

CUS30E

EVALUATION DATA

型式データ

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## 使用記号 Terminology used

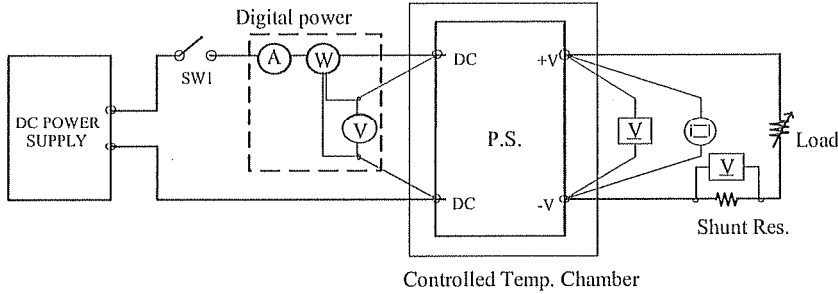
	定義	Definition
$V_{in}$	..... 入力電圧	Input voltage
$V_{out}$	..... 出力電圧	Output voltage
$I_{in}$	..... 入力電流	Input current
$I_{out}$	..... 出力電流	Output current
$T_a$	..... 周囲温度	Ambient temperature
$f$	..... 周波数	Frequency

1. 測定方法 Evaluation Method

1.1 測定回路 Circuit used for determination

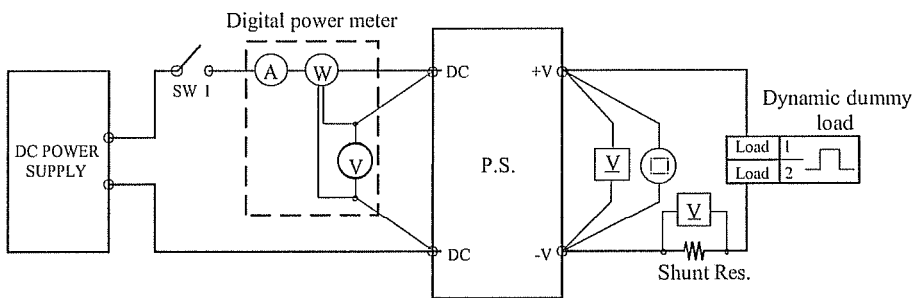
測定回路1 Circuit 1 used for determination

- ・ 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

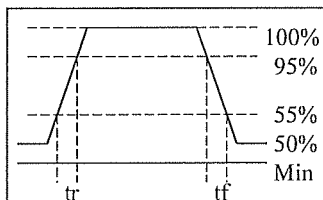


測定回路2 Circuit 2 used for determination

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

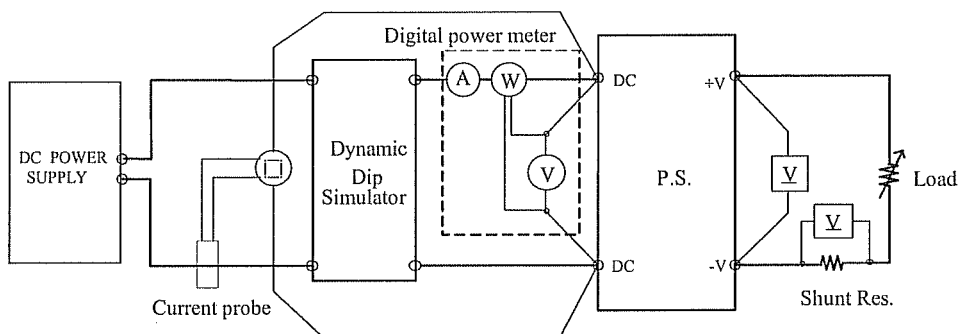


Output current waveform



測定回路3 Circuit 3 used for determination

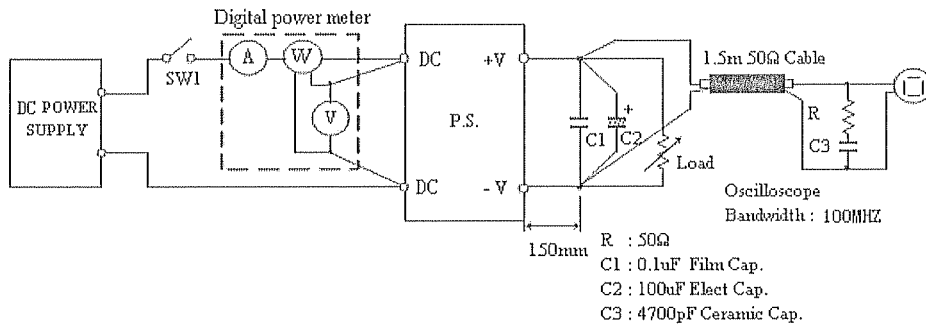
- ・ 入力サージ電流(突入電流) 波形 Inrush current waveform



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



## 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

## 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

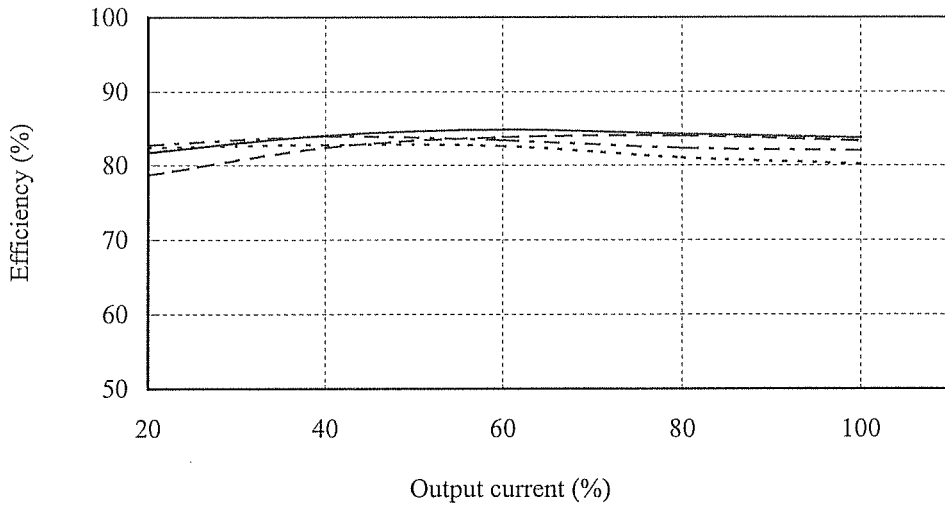
5V		1. Regulation - line and load				Condition Ta : 25 °C	
Iout \ Vin	88VDC	110VDC	220VDC	370VDC	line regulation		
0%	4.998V	4.998V	4.998V	4.998V	0mV	0.000%	
50%	4.997V	4.997V	4.997V	4.997V	0mV	0.000%	
100%	4.997V	4.997V	4.997V	4.997V	0mV	0.000%	
load	1mV	1mV	1mV	1mV			
regulation	0.020%	0.020%	0.020%	0.020%			
		2. Temperature drift				Conditions Vin : 110 VDC Iout : 100 %	
Ta	-10°C	+25°C	+50°C	temperature stability			
Vout	4.999V	4.997V	4.994V	5mV	0.100%		
		3. Start up voltage and Drop out voltage				Conditions Ta : 25 °C Iout : 100 %	
Start up voltage (Vin)		56VDC					
Drop out voltage (Vin)		47VDC					
12V		1. Regulation - line and load				Condition Ta : 25 °C	
Iout \ Vin	88VDC	110VDC	220VDC	370VDC	line regulation		
0%	11.999V	11.999V	11.999V	11.999V	0mV	0.000%	
50%	11.997V	11.997V	11.997V	11.997V	0mV	0.000%	
100%	11.997V	11.997V	11.997V	11.997V	0mV	0.000%	
load	2mV	2mV	2mV	2mV			
regulation	0.017%	0.017%	0.017%	0.017%			
		2. Temperature drift				Conditions Vin : 110 VDC Iout : 100 %	
Ta	-10°C	+25°C	+50°C	temperature stability			
Vout	12.020V	11.997V	11.991V	29mV	0.242%		
		3. Start up voltage and Drop out voltage				Conditions Ta : 25 °C Iout : 100 %	
Start up voltage (Vin)		51VDC					
Drop out voltage (Vin)		42VDC					
24V		1. Regulation - line and load				Condition Ta : 25 °C	
Iout \ Vin	88VDC	110VDC	220VDC	370VDC	line regulation		
0%	24.004V	24.004V	24.004V	24.004V	0mV	0.000%	
50%	24.003V	24.003V	24.003V	24.003V	0mV	0.000%	
100%	24.003V	24.003V	24.003V	24.003V	0mV	0.000%	
load	1mV	1mV	1mV	1mV			
regulation	0.004%	0.004%	0.004%	0.004%			
		2. Temperature drift				Conditions Vin : 110 VDC Iout : 100 %	
Ta	-10°C	+25°C	+50°C	temperature stability			
Vout	24.019V	24.003V	23.985V	34mV	0.142%		
		3. Start up voltage and Drop out voltage				Conditions Ta : 25 °C Iout : 100 %	
Start up voltage (Vin)		58VDC					
Drop out voltage (Vin)		44VDC					

(2) 効率対出力電流

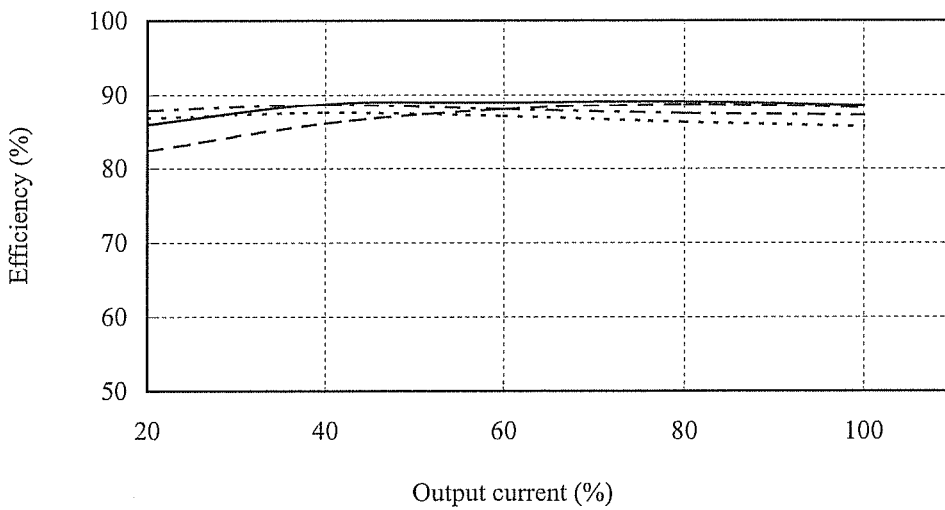
Efficiency vs. Output current

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

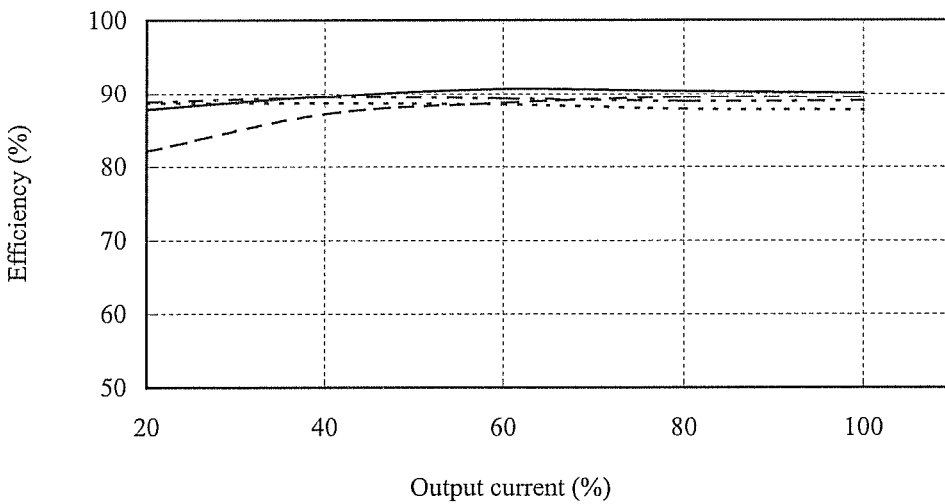
5V



12V



24V



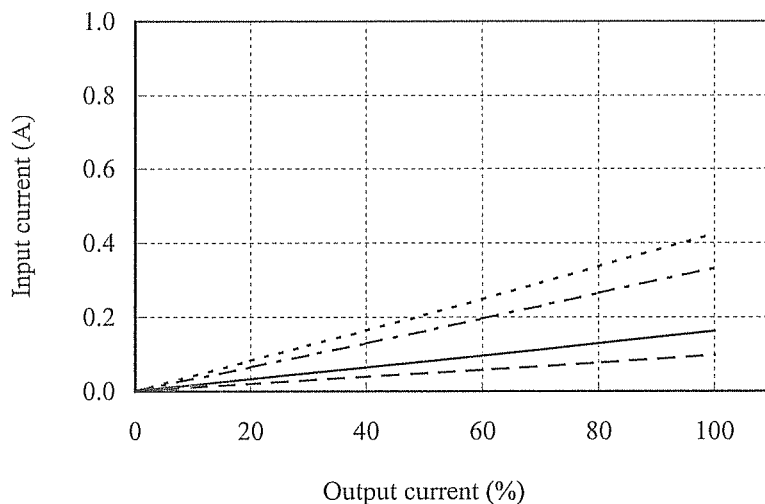
(3) 入力電流対出力電流  
Input current vs. Output current

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

5V

Io: 0%

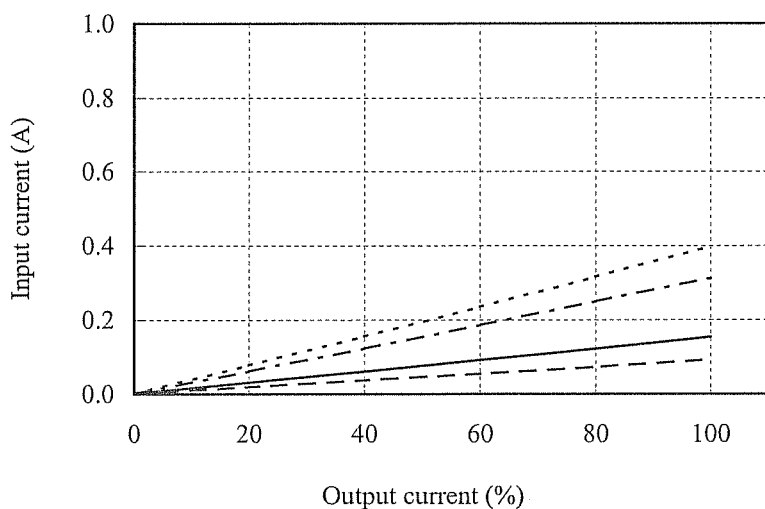
Vin	Input current
88 VDC	0.001A
110 VDC	0.001A
220 VDC	0.001A
370 VDC	0.002A



12V

Io: 0%

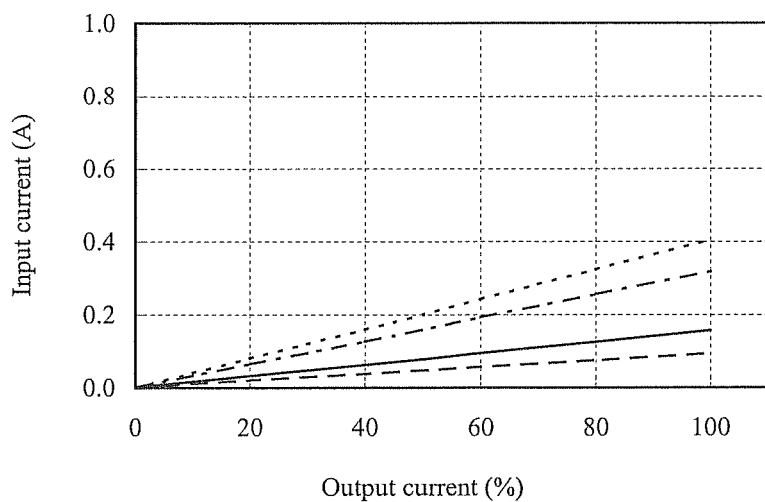
Vin	Input current
88 VDC	0.001A
110 VDC	0.001A
220 VDC	0.001A
370 VDC	0.002A



24V

Io: 0%

Vin	Input current
88 VDC	0.001A
110 VDC	0.001A
220 VDC	0.001A
370 VDC	0.002A





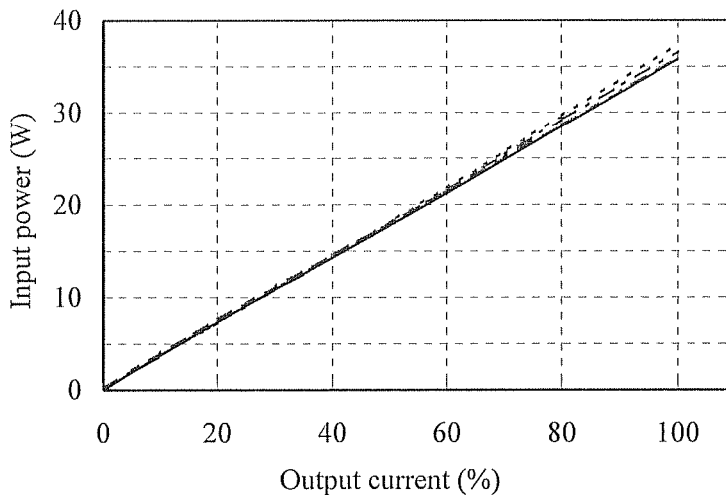
(4) 入力電力対出力電流  
Input power vs. Output current

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

5V

Io: 0%

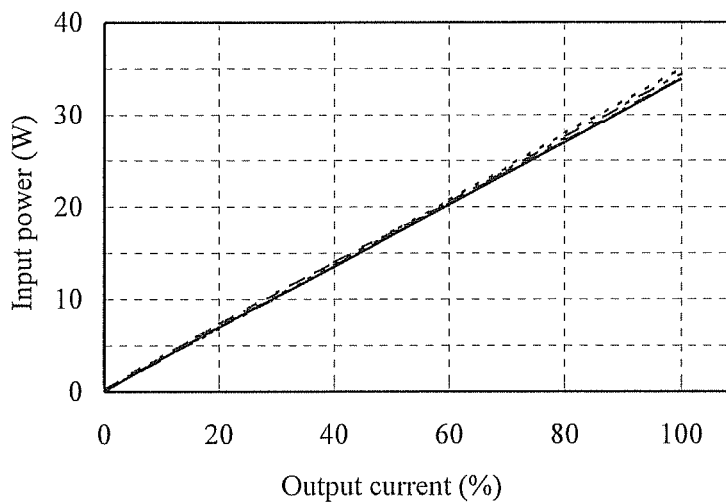
Vin	Input power
88 VDC	0.01W
110 VDC	0.03W
220 VDC	0.05W
370 VDC	0.21W



12V

Io: 0%

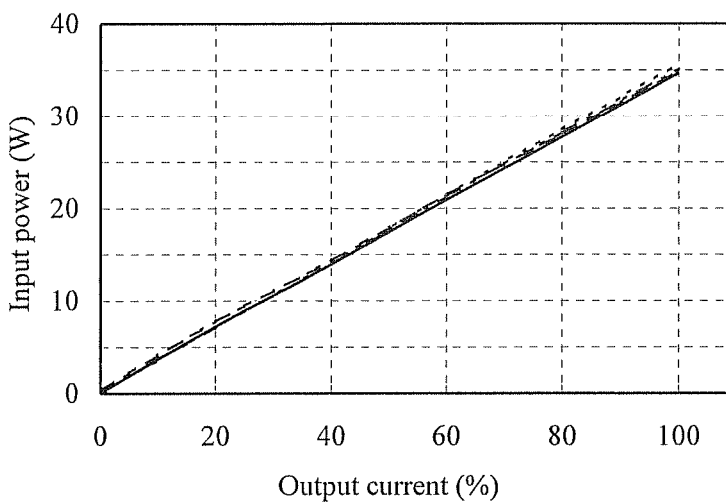
Vin	Input power
88 VDC	0.01W
110 VDC	0.02W
220 VDC	0.05W
370 VDC	0.18W



24V

Io: 0%

Vin	Input power
88 VDC	0.01W
110 VDC	0.02W
220 VDC	0.05W
370 VDC	0.26W

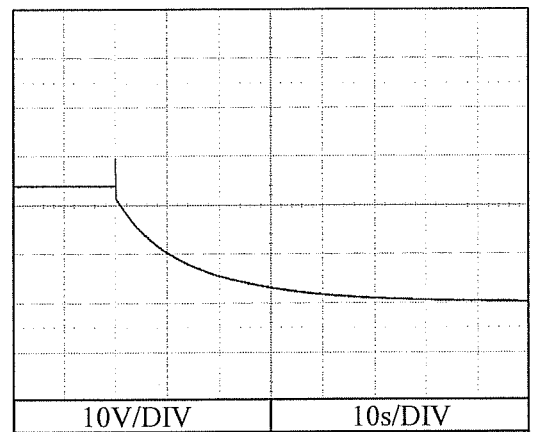
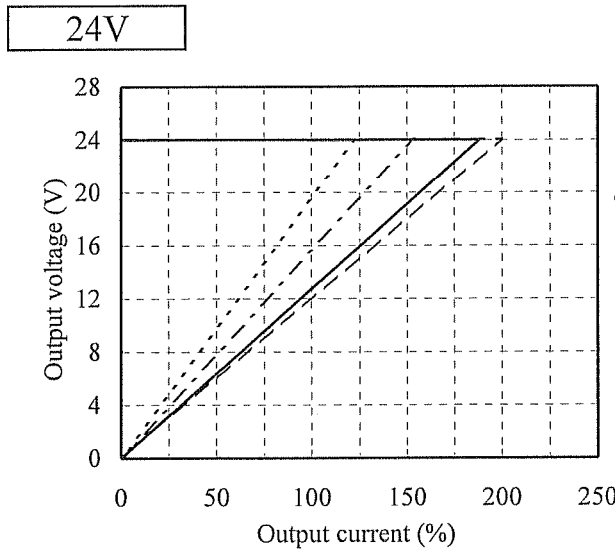
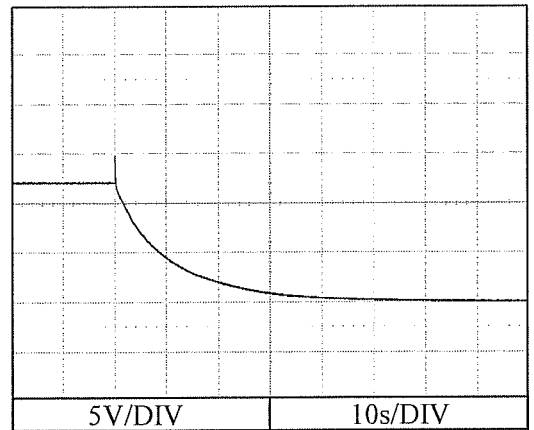
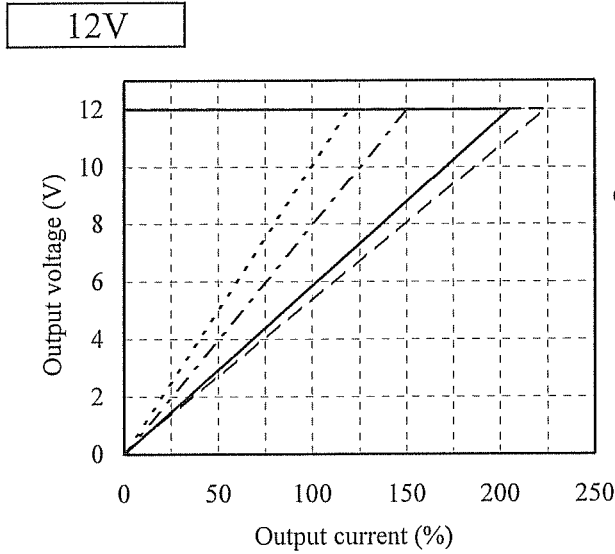
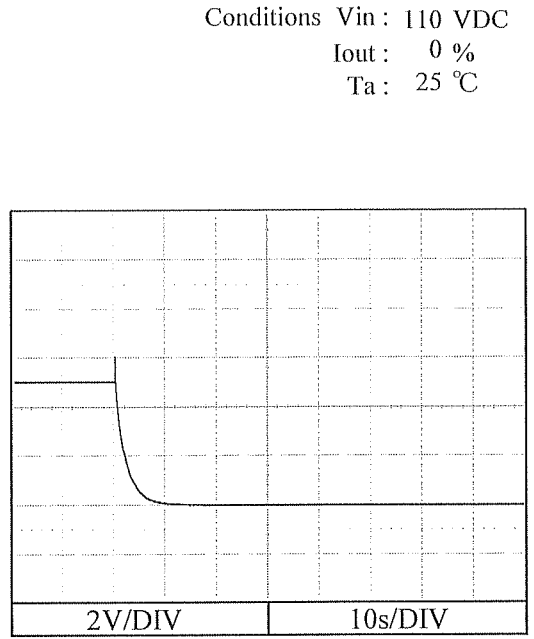
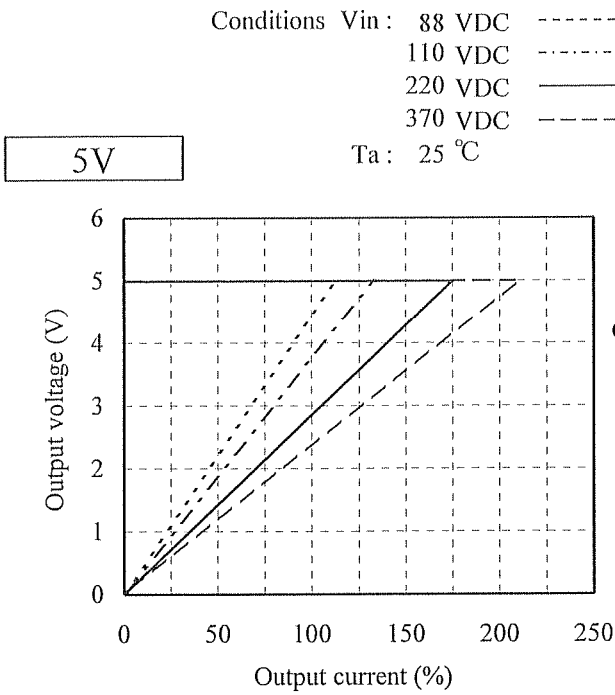


2.2 過電流保護特性

Over current protection (OCP) characteristics

2.3 過電圧保護特性

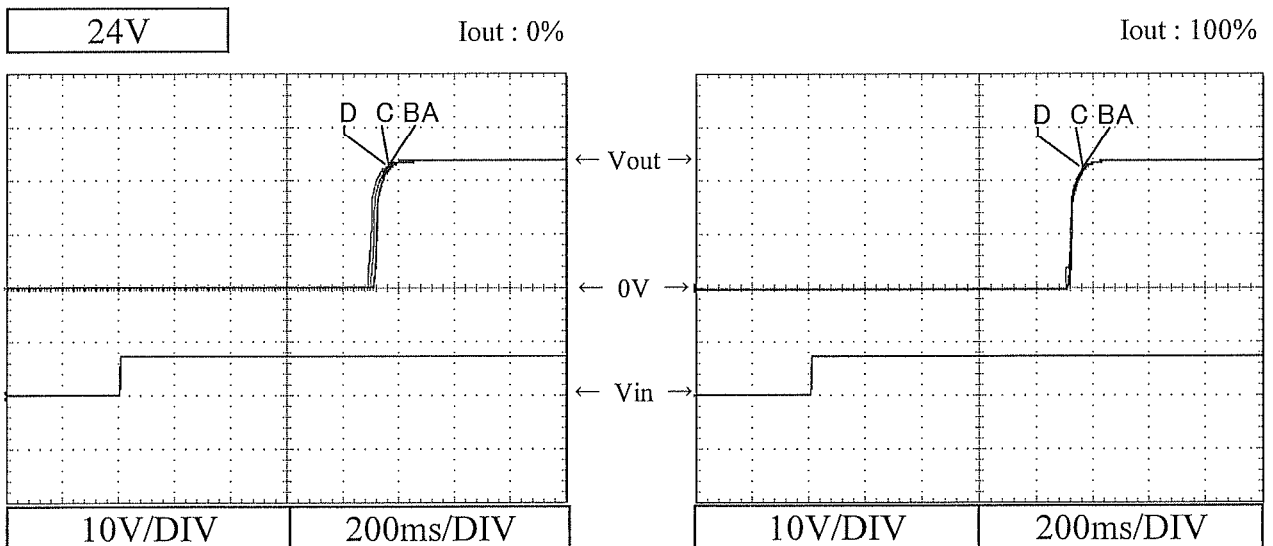
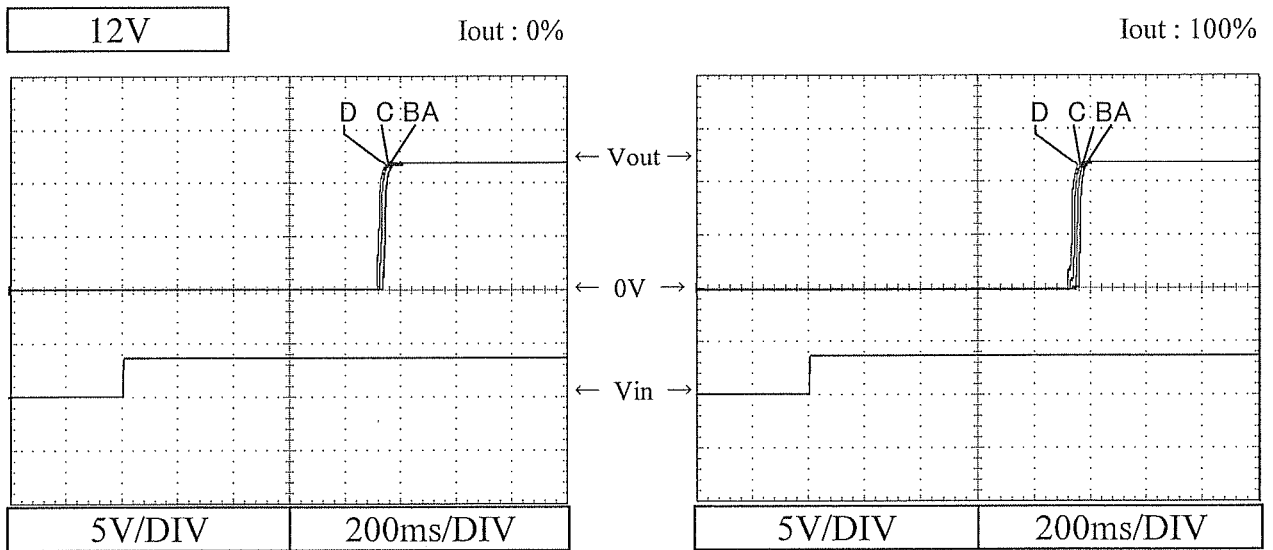
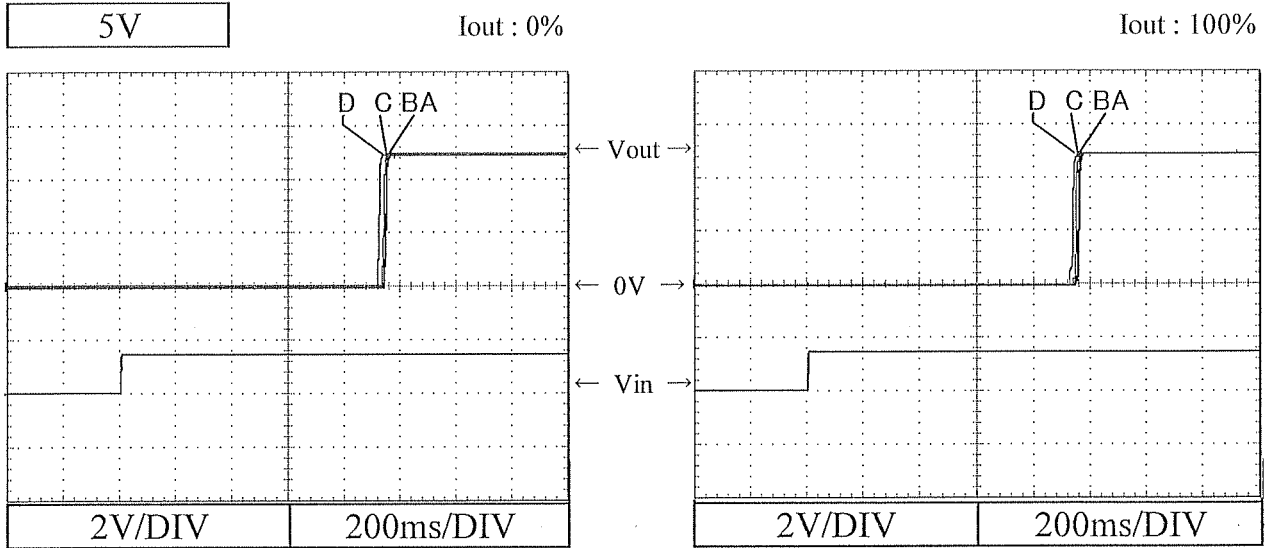
Over voltage protection (OVP) characteristics



2.4 出力立ち上がり特性

Output rise characteristics

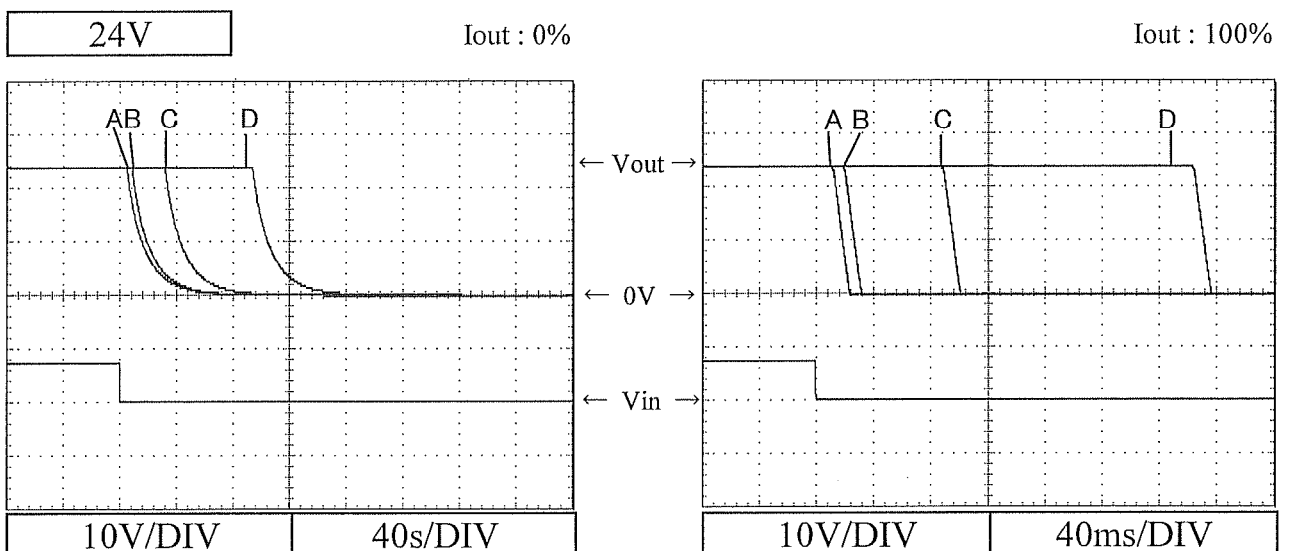
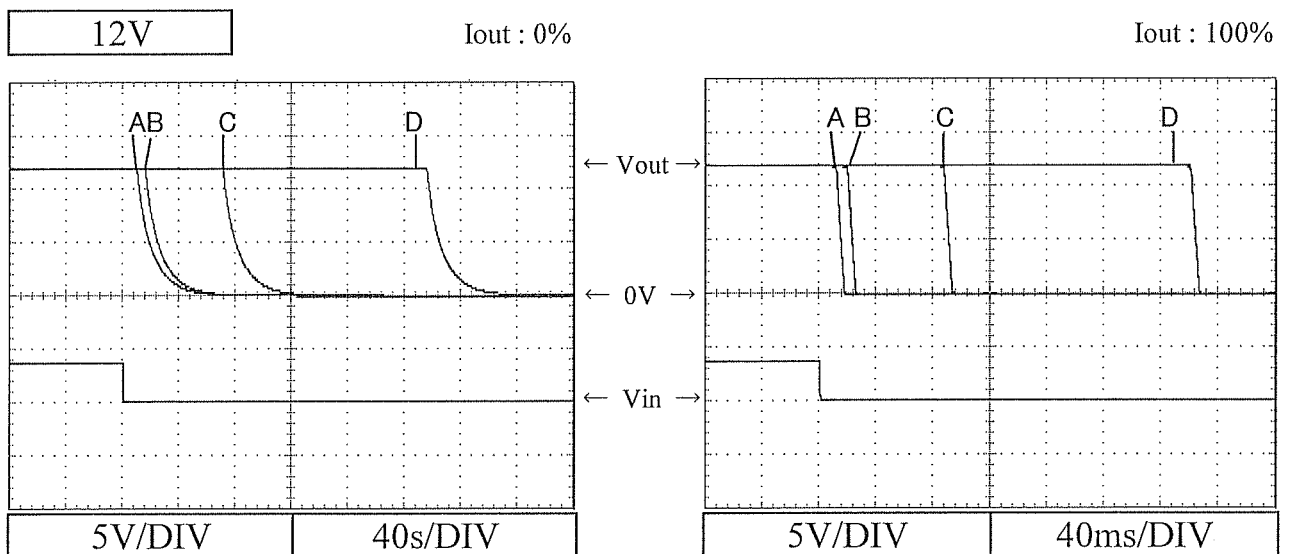
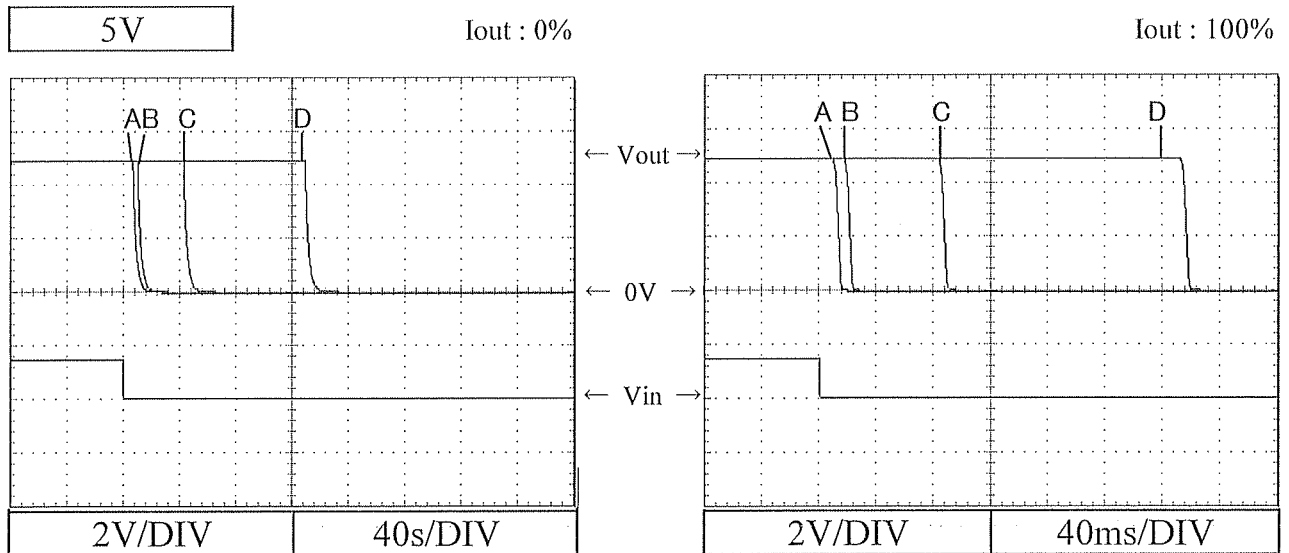
Conditions Vin : 88 VDC (A)  
 110 VDC (B)  
 220 VDC (C)  
 370 VDC (D)  
 Ta : 25 °C



2.5 出力立ち下がり特性

Output fall characteristics

Conditions Vin : 88 VDC (A)  
 110 VDC (B)  
 220 VDC (C)  
 370 VDC (D)  
 Ta : 25 °C

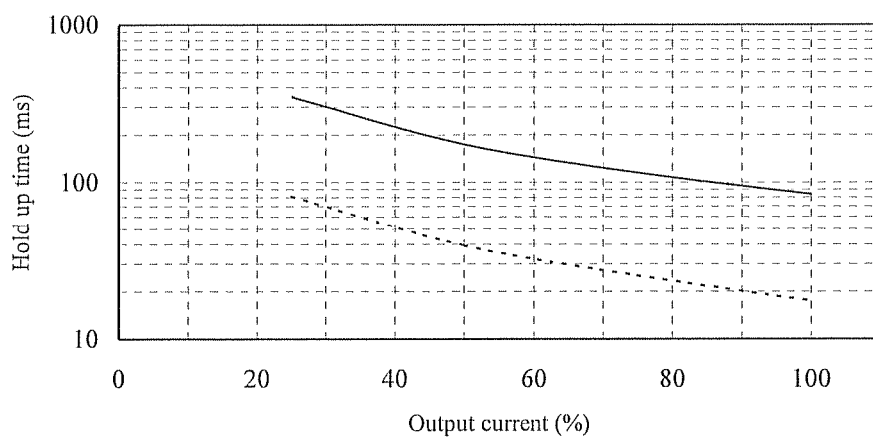


2.6 出力保持時間特性

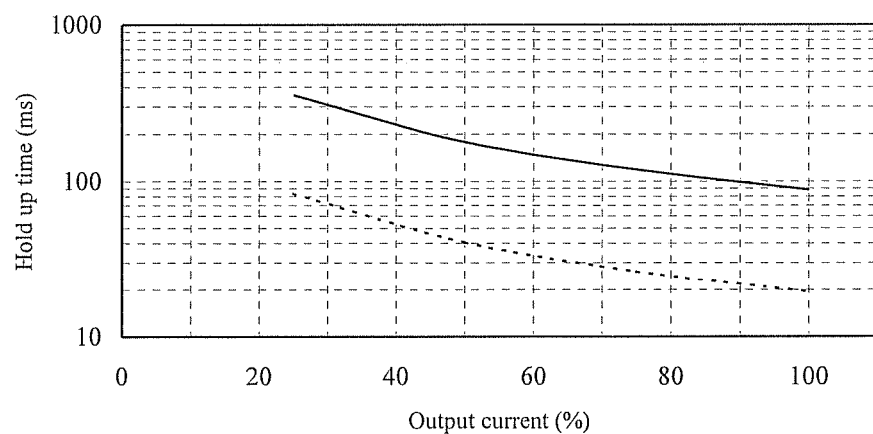
Hold up time characteristics

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

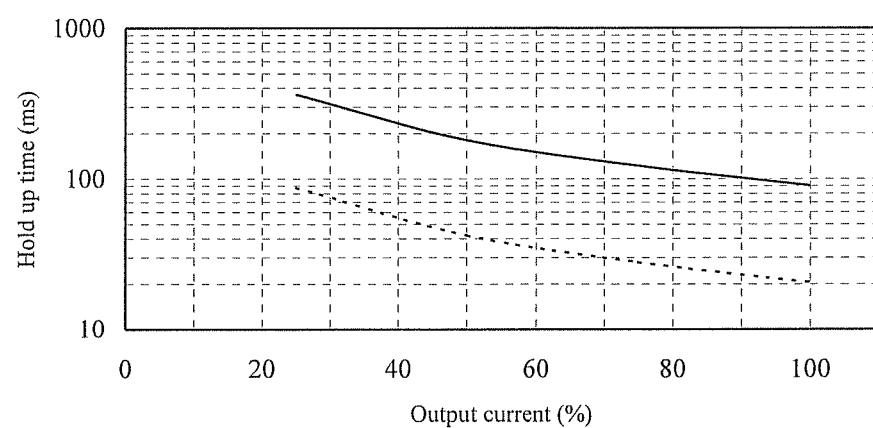
5V



12V



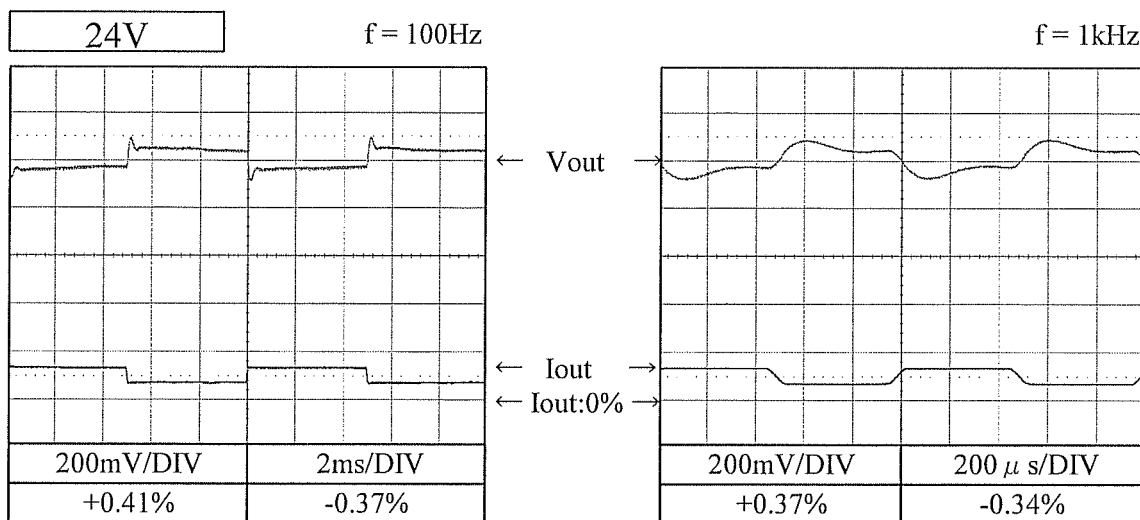
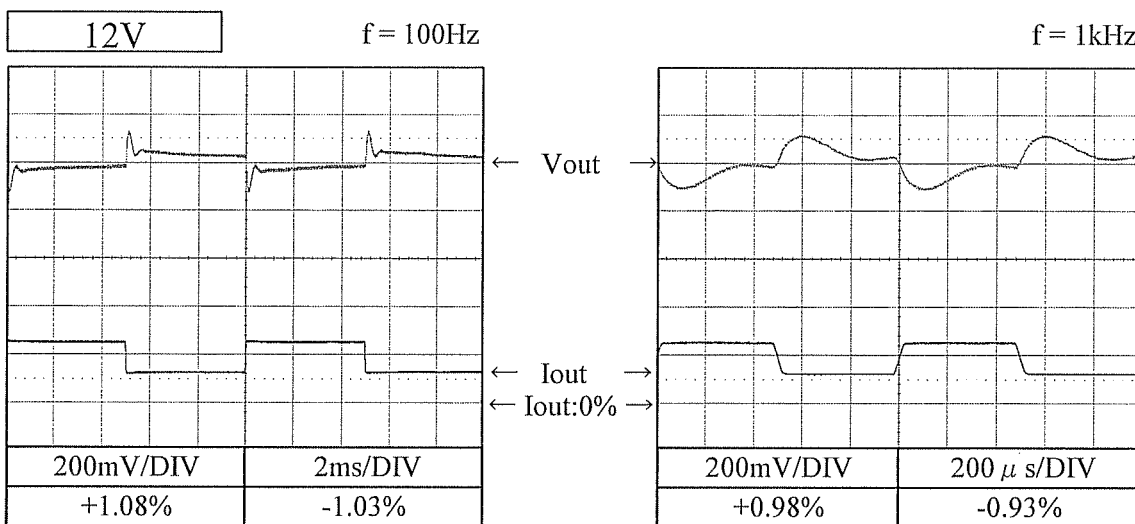
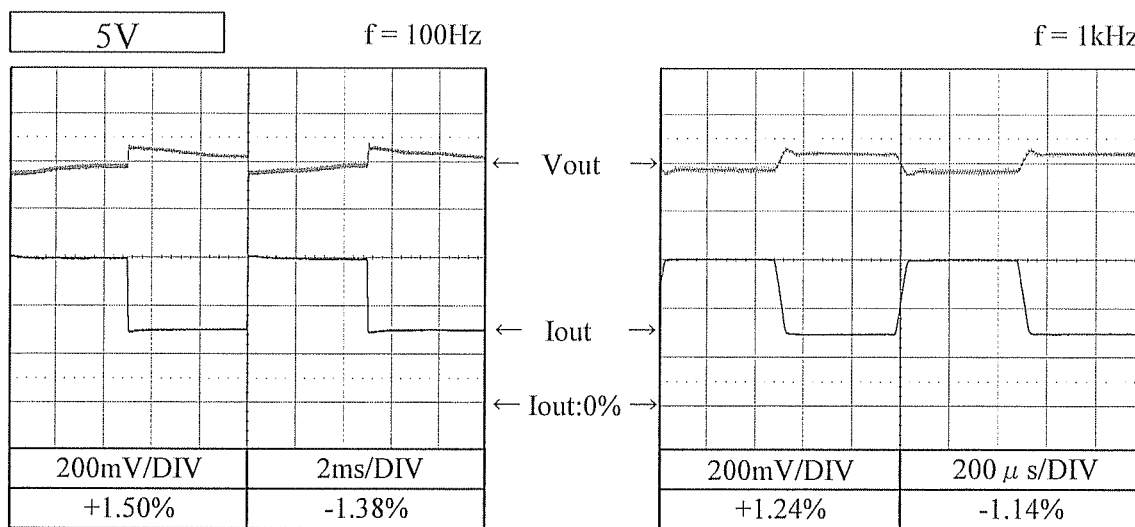
24V



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

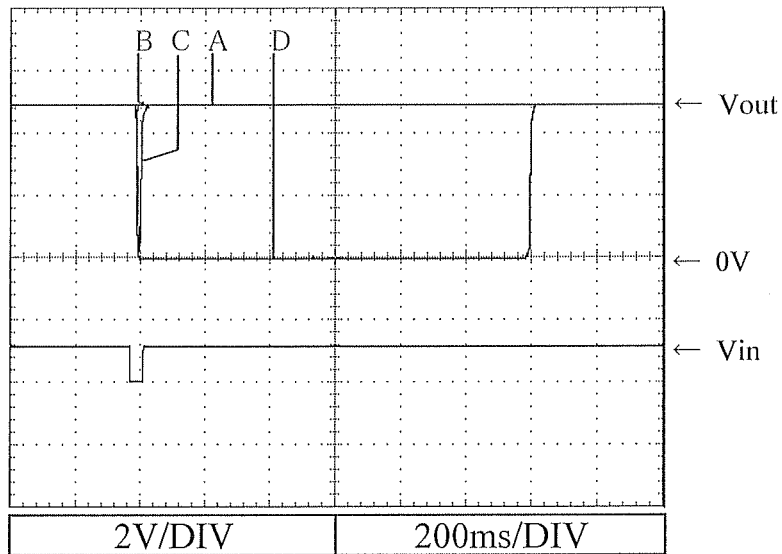
5V

A = 15ms

B = 18ms

C = 25ms

D = 42ms



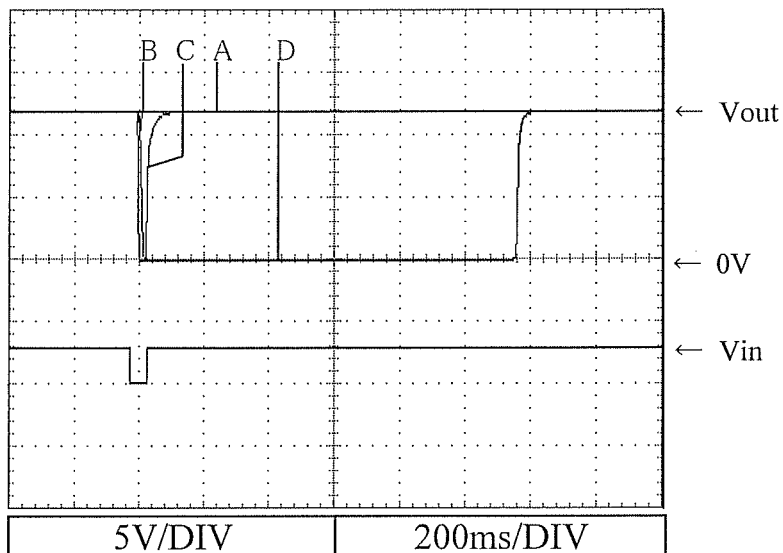
12V

A = 18ms

B = 21ms

C = 30ms

D = 50ms



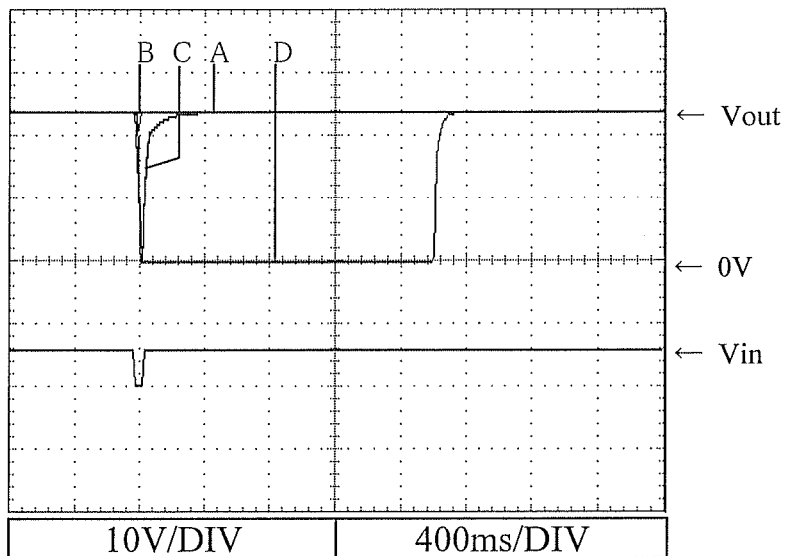
24V

A = 20ms

B = 22ms

C = 35ms

D = 55ms



2.8 入力電圧瞬停特性

Response to brown out characteristics

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

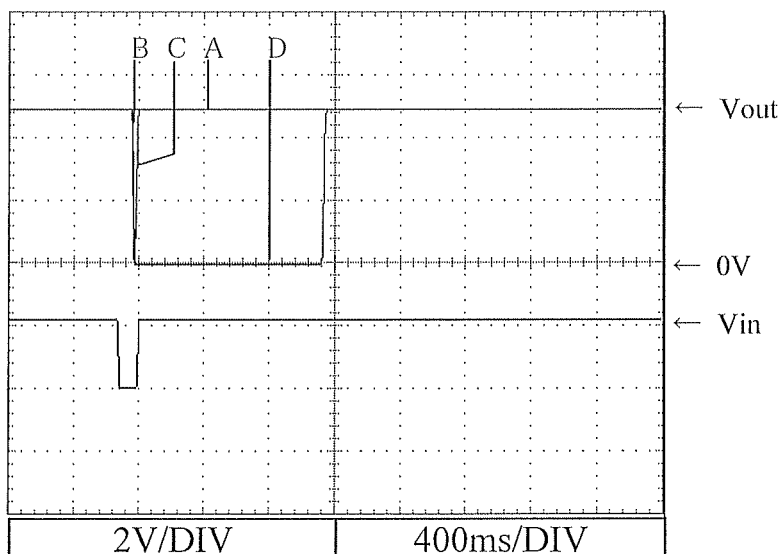
5V

A = 85ms

B = 88ms

C = 104ms

D = 120ms



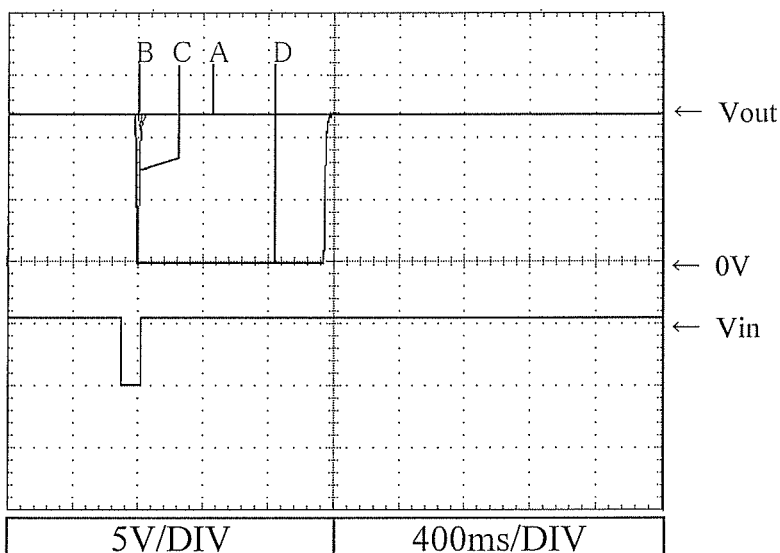
12V

A = 88ms

B = 90ms

C = 108ms

D = 120ms



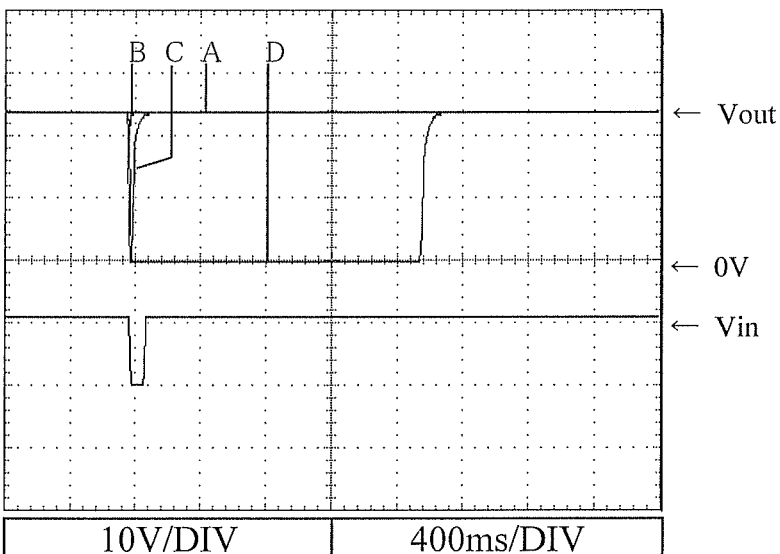
24V

A = 92ms

B = 94ms

C = 113ms

D = 125ms

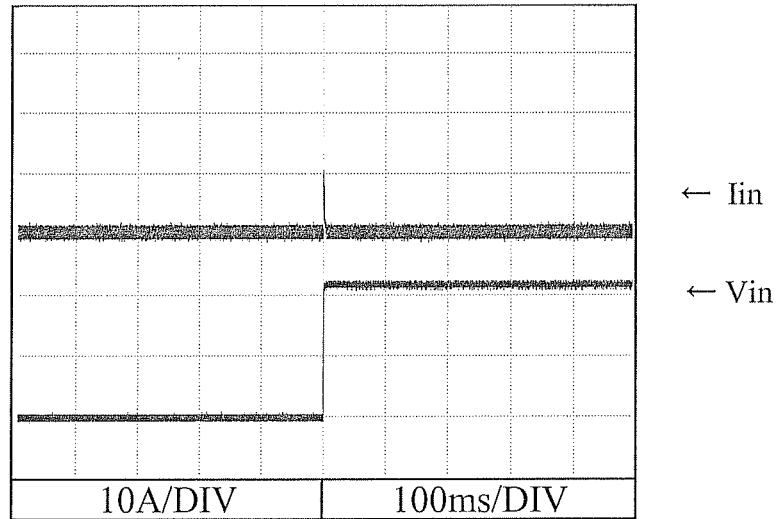




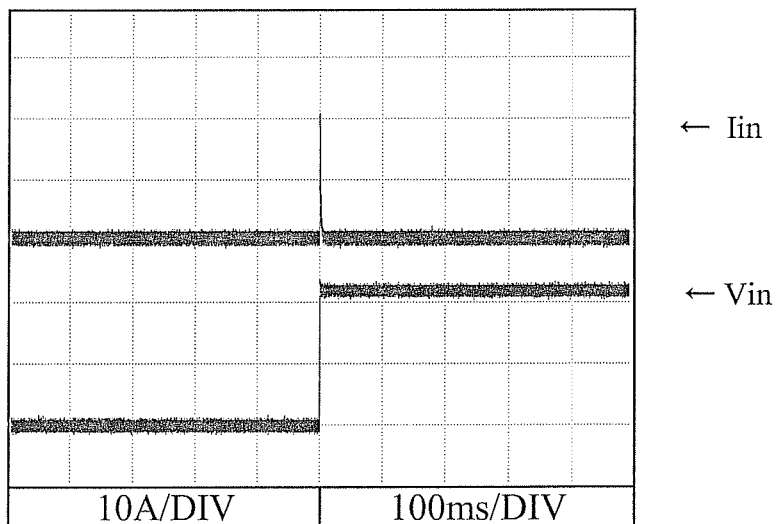
2.9 入力サージ電流 (突入電流) 波形  
Inrush current waveform

5V

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

