

TEST DATA OF SUTS60512

Regulated DC Power Supply
March 5, 2009

Approved by : Kazunari Asano
Kazunari Asano Design Manager

Prepared by : Sho Saito
Sho Saito Design Engineer

COSEL CO.,LTD.

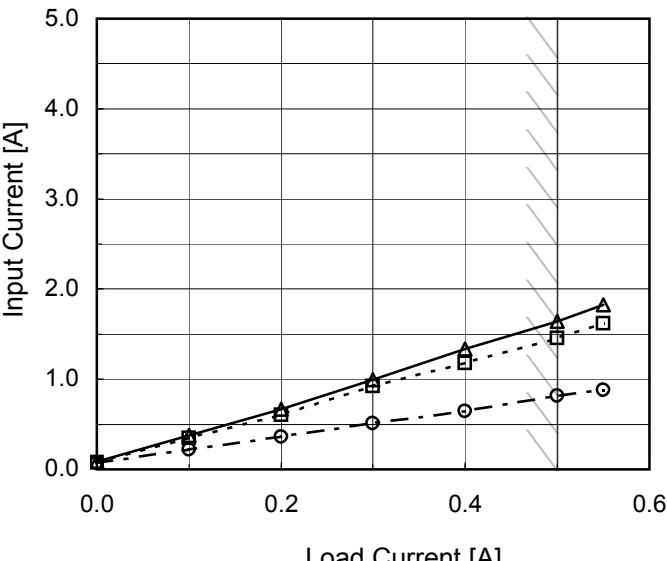
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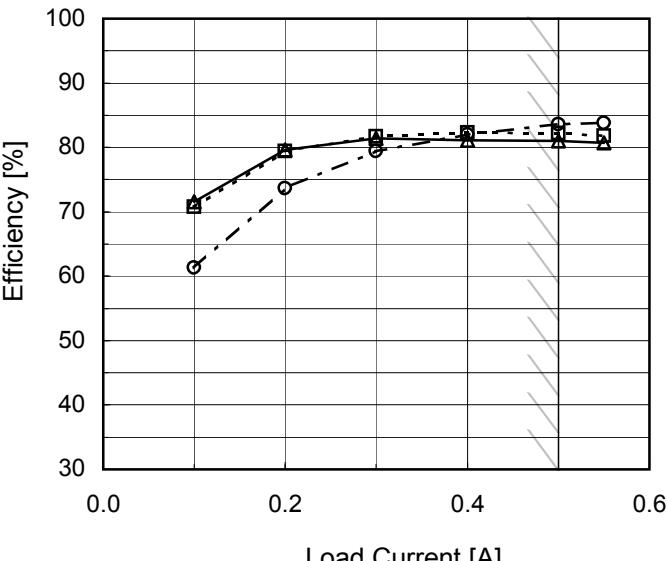
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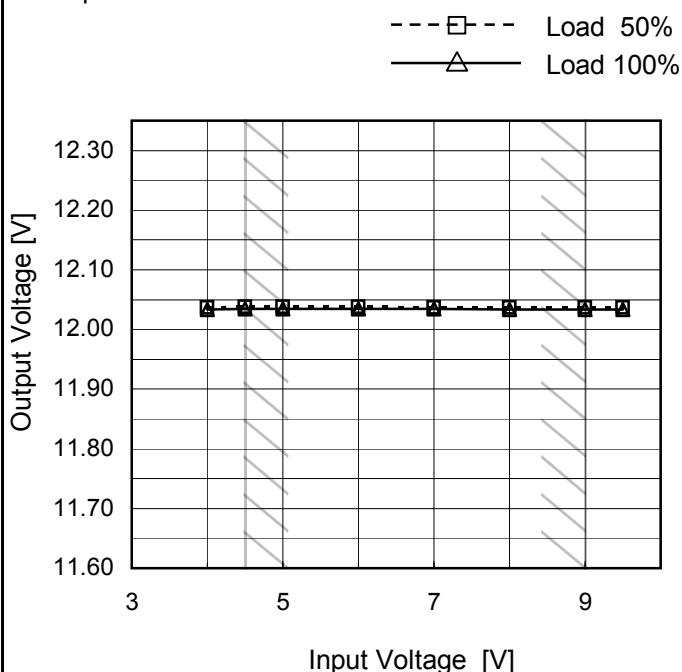
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<table border="1"> <thead> <tr> <th rowspan="2">Load Current [A]</th> <th colspan="3">Efficiency [%]</th> </tr> <tr> <th>Input Volt. 4.5[V]</th> <th>Input Volt. 5[V]</th> <th>Input Volt. 9[V]</th> </tr> </thead> <tbody> <tr><td>0.00</td><td>-</td><td>-</td><td>-</td></tr> <tr><td>0.10</td><td>71.5</td><td>70.7</td><td>61.4</td></tr> <tr><td>0.20</td><td>79.6</td><td>79.4</td><td>73.7</td></tr> <tr><td>0.30</td><td>81.4</td><td>81.7</td><td>79.5</td></tr> <tr><td>0.40</td><td>81.1</td><td>82.3</td><td>82.0</td></tr> <tr><td>0.50</td><td>81.0</td><td>82.2</td><td>83.6</td></tr> <tr><td>0.55</td><td>80.7</td><td>81.8</td><td>83.8</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. 4.5[V]	Input Volt. 5[V]	Input Volt. 9[V]	0.00	-	-	-	0.10	71.5	70.7	61.4	0.20	79.6	79.4	73.7	0.30	81.4	81.7	79.5	0.40	81.1	82.3	82.0	0.50	81.0	82.2	83.6	0.55	80.7	81.8	83.8	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-
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Note: Slanted line shows the range of the rated load current.																																																				

Model	SUTS60512
Item	Line Regulation
Object	+12V0.5A

Temperature 25°C
Testing Circuitry Figure A

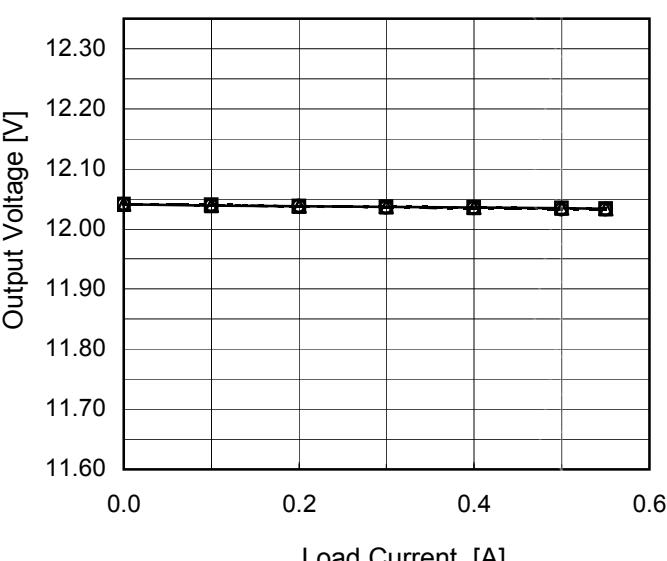
1.Graph



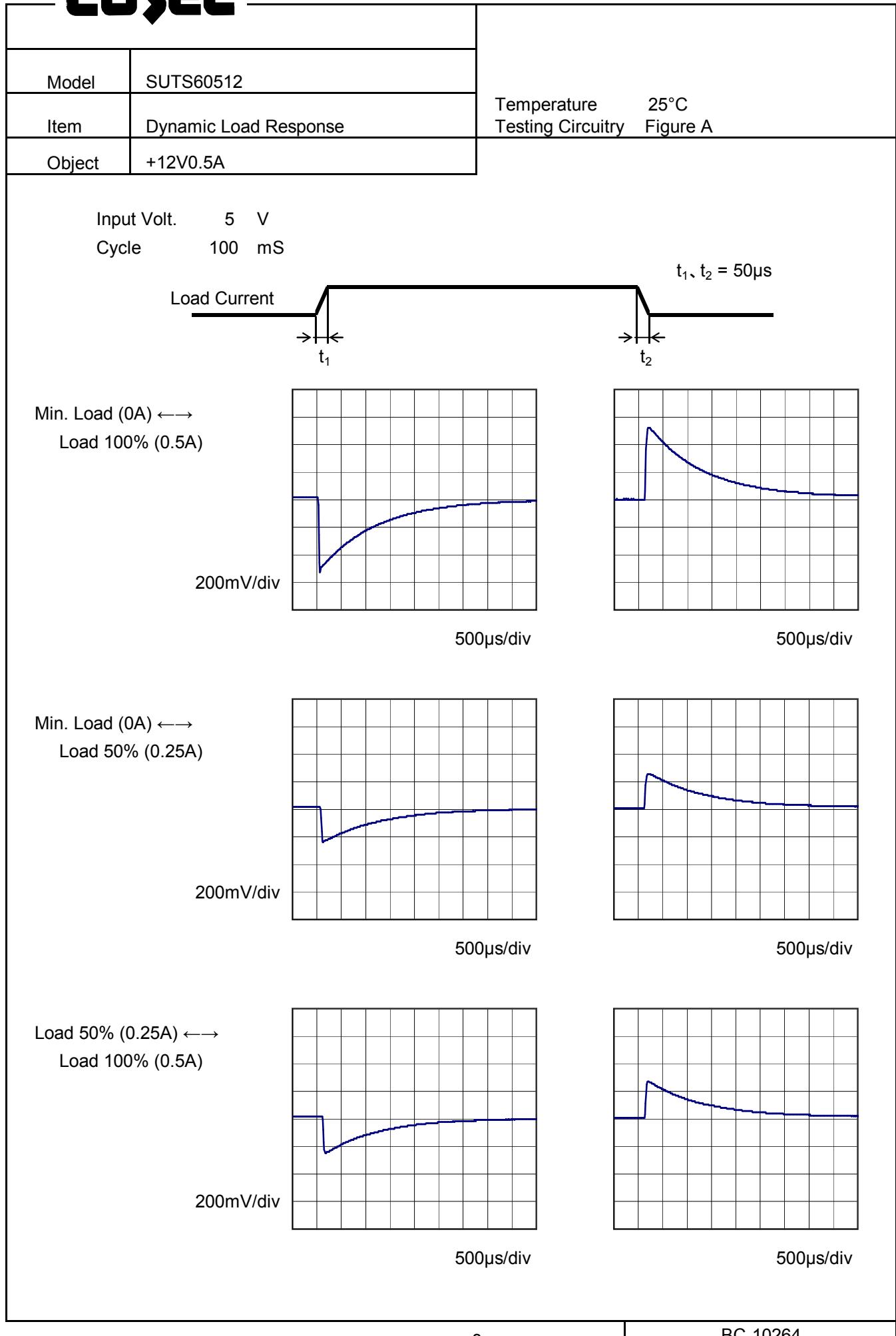
2.Values

Input Voltage [V]	Output Voltage [V]	
	Load 50%	Load 100%
4.0	12.037	12.034
4.5	12.038	12.035
5.0	12.038	12.035
6.0	12.037	12.035
7.0	12.037	12.035
8.0	12.037	12.034
9.0	12.037	12.034
9.5	12.036	12.033
--	-	-

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

Model	SUTS60512	Temperature Testing Circuitry 25°C Figure A																																																			
Item	Load Regulation																																																				
Object	+12V0.5A																																																				
1.Graph	<p>—△— Input Volt. 4.5V - - -□--- Input Volt. 5V - - -○--- Input Volt. 9V</p>  <p>The graph plots Output Voltage [V] on the Y-axis (11.60 to 12.30) against Load Current [A] on the X-axis (0.0 to 0.6). Three data series are shown for input voltages of 4.5V, 5V, and 9V. All series show a slight decrease in output voltage as load current increases, with the 9V series showing the most significant drop.</p>	2.Values																																																			
		<table border="1"> <thead> <tr> <th rowspan="2">Load Current [A]</th> <th colspan="3">Output Voltage [V]</th> </tr> <tr> <th>Input Volt. 4.5[V]</th> <th>Input Volt. 5[V]</th> <th>Input Volt. 9[V]</th> </tr> </thead> <tbody> <tr><td>0.00</td><td>12.041</td><td>12.041</td><td>12.041</td></tr> <tr><td>0.10</td><td>12.039</td><td>12.040</td><td>12.039</td></tr> <tr><td>0.20</td><td>12.038</td><td>12.038</td><td>12.038</td></tr> <tr><td>0.30</td><td>12.037</td><td>12.037</td><td>12.036</td></tr> <tr><td>0.40</td><td>12.036</td><td>12.036</td><td>12.035</td></tr> <tr><td>0.50</td><td>12.034</td><td>12.035</td><td>12.033</td></tr> <tr><td>0.55</td><td>12.033</td><td>12.034</td><td>12.032</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. 4.5[V]	Input Volt. 5[V]	Input Volt. 9[V]	0.00	12.041	12.041	12.041	0.10	12.039	12.040	12.039	0.20	12.038	12.038	12.038	0.30	12.037	12.037	12.036	0.40	12.036	12.036	12.035	0.50	12.034	12.035	12.033	0.55	12.033	12.034	12.032	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-
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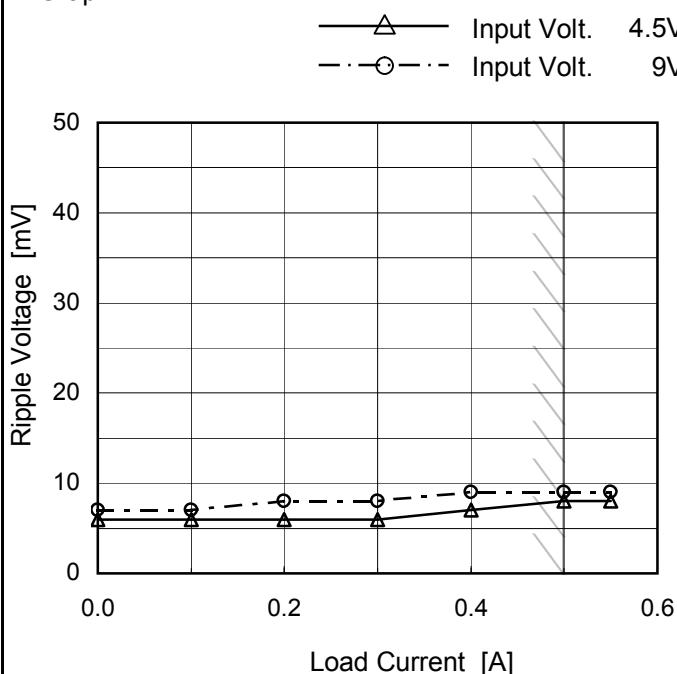
COSEL



Model	SUTS60512
Item	Ripple Voltage (by Load Current)
Object	+12V0.5A

Temperature 25°C
Testing Circuitry Figure B

1. Graph



2. Values

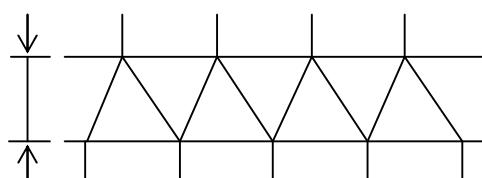
Load Current [A]	Ripple Voltage [mV]	
	Input Volt. 4.5 [V]	Input Volt. 9 [V]
0.00	6	7
0.10	6	7
0.20	6	8
0.30	6	8
0.40	7	9
0.50	8	9
0.55	8	9
--	-	-
--	-	-
--	-	-
--	-	-

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.

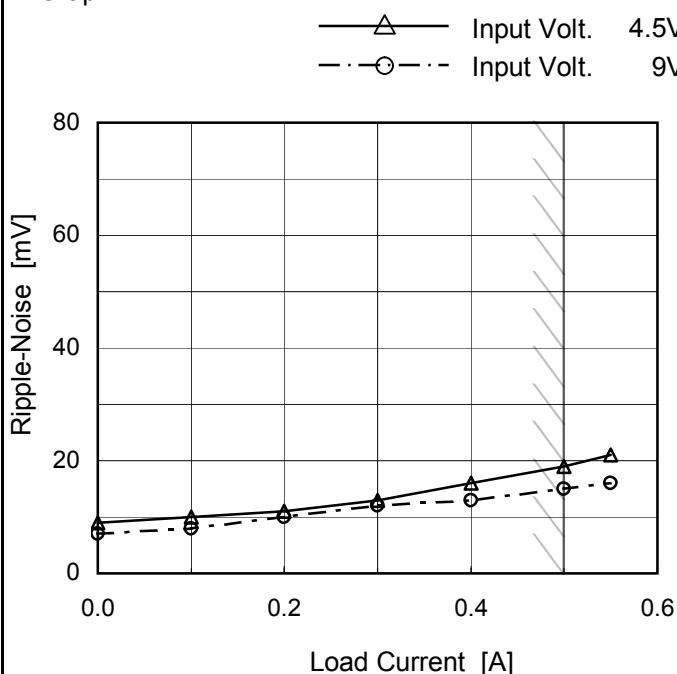
Ripple [mVp-p]



Model	SUTS60512
Item	Ripple-Noise
Object	+12V0.5A

Temperature 25°C
Testing Circuitry Figure B

1. Graph



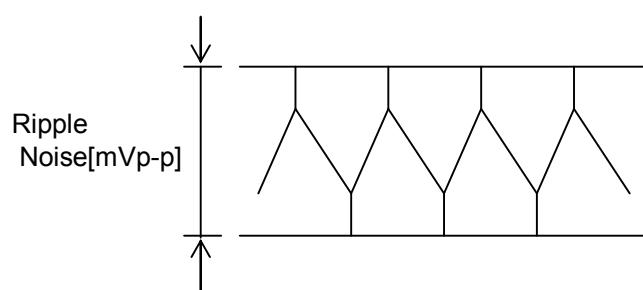
Measured by 100 MHz Oscilloscope.

Ripple-Noise is shown as p-p in the figure below.

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

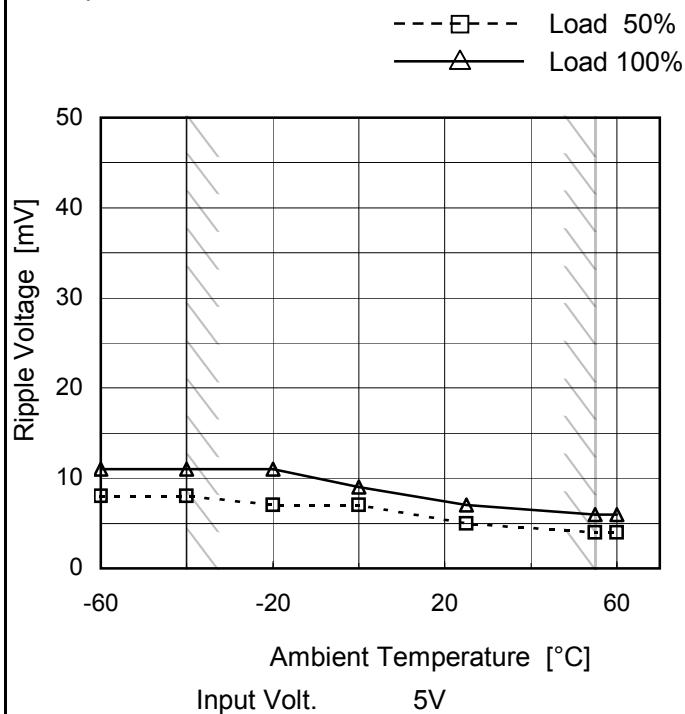
2. Values

Load Current [A]	Ripple-Noise [mV]	
	Input Volt. 4.5 [V]	Input Volt. 9 [V]
0.00	9	7
0.10	10	8
0.20	11	10
0.30	13	12
0.40	16	13
0.50	19	15
0.55	21	16
--	-	-
--	-	-
--	-	-
--	-	-



Model	SUTS60512
Item	Ripple Voltage (by Ambient Temp.)
Object	+12V0.5A

1. Graph



Measured by 100 MHz Oscilloscope.

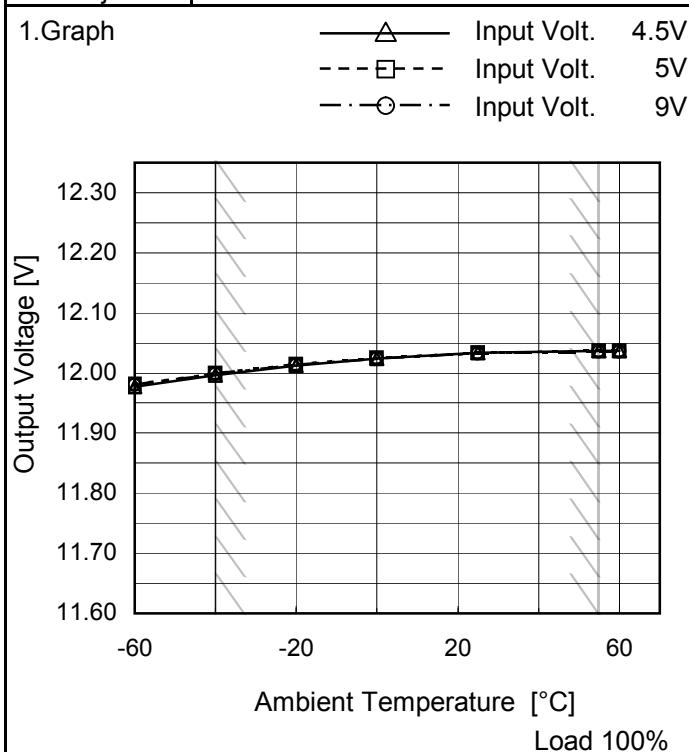
Note: Slanted line shows the range of the rated ambient temperature.

Testing Circuitry Figure B

2. Values

Ambient Temperature [°C]	Ripple Voltage [mV]	
	Load 50%	Load 100%
-60	8	11
-40	8	11
-20	7	11
0	7	9
25	5	7
55	4	6
60	4	6
--	-	-
--	-	-
--	-	-
--	-	-

Model	SUTS60512
Item	Ambient Temperature Drift
Object	+12V0.5A



Testing Circuitry Figure A

2.Values

Ambient Temperature [°C]	Output Voltage [V]		
	Input Volt. 4.5[V]	Input Volt. 5[V]	Input Volt. 9[V]
-60	11.977	11.981	11.980
-40	11.997	12.000	11.999
-20	12.012	12.014	12.013
0	12.024	12.026	12.024
25	12.033	12.034	12.033
55	12.037	12.037	12.035
60	12.037	12.037	12.035
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

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



Model	SUTS60512	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 - 55°C

Input Voltage : 4.5 - 9V

Load Current : 0 - 0.5A

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

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

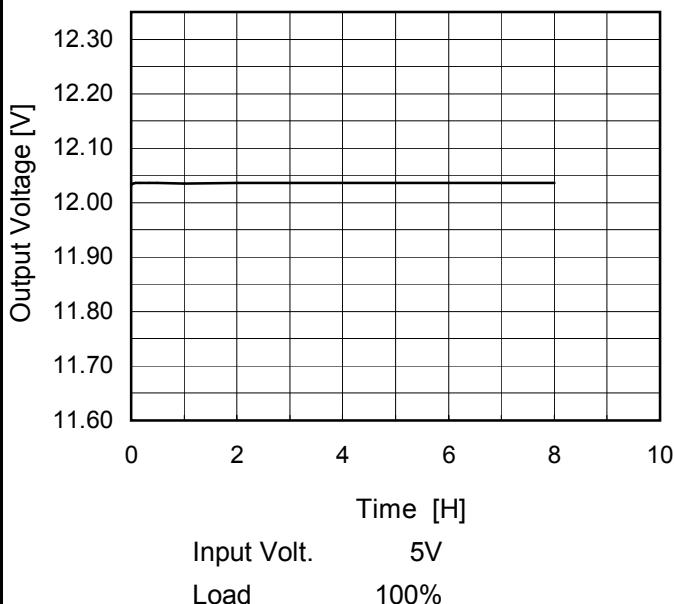
2. Values

Item	Temperature [°C]	Input Voltage[V]	Output		Output Voltage Accuracy	
			Current[A]	Voltage[V]	Value [mV]	Ration [%]
Maximum Voltage	55	5	0	12.044	±24	±0.2
Minimum Voltage	-40	4.5	0.5	11.997		

COSEL

Model	SUTS60512
Item	Time Lapse Drift
Object	+12V0.5A

1. Graph



Temperature 25°C
Testing Circuitry Figure A

2. Values

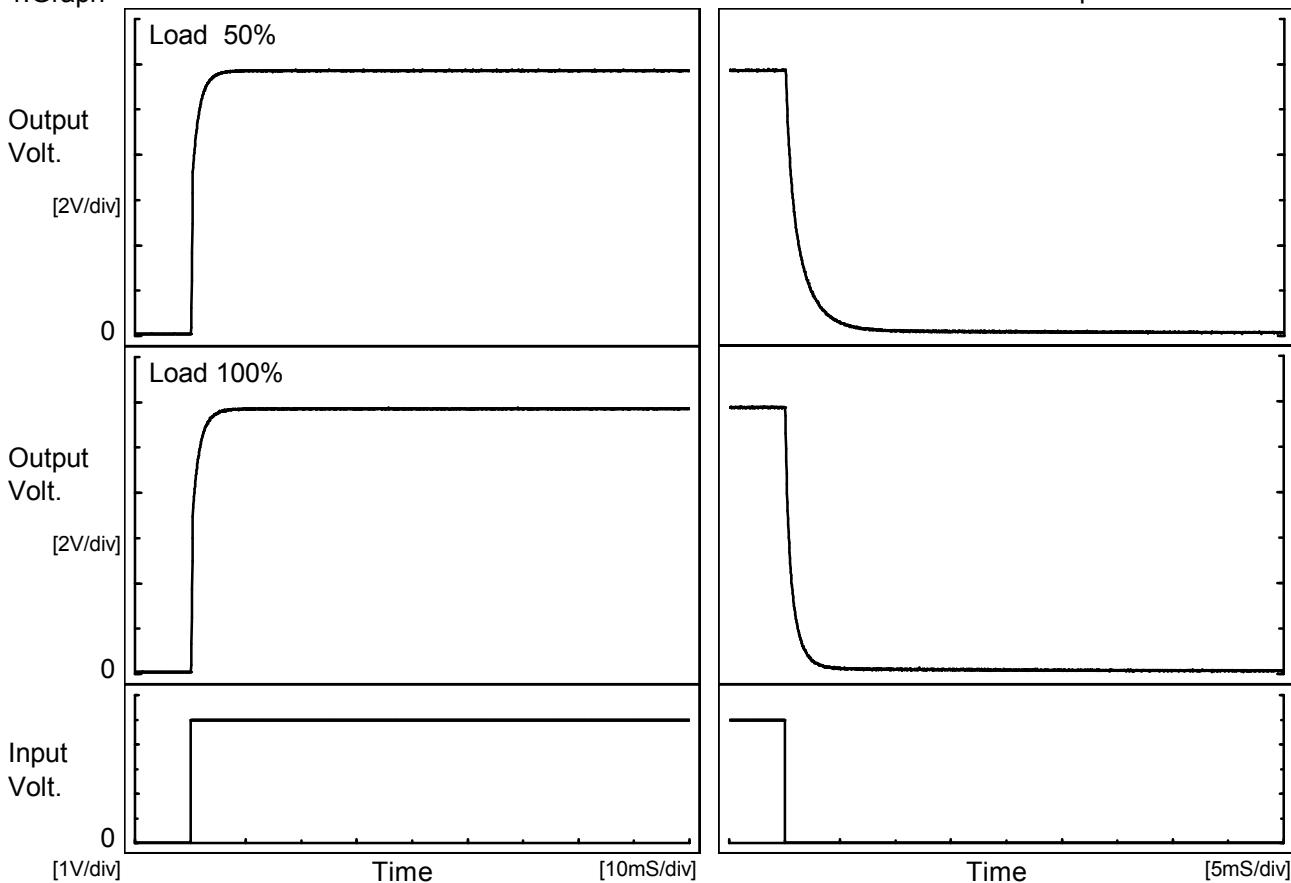
Time since start [H]	Output Voltage [V]
0.0	12.031
0.5	12.036
1.0	12.035
2.0	12.036
3.0	12.036
4.0	12.036
5.0	12.036
6.0	12.036
7.0	12.036
8.0	12.036

COSEL

Model	SUTS60512
Item	Rise and Fall Time
Object	+12V0.5A

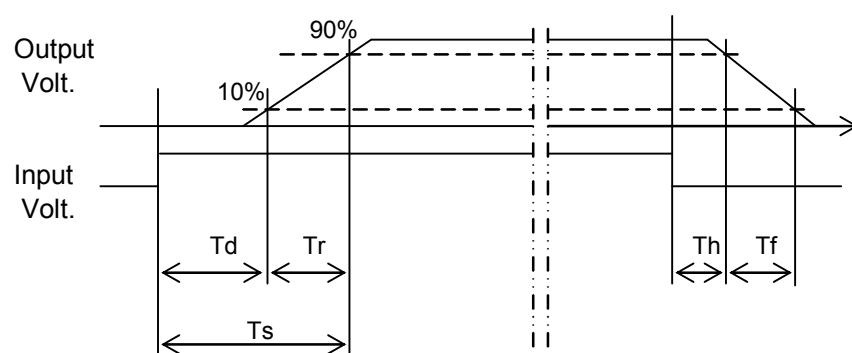
Temperature 25°C
Testing Circuitry Figure A

1. Graph



2. Values

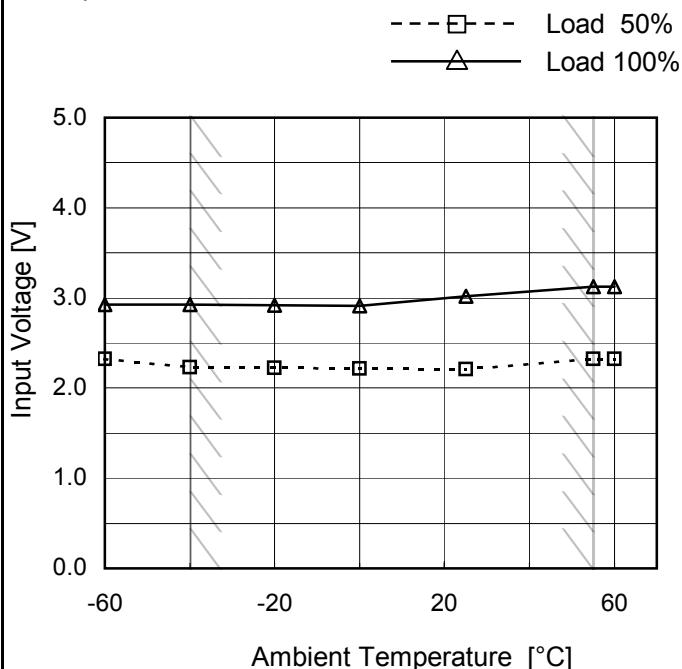
Load	Time	Td	Tr	Ts	Th	Tf	[mS]
50 %		0.3	2.4	2.7	0.1	3.0	
100 %		0.2	2.5	2.7	0.1	1.5	



Model	SUTS60512
Item	Minimum Input Voltage for Regulated Output Voltage
Object	+12V0.5A

Testing Circuitry Figure A

1. Graph



2. Values

Ambient Temperature [°C]	Input Voltage [V]	
	Load 50%	Load 100%
-60	2.4	3.0
-40	2.3	3.0
-20	2.3	3.0
0	2.3	3.0
25	2.3	3.1
55	2.4	3.2
60	2.4	3.2
--	-	-
--	-	-
--	-	-
--	-	-

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

Model	SUTS60512	Temperature Testing Circuitry 25°C Figure A																																																						
Item	Overcurrent Protection																																																							
Object	+12V0.5A																																																							
1.Graph	<p>Input Volt. 4.5V Input Volt. 5V Input Volt. 9V</p> <p>Output Voltage [V]</p> <p>Load Current [A]</p> <p>Note: Slanted line shows the range of the rated load current.</p>	2.Values																																																						
2.Values	<table border="1"> <thead> <tr> <th rowspan="2">Output Voltage [V]</th> <th colspan="3">Load Current [A]</th> </tr> <tr> <th>Input Volt. 4.5[V]</th> <th>Input Volt. 5[V]</th> <th>Input Volt. 9[V]</th> </tr> </thead> <tbody> <tr><td>12.0</td><td>0.50</td><td>0.50</td><td>0.50</td></tr> <tr><td>11.4</td><td>0.66</td><td>0.70</td><td>0.72</td></tr> <tr><td>10.8</td><td>0.67</td><td>0.71</td><td>0.72</td></tr> <tr><td>9.6</td><td>0.70</td><td>0.73</td><td>0.73</td></tr> <tr><td>8.4</td><td>0.73</td><td>0.76</td><td>0.74</td></tr> <tr><td>7.2</td><td>0.76</td><td>0.78</td><td>0.74</td></tr> <tr><td>6.0</td><td>0.78</td><td>0.81</td><td>0.74</td></tr> <tr><td>4.8</td><td>0.80</td><td>0.82</td><td>0.75</td></tr> <tr><td>3.6</td><td>0.81</td><td>0.83</td><td>0.74</td></tr> <tr><td>2.4</td><td>0.78</td><td>0.80</td><td>0.72</td></tr> <tr><td>1.2</td><td>0.72</td><td>0.73</td><td>0.66</td></tr> <tr><td>0.0</td><td>0.55</td><td>0.56</td><td>0.54</td></tr> </tbody> </table>	Output Voltage [V]	Load Current [A]			Input Volt. 4.5[V]	Input Volt. 5[V]	Input Volt. 9[V]	12.0	0.50	0.50	0.50	11.4	0.66	0.70	0.72	10.8	0.67	0.71	0.72	9.6	0.70	0.73	0.73	8.4	0.73	0.76	0.74	7.2	0.76	0.78	0.74	6.0	0.78	0.81	0.74	4.8	0.80	0.82	0.75	3.6	0.81	0.83	0.74	2.4	0.78	0.80	0.72	1.2	0.72	0.73	0.66	0.0	0.55	0.56	0.54
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coSEL

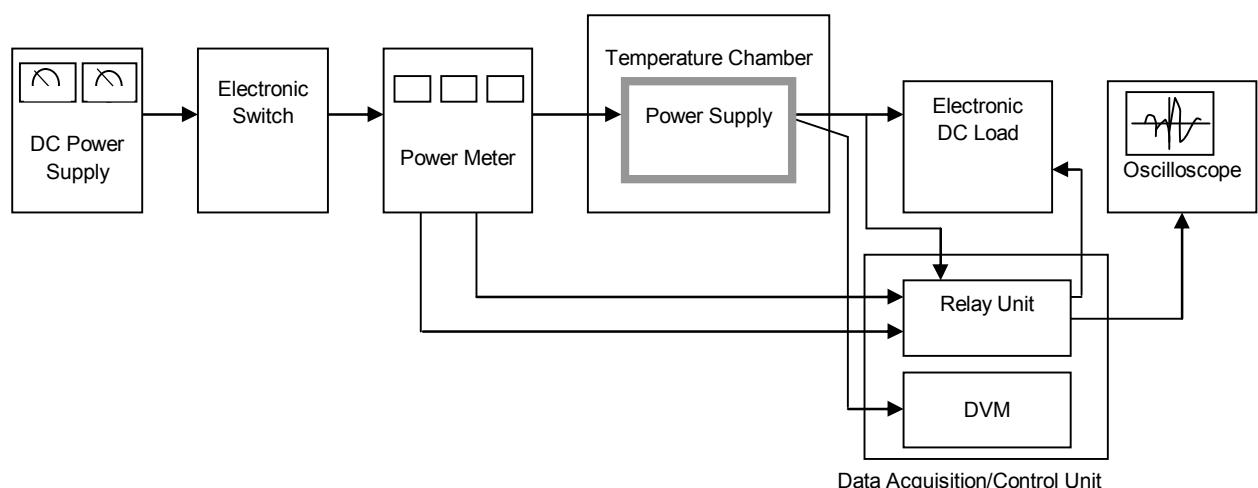


Figure A

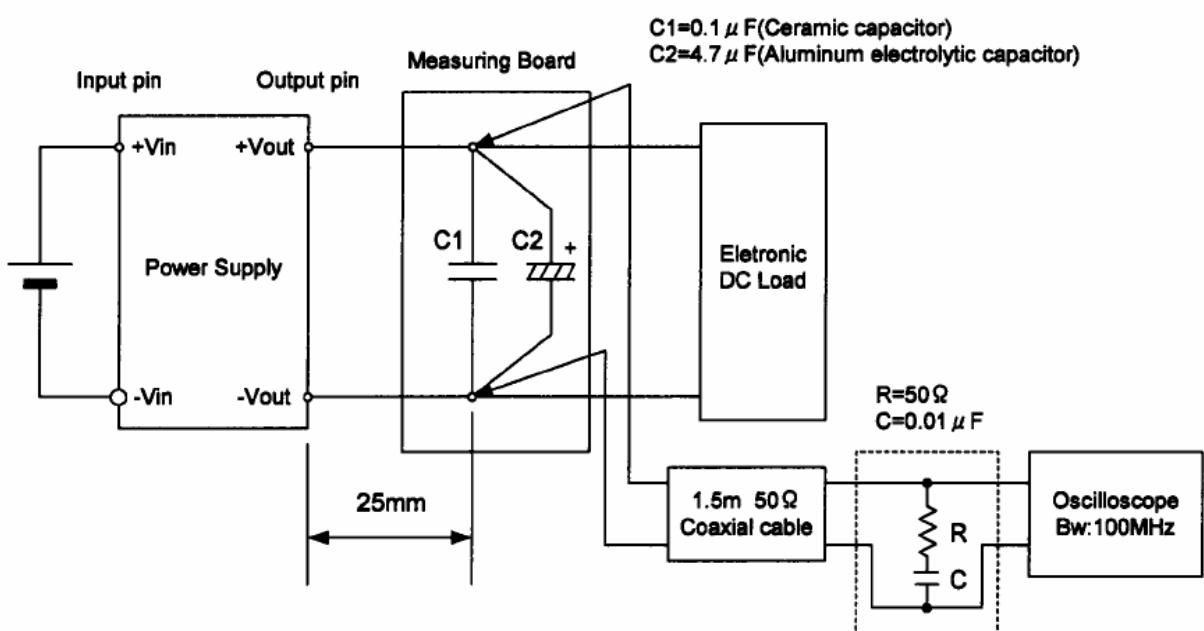


Figure B (Ripple and Ripple noise Characteristic)