

PAF600F280-*

EVALUATION DATA

型式データ

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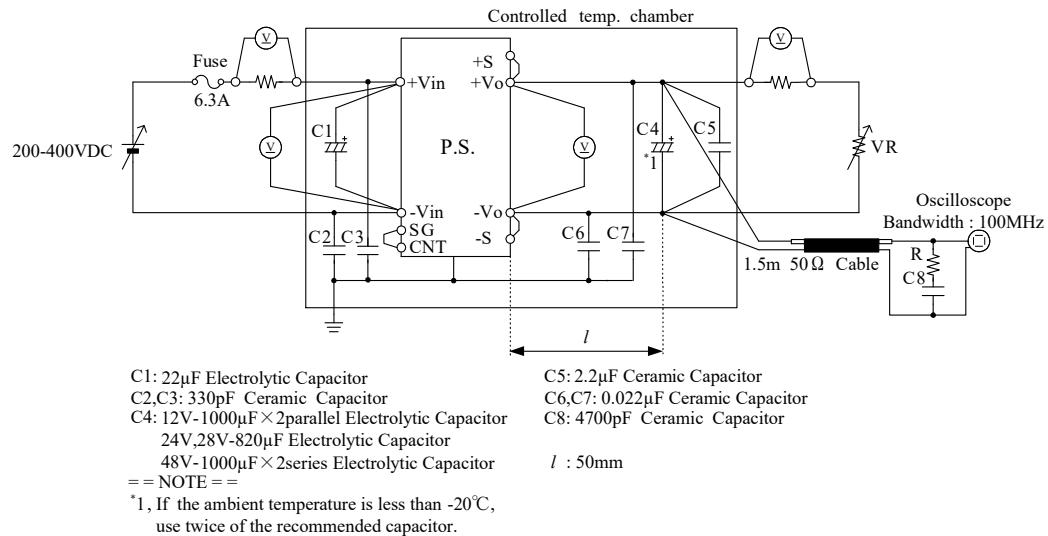
使用記号 Terminology used

Definition			
Vin	入力電圧	Input Voltage
Vout	出力電圧	Output Voltage
Vcnt	.....	CNT電圧	CNT Voltage
Iin	.....	入力電流	Input Current
Iout	.....	出力電流	Output Current
Tbp	.....	ベースプレート温度	Baseplate Temperature
Ta	.....	周囲温度	Ambient Temperature

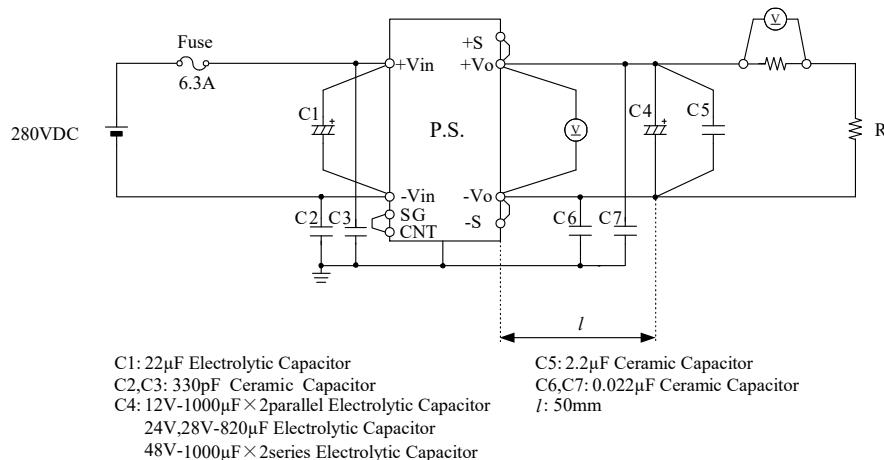
1. 測定方法 Evaluation Method

1.1 測定回路 Circuits used for determination

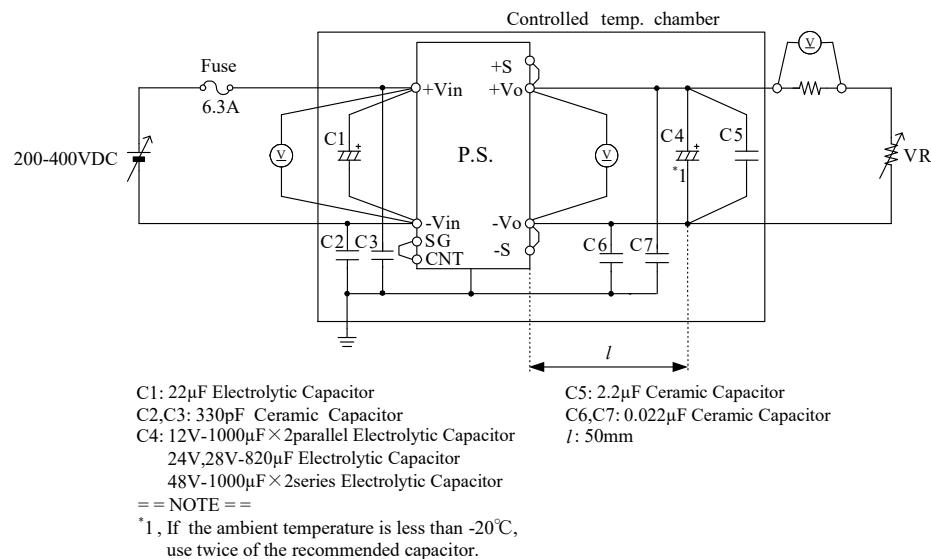
(1) 静特性 Steady state data



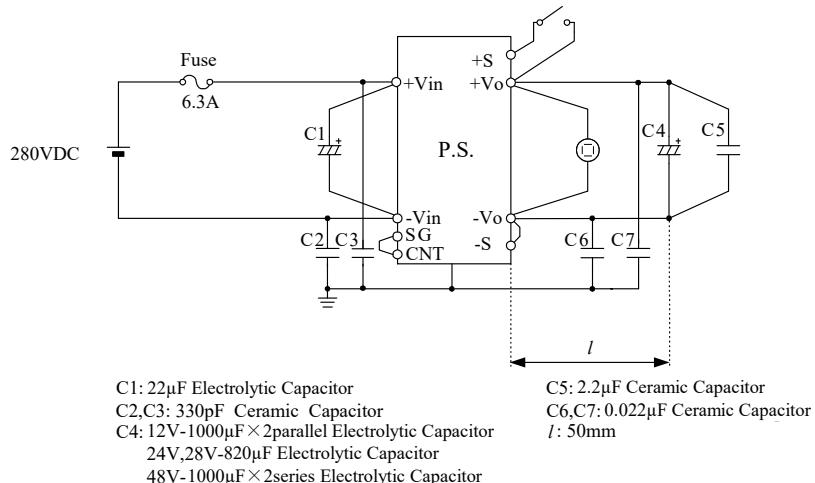
(2) 通電ドリフト特性 Warm up voltage drift characteristics



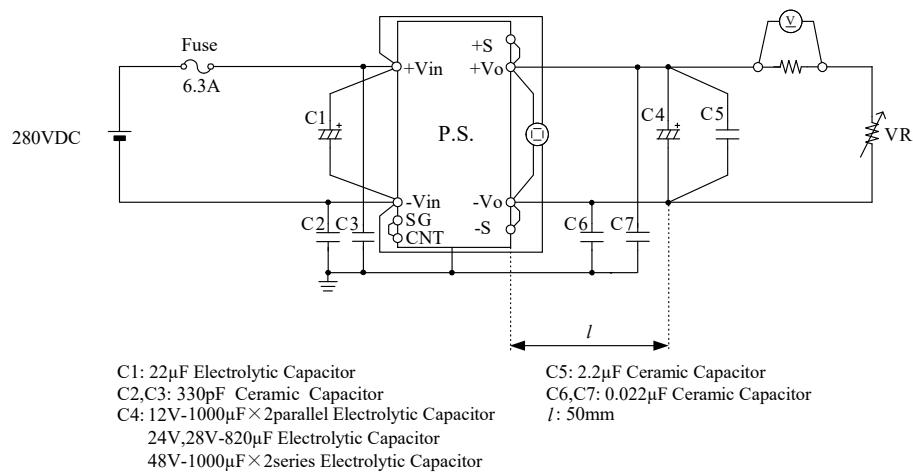
(3) 過電流保護特性 Over current protection (OCP) characteristics



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



(5) 出力立ち上がり特性 Output rise characteristics



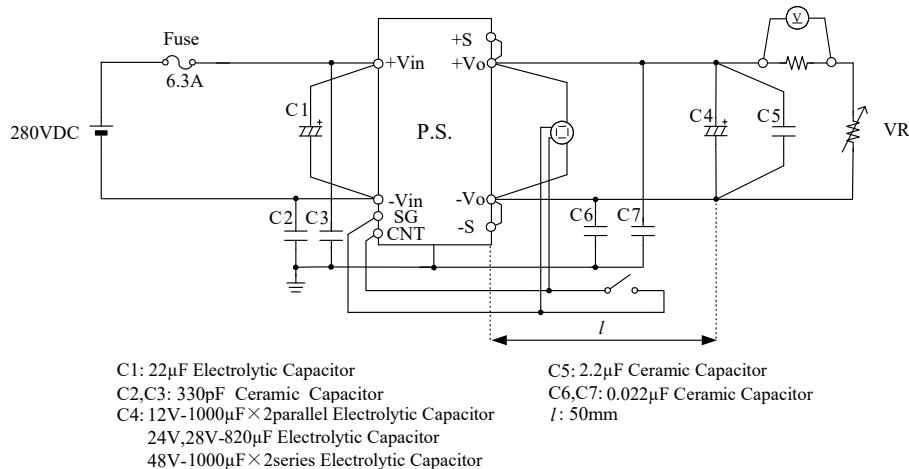
(6) 出力立ち下がり特性 Output fall characteristics

出力立ち上がり特性と同じ

Same as output rise characteristics

(7) 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



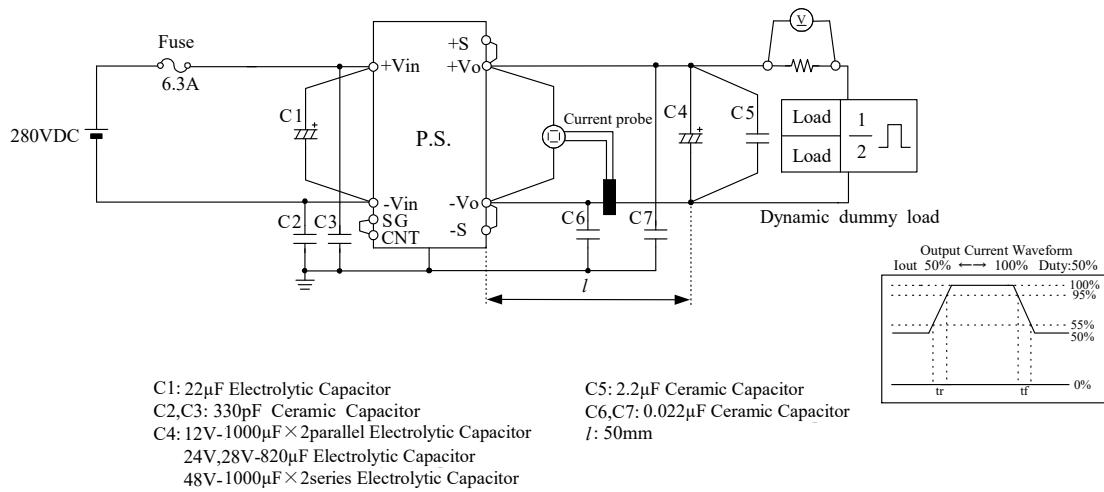
(8) 出力立ち下がり特性 (ON/OFF コントロール時)

Output fall characteristics with ON/OFF CONTROL

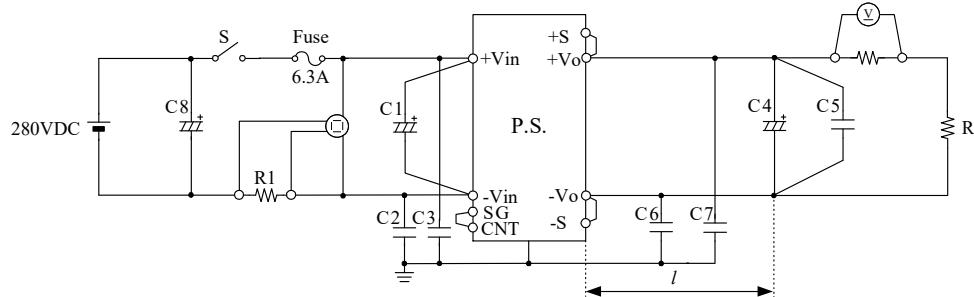
出力立ち上がり特性 (ON/OFF コントロール時)と同じ

Same as output rise characteristics with ON/OFF CONTROL

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



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

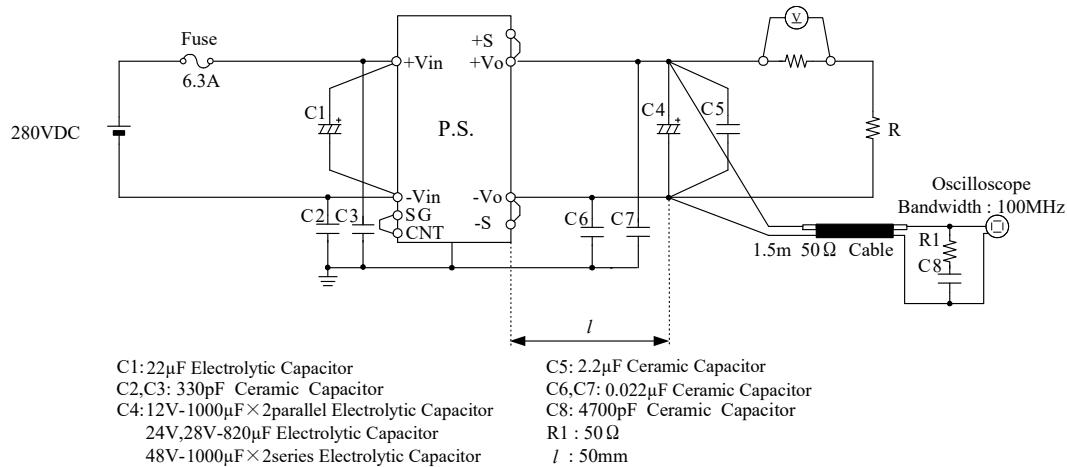


C1: 22μF Electrolytic Capacitor
C2,C3: 330pF Ceramic Capacitor
C4: 48V-1000μF×2series Electrolytic Capacitor
C5: 2.2μF Ceramic Capacitor

C6,C7: 0.022μF Ceramic Capacitor
C8: 450μF Electrolytic Capacitor
R1: 0.01 Ω
l: 50mm

(11) 出力リップル、ノイズ波形 Output ripple and noise waveform

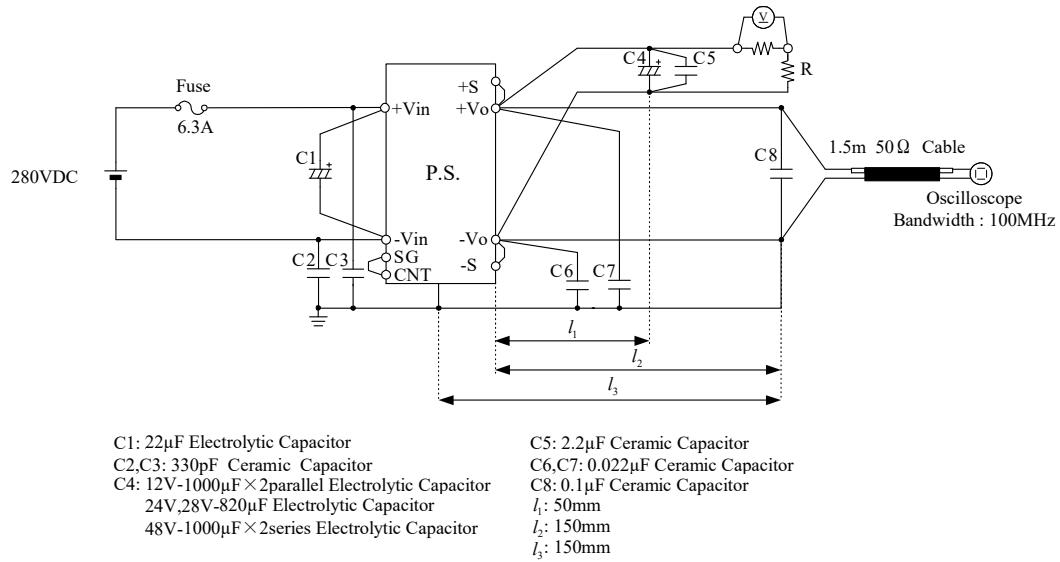
(a) Normal Mode



C1:22μF Electrolytic Capacitor
C2,C3: 330pF Ceramic Capacitor
C4:12V-1000μF×2parallel Electrolytic Capacitor
24V,28V-820μF Electrolytic Capacitor
48V-1000μF×2series Electrolytic Capacitor

C5: 2.2μF Ceramic Capacitor
C6,C7: 0.022μF Ceramic Capacitor
C8: 4700pF Ceramic Capacitor
R1 : 50 Ω
l : 50mm

(b) Normal + Common Mode

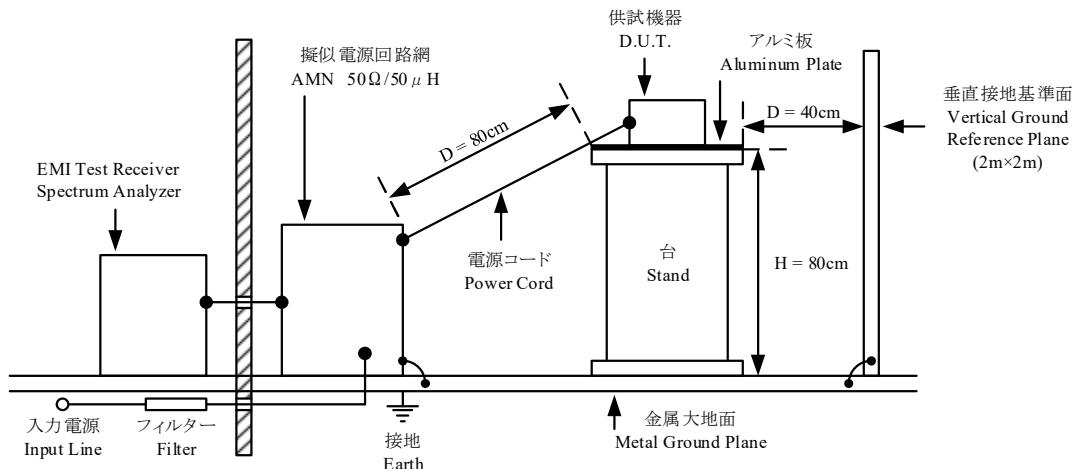


C1: 22μF Electrolytic Capacitor
C2,C3: 330pF Ceramic Capacitor
C4: 12V-1000μF×2parallel Electrolytic Capacitor
24V,28V-820μF Electrolytic Capacitor
48V-1000μF×2series Electrolytic Capacitor

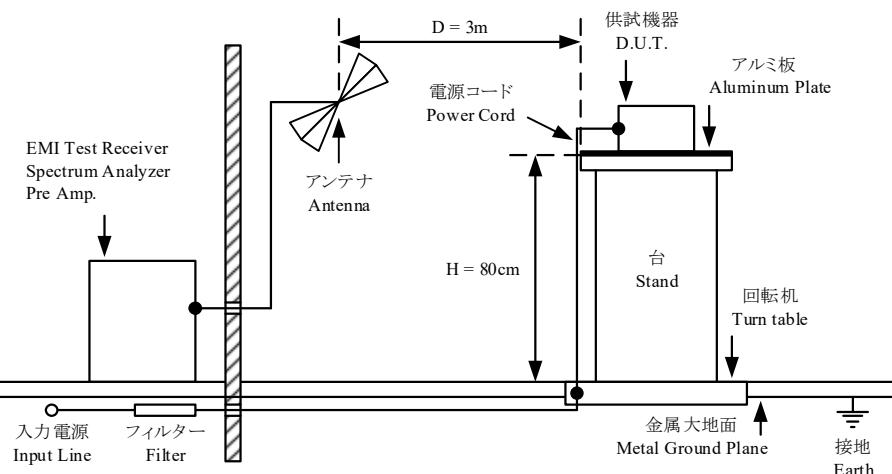
C5: 2.2μF Ceramic Capacitor
C6,C7: 0.022μF Ceramic Capacitor
C8: 0.1μF Ceramic Capacitor
l₁: 50mm
l₂: 150mm
l₃: 150mm

(12) EMI 特性 Electro-Magnetic Interference characteristics

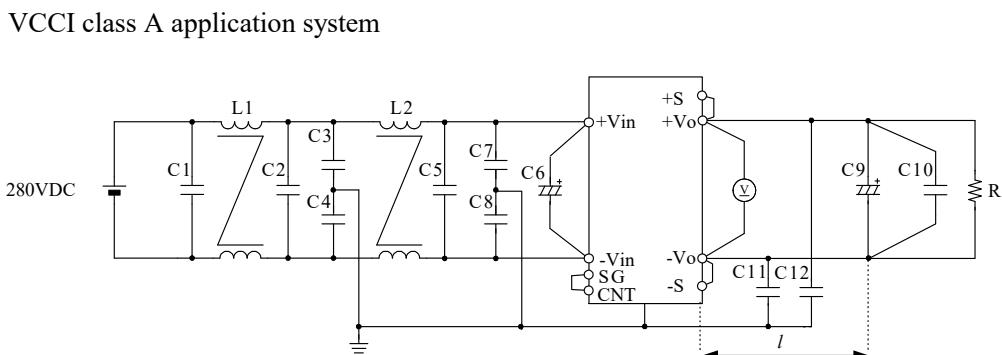
(a) 雑音端子電圧(帰還ノイズ) Conducted Emission Noise



(b) 雑音電界強度(輻射ノイズ) Radiated Emission Noise



(1) VCCI class A 対応アプリケーションシステム



1.2 使用測定機器 List of equipment used

	EQUIPMENT USED	MANUFACTURER	MODEL NO.
1	DIGITAL STORAGE OSCILLOSCOPE	YOKOGAWA ELECT.	DLM3054
2	DATA ACQUISITION / SWITCH UNIT	AGILENT	34970A
3	DIGITAL POWER METER	YOKOGAWA ELECT.	WT210
4	CURRENT PROBE	YOKOGAWA ELECT.	701929
5	CURRENT PROBE	YOKOGAWA ELECT.	701930
6	AC POWER SUPPLY	KIKUSUI	PCR2000MA
7	CVCF	NF	ES10000S
8	DYNAMIC DUMMY LOAD	KIKUSUI	PLZ1205W
9	CONTROLLED TEMP. CHAMBER	ESPEC	SU-662
10	SHUNT RESISTER	YOKOGAWA ELECT.	2215
11	EMI TEST RECEIVER SPECTRUM ANALYZER	ROHDE & SCHWARZ	ESR3
12	PRE AMP.	SONOMA	310N
13	ANTENNA	TESEQ	CBL 6111D
14	AMN	SCHWARZBECK	NNLK8121

2. 特性データ Characteristics

2.1 静特性 Steady state data

(1) 入力・負荷・温度変動

Regulation - line and load, temperature drift

12V

1. Regulation - line and load

Condition Tbp : 25°C

Iout \ Vin	200VDC	280VDC	400VDC	line regulation	
0%	12.006V	12.006V	12.006V	0mV	0.000%
50%	12.006V	12.007V	12.007V	1mV	0.008%
100%	12.007V	12.007V	12.007V	0mV	0.000%
load regulation	1mV	1mV	1mV		
	0.008%	0.008%	0.008%		

2. Temperature drift

Conditions Vin : 280VDC

Iout : 80%

Tbp	-40°C	25°C	100°C	temperature drift	
Vout	11.950V	12.007V	12.017V	67mV	0.558%

24V

1. Regulation - line and load

Condition Tbp : 25°C

Iout \ Vin	200VDC	280VDC	400VDC	line regulation	
0%	24.036V	24.036V	24.036V	0mV	0.000%
50%	24.039V	24.039V	24.038V	1mV	0.004%
100%	24.040V	24.040V	24.040V	0mV	0.000%
load regulation	4mV	4mV	4mV		
	0.017%	0.017%	0.017%		

2. Temperature drift

Conditions Vin : 280VDC

Iout : 80%

Tbp	-40°C	25°C	100°C	temperature drift	
Vout	23.881V	24.039V	24.070V	189mV	0.788%

(1) 入力・負荷・温度変動

Regulation - line and load, temperature drift

28V

1. Regulation - line and load

Condition Tbp : 25°C

Iout \ Vin	200VDC	280VDC	400VDC	line regulation	
0%	27.995V	28.005V	28.005V	10mV	0.036%
50%	28.001V	28.010V	28.007V	9mV	0.032%
100%	28.006V	28.014V	28.009V	8mV	0.029%
load	11mV	9mV	4mV		
regulation	0.039%	0.032%	0.014%		

2. Temperature drift

Conditions Vin : 280VDC

Iout : 80%

Tbp	-40°C	25°C	100°C	temperature drift	
Vout	27.827V	28.012V	28.056V	229mV	0.818%

48V

1. Regulation - line and load

Condition Tbp : 25°C

Iout \ Vin	200VDC	280VDC	400VDC	line regulation	
0%	48.018V	48.026V	48.027V	9mV	0.019%
50%	48.024V	48.032V	48.034V	10mV	0.021%
100%	48.027V	48.034V	48.038V	11mV	0.023%
load	9mV	8mV	11mV		
regulation	0.019%	0.017%	0.023%		

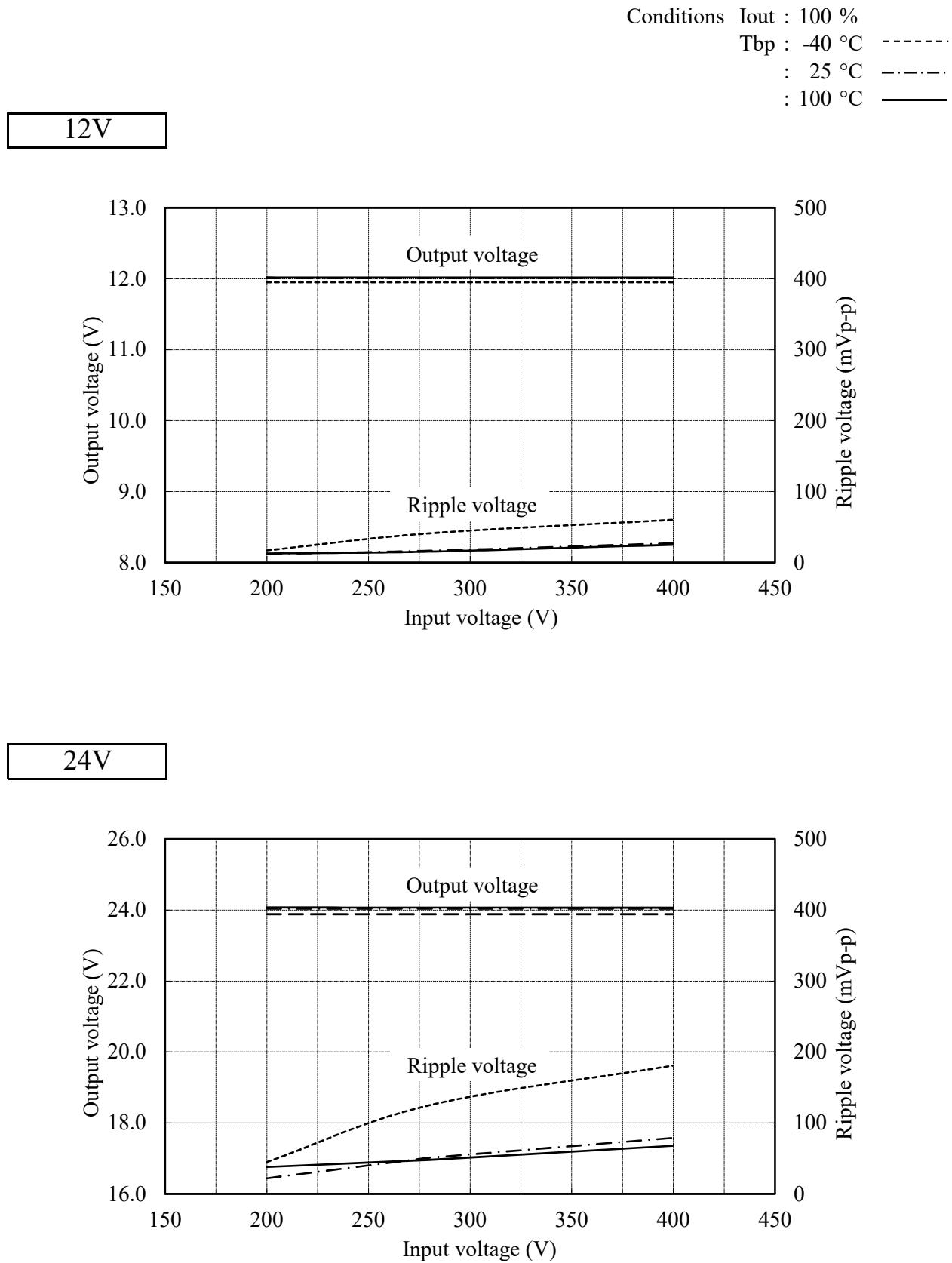
2. Temperature drift

Conditions Vin : 280VDC

Iout : 80%

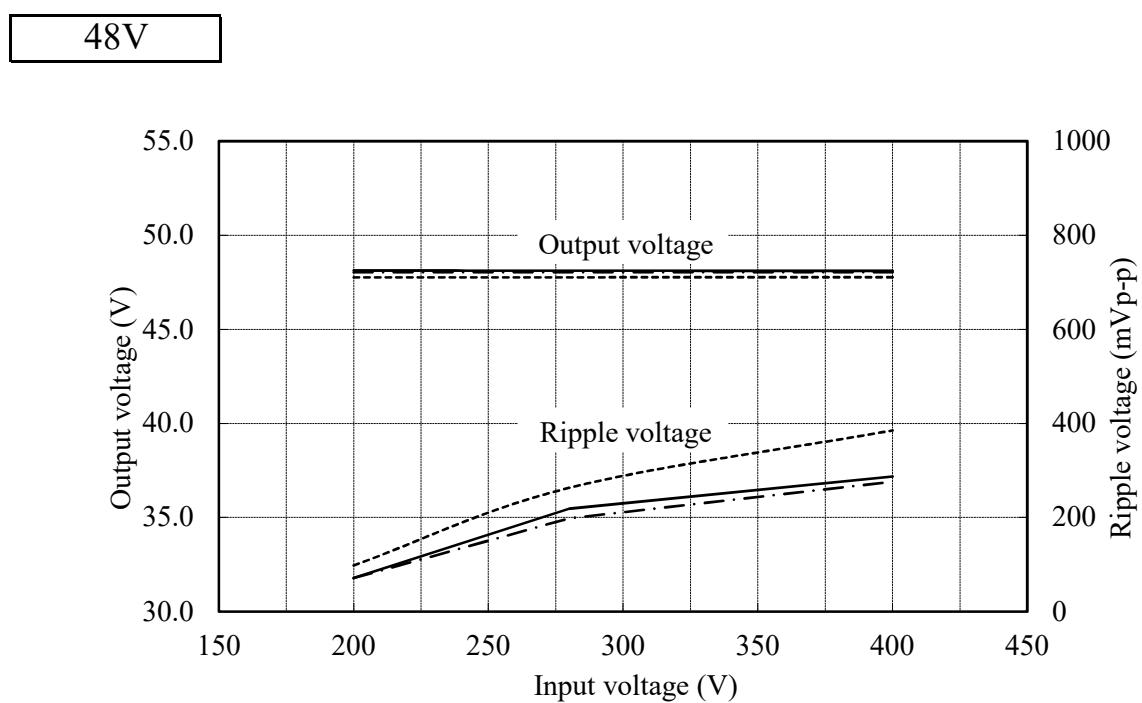
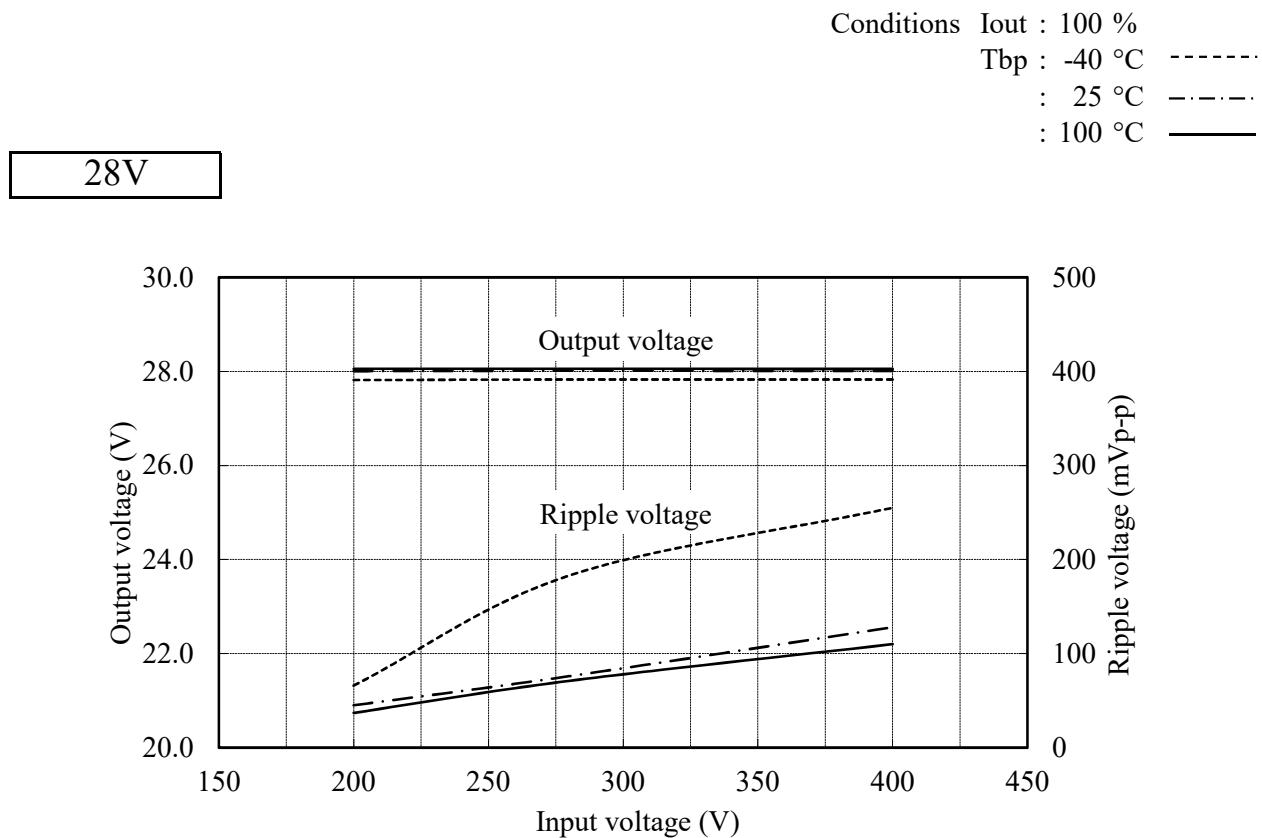
Tbp	-40°C	25°C	100°C	temperature drift	
Vout	47.764V	48.033V	48.117V	353mV	0.735%

2.1 (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



2.1 (2) 出力電圧・リップル電圧対入力電圧

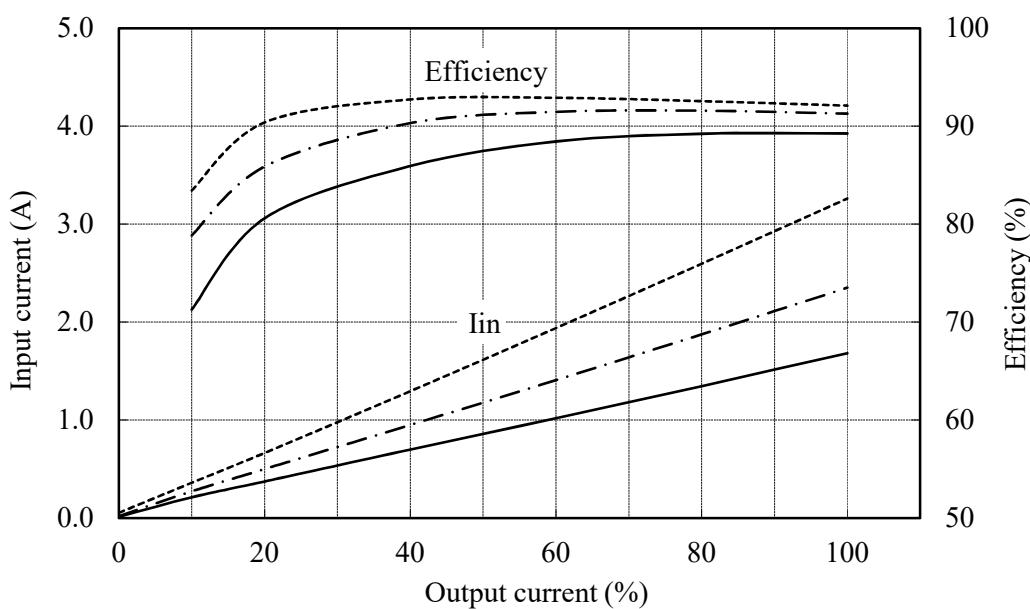
Output voltage and Ripple voltage v.s. Input voltage



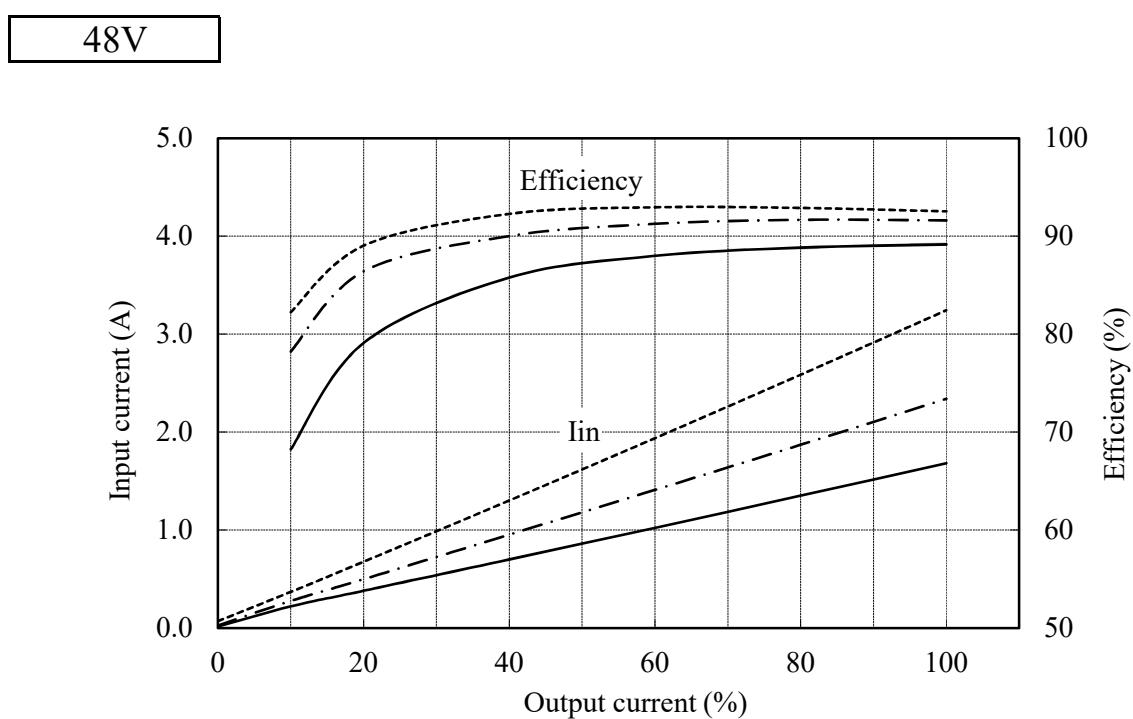
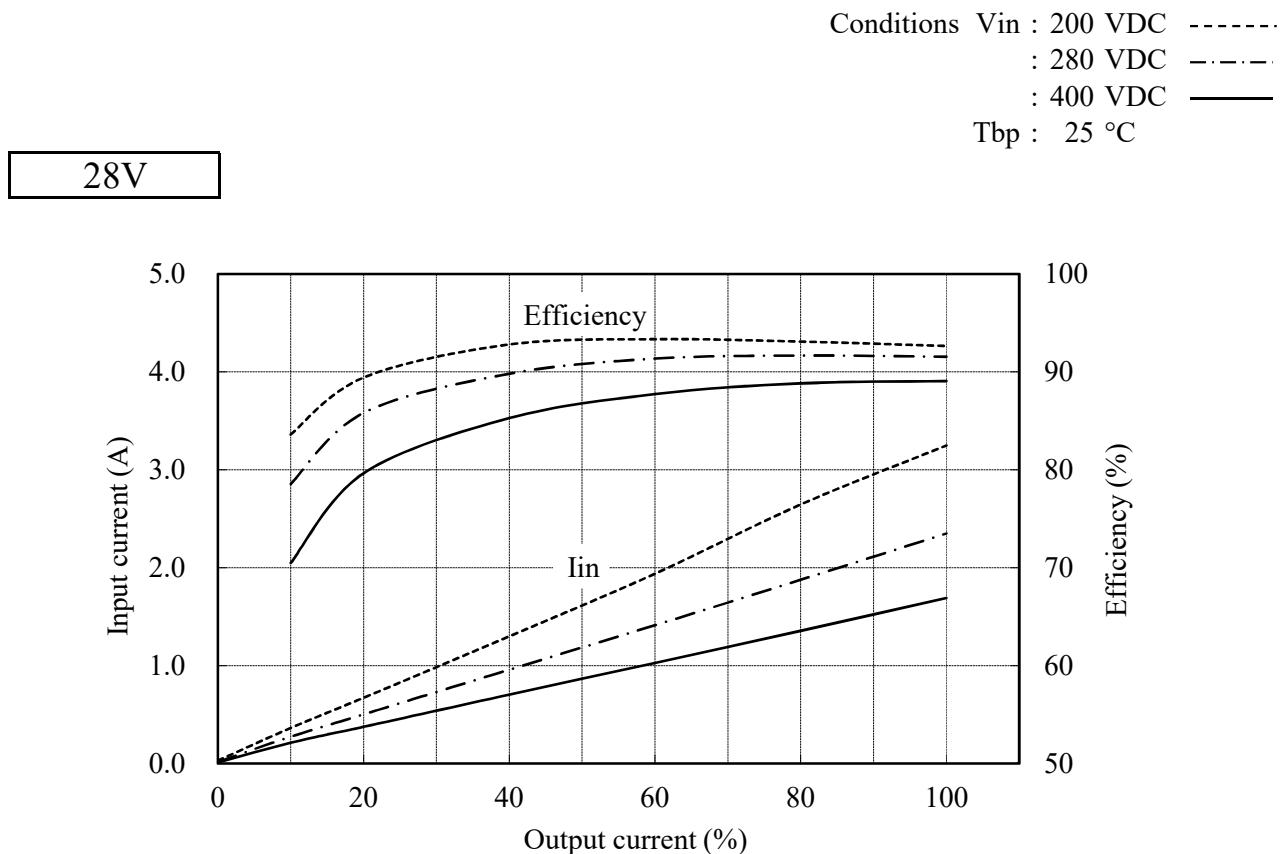
2.1 (3) 効率・入力電流対出力電流
 Efficiency and Input current v.s. Output current



24V



2.1 (3) 効率・入力電流対出力電流
 Efficiency and Input current v.s. Output current

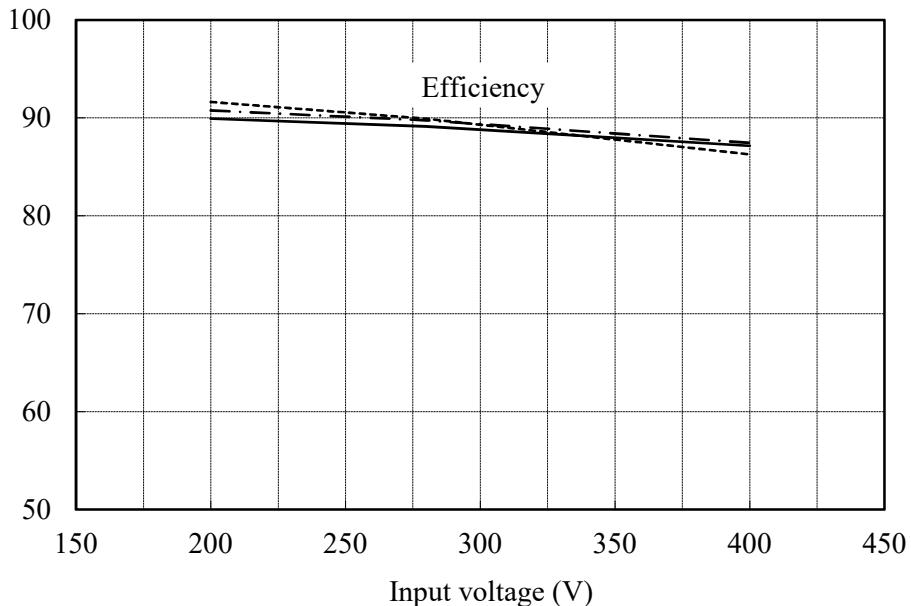


2.1 (4) 効率対入力電圧

Efficiency v.s. Input voltage

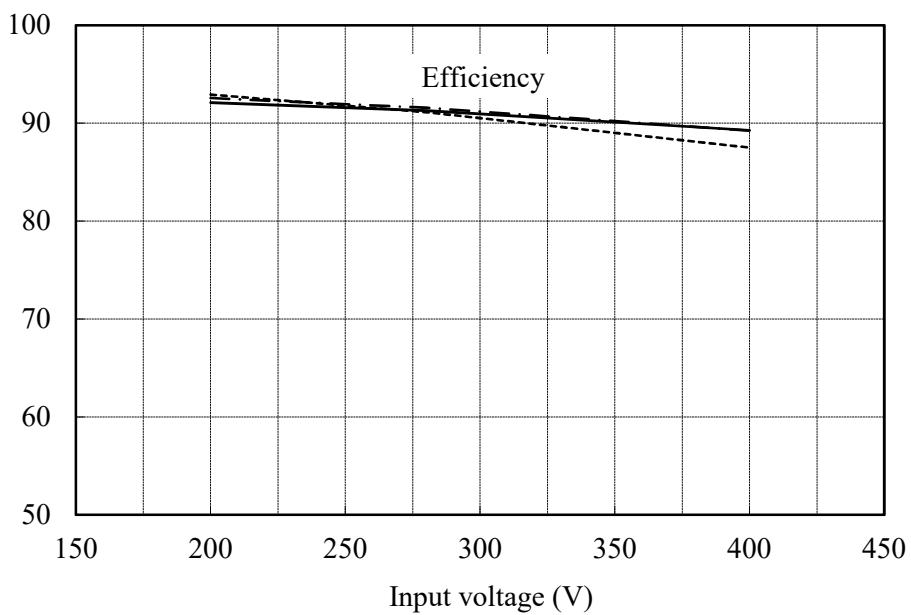


Efficiency (%)



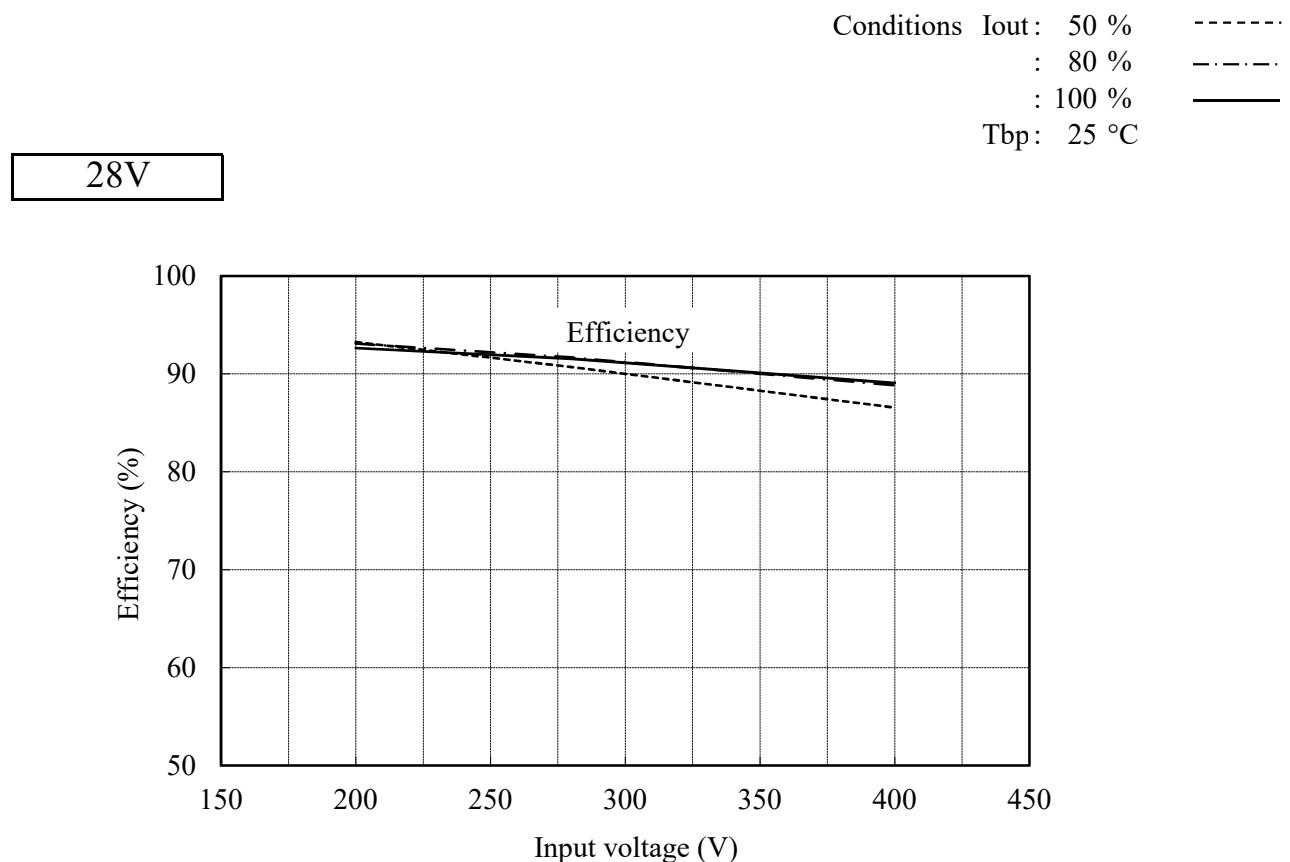
24V

Efficiency (%)

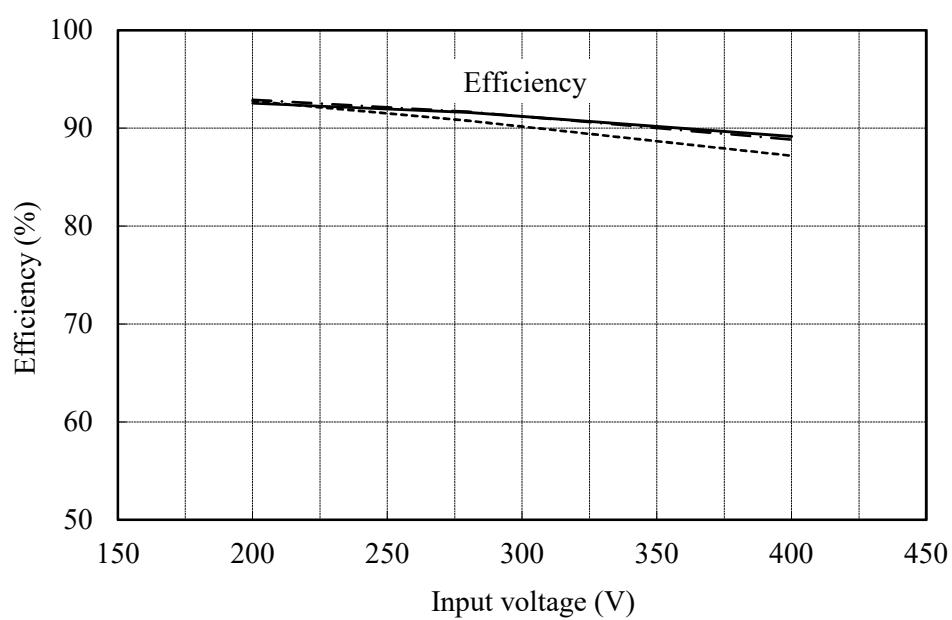


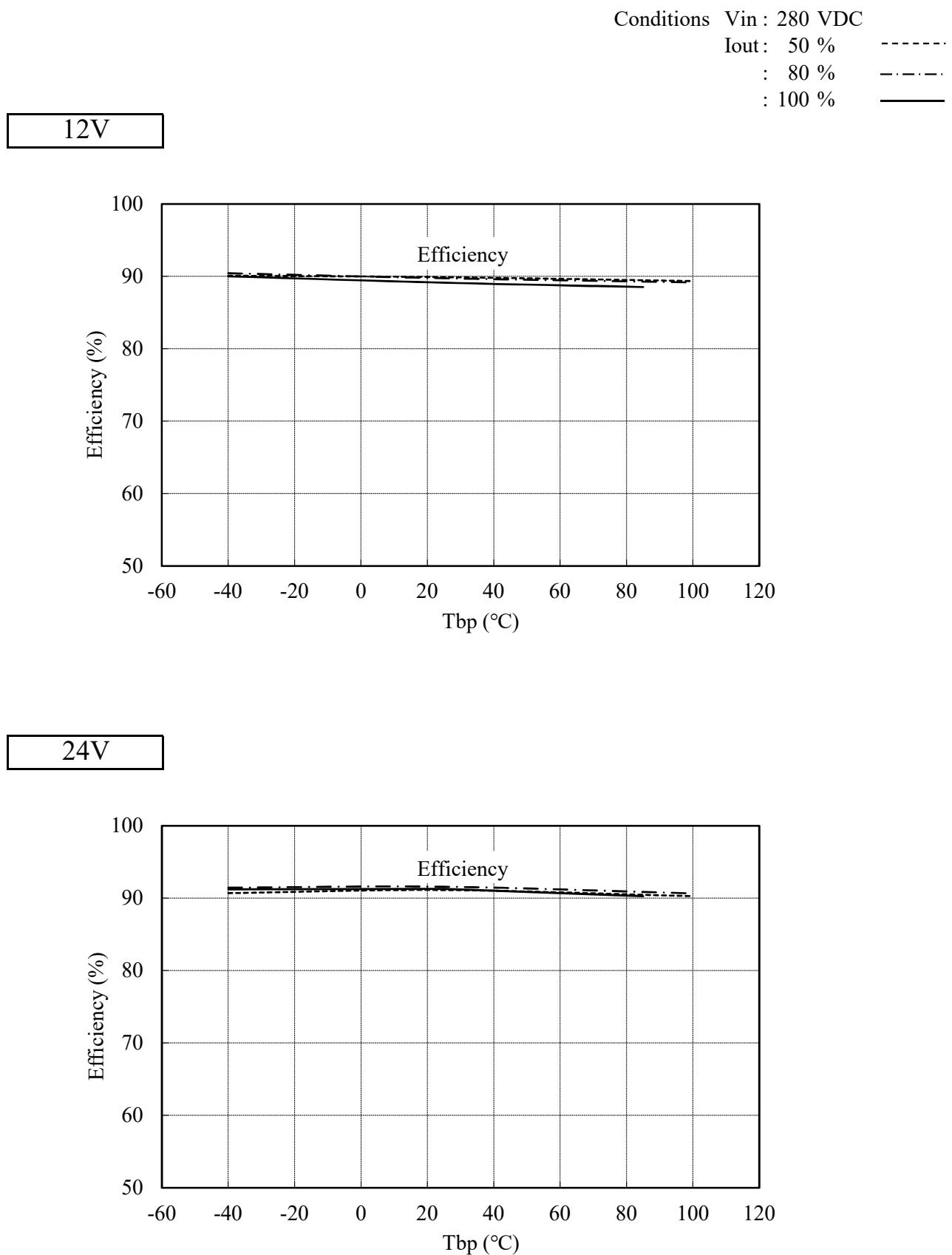
2.1 (4) 効率対入力電圧

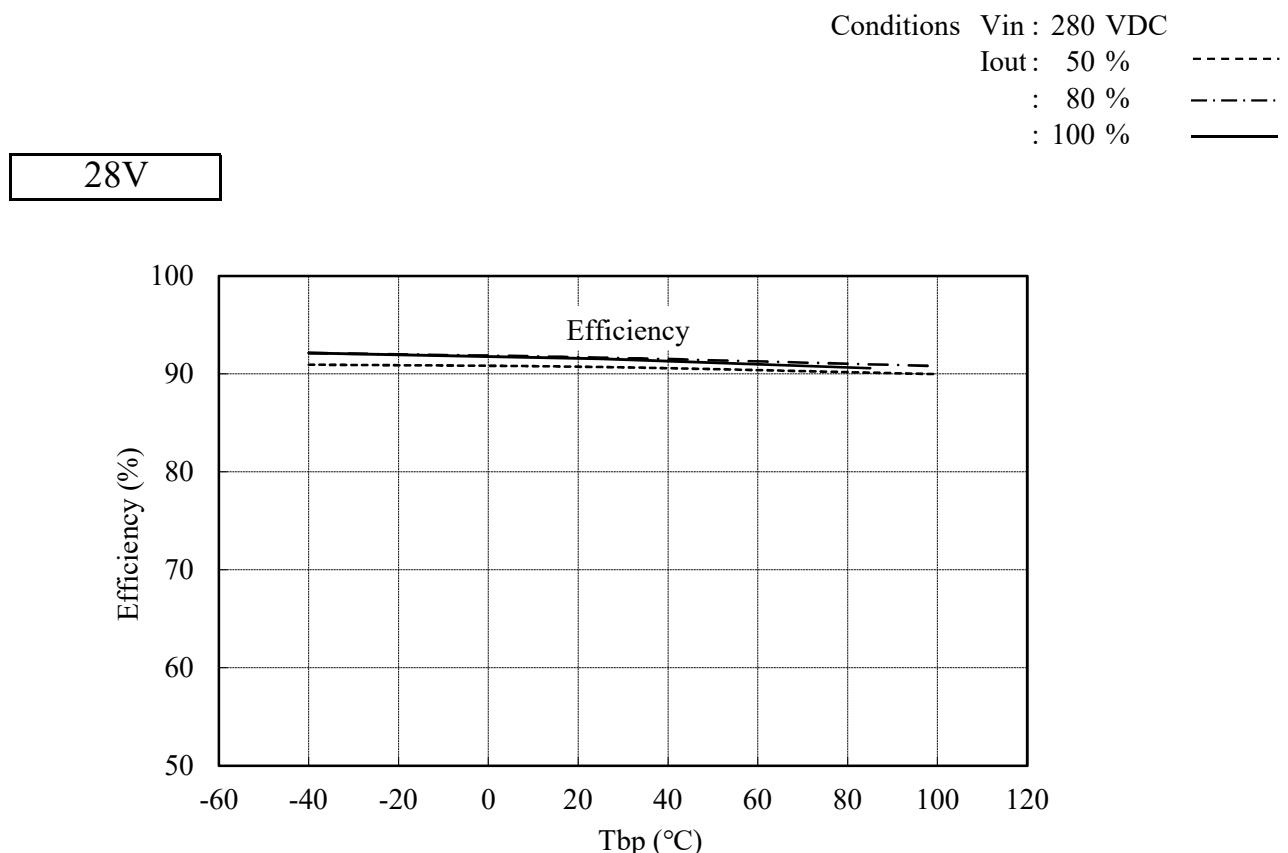
Efficiency v.s. Input voltage



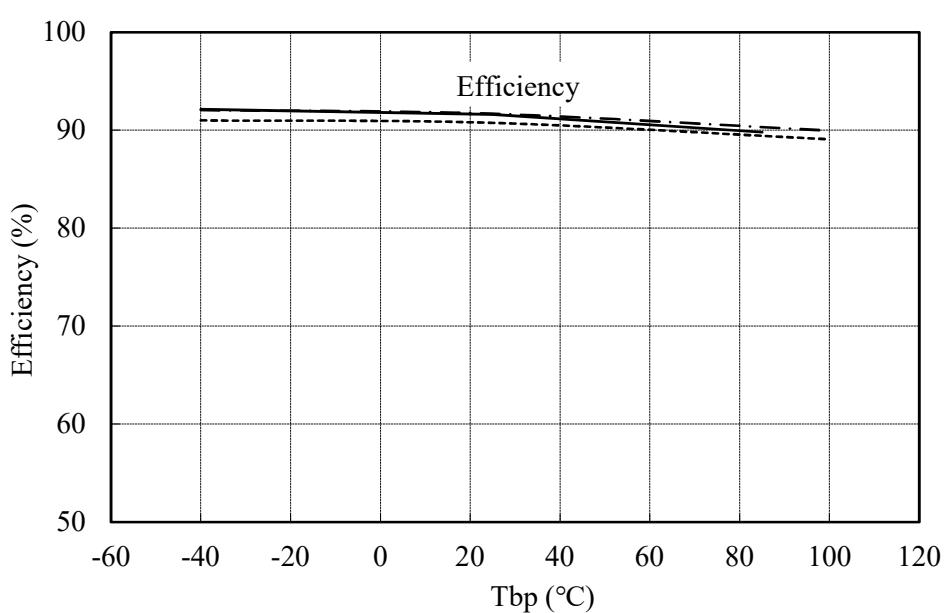
48V



2.1 (5) 効率対ベースプレート温度
Efficiency v.s. Baseplate temperature

2.1 (5) 効率対ベースプレート温度
Efficiency v.s. Baseplate temperature

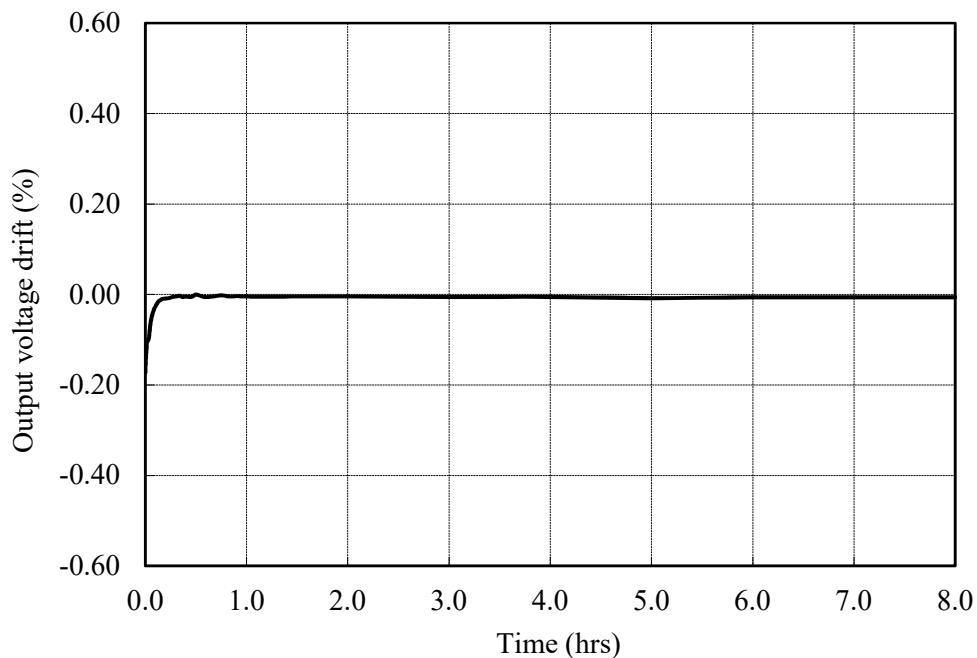
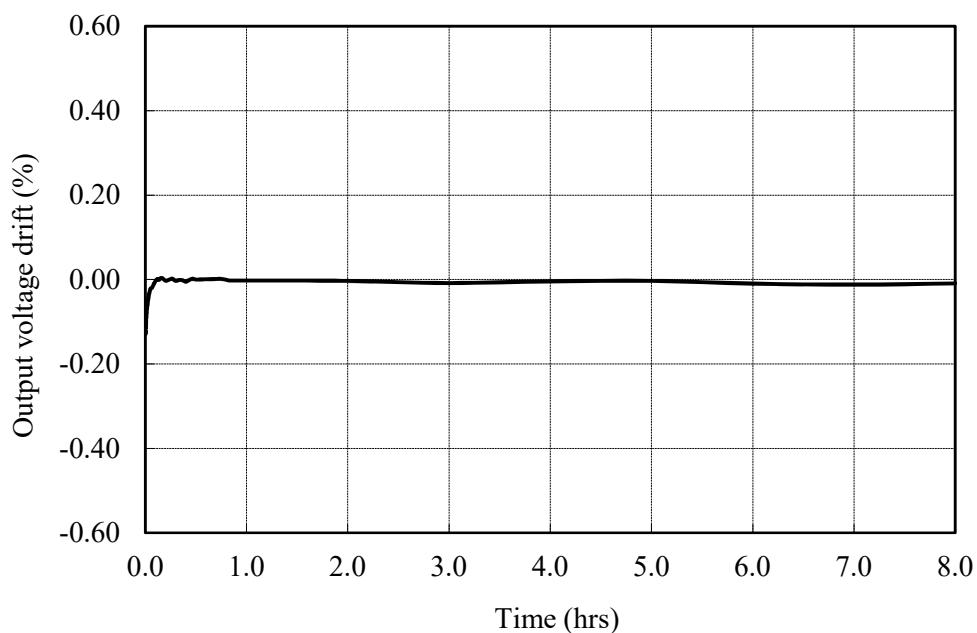
48V



2.2 通電ドリフト特性

Warm up voltage drift characteristics

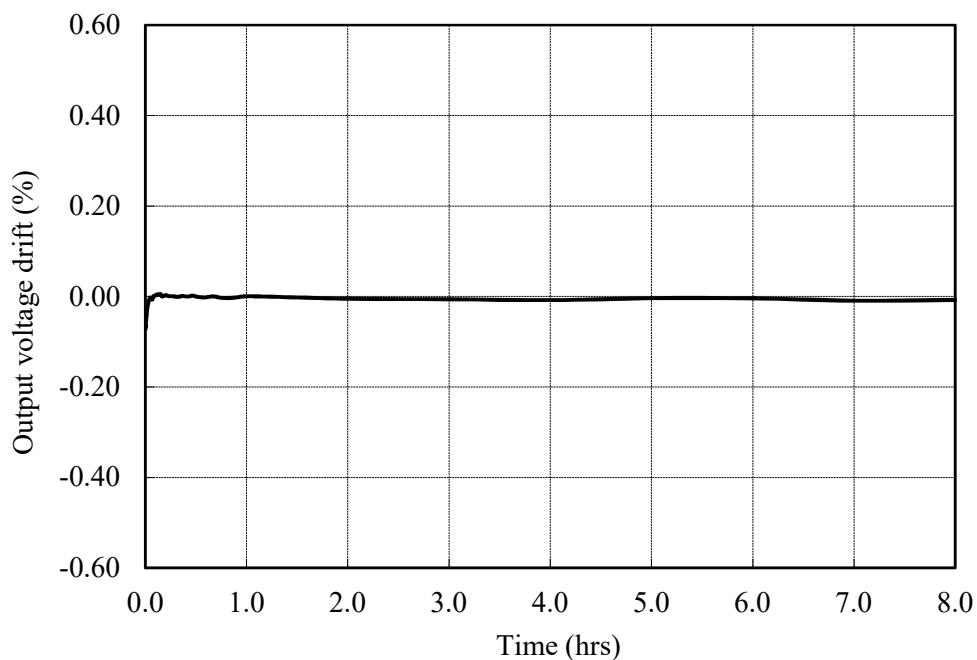
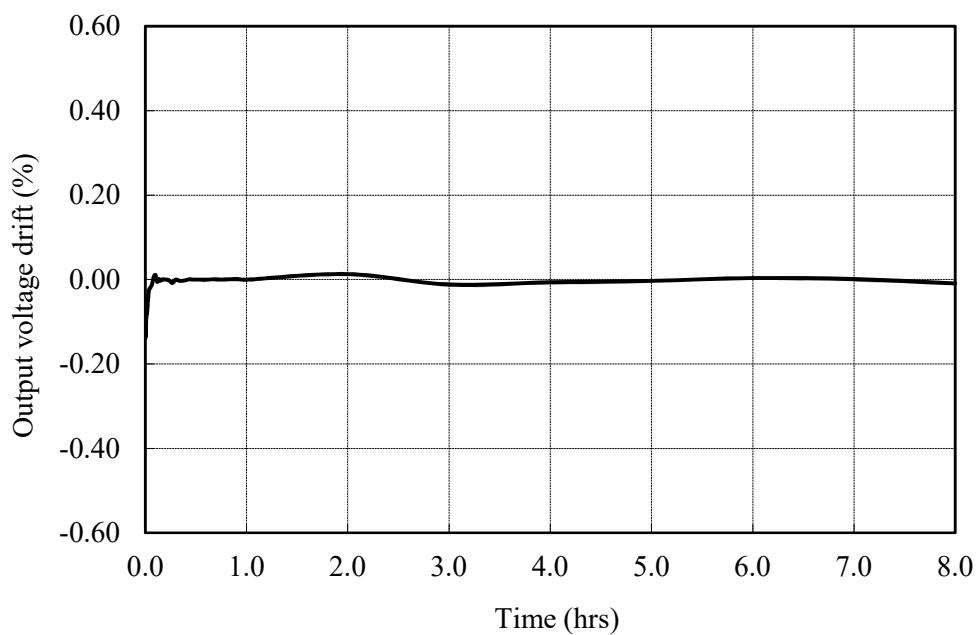
Conditions Vin : 280 VDC
Iout: 100 %
Ta : 25 °C

12V**24V**

2.2 通電ドリフト特性

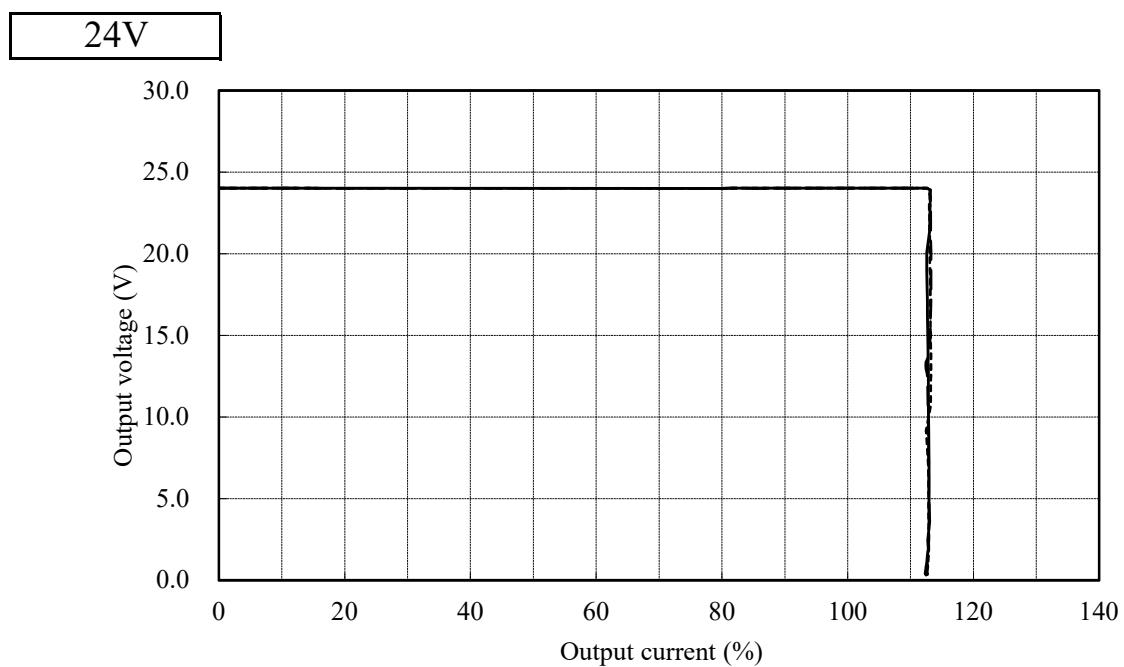
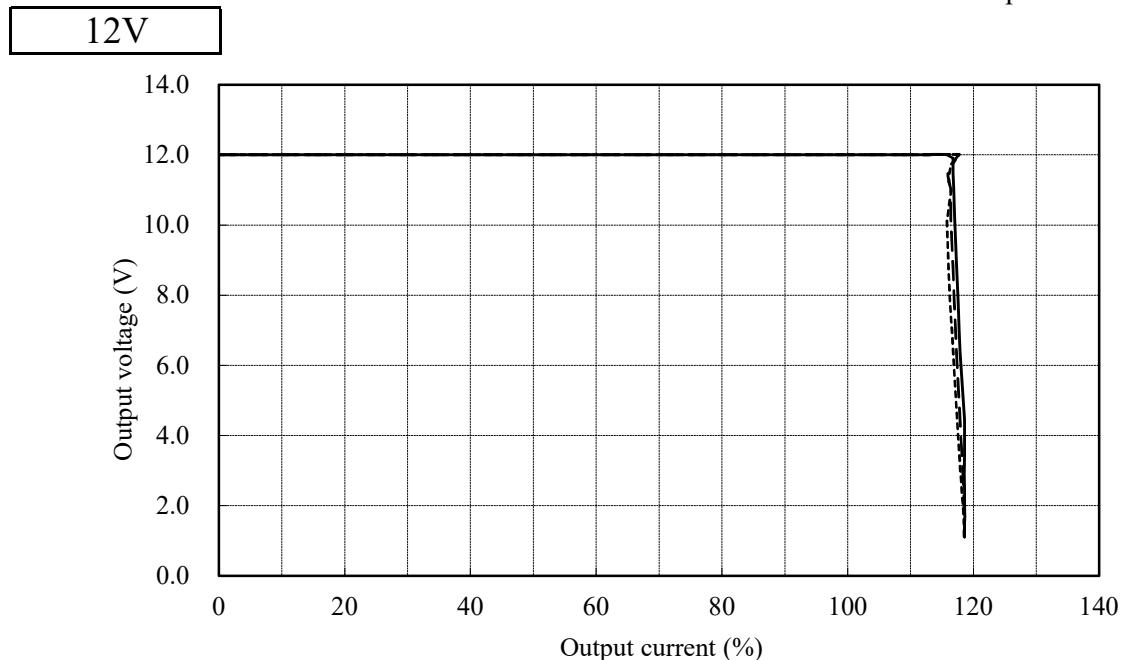
Warm up voltage drift characteristics

Conditions Vin : 280 VDC
Iout: 100 %
Ta : 25 °C

28V**48V**

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

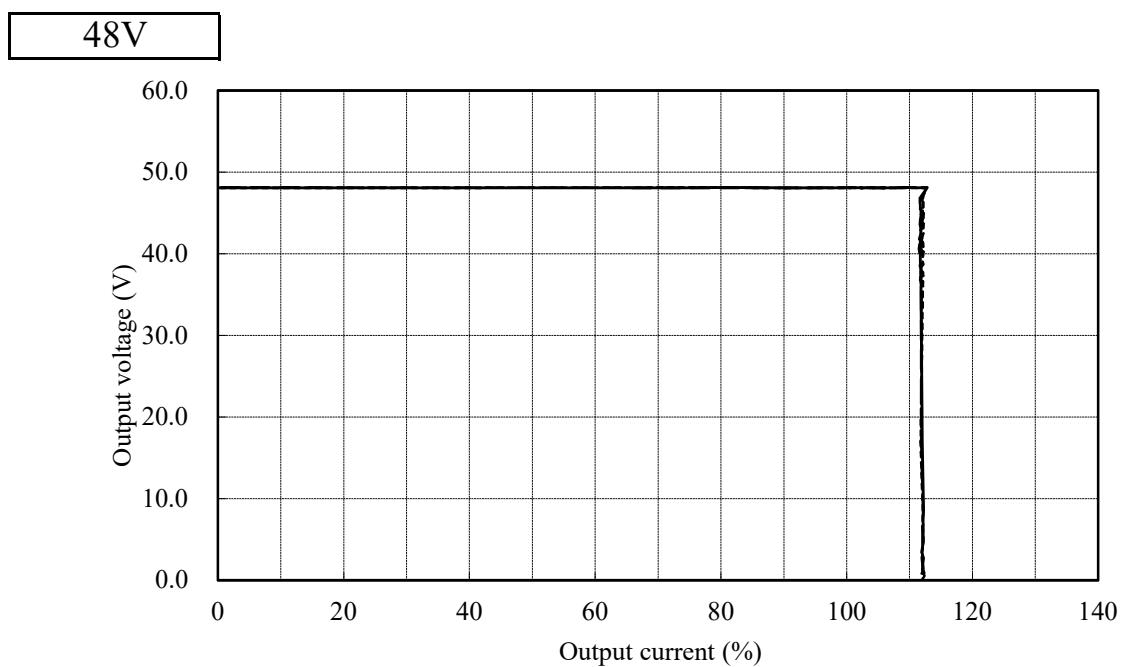
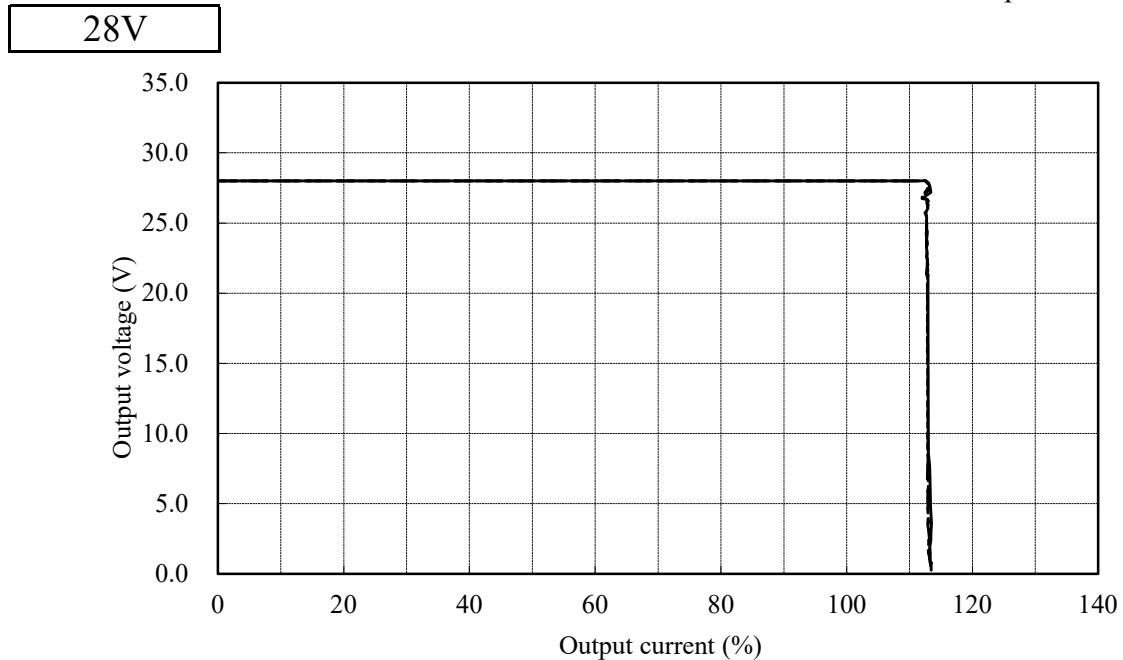
Conditions Vin : 200 VDC -----
: 280 VDC - - - - -
: 400 VDC —————
Tbp : 25 °C



2.3 過電流保護特性

Over current protection (OCP) characteristics

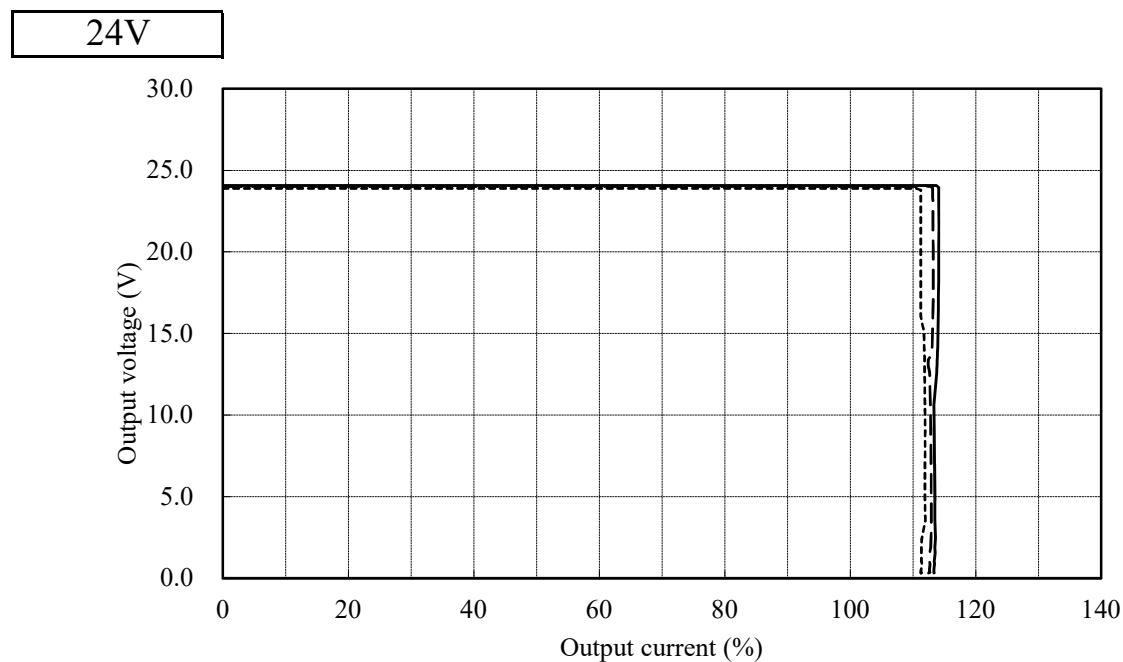
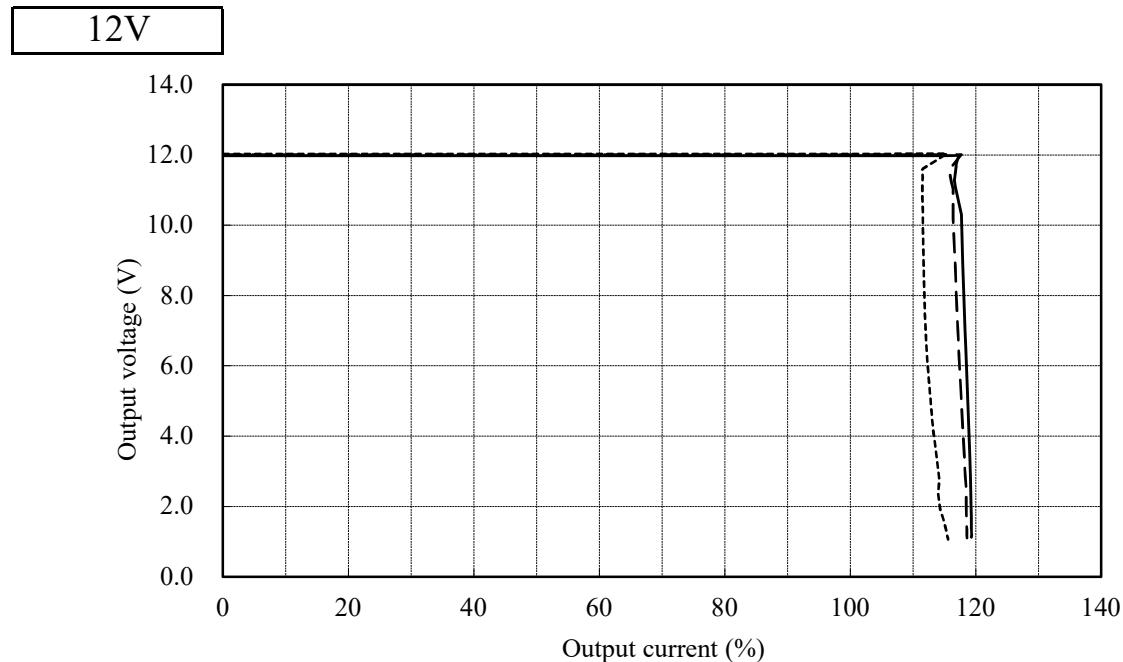
Conditions Vin : 200 VDC -----
: 280 VDC - - - - -
: 400 VDC —————
Tbp : 25 °C



2.3 過電流保護特性

Over current protection (OCP) characteristics

Conditions Vin : 280 VDC
Tbp : -40 °C -----
: 25 °C - - -
: 100 °C —————

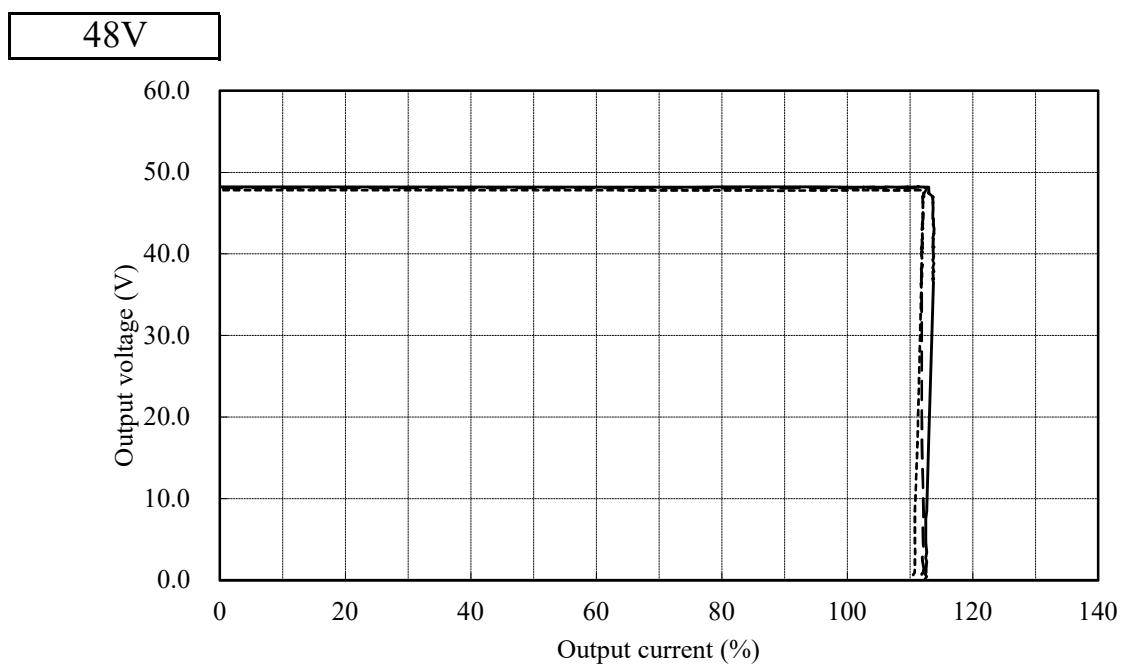
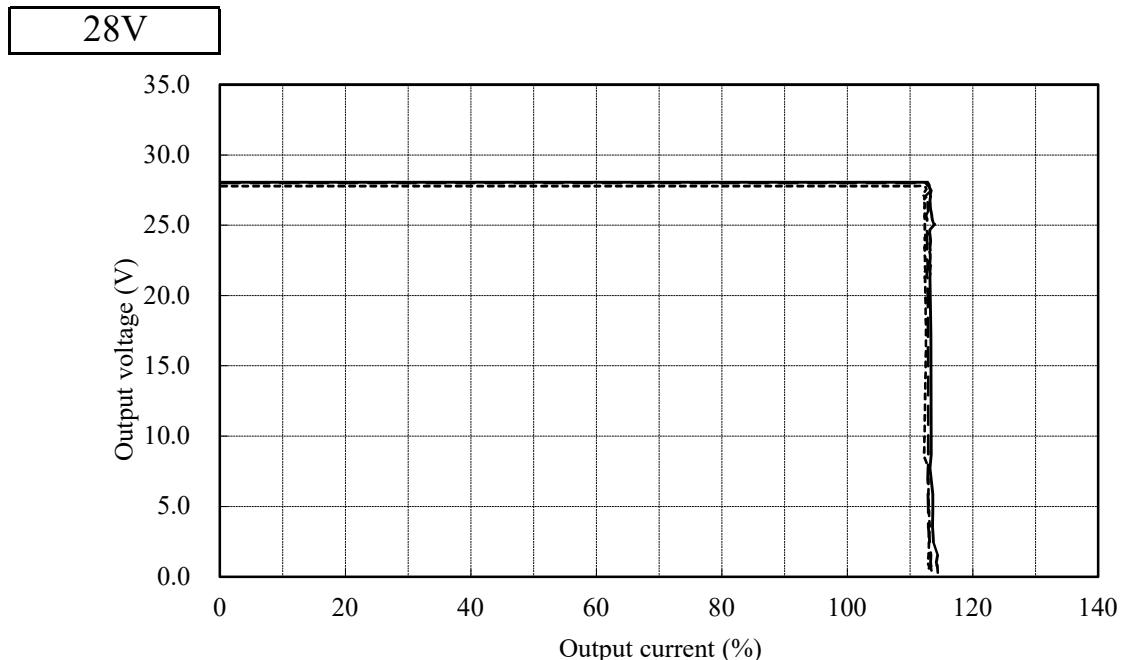


2.3 過電流保護特性

Over current protection (OCP) characteristics

Conditions Vin : 280 VDC

Tbp :	-40 °C	-----
:	25 °C	-----
:	100 °C	———



2.4 過電圧保護特性

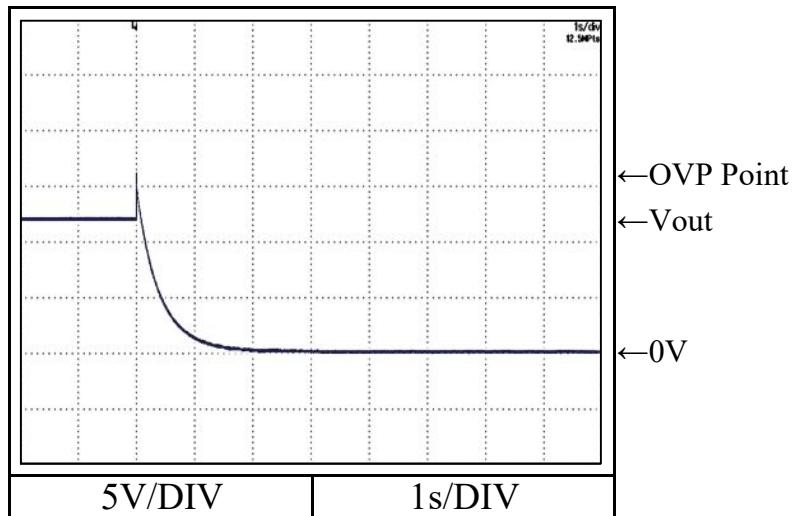
Over voltage protection (OVP) characteristics

Conditions Vin : 280 VDC

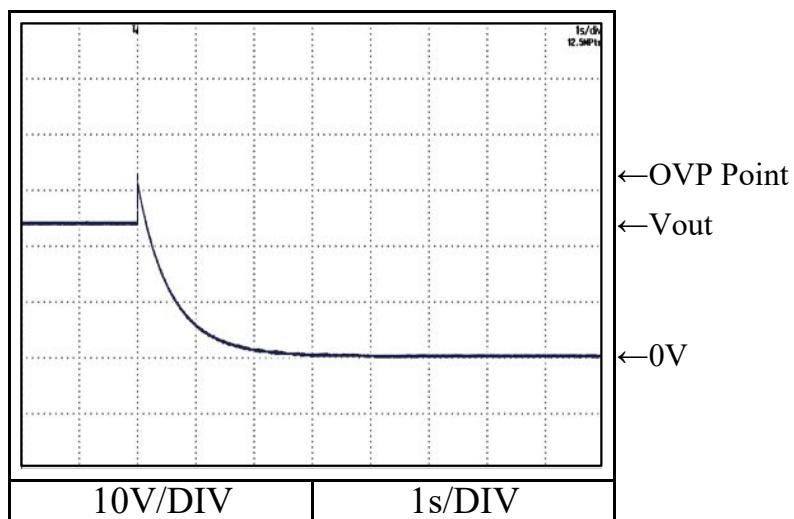
Iout : 0 %

Tbp : 25 °C

12V



24V



2.4 過電圧保護特性

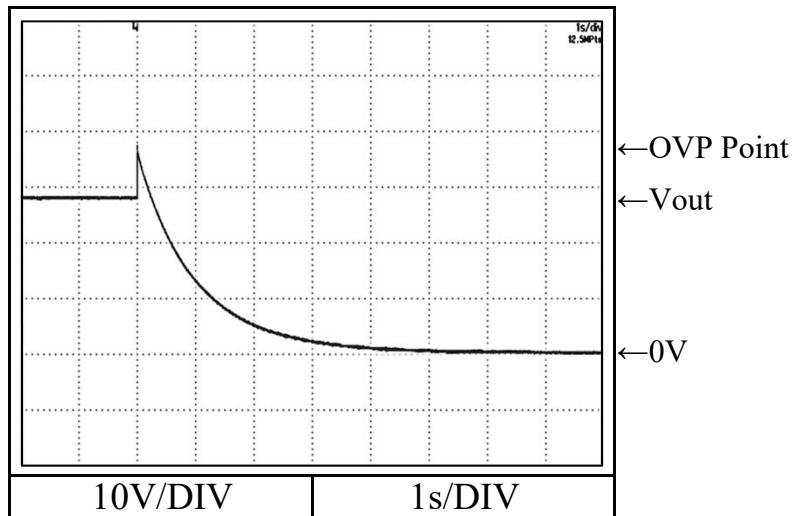
Over voltage protection (OVP) characteristics

Conditions Vin : 280 VDC

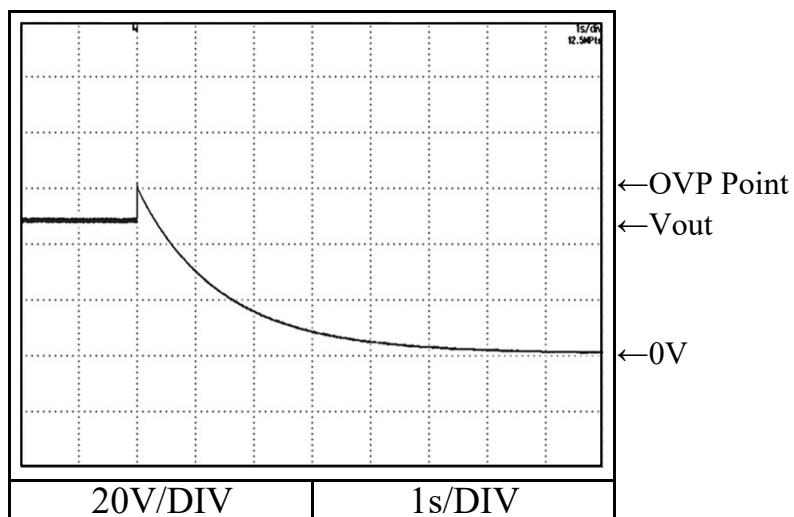
Iout : 0 %

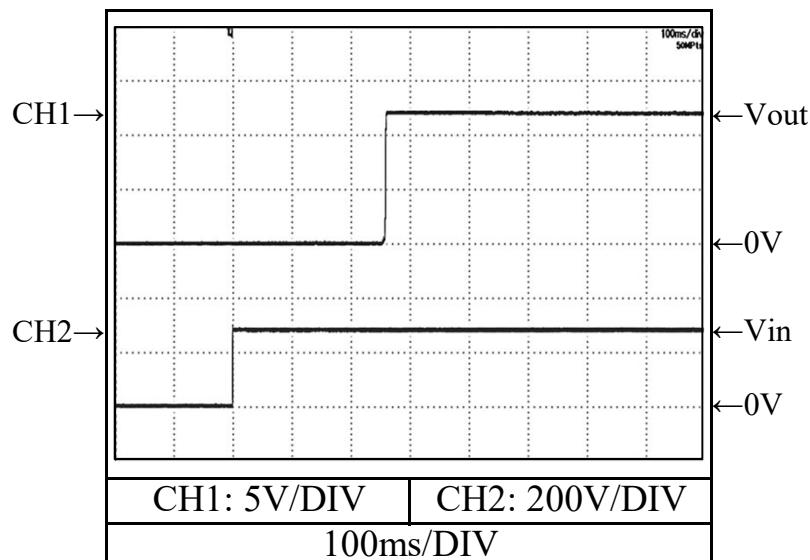
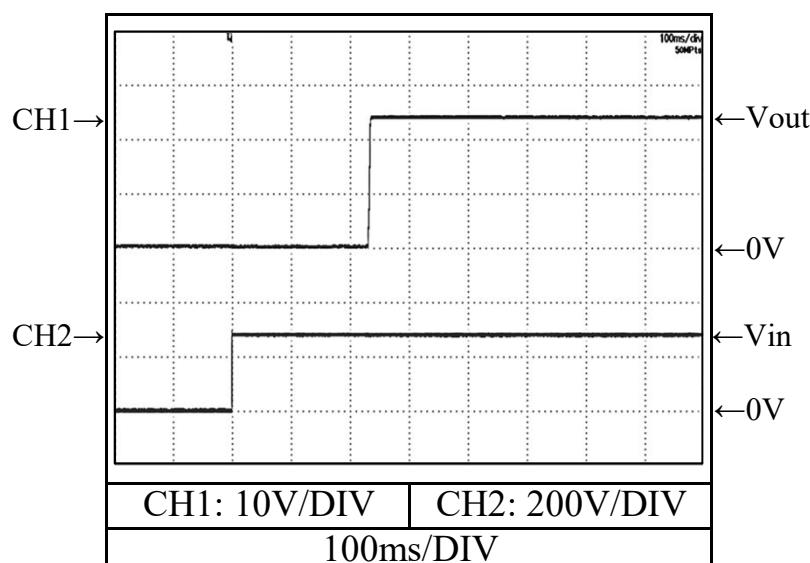
Tbp : 25 °C

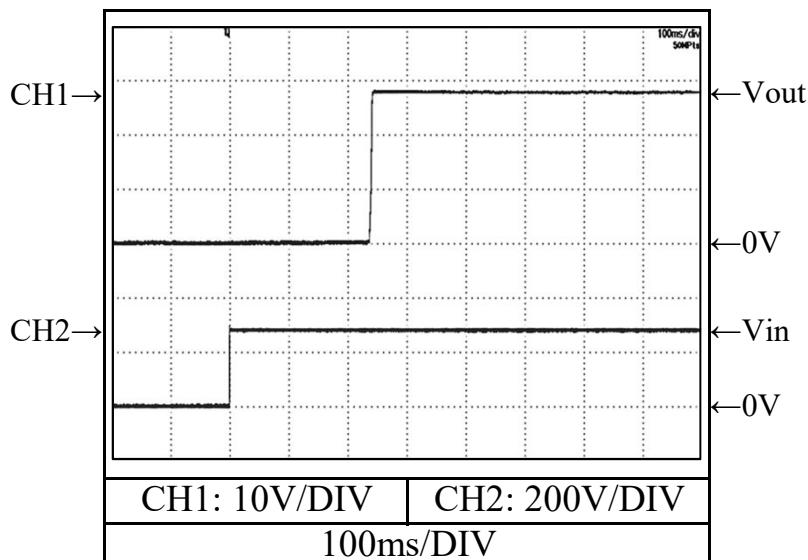
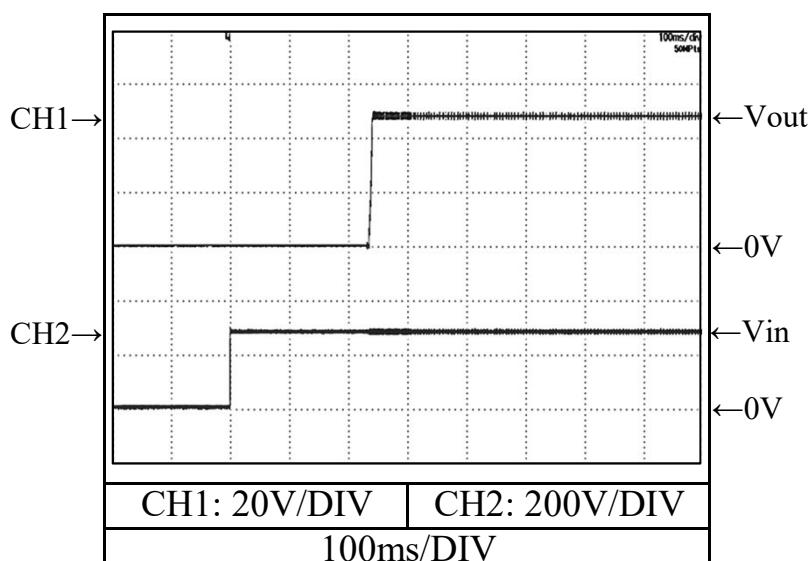
28V

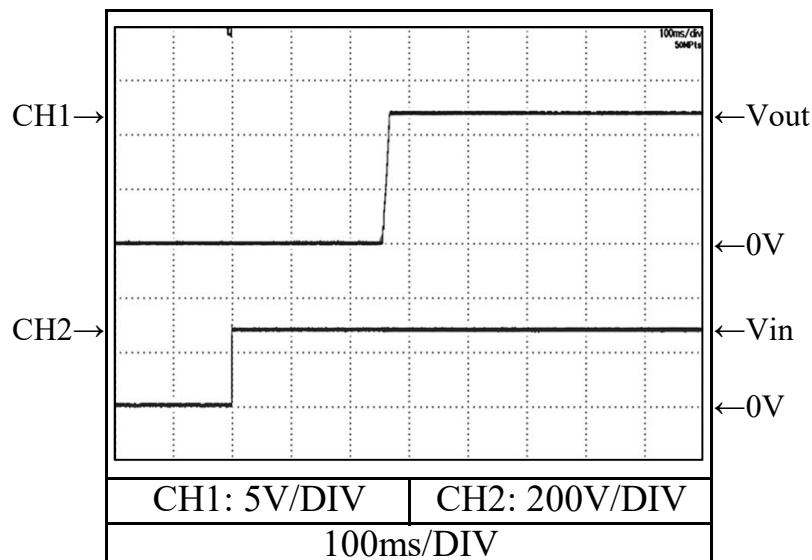
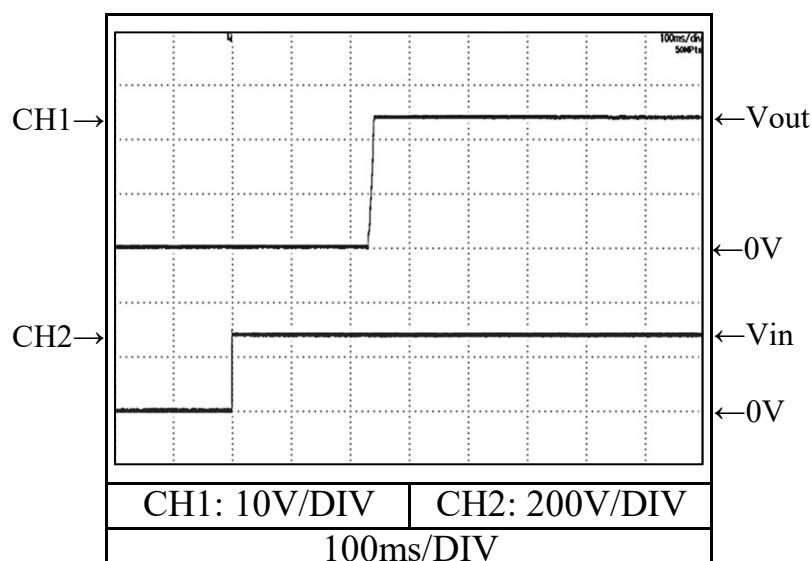


48V



2.5 出力立ち上がり特性
Output rise characteristicsConditions Vin : 280 VDC
Iout : 0 %
Tbp : 25 °C**12V****24V**

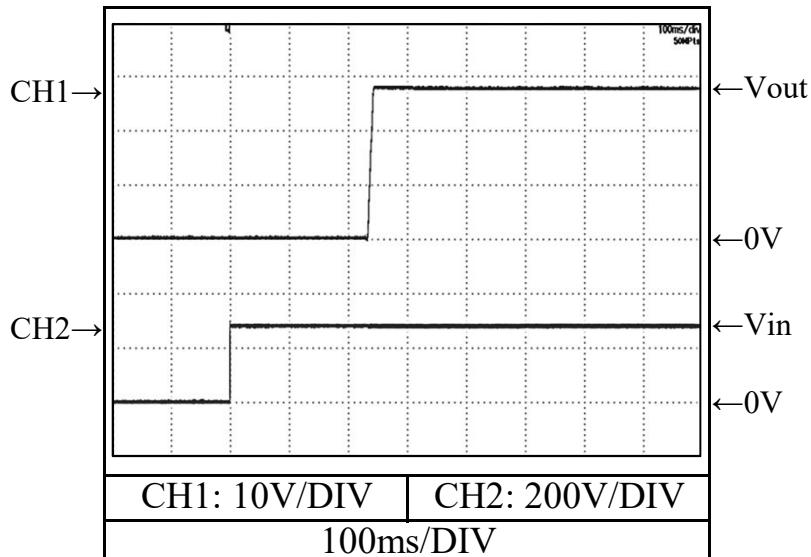
2.5 出力立ち上がり特性
Output rise characteristicsConditions Vin : 280 VDC
Iout : 0 %
Tbp : 25 °C**28V****48V**

2.5 出力立ち上がり特性
Output rise characteristicsConditions Vin : 280 VDC
Iout : 100 %
Tbp : 25 °C**12V****24V**

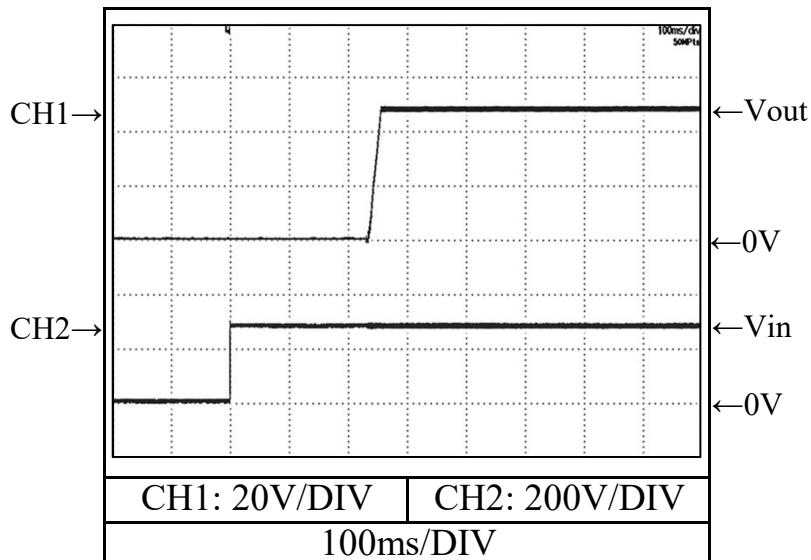
2.5 出力立ち上がり特性
Output rise characteristics

Conditions Vin : 280 VDC
Iout : 100 %
Tbp : 25 °C

28V



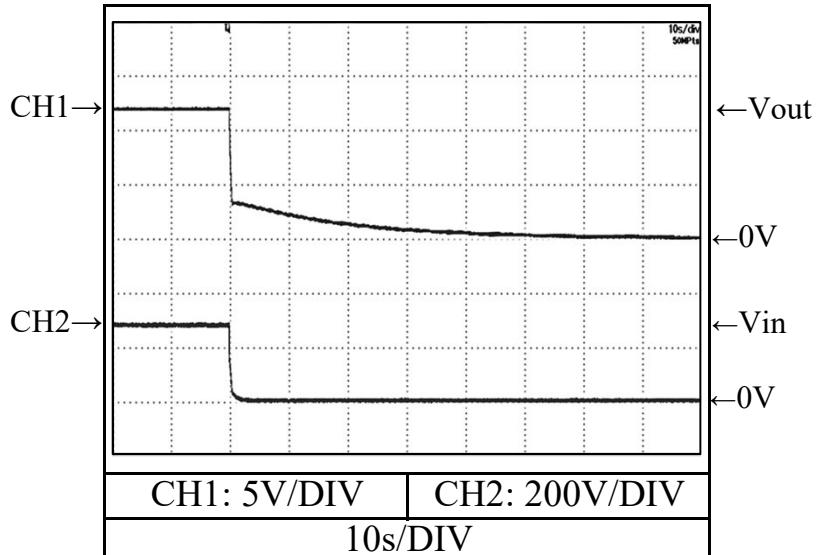
48V



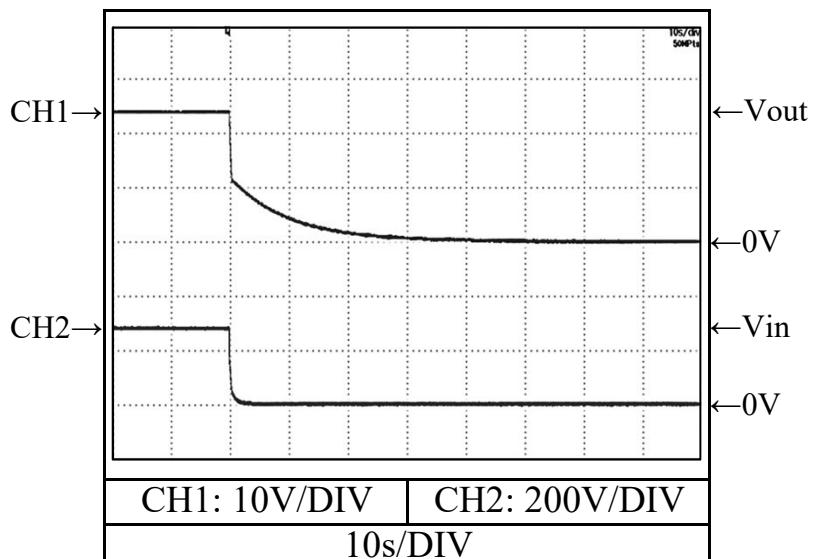
2.6 出力立ち下がり特性 Output fall characteristics

Conditions Vin : 280 VDC
Iout : 0 %
Tbp : 25 °C

12V



24V

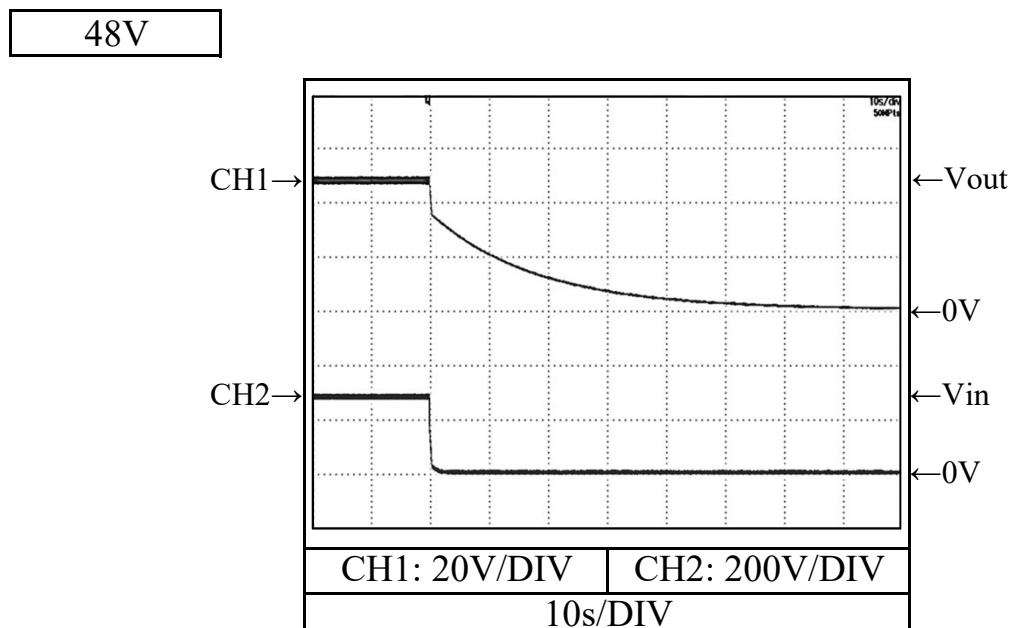
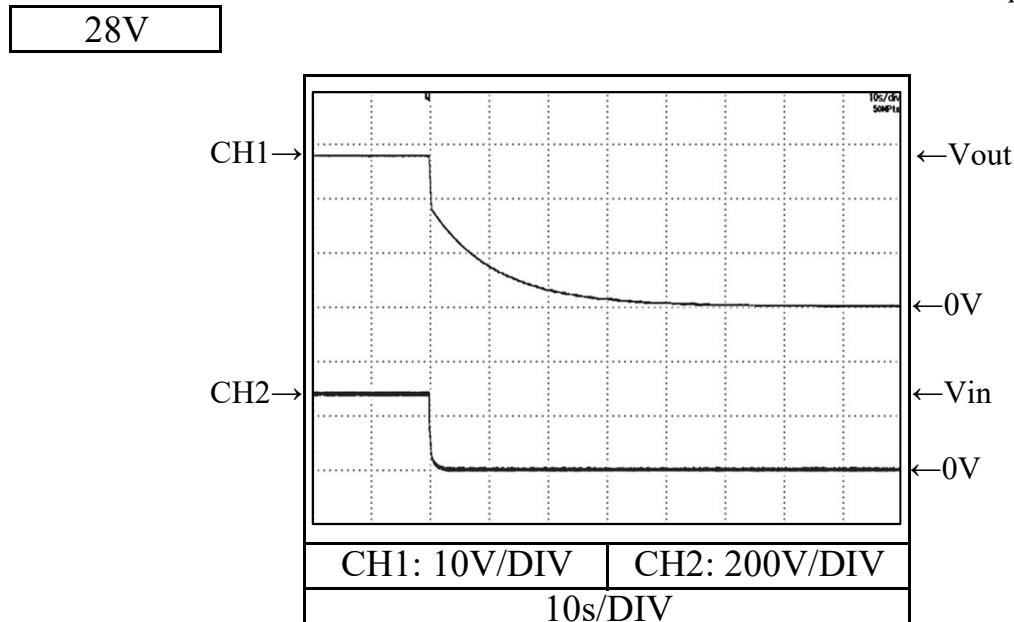


2.6 出力立ち下がり特性
Output fall characteristics

Conditions Vin : 280 VDC

Iout : 0 %

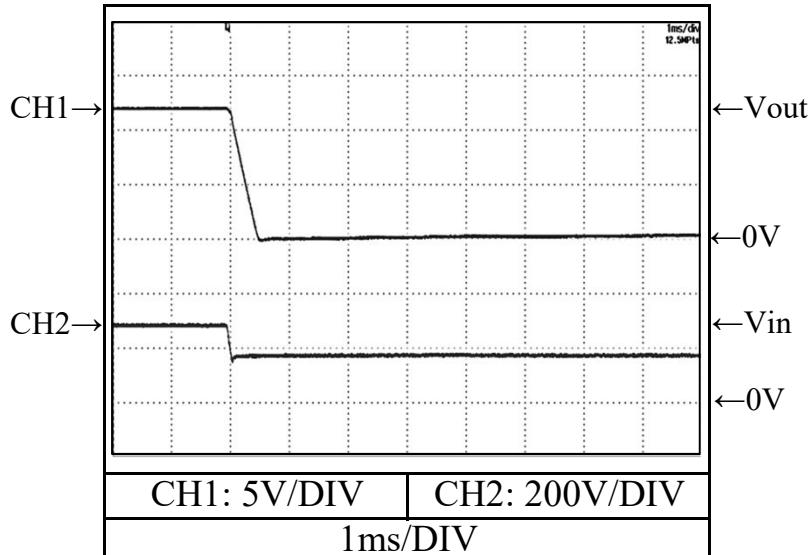
Tbp : 25 °C



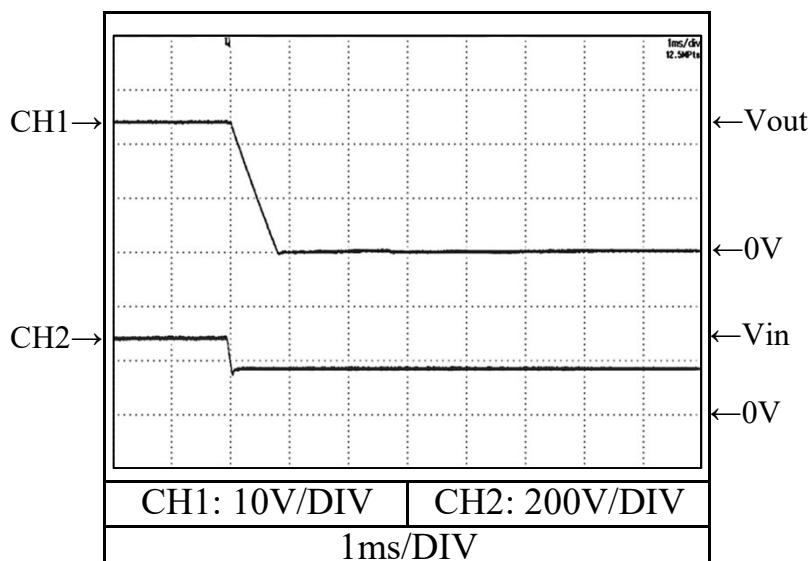
2.6 出力立ち下がり特性
Output fall characteristics

Conditions Vin : 280 VDC
Iout : 100 %
Tbp : 25 °C

12V



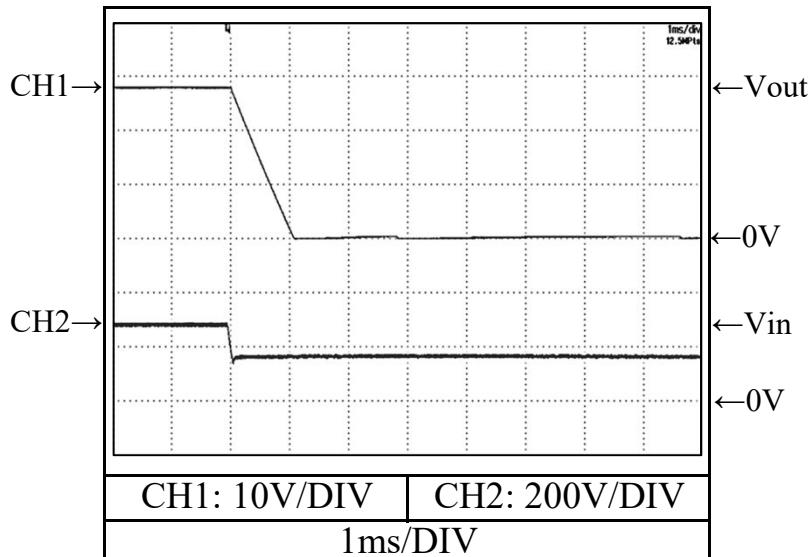
24V



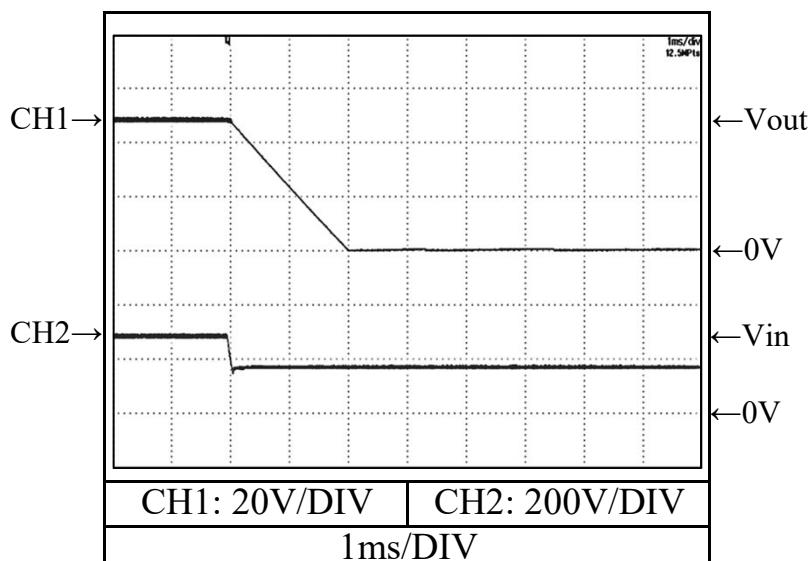
2.6 出力立ち下がり特性 Output fall characteristics

Conditions Vin : 280 VDC
Iout : 100 %
Tbp : 25 °C

28V



48V



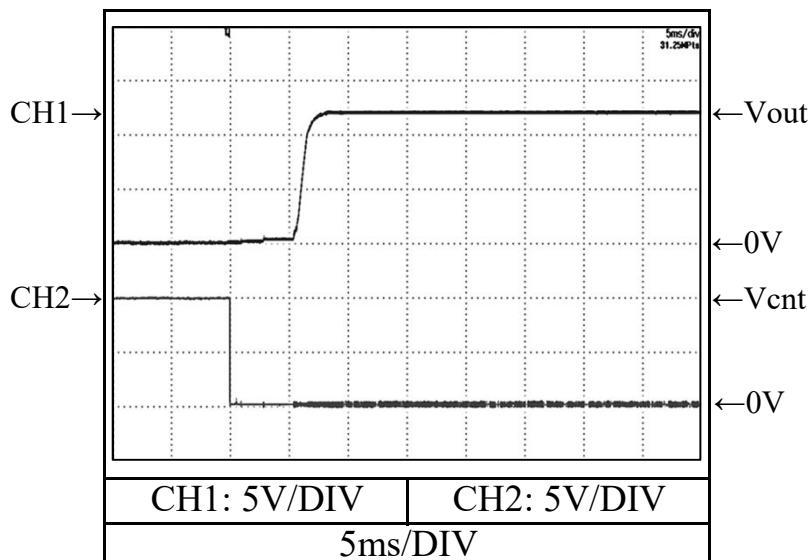
2.7 出力立ち上がり特性 (ON/OFFコントロール時)
Output rise characteristics with ON/OFF CONTROL

Conditions Vin : 280 VDC

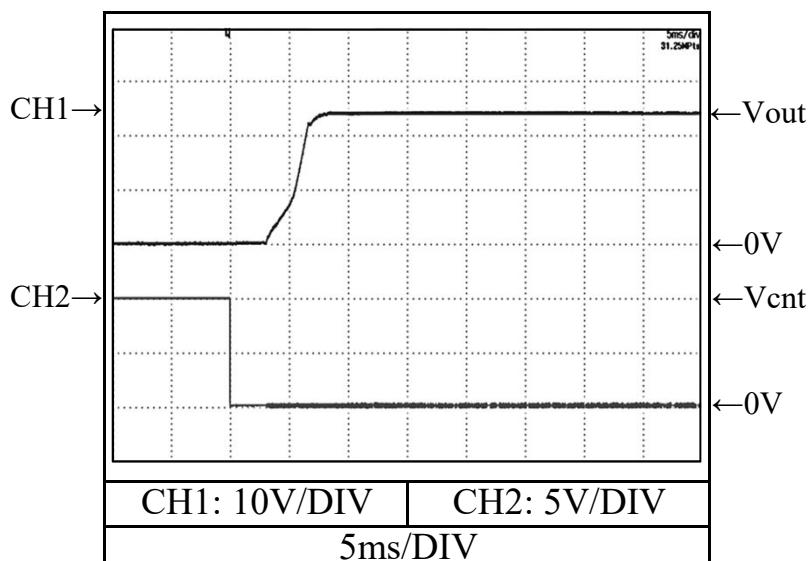
Iout : 0 %

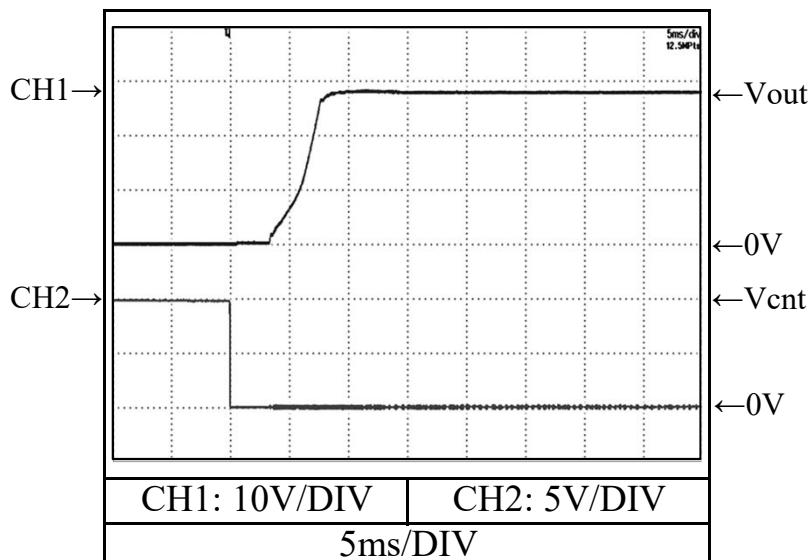
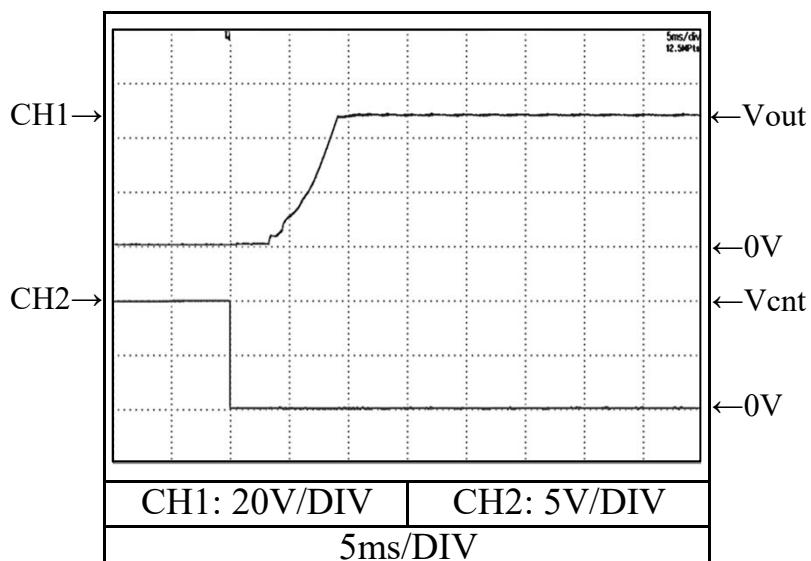
Tbp : 25 °C

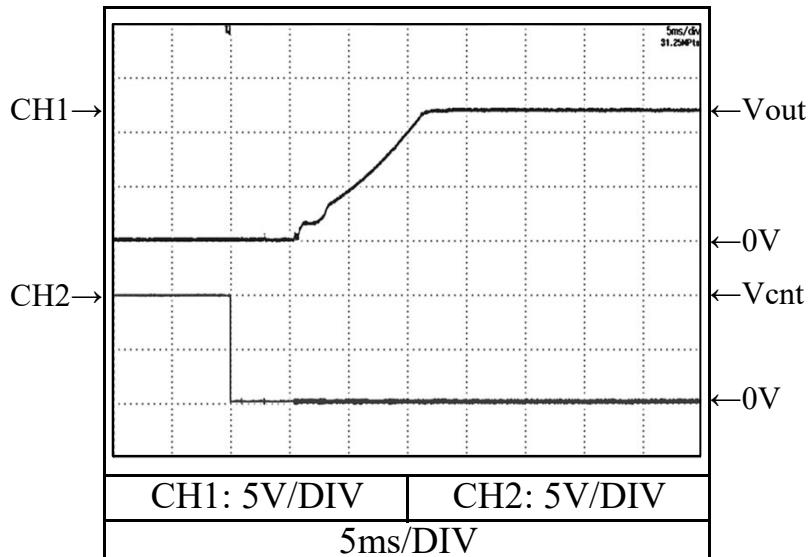
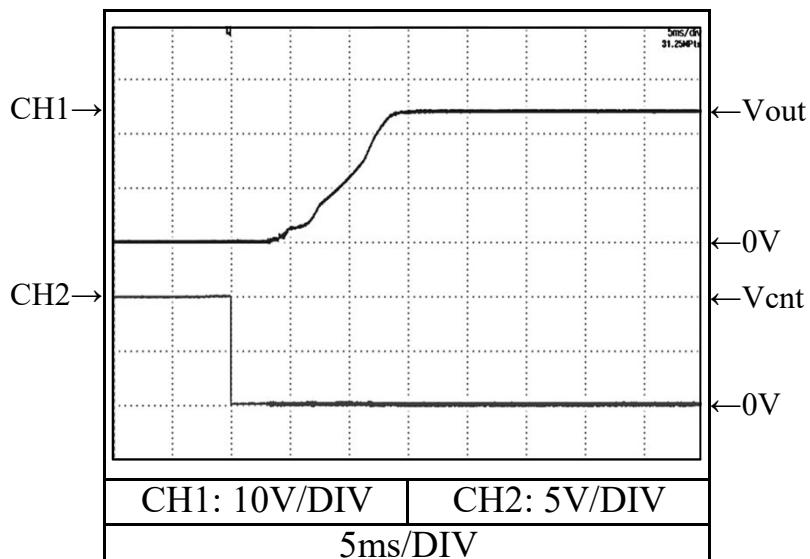
12V

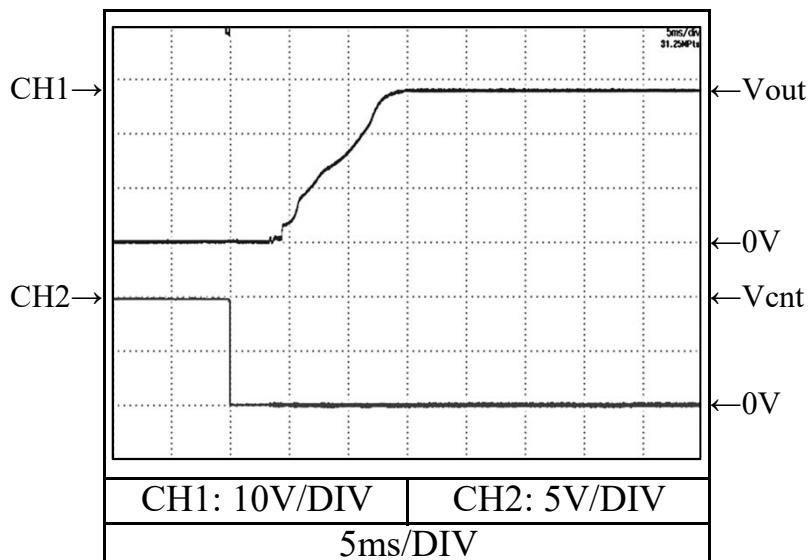
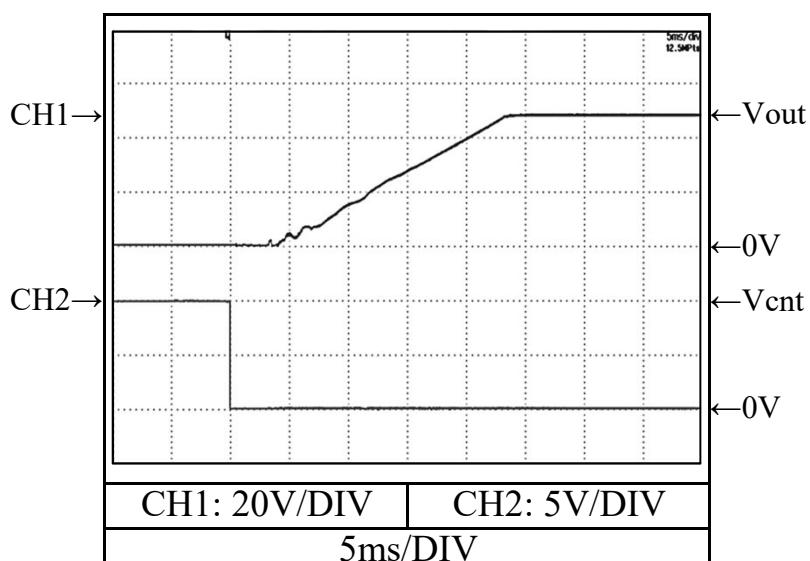


24V



2.7 出力立ち上がり特性 (ON/OFFコントロール時)
Output rise characteristics with ON/OFF CONTROLConditions
Vin : 280 VDC
Iout : 0 %
Tbp : 25 °C**28V****48V**

2.7 出力立ち上がり特性 (ON/OFFコントロール時)
Output rise characteristics with ON/OFF CONTROLConditions
Vin : 280 VDC
Iout : 100 %
Tbp : 25 °C**12V****24V**

2.7 出力立ち上がり特性 (ON/OFFコントロール時)
Output rise characteristics with ON/OFF CONTROLConditions
Vin : 280 VDC
Iout : 100 %
Tbp : 25 °C**28V****48V**

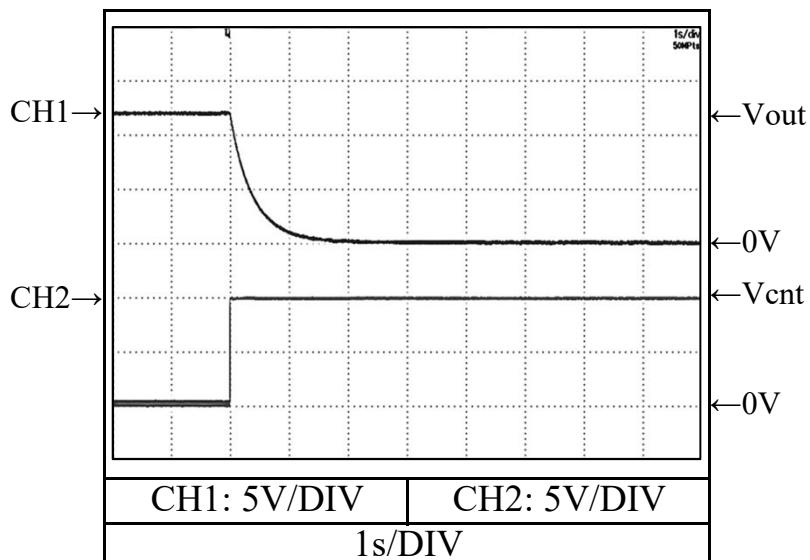
2.8 出力立ち下がり特性 (ON/OFFコントロール時)
Output fall characteristics with ON/OFF CONTROL

Conditions Vin : 280 VDC

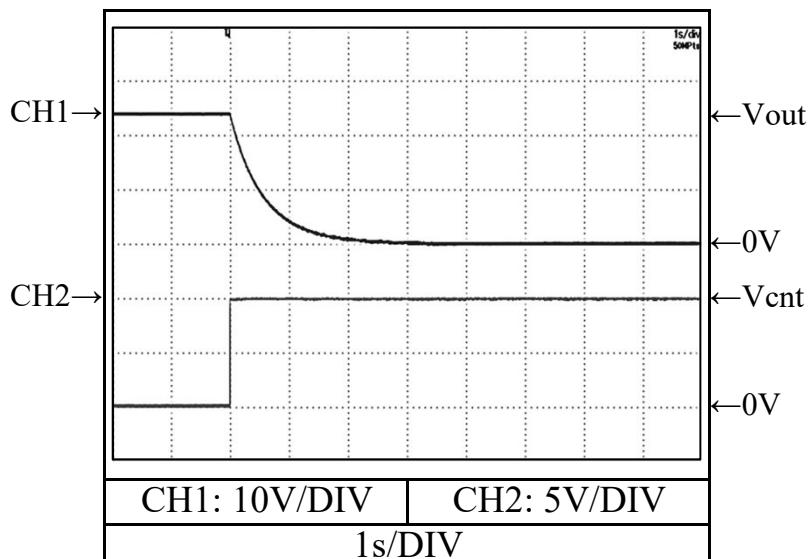
Iout : 0 %

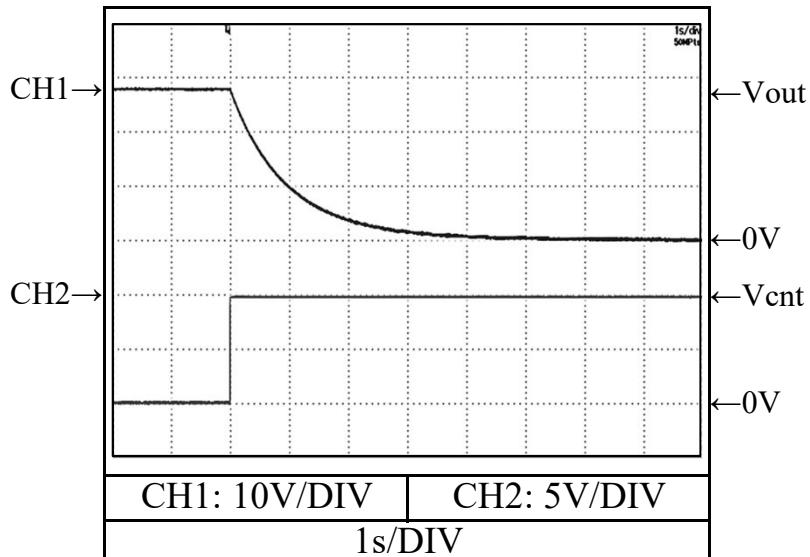
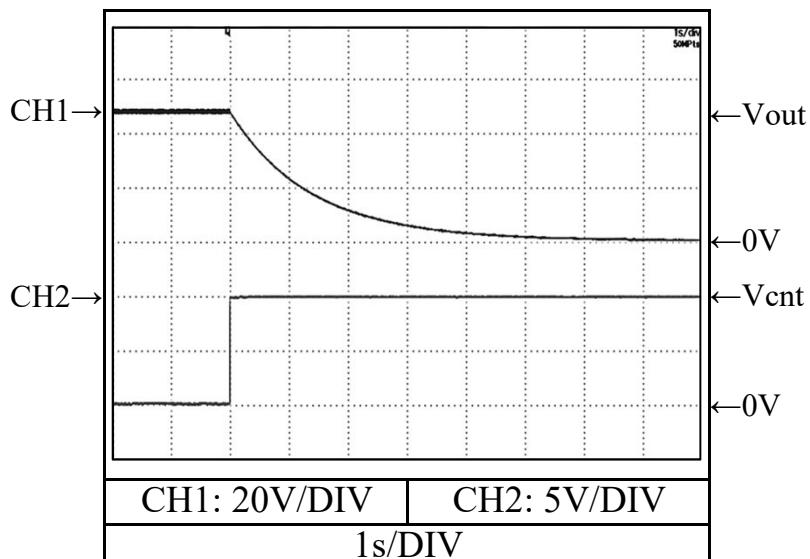
Tbp : 25 °C

12V



24V

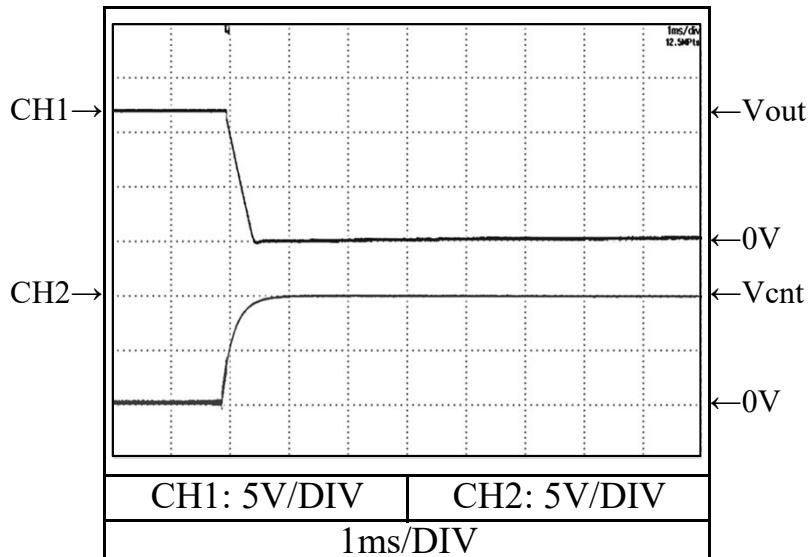


2.8 出力立ち下がり特性 (ON/OFFコントロール時)
Output fall characteristics with ON/OFF CONTROLConditions Vin : 280 VDC
Iout : 0 %
Tbp : 25 °C**28V****48V**

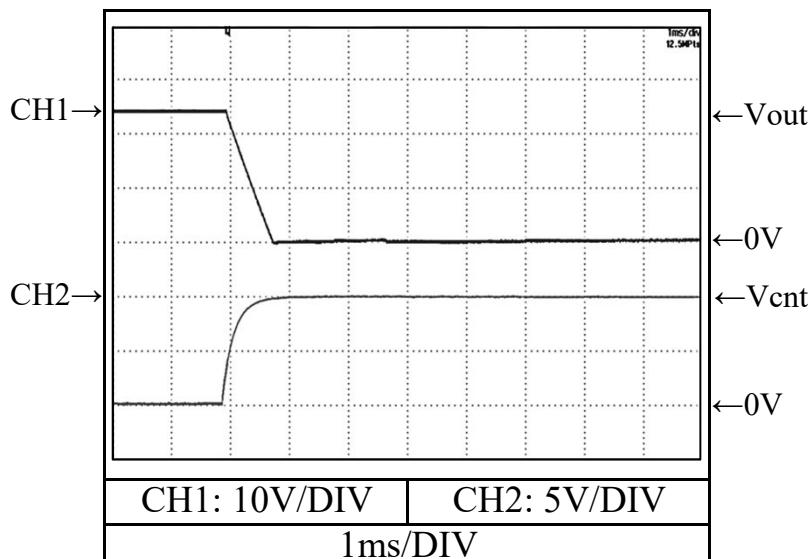
2.8 出力立ち下がり特性 (ON/OFFコントロール時)
Output fall characteristics with ON/OFF CONTROL

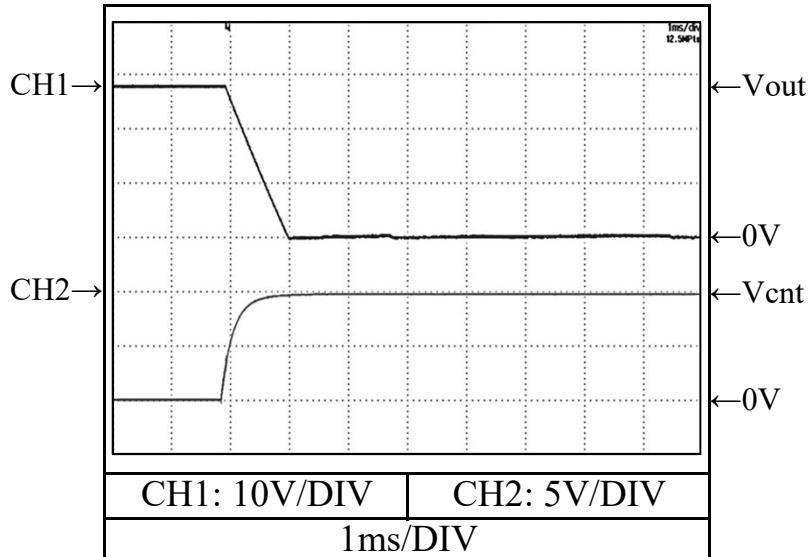
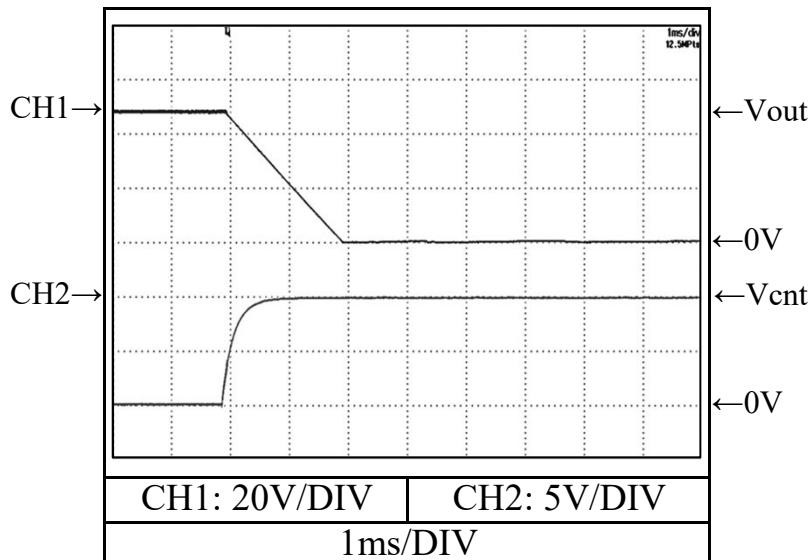
Conditions Vin : 280 VDC
Iout : 100 %
Tbp : 25 °C

12V



24V



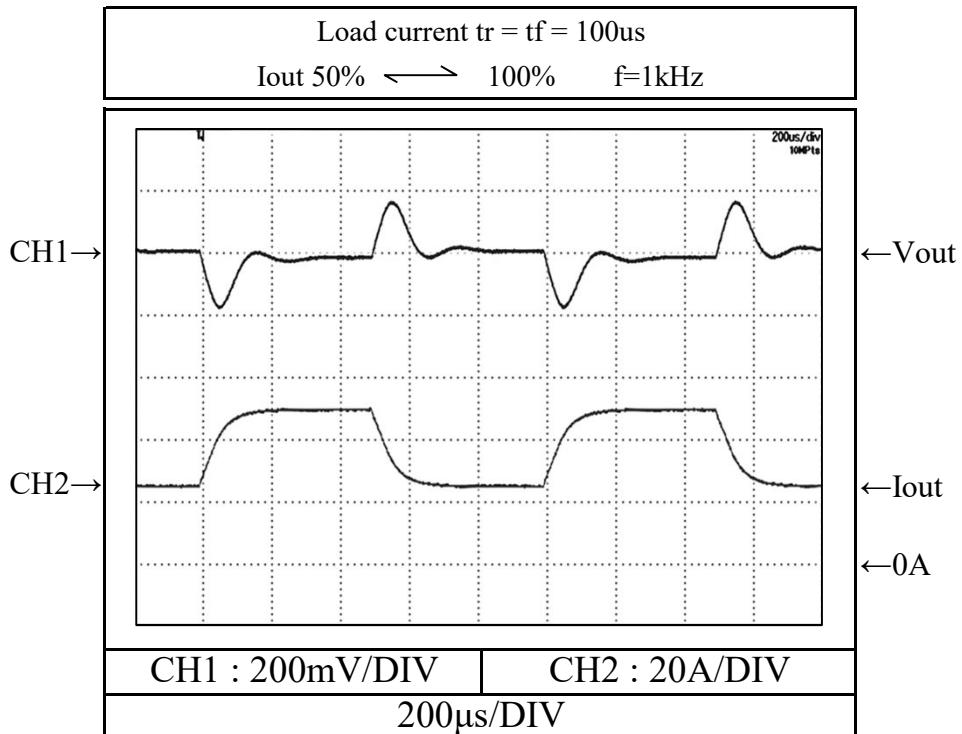
2.8 出力立ち下がり特性(ON/OFFコントロール時)
Output fall characteristics with ON/OFF CONTROLConditions Vin : 280 VDC
Iout : 100 %
Tbp : 25 °C**28V****48V**

2.9 過渡応答(負荷急変)特性

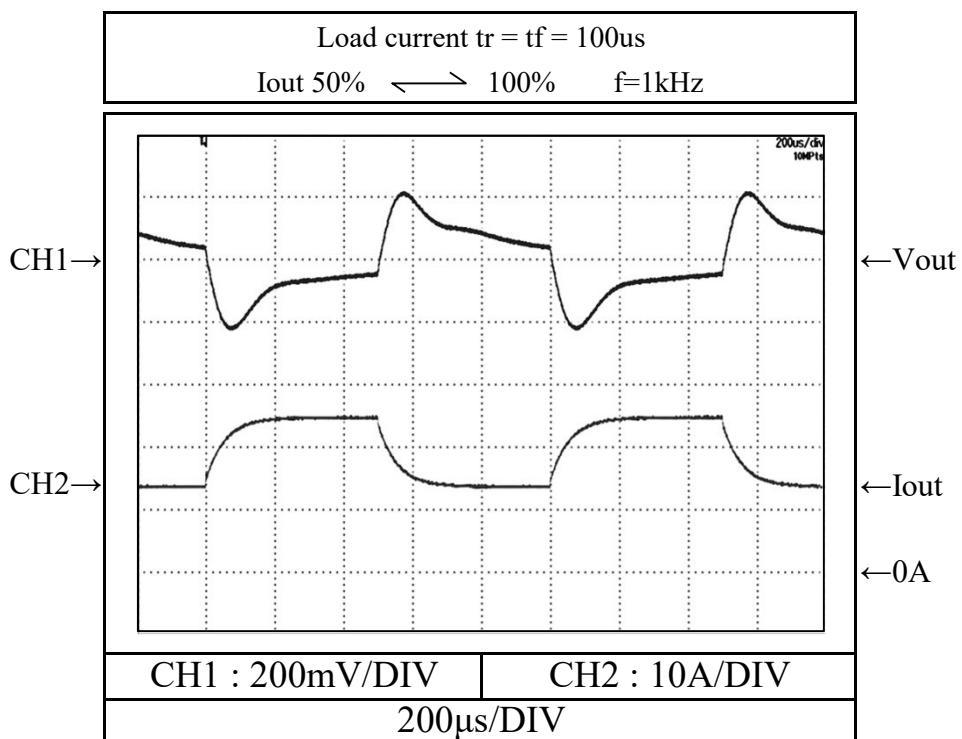
Dynamic load response characteristics

Conditions Vin : 280 VDC
Tbp : 25 °C

12V



24V

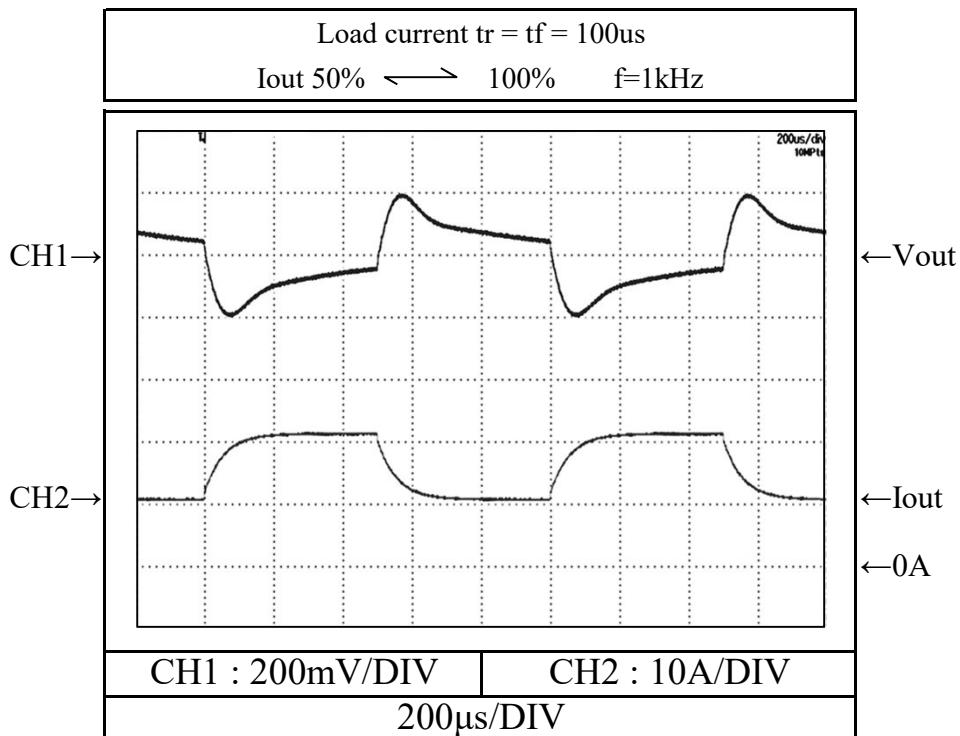


2.9 過渡応答(負荷急変)特性

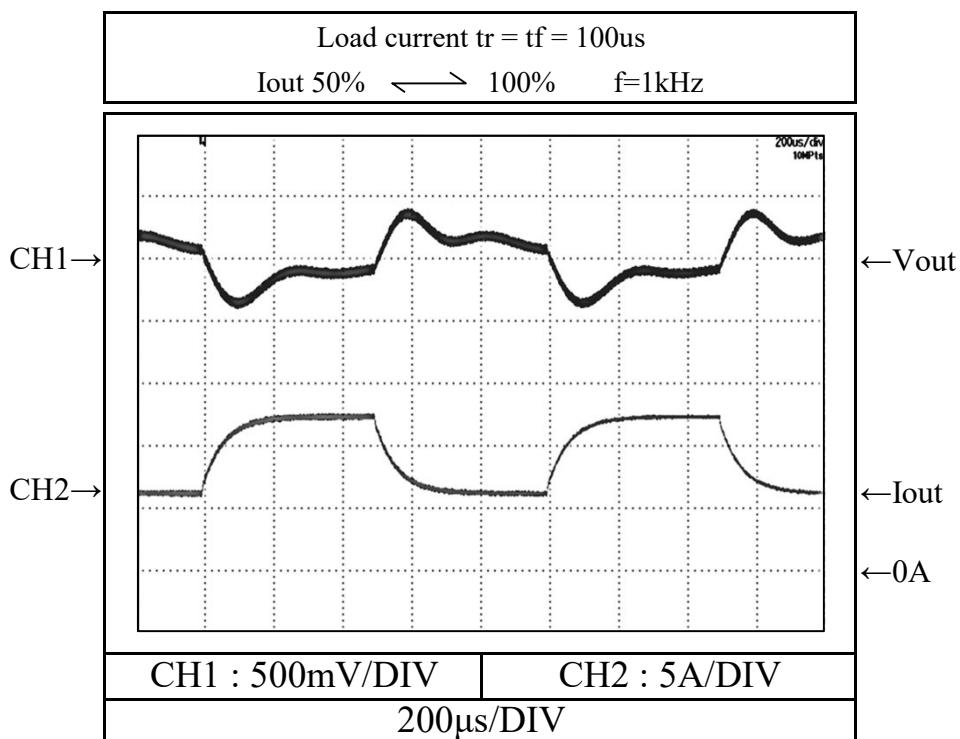
Dynamic load response characteristics

Conditions Vin : 280 VDC
Tbp : 25 °C

28V



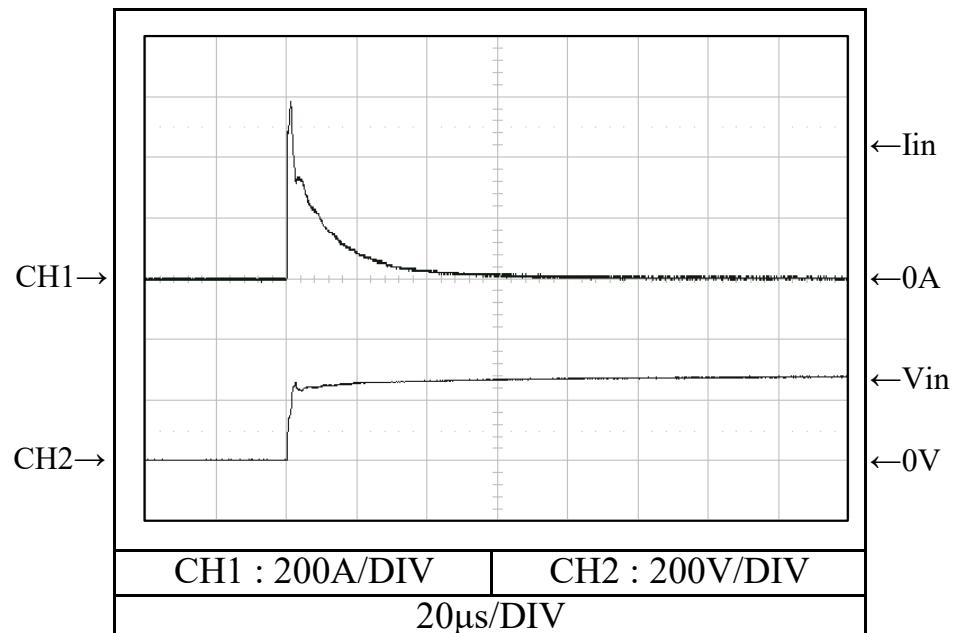
48V



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

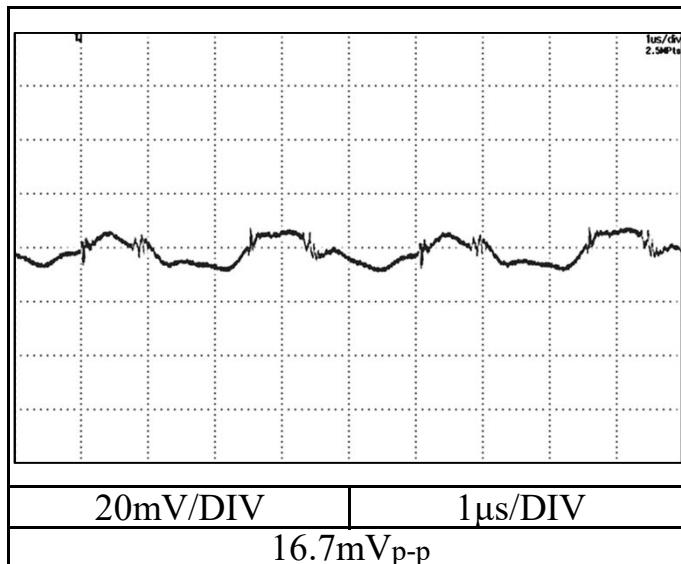
48V

Conditions Vin : 280 VDC
Iout : 100 %
Tbp : 25 °C

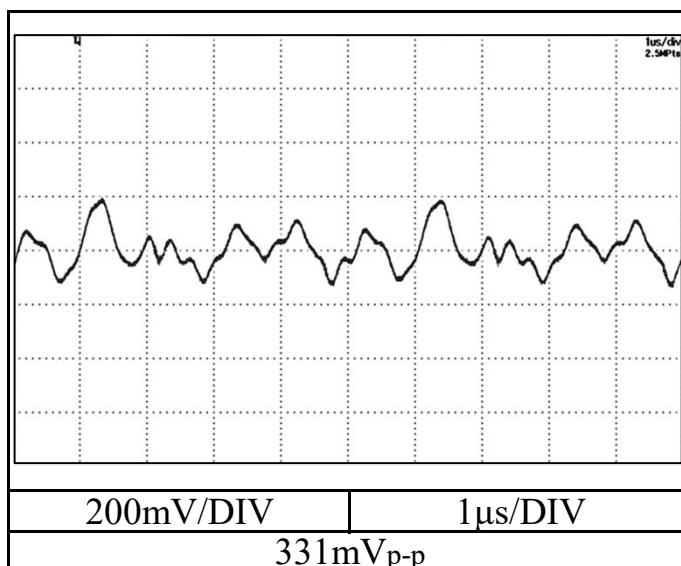


2.11 出力リップル、ノイズ波形
Output ripple and noise waveformConditions Vin : 280 VDC
Iout : 100 %
Tbp : 25 °C**12V**

Normal mode

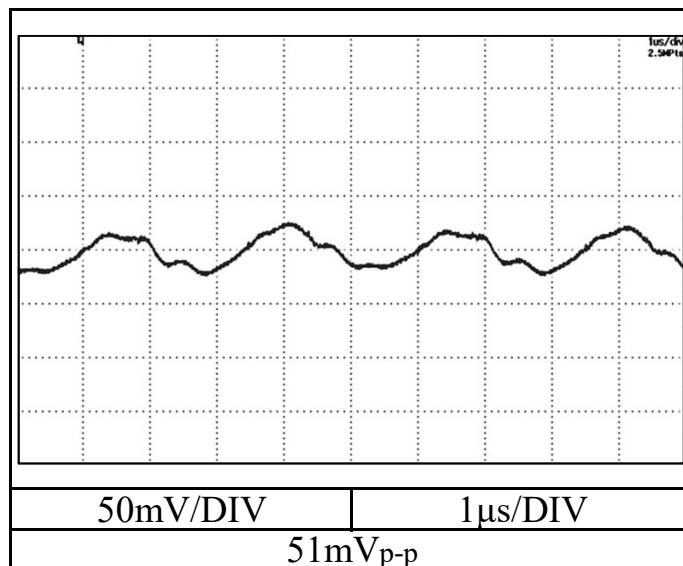


Normal + common mode

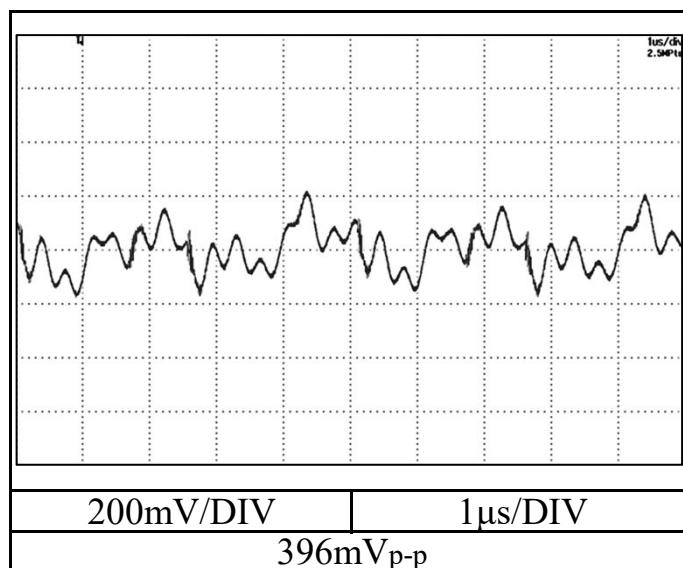


2.11 出力リップル、ノイズ波形
Output ripple and noise waveformConditions Vin : 280 VDC
Iout : 100 %
Tbp : 25 °C**24V**

Normal mode

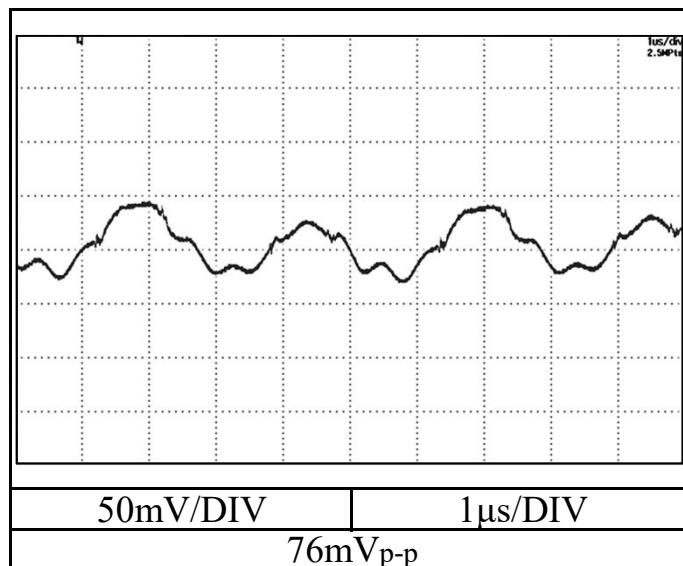


Normal + common mode

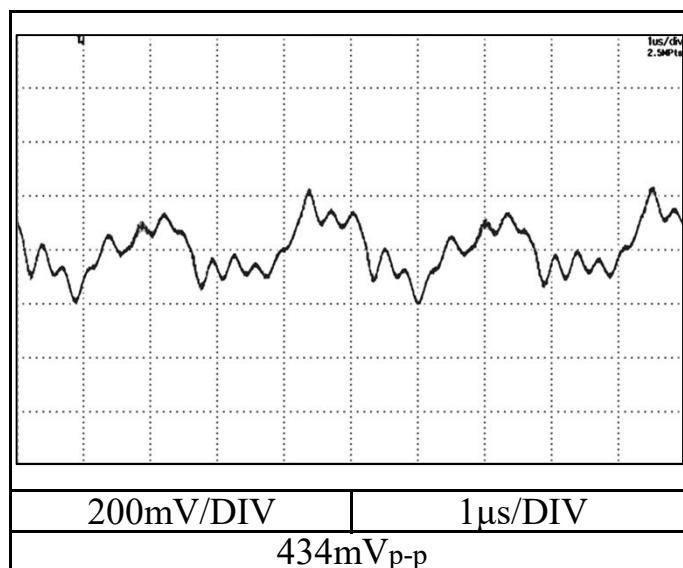


2.11 出力リップル、ノイズ波形
Output ripple and noise waveformConditions Vin : 280 VDC
Iout : 100 %
Tbp : 25 °C**28V**

Normal mode

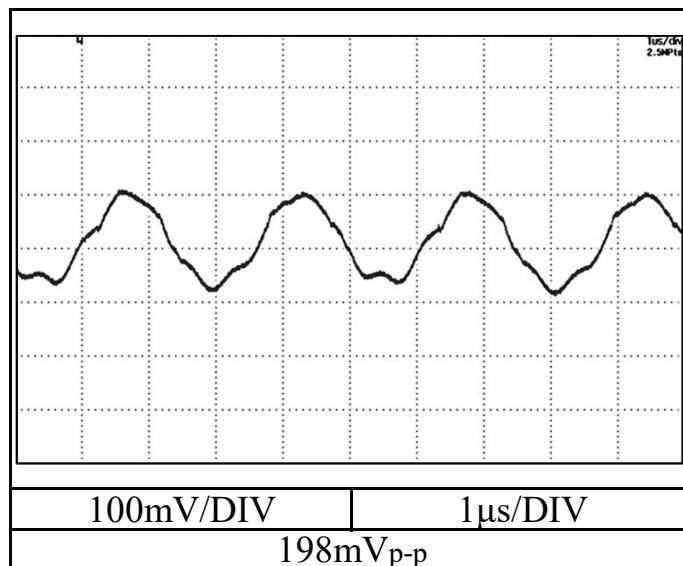


Normal + common mode

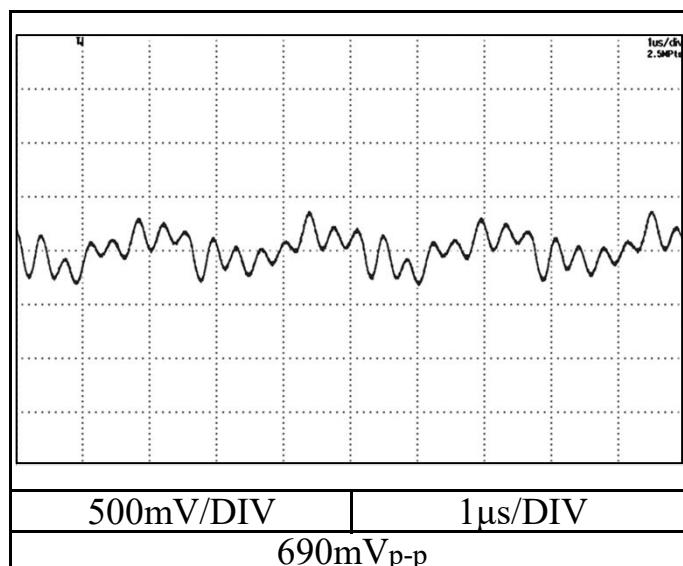


2.11 出力リップル、ノイズ波形
Output ripple and noise waveformConditions Vin : 280 VDC
Iout : 100 %
Tbp : 25 °C**48V**

Normal mode



Normal + common mode



2.12 EMI特性

Electro-Magnetic Interference characteristics

(a) 雜音端子電圧(帰還ノイズ)

Conducted Emission

(1) VCCI class A 対応アプリケーションシステム

VCCI class A application system

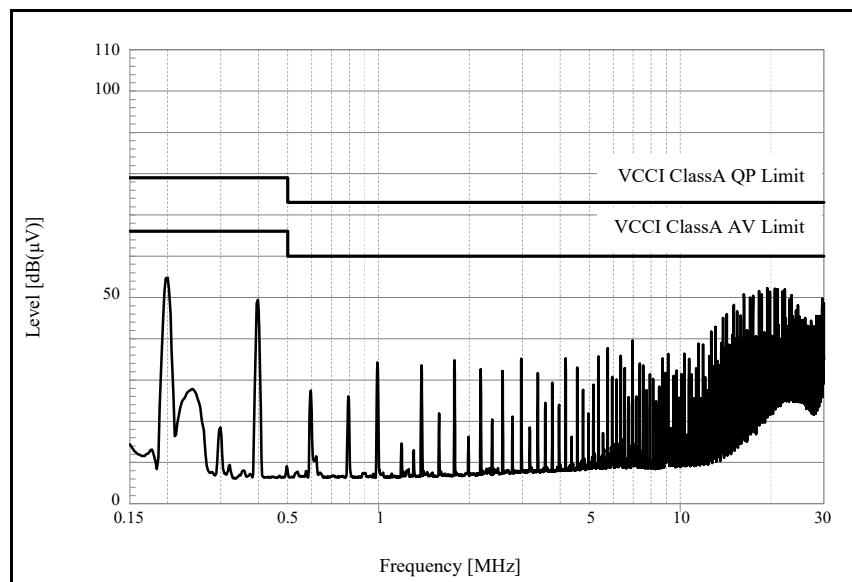
Conditions Vin : 280 VDC

Iout : 100 %

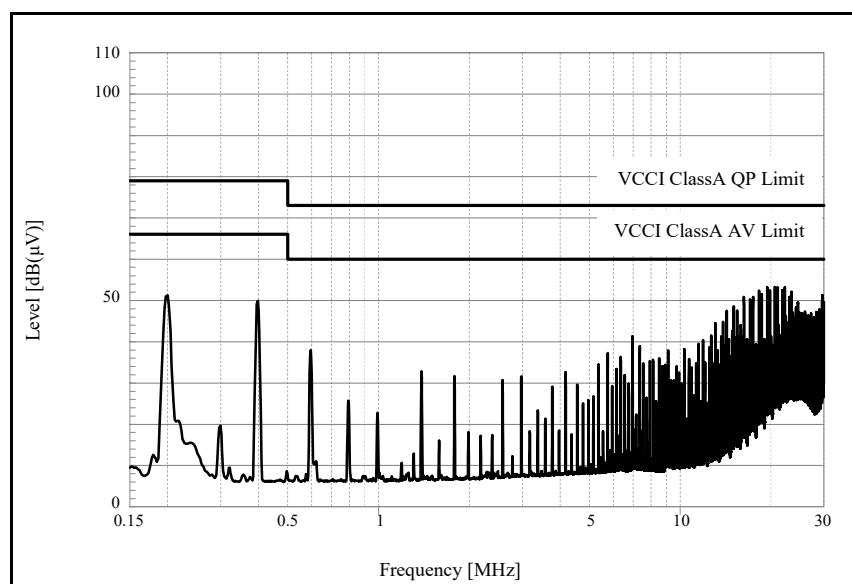
Tbp : 25 °C

12V

+Vin :



-Vin :



2.12 EMI特性

Electro-Magnetic Interference characteristics

(a) 雑音端子電圧(帰還ノイズ)

Conducted Emission

(1) VCCI class A 対応アプリケーションシステム

VCCI class A application system

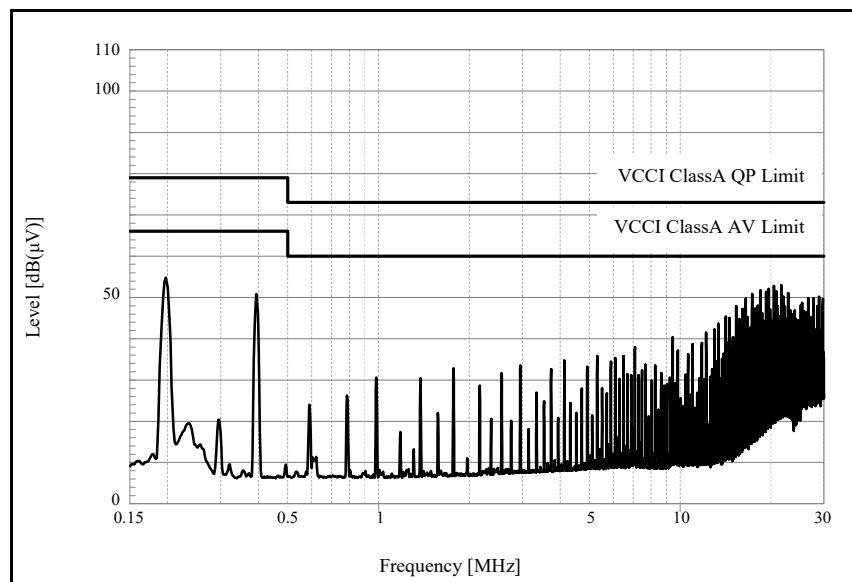
Conditions Vin : 280 VDC

Iout : 100 %

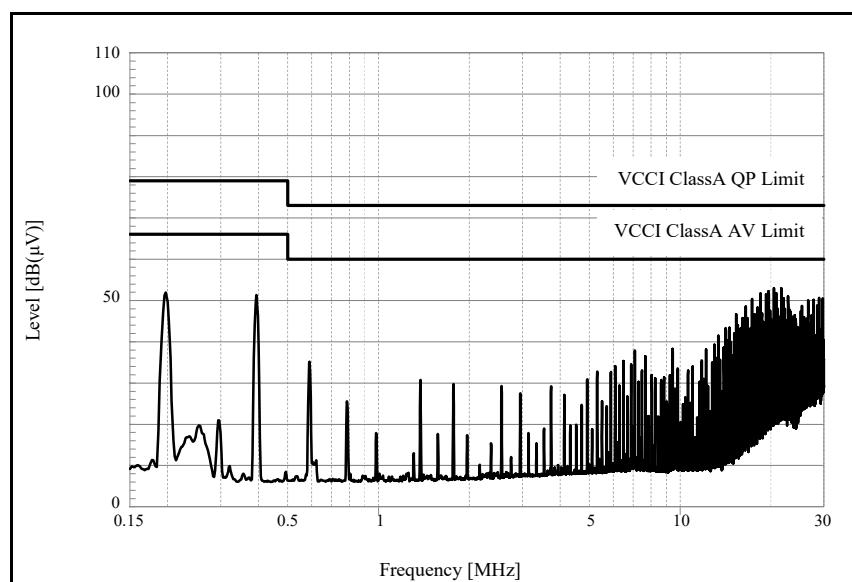
Tbp : 25 °C

24V

+Vin :



-Vin :



2.12 EMI特性

Electro-Magnetic Interference characteristics

(a) 雜音端子電圧(帰還ノイズ)

Conducted Emission

(1) VCCI class A 対応アプリケーションシステム

VCCI class A application system

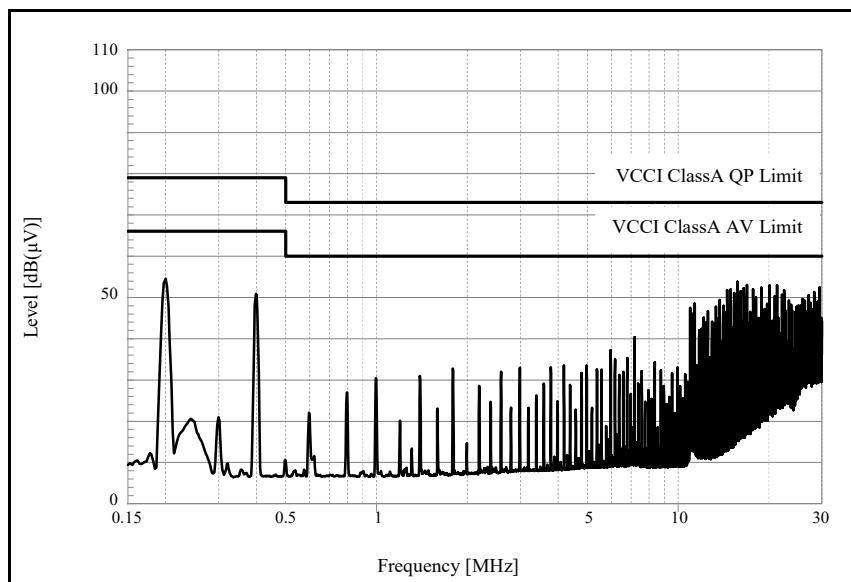
Conditions Vin : 280 VDC

Iout : 100 %

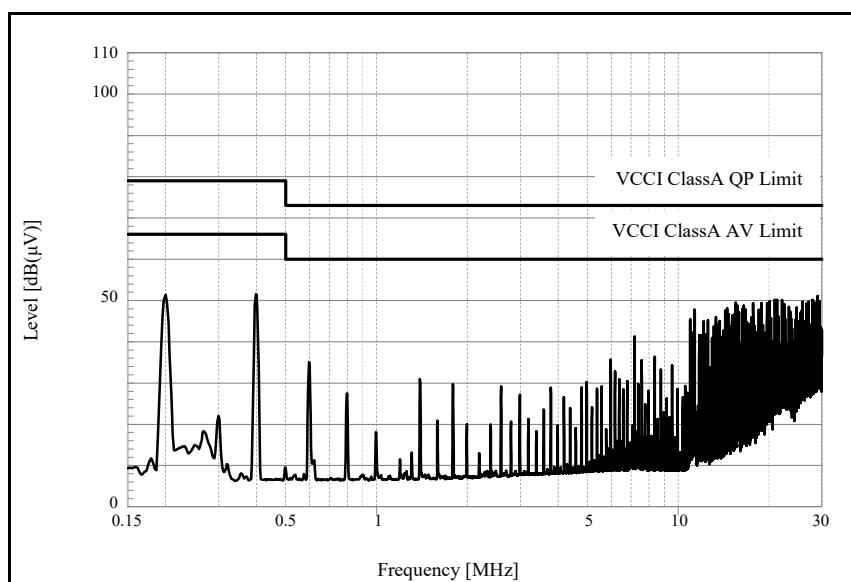
Tbp : 25 °C

28V

+Vin :



-Vin :



2.12 EMI特性

Electro-Magnetic Interference characteristics

(a) 雜音端子電圧(帰還ノイズ)

Conducted Emission

(1) VCCI class A 対応アプリケーションシステム

VCCI class A application system

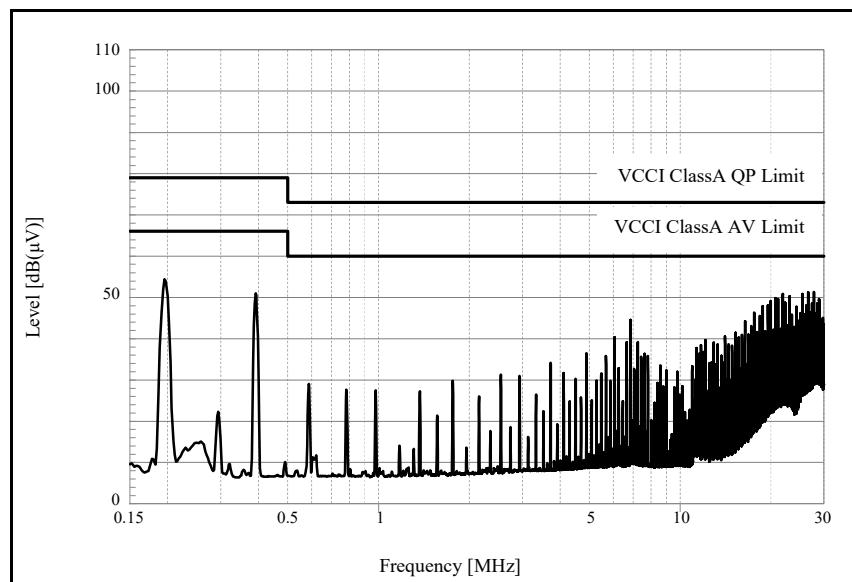
Conditions Vin : 280 VDC

Iout : 100 %

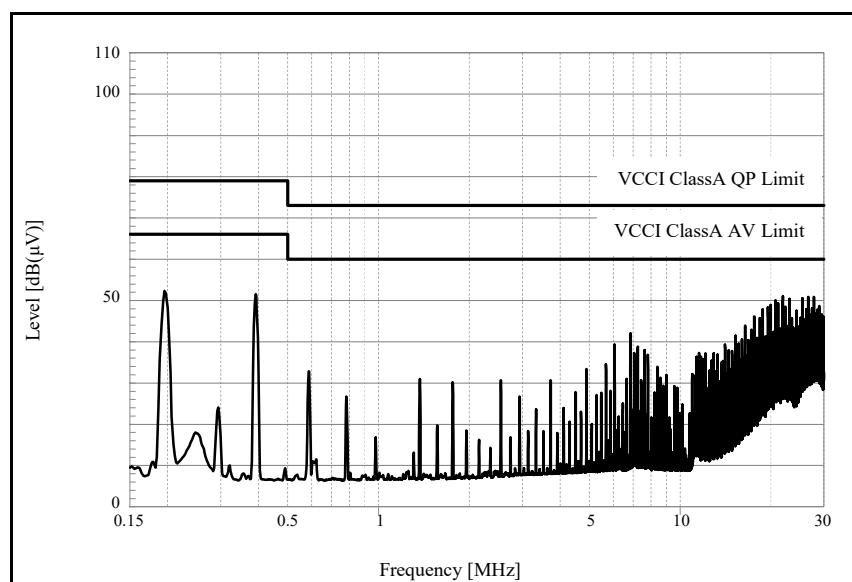
Tbp : 25 °C

48V

+Vin :



-Vin :



2.12 EMI特性

Electro-Magnetic Interference characteristics

(b) 雜音電界強度(輻射ノイズ)

Radiated Emission

(1) VCCI class A 対応アプリケーションシステム

VCCI class A application system

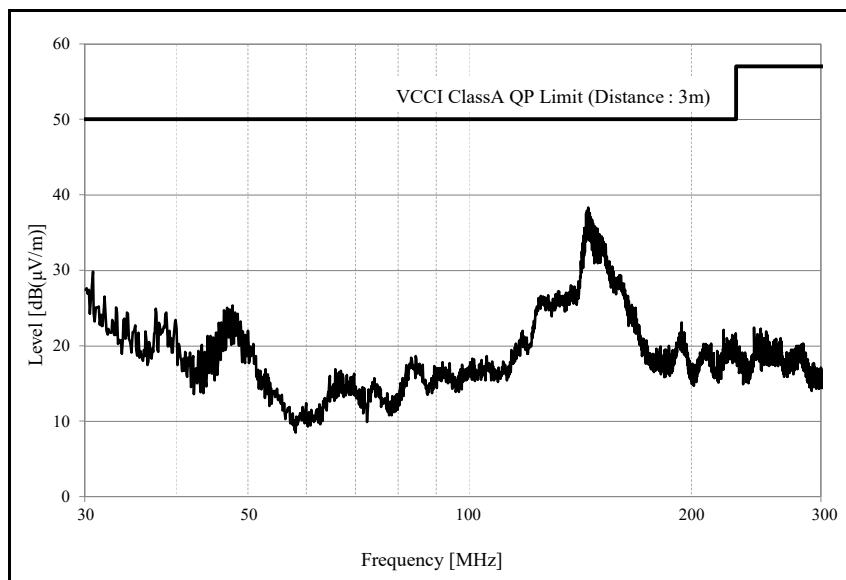
Conditions Vin : 280 VDC

Iout : 100 %

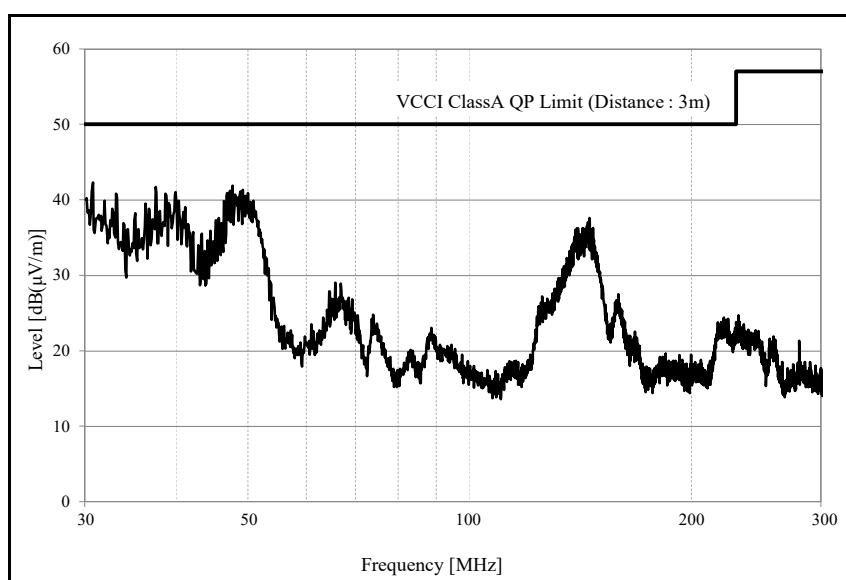
Tbp : 25 °C

12V

HORIZONTAL :



VERTICAL :



2.12 EMI特性

Electro-Magnetic Interference characteristics

(b) 雜音電界強度(輻射ノイズ)

Radiated Emission

(1) VCCI class A 対応アプリケーションシステム

VCCI class A application system

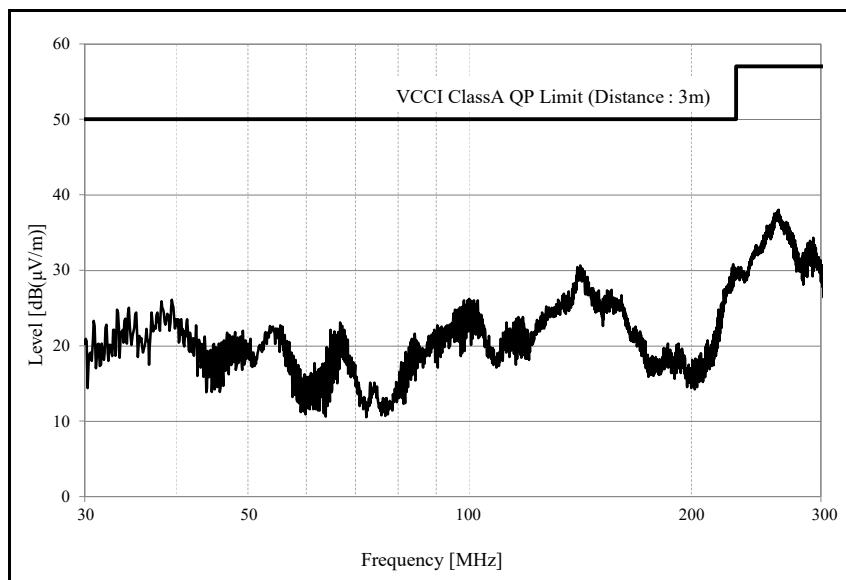
Conditions Vin : 280 VDC

Iout : 100 %

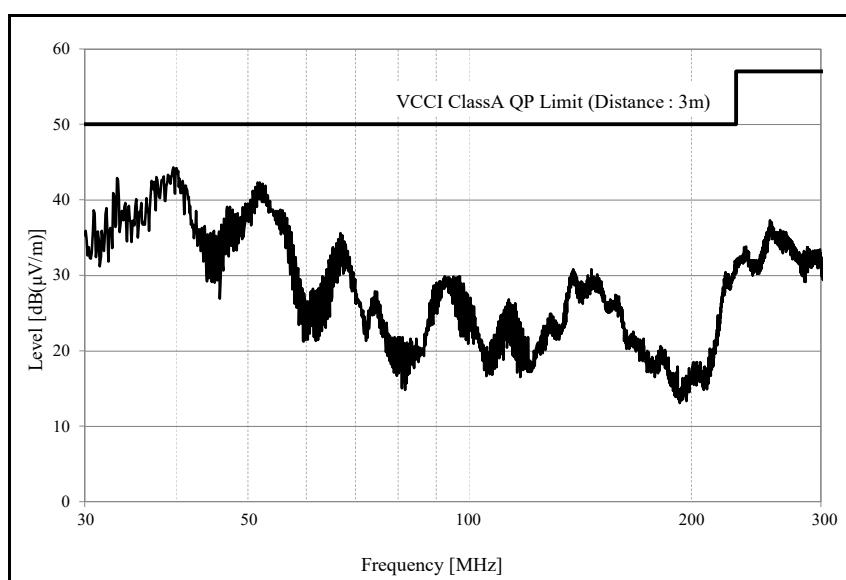
Tbp : 25 °C

24V

HORIZONTAL :



VERTICAL :



2.12 EMI特性

Electro-Magnetic Interference characteristics

(b) 雜音電界強度(輻射ノイズ)

Radiated Emission

(1) VCCI class A 対応アプリケーションシステム

VCCI class A application system

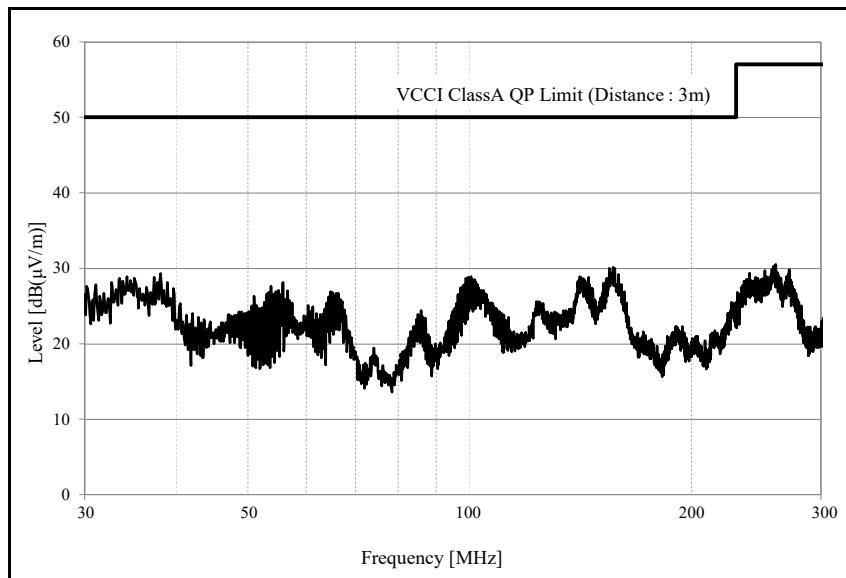
Conditions Vin : 280 VDC

Iout : 100 %

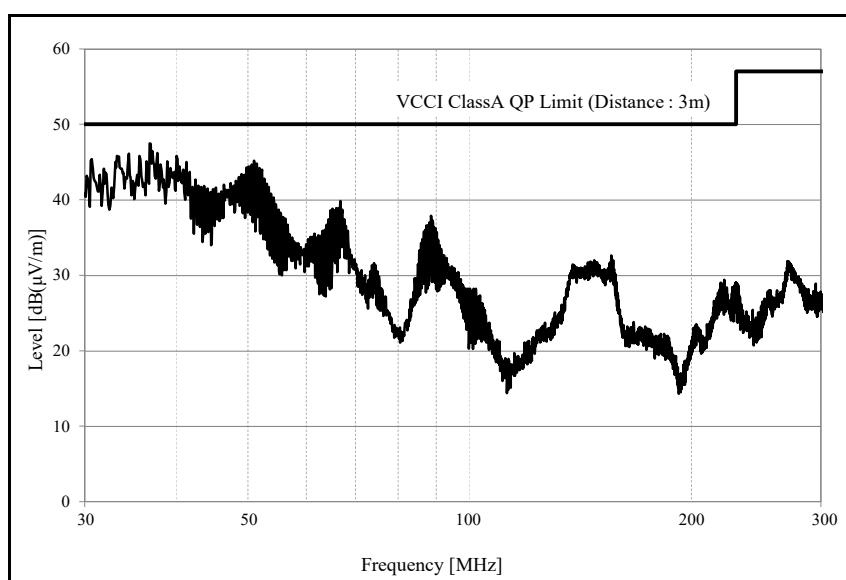
Tbp : 25 °C

28V

HORIZONTAL :



VERTICAL :



2.12 EMI特性

Electro-Magnetic Interference characteristics

(b) 雜音電界強度(輻射ノイズ)

Radiated Emission

(1) VCCI class A 対応アプリケーションシステム

VCCI class A application system

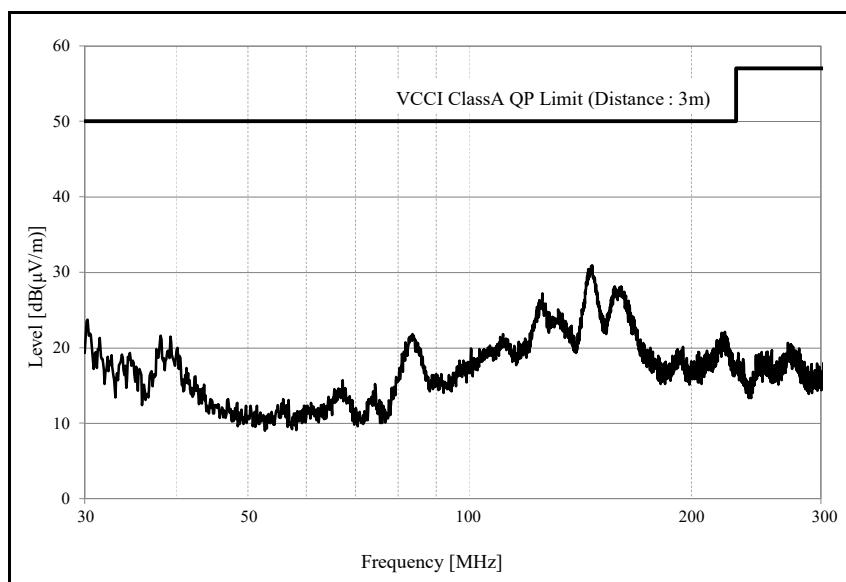
Conditions Vin : 280 VDC

Iout : 100 %

Tbp : 25 °C

48V

HORIZONTAL :



VERTICAL :

