

**CUS90E**

**EVALUATION DATA**

**型式データ**

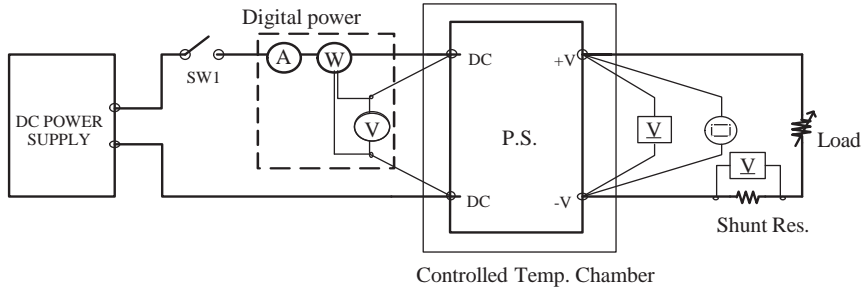
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使用記号	Terminology used	
	定義 Definition	
Vin	..... 入力電圧 Input voltage	
Vout	..... 出力電圧 Output voltage	
Iin	..... 入力電流 Input current	
Iout	..... 出力電流 Output current	
Ta	..... 周囲温度 Ambient temperature	
f	..... 周波数 Frequency	

1.1 測定回路 Circuit used for determination

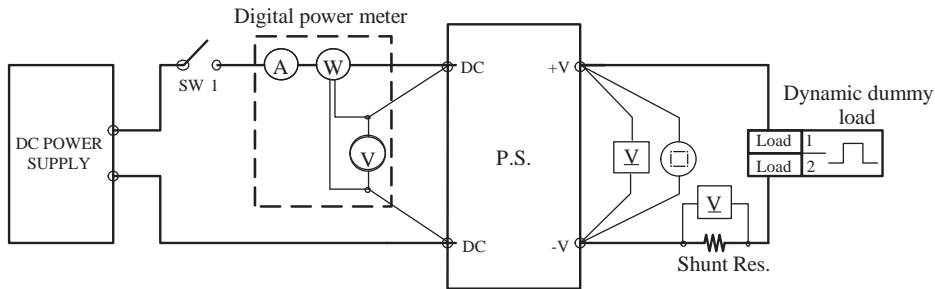
測定回路1 Circuit 1 used for determination

- ・ 静特性 Steady state data
- ・ 過電流保護特性 Over current protection (OCP) 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
- ・ 出力保持時間特性 Hold up time characteristics

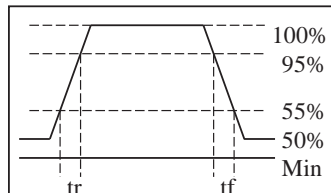


測定回路2 Circuit 2 used for determination

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

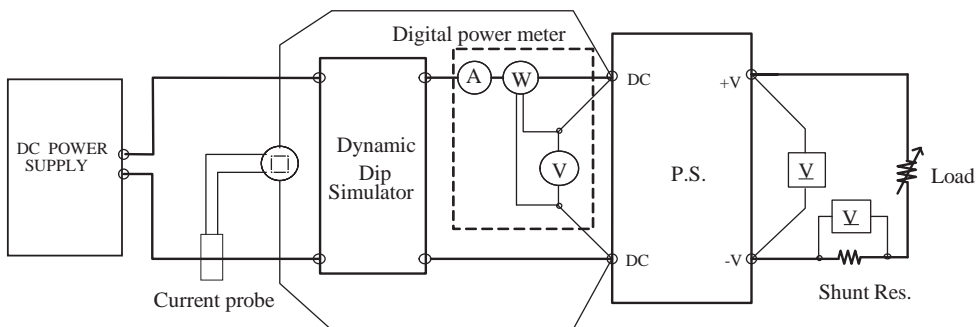


Output current waveform



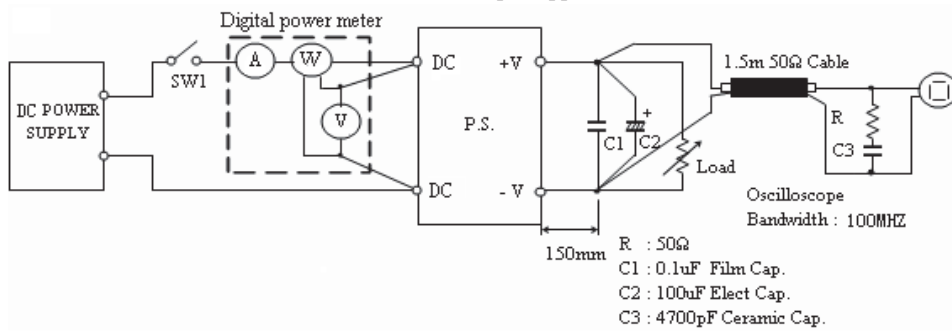
測定回路3 Circuit 3 used for determination

- ・ 入力サージ電流(突入電流) 波形 Inrush current waveform



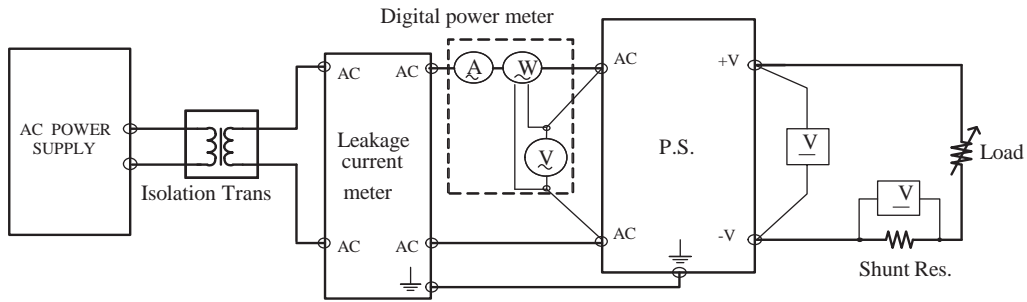
測定回路4 Circuit 4 used for determination

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



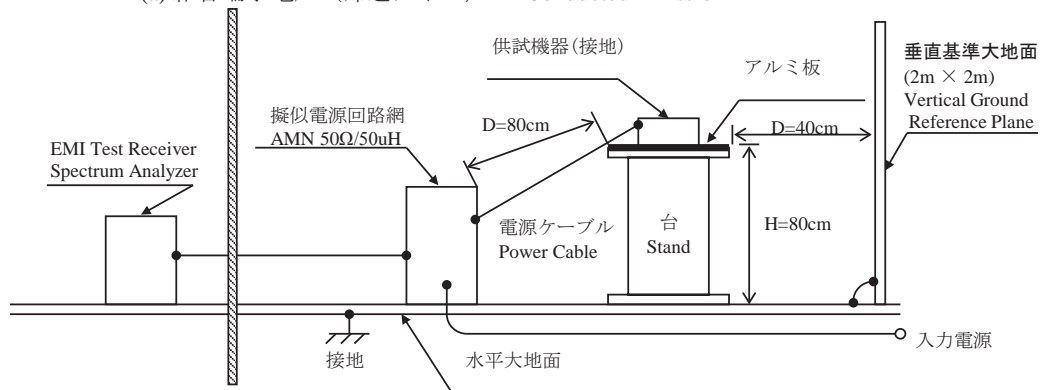
測定回路5 Circuit 5 used for determination

- リーク電流特性 Leakage current characteristics

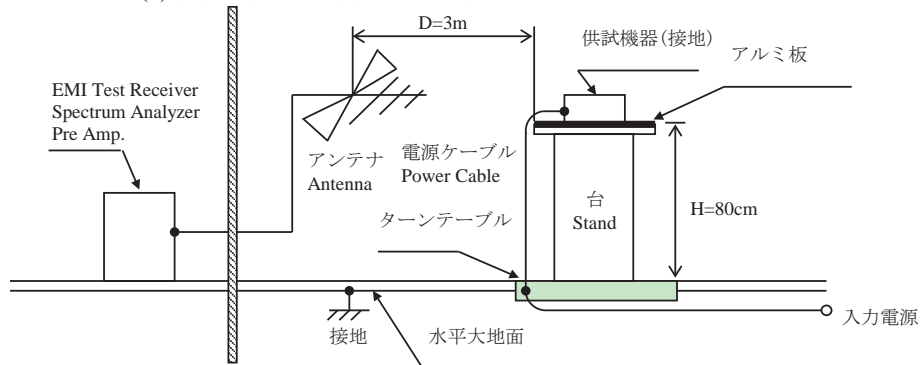


測定構成 Configuration used for determination

- E M I 特性 Electro-Magnetic Interference characteristics
- (a) 雑音端子電圧 (帰還ノイズ) Conducted Emission



- (b) 雑音電界強度 (放射ノイズ) Radiated Emission



## 1.2 使用測定機器 List of equipment used

	EQUIPMENT USED	MANUFACTURER	MODEL NO.
1	DIGITAL STORAGE OSCILLOSCOPE	TEKTRONIX	TDS 540A
2	DIGITAL STORAGE OSCILLOSCOPE	YOKOGAWA ELECT.	DL1720E
3	DIGITAL MULTIMETER	FLUKE	45
4	DIGITAL POWER METER	YOKOGAWA ELECT.	WT210
5	CURRENT PROBE	TEKTRONIX	63202
6	DC AMPERE METER	TEKTRONIX	P5100
7	DYNAMIC DUMMY LOAD	CHROMA	63030
8	CVCF	KIKUSUI	PCR2000L
9	CONTROLLED TEMP. CHAMBER	TABAI-ESPEC	63203
10	LEAKAGE CURRENT METER	SIMPSON	228
11	EMI TEST RECEIVER	ROHDE & SCHWARZ	ESCI-03
12	LISN	ROHDE & SCHWARZ	ENV216
13	BICONICAL ANTENNA	EMCO	63208

## 2.1 静特性 Steady state data

(1) 入力・負荷・温度変動／出力起動・遮断電圧

Regulation - line and load, Temperature drift / Start up voltage and Drop out voltage

**5V**

## 1. Regulation - line and load

Condition Ta : 25 °C

Iout \ Vin	85VDC	110VDC	220VDC	300VDC	line regulation	
0%	5.001V	5.001V	5.001V	5.001V	0mV	0.000%
50%	5.001V	5.001V	5.001V	5.001V	0mV	0.000%
100%	4.999V	4.999V	4.999V	4.999V	0mV	0.000%
load	2mV	2mV	2mV	2mV		
regulation	0.040%	0.040%	0.040%	0.040%		

## 2. Temperature drift

Conditions Vin : 110 VDC

Iout : 100 %

Ta	-50°C	+25°C	+70°C	temperature stability	
Vout	4.965V	4.999V	4.995V	34mV	0.680%

## 3. Start up voltage and Drop out voltage

Conditions Ta : 25 °C

Iout : 100 %

Start up voltage (Vin)	64.9VDC
Drop out voltage (Vin)	51.0VDC

**12V**

## 1. Regulation - line and load

Condition Ta : 25 °C

Iout \ Vin	85VDC	110VDC	220VDC	300VDC	line regulation	
0%	12.053V	12.053V	12.053V	12.053V	0mV	0.000%
50%	12.040V	12.040V	12.040V	12.040V	0mV	0.000%
100%	12.027V	12.028V	12.028V	12.028V	1mV	0.008%
load	26mV	25mV	25mV	25mV		
regulation	0.217%	0.208%	0.208%	0.208%		

## 2. Temperature drift

Conditions Vin : 110 VDC

Iout : 100 %

Ta	-50°C	+25°C	+70°C	temperature stability	
Vout	11.984V	12.028V	12.010V	44mV	0.367%

## 3. Start up voltage and Drop out voltage

Conditions Ta : 25 °C

Iout : 100 %

Start up voltage (Vin)	65.8VDC
Drop out voltage (Vin)	52.0VDC

**24V**

## 1. Regulation - line and load

Condition Ta : 25 °C

Iout \ Vin	85VDC	110VDC	220VDC	300VDC	line regulation	
0%	23.988V	23.990V	23.990V	23.990V	2mV	0.008%
50%	23.991V	23.991V	23.991V	23.991V	0mV	0.000%
100%	23.989V	23.989V	23.989V	23.989V	0mV	0.000%
load	3mV	2mV	2mV	2mV		
regulation	0.013%	0.008%	0.008%	0.008%		

## 2. Temperature drift

Conditions Vin : 110 VDC

Iout : 100 %

Ta	-50°C	+25°C	+70°C	temperature stability	
Vout	23.919V	23.989V	23.951V	70mV	0.292%

## 3. Start up voltage and Drop out voltage

Conditions Ta : 25 °C

Iout : 100 %

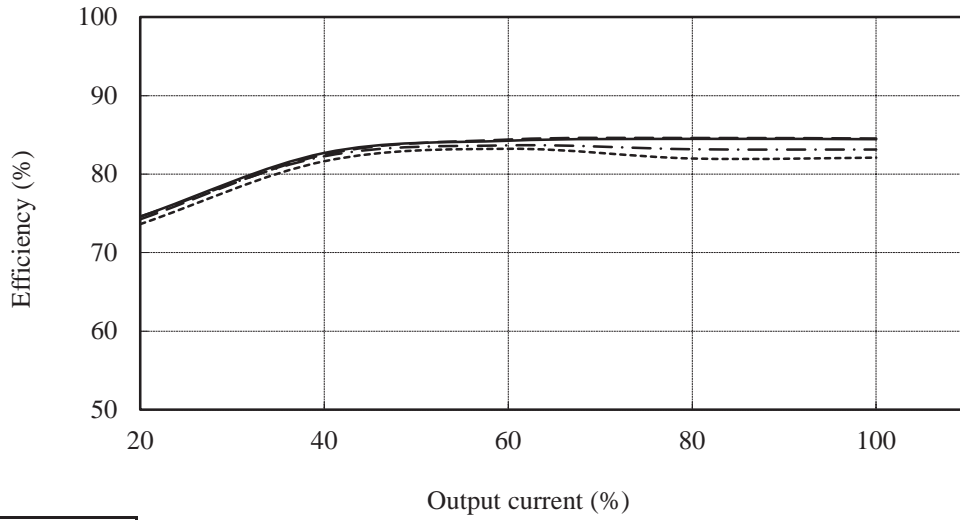
Start up voltage (Vin)	65.9VDC
Drop out voltage (Vin)	51.0VDC

(2) 効率対出力電流

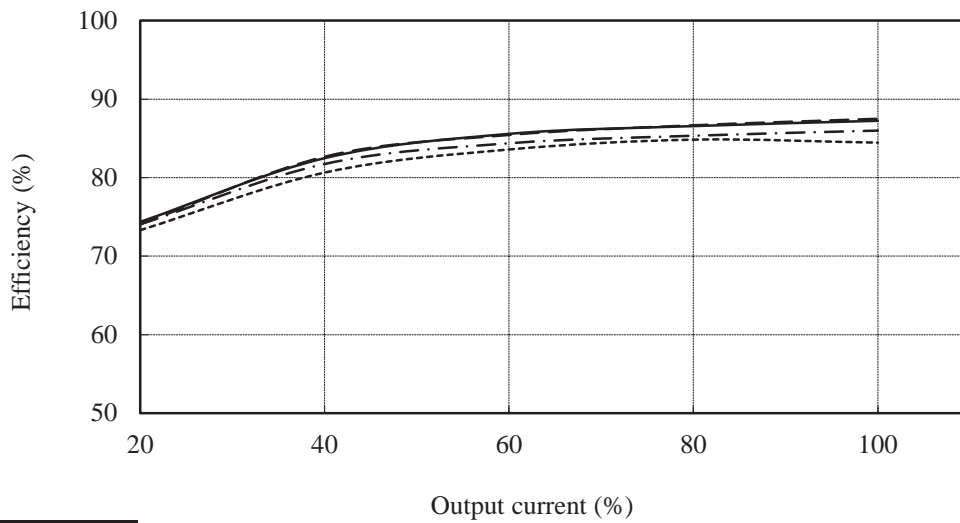
Efficiency vs. Output current

Conditions Vin : 85 VDC -----  
 : 110 VDC -.-.-.-  
 : 220 VDC ————  
 : 300 VDC - - - -  
 Ta : 25 °C

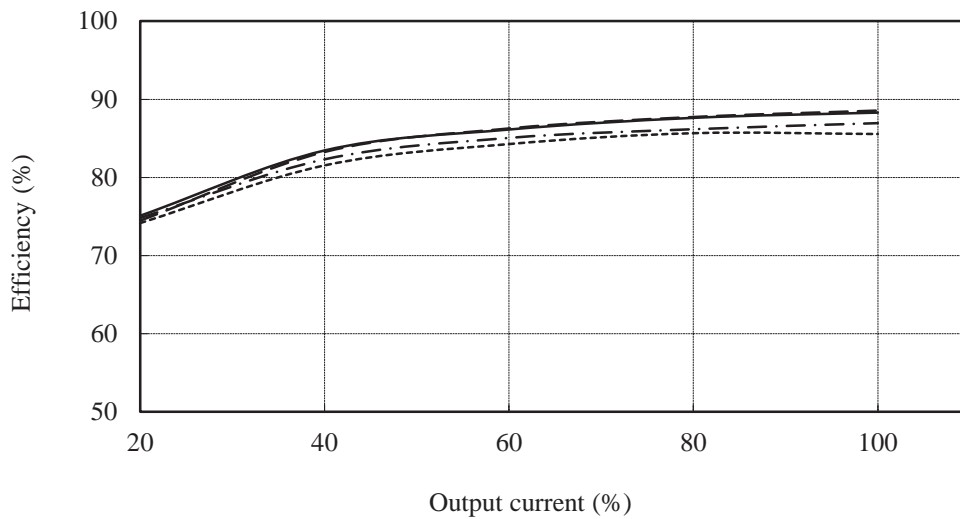
5V



12V



24V

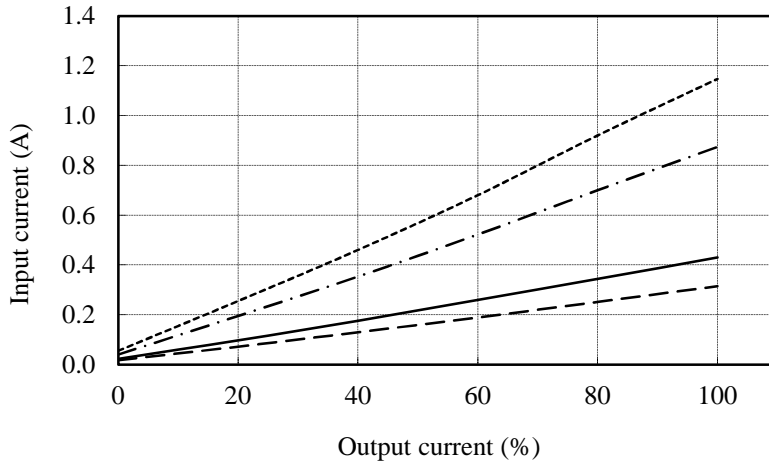


(3) 入力電流対出力電流

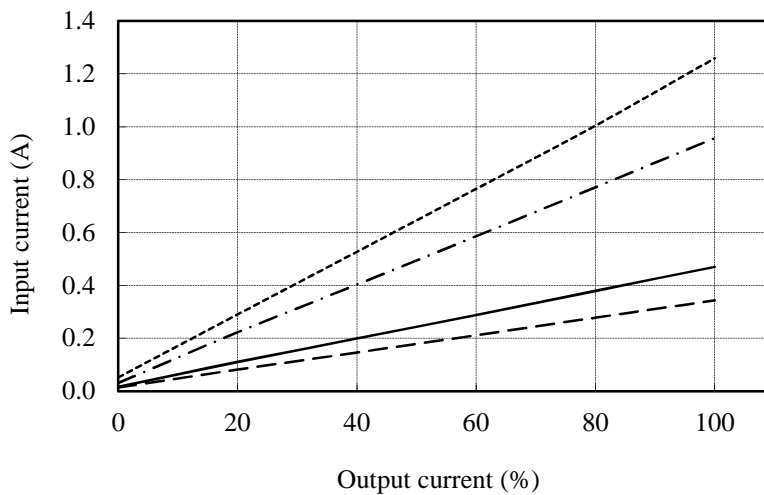
Input current vs. Output current

Conditions Vin : 88 VDC -----  
 : 110 VDC -.-.-.  
 : 220 VDC ———  
 : 300 VDC - - - -  
 Ta : 25 °C

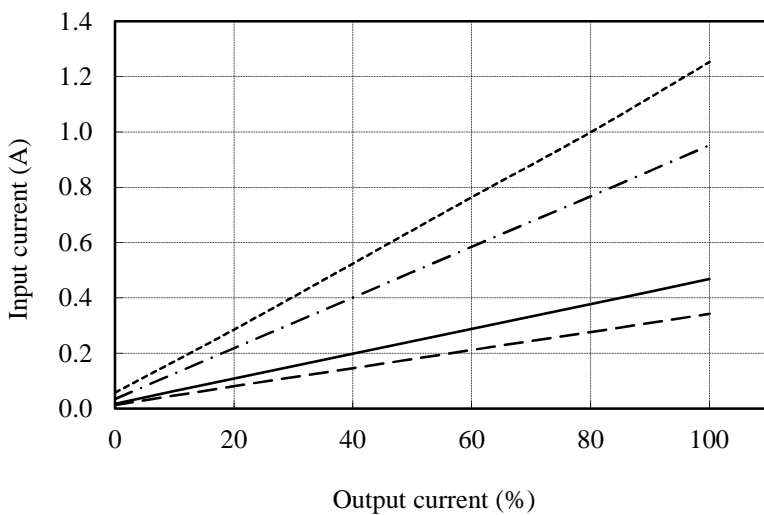
5V



12V



24V

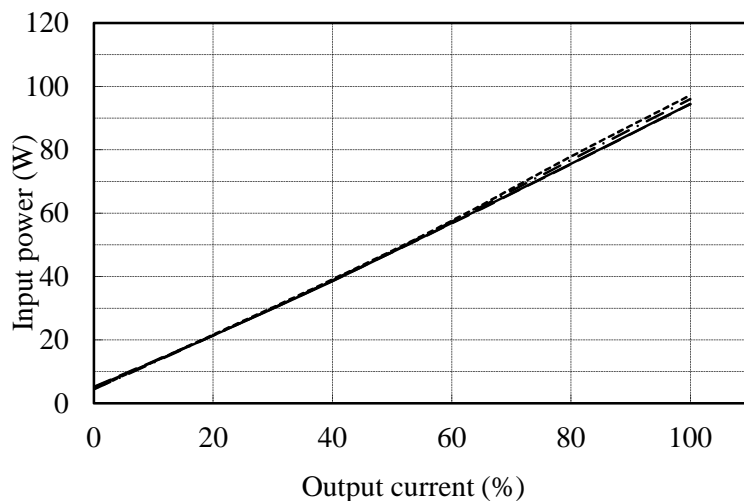




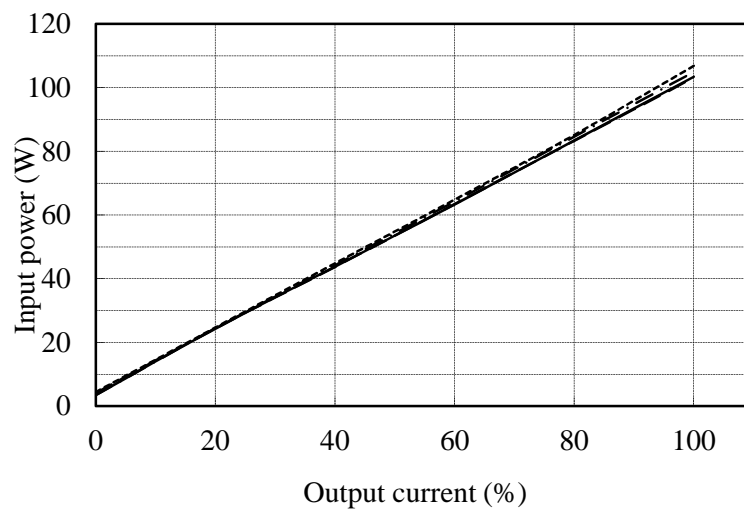
(4) 入力電力対出力電流  
Input power vs. Output current

Conditions Vin : 85 VDC -----  
 : 110 VDC -.-.-  
 : 220 VDC ———  
 : 300 VDC - - -  
 Ta : 25 °C

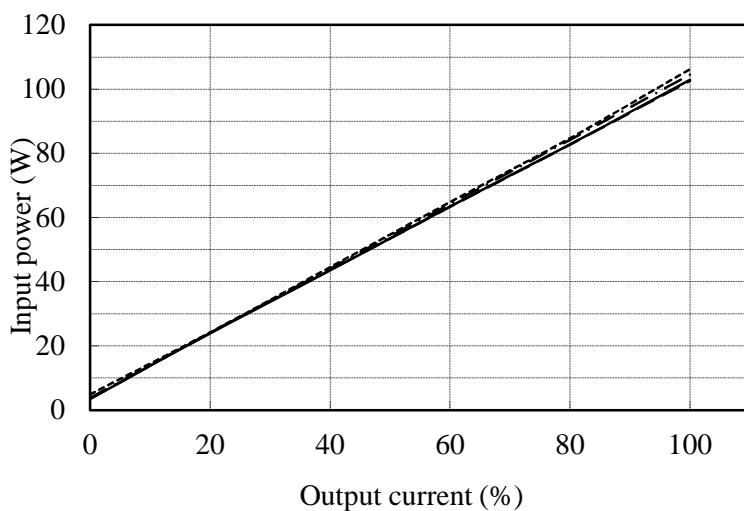
5V



12V



24V



2.2 過電流保護特性

Over current protection (OCP) characteristics

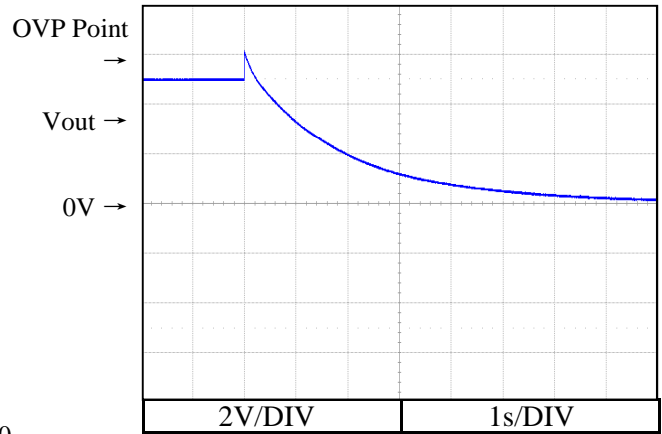
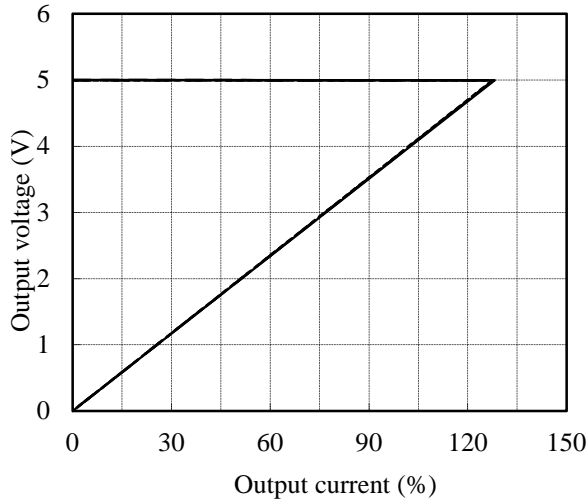
2.3 過電圧保護特性

Over voltage protection (OVP) characteristics

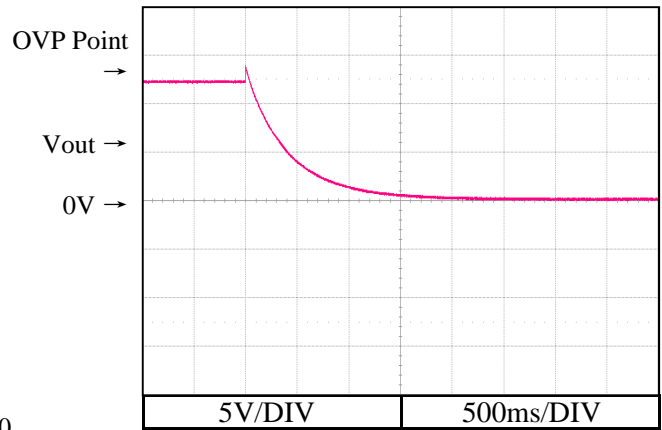
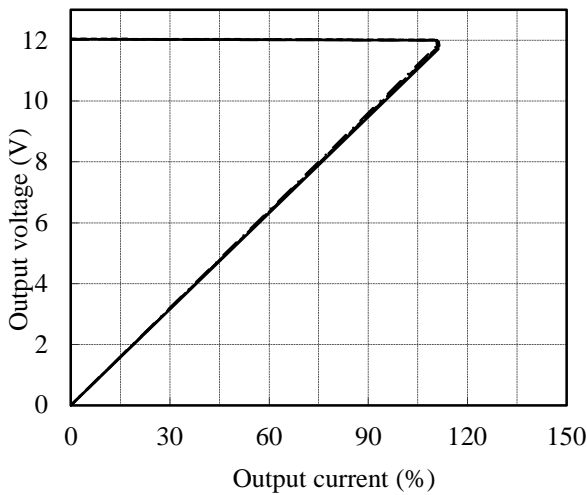
Conditions Vin : 85 VDC -----  
 110 VDC -.-.-.-.-  
 220 VDC ————  
 300 VDC - - - - -  
 Ta : 25 °C

Conditions Vin : 110 VDC  
 Iout : 0 %  
 Ta : 25 °C

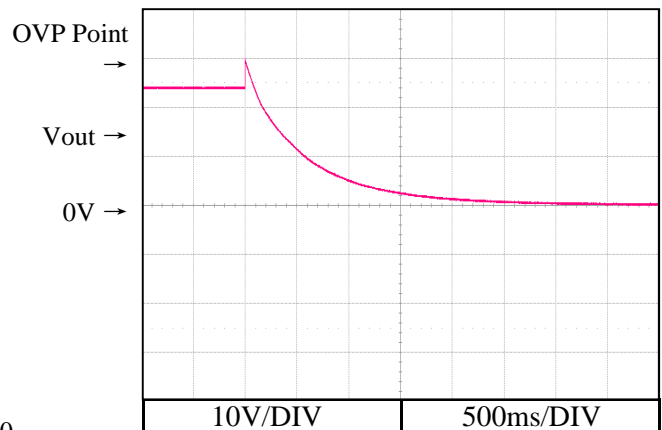
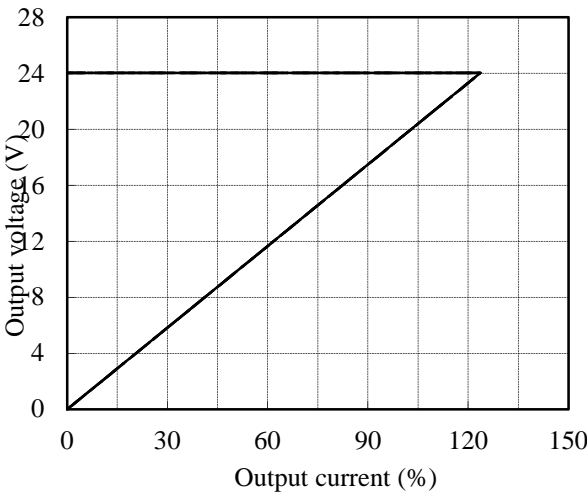
5V



12V



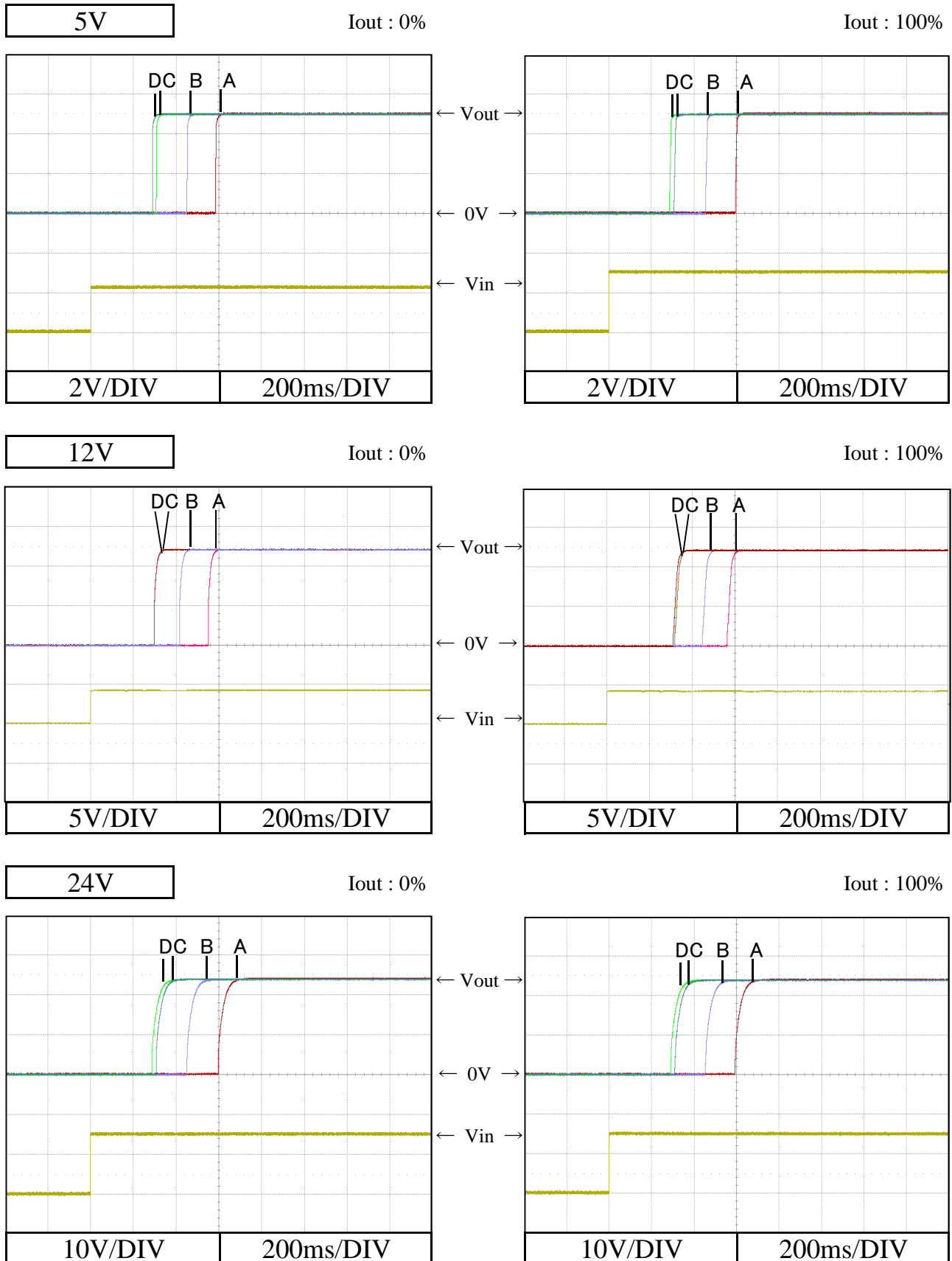
24V



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

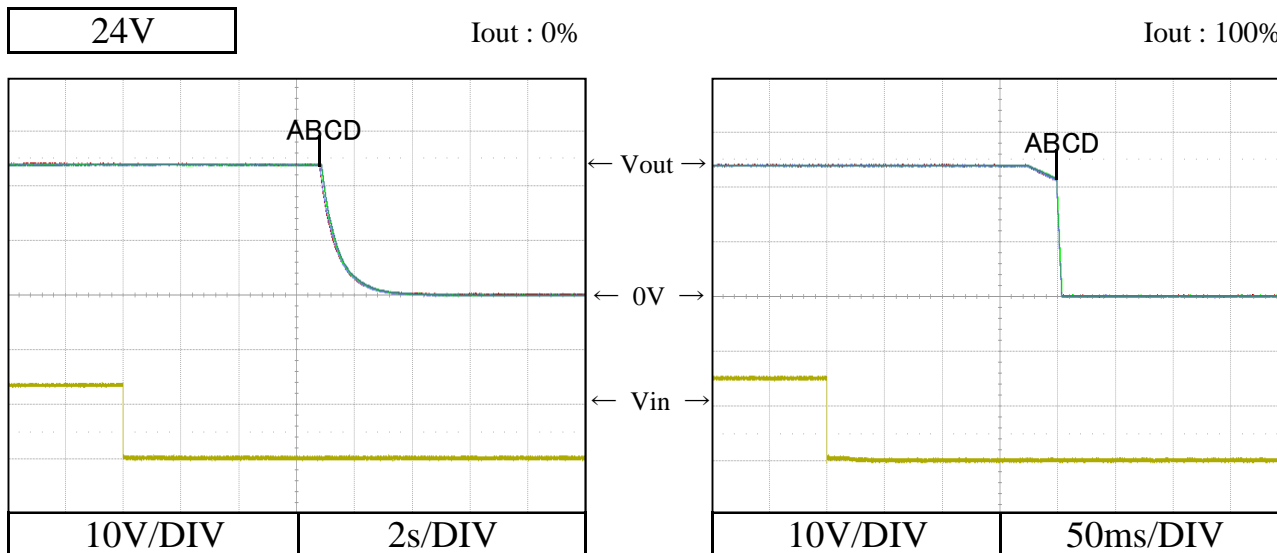
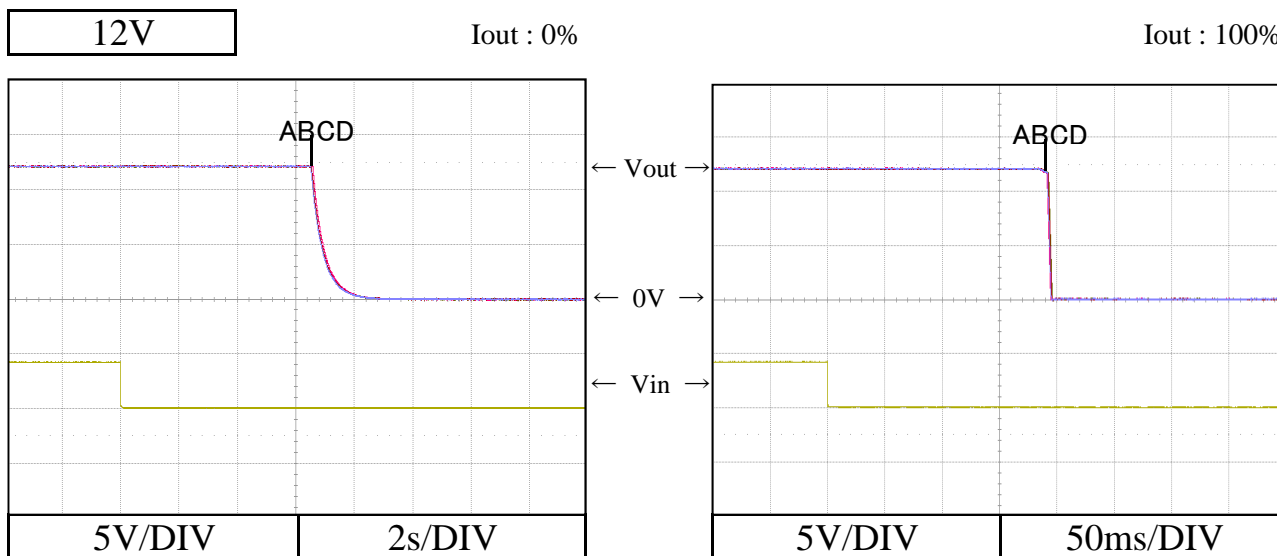
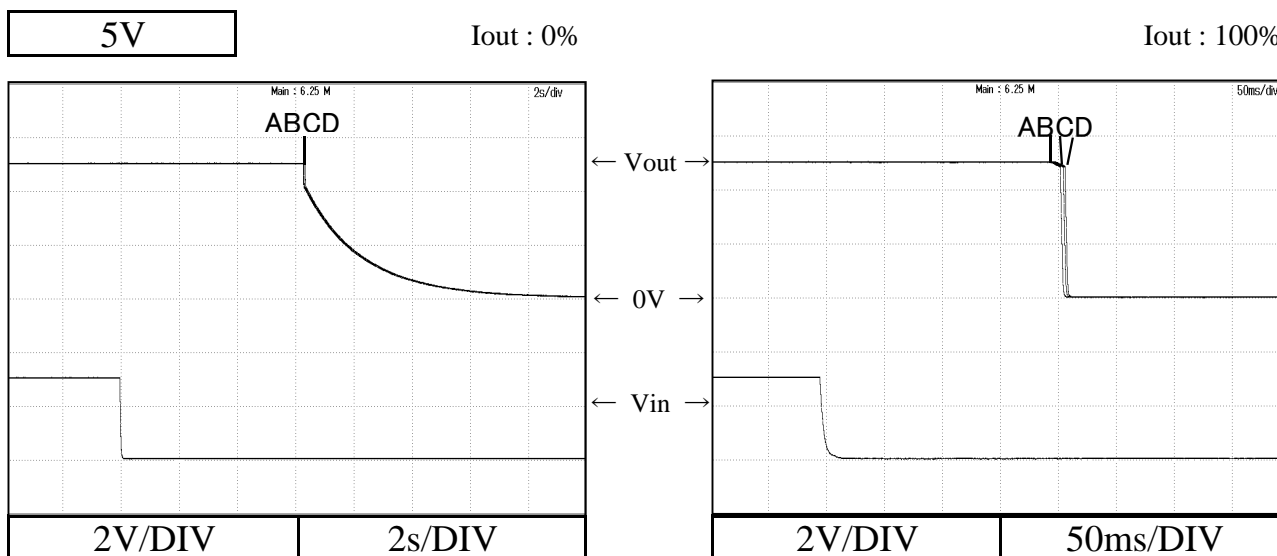
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Conditions Vin : 85 VDC (A)  
110 VDC (B)  
220 VDC (C)  
300 VDC (D)  
Ta : 25 °C



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

Conditions Vin : 85 VDC (A)  
110 VDC (B)  
220 VDC (C)  
300 VDC (D)  
Ta : 25 °C

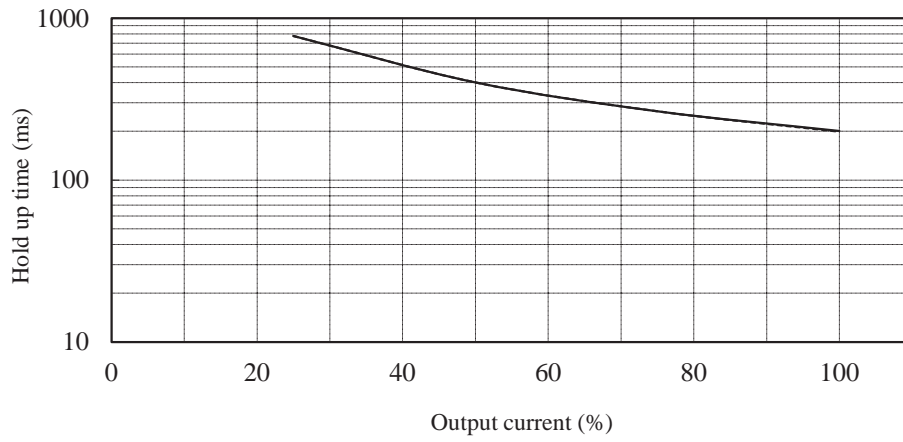


2.6 出力保持時間特性  
Hold up time characteristics

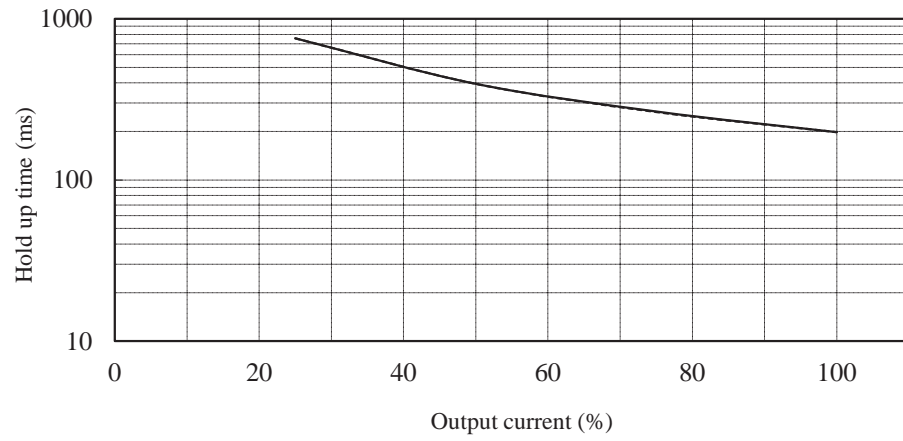
CUS90E

Conditions  $V_{in}$  : 110 VDC -----  
                  220 VDC       —  
 $T_a$  : 25 °C

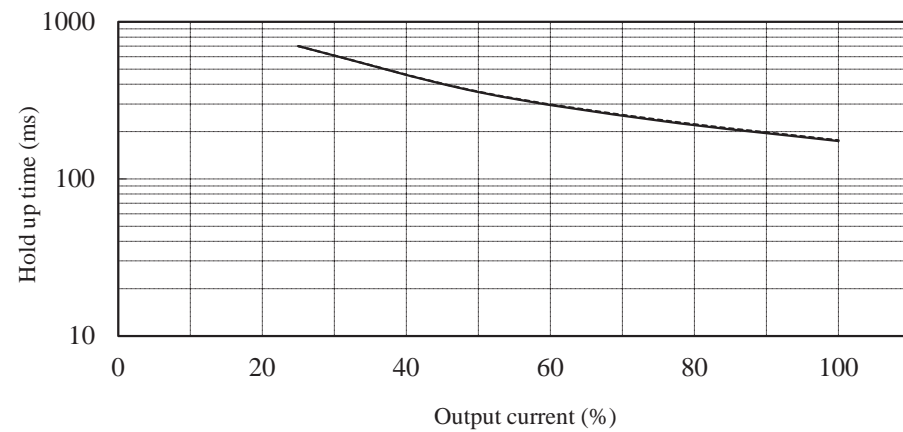
5V



12V



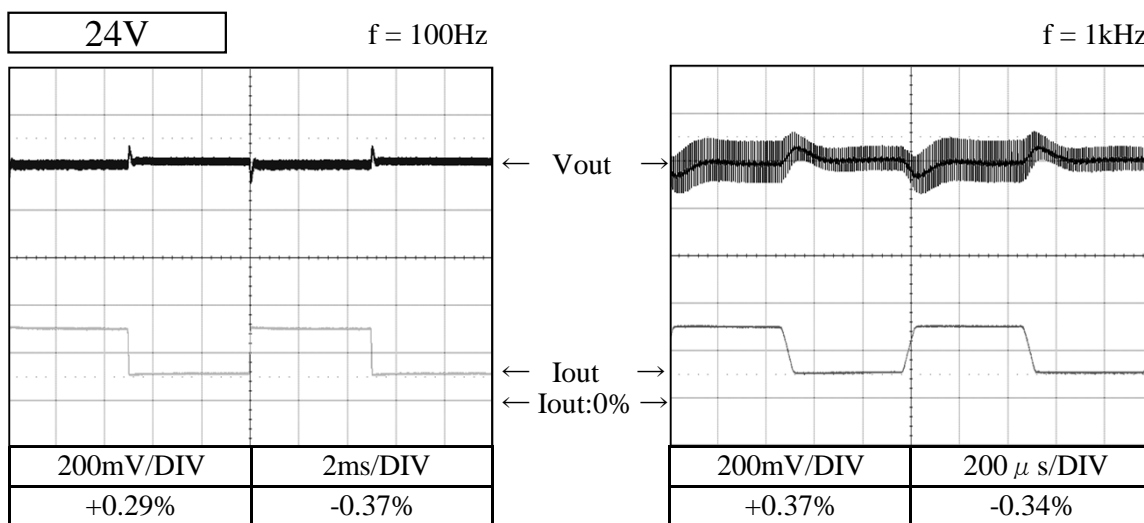
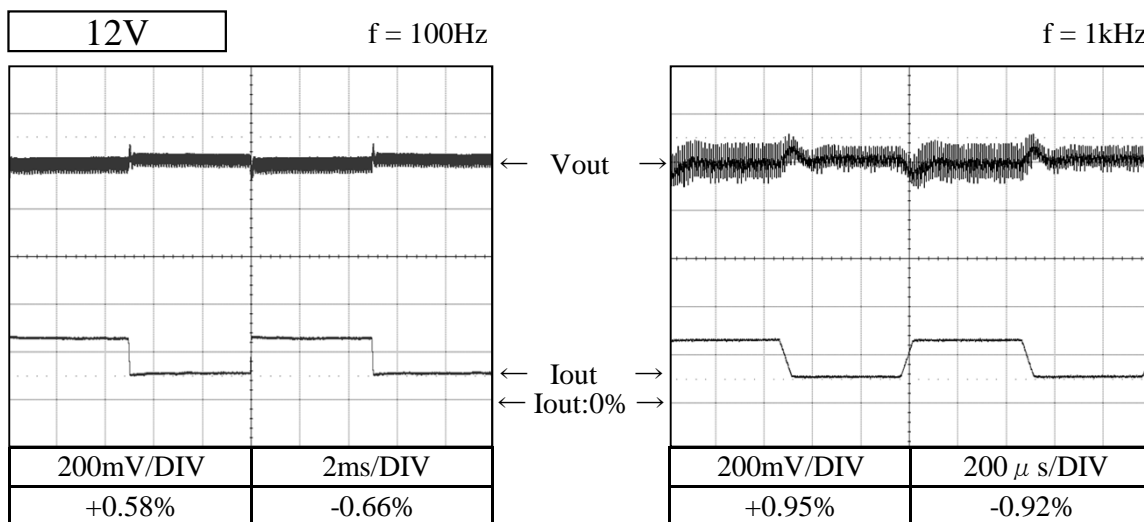
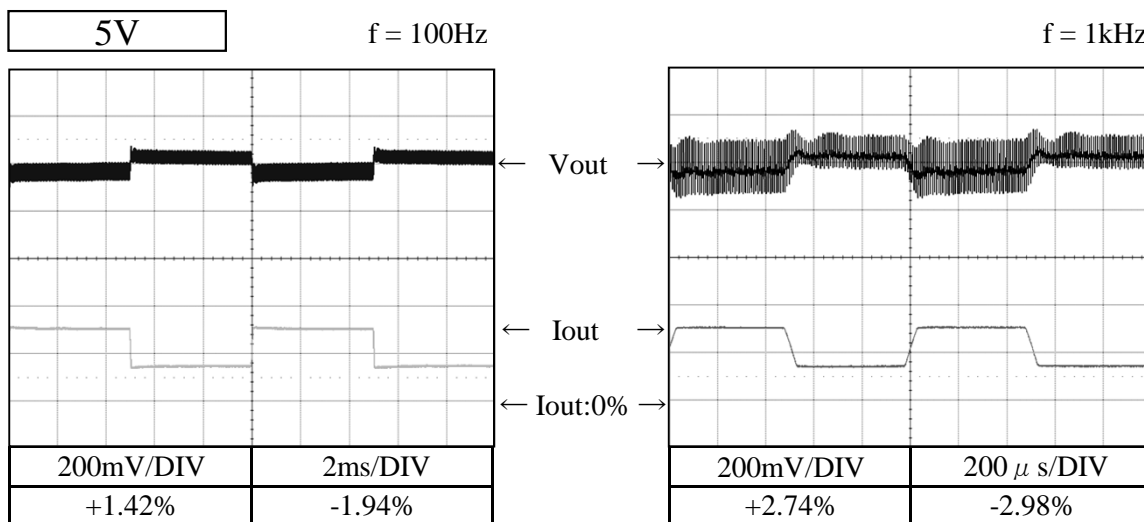
24V



2.7 過渡応答（負荷急変）特性

Dynamic load response characteristics

Conditions Vin : 110 VDC  
 Iout : 50 % ↔ 100 %  
 (tr = tf = 50us)  
 Ta : 25 °C

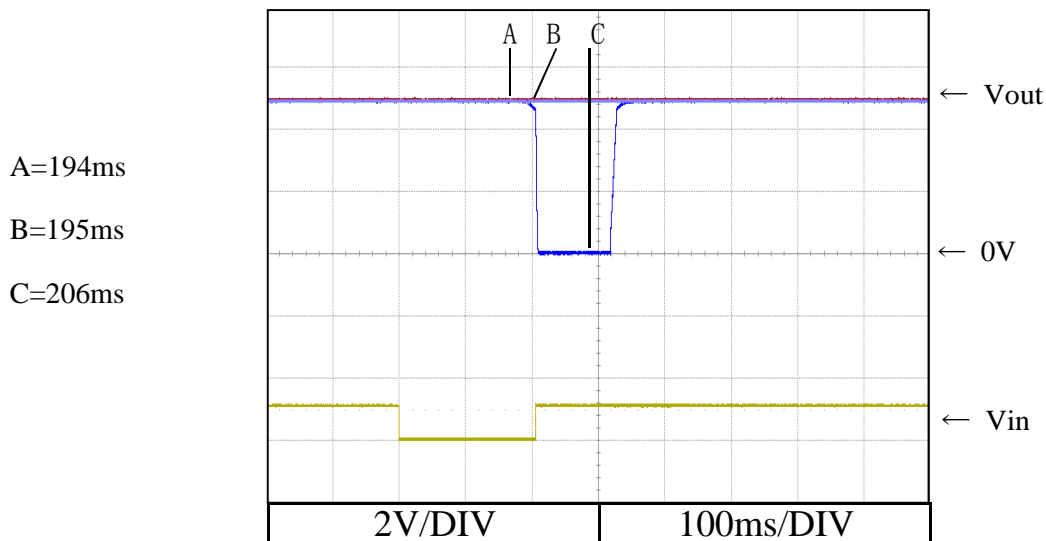


2.8 入力電圧瞬停特性

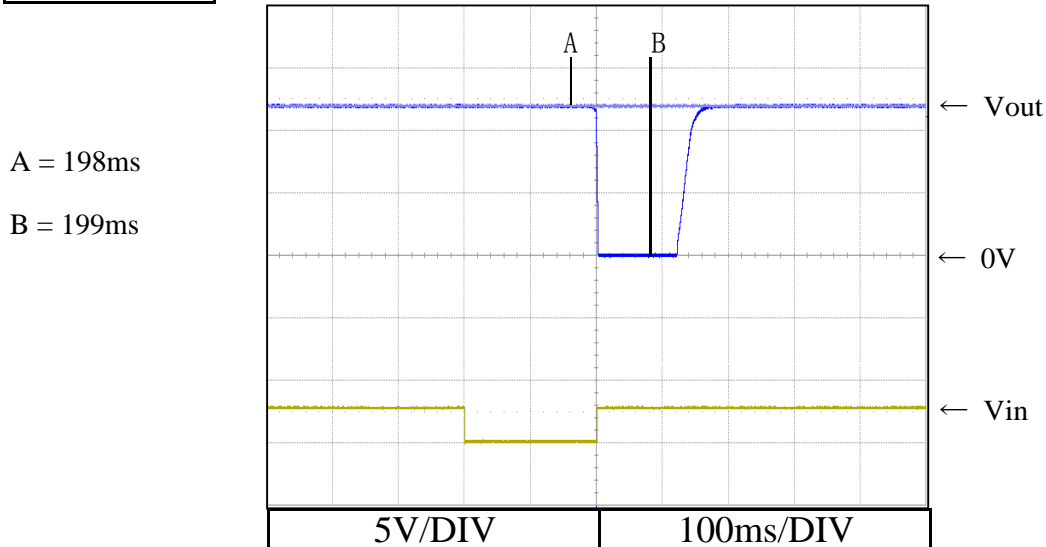
Response to brown out characteristics

Conditions Vin : 110 VDC  
Iout : 100 %  
Ta : 25 °C

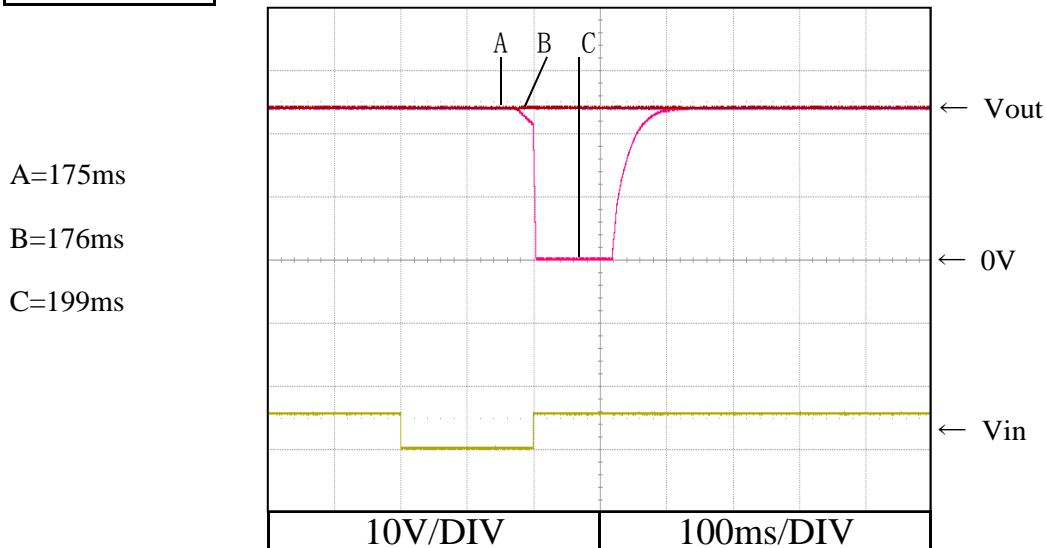
5V



12V



24V



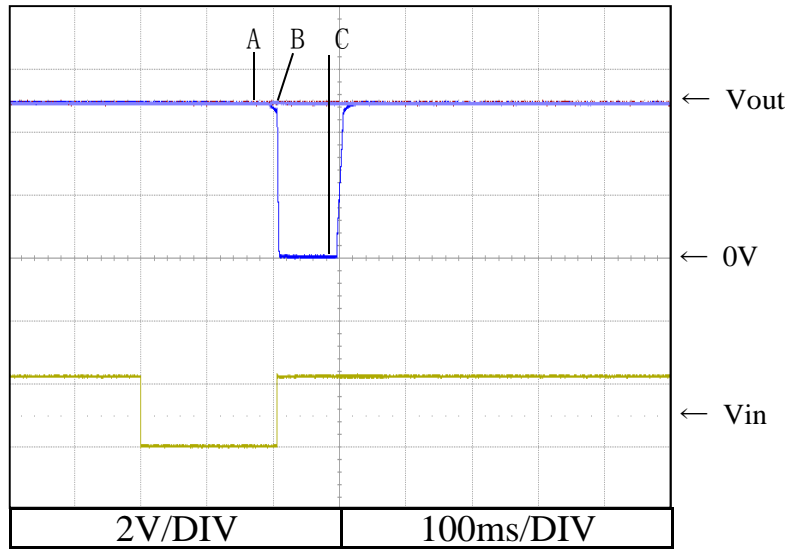
2.8 入力電圧瞬停特性

Response to brown out characteristics

Conditions Vin : 220 VDC  
Iout : 100 %  
Ta : 25 °C

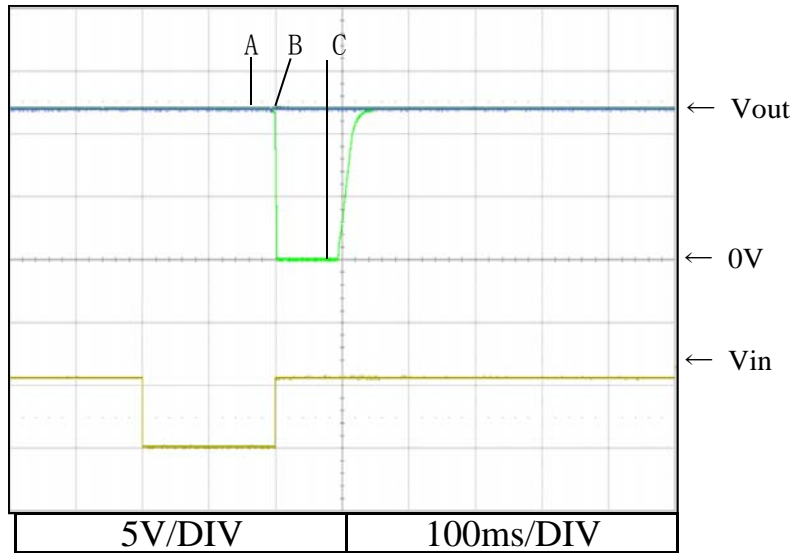
5V

A=194ms  
B=195ms  
C=206ms



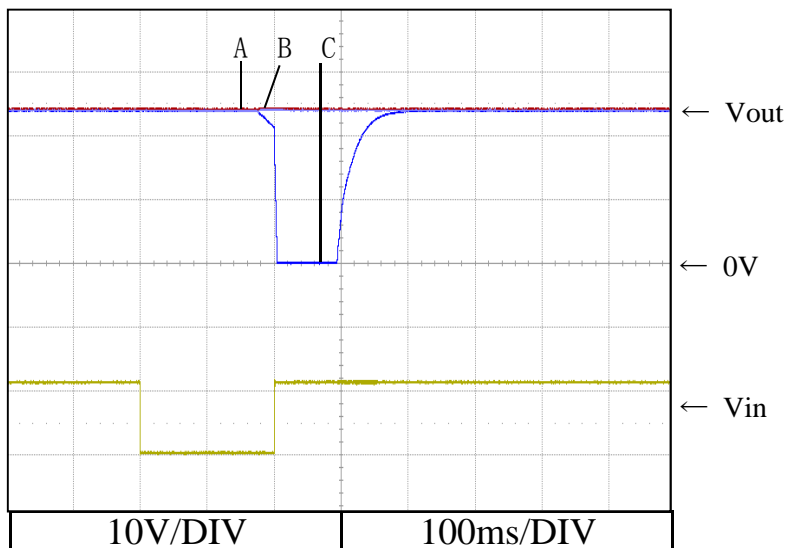
12V

A = 193ms  
B = 194ms  
C = 199ms



24V

A = 176ms  
B = 177ms  
C = 201ms

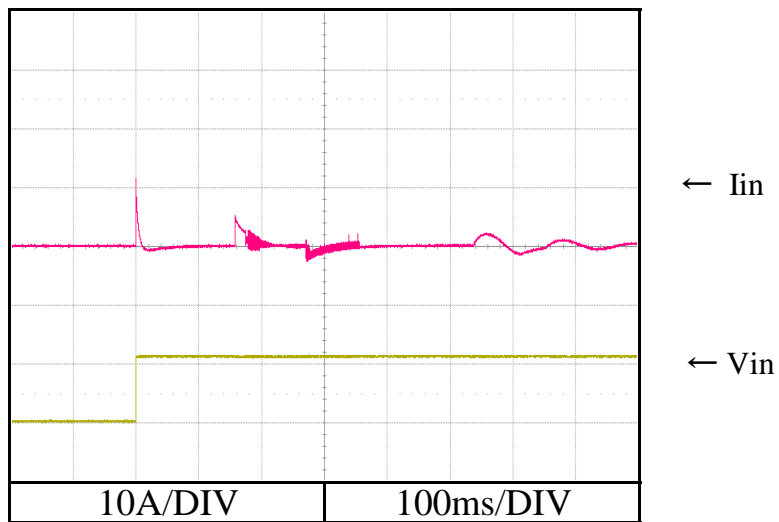




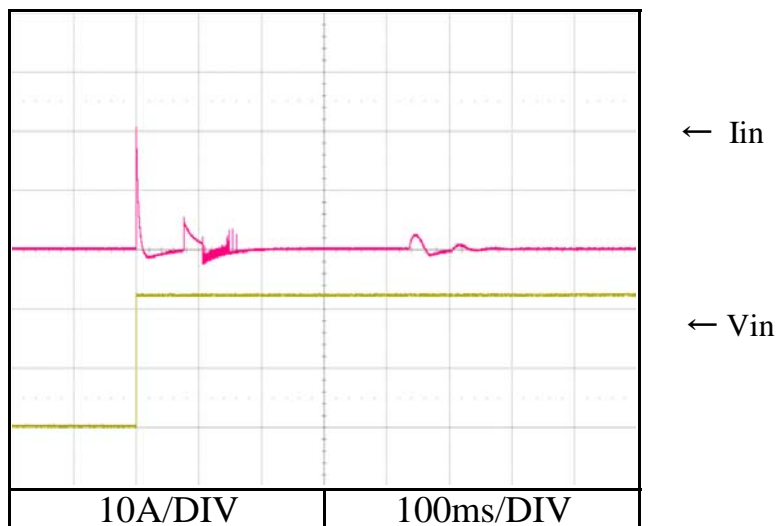
2.9 入力サージ電流 (突入電流) 波形  
Inrush current waveform

12V

Conditions Vin : 110 VDC  
Iout : 100 %  
Ta : 25 °C

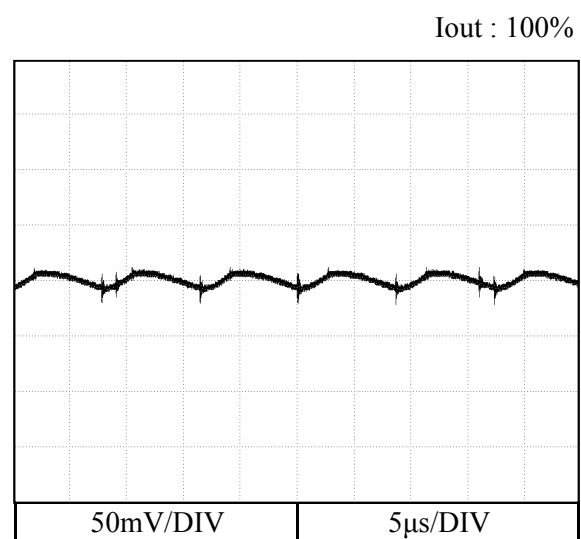
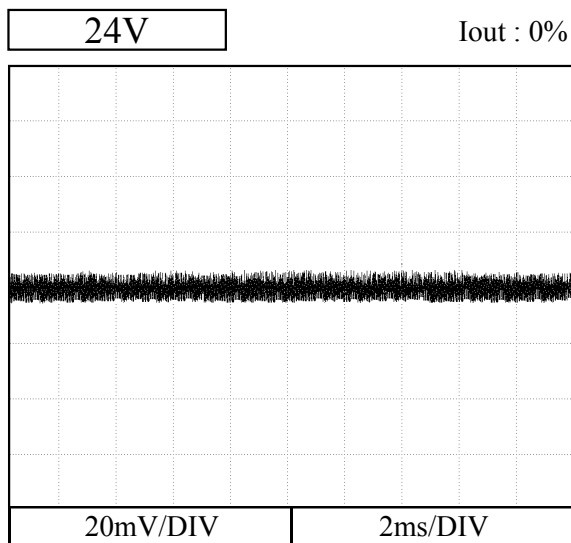
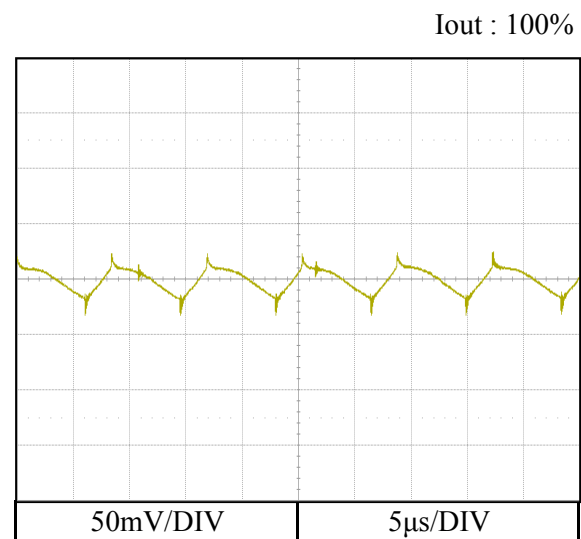
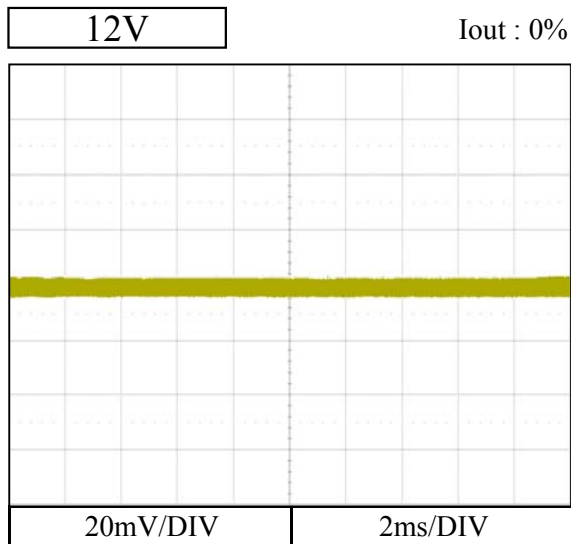
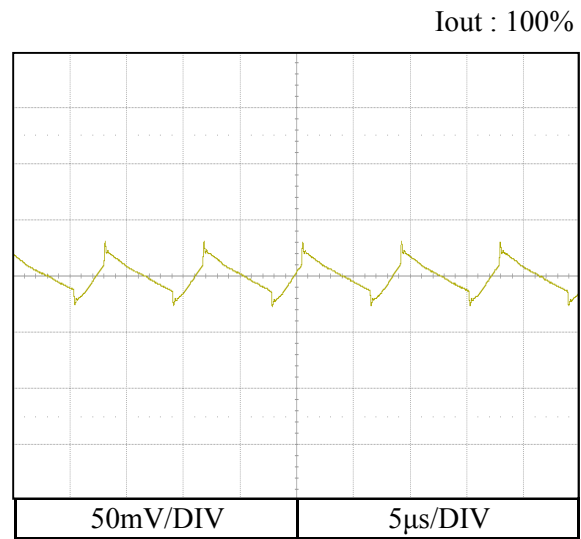
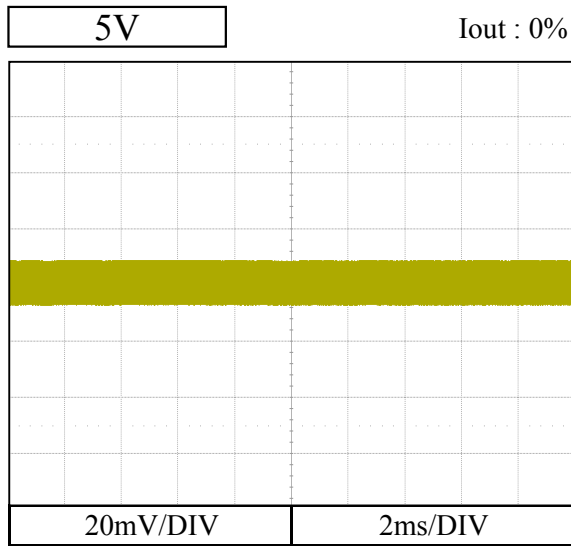


Conditions Vin : 220 VDC  
Iout : 100 %  
Ta : 25 °C



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

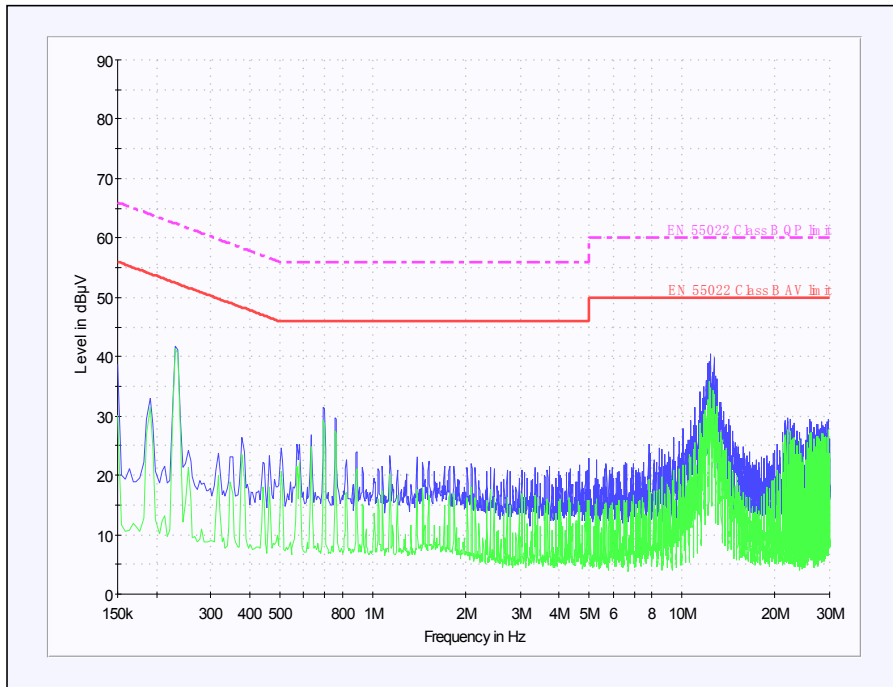
Conditions Vin : 110 VDC  
Ta : 25 °C



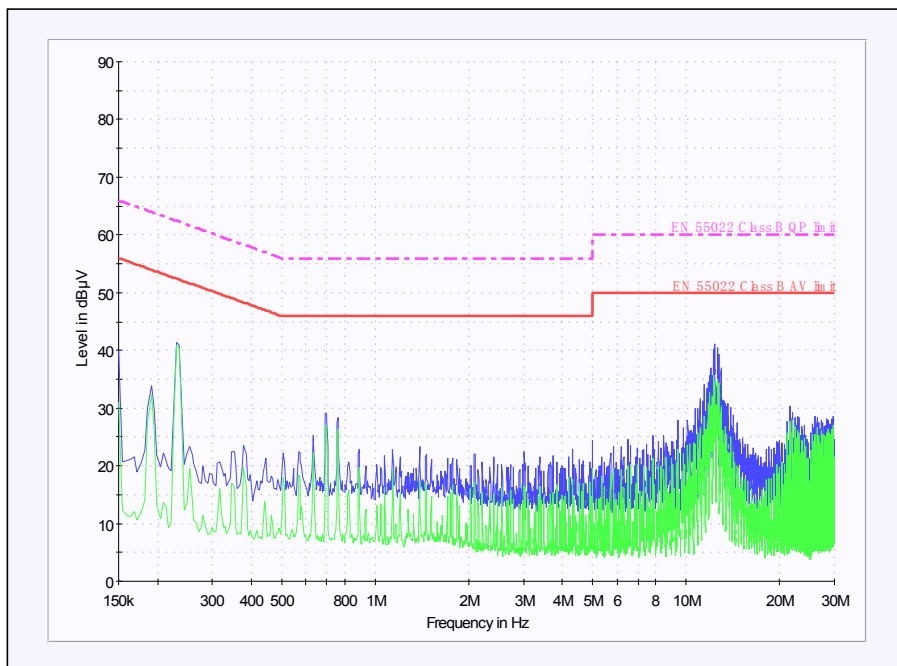
雑音端子電圧  
Conducted Emission

5V

Conditions Vin : 220 VDC  
Iout : 100 %  
Ta : 25 °C  
Polarity : +



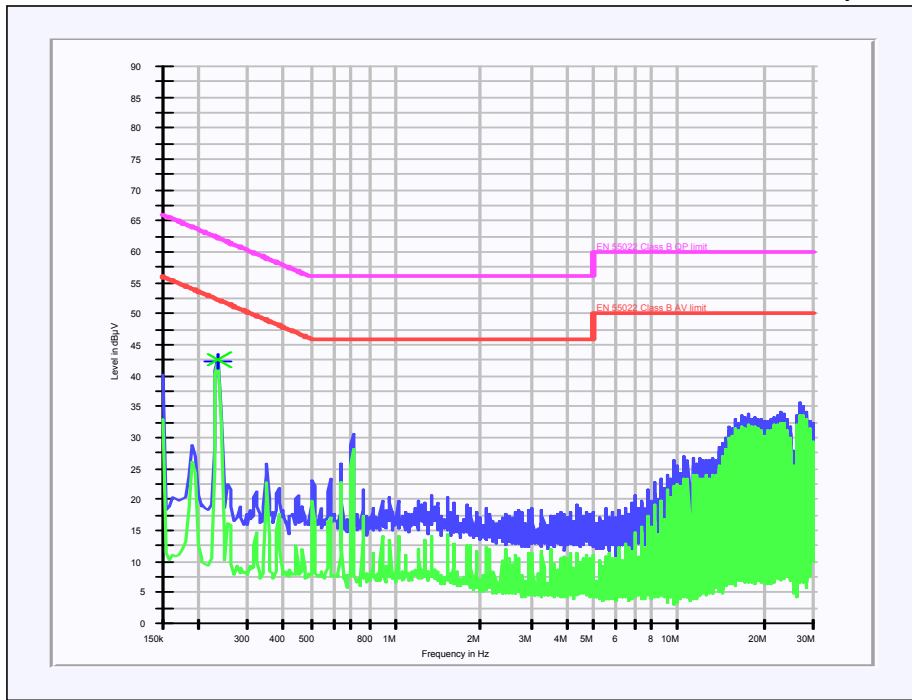
Polarity : -



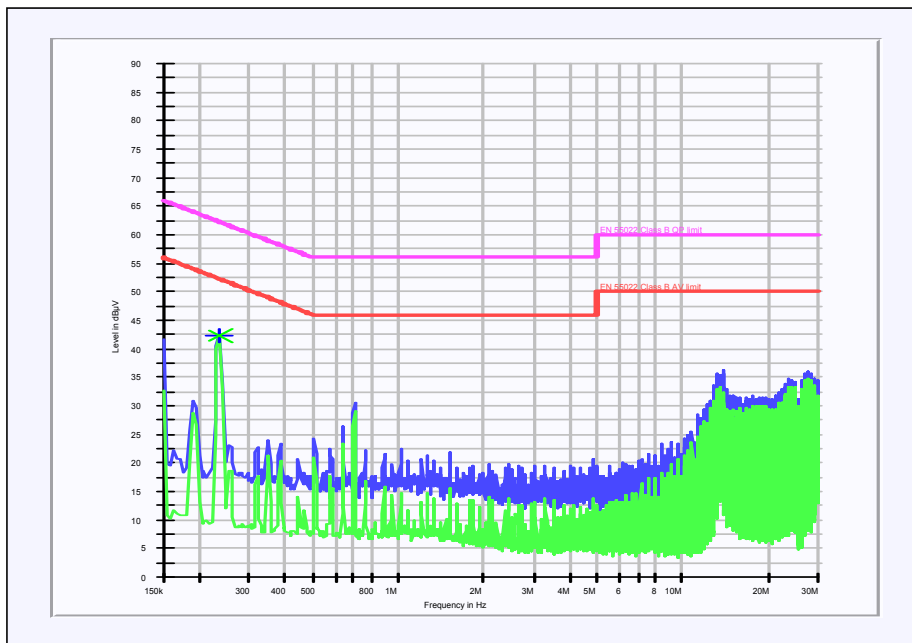
雑音端子電圧  
Conducted Emission

12V

Conditions Vin : 220 VDC  
Iout : 100 %  
Ta : 25 °C  
Polarity : +



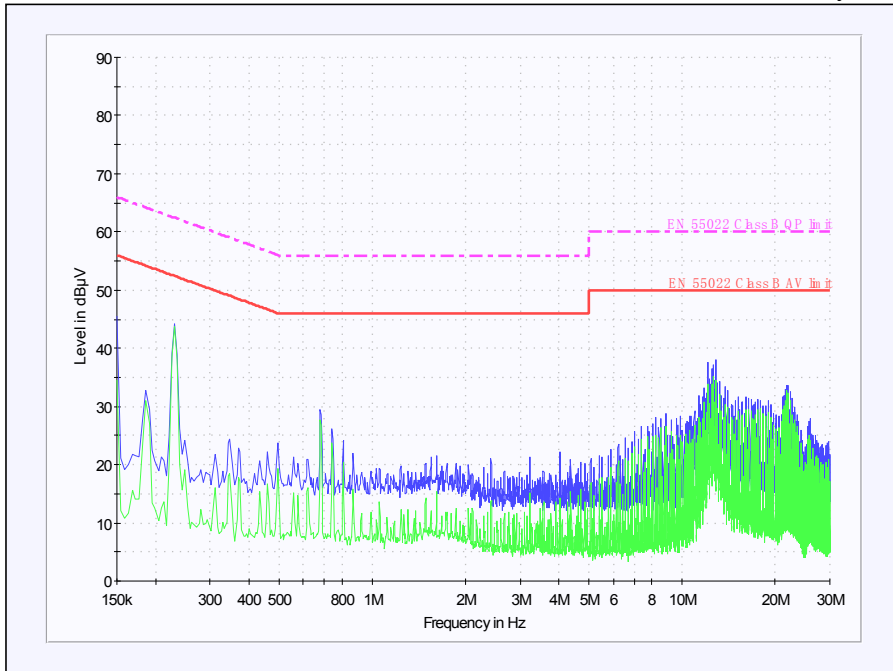
Polarity : -



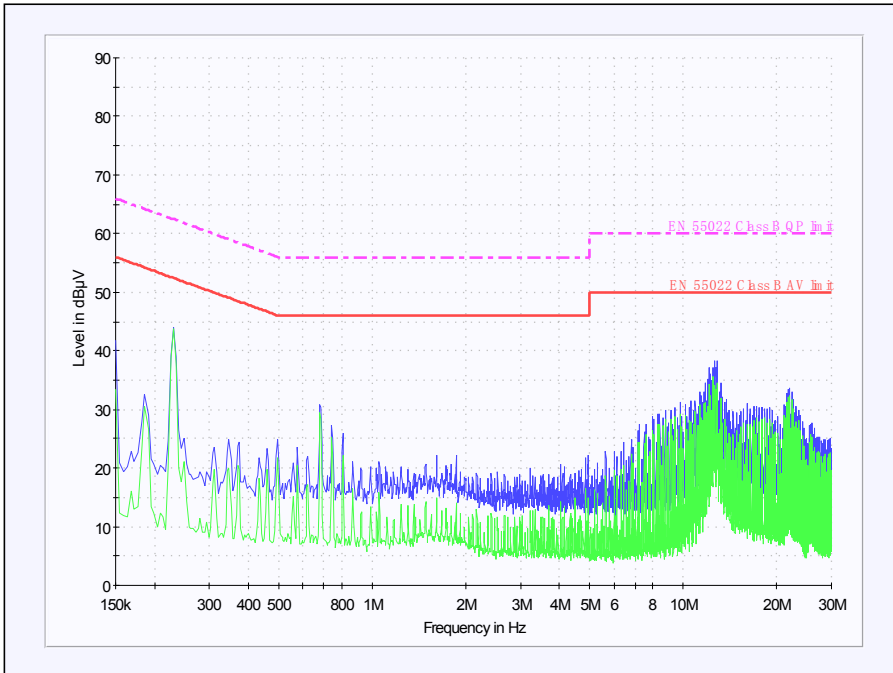
雑音端子電圧  
Conducted Emission

24V

Conditions Vin : 220 VDC  
Iout : 100 %  
Ta : 25 °C  
Polarity : +



Polarity : -



2.12 EMI 特性  
Electro-Magnetic Interference characteristics

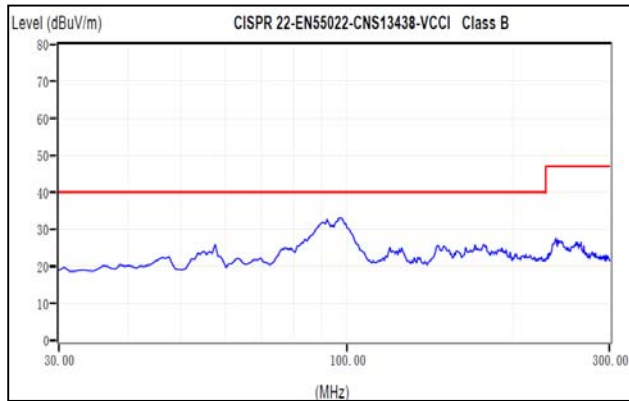
CUS90E

Conditions Vin: 230VAC  
Io: 100%  
Ta: 25°C

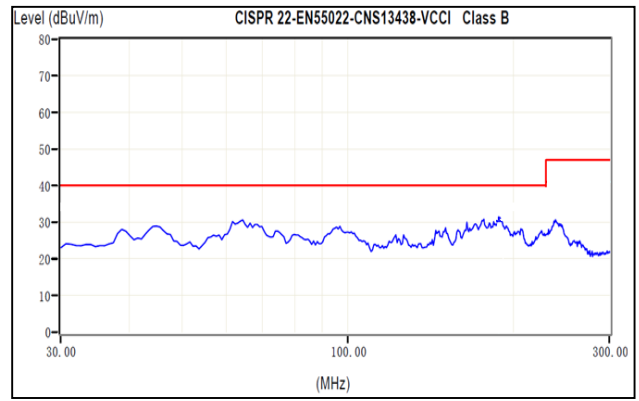
雑音電界強度  
Radiated Emission

5V

HORIZONTAL

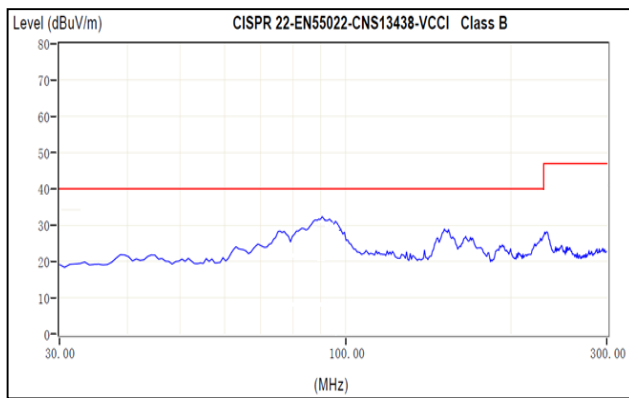


VERTICAL

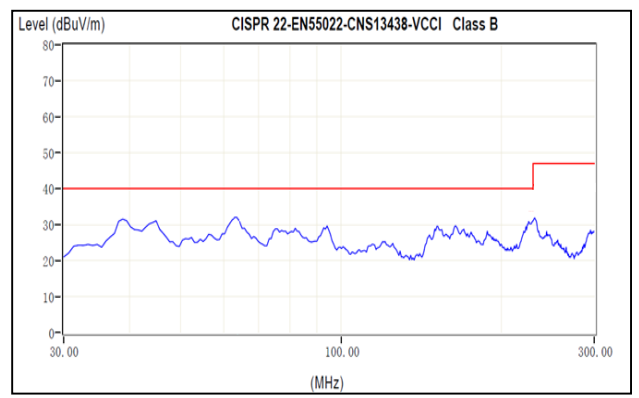


12V

HORIZONTAL

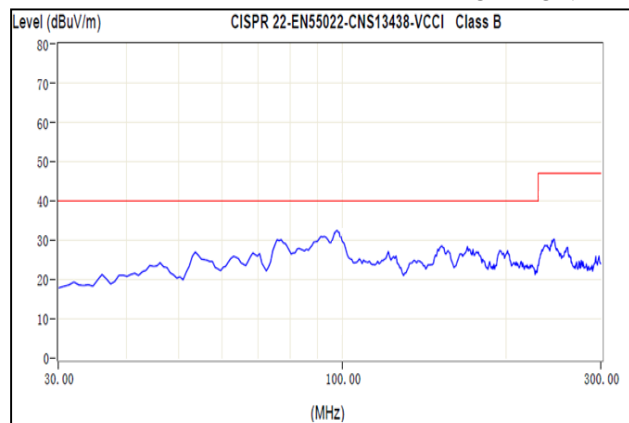


VERTICAL

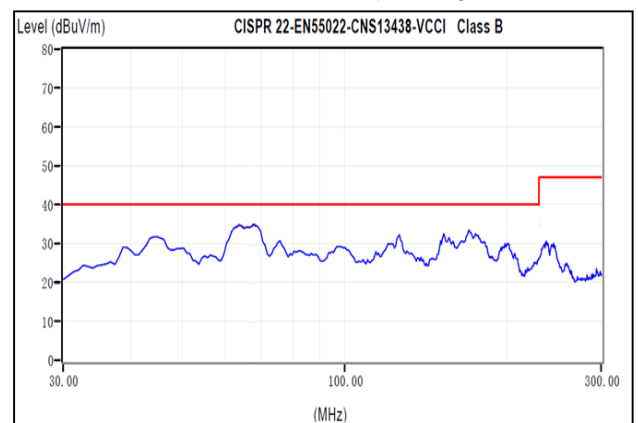


24V

HORIZONTAL



VERTICAL



EN55011-B,EN55022-Bの限界値はVCCI class Bの限界値と同じ  
Limit of EN55011-B,EN55022-B are same as its VCCI class B.

表示はピーク値  
Indication is peak values.