



TEST DATA OF LFA10F-5

Regulated DC Power Supply
June 19, 2009

Approved by : Yoshiaki Shimizu
Yoshiaki Shimizu Design Manager

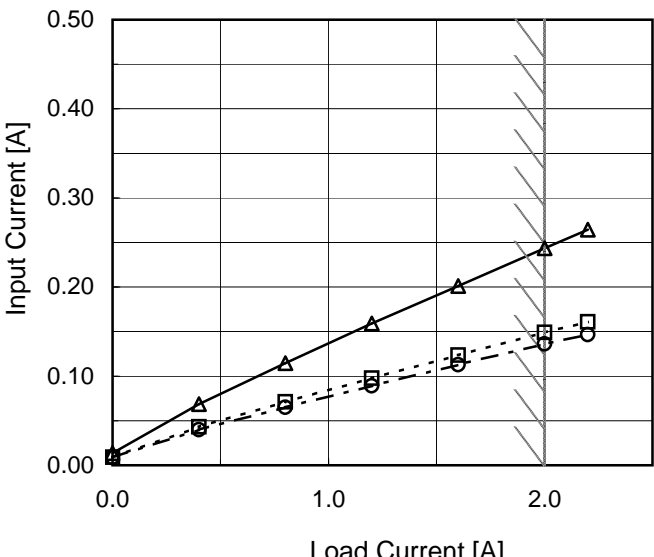
Prepared by : Yuki Nakamura
Yuki Nakamura Design Engineer

COSEL CO.,LTD.

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(Final Page 25)

Model		LFA10F-5		Temperature 25℃																																																				
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Object		_____																																																						
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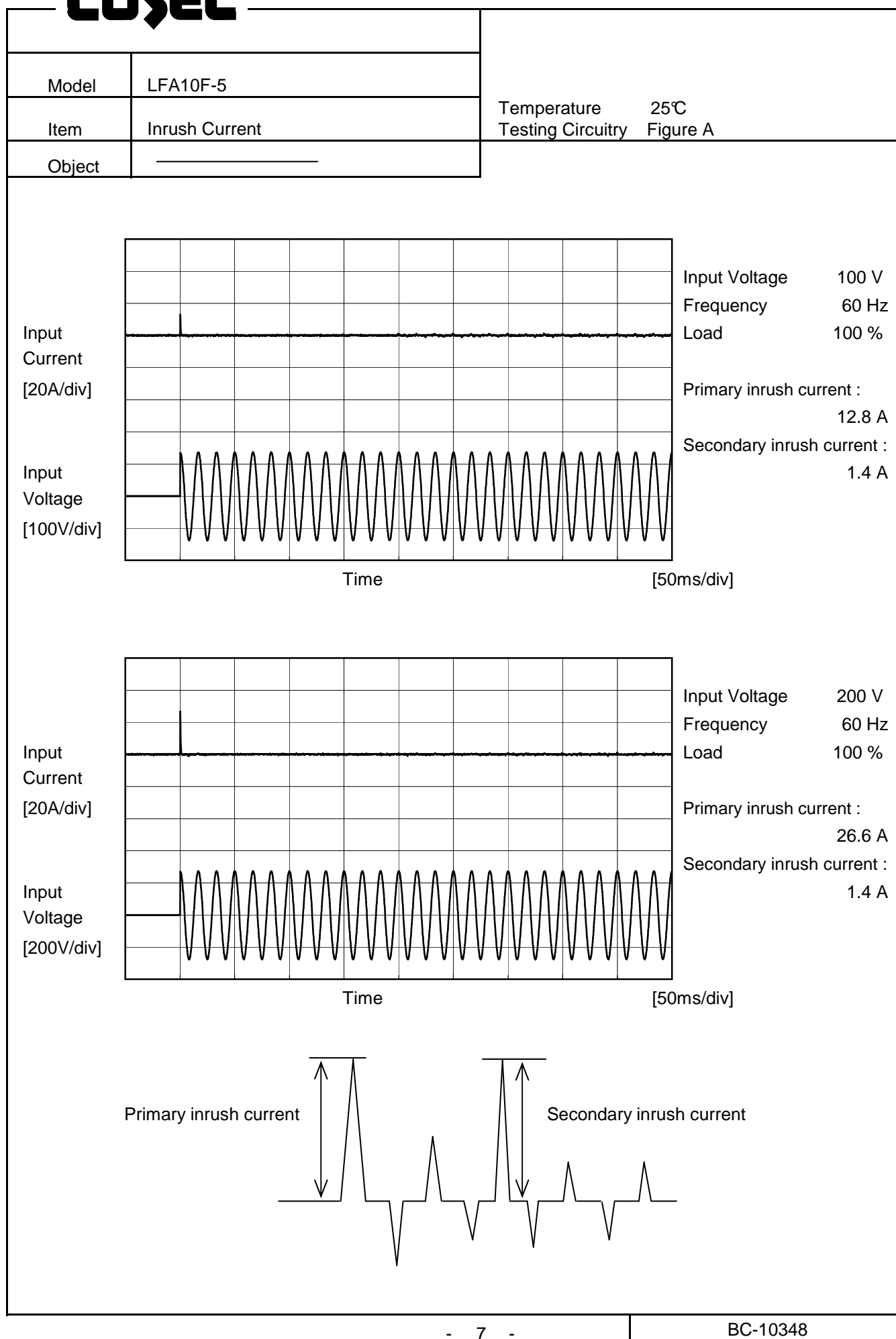
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		Temperature 25℃ Testing Circuitry Figure B
Model	LFA10F-5	
Item	Leakage Current	
Object	_____	

1.Results

[mA]

Standards		Input Volt.			Note
		100 [V]	200 [V]	240 [V]	
DEN-AN	Both phases	0.07	0.14	0.16	Operation
	One of phase	0.13	0.27	0.33	stand by
IEC60950-1	Both phases	0.09	0.19	0.20	Operation
	One of phase	0.13	0.28	0.31	stand by

The value for "One phase" is the reference value only.

2.Condition

Leakage current value is concluded after measuring both phases of AC input and by choosing the larger one.

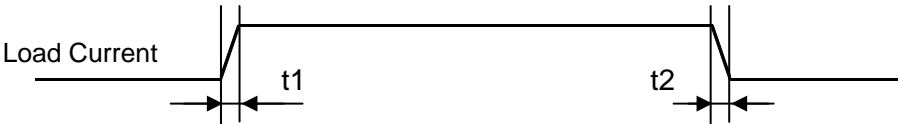
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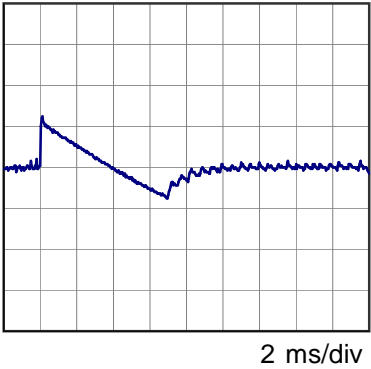
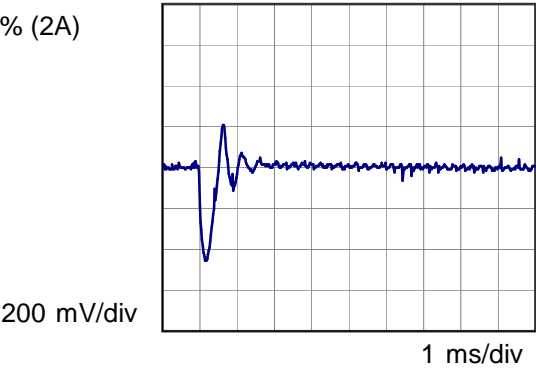


Model	LFA10F-5	Temperature Testing Circuitry	25°C Figure A
Item	Dynamic Load Response		
Object	+5V2A		

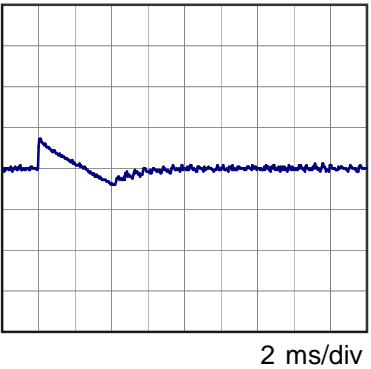
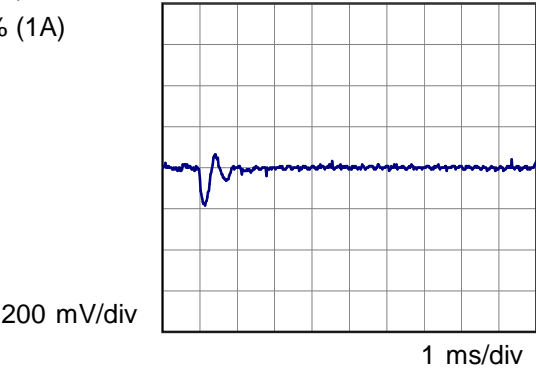
Input Volt. 100 V Response. $t_1=t_2=50\mu\text{s}$. Typ
Cycle 1000 ms



Min. Load (0A) \longleftrightarrow
Load 100% (2A)



Min. Load (0A) \longleftrightarrow
Load 50% (1A)



Model	LFA10F-5	Temperature Testing Circuitry	25℃ Figure C																																						
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<div><div><div>—△— Input Volt. 100V</div><div>-·-○-·- Input Volt. 200V</div></div><p>Ripple Voltage [mV]</p><p>Load Current [A]</p></div>		<table><tr><th rowspan="2">Load Current [A]</th><th colspan="2">Ripple Voltage [mV]</th></tr><tr><th>Input Volt. 100 [V]</th><th>Input Volt. 200 [V]</th></tr><tr><td>0.0</td><td>30</td><td>55</td></tr><tr><td>0.4</td><td>10</td><td>15</td></tr><tr><td>0.8</td><td>15</td><td>20</td></tr><tr><td>1.2</td><td>25</td><td>25</td></tr><tr><td>1.6</td><td>25</td><td>25</td></tr><tr><td>2.0</td><td>25</td><td>25</td></tr><tr><td>2.2</td><td>30</td><td>25</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. 100 [V]	Input Volt. 200 [V]	0.0	30	55	0.4	10	15	0.8	15	20	1.2	25	25	1.6	25	25	2.0	25	25	2.2	30	25	--	-	-	--	-	-	--	-	-	--	-	-
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<div><div>T1: Due to AC Input Line</div><div>T2: Due to Switching</div><p>Ripple [mVp-p]</p><p>T1</p><p>T2</p></div>																																									
Fig. Complex Ripple Wave Form																																									

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Model		LFA10F-5	Temperature		25°C																																				
Item		Ripple-Noise	Testing Circuitry		Figure C																																				
Object		+5V2A																																							
1.Graph			2.Values																																						
<div><div><div>—△— Input Volt. 100V</div><div>-·-○-·- Input Volt. 200V</div></div><table border="1"><caption>Ripple-Noise Data</caption><thead><tr><th>Load Current [A]</th><th>Input Volt. 100 [V] [mV]</th><th>Input Volt. 200 [V] [mV]</th></tr></thead><tbody><tr><td>0.0</td><td>30</td><td>55</td></tr><tr><td>0.4</td><td>10</td><td>15</td></tr><tr><td>0.8</td><td>15</td><td>20</td></tr><tr><td>1.2</td><td>25</td><td>25</td></tr><tr><td>1.6</td><td>25</td><td>25</td></tr><tr><td>2.0</td><td>25</td><td>25</td></tr><tr><td>2.2</td><td>30</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></tbody></table></div>			Load Current [A]	Input Volt. 100 [V] [mV]	Input Volt. 200 [V] [mV]	0.0	30	55	0.4	10	15	0.8	15	20	1.2	25	25	1.6	25	25	2.0	25	25	2.2	30	30	--	-	-	--	-	-	--	-	-	--	-	-			
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<div><div><div>T1: Due to AC Input Line</div><div>T2: Due to Switching</div></div><p>Fig. Complex Ripple Wave Form</p></div>																																									

[illegible]

Model	LFA10F-5																																																					
Item	Ambient Temperature Drift	Testing Circuitry Figure A																																																				
Object	+5V2A																																																					
1.Graph		2.Values																																																				
<div><div><div>—△—</div><div>Input Volt. 100V</div></div><div><div>---□---</div><div>Input Volt. 200V</div></div><div><div>---○---</div><div>Input Volt. 230V</div></div></div> <p>Output Voltage [V]</p> <p>Ambient Temperature [°C]</p> <p>Load 100%</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="3">Output Voltage [V]</th></tr><tr><th>Input Volt. 100[V]</th><th>Input Volt. 200[V]</th><th>Input Volt. 230[V]</th></tr><tr><td>-20</td><td>5.084</td><td>5.085</td><td>5.085</td></tr><tr><td>-10</td><td>5.085</td><td>5.085</td><td>5.086</td></tr><tr><td>0</td><td>5.085</td><td>5.084</td><td>5.084</td></tr><tr><td>10</td><td>5.084</td><td>5.084</td><td>5.084</td></tr><tr><td>20</td><td>5.085</td><td>5.084</td><td>5.084</td></tr><tr><td>25</td><td>5.084</td><td>5.084</td><td>5.084</td></tr><tr><td>30</td><td>5.084</td><td>5.084</td><td>5.084</td></tr><tr><td>40</td><td>5.083</td><td>5.083</td><td>5.083</td></tr><tr><td>50</td><td>5.081</td><td>5.080</td><td>5.080</td></tr><tr><td>60</td><td>5.078</td><td>5.078</td><td>5.077</td></tr><tr><td>--</td><td>-</td><td>-</td><td>-</td></tr></table>		Ambient Temperature [°C]	Output Voltage [V]			Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]	-20	5.084	5.085	5.085	-10	5.085	5.085	5.086	0	5.085	5.084	5.084	10	5.084	5.084	5.084	20	5.085	5.084	5.084	25	5.084	5.084	5.084	30	5.084	5.084	5.084	40	5.083	5.083	5.083	50	5.081	5.080	5.080	60	5.078	5.078	5.077	--	-	-	-
Ambient Temperature [°C]	Output Voltage [V]																																																					
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		Testing Circuitry Figure A
Model	LFA10F-5	
Item	Output Voltage Accuracy	
Object	+5V2A	

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℃

Input Voltage : 85 - 264V

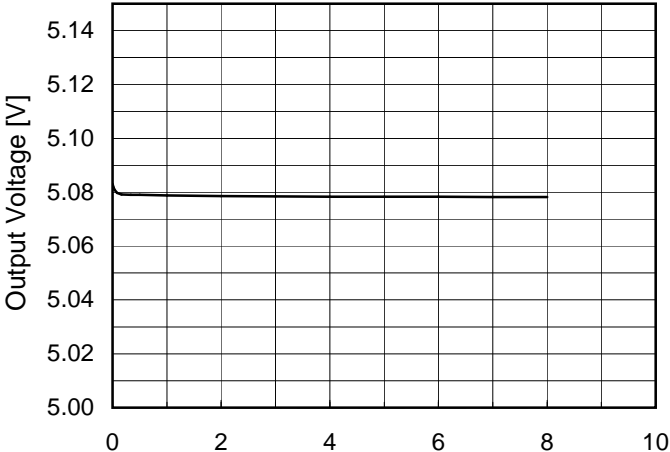
Load Current : 0 - 2A

* 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 [℃]	Input Voltage[V]	Output		Output Voltage Accuracy	
			Current[A]	Voltage[V]	Value [mV]	Ration [%]
Maximum Voltage	25	85	0	5.092	±6	±0.1
Minimum Voltage	50	264	2	5.080		

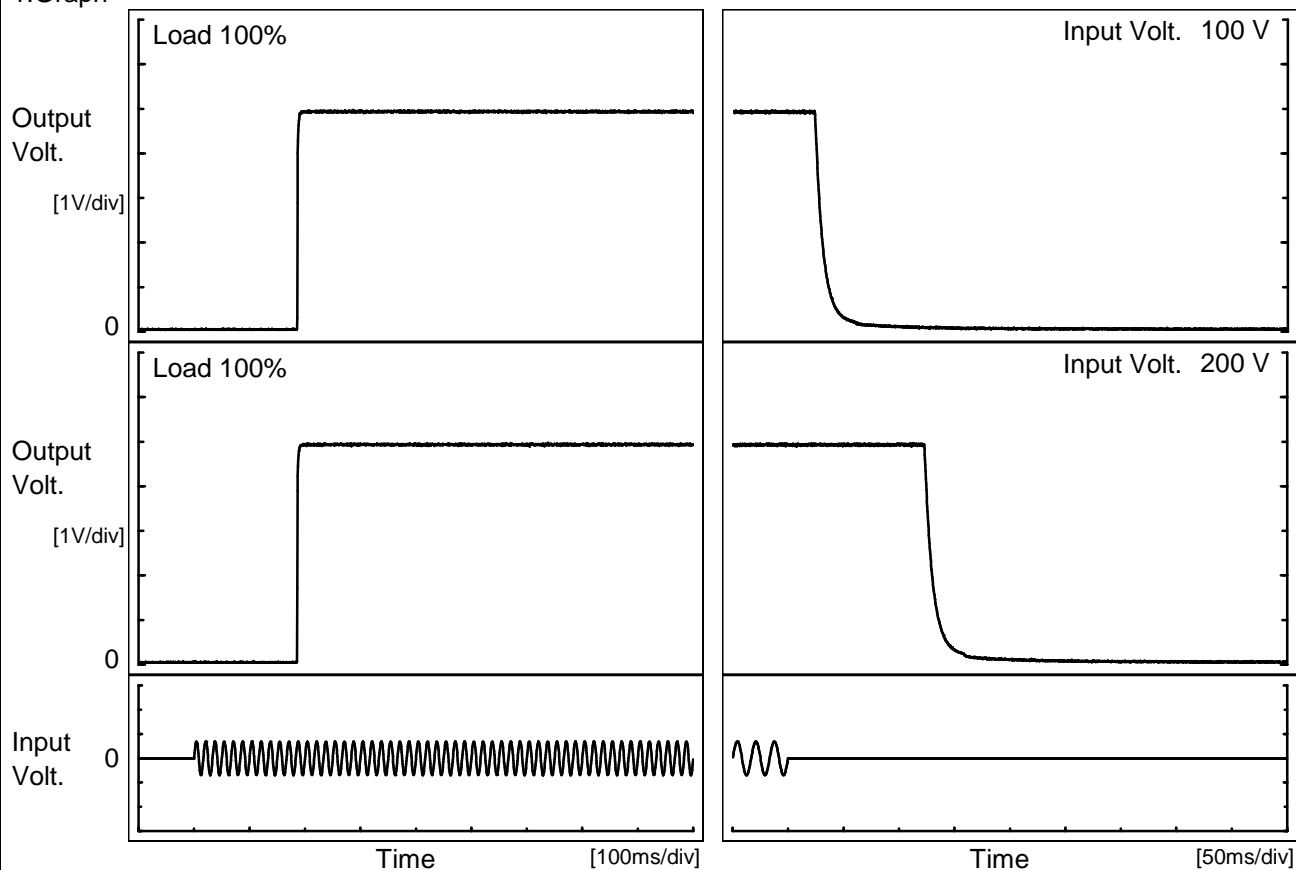
Model	LFA10F-5																								
Item	Time Lapse Drift	Temperature	25℃																						
		Testing Circuitry	Figure A																						
Object	+5V2A																								
1.Graph		2.Values																							
<div><p>Output Voltage [V]</p><p>Time [H]</p><p>Input Volt. 100V</p><p>Load 100%</p></div>		<table><tr><th>Time since start [H]</th><th>Output Voltage [V]</th></tr><tr><td>0.0</td><td>5.083</td></tr><tr><td>0.5</td><td>5.079</td></tr><tr><td>1.0</td><td>5.079</td></tr><tr><td>2.0</td><td>5.079</td></tr><tr><td>3.0</td><td>5.078</td></tr><tr><td>4.0</td><td>5.078</td></tr><tr><td>5.0</td><td>5.078</td></tr><tr><td>6.0</td><td>5.078</td></tr><tr><td>7.0</td><td>5.078</td></tr><tr><td>8.0</td><td>5.078</td></tr></table>		Time since start [H]	Output Voltage [V]	0.0	5.083	0.5	5.079	1.0	5.079	2.0	5.079	3.0	5.078	4.0	5.078	5.0	5.078	6.0	5.078	7.0	5.078	8.0	5.078
Time since start [H]	Output Voltage [V]																								
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8.0	5.078																								
* The characteristic of AC200V is equal.																									

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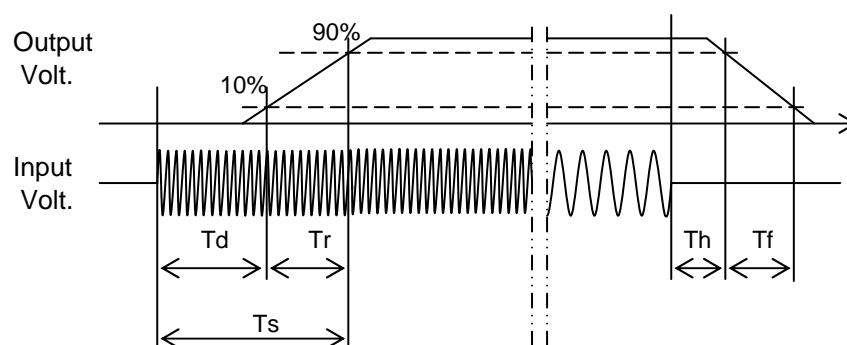
Model	LFA10F-5	Temperature	25°C
Item	Rise and Fall Time	Testing Circuitry	Figure A
Object	+5V2A		

1.Graph



2.Values

Input Volt. \ Time	Td	Tr	Ts	Th	Tf
100 V	186.5	2.0	188.5	24.3	17.8
200 V	186.0	2.0	188.0	123.5	18.8



Model	LFA10F-5																																		
Item	Hold-Up Time	Temperature	25℃																																
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Object	+5V2A																																		
1.Graph		2.Values																																	
<div><div><div>---□--- Load 50%</div><div>—△— Load 100%</div></div><div>Hold-Up Time [ms]</div><div>Input Voltage [V]</div></div>		<table><tr><th rowspan="2">Input Voltage [V]</th><th colspan="2">Hold-Up Time [ms]</th></tr><tr><th>Load 50%</th><th>Load 100%</th></tr><tr><td>75</td><td>25</td><td>6</td></tr><tr><td>85</td><td>35</td><td>11</td></tr><tr><td>100</td><td>53</td><td>24</td></tr><tr><td>120</td><td>81</td><td>34</td></tr><tr><td>200</td><td>248</td><td>124</td></tr><tr><td>230</td><td>333</td><td>165</td></tr><tr><td>264</td><td>447</td><td>227</td></tr><tr><td>280</td><td>508</td><td>258</td></tr><tr><td>--</td><td>-</td><td>-</td></tr></table>		Input Voltage [V]	Hold-Up Time [ms]		Load 50%	Load 100%	75	25	6	85	35	11	100	53	24	120	81	34	200	248	124	230	333	165	264	447	227	280	508	258	--	-	-
Input Voltage [V]	Hold-Up Time [ms]																																		
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230	333	165																																	
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<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>																																			

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Model	LFA10F-5																																																					
Item	Instantaneous Interruption Compensation	Temperature	25℃																																																			
Object	+5V2A	Testing Circuitry	Figure A																																																			
1.Graph		2.Values																																																				
<div><div>—△—</div><div>Input Volt.</div><div>100V</div></div> <div><div>---□---</div><div>Input Volt.</div><div>200V</div></div> <div><div>---○---</div><div>Input Volt.</div><div>230V</div></div> <p>Instantaneous Compensation Time [ms]</p> <p>Load Current [A]</p> <p>Note: Slanted line shows the range of the rated load current.</p>		<table><tr><th rowspan="2">Load Current [A]</th><th colspan="3">Time [ms]</th></tr><tr><th>Input Volt. 100[V]</th><th>Input Volt. 200[V]</th><th>Input Volt. 230[V]</th></tr><tr><td>0.0</td><td>-</td><td>-</td><td>-</td></tr><tr><td>0.4</td><td>129</td><td>569</td><td>760</td></tr><tr><td>0.8</td><td>68</td><td>308</td><td>417</td></tr><tr><td>1.2</td><td>45</td><td>208</td><td>283</td></tr><tr><td>1.6</td><td>30</td><td>157</td><td>213</td></tr><tr><td>2.0</td><td>20</td><td>120</td><td>165</td></tr><tr><td>2.2</td><td>17</td><td>107</td><td>149</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. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]	0.0	-	-	-	0.4	129	569	760	0.8	68	308	417	1.2	45	208	283	1.6	30	157	213	2.0	20	120	165	2.2	17	107	149	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-
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Model	LFA10F-5																																																																								
Item	Minimum Input Voltage for Regulated Output Voltage	Testing Circuitry Figure A																																																																							
Object	+5V2A																																																																								
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<div style="text-align: right; margin-bottom: 10px;"><div>-- □ -- Load 50%</div><div>-- △ -- Load 100%</div></div> <table border="1" style="margin-top: 10px;"><caption>Data extracted from Graph</caption><thead><tr><th>Ambient Temp [°C]</th><th>Load 50% [V]</th><th>Load 100% [V]</th></tr></thead><tbody><tr><td>-20</td><td>~39</td><td>~51</td></tr><tr><td>-10</td><td>~39</td><td>~50</td></tr><tr><td>0</td><td>~39</td><td>~50</td></tr><tr><td>10</td><td>~38</td><td>~49</td></tr><tr><td>20</td><td>~38</td><td>~50</td></tr><tr><td>25</td><td>~38</td><td>~50</td></tr><tr><td>30</td><td>~38</td><td>~51</td></tr><tr><td>40</td><td>~38</td><td>~51</td></tr><tr><td>50</td><td>~38</td><td>~51</td></tr><tr><td>60</td><td>~38</td><td>~52</td></tr></tbody></table> <p>Note: Slanted line shows the range of the rated ambient temperature.</p>		Ambient Temp [°C]	Load 50% [V]	Load 100% [V]	-20	~39	~51	-10	~39	~50	0	~39	~50	10	~38	~49	20	~38	~50	25	~38	~50	30	~38	~51	40	~38	~51	50	~38	~51	60	~38	~52	<table border="1"><thead><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></thead><tbody><tr><td>-20</td><td>39</td><td>51</td></tr><tr><td>-10</td><td>39</td><td>50</td></tr><tr><td>0</td><td>39</td><td>50</td></tr><tr><td>10</td><td>38</td><td>49</td></tr><tr><td>20</td><td>38</td><td>50</td></tr><tr><td>25</td><td>38</td><td>50</td></tr><tr><td>30</td><td>38</td><td>51</td></tr><tr><td>40</td><td>38</td><td>51</td></tr><tr><td>50</td><td>38</td><td>51</td></tr><tr><td>60</td><td>38</td><td>52</td></tr><tr><td>--</td><td>-</td><td>-</td></tr></tbody></table>	Ambient Temperature [°C]	Input Voltage [V]		Load 50%	Load 100%	-20	39	51	-10	39	50	0	39	50	10	38	49	20	38	50	25	38	50	30	38	51	40	38	51	50	38	51	60	38	52	--	-	-
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Model	LFA10F-5																																											
Item	Overcurrent Protection	Temperature	25℃																																									
Object	+5V2A	Testing Circuitry	Figure A																																									
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Model	LFA10F-5																																							
Item	Overvoltage Protection	Testing Circuitry Figure A																																						
Object	+5V2A																																							
1.Graph		2.Values																																						
<div><div><div>—△— Input Volt. 100V</div><div>---□--- Input Volt. 200V</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></div>		<table><tr><th rowspan="2">Ambient Temperature [°C]</th><th colspan="2">Operating Point [V]</th></tr><tr><th>Input Volt. 100[V]</th><th>Input Volt. 200[V]</th></tr><tr><td>-20</td><td>6.60</td><td>6.60</td></tr><tr><td>-10</td><td>6.60</td><td>6.60</td></tr><tr><td>0</td><td>6.59</td><td>6.59</td></tr><tr><td>10</td><td>6.52</td><td>6.52</td></tr><tr><td>20</td><td>6.52</td><td>6.52</td></tr><tr><td>25</td><td>6.52</td><td>6.52</td></tr><tr><td>30</td><td>6.52</td><td>6.52</td></tr><tr><td>40</td><td>6.52</td><td>6.52</td></tr><tr><td>50</td><td>6.52</td><td>6.52</td></tr><tr><td>60</td><td>6.52</td><td>6.52</td></tr><tr><td>--</td><td>-</td><td>-</td></tr></table>	Ambient Temperature [°C]	Operating Point [V]		Input Volt. 100[V]	Input Volt. 200[V]	-20	6.60	6.60	-10	6.60	6.60	0	6.59	6.59	10	6.52	6.52	20	6.52	6.52	25	6.52	6.52	30	6.52	6.52	40	6.52	6.52	50	6.52	6.52	60	6.52	6.52	--	-	-
Ambient Temperature [°C]	Operating Point [V]																																							
	Input Volt. 100[V]	Input Volt. 200[V]																																						
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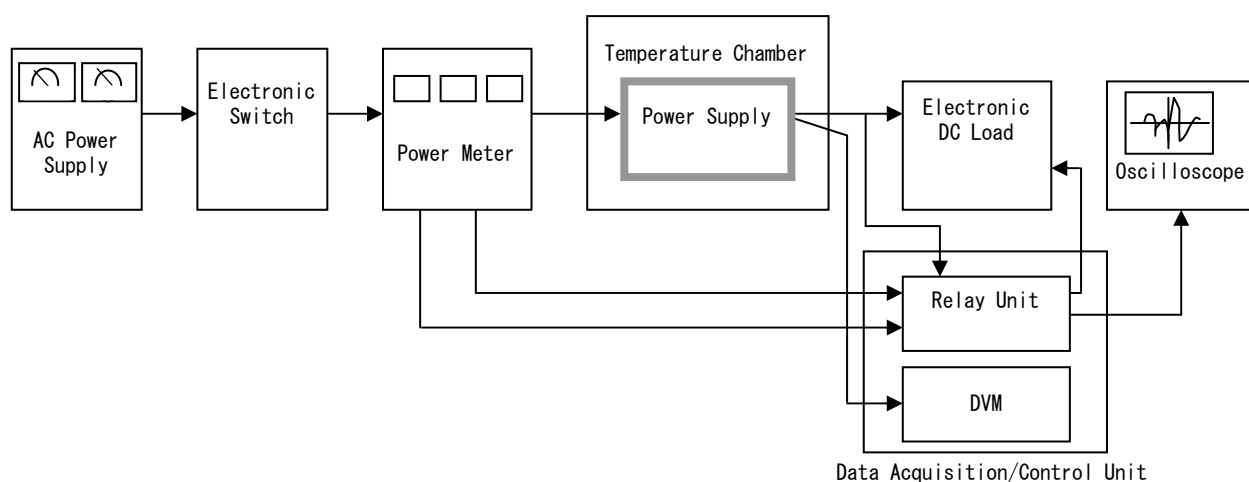


Figure A

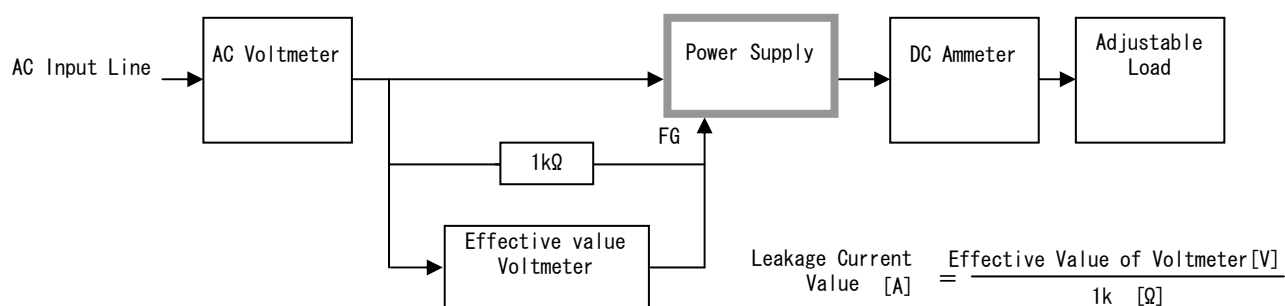


Figure B (DEN-AN)

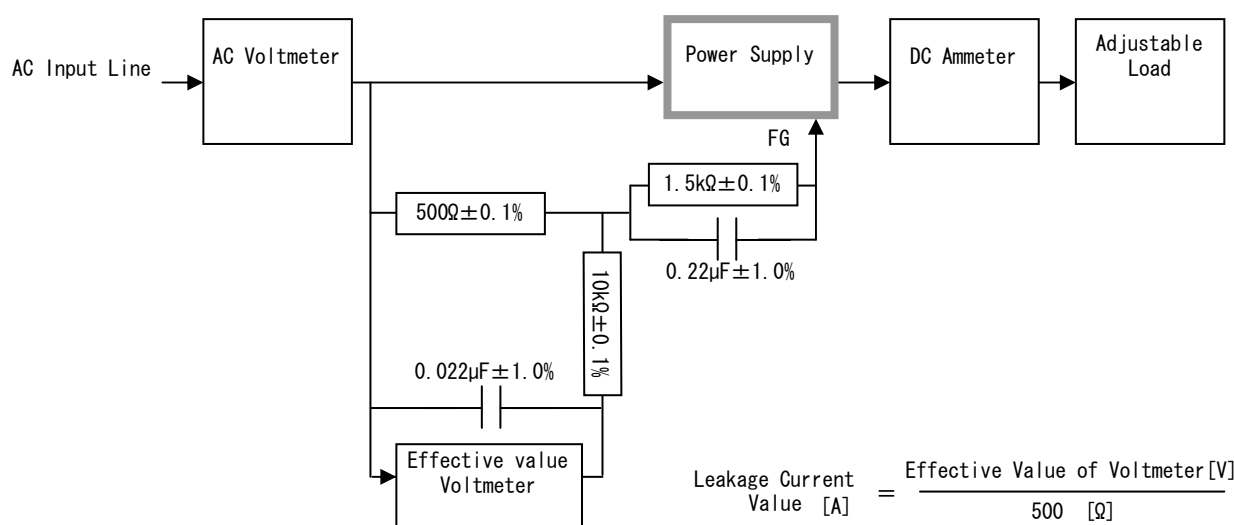


Figure B (IEC60950-1)

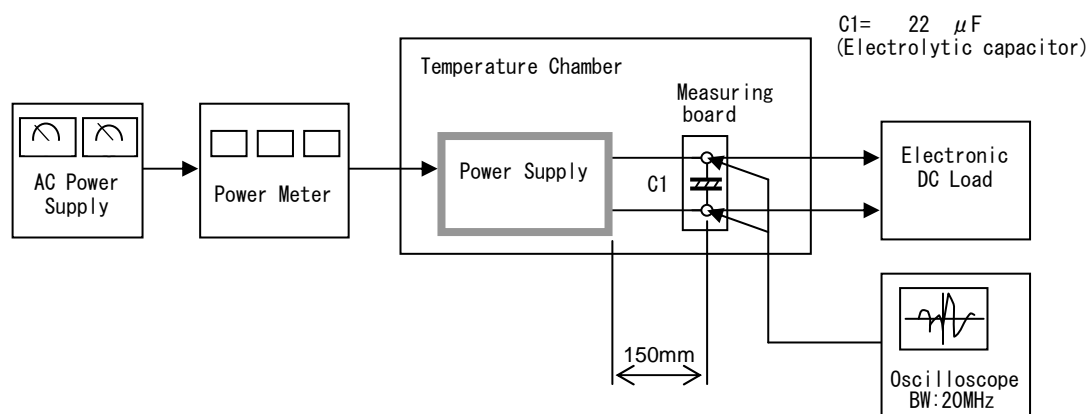


Figure C