



# TEST DATA OF MGS102415

Regulated DC Power Supply  
July 21, 2016

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Design Manager

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Ryosuke Nakao

Design Engineer

**COSEL CO.,LTD.**



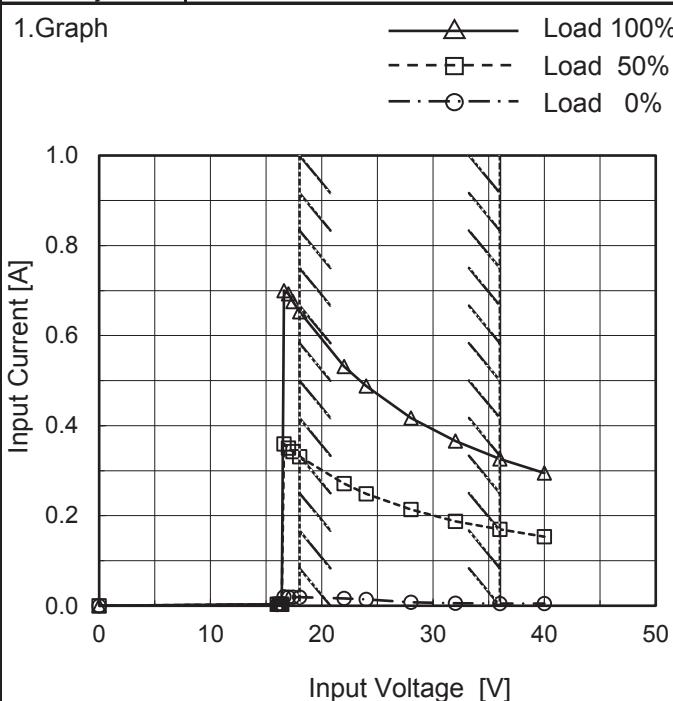
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Model	MGS102415
Item	Input Current (by Input Voltage)
Object	_____



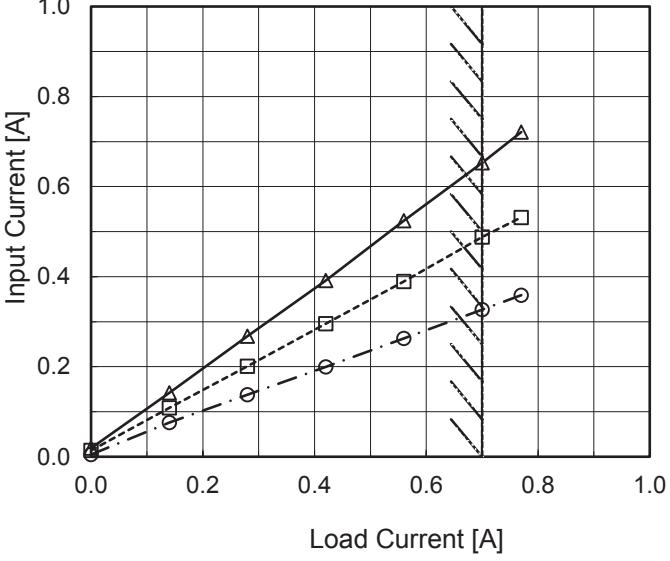
Note: Slanted line shows the range of the rated input voltage.

Temperature 25°C  
Testing Circuitry Figure A

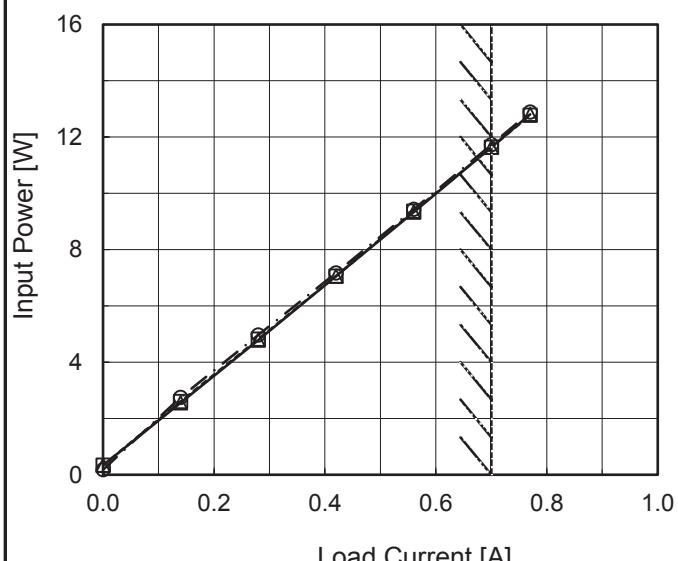
## 2.Values

Input Voltage [V]	Input Current [A]		
	Load 0%	Load 50%	Load 100%
0.0	0.000	0.000	0.000
16.0	0.003	0.004	0.003
16.2	0.004	0.003	0.003
16.4	0.004	0.004	0.004
16.6	0.020	0.360	0.700
17.0	0.019	0.351	0.692
17.4	0.019	0.343	0.676
18.0	0.019	0.331	0.653
22.0	0.016	0.271	0.531
24.0	0.014	0.248	0.488
28.0	0.008	0.214	0.417
32.0	0.006	0.187	0.366
36.0	0.005	0.170	0.326
40.0	0.005	0.154	0.295
--	-	-	-
--	-	-	-
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Model	MGS102415		
Item	Input Current (by Load Current)		
Object	_____		
1.Graph	—△— Input Volt. 18V - -□--- Input Volt. 24V - -○--- Input Volt. 36V		
 <p>Note: Slanted line shows the range of the rated load current.</p>			
Temperature	25°C		
Testing Circuitry	Figure A		
2.Values			
Load Current [A]	Input Current [A]		
	Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]
0.00	0.019	0.014	0.005
0.14	0.142	0.109	0.076
0.28	0.268	0.201	0.138
0.42	0.392	0.295	0.199
0.56	0.524	0.390	0.263
0.70	0.653	0.488	0.326
0.77	0.721	0.532	0.359
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

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Model	MGS102415																																																					
Item	Input Power (by Load Current)																																																					
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1.Graph																																																						
—△— Input Volt. 18V - - □--- Input Volt. 24V - - ○--- Input Volt. 36V																																																						
 <p>The graph plots Input Power [W] on the Y-axis (0 to 16) against Load Current [A] on the X-axis (0.0 to 1.0). Three curves are shown for input voltages of 18V, 24V, and 36V. The 18V curve starts at (0,0) and ends at approximately (0.75, 12.5). The 24V curve starts at (0,0) and ends at approximately (0.75, 11.5). The 36V curve starts at (0,0) and ends at approximately (0.75, 10.5). A slanted line connects the points (0.75, 12.5), (0.75, 11.5), and (0.75, 10.5), representing the rated load current range.</p>																																																						
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<table border="1"> <thead> <tr> <th rowspan="2">Load Current [A]</th> <th colspan="3">Input Power [W]</th> </tr> <tr> <th>Input Volt. 18[V]</th> <th>Input Volt. 24[V]</th> <th>Input Volt. 36[V]</th> </tr> </thead> <tbody> <tr> <td>0.00</td> <td>0.33</td> <td>0.33</td> <td>0.18</td> </tr> <tr> <td>0.14</td> <td>2.56</td> <td>2.60</td> <td>2.74</td> </tr> <tr> <td>0.28</td> <td>4.78</td> <td>4.82</td> <td>4.97</td> </tr> <tr> <td>0.42</td> <td>7.06</td> <td>7.05</td> <td>7.17</td> </tr> <tr> <td>0.56</td> <td>9.33</td> <td>9.36</td> <td>9.44</td> </tr> <tr> <td>0.70</td> <td>11.64</td> <td>11.64</td> <td>11.72</td> </tr> <tr> <td>0.77</td> <td>12.81</td> <td>12.78</td> <td>12.89</td> </tr> <tr> <td>--</td> <td>-</td> <td>-</td> <td>-</td> </tr> </tbody> </table>				Load Current [A]	Input Power [W]			Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]	0.00	0.33	0.33	0.18	0.14	2.56	2.60	2.74	0.28	4.78	4.82	4.97	0.42	7.06	7.05	7.17	0.56	9.33	9.36	9.44	0.70	11.64	11.64	11.72	0.77	12.81	12.78	12.89	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-
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Model	MGS102415																																	
Item	Efficiency (by Input Voltage)	Temperature 25°C Testing Circuitry Figure A																																
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1.Graph																																		
<p>Efficiency [%]</p> <p>Input Voltage [V]</p> <p>Legend: Load 50% (dashed line with squares), Load 100% (solid line with triangles)</p>																																		
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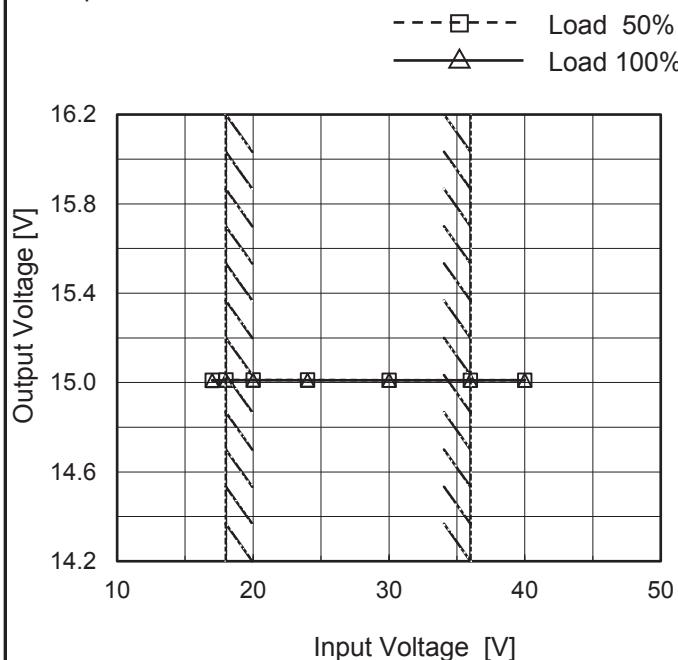
Model	MGS102415	Temperature	25°C																																																			
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<p>The graph plots Efficiency [%] on the y-axis (55 to 95) against Load Current [A] on the x-axis (0.0 to 1.0). Three data series are shown: Input Volt. 18V (solid line with open triangle markers), Input Volt. 24V (dashed line with open square markers), and Input Volt. 36V (dash-dot line with open circle markers). All series show efficiency increasing with load current. A vertical dashed line at approximately 0.77A marks the rated load current.</p>		<table border="1"> <thead> <tr> <th rowspan="2">Load Current [A]</th> <th colspan="3">Efficiency [%]</th> </tr> <tr> <th>Input Volt. 18[V]</th> <th>Input Volt. 24[V]</th> <th>Input Volt. 36[V]</th> </tr> </thead> <tbody> <tr><td>0.00</td><td>-</td><td>-</td><td>-</td></tr> <tr><td>0.14</td><td>81.5</td><td>80.5</td><td>75.2</td></tr> <tr><td>0.28</td><td>87.6</td><td>86.9</td><td>83.2</td></tr> <tr><td>0.42</td><td>89.3</td><td>89.1</td><td>87.1</td></tr> <tr><td>0.56</td><td>90.0</td><td>89.5</td><td>88.5</td></tr> <tr><td>0.70</td><td>90.2</td><td>90.2</td><td>89.1</td></tr> <tr><td>0.77</td><td>90.2</td><td>90.3</td><td>89.3</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]	Efficiency [%]			Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]	0.00	-	-	-	0.14	81.5	80.5	75.2	0.28	87.6	86.9	83.2	0.42	89.3	89.1	87.1	0.56	90.0	89.5	88.5	0.70	90.2	90.2	89.1	0.77	90.2	90.3	89.3	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-
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Model	MGS102415
Item	Line Regulation
Object	+15V0.7A

Temperature 25°C  
Testing Circuitry Figure A

## 1.Graph



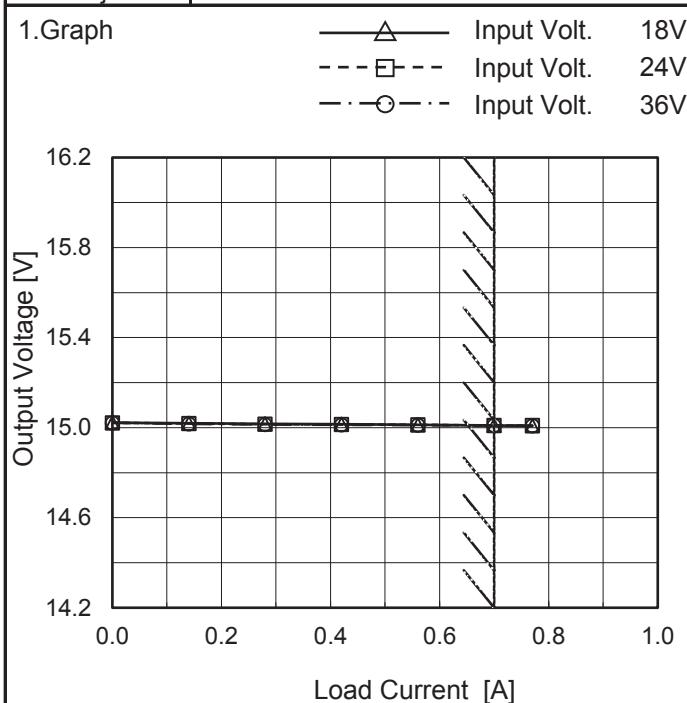
## 2.Values

Input Voltage [V]	Output Voltage [V]	
	Load 50%	Load 100%
17	15.011	15.009
18	15.011	15.010
20	15.011	15.010
24	15.011	15.010
30	15.011	15.010
36	15.011	15.010
40	15.011	15.010
--	-	-
--	-	-

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

**COSEL**

Model	MGS102415
Item	Load Regulation
Object	+15V0.7A


 Temperature 25°C  
 Testing Circuitry Figure A

## 2.Values

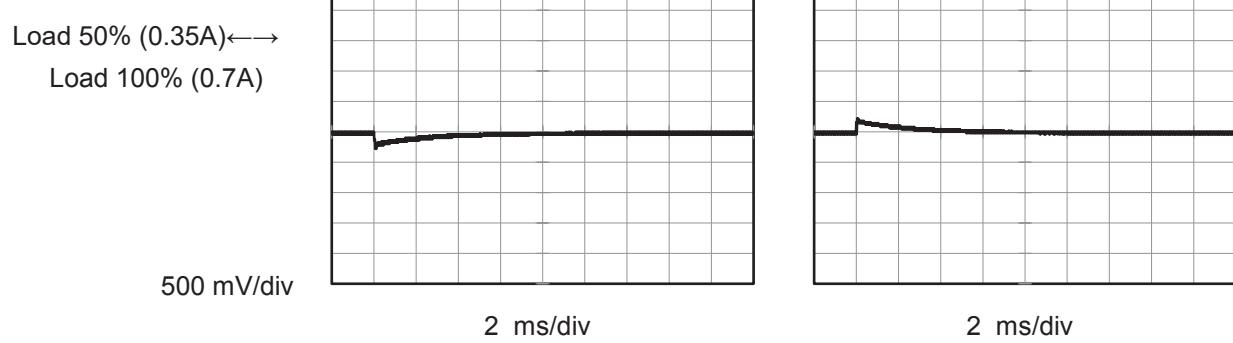
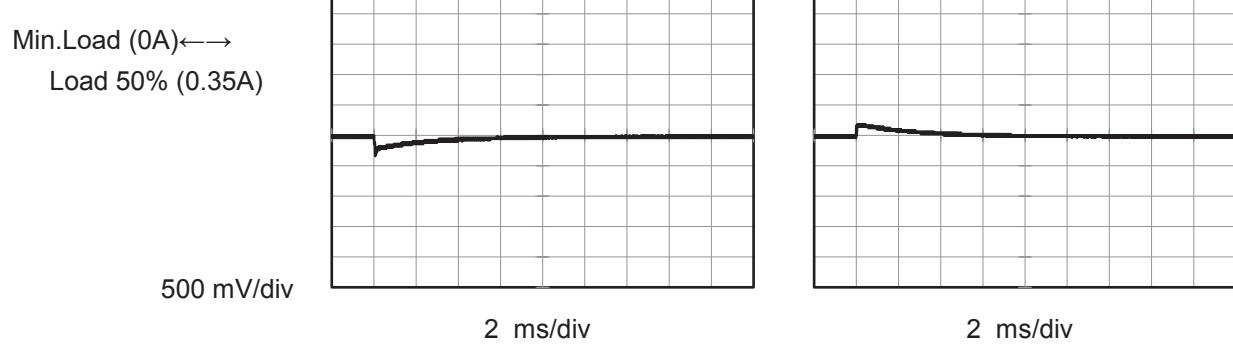
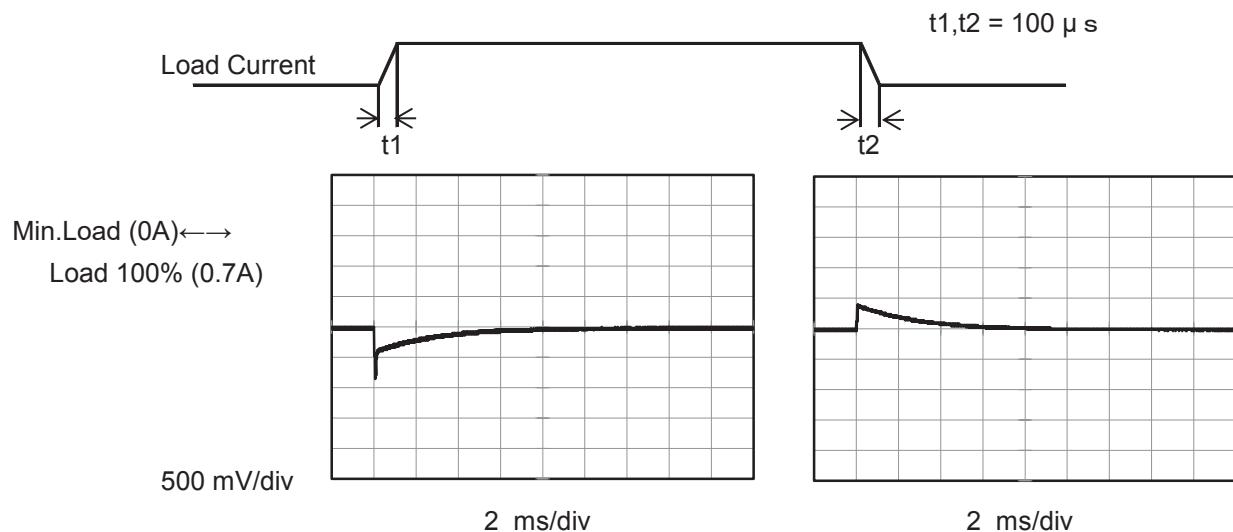
Load Current [A]	Output Voltage [V]		
	Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]
0.00	15.022	15.022	15.022
0.14	15.019	15.018	15.018
0.28	15.017	15.016	15.014
0.42	15.015	15.015	15.013
0.56	15.013	15.012	15.011
0.70	15.010	15.010	15.010
0.77	15.008	15.009	15.008
--	-	-	-
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--	-	-	-
--	-	-	-

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

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Model	MGS102415	Temperature	25°C
Item	Dynamic Load Response	Testing Circuitry	Figure A
Object	+15V0.7A		

Input Volt. 24 V  
 Cycle 100 ms



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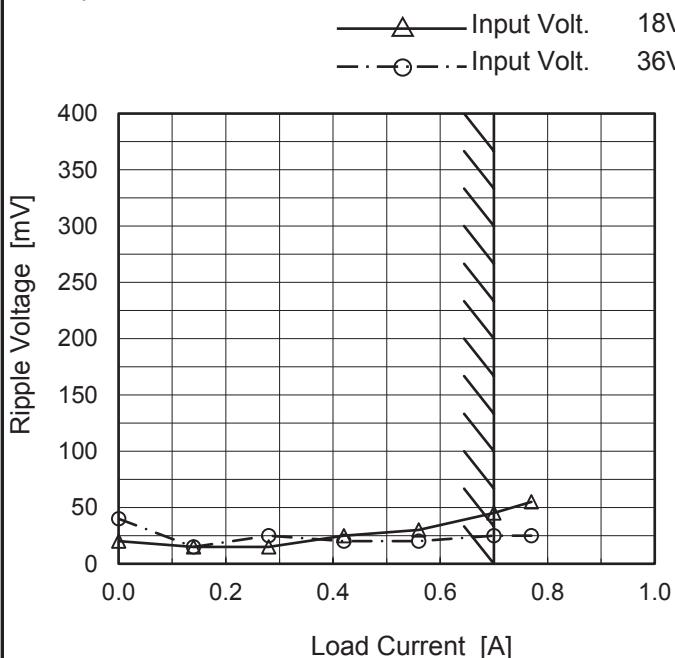
Model	MGS102415																																							
Item	Ripple Voltage (by Load Current)	Temperature      25°C Testing Circuitry      Figure B																																						
Object	+15V0.7A																																							
1.Graph																																								
<p>Y-axis: Ripple Voltage [mV] X-axis: Load Current [A]</p> <p>Legend:      —△— Input Volt. 18V      -○- Input Volt. 36V   </p>																																								
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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>																																								

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Model	MGS102415
Item	Ripple-Noise
Object	+15V0.7A

 Temperature 25°C  
 Testing Circuitry Figure B

## 1.Graph



## 2.Values

Load Current [A]	Ripple-Noise [mV]	
	Input Volt. 18 [V]	Input Volt. 36 [V]
0.00	20	40
0.14	15	15
0.28	15	25
0.42	25	20
0.56	30	20
0.70	45	25
0.77	55	25
--	-	-
--	-	-
--	-	-
--	-	-

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]

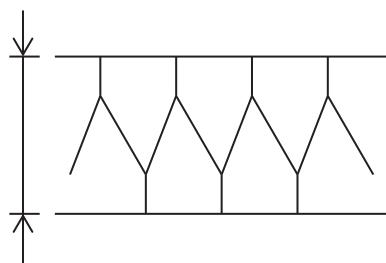
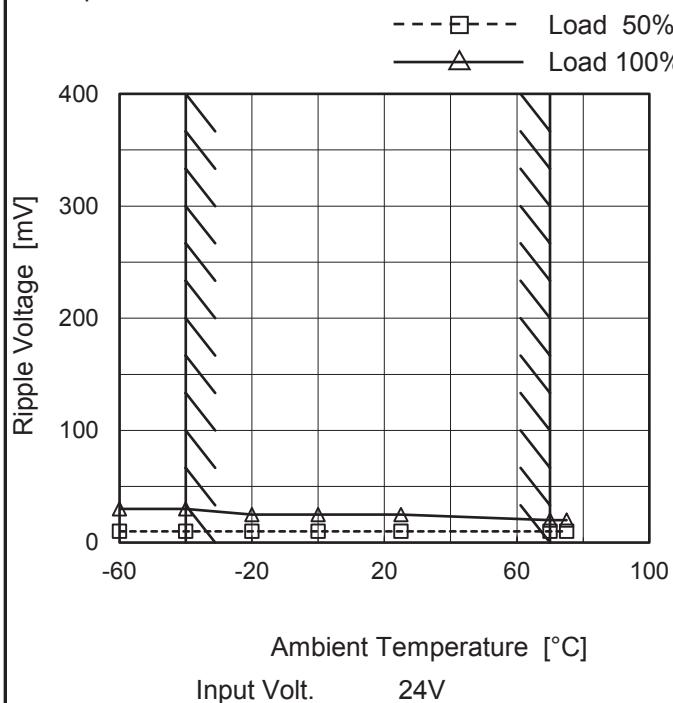


Fig.Complex Ripple Noise Wave Form

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Model	MGS102415
Item	Ripple Voltage (by Ambient Temp.)
Object	+15V0.7A

## 1. Graph



Measured by 100 MHz Oscilloscope.

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

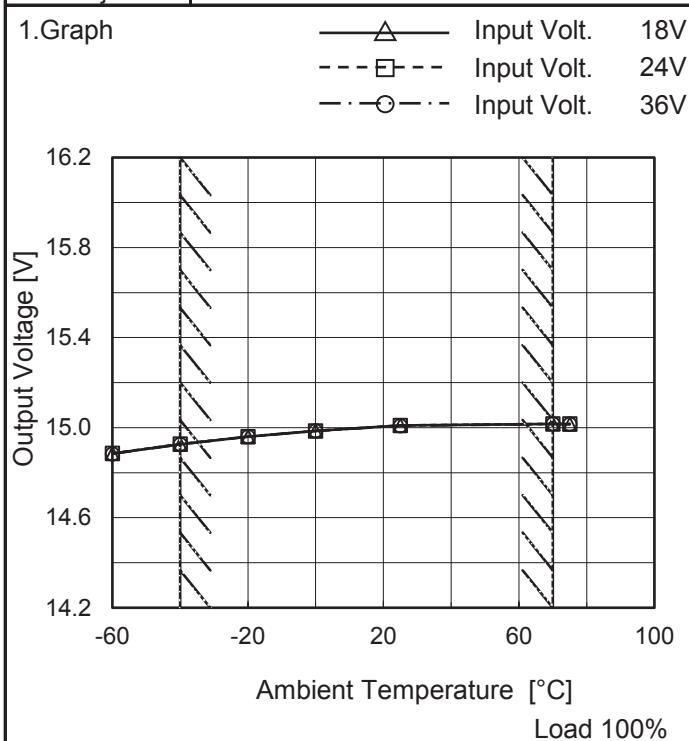
Testing Circuitry Figure B

## 2. Values

Ambient Temperature [°C]	Ripple Voltage [mV]	
	Load 50%	Load 100%
-60	10	30
-40	10	30
-20	10	25
0	10	25
25	10	25
70	10	20
75	10	20
--	-	-
--	-	-
--	-	-
--	-	-

**COSEL**

Model	MGS102415
Item	Ambient Temperature Drift
Object	+15V0.7A



Testing Circuitry Figure A

## 2.Values

Ambient Temperature [°C]	Output Voltage [V]		
	Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]
-60	14.885	14.886	14.884
-40	14.926	14.927	14.926
-20	14.959	14.960	14.960
0	14.985	14.986	14.986
25	15.010	15.010	15.009
70	15.017	15.017	15.016
75	15.016	15.017	15.016
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

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



Model	MGS102415	Testing Circuitry Figure A
Item	Output Voltage Accuracy	
Object	+15V0.7A	

### 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 : 18 - 36V

Load Current : 0 - 0.7A

\* 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

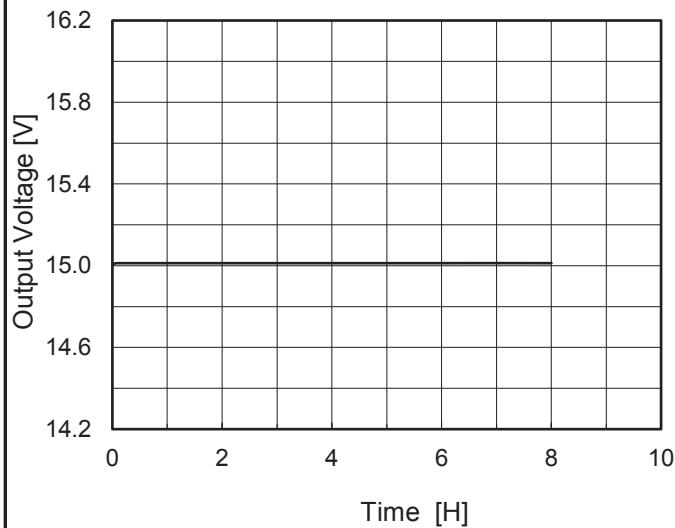
Item	Temperature [°C]	Input Voltage[V]	Output		Output Voltage Accuracy	
			Current[A]	Voltage[V]	Value [mV]	Ratio [%]
Maximum Voltage	70	36	0	15.030	±52	±0.3
Minimum Voltage	-40	18	0.7	14.926		

**COSEL**

Model	MGS102415
Item	Time Lapse Drift
Object	+15V0.7A

Temperature 25°C  
Testing Circuitry Figure A

## 1.Graph



Input Volt. 24V  
Load 100%

## 2.Values

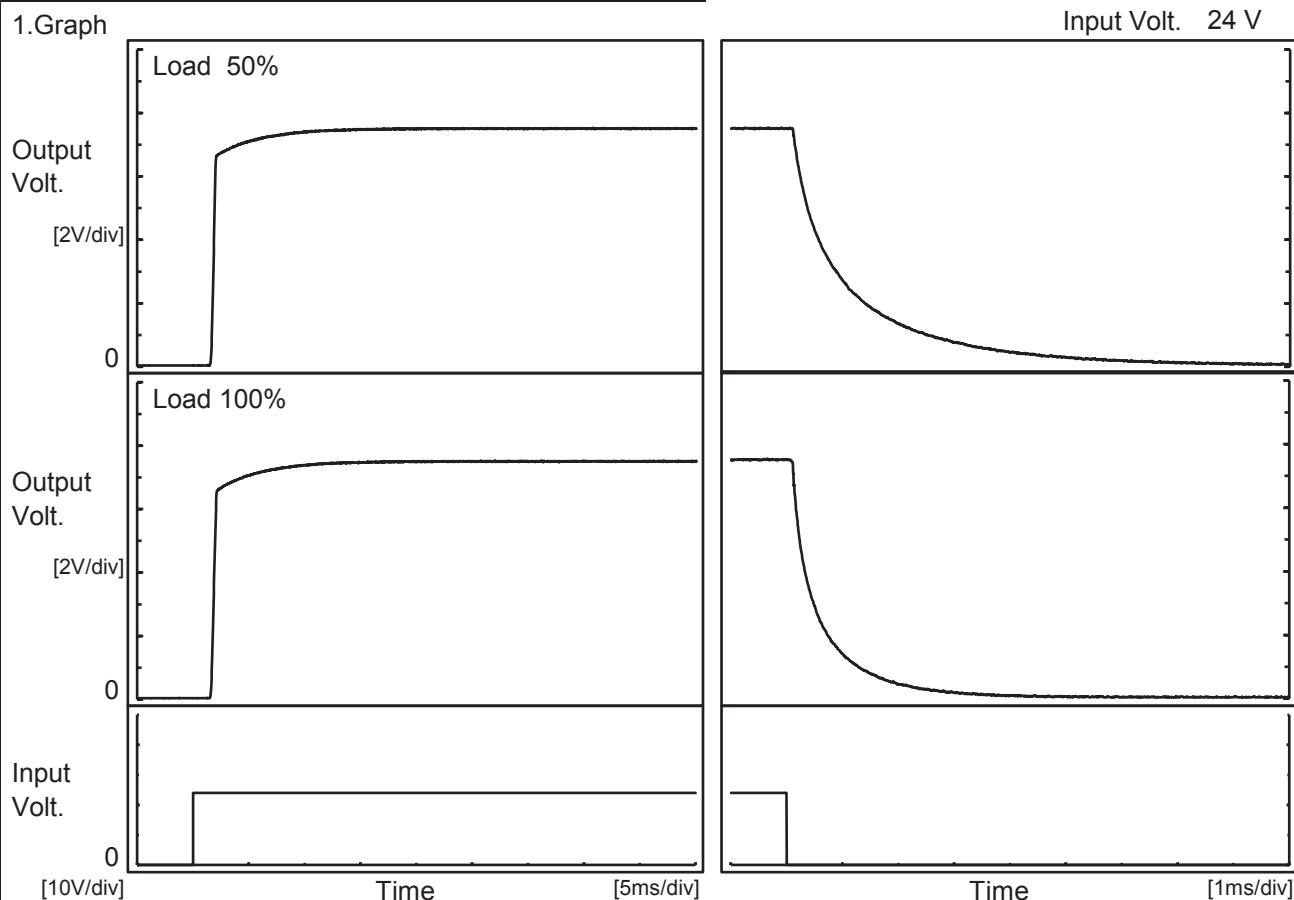
Time since start [H]	Output Voltage [V]
0.0	15.003
0.5	15.012
1.0	15.012
2.0	15.013
3.0	15.013
4.0	15.012
5.0	15.012
6.0	15.012
7.0	15.013
8.0	15.012

**COSEL**

Model	MGS102415
Item	Rise and Fall Time
Object	+15V0.7A

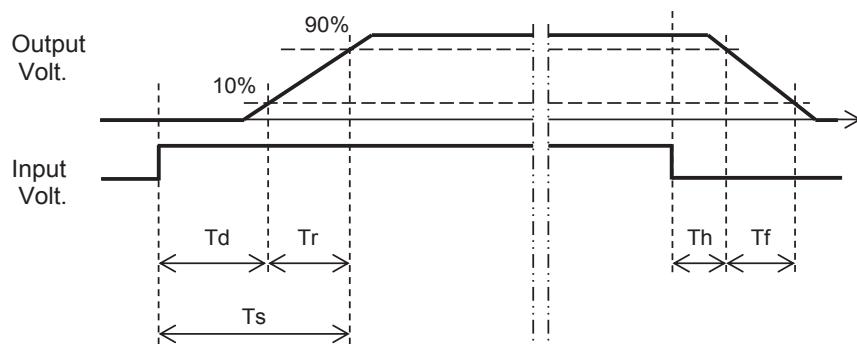
Temperature 25°C  
Testing Circuitry Figure A

## 1.Graph



## 2.Values

Load	Time	Td	Tr	Ts	Th	Tf
50 %		1.7	1.1	2.8	0.2	2.8
100 %		1.7	1.4	3.1	0.1	1.4

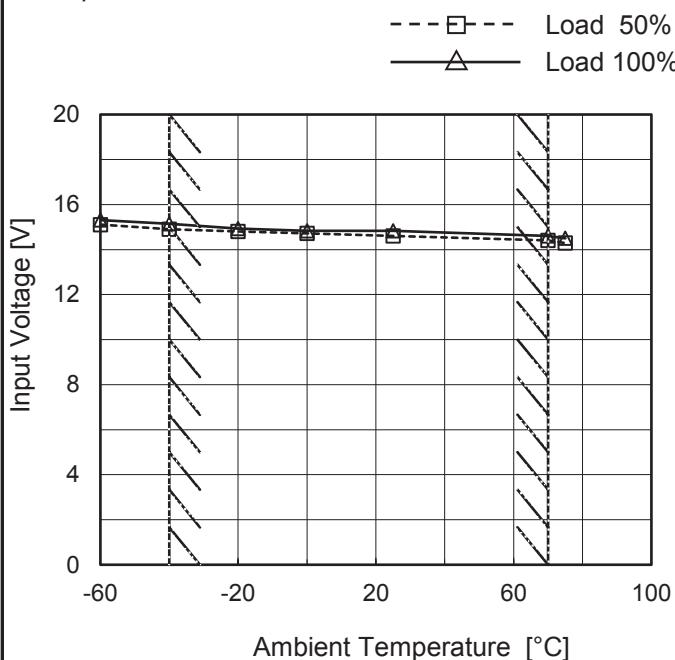


**COSEL**

Model	MGS102415
Item	Minimum Input Voltage for Regulated Output Voltage
Object	+15V0.7A

## Testing Circuitry Figure A

## 1.Graph



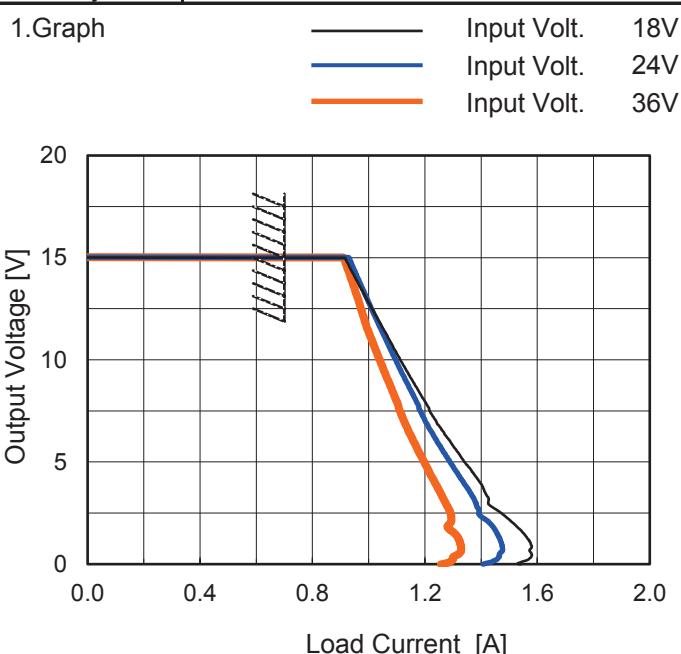
## 2.Values

Ambient Temperature [°C]	Input Voltage [V]	
	Load 50%	Load 100%
-60	15.2	15.4
-40	15.0	15.2
-20	14.9	15.0
0	14.8	14.9
25	14.7	14.9
70	14.5	14.7
75	14.3	14.5
--	-	-
--	-	-
--	-	-
--	-	-

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

**COSEL**

Model	MGS102415
Item	Overcurrent Protection
Object	+15V0.7A



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. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]
15.0	0.70	0.70	0.70
14.3	0.94	0.95	0.93
13.5	0.97	0.98	0.95
12.0	1.03	1.03	0.98
10.5	1.09	1.08	1.02
9.0	1.15	1.13	1.07
7.5	1.22	1.18	1.11
6.0	1.29	1.24	1.16
4.5	1.37	1.31	1.21
3.0	1.43	1.38	1.27
1.5	1.55	1.46	1.30
0.0	1.54	1.41	1.26

**COSEL**

Model	MGS102415	Temperature	25°C																																																			
Item	Switching Frequency (by Load Current)	Testing Circuitry	Figure A																																																			
Object	+15V0.7A																																																					
1.Graph	<p>—△— Input Volt. 18V        - - -□--- Input Volt. 24V        - - ○--- Input Volt. 36V</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. 18[V]</th> <th>Input Volt. 24[V]</th> <th>Input Volt. 36[V]</th> </tr> </thead> <tbody> <tr><td>0.00</td><td>863</td><td>898</td><td>865</td></tr> <tr><td>0.14</td><td>536</td><td>606</td><td>673</td></tr> <tr><td>0.28</td><td>391</td><td>454</td><td>524</td></tr> <tr><td>0.42</td><td>307</td><td>363</td><td>428</td></tr> <tr><td>0.56</td><td>253</td><td>302</td><td>362</td></tr> <tr><td>0.70</td><td>215</td><td>259</td><td>314</td></tr> <tr><td>0.77</td><td>199</td><td>242</td><td>293</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. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]	0.00	863	898	865	0.14	536	606	673	0.28	391	454	524	0.42	307	363	428	0.56	253	302	362	0.70	215	259	314	0.77	199	242	293	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-
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Note:	Slanted line shows the range of the rated load current.																																																					
-When load current is low, MG operates intermittently, so switching frequency would not become constant.																																																						

COSEL

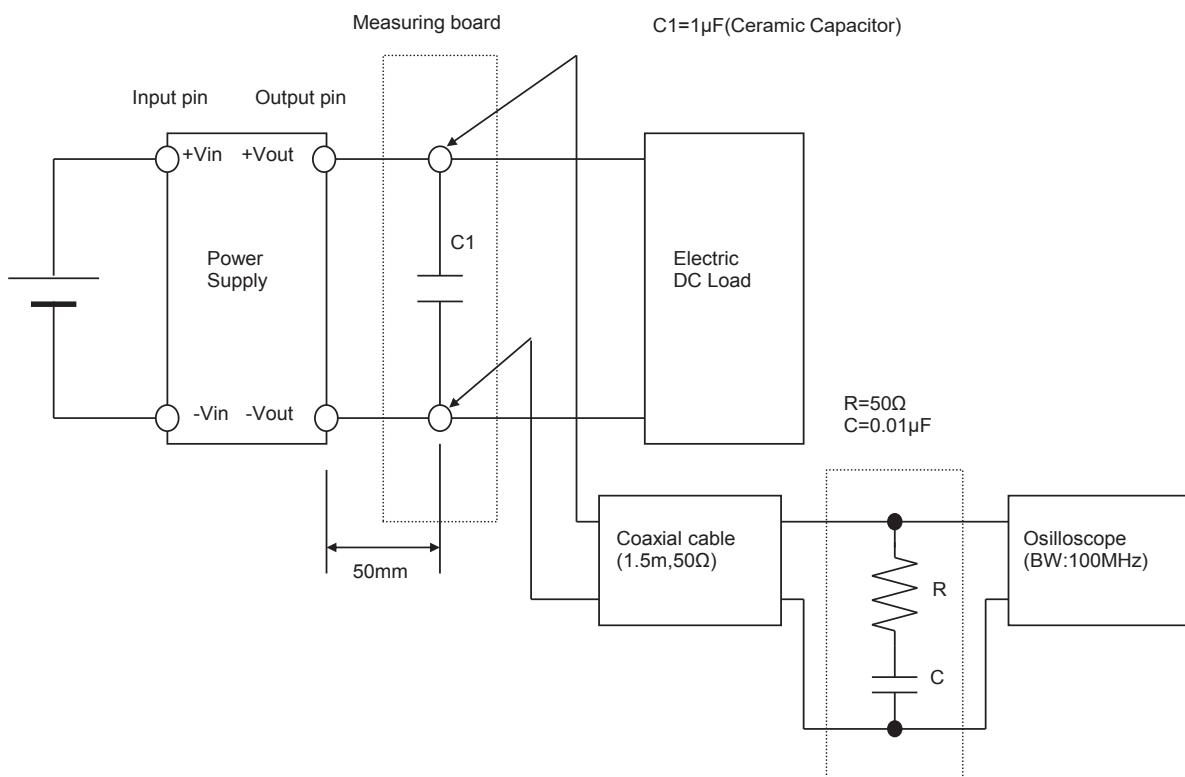
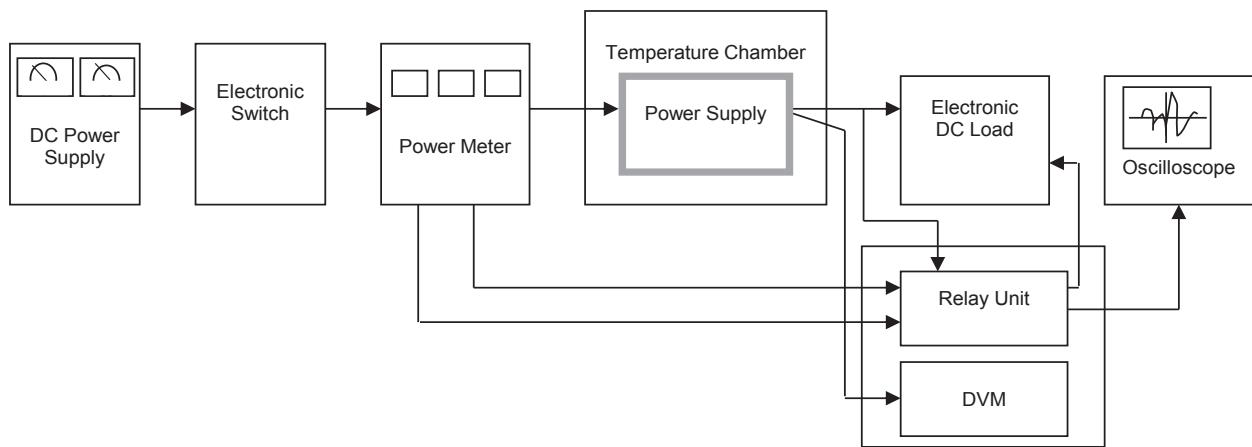


Figure B (Ripple and Ripple noise Characteristic)