COSEL

参考資料

TEST DATA OF MGW1R50512

Regulated DC Power Supply
October 31, 2016

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Takayuki Fukuda Design Manager

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Takaaki Sekiguchi Design Engineer

COSEL CO.,LTD.

参考資料

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参考資料

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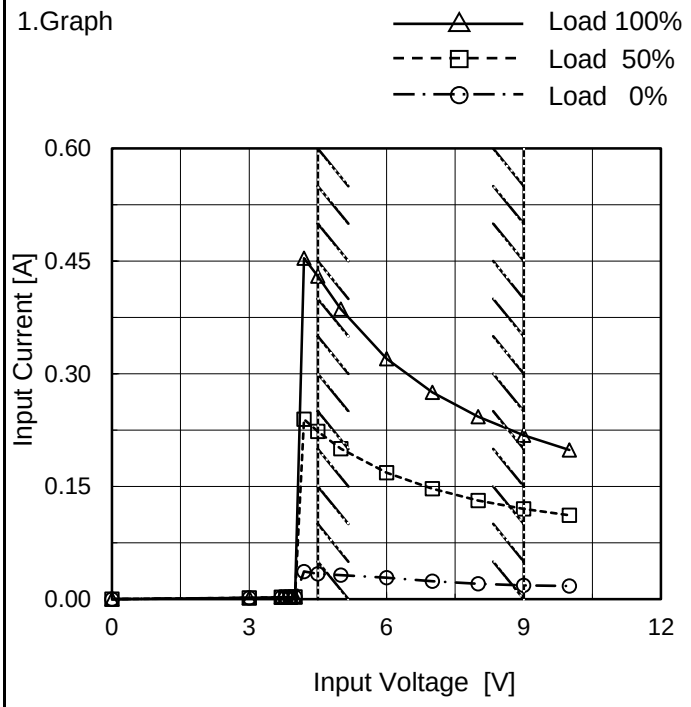
Model	MGW1R50512
Item	Input Current (by Input Voltage)
Object	――――――――

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	0.002
3.7	0.003	0.002	0.002
3.8	0.003	0.003	0.003
3.9	0.003	0.003	0.003
4.0	0.003	0.003	0.003
4.2	0.037	0.239	0.454
4.5	0.034	0.223	0.430
5.0	0.032	0.200	0.386
6.0	0.029	0.169	0.320
7.0	0.024	0.147	0.275
8.0	0.021	0.131	0.243
9.0	0.018	0.120	0.218
10.0	0.017	0.112	0.199
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

BC-10954

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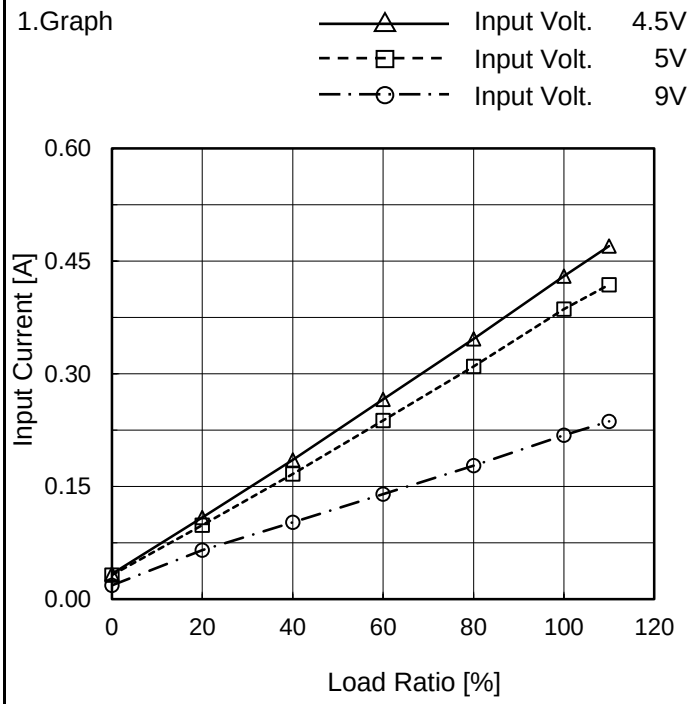
Model	MGW1R50512
Item	Input Current (by Load Ratio)
Object	――――――――

Temperature 25°C
Testing Circuitry Figure A

1.Graph



2.Values

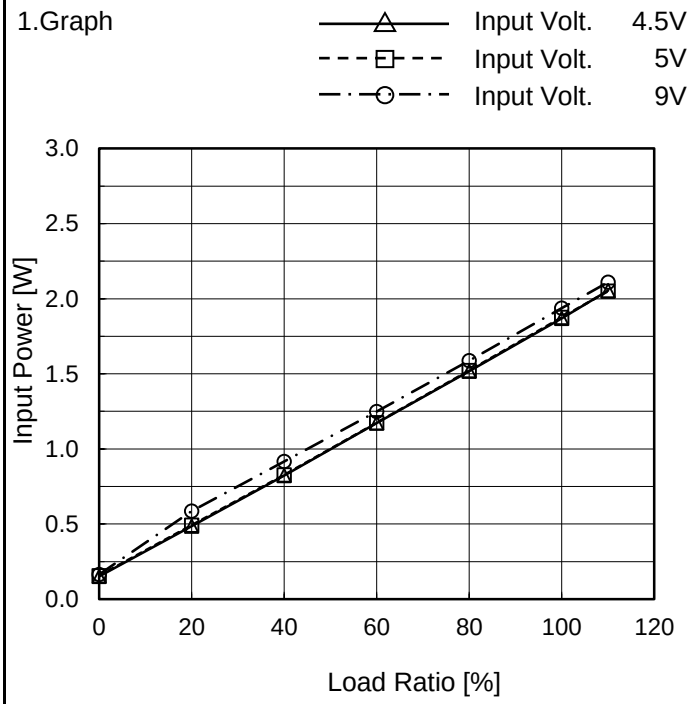
Load Ratio [%]	Input Current [A]		
	Input Volt. 4.5[V]	Input Volt. 5[V]	Input Volt. 9[V]
0	0.034	0.032	0.018
20	0.109	0.099	0.065
40	0.185	0.167	0.102
60	0.266	0.238	0.140
80	0.347	0.310	0.178
100	0.430	0.386	0.218
110	0.470	0.419	0.237
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

COSEL

Model	MGW1R50512
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	0.15	0.16	0.16
20	0.49	0.49	0.59
40	0.82	0.83	0.92
60	1.17	1.17	1.25
80	1.52	1.52	1.59
100	1.87	1.88	1.94
110	2.06	2.05	2.11
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

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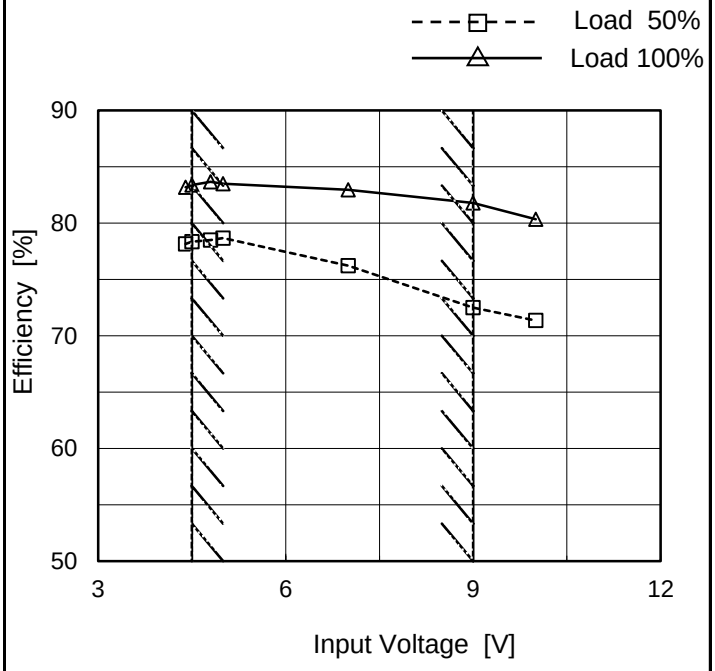
COSEL

Model	MGW1R50512
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

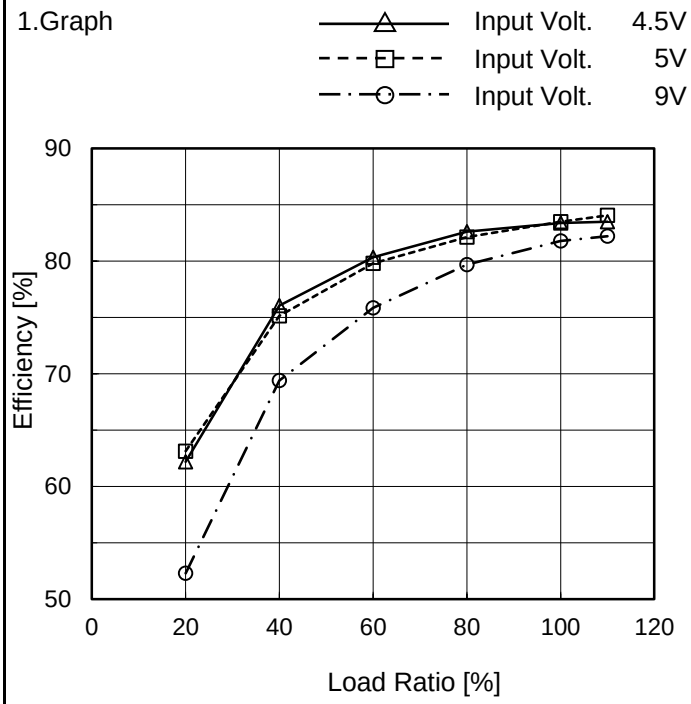
Input Voltage [V]	Efficiency [%]	
	Load 50%	Load 100%
4.4	78.1	83.2
4.5	78.4	83.4
4.8	78.5	83.7
5.0	78.7	83.5
7.0	76.2	83.0
9.0	72.5	81.8
10.0	71.4	80.4
--	-	-
--	-	-

COSEL

Model	MGW1R50512
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	62.2	63.1	52.3
40	76.1	75.1	69.4
60	80.4	79.8	75.8
80	82.6	82.2	79.7
100	83.4	83.5	81.8
110	83.5	84.1	82.2
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

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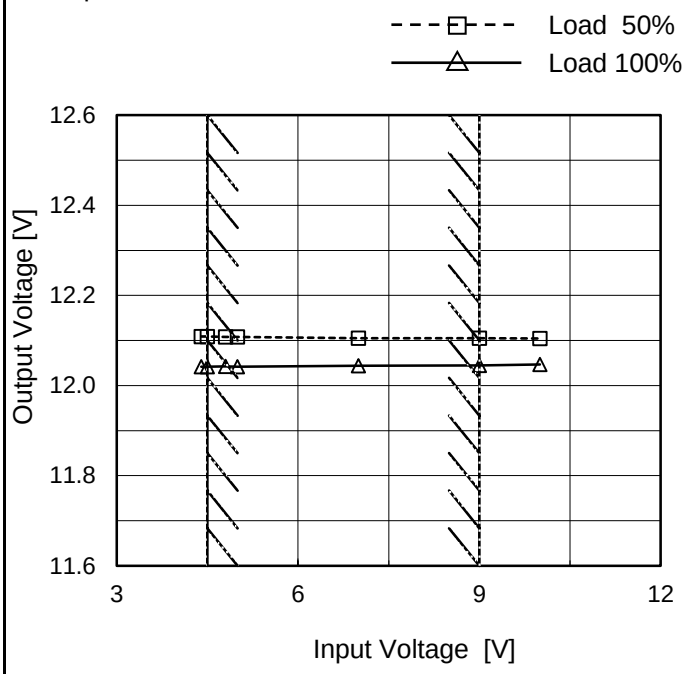
COSEL

Model	MGW1R50512
Item	Line Regulation
Object	+12V0.065A

Temperature 25°C
Testing Circuitry Figure A

1.Graph



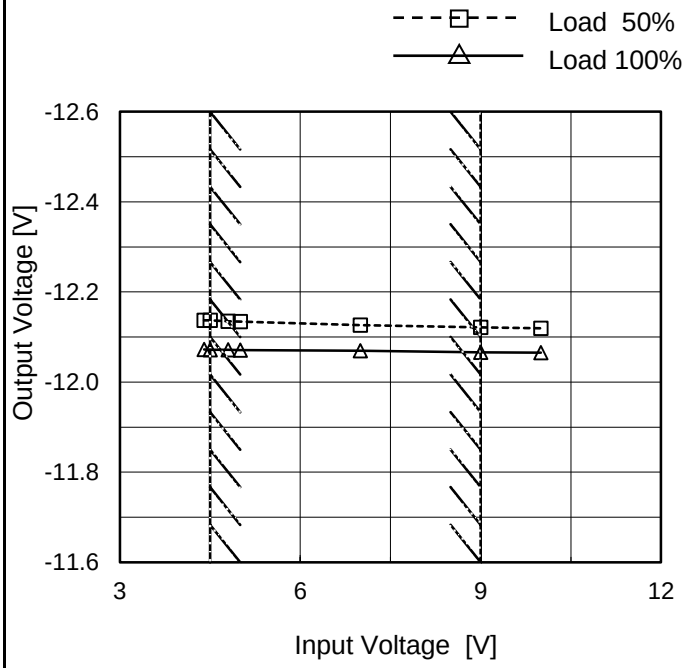
2.Values

Input Voltage [V]	Output Voltage [V]	
	Load 50%	Load 100%
4.4	12.109	12.042
4.5	12.109	12.042
4.8	12.108	12.042
5.0	12.108	12.042
7.0	12.105	12.044
9.0	12.105	12.045
10.0	12.105	12.047
--	-	-
--	-	-

-12V: Rated Load Current

Object	-12V0.065A

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	-12.137	-12.072
4.5	-12.137	-12.072
4.8	-12.135	-12.071
5.0	-12.134	-12.071
7.0	-12.127	-12.069
9.0	-12.121	-12.066
10.0	-12.119	-12.066
--	-	-
--	-	-

+12V: Rated Load Current

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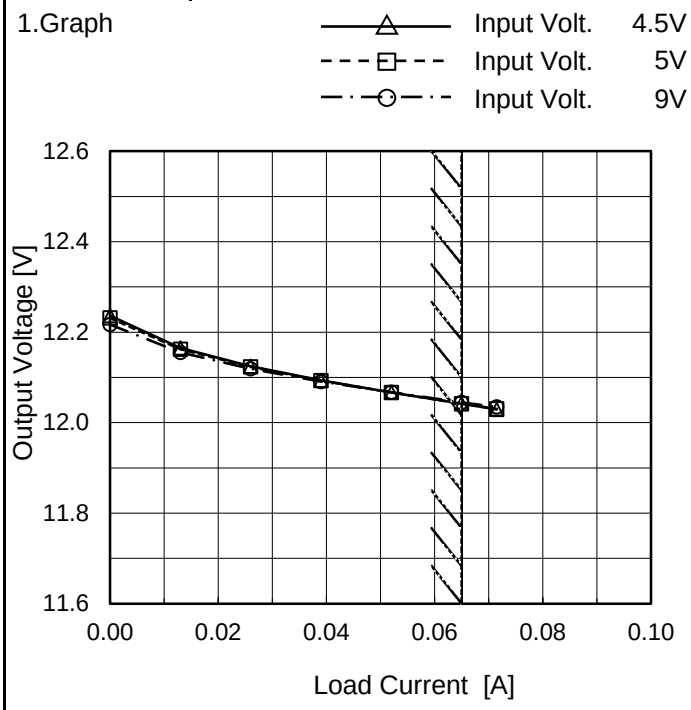
Model	MGW1R50512
Item	Load Regulation
Object	+12V0.065A

Temperature 25°C
Testing Circuitry Figure A

1.Graph



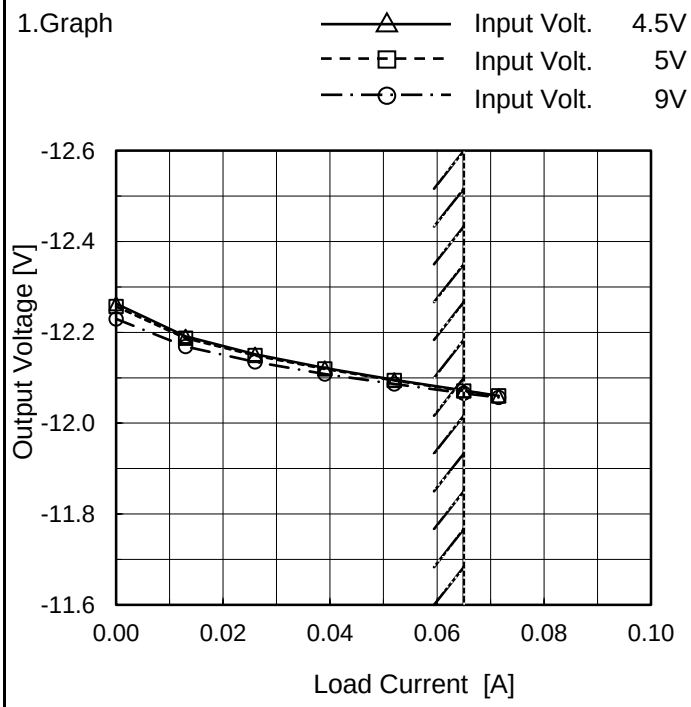
2.Values

Load Current [A]	Output Voltage [V] Input Volt. 4.5[V]	Input Volt. 5[V]	Input Volt. 9[V]
0.000	12.237	12.231	12.217
0.013	12.165	12.163	12.155
0.026	12.125	12.123	12.119
0.039	12.094	12.093	12.091
0.052	12.067	12.067	12.068
0.065	12.042	12.042	12.045
0.072	12.029	12.030	12.035
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

-12V: Rated Load Current

Object	-12V0.065A

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	-12.264	-12.257	-12.230
0.013	-12.192	-12.187	-12.169
0.026	-12.152	-12.149	-12.135
0.039	-12.122	-12.120	-12.109
0.052	-12.096	-12.094	-12.086
0.065	-12.072	-12.071	-12.066
0.072	-12.060	-12.060	-12.057
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

+12V: Rated Load Current

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Model	MGW1R50512	
Item	Dynamic Load Response	Temperature 25°C Testing Circuitry Figure A
Object	+12V0.065A	

Input Volt. 5 V

-12V:rated load current.

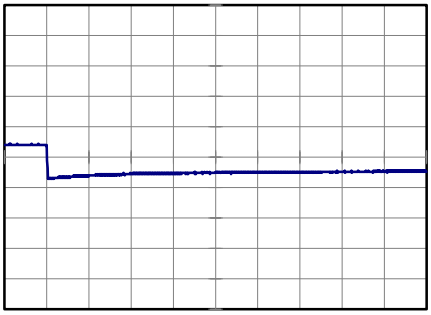
Cycle 100 ms

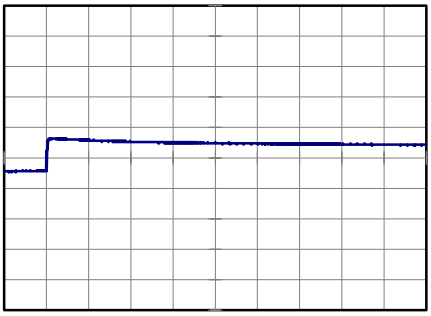
t1,t2 = 100 μs

Load Current

t1 t2

Min.Load (0A)←→
Load 100% (0.065A)

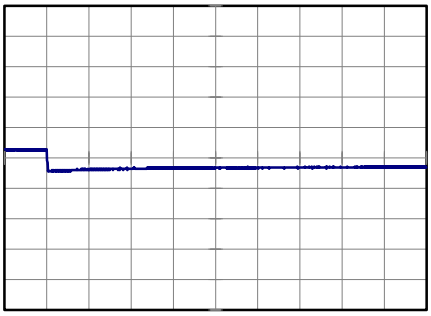


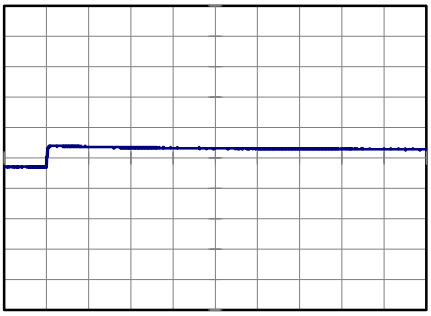


200 mV/div

4 ms/div 4 ms/div

Min.Load (0A)←→
Load 50% (0.0325A)

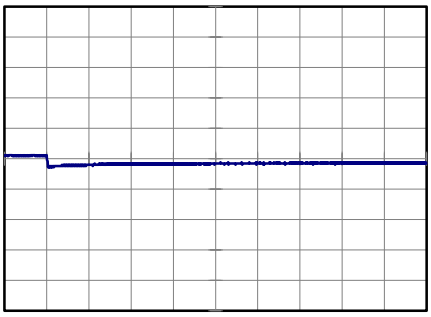


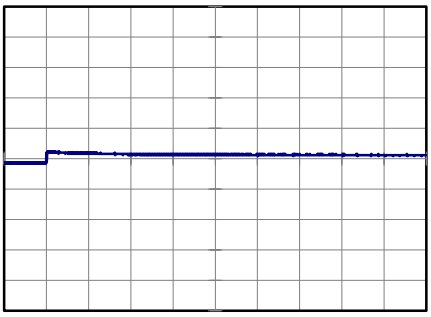


200 mV/div

4 ms/div 4 ms/div

Load 50% (0.0325A)←→
Load 100% (0.065A)





200 mV/div

4 ms/div 4 ms/div

COSEL

Model	MGW1R50512	
Item	Dynamic Load Response	Temperature 25°C Testing Circuitry Figure A
Object	-12V0.065A	

Input Volt. 5 V

+12V:rated load current.

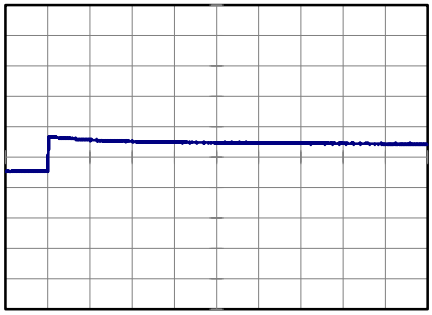
Cycle 100 ms

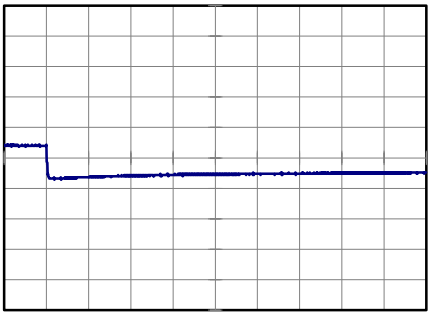
t1,t2 = 100 μs

Load Current

t1 t2

Min.Load (0A)←→
Load 100% (0.065A)

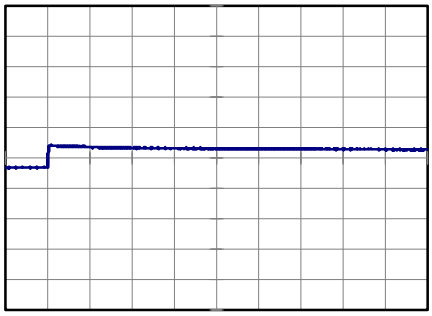


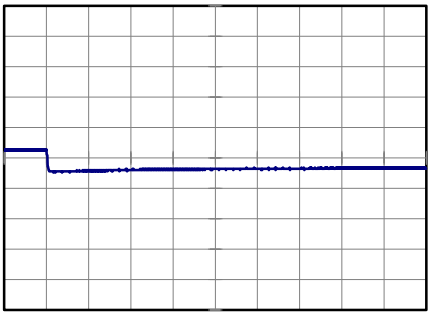


200 mV/div

4 ms/div 4 ms/div

Min.Load (0A)←→
Load 50% (0.0325A)

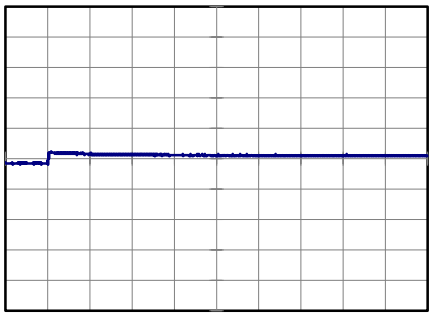


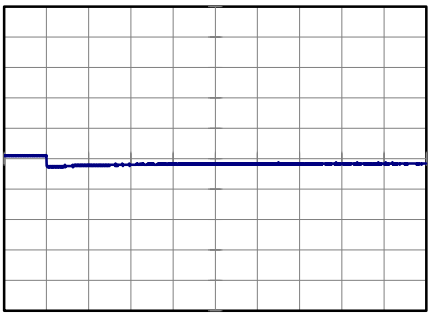


200 mV/div

4 ms/div 4 ms/div

Load 50% (0.0325A)←→
Load 100% (0.065A)





200 mV/div

4 ms/div 4 ms/div

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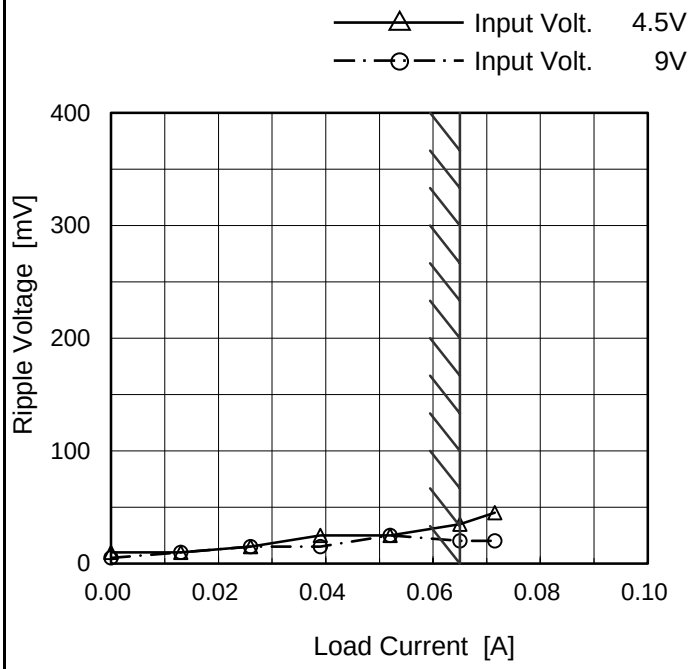
Model	MGW1R50512
Item	Ripple Voltage (by Load Current)
Object	+12V0.065A

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]

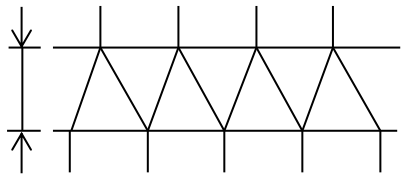


Fig.Complex Ripple Wave Form

2.Values

Load Current [A]	Ripple Voltage [mV]	
	Input Volt. 4.5 [V]	Input Volt. 9 [V]
0.000	10	5
0.013	10	10
0.026	15	15
0.039	25	15
0.052	25	25
0.065	35	20
0.072	45	20
--	-	-
--	-	-
--	-	-
--	-	-

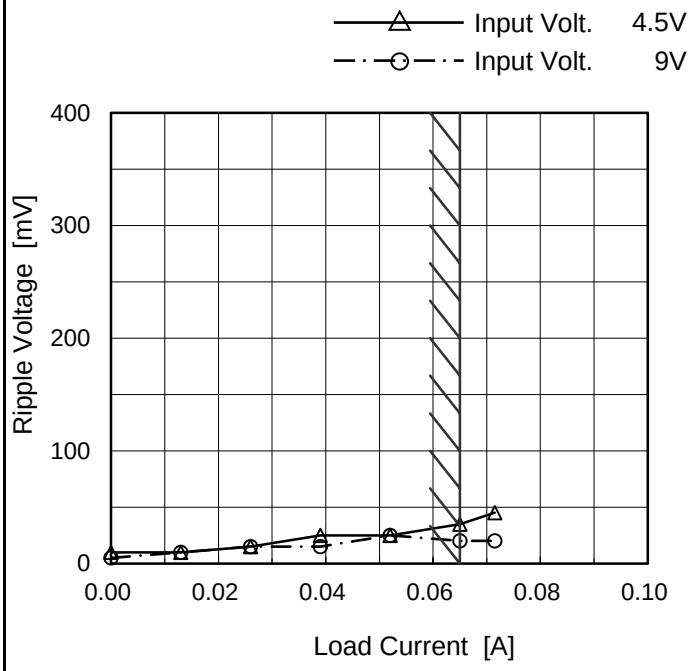
-12V: Rated Load Current

COSEL

Model	MGW1R50512
Item	Ripple Voltage (by Load Current)
Object	-12V0.065A

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]

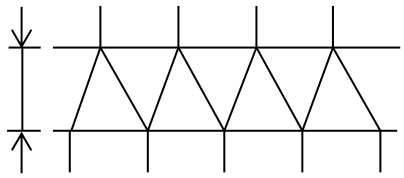


Fig.Complex Ripple Wave Form

2.Values

Load Current [A]	Ripple Voltage [mV] Input Volt. 4.5 [V]	Ripple Voltage [mV] Input Volt. 9 [V]
0.000	10	5
0.013	10	10
0.026	15	15
0.039	25	15
0.052	25	25
0.065	35	20
0.072	45	20
--	-	-
--	-	-
--	-	-
--	-	-

+12V: Rated Load Current

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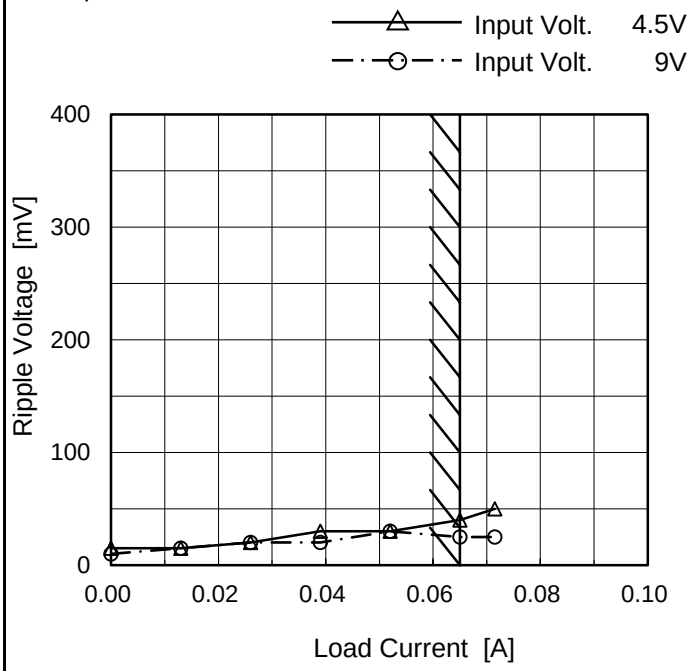
COSEL

Model	MGW1R50512
Item	Ripple-Noise
Object	+12V0.065A

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]

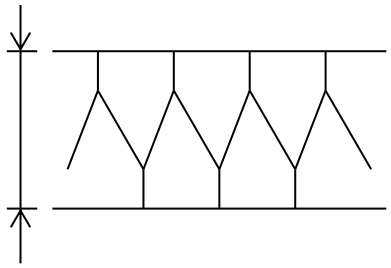


Fig.Complex Ripple Noise Wave Form

2.Values

Load Current [A]	Ripple-Noise [mV]	
	Input Volt. 4.5 [V]	Input Volt. 9 [V]
0.000	15	10
0.013	15	15
0.026	20	20
0.039	30	20
0.052	30	30
0.065	40	25
0.072	50	25
--	-	-
--	-	-
--	-	-
--	-	-

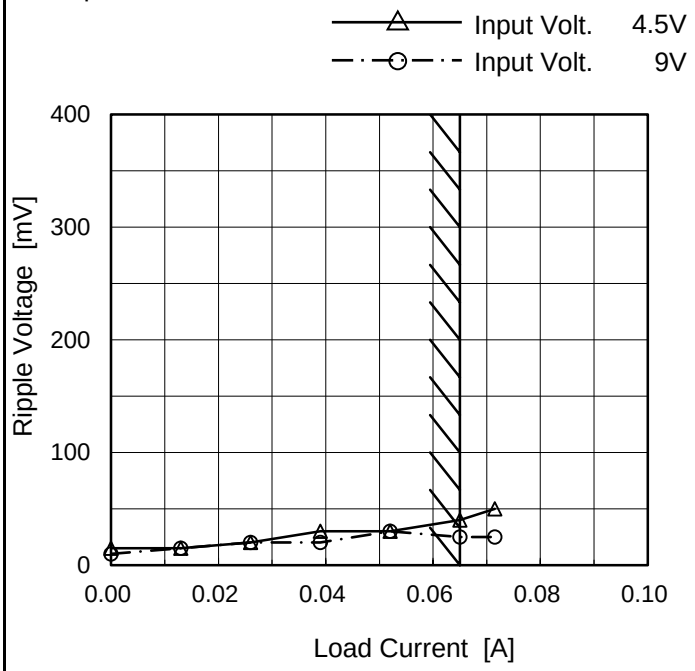
-12V: Rated Load Current

COSEL

Model	MGW1R50512
Item	Ripple-Noise
Object	-12V0.065A

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]

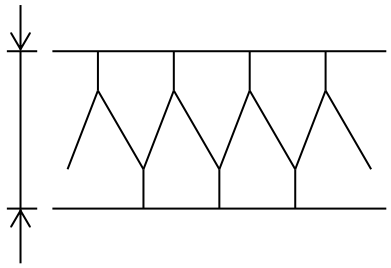


Fig.Complex Ripple Noise Wave Form

2.Values

Load Current [A]	Ripple-Noise [mV]	
	Input Volt. 4.5 [V]	Input Volt. 9 [V]
0.000	15	10
0.013	15	15
0.026	20	20
0.039	30	20
0.052	30	30
0.065	40	25
0.072	50	25
--	-	-
--	-	-
--	-	-
--	-	-

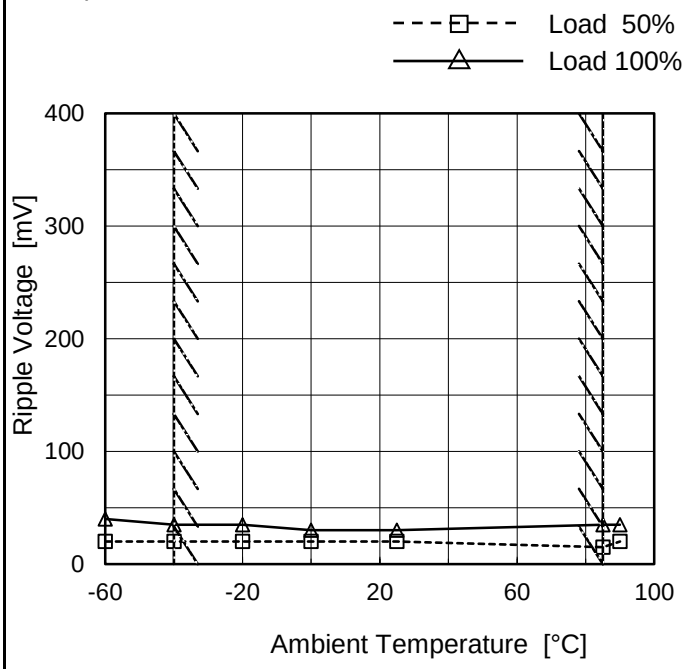
+12V: Rated Load Current

COSEL

Model	MGW1R50512
Item	Ripple Voltage (by Ambient Temp.)
Object	+12V0.065A

Testing Circuitry Figure B

1.Graph



Input Volt. 5V

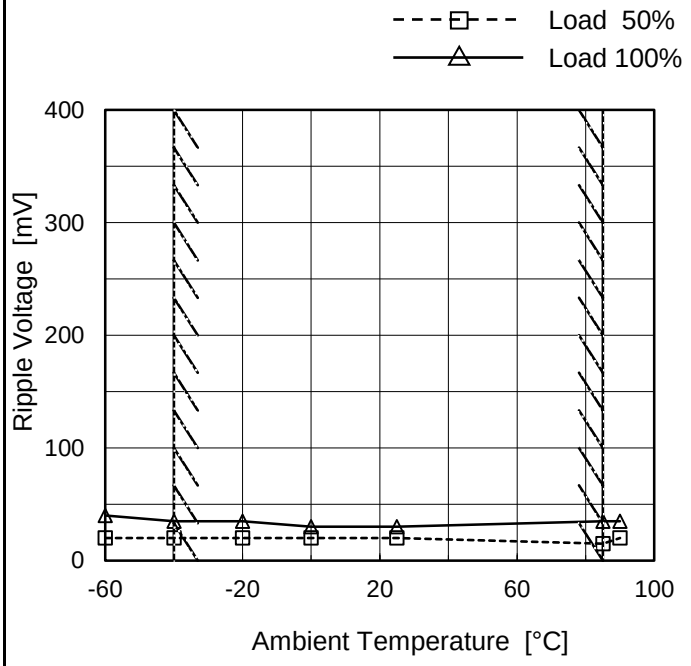
2.Values

Ambient Temperature [°C]	Ripple Voltage [mV]	
	Load 50%	Load 100%
-60	20	40
-40	20	35
-20	20	35
0	20	30
25	20	30
85	15	35
90	20	35
--	-	-
--	-	-
--	-	-
--	-	-

-12V: Rated Load Current

Object	-12V0.065A

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	20	40
-40	20	35
-20	20	35
0	20	30
25	20	30
85	15	35
90	20	35
--	-	-
--	-	-
--	-	-
--	-	-

+12V: Rated Load Current

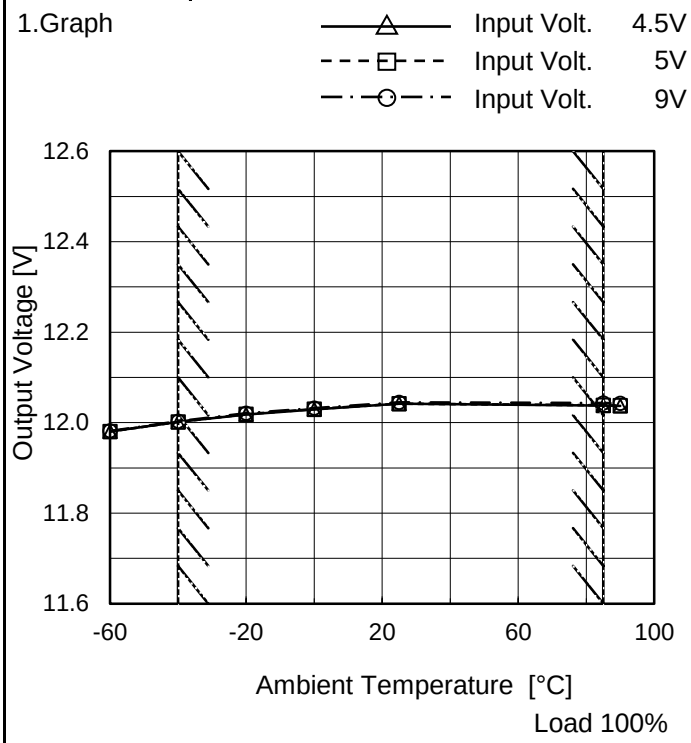
COSEL

Model	MGW1R50512
Item	Ambient Temperature Drift

Testing Circuitry Figure A

Object +12V0.065A

1.Graph



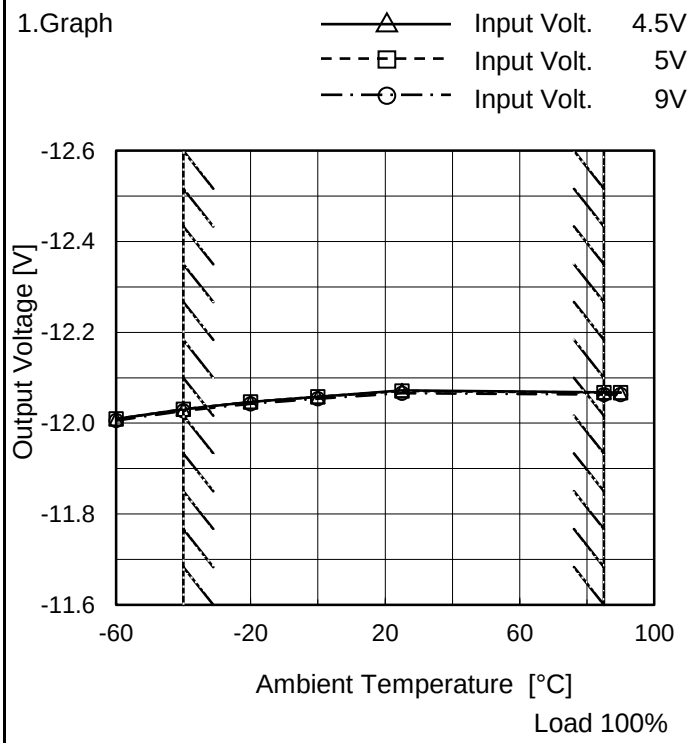
2.Values

Ambient Temperature [°C]	Output Voltage [V] Input Volt. 4.5[V]	Input Volt. 5[V]	Input Volt. 9[V]
-60	11.980	11.981	11.982
-40	12.001	12.002	12.004
-20	12.018	12.018	12.021
0	12.029	12.030	12.032
25	12.042	12.042	12.045
85	12.038	12.039	12.043
90	12.037	12.038	12.043
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

-12V: Rated Load Current

Object -12V0.065A

1.Graph



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	-12.009	-12.009	-12.006
-40	-12.031	-12.031	-12.027
-20	-12.047	-12.047	-12.043
0	-12.059	-12.058	-12.054
25	-12.072	-12.071	-12.066
85	-12.068	-12.068	-12.063
90	-12.068	-12.068	-12.063
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

+12V: Rated Load Current

COSEL

Model	MGW1R50512
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 - 85°C

Input Voltage : 4.5 - 9V

Load Current (AVR 1) : 0 - 0.065A (AVR 2) : 0 - 0.065A

* 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	+12V0.065A					
Item	Temperature [°C]	Input Voltage[V]	Output		Output Voltage Accuracy	
			Current[A]	Voltage[V]	Value [mV]	Ratio [%]
Maximum Voltage	85	4.5	0	12.259	±213	±1.8
Minimum Voltage	-40	4.5	0.065	11.834		

Object	-12V0.065A					
Item	Temperature [°C]	Input Voltage[V]	Output		Output Voltage Accuracy	
			Current[A]	Voltage[V]	Value [mV]	Ratio [%]
Maximum Voltage	85	4.5	0	-12.284	±213	±1.8
Minimum Voltage	85	4.5	0.065	-11.859		

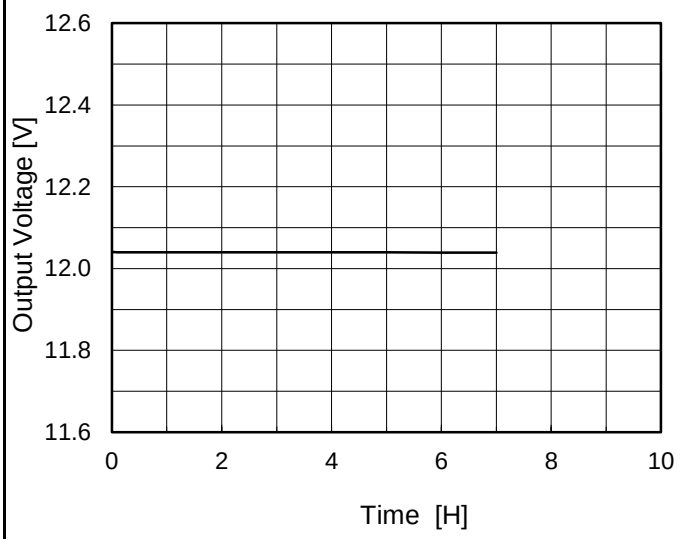
COSEL

Model	MGW1R50512
Item	Time Lapse Drift

Temperature 25°C
Testing Circuitry Figure A

Object +12V0.065A

1.Graph



Input Volt. 5V
Load 100%

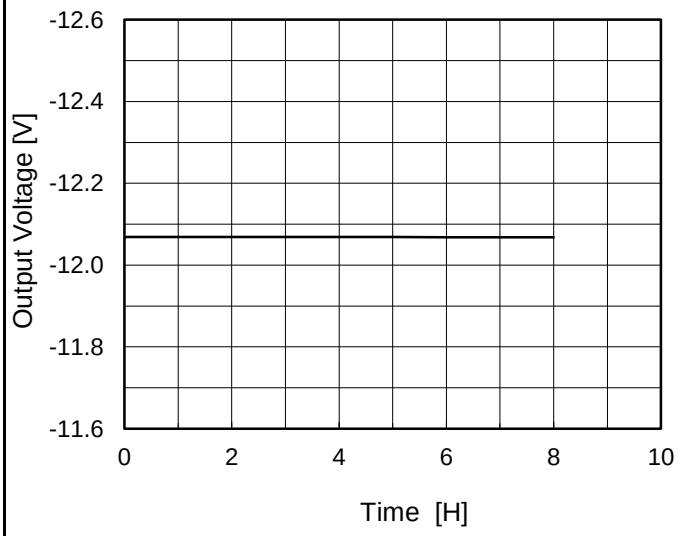
2.Values

Time since start [H]	Output Voltage [V]
0.0	12.039
0.5	12.040
1.0	12.040
2.0	12.040
3.0	12.040
4.0	12.040
5.0	12.040
6.0	12.039
7.0	12.039
8.0	12.039

-12V: Rated Load Current

Object -12V0.065A

1.Graph



Input Volt. 5V
Load 100%

2.Values

Time since start [H]	Output Voltage [V]
0.0	-12.067
0.5	-12.068
1.0	-12.069
2.0	-12.069
3.0	-12.069
4.0	-12.069
5.0	-12.069
6.0	-12.068
7.0	-12.068
8.0	-12.068

+12V: Rated Load Current

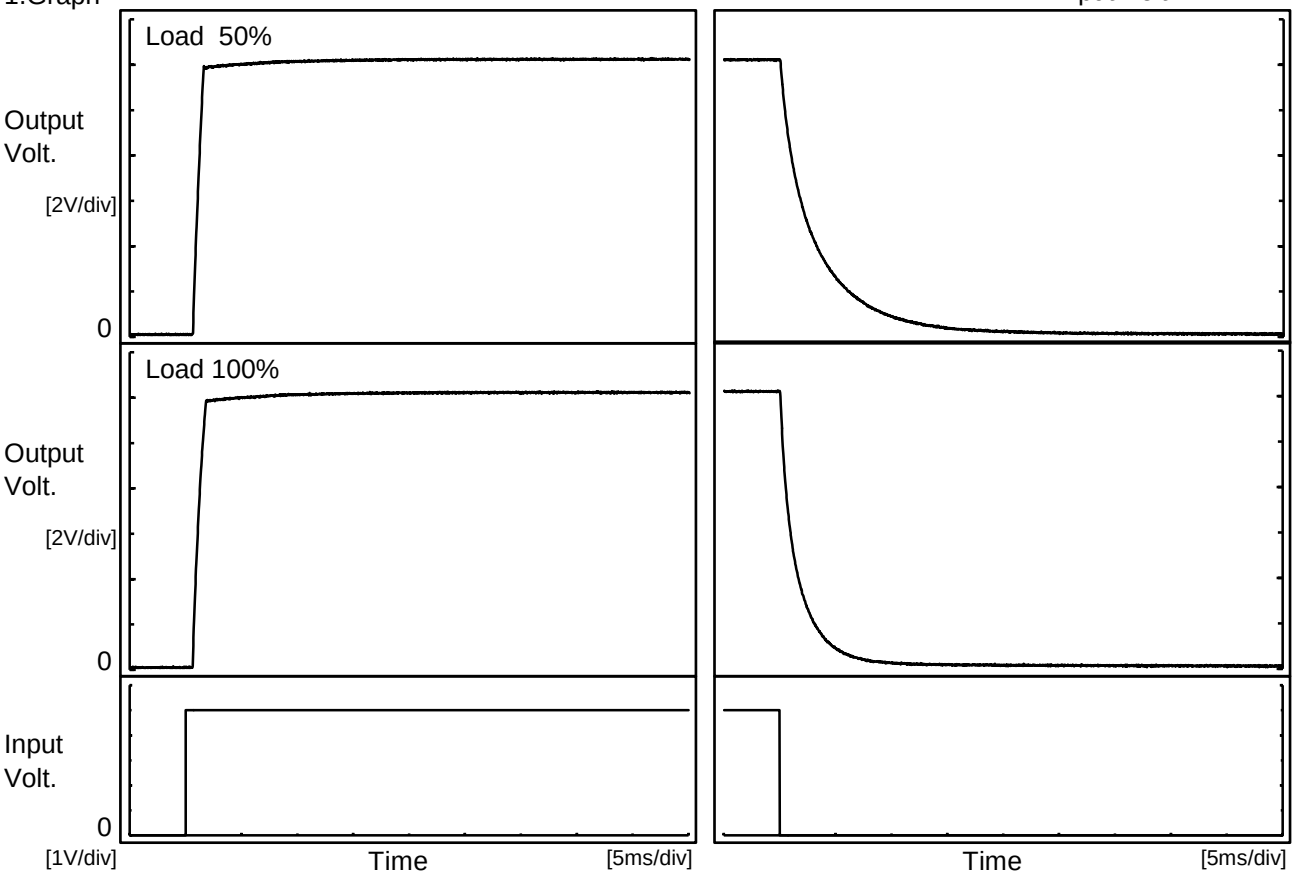
COSEL

Model	MGW1R50512
Item	Rise and Fall Time
Object	+12V0.065A

Temperature 25°C
Testing Circuitry Figure A

1.Graph

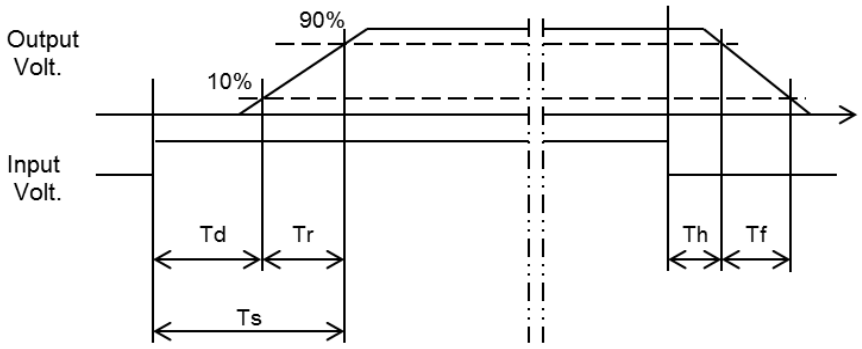
Input Volt. 5 V



2.Values

[ms]

Load \ Time	Td	Tr	Ts	Th	Tf
50 %	0.7	0.8	1.5	0.3	8.0
100 %	0.7	1.0	1.7	0.2	4.0



BC-10954

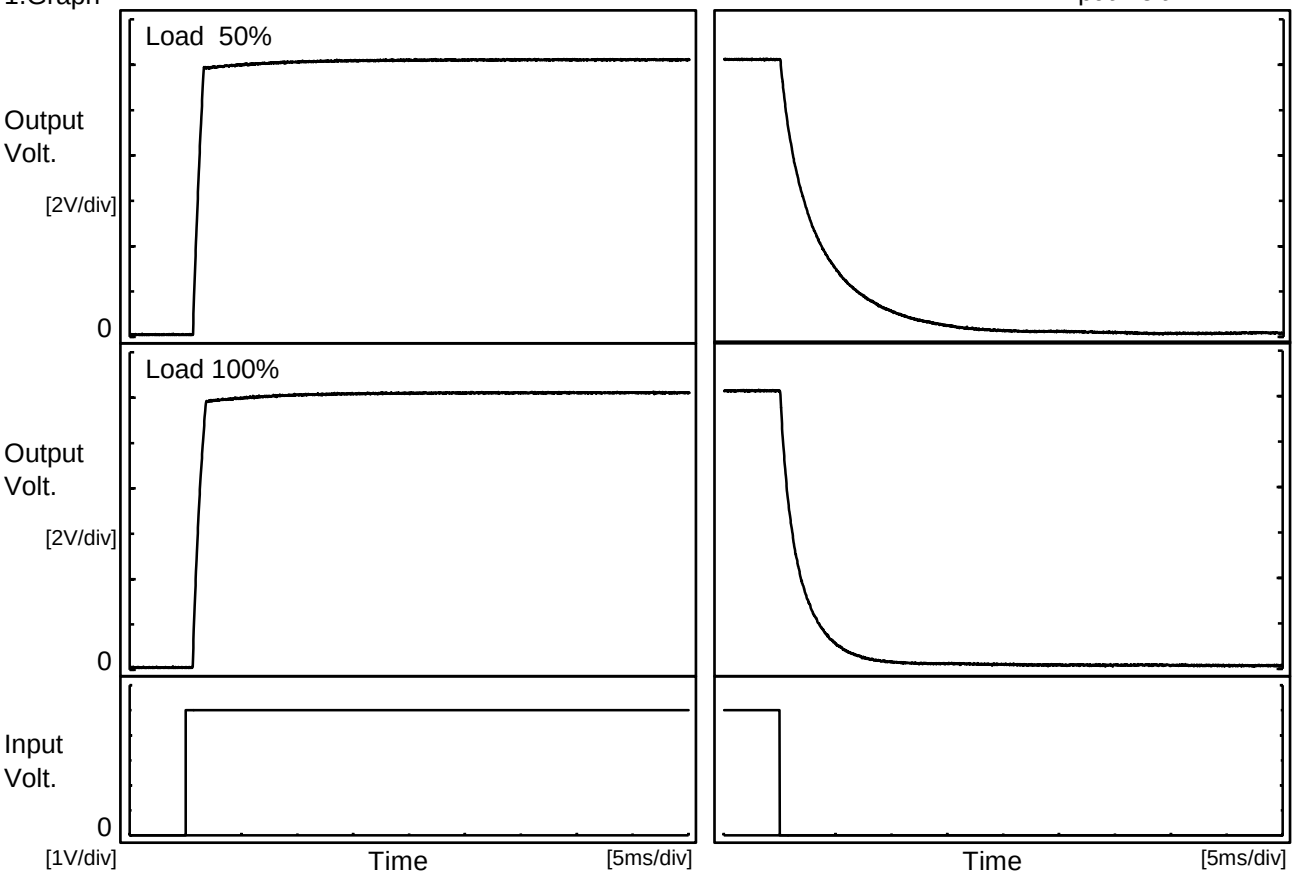
COSEL

Model	MGW1R50512
Item	Rise and Fall Time
Object	-12V0.065A

Temperature 25°C
Testing Circuitry Figure A

1.Graph

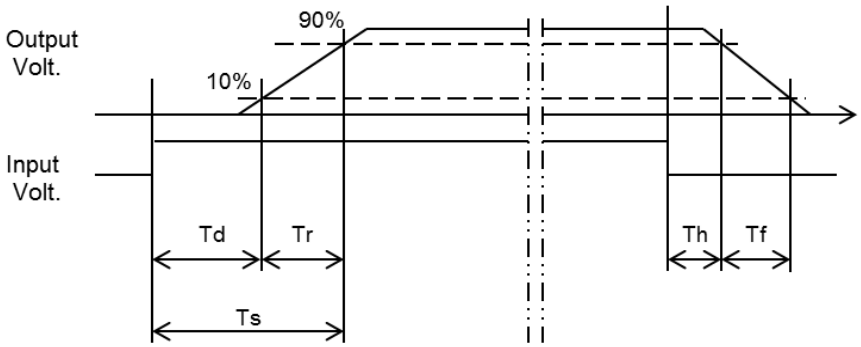
Input Volt. 5 V



2.Values

[ms]

Load \ Time	Td	Tr	Ts	Th	Tf
50 %	0.7	0.8	1.5	0.3	9.0
100 %	0.7	1.0	1.7	0.2	4.5



BC-10954

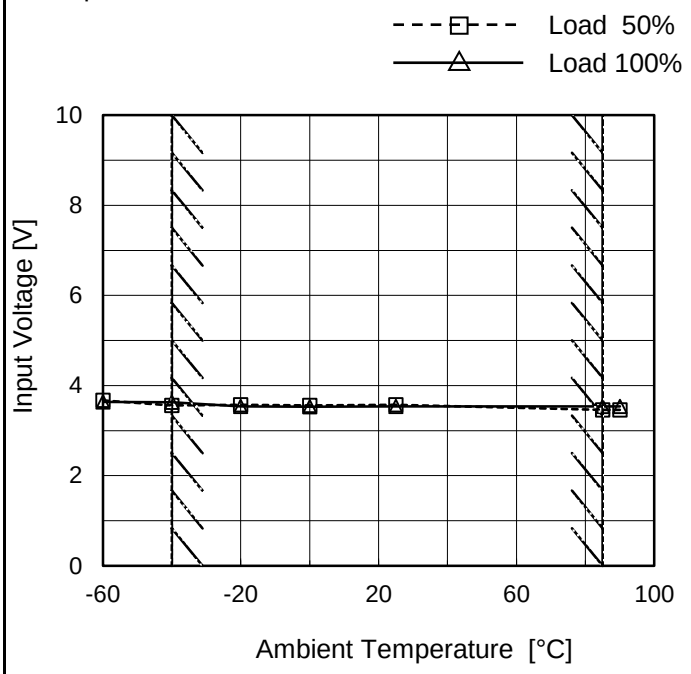
COSEL

Model	MGW1R50512
Item	Minimum Input Voltage for Regulated Output Voltage

Testing Circuitry Figure A

Object: +12V0.065A

1.Graph

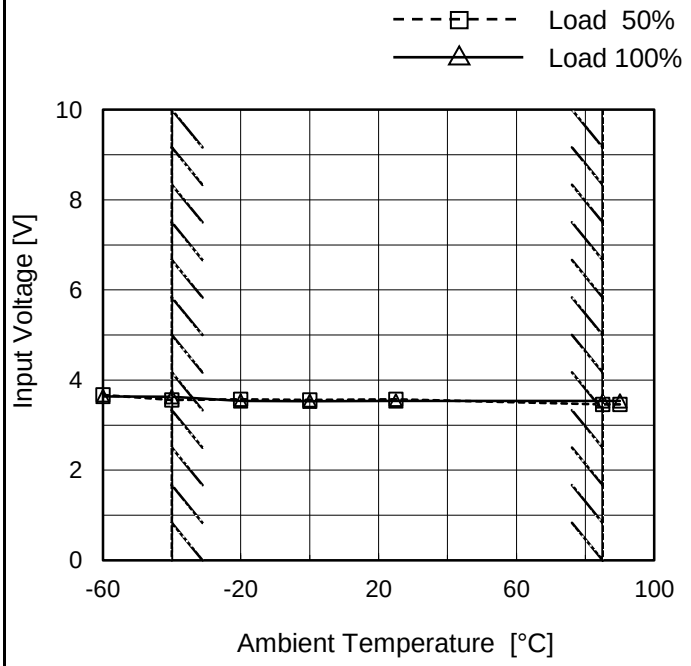


2.Values

Ambient Temperature [°C]	Input Voltage [V]	
	Load 50%	Load 100%
-60	3.7	3.7
-40	3.6	3.7
-20	3.6	3.6
0	3.6	3.6
25	3.6	3.6
85	3.5	3.6
90	3.5	3.6
--	-	-
--	-	-
--	-	-
--	-	-

Object: -12V0.065A

1.Graph



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

2.Values

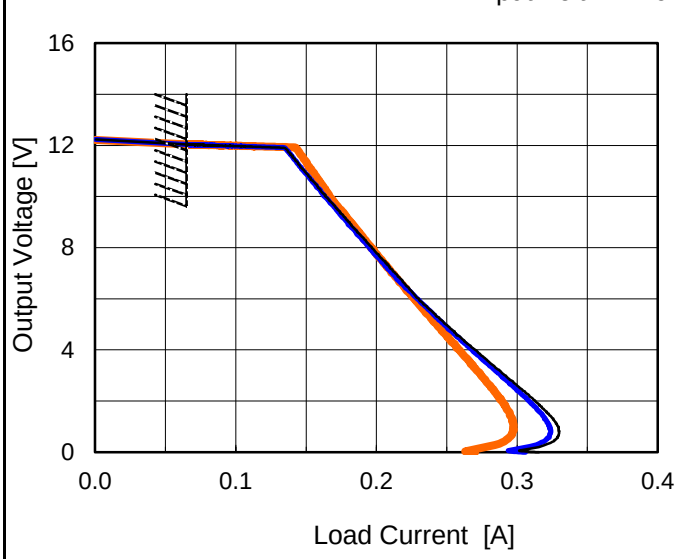
Ambient Temperature [°C]	Input Voltage [V]	
	Load 50%	Load 100%
-60	3.7	3.7
-40	3.6	3.7
-20	3.6	3.6
0	3.6	3.6
25	3.6	3.6
85	3.5	3.6
90	3.5	3.6
--	-	-
--	-	-
--	-	-
--	-	-

COSEL

Model	MGW1R50512
Item	Overcurrent Protection
Object	+12V0.065A

Temperature 25°C
Testing Circuitry Figure A

1.Graph



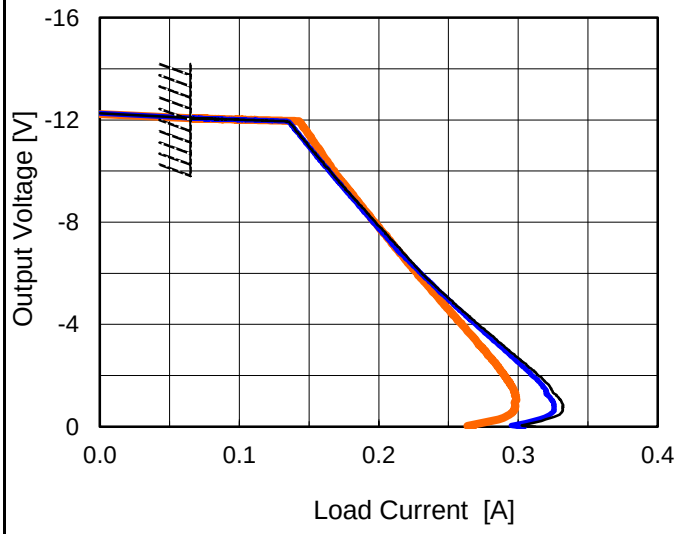
2.Values

Output Voltage [V]	Load Current [A]		
	Input Volt. 4.5[V]	Input Volt. 5[V]	Input Volt. 9[V]
11.4	0.14	0.14	0.15
10.8	0.15	0.15	0.16
9.6	0.17	0.17	0.17
8.4	0.19	0.19	0.19
7.2	0.21	0.21	0.21
6.0	0.23	0.23	0.23
4.8	0.25	0.25	0.25
3.6	0.28	0.28	0.26
2.4	0.30	0.30	0.28
1.2	0.33	0.32	0.30
0.0	0.32	0.31	0.27
--	-	-	-

-12V: Rated Load Current

Object	-12V0.065A

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	0.14	0.14	0.15
-10.8	0.15	0.15	0.16
-9.6	0.17	0.17	0.17
-8.4	0.19	0.19	0.19
-7.2	0.21	0.21	0.21
-6.0	0.23	0.23	0.23
-4.8	0.25	0.25	0.25
-3.6	0.28	0.28	0.27
-2.4	0.31	0.30	0.28
-1.2	0.33	0.32	0.30
0.0	0.31	0.30	0.27
--	-	-	-

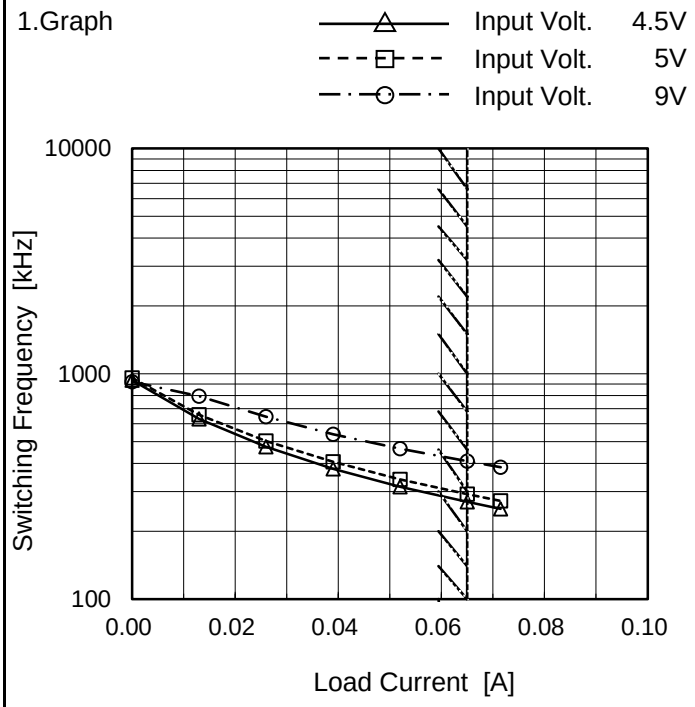
+12V: Rated Load Current

COSEL

Model	MGW1R50512
Item	Switching Frequency (by Load Current)
Object	+/-12V0.065A

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	936	959	922
0.013	630	658	795
0.026	475	503	645
0.039	379	406	539
0.052	315	340	466
0.065	270	292	409
0.072	251	273	385
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

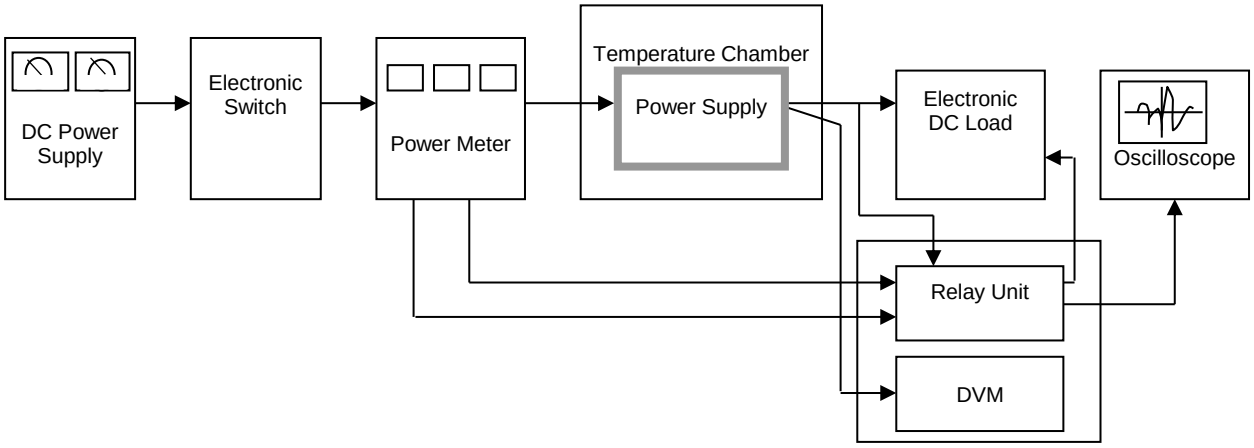


Figure A

Data Acquisition/Control Unit

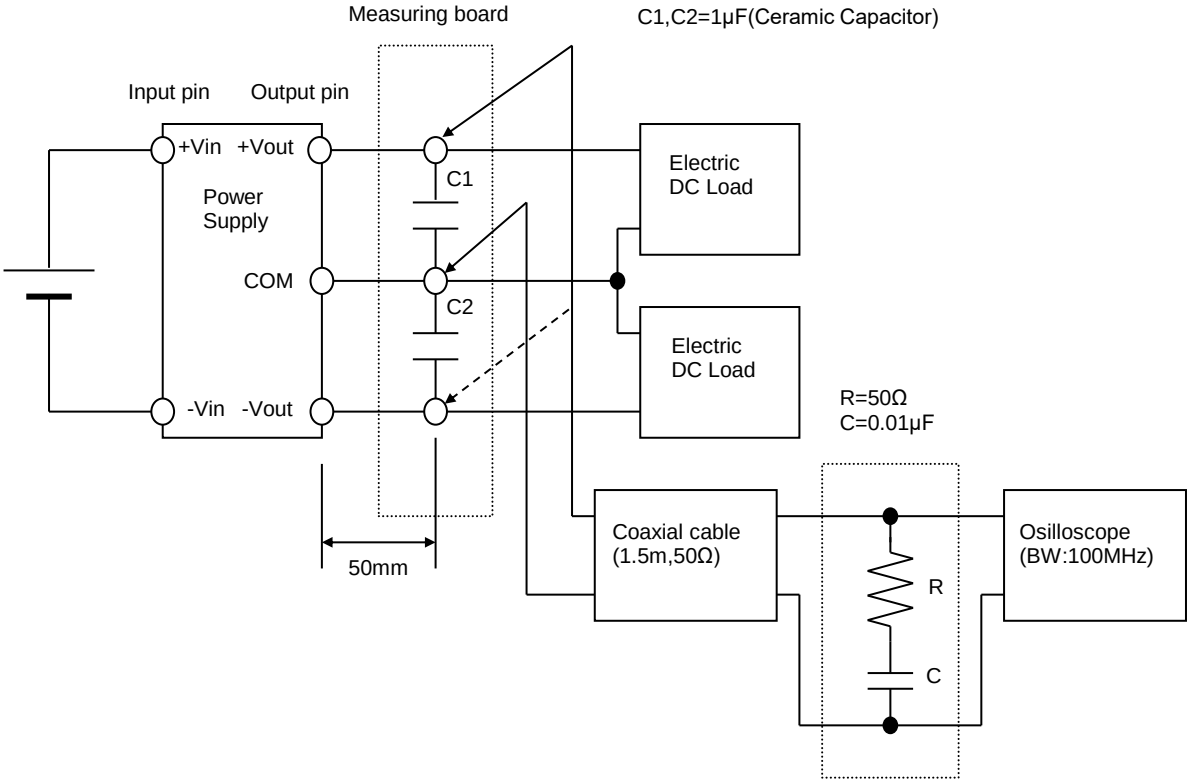


Figure B（Ripple and Ripple noise Characteristic）