COSEL

参考資料

TEST DATA OF MGW61212

Regulated DC Power Supply
November 1, 2016

Approved by : Takayuki Fukuda
Takayuki Fukuda Design Manager

Prepared by : Takaaki Sekiguchi
Takaaki Sekiguchi Design Engineer

COSEL CO.,LTD.

COSEL

CONTENTS

1.Input Current (by Input Voltage) ・・・・・・・・・・・・・・・・・・・・・・・・ 1
2.Input Ratio (by Load Ratio) ・・・・・・・・・・・・・・・・・・・・・・・・・・ 2
3.Input Power (by Load Ratio) ・・・・・・・・・・・・・・・・・・・・・・・・・・ 3
4.Efficiency (by Input Voltage) ・・・・・・・・・・・・・・・・・・・・・・・・・ 4
5.Efficiency (by Load Ratio) ・・・・・・・・・・・・・・・・・・・・・・・・・・・ 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.Switching Frequency (by Load Current) ・・・・・・・・・・・・・・・・・・・・ 22
19.Figure of Testing Circuitry ・・・・・・・・・・・・・・・・・・・・・・・・・・ 23

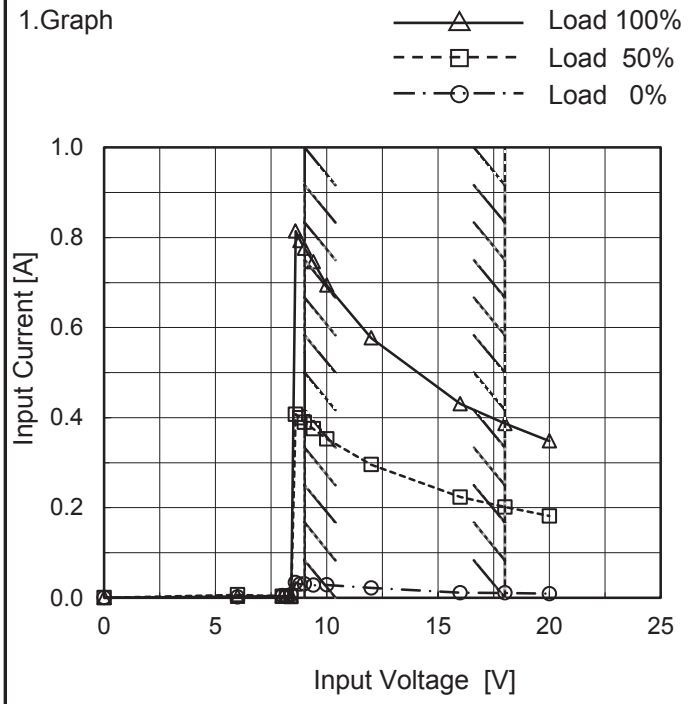
(Final Page 23)

COSEL

Model	MGW61212
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
6.0	0.002	0.007	0.003
8.0	0.005	0.003	0.004
8.2	0.004	0.004	0.003
8.4	0.007	0.003	0.004
8.6	0.034	0.408	0.815
8.8	0.030	0.399	0.793
9.0	0.031	0.390	0.776
9.4	0.028	0.375	0.746
10.0	0.028	0.353	0.694
12.0	0.022	0.296	0.577
16.0	0.011	0.223	0.431
18.0	0.011	0.202	0.387
20.0	0.009	0.182	0.348
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

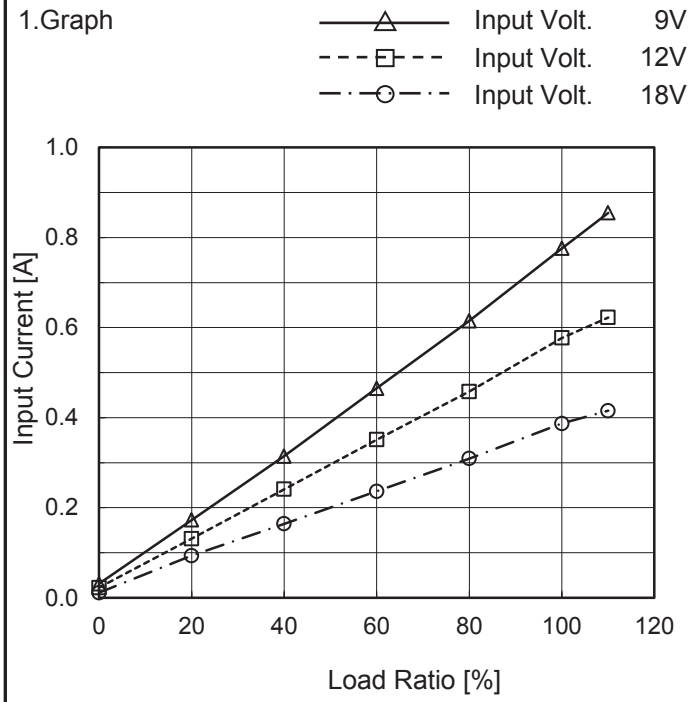
BC-11028

COSEL

Model	MGW61212
Item	Input Current (by Load Ratio)
Object	――――――

Temperature 25°C
Testing Circuitry Figure A

1.Graph



2.Values

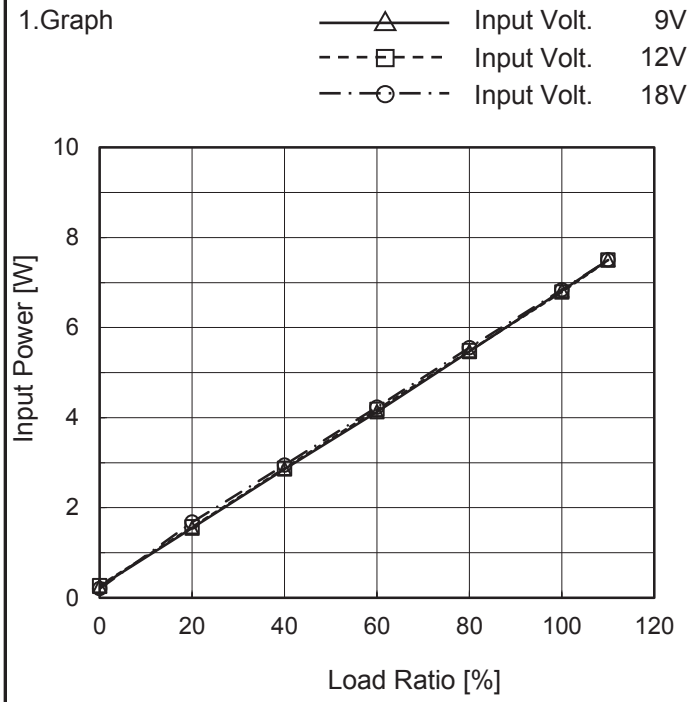
Load Ratio [%]	Input Current [A]		
	Input Volt. 9[V]	Input Volt. 12[V]	Input Volt. 18[V]
0	0.031	0.022	0.011
20	0.173	0.131	0.094
40	0.314	0.241	0.164
60	0.465	0.351	0.236
80	0.615	0.458	0.309
100	0.776	0.577	0.387
110	0.855	0.623	0.415
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

COSEL

Model	MGW61212
Item	Input Power (by Load Ratio)
Object	――――――

Temperature 25°C
Testing Circuitry Figure A

1.Graph



2.Values

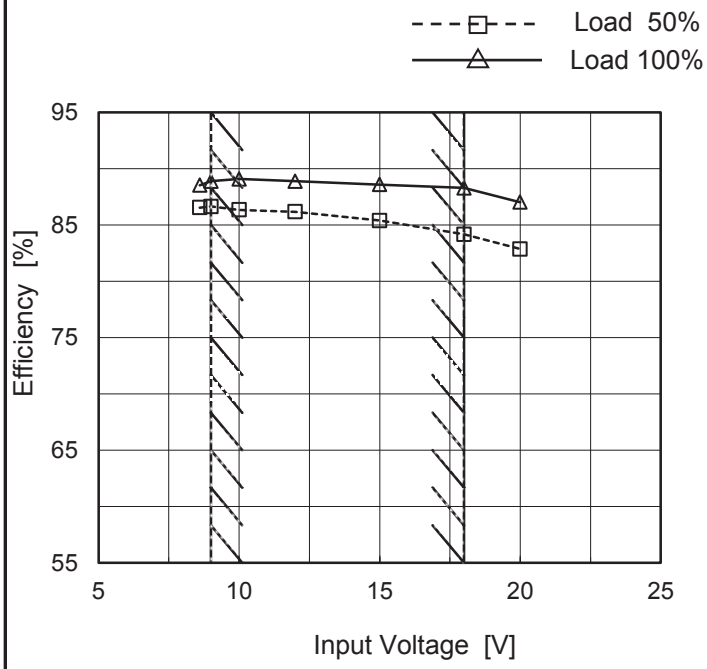
Load Ratio [%]	Input Power [W]		
	Input Volt. 9[V]	Input Volt. 12[V]	Input Volt. 18[V]
0	0.25	0.27	0.20
20	1.54	1.57	1.68
40	2.86	2.87	2.94
60	4.13	4.18	4.23
80	5.47	5.49	5.55
100	6.82	6.79	6.84
110	7.50	7.50	7.50
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

COSEL

Model	MGW61212
Item	Efficiency (by Input Voltage)
Object	――――――――――

Temperature 25°C
Testing Circuitry Figure A

1.Graph



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

2.Values

Input Voltage [V]	Efficiency [%]	
	Load 50%	Load 100%
8.6	86.5	88.5
9.0	86.6	88.9
10.0	86.4	89.1
12.0	86.2	88.9
15.0	85.4	88.6
18.0	84.2	88.3
20.0	82.9	87.0
--	-	-
--	-	-

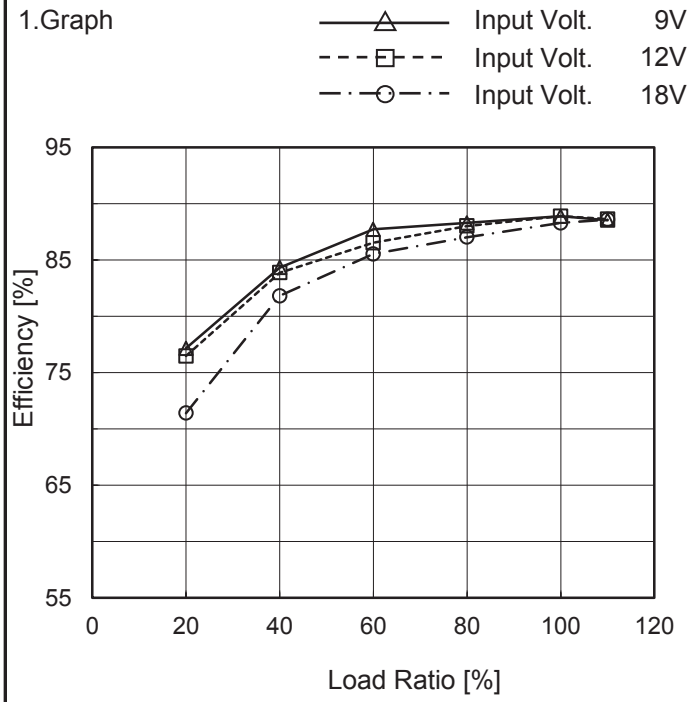
BC-11028

COSEL

Model	MGW61212
Item	Efficiency (by Load Ratio)
Object	――――――

Temperature 25°C
Testing Circuitry Figure A

1.Graph



2.Values

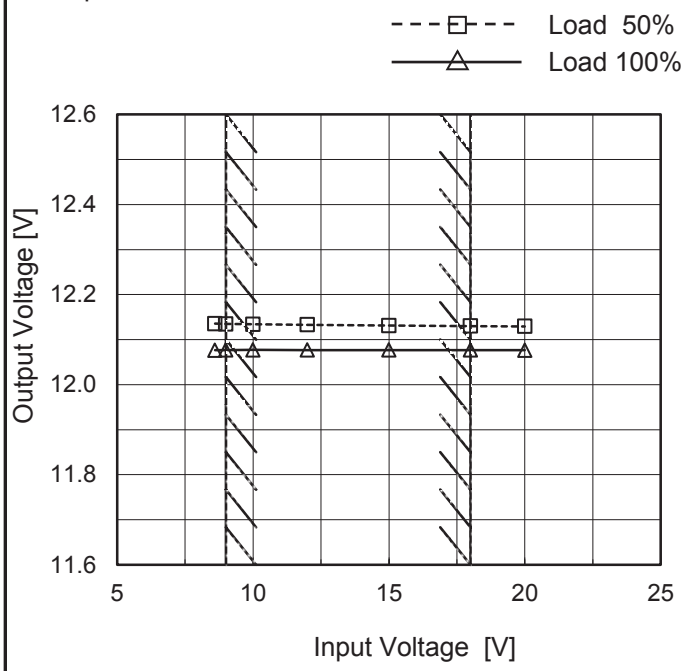
Load Ratio [%]	Efficiency [%]		
	Input Volt. 9[V]	Input Volt. 12[V]	Input Volt. 18[V]
0	-	-	-
20	77.2	76.5	71.4
40	84.3	83.9	81.8
60	87.7	86.5	85.5
80	88.3	88.0	87.0
100	88.9	88.9	88.3
110	88.5	88.6	88.6
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

COSEL

Model	MGW61212
Item	Line Regulation
Object	+12V0.25A

Temperature 25°C
Testing Circuitry Figure A

1.Graph



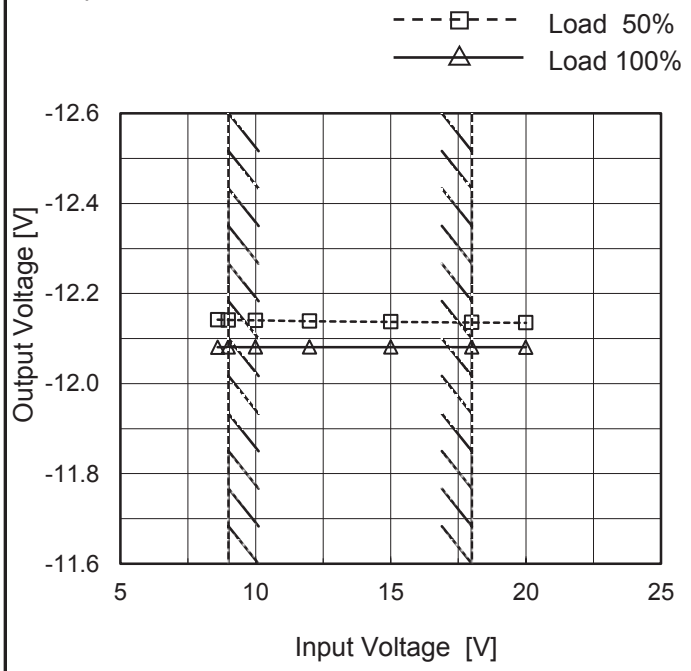
2.Values

Input Voltage [V]	Output Voltage [V]	
	Load 50%	Load 100%
8.6	12.135	12.077
9.0	12.135	12.077
10.0	12.134	12.077
12.0	12.133	12.077
15.0	12.131	12.077
18.0	12.130	12.077
20.0	12.129	12.077
--	-	-
--	-	-

-12V: Rated Load Current

Object	-12V0.25A

1.Graph



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

2.Values

Input Voltage [V]	Output Voltage [V]	
	Load 50%	Load 100%
8.6	-12.142	-12.081
9.0	-12.141	-12.081
10.0	-12.140	-12.081
12.0	-12.139	-12.081
15.0	-12.137	-12.081
18.0	-12.136	-12.081
20.0	-12.135	-12.081
--	-	-
--	-	-

+12V: Rated Load Current

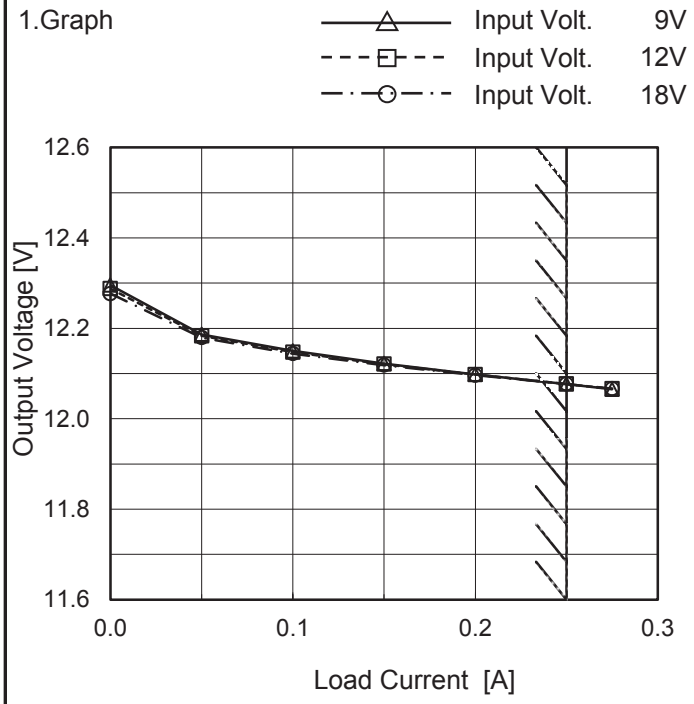
BC-11028

COSEL

Model	MGW61212
Item	Load Regulation
Object	+12V0.25A

Temperature 25°C
Testing Circuitry Figure A

1.Graph



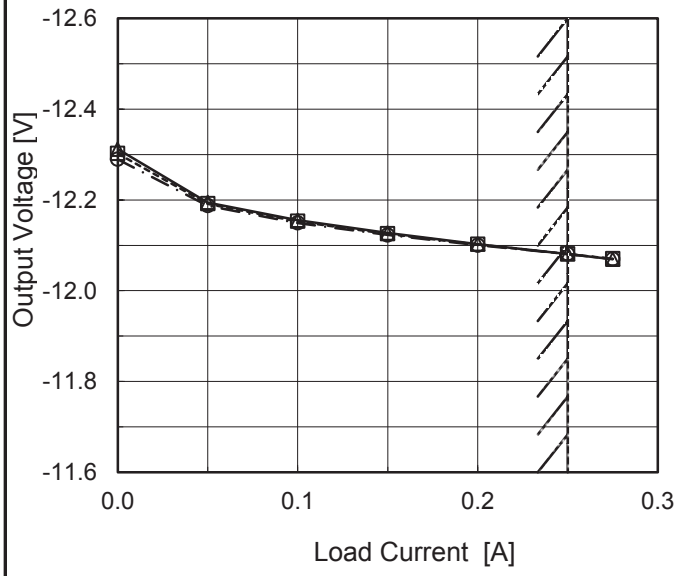
2.Values

Load Current [A]	Output Voltage [V]		
	Input Volt. 9[V]	Input Volt. 12[V]	Input Volt. 18[V]
0.000	12.295	12.288	12.277
0.050	12.187	12.183	12.180
0.100	12.150	12.147	12.144
0.150	12.122	12.121	12.119
0.200	12.098	12.098	12.096
0.250	12.077	12.077	12.077
0.275	12.065	12.066	12.067
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

-12V: Rated Load Current

Object	-12V0.25A

1.Graph



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

2.Values

Load Current [A]	Output Voltage [V]		
	Input Volt. 9[V]	Input Volt. 12[V]	Input Volt. 18[V]
0.000	-12.312	-12.302	-12.290
0.050	-12.194	-12.192	-12.187
0.100	-12.155	-12.153	-12.149
0.150	-12.127	-12.125	-12.123
0.200	-12.103	-12.102	-12.100
0.250	-12.081	-12.081	-12.081
0.275	-12.069	-12.070	-12.070
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

+12V: Rated Load Current

COSEL

Model	MGW61212	
Item	Dynamic Load Response	Temperature 25°C Testing Circuitry Figure A
Object	+12V0.25A	

Input Volt. 12 V

-12V:rated load current.

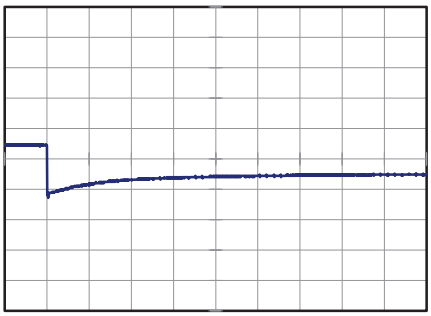
Cycle 100 ms

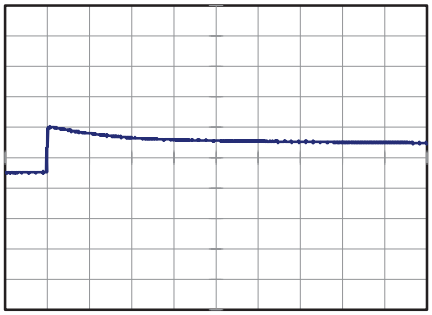
t1,t2 = 100 μ s

Load Current

t1 t2

Min.Load (0A)←→
Load 100% (0.25A)

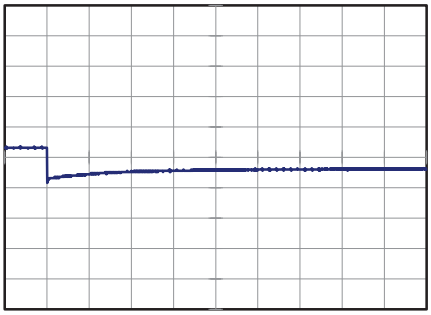


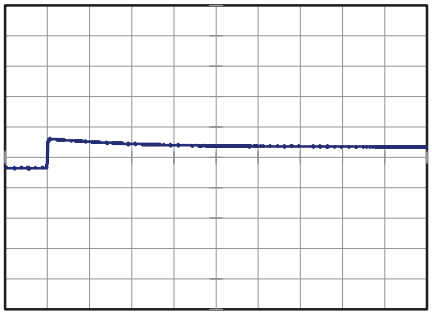


200 mV/div

4 ms/div 4 ms/div

Min.Load (0A)←→
Load 50% (0.125A)

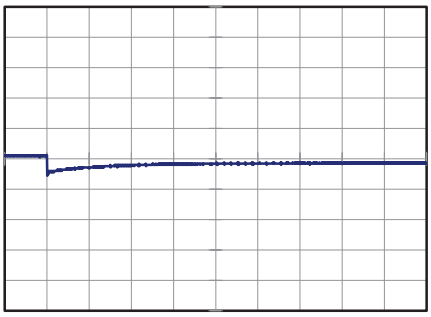


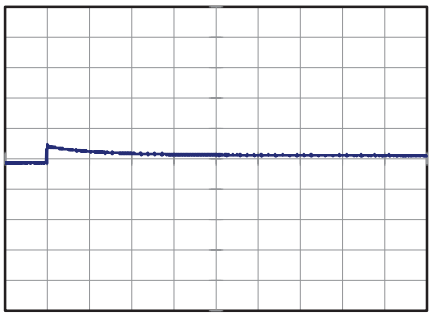


200 mV/div

4 ms/div 4 ms/div

Load 50% (0.125A)←→
Load 100% (0.25A)





200 mV/div

4 ms/div 4 ms/div

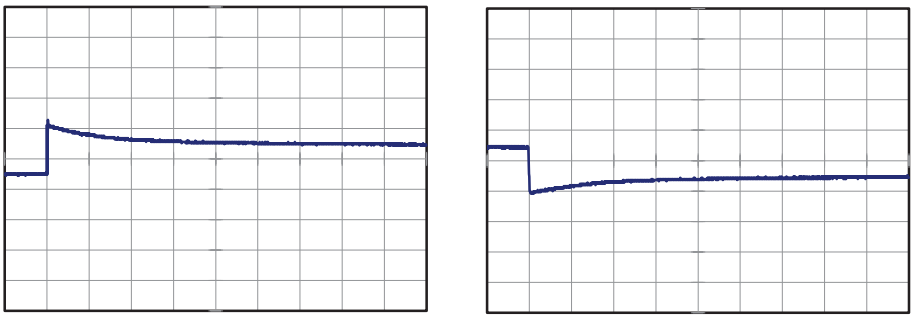
COSEL

Model	MGW61212
Item	Dynamic Load Response
Object	-12V0.25A

Temperature 25°C
Testing Circuitry Figure A

Input Volt. 12 V
+12V:rated load current.
Cycle 100 ms

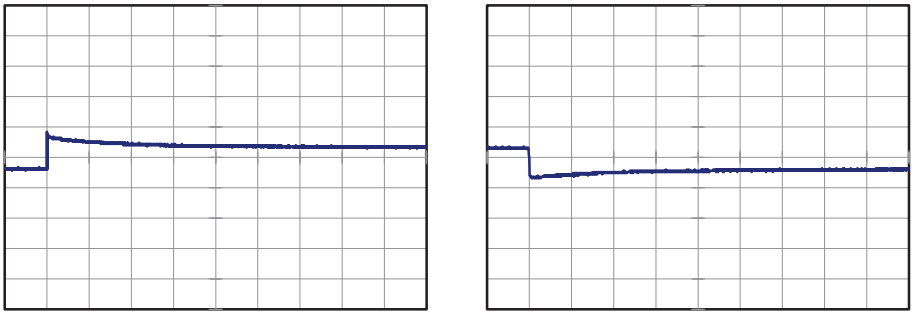
Min.Load (0A)←→
Load 100% (0.25A)



200 mV/div

4 ms/div 4 ms/div

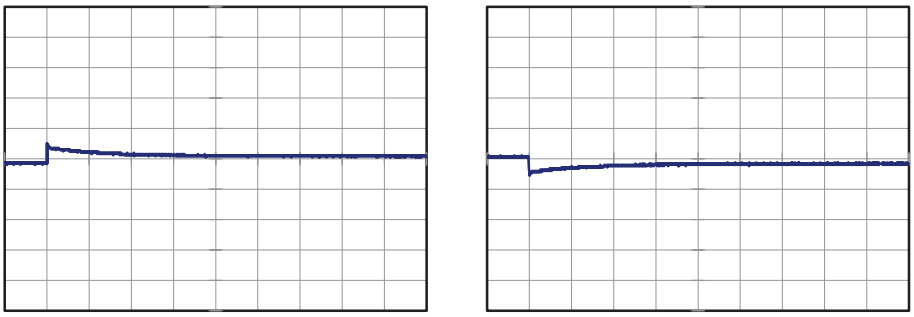
Min.Load (0A)←→
Load 50% (0.125A)



200 mV/div

4 ms/div 4 ms/div

Load 50% (0.125A)←→
Load 100% (0.25A)



200 mV/div

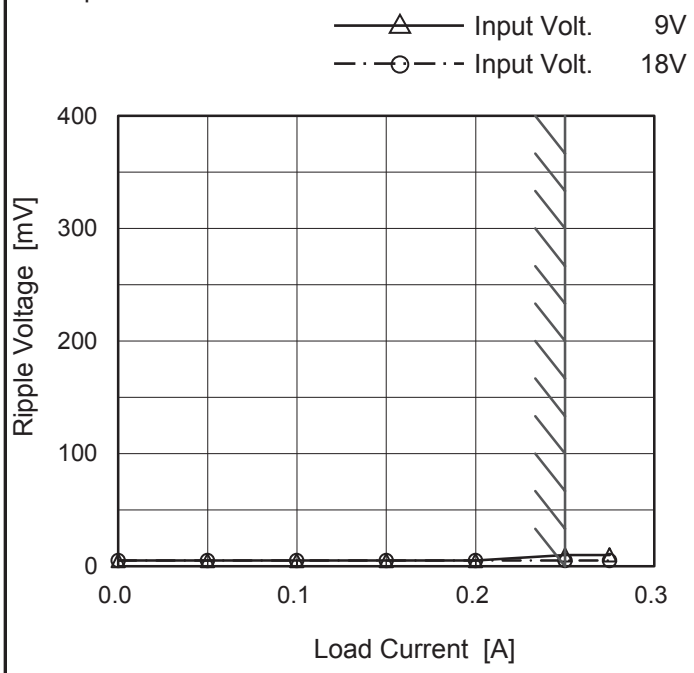
4 ms/div 4 ms/div

COSEL

Model	MGW61212
Item	Ripple Voltage (by Load Current)
Object	+12V0.25A

Temperature 25°C
Testing Circuitry Figure B

1.Graph



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

Ripple [mVp-p]

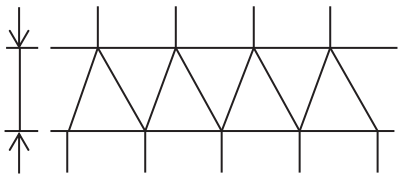


Fig.Complex Ripple Wave Form

2.Values

Load Current [A]	Ripple Voltage [mV]	
	Input Volt. 9 [V]	Input Volt. 18 [V]
0.000	5	5
0.050	5	5
0.100	5	5
0.150	5	5
0.200	5	5
0.250	10	5
0.275	10	5
--	-	-
--	-	-
--	-	-
--	-	-

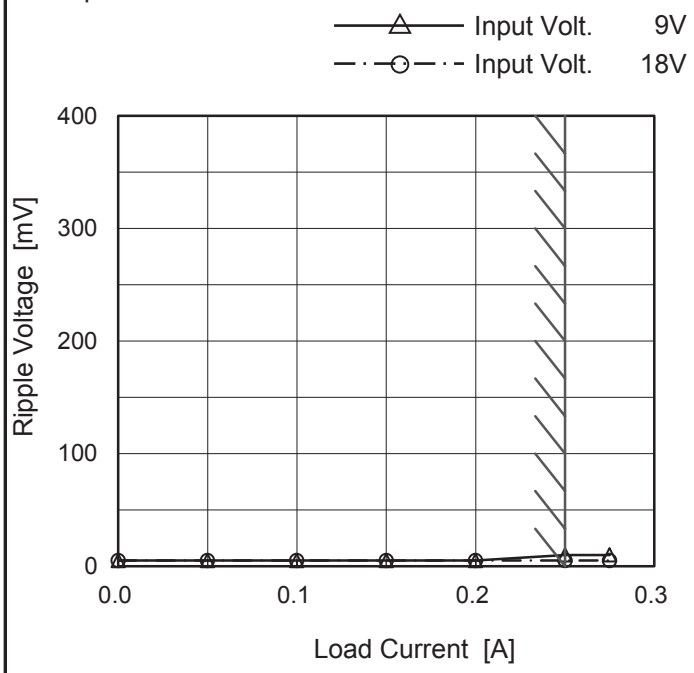
-12V: Rated Load Current

COSEL

Model	MGW61212
Item	Ripple Voltage (by Load Current)
Object	-12V0.25A

Temperature 25°C
Testing Circuitry Figure B

1.Graph



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

Ripple [mVp-p]

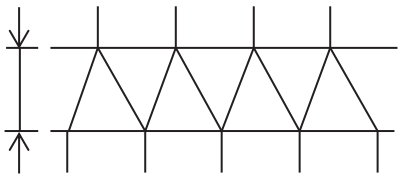


Fig.Complex Ripple Wave Form

2.Values

Load Current [A]	Ripple Voltage [mV]	
	Input Volt. 9 [V]	Input Volt. 18 [V]
0.000	5	5
0.050	5	5
0.100	5	5
0.150	5	5
0.200	5	5
0.250	10	5
0.275	10	5
--	-	-
--	-	-
--	-	-
--	-	-

+12V: Rated Load Current

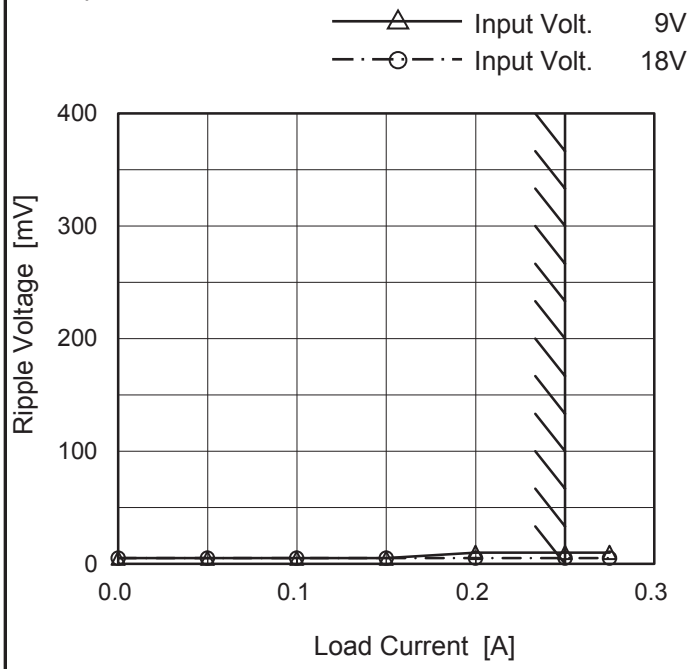
BC-11028

COSEL

Model	MGW61212
Item	Ripple-Noise
Object	+12V0.25A

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.

Ripple Noise[mVp-p]

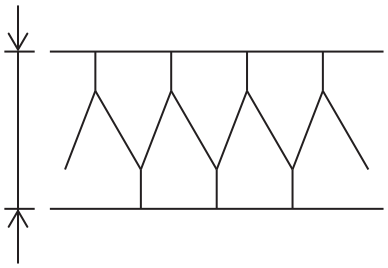


Fig.Complex Ripple Noise Wave Form

2.Values

Load Current [A]	Ripple-Noise [mV]	
	Input Volt. 9 [V]	Input Volt. 18 [V]
0.000	5	5
0.050	5	5
0.100	5	5
0.150	5	5
0.200	10	5
0.250	10	5
0.275	10	5
--	-	-
--	-	-
--	-	-
--	-	-

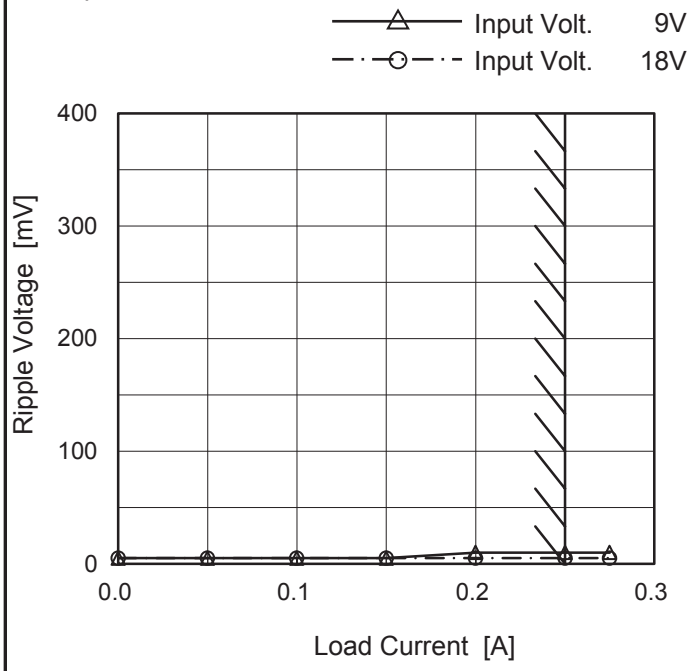
-12V: Rated Load Current

COSEL

Model	MGW61212
Item	Ripple-Noise
Object	-12V0.25A

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.

Ripple Noise[mVp-p]

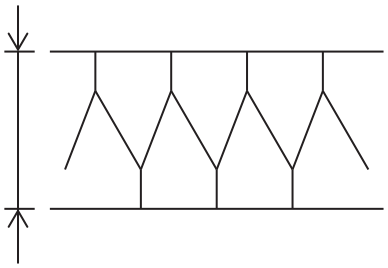


Fig.Complex Ripple Noise Wave Form

2.Values

Load Current [A]	Ripple-Noise [mV]	
	Input Volt. 9 [V]	Input Volt. 18 [V]
0.000	5	5
0.050	5	5
0.100	5	5
0.150	5	5
0.200	10	5
0.250	10	5
0.275	10	5
--	-	-
--	-	-
--	-	-
--	-	-

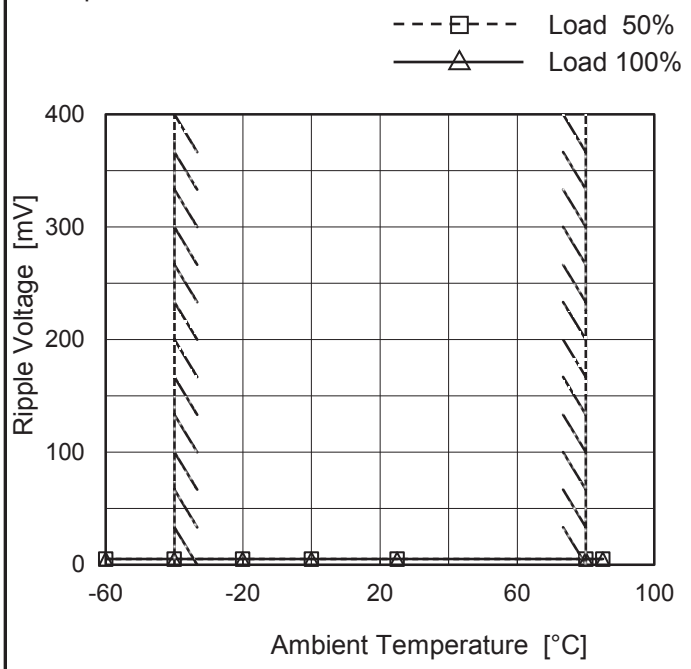
+12V: Rated Load Current

COSEL

Model	MGW61212
Item	Ripple Voltage (by Ambient Temp.)
Object	+12V0.25A

Testing Circuitry Figure B

1.Graph



Input Volt. 12V

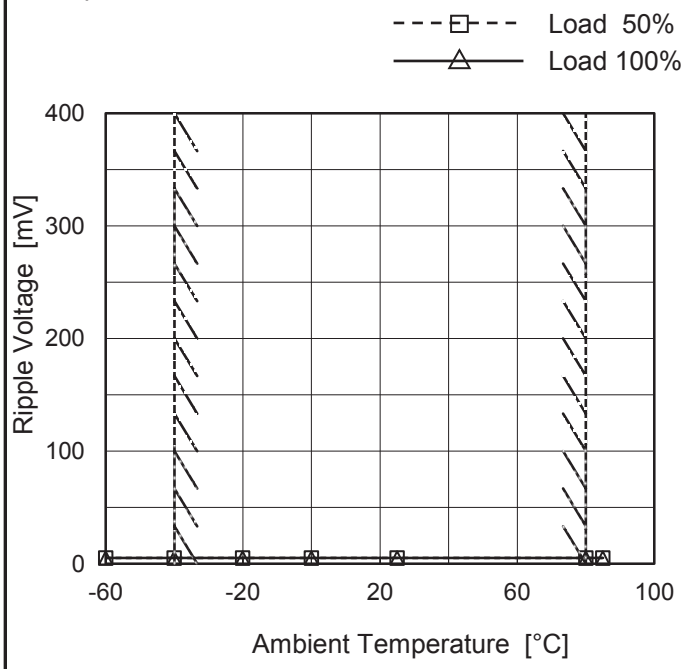
2.Values

Ambient Temperature [°C]	Ripple Voltage [mV]	
	Load 50%	Load 100%
-60	5	5
-40	5	5
-20	5	5
0	5	5
25	5	5
80	5	5
85	5	5
--	-	-
--	-	-
--	-	-
--	-	-

-12V: Rated Load Current

Object	-12V0.25A

1.Graph



Input Volt. 12V

Measured by 100 MHz Oscilloscope.

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

2.Values

Ambient Temperature [°C]	Ripple Voltage [mV]	
	Load 50%	Load 100%
-60	5	5
-40	5	5
-20	5	5
0	5	5
25	5	5
80	5	5
85	5	5
--	-	-
--	-	-
--	-	-
--	-	-

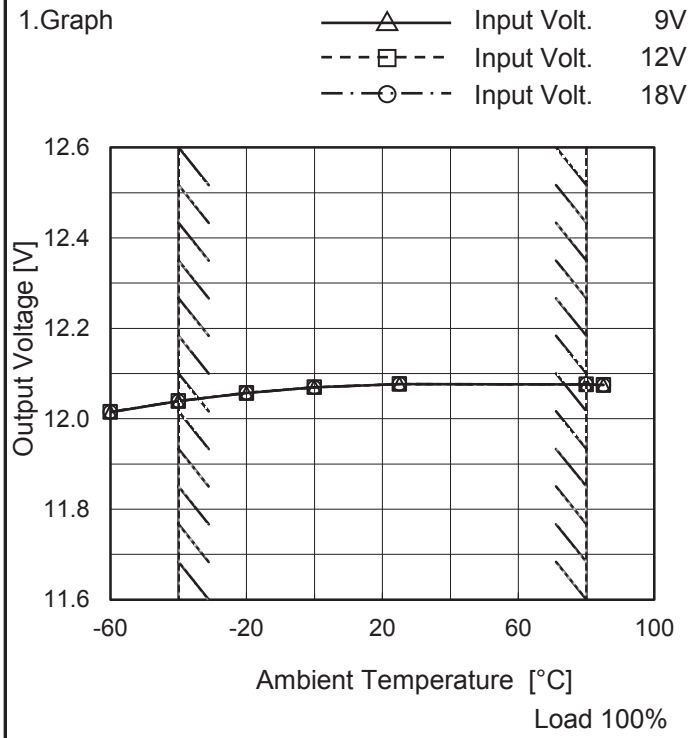
+12V: Rated Load Current

COSEL

Model	MGW61212
Item	Ambient Temperature Drift
Object	+12V0.25A

Testing Circuitry Figure A

1.Graph



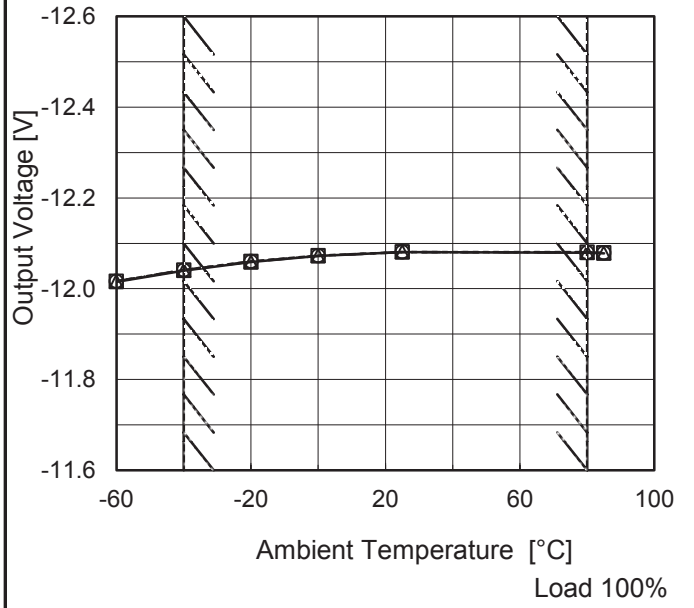
2.Values

Ambient Temperature [°C]	Output Voltage [V]		
	Input Volt. 9[V]	Input Volt. 12[V]	Input Volt. 18[V]
-60	12.015	12.015	12.015
-40	12.039	12.039	12.039
-20	12.057	12.058	12.057
0	12.070	12.070	12.069
25	12.077	12.077	12.077
80	12.076	12.076	12.076
85	12.075	12.075	12.074
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

-12V: Rated Load Current

Object	-12V0.25A

1.Graph



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

2.Values

Ambient Temperature [°C]	Output Voltage [V]		
	Input Volt. 9[V]	Input Volt. 12[V]	Input Volt. 18[V]
-60	-12.015	-12.016	-12.017
-40	-12.040	-12.041	-12.041
-20	-12.059	-12.060	-12.060
0	-12.072	-12.073	-12.073
25	-12.081	-12.081	-12.081
80	-12.080	-12.081	-12.080
85	-12.078	-12.079	-12.079
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

+12V: Rated Load Current

BC-11028

COSEL

Model	MGW61212	
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 - 80°C
Input Voltage : 9 - 18V
Load Current (AVR 1) : 0 - 0.25A (AVR 2) : 0 - 0.25A

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

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

2.Values

Object	+12V0.25A					
Item	Temperature [°C]	Input Voltage[V]	Output		Output Voltage Accuracy	
			Current[A]	Voltage[V]	Value [mV]	Ratio [%]
Maximum Voltage	80	9	0	12.322	±246	±2.1
Minimum Voltage	80	9	0.25	11.830		

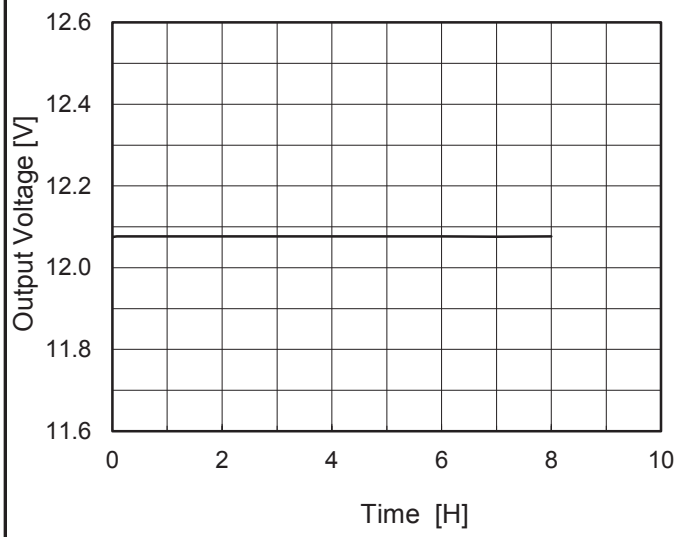
Object	-12V0.25A					
Item	Temperature [°C]	Input Voltage[V]	Output		Output Voltage Accuracy	
			Current[A]	Voltage[V]	Value [mV]	Ratio [%]
Maximum Voltage	80	9	0	-12.337	±247	±2.1
Minimum Voltage	80	9	0.25	-11.844		

COSEL

Model	MGW61212
Item	Time Lapse Drift
Object	+12V0.25A

Temperature 25°C
Testing Circuitry Figure A

1.Graph



Input Volt. 12V
Load 100%

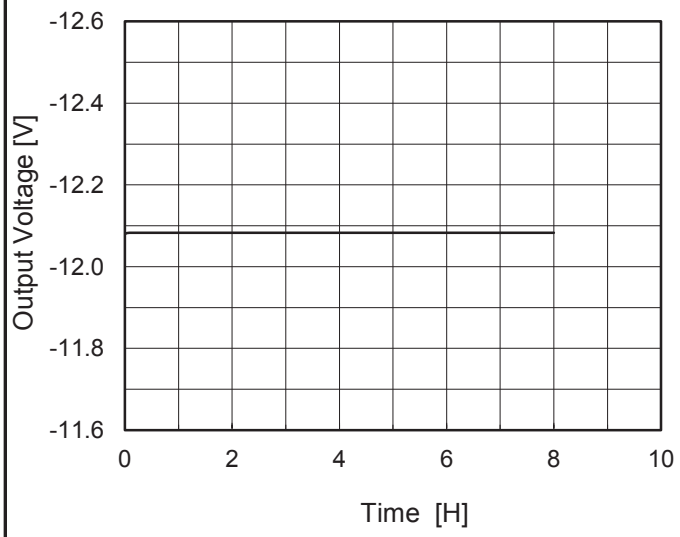
2.Values

Time since start [H]	Output Voltage [V]
0.0	12.074
0.5	12.077
1.0	12.076
2.0	12.076
3.0	12.076
4.0	12.077
5.0	12.077
6.0	12.077
7.0	12.076
8.0	12.077

-12V: Rated Load Current

Object	-12V0.25A

1.Graph



Input Volt. 12V
Load 100%

2.Values

Time since start [H]	Output Voltage [V]
0.0	-12.079
0.5	-12.083
1.0	-12.083
2.0	-12.083
3.0	-12.083
4.0	-12.083
5.0	-12.083
6.0	-12.083
7.0	-12.083
8.0	-12.083

+12V: Rated Load Current

BC-11028

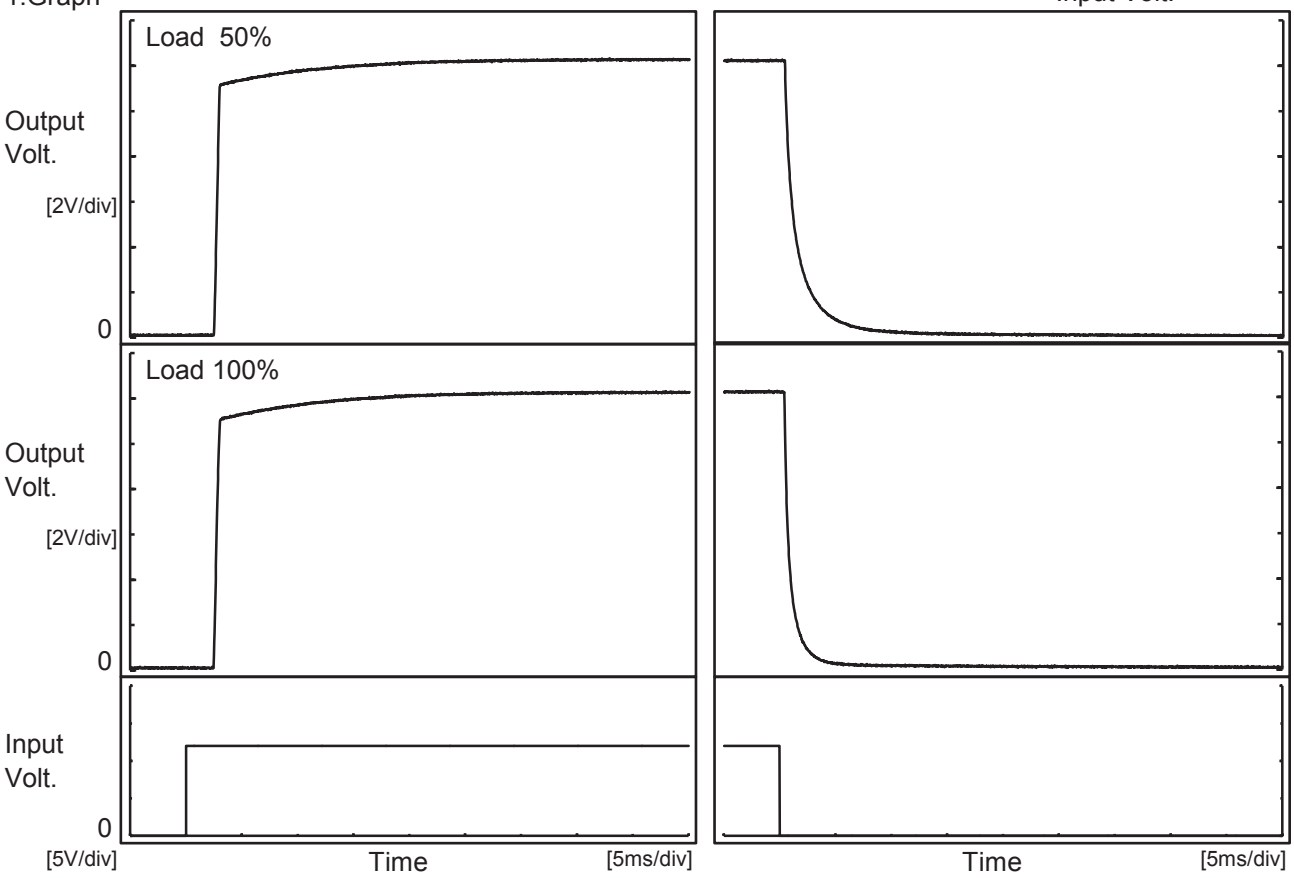
COSEL

Model	MGW61212
Item	Rise and Fall Time
Object	+12V0.25A

Temperature 25°C
Testing Circuitry Figure A

1.Graph

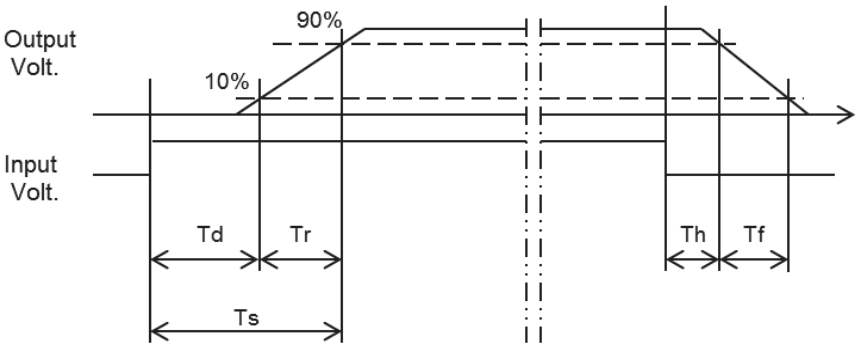
Input Volt. 12 V



2.Values

[ms]

Load \ Time	Td	Tr	Ts	Th	Tf
50 %	2.6	0.4	3.0	0.5	3.3
100 %	2.6	0.5	3.1	0.5	1.6



BC-11028

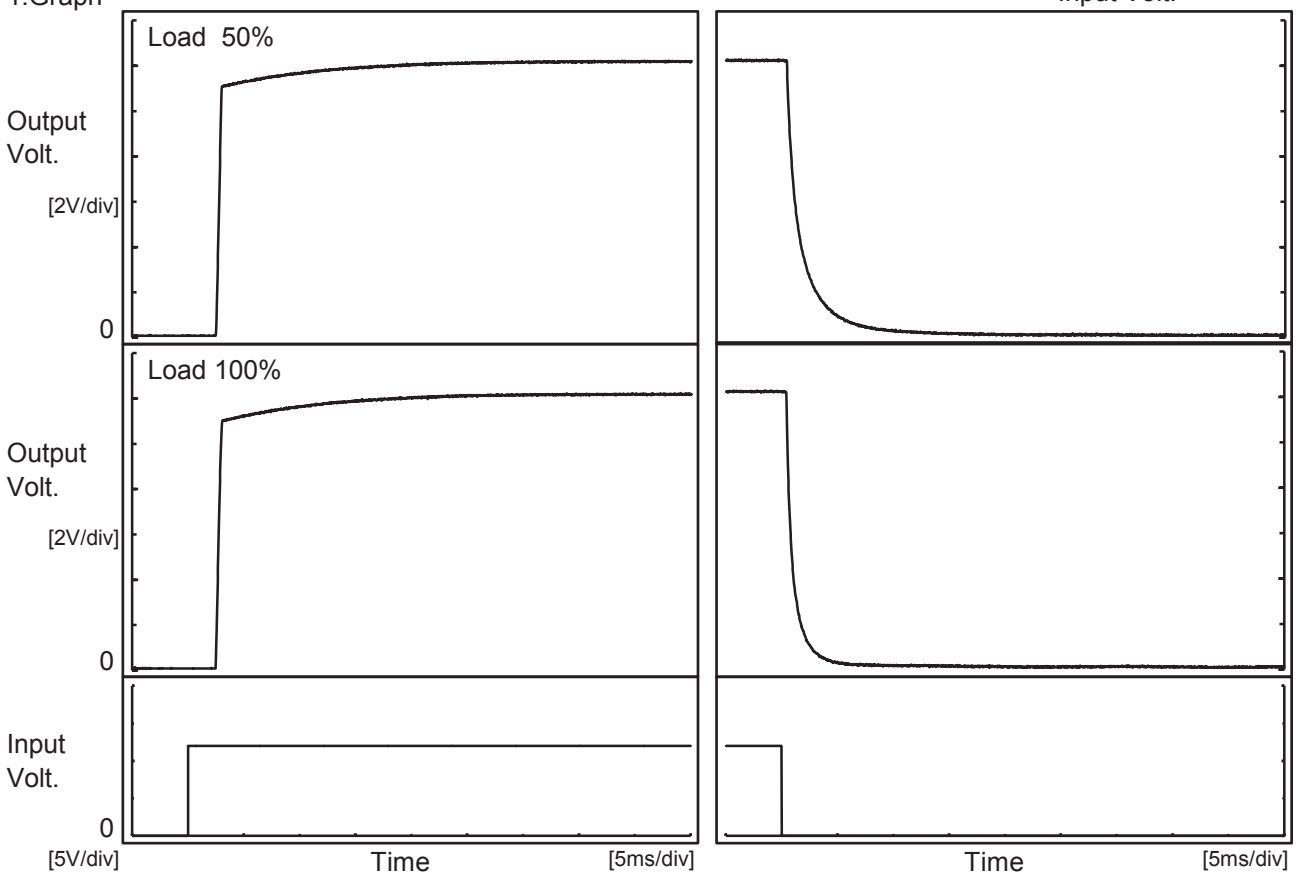
COSEL

Model	MGW61212
Item	Rise and Fall Time
Object	-12V0.25A

Temperature 25°C
Testing Circuitry Figure A

1.Graph

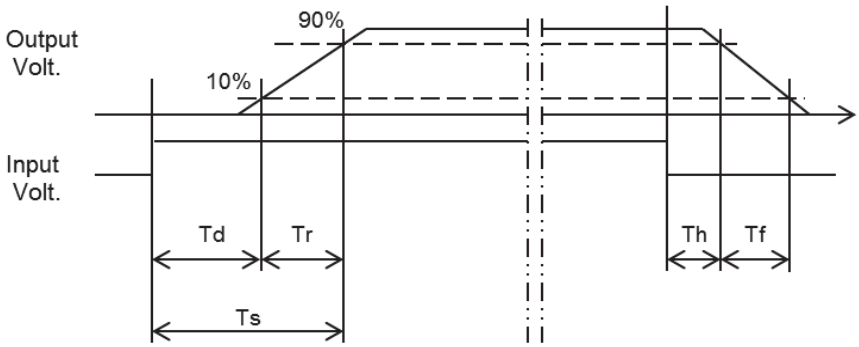
Input Volt. 12 V



2.Values

[ms]

Load \ Time	Td	Tr	Ts	Th	Tf
50 %	2.6	0.4	3.0	0.5	3.7
100 %	2.6	0.5	3.1	0.5	1.8



BC-11028

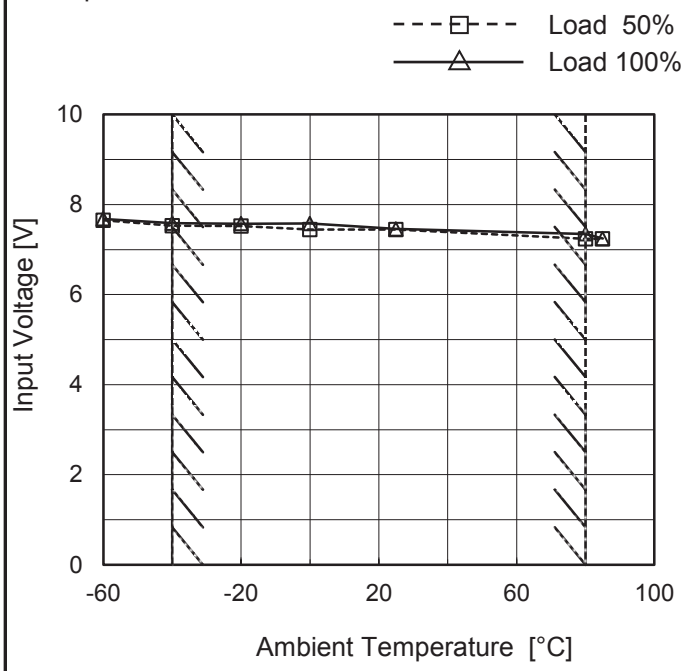
COSEL

Model	MGW61212
Item	Minimum Input Voltage for Regulated Output Voltage

Testing Circuitry Figure A

Object +12V0.25A

1.Graph

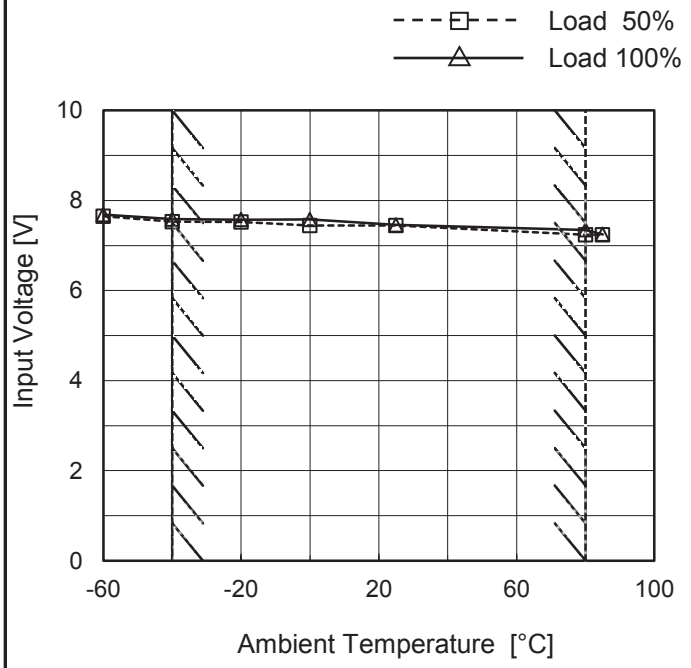


2.Values

Ambient Temperature [°C]	Input Voltage [V]	
	Load 50%	Load 100%
-60	7.7	7.7
-40	7.6	7.6
-20	7.6	7.6
0	7.5	7.6
25	7.5	7.5
80	7.3	7.4
85	7.3	7.3
--	-	-
--	-	-
--	-	-
--	-	-

Object -12V0.25A

1.Graph



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

2.Values

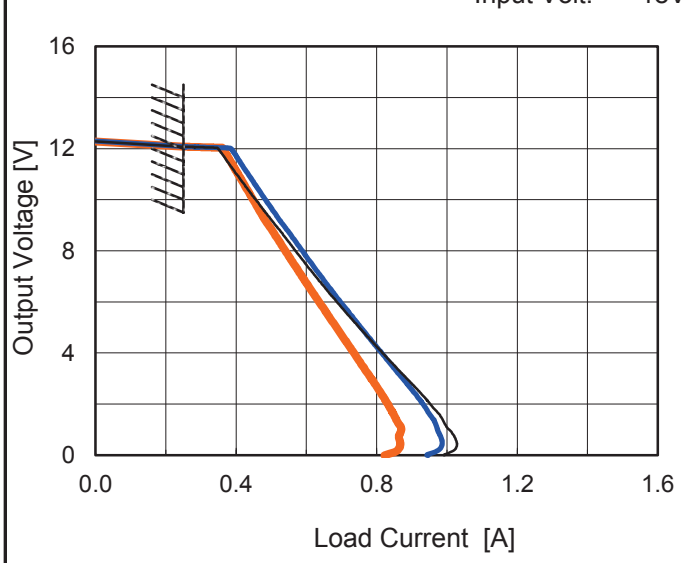
Ambient Temperature [°C]	Input Voltage [V]	
	Load 50%	Load 100%
-60	7.7	7.7
-40	7.6	7.6
-20	7.6	7.6
0	7.5	7.6
25	7.5	7.5
80	7.3	7.4
85	7.3	7.3
--	-	-
--	-	-
--	-	-
--	-	-

COSEL

Model	MGW61212
Item	Overcurrent Protection
Object	+12V0.25A

Temperature 25°C
Testing Circuitry Figure A

1.Graph



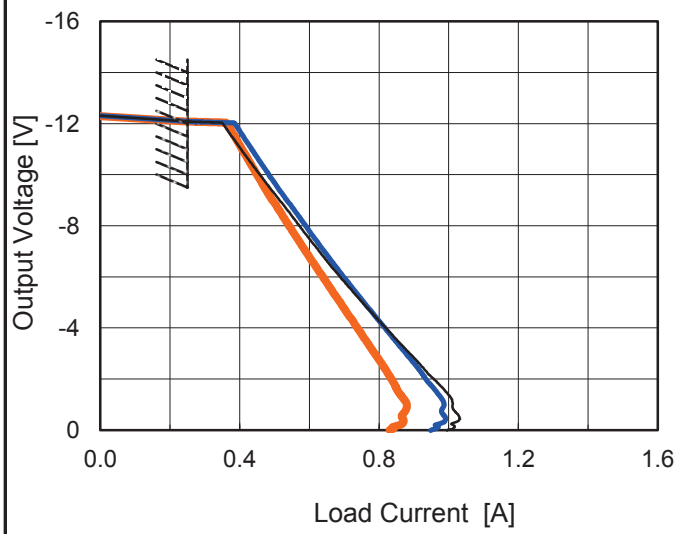
2.Values

Output Voltage [V]	Load Current [A]		
	Input Volt. 9[V]	Input Volt. 12[V]	Input Volt. 18[V]
11.4	0.38	0.41	0.39
10.8	0.41	0.44	0.41
9.6	0.48	0.50	0.46
8.4	0.55	0.57	0.52
7.2	0.61	0.63	0.58
6.0	0.68	0.70	0.63
4.8	0.76	0.76	0.69
3.6	0.84	0.84	0.75
2.4	0.93	0.91	0.81
1.2	0.99	0.97	0.86
0.0	0.99	0.95	0.82
--	-	-	-

-12V: Rated Load Current

Object	-12V0.25A

1.Graph



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

2.Values

Output Voltage [V]	Load Current [A]		
	Input Volt. 9[V]	Input Volt. 12[V]	Input Volt. 18[V]
-11.4	0.38	0.41	0.39
-10.8	0.41	0.44	0.41
-9.6	0.48	0.50	0.47
-8.4	0.55	0.57	0.52
-7.2	0.62	0.63	0.58
-6.0	0.69	0.70	0.64
-4.8	0.76	0.77	0.70
-3.6	0.85	0.84	0.76
-2.4	0.93	0.91	0.82
-1.2	1.01	0.98	0.87
0.0	0.99	0.95	0.83
--	-	-	-

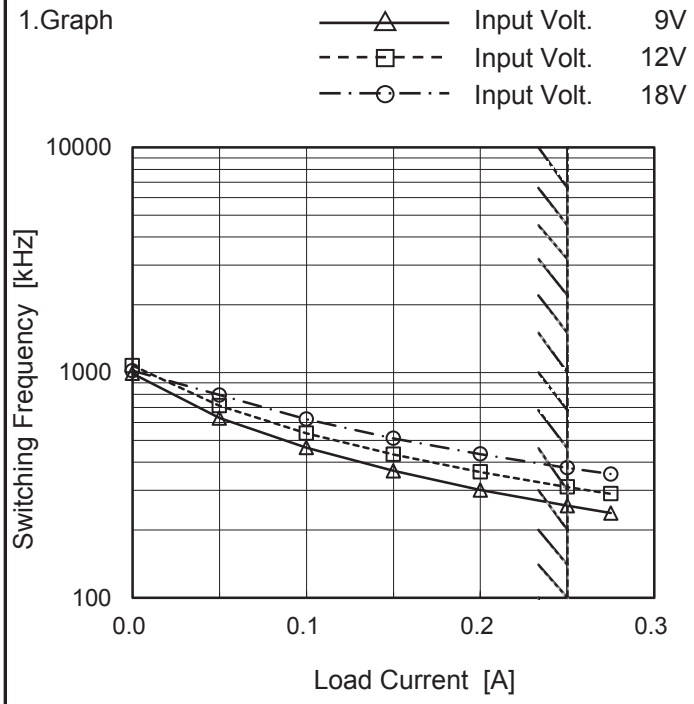
+12V: Rated Load Current

COSEL

Model	MGW61212
Item	Switching Frequency (by Load Current)
Object	+/-12V0.25A

Temperature 25°C
Testing Circuitry Figure A

1.Graph



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

-When load current is low, MG operates intermittently, so switching frequency would not become constant.

2.Values

Load Current [A]	Frequency [kHz]		
	Input Volt. 9[V]	Input Volt. 12[V]	Input Volt. 18[V]
0.000	992	1075	1020
0.050	628	712	795
0.100	464	537	621
0.150	366	434	510
0.200	301	362	435
0.250	256	310	378
0.275	238	290	354
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

BC-11028

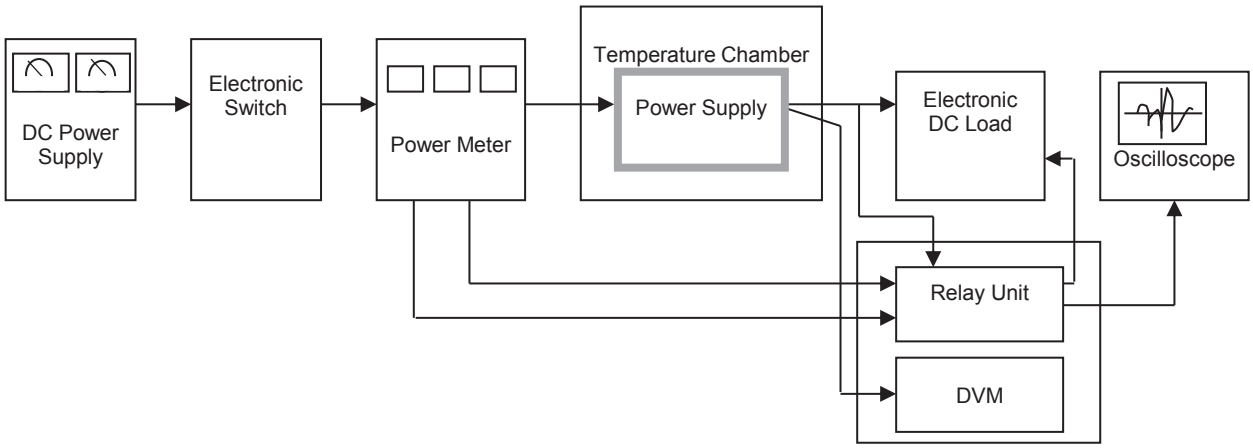


Figure A

Data Acquisition/Control Unit

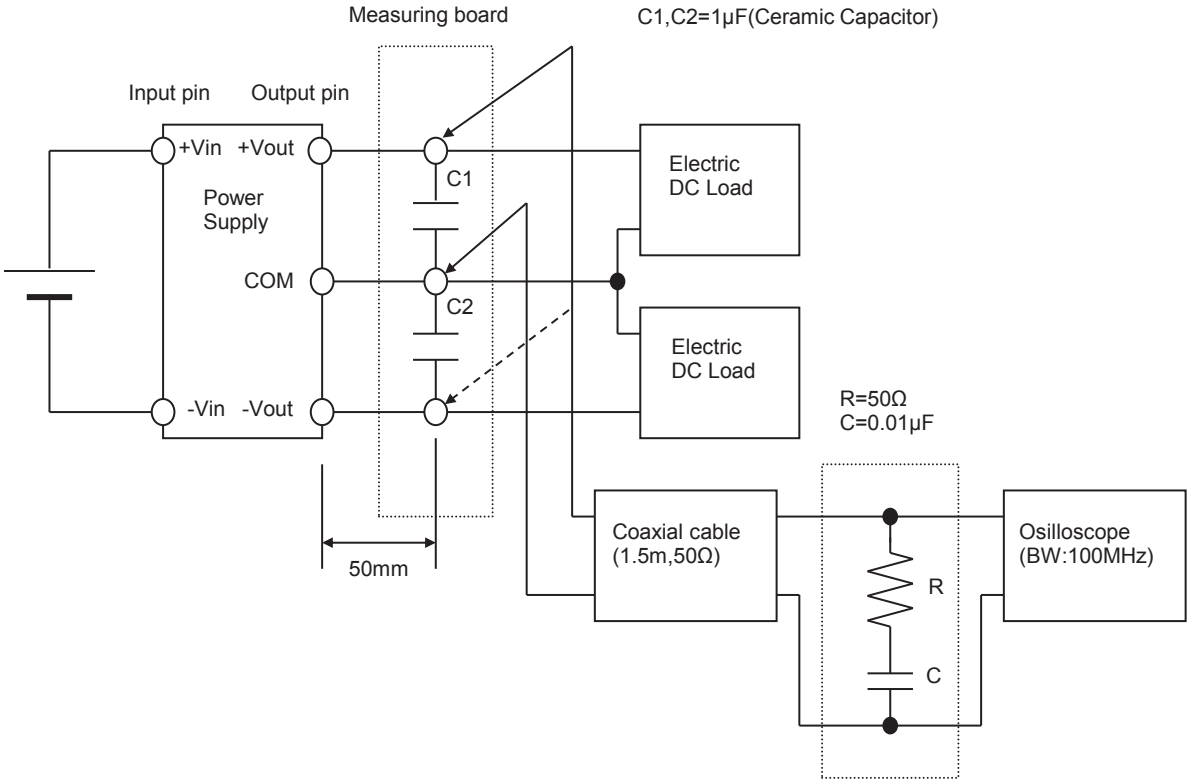


Figure B（Ripple and Ripple noise Characteristic）