参考資料

TEST DATA OF MGFW64815

Regulated DC Power Supply
December 20, 2016

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Takaaki Sekiguchi Design Engineer

COSEL CO.,LTD.

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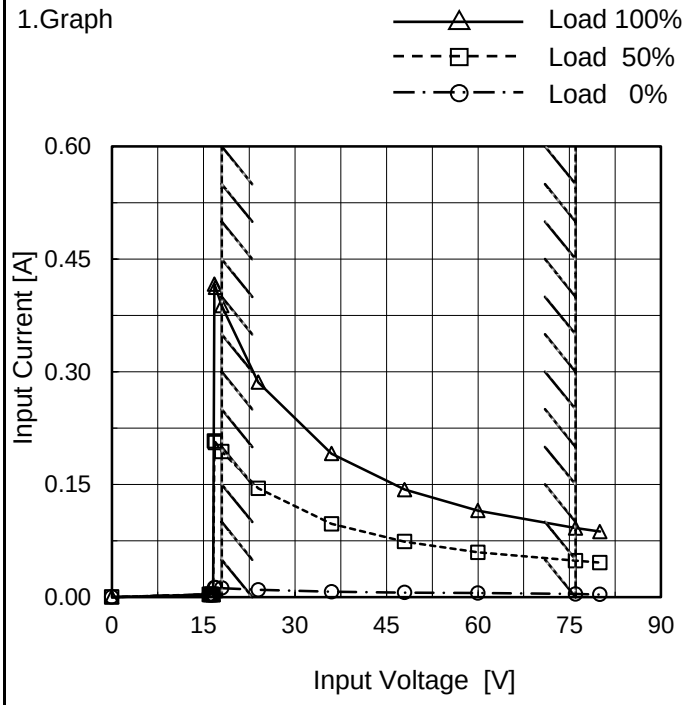
Model	MGFW64815
Item	Input Current (by Input Voltage)
Object	————————

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	0.004	0.004	0.003
16.2	0.003	0.004	0.003
16.4	0.003	0.004	0.004
16.6	0.003	0.003	0.003
16.8	0.012	0.208	0.417
17.0	0.013	0.206	0.412
18.0	0.012	0.194	0.388
24.0	0.010	0.145	0.286
36.0	0.007	0.097	0.191
48.0	0.006	0.074	0.143
60.0	0.005	0.060	0.115
76.0	0.004	0.048	0.092
80.0	0.004	0.046	0.087
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

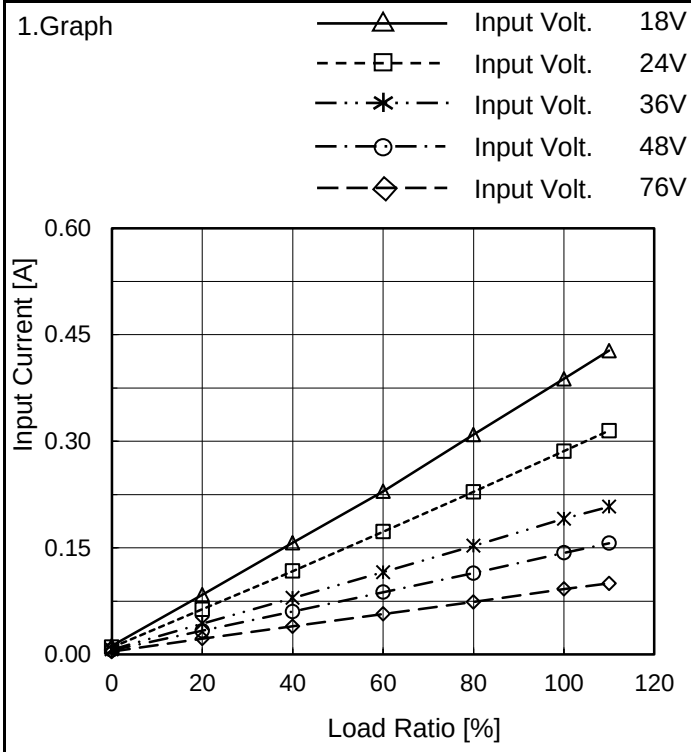
BC-11045

COSEL

Model	MGFW64815
Item	Input Current (by Load Ratio)
Object	————————

Temperature 25°C
Testing Circuitry Figure A

1.Graph



2.Values

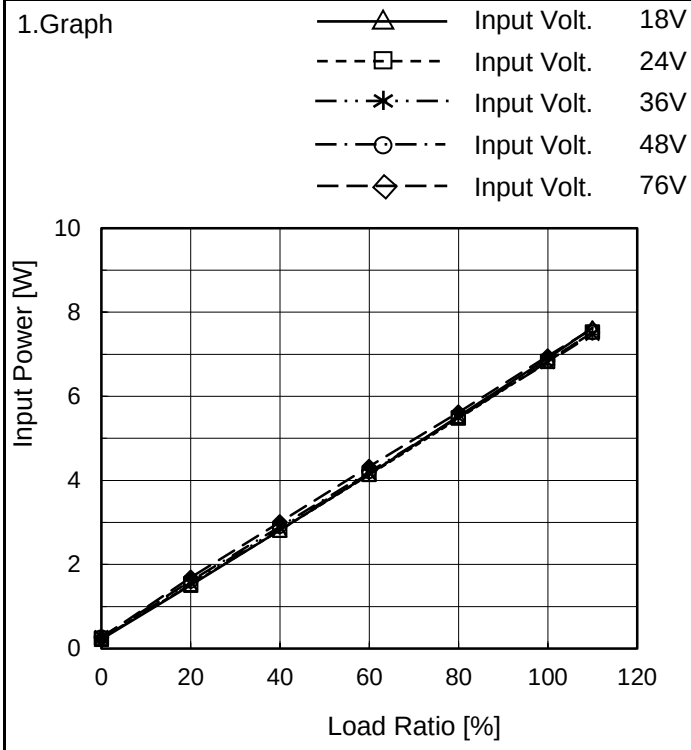
Load Ratio [%]	Input Current [A]				
	Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]	Input Volt. 48[V]	Input Volt. 76[V]
0	0.012	0.010	0.007	0.006	0.004
20	0.084	0.063	0.044	0.033	0.022
40	0.157	0.117	0.080	0.060	0.040
60	0.230	0.173	0.116	0.088	0.057
80	0.310	0.229	0.153	0.114	0.074
100	0.388	0.286	0.191	0.143	0.092
110	0.428	0.315	0.208	0.157	0.100
--	-	-	-	-	-
--	-	-	-	-	-
--	-	-	-	-	-
--	-	-	-	-	-

COSEL

Model	MGFW64815
Item	Input Power (by Load Ratio)
Object	————————

Temperature 25°C
Testing Circuitry Figure A

1.Graph



2.Values

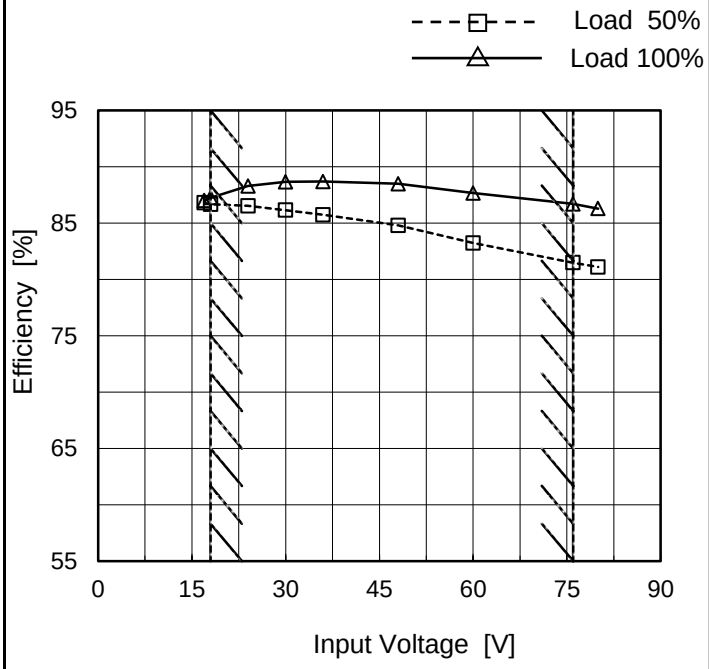
Load Ratio [%]	Input Power [W]				
	Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]	Input Volt. 48[V]	Input Volt. 76[V]
0	0.22	0.24	0.27	0.27	0.26
20	1.50	1.52	1.57	1.60	1.69
40	2.82	2.82	2.86	2.90	3.01
60	4.15	4.14	4.17	4.20	4.33
80	5.53	5.48	5.50	5.49	5.62
100	6.91	6.83	6.81	6.84	6.96
110	7.63	7.52	7.48	7.52	7.61
--	-	-	-	-	-
--	-	-	-	-	-
--	-	-	-	-	-
--	-	-	-	-	-

COSEL

Model	MGFW64815
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

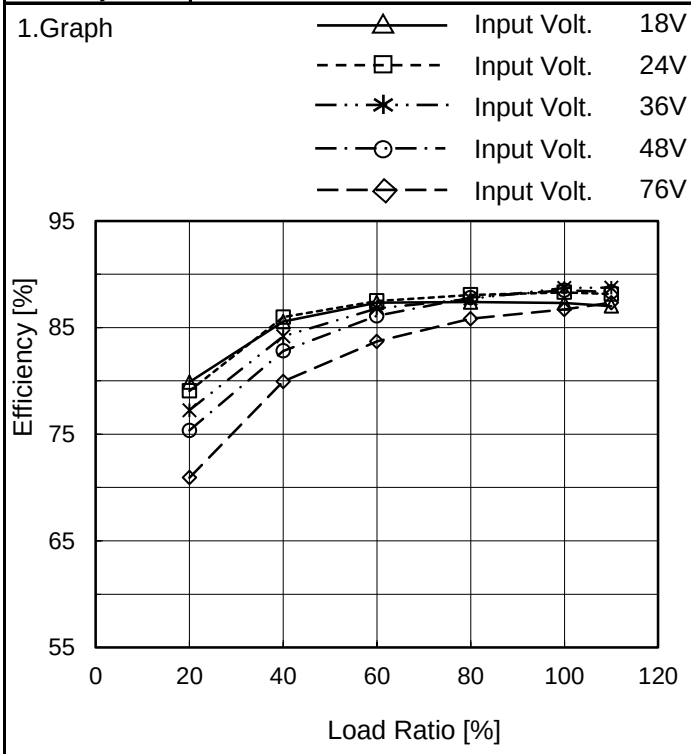
Input Voltage [V]	Efficiency [%]	
	Load 50%	Load 100%
17	86.8	87.0
18	86.7	87.3
24	86.5	88.3
30	86.2	88.7
36	85.7	88.7
48	84.8	88.5
60	83.2	87.7
76	81.5	86.7
80	81.1	86.3

COSEL

Model	MGFW64815
Item	Efficiency (by Load Ratio)
Object	————————

Temperature 25°C
Testing Circuitry Figure A

1.Graph



2.Values

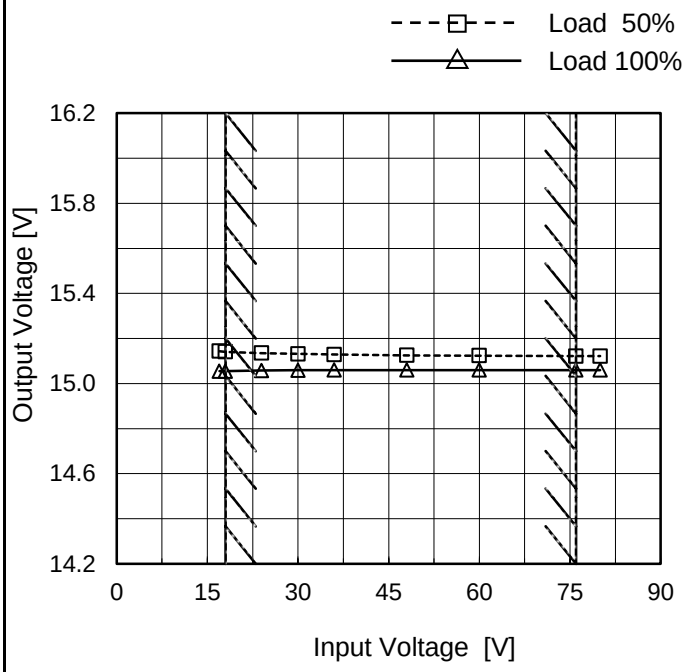
Load Ratio [%]	Efficiency [%]				
	Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]	Input Volt. 48[V]	Input Volt. 76[V]
0	-	-	-	-	-
20	79.9	79.1	77.2	75.3	70.9
40	85.6	86.0	84.2	82.8	79.9
60	87.3	87.5	86.8	86.1	83.7
80	87.4	88.1	87.7	87.8	85.8
100	87.3	88.3	88.7	88.5	86.7
110	87.0	88.1	88.7	88.3	87.3
--	-	-	-	-	-
--	-	-	-	-	-
--	-	-	-	-	-
--	-	-	-	-	-

COSEL

Model	MGFW64815
Item	Line Regulation
Object	+15V0.2A

Temperature 25°C
Testing Circuitry Figure A

1.Graph



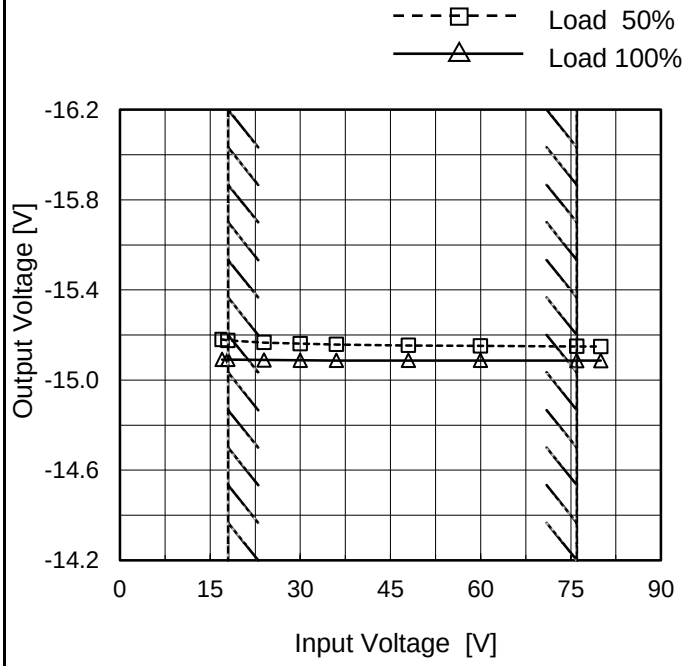
2.Values

Input Voltage [V]	Output Voltage [V]	
	Load 50%	Load 100%
17	15.144	15.055
18	15.141	15.055
24	15.135	15.058
30	15.132	15.059
36	15.129	15.060
48	15.125	15.060
60	15.124	15.060
76	15.122	15.060
80	15.122	15.060

-15V : Rated Load Current

Object	-15V0.2A

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	-15.180	-15.091
18	-15.176	-15.091
24	-15.166	-15.089
30	-15.161	-15.087
36	-15.158	-15.087
48	-15.154	-15.087
60	-15.151	-15.087
76	-15.149	-15.086
80	-15.149	-15.086

+15V : Rated Load Current

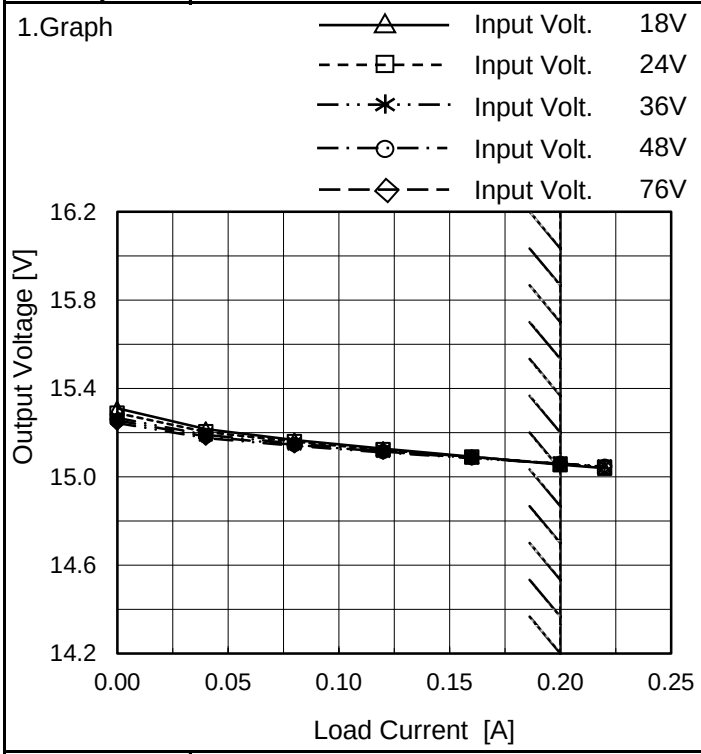
COSEL

Model	MGFW64815
Item	Load Regulation

Temperature 25°C
Testing Circuitry Figure A

Object +15V0.2A

1.Graph



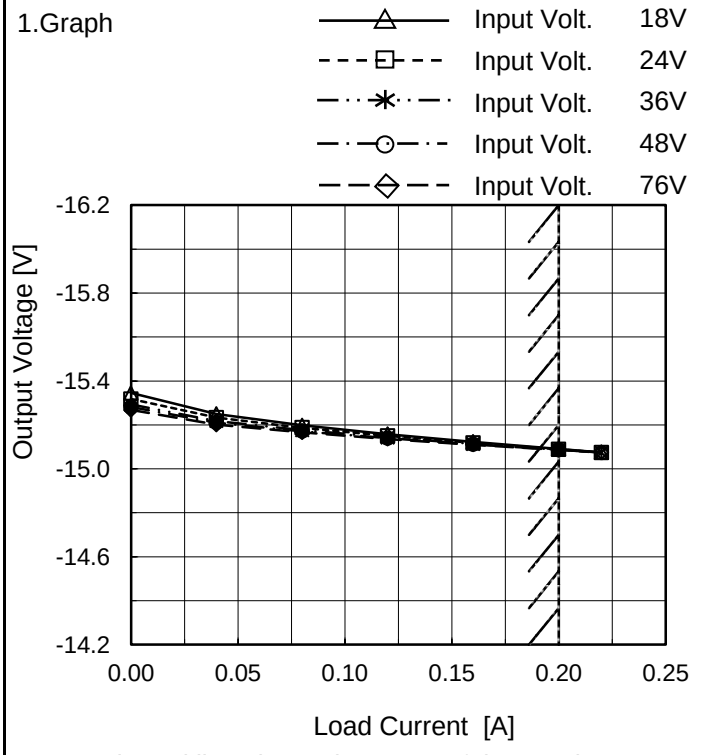
2.Values

Load Current [A]	Output Voltage [V]				
	Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]	Input Volt. 48[V]	Input Volt. 76[V]
0.00	15.311	15.288	15.266	15.255	15.243
0.04	15.216	15.204	15.190	15.183	15.176
0.08	15.167	15.159	15.150	15.145	15.140
0.12	15.127	15.122	15.117	15.114	15.111
0.16	15.091	15.090	15.087	15.086	15.085
0.20	15.055	15.058	15.060	15.060	15.060
0.22	15.039	15.043	15.047	15.048	15.048
--	-	-	-	-	-
--	-	-	-	-	-
--	-	-	-	-	-
--	-	-	-	-	-

-15V : Rated Load Current

Object -15V0.2A

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]	Input Volt. 48[V]	Input Volt. 76[V]
0.00	-15.345	-15.318	-15.293	-15.281	-15.268
0.04	-15.250	-15.233	-15.217	-15.210	-15.201
0.08	-15.198	-15.187	-15.176	-15.171	-15.166
0.12	-15.158	-15.150	-15.143	-15.140	-15.136
0.16	-15.123	-15.118	-15.113	-15.112	-15.110
0.20	-15.091	-15.089	-15.087	-15.087	-15.086
0.22	-15.075	-15.074	-15.074	-15.074	-15.075
--	-	-	-	-	-
--	-	-	-	-	-
--	-	-	-	-	-
--	-	-	-	-	-

+15V : Rated Load Current

COSEL

Model	MGFW64815
Item	Dynamic Load Response
Object	+15V0.2A

Temperature 25°C
Testing Circuitry Figure A

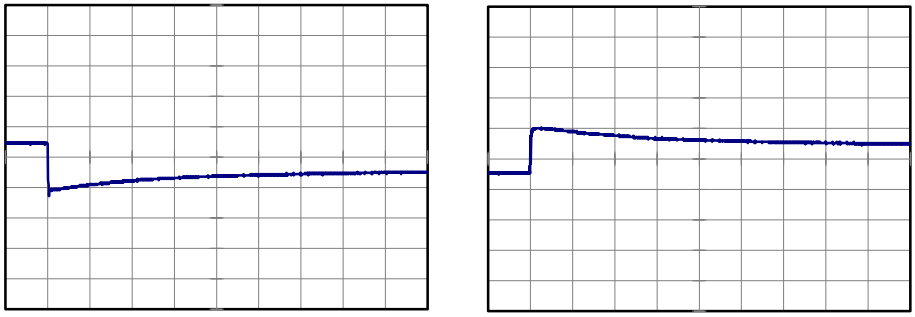
Input Volt. 48 V
-15V:rated load current.
Cycle 100 ms

t1,t2 = 100 μs

Load Current

t1 t2

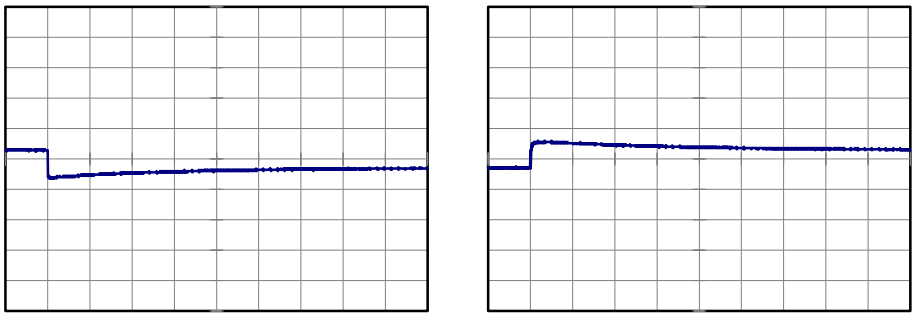
Min.Load (0A)←→
Load 100% (0.2A)



200 mV/div

4 ms/div 4 ms/div

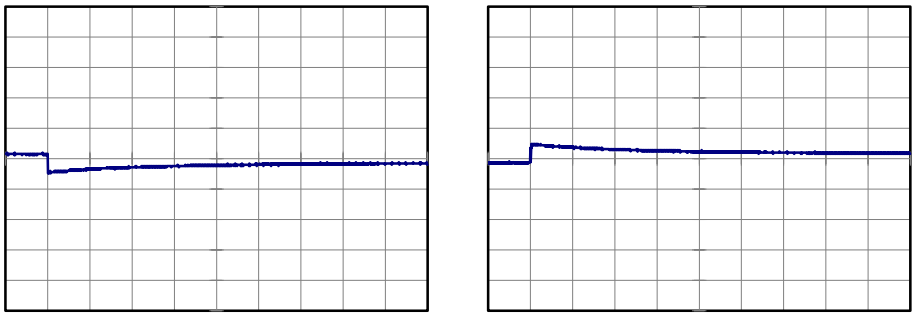
Min.Load (0A)←→
Load 50% (0.1A)



200 mV/div

4 ms/div 4 ms/div

Load 50% (0.1A)←→
Load 100% (0.2A)



200 mV/div

4 ms/div 4 ms/div

COSEL

Model	MGFW64815
Item	Dynamic Load Response
Object	-15V0.2A

Temperature 25°C
Testing Circuitry Figure A

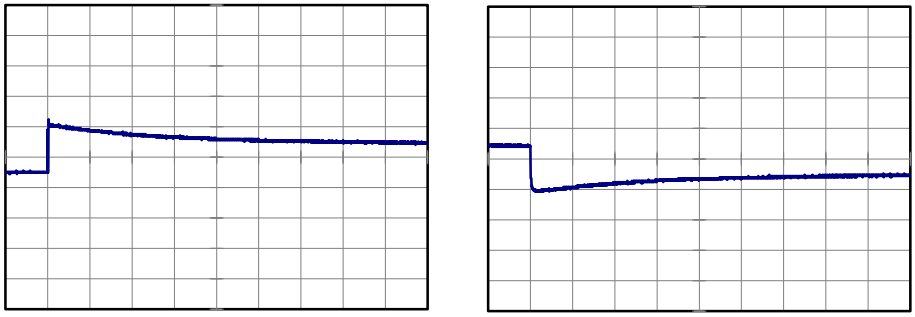
Input Volt. 48 V
+15V:rated load current.
Cycle 100 ms

t1,t2 = 100 μs

Load Current

t1 t2

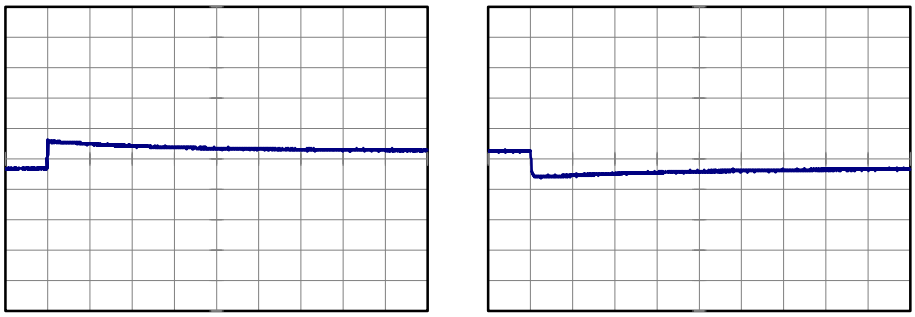
Min.Load (0A)←→
Load 100% (0.2A)



200 mV/div

4 ms/div 4 ms/div

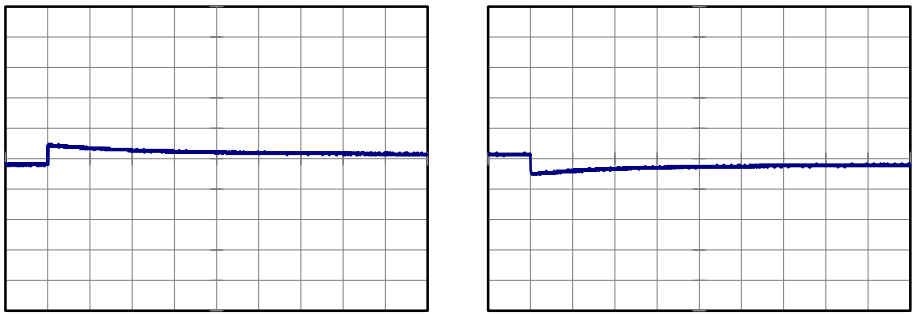
Min.Load (0A)←→
Load 50% (0.1A)



200 mV/div

4 ms/div 4 ms/div

Load 50% (0.1A)←→
Load 100% (0.2A)



200 mV/div

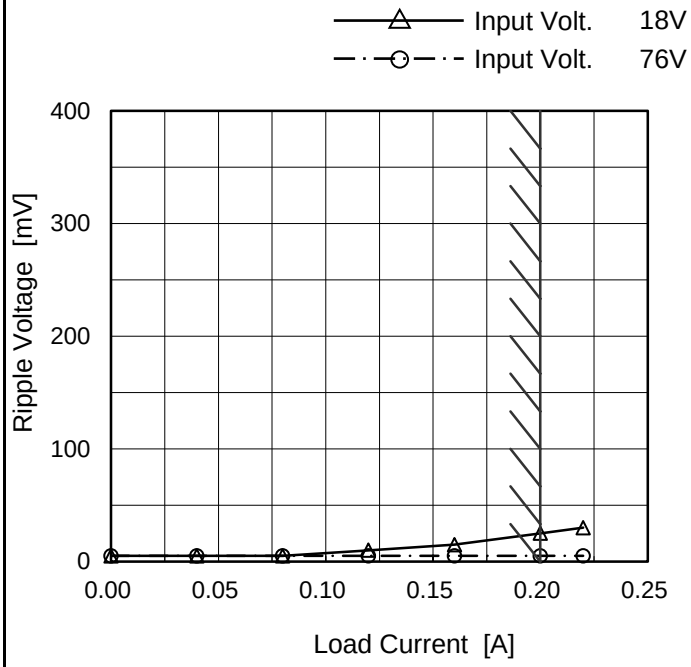
4 ms/div 4 ms/div

COSEL

Model	MGFW64815
Item	Ripple Voltage (by Load Current)
Object	+15V0.2A

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]

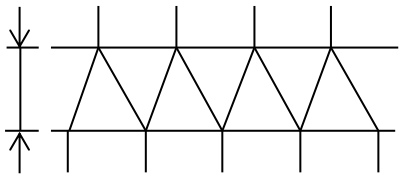


Fig.Complex Ripple Wave Form

2.Values

Load Current [A]	Ripple Voltage [mV]	
	Input Volt. 18 [V]	Input Volt. 76 [V]
0.00	5	5
0.04	5	5
0.08	5	5
0.12	10	5
0.16	15	5
0.20	25	5
0.22	30	5
--	-	-
--	-	-
--	-	-
--	-	-

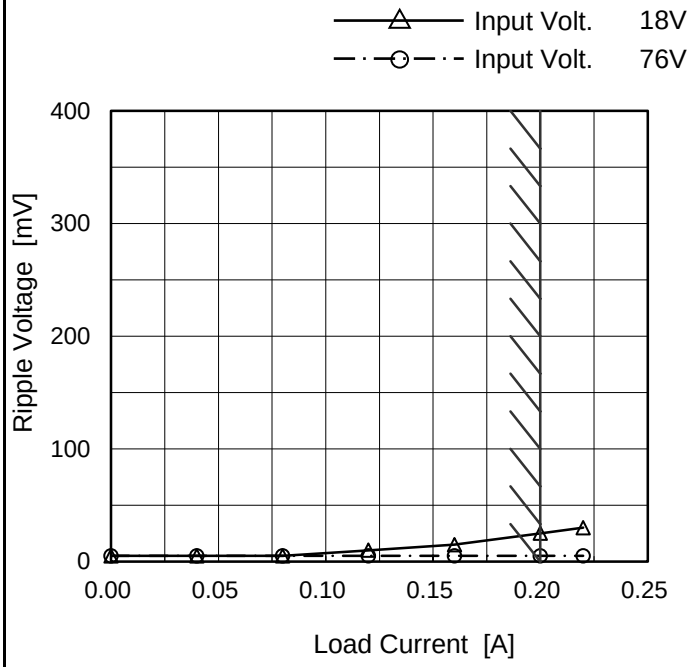
-15V: Rated Load Current

COSEL

Model	MGFW64815
Item	Ripple Voltage (by Load Current)
Object	-15V0.2A

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]

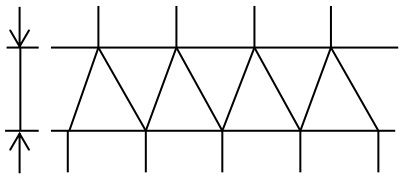


Fig.Complex Ripple Wave Form

2.Values

Load Current [A]	Ripple Voltage [mV]	
	Input Volt. 18 [V]	Input Volt. 76 [V]
0.00	5	5
0.04	5	5
0.08	5	5
0.12	10	5
0.16	15	5
0.20	25	5
0.22	30	5
--	-	-
--	-	-
--	-	-
--	-	-

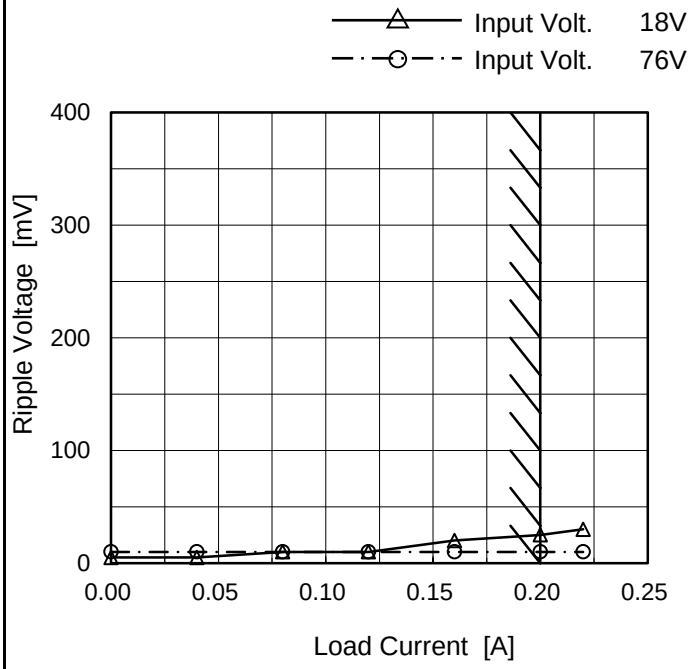
+15V: Rated Load Current

COSEL

Model	MGFW64815
Item	Ripple-Noise
Object	+15V0.2A

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]

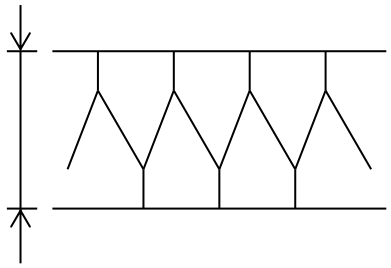


Fig.Complex Ripple Noise Wave Form

2.Values

Load Current [A]	Ripple-Noise [mV]	
	Input Volt. 18 [V]	Input Volt. 76 [V]
0.00	5	10
0.04	5	10
0.08	10	10
0.12	10	10
0.16	20	10
0.20	25	10
0.22	30	10
--	-	-
--	-	-
--	-	-
--	-	-

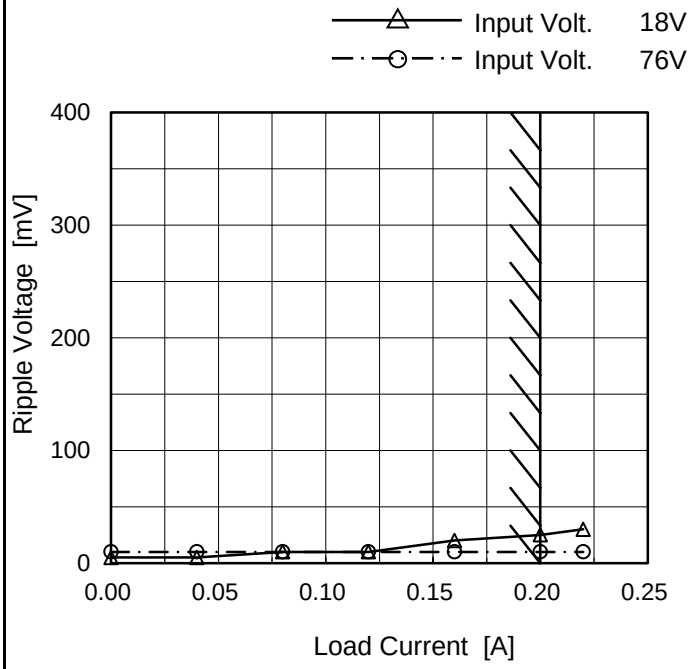
-15V: Rated Load Current

COSEL

Model	MGFW64815
Item	Ripple-Noise
Object	-15V0.2A

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]

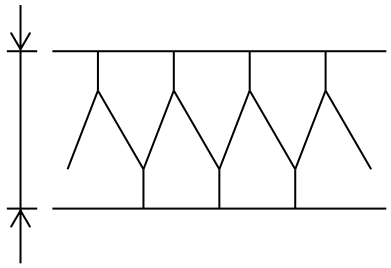


Fig.Complex Ripple Noise Wave Form

2.Values

Load Current [A]	Ripple-Noise [mV]	
	Input Volt. 18 [V]	Input Volt. 76 [V]
0.00	5	10
0.04	5	10
0.08	10	10
0.12	10	10
0.16	20	10
0.20	25	10
0.22	30	10
--	-	-
--	-	-
--	-	-
--	-	-

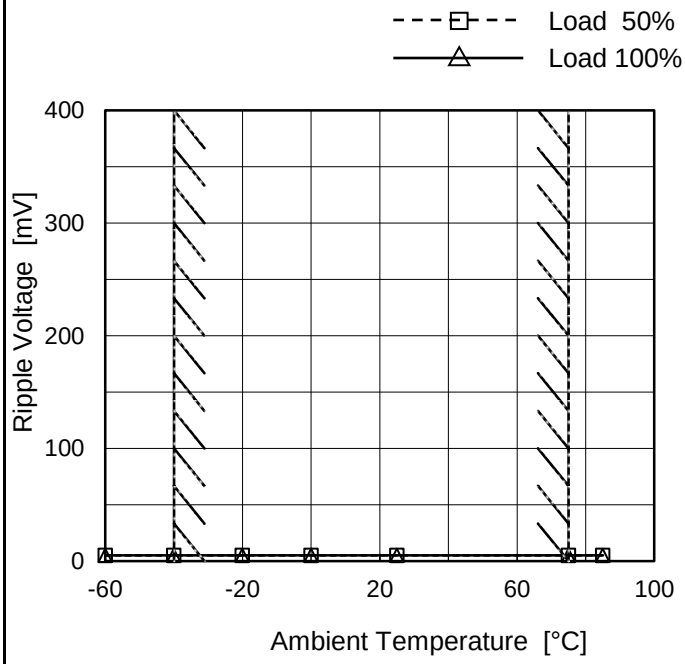
+15V: Rated Load Current

COSEL

Model	MGFW64815
Item	Ripple Voltage (by Ambient Temp.)
Object	+15V0.2A

Testing Circuitry Figure B

1.Graph



Input Volt. 48V

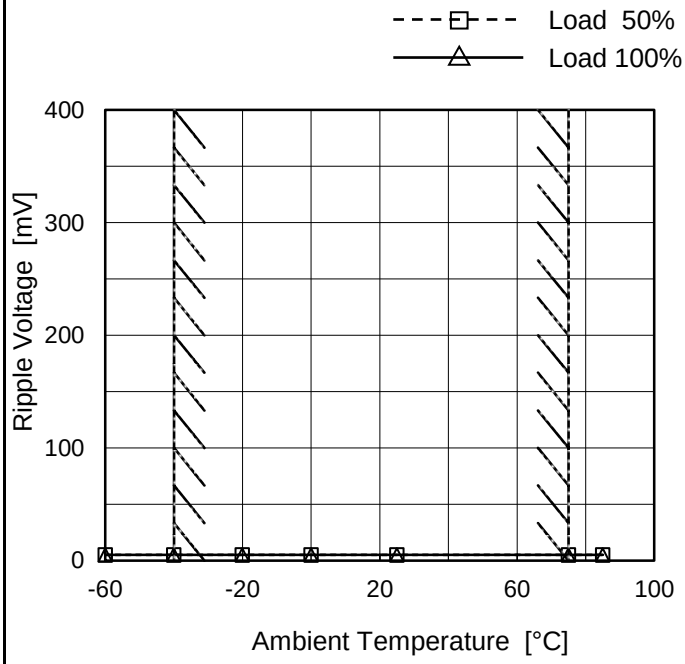
2.Values

Ambient Temperature [°C]	Ripple Voltage [mV]	
	Load 50%	Load 100%
-60	5	5
-40	5	5
-20	5	5
0	5	5
25	5	5
75	5	5
85	5	5
--	-	-
--	-	-
--	-	-
--	-	-

-15V: Rated Load Current

Object	-15V0.2A

1.Graph



Input Volt. 48V

Measured by 100 MHz Oscilloscope.

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

2.Values

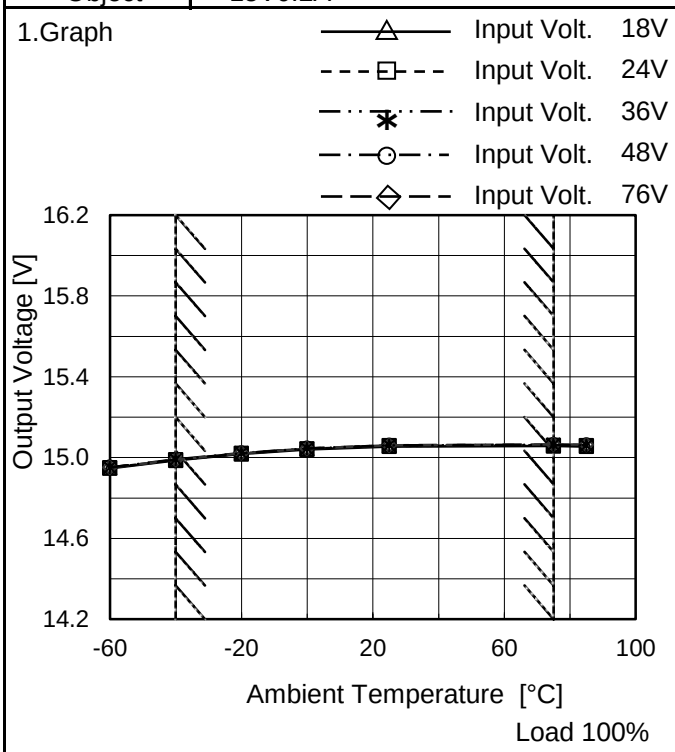
Ambient Temperature [°C]	Ripple Voltage [mV]	
	Load 50%	Load 100%
-60	5	5
-40	5	5
-20	5	5
0	5	5
25	5	5
75	5	5
85	5	5
--	-	-
--	-	-
--	-	-
--	-	-

+15V: Rated Load Current

COSEL

Model	MGFW64815	
Item	Ambient Temperature Drift	Testing Circuitry Figure A
Object	+15V0.2A	

1.Graph



Load 100%

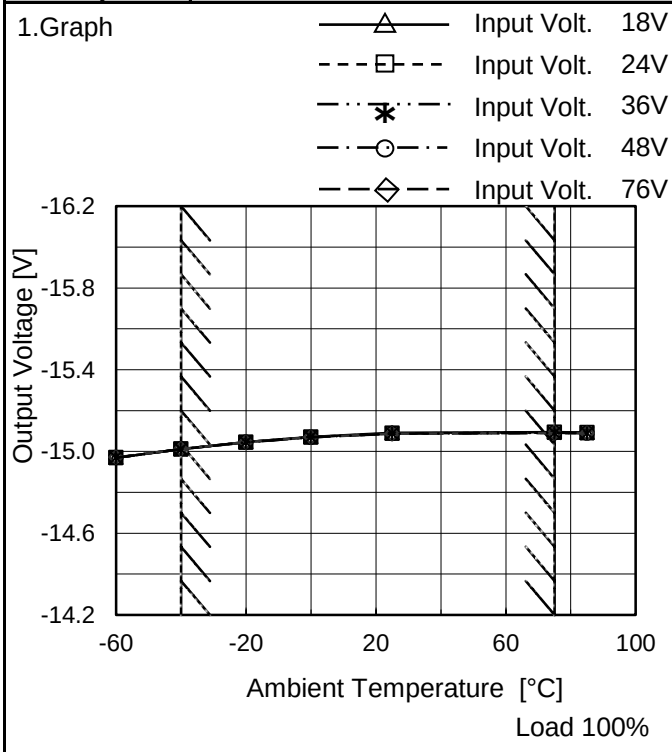
2.Values

Ambient Temperature [°C]	Output Voltage [V]				
	Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]	Input Volt. 48[V]	Input Volt. 76[V]
-60	14.947	14.949	14.951	14.951	14.950
-40	14.986	14.988	14.990	14.990	14.989
-20	15.018	15.020	15.021	15.022	15.021
0	15.041	15.043	15.045	15.045	15.044
25	15.055	15.058	15.060	15.060	15.060
75	15.057	15.060	15.062	15.064	15.065
85	15.055	15.058	15.060	15.062	15.063
--	-	-	-	-	-
--	-	-	-	-	-
--	-	-	-	-	-
--	-	-	-	-	-

-15V : Rated Load Current

Object	-15V0.2A

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. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]	Input Volt. 48[V]	Input Volt. 76[V]
-60	-14.969	-14.970	-14.970	-14.970	-14.971
-40	-15.012	-15.012	-15.011	-15.012	-15.012
-20	-15.046	-15.046	-15.045	-15.045	-15.046
0	-15.071	-15.071	-15.070	-15.070	-15.070
25	-15.091	-15.089	-15.087	-15.087	-15.086
75	-15.095	-15.093	-15.091	-15.091	-15.090
85	-15.093	-15.092	-15.090	-15.089	-15.089
--	-	-	-	-	-
--	-	-	-	-	-
--	-	-	-	-	-
--	-	-	-	-	-

+15V : Rated Load Current

COSEL

Model	MGFW64815	
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 - 75°C
Input Voltage : 18 - 76V
Load Current (AVR 1) : 0 - 0.2A (AVR 2) : 0 - 0.2A

* 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	+15V0.2A					
Item	Temperature [°C]	Input Voltage[V]	Output		Output Voltage Accuracy	
			Current[A]	Voltage[V]	Value [mV]	Ratio [%]
Maximum Voltage	75	18	0	15.329	±280	±1.9
Minimum Voltage	-40	18	0.2	14.769		

Object	-15V0.2A					
Item	Temperature [°C]	Input Voltage[V]	Output		Output Voltage Accuracy	
			Current[A]	Voltage[V]	Value [mV]	Ratio [%]
Maximum Voltage	75	18	0	-15.363	±281	±1.9
Minimum Voltage	-40	18	0.2	-14.802		

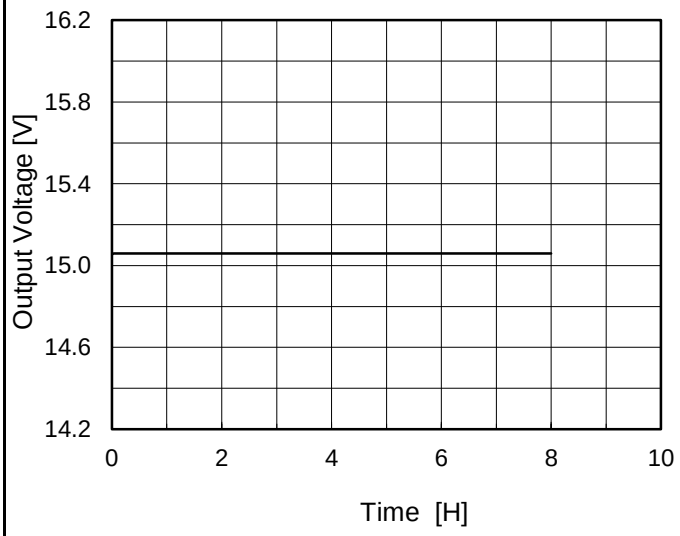
COSEL

Model	MGFW64815
Item	Time Lapse Drift

Temperature 25°C
Testing Circuitry Figure A

Object +15V0.2A

1.Graph



Input Volt. 48V
Load 100%

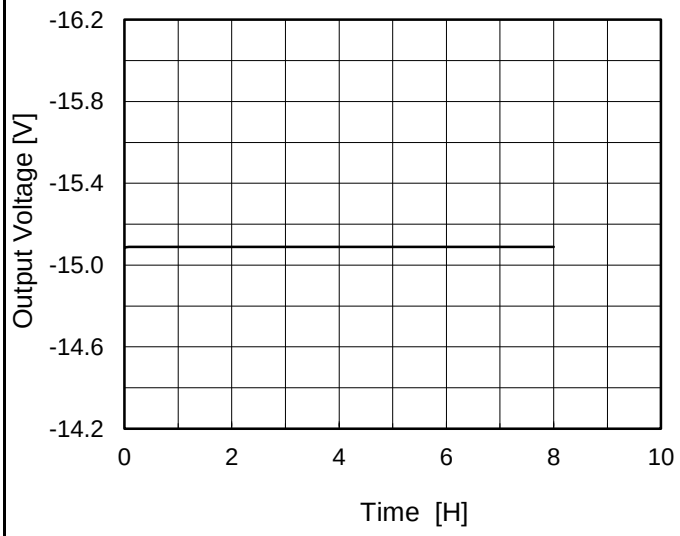
2.Values

Time since start [H]	Output Voltage [V]
0.0	15.054
0.5	15.060
1.0	15.060
2.0	15.060
3.0	15.060
4.0	15.060
5.0	15.059
6.0	15.060
7.0	15.060
8.0	15.060

-15V：Rated Load Current

Object -15V0.2A

1.Graph



Input Volt. 48V
Load 100%

2.Values

Time since start [H]	Output Voltage [V]
0.0	-15.083
0.5	-15.089
1.0	-15.089
2.0	-15.089
3.0	-15.089
4.0	-15.089
5.0	-15.089
6.0	-15.089
7.0	-15.089
8.0	-15.089

+15V：Rated Load Current

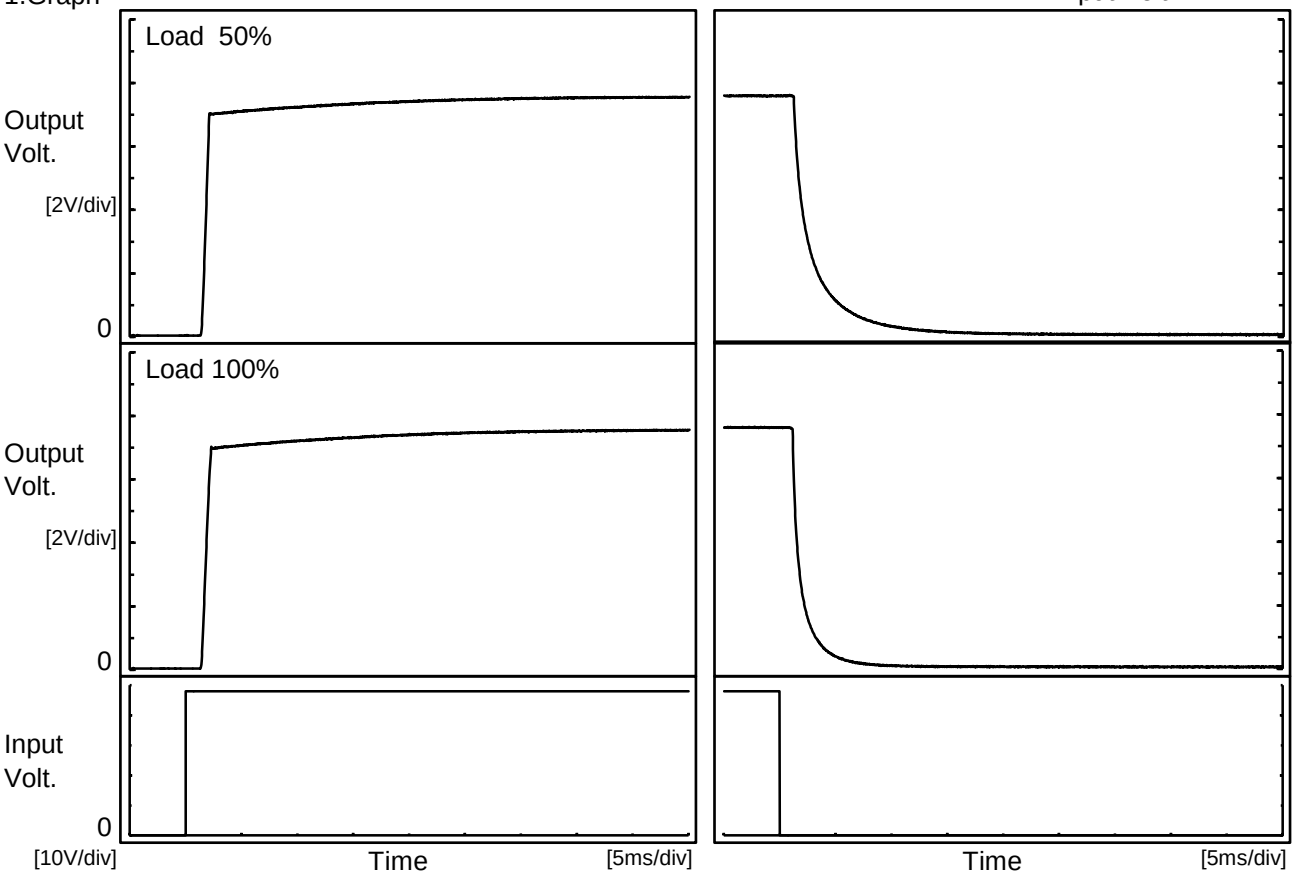
COSEL

Model	MGFW64815
Item	Rise and Fall Time
Object	+15V0.2A

Temperature 25°C
Testing Circuitry Figure A

1.Graph

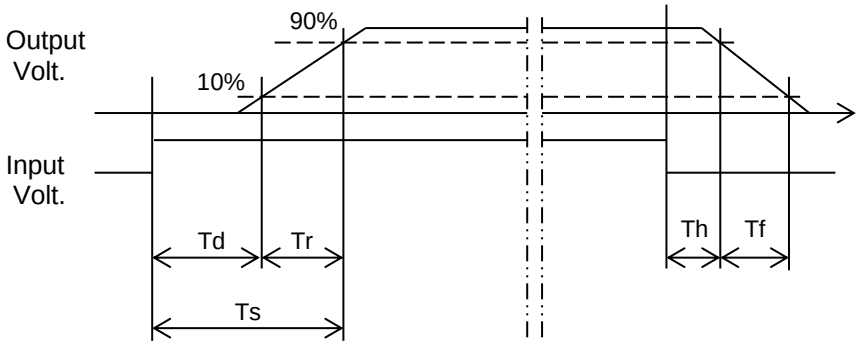
Input Volt. 48 V



2.Values

[ms]

Load \ Time	Td	Tr	Ts	Th	Tf
50 %	1.5	0.6	2.1	1.3	5.0
100 %	1.5	0.7	2.2	1.2	2.5



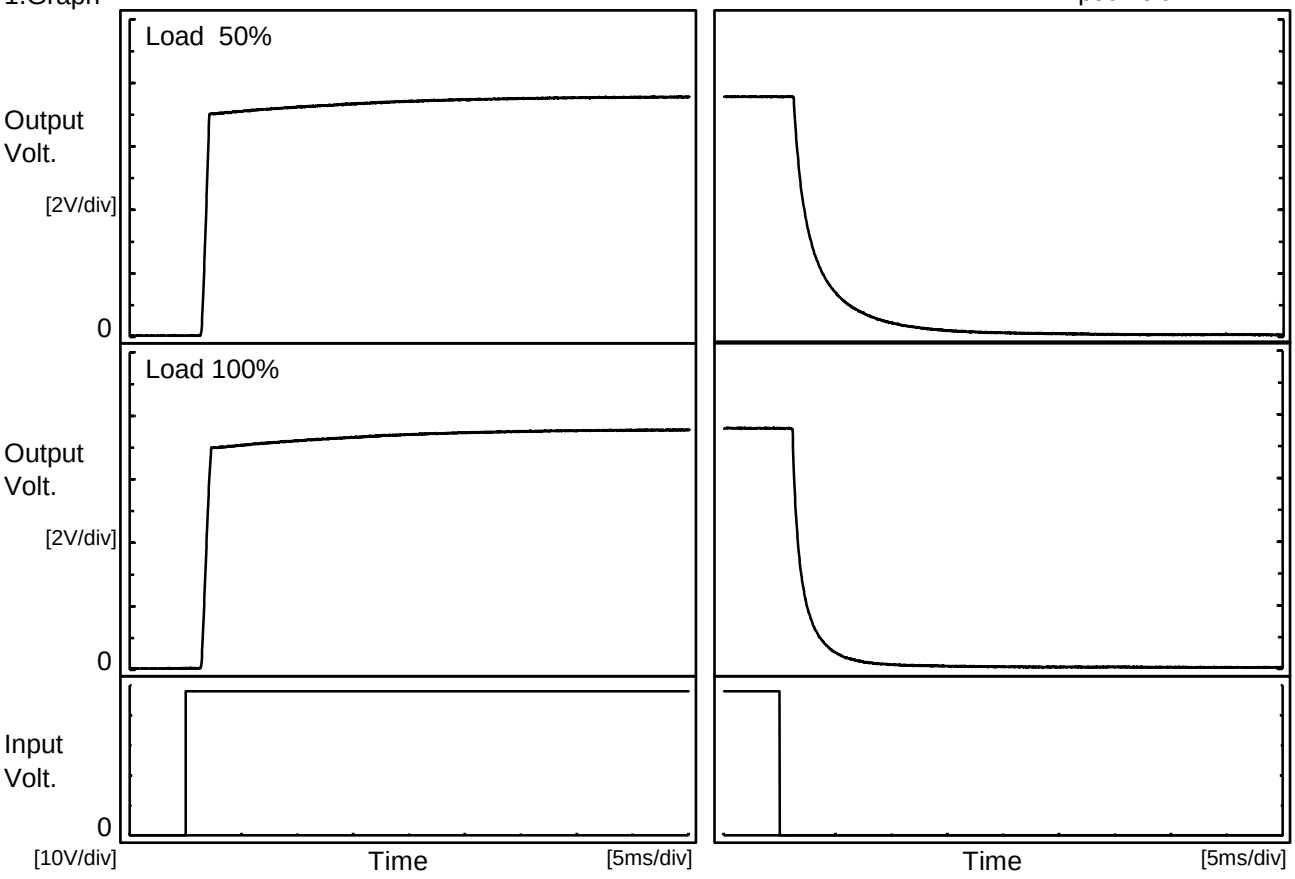
COSEL

Model	MGFW64815
Item	Rise and Fall Time
Object	-15V0.2A

Temperature 25°C
Testing Circuitry Figure A

1.Graph

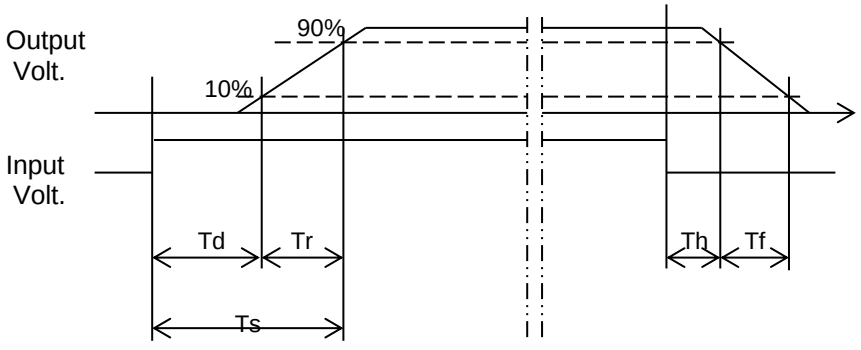
Input Volt. 48 V



2.Values

[ms]

Load \ Time	Td	Tr	Ts	Th	Tf
50 %	1.5	0.6	2.1	1.4	5.9
100 %	1.5	0.7	2.2	1.2	2.8

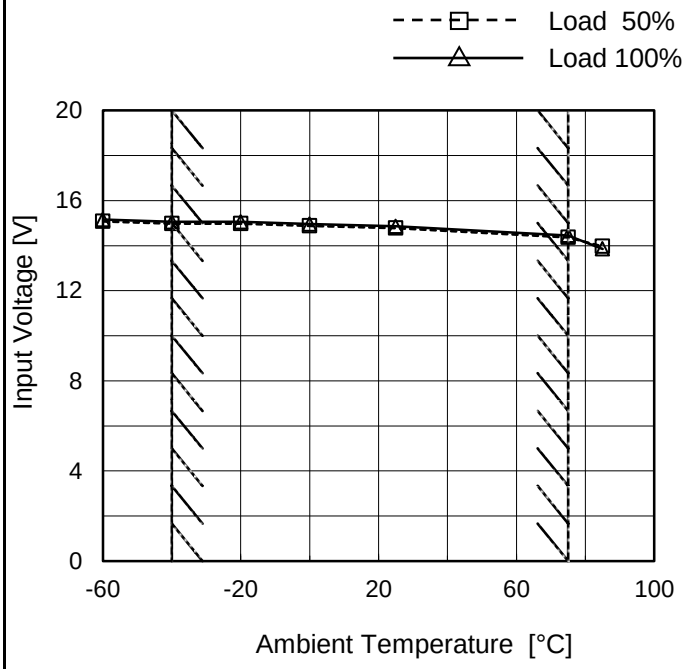


COSEL

Model	MGFW64815
Item	Minimum Input Voltage for Regulated Output Voltage
Object	+15V0.2A

Testing Circuitry Figure A

1.Graph

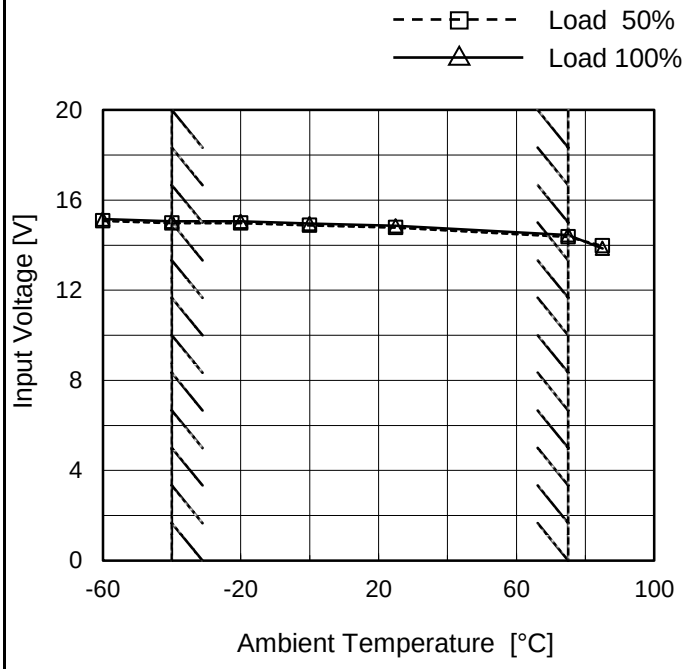


2.Values

Ambient Temperature [°C]	Input Voltage [V]	
	Load 50%	Load 100%
-60	15.1	15.2
-40	15.0	15.1
-20	15.0	15.1
0	14.9	15.0
25	14.8	14.9
75	14.4	14.5
85	14.0	13.9
--	-	-
--	-	-
--	-	-
--	-	-

Object	-15V0.2A

1.Graph



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

2.Values

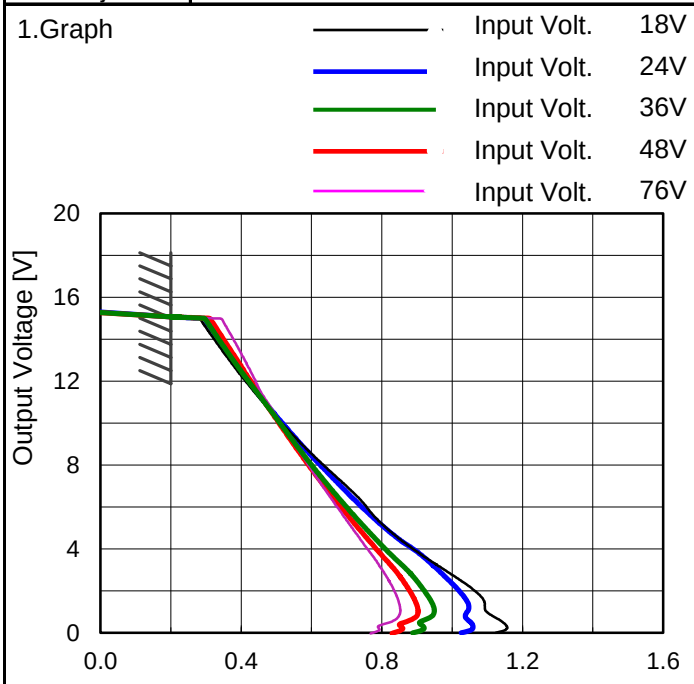
Ambient Temperature [°C]	Input Voltage [V]	
	Load 50%	Load 100%
-60	15.1	15.2
-40	15.0	15.1
-20	15.0	15.1
0	14.9	15.0
25	14.8	14.9
75	14.4	14.5
85	14.0	13.9
--	-	-
--	-	-
--	-	-
--	-	-

COSEL

Model	MGFW64815
Item	Overcurrent Protection
Object	+15V0.2A

Temperature 25°C
Testing Circuitry Figure A

1.Graph



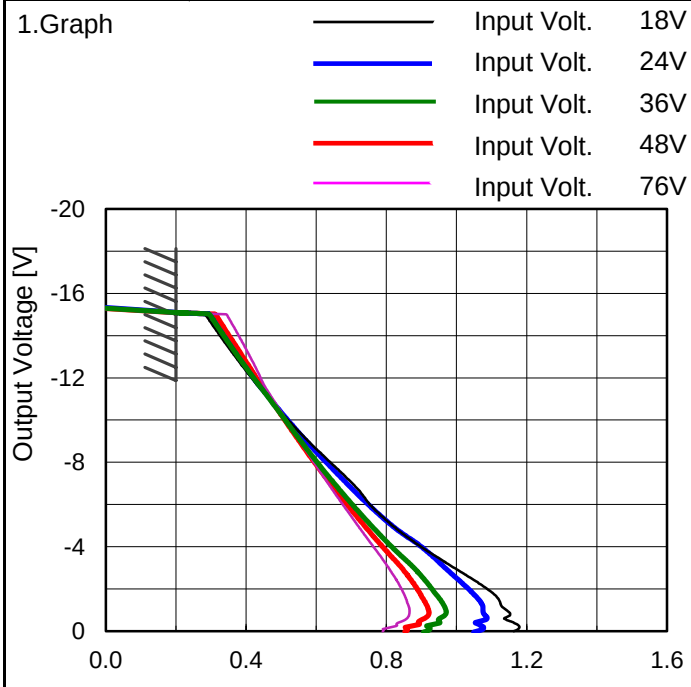
2.Values

Output Voltage [V]	Load Current [A]				
	Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]	Input Volt. 48[V]	Input Volt. 76[V]
14.3	0.313	0.325	0.326	0.340	0.369
13.5	0.344	0.355	0.355	0.369	0.393
12.0	0.411	0.419	0.420	0.426	0.440
10.5	0.488	0.491	0.488	0.485	0.492
9.0	0.572	0.568	0.552	0.548	0.552
7.5	0.665	0.654	0.622	0.612	0.610
6.0	0.756	0.741	0.699	0.683	0.672
4.5	0.846	0.845	0.780	0.757	0.737
3.0	0.978	0.958	0.869	0.836	0.800
1.5	1.090	1.042	0.940	0.895	0.847
0.0	1.124	1.026	0.888	0.829	0.768
--	-	-	-	-	-

-15V : Rated Load Current

Object	-15V0.2A

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]	Input Volt. 48[V]	Input Volt. 76[V]
-14.3	0.315	0.327	0.327	0.342	0.371
-13.5	0.347	0.356	0.356	0.370	0.395
-12.0	0.416	0.420	0.421	0.429	0.441
-10.5	0.492	0.493	0.489	0.489	0.494
-9.0	0.575	0.571	0.554	0.550	0.554
-7.5	0.672	0.656	0.626	0.617	0.613
-6.0	0.753	0.748	0.702	0.686	0.675
-4.5	0.856	0.855	0.784	0.761	0.740
-3.0	0.993	0.965	0.878	0.843	0.806
-1.5	1.120	1.062	0.953	0.905	0.856
0.0	1.163	1.049	0.906	0.853	0.790
--	-	-	-	-	-

+15V : Rated Load Current

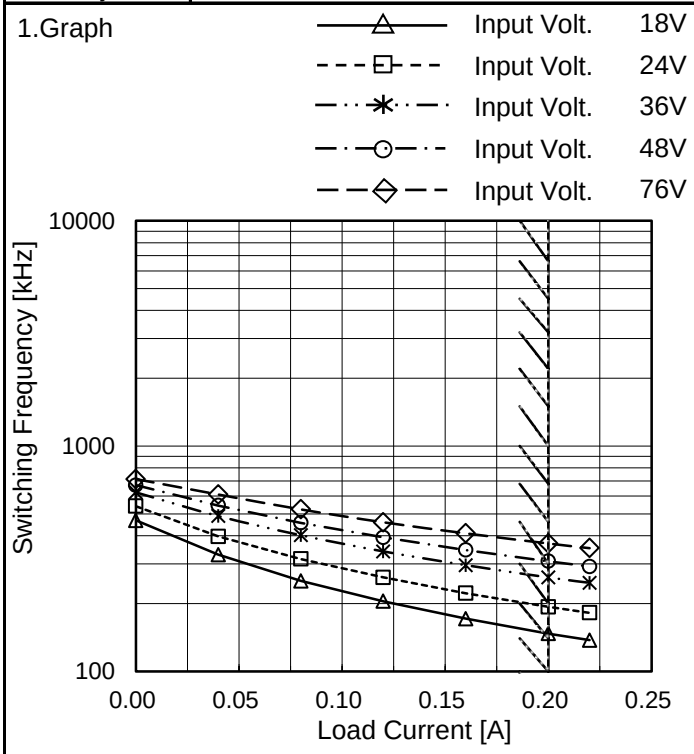
BC-11045

COSEL

Model	MGFW64815
Item	Switching frequency (by Load Current)
Object	+/-15V0.2A

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. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]	Input Volt. 48[V]	Input Volt. 76[V]
0.00	468	541	623	671	714
0.04	329	398	489	545	610
0.08	252	316	402	457	524
0.12	205	261	341	393	459
0.16	171	222	296	346	410
0.20	147	193	261	308	370
0.22	138	182	247	292	352
--	-	-	-	-	-
--	-	-	-	-	-
--	-	-	-	-	-
--	-	-	-	-	-

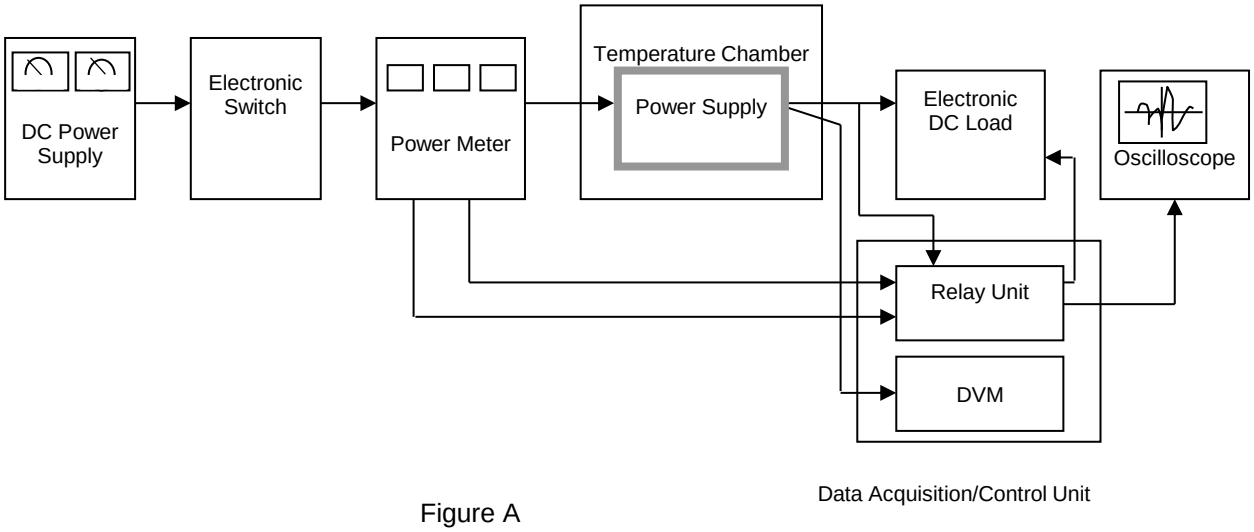


Figure A

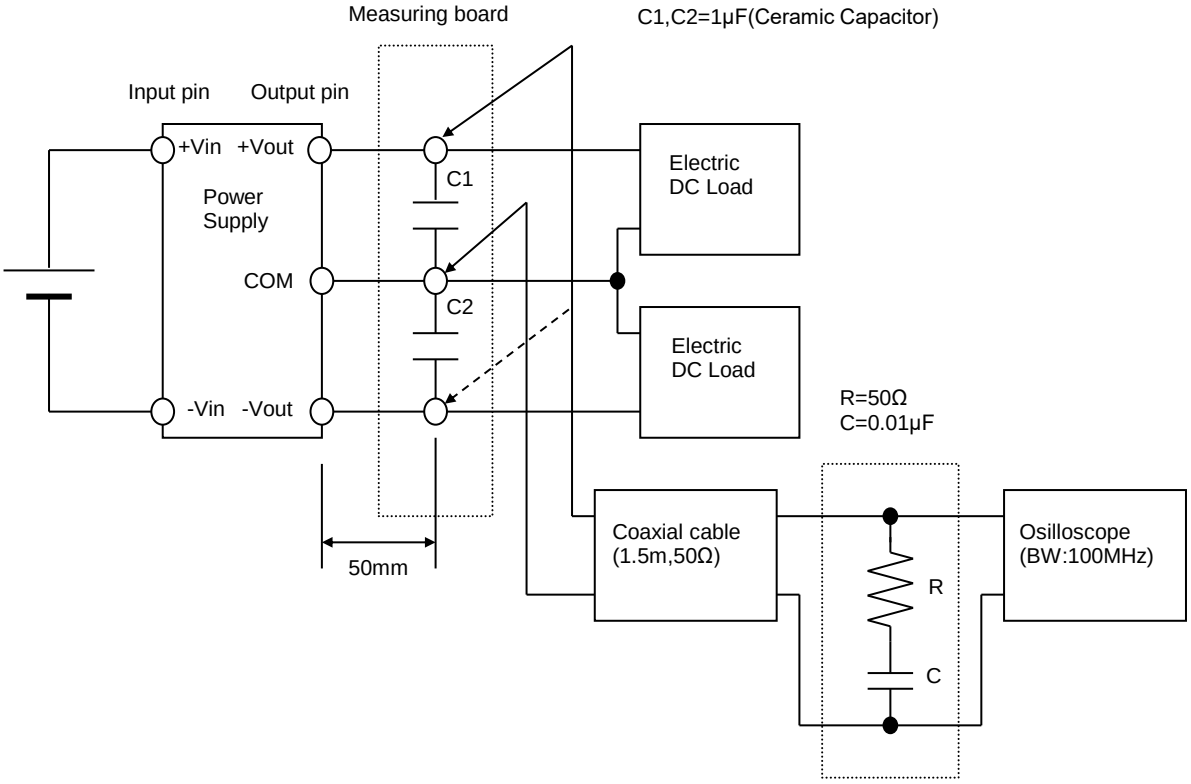


Figure B（Ripple and Ripple noise Characteristic）