参考資料

TEST DATA OF MGW60512

Regulated DC Power Supply
October 24, 2016

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COSEL CO.,LTD.

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CONTENTS

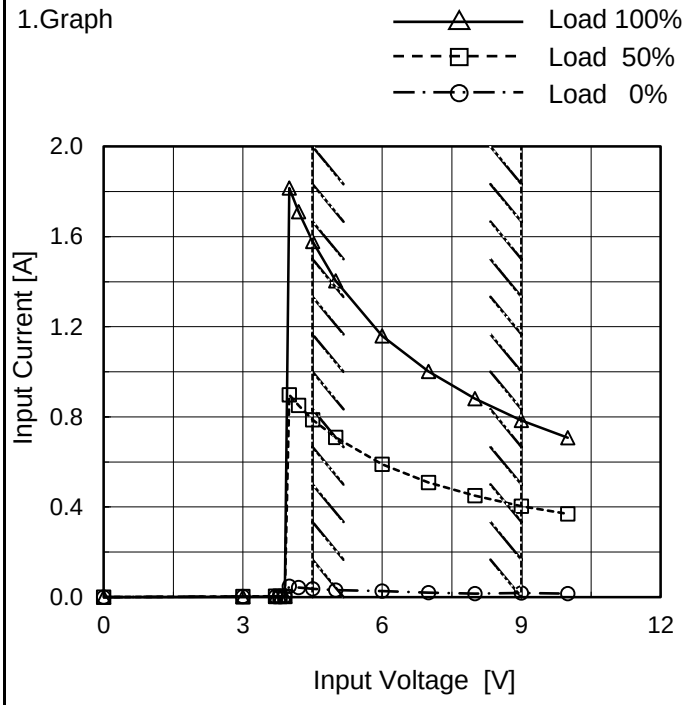
1.Input Current (by Input Voltage) ・・・・・・・・・・・・・・・・・・・・・・・・ 1
2.Input Ratio (by Load Ratio) ・・・・・・・・・・・・・・・・・・・・・・・・・・ 2
3.Input Power (by Load Ratio) ・・・・・・・・・・・・・・・・・・・・・・・・・・ 3
4.Efficiency (by Input Voltage) ・・・・・・・・・・・・・・・・・・・・・・・・・ 4
5.Efficiency (by Load Ratio) ・・・・・・・・・・・・・・・・・・・・・・・・・・・ 5
6.Line 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	MGW60512
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

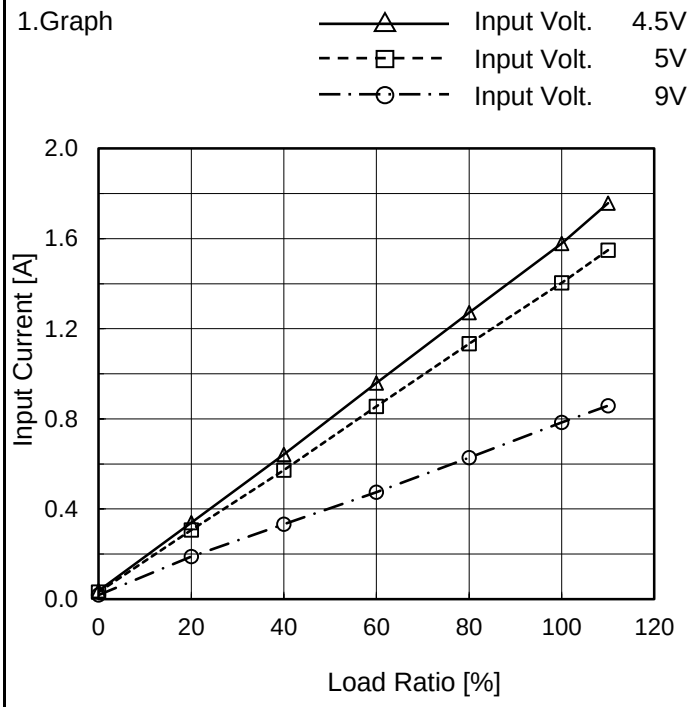
Input Voltage [V]	Input Current [A]		
	Load 0%	Load 50%	Load 100%
0.0	0.000	0.000	0.000
3.0	0.002	0.002	0.001
3.7	0.002	0.004	0.003
3.8	0.003	0.004	0.003
3.9	0.004	0.003	0.005
4.0	0.048	0.898	1.816
4.2	0.043	0.851	1.711
4.5	0.037	0.787	1.579
5.0	0.031	0.709	1.404
6.0	0.027	0.590	1.159
7.0	0.019	0.508	1.002
8.0	0.016	0.450	0.880
9.0	0.018	0.403	0.784
10.0	0.015	0.369	0.708
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

COSEL

Model	MGW60512
Item	Input Current (by Load Ratio)
Object	————————

Temperature 25°C
Testing Circuitry Figure A

1.Graph



2.Values

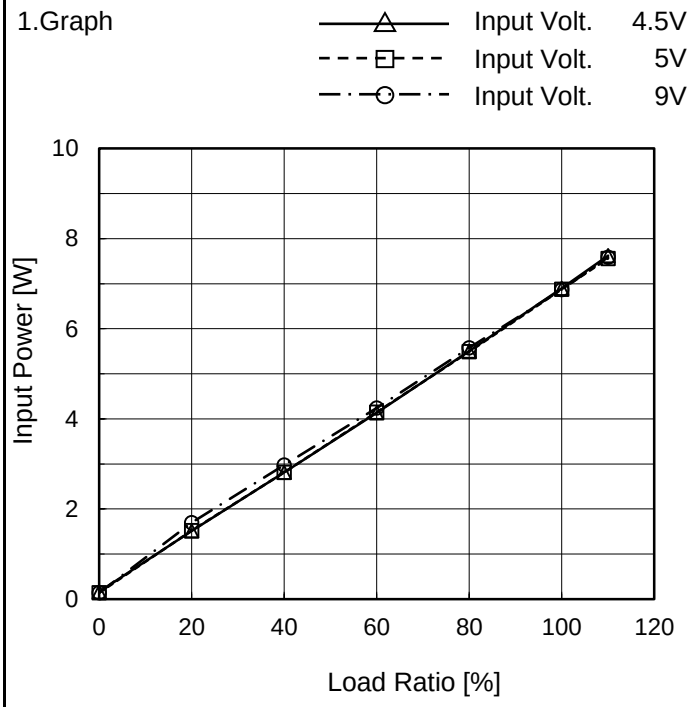
Load Ratio [%]	Input Current [A]		
	Input Volt. 4.5[V]	Input Volt. 5[V]	Input Volt. 9[V]
0	0.037	0.031	0.018
20	0.340	0.307	0.189
40	0.642	0.573	0.333
60	0.960	0.855	0.475
80	1.272	1.133	0.627
100	1.579	1.404	0.784
110	1.757	1.549	0.858
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

COSEL

Model	MGW60512
Item	Input Power (by Load Ratio)
Object	————————

Temperature 25°C
Testing Circuitry Figure A

1.Graph



2.Values

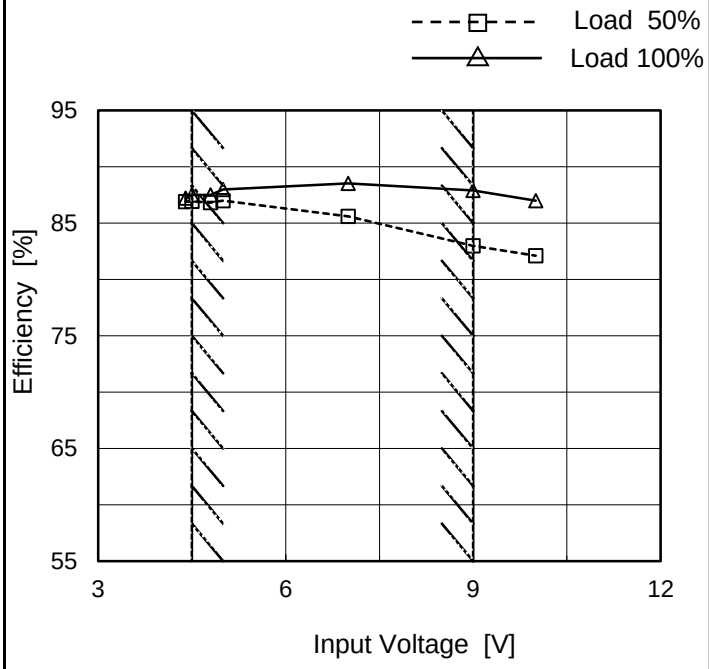
Load Ratio [%]	Input Power [W] Input Volt. 4.5[V]	Input Volt. 5[V]	Input Volt. 9[V]
0	0.16	0.14	0.14
20	1.51	1.52	1.70
40	2.81	2.81	2.98
60	4.14	4.15	4.24
80	5.51	5.49	5.58
100	6.90	6.88	6.87
110	7.62	7.56	7.59
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

COSEL

Model	MGW60512
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

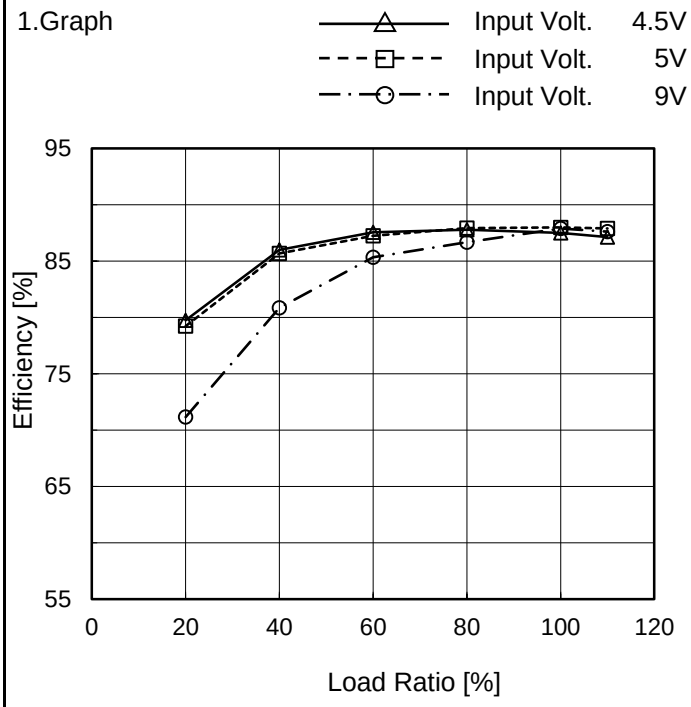
Input Voltage [V]	Efficiency [%]	
	Load 50%	Load 100%
4.4	86.9	87.2
4.5	86.9	87.5
4.8	86.8	87.5
5.0	87.0	88.0
7.0	85.6	88.5
9.0	83.0	87.9
10.0	82.1	87.0
--	-	-
--	-	-

COSEL

Model	MGW60512
Item	Efficiency (by Load Ratio)
Object	————————

Temperature 25°C
Testing Circuitry Figure A

1.Graph



2.Values

Load Ratio [%]	Efficiency [%] Input Volt. 4.5[V]	Input Volt. 5[V]	Input Volt. 9[V]
0	-	-	-
20	79.7	79.2	71.2
40	86.0	85.7	80.9
60	87.6	87.3	85.4
80	87.8	87.9	86.7
100	87.5	88.0	87.9
110	87.1	87.9	87.6
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

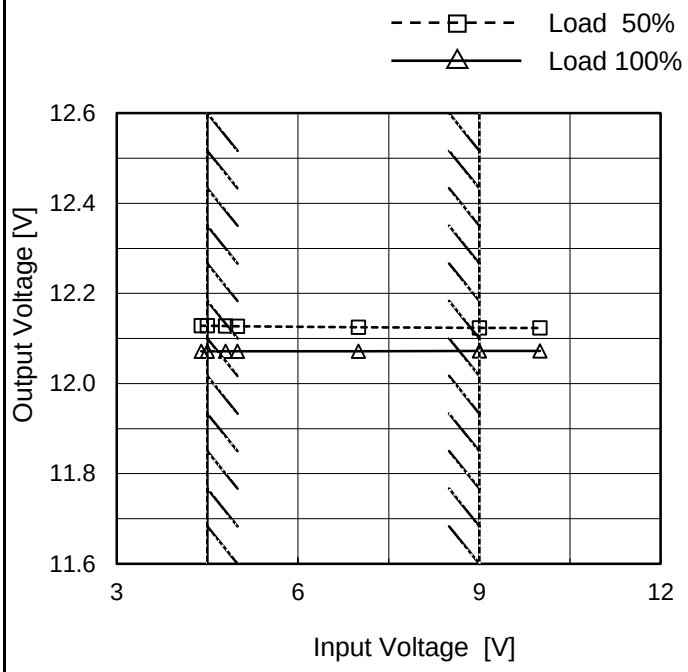
COSEL

Model	MGW60512
Item	Line Regulation

Temperature 25°C
Testing Circuitry Figure A

Object +12V0.25A

1.Graph



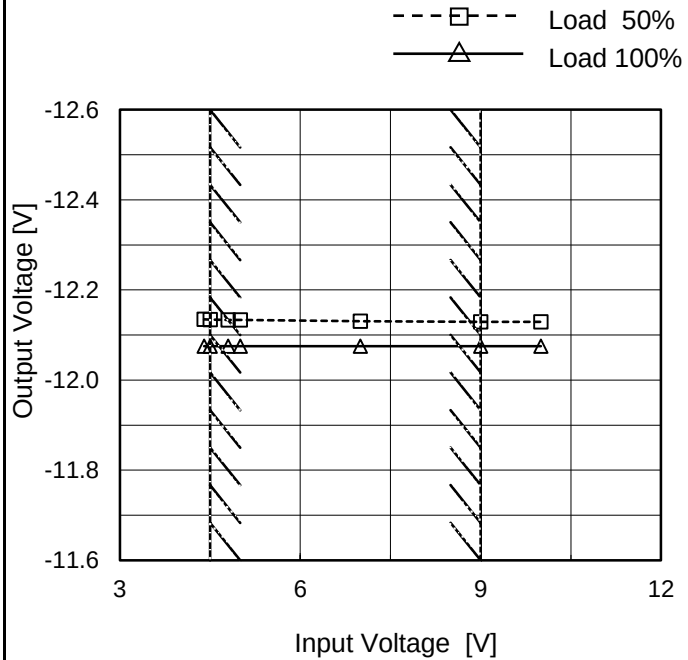
2.Values

Input Voltage [V]	Output Voltage [V]	
	Load 50%	Load 100%
4.4	12.128	12.072
4.5	12.128	12.072
4.8	12.128	12.072
5.0	12.127	12.072
7.0	12.125	12.072
9.0	12.124	12.072
10.0	12.123	12.072
--	-	-
--	-	-

-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%
4.4	-12.135	-12.075
4.5	-12.135	-12.075
4.8	-12.134	-12.075
5.0	-12.134	-12.075
7.0	-12.131	-12.075
9.0	-12.130	-12.075
10.0	-12.129	-12.075
--	-	-
--	-	-

+12V: Rated Load Current

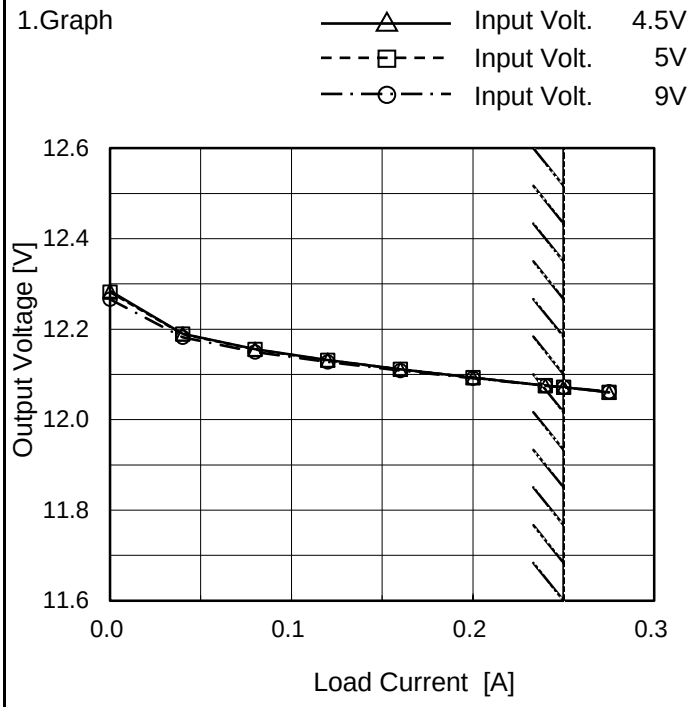
COSEL

Model	MGW60512
Item	Load Regulation

Temperature 25°C
Testing Circuitry Figure A

Object +12V0.25A

1.Graph



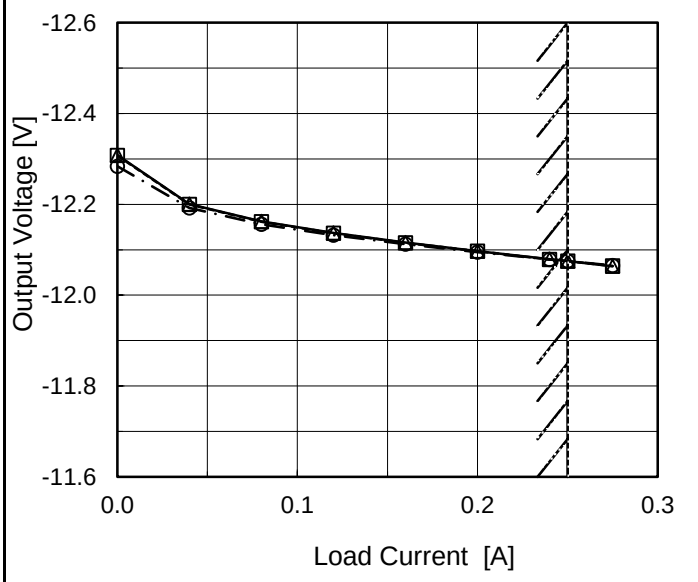
2.Values

Load Current [A]	Output Voltage [V] Input Volt. 4.5[V]	Input Volt. 5[V]	Input Volt. 9[V]
0.000	12.285	12.282	12.266
0.040	12.190	12.189	12.182
0.080	12.156	12.155	12.150
0.120	12.132	12.131	12.128
0.160	12.111	12.111	12.109
0.200	12.093	12.093	12.092
0.240	12.076	12.076	12.076
0.250	12.072	12.072	12.072
0.275	12.060	12.061	12.062
--	-	-	-
--	-	-	-

-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. 4.5[V]	Input Volt. 5[V]	Input Volt. 9[V]
0.000	-12.309	-12.308	-12.284
0.040	-12.201	-12.200	-12.192
0.080	-12.163	-12.162	-12.156
0.120	-12.137	-12.136	-12.132
0.160	-12.116	-12.115	-12.112
0.200	-12.097	-12.097	-12.095
0.240	-12.079	-12.079	-12.079
0.250	-12.075	-12.075	-12.075
0.275	-12.064	-12.064	-12.065
--	-	-	-
--	-	-	-

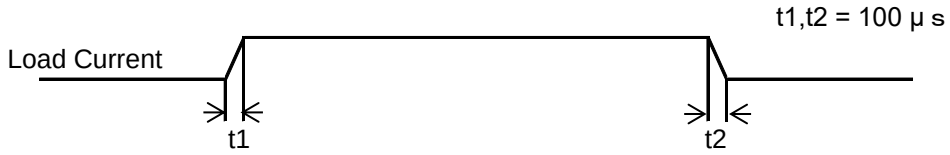
+12V: Rated Load Current

COSEL

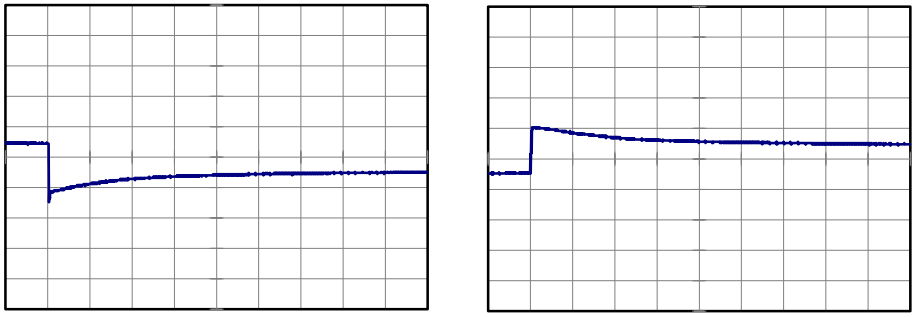
Model	MGW60512
Item	Dynamic Load Response
Object	+12V0.25A

Temperature 25°C
Testing Circuitry Figure A

Input Volt. 5 V
-12V:rated load current.
Cycle 100 ms



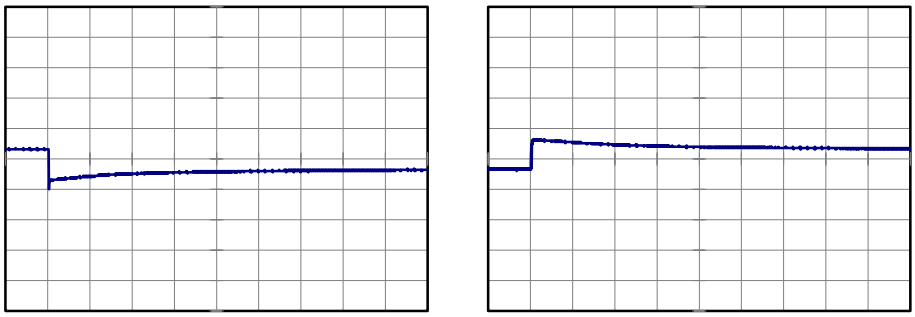
Min.Load (0A)←→
Load 100% (0.25A)



200 mV/div

4 ms/div 4 ms/div

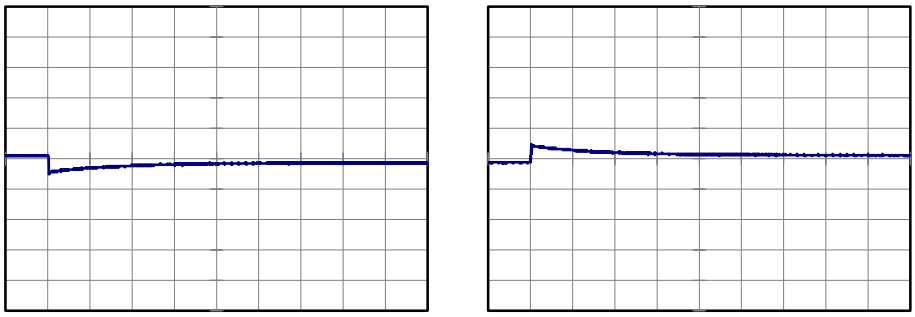
Min.Load (0A)←→
Load 50% (0.125A)



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	MGW60512
Item	Dynamic Load Response
Object	-12V0.25A

Temperature 25°C
Testing Circuitry Figure A

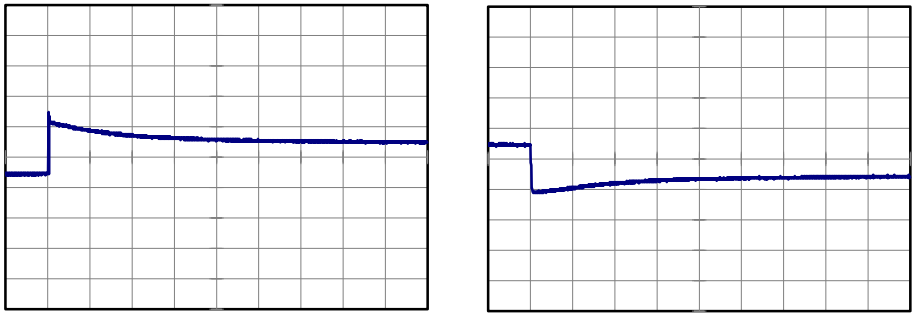
Input Volt. 5 V
+12V:rated load current.
Cycle 100 ms

t1,t2 = 100 μs

Load Current

t1 t2

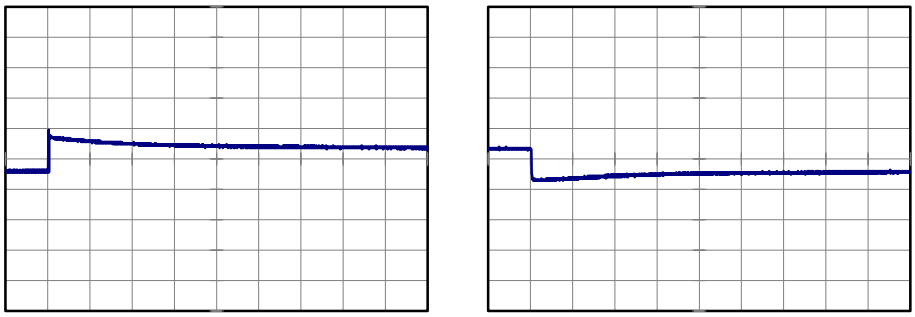
Min.Load (0A)←→
Load 100% (0.25A)



200 mV/div

4 ms/div 4 ms/div

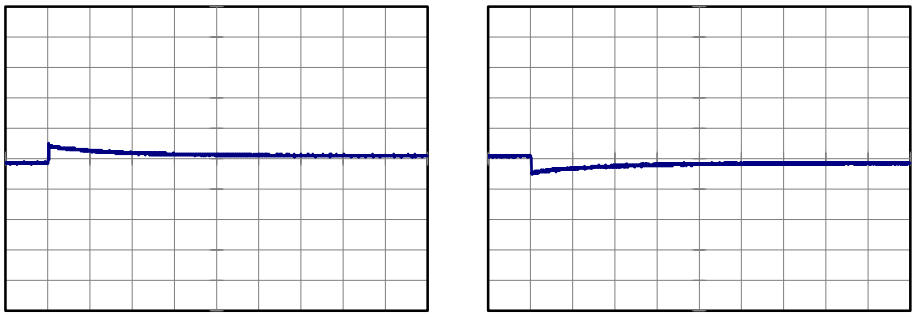
Min.Load (0A)←→
Load 50% (0.125A)



200 mV/div

4 ms/div 4 ms/div

Load 50% (0.125A)←→
Load 100% (0.25A)



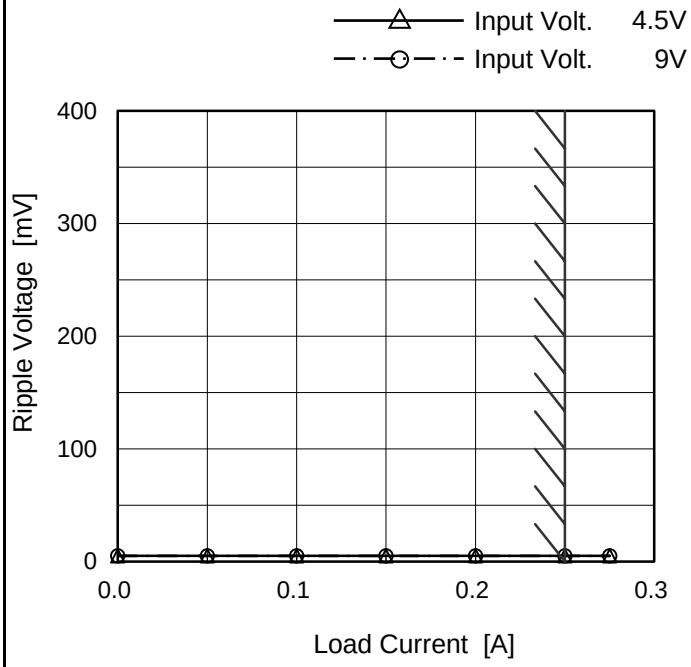
200 mV/div

4 ms/div 4 ms/div

Model	MGW60512
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]

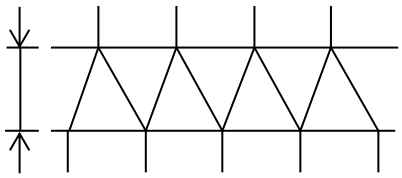


Fig.Complex Ripple Wave Form

2.Values

Load Current [A]	Ripple Voltage [mV]	
	Input Volt. 4.5 [V]	Input Volt. 9 [V]
0.000	5	5
0.050	5	5
0.100	5	5
0.150	5	5
0.200	5	5
0.250	5	5
0.275	5	5
--	-	-
--	-	-
--	-	-
--	-	-

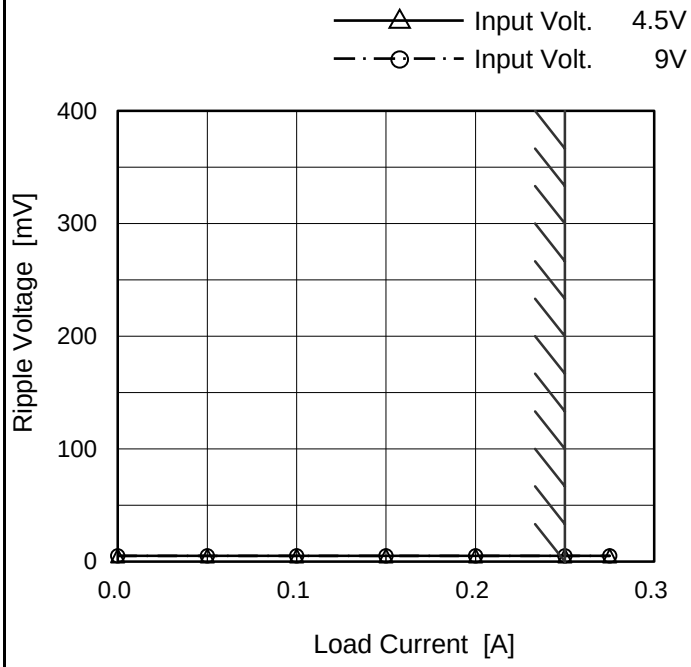
-12V: Rated Load Current

COSEL

Model	MGW60512
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]

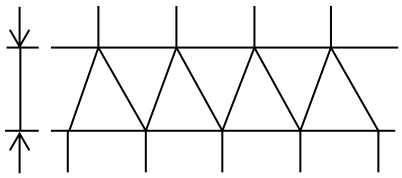


Fig.Complex Ripple Wave Form

2.Values

Load Current [A]	Ripple Voltage [mV]	
	Input Volt. 4.5 [V]	Input Volt. 9 [V]
0.000	5	5
0.050	5	5
0.100	5	5
0.150	5	5
0.200	5	5
0.250	5	5
0.275	5	5
--	-	-
--	-	-
--	-	-
--	-	-

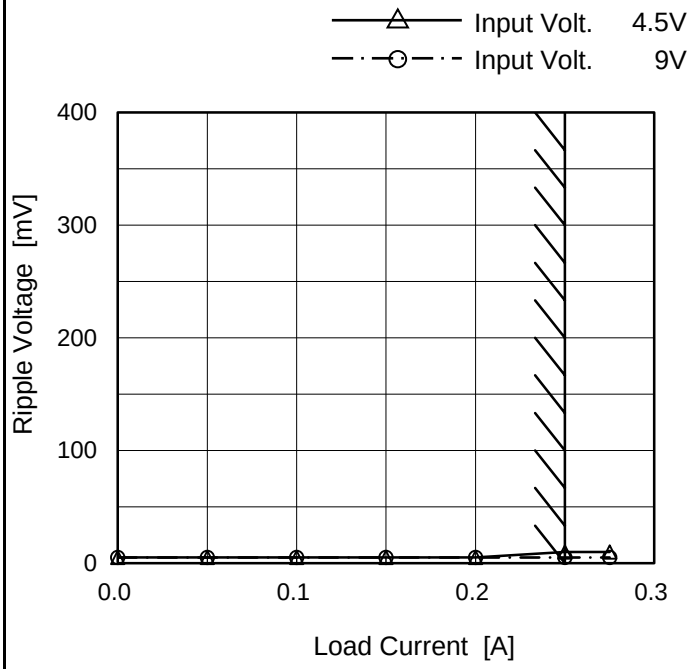
+12V: Rated Load Current

COSEL

Model	MGW60512
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]

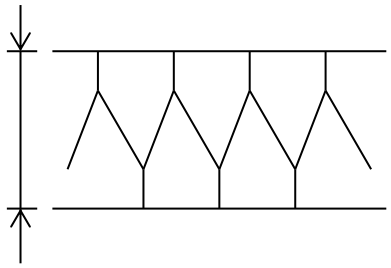


Fig.Complex Ripple Noise Wave Form

2.Values

Load Current [A]	Ripple-Noise [mV]	
	Input Volt. 4.5 [V]	Input Volt. 9 [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
--	-	-
--	-	-
--	-	-
--	-	-

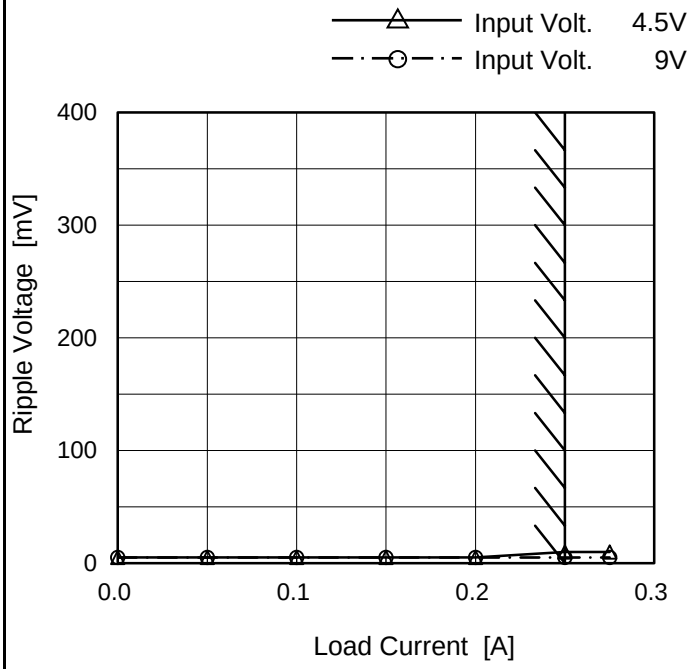
-12V: Rated Load Current

COSEL

Model	MGW60512
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]

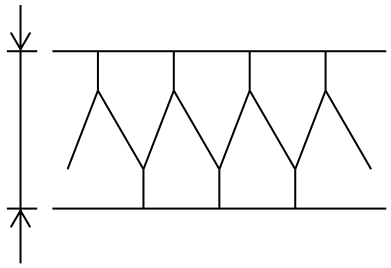


Fig.Complex Ripple Noise Wave Form

2.Values

Load Current [A]	Ripple-Noise [mV]	
	Input Volt. 4.5 [V]	Input Volt. 9 [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
--	-	-
--	-	-
--	-	-
--	-	-

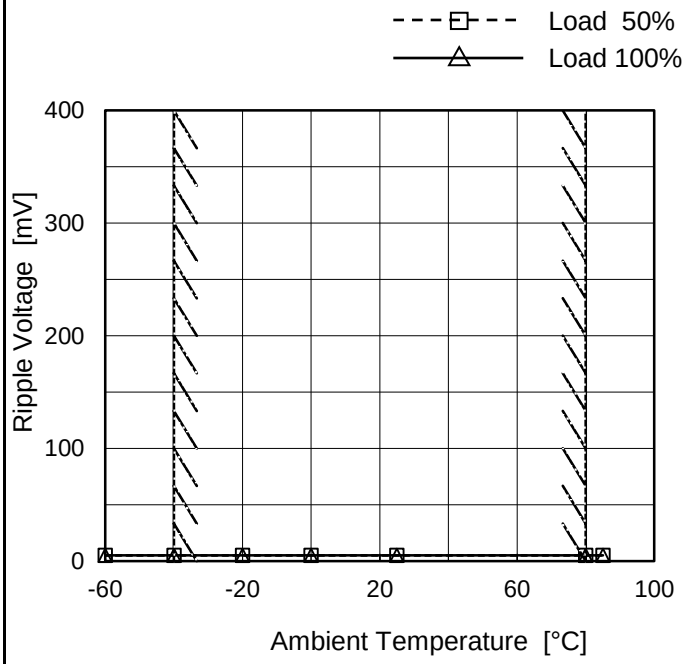
+12V: Rated Load Current

COSEL

Model	MGW60512
Item	Ripple Voltage (by Ambient Temp.)
Object	+12V0.25A

Testing Circuitry Figure B

1.Graph



Input Volt. 5V

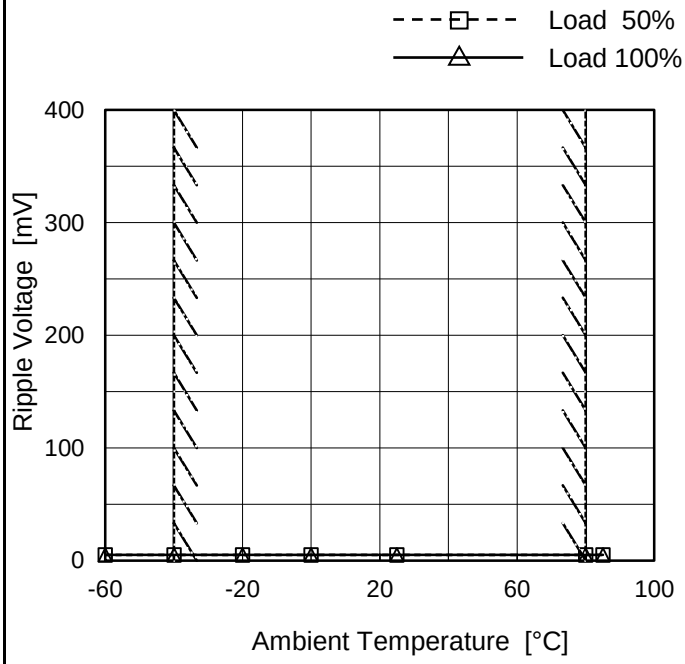
2.Values

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. 5V

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
--	-	-
--	-	-
--	-	-
--	-	-

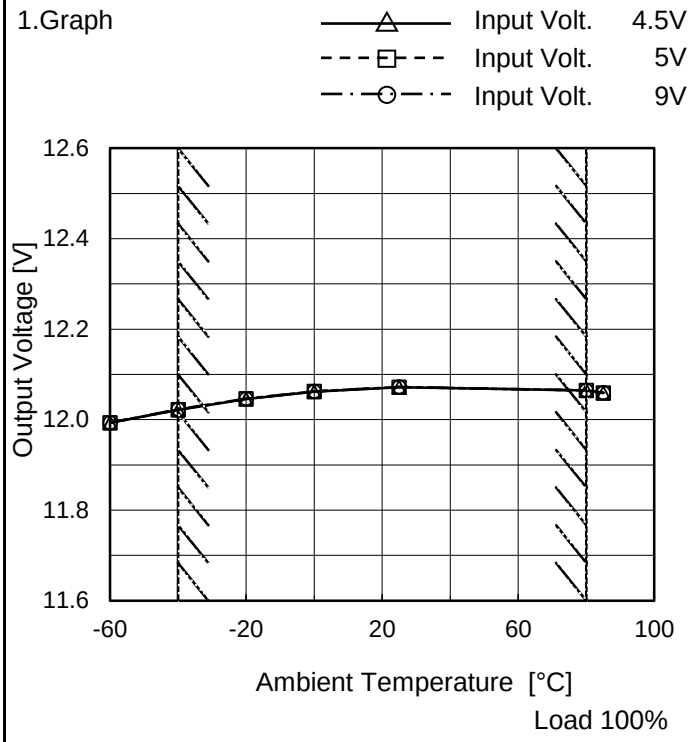
+12V: Rated Load Current

COSEL

Model	MGW60512
Item	Ambient Temperature Drift
Object	+12V0.25A

Testing Circuitry Figure A

1.Graph



Load 100%

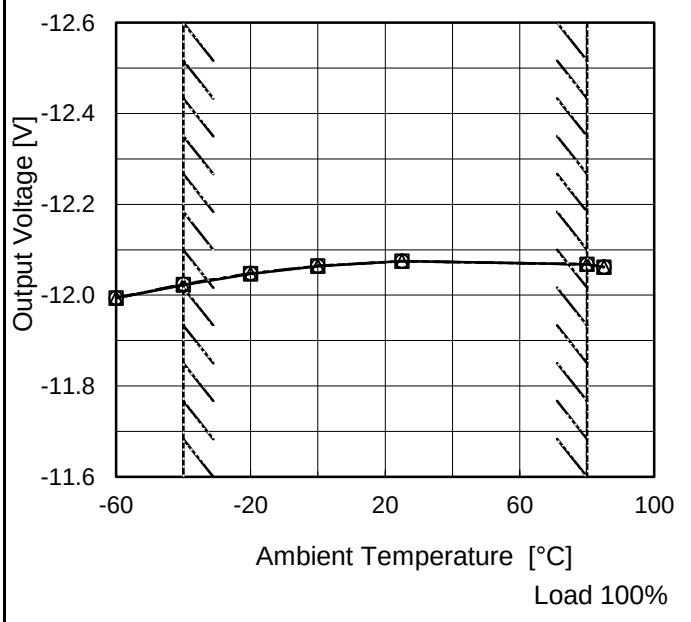
2.Values

Ambient Temperature [°C]	Output Voltage [V] Input Volt. 4.5[V]	Input Volt. 5[V]	Input Volt. 9[V]
-60	11.993	11.993	11.993
-40	12.022	12.022	12.023
-20	12.046	12.046	12.047
0	12.062	12.062	12.062
25	12.072	12.072	12.073
80	12.065	12.064	12.065
85	12.059	12.059	12.060
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

-12V: Rated Load Current

Object	-12V0.25A

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. 4.5[V]	Input Volt. 5[V]	Input Volt. 9[V]
-60	-11.993	-11.994	-11.994
-40	-12.022	-12.023	-12.024
-20	-12.047	-12.048	-12.049
0	-12.064	-12.064	-12.065
25	-12.075	-12.075	-12.075
80	-12.068	-12.068	-12.068
85	-12.062	-12.062	-12.063
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

+12V: Rated Load Current

COSEL

Model	MGW60512	
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 : 4.5 - 9V
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	4.5	0	12.300	±247	±2.1
Minimum Voltage	-40	4.5	0.25	11.807		

Object	-12V0.25A					
Item	Temperature [°C]	Input Voltage[V]	Output		Output Voltage Accuracy	
			Current[A]	Voltage[V]	Value [mV]	Ratio [%]
Maximum Voltage	80	4.5	0	-12.319	±243	±2.0
Minimum Voltage	-40	4.5	0.25	-11.834		

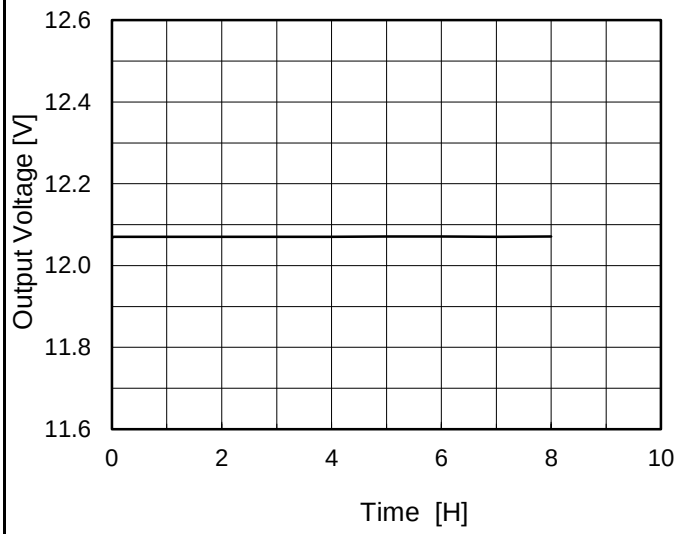
COSEL

Model	MGW60512
Item	Time Lapse Drift

Temperature 25°C
Testing Circuitry Figure A

Object +12V0.25A

1.Graph



Input Volt. 5V
Load 100%

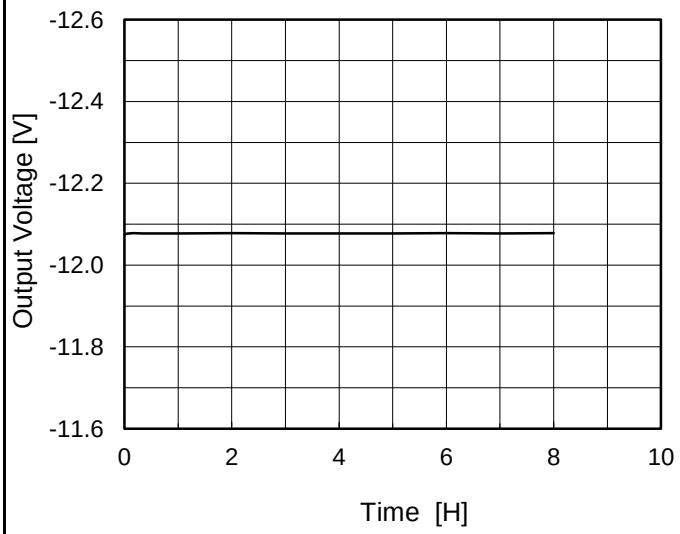
2.Values

Time since start [H]	Output Voltage [V]
0.0	12.067
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

-12V: Rated Load Current

Object -12V0.25A

1.Graph



Input Volt. 5V
Load 100%

2.Values

Time since start [H]	Output Voltage [V]
0.0	-12.073
0.5	-12.078
1.0	-12.078
2.0	-12.078
3.0	-12.078
4.0	-12.078
5.0	-12.078
6.0	-12.078
7.0	-12.077
8.0	-12.078

+12V: Rated Load Current

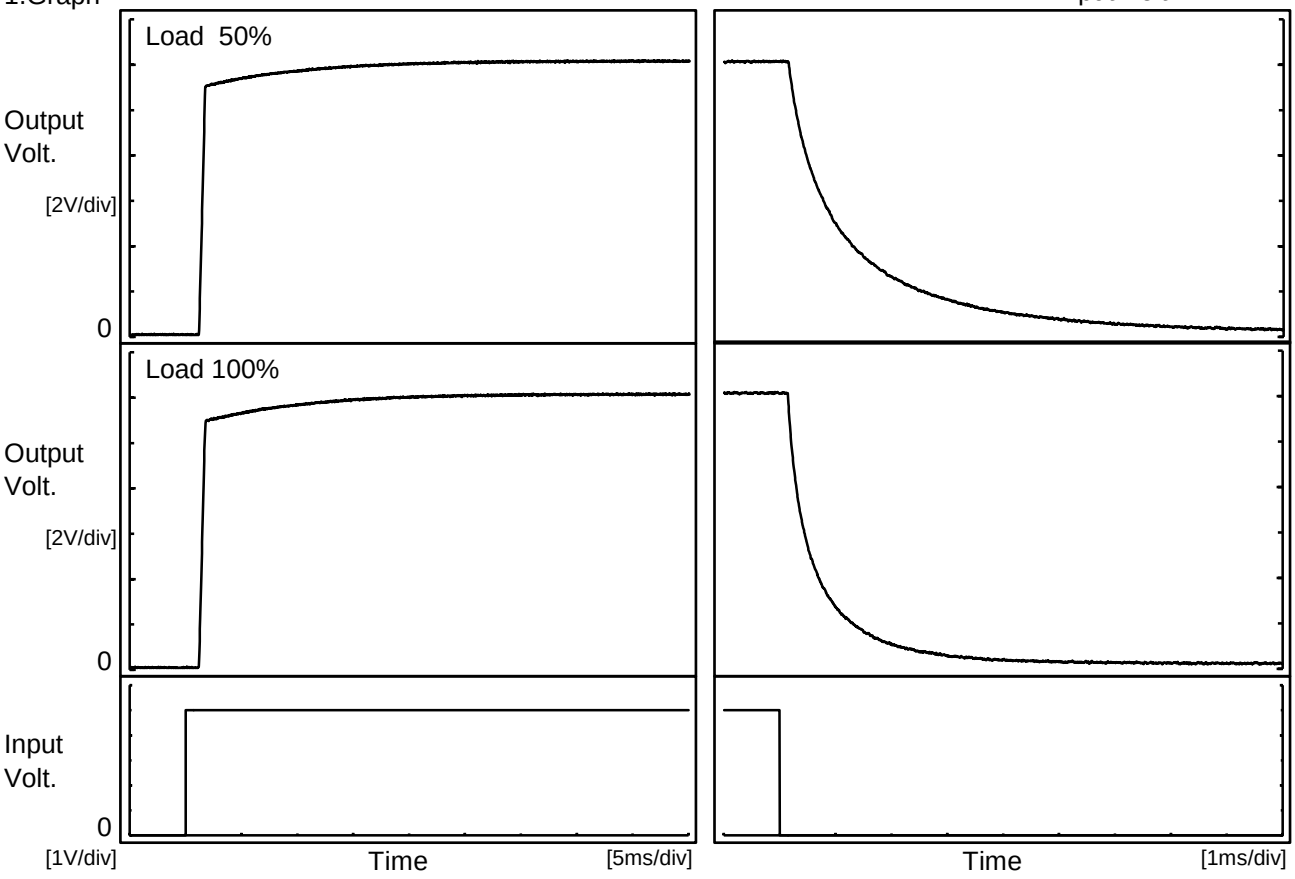
COSEL

Model	MGW60512
Item	Rise and Fall Time
Object	+12V0.25A

Temperature 25°C
Testing Circuitry Figure A

1.Graph

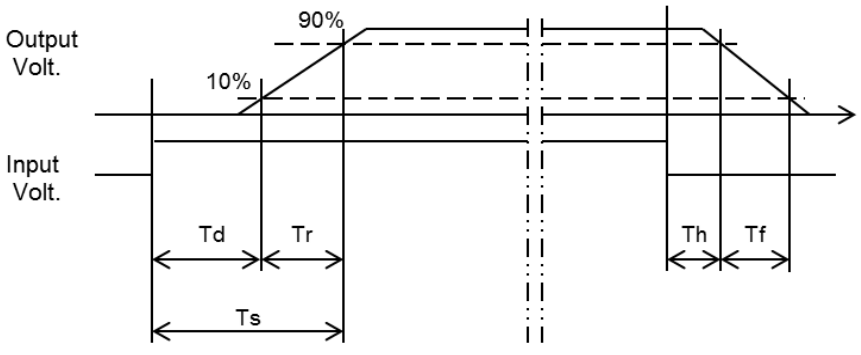
Input Volt. 5 V



2.Values

[ms]

Load \ Time	Td	Tr	Ts	Th	Tf
50 %	1.3	0.5	1.8	0.2	3.3
100 %	1.3	0.5	1.8	0.2	1.6

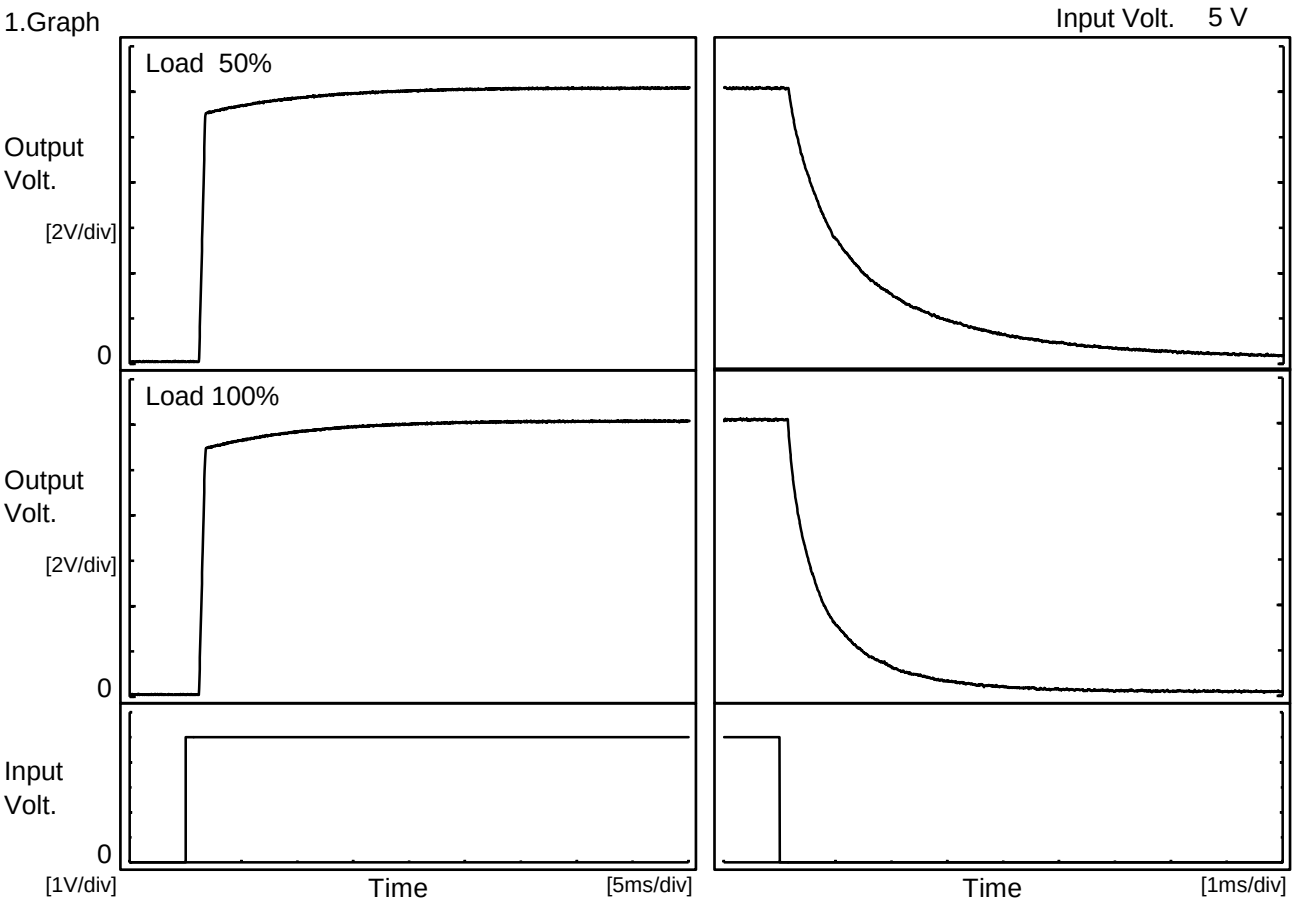


COSEL

Model	MGW60512
Item	Rise and Fall Time
Object	-12V0.25A

Temperature 25°C
Testing Circuitry Figure A

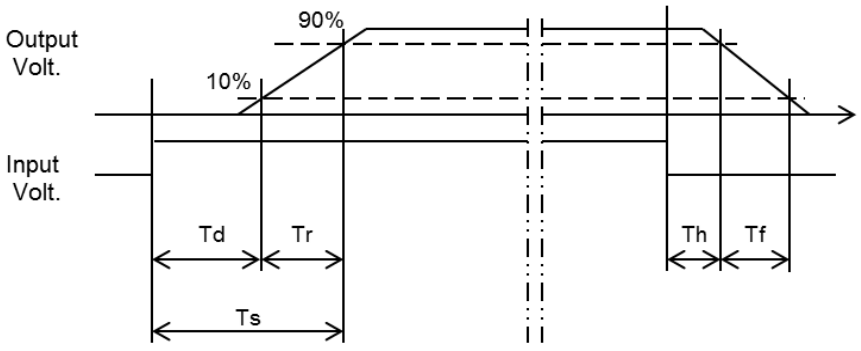
1.Graph



2.Values

[ms]

Load \ Time	Td	Tr	Ts	Th	Tf
50 %	1.3	0.5	1.8	0.2	3.8
100 %	1.3	0.5	1.8	0.2	1.8



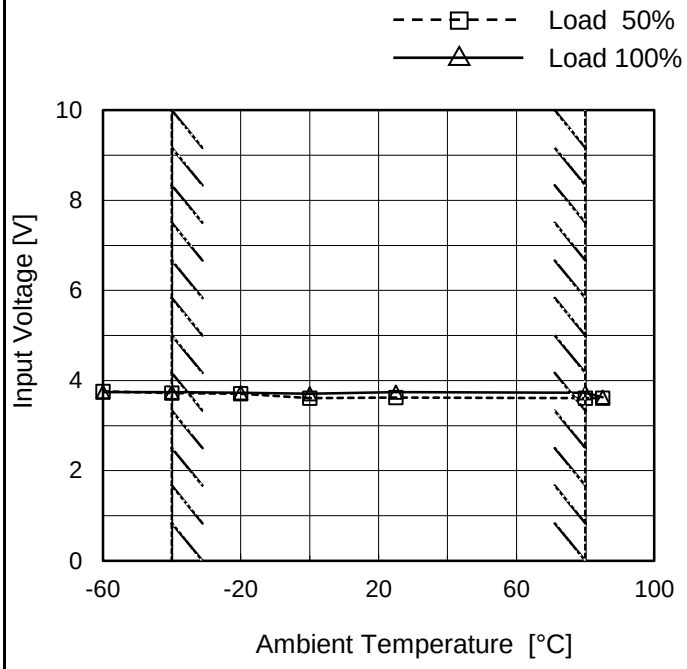
COSEL

Model	MGW60512
Item	Minimum Input Voltage for Regulated Output Voltage

Testing Circuitry Figure A

Object +12V0.25A

1.Graph

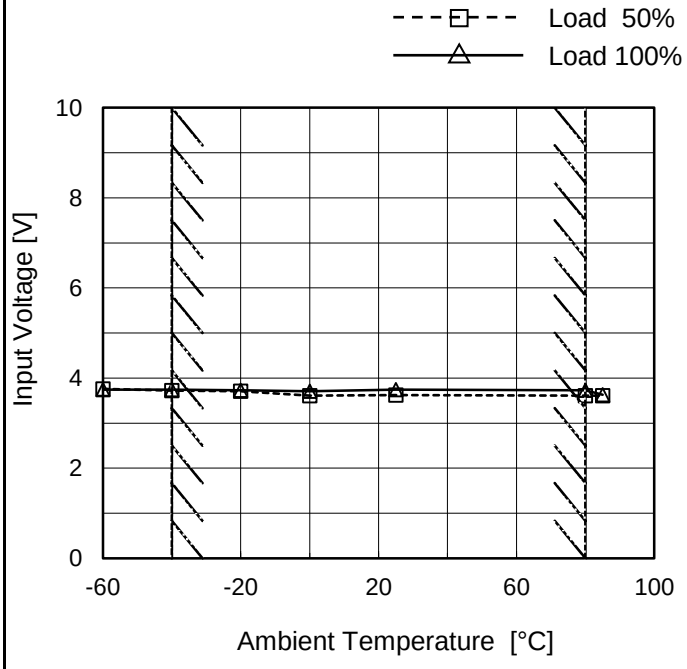


2.Values

Ambient Temperature [°C]	Input Voltage [V]	
	Load 50%	Load 100%
-60	3.8	3.8
-40	3.8	3.8
-20	3.8	3.8
0	3.7	3.8
25	3.7	3.8
80	3.7	3.8
85	3.7	3.7
--	-	-
--	-	-
--	-	-
--	-	-

Object -12V0.25A

1.Graph



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

2.Values

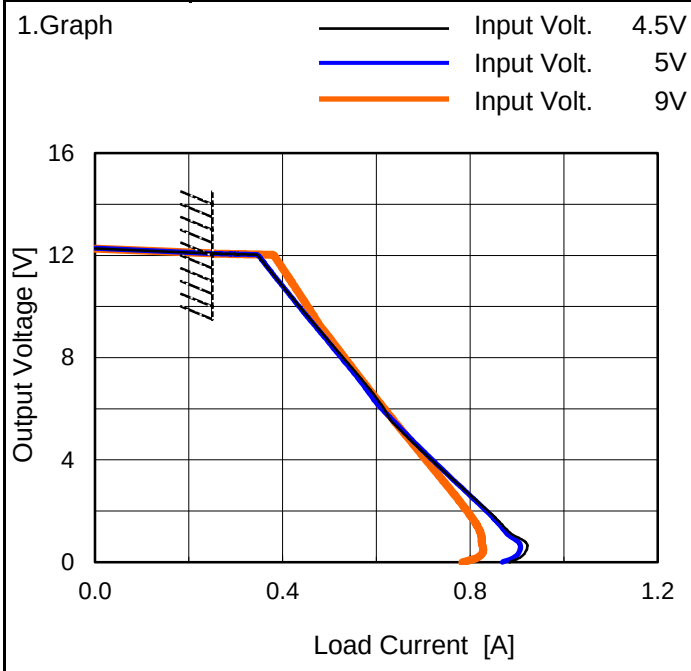
Ambient Temperature [°C]	Input Voltage [V]	
	Load 50%	Load 100%
-60	3.8	3.8
-40	3.8	3.8
-20	3.8	3.8
0	3.7	3.8
25	3.7	3.8
80	3.7	3.8
85	3.7	3.7
--	-	-
--	-	-
--	-	-
--	-	-

COSEL

Model	MGW60512
Item	Overcurrent Protection
Object	+12V0.25A

Temperature 25°C
Testing Circuitry Figure A

1.Graph



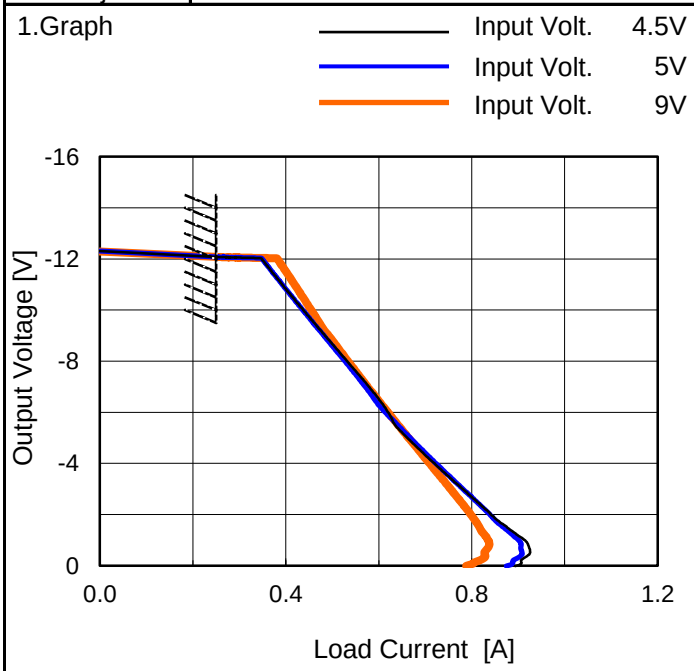
2.Values

Output Voltage [V]	Load Current [A] Input Volt. 4.5[V]	Input Volt. 5[V]	Input Volt. 9[V]
11.4	0.37	0.37	0.40
10.8	0.40	0.40	0.42
9.6	0.45	0.45	0.47
8.4	0.51	0.51	0.51
7.2	0.56	0.56	0.56
6.0	0.62	0.61	0.62
4.8	0.67	0.67	0.67
3.6	0.74	0.74	0.72
2.4	0.81	0.81	0.78
1.2	0.88	0.87	0.82
0.0	0.88	0.87	0.78
--	-	-	-

-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. 4.5[V]	Input Volt. 5[V]	Input Volt. 9[V]
-11.4	0.38	0.38	0.40
-10.8	0.40	0.40	0.43
-9.6	0.46	0.45	0.47
-8.4	0.51	0.51	0.52
-7.2	0.57	0.56	0.57
-6.0	0.62	0.61	0.62
-4.8	0.67	0.68	0.67
-3.6	0.74	0.75	0.73
-2.4	0.82	0.81	0.78
-1.2	0.90	0.89	0.83
0.0	0.89	0.87	0.79
--	-	-	-

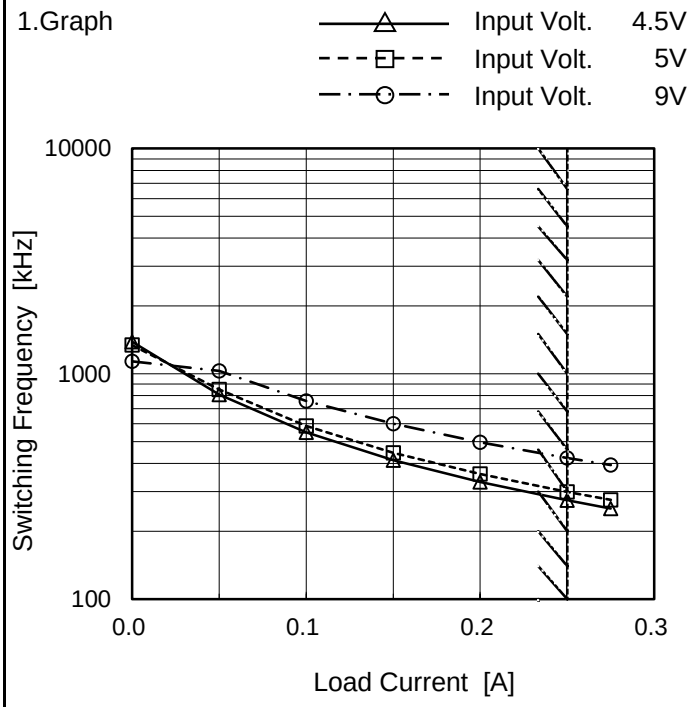
+12V: Rated Load Current

COSEL

Model	MGW60512
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. 4.5[V]	Input Volt. 5[V]	Input Volt. 9[V]
0.000	1389	1341	1136
0.050	809	853	1029
0.100	551	587	758
0.150	414	446	601
0.200	331	359	496
0.250	274	299	423
0.275	252	276	394
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

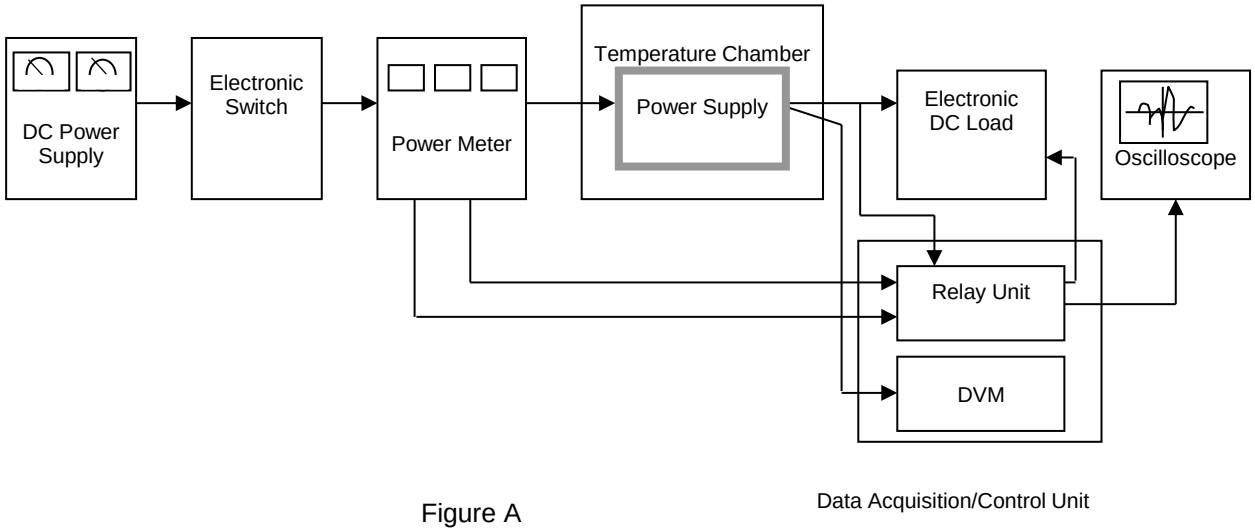


Figure A

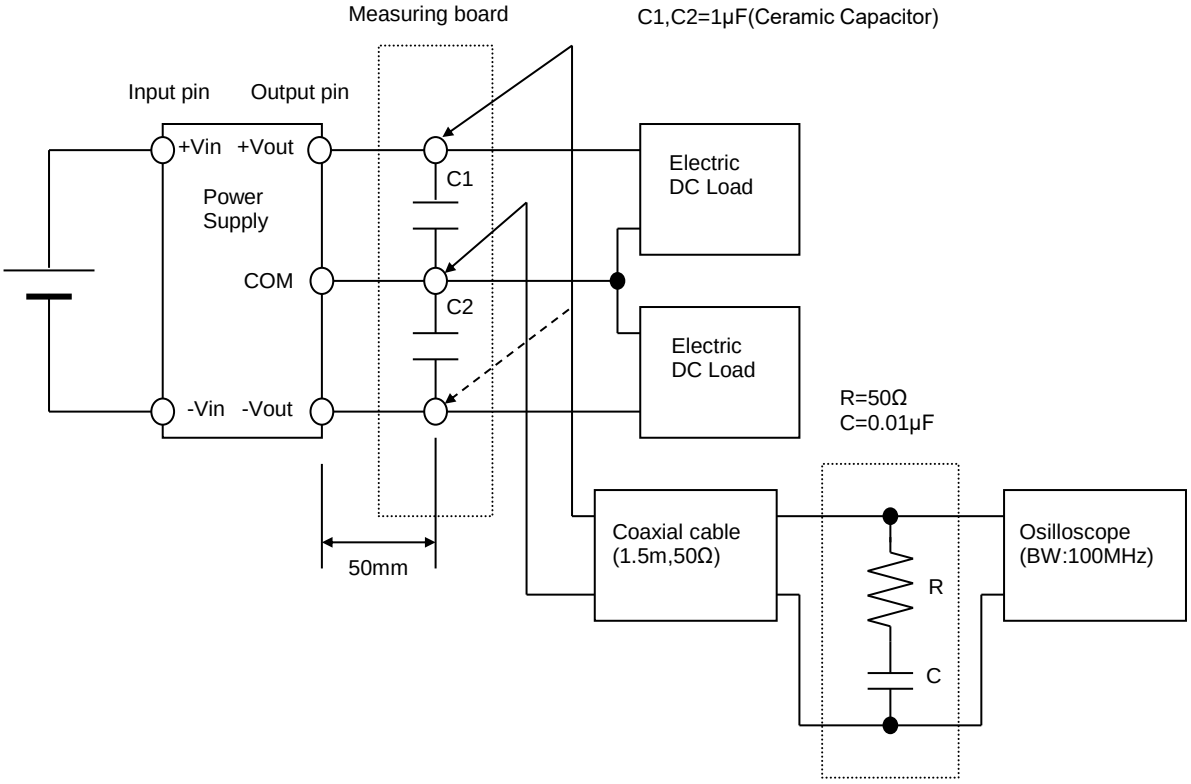


Figure B（Ripple and Ripple noise Characteristic）