Volt. 76[V]
15.0	0.05	0.05	0.05
14.3	0.10	0.09	0.08
13.5	0.11	0.10	0.09
12.0	0.12	0.12	0.10
10.5	0.14	0.13	0.12
9.0	0.16	0.15	0.14
7.5	0.18	0.17	0.15
6.0	0.20	0.18	0.17
4.5	0.22	0.20	0.18
3.0	0.23	0.21	0.19
1.5	0.24	0.22	0.20
0.0	0.32	0.29	0.28

Object	-15V0.05A

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]
-15.00	0.05	0.05	0.05
-14.25	0.10	0.09	0.08
-13.50	0.11	0.10	0.09
-12.00	0.12	0.12	0.11
-10.50	0.14	0.13	0.12
-9.00	0.16	0.15	0.14
-7.50	0.18	0.17	0.15
-6.00	0.20	0.19	0.17
-4.50	0.22	0.20	0.18
-3.00	0.23	0.21	0.19
-1.50	0.24	0.22	0.21
0.00	0.32	0.29	0.28

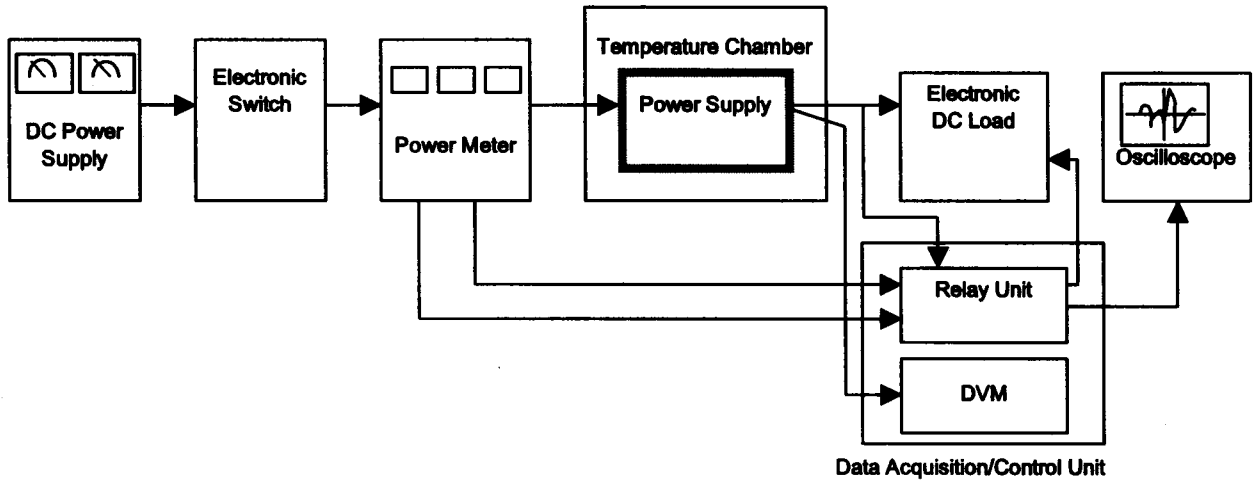


Figure A

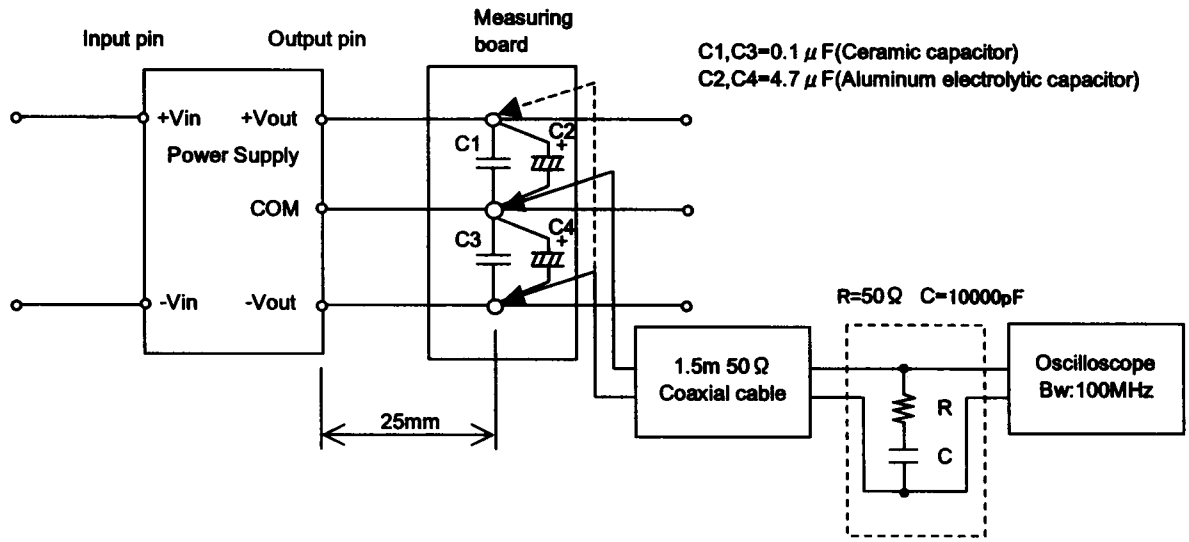


Figure B (Ripple and Ripple noise Characteristic)