COSEL

参考資料

TEST DATA OF MGW304805

Regulated DC Power Supply
November 18, 2010

Approved by : Kazunari Asano
Kazunari Asano Design Manager

Prepared by : Sho Saito
Sho Saito Design Engineer

COSEL CO.,LTD.

COSEL

CONTENTS

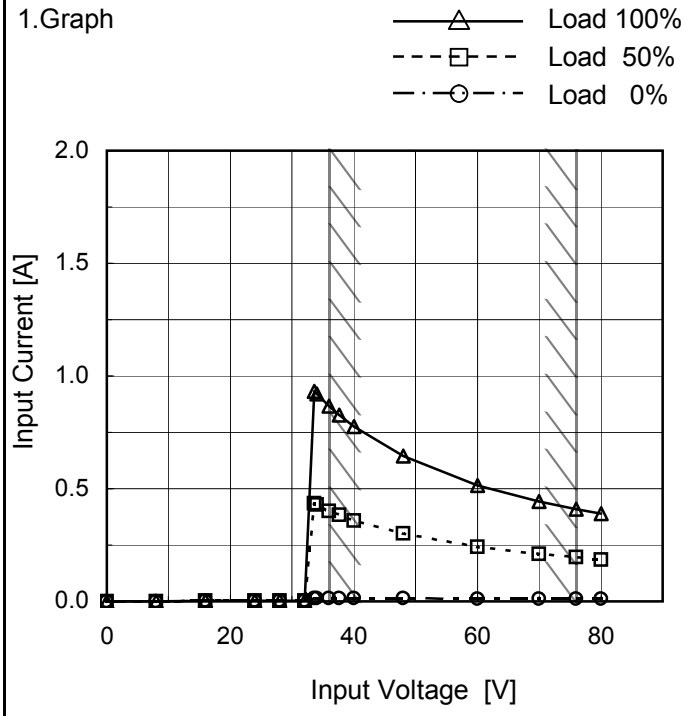
1.Input Current (by Input Voltage) ・・・・・・・・・・・・・・・・・・・・・・・・ 1
2.Input Current (by Load Current) ・・・・・・・・・・・・・・・・・・・・・・ 2
3.Input Power (by Load Current) ・・・・・・・・・・・・・・・・・・・・・・・ 3
4.Efficiency (by Input Voltage) ・・・・・・・・・・・・・・・・・・・・・・・ 4
5.Efficiency (by Load Current) ・・・・・・・・・・・・・・・・・・・・・・・・ 5
6.Line 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.Overvoltage Protection ・・・・・・・・・・・・・・・・・・・・・・・・・・ 22
19.Figure of Testing Circuitry ・・・・・・・・・・・・・・・・・・・・・・・・ 23
(Final Page 23)

COSEL

Model	MGW304805
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	0.002	0.002	0.002
24.0	0.002	0.002	0.002
28.0	0.002	0.002	0.002
32.0	0.002	0.002	0.002
33.6	0.014	0.435	0.933
34.0	0.014	0.429	0.921
36.0	0.014	0.401	0.867
37.6	0.014	0.382	0.827
40.0	0.014	0.358	0.775
48.0	0.013	0.301	0.644
60.0	0.012	0.243	0.515
70.0	0.012	0.210	0.444
76.0	0.012	0.195	0.409
80.0	0.012	0.186	0.390
--	-	-	-
--	-	-	-

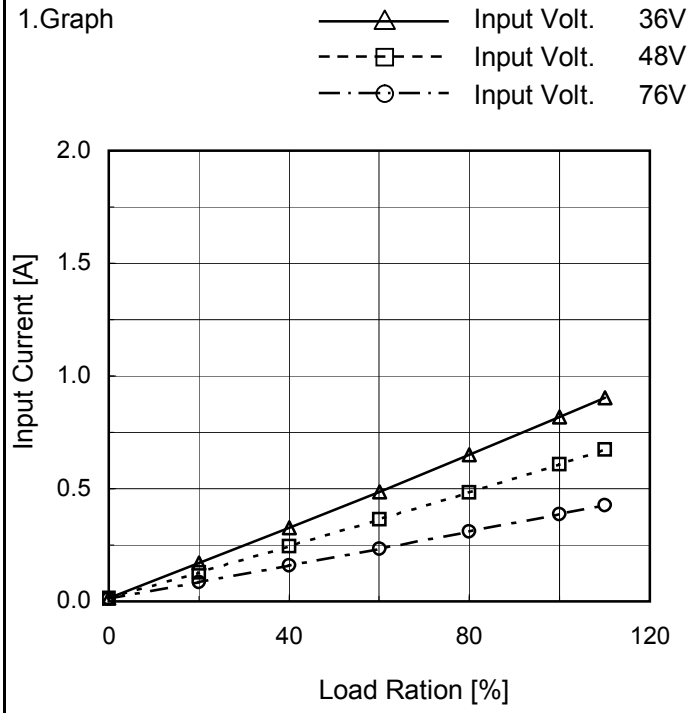
BC-10527

COSEL

Model	MGW304805
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	0.014	0.013	0.012
20	0.170	0.128	0.085
40	0.326	0.244	0.159
60	0.486	0.363	0.234
80	0.650	0.484	0.309
100	0.818	0.608	0.386
110	0.904	0.672	0.425
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

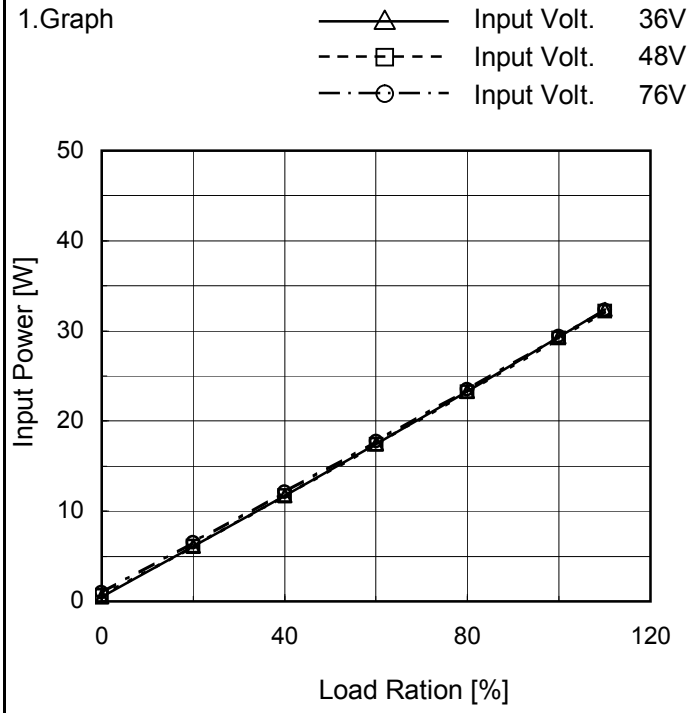
BC-10527

COSEL

Model	MGW304805
Item	Input Power (by Load Current)
Object	————————

Temperature 25°C
Testing Circuitry Figure A

1.Graph



2.Values

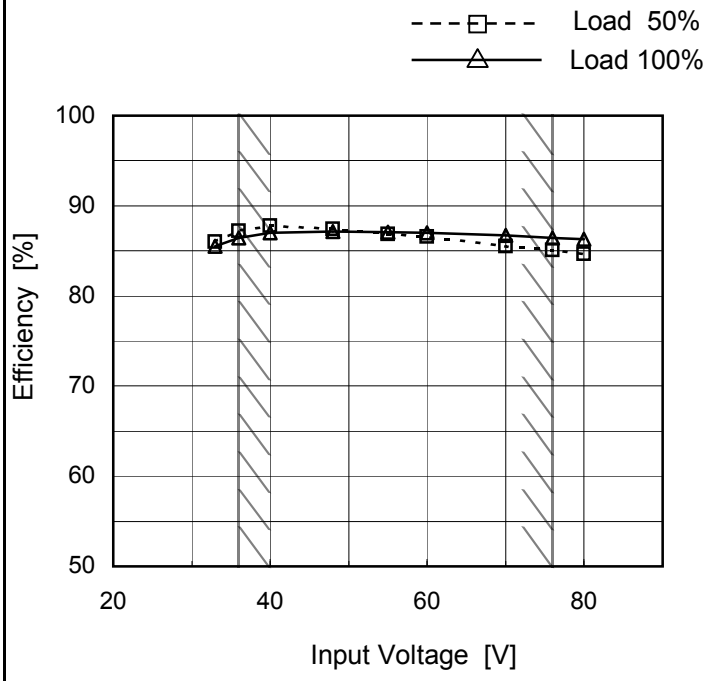
Load Ration [%]	Input Power [W]		
	Input Volt. 36[V]	Input Volt. 48[V]	Input Volt. 76[V]
0	0.50	0.64	0.96
20	6.12	6.14	6.51
40	11.73	11.72	12.12
60	17.47	17.41	17.79
80	23.33	23.23	23.52
100	29.35	29.16	29.39
110	32.42	32.16	32.34
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

COSEL

Model	MGW304805
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

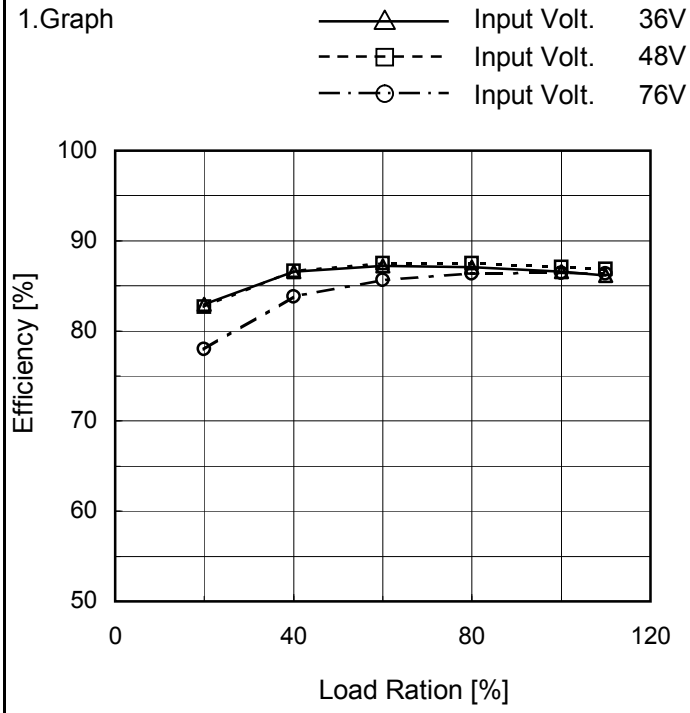
Input Voltage [V]	Efficiency [%]	
	Load 50%	Load 100%
33	86.0	85.5
36	87.2	86.4
40	87.8	87.0
48	87.4	87.1
55	86.9	87.1
60	86.6	87.0
70	85.5	86.7
76	85.1	86.4
80	84.7	86.3

COSEL

Model	MGW304805
Item	Efficiency (by Load Current)
Object	————————

Temperature 25°C
Testing Circuitry Figure A

1.Graph



2.Values

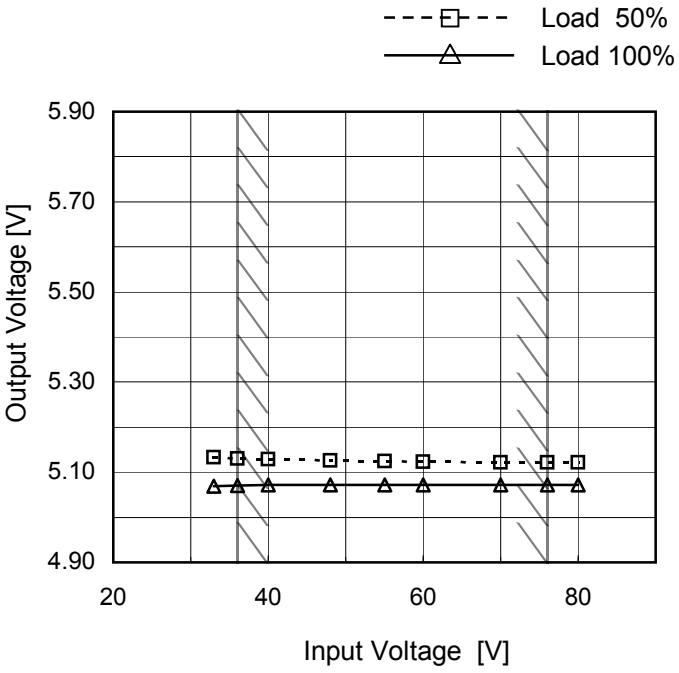
Load Ration [%]	Efficiency [%] Input Volt. 36[V]	Input Volt. 48[V]	Input Volt. 76[V]
0	-	-	-
20	83.0	82.7	78.0
40	86.6	86.7	83.8
60	87.2	87.5	85.7
80	87.1	87.5	86.4
100	86.5	87.1	86.4
110	86.2	86.9	86.4
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

COSEL

Model	MGW304805
Item	Line Regulation
Object	+5V2.5A

Temperature 25°C
Testing Circuitry Figure A

1.Graph



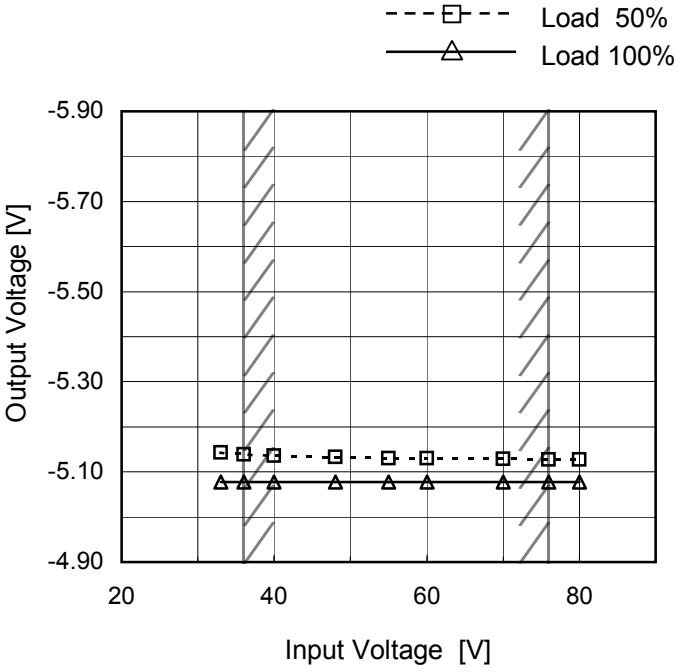
2.Values

Input Voltage [V]	Output Voltage [V]	
	Load 50%	Load 100%
33	5.133	5.070
36	5.130	5.071
40	5.129	5.072
48	5.126	5.072
55	5.124	5.072
60	5.123	5.072
70	5.122	5.072
76	5.122	5.072
80	5.122	5.072

-5V: Rated output current

Object	-5V2.5A

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	-5.142	-5.078
36	-5.139	-5.078
40	-5.136	-5.077
48	-5.132	-5.077
55	-5.131	-5.077
60	-5.130	-5.077
70	-5.128	-5.077
76	-5.128	-5.077
80	-5.127	-5.077

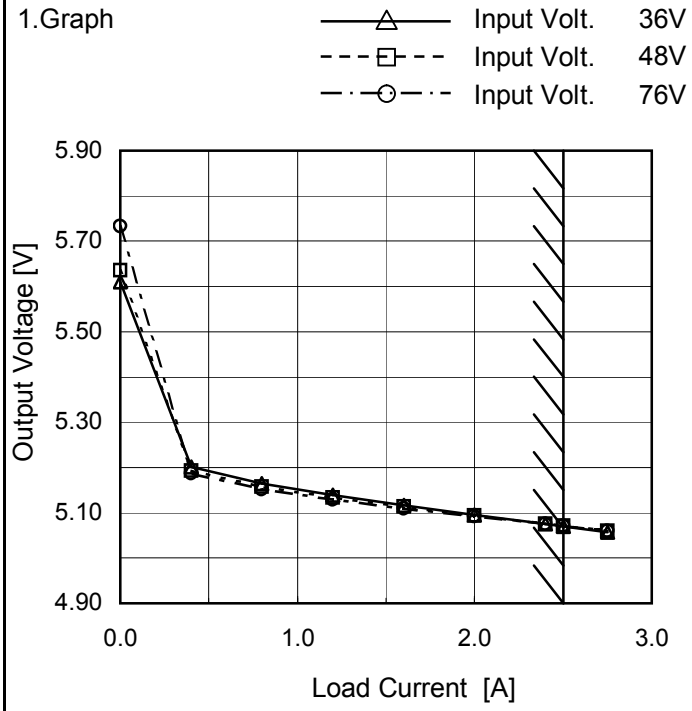
+5V: Rated output current

COSEL

Model	MGW304805
Item	Load Regulation
Object	+5V2.5A

Temperature 25°C
Testing Circuitry Figure A

1.Graph



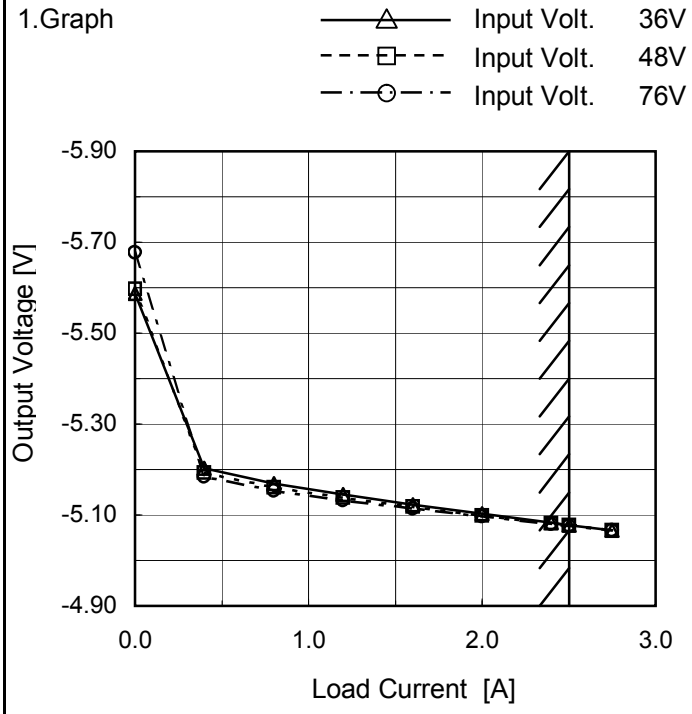
2.Values

Load Current [A]	Output Voltage [V]		
	Input Volt. 36[V]	Input Volt. 48[V]	Input Volt. 76[V]
0.00	5.610	5.636	5.733
0.40	5.201	5.192	5.187
0.80	5.164	5.157	5.151
1.20	5.139	5.134	5.129
1.60	5.117	5.113	5.110
2.00	5.096	5.094	5.092
2.40	5.075	5.075	5.075
2.50	5.070	5.071	5.071
2.75	5.058	5.060	5.061
--	-	-	-
--	-	-	-

-5V: Rated output current

Object	-5V2.5A

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]
0.00	-5.587	-5.597	-5.678
0.40	-5.203	-5.192	-5.184
0.80	-5.169	-5.161	-5.154
1.20	-5.145	-5.138	-5.133
1.60	-5.123	-5.118	-5.115
2.00	-5.102	-5.099	-5.097
2.40	-5.083	-5.081	-5.081
2.50	-5.078	-5.077	-5.077
2.75	-5.066	-5.066	-5.066
--	-	-	-
--	-	-	-

+5V: Rated output current

COSEL

Model	MGW304805
Item	Dynamic Load Response
Object	+5V2.5A

Temperature 25°C
Testing Circuitry Figure A

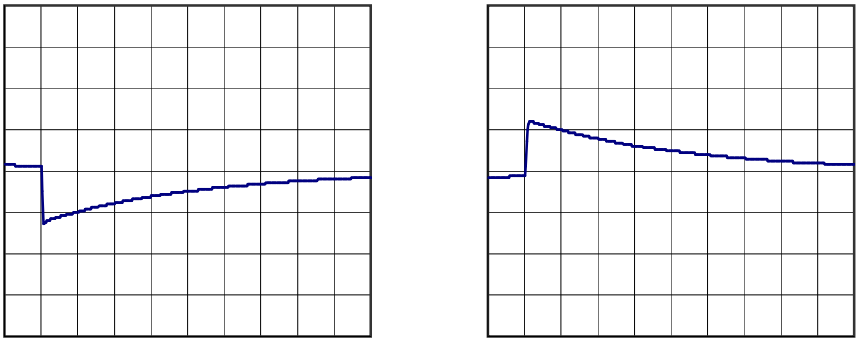
Input Volt. 48 V
Other output current rated
Cycle 1000 ms

t_1、t_2 = 50μs

Load Current

Min. Load (0A) ⟷
Load 100% (2.5A)

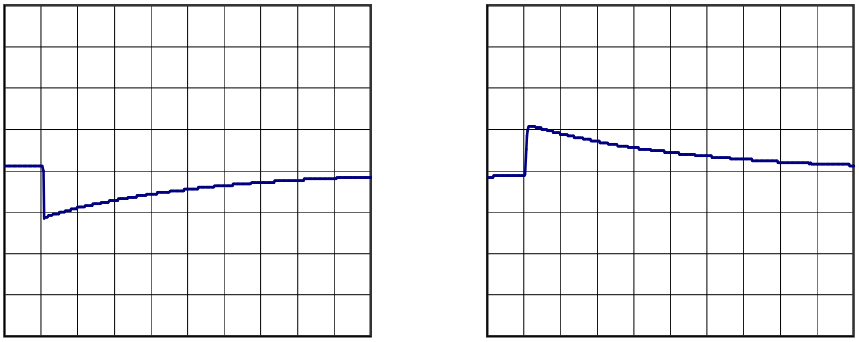
500mV/div



50ms/div 50ms/div

Min. Load (0A) ⟷
Load 50% (1.25A)

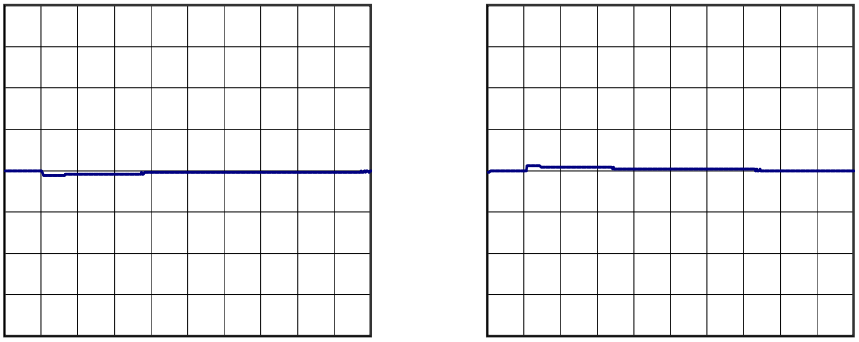
500mV/div



50ms/div 50ms/div

Load 50% (1.25A) ⟷
Load 100% (2.5A)

500mV/div



50ms/div 50ms/div

COSEL

Model	MGW304805
Item	Dynamic Load Response
Object	-5V2.5A

Temperature 25°C
Testing Circuitry Figure A

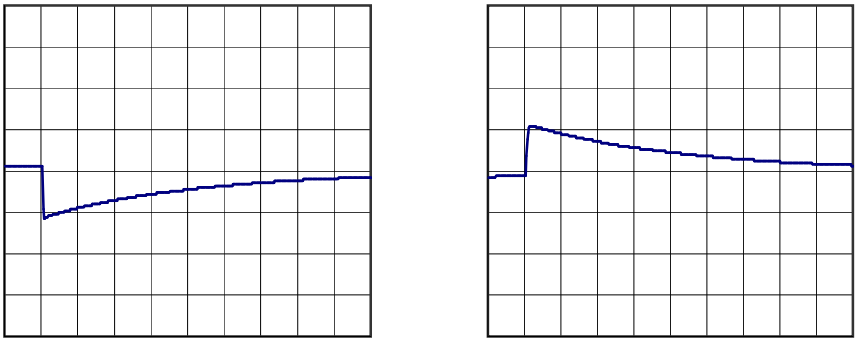
Input Volt. 48 V
Other output current rated
Cycle 1000 ms

t_1、t_2 = 50μs

Load Current

Min. Load (0A) ⟷
Load 100% (2.5A)

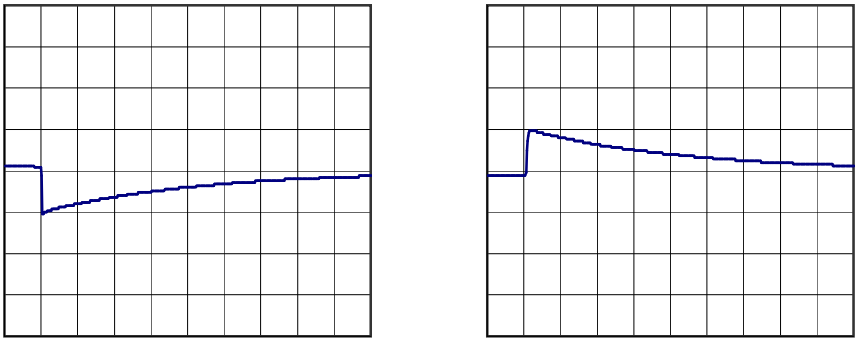
500mV/div



50ms/div 50ms/div

Min. Load (0A) ⟷
Load 50% (1.25A)

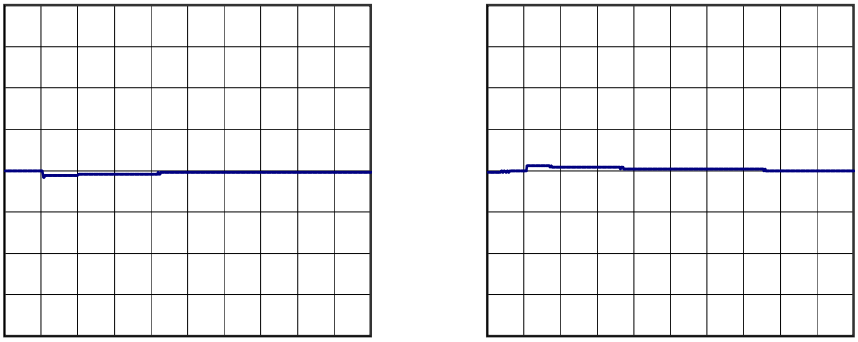
500mV/div



50ms/div 50ms/div

Load 50% (1.25A) ⟷
Load 100% (2.5A)

500mV/div



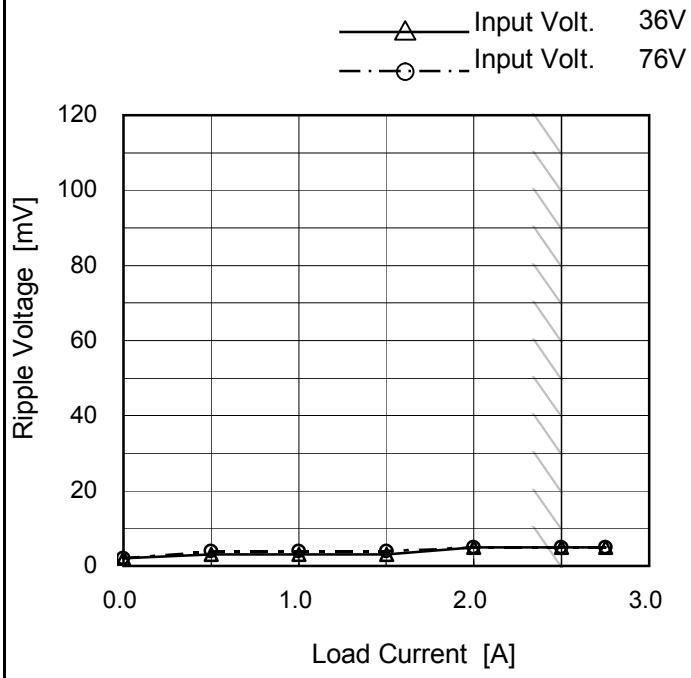
50ms/div 50ms/div

COSEL

Model	MGW304805
Item	Ripple Voltage (by Load Current)
Object	+5V2.5A

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.

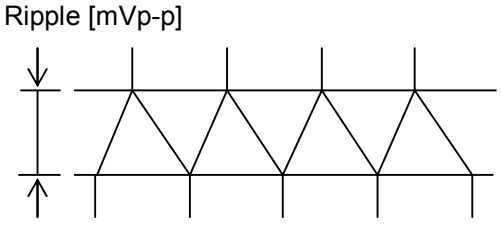


Fig.Complex Ripple Wave Form

2.Values

Load Current [A]	Ripple Voltage [mV]	
	Input Volt. 36 [V]	Input Volt. 76 [V]
0.00	2	2
0.50	3	4
1.00	3	4
1.50	3	4
2.00	5	5
2.50	5	5
2.75	5	5
--	-	-
--	-	-
--	-	-
--	-	-

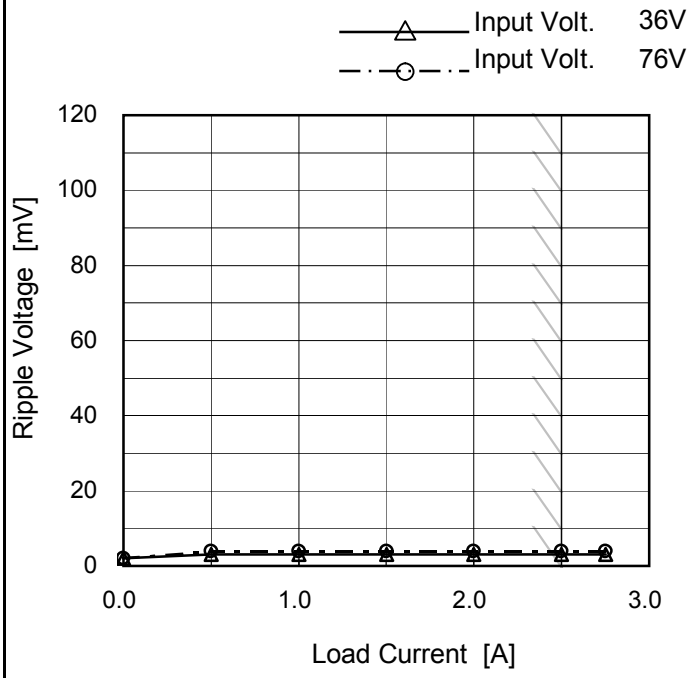
-5V: Rated output current

COSEL

Model	MGW304805
Item	Ripple Voltage (by Load Current)
Object	-5V2.5A

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.

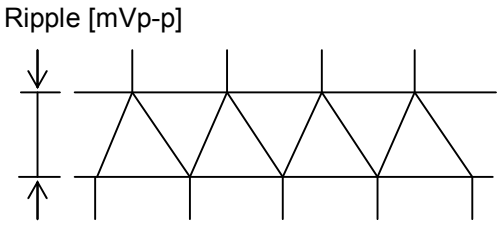


Fig.Complex Ripple Wave Form

2.Values

Load Current [A]	Ripple Voltage [mV]	
	Input Volt. 36 [V]	Input Volt. 76 [V]
0.00	2	2
0.50	3	4
1.00	3	4
1.50	3	4
2.00	3	4
2.50	3	4
2.75	3	4
--	-	-
--	-	-
--	-	-
--	-	-

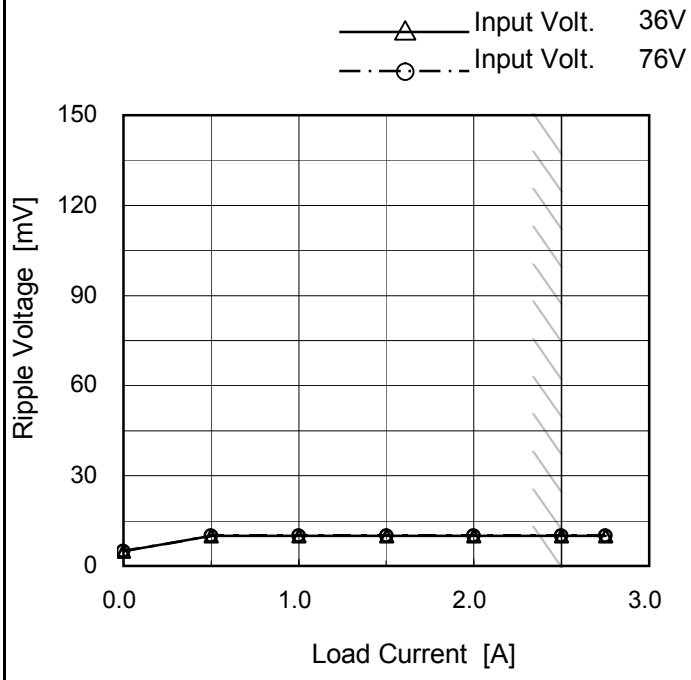
+5V: Rated output current

COSEL

Model	MGW304805
Item	Ripple-Noise
Object	+5V2.5A

Temperature 25°C
Testing Circuitry Figure B

1.Graph



Ripple-Noise is shown as p-p in the figure below.
Note: Slanted line shows the range of the rated load current.

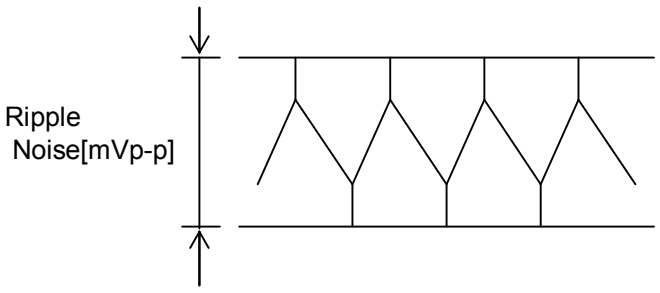


Fig.Complex Ripple Noise Wave Form

2.Values

Load Current [A]	Ripple-Noise [mV]	
	Input Volt. 36 [V]	Input Volt. 76 [V]
0.00	5	5
0.50	10	10
1.00	10	10
1.50	10	10
2.00	10	10
2.50	10	10
2.75	10	10
--	-	-
--	-	-
--	-	-
--	-	-

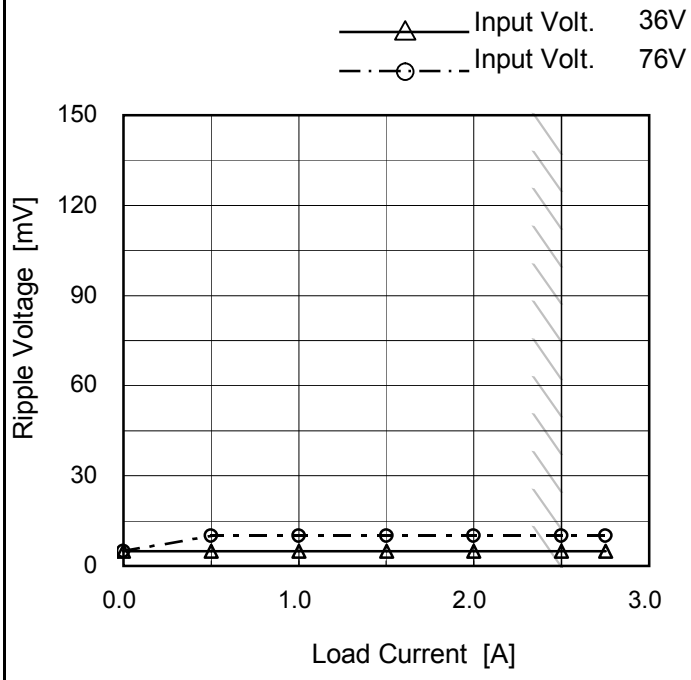
-5V: Rated output current

COSEL

Model	MGW304805
Item	Ripple-Noise
Object	-5V2.5A

Temperature 25°C
Testing Circuitry Figure B

1.Graph



Ripple-Noise is shown as p-p in the figure below.
Note: Slanted line shows the range of the rated load current.

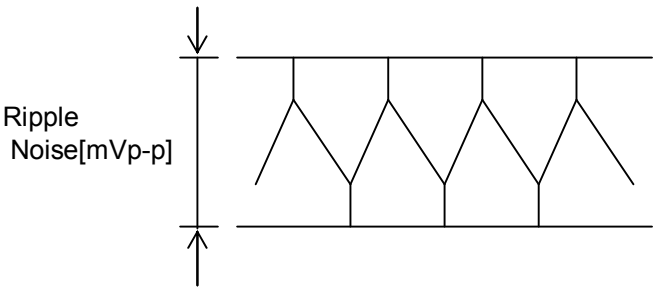


Fig.Complex Ripple Noise Wave Form

2.Values

Load Current [A]	Ripple-Noise [mV]	
	Input Volt. 36 [V]	Input Volt. 76 [V]
0.00	5	5
0.50	5	10
1.00	5	10
1.50	5	10
2.00	5	10
2.50	5	10
2.75	5	10
--	-	-
--	-	-
--	-	-
--	-	-

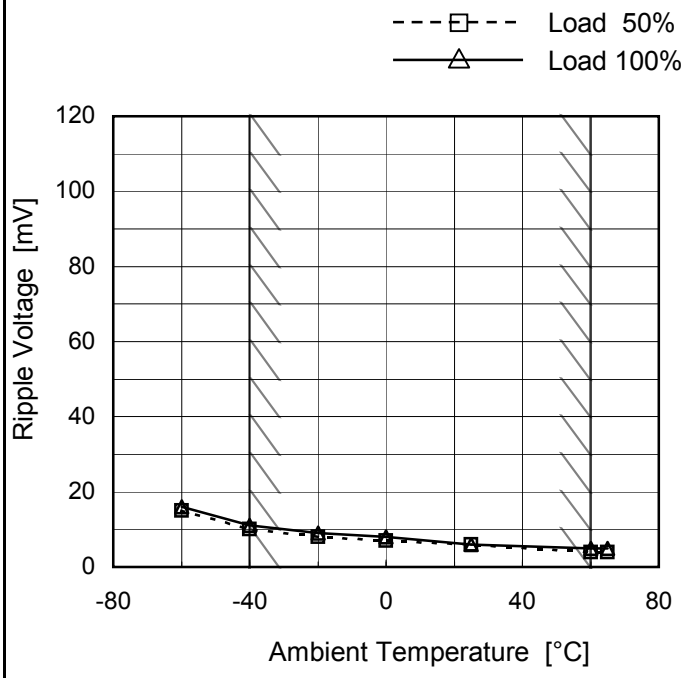
+5V: Rated output current

COSEL

Model	MGW304805
Item	Ripple Voltage (by Ambient Temp.)
Object	+5V2.5A

Testing Circuitry Figure A

1.Graph



Input Volt. 48V

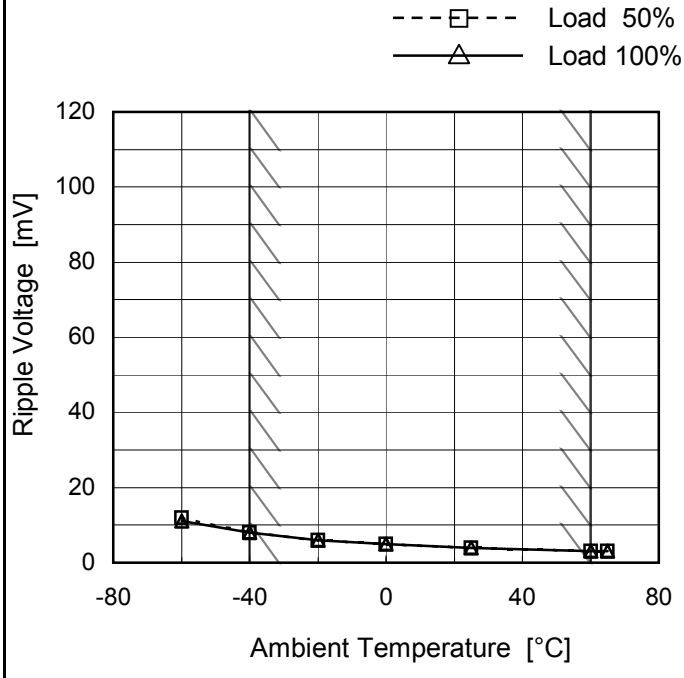
2.Values

Ambient Temperature [°C]	Ripple Voltage [mV]	
	Load 50%	Load 100%
-60	15	16
-40	10	11
-20	8	9
0	7	8
25	6	6
60	4	5
65	4	5
--	-	-
--	-	-
--	-	-
--	-	-

-5V: Rated output current

Object	-5V2.5A

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	12	11
-40	8	8
-20	6	6
0	5	5
25	4	4
60	3	3
65	3	3
--	-	-
--	-	-
--	-	-
--	-	-

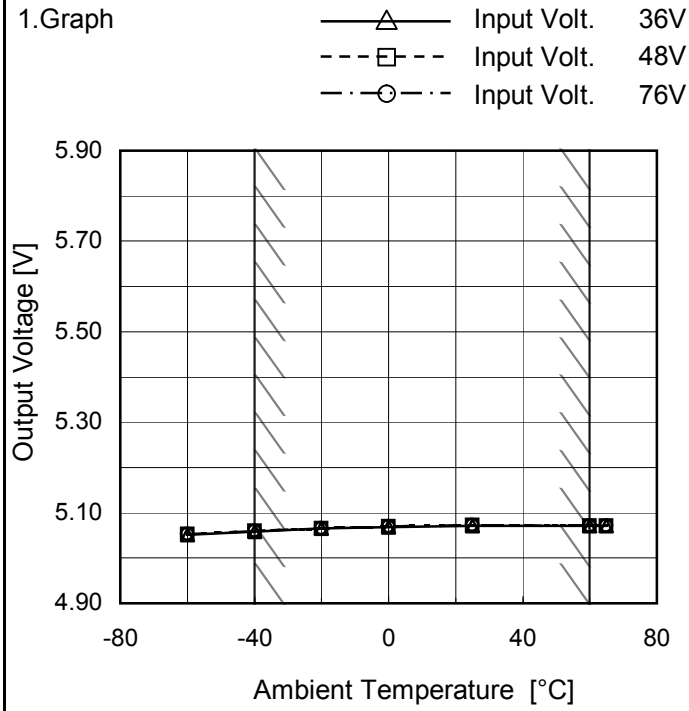
+5V: Rated output current

COSEL

Model	MGW304805
Item	Ambient Temperature Drift
Object	+5V2.5A

Testing Circuitry Figure A

1.Graph

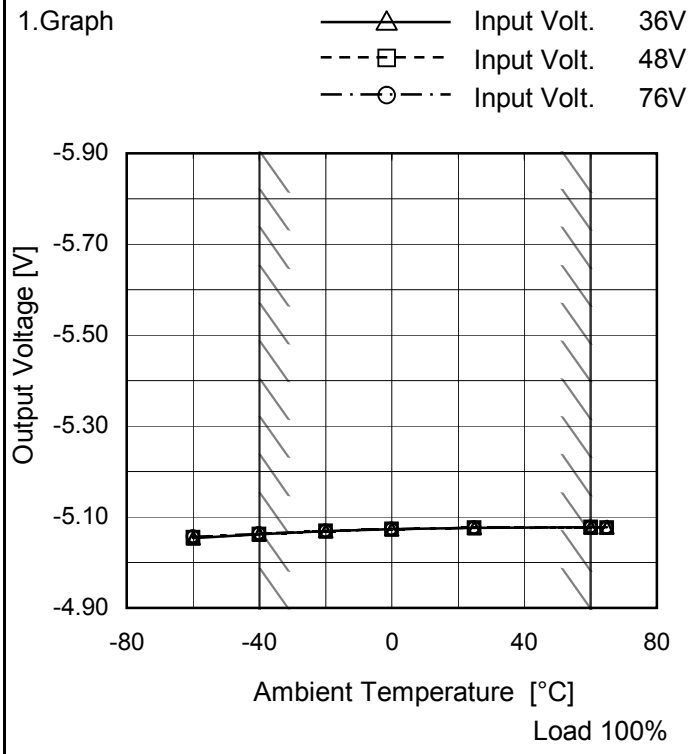


2.Values

Ambient Temperature [°C]	Output Voltage [V] Input Volt. 36[V]	Input Volt. 48[V]	Input Volt. 76[V]
-60	5.051	5.052	5.053
-40	5.059	5.060	5.061
-20	5.065	5.066	5.066
0	5.069	5.070	5.070
25	5.071	5.072	5.072
60	5.071	5.072	5.072
65	5.071	5.071	5.071
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

Object -5V2.5A

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	-5.054	-5.054	-5.056
-40	-5.062	-5.063	-5.063
-20	-5.069	-5.069	-5.070
0	-5.073	-5.073	-5.073
25	-5.077	-5.076	-5.076
60	-5.078	-5.077	-5.077
65	-5.078	-5.077	-5.076
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

COSEL

Model	MGW304805	
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 - 60°C
Input Voltage : 36 - 76V
Load Current (AVR 1) : 0 - 2.5A (AVR 2) : 0 - 2.5A

* 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	+5V2.5A					
Item	Temperature [°C]	Input Voltage[V]	Output		Output Voltage Accuracy	
			Current[A]	Voltage[V]	Value [mV]	Ration [%]
Maximum Voltage	-40	76	0	5.818	±380	±7.6
Minimum Voltage	-40	36	2.5	5.059		

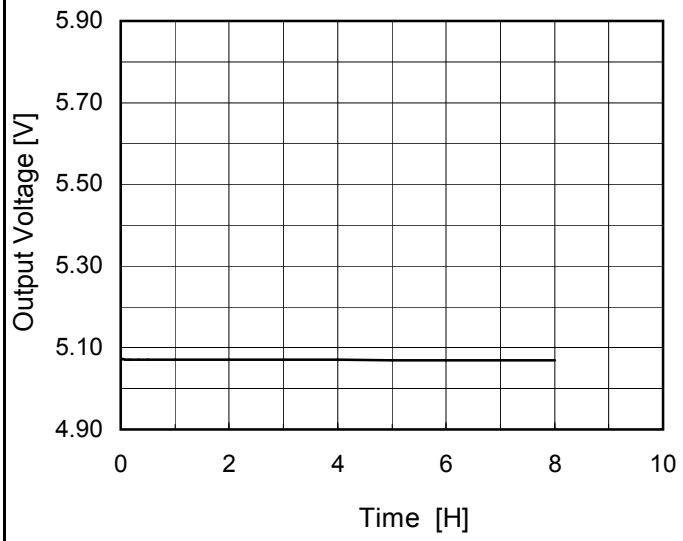
Object	-5V2.5A					
Item	Temperature [°C]	Input Voltage[V]	Output		Output Voltage Accuracy	
			Current[A]	Voltage[V]	Value [mV]	Ration [%]
Maximum Voltage	-40	76	0	-5.764	±351	±7.0
Minimum Voltage	-40	36	2.5	-5.062		

COSEL

Model	MGW304805
Item	Time Lapse Drift
Object	+5V2.5A

Temperature 25°C
Testing Circuitry Figure A

1.Graph



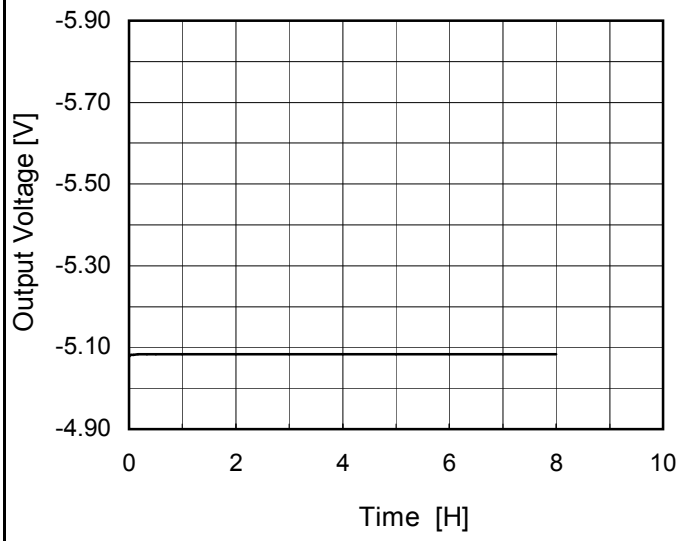
Input Volt. 48V
Load 100%

2.Values

Time since start [H]	Output Voltage [V]
0.0	5.071
0.5	5.070
1.0	5.070
2.0	5.070
3.0	5.070
4.0	5.070
5.0	5.070
6.0	5.070
7.0	5.070
8.0	5.070

Object	-5V2.5A

1.Graph



Input Volt. 48V
Load 100%

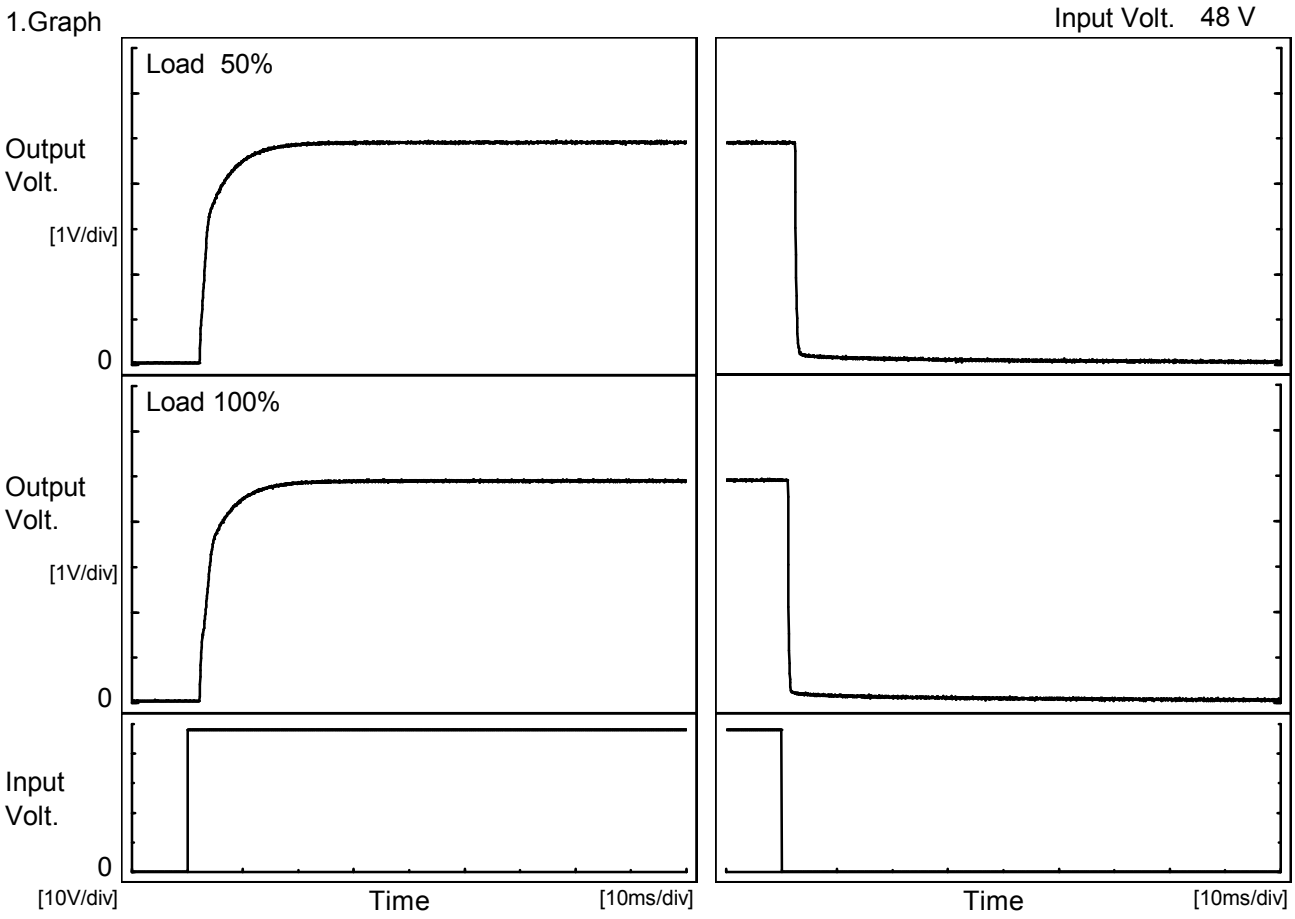
2.Values

Time since start [H]	Output Voltage [V]
0.0	-5.077
0.5	-5.083
1.0	-5.083
2.0	-5.083
3.0	-5.083
4.0	-5.083
5.0	-5.084
6.0	-5.084
7.0	-5.084
8.0	-5.084

COSEL

Model	MGW304805	
Item	Rise and Fall Time	Temperature 25°C Testing Circuitry Figure A
Object	+5V2.5A	

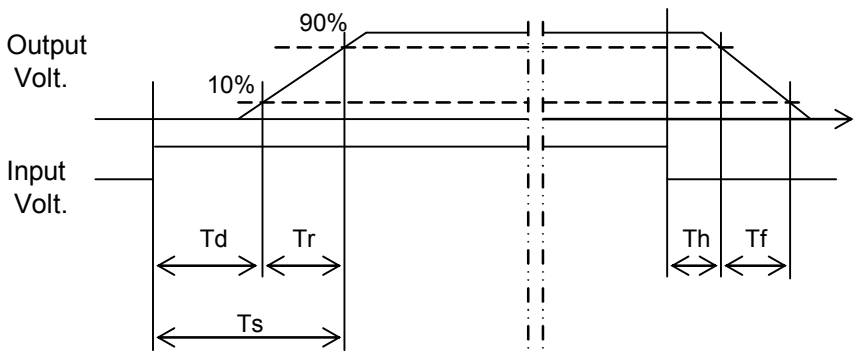
1.Graph



2.Values

[ms]

Load \ Time	Td	Tr	Ts	Th	Tf
50 %	2.5	9.0	11.5	2.3	0.5
100 %	2.5	8.8	11.3	1.2	0.3

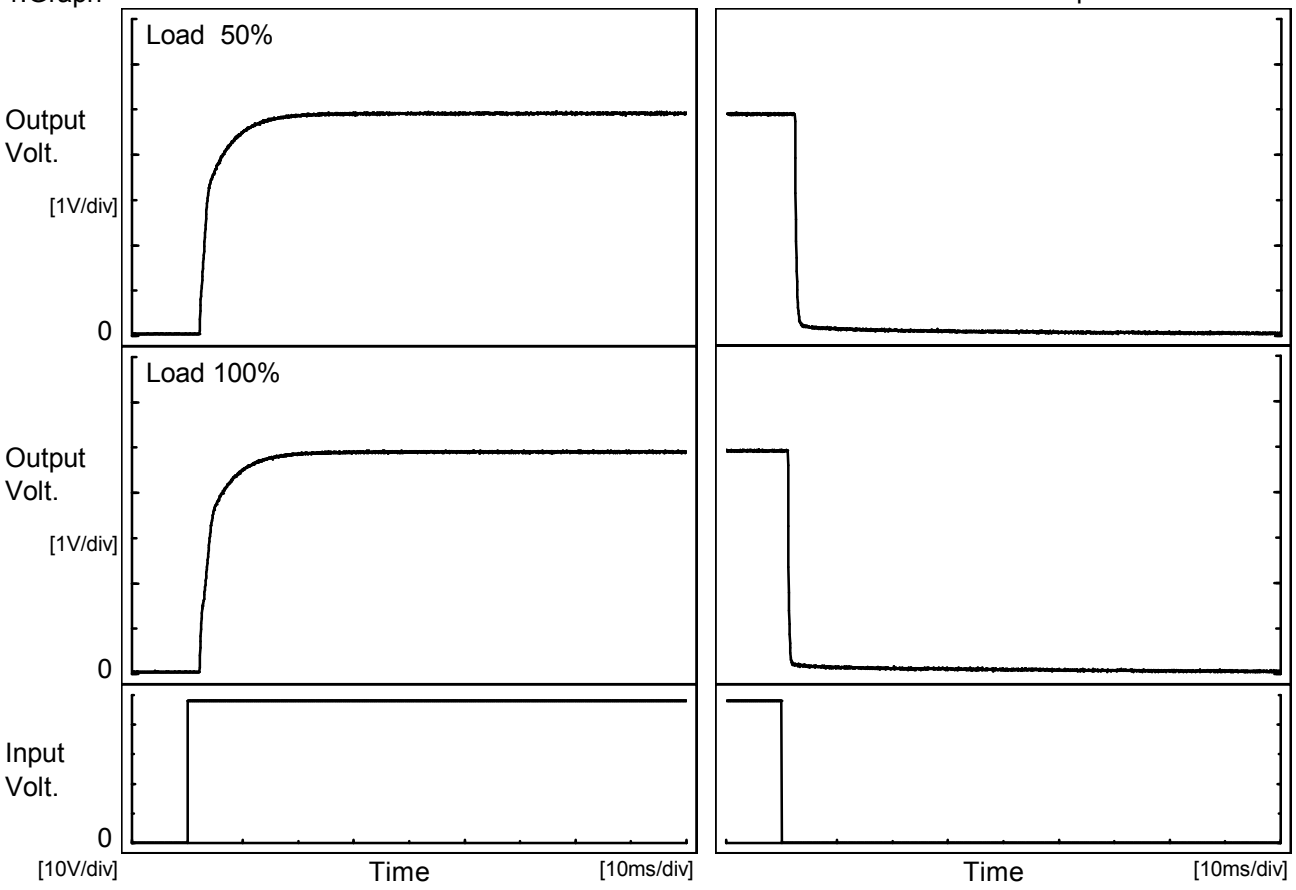


COSEL

Model		
Item	Rise and Fall Time	Temperature 25°C Testing Circuitry Figure A
Object	-5V2.5A	

1.Graph

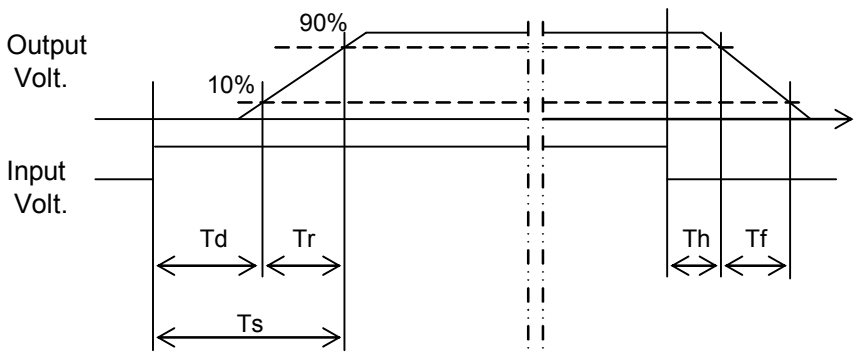
Input Volt. 48 V



2.Values

[ms]

Load \ Time	Td	Tr	Ts	Th	Tf
50 %	2.5	9.0	11.5	2.3	0.6
100 %	2.5	9.0	11.5	1.2	0.4

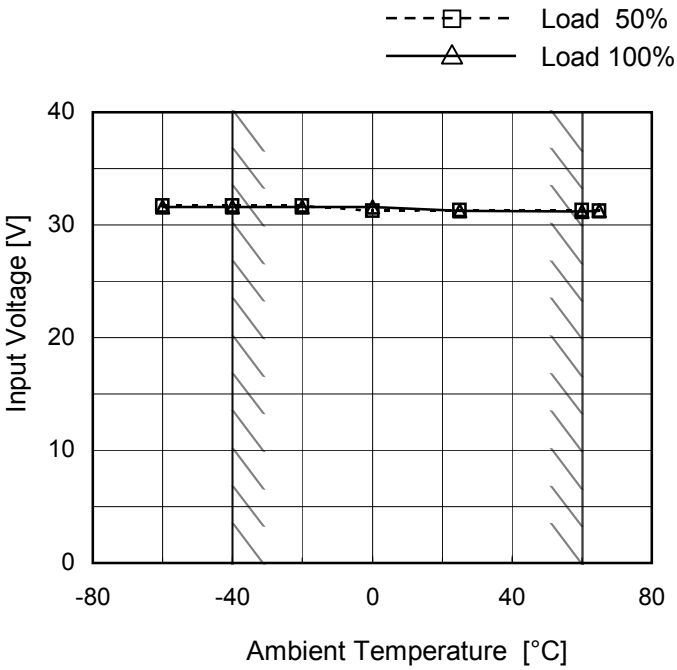


COSEL

Model	MGW304805
Item	Minimum Input Voltage for Regulated Output Voltage
Object	+5V2.5A

Testing Circuitry Figure A

1.Graph

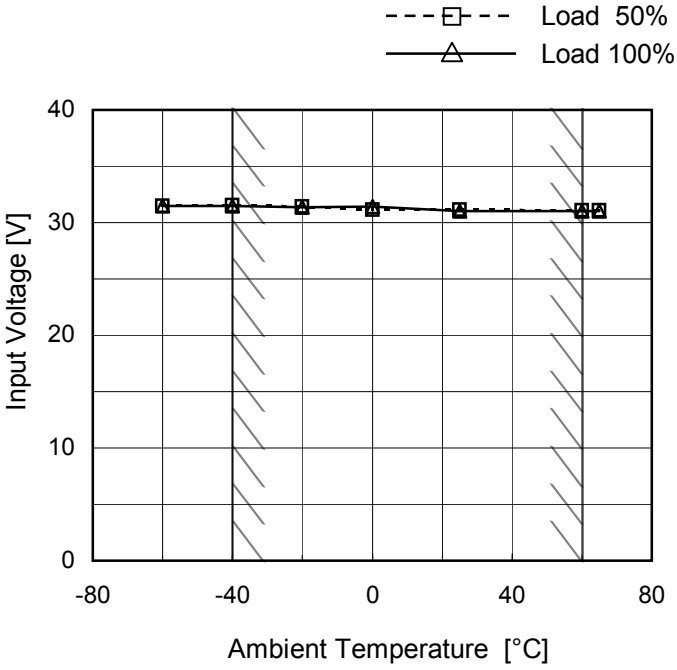


2.Values

Ambient Temperature [°C]	Input Voltage [V]	
	Load 50%	Load 100%
-60	31.8	31.7
-40	31.7	31.6
-20	31.7	31.6
0	31.3	31.6
25	31.4	31.3
60	31.3	31.3
65	31.3	31.3
--	-	-
--	-	-
--	-	-
--	-	-

Object	-5V2.5A

1.Graph



2.Values

Ambient Temperature [°C]	Input Voltage [V]	
	Load 50%	Load 100%
-60	31.5	31.5
-40	31.6	31.5
-20	31.5	31.4
0	31.2	31.5
25	31.2	31.1
60	31.1	31.1
65	31.1	31.1
--	-	-
--	-	-
--	-	-
--	-	-

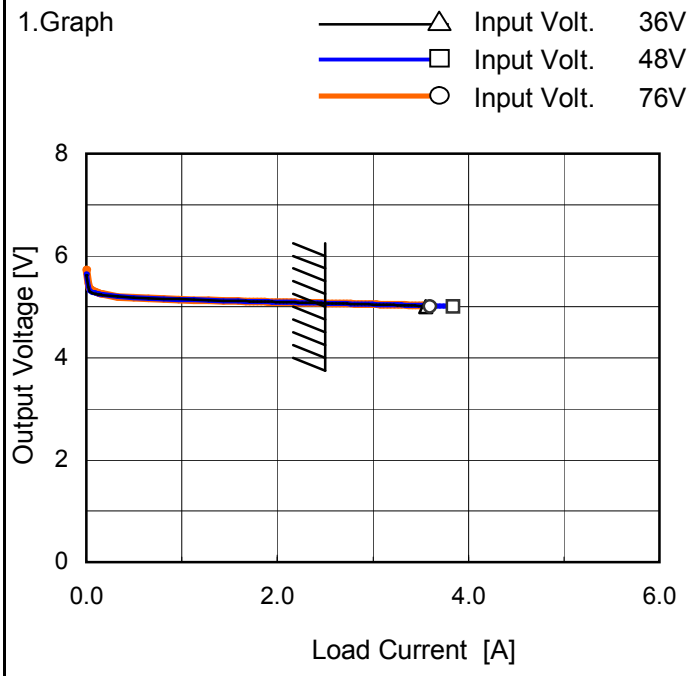
Note: Slanted line shows the range of the rated ambient temperature.

COSEL

Model	MGW304805
Item	Overcurrent Protection
Object	+5V2.5A

Temperature 25°C
Testing Circuitry Figure A

1.Graph

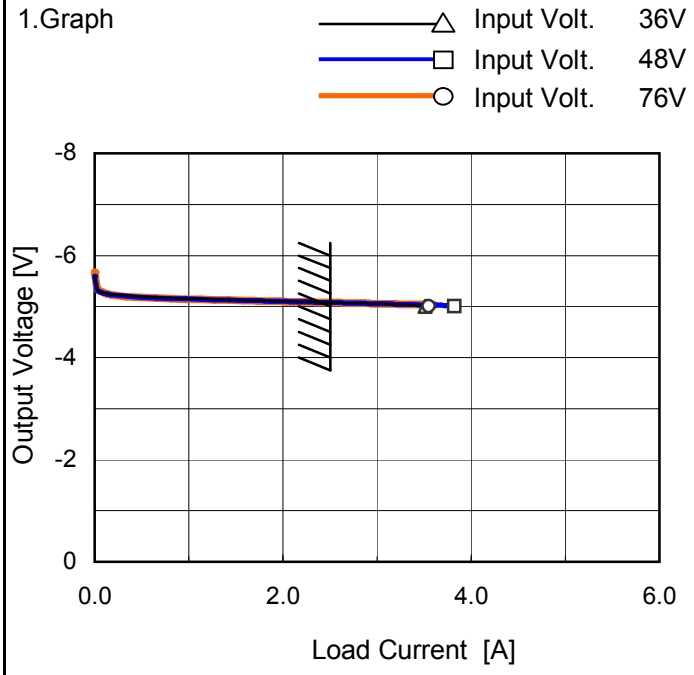


2.Values

Output Voltage [V]	Load Current [A]		
	Input Volt. 36[V]	Input Volt. 48[V]	Input Volt. 76[V]
5.00	3.55	3.84	3.60
4.75	-	-	-
4.50	-	-	-
4.00	-	-	-
3.50	-	-	-
3.00	-	-	-
2.50	-	-	-
2.00	-	-	-
1.50	-	-	-
1.00	-	-	-
0.50	-	-	-
0.00	-	-	-

Object	-5V2.5A

1.Graph



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

Intermittent operation occurs when overcurrent protection is activated.

2.Values

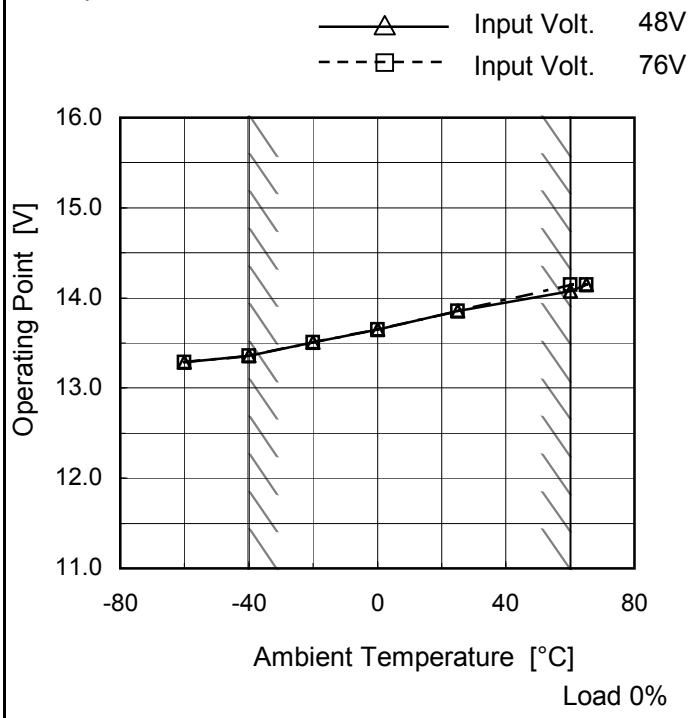
Output Voltage [V]	Load Current [A]		
	Input Volt. 36[V]	Input Volt. 48[V]	Input Volt. 76[V]
-5.00	3.51	3.82	3.55
-4.75	-	-	-
-4.50	-	-	-
-4.00	-	-	-
-3.50	-	-	-
-3.00	-	-	-
-2.50	-	-	-
-2.00	-	-	-
-1.50	-	-	-
-1.00	-	-	-
-0.50	-	-	-
0.00	-	-	-

COSEL

Model	MGW304805
Item	Overvoltage Protection
Object	+10V2.5A

Testing Circuitry Figure A

1.Graph



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

Measured as a single output(+10V).

2.Values

Ambient Temperature [°C]	Operating Point [V]	
	Input Volt. 48[V]	Input Volt. 76[V]
-60	13.29	13.29
-40	13.36	13.36
-20	13.51	13.51
0	13.65	13.65
25	13.86	13.86
60	14.08	14.15
65	14.15	14.15
--	-	-
--	-	-
--	-	-
--	-	-

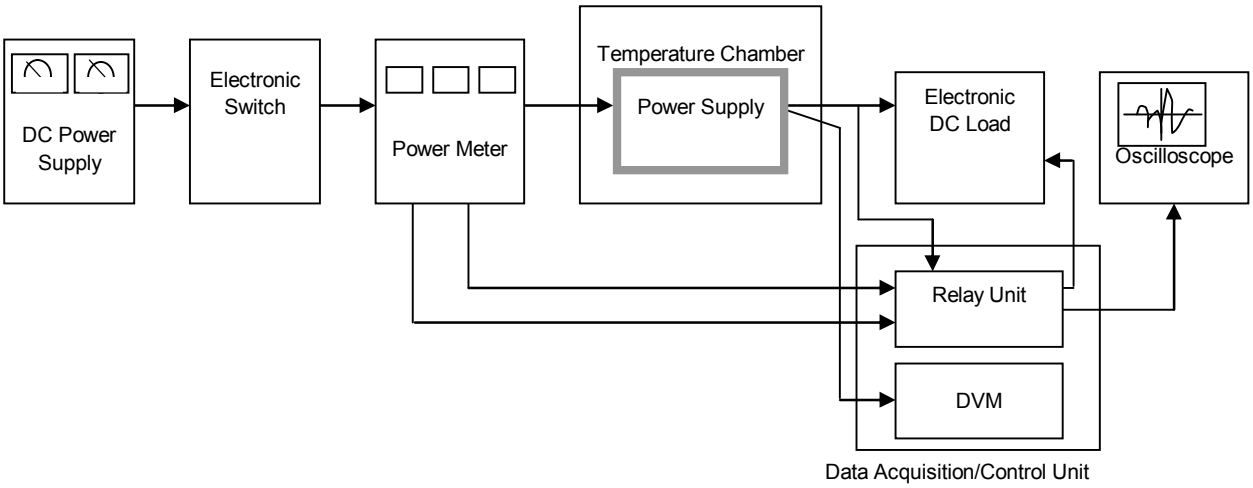


Figure A

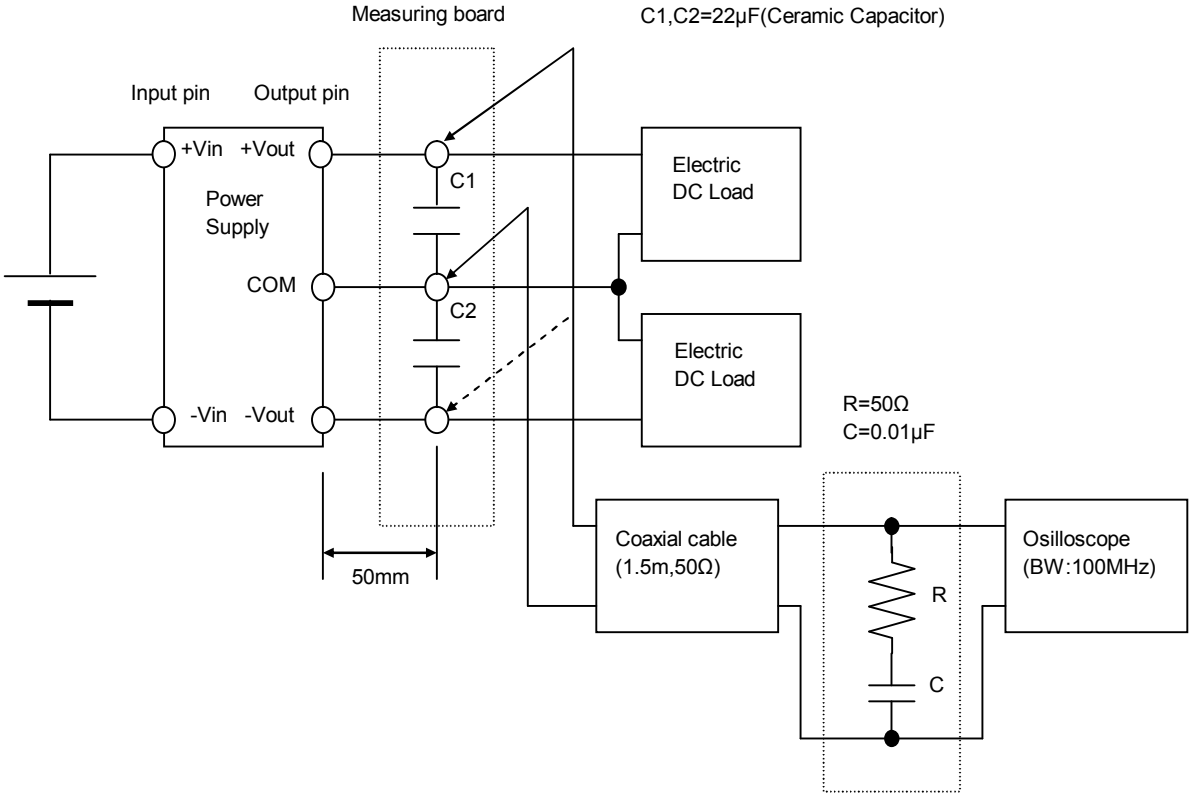


Figure B（Ripple and Ripple noise Characteristic）