COSEL

参考資料

TEST DATA OF MGW1R50515

Regulated DC Power Supply
October 31, 2016

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Takaaki Sekiguchi Design Engineer

COSEL CO.,LTD.

参考資料

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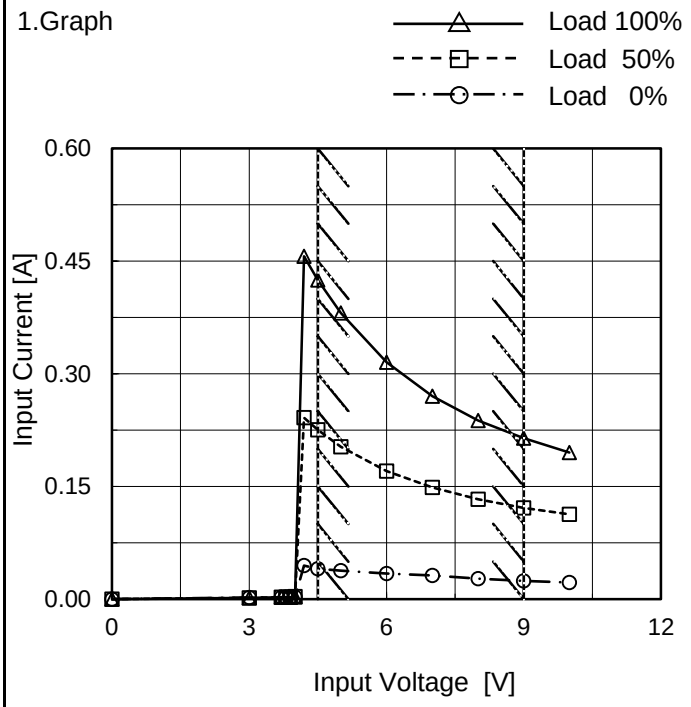
参考資料

COSEL

Model	MGW1R50515
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	0.002	0.002	0.003
3.8	0.003	0.003	0.003
3.9	0.003	0.003	0.003
4.0	0.003	0.003	0.003
4.2	0.045	0.242	0.457
4.5	0.041	0.225	0.425
5.0	0.038	0.203	0.381
6.0	0.034	0.171	0.316
7.0	0.031	0.149	0.270
8.0	0.027	0.133	0.238
9.0	0.024	0.122	0.214
10.0	0.022	0.113	0.195
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

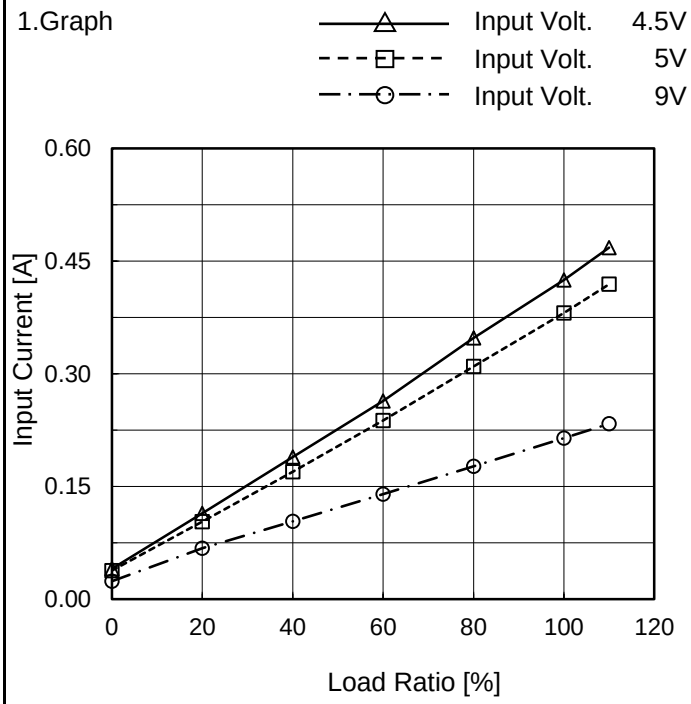
BC-10955

COSEL

Model	MGW1R50515
Item	Input Current (by Load Ratio)
Object	――――――――

Temperature 25°C
Testing Circuitry Figure A

1.Graph



2.Values

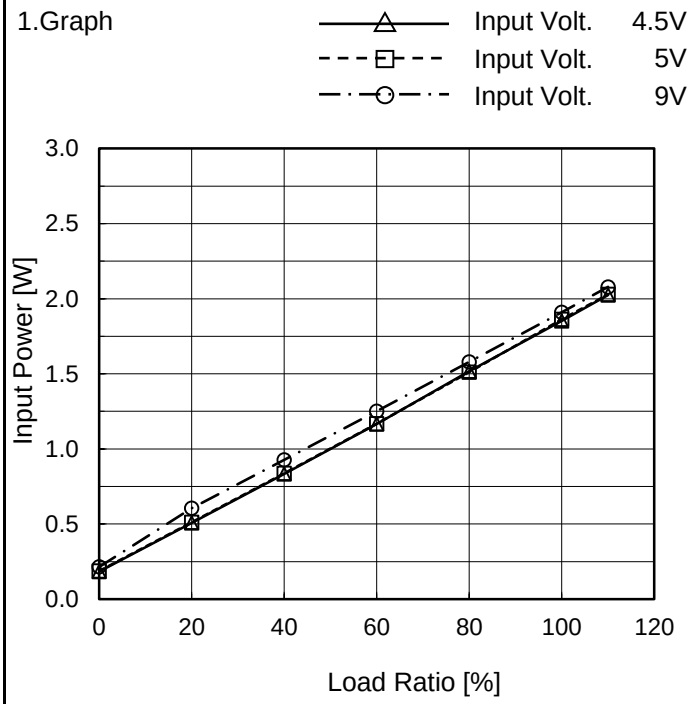
Load Ratio [%]	Input Current [A]		
	Input Volt. 4.5[V]	Input Volt. 5[V]	Input Volt. 9[V]
0	0.041	0.038	0.024
20	0.114	0.103	0.068
40	0.189	0.170	0.104
60	0.264	0.238	0.140
80	0.348	0.310	0.177
100	0.425	0.381	0.214
110	0.468	0.419	0.233
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

COSEL

Model	MGW1R50515
Item	Input Power (by Load Ratio)
Object	――――――――

Temperature 25°C
Testing Circuitry Figure A

1.Graph



2.Values

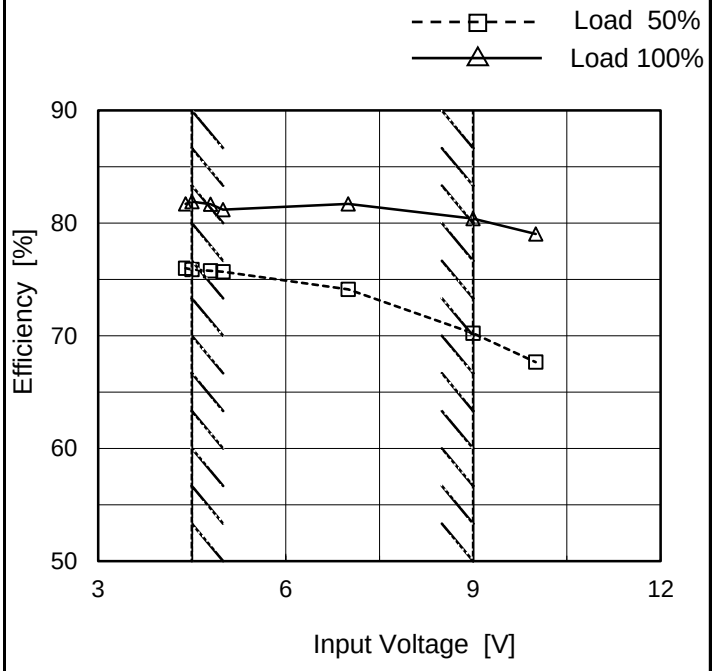
Load Ratio [%]	Input Power [W]		
	Input Volt. 4.5[V]	Input Volt. 5[V]	Input Volt. 9[V]
0	0.18	0.19	0.21
20	0.51	0.51	0.61
40	0.83	0.84	0.93
60	1.17	1.17	1.25
80	1.52	1.51	1.58
100	1.85	1.86	1.91
110	2.02	2.03	2.08
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

COSEL

Model	MGW1R50515
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	76.0	81.7
4.5	75.9	81.9
4.8	75.8	81.7
5.0	75.7	81.2
7.0	74.1	81.7
9.0	70.2	80.4
10.0	67.7	79.1
--	-	-
--	-	-

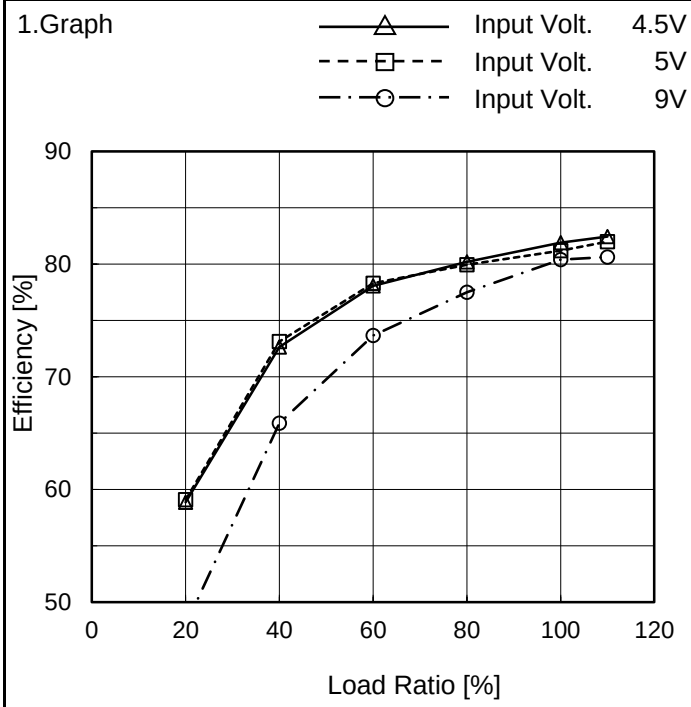
BC-10955

COSEL

Model	MGW1R50515
Item	Efficiency (by Load Ratio)
Object	――――――――

Temperature 25°C
Testing Circuitry Figure A

1.Graph



2.Values

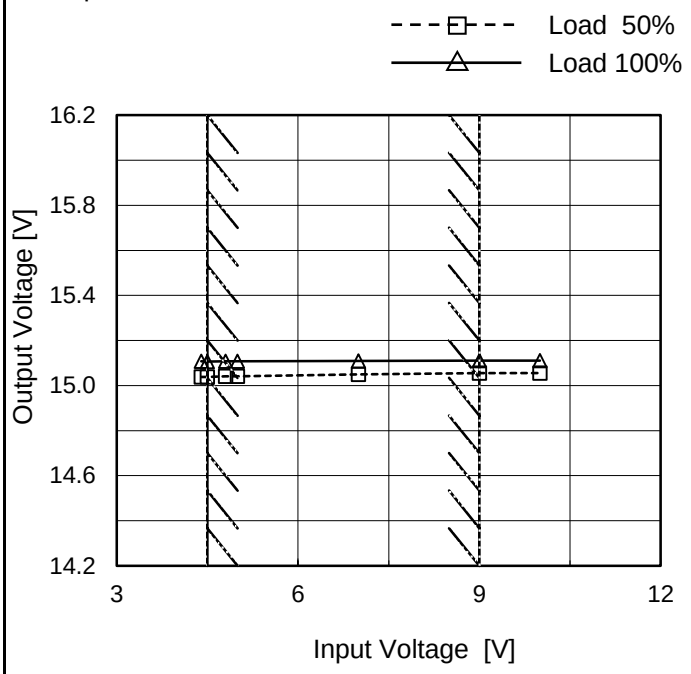
Load Ratio [%]	Efficiency [%]		
	Input Volt. 4.5[V]	Input Volt. 5[V]	Input Volt. 9[V]
0	-	-	-
20	58.9	59.1	48.0
40	72.7	73.1	65.9
60	78.1	78.3	73.7
80	80.2	79.9	77.5
100	81.9	81.2	80.4
110	82.4	82.0	80.6
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

COSEL

Model	MGW1R50515
Item	Line Regulation
Object	+15V0.05A

Temperature 25°C
Testing Circuitry Figure A

1.Graph



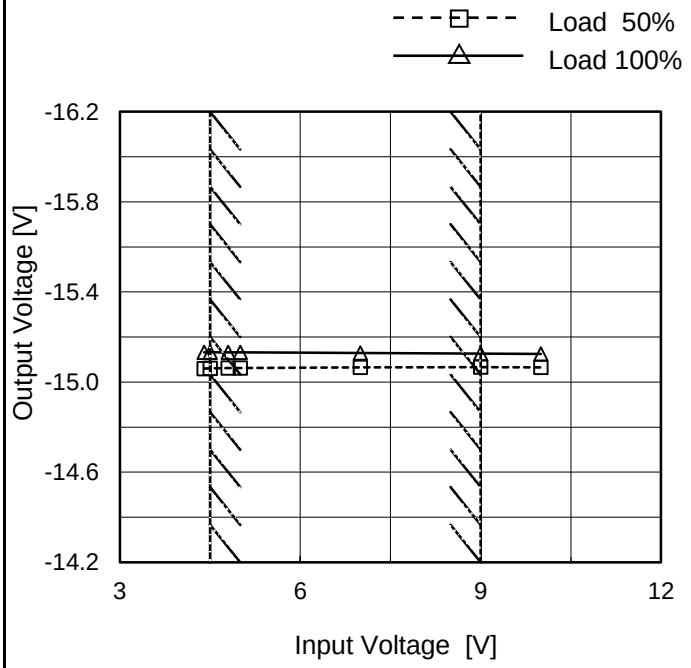
2.Values

Input Voltage [V]	Output Voltage [V]	
	Load 50%	Load 100%
4.4	15.038	15.107
4.5	15.039	15.107
4.8	15.041	15.108
5.0	15.041	15.108
7.0	15.050	15.110
9.0	15.055	15.111
10.0	15.056	15.111
--	-	-
--	-	-

-15V: Rated Load Current

Object	-15V0.05A

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	-15.060	-15.133
4.5	-15.061	-15.132
4.8	-15.062	-15.132
5.0	-15.062	-15.132
7.0	-15.066	-15.129
9.0	-15.066	-15.126
10.0	-15.066	-15.125
--	-	-
--	-	-

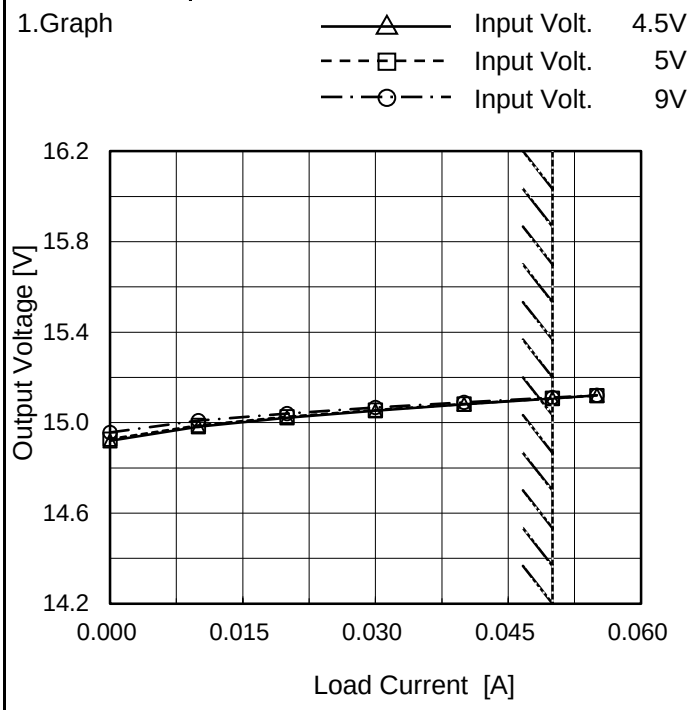
+15V: Rated Load Current

COSEL

Model	MGW1R50515
Item	Load Regulation
Object	+15V0.05A

Temperature 25°C
Testing Circuitry Figure A

1.Graph



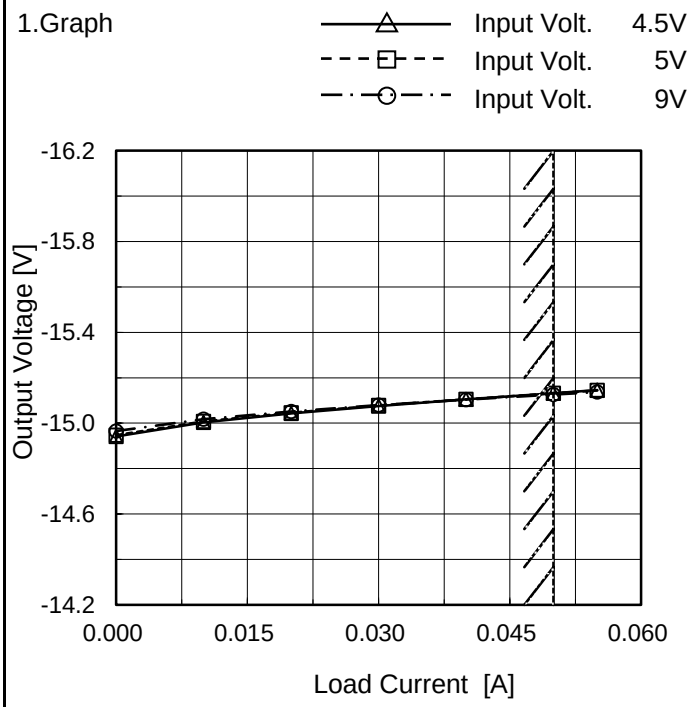
2.Values

Load Current [A]	Output Voltage [V] Input Volt. 4.5[V]	Input Volt. 5[V]	Input Volt. 9[V]
0.000	14.920	14.928	14.957
0.010	14.982	14.988	15.009
0.020	15.022	15.026	15.041
0.030	15.053	15.056	15.067
0.040	15.081	15.083	15.090
0.050	15.107	15.108	15.111
0.055	15.120	15.120	15.122
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

-15V: Rated Load Current

Object	-15V0.05A

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	-14.942	-14.947	-14.965
0.010	-15.004	-15.008	-15.018
0.020	-15.044	-15.046	-15.052
0.030	-15.076	-15.078	-15.079
0.040	-15.106	-15.105	-15.104
0.050	-15.132	-15.132	-15.126
0.055	-15.146	-15.144	-15.137
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

+15V: Rated Load Current

COSEL

Model	MGW1R50515	
Item	Dynamic Load Response	Temperature 25°C Testing Circuitry Figure A
Object	+15V0.05A	

Input Volt. 5 V

-15V:rated load current.

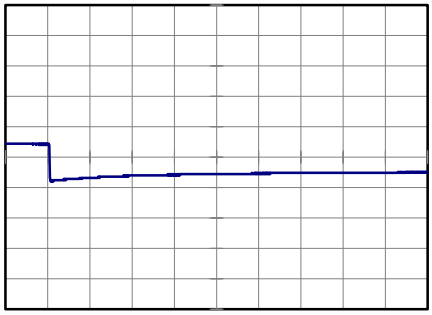
Cycle 100 ms

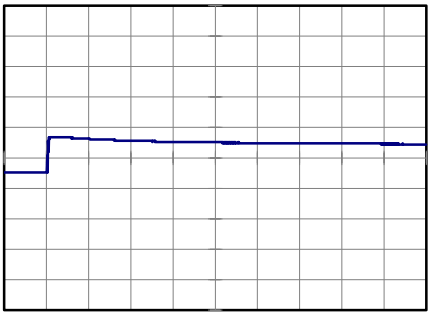
t1,t2 = 100 μs

Load Current

t1 t2

Min.Load (0A)←→
Load 100% (0.05A)

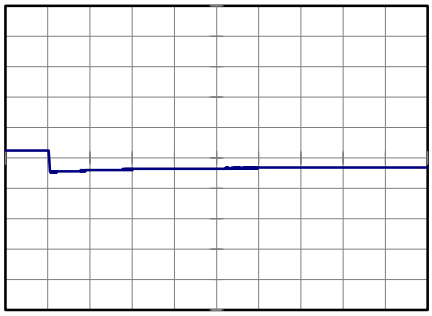


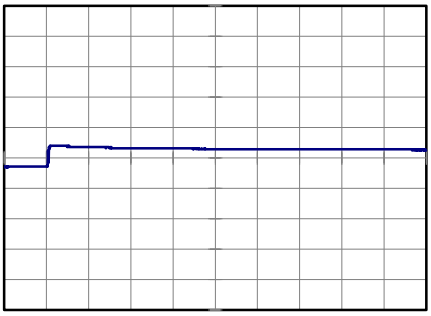


200 mV/div

4 ms/div 4 ms/div

Min.Load (0A)←→
Load 50% (0.025A)

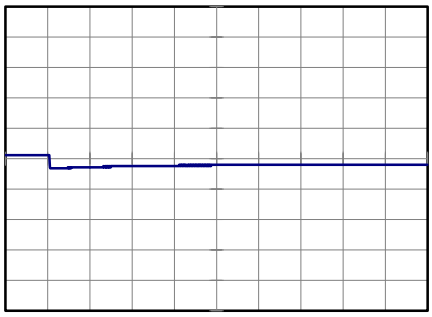


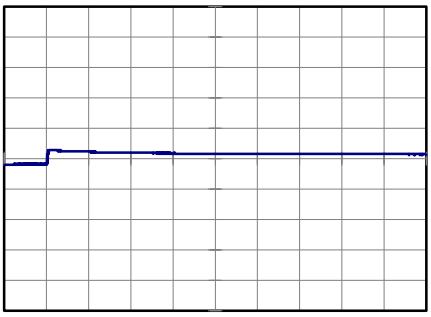


200 mV/div

4 ms/div 4 ms/div

Load 50% (0.025A)←→
Load 100% (0.05A)





200 mV/div

4 ms/div 4 ms/div

COSEL

Model	MGW1R50515	
Item	Dynamic Load Response	Temperature 25°C Testing Circuitry Figure A
Object	-15V0.05A	

Input Volt. 5 V

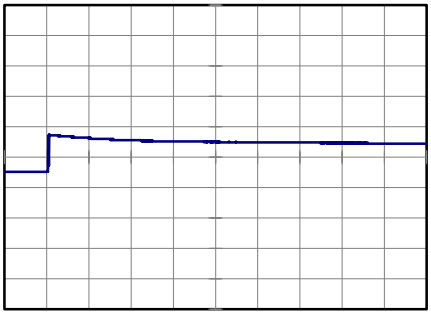
+15V:rated load current.

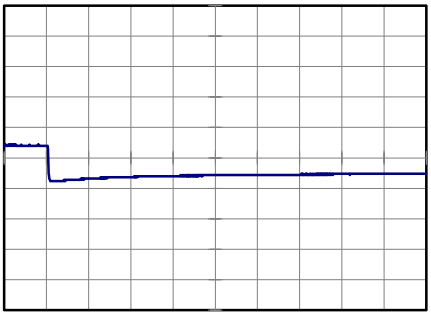
Cycle 100 ms

t1,t2 = 100 μs

Load Current

Min.Load (0A)←→
Load 100% (0.05A)



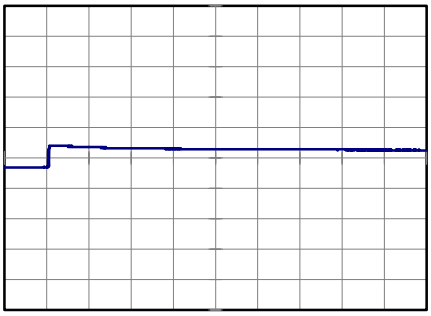


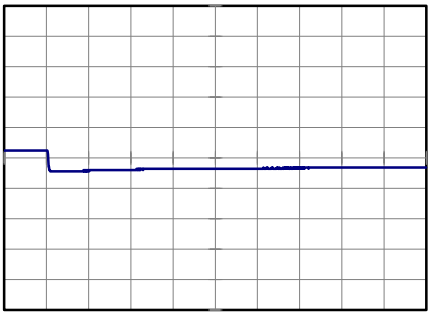
200 mV/div

4 ms/div

4 ms/div

Min.Load (0A)←→
Load 50% (0.025A)



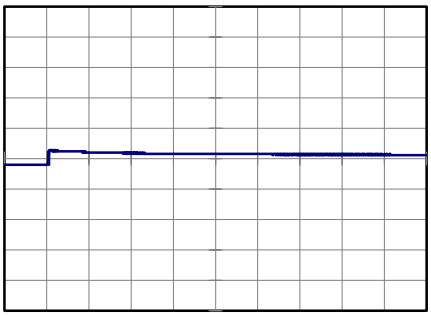


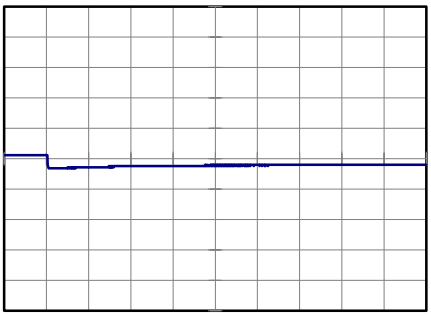
200 mV/div

4 ms/div

4 ms/div

Load 50% (0.025A)←→
Load 100% (0.05A)





200 mV/div

4 ms/div

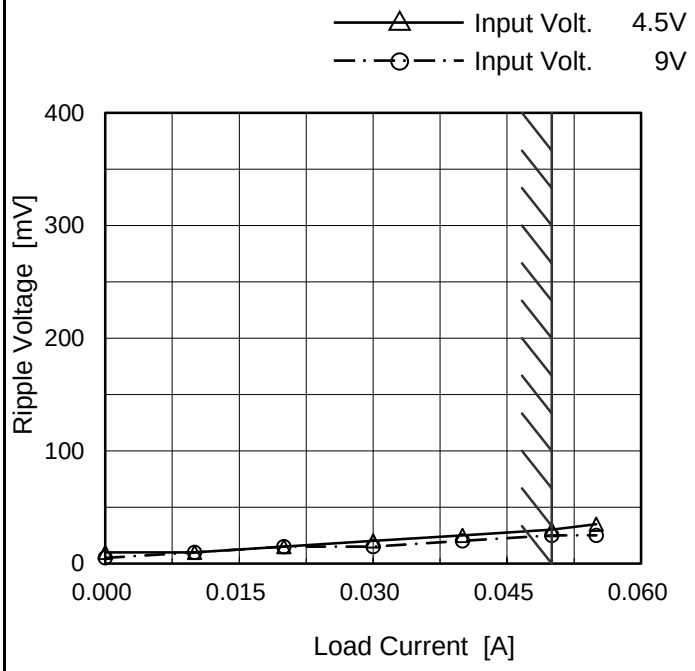
4 ms/div

COSEL

Model	MGW1R50515
Item	Ripple Voltage (by Load Current)
Object	+15V0.05A

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]

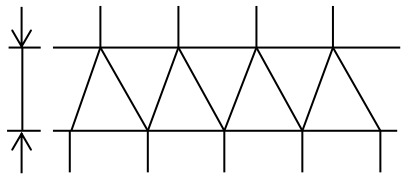


Fig.Complex Ripple Wave Form

2.Values

Load Current [A]	Ripple Voltage [mV]	
	Input Volt. 4.5 [V]	Input Volt. 9 [V]
0.000	10	5
0.010	10	10
0.020	15	15
0.030	20	15
0.040	25	20
0.050	30	25
0.055	35	25
--	-	-
--	-	-
--	-	-
--	-	-

-15V: Rated Load Current

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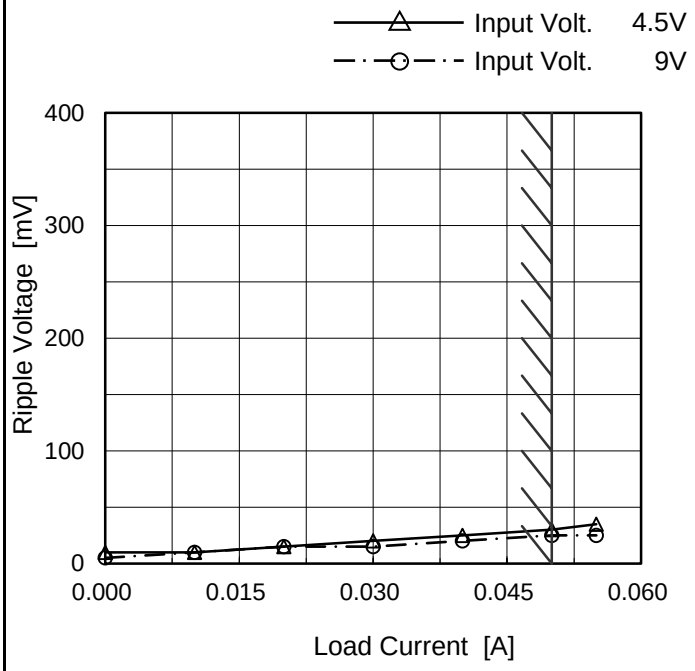
COSEL

Model	MGW1R50515
Item	Ripple Voltage (by Load Current)
Object	-15V0.05A

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]

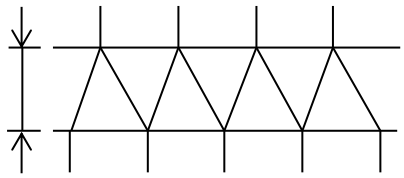


Fig.Complex Ripple Wave Form

2.Values

Load Current [A]	Ripple Voltage [mV]	
	Input Volt. 4.5 [V]	Input Volt. 9 [V]
0.000	10	5
0.010	10	10
0.020	15	15
0.030	20	15
0.040	25	20
0.050	30	25
0.055	35	25
--	-	-
--	-	-
--	-	-
--	-	-

+15V: Rated Load Current

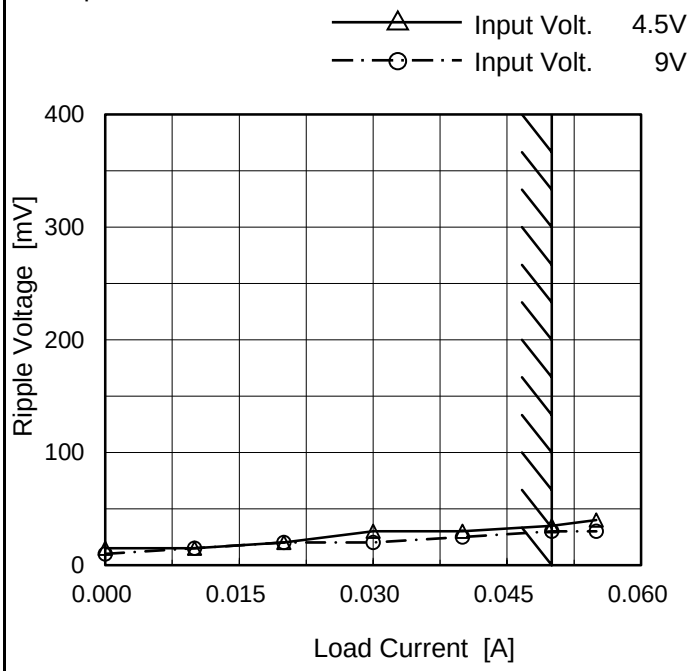
BC - 10955

COSEL

Model	MGW1R50515
Item	Ripple-Noise
Object	+15V0.05A

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]

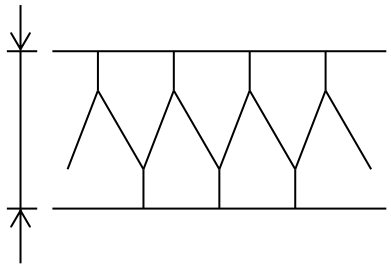


Fig.Complex Ripple Noise Wave Form

2.Values

Load Current [A]	Ripple-Noise [mV]	
	Input Volt. 4.5 [V]	Input Volt. 9 [V]
0.000	15	10
0.010	15	15
0.020	20	20
0.030	30	20
0.040	30	25
0.050	35	30
0.055	40	30
--	-	-
--	-	-
--	-	-
--	-	-

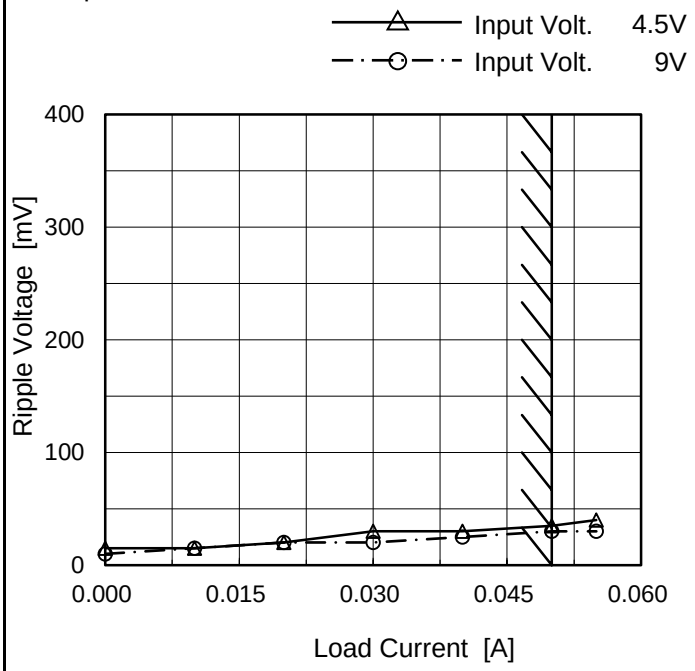
-15V: Rated Load Current

COSEL

Model	MGW1R50515
Item	Ripple-Noise
Object	-15V0.05A

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]

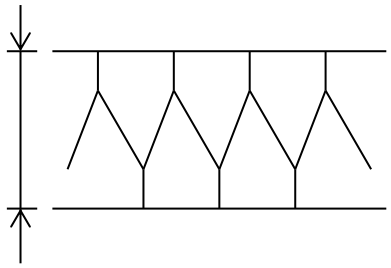


Fig.Complex Ripple Noise Wave Form

2.Values

Load Current [A]	Ripple-Noise [mV]	
	Input Volt. 4.5 [V]	Input Volt. 9 [V]
0.000	15	10
0.010	15	15
0.020	20	20
0.030	30	20
0.040	30	25
0.050	35	30
0.055	40	30
--	-	-
--	-	-
--	-	-
--	-	-

+15V: Rated Load Current

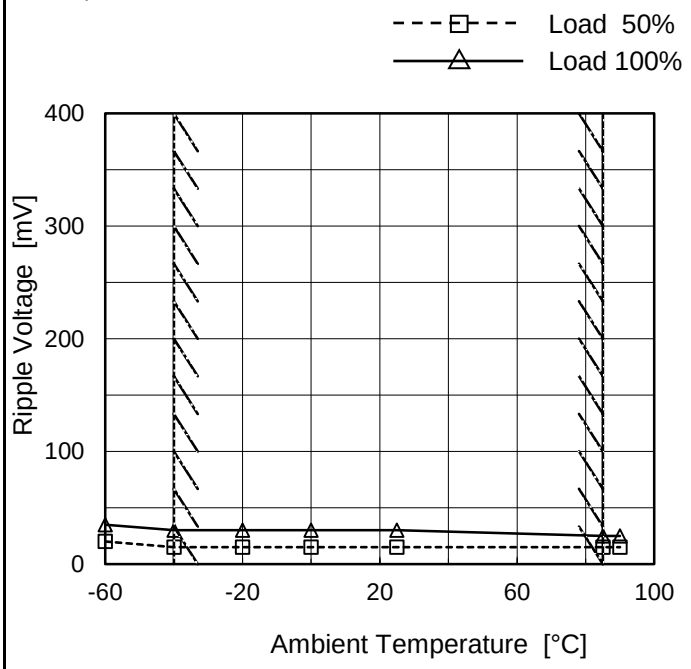
BC - 10955

COSEL

Model	MGW1R50515
Item	Ripple Voltage (by Ambient Temp.)
Object	+15V0.05A

Testing Circuitry Figure B

1.Graph



Input Volt. 5V

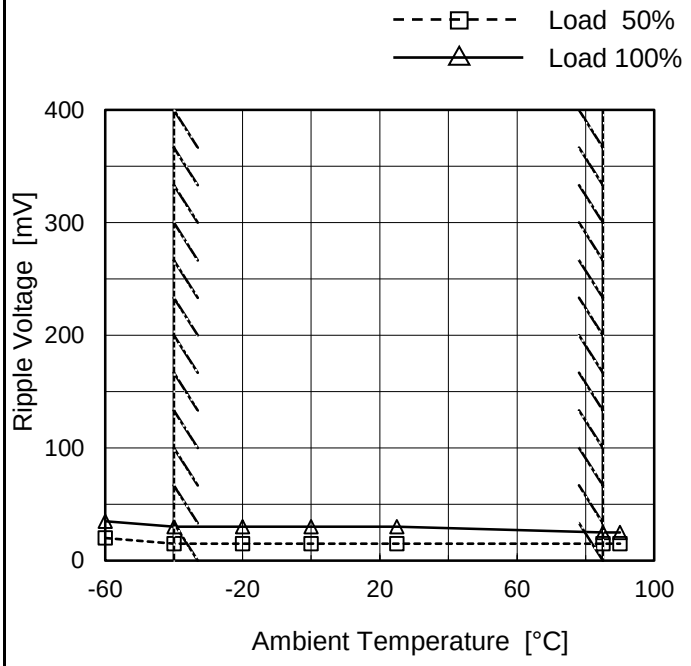
2.Values

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

-15V: Rated Load Current

Object	-15V0.05A

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

+15V: Rated Load Current

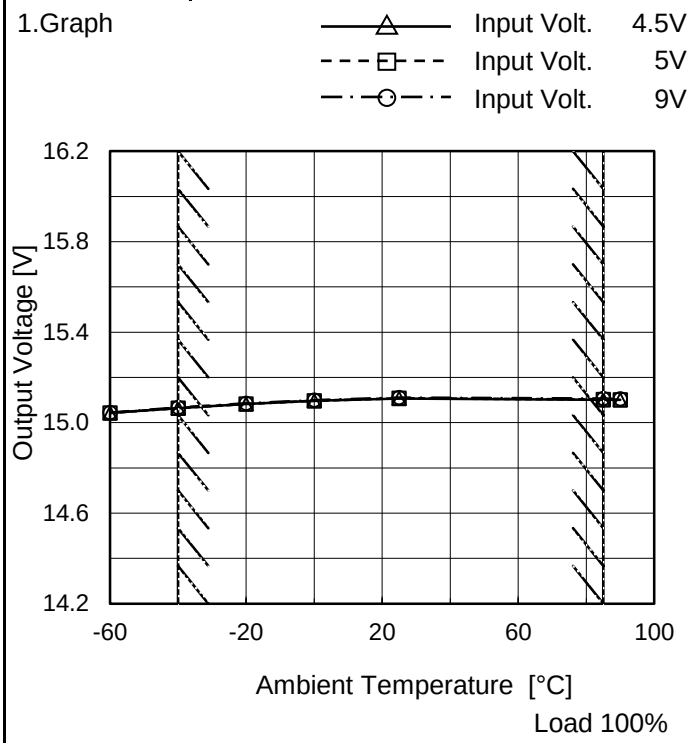
COSEL

Model	MGW1R50515
Item	Ambient Temperature Drift

Testing Circuitry Figure A

Object +15V0.05A

1.Graph



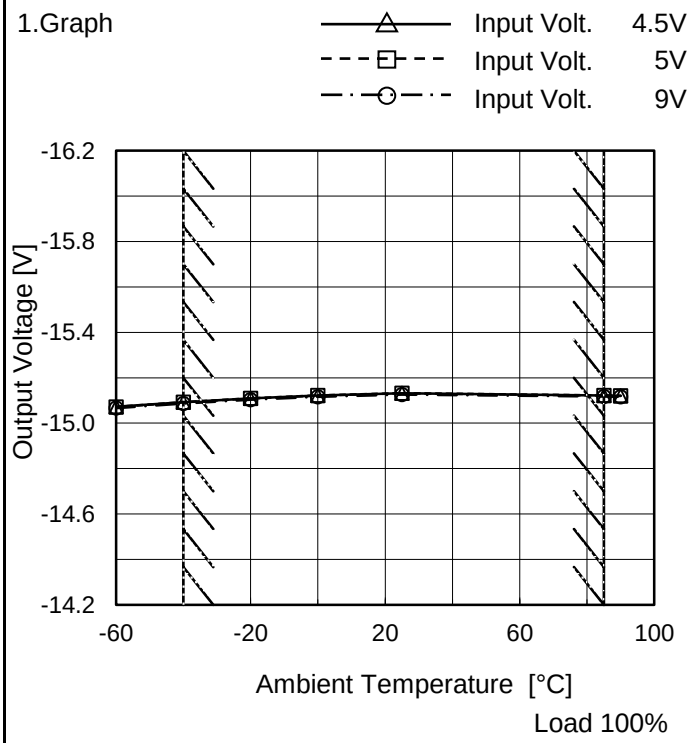
2.Values

Ambient Temperature [°C]	Output Voltage [V] Input Volt. 4.5[V]	Input Volt. 5[V]	Input Volt. 9[V]
-60	15.043	15.043	15.045
-40	15.064	15.065	15.067
-20	15.083	15.083	15.086
0	15.097	15.097	15.100
25	15.107	15.108	15.111
85	15.102	15.103	15.106
90	15.101	15.101	15.105
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

-15V: Rated Load Current

Object -15V0.05A

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	-15.072	-15.072	-15.067
-40	-15.093	-15.092	-15.087
-20	-15.110	-15.109	-15.104
0	-15.123	-15.122	-15.117
25	-15.132	-15.132	-15.126
85	-15.122	-15.122	-15.118
90	-15.121	-15.120	-15.117
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

-15V: Rated Load Current

COSEL

Model	MGW1R50515	
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 - 0.05A (AVR 2) : 0 - 0.05A

* 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	+15V0.05A					
Item	Temperature [°C]	Input Voltage[V]	Output		Output Voltage Accuracy	
			Current[A]	Voltage[V]	Value [mV]	Ratio [%]
Maximum Voltage	85	4.5	0.05	15.332	±219	±1.5
Minimum Voltage	85	4.5	0	14.895		

Object	-15V0.05A					
Item	Temperature [°C]	Input Voltage[V]	Output		Output Voltage Accuracy	
			Current[A]	Voltage[V]	Value [mV]	Ratio [%]
Maximum Voltage	85	4.5	0.05	-15.350	±219	±1.5
Minimum Voltage	85	4.5	0	-14.912		

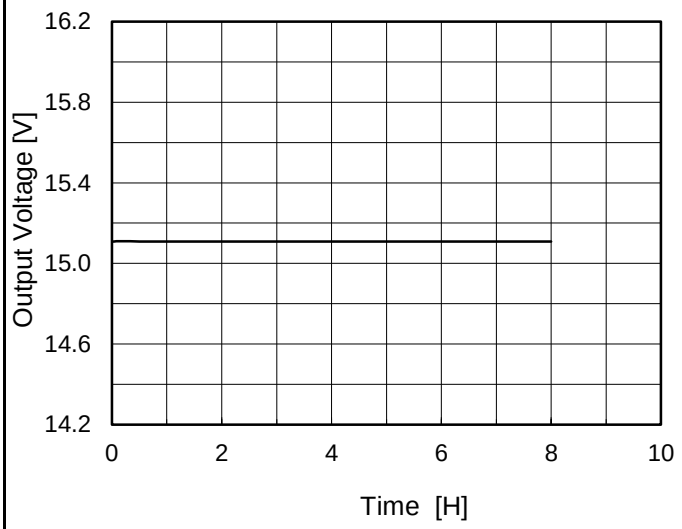
COSEL

Model	MGW1R50515
Item	Time Lapse Drift

Temperature 25°C
Testing Circuitry Figure A

Object +15V0.05A

1.Graph



Input Volt. 5V
Load 100%

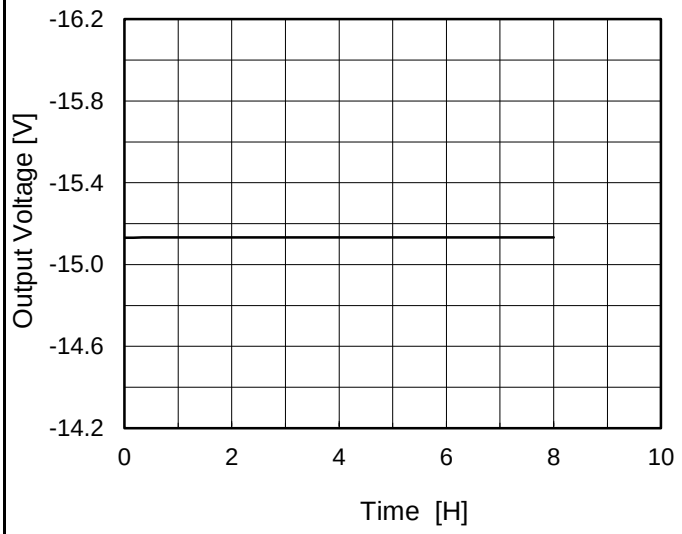
2.Values

Time since start [H]	Output Voltage [V]
0.0	15.108
0.5	15.109
1.0	15.109
2.0	15.109
3.0	15.109
4.0	15.109
5.0	15.109
6.0	15.109
7.0	15.108
8.0	15.108

-15V: Rated Load Current

Object -15V0.05A

1.Graph



Input Volt. 5V
Load 100%

2.Values

Time since start [H]	Output Voltage [V]
0.0	-15.131
0.5	-15.132
1.0	-15.133
2.0	-15.133
3.0	-15.133
4.0	-15.133
5.0	-15.133
6.0	-15.133
7.0	-15.133
8.0	-15.133

+15V: Rated Load Current

BC-10955

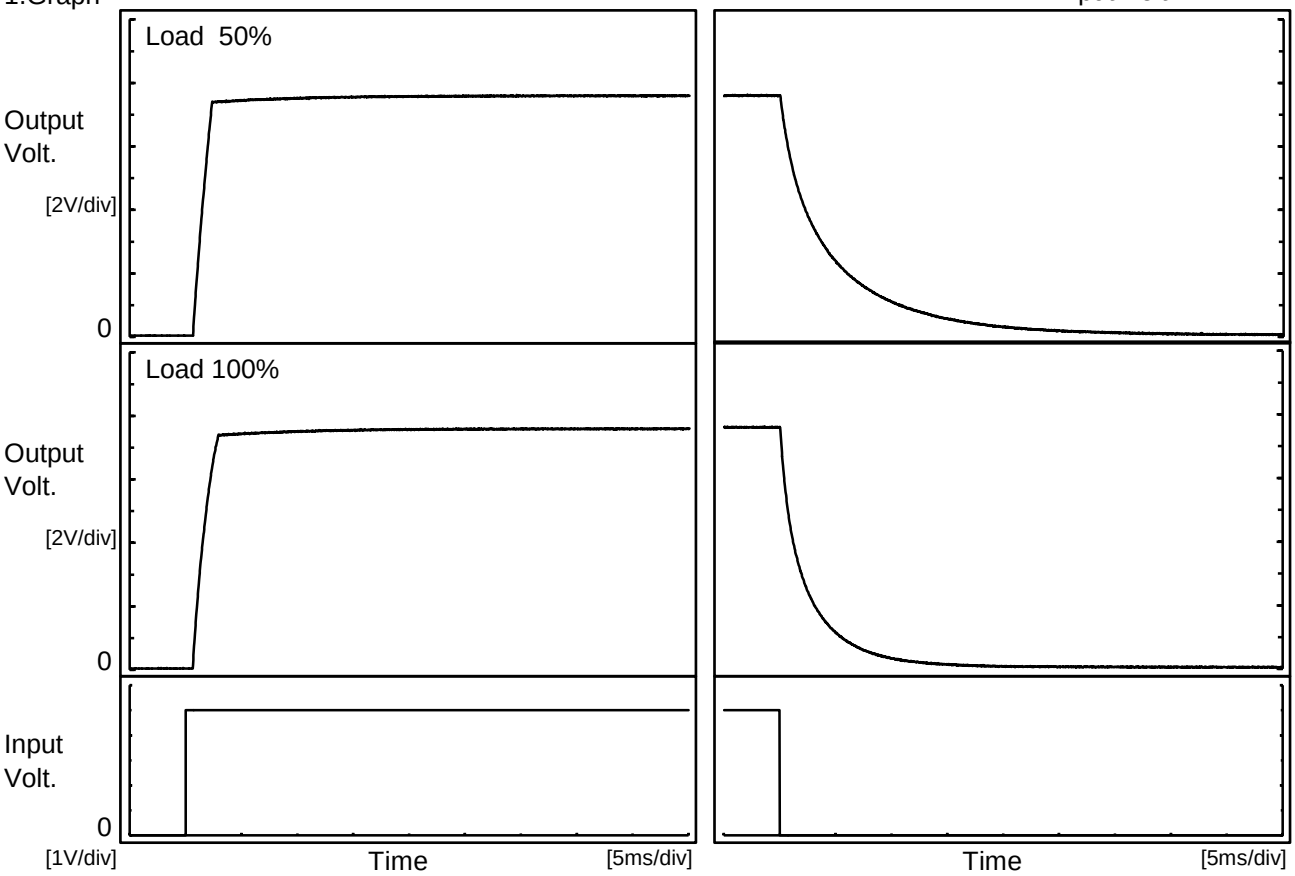
COSEL

Model	MGW1R50515
Item	Rise and Fall Time
Object	+15V0.05A

Temperature 25°C
Testing Circuitry Figure A

1.Graph

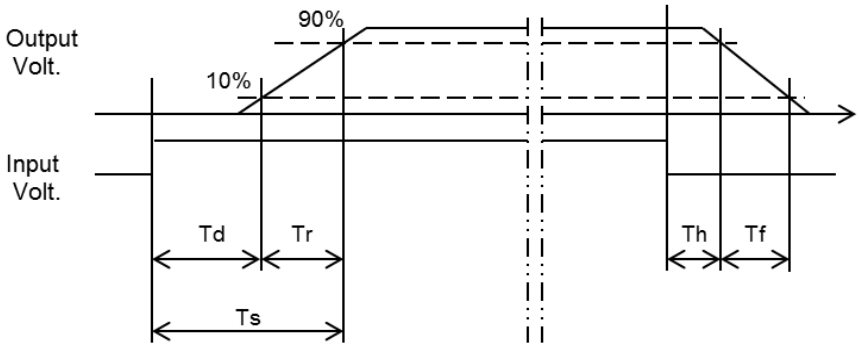
Input Volt. 5 V



2.Values

[ms]

Load \ Time	Td	Tr	Ts	Th	Tf
50 %	0.8	1.4	2.2	0.4	12.2
100 %	0.8	1.8	2.6	0.2	6.2



BC-10955

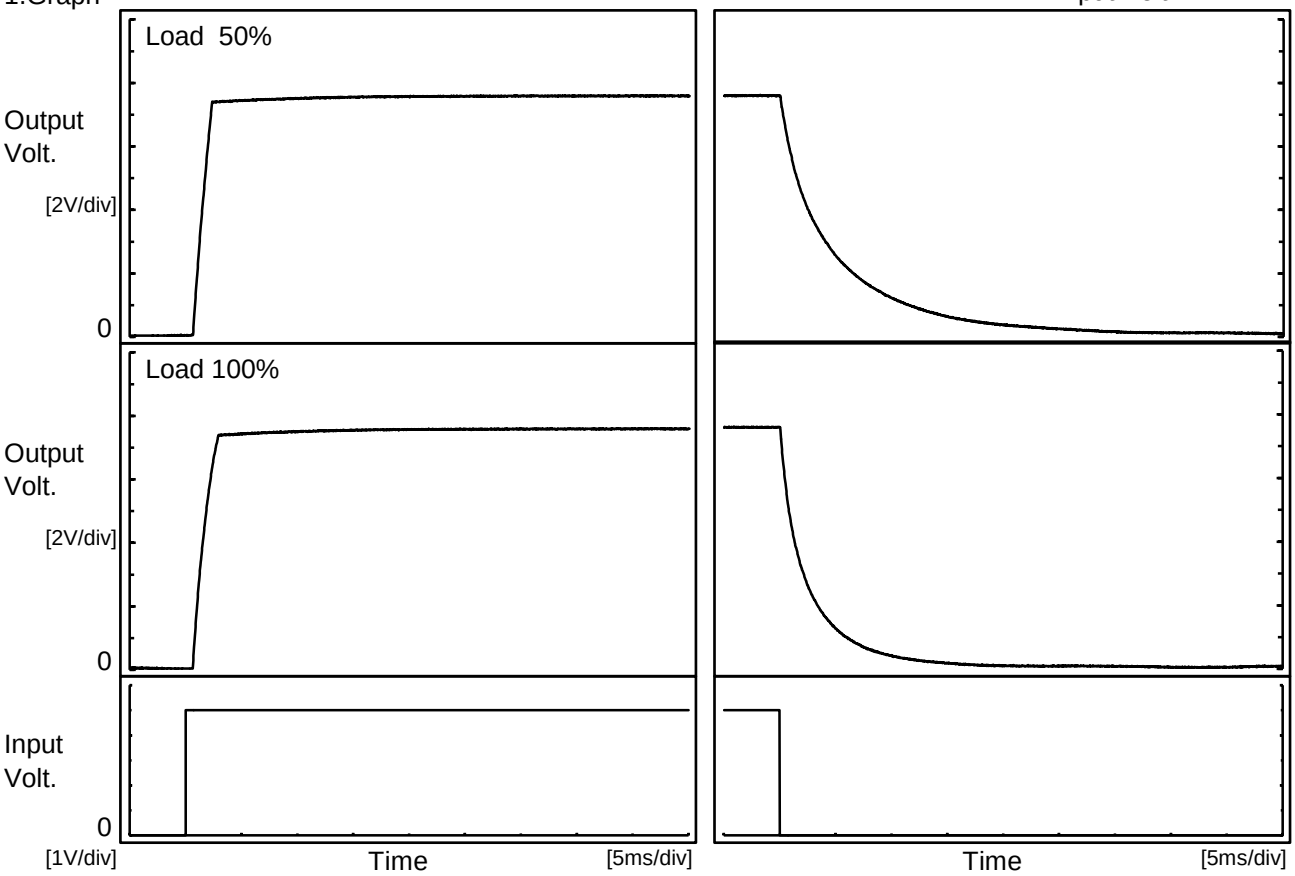
COSEL

Model	MGW1R50515
Item	Rise and Fall Time
Object	-15V0.05A

Temperature 25°C
Testing Circuitry Figure A

1.Graph

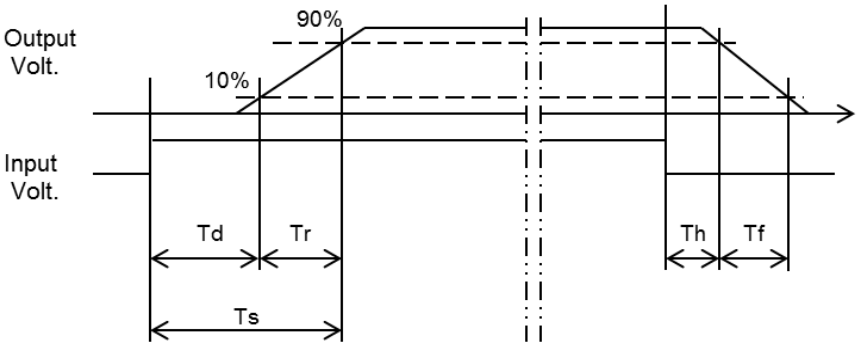
Input Volt. 5 V



2.Values

[ms]

Load \ Time	Td	Tr	Ts	Th	Tf
50 %	0.8	1.4	2.2	0.4	13.0
100 %	0.8	1.8	2.6	0.2	6.8



BC-10955

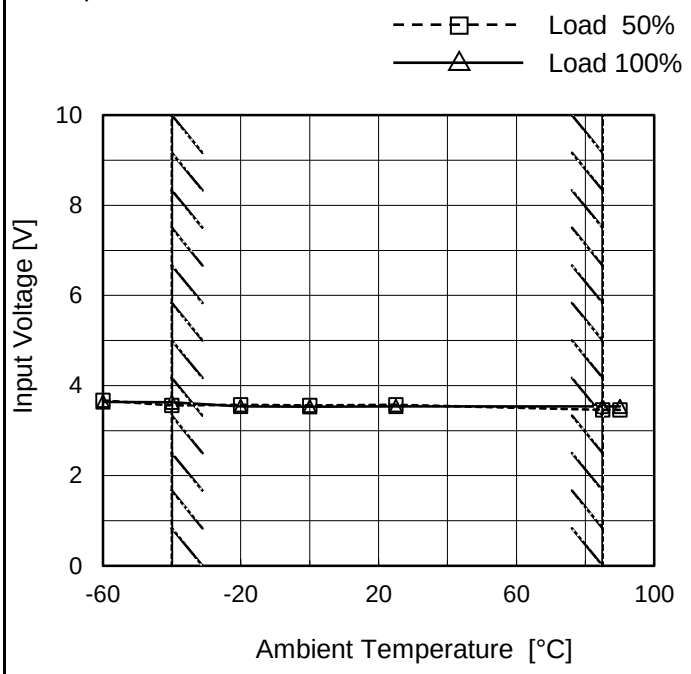
COSEL

Model	MGW1R50515
Item	Minimum Input Voltage for Regulated Output Voltage

Testing Circuitry Figure A

Object: +15V0.05A

1.Graph

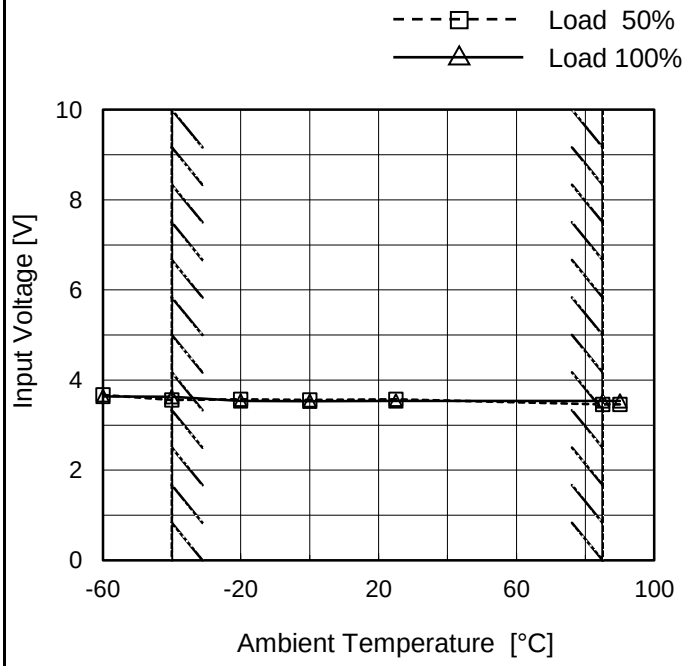


2.Values

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: -15V0.05A

1.Graph



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

2.Values

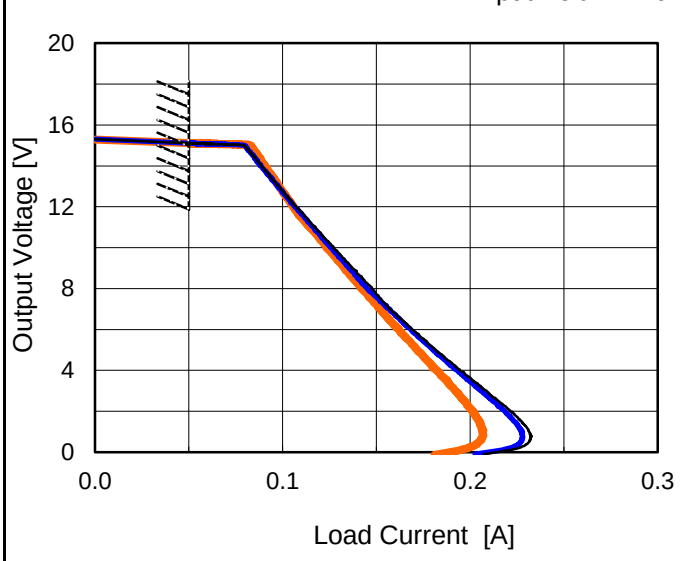
Ambient Temperature [°C]	Input Voltage [V]	
	Load 50%	Load 100%
-60	3.7	3.7
-40	3.6	3.7
-20	3.6	3.6
0	3.6	3.6
25	3.6	3.6
85	3.5	3.6
90	3.5	3.6
--	-	-
--	-	-
--	-	-
--	-	-

COSEL

Model	MGW1R50515
Item	Overcurrent Protection
Object	+15V0.05A

Temperature 25°C
Testing Circuitry Figure A

1.Graph



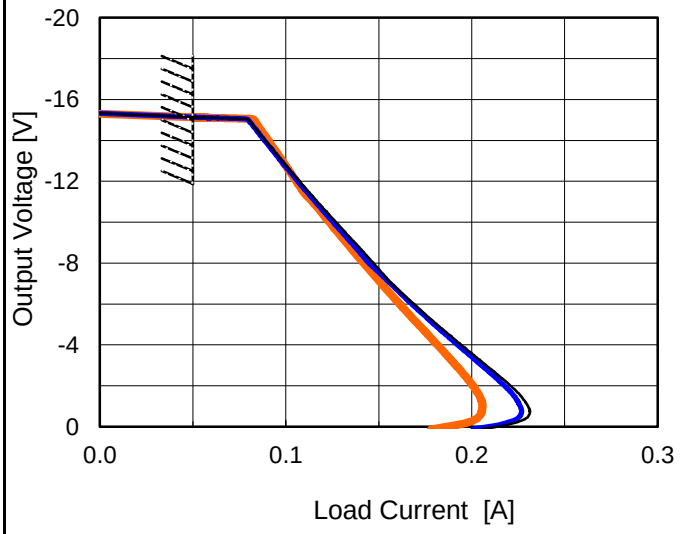
2.Values

Output Voltage [V]	Load Current [A]		
	Input Volt. 4.5[V]	Input Volt. 5[V]	Input Volt. 9[V]
14.25	0.09	0.09	0.09
13.50	0.09	0.09	0.09
12.00	0.11	0.11	0.11
10.50	0.12	0.12	0.12
9.00	0.14	0.14	0.13
7.50	0.15	0.15	0.15
6.00	0.17	0.17	0.16
4.50	0.19	0.19	0.18
3.00	0.21	0.21	0.19
1.50	0.23	0.22	0.20
0.00	0.21	0.20	0.18
--	-	-	-

-15V: Rated Load Current

Object	-15V0.05A

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]
-14.25	0.09	0.09	0.09
-13.50	0.09	0.09	0.09
-12.00	0.11	0.11	0.11
-10.50	0.12	0.12	0.12
-9.00	0.14	0.13	0.13
-7.50	0.15	0.15	0.15
-6.00	0.17	0.17	0.16
-4.50	0.19	0.19	0.18
-3.00	0.21	0.21	0.19
-1.50	0.23	0.22	0.20
0.00	0.21	0.20	0.18
--	-	-	-

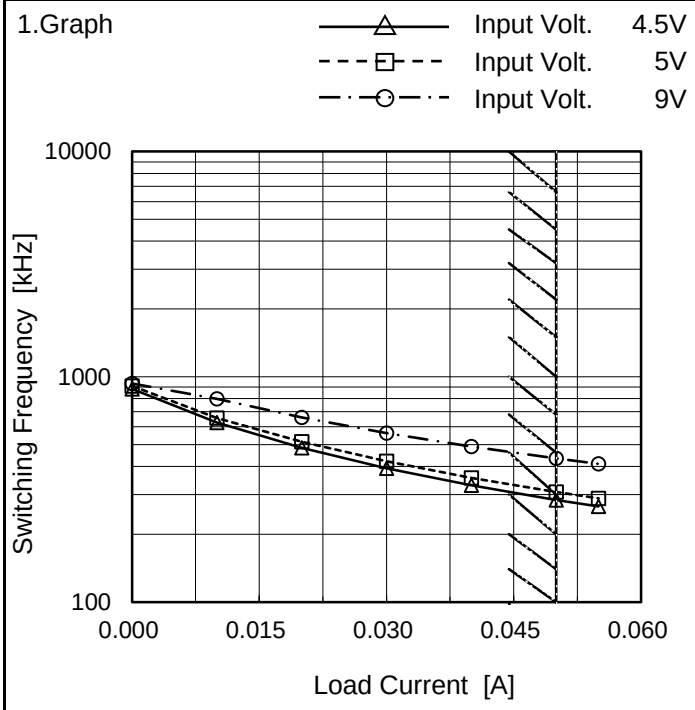
+15V: Rated Load Current

COSEL

Model	MGW1R50515
Item	Switching Frequency (by Load Current)
Object	+/-15V0.05A

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	883	911	934
0.010	627	656	797
0.020	484	514	660
0.030	393	422	562
0.040	330	356	490
0.050	284	308	434
0.055	266	289	411
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

BC-10955

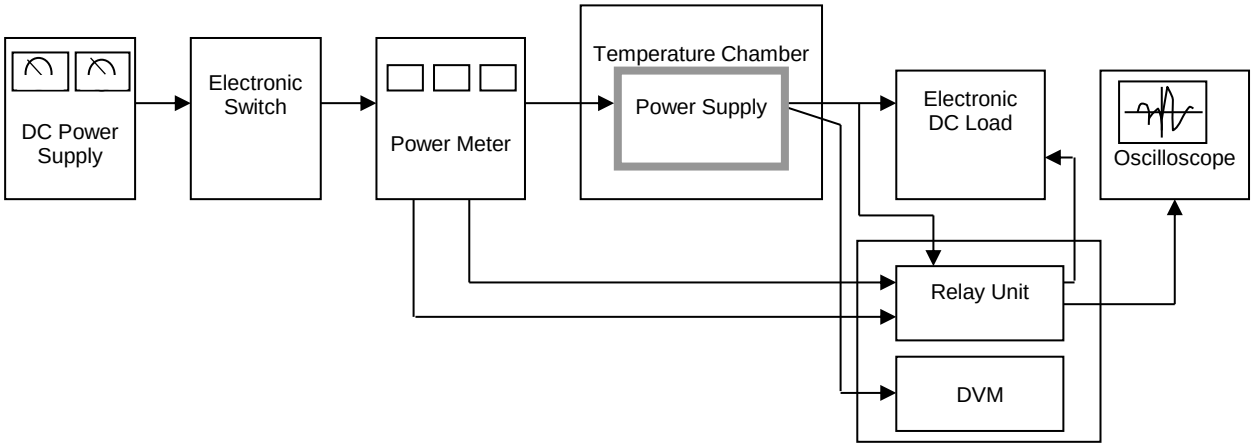


Figure A

Data Acquisition/Control Unit

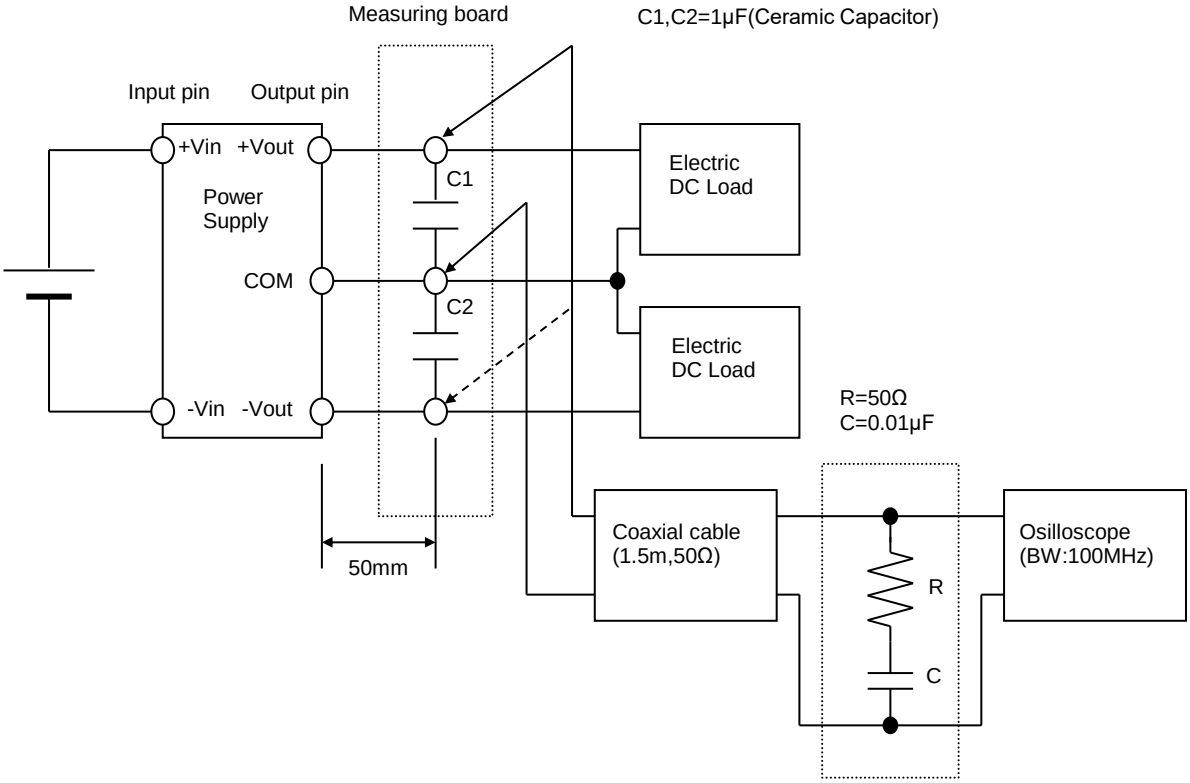


Figure B（Ripple and Ripple noise Characteristic）