



TEST DATA OF MGS1R5123R3

Regulated DC Power Supply
April 1, 2016

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Takayuki Fukuda Design Manager

Prepared by : Shohei Mukaiide
Shohei Mukaiide Design Engineer

COSEL CO.,LTD.



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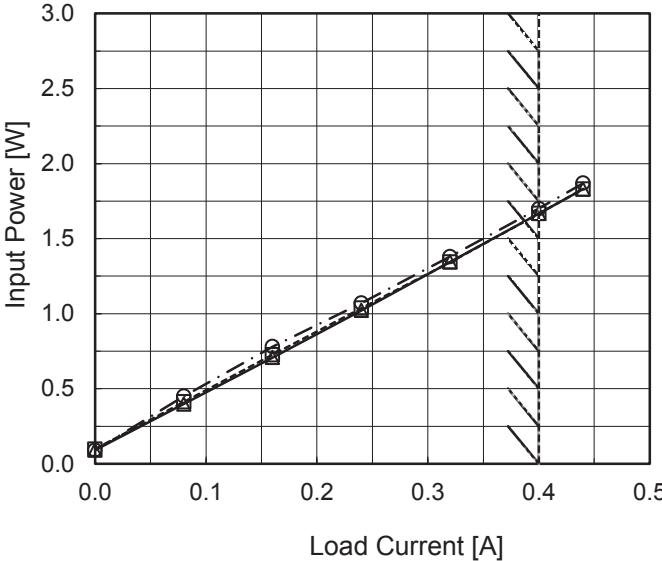
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<p>The graph plots Efficiency [%] on the y-axis (50 to 90) against Input Voltage [V] on the x-axis (5 to 25). Two data series are shown: Load 50% (dashed line with square markers) and Load 100% (solid line with triangle markers). Both series show a general downward trend as input voltage increases. Vertical dashed lines indicate the rated input voltage range, which is approximately 9V to 18V.</p> <table border="1"> <thead> <tr> <th>Input Voltage [V]</th> <th>Efficiency Load 50% [%]</th> <th>Efficiency Load 100% [%]</th> </tr> </thead> <tbody> <tr><td>8.6</td><td>77.9</td><td>80.2</td></tr> <tr><td>9.0</td><td>77.6</td><td>80.1</td></tr> <tr><td>10.0</td><td>76.8</td><td>80.1</td></tr> <tr><td>12.0</td><td>76.6</td><td>79.8</td></tr> <tr><td>15.0</td><td>75.6</td><td>79.2</td></tr> <tr><td>18.0</td><td>72.8</td><td>78.7</td></tr> <tr><td>20.0</td><td>71.7</td><td>77.9</td></tr> <tr><td>--</td><td>-</td><td>-</td></tr> <tr><td>--</td><td>-</td><td>-</td></tr> </tbody> </table>		Input Voltage [V]	Efficiency Load 50% [%]	Efficiency Load 100% [%]	8.6	77.9	80.2	9.0	77.6	80.1	10.0	76.8	80.1	12.0	76.6	79.8	15.0	75.6	79.2	18.0	72.8	78.7	20.0	71.7	77.9	--	-	-	--	-	-		
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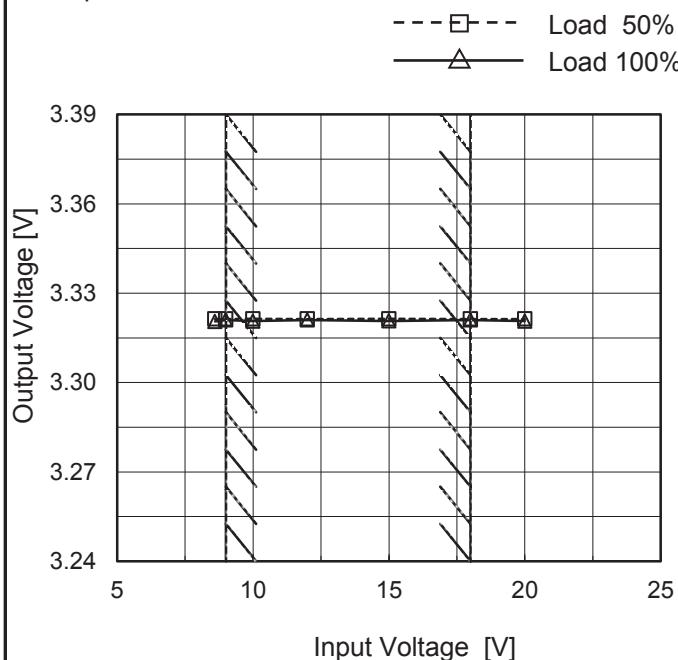
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<p>The graph plots Efficiency [%] on the y-axis (50 to 90) against Load Current [A] on the x-axis (0.0 to 0.5). Three curves are shown for different input voltages: 9V (solid line with triangles), 12V (dashed line with squares), and 18V (dash-dot line with circles). All curves show efficiency increasing with load current, peaking around 0.3-0.4 A and then slightly decreasing. A slanted line on the right side of the graph indicates the rated load current range.</p>																																																						
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Item	Line Regulation
Object	+3.3V0.4A

1.Graph



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

Temperature 25°C
Testing Circuitry Figure A

2.Values

Input Voltage [V]	Output Voltage [V]	
	Load 50%	Load 100%
8.6	3.321	3.321
9.0	3.321	3.321
10.0	3.321	3.321
12.0	3.321	3.321
15.0	3.321	3.321
18.0	3.321	3.321
20.0	3.321	3.321
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Note:	Slanted line shows the range of the rated load current.																																																					

COSEL

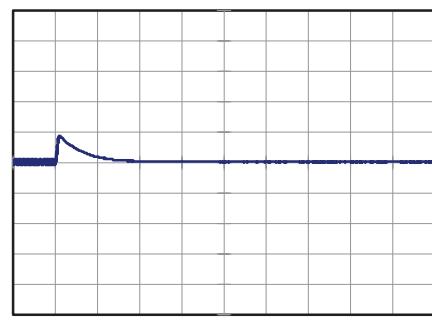
Model	MGS1R5123R3	Temperature	25°C
Item	Dynamic Load Response	Testing Circuitry	Figure A
Object	+3.3V0.4A		

Input Volt. 12 V
 Cycle 1000 ms



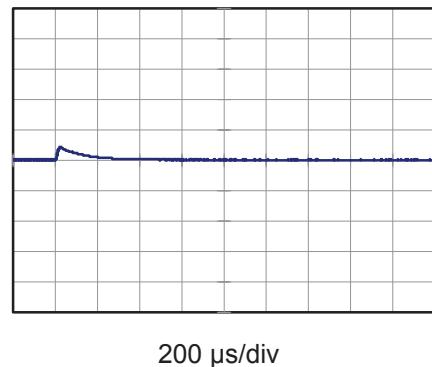
Min.Load (0A)↔
 Load 100% (0.4A)

100 mV/div
 100 μ s/div



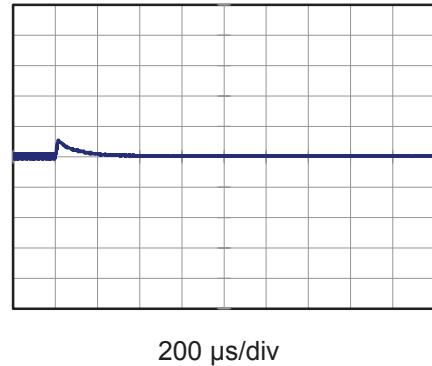
Min.Load (0A)↔
 Load 50% (0.2A)

100 mV/div
 100 μ s/div



Load 50% (0.2A)↔
 Load 100% (0.4A)

100 mV/div
 100 μ s/div

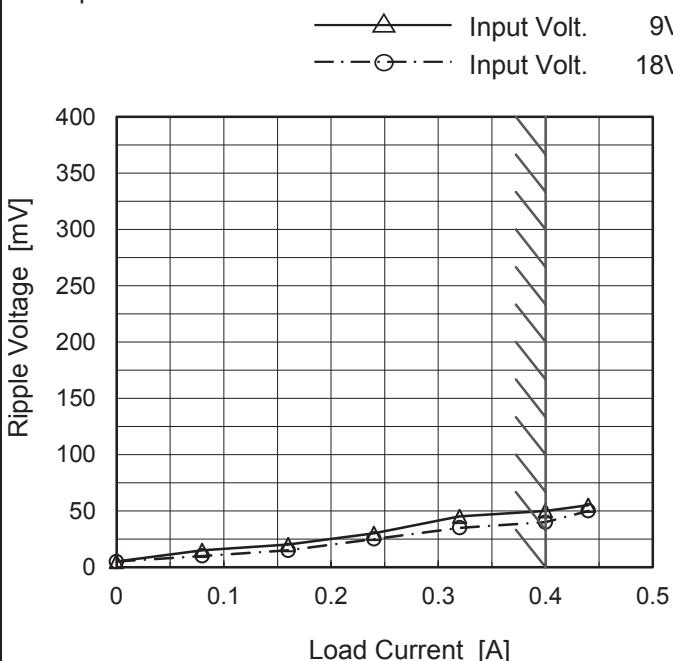


COSEL

Model	MGS1R5123R3
Item	Ripple Voltage (by Load Current)
Object	+3.3V0.4A

 Temperature 25°C
 Testing Circuitry Figure B

1.Graph



2.Values

Load Current [A]	Ripple Voltage [mV]	
	Input Volt. 9 [V]	Input Volt. 18 [V]
0.00	5	5
0.08	15	10
0.16	20	15
0.24	30	25
0.32	45	35
0.40	50	40
0.44	55	50
--	-	-
--	-	-
--	-	-
--	-	-

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.
 load current.

Ripple [mVp-p]

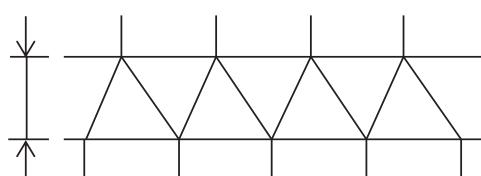


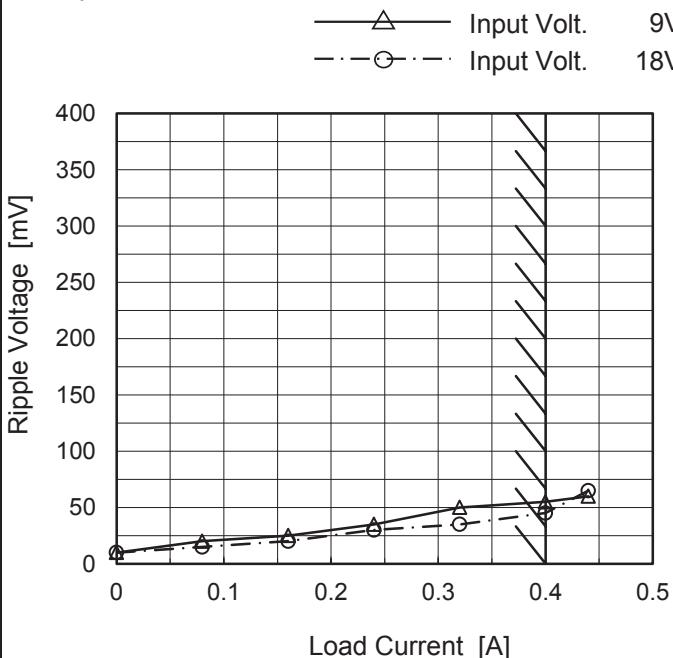
Fig.Complex Ripple Wave Form

COSEL

Model	MGS1R5123R3
Item	Ripple-Noise
Object	+3.3V0.4A

 Temperature 25°C
 Testing Circuitry Figure B

1.Graph



2.Values

Load Current [A]	Ripple-Noise [mV]	
	Input Volt. 9 [V]	Input Volt. 18 [V]
0.00	10	10
0.08	20	15
0.16	25	20
0.24	35	30
0.32	50	35
0.40	55	45
0.44	60	65
--	-	-
--	-	-
--	-	-
--	-	-

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]

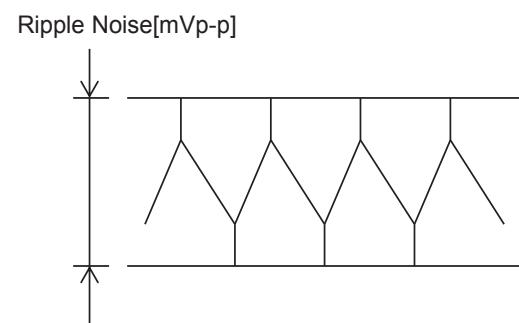
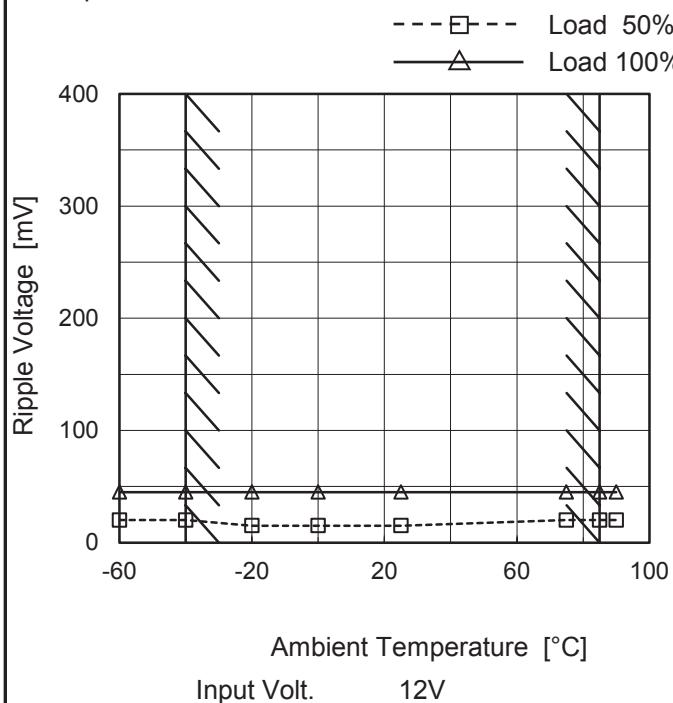


Fig.Complex Ripple Noise Wave Form

COSEL

Model	MGS1R5123R3
Item	Ripple Voltage (by Ambient Temp.)
Object	+3.3V0.4A

1. Graph



Measured by 100 MHz Oscilloscope.

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

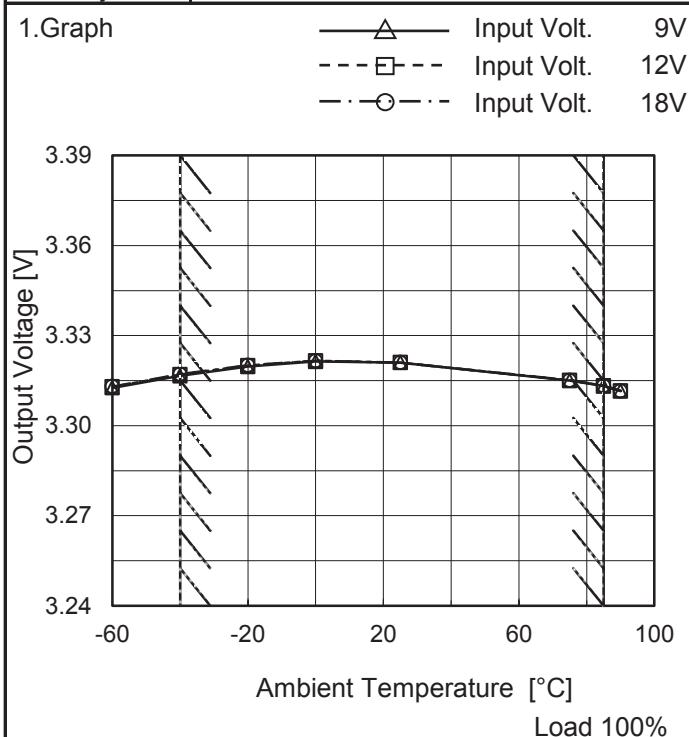
Testing Circuitry Figure B

2. Values

Ambient Temperature [°C]	Ripple Voltage [mV]	
	Load 50%	Load 100%
-60	20	45
-40	20	45
-20	15	45
0	15	45
25	15	45
75	20	45
85	20	45
90	20	45
--	-	-
--	-	-
--	-	-

COSEL

Model	MGS1R5123R3
Item	Ambient Temperature Drift
Object	+3.3V0.4A



Testing Circuitry Figure A

2.Values

Ambient Temperature [°C]	Output Voltage [V]		
	Input Volt. 9[V]	Input Volt. 12[V]	Input Volt. 18[V]
-60	3.313	3.313	3.313
-40	3.317	3.317	3.317
-20	3.320	3.320	3.320
0	3.321	3.322	3.322
25	3.321	3.321	3.321
75	3.315	3.315	3.315
85	3.313	3.313	3.313
90	3.312	3.312	3.312
--	-	-	-
--	-	-	-
--	-	-	-

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



Model	MGS1R5123R3	Testing Circuitry Figure A
Item	Output Voltage Accuracy	
Object	+3.3V0.4A	

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 - 85°C

Input Voltage : 9 - 18V

Load Current : 0 - 0.4A

* Output Voltage Accuracy = $\pm(\text{Maximum of Output Voltage} - \text{Minimum of Output Voltage}) / 2$

$$\text{* Output Voltage Accuracy (Ratio)} = \frac{\text{Output Voltage Accuracy}}{\text{Rated Output Voltage}} \times 100$$

2. Values

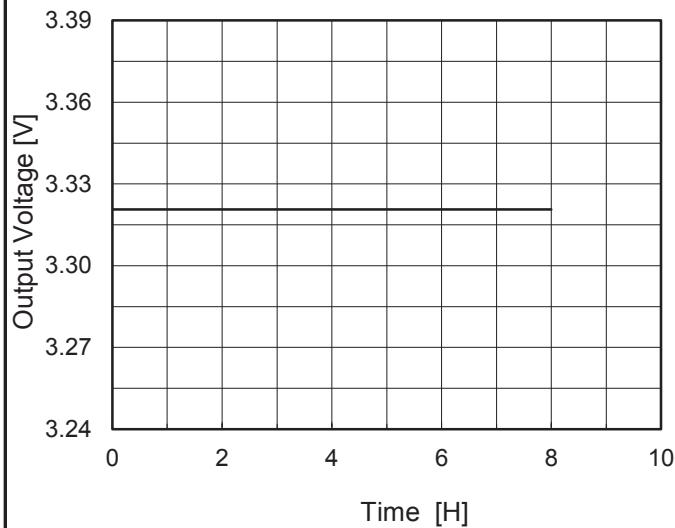
Item	Temperature [°C]	Input Voltage[V]	Output		Output Voltage Accuracy	
			Current[A]	Voltage[V]	Value [mV]	Ratio [%]
Maximum Voltage	25	18	0	3.323	± 5	± 0.2
Minimum Voltage	85	9	0.4	3.313		

COSEL

Model	MGS1R5123R3
Item	Time Lapse Drift
Object	+3.3V0.4A

 Temperature 25°C
 Testing Circuitry Figure A

1.Graph


 Input Volt. 12V
 Load 100%

2.Values

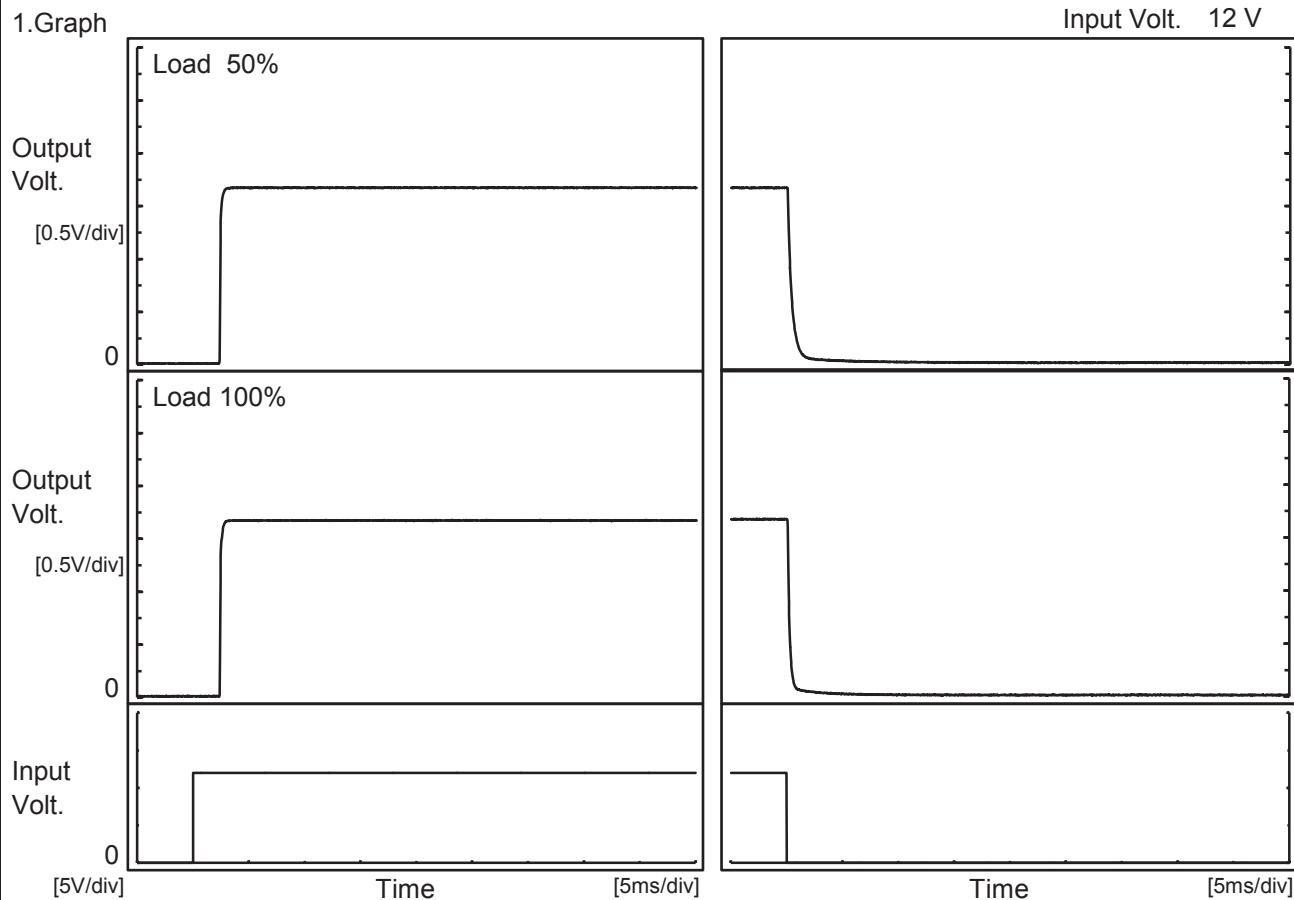
Time since start [H]	Output Voltage [V]
0.0	3.321
0.5	3.321
1.0	3.321
2.0	3.321
3.0	3.321
4.0	3.321
5.0	3.321
6.0	3.321
7.0	3.321
8.0	3.321

COSEL

Model	MGS1R5123R3
Item	Rise and Fall Time
Object	+3.3V0.4A

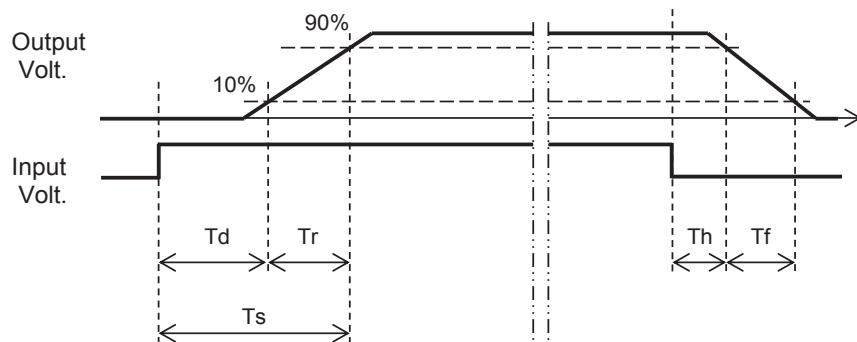
Temperature 25°C
Testing Circuitry Figure A

1. Graph



2. Values

Load	Time	Td	Tr	Ts	Th	Tf	[ms]
50 %		2.4	0.2	2.6	0.1	0.9	
100 %		2.4	0.2	2.6	0.1	0.5	

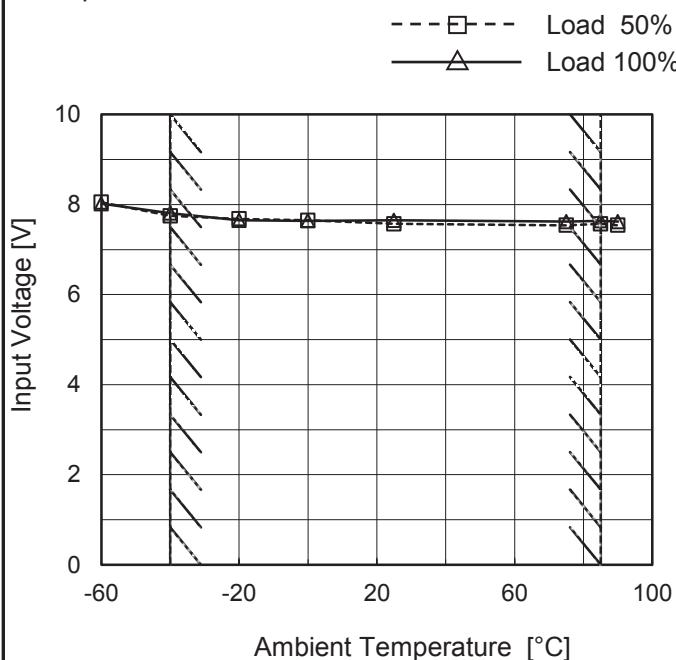


COSEL

Model	MGS1R5123R3
Item	Minimum Input Voltage for Regulated Output Voltage
Object	+3.3V0.4A

Testing Circuitry Figure A

1. Graph



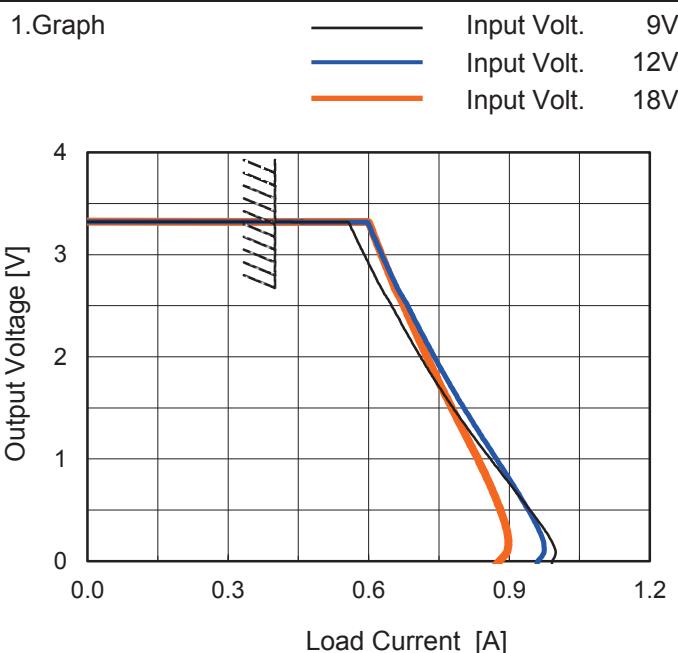
Note: Slanted line shows the range of the rated ambient temperature.

2. Values

Ambient Temperature [°C]	Input Voltage [V]	
	Load 50%	Load 100%
-60	8.1	8.1
-40	7.8	7.9
-20	7.7	7.7
0	7.7	7.7
25	7.6	7.7
75	7.6	7.7
85	7.6	7.7
90	7.6	7.7
--	-	-
--	-	-
--	-	-

COSEL

Model	MGS1R5123R3
Item	Overcurrent Protection
Object	+3.3V0.4A



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

Temperature 25°C
Testing Circuitry Figure A

2.Values

Output Voltage [V]	Load Current [A]		
	Input Volt. 9[V]	Input Volt. 12[V]	Input Volt. 18[V]
3.30	0.42	0.41	0.41
3.14	0.58	0.62	0.62
2.97	0.59	0.63	0.63
2.64	0.63	0.66	0.66
2.31	0.67	0.70	0.69
1.98	0.71	0.74	0.73
1.65	0.76	0.78	0.76
1.32	0.81	0.83	0.80
0.99	0.86	0.87	0.83
0.66	0.92	0.92	0.87
0.33	0.97	0.96	0.89
0.00	0.99	0.96	0.87

COSEL

Model	MGS1R5123R3	Temperature	25°C																																																			
Item	Switching frequency (by Load Current)	Testing Circuitry	Figure A																																																			
Object	+3.3V0.4A																																																					
1.Graph	<p>—△— Input Volt. 9V - - □ - - Input Volt. 12V - - ○ - - Input Volt. 18V</p> <table border="1"> <caption>Data points estimated from Graph</caption> <thead> <tr> <th>Load Current [A]</th> <th>9V [kHz]</th> <th>12V [kHz]</th> <th>18V [kHz]</th> </tr> </thead> <tbody> <tr><td>0.00</td><td>970</td><td>990</td><td>1060</td></tr> <tr><td>0.08</td><td>656</td><td>739</td><td>827</td></tr> <tr><td>0.16</td><td>494</td><td>572</td><td>660</td></tr> <tr><td>0.24</td><td>393</td><td>465</td><td>551</td></tr> <tr><td>0.32</td><td>327</td><td>393</td><td>472</td></tr> <tr><td>0.40</td><td>279</td><td>339</td><td>412</td></tr> <tr><td>0.44</td><td>261</td><td>324</td><td>400</td></tr> </tbody> </table>			Load Current [A]	9V [kHz]	12V [kHz]	18V [kHz]	0.00	970	990	1060	0.08	656	739	827	0.16	494	572	660	0.24	393	465	551	0.32	327	393	472	0.40	279	339	412	0.44	261	324	400																			
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-When load current is low, MG operates intermittently, so switching frequency would not become constant.																																																						

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