ZWQ130 Series

EVALUATION DATA

型式データ

INDEX

INDEX

2. 特性データ　　Characteristics

－ 使用記号　Terminology used －

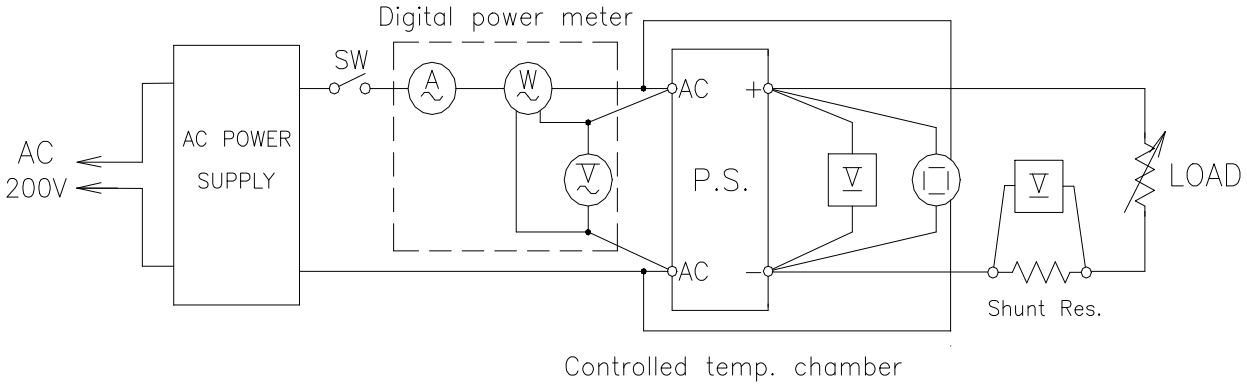
Definition

Vin	.....	入力電圧	Input voltage
Vout	.....	出力電圧	Output voltage
Iin	.....	入力電流	Input current
Iout	.....	出力電流	Output current
f	.....	周波数	Frequency
Ta	.....	周囲温度	Ambient temperature

1.1 測定回路　Circuit used for determination

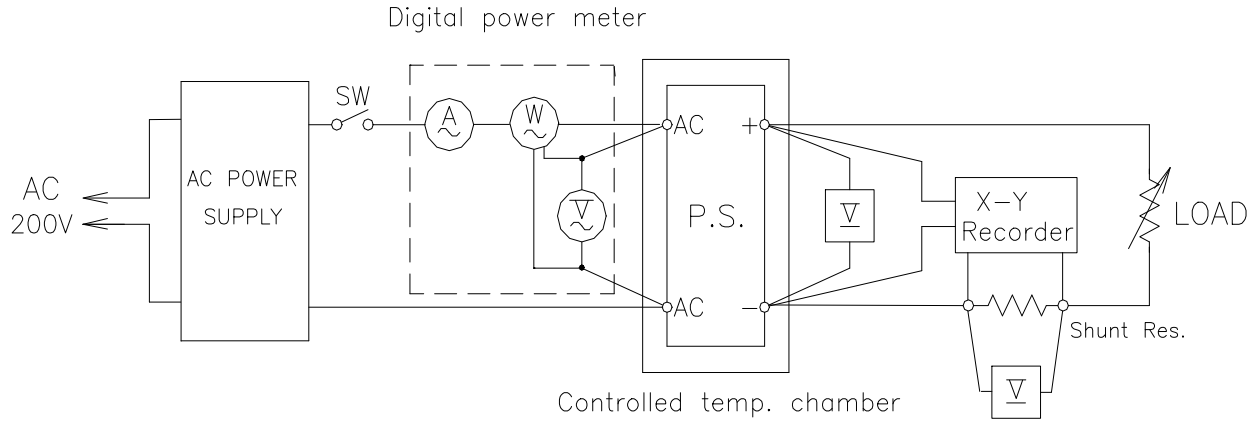
測定回路 1

・静特性	Steady state data
・通電ドリフト特性	Warm up voltage drift characteristics
・過電圧保護特性	Over voltage protection (OVP) characteristics
・出力立ち上がり特性	Output rise characteristics
・出力立ち下がり特性	Output fall characteristics
・過渡応答（入力急変）特性	Dynamic line response characteristics
・スタンバイ電流特性	Stand-by current characteristics
(a)　最小負荷時	Minimum LOAD
(b)　ON/OFF コントロール OFF 時	ON/OFF CONTROL OFF condition



測定回路２

・過電流保護特性　　Over current protection (OCP) characteristics



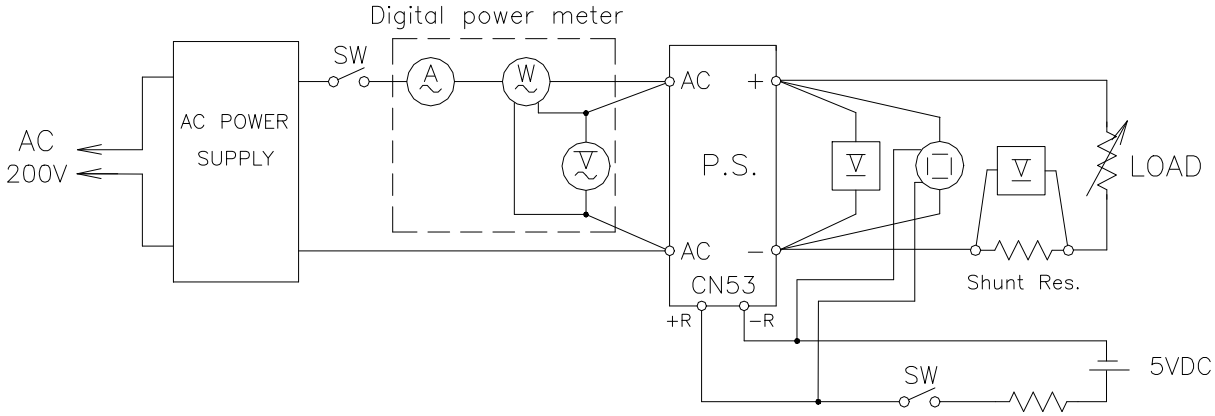
測定回路３

・出力立ち上がり特性　（ON/OFF コントロール時）

Output rise characteristics with ON/OFF CONTROL

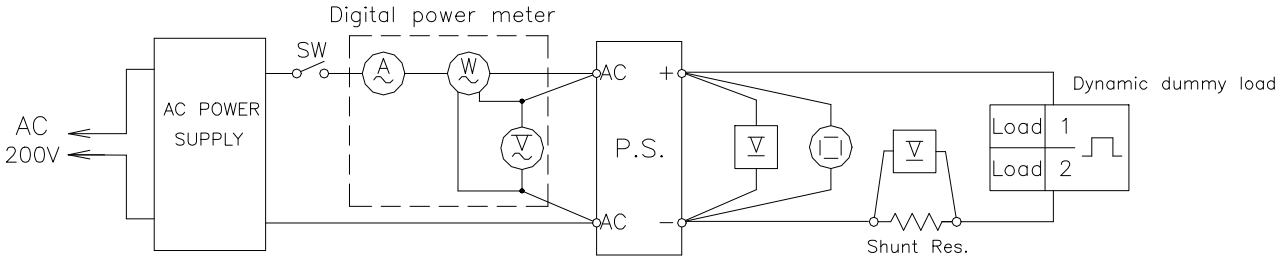
・出力立ち下がり特性　（ON/OFF コントロール時）

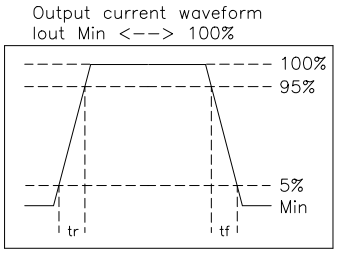
Output fall characteristics with ON/OFF CONTROL

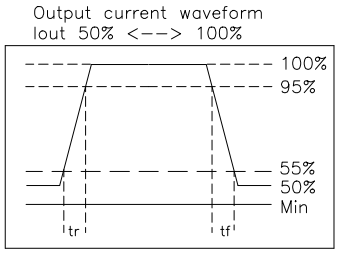


測定回路４

・過渡応答（負荷急変）特性　　Dynamic load response characteristics

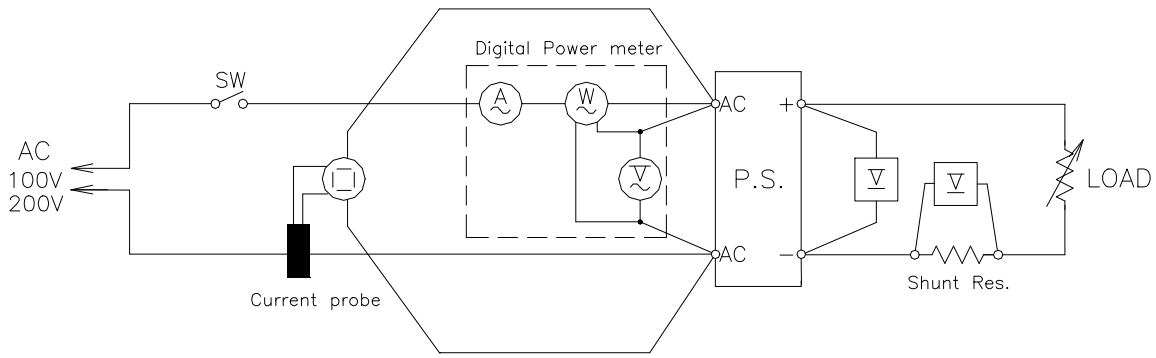






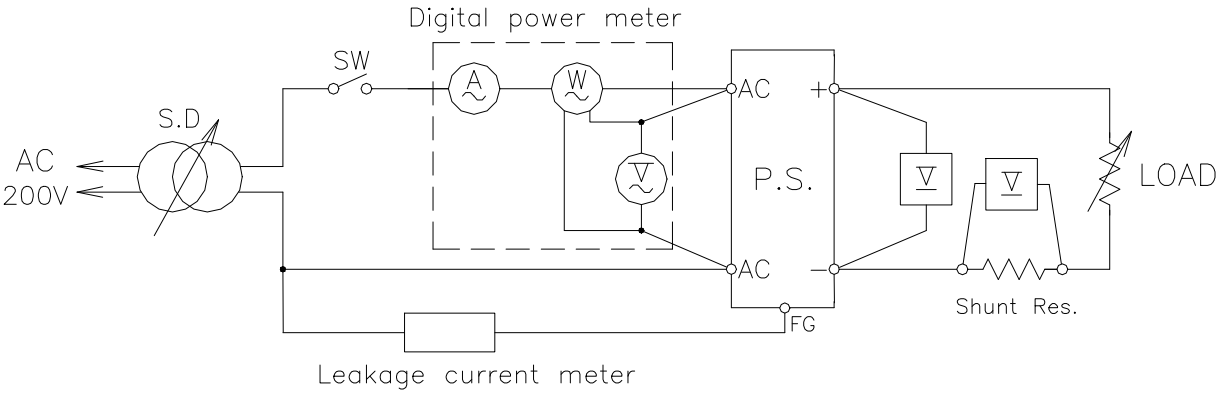
測定回路５

・入力サージ電流（突入電流）特性　　Inrush current characteristics



測定回路６

・リーク電流　Leakage current characteristics



NOTE : Leakage current measured through a 1k ohm resistor.

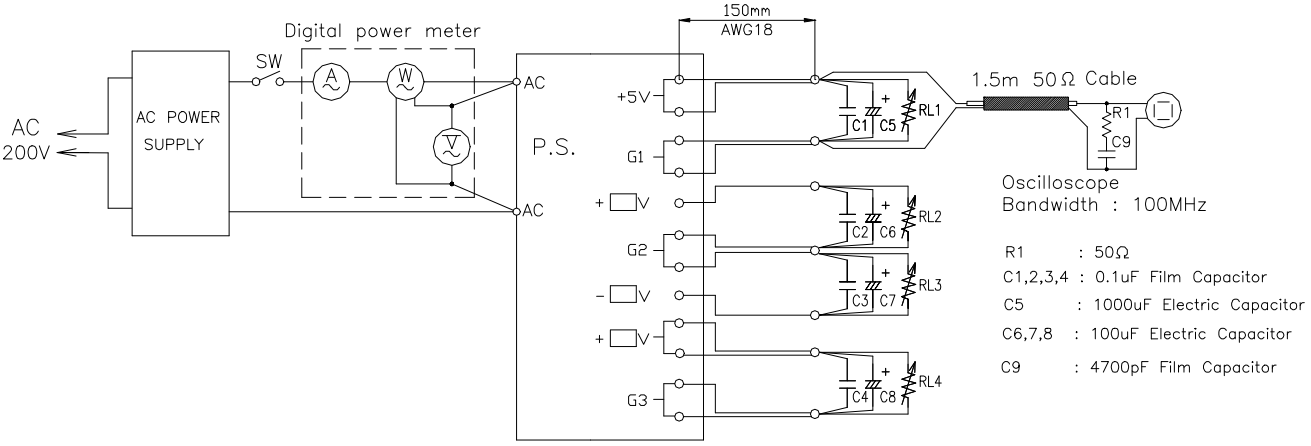
Range used−−−AC+DC (For YOKOGAWA : TYPE 3226)

−−−AC (For SIMPSON : MODEL 229−2)

測定回路７

・出力リップル、ノイズ　Output ripple and noise

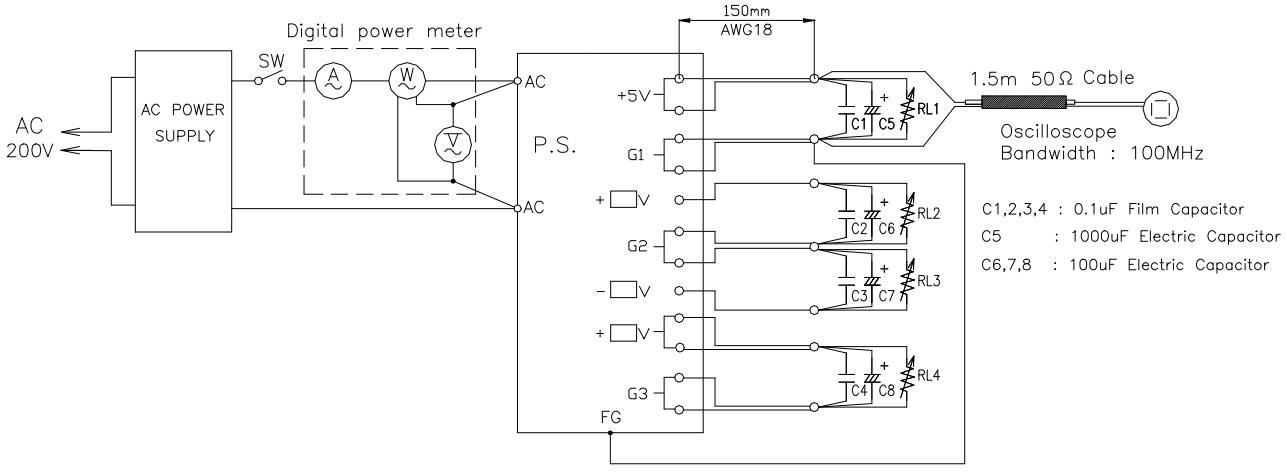
(a) Normal Mode



測定回路８

・出力リップル、ノイズ　Output ripple and noise

(b) Normal + Common Mode

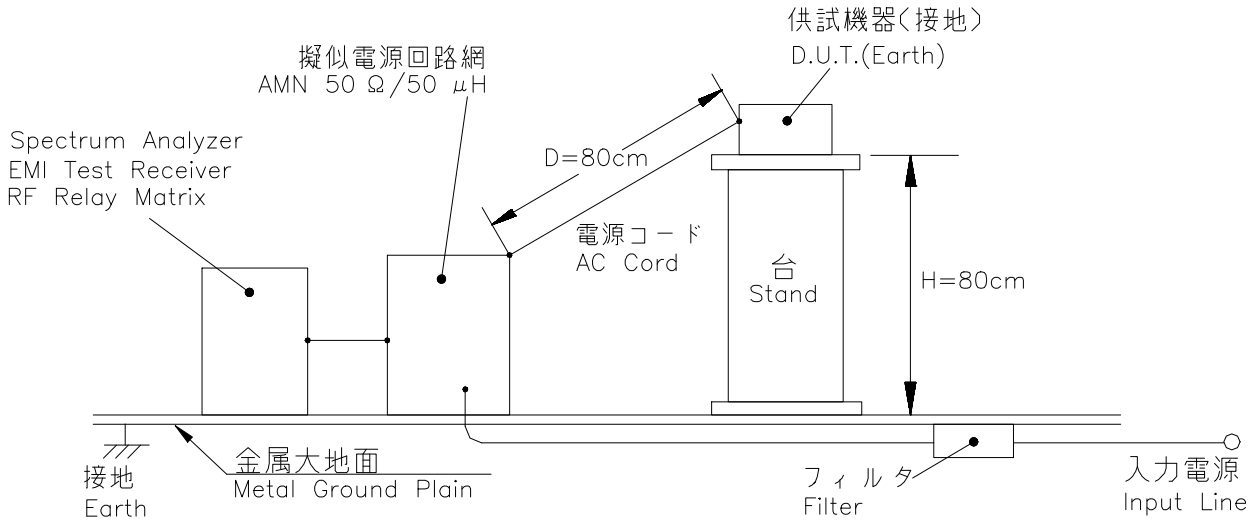


測定回路９

・EMI 特性　Electro-Magnetic Interference characteristics

(a) 雑音端子電圧（帰還ノイズ）

Conducted Emission Noise

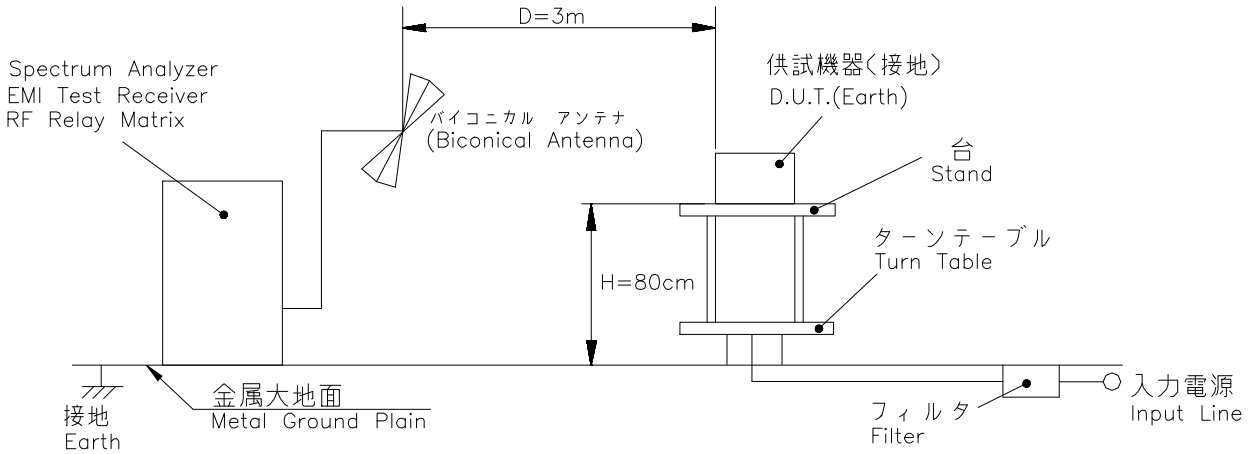


測定回路１０

・EMI 特性　Electro-Magnetic Interference characteristics

(b) 雑音電界強度（輻射ノイズ）

Radiated Emission Noise



1.2 使用測定機器　　List of equipment used

	EQUIPMENT USED	MANUFACTURER	MODEL NO.
1	OSCILLOSCOPE	HITACHI DENSHI	V-1100A
2	DIGITAL STORAGE OSCILLOSCOPE	TEKTRONIX	TDS540D
3	DIGITAL MULTIMETER	ADVANTEST	R6341A
4	DIGITAL POWER METER	YOKOGAWA ELECT.	WT110
5	DC AMPERE METER	YOKOGAWA ELECT.	TYPE2051
6	CURRENT PROBE/AMPLIFIER	TEKTRONIX	A6303/AM503
7	DYNAMIC DUMMY LOAD	TAKASAGO	FK-200L
8	SLIDE REGULATOR	MATSUNAGA	S3-3019
9	AC POWER SUPPLY	KIKUSUI	PCR6000
10	LEAKAGE CURRENT METER	SIMPSON	MODEL229-2
11	LEAKAGE CURRENT METER	YOKOGAWA	TYPE3226
12	X-Y RECORDER	GRAPHTEC	WX3000
13	DYNAMIC DIP SIMULATOR	TAKAMISAWA CYBERNETICS	PSA-300
14	CONTROLLED TEMP. CHAMBER	TABAI ESPEC	SH-240
15	SPECTRUM ANALYZER	ROHDE & SCHWARZ	FSA
16	EMI TEST RECEIVER	ROHDE & SCHWARZ	ESHS10
17	EMI TEST RECEIVER	ROHDE & SCHWARZ	ESVS10
18	RF RELAY MATRIX	ROHDE & SCHWARZ	PSU
19	AMN	KYORITU DENSHI	KNW-242
20	ANTENNA(BICONICAL ANTENA)	SCHWARZBECK	BBA9106

2. 特性データ

V1 : 5V

2.1 入力、負荷、温度変動　Regulation - line and load, temperature drift

1. Regulation - line and load

Conditions Ta : 25 ºC
Iout (100%)
V1 : -A
V2 : 0.3A
V3 : 0.3A
V4 : 10.0A

Iout \ Vin	85VAC	100VAC	200VAC	265VAC	line regulation	
1.5A	5.010V	5.010V	5.010V	5.010V	0mV	0.00%
7.5A	5.009V	5.009V	5.009V	5.009V	0mV	0.00%
15.0A	5.009V	5.009V	5.009V	5.009V	0mV	0.00%
load	1mV	1mV	1mV	1mV		
regulation	0.02%	0.02%	0.02%	0.02%		

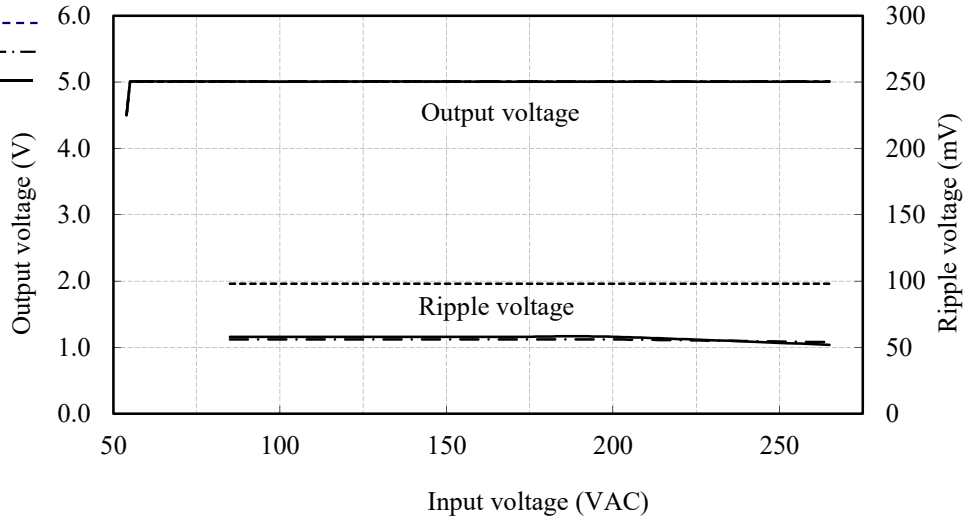
2. Temperature drift

Conditions Vin : 100VAC
Iout (100%)
V1 : 15.0A
V2 : 0.3A
V3 : 0.3A
V4 : 10.0A

Ta	-10℃	+25℃	+40℃	temperature stability	
Vo	5.006V	5.009V	5.007V	3mV	0.06%

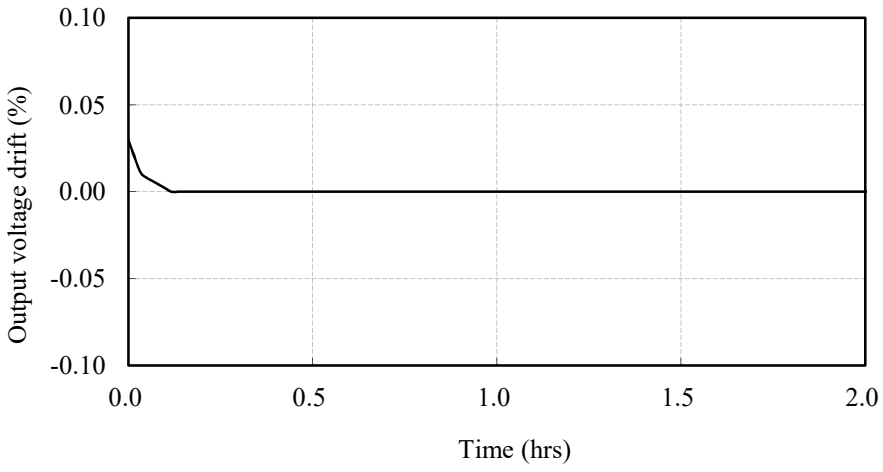
2.2 出力電圧、リップル電圧対入力電圧　Output voltage and Ripple voltage v.s. Input voltage

Conditions Ta : -10 ºC
: 25 ºC
: 40 ºC
Iout (100%)
V1 : 15.0A
V2 : 0.3A
V3 : 0.3A
V4 : 10.0A



2.3 通電ドリフト特性　Warm up voltage drift characteristics

Conditions Ta : 25 ºC
Vin : 100VAC
Iout (100%)
V1 : 8.5A
V2 : 2.5A
V3 : 2.5A
V4 : 5.5A



V2 : +12V

2.1 入力、負荷、温度変動　Regulation - line and load, temperature drift

1. Regulation - line and load

Conditions Ta : 25 ºC
Iout (100%)
V1 : 4.0A
V2 : -A
V3 : 4.0A
V4 : 2.8A

Iout \ Vin	85VAC	100VAC	200VAC	265VAC	line regulation	
0.0A	12.139V	12.139V	12.139V	12.140V	1mV	0.01%
2.0A	12.141V	12.141V	12.140V	12.140V	1mV	0.01%
4.0A	12.140V	12.140V	12.140V	12.140V	0mV	0.00%
load regulation	2mV	2mV	1mV	0mV		
	0.02%	0.02%	0.01%	0.00%		

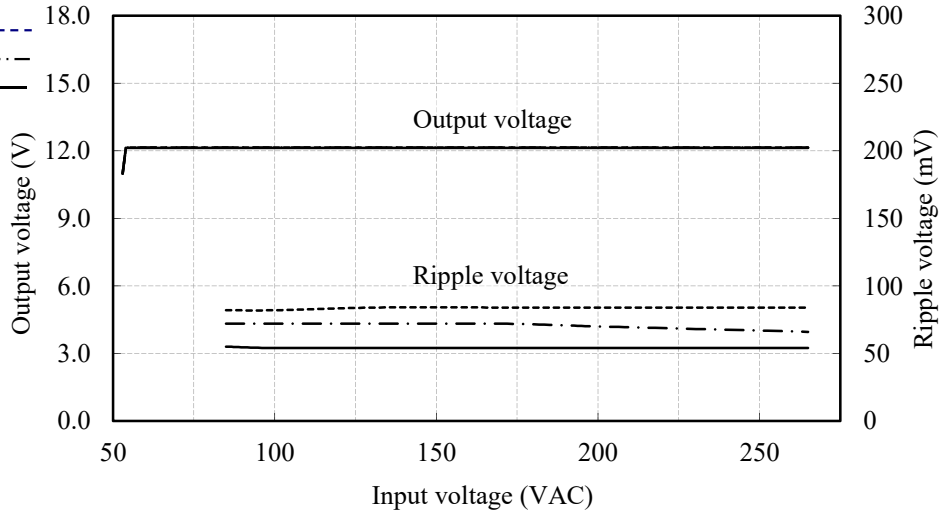
2. Temperature drift

Conditions Vin : 100VAC
Iout (100%)
V1 : 4.0A
V2 : 4.0A
V3 : 4.0A
V4 : 2.8A

Ta	-10℃	+25℃	+40℃	temperature stability	
Vo	12.140V	12.140V	12.136V	4mV	0.03%

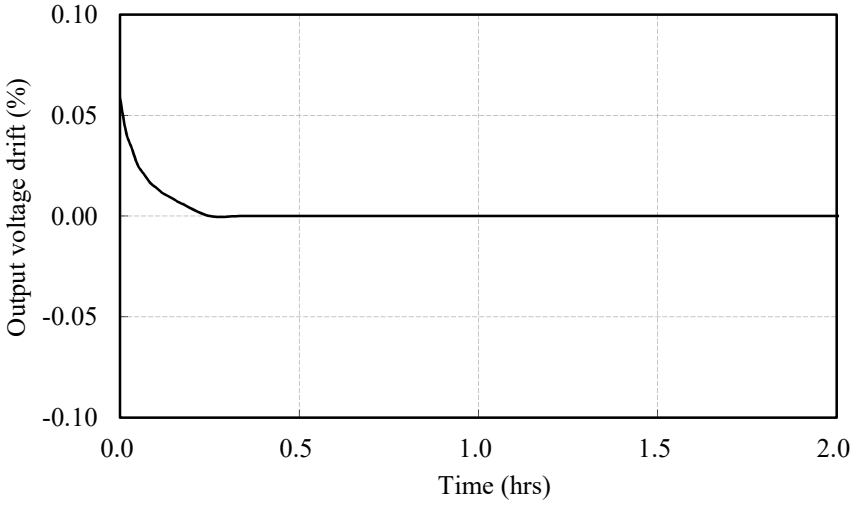
2.2 出力電圧、リップル電圧対入力電圧　Output voltage and Ripple voltage v.s. Input voltage

Conditions Ta : -10 ºC
: 25 ºC
: 40 ºC
Iout (100%)
V1 : 4.0A
V2 : 4.0A
V3 : 4.0A
V4 : 2.8A



2.3 通電ドリフト特性　Warm up voltage drift characteristics

Conditions Ta : 25 ºC
Vin : 100VAC
Iout (100%)
V1 : 8.5A
V2 : 2.5A
V3 : 2.5A
V4 : 5.5A



V3 : -12V

2.1 入力、負荷、温度変動　Regulation - line and load, temperature drift

1. Regulation - line and load

Conditions Ta : 25 ºC
Iout (100%)
V1 : 4.0A
V2 : -A
V3 : 4.0A
V4 : 2.8A

Iout \ Vin	85VAC	100VAC	200VAC	265VAC	line regulation	
0.0A	-12.095V	-12.095V	-12.095V	-12.095V	0mV	0.00%
2.0A	-12.094V	-12.094V	-12.094V	-12.094V	0mV	0.00%
4.0A	-12.093V	-12.093V	-12.093V	-12.093V	0mV	0.00%
load regulation	2mV	2mV	2mV	2mV		
	0.02%	0.02%	0.02%	0.02%		

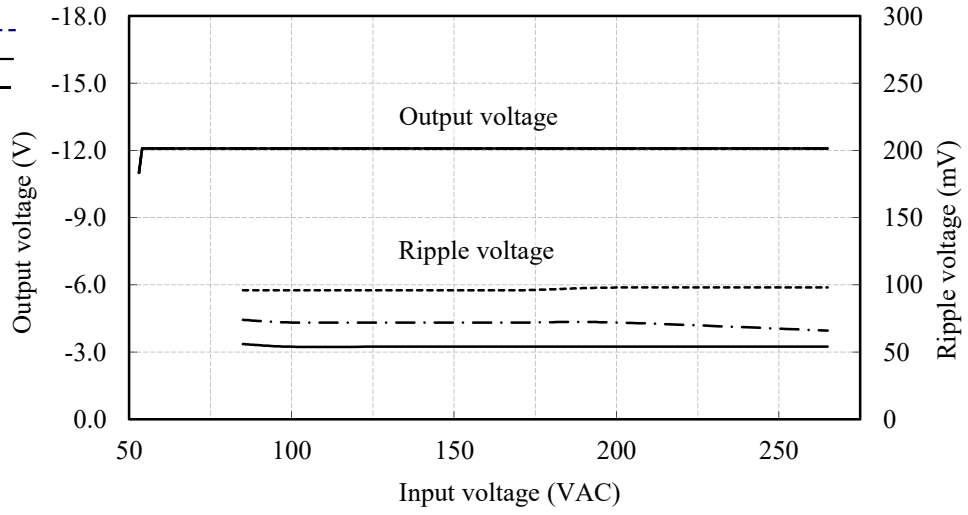
2. Temperature drift

Conditions Vin : 100VAC
Iout (100%)
V1 : 4.0A
V2 : 4.0A
V3 : 4.0A
V4 : 2.8A

Ta	-10℃	+25℃	+40℃	temperature stability	
Vo	-12.089V	-12.093V	-12.091V	4mV	0.03%

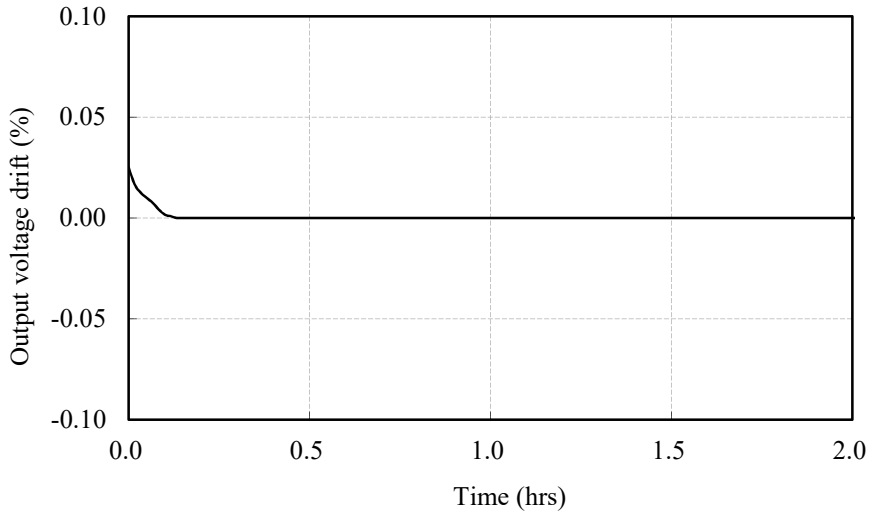
2.2 出力電圧、リップル電圧対入力電圧　Output voltage and Ripple voltage v.s. Input voltage

Conditions Ta : -10 ºC
: 25 ºC
: 40 ºC
Iout (100%)
V1 : 4.0A
V2 : 4.0A
V3 : 4.0A
V4 : 2.8A



2.3 通電ドリフト特性　Warm up voltage drift characteristics

Conditions Ta : 25 ºC
Vin : 100VAC
Iout (100%)
V1 : 8.5A
V2 : 2.5A
V3 : 2.5A
V4 : 5.5A



V4 : 5V

2.1 入力、負荷、温度変動　Regulation - line and load, temperature drift

1. Regulation - line and load

Conditions Ta : 25 ºC
Iout (100%)
V1 : 15.0A
V2 : 0.3A
V3 : 0.3A
V4 : -A

Iout \ Vin	85VAC	100VAC	200VAC	265VAC	line regulation	
0.0A	5.042V	5.043V	5.043V	5.043V	1mV	0.02%
5.0A	5.041V	5.041V	5.040V	5.040V	1mV	0.02%
10.0A	5.039V	5.039V	5.038V	5.038V	1mV	0.02%
load regulation	3mV	4mV	5mV	5mV		
	0.06%	0.08%	0.10%	0.10%		

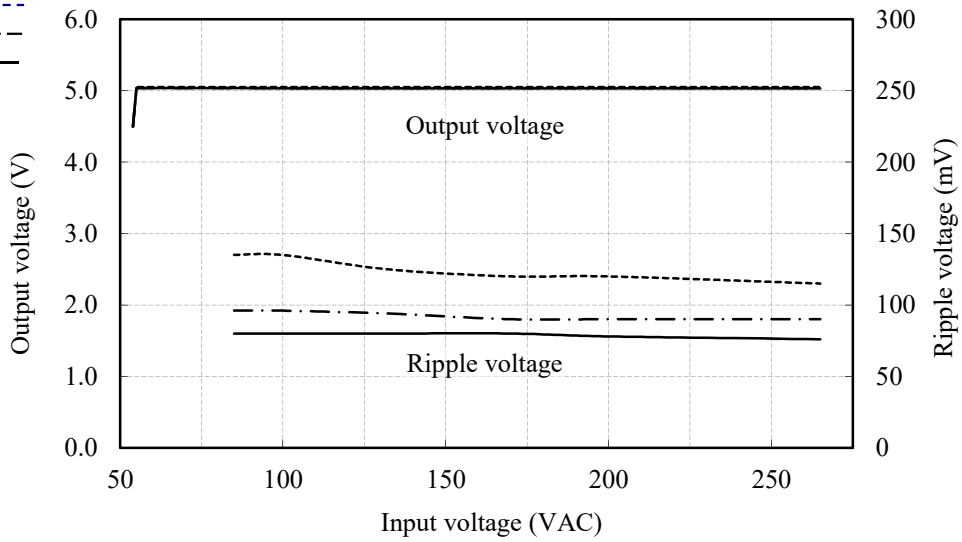
2. Temperature drift

Conditions Vin : 100VAC
Iout (100%)
V1 : 15.0A
V2 : 0.3A
V3 : 0.3A
V4 : 10.0A

Ta	-10℃	+25℃	+40℃	temperature stability	
Vo	5.049V	5.039V	5.035V	14mV	0.28%

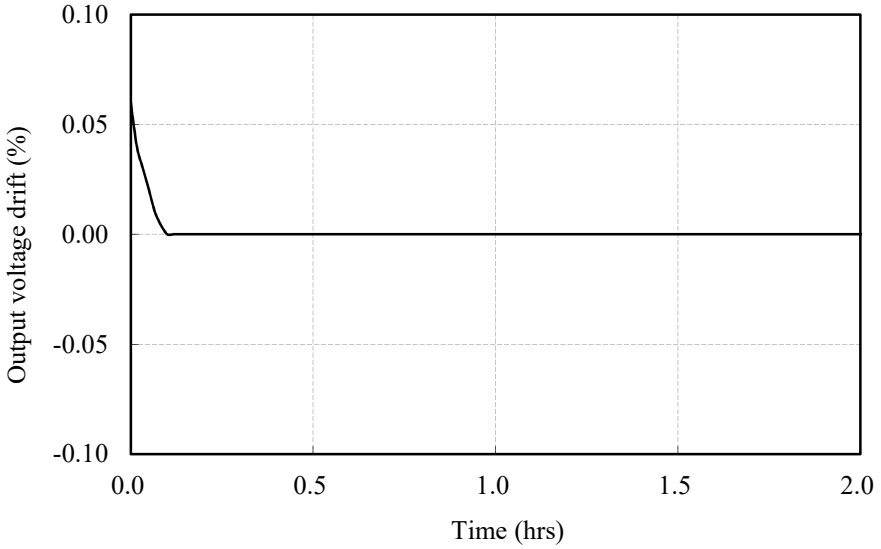
2.2 出力電圧、リップル電圧対入力電圧　Output voltage and Ripple voltage v.s. Input voltage

Conditions Ta : -10 ºC
: 25 ºC
: 40 ºC
Iout (100%)
V1 : 15.0A
V2 : 0.3A
V3 : 0.3A
V4 : 10.0A



2.3 通電ドリフト特性　Warm up voltage drift characteristics

Conditions Ta : 25 ºC
Vin : 100VAC
Iout (100%)
V1 : 8.5A
V2 : 2.5A
V3 : 2.5A
V4 : 5.5A



2.4 (3) 効率、入力電流対出力電流

Efficiency and Input current v.s. Output current

Conditions Ta : 25 ℃

Vin : 85VAC

: 100VAC

: 200VAC

: 265VAC

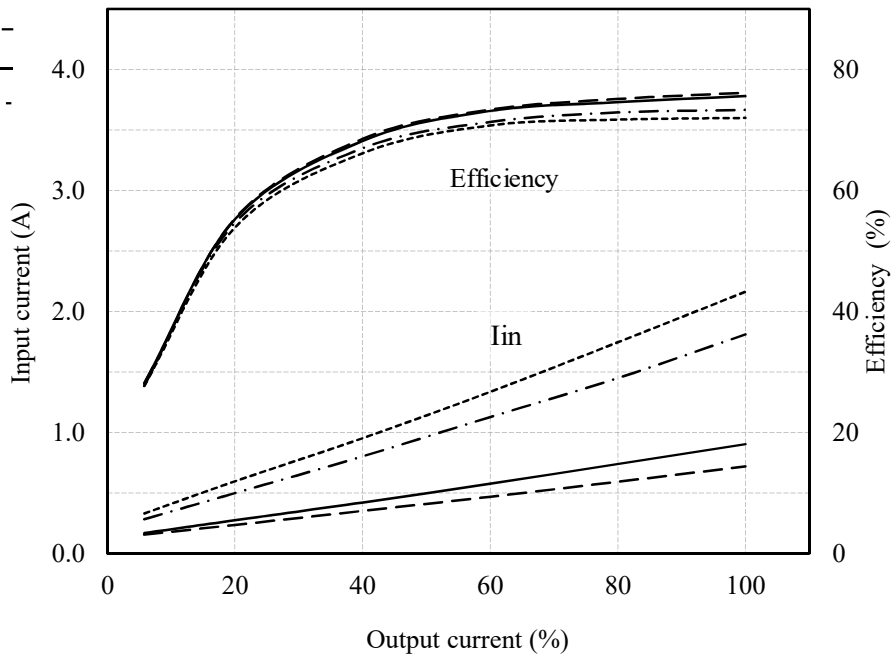
Iout (100%)

V1 : 15.0A

V2 : 0.3A

V3 : 0.3A

V4 : 10.0A



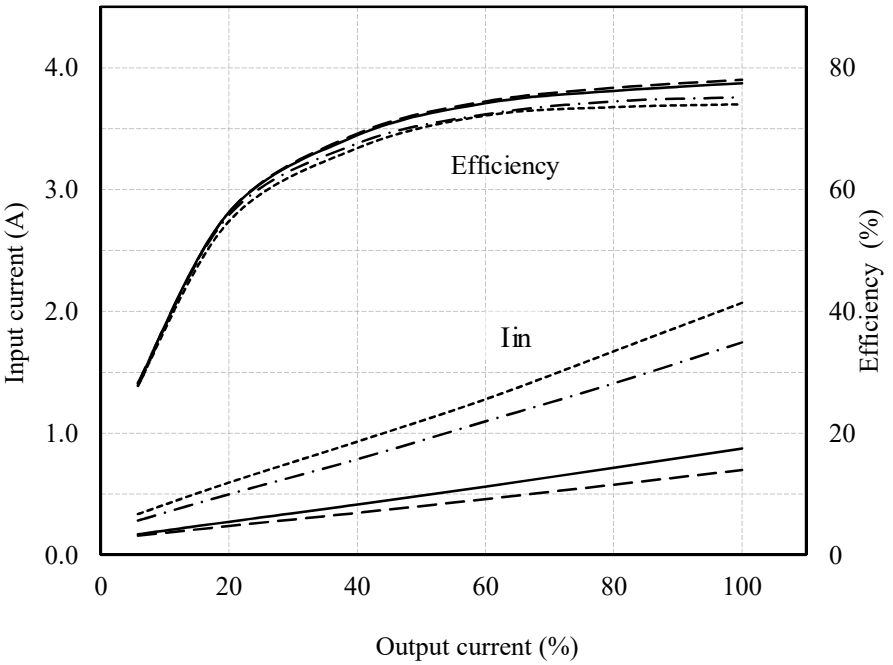
Iout (100%)

V1 : 4.0A

V2 : 4.0A

V3 : 4.0A

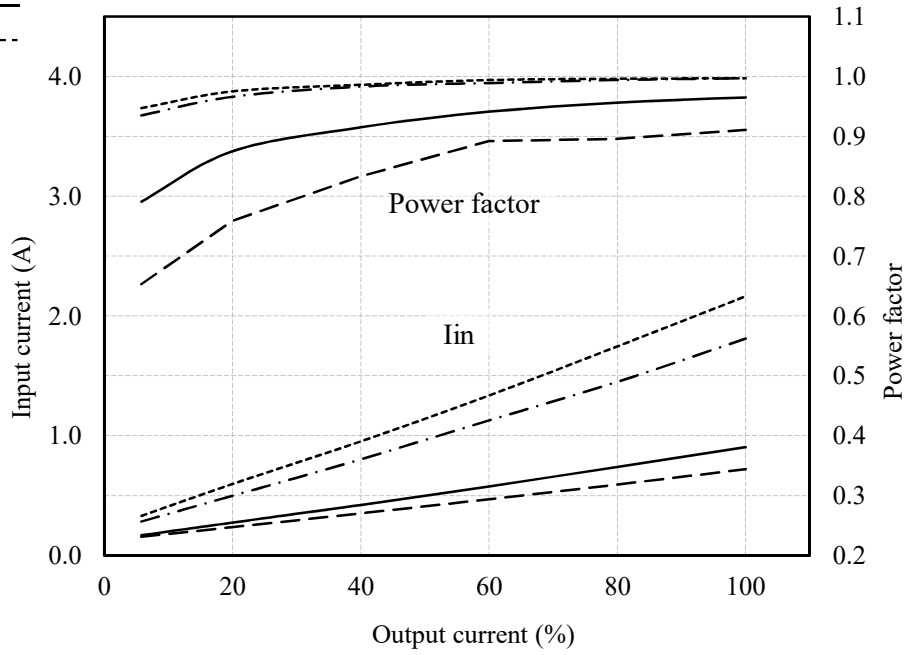
V4 : 2.8A



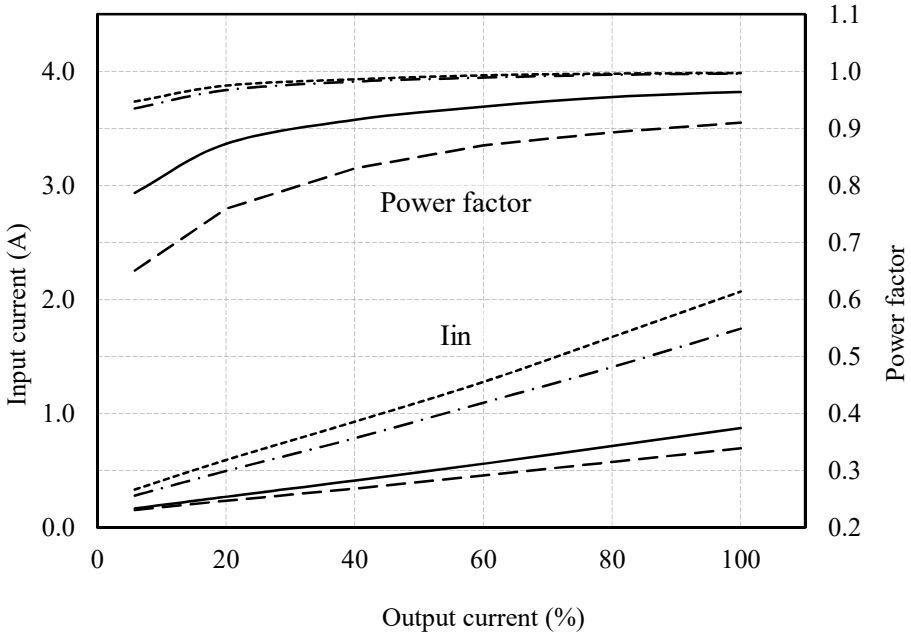
2.5 (4) 力率、入力電流対出力電流　Power factor and Input current v.s. Output current

Conditions　Ta　:　25 ℃
Vin　:　85VAC
:　100VAC
:　200VAC
:　265VAC

Iout (100%)
V1　:　15.0A
V2　:　0.3A
V3　:　0.3A
V4　:　10.0A

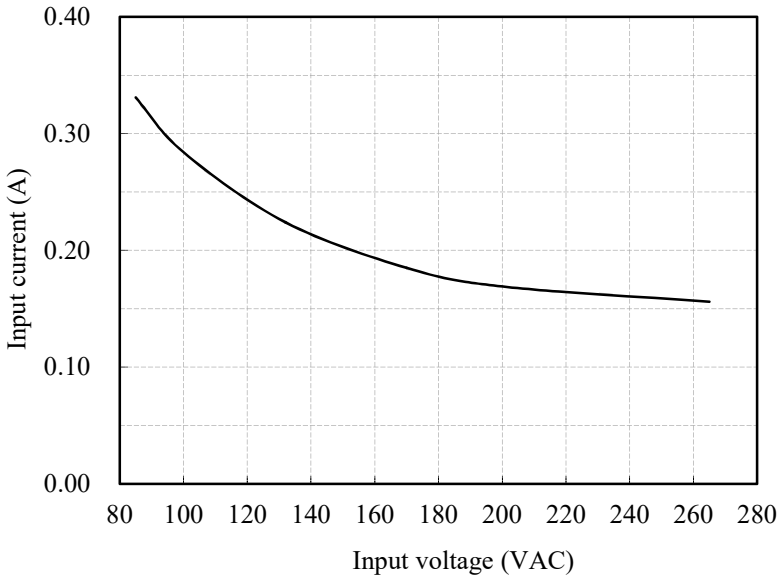


Iout (100%)
V1　:　4.0A
V2　:　4.0A
V3　:　4.0A
V4　:　2.8A

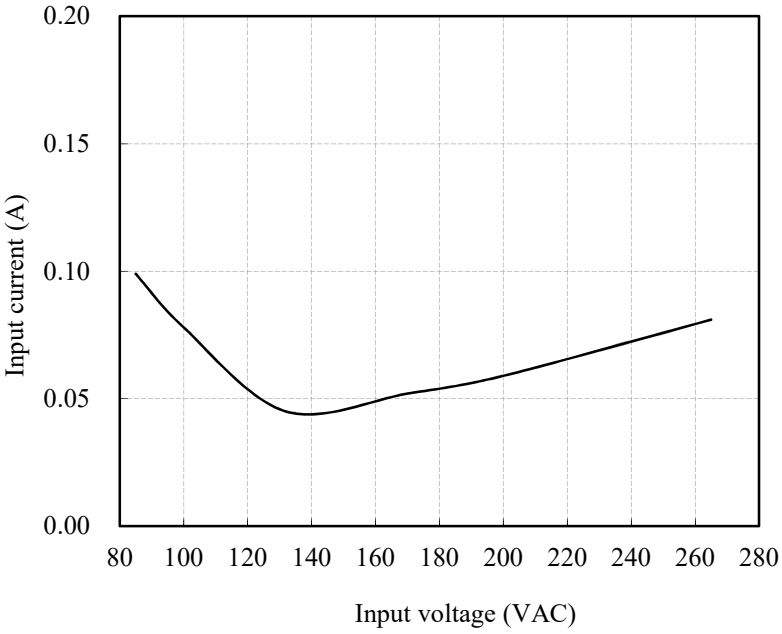


2.6 スタンバイ電流　Stand-by current

Conditions　Ta ： 25 ºC
Iout (MIN)
V1 ： 1.5A
V2 ： 0A
V3 ： 0A
V4 ： 0A



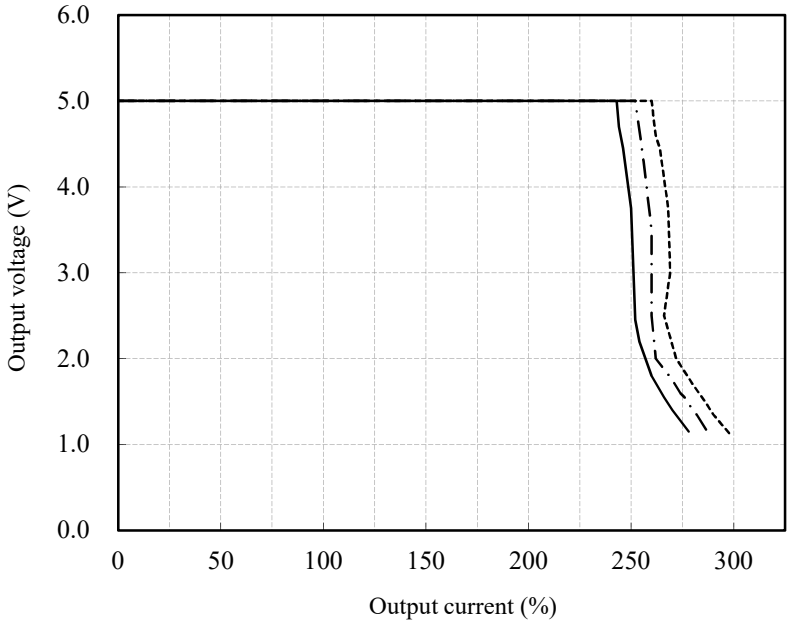
Conditions　Ta ： 25 ºC
Remote ON/OFF CONTROL OFF condition



V1 : 5V

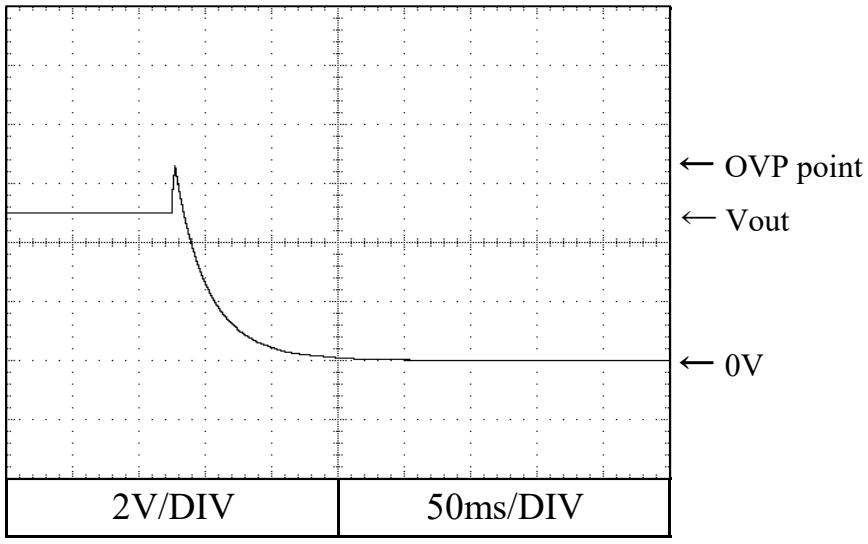
2.7 過電流保護特性　Over current protection (OCP) characteristics

Conditions　Ta : -10 ºC
: 25 ºC
: 40 ºC
Vin : 85-265VAC
Iout (100%)
V1 : - A
V2 : 1.5A
V3 : 1.5A
V4 : 3.8A



2.8 過電圧保護特性　Over voltage protection (OVP) characteristics

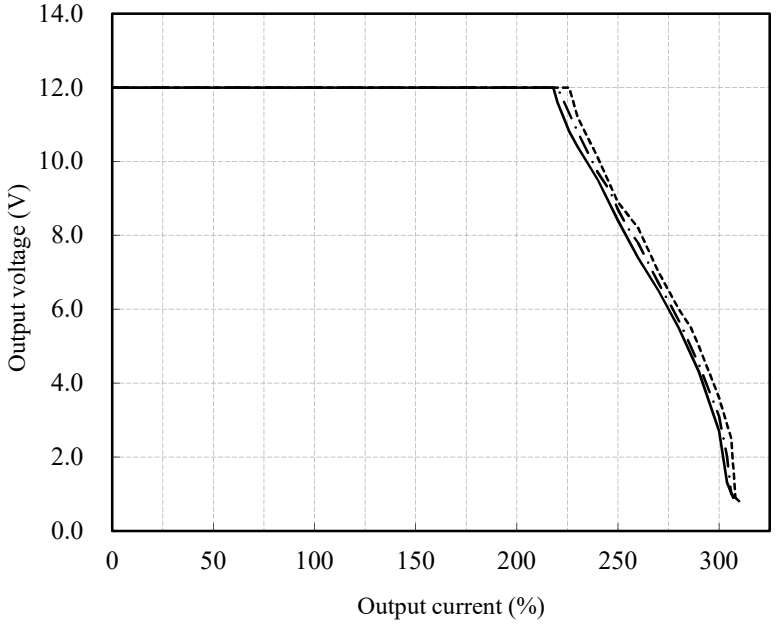
Conditions　Ta : 25 ºC
Vin : 100VAC
Iout (MIN)
V1 : 1.5A
V2 : 0A
V3 : 0A
V4 : 0A



V2 : +12V

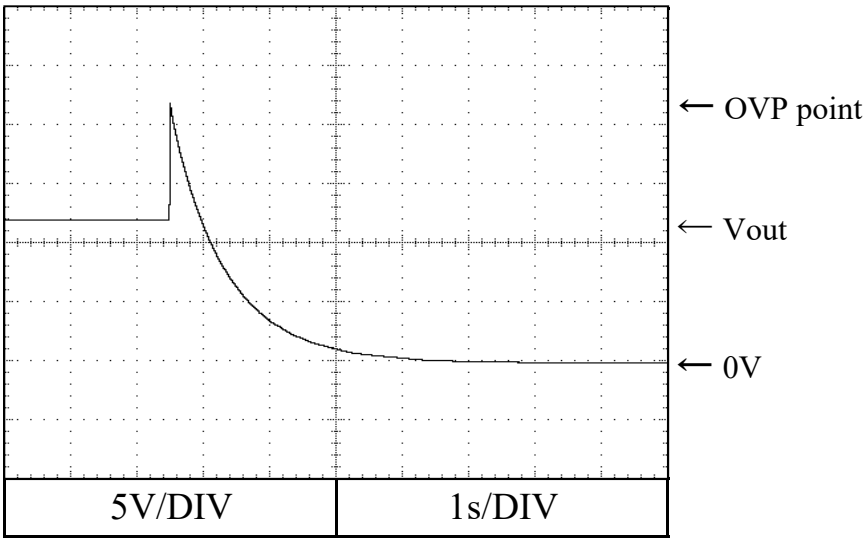
2.7 過電流保護特性　Over current protection (OCP) characteristics

Conditions　Ta : -10 ºC
: 25 ºC
: 40 ºC
Vin : 85-265VAC
Iout (100%)
V1 : 7.0A
V2 : -A
V3 : 2.0A
V4 : 4.6A



2.8 過電圧保護特性　Over voltage protection (OVP) characteristics

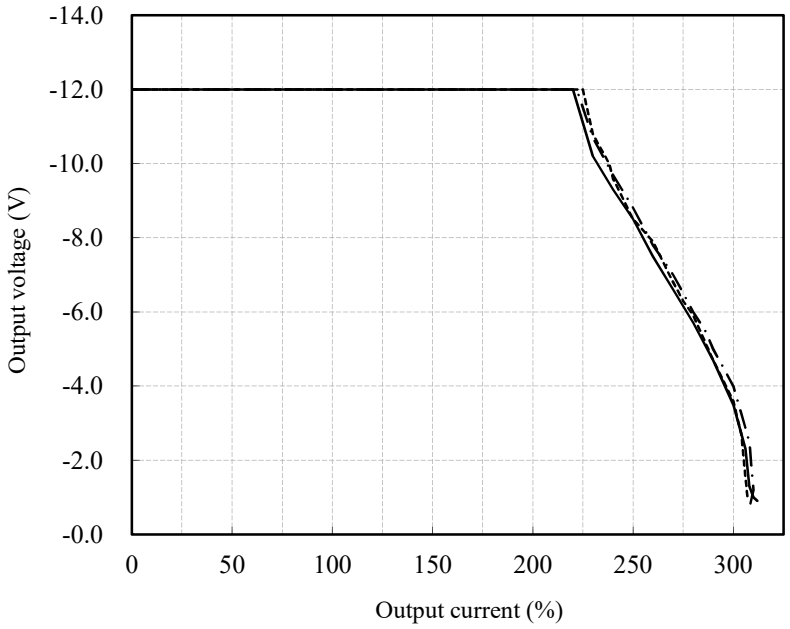
Conditions　Ta : 25 ºC
Vin : 100VAC
Iout (MIN)
V1 : 1.5A
V2 : 0A
V3 : 0A
V4 : 0A



V3 : -12V

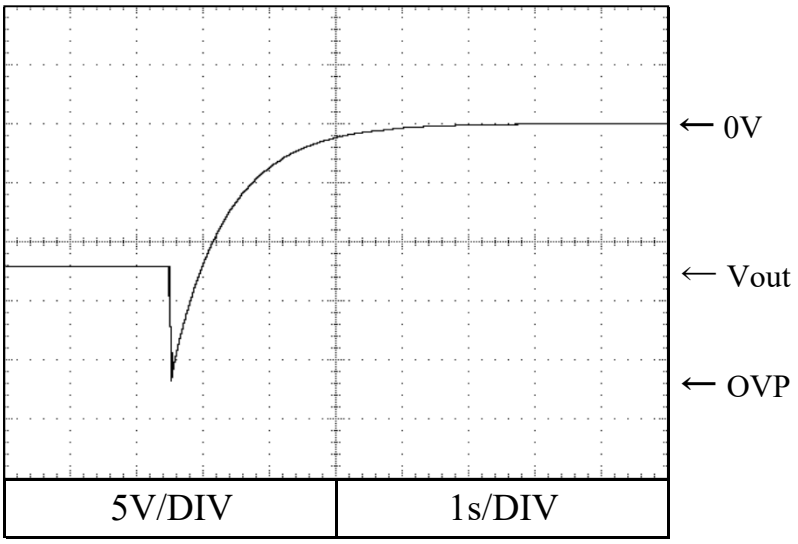
2.7 過電流保護特性　Over current protection (OCP) characteristics

Conditions　Ta : -10 ºC
: 25 ºC
: 40 ºC
Vin : 85-265VAC
Iout (100%)
V1 : 7.0A
V2 : 2.0A
V3 : -A
V4 : 4.6A



2.8 過電圧保護特性　Over voltage protection (OVP) characteristics

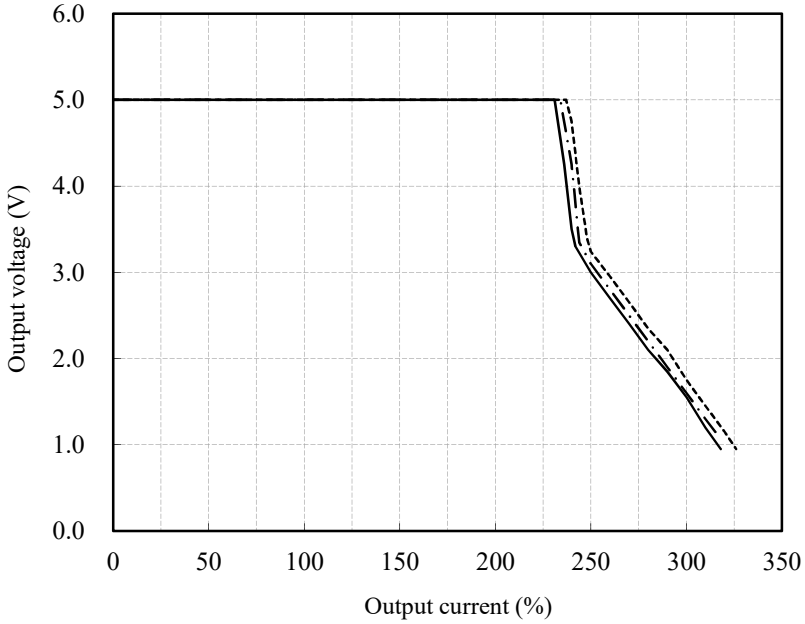
Conditions　Ta : 25 ºC
Vin : 100VAC
Iout (MIN)
V1 : 1.5A
V2 : 0A
V3 : 0A
V4 : 0A



V4 : 5V

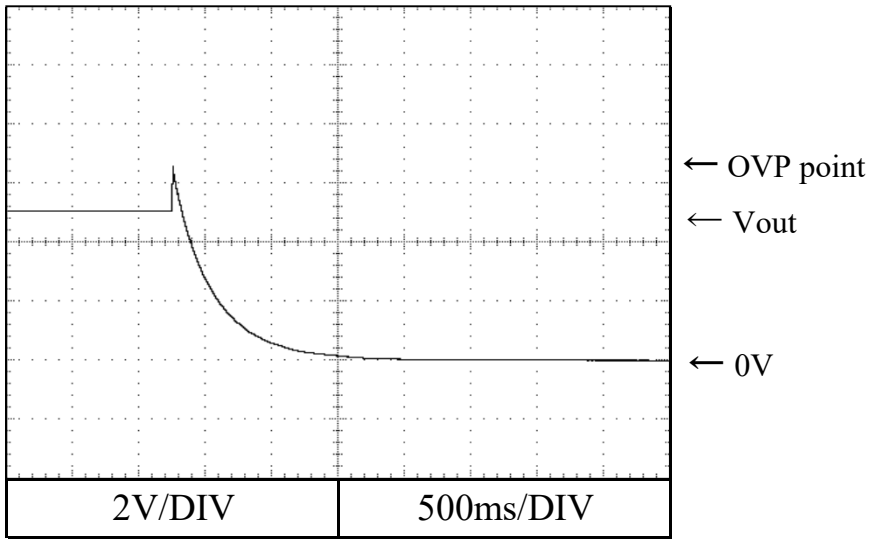
2.7 過電流保護特性　Over current protection (OCP) characteristics

Conditions　Ta : -10 ºC
: 25 ºC
: 40 ºC
Vin : 85-265VAC
Iout (100%)
V1 : 6.4A
V2 : 2.0A
V3 : 2.0A
V4 : -A



2.8 過電圧保護特性　Over voltage protection (OVP) characteristics

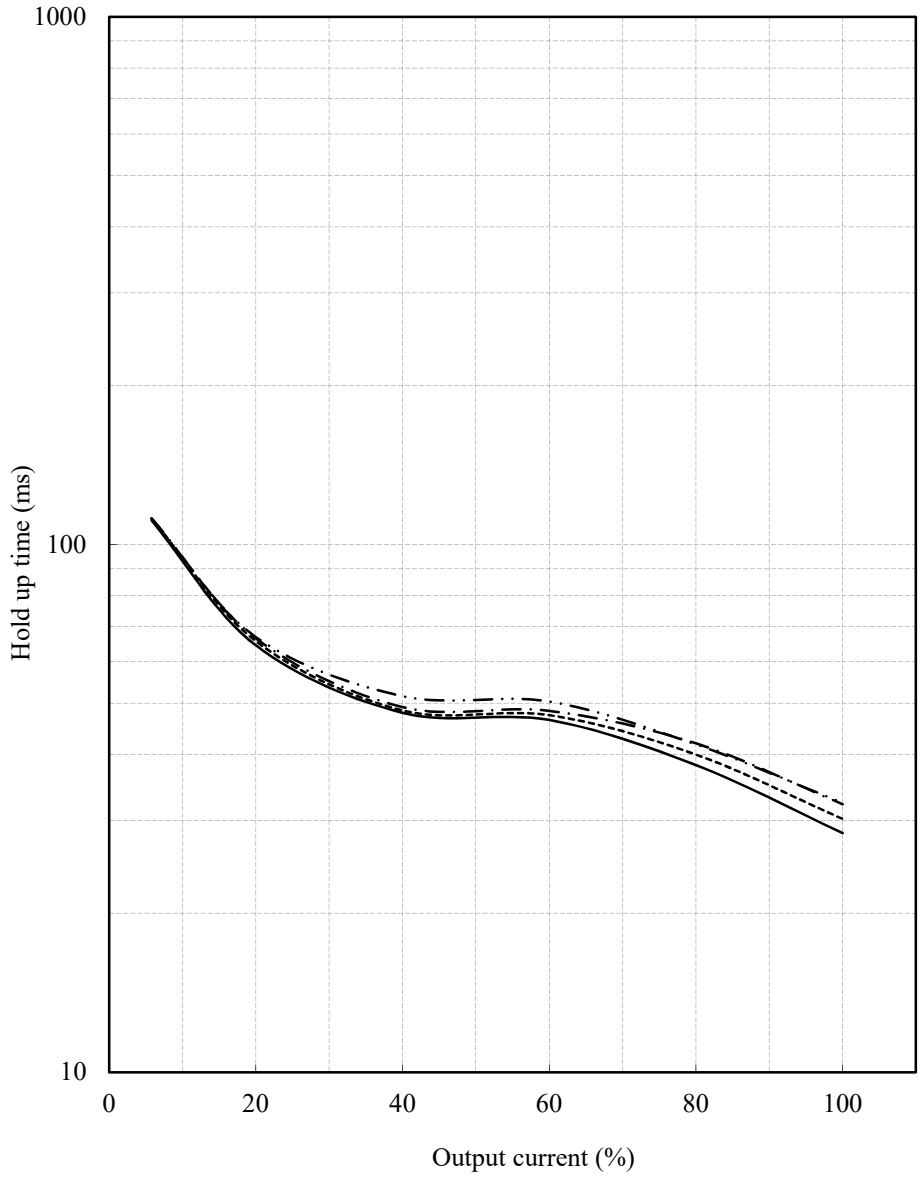
Conditions　Ta : 25 ºC
Vin : 100VAC
Iout (MIN)
V1 : 1.5A
V2 : 0A
V3 : 0A
V4 : 0A



V1 : 5V

2. 9 出力保持時間特性　　Hold up time characteristics

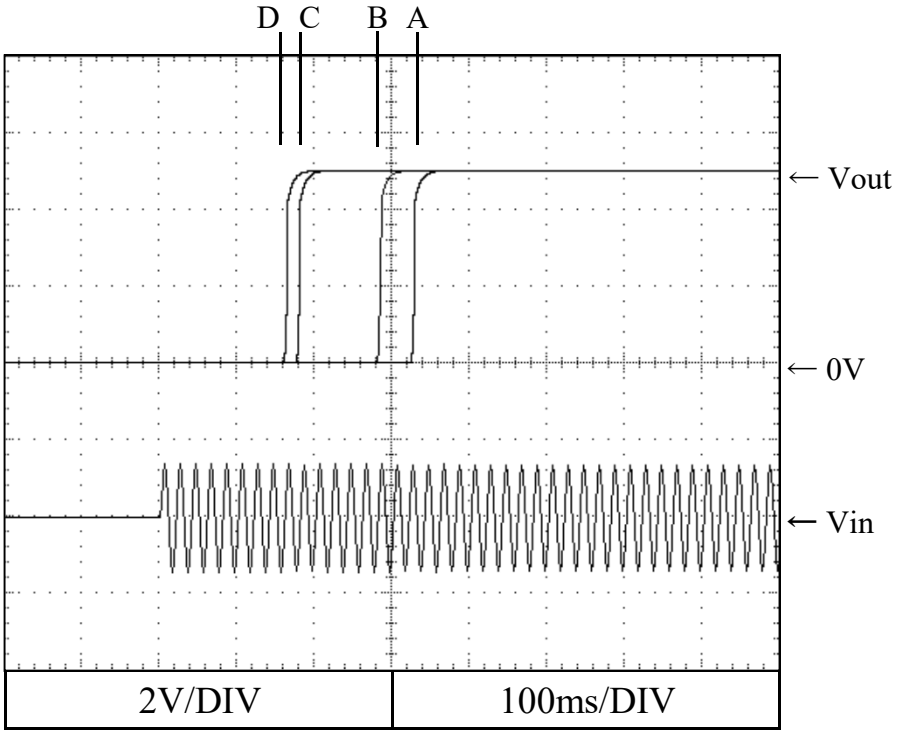
Conditions Ta : 25℃
Vin : 85VAC ———
: 100VAC - - - - - - -
: 200VAC —·—·—·-
: 265VAC —··—··—
Iout (100%)
V1 : 15.0A
V2 : 1.5A
V3 : 1.5A
V4 : 3.8A



V1 : 5V

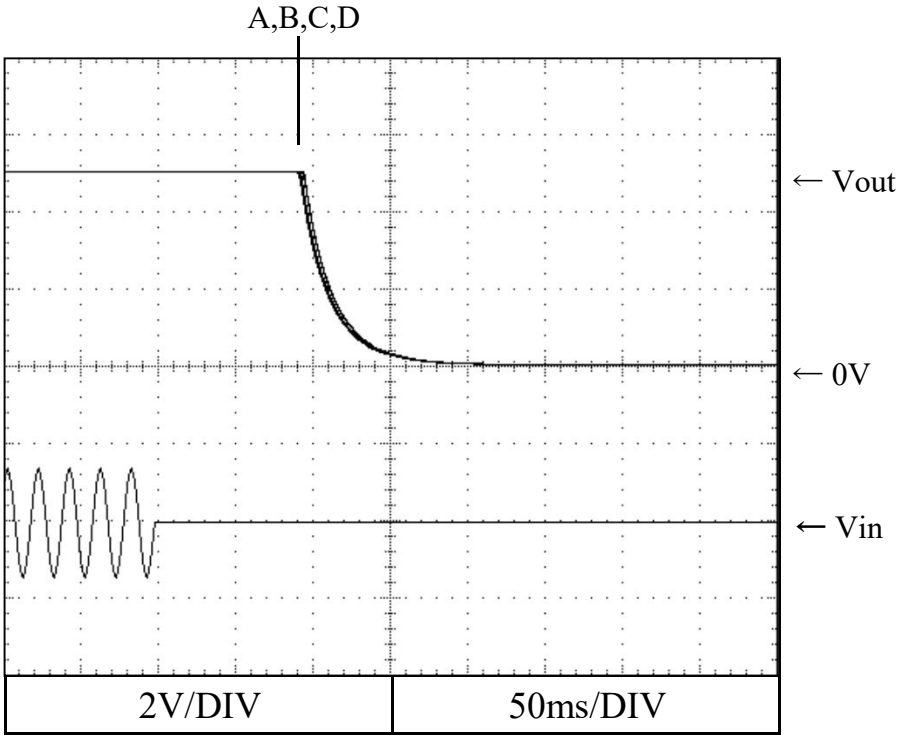
2.10 出力立ち上がり特性 Output rise characteristics

Conditions Ta : 25 ºC
A : 85VAC
B : 100VAC
C : 200VAC
D : 265VAC
Iout (MIN)
V1 : 1.5A
V2 : 0A
V3 : 0A
V4 : 0A



2.11 出力立ち下がり特性 Output fall characteristics

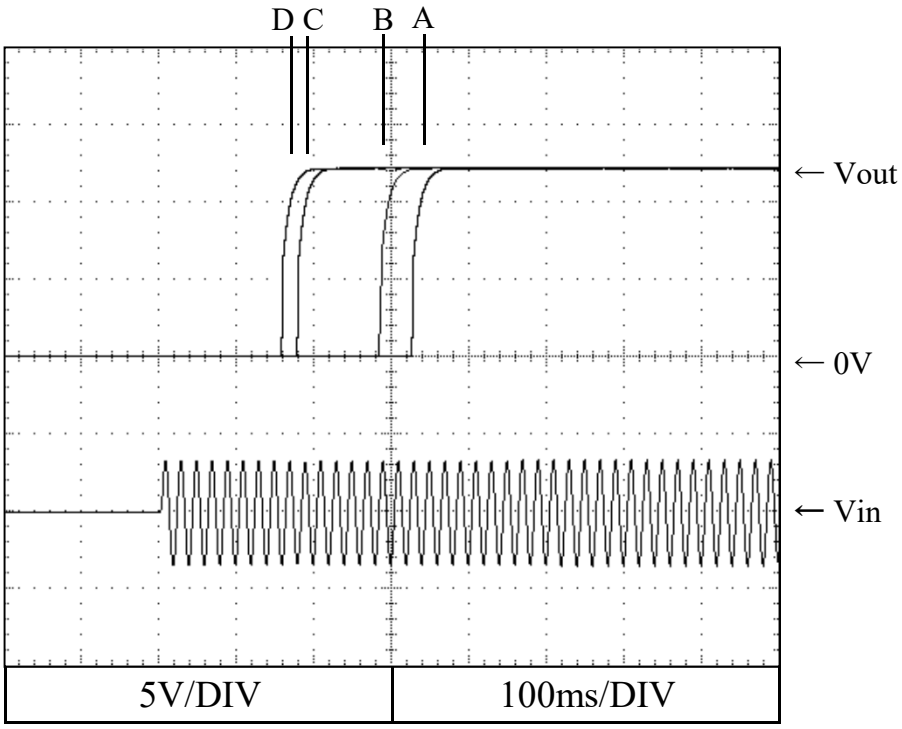
Conditions Ta : 25 ºC
A : 85VAC
B : 100VAC
C : 200VAC
D : 265VAC
Iout (MIN)
V1 : 1.5A
V2 : 0A
V3 : 0A
V4 : 0A



V2 : +12V

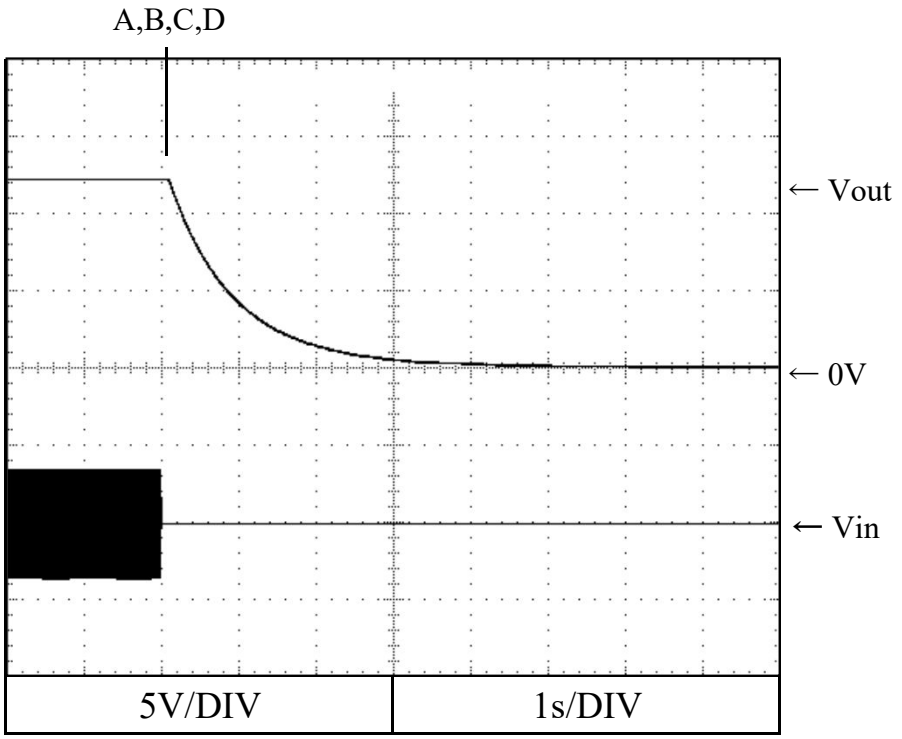
2.10 出力立ち上がり特性　Output rise characteristics

Conditions　Ta　:　25 ºC
A　:　85VAC
B　:　100VAC
C　:　200VAC
D　:　265VAC
Iout (MIN)
V1　:　1.5A
V2　:　0A
V3　:　0A
V4　:　0A



2.11 出力立ち下がり特性　Output fall characteristics

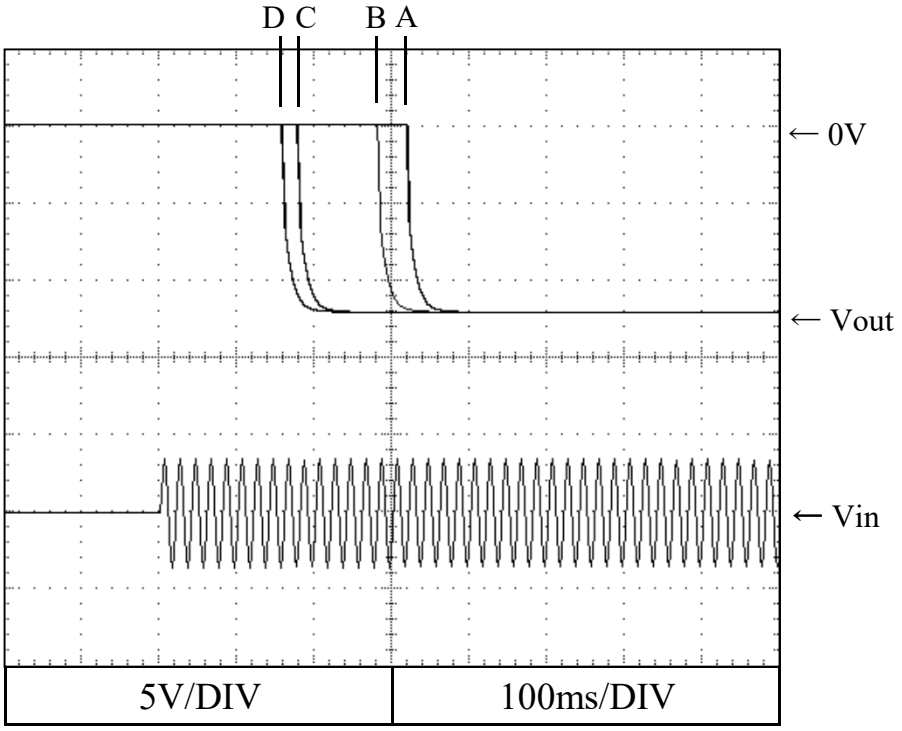
Conditions　Ta　:　25 ºC
A　:　85VAC
B　:　100VAC
C　:　200VAC
D　:　265VAC
Iout (MIN)
V1　:　1.5A
V2　:　0A
V3　:　0A
V4　:　0A



V3 : -12V

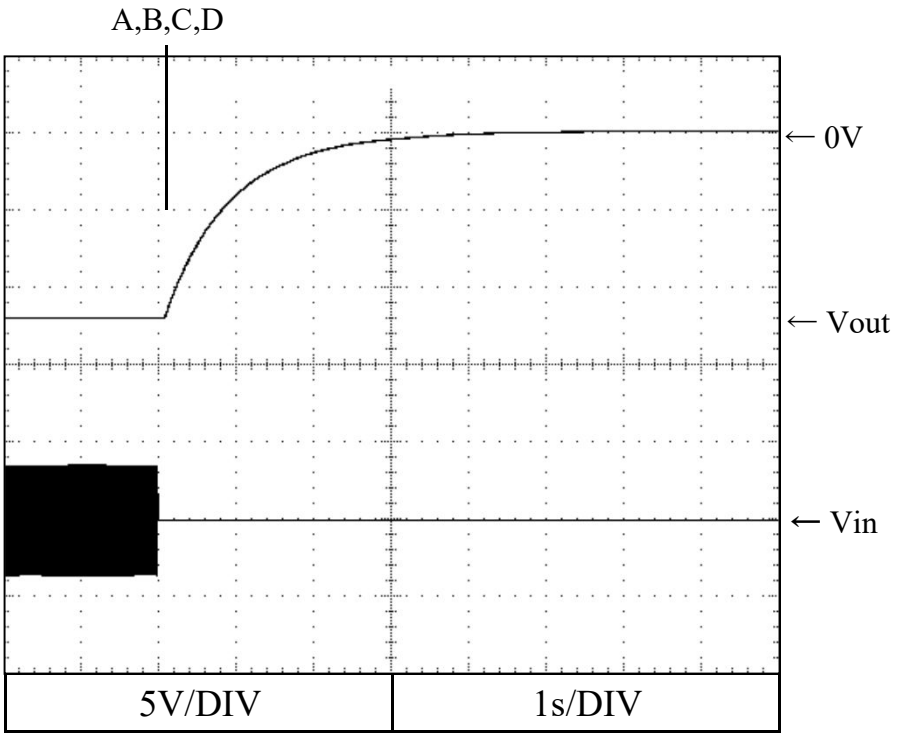
2.10 出力立ち上がり特性 Output rise characteristics

Conditions Ta : 25 ºC
A : 85VAC
B : 100VAC
C : 200VAC
D : 265VAC
Iout (MIN)
V1 : 1.5A
V2 : 0A
V3 : 0A
V4 : 0A



2.11 出力立ち下がり特性 Output fall characteristics

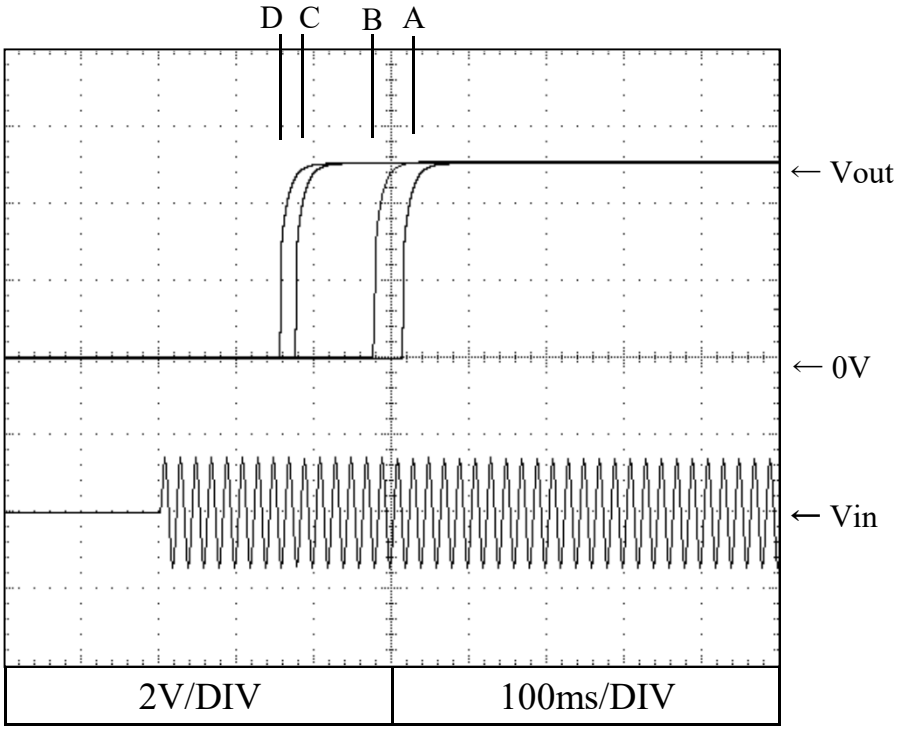
Conditions Ta : 25 ºC
A : 85VAC
B : 100VAC
C : 200VAC
D : 265VAC
Iout (MIN)
V1 : 1.5A
V2 : 0A
V3 : 0A
V4 : 0A



V4 : 5V

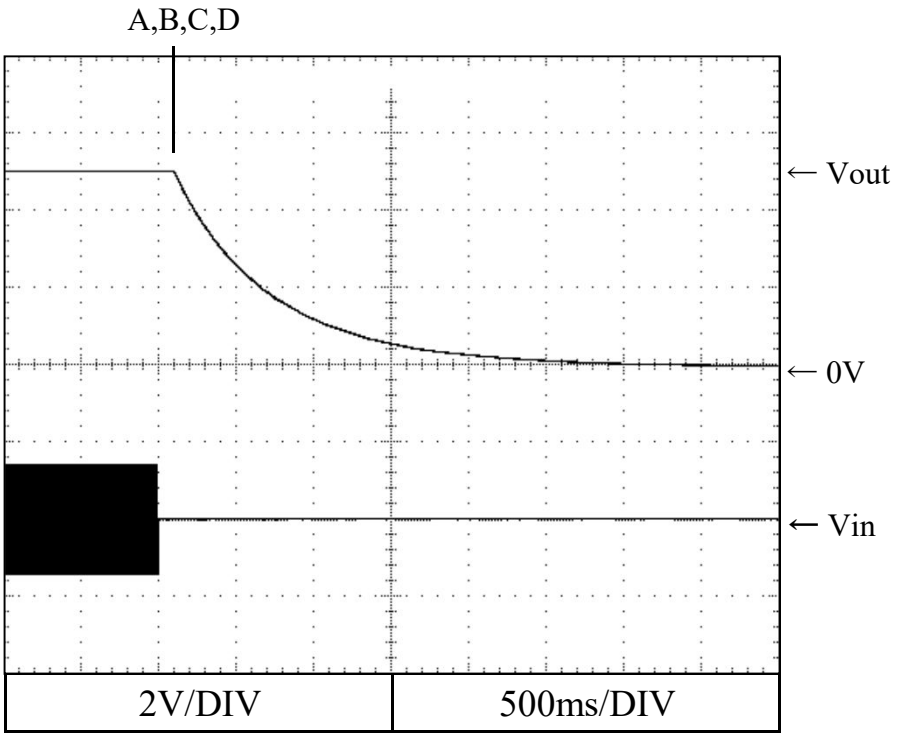
2.10 出力立ち上がり特性 Output rise characteristics

Conditions Ta : 25 ºC
A : 85VAC
B : 100VAC
C : 200VAC
D : 265VAC
Iout (MIN)
V1 : 1.5A
V2 : 0A
V3 : 0A
V4 : 0A



2.11 出力立ち下がり特性 Output fall characteristics

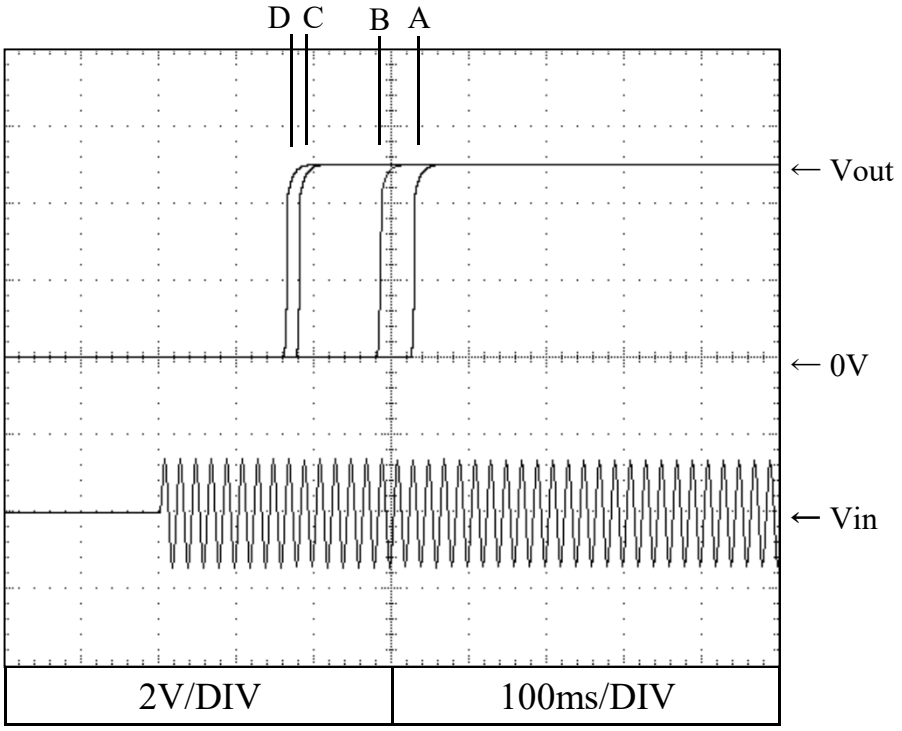
Conditions Ta : 25 ºC
A : 85VAC
B : 100VAC
C : 200VAC
D : 265VAC
Iout (MIN)
V1 : 1.5A
V2 : 0A
V3 : 0A
V4 : 0A



V1 : 5V

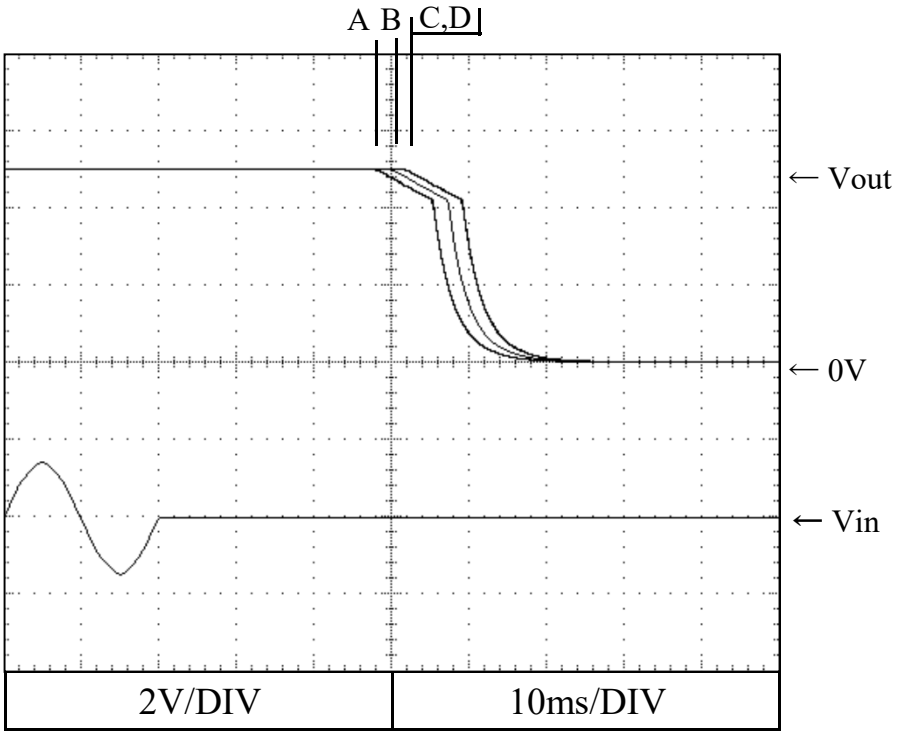
2.10 出力立ち上がり特性　Output rise characteristics

Conditions　Ta　:　25 ºC
A　:　85VAC
B　:　100VAC
C　:　200VAC
D　:　265VAC
Iout (100%)
V1　:　15.0A
V2　:　1.5A
V3　:　1.5A
V4　:　3.8A



2.11 出力立ち下がり特性　Output fall characteristics

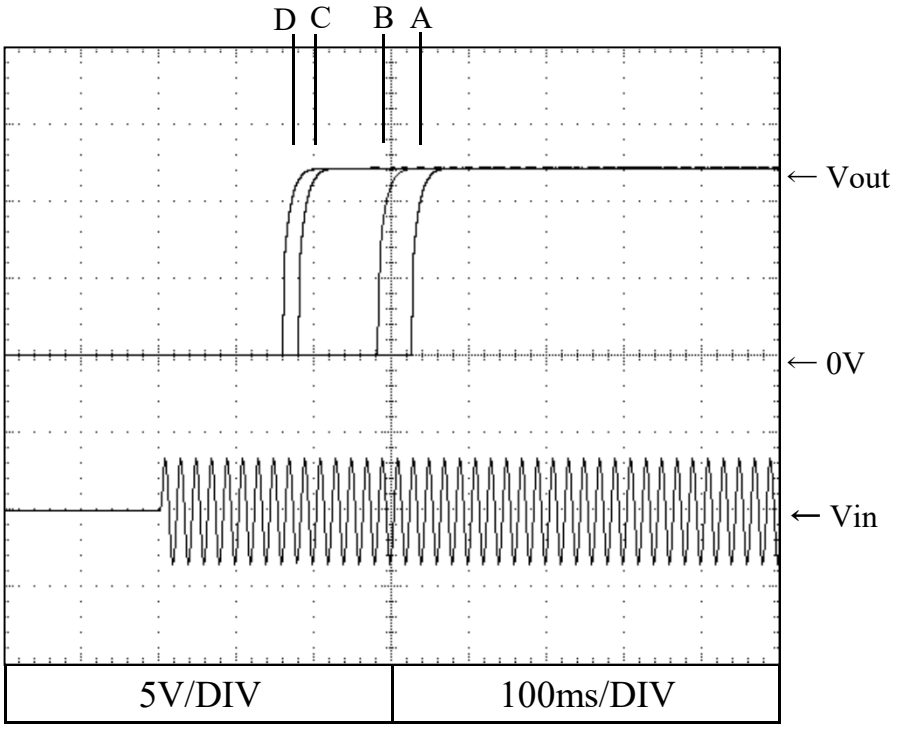
Conditions　Ta　:　25 ºC
A　:　85VAC
B　:　100VAC
C　:　200VAC
D　:　265VAC
Iout (100%)
V1　:　15.0A
V2　:　1.5A
V3　:　1.5A
V4　:　3.8A



V2 : +12V

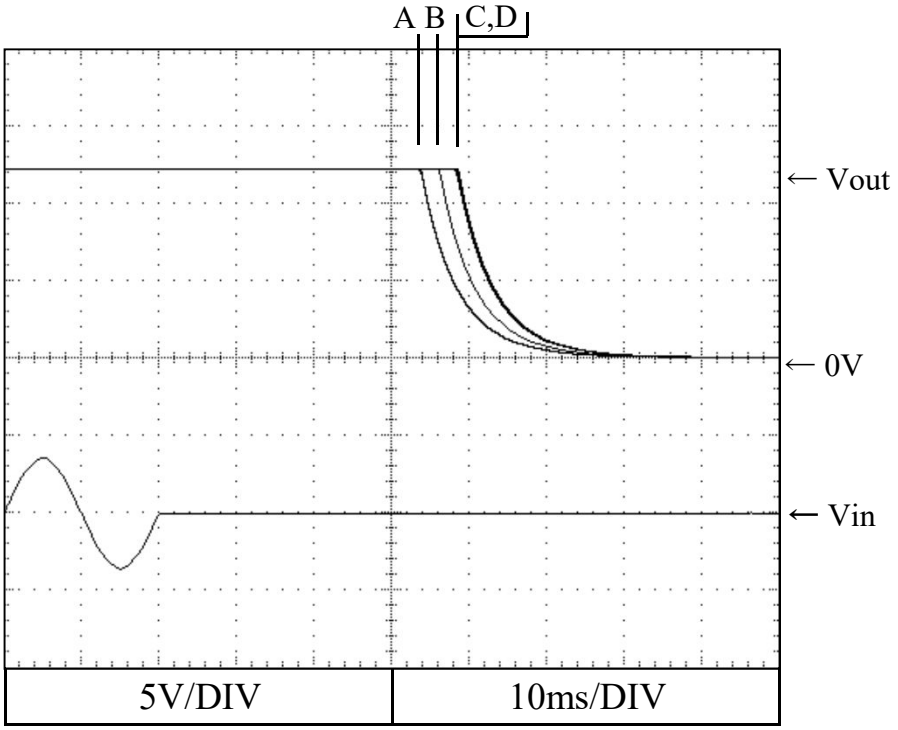
2.10 出力立ち上がり特性　Output rise characteristics

Conditions　Ta　:　25 ºC
A　:　85VAC
B　:　100VAC
C　:　200VAC
D　:　265VAC
Iout (100%)
V1　:　7.0A
V2　:　4.0A
V3　:　2.0A
V4　:　4.6A



2.11 出力立ち下がり特性　Output fall characteristics

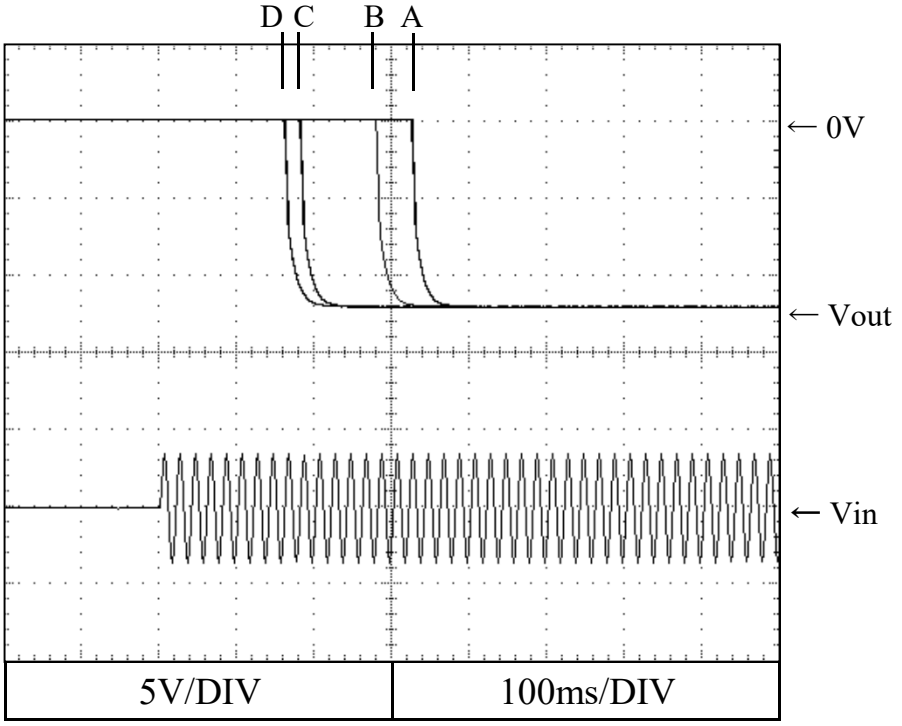
Conditions　Ta　:　25 ºC
A　:　85VAC
B　:　100VAC
C　:　200VAC
D　:　265VAC
Iout (100%)
V1　:　7.0A
V2　:　4.0A
V3　:　2.0A
V4　:　4.6A



V3 : -12V

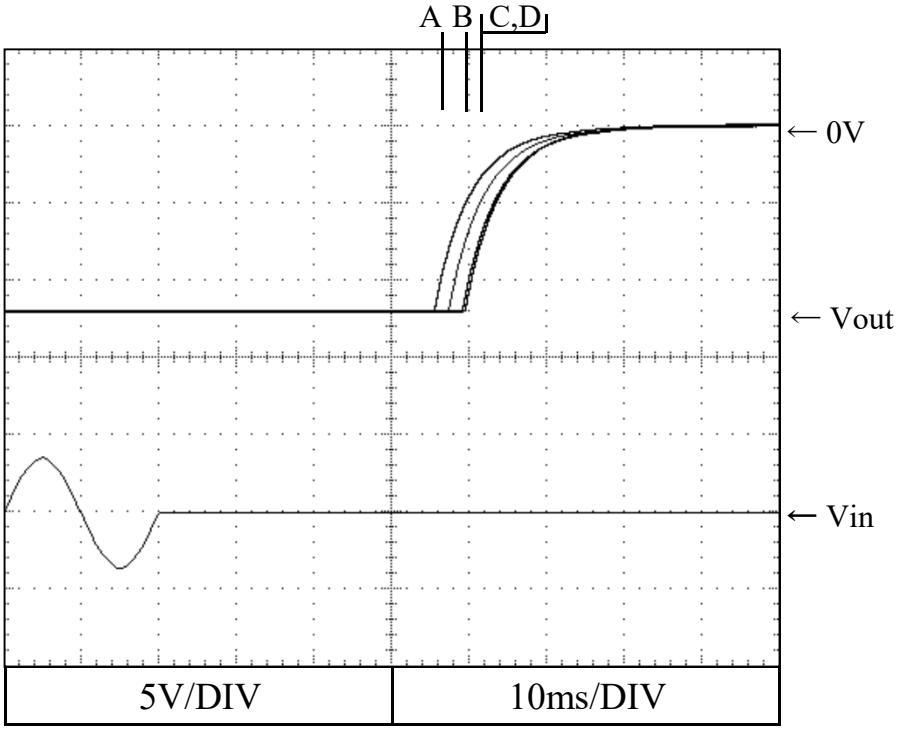
2.10 出力立ち上がり特性　Output rise characteristics

Conditions　Ta　:　25 ºC
A　:　85VAC
B　:　100VAC
C　:　200VAC
D　:　265VAC
Iout (100%)
V1　:　7.0A
V2　:　2.0A
V3　:　4.0A
V4　:　4.6A



2.11 出力立ち下がり特性　Output fall characteristics

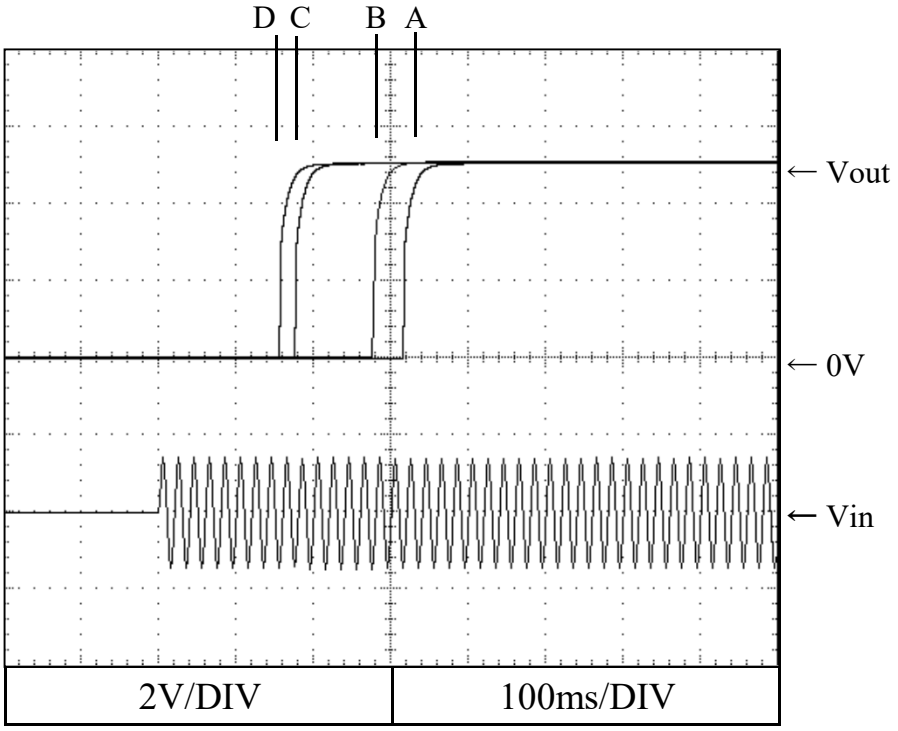
Conditions　Ta　:　25 ºC
A　:　85VAC
B　:　100VAC
C　:　200VAC
D　:　265VAC
Iout (100%)
V1　:　7.0A
V2　:　2.0A
V3　:　4.0A
V4　:　4.6A



V4 : 5V

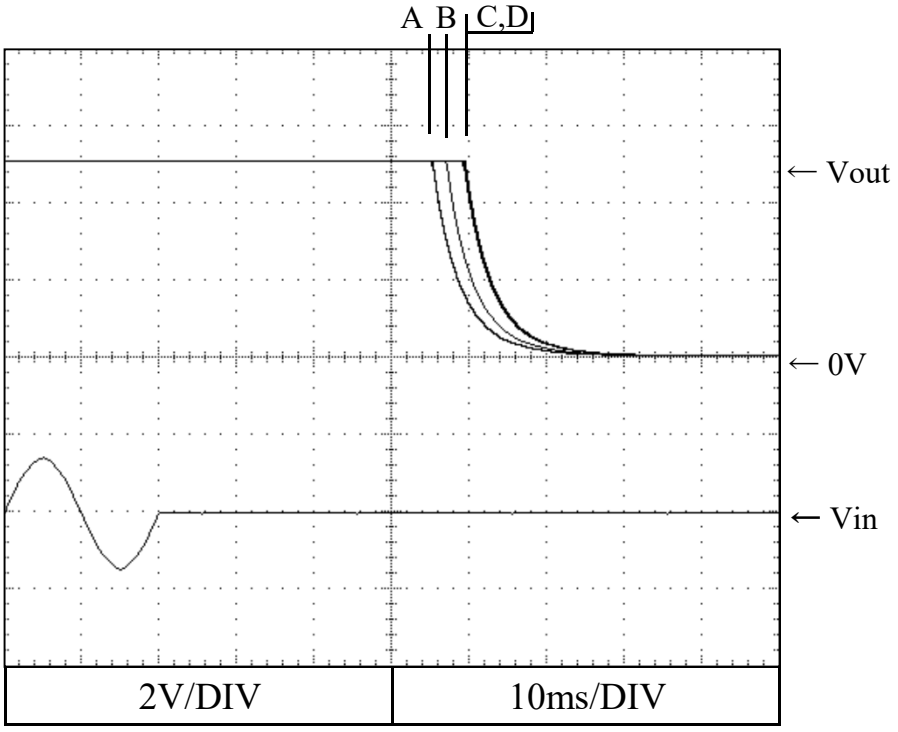
2.10 出力立ち上がり特性　Output rise characteristics

Conditions　Ta　:　25 ºC
A　:　85VAC
B　:　100VAC
C　:　200VAC
D　:　265VAC
Iout (100%)
V1　:　6.4A
V2　:　2.0A
V3　:　2.0A
V4　:　10.0A



2.11 出力立ち下がり特性　Output fall characteristics

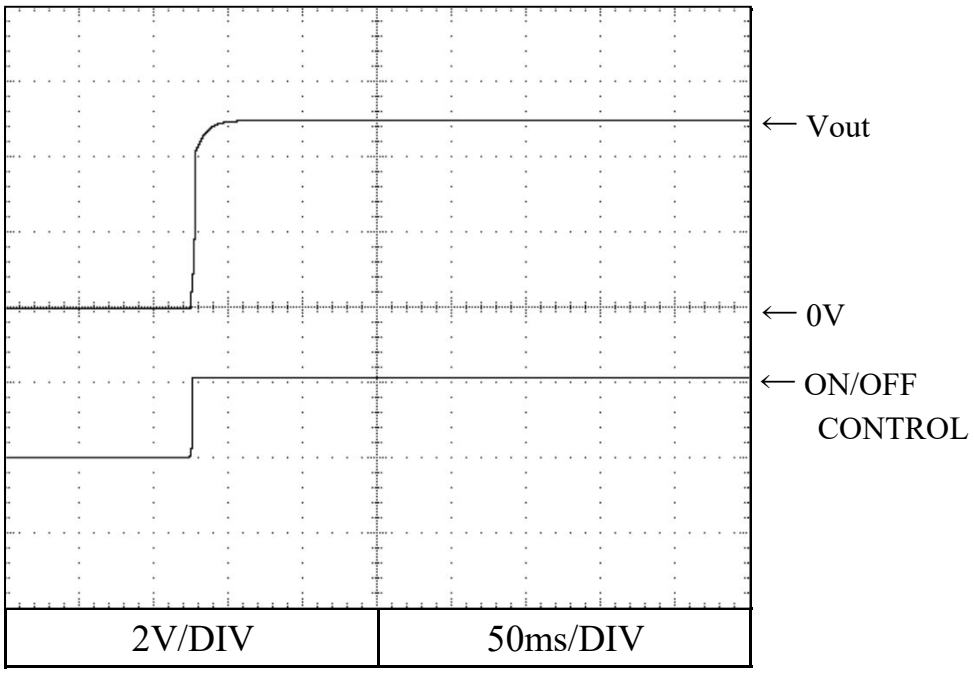
Conditions　Ta　:　25 ºC
A　:　85VAC
B　:　100VAC
C　:　200VAC
D　:　265VAC
Iout (100%)
V1　:　6.4A
V2　:　2.0A
V3　:　2.0A
V4　:　10.0A



V1 : 5V

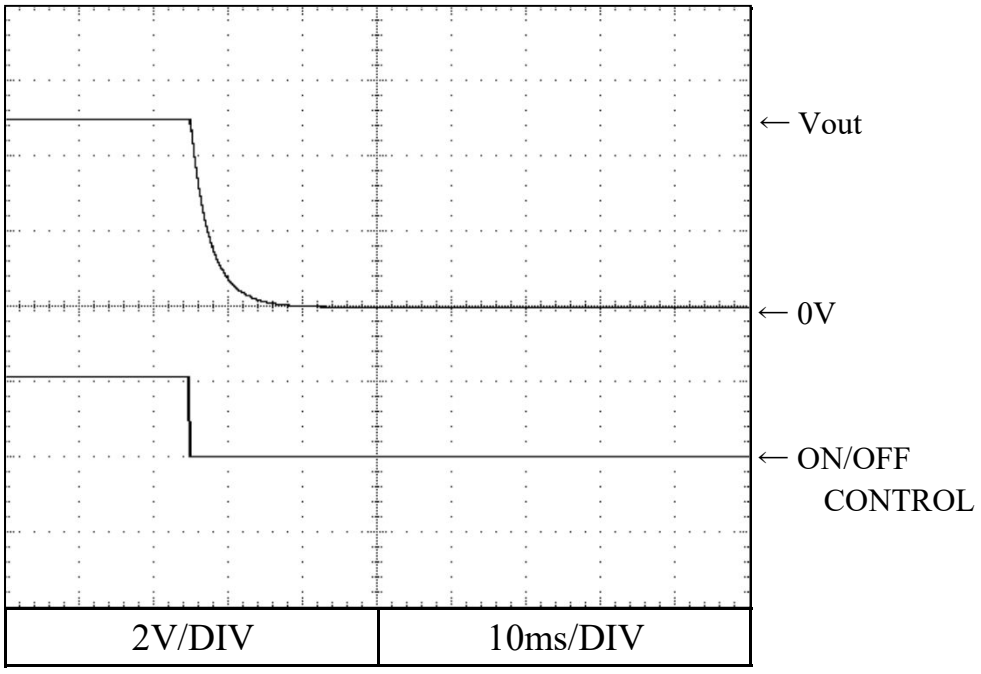
2.12 ON/OFFコントロール時出力立ち上がり特性　Output rise characteristics with ON/OFF CONTROL

Conditions　Ta :　25 ºC
Vin :　100VAC
Iout (100%)
V1 :　15.0A
V2 :　1.5A
V3 :　1.5A
V4 :　3.8A



2.13 ON/OFFコントロール時出力立ち下がり特性　Output fall characteristics with ON/OFF CONTROL

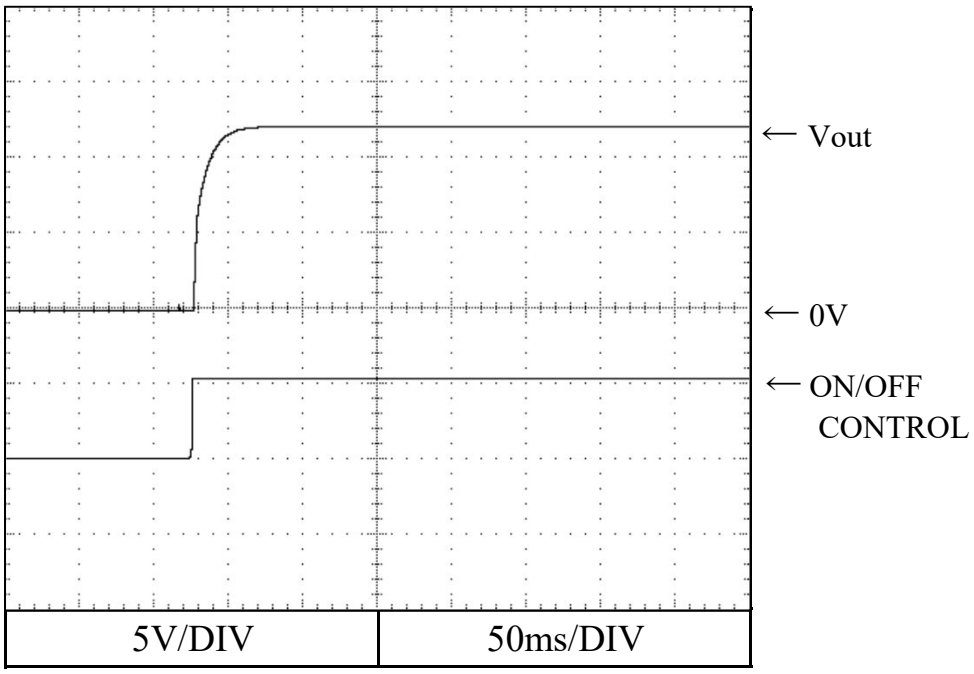
Conditions　Ta :　25 ºC
Vin :　100VAC
Iout (100%)
V1 :　15.0A
V2 :　1.5A
V3 :　1.5A
V4 :　3.8A



V2 : +12V

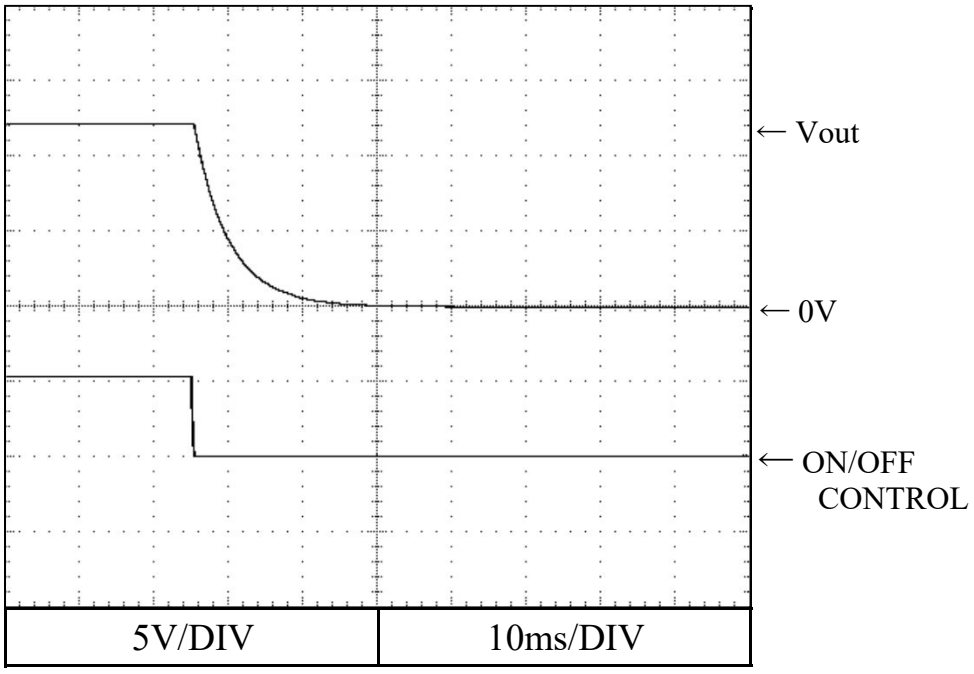
2.12 ON/OFFコントロール時出力立ち上がり特性　Output rise characteristics with ON/OFF CONTROL

Conditions　Ta :　25 ºC
Vin :　100VAC
Iout (100%)
V1 :　7.0A
V2 :　4.0A
V3 :　2.0A
V4 :　4.6A



2.13 ON/OFFコントロール時出力立ち下がり特性　Output fall characteristics with ON/OFF CONTROL

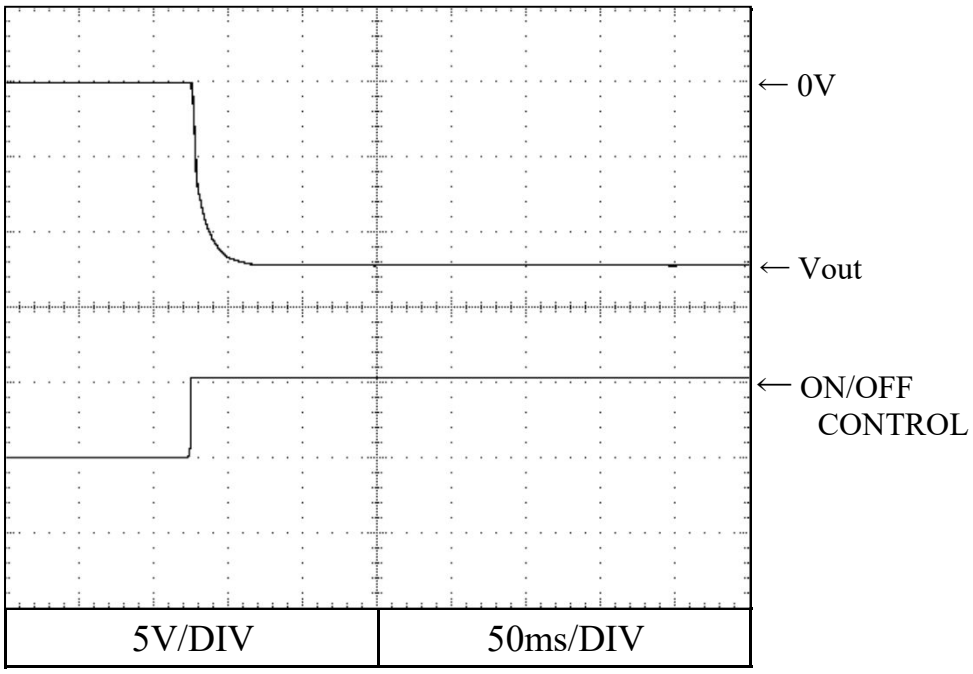
Conditions　Ta :　25 ºC
Vin :　100VAC
Iout (100%)
V1 :　7.0A
V2 :　4.0A
V3 :　2.0A
V4 :　4.6A



V3 : -12V

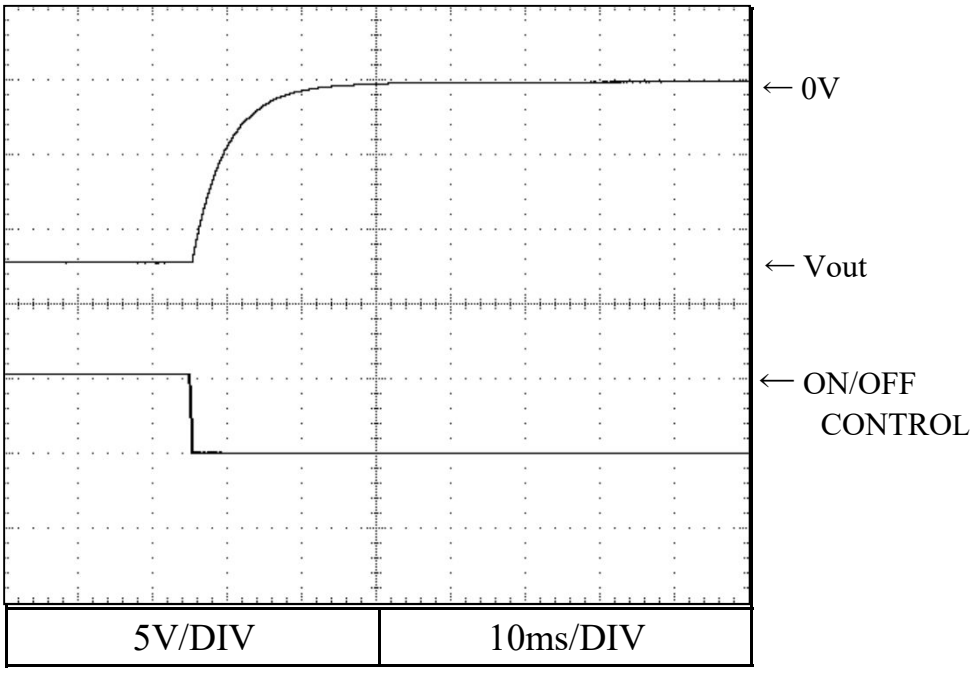
2.12 ON/OFFコントロール時出力立ち上がり特性　Output rise characteristics with ON/OFF CONTROL

Conditions　Ta :　25 ºC
Vin :　100VAC
Iout (100%)
V1 :　7.0A
V2 :　2.0A
V3 :　4.0A
V4 :　4.6A



2.13 ON/OFFコントロール時出力立ち下がり特性　Output fall characteristics with ON/OFF CONTROL

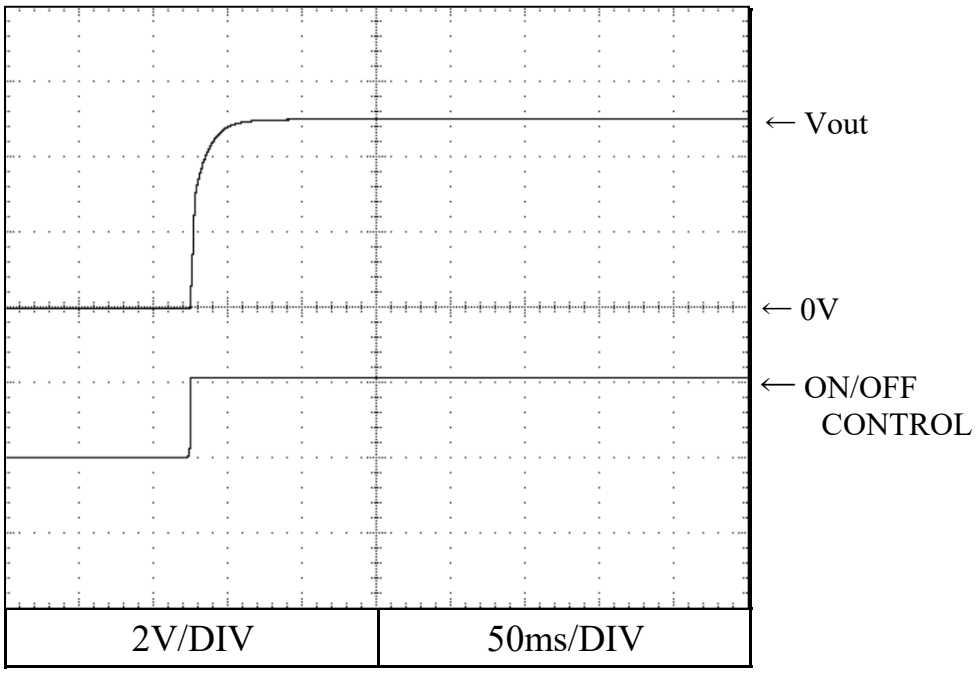
Conditions　Ta :　25 ºC
Vin :　100VAC
Iout (100%)
V1 :　7.0A
V2 :　2.0A
V3 :　4.0A
V4 :　4.6A



V4 : 5V

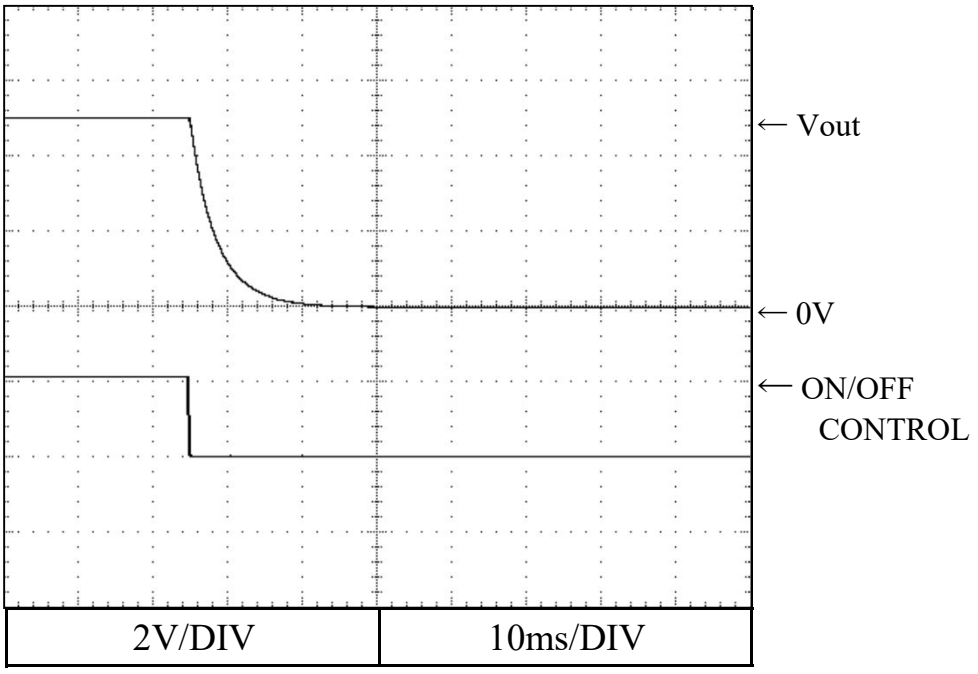
2.12 ON/OFFコントロール時出力立ち上がり特性　Output rise characteristics with ON/OFF CONTROL

Conditions　Ta :　25 ºC
Vin :　100VAC
Iout (100%)
V1 :　6.4A
V2 :　2.0A
V3 :　2.0A
V4 :　10.0A



2.13 ON/OFFコントロール時出力立ち下がり特性　Output fall characteristics with ON/OFF CONTROL

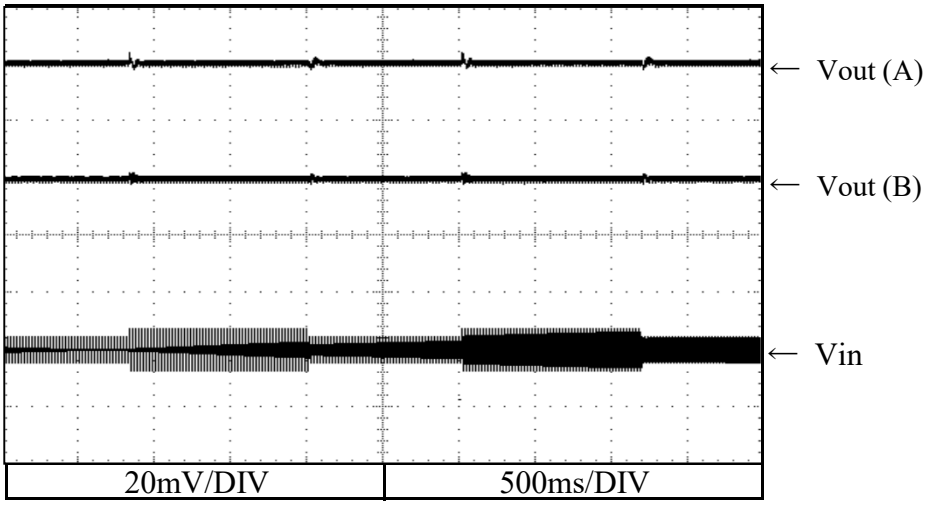
Conditions　Ta :　25 ºC
Vin :　100VAC
Iout (100%)
V1 :　6.4A
V2 :　2.0A
V3 :　2.0A
V4 :　10.0A



V1 : 5V

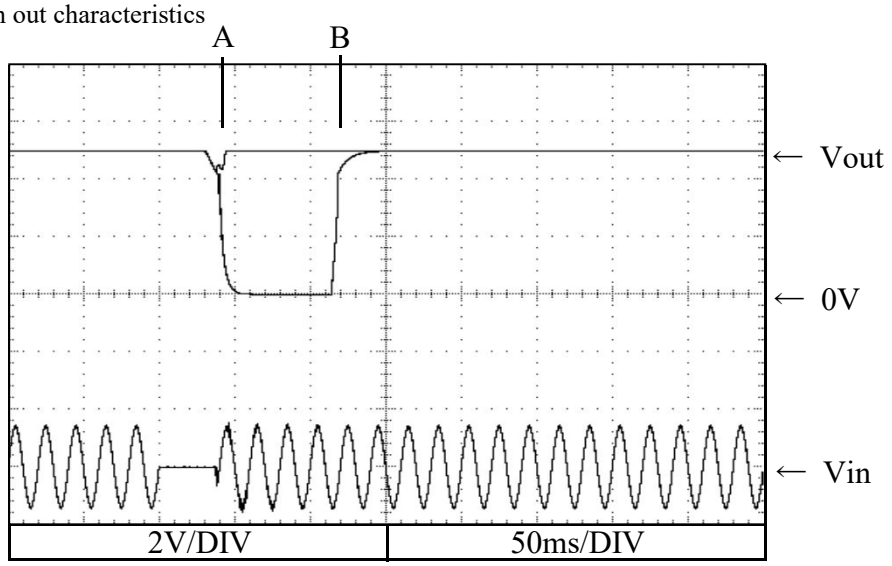
2.14 過渡応答（入力急変）特性　Dynamic line response characteristics

Conditions　Ta : 25 ºC
Vin : 85VAC⇔132VAC(A)
: 170VAC⇔265VAC(B)
Iout (100%)
V1 : 15.0A
V2 : 1.5A
V3 : 1.5A
V4 : 3.8A

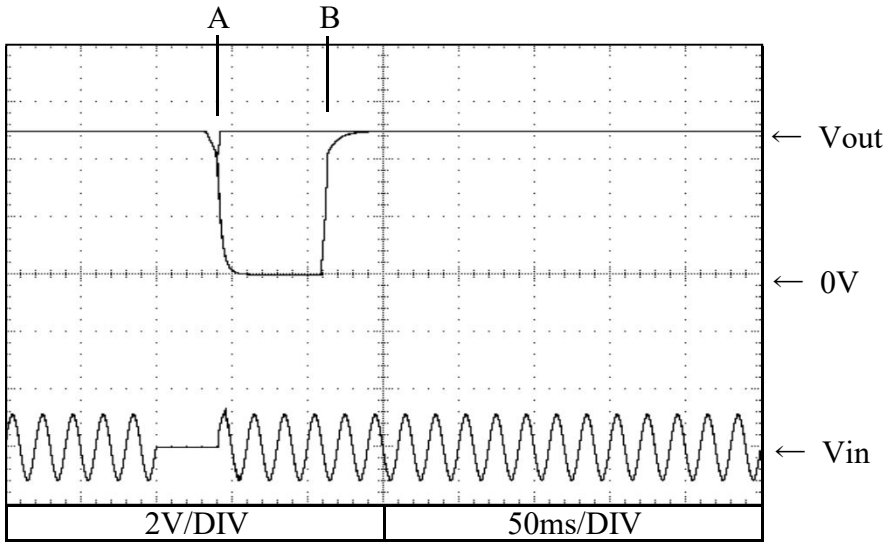


2.15 入力電圧瞬停特性　Response to brown out characteristics

Conditions　Ta : 25 ºC
Vin : 100VAC
Iout (100%)
V1 : 15.0A
V2 : 1.5A
V3 : 1.5A
V4 : 3.8A
Brown out time
A : 37ms
B : 38ms



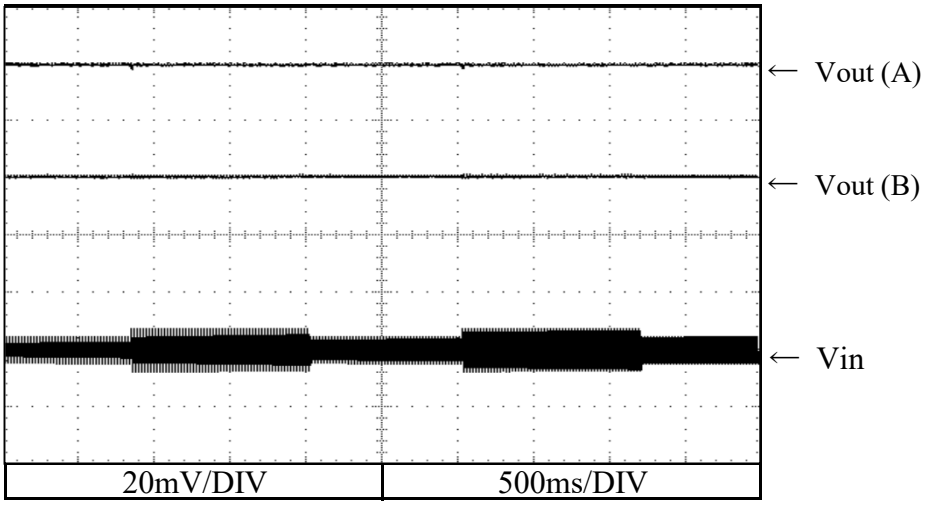
Conditions　Ta : 25 ºC
Vin : 200VAC
Iout (100%)
V1 : 15.0A
V2 : 1.5A
V3 : 1.5A
V4 : 3.8A
Brown out time
A : 40ms
B : 41ms



V2 : +12V

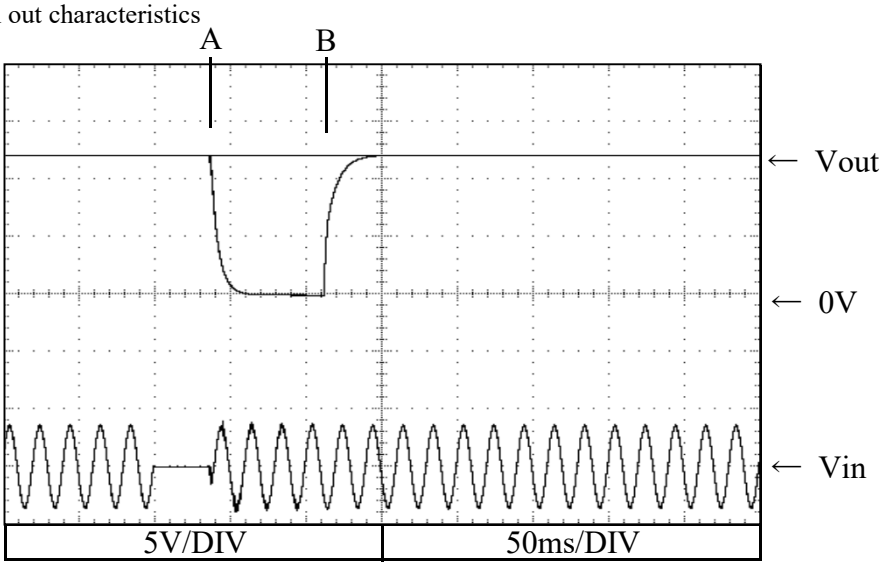
2.14 過渡応答（入力急変）特性　Dynamic line response characteristics

Conditions　Ta ： 25 ℃
Vin ： 85VAC⇔132VAC(A)
： 170VAC⇔265VAC(B)
Iout (100%)
V1 ： 7.0A
V2 ： 4.0A
V3 ： 2.0A
V4 ： 4.6A

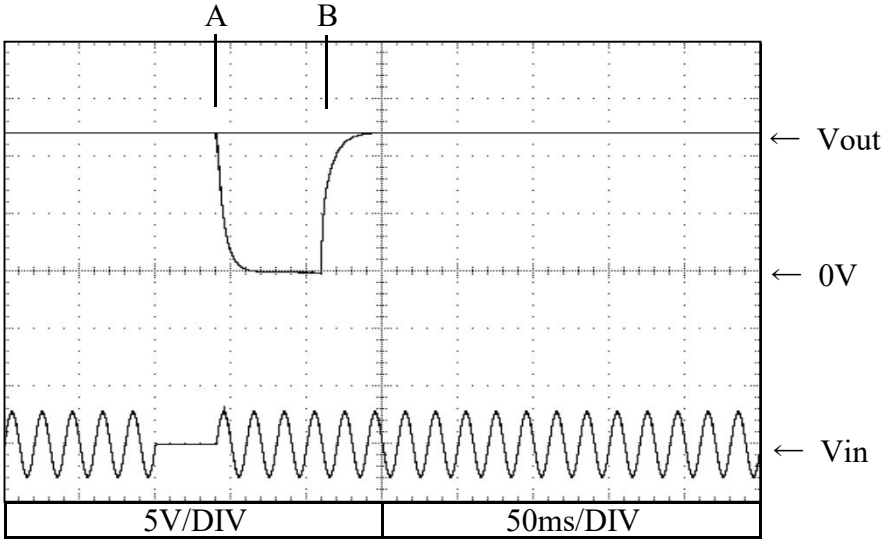


2.15 入力電圧瞬停特性　Response to brown out characteristics

Conditions　Ta ： 25 ℃
Vin ： 100VAC
Iout (100%)
V1 ： 7.0A
V2 ： 4.0A
V3 ： 2.0A
V4 ： 4.6A
Brown out time
A ： 37ms
B ： 38ms



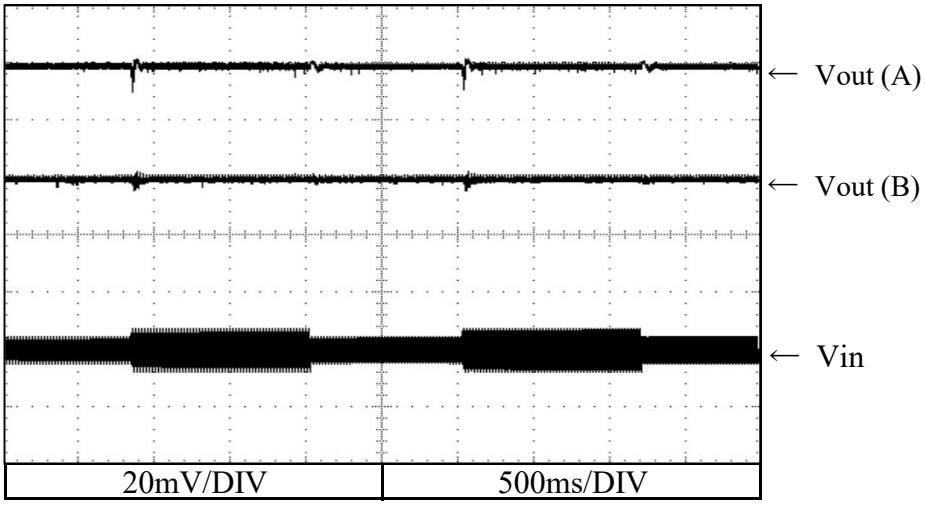
Conditions　Ta ： 25 ℃
Vin ： 200VAC
Iout (100%)
V1 ： 7.0A
V2 ： 4.0A
V3 ： 2.0A
V4 ： 4.6A
Brown out time
A ： 39ms
B ： 40ms



V3 : -12V

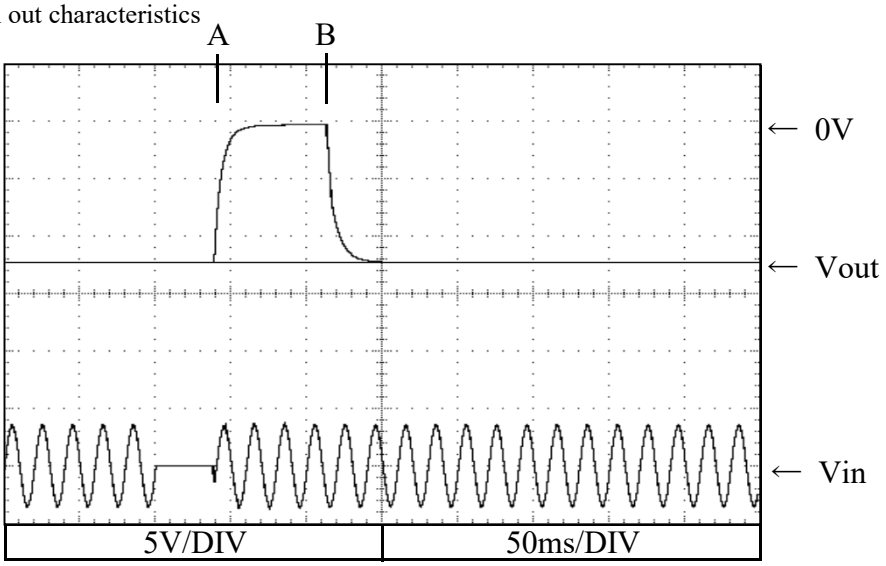
2.14 過渡応答（入力急変）特性　Dynamic line response characteristics

Conditions　Ta ： 25 ℃
Vin ： 85VAC⇔132VAC(A)
： 170VAC⇔265VAC(B)
Iout (100%)
V1 ： 7.0A
V2 ： 2.0A
V3 ： 4.0A
V4 ： 4.6A

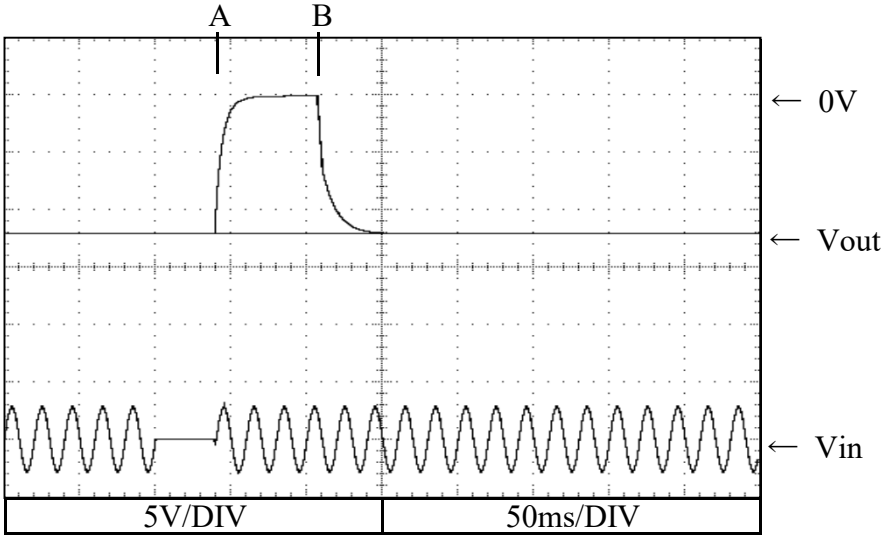


2.15 入力電圧瞬停特性　Response to brown out characteristics

Conditions　Ta ： 25 ℃
Vin ： 100VAC
Iout (100%)
V1 ： 7.0A
V2 ： 2.0A
V3 ： 4.0A
V4 ： 4.6A
Brown out time
A ： 37ms
B ： 38ms



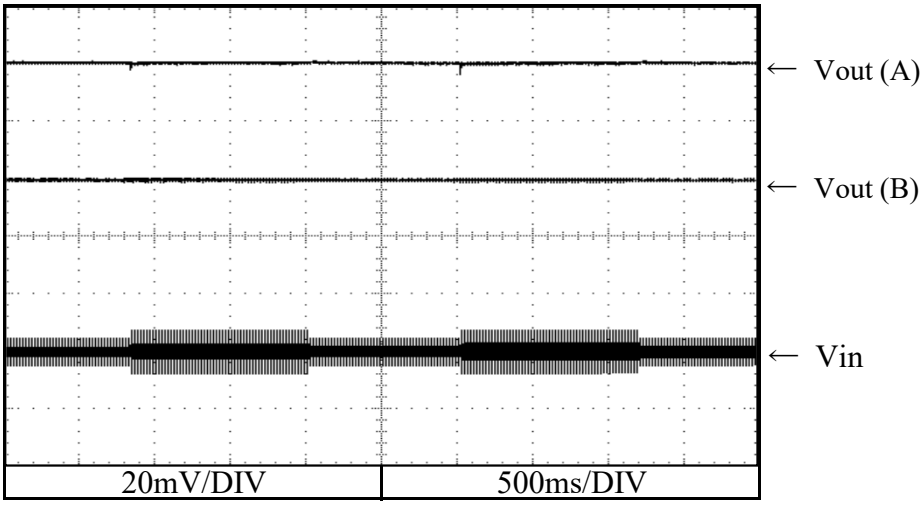
Conditions　Ta ： 25 ℃
Vin ： 200VAC
Iout (100%)
V1 ： 7.0A
V2 ： 2.0A
V3 ： 4.0A
V4 ： 4.6A
Brown out time
A ： 38ms
B ： 39ms



V4 : 5V

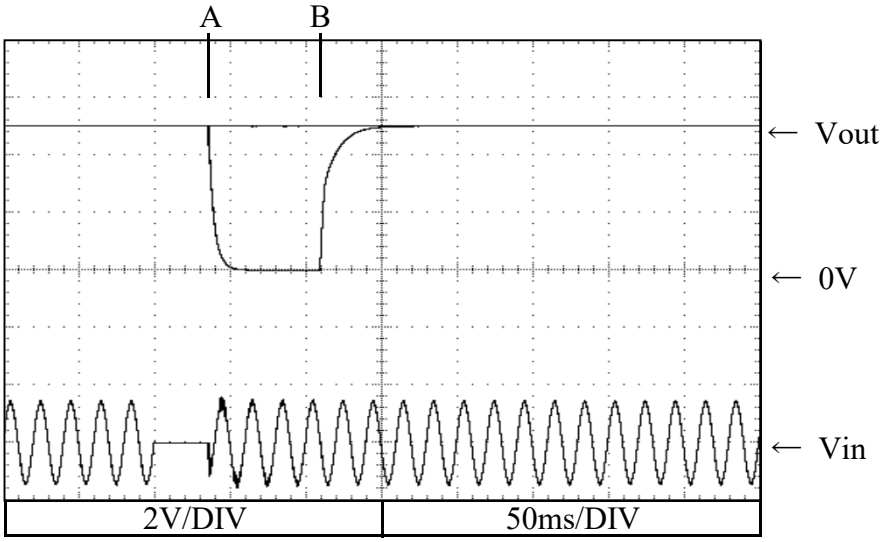
2.14 過渡応答（入力急変）特性　Dynamic line response characteristics

Conditions　Ta ： 25 ºC
Vin ： 85VAC⇔132VAC(A)
： 170VAC⇔265VAC(B)
Iout (100%)
V1 ： 6.4A
V2 ： 2.0A
V3 ： 2.0A
V4 ： 10.0A

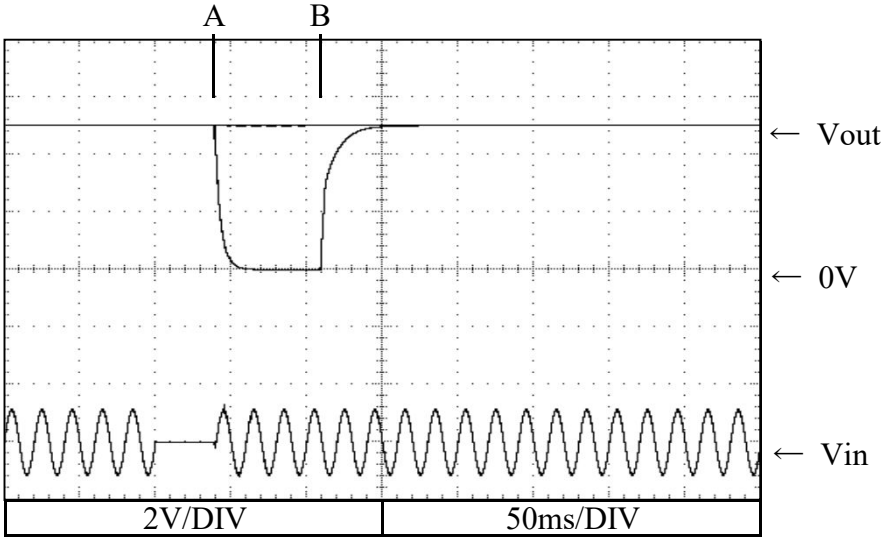


2.15 入力電圧瞬停特性　Response to brown out characteristics

Conditions　Ta ： 25 ºC
Vin ： 100VAC
Iout (100%)
V1 ： 6.4A
V2 ： 2.0A
V3 ： 2.0A
V4 ： 10.0A
Brown out time
A ： 35ms
B ： 36ms



Conditions　Ta ： 25 ºC
Vin ： 200VAC
Iout (100%)
V1 ： 6.4A
V2 ： 2.0A
V3 ： 2.0A
V4 ： 10.0A
Brown out time
A ： 38ms
B ： 39ms

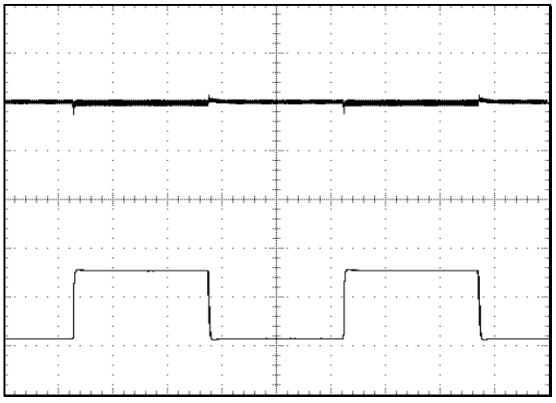


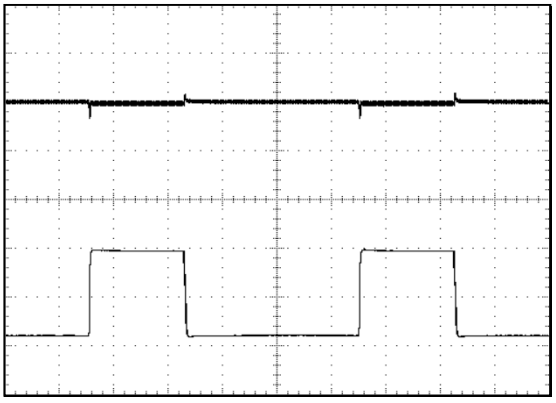
V1 : 5V

2.16 過渡応答（負荷急変）特性
Dynamic load response characteristics

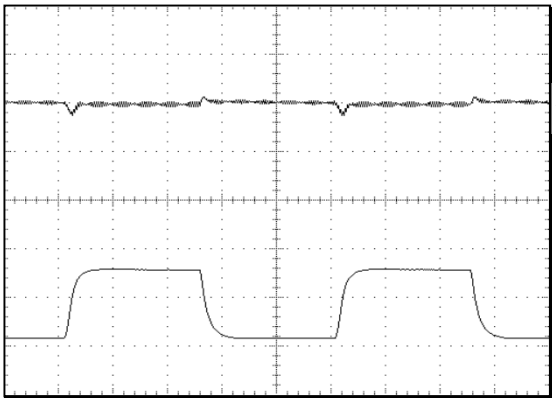
Conditions Ta : 25 ºC
Vin : 100VAC
Iout (100%)
V1 : -A
V2 : 1.5A
V3 : 1.5A
V4 : 3.8A

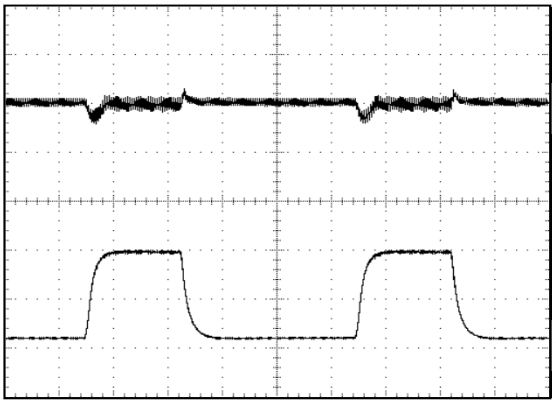
f=100Hz

Load current tr = tf = 50us Iout 1.5A (MIN) ⟷ 15.0A (MAX)	
	
200mV/DIV	2ms/DIV
+0.64%	
-0.96%	

Load current tr = tf = 50us Iout 2.1A (MIN) ⟷ 19.0A (Peak)	
	
200mV/DIV	2ms/DIV
+0.80%	
-1.44%	

f=1kHz

Load current tr = tf = 50us Iout 1.5A (MIN) ⟷ 15.0A (MAX)	
	
200mV/DIV	200 μ s/DIV
+0.64%	
-1.04%	

Load current tr = tf = 50us Iout 2.1A (MIN) ⟷ 19.0A (Peak)	
	
200mV/DIV	200 μ s/DIV
+1.20%	
-1.76%	

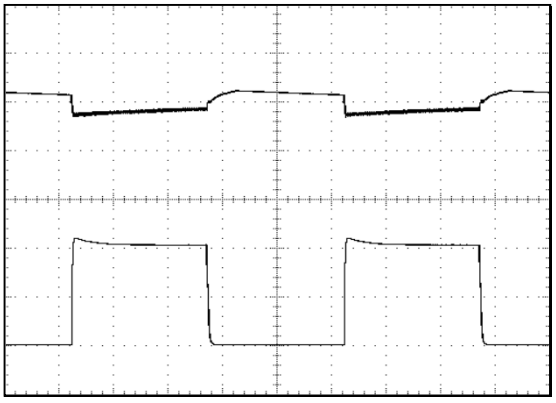
V2 : +12V

2.16 過渡応答（負荷急変）特性
Dynamic load response characteristics

Conditions Ta : 25 ºC
Vin : 100VAC
Iout (100%)
V1 : 7.0A
V2 : -A
V3 : 2.0A
V4 : 4.6A

f=100Hz

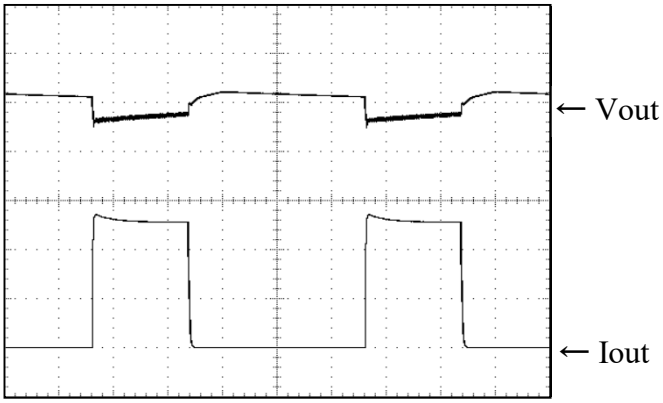
Load current tr = tf = 50us
Iout 0A (MIN) ⟷ 4.0A (MAX)



200mV/DIV	2ms/DIV

+0.43%
-0.50%

Load current tr = tf = 50us
Iout 0A (MIN) ⟷ 5.0A (Peak)

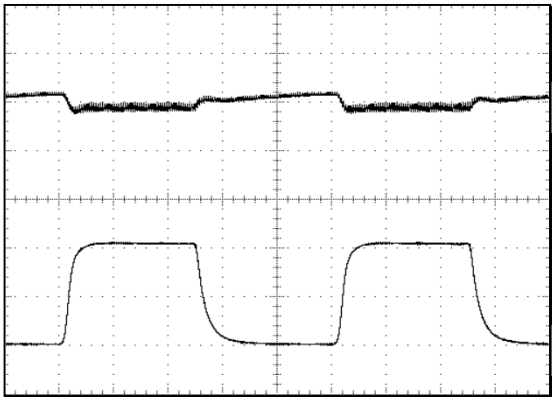


200mV/DIV	2ms/DIV

+0.40%
-0.87%

f=1kHz

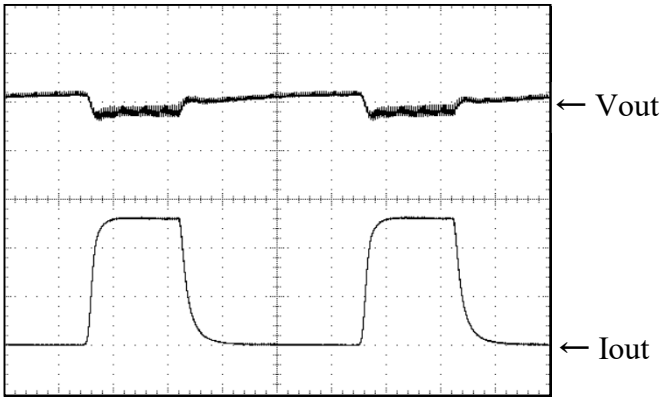
Load current tr = tf = 50us
Iout 0A (MIN) ⟷ 4.0A (MAX)



200mV/DIV	200 μ s/DIV

+0.37%
-0.40%

Load current tr = tf = 50us
Iout 0A (MIN) ⟷ 5.0A (Peak)



200mV/DIV	200 μ s/DIV

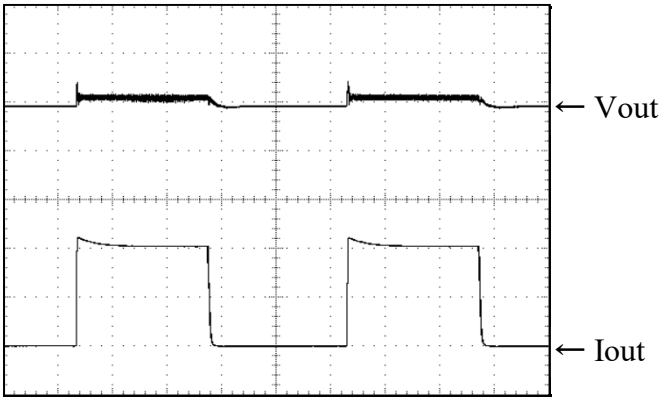
+0.40%
-0.63%

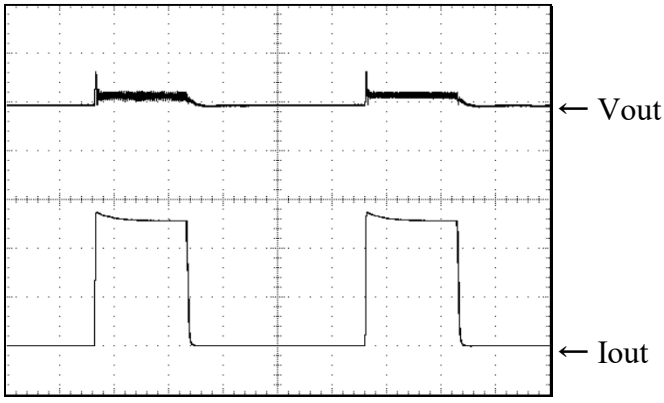
V3 : -12V

2.16 過渡応答（負荷急変）特性
Dynamic load response characteristics

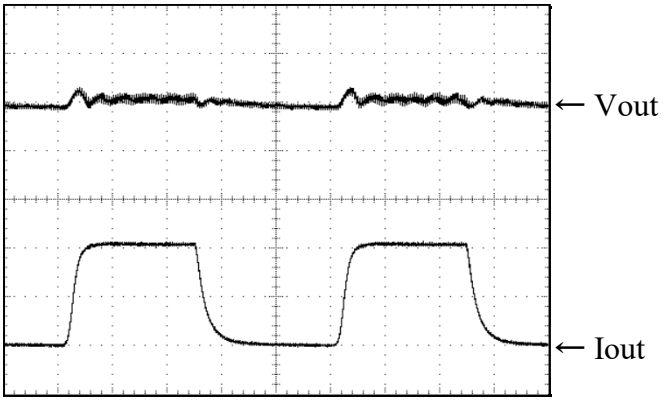
Conditions Ta : 25 °C
Vin : 100VAC
Iout (100%)
V1 : 7.0A
V2 : 2.0A
V3 : -A
V4 : 4.6A

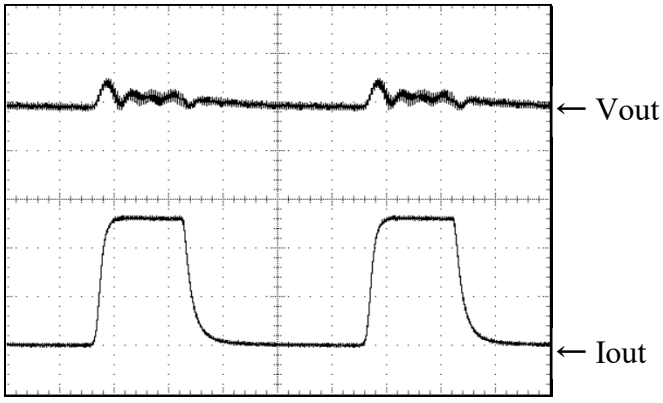
f=100Hz

Load current tr = tf = 50us Iout 0A (MIN) ⟷ 4.0A (MAX)	
	
200mV/DIV	2ms/DIV
+0.70 %	
-0.20%	

Load current tr = tf = 50us Iout 0A (MIN) ⟷ 5.0A (Peak)	
	
200mV/DIV	2ms/DIV
+1.10%	
-0.17%	

f=1kHz

Load current tr = tf = 50us Iout 0A (MIN) ⟷ 4.0A (MAX)	
	
200mV/DIV	200 μ s/DIV
+0.53%	
-0.27%	

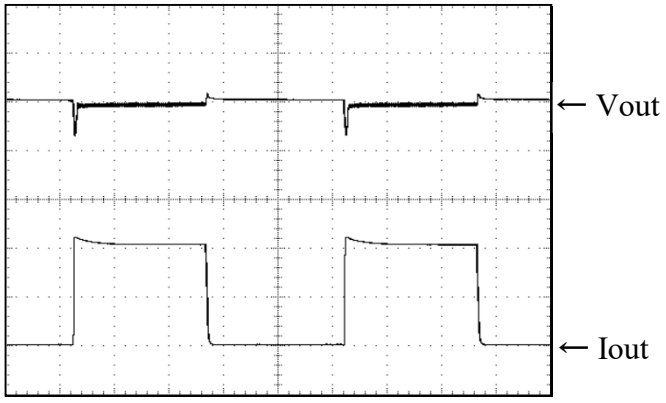
Load current tr = tf = 50us Iout 0A (MIN) ⟷ 5.0A (Peak)	
	
200mV/DIV	200 μ s/DIV
+0.87%	
-0.33%	

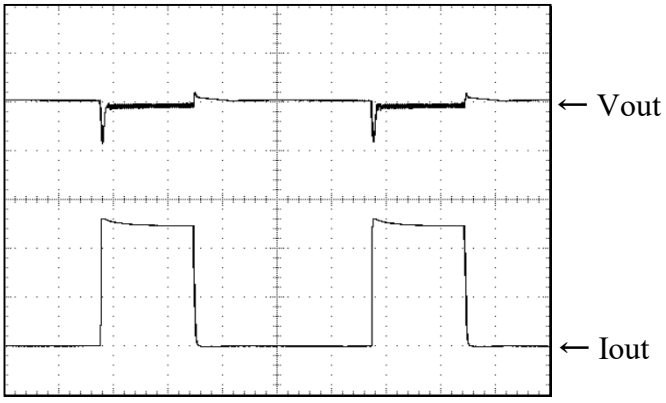
V4 : 5V

2.16 過渡応答（負荷急変）特性
Dynamic load response characteristics

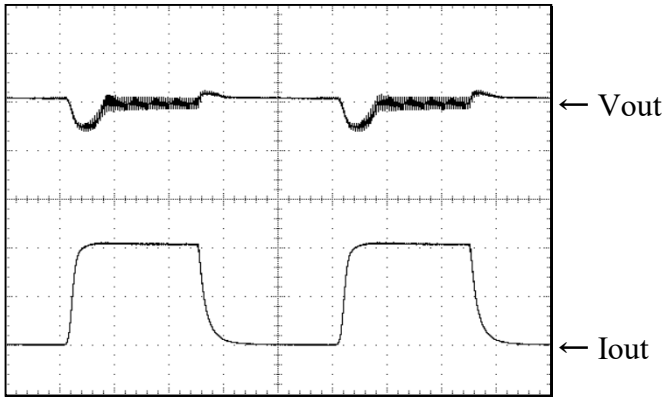
Conditions Ta : 25 ºC
Vin : 100VAC
Iout (100%)
V1 : 6.4A
V2 : 2.0A
V3 : 2.0A
V4 : -A

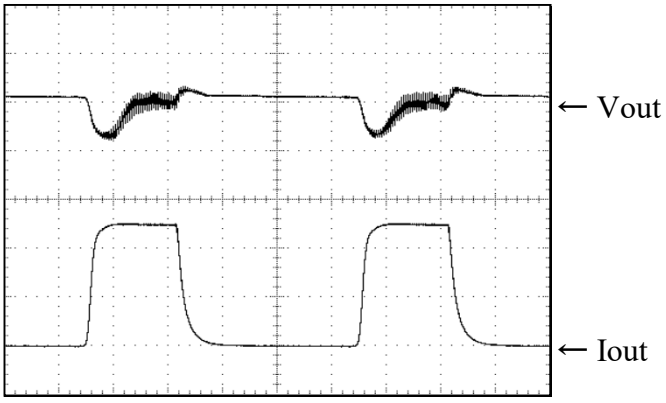
f=100Hz

Load current tr = tf = 50us Iout 0A (MIN) ⟷ 10.0A (MAX)	
	
200mV/DIV	2ms/DIV
+0.72%	
-2.72%	

Load current tr = tf = 50us Iout 0A (MIN) ⟷ 12.0A (Peak)	
	
200mV/DIV	2ms/DIV
+0.88%	
-3.44%	

f=1kHz

Load current tr = tf = 50us Iout 0A (MIN) ⟷ 10.0A (MAX)	
	
200mV/DIV	200 μ s/DIV
+1.04%	
-2.40%	

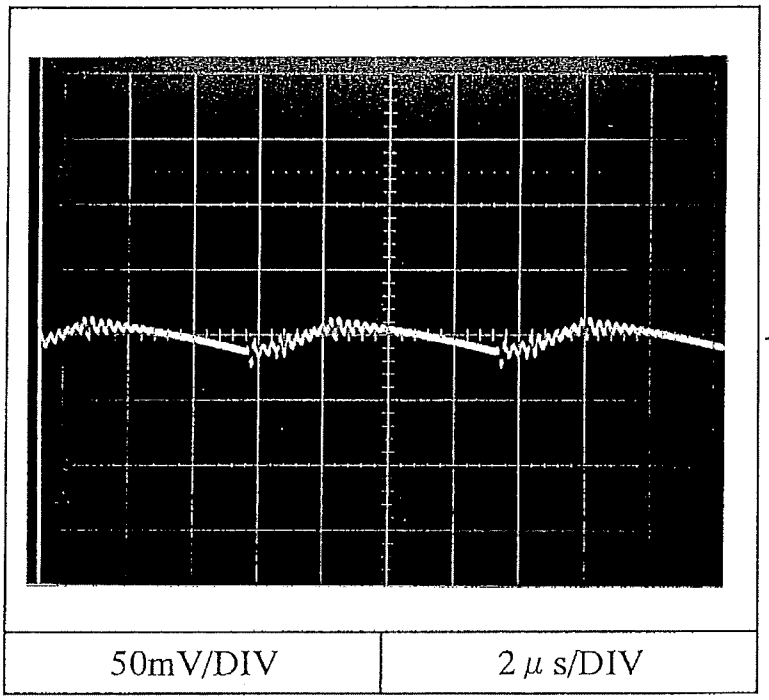
Load current tr = tf = 50us Iout 0A (MIN) ⟷ 12.0A (Peak)	
	
200mV/DIV	200 μ s/DIV
+1.28%	
-3.28%	

V1 : 5V

2.17 出力リップル、ノイズ波形　Output ripple and noise waveform

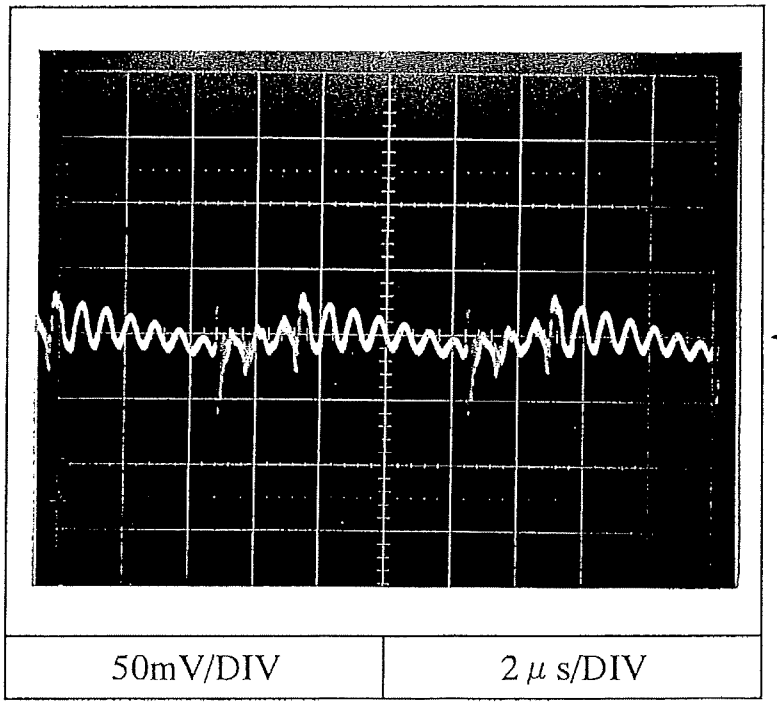
NORMAL MODE

Conditions　Ta :　25 °C
Vin :　100VAC
Iout (100%)
V1 :　15.0A
V2 :　1.5A
V3 :　1.5A
V4 :　3.8A



50mV/DIV	2 μ s/DIV

NORMAL + COMMON MODE



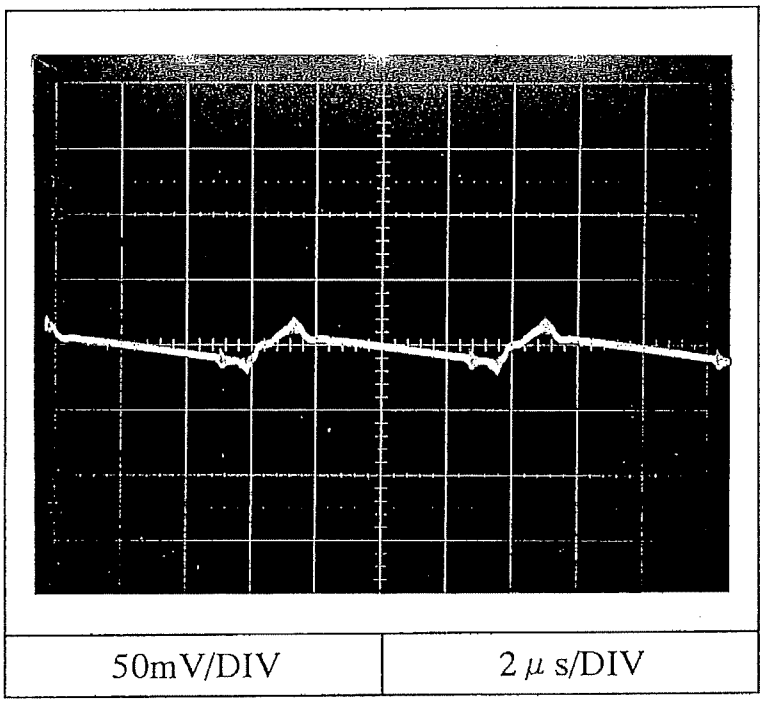
50mV/DIV	2 μ s/DIV

V2 : 12V

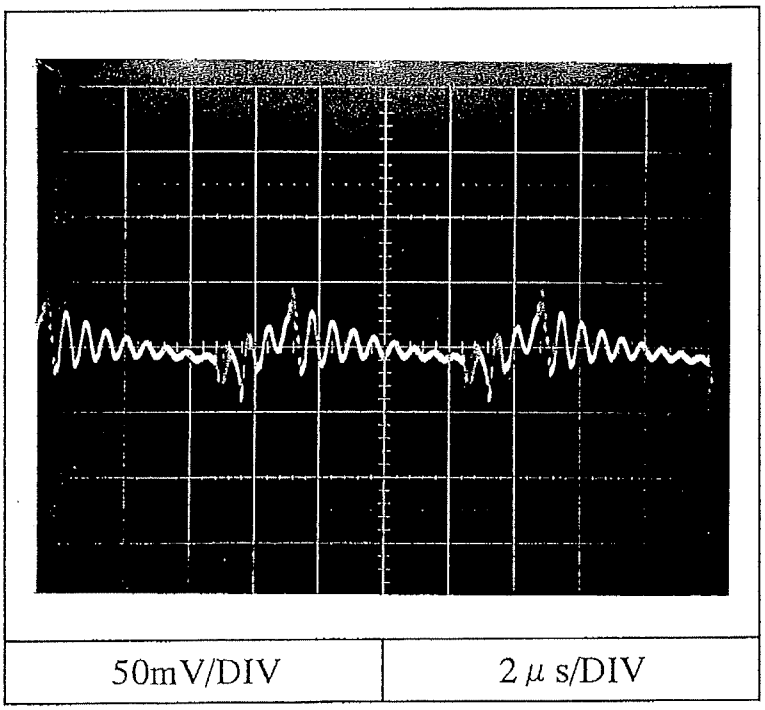
2.17 出力リップル、ノイズ波形　Output ripple and noise waveform

NORMAL MODE

Conditions　Ta :　25 °C
Vin : 100VAC
Iout (100%)
V1 :　7.0A
V2 :　4.0A
V3 :　2.0A
V4 :　4.6A



NORMAL + COMMON MODE

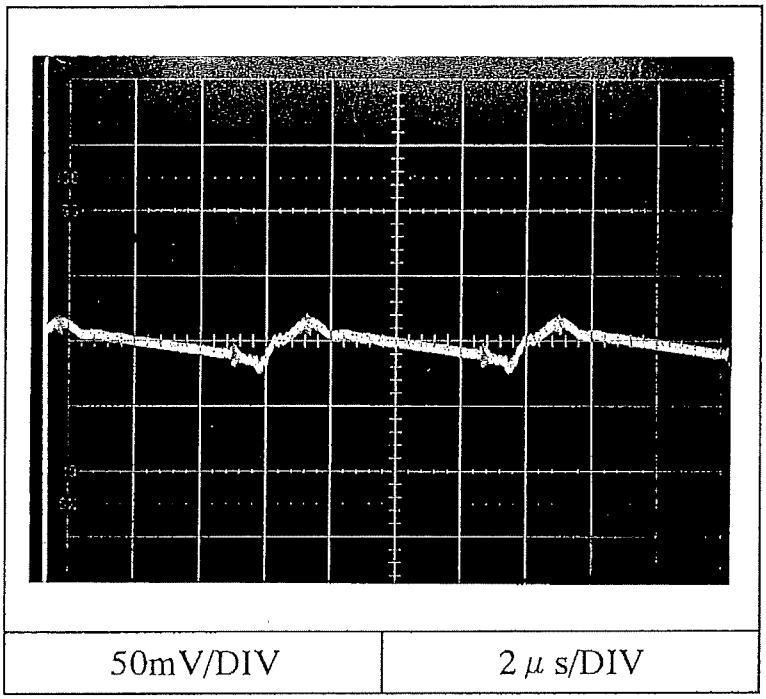


V3 : -12V

2.17 出力リップル、ノイズ波形　Output ripple and noise waveform

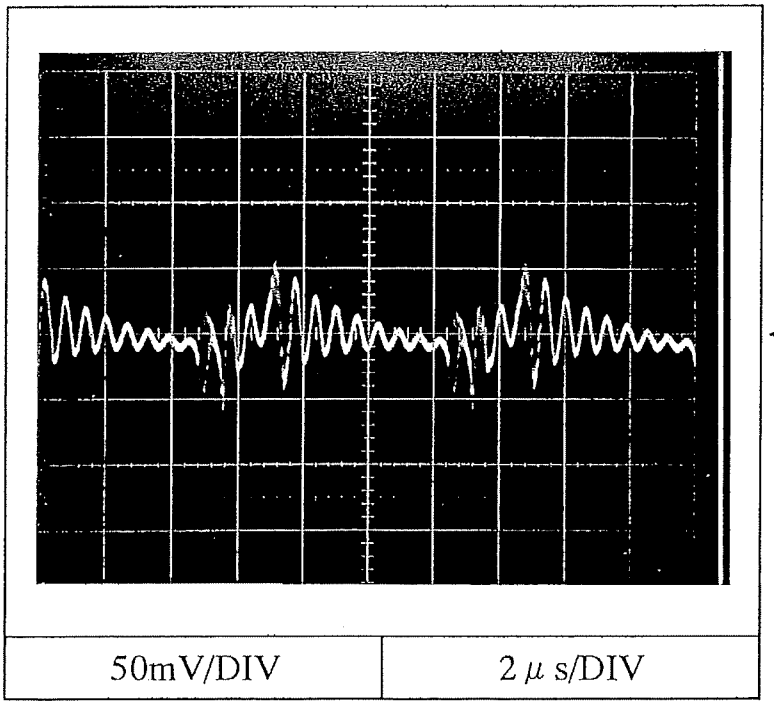
NORMAL MODE

Conditions　Ta :　25 °C
Vin : 100VAC
Iout (100%)
V1 :　7.0A
V2 :　2.0A
V3 :　4.0A
V4 :　4.6A



50mV/DIV	2 μ s/DIV

NORMAL + COMMON MODE



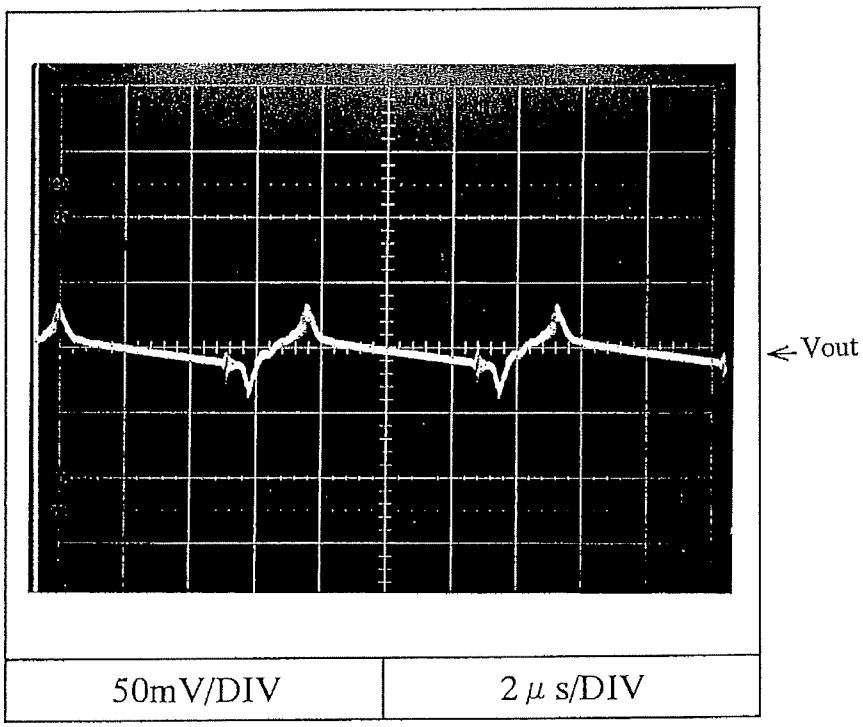
50mV/DIV	2 μ s/DIV

V4 : 5V

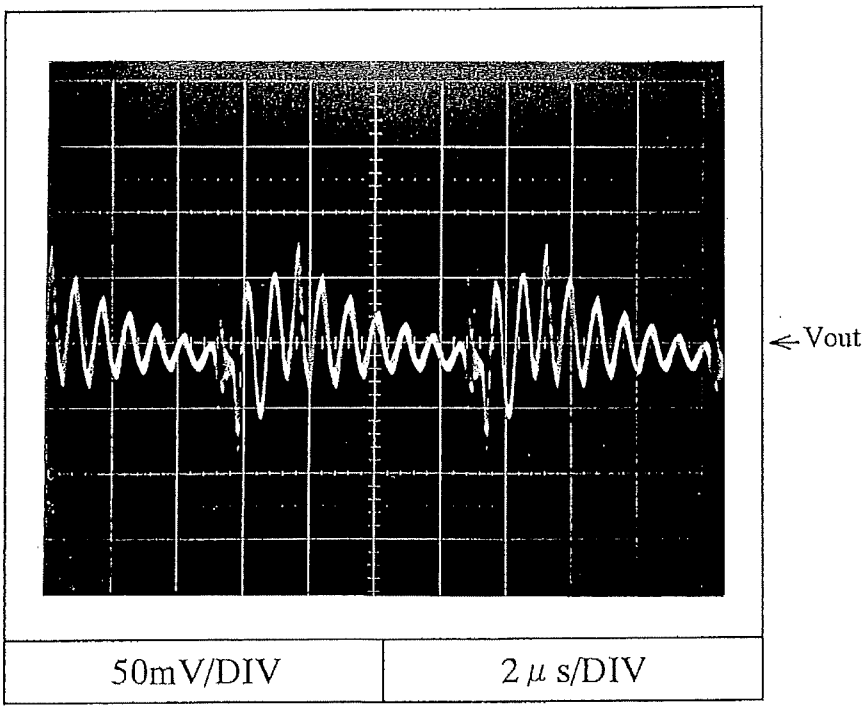
2.17 出力リップル、ノイズ波形　Output ripple and noise waveform

NORMAL MODE

Conditions　Ta :　25 °C
Vin : 100VAC
Iout (100%)
V1 :　6.4A
V2 :　2.0A
V3 :　2.0A
V4 :　10.0A



NORMAL + COMMON MODE



2.18 入力サージ電流（突入電流）特性

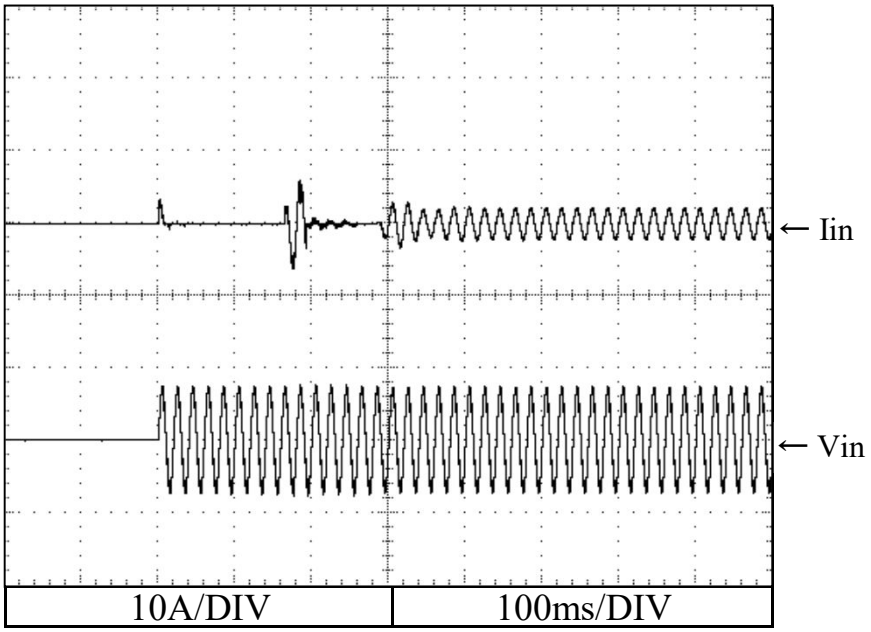
Inrush current waveform

Conditions Ta : 25 ℃
Vin : 100VAC
Iout (100%)
V1 : 8.5A
V2 : 2.5A
V3 : 2.5A
V4 : 5.5A

Switch on phase angle

of input AC voltage

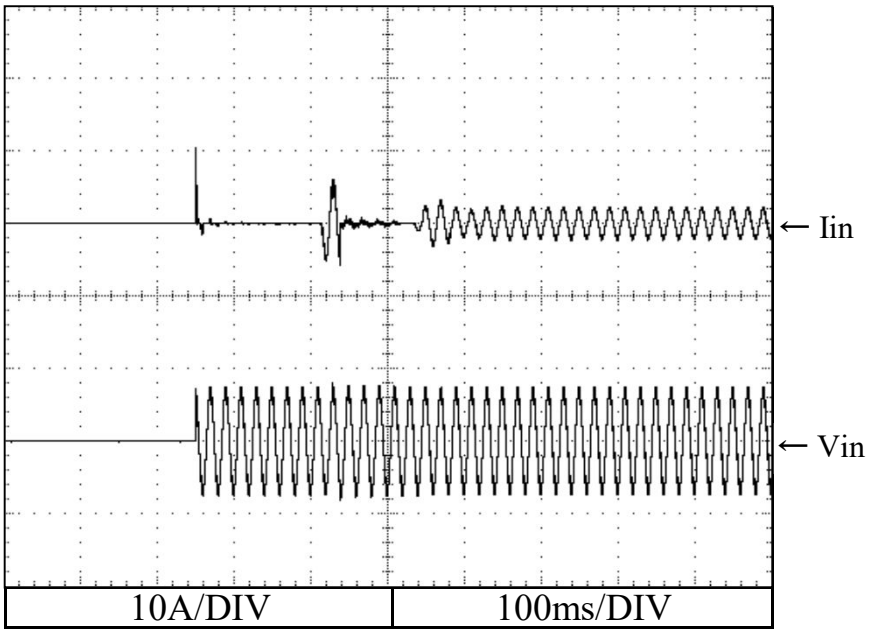
ϕ =0°



Switch on phase angle

of input AC voltage

ϕ =90°



2.18 入力サージ電流（突入電流）特性

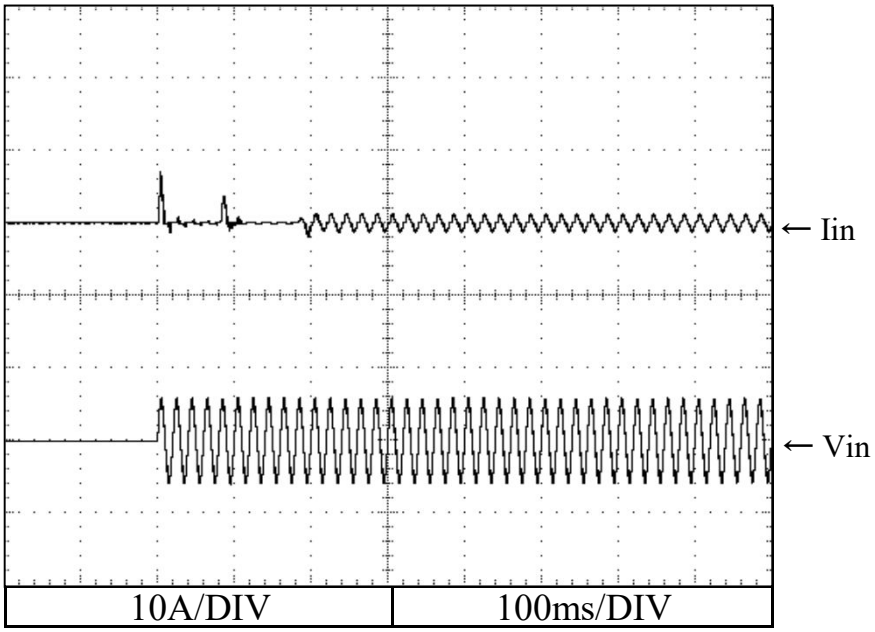
Inrush current waveform

Conditions Ta : 25 ºC
Vin : 200VAC
Iout (100%)
V1 : 8.5A
V2 : 2.5A
V3 : 2.5A
V4 : 5.5A

Switch on phase angle

of input AC voltage

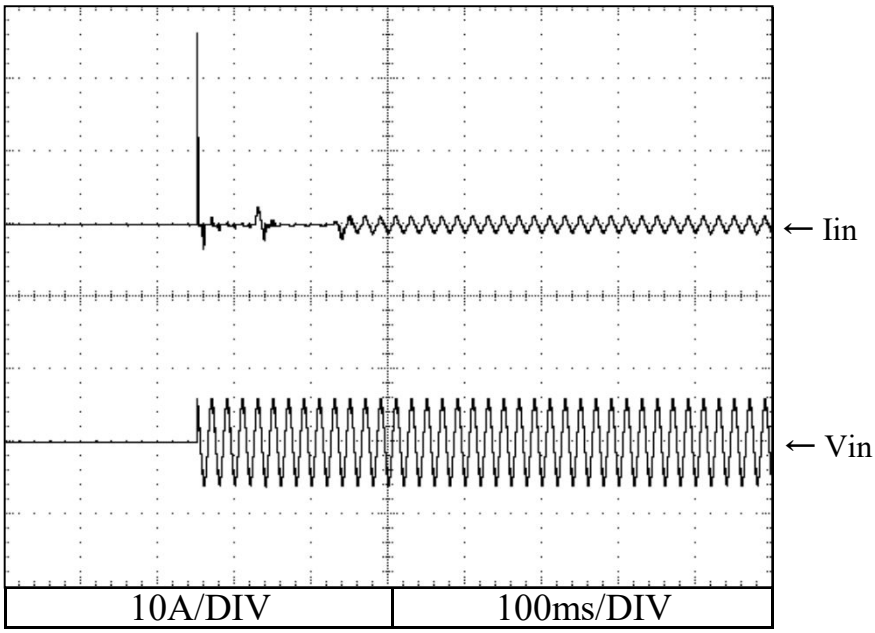
ϕ =0°



Switch on phase angle

of input AC voltage

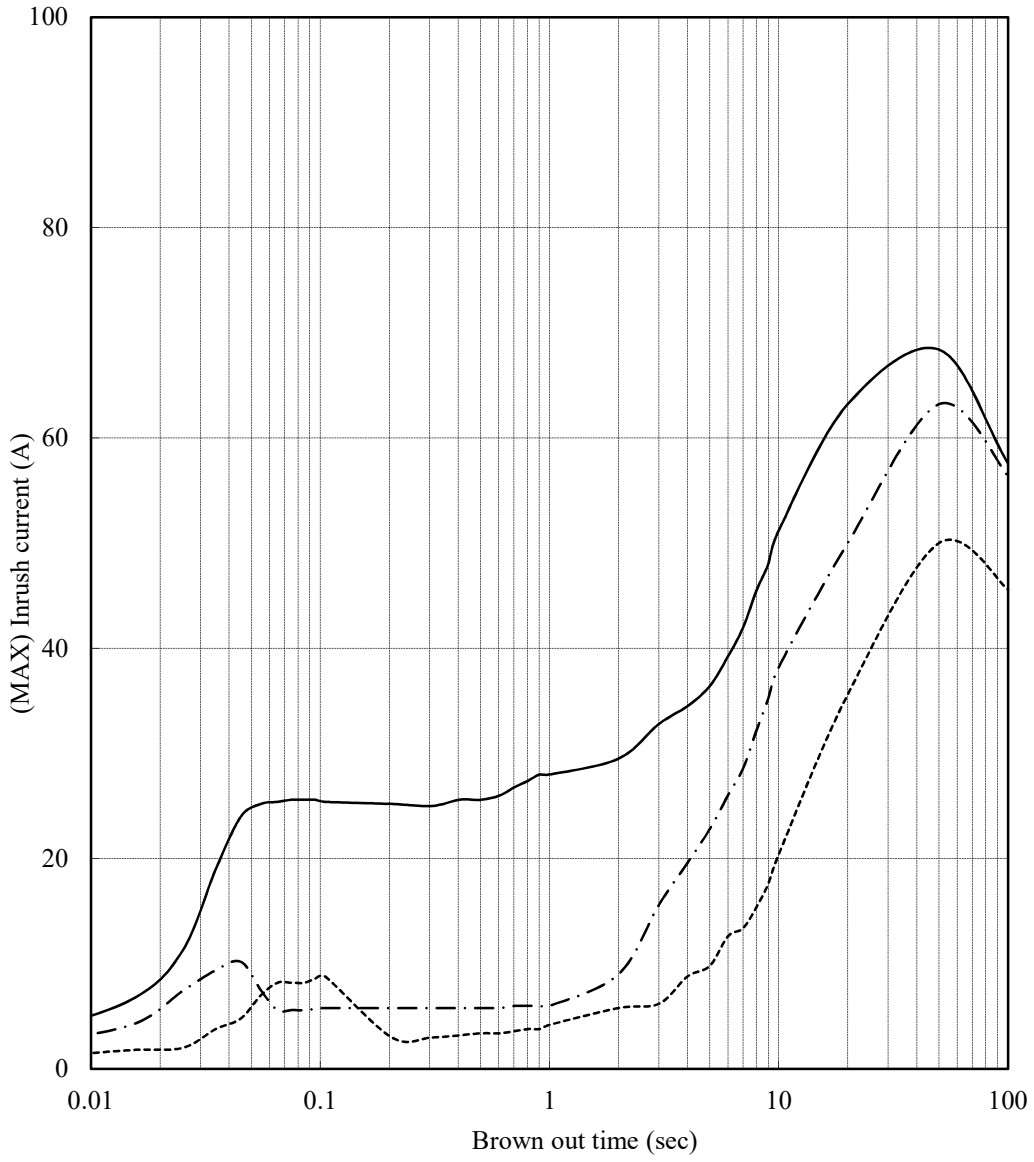
ϕ =90°



2.19 瞬停時突入電流特性
Inrush current characteristics

Conditions Ta : 25 ºC
Vin : 200VAC

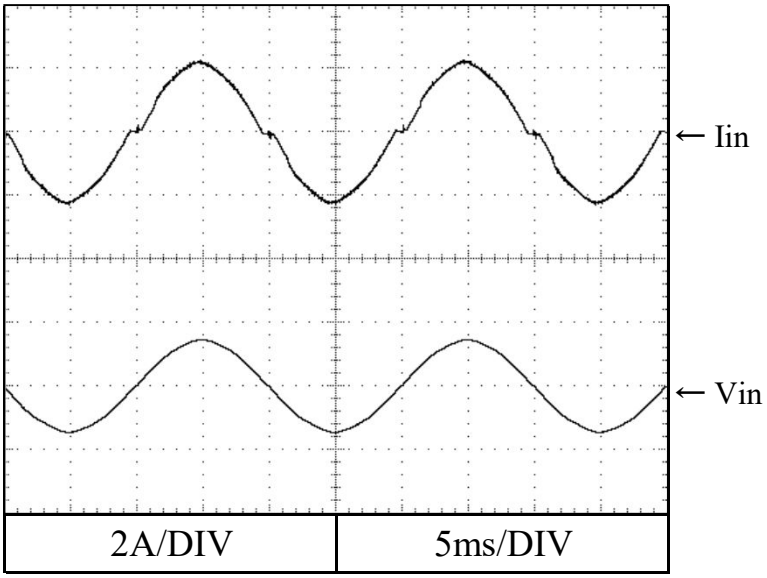
Iout :	V1	V2	V3	V4	
(MIN)	1.5A	0A	0A	0A	------
(50%)	4.2A	1.3A	1.3A	2.7A	-·-·-
(100%)	8.5A	2.5A	2.5A	5.5A	———



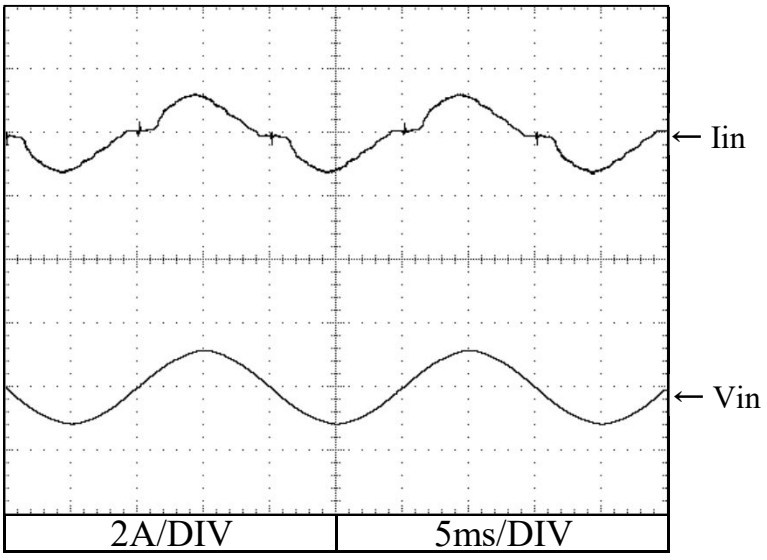
※ 上記値は、2次突入電流を含んだ値である。
Above data includes secondary inrush current.

2.20 入力電流波形　Input current waveform

Conditions　Ta : 25 ºC
Vin : 100VAC
Iout (100%)
V1 : 8.5A
V2 : 2.5A
V3 : 2.5A
V4 : 5.5A

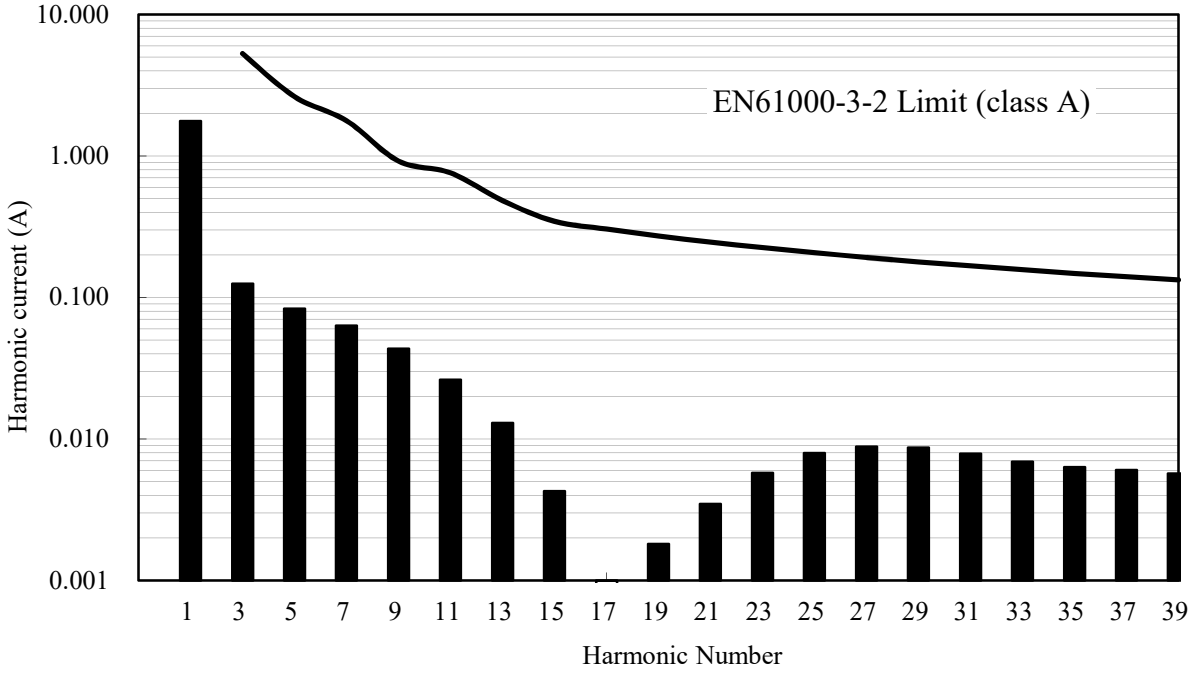


Conditions　Ta : 25 ºC
Vin : 200VAC
Iout (100%)
V1 : 8.5A
V2 : 2.5A
V3 : 2.5A
V4 : 5.5A

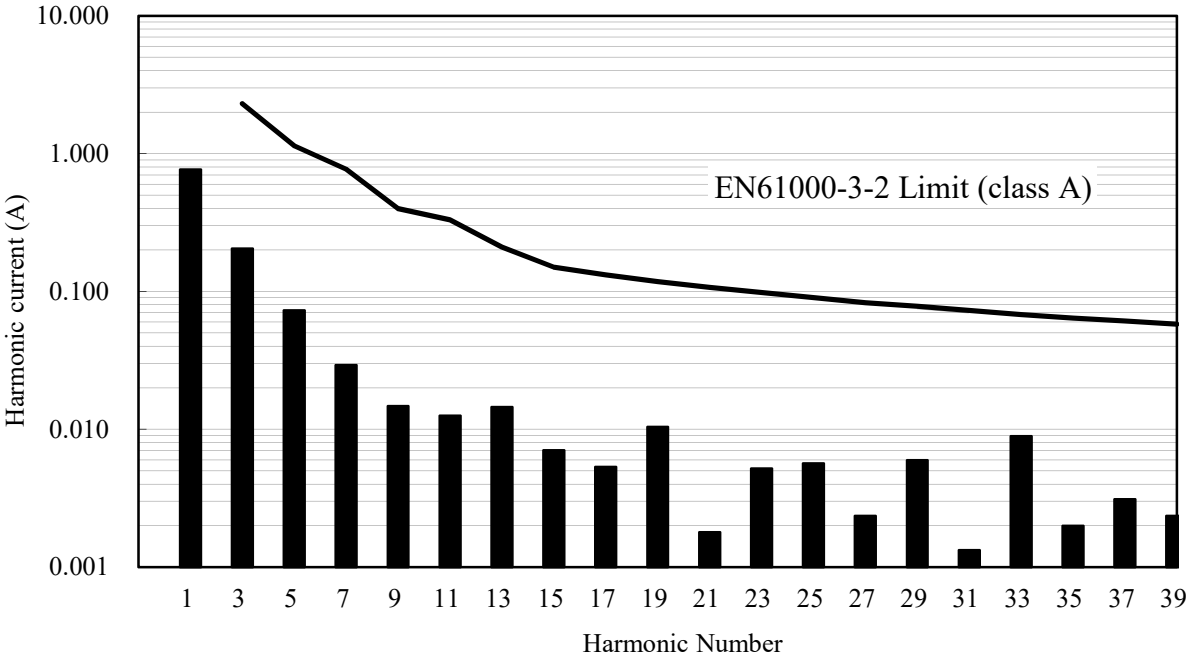


2.21 高調波成分　Input current harmonics

Conditions Ta : 25 ºC
Vin : 100VAC
Iout (100%)
V1 : 8.7A
V2 : 2.3A
V3 : 2.3A
V4 : 5.8A



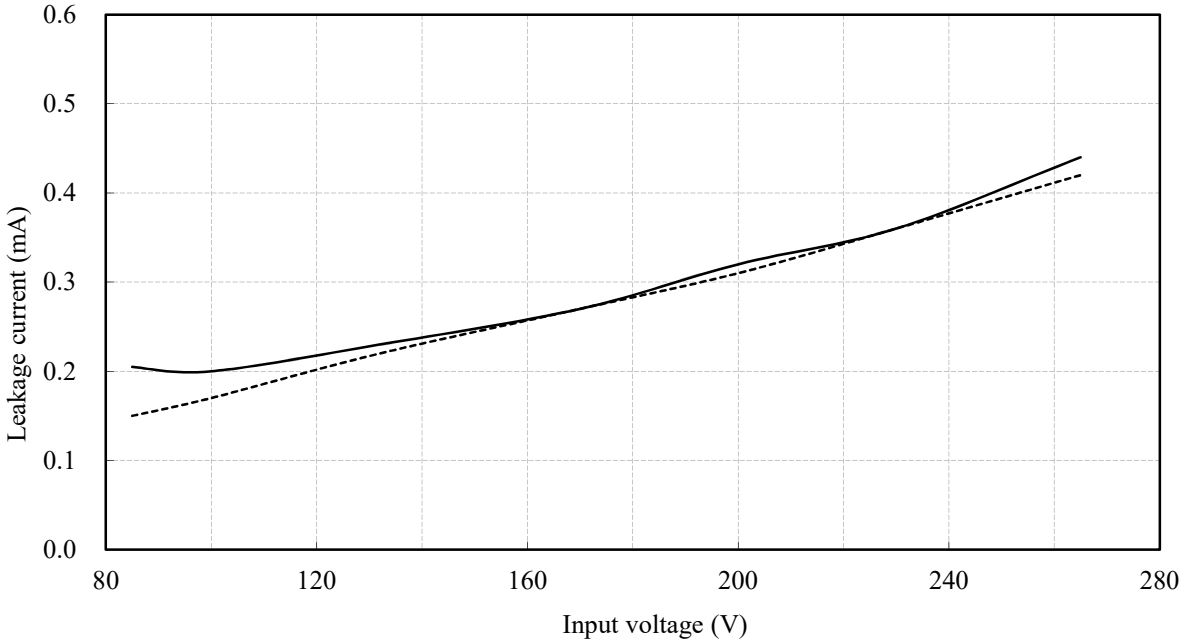
Conditions Ta : 25 ºC
Vin : 230VAC



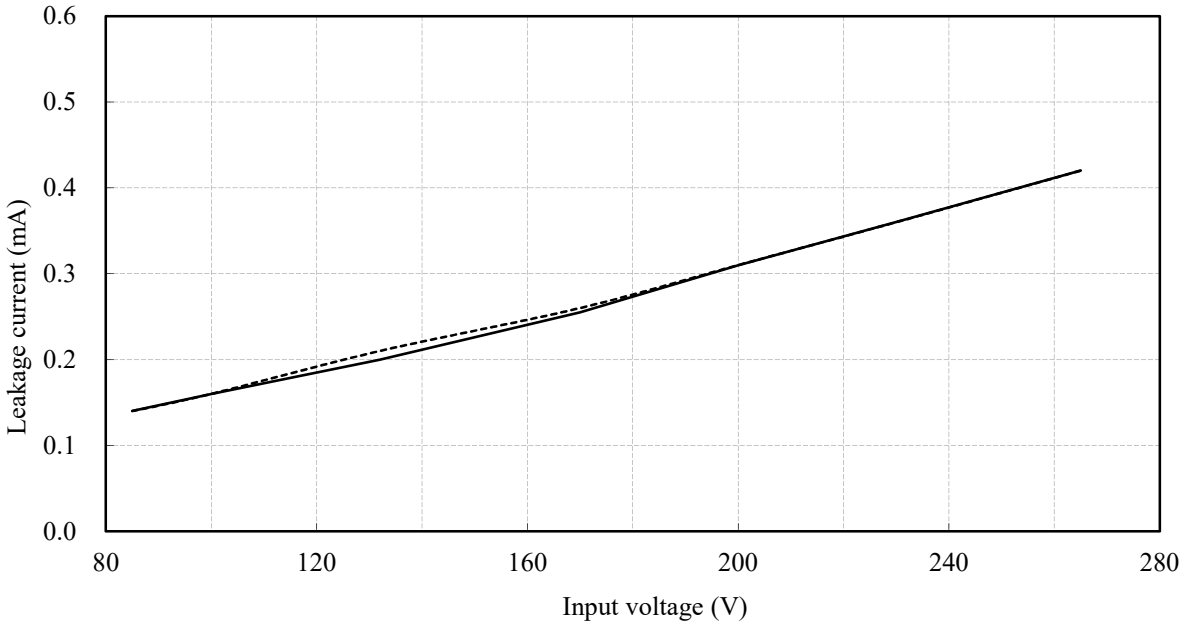
2.22 リーク電流特性
Leakage current characteristics

Conditions Ta : 25 °C
Iout (MIN) : - - - - - - -
V1 : 1.5A
V2 : 0A
V3 : 0A
V4 : 0A
Iout (100%) : ——————
V1 : 8.5A
V2 : 2.5A
V3 : 2.5A
V4 : 5.5A
f : 50Hz

Equipment used : TYPE 3226 (Yokogawa)



Equipment used : MODEL 229-2 (Simpson)



2.23 EMI 特性

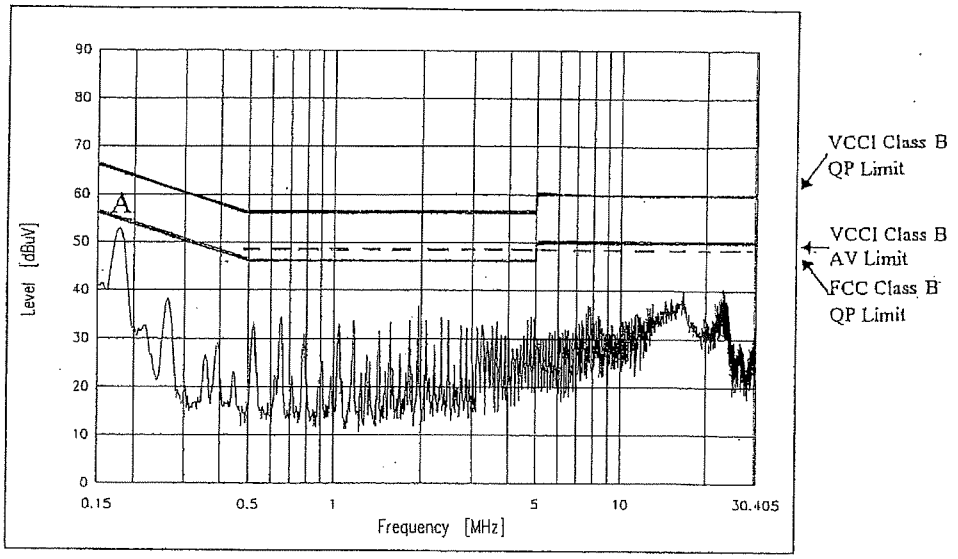
Electro-Magnetic Interference characteristics

Conditions Vin : 100VAC
Iout (100%)
V1 : 8.5A
V2 : 2.5A
V3 : 2.5A
V4 : 5.5A

雑音端子電圧

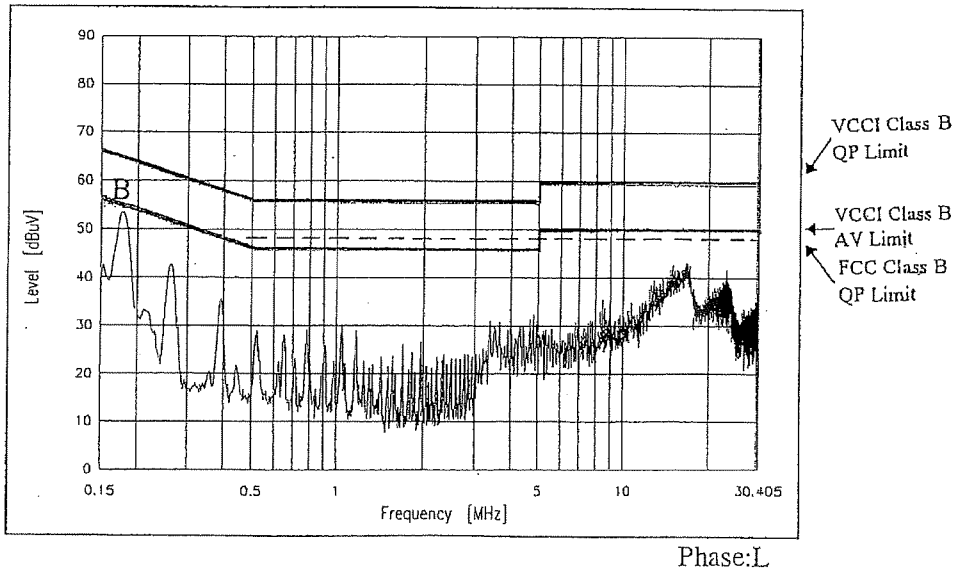
Conducted Emission Noise

Ref. / Data	Point A (0.177MHz) Limit (dBuV)	Measure (dBuV)
QP	64.6	51.8
AV	54.6	48.2



Phase :N

Ref. / Data	Point B (0.177MHz) Limit (dBuV)	Measure (dBuV)
QP	64.6	52.1
AV	54.6	48.5



Phase:L

EN55011-B, EN55032-Bの限界値はVCCI class Bの限界値と同じ
Limits of EN55032-B are same as its VCCI class B.

2.23 EMI 特性

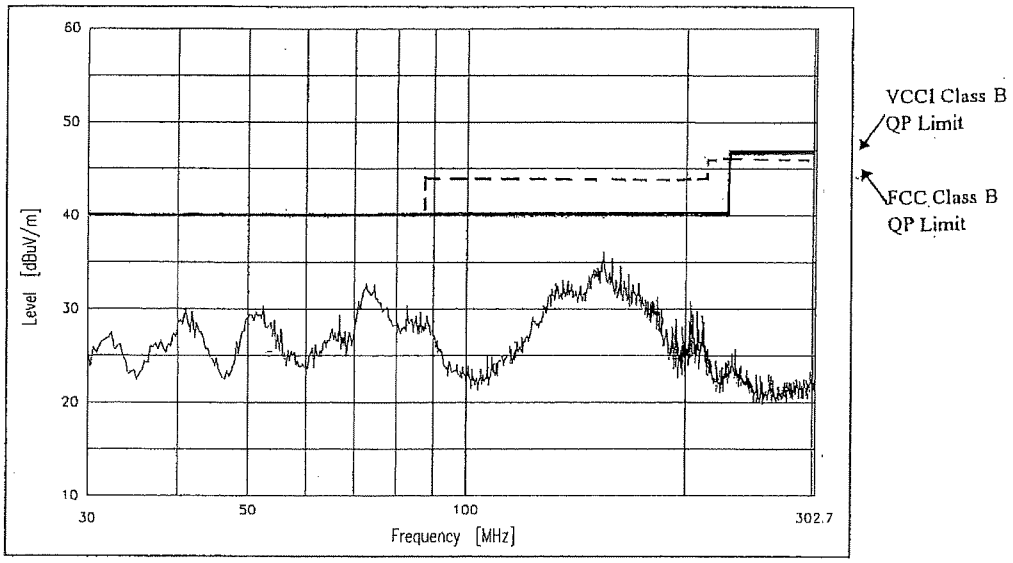
Electro-Magnetic Interference characteristics

Conditions Vin : 100VAC
Iout (100%)
V1 : 8.5A
V2 : 2.5A
V3 : 2.5A
V4 : 5.5A

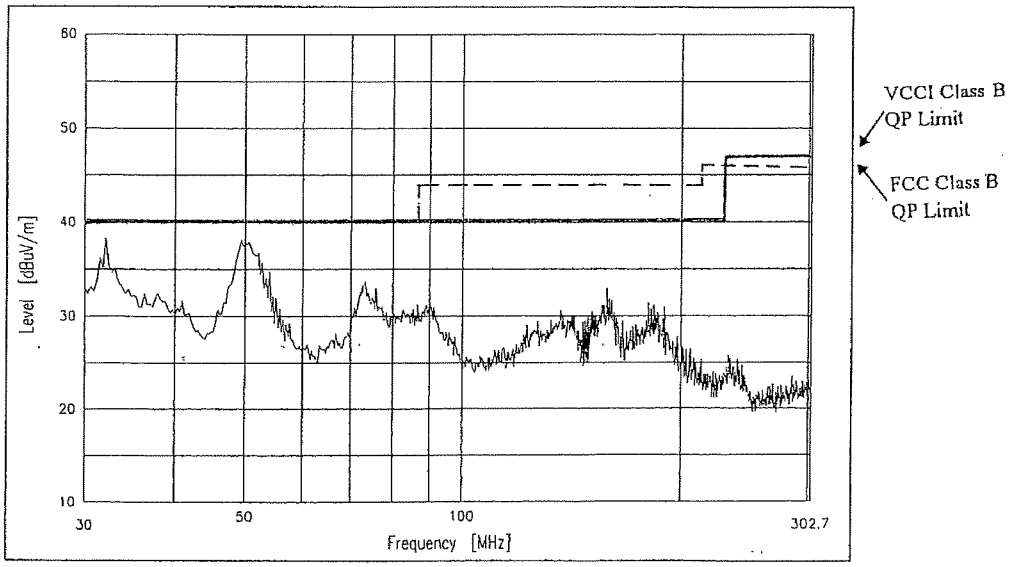
雑音電界強度

Radiated Emission Noise

HORIZONTAL:



VERTICAL:



EN55011-B, EN55032-Bの限界値はVCCI class Bの限界値と同じ
Limits of EN55032-B are same as its VCCI class B.