



TEST DATA OF DHS250B12

Regulated DC Power Supply

Approved by : Tatsuya Mano Tatsuya Mano Design Manager

Prepared by : Noriaki Nakase
Noriaki Nakase Design Engineer

COSEL CO.,LTD.

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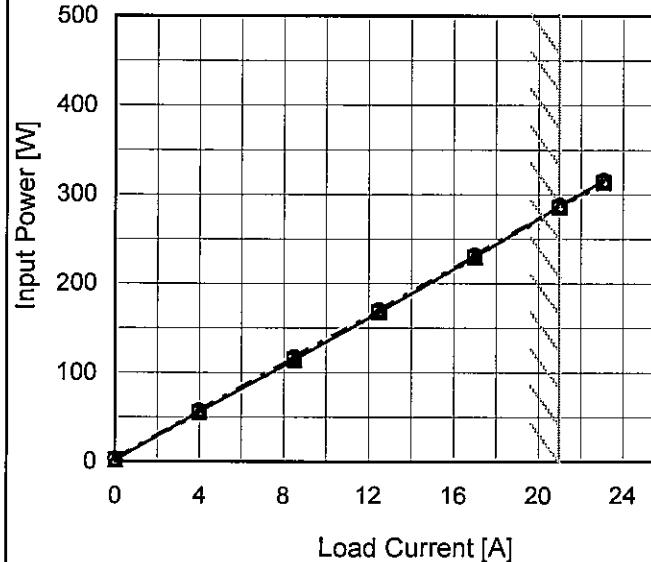
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Input Voltage [V]	Output Voltage [V]																																		
	Load 50%	Load 100%																																	
195	12.119	12.118																																	
200	12.119	12.119																																	
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280	12.119	12.119																																	
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420	12.119	12.119																																	
--	-	-																																	

Model	DHS250B12	Temperature	25°C																																																			
Item	Load Regulation	Testing Circuitry	Figure A																																																			
Object	+12V21A																																																					
1.Graph	<p>—△— Input Volt. 200V - - -□-- Input Volt. 280V - - -○--- Input Volt. 400V</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. 200[V]</th> <th>Input Volt. 280[V]</th> <th>Input Volt. 400[V]</th> </tr> </thead> <tbody> <tr><td>0.0</td><td>12.120</td><td>12.120</td><td>12.120</td></tr> <tr><td>4.0</td><td>12.120</td><td>12.119</td><td>12.120</td></tr> <tr><td>8.5</td><td>12.119</td><td>12.119</td><td>12.119</td></tr> <tr><td>12.5</td><td>12.119</td><td>12.119</td><td>12.119</td></tr> <tr><td>17.0</td><td>12.119</td><td>12.119</td><td>12.119</td></tr> <tr><td>21.0</td><td>12.119</td><td>12.119</td><td>12.119</td></tr> <tr><td>23.0</td><td>12.118</td><td>12.119</td><td>12.119</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. 200[V]	Input Volt. 280[V]	Input Volt. 400[V]	0.0	12.120	12.120	12.120	4.0	12.120	12.119	12.120	8.5	12.119	12.119	12.119	12.5	12.119	12.119	12.119	17.0	12.119	12.119	12.119	21.0	12.119	12.119	12.119	23.0	12.118	12.119	12.119	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-
Load Current [A]	Output Voltage [V]																																																					
	Input Volt. 200[V]	Input Volt. 280[V]	Input Volt. 400[V]																																																			
0.0	12.120	12.120	12.120																																																			
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COSEL

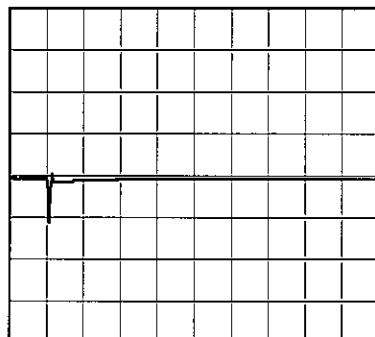
Model	DHS250B12	Temperature Testing Circuitry Figure A
Item	Dynamic Load Response	
Object	+12V21A	

Input Volt. 280 V
 Cycle 1000 mS

Load Current  21.0A/50 μs

Min. Load (0A) ←→
 Load 100% (21A)

1 V/div

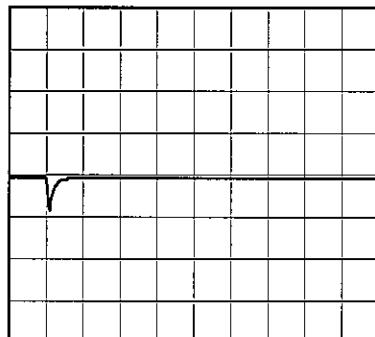


1ms/div

50ms/div

Min. Load (0A) ←→
 Load 50% (10.5A)

1 V/div

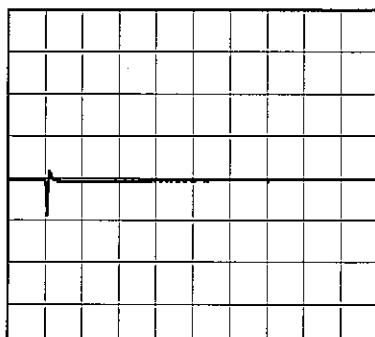


1ms/div

50ms/div

Load 10% (2.1A) ←→
 Load 100% (21A)

1 V/div



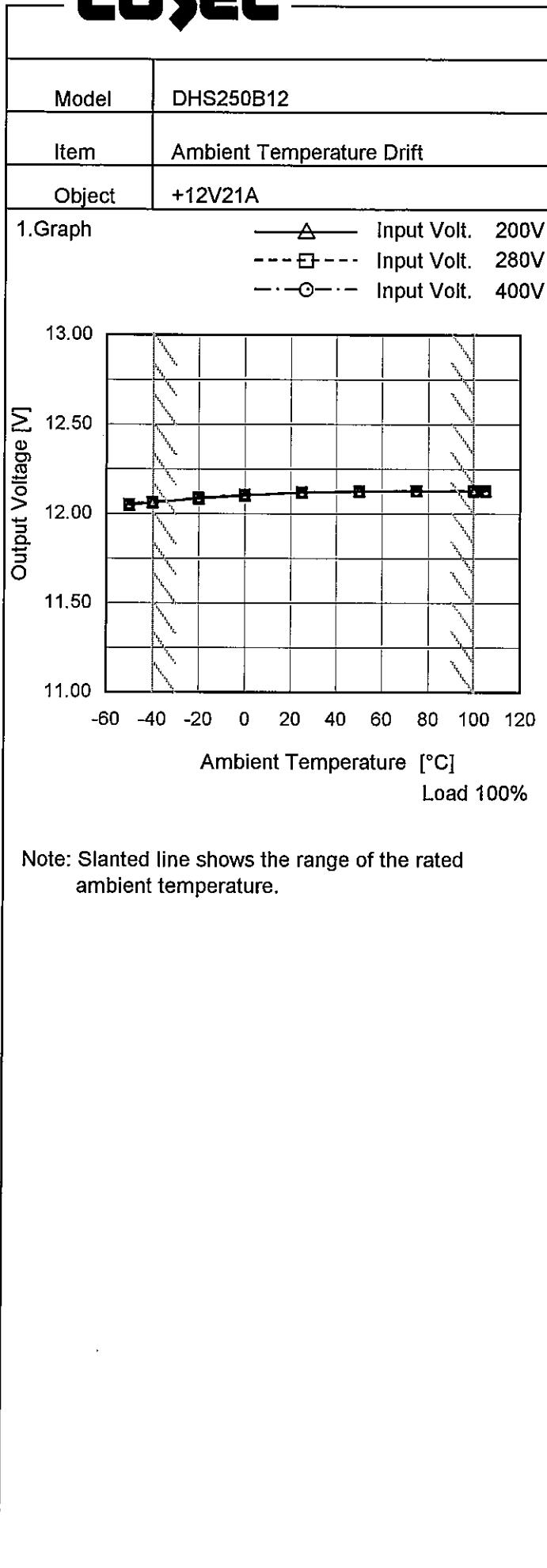
1ms/div

50ms/div

Model	DHS250B12	Temperature Testing Circuitry 25°C Figure B																							
Item	Ripple Voltage (by Load Current)																								
Object	+12V21A																								
1.Graph		2.Values																							
<p>Graph showing Ripple Voltage [mV] vs Load Current [A]. The graph plots Ripple Voltage [mV] on the Y-axis (0.0 to 400.0) against Load Current [A] on the X-axis (0 to 24). Two sets of data points are shown: Input Volt. 200V (solid triangles) and Input Volt. 400V (dashed circles). A slanted line indicates the range of the rated load current.</p> <table border="1"> <thead> <tr> <th>Load Current [A]</th> <th>Ripple Voltage [mV] (Input Volt. 200V)</th> <th>Ripple Voltage [mV] (Input Volt. 400V)</th> </tr> </thead> <tbody> <tr><td>0.0</td><td>5</td><td>15</td></tr> <tr><td>4.0</td><td>35</td><td>50</td></tr> <tr><td>8.5</td><td>35</td><td>55</td></tr> <tr><td>12.5</td><td>35</td><td>55</td></tr> <tr><td>17.0</td><td>35</td><td>55</td></tr> <tr><td>21.0</td><td>35</td><td>60</td></tr> <tr><td>23.1</td><td>35</td><td>60</td></tr> </tbody> </table>		Load Current [A]	Ripple Voltage [mV] (Input Volt. 200V)	Ripple Voltage [mV] (Input Volt. 400V)	0.0	5	15	4.0	35	50	8.5	35	55	12.5	35	55	17.0	35	55	21.0	35	60	23.1	35	60
Load Current [A]	Ripple Voltage [mV] (Input Volt. 200V)	Ripple Voltage [mV] (Input Volt. 400V)																							
0.0	5	15																							
4.0	35	50																							
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12.5	35	55																							
17.0	35	55																							
21.0	35	60																							
23.1	35	60																							
<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>																									

Model	DHS250B12	Temperature	25°C																																						
Item	Ripple-Noise	Testing Circuitry	Figure B																																						
Object	+12V21A																																								
1.Graph		2.Values																																							
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Load Current [A]	Ripple-Noise [mV]																																								
	Input Volt. 200 [V]	Input Volt. 400 [V]																																							
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Model	DHS250B12																																								
Item	Ripple Voltage (by Ambient Temp.)	Testing Circuitry Figure B																																							
Object	+12V21A																																								
1.Graph																																									
<p>Input Volt. 280V</p>			2.Values																																						
<table border="1"> <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>-50</td><td>120</td><td>120</td></tr> <tr><td>-40</td><td>105</td><td>105</td></tr> <tr><td>-20</td><td>85</td><td>85</td></tr> <tr><td>0</td><td>85</td><td>85</td></tr> <tr><td>25</td><td>75</td><td>75</td></tr> <tr><td>50</td><td>70</td><td>70</td></tr> <tr><td>75</td><td>65</td><td>65</td></tr> <tr><td>100</td><td>60</td><td>60</td></tr> <tr><td>105</td><td>60</td><td>60</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%	-50	120	120	-40	105	105	-20	85	85	0	85	85	25	75	75	50	70	70	75	65	65	100	60	60	105	60	60	--	-	-	--	-	-
Ambient Temperature [°C]	Ripple Voltage [mV]																																								
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-40	105	105																																							
-20	85	85																																							
0	85	85																																							
25	75	75																																							
50	70	70																																							
75	65	65																																							
100	60	60																																							
105	60	60																																							
--	-	-																																							
--	-	-																																							
<p>Measured by 100 MHz Oscilloscope. 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. 200[V]	Input Volt. 280[V]	Input Volt. 400[V]
-50	12.049	12.050	12.051
-40	12.063	12.064	12.065
-20	12.086	12.087	12.088
0	12.104	12.105	12.105
25	12.118	12.119	12.119
50	12.125	12.125	12.125
75	12.127	12.127	12.127
100	12.129	12.129	12.130
105	12.129	12.129	12.129
--	-	-	-
--	-	-	-

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



Model	DHS250B12	Testing Circuitry Figure A
Item	Output Voltage Accuracy	
Object	+12V21A	

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 - 100°C

Input Voltage : 200 - 400V

Load Current : 0 - 21A

* Output Voltage Accuracy = ±(Maximum of Output Voltage - Minimum of Output Voltage) / 2

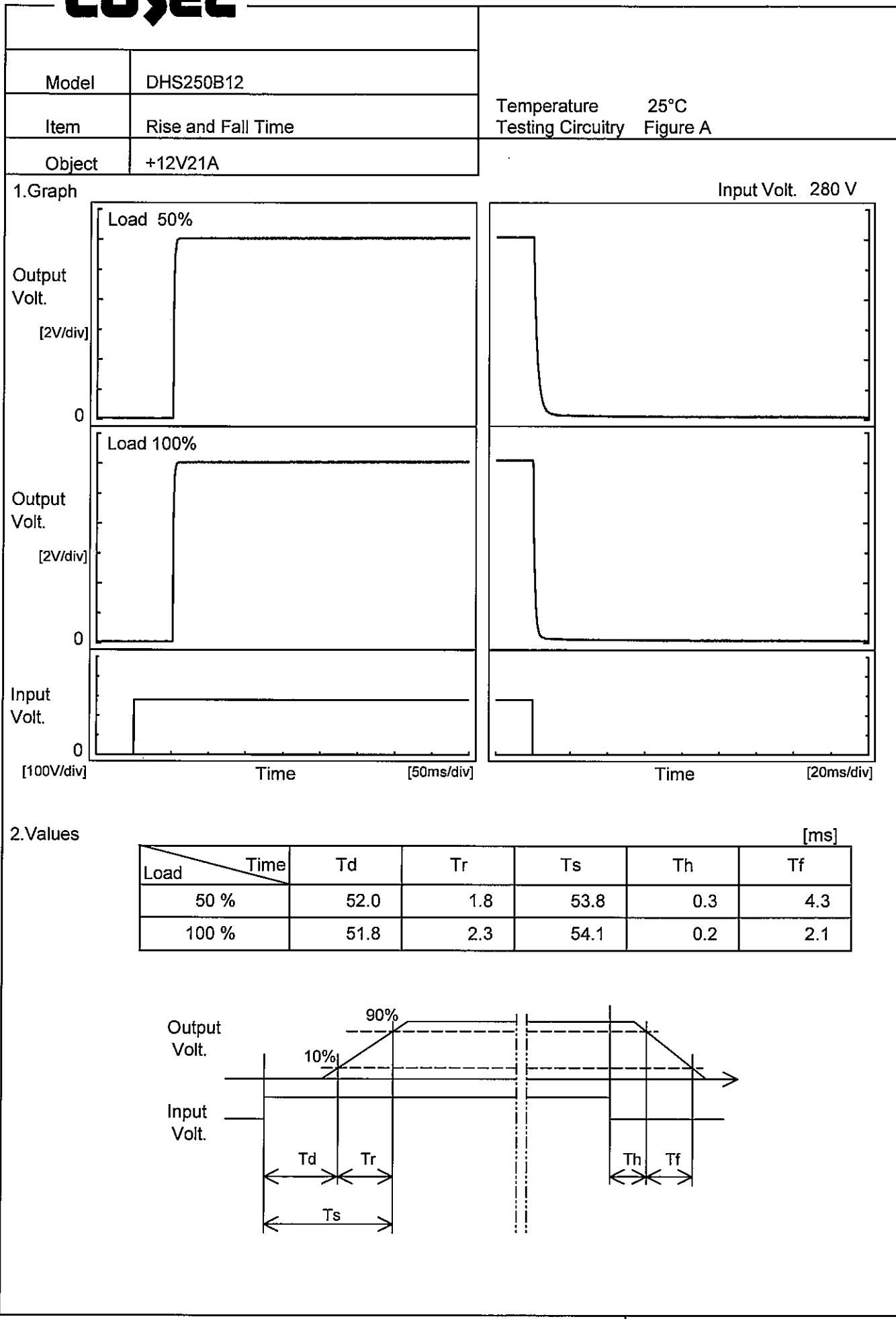
$$\text{* Output Voltage Accuracy (Ration)} = \frac{\text{Output Voltage Accuracy}}{\text{Rated Output Voltage}} \times 100$$

2. Values

Item	Temperature [°C]	Input Voltage[V]	Output		Output Voltage Accuracy	
			Current[A]	Voltage[V]	Value [mV]	Ration [%]
Maximum Voltage	100	200	0	12.131		
Minimum Voltage	-40	200	21	12.063	±34	±0.3

COSEL

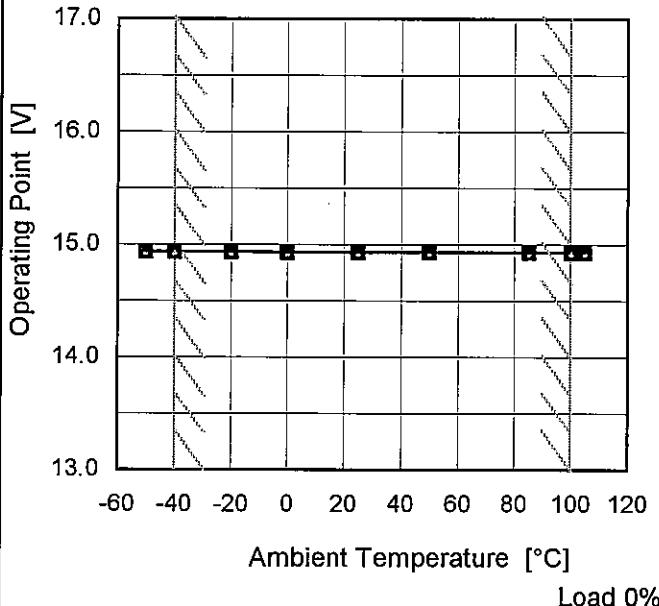
Model	DHS250B12	Temperature	25°C																						
Item	Time Lapse Drift	Testing Circuitry	Figure A																						
Object	+12V21A																								
1.Graph			2.Values																						
<p>Output Voltage [V]</p> <p>Time [H]</p> <p>Input Volt. 280V Load 100%</p>			<table border="1"> <thead> <tr> <th>Time since start [H]</th> <th>Output Voltage [V]</th> </tr> </thead> <tbody> <tr><td>0.0</td><td>12.117</td></tr> <tr><td>0.5</td><td>12.119</td></tr> <tr><td>1.0</td><td>12.119</td></tr> <tr><td>2.0</td><td>12.119</td></tr> <tr><td>3.0</td><td>12.119</td></tr> <tr><td>4.0</td><td>12.119</td></tr> <tr><td>5.0</td><td>12.119</td></tr> <tr><td>6.0</td><td>12.119</td></tr> <tr><td>7.0</td><td>12.119</td></tr> <tr><td>8.0</td><td>12.119</td></tr> </tbody> </table>	Time since start [H]	Output Voltage [V]	0.0	12.117	0.5	12.119	1.0	12.119	2.0	12.119	3.0	12.119	4.0	12.119	5.0	12.119	6.0	12.119	7.0	12.119	8.0	12.119
Time since start [H]	Output Voltage [V]																								
0.0	12.117																								
0.5	12.119																								
1.0	12.119																								
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5.0	12.119																								
6.0	12.119																								
7.0	12.119																								
8.0	12.119																								

COSEL

Model	DHS250B12	Testing Circuitry Figure A																																									
Item	Minimum Input Voltage for Regulated Output Voltage																																										
Object	+12V21A																																										
1.Graph																																											
<p>Input Voltage [V]</p> <p>Ambient Temperature [°C]</p> <p>--- □ --- Load 50%</p> <p>— △ — Load 100%</p>			2.Values																																								
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Ambient Temperature [°C]	Input Voltage [V]																																										
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--	-	-																																									
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<p>Note: Slanted line shows the range of the rated ambient temperature.</p>																																											

COSEL

Model	DHS250B12	Temperature 25°C Testing Circuitry Figure A																																																													
Item	Overcurrent Protection																																																														
Object	+12V21A																																																														
1.Graph	<p>The graph plots Output Voltage [V] on the y-axis (0 to 12) against Load Current [A] on the x-axis (0 to 40). Three solid lines represent different input voltages: 200V (top), 280V (middle), and 400V (bottom). Each line is horizontal at 12V until a specific load current is reached, after which it drops vertically to 0V. A slanted line connects the points where each curve begins to drop, indicating the range of the rated load current.</p>																																																														
	<p>2.Values</p> <table border="1"> <thead> <tr> <th rowspan="2">Output Voltage [V]</th> <th colspan="3">Load Current [A]</th> </tr> <tr> <th>Input Volt. 200[V]</th> <th>Input Volt. 280[V]</th> <th>Input Volt. 400[V]</th> </tr> </thead> <tbody> <tr><td>12.0</td><td>21.09</td><td>21.10</td><td>21.10</td></tr> <tr><td>11.4</td><td>26.36</td><td>26.52</td><td>26.73</td></tr> <tr><td>10.8</td><td>26.50</td><td>26.71</td><td>27.07</td></tr> <tr><td>9.6</td><td>26.87</td><td>27.21</td><td>27.57</td></tr> <tr><td>8.4</td><td>27.31</td><td>27.71</td><td>28.08</td></tr> <tr><td>7.2</td><td>27.78</td><td>28.25</td><td>28.63</td></tr> <tr><td>6.0</td><td>28.29</td><td>28.81</td><td>29.23</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> <tr><td>--</td><td>-</td><td>-</td><td>-</td></tr> <tr><td>--</td><td>-</td><td>-</td><td>-</td></tr> </tbody> </table>				Output Voltage [V]	Load Current [A]			Input Volt. 200[V]	Input Volt. 280[V]	Input Volt. 400[V]	12.0	21.09	21.10	21.10	11.4	26.36	26.52	26.73	10.8	26.50	26.71	27.07	9.6	26.87	27.21	27.57	8.4	27.31	27.71	28.08	7.2	27.78	28.25	28.63	6.0	28.29	28.81	29.23	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-
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	<p>Note: Slanted line shows the range of the rated load current.</p> <p>Intermittent operation occurs when the output voltage is from 6V to 0V.</p>																																																														

Model DHS250B12 Item Overvoltage Protection Object +12V21A	Testing Circuitry Figure A																																																					
	1. Graph	—△— Input Volt. 200V	—□— Input Volt. 280V																																																			
		—○— Input Volt. 400V																																																				
 <p>Operating Point [V]</p> <p>Ambient Temperature [°C]</p> <p>Load 0%</p>			2. Values																																																			
<table border="1"> <thead> <tr> <th rowspan="2">Ambient Temperature [°C]</th> <th colspan="3">Operating Point [V]</th> </tr> <tr> <th>Input Volt. 200[V]</th> <th>Input Volt. 280[V]</th> <th>Input Volt. 400[V]</th> </tr> </thead> <tbody> <tr> <td>-50</td><td>14.94</td><td>14.94</td><td>14.94</td></tr> <tr> <td>-40</td><td>14.94</td><td>14.94</td><td>14.94</td></tr> <tr> <td>-20</td><td>14.94</td><td>14.94</td><td>14.94</td></tr> <tr> <td>0</td><td>14.93</td><td>14.93</td><td>14.93</td></tr> <tr> <td>25</td><td>14.93</td><td>14.93</td><td>14.93</td></tr> <tr> <td>50</td><td>14.93</td><td>14.93</td><td>14.93</td></tr> <tr> <td>85</td><td>14.93</td><td>14.93</td><td>14.93</td></tr> <tr> <td>100</td><td>14.93</td><td>14.93</td><td>14.93</td></tr> <tr> <td>105</td><td>14.93</td><td>14.93</td><td>14.93</td></tr> <tr> <td>--</td><td>-</td><td>-</td><td>-</td></tr> <tr> <td>--</td><td>-</td><td>-</td><td>-</td></tr> </tbody> </table>				Ambient Temperature [°C]	Operating Point [V]			Input Volt. 200[V]	Input Volt. 280[V]	Input Volt. 400[V]	-50	14.94	14.94	14.94	-40	14.94	14.94	14.94	-20	14.94	14.94	14.94	0	14.93	14.93	14.93	25	14.93	14.93	14.93	50	14.93	14.93	14.93	85	14.93	14.93	14.93	100	14.93	14.93	14.93	105	14.93	14.93	14.93	--	-	-	-	--	-	-	-
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<p>Note: Slanted line shows the range of the rated ambient temperature.</p>																																																						

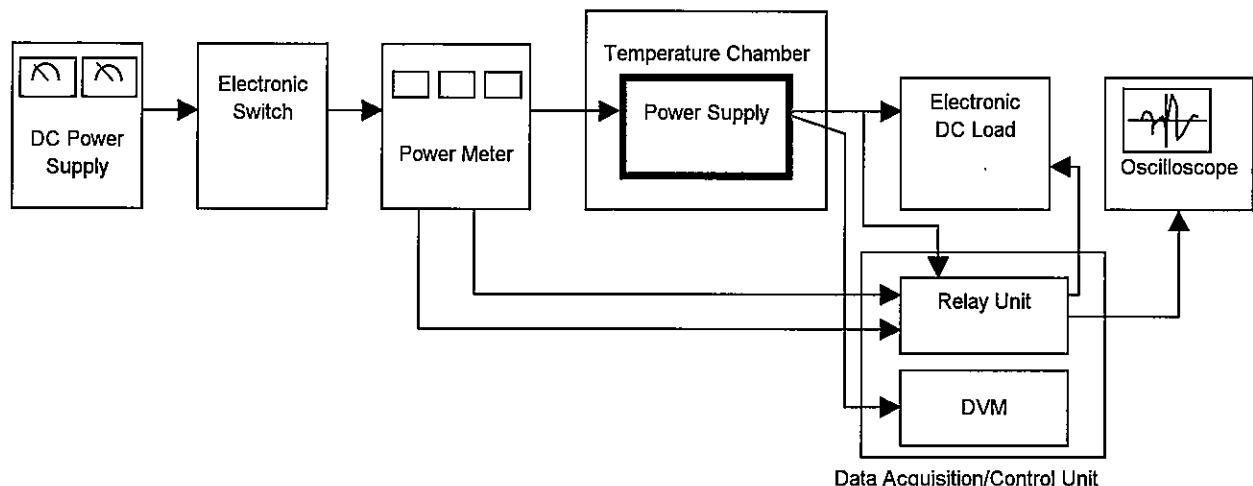
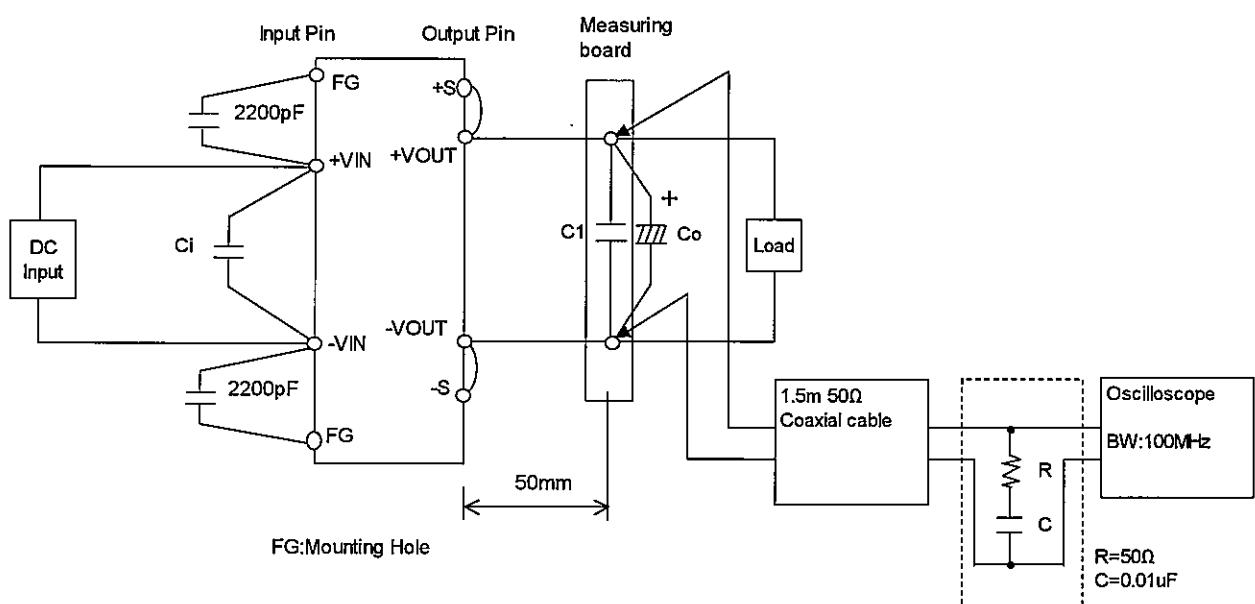


Figure A



C1		Co	
DHS250B24	$4.7\mu\text{F}$	DHS250B03	$2200\mu\text{F}$
DHS250B28	$4.7\mu\text{F}$	DHS250B05	$2200\mu\text{F}$
DHS250B48	$2.2\mu\text{F}$	DHS250B07	$2200\mu\text{F}$
Others	$10\mu\text{F}$	DHS250B12	$1000\mu\text{F}$

C1		Co	
DHS250B24	$4.7\mu\text{F}$	DHS250B03	$2200\mu\text{F}$
DHS250B28	$4.7\mu\text{F}$	DHS250B05	$2200\mu\text{F}$
DHS250B48	$2.2\mu\text{F}$	DHS250B07	$2200\mu\text{F}$
Others	$10\mu\text{F}$	DHS250B12	$1000\mu\text{F}$
		DHS250B15	$1000\mu\text{F}$
		DHS250B24	$470\mu\text{F}$
		DHS250B28	$470\mu\text{F}$
		DHS250B48	$330\mu\text{F}$

Figure B