参考資料

TEST DATA OF MGFS80243R3

Regulated DC Power Supply
April 15, 2019

Approved by : Junichi Hatagishi
Junichi Hatagishi Design Manager

Prepared by : Satoshi Kinoshita
Satoshi Kinoshita Design Engineer

COSEL CO.,LTD.

COSEL

CONTENTS

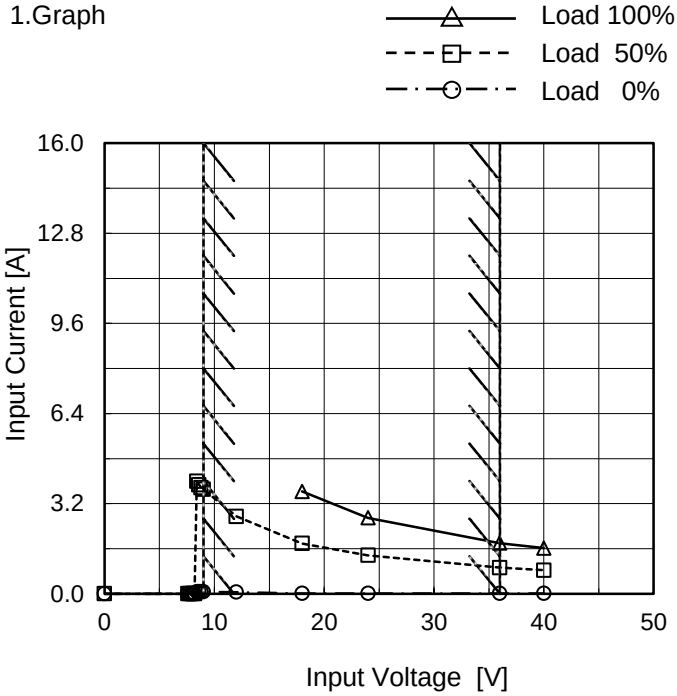
(Final Page 20)

COSEL

Model	MGFS80243R3
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
7.6	0.001	0.001	- ※
7.8	0.001	0.001	- ※
8.0	0.001	0.001	- ※
8.2	0.001	0.001	- ※
8.4	0.075	3.997	- ※
8.6	0.074	3.872	- ※
8.8	0.073	3.761	- ※
9.0	0.071	3.707	- ※
12.0	0.058	2.746	- ※
18.0	0.012	1.784	3.632
24.0	0.012	1.364	2.694
36.0	0.012	0.926	1.797
40.0	0.012	0.837	1.621
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

※During this area, overcurrent protection activates and power supply operates in hiccup mode.

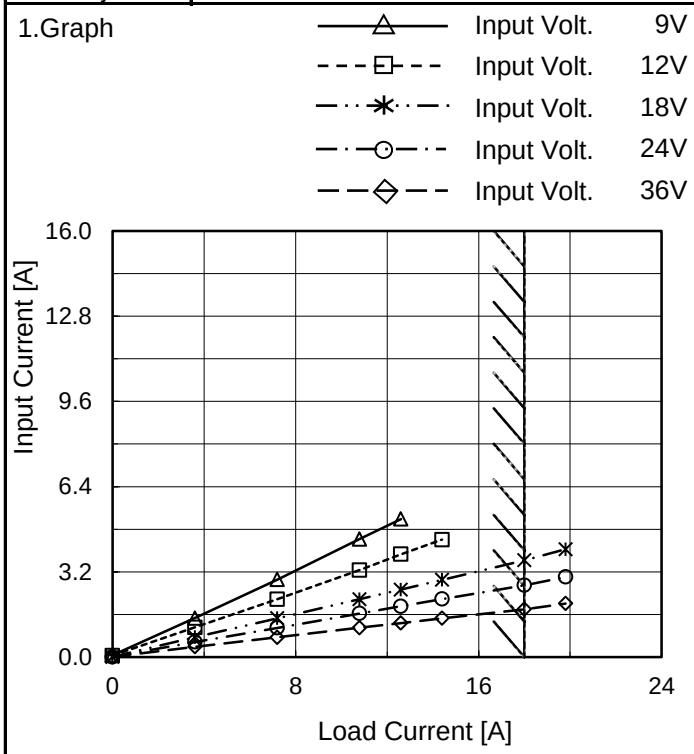
BC-11367

COSEL

Model	MGFS80243R3
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. 9[V]	Input Volt. 12[V]	Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]
0.0	0.072	0.058	0.012	0.012	0.012
3.6	1.466	1.114	0.751	0.571	0.392
7.2	2.912	2.175	1.458	1.098	0.747
10.8	4.430	3.265	2.175	1.637	1.102
12.6	5.186	3.861	2.535	1.910	1.280
14.4	- ※1	4.406	2.899	2.178	1.459
18.0	- ※1	- ※2	3.632	2.694	1.797
19.8	- ※1	- ※2	4.046	3.010	2.013
--	-	-	-	-	-
--	-	-	-	-	-
--	-	-	-	-	-

※1 Maximum output current at minimum input Voltage is 70% of rated load current.
※2 Maximum output current at 12V input Voltage is 80% of rated load current.
Refer to instruction manuals for details of input derating.

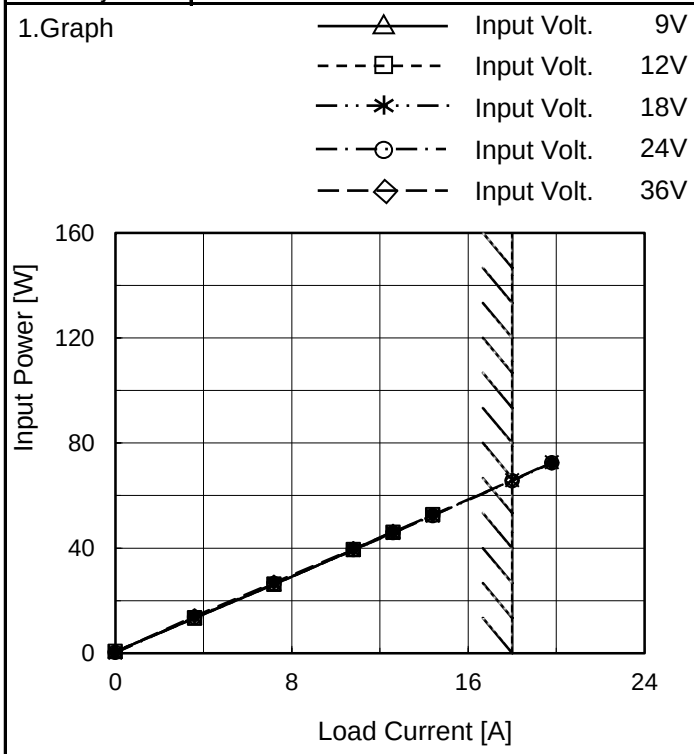
BC-11367

COSEL

Model	MGFS80243R3
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. 9[V]	Input Volt. 12[V]	Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]
0.0	0.65	0.70	0.22	0.28	0.43
3.6	13.34	13.38	13.55	13.72	14.15
7.2	26.23	26.23	26.32	26.44	26.97
10.8	39.52	39.38	39.24	39.34	39.73
12.6	46.39	45.97	45.77	45.83	46.18
14.4	- ※1	52.69	52.35	52.37	52.65
18.0	- ※1	- ※2	65.79	65.59	65.78
19.8	- ※1	- ※2	72.67	72.40	72.45
--	-	-	-	-	-
--	-	-	-	-	-
--	-	-	-	-	-

※1 Maximum output current at minimum input Voltage is 70% of rated load current.
※2 Maximum output current at 12V input Voltage is 80% of rated load current.
Refer to instruction manuals for details of input derating.

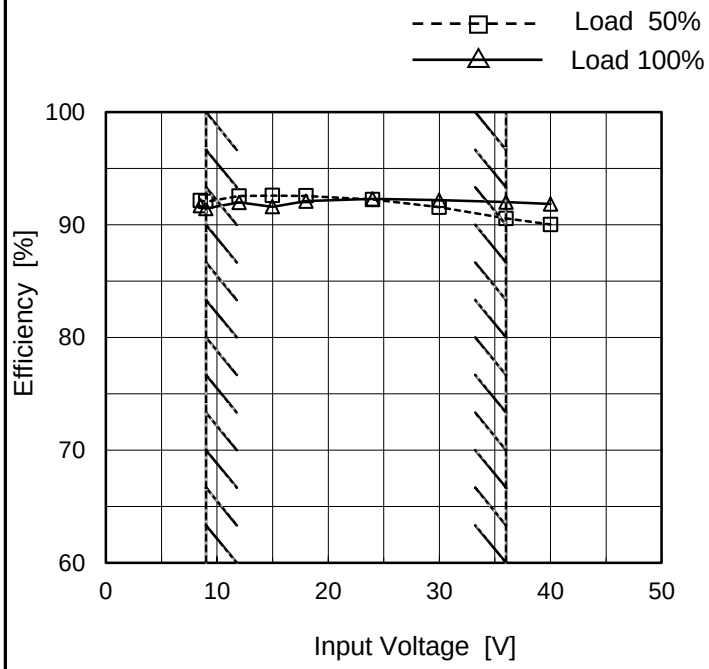
BC-11367

COSEL

Model	MGFS80243R3
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%
8.5	92.2	91.7 ※1
9.0	92.1	91.5 ※1
12.0	92.6	92.0 ※2
15.0	92.6	91.6
18.0	92.6	92.1
24.0	92.2	92.3
30.0	91.6	92.2
36.0	90.6	92.0
40.0	90.0	91.9

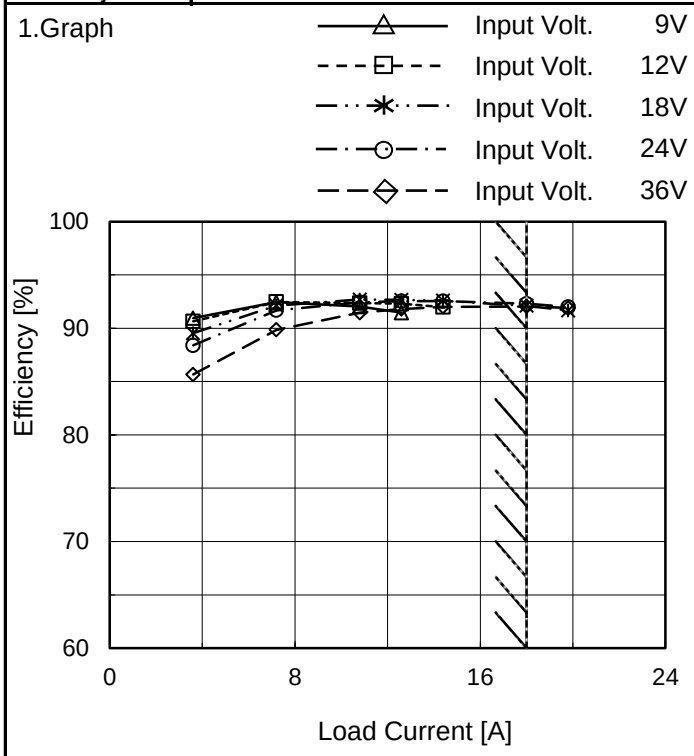
※1:Load 70%
※2:Load 80%

COSEL

Model	MGFS80243R3
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. 9[V]	Input Volt. 12[V]	Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]
0.0	-	-	-	-	-
3.6	90.9	90.6	89.5	88.4	85.7
7.2	92.5	92.5	92.1	91.7	89.9
10.8	92.0	92.4	92.7	92.4	91.5
12.6	91.5	92.3	92.7	92.5	91.8
14.4	- ※1	92.0	92.6	92.5	92.0
18.0	- ※1	- ※2	92.1	92.3	92.0
19.8	- ※1	- ※2	91.7	92.0	91.9
--	-	-	-	-	-
--	-	-	-	-	-
--	-	-	-	-	-

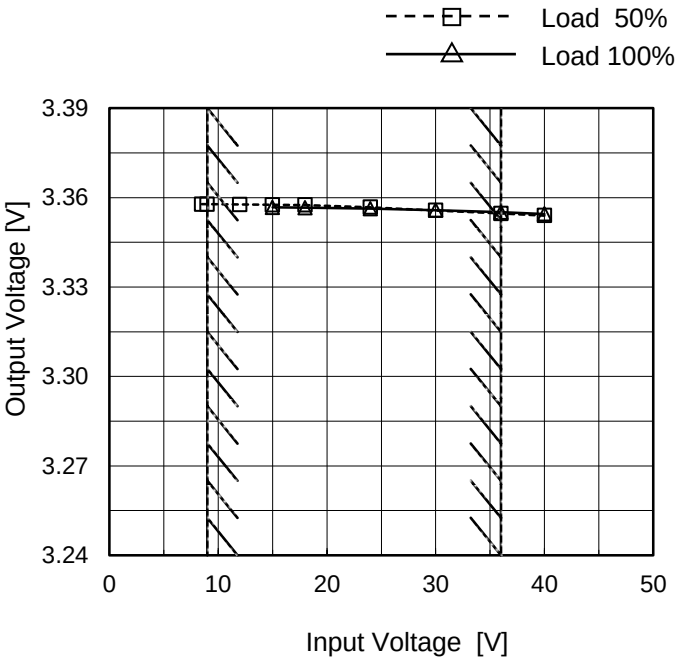
※1 Maximum output current at minimum input Voltage is 70% of rated load current.
※2 Maximum output current at 12V input Voltage is 80% of rated load current.
Refer to instruction manuals for details of input derating.

COSEL

Model	MGFS80243R3
Item	Line Regulation
Object	+3.3V18A

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%
8.5	3.358	- ※1
9.0	3.358	- ※1
12.0	3.358	- ※2
15.0	3.358	3.357
18.0	3.358	3.357
24.0	3.357	3.356
30.0	3.356	3.356
36.0	3.355	3.355
40.0	3.354	3.355

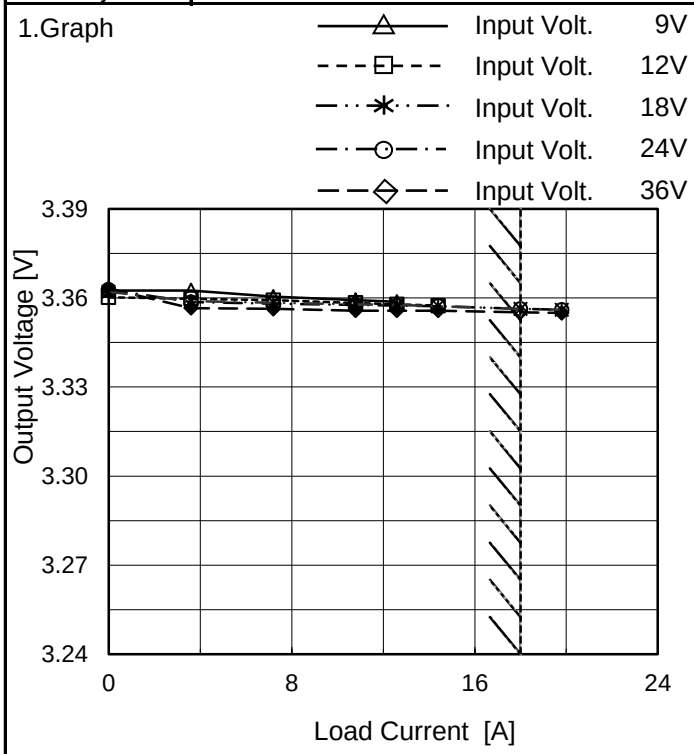
※1 Maximum output current at minimum input Voltage is 70% of rated load current.
※2 Maximum output current at 12V input Voltage is 80% of rated load current.
Refer to instruction manuals for details of input derating.

COSEL

Model	MGFS80243R3
Item	Load Regulation
Object	+3.3V18A

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. 9[V]	Input Volt. 12[V]	Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]
0.0	3.363	3.360	3.362	3.363	3.363
3.6	3.363	3.360	3.359	3.359	3.357
7.2	3.360	3.359	3.358	3.358	3.356
10.8	3.359	3.358	3.358	3.358	3.356
12.6	3.359	3.358	3.358	3.357	3.356
14.4	- ※1	3.357	3.357	3.357	3.356
18.0	- ※1	- ※2	3.356	3.356	3.355
19.8	- ※1	- ※2	3.356	3.356	3.355
--	-	-	-	-	-
--	-	-	-	-	-
--	-	-	-	-	-

※1 Maximum output current at minimum input Voltage is 70% of rated load current.
※2 Maximum output current at 12V input Voltage is 80% of rated load current.
Refer to instruction manuals for details of input derating.

BC-11367

COSEL

Model	MGFS80243R3
Item	Dynamic Load Response
Object	+3.3V18A

Temperature 25°C
Testing Circuitry Figure A

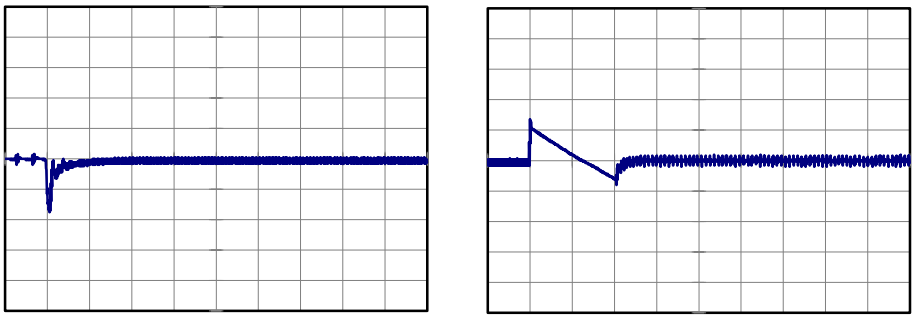
Input Volt. 24 V
Cycle 100 ms

t1,t2 = 100 μs

Load Current

t1 t2

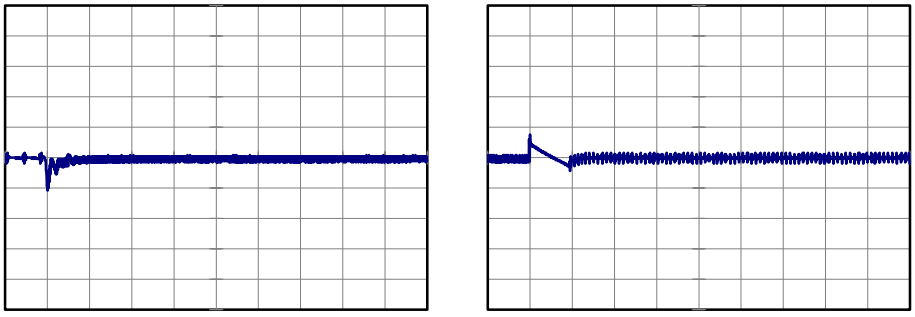
Min.Load (0A)←→
Load 100% (18A)



200 mV/div

1 ms/div 4 ms/div

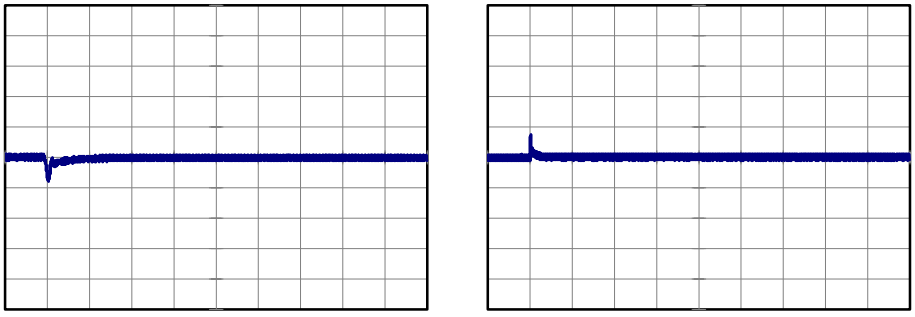
Min.Load (0A)←→
Load 50% (9A)



200 mV/div

1 ms/div 4 ms/div

Load 50% (9A)←→
Load 100% (18A)



200 mV/div

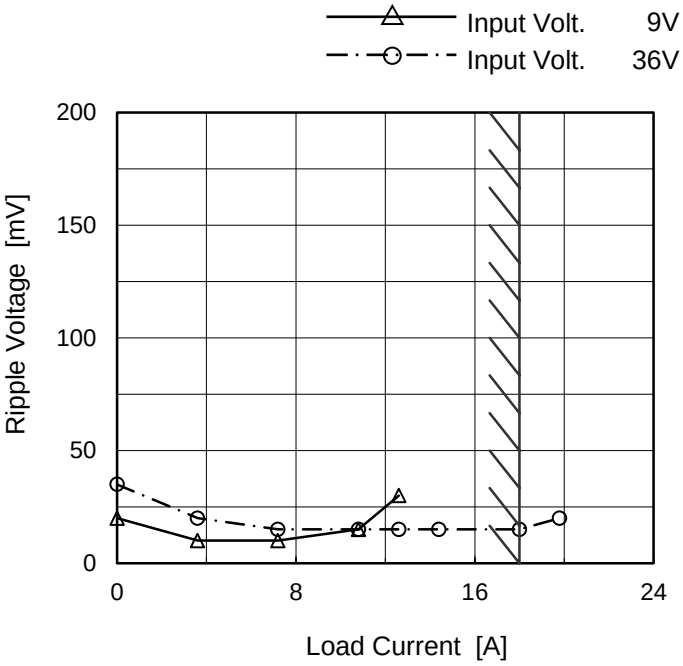
1 ms/div 4 ms/div

COSEL

Model	MGFS80243R3
Item	Ripple Voltage (by Load Current)
Object	+3.3V18A

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]

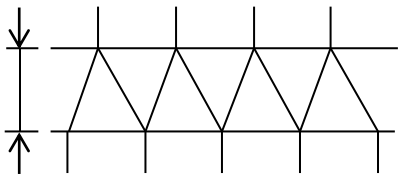


Fig.Complex Ripple Wave Form

2.Values

Load Current [A]	Ripple Voltage [mV]	
	Input Volt. 9 [V]	Input Volt. 36 [V]
0.0	20	35
3.6	10	20
7.2	10	15
10.8	15	15
12.6	30	15
14.4	- ※	15
18.0	- ※	15
19.8	- ※	20
--	-	-
--	-	-
--	-	-

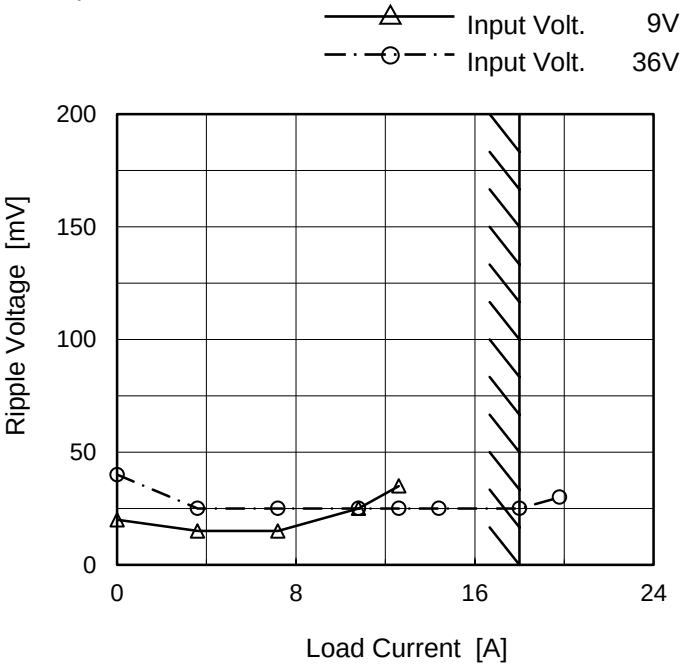
※ Maximum output current at minimum input Voltage is 70% of rated load current. Refer to instruction manuals for details of input derating.

COSEL

Model	MGFS80243R3
Item	Ripple-Noise
Object	+3.3V18A

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]

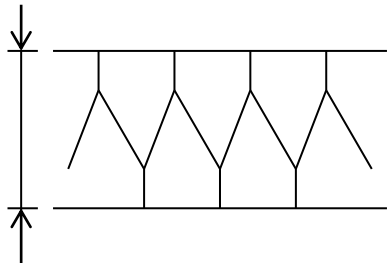


Fig.Complex Ripple Noise Wave Form

2.Values

Load Current [A]	Ripple-Noise [mV]	
	Input Volt. 9 [V]	Input Volt. 36 [V]
0.0	20	40
3.6	15	25
7.2	15	25
10.8	25	25
12.6	35	25
14.4	- ※	25
18.0	- ※	25
19.8	- ※	30
--	-	-
--	-	-
--	-	-

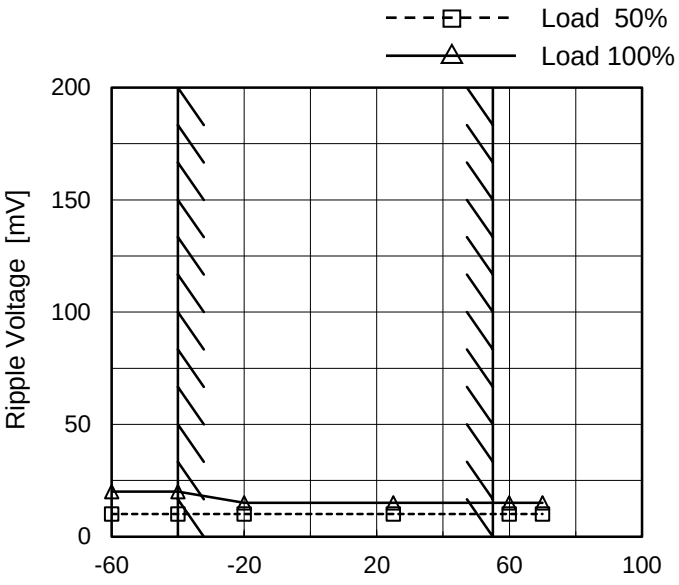
※ Maximum output current at minimum input Voltage is 70% of rated load current. Refer to instruction manuals for details of input derating.

COSEL

Model	MGFS80243R3
Item	Ripple Voltage (by Ambient Temp.)
Object	+3.3V18A

Testing Circuitry Figure B

1.Graph



Input Volt. 24V

Measured by 100 MHz Oscilloscope.

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

2.Values

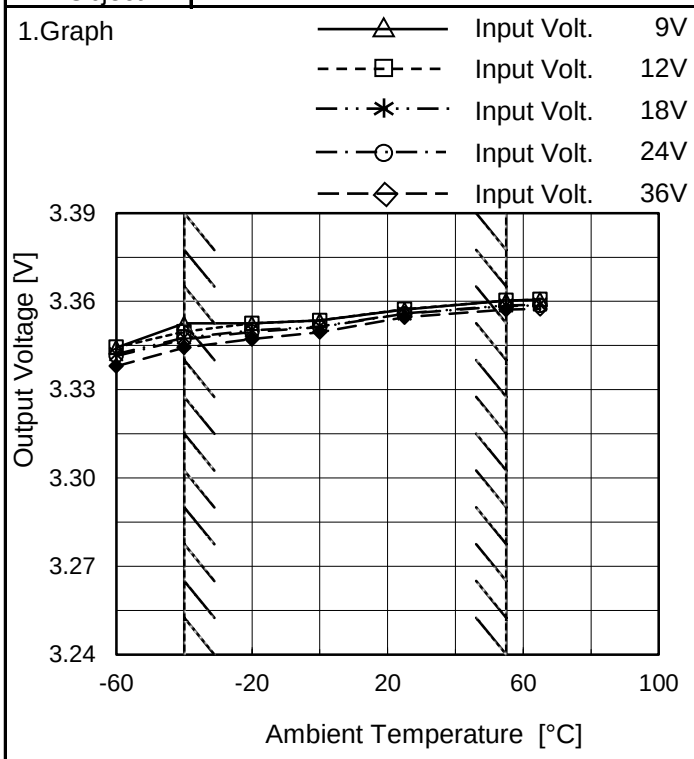
Ambient Temperature [°C]	Ripple Voltage [mV]	
	Load 50%	Load 100%
-60	10	20
-40	10	20
-20	10	15
25	10	15
60	10	15
70	10	15
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-

COSEL

Model	MGFS80243R3
Item	Ambient Temperature Drift
Object	+3.3V18A

Testing Circuitry Figure A

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	3.344	3.344	3.342	3.342	3.338
-40	3.353	3.350	3.348	3.347	3.344
-20	3.353	3.353	3.350	3.350	3.347
0	3.354	3.354	3.352	3.351	3.350
25	3.357	3.357	3.356	3.356	3.355
55	3.360	3.360	3.359	3.358	3.357
65	3.361	3.361	3.359	3.359	3.357
--	-	-	-	-	-
--	-	-	-	-	-
--	-	-	-	-	-
--	-	-	-	-	-

Note: In case of input Volt.9V, Load 70%.
12V, Load 80%.
Other case Load 100%.

Model	MGFS80243R3	
Item	Output Voltage Accuracy	Testing Circuitry Figure A
Object	+3.3V18A	

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 - 55°C
Input Voltage : 9 - 36V
Load Current : 0 - 18A

* 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

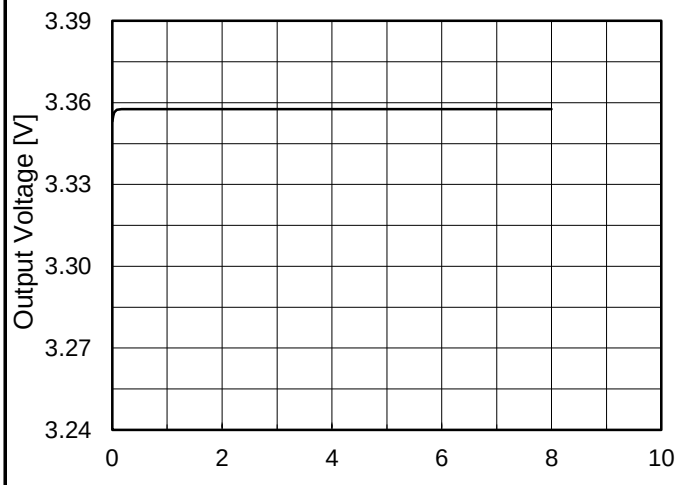
Item	Temperature [°C]	Input Voltage[V]	Output		Output Voltage Accuracy	
			Current[A]	Voltage[V]	Value [mV]	Ratio [%]
Maximum Voltage	55	36	0	3.365	±11	±0.3
Minimum Voltage	-40	36	18.0	3.344		

COSEL

Model	MGFS80243R3
Item	Time Lapse Drift
Object	+3.3V18A

Temperature 25°C
Testing Circuitry Figure A

1.Graph



Input Volt. 24V
Load 100%

2.Values

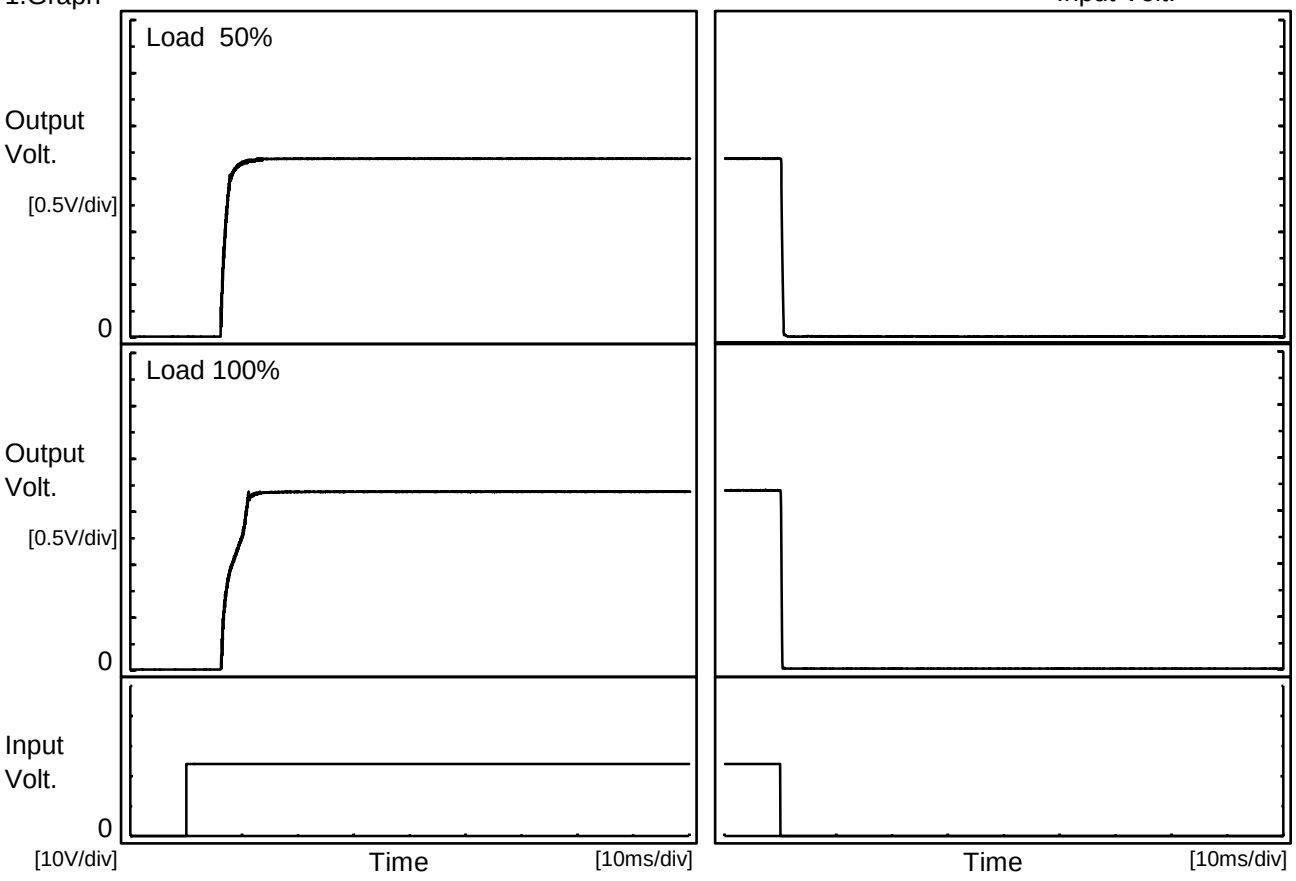
Time since start [H]	Output Voltage [V]
0.0	3.353
0.5	3.358
1.0	3.358
2.0	3.358
3.0	3.358
4.0	3.358
5.0	3.358
6.0	3.358
7.0	3.358
8.0	3.358

COSEL

Model	MGFS80243R3	
Item	Rise and Fall Time	Temperature 25°C Testing Circuitry Figure A
Object	+3.3V18A	

1.Graph

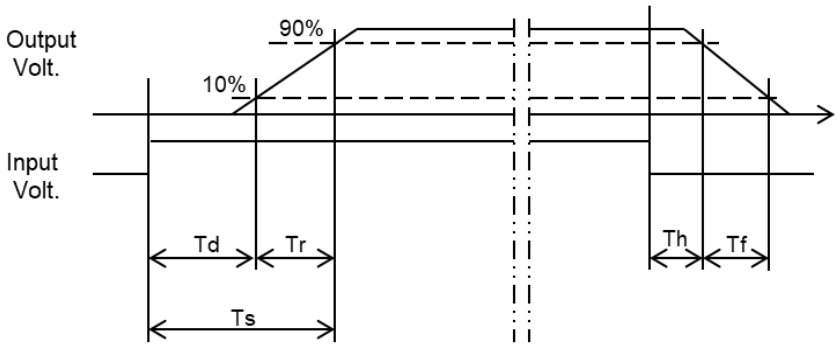
Input Volt. 24 V



2.Values

[ms]

Load \ Time	Td	Tr	Ts	Th	Tf
50 %	6.3	2.7	9.0	0.2	0.4
100 %	6.3	4.6	10.9	0.2	0.2

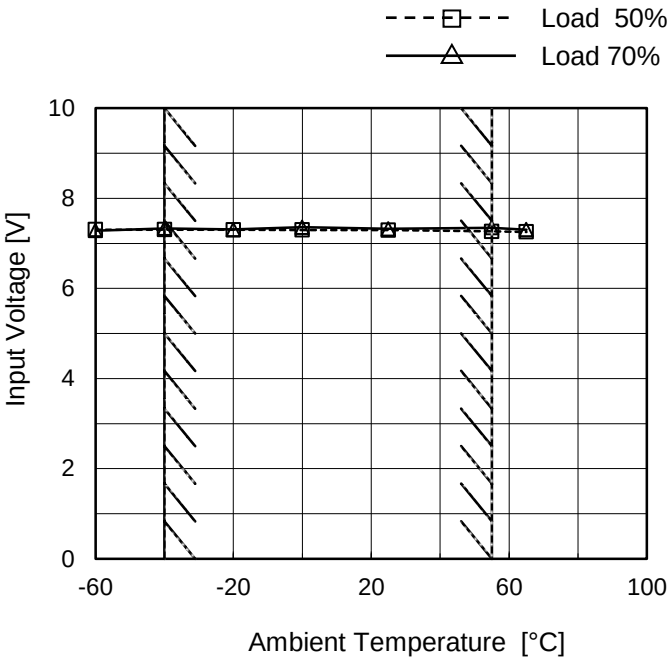


COSEL

Model	MGFS80243R3
Item	Minimum Input Voltage for Regulated Output Voltage
Object	+3.3V12.6A

Testing Circuitry Figure A

1.Graph



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

2.Values

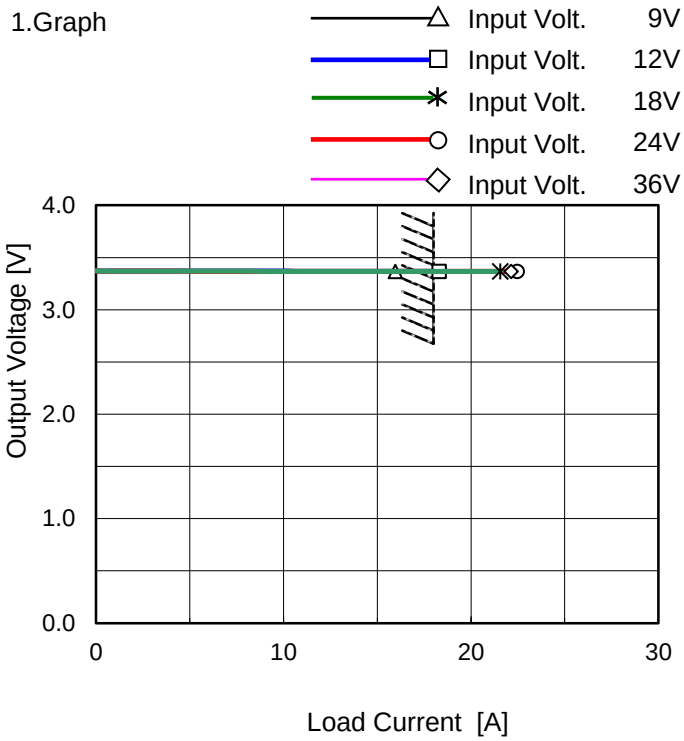
Ambient Temperature [°C]	Input Voltage [V]	
	Load 50%	Load 70%
-60	7.3	7.3
-40	7.3	7.4
-20	7.3	7.3
0	7.3	7.4
25	7.3	7.4
55	7.3	7.4
65	7.3	7.3
--	-	-
--	-	-
--	-	-
--	-	-

COSEL

Model	MGFS80243R3
Item	Overcurrent Protection
Object	+3.3V18A

Temperature 25°C
Testing Circuitry Figure A

1.Graph



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

Intermittent operation occurs when overcurrent protection is activated.

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]
3.300	15.963	18.300	21.572	22.468	22.153
3.135	- ※1	- ※2	-	-	-
2.970	-	-	-	-	-
2.640	-	-	-	-	-
2.310	-	-	-	-	-
1.980	-	-	-	-	-
1.650	-	-	-	-	-
1.320	-	-	-	-	-
0.990	-	-	-	-	-
0.660	-	-	-	-	-
0.330	-	-	-	-	-
0.000	-	-	-	-	-

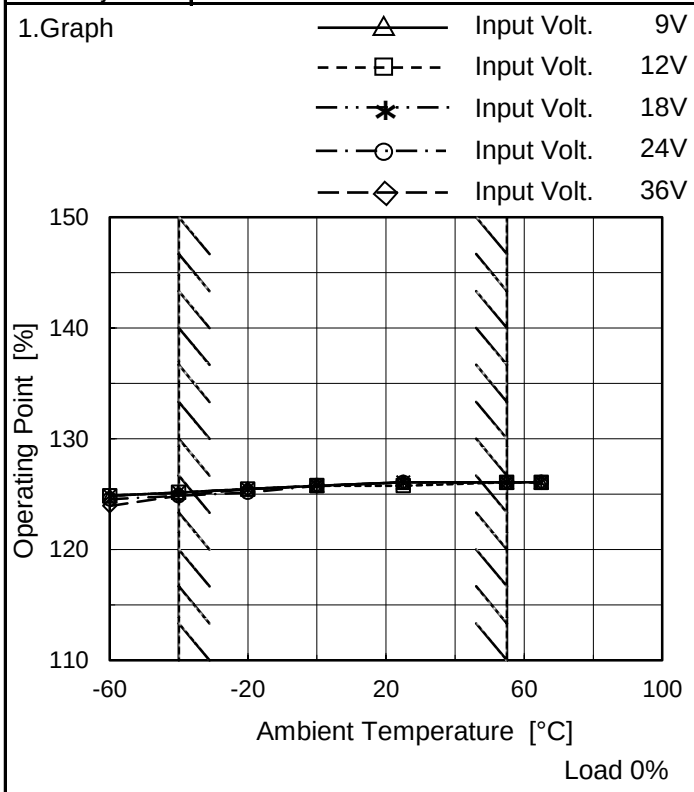
※1 Maximum output current at minimum input Voltage is 70% of rated load current.
※2 Maximum output current at 12V input Voltage is 80% of rated load current.
Refer to instruction manuals for details of input derating.

COSEL

Model	MGFS80243R3
Item	Overvoltage Protection
Object	+3.3V18A

Testing Circuitry Figure A

1.Graph



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

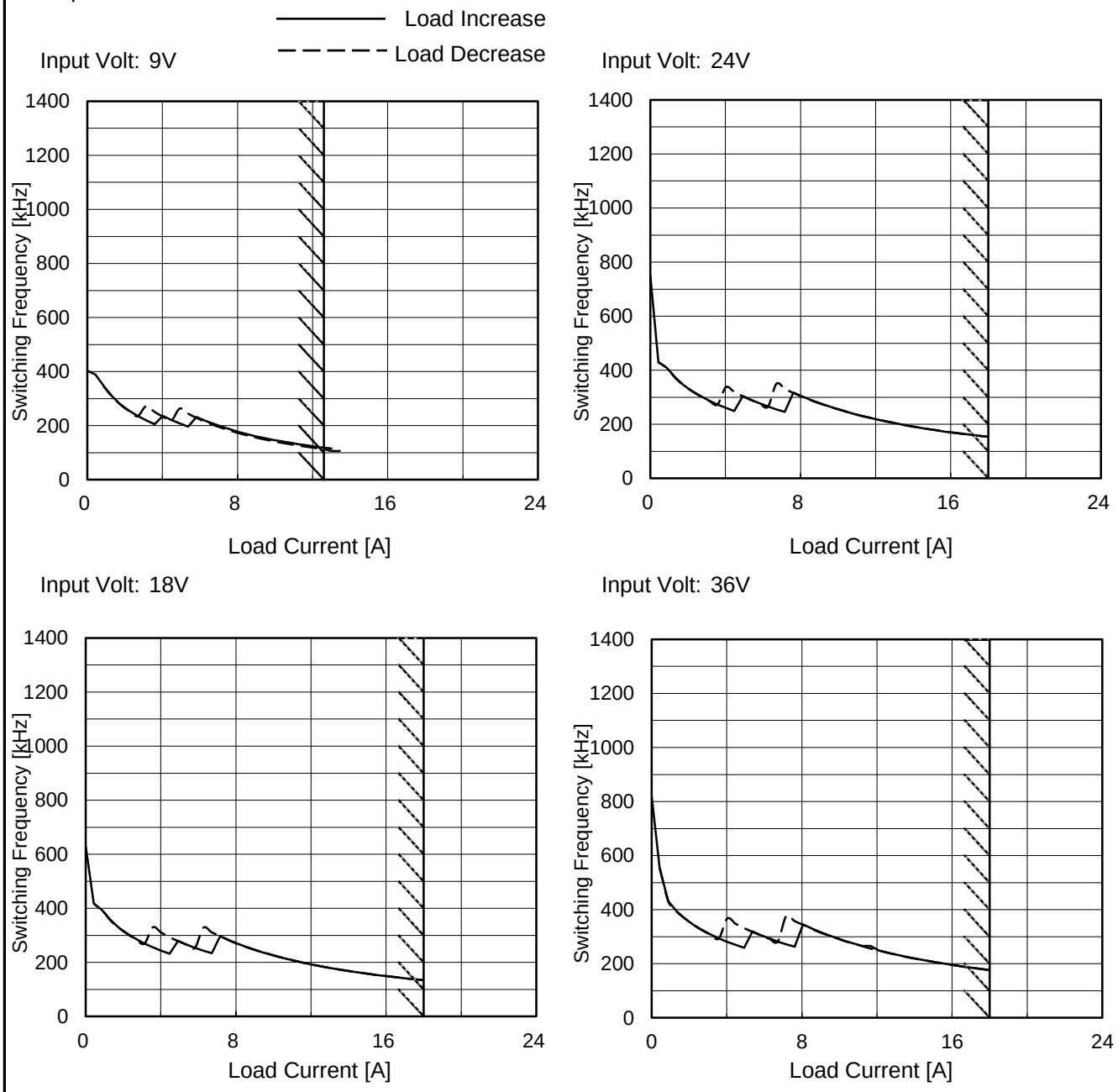
2.Values

Ambient Temperature [°C]	Operating Point [%] Input Volt. 9[V]	Input Volt. 12[V]	Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]
-60	125	125	125	125	124
-40	125	125	125	125	125
-20	125	125	125	125	125
0	126	126	126	126	126
25	126	126	126	126	126
55	126	126	126	126	126
65	126	126	126	126	126
--	-	-	-	-	-
--	-	-	-	-	-
--	-	-	-	-	-
--	-	-	-	-	-

COSEL

Model	MGFS80243R3	
Item	Switching frequency (by Load Current)	Temperature 25°C Testing Circuitry Figure A
Object	+3.3V18A	

1.Graph



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

-switching frequency of MG80 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, MG80 operates intermittently, so switching frequency would not become constant.
※ Maximum output current at minimum input Voltage is 70% of rated load current.
Refer to instruction manuals for details of input derating.

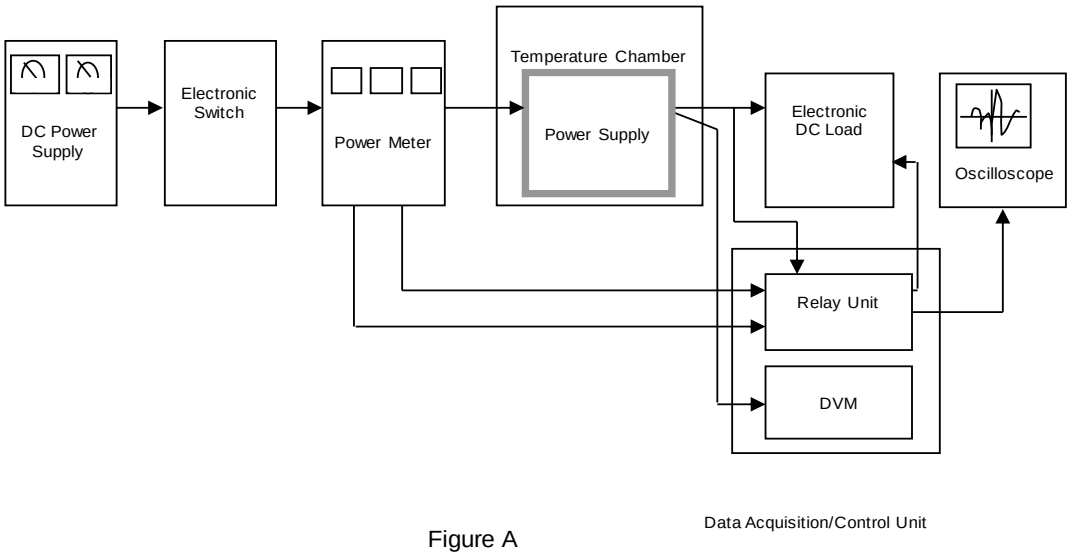


Figure A

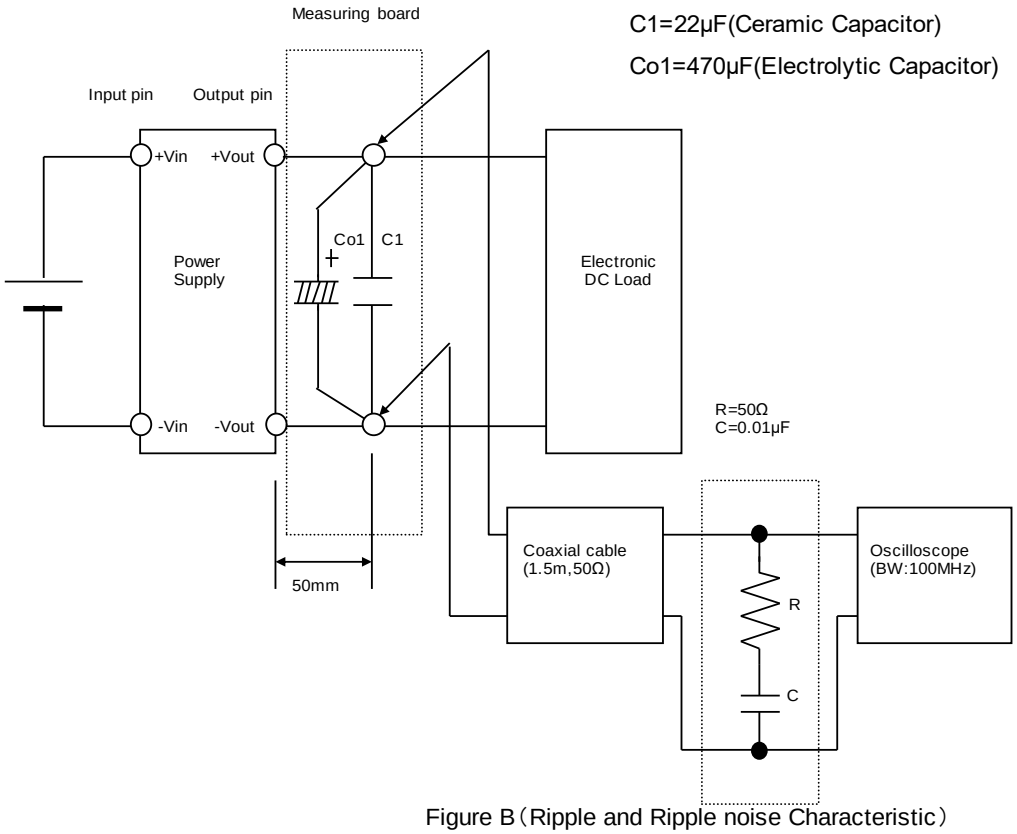


Figure B（Ripple and Ripple noise Characteristic）