

TEST DATA OF MGS302412

Regulated DC Power Supply
December 7, 2010

Approved by : Kazunari Asano
Kazunari Asano Design Manager

Prepared by : Sho Saito
Sho Saito Design Engineer

COSEL CO.,LTD.

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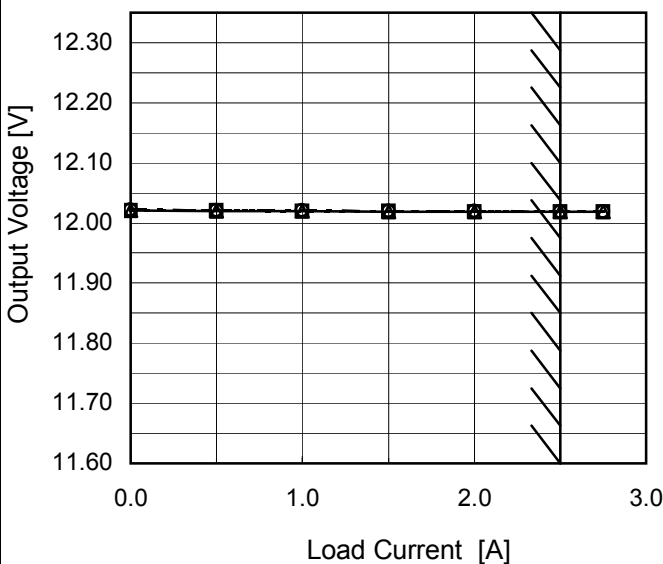
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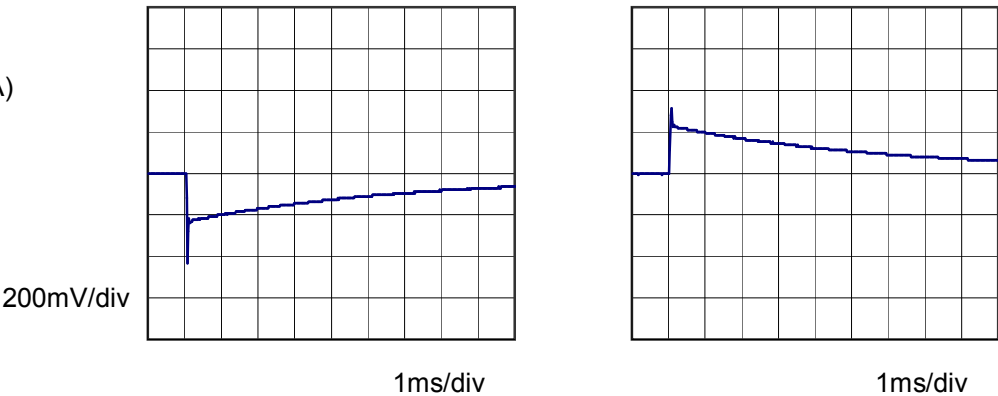


Model	MGS302412	Temperature 25°C Testing Circuitry Figure A
Item	Dynamic Load Response	
Object	+12V2.5A	

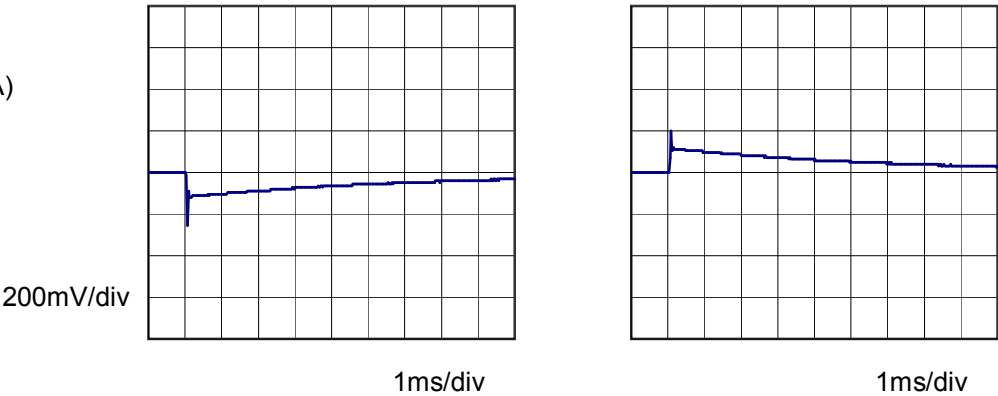
Input Volt. 24 V
Cycle 1000 ms



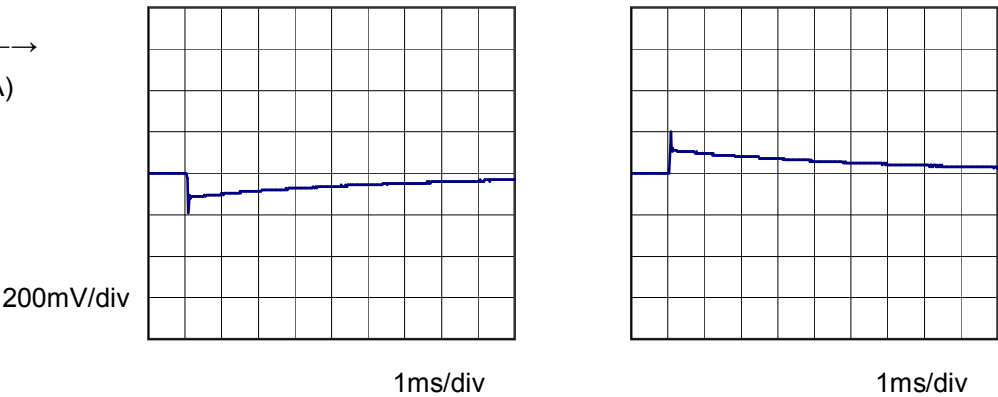
Min. Load (0A) \longleftrightarrow
Load 100% (2.5A)



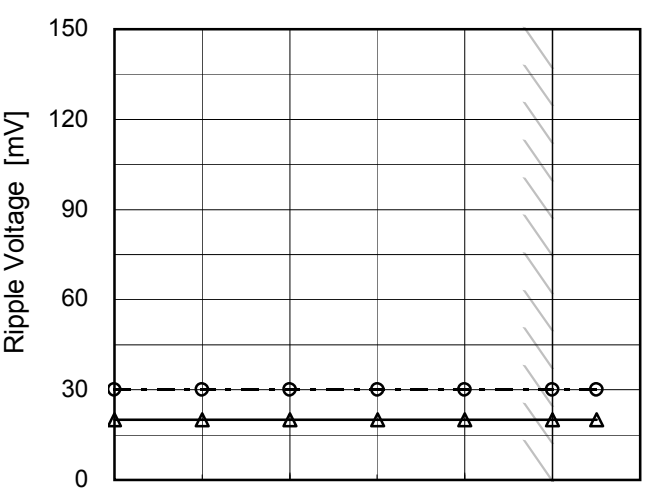
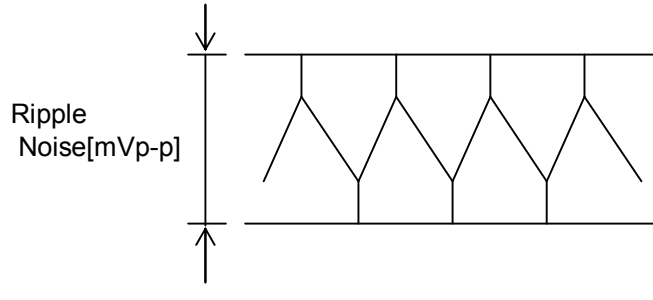
Min. Load (0A) \longleftrightarrow
Load 50% (1.25A)



Load 50% (1.25A) \longleftrightarrow
Load 100% (2.5A)



Model		MGS302412	Temperature 25°C Testing Circuitry Figure B																																						
Item		Ripple Voltage (by Load Current)																																							
Object		+12V2.5A																																							
1.Graph		2.Values																																							
<div><div><div>—△— Input Volt. 18V</div><div>-.-○-.- Input Volt. 36V</div></div><div>Ripple Voltage [mV]</div><div>Load Current [A]</div></div>		<table><tr><th rowspan="2">Load Current [A]</th><th colspan="2">Ripple Voltage [mV]</th></tr><tr><th>Input Volt. 18 [V]</th><th>Input Volt. 36 [V]</th></tr><tr><td>0.00</td><td>17</td><td>24</td></tr><tr><td>0.50</td><td>17</td><td>24</td></tr><tr><td>1.00</td><td>17</td><td>24</td></tr><tr><td>1.50</td><td>17</td><td>24</td></tr><tr><td>2.00</td><td>17</td><td>24</td></tr><tr><td>2.50</td><td>17</td><td>24</td></tr><tr><td>2.75</td><td>17</td><td>24</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></table>		Load Current [A]	Ripple Voltage [mV]		Input Volt. 18 [V]	Input Volt. 36 [V]	0.00	17	24	0.50	17	24	1.00	17	24	1.50	17	24	2.00	17	24	2.50	17	24	2.75	17	24	--	-	-	--	-	-	--	-	-	--	-	-
Load Current [A]	Ripple Voltage [mV]																																								
	Input Volt. 18 [V]	Input Volt. 36 [V]																																							
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0.50	17	24																																							
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2.00	17	24																																							
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2.75	17	24																																							
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<div><div>Ripple Voltage is shown as p-p in the figure below.</div><div>Note: Slanted line shows the range of the rated load current.</div></div>																																									
<div><div>Ripple [mVp-p]</div><div>Fig.Complex Ripple Wave Form</div></div>																																									

Model	MGS302412																																								
Item	Ripple-Noise	Temperature	25°C																																						
Object	+12V2.5A	Testing Circuitry	Figure B																																						
1.Graph		2.Values																																							
<div><div><div><div><div></div><div>Input Volt. 18V</div></div><div><div></div><div>Input Volt. 36V</div></div></div><div></div></div><div><p>Ripple-Noise is shown as p-p in the figure below.</p><p>Note: Slanted line shows the range of the rated load current.</p></div><div><div><div><div></div><div>Ripple Noise[mVp-p]</div></div><div></div></div><div>Fig.Complex Ripple Noise Wave Form</div></div></div>		<table><tr><th rowspan="2">Load Current [A]</th><th colspan="2">Ripple-Noise [mV]</th></tr><tr><th>Input Volt. 18 [V]</th><th>Input Volt. 36 [V]</th></tr><tr><td>0.00</td><td>20</td><td>30</td></tr><tr><td>0.50</td><td>20</td><td>30</td></tr><tr><td>1.00</td><td>20</td><td>30</td></tr><tr><td>1.50</td><td>20</td><td>30</td></tr><tr><td>2.00</td><td>20</td><td>30</td></tr><tr><td>2.50</td><td>20</td><td>30</td></tr><tr><td>2.75</td><td>20</td><td>30</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></table>		Load Current [A]	Ripple-Noise [mV]		Input Volt. 18 [V]	Input Volt. 36 [V]	0.00	20	30	0.50	20	30	1.00	20	30	1.50	20	30	2.00	20	30	2.50	20	30	2.75	20	30	--	-	-	--	-	-	--	-	-	--	-	-
Load Current [A]	Ripple-Noise [mV]																																								
	Input Volt. 18 [V]	Input Volt. 36 [V]																																							
0.00	20	30																																							
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--	-	-																																							
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--	-	-																																							
--	-	-																																							

		Testing Circuitry Figure B
Model	MGS302412	
Item	Ripple Voltage (by Ambient Temp.)	
Object	+12V2.5A	
1.Graph		2.Values
<div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></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	MGS302412																																																					
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<div><div><div>—△—</div><div>Input Volt.</div><div>18V</div></div><div><div>---□---</div><div>Input Volt.</div><div>24V</div></div><div><div>---○---</div><div>Input Volt.</div><div>36V</div></div></div> <p>Output Voltage [V]</p> <p>Ambient Temperature [°C]</p> <p>Load 100%</p>		<table><tr><th rowspan="2">Ambient Temperature [°C]</th><th colspan="3">Output Voltage [V]</th></tr><tr><th>Input Volt. 18[V]</th><th>Input Volt. 24[V]</th><th>Input Volt. 36[V]</th></tr><tr><td>-60</td><td>11.936</td><td>11.937</td><td>11.940</td></tr><tr><td>-40</td><td>11.964</td><td>11.965</td><td>11.967</td></tr><tr><td>-20</td><td>11.986</td><td>11.987</td><td>11.988</td></tr><tr><td>0</td><td>12.003</td><td>12.004</td><td>12.004</td></tr><tr><td>25</td><td>12.018</td><td>12.019</td><td>12.019</td></tr><tr><td>60</td><td>12.024</td><td>12.023</td><td>12.023</td></tr><tr><td>65</td><td>12.023</td><td>12.023</td><td>12.023</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></table>		Ambient Temperature [°C]	Output Voltage [V]			Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]	-60	11.936	11.937	11.940	-40	11.964	11.965	11.967	-20	11.986	11.987	11.988	0	12.003	12.004	12.004	25	12.018	12.019	12.019	60	12.024	12.023	12.023	65	12.023	12.023	12.023	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-
Ambient Temperature [°C]	Output Voltage [V]																																																					
	Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]																																																			
-60	11.936	11.937	11.940																																																			
-40	11.964	11.965	11.967																																																			
-20	11.986	11.987	11.988																																																			
0	12.003	12.004	12.004																																																			
25	12.018	12.019	12.019																																																			
60	12.024	12.023	12.023																																																			
65	12.023	12.023	12.023																																																			
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Note: Slanted line shows the range of the rated ambient temperature.																																																						



Model		MGS302412	Testing Circuitry Figure A
Item		Output Voltage Accuracy	
Object		+12V2.5A	

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 - 60°C

Input Voltage : 18 - 36V

Load Current : 0 - 2.5A

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

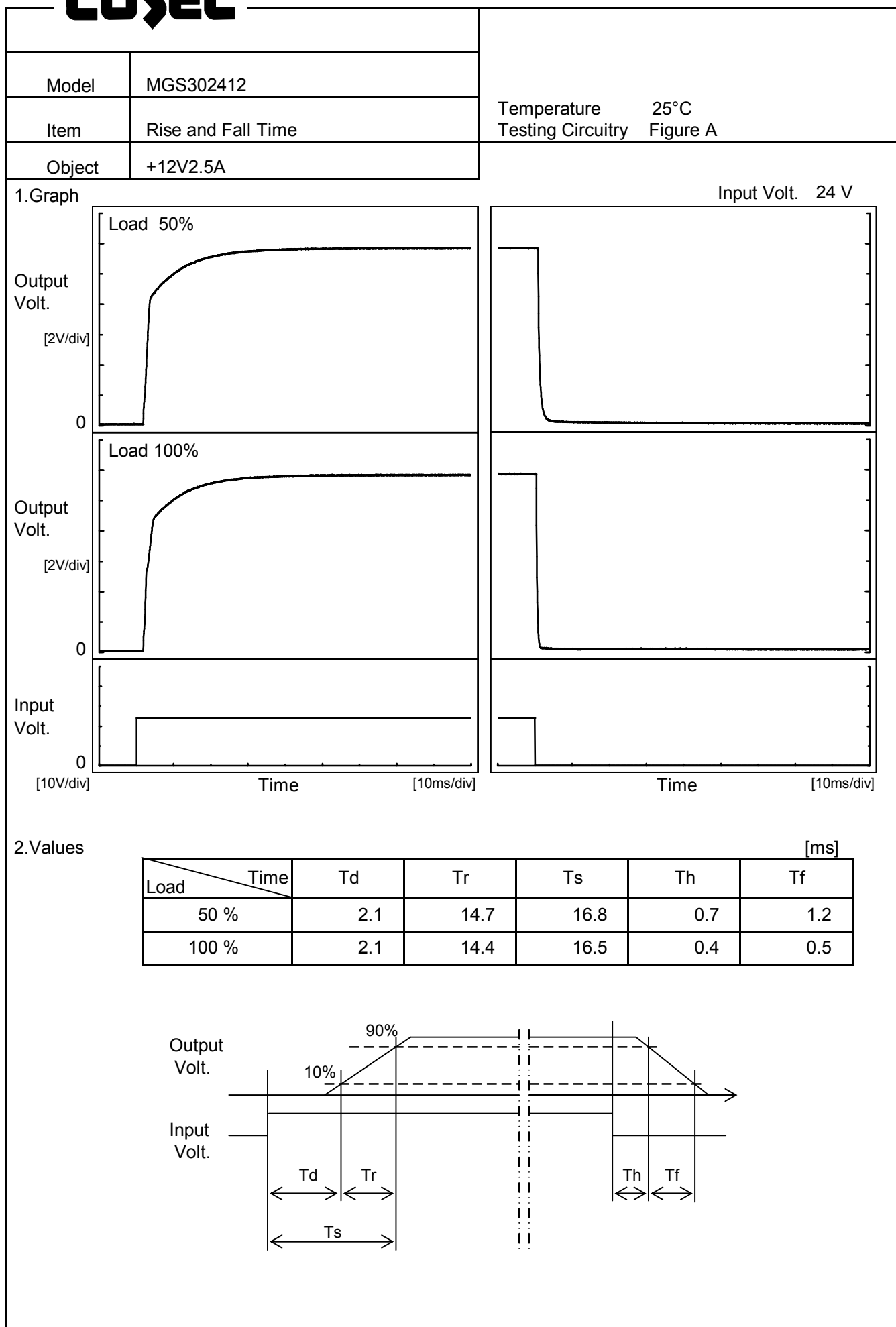
* Output Voltage Accuracy (Ration) = $\frac{\text{Output Voltage Accuracy}}{\text{Rated Output Voltage}} \times 100$

2. Values

Item	Temperature [°C]	Input Voltage[V]	Output		Output Voltage Accuracy	
			Current[A]	Voltage[V]	Value [mV]	Ration [%]
Maximum Voltage	60	24	0	12.027	±32	±0.3
Minimum Voltage	-40	18	0	11.964		



Model	MGS302412																								
Item	Time Lapse Drift	Temperature	25°C																						
		Testing Circuitry	Figure A																						
Object	+12V2.5A																								
1.Graph		2.Values																							
<div><div><div>12.30</div><div>12.20</div><div>12.10</div><div>12.00</div><div>11.90</div><div>11.80</div><div>11.70</div><div>11.60</div></div><div><div>0</div><div>2</div><div>4</div><div>6</div><div>8</div><div>10</div></div><div><div>Output Voltage [V]</div><div>Time [H]</div></div><div><div>Input Volt.24V</div><div>Load100%</div></div></div>		<table><tr><th>Time since start [H]</th><th>Output Voltage [V]</th></tr><tr><td>0.0</td><td>12.019</td></tr><tr><td>0.5</td><td>12.029</td></tr><tr><td>1.0</td><td>12.029</td></tr><tr><td>2.0</td><td>12.029</td></tr><tr><td>3.0</td><td>12.029</td></tr><tr><td>4.0</td><td>12.029</td></tr><tr><td>5.0</td><td>12.029</td></tr><tr><td>6.0</td><td>12.029</td></tr><tr><td>7.0</td><td>12.029</td></tr><tr><td>8.0</td><td>12.029</td></tr></table>		Time since start [H]	Output Voltage [V]	0.0	12.019	0.5	12.029	1.0	12.029	2.0	12.029	3.0	12.029	4.0	12.029	5.0	12.029	6.0	12.029	7.0	12.029	8.0	12.029
Time since start [H]	Output Voltage [V]																								
0.0	12.019																								
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3.0	12.029																								
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5.0	12.029																								
6.0	12.029																								
7.0	12.029																								
8.0	12.029																								



Model	MGS302412																																								
Item	Minimum Input Voltage for Regulated Output Voltage	Testing Circuitry Figure A																																							
Object	+12V2.5A																																								
1.Graph		2.Values																																							
<div><div><div>---□---</div><div>Load 50%</div></div><div><div>—△—</div><div>Load 100%</div></div></div> <p>Note: Slanted line shows the range of the rated ambient temperature.</p>		<table><tr><th rowspan="2">Ambient Temperature [°C]</th><th colspan="2">Input Voltage [V]</th></tr><tr><th>Load 50%</th><th>Load 100%</th></tr><tr><td>-60</td><td>15.6</td><td>15.6</td></tr><tr><td>-40</td><td>15.6</td><td>15.6</td></tr><tr><td>-20</td><td>15.6</td><td>15.6</td></tr><tr><td>0</td><td>15.6</td><td>15.6</td></tr><tr><td>25</td><td>15.6</td><td>15.6</td></tr><tr><td>60</td><td>15.5</td><td>15.6</td></tr><tr><td>65</td><td>15.5</td><td>15.6</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></table>		Ambient Temperature [°C]	Input Voltage [V]		Load 50%	Load 100%	-60	15.6	15.6	-40	15.6	15.6	-20	15.6	15.6	0	15.6	15.6	25	15.6	15.6	60	15.5	15.6	65	15.5	15.6	--	-	-	--	-	-	--	-	-	--	-	-
Ambient Temperature [°C]	Input Voltage [V]																																								
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Model	MGS302412																																																									
Item	Overcurrent Protection	Temperature	25°C																																																							
Object	+12V2.5A	Testing Circuitry	Figure A																																																							
1.Graph		2.Values																																																								
<div><div><div></div><div></div><div></div></div><div><div>Input Volt. 18V</div><div>Input Volt. 24V</div><div>Input Volt. 36V</div></div></div> <p>Output Voltage [V]</p> <p>Load Current [A]</p> <p>Note: Slanted line shows the range of the rated load current.</p> <p>Intermittent operation occurs when overcurrent protection is activated.</p>		<table><tr><th rowspan="2">Output Voltage [V]</th><th colspan="3">Load Current [A]</th></tr><tr><th>Input Volt. 18[V]</th><th>Input Volt. 24[V]</th><th>Input Volt. 36[V]</th></tr><tr><td>12.0</td><td>3.42</td><td>3.47</td><td>3.42</td></tr><tr><td>11.4</td><td>-</td><td>-</td><td>-</td></tr><tr><td>10.8</td><td>-</td><td>-</td><td>-</td></tr><tr><td>9.6</td><td>-</td><td>-</td><td>-</td></tr><tr><td>8.4</td><td>-</td><td>-</td><td>-</td></tr><tr><td>7.2</td><td>-</td><td>-</td><td>-</td></tr><tr><td>6.0</td><td>-</td><td>-</td><td>-</td></tr><tr><td>4.8</td><td>-</td><td>-</td><td>-</td></tr><tr><td>3.6</td><td>-</td><td>-</td><td>-</td></tr><tr><td>2.4</td><td>-</td><td>-</td><td>-</td></tr><tr><td>1.2</td><td>-</td><td>-</td><td>-</td></tr><tr><td>0.0</td><td>-</td><td>-</td><td>-</td></tr></table>		Output Voltage [V]	Load Current [A]			Input Volt. 18[V]	Input Volt. 24[V]	Input Volt. 36[V]	12.0	3.42	3.47	3.42	11.4	-	-	-	10.8	-	-	-	9.6	-	-	-	8.4	-	-	-	7.2	-	-	-	6.0	-	-	-	4.8	-	-	-	3.6	-	-	-	2.4	-	-	-	1.2	-	-	-	0.0	-	-	-
Output Voltage [V]	Load Current [A]																																																									
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1.2	-	-	-																																																							
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Model	MGS302412																																								
Item	Overvoltage Protection	Testing Circuitry Figure A																																							
Object	+12V2.5A																																								
1.Graph		2.Values																																							
<div><div><div>—△—</div><div>Input Volt.</div><div>24V</div></div><div><div>---□---</div><div>Input Volt.</div><div>36V</div></div></div> <p>Operating Point [V]</p> <p>Ambient Temperature [°C]</p> <p>Load 0%</p> <p>Note: Slanted line shows the range of the rated ambient temperature.</p>		<table><tr><th rowspan="2">Ambient Temperature [°C]</th><th colspan="2">Operating Point [V]</th></tr><tr><th>Input Volt. 24[V]</th><th>Input Volt. 36[V]</th></tr><tr><td>-60</td><td>16.36</td><td>16.36</td></tr><tr><td>-40</td><td>16.45</td><td>16.45</td></tr><tr><td>-20</td><td>16.57</td><td>16.59</td></tr><tr><td>0</td><td>16.73</td><td>16.75</td></tr><tr><td>25</td><td>16.96</td><td>16.98</td></tr><tr><td>60</td><td>17.28</td><td>17.29</td></tr><tr><td>65</td><td>17.33</td><td>17.35</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></table>		Ambient Temperature [°C]	Operating Point [V]		Input Volt. 24[V]	Input Volt. 36[V]	-60	16.36	16.36	-40	16.45	16.45	-20	16.57	16.59	0	16.73	16.75	25	16.96	16.98	60	17.28	17.29	65	17.33	17.35	--	-	-	--	-	-	--	-	-	--	-	-
Ambient Temperature [°C]	Operating Point [V]																																								
	Input Volt. 24[V]	Input Volt. 36[V]																																							
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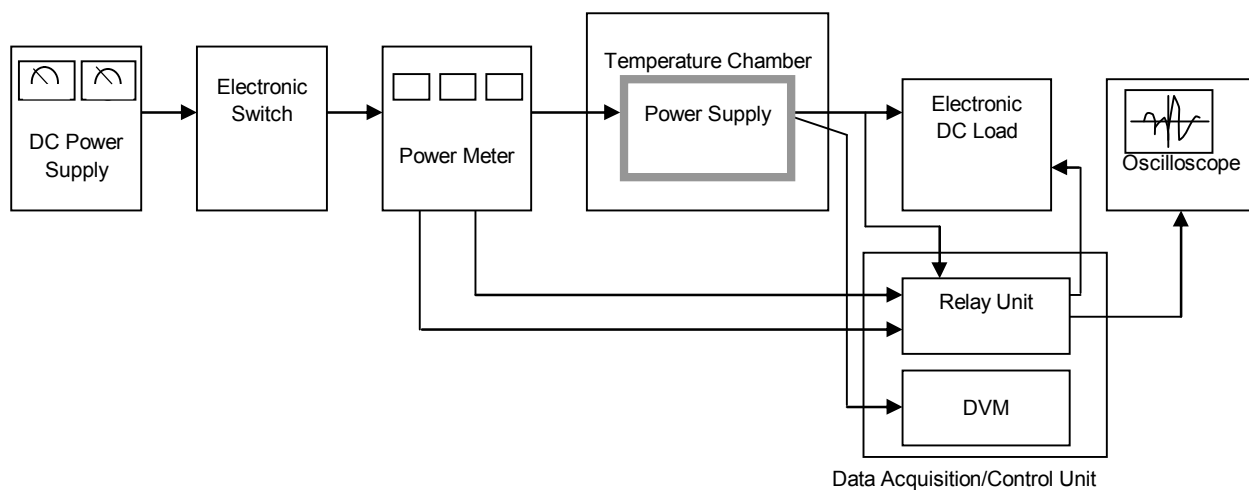


Figure A

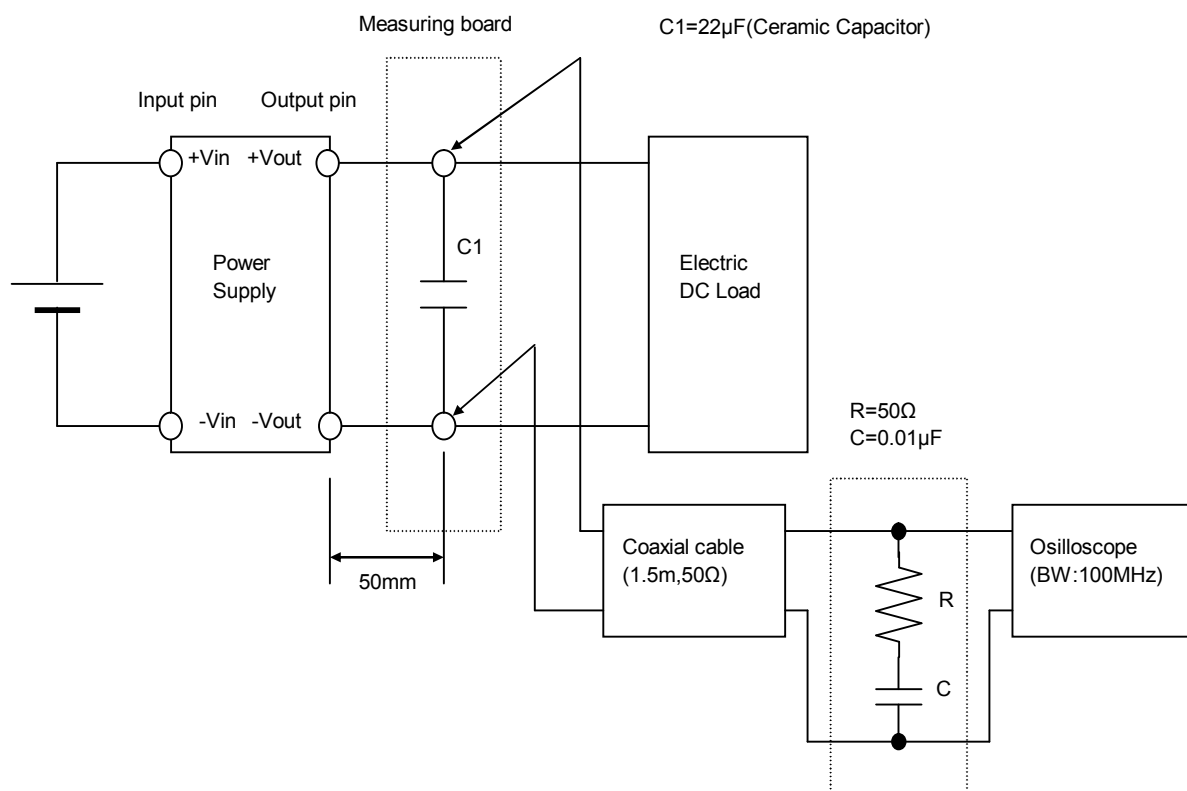


Figure B (Ripple and Ripple noise Characteristic)