参考資料

TEST DATA OF MGFW1R52415

Regulated DC Power Supply
December 28, 2016

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COSEL CO.,LTD.

COSEL

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COSEL

Model	MGFW1R52415
Item	Input Current (by Input Voltage)
Object	————————

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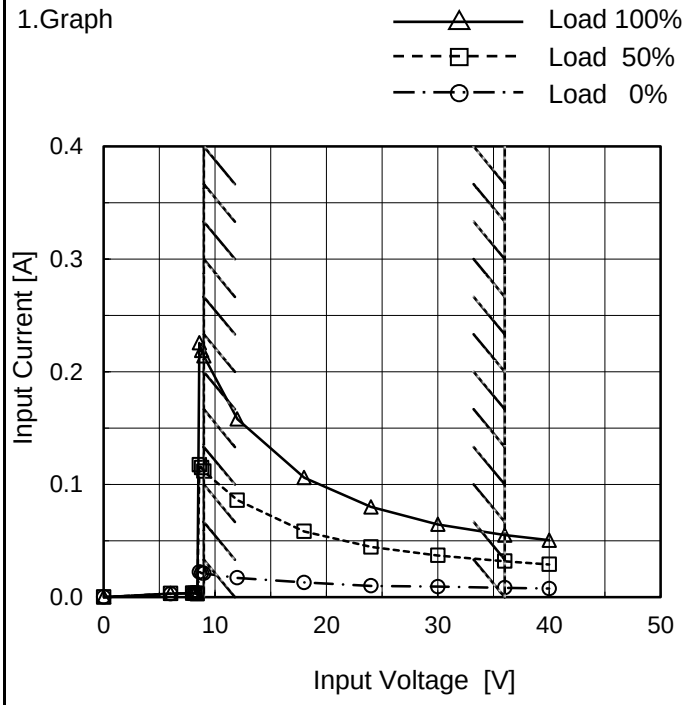
Testing Circuitry Figure A

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
8.0	0.004	0.004	0.003
8.2	0.004	0.003	0.004
8.4	0.003	0.003	0.003
8.6	0.022	0.118	0.226
8.8	0.021	0.115	0.219
9.0	0.021	0.112	0.214
12.0	0.017	0.086	0.158
18.0	0.013	0.058	0.106
24.0	0.010	0.045	0.080
30.0	0.009	0.037	0.065
36.0	0.008	0.032	0.055
40.0	0.008	0.029	0.051
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

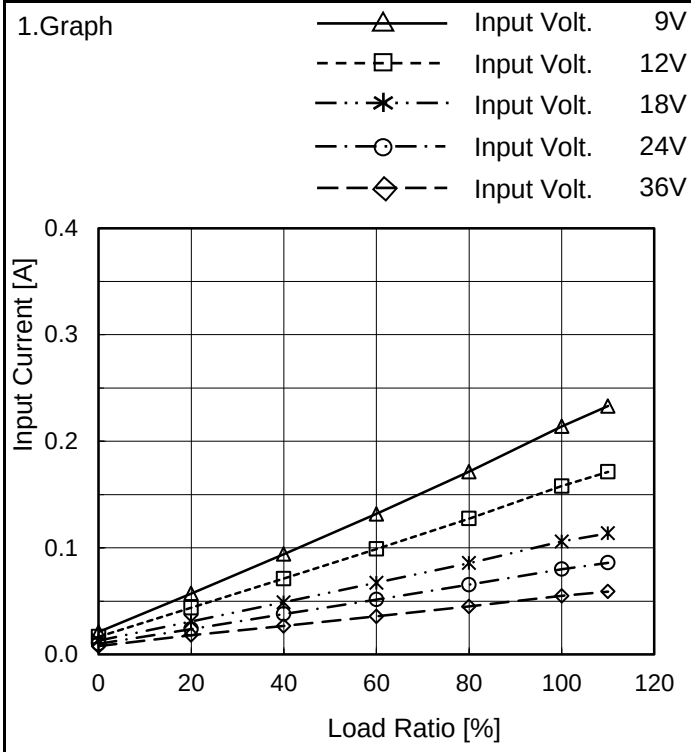
BC-10971

COSEL

Model	MGFW1R52415
Item	Input Current (by Load Ratio)
Object	————————

Temperature 25°C
Testing Circuitry Figure A

1.Graph



2.Values

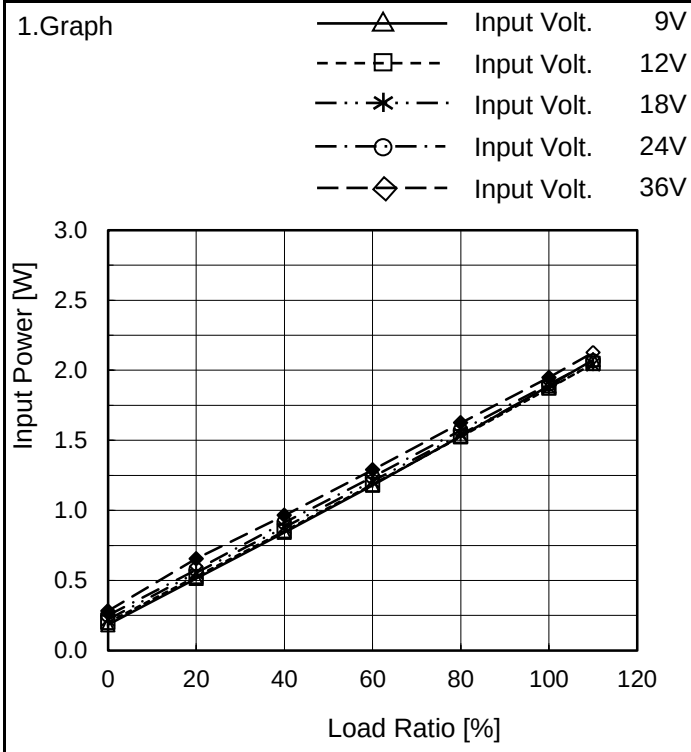
Load Ratio [%]	Input Current [A]				
	Input Volt. 9[V]	Input Volt. 12[V]	Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]
0	0.021	0.017	0.013	0.010	0.008
20	0.057	0.044	0.031	0.024	0.018
40	0.094	0.071	0.049	0.038	0.027
60	0.132	0.099	0.067	0.052	0.036
80	0.172	0.128	0.086	0.066	0.045
100	0.214	0.158	0.106	0.080	0.055
110	0.233	0.171	0.114	0.086	0.059
--	-	-	-	-	-
--	-	-	-	-	-
--	-	-	-	-	-
--	-	-	-	-	-

COSEL

Model	MGFW1R52415
Item	Input Power (by Load Ratio)
Object	————————

Temperature 25°C
Testing Circuitry Figure A

1.Graph



2.Values

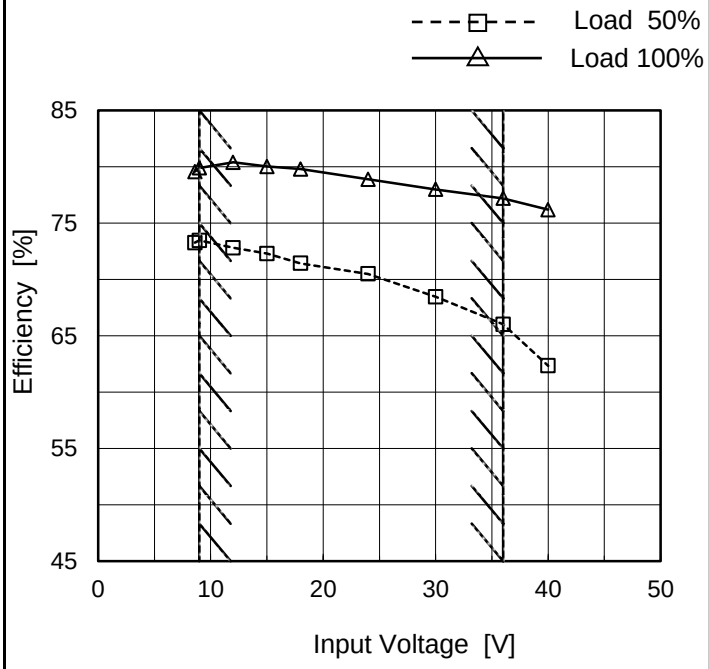
Load Ratio [%]	Input Power [W]				
	Input Volt. 9[V]	Input Volt. 12[V]	Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]
0	0.18	0.20	0.22	0.25	0.28
20	0.51	0.53	0.56	0.58	0.65
40	0.84	0.85	0.88	0.91	0.96
60	1.18	1.18	1.21	1.24	1.29
80	1.53	1.53	1.54	1.57	1.62
100	1.89	1.87	1.88	1.90	1.95
110	2.07	2.05	2.04	2.07	2.13
--	-	-	-	-	-
--	-	-	-	-	-
--	-	-	-	-	-
--	-	-	-	-	-

COSEL

Model	MGFW1R52415
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	73.3	79.6
9.0	73.5	79.9
12.0	72.8	80.4
15.0	72.3	80.0
18.0	71.4	79.8
24.0	70.5	78.9
30.0	68.5	78.0
36.0	66.0	77.2
40.0	62.3	76.2

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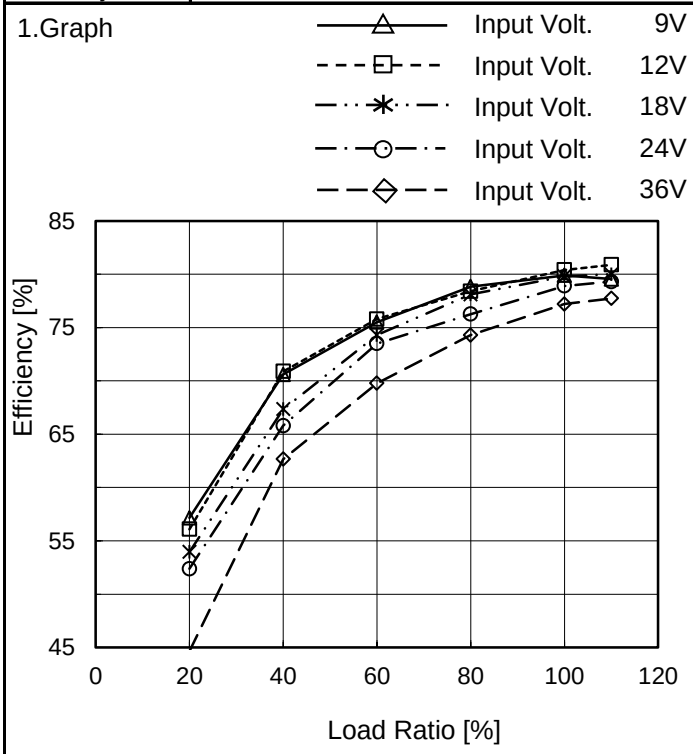
Model	MGFW1R52415
Item	Efficiency (by Load Ratio)
Object	————————

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]	Input Volt. 24[V]	Input Volt. 36[V]
0	-	-	-	-	-
20	57.2	56.1	54.0	52.4	44.7
40	70.6	70.9	67.3	65.8	62.7
60	75.5	75.8	74.3	73.5	69.8
80	78.8	78.4	78.1	76.3	74.3
100	79.9	80.4	79.8	78.9	77.2
110	79.5	80.9	80.0	79.3	77.7
--	-	-	-	-	-
--	-	-	-	-	-
--	-	-	-	-	-
--	-	-	-	-	-

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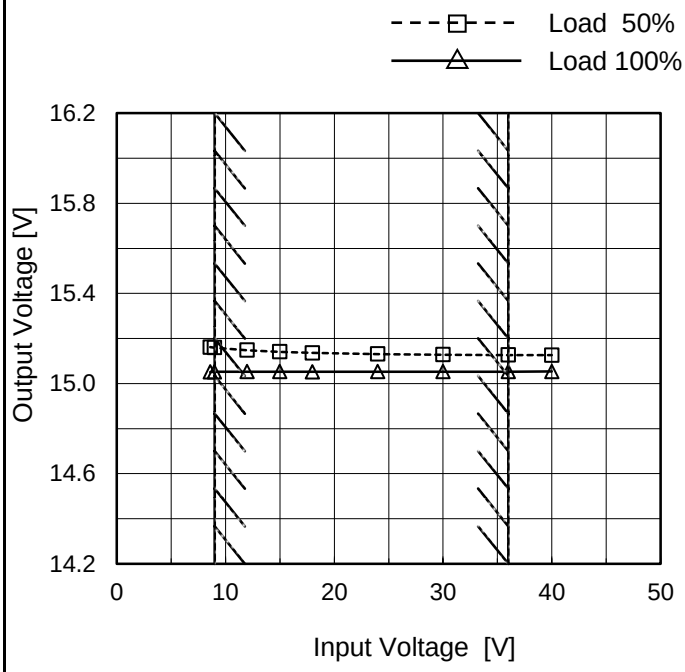
Model	MGFW1R52415
Item	Line Regulation

Temperature 25°C
Testing Circuitry Figure A

Object +15V0.05A

1.Graph



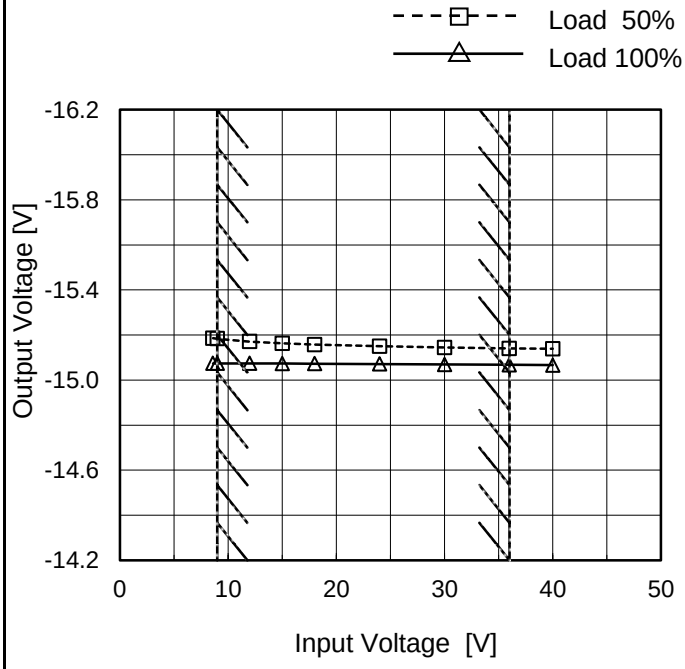
2.Values

Input Voltage [V]	Output Voltage [V]	
	Load 50%	Load 100%
8.6	15.161	15.051
9.0	15.159	15.052
12.0	15.148	15.053
15.0	15.141	15.053
18.0	15.136	15.052
24.0	15.131	15.053
30.0	15.128	15.053
36.0	15.127	15.053
40.0	15.126	15.053

-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%
8.6	-15.186	-15.074
9.0	-15.183	-15.074
12.0	-15.171	-15.074
15.0	-15.163	-15.073
18.0	-15.157	-15.073
24.0	-15.150	-15.071
30.0	-15.145	-15.069
36.0	-15.141	-15.068
40.0	-15.139	-15.066

+15V : Rated Load Current

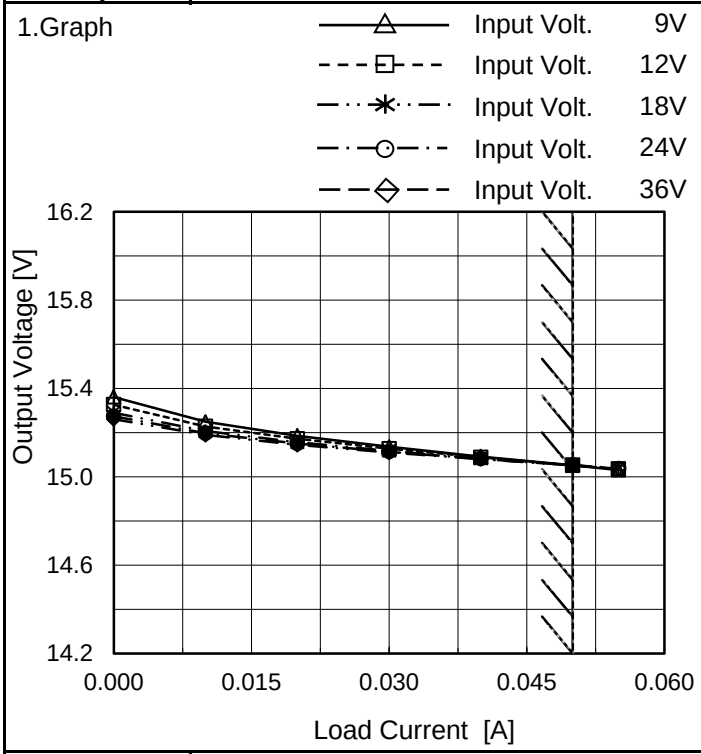
COSEL

Model	MGFW1R52415
Item	Load Regulation

Temperature 25°C
Testing Circuitry Figure A

Object +15V0.05A

1.Graph



2.Values

Load Current [A]	Output Voltage [V]				
	Input Volt. 9[V]	Input Volt. 12[V]	Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]
0.000	15.362	15.327	15.291	15.275	15.262
0.010	15.249	15.228	15.207	15.197	15.190
0.020	15.186	15.172	15.157	15.150	15.145
0.030	15.136	15.127	15.118	15.114	15.110
0.040	15.092	15.088	15.084	15.081	15.080
0.050	15.052	15.053	15.052	15.053	15.053
0.055	15.031	15.035	15.037	15.038	15.040
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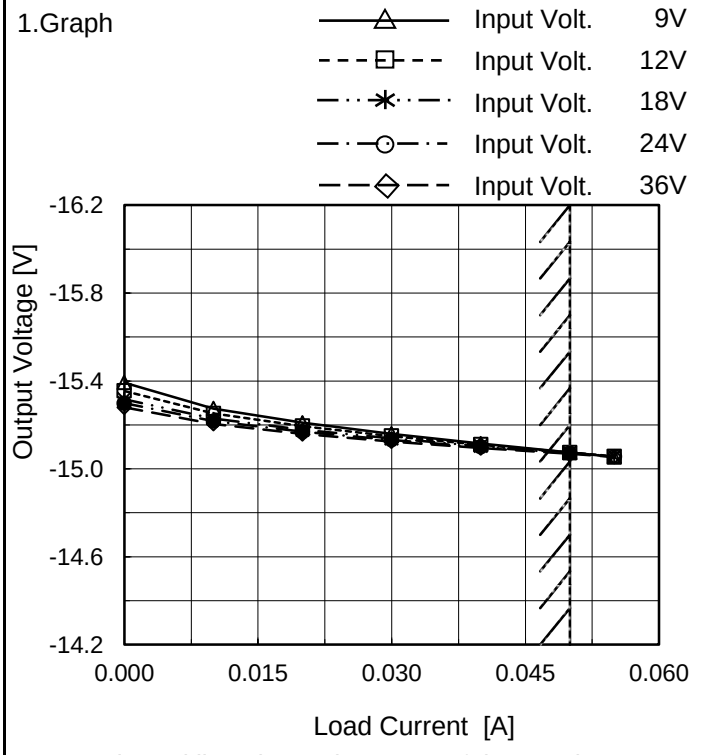
--	-	-	-	-	-
--	-	-	-	-	-
--	-	-	-	-	-

-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. 9[V]	Input Volt. 12[V]	Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]
0.000	-15.392	-15.355	-15.317	-15.299	-15.280
0.010	-15.274	-15.252	-15.229	-15.217	-15.205
0.020	-15.210	-15.194	-15.178	-15.169	-15.159
0.030	-15.159	-15.150	-15.138	-15.132	-15.124
0.040	-15.115	-15.110	-15.104	-15.100	-15.094
0.050	-15.074	-15.074	-15.073	-15.071	-15.068
0.055	-15.054	-15.057	-15.057	-15.057	-15.054
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+15V : Rated Load Current

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Model	MGFW1R52415	
Item	Dynamic Load Response	Temperature 25°C Testing Circuitry Figure A
Object	+15V0.05A	

Input Volt. 24 V

-15V:rated load current.

Cycle 100 ms

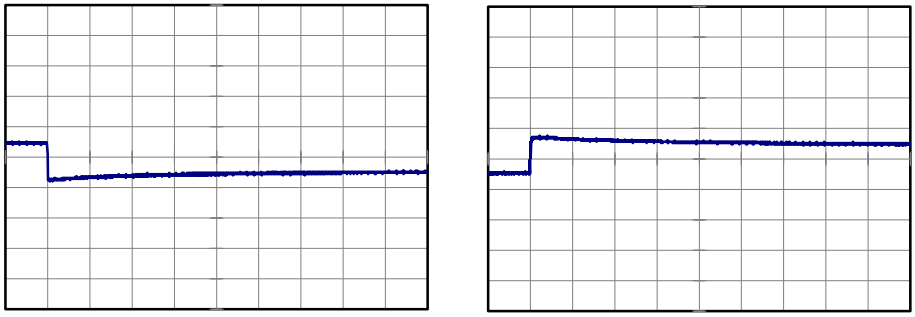
t1,t2 = 100 μs

Load Current

t1

t2

Min.Load (0A)←→
Load 100% (0.05A)

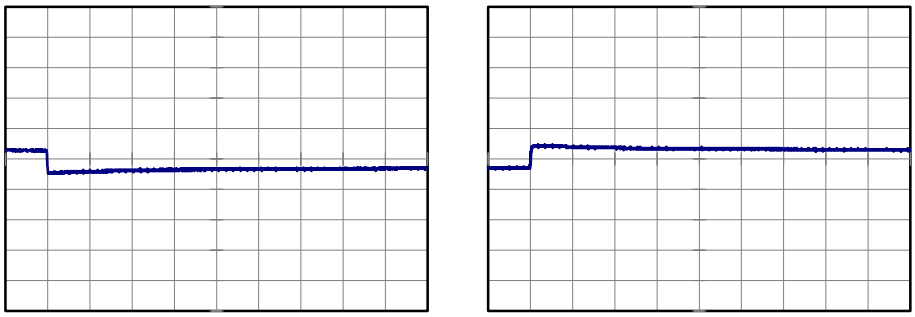


200 mV/div

4 ms/div

4 ms/div

Min.Load (0A)←→
Load 50% (0.025A)

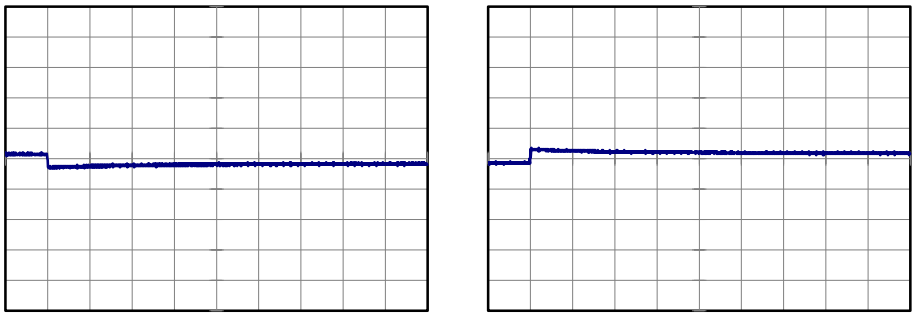


200 mV/div

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	MGFW1R52415
Item	Dynamic Load Response
Object	-15V0.05A

Temperature 25°C
Testing Circuitry Figure A

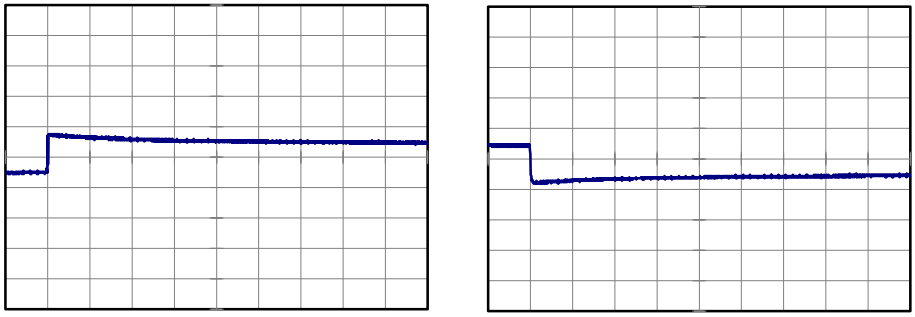
Input Volt. 24 V
+15V:rated load current.
Cycle 100 ms

t1,t2 = 100 μs

Load Current

t1 t2

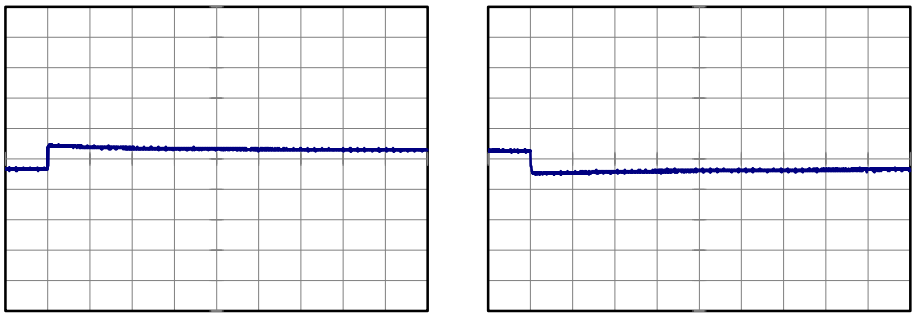
Min.Load (0A)←→
Load 100% (0.05A)



200 mV/div

4 ms/div 4 ms/div

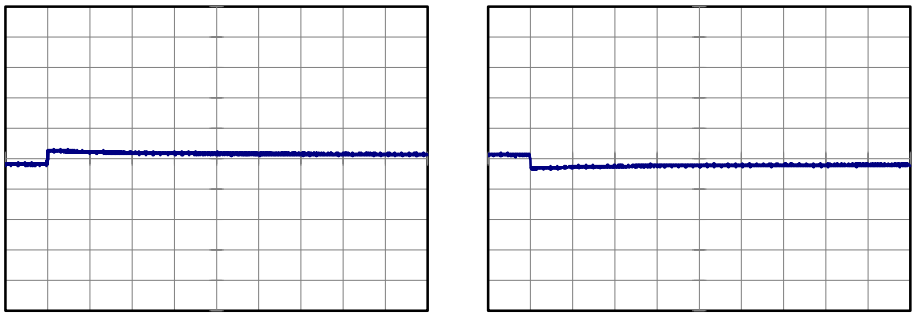
Min.Load (0A)←→
Load 50% (0.025A)



200 mV/div

4 ms/div 4 ms/div

Load 50% (0.025A)←→
Load 100% (0.05A)



200 mV/div

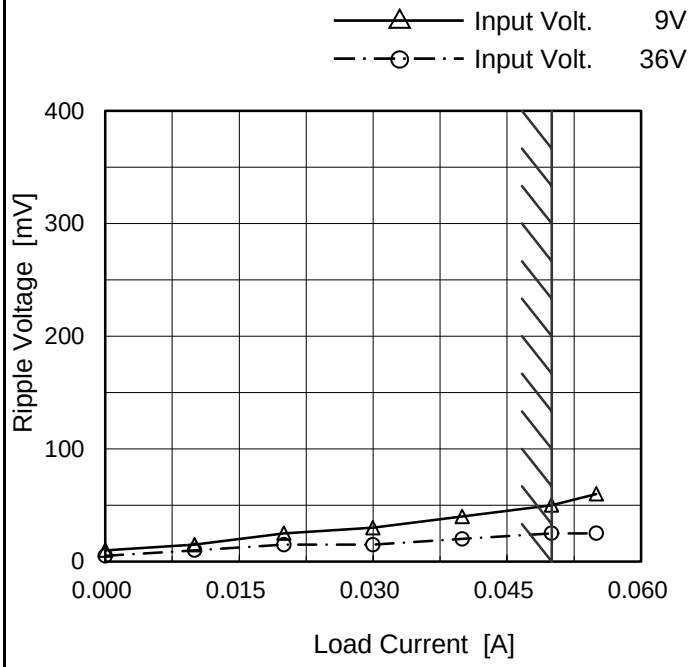
4 ms/div 4 ms/div

COSEL

Model	MGFW1R52415
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]

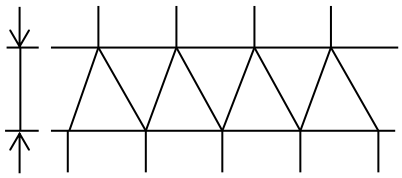


Fig.Complex Ripple Wave Form

2.Values

Load Current [A]	Ripple Voltage [mV]	
	Input Volt. 9 [V]	Input Volt. 36 [V]
0.000	10	5
0.010	15	10
0.020	25	15
0.030	30	15
0.040	40	20
0.050	50	25
0.055	60	25
--	-	-
--	-	-
--	-	-
--	-	-

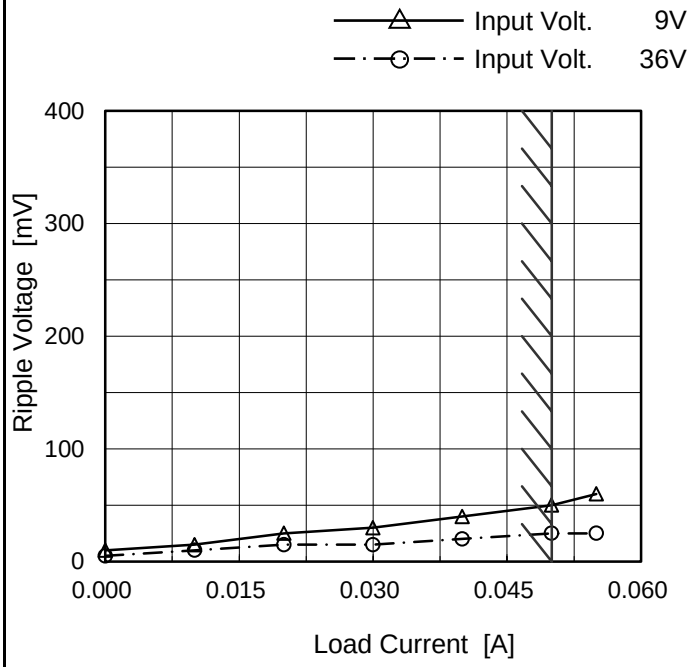
-15V: Rated Load Current

COSEL

Model	MGFW1R52415
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]

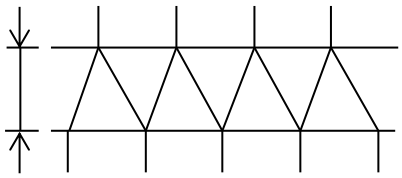


Fig.Complex Ripple Wave Form

2.Values

Load Current [A]	Ripple Voltage [mV]	
	Input Volt. 9 [V]	Input Volt. 36 [V]
0.000	10	5
0.010	15	10
0.020	25	15
0.030	30	15
0.040	40	20
0.050	50	25
0.055	60	25
--	-	-
--	-	-
--	-	-
--	-	-

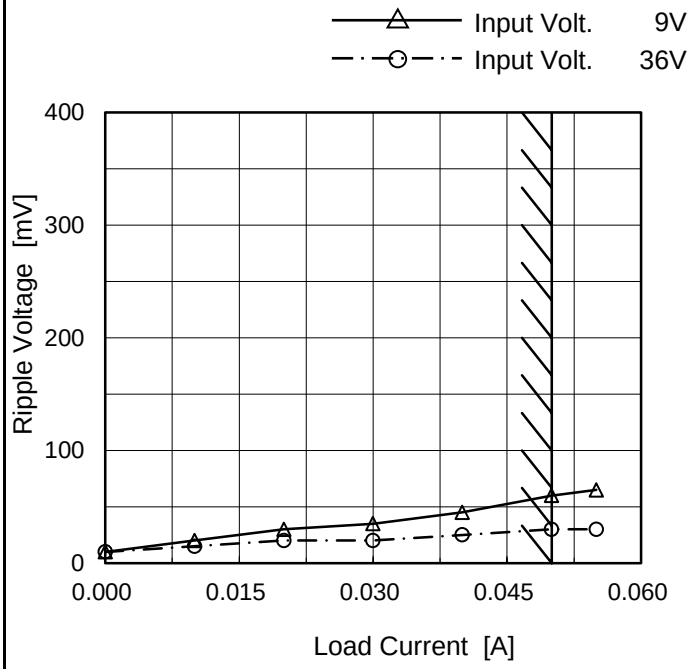
+15V: Rated Load Current

COSEL

Model	MGFW1R52415
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]

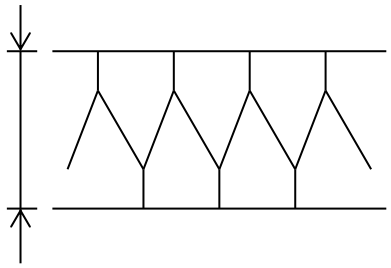


Fig.Complex Ripple Noise Wave Form

2.Values

Load Current [A]	Ripple-Noise [mV]	
	Input Volt. 9 [V]	Input Volt. 36 [V]
0.000	10	10
0.010	20	15
0.020	30	20
0.030	35	20
0.040	45	25
0.050	60	30
0.055	65	30
--	-	-
--	-	-
--	-	-
--	-	-

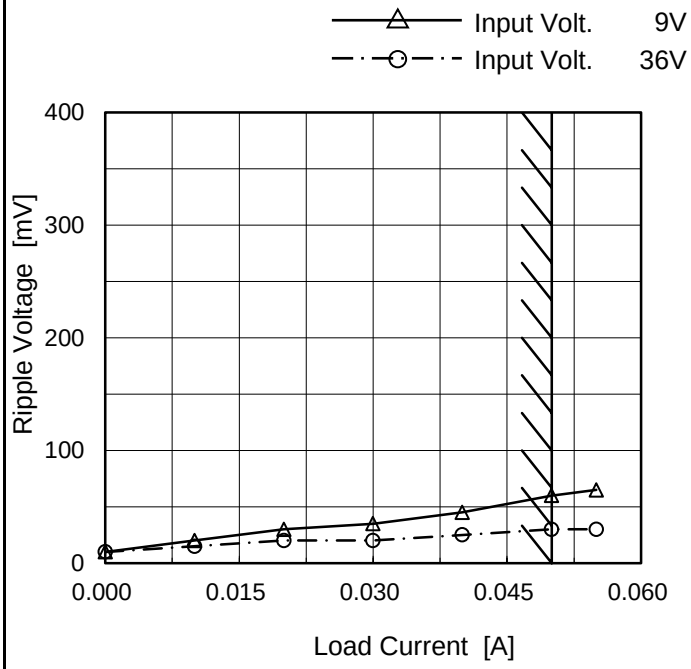
-15V: Rated Load Current

COSEL

Model	MGFW1R52415
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]

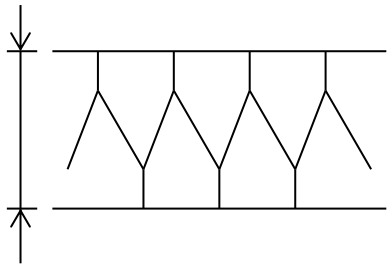


Fig.Complex Ripple Noise Wave Form

2.Values

Load Current [A]	Ripple-Noise [mV]	
	Input Volt. 9 [V]	Input Volt. 36 [V]
0.000	10	10
0.010	20	15
0.020	30	20
0.030	35	20
0.040	45	25
0.050	60	30
0.055	65	30
--	-	-
--	-	-
--	-	-
--	-	-

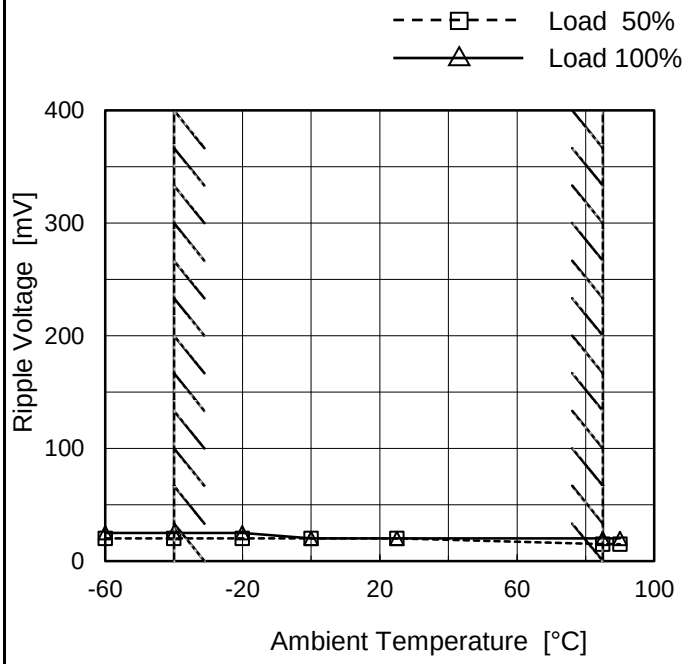
+15V: Rated Load Current

COSEL

Model	MGFW1R52415
Item	Ripple Voltage (by Ambient Temp.)
Object	+15V0.05A

Testing Circuitry Figure B

1.Graph



Input Volt. 24V

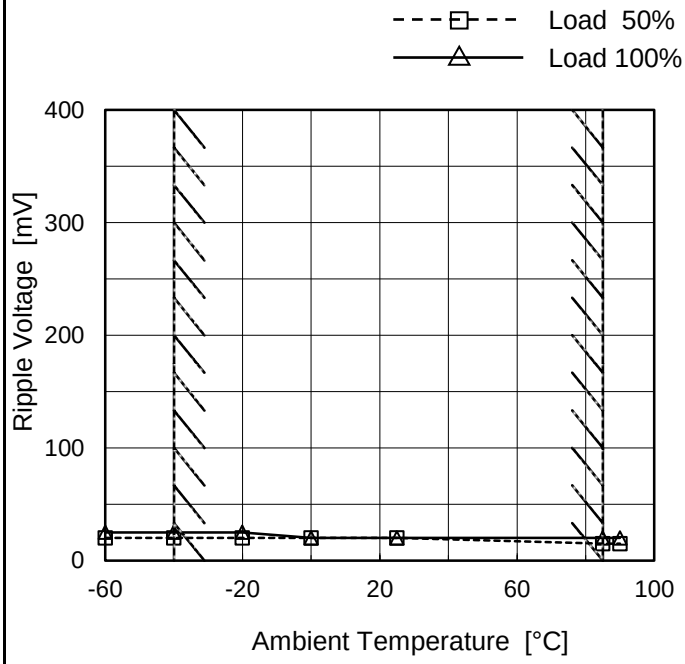
2.Values

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

-15V: Rated Load Current

Object	-15V0.05A

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

+15V: Rated Load Current

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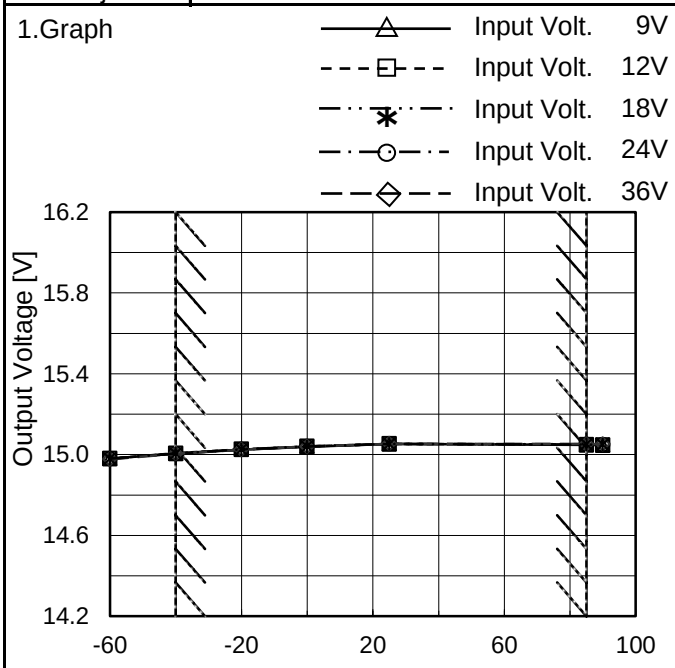
Model	MGFW1R52415	
Item	Ambient Temperature Drift	Testing Circuitry Figure A
Object	+15V0.05A	

1.Graph



Load 100%

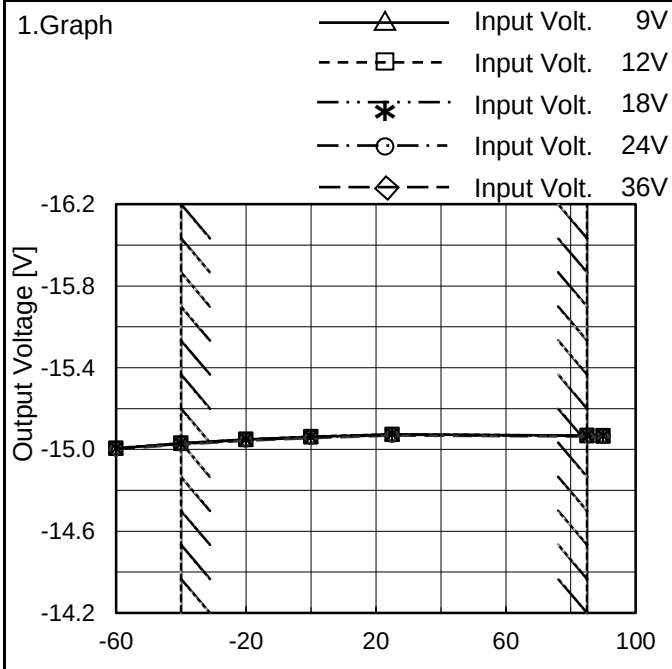
2.Values

Ambient Temperature [°C]	Output Voltage [V]				
	Input Volt. 9[V]	Input Volt. 12[V]	Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]
-60	14.979	14.980	14.979	14.979	14.977
-40	15.005	15.006	15.005	15.005	15.004
-20	15.025	15.026	15.026	15.025	15.025
0	15.039	15.040	15.040	15.040	15.040
25	15.052	15.053	15.052	15.053	15.053
85	15.047	15.049	15.050	15.051	15.053
90	15.046	15.048	15.049	15.049	15.051
--	-	-	-	-	-
--	-	-	-	-	-
--	-	-	-	-	-
--	-	-	-	-	-

-15V:Rated Load Current

Object	-15V0.05A

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. 9[V]	Input Volt. 12[V]	Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]
-60	-15.006	-15.006	-15.004	-15.003	-15.000
-40	-15.030	-15.031	-15.029	-15.028	-15.024
-20	-15.049	-15.050	-15.048	-15.046	-15.043
0	-15.062	-15.063	-15.061	-15.059	-15.056
25	-15.074	-15.074	-15.073	-15.071	-15.068
85	-15.067	-15.068	-15.067	-15.066	-15.064
90	-15.066	-15.067	-15.066	-15.064	-15.062
--	-	-	-	-	-
--	-	-	-	-	-
--	-	-	-	-	-
--	-	-	-	-	-

+15V:Rated Load Current

COSEL

Model	MGFW1R52415	
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 - 36V
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	9	0	15.398	±343	±2.3
Minimum Voltage	85	9	0.05	14.712		

Object	-15V0.05A					
Item	Temperature [°C]	Input Voltage[V]	Output		Output Voltage Accuracy	
			Current[A]	Voltage[V]	Value [mV]	Ratio [%]
Maximum Voltage	85	9	0	-15.426	±344	±2.3
Minimum Voltage	85	9	0.05	-14.739		

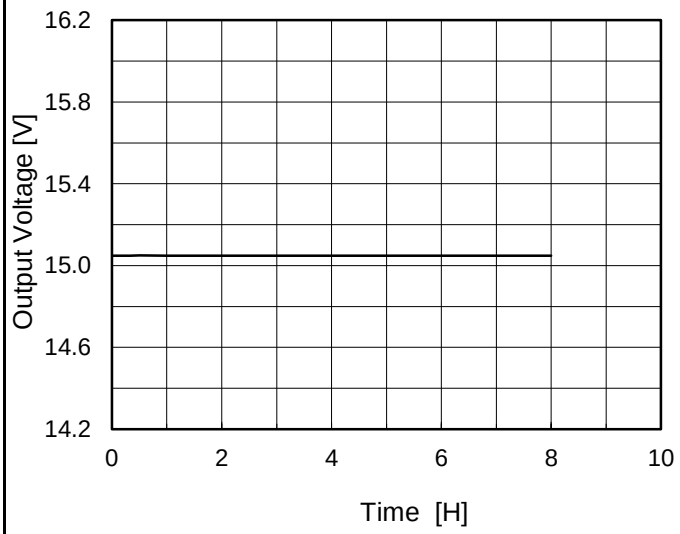
COSEL

Model	MGFW1R52415
Item	Time Lapse Drift

Temperature 25°C
Testing Circuitry Figure A

Object +15V0.05A

1.Graph



Input Volt. 24V
Load 100%

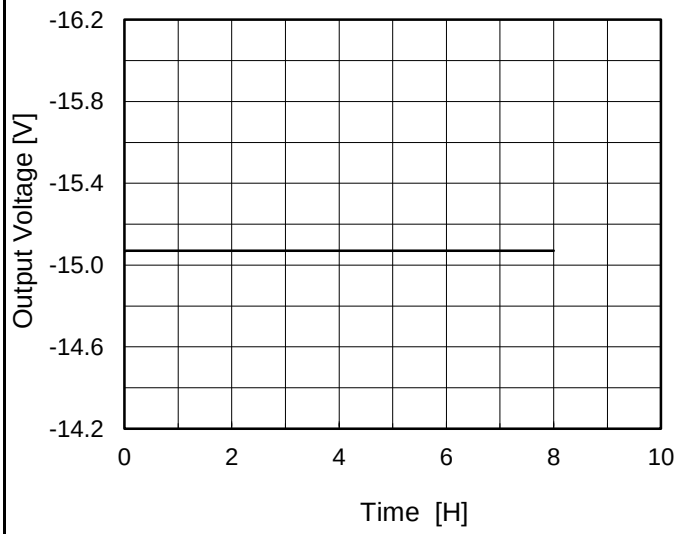
2.Values

Time since start [H]	Output Voltage [V]
0.0	15.048
0.5	15.049
1.0	15.049
2.0	15.049
3.0	15.049
4.0	15.049
5.0	15.049
6.0	15.049
7.0	15.049
8.0	15.049

-15V:Rated Load Current

Object -15V0.05A

1.Graph



Input Volt. 24V
Load 100%

2.Values

Time since start [H]	Output Voltage [V]
0.0	-15.069
0.5	-15.070
1.0	-15.070
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

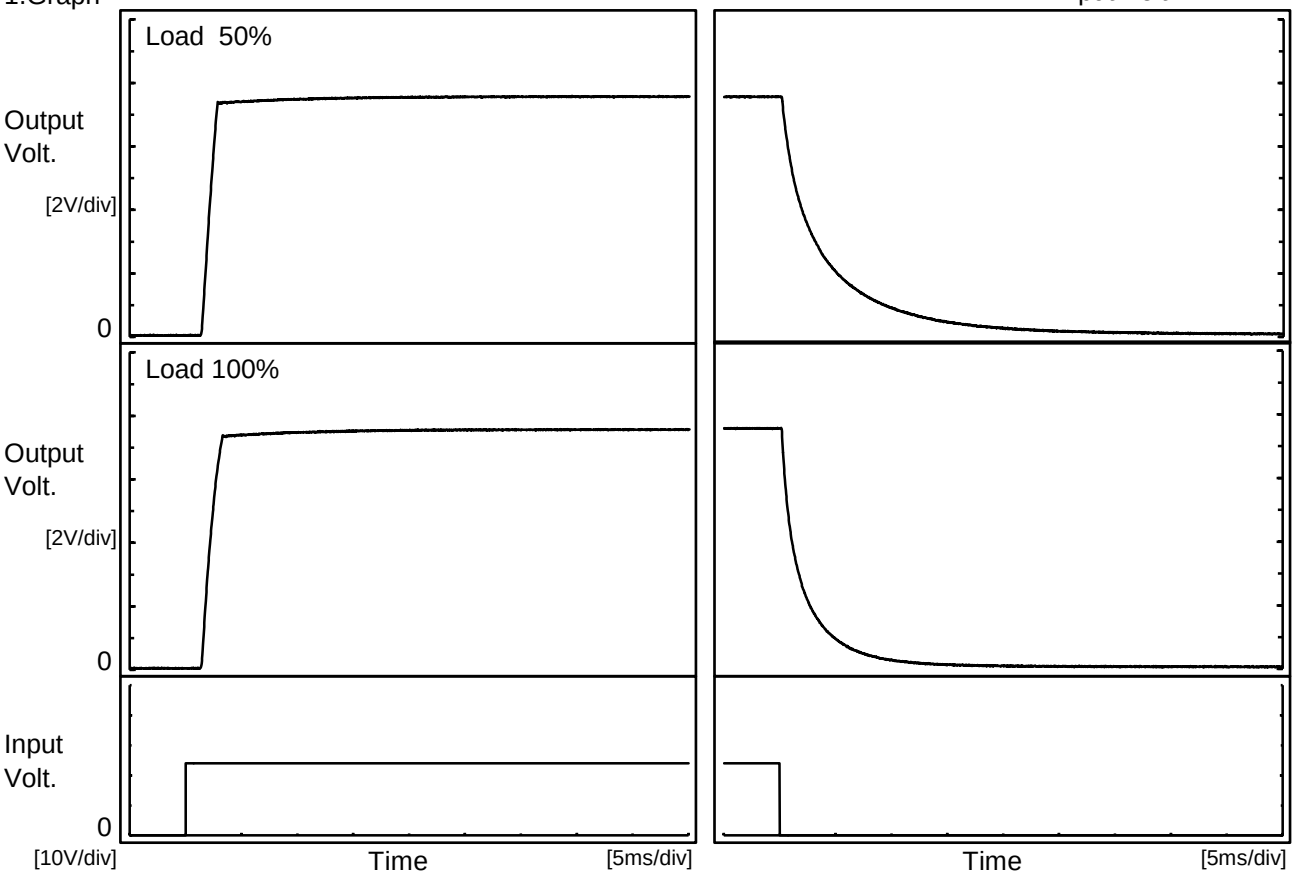
COSEL

Model	MGFW1R52415
Item	Rise and Fall Time
Object	+15V0.05A

Temperature 25°C
Testing Circuitry Figure A

1.Graph

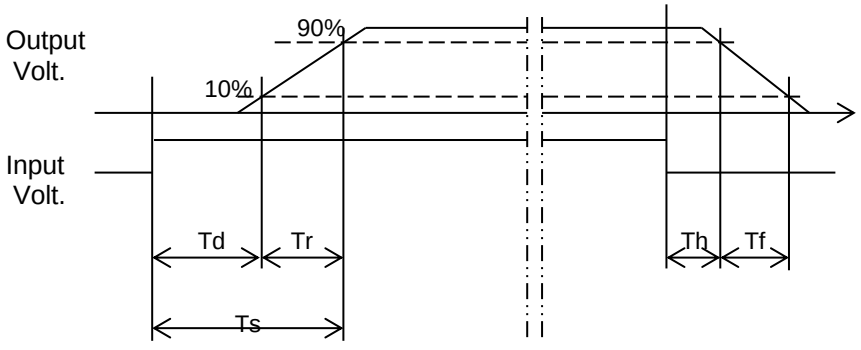
Input Volt. 24 V



2.Values

[ms]

Load \ Time	Td	Tr	Ts	Th	Tf
50 %	1.6	1.2	2.8	0.4	10.7
100 %	1.6	1.5	3.1	0.3	5.4

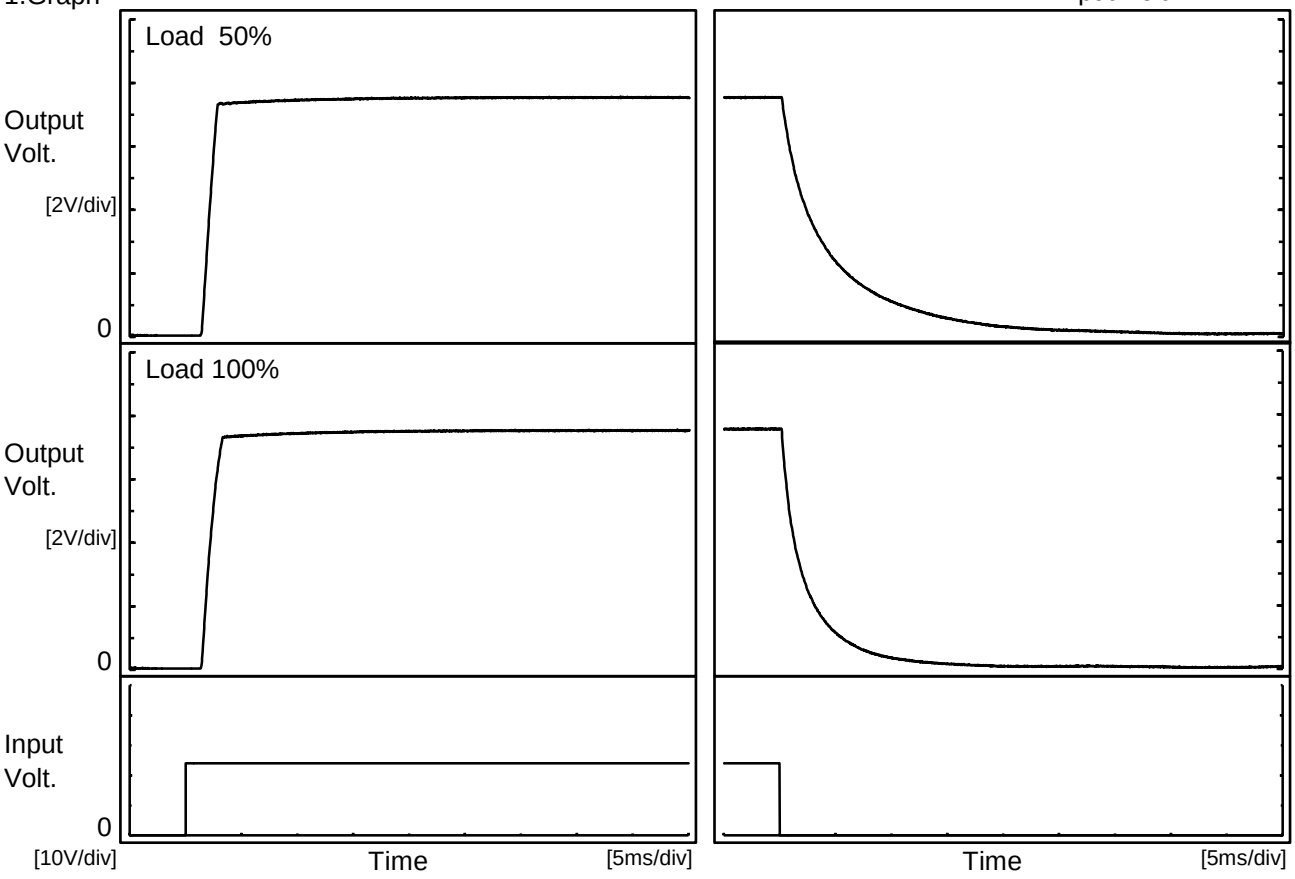


COSEL

Model	MGFW1R52415	
Item	Rise and Fall Time	Temperature 25°C Testing Circuitry Figure A
Object	-15V0.05A	

1.Graph

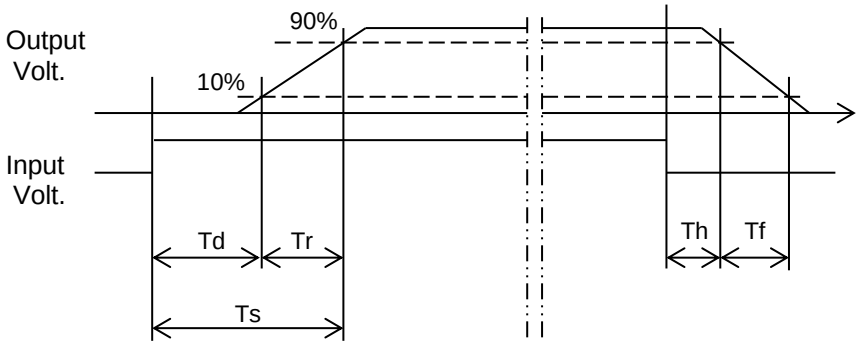
Input Volt. 24 V



2.Values

[ms]

Load \ Time	Td	Tr	Ts	Th	Tf
50 %	1.6	1.2	2.8	0.5	12.3
100 %	1.6	1.5	3.1	0.3	6.0

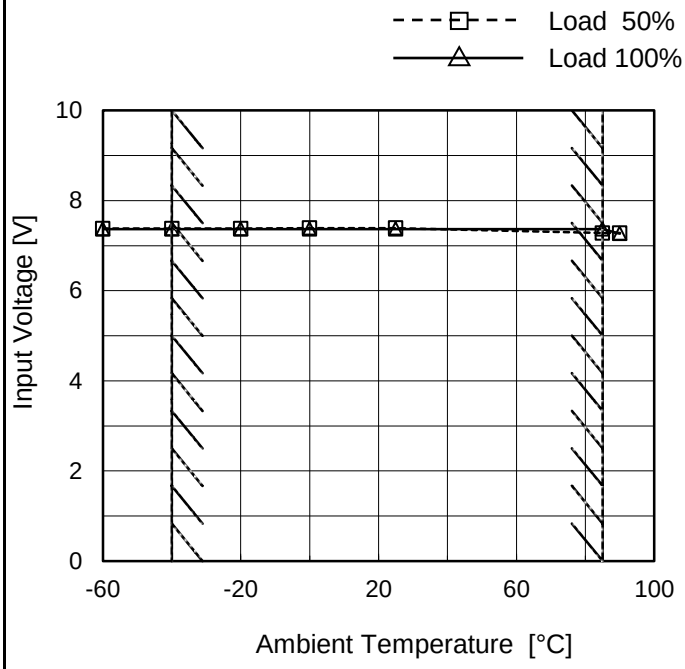


COSEL

Model	MGFW1R52415
Item	Minimum Input Voltage for Regulated Output Voltage
Object	+15V0.05A

Testing Circuitry Figure A

1.Graph

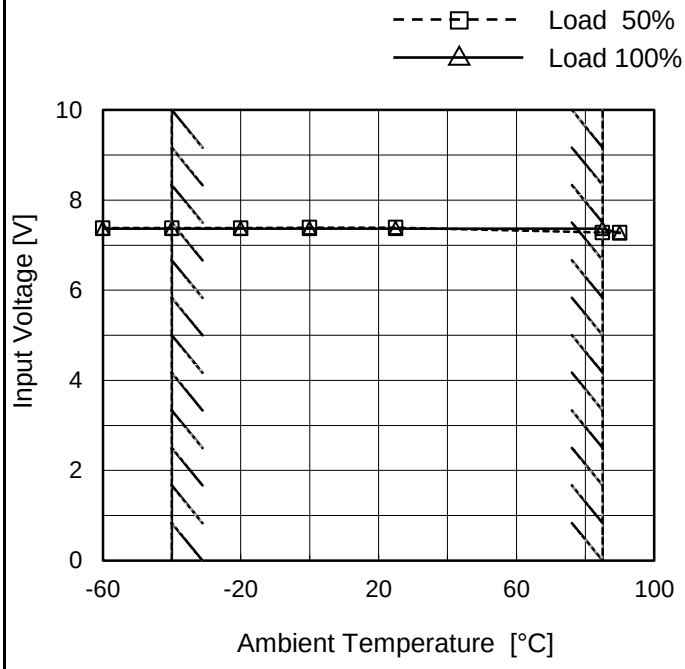


2.Values

Ambient Temperature [°C]	Input Voltage [V]	
	Load 50%	Load 100%
-60	7.4	7.4
-40	7.4	7.4
-20	7.4	7.4
0	7.4	7.4
25	7.4	7.4
85	7.3	7.4
90	7.3	7.3
--	-	-
--	-	-
--	-	-
--	-	-

Object	-15V0.05A

1.Graph



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

2.Values

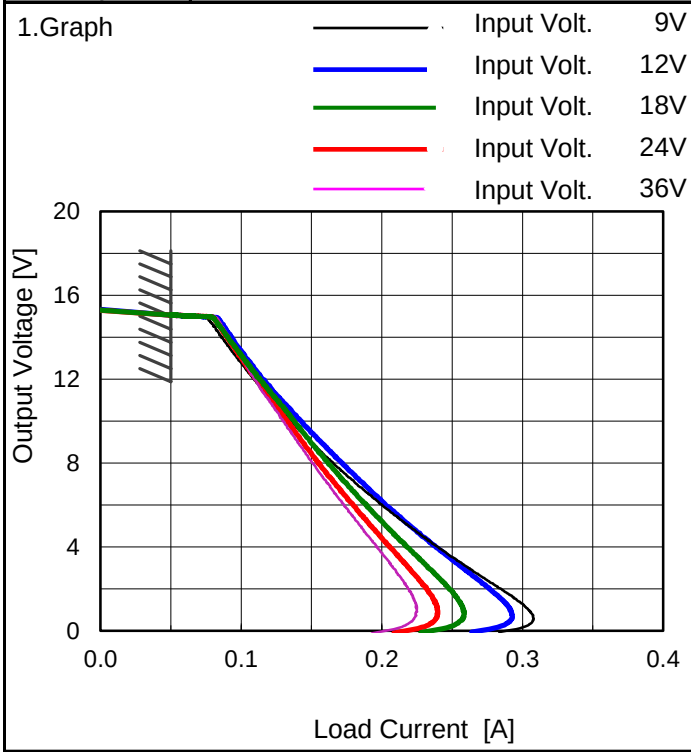
Ambient Temperature [°C]	Input Voltage [V]	
	Load 50%	Load 100%
-60	7.4	7.4
-40	7.4	7.4
-20	7.4	7.4
0	7.4	7.4
25	7.4	7.4
85	7.3	7.4
90	7.3	7.3
--	-	-
--	-	-
--	-	-
--	-	-

COSEL

Model	MGFW1R52415
Item	Overcurrent Protection
Object	+15V0.05A

Temperature 25°C
Testing Circuitry Figure A

1.Graph



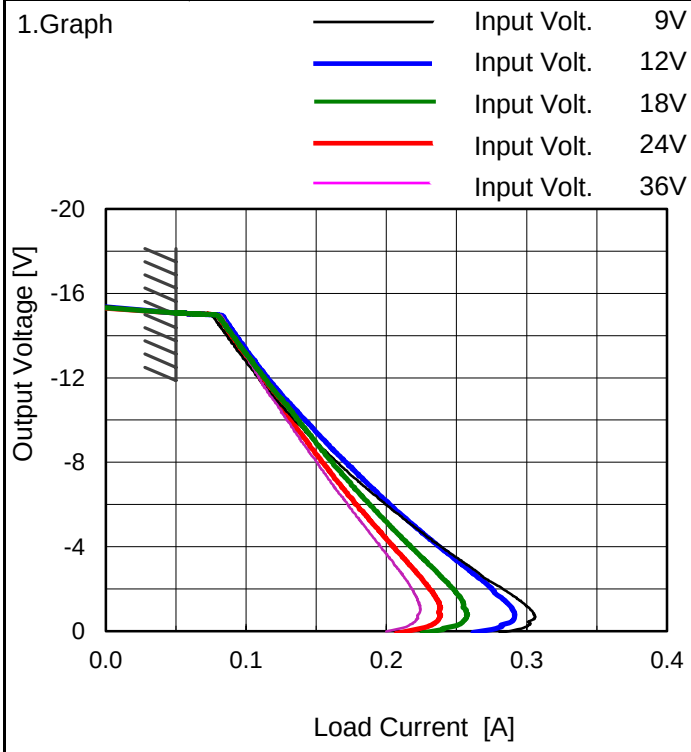
2.Values

Output Voltage [V]	Load Current [A]				
	Input Volt. 9[V]	Input Volt. 12[V]	Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]
14.3	0.084	0.090	0.088	0.087	0.089
13.5	0.092	0.098	0.096	0.095	0.096
12.0	0.109	0.115	0.113	0.111	0.109
10.5	0.128	0.136	0.132	0.127	0.125
9.0	0.149	0.157	0.149	0.143	0.140
7.5	0.173	0.179	0.168	0.161	0.156
6.0	0.200	0.202	0.188	0.179	0.173
4.5	0.229	0.229	0.210	0.199	0.190
3.0	0.261	0.258	0.233	0.219	0.208
1.5	0.296	0.285	0.254	0.236	0.223
0.0	0.283	0.264	0.228	0.209	0.193
--	-	-	-	-	-

-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. 9[V]	Input Volt. 12[V]	Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]
-14.3	0.084	0.090	0.088	0.087	0.089
-13.5	0.092	0.098	0.096	0.095	0.096
-12.0	0.109	0.115	0.113	0.110	0.109
-10.5	0.128	0.135	0.131	0.126	0.124
-9.0	0.149	0.156	0.149	0.143	0.139
-7.5	0.173	0.179	0.168	0.160	0.155
-6.0	0.199	0.202	0.188	0.178	0.173
-4.5	0.228	0.228	0.210	0.198	0.190
-3.0	0.261	0.257	0.233	0.218	0.208
-1.5	0.294	0.283	0.253	0.236	0.222
0.0	0.281	0.262	0.226	0.207	0.200
--	-	-	-	-	-

+15V : Rated Load Current

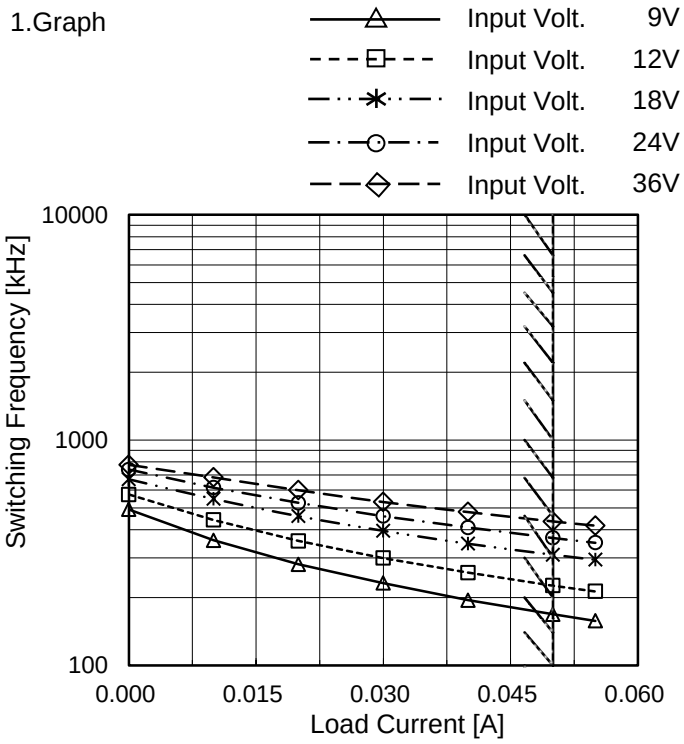
BC-10971

COSEL

Model	MGFW1R52415
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]	Input Current [A]				
	Input Volt. 9[V]	Input Volt. 12[V]	Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]
0.000	492	573	670	740	777
0.010	359	442	548	615	683
0.020	281	357	460	527	599
0.030	232	300	396	460	531
0.040	195	258	347	409	479
0.050	168	226	310	368	436
0.055	158	213	294	350	417
--	-	-	-	-	-
--	-	-	-	-	-
--	-	-	-	-	-
--	-	-	-	-	-

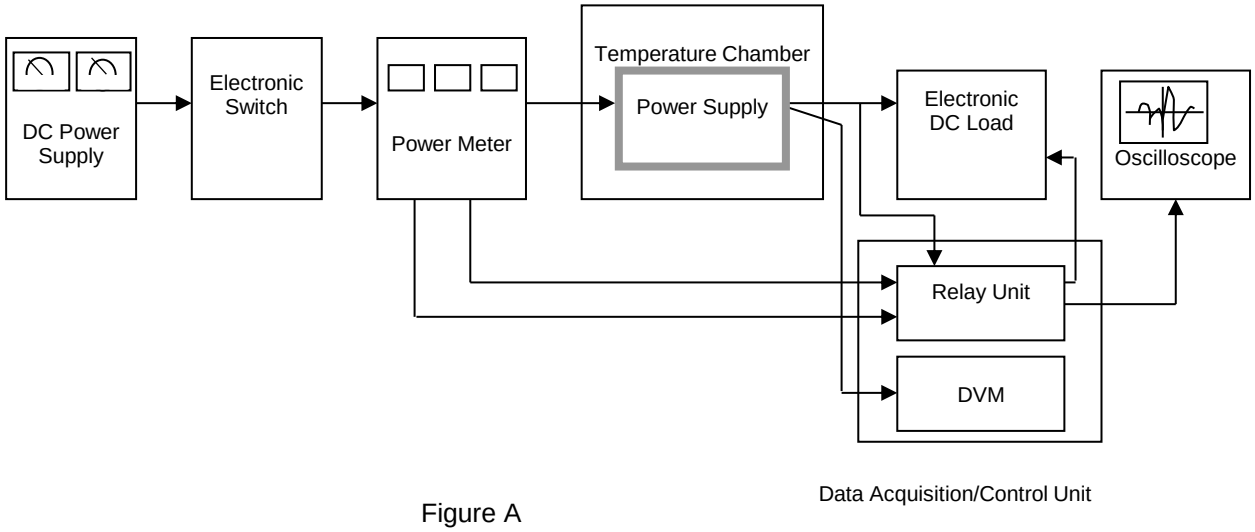


Figure A

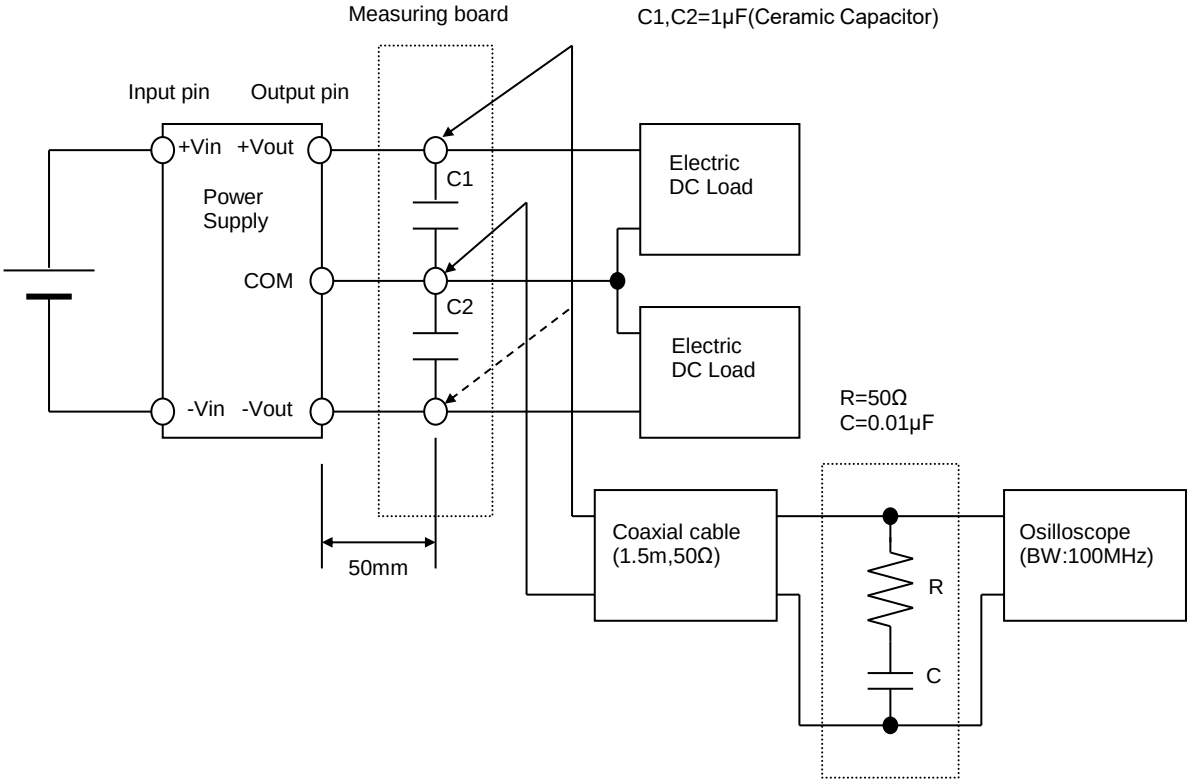


Figure B（Ripple and Ripple noise Characteristic）