

TEST DATA OF MGXS62412

Regulated DC Power Supply
February 19, 2018

Approved by : Takayuki Fukuda
Takayuki Fukuda Design Manager

Prepared by : Masumi Kitamura
Masumi Kitamura Design Engineer

COSEL CO.,LTD.

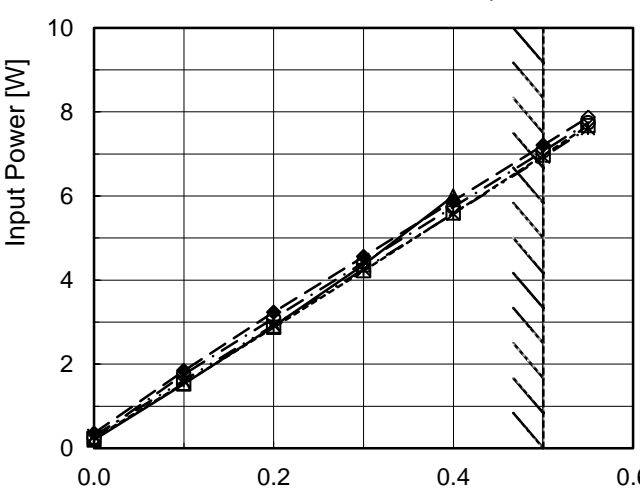
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Model		MGXS62412		Temperature 25°C																																																																																
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<div><div><div>Output Voltage [V]</div><div>12.6</div><div>12.4</div><div>12.2</div><div>12.0</div><div>11.8</div><div>11.6</div></div><div><div>0.0</div><div>0.2</div><div>0.4</div><div>0.6</div></div><div>Load Current [A]</div></div>		<table><tr><th rowspan="2">Load Current [A]</th><th colspan="5">Output Voltage [V]</th></tr><tr><th>Input Volt. 6[V]</th><th>Input Volt. 12[V]</th><th>Input Volt. 24[V]</th><th>Input Volt. 48[V]</th><th>Input Volt. 60[V]</th></tr><tr><td>0.00</td><td>12.047</td><td>12.046</td><td>12.045</td><td>12.048</td><td>12.048</td></tr><tr><td>0.10</td><td>12.045</td><td>12.045</td><td>12.044</td><td>12.042</td><td>12.043</td></tr><tr><td>0.20</td><td>12.044</td><td>12.044</td><td>12.043</td><td>12.041</td><td>12.039</td></tr><tr><td>0.30</td><td>12.042</td><td>12.043</td><td>12.042</td><td>12.040</td><td>12.038</td></tr><tr><td>0.40</td><td>12.038</td><td>12.042</td><td>12.041</td><td>12.039</td><td>12.038</td></tr><tr><td>0.50</td><td>- ※</td><td>12.041</td><td>12.040</td><td>12.038</td><td>12.037</td></tr><tr><td>0.55</td><td>- ※</td><td>12.040</td><td>12.039</td><td>12.038</td><td>12.036</td></tr><tr><td>--</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td></tr><tr><td>--</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td></tr><tr><td>--</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td></tr><tr><td>--</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td></tr></table>		Load Current [A]	Output Voltage [V]					Input Volt. 6[V]	Input Volt. 12[V]	Input Volt. 24[V]	Input Volt. 48[V]	Input Volt. 60[V]	0.00	12.047	12.046	12.045	12.048	12.048	0.10	12.045	12.045	12.044	12.042	12.043	0.20	12.044	12.044	12.043	12.041	12.039	0.30	12.042	12.043	12.042	12.040	12.038	0.40	12.038	12.042	12.041	12.039	12.038	0.50	- ※	12.041	12.040	12.038	12.037	0.55	- ※	12.040	12.039	12.038	12.036	--	-	-	-	-	-	--	-	-	-	-	-	--	-	-	-	-	-	--	-	-	-	-	-
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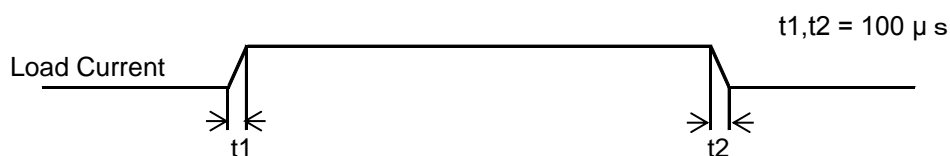
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BC-11270

COSEL

Model	MGXS62412	Temperature 25°C Testing Circuitry Figure A
Item	Dynamic Load Response	
Object	+12V0.5A	

Input Volt. 24 V
Cycle 100 ms



Min.Load (0A) ←→
Load 100% (0.5A)

500 mV/div

2 ms/div

2 ms/div

Min.Load (0A) ←→
Load 50% (0.25A)

500 mV/div

2 ms/div

2 ms/div

Load 50% (0.25A) ←→
Load 100% (0.5A)

500 mV/div

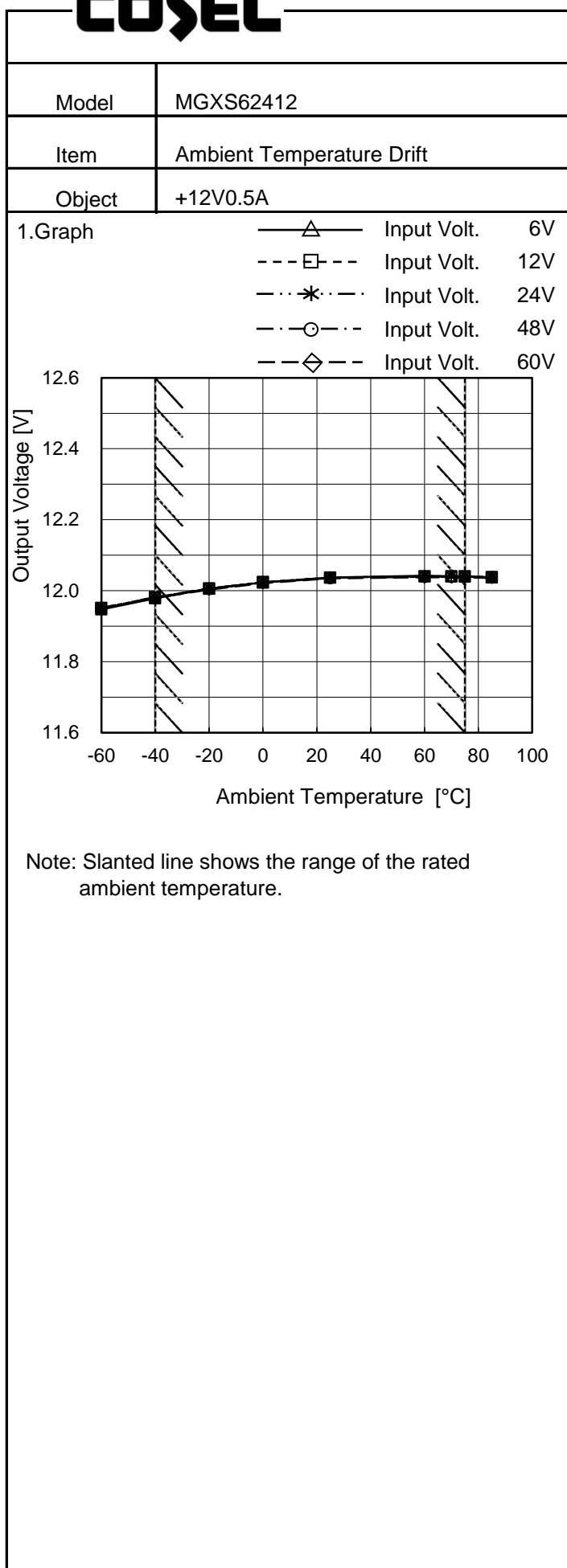
2 ms/div

2 ms/div

COSEL																																									
Model	MGXS62412	Temperature	25°C																																						
Item	Ripple Voltage (by Load Current)	Testing Circuitry	Figure B																																						
Object	+12V0.5A																																								
1.Graph		2.Values																																							
<div><div><div>—△—</div><div>Input Volt.</div><div>6V</div></div><div><div>-·-○-·-</div><div>Input Volt.</div><div>60V</div></div></div> <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> <div><p>Ripple [mVp-p]</p><p>Fig.Complex Ripple Wave Form</p></div>		<table><tr><th rowspan="2">Load Current [A]</th><th colspan="2">Ripple Voltage [mV]</th></tr><tr><th>Input Volt. 6 [V]</th><th>Input Volt. 60 [V]</th></tr><tr><td>0.00</td><td>3</td><td>116</td></tr><tr><td>0.10</td><td>4</td><td>120</td></tr><tr><td>0.20</td><td>9</td><td>4</td></tr><tr><td>0.25</td><td>17</td><td>5</td></tr><tr><td>0.30</td><td>26</td><td>2</td></tr><tr><td>0.40</td><td>42</td><td>3</td></tr><tr><td>0.50</td><td>- ※</td><td>3</td></tr><tr><td>0.55</td><td>- ※</td><td>3</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></table> <p>※ Maximum output current at minimum input Voltage is 70% of rated load current. Refer to instruction manuals for details of input derating.</p>		Load Current [A]	Ripple Voltage [mV]		Input Volt. 6 [V]	Input Volt. 60 [V]	0.00	3	116	0.10	4	120	0.20	9	4	0.25	17	5	0.30	26	2	0.40	42	3	0.50	- ※	3	0.55	- ※	3	--	-	-	--	-	-	--	-	-
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Model		MGXS62412		Temperature 25°C																																							
Item		Ripple-Noise		Testing Circuitry Figure B																																							
Object		+12V0.5A																																									
1.Graph				2.Values																																							
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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> <div></div> <p>Fig.Complex Ripple Noise Wave Form</p>				<p>※ Maximum output current at minimum input Voltage is 70% of rated load current. Refer to instruction manuals for details of input derating.</p>																																							

Model	MGXS62412																																							
Item	Ripple Voltage (by Ambient Temp.)	Testing Circuitry Figure B																																						
Object	+12V0.5A																																							
<p>1.Graph</p> <div style="text-align: right; margin-bottom: 10px;"> ---□--- Load 50% —△— Load 100% </div> <p style="margin-left: 80px;">Ambient Temperature [°C]</p> <p style="margin-left: 40px;">Input Volt. 24V</p>		<p>2.Values</p> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th rowspan="2">Ambient Temperature [°C]</th><th colspan="2">Ripple Voltage [mV]</th></tr> <tr> <th>Load 50%</th><th>Load 100%</th></tr> </thead> <tbody> <tr><td>-60</td><td>6</td><td>7</td></tr> <tr><td>-40</td><td>5</td><td>6</td></tr> <tr><td>-20</td><td>5</td><td>5</td></tr> <tr><td>0</td><td>5</td><td>4</td></tr> <tr><td>25</td><td>5</td><td>4</td></tr> <tr><td>50</td><td>4</td><td>3</td></tr> <tr><td>75</td><td>4</td><td>3</td></tr> <tr><td>80</td><td>4</td><td>3</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>	Ambient Temperature [°C]	Ripple Voltage [mV]		Load 50%	Load 100%	-60	6	7	-40	5	6	-20	5	5	0	5	4	25	5	4	50	4	3	75	4	3	80	4	3	--	-	-	--	-	-	--	-	-
Ambient Temperature [°C]	Ripple Voltage [mV]																																							
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80	4	3																																						
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<p>Measured by 100 MHz Oscilloscope.</p> <p>Note: Slanted line shows the range of the rated ambient temperature.</p>																																								



Testing Circuitry Figure A

2.Values

Ambient Temperature [°C]	Output Voltage [V]				
	Input Volt. 6[V]	Input Volt. 12[V]	Input Volt. 24[V]	Input Volt. 48[V]	Input Volt. 60[V]
-60	11.947	11.951	11.951	11.950	11.950
-40	11.978	11.982	11.982	11.981	11.980
-20	12.006	12.006	12.006	12.005	12.003
0	12.023	12.024	12.024	12.023	12.021
25	12.037	12.037	12.037	12.035	12.035
60	12.042	12.041	12.041	12.039	12.038
70	12.041	12.040	12.040	12.039	12.038
75	12.040	12.040	12.040	12.039	12.038
85	12.038	12.038	12.038	12.037	12.036
--	-	-	-	-	-
--	-	-	-	-	-

Note: In case of input Volt. 6V, Load 70%.
Other case Load 100%.



Model		MGXS62412	Testing Circuitry Figure A
Item		Output Voltage Accuracy	
Object		+12V0.5A	

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 - 75°C

Input Voltage : 6 - 60V

Load Current : 0 - 0.5A

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

* 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	75	60	0	12.050	±36	±0.3
Minimum Voltage	-40	6	0.35 ※	11.978		

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

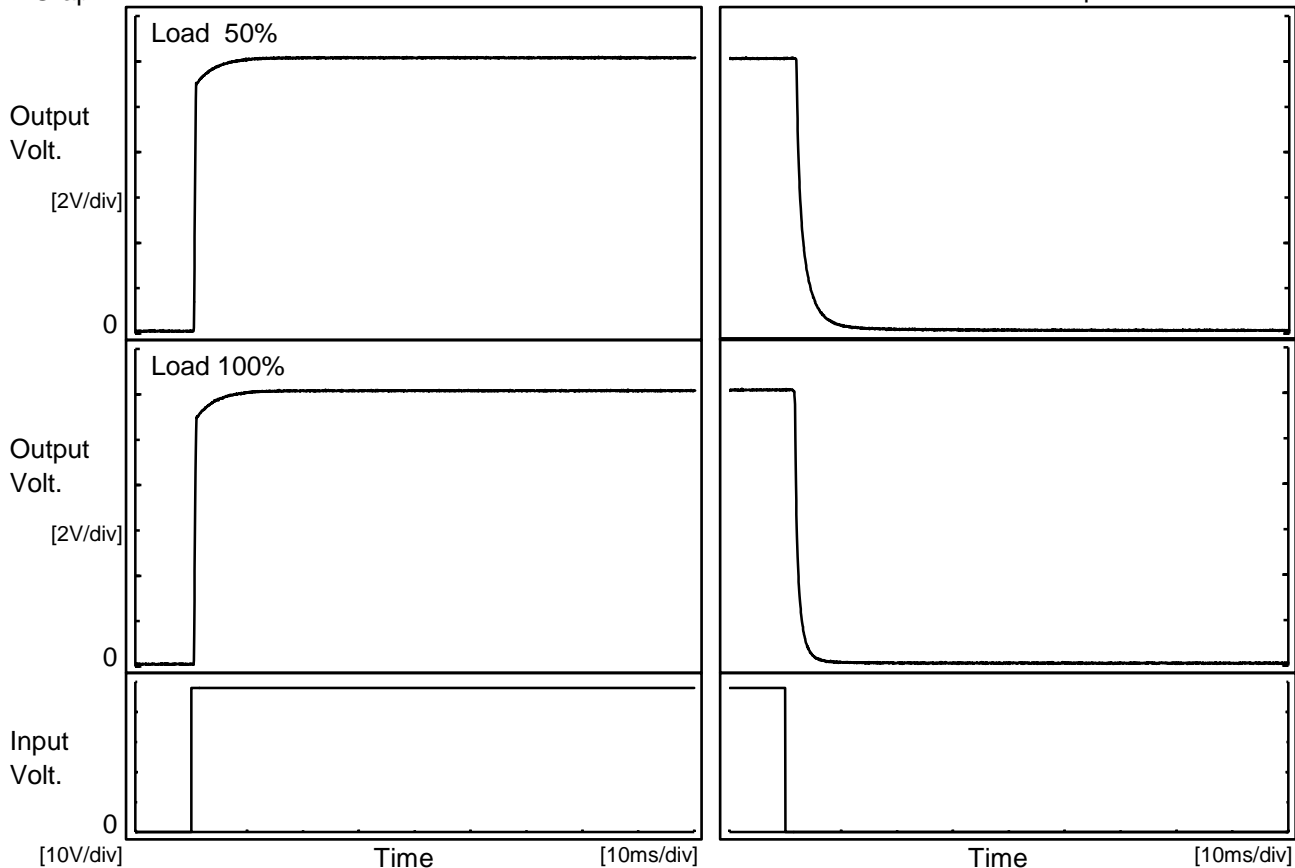


COSEL			
Model	MGXS62412	Temperature 25°C Testing Circuitry Figure A	
Item	Time Lapse Drift		
Object	+12V0.5A		
1.Graph		2.Values	
<div><div><div><div><div>12.6</div><div>12.4</div><div>12.2</div><div>12.0</div><div>11.8</div><div>11.6</div></div><div><div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></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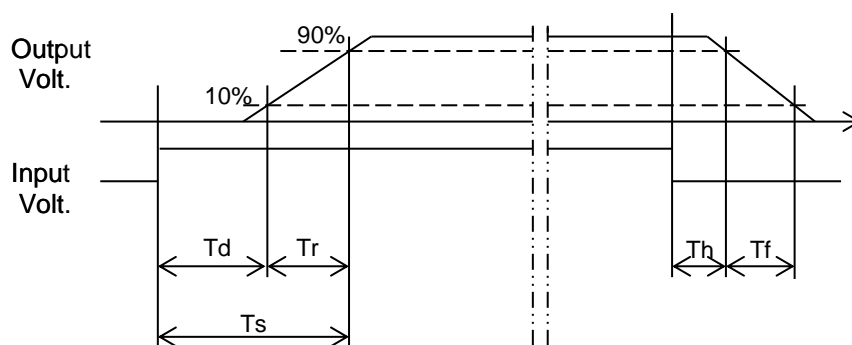
Model	MGXS62412	Temperature	25°C
Item	Rise and Fall Time	Testing Circuitry	Figure A
Object	+12V0.5A		

1.Graph



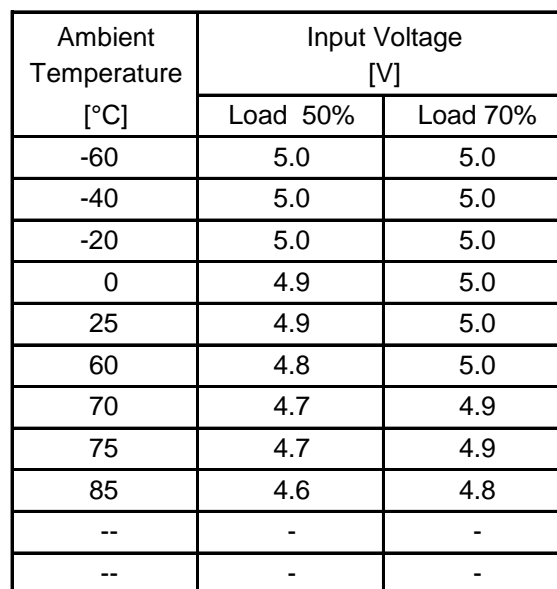
2.Values

Load \ Time	Td	Tr	Ts	Th	Tf
50 %	0.5	0.4	0.9	2.0	3.4
100 %	0.5	0.4	0.9	1.8	1.7



Testing Circuitry Figure A

2.Values



- 16 -

Model		MGXS62412		Temperature 25°C																																																																																				
Item		Overcurrent Protection		Testing Circuitry Figure A																																																																																				
Object		+12V0.5A																																																																																						
1.Graph		<div><div><div></div>Input Volt. 6V</div><div><div></div>Input Volt. 12V</div><div><div></div>Input Volt. 24V</div><div><div></div>Input Volt. 48V</div><div><div></div>Input Volt. 60V</div></div> <div><div><div>Output Voltage [V]</div><div><div>16</div><div>12</div><div>8</div><div>4</div><div>0</div></div><div><div>0.0</div><div>0.4</div><div>0.8</div><div>1.2</div><div>1.6</div><div>2.0</div></div></div><div>Load Current [A]</div></div>		2.Values																																																																																				
				<table><tr><th rowspan="2">Output Voltage [V]</th><th colspan="5">Load Current [A]</th></tr><tr><th>Input Volt. 6[V]</th><th>Input Volt. 12[V]</th><th>Input Volt. 24[V]</th><th>Input Volt. 48[V]</th><th>Input Volt. 60[V]</th></tr><tr><td>11.4</td><td>0.482</td><td>0.653</td><td>0.706</td><td>0.709</td><td>0.709</td></tr><tr><td>10.8</td><td>0.503</td><td>0.679</td><td>0.736</td><td>0.730</td><td>0.729</td></tr><tr><td>9.6</td><td>0.549</td><td>0.739</td><td>0.798</td><td>0.776</td><td>0.771</td></tr><tr><td>8.4</td><td>0.583</td><td>0.811</td><td>0.860</td><td>0.822</td><td>0.815</td></tr><tr><td>7.2</td><td>0.633</td><td>0.891</td><td>0.928</td><td>0.870</td><td>0.861</td></tr><tr><td>6.0</td><td>0.708</td><td>0.984</td><td>0.993</td><td>0.921</td><td>0.911</td></tr><tr><td>4.8</td><td>0.813</td><td>1.092</td><td>1.062</td><td>0.975</td><td>0.965</td></tr><tr><td>3.6</td><td>0.957</td><td>1.205</td><td>1.139</td><td>1.034</td><td>1.018</td></tr><tr><td>2.4</td><td>1.145</td><td>1.325</td><td>1.226</td><td>1.095</td><td>1.073</td></tr><tr><td>1.2</td><td>1.332</td><td>1.434</td><td>1.296</td><td>1.137</td><td>1.110</td></tr><tr><td>0.0</td><td>1.636</td><td>1.624</td><td>1.401</td><td>1.109</td><td>1.070</td></tr><tr><td>--</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td></tr></table>		Output Voltage [V]	Load Current [A]					Input Volt. 6[V]	Input Volt. 12[V]	Input Volt. 24[V]	Input Volt. 48[V]	Input Volt. 60[V]	11.4	0.482	0.653	0.706	0.709	0.709	10.8	0.503	0.679	0.736	0.730	0.729	9.6	0.549	0.739	0.798	0.776	0.771	8.4	0.583	0.811	0.860	0.822	0.815	7.2	0.633	0.891	0.928	0.870	0.861	6.0	0.708	0.984	0.993	0.921	0.911	4.8	0.813	1.092	1.062	0.975	0.965	3.6	0.957	1.205	1.139	1.034	1.018	2.4	1.145	1.325	1.226	1.095	1.073	1.2	1.332	1.434	1.296	1.137	1.110	0.0	1.636	1.624	1.401	1.109	1.070	--	-	-	-	-	-
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Note: Slanted line shows the range of the rated load current.																																																																																								
※ Maximum output current at minimum input Voltage is 70% of rated load current. Refer to instruction manuals for details of input derating.																																																																																								

Model		MGXS62412		Temperature 25°C																																																																														
Item		Switching frequency (by Load Current)		Testing Circuitry Figure A																																																																														
Object		+12V0.5A																																																																																
1.Graph		<div><div><div>—△—</div><div>Input Volt.</div><div>6V</div></div><div><div>---□---</div><div>Input Volt.</div><div>12V</div></div><div><div>-·-*·-</div><div>Input Volt.</div><div>24V</div></div><div><div>-·-○-</div><div>Input Volt.</div><div>48V</div></div><div><div>---◇---</div><div>Input Volt.</div><div>60V</div></div></div> <div>Switching Frequency [kHz]</div> <div>Load Current [A]</div>		2.Values																																																																														
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Load Current [A]	Input Current [A]																																																																																	
	Input Volt. 6[V]	Input Volt. 12[V]	Input Volt. 24[V]	Input Volt. 48[V]	Input Volt. 60[V]																																																																													
0.000	416	599	757	742	714																																																																													
0.100	255	438	614	722	651																																																																													
0.200	183	344	511	626	647																																																																													
0.250	159	310	472	587	609																																																																													
0.300	140	283	438	551	574																																																																													
0.350	126	259	409	520	544																																																																													
0.400	113	240	383	493	516																																																																													
0.425	108	231	371	480	503																																																																													
0.500	- ※	208	340	445	468																																																																													
0.550	- ※	195	322	425	448																																																																													
--	-	-	-	-	-																																																																													
Note: Slanted line shows the range of the rated load current.				※ Maximum output current at minimum input Voltage is 70% of rated load current. Refer to instruction manuals for details of input derating.																																																																														
When load current is low, MG operates intermittently, so switching frequency would not become constant.																																																																																		

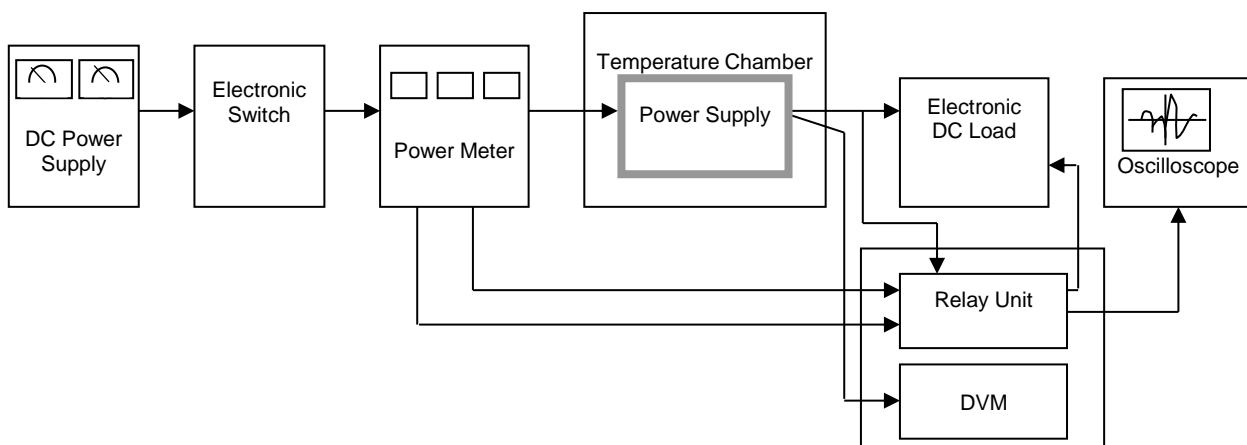


Figure A

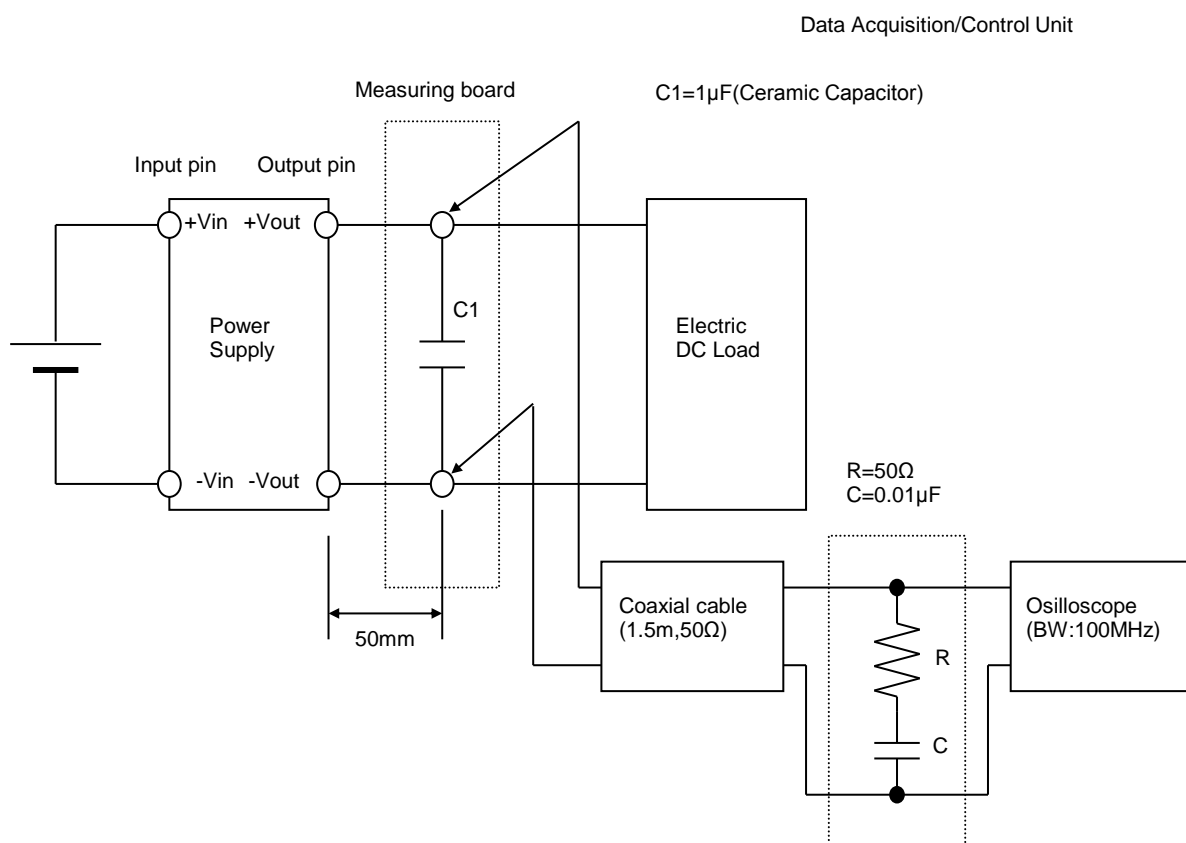


Figure B (Ripple and Ripple noise Characteristic)