参考資料

TEST DATA OF MGFS40053R3

Regulated DC Power Supply
November 29, 2018

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COSEL CO.,LTD.

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

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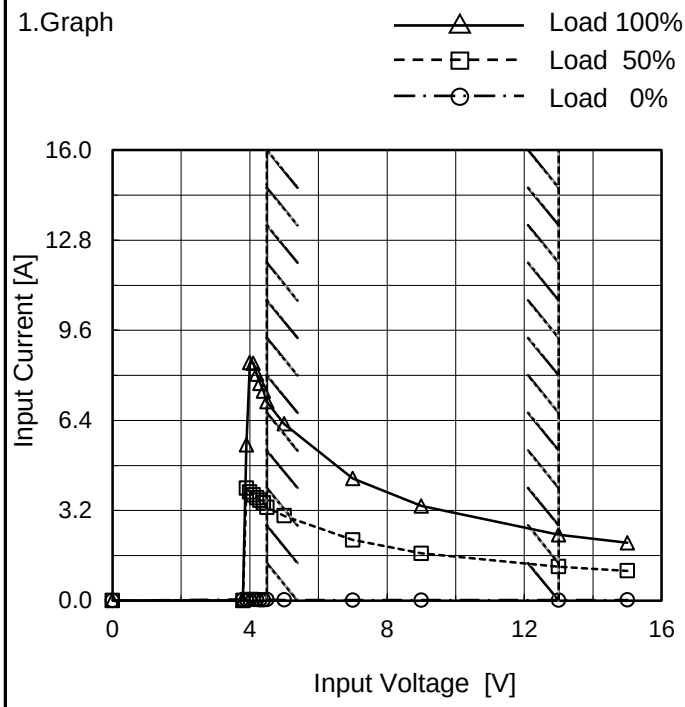

Note: Slanted line shows the range of the rated input voltage.

2.Values

Input Voltage [V]	Input Current [A]		
	Load 0%	Load 50%	Load 100%
0.0	0.000	0.000	0.000
3.8	0.043	0.004	0.004
3.9	0.038	3.996	5.532
4.0	0.035	3.858	8.450
4.1	0.032	3.760	8.430
4.2	0.033	3.655	8.046
4.3	0.029	3.566	7.715
4.4	0.028	3.472	7.436
4.5	0.036	3.314	7.062
5.0	0.023	3.016	6.274
7.0	0.017	2.156	4.340
9.0	0.017	1.678	3.361
13.0	0.021	1.205	2.339
15.0	0.023	1.061	2.051
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

BC-11309

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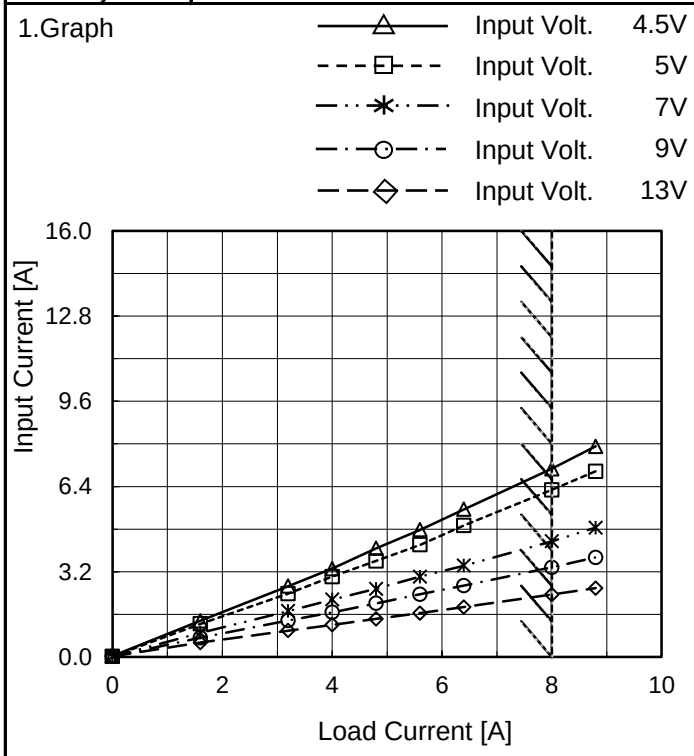
Model	MGFS40053R3
Item	Input Current (by Load Current)
Object	———————

Temperature 25°C
Testing Circuitry Figure A

1.Graph



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

2.Values

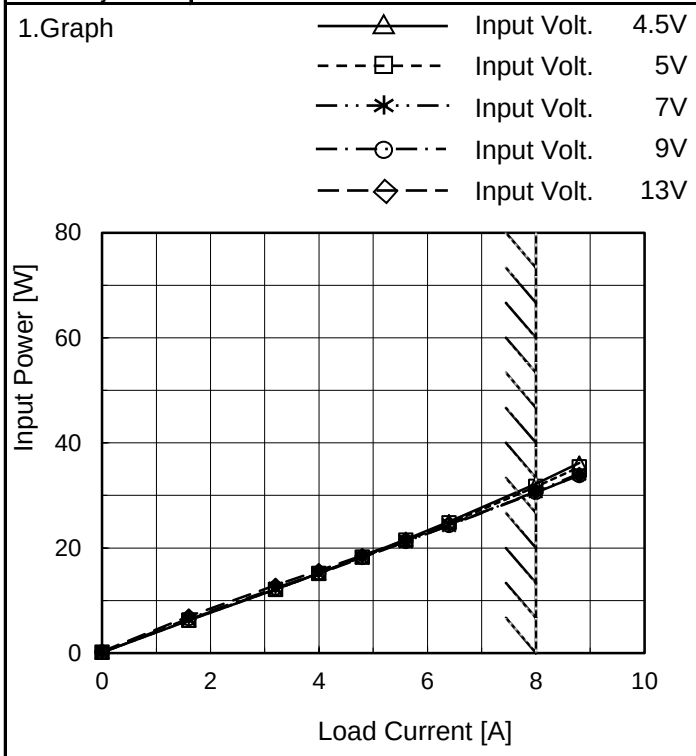
Load Current [A]	Input Current [A]				
	Input Volt. 4.5[V]	Input Volt. 5[V]	Input Volt. 7[V]	Input Volt. 9[V]	Input Volt. 13[V]
0.0	0.036	0.023	0.017	0.017	0.021
1.6	1.357	1.245	0.906	0.722	0.540
3.2	2.660	2.380	1.723	1.370	0.990
4.0	3.314	3.016	2.156	1.678	1.205
4.8	4.078	3.603	2.561	2.014	1.427
5.6	4.778	4.209	3.018	2.356	1.644
6.4	5.546	4.937	3.431	2.676	1.876
8.0	7.062	6.274	4.340	3.361	2.339
8.8	7.904	6.967	4.854	3.734	2.585
--	-	-	-	-	-
--	-	-	-	-	-

COSEL

Model	MGFS40053R3
Item	Input Power (by Load Current)
Object	———————

Temperature 25°C
Testing Circuitry Figure A

1.Graph



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

2.Values

Load Current [A]	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	0.12	0.12	0.12	0.16	0.27
1.6	6.23	6.25	6.38	6.55	7.03
3.2	12.12	12.11	12.18	12.34	12.89
4.0	15.19	15.14	15.12	15.24	15.69
4.8	18.37	18.26	18.13	18.19	18.57
5.6	21.62	21.44	21.19	21.20	21.51
6.4	25.02	24.75	24.33	24.27	24.50
8.0	32.21	31.68	30.78	30.55	30.63
8.8	36.18	35.41	34.15	33.79	33.78
--	-	-	-	-	-
--	-	-	-	-	-

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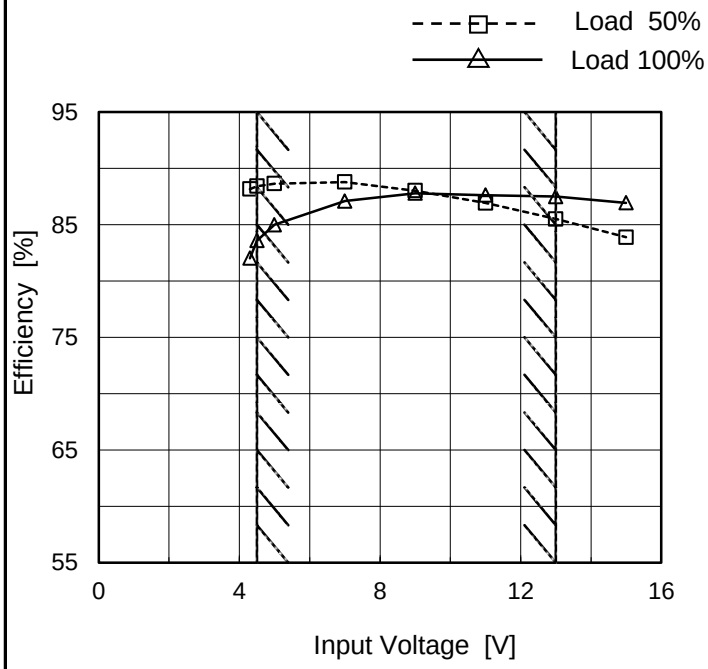
Model	MGFS40053R3
Item	Efficiency (by Input Voltage)
Object	――――――――――

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	88.2	82.0
4.5	88.4	83.6
5.0	88.6	85.0
7.0	88.8	87.1
9.0	88.0	87.8
11.0	86.9	87.6
13.0	85.5	87.5
15.0	83.9	87.0
--	-	-

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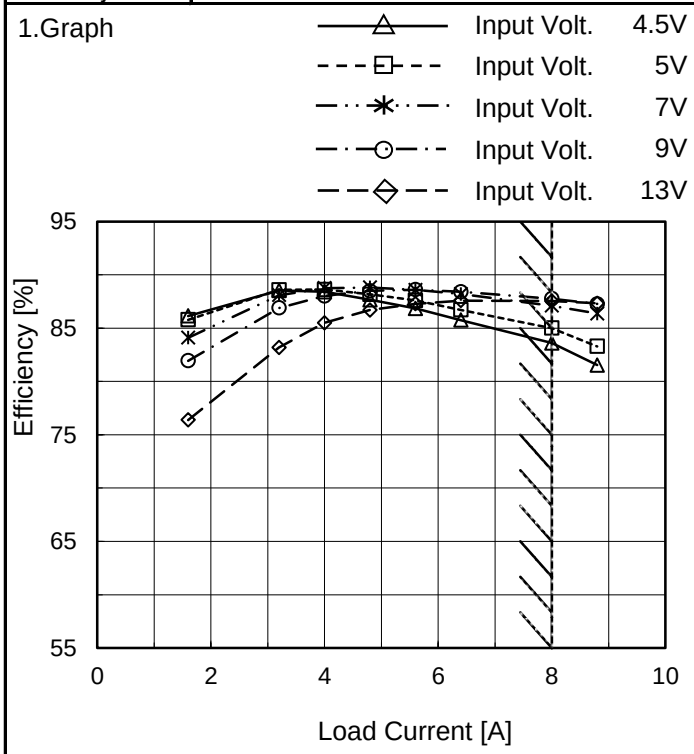
Model	MGFS40053R3
Item	Efficiency (by Load Current)
Object	————————

Temperature 25°C
Testing Circuitry Figure A

1.Graph



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

2.Values

Load Current [A]	Efficiency [%]				
	Input Volt. 4.5[V]	Input Volt. 5[V]	Input Volt. 7[V]	Input Volt. 9[V]	Input Volt. 13[V]
0.0	-	-	-	-	-
1.6	86.1	85.8	84.1	81.9	76.4
3.2	88.5	88.6	88.1	86.9	83.2
4.0	88.4	88.6	88.8	88.0	85.5
4.8	87.7	88.2	88.8	88.5	86.7
5.6	86.8	87.6	88.6	88.6	87.3
6.4	85.8	86.7	88.2	88.4	87.6
8.0	83.6	85.0	87.1	87.8	87.5
8.8	81.5	83.3	86.4	87.3	87.3
--	-	-	-	-	-
--	-	-	-	-	-

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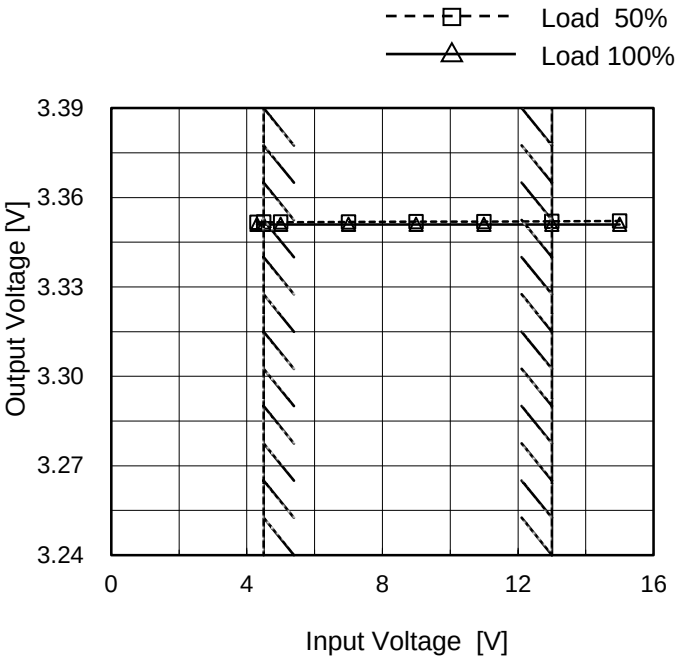
Model	MGFS40053R3
Item	Line Regulation
Object	+3.3V8A

Temperature 25°C
Testing Circuitry Figure A

1.Graph



Note: Slanted line shows the range of the rated input voltage.

2.Values

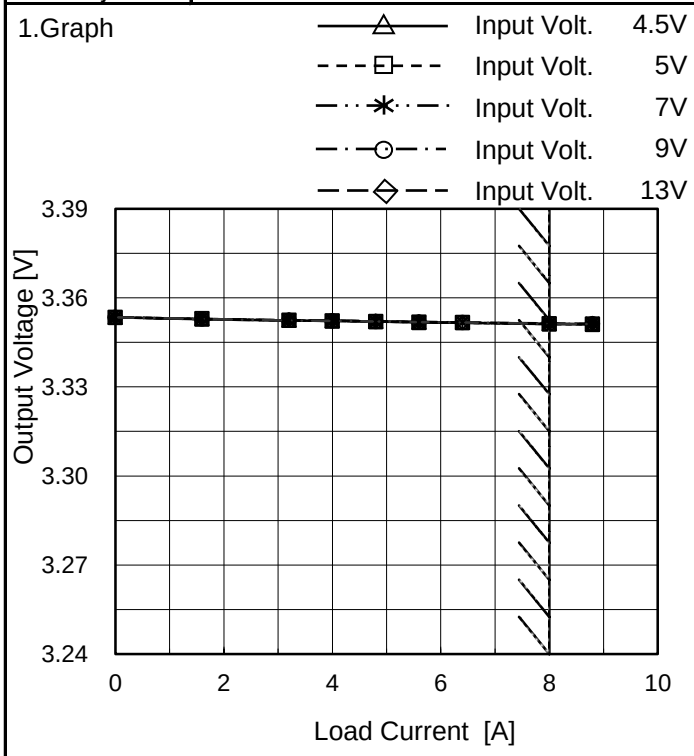
Input Voltage [V]	Output Voltage [V]	
	Load 50%	Load 100%
4.3	3.352	3.351
4.5	3.352	3.351
5.0	3.352	3.351
7.0	3.352	3.351
9.0	3.352	3.351
11.0	3.352	3.351
13.0	3.352	3.351
15.0	3.352	3.351
--	-	-

COSEL

Model	MGFS40053R3
Item	Load Regulation
Object	+3.3V8A

Temperature 25°C
Testing Circuitry Figure A

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	3.353	3.353	3.353	3.353	3.353
1.6	3.353	3.353	3.353	3.353	3.353
3.2	3.352	3.352	3.352	3.352	3.353
4.0	3.352	3.352	3.352	3.352	3.352
4.8	3.352	3.352	3.352	3.352	3.352
5.6	3.352	3.352	3.352	3.352	3.352
6.4	3.352	3.352	3.352	3.352	3.352
8.0	3.351	3.351	3.351	3.351	3.351
8.8	3.351	3.351	3.351	3.351	3.351
--	-	-	-	-	-
--	-	-	-	-	-

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Model	MGFS40053R3
Item	Dynamic Load Response
Object	+3.3V8A

Temperature 25°C
Testing Circuitry Figure A

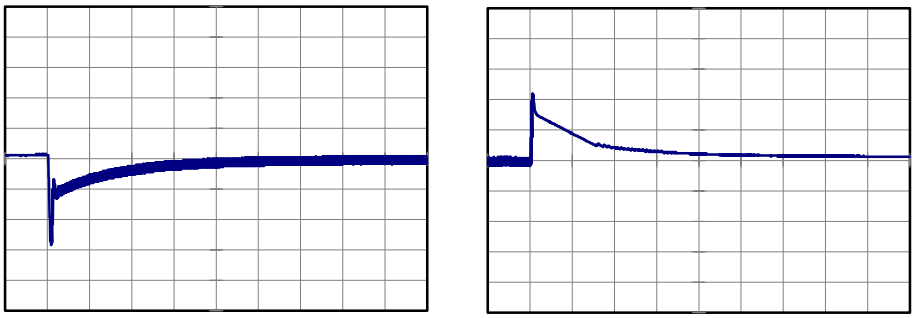
Input Volt. 5 V
Cycle 100 ms

t1,t2 = 100 μs

Load Current

t1 t2

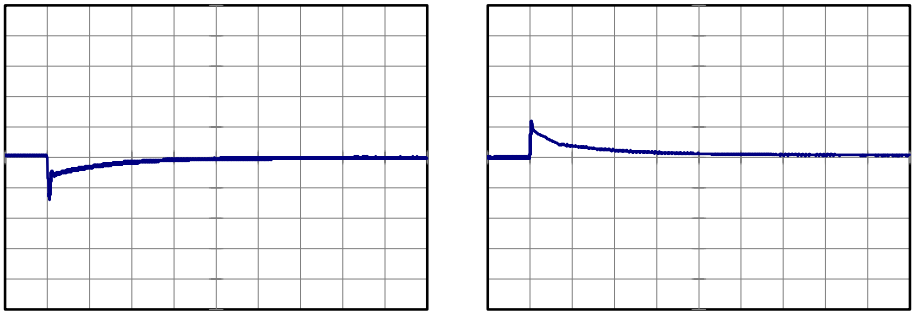
Min.Load (0A)←→
Load 100% (8A)



100 mV/div

1 ms/div 1 ms/div

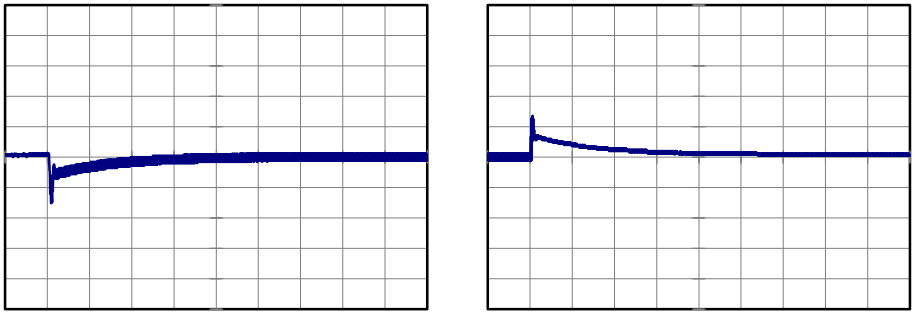
Min.Load (0A)←→
Load 50% (4A)



100 mV/div

1 ms/div 1 ms/div

Load 50% (4A)←→
Load 100% (8A)



100 mV/div

1 ms/div 1 ms/div

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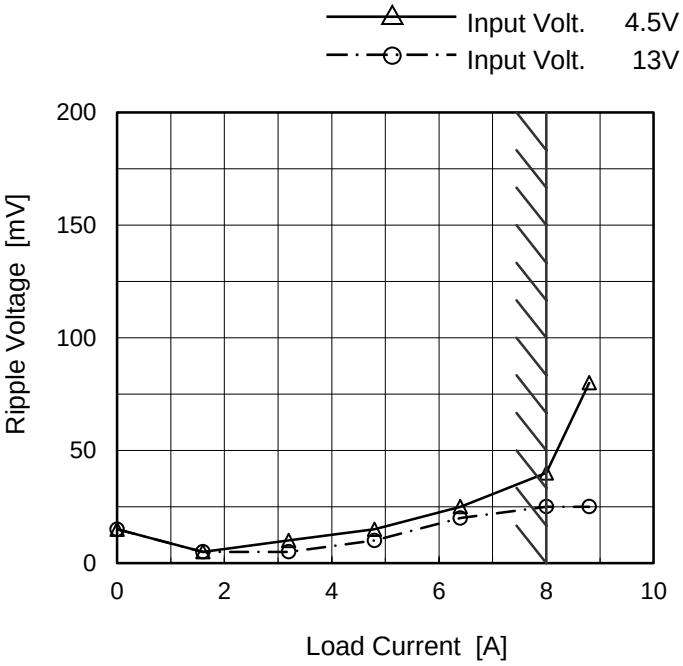
Model	MGFS40053R3
Item	Ripple Voltage (by Load Current)
Object	+3.3V8A

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]

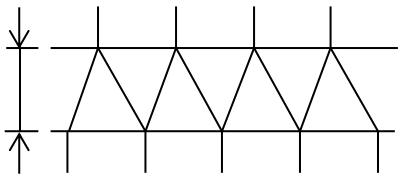


Fig.Complex Ripple Wave Form

2.Values

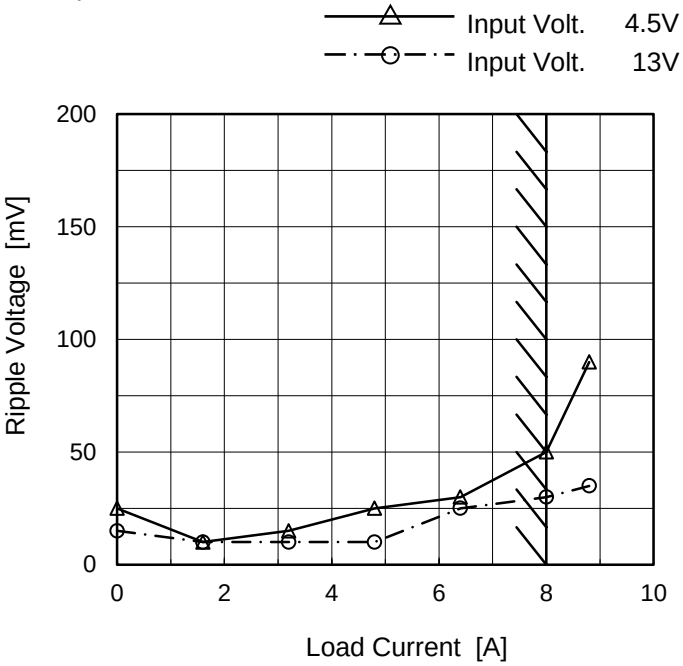
Load Current [A]	Ripple Voltage [mV]	
	Input Volt. 4.5 [V]	Input Volt. 13 [V]
0.0	15	15
1.6	5	5
3.2	10	5
4.8	15	10
6.4	25	20
8.0	40	25
8.8	80	25
--	-	-
--	-	-
--	-	-
--	-	-

COSEL

Model	MGFS40053R3
Item	Ripple-Noise
Object	+3.3V8A

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]

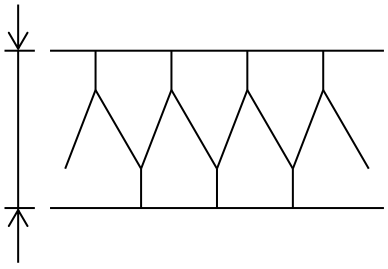


Fig.Complex Ripple Noise Wave Form

2.Values

Load Current [A]	Ripple-Noise [mV]	
	Input Volt. 4.5 [V]	Input Volt. 13 [V]
0.0	25	15
1.6	10	10
3.2	15	10
4.8	25	10
6.4	30	25
8.0	50	30
8.8	90	35
--	-	-
--	-	-
--	-	-
--	-	-

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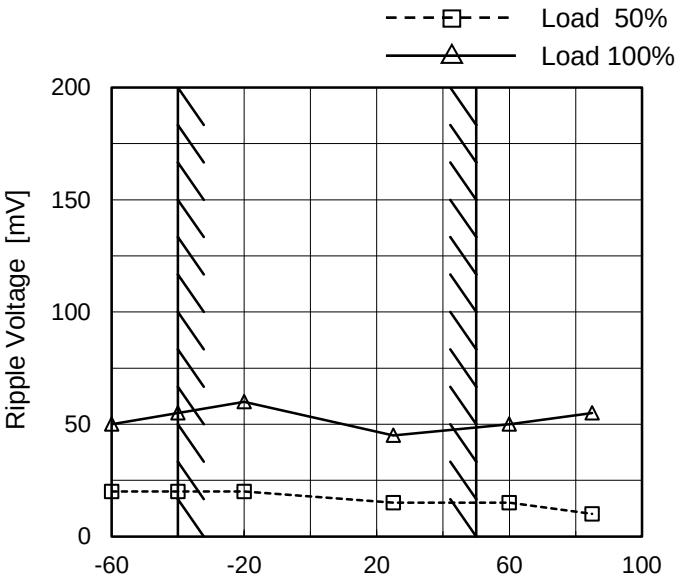
Model	MGFS40053R3
Item	Ripple Voltage (by Ambient Temp.)
Object	+3.3V8A

Testing Circuitry Figure B

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	20	50
-40	20	55
-20	20	60
25	15	45
60	15	50
85	10	55
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-

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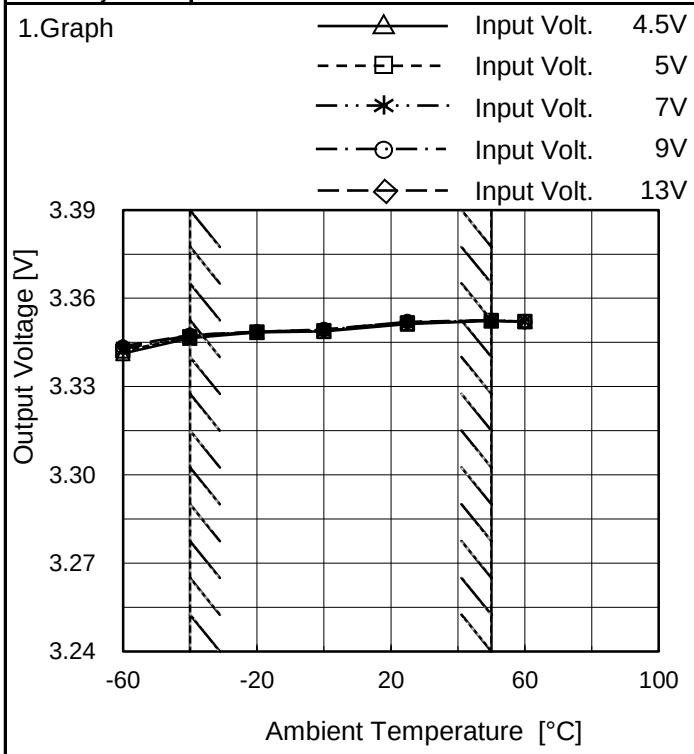
Model	MGFS40053R3
Item	Ambient Temperature Drift
Object	+3.3V8A

Testing Circuitry Figure A

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. 4.5[V]	Input Volt. 5[V]	Input Volt. 7[V]	Input Volt. 9[V]	Input Volt. 13[V]
-60	3.341	3.342	3.343	3.343	3.344
-40	3.346	3.347	3.347	3.347	3.348
-20	3.348	3.349	3.349	3.349	3.349
0	3.349	3.349	3.349	3.349	3.349
25	3.351	3.352	3.352	3.352	3.352
50	3.352	3.352	3.353	3.353	3.352
60	3.352	3.352	3.352	3.352	3.352
--	-	-	-	-	-
--	-	-	-	-	-
--	-	-	-	-	-
--	-	-	-	-	-

Model	MGFS40053R3	
Item	Output Voltage Accuracy	Testing Circuitry Figure A
Object	+3.3V8A	

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 : 0 - 8A

* 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

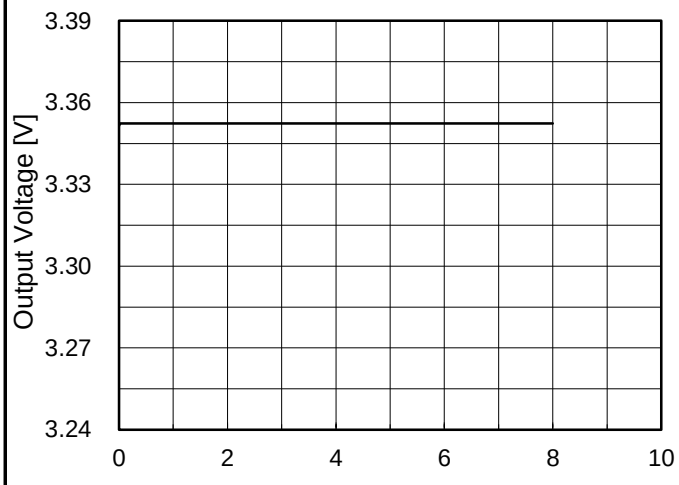
Item	Temperature [°C]	Input Voltage[V]	Output		Output Voltage Accuracy	
			Current[A]	Voltage[V]	Value [mV]	Ratio [%]
Maximum Voltage	50	4.5	0	3.355	±5	±0.2
Minimum Voltage	-40	4.5	8	3.346		

COSEL

Model	MGFS40053R3
Item	Time Lapse Drift
Object	+3.3V8A

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	3.352
0.5	3.352
1.0	3.352
2.0	3.352
3.0	3.352
4.0	3.352
5.0	3.352
6.0	3.352
7.0	3.352
8.0	3.352

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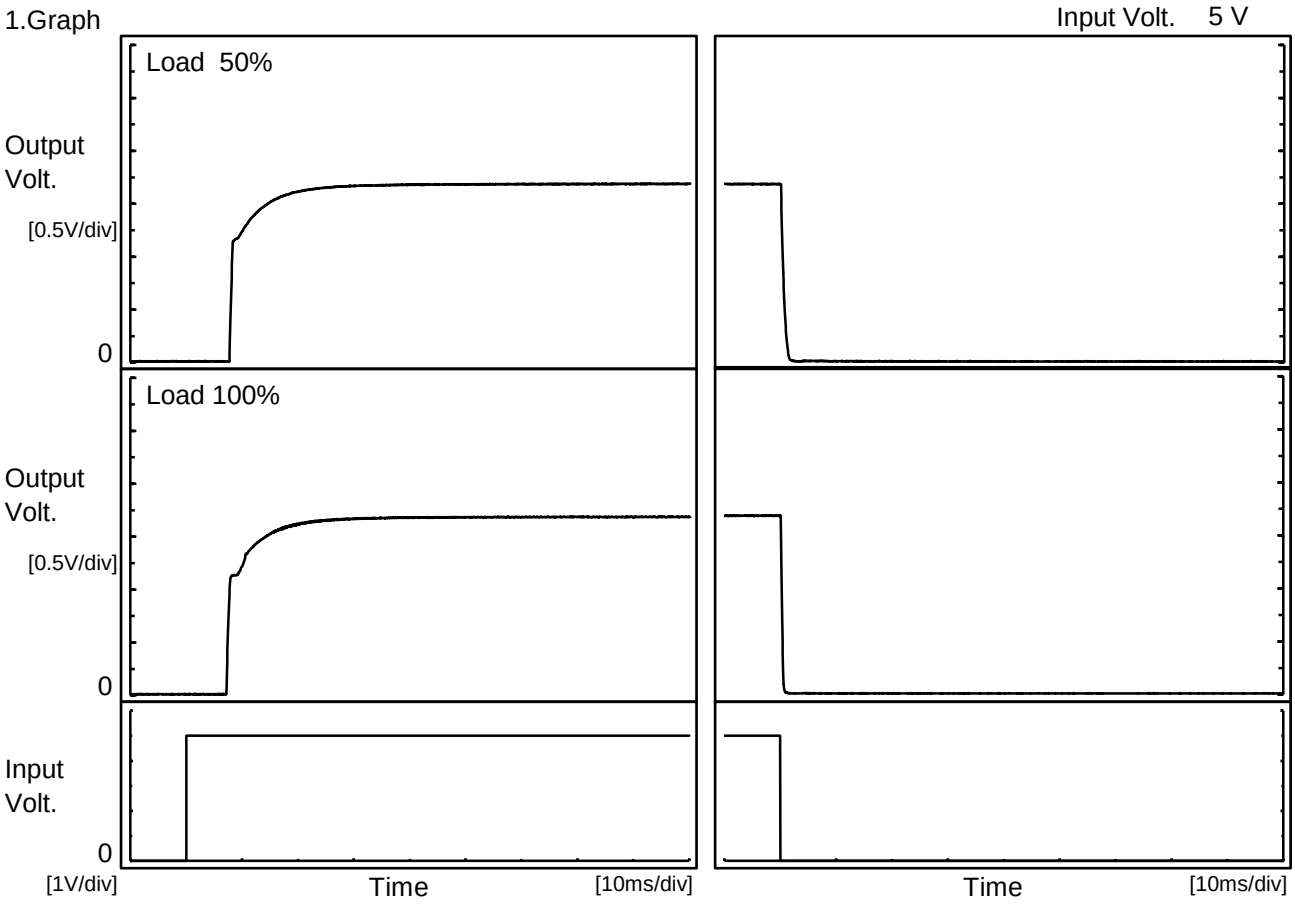
Model	MGFS40053R3	
Item	Rise and Fall Time	Temperature 25°C Testing Circuitry Figure A
Object	+3.3V8A	

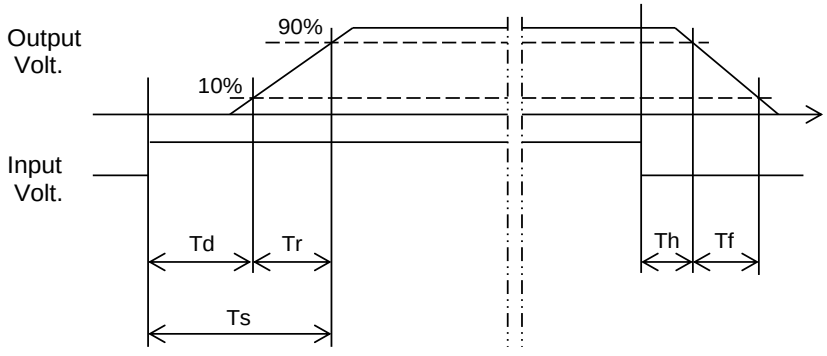
1.Graph



2.Values

[ms]

Load \ Time	Td	Tr	Ts	Th	Tf
50 %	7.8	6.7	14.5	0.2	1.0
100 %	7.3	6.8	14.1	0.1	0.4

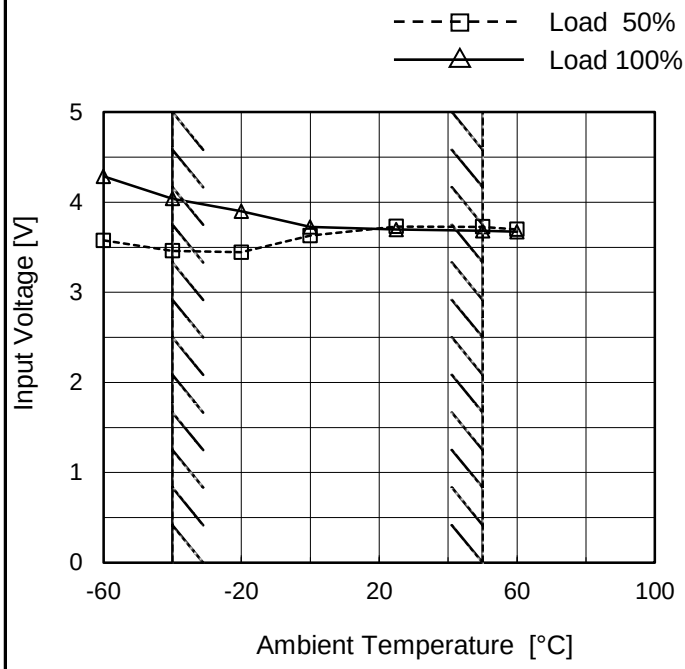


COSEL

Model	MGFS40053R3
Item	Minimum Input Voltage for Regulated Output Voltage
Object	+3.3V8A

Testing Circuitry Figure A

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	3.6	4.3
-40	3.5	4.1
-20	3.5	3.9
0	3.7	3.8
25	3.8	3.7
50	3.8	3.7
60	3.7	3.7
--	-	-
--	-	-
--	-	-
--	-	-

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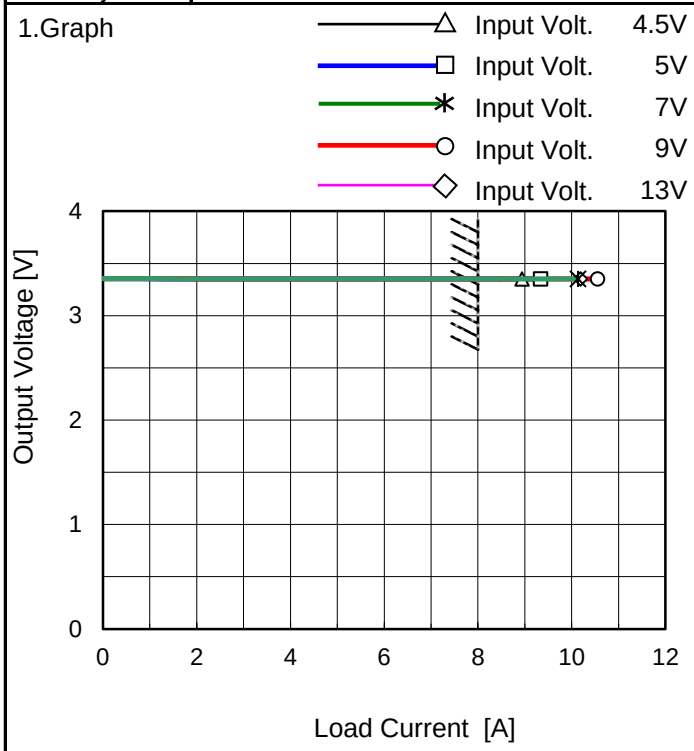
Model	MGFS40053R3
Item	Overcurrent Protection
Object	+3.3V8A

Temperature 25°C
Testing Circuitry Figure A

1.Graph



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

Intermittent operation activates when overcurrent protection is activated.

2.Values

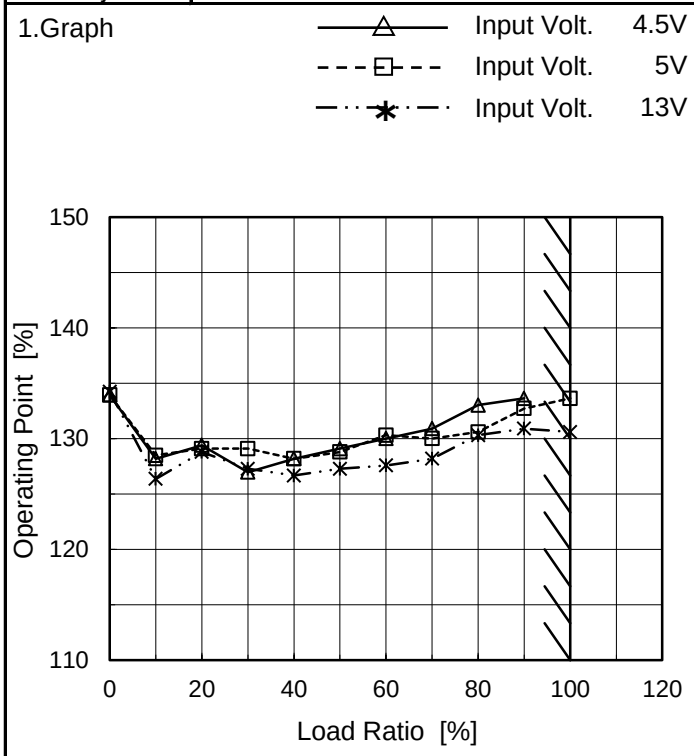
Output Voltage [V]	Load Current [A]				
	Input Volt. 4.5[V]	Input Volt. 5[V]	Input Volt. 7[V]	Input Volt. 9[V]	Input Volt. 13[V]
3.300	8.940	9.339	10.135	10.552	10.190
3.135	-	-	-	-	-
2.970	-	-	-	-	-
2.640	-	-	-	-	-
2.310	-	-	-	-	-
1.980	-	-	-	-	-
1.650	-	-	-	-	-
1.320	-	-	-	-	-
0.990	-	-	-	-	-
0.660	-	-	-	-	-
0.330	-	-	-	-	-
0.000	-	-	-	-	-

COSEL

Model	MGFS40053R3
Item	Overvoltage Protection
Object	+3.3V8A

Temperature 25°C
Testing Circuitry Figure A

1.Graph



2.Values

Load Ratio [%]	Operating Point [%] Input Volt. 4.5[V]	Input Volt. 5[V]	Input Volt. 13[V]
0	134	134	134
10	128	128	126
20	129	129	129
30	127	129	127
40	128	128	127
50	129	129	127
60	130	130	128
70	131	130	128
80	133	131	130
90	134	133	131
100	- ※	134	131

※During this area, overcurrent protection activates.

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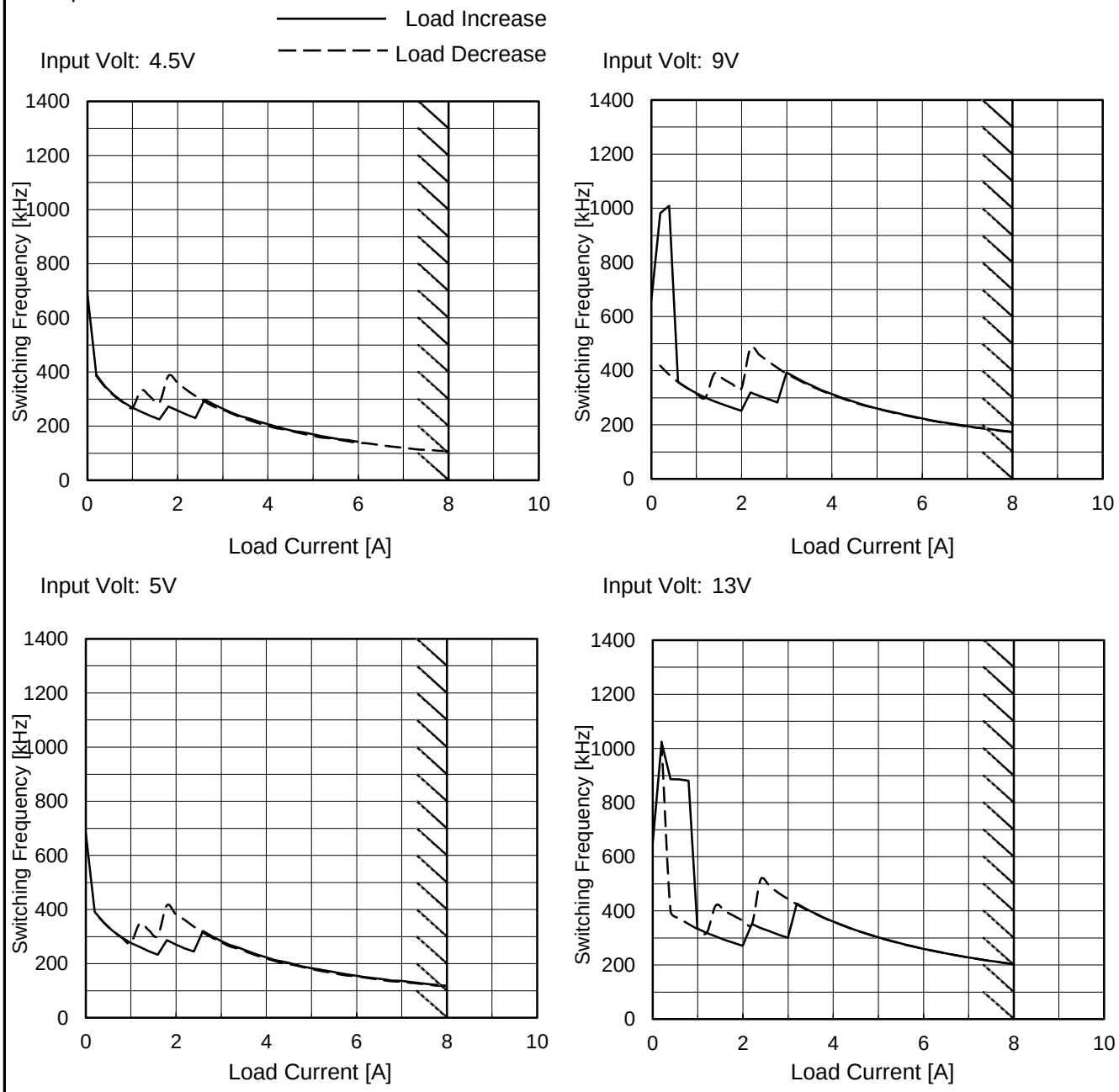
Model	MGFS40053R3	
Item	Switching frequency (by Load Current)	Temperature 25°C Testing Circuitry Figure A
Object	3.3V8A	

1.Graph



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.

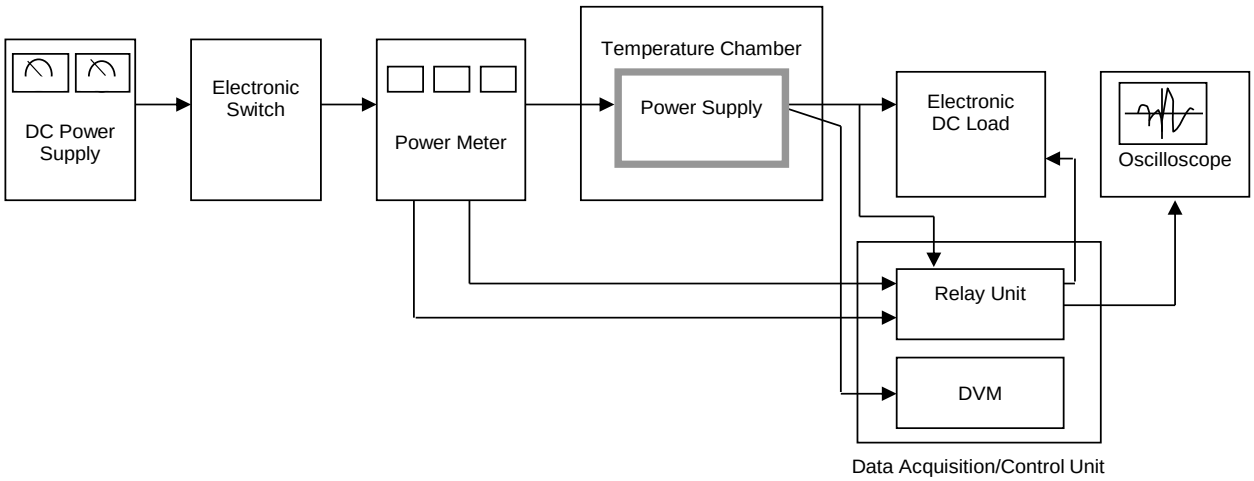


Figure A

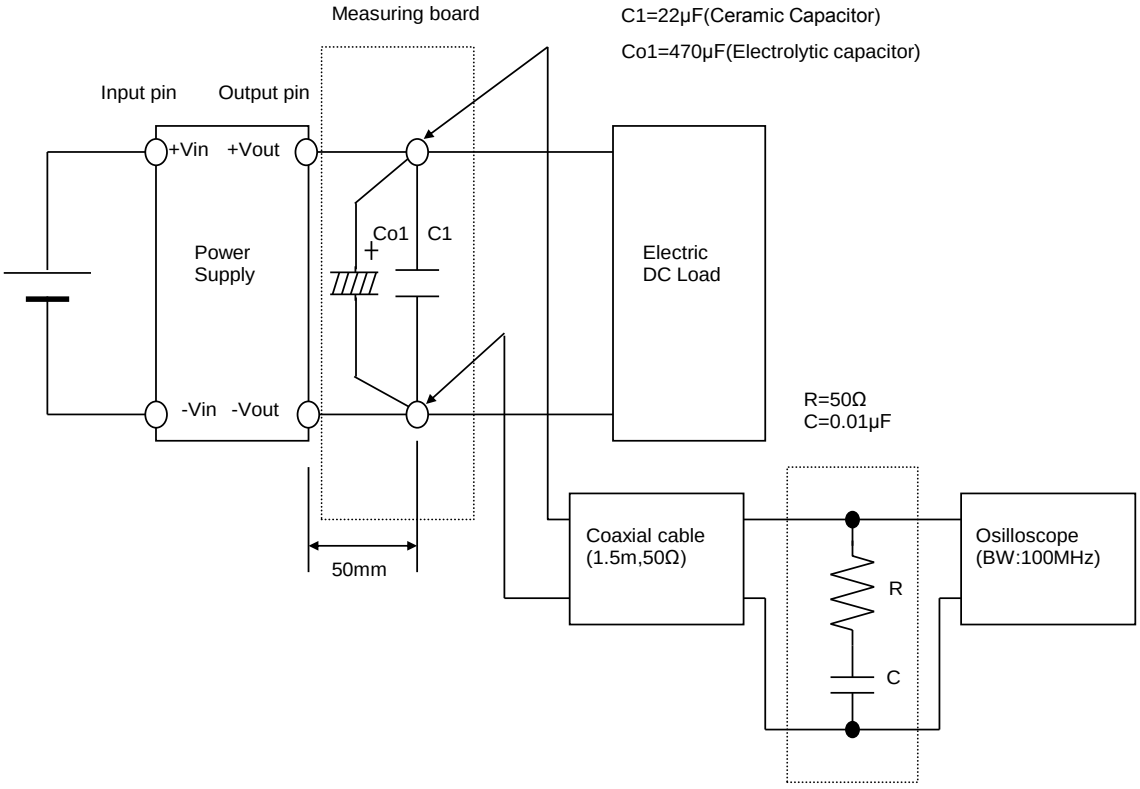


Figure B（Ripple and Ripple noise Characteristic）