GSPL 15kW

EVALUATION DATA

DWG: IA993-53-01		
APPD	CHK	DWG
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TDK-LAMBDA

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TERMINOLOGY USED

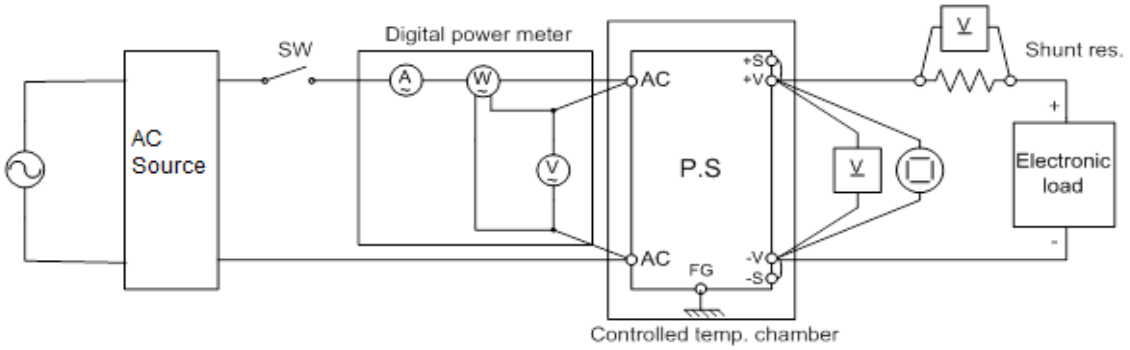
Definition

Vin	Input voltage
Vout	Output voltage
Iin	Input current
Iout	Output current
Ta	Ambient temperature
C.V	Constant voltage mode
C.C	Constant current mode

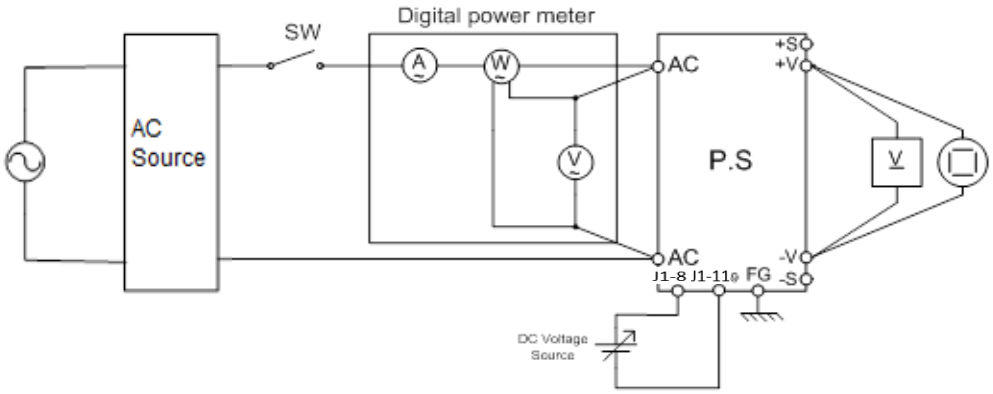
1. EVALUATION METHOD

1.1 Circuit used for determination

(1) Steady state data

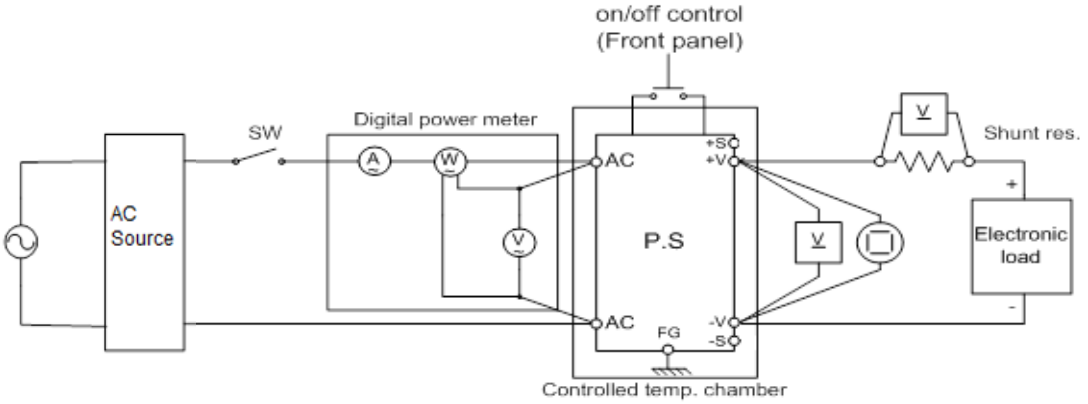


(2) Over voltage protection (OVP) characteristics

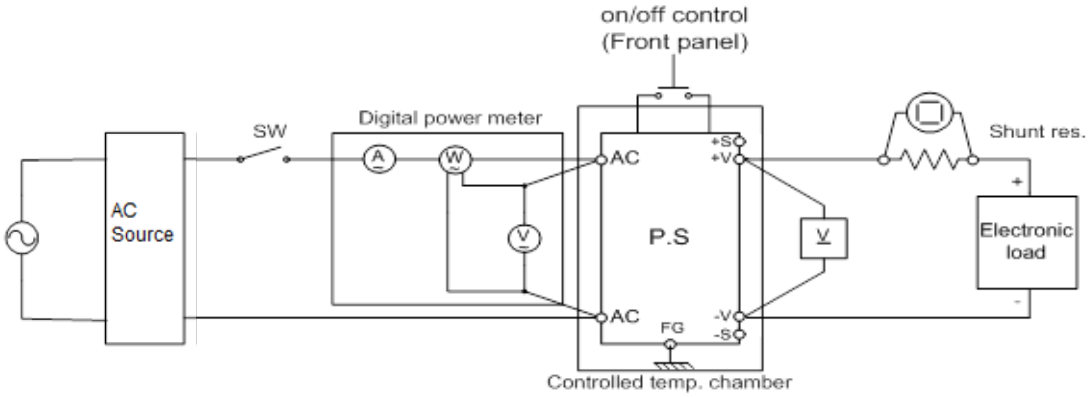


(3) Output rise/fall characteristics

Constant Voltage mode

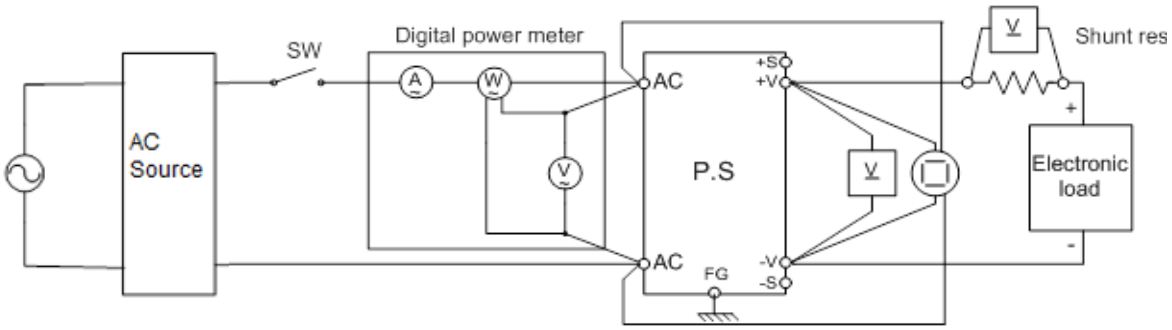


Constant Current mode

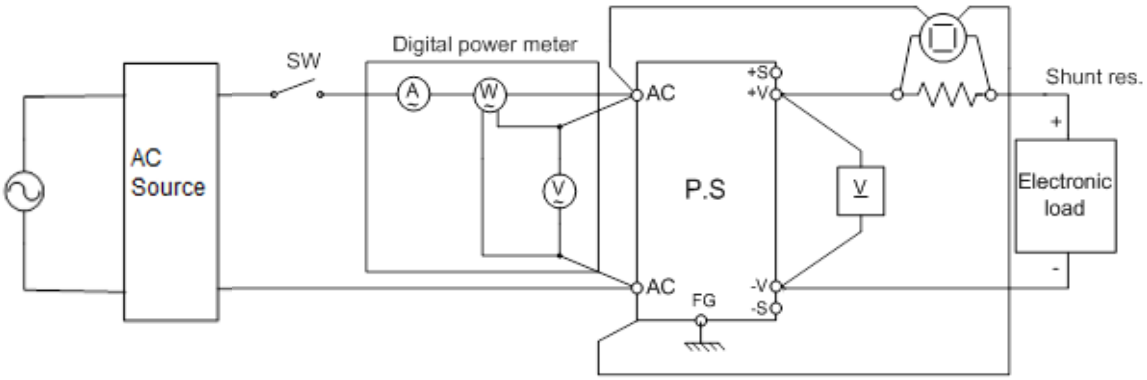


(4) Dynamic line response characteristics

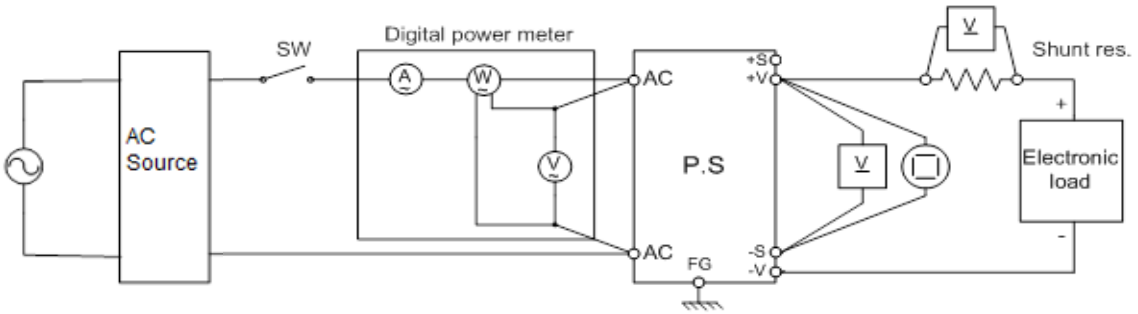
Constant Voltage mode



Constant Current mode

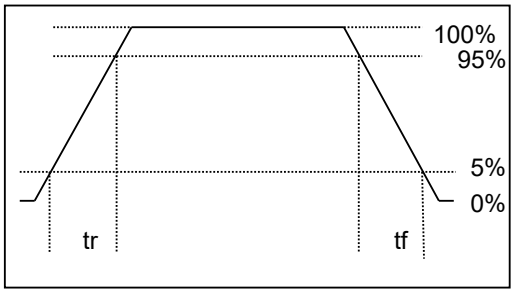


(5) Dynamic load response characteristics



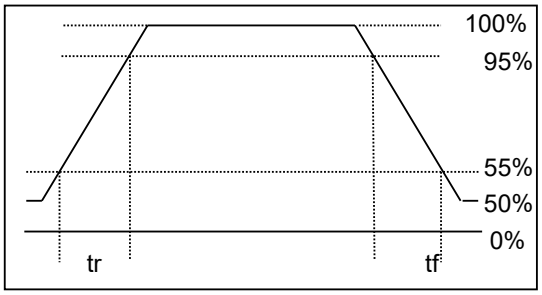
Output current waveform

Iout 0% <---> 100%



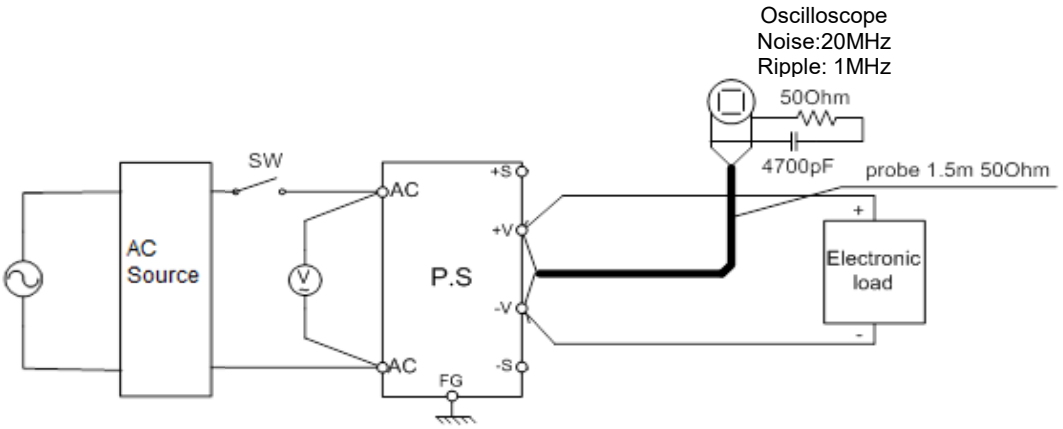
Output current waveform

Iout 50% <---> 100%

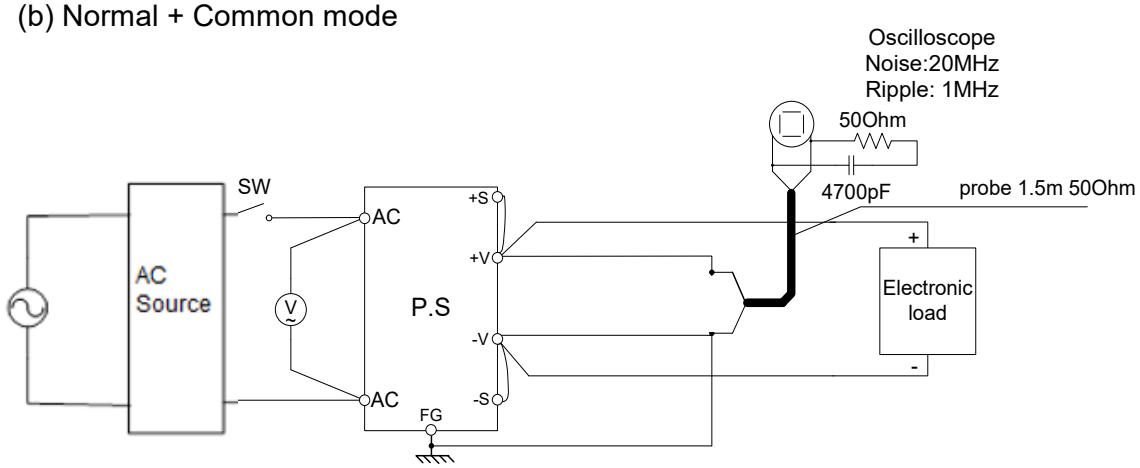


(6) Output ripple & noise waveform (20V to 300V models)

(a) Normal mode (JEITA Standard RC-9131A)

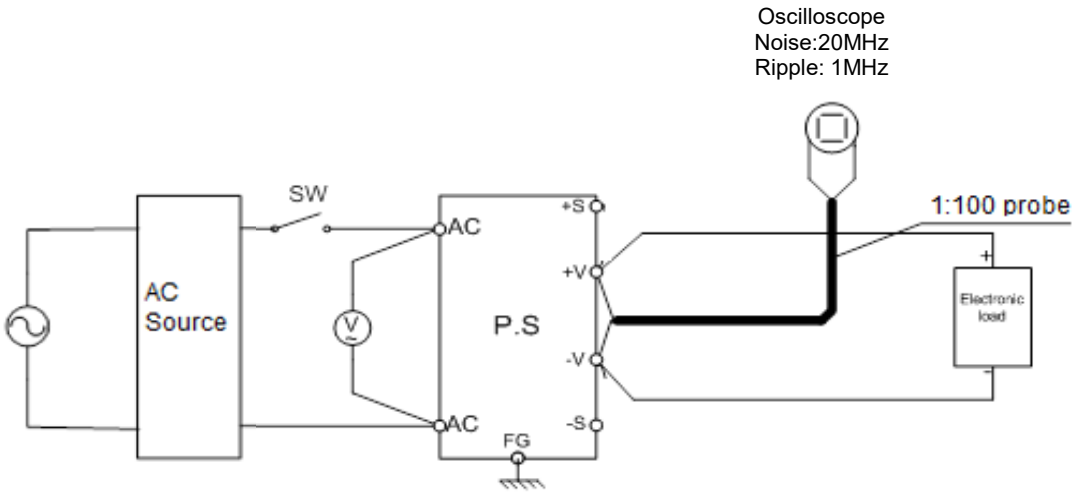


(b) Normal + Common mode

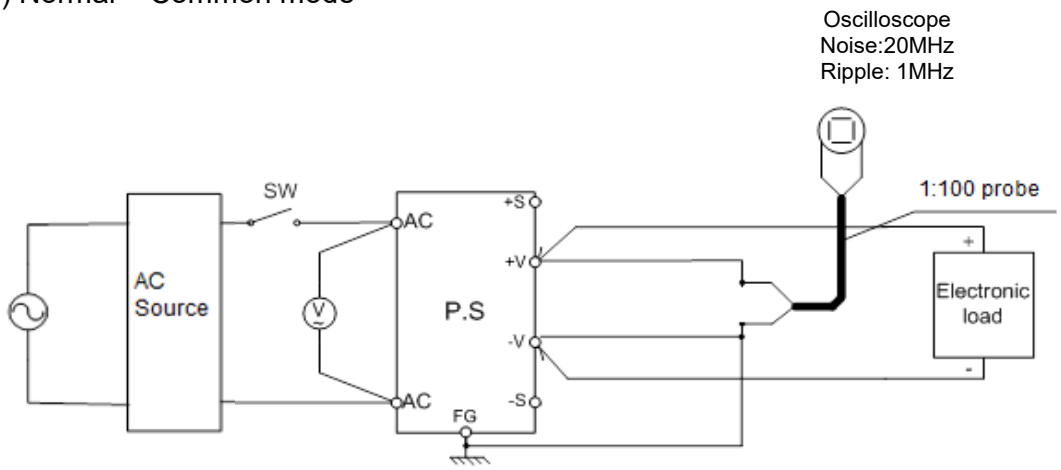


(7) Output ripple & noise waveform (600V to 1500V models)

(a) Normal mode



(b) Normal + Common mode



1.2 List of equipment used

	EQUIPMENT USED	MANUFACTURER	MODEL No.
1	Storage oscilloscope	YOKOGAWA	DLM2034
2	Storage oscilloscope	YOKOGAWA	DLM3034
3	Digital multimeter	HEWLETT-PACKARD	34401A
4	Digital multimeter	KEITHLEY INSTRUMENTS INC.	2001
5	Digital multimeter	KEITHLEY INSTRUMENTS INC.	DMM6500
6	Digital voltmeter	VITERK	4700
7	Digital power meter	YOKOGAWA	WT333E
8	AC source	Chroma	61815
9	AC source	Pacific	3150AFX
10	AC source	Pacific	3450AFX-4AGE
11	Electronic load	Chroma	63224A-150-2000
12	Electronic load	Chroma	63224A-1200-960
13	Electronic load	ITECH	IT8018-2250-20
14	Controlled temp. chamber	THERMOTRON	SM-16-3800
15	Controlled temp. chamber	THERMOTRON	SE-600-6-6
16	Differential voltage probe	YOKOGAWA	701927
17	Current probe	YOKOGAWA	710120
18	Probe 1:10V (up to 300V models)	YOKOGAWA	701939
19	Probe 1:100V (up to 300V models)	YOKOGAWA	701945
20	Probe 1:100V (above 600V models)	YOKOGAWA	SS-0170R
21	Shunt	ISABELLA	RUG-Z
22	Transducer	LEM	IN2000-N
23	Transducer	DANISENSE	DS600UB
24	Transducer	LEM	IT-200S
25	Switching matrix (Analog/Resistor Programming)	HEWLETT-PACKARD	34970A

2. CHARACTERISTICS

2.1 Steady state data

(1). Regulation - Line & Load, Temperature drift

GSPL20-750

Conditions: Ta: 25°C

1. Regulation - Line & Load, C.V mode 3Φ208

	Vin						
Io	170VAC	200VAC	208VAC	230VAC	265VAC	Line Regulation	
0%	19.9981	19.9982	19.9982	19.9981	19.9982	0.1	0.000%
25%	19.9970	19.9970	19.9970	19.9970	19.9970	0.0	0.000%
50%	19.9958	19.9958	19.9959	19.9957	19.9958	0.2	0.001%
75%	19.9945	19.9945	19.9945	19.9945	19.9945	0.0	0.000%
100%	19.9933	19.9934	19.9934	19.9934	19.9934	0.1	0.000%
Load	4.8	4.8	4.8	4.7	4.8	ΔV(mV)	
Regulation	0.024%	0.024%	0.024%	0.023%	0.024%		

2. Regulation - Line & Load, C.V mode 3Φ480

	Vin									
Io	342VAC	380VAC	400VAC	415VAC	432VAC	460VAC	480VAC	520VAC	Line Regulation	
0%	20.0020	20.0020	20.0021	20.0020	20.0020	20.0021	20.0021	20.0021	0.1	0.000%
25%	20.0010	20.0010	20.0009	20.0010	20.0010	20.0010	20.0011	20.0010	0.2	0.001%
50%	20.0001	20.0001	20.0001	20.0001	20.0001	20.0001	20.0001	20.0001	0.0	0.000%
75%	19.9992	19.9992	19.9992	19.9992	19.9992	19.9992	19.9992	19.9992	0.0	0.000%
100%	19.9984	19.9983	19.9983	19.9983	19.9983	19.9983	19.9983	19.9983	0.1	0.000%
Load	3.6	3.7	3.8	3.7	3.7	3.8	3.8	3.8	ΔV(mV)	
Regulation	0.018%	0.018%	0.019%	0.018%	0.018%	0.019%	0.019%	0.019%		

3. Temperature drift, C.V mode

Conditions: Vin: 3Φ200V
Iout: 100%

Ta	0°C	25°C	50°C	Temp. Coefficient (0˚C~50˚C)			
Vout	19.9961	19.9934	19.9949	2.7	mV	3	ppm/˚C

(1). Regulation - Line & Load

GSPL100-150

Conditions: Ta: 25°C

1. Regulation - Line & Load, C.V mode 3Φ208

	Vin						
Io	170VAC	200VAC	208VAC	230VAC	265VAC	Line Regulation	
0%	100.0130	100.0128	100.0128	100.0127	100.0130	0.3	0.0003%
25%	100.0122	100.0121	100.0122	100.0123	100.0123	0.2	0.0002%
50%	100.0118	100.0118	100.0119	100.0118	100.0120	0.2	0.0002%
75%	100.0113	100.0113	100.0113	100.0114	100.0114	0.1	0.0001%
100%	100.0108	100.0107	100.0107	100.0108	100.0109	0.2	0.0002%
Load	2.2	2.1	2.1	1.9	2.1	ΔV(mV)	
Regulation	0.002%	0.002%	0.002%	0.002%	0.002%		

(1). Regulation - Line & Load, Temperature drift

GSPL600-25

Conditions: Ta: 25°C

1. Regulation - Line & Load, C.V mode 3Φ208

	Vin						
Io	170VAC	200VAC	208VAC	230VAC	265VAC	Line Regulation	
0%	600.0192	600.0160	600.0168	600.0235	600.0197	7.5	0.001%
25%	600.0210	600.0142	600.0218	600.0160	600.0200	7.6	0.001%
50%	600.0186	600.0189	600.0176	600.0188	600.0193	1.7	0.000%
75%	600.0188	600.0170	600.0197	600.0190	600.0190	2.7	0.000%
100%	600.0166	600.0134	600.0113	600.0172	600.0141	5.9	0.001%
Load	4.4	5.5	10.5	7.5	5.9	ΔV(mV)	
Regulation	0.001%	0.001%	0.002%	0.001%	0.001%		

2. Temperature drift, C.V mode

Conditions: Vin: 3Φ480V
Iout: 100%

Ta	0°C	25°C	50°C	Temp. Coefficient (0˚C~50˚C)			
Vout	600.0913	600.0134	600.0038	87.5	mV	3	ppm/˚C

(1). Regulation - Line & Load, Temperature drift

GSPL1500-10

Conditions: Ta: 25°C

1. Regulation - Line & Load, C.V mode 3Φ208

	Vin						
Io	170VAC	200VAC	208VAC	230VAC	265VAC	Line Regulation	
0%	1500.00	1500.00	1500.00	1500.00	1500.00	0	0.000%
25%	1500.00	1500.00	1500.00	1500.00	1500.00	0	0.000%
50%	1499.99	1500.00	1500.00	1500.00	1500.00	10	0.001%
75%	1499.99	1499.99	1500.00	1500.00	1500.00	10	0.001%
100%	1499.99	1499.99	1499.99	1499.99	1499.99	0	0.000%
Load	10	10	10	10	10	ΔV(mV)	
Regulation	0.001%	0.001%	0.001%	0.001%	0.001%		

2. Regulation - Line & Load, C.V mode 3Φ480

	Vin									
Io	342VAC	380VAC	400VAC	415VAC	432VAC	460VAC	480VAC	520VAC	Line Regulation	
0%	1500.37	1500.36	1500.37	1500.36	1500.36	1500.36	1500.36	1500.36	10	0.001%
25%	1500.36	1500.36	1500.36	1500.36	1500.36	1500.36	1500.36	1500.36	0	0.000%
50%	1500.35	1500.36	1500.36	1500.36	1500.36	1500.36	1500.36	1500.36	10	0.001%
75%	1500.35	1500.35	1500.35	1500.36	1500.36	1500.36	1500.36	1500.36	10	0.001%
100%	1500.34	1500.34	1500.35	1500.35	1500.35	1500.35	1500.35	1500.35	10	0.001%
Load	30	20	20	10	10	10	10	10	ΔV(mV)	
Regulation	0.002%	0.001%	0.001%	0.001%	0.001%	0.001%	0.001%	0.001%		

3. Temperature drift, C.V mode

Conditions: Vin: 3Φ480V
Iout: 100%

Ta	0°C	25°C	50°C	Temp. Coefficient (0˚C~50˚C)			
Vout	1500.13	1500.35	1500.81	680	mV	9	ppm/˚C

(1). Regulation - Line & Load, Temperature drift

GSPL20-750

Conditions: Ta: 25°C

1. Regulation - Line & Load, C.C mode 3Φ208 (*)

	Vin						
Vo	170VAC	200VAC	208VAC	230VAC	265VAC	Line Regulation	
0%	750.0016	750.0069	750.0144	750.0201	750.0264	24.8	0.003%
25%	749.9798	749.9901	749.9995	750.0037	750.0086	28.8	0.004%
50%	749.9646	749.9743	749.9817	749.9890	749.9985	33.9	0.005%
75%	749.9804	749.9936	750.0027	750.0100	750.0180	37.6	0.005%
100%	750.0579	750.0676	750.0703	750.0703	750.0754	17.5	0.002%
Load	93.3	93.3	88.6	81.3	76.9	ΔI(mA)	
Regulation	0.012%	0.012%	0.012%	0.011%	0.010%		

2. Regulation - Line & Load, C.C mode 3Φ480 (*)

	Vin									
Io	342VAC	380VAC	400VAC	415VAC	432VAC	460VAC	480VAC	520VAC	Line Regulation	
0%	749.8985	749.9035	749.9073	749.9115	749.9174	749.9228	749.9272	749.9319	33.4	0.004%
25%	749.8470	749.8548	749.8678	749.8737	749.8823	749.8869	749.8930	749.8993	52.3	0.007%
50%	749.8583	749.8669	749.8758	749.8806	749.8873	749.8919	749.8966	749.9010	42.7	0.006%
75%	749.8921	749.8957	749.8995	749.9045	749.9083	749.9092	749.9100	749.9125	20.4	0.003%
100%	749.8476	749.8594	749.8680	749.8762	749.8810	749.8886	749.8926	749.8968	49.2	0.007%
Load	51.5	48.7	39.5	37.8	36.4	35.9	34.6	35.1	ΔI(mA)	
Regulation	0.007%	0.006%	0.005%	0.005%	0.005%	0.005%	0.005%	0.005%		

Notes:
(*) Not including load regulation thermal drift effect.

3. Temperature drift, C.C mode

Conditions: Vin: 3Φ480V
Iout: 100%

Ta	0°C	25°C	50°C	Temp. Coefficient (0˚C~50˚C)			
Io[A]	749.9588	750.0382	750.2506	291.8	mA	11	ppm/˚C

Notes:
(*) Not including load regulation thermal drift effect.

(1). Regulation - Line & Load

GSPL100-150

Conditions: Ta: 25°C

1. Regulation - Line & Load, C.C mode 3Φ208 (*)

	Vin						
Vo	170VAC	200VAC	208VAC	230VAC	265VAC	Line Regulation	
0%	149.9668	149.9662	149.9655	149.9653	149.9646	2.2	0.001%
25%	149.9710	149.9699	149.9688	149.9682	149.9677	3.3	0.002%
50%	149.9717	149.9706	149.9699	149.9695	149.9692	2.5	0.002%
75%	149.9731	149.9723	149.9710	149.9706	149.9701	3.0	0.002%
100%	149.9836	149.9781	149.9748	149.9722	149.9709	12.7	0.008%
Load	16.8	11.9	9.3	6.9	6.3	ΔI(mA)	
Regulation	0.011%	0.008%	0.006%	0.005%	0.004%		

Notes:
(*) Not including load regulation thermal drift effect.

(1). Regulation - Line & Load, Temperature drift

GSPL600-25

Conditions: Ta: 25°C

1. Regulation - Line & Load, C.C mode 3Φ208 (*)

	Vin						
Vo	170VAC	200VAC	208VAC	230VAC	265VAC	Line Regulation	
0%	25.0149	25.0150	25.0150	25.0149	25.0149	0.1	0.000%
25%	25.0139	25.0140	25.0139	25.0139	25.0139	0.1	0.000%
50%	25.0100	25.0100	25.0100	25.0099	25.0099	0.1	0.000%
75%	25.0077	25.0077	25.0076	25.0075	25.0075	0.2	0.001%
100%	25.0078	25.0079	25.0079	25.0077	25.0076	0.3	0.001%
Load	7.2	7.3	7.4	7.4	7.4	ΔI(mA)	
Regulation	0.029%	0.029%	0.030%	0.030%	0.030%		

2. Temperature drift, C.C mode

Conditions: Vin: 3Φ480V
Iout: 100%

Ta	0°C	25°C	50°C	Temp. Coefficient (0˚C~50˚C)			
Io[A]	25.0192	25.0145	25.0168	4.8	mA	8	ppm/˚C

Notes:
(*) Not including load regulation thermal drift effect.

(1). Regulation - Line & Load, Temperature drift

GSPL1500-10

Conditions: Ta: 25°C

1. Regulation - Line & Load, C.C mode 3Φ208 (*)

	Vin						
Vo	170VAC	200VAC	208VAC	230VAC	265VAC	Line Regulation	
0%	10.00321	10.00324	10.00324	10.00320	10.00327	0.07	0.001%
25%	10.00310	10.00310	10.00320	10.00323	10.00325	0.15	0.001%
50%	10.00312	10.00316	10.00326	10.00317	10.00310	0.16	0.002%
75%	10.00312	10.00311	10.00310	10.00310	10.00313	0.03	0.000%
100%	10.00319	10.00310	10.00313	10.00311	10.00315	0.09	0.001%
Load	0.11	0.14	0.16	0.13	0.17	ΔI(mA)	
Regulation	0.002%	0.003%	0.003%	0.003%	0.003%		

2. Regulation - Line & Load, C.C mode 3Φ480 (*)

	Vin									
Io	342VAC	380VAC	400VAC	415VAC	432VAC	460VAC	480VAC	520VAC	Line Regulation	
0%	10.00630	10.00631	10.00632	10.00636	10.00630	10.00633	10.00641	10.00640	0.11	0.001%
25%	10.00600	10.00614	10.00620	10.00620	10.00624	10.00627	10.00635	10.00630	0.35	0.003%
50%	10.00608	10.00610	10.00624	10.00621	10.00620	10.00623	10.00620	10.00620	0.16	0.002%
75%	10.00591	10.00610	10.00614	10.00610	10.00622	10.00623	10.00627	10.00620	0.36	0.004%
100%	10.00590	10.00618	10.00620	10.00629	10.00620	10.00621	10.00620	10.00620	0.39	0.004%
Load	0.40	0.21	0.18	0.26	0.10	0.12	0.21	0.20	ΔI(mA)	
Regulation	0.008%	0.004%	0.004%	0.005%	0.002%	0.002%	0.004%	0.004%		

3. Temperature drift, C.C mode

Conditions: Vin: 3Φ200V
Iout: 100%

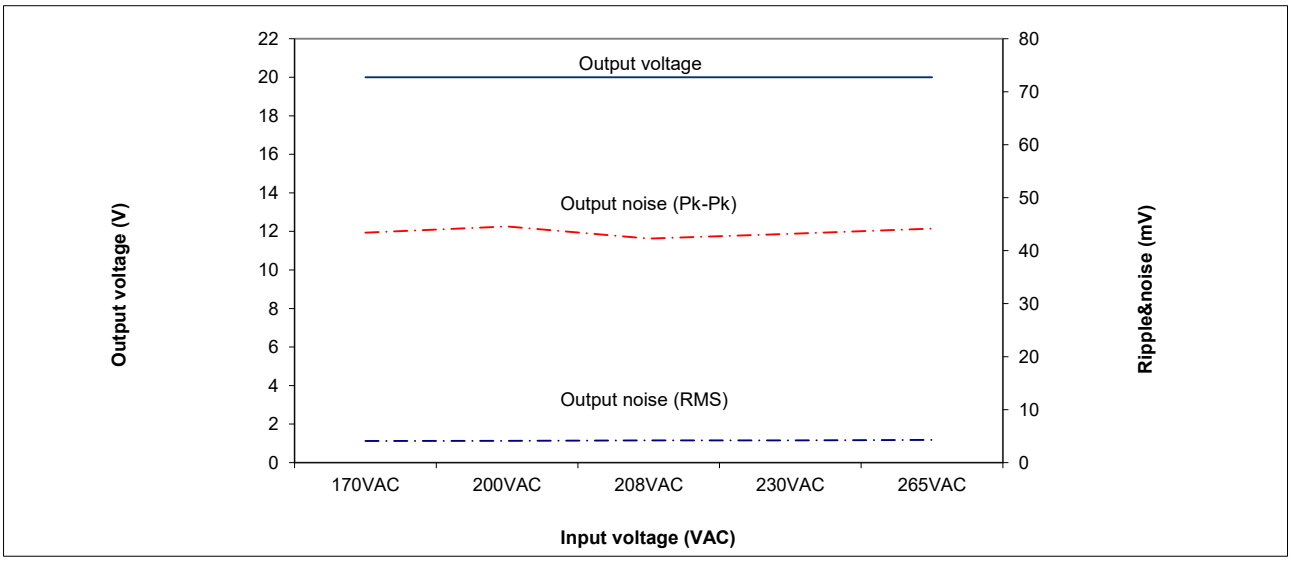
Ta	0°C	25°C	50°C	Temp. Coefficient (0˚C~50˚C)			
Io[A]	10.00661	10.00390	10.00222	4.39	mA	9	ppm/˚C

Notes:
(*) Not including load regulation thermal drift effect.

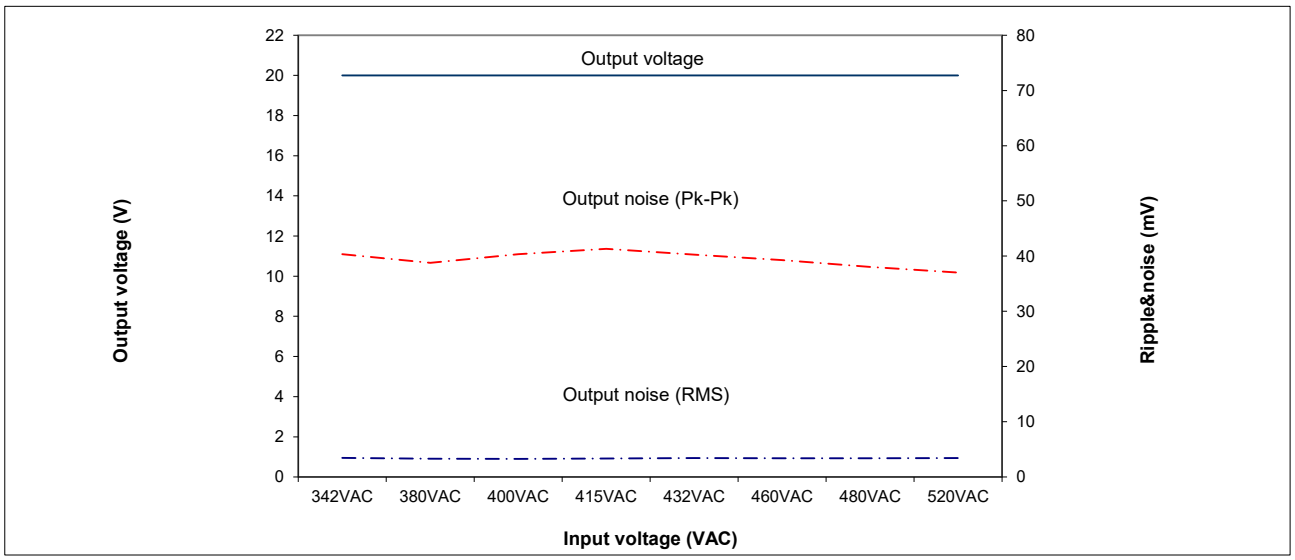
(2). Output voltage and ripple voltage vs. input voltage
C.V mode

Conditions: Iout: 100%
Ta: 25°C

GSPL20-750 3Φ208



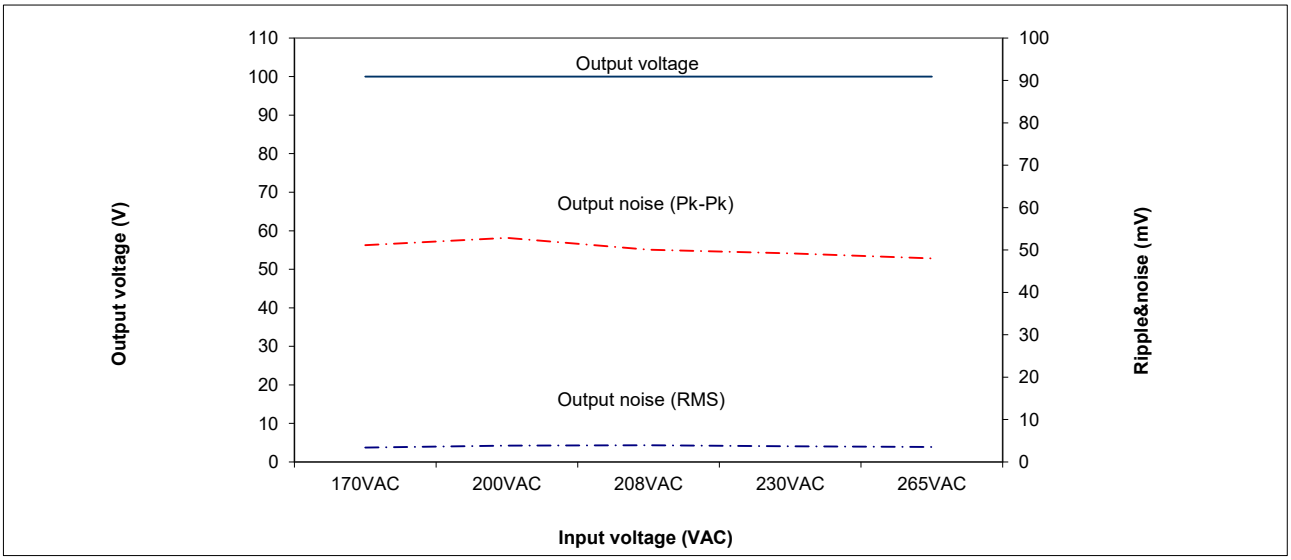
GSPL20-750 3Φ480



(2). Output voltage and ripple voltage vs. input voltage
C.V mode

Conditions: Iout: 100%
Ta: 25°C

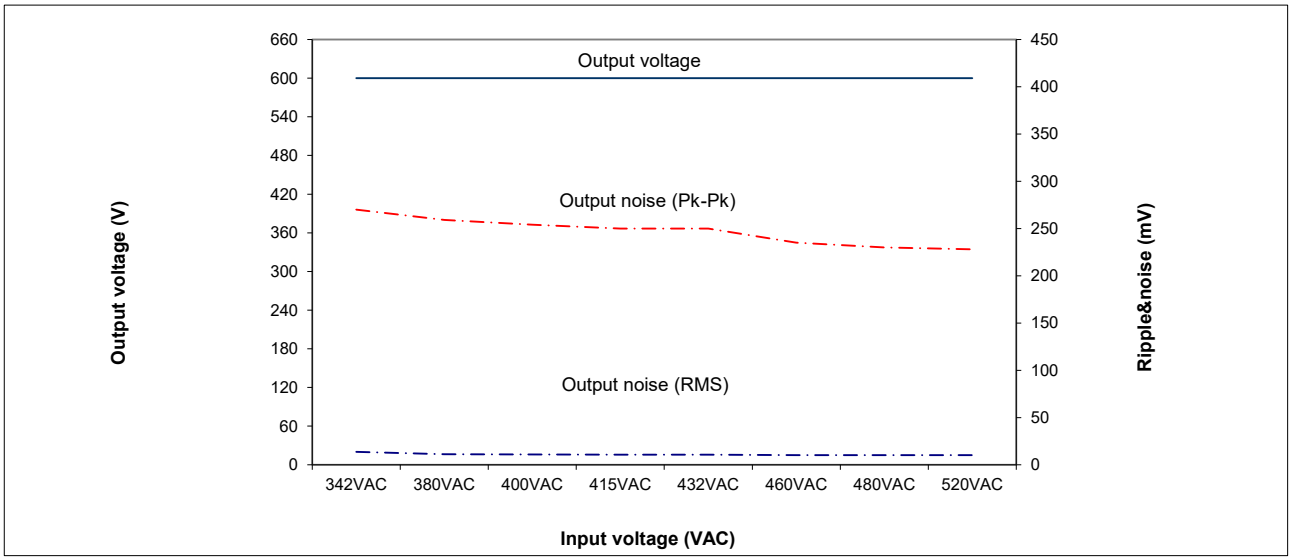
GSPL100-150 3Φ208



(2). Output voltage and ripple voltage vs. input voltage
C.V mode

Conditions: Iout: 100%
Ta: 25°C

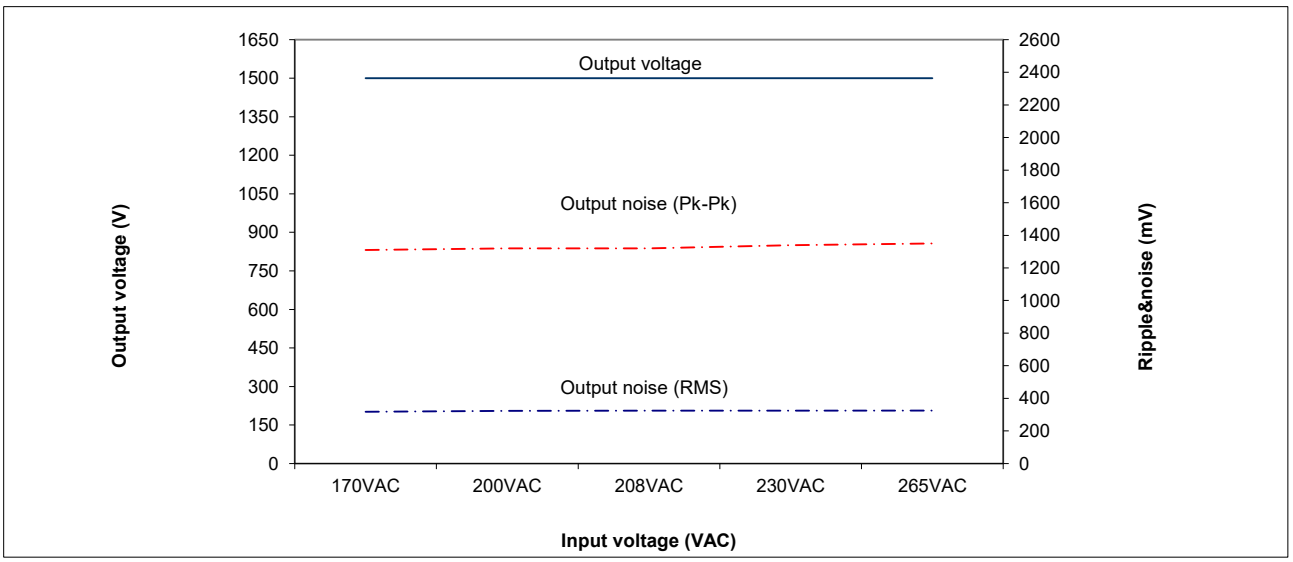
GSPL600-25 3Φ480



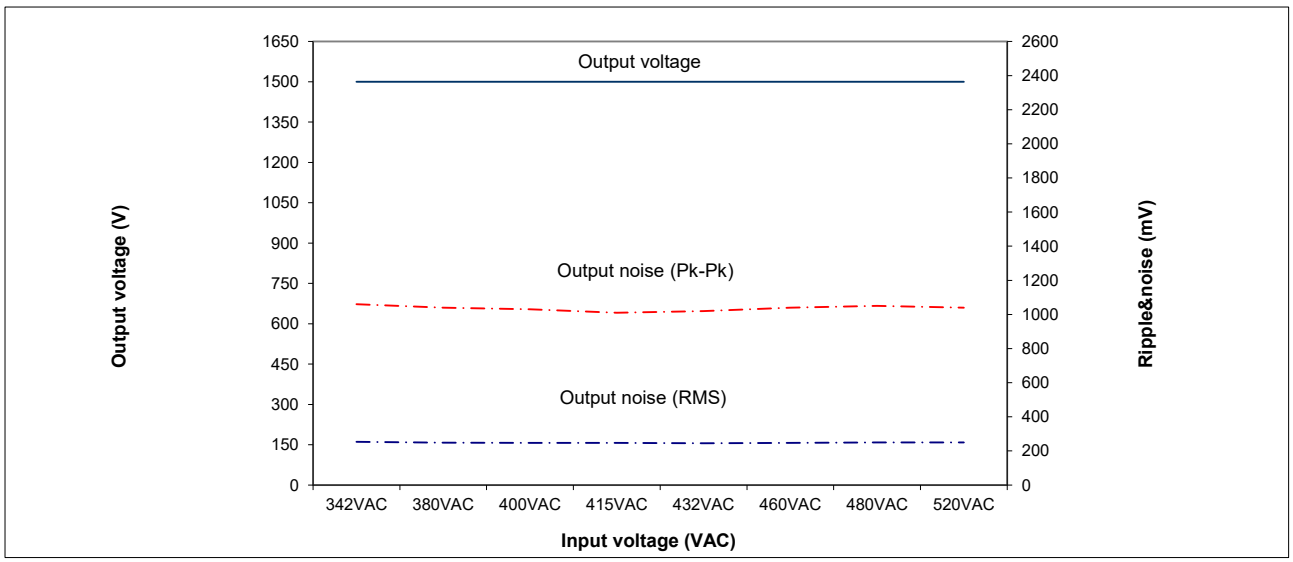
(2). Output voltage and ripple voltage vs. input voltage
C.V mode

Conditions: Iout: 100%
Ta: 25°C

GSPL1500-10 3Φ208



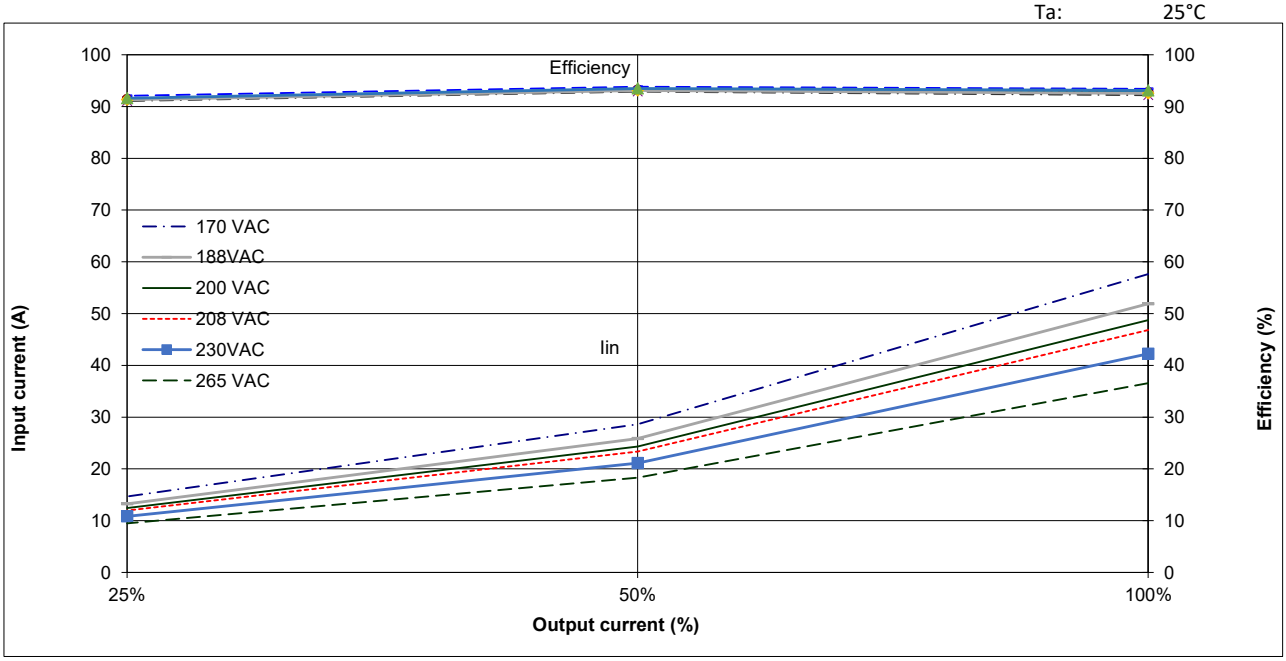
GSPL1500-10 3Φ480



(3). Efficiency and Input current vs. Output current

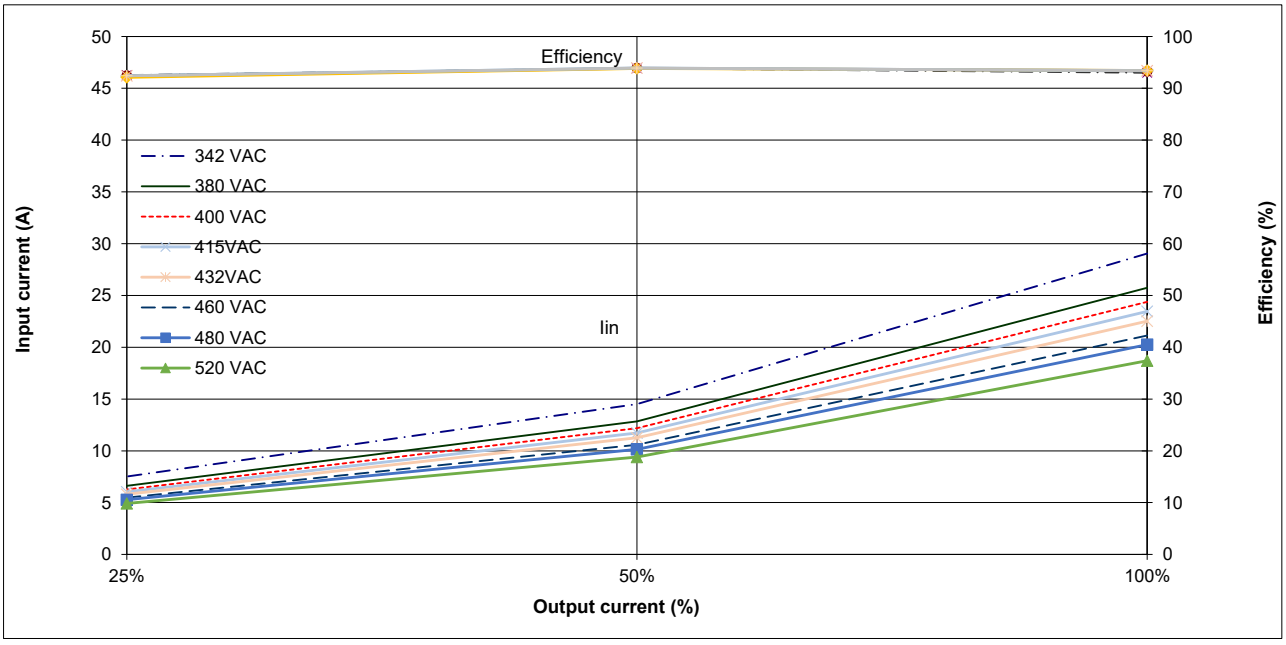
GSPL20-750 3Φ208

Conditions: Vin: 170~265 VAC
Vout: 100%
Ta: 25°C



GSPL20-750 3Φ480

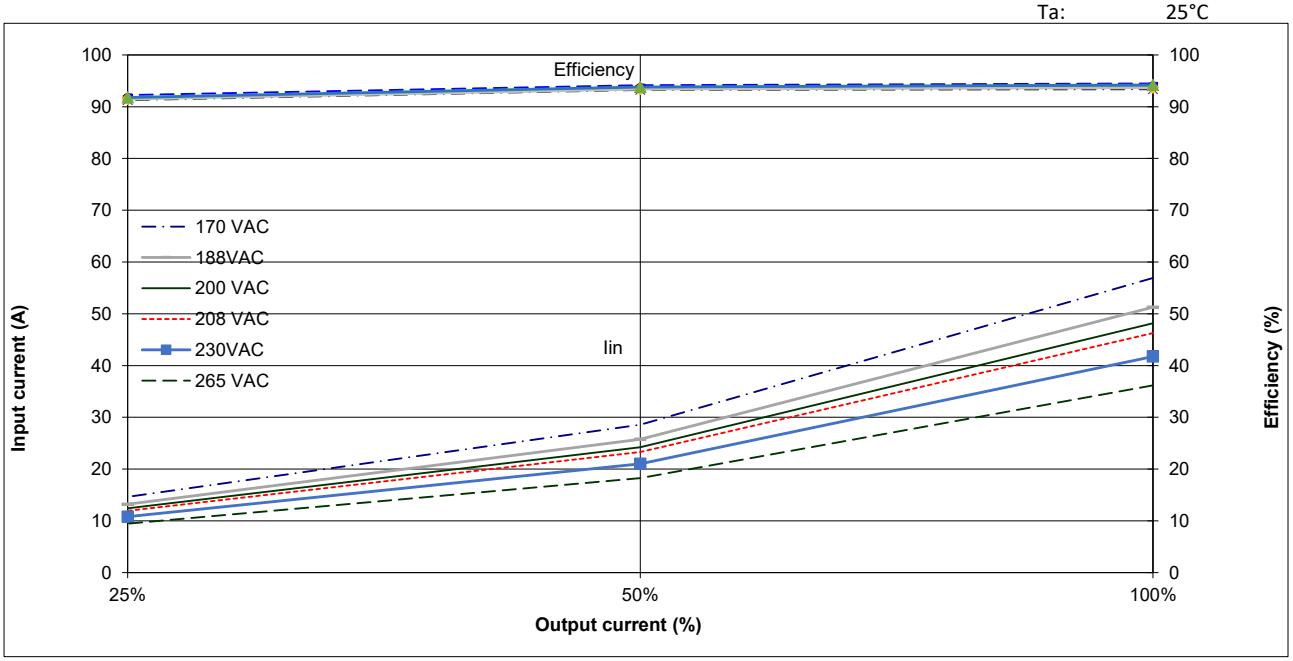
Conditions: Vin: 342~520 VAC
Vout: 100%
Ta: 25°C



(3). Efficiency and Input current vs. Output current

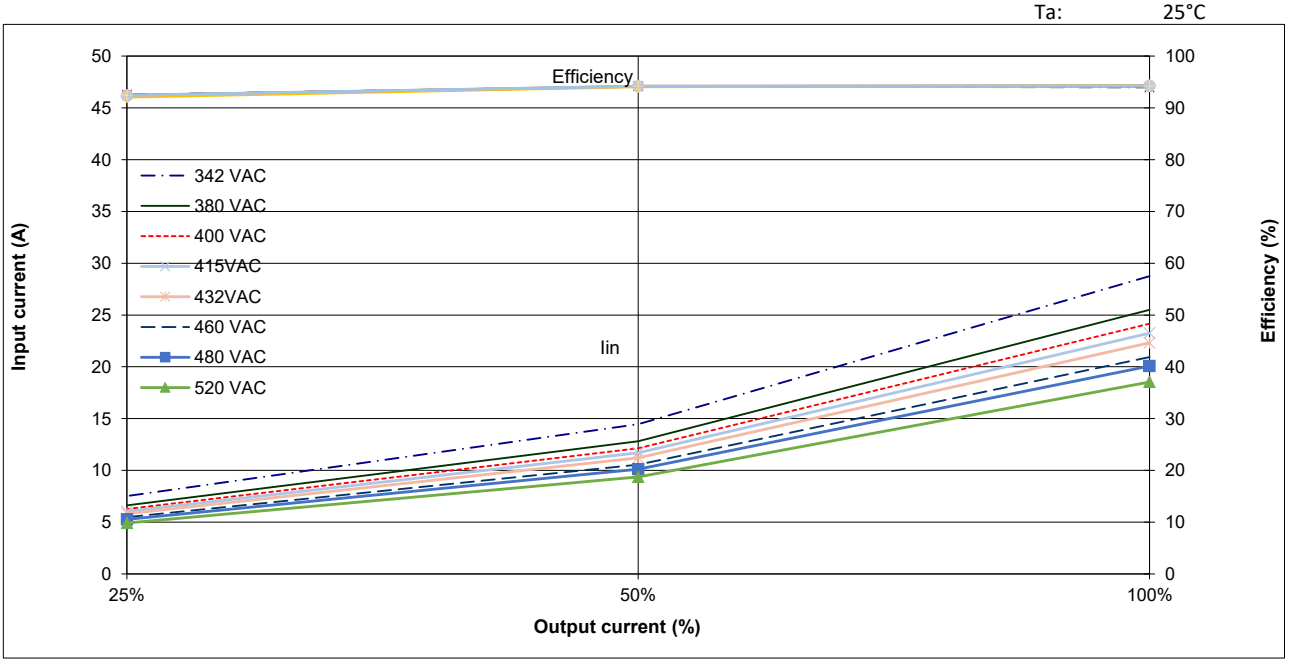
GSPL100-150 3Φ208

Conditions: Vin: 170~265 VAC
Vout: 100%
Ta: 25°C



GSPL100-150 3Φ480

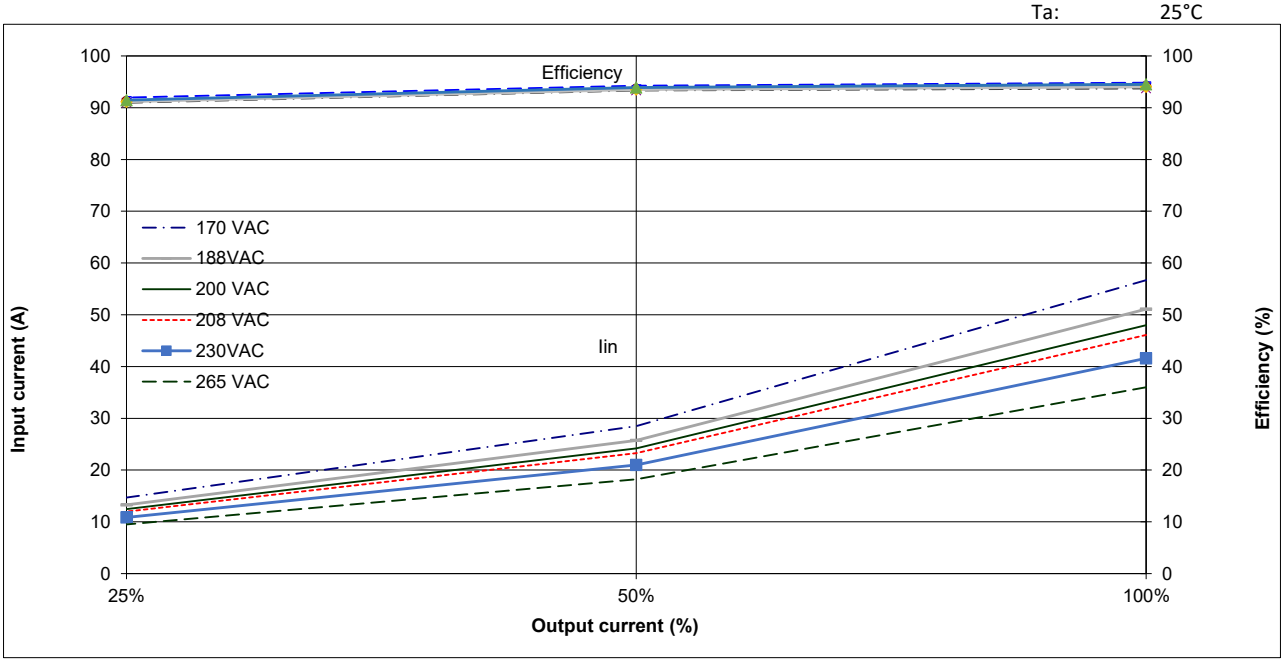
Conditions: Vin: 342~520 VAC
Vout: 100%
Ta: 25°C



(3). Efficiency and Input current vs. Output current

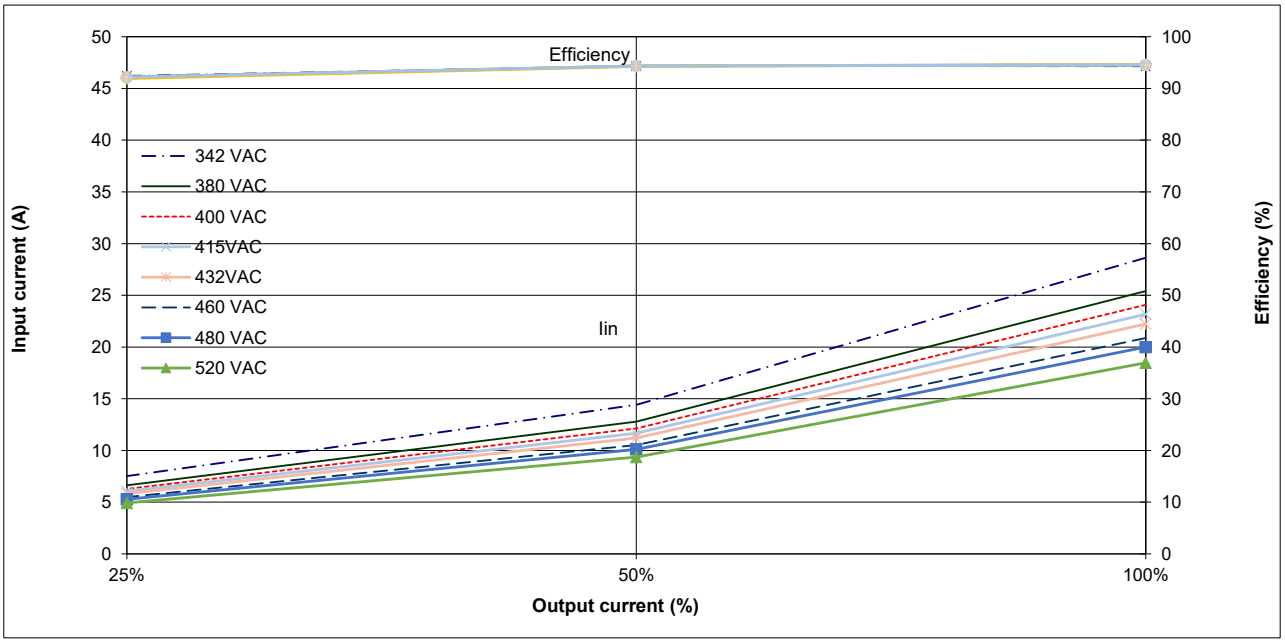
GSPL600-25 3Φ208

Conditions: Vin: 170~265 VAC
Vout: 100%
Ta: 25°C



GSPL600-25 3Φ480

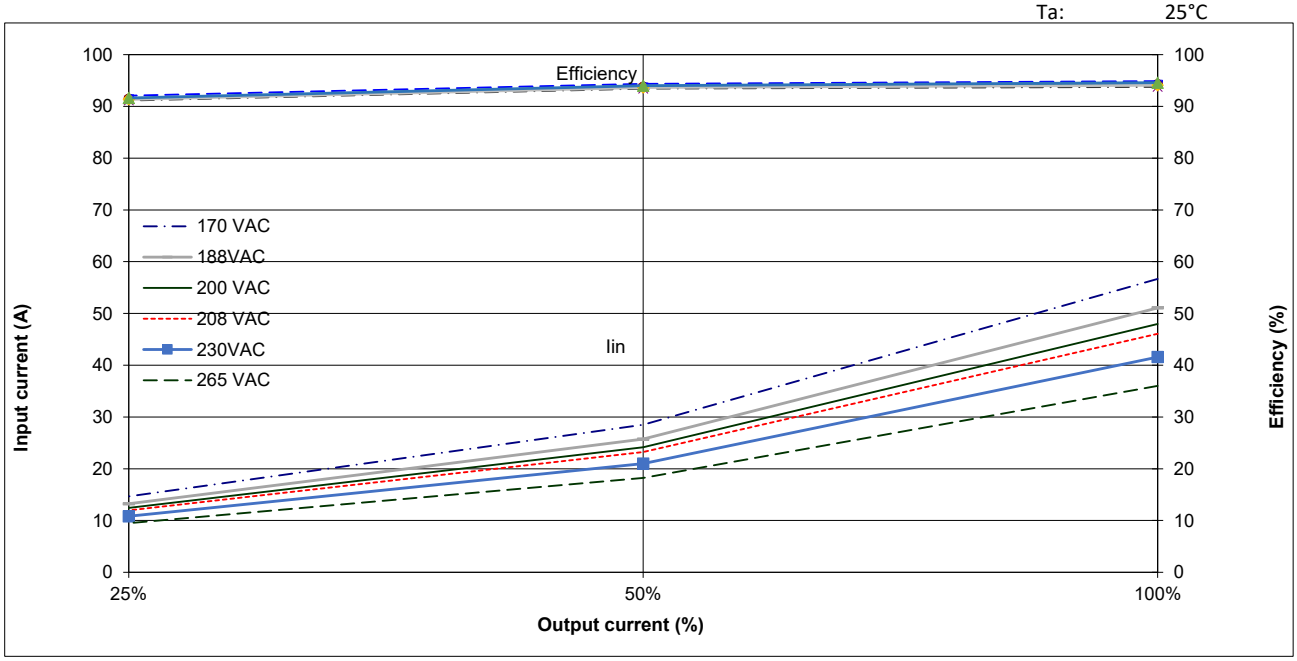
Conditions: Vin: 342~520 VAC
Vout: 100%
Ta: 25°C



(3). Efficiency and Input current vs. Output current

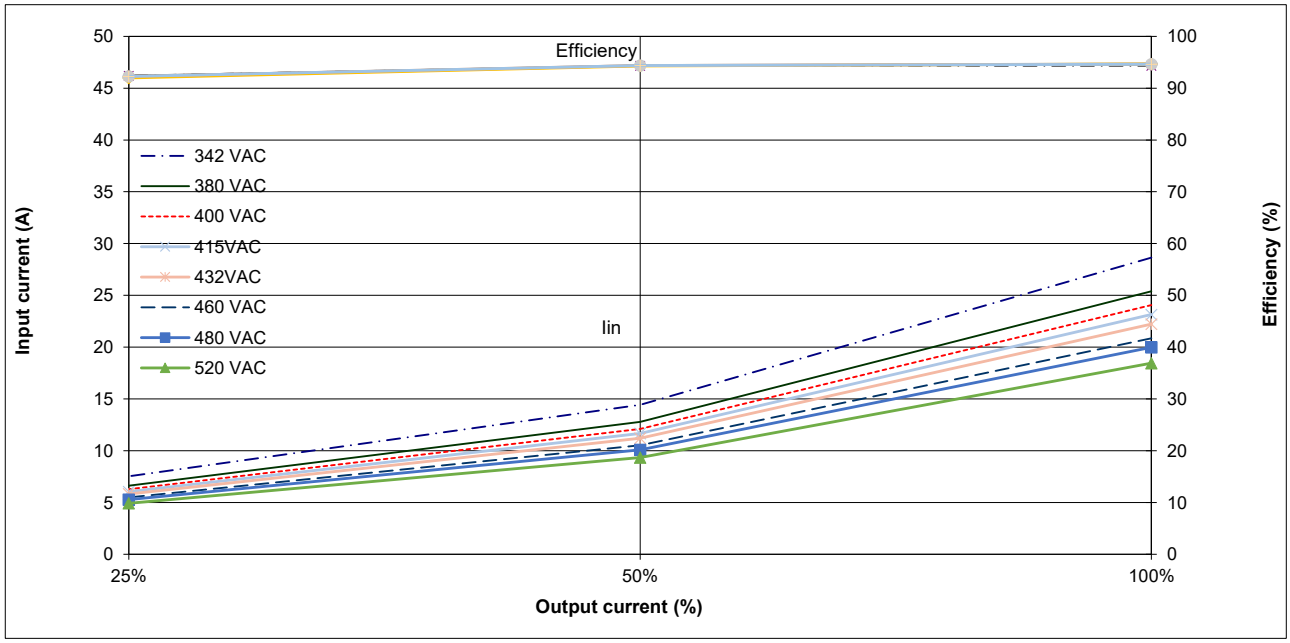
GSPL1500-10 3Φ208

Conditions: Vin: 170~265 VAC
Vout: 100%
Ta: 25°C



GSPL1500-10 3Φ480

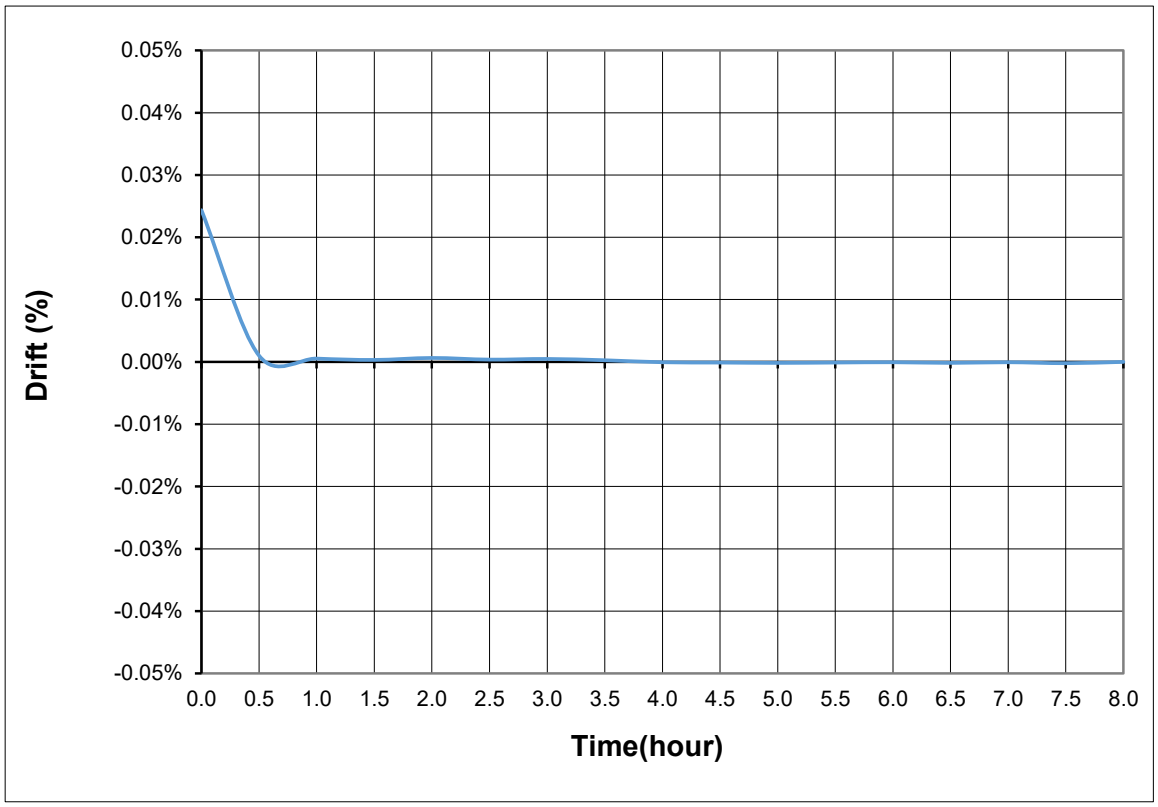
Conditions: Vin: 342~520 VAC
Vout: 100%
Ta: 25°C



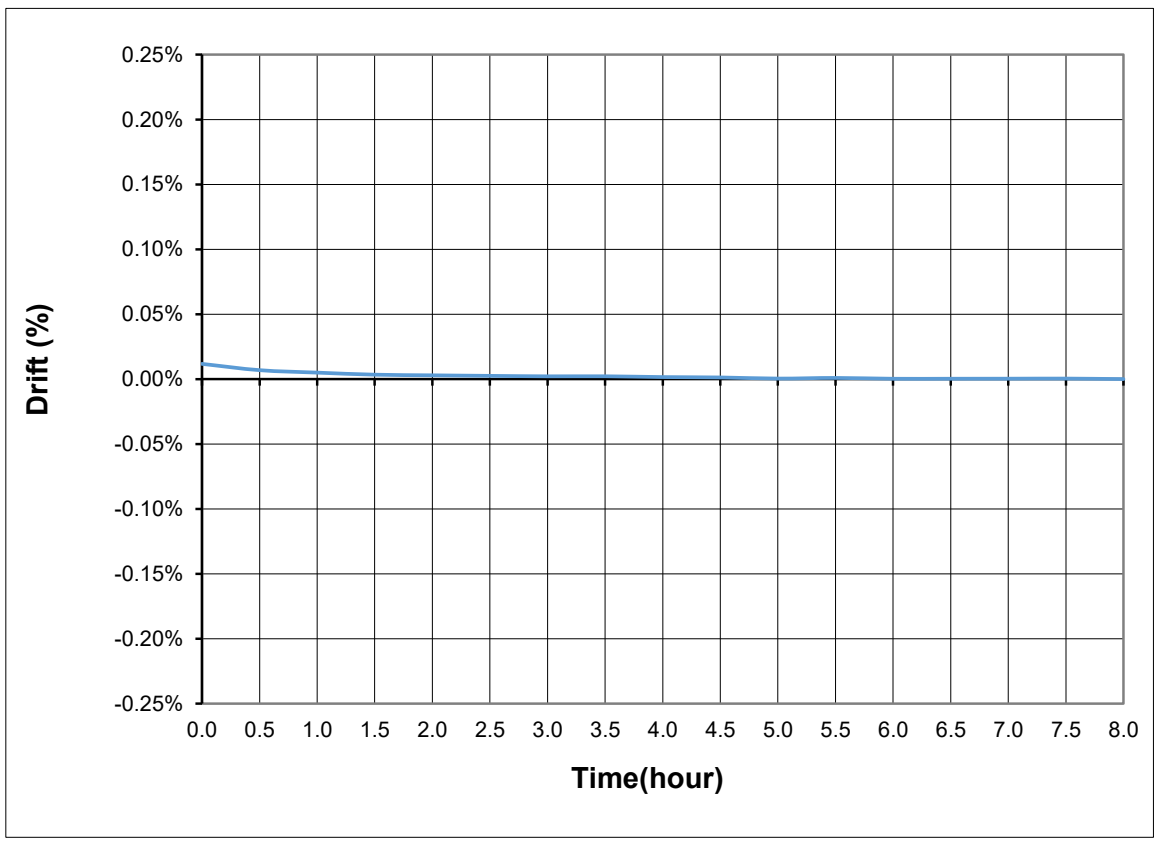
2.2 Warm up drift & stability

Conditions: Vset: 100%
Iout: 100%
Ta: 25°C

GSPL20-750 C.V mode



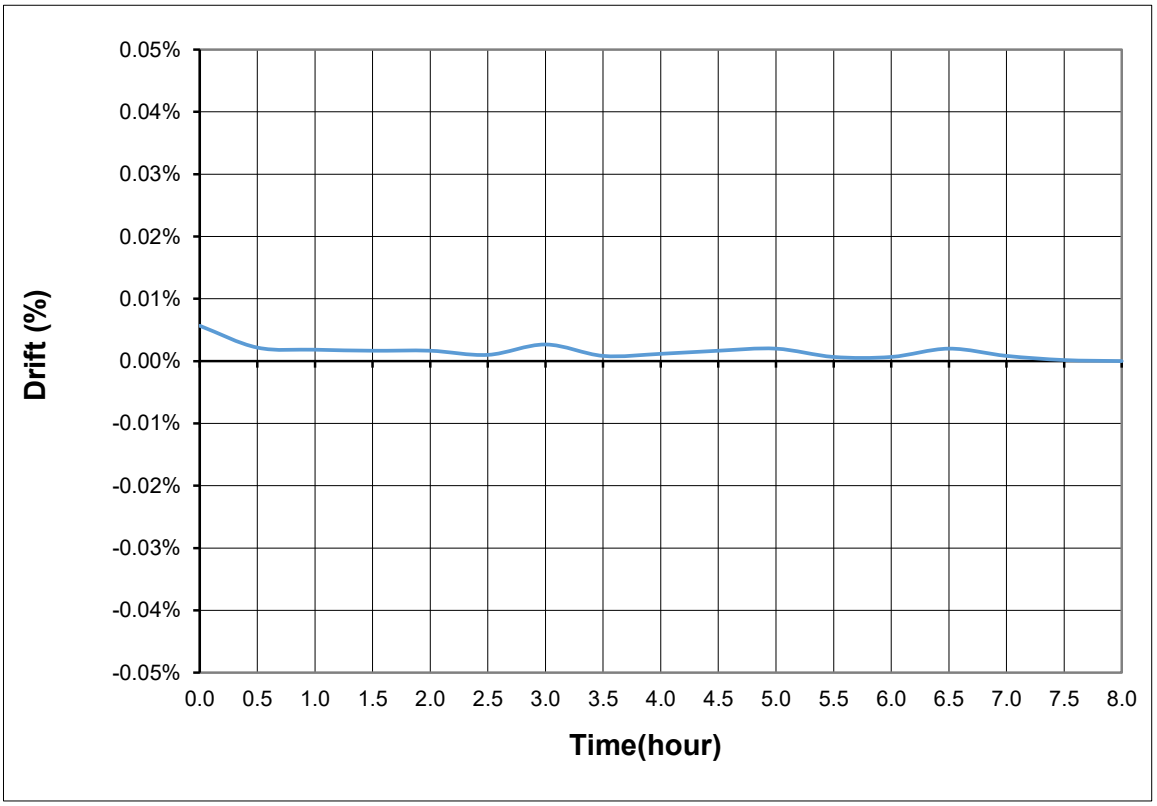
GSPL20-750 C.C mode



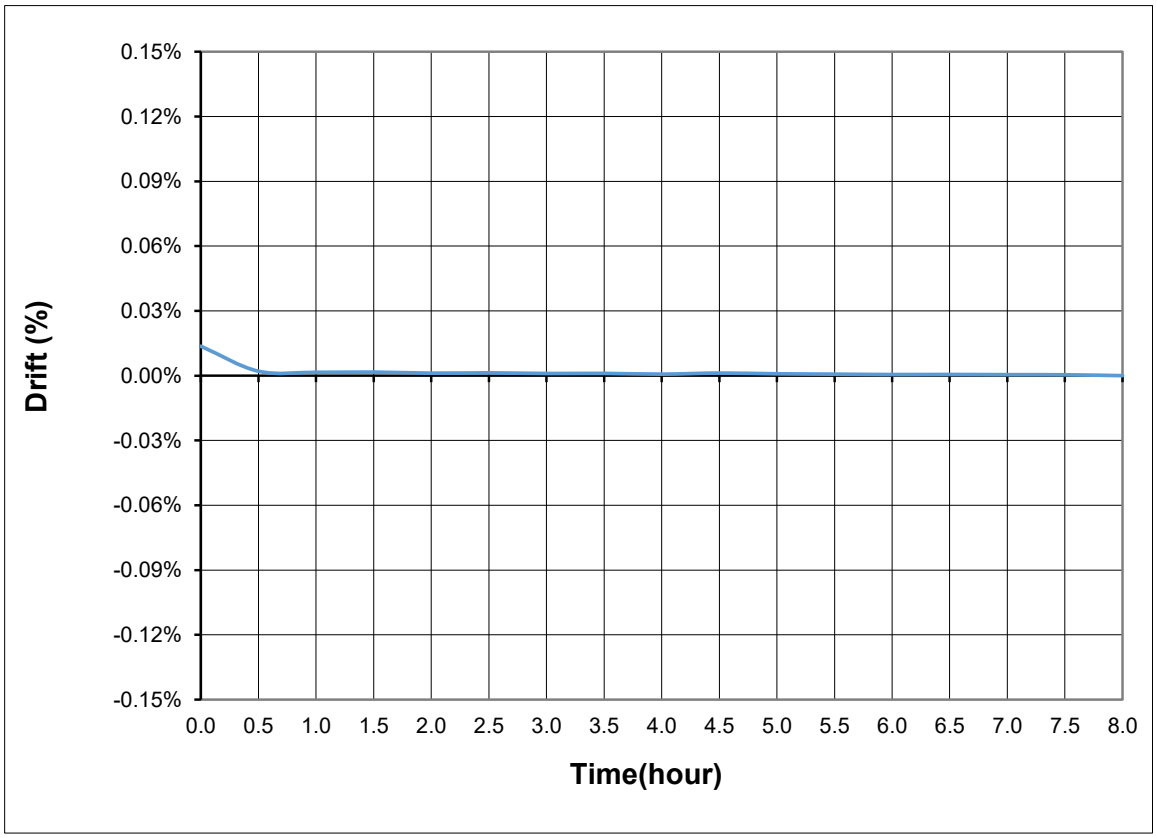
2.2 Warm up drift & stability

Conditions: Vset: 100%
Iout: 100%
Ta: 25°C

GSPL600-25 C.V mode



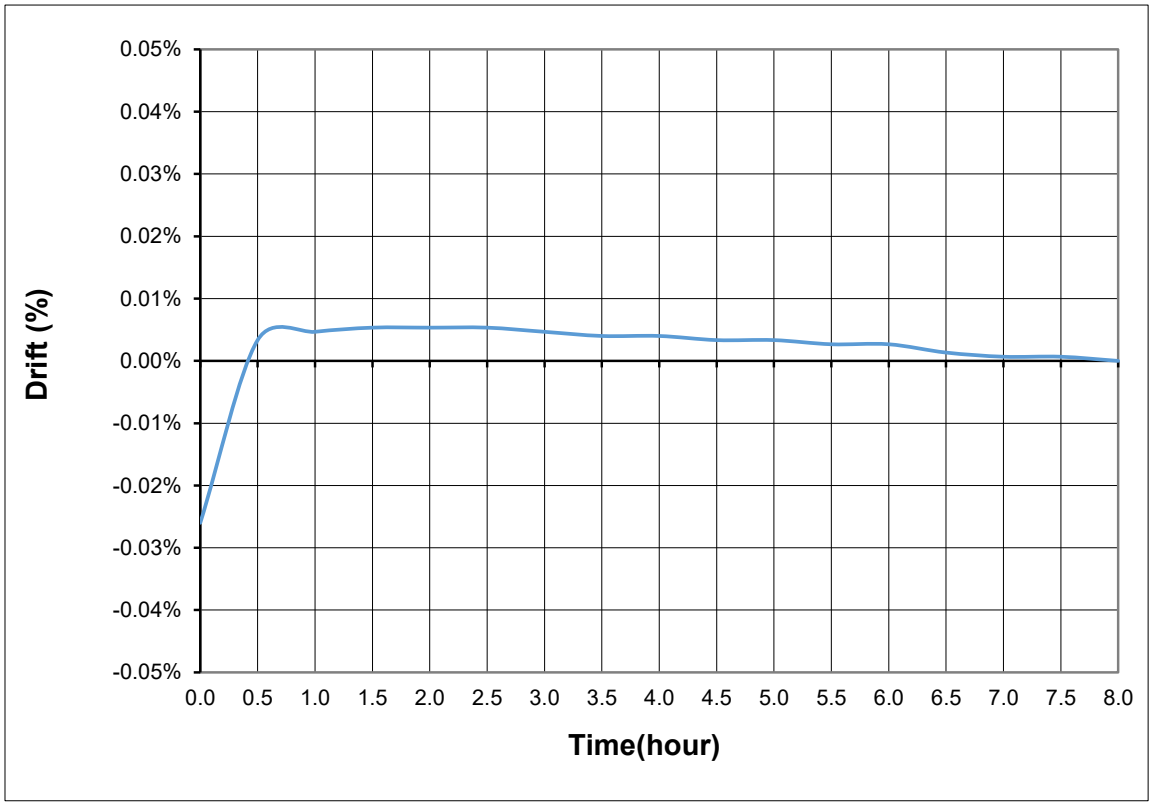
GSPL600-25 C.C mode



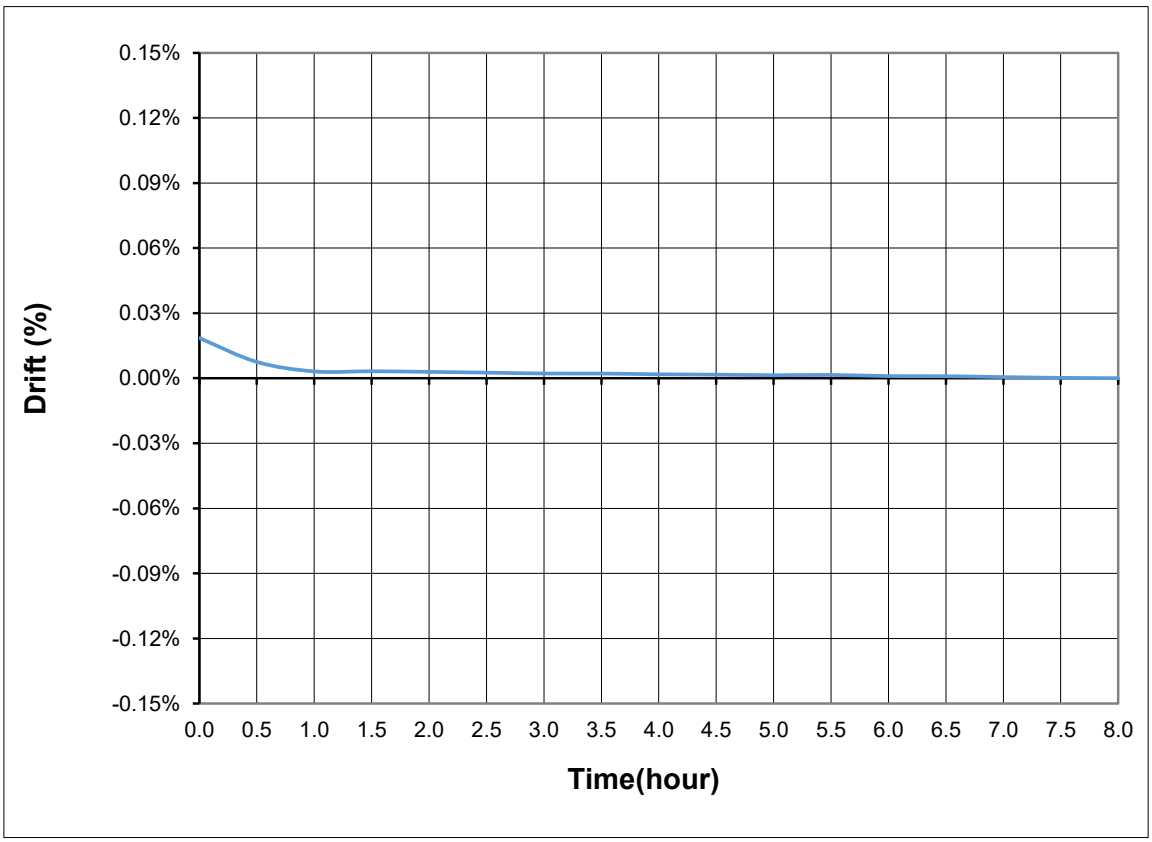
2.2 Warm up drift & stability

Conditions: Vset: 100%
Iout: 100%
Ta: 25°C

GSPL1500-10 C.V mode



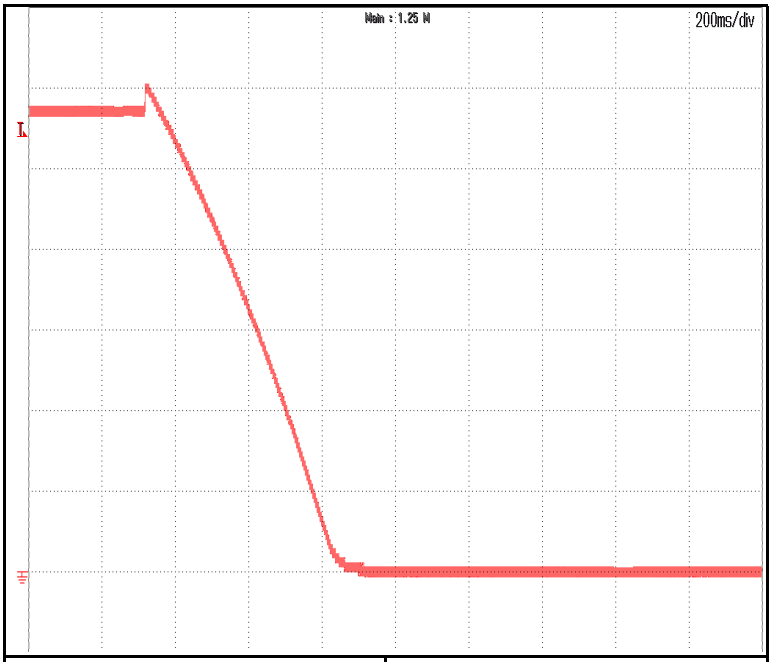
GSPL1500-10 C.C mode



2.3 Over voltage protection (OVP) characteristic

Conditions: Vset: 100%
Iout: 0%
Ta: 25°C

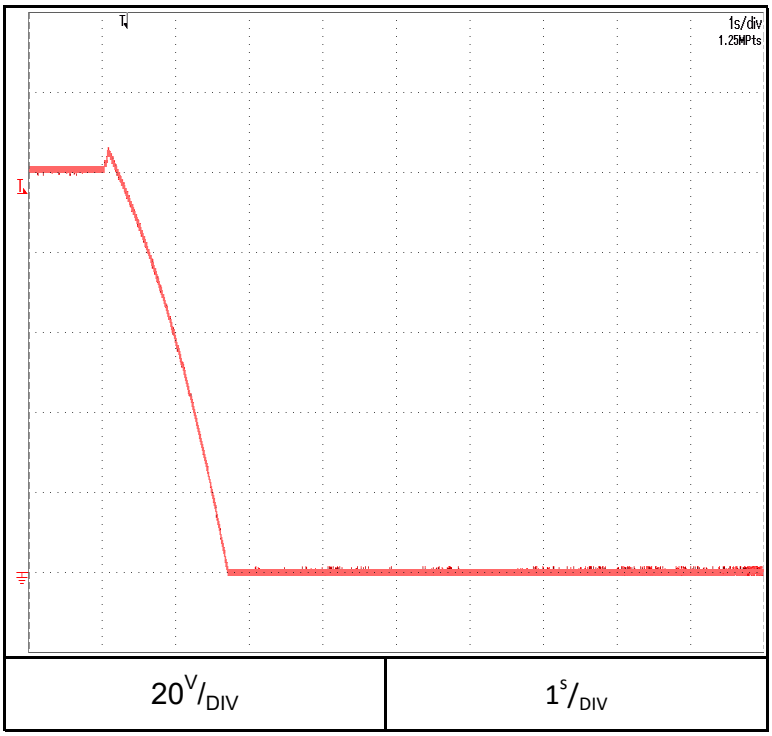
GSPL20-750



3.5V/DIV	200ms/DIV

OVP setting: 21V

GSPL100-150



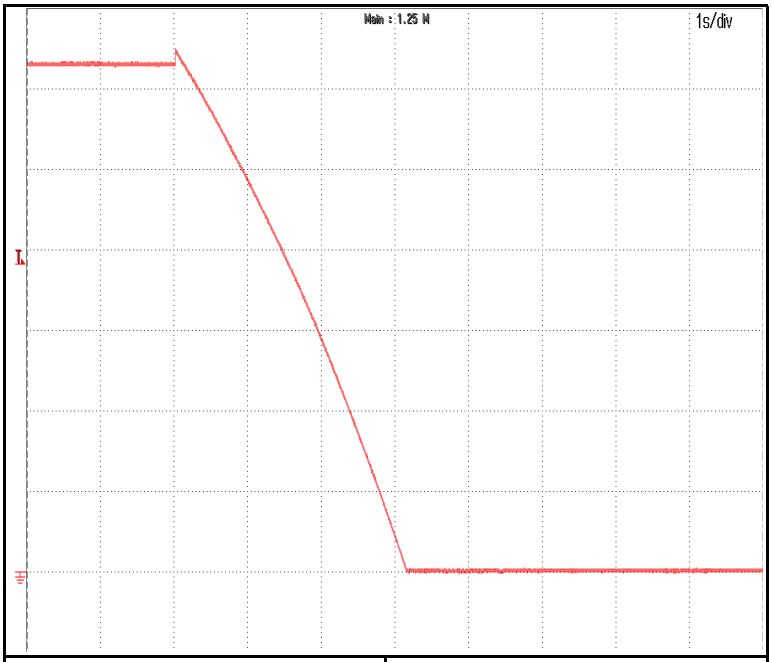
20V/DIV	1s/DIV

OVP setting: 105V

2.3 Over voltage protection (OVP) characteristic

Conditions: Vset: 100%
Iout: 0%
Ta: 25°C

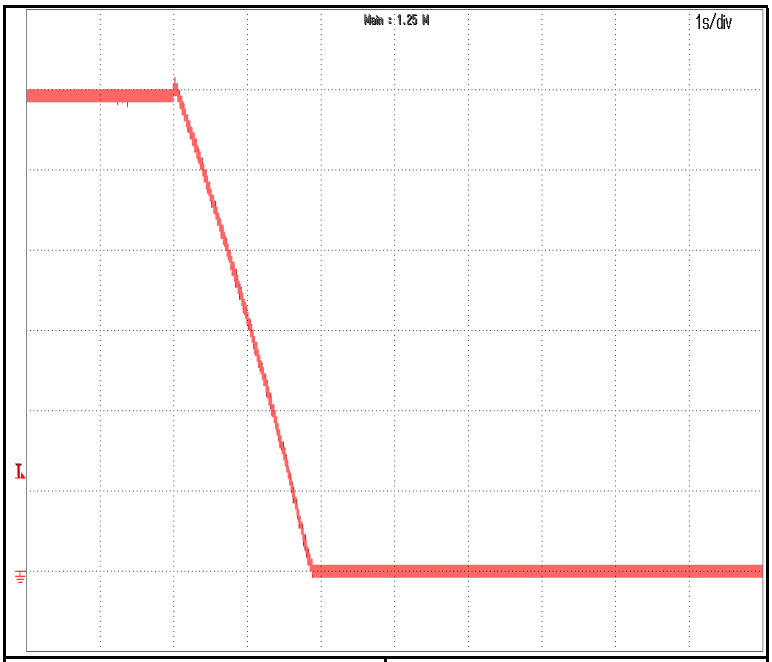
GSPL600-25



100V/DIV	1s/DIV

OVP setting: 630V

GSPL1500-10



260V/DIV	1s/DIV

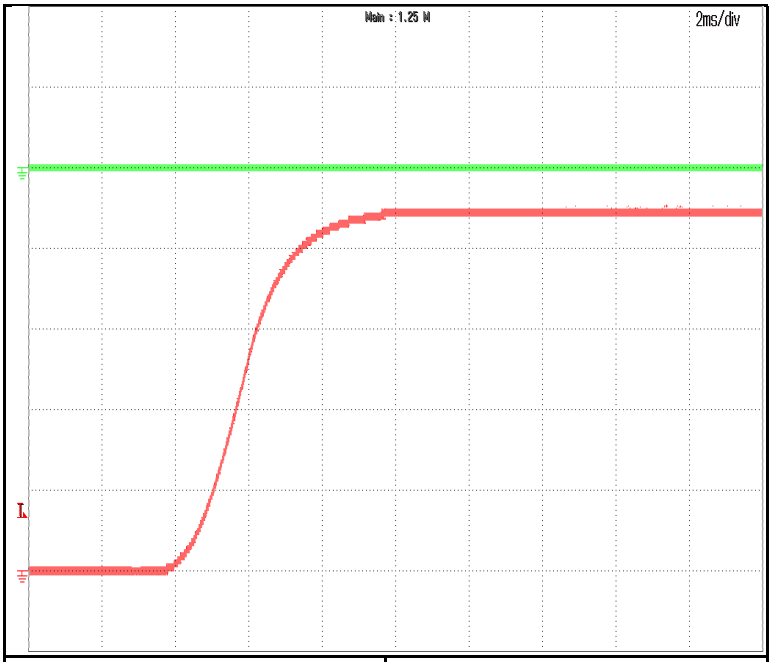
OVP setting: 1575V

2.4 ON/OFF Output rise characteristics

C.V mode

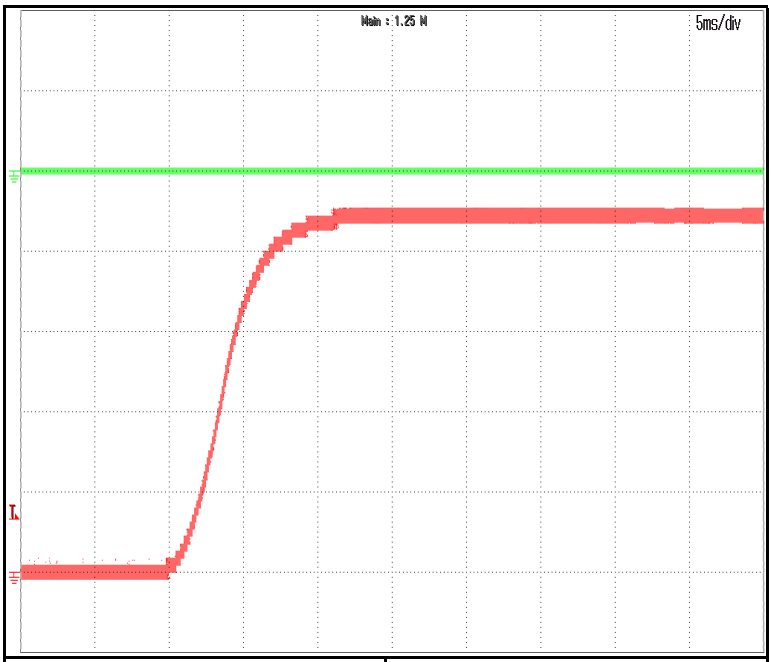
Conditions: Vin: Nominal
Vout: 100%
Iout: 0%
Iset: 105%
Ta: 25°C

GSPL20-750



$4.5^{V}/_{DIV}$	$2^{ms}/_{DIV}$
$1^{A}/_{DIV}$	

GSPL100-150



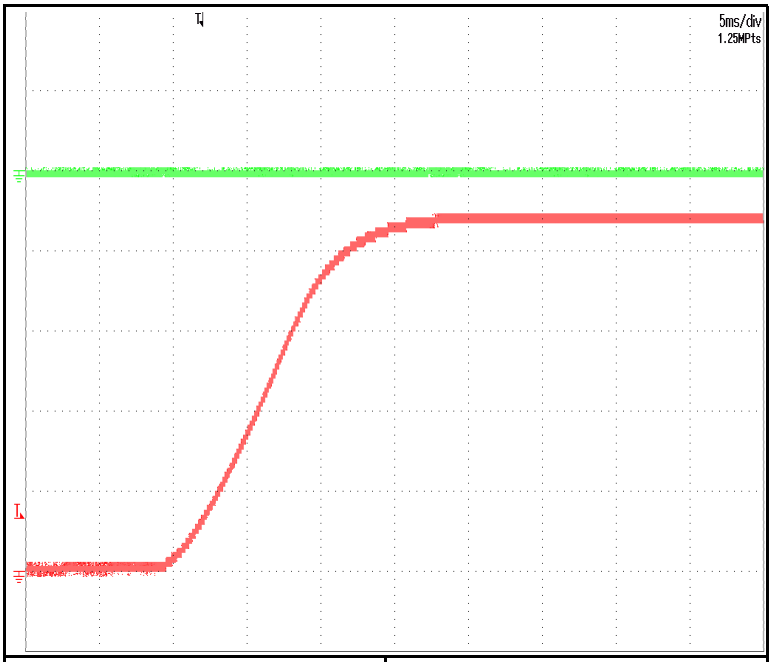
$22.5^{V}/_{DIV}$	$5^{ms}/_{DIV}$
$1^{A}/_{DIV}$	

2.4 ON/OFF Output rise characteristics

C.V mode

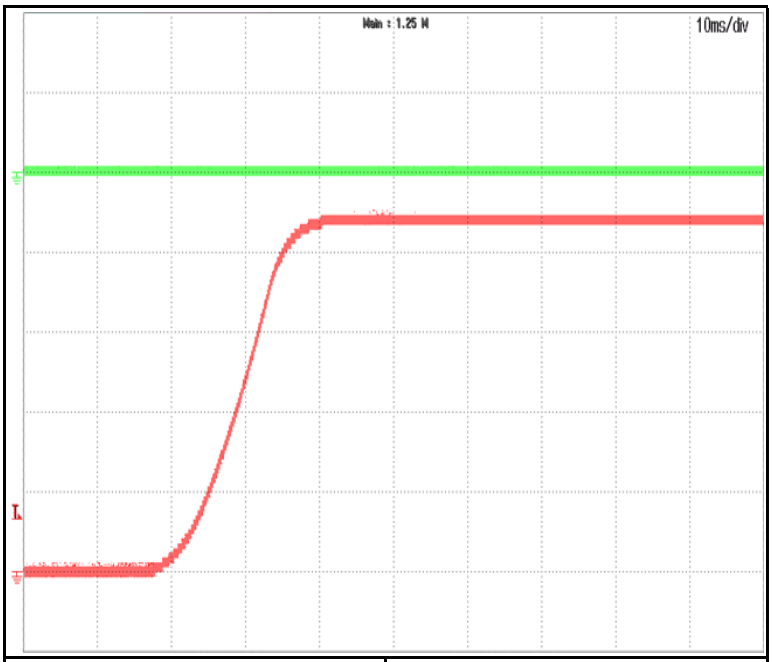
Conditions: Vin: Nominal
Vout: 100%
Iout: 0%
Iset: 105%
Ta: 25°C

GSPL600-25



136 V/DIV	5 ms/DIV
1 A/DIV	

GSPL1500-10



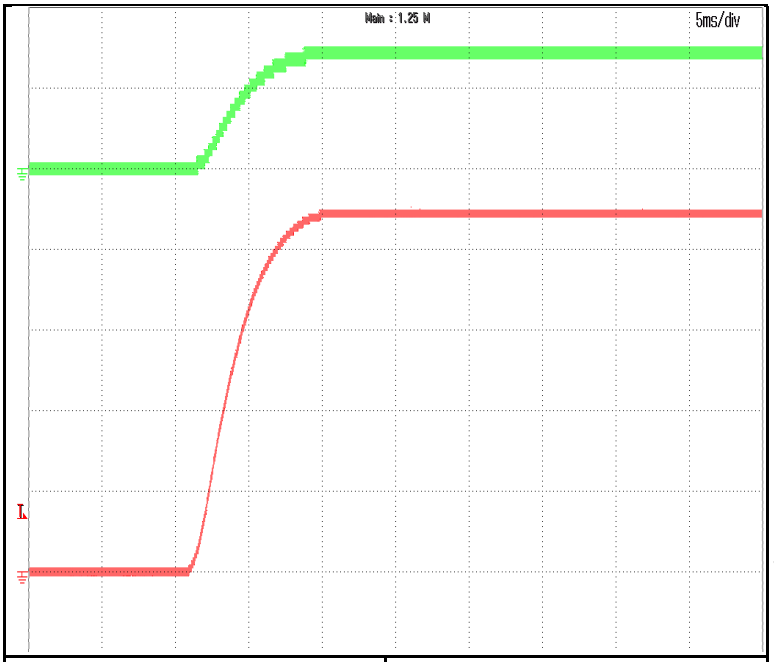
340 V/DIV	10 ms/DIV
1 A/DIV	

2.4 ON/OFF Output rise characteristics

C.V mode

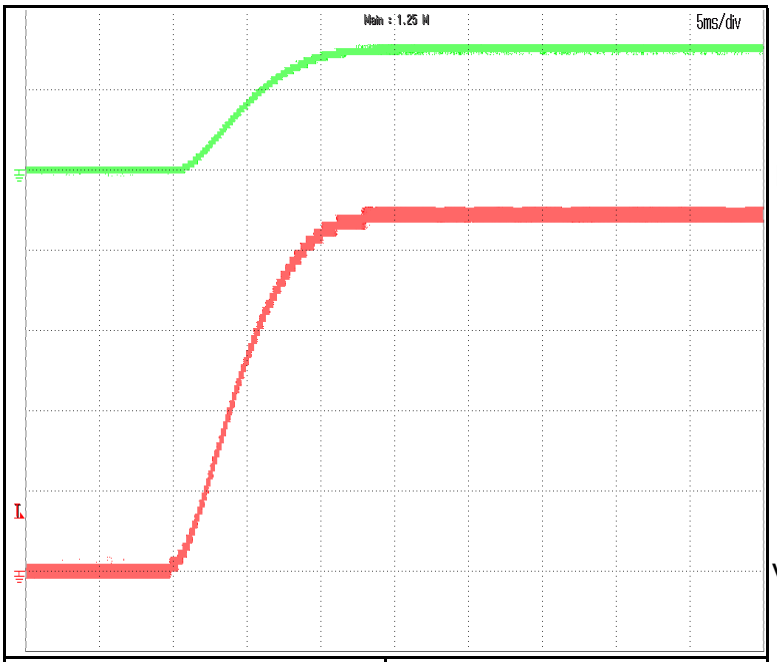
Conditions: Vin: Nominal
Vout: 100%
Iout: 100%
Iset: 105%
Load: CR
Ta: 25°C

GSPL20-750



$4.5^{V}/_{DIV}$	$5^{ms}/_{DIV}$
$500^{A}/_{DIV}$	

GSPL100-150



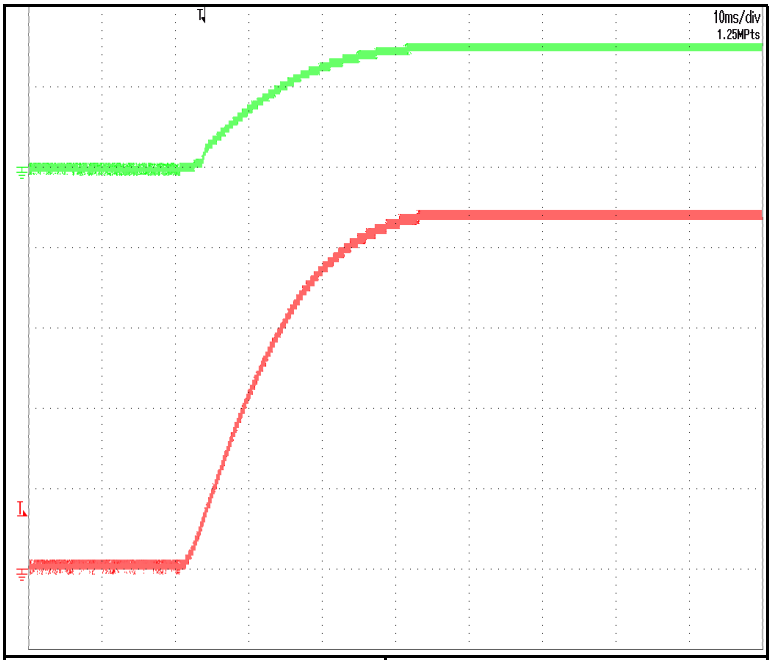
$22.5^{V}/_{DIV}$	$5^{ms}/_{DIV}$
$100^{A}/_{DIV}$	

2.4 ON/OFF Output rise characteristics

C.V mode

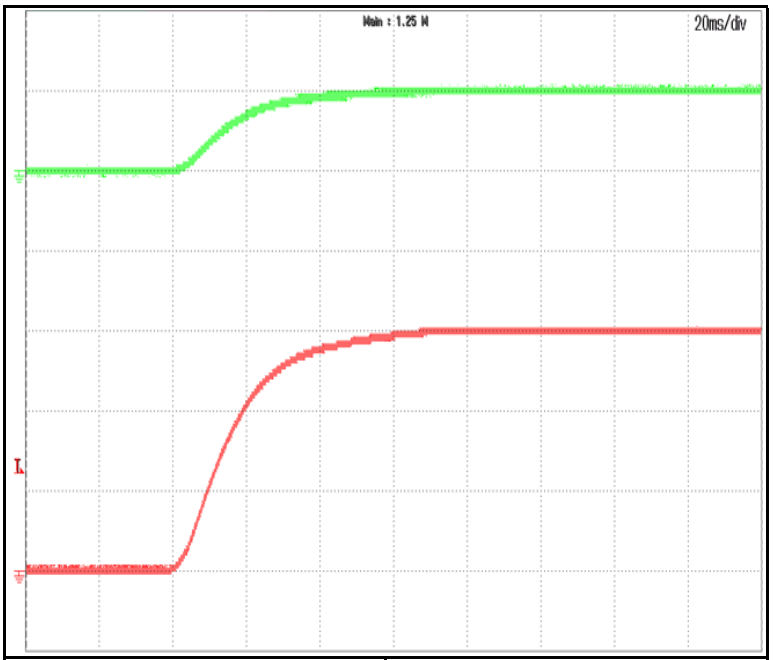
Conditions: Vin: Nominal
Vout: 100%
Iout: 100%
Iset: 105%
Load: CR
Ta: 25°C

GSPL600-25



136 V/DIV	10 ms/DIV
16.6 A/DIV	

GSPL1500-10



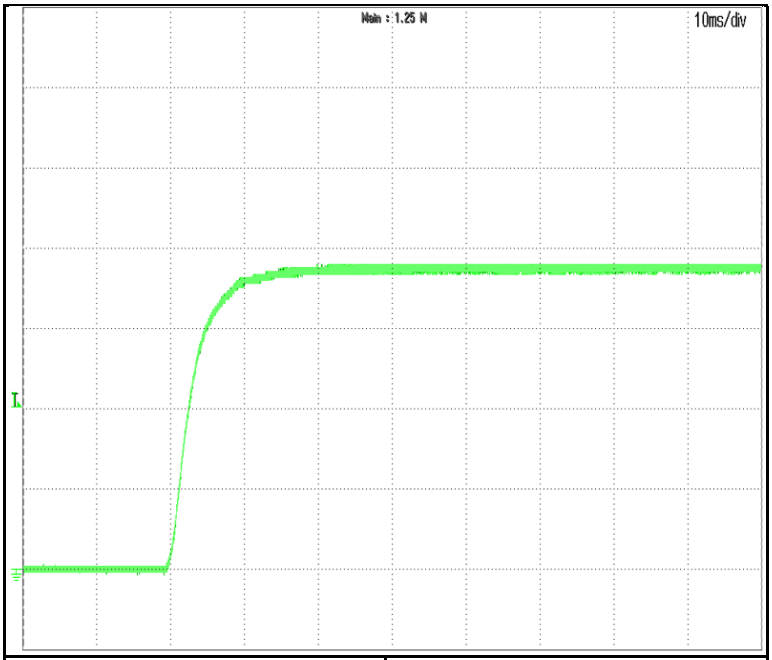
500 V/DIV	20 ms/DIV
10 A/DIV	

2.4 ON/OFF Output rise characteristics

C.C mode

Conditions: Vin: Nominal
Vout: 100%
Iout: 100%
Vset: 105%
Load: CR
Ta: 25°C

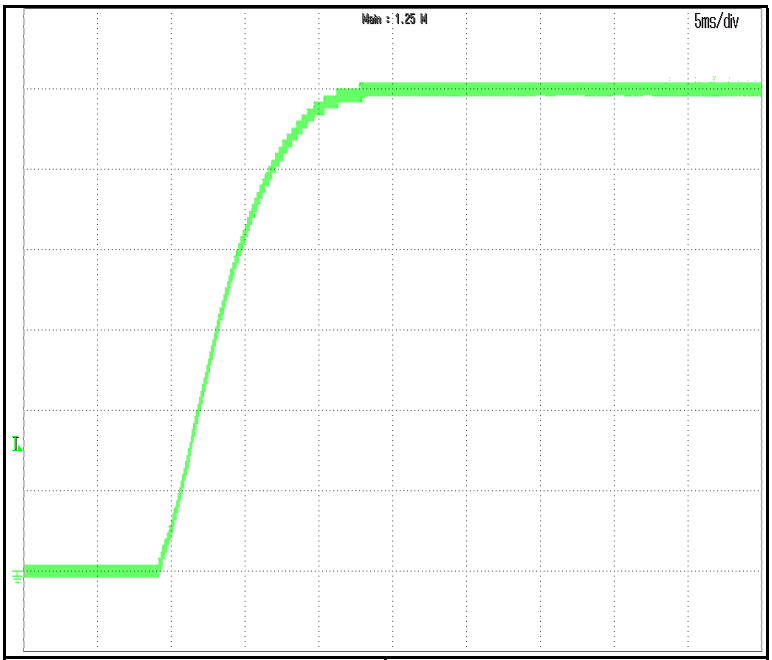
GSPL20-750



Iout

$200^{A}/_{DIV}$	$10^{ms}/_{DIV}$

GSPL100-150



Iout

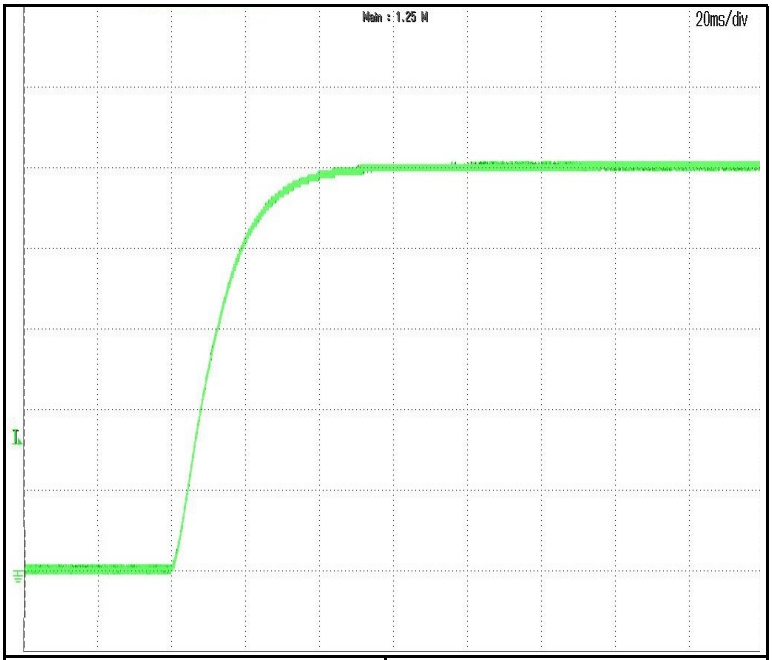
$25^{A}/_{DIV}$	$5^{ms}/_{DIV}$

2.4 ON/OFF Output rise characteristics

C.C mode

Conditions: Vin: Nominal
Vout: 100%
Iout: 100%
Vset: 105%
Load: CR
Ta: 25°C

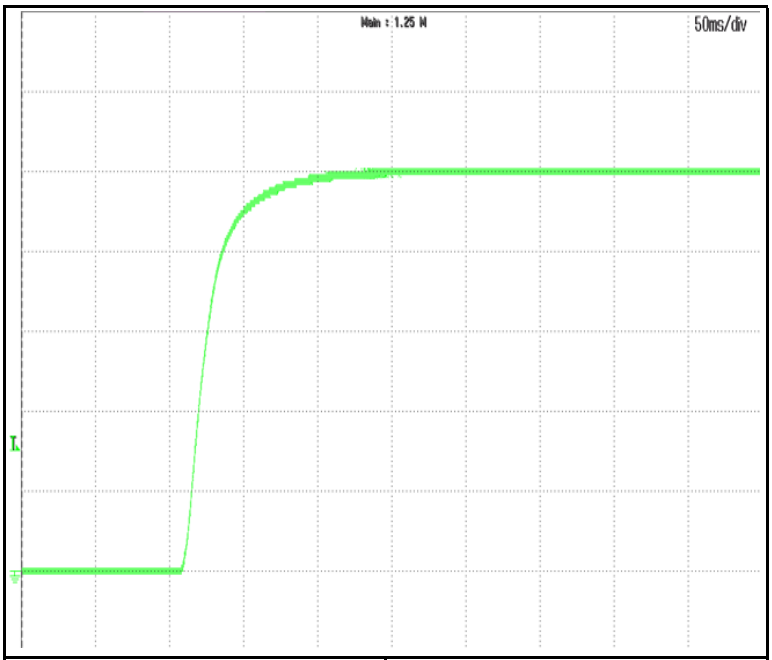
GSPL600-25



Iout

$5^{A}/_{DIV}$	$20^{ms}/_{DIV}$

GSPL1500-10



Iout

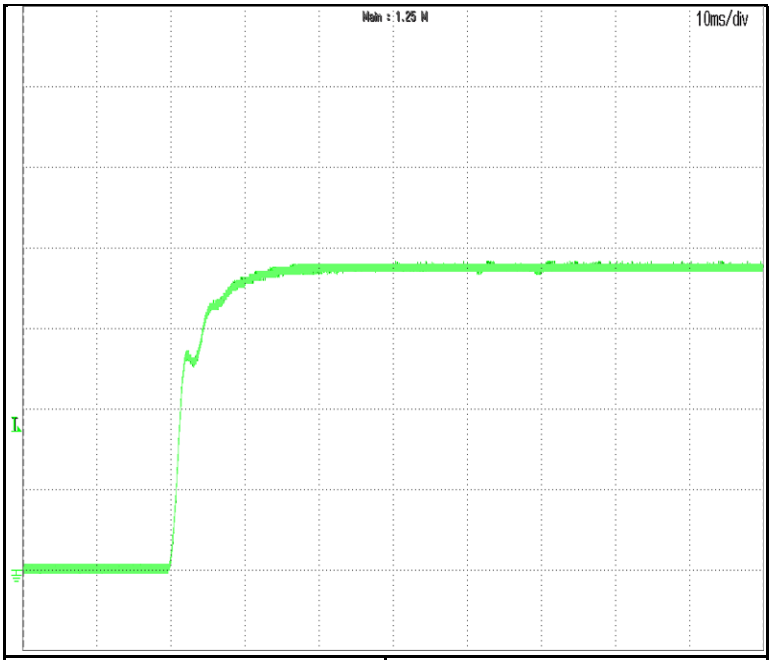
$2^{A}/_{DIV}$	$50^{ms}/_{DIV}$

2.4 ON/OFF Output rise characteristics

C.C mode

Conditions: Vin: Nominal
Iout: 100%
Vset: 105%
shorted output
Ta: 25°C

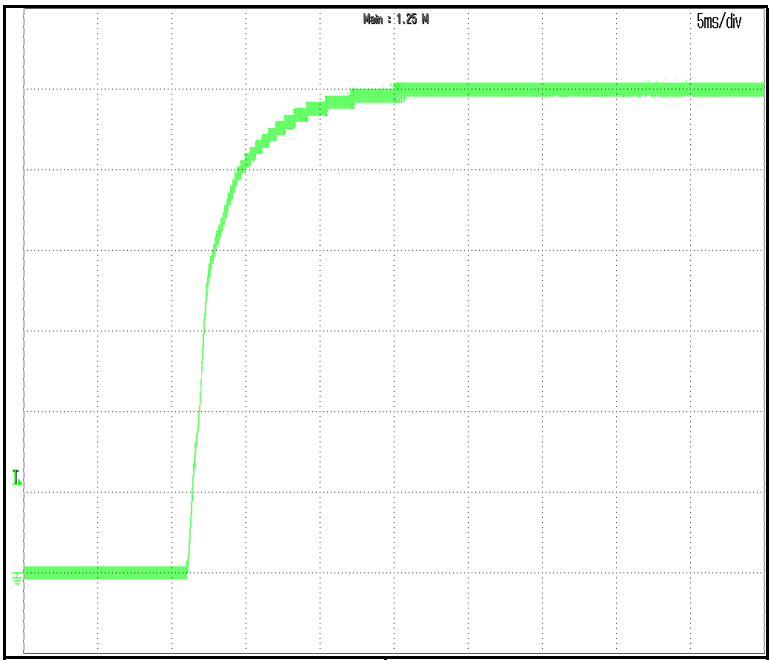
GSPL20-750



Iout

$200^{A}/_{DIV}$	$10^{ms}/_{DIV}$

GSPL100-150



Iout

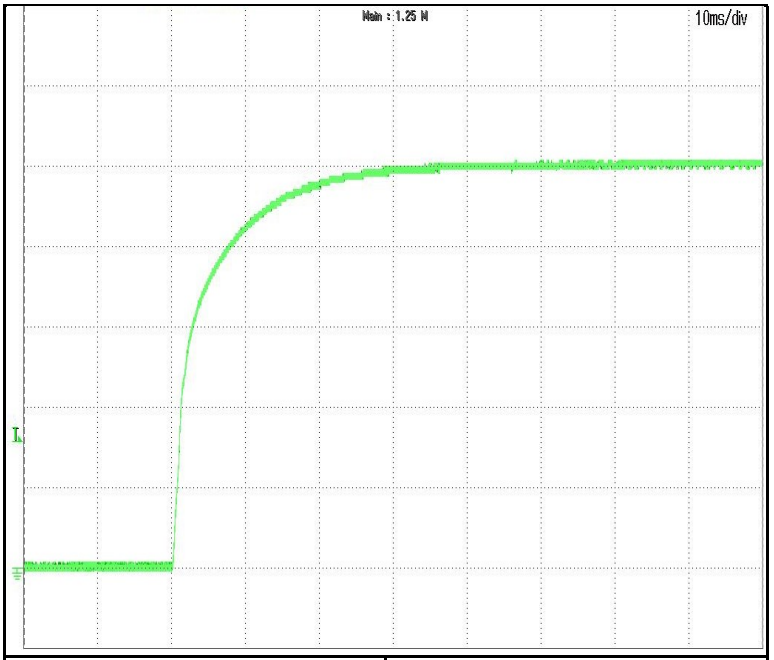
$25^{A}/_{DIV}$	$5^{ms}/_{DIV}$

2.4 ON/OFF Output rise characteristics

C.C mode

Conditions: Vin: Nominal
Iout: 100%
Vset: 105%
shorted output
Ta: 25°C

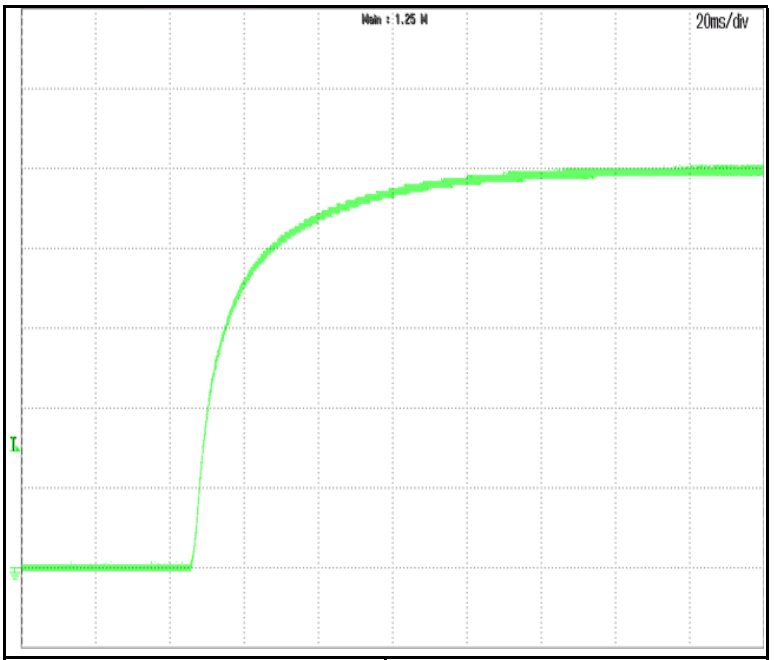
GSPL600-25



Iout

$5^{A}/_{DIV}$	$10^{ms}/_{DIV}$

GSPL1500-10



Iout

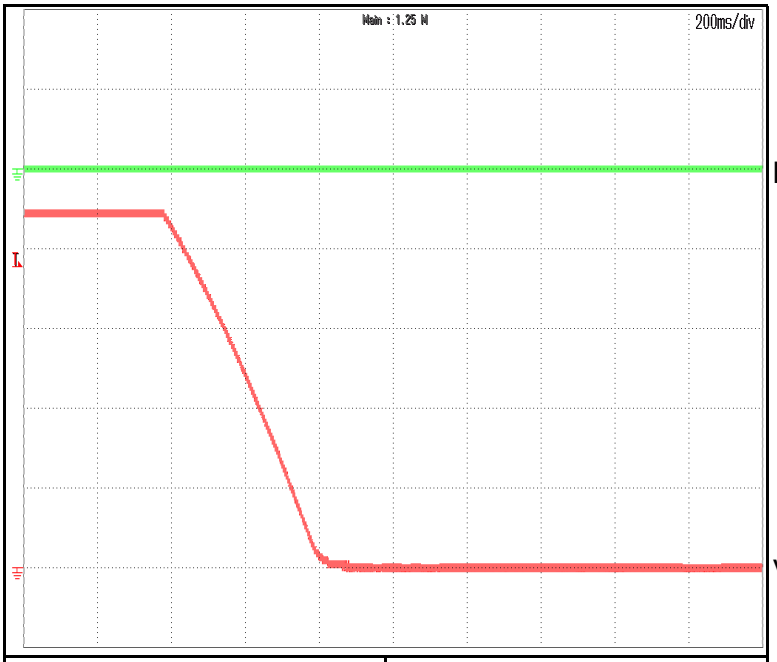
$2^{A}/_{DIV}$	$20^{ms}/_{DIV}$

2.5 ON/OFF Output fall characteristics

C.V mode

Conditions: Vin: Nominal
Vout: 100%
Iout: 0%
Ta: 25°C

GSPL20-750



$4.5^{V}/_{DIV}$	$200^{ms}/_{DIV}$
$1^{A}/_{DIV}$	

GSPL100-150

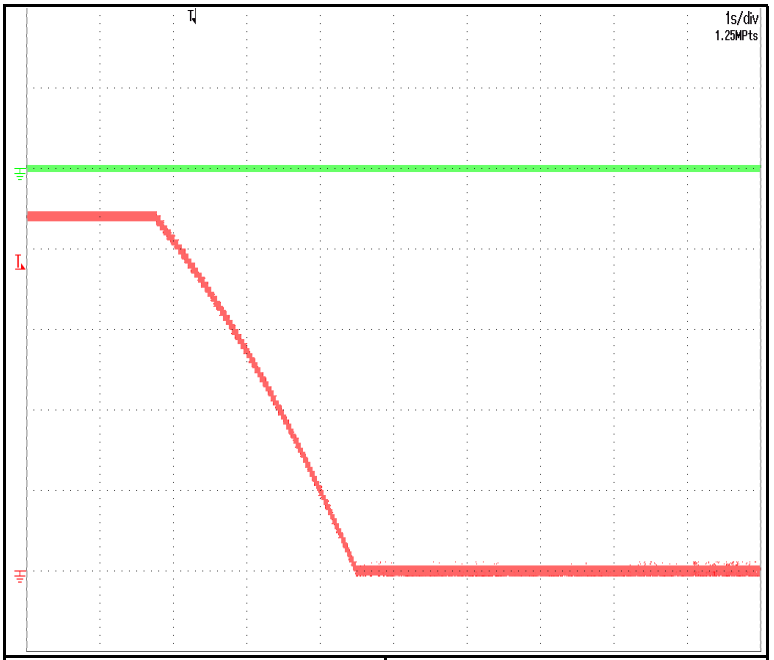
$22.5^{V}/_{DIV}$	$1^{s}/_{DIV}$
$1^{A}/_{DIV}$	

2.5 ON/OFF Output fall characteristics

C.V mode

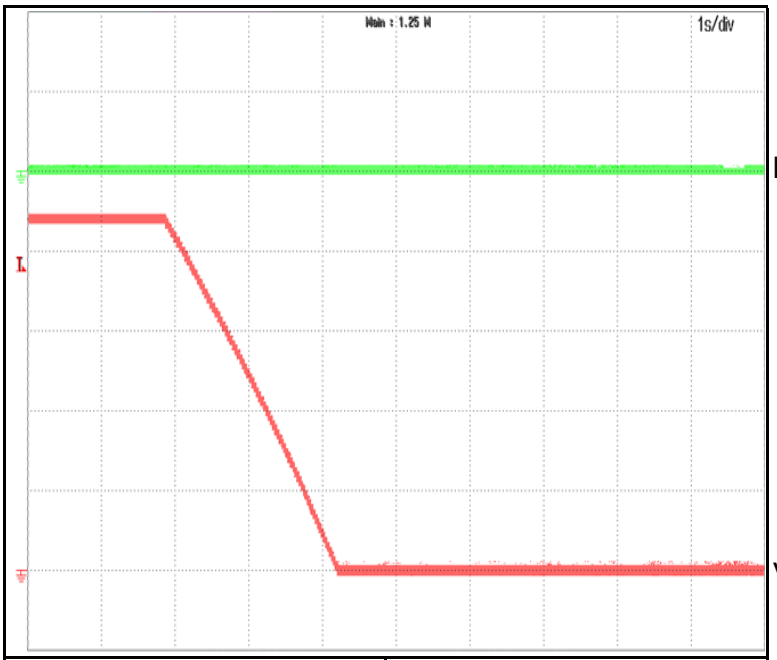
Conditions: Vin: Nominal
Vout: 100%
Iout: 0%
Ta: 25°C

GSPL600-25



136 V/DIV	1 s/DIV
1 A/DIV	

GSPL1500-10



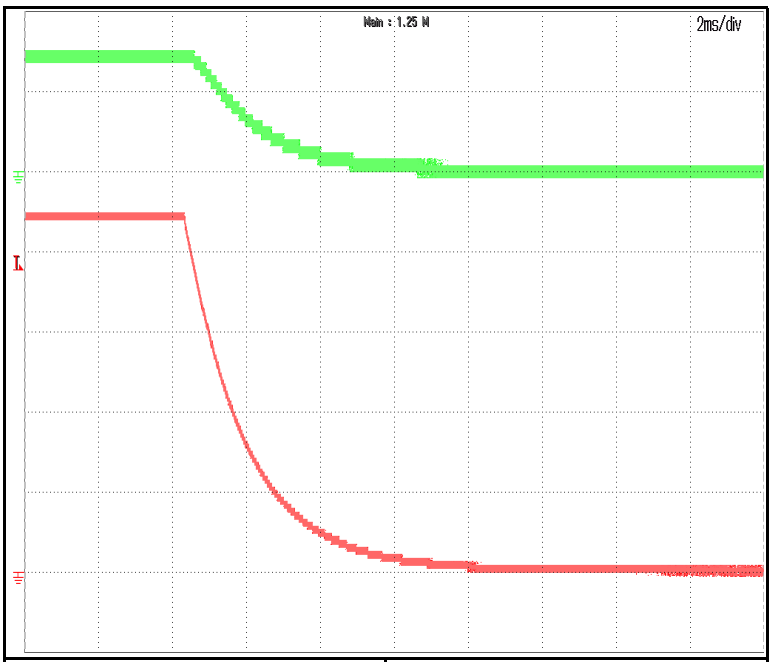
340 V/DIV	1 s/DIV
1 A/DIV	

2.5 ON/OFF Output fall characteristics

C.V mode

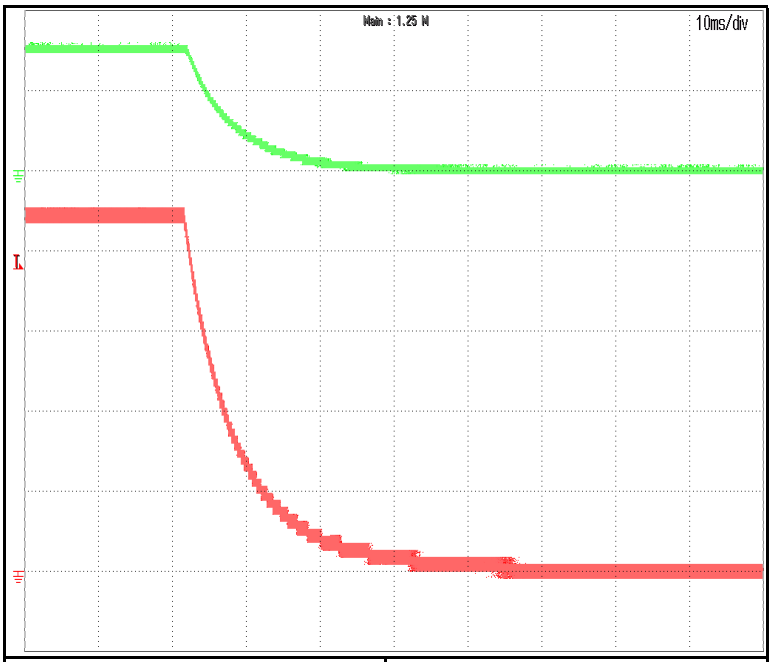
Conditions: Vin: Nominal
Vout: 100%
Iout: 100%
Load: CR
Ta: 25°C

GSPL20-750



$4.5^{V}/_{DIV}$	$2^{ms}/_{DIV}$
$500^{A}/_{DIV}$	

GSPL100-150



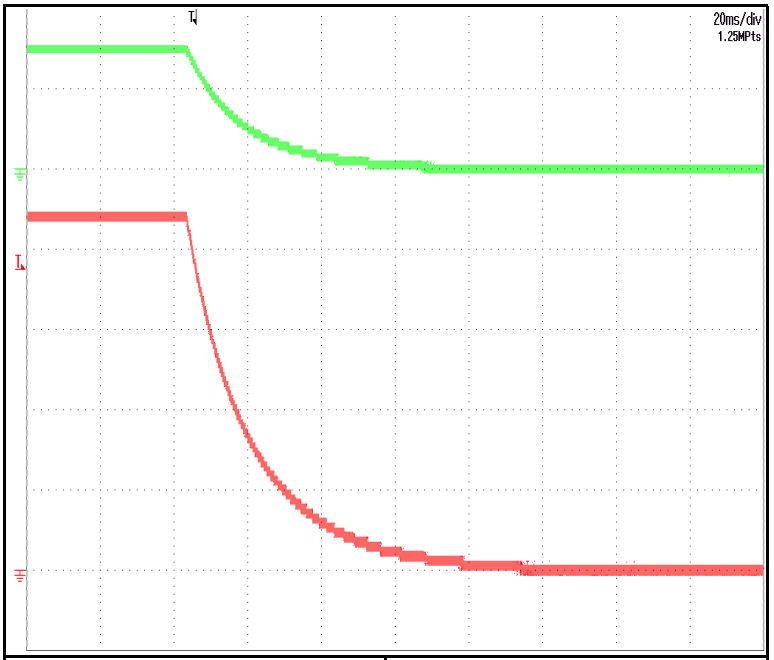
$22.5^{V}/_{DIV}$	$10^{ms}/_{DIV}$
$100^{A}/_{DIV}$	

2.5 ON/OFF Output fall characteristics

C.V mode

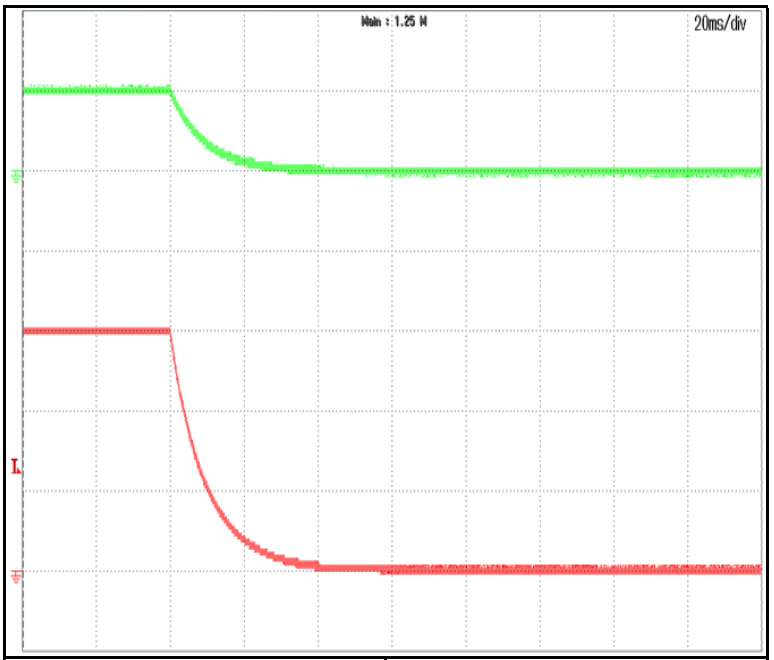
Conditions: Vin: Nominal
Vout: 100%
Iout: 100%
Load: CR
Ta: 25°C

GSPL600-25



$136^{V}/_{DIV}$	$20^{ms}/_{DIV}$
$16.6^{A}/_{DIV}$	

GSPL1500-10



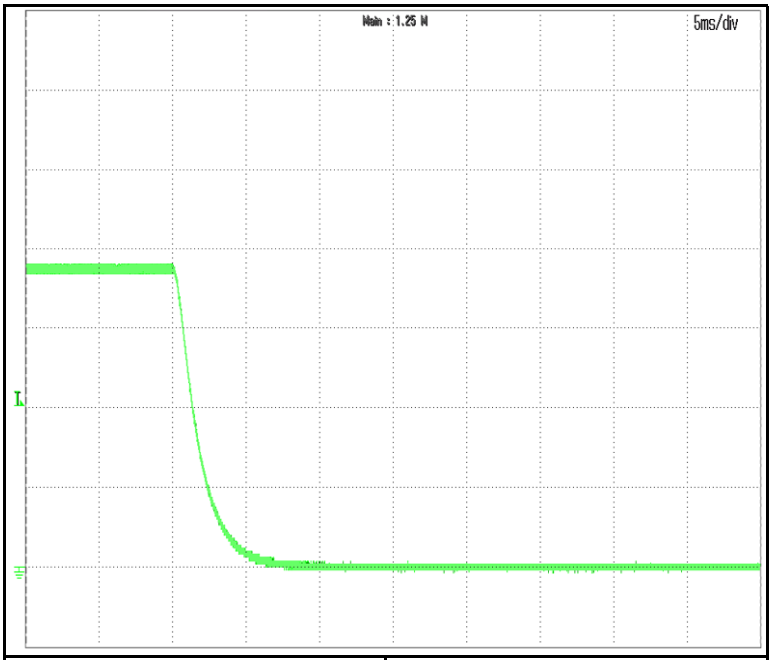
$500^{V}/_{DIV}$	$20^{ms}/_{DIV}$
$10^{A}/_{DIV}$	

2.5 ON/OFF Output fall characteristics

C.C mode

Conditions: Vin: Nominal
Vout: 100%
Iout: 100%
Load: CR
Ta: 25°C

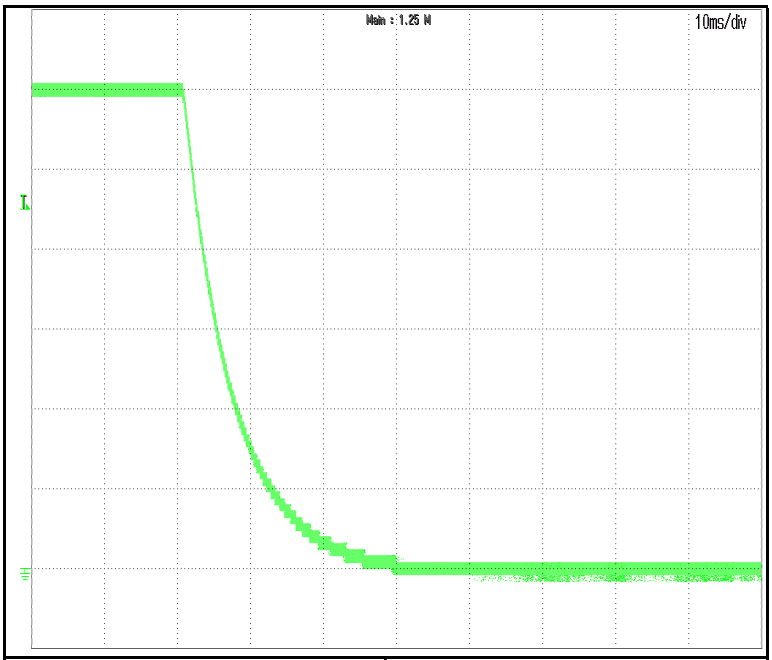
GSPL20-750



Iout

$200^{A}/_{DIV}$	$5^{ms}/_{DIV}$

GSPL100-150



Iout

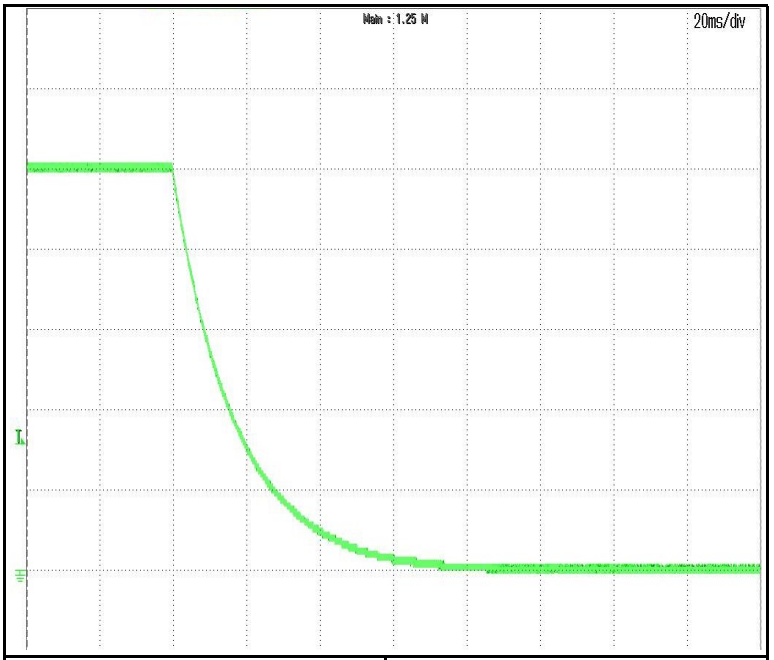
$25^{A}/_{DIV}$	$10^{ms}/_{DIV}$

2.5 ON/OFF Output fall characteristics

C.C mode

Conditions: Vin: Nominal
Vout: 100%
Iout: 100%
Load: CR
Ta: 25°C

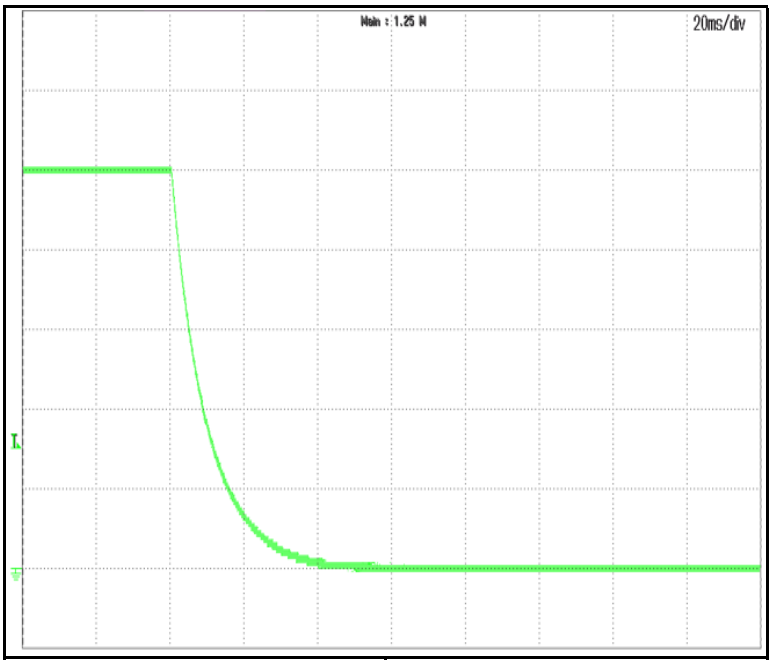
GSPL600-25



Iout

$5^{A}/_{DIV}$	$20^{ms}/_{DIV}$

GSPL1500-10



Iout

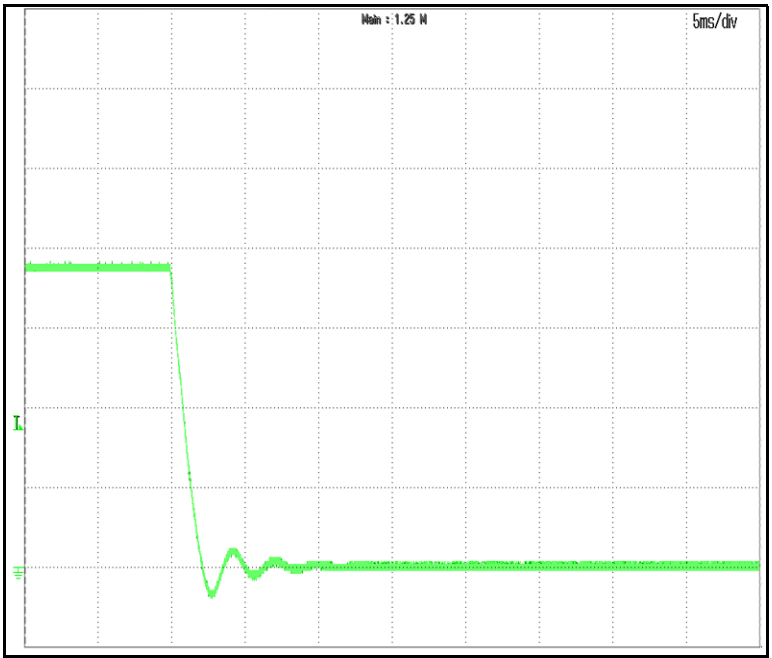
$2^{A}/_{DIV}$	$20^{ms}/_{DIV}$

2.5 ON/OFF Output fall characteristics

C.C mode

Conditions: Vin: Nominal
shorted output
Iout: 100%
Ta: 25°C

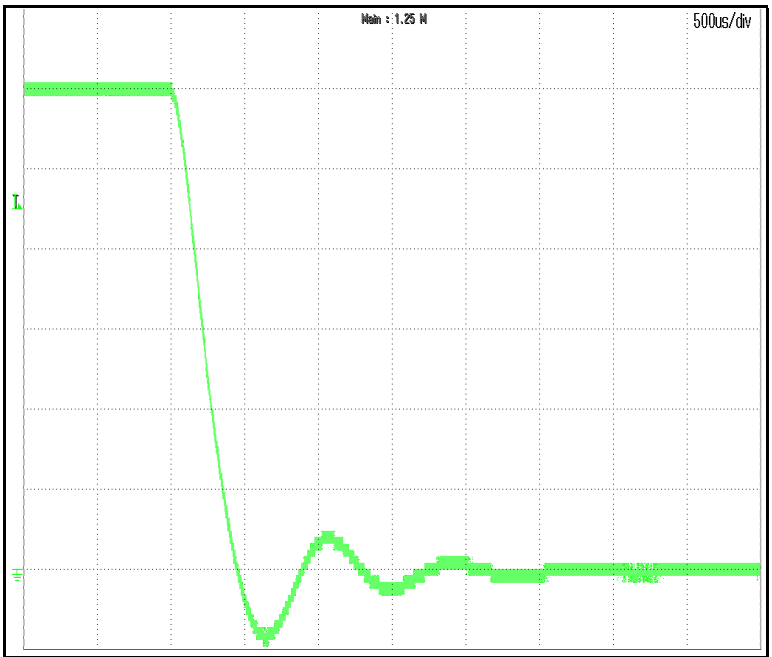
GSPL20-750



Iout

$200^{A}/_{DIV}$	$5^{ms}/_{DIV}$

GSPL100-150



Iout

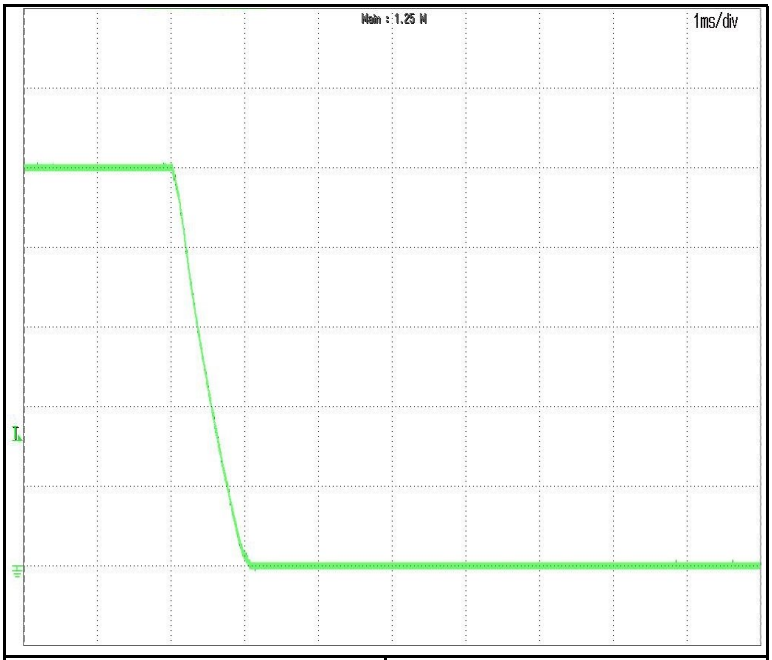
$25^{A}/_{DIV}$	$500^{us}/_{DIV}$

2.5 ON/OFF Output fall characteristics

C.C mode

Conditions: Vin: Nominal
shorted output
Iout: 100%
Ta: 25°C

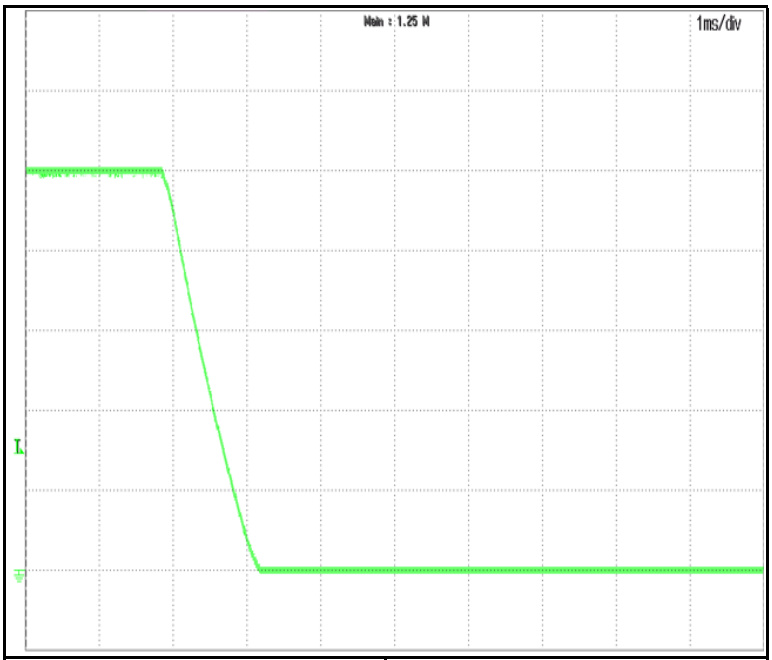
GSPL600-25



Iout

$5^{A}/_{DIV}$	$1^{ms}/_{DIV}$

GSPL1500-10



Iout

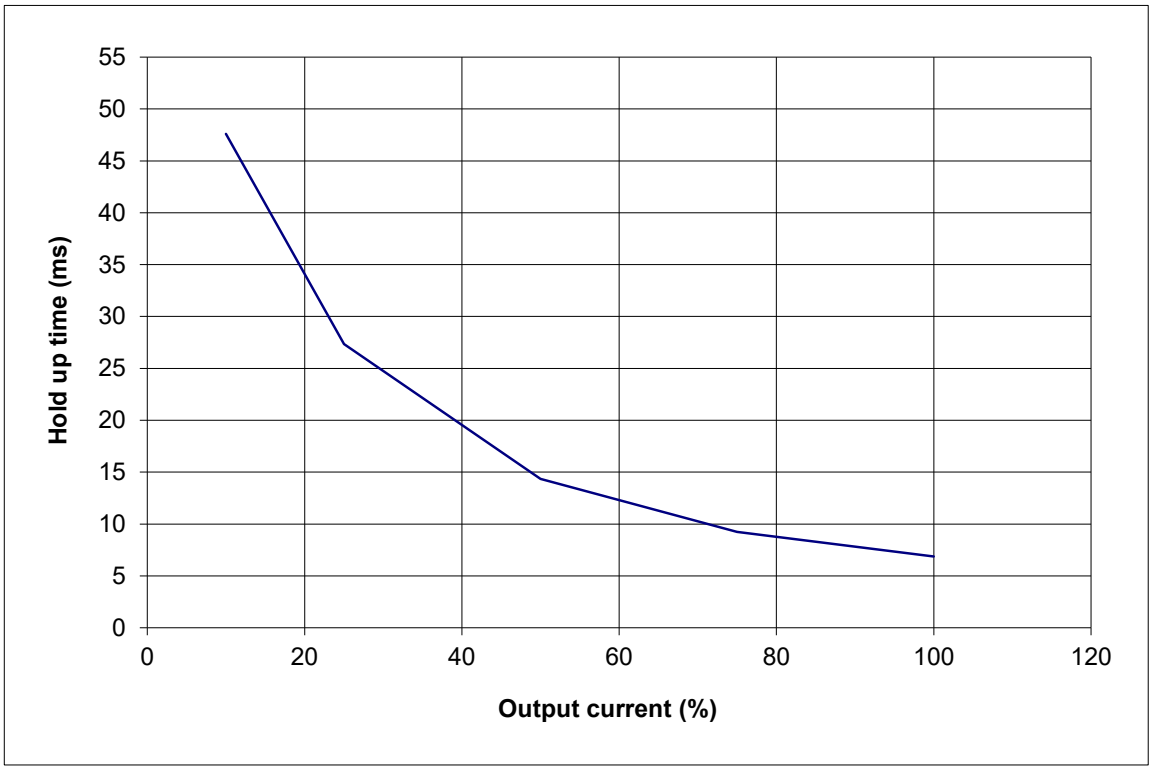
$2^{A}/_{DIV}$	$1^{ms}/_{DIV}$

2.6 Holdup time characteristics

Conditions: Vout: 100%
Ta: 25°C

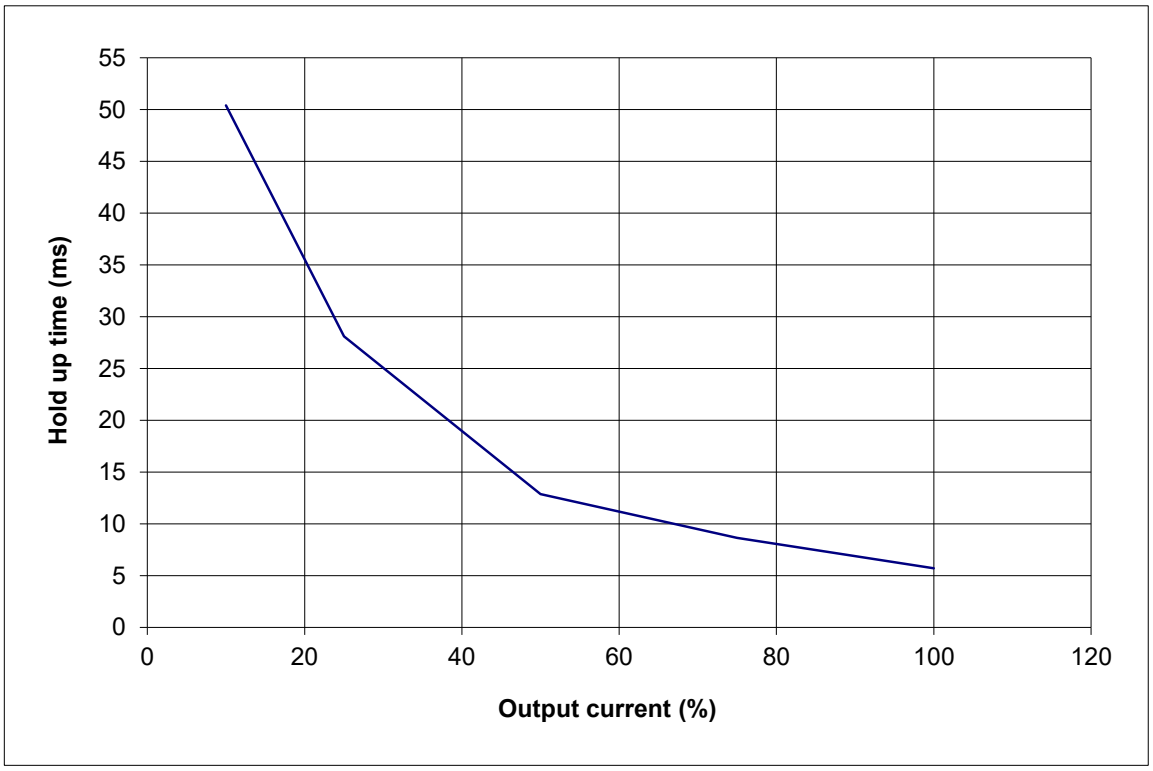
GSPL20-750 3Φ208

Vin:200VAC



GSPL20-750 3Φ480

Vin:400VAC

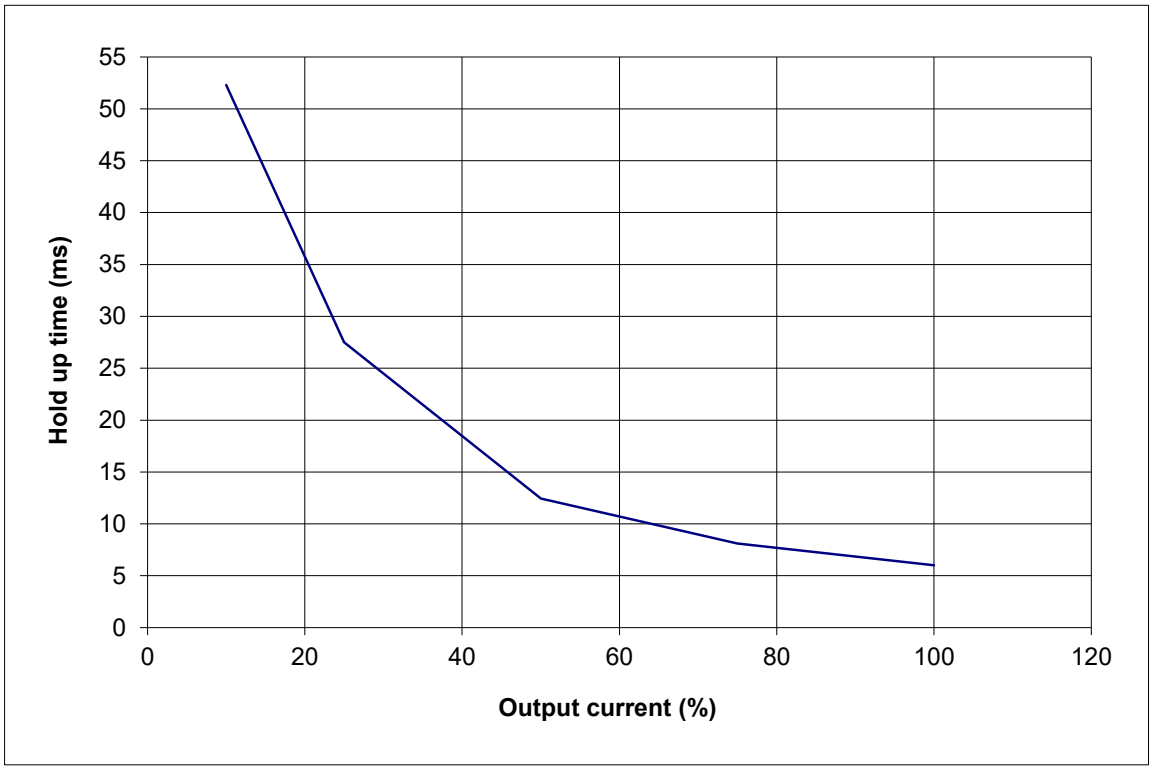


2.6 Holdup time characteristics

Conditions: Vout: 100%
Ta: 25°C

GSPL20-750 3Φ480

Vin:480VAC

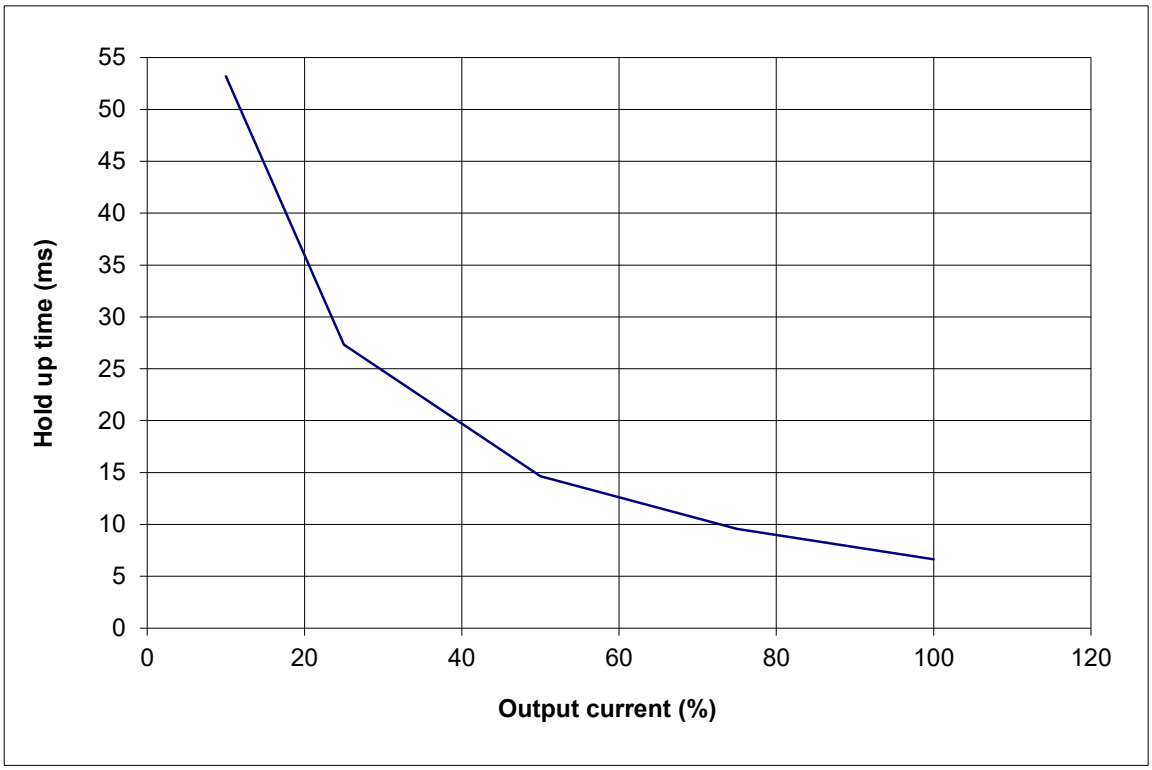


2.6 Holdup time characteristics

Conditions: Vout: 100%
Ta: 25°C

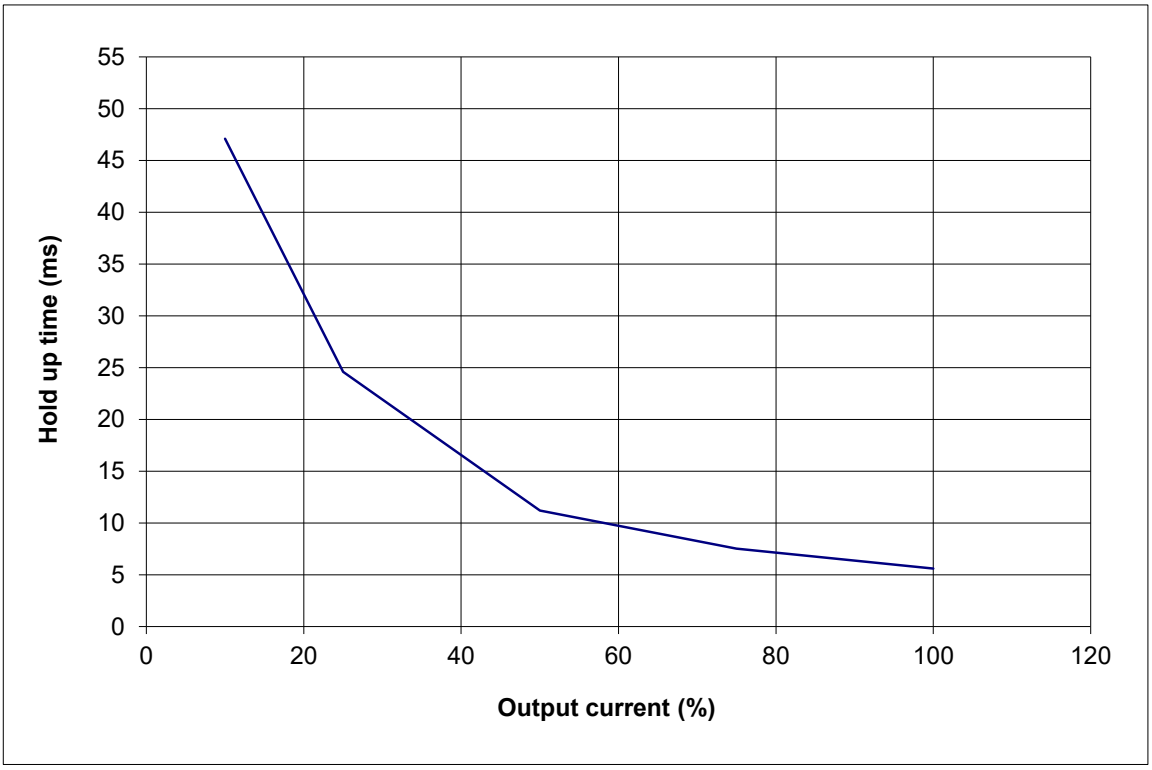
GSPL1500-10 3Φ208

Vin:200VAC



GSPL1500-10 3Φ480

Vin:400VAC

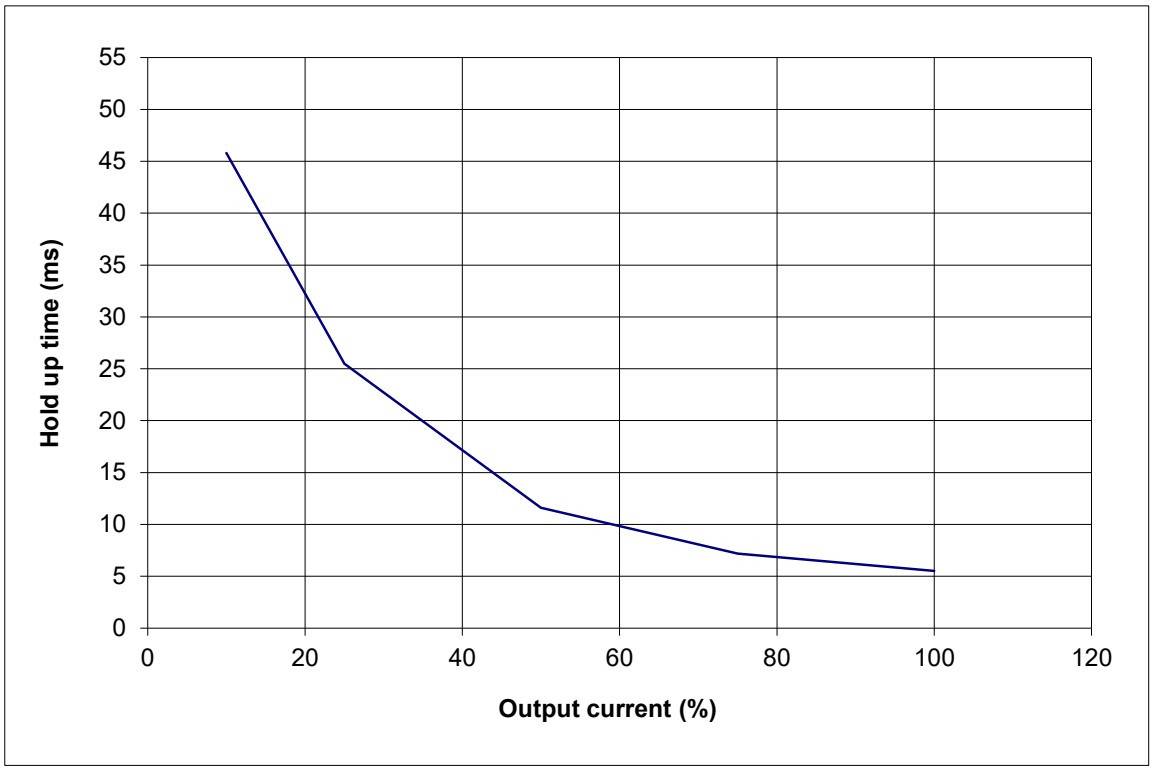


2.6 Holdup time characteristics

Conditions: Vout: 100%
Ta: 25°C

GSPL1500-10 3Φ480

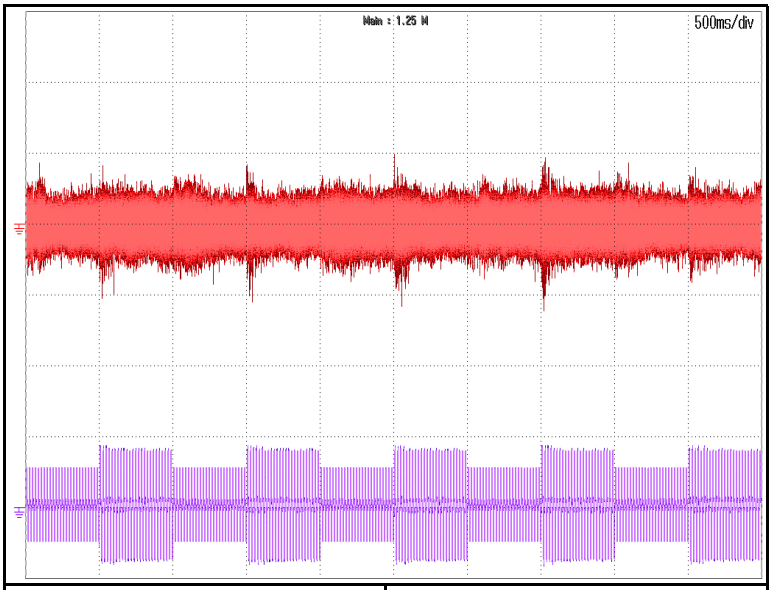
Vin:480VAC



2.7 Dynamic line response characteristics
C.V mode

GSPL20-750 3Φ208

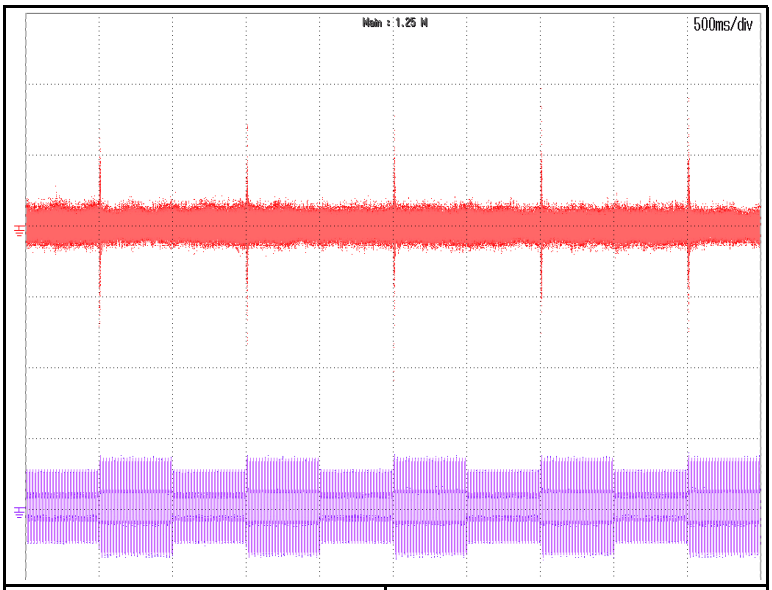
Conditions: Vout: 100%
Iout: 100%
Vin: 170↔265V
Ta: 25°C



Vout: 20$^{mv}/_{DIV}$	500$^{ms}/_{DIV}$
Vin: 500$^{v}/_{DIV}$	

GSPL20-750 3Φ480

Conditions: Vout: 100%
Iout: 100%
Vin: 342↔460V
Ta: 25°C

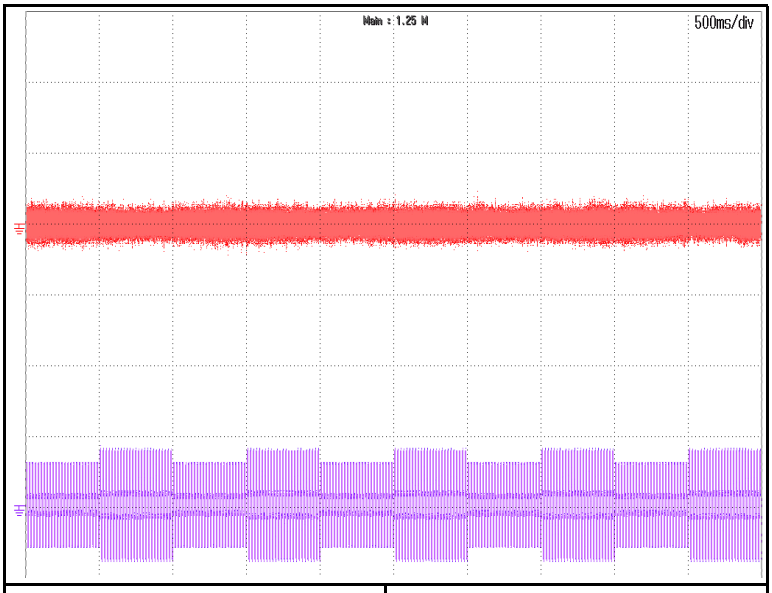


Vout: 50$^{mv}/_{DIV}$	500$^{ms}/_{DIV}$
Vin: 1000$^{v}/_{DIV}$	

2.7 Dynamic line response characteristics
C.V mode

GSPL20-750 3Φ480

Conditions: Vout: 100%
Iout: 100%
Vin: 396↔520V
Ta: 25°C



Vout

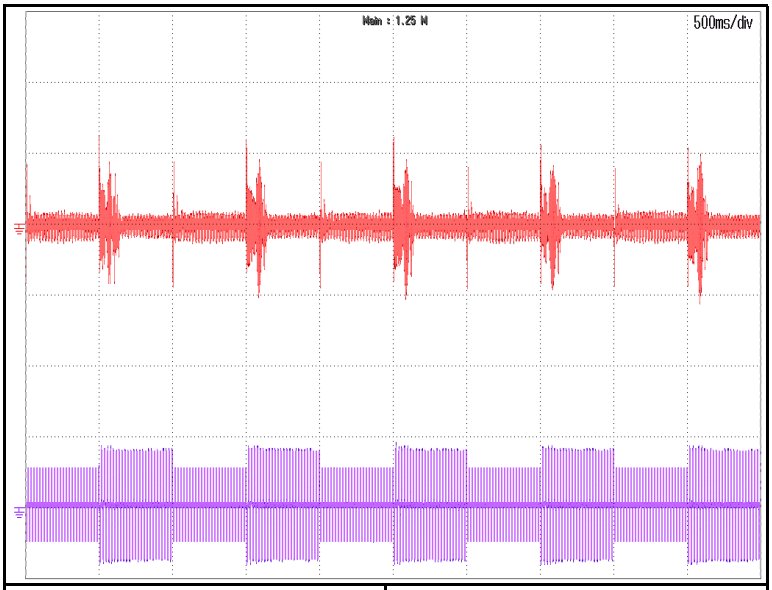
Vin

Vout: 50$^{mv}/_{DIV}$	500$^{ms}/_{DIV}$
Vin: 1000$^{v}/_{DIV}$	

2.7 Dynamic line response characteristics
C.C mode

GSPL20-750 3Φ208

Conditions: Vout: 100%
Iout: 100%
Vin: 170↔265V
Ta: 25°C



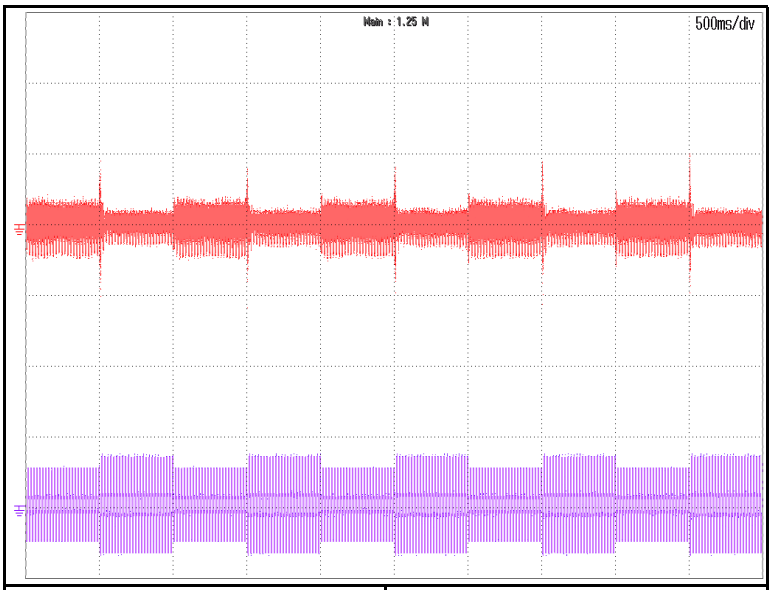
Iout

Vin

Iout: 3.75$^{A}/_{DIV}$	500$^{ms}/_{DIV}$
Vin: 500$^{v}/_{DIV}$	

GSPL20-750 3Φ480

Conditions: Vout: 100%
Iout: 100%
Vin: 342↔460V
Ta: 25°C



Iout

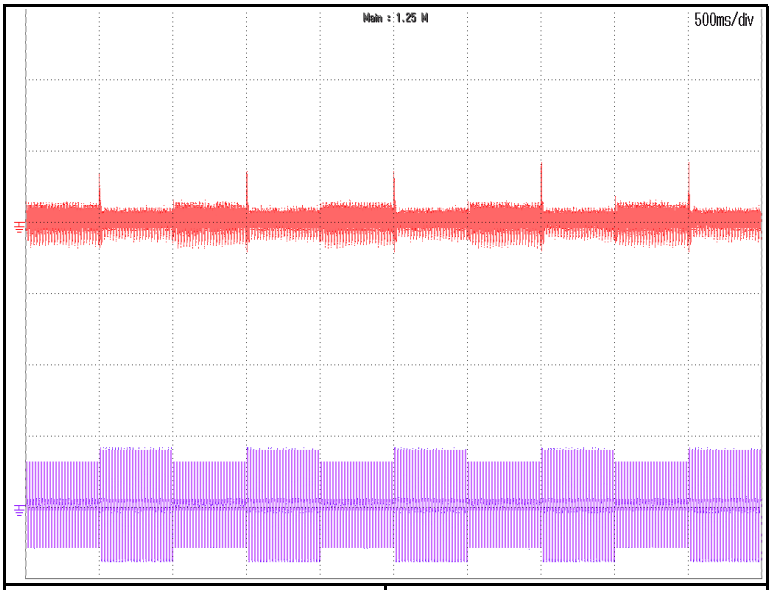
Vin

Iout: 1.88$^{A}/_{DIV}$	500$^{ms}/_{DIV}$
Vin: 1000$^{v}/_{DIV}$	

2.7 Dynamic line response characteristics
C.C mode

GSPL20-750 3Φ480

Conditions: Vout: 100%
Iout: 100%
Vin: 396↔528V
Ta: 25°C



Iout

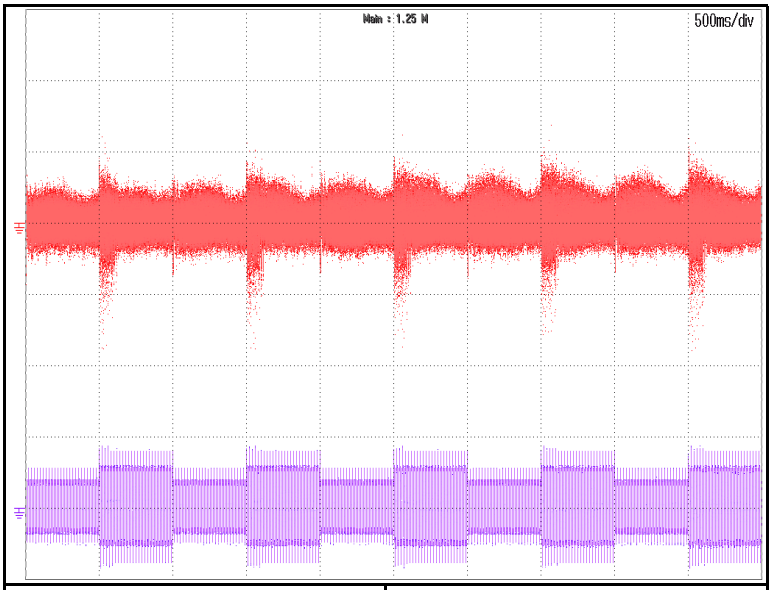
Vin

Iout: 1.88$^{A}/_{DIV}$	500$^{ms}/_{DIV}$
Vin: 1000$^{V}/_{DIV}$	

2.7 Dynamic line response characteristics
C.V mode

GSPL100-150 3Φ208

Conditions: Vout: 100%
Iout: 100%
Vin: 170↔265V
Ta: 25°C



Vout

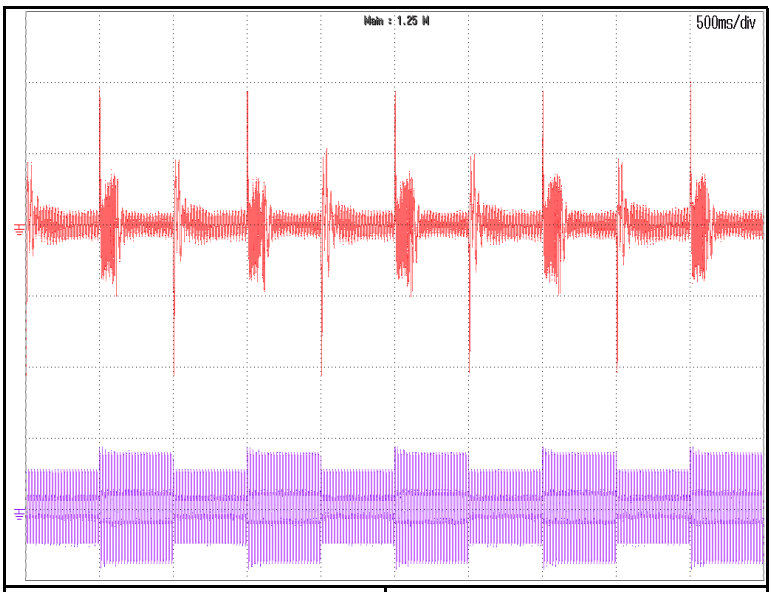
Vin

Vout: 20$^{mv}/_{DIV}$	500$^{ms}/_{DIV}$
Vin: 500$^{v}/_{DIV}$	

2.7 Dynamic line response characteristics
C.C mode

GSPL100-150 3Φ208

Conditions: Vout: 100%
Iout: 100%
Vin: 170↔265V
Ta: 25°C



Iout

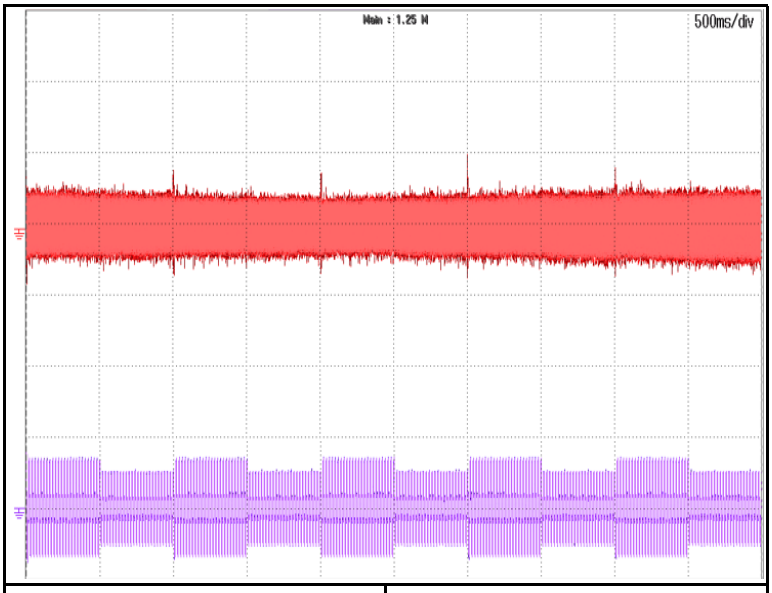
Vin

Iout: 150$^{mA}/_{DIV}$	500$^{ms}/_{DIV}$
Vin: 500$^{V}/_{DIV}$	

2.7 Dynamic line response characteristics
C.V mode

GSPL600-25 3Φ480

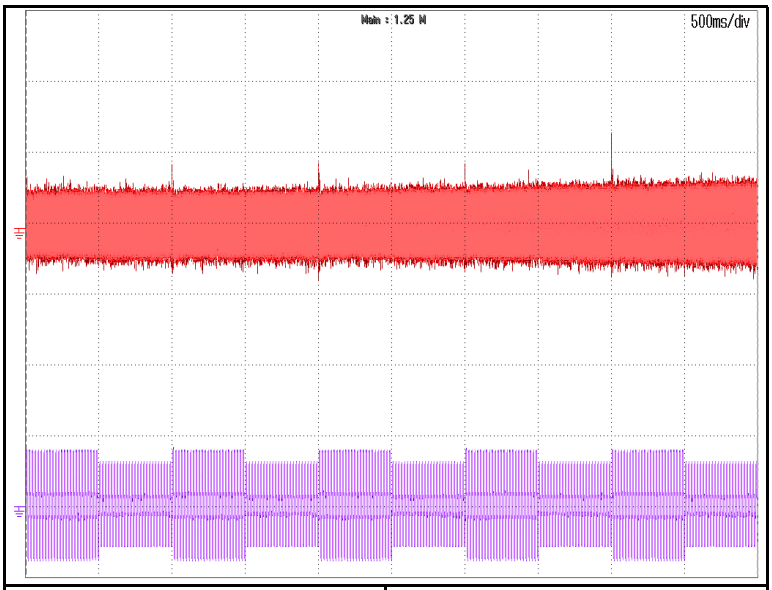
Conditions: Vout: 100%
Iout: 100%
Vin: 342↔460V
Ta: 25°C



Vout: 200$^{mv}/_{DIV}$	500$^{ms}/_{DIV}$
Vin: 1000$^{v}/_{DIV}$	

GSPL600-25 3Φ480

Conditions: Vout: 100%
Iout: 100%
Vin: 396↔520V
Ta: 25°C



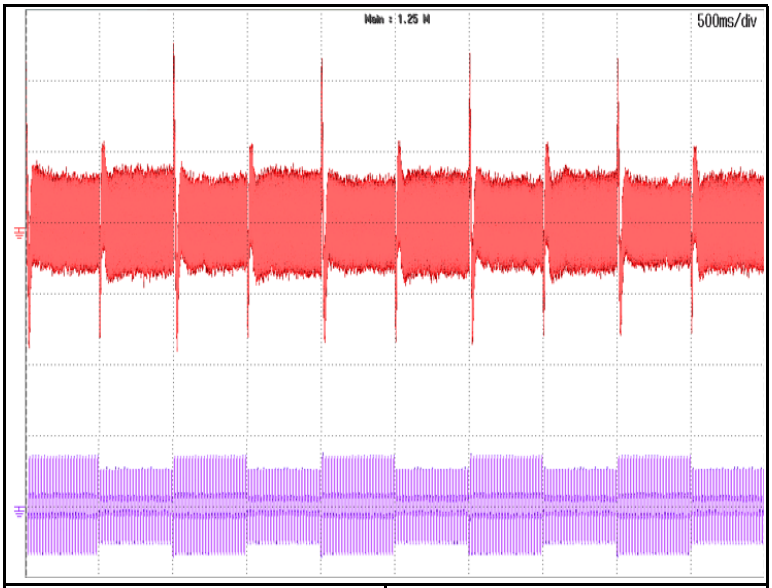
Vout: 200$^{mv}/_{DIV}$	500$^{ms}/_{DIV}$
Vin: 1000$^{v}/_{DIV}$	

2.7 Dynamic line response characteristics

C.C mode

GSPL600-25 3Φ480

Conditions: Vout: 100%
Iout: 100%
Vin: 342↔460V
Ta: 25°C



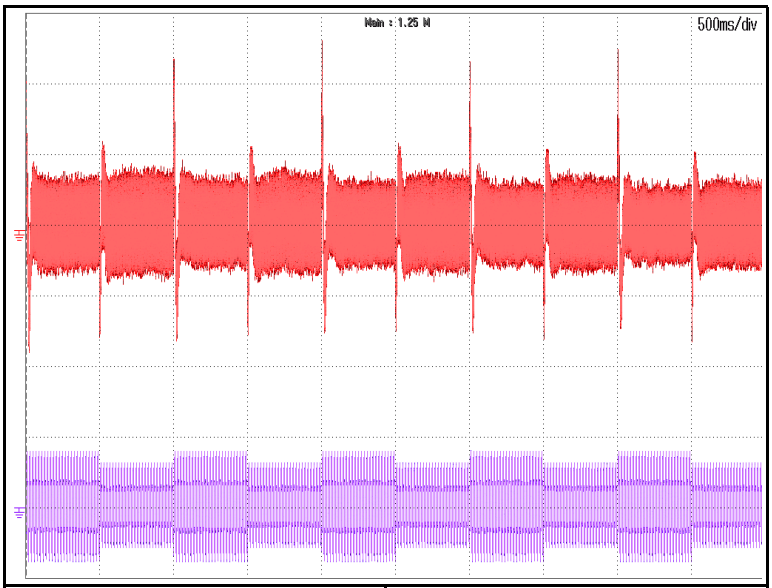
Iout

Vin

Iout: 12.5$^{mA}/_{DIV}$	500$^{ms}/_{DIV}$
Vin: 1000$^{v}/_{DIV}$	

GSPL600-25 3Φ480

Conditions: Vout: 100%
Iout: 100%
Vin: 396↔528V
Ta: 25°C



Iout

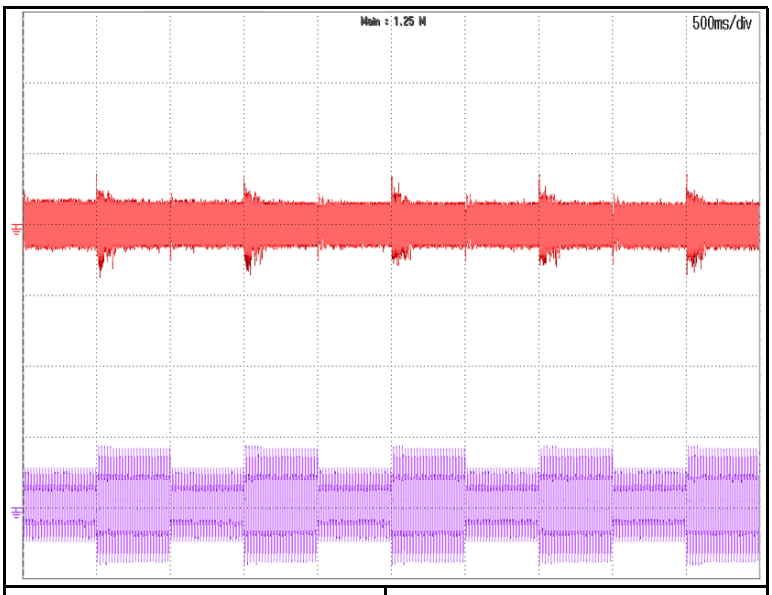
Vin

Iout: 12.5$^{mA}/_{DIV}$	500$^{ms}/_{DIV}$
Vin: 1000$^{v}/_{DIV}$	

2.7 Dynamic line response characteristics
C.V mode

GSPL1500-10 3Φ208

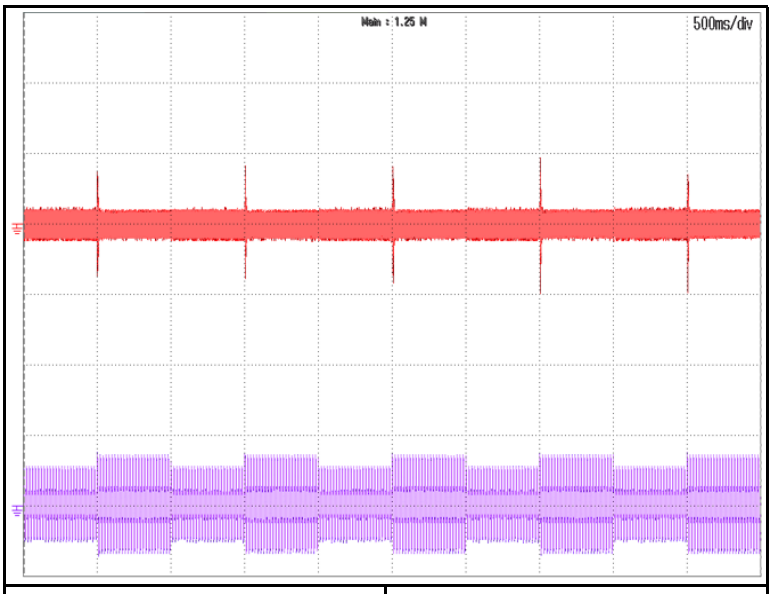
Conditions: Vout: 100%
Iout: 100%
Vin: 170↔265V
Ta: 25°C



Vout: $1^{V}/_{DIV}$	$500^{ms}/_{DIV}$
Vin: $500^{V}/_{DIV}$	

GSPL1500-10 3Φ480

Conditions: Vout: 100%
Iout: 100%
Vin: 342↔460V
Ta: 25°C

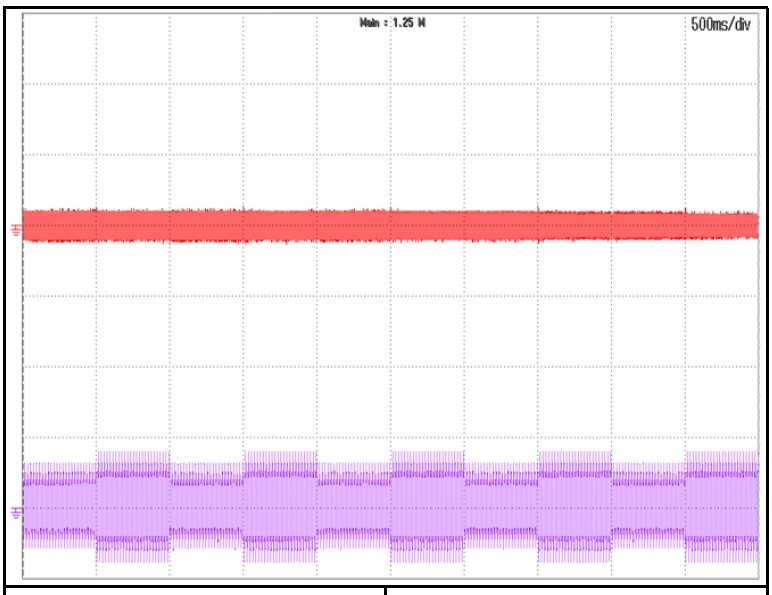


Vout: $2^{V}/_{DIV}$	$500^{ms}/_{DIV}$
Vin: $1000^{V}/_{DIV}$	

2.7 Dynamic line response characteristics
C.V mode

GSPL1500-10 3Φ480

Conditions: Vout: 100%
Iout: 100%
Vin: 396↔528V
Ta: 25°C



Vout

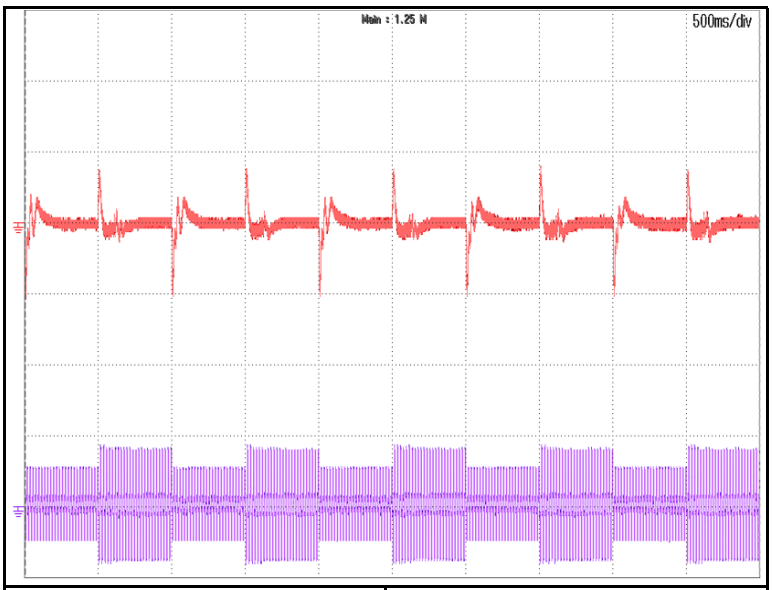
Vin

Vout: $2^{V}/_{DIV}$	$500^{ms}/_{DIV}$
Vin: $1000^{V}/_{DIV}$	

2.7 Dynamic line response characteristics
C.C mode

GSPL1500-10 3Φ208

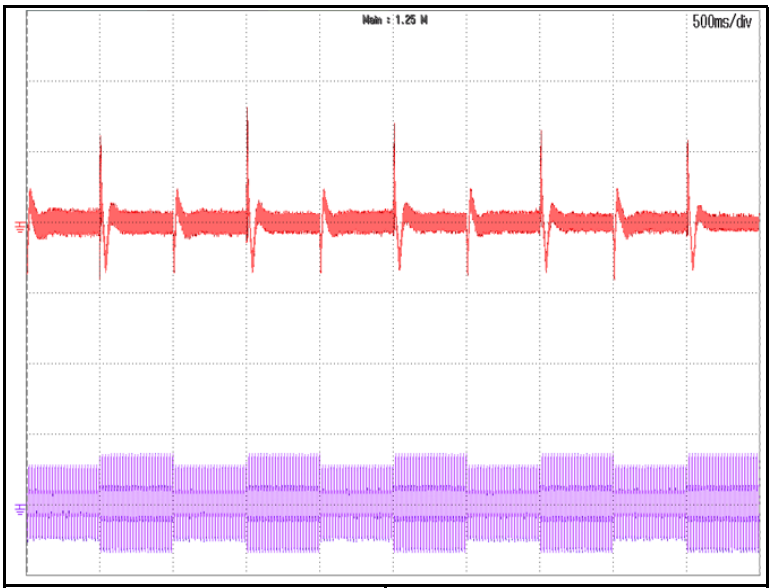
Conditions: Vout: 100%
Iout: 100%
Vin: 170↔265V
Ta: 25°C



Iout: 33.33$^{mA}/_{DIV}$	500$^{ms}/_{DIV}$
Vin: 500$^{v}/_{DIV}$	

GSPL1500-10 3Φ480

Conditions: Vout: 100%
Iout: 100%
Vin: 342↔460V
Ta: 25°C

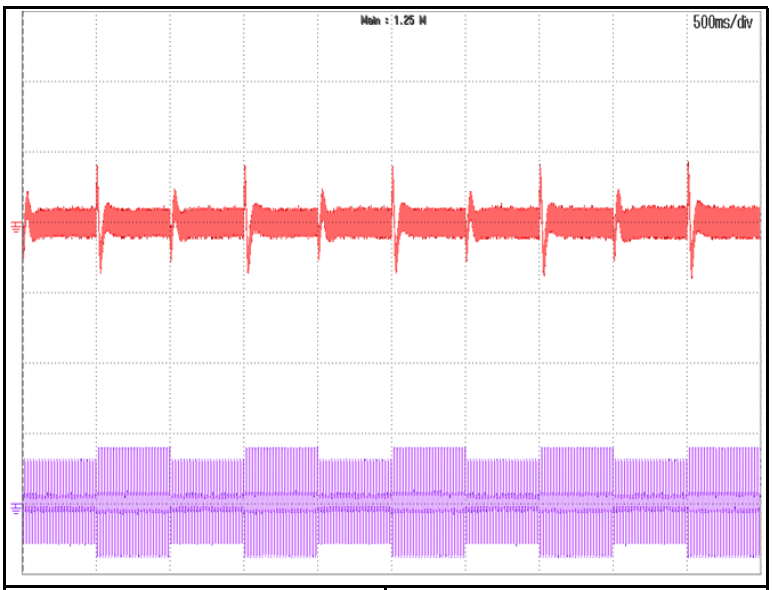


Iout: 13.33$^{mA}/_{DIV}$	500$^{ms}/_{DIV}$
Vin: 1000$^{v}/_{DIV}$	

2.7 Dynamic line response characteristics
C.C mode

GSPL1500-10 3Φ480

Conditions: Vout: 100%
Iout: 100%
Vin: 396↔528V
Ta: 25°C



Iout: 13.33$^{mA}/_{DIV}$	500$^{ms}/_{DIV}$
Vin: 1000$^{V}/_{DIV}$	

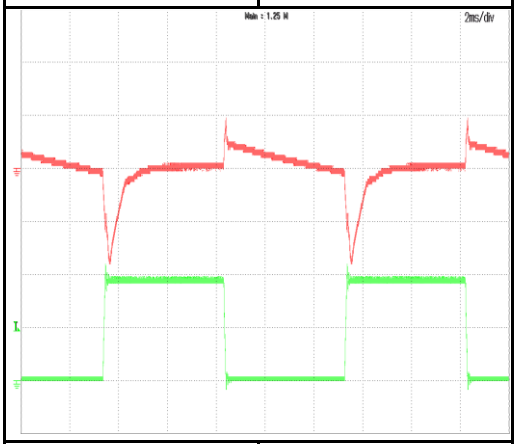
2.8 Dynamic load response characteristics

C.V mode

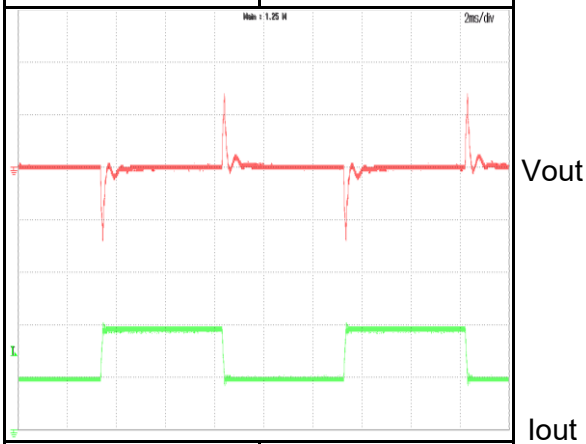
Conditions: Vin: Nominal
Vout: 100%
Ta: 25°C
Load current: tr=tf=100us

GSPL20-750

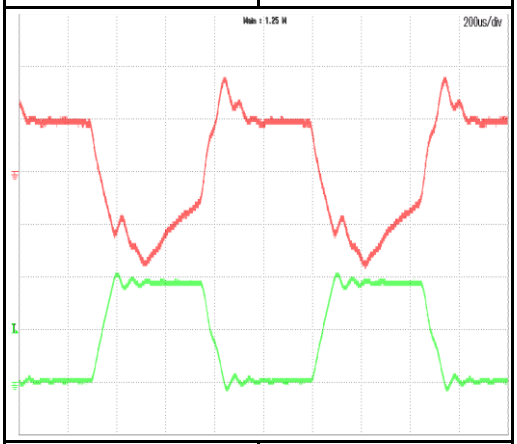
Iout:0%↔100%	f:100Hz
1.6V/DIV	2ms/DIV
7.60%	400A/DIV
-14.40%	



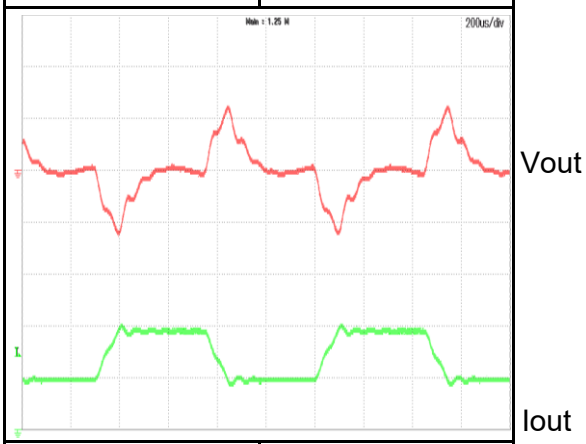
Iout:50%↔100%	f:100Hz
500mV/DIV	2ms/DIV
3.50%	400A/DIV
-3.50%	



Iout:0%↔100%	f:1KHz
760mV/DIV	200us/DIV
6.80%	400A/DIV
-7.00%	



Iout:50%↔100%	f:1KHz
500mV/DIV	200us/DIV
3.10%	400A/DIV
-3.20%	



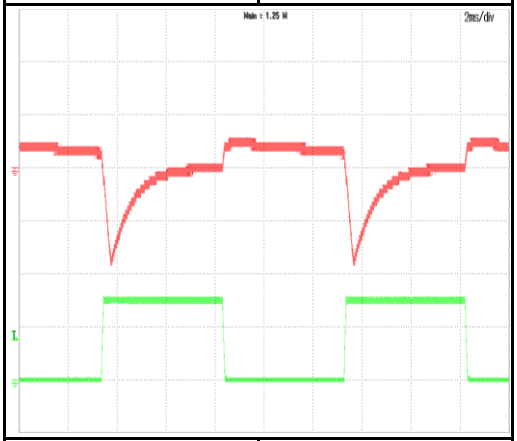
2.8 Dynamic load response characteristics

C.V mode

Conditions: Vin: Nominal
Vout: 100%
Ta: 25°C
Load current: tr=tf=100us

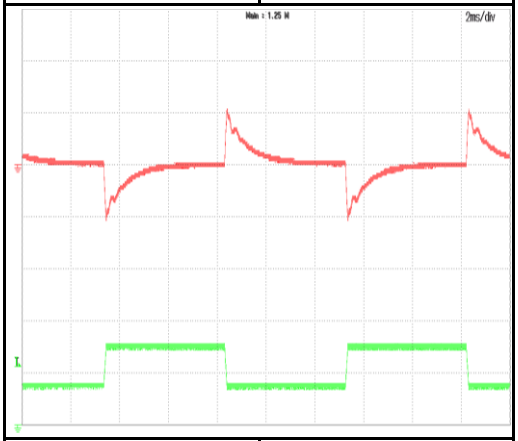
GSPL100-150

Iout:0%↔100%	f:100Hz



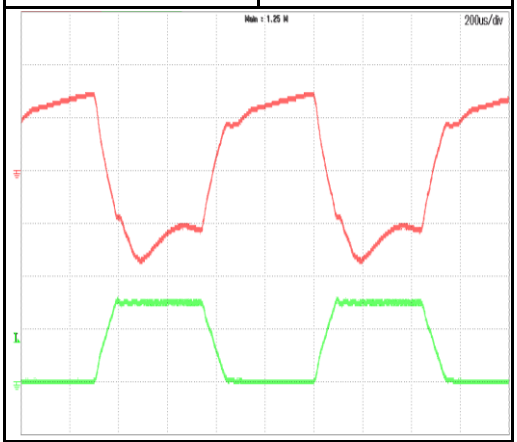
2.5V/DIV	2ms/DIV
1.40%	100A/DIV
-4.60%	

Iout:50%↔100%	f:100Hz



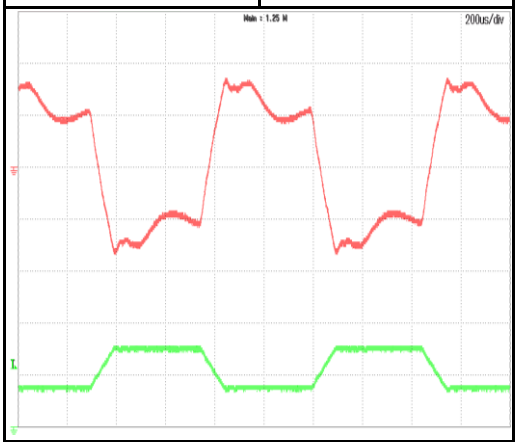
500mV/DIV	2ms/DIV
0.54%	100A/DIV
-0.54%	

Iout:0%↔100%	f:1KHz



500mV/DIV	200us/DIV
0.74%	100A/DIV
-0.88%	

Iout:50%↔100%	f:1KHz



200mV/DIV	200us/DIV
0.34%	100A/DIV
-0.34%	

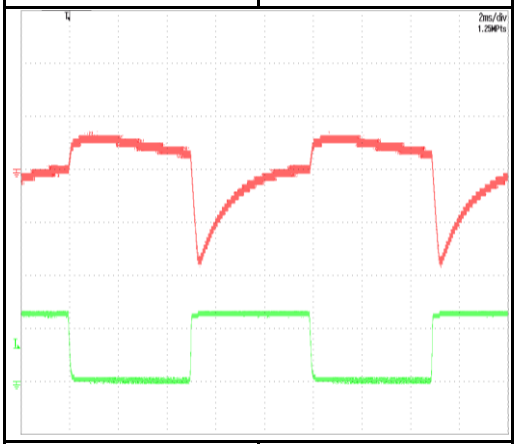
2.8 Dynamic load response characteristics

C.V mode

Conditions: Vin: Nominal
Vout: 100%
Ta: 25°C
Load current: tr=tf=100us

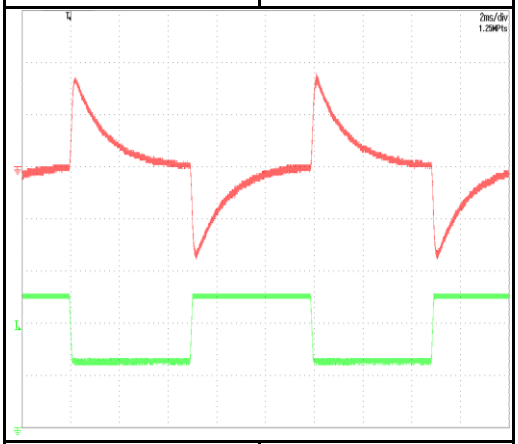
GSPL600-25

Iout:0%↔100%	f:100Hz



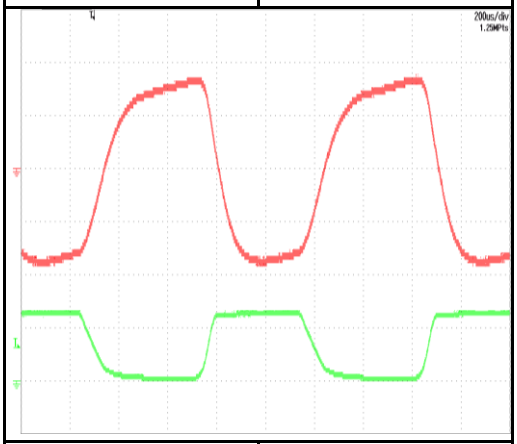
5.6V/DIV	2ms/DIV
0.67%	20A/DIV
-1.72%	

Iout:50%↔100%	f:100Hz



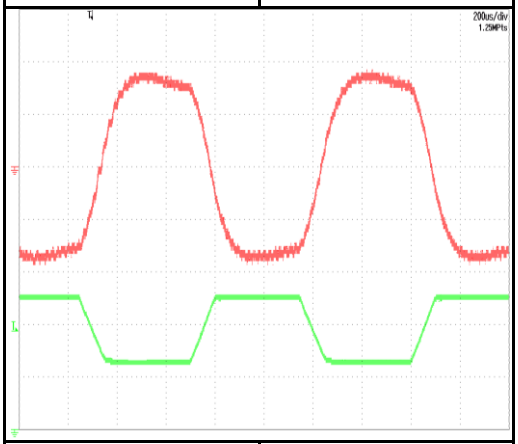
1V/DIV	2ms/DIV
0.30%	10A/DIV
-0.29%	

Iout:0%↔100%	f:1KHz



1.3V/DIV	200us/DIV
0.37%	20A/DIV
-0.39%	

Iout:50%↔100%	f:1KHz



580mV/DIV	200us/DIV
0.18%	10A/DIV
-0.18%	

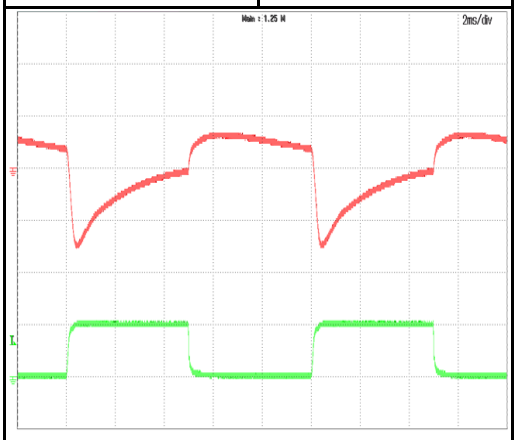
2.8 Dynamic load response characteristics

C.V mode

Conditions: Vin: Nominal
Vout: 70%(*)
Ta: 25°C
Load current: tr=tf=100us

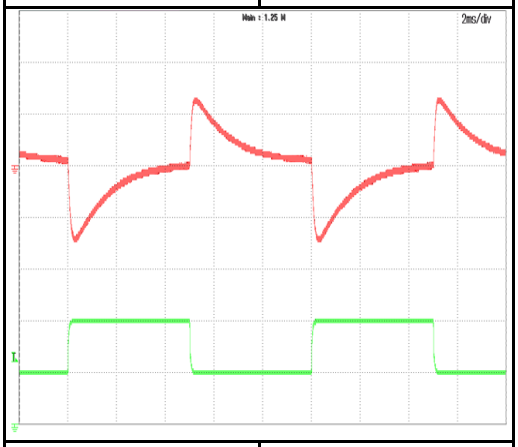
GSPL1500-10

Iout:0%↔100%	f:100Hz



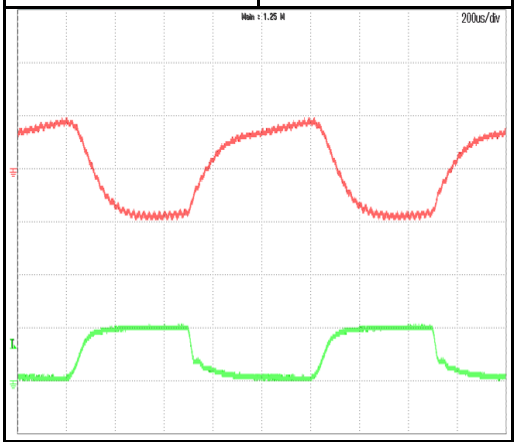
$20^{V}/_{DIV}$	$2^{ms}/_{DIV}$
0.91%	$10^{A}/_{DIV}$
-2.05%	

Iout:50%↔100%	f:100Hz



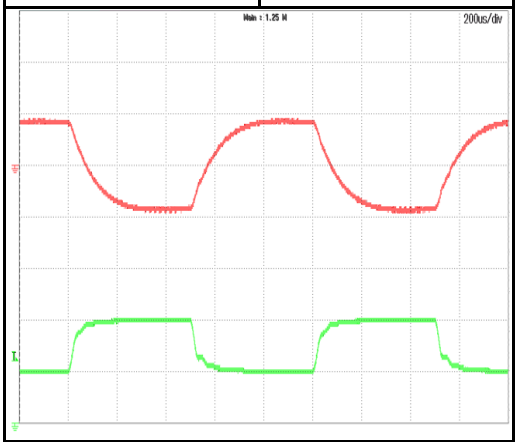
$5^{V}/_{DIV}$	$2^{ms}/_{DIV}$
0.44%	$5^{A}/_{DIV}$
-0.49%	

Iout:0%↔100%	f:1KHz



$10^{V}/_{DIV}$	$200^{us}/_{DIV}$
0.64%	$10^{A}/_{DIV}$
-0.64%	

Iout:50%↔100%	f:1KHz



$5^{V}/_{DIV}$	$200^{us}/_{DIV}$
0.31%	$5^{A}/_{DIV}$
-0.31%	

Notes:
(*) Electronic load max dynamic voltage 1050V

2.8 Dynamic load response characteristics

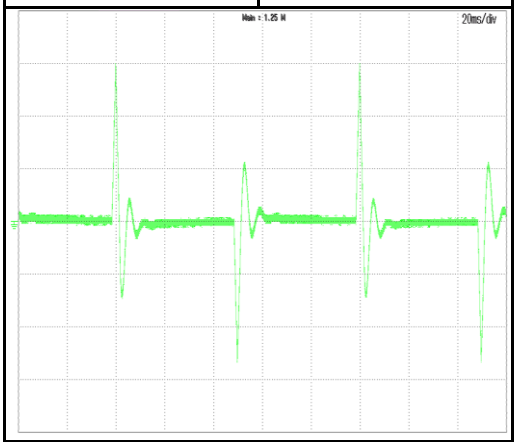
C.C mode

Conditions: Vin: Nominal
Ta: 25°C

GSPL20-750

Io=750A

Vout:18↔15V	f:10Hz

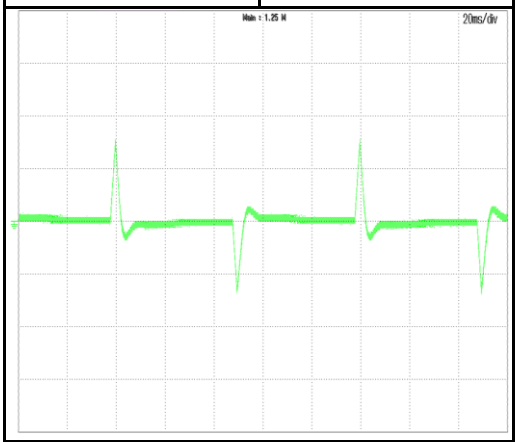


Iout

40A/DIV	20ms/DIV
	-14.29%

Io=375A

Vout:18↔15V	f:10Hz



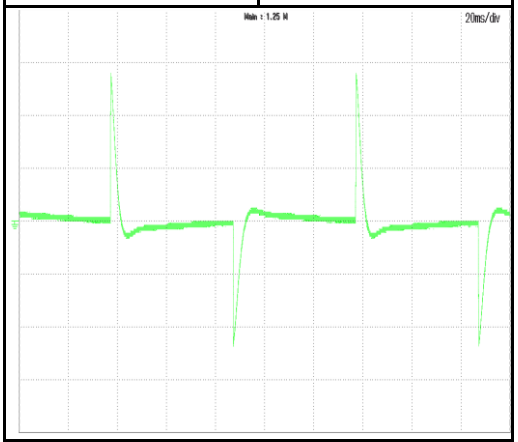
Iout

40A/DIV	20ms/DIV
	-7.39%

GSPL100-150

Io=150A

Vout:90↔75V	f:10Hz

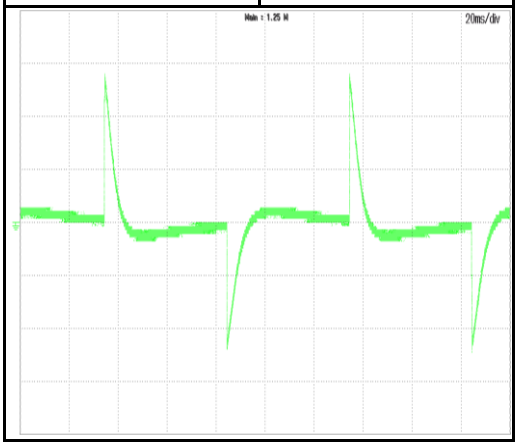


Iout

11A/DIV	20ms/DIV
	-17.33%

Io=75A

Vout:90↔75V	f:10Hz



Iout

5.7A/DIV	20ms/DIV
	-9.33%

2.8 Dynamic load response characteristics

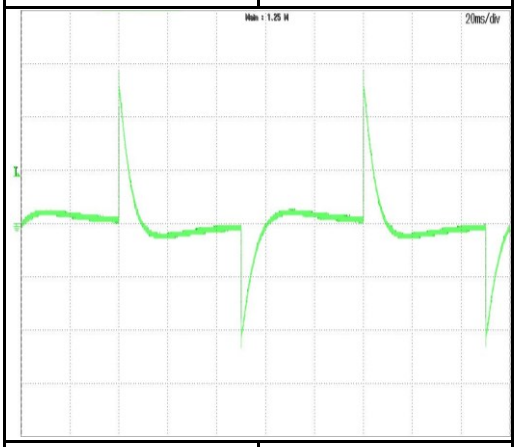
C.C mode

Conditions: Vin: Nominal
Ta: 25°C

GSPL600-25

Io=25A

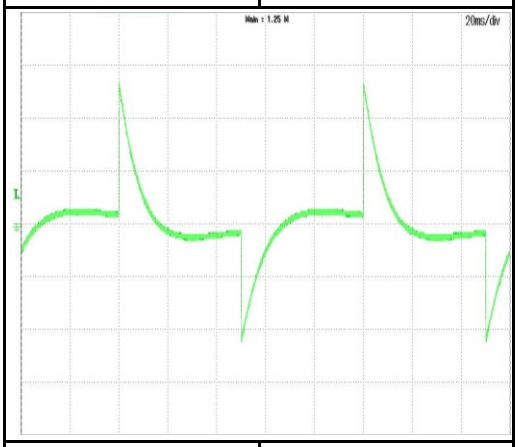
Vout:540↔450V	f:10Hz



$2^{A}/_{DIV}$	$20^{ms}/_{DIV}$
	-18.56%

Io=12.5A

Vout:540↔450V	f:10Hz

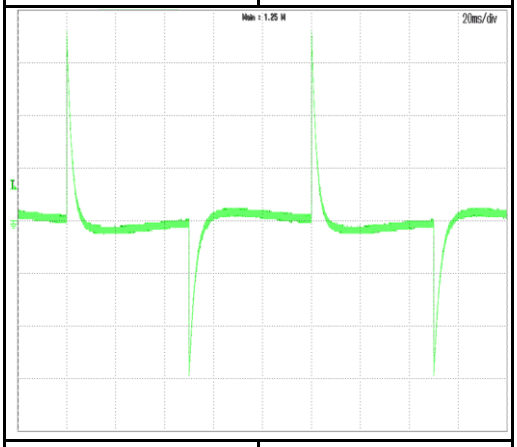


$1^{A}/_{DIV}$	$20^{ms}/_{DIV}$
	-8.96%

GSPL1500-10

Io=10A

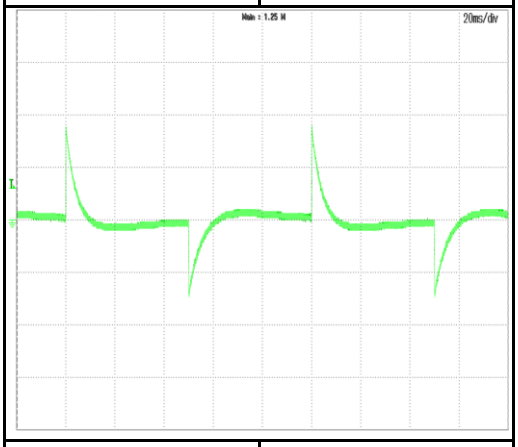
Vout:945↔787.5V	f:10Hz



$500^{mA}/_{DIV}$	$20^{ms}/_{DIV}$
	-14.80%

Io=5A

Vout:945↔787.5V	f:10Hz



$500^{mA}/_{DIV}$	$20^{ms}/_{DIV}$
	-7.40%

Notes:
(*) Electronic load max dynamic voltage 1050V

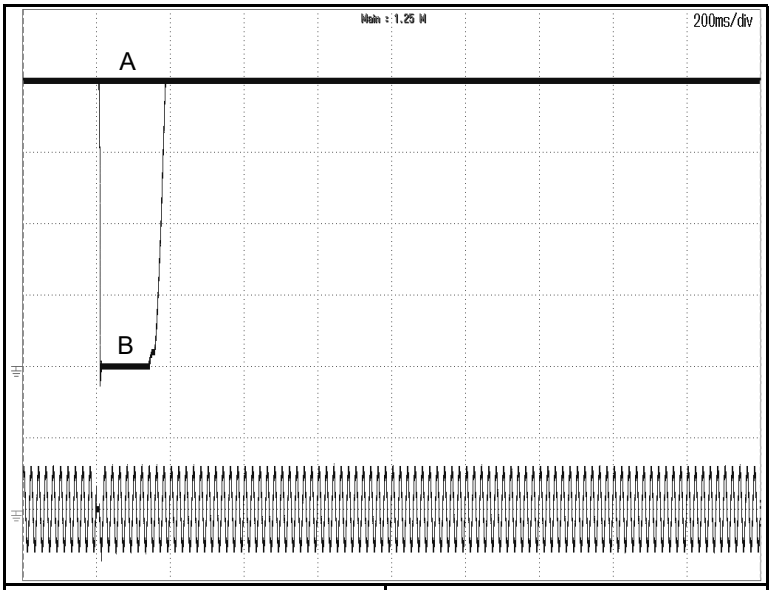
2.9 Response to brown-out characteristics

C.V mode

Conditions: Vout: 100%
Iout: 100%
Ta: 25°C

GSPL20-750 3Φ208

Vin: 200VAC

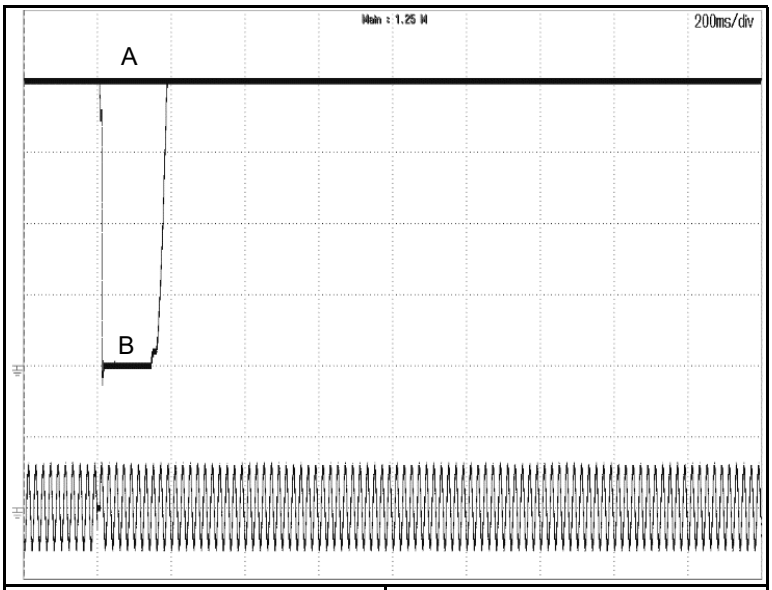


Brown-out time
A - 7ms
B - 8ms

Vout: $5^{V}/_{DIV}$	$200^{ms}/_{DIV}$
Vin: $500^{V}/_{DIV}$	

GSPL20-750 3Φ480

Vin: 400VAC



Brown-out time
A - 8ms
B - 9ms

Vout: $5^{V}/_{DIV}$	$200^{ms}/_{DIV}$
Vin: $1000^{V}/_{DIV}$	

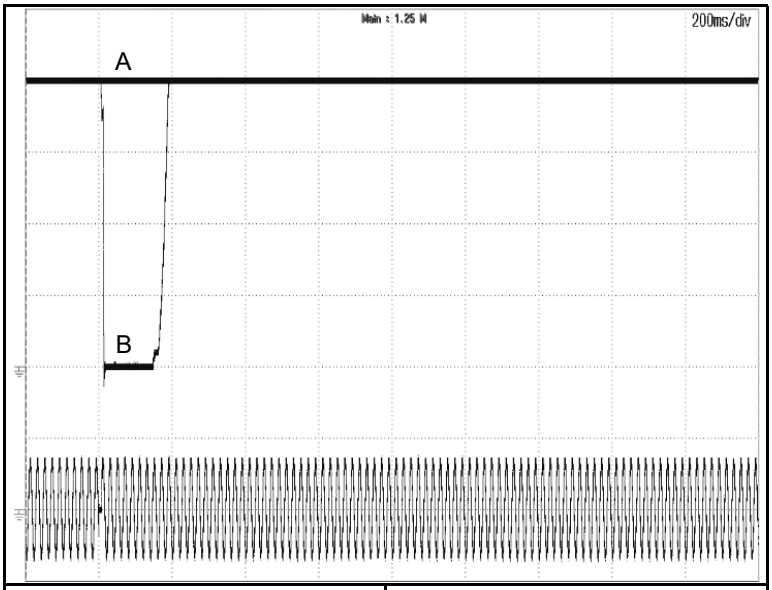
2.9 Response to brown-out characteristics

C.V mode

Conditions: Vout: 100%
Iout: 100%
Ta: 25°C

GSPL20-750 3Φ480

Vin: 480VAC



Brown-out time
A - 8ms
B - 9ms

Vout: $5^{V}/_{DIV}$	$200^{ms}/_{DIV}$
Vin: $1000^{V}/_{DIV}$	

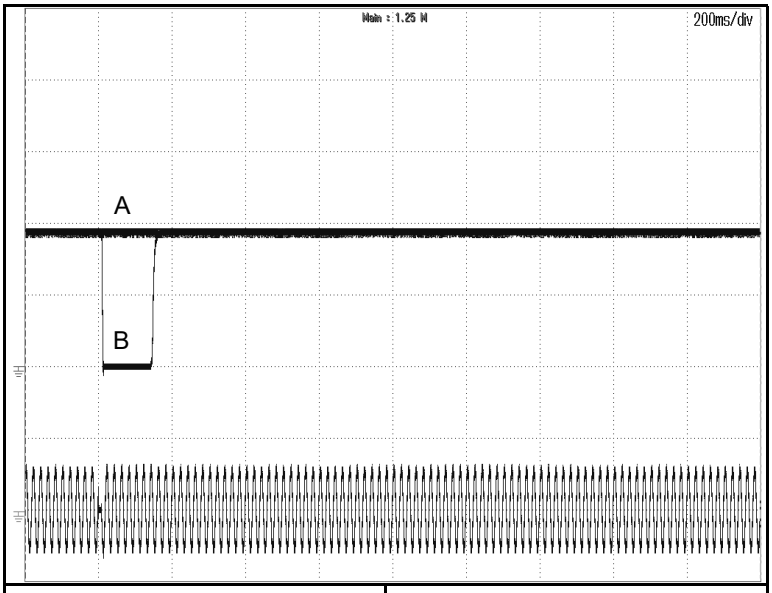
2.9 Response to brown-out characteristics

C.C mode

Conditions: Vout: 100%
Iout: 100%
Ta: 25°C

GSPL20-750 3Φ208

Vin: 200VAC

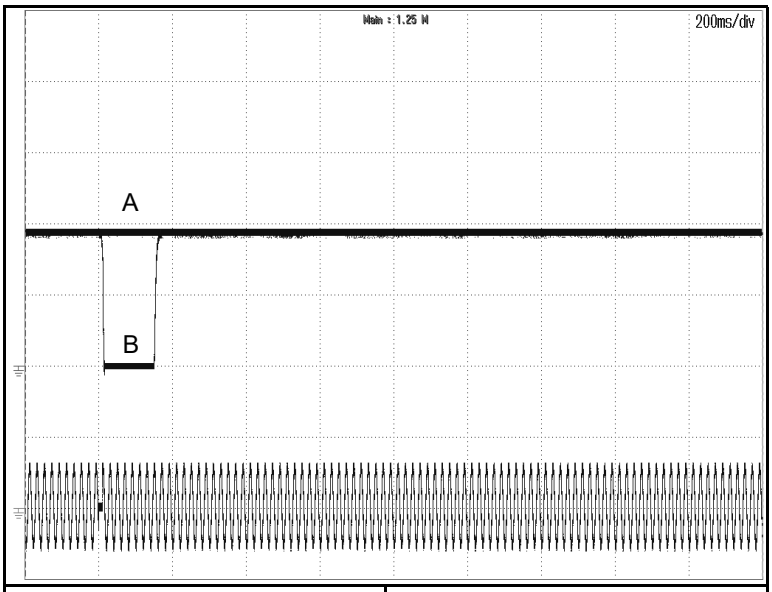


Brown-out time
A - 7ms
B - 8ms

Iout: 400$^{A}/_{DIV}$	200$^{ms}/_{DIV}$
Vin: 500$^{V}/_{DIV}$	

GSPL20-750 3Φ480

Vin: 400VAC



Brown-out time
A - 8ms
B - 9ms

Iout: 400$^{A}/_{DIV}$	200$^{ms}/_{DIV}$
Vin: 1000$^{V}/_{DIV}$	

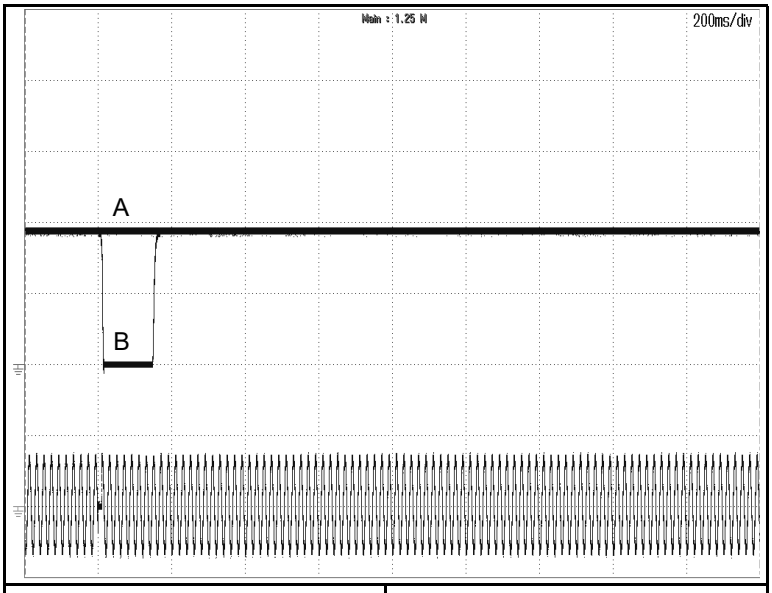
2.9 Response to brown-out characteristics

C.C mode

Conditions: Vout: 100%
Iout: 100%
Ta: 25°C

GSPL20-750 3Φ480

Vin: 480VAC



Brown-out time
A - 8ms
B - 9ms

Iout: $400^{A}/_{DIV}$	$200^{ms}/_{DIV}$
Vin: $1000^{V}/_{DIV}$	

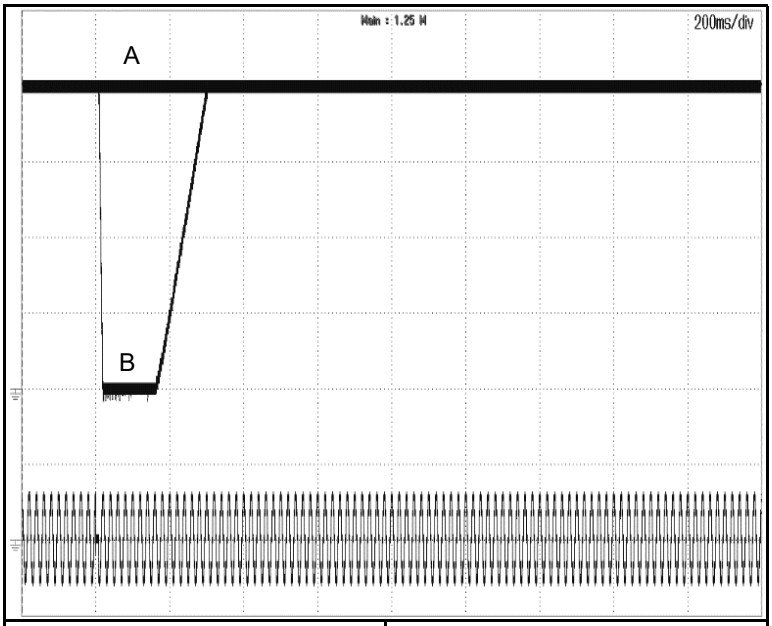
2.9 Response to brown-out characteristics

C.V mode

Conditions: Vout: 100%
Iout: 100%
Ta: 25°C

GSPL100-150 3Φ208

Vin: 200VAC



Brown-out time
A - 7ms
B - 8ms

Vout: 25 V/DIV	200 ms/DIV
Vin: 500 V/DIV	

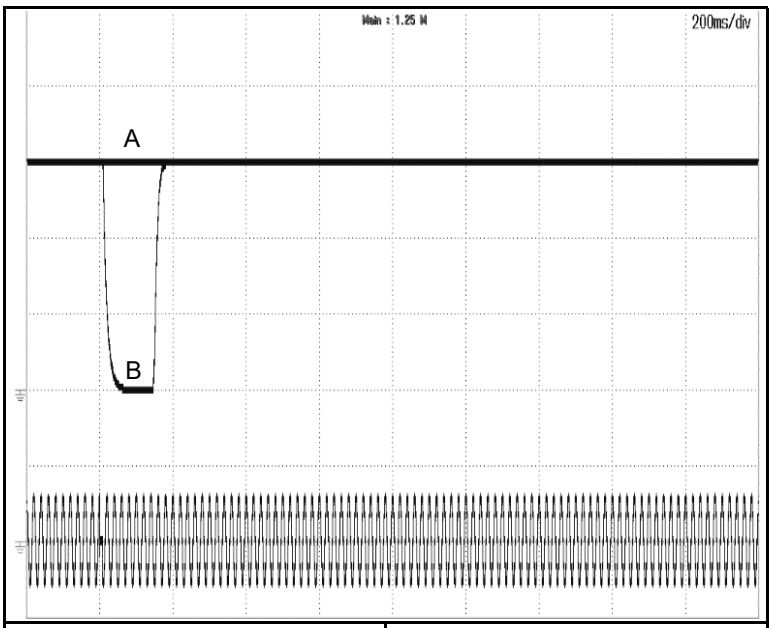
2.9 Response to brown-out characteristics

C.C mode

Conditions: Vout: 100%
Iout: 100%
Ta: 25°C

GSPL100-150 3Φ208

Vin: 200VAC



Brown-out time
A - 7ms
B - 8ms

Iout: $50^{A}/_{DIV}$	$200^{ms}/_{DIV}$
Vin: $500^{V}/_{DIV}$	

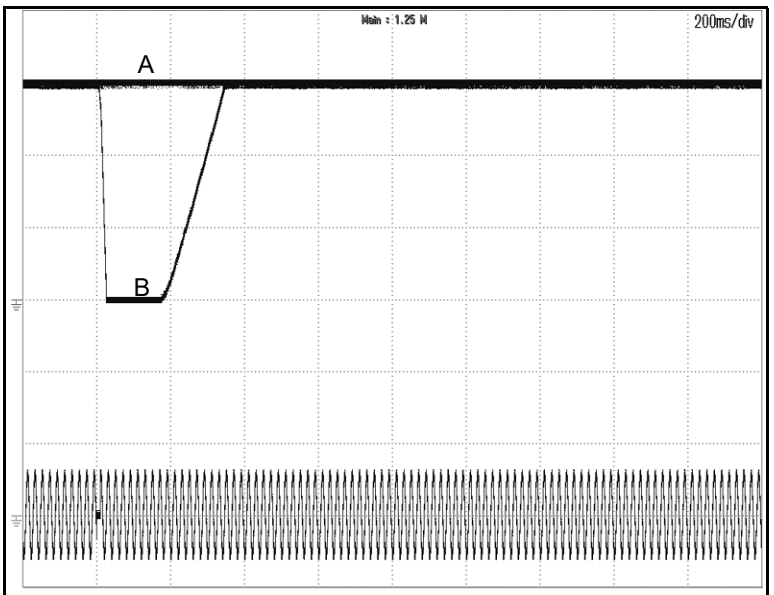
2.9 Response to brown-out characteristics

C.V mode

Conditions: Vout: 100%
Iout: 100%
Ta: 25°C

GSPL600-25 3Φ480

Vin: 400VAC



← Vout: 100%

← Vout: 0V

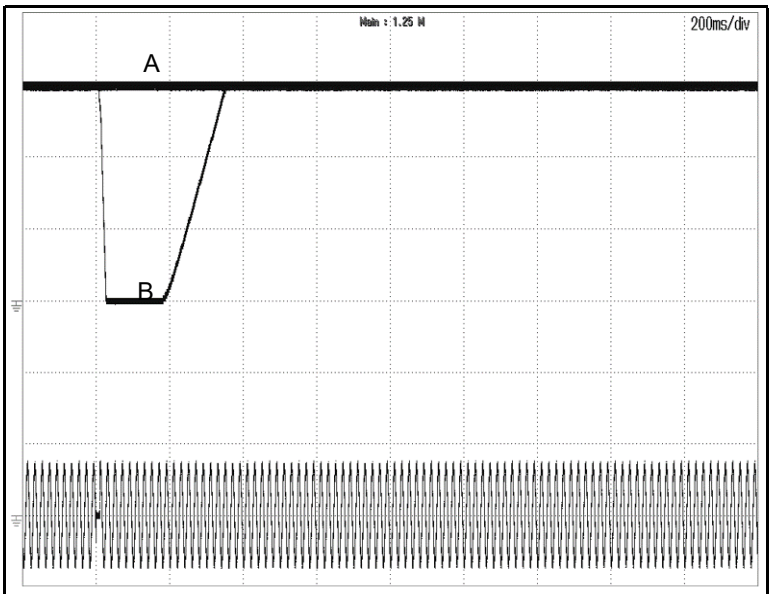
← Vin

Brown-out time
A - 9ms
B - 10ms

Vout: 200V/DIV	200ms/DIV
Vin: 1000V/DIV	

GSPL600-25 3Φ480

Vin: 480VAC



← Vout: 100%

← Vout: 0V

← Vin

Brown-out time
A - 9ms
B - 10ms

Vout: 200V/DIV	200ms/DIV
Vin: 1000V/DIV	

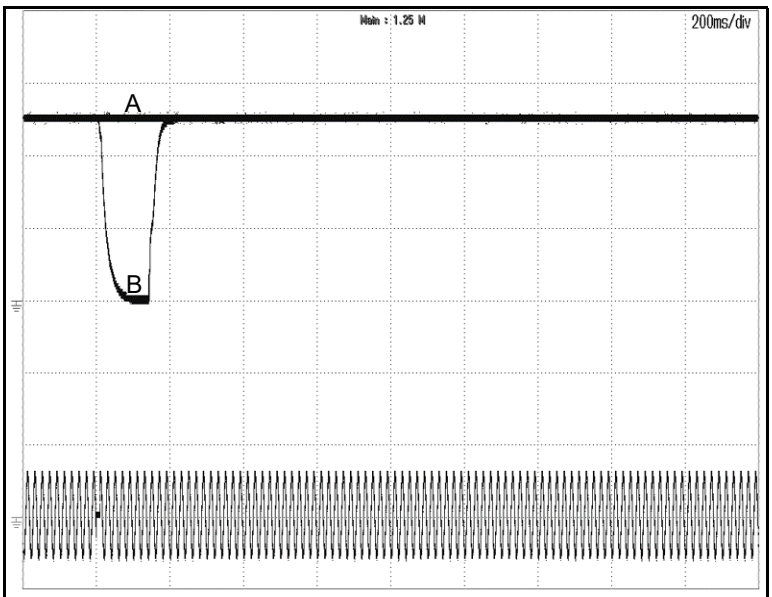
2.9 Response to brown-out characteristics

C.C mode

Conditions: Vout: 100%
Iout: 100%
Ta: 25°C

GSPL600-25 3Φ480

Vin: 400VAC



← Iout: 100%

← Iout: 0A

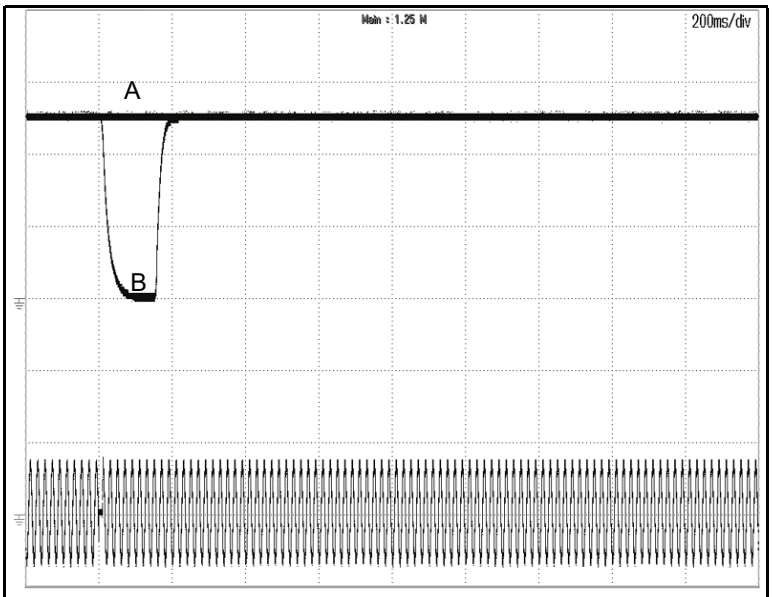
← Vin

Brown-out time
A - 7ms
B - 8ms

Iout: $10^{A}/_{DIV}$	$200^{ms}/_{DIV}$
Vin: $1000^{V}/_{DIV}$	

GSPL600-25 3Φ480

Vin: 480VAC



← Iout: 100%

← Iout: 0A

← Vin

Brown-out time
A - 7ms
B - 8ms

Iout: $10^{A}/_{DIV}$	$200^{ms}/_{DIV}$
Vin: $1000^{V}/_{DIV}$	

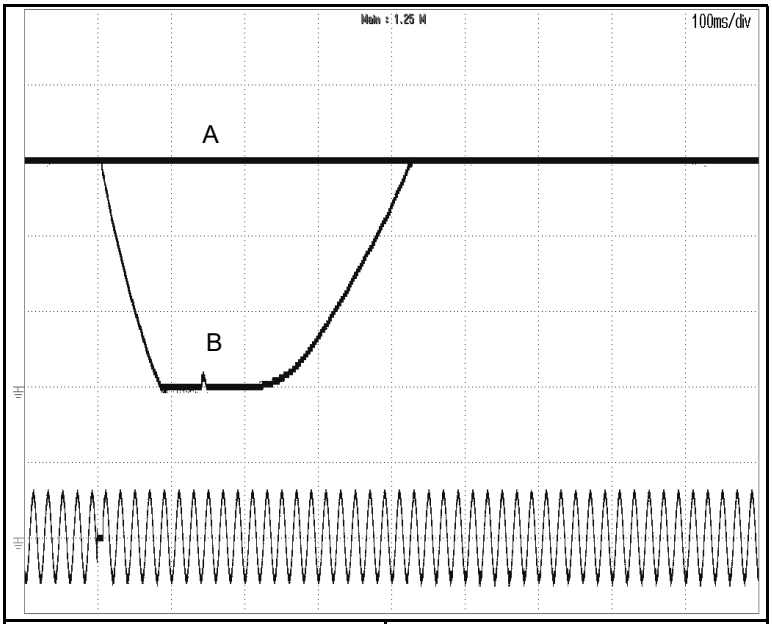
2.9 Response to brown-out characteristics

C.V mode

Conditions: Vout: 100%
Iout: 100%
Ta: 25°C

GSPL1500-10 3Φ208

Vin: 200VAC

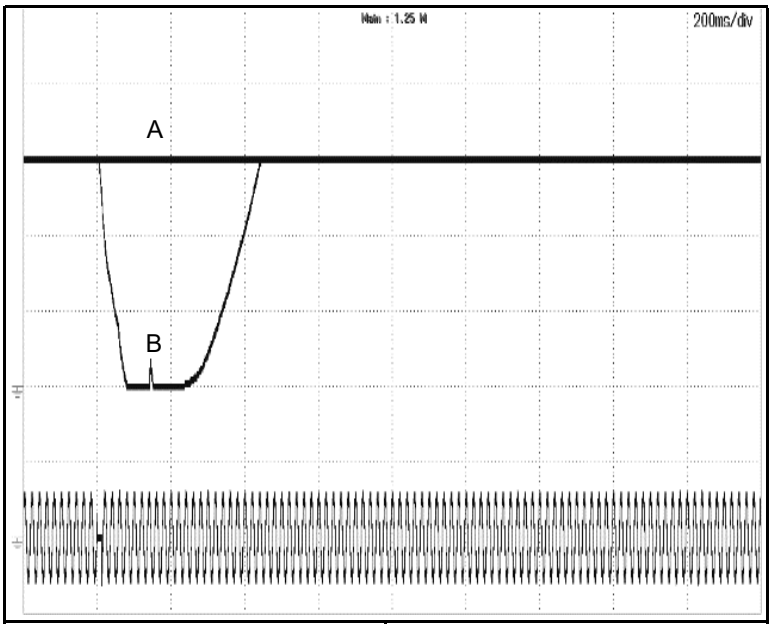


Brown-out time
A - 8ms
B - 9ms

Vout: 500$^{V}/_{DIV}$	100$^{ms}/_{DIV}$
Vin: 500$^{V}/_{DIV}$	

GSPL1500-10 3Φ480

Vin: 400VAC



Brown-out time
A - 6ms
B - 12ms

Vout: 500$^{V}/_{DIV}$	200$^{ms}/_{DIV}$
Vin: 1000$^{V}/_{DIV}$	

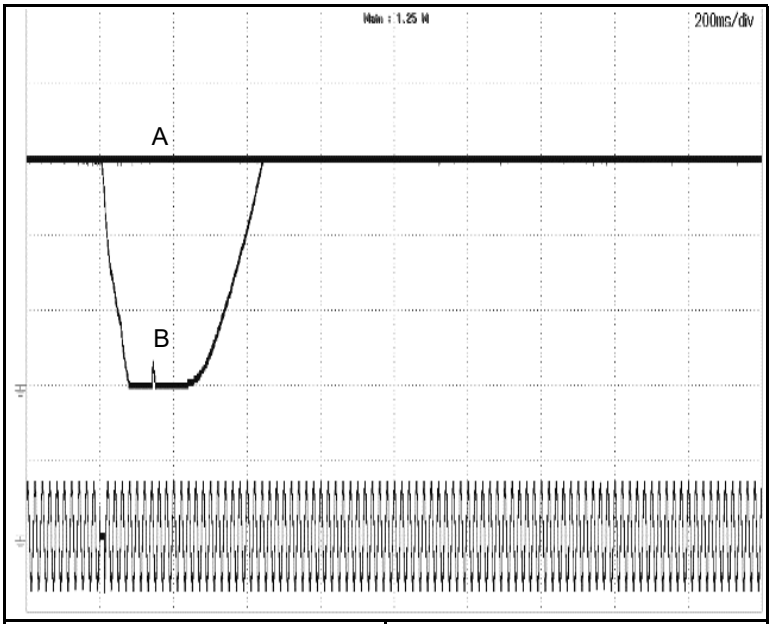
2.9 Response to brown-out characteristics

C.V mode

Conditions: Vout: 100%
Iout: 100%
Ta: 25°C

GSPL1500-10 3Φ480

Vin: 480VAC



← Vout: 100%

← Vout: 0V

← Vin

Brown-out time
A - 6ms
B - 12ms

Vout: 500 V/DIV	200 ms/DIV
Vin: 1000 V/DIV	

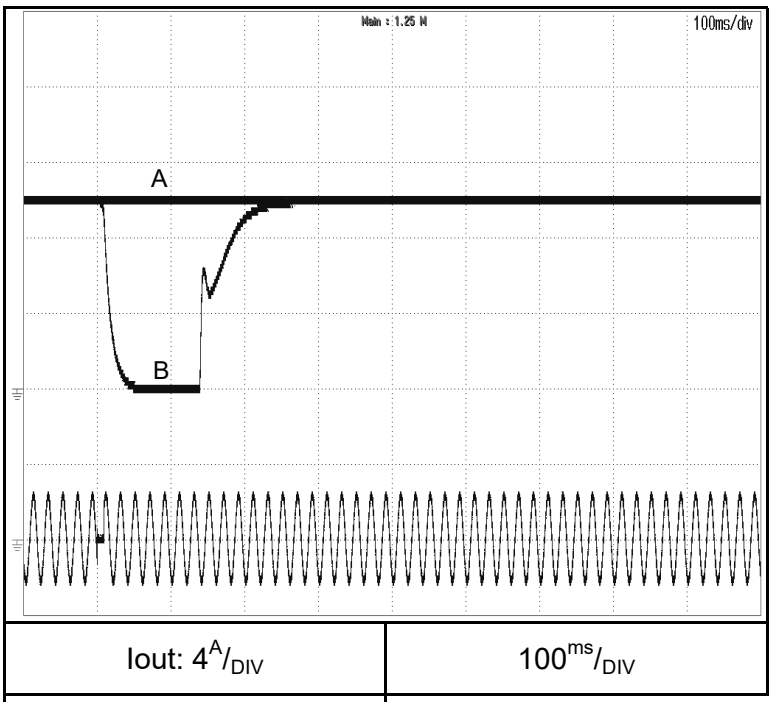
2.9 Response to brown-out characteristics

C.C mode

Conditions: Vout: 100%
Iout: 100%
Ta: 25°C

GSPL1500-10 3Φ208

Vin: 200VAC

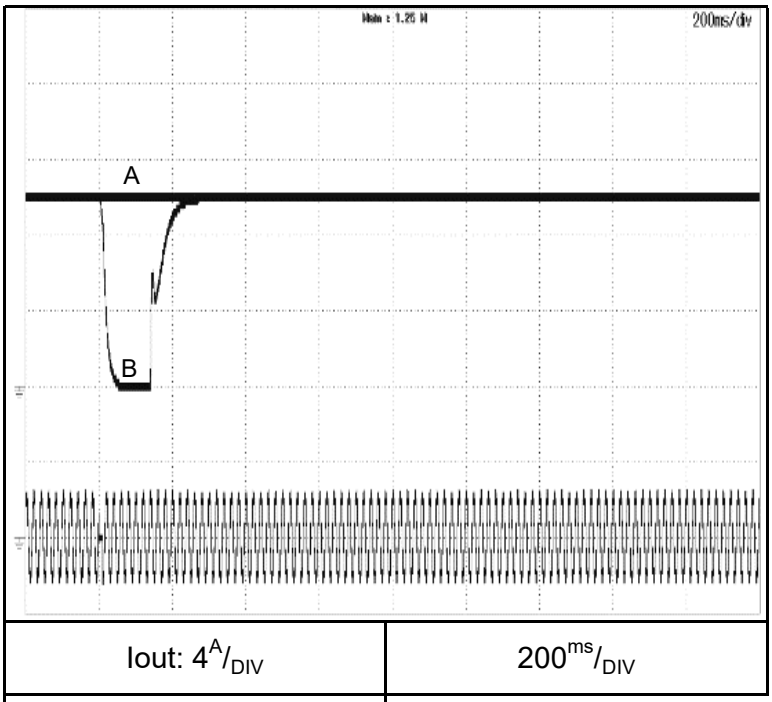


Brown-out time
A - 8ms
B - 9ms

Iout: $4^{A}/_{DIV}$	$100^{ms}/_{DIV}$
Vin: $500^{V}/_{DIV}$	

GSPL1500-10 3Φ480

Vin: 400VAC



Brown-out time
A - 5ms
B - 11ms

Iout: $4^{A}/_{DIV}$	$200^{ms}/_{DIV}$
Vin: $1000^{V}/_{DIV}$	

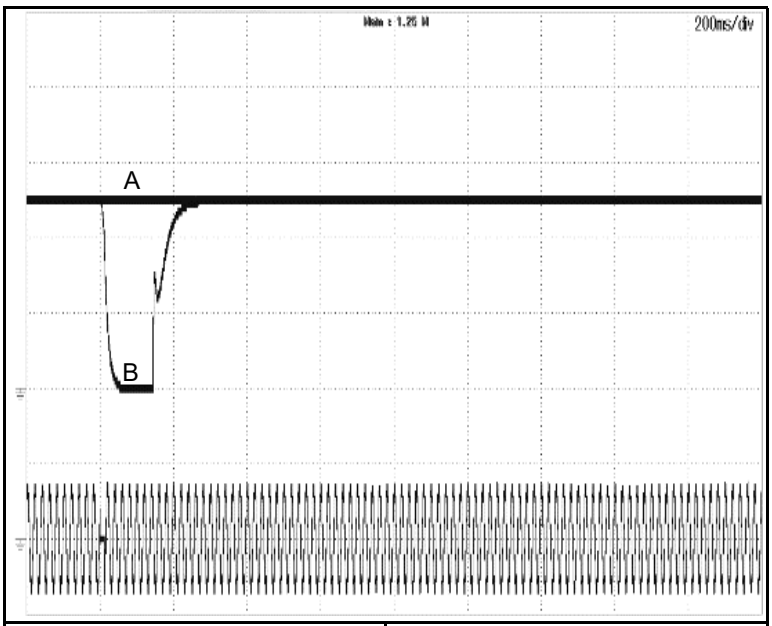
2.9 Response to brown-out characteristics

C.C mode

Conditions: Vout: 100%
Iout: 100%
Ta: 25°C

GSPL1500-10 3Φ480

Vin: 480VAC



Brown-out time
A - 5ms
B - 11ms

Iout: $4^{A}/_{DIV}$	$200^{ms}/_{DIV}$
Vin: $1000^{V}/_{DIV}$	

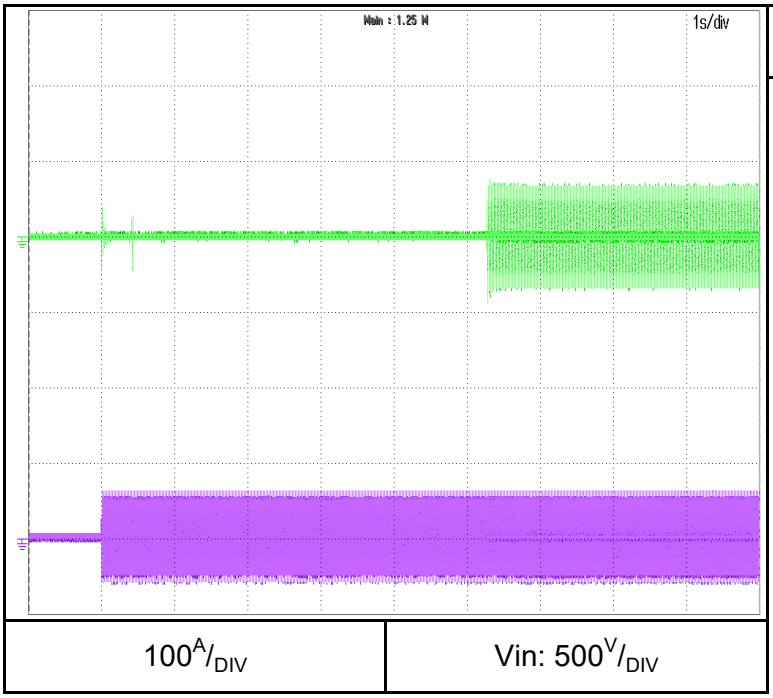
2.10 Inrush current waveform

Conditions: Vin: 200VAC
Vout: 100%
Iout: 100%
Ta: 25°C

3Φ208 Input

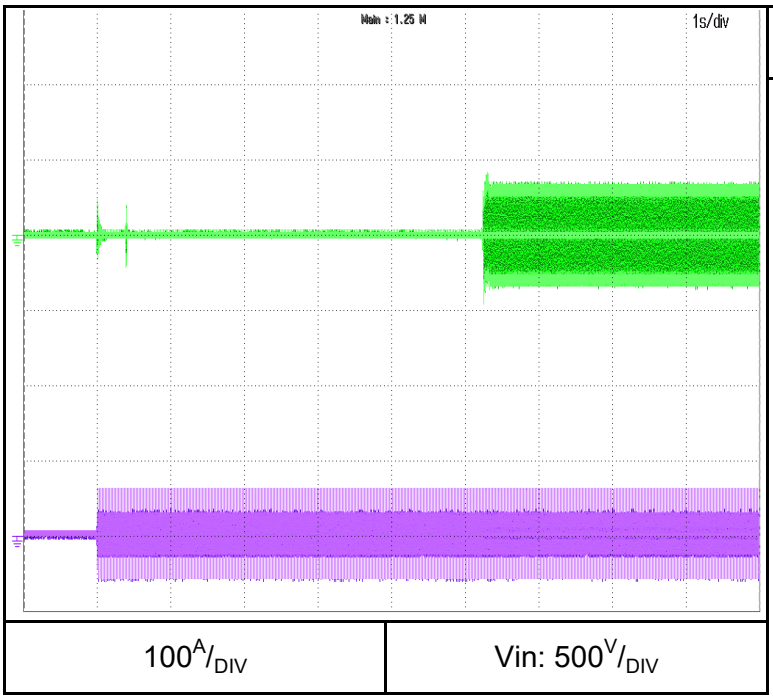
Switch on phase angle of input AC voltage

Φ=0˚



Switch on phase angle of input AC voltage

Φ=90˚



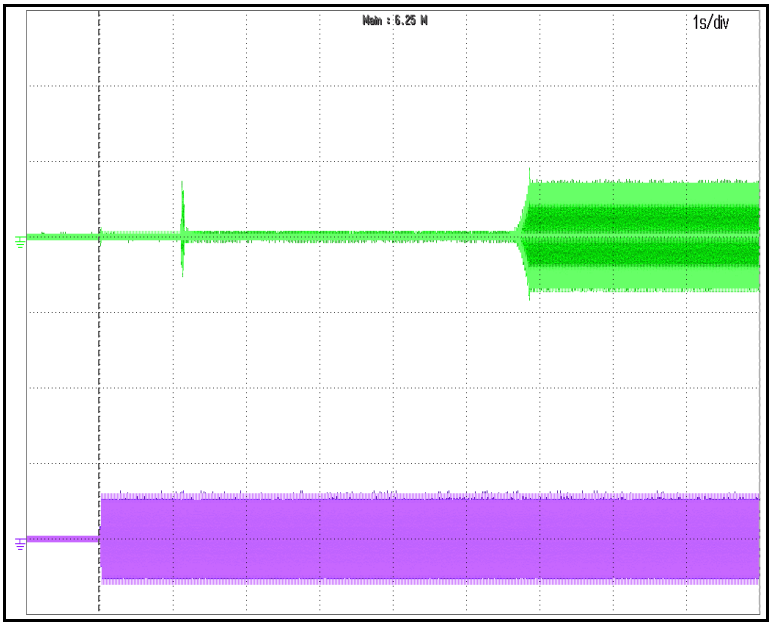
2.10 Inrush current waveform

Conditions: Vin: 400VAC
Vout: 100%
Iout: 100%
Ta: 25°C

3Φ480 Input

Switch on phase angle of input AC voltage

Φ=0˚



1S/DIV

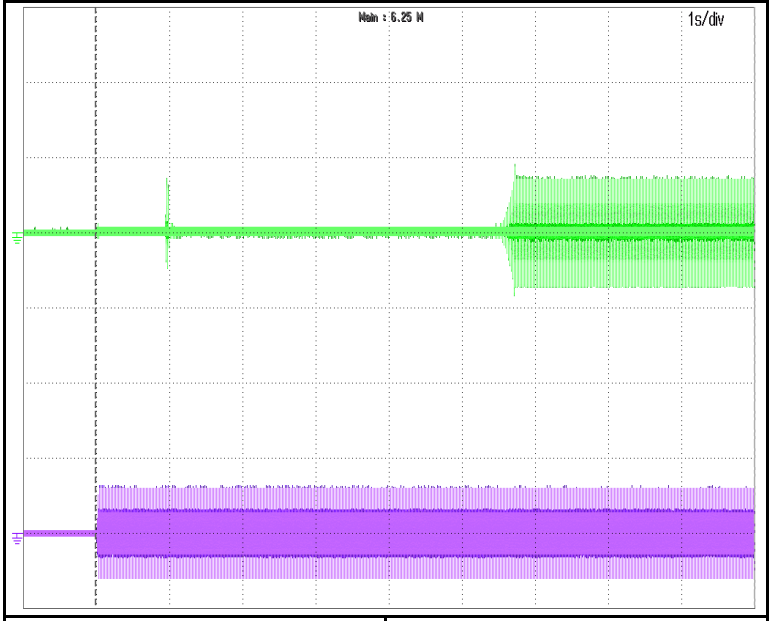
Iin

Vin

50A/DIV | Vin: 1000V/DIV

Switch on phase angle of input AC voltage

Φ=90˚



1S/DIV

Iin

Vin

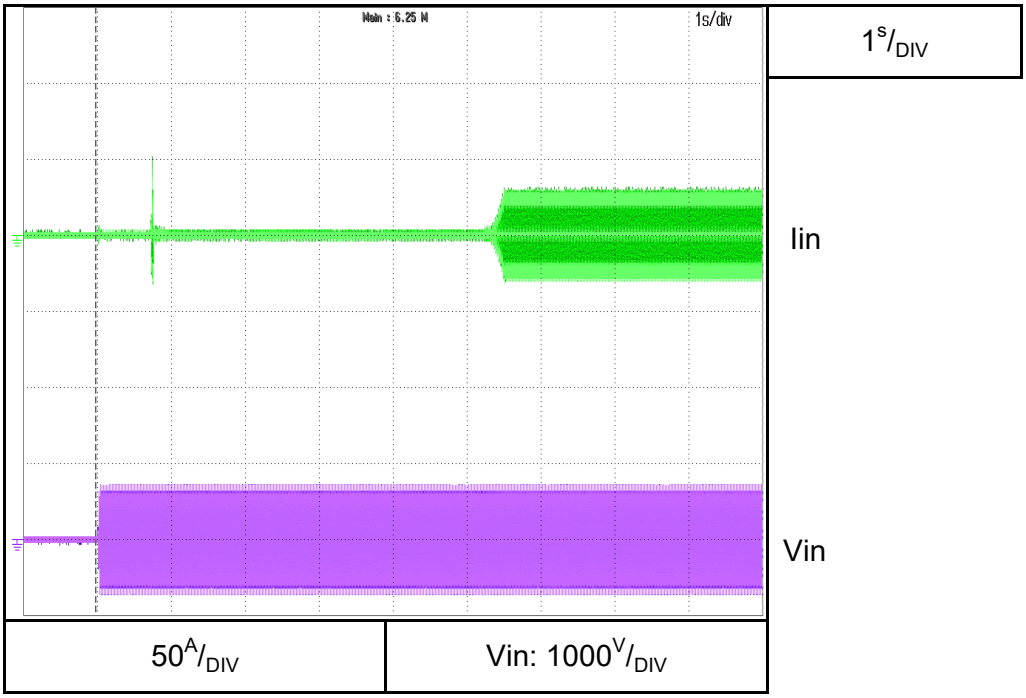
50A/DIV | Vin: 1000V/DIV

2.10 Inrush current waveform

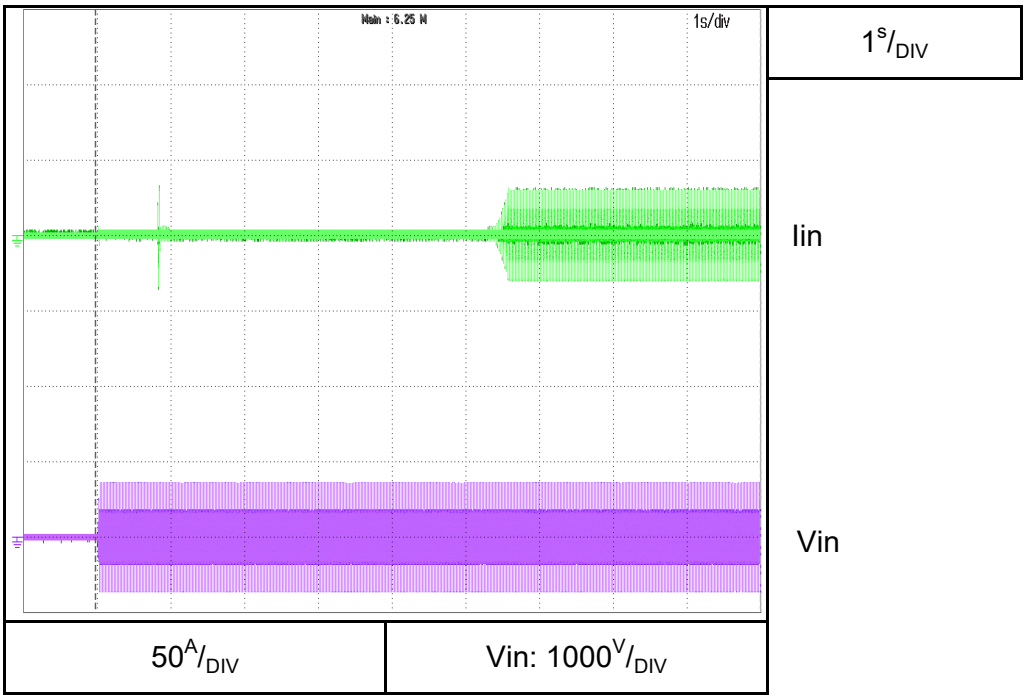
Conditions: Vin: 480VAC
Vout: 100%
Iout: 100%
Ta: 25°C

3Φ480 Input

Switch on phase angle of input AC voltage
Φ=0˚



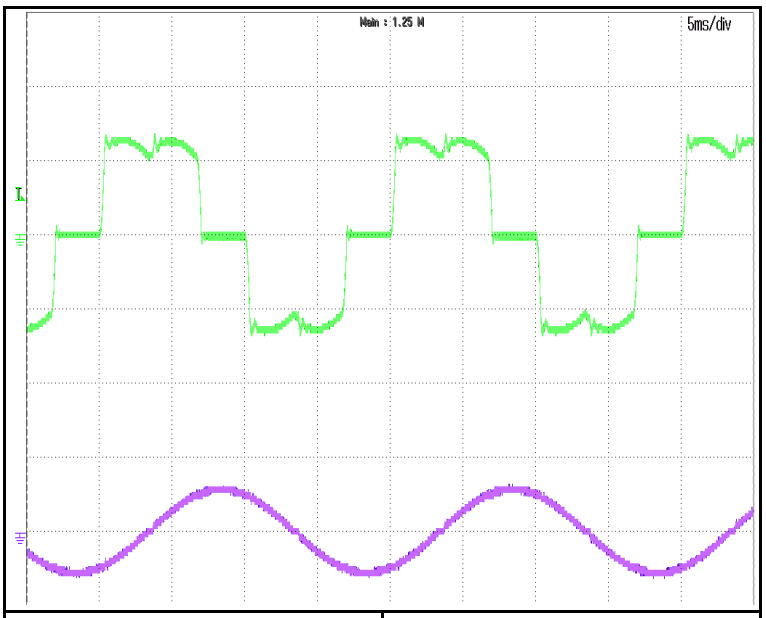
Switch on phase angle of input AC voltage
Φ=90˚



2.11 Input current waveform

Conditions: Vin: 200VAC
Vout: 100%
Iout: 100%
Ta: 25°C

3Φ208 Input



Iin

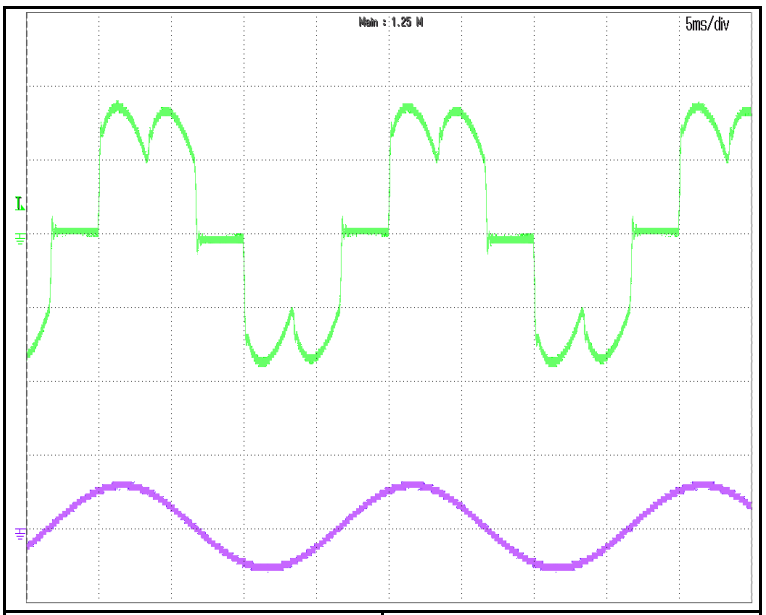
Vin

$50^{A}/_{DIV}$	$5^{ms}/_{DIV}$
$500^{V}/_{DIV}$	

2.11 Input current waveform

Conditions: Vin: 400VAC
Vout: 100%
Iout: 100%
Ta: 25°C

3Φ480 Input



Iin

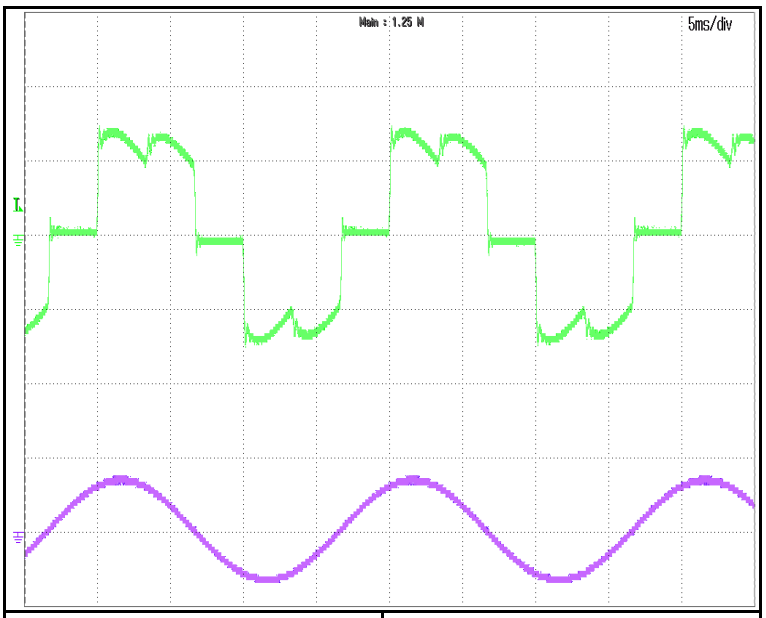
Vin

$20^{A}/_{DIV}$	$5^{ms}/_{DIV}$
$1000^{V}/_{DIV}$	

2.11 Input current waveform

Conditions: Vin: 480VAC
Vout: 100%
Iout: 100%
Ta: 25°C

3Φ480 Input



Iin

Vin

$20^{A}/_{DIV}$	$5^{ms}/_{DIV}$
$1000^{V}/_{DIV}$	

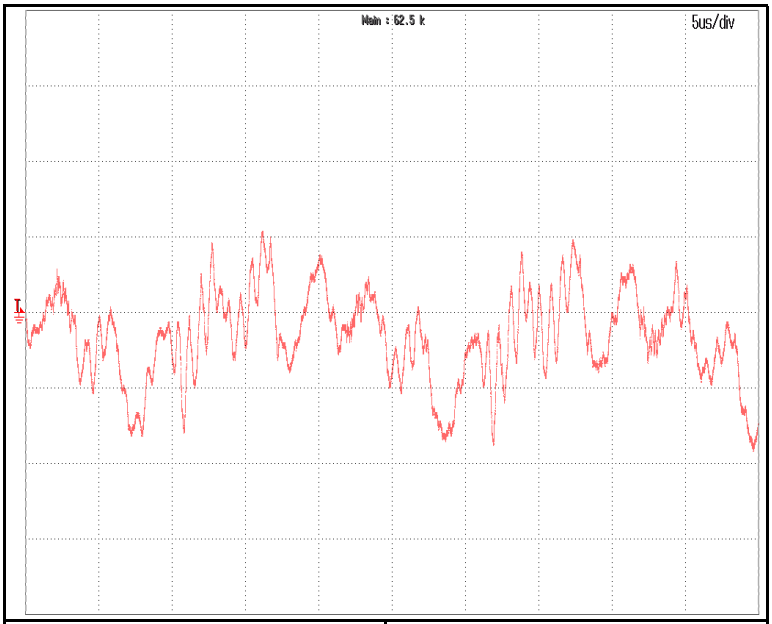
2.12 Output ripple & noise waveform

C.V mode

Conditions: Vout: 100%
Iout: 100%
Ta: 25°C

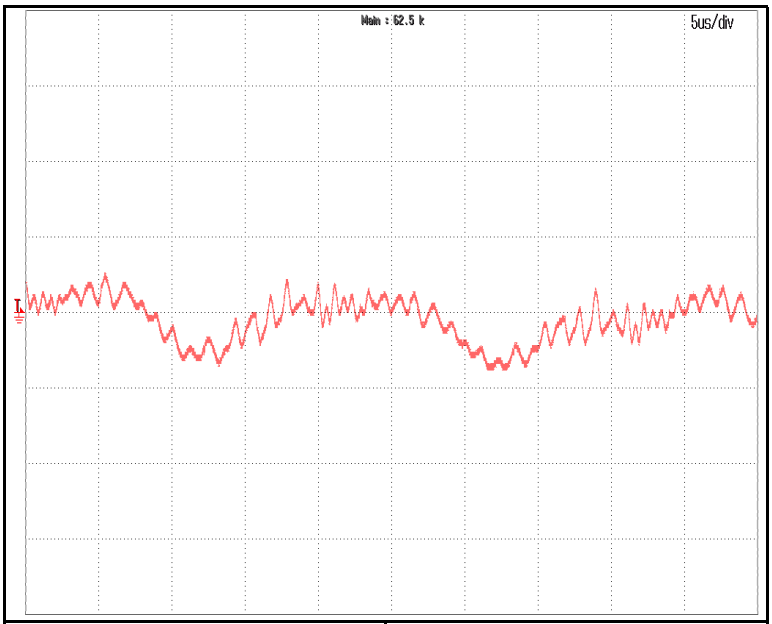
Normal Mode

GSPL20-750



$5^{mV}/_{DIV}$	$5^{us}/_{DIV}$

GSPL100-150



$10^{mV}/_{DIV}$	$5^{us}/_{DIV}$

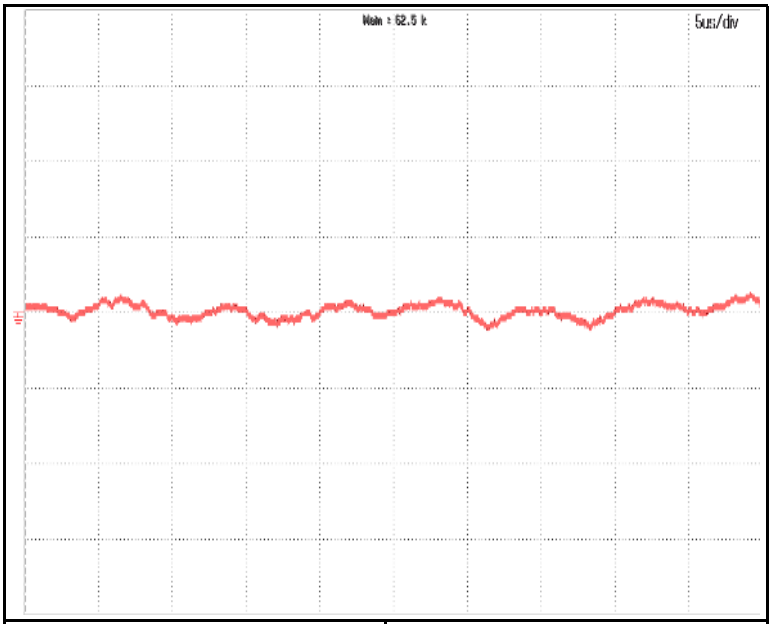
2.12 Output ripple & noise waveform

C.V mode

Conditions: Vout: 100%
Iout: 100%
Ta: 25°C

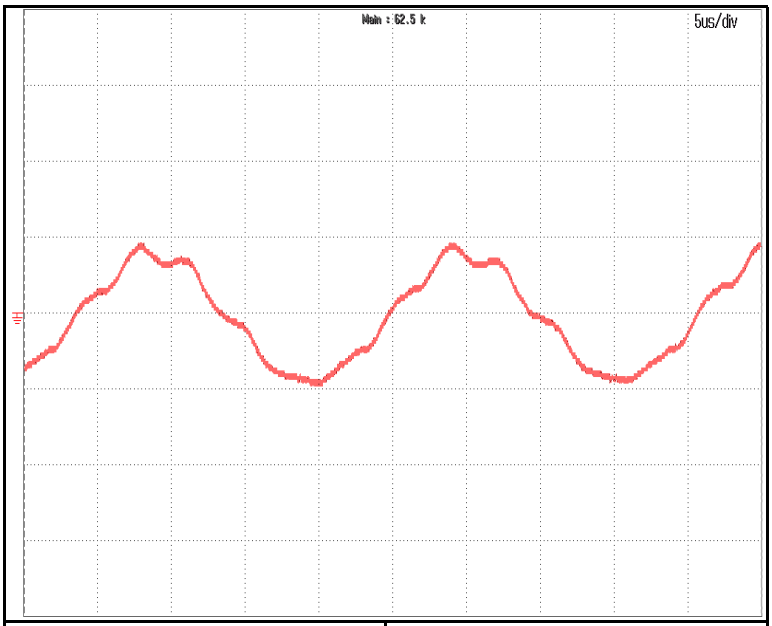
Normal Mode

GSPL600-25



200mV/DIV	5us/DIV

GSPL1500-10



500mV/DIV	5us/DIV