



TEST DATA OF LFA15F-3R3-Y

Regulated DC Power Supply
June 26, 2009

Approved by : *Yoshiaki Shimizu*
Yoshiaki Shimizu Design Manager

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Yuki Nakamura Design Engineer

COSEL CO.,LTD.

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Model	LFA15F-3R3-Y																																																					
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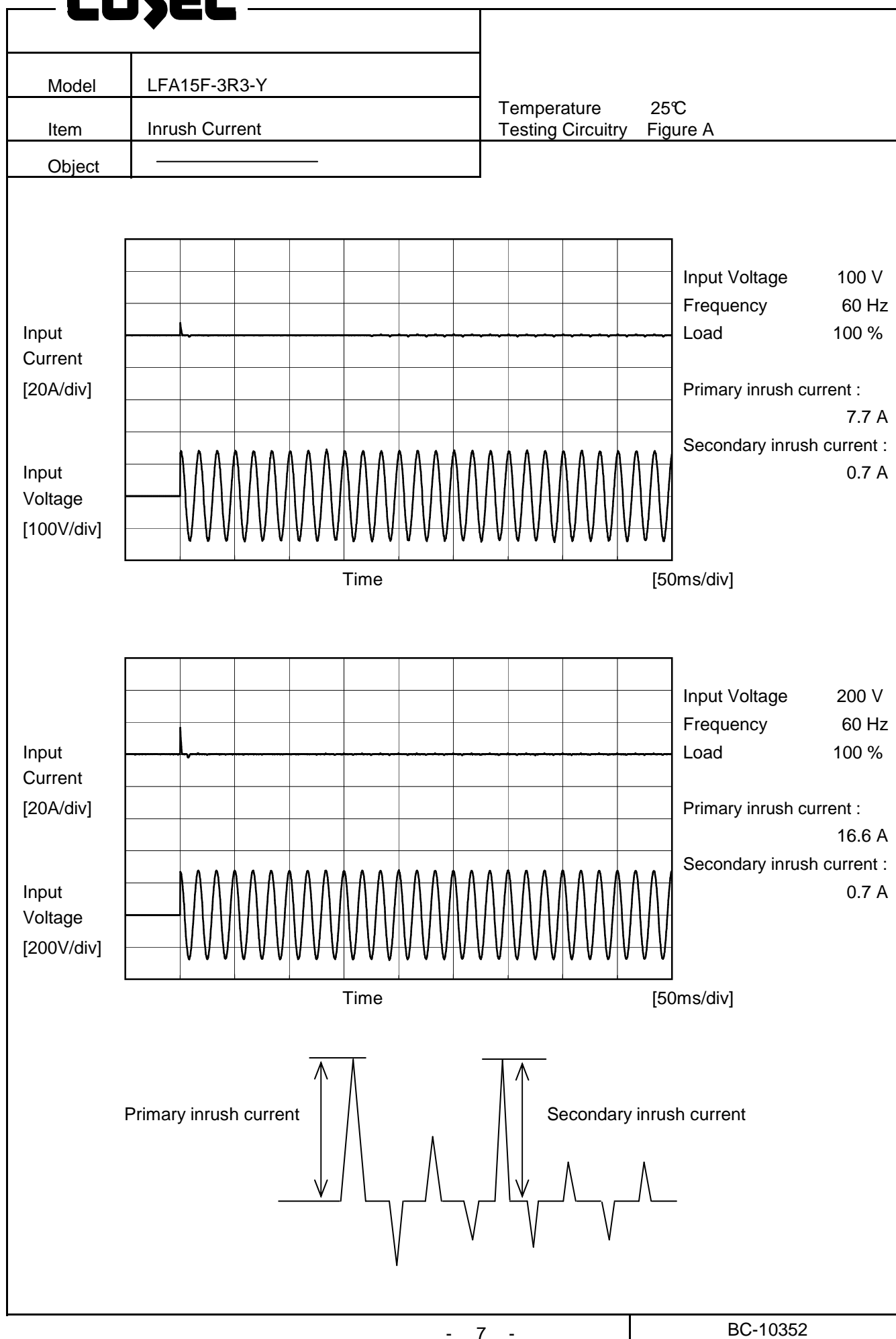
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		Temperature 25℃ Testing Circuitry Figure B
Model	LFA15F-3R3-Y	
Item	Leakage Current	
Object	_____	

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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Item	Line Regulation	Temperature	25℃																														
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Object	+3.3V3A																																
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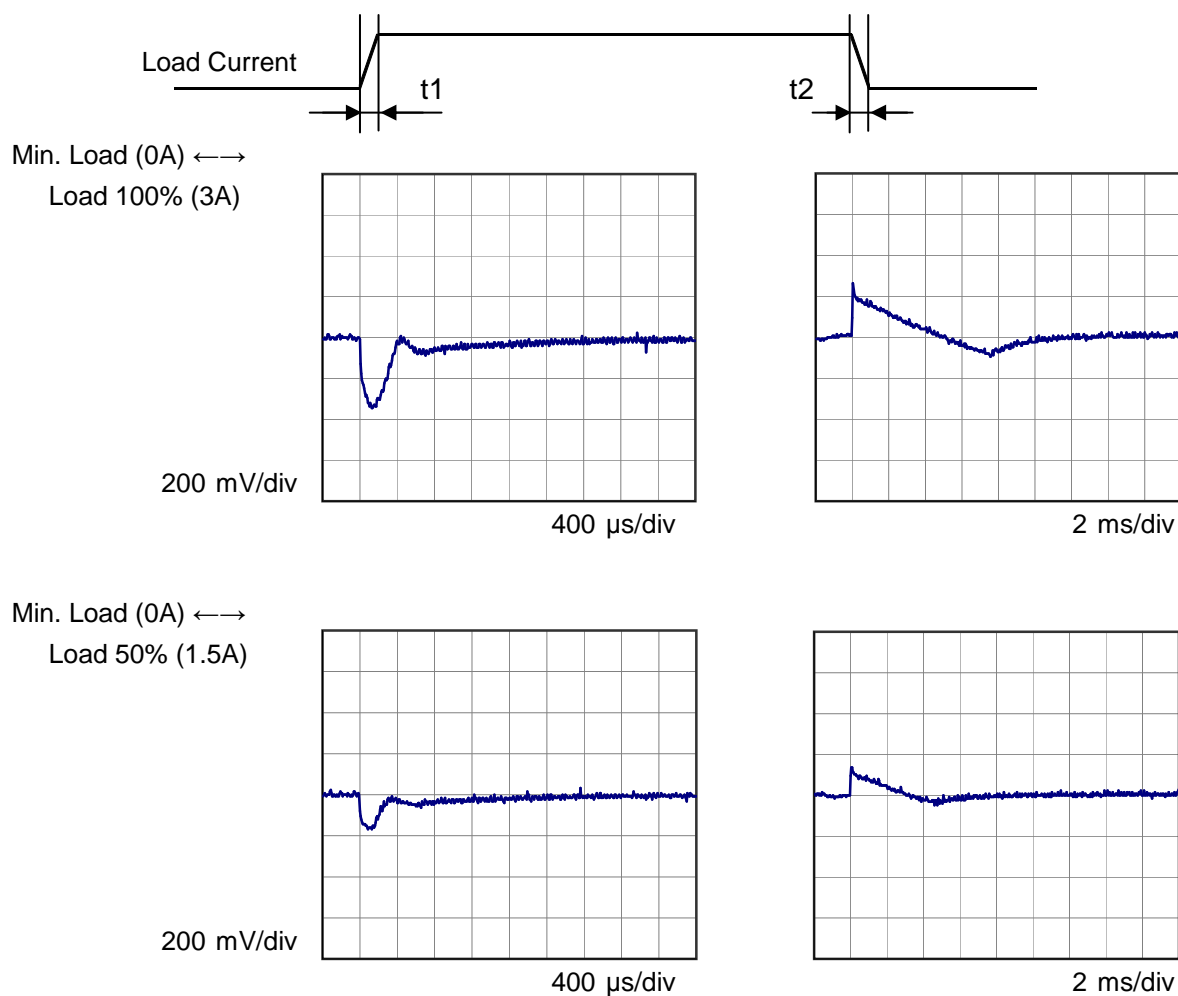
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Model	LFA15F-3R3-Y	Temperature Testing Circuitry	25°C Figure A
Item	Dynamic Load Response		
Object	+3.3V3A		

Input Volt. 100 V
Cycle 1000 ms

Response. $t_1=t_2=50\mu\text{s}$. Typ



Model	LFA15F-3R3-Y																																								
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<div><div><div>—△— Input Volt. 100V</div><div>- -○- - Input Volt. 200V</div></div><div>Ripple Voltage [mV]</div><div>Load Current [A]</div></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>50</td></tr><tr><td>0.6</td><td>15</td><td>15</td></tr><tr><td>1.2</td><td>20</td><td>20</td></tr><tr><td>1.8</td><td>25</td><td>20</td></tr><tr><td>2.4</td><td>25</td><td>20</td></tr><tr><td>3.0</td><td>30</td><td>25</td></tr><tr><td>3.3</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> <p>Measured by 20 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> <div><div>T1: Due to AC Input Line</div><div>T2: Due to Switching</div><div>Ripple [mVp-p]</div><div>T1</div><div>T2</div></div> <p>Fig. Complex Ripple Wave Form</p>		Load Current [A]	Ripple Voltage [mV]		Input Volt. 100 [V]	Input Volt. 200 [V]	0.0	30	50	0.6	15	15	1.2	20	20	1.8	25	20	2.4	25	20	3.0	30	25	3.3	30	25	--	-	-	--	-	-	--	-	-	--	-	-		
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1.2	20	20																																							
1.8	25	20																																							
2.4	25	20																																							
3.0	30	25																																							
3.3	30	25																																							
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Model	LFA15F-3R3-Y																																								
Item	Ripple-Noise	Temperature	25℃																																						
Object	+3.3V3A	Testing Circuitry	Figure C																																						
1.Graph		2.Values																																							
<div><div><div>—△— Input Volt. 100V</div><div>-·-○-·- Input Volt. 200V</div></div><p>Measured by 20 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></div>		<table><tr><th rowspan="2">Load Current [A]</th><th colspan="2">Ripple-Noise [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>0.6</td><td>15</td><td>20</td></tr><tr><td>1.2</td><td>20</td><td>25</td></tr><tr><td>1.8</td><td>25</td><td>25</td></tr><tr><td>2.4</td><td>25</td><td>25</td></tr><tr><td>3.0</td><td>30</td><td>30</td></tr><tr><td>3.3</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></table>		Load Current [A]	Ripple-Noise [mV]		Input Volt. 100 [V]	Input Volt. 200 [V]	0.0	30	55	0.6	15	20	1.2	20	25	1.8	25	25	2.4	25	25	3.0	30	30	3.3	30	30	--	-	-	--	-	-	--	-	-	--	-	-
Load Current [A]	Ripple-Noise [mV]																																								
	Input Volt. 100 [V]	Input Volt. 200 [V]																																							
0.0	30	55																																							
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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>																																									

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Model		LFA15F-3R3-Y		Testing Circuitry Figure A																																																		
Item		Ambient Temperature Drift																																																				
Object		+3.3V3A																																																				
1.Graph		<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> <div><div>Output Voltage [V]</div><div>Ambient Temperature [°C]</div><div>Load 100%</div></div>		2.Values																																																		
		<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>3.309</td><td>3.309</td><td>3.309</td></tr><tr><td>-10</td><td>3.311</td><td>3.311</td><td>3.311</td></tr><tr><td>0</td><td>3.312</td><td>3.312</td><td>3.312</td></tr><tr><td>10</td><td>3.313</td><td>3.313</td><td>3.313</td></tr><tr><td>20</td><td>3.314</td><td>3.314</td><td>3.314</td></tr><tr><td>25</td><td>3.314</td><td>3.314</td><td>3.314</td></tr><tr><td>30</td><td>3.314</td><td>3.314</td><td>3.314</td></tr><tr><td>40</td><td>3.314</td><td>3.314</td><td>3.314</td></tr><tr><td>50</td><td>3.314</td><td>3.314</td><td>3.314</td></tr><tr><td>60</td><td>3.314</td><td>3.314</td><td>3.314</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	3.309	3.309	3.309	-10	3.311	3.311	3.311	0	3.312	3.312	3.312	10	3.313	3.313	3.313	20	3.314	3.314	3.314	25	3.314	3.314	3.314	30	3.314	3.314	3.314	40	3.314	3.314	3.314	50	3.314	3.314	3.314	60	3.314	3.314	3.314	--	-	-	-
Ambient Temperature [°C]	Output Voltage [V]																																																					
	Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]																																																			
-20	3.309	3.309	3.309																																																			
-10	3.311	3.311	3.311																																																			
0	3.312	3.312	3.312																																																			
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20	3.314	3.314	3.314																																																			
25	3.314	3.314	3.314																																																			
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40	3.314	3.314	3.314																																																			
50	3.314	3.314	3.314																																																			
60	3.314	3.314	3.314																																																			
--	-	-	-																																																			
Note: Slanted line shows the range of the rated ambient temperature.																																																						

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		Testing Circuitry Figure A
Model	LFA15F-3R3-Y	
Item	Output Voltage Accuracy	
Object	+3.3V3A	

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

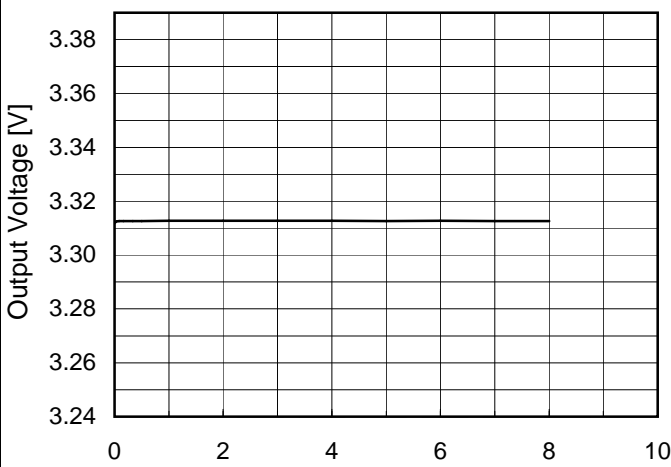
Load Current : 0 - 3A

* 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	40	85	0	3.322	±6	±0.2
Minimum Voltage	-10	264	3	3.311		

Model	LFA15F-3R3-Y																								
Item	Time Lapse Drift	Temperature	25℃																						
		Testing Circuitry	Figure A																						
Object	+3.3V3A																								
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>3.312</td></tr><tr><td>0.5</td><td>3.313</td></tr><tr><td>1.0</td><td>3.313</td></tr><tr><td>2.0</td><td>3.313</td></tr><tr><td>3.0</td><td>3.313</td></tr><tr><td>4.0</td><td>3.313</td></tr><tr><td>5.0</td><td>3.313</td></tr><tr><td>6.0</td><td>3.313</td></tr><tr><td>7.0</td><td>3.313</td></tr><tr><td>8.0</td><td>3.313</td></tr></table>		Time since start [H]	Output Voltage [V]	0.0	3.312	0.5	3.313	1.0	3.313	2.0	3.313	3.0	3.313	4.0	3.313	5.0	3.313	6.0	3.313	7.0	3.313	8.0	3.313
Time since start [H]	Output Voltage [V]																								
0.0	3.312																								
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6.0	3.313																								
7.0	3.313																								
8.0	3.313																								
* The characteristic of AC200V is equal.																									

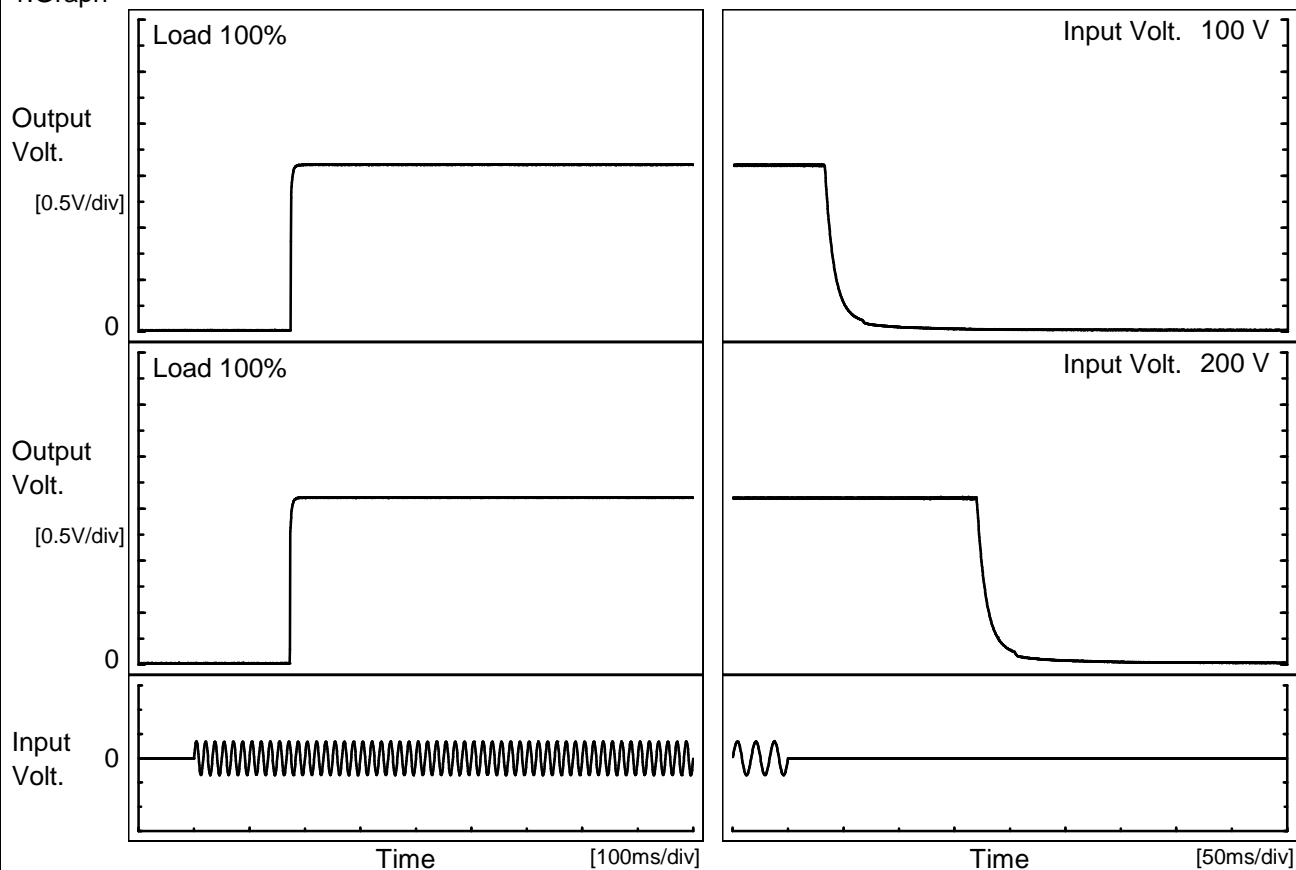
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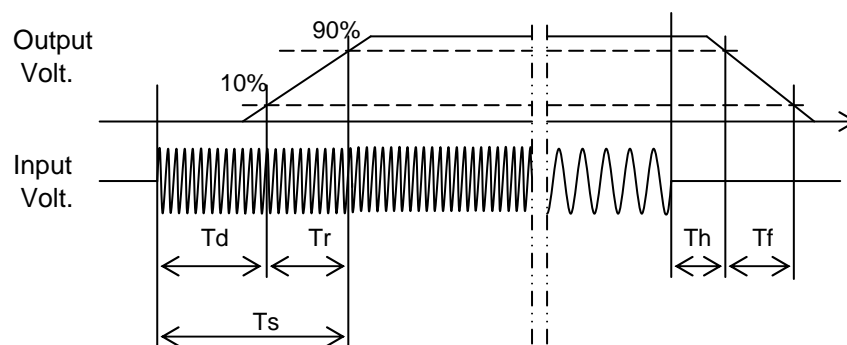
Model	LFA15F-3R3-Y	Temperature	25°C
Item	Rise and Fall Time	Testing Circuitry	Figure A
Object	+3.3V3A		

1. Graph



2. Values

Input Volt.	Time	Td	Tr	Ts	Th	Tf
100 V		174.5	3.5	178.0	33.0	23.3
200 V		173.5	3.0	176.5	170.5	25.0



Model	LFA15F-3R3-Y																																		
Item	Hold-Up Time	Temperature	25℃																																
		Testing Circuitry	Figure A																																
Object	+3.3V3A																																		
1.Graph		2.Values																																	
<div><div>---□--- Load 50%</div><div>—△— Load 100%</div><p>Hold-Up Time [ms]</p><p>Input Voltage [V]</p></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>35</td><td>9</td></tr><tr><td>85</td><td>49</td><td>16</td></tr><tr><td>100</td><td>73</td><td>30</td></tr><tr><td>120</td><td>112</td><td>47</td></tr><tr><td>200</td><td>344</td><td>168</td></tr><tr><td>230</td><td>460</td><td>233</td></tr><tr><td>264</td><td>612</td><td>313</td></tr><tr><td>280</td><td>691</td><td>355</td></tr><tr><td>--</td><td>-</td><td>-</td></tr></table>		Input Voltage [V]	Hold-Up Time [ms]		Load 50%	Load 100%	75	35	9	85	49	16	100	73	30	120	112	47	200	344	168	230	460	233	264	612	313	280	691	355	--	-	-
Input Voltage [V]	Hold-Up Time [ms]																																		
	Load 50%	Load 100%																																	
75	35	9																																	
85	49	16																																	
100	73	30																																	
120	112	47																																	
200	344	168																																	
230	460	233																																	
264	612	313																																	
280	691	355																																	
--	-	-																																	
<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	LFA15F-3R3-Y																																																					
Item	Instantaneous Interruption Compensation	Temperature	25℃																																																			
Object	+3.3V3A	Testing Circuitry	Figure A																																																			
1.Graph		2.Values																																																				
<div><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></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>0.6</td><td>176</td><td>761</td><td>990</td></tr><tr><td>1.2</td><td>95</td><td>424</td><td>567</td></tr><tr><td>1.8</td><td>60</td><td>291</td><td>397</td></tr><tr><td>2.4</td><td>39</td><td>220</td><td>290</td></tr><tr><td>3.0</td><td>30</td><td>168</td><td>230</td></tr><tr><td>3.3</td><td>26</td><td>155</td><td>213</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	-	-	-	0.6	176	761	990	1.2	95	424	567	1.8	60	291	397	2.4	39	220	290	3.0	30	168	230	3.3	26	155	213	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-
Load Current [A]	Time [ms]																																																					
	Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]																																																			
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		Testing Circuitry Figure A
Model	LFA15F-3R3-Y	
Item	Minimum Input Voltage for Regulated Output Voltage	
Object	+3.3V3A	
1.Graph		2.Values
<div><div><div>---□---</div><div>Load 50%</div></div><div><div>—△—</div><div>Load 100%</div></div></div> <p>Note: Slanted line shows the range of the rated ambient temperature.</p>		

Ambient Temperature [°C]	Input Voltage [V]	
	Load 50%	Load 100%
-20	36	48
-10	36	47
0	35	46
10	35	46
20	34	46
25	34	46
30	34	46
40	34	46
50	34	46
60	34	47
--	-	-

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COSEL																																												
Model	LFA15F-3R3-Y																																											
Item	Overcurrent Protection	Temperature	25℃																																									
Object	+3.3V3A	Testing Circuitry	Figure A																																									
1.Graph		2.Values																																										
<div><div><div>△</div><div>Input Volt. 100V</div></div><div><div>○</div><div>Input Volt. 200V</div></div></div> <p>Note: Slanted line shows the range of the rated load current.</p> <p>Intermittent operation occurs when the output voltage is less than rated output voltage.</p>		<table><tr><th rowspan="2">Output Voltage [V]</th><th colspan="2">Load Current [A]</th></tr><tr><th>Input Volt. 100[V]</th><th>Input Volt. 200[V]</th></tr><tr><td>3.300</td><td>5.33</td><td>7.05</td></tr><tr><td>3.135</td><td>-</td><td>-</td></tr><tr><td>2.970</td><td>-</td><td>-</td></tr><tr><td>2.640</td><td>-</td><td>-</td></tr><tr><td>2.310</td><td>-</td><td>-</td></tr><tr><td>1.980</td><td>-</td><td>-</td></tr><tr><td>1.650</td><td>-</td><td>-</td></tr><tr><td>1.320</td><td>-</td><td>-</td></tr><tr><td>0.990</td><td>-</td><td>-</td></tr><tr><td>0.660</td><td>-</td><td>-</td></tr><tr><td>0.330</td><td>-</td><td>-</td></tr><tr><td>0.000</td><td>-</td><td>-</td></tr></table>		Output Voltage [V]	Load Current [A]		Input Volt. 100[V]	Input Volt. 200[V]	3.300	5.33	7.05	3.135	-	-	2.970	-	-	2.640	-	-	2.310	-	-	1.980	-	-	1.650	-	-	1.320	-	-	0.990	-	-	0.660	-	-	0.330	-	-	0.000	-	-
Output Voltage [V]	Load Current [A]																																											
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0.990	-	-																																										
0.660	-	-																																										
0.330	-	-																																										
0.000	-	-																																										

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Model	LFA15F-3R3-Y																																							
Item	Overvoltage Protection	Testing Circuitry Figure A																																						
Object	+3.3V3A																																							
1.Graph <p>Note: Slanted line shows the range of the rated ambient temperature.</p>		2.Values <table border="1"> <thead> <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> </thead> <tbody> <tr><td>-20</td><td>4.93</td><td>4.93</td></tr> <tr><td>-10</td><td>4.86</td><td>4.86</td></tr> <tr><td>0</td><td>4.79</td><td>4.79</td></tr> <tr><td>10</td><td>4.79</td><td>4.79</td></tr> <tr><td>20</td><td>4.72</td><td>4.72</td></tr> <tr><td>25</td><td>4.72</td><td>4.72</td></tr> <tr><td>30</td><td>4.65</td><td>4.65</td></tr> <tr><td>40</td><td>4.65</td><td>4.65</td></tr> <tr><td>50</td><td>4.58</td><td>4.58</td></tr> <tr><td>60</td><td>4.58</td><td>4.58</td></tr> <tr><td>--</td><td>-</td><td>-</td></tr> </tbody> </table>	Ambient Temperature [°C]	Operating Point [V]		Input Volt. 100[V]	Input Volt. 200[V]	-20	4.93	4.93	-10	4.86	4.86	0	4.79	4.79	10	4.79	4.79	20	4.72	4.72	25	4.72	4.72	30	4.65	4.65	40	4.65	4.65	50	4.58	4.58	60	4.58	4.58	--	-	-
Ambient Temperature [°C]	Operating Point [V]																																							
	Input Volt. 100[V]	Input Volt. 200[V]																																						
-20	4.93	4.93																																						
-10	4.86	4.86																																						
0	4.79	4.79																																						
10	4.79	4.79																																						
20	4.72	4.72																																						
25	4.72	4.72																																						
30	4.65	4.65																																						
40	4.65	4.65																																						
50	4.58	4.58																																						
60	4.58	4.58																																						
--	-	-																																						

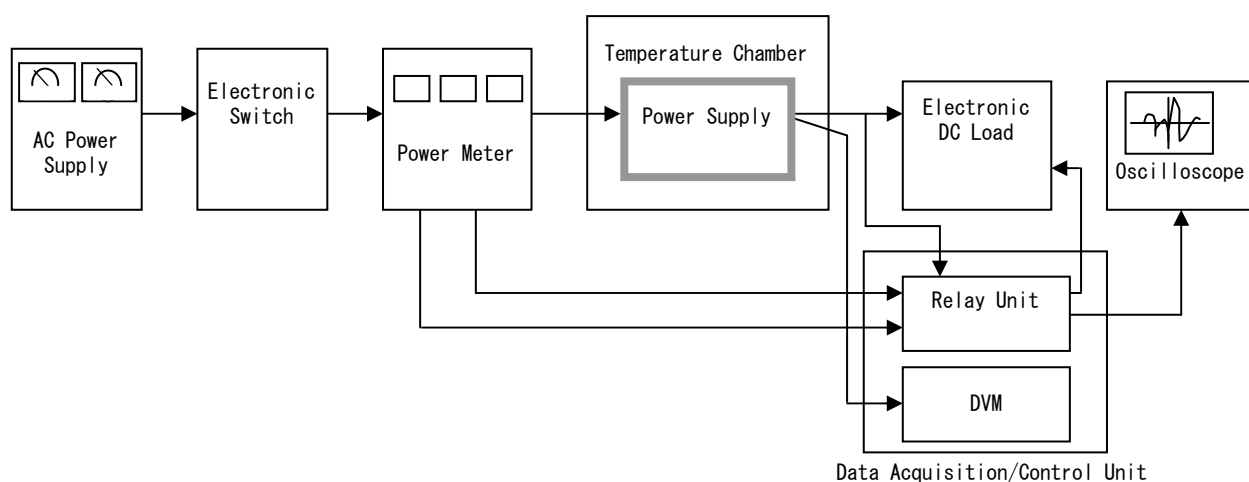


Figure A

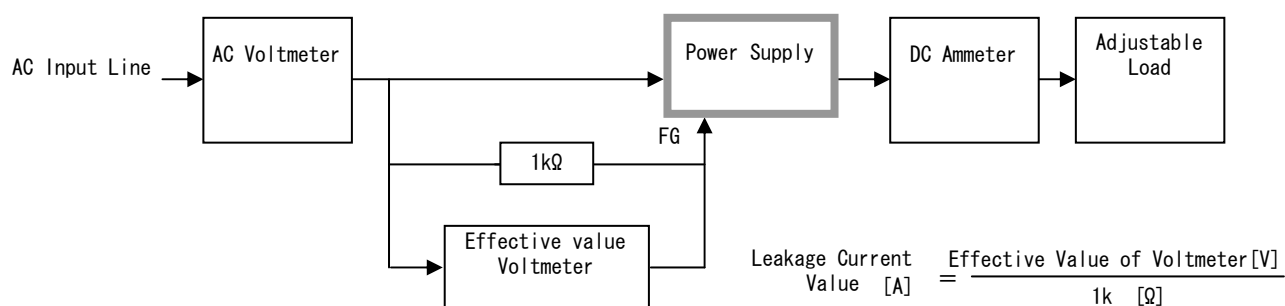


Figure B (DEN-AN)

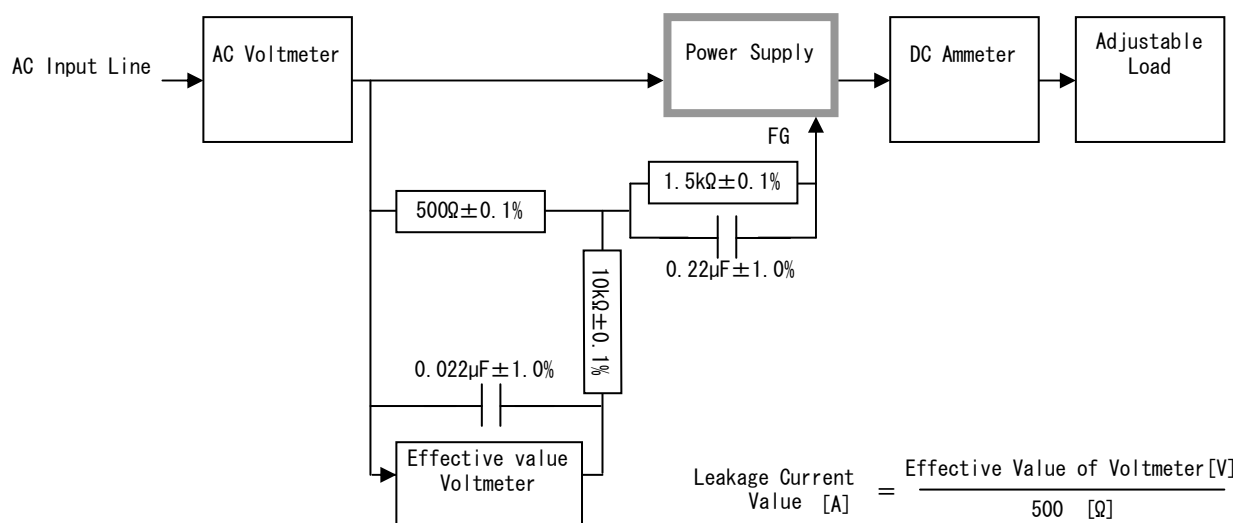


Figure B (IEC60950-1)

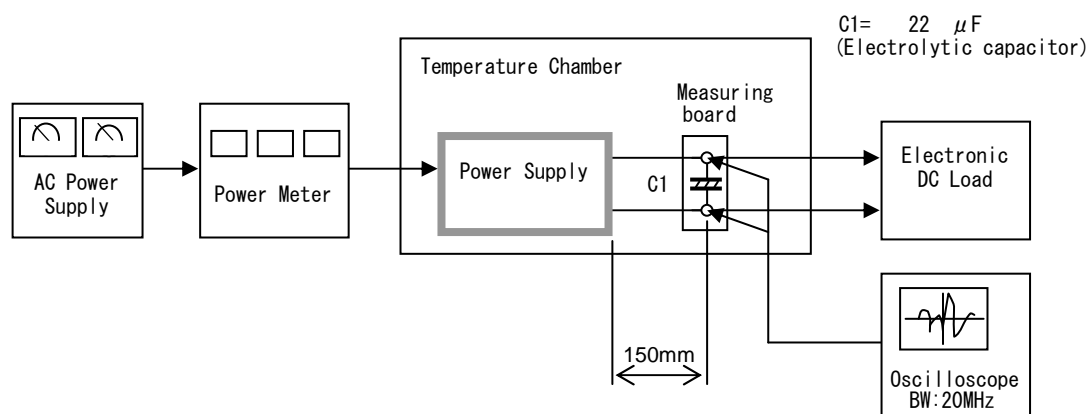


Figure C