

TEST DATA OF GT3.5-5

Regulated DC Power Supply
July 23, 2010

Approved by : Eiyoshi Wakamatsu
Eiyoshi Wakamatsu Design Manager

Prepared by : Satoshi Kinoshita
Satoshi Kinoshita Design Engineer

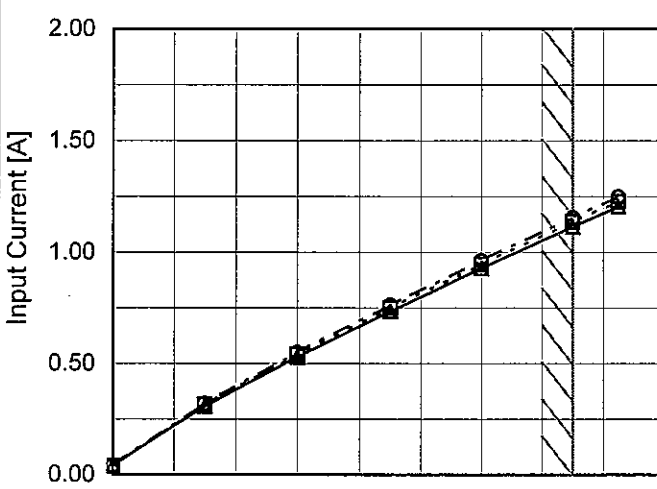
COSEL CO.,LTD.

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Model		GT3.5-5		Temperature 25°C																																																				
Item		Input Current (by Load Current)		Testing Circuitry Figure A																																																				
Object																																																								
1.Graph		<div><div><div>—△—</div><div>Input Volt.</div><div>90V</div></div><div><div>---□---</div><div>Input Volt.</div><div>100V</div></div><div><div>-·-○-·-</div><div>Input Volt.</div><div>110V</div></div></div> 		2.Values																																																				
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Note: Slanted line shows the range of the rated load current.																																																			

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Model		GT3.5-5	
Item		Efficiency (by Input Voltage)	
Object			

1.Graph

Load 50%

Load 100%

Efficiency [%]

60

52

44

36

28

20

12

4

80

90

100

110

120

Input Voltage [V]

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

2.Values

Input Voltage [V]	Efficiency [%]	
	Load 50%	Load 100%
85	50.1	52.3
90	47.1	49.3
100	42.3	44.2
110	38.3	40.0
115	36.6	38.2
--	-	-
--	-	-
--	-	-
--	-	-

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Model		GT3.5-5		Temperature Testing Circuitry	25°C Figure A
Item		Efficiency (by Load Current)			
Object					

1.Graph

—△—

Input Volt.

90V

---□---

Input Volt.

100V

---○---

Input Volt.

110V

Efficiency [%]

60

52

44

36

28

20

12

4

0

2

4

6

8

0

2

4

6

8

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

2.Values

Load Current [A]	Efficiency [%]		
	Input Volt. 90[V]	Input Volt. 100[V]	Input Volt. 110[V]
0.00	-	-	-
1.50	43.2	38.7	35.0
3.00	46.3	41.6	37.7
4.50	47.8	42.8	38.8
6.00	48.6	43.6	39.5
7.50	49.3	44.2	40.0
8.25	49.6	44.4	40.2
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

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

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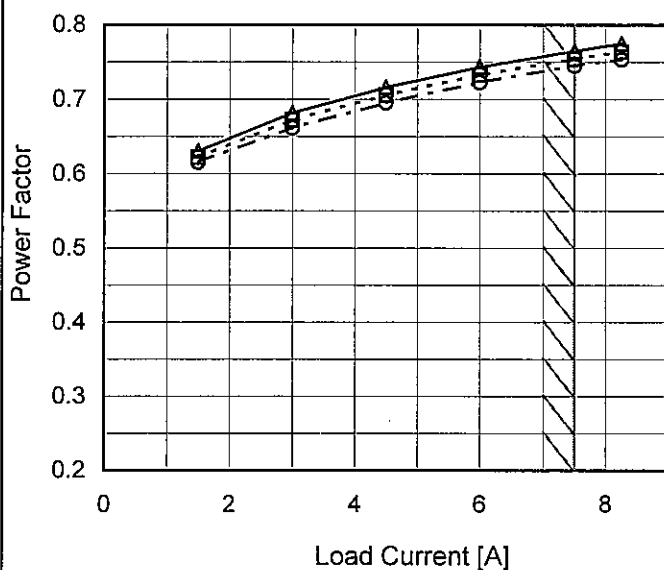
Model		GT3.5-5																																																															
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Note: Slanted line shows the range of the rated input voltage.																																																																	

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Model	GT3.5-5
Item	Power Factor (by Load Current)
Object	

1.Graph

—△— Input Volt. 90V
 ---□--- Input Volt. 100V
 -○- - Input Volt. 110V



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

Temperature 25°C
Testing Circuitry Figure A

2.Values

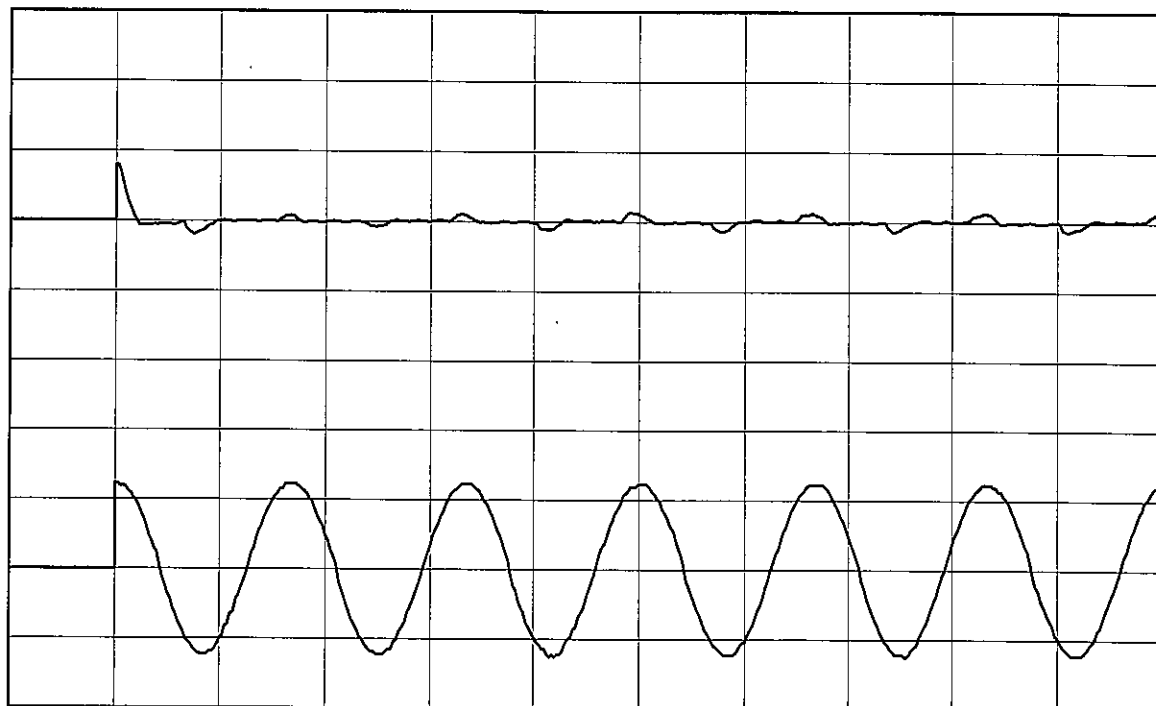
Load Current [A]	Power Factor		
	Input Volt. 90[V]	Input Volt. 100[V]	Input Volt. 110[V]
0.00	-	-	-
1.50	0.631	0.622	0.615
3.00	0.682	0.672	0.662
4.50	0.716	0.706	0.695
6.00	0.743	0.733	0.723
7.50	0.765	0.754	0.745
8.25	0.775	0.764	0.753
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

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Model	GT3.5-5	Temperature 25°C Testing Circuitry Figure A
Item	Inrush Current	
Object	_____	

Input
Current
[20A/div]

Input
Voltage
[100V/div]

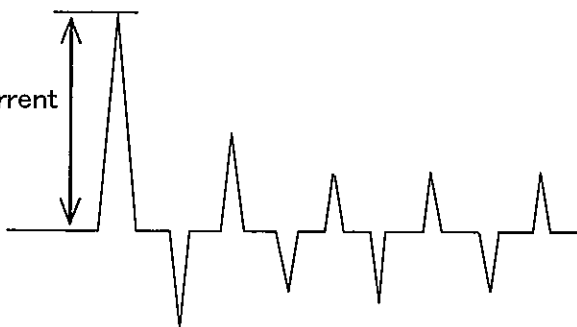


Time [10ms/div]

Input Voltage 100 V
Frequency 60 Hz
Load 100 %

Primary inrush current 15.9 A

Primary inrush current



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Model	GT3.5-5																																
Item	Line Regulation	Temperature	25°C																														
Object	+5V7.5A	Testing Circuitry	Figure A																														
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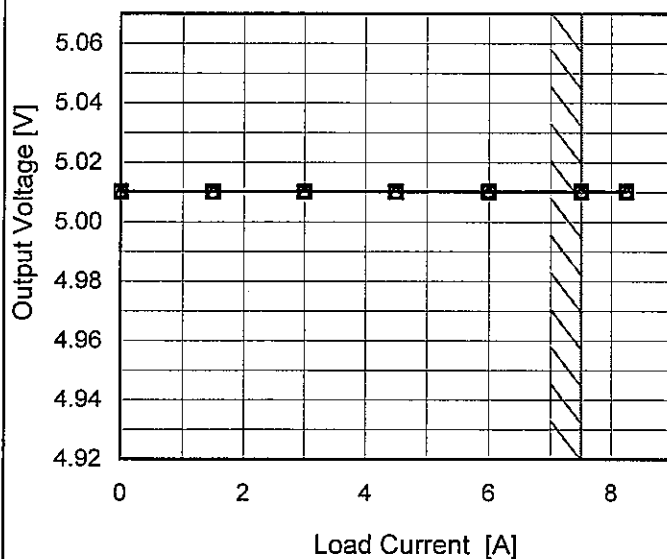
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Model	GT3.5-5
Item	Load Regulation
Object	+5V7.5A

Temperature 25°C
Testing Circuitry Figure A

1. Graph

—△— Input Volt. 90V
 ---□--- Input Volt. 100V
 ---○--- Input Volt. 110V



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

2. Values

Load Current [A]	Output Voltage [V]		
	Input Volt. 90[V]	Input Volt. 100[V]	Input Volt. 110[V]
0.00	5.010	5.010	5.010
1.50	5.010	5.010	5.010
3.00	5.010	5.010	5.010
4.50	5.010	5.010	5.010
6.00	5.010	5.010	5.010
7.50	5.010	5.010	5.010
8.25	5.010	5.010	5.010
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

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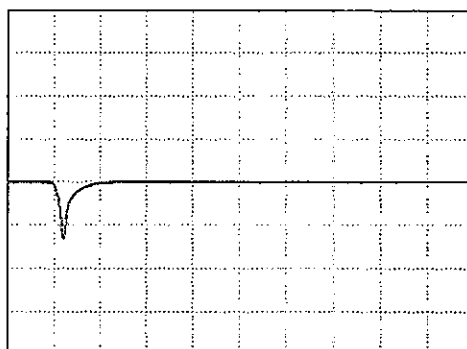
Model	GT3.5-5	Temperature 25°C Testing Circuitry Figure A
Item	Dynamic Load Response	
Object	.+5V7.5A	

Input Volt. 100 V
Cycle 1000 ms

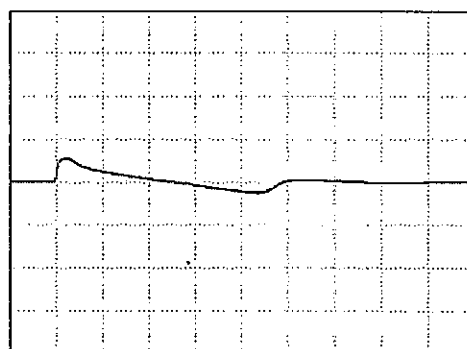
Load Current

Min. Load (0A) ←→
Load 100% (7.5A)

100 mV/div



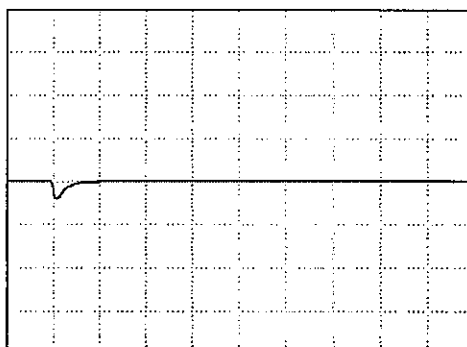
100 μs/div



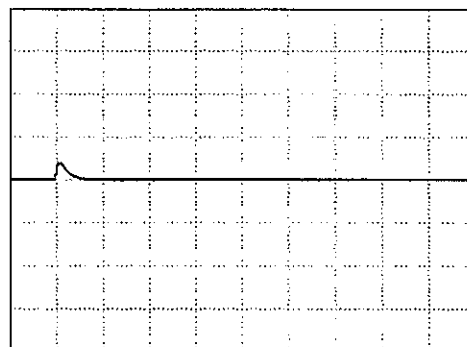
100 μs/div

Load 50% (3.75A) ←→
Load 100% (7.5A)

100 mV/div



100 μs/div



100 μs/div

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Model	GT3.5-5																																											
Item	Ripple Voltage (by Load Current)	Temperature	25°C																																									
Object	+5V7.5A	Testing Circuitry	Figure A																																									
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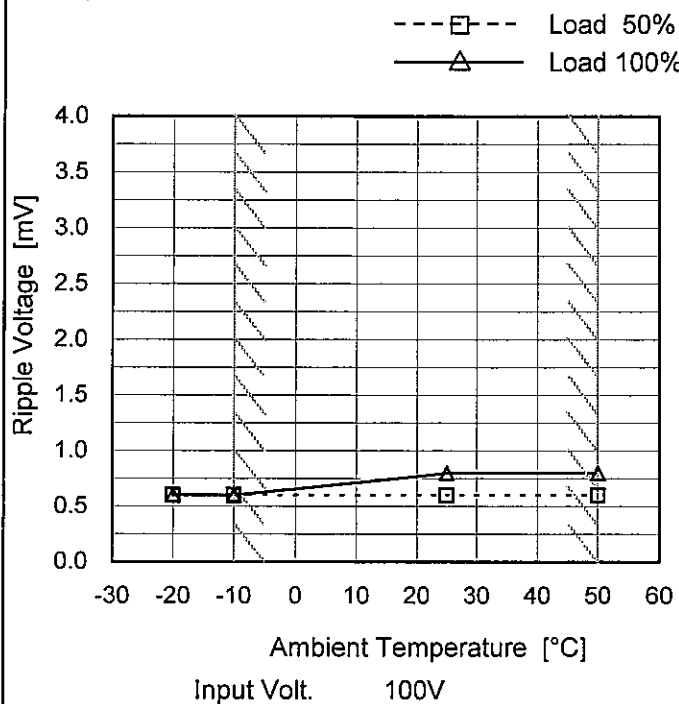
Model GT3.5-5

Item Ripple Voltage (by Ambient Temp.)

Object +5V7.5A

Testing Circuitry Figure A

1. Graph



Measured by 20 MHz Oscilloscope.

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

2. Values

Ambient Temperature [°C]	Ripple Voltage [mV]	
	Load 50%	Load 100%
-20	0.6	0.6
-10	0.6	0.6
25	0.6	0.8
50	0.6	0.8
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-

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Model

GT3.5-5

Item

Ambient Temperature Drift

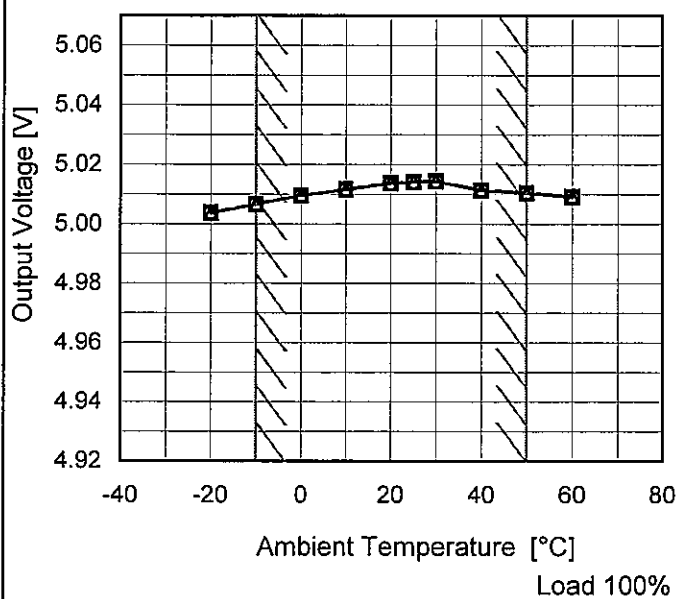
Object

+5V7.5A

Testing Circuitry Figure A

1.Graph

—△— Input Volt. 90V
 ---□--- Input Volt. 100V
 ---○--- Input Volt. 110V



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

2.Values

Ambient Temperature [°C]	Output Voltage [V]		
	Input Volt. 90[V]	Input Volt. 100[V]	Input Volt. 110[V]
-20	5.004	5.004	5.004
-10	5.007	5.007	5.007
0	5.010	5.010	5.010
10	5.012	5.012	5.012
20	5.014	5.014	5.014
25	5.014	5.014	5.014
30	5.014	5.014	5.015
40	5.011	5.011	5.012
50	5.011	5.011	5.011
60	5.009	5.009	5.009
--	-	-	-

COSEL

		Testing Circuitry Figure A
Model	GT3.5-5	
Item	Output Voltage Accuracy	
Object	+5V7.5A	

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 : -10 - 50°C

Input Voltage : 90 - 110V

Load Current : 0 - 7.5A

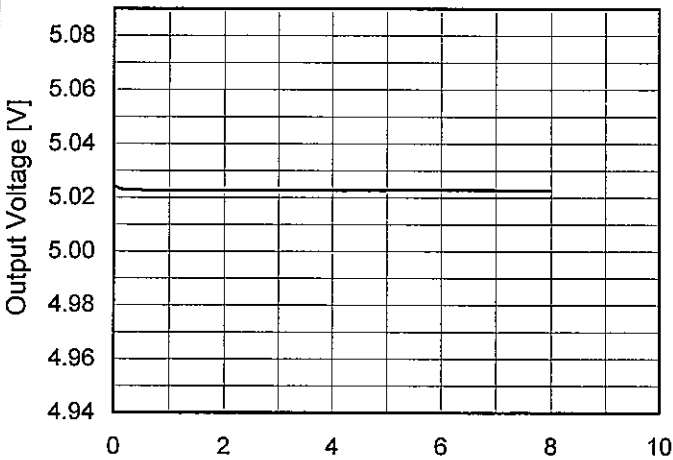
* Output Voltage Accuracy = $\pm(\text{Maximum of Output Voltage} - \text{Minimum of Output Voltage}) / 2$

* 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	30	110	7.5	5.015	±5	±0.1
Minimum Voltage	-10	90	0	5.006		

COSEL

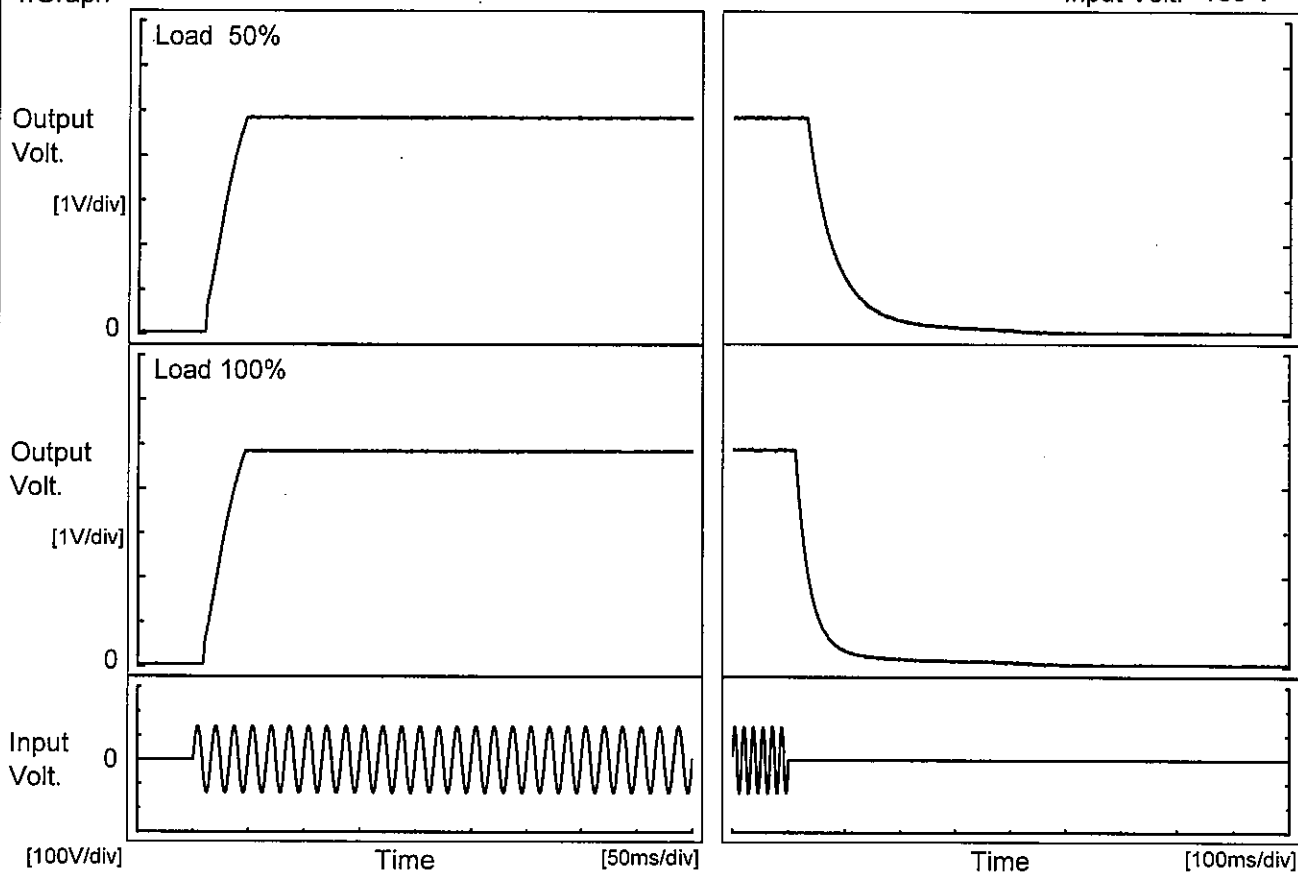
Model	GT3.5-5																								
Item	Time Lapse Drift	Temperature	25°C																						
Object	+5V7.5A	Testing Circuitry	Figure A																						
1.Graph		2.Values																							
<div><p>Output Voltage [V]</p><p>Time [H]</p><p>Input Volt. 100V</p><p>Load 100%</p></div>		<table><tr><th>Time since start [H]</th><th>Output Voltage [V]</th></tr><tr><td>0.0</td><td>5.024</td></tr><tr><td>0.5</td><td>5.023</td></tr><tr><td>1.0</td><td>5.023</td></tr><tr><td>2.0</td><td>5.023</td></tr><tr><td>3.0</td><td>5.023</td></tr><tr><td>4.0</td><td>5.023</td></tr><tr><td>5.0</td><td>5.023</td></tr><tr><td>6.0</td><td>5.023</td></tr><tr><td>7.0</td><td>5.023</td></tr><tr><td>8.0</td><td>5.023</td></tr></table>		Time since start [H]	Output Voltage [V]	0.0	5.024	0.5	5.023	1.0	5.023	2.0	5.023	3.0	5.023	4.0	5.023	5.0	5.023	6.0	5.023	7.0	5.023	8.0	5.023
Time since start [H]	Output Voltage [V]																								
0.0	5.024																								
0.5	5.023																								
1.0	5.023																								
2.0	5.023																								
3.0	5.023																								
4.0	5.023																								
5.0	5.023																								
6.0	5.023																								
7.0	5.023																								
8.0	5.023																								

COSEL

Model	GT3.5-5	Temperature 25°C Testing Circuitry Figure A
Item	Rise and Fall Time	
Object	+5V7.5A	

1.Graph

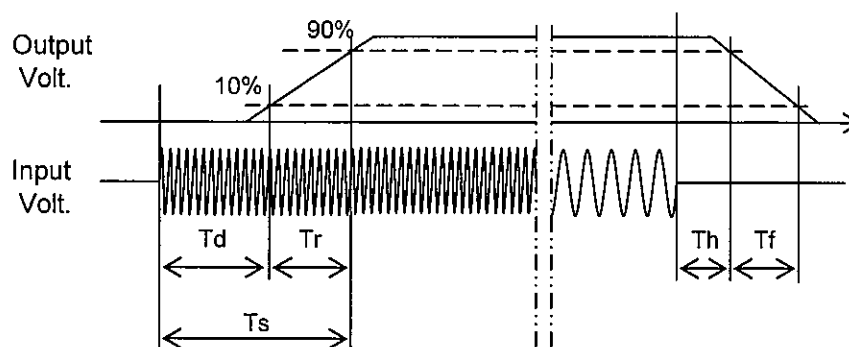
Input Volt. 100 V



2.Values

[ms]

Load \ Time	Td	Tr	Ts	Th	Tf
50 %	11.8	32.3	44.1	35.0	122.0
100 %	10.5	32.5	43.0	13.5	65.5



COSEL

Model	GT3.5-5																																
Item	Hold-Up Time	Temperature	25°C																														
		Testing Circuitry	Figure A																														
Object	+5V7.5A																																
1.Graph		2.Values																															
<div><div><div>---□---</div><div>Load 50%</div></div><div><div>—△—</div><div>Load 100%</div></div></div> <p>The graph shows Hold-Up Time [ms] on a logarithmic y-axis (1 to 1000) versus Input Voltage [V] on a linear x-axis (80 to 120). Two data series are plotted: Load 50% (dashed line with square markers) and Load 100% (solid line with triangle markers). Both series show an increasing trend. A slanted shaded region indicates the rated input voltage range from approximately 90V to 115V.</p> <table border="1"><thead><tr><th>Input Voltage [V]</th><th>Load 50% [ms]</th><th>Load 100% [ms]</th></tr></thead><tbody><tr><td>85</td><td>18</td><td>5</td></tr><tr><td>90</td><td>23</td><td>7</td></tr><tr><td>100</td><td>32</td><td>11</td></tr><tr><td>110</td><td>41</td><td>16</td></tr><tr><td>115</td><td>46</td><td>18</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></tbody></table>		Input Voltage [V]	Load 50% [ms]	Load 100% [ms]	85	18	5	90	23	7	100	32	11	110	41	16	115	46	18	--	-	-	--	-	-	--	-	-	--	-	-		
Input Voltage [V]	Load 50% [ms]	Load 100% [ms]																															
85	18	5																															
90	23	7																															
100	32	11																															
110	41	16																															
115	46	18																															
--	-	-																															
--	-	-																															
--	-	-																															
--	-	-																															
<p>This duration covers from Shut-off of input voltage to the moment when output voltage descends to the rated range of voltage accuracy.</p> <p>Note: Slanted line shows the range of the rated input voltage.</p>																																	

COSEL

Model	GT3.5-5																																																					
Item	Instantaneous Interruption Compensation	Temperature	25°C																																																			
Object	+5V7.5A	Testing Circuitry	Figure A																																																			
1.Graph		2.Values																																																				
<div><div><div>—△—</div><div>Input Volt.</div><div>90V</div></div><div><div>---□---</div><div>Input Volt.</div><div>100V</div></div><div><div>---○---</div><div>Input Volt.</div><div>110V</div></div></div> <div>Instantaneous Compensation Time [ms]</div> <div>Load Current [A]</div> <div>Note: Slanted line shows the range of the rated load current.</div>		<table><tr><th rowspan="2">Load Current [A]</th><th colspan="3">Time [ms]</th></tr><tr><th>Input Volt. 90[V]</th><th>Input Volt. 100[V]</th><th>Input Volt. 110[V]</th></tr><tr><td>0.00</td><td>-</td><td>-</td><td>-</td></tr><tr><td>1.50</td><td>74</td><td>97</td><td>121</td></tr><tr><td>3.00</td><td>23</td><td>45</td><td>57</td></tr><tr><td>4.50</td><td>20</td><td>23</td><td>24</td></tr><tr><td>6.00</td><td>5</td><td>18</td><td>23</td></tr><tr><td>7.50</td><td>5</td><td>5</td><td>18</td></tr><tr><td>8.25</td><td>4</td><td>5</td><td>6</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>		Load Current [A]	Time [ms]			Input Volt. 90[V]	Input Volt. 100[V]	Input Volt. 110[V]	0.00	-	-	-	1.50	74	97	121	3.00	23	45	57	4.50	20	23	24	6.00	5	18	23	7.50	5	5	18	8.25	4	5	6	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-
Load Current [A]	Time [ms]																																																					
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		Testing Circuitry Figure A																																				
Model	GT3.5-5																																					
Item	Minimum Input Voltage for Regulated Output Voltage																																					
Object	+5V7.5A																																					
1.Graph		2.Values																																				
<div><div><div>---□---</div><div>Load 50%</div></div><div><div>—△—</div><div>Load 100%</div></div></div> <table><thead><tr><th>Ambient Temperature [°C]</th><th>Load 50%</th><th>Load 100%</th></tr></thead><tbody><tr><td>-20</td><td>62</td><td>72</td></tr><tr><td>-10</td><td>62</td><td>72</td></tr><tr><td>0</td><td>62</td><td>72</td></tr><tr><td>10</td><td>62</td><td>72</td></tr><tr><td>20</td><td>62</td><td>72</td></tr><tr><td>25</td><td>62</td><td>72</td></tr><tr><td>30</td><td>62</td><td>72</td></tr><tr><td>40</td><td>62</td><td>72</td></tr><tr><td>50</td><td>62</td><td>72</td></tr><tr><td>60</td><td>62</td><td>73</td></tr><tr><td>--</td><td>-</td><td>-</td></tr></tbody></table>		Ambient Temperature [°C]	Load 50%	Load 100%	-20	62	72	-10	62	72	0	62	72	10	62	72	20	62	72	25	62	72	30	62	72	40	62	72	50	62	72	60	62	73	--	-	-	
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Note: Slanted line shows the range of the rated ambient temperature.																																						

Model	GT3.5-5																																																									
Item	Overcurrent Protection	Temperature	25°C																																																							
Object	+5V7.5A	Testing Circuitry	Figure A																																																							
1.Graph		2.Values																																																								
<div><div><div></div>Input Volt. 90V</div><div><div></div>Input Volt. 100V</div><div><div></div>Input Volt. 110V</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>		<table><tr><th rowspan="2">Output Voltage [V]</th><th colspan="3">Load Current [A]</th></tr><tr><th>Input Volt. 90[V]</th><th>Input Volt. 100[V]</th><th>Input Volt. 110[V]</th></tr><tr><td>5.00</td><td>9.28</td><td>9.31</td><td>9.33</td></tr><tr><td>4.75</td><td>9.16</td><td>9.16</td><td>9.17</td></tr><tr><td>4.50</td><td>8.94</td><td>8.84</td><td>8.95</td></tr><tr><td>4.00</td><td>8.60</td><td>8.56</td><td>8.59</td></tr><tr><td>3.50</td><td>7.98</td><td>8.01</td><td>7.96</td></tr><tr><td>3.00</td><td>7.46</td><td>7.32</td><td>7.24</td></tr><tr><td>2.50</td><td>6.83</td><td>6.74</td><td>6.84</td></tr><tr><td>2.00</td><td>6.20</td><td>6.30</td><td>6.20</td></tr><tr><td>1.50</td><td>5.71</td><td>5.74</td><td>5.71</td></tr><tr><td>1.00</td><td>5.23</td><td>5.17</td><td>5.22</td></tr><tr><td>0.50</td><td>4.65</td><td>4.67</td><td>4.64</td></tr><tr><td>0.00</td><td>4.09</td><td>4.11</td><td>4.08</td></tr></table>		Output Voltage [V]	Load Current [A]			Input Volt. 90[V]	Input Volt. 100[V]	Input Volt. 110[V]	5.00	9.28	9.31	9.33	4.75	9.16	9.16	9.17	4.50	8.94	8.84	8.95	4.00	8.60	8.56	8.59	3.50	7.98	8.01	7.96	3.00	7.46	7.32	7.24	2.50	6.83	6.74	6.84	2.00	6.20	6.30	6.20	1.50	5.71	5.74	5.71	1.00	5.23	5.17	5.22	0.50	4.65	4.67	4.64	0.00	4.09	4.11	4.08
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COSEL

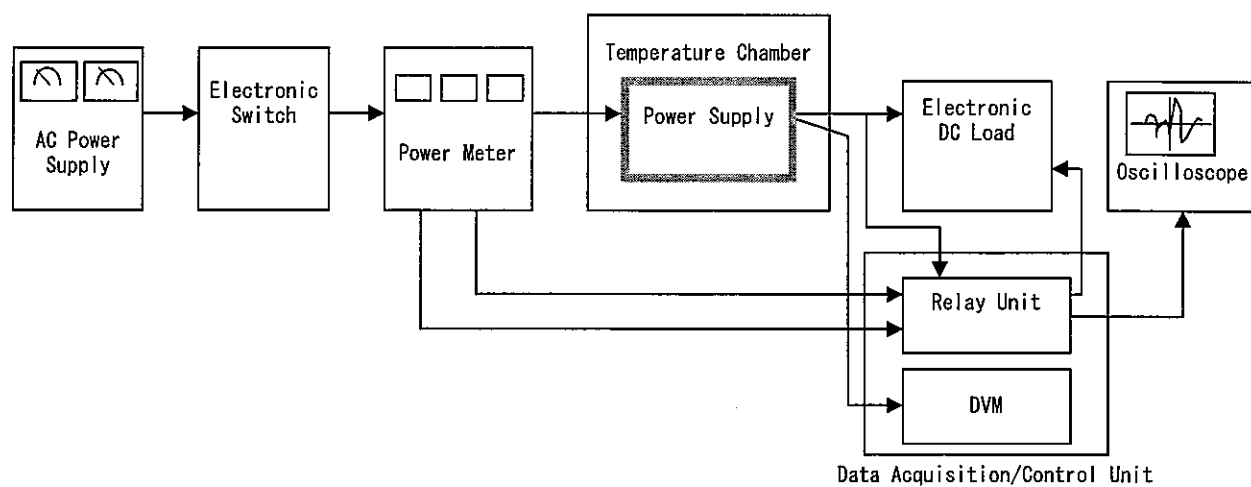


Figure A