

TEST DATA OF DHS100B28

Regulated DC Power Supply
May 22, 2009

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COSEL CO.,LTD.

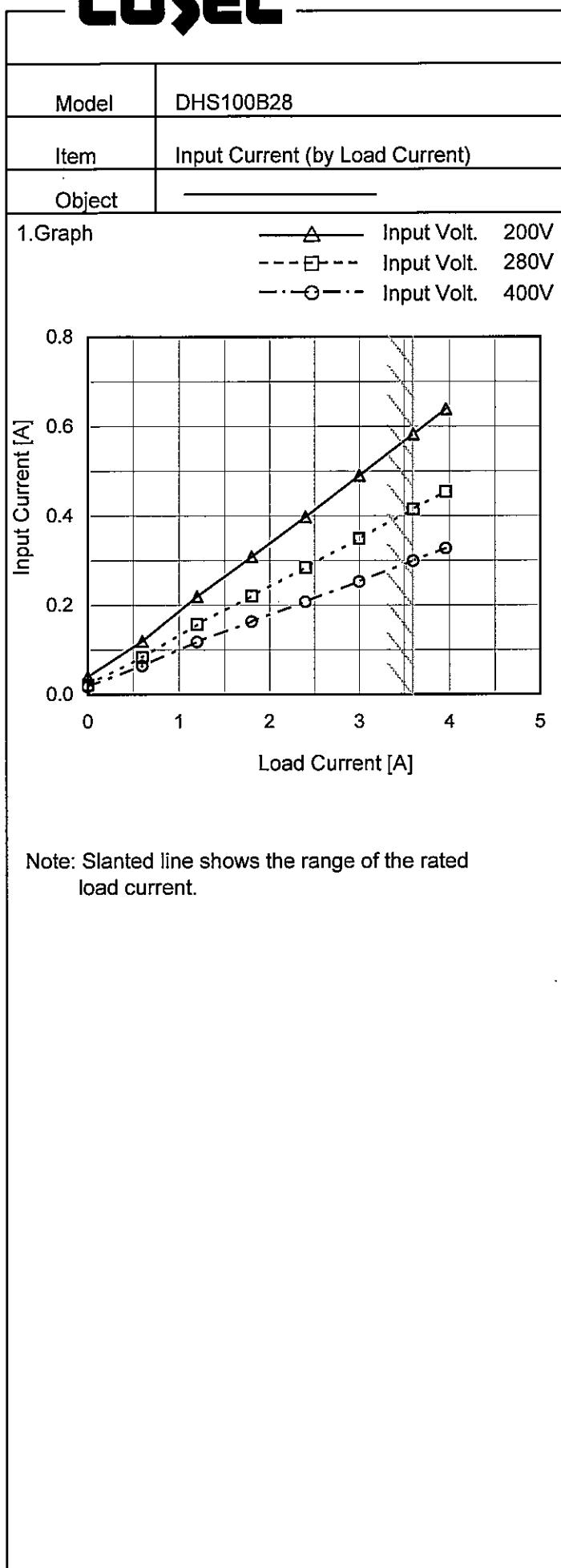
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Model	DHS100B28	Temperature Testing Circuitry	25°C Figure A																																																																															
Item	Input Current (by Input Voltage)																																																																																	
Object	_____																																																																																	
1.Graph	<p>Input Current [A]</p> <p>Input Voltage [V]</p> <p>Legend:</p> <ul style="list-style-type: none"> Load 100% (Solid line with triangles) Load 50% (Dashed line with squares) Load 0% (Dotted line with circles) 																																																																																	
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 Temperature 25°C
 Testing Circuitry Figure A

2. Values

Load Current [A]	Input Current [A]		
	Input Volt. 200[V]	Input Volt. 280[V]	Input Volt. 400[V]
0.00	0.040	0.022	0.018
0.60	0.119	0.083	0.065
1.20	0.220	0.157	0.118
1.80	0.309	0.220	0.163
2.40	0.398	0.284	0.207
3.00	0.490	0.349	0.253
3.60	0.583	0.415	0.300
3.96	0.639	0.454	0.328
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--	-	-	-

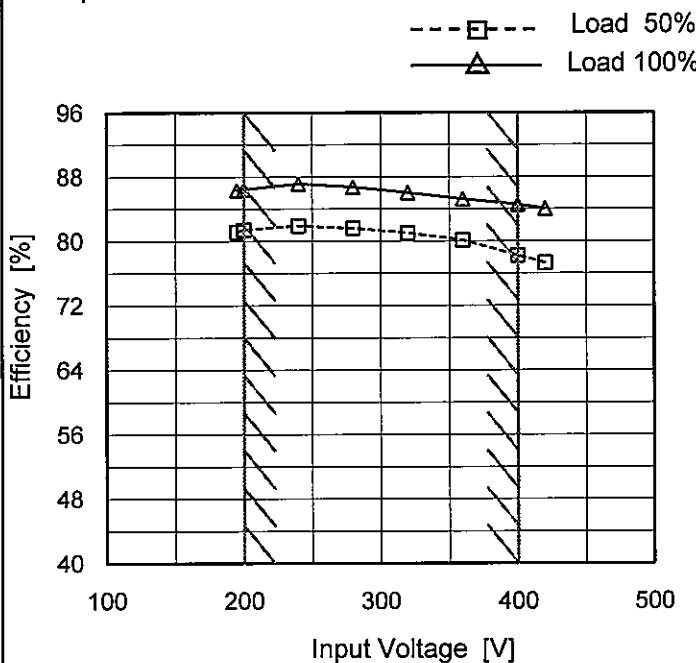
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Model	DHS100B28	Temperature	25°C																																																			
Item	Input Power (by Load Current)	Testing Circuitry	Figure A																																																			
Object	<hr/>																																																					
1.Graph	<p style="text-align: center;"> —▲— Input Volt. 200V ---■--- Input Volt. 280V ---○--- Input Volt. 400V </p>																																																					
2.Values	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th rowspan="2">Load Current [A]</th> <th colspan="3">Input Power [W]</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>0.00</td><td>6.30</td><td>6.70</td><td>6.60</td></tr> <tr><td>0.60</td><td>24.0</td><td>23.4</td><td>26.0</td></tr> <tr><td>1.20</td><td>44.1</td><td>44.0</td><td>47.4</td></tr> <tr><td>1.80</td><td>61.9</td><td>61.8</td><td>65.6</td></tr> <tr><td>2.40</td><td>79.7</td><td>79.5</td><td>83.2</td></tr> <tr><td>3.00</td><td>98.3</td><td>97.8</td><td>101.5</td></tr> <tr><td>3.60</td><td>116.9</td><td>116.3</td><td>120.2</td></tr> <tr><td>3.96</td><td>128.1</td><td>127.3</td><td>131.4</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 Power [W]			Input Volt. 200[V]	Input Volt. 280[V]	Input Volt. 400[V]	0.00	6.30	6.70	6.60	0.60	24.0	23.4	26.0	1.20	44.1	44.0	47.4	1.80	61.9	61.8	65.6	2.40	79.7	79.5	83.2	3.00	98.3	97.8	101.5	3.60	116.9	116.3	120.2	3.96	128.1	127.3	131.4	--	-	-	-	--	-	-	-	--	-	-	-
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Note:	Slanted line shows the range of the rated load current.																																																					

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Model	DHS100B28
Item	Efficiency (by Input Voltage)
Object	_____

1. Graph



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

 Temperature 25°C
 Testing Circuitry Figure A

2. Values

Input Voltage [V]	Efficiency [%]	
	Load 50%	Load 100%
195	81.1	86.3
200	81.4	86.4
240	81.9	87.1
280	81.6	86.7
320	81.0	86.0
360	80.1	85.2
400	78.2	84.5
420	77.3	84.0
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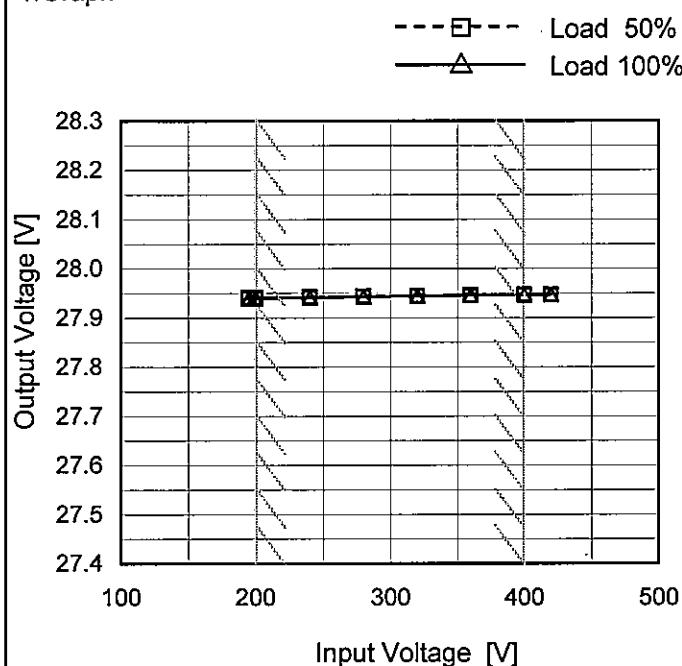
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Item	Efficiency (by Load Current)	Testing Circuitry	Figure A																																																			
Object	—	—	—																																																			
1.Graph		2.Values																																																				
<p>The graph plots Efficiency [%] on the Y-axis (40 to 96) against Load Current [A] on the X-axis (0 to 5). Three data series are shown: Input Volt. 200V (solid line with triangle markers), Input Volt. 280V (dashed line with square markers), and Input Volt. 400V (dash-dot line with circle markers). All three series show efficiency increasing with load current. A slanted line on the graph indicates the range of the rated load current.</p>		<table border="1"> <thead> <tr> <th rowspan="2">Load Current [A]</th> <th colspan="3">Efficiency [%]</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>0.00</td><td>-</td><td>-</td><td>-</td></tr> <tr><td>0.60</td><td>64.1</td><td>67.9</td><td>62.5</td></tr> <tr><td>1.20</td><td>76.0</td><td>76.5</td><td>72.2</td></tr> <tr><td>1.80</td><td>81.2</td><td>81.5</td><td>78.1</td></tr> <tr><td>2.40</td><td>83.8</td><td>84.1</td><td>81.2</td></tr> <tr><td>3.00</td><td>85.5</td><td>85.8</td><td>82.9</td></tr> <tr><td>3.60</td><td>86.4</td><td>86.7</td><td>84.5</td></tr> <tr><td>3.96</td><td>86.8</td><td>87.1</td><td>85.1</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. 200[V]	Input Volt. 280[V]	Input Volt. 400[V]	0.00	-	-	-	0.60	64.1	67.9	62.5	1.20	76.0	76.5	72.2	1.80	81.2	81.5	78.1	2.40	83.8	84.1	81.2	3.00	85.5	85.8	82.9	3.60	86.4	86.7	84.5	3.96	86.8	87.1	85.1	--	-	-	-	--	-	-	-	--	-	-	-
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Note: Slanted line shows the range of the rated load current.																																																						

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Model	DHS100B28
Item	Line Regulation
Object	+28V3.6A

Temperature 25°C
Testing Circuitry Figure A

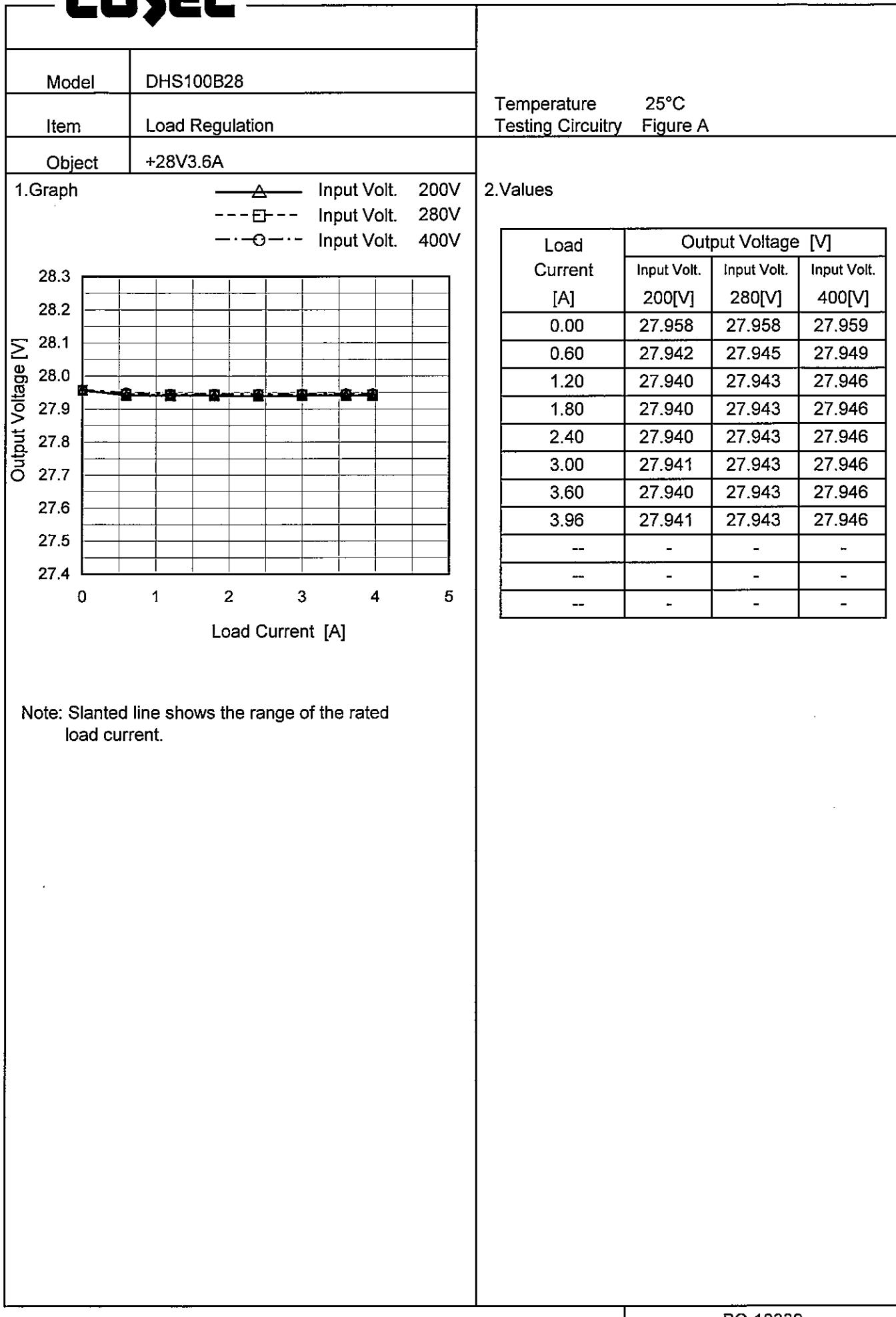
1.Graph



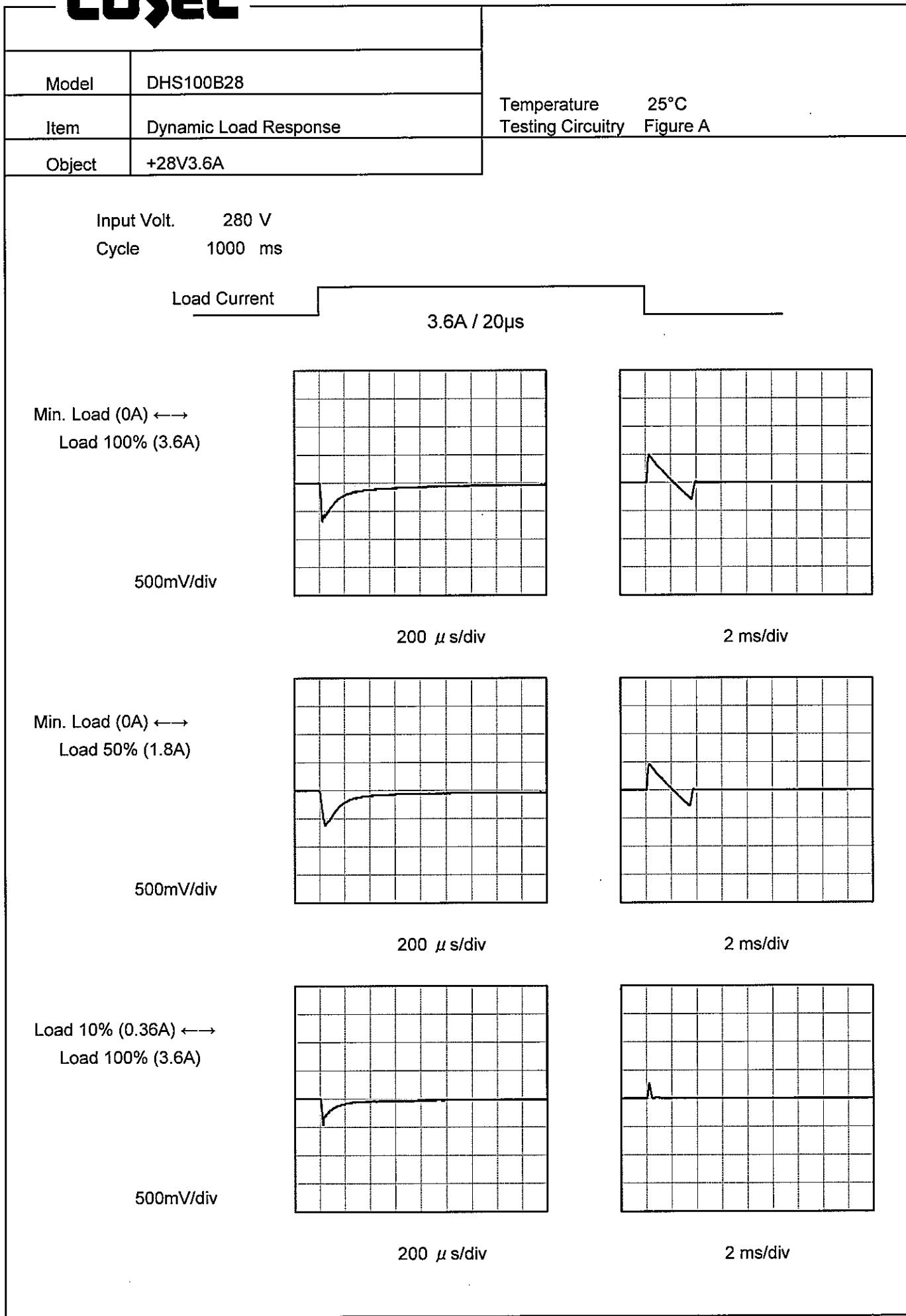
Note: Slanted line shows the range of the rated input voltage.

2.Values

Input Voltage [V]	Output Voltage [V]	
	Load 50%	Load 100%
195	27.941	27.940
200	27.941	27.940
240	27.942	27.942
280	27.943	27.944
320	27.945	27.945
360	27.946	27.946
400	27.947	27.947
420	27.947	27.947
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Note: Slanted line shows the range of the rated load current.

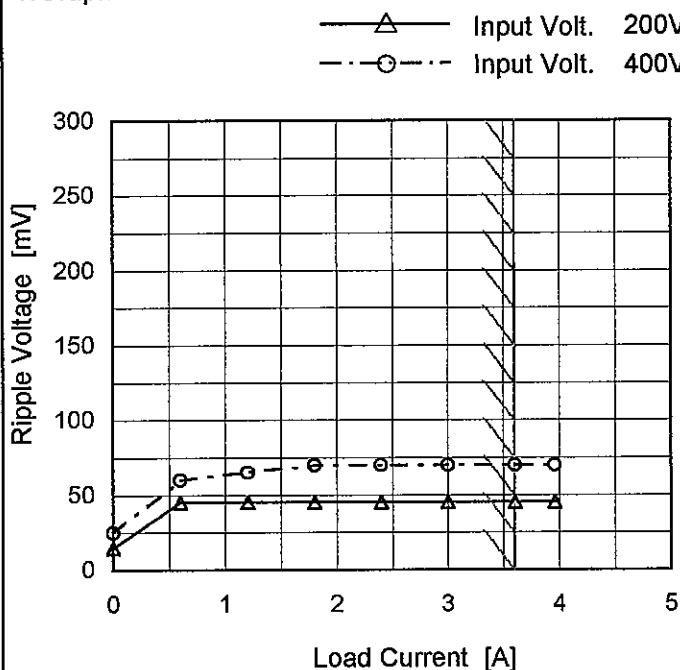
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Model	DHS100B28
Item	Ripple Voltage (by Load Current)
Object	+28V3.6A

Temperature 25°C
Testing Circuitry Figure B

1. Graph



2. Values

Load Current [A]	Ripple Voltage [mV]	
	Input Volt. 200 [V]	Input Volt. 400 [V]
0.00	15	25
0.60	45	60
1.20	45	65
1.80	45	70
2.40	45	70
3.00	45	70
3.60	45	70
3.96	45	70
--	-	-
--	-	-
--	-	-

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]

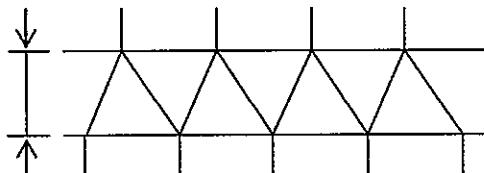


Fig.Complex Ripple Wave Form

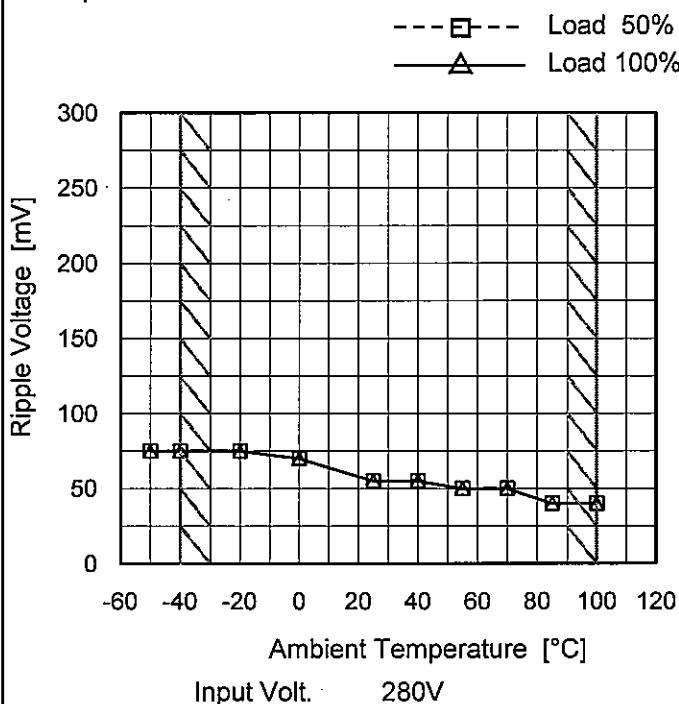
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Model	DHS100B28	Temperature	25°C																																				
Item	Ripple-Noise	Testing Circuitry	Figure B																																				
Object	+28V3.6A																																						
1.Graph			2.Values																																				
<p>Graph showing Ripple-Noise [mV] vs Load Current [A]. The Y-axis ranges from 0 to 300 mV, and the X-axis ranges from 0 to 5 A. Two curves are plotted: one for Input Volt. 200V (solid line with triangle markers) and one for Input Volt. 400V (dashed line with circle markers). A slanted line indicates the range of the rated load current.</p> <table border="1"> <thead> <tr> <th>Load Current [A]</th> <th>Ripple-Noise [mV] (Input Volt. 200V)</th> <th>Ripple-Noise [mV] (Input Volt. 400V)</th> </tr> </thead> <tbody> <tr><td>0.00</td><td>20</td><td>35</td></tr> <tr><td>0.60</td><td>60</td><td>80</td></tr> <tr><td>1.20</td><td>60</td><td>80</td></tr> <tr><td>1.80</td><td>60</td><td>80</td></tr> <tr><td>2.40</td><td>60</td><td>80</td></tr> <tr><td>3.00</td><td>60</td><td>80</td></tr> <tr><td>3.60</td><td>60</td><td>85</td></tr> <tr><td>3.96</td><td>70</td><td>90</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>				Load Current [A]	Ripple-Noise [mV] (Input Volt. 200V)	Ripple-Noise [mV] (Input Volt. 400V)	0.00	20	35	0.60	60	80	1.20	60	80	1.80	60	80	2.40	60	80	3.00	60	80	3.60	60	85	3.96	70	90	--	-	-	--	-	-	--	-	-
Load Current [A]	Ripple-Noise [mV] (Input Volt. 200V)	Ripple-Noise [mV] (Input Volt. 400V)																																					
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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>Fig.Complex Ripple Noise Wave Form</p>																																							

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Model	DHS100B28
Item	Ripple Voltage (by Ambient Temp.)
Object	+28V3.6A

1.Graph



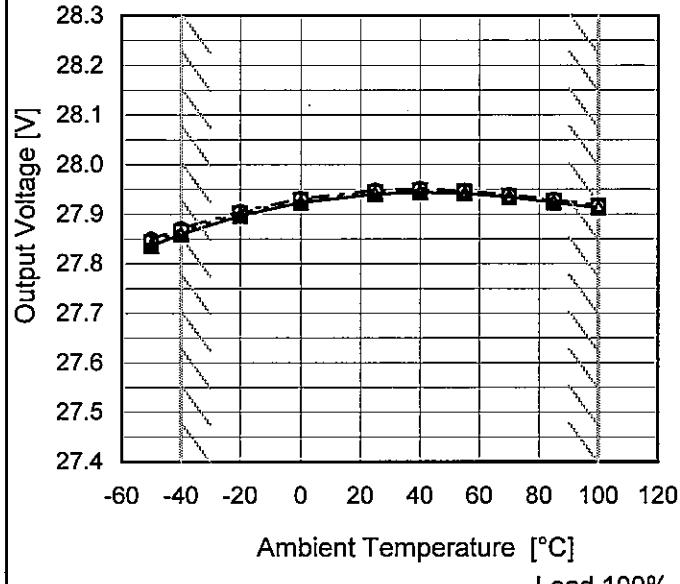
Measured by 100 MHz Oscilloscope.

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%
-50	75	75
-40	75	75
-20	75	75
0	70	70
25	55	55
40	55	55
55	50	50
70	50	50
85	40	40
100	40	40
--	-	-

Model	DHS100B28	Testing Circuitry Figure A			
Item	Ambient Temperature Drift				
Object	+28V3.6A	2.Values			
1.Graph	<p style="text-align: center;"> —△— Input Volt. 200V ---■--- Input Volt. 280V ---○--- Input Volt. 400V </p>  <p style="text-align: center;">Output Voltage [V]</p> <p style="text-align: center;">Ambient Temperature [°C]</p> <p style="text-align: center;">Load 100%</p>				
		Ambient Temperature [°C]	Output Voltage [V]		
			Input Volt. 200[V]	Input Volt. 280[V]	Input Volt. 400[V]
-50	27.836	27.843	27.849		
-40	27.860	27.866	27.871		
-20	27.897	27.902	27.905		
0	27.924	27.928	27.931		
25	27.941	27.944	27.948		
40	27.945	27.948	27.951		
55	27.942	27.945	27.947		
70	27.935	27.937	27.939		
85	27.924	27.927	27.929		
100	27.913	27.916	27.918		
--	-	-	-	-	-

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



Model	DHS100B28	Testing Circuitry Figure A
Item	Output Voltage Accuracy	
Object	+28V3.6A	

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 - 3.6A

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

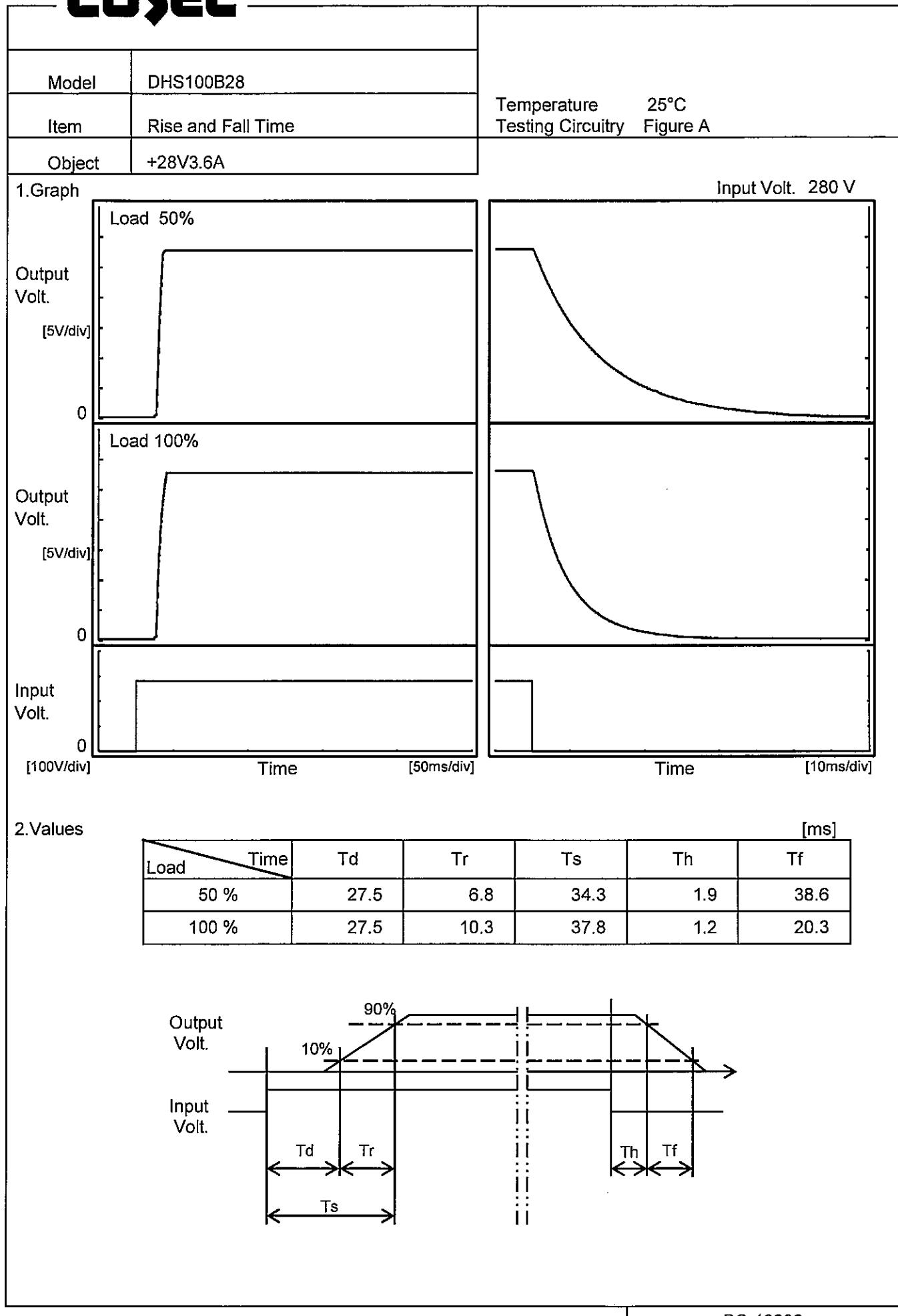
$$\text{* Output Voltage Accuracy (Ration)} = \frac{\text{Output Voltage Accuracy}}{\text{Rated Output Voltage}} \times 100$$

2. Values

Item	Temperature [°C]	Input Voltage[V]	Output		Output Voltage Accuracy	
			Current[A]	Voltage[V]	Value [mV]	Ration [%]
Maximum Voltage	40	200	0	27.966	±53	±0.2
Minimum Voltage	-40	200	3.6	27.860		

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Model	DHS100B28	Temperature	25°C																						
Item	Time Lapse Drift	Testing Circuitry	Figure A																						
Object	+28V3.6A																								
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>27.941</td></tr> <tr><td>0.5</td><td>27.944</td></tr> <tr><td>1.0</td><td>27.944</td></tr> <tr><td>2.0</td><td>27.944</td></tr> <tr><td>3.0</td><td>27.944</td></tr> <tr><td>4.0</td><td>27.944</td></tr> <tr><td>5.0</td><td>27.944</td></tr> <tr><td>6.0</td><td>27.944</td></tr> <tr><td>7.0</td><td>27.944</td></tr> <tr><td>8.0</td><td>27.944</td></tr> </tbody> </table>	Time since start [H]	Output Voltage [V]	0.0	27.941	0.5	27.944	1.0	27.944	2.0	27.944	3.0	27.944	4.0	27.944	5.0	27.944	6.0	27.944	7.0	27.944	8.0	27.944
Time since start [H]	Output Voltage [V]																								
0.0	27.941																								
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6.0	27.944																								
7.0	27.944																								
8.0	27.944																								

COSEL

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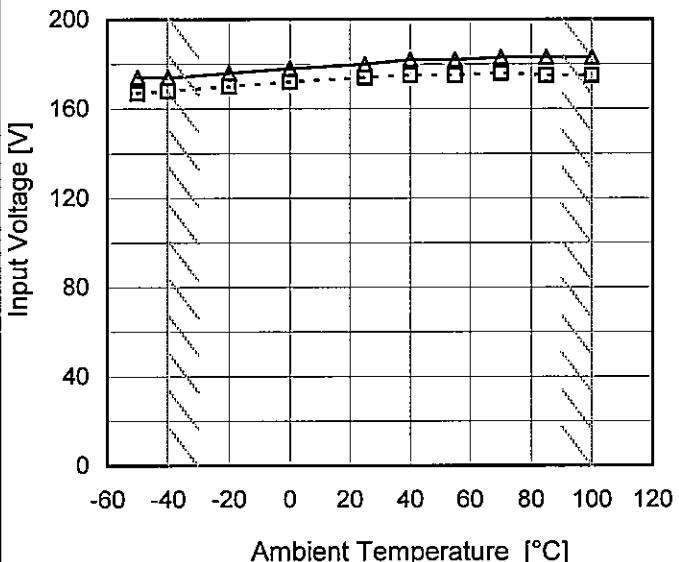
Model DHS100B28

Item Minimum Input Voltage
for Regulated Output Voltage

Object +28V3.6A

1. Graph

---□--- Load 50%
—△— Load 100%

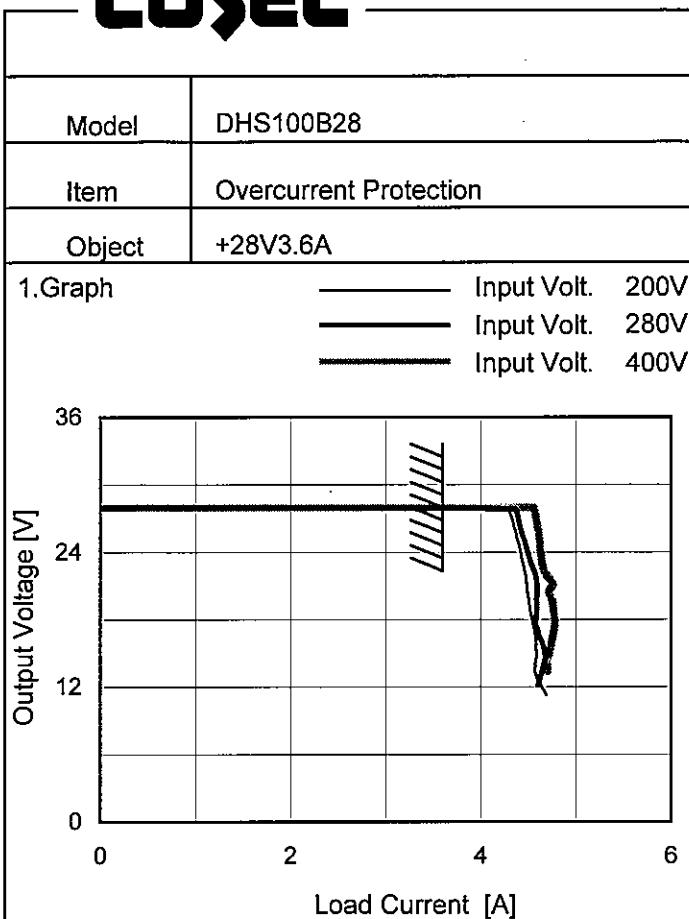


Note: Slanted line shows the range of the rated ambient temperature.

Testing Circuitry Figure A

2. Values

Ambient Temperature [°C]	Input Voltage [V]	
	Load 50%	Load 100%
-50	167	174
-40	168	174
-20	170	176
0	172	178
25	174	180
40	175	182
55	175	182
70	176	183
85	175	183
100	175	183
--	-	-

COSEL


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

Intermittent operation occurs when the output voltage is from 11.2V to 0V.

Temperature 25°C
Testing Circuitry Figure A

2. Values

Output Voltage [V]	Load Current [A]		
	Input Volt. 200[V]	Input Volt. 280[V]	Input Volt. 400[V]
28.0	3.62	3.62	3.60
26.6	4.34	4.40	4.59
25.2	4.38	4.44	4.62
22.4	4.46	4.56	4.66
19.6	4.51	4.59	4.75
16.8	4.57	4.60	4.76
14.0	4.57	4.66	4.70
11.2	4.69	4.60	4.70
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

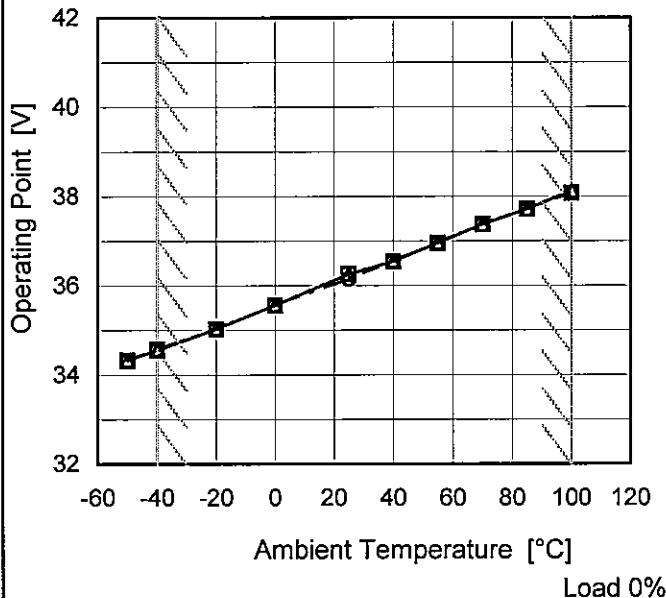
COSEL

Model DHS100B28

Item Overvoltage Protection

Object +28V3.6A

1. Graph
- △— Input Volt. 200V
 - -□-- Input Volt. 280V
 - -○-- Input Volt. 400V



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

Testing Circuitry Figure A

2. Values

Ambient Temperature [°C]	Operating Point [V]		
	Input Volt. 200[V]	Input Volt. 280[V]	Input Volt. 400[V]
-50	34.33	34.33	34.33
-40	34.56	34.57	34.57
-20	35.03	35.03	35.03
0	35.56	35.56	35.56
25	36.26	36.26	36.15
40	36.55	36.55	36.55
55	36.96	36.96	36.96
70	37.37	37.37	37.37
85	37.72	37.72	37.72
100	38.13	38.07	38.08
--	-	-	-

COSEL

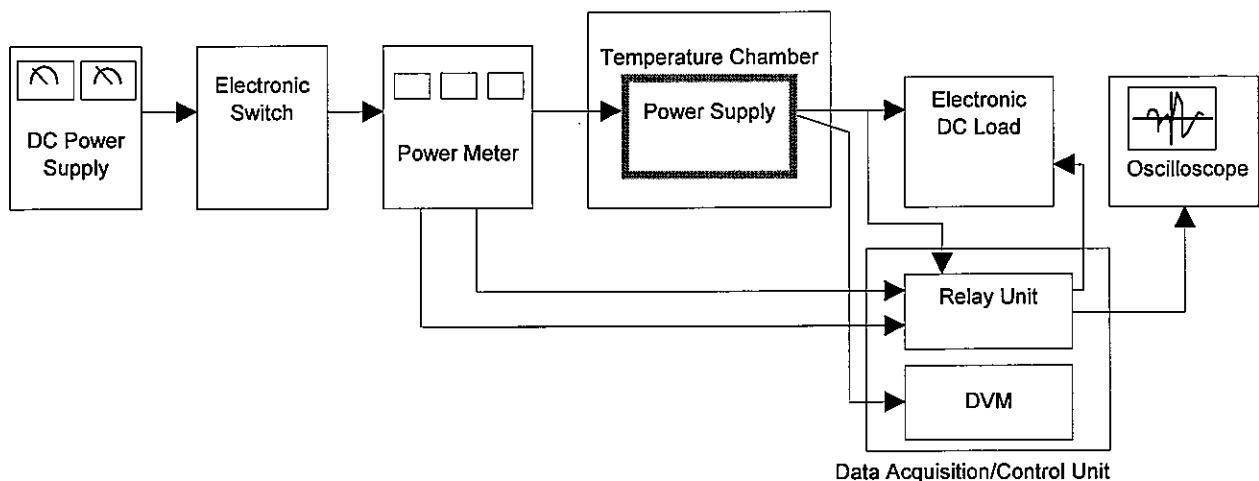
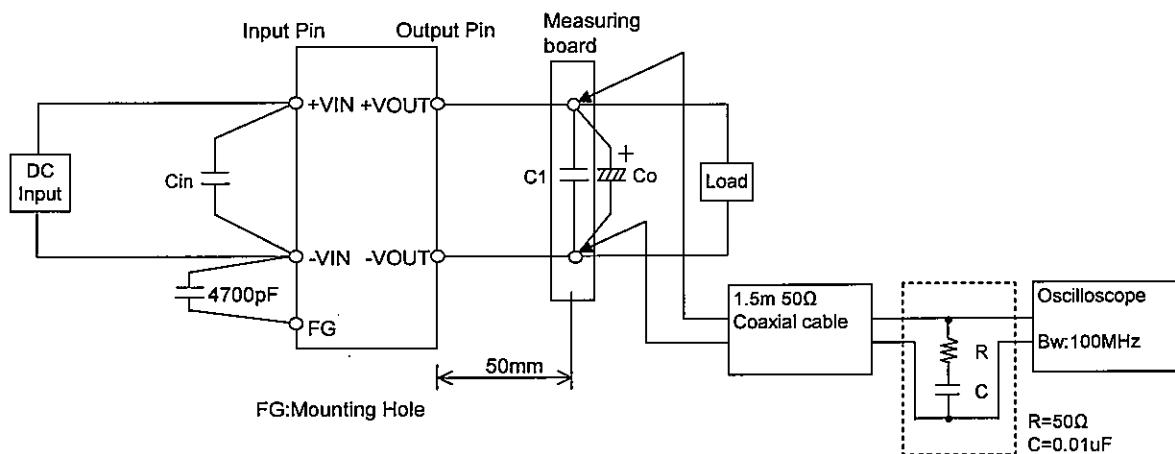


Figure A



- C1 : DHS100B24 4.7uF
 DHS100B28 4.7uF
 Others 10uF
- Co : DHS100B03 2200uF
 DHS100B05 2200uF
 DHS100B12 470uF
 DHS100B15 470uF
 DHS100B24 220uF
 DHS100B28 220uF

Figure B