

**CN100A24-\***

**EVALUATION DATA**

**型式データ**

## INDEX

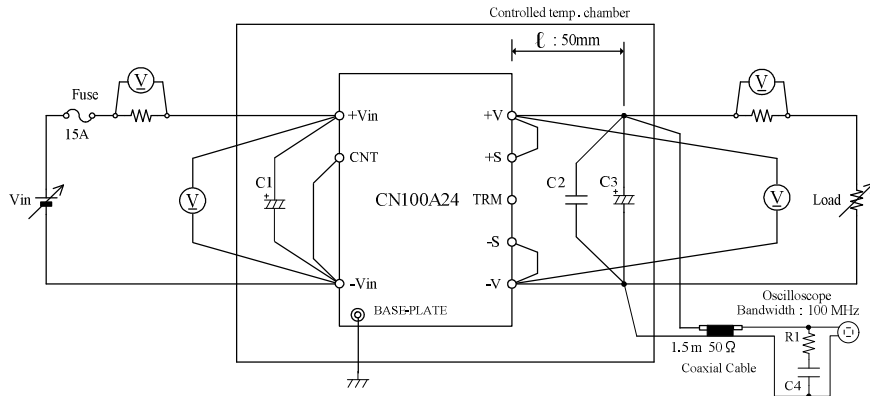
1. 評価方法	Evaluation Method	PAGE
1.1	測定回路 Measurement Circuits .....	T-1
	(1) 静特性、過電流保護特性、出力リップル・ノイズ波形 Steady state characteristics, Over current protection (OCP) characteristics, and Output ripple and noise waveform	
	(2) 過渡応答、過電圧保護特性、その他 Dynamic response, Over voltage protection (OVP) characteristics and Other characteristics	
	(3) 入力サージ電流（突入電流）特性 Inrush current characteristics	
	(4) EMI 特性 Electro-Magnetic Interference characteristics	
1.2	使用測定機器 List of equipment used .....	T-3
2. 特性データ	Characteristics	
2.1	静特性 Steady state data	
	(1) 入力変動、負荷変動、温度変動 Line regulation, Load regulation, Temperature drift .....	T-4
	(2) 出力電圧、出力リップル・ノイズ電圧 対 入力電圧 Output voltage and Output ripple and noise voltage vs. Input voltage .....	T-6
	(3) 入力電流、効率 対 出力電流 Input current and Efficiency vs. Output current .....	T-8
	(4) 効率 対 入力電圧 Efficiency vs. Input voltage .....	T-10
	(5) 効率 対 ベースプレート温度 Efficiency vs. Base-plate temperature .....	T-12
	(6) 起動、停止電圧特性 Start and Stop voltage characteristics .....	T-14
2.2	待機電力特性 Standby power characteristics .....	T-16
2.3	通電ドリフト特性 Warm up voltage drift characteristics .....	T-18
2.4	過電流保護特性 Over current protection (OCP) characteristics .....	T-20
2.5	過電圧保護特性 Over voltage protection (OVP) characteristics .....	T-22
2.6	出力立ち上がり、立ち下がり特性 Output rise and fall characteristics .....	T-24
2.7	過渡応答（負荷急変）特性 Dynamic load response characteristics .....	T-32
2.8	入力サージ電流（突入電流）特性 Inrush current characteristics .....	T-34
2.9	出力リップル・ノイズ波形 Output ripple and noise waveform .....	T-35
2.10	EMI特性 Electro-Magnetic Interference characteristics .....	T-37

## 使用記号 Terminology used

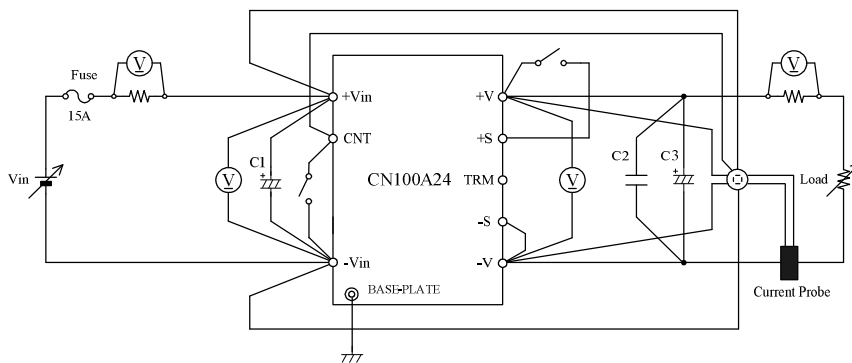
Definition		
$V_{in}$	.....	入力電圧 Input voltage
$V_o$	.....	出力電圧 Output voltage
$V_{cnt}$	.....	CNT電圧 CNT voltage
$I_{in}$	.....	入力電流 Input current
$I_o$	.....	出力電流 Output current
$T_{bp}$	.....	ベースプレート温度 Base-plate temperature
$T_a$	.....	周囲温度 Ambient temperature
$f$	.....	周波数 Frequency

1. 評価方法 Evaluation Method  
 1.1 測定回路 Measurement Circuits

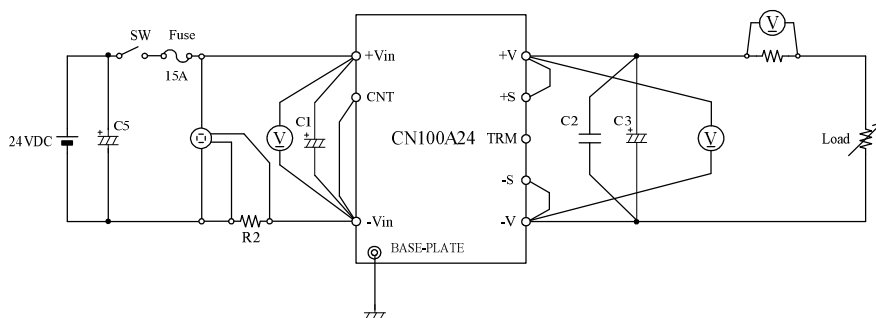
- (1) 静特性、過電流保護特性、出力リップル・ノイズ波形  
 Steady state characteristics, Over current protection (OCP) characteristics,  
 and Output ripple and noise waveform



- (2) 過渡応答、過電圧保護特性、その他  
 Dynamic response, Over voltage protection (OVP) characteristics  
 and Other characteristics



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

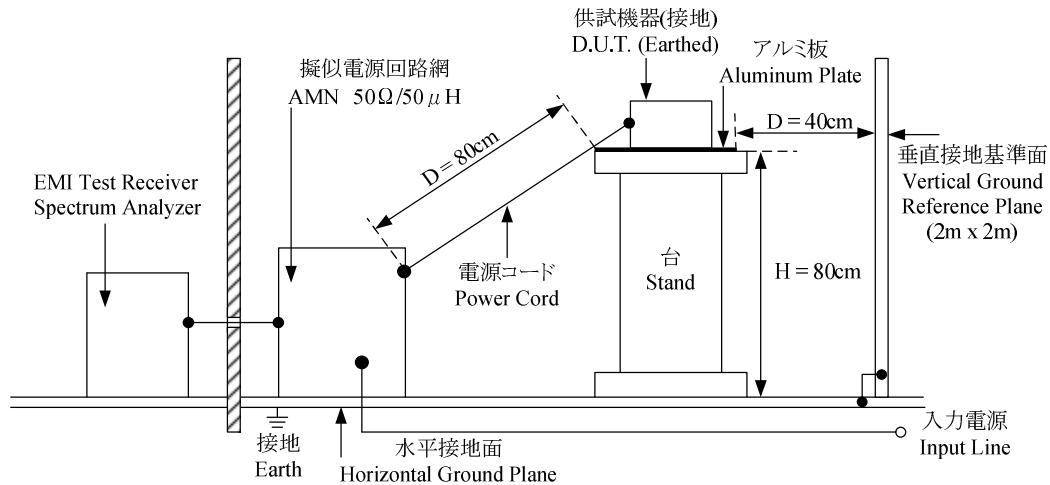


C1 : 470uF Electrolytic Capacitor  
 C2 : 2.2μF Ceramic Capacitor  
 C3 : 5V-1000uF Electrolytic Capacitor  
       : 12V-470uF Electrolytic Capacitor  
       : 24V-220uF Electrolytic Capacitor

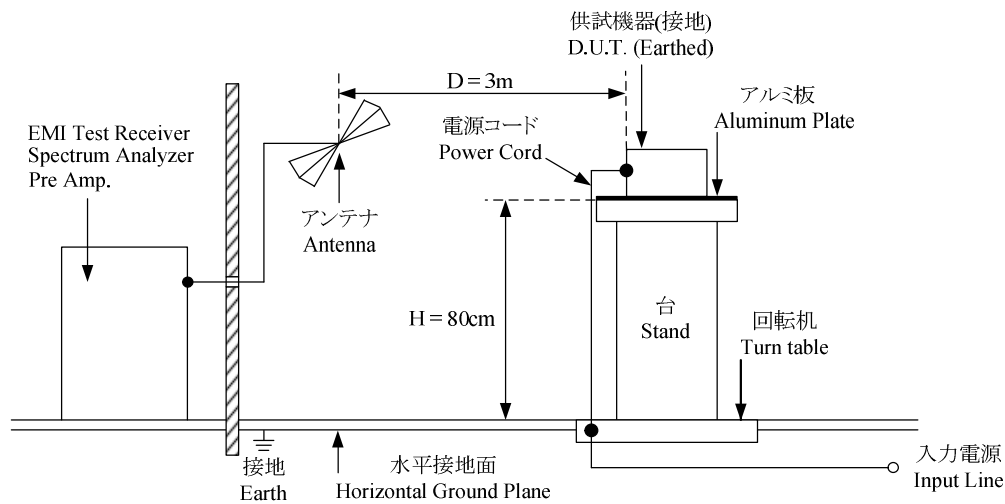
C4 : 4700pF Ceramic Capacitor  
 C5 : 8000uF Electrolytic Capacitor  
 R1 : 50Ω  
 R2 : 0.01Ω

(4) EMI特性 Electro-Magnetic Interference characteristics

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

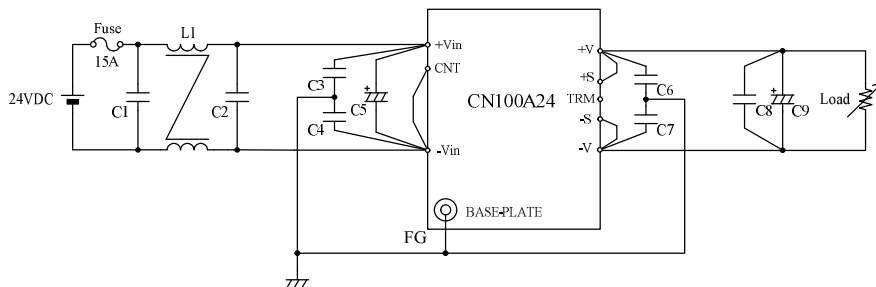


(b) 雑音電界強度 (輻射ノイズ) Radiated Emission Noise



\*入出力ケーブルとしてシールドケーブルを使用  
Shielded cable used to input and output cable.

VCCI class A対応アプリケーションシステム  
VCCI class A application system



C1,C2 : 2.2μF Film Capacitor

C3,C4 : 4700pF Ceramic Capacitor

C5 : 470μF Electrolytic Capacitor

C6,C7 : 3300pF Ceramic Capacitor x 2parallel

C8 : 2.2μF Ceramic Capacitor

C9 : 5V-1000μF Electrolytic Capacitor

: 12V-470μF Electrolytic Capacitor

: 24V-220μF Electrolytic Capacitor

L1 : 1.0mH

## 1.2 使用測定機器 List of equipment used

	EQUIPMENT USED	MANUFACTURER	MODEL NO.
1	AC POWER SUPPLY	TAKASAGO	AA-2000XG
2	DYNAMIC DUMMY LOAD	TAKASAGO	FK-200L
3	DUMMY LOAD	PCN	RHF250 SERIES
4	DATA ACQUISITION / SWITCH UNIT	AGILENT	34970A
5	SHUNT RESISTER	YOKOGAWA ELECT.	2215
6	CONTROLLED TEMP. CHAMBER	ESPEC CORP.	SU-261
7	DIGITAL PHOSPHOR OSCILOSCOPE	TEKTRONIX	TDS3012
8	DIGITAL STORAGE OSCILLOSCOPE	LECROY	WR6050A
9	CURRENT PROBE	LECROY	AP015
10	EMI TEST RECEIVER SPECTRUM ANALYZER	ROHDE & SCHWARZ	ESCI
11	PRE AMP.	SONOMA	310N
12	AMN	SCHWARZBECK	NNLK8121
13	ANTENNA(BI-LOG ANTENNA)	TESEQ	CBL6111D

## 2. 特性データ Characteristics

## 2.1 静特性 Steady state data

(1) 入力変動、負荷変動、温度変動 Line regulation, Load regulation, Temperature drift

5V

## 1. Line regulation and Load regulation Condition Tbp : 25°C

Io \ Vin	14.4VDC	24VDC	36VDC	Line regulation	
0%	5.008V	5.008V	5.008V	0mV	0.000%
50%	5.007V	5.007V	5.007V	0mV	0.000%
100%	5.006V	5.005V	5.005V	1mV	0.020%
Load regulation	2mV	3mV	3mV		
	0.040%	0.060%	0.060%		

## 2. Temperature drift

Conditions Vin : 24VDC

Io : 100%

Tbp	-40°C	+25°C	+100°C	Temperature stability	
Vo	5.012V	5.005V	4.999V	13mV	0.260%

12V

## 1. Line regulation and Load regulation Condition Tbp : 25°C

Io \ Vin	14.4VDC	24VDC	36VDC	Line regulation	
0%	12.028V	12.029V	12.028V	1mV	0.008%
50%	12.028V	12.027V	12.027V	1mV	0.008%
100%	12.026V	12.026V	12.026V	0mV	0.000%
Load regulation	2mV	3mV	2mV		
	0.017%	0.025%	0.017%		

## 2. Temperature drift

Conditions Vin : 24VDC

Io : 100%

Tbp	-40°C	+25°C	+100°C	Temperature stability	
Vo	12.033V	12.026V	12.000V	33mV	0.275%

(1) 入力変動、負荷変動、温度変動 Line regulation, Load regulation, Temperature drift

24V

1. Line regulation and Load regulation Condition Tbp : 25°C

Io \ Vin	14.4VDC	24VDC	36VDC	Line regulation	
0%	23.952V	23.952V	23.952V	0mV	0.000%
50%	23.951V	23.951V	23.950V	1mV	0.004%
100%	23.951V	23.950V	23.950V	1mV	0.004%
Load regulation	1mV	2mV	2mV		
	0.004%	0.008%	0.008%		

2. Temperature drift

Conditions Vin : 24VDC

Io : 100%

Tbp	-40°C	+25°C	+100°C	Temperature stability	
Vo	23.938V	23.950V	23.957V	19mV	0.079%

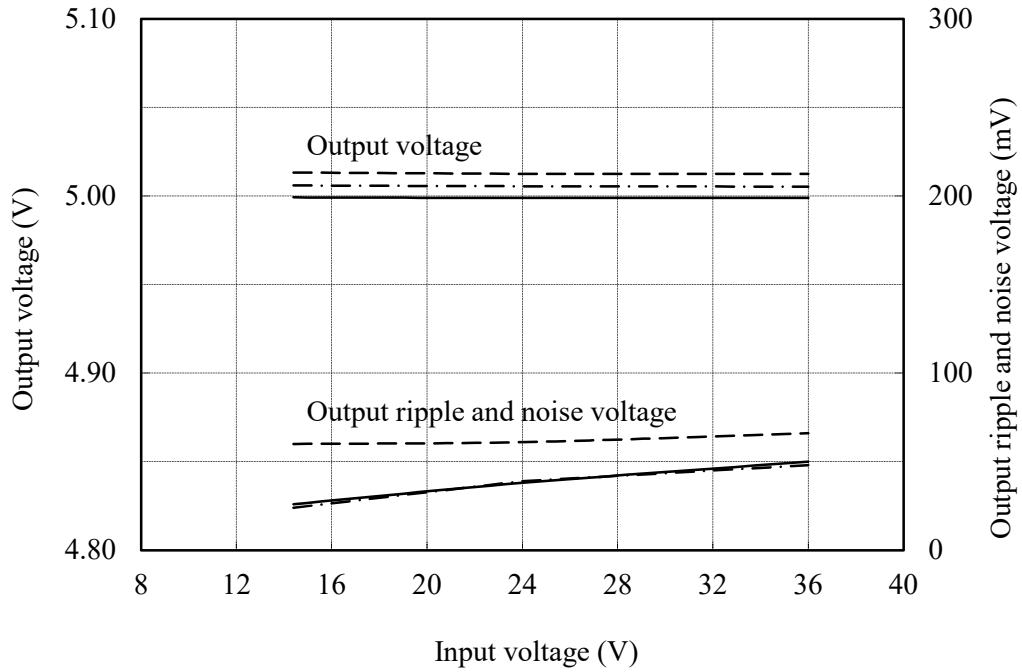
(2) 出力電圧、出力リップル・ノイズ電圧 対 入力電圧

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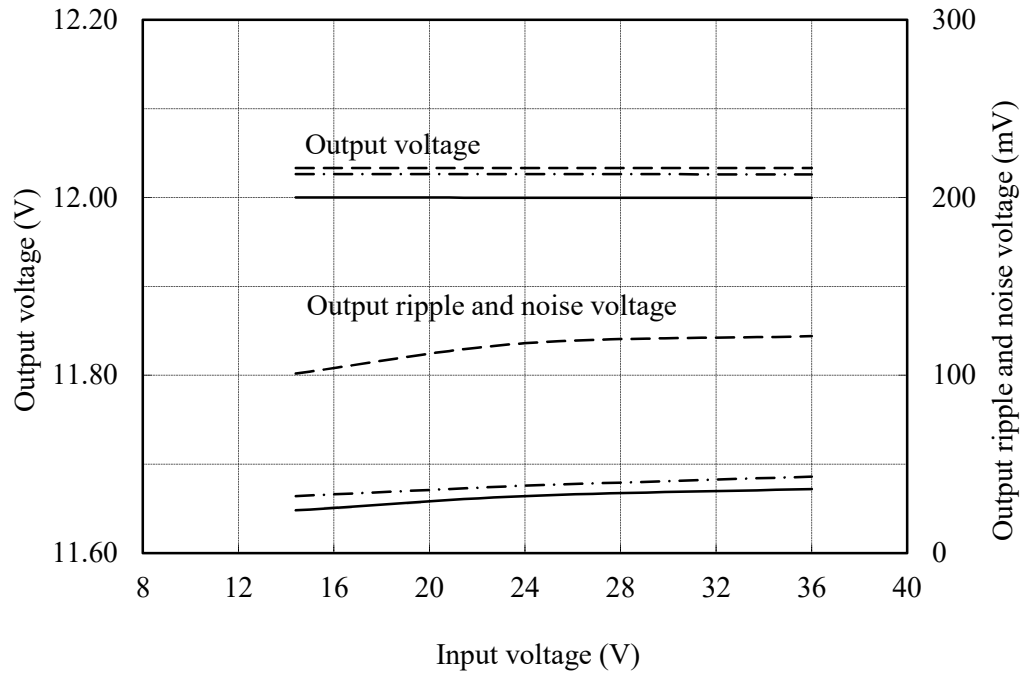
Output voltage and Output ripple and noise voltage vs. Input voltage

Conditions  $I_o$  : 100 %  
 $T_{bp}$  : -40 °C ---  
: 25 °C - · - · -  
: 100 °C —

5V



12V





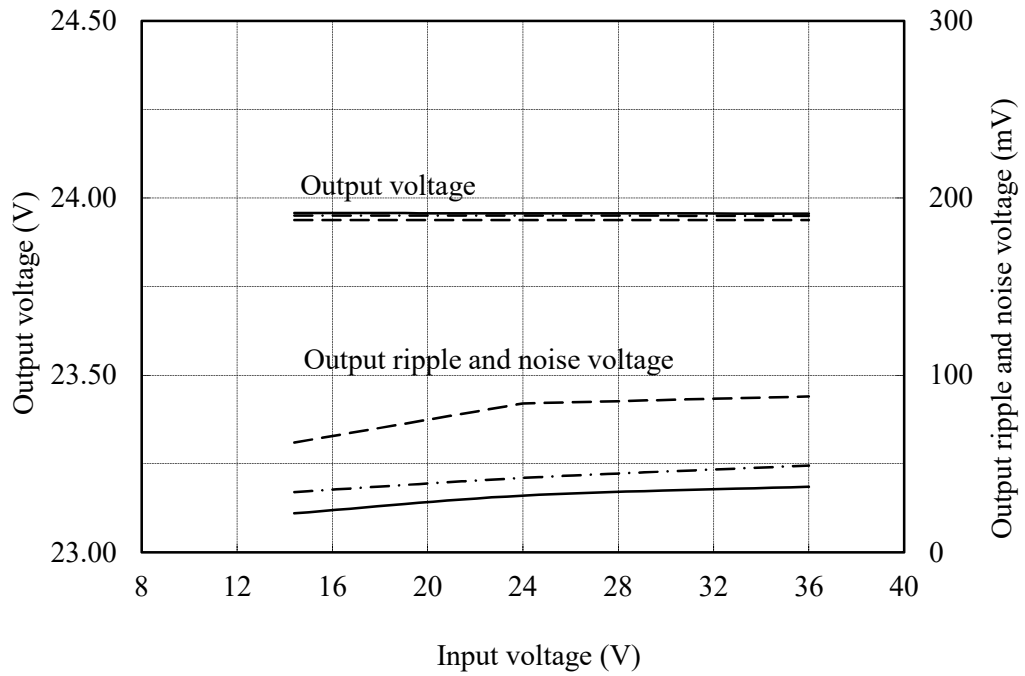
(2) 出力電圧、出力リップル・ノイズ電圧 対 入力電圧

CN100A24-\*

Output voltage and Output ripple and noise voltage vs. Input voltage

Conditions I<sub>o</sub> : 100 %  
T<sub>bp</sub> : -40 °C ---  
: 25 °C - · - · -  
: 100 °C —

24V

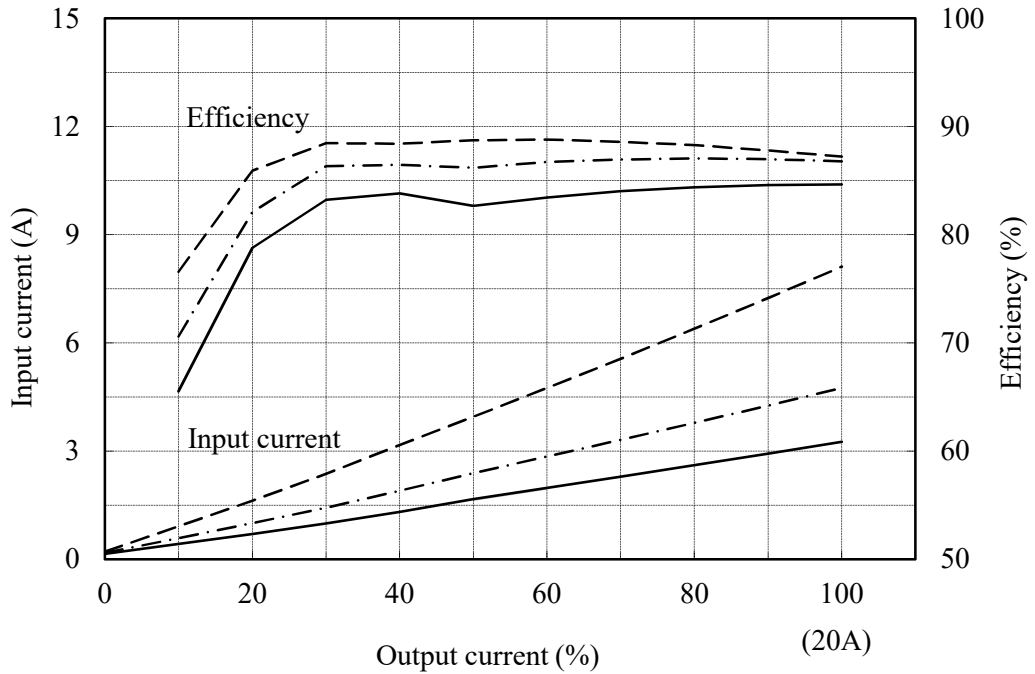


(3) 入力電流、効率 対 出力電流

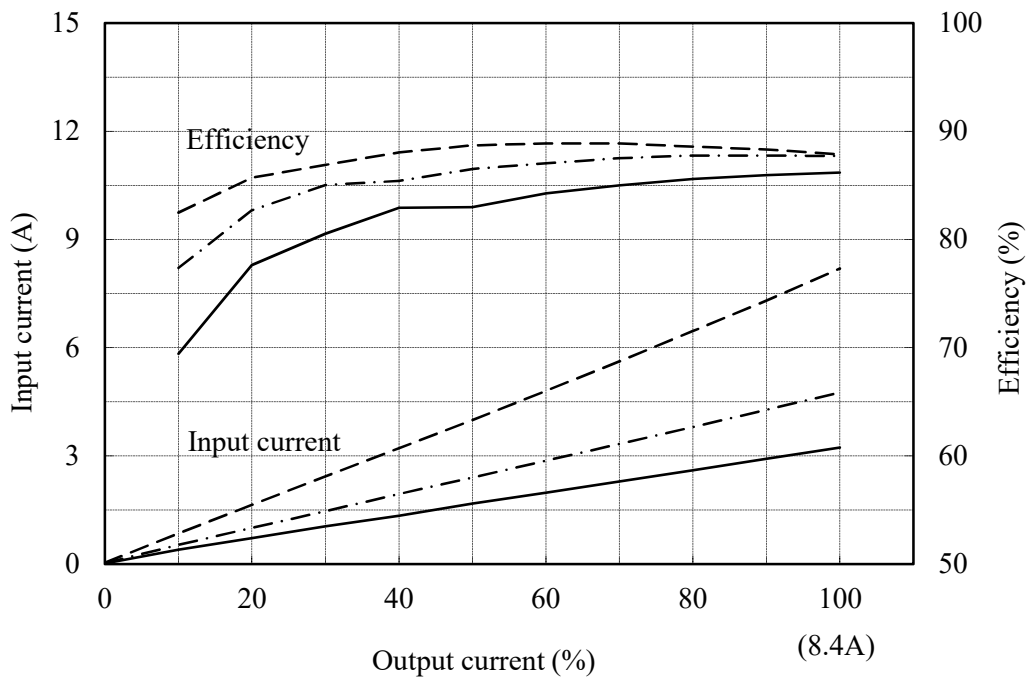
Input current and Efficiency vs. Output current

Conditions Vin : 14.4 VDC - - - -  
 : 24 VDC - · - · -  
 : 36 VDC ————  
 Tbp : 25 °C

5V



12V

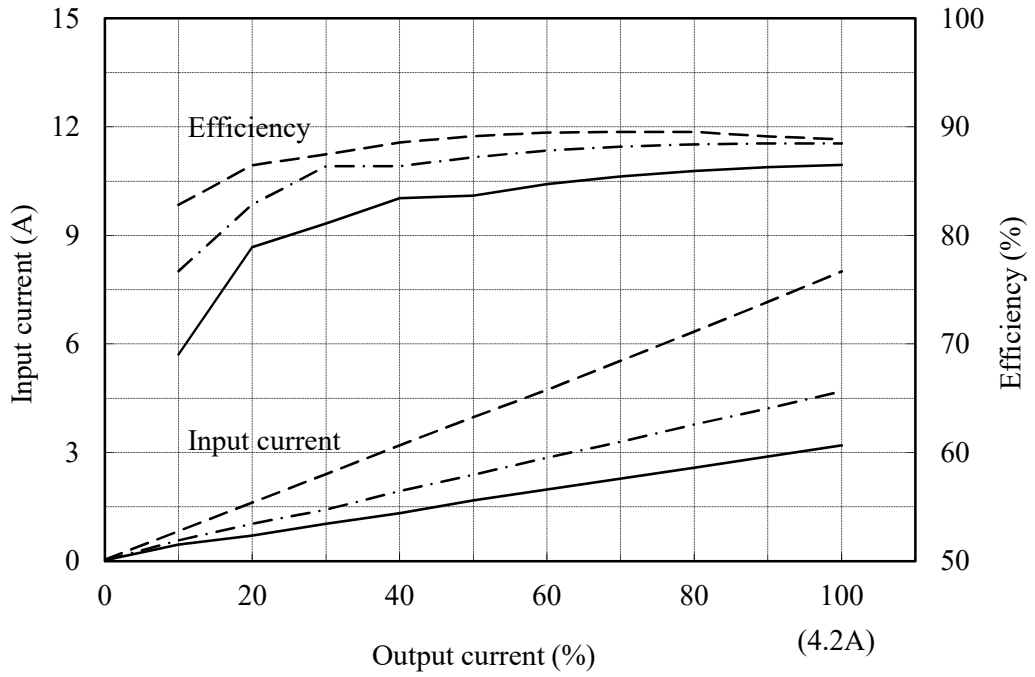


(3) 入力電流、効率 対 出力電流

Input current and Efficiency vs. Output current

Conditions Vin : 14.4 VDC - - - -  
 : 24 VDC - · - · -  
 : 36 VDC ————  
 Tbp : 25 °C

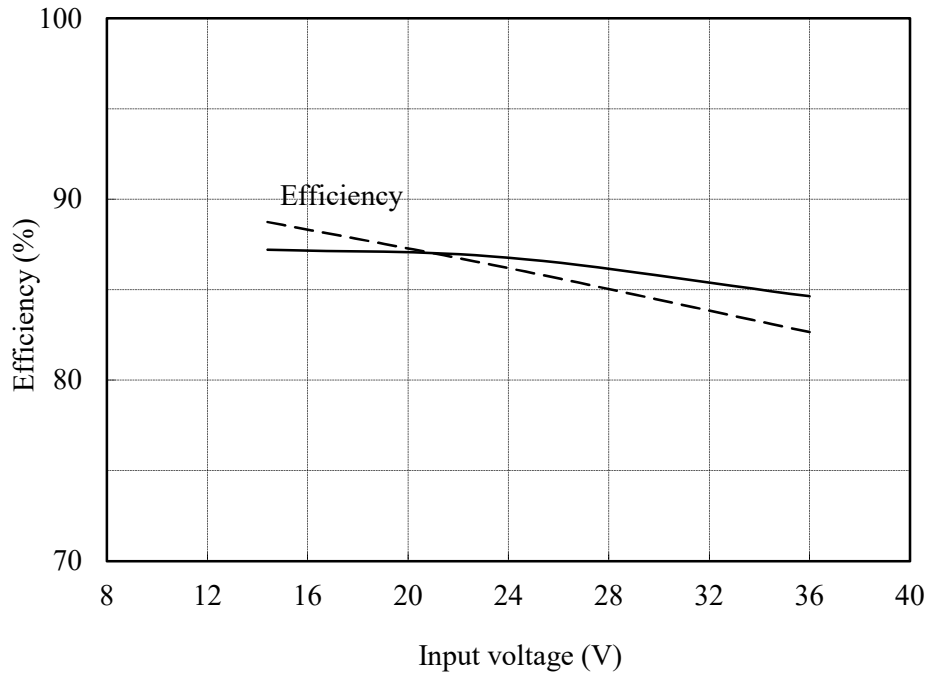
24V



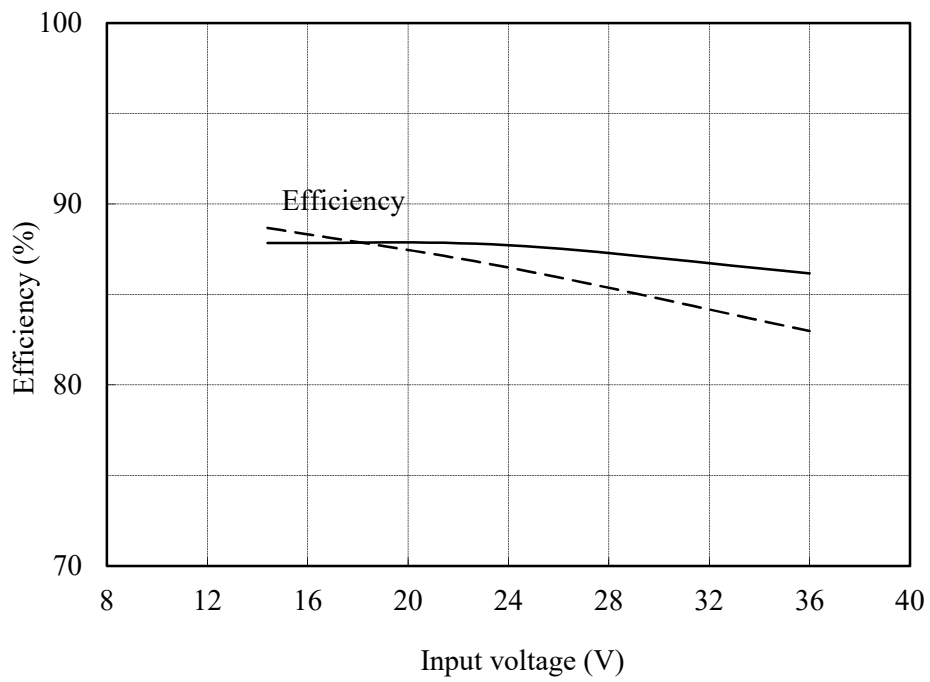
(4) 効率 対 入力電圧  
Efficiency vs. Input voltage

Conditions  $I_o$  : 50 %    - - - -  
                  : 100 %    ————  
                   $T_{bp}$  : 25 °C

5V



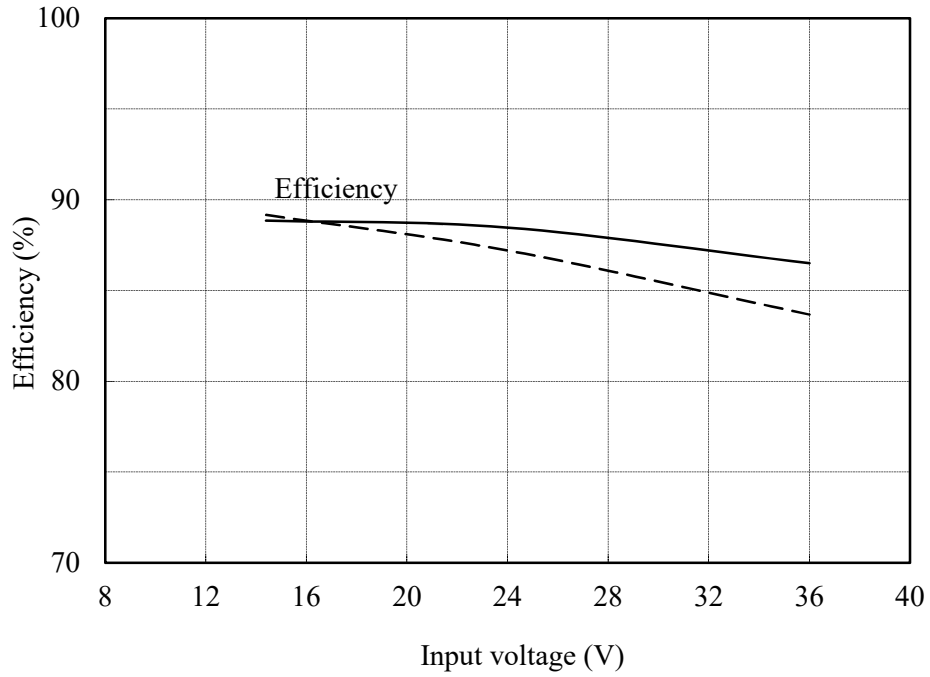
12V



(4) 効率 対 入力電圧  
Efficiency vs. Input voltage

Conditions Io : 50 % ----  
              : 100 % ——  
              Tbp : 25 °C

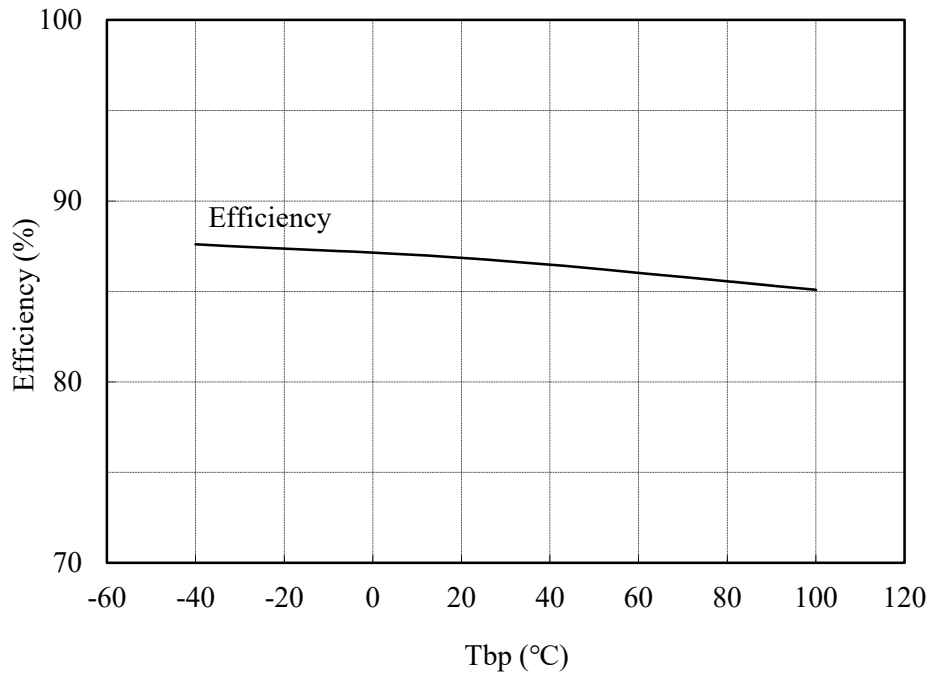
24V



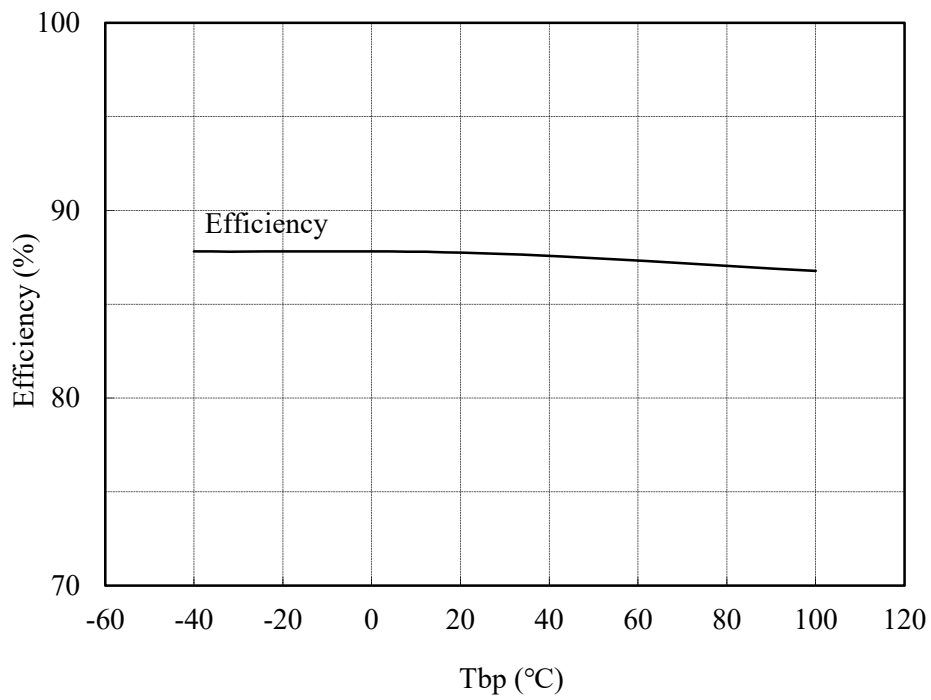
(5) 効率 対 ベースプレート温度  
Efficiency vs. Base-plate temperature

Conditions Vin : 24 VDC  
Io : 100 %

5V



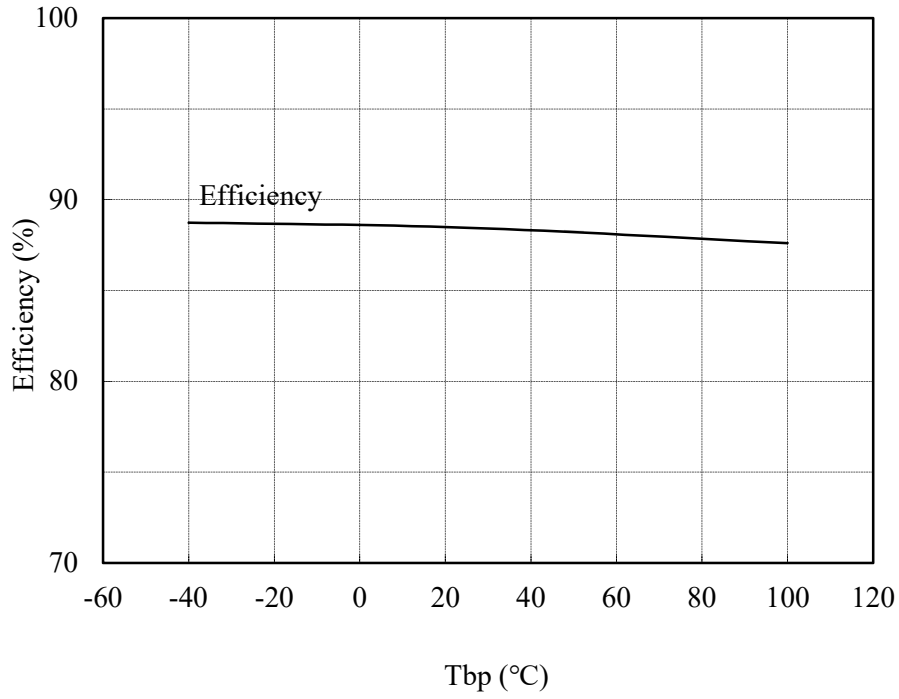
12V



(5) 効率 対 ベースプレート温度  
Efficiency vs. Base-plate temperature

Conditions Vin : 24 VDC  
Io : 100 %

24V



(6) 起動、停止電圧特性  
Start and Stop voltage characteristics

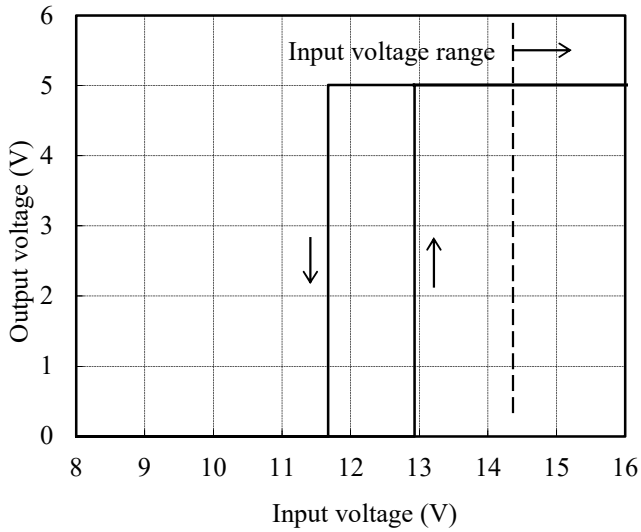
出力電圧 対 入力電圧  
Output voltage vs. Input voltage

Conditions  $I_o$  : 100 %  
 $T_{bp}$  : 25 °C

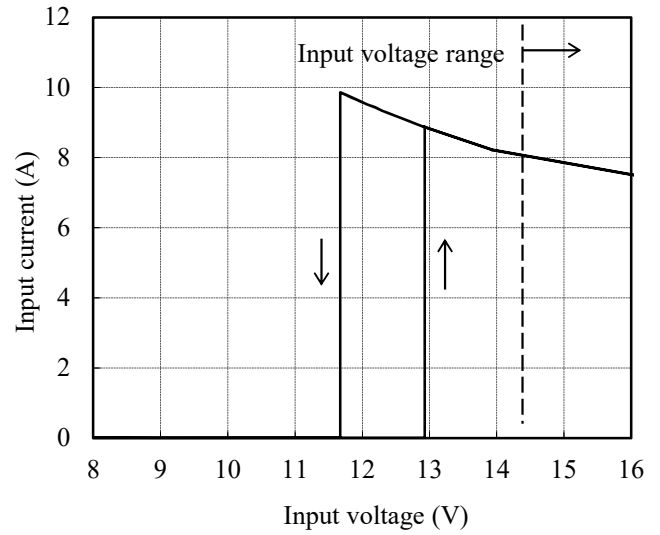
入力電流 対 入力電圧  
Input current vs. Input voltage

Conditions  $I_o$  : 100 %  
 $T_{bp}$  : 25 °C

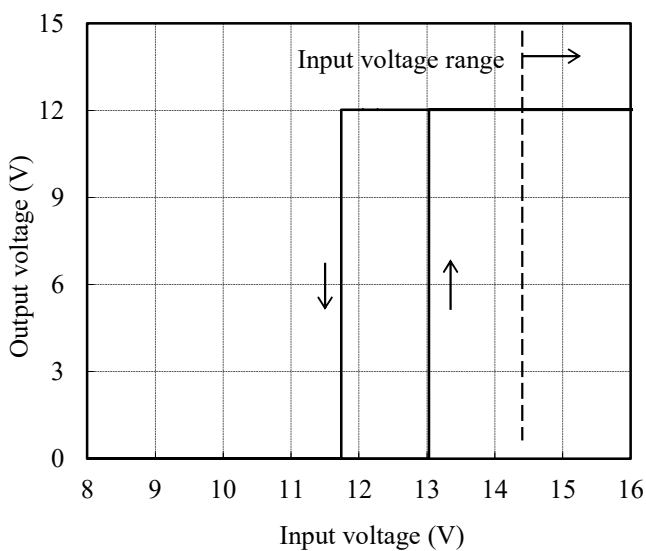
5V



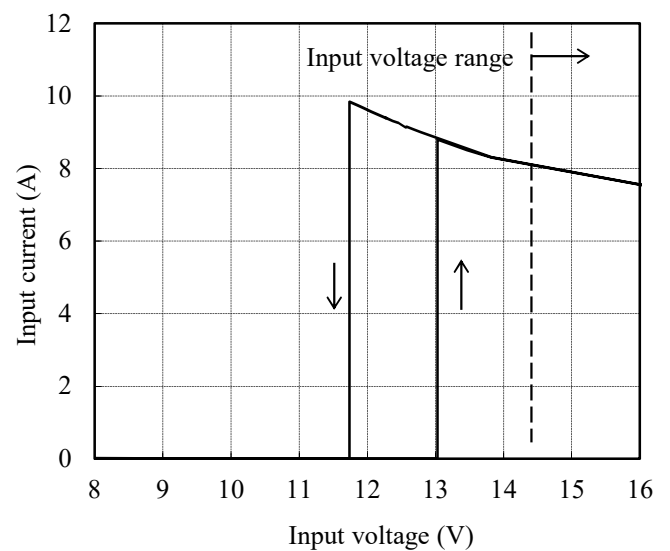
5V



12V



12V



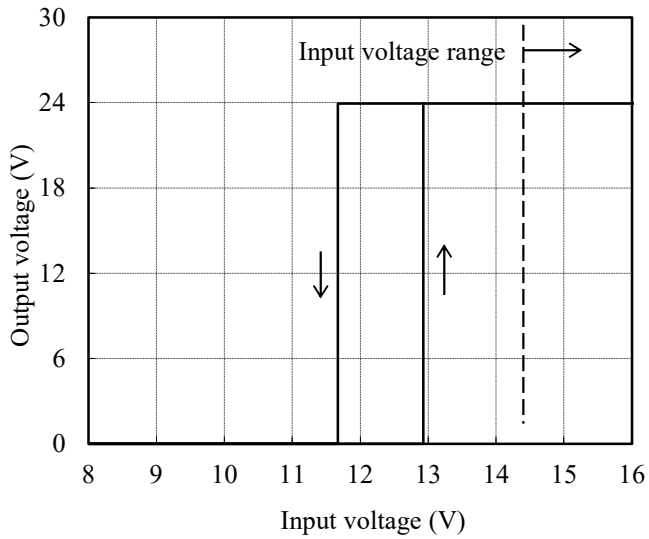


(6) 起動、停止電圧特性  
Start and Stop voltage characteristics

出力電圧 対 入力電圧  
Output voltage vs. Input voltage

Conditions  $I_o$  : 100 %  
 $T_{bp}$  : 25 °C

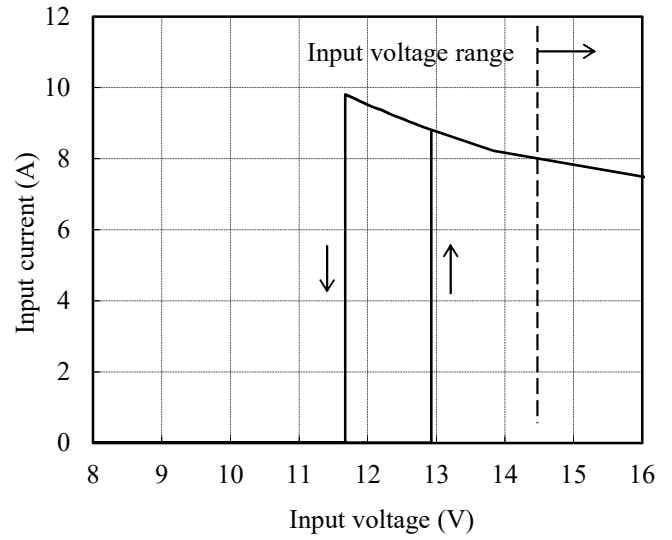
24V



入力電流 対 入力電圧  
Input current vs. Input voltage

Conditions  $I_o$  : 100 %  
 $T_{bp}$  : 25 °C

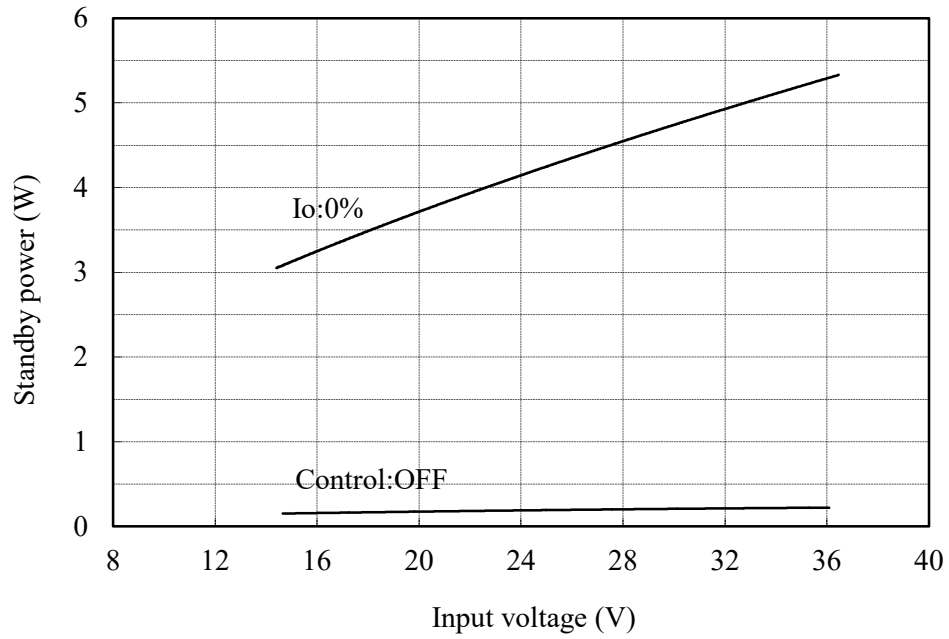
24V



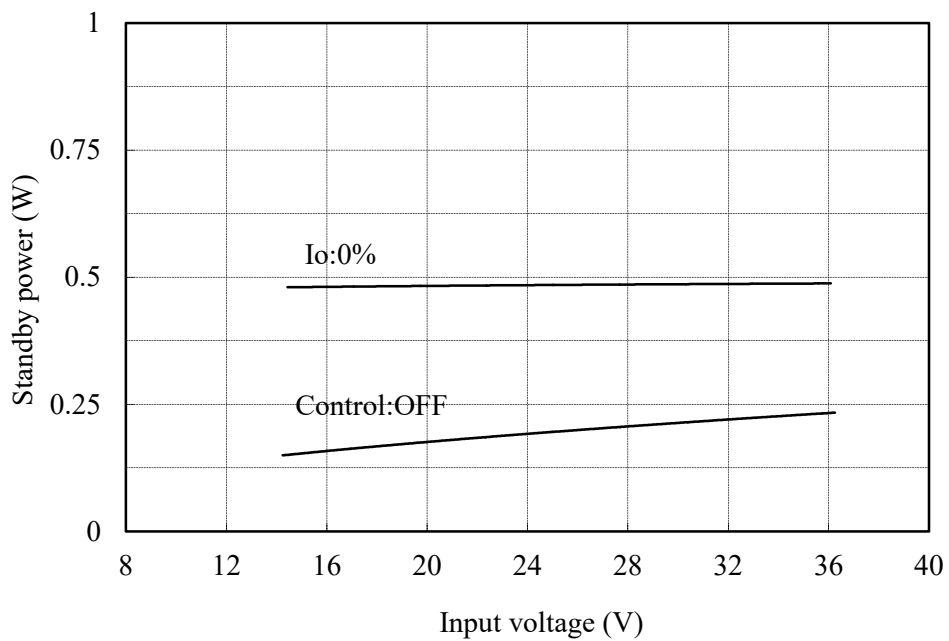
2.2 待機電力特性  
Standby power characteristics

Condition Tbp : 25 °C

5V



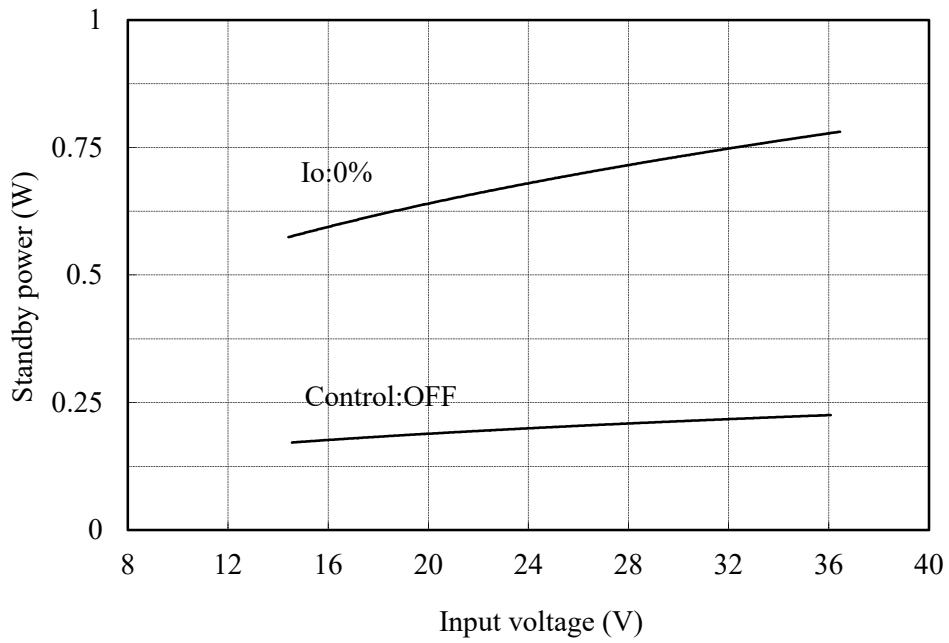
12V



2.2 待機電力特性  
Standby power characteristics

Condition Tbp : 25 °C

24V



2.3 通電ドリフト特性

Warm up voltage drift characteristics

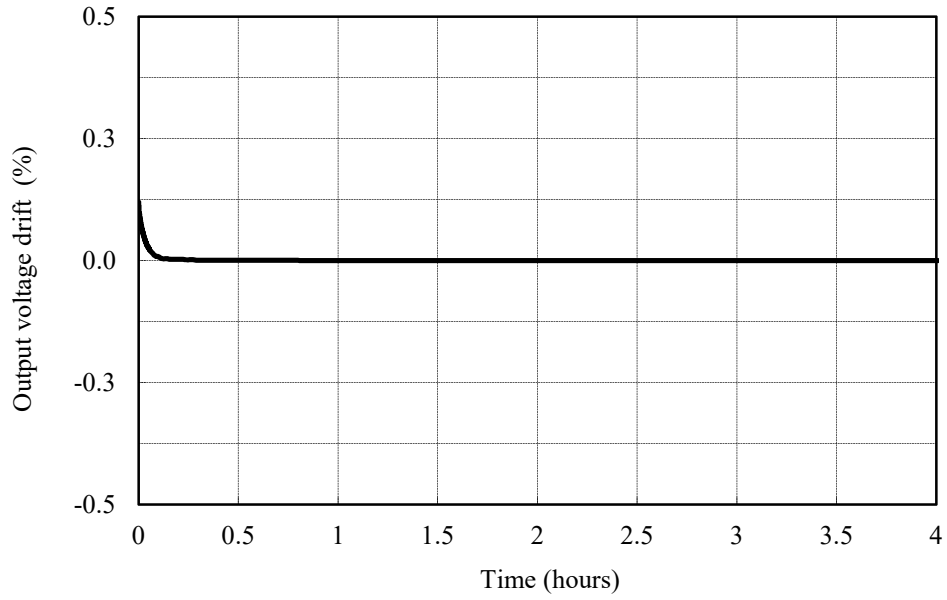
Conditions

Vin : 24 VDC

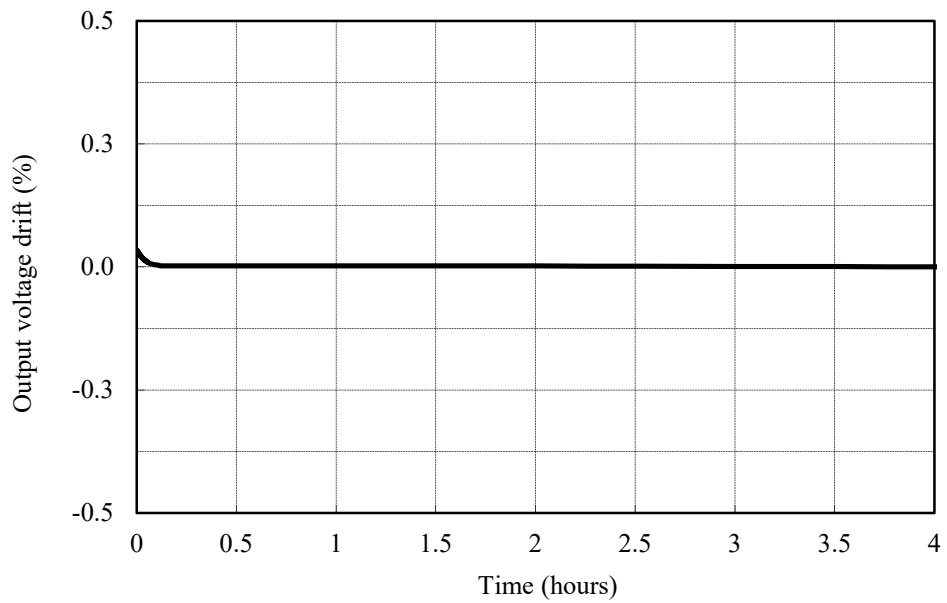
Io : 100 %

Ta : 25 °C

5V



12V



2.3 通電ドリフト特性

Warm up voltage drift characteristics

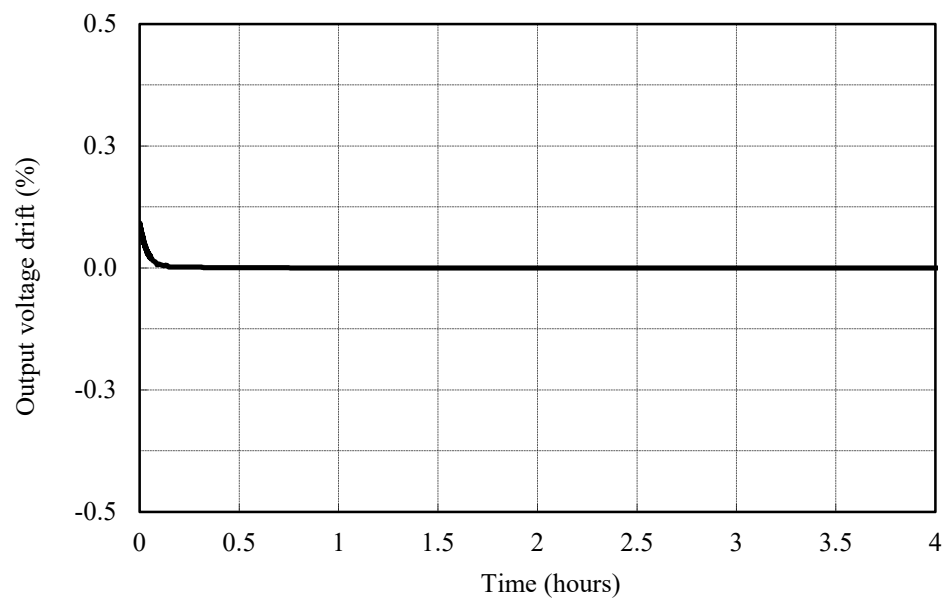
Conditions

Vin : 24 VDC

Io : 100 %

Ta : 25 °C

24V



2.4 過電流保護特性

Over current protection (OCP) characteristics

入力電圧依存性

Input voltage dependence

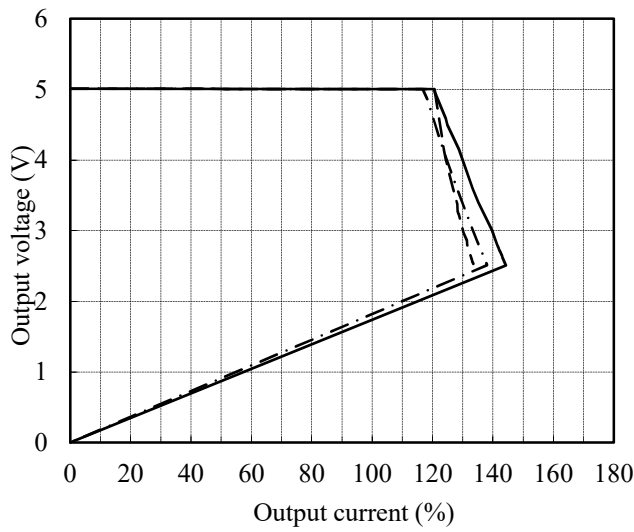
Conditions Vin : 14.4 VDC -----  
 : 24 VDC -.-.-.-  
 : 36 VDC \_\_\_\_\_  
 Tbp : 25 °C

ベースプレート温度依存性

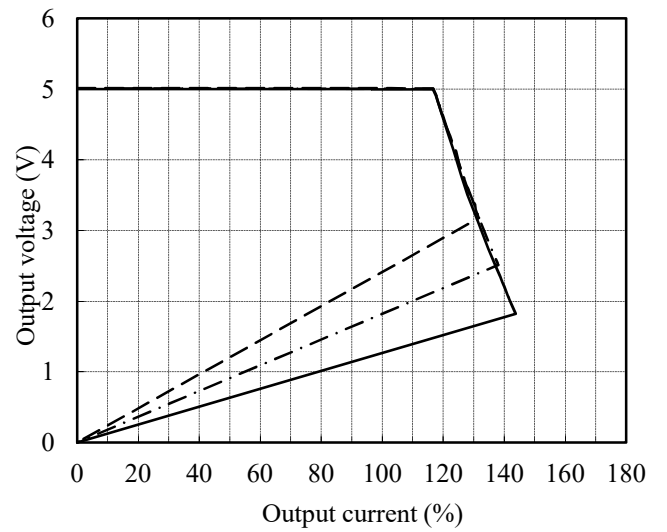
Base-plate temperature dependence

Conditions Vin : 24 VDC  
 Tbp : -40 °C -----  
 : 25 °C -.-.-.-  
 : 100 °C \_\_\_\_\_

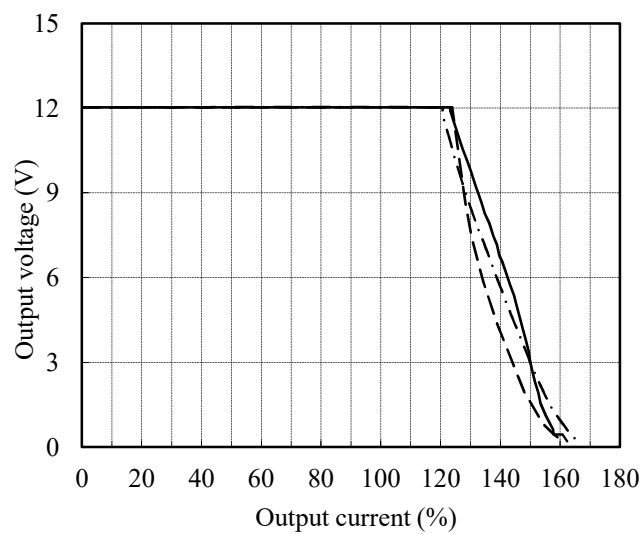
5V



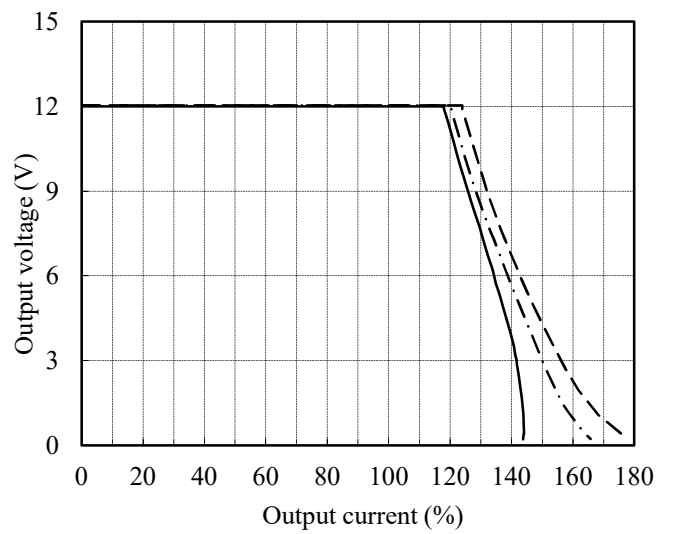
5V



12V



12V



2.4 過電流保護特性

Over current protection (OCP) characteristics

入力電圧依存性

Input voltage dependence

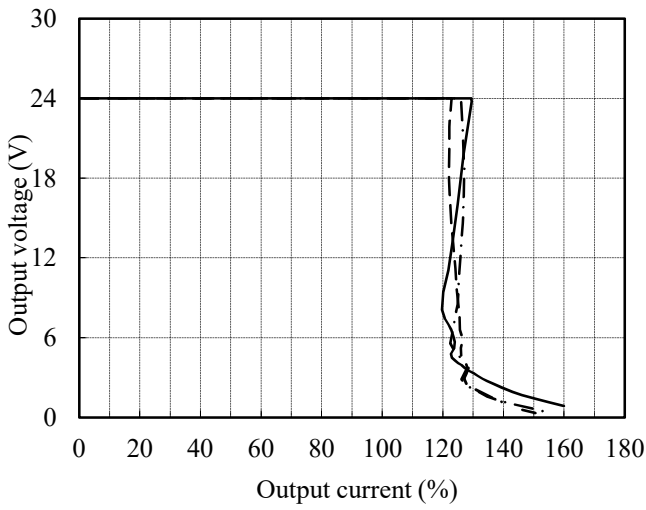
Conditions Vin : 14.4 VDC -----  
 : 24 VDC -.-.-.-  
 : 36 VDC \_\_\_\_\_  
 Tbp : 25 °C

ベースプレート温度依存性

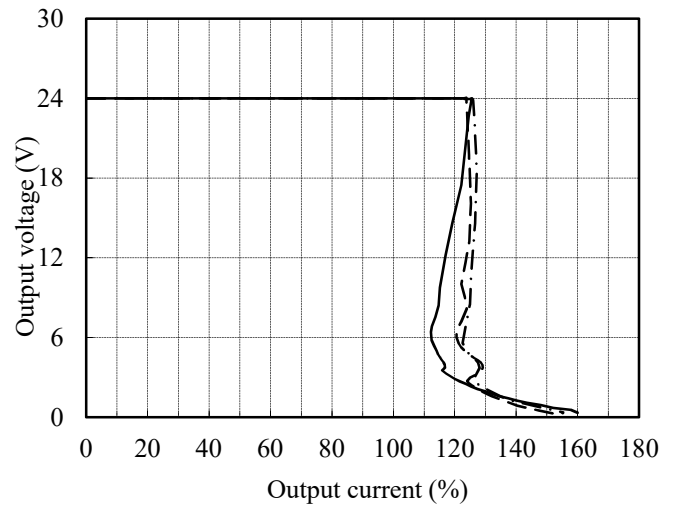
Base-plate temperature dependence

Conditions Vin : 24 VDC  
 Tbp : -40 °C -----  
 : 25 °C -.-.-.-  
 : 100 °C \_\_\_\_\_

24V



24V



2.5 過電圧保護特性

Over voltage protection (OVP) characteristics

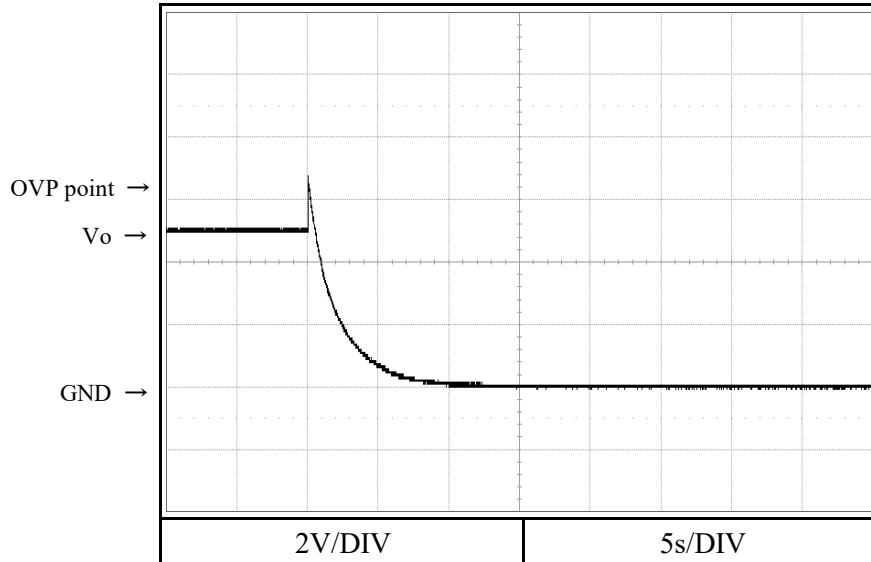
Conditions

Vin : 24 VDC

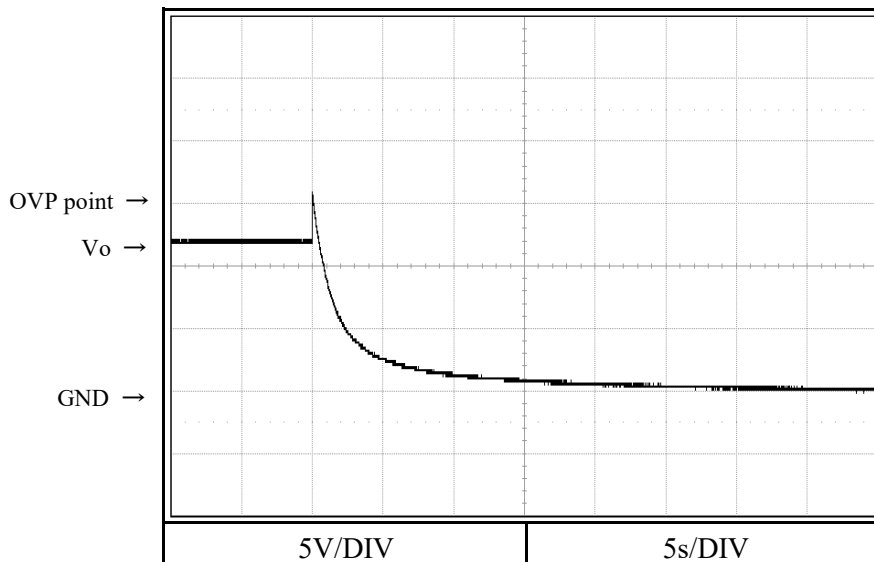
Io : 0 %

Tbp : 25 °C

5V



12V





2.5 過電圧保護特性

Over voltage protection (OVP) characteristics

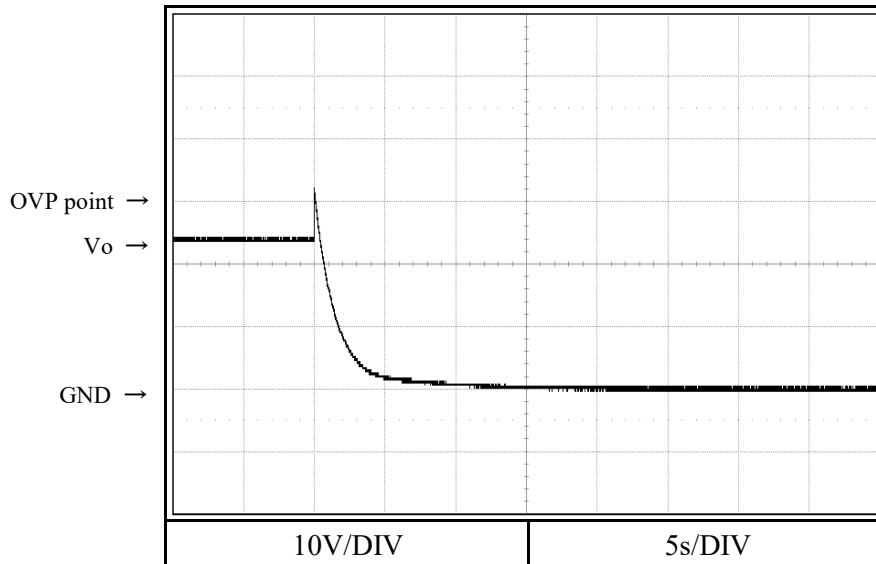
Conditions

Vin : 24 VDC

Io : 0 %

Tbp : 25 °C

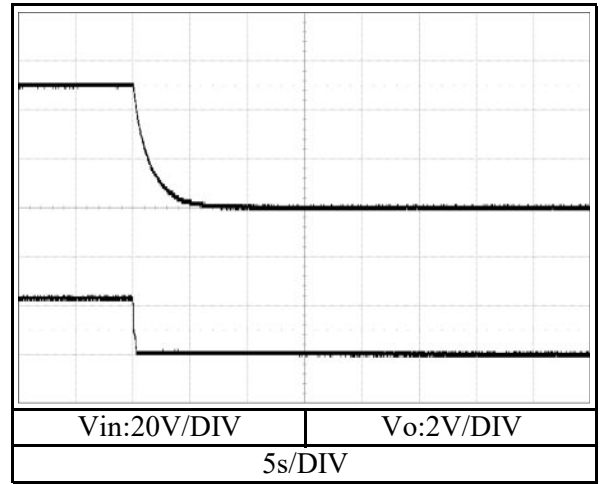
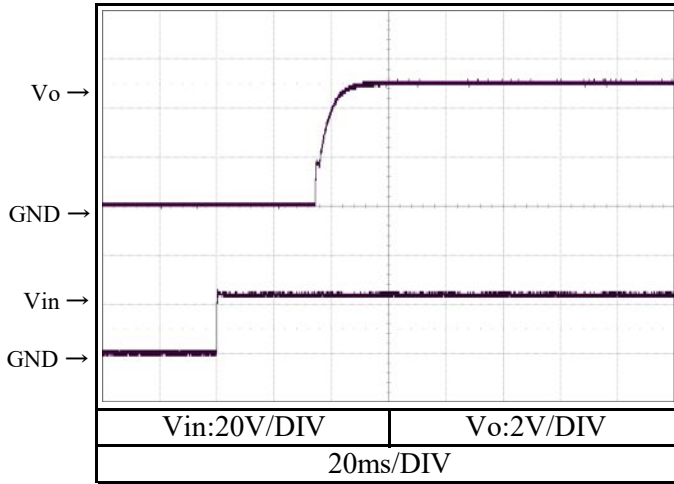
24V



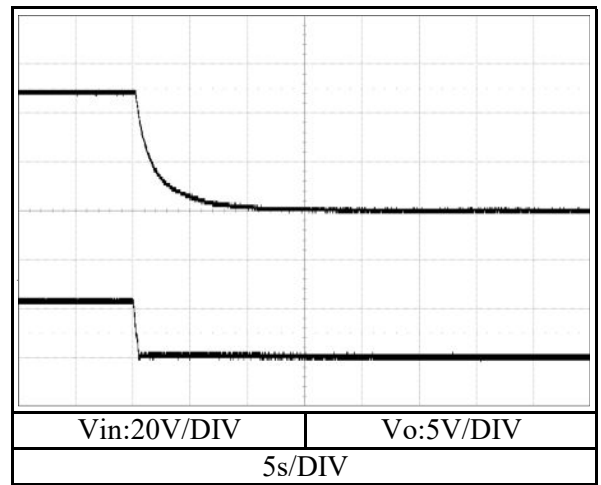
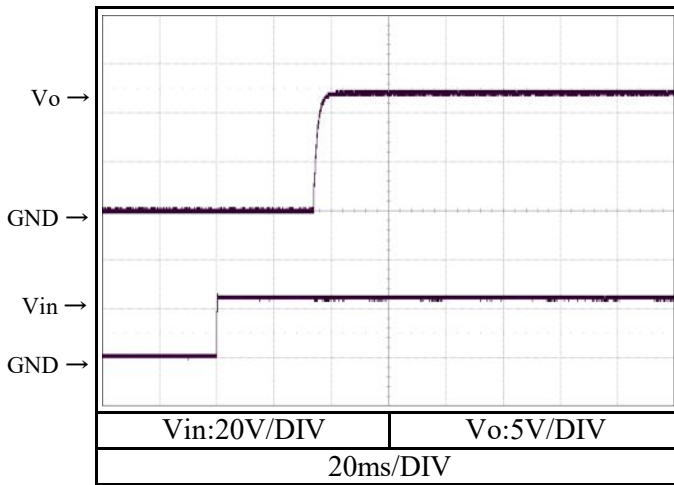
2.6 出力立ち上がり、立ち下がり特性  
Output rise and fall characteristics

Conditions Vin : 24 VDC  
Io : 0 %  
Tbp : 25 °C

5V



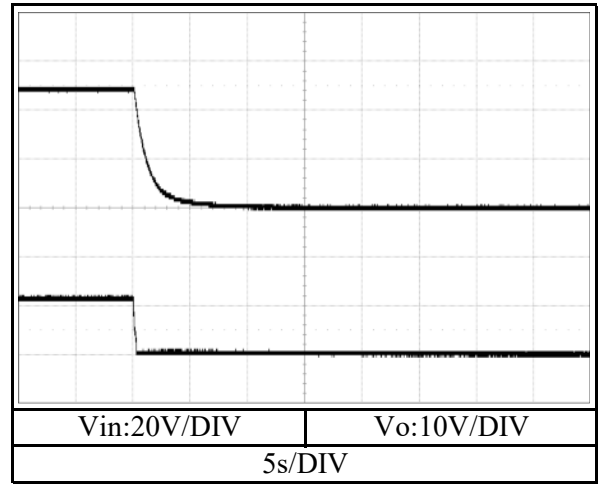
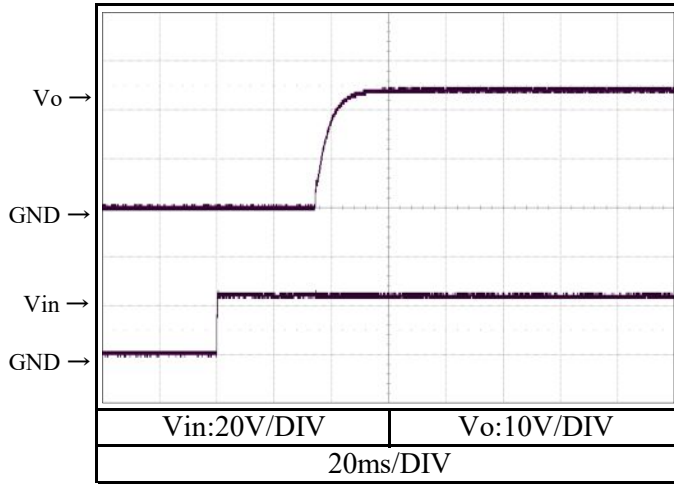
12V



2.6 出力立ち上がり、立ち下がり特性  
Output rise and fall characteristics

Conditions Vin : 24 VDC  
Io : 0 %  
Tbp : 25 °C

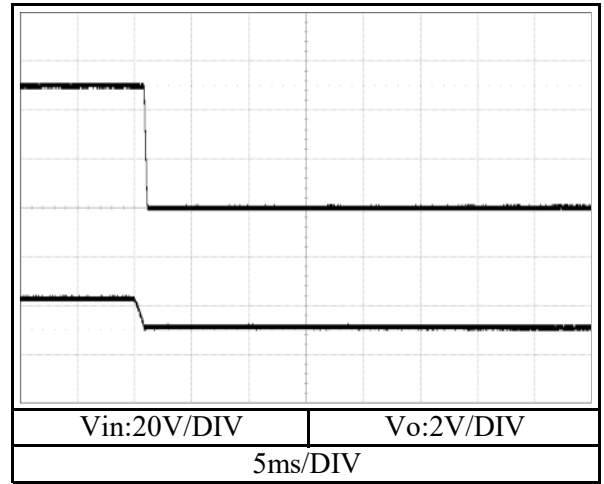
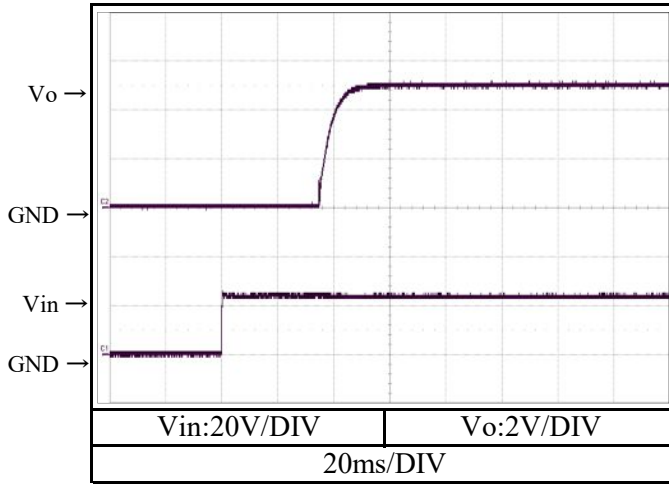
24V



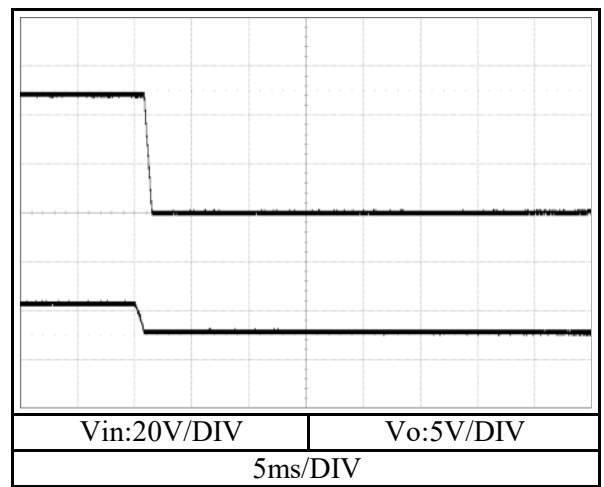
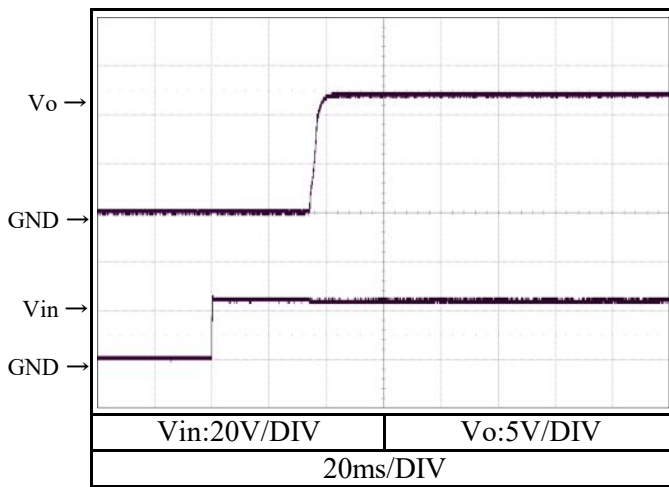
2.6 出力立ち上がり、立ち下がり特性  
Output rise and fall characteristics

Conditions Vin : 24 VDC  
Io : 100 %  
Tbp : 25 °C

5V



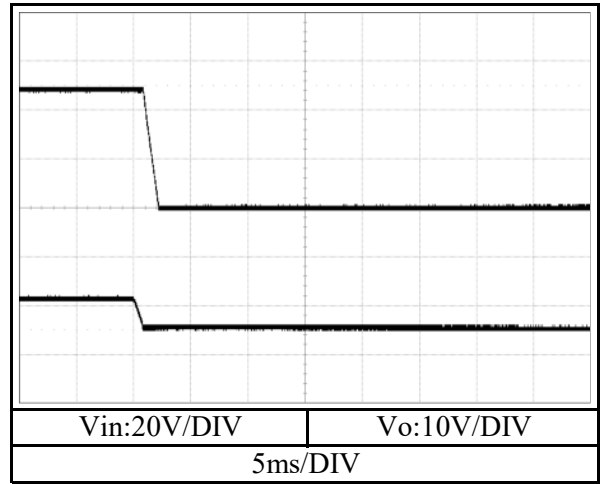
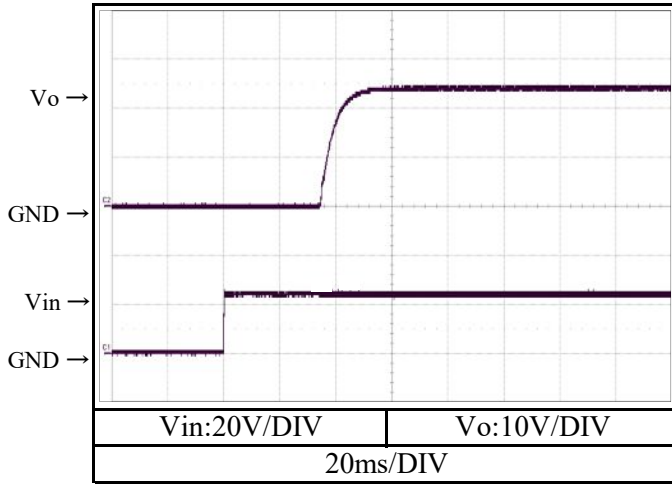
12V



2.6 出力立ち上がり、立ち下がり特性  
Output rise and fall characteristics

Conditions Vin : 24 VDC  
Io : 100 %  
Tbp : 25 °C

24V



2.6 出力立ち上がり、立ち下がり特性 (ON/OFFコントロール時)

Output rise and fall characteristics with ON/OFF CONTROL

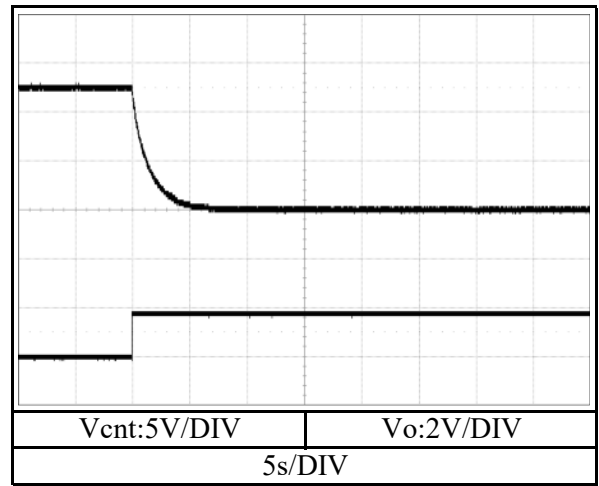
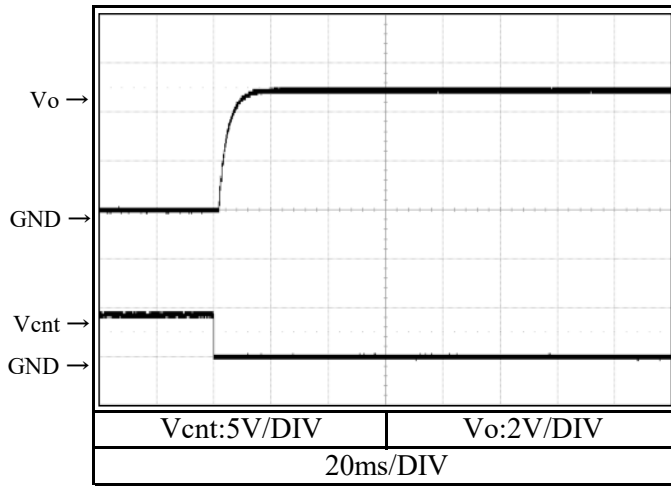
Conditions

Vin : 24 VDC

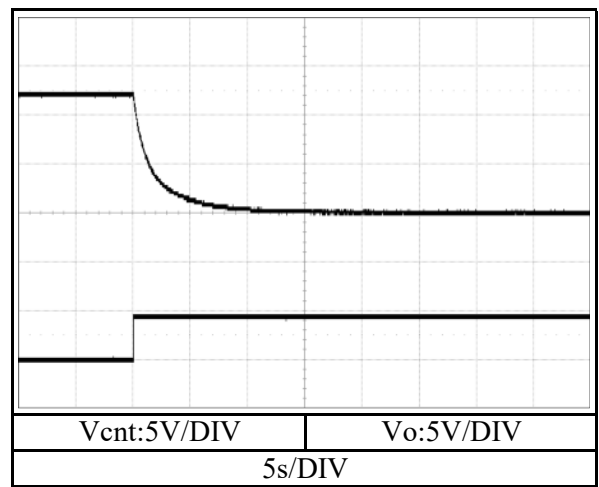
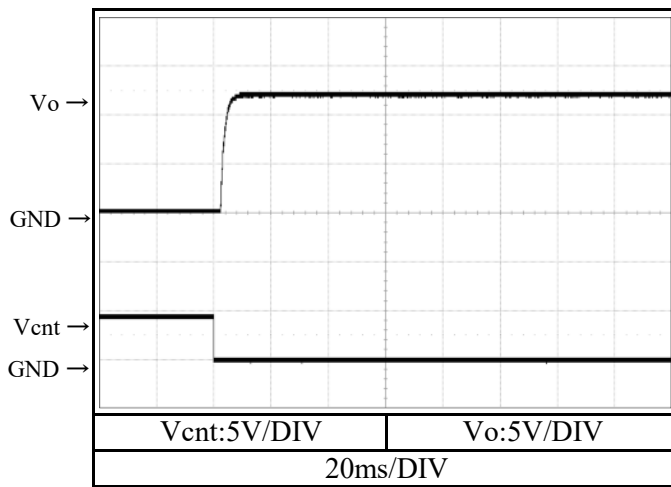
Io : 0 %

Tbp : 25 °C

5V



12V



2.6 出力立ち上がり、立ち下がり特性 (ON/OFFコントロール時)

Output rise and fall characteristics with ON/OFF CONTROL

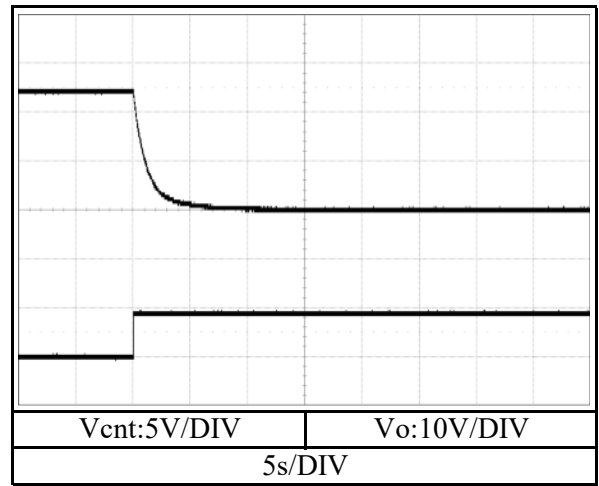
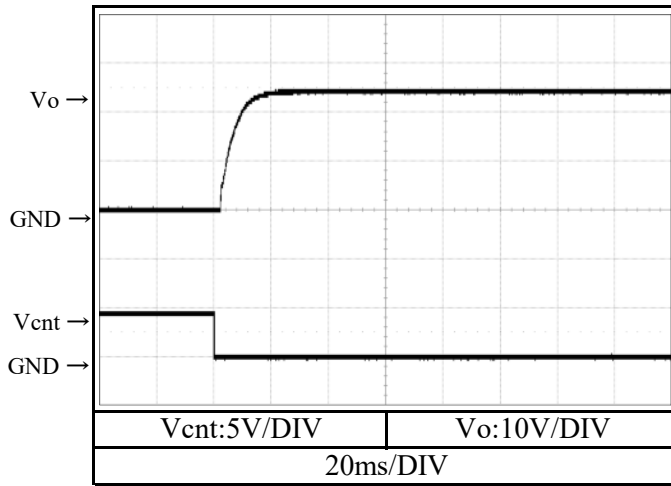
Conditions

V<sub>in</sub> : 24 VDC

I<sub>o</sub> : 0 %

T<sub>bp</sub> : 25 °C

24V



2.6 出力立ち上がり、立ち下がり特性 (ON/OFFコントロール時)

Output rise and fall characteristics with ON/OFF CONTROL

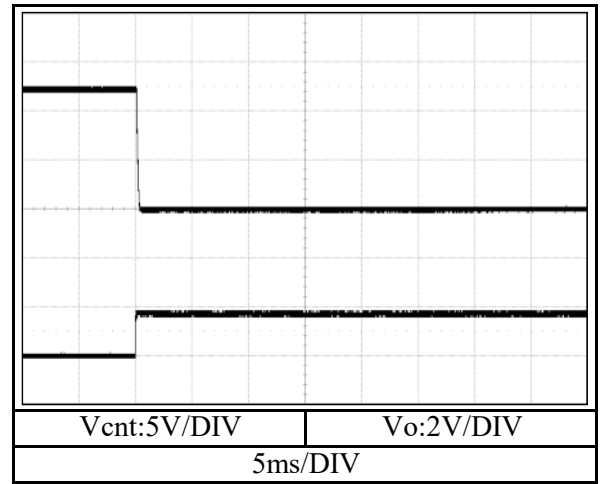
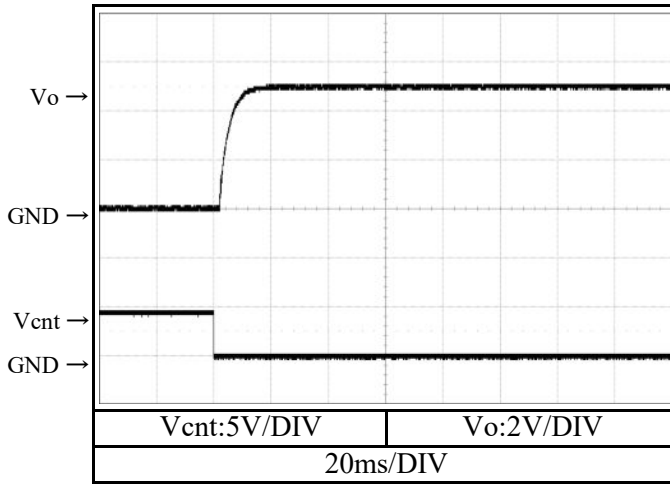
Conditions

Vin : 24 VDC

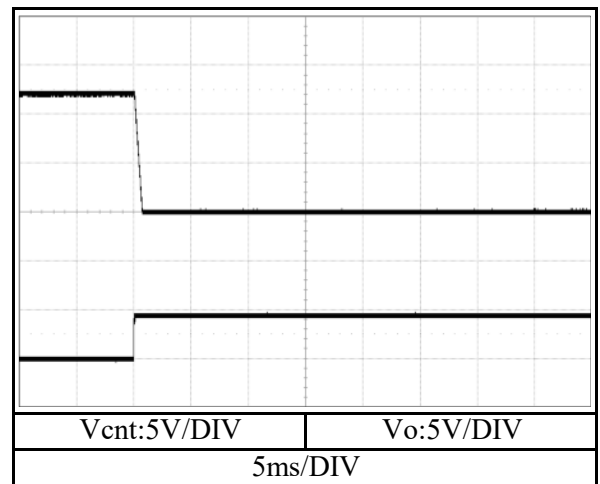
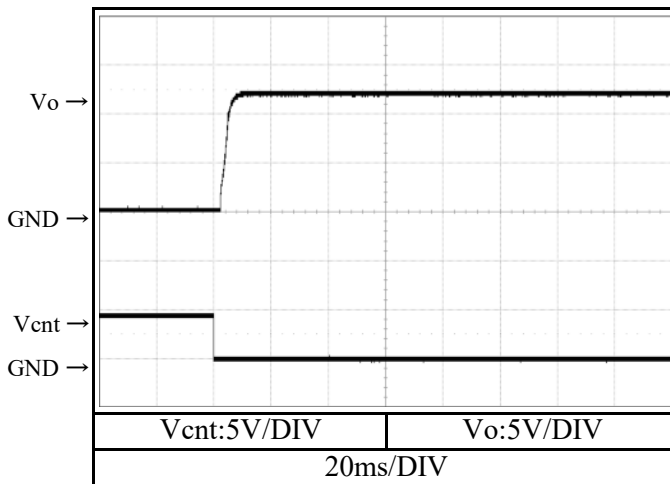
Io : 100 %

Tbp : 25 °C

5V



12V





2.6 出力立ち上がり、立ち下がり特性 (ON/OFFコントロール時)

Output rise and fall characteristics with ON/OFF CONTROL

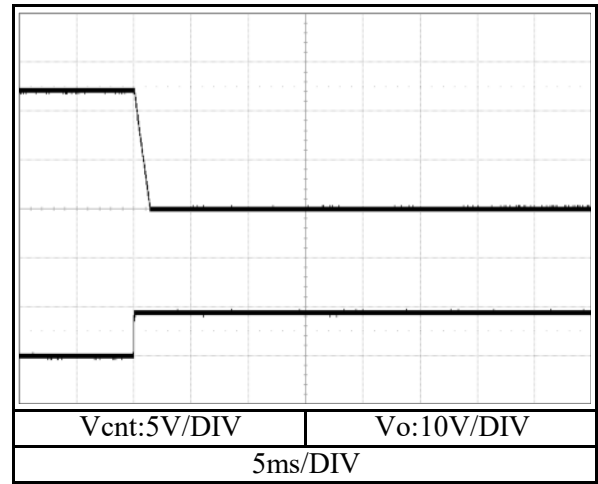
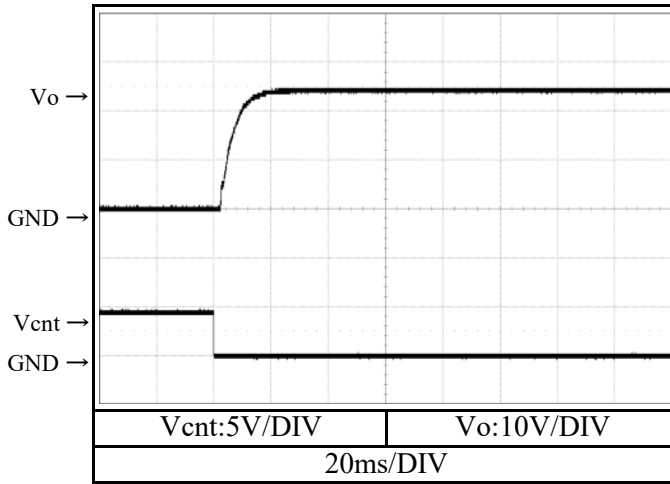
Conditions

Vin : 24 VDC

Io : 100 %

Tbp : 25 °C

24V



2.7 過渡応答（負荷急変）特性

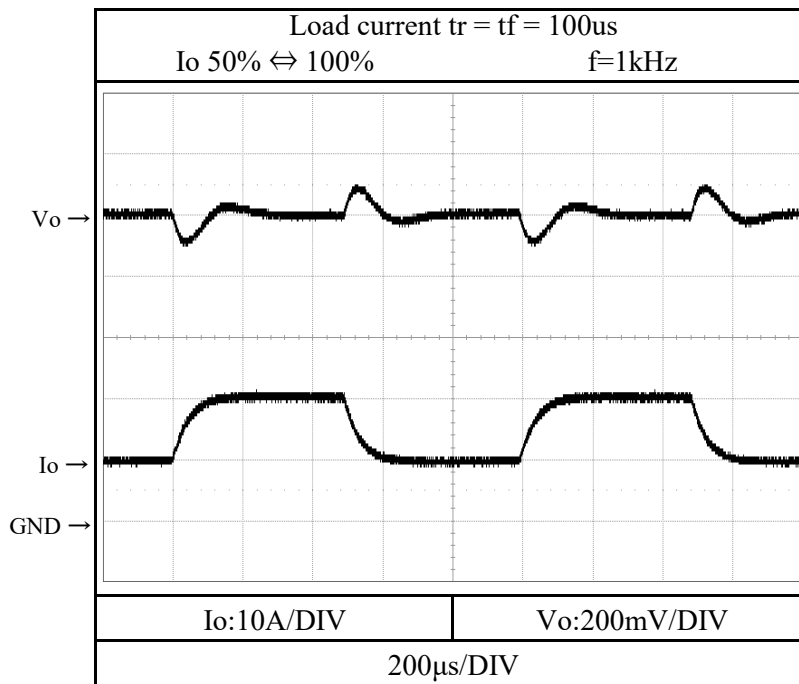
Dynamic load response characteristics

Conditions

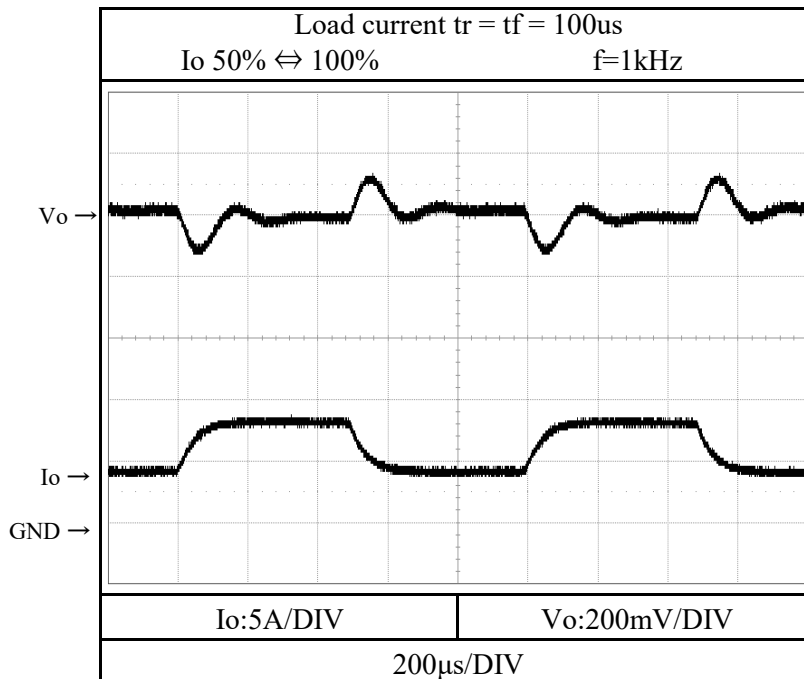
Vin : 24 VDC

Tbp : 25 °C

5V



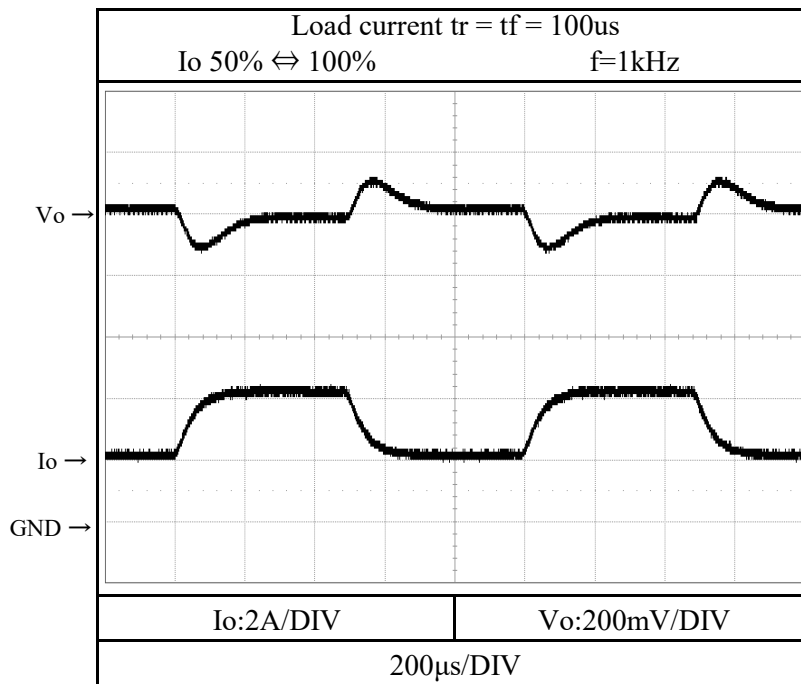
12V



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

Conditions Vin : 24 VDC  
Tbp : 25 °C

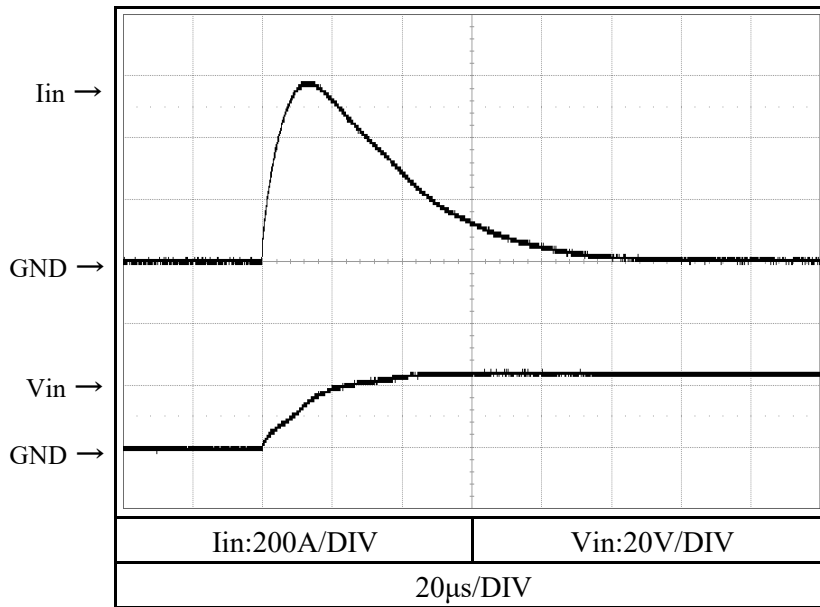
24V



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

Conditions Vin : 24 VDC  
Io : 100 %  
Tbp : 25 °C

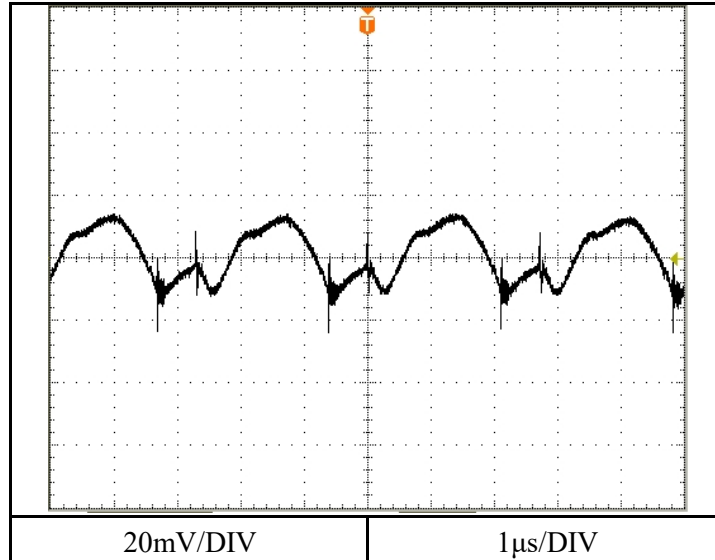
5V



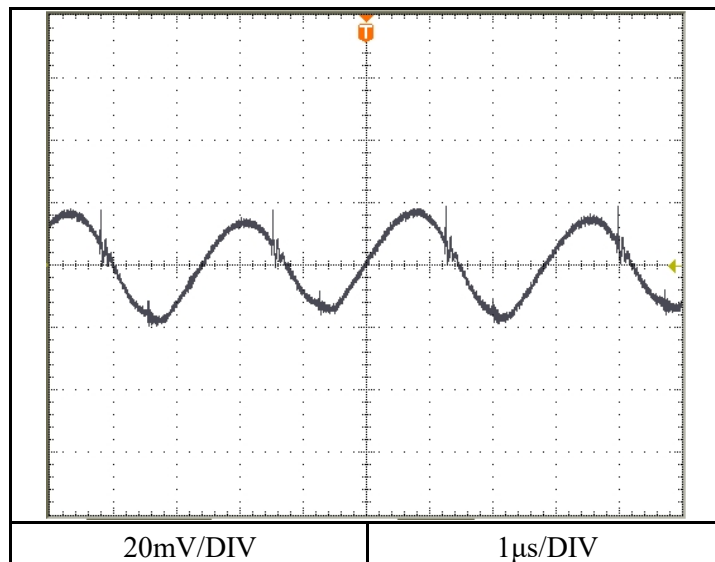
2.9 出力リップル・ノイズ波形  
Output ripple and noise waveform

Conditions Vin : 24 VDC  
Io : 100 %  
Tbp : 25 °C

5V



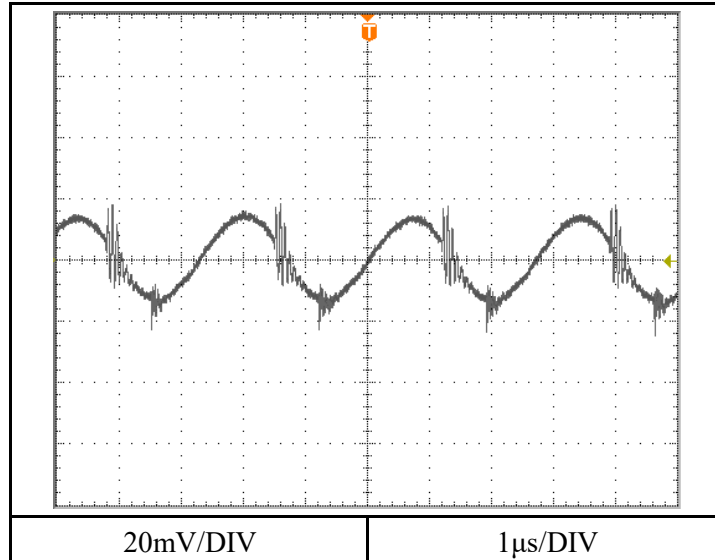
12V



2.9 出力リップル・ノイズ波形  
Output ripple and noise waveform

Conditions       $V_{in}$  : 24 VDC  
                      $I_o$  : 100 %  
                      $T_{bp}$  : 25 °C

24V



2.10 EMI特性

Electro-Magnetic Interference characteristics

(a) 雑音端子電圧 (帰還ノイズ)

Conducted Emission Noise

Conditions

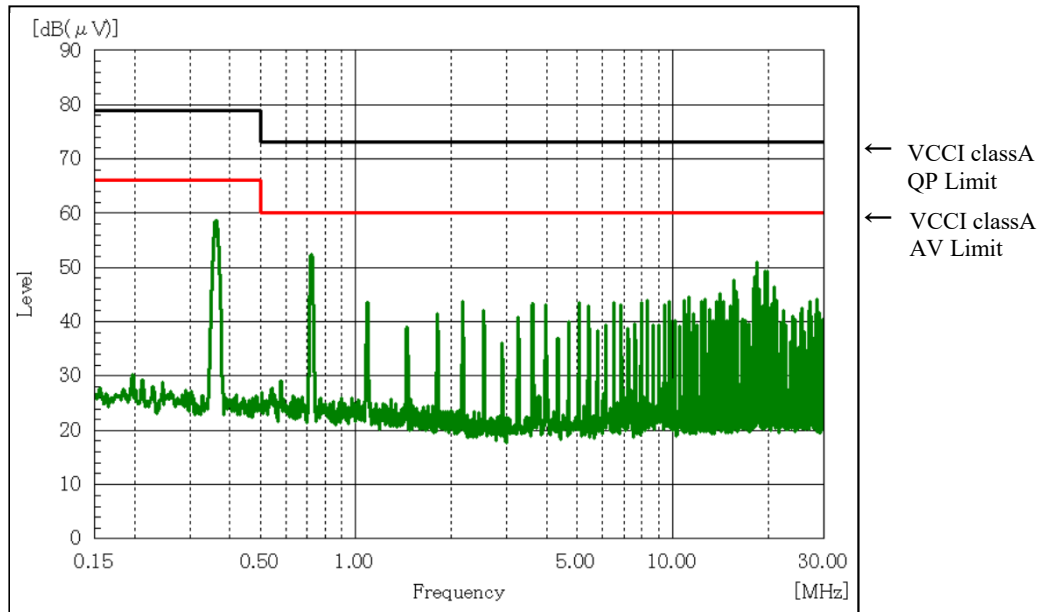
Vin : 24 VDC

Io : 100 %

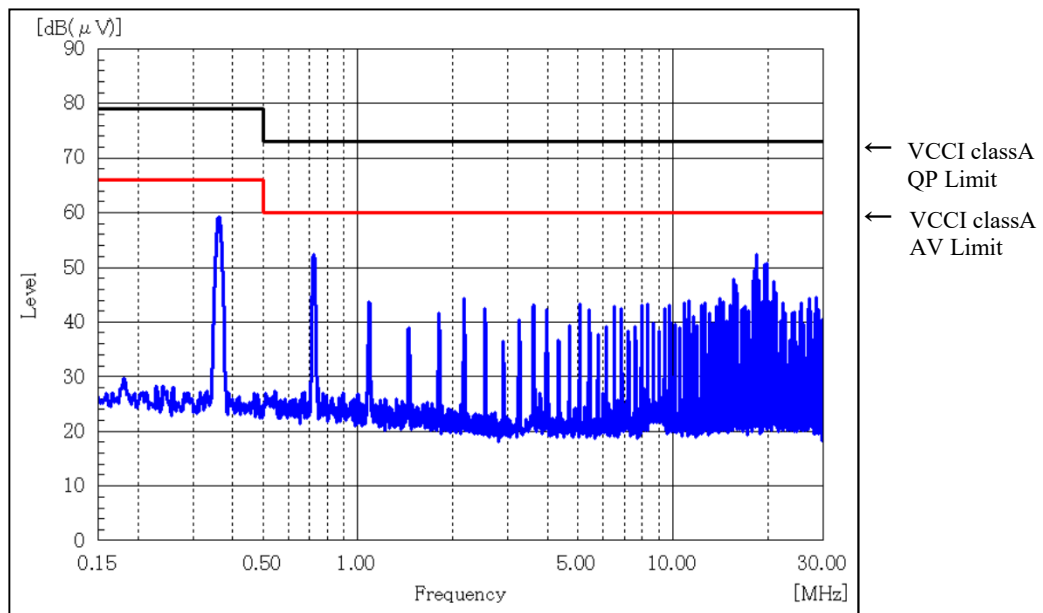
Tbp : 25 °C

5V

+Vin



-Vin



EN55011-A, EN55032-A, FCC Part.15 Subpart.B ClassAの限界値は、VCCI ClassAの限界値と同じ  
 Limit of EN55011-A, EN55032-A and FCC Part.15 Subpart.B ClassA are same as its VCCI ClassA.

2.10 EMI特性

Electro-Magnetic Interference characteristics

(a) 雑音端子電圧 (帰還ノイズ)

Conducted Emission Noise

Conditions

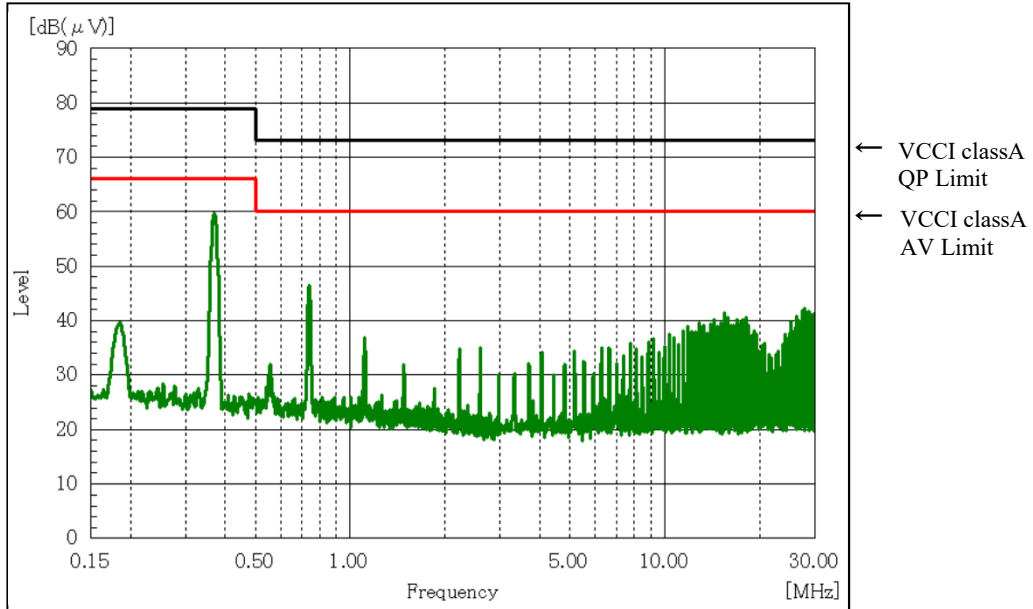
Vin : 24 VDC

Io : 100 %

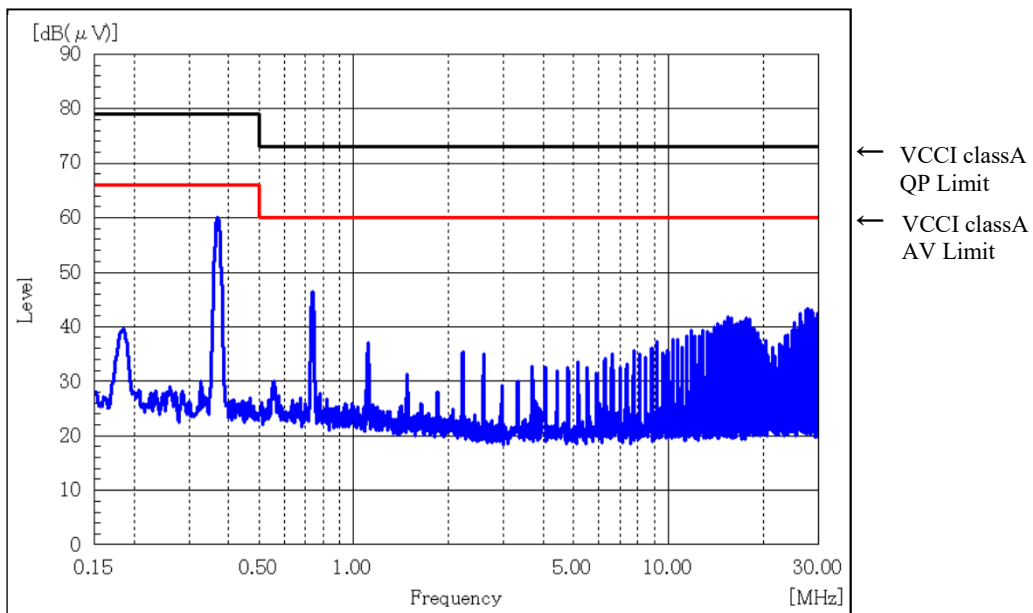
Tbp : 25 °C

12V

+Vin



-Vin



EN55011-A, EN55032-A, FCC Part.15 Subpart.B ClassAの限界値は、VCCI ClassAの限界値と同じ  
Limit of EN55011-A, EN55032-A and FCC Part.15 Subpart.B ClassA are same as its VCCI ClassA.



2.10 EMI特性

Electro-Magnetic Interference characteristics

(a) 雑音端子電圧 (帰還ノイズ)

Conducted Emission Noise

Conditions

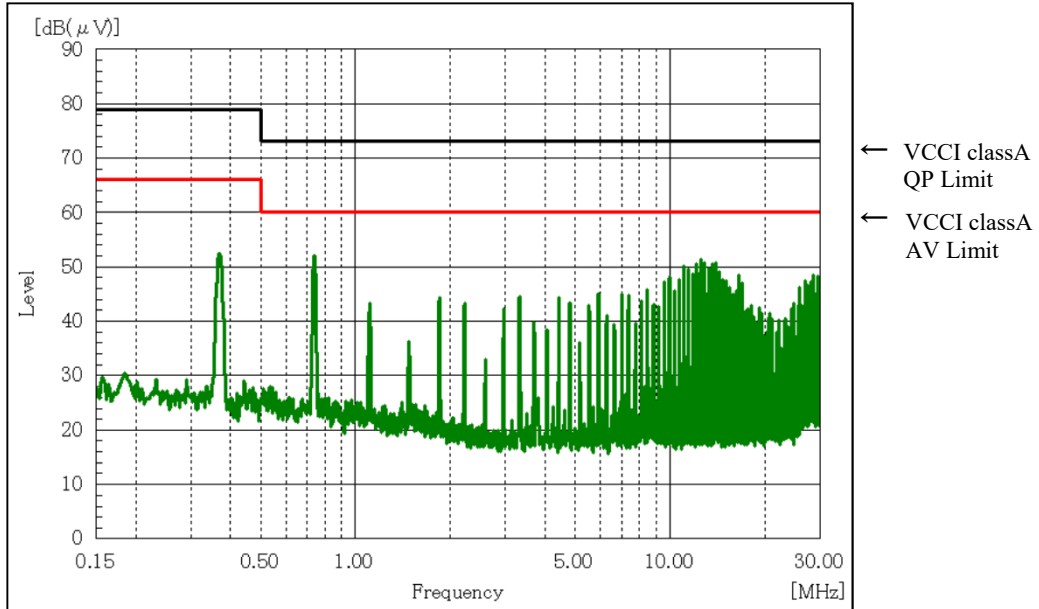
Vin : 24 VDC

Io : 100 %

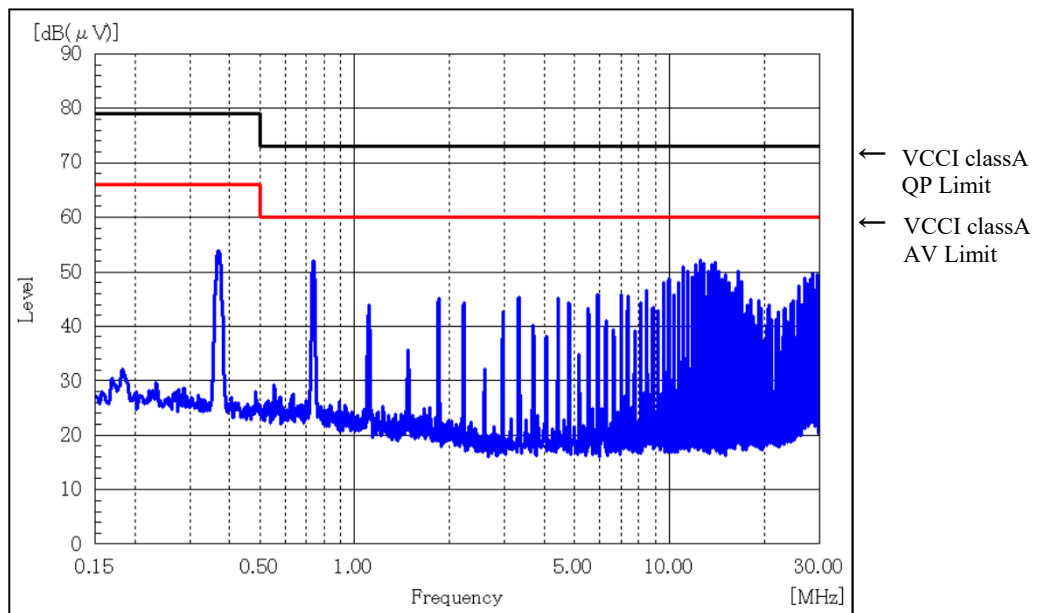
Tbp : 25 °C

24V

+Vin



-Vin



EN55011-A, EN55032-A, FCC Part.15 Subpart.B ClassAの限界値は、VCCI ClassAの限界値と同じ  
Limit of EN55011-A, EN55032-A and FCC Part.15 Subpart.B ClassA are same as its VCCI ClassA.

2.10 EMI特性

Electro-Magnetic Interference characteristics

(b) 雑音電界強度 (輻射ノイズ)

Radiated Emission Noise

Conditions

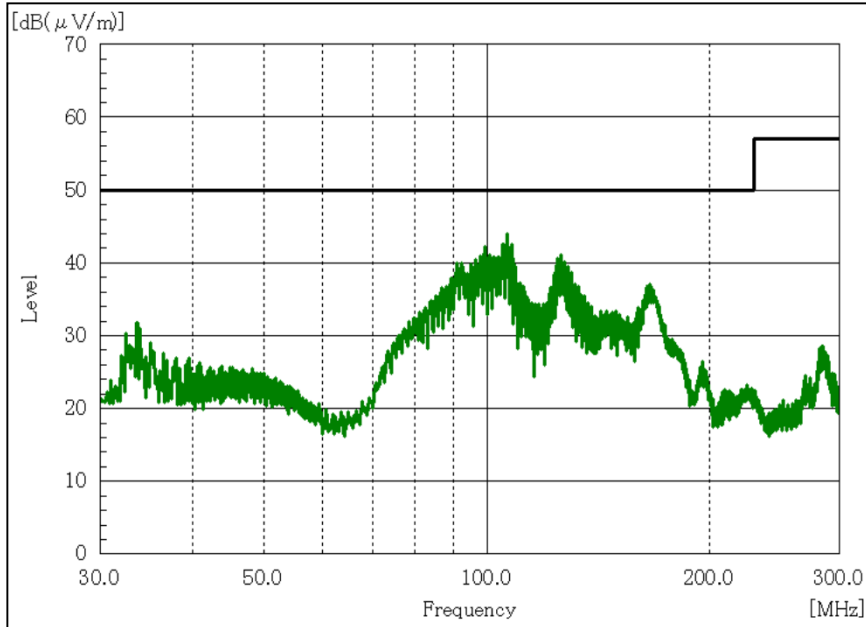
Vin : 24 VDC

Io : 100 %

Tbp : 25 °C

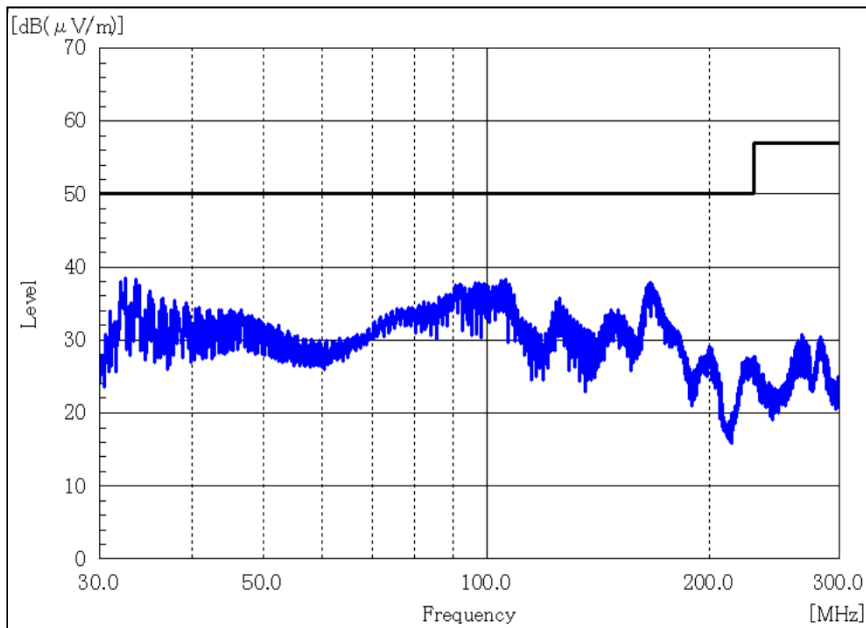
5V

HORIZONTAL



← VCCI classA  
QP Limit  
(Distance: 3m)

VERTICAL



← VCCI classA  
QP Limit  
(Distance: 3m)

EN55011-A, EN55032-Aの限界値は、VCCI ClassAの限界値と同じ  
Limit of EN55011-A, EN55032-A are same as its VCCI ClassA.

2.10 EMI特性

Electro-Magnetic Interference characteristics

(b) 雑音電界強度 (輻射ノイズ)

Radiated Emission Noise

Conditions

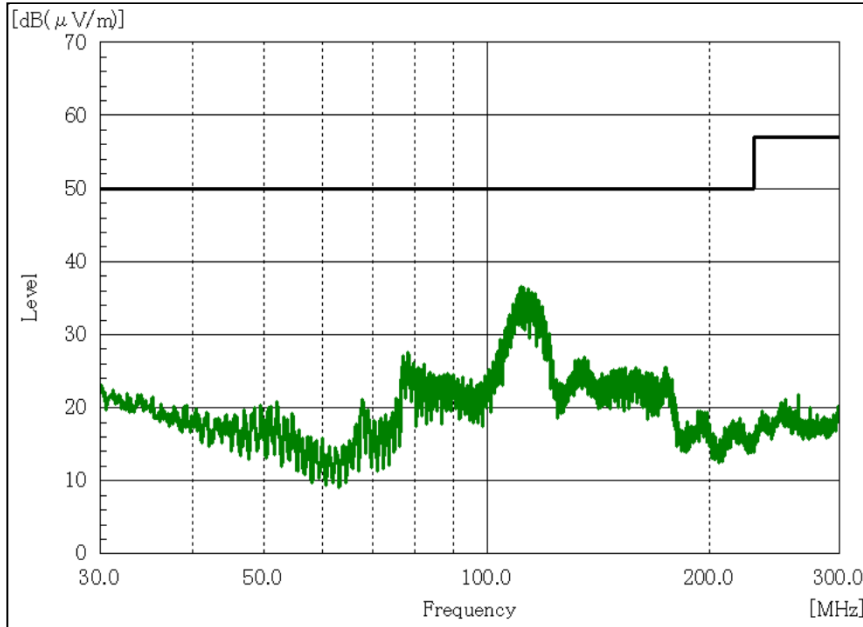
Vin : 24 VDC

Io : 100 %

Tbp : 25 °C

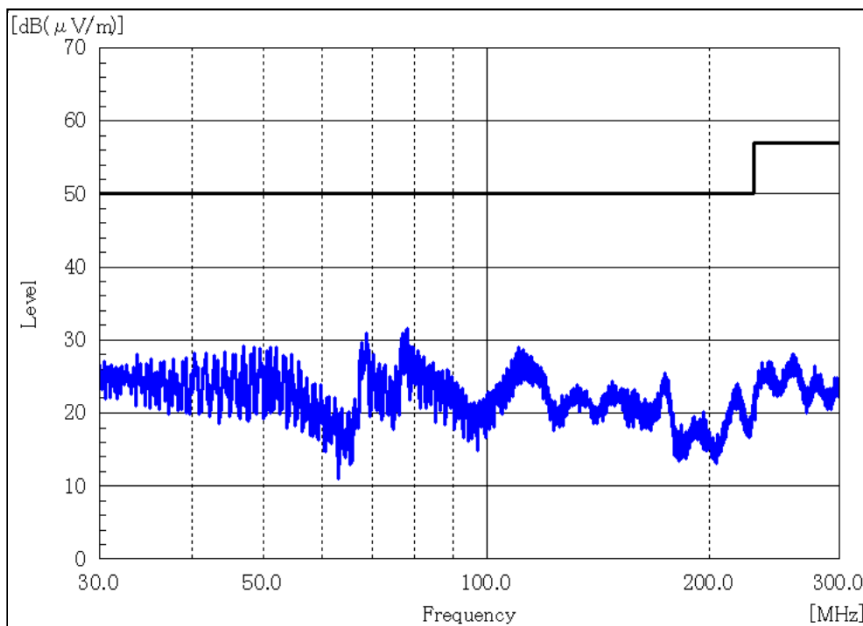
12V

HORIZONTAL



← VCCI classA  
QP Limit  
(Distance: 3m)

VERTICAL



← VCCI classA  
QP Limit  
(Distance: 3m)

EN55011-A, EN55032-Aの限界値は、VCCI ClassAの限界値と同じ  
Limit of EN55011-A, EN55032-A are same as its VCCI ClassA.

2.10 EMI特性

Electro-Magnetic Interference characteristics

(b) 雑音電界強度 (輻射ノイズ)

Radiated Emission Noise

Conditions

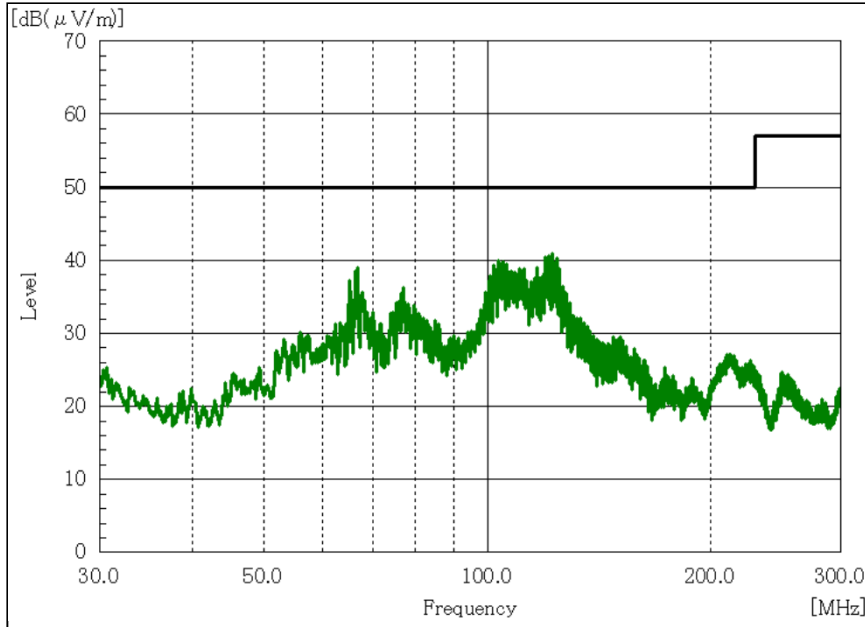
Vin : 24 VDC

Io : 100 %

Tbp : 25 °C

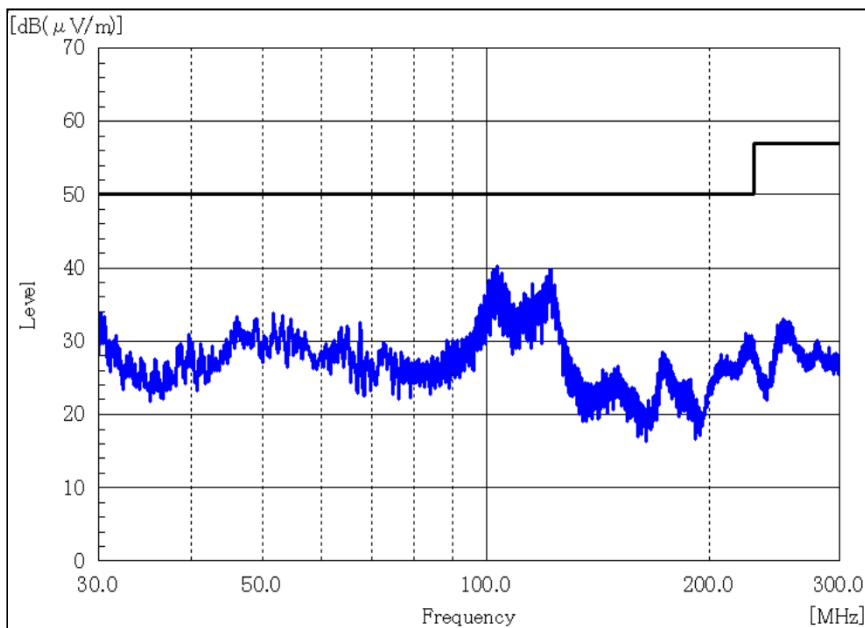
24V

HORIZONTAL



← VCCI classA  
QP Limit  
(Distance: 3m)

VERTICAL



← VCCI classA  
QP Limit  
(Distance: 3m)

EN55011-A, EN55032-Aの限界値は、VCCI ClassAの限界値と同じ  
Limit of EN55011-A, EN55032-A are same as its VCCI ClassA.