



TEST DATA OF MGS31212

Regulated DC Power Supply
March 24, 2016

Approved by : Takayuki Fukuda
Takayuki Fukuda _____ Design Manager

Prepared by : Shohei Mukaide
Shohei Mukaide _____ Design Engineer

COSEL CO.,LTD.



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(Final Page 19)

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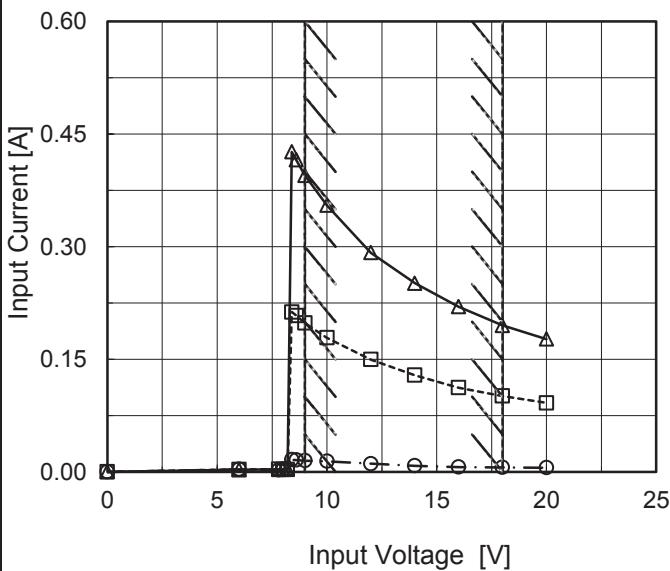
Model MGS31212

Item Input Current (by Input Voltage)

Object _____

1.Graph

—△— Load 100%
 - -□--- Load 50%
 - -○--- Load 0%



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

 Temperature 25°C
 Testing Circuitry Figure A

2.Values

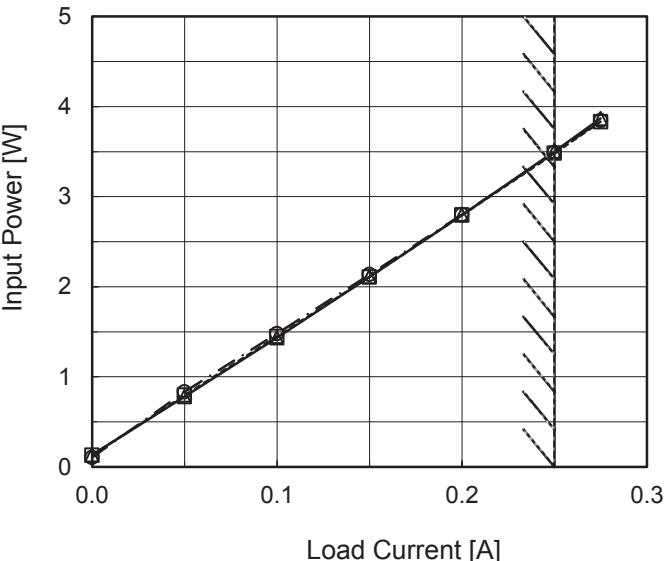
Input Voltage [V]	Input Current [A]		
	Load 0%	Load 50%	Load 100%
0.0	0.000	0.000	0.000
6.0	0.003	0.003	0.003
7.8	0.003	0.004	0.003
8.0	0.003	0.003	0.004
8.2	0.004	0.003	0.004
8.4	0.016	0.213	0.426
8.6	0.016	0.208	0.416
9.0	0.015	0.198	0.395
10.0	0.014	0.179	0.355
12.0	0.011	0.150	0.292
14.0	0.008	0.129	0.251
16.0	0.007	0.112	0.220
18.0	0.006	0.101	0.195
20.0	0.006	0.092	0.177
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

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Model	MGS31212																																																
Item	Input Current (by Load Current)	Temperature	25°C																																														
Object		Testing Circuitry	Figure A																																														
1.Graph	<p>Legend:</p> <ul style="list-style-type: none"> —△— Input Volt. 9V - -□-- Input Volt. 12V - -○-- Input Volt. 18V <table border="1"> <thead> <tr> <th>Load Current [A]</th> <th>Input Volt. 9[V]</th> <th>Input Volt. 12[V]</th> <th>Input Volt. 18[V]</th> </tr> </thead> <tbody> <tr><td>0.000</td><td>0.015</td><td>0.011</td><td>0.006</td></tr> <tr><td>0.050</td><td>0.087</td><td>0.066</td><td>0.046</td></tr> <tr><td>0.100</td><td>0.160</td><td>0.121</td><td>0.082</td></tr> <tr><td>0.150</td><td>0.237</td><td>0.176</td><td>0.119</td></tr> <tr><td>0.200</td><td>0.314</td><td>0.234</td><td>0.156</td></tr> <tr><td>0.250</td><td>0.395</td><td>0.292</td><td>0.195</td></tr> <tr><td>0.275</td><td>0.435</td><td>0.322</td><td>0.215</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]	Input Volt. 9[V]	Input Volt. 12[V]	Input Volt. 18[V]	0.000	0.015	0.011	0.006	0.050	0.087	0.066	0.046	0.100	0.160	0.121	0.082	0.150	0.237	0.176	0.119	0.200	0.314	0.234	0.156	0.250	0.395	0.292	0.195	0.275	0.435	0.322	0.215	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-
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2.Values																																																	

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

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Item	Input Power (by Load Current)	Temperature	25°C																																																			
Object		Testing Circuitry	Figure A																																																			
1.Graph	<p style="text-align: center;"> —△— Input Volt. 9V ---□--- Input Volt. 12V ---○--- Input Volt. 18V </p>  <p>The graph plots Input Power [W] on the Y-axis (0 to 5) against Load Current [A] on the X-axis (0.0 to 0.3). Three curves are shown for input voltages of 9V, 12V, and 18V. A slanted line is drawn across the graph, representing the rated load current range.</p> <table border="1"> <caption>Data points estimated from the graph</caption> <thead> <tr> <th>Load Current [A]</th> <th>Input Power [W] (9V)</th> <th>Input Power [W] (12V)</th> <th>Input Power [W] (18V)</th> </tr> </thead> <tbody> <tr><td>0.000</td><td>0.13</td><td>0.13</td><td>0.11</td></tr> <tr><td>0.050</td><td>0.78</td><td>0.80</td><td>0.83</td></tr> <tr><td>0.100</td><td>1.43</td><td>1.45</td><td>1.48</td></tr> <tr><td>0.150</td><td>2.11</td><td>2.11</td><td>2.13</td></tr> <tr><td>0.200</td><td>2.80</td><td>2.80</td><td>2.80</td></tr> <tr><td>0.250</td><td>3.50</td><td>3.48</td><td>3.49</td></tr> <tr><td>0.275</td><td>3.87</td><td>3.83</td><td>3.84</td></tr> </tbody> </table>	Load Current [A]	Input Power [W] (9V)	Input Power [W] (12V)	Input Power [W] (18V)	0.000	0.13	0.13	0.11	0.050	0.78	0.80	0.83	0.100	1.43	1.45	1.48	0.150	2.11	2.11	2.13	0.200	2.80	2.80	2.80	0.250	3.50	3.48	3.49	0.275	3.87	3.83	3.84																					
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Note: Slanted line shows the range of the rated load current.

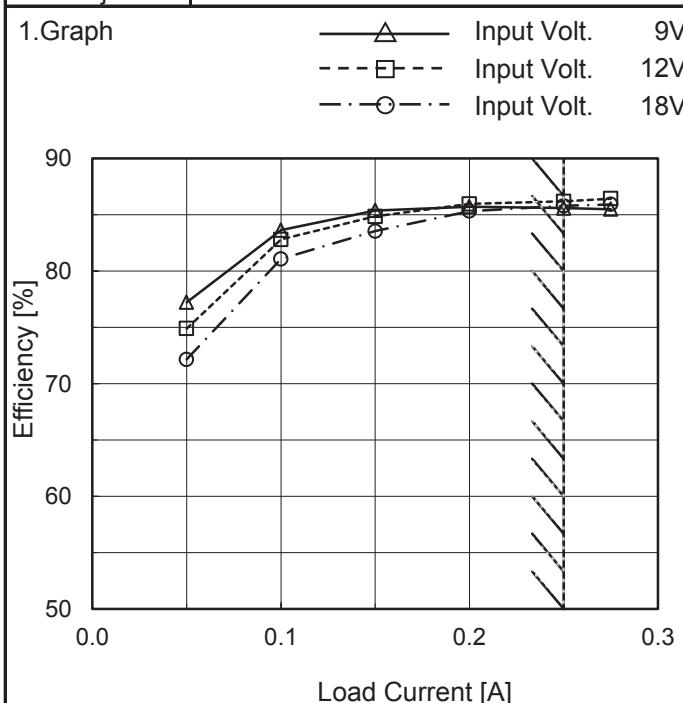
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Model	MGS31212	Temperature	25°C																																
Item	Efficiency (by Input Voltage)	Testing Circuitry	Figure A																																
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1.Graph			2.Values																																
<p>The graph displays efficiency data for the MGS31212 model. The x-axis represents Input Voltage [V] from 5 to 25, and the y-axis represents Efficiency [%] from 50 to 90. Two sets of data points are shown: Load 50% (dashed line with square markers) and Load 100% (solid line with triangle markers). Both series show a slight decrease in efficiency as input voltage increases. Two vertical dashed lines are drawn across the graph, one near 10V and another near 18V, representing the rated input voltage range.</p>			<table border="1"> <thead> <tr> <th rowspan="2">Input Voltage [V]</th> <th colspan="2">Efficiency [%]</th> </tr> <tr> <th>Load 50%</th> <th>Load 100%</th> </tr> </thead> <tbody> <tr> <td>8.6</td> <td>84.6</td> <td>85.4</td> </tr> <tr> <td>9.0</td> <td>84.7</td> <td>85.6</td> </tr> <tr> <td>10.0</td> <td>84.8</td> <td>86.0</td> </tr> <tr> <td>12.0</td> <td>84.4</td> <td>86.2</td> </tr> <tr> <td>15.0</td> <td>83.6</td> <td>86.1</td> </tr> <tr> <td>18.0</td> <td>83.0</td> <td>85.8</td> </tr> <tr> <td>20.0</td> <td>82.2</td> <td>85.6</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%	Load 100%	8.6	84.6	85.4	9.0	84.7	85.6	10.0	84.8	86.0	12.0	84.4	86.2	15.0	83.6	86.1	18.0	83.0	85.8	20.0	82.2	85.6	--	-	-	--	-	-
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Note: Slanted line shows the range of the rated input voltage.

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Model	MGS31212
Item	Efficiency (by Load Current)
Object	


 Temperature 25°C
 Testing Circuitry Figure A

2.Values

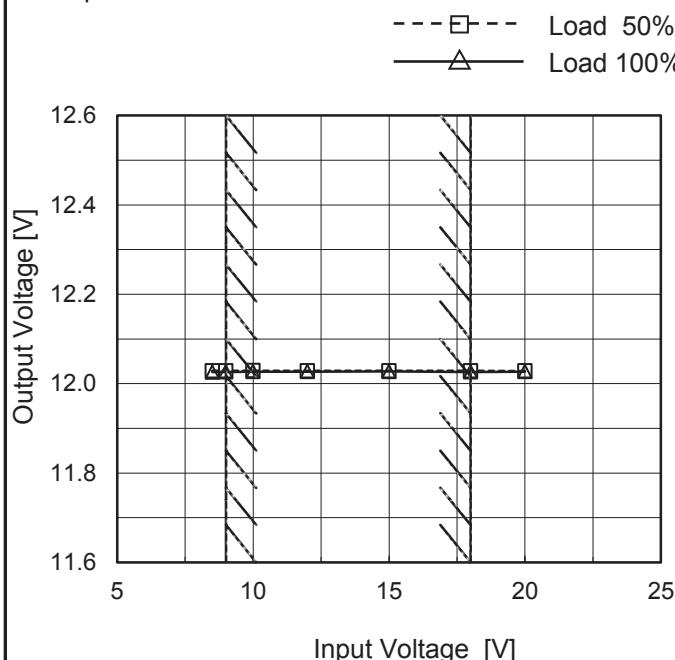
Load Current [A]	Efficiency [%]		
	Input Volt. 9[V]	Input Volt. 12[V]	Input Volt. 18[V]
0.000	-	-	-
0.050	77.2	74.9	72.2
0.100	83.6	82.8	81.1
0.150	85.4	84.9	83.5
0.200	85.7	86.0	85.3
0.250	85.6	86.2	85.8
0.275	85.5	86.4	85.9
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

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

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Model	MGS31212	Temperature	25°C
Item	Line Regulation	Testing Circuitry	Figure A
Object	+12V0.25A		

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	12.029	12.026
9.0	12.029	12.026
10.0	12.029	12.027
12.0	12.029	12.027
15.0	12.029	12.027
18.0	12.029	12.026
20.0	12.028	12.027
--	-	-
--	-	-

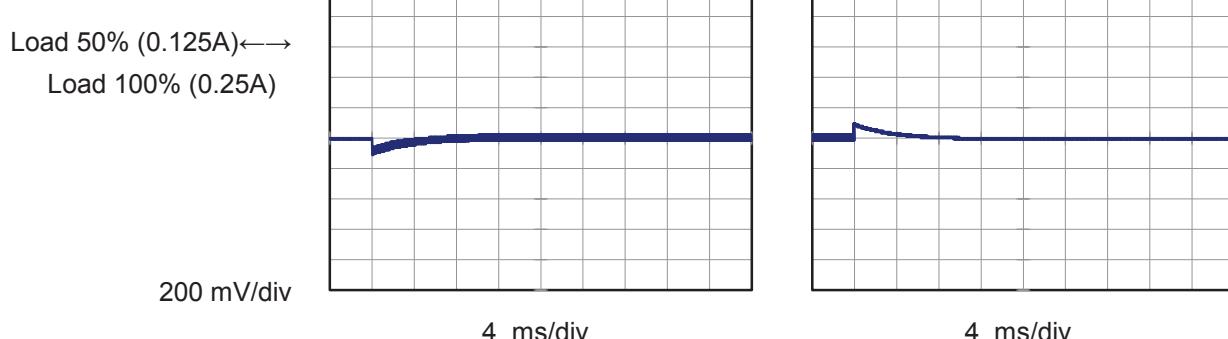
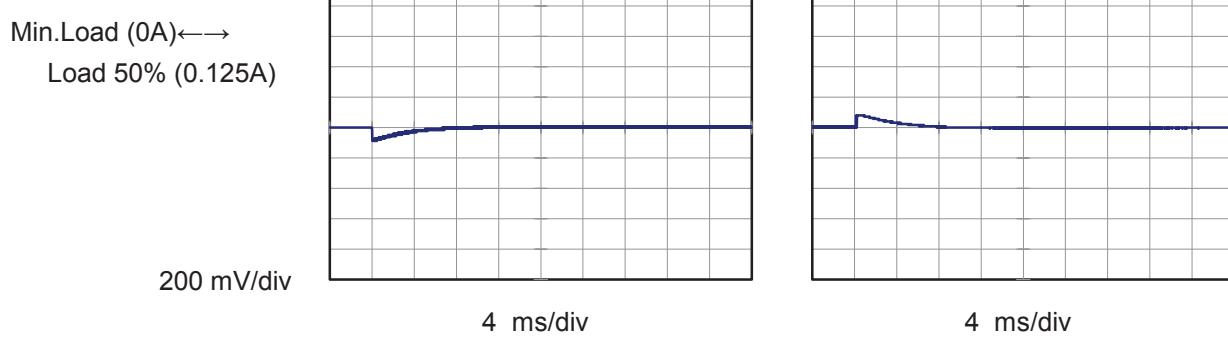
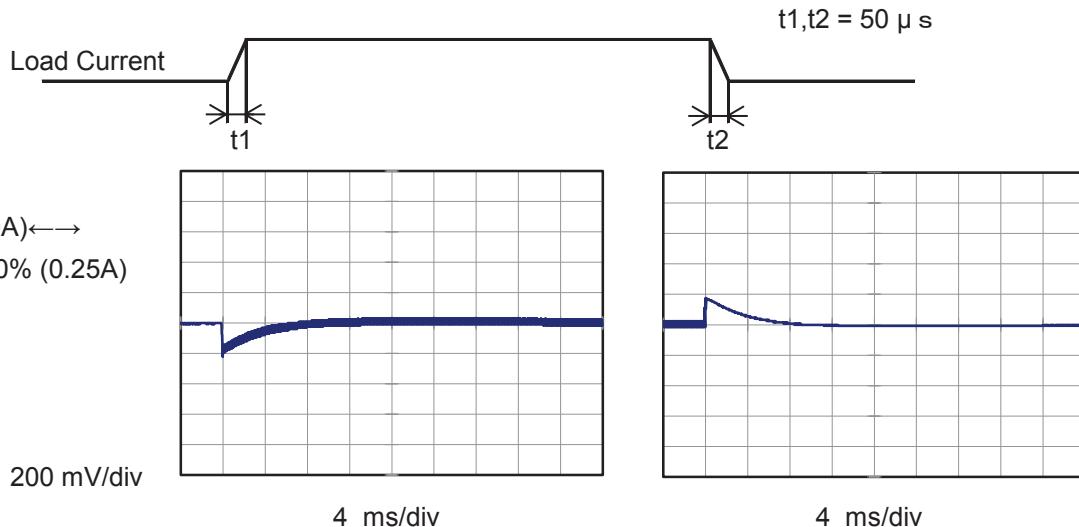
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Object	+12V0.25A																																																					
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<p>The graph plots Output Voltage [V] on the Y-axis (11.6 to 12.6) against Load Current [A] on the X-axis (0.0 to 0.3). Three curves are shown for Input Voltages of 9V, 12V, and 18V. All curves show a flat output voltage until a certain load current, after which the output voltage drops sharply. A vertical dashed line marks the rated load current of 0.25A.</p>		<table border="1"> <thead> <tr> <th rowspan="2">Load Current [A]</th> <th colspan="3">Output Voltage [V]</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>0.000</td><td>12.034</td><td>12.034</td><td>12.034</td></tr> <tr><td>0.050</td><td>12.033</td><td>12.032</td><td>12.032</td></tr> <tr><td>0.100</td><td>12.031</td><td>12.031</td><td>12.030</td></tr> <tr><td>0.150</td><td>12.030</td><td>12.030</td><td>12.029</td></tr> <tr><td>0.200</td><td>12.028</td><td>12.028</td><td>12.028</td></tr> <tr><td>0.250</td><td>12.026</td><td>12.027</td><td>12.026</td></tr> <tr><td>0.275</td><td>12.025</td><td>12.026</td><td>12.025</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]	Output Voltage [V]			Input Volt. 9[V]	Input Volt. 12[V]	Input Volt. 18[V]	0.000	12.034	12.034	12.034	0.050	12.033	12.032	12.032	0.100	12.031	12.031	12.030	0.150	12.030	12.030	12.029	0.200	12.028	12.028	12.028	0.250	12.026	12.027	12.026	0.275	12.025	12.026	12.025	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-
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<p>Note: Slanted line shows the range of the rated load current.</p>																																																						

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Model	MGS31212	Temperature	25°C
Item	Dynamic Load Response	Testing Circuitry	Figure A
Object	+12V0.25A		

Input Volt. 12 V
 Cycle 1000 ms



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Model	MGS31212																																							
Item	Ripple Voltage (by Load Current)	Temperature 25°C Testing Circuitry Figure B																																						
Object	+12V0.25A																																							
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<p>—○— Input Volt. 9V -·△- Input Volt. 18V</p> <p>Ripple Voltage [mV]</p> <p>Load Current [A]</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>																																								

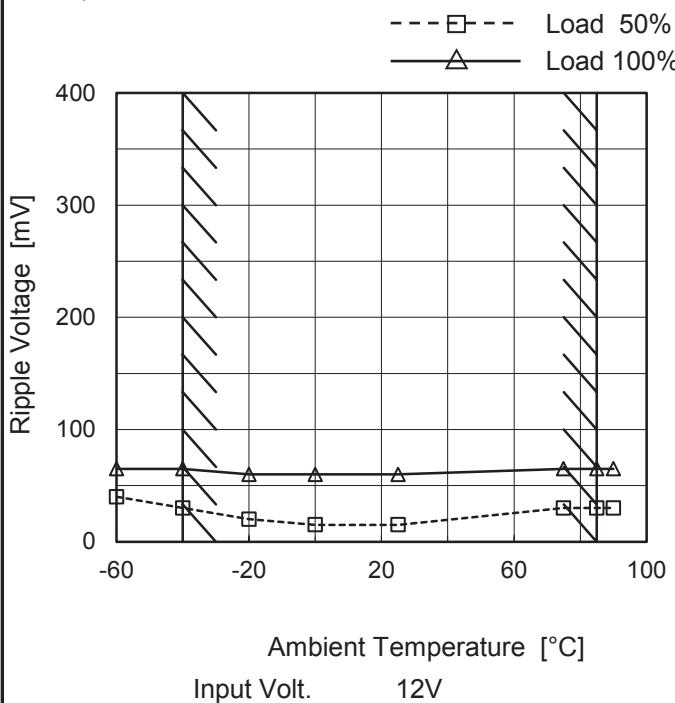
COSEL

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Item	Ripple-Noise	Temperature 25°C Testing Circuitry Figure B																																						
Object	+12V0.25A																																							
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<p>Graph showing Ripple Voltage [mV] vs Load Current [A]. The Y-axis ranges from 0 to 400 mV, and the X-axis ranges from 0 to 0.3 A. Two curves are plotted: one for Input Volt. 9V (solid line with triangles) and one for Input Volt. 18V (dashed line with circles). Both curves show an increase in ripple voltage as load current increases. A slanted line indicates the rated load current range.</p> <table border="1"> <thead> <tr> <th>Load Current [A]</th> <th>Ripple Noise [mV] (9V)</th> <th>Ripple Noise [mV] (18V)</th> </tr> </thead> <tbody> <tr><td>0.000</td><td>10</td><td>25</td></tr> <tr><td>0.050</td><td>15</td><td>20</td></tr> <tr><td>0.100</td><td>35</td><td>25</td></tr> <tr><td>0.150</td><td>45</td><td>35</td></tr> <tr><td>0.200</td><td>60</td><td>55</td></tr> <tr><td>0.250</td><td>85</td><td>55</td></tr> <tr><td>0.275</td><td>100</td><td>65</td></tr> </tbody> </table>			Load Current [A]	Ripple Noise [mV] (9V)	Ripple Noise [mV] (18V)	0.000	10	25	0.050	15	20	0.100	35	25	0.150	45	35	0.200	60	55	0.250	85	55	0.275	100	65														
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<p>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.</p> <p>Ripple Noise[mVp-p]</p> <p>Fig.Complex Ripple Noise Wave Form</p>																																								

COSEL

Model	MGS31212
Item	Ripple Voltage (by Ambient Temp.)
Object	+12V0.25A

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	40	65
-40	30	65
-20	20	60
0	15	60
25	15	60
75	30	65
85	30	65
90	30	65
--	-	-
--	-	-
--	-	-

COSEL

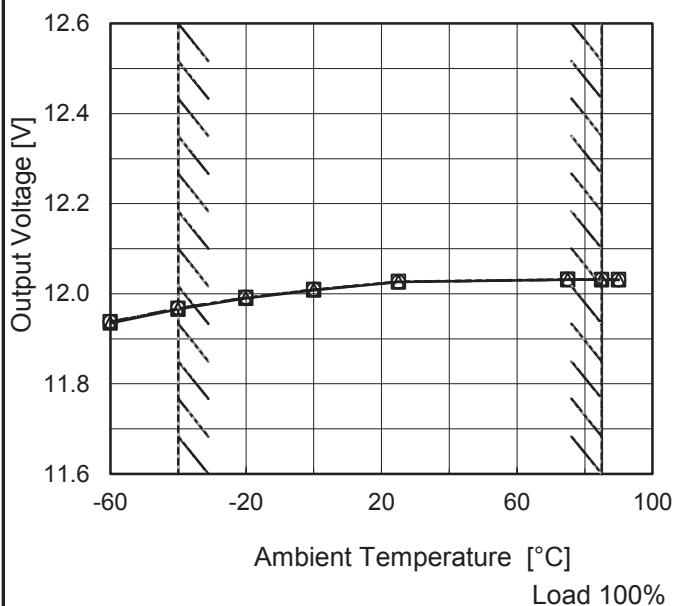
Model MGS31212

Item Ambient Temperature Drift

Object +12V0.25A

1.Graph

—△— Input Volt. 9V
 - - -□--- Input Volt. 12V
 - ·○--- Input Volt. 18V



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

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	11.935	11.937	11.938
-40	11.966	11.968	11.968
-20	11.990	11.991	11.992
0	12.008	12.009	12.009
25	12.026	12.027	12.026
75	12.031	12.032	12.032
85	12.031	12.032	12.031
90	12.031	12.031	12.031
--	-	-	-
--	-	-	-
--	-	-	-



Model	MGS31212	Testing Circuitry Figure A
Item	Output Voltage Accuracy	
Object	+12V0.25A	

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 - 0.25A

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

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

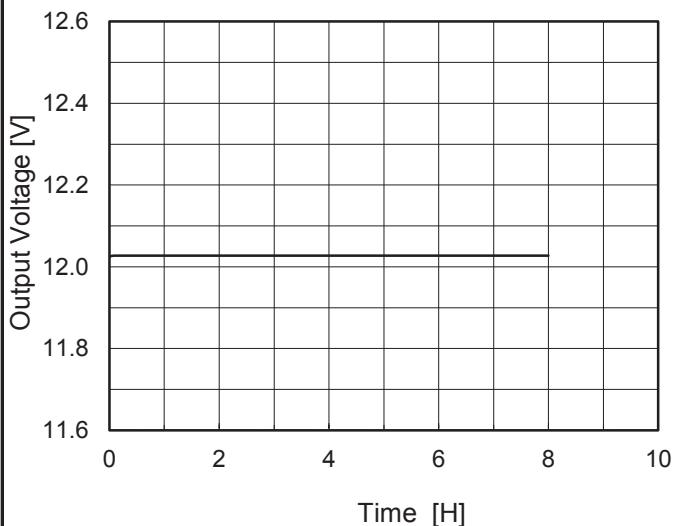
2. Values

Item	Temperature [°C]	Input Voltage[V]	Output		Output Voltage Accuracy	
			Current[A]	Voltage[V]	Value [mV]	Ratio [%]
Maximum Voltage	85	18	0	12.042	±38	±0.3
Minimum Voltage	-40	9	0.25	11.966		

COSEL

Model	MGS31212	Temperature	25°C
Item	Time Lapse Drift	Testing Circuitry	Figure A
Object	+12V0.25A		

1.Graph



Input Volt. 12V
Load 100%

2.Values

Time since start [H]	Output Voltage [V]
0.0	12.024
0.5	12.027
1.0	12.028
2.0	12.027
3.0	12.027
4.0	12.027
5.0	12.027
6.0	12.027
7.0	12.027
8.0	12.027

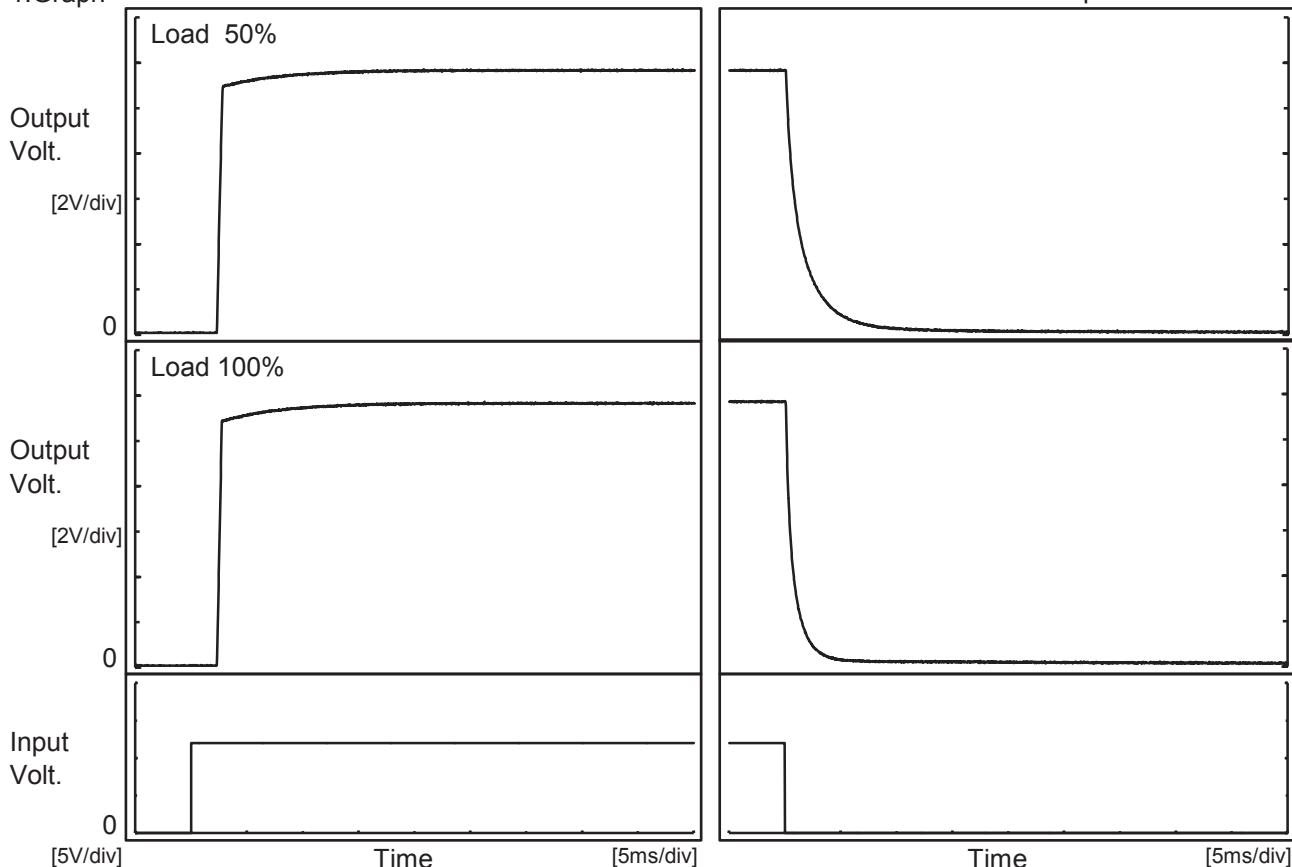
COSEL

Model MGS31212

Temperature 25°C
Testing Circuitry Figure AItem Rise and Fall Time
Object +12V0.25A

1. Graph

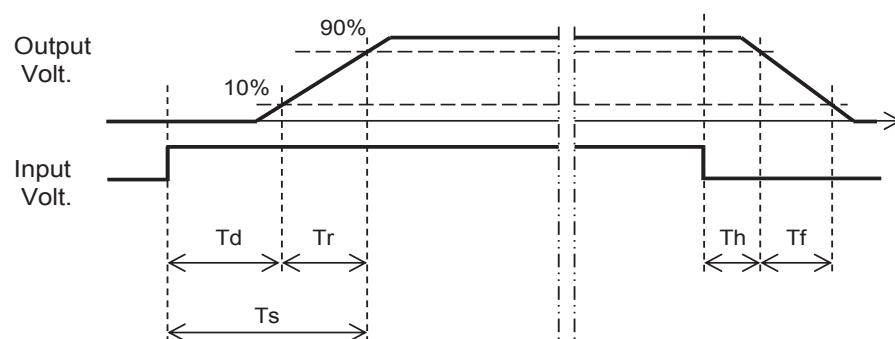
Input Volt. 12 V



2. Values

[ms]

Load \ Time	Td	Tr	Ts	Th	Tf
50 %	2.4	0.5	2.9	0.2	3.8
100 %	2.4	0.4	2.8	0.1	1.9

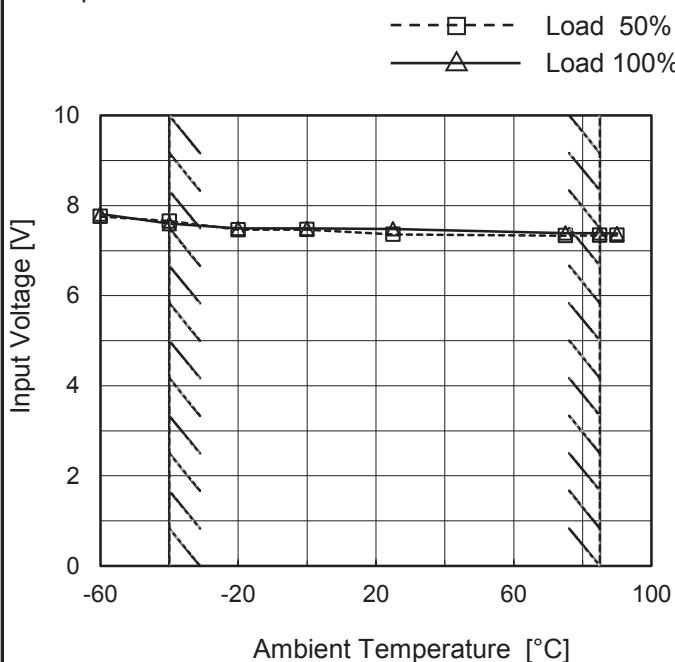


COSEL

Model	MGS31212
Item	Minimum Input Voltage for Regulated Output Voltage
Object	+12V0.25A

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	7.8	7.9
-40	7.7	7.6
-20	7.5	7.5
0	7.5	7.5
25	7.4	7.5
75	7.4	7.4
85	7.4	7.4
90	7.4	7.4
--	-	-
--	-	-
--	-	-

COSEL

Model	MGS31212	Temperature	25°C																																																							
Item	Overcurrent Protection	Testing Circuitry	Figure A																																																							
Object	+12V0.25A																																																									
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COSEL

Model	MGS31212	Temperature	25°C																																																			
Item	Switching frequency (by Load Current)	Testing Circuitry	Figure A																																																			
Object	+12V0.25A																																																					
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<p>The graph plots Oscillator Frequency [kHz] on a logarithmic scale (100 to 10000) against Load Current [A] on a linear scale (0 to 0.3). Three data series are shown for different input voltages: 9V (solid line with open triangles), 12V (dashed line with open squares), and 18V (dash-dot line with open circles). All series show a general decrease in frequency as load current increases. A slanted line on the right side of the graph indicates the rated load current range.</p>		<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>0.000</td><td>1080</td><td>1140</td><td>1240</td></tr> <tr><td>0.050</td><td>632</td><td>739</td><td>851</td></tr> <tr><td>0.100</td><td>443</td><td>534</td><td>641</td></tr> <tr><td>0.150</td><td>341</td><td>420</td><td>515</td></tr> <tr><td>0.200</td><td>277</td><td>343</td><td>429</td></tr> <tr><td>0.250</td><td>231</td><td>291</td><td>367</td></tr> <tr><td>0.275</td><td>210</td><td>268</td><td>340</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]	0.000	1080	1140	1240	0.050	632	739	851	0.100	443	534	641	0.150	341	420	515	0.200	277	343	429	0.250	231	291	367	0.275	210	268	340	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-
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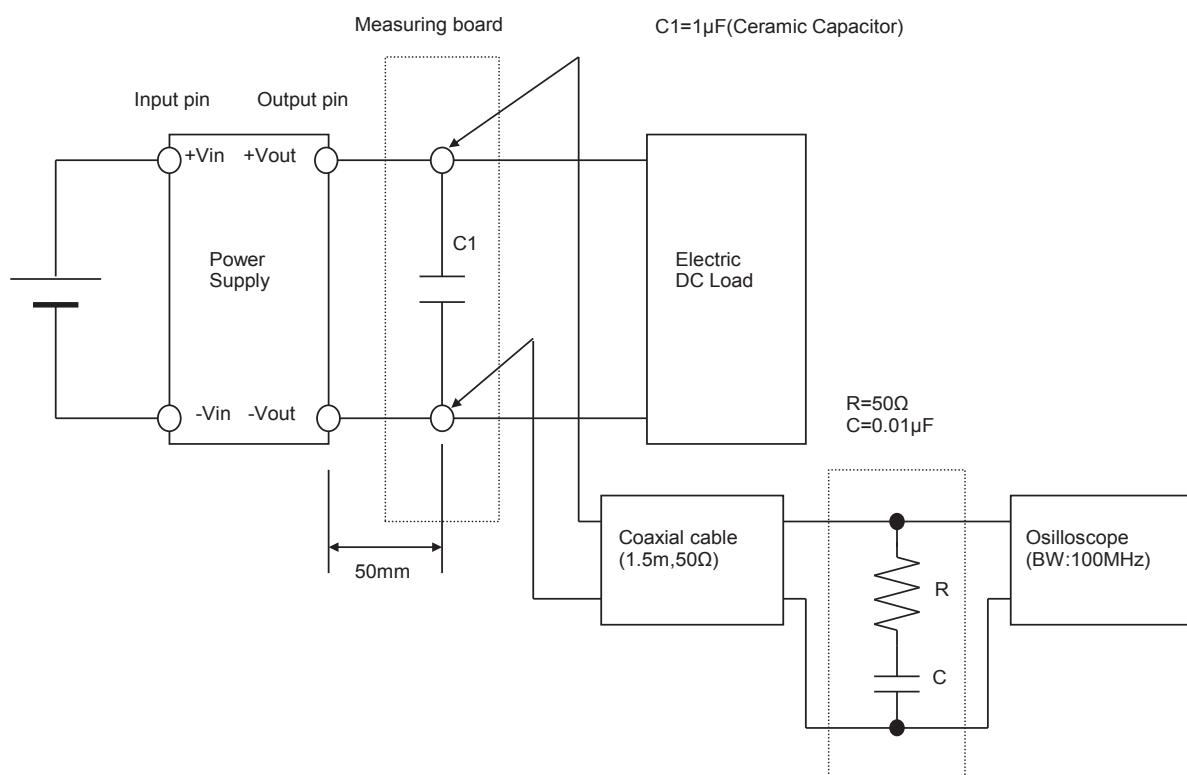
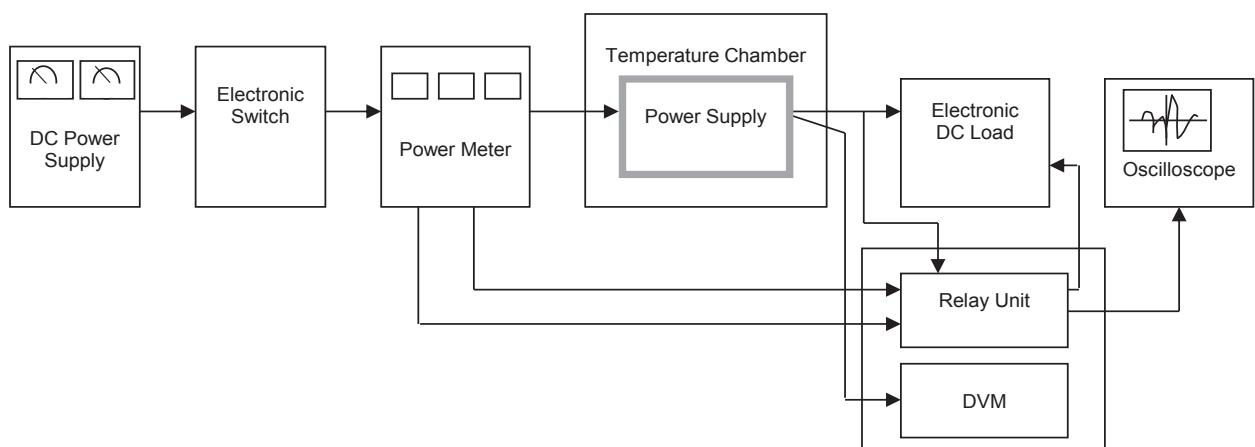


Figure B (Ripple and Ripple noise Characteristic)