COSEL

参考資料

TEST DATA OF MGFW62415

Regulated DC Power Supply
December 22, 2016

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Takaaki Sekiguchi Design Engineer

COSEL CO.,LTD.

参考資料

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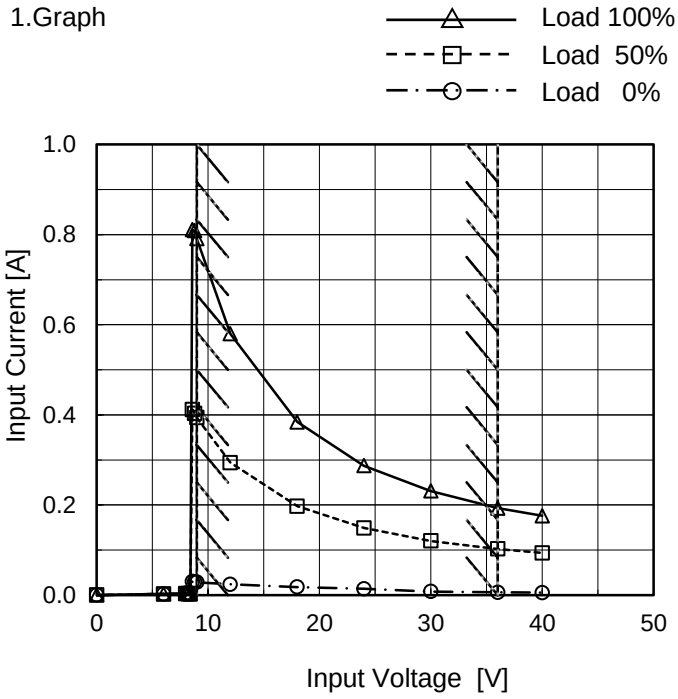
参考資料

COSEL

Model	MGFW62415
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
8.0	0.004	0.003	0.004
8.2	0.003	0.003	0.003
8.4	0.003	0.003	0.003
8.6	0.030	0.412	0.811
8.8	0.029	0.403	0.809
9.0	0.029	0.394	0.791
12.0	0.024	0.294	0.580
18.0	0.018	0.197	0.384
24.0	0.014	0.149	0.287
30.0	0.008	0.120	0.231
36.0	0.006	0.102	0.193
40.0	0.005	0.093	0.176
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

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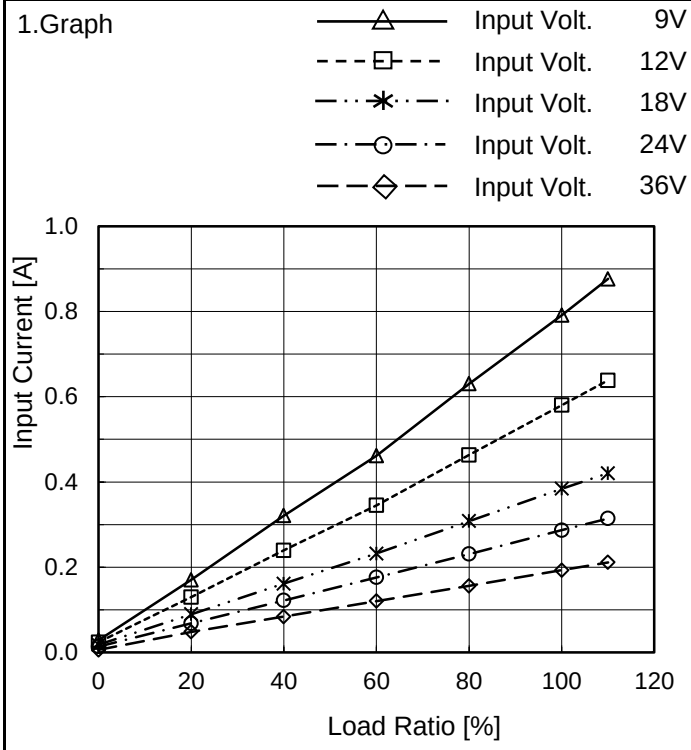
COSEL

Model	MGFW62415
Item	Input Current (by Load Ratio)
Object	――――――――

Temperature 25°C
Testing Circuitry Figure A

1.Graph



2.Values

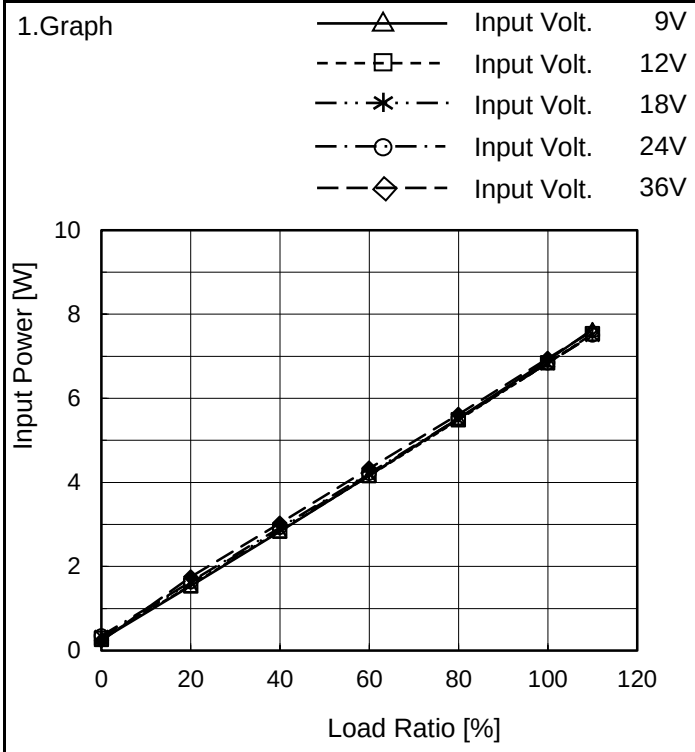
Load Ratio [%]	Input Current [A]				
	Input Volt. 9[V]	Input Volt. 12[V]	Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]
0	0.029	0.024	0.018	0.014	0.006
20	0.171	0.130	0.090	0.068	0.049
40	0.321	0.239	0.162	0.122	0.084
60	0.461	0.345	0.232	0.176	0.120
80	0.630	0.463	0.308	0.231	0.156
100	0.791	0.580	0.384	0.287	0.193
110	0.876	0.638	0.420	0.314	0.211
--	-	-	-	-	-
--	-	-	-	-	-
--	-	-	-	-	-
--	-	-	-	-	-

COSEL

Model	MGFW62415
Item	Input Power (by Load Ratio)
Object	――――――――

Temperature 25°C
Testing Circuitry Figure A

1.Graph



2.Values

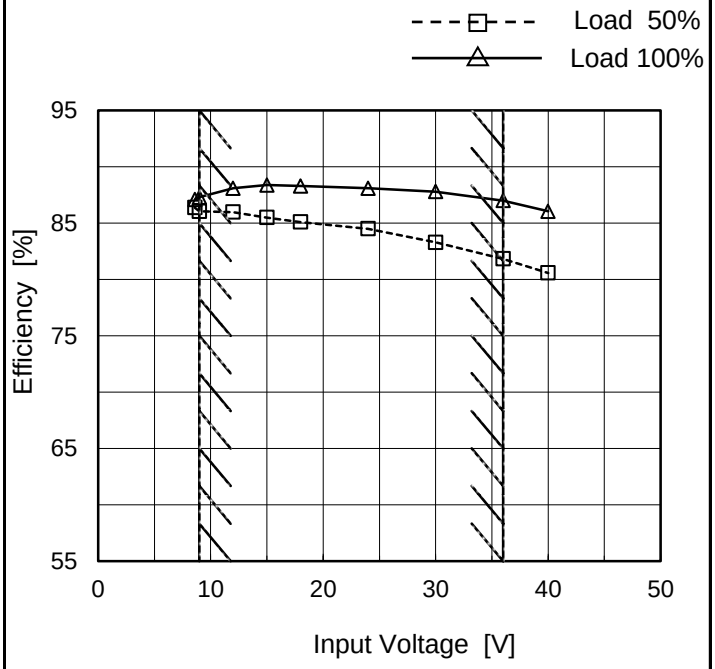
Load Ratio [%]	Input Power [W]				
	Input Volt. 9[V]	Input Volt. 12[V]	Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]
0	0.26	0.28	0.32	0.35	0.23
20	1.53	1.55	1.61	1.63	1.75
40	2.83	2.85	2.89	2.92	3.03
60	4.16	4.16	4.19	4.22	4.33
80	5.53	5.49	5.50	5.52	5.62
100	6.91	6.84	6.83	6.84	6.95
110	7.63	7.53	7.50	7.50	7.60
--	-	-	-	-	-
--	-	-	-	-	-
--	-	-	-	-	-
--	-	-	-	-	-

COSEL

Model	MGFW62415
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

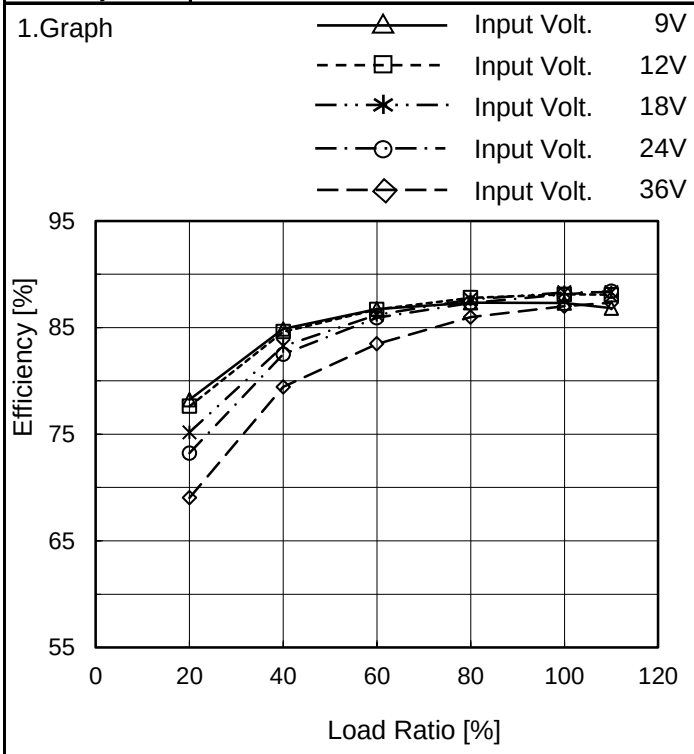
Input Voltage [V]	Efficiency [%]	
	Load 50%	Load 100%
8.6	86.4	87.1
9.0	86.1	87.3
12.0	86.0	88.1
15.0	85.5	88.4
18.0	85.1	88.3
24.0	84.5	88.1
30.0	83.3	87.8
36.0	81.8	87.0
40.0	80.6	86.1

COSEL

Model	MGFW62415
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	78.2	77.6	75.2	73.2	69.0
40	84.9	84.6	83.3	82.5	79.4
60	86.7	86.7	86.2	85.9	83.5
80	87.3	87.8	87.6	87.3	86.0
100	87.3	88.1	88.3	88.1	87.0
110	86.8	88.1	88.3	88.4	87.3
--	-	-	-	-	-
--	-	-	-	-	-
--	-	-	-	-	-
--	-	-	-	-	-

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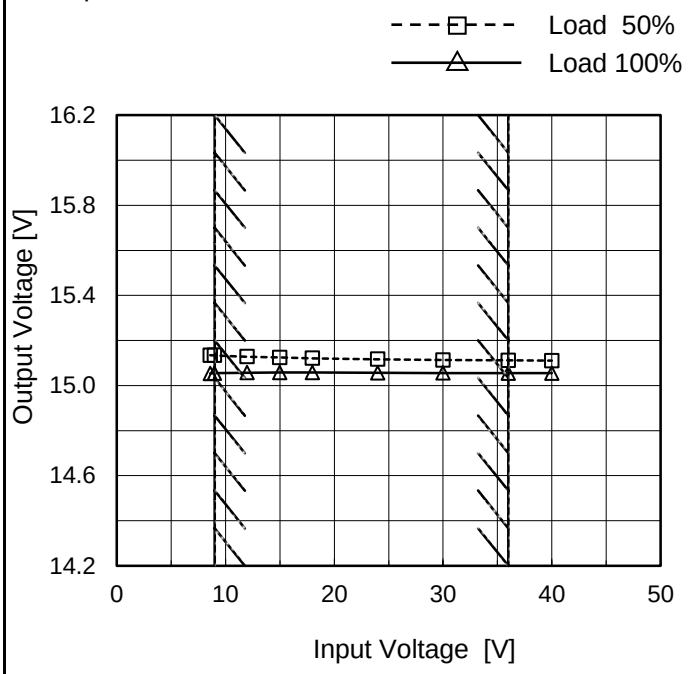
COSEL

Model	MGFW62415
Item	Line Regulation
Object	+15V0.2A

Temperature 25°C
Testing Circuitry Figure A

1.Graph



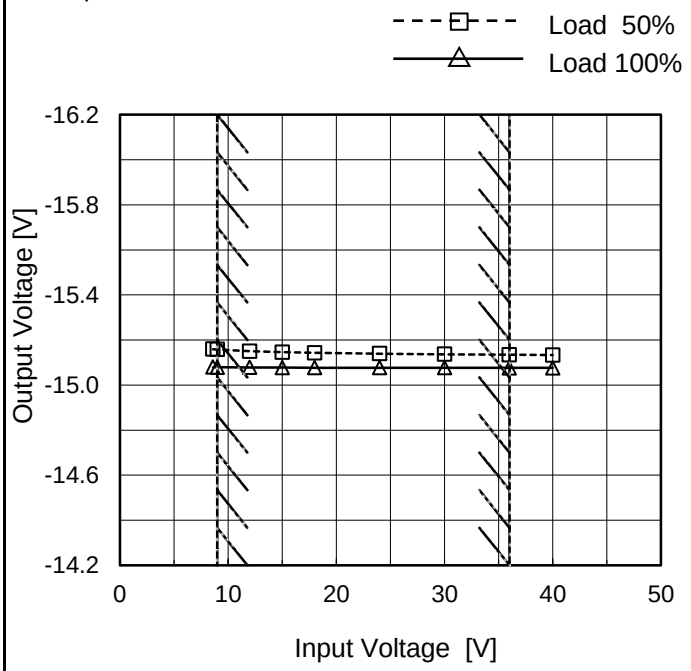
2.Values

Input Voltage [V]	Output Voltage [V]	
	Load 50%	Load 100%
8.6	15.134	15.054
9.0	15.134	15.055
12.0	15.128	15.057
15.0	15.124	15.058
18.0	15.121	15.058
24.0	15.116	15.056
30.0	15.113	15.056
36.0	15.111	15.055
40.0	15.110	15.055

-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%
8.6	-15.159	-15.079
9.0	-15.158	-15.079
12.0	-15.150	-15.078
15.0	-15.146	-15.077
18.0	-15.143	-15.077
24.0	-15.140	-15.077
30.0	-15.137	-15.077
36.0	-15.134	-15.076
40.0	-15.133	-15.076

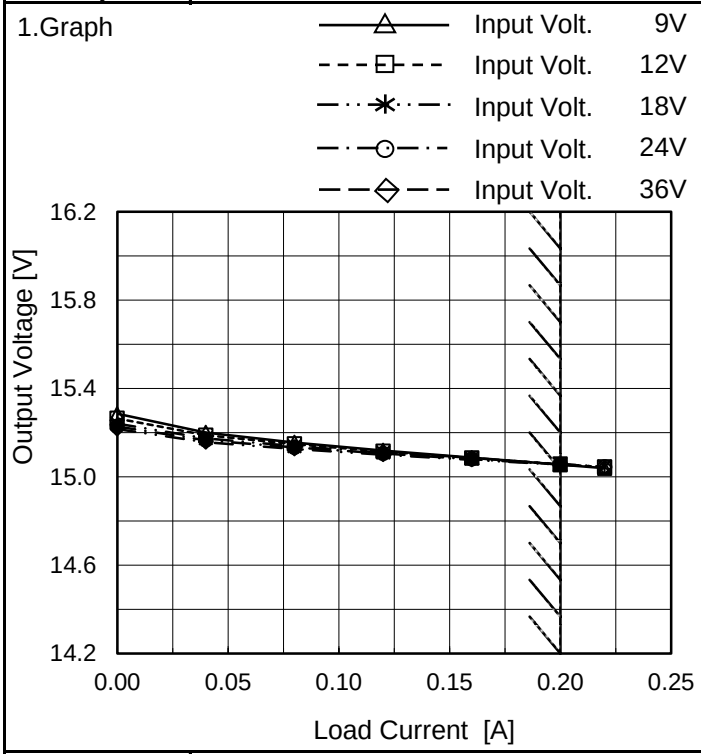
+15V : Rated Load Current

COSEL

Model	MGFW62415
Item	Load Regulation
Object	+15V0.2A

Temperature 25°C
Testing Circuitry Figure A

1.Graph



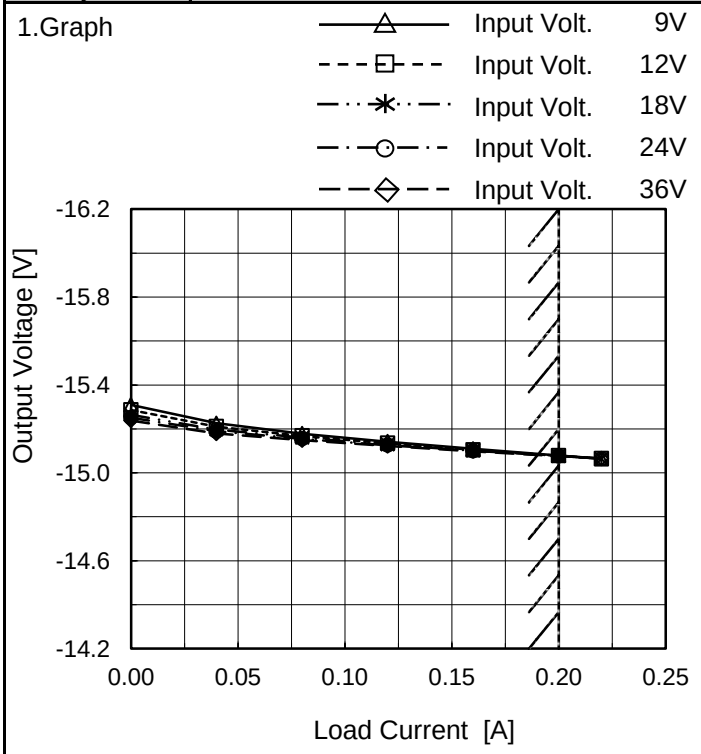
2.Values

Load Current [A]	Output Voltage [V] Input Volt. 9[V]	Input Volt. 12[V]	Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]
0.00	15.286	15.264	15.242	15.228	15.217
0.04	15.201	15.189	15.175	15.166	15.157
0.08	15.156	15.148	15.139	15.133	15.127
0.12	15.119	15.115	15.110	15.106	15.101
0.16	15.087	15.086	15.083	15.080	15.077
0.20	15.055	15.057	15.058	15.056	15.055
0.22	15.039	15.044	15.045	15.045	15.044
--	-	-	-	-	-
--	-	-	-	-	-
--	-	-	-	-	-
--	-	-	-	-	-

-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. 9[V]	Input Volt. 12[V]	Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]
0.00	-15.310	-15.286	-15.264	-15.251	-15.238
0.04	-15.226	-15.210	-15.197	-15.189	-15.179
0.08	-15.178	-15.168	-15.160	-15.155	-15.149
0.12	-15.142	-15.135	-15.129	-15.126	-15.123
0.16	-15.109	-15.105	-15.101	-15.100	-15.098
0.20	-15.079	-15.078	-15.077	-15.077	-15.076
0.22	-15.064	-15.065	-15.064	-15.065	-15.066
--	-	-	-	-	-
--	-	-	-	-	-
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--	-	-	-	-	-

+15V : Rated Load Current

COSEL

Model	MGFW62415	
Item	Dynamic Load Response	Temperature 25°C Testing Circuitry Figure A
Object	+15V0.2A	

Input Volt. 24 V

-15V:rated load current.

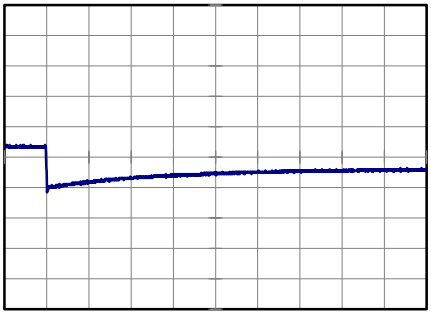
Cycle 100 ms

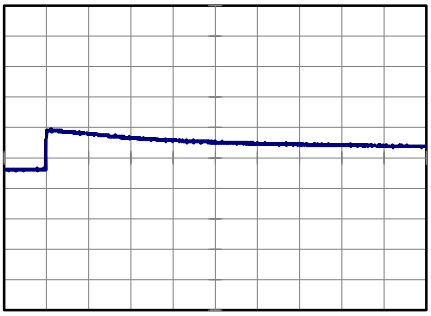
t1,t2 = 100 μs

Load Current

t1 t2

Min.Load (0A)←→
Load 100% (0.2A)

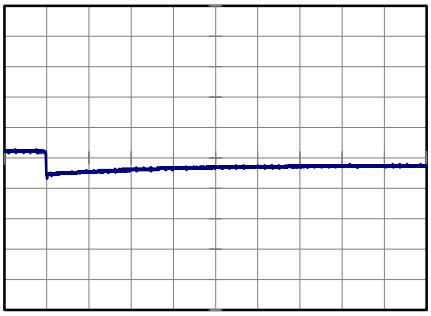


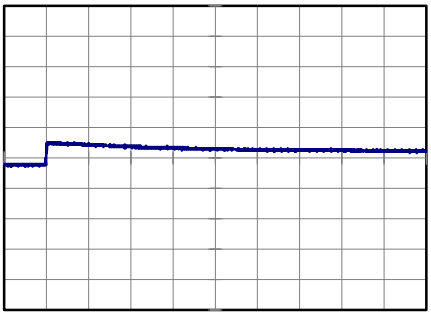


200 mV/div

4 ms/div 4 ms/div

Min.Load (0A)←→
Load 50% (0.1A)

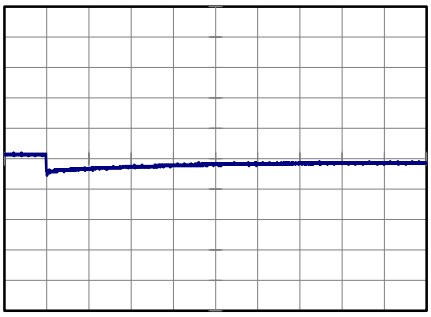


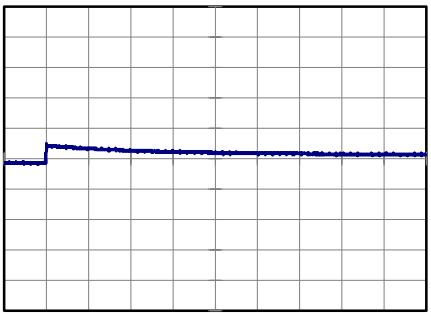


200 mV/div

4 ms/div 4 ms/div

Load 50% (0.1A)←→
Load 100% (0.2A)





200 mV/div

4 ms/div 4 ms/div

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Model	MGFW62415	Temperature 25°C
Item	Dynamic Load Response	Testing Circuitry Figure A
Object	-15V0.2A	

Input Volt. 24 V

+15V:rated load current.

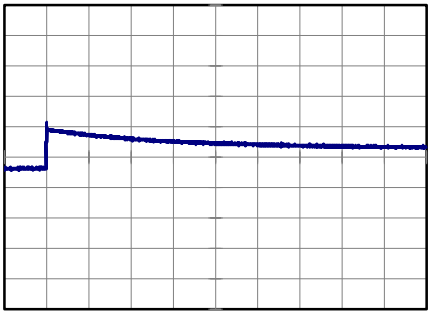
Cycle 100 ms

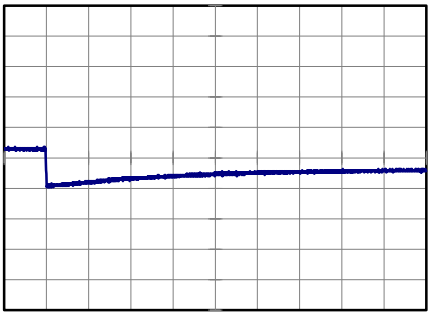
t1,t2 = 100 μs

Load Current

t1 t2

Min.Load (0A)←→
Load 100% (0.2A)

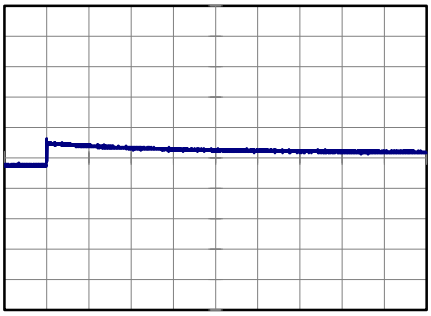


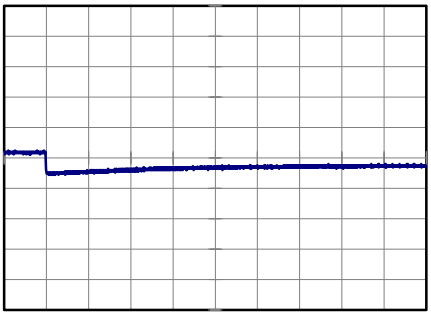


200 mV/div

4 ms/div 4 ms/div

Min.Load (0A)←→
Load 50% (0.1A)

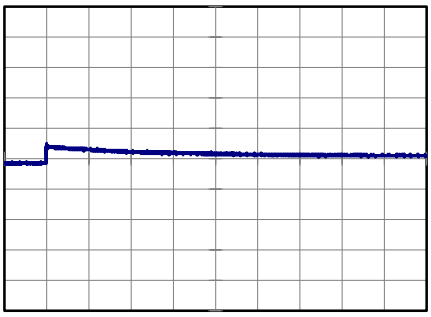


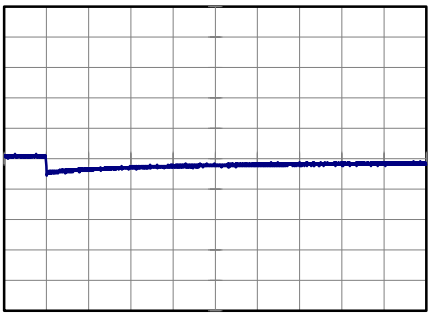


200 mV/div

4 ms/div 4 ms/div

Load 50% (0.1A)←→
Load 100% (0.2A)





200 mV/div

4 ms/div 4 ms/div

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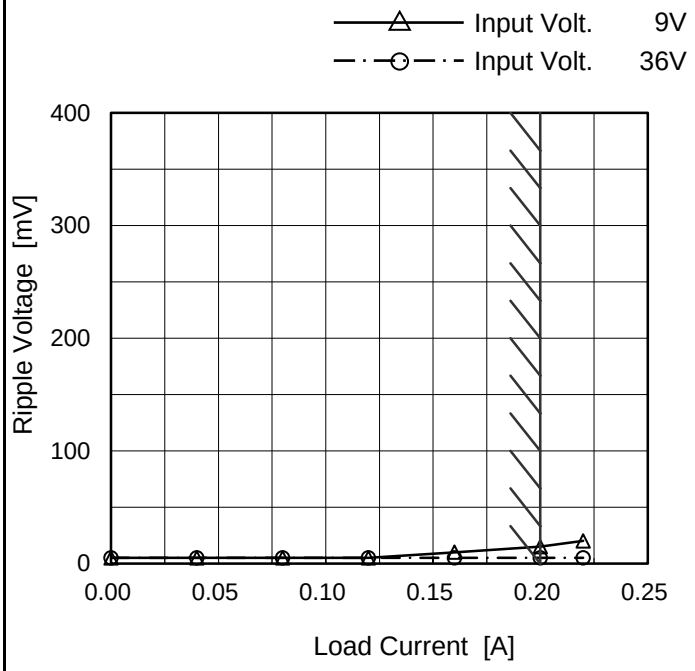
Model	MGFW62415
Item	Ripple Voltage (by Load Current)
Object	+15V0.2A

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]

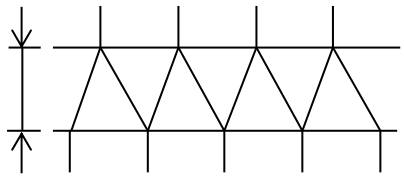


Fig.Complex Ripple Wave Form

2.Values

Load Current [A]	Ripple Voltage [mV]	
	Input Volt. 9 [V]	Input Volt. 36 [V]
0.00	5	5
0.04	5	5
0.08	5	5
0.12	5	5
0.16	10	5
0.20	15	5
0.22	20	5
--	-	-
--	-	-
--	-	-
--	-	-

-15V: Rated Load Current

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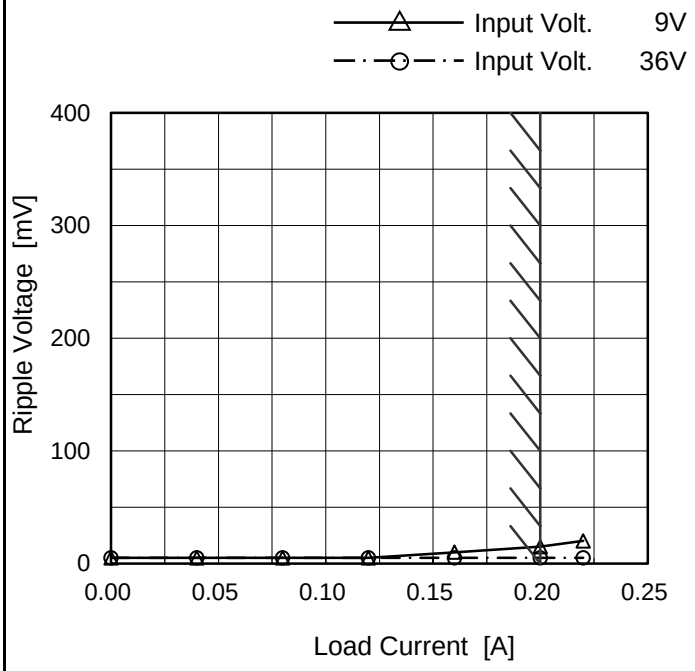
Model	MGFW62415
Item	Ripple Voltage (by Load Current)
Object	-15V0.2A

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]

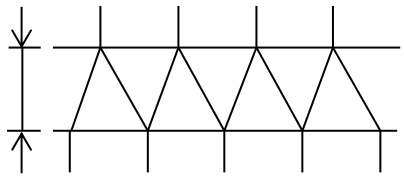


Fig.Complex Ripple Wave Form

2.Values

Load Current [A]	Ripple Voltage [mV]	
	Input Volt. 9 [V]	Input Volt. 36 [V]
0.00	5	5
0.04	5	5
0.08	5	5
0.12	5	5
0.16	10	5
0.20	15	5
0.22	20	5
--	-	-
--	-	-
--	-	-
--	-	-

+15V: Rated Load Current

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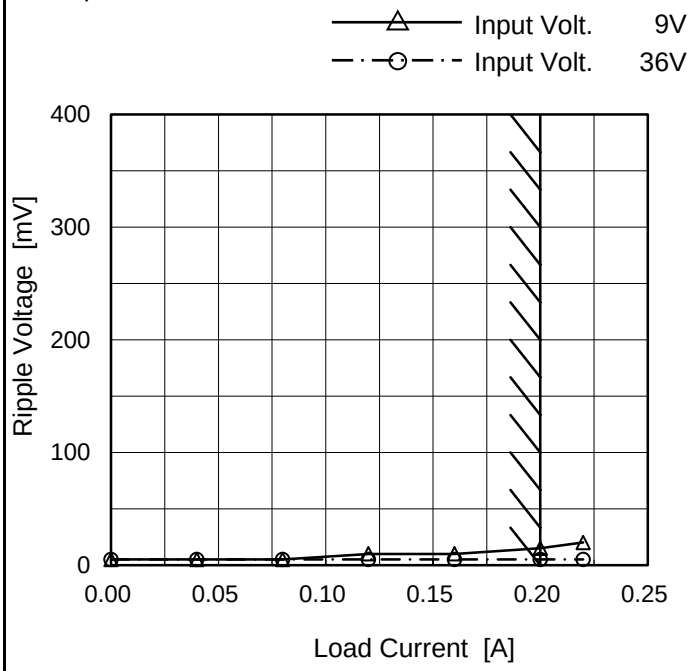
COSEL

Model	MGFW62415
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]

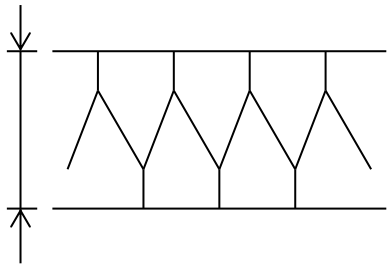


Fig.Complex Ripple Noise Wave Form

2.Values

Load Current [A]	Ripple-Noise [mV]	
	Input Volt. 9 [V]	Input Volt. 36 [V]
0.00	5	5
0.04	5	5
0.08	5	5
0.12	10	5
0.16	10	5
0.20	15	5
0.22	20	5
--	-	-
--	-	-
--	-	-
--	-	-

-15V: Rated Load Current

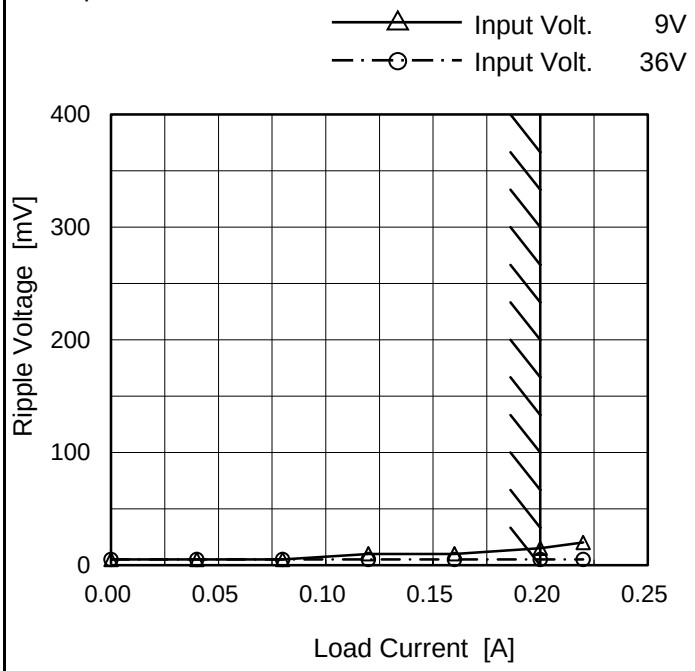
BC-11043

COSEL

Model	MGFW62415
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]

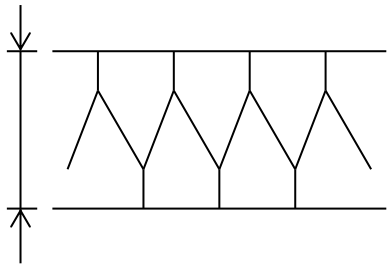


Fig.Complex Ripple Noise Wave Form

2.Values

Load Current [A]	Ripple-Noise [mV]	
	Input Volt. 9 [V]	Input Volt. 36 [V]
0.00	5	5
0.04	5	5
0.08	5	5
0.12	10	5
0.16	10	5
0.20	15	5
0.22	20	5
--	-	-
--	-	-
--	-	-
--	-	-

+15V: Rated Load Current

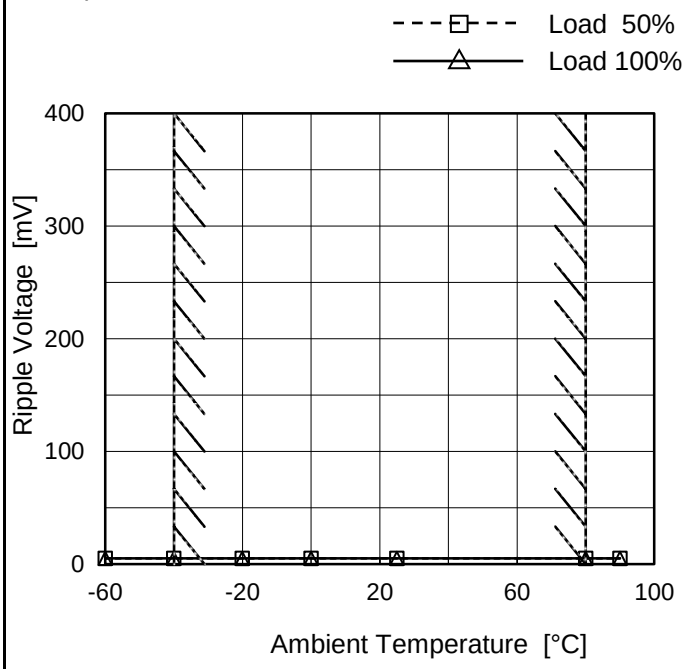
BC-11043

COSEL

Model	MGFW62415
Item	Ripple Voltage (by Ambient Temp.)
Object	+15V0.2A

Testing Circuitry Figure B

1.Graph



Input Volt. 24V

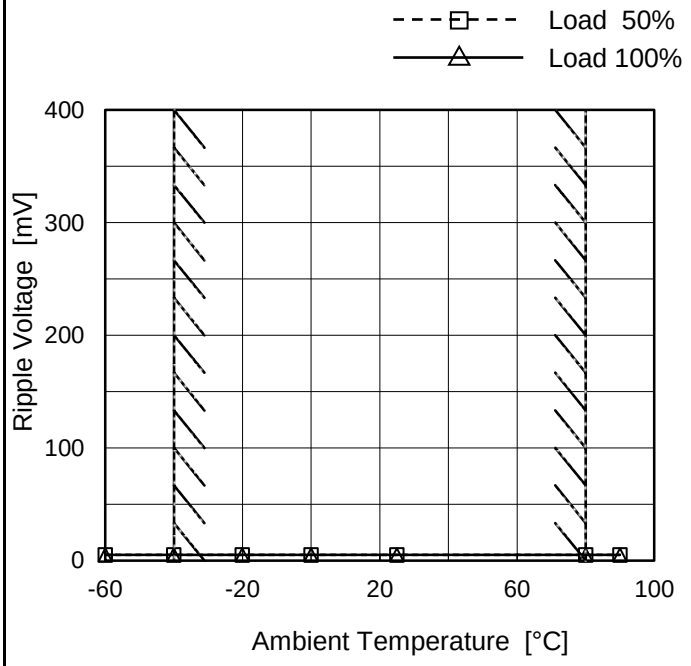
2.Values

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
80	5	5
90	5	5
--	-	-
--	-	-
--	-	-
--	-	-

-15V: Rated Load Current

Object	-15V0.2A

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	5	5
-40	5	5
-20	5	5
0	5	5
25	5	5
80	5	5
90	5	5
--	-	-
--	-	-
--	-	-
--	-	-

+15V: Rated Load Current

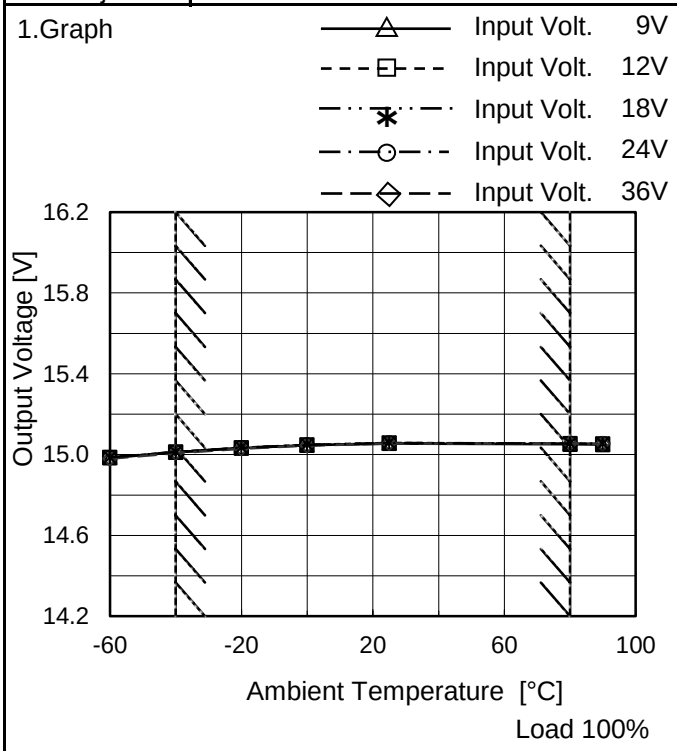
COSEL

Model	MGFW62415
Item	Ambient Temperature Drift

Testing Circuitry Figure A

Object +15V0.2A

1.Graph



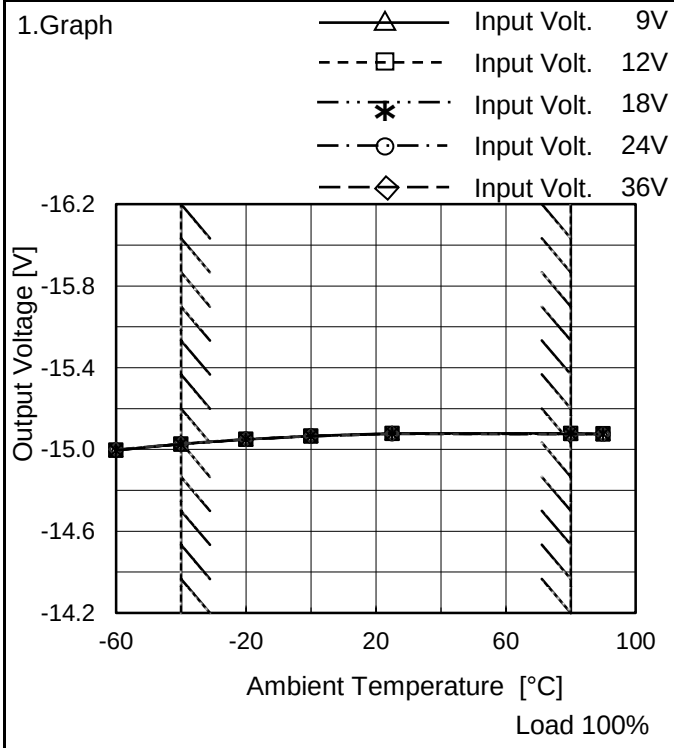
2.Values

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	14.983	14.985	14.986	14.984	14.979
-40	15.011	15.013	15.013	15.011	15.008
-20	15.032	15.034	15.034	15.032	15.029
0	15.046	15.047	15.048	15.047	15.044
25	15.055	15.057	15.058	15.056	15.055
80	15.051	15.054	15.055	15.055	15.055
90	15.049	15.052	15.053	15.053	15.053
--	-	-	-	-	-
--	-	-	-	-	-
--	-	-	-	-	-
--	-	-	-	-	-

-15V : Rated Load Current

Object -15V0.2A

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]	Input Volt. 24[V]	Input Volt. 36[V]
-60	-14.996	-14.997	-14.996	-14.997	-14.999
-40	-15.027	-15.027	-15.026	-15.027	-15.028
-20	-15.050	-15.050	-15.049	-15.049	-15.050
0	-15.067	-15.066	-15.065	-15.065	-15.066
25	-15.079	-15.078	-15.077	-15.077	-15.076
80	-15.079	-15.078	-15.076	-15.076	-15.075
90	-15.077	-15.077	-15.075	-15.074	-15.074
--	-	-	-	-	-
--	-	-	-	-	-
--	-	-	-	-	-
--	-	-	-	-	-

+15V : Rated Load Current

COSEL

Model	MGFW62415	
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 - 80°C

Input Voltage : 9 - 36V

Load Current (AVR 1) : 0 - 0.2A (AVR 2) : 0 - 0.2A

* 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	+15V0.2A					
Item	Temperature [°C]	Input Voltage[V]	Output		Output Voltage Accuracy	
			Current[A]	Voltage[V]	Value [mV]	Ratio [%]
Maximum Voltage	75	9	0	15.298	±241	±1.6
Minimum Voltage	-40	9	0.2	14.816		

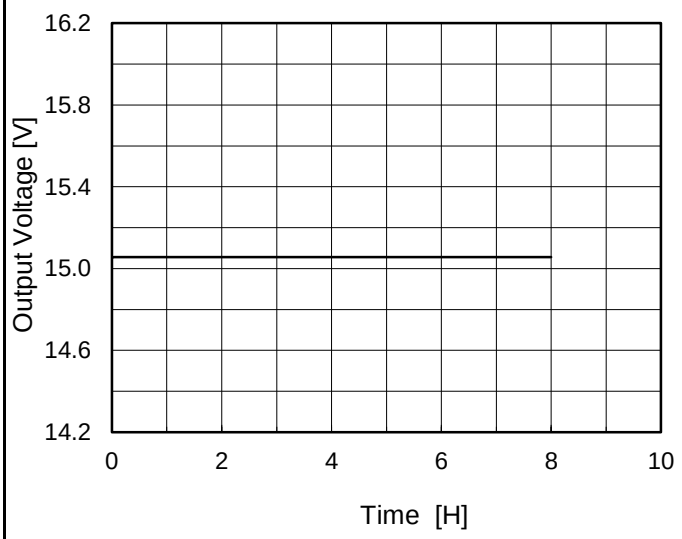
Object	-15V0.2A					
Item	Temperature [°C]	Input Voltage[V]	Output		Output Voltage Accuracy	
			Current[A]	Voltage[V]	Value [mV]	Ratio [%]
Maximum Voltage	75	9	0	-15.322	±242	±1.6
Minimum Voltage	-40	9	0.2	-14.839		

COSEL

Model	MGFW62415
Item	Time Lapse Drift
Object	+15V0.2A

Temperature 25°C
Testing Circuitry Figure A

1.Graph



Input Volt. 24V
Load 100%

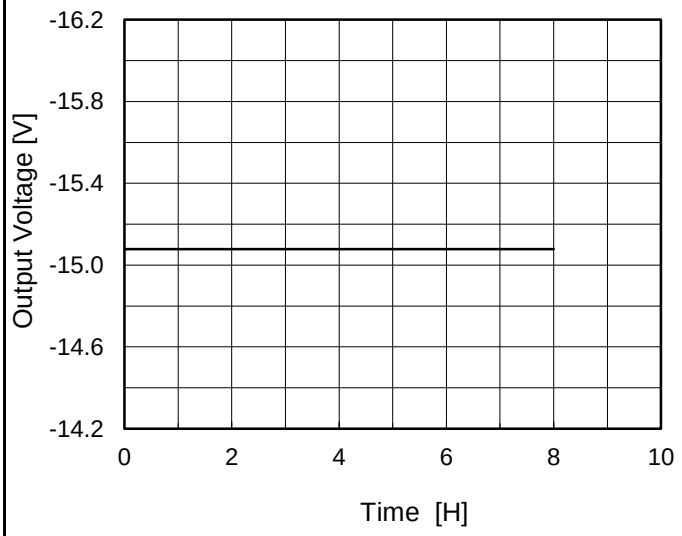
2.Values

Time since start [H]	Output Voltage [V]
0.0	15.054
0.5	15.057
1.0	15.057
2.0	15.056
3.0	15.056
4.0	15.057
5.0	15.057
6.0	15.056
7.0	15.057
8.0	15.057

-15V : Rated Load Current

Object	-15V0.2A

1.Graph



Input Volt. 24V
Load 100%

2.Values

Time since start [H]	Output Voltage [V]
0.0	-15.074
0.5	-15.078
1.0	-15.078
2.0	-15.078
3.0	-15.078
4.0	-15.078
5.0	-15.078
6.0	-15.078
7.0	-15.077
8.0	-15.078

+15V : Rated Load Current

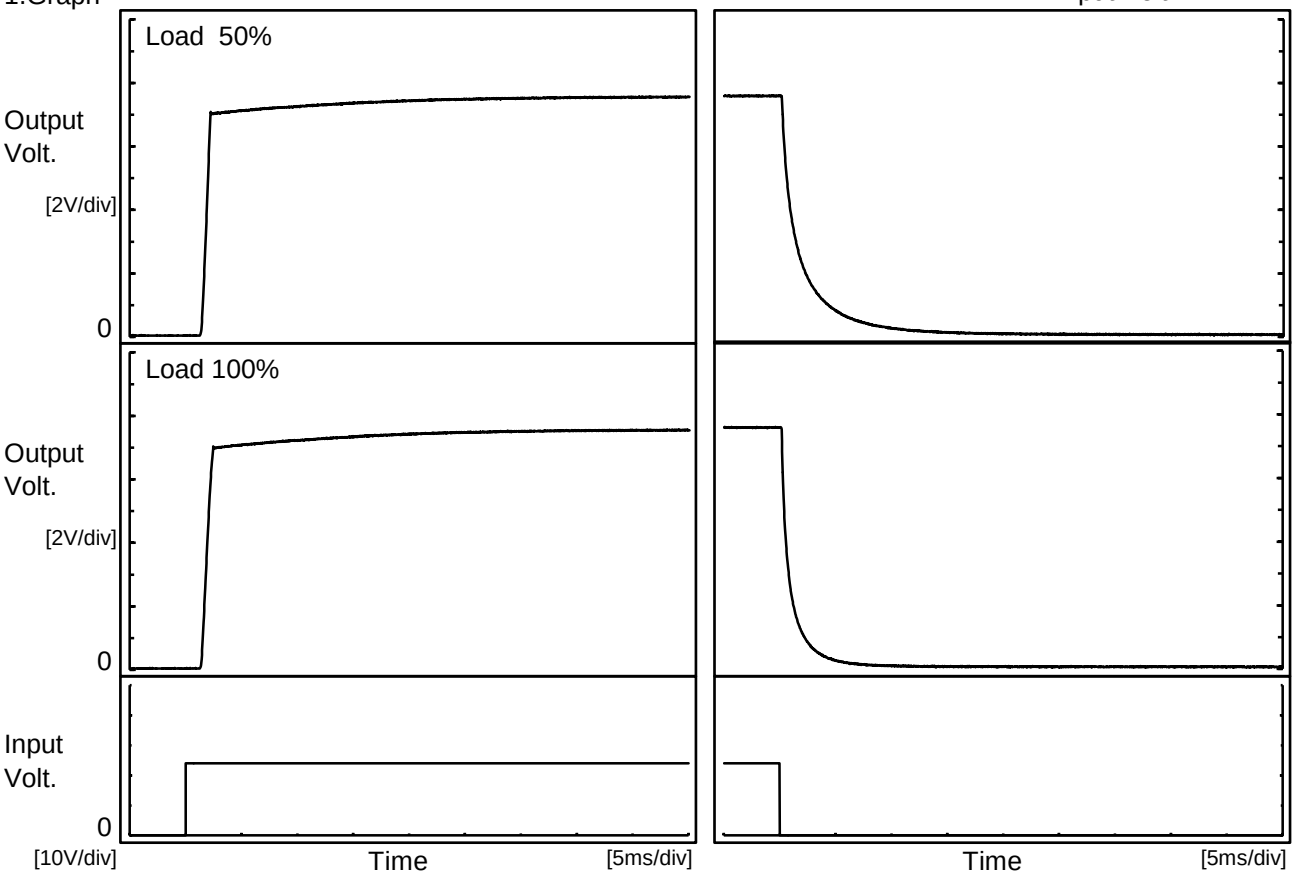
COSEL

Model	MGFW62415
Item	Rise and Fall Time
Object	+15V0.2A

Temperature 25°C
Testing Circuitry Figure A

1.Graph

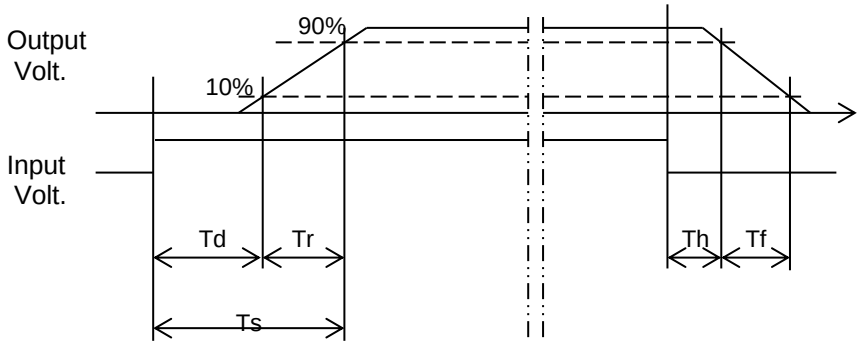
Input Volt. 24 V



2.Values

[ms]

Load \ Time	Td	Tr	Ts	Th	Tf
50 %	1.5	0.7	2.2	0.3	4.9
100 %	1.5	0.9	2.4	0.2	2.4



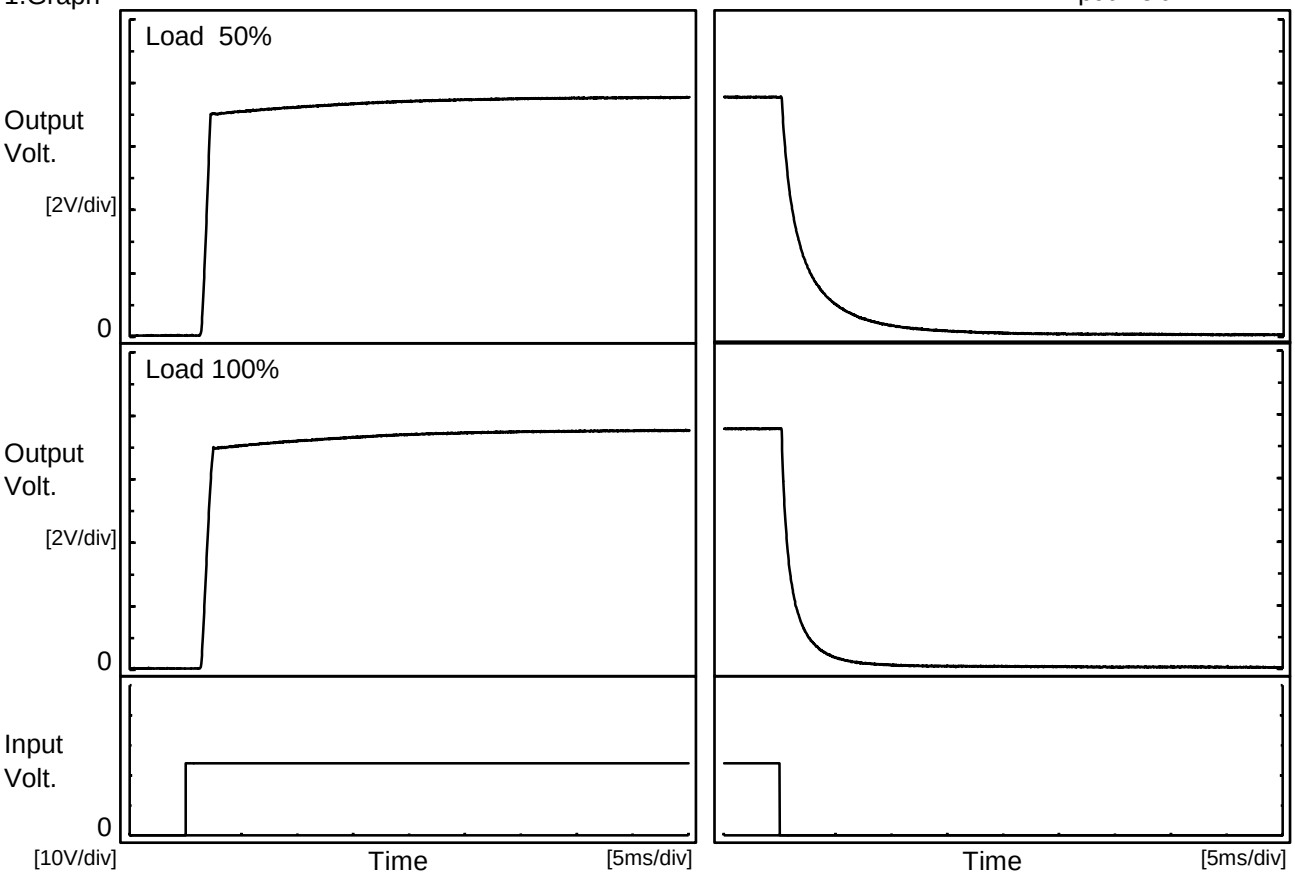
COSEL

Model	MGFW62415
Item	Rise and Fall Time
Object	-15V0.2A

Temperature 25°C
Testing Circuitry Figure A

1.Graph

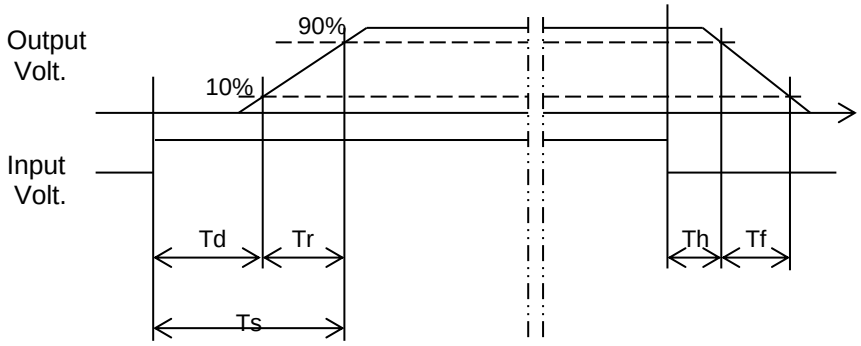
Input Volt. 24 V



2.Values

[ms]

Load \ Time	Td	Tr	Ts	Th	Tf
50 %	1.5	0.7	2.2	0.3	5.8
100 %	1.5	0.9	2.4	0.2	2.9



BC-11043

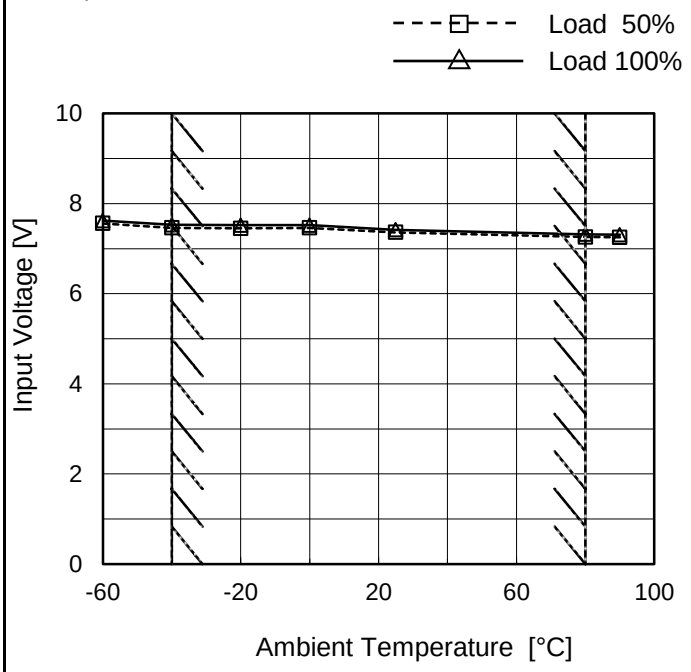
COSEL

Model	MGFW62415
Item	Minimum Input Voltage for Regulated Output Voltage

Testing Circuitry Figure A

Object	+15V0.2A

1.Graph

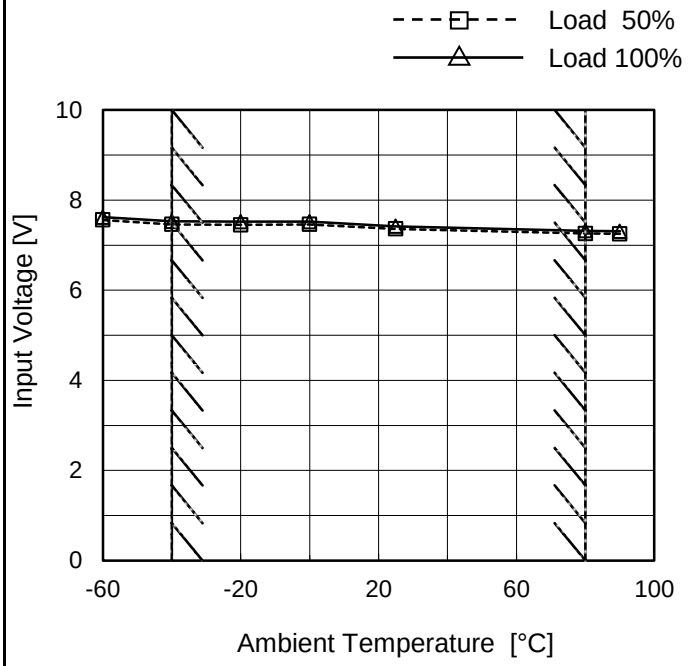


2.Values

Ambient Temperature [°C]	Input Voltage [V]	
	Load 50%	Load 100%
-60	7.6	7.7
-40	7.5	7.6
-20	7.5	7.6
0	7.5	7.6
25	7.4	7.5
80	7.3	7.4
90	7.3	7.4
--	-	-
--	-	-
--	-	-
--	-	-

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	7.6	7.7
-40	7.5	7.6
-20	7.5	7.6
0	7.5	7.6
25	7.4	7.5
80	7.3	7.4
90	7.3	7.4
--	-	-
--	-	-
--	-	-
--	-	-

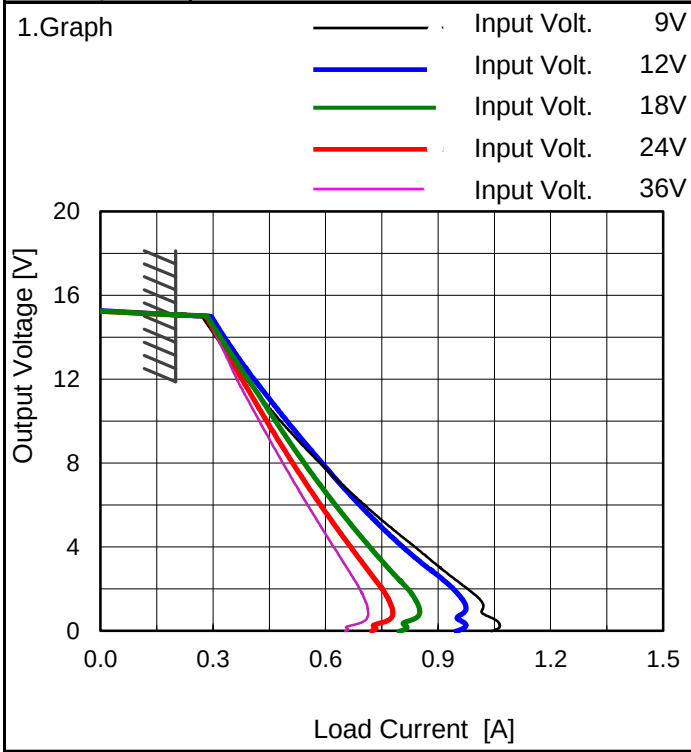
BC-11043

COSEL

Model	MGFW62415
Item	Overcurrent Protection
Object	+15V0.2A

Temperature 25°C
Testing Circuitry Figure A

1.Graph



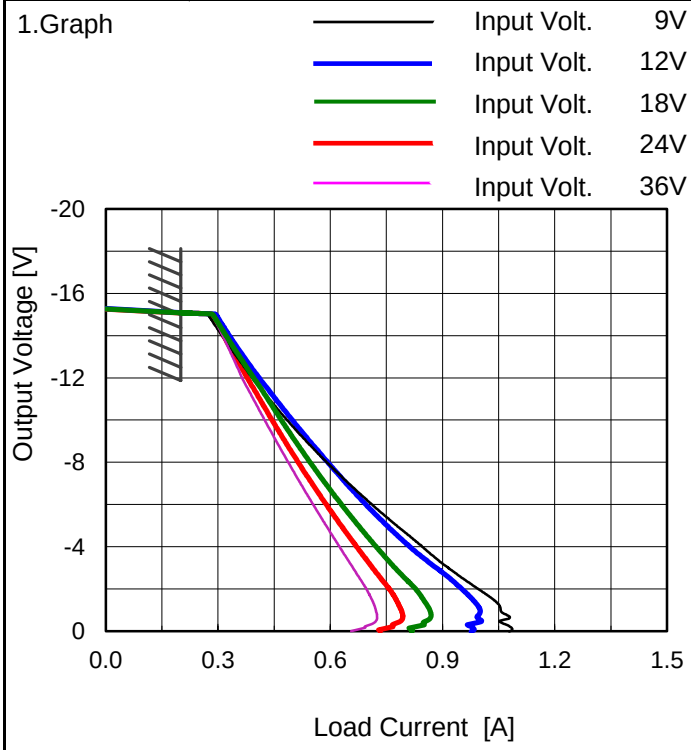
2.Values

Output Voltage [V]	Load Current [A]				
	Input Volt. 9[V]	Input Volt. 12[V]	Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]
14.3	0.298	0.320	0.311	0.305	0.304
13.5	0.327	0.348	0.337	0.328	0.324
12.0	0.387	0.409	0.392	0.375	0.363
10.5	0.455	0.474	0.448	0.425	0.408
9.0	0.530	0.543	0.503	0.476	0.453
7.5	0.614	0.614	0.561	0.530	0.501
6.0	0.703	0.690	0.625	0.586	0.551
4.5	0.801	0.775	0.693	0.645	0.603
3.0	0.905	0.871	0.765	0.708	0.656
1.5	1.011	0.964	0.839	0.768	0.704
0.0	1.042	0.948	0.796	0.722	0.653
--	-	-	-	-	-

-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. 9[V]	Input Volt. 12[V]	Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]
-14.3	0.301	0.321	0.312	0.306	0.306
-13.5	0.329	0.349	0.339	0.329	0.326
-12.0	0.390	0.410	0.395	0.378	0.364
-10.5	0.459	0.475	0.450	0.427	0.409
-9.0	0.534	0.544	0.506	0.478	0.455
-7.5	0.618	0.617	0.565	0.531	0.504
-6.0	0.711	0.694	0.629	0.589	0.554
-4.5	0.810	0.779	0.698	0.650	0.606
-3.0	0.915	0.881	0.771	0.712	0.661
-1.5	1.035	0.980	0.848	0.776	0.711
0.0	1.079	0.977	0.817	0.734	0.656
--	-	-	-	-	-

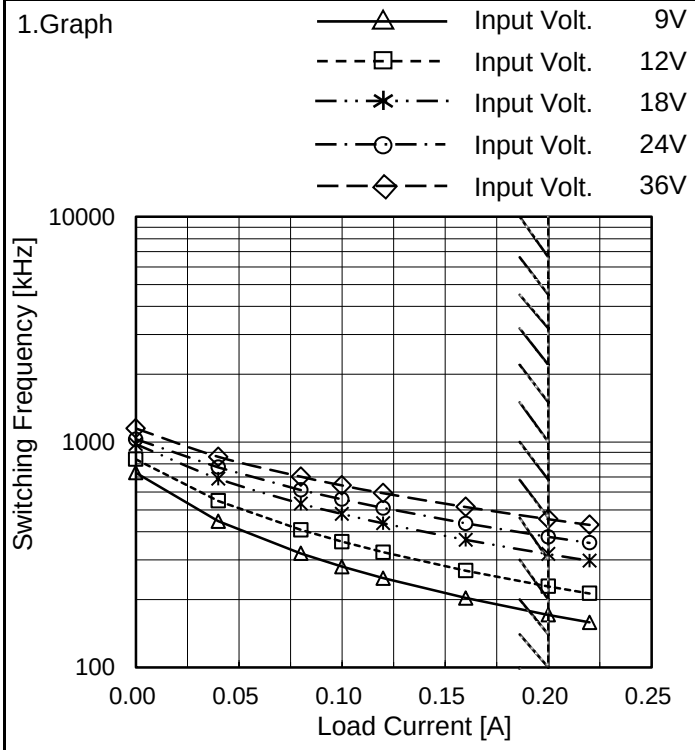
+15V : Rated Load Current

COSEL

Model	MGFW62415
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. 9[V]	Input Volt. 12[V]	Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]
0.00	731	839	980	1030	1150
0.04	446	549	688	773	860
0.08	321	408	533	613	702
0.10	280	361	480	557	642
0.12	249	325	436	510	593
0.16	203	269	368	436	515
0.20	171	229	318	379	455
0.22	159	213	298	357	429
--	-	-	-	-	-
--	-	-	-	-	-
--	-	-	-	-	-

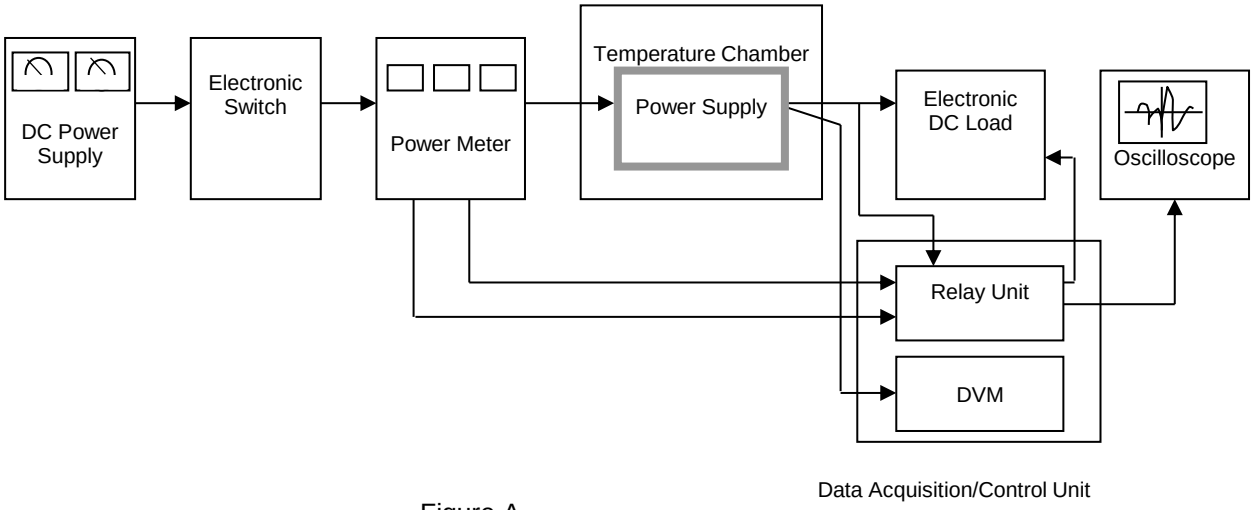


Figure A

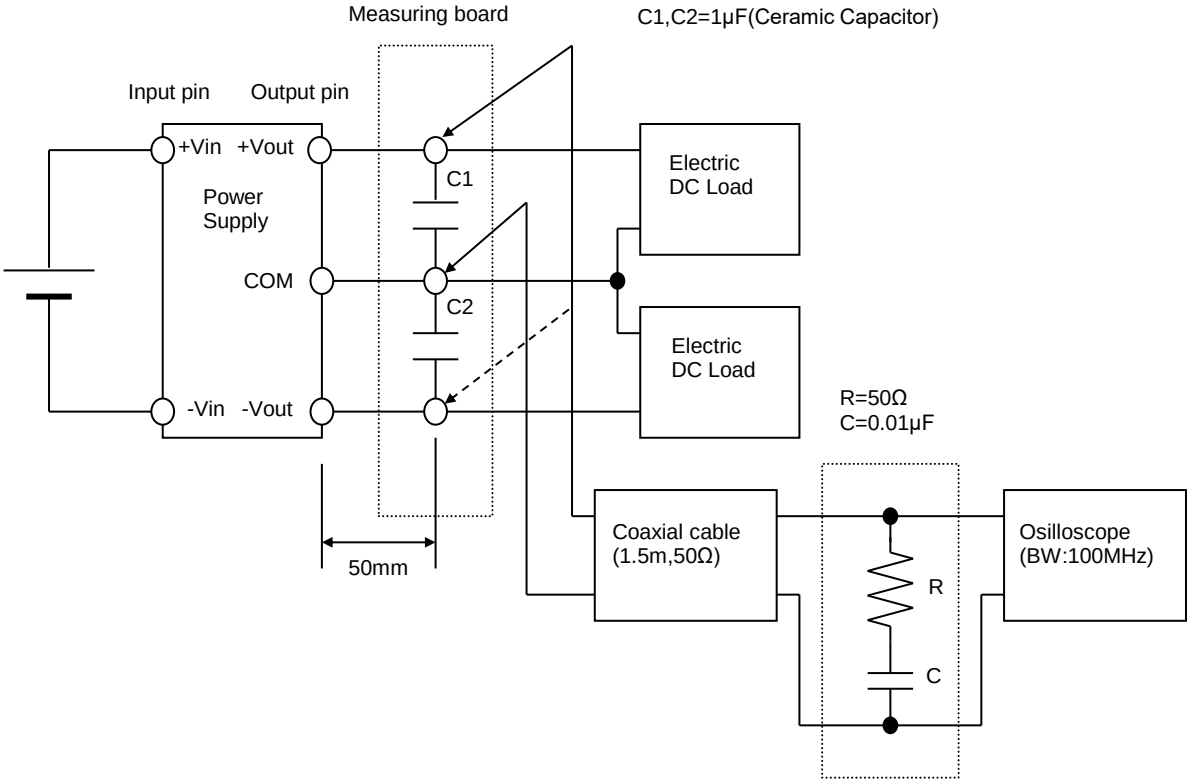


Figure B（Ripple and Ripple noise Characteristic）