COSEL

参考資料

TEST DATA OF MGW32415

Regulated DC Power Supply
November 8, 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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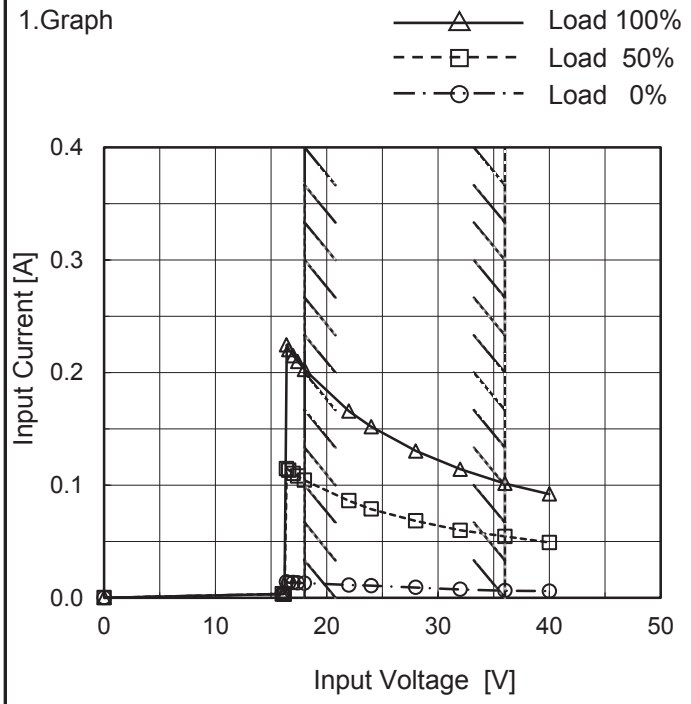
COSEL

Model	MGW32415
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
16.0	0.003	0.004	0.003
16.2	0.004	0.003	0.004
16.4	0.014	0.115	0.225
16.6	0.013	0.113	0.220
17.0	0.014	0.111	0.215
17.4	0.013	0.108	0.210
18.0	0.013	0.104	0.203
22.0	0.011	0.086	0.166
24.0	0.011	0.079	0.152
28.0	0.009	0.068	0.130
32.0	0.007	0.060	0.114
36.0	0.006	0.055	0.102
40.0	0.006	0.049	0.092
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

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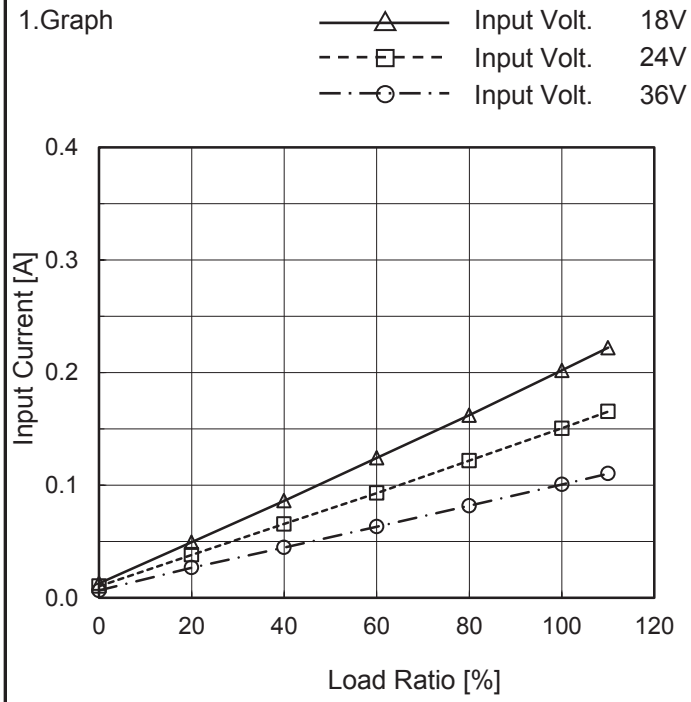
COSEL

Model	MGW32415
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. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]
0	0.013	0.010	0.006
20	0.049	0.038	0.027
40	0.086	0.066	0.045
60	0.124	0.093	0.063
80	0.162	0.122	0.082
100	0.202	0.151	0.101
110	0.222	0.165	0.110
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

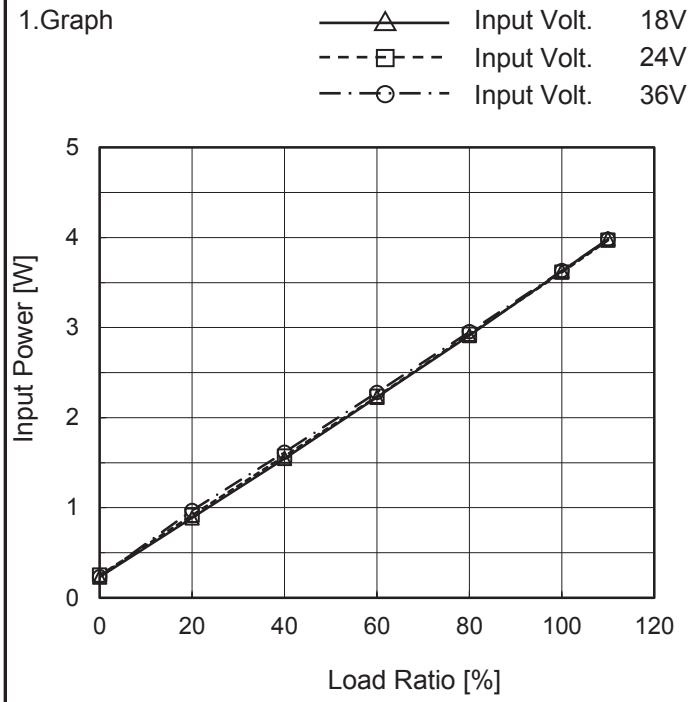
BC-10995

COSEL

Model	MGW32415
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. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]
0	0.23	0.25	0.23
20	0.89	0.91	0.97
40	1.55	1.57	1.61
60	2.23	2.23	2.28
80	2.91	2.93	2.95
100	3.63	3.61	3.63
110	3.99	3.97	3.98
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

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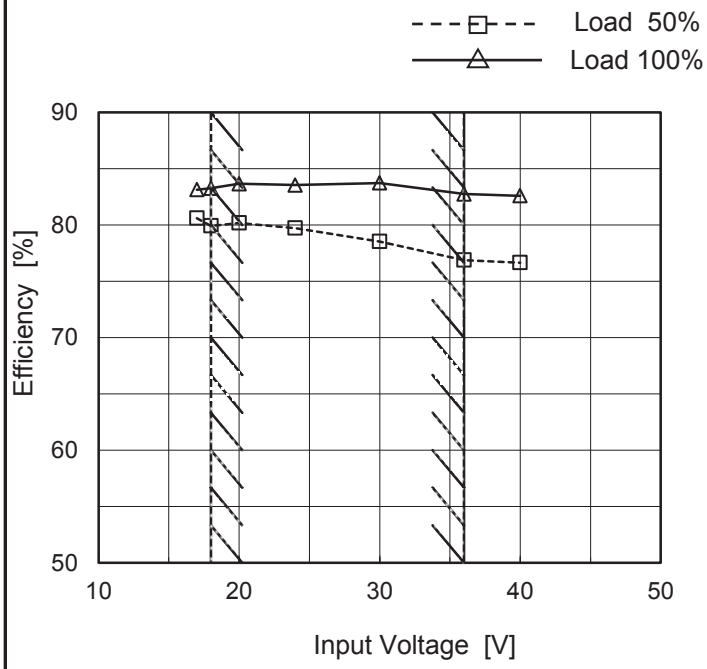
COSEL

Model	MGW32415
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%
17	80.6	83.1
18	79.9	83.3
20	80.2	83.7
24	79.7	83.6
30	78.5	83.7
36	76.9	82.8
40	76.7	82.6
--	-	-
--	-	-

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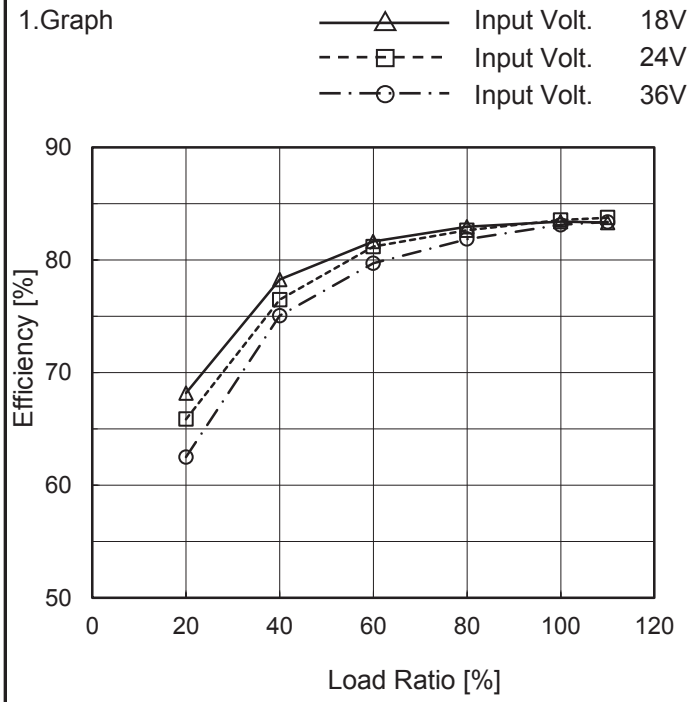
COSEL

Model	MGW32415
Item	Efficiency (by Load Ratio)
Object	――――――

Temperature 25°C
Testing Circuitry Figure A

1.Graph



2.Values

Load Ratio [%]	Efficiency [%]		
	Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]
0	-	-	-
20	68.2	65.9	62.5
40	78.3	76.5	75.0
60	81.6	81.2	79.7
80	83.0	82.6	81.9
100	83.4	83.6	83.1
110	83.3	83.8	83.4
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

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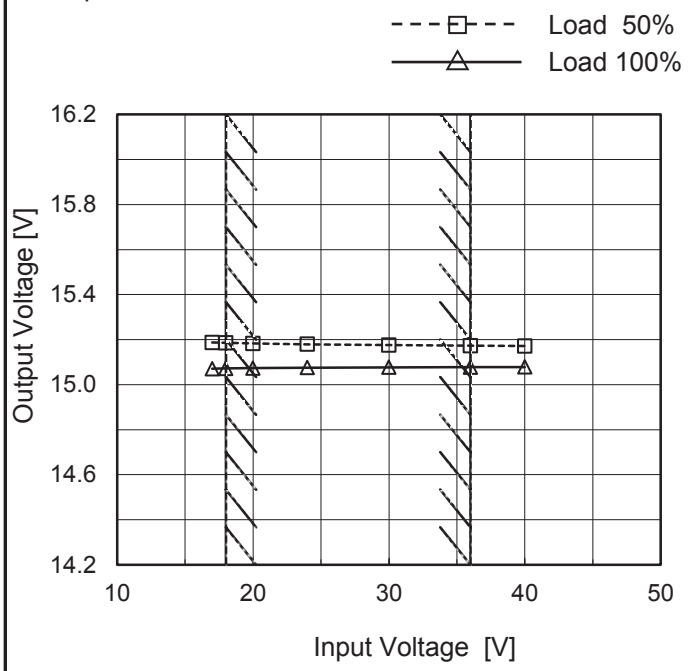
COSEL

Model	MGW32415
Item	Line Regulation
Object	+15V0.1A

Temperature 25°C
Testing Circuitry Figure A

1.Graph



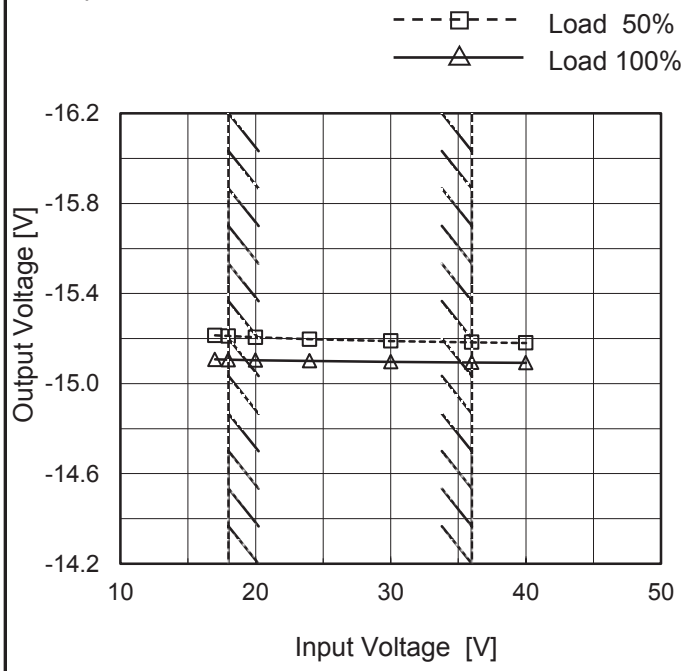
2.Values

Input Voltage [V]	Output Voltage [V]	
	Load 50%	Load 100%
17	15.187	15.071
18	15.186	15.072
20	15.183	15.073
24	15.179	15.075
30	15.176	15.077
36	15.173	15.078
40	15.171	15.078
--	-	-
--	-	-

-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%
17	-15.214	-15.107
18	-15.211	-15.106
20	-15.205	-15.104
24	-15.197	-15.101
30	-15.189	-15.097
36	-15.183	-15.094
40	-15.180	-15.092
--	-	-
--	-	-

+15V: Rated Load Current

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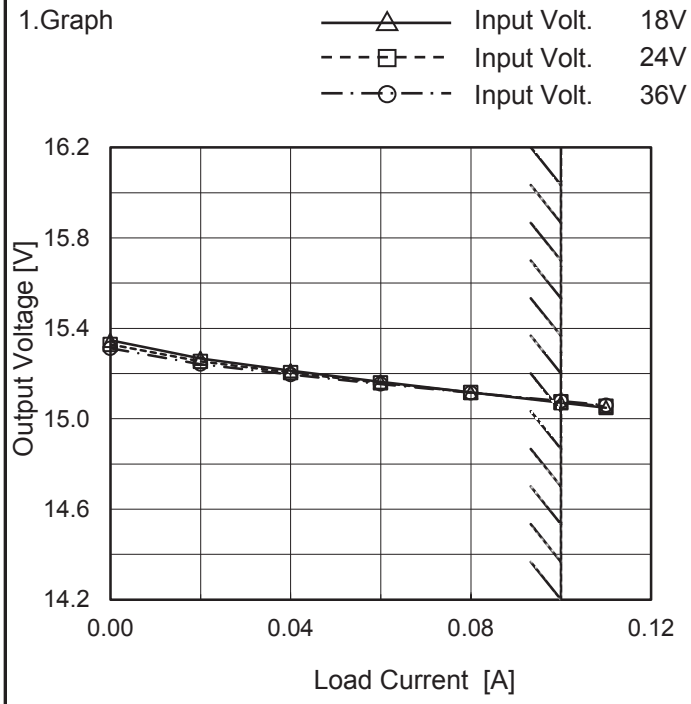
Model	MGW32415
Item	Load Regulation
Object	+15V0.1A

Temperature 25°C
Testing Circuitry Figure A

1.Graph



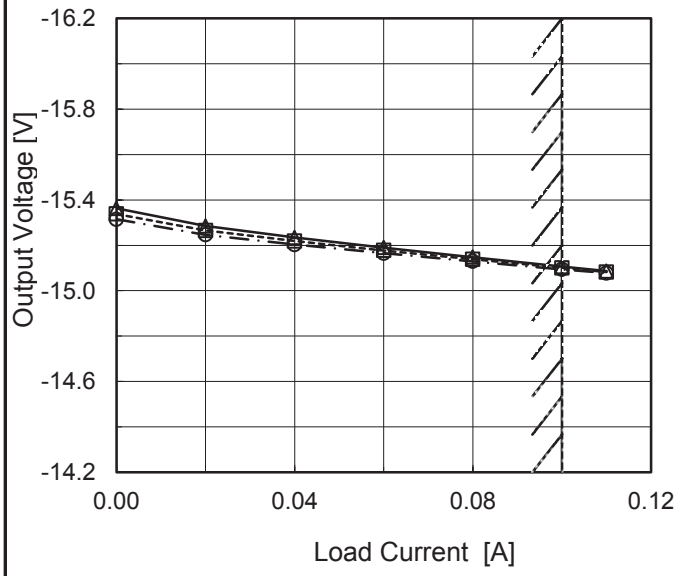
2.Values

Load Current [A]	Output Voltage [V]		
	Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]
0.00	15.347	15.328	15.312
0.02	15.267	15.254	15.242
0.04	15.213	15.204	15.196
0.06	15.163	15.159	15.154
0.08	15.116	15.116	15.115
0.10	15.071	15.075	15.078
0.11	15.049	15.055	15.060
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

-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. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]
0.00	-15.363	-15.338	-15.315
0.02	-15.285	-15.265	-15.246
0.04	-15.235	-15.219	-15.203
0.06	-15.190	-15.178	-15.165
0.08	-15.147	-15.138	-15.129
0.10	-15.106	-15.101	-15.094
0.11	-15.086	-15.082	-15.078
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

+15V: Rated Load Current

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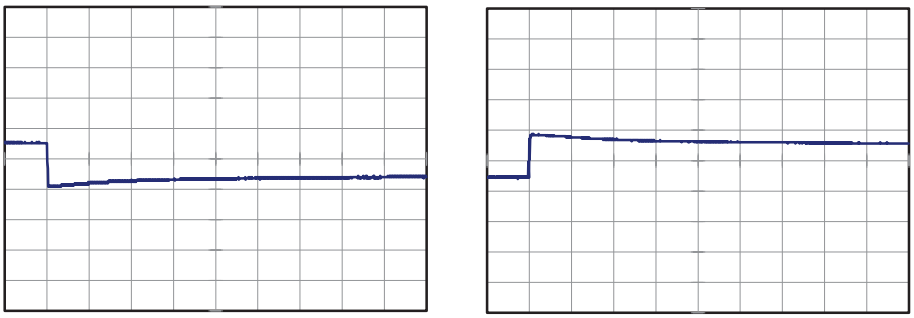
Model	MGW32415	
Item	Dynamic Load Response	Temperature 25°C Testing Circuitry Figure A
Object	+15V0.1A	

Input Volt. 24 V

-15V:rated load current.

Cycle 100 ms

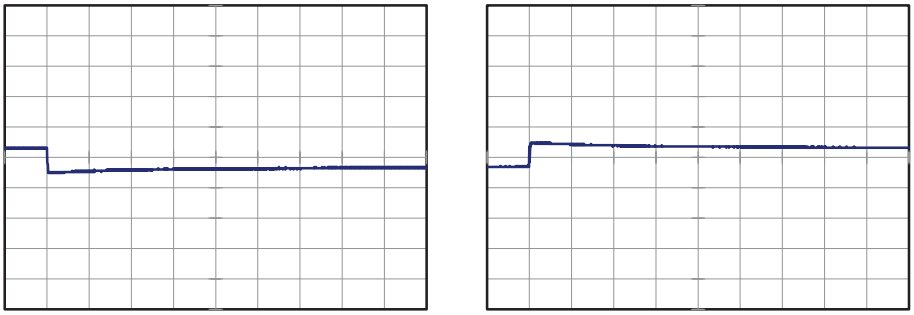
Min.Load (0A)←→
Load 100% (0.1A)



200 mV/div

4 ms/div 4 ms/div

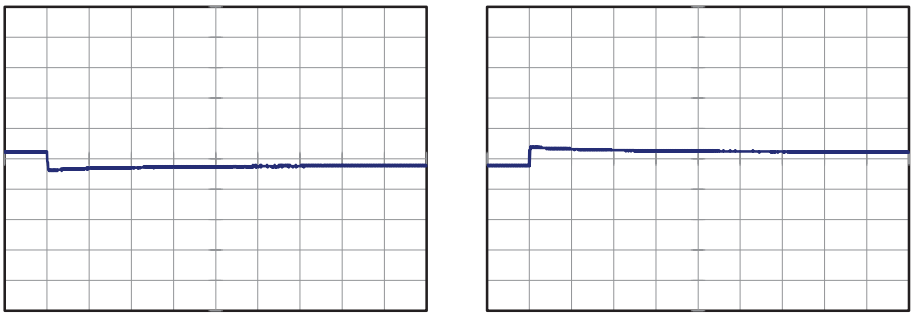
Min.Load (0A)←→
Load 50% (0.05A)



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

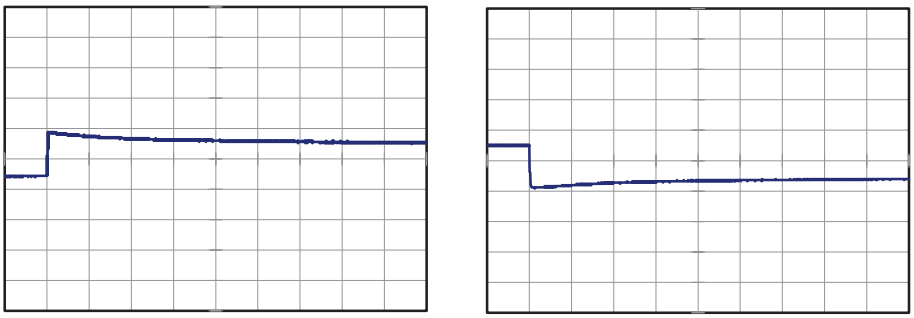
Model	MGW32415	
Item	Dynamic Load Response	Temperature 25°C Testing Circuitry Figure A
Object	-15V0.1A	

Input Volt. 24 V

+15V:rated load current.

Cycle 100 ms

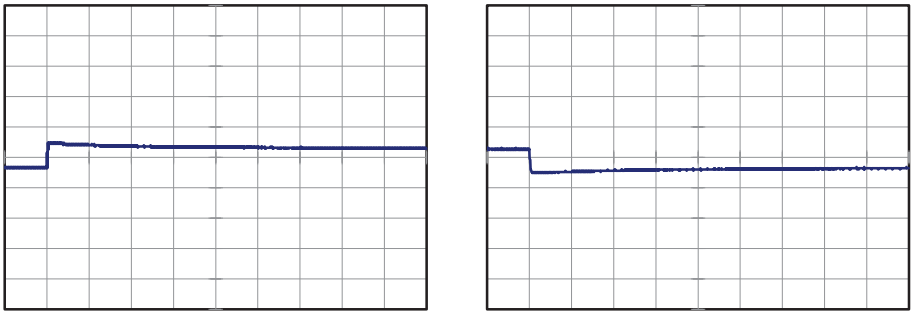
Min.Load (0A)←→
Load 100% (0.1A)



200 mV/div

4 ms/div 4 ms/div

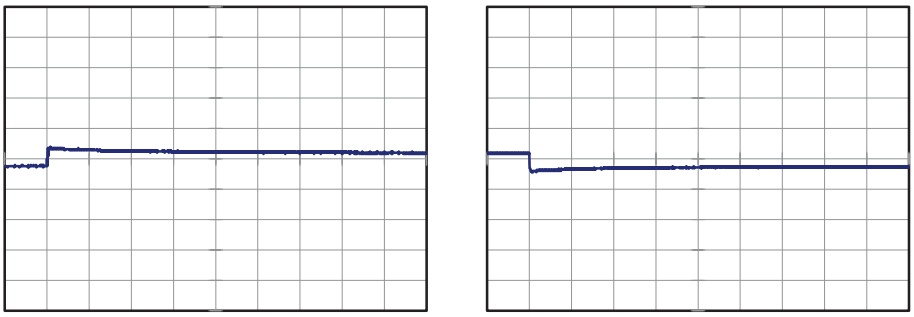
Min.Load (0A)←→
Load 50% (0.05A)



200 mV/div

4 ms/div 4 ms/div

Load 50% (0.05A)←→
Load 100% (0.1A)



200 mV/div

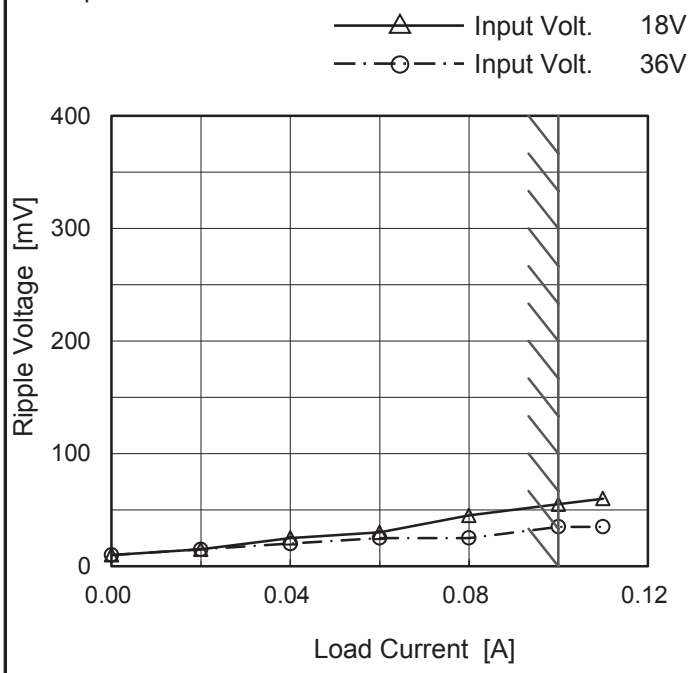
4 ms/div 4 ms/div

COSEL

Model	MGW32415
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]

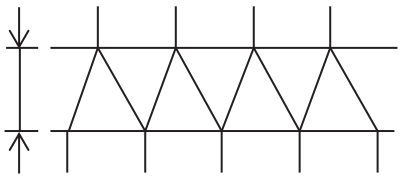


Fig.Complex Ripple Wave Form

2.Values

Load Current [A]	Ripple Voltage [mV]	
	Input Volt. 18 [V]	Input Volt. 36 [V]
0.00	10	10
0.02	15	15
0.04	25	20
0.06	30	25
0.08	45	25
0.10	55	35
0.11	60	35
--	-	-
--	-	-
--	-	-
--	-	-

-15V: Rated Load Current

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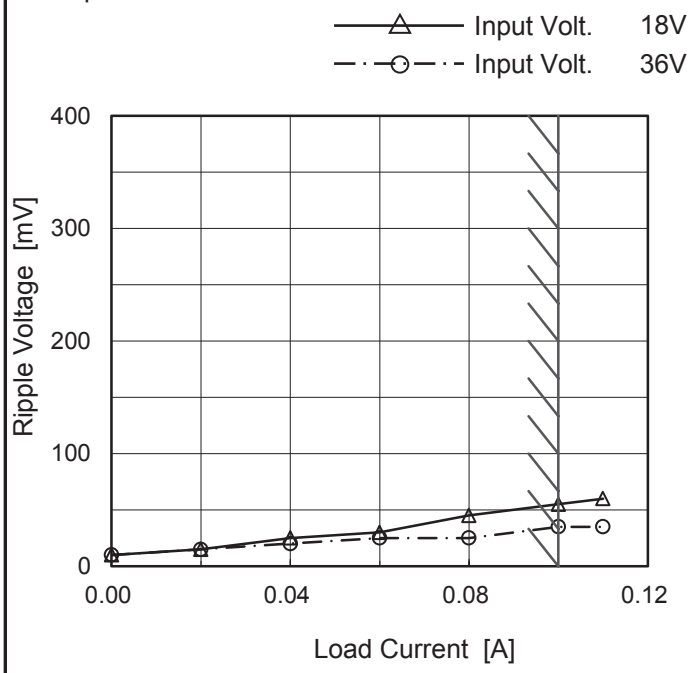
Model	MGW32415
Item	Ripple Voltage (by Load Current)
Object	-15V0.1A

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]

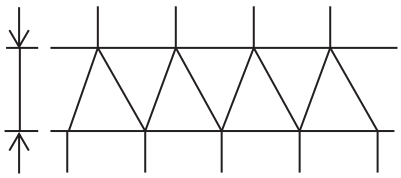


Fig.Complex Ripple Wave Form

2.Values

Load Current [A]	Ripple Voltage [mV]	
	Input Volt. 18 [V]	Input Volt. 36 [V]
0.00	10	10
0.02	15	15
0.04	25	20
0.06	30	25
0.08	45	25
0.10	55	35
0.11	60	35
--	-	-
--	-	-
--	-	-
--	-	-

+15V: Rated Load Current

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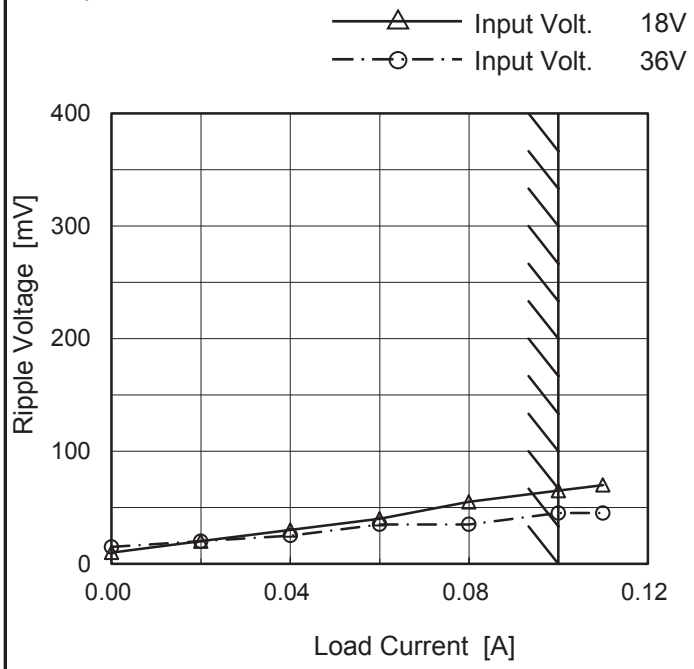
COSEL

Model	MGW32415
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]

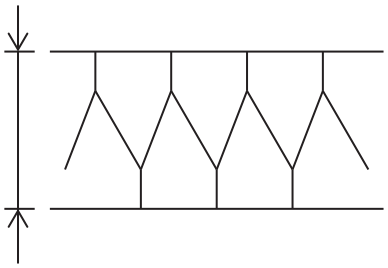


Fig.Complex Ripple Noise Wave Form

2.Values

Load Current [A]	Ripple-Noise [mV]	
	Input Volt. 18 [V]	Input Volt. 36 [V]
0.00	10	15
0.02	20	20
0.04	30	25
0.06	40	35
0.08	55	35
0.10	65	45
0.11	70	45
--	-	-
--	-	-
--	-	-
--	-	-

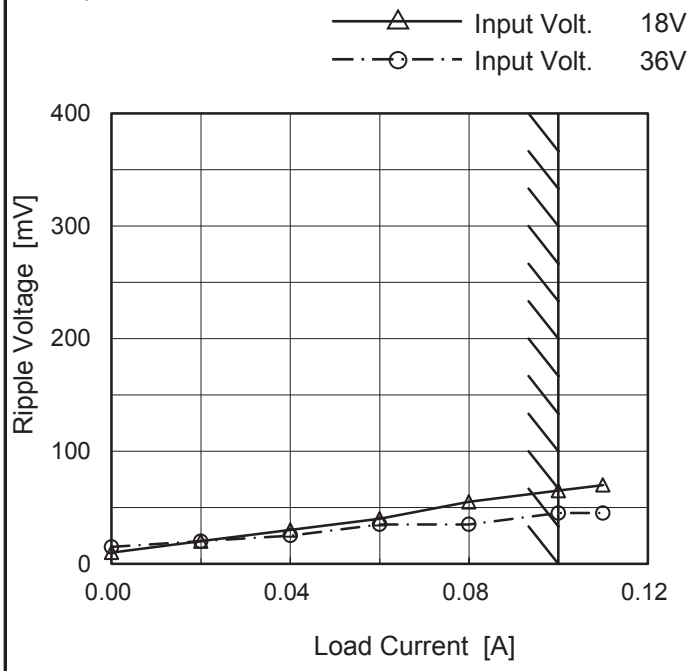
-15V: Rated Load Current

COSEL

Model	MGW32415
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]

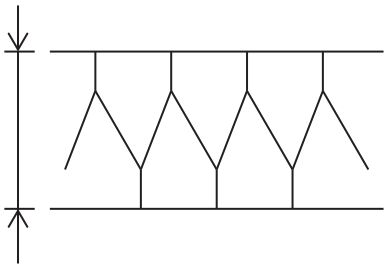


Fig.Complex Ripple Noise Wave Form

2.Values

Load Current [A]	Ripple-Noise [mV]	
	Input Volt. 18 [V]	Input Volt. 36 [V]
0.00	10	15
0.02	20	20
0.04	30	25
0.06	40	35
0.08	55	35
0.10	65	45
0.11	70	45
--	-	-
--	-	-
--	-	-
--	-	-

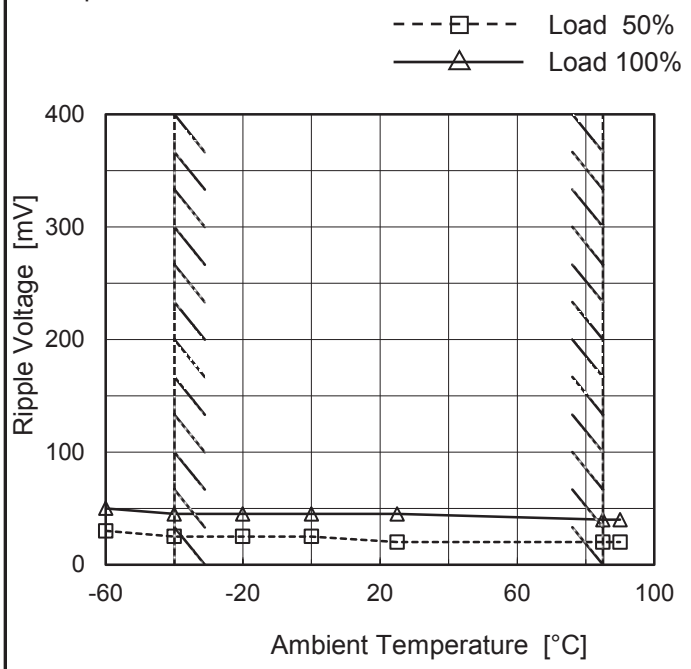
+15V: Rated Load Current

COSEL

Model	MGW32415
Item	Ripple Voltage (by Ambient Temp.)
Object	+15V0.1A

Testing Circuitry Figure B

1.Graph



Input Volt. 24V

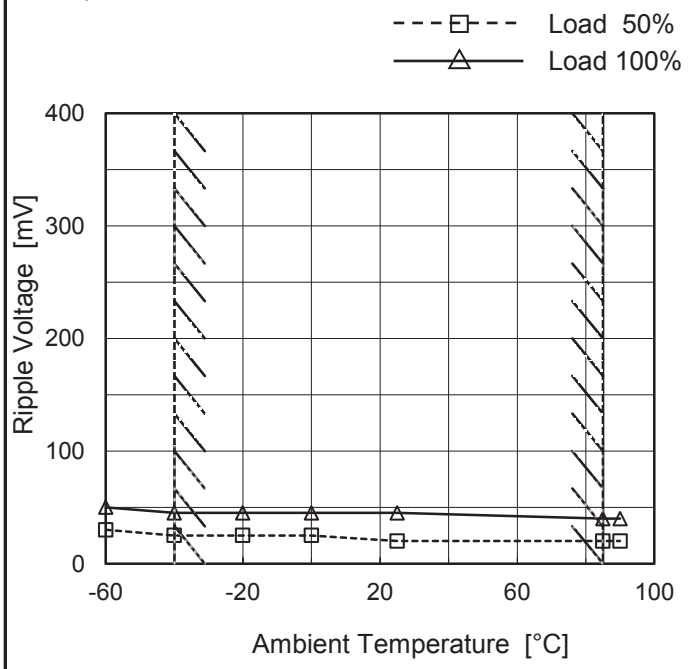
2.Values

Ambient Temperature [°C]	Ripple Voltage [mV]	
	Load 50%	Load 100%
-60	30	50
-40	25	45
-20	25	45
0	25	45
25	20	45
85	20	40
90	20	40
--	-	-
--	-	-
--	-	-
--	-	-

-15V: Rated Load Current

Object	-15V0.1A

1.Graph



Input Volt. 24V

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	50
-40	25	45
-20	25	45
0	25	45
25	20	45
85	20	40
90	20	40
--	-	-
--	-	-
--	-	-
--	-	-

+15V: Rated Load Current

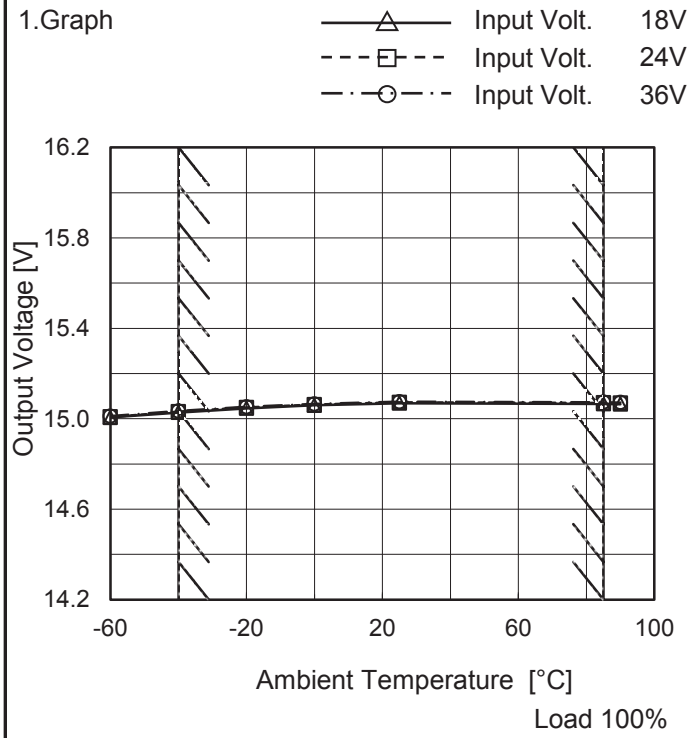
BC-10995

COSEL

Model	MGW32415
Item	Ambient Temperature Drift
Object	+15V0.1A

Testing Circuitry Figure A

1.Graph



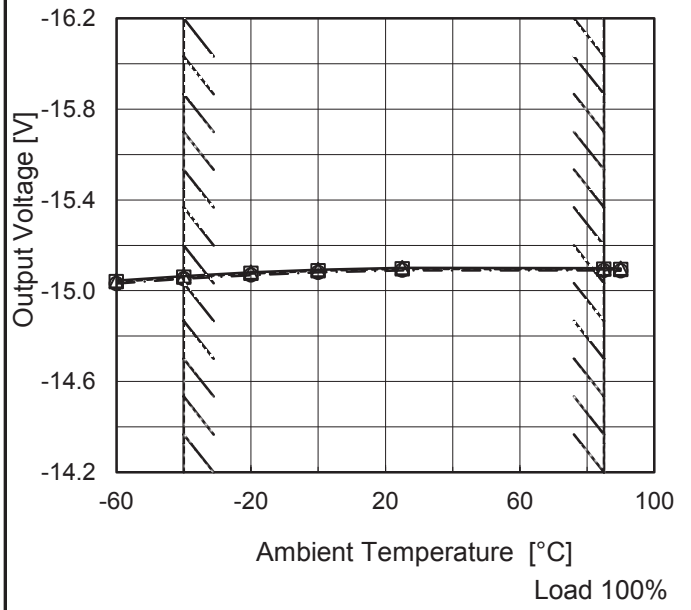
2.Values

Ambient Temperature [°C]	Output Voltage [V]		
	Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]
-60	15.006	15.008	15.011
-40	15.028	15.032	15.034
-20	15.046	15.050	15.053
0	15.060	15.063	15.066
25	15.069	15.072	15.075
85	15.066	15.070	15.073
90	15.065	15.069	15.072
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

-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. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]
-60	-15.044	-15.039	-15.031
-40	-15.065	-15.060	-15.052
-20	-15.081	-15.076	-15.069
0	-15.093	-15.088	-15.081
25	-15.101	-15.096	-15.090
85	-15.099	-15.094	-15.089
90	-15.098	-15.093	-15.088
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

+15V: Rated Load Current

BC-10995

COSEL

Model	MGW32415	
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 : 18 - 36V

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	18	0	15.361	±276	±1.8
Minimum Voltage	-40	18	0.1	14.809		

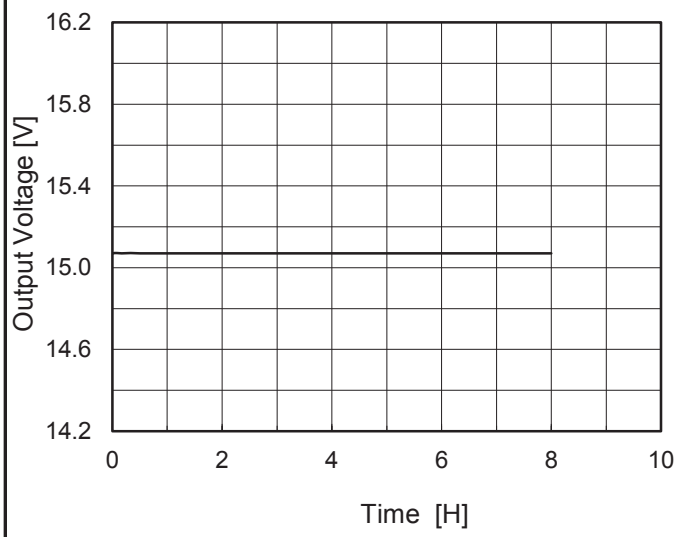
Object	-15V0.1A					
Item	Temperature [°C]	Input Voltage[V]	Output		Output Voltage Accuracy	
			Current[A]	Voltage[V]	Value [mV]	Ratio [%]
Maximum Voltage	85	18	0	-15.375	±275	±1.8
Minimum Voltage	85	18	0.1	-14.825		

COSEL

Model	MGW32415
Item	Time Lapse Drift
Object	+15V0.1A

Temperature 25°C
Testing Circuitry Figure A

1.Graph



Input Volt. 24V
Load 100%

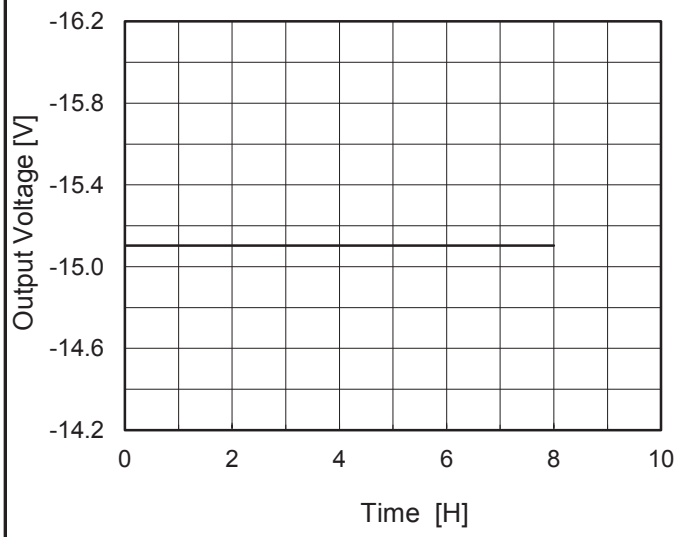
2.Values

Time since start [H]	Output Voltage [V]
0.0	15.070
0.5	15.071
1.0	15.071
2.0	15.070
3.0	15.070
4.0	15.070
5.0	15.070
6.0	15.070
7.0	15.070
8.0	15.070

-15V: Rated Load Current

Object	-15V0.1A

1.Graph



Input Volt. 24V
Load 100%

2.Values

Time since start [H]	Output Voltage [V]
0.0	-15.101
0.5	-15.103
1.0	-15.103
2.0	-15.103
3.0	-15.103
4.0	-15.104
5.0	-15.104
6.0	-15.104
7.0	-15.104
8.0	-15.104

+15V: Rated Load Current

BC-10995

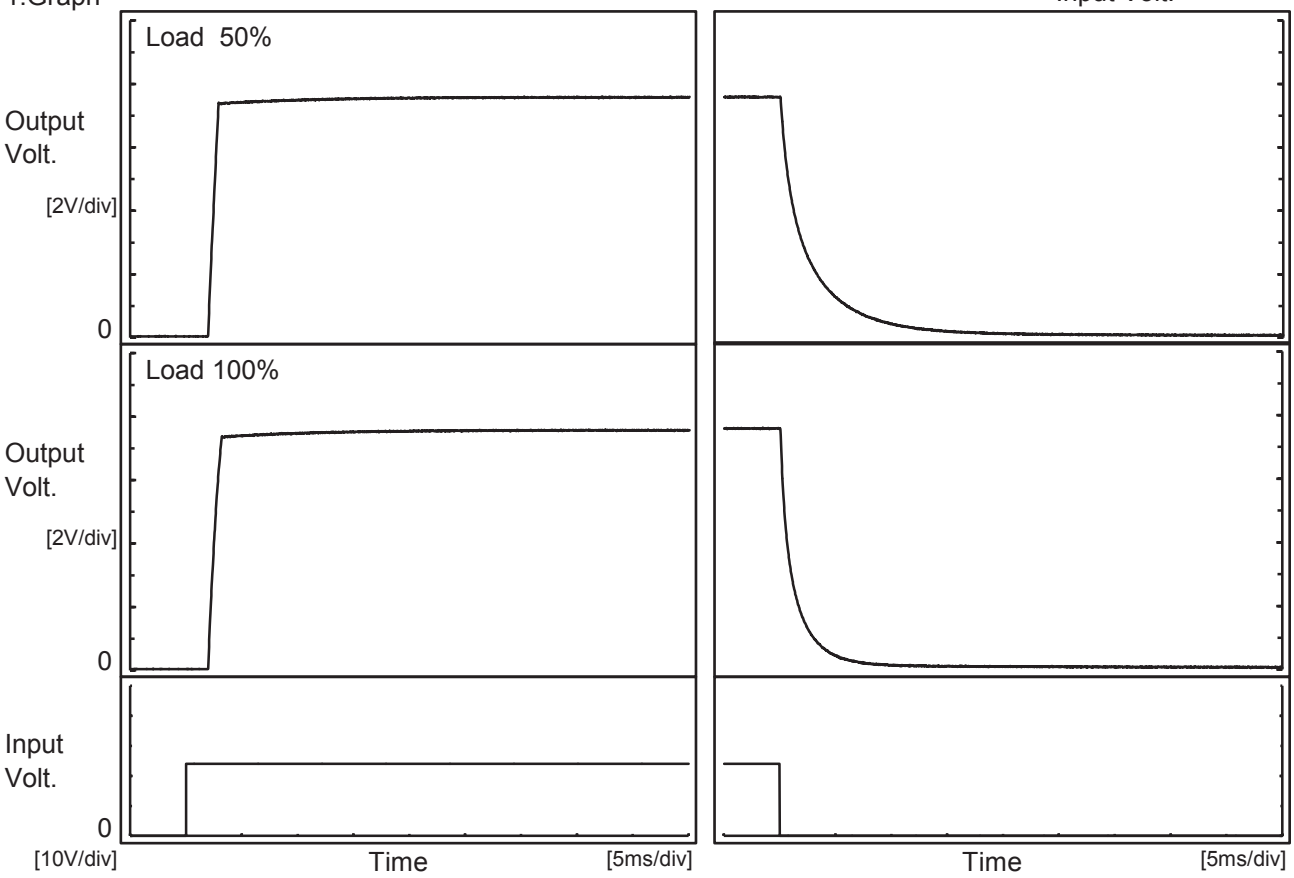
COSEL

Model	MGW32415
Item	Rise and Fall Time
Object	+15V0.1A

Temperature 25°C
Testing Circuitry Figure A

1.Graph

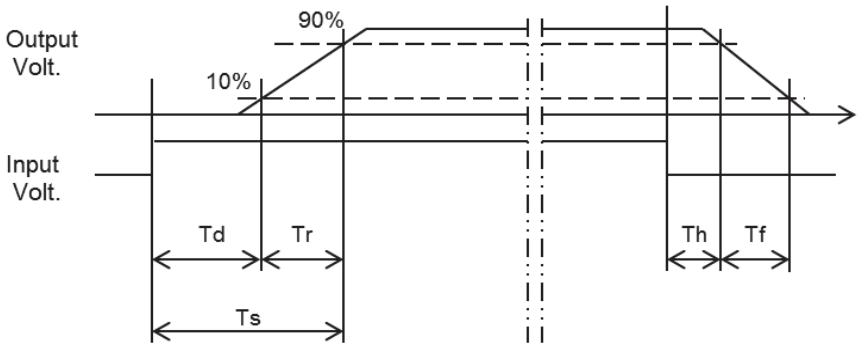
Input Volt. 24 V



2.Values

[ms]

Load \ Time	Td	Tr	Ts	Th	Tf
50 %	2.1	0.8	2.9	0.2	6.9
100 %	2.1	1.0	3.1	0.2	3.4



BC-10995

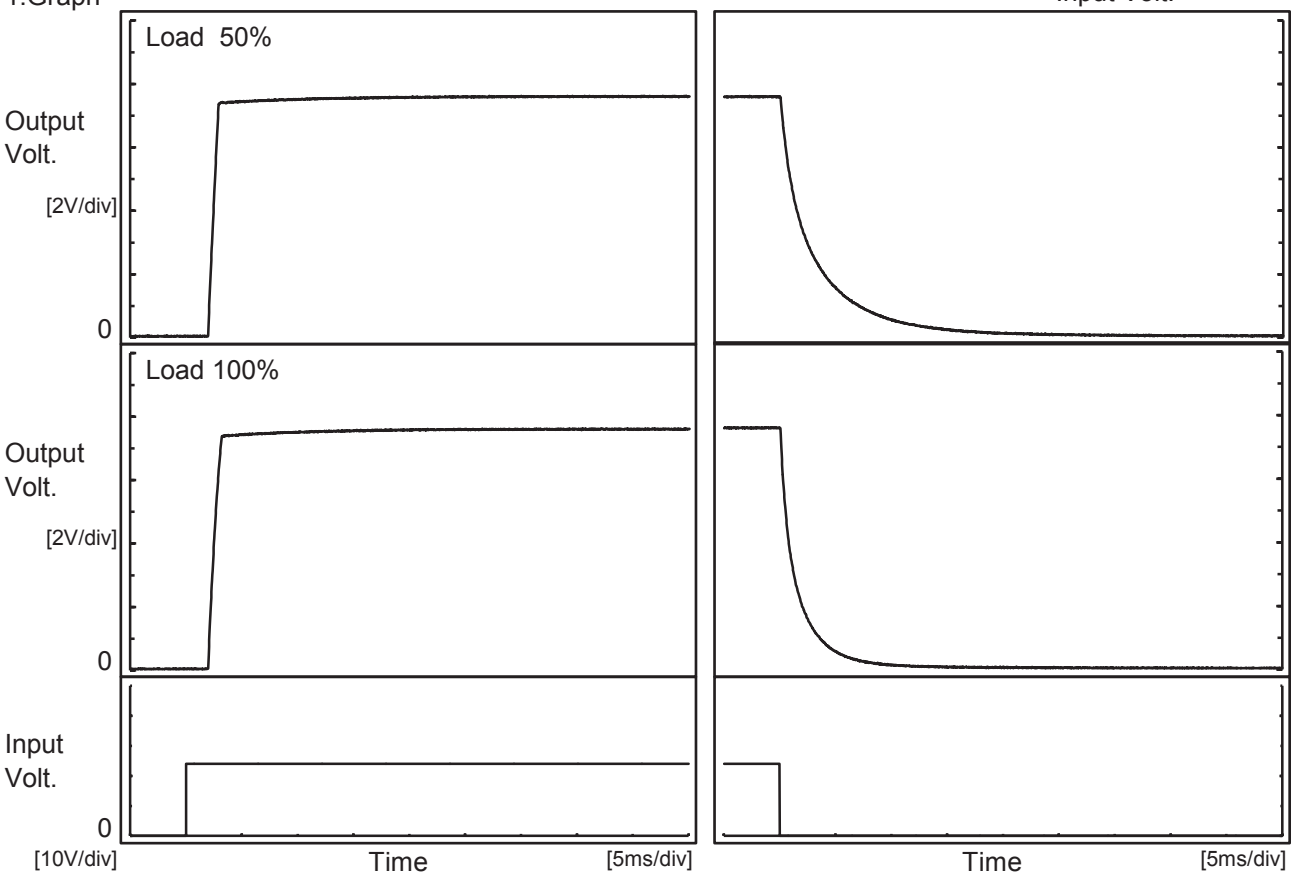
COSEL

Model	MGW32415
Item	Rise and Fall Time
Object	-15V0.1A

Temperature 25°C
Testing Circuitry Figure A

1.Graph

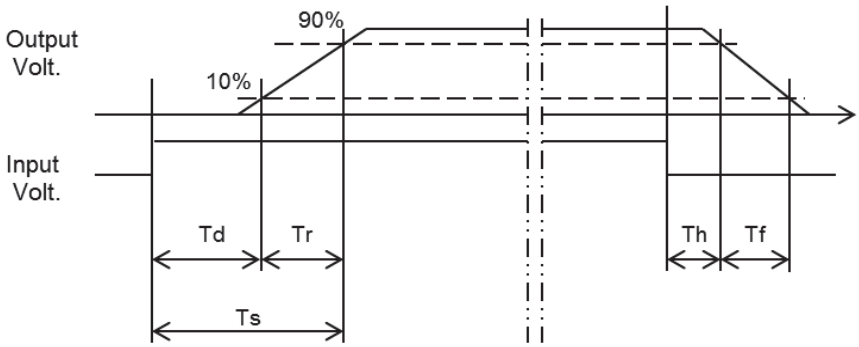
Input Volt. 24 V



2.Values

[ms]

Load \ Time	Td	Tr	Ts	Th	Tf
50 %	2.1	0.8	2.9	0.3	8.1
100 %	2.1	1.0	3.1	0.2	4.0



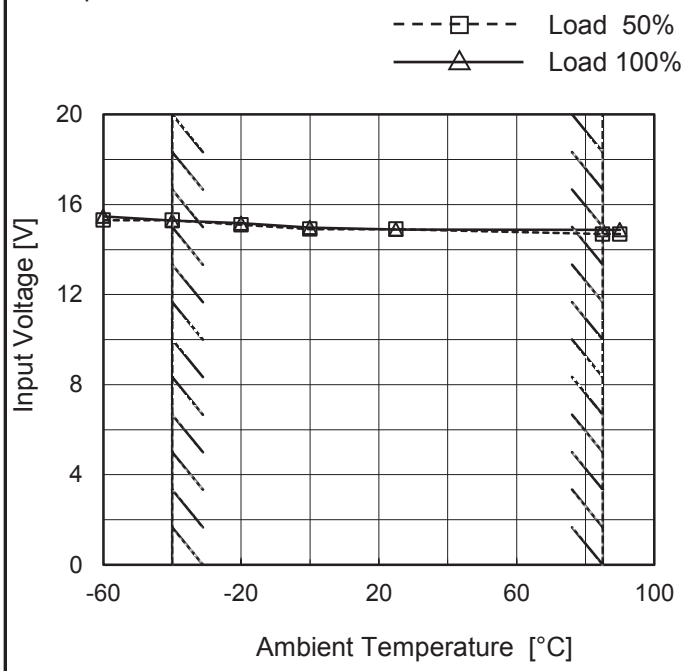
BC-10995

COSEL

Model	MGW32415
Item	Minimum Input Voltage for Regulated Output Voltage
Object	+15V0.1A

Testing Circuitry Figure A

1.Graph

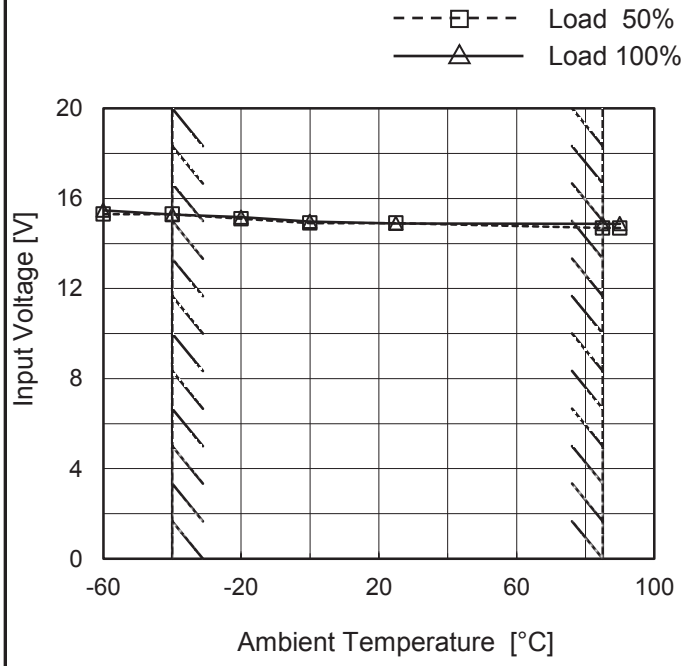


2.Values

Ambient Temperature [°C]	Input Voltage [V]	
	Load 50%	Load 100%
-60	15.3	15.5
-40	15.3	15.3
-20	15.1	15.2
0	14.9	15.0
25	14.9	14.9
85	14.7	14.9
90	14.7	14.9
--	-	-
--	-	-
--	-	-
--	-	-

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	15.3	15.5
-40	15.3	15.3
-20	15.1	15.2
0	14.9	15.0
25	14.9	14.9
85	14.7	14.9
90	14.7	14.9
--	-	-
--	-	-
--	-	-
--	-	-

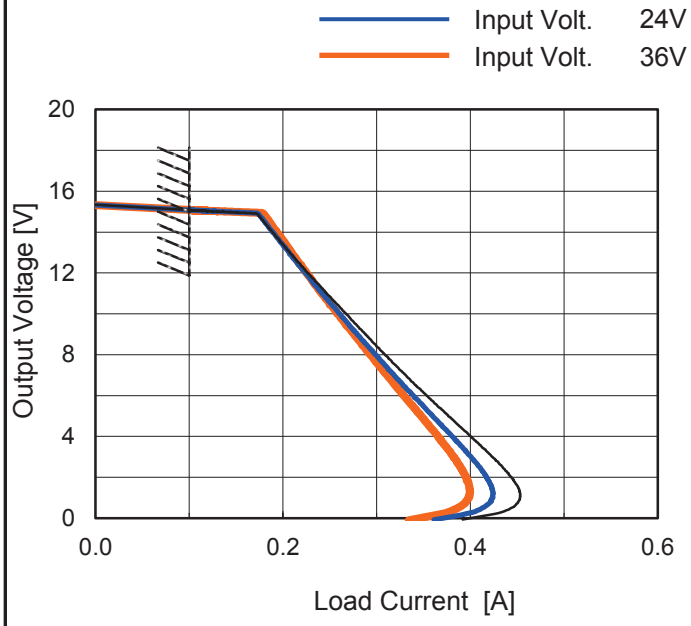
BC-10995

COSEL

Model	MGW32415
Item	Overcurrent Protection
Object	+15V0.1A

Temperature 25°C
Testing Circuitry Figure A

1.Graph



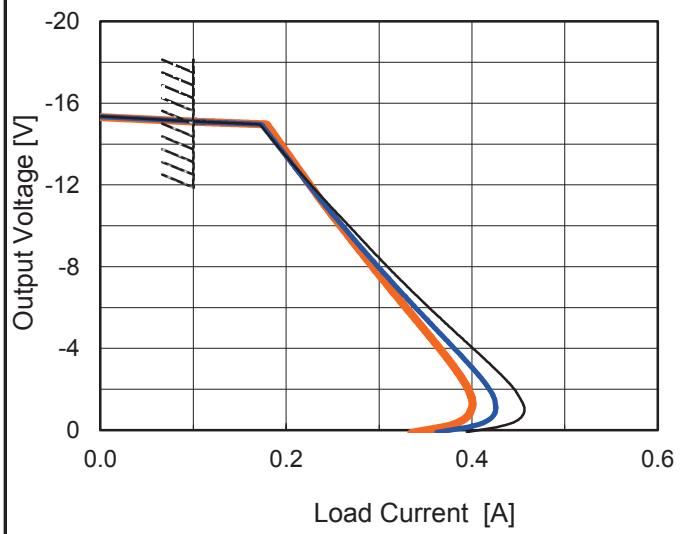
2.Values

Output Voltage [V]	Load Current [A]		
	Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]
14.25	0.18	0.19	0.19
13.50	0.20	0.20	0.20
12.00	0.23	0.22	0.22
10.50	0.26	0.25	0.25
9.00	0.29	0.28	0.28
7.50	0.32	0.31	0.30
6.00	0.35	0.34	0.33
4.50	0.39	0.37	0.36
3.00	0.42	0.40	0.38
1.50	0.45	0.42	0.40
0.00	0.39	0.36	0.33
--	-	-	-

-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. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]
-14.25	0.18	0.19	0.19
-13.50	0.20	0.20	0.20
-12.00	0.23	0.22	0.23
-10.50	0.26	0.25	0.25
-9.00	0.29	0.28	0.28
-7.50	0.32	0.31	0.30
-6.00	0.35	0.34	0.33
-4.50	0.39	0.37	0.36
-3.00	0.42	0.40	0.38
-1.50	0.45	0.42	0.40
0.00	0.39	0.36	0.33
--	-	-	-

+15V: Rated Load Current

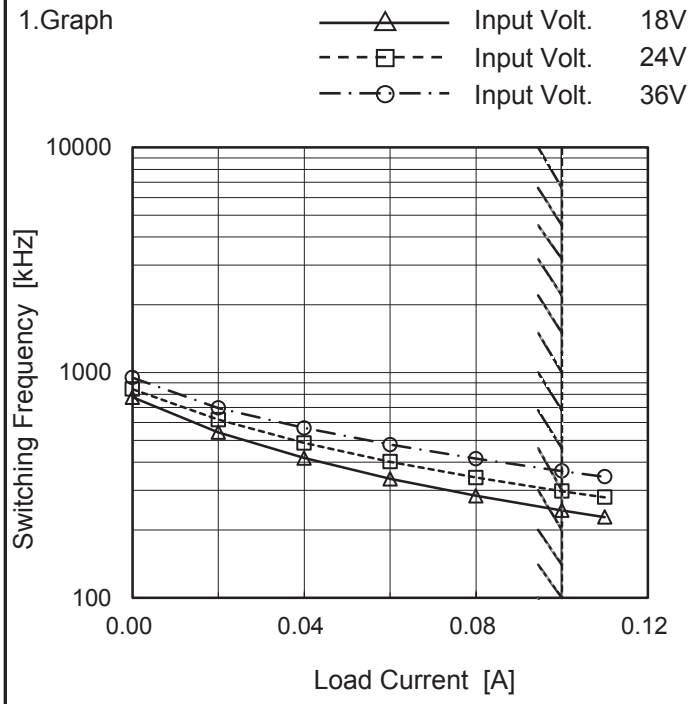
BC-10995

COSEL

Model	MGW32415
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. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]
0.00	777	845	950
0.02	543	618	696
0.04	417	487	568
0.06	337	402	479
0.08	283	342	415
0.10	244	297	365
0.11	228	279	344
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

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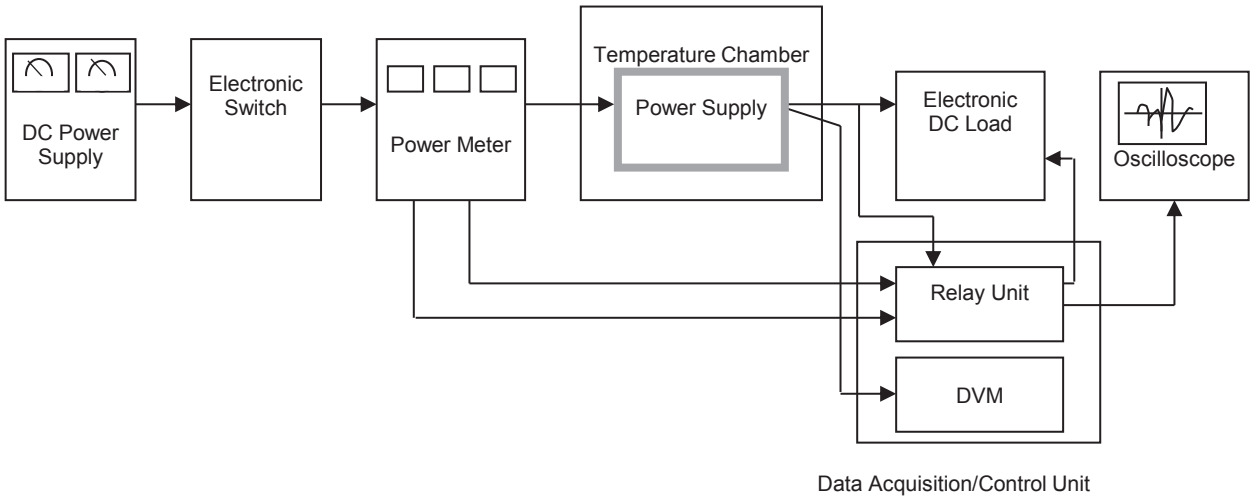

Figure A

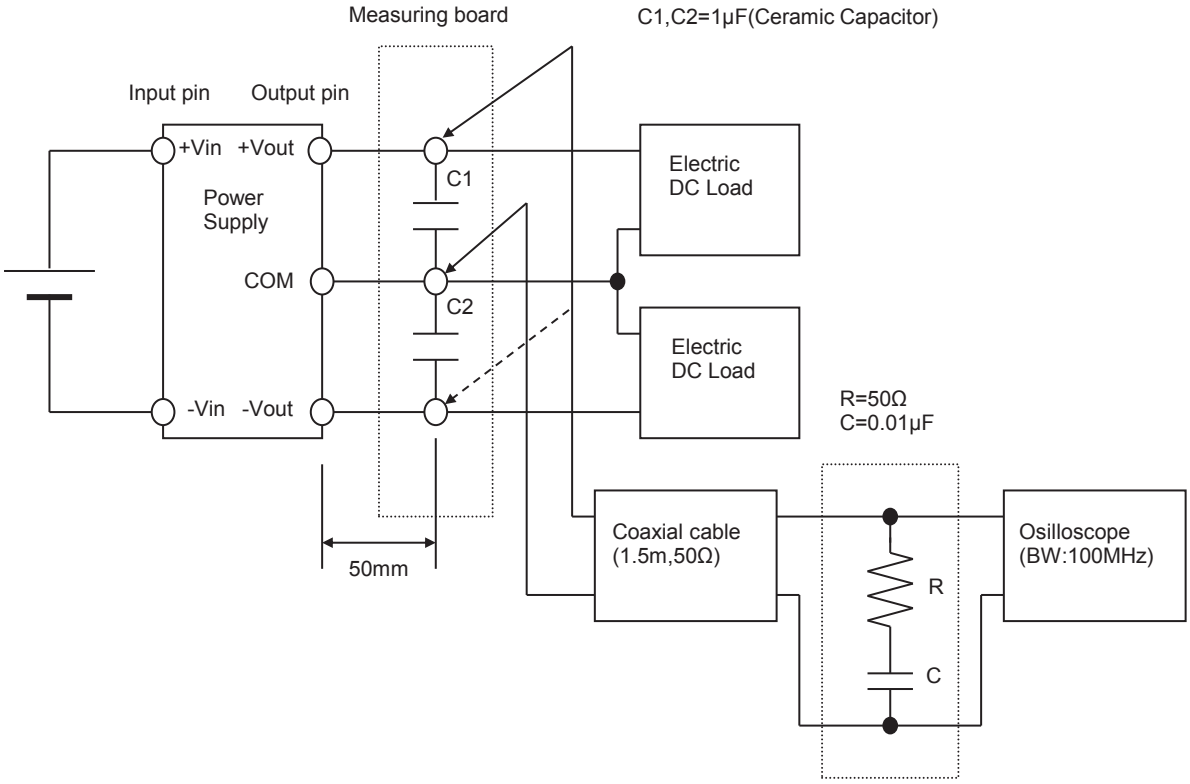

Figure B（Ripple and Ripple noise Characteristic）