参考資料

TEST DATA OF MGW30512

Regulated DC Power Supply
October 25, 2016

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Takaaki Sekiguchi Design Engineer

COSEL CO.,LTD.

COSEL

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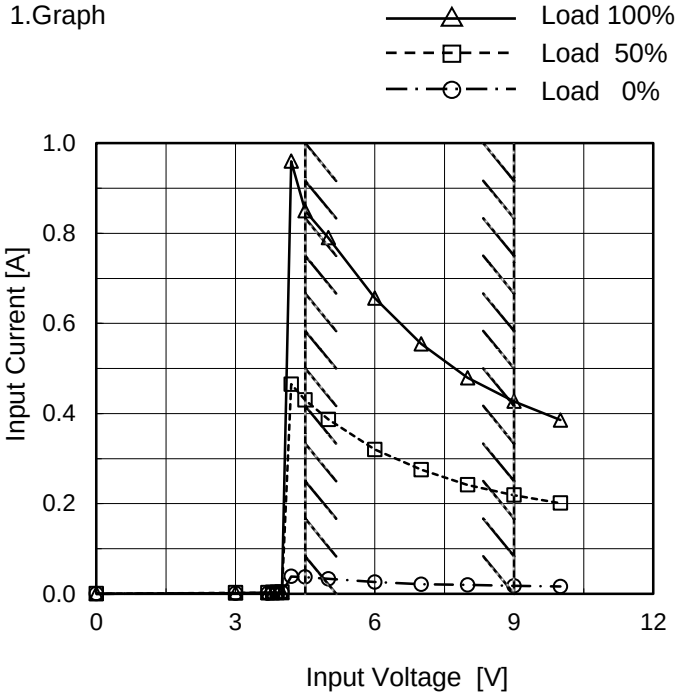
COSEL

Model	MGW30512
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	0.001	0.002	0.002
3.7	0.001	0.002	0.003
3.8	0.003	0.003	0.003
3.9	0.003	0.003	0.003
4.0	0.003	0.004	0.003
4.2	0.038	0.465	0.960
4.5	0.037	0.430	0.850
5.0	0.033	0.387	0.790
6.0	0.026	0.320	0.656
7.0	0.021	0.275	0.555
8.0	0.020	0.242	0.479
9.0	0.017	0.219	0.427
10.0	0.016	0.201	0.385
--	-	-	-
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--	-	-	-
--	-	-	-

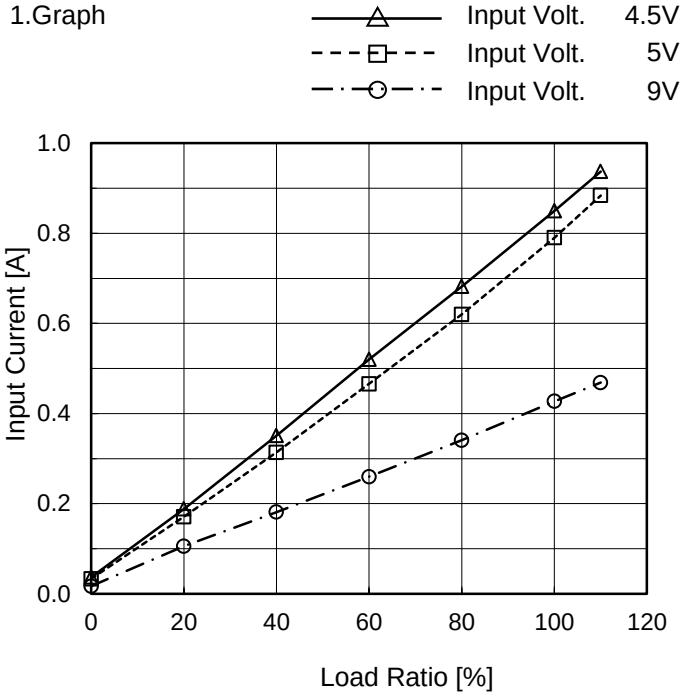
BC-10990

COSEL

Model	MGW30512
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	0.033	0.017
20	0.188	0.171	0.106
40	0.351	0.314	0.181
60	0.520	0.466	0.260
80	0.682	0.620	0.341
100	0.850	0.790	0.427
110	0.937	0.884	0.469
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

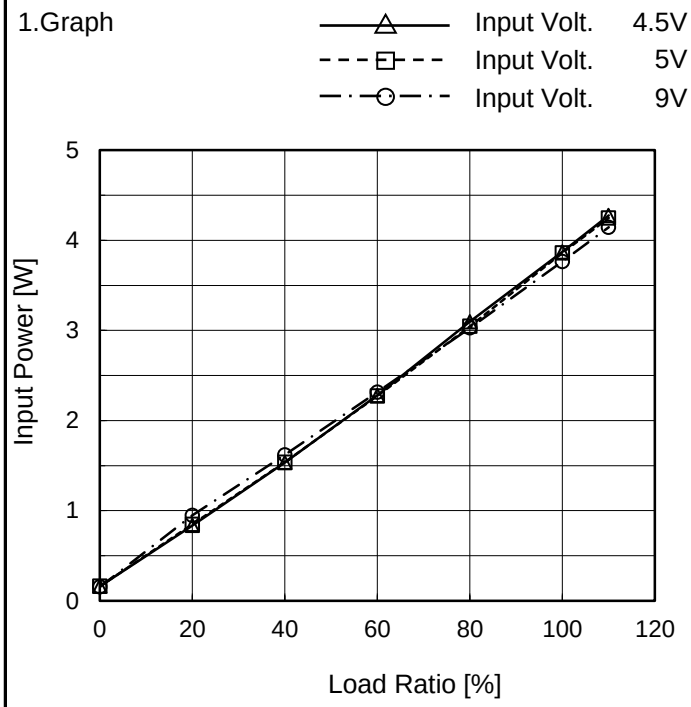
BC-10990

COSEL

Model	MGW30512
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	0.16	0.15
20	0.83	0.85	0.95
40	1.53	1.54	1.62
60	2.28	2.27	2.31
80	3.10	3.05	3.03
100	3.87	3.86	3.76
110	4.28	4.25	4.15
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

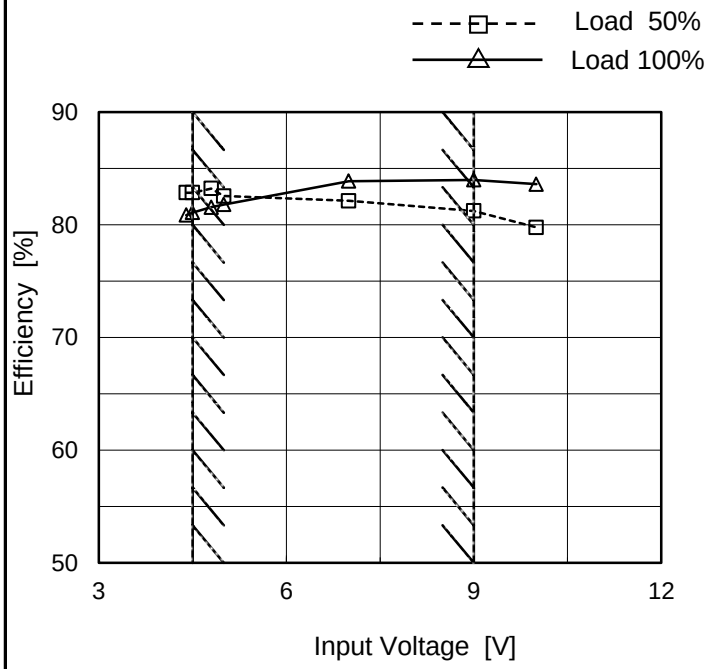
BC-10990

COSEL

Model	MGW30512
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

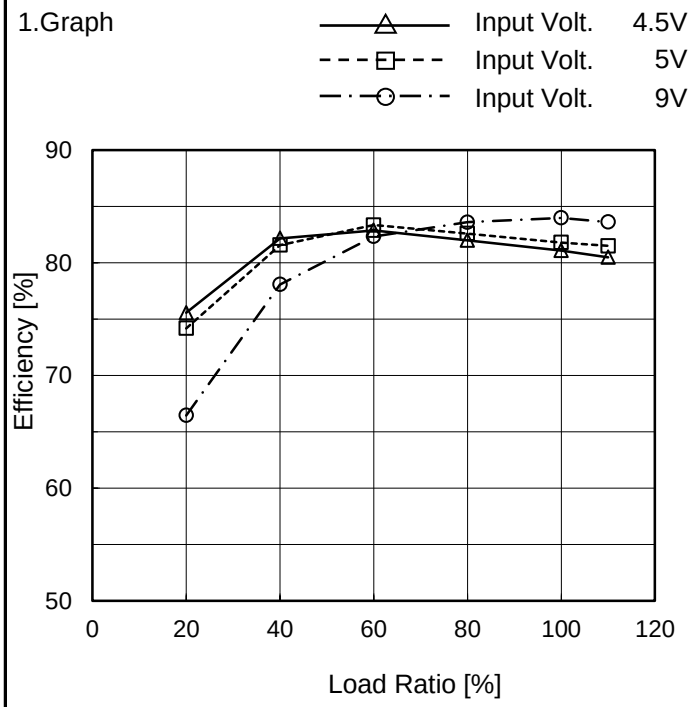
Input Voltage [V]	Efficiency [%]	
	Load 50%	Load 100%
4.4	82.9	80.9
4.5	82.9	81.1
4.8	83.2	81.6
5.0	82.6	81.8
7.0	82.1	83.9
9.0	81.2	84.0
10.0	79.8	83.6
--	-	-
--	-	-

COSEL

Model	MGW30512
Item	Efficiency (by Load Ratio)
Object	————————

Temperature 25°C
Testing Circuitry Figure A

1.Graph



2.Values

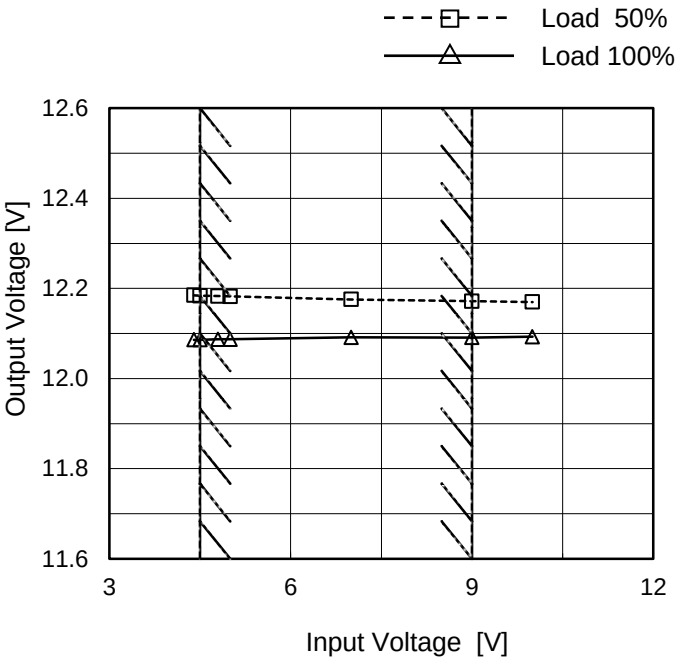
Load Ratio [%]	Efficiency [%] Input Volt. 4.5[V]	Input Volt. 5[V]	Input Volt. 9[V]
0	-	-	-
20	75.6	74.2	66.5
40	82.2	81.6	78.1
60	82.9	83.4	82.4
80	82.0	82.6	83.6
100	81.1	81.8	84.0
110	80.5	81.5	83.6
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

COSEL

Model	MGW30512
Item	Line Regulation
Object	+12V0.13A

Temperature 25°C
Testing Circuitry Figure A

1.Graph



2.Values

Input Voltage [V]	Output Voltage [V]	
	Load 50%	Load 100%
4.4	12.185	12.086
4.5	12.184	12.086
4.8	12.183	12.087
5.0	12.182	12.087
7.0	12.176	12.091
9.0	12.172	12.091
10.0	12.170	12.093
--	-	-
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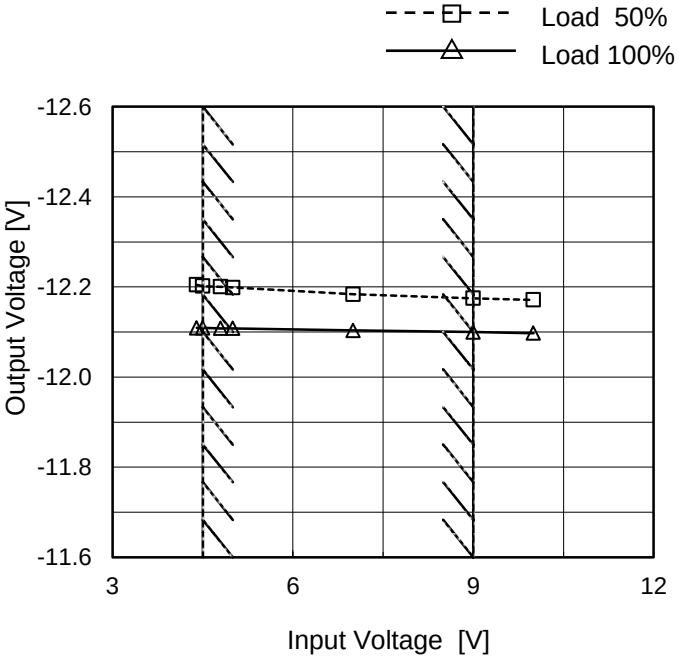
-12V: Rated Load Current

Object	-12V0.13A

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	-12.205	-12.109
4.5	-12.202	-12.109
4.8	-12.200	-12.108
5.0	-12.199	-12.108
7.0	-12.184	-12.103
9.0	-12.175	-12.100
10.0	-12.172	-12.098
--	-	-
--	-	-

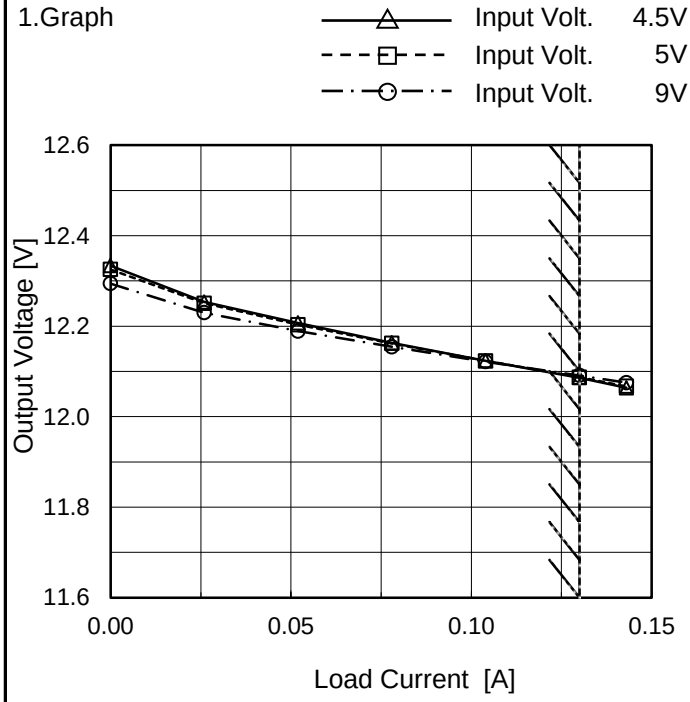
+12V: Rated Load Current

COSEL

Model	MGW30512
Item	Load Regulation
Object	+12V0.13A

Temperature 25°C
Testing Circuitry Figure A

1.Graph



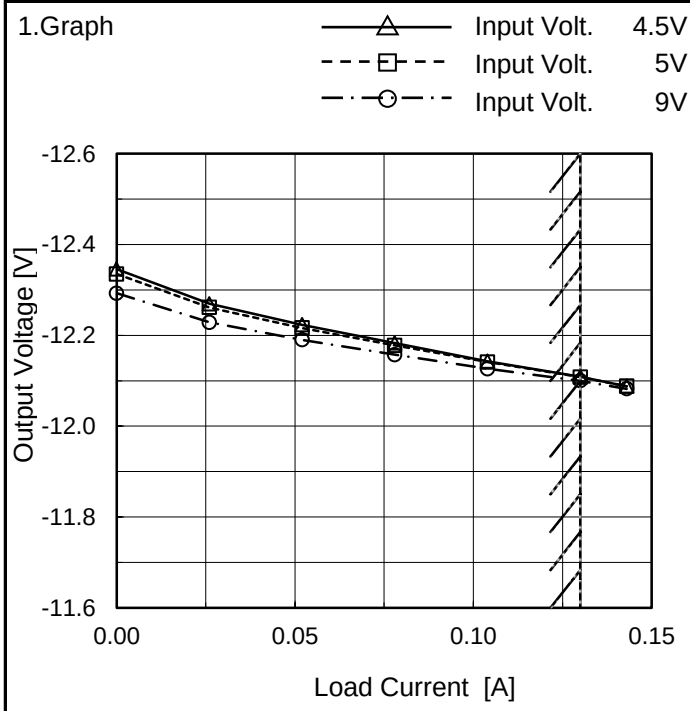
2.Values

Load Current [A]	Output Voltage [V] Input Volt. 4.5[V]	Input Volt. 5[V]	Input Volt. 9[V]
0.000	12.334	12.325	12.294
0.026	12.254	12.251	12.230
0.052	12.207	12.203	12.189
0.078	12.163	12.162	12.154
0.104	12.124	12.123	12.122
0.130	12.086	12.087	12.091
0.143	12.064	12.067	12.075
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

-12V: Rated Load Current

Object	-12V0.13A

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	-12.346	-12.335	-12.293
0.026	-12.270	-12.261	-12.229
0.052	-12.223	-12.216	-12.190
0.078	-12.183	-12.178	-12.158
0.104	-12.143	-12.141	-12.127
0.130	-12.109	-12.108	-12.100
0.143	-12.088	-12.088	-12.082
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

+12V: Rated Load Current

BC-10990

COSEL

Model	MGW30512
Item	Dynamic Load Response
Object	+12V0.13A

Temperature 25°C
Testing Circuitry Figure A

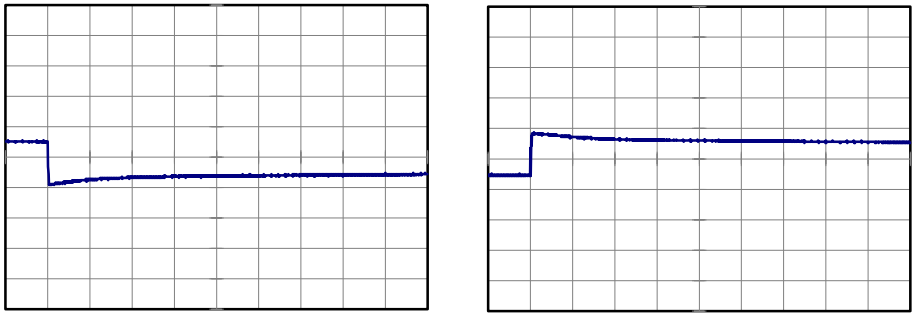
Input Volt. 5 V
-12V:rated load current.
Cycle 100 ms

t1,t2 = 100 μs

Load Current

t1 t2

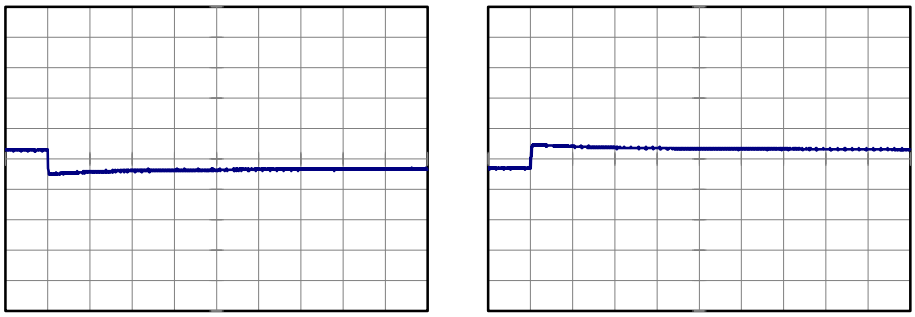
Min.Load (0A)←→
Load 100% (0.13A)



200 mV/div

4 ms/div 4 ms/div

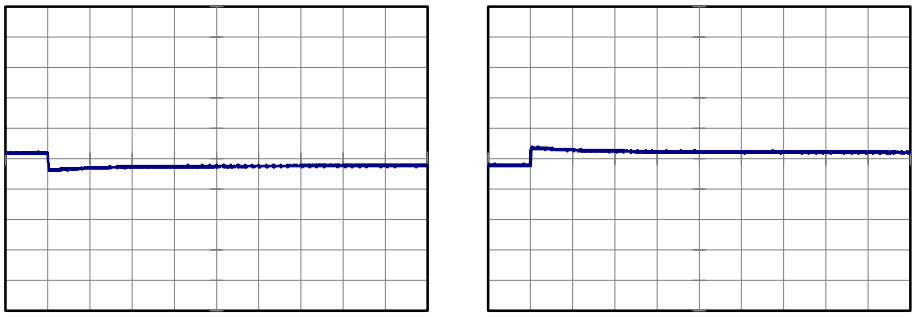
Min.Load (0A)←→
Load 50% (0.065A)



200 mV/div

4 ms/div 4 ms/div

Load 50% (0.065A)←→
Load 100% (0.13A)



200 mV/div

4 ms/div 4 ms/div

COSEL

Model	MGW30512
Item	Dynamic Load Response
Object	-12V0.13A

Temperature 25°C
Testing Circuitry Figure A

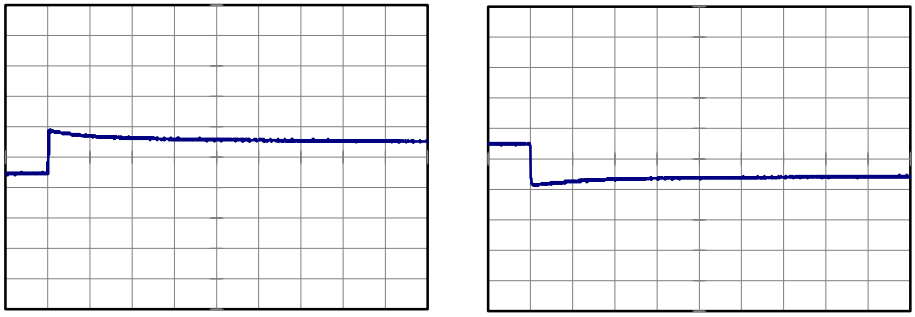
Input Volt. 5 V
+12V:rated load current.
Cycle 100 ms

t1,t2 = 100 μs

Load Current

t1 t2

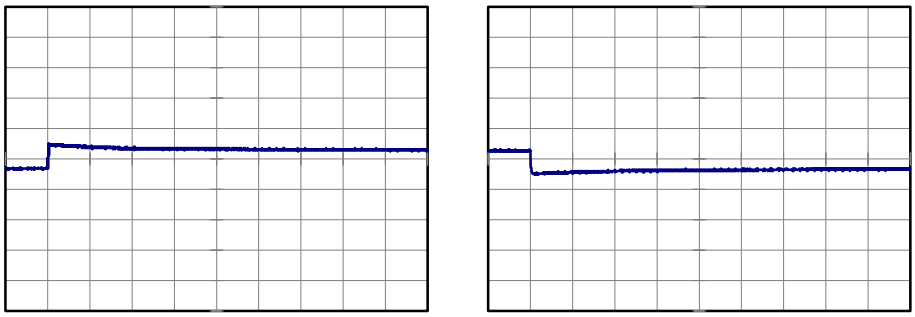
Min.Load (0A)←→
Load 100% (0.13A)



200 mV/div

4 ms/div 4 ms/div

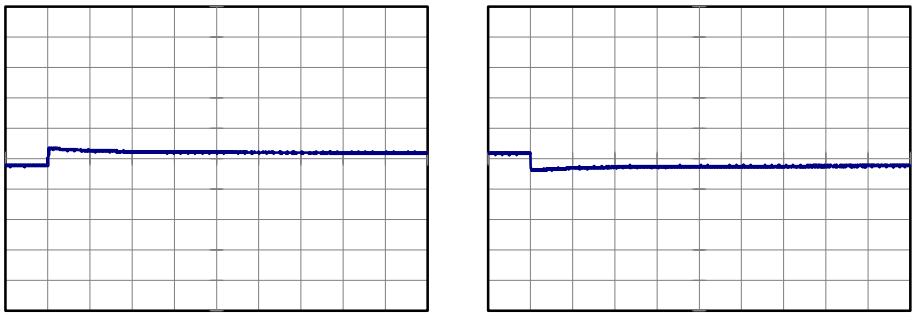
Min.Load (0A)←→
Load 50% (0.065A)



200 mV/div

4 ms/div 4 ms/div

Load 50% (0.065A)←→
Load 100% (0.13A)



200 mV/div

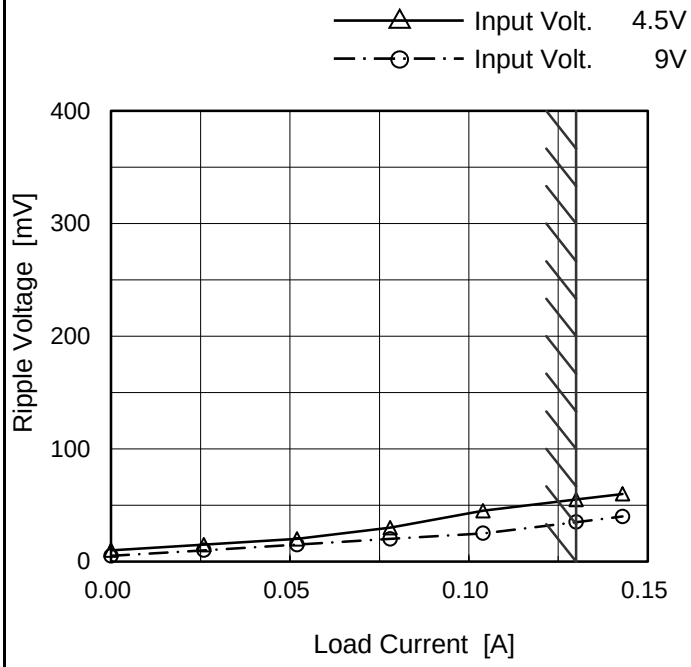
4 ms/div 4 ms/div

COSEL

Model	MGW30512
Item	Ripple Voltage (by Load Current)
Object	+12V0.13A

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]

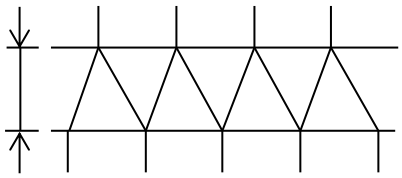


Fig.Complex Ripple Wave Form

2.Values

Load Current [A]	Ripple Voltage [mV]	
	Input Volt. 4.5 [V]	Input Volt. 9 [V]
0.000	10	5
0.026	15	10
0.052	20	15
0.078	30	20
0.104	45	25
0.130	55	35
0.143	60	40
--	-	-
--	-	-
--	-	-
--	-	-

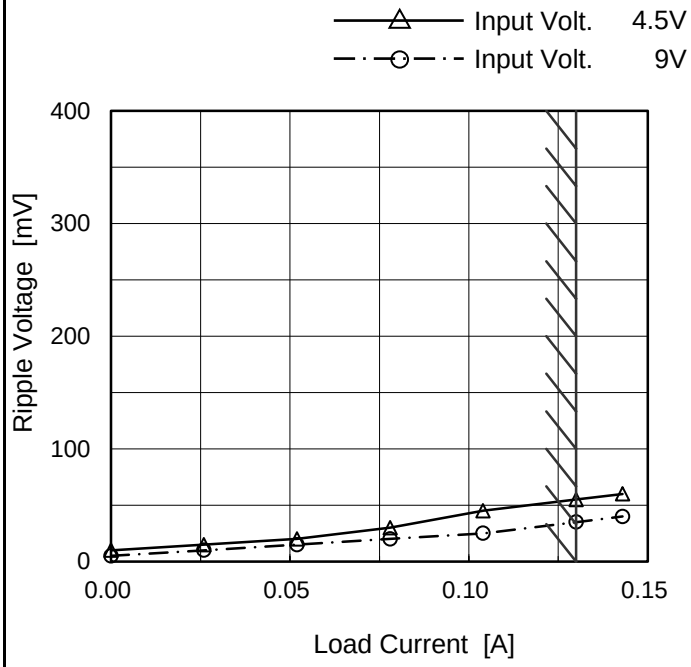
-12V: Rated Load Current

COSEL

Model	MGW30512
Item	Ripple Voltage (by Load Current)
Object	-12V0.13A

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]

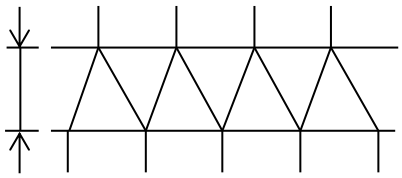


Fig.Complex Ripple Wave Form

2.Values

Load Current [A]	Ripple Voltage [mV]	
	Input Volt. 4.5 [V]	Input Volt. 9 [V]
0.000	10	5
0.026	15	10
0.052	20	15
0.078	30	20
0.104	45	25
0.130	55	35
0.143	60	40
--	-	-
--	-	-
--	-	-
--	-	-

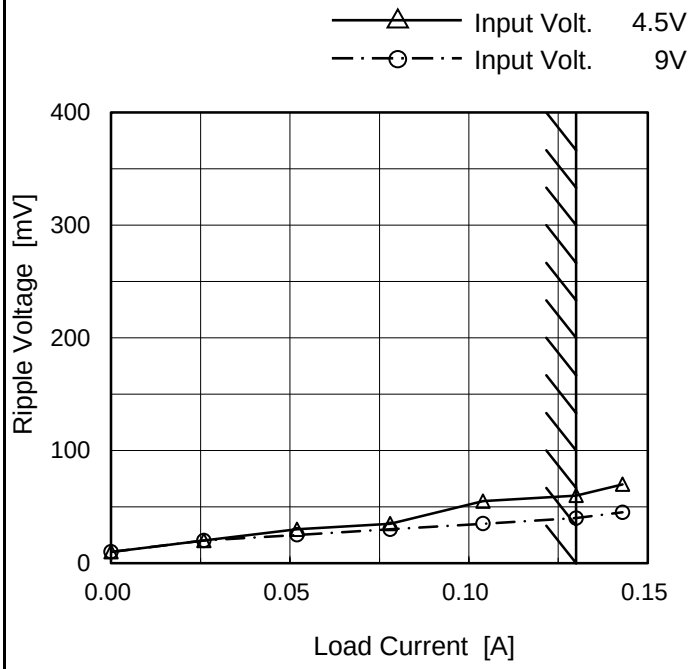
+12V: Rated Load Current

COSEL

Model	MGW30512
Item	Ripple-Noise
Object	+12V0.13A

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]

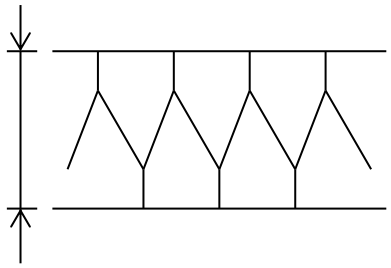


Fig.Complex Ripple Noise Wave Form

2.Values

Load Current [A]	Ripple-Noise [mV]	
	Input Volt. 4.5 [V]	Input Volt. 9 [V]
0.000	10	10
0.026	20	20
0.052	30	25
0.078	35	30
0.104	55	35
0.130	60	40
0.143	70	45
--	-	-
--	-	-
--	-	-
--	-	-

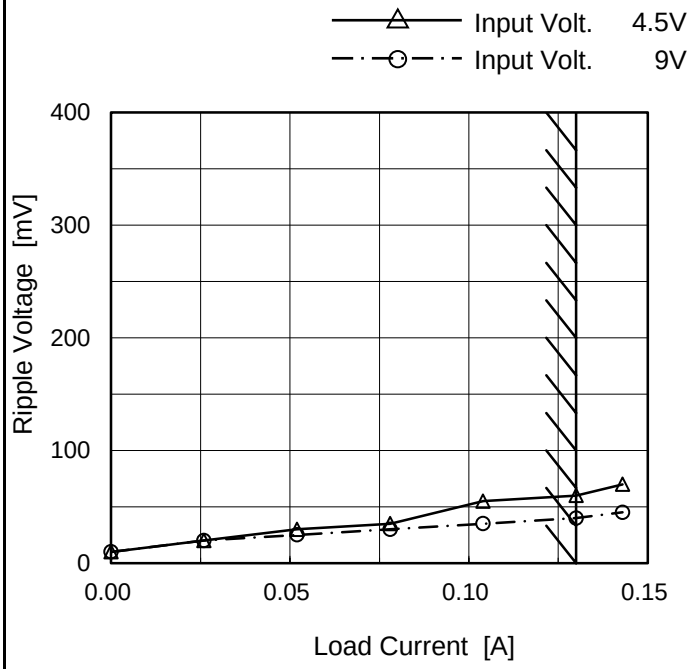
-12V: Rated Load Current

COSEL

Model	MGW30512
Item	Ripple-Noise
Object	-12V0.13A

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]

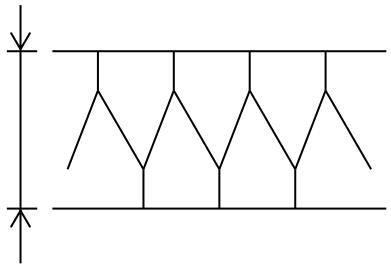


Fig.Complex Ripple Noise Wave Form

2.Values

Load Current [A]	Ripple-Noise [mV]	
	Input Volt. 4.5 [V]	Input Volt. 9 [V]
0.000	10	10
0.026	20	20
0.052	30	25
0.078	35	30
0.104	55	35
0.130	60	40
0.143	70	45
--	-	-
--	-	-
--	-	-
--	-	-

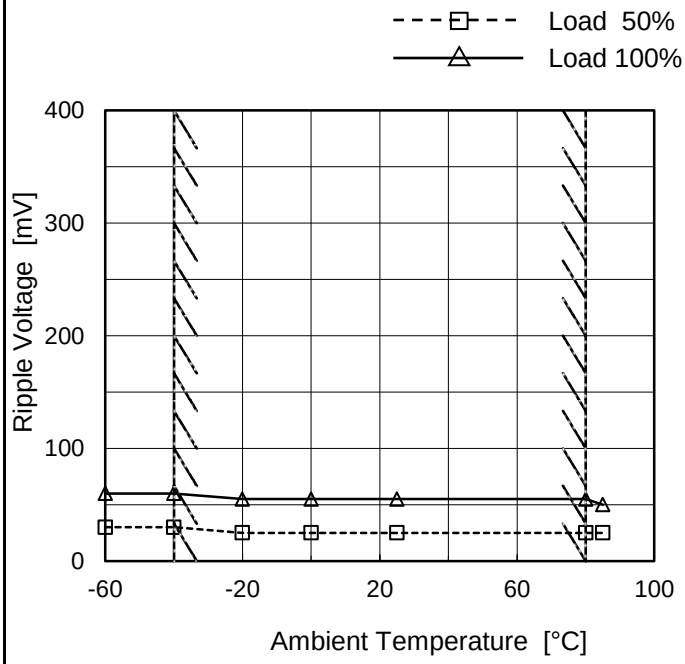
+12V: Rated Load Current

COSEL

Model	MGW30512
Item	Ripple Voltage (by Ambient Temp.)
Object	+12V0.13A

Testing Circuitry Figure B

1.Graph



Input Volt. 5V

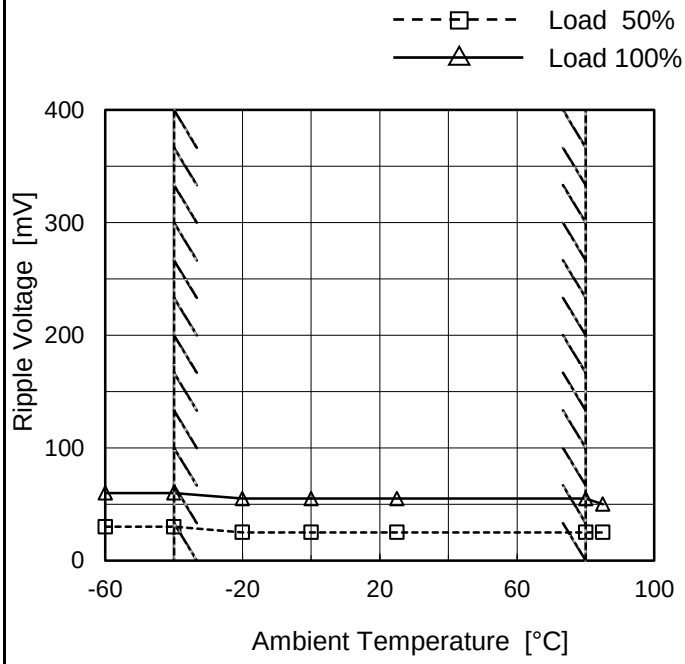
2.Values

Ambient Temperature [°C]	Ripple Voltage [mV]	
	Load 50%	Load 100%
-60	30	60
-40	30	60
-20	25	55
0	25	55
25	25	55
80	25	55
85	25	50
--	-	-
--	-	-
--	-	-
--	-	-

-12V: Rated Load Current

Object	-12V0.13A

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	30	60
-40	30	60
-20	25	55
0	25	55
25	25	55
80	25	55
85	25	50
--	-	-
--	-	-
--	-	-
--	-	-

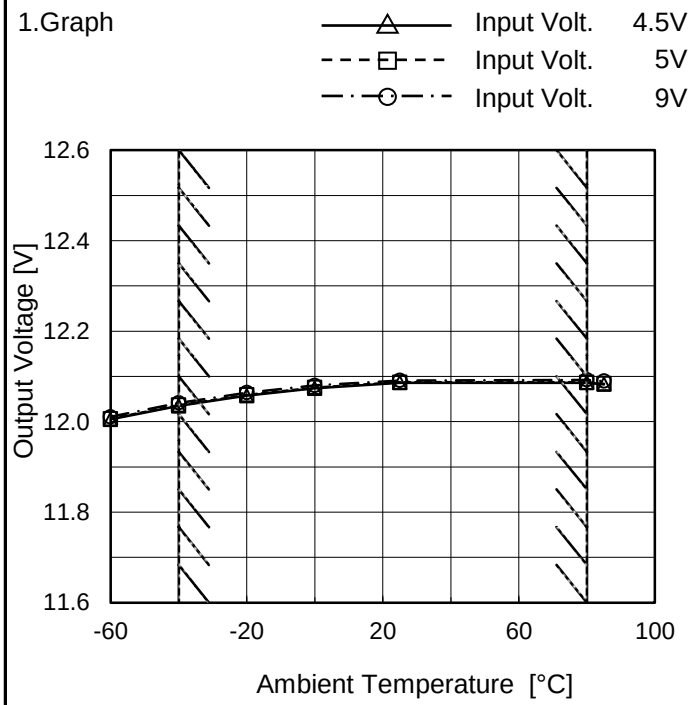
+12V: Rated Load Current

COSEL

Model	MGW30512
Item	Ambient Temperature Drift
Object	+12V0.13A

Testing Circuitry Figure A

1.Graph



Load 100%

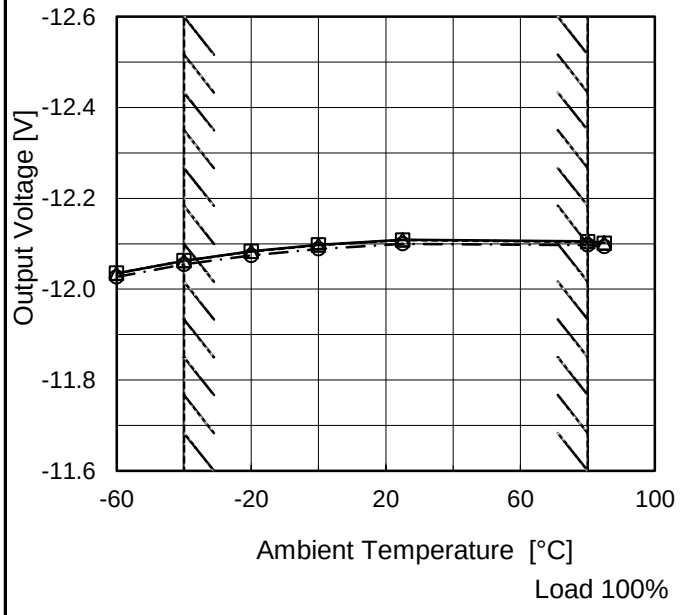
2.Values

Ambient Temperature [°C]	Output Voltage [V]		
	Input Volt. 4.5[V]	Input Volt. 5[V]	Input Volt. 9[V]
-60	12.005	12.006	12.011
-40	12.035	12.037	12.041
-20	12.058	12.059	12.064
0	12.074	12.075	12.080
25	12.086	12.087	12.091
80	12.086	12.087	12.093
85	12.083	12.084	12.090
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

-12V: Rated Load Current

Object	-12V0.13A

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	-12.035	-12.035	-12.027
-40	-12.063	-12.063	-12.054
-20	-12.083	-12.083	-12.074
0	-12.098	-12.097	-12.089
25	-12.109	-12.108	-12.100
80	-12.105	-12.104	-12.097
85	-12.102	-12.101	-12.094
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

+12V: Rated Load Current

Model	MGW30512	
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 - 0.13A (AVR 2) : 0 - 0.13A

* 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	+12V0.13A					
Item	Temperature [°C]	Input Voltage[V]	Output		Output Voltage Accuracy	
			Current[A]	Voltage[V]	Value [mV]	Ratio [%]
Maximum Voltage	80	4.5	0	12.358	±268	±2.2
Minimum Voltage	-40	4.5	0.13	11.822		

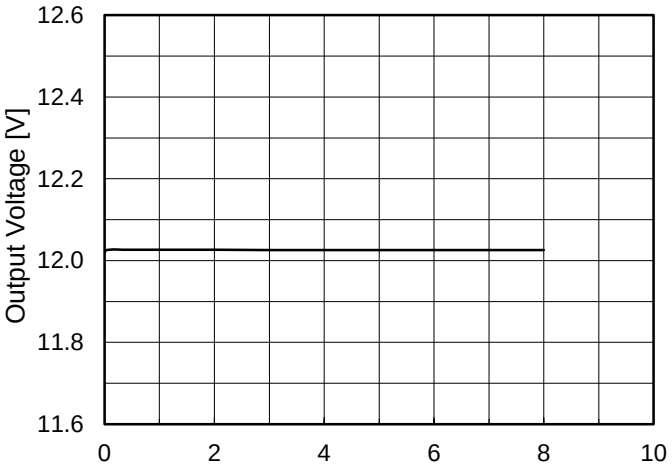
Object	-12V0.13A					
Item	Temperature [°C]	Input Voltage[V]	Output		Output Voltage Accuracy	
			Current[A]	Voltage[V]	Value [mV]	Ratio [%]
Maximum Voltage	80	4.5	0	-12.363	±261	±2.2
Minimum Voltage	-40	4.5	0.13	-11.841		

COSEL

Model	MGW30512
Item	Time Lapse Drift
Object	+12V0.13A

Temperature 25°C
Testing Circuitry Figure A

1.Graph



Input Volt. 5V
Load 100%

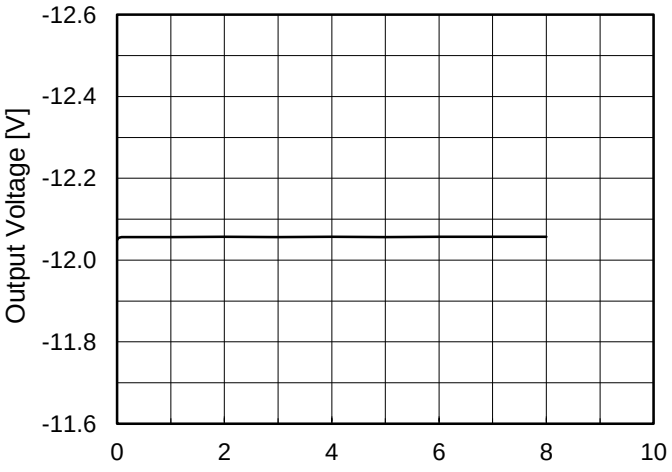
2.Values

Time since start [H]	Output Voltage [V]
0.0	12.021
0.5	12.027
1.0	12.026
2.0	12.026
3.0	12.026
4.0	12.026
5.0	12.026
6.0	12.026
7.0	12.026
8.0	12.026

-12V: Rated Load Current

Object	-12V0.13A

1.Graph



Input Volt. 5V
Load 100%

2.Values

Time since start [H]	Output Voltage [V]
0.0	-12.049
0.5	-12.056
1.0	-12.056
2.0	-12.057
3.0	-12.057
4.0	-12.057
5.0	-12.057
6.0	-12.057
7.0	-12.057
8.0	-12.057

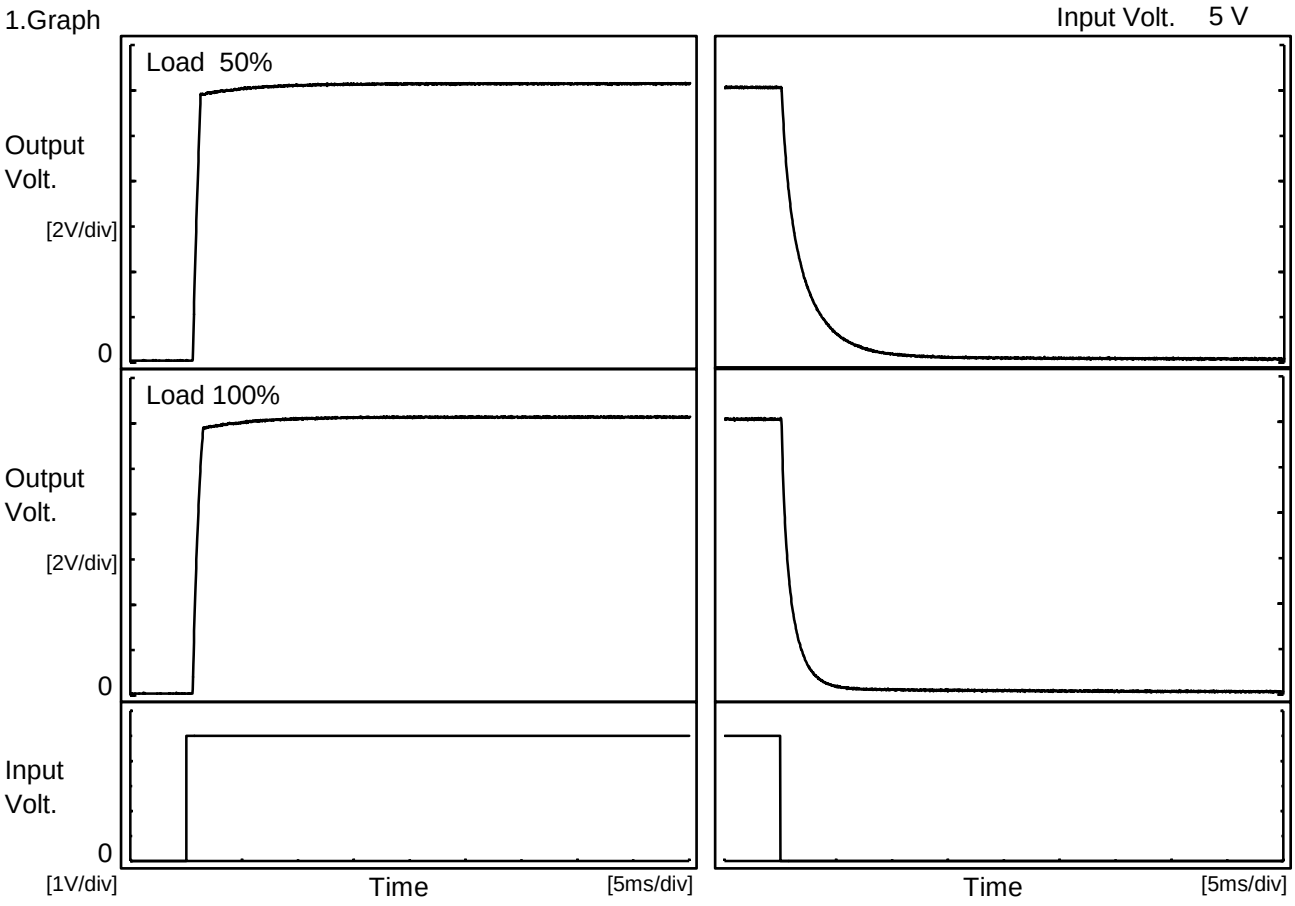
+12V: Rated Load Current

BC-10990

COSEL

Model	MGW30512	
Item	Rise and Fall Time	Temperature 25°C Testing Circuitry Figure A
Object	+12V0.13A	

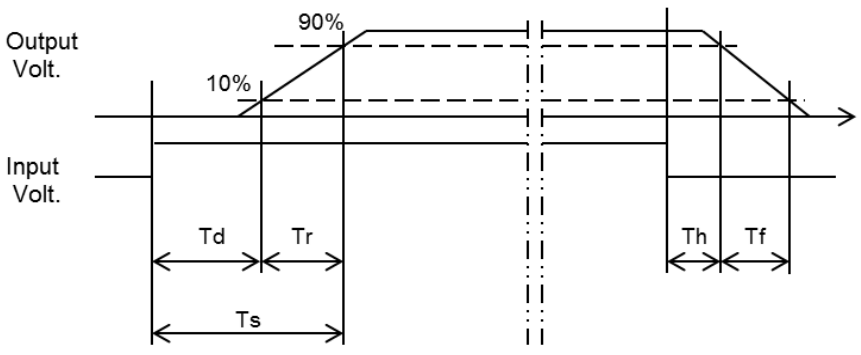
1.Graph



2.Values

[ms]

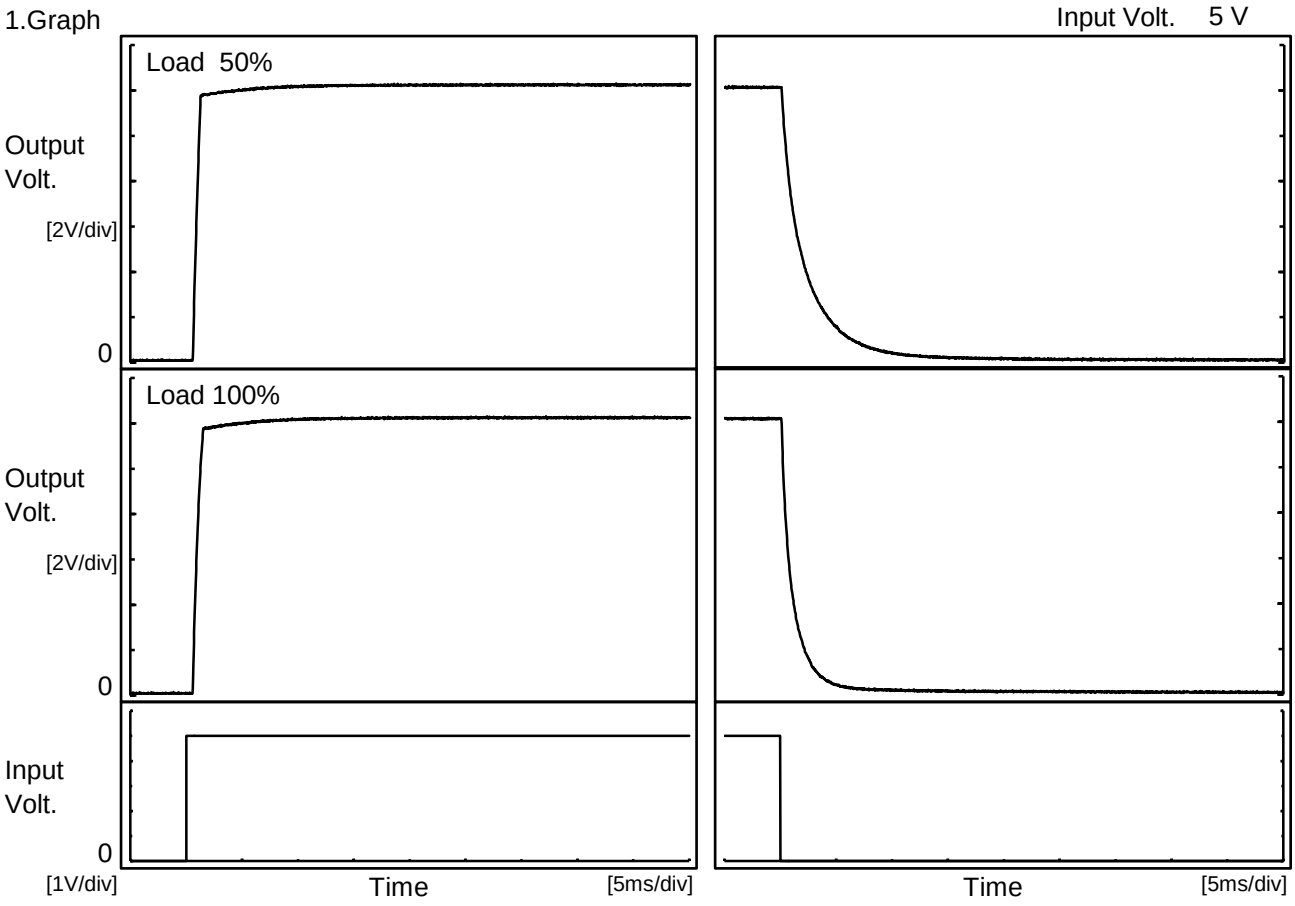
Load \ Time	Td	Tr	Ts	Th	Tf
50 %	0.7	0.6	1.3	0.2	4.8
100 %	0.6	0.8	1.4	0.2	2.3



COSEL

Model	MGW30512	
Item	Rise and Fall Time	Temperature 25°C Testing Circuitry Figure A
Object	-12V0.13A	

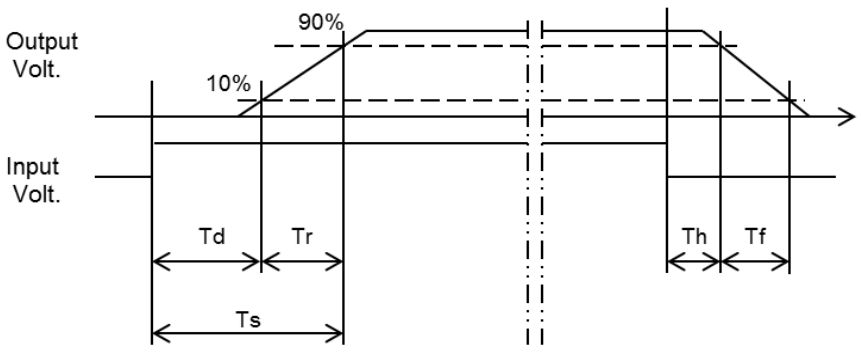
1.Graph



2.Values

[ms]

Load \ Time	Td	Tr	Ts	Th	Tf
50 %	0.7	0.6	1.3	0.3	5.4
100 %	0.6	0.8	1.4	0.2	2.6

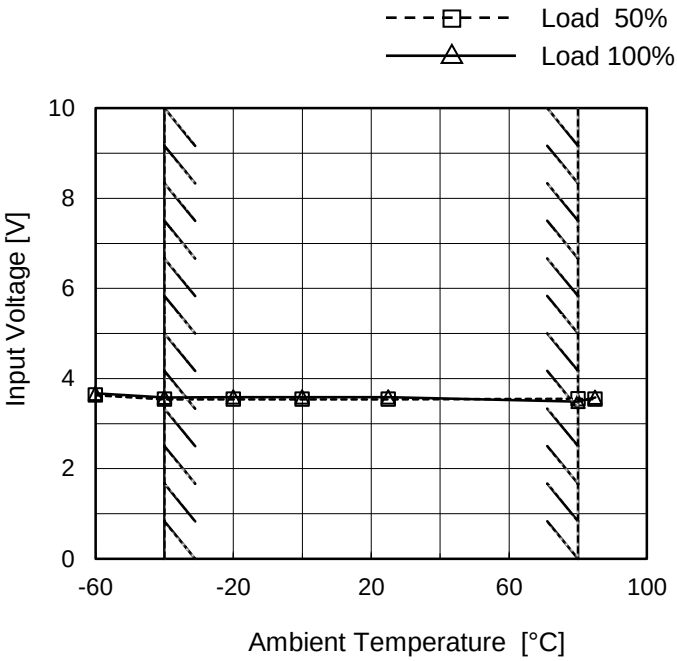


COSEL

Model	MGW30512
Item	Minimum Input Voltage for Regulated Output Voltage
Object	+12V0.13A

Testing Circuitry Figure A

1.Graph

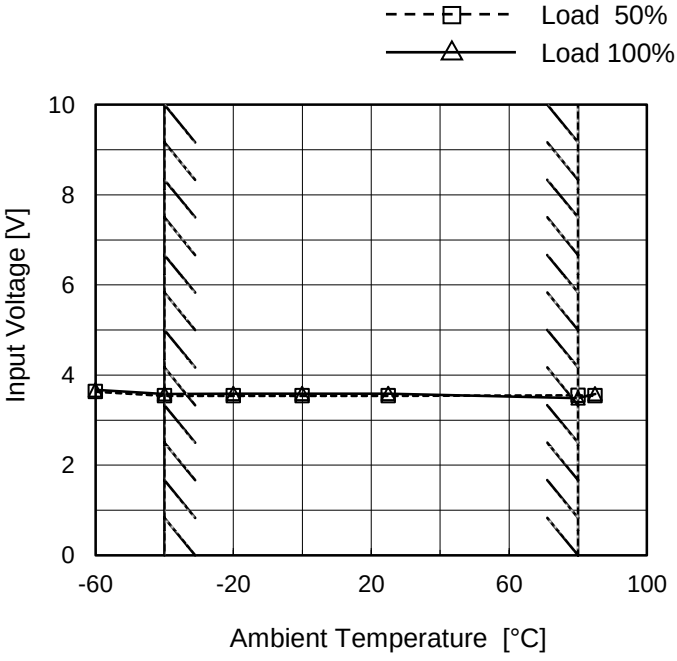


2.Values

Ambient Temperature [°C]	Input Voltage [V]	
	Load 50%	Load 100%
-60	3.7	3.7
-40	3.6	3.6
-20	3.6	3.6
0	3.6	3.6
25	3.6	3.6
80	3.6	3.5
85	3.6	3.6
--	-	-
--	-	-
--	-	-
--	-	-

Object	-12V0.13A

1.Graph



2.Values

Ambient Temperature [°C]	Input Voltage [V]	
	Load 50%	Load 100%
-60	3.7	3.7
-40	3.6	3.6
-20	3.6	3.6
0	3.6	3.6
25	3.6	3.6
80	3.6	3.5
85	3.6	3.6
--	-	-
--	-	-
--	-	-
--	-	-

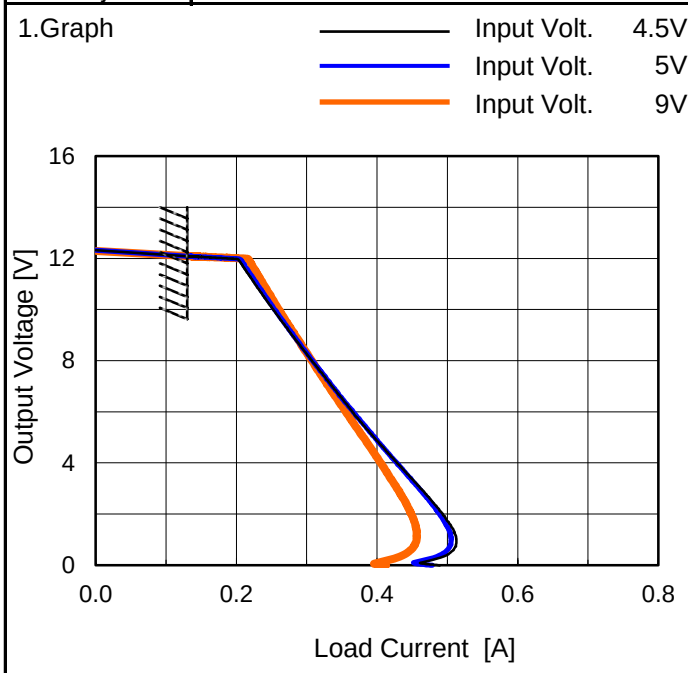
Note: Slanted line shows the range of the rated ambient temperature.

COSEL

Model	MGW30512
Item	Overcurrent Protection
Object	+12V0.13A

Temperature 25°C
Testing Circuitry Figure A

1.Graph



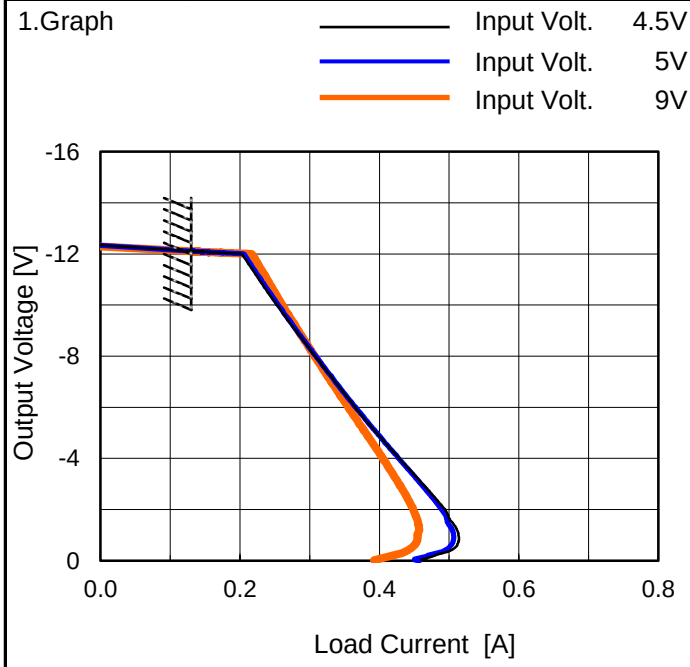
2.Values

Output Voltage [V]	Load Current [A] Input Volt. 4.5[V]	Input Volt. 5[V]	Input Volt. 9[V]
11.4	0.22	0.22	0.23
10.8	0.23	0.23	0.24
9.6	0.26	0.26	0.27
8.4	0.30	0.30	0.30
7.2	0.33	0.33	0.33
6.0	0.36	0.37	0.36
4.8	0.40	0.40	0.38
3.6	0.44	0.44	0.41
2.4	0.48	0.48	0.44
1.2	0.51	0.50	0.46
0.0	0.49	0.48	0.41
--	-	-	-

-12V: Rated Load Current

Object	-12V0.13A

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	0.22	0.22	0.23
-10.8	0.23	0.23	0.24
-9.6	0.26	0.27	0.27
-8.4	0.30	0.30	0.30
-7.2	0.33	0.33	0.33
-6.0	0.37	0.37	0.36
-4.8	0.40	0.40	0.38
-3.6	0.44	0.44	0.41
-2.4	0.48	0.48	0.44
-1.2	0.51	0.50	0.46
0.0	0.47	0.46	0.40
--	-	-	-

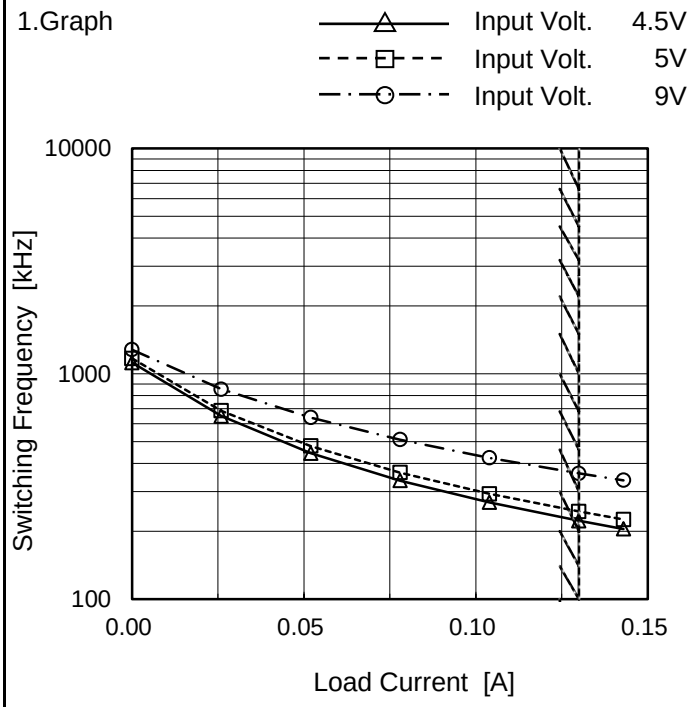
+12V: Rated Load Current

COSEL

Model	MGW30512
Item	Switching Frequency (by Load Current)
Object	+/-12V0.13A

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	1120	1170	1280
0.026	649	685	854
0.052	444	478	639
0.078	336	364	510
0.104	269	293	423
0.130	223	245	361
0.143	205	226	337
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

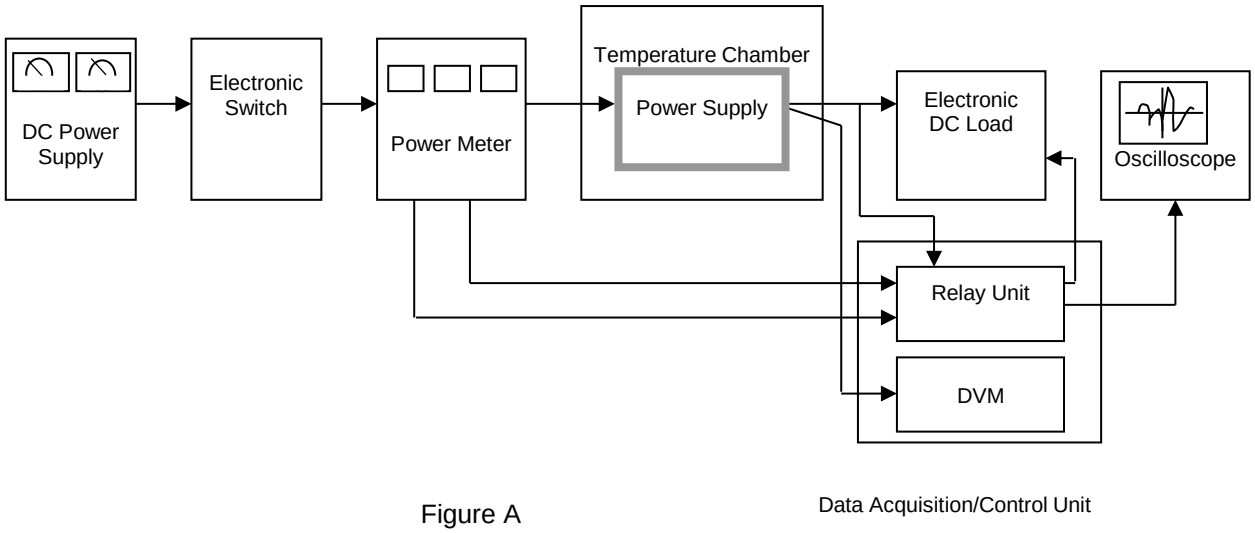


Figure A

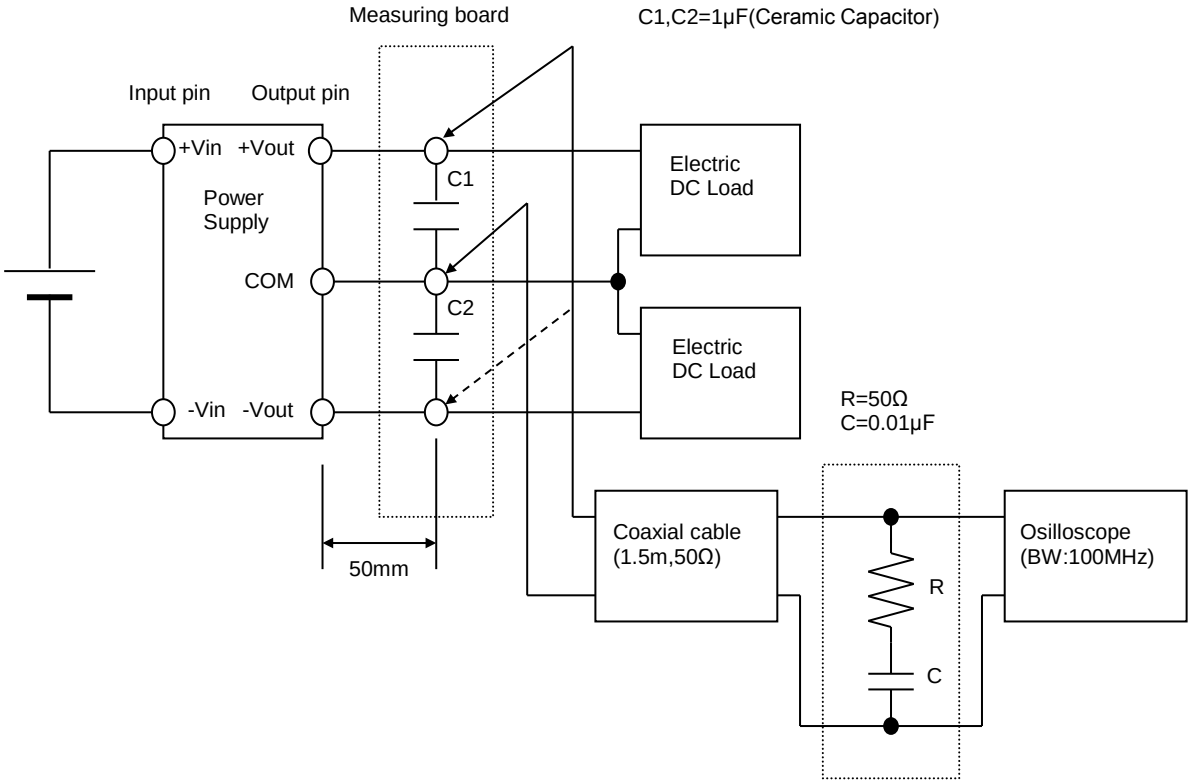


Figure B（Ripple and Ripple noise Characteristic）