COSEL

参考資料

TEST DATA OF MGW31215

Regulated DC Power Supply
November 8, 2016

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Takaaki Sekiguchi Design Engineer

COSEL CO.,LTD.

参考資料

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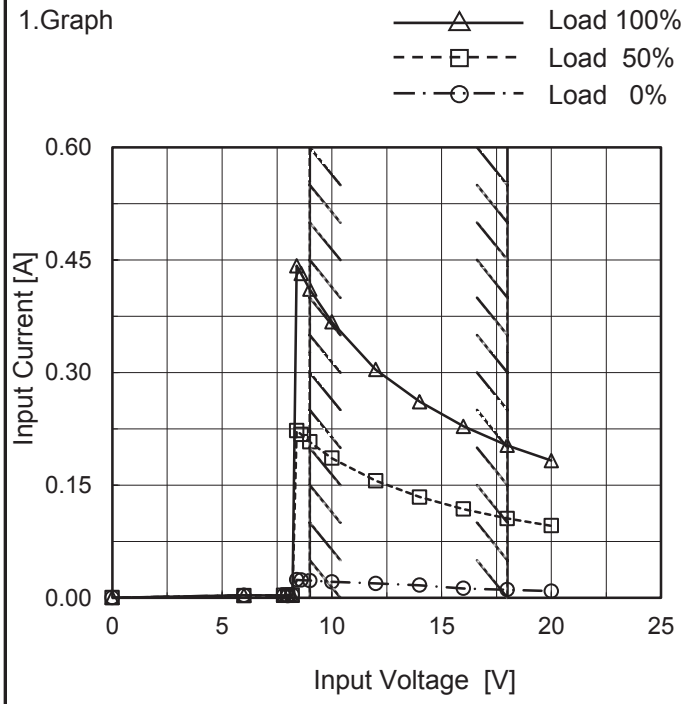
Model	MGW31215
Item	Input Current (by Input Voltage)
Object	――――――――

Temperature 25°C
Testing Circuitry Figure A

1.Graph



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

2.Values

Input Voltage [V]	Input Current [A]		
	Load 0%	Load 50%	Load 100%
0.0	0.000	0.000	0.000
6.0	0.003	0.003	0.003
7.8	0.003	0.003	0.003
8.0	0.003	0.004	0.003
8.2	0.004	0.004	0.003
8.4	0.024	0.223	0.442
8.6	0.024	0.218	0.432
9.0	0.023	0.208	0.411
10.0	0.021	0.186	0.368
12.0	0.019	0.156	0.304
14.0	0.017	0.134	0.261
16.0	0.013	0.118	0.228
18.0	0.011	0.106	0.203
20.0	0.009	0.096	0.183
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

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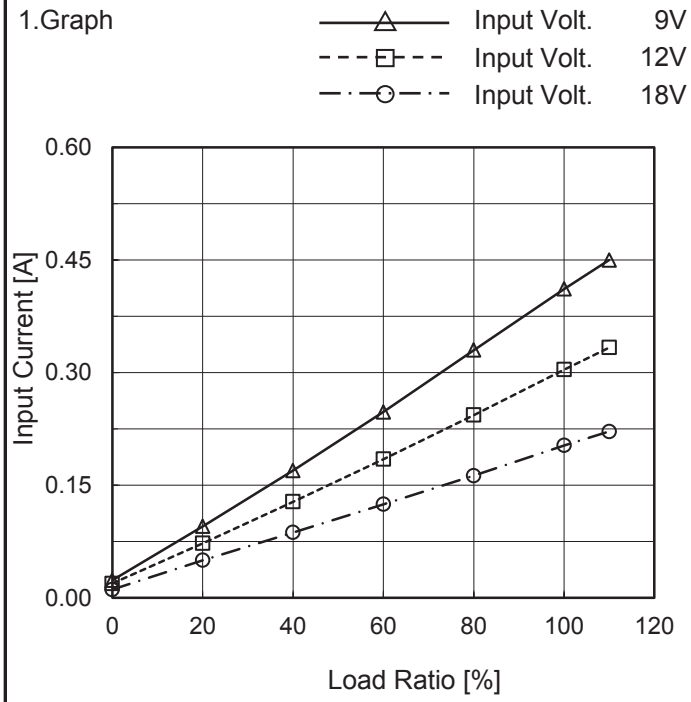
COSEL

Model	MGW31215
Item	Input Current (by Load Ratio)
Object	――――――――

Temperature 25°C
Testing Circuitry Figure A

1.Graph



2.Values

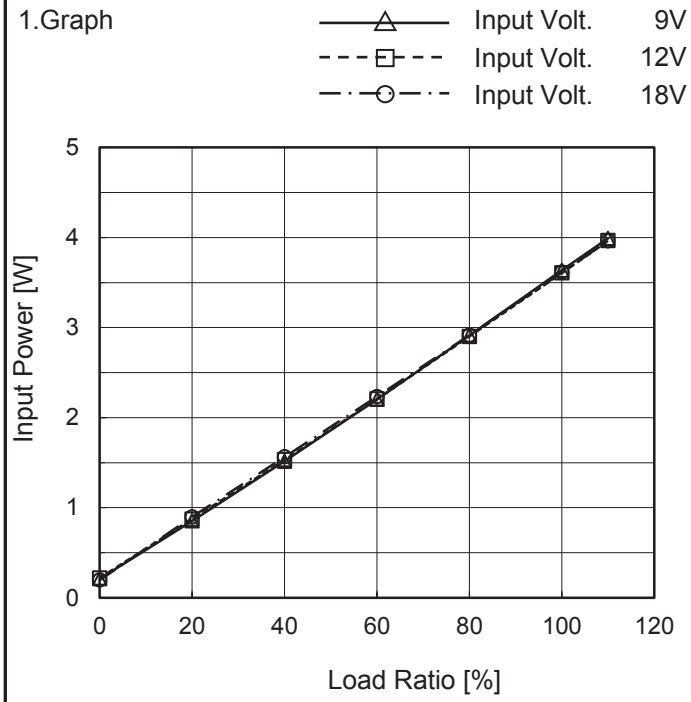
Load Ratio [%]	Input Current [A]		
	Input Volt. 9[V]	Input Volt. 12[V]	Input Volt. 18[V]
0	0.023	0.019	0.011
20	0.095	0.073	0.050
40	0.170	0.128	0.087
60	0.248	0.185	0.125
80	0.330	0.243	0.163
100	0.411	0.304	0.203
110	0.450	0.334	0.221
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

COSEL

Model	MGW31215
Item	Input Power (by Load Ratio)
Object	――――――――

Temperature 25°C
Testing Circuitry Figure A

1.Graph



2.Values

Load Ratio [%]	Input Power [W]		
	Input Volt. 9[V]	Input Volt. 12[V]	Input Volt. 18[V]
0	0.21	0.22	0.19
20	0.85	0.87	0.90
40	1.52	1.53	1.56
60	2.20	2.21	2.23
80	2.91	2.90	2.92
100	3.64	3.61	3.61
110	3.99	3.97	3.96
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

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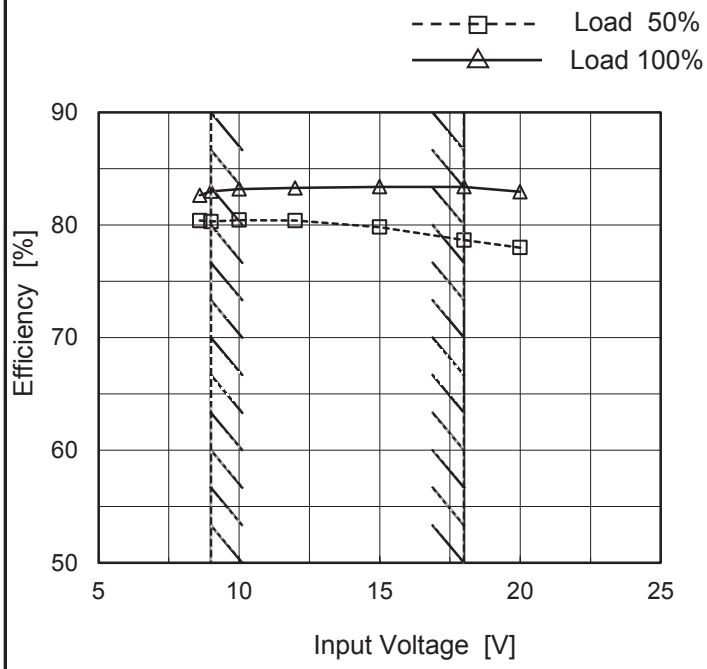
COSEL

Model	MGW31215
Item	Efficiency (by Input Voltage)
Object	――――――――――

Temperature 25°C
Testing Circuitry Figure A

1.Graph



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

2.Values

Input Voltage [V]	Efficiency [%]	
	Load 50%	Load 100%
8.6	80.4	82.6
9.0	80.3	83.0
10.0	80.4	83.2
12.0	80.4	83.3
15.0	79.8	83.4
18.0	78.7	83.4
20.0	78.0	83.0
--	-	-
--	-	-

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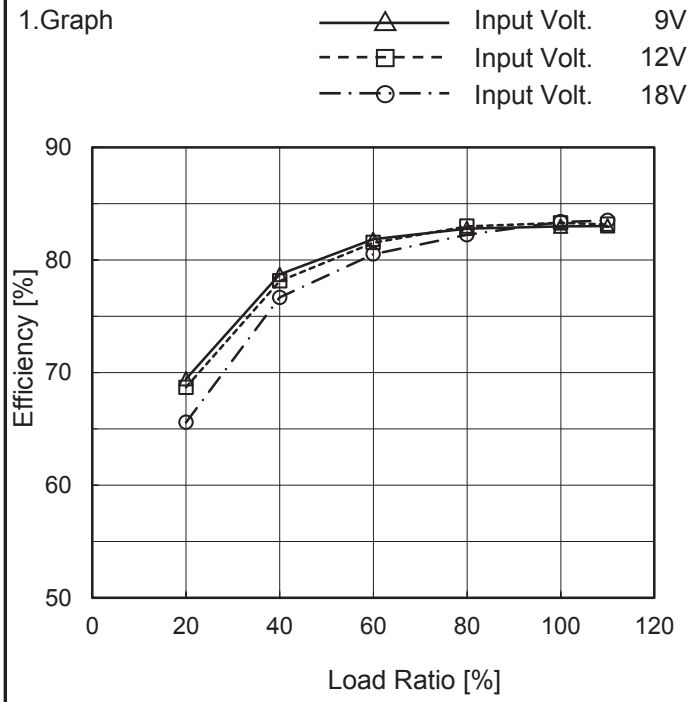
COSEL

Model	MGW31215
Item	Efficiency (by Load Ratio)
Object	――――――――

Temperature 25°C
Testing Circuitry Figure A

1.Graph



2.Values

Load Ratio [%]	Efficiency [%]		
	Input Volt. 9[V]	Input Volt. 12[V]	Input Volt. 18[V]
0	-	-	-
20	69.4	68.7	65.6
40	78.7	78.1	76.7
60	81.8	81.5	80.5
80	82.8	83.0	82.2
100	83.0	83.3	83.4
110	83.0	83.2	83.5
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

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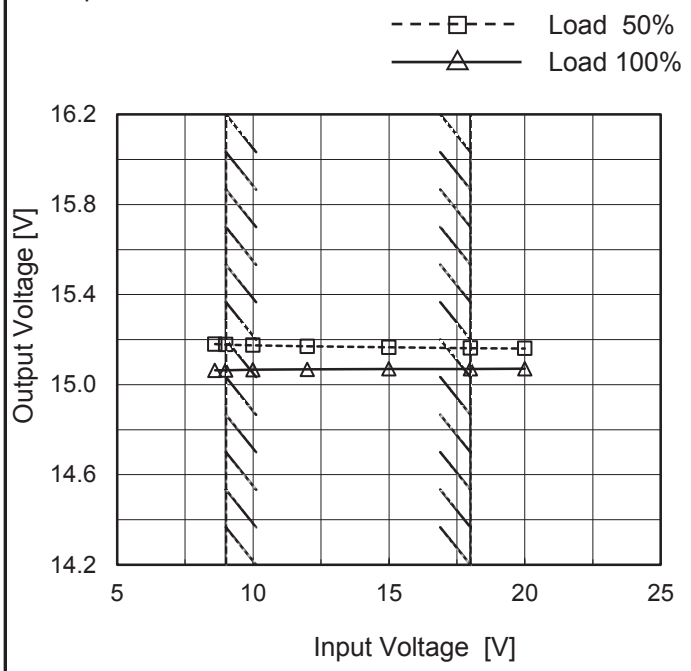
COSEL

Model	MGW31215
Item	Line Regulation
Object	+15V0.1A

Temperature 25°C
Testing Circuitry Figure A

1.Graph



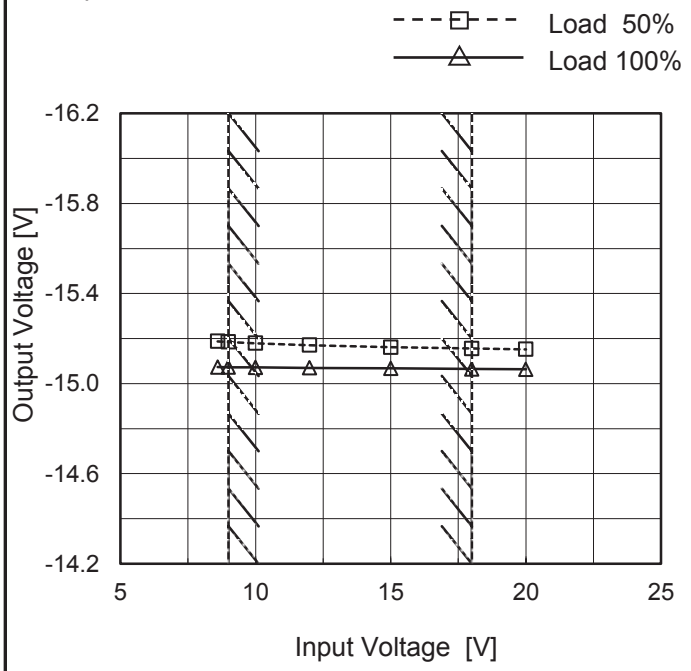
2.Values

Input Voltage [V]	Output Voltage [V]	
	Load 50%	Load 100%
8.6	15.180	15.063
9.0	15.178	15.064
10.0	15.175	15.066
12.0	15.170	15.068
15.0	15.166	15.070
18.0	15.162	15.070
20.0	15.160	15.071
--	-	-
--	-	-

-15V: Rated Load Current

Object	-15V0.1A

1.Graph



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

2.Values

Input Voltage [V]	Output Voltage [V]	
	Load 50%	Load 100%
8.6	-15.188	-15.073
9.0	-15.185	-15.073
10.0	-15.179	-15.072
12.0	-15.171	-15.070
15.0	-15.162	-15.067
18.0	-15.156	-15.065
20.0	-15.152	-15.063
--	-	-
--	-	-

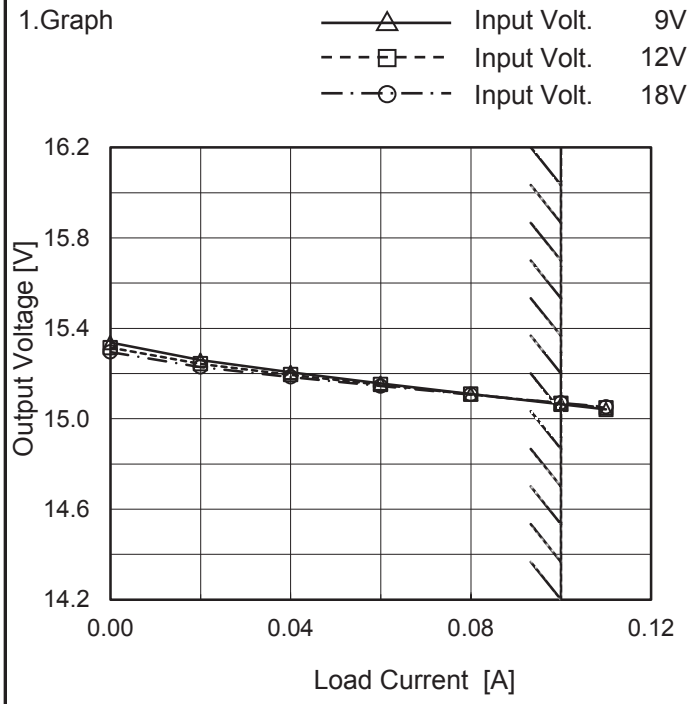
+15V: Rated Load Current

COSEL

Model	MGW31215
Item	Load Regulation
Object	+15V0.1A

Temperature 25°C
Testing Circuitry Figure A

1.Graph



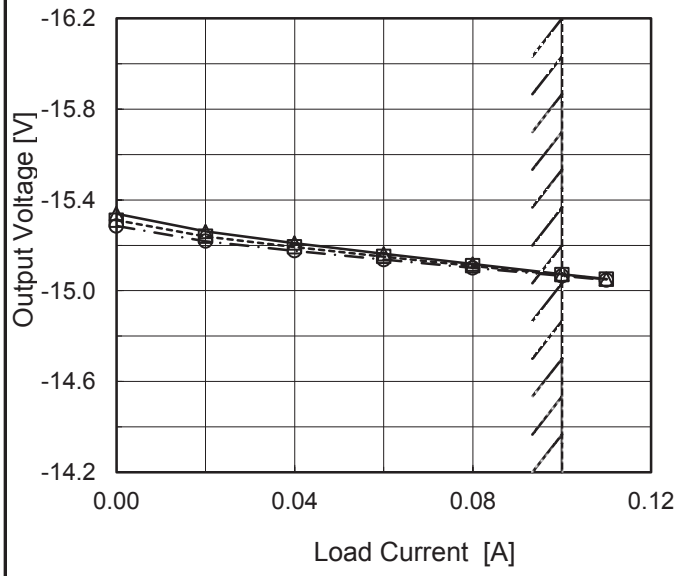
2.Values

Load Current [A]	Output Voltage [V]		
	Input Volt. 9[V]	Input Volt. 12[V]	Input Volt. 18[V]
0.00	15.337	15.315	15.295
0.02	15.259	15.243	15.229
0.04	15.206	15.195	15.185
0.06	15.157	15.151	15.145
0.08	15.110	15.109	15.107
0.10	15.064	15.068	15.070
0.11	15.042	15.048	15.053
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

-15V: Rated Load Current

Object	-15V0.1A

1.Graph



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

2.Values

Load Current [A]	Output Voltage [V]		
	Input Volt. 9[V]	Input Volt. 12[V]	Input Volt. 18[V]
0.00	-15.340	-15.311	-15.286
0.02	-15.262	-15.239	-15.219
0.04	-15.210	-15.193	-15.176
0.06	-15.162	-15.150	-15.137
0.08	-15.117	-15.110	-15.100
0.10	-15.073	-15.070	-15.065
0.11	-15.051	-15.051	-15.047
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

+15V: Rated Load Current

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Model	MGW31215	
Item	Dynamic Load Response	Temperature 25°C Testing Circuitry Figure A
Object	+15V0.1A	

Input Volt. 12 V

-15V:rated load current.

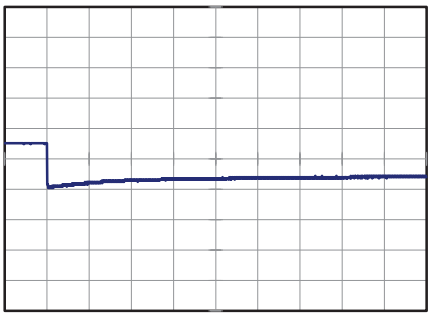
Cycle 100 ms

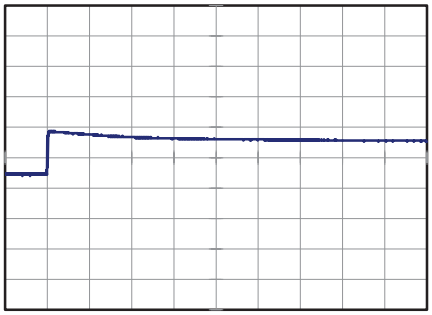
t1,t2 = 100 μ s

Load Current

t1 t2

Min.Load (0A)←→
Load 100% (0.1A)

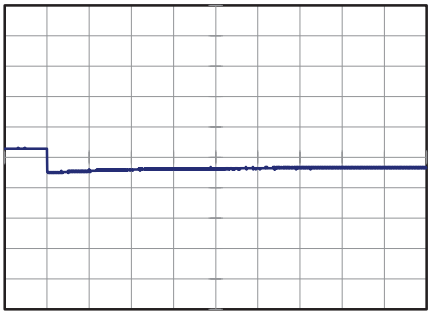


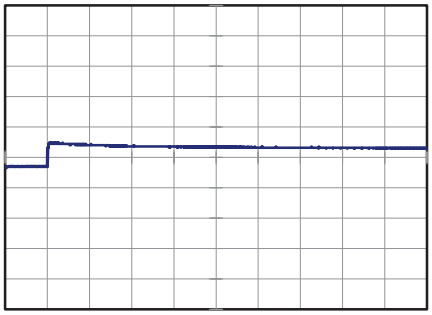


200 mV/div

4 ms/div 4 ms/div

Min.Load (0A)←→
Load 50% (0.05A)

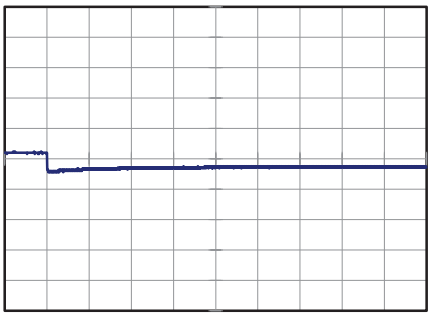


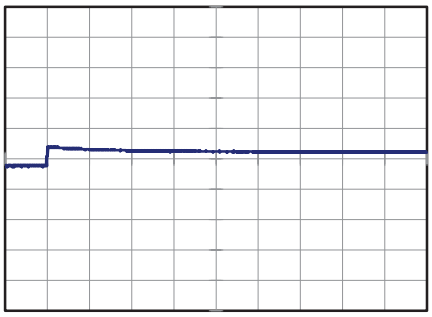


200 mV/div

4 ms/div 4 ms/div

Load 50% (0.05A)←→
Load 100% (0.1A)





200 mV/div

4 ms/div 4 ms/div

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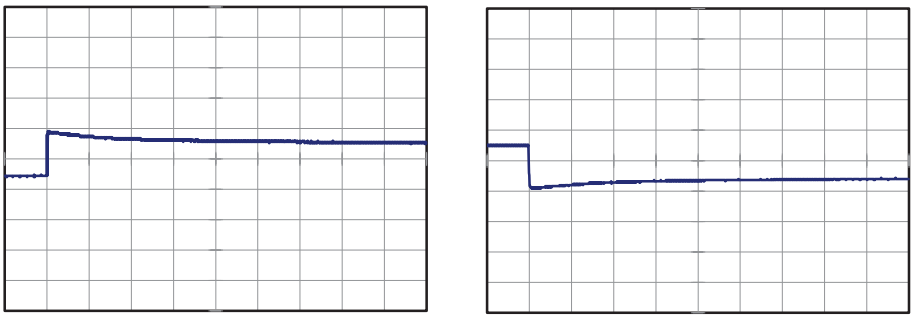
Model	MGW31215	
Item	Dynamic Load Response	Temperature 25°C Testing Circuitry Figure A
Object	-15V0.1A	

Input Volt. 12 V

+15V:rated load current.

Cycle 100 ms

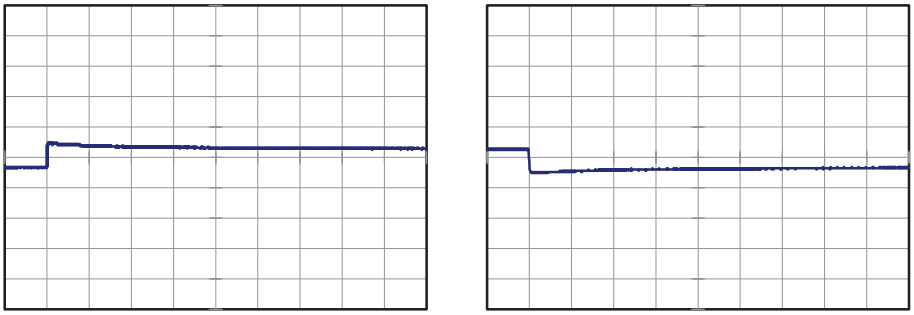
Min.Load (0A)←→
Load 100% (0.1A)



200 mV/div

4 ms/div 4 ms/div

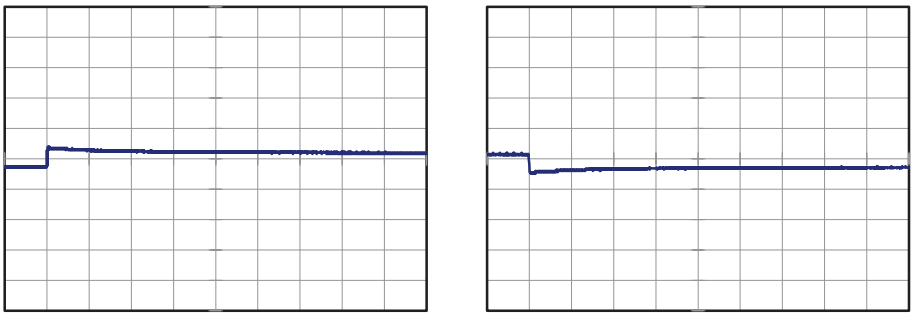
Min.Load (0A)←→
Load 50% (0.05A)



200 mV/div

4 ms/div 4 ms/div

Load 50% (0.05A)←→
Load 100% (0.1A)



200 mV/div

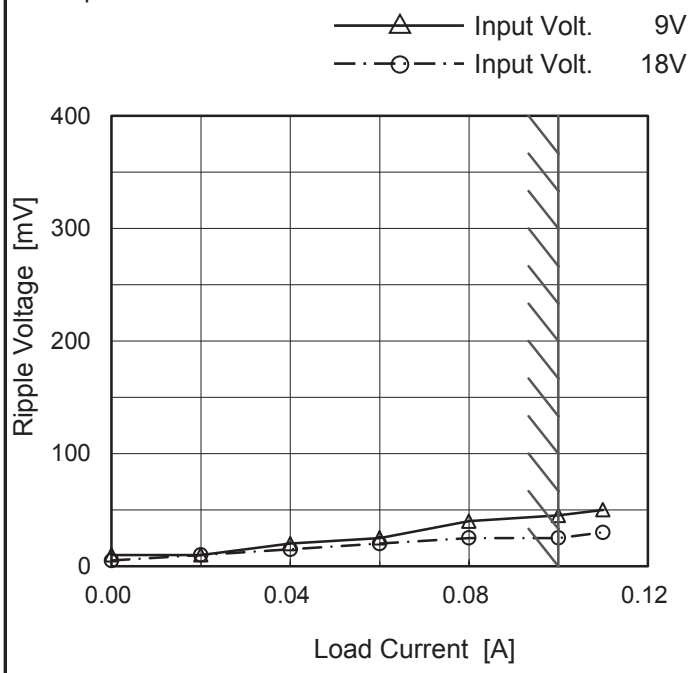
4 ms/div 4 ms/div

COSEL

Model	MGW31215
Item	Ripple Voltage (by Load Current)
Object	+15V0.1A

Temperature 25°C
Testing Circuitry Figure B

1.Graph



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

Ripple [mVp-p]

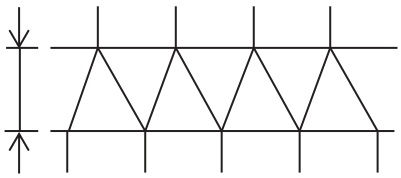


Fig.Complex Ripple Wave Form

2.Values

Load Current [A]	Ripple Voltage [mV]	
	Input Volt. 9 [V]	Input Volt. 18 [V]
0.00	10	5
0.02	10	10
0.04	20	15
0.06	25	20
0.08	40	25
0.10	45	25
0.11	50	30
--	-	-
--	-	-
--	-	-
--	-	-

-15V: Rated Load Current

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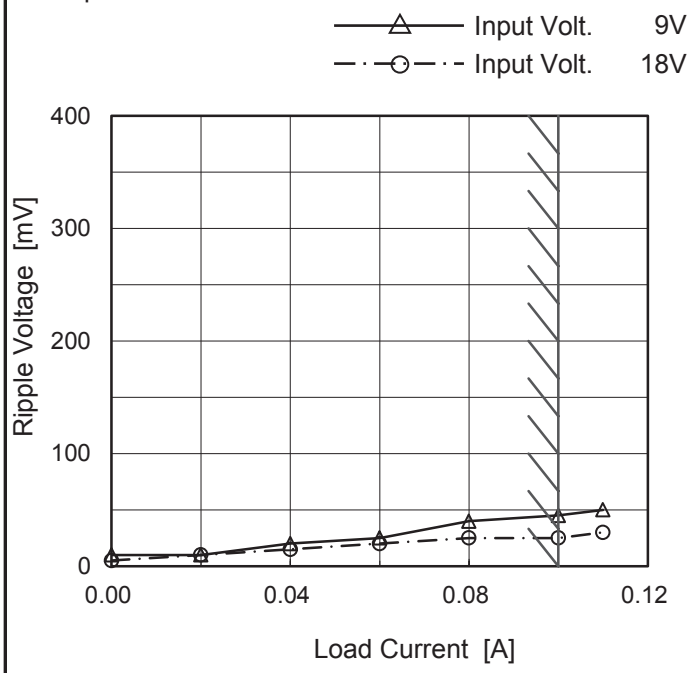
Model	MGW31215
Item	Ripple Voltage (by Load Current)
Object	-15V0.1A

Temperature 25°C
Testing Circuitry Figure B

1.Graph



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

Ripple [mVp-p]

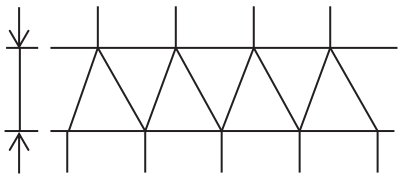


Fig.Complex Ripple Wave Form

2.Values

Load Current [A]	Ripple Voltage [mV]	
	Input Volt. 9 [V]	Input Volt. 18 [V]
0.00	10	5
0.02	10	10
0.04	20	15
0.06	25	20
0.08	40	25
0.10	45	25
0.11	50	30
--	-	-
--	-	-
--	-	-
--	-	-

+15V: Rated Load Current

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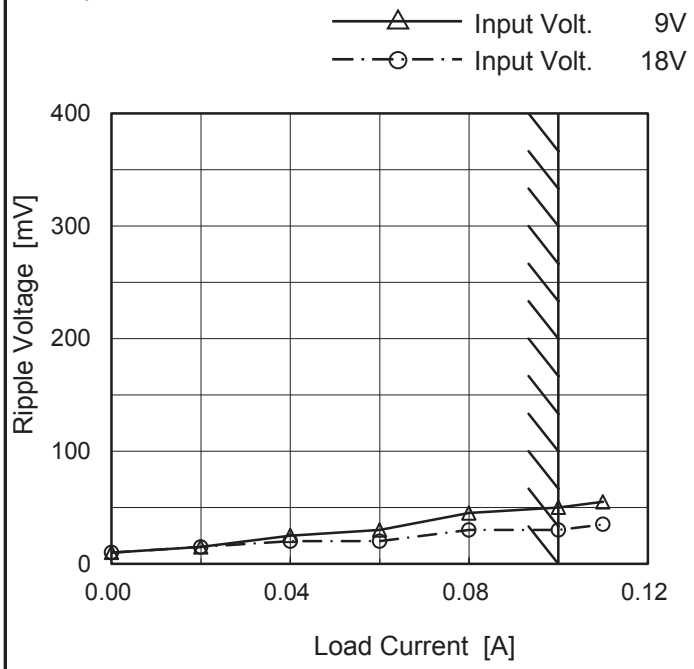
COSEL

Model	MGW31215
Item	Ripple-Noise
Object	+15V0.1A

Temperature 25°C
Testing Circuitry Figure B

1.Graph



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

Ripple Noise[mVp-p]

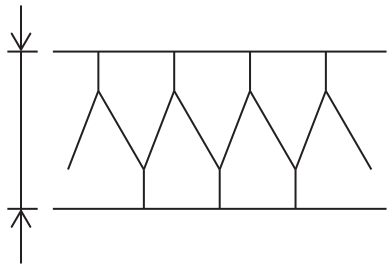


Fig.Complex Ripple Noise Wave Form

2.Values

Load Current [A]	Ripple-Noise [mV]	
	Input Volt. 9 [V]	Input Volt. 18 [V]
0.00	10	10
0.02	15	15
0.04	25	20
0.06	30	20
0.08	45	30
0.10	50	30
0.11	55	35
--	-	-
--	-	-
--	-	-
--	-	-

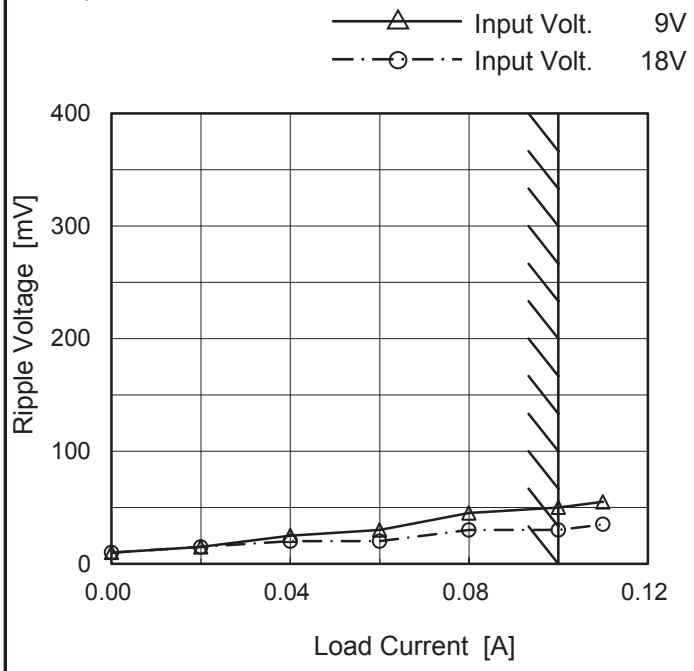
-15V: Rated Load Current

COSEL

Model	MGW31215
Item	Ripple-Noise
Object	-15V0.1A

Temperature 25°C
Testing Circuitry Figure B

1.Graph



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

Ripple Noise[mVp-p]

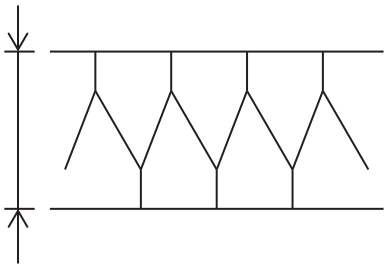


Fig.Complex Ripple Noise Wave Form

2.Values

Load Current [A]	Ripple-Noise [mV]	
	Input Volt. 9 [V]	Input Volt. 18 [V]
0.00	10	10
0.02	15	15
0.04	25	20
0.06	30	20
0.08	45	30
0.10	50	30
0.11	55	35
--	-	-
--	-	-
--	-	-
--	-	-

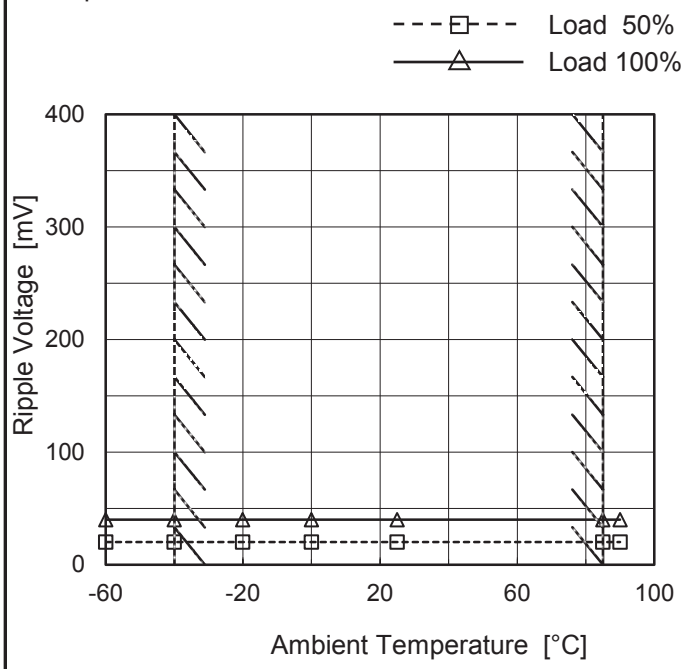
+15V: Rated Load Current

COSEL

Model	MGW31215
Item	Ripple Voltage (by Ambient Temp.)
Object	+15V0.1A

Testing Circuitry Figure B

1.Graph



Input Volt. 12V

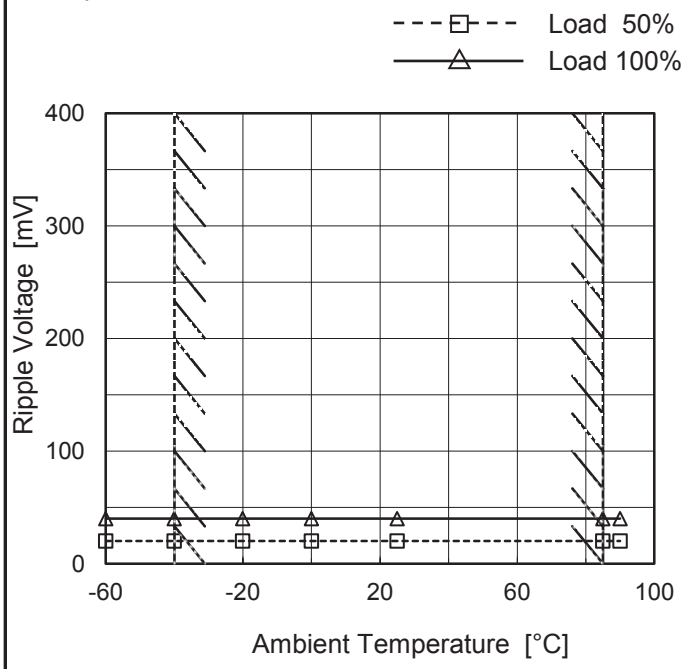
2.Values

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

-15V: Rated Load Current

Object	-15V0.1A

1.Graph



Input Volt. 12V

Measured by 100 MHz Oscilloscope.

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

2.Values

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

+15V: Rated Load Current

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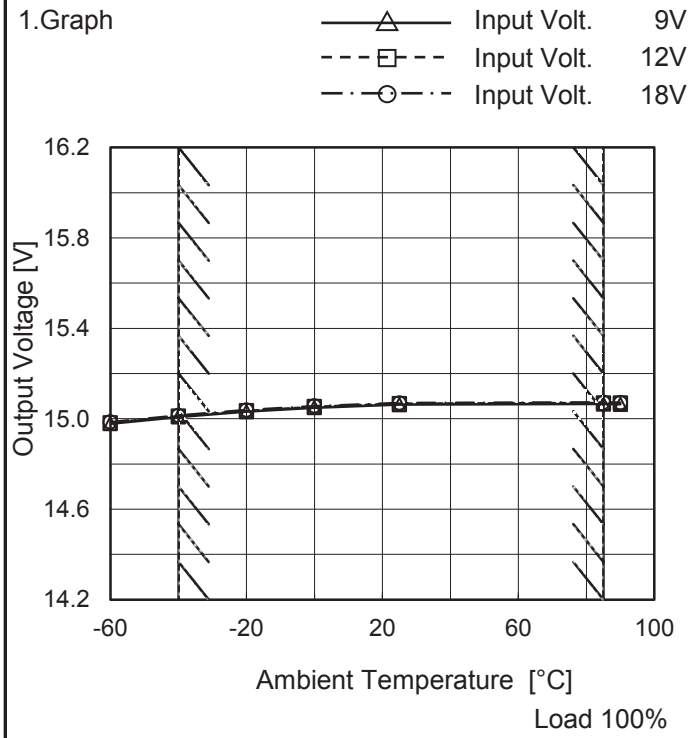
COSEL

Model	MGW31215
Item	Ambient Temperature Drift
Object	+15V0.1A

Testing Circuitry Figure A

1.Graph



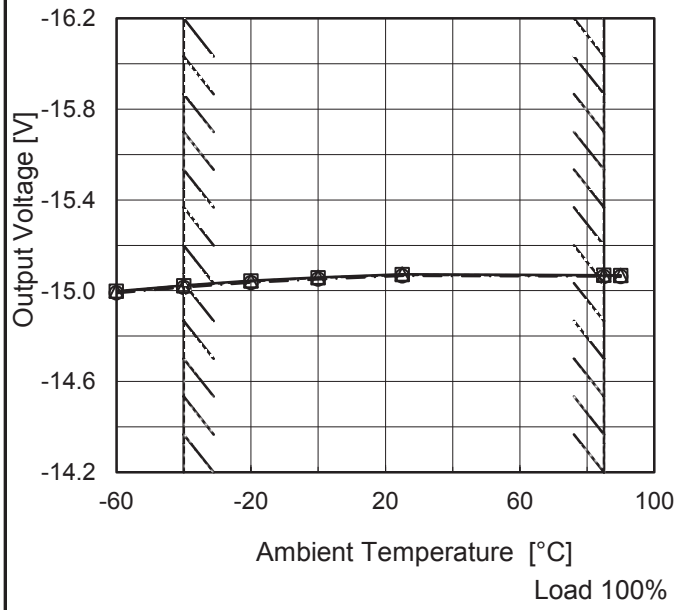
2.Values

Ambient Temperature [°C]	Output Voltage [V]		
	Input Volt. 9[V]	Input Volt. 12[V]	Input Volt. 18[V]
-60	14.978	14.982	14.985
-40	15.008	15.012	15.015
-20	15.031	15.035	15.038
0	15.049	15.053	15.056
25	15.063	15.067	15.070
85	15.066	15.070	15.072
90	15.064	15.069	15.071
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

-15V: Rated Load Current

Object	-15V0.1A

1.Graph



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

2.Values

Ambient Temperature [°C]	Output Voltage [V]		
	Input Volt. 9[V]	Input Volt. 12[V]	Input Volt. 18[V]
-60	-14.998	-14.997	-14.990
-40	-15.023	-15.021	-15.015
-20	-15.044	-15.042	-15.035
0	-15.059	-15.057	-15.051
25	-15.073	-15.070	-15.065
85	-15.069	-15.067	-15.062
90	-15.068	-15.066	-15.062
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

+15V: Rated Load Current

COSEL

Model	MGW31215	
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 : 9 - 18V
Load Current (AVR 1) : 0 - 0.1A (AVR 2) : 0 - 0.1A

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

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

2.Values

Object	+15V0.1A					
Item	Temperature [°C]	Input Voltage[V]	Output		Output Voltage Accuracy	
			Current[A]	Voltage[V]	Value [mV]	Ratio [%]
Maximum Voltage	85	9	0	15.363	±297	±2.0
Minimum Voltage	-40	9	0.1	14.770		

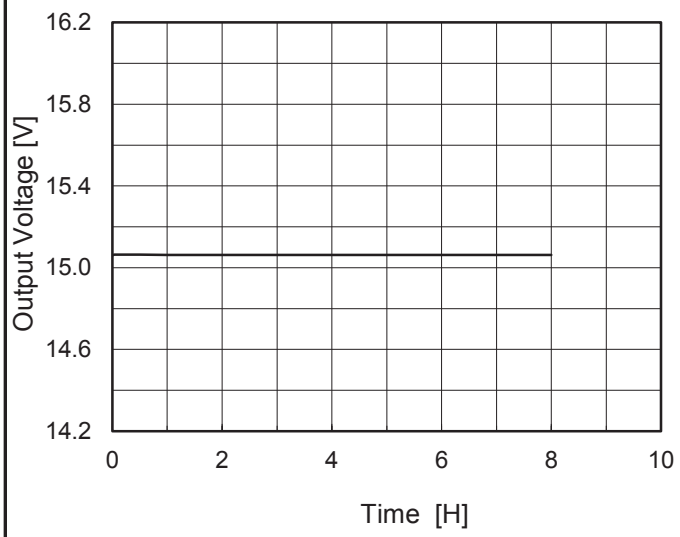
Object	-15V0.1A					
Item	Temperature [°C]	Input Voltage[V]	Output		Output Voltage Accuracy	
			Current[A]	Voltage[V]	Value [mV]	Ratio [%]
Maximum Voltage	85	9	0	-15.359	±287	±1.9
Minimum Voltage	-40	9	0.1	-14.786		

COSEL

Model	MGW31215
Item	Time Lapse Drift
Object	+15V0.1A

Temperature 25°C
Testing Circuitry Figure A

1.Graph



Input Volt. 12V
Load 100%

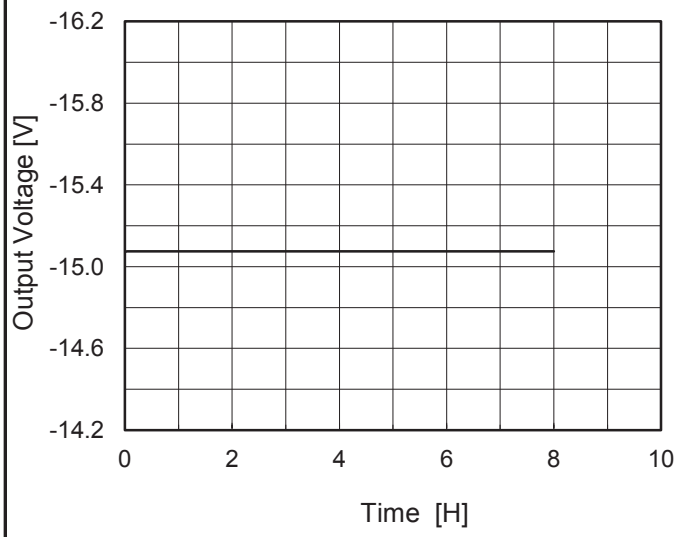
2.Values

Time since start [H]	Output Voltage [V]
0.0	15.060
0.5	15.063
1.0	15.063
2.0	15.063
3.0	15.063
4.0	15.063
5.0	15.063
6.0	15.063
7.0	15.063
8.0	15.063

-15V: Rated Load Current

Object	-15V0.1A

1.Graph



Input Volt. 12V
Load 100%

2.Values

Time since start [H]	Output Voltage [V]
0.0	-15.072
0.5	-15.075
1.0	-15.075
2.0	-15.075
3.0	-15.075
4.0	-15.075
5.0	-15.075
6.0	-15.075
7.0	-15.075
8.0	-15.075

+15V: Rated Load Current

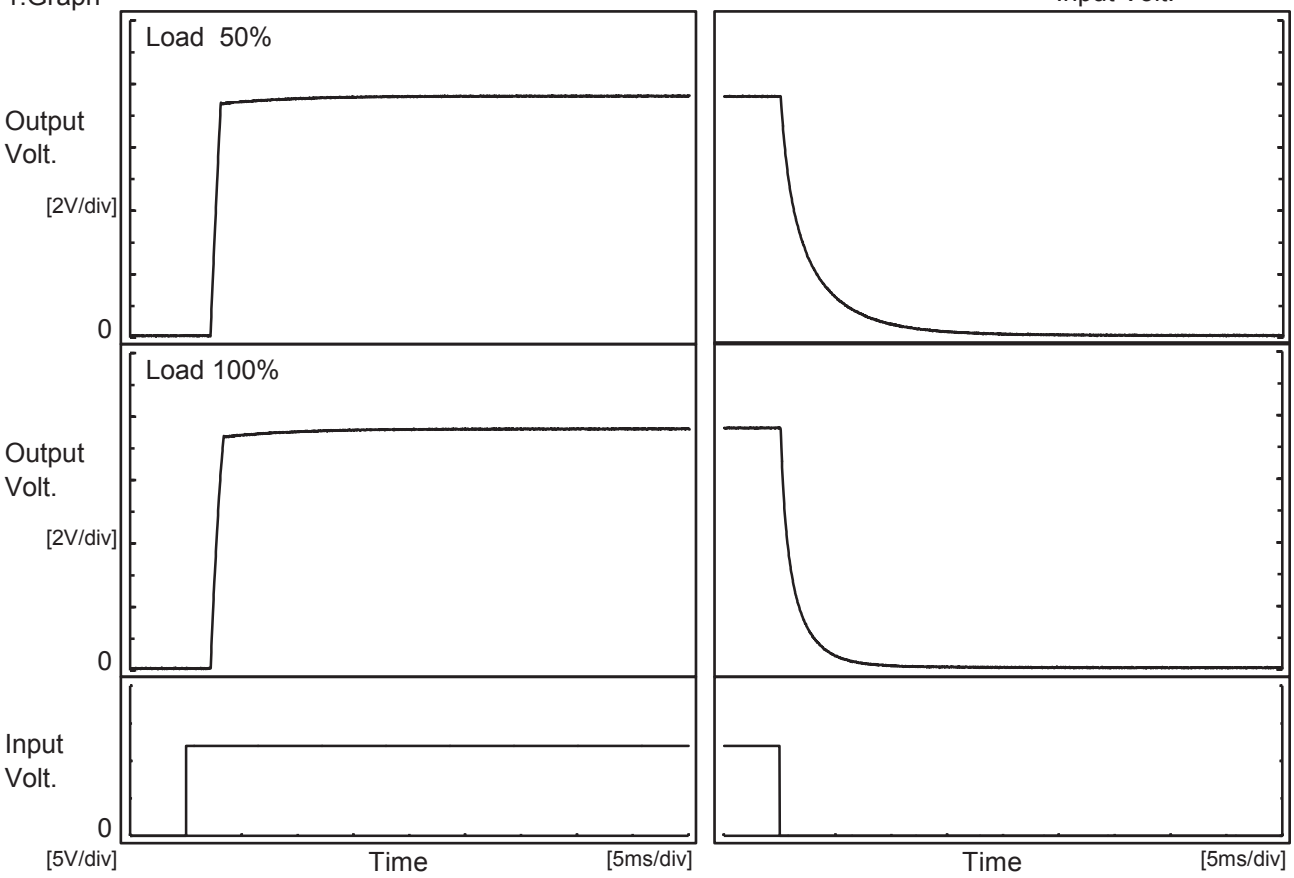
COSEL

Model	MGW31215
Item	Rise and Fall Time
Object	+15V0.1A

Temperature 25°C
Testing Circuitry Figure A

1.Graph

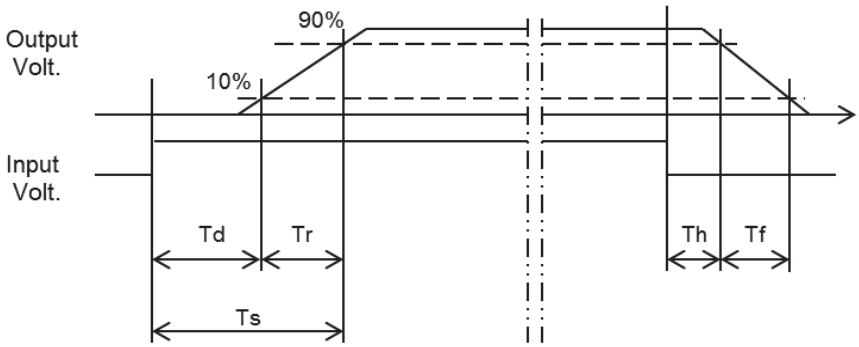
Input Volt. 12 V



2.Values

[ms]

Load \ Time	Td	Tr	Ts	Th	Tf
50 %	2.3	0.8	3.1	0.3	6.8
100 %	2.3	0.9	3.2	0.2	3.4



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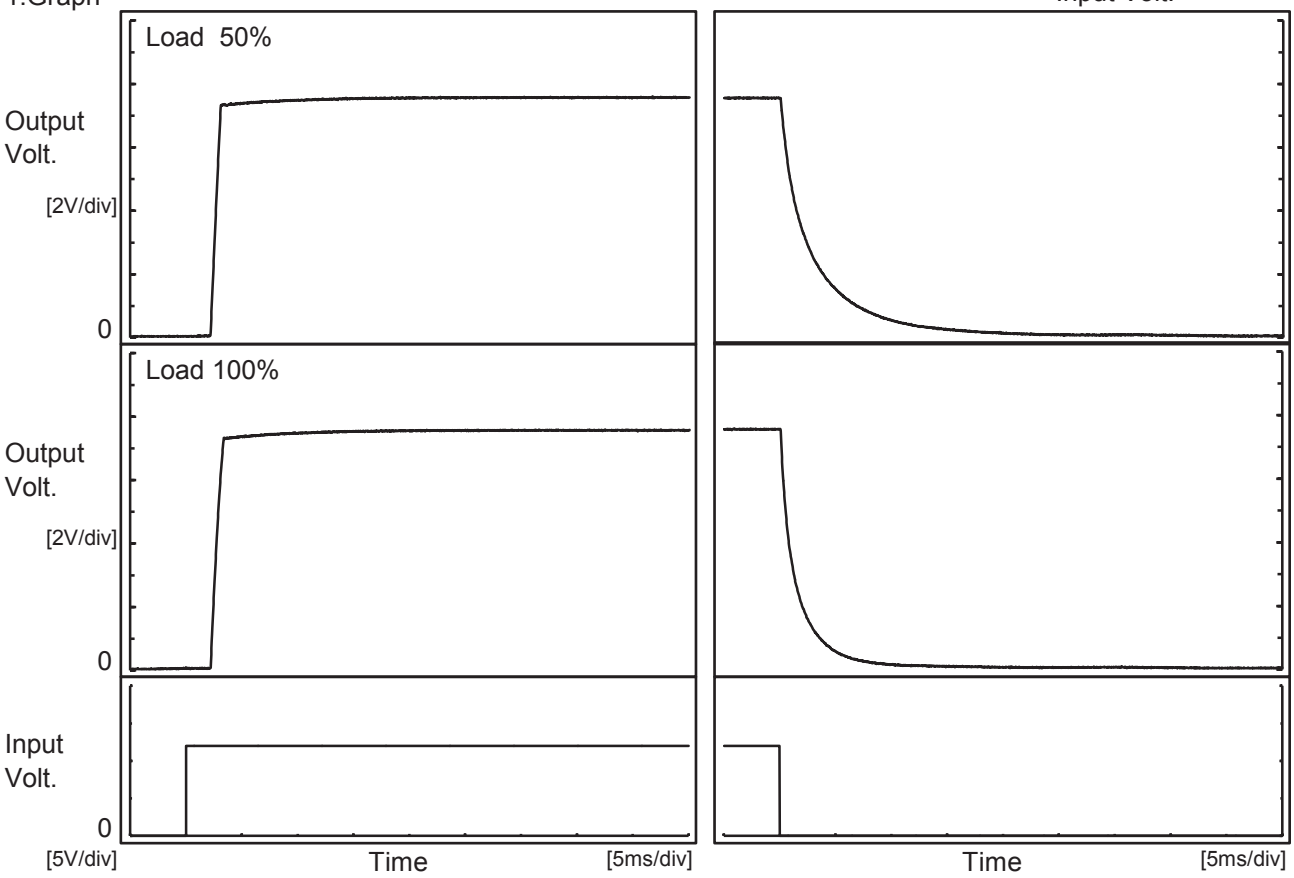
COSEL

Model	MGW31215
Item	Rise and Fall Time
Object	-15V0.1A

Temperature 25°C
Testing Circuitry Figure A

1.Graph

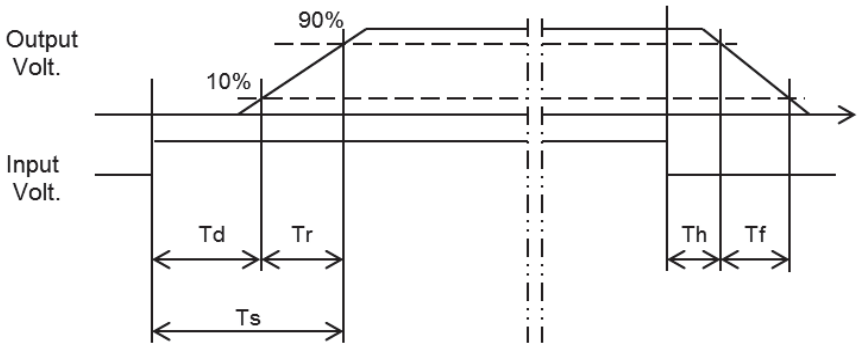
Input Volt. 12 V



2.Values

[ms]

Load \ Time	Td	Tr	Ts	Th	Tf
50 %	2.3	0.8	3.1	0.3	7.9
100 %	2.3	1.0	3.3	0.2	4.0



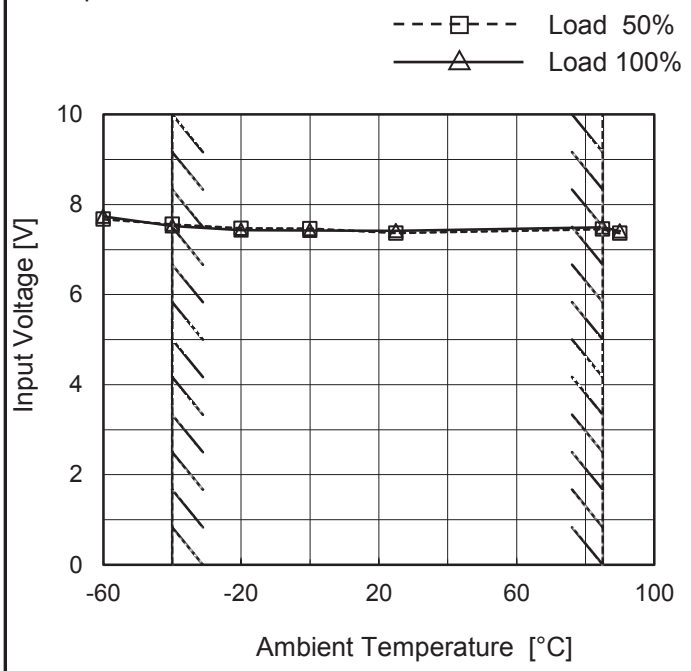
BC-10993

COSEL

Model	MGW31215
Item	Minimum Input Voltage for Regulated Output Voltage
Object	+15V0.1A

Testing Circuitry Figure A

1.Graph

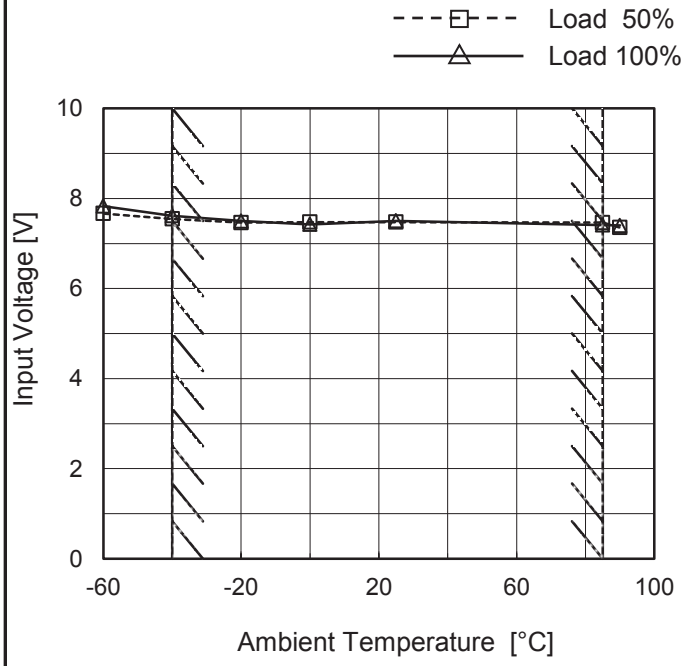


2.Values

Ambient Temperature [°C]	Input Voltage [V]	
	Load 50%	Load 100%
-60	7.7	7.8
-40	7.6	7.6
-20	7.5	7.5
0	7.5	7.5
25	7.4	7.5
85	7.5	7.5
90	7.4	7.5
--	-	-
--	-	-
--	-	-
--	-	-

Object	-15V0.1A

1.Graph



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

2.Values

Ambient Temperature [°C]	Input Voltage [V]	
	Load 50%	Load 100%
-60	7.7	7.9
-40	7.6	7.7
-20	7.5	7.5
0	7.5	7.5
25	7.5	7.5
85	7.5	7.5
90	7.4	7.4
--	-	-
--	-	-
--	-	-
--	-	-

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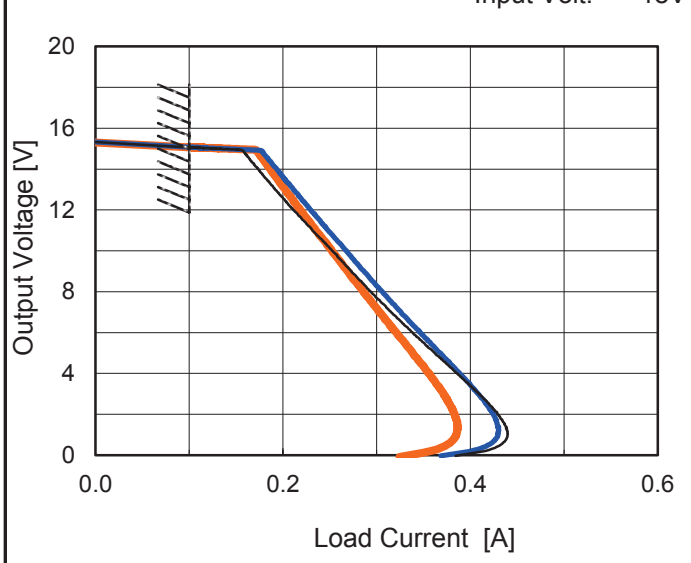
COSEL

Model	MGW31215
Item	Overcurrent Protection
Object	+15V0.1A

Temperature 25°C
Testing Circuitry Figure A

1.Graph



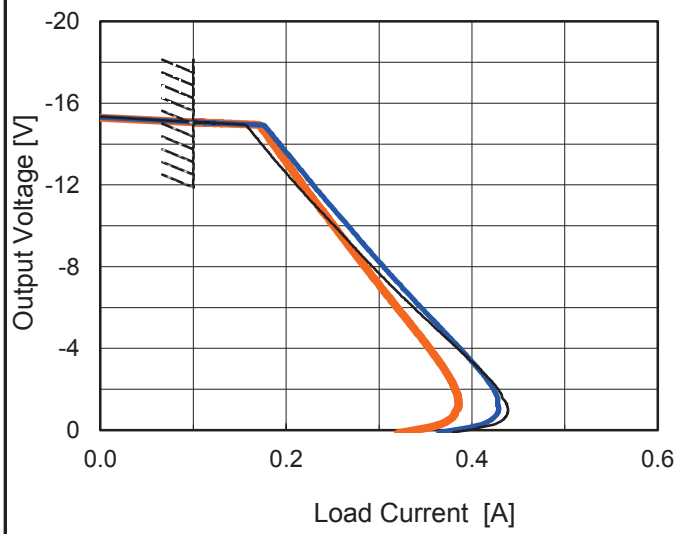
2.Values

Output Voltage [V]	Load Current [A]		
	Input Volt. 9[V]	Input Volt. 12[V]	Input Volt. 18[V]
14.25	0.17	0.19	0.18
13.50	0.18	0.20	0.19
12.00	0.21	0.23	0.22
10.50	0.24	0.26	0.24
9.00	0.27	0.29	0.27
7.50	0.30	0.32	0.29
6.00	0.34	0.35	0.32
4.50	0.37	0.38	0.35
3.00	0.41	0.41	0.37
1.50	0.44	0.43	0.39
0.00	0.38	0.37	0.32
--	-	-	-

-15V: Rated Load Current

Object	-15V0.1A

1.Graph



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

2.Values

Output Voltage [V]	Load Current [A]		
	Input Volt. 9[V]	Input Volt. 12[V]	Input Volt. 18[V]
-14.25	0.17	0.19	0.18
-13.50	0.18	0.20	0.19
-12.00	0.21	0.23	0.22
-10.50	0.24	0.26	0.24
-9.00	0.27	0.28	0.27
-7.50	0.30	0.31	0.29
-6.00	0.34	0.34	0.32
-4.50	0.37	0.38	0.35
-3.00	0.41	0.41	0.37
-1.50	0.43	0.43	0.39
0.00	0.38	0.36	0.32
--	-	-	-

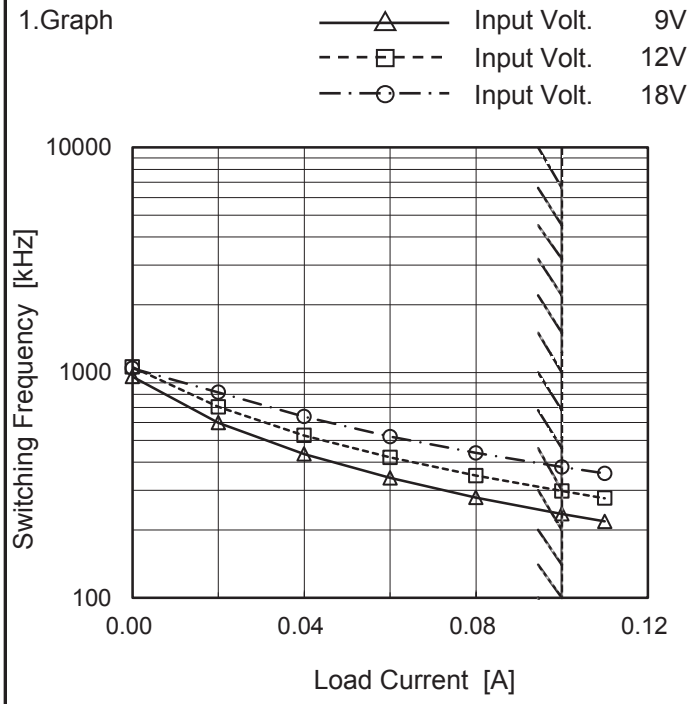
+15V: Rated Load Current

COSEL

Model	MGW31215
Item	Switching Frequency (by Load Current)
Object	+/-15V0.1A

Temperature 25°C
Testing Circuitry Figure A

1.Graph



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

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

2.Values

Load Current [A]	Frequency [kHz]		
	Input Volt. 9[V]	Input Volt. 12[V]	Input Volt. 18[V]
0.00	959	1059	1045
0.02	599	705	818
0.04	435	526	637
0.06	340	420	519
0.08	278	349	440
0.10	236	298	381
0.11	218	277	356
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

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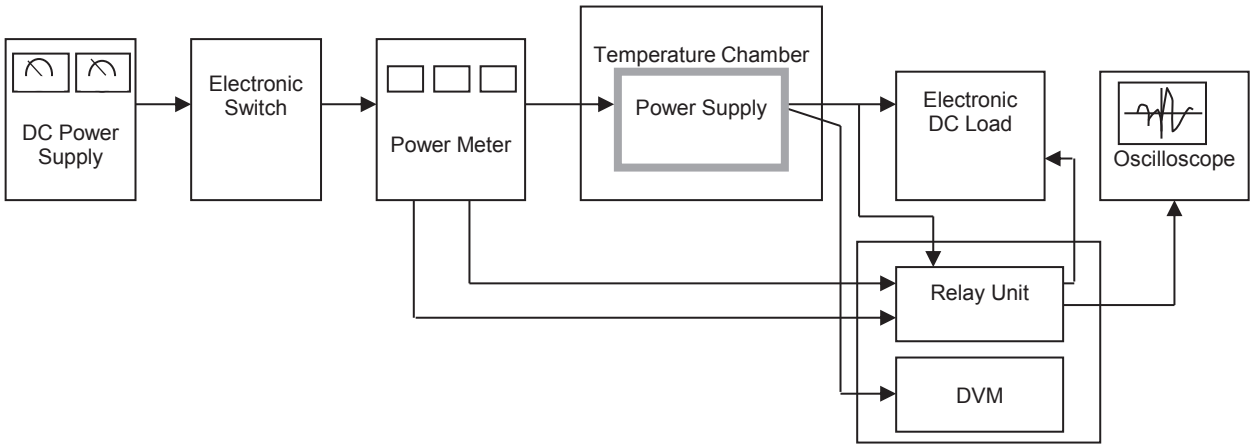

Figure A

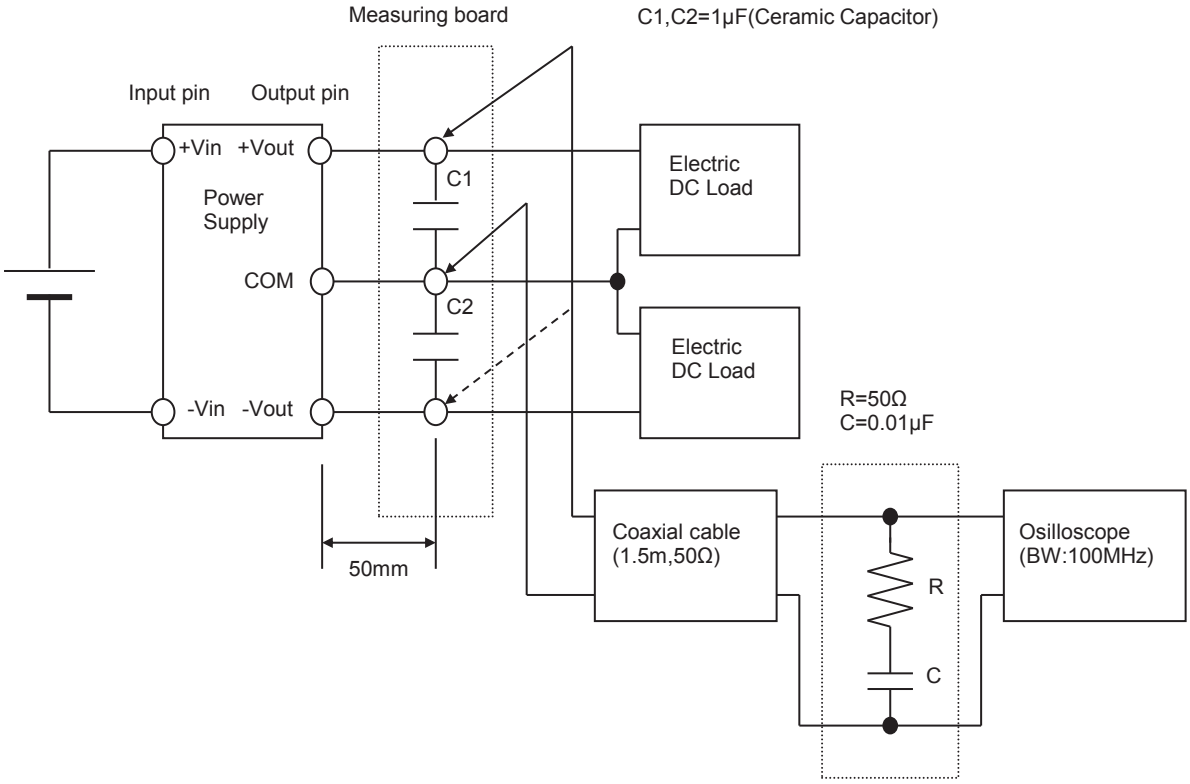

Figure B（Ripple and Ripple noise Characteristic）