

Evaluation Data

	SMPS
	CSF150-S
Rev. No.	A

2007 4 19

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: 장영민
: 장영민



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Evaluation data

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1-1. CSF150-3R3 Input characteristics

- ◆ Oscilloscope : LT374AL(LeCroy)
 - ◇ CH1 : Input voltage – ADP305 High voltage differential probe(BW:200MHz)
 - ◇ CH2 : Input current – AP015 current probe (BW:20MHz)
- ◆ Digital Multimeter : FLUKE189 (FLUKE)

입력	출력	측정값	파형	비고
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(1) Inrush Current Characteristics (110V)

$V_{in} = 110V$	$I_o = 100\%$	$I_{inrush} = 15.9A$		CH1 100V/div 5.00ms/div CH2 5.00A/div 5.00ms/div
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(2) Inrush Current Characteristics (220V)

$V_{in} = 220V$	$I_o = 100\%$	$I_{inrush} = 25.9A$		CH1 200V/div 5.00ms/div CH2 10.0A/div 5.00ms/div
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(3) Input Current & Efficiency Characteristics

Condition $T_a : 25^\circ C$

$V_{in} \backslash I_o$		85V	110V	132V	170V	220V	264V
Load (min)	Input Current	0.00A	0.00A	0.00A	0.00A	0.00A	0.00A
	Efficiency	-	-	-	-	-	-
Load (50%)	Input Current	0.785A	0.599A	0.499A	0.372A	0.284A	0.237A
	Efficiency	74%	75%	75%	78%	79%	79%
Load (100%)	Input Current	1.532A	1.168A	0.974A	0.727A	0.555A	0.462A
	Efficiency	76%	77%	77%	80%	81%	81%

1-2. CSF150-3R3 Output characteristics

◆ Oscilloscope : LT374AL(LeCroy)

◇ CH2 : Output current – AP015 current probe (BW:20MHz)

◇ CH3 : Output voltage – ADP305 High voltage differential probe(BW:200MHz)

◆ Digital Multimeter : FLUKE189 (FLUKE)

입력	출력	측정값	파형				비고
(1) Line & Load Regulation Characteristics							
Condition Ta : 25°C							
V_{in}	85V	110V	132V	170V	220V	264V	Line Regulation
I_o							
Load (min)	3.325V	3.339V	3.339V	3.340V	3.340V	3.339V	15mV
Load (50%)	3.320V	3.332V	3.320V	3.321V	3.320V	3.319V	13mV
Load (100%)	3.300V	3.301V	3.300V	3.301V	3.300V	3.300V	1mV
Load Regulation	25mV	38mV	39mV	39mV	40mV	39mV	

(3) Dynamic Load Response Characteristics (100Hz)

$V_{in} = 220V$	$I_o = 0 \sim 100\%$ 100Hz	$V_{over} = 101mV$ $V_{under} = 172mV$		CH3 200mV/div 2.00ms/div CH2 10.0A/div 2.00ms/div
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(4) Dynamic Load Response Characteristics (1kHz)

$V_{in} = 220V$	$I_o = 0 \sim 100\%$ 1kHz	$V_{over} = 102mV$ $V_{under} = 104mV$		CH3 200mV/div 200us/div CH2 10.0A/div 200us/div
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1-3. CSF150-3R3 Output characteristics

◆ Oscilloscope : LT374AL(LeCroy)

- ◇ CH1 : Output current – AP015 current probe (BW:20MHz)
- ◇ CH3 : Input voltage – ADP305 High voltage differential probe(BW:200MHz)
- ◇ CH4 : Output voltage – DA1855 Differential Probe

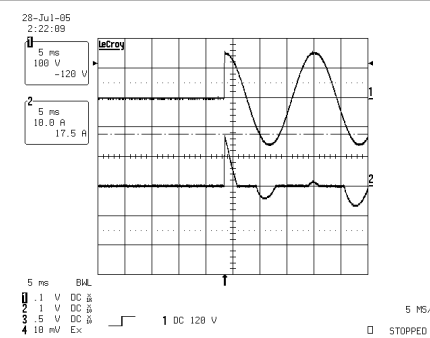
입력	출력	측정값	파형	비고
(1) Ripple & Noise characteristics.				
Vin= 220V	Io= 100%	V _{Ripple} = 30.0mV V _{Noise} = 36.2mV		CH4 10.0mV/div 2.00us/div
(2) Turn on time characteristics				
Vin= 85V	Io= 100%	t _{turn on} = 151.3ms		CH3 100V/div 50.0ms/div CH4 1.00V/div 50.0ms/div
(3) Hold up characteristics				
Vin= 100V	Io= 100%	t _{hold up} = 45.0ms		CH3 100V/div 10.0ms/div CH4 1.00V/div 10.0ms/div
(4) Over Current protection characteristics				
Vin= 220V	Io= 110~145%	O.C.P = 37.8A		X(CH1) 5.00A/div 0.10ms/div Y(CH4) 0.5V/div 0.10ms/div

2-1. CSF150-05 Input characteristics

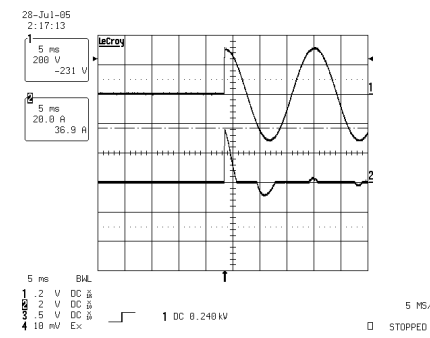
- ◆ Oscilloscope : LT374AL(LeCroy)
 - ◇ CH1 : Input voltage – ADP305 High voltage differential probe(BW:200MHz)
 - ◇ CH2 : Input current – AP015 current probe (BW:20MHz)
- ◆ Digital Multimeter : FLUKE189 (FLUKE)

입력	출력	측정값	파형	비고
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(1) Inrush Current Characteristics (110V)

$V_{in} = 110V$	$I_o = 100\%$	$I_{inrush} = 17.5A$		CH1 100V/div 5.00ms/div CH2 10.0A/div 5.00ms/div
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(2) Inrush Current Characteristics (220V)

$V_{in} = 220V$	$I_o = 100\%$	$I_{inrush} = 36.9A$		CH1 200V/div 5.00ms/div CH2 20.0A/div 5.00ms/div
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(3) Input Current & Efficiency Characteristics

Condition $T_a : 25^\circ C$

V_{in} / I_o		85V	110V	132V	170V	220V	264V
Load (min)	Input Current	0.00A	0.00A	0.00A	0.00A	0.00A	0.00A
	Efficiency	-	-	-	-	-	-
Load (50%)	Input Current	1.129A	0.873A	0.718A	0.543A	0.420A	0.346A
	Efficiency	78%	78%	79%	81%	81%	82%
Load (100%)	Input Current	2.203A	1.702A	1.401A	1.061A	0.820A	0.675A
	Efficiency	80%	80%	81%	83%	83%	84%

2-2. CSF150-05 Output characteristics

◆ Oscilloscope : LT374AL(LeCroy)

◇ CH2 : Output current – AP015 current probe (BW:20MHz)

◇ CH3 : Output voltage – ADP305 High voltage differential probe(BW:200MHz)

◆ Digital Multimeter : FLUKE189 (FLUKE)

입력	출력	측정값	파형				비고
(1) Line & Load Regulation Characteristics							
Condition Ta : 25°C							
V_{in}	85V	110V	132V	170V	220V	264V	Line Regulation
I_o							
Load (min)	5.027V	5.028V	5.031V	5.031V	5.035V	5.035V	8mV
Load (50%)	5.005V	5.005V	5.009V	5.007V	5.016V	5.012V	11mV
Load (100%)	4.981V	4.983V	4.986V	4.986V	4.992V	5.4989V	11mV
Load Regulation	46mV	45mV	45mV	45mV	43mV	46mV	

(3) Dynamic Load Response Characteristics (100Hz)

$V_{in} = 220V$	$I_o = 0 \sim 100\%$ 100Hz	$V_{over} = 136mV$ $V_{under} = 150mV$		<p>CH3 200mV/div 2.00ms/div</p> <p>CH2 10.0A/div 2.00ms/div</p>
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(4) Dynamic Load Response Characteristics (1kHz)

$V_{in} = 220V$	$I_o = 0 \sim 100\%$ 1kHz	$V_{over} = 124mV$ $V_{under} = 106mV$		<p>CH3 200mV/div 200us/div</p> <p>CH2 10.0A/div 200us/div</p>
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2-3. CSF150-05 Output characteristics

◆ Oscilloscope : LT374AL(LeCroy)

- ◇ CH1 : Output current – AP015 current probe (BW:20MHz)
- ◇ CH3 : Input voltage – ADP305 High voltage differential probe(BW:200MHz)
- ◇ CH4 : Output voltage – DA1855 Differential Probe

입력	출력	측정값	파형	비고
(1) Ripple & Noise characteristics.				
Vin= 220V	Io=100%	V _{Ripple} = 45.0mV V _{Noise} = 73.0mV		CH4 20.0mV/div 2.00us/div
(2) Turn on time characteristics				
Vin= 85V	Io=100%	t _{turn on} = 150.5ms		CH3 100V/div 50ms/div CH4 2V/div 50ms/div
(3) Hold up characteristics				
Vin= 100V	Io=100%	t _{hold up} = 24.6ms		CH3 100V/div 20.0ms/div CH4 2.00V/div 20.0ms/div
(4) Over Current protection characteristics				
Vin= 220V	Io= 110~145%	O.C.P = 38.0A		X(CH1) 5.00A/div 0.50ms/div Y(CH4) 1.00V/div 0.50ms/div

3-1. CSF150-09 Input characteristics

- ◆ Oscilloscope : LT374AL(LeCroy)
 - ◇ CH1 : Input voltage – ADP305 High voltage differential probe(BW:200MHz)
 - ◇ CH2 : Input current – AP015 current probe (BW:20MHz)
- ◆ Digital Multimeter : FLUKE189 (FLUKE)

입력	출력	측정값	파형	비고
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(1) Inrush Current Characteristics (110V)

$V_{in} = 110V$	$I_o = 100\%$	$I_{inrush} = 18.4A$		CH1 100V/div 5.00ms/div CH2 1.00A/div 5.00ms/div
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(2) Inrush Current Characteristics (220V)

$V_{in} = 220V$	$I_o = 100\%$	$I_{inrush} = 37.3A$		CH1 200V/div 5.00ms/div CH2 20.0A/div 5.00ms/div
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(3) Input Current & Efficiency Characteristics

Condition $T_a : 25^\circ C$

V_{in} / I_o		85V	110V	132V	170V	220V	264V
Load (min)	Input Current	0.00A	0.00A	0.00A	0.00A	0.00A	0.00A
	Efficiency	–	–	–	–	–	–
Load (50%)	Input Current	1.086A	0.839A	0.691A	0.530A	0.404A	0.337A
	Efficiency	81%	81%	82%	83%	84%	84%
Load (100%)	Input Current	2.115A	1.635A	1.346A	1.033A	0.789A	0.657A
	Efficiency	83%	83%	84%	85%	86%	86%

3-2. CSF150-09 Output characteristics

- ◆ Oscilloscope : LT374AL(LeCroy)
 - ◇ CH2 : Output current – AP015 current probe (BW:20MHz)
 - ◇ CH3 : Output voltage – ADP305 High voltage differential probe(BW:200MHz)
- ◆ Digital Multimeter : FLUKE189 (FLUKE)

입력	출력	측정값	파형				비고
(1) Line & Load Regulation Characteristics							
Condition Ta : 25°C							
V_{in}	85V	110V	132V	170V	220V	264V	Line Regulation
I_o							
Load (min)	9.011V	9.020V	9.020V	9.021V	9.021V	9.020V	10mV
Load (50%)	9.002V	9.009V	9.010V	9.010V	9.022V	9.010V	20mV
Load (100%)	8.993V	8.998V	8.999V	9.000V	9.007V	9.004V	14mV
Load Regulation	18mV	22mV	21mV	21mV	15mV	16mV	

(3) Dynamic Load Response Characteristics (100Hz)

$V_{in} = 220V$	$I_o = 0 \sim 100\%$ 100Hz	$V_{over} = 52mV$ $V_{under} = 94mV$		CH3 200mV/div 2.00ms/div CH2 5.00A/div 2.00ms/div
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(4) Dynamic Load Response Characteristics (1kHz)

$V_{in} = 220V$	$I_o = 0 \sim 100\%$ 1kHz	$V_{over} = 42mV$ $V_{under} = 52mV$		CH3 200mV/div 200us/div CH2 5.00A/div 200us/div
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3-3. CSF150-09 Output characteristics

◆ Oscilloscope : LT374AL(LeCroy)

- ◇ CH1 : Output current – AP015 current probe (BW:20MHz)
- ◇ CH3 : Input voltage – ADP305 High voltage differential probe(BW:200MHz)
- ◇ CH4 : Output voltage – DA1855 Differential Probe

입력	출력	측정값	파형	비고
(1) Ripple & Noise characteristics.				
Vin= 220V	Io= 100%	V _{Ripple} = 45.0mV V _{Noise} = 60.2mV		CH4 20.0mV/div 2.00us/div
(2) Turn on time characteristics				
Vin= 85V	Io= 100%	t _{turn on} = 151.2ms		CH3 100V/div 50.0ms/div CH4 5.00V/div 50.0ms/div
(3) Hold up characteristics				
Vin= 100V	Io= 100%	t _{hold up} = 28.8ms		CH3 100V/div 10.0ms/div CH4 5.00V/div 10.0ms/div
(4) Over Current protection characteristics				
Vin= 220V	Io= 110~145%	O.C.P = 21.0A		X(CH1) 5.00A/div 10.0ms/div Y(CH4) 2.00V/div 10.0ms/div

4-1. CSF150-12 Input characteristics

- ◆ Oscilloscope : LT374AL(LeCroy)
 - ◇ CH1 : Input voltage – ADP305 High voltage differential probe(BW:200MHz)
 - ◇ CH2 : Input current – AP015 current probe (BW:20MHz)
- ◆ Digital Multimeter : FLUKE189 (FLUKE)

입력	출력	측정값	파형	비고
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(1) Inrush Current Characteristics (110V)

$V_{in} = 110V$	$I_o = 100\%$	$I_{inrush} = 19.5A$		CH1 100V/div 10.0ms/div CH2 10.0A/div 10.0ms/div
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(2) Inrush Current Characteristics (220V)

$V_{in} = 220V$	$I_o = 100\%$	$I_{inrush} = 35.5A$		CH1 200V/div 10.0ms/div CH2 20.0A/div 10.0ms/div
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(3) Input Current & Efficiency Characteristics

I_o \ V_{in}		Condition $T_a : 25^\circ C$					
		85V	110V	132V	170V	220V	264V
Load (min)	Input Current	0.00A	0.00A	0.00A	0.00A	0.00A	0.00A
	Efficiency	-	-	-	-	-	-
Load (50%)	Input Current	1.085A	0.838A	0.680A	0.529A	0.409A	0.336A
	Efficiency	81%	81%	82%	83%	83%	84%
Load (100%)	Input Current	2.113A	1.633A	1.344A	1.031A	0.797A	0.656A
	Efficiency	83%	83%	84%	85%	85%	86%

4-2. CSF150-12 Output characteristics

◆ Oscilloscope : LT374AL(LeCroy)

◇ CH2 : Output current – AP015 current probe (BW:20MHz)

◇ CH3 : Output voltage – ADP305 High voltage differential probe(BW:200MHz)

◆ Digital Multimeter : FLUKE189 (FLUKE)

입력	출력	측정값	파형				비고
(1) Line & Load Regulation Characteristics							
Condition Ta : 25°C							
V_{in}	85V	110V	132V	170V	220V	264V	Line Regulation
I_o							
Load (min)	11.94V	11.98V	11.98V	11.98V	11.99V	11.99V	50mV
Load (50%)	11.96V	11.97V	11.97V	11.97V	11.99V	11.98V	30mV
Load (100%)	11.96V	11.96V	11.96V	11.97V	11.97V	11.97V	10mV
Load Regulation	20mV	20mV	20mV	10mV	20mV	20mV	

(3) Dynamic Load Response Characteristics (100Hz)

$V_{in} = 220V$	$I_o = 0 \sim 100\%$ 100Hz	$V_{over} = 86mV$ $V_{under} = 132mV$		CH3 200mV/div 2.00ms/div CH2 5.00A/div 2.00ms/div
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(4) Dynamic Load Response Characteristics (1kHz)

$V_{in} = 220V$	$I_o = 0 \sim 100\%$ 1kHz	$V_{over} = 64mV$ $V_{under} = 86mV$		CH3 200mV/div 200us/div CH2 5.00A/div 200us/div
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4-3. CSF150-12 Output characteristics

◆ Oscilloscope : LT374AL(LeCroy)

- ◇ CH1 : Output current – AP015 current probe (BW:20MHz)
- ◇ CH3 : Input voltage – ADP305 High voltage differential probe(BW:200MHz)
- ◇ CH4 : Output voltage – DA1855 Differential Probe

입력	출력	측정값	파형	비고
(1) Ripple & Noise characteristics.				
Vin= 220V	Io= 100%	V _{Ripple} = 63.0mV V _{Noise} = 109.0mV		CH4 50.0mV/div 2.00us/div
(2) Turn on time characteristics				
Vin= 85V	Io= 100%	t _{turn on} = 161.8ms		CH3 100V/div 50.0ms/div CH4 5.00V/div 50.0ms/div
(3) Hold up characteristics				
Vin= 100V	Io= 100%	t _{hold up} = 25.4ms		CH3 100V/div 10.0ms/div CH4 5.00V/div 10.0ms/div
(4) Over Current protection characteristics				
Vin= 220V	Io= 110~145%	O.C.P = 15.9A		X(CH1) 5.00A/div 2.00ms/div Y(CH4) 2.00V/div 2.00ms/div

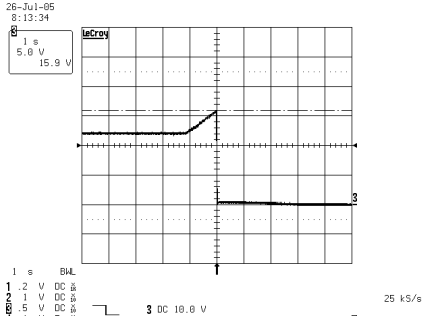
4-4. CSF150-12 Output characteristics

◆ Oscilloscope : LT374AL(LeCroy)

◇ CH3 : Output voltage - ADP305 High voltage differential probe(BW:200MHz)

입력	출력	측정값	파형	비고
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(1) Over-voltage protection characteristics

<p>V_{in} = 220V</p>	<p>I_o = 10%</p>	<p>O.V.P = 15.9V</p>		<p>CH3 5.00V/div 1.00s/div</p>

5-1. CSF150-15 Input characteristics

- ◆ Oscilloscope : LT374AL(LeCroy)
 - ◇ CH1 : Input voltage – ADP305 High voltage differential probe(BW:200MHz)
 - ◇ CH2 : Input current – AP015 current probe (BW:20MHz)
- ◆ Digital Multimeter : FLUKE189 (FLUKE)

입력	출력	측정값	파형	비고
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(1) Inrush Current Characteristics (110V)

$V_{in} = 110V$	$I_o = 100\%$	$I_{inrush} = 18.4A$		CH1 100V/div 10.0ms/div CH2 5.00A/div 10.0ms/div
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(2) Inrush Current Characteristics (220V)

$V_{in} = 220V$	$I_o = 100\%$	$I_{inrush} = 34.1A$		CH1 200V/div 10.0ms/div CH2 10.0A/div 10.0ms/div
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(3) Input Current & Efficiency Characteristics

Condition $T_a : 25^\circ C$

Vin		85V	110V	132V	170V	220V	264V
Load (min)	Input Current	0.00A	0.00A	0.00A	0.00A	0.00A	0.00A
	Efficiency	-	-	-	-	-	-
Load (50%)	Input Current	1.070A	0.827A	0.681A	0.516A	0.399A	0.328A
	Efficiency	82%	82%	83%	85%	85%	86%
Load (100%)	Input Current	2.085A	1.611A	1.327A	1.007A	0.778A	0.641A
	Efficiency	84%	84%	85%	87%	87%	88%

5-2. CSF150-15 Output characteristics

◆ Oscilloscope : LT374AL(LeCroy)

◇ CH2 : Output current – AP015 current probe (BW:20MHz)

◇ CH3 : Output voltage – ADP305 High voltage differential probe(BW:200MHz)

◆ Digital Multimeter : FLUKE189 (FLUKE)

입력	출력	측정값	파형				비고
(1) Line & Load Regulation Characteristics							
Condition Ta : 25°C							
V_{in}	85V	110V	132V	170V	220V	264V	Line Regulation
I_o							
Load (min)	24.07V	24.07V	24.07V	24.08V	24.08V	24.09V	20mV
Load (50%)	24.06V	24.06V	24.06V	24.07V	24.09V	24.07V	20mV
Load (100%)	24.06V	24.05V	24.06V	24.06V	24.08V	24.07V	10mV
Load Regulation	10mV	20mV	10mV	20mV	10mV	20mV	

(3) Dynamic Load Response Characteristics (100Hz)

$V_{in} = 220V$	$I_o = 0 \sim 100\%$ 100Hz	$V_{over} = 72mV$ $V_{under} = 72mV$		CH3 200mV/div 2.00ms/div CH2 5.00A/div 2.00ms/div
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(4) Dynamic Load Response Characteristics (1KHz)

$V_{in} = 220V$	$I_o = 0 \sim 100\%$ 1kHz	$V_{over} = 46mV$ $V_{under} = 60mV$		CH3 200mV/div 200us/div CH2 5.00A/div 200us/div
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5-3. CSF150-15 Output characteristics

◆ Oscilloscope : LT374AL(LeCroy)

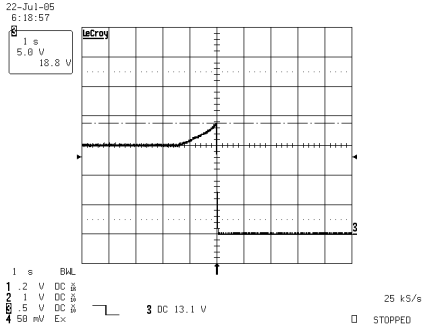
- ◇ CH1 : Output current – AP015 current probe (BW:20MHz)
- ◇ CH3 : Input voltage – ADP305 High voltage differential probe(BW:200MHz)
- ◇ CH4 : Output voltage – DA1855 Differential Probe

입력	출력	측정값	파형	비고
(1) Ripple & Noise characteristics.				
Vin= 220V	Io= 100%	V _{Ripple} = 50.0mV V _{Noise} = 128.0mV		CH4 50.0mV/div 5.00us/div
(2) Turn on time characteristics				
Vin= 85V	Io= 100%	t _{turn on} = 164.6ms		CH3 100V/div 50.0ms/div CH4 5.00V/div 50.0ms/div
(3) Hold up characteristics				
Vin= 100V	Io= 100%	t _{hold up} = 30.4ms		CH3 100V/div 10.0ms/div CH4 5.00V/div 10.0ms/div
(4) Over Current protection characteristics				
Vin= 220V	Io= 110~145%	O.C.P = 13.0A		X(CH1) 2.00A/div 0.50ms/div Y(CH4) 2.00V/div 0.50ms/div

5-4. CSF150-15 Output characteristics

◆ Oscilloscope : LT374AL(LeCroy)

◇ CH3 : Output voltage - ADP305 High voltage differential probe(BW:200MHz)

입력	출력	측정값	파형	비고
(1) Over-voltage protection characteristics				
Vin= 220V	Io= 10%	O.V.P = 18.8V		CH3 5.00V/div 1.00s/div

6-1. CSF150-24 Input characteristics

- ◆ Oscilloscope : LT374AL(LeCroy)
 - ◇ CH1 : Input voltage – ADP305 High voltage differential probe(BW:200MHz)
 - ◇ CH2 : Input current – AP015 current probe (BW:20MHz)
- ◆ Digital Multimeter : FLUKE189 (FLUKE)

입력	출력	측정값	파형	비고		
(1) Inrush Current Characteristics (110V)						
Vin= 110V	Io= 100%	$I_{inrush} = 16.4A$		CH1 100V/div 10.0ms/div CH2 10.0A/div 10.0ms/div		
(2) Inrush Current Characteristics (220V)						
Vin= 220V	Io= 100%	$I_{inrush} = 37.3A$		CH1 200V/div 10.0ms/div CH2 20.0A/div 10.0ms/div		
(3) Input Current & Efficiency Characteristics						
Condition Ta : 25°C						
Io \ Vin	85V	110V	132V	170V	220V	264V
Load (min)	Input Current	0.00A	0.00A	0.00A	0.00A	0.00A
Load (min)	Efficiency	-	-	-	-	-
Load (50%)	Input Current	1.069A	0.826A	0.680A	0.510A	0.394A
Load (50%)	Efficiency	82%	82%	83%	86%	86%
Load (100%)	Input Current	2.083A	1.609A	1.325A	0.994A	0.768A
Load (100%)	Efficiency	84%	84%	85%	88%	88%

6-2. CSF150-24 Output characteristics

◆ Oscilloscope : LT374AL(LeCroy)

◇ CH2 : Output current – AP015 current probe (BW:20MHz)

◇ CH3 : Output voltage – ADP305 High voltage differential probe(BW:200MHz)

◆ Digital Multimeter : FLUKE189 (FLUKE)

입력	출력	측정값	파형				비고
(1) Line & Load Regulation Characteristics							
Condition Ta : 25°C							
V_{in}	85V	110V	132V	170V	220V	264V	Line Regulation
I_o							
Load (min)	24.07V	24.07V	24.07V	24.08V	24.08V	24.09V	20mV
Load (50%)	24.06V	24.06V	24.06V	24.07V	24.09V	24.07V	30mV
Load (100%)	24.06V	24.05V	24.06V	24.06V	24.08V	24.07V	20mV
Load Regulation	10mV	20mV	10mV	20mV	10mV	20mV	

(3) Dynamic Load Response Characteristics (100Hz)

$V_{in} = 220V$	$I_o = 0 \sim 100\%$ 100Hz	$V_{over} = 86mV$ $V_{under} = 70mV$		CH3 200mV/div 2.00ms/div CH2 2.00A/div 2.00ms/div
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(4) Dynamic Load Response Characteristics (1kHz)

$V_{in} = 220V$	$I_o = 0 \sim 100\%$ 1kHz	$V_{over} = 40mV$ $V_{under} = 42mV$		CH3 200mV/div 200us/div CH2 2.00A/div 200us/div
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6-3. CSF150-24 Output characteristics

◆ Oscilloscope : LT374AL(LeCroy)

- ◇ CH1 : Output current – AP015 current probe (BW:20MHz)
- ◇ CH3 : Input voltage – ADP305 High voltage differential probe(BW:200MHz)
- ◇ CH4 : Output voltage – DA1855 Differential Probe

입력	출력	측정값	파형	비고
(1) Ripple & Noise characteristics.				
$V_{in} = 220V$	$I_o = 100\%$	$V_{Ripple} = 59.0mV$ $V_{Noise} = 150.0mV$		CH4 50.0mV/div 2.00us/div
(2) Turn on time characteristics				
$V_{in} = 85V$	$I_o = 100\%$	$t_{turn\ on} = 160.5ms$		CH3 100V/div 50.0ms/div CH4 10.0V/div 50.0ms/div
(3) Hold up characteristics				
$V_{in} = 100V$	$I_o = 100\%$	$t_{hold\ up} = 27.0ms$		CH3 100V/div 10.0ms/div CH4 5.00V/div 10.0ms/div
(4) Over Current protection characteristics				
$V_{in} = 220V$	$I_o = 110\sim 145\%$	O.C.P = 8.3A		X(CH1) 2.00A/div 0.50ms/div Y(CH4) 5.00V/div 0.50ms/div

7-1. CSF150-48 Input characteristics

- ◆ Oscilloscope : LT374AL(LeCroy)
 - ◇ CH1 : Input voltage – ADP305 High voltage differential probe(BW:200MHz)
 - ◇ CH2 : Input current – AP015 current probe (BW:20MHz)
- ◆ Digital Multimeter : FLUKE189 (FLUKE)

입력	출력	측정값	파형	비고			
(1) Inrush Current Characteristics (110V)							
$V_{in} = 110V$	$I_o = 100\%$	$I_{inrush} = 17.9A$		CH1 100V/div 10.0ms/div CH2 10.0A/div 10.0ms/div			
(2) Inrush Current Characteristics (220V)							
$V_{in} = 220V$	$I_o = 100\%$	$I_{inrush} = 34.5A$		CH1 200V/div 20.0ms/div CH2 20.0A/div 20.0ms/div			
(3) Input Current & Efficiency Characteristics							
Condition Ta : 25°C							
I_o	V_{in}	85V	110V	132V	170V	220V	264V
Load (min)	Input Current	0.00A	0.00A	0.00A	0.00A	0.00A	0.00A
	Efficiency	-	-	-	-	-	-
Load (50%)	Input Current	1.066A	0.824A	0.678A	0.514A	0.397A	0.327A
	Efficiency	82%	82%	83%	85%	85%	86%
Load (100%)	Input Current	2.078A	1.606A	1.322A	1.003A	0.775A	0.639A
	Efficiency	84%	84%	85%	87%	87%	88%

7-2. CSF150-48 Output characteristics

◆ Oscilloscope : LT374AL(LeCroy)

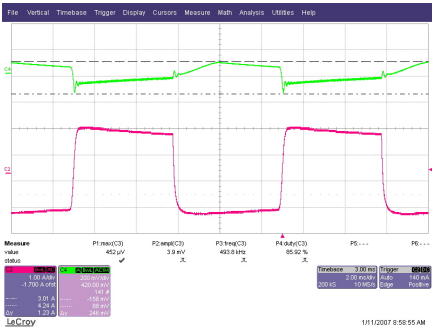
◇ CH2 : Output current – AP015 current probe (BW:20MHz)

◇ CH3 : Output voltage – ADP305 High voltage differential probe(BW:200MHz)

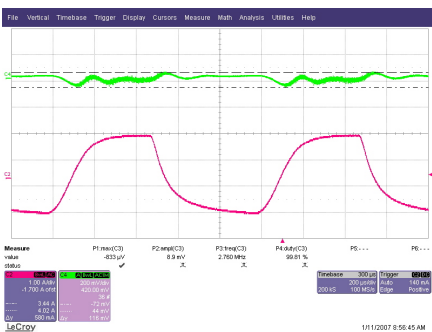
◆ Digital Multimeter : FLUKE189 (FLUKE)

입력	출력	측정값	파형				비고	
(1) Line & Load Regulation Characteristics								
Condition Ta : 25°C								
V_{in}		85V	110V	132V	170V	220V	264V	Line Regulation
I_o								
Load (min)		48.07V	48.07V	48.08V	48.08V	48.08V	48.08V	10mV
Load (50%)		48.07V	48.07V	48.08V	48.08V	48.08V	48.08V	10mV
Load (100%)		48.07V	48.07V	48.08V	48.08V	48.07V	48.07V	10mV
Load Regulation		0mV	0mV	0mV	0mV	10mV	10mV	

(3) Dynamic Load Response Characteristics (100Hz)

$V_{in} = 220V$	$I_o = 0 \sim 100\%$ 100Hz	$V_{over} = 142mV$ $V_{under} = 106mV$		CH3 200mV/div 2.00ms/div CH2 1.00A/div 2.00ms/div
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(4) Dynamic Load Response Characteristics (1KHz)

$V_{in} = 220V$	$I_o = 0 \sim 100\%$ 1kHz	$V_{over} = 58mV$ $V_{under} = 60mV$		CH3 200mV/div 200us/div CH2 1.00A/div 200us/div
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7-3. CSF150-48 Output characteristics

◆ Oscilloscope : LT374AL(LeCroy)

- ◇ CH1 : Output current – AP015 current probe (BW:20MHz)
- ◇ CH3 : Input voltage – ADP305 High voltage differential probe(BW:200MHz)
- ◇ CH4 : Output voltage – DA1855 Differential Probe

입력	출력	측정값	파형	비고
(1) Ripple & Noise characteristics.				
Vin= 220V	Io= 100%	V _{Ripple} = 50.0mV V _{Noise} = 138.0mV		CH4 50.0mV/div 2.00us/div
(2) Turn on time characteristics				
Vin= 85V	Io= 100%	t _{turn on} = 187.6ms		CH3 100V/div 50.0ms/div CH4 20.0V/div 50.0ms/div
(3) Hold up characteristics				
Vin= 100V	Io= 100%	t _{hold up} = 26.0ms		CH3 100V/div 10.0ms/div CH4 20.0V/div 10.0ms/div
(4) Over Current protection characteristics				
Vin= 220V	Io= 110~145%	O.C.P = 4.0A		X(CH1) 1.00A/div 0.05ms/div Y(CH4) 10.0V/div 0.05ms/div

