CCG30-24-**S

EVALUATION DATA

型式データ

INDEX

PAGE

1. 測定方法 Evaluation Method

1-1. 測定回路 Measurement Circuits ・・ 3

(1) 静特性 、待機電力特性、通電ドリフト特性、その他特性
Steady state, Standby power, Warm up voltage drift and Other characteristics

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

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

(4) EMI特性 Electro-Magnetic Interference characteristics

1-2. 使用測定機器 List of equipment used ・・ 5

2. 特性データ Characteristics

2-1. 静特性 Steady state characteristics

(1) 入力・負荷・温度変動 Regulation - line and load, Temperature drift ・・・・・・・・・・・・・・・・ 6

(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 ・・・・・・・・・・・・・・・・ 7

(3) 入力電流・効率 対 出力電流 Input current and Efficiency vs. Output current ・・・・・・・ 9

(4) 効率 対 入力電圧 Efficiency vs. Input voltage ・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・ 11

(5) 起動・遮断電圧特性 Start up and Drop out voltage characteristics ・・・・・・・・・・・・・・・・・ 13

2-2. 待機電力特性 Standby power characteristics ・・ 15

2-3. 通電ドリフト特性 Warm up voltage drift characteristics ・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・ 17

2-4. 過電流保護特性 Over current protection (OCP) characteristics ・・・・・・・・・・・・・・・・・・・・・・・・ 19

2-5. 出力立ち上がり・立ち下がり特性 Output rise and fall characteristics ・・・・・・・・・・・・・・・・・・・ 21

2-6. 過渡応答(負荷急変)特性 Dynamic load response characteristics ・・・・・・・・・・・・・・・・・・・・・ 29

2-7. 入力サージ電流(突入電流)特性 Inrush current characteristics ・・・・・・・・・・・・・・・・・・・・・・ 30

2-8. 出力リップル、ノイズ波形 Output ripple and noise waveform ・・・・・・・・・・・・・・・・・・・・・・・・ 31

2-9. EMI特性 Electro-Magnetic Interference characteristics ・・・・・・・・・・・・・・・・・・・・・・・・・・ 32

使用記号 Terminology used

		定義	Definition
Vin	・・・・・	入力電圧	Input voltage
Vo	・・・・・	出力電圧	Output voltage
Vrc	・・・・・	RC電圧	RC voltage
Iin	・・・・・	入力電流	Input current
Io	・・・・・	出力電流	Output current
Ta	・・・・・	周囲温度	Ambient temperature
f	・・・・・	周波数	Frequency

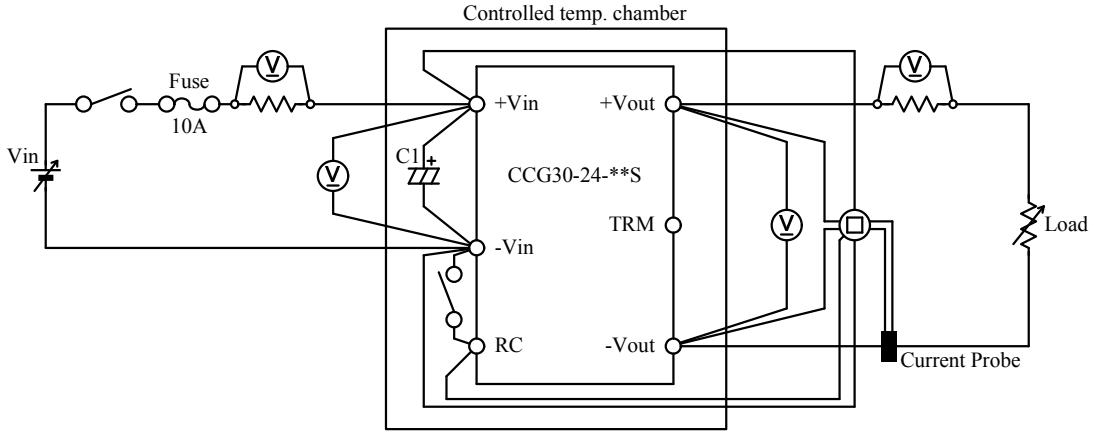
※ 当社測定条件における結果であり、参考値としてお考え願います。
Test results are reference data based on our measurement condition.

1. 測定方法 Evaluation Method

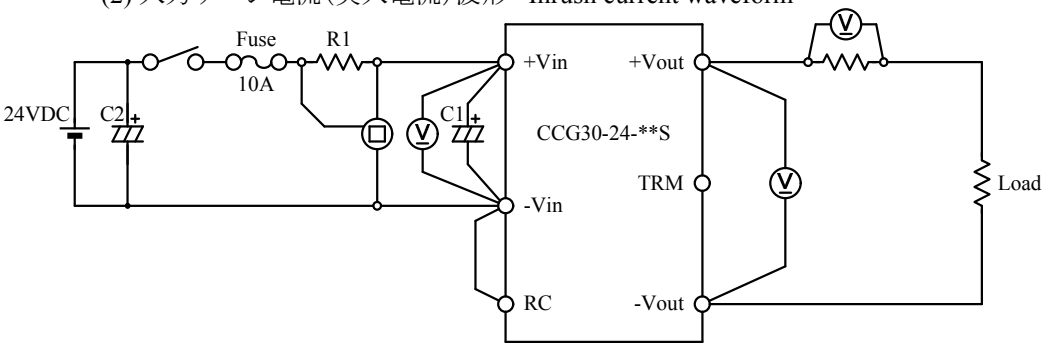
1-1. 測定回路 Measurement Circuits

(1) 静特性 、待機電力特性、通電ドリフト特性、その他特性

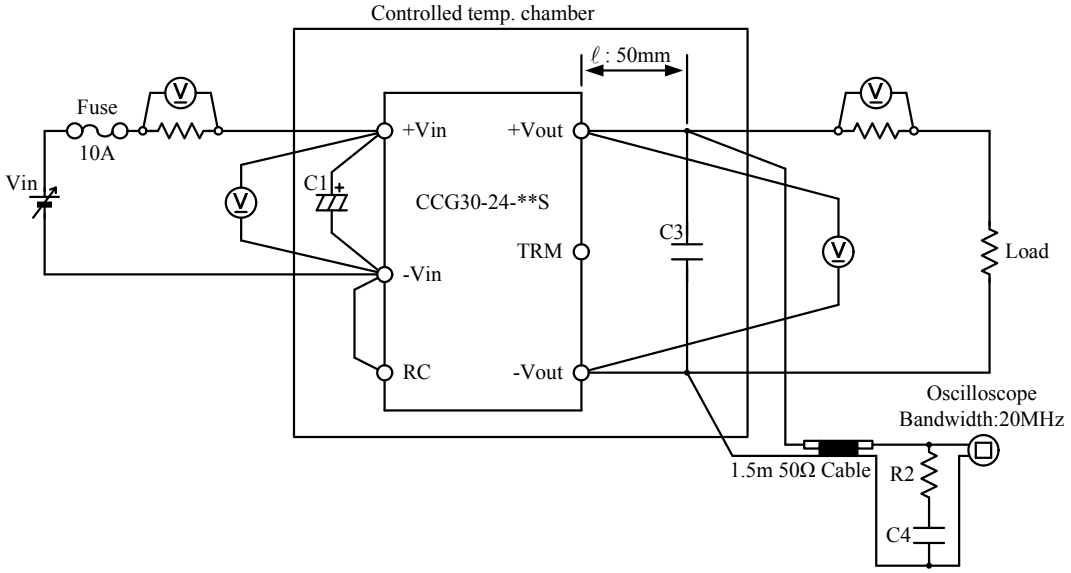
Steady state, Standby power, Warm up voltage drift and Other characteristics



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



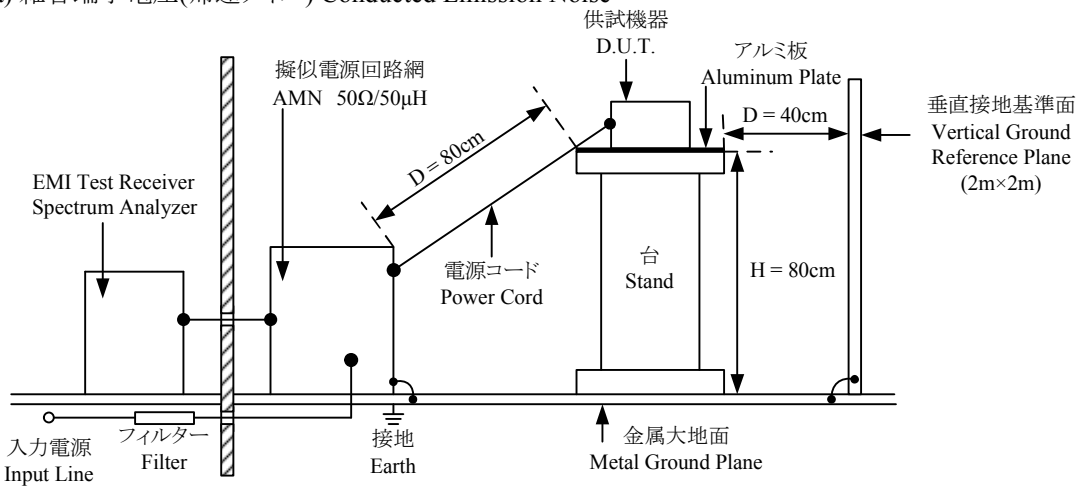
(3) 出力リップル、ノイズ電圧、波形 Output ripple and noise voltage and waveform



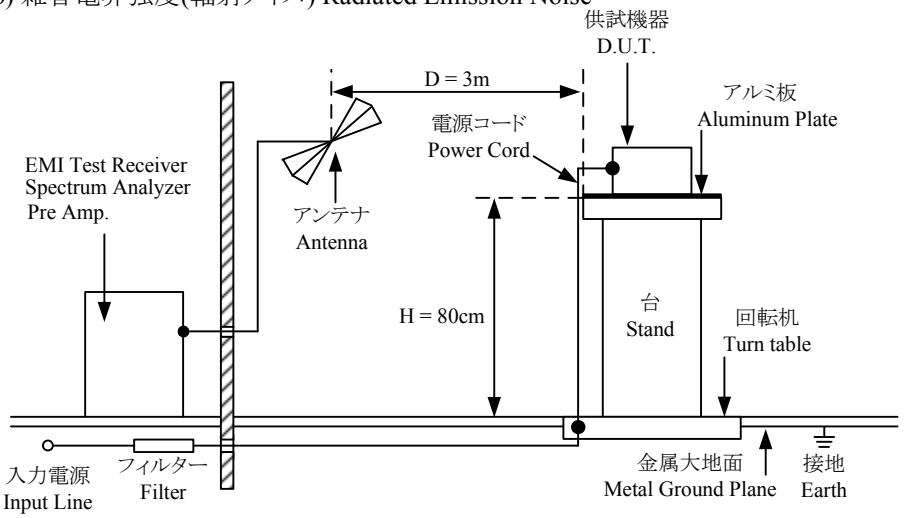
C1	: 120μF	Electrolytic Capacitor	
C2	: 8000μF	Electrolytic Capacitor	
C3	: 3.3V,5V - 22μF	Ceramic Capacitor	-20ºC≦Ta≦85ºC
	: 3.3V,5V - 22μF ×2parallel	Ceramic Capacitor	-40ºC≦Ta＜-20ºC
	: 12V,15V - 22μF	Ceramic Capacitor	
C4	: 4700pF	Ceramic Capacitor	
R1	: 0.01Ω		
R2	: 50Ω		

(4) EMI特性　Electro-Magnetic Interference characteristics

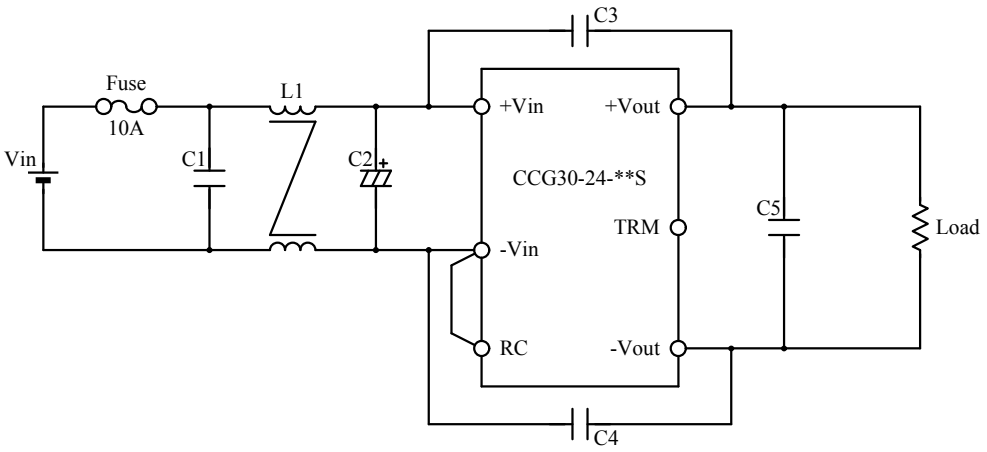
(a) 雑音端子電圧(帰還ノイズ) Conducted Emission Noise



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



VCCI class A 対応アプリケーション　VCCI class A application system



C1	: 10μF	Ceramic Capacitor
C2	: 120μF	Electrolytic Capacitor
C3	: 1000pF×2parallel	Ceramic Capacitor
C4	: 1000pF×2parallel	Ceramic Capacitor
C5	: 22μF	Ceramic Capacitor
L1	: ACM1211-102-2PL (TDK)	Common Mode Choke Coil

1-2. 使用測定機器 List of equipment used

	EQUIPMENT USED	MANUFACTURER	MODEL NO.
1	DIGITAL STORAGE OSCILLOSCOPE	YOKOGAWA ELECT.	DL1740 / DL1740E
2	DIGITAL MULTIMETER	AGILENT	34970A
3	CURRENT PROBE	YOKOGAWA ELECT.	701932
4	CURRENT PROBE	AGILENT	N2774A
5	SHUNT RESISTER	YOKOGAWA ELECT.	2215
6	DYNAMIC DUMMY LOAD	TAKASAGO	FK-200L / FK-600L
7	CVCF	TAKASAGO	AA2000XG
8	CVCF	NF	ES1000S / ES10000S
9	DC POWER SUPPLY	TDK-Lambda	Z+100-8
10	CONTROLLED TEMP. CHAMBER	ESPEC	SU-261 / SU-641
11	EMI TEST RECEIVER / SPECTRUM ANALYZER	ROHDE & SCHWARZ	ESCI
12	PRE AMP.	SONOMA	310N
13	AMN	KIKUSUI	KNW-242C
14	ANTENNA	SCHWARZBECK	BBA9106/VHA9103
15	ANTENNA	SCHWARZBECK	UHALP9107

2. 特性データ Characteristics

2-1. 静特性 Steady state characteristics

(1) 入力・負荷・温度変動 Regulation - line and load, Temperature drift

3.3V

1. Regulation - line and load　　Condition Ta : 25 ºC

Io \ Vin	9VDC	12VDC	24VDC	36VDC	Line regulation	
0%	3.313V	3.313V	3.313V	3.313V	0mV	0.000%
50%	3.309V	3.309V	3.309V	3.309V	0mV	0.000%
100%	3.306V	3.306V	3.306V	3.305V	1mV	0.030%
Load	7mV	7mV	7mV	8mV		
regulation	0.212%	0.212%	0.212%	0.242%		

2. Temperature drift　　Conditions Vin : 24 VDC
Io : 100 %

Ta	-40°C	25°C	85°C	Temperature stability	
Vo	3.297V	3.306V	3.298V	9mV	0.273%

5V

1. Regulation - line and load　　Condition Ta : 25 ºC

Io \ Vin	9VDC	12VDC	24VDC	36VDC	Line regulation	
0%	5.006V	5.007V	5.007V	5.006V	1mV	0.020%
50%	5.003V	5.003V	5.003V	5.003V	0mV	0.000%
100%	4.999V	5.000V	5.000V	4.999V	1mV	0.020%
Load	7mV	7mV	7mV	7mV		
regulation	0.140%	0.140%	0.140%	0.140%		

2. Temperature drift　　Conditions Vin : 24 VDC
Io : 100 %

Ta	-40°C	25°C	85°C	Temperature stability	
Vo	4.973V	5.000V	4.997V	27mV	0.540%

12V

1. Regulation - line and load　　Condition Ta : 25 ºC

Io \ Vin	9VDC	12VDC	24VDC	36VDC	Line regulation	
0%	12.093V	12.093V	12.092V	12.094V	2mV	0.017%
50%	12.090V	12.091V	12.088V	12.088V	3mV	0.025%
100%	12.090V	12.090V	12.088V	12.086V	4mV	0.033%
Load	3mV	3mV	4mV	8mV		
regulation	0.025%	0.025%	0.033%	0.067%		

2. Temperature drift　　Conditions Vin : 24 VDC
Io : 100 %

Ta	-40°C	25°C	85°C	Temperature stability	
Vo	12.065V	12.088V	12.114V	49mV	0.408%

15V

1. Regulation - line and load　　Condition Ta : 25 ºC

Io \ Vin	9VDC	12VDC	24VDC	36VDC	Line regulation	
0%	15.179V	15.179V	15.179V	15.177V	2mV	0.013%
50%	15.178V	15.177V	15.176V	15.174V	4mV	0.027%
100%	15.177V	15.177V	15.175V	15.176V	2mV	0.013%
Load	2mV	2mV	4mV	3mV		
regulation	0.013%	0.013%	0.027%	0.020%		

2. Temperature drift　　Conditions Vin : 24 VDC
Io : 100 %

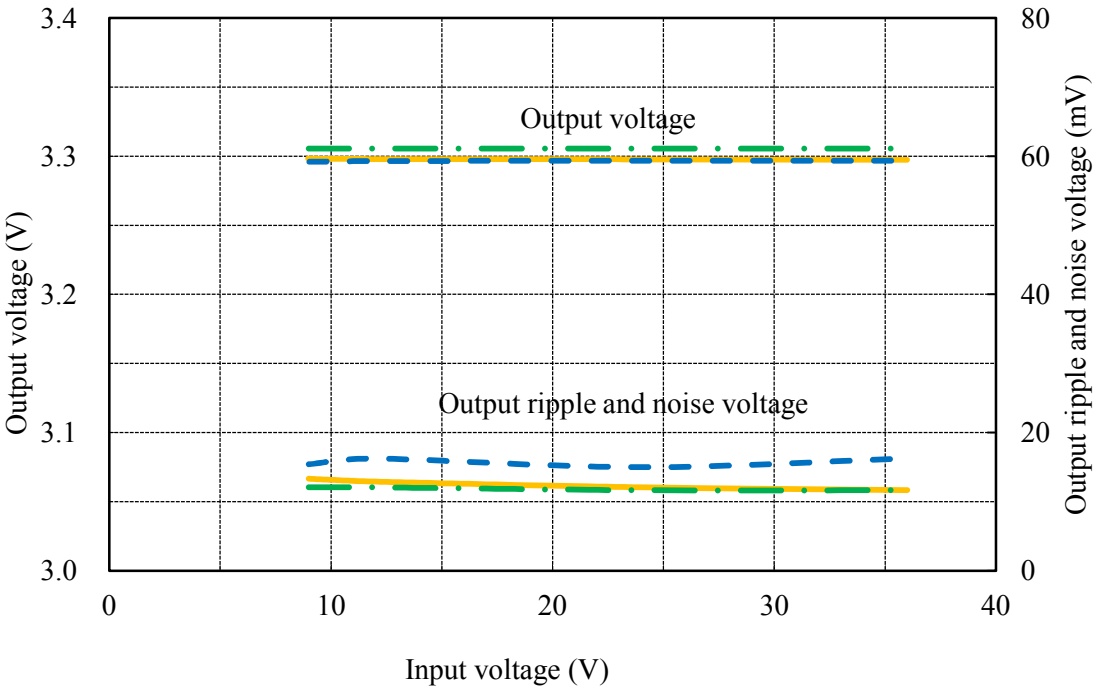
Ta	-40°C	25°C	85°C	Temperature stability	
Vo	15.177V	15.175V	15.179V	4mV	0.027%

(2) 出力電圧・出力リップルノイズ電圧 対 入力電圧

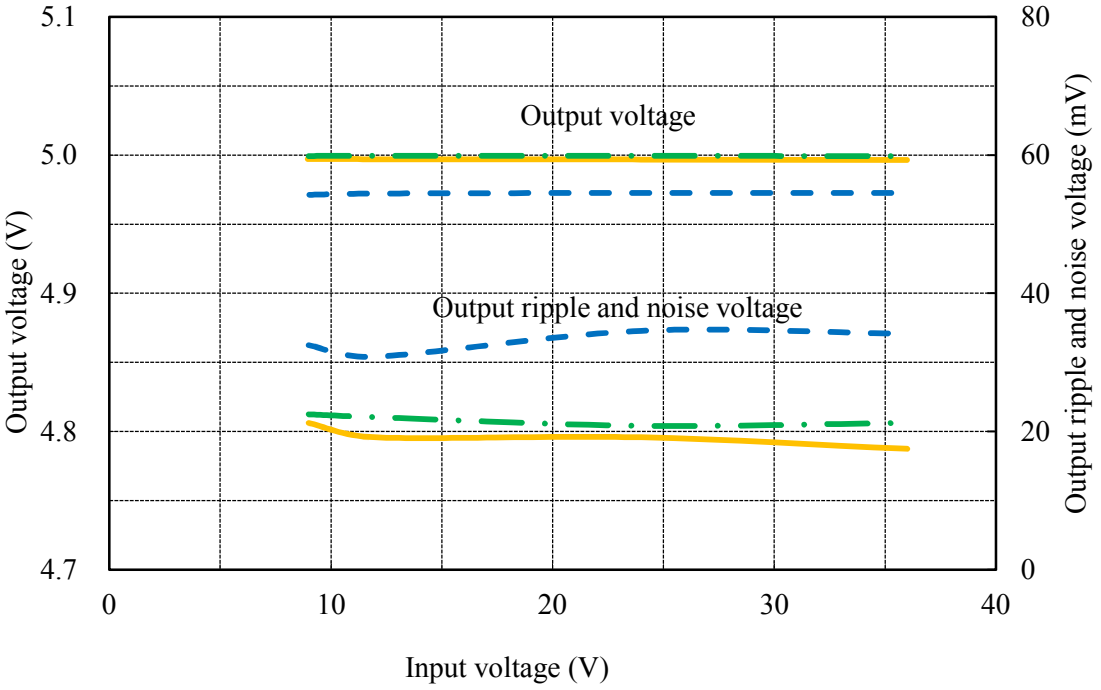
Output voltage and Output ripple and noise voltage vs. Input voltage

Conditions Io : 100 %
Ta : -40 ℃
: 25 ℃
: 85 ℃

3.3V



5V

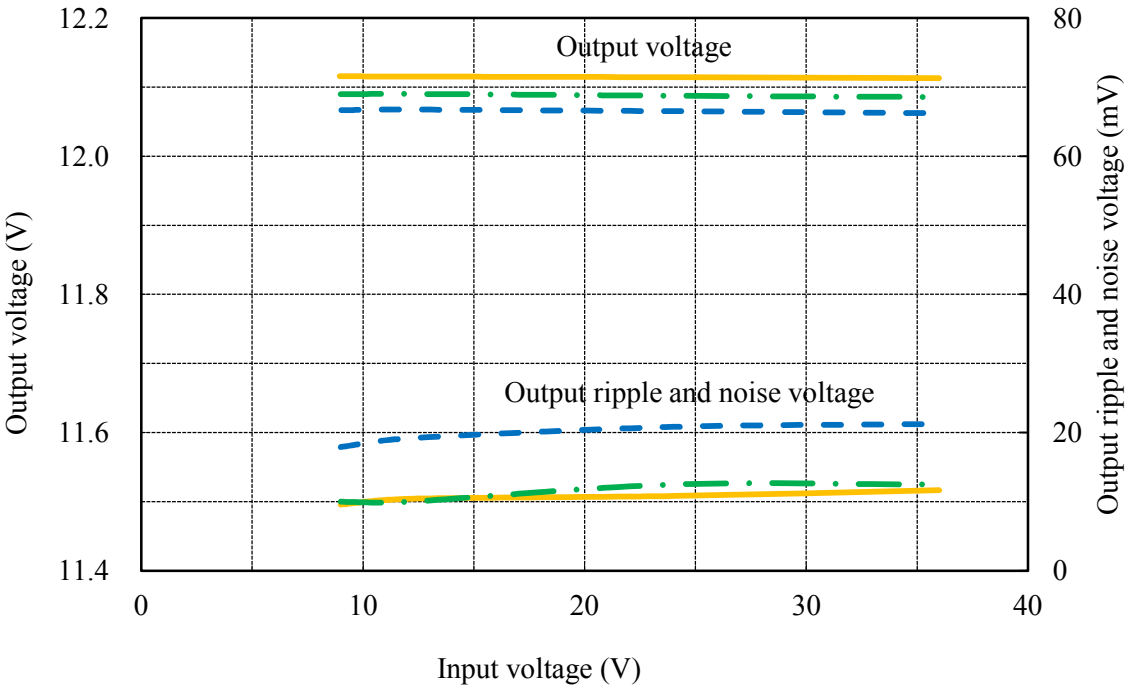


(2) 出力電圧・出力リップルノイズ電圧 対 入力電圧

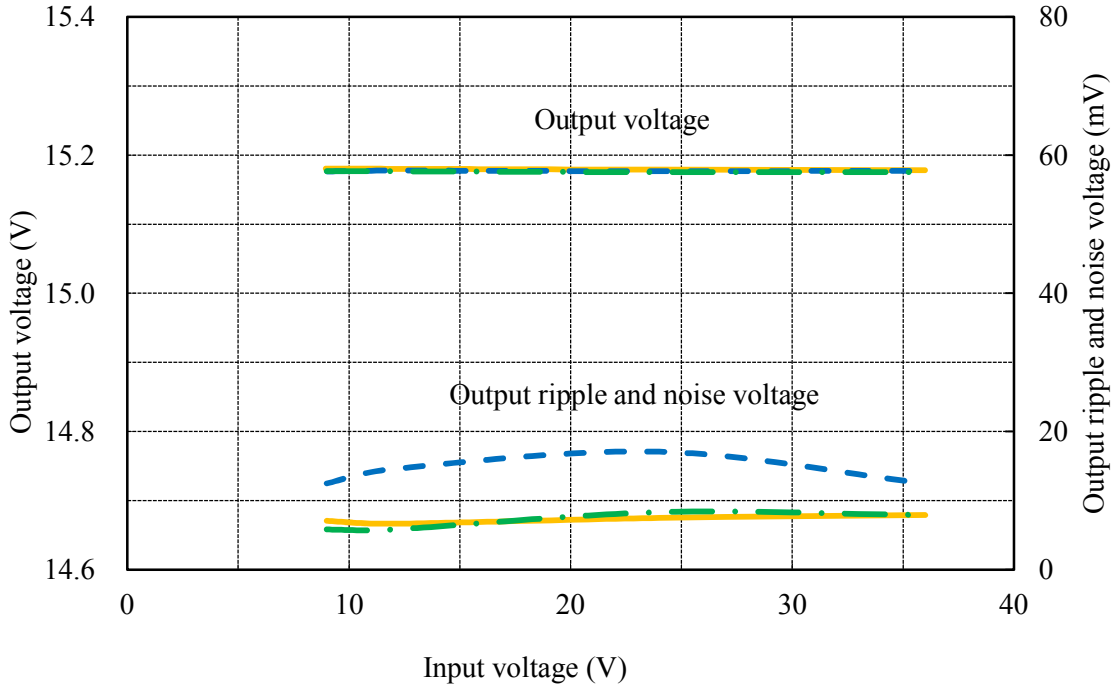
Output voltage and Output ripple and noise voltage vs. Input voltage

Conditions Io : 100 %
Ta : -40 ºC
: 25 ºC
: 85 ºC

12V



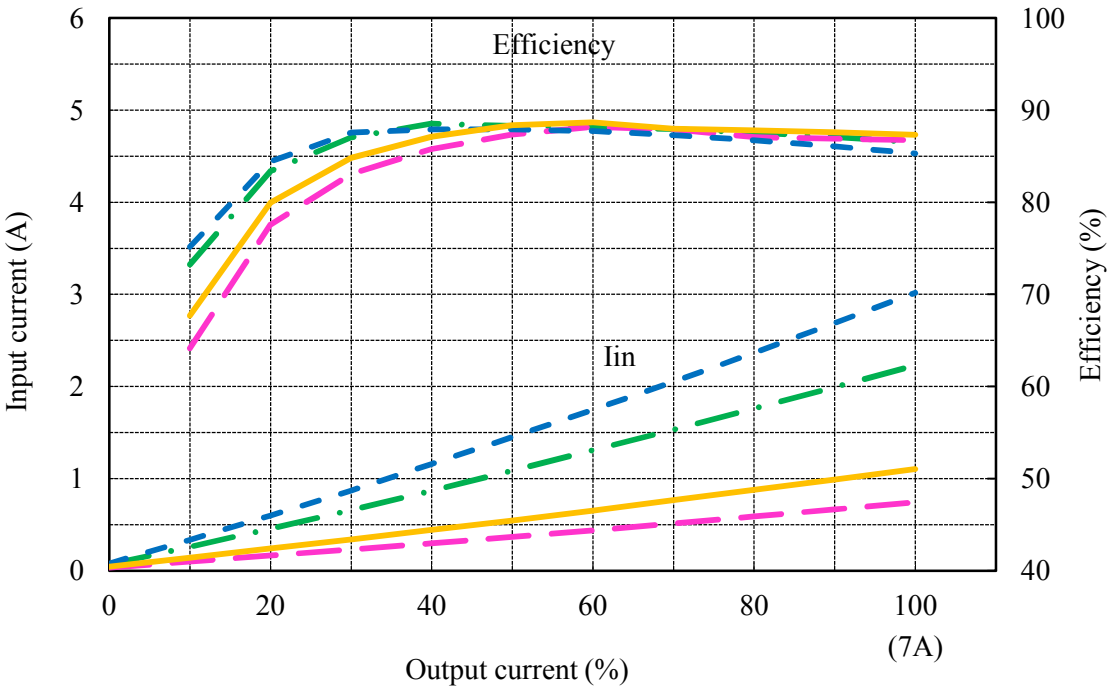
15V



(3) 入力電流･効率 対 出力電流　Input current and Efficiency vs. Output current

Conditions Vin : 9 VDC
: 12 VDC
: 24 VDC
: 36 VDC
Ta : 25 ºC

3.3V



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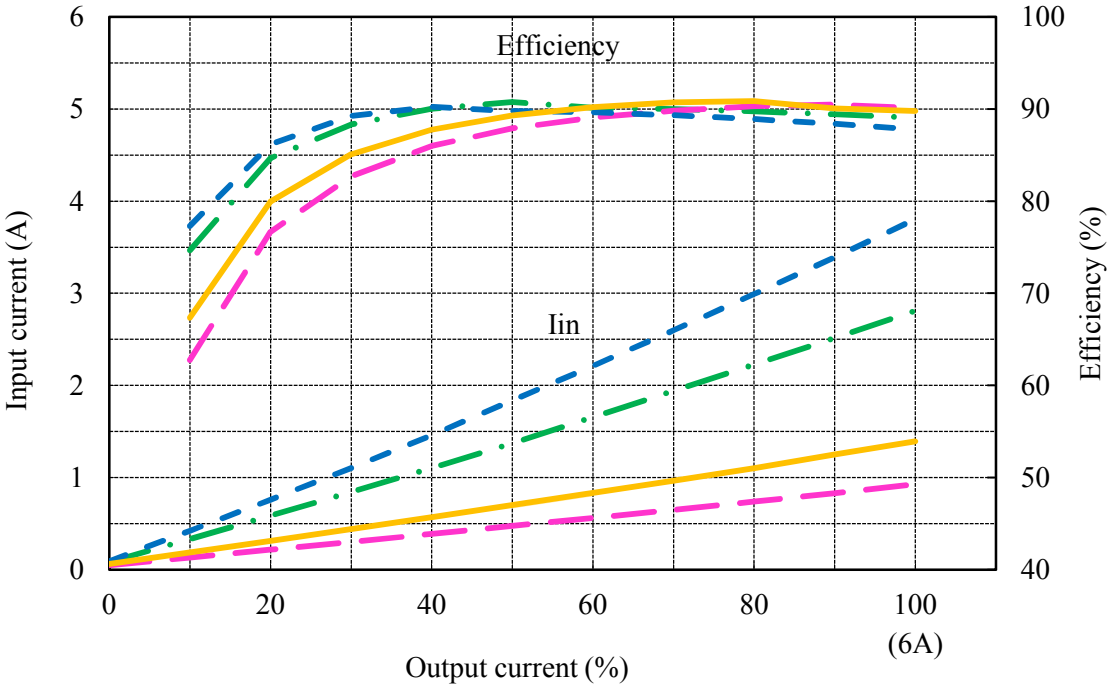
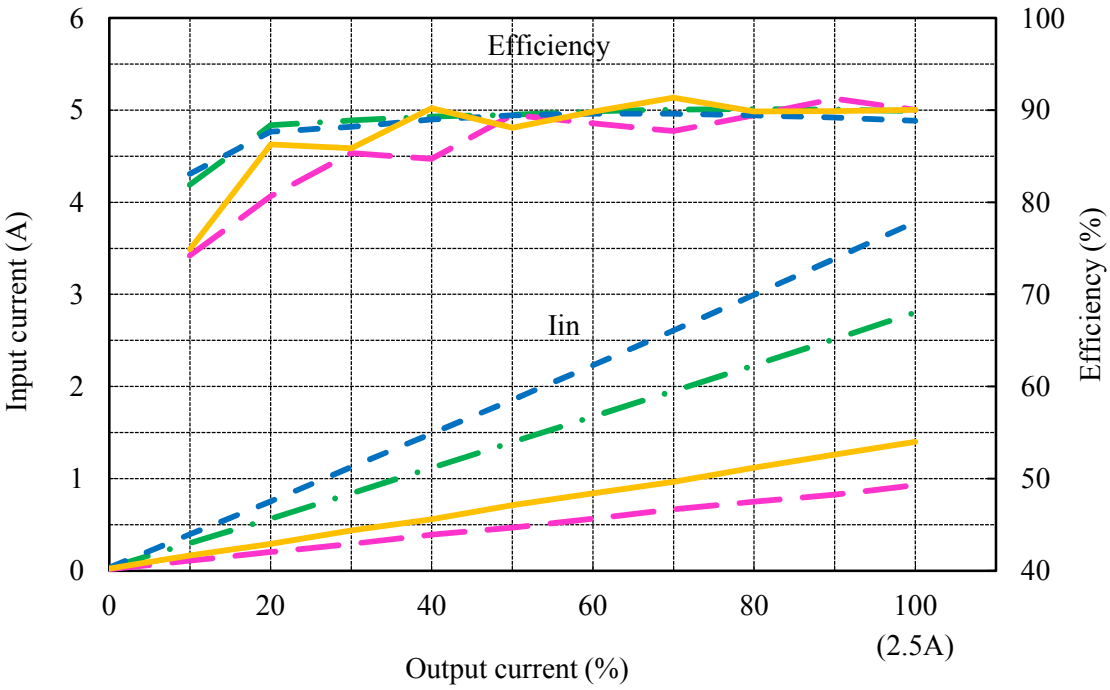


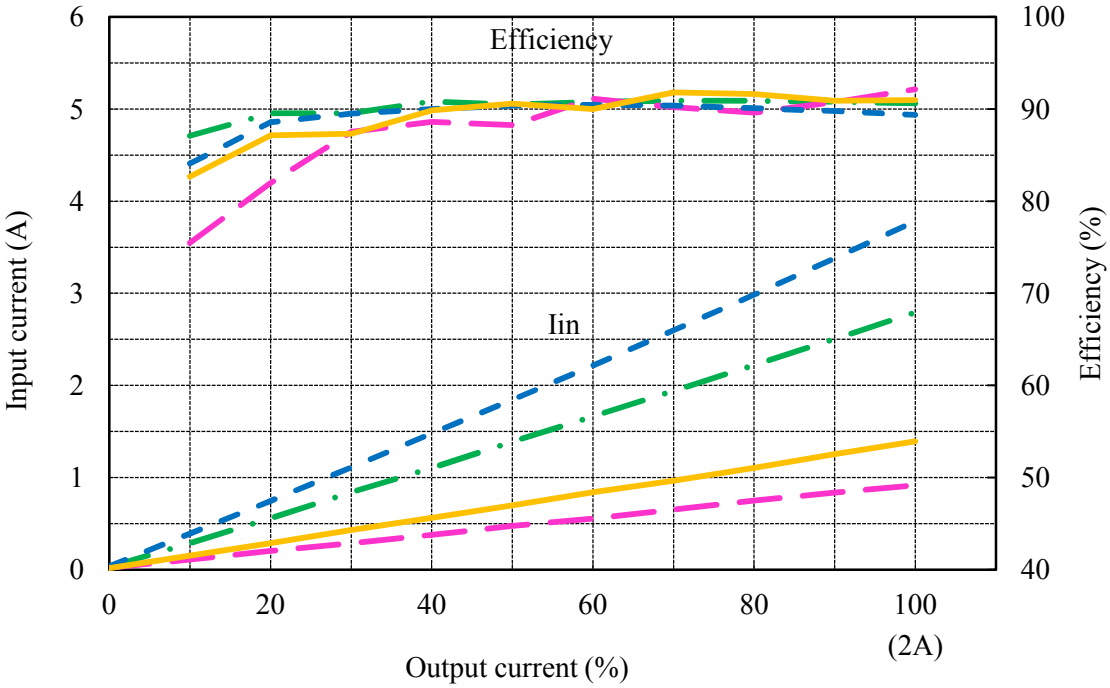
(3) 入力電流・効率 対 出力電流　Input current and Efficiency vs. Output current

Conditions Vin : 9 VDC
: 12 VDC
: 24 VDC
: 36 VDC
Ta : 25 ºC

12V



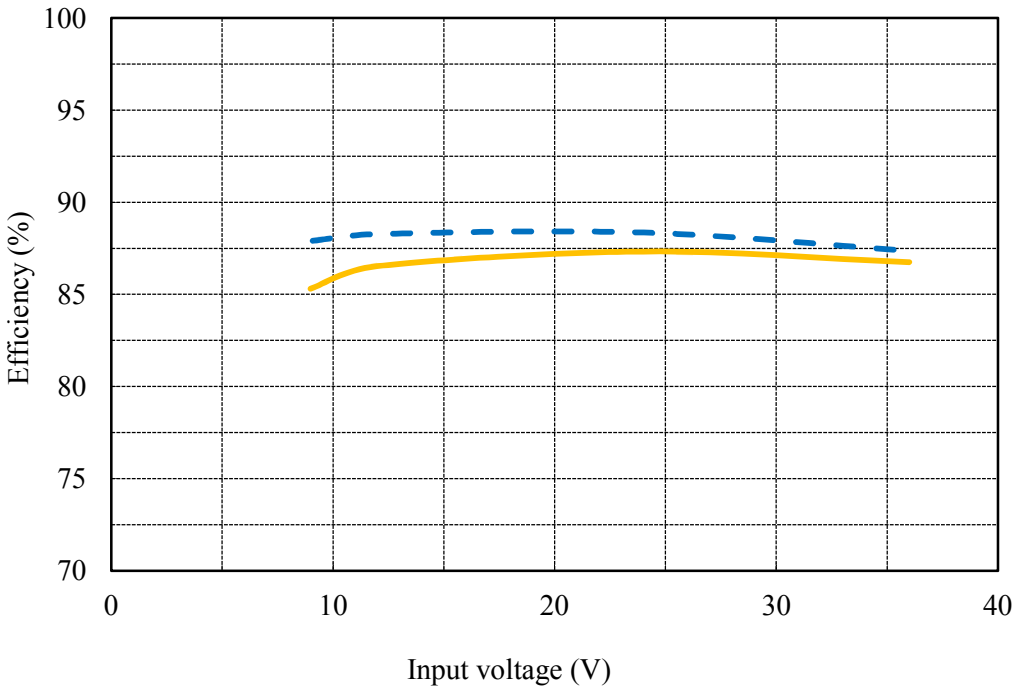
15V



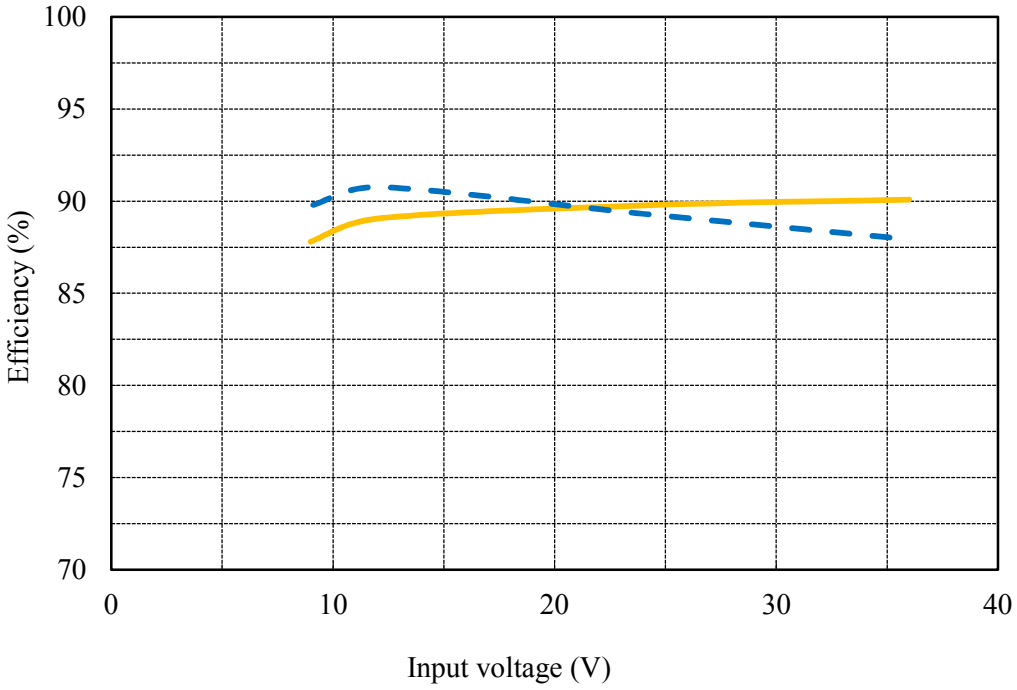
(4) 効率 対 入力電圧 Efficiency vs. Input voltage

Conditions Io : 50 %
: 100 %
Ta : 25 ºC

3.3V



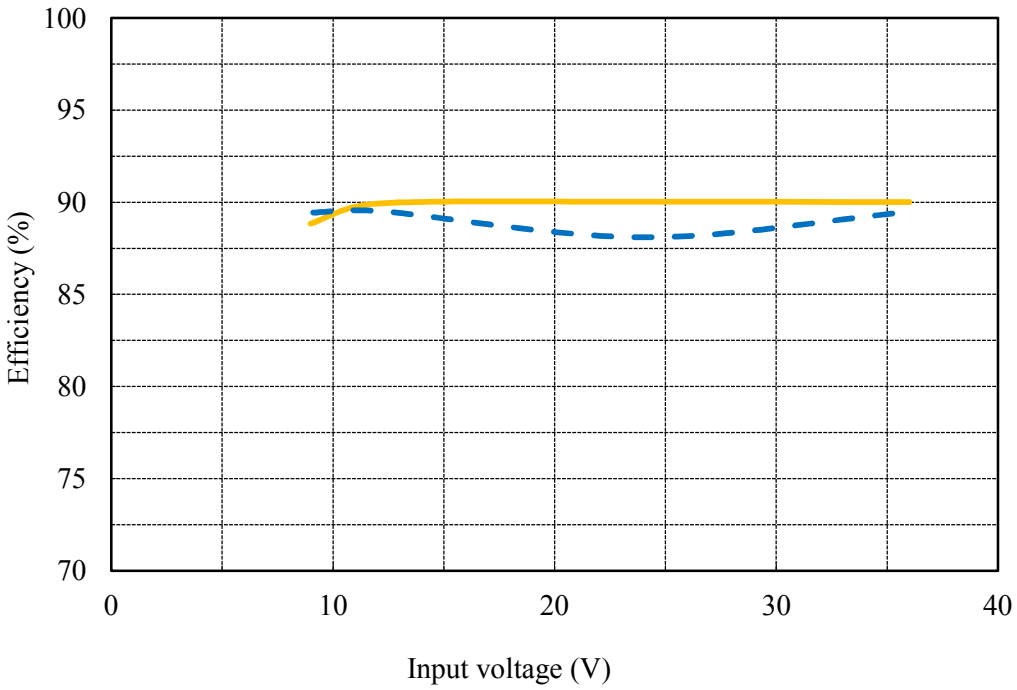
5V



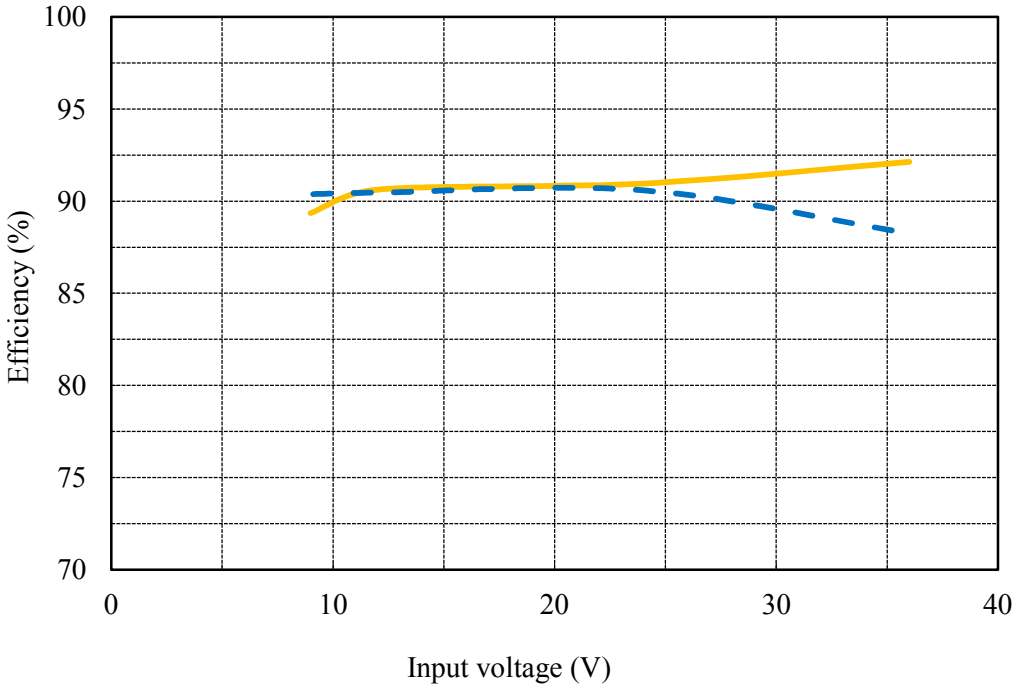
(4) 効率 対 入力電圧 Efficiency vs. Input voltage

Conditions Io : 50 %
: 100 %
Ta : 25 ℃

12V



15V



(5) 起動・遮断電圧特性 Start up and Drop out voltage characteristics

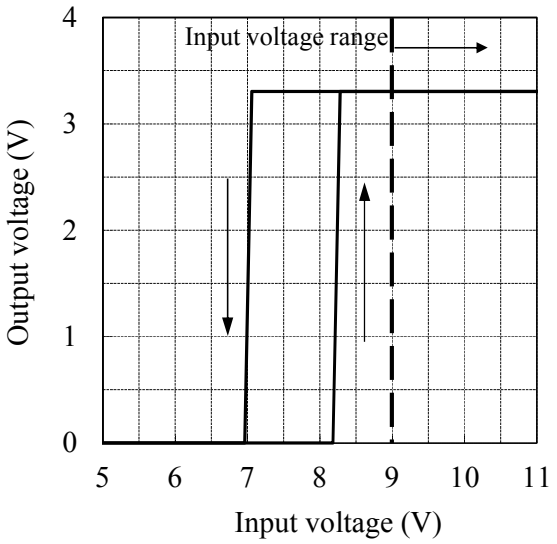
出力電圧 対 入力電圧

Output voltage vs. Input voltage

Conditions Io : 100 %

Ta : 25 ºC

3.3V



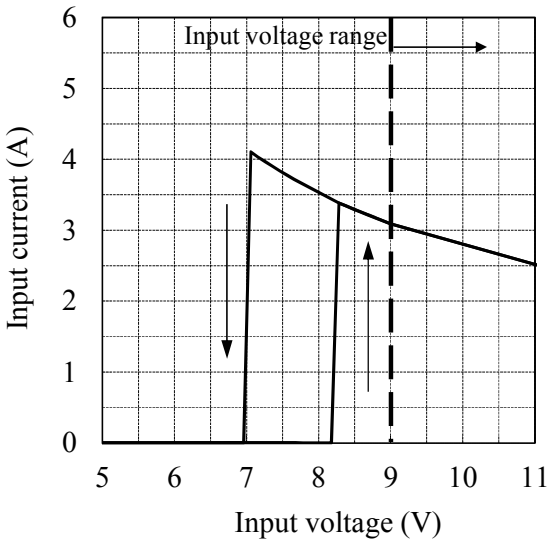
入力電流 対 入力電圧

Input current vs. Input voltage

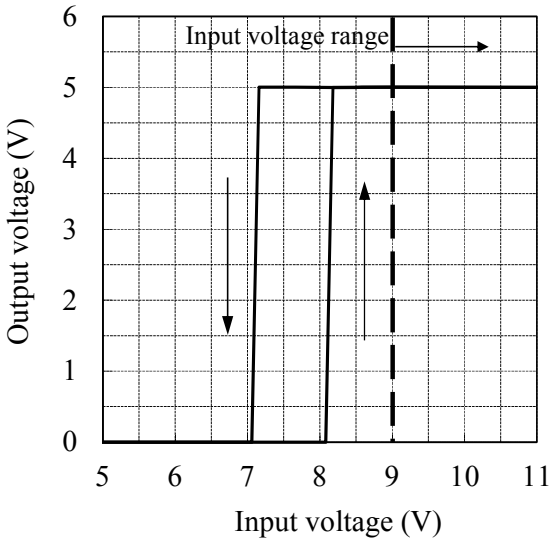
Conditions Io : 100 %

Ta : 25 ºC

3.3V



5V



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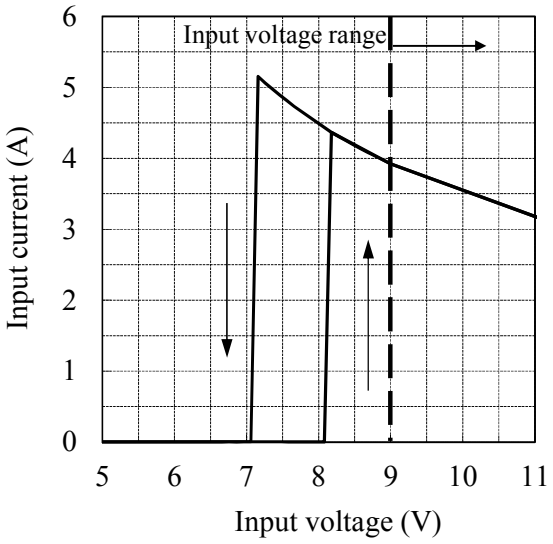


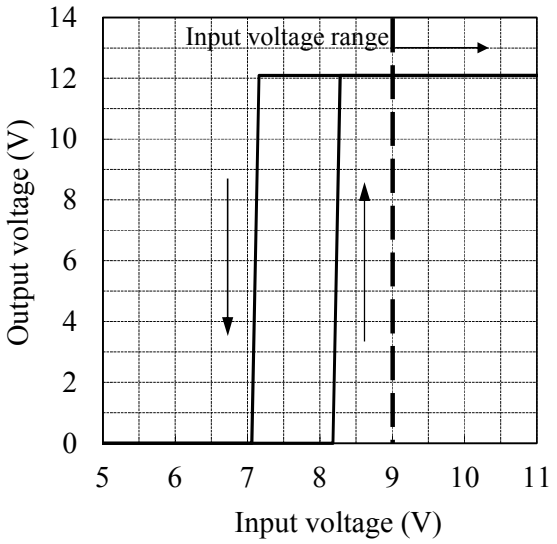
(5) 起動・遮断電圧特性 Start up and Drop out voltage characteristics

出力電圧 対 入力電圧

Output voltage vs. Input voltage

Conditions Io : 100 %
Ta : 25 ºC

12V

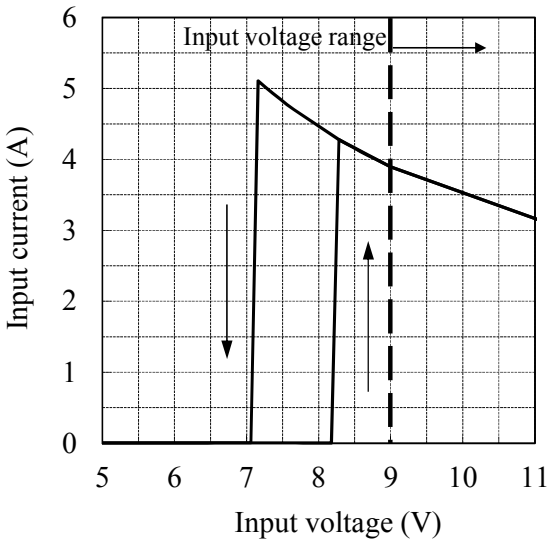


入力電流 対 入力電圧

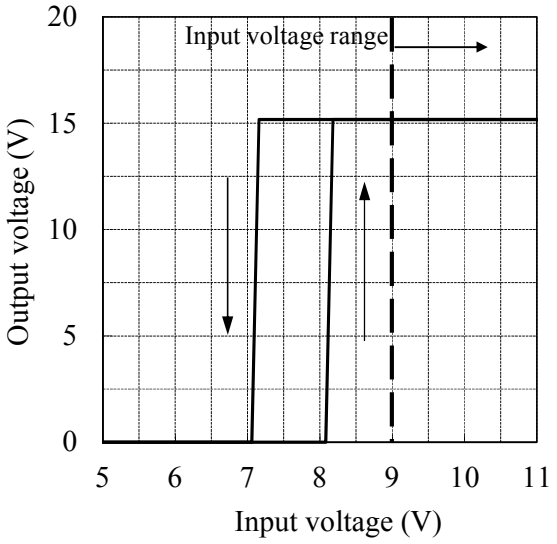
Input current vs. Input voltage

Conditions Io : 100 %
Ta : 25 ºC

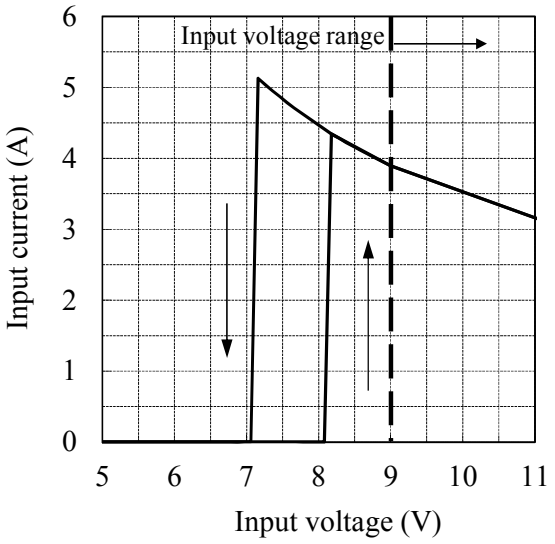
12V



15V



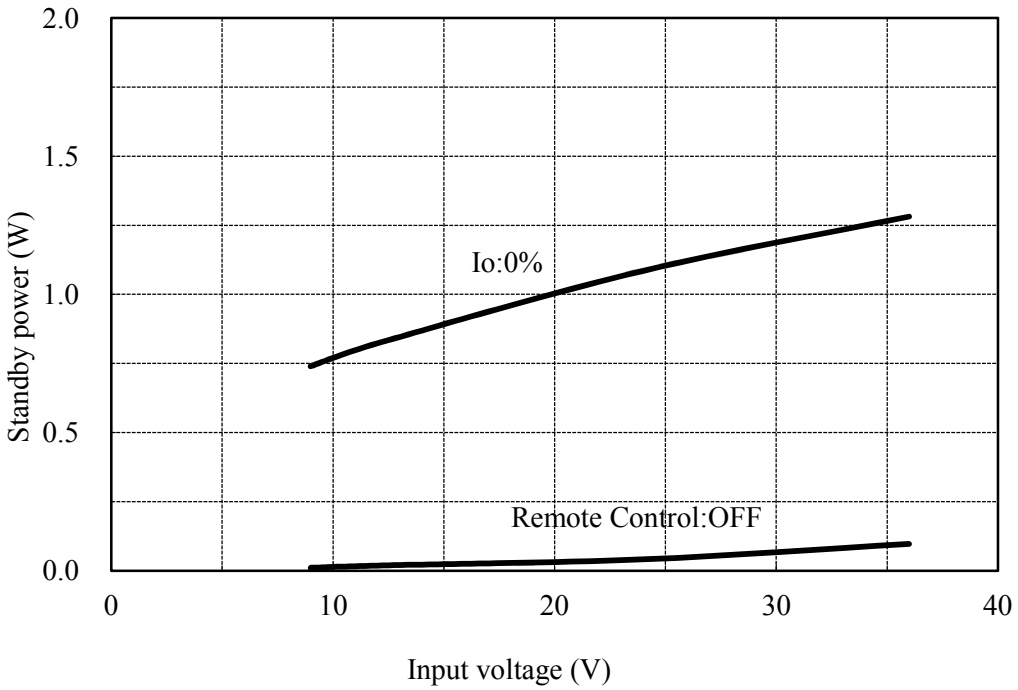
15V



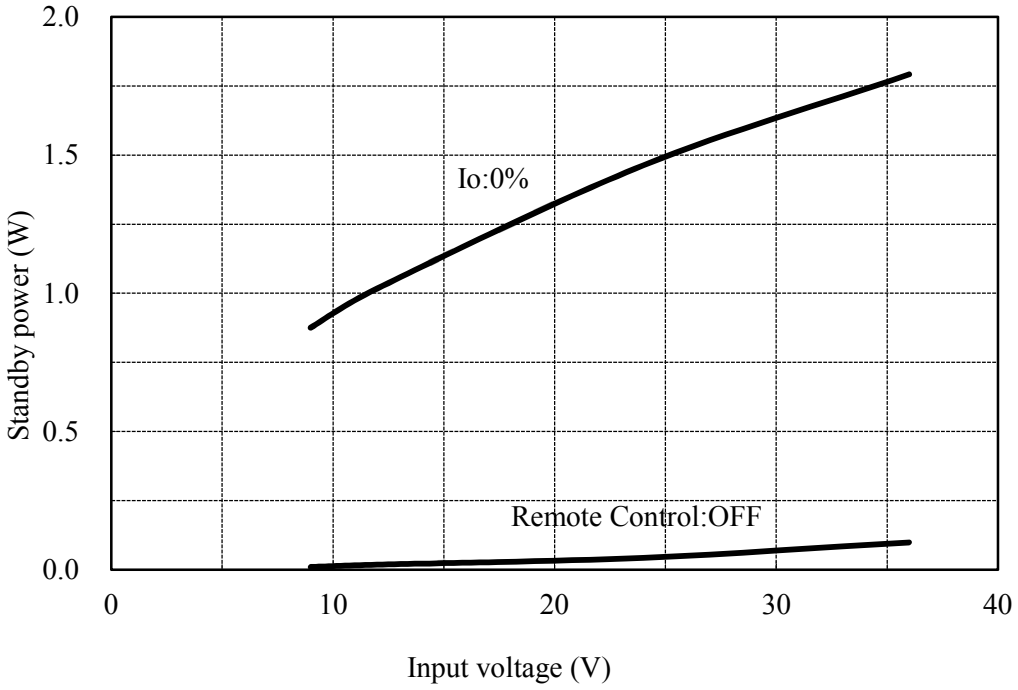
2-2. 待機電力特性 Standby power characteristics

Condition Ta : 25 ºC

3.3V



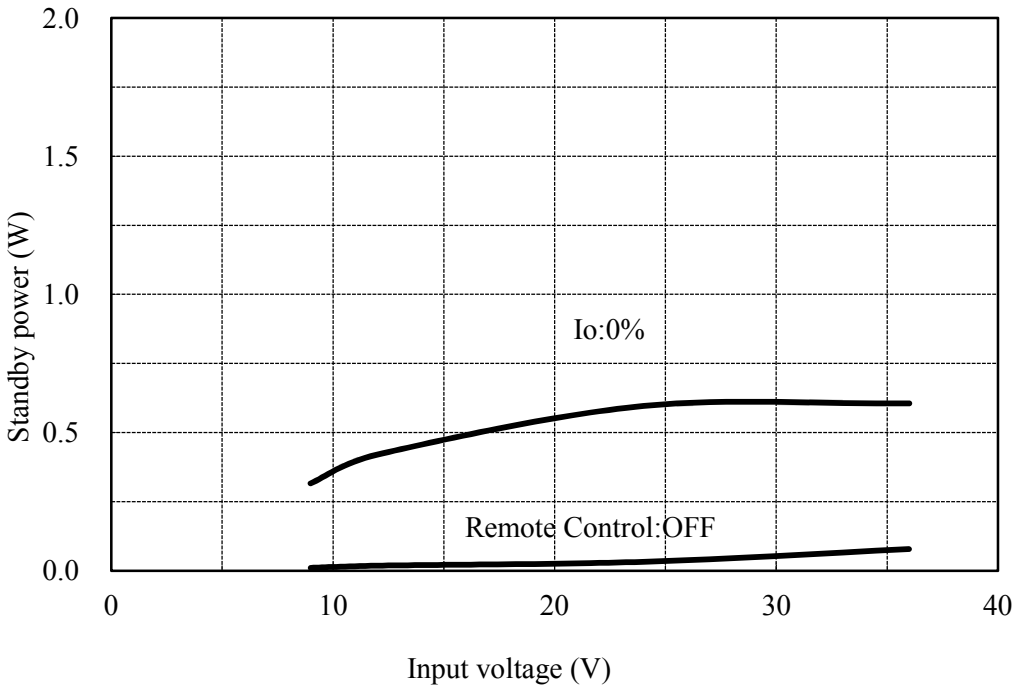
5V



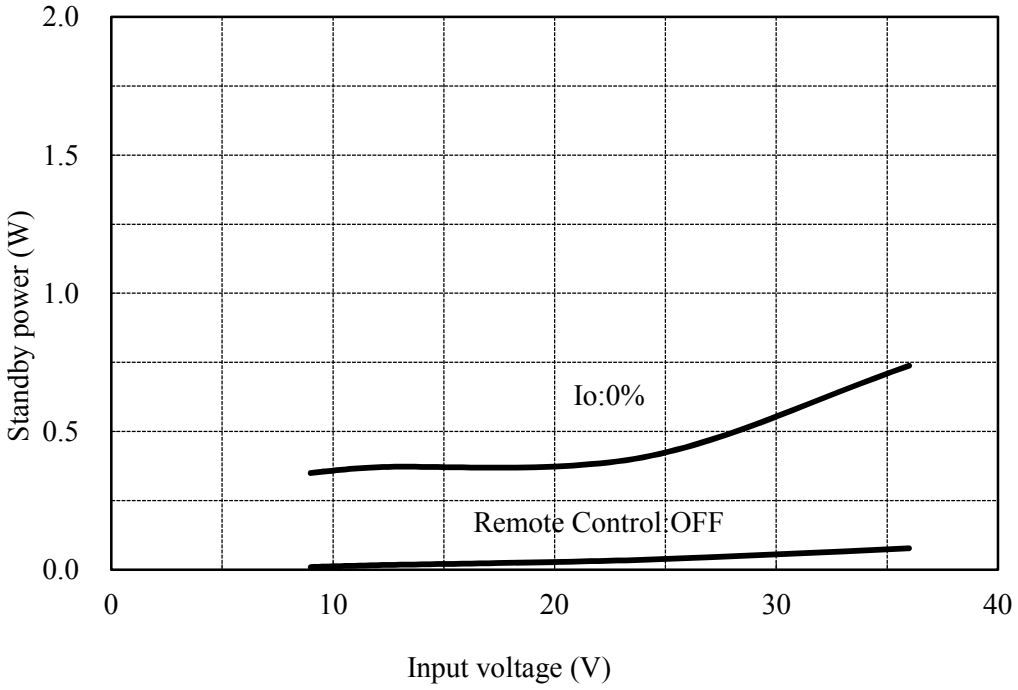
2-2. 待機電力特性 Standby power characteristics

Condition Ta : 25 ºC

12V



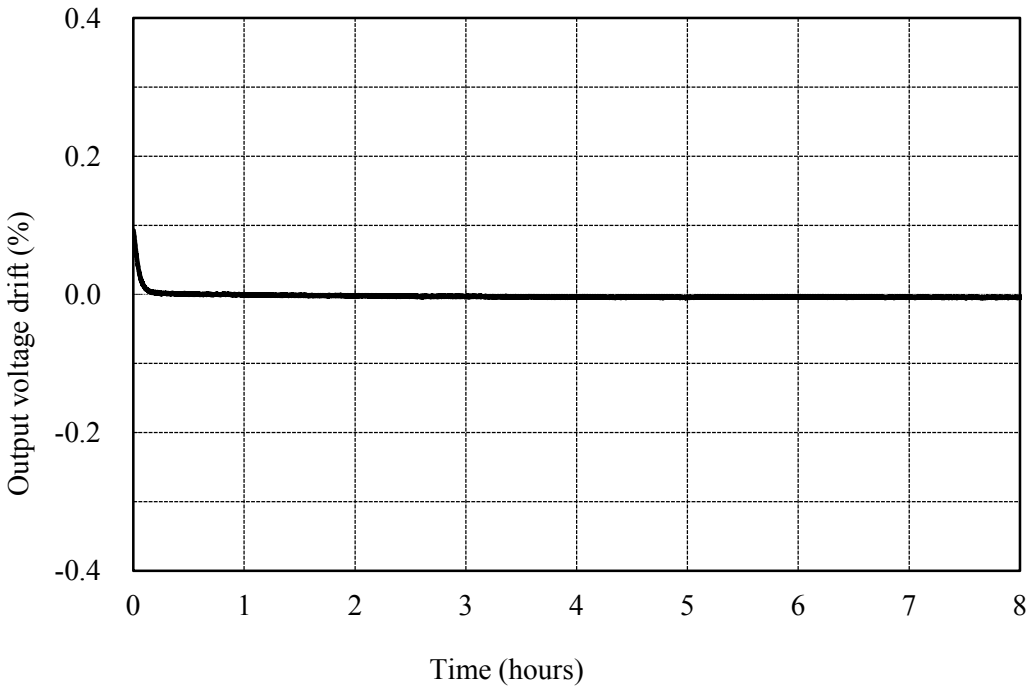
15V



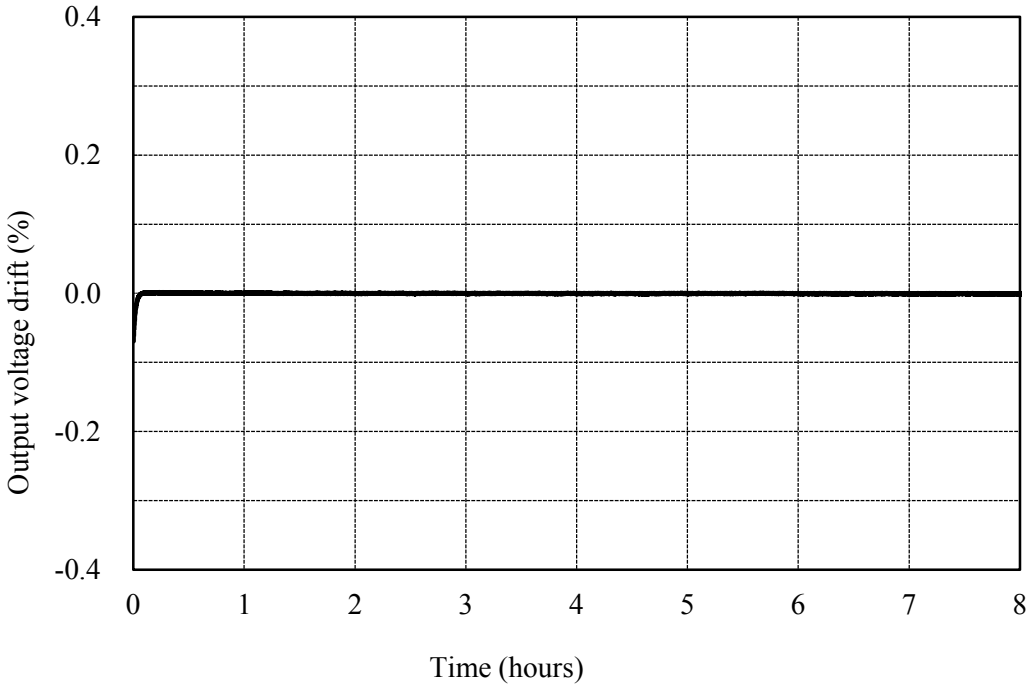
2-3. 通電ドリフト特性 Warm up voltage drift characteristics

Conditions Vin : 24 VDC
Io : 100 %
Ta : 25 ºC

3.3V



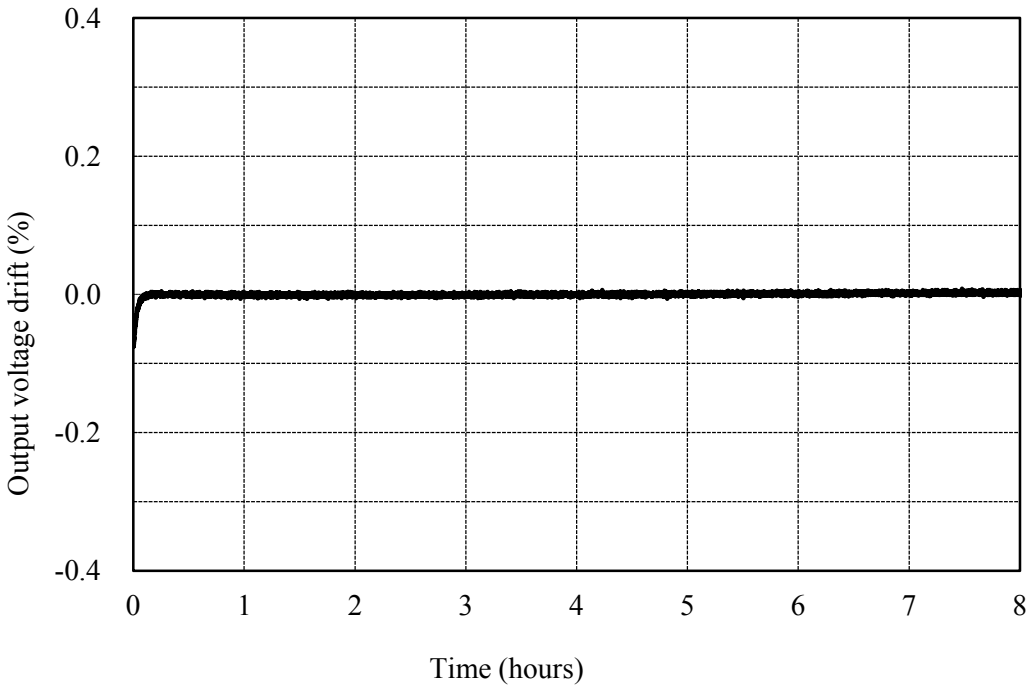
5V



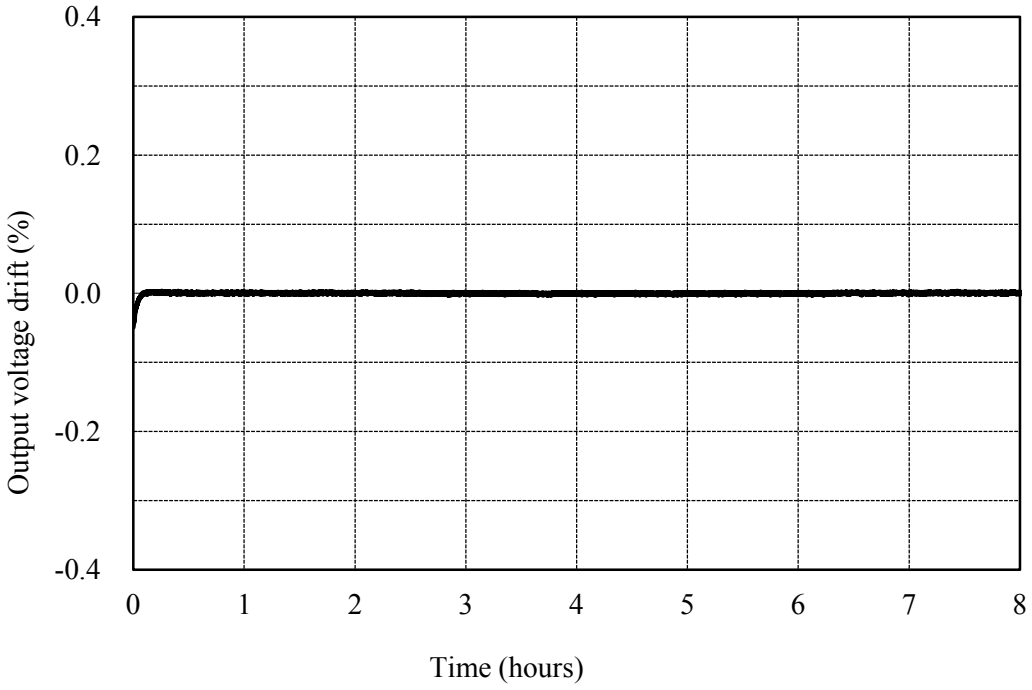
2-3. 通電ドリフト特性 Warm up voltage drift characteristics

Conditions Vin : 24 VDC
Io : 100 %
Ta : 25 ºC

12V



15V



2-4. 過電流保護特性 Over current protection (OCP) characteristics

入力電圧依存性

Input voltage dependence

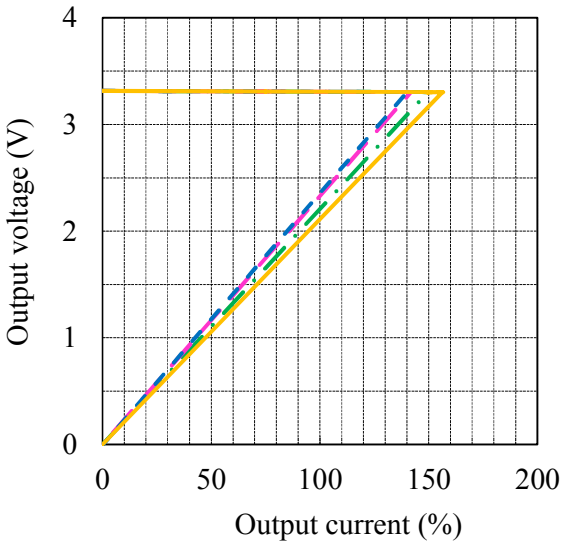
Conditions Vin : 9 VDC
: 12 VDC
: 24 VDC
: 36 VDC
Ta : 25 ℃

周囲温度依存性

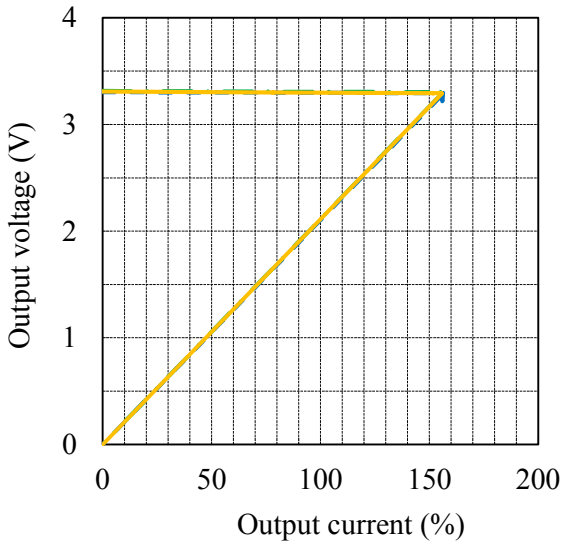
Ambient temperature dependence

Conditions Vin : 24 VDC
Ta : -40 ℃
25 ℃
85 ℃

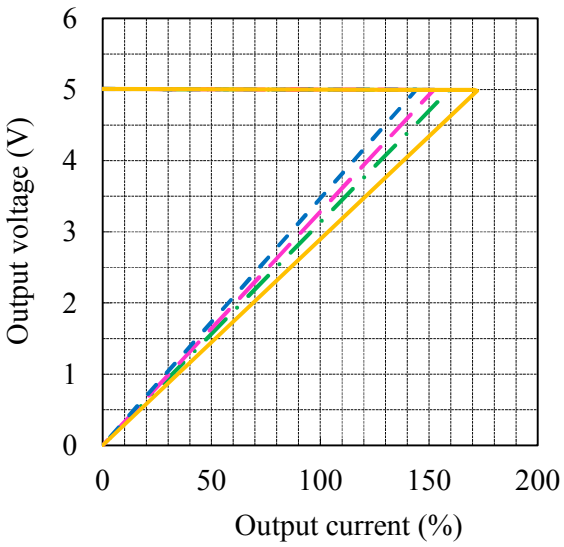
3.3V



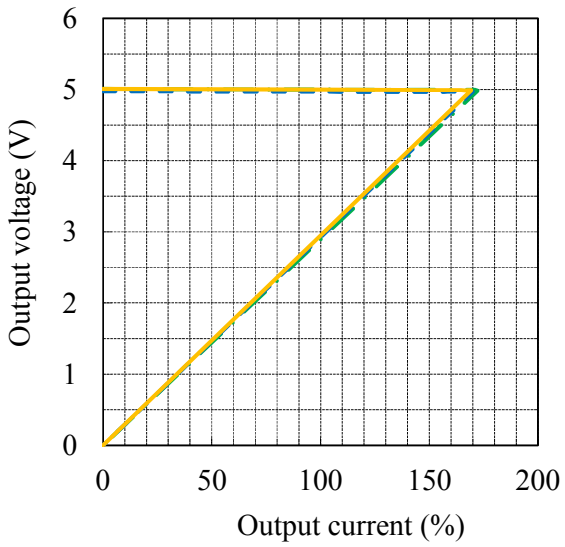
3.3V



5V



5V



2-4. 過電流保護特性 Over current protection (OCP) characteristics

入力電圧依存性

Input voltage dependence

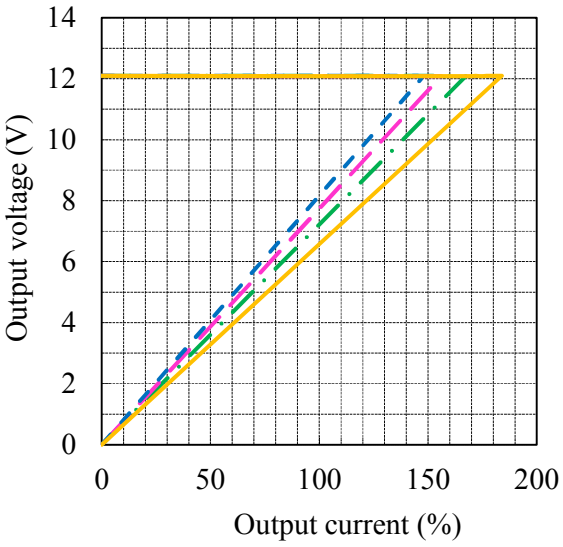
Conditions Vin : 9 VDC
: 12 VDC
: 24 VDC
: 36 VDC
Ta : 25 ℃

周囲温度依存性

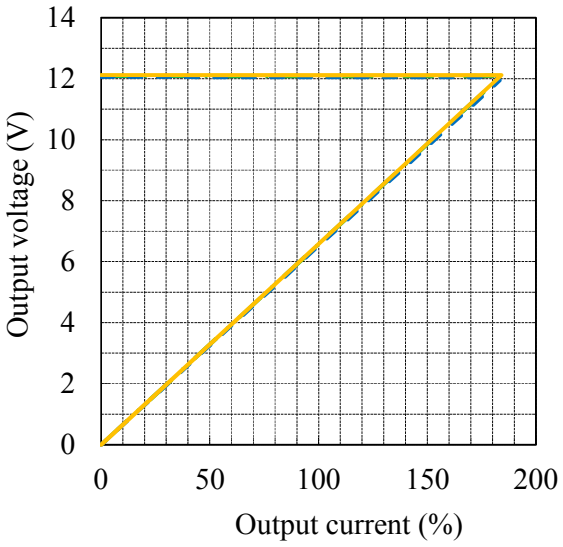
Ambient temperature dependence

Conditions Vin : 24 VDC
Ta : -40 ℃
25 ℃
85 ℃

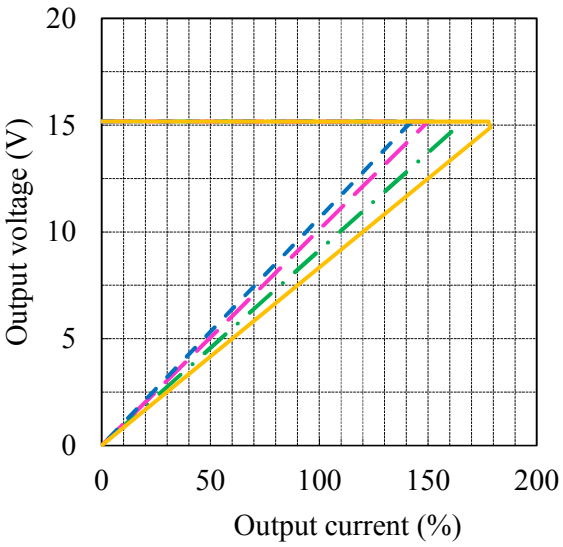
12V



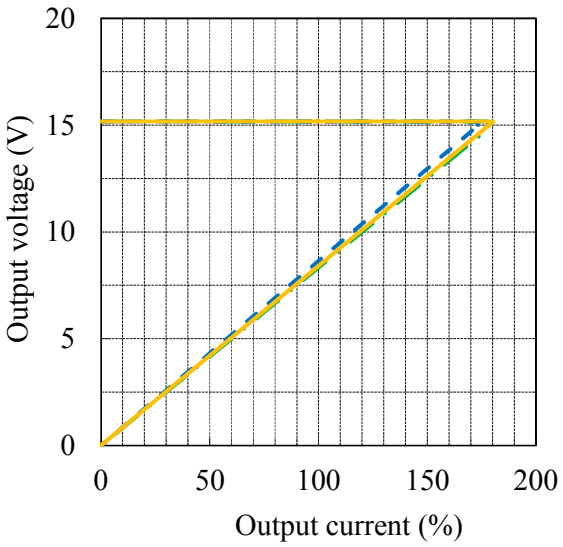
12V



15V



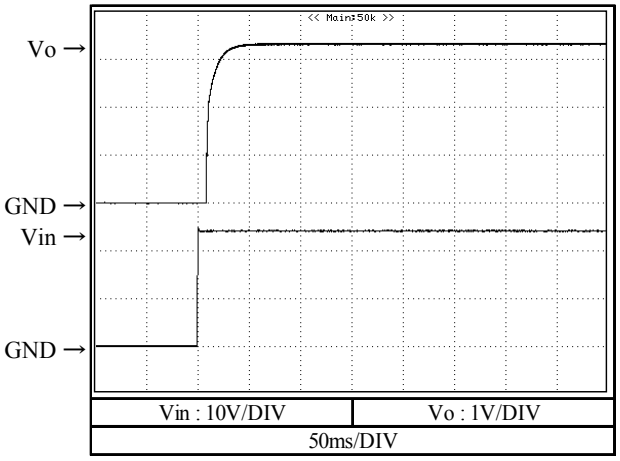
15V

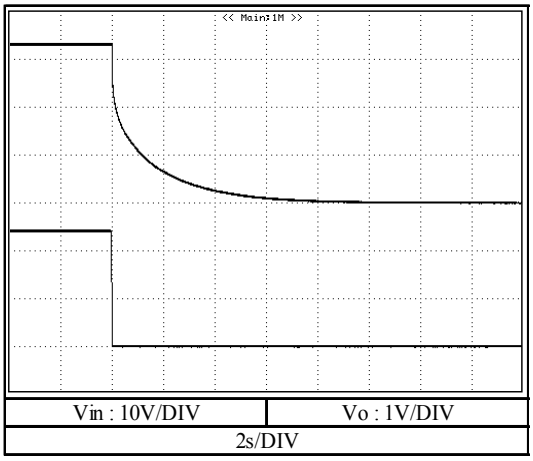


2-5. 出力立ち上がり・立ち下がり特性 Output rise and fall characteristics

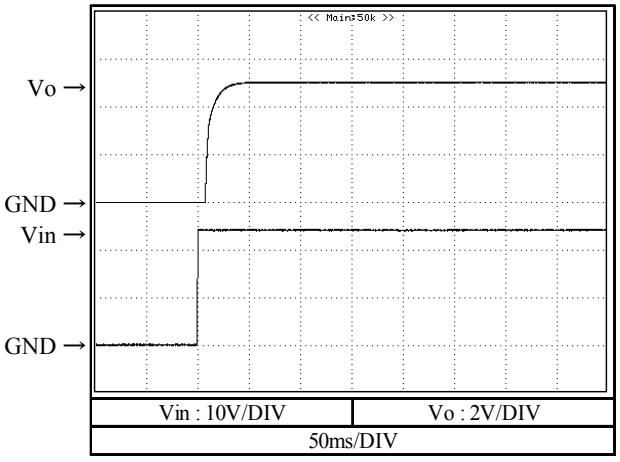
Conditions Vin : 24 VDC
Io : 0 %
Ta : 25 ºC

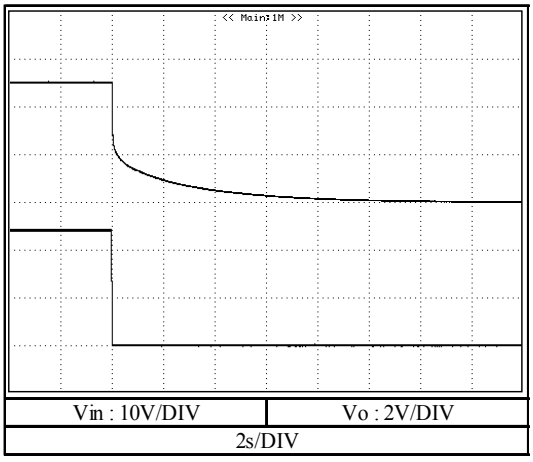
3.3V





5V

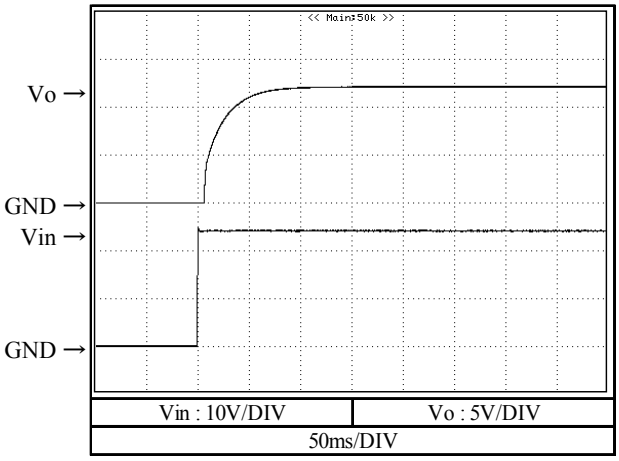


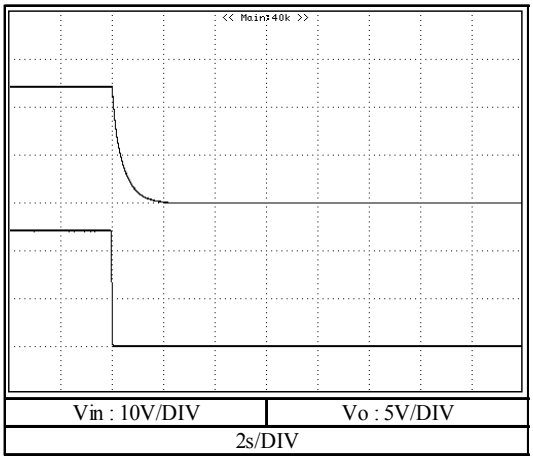


2-5. 出力立ち上がり・立ち下がり特性 Output rise and fall characteristics

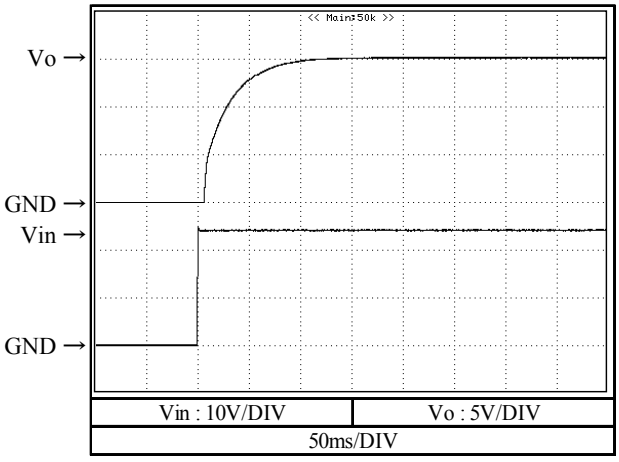
Conditions Vin : 24 VDC
Io : 0 %
Ta : 25 ºC

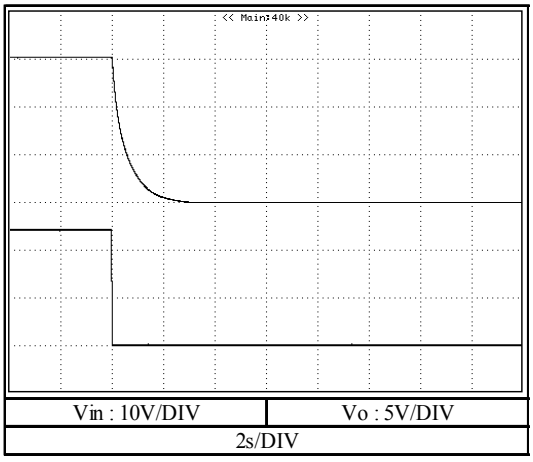
12V





15V

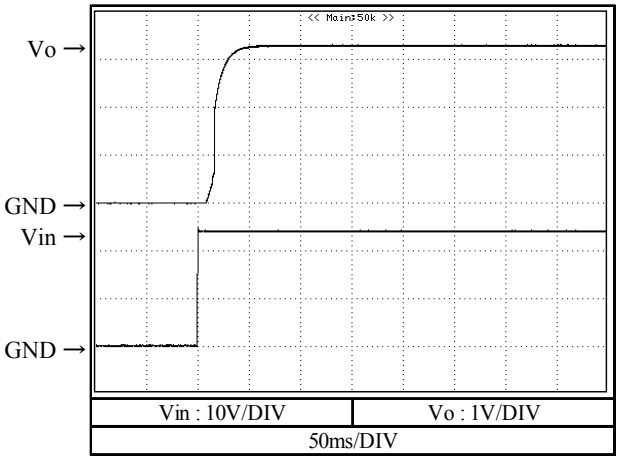


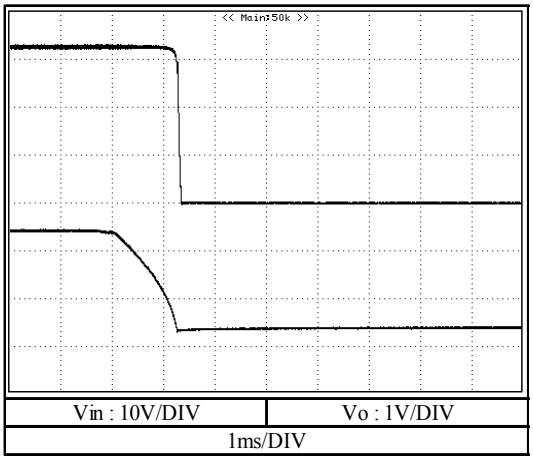


2-5. 出力立ち上がり・立ち下がり特性 Output rise and fall characteristics

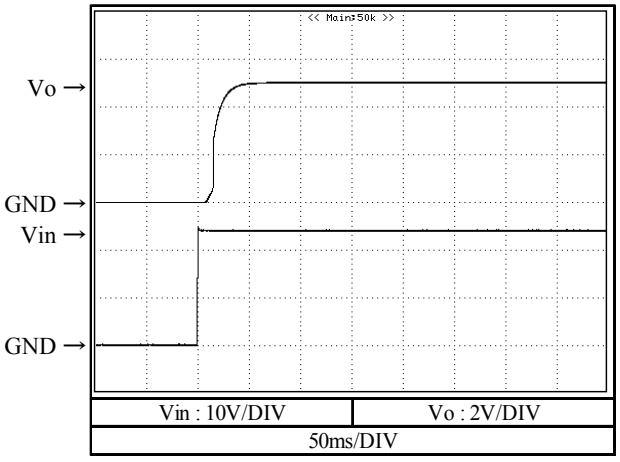
Conditions Vin : 24 VDC
Io : 100 %
Ta : 25 ºC

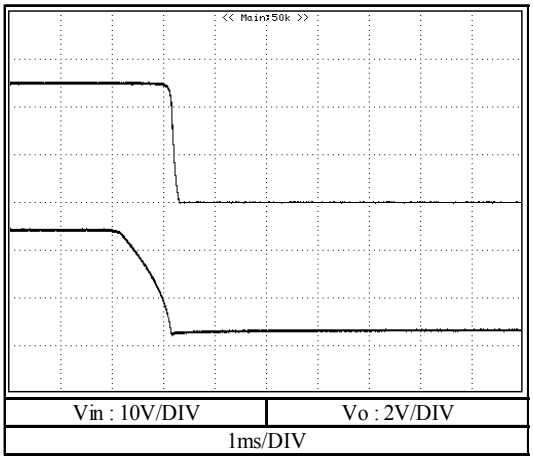
3.3V





5V

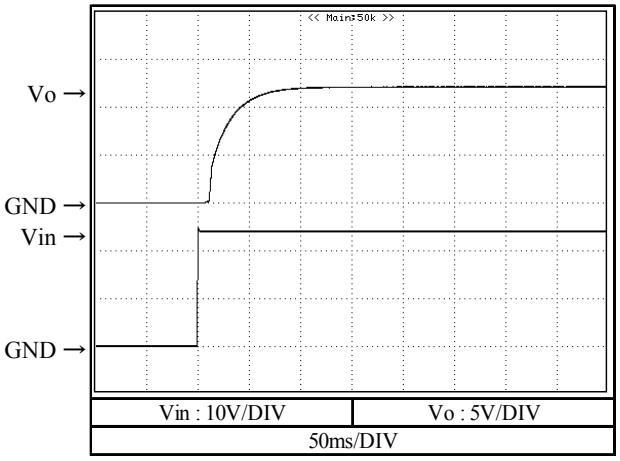


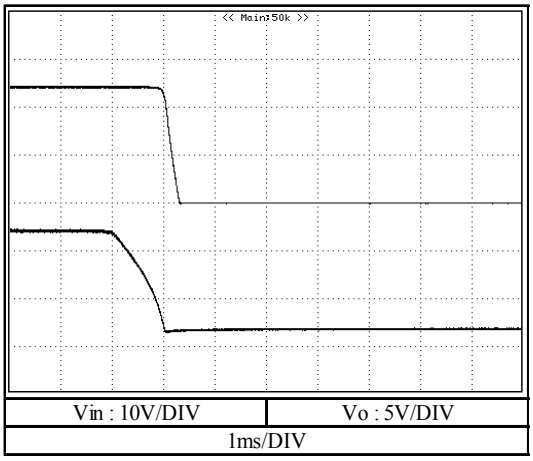


2-5. 出力立ち上がり・立ち下がり特性 Output rise and fall characteristics

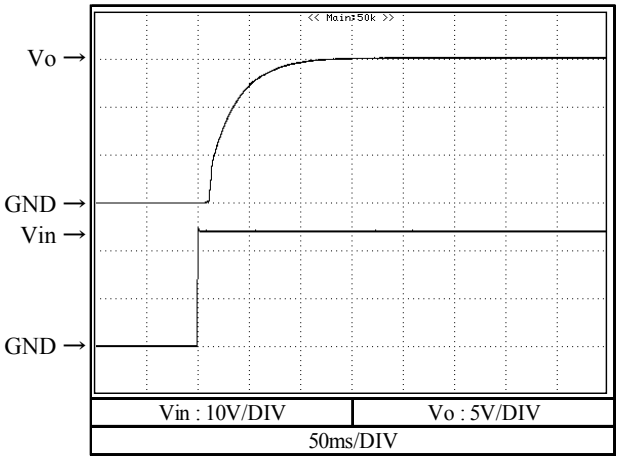
Conditions Vin : 24 VDC
Io : 100 %
Ta : 25 ºC

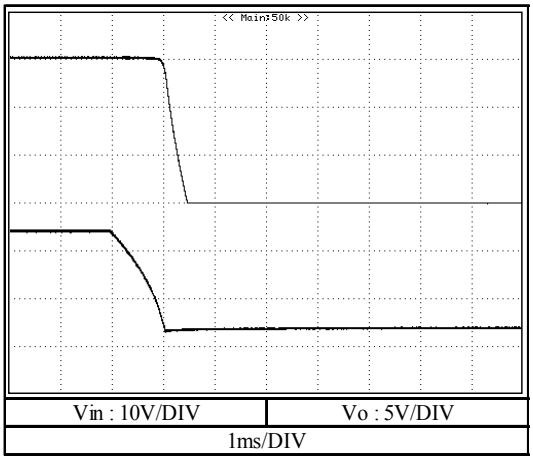
12V





15V



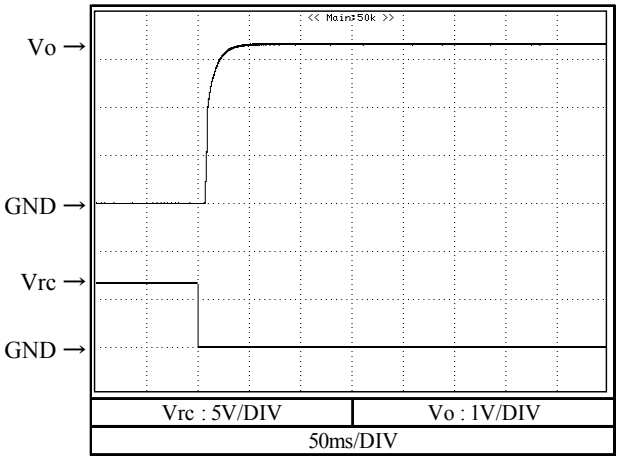


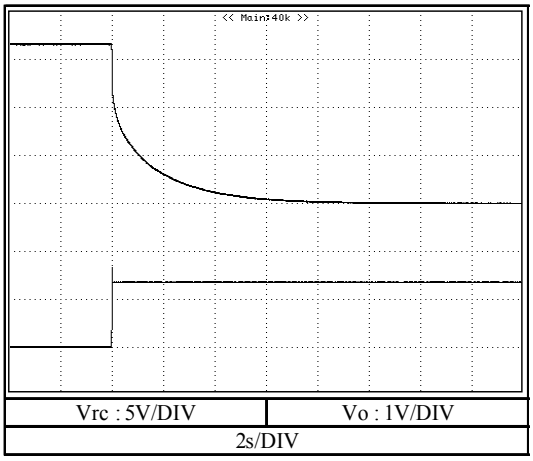
2-5. 出力立ち上がり・立ち下がり特性 (リモートON/OFFコントロール時)

Output rise and fall characteristics with REMOTE ON/OFF CONTROL

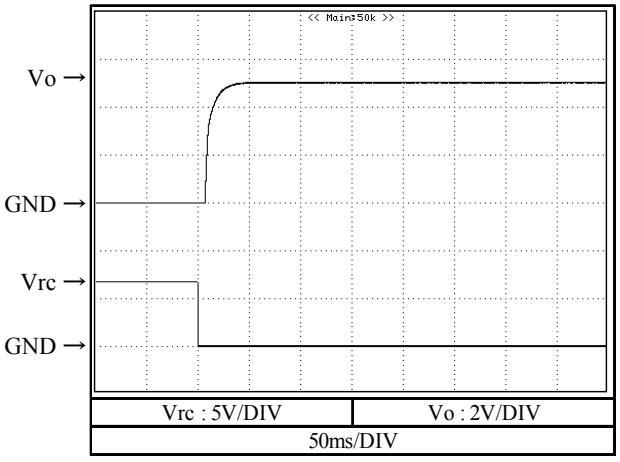
Conditions Vin : 24 VDC
Io : 0 %
Ta : 25 ºC

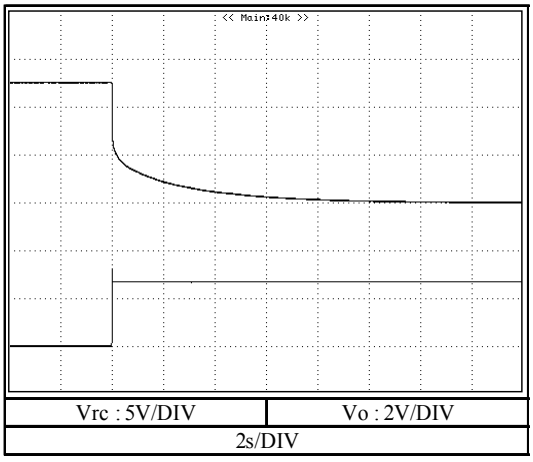
3.3V





5V



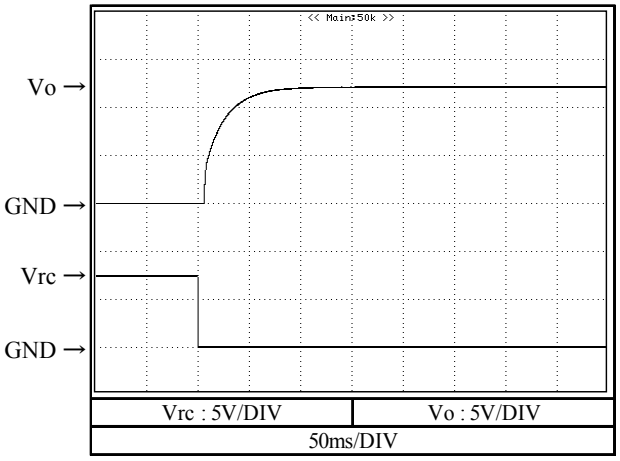


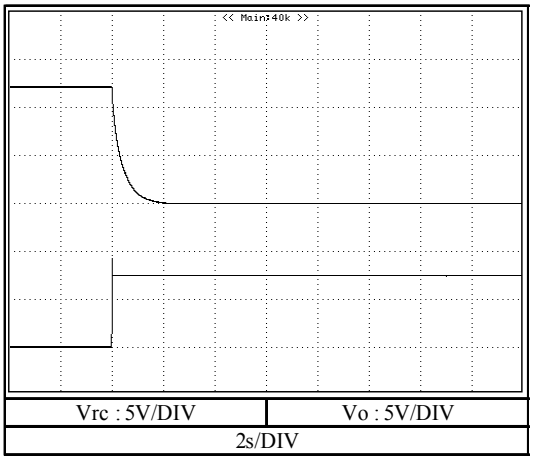
2-5. 出力立ち上がり・立ち下がり特性 (リモートON/OFFコントロール時)

Output rise and fall characteristics with REMOTE ON/OFF CONTROL

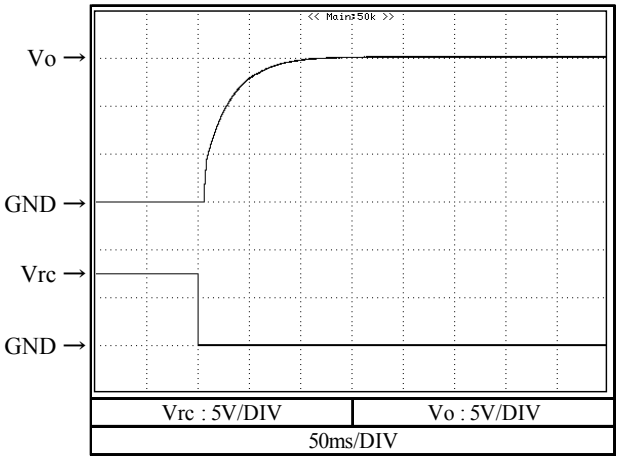
Conditions Vin : 24 VDC
Io : 0 %
Ta : 25 ºC

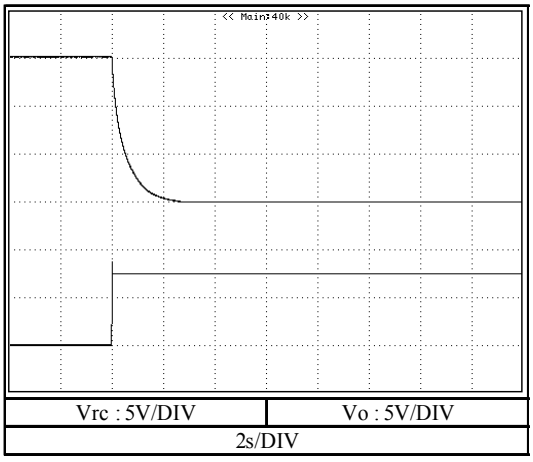
12V





15V



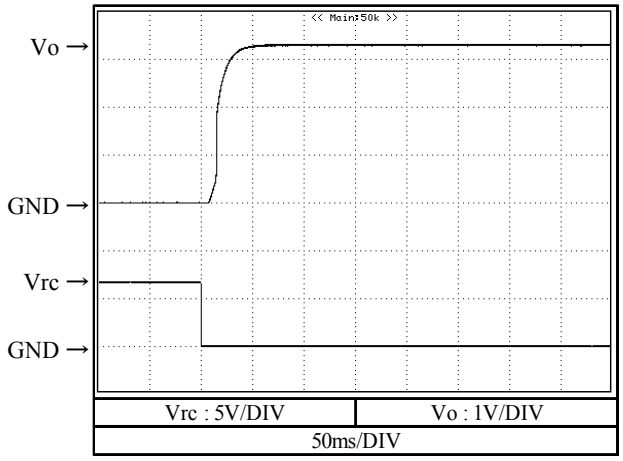


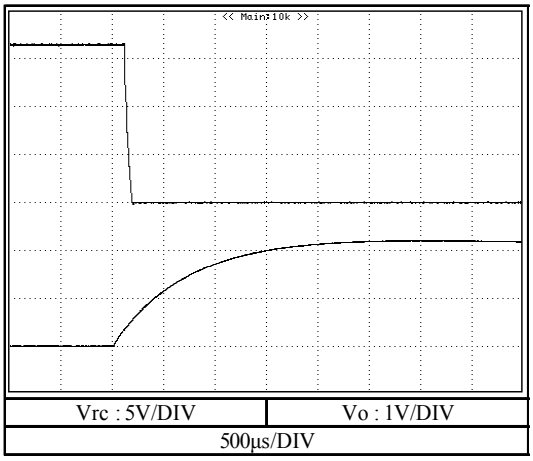
2-5. 出力立ち上がり・立ち下がり特性 (リモートON/OFFコントロール時)

Output rise and fall characteristics with REMOTE ON/OFF CONTROL

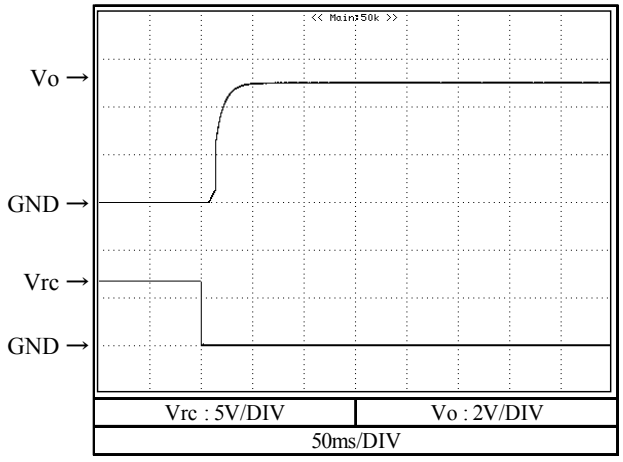
Conditions Vin : 24 VDC
Io : 100 %
Ta : 25 ºC

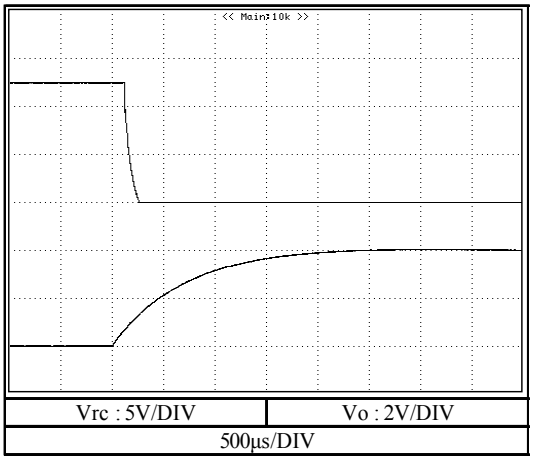
3.3V





5V



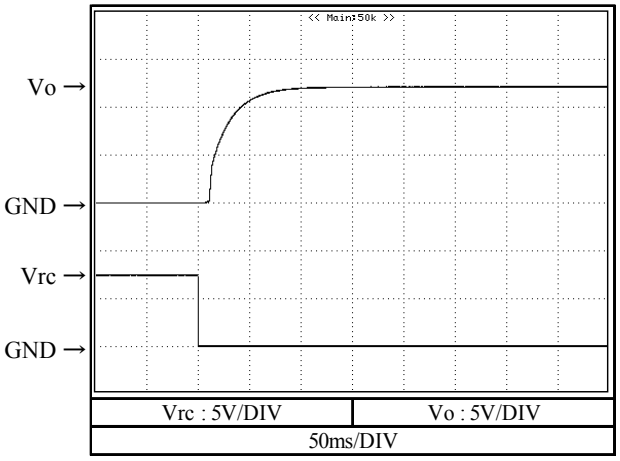


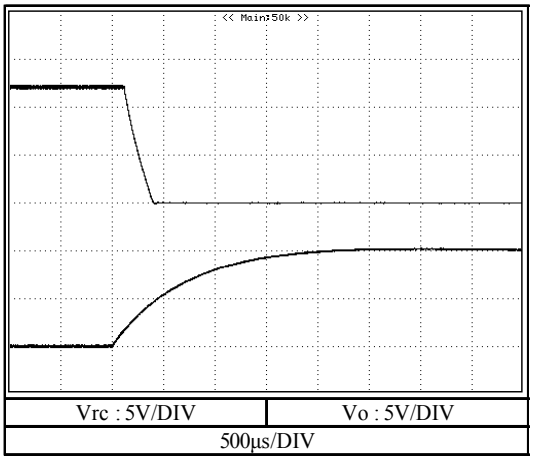
2-5. 出力立ち上がり・立ち下がり特性 (リモートON/OFFコントロール時)

Output rise and fall characteristics with REMOTE ON/OFF CONTROL

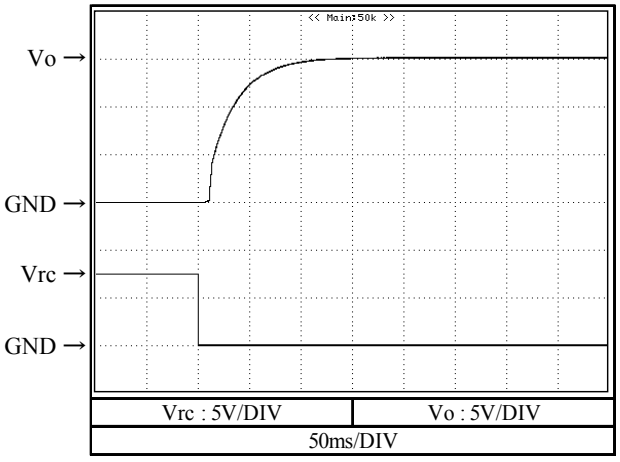
Conditions Vin : 24 VDC
Io : 100 %
Ta : 25 ºC

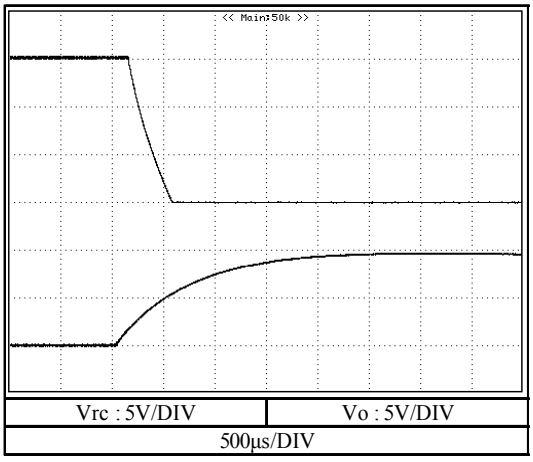
12V





15V

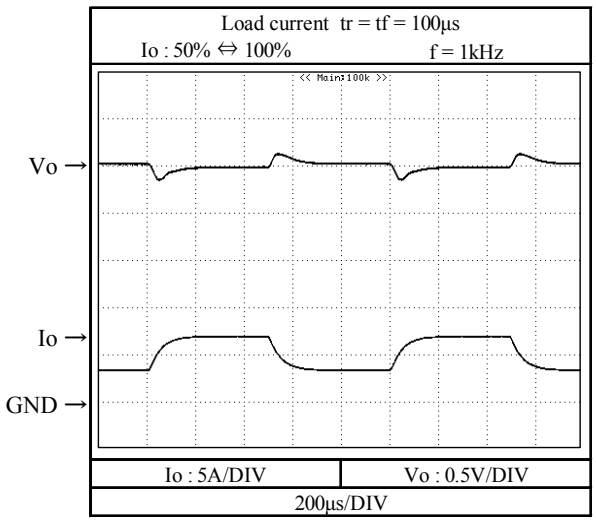




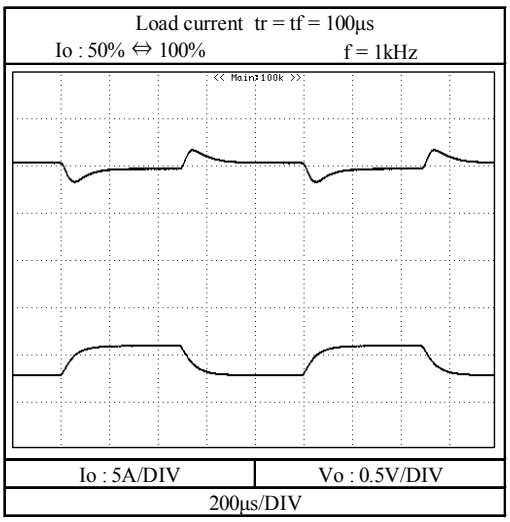
2-6. 過渡応答(負荷急変)特性 Dynamic load response characteristics

Conditions Vin : 24 VDC
Io : 100 %
Ta : 25 ºC

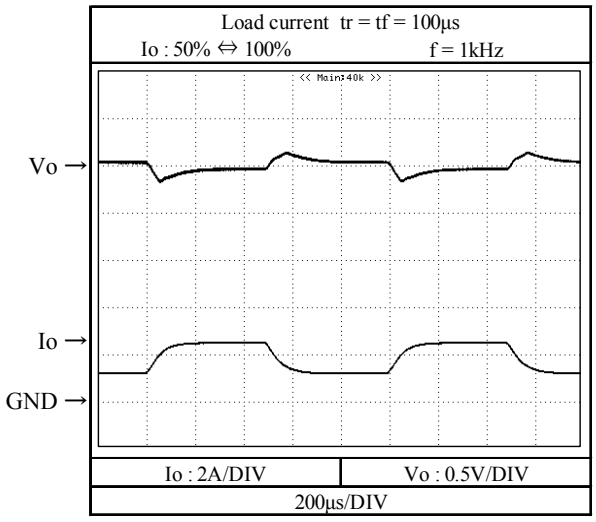
3.3V



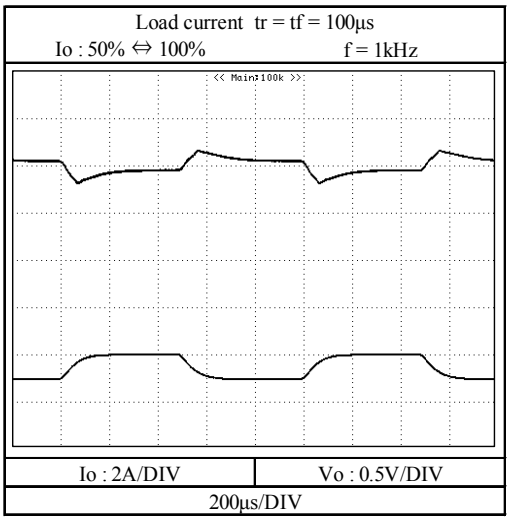
5V



12V



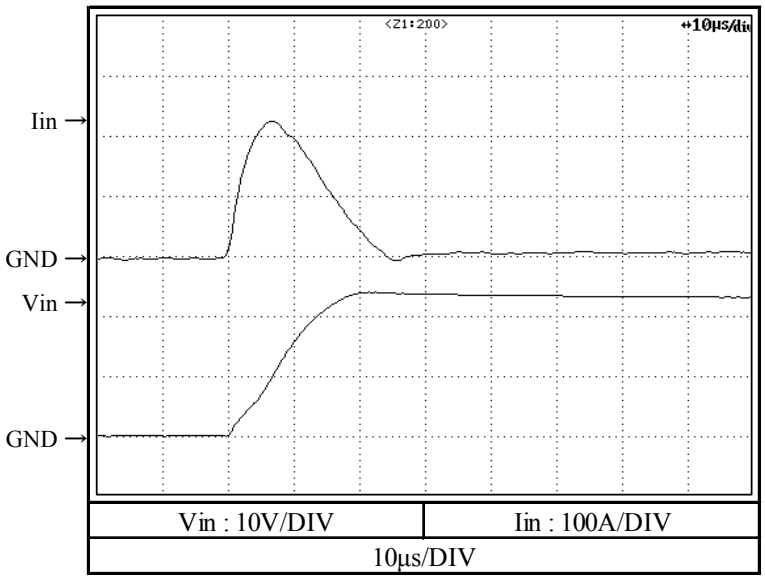
15V



2-7. 入力サージ電流(突入電流)特性 Inrush current characteristics

Conditions Vin : 24 VDC
Io : 100 %
Ta : 25 ºC

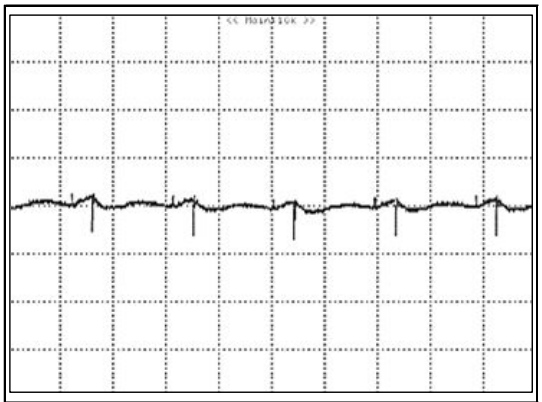
5V



2-8. 出力リップル、ノイズ波形 Output ripple and noise waveform

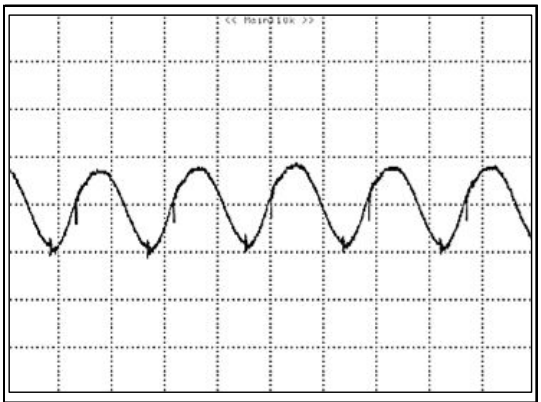
Conditions Vin : 24 VDC
Io : 100 %
Ta : 25 ºC

3.3V



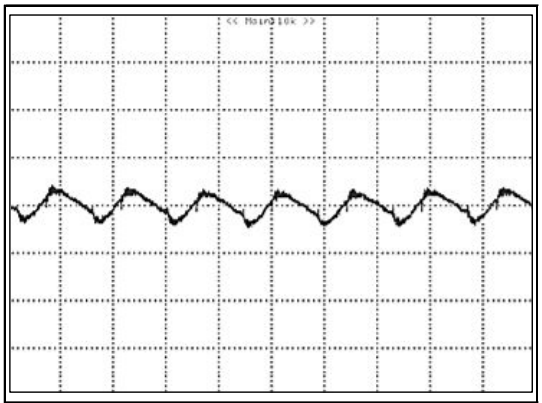
10mV/DIV | 2µs/DIV

5V



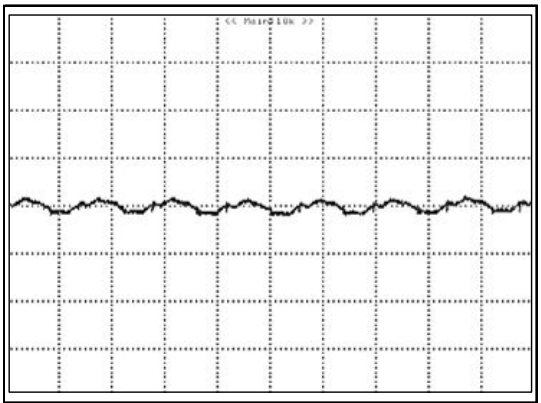
10mV/DIV | 2µs/DIV

12V



10mV/DIV | 2µs/DIV

15V



10mV/DIV | 2µs/DIV

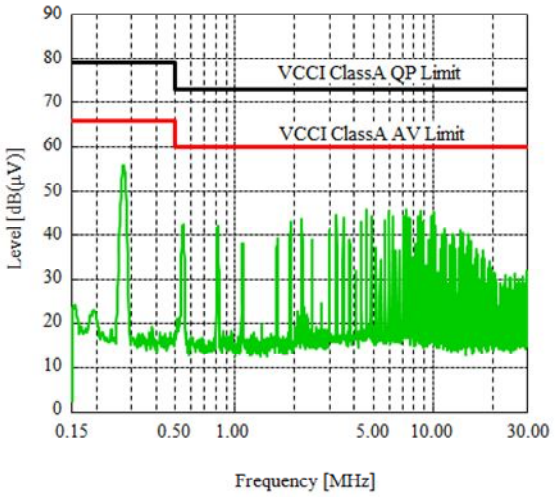
2-9. EMI特性 Electro-Magnetic Interference characteristics

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

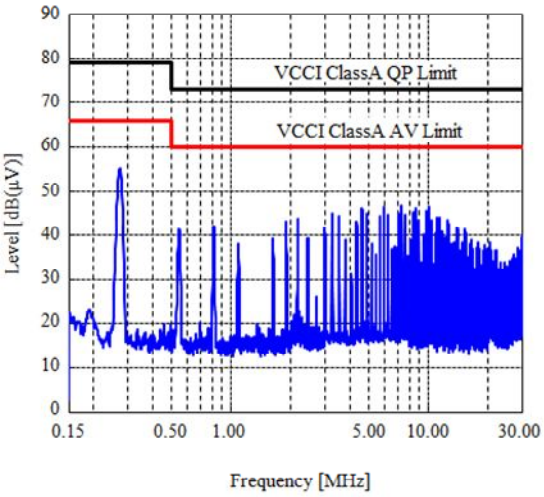
Conditions Vin : 24 VDC
Io : 100 %
Ta : 25 ºC

3.3V

+Vin

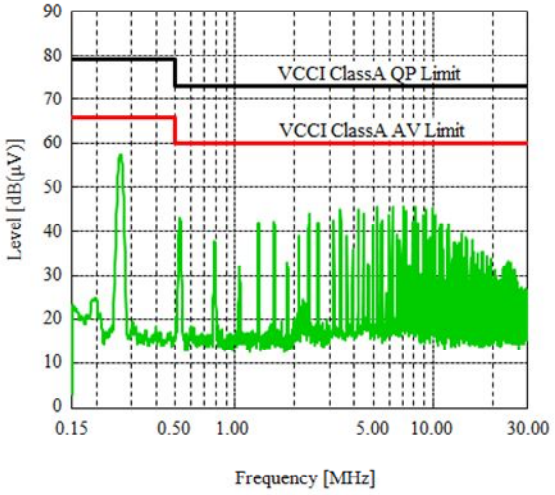


-Vin

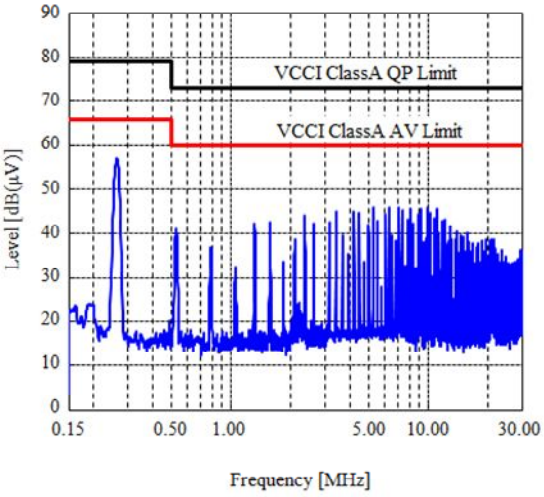


5V

+Vin



-Vin



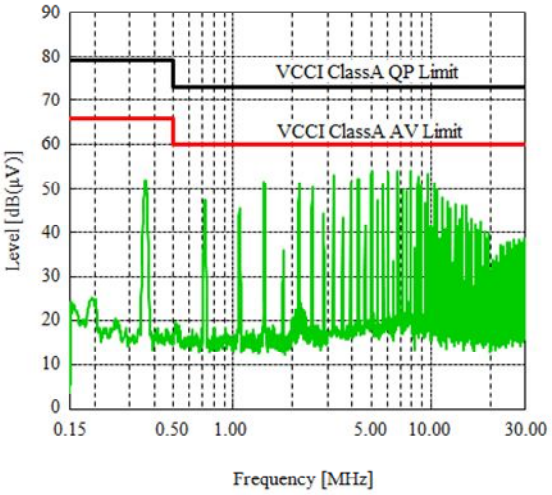
2-9. EMI特性 Electro-Magnetic Interference characteristics

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

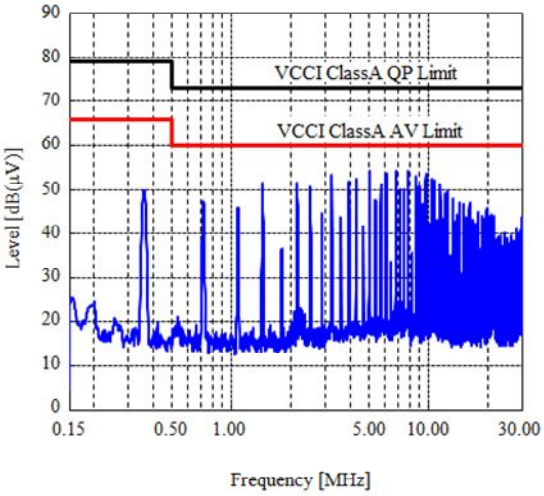
Conditions Vin : 24 VDC
Io : 100 %
Ta : 25 ºC

12V

+Vin

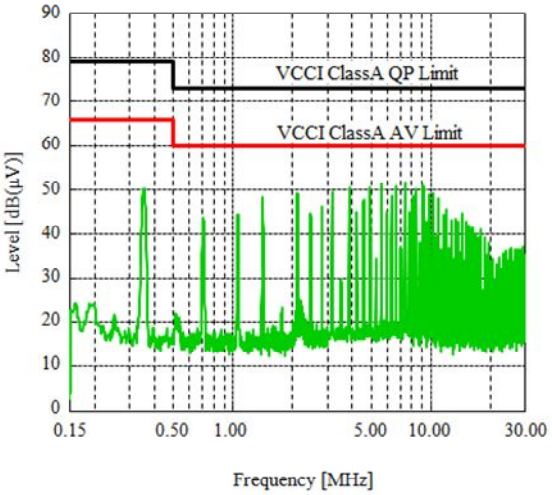


-Vin

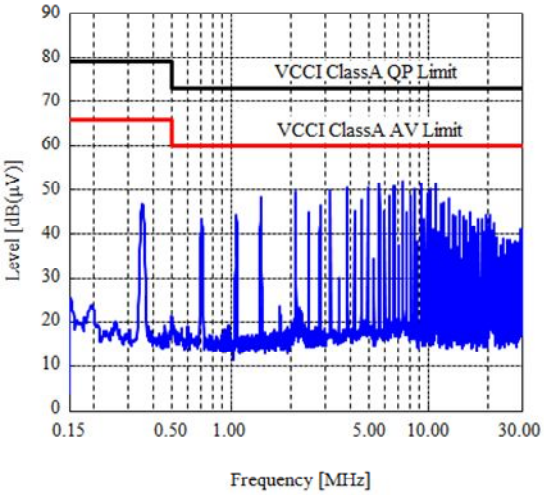


15V

+Vin



-Vin



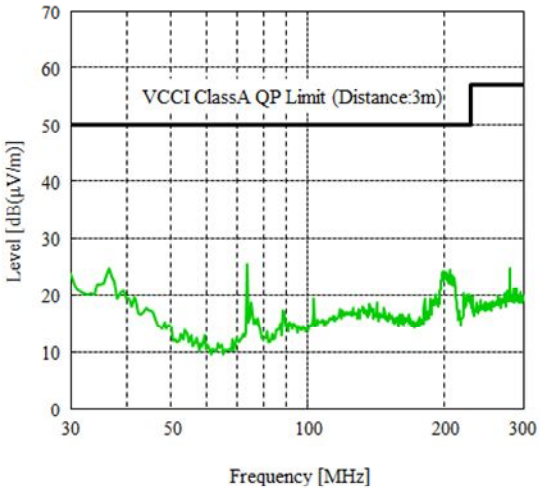
2-9. EMI特性 Electro-Magnetic Interference characteristics

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

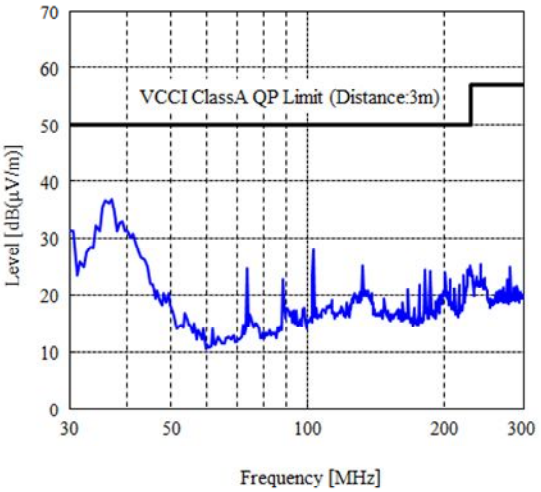
Conditions Vin : 24 VDC
Io : 100 %
Ta : 25 ºC

3.3V

HORIZONTAL

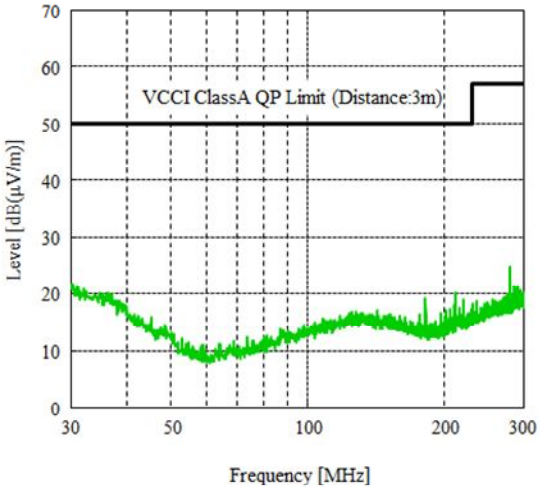


VERTICAL

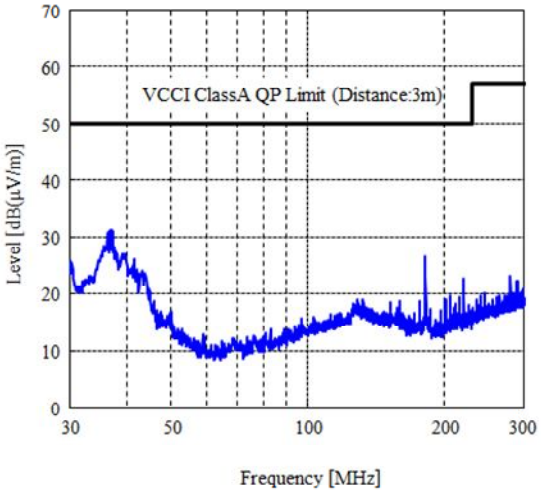


5V

HORIZONTAL



VERTICAL



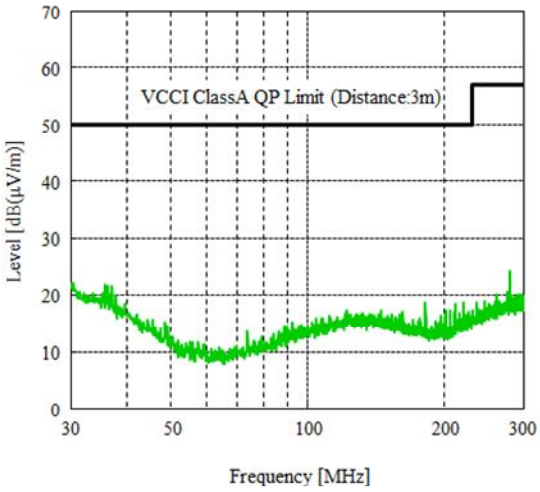
2-9. EMI特性 Electro-Magnetic Interference characteristics

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

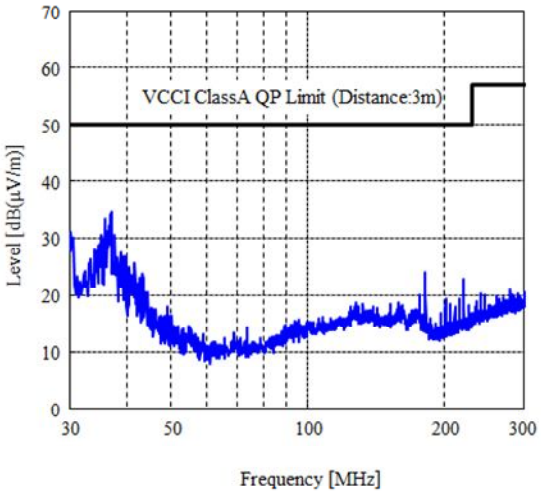
Conditions Vin : 24 VDC
Io : 100 %
Ta : 25 ºC

12V

HORIZONTAL

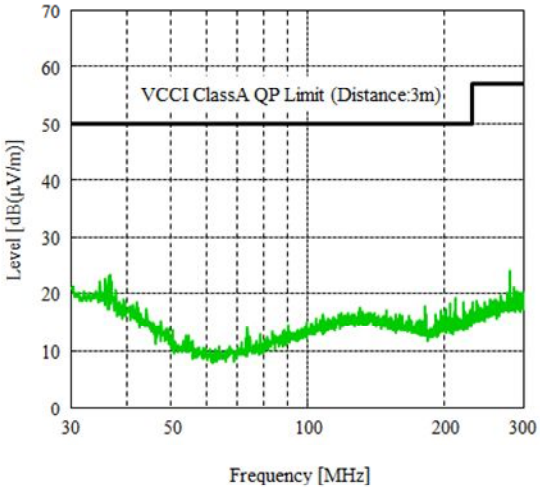


VERTICAL



15V

HORIZONTAL



VERTICAL