



# TEST DATA OF MGS6123R3

# Regulated DC Power Supply

## July 28, 2016

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Prepared by : Ryosuke Nakao Ryosuke Nakao Design Engineer

**COSEL CO.,LTD.**



## CONTENTS

1.Input Current (by Input Voltage) . . . . .	1
2.Input Current (by Load Current) . . . . .	2
3.Input Power (by Load Current) . . . . .	3
4.Efficiency (by Input Voltage) . . . . .	4
5.Efficiency (by Load Current) . . . . .	5
6.Line Regulation . . . . .	6
7.Load Regulation . . . . .	7
8.Dynamic Load Response . . . . .	8
9.Ripple Voltage (by Load Current) . . . . .	9
10.Ripple-Noise . . . . .	10
11.Ripple Voltage (by Ambient Temperature) . . . . .	11
12.Ambient Temperature Drift . . . . .	12
13.Output Voltage Accuracy . . . . .	13
14.Time Lapse Drift . . . . .	14
15.Rise and Fall Time . . . . .	15
16.Minimum Input Voltage for Regulated Output Voltage . . . . .	16
17.Overcurrent Protection . . . . .	17
18.Switching Frequency (by Load Current) . . . . .	18
19.Figure of Testing Circuitry . . . . .	19

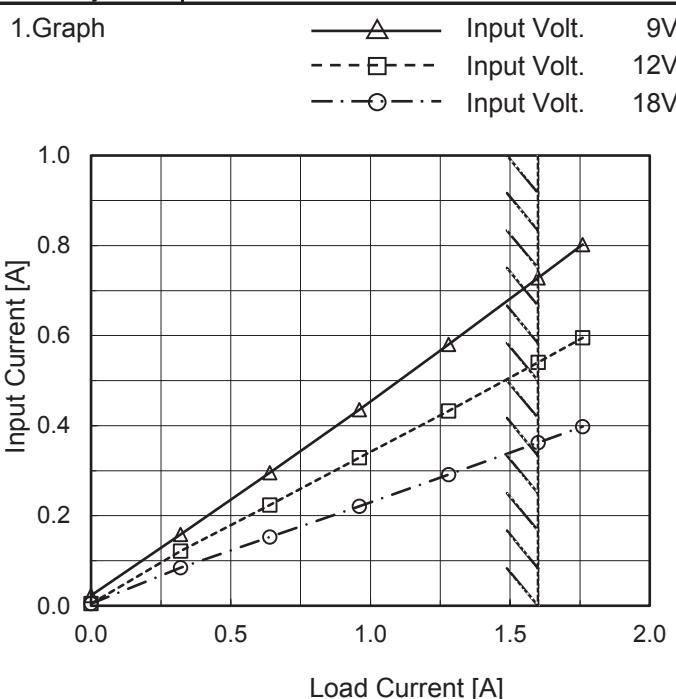
(Final Page 19)

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Model	MGS6123R3		
Item	Input Current (by Input Voltage)		
Object	_____		
1.Graph	<p>Legend:</p> <ul style="list-style-type: none"> <li>Load 100% (solid line with open triangle markers)</li> <li>Load 50% (dashed line with open square markers)</li> <li>Load 0% (dash-dot line with open circle markers)</li> </ul>		
Note:	Slanted line shows the range of the rated input voltage.		
Temperature	25°C		
Testing Circuitry	Figure A		
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	0.003	0.003	0.003
8.2	0.025	0.401	0.797
8.4	0.025	0.391	0.777
8.6	0.024	0.383	0.756
8.8	0.023	0.372	0.737
9.0	0.023	0.364	0.721
10.0	0.009	0.327	0.645
12.0	0.004	0.275	0.538
16.0	0.004	0.208	0.401
18.0	0.004	0.187	0.361
20.0	0.005	0.169	0.325
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**COSEL**

Model	MGS6123R3
Item	Input Current (by Load Current)
Object	_____


 Temperature 25°C  
 Testing Circuitry Figure A

## 2.Values

Load Current [A]	Input Current [A]		
	Input Volt. 9[V]	Input Volt. 12[V]	Input Volt. 18[V]
0.00	0.023	0.005	0.005
0.32	0.159	0.121	0.085
0.64	0.296	0.224	0.153
0.96	0.436	0.329	0.221
1.28	0.581	0.432	0.291
1.60	0.728	0.541	0.362
1.76	0.802	0.595	0.398
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Note: Slanted line shows the range of the rated load current.

**COSEL**

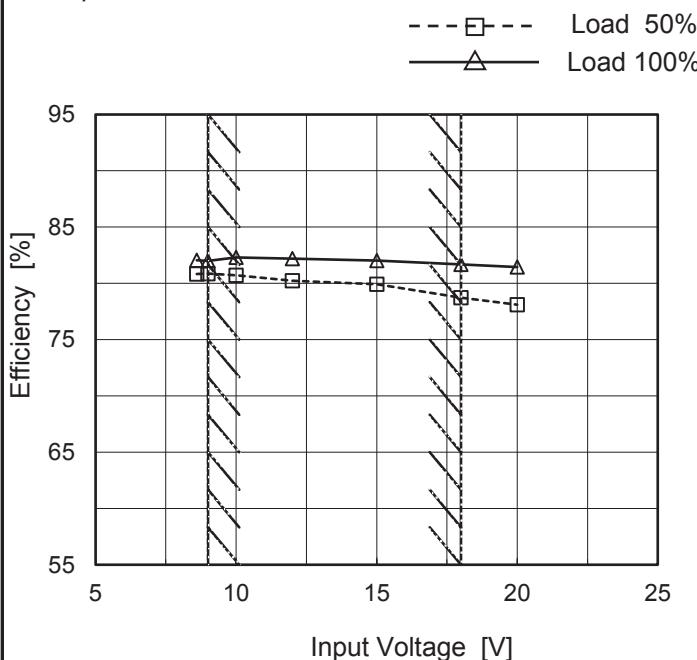
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**COSEL**

Model	MGS6123R3
Item	Efficiency (by Input Voltage)
Object	_____

 Temperature 25°C  
 Testing Circuitry Figure A

## 1.Graph



## 2.Values

Input Voltage [V]	Efficiency [%]	
	Load 50%	Load 100%
8.6	80.8	82.1
9.0	80.9	82.0
10.0	80.7	82.3
12.0	80.2	82.2
15.0	79.9	82.0
18.0	78.7	81.7
20.0	78.1	81.4
--	-	-
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Note: Slanted line shows the range of the rated input voltage.

**COSEL**

Model	MGS6123R3	Temperature	25°C																																																			
Item	Efficiency (by Load Current)	Testing Circuitry	Figure A																																																			
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1.Graph	—△— Input Volt. 9V - - □--- Input Volt. 12V - - ○--- Input Volt. 18V																																																					
	<p>The graph shows efficiency increasing from approximately 74% at 0.32A to 84% at 1.76A, then slightly decreasing to 82%. The 9V curve is the highest, followed by 12V, and then 18V. A vertical dashed line at ~1.6A marks the rated load current range.</p> <table border="1"> <thead> <tr> <th>Load Current [A]</th> <th>Efficiency [%] (9V)</th> <th>Efficiency [%] (12V)</th> <th>Efficiency [%] (18V)</th> </tr> </thead> <tbody> <tr><td>0.32</td><td>74.2</td><td>72.9</td><td>69.6</td></tr> <tr><td>0.64</td><td>80.0</td><td>79.1</td><td>77.2</td></tr> <tr><td>0.96</td><td>81.5</td><td>81.0</td><td>80.2</td></tr> <tr><td>1.28</td><td>81.8</td><td>82.0</td><td>81.2</td></tr> <tr><td>1.60</td><td>82.0</td><td>82.2</td><td>81.7</td></tr> <tr><td>1.76</td><td>81.8</td><td>82.1</td><td>81.8</td></tr> </tbody> </table>	Load Current [A]	Efficiency [%] (9V)	Efficiency [%] (12V)	Efficiency [%] (18V)	0.32	74.2	72.9	69.6	0.64	80.0	79.1	77.2	0.96	81.5	81.0	80.2	1.28	81.8	82.0	81.2	1.60	82.0	82.2	81.7	1.76	81.8	82.1	81.8	2.Values																								
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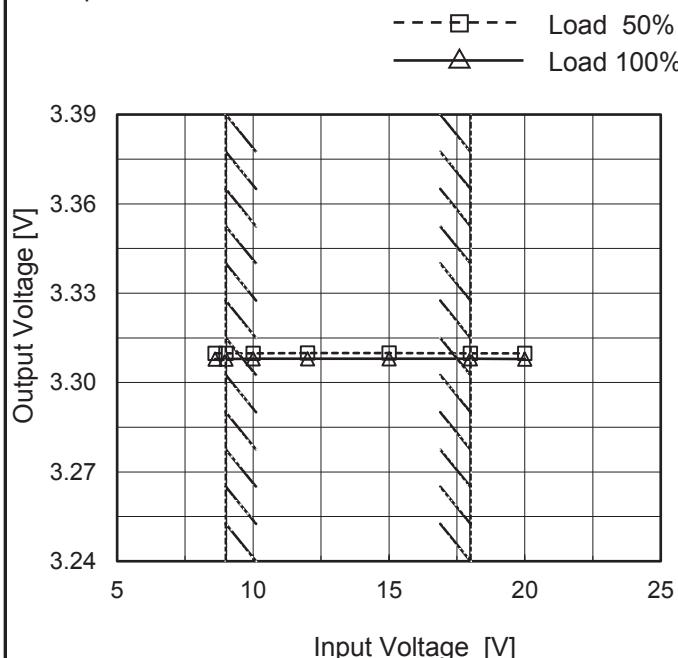
Note: Slanted line shows the range of the rated load current.

**COSEL**

Model	MGS6123R3
Item	Line Regulation
Object	+3.3V1.6A

 Temperature 25°C  
 Testing Circuitry Figure A

## 1.Graph



## 2.Values

Input Voltage [V]	Output Voltage [V]	
	Load 50%	Load 100%
8.6	3.310	3.308
9.0	3.310	3.308
10.0	3.310	3.308
12.0	3.310	3.308
15.0	3.310	3.308
18.0	3.310	3.308
20.0	3.310	3.308
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--	-	-

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

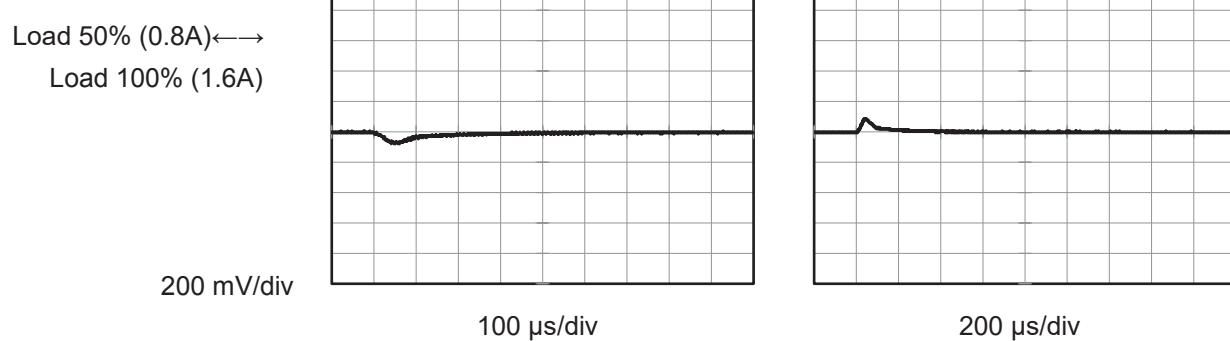
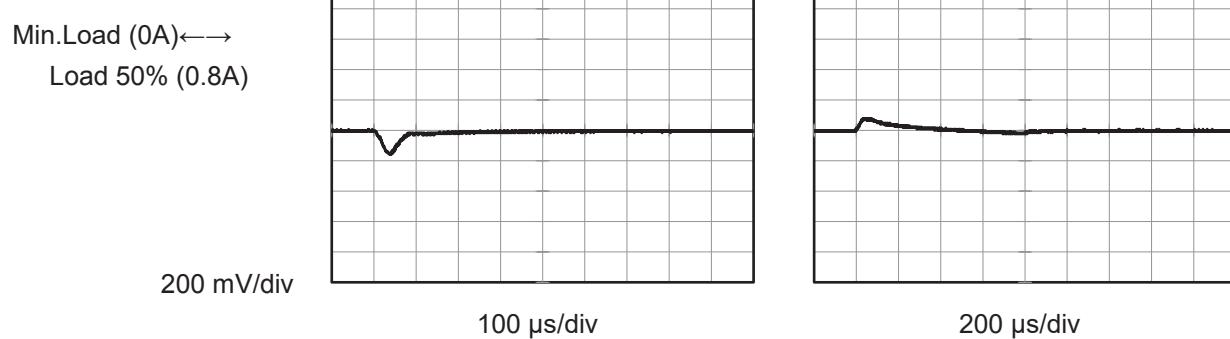
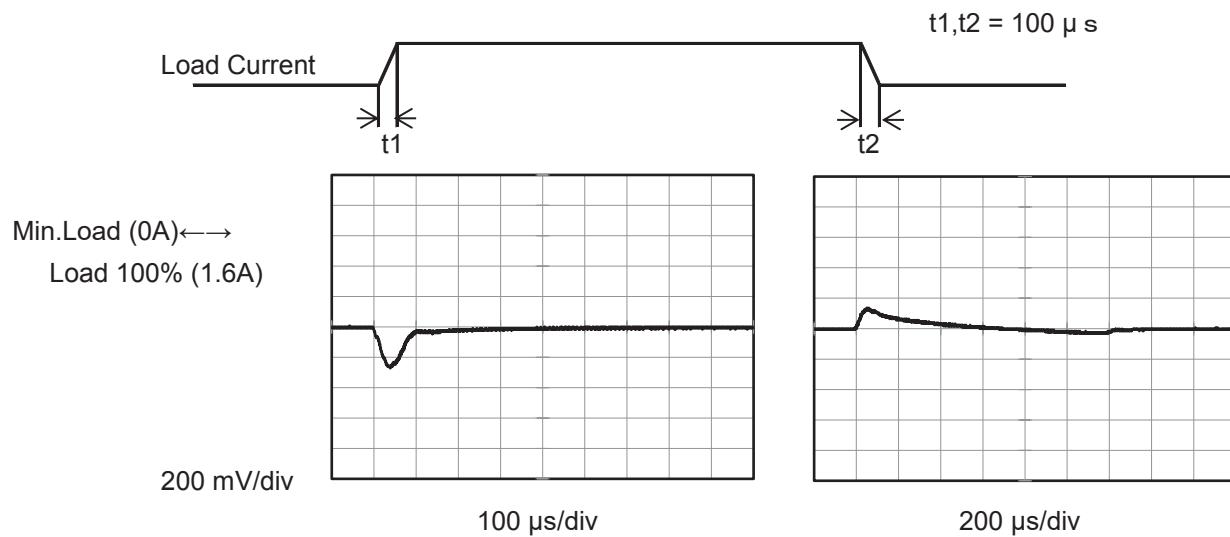
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Item	Load Regulation	Testing Circuitry	Figure A																																																			
Object	+3.3V1.6A																																																					
1.Graph	<p>Output Voltage [V]</p> <p>Load Current [A]</p> <ul style="list-style-type: none"> <li>— △ — Input Volt. 9V</li> <li>- - □ - - Input Volt. 12V</li> <li>- - ○ - - Input Volt. 18V</li> </ul>																																																					
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Note:	Slanted line shows the range of the rated load current.																																																					

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Model	MGS6123R3	Temperature	25°C
Item	Dynamic Load Response	Testing Circuitry	Figure A
Object	+3.3V1.6A		

Input Volt. 12 V  
 Cycle 100 ms



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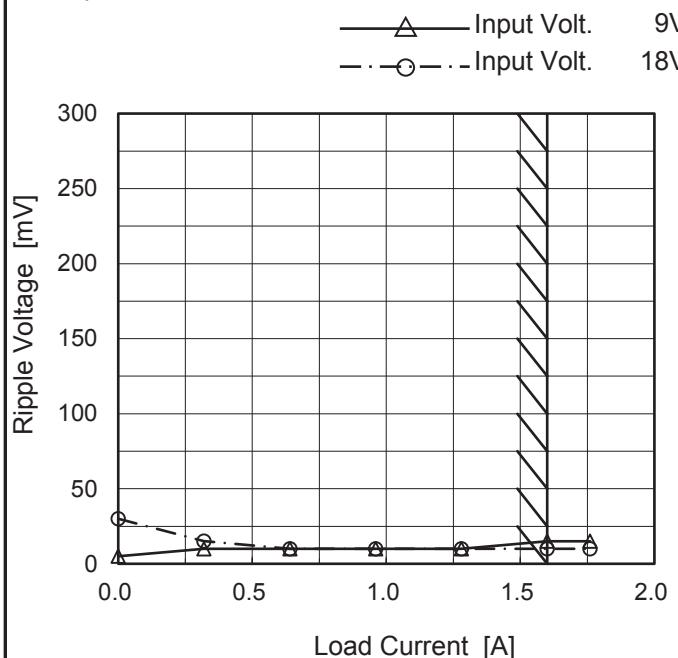
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Item	Ripple Voltage (by Load Current)	Temperature      25°C Testing Circuitry      Figure B																																						
Object	+3.3V1.6A																																							
1.Graph																																								
<p>Graph showing Ripple Voltage [mV] vs Load Current [A]. The Y-axis ranges from 0 to 300 mV, and the X-axis ranges from 0.0 to 2.0 A. Two data series are shown: Input Volt. 9V (solid line with open circles) and Input Volt. 18V (dashed line with open circles). A slanted line indicates the rated load current range.</p> <table border="1"> <thead> <tr> <th>Load Current [A]</th> <th>Ripple Voltage [mV] (9V)</th> <th>Ripple Voltage [mV] (18V)</th> </tr> </thead> <tbody> <tr><td>0.00</td><td>5</td><td>25</td></tr> <tr><td>0.32</td><td>5</td><td>10</td></tr> <tr><td>0.64</td><td>5</td><td>5</td></tr> <tr><td>0.96</td><td>10</td><td>5</td></tr> <tr><td>1.28</td><td>10</td><td>10</td></tr> <tr><td>1.60</td><td>15</td><td>10</td></tr> <tr><td>1.76</td><td>15</td><td>10</td></tr> <tr><td>--</td><td>-</td><td>-</td></tr> <tr><td>--</td><td>-</td><td>-</td></tr> <tr><td>--</td><td>-</td><td>-</td></tr> <tr><td>--</td><td>-</td><td>-</td></tr> </tbody> </table>			Load Current [A]	Ripple Voltage [mV] (9V)	Ripple Voltage [mV] (18V)	0.00	5	25	0.32	5	10	0.64	5	5	0.96	10	5	1.28	10	10	1.60	15	10	1.76	15	10	--	-	-	--	-	-	--	-	-	--	-	-		
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<p>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.</p>																																								
<p>Ripple [mVp-p]</p> <p>Fig.Complex Ripple Wave Form</p>																																								

**COSEL**

Model	MGS6123R3
Item	Ripple-Noise
Object	+3.3V1.6A

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	5	30
0.32	10	15
0.64	10	10
0.96	10	10
1.28	10	10
1.60	15	10
1.76	15	10
--	-	-
--	-	-
--	-	-
--	-	-

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]

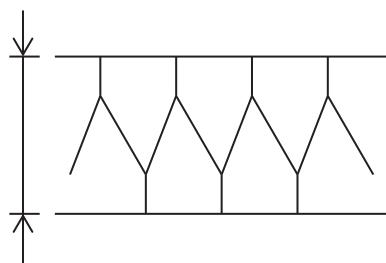
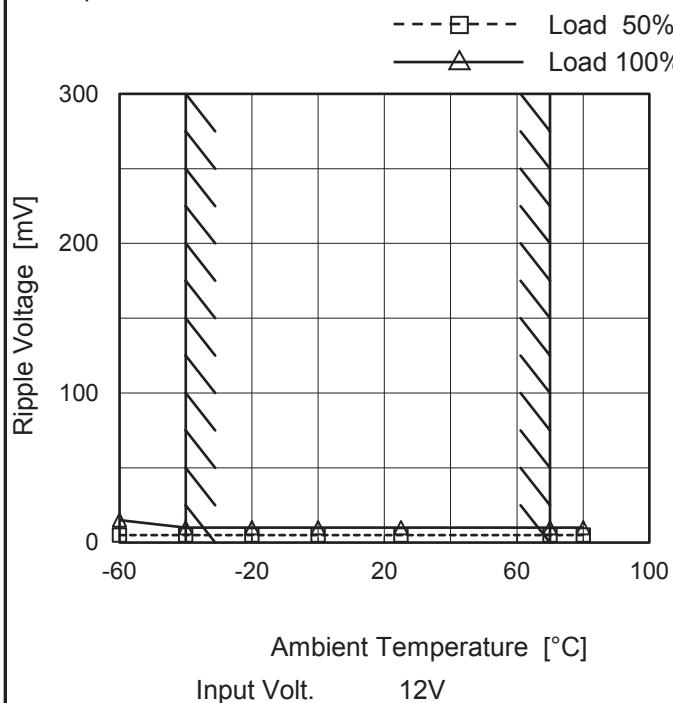


Fig.Complex Ripple Noise Wave Form

**COSEL**

Model	MGS6123R3
Item	Ripple Voltage (by Ambient Temp.)
Object	+3.3V1.6A

## 1.Graph



Measured by 100 MHz Oscilloscope.

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

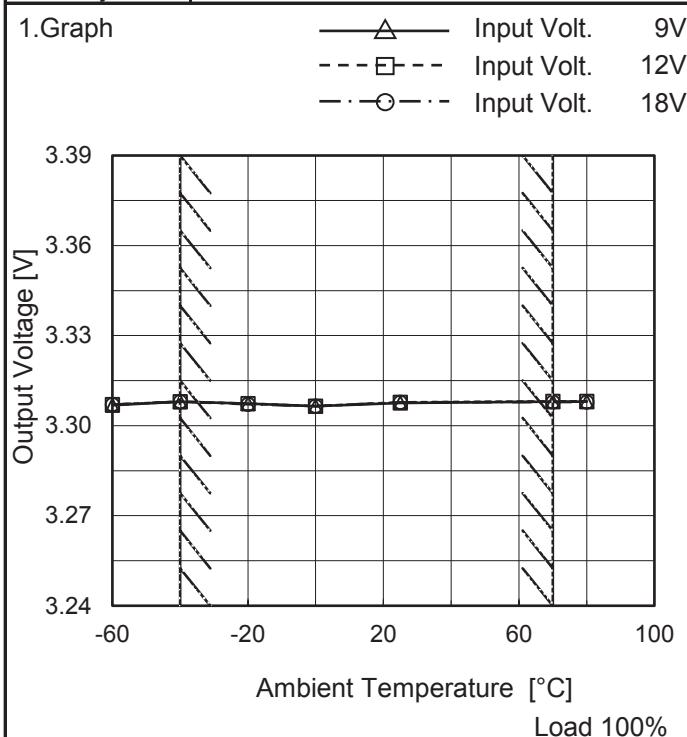
Testing Circuitry Figure B

## 2.Values

Ambient Temperature [°C]	Ripple Voltage [mV]	
	Load 50%	Load 100%
-60	5	15
-40	5	10
-20	5	10
0	5	10
25	5	10
70	5	10
80	5	10
--	-	-
--	-	-
--	-	-
--	-	-

**COSEL**

Model	MGS6123R3
Item	Ambient Temperature Drift
Object	+3.3V1.6A



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	3.307	3.307	3.307
-40	3.308	3.308	3.308
-20	3.307	3.307	3.307
0	3.307	3.307	3.307
25	3.308	3.308	3.308
70	3.308	3.308	3.308
80	3.308	3.308	3.308
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

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



Model	MGS6123R3	Testing Circuitry Figure A
Item	Output Voltage Accuracy	
Object	+3.3V1.6A	

### 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 - 70°C

Input Voltage : 9 - 18V

Load Current : 0 - 1.6A

\* 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

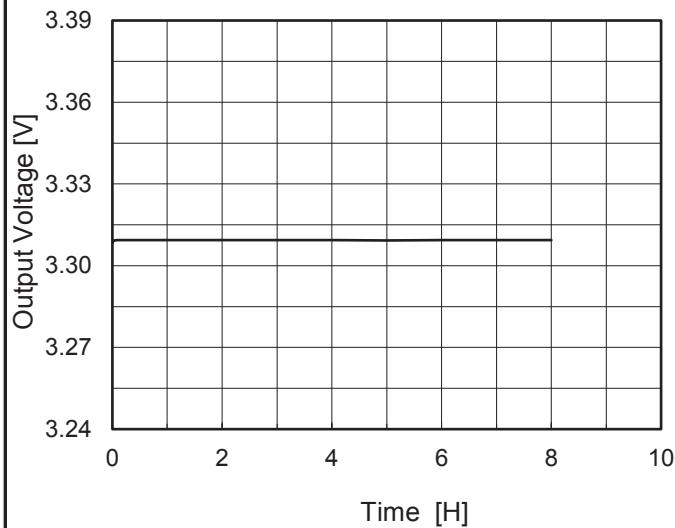
Item	Temperature [°C]	Input Voltage[V]	Output		Output Voltage Accuracy	
			Current[A]	Voltage[V]	Value [mV]	Ratio [%]
Maximum Voltage	70	18	0	3.314	$\pm 4$	$\pm 0.1$
Minimum Voltage	0	9	1.6	3.306		

**COSEL**

Model	MGS6123R3
Item	Time Lapse Drift
Object	+3.3V1.6A

Temperature 25°C  
Testing Circuitry Figure A

## 1.Graph



Input Volt. 12V  
Load 100%

## 2.Values

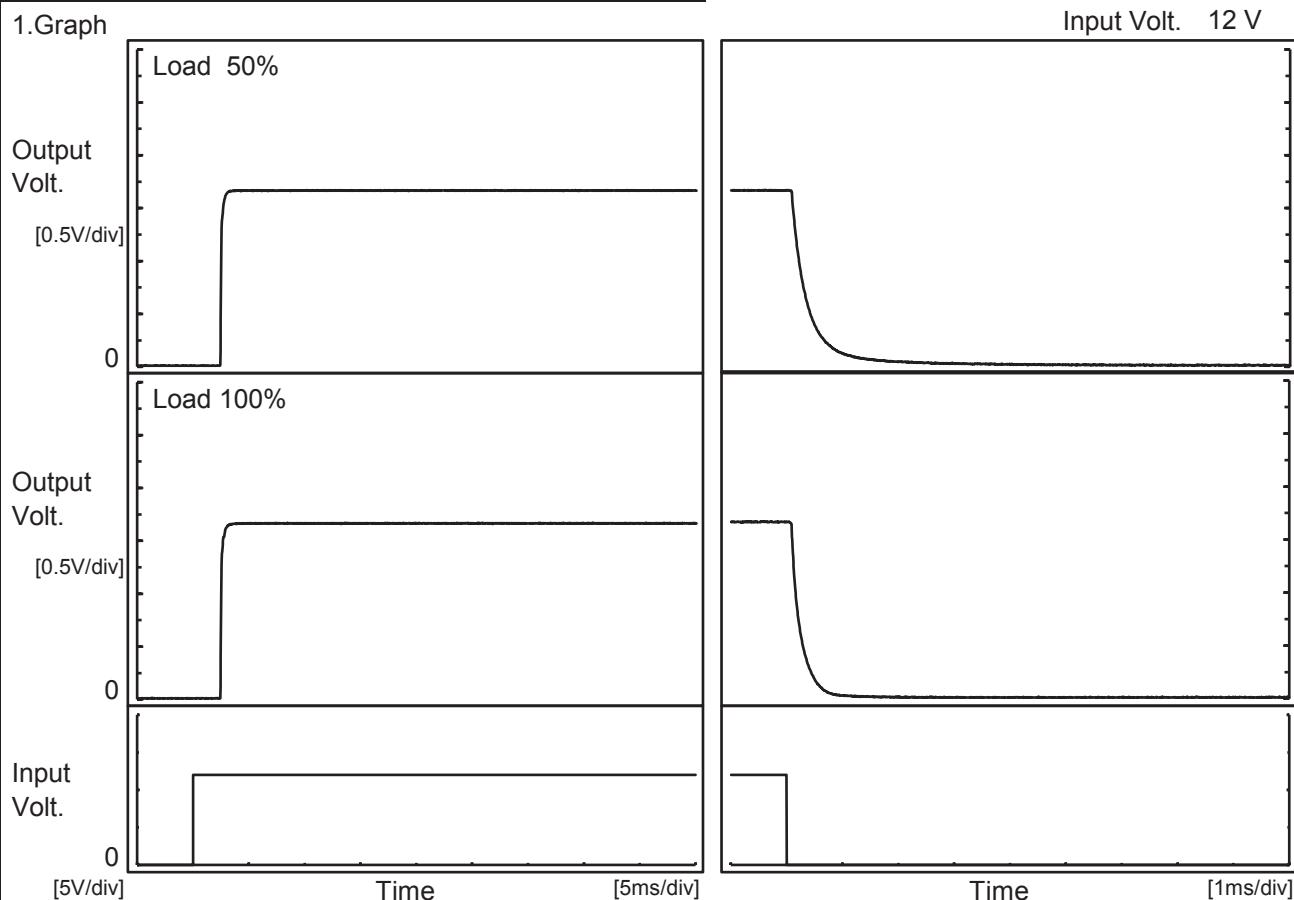
Time since start [H]	Output Voltage [V]
0.0	3.308
0.5	3.309
1.0	3.309
2.0	3.309
3.0	3.309
4.0	3.309
5.0	3.309
6.0	3.309
7.0	3.309
8.0	3.309

**COSEL**

Model	MGS6123R3
Item	Rise and Fall Time
Object	+3.3V1.6A

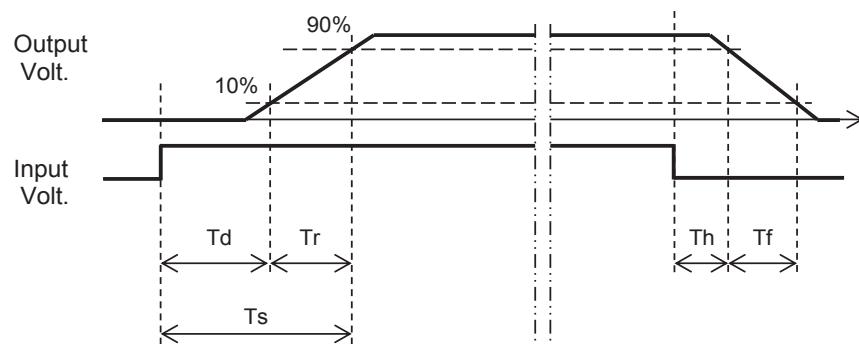
Temperature 25°C  
Testing Circuitry Figure A

## 1.Graph



## 2.Values

Load	Time	Td	Tr	Ts	Th	Tf	[ms]
50 %		2.5	0.2	2.7	0.1	0.7	
100 %		2.5	0.2	2.7	0.1	0.4	

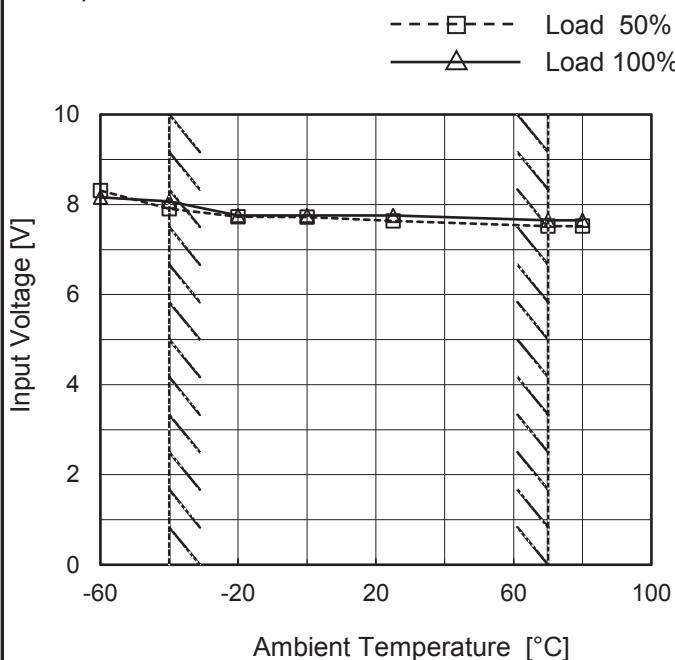


**COSEL**

Model	MGS6123R3
Item	Minimum Input Voltage for Regulated Output Voltage
Object	+3.3V1.6A

## Testing Circuitry Figure A

## 1.Graph



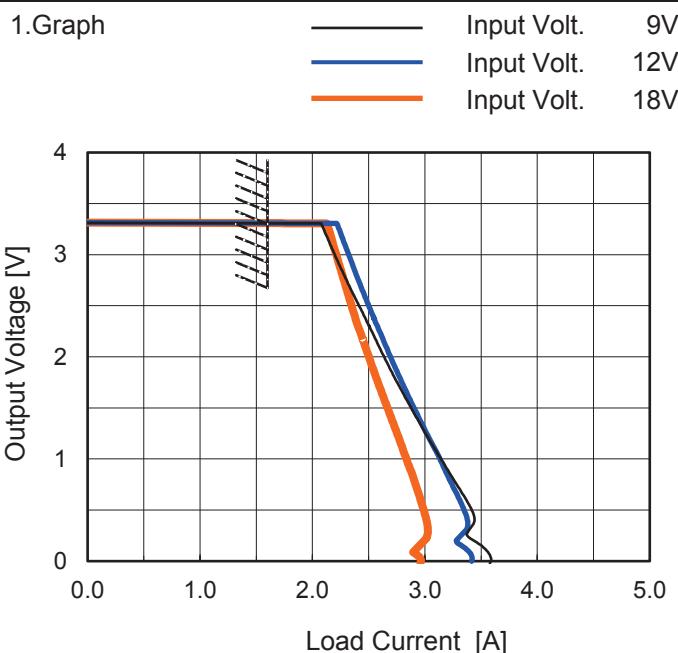
## 2.Values

Ambient Temperature [°C]	Input Voltage [V]	
	Load 50%	Load 100%
-60	8.4	8.2
-40	8.0	8.1
-20	7.8	7.8
0	7.8	7.8
25	7.7	7.8
70	7.6	7.7
80	7.6	7.7
--	-	-
--	-	-
--	-	-
--	-	-

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

**COSEL**

Model	MGS6123R3
Item	Overcurrent Protection
Object	+3.3V1.6A



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	1.64	1.64	1.64
3.14	2.15	2.28	2.17
2.97	2.21	2.33	2.22
2.64	2.35	2.44	2.31
2.31	2.50	2.57	2.40
1.98	2.65	2.70	2.50
1.65	2.80	2.84	2.61
1.32	2.97	2.98	2.72
0.99	3.15	3.13	2.84
0.66	3.33	3.28	2.94
0.33	3.43	3.38	3.02
0.00	3.58	3.42	2.96

**COSEL**

Model	MGS6123R3	Temperature	25°C																																																			
Item	Switching Frequency (by Load Current)	Testing Circuitry	Figure A																																																			
Object	+3.3V1.6A																																																					
1.Graph	<p>—△— Input Volt. 9V        - - - □ - - Input Volt. 12V        - - ○ - - Input Volt. 18V</p>																																																					
2.Values	<table border="1"> <thead> <tr> <th rowspan="2">Load Current [A]</th> <th colspan="3">Frequency [kHz]</th> </tr> <tr> <th>Input Volt. 9[V]</th> <th>Input Volt. 12[V]</th> <th>Input Volt. 18[V]</th> </tr> </thead> <tbody> <tr><td>0.00</td><td>1074</td><td>1166</td><td>1198</td></tr> <tr><td>0.32</td><td>675</td><td>762</td><td>849</td></tr> <tr><td>0.64</td><td>496</td><td>578</td><td>666</td></tr> <tr><td>0.96</td><td>392</td><td>465</td><td>549</td></tr> <tr><td>1.28</td><td>323</td><td>389</td><td>466</td></tr> <tr><td>1.60</td><td>274</td><td>334</td><td>406</td></tr> <tr><td>1.76</td><td>255</td><td>311</td><td>381</td></tr> <tr><td>--</td><td>-</td><td>-</td><td>-</td></tr> <tr><td>--</td><td>-</td><td>-</td><td>-</td></tr> <tr><td>--</td><td>-</td><td>-</td><td>-</td></tr> <tr><td>--</td><td>-</td><td>-</td><td>-</td></tr> </tbody> </table>			Load Current [A]	Frequency [kHz]			Input Volt. 9[V]	Input Volt. 12[V]	Input Volt. 18[V]	0.00	1074	1166	1198	0.32	675	762	849	0.64	496	578	666	0.96	392	465	549	1.28	323	389	466	1.60	274	334	406	1.76	255	311	381	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-
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-When load current is low, MG operates intermittently, so switching frequency would not become constant.																																																						

COSEL

