COSEL

参考資料

TEST DATA OF MGFW400515

Regulated DC Power Supply
November 28, 2018

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COSEL CO.,LTD.

参考資料

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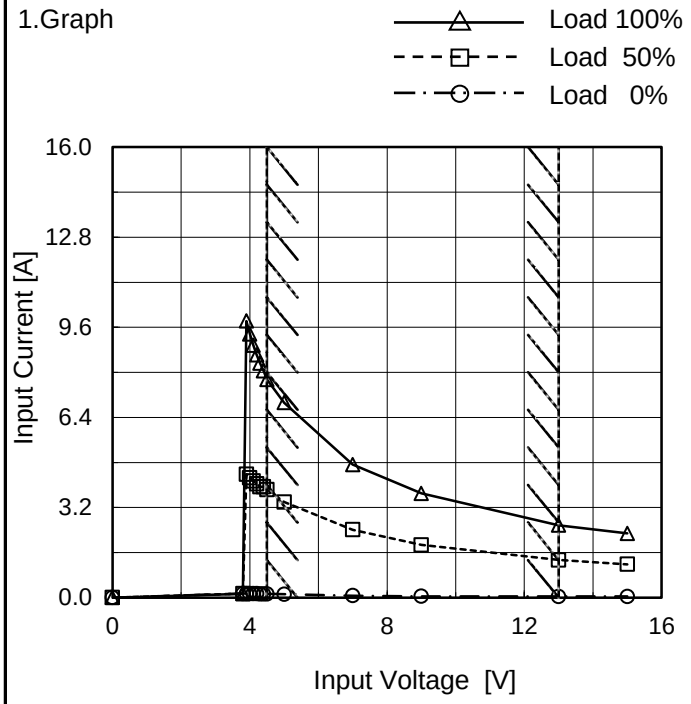
COSEL

Model	MGFW400515
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
3.8	0.145	0.141	0.135
3.9	0.144	4.384	9.824
4.0	0.142	4.255	9.361
4.1	0.139	4.147	8.961
4.2	0.136	4.045	8.622
4.3	0.134	3.937	8.322
4.4	0.131	3.938	8.050
4.5	0.129	3.838	7.747
5.0	0.118	3.393	6.926
7.0	0.069	2.412	4.726
9.0	0.049	1.873	3.702
13.0	0.041	1.338	2.570
15.0	0.040	1.182	2.280
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

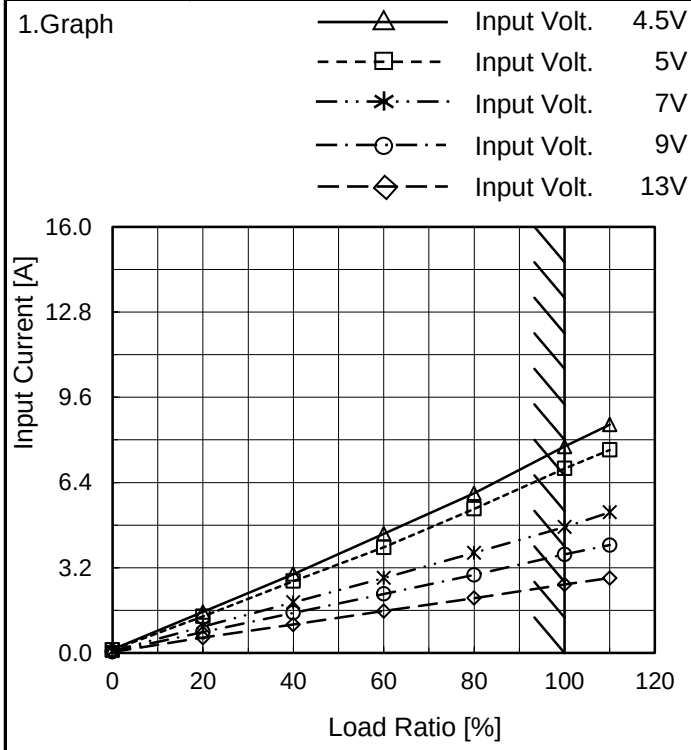
BC-11314

COSEL

Model	MGFW400515
Item	Input Current (by Load Current)
Object	――――――――

Temperature 25°C
Testing Circuitry Figure A

1.Graph



2.Values

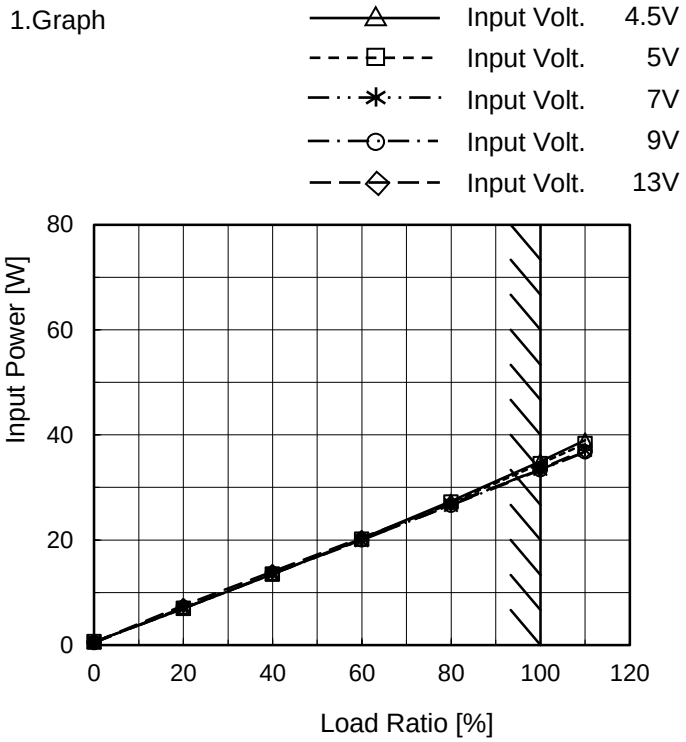
Load Ratio [%]	Input Current [A]				
	Input Volt. 4.5[V]	Input Volt. 5[V]	Input Volt. 7[V]	Input Volt. 9[V]	Input Volt. 13[V]
0	0.129	0.118	0.069	0.049	0.041
20	1.537	1.376	0.992	0.787	0.578
40	2.963	2.695	1.906	1.506	1.070
60	4.476	3.962	2.819	2.213	1.571
80	5.996	5.413	3.757	2.932	2.059
100	7.747	6.926	4.726	3.702	2.570
110	8.570	7.625	5.282	4.047	2.810
--	-	-	-	-	-
--	-	-	-	-	-
--	-	-	-	-	-
--	-	-	-	-	-

COSEL

Model	MGFW400515
Item	Input Power (by Load Current)
Object	――――――――

Temperature 25°C
Testing Circuitry Figure A

1.Graph



2.Values

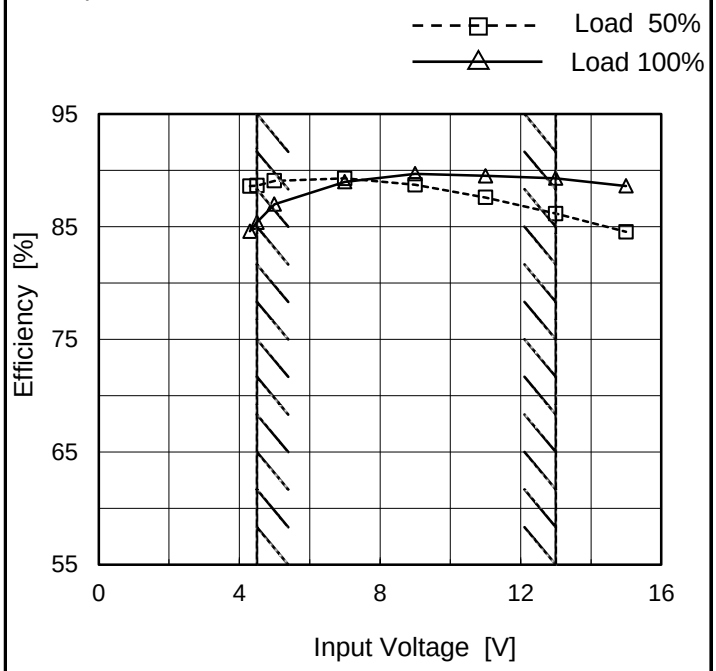
Load Ratio [%]	Input Power [W]				
	Input Volt. 4.5[V]	Input Volt. 5[V]	Input Volt. 7[V]	Input Volt. 9[V]	Input Volt. 13[V]
0	0.58	0.60	0.49	0.44	0.53
20	6.96	6.96	7.02	7.16	7.53
40	13.54	13.50	13.49	13.58	13.98
60	20.25	20.13	19.97	20.03	20.44
80	27.39	27.17	26.66	26.60	26.90
100	34.98	34.53	33.56	33.34	33.46
110	38.99	38.33	37.14	36.75	36.80
--	-	-	-	-	-
--	-	-	-	-	-
--	-	-	-	-	-
--	-	-	-	-	-

COSEL

Model	MGFW400515
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%
4.3	88.6	84.6
4.5	88.7	85.4
5.0	89.1	87.0
7.0	89.3	89.0
9.0	88.7	89.7
11.0	87.6	89.5
13.0	86.2	89.3
15.0	84.5	88.6
--	-	-

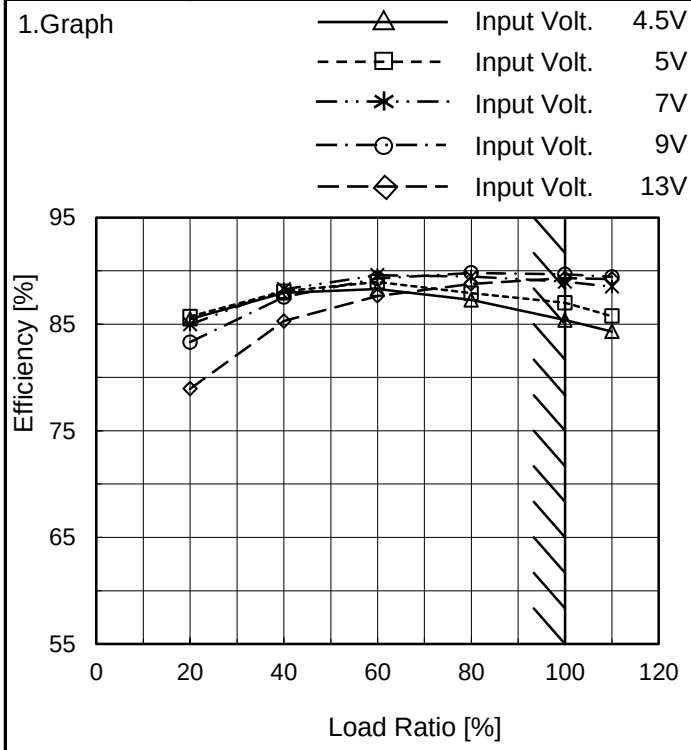
BC-11314

COSEL

Model	MGFW400515
Item	Efficiency (by Load Current)
Object	――――――――

Temperature 25°C
Testing Circuitry Figure A

1.Graph



2.Values

Load Ratio [%]	Efficiency [%]				
	Input Volt. 4.5[V]	Input Volt. 5[V]	Input Volt. 7[V]	Input Volt. 9[V]	Input Volt. 13[V]
0	-	-	-	-	-
20	85.5	85.7	85.0	83.3	78.9
40	87.9	88.1	88.3	87.5	85.3
60	88.3	89.0	89.6	89.3	87.6
80	87.3	87.9	89.5	89.8	88.8
100	85.4	87.0	89.0	89.7	89.3
110	84.3	85.7	88.5	89.4	89.2
--	-	-	-	-	-
--	-	-	-	-	-
--	-	-	-	-	-
--	-	-	-	-	-

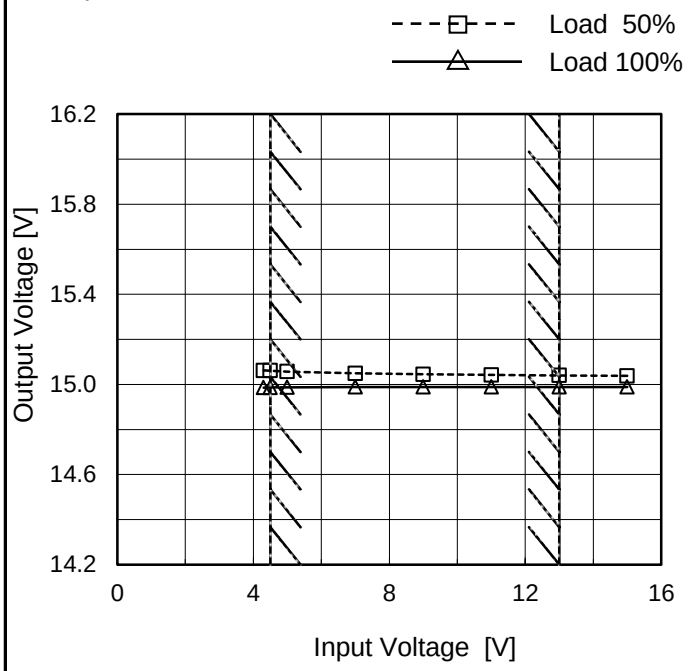
BC-11314

COSEL

Model	MGFW400515
Item	Line Regulation
Object	+15V1A

Temperature 25°C
Testing Circuitry Figure A

1.Graph



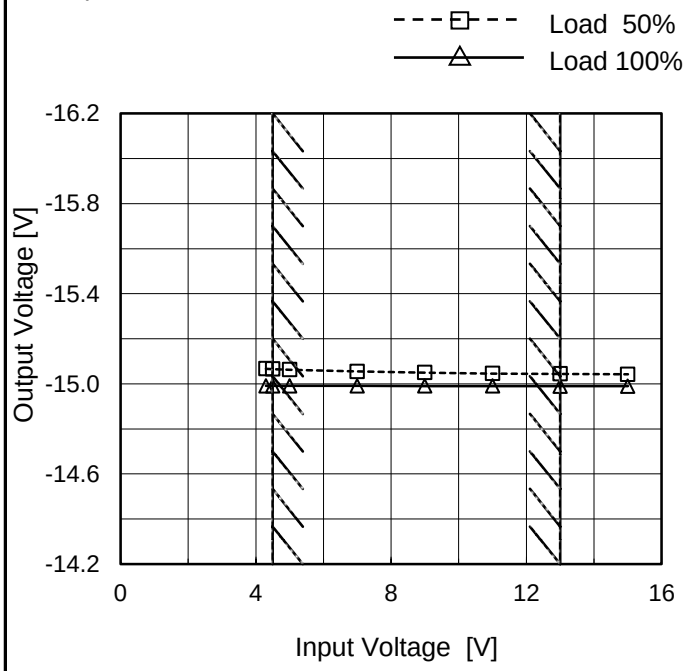
2.Values

Input Voltage [V]	Output Voltage [V]	
	Load 50%	Load 100%
4.3	15.062	14.986
4.5	15.061	14.987
5.0	15.057	14.988
7.0	15.049	14.989
9.0	15.045	14.989
11.0	15.042	14.989
13.0	15.040	14.989
15.0	15.038	14.989
--	-	-

-15V: Rated Load Current

Object	-15V1A

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%
4.3	-15.067	-14.991
4.5	-15.066	-14.991
5.0	-15.063	-14.991
7.0	-15.055	-14.991
9.0	-15.050	-14.990
11.0	-15.046	-14.990
13.0	-15.044	-14.990
15.0	-15.042	-14.989
--	-	-

+15V: Rated Load Current

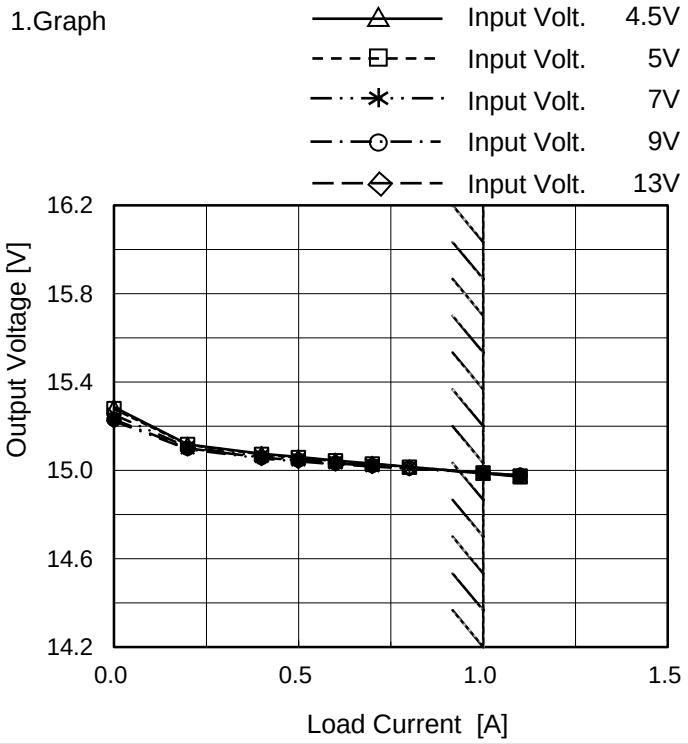
BC-11314

COSEL

Model	MGFW400515
Item	Load Regulation
Object	+15V1A

Temperature 25°C
Testing Circuitry Figure A

1.Graph



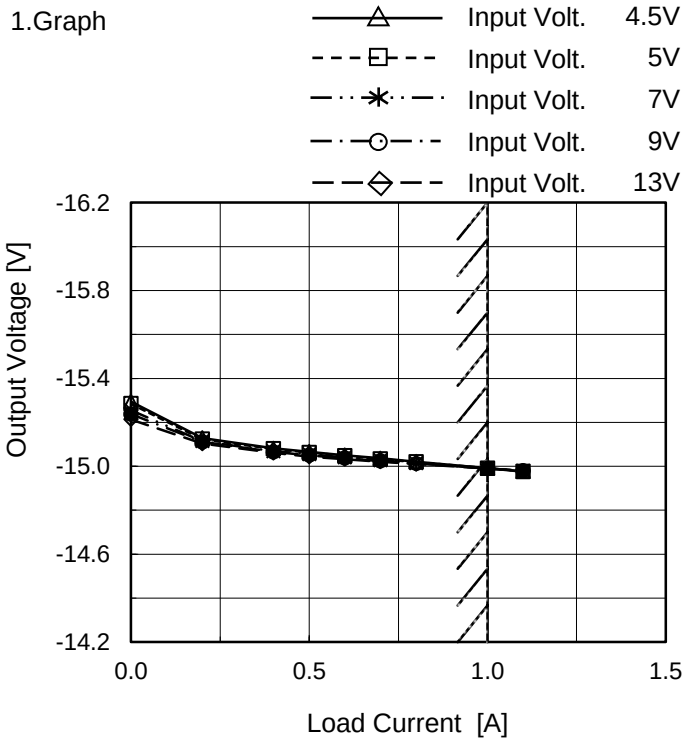
2.Values

Load Current [A]	Output Voltage [V] Input Volt. 4.5[V]	Input Volt. 5[V]	Input Volt. 7[V]	Input Volt. 9[V]	Input Volt. 13[V]
0.0	15.287	15.279	15.253	15.231	15.224
0.2	15.118	15.116	15.104	15.100	15.097
0.4	15.076	15.072	15.065	15.058	15.053
0.5	15.061	15.057	15.049	15.045	15.040
0.6	15.046	15.043	15.036	15.032	15.028
0.7	15.031	15.029	15.023	15.021	15.017
0.8	15.016	15.014	15.011	15.010	15.007
1.0	14.987	14.988	14.989	14.989	14.989
1.1	14.971	14.973	14.977	14.978	14.978
--	-	-	-	-	-
--	-	-	-	-	-

-15V: Rated Load Current

Object	-15V1A

1.Graph



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

2.Values

Load Current [A]	Output Voltage [V] Input Volt. 4.5[V]	Input Volt. 5[V]	Input Volt. 7[V]	Input Volt. 9[V]	Input Volt. 13[V]
0.0	-15.295	-15.285	-15.256	-15.237	-15.214
0.2	-15.129	-15.123	-15.114	-15.111	-15.103
0.4	-15.081	-15.080	-15.069	-15.066	-15.061
0.5	-15.066	-15.063	-15.055	-15.050	-15.044
0.6	-15.050	-15.048	-15.040	-15.037	-15.033
0.7	-15.036	-15.033	-15.027	-15.024	-15.021
0.8	-15.021	-15.019	-15.015	-15.013	-15.010
1.0	-14.991	-14.991	-14.991	-14.990	-14.990
1.1	-14.976	-14.977	-14.979	-14.980	-14.980
--	-	-	-	-	-
--	-	-	-	-	-

+15V: Rated Load Current

COSEL

Model	MGFW400515	
Item	Dynamic Load Response	Temperature 25°C Testing Circuitry Figure A
Object	+15V1A	

Input Volt. 5 V

-15V:rated load current.

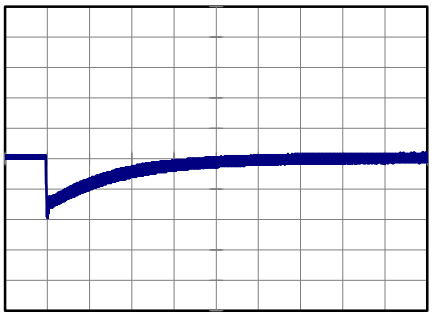
Cycle 100 ms

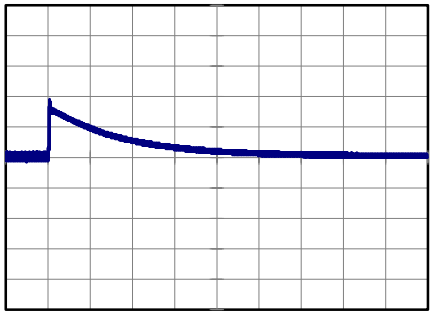
t1,t2 = 100 μ s

Load Current

t1 t2

Min.Load (0A)←→
Load 100% (1A)

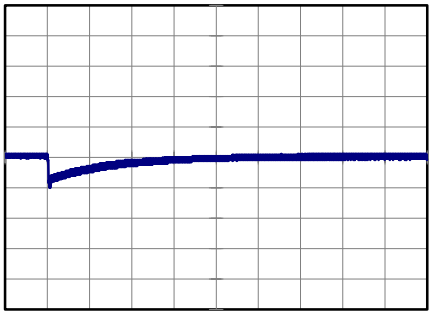


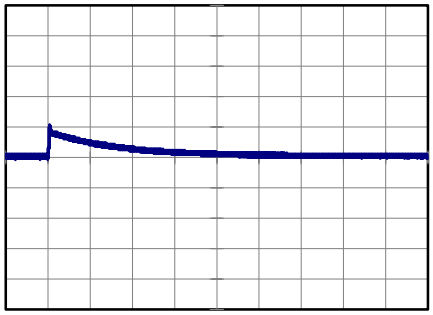


200 mV/div

2 ms/div 2 ms/div

Min.Load (0A)←→
Load 50% (0.5A)

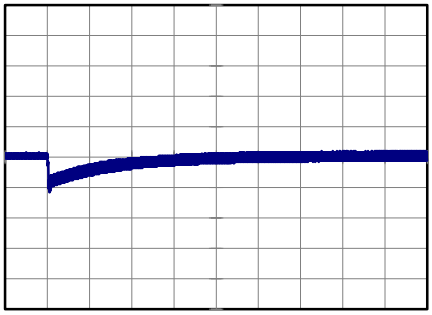


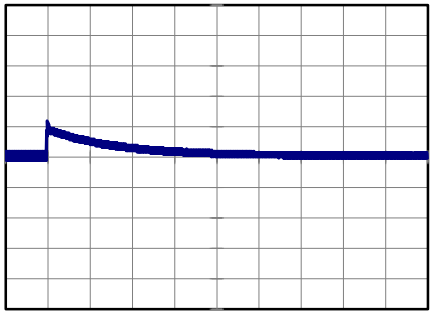


200 mV/div

2 ms/div 2 ms/div

Load 50% (0.5A)←→
Load 100% (1A)





200 mV/div

2 ms/div 2 ms/div

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Model	MGFW400515	
Item	Dynamic Load Response	Temperature 25°C Testing Circuitry Figure A
Object	-15V1A	

Input Volt. 5 V

+15V:rated load current.

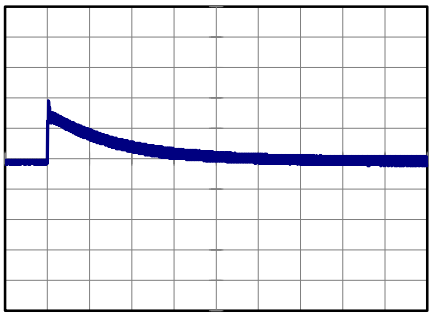
Cycle 100 ms

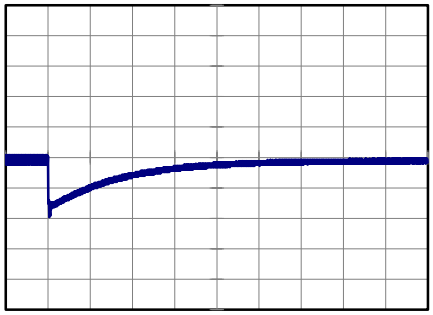
t1,t2 = 100 μs

Load Current

t1 t2

Min.Load (0A)←→
Load 100% (1A)

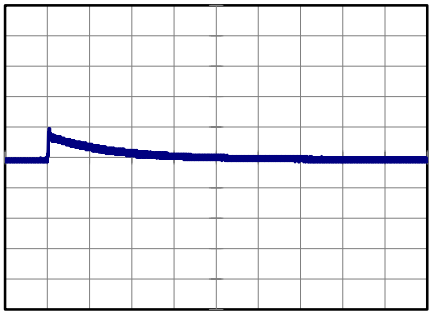


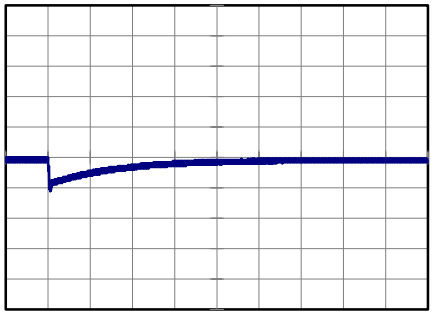


200 mV/div

2 ms/div 2 ms/div

Min.Load (0A)←→
Load 50% (0.5A)

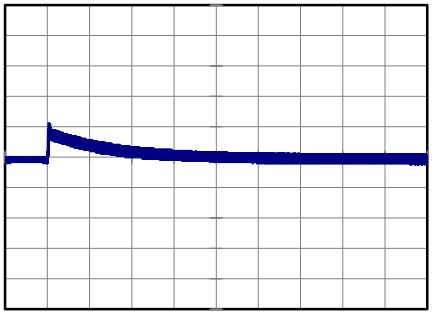


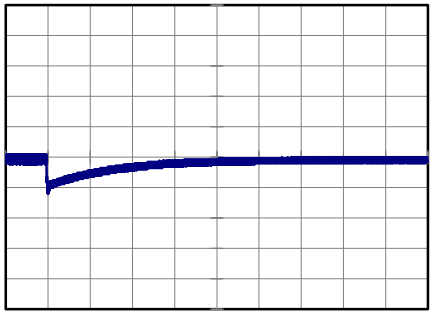


200 mV/div

2 ms/div 2 ms/div

Load 50% (0.5A)←→
Load 100% (1A)





200 mV/div

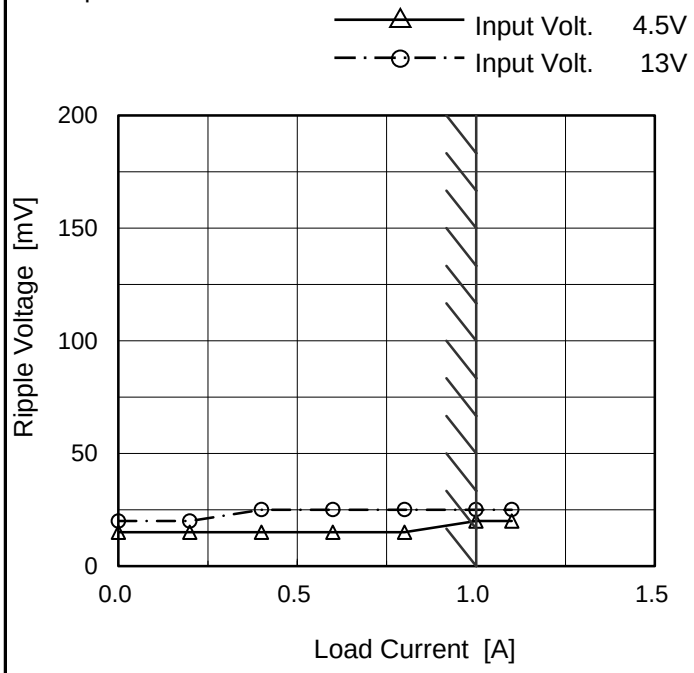
2 ms/div 2 ms/div

COSEL

Model	MGFW400515
Item	Ripple Voltage (by Load Current)
Object	+15V1A

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]

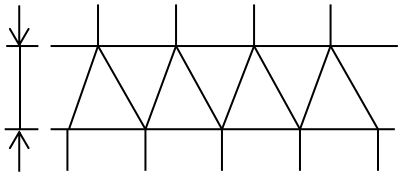


Fig.Complex Ripple Wave Form

2.Values

Load Current [A]	Ripple Voltage [mV]	
	Input Volt. 4.5 [V]	Input Volt. 13 [V]
0.0	15	20
0.2	15	20
0.4	15	25
0.6	15	25
0.8	15	25
1.0	20	25
1.1	20	25
--	-	-
--	-	-
--	-	-
--	-	-

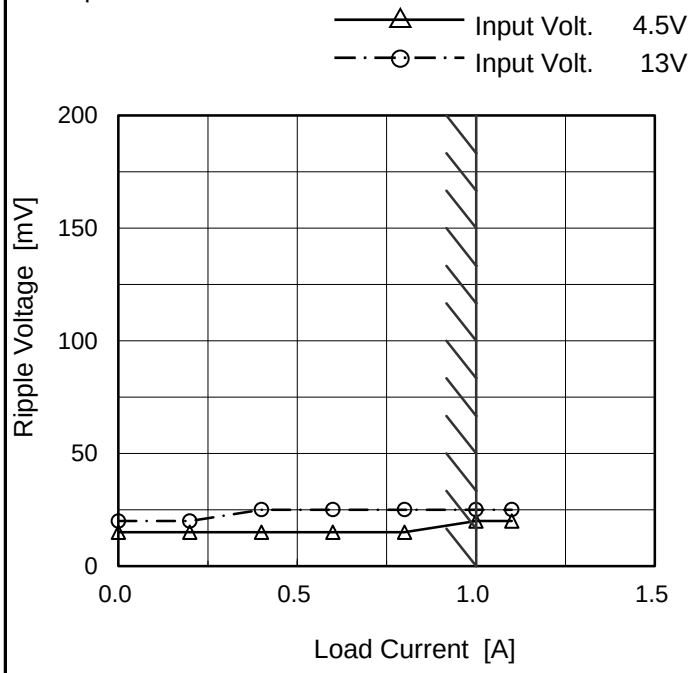
-15V: Rated Load Current

COSEL

Model	MGFW400515
Item	Ripple Voltage (by Load Current)
Object	-15V1A

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]

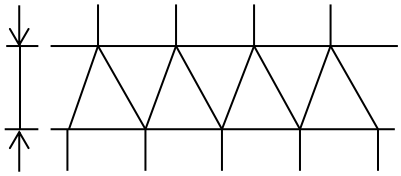


Fig.Complex Ripple Wave Form

2.Values

Load Current [A]	Ripple Voltage [mV]	
	Input Volt. 4.5 [V]	Input Volt. 13 [V]
0.0	15	20
0.2	15	20
0.4	15	25
0.6	15	25
0.8	15	25
1.0	20	25
1.1	20	25
--	-	-
--	-	-
--	-	-
--	-	-

+15V: Rated Load Current

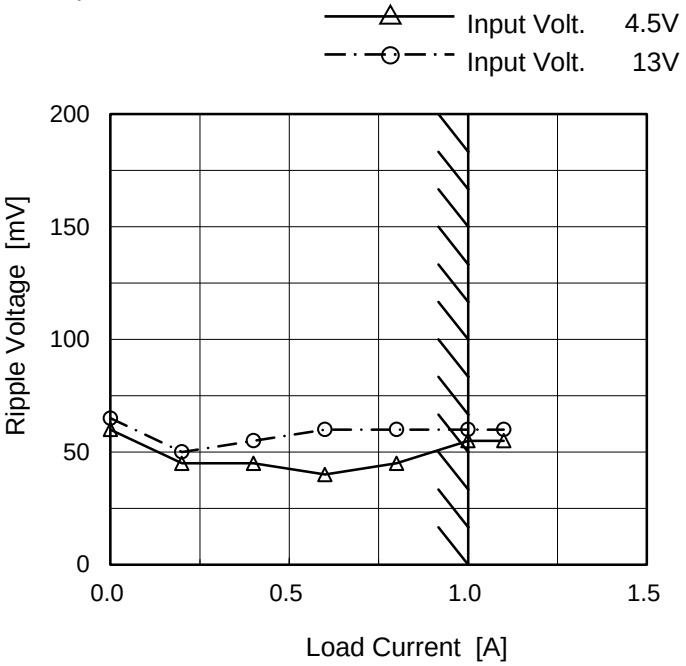
BC-11314

COSEL

Model	MGFW400515
Item	Ripple-Noise
Object	+15V1A

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]

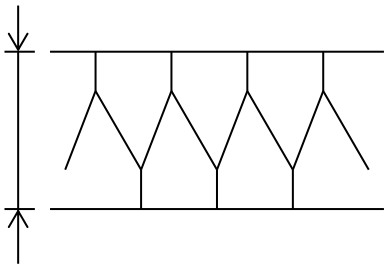


Fig.Complex Ripple Noise Wave Form

2.Values

Load Current [A]	Ripple-Noise [mV]	
	Input Volt. 4.5 [V]	Input Volt. 13 [V]
0.0	60	65
0.2	45	50
0.4	45	55
0.6	40	60
0.8	45	60
1.0	55	60
1.1	55	60
--	-	-
--	-	-
--	-	-
--	-	-

-15V: Rated Load Current

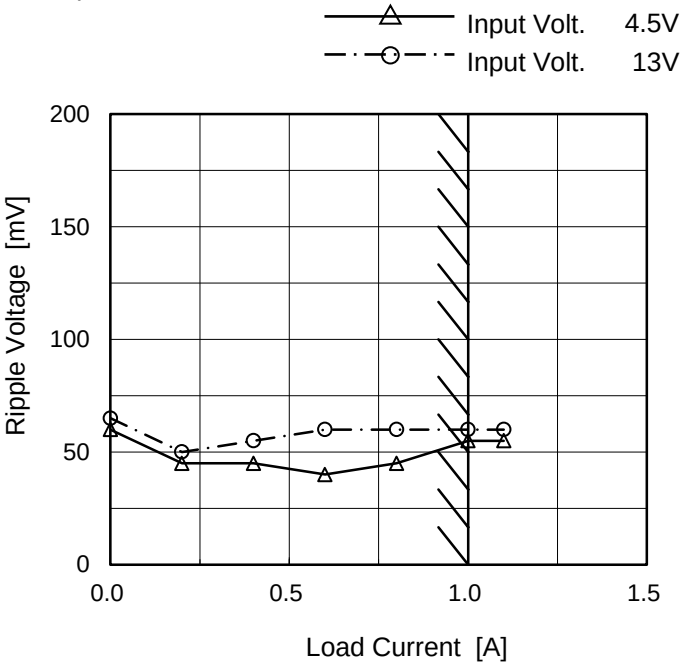
BC-11314

COSEL

Model	MGFW400515
Item	Ripple-Noise
Object	-15V1A

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]

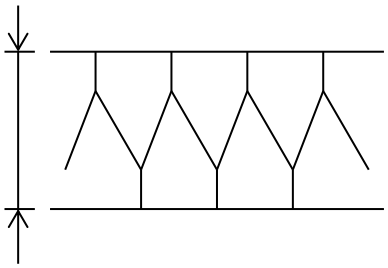


Fig.Complex Ripple Noise Wave Form

2.Values

Load Current [A]	Ripple-Noise [mV]	
	Input Volt. 4.5 [V]	Input Volt. 13 [V]
0.0	60	65
0.2	45	50
0.4	45	55
0.6	40	60
0.8	45	60
1.0	55	60
1.1	55	60
--	-	-
--	-	-
--	-	-
--	-	-

+15V: Rated Load Current

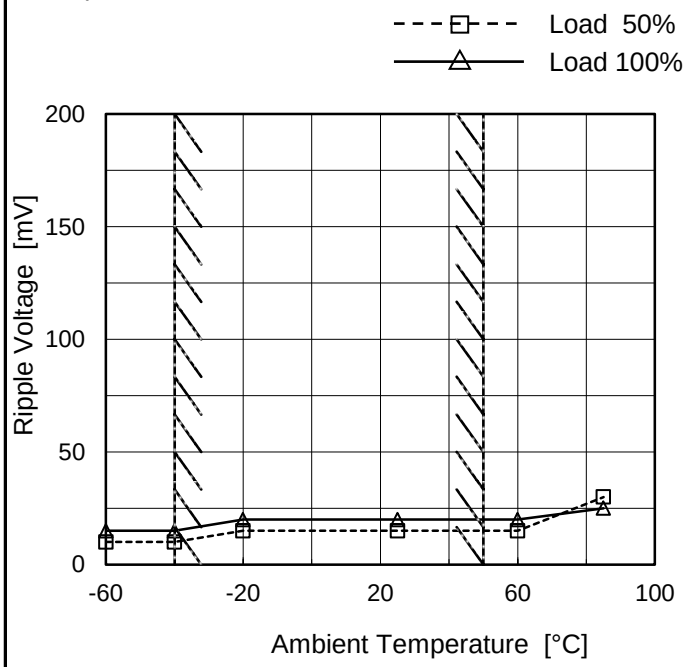
BC-11314

COSEL

Model	MGFW400515
Item	Ripple Voltage (by Ambient Temp.)
Object	+15V1A

Testing Circuitry Figure B

1.Graph



Input Volt. 5V

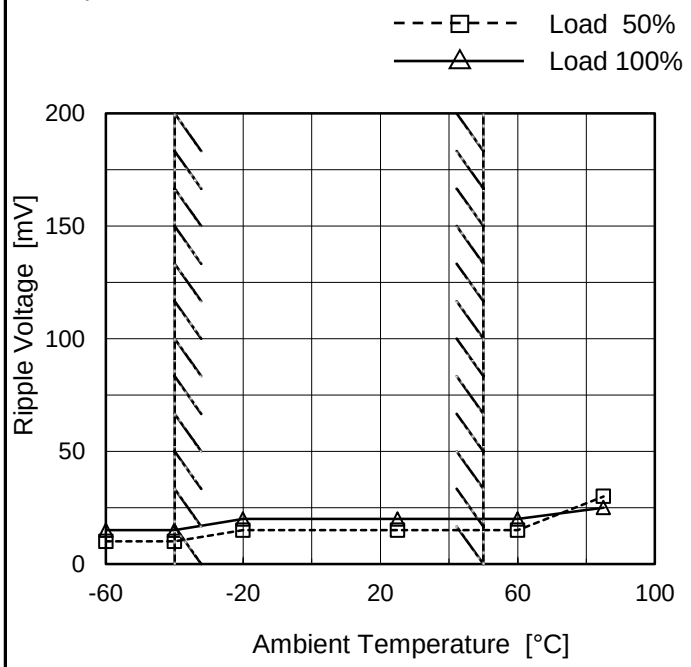
2.Values

Ambient Temperature [°C]	Ripple Voltage [mV]	
	Load 50%	Load 100%
-60	10	15
-40	10	15
-20	15	20
25	15	20
60	15	20
85	30	25
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-

-15V: Rated Load Current

Object	-15V1A

1.Graph



Input Volt. 5V

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	10	15
-40	10	15
-20	15	20
25	15	20
60	15	20
85	30	25
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-

+15V: Rated Load Current

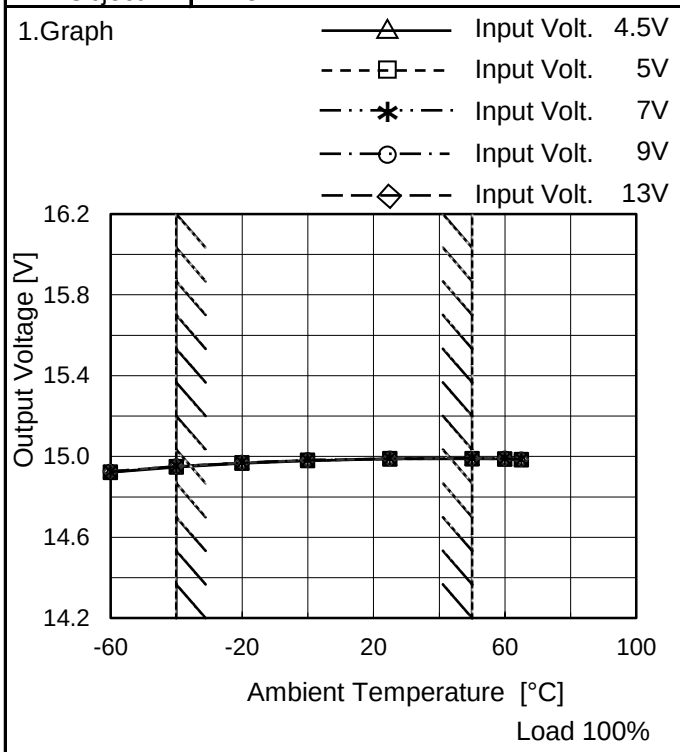
COSEL

Model	MGFW400515
Item	Ambient Temperature Drift

Testing Circuitry Figure A

Object +15V1A

1.Graph



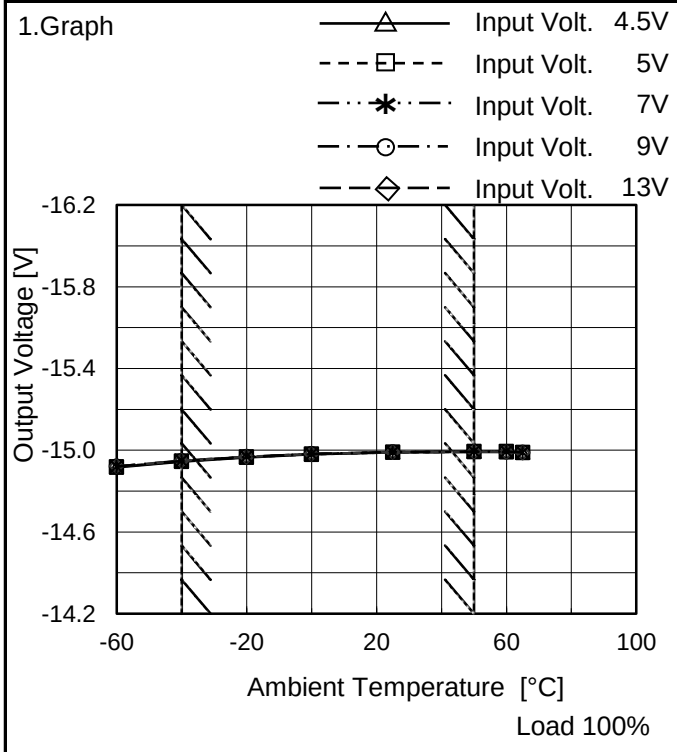
2.Values

Ambient Temperature [°C]	Output Voltage [V] Input Volt. 4.5[V]	Input Volt. 5[V]	Input Volt. 7[V]	Input Volt. 9[V]	Input Volt. 13[V]
-60	14.921	14.922	14.924	14.926	14.925
-40	14.947	14.949	14.950	14.952	14.952
-20	14.966	14.967	14.969	14.970	14.969
0	14.979	14.980	14.982	14.982	14.981
25	14.987	14.988	14.990	14.990	14.989
50	14.988	14.989	14.990	14.991	14.990
60	14.987	14.988	14.989	14.990	14.989
65	14.983	14.984	14.986	14.986	14.985
--	-	-	-	-	-
--	-	-	-	-	-
--	-	-	-	-	-

-15V: Rated Load Current

Object -15V1A

1.Graph



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

2.Values

Ambient Temperature [°C]	Output Voltage [V] Input Volt. 4.5[V]	Input Volt. 5[V]	Input Volt. 7[V]	Input Volt. 9[V]	Input Volt. 13[V]
-60	-14.916	-14.919	-14.920	-14.921	-14.921
-40	-14.945	-14.946	-14.948	-14.949	-14.948
-20	-14.965	-14.967	-14.968	-14.968	-14.968
0	-14.980	-14.981	-14.981	-14.982	-14.981
25	-14.990	-14.990	-14.991	-14.991	-14.990
50	-14.993	-14.993	-14.993	-14.993	-14.992
60	-14.993	-14.993	-14.993	-14.993	-14.991
65	-14.989	-14.989	-14.990	-14.989	-14.988
--	-	-	-	-	-
--	-	-	-	-	-
--	-	-	-	-	-

+15V: Rated Load Current

COSEL

Model	MGFW400515	
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 - 50°C

Input Voltage : 4.5 - 13V

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

* 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	+15V1A					
Item	Temperature [°C]	Input Voltage[V]	Output		Output Voltage Accuracy	
			Current[A]	Voltage[V]	Value [mV]	Ratio [%]
Maximum Voltage	50	4.5	0	15.295	±313	±2.1
Minimum Voltage	-40	4.5	1	14.670		

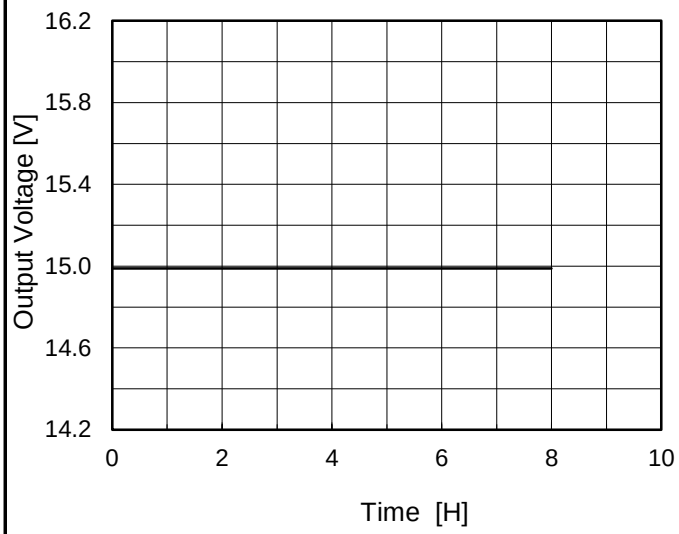
Object	-15V1A					
Item	Temperature [°C]	Input Voltage[V]	Output		Output Voltage Accuracy	
			Current[A]	Voltage[V]	Value [mV]	Ratio [%]
Maximum Voltage	50	4.5	0	-15.306	±319	±2.1
Minimum Voltage	-40	4.5	1	-14.669		

COSEL

Model	MGFW400515
Item	Time Lapse Drift
Object	+15V1A

Temperature 25°C
Testing Circuitry Figure A

1.Graph



Input Volt. 5V
Load 100%

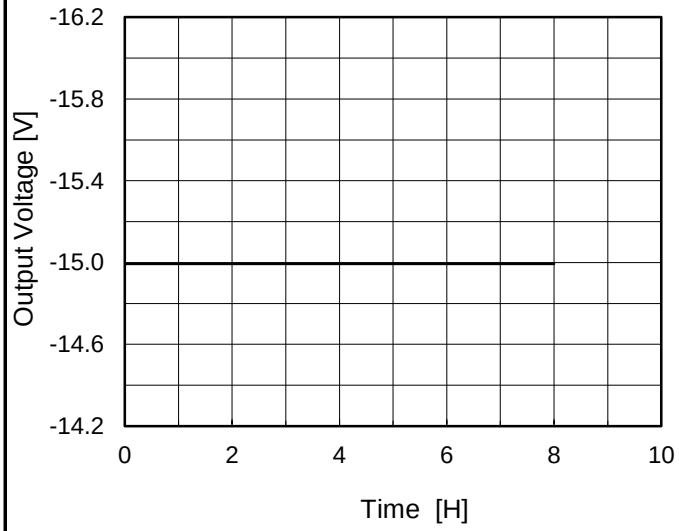
2.Values

Time since start [H]	Output Voltage [V]
0.0	14.988
0.5	14.989
1.0	14.989
2.0	14.989
3.0	14.989
4.0	14.989
5.0	14.989
6.0	14.989
7.0	14.989
8.0	14.989

-15V: Rated Load Current

Object	-15V1A

1.Graph



Input Volt. 5V
Load 100%

2.Values

Time since start [H]	Output Voltage [V]
0.0	-14.990
0.5	-14.993
1.0	-14.993
2.0	-14.993
3.0	-14.993
4.0	-14.993
5.0	-14.993
6.0	-14.993
7.0	-14.993
8.0	-14.993

+15V: Rated Load Current

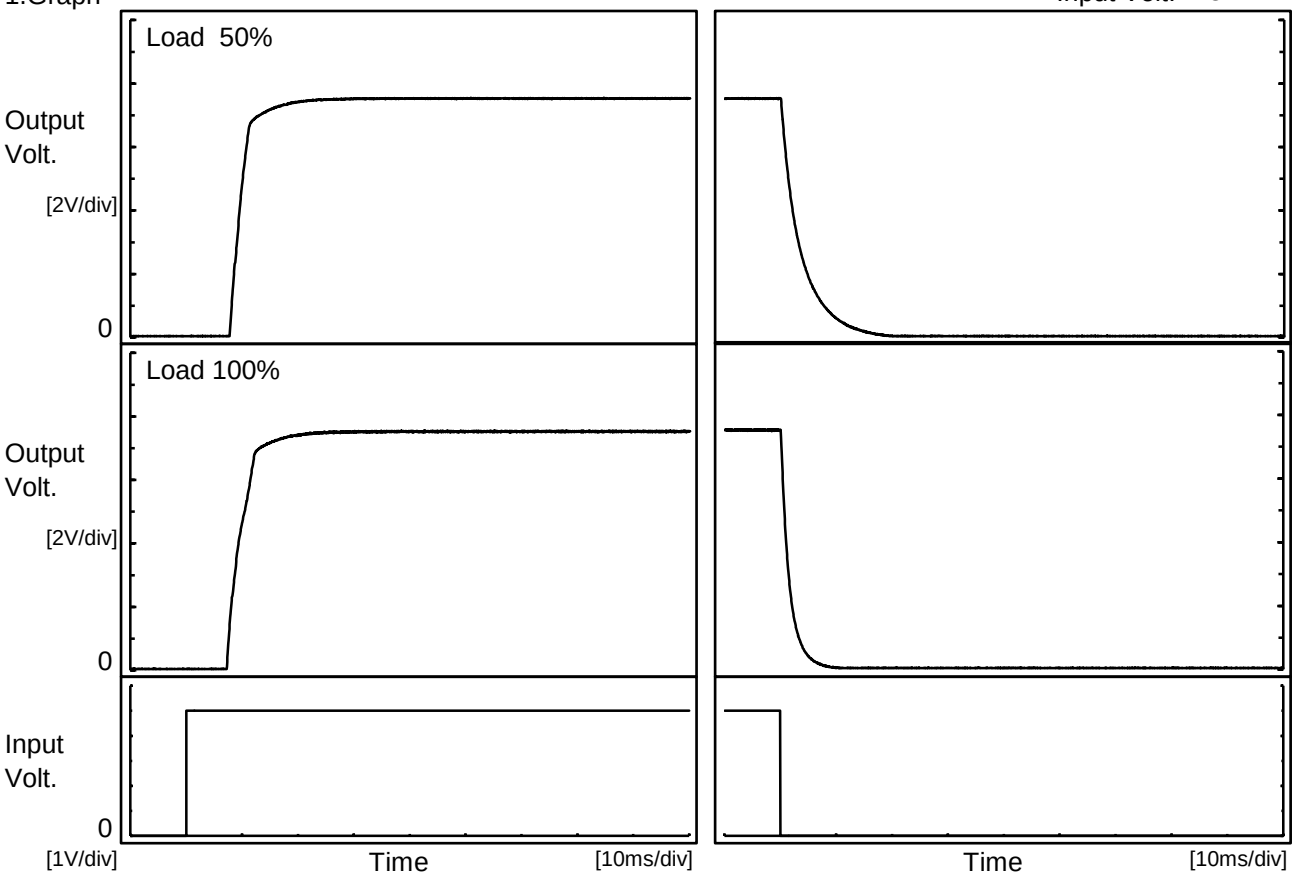
COSEL

Model	MGFW400515
Item	Rise and Fall Time
Object	+15V1A

Temperature 25°C
Testing Circuitry Figure A

1.Graph

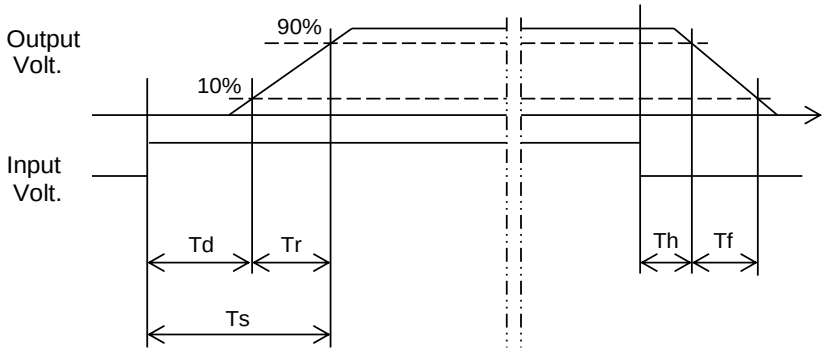
Input Volt. 5 V



2.Values

[ms]

Load \ Time	Td	Tr	Ts	Th	Tf
50 %	8.1	3.7	11.8	0.4	8.4
100 %	7.5	4.7	12.2	0.3	3.5



BC-11314

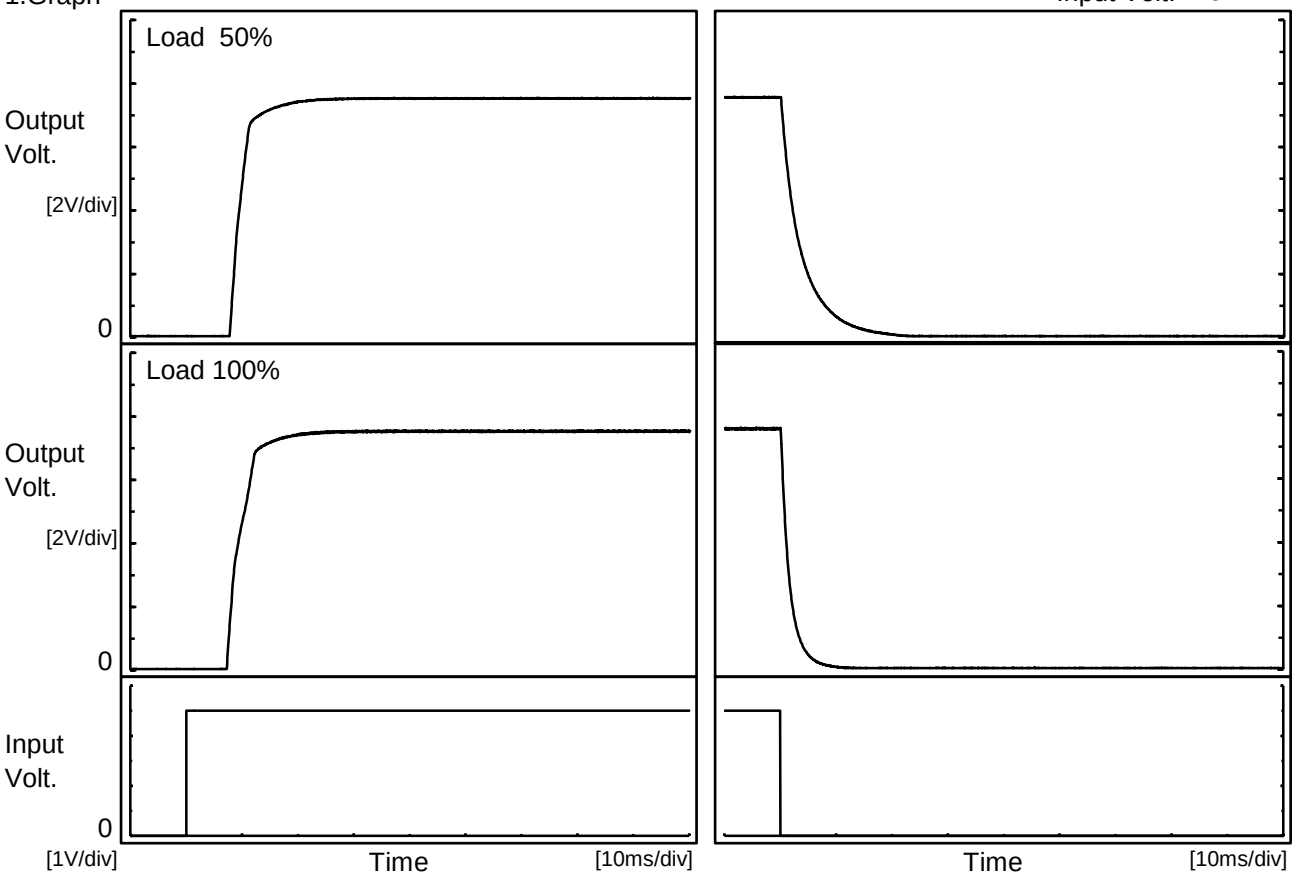
COSEL

Model	MGFW400515
Item	Rise and Fall Time
Object	-15V1A

Temperature 25°C
Testing Circuitry Figure A

1.Graph

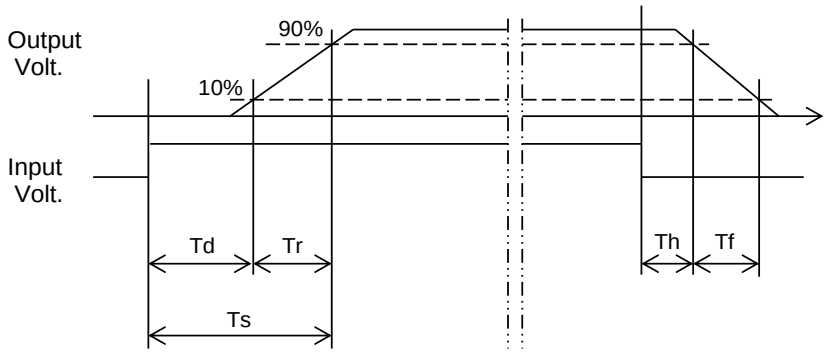
Input Volt. 5 V



2.Values

[ms]

Load \ Time	Td	Tr	Ts	Th	Tf
50 %	8.1	3.6	11.7	0.5	8.7
100 %	7.5	4.7	12.2	0.3	3.7



BC-11314

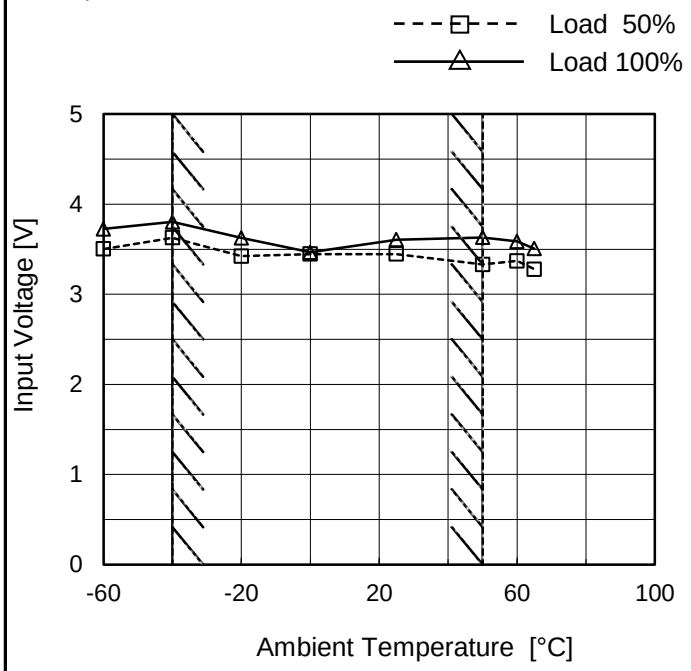
COSEL

Model	MGFW400515
Item	Minimum Input Voltage for Regulated Output Voltage

Testing Circuitry Figure A

Object: +15V1A

1.Graph



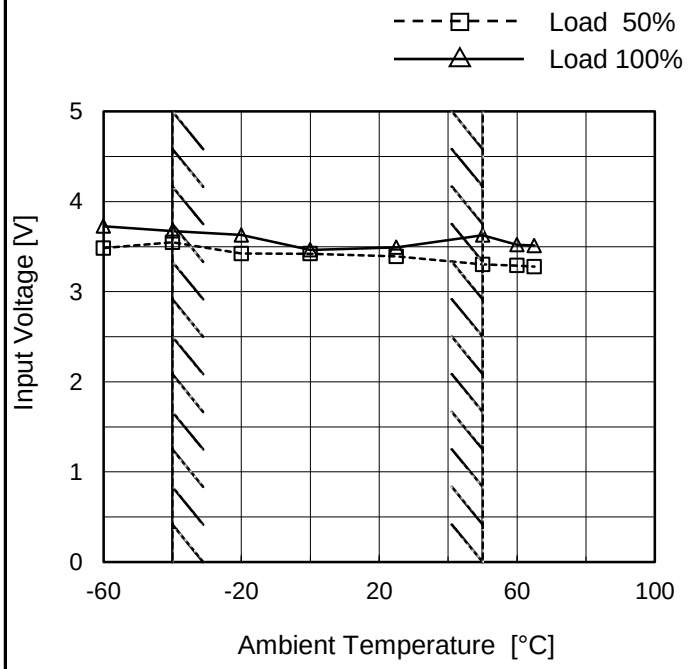
2.Values

Ambient Temperature [°C]	Input Voltage [V]	
	Load 50%	Load 100%
-60	3.5	3.8
-40	3.7	3.8
-20	3.5	3.7
0	3.5	3.5
25	3.5	3.6
50	3.4	3.7
60	3.4	3.6
65	3.3	3.5
--	-	-
--	-	-
--	-	-

-15V: Rated Load Current

Object: -15V1A

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	3.5	3.8
-40	3.6	3.7
-20	3.5	3.7
0	3.5	3.5
25	3.4	3.5
50	3.3	3.7
60	3.3	3.6
65	3.3	3.6
--	-	-
--	-	-
--	-	-

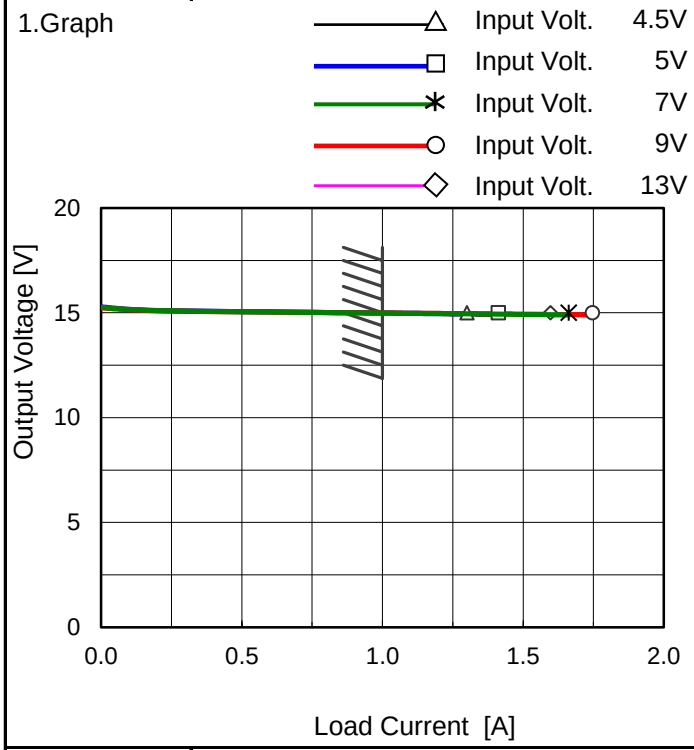
+15V: Rated Load Current

COSEL

Model	MGFW400515
Item	Overcurrent Protection
Object	+15V1A

Temperature 25°C
Testing Circuitry Figure A

1.Graph



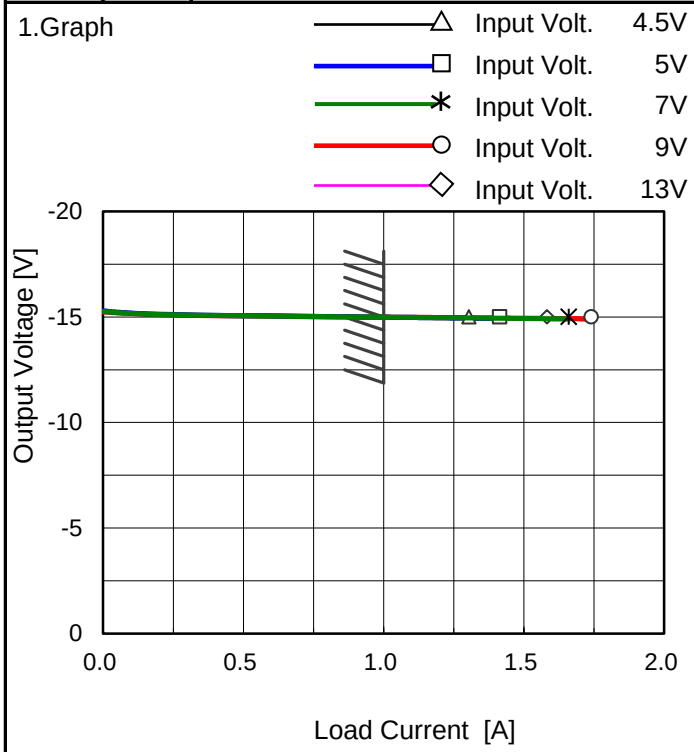
2.Values

Output Voltage [V]	Load Current [A]				
	Input Volt. 4.5[V]	Input Volt. 5[V]	Input Volt. 7[V]	Input Volt. 9[V]	Input Volt. 13[V]
15.0	1.301	1.413	1.662	1.747	1.598
14.3	-	-	-	-	-
13.5	-	-	-	-	-
12.0	-	-	-	-	-
10.5	-	-	-	-	-
9.0	-	-	-	-	-
7.5	-	-	-	-	-
6.0	-	-	-	-	-
4.5	-	-	-	-	-
0.0	-	-	-	-	-

-15V: Rated Load Current

Object	-15V1A

1.Graph



Note: Slanted line shows the range of the rated load current.
Intermittent operation activates when overcurrent protection is activated.

2.Values

Output Voltage [V]	Load Current [A]				
	Input Volt. 4.5[V]	Input Volt. 5[V]	Input Volt. 7[V]	Input Volt. 9[V]	Input Volt. 13[V]
-15.0	1.304	1.414	1.660	1.740	1.583
-14.3	-	-	-	-	-
-13.5	-	-	-	-	-
-12.0	-	-	-	-	-
-10.5	-	-	-	-	-
-9.0	-	-	-	-	-
-7.5	-	-	-	-	-
-6.0	-	-	-	-	-
-4.5	-	-	-	-	-
0.0	-	-	-	-	-

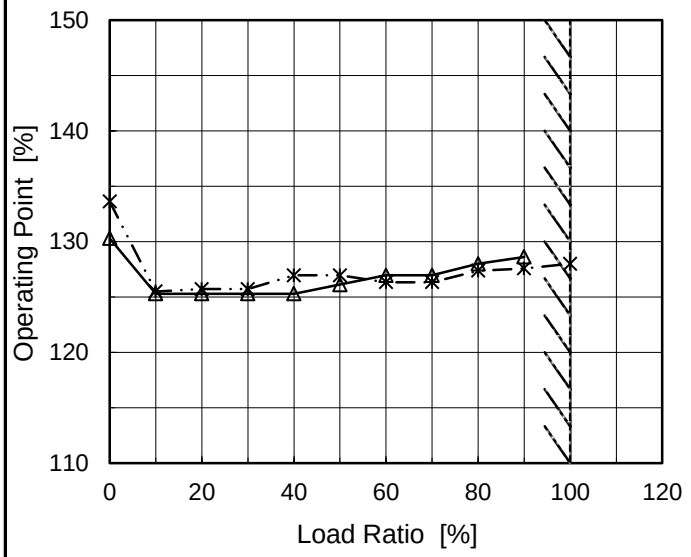
+15V: Rated Load Current

COSEL

Model	MGFW400515
Item	Overvoltage Protection
Object	+30V1A

Temperature 25°C
Testing Circuitry Figure A

1.Graph



Measured as a single output(+30V).

2.Values

Load Ratio [%]	Operating Point [%]		
	Input Volt. 4.5[V]	Input Volt. 5[V]	Input Volt. 13[V]
0	130	130	134
10	125	125	126
20	125	125	126
30	125	125	126
40	125	125	127
50	126	126	127
60	127	126	126
70	127	127	126
80	128	127	127
90	129	128	128
100	- ※	126	128

※During this area, overcurrent protection activates.

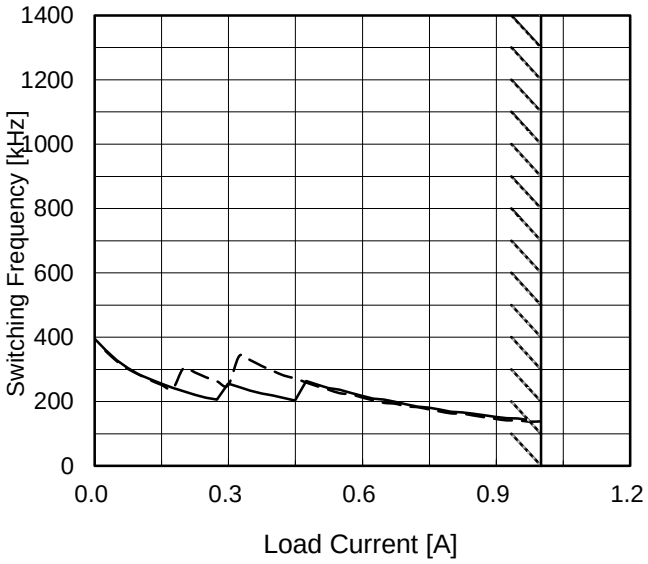
COSEL

Model	MGFW400515	
Item	Switching frequency (by Load Current)	Temperature 25°C Testing Circuitry Figure A
Object	+/-15V1A	

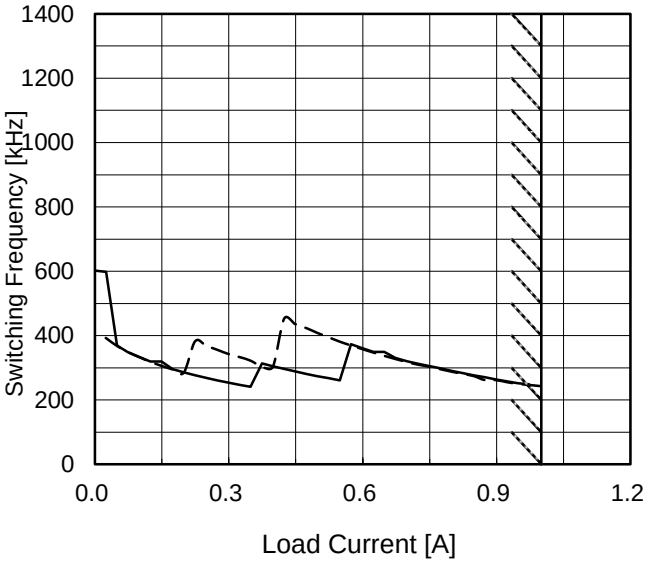
1.Graph

Load Increase
Load Decrease

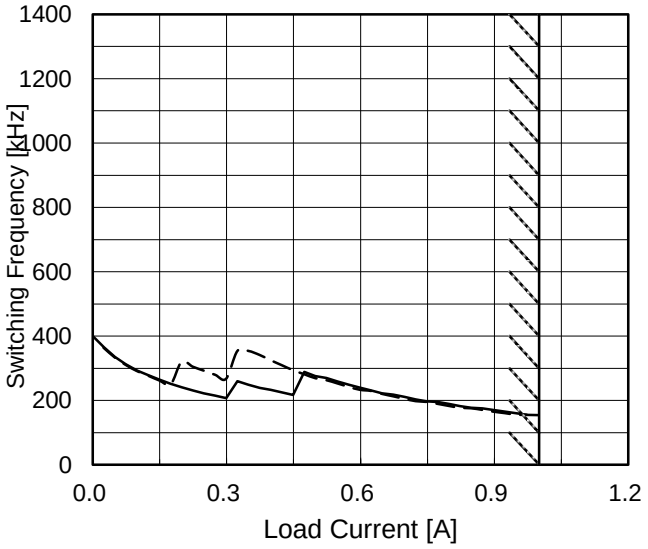
Input Volt: 4.5V



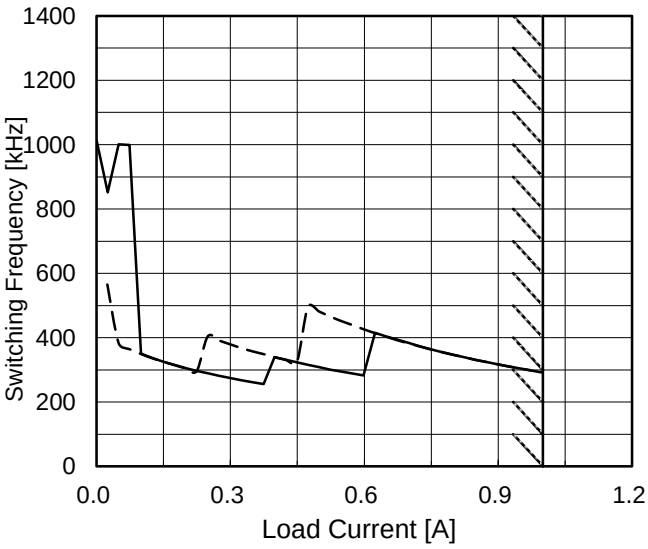
Input Volt: 9V



Input Volt: 5V



Input Volt: 13V



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

-switching frequency of MG40 changes depending on load current and input voltage.
When load current is low, switching frequency becomes high and step down to low frequency at certain point.
There is hysteresis, so characteristic is different between load increase (sweep from 0% to 100%) and load decrease (sweep from 100% to 0%).

-When load current is low, MG40 operates intermittently, so switching frequency can not be stable.

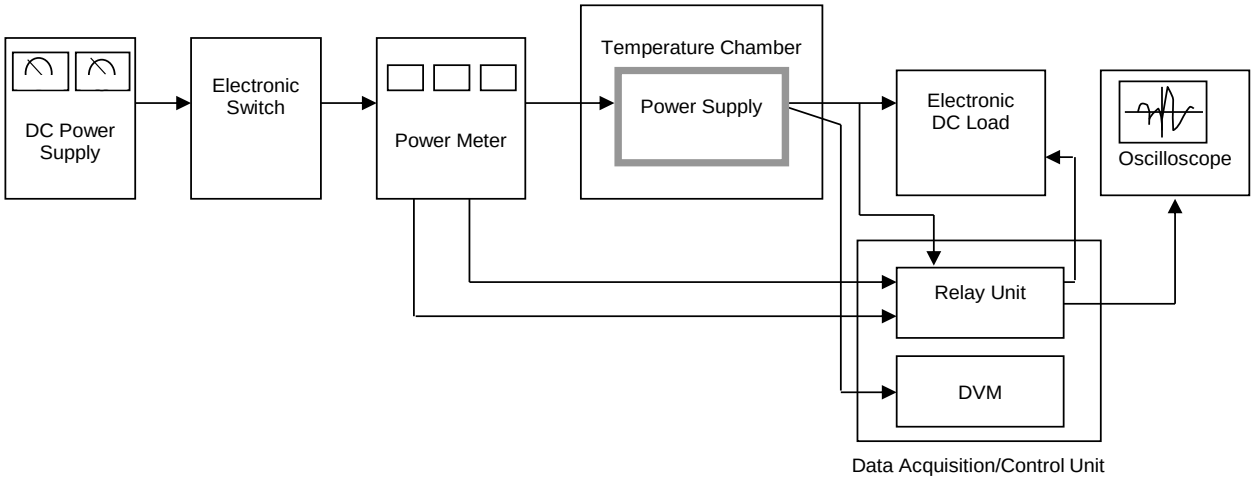


Figure A

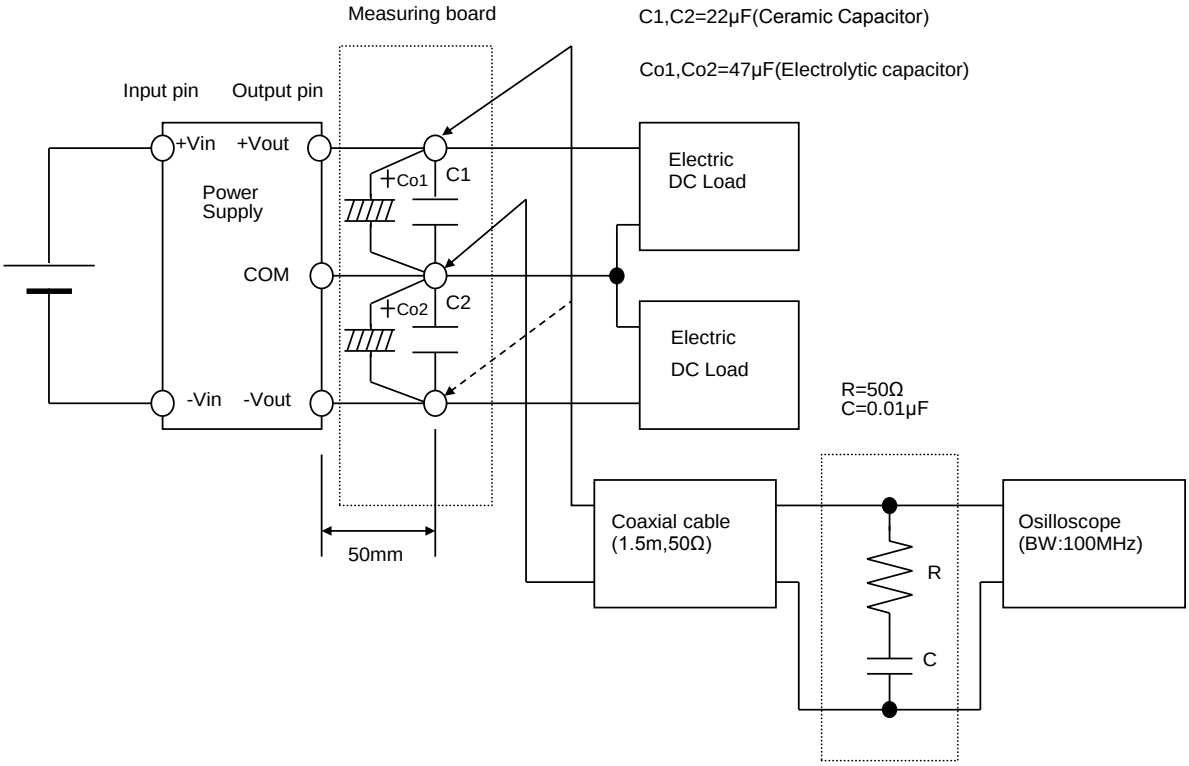


Figure B（Ripple and Ripple noise Characteristic）