CCG3-24-xxD

EVALUATION DATA

型式データ

INDEX

使用記号 Terminology used

		定義 Definition	
Vin	・・・・・	入力電圧	Input voltage
+Vo, -Vo	・・・・・	出力電圧	Output voltage
V_{RC}	・・・・・	RC電圧	RC voltage
Iin	・・・・・	入力電流	Input current
+Io, -Io	・・・・・	出力電流	Output current
Ta	・・・・・	周囲温度	Ambient temperature
f	・・・・・	周波数	Frequency

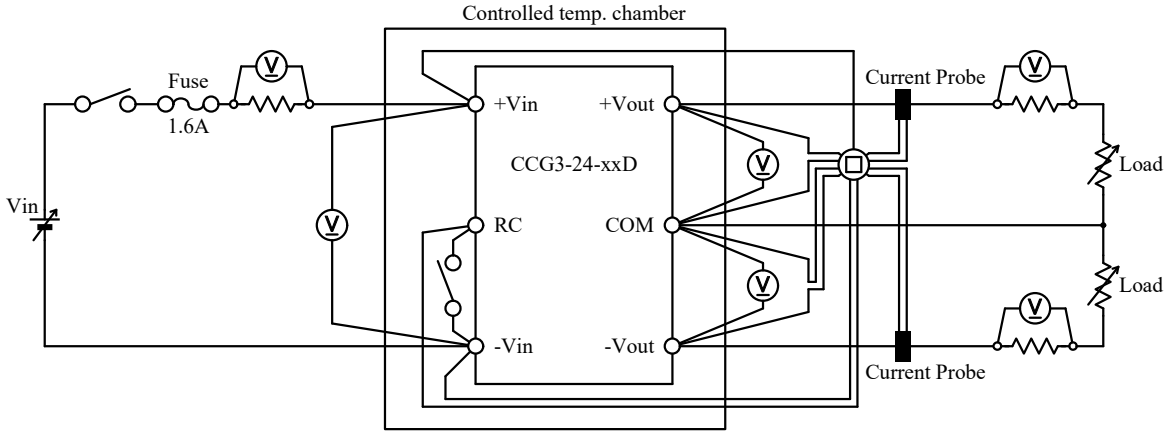
※ 当社測定条件における結果であり、参考値としてお考え願います。
Test results are reference data based on our measurement condition.

1. 測定方法 Evaluation Method

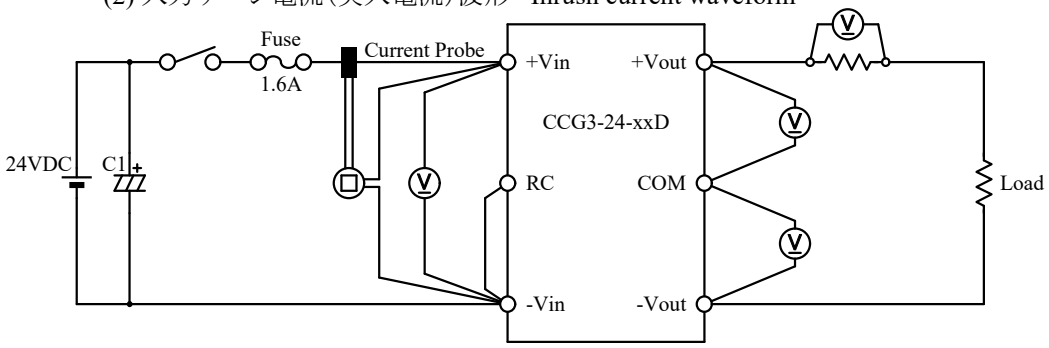
1-1. 測定回路 Measurement Circuits

(1) 静特性 、待機電力特性、通電ドリフト特性、その他特性

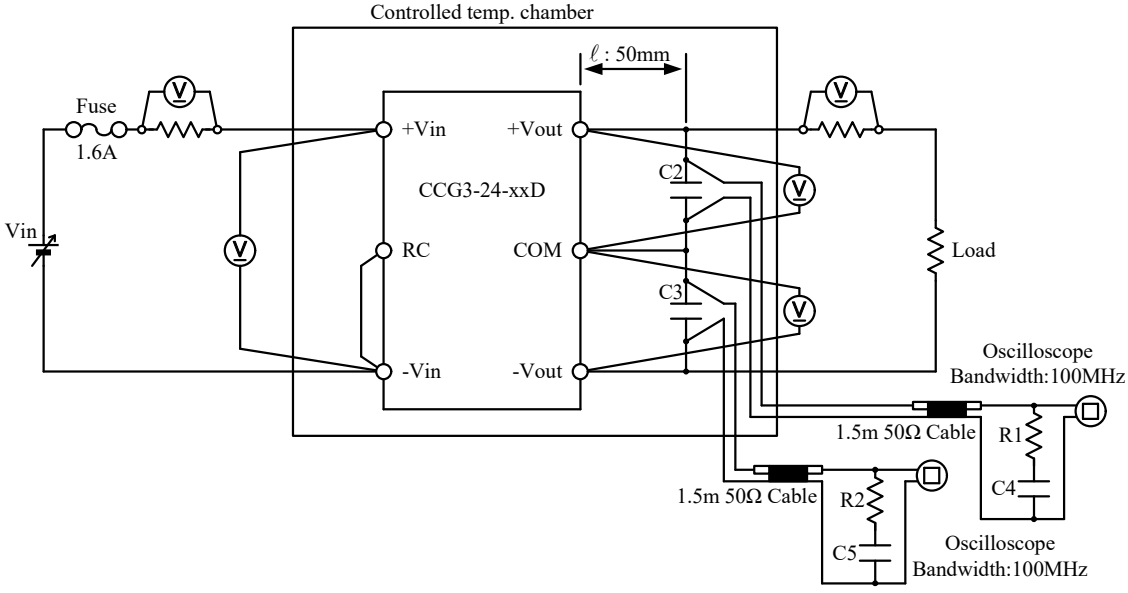
Steady state, Standby power, Warm up voltage drift and Other characteristics



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



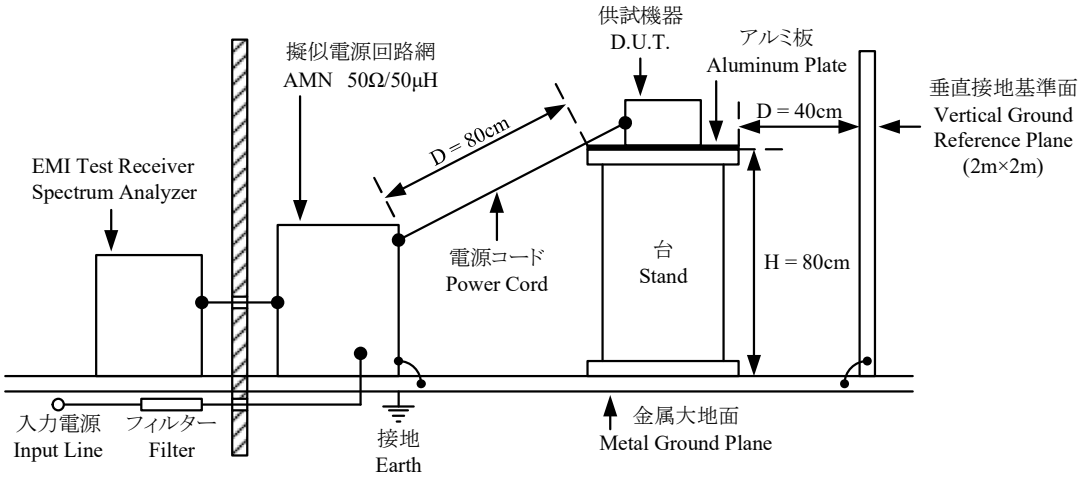
(3) 出力リップルノイズ電圧、波形 Output ripple and noise voltage and waveform



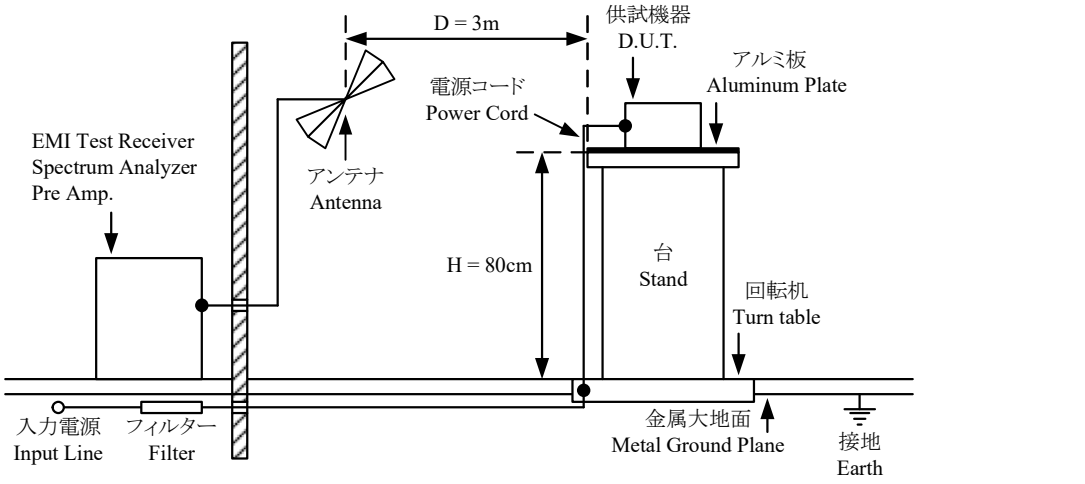
C1	: 4000μF	Electrolytic Capacitor
C2, C3	: 1μF	Ceramic Capacitor
C4, C5	: 4700pF	Ceramic Capacitor
R1, R2	: 50Ω	

(4) EMI特性　Electro-Magnetic Interference characteristics

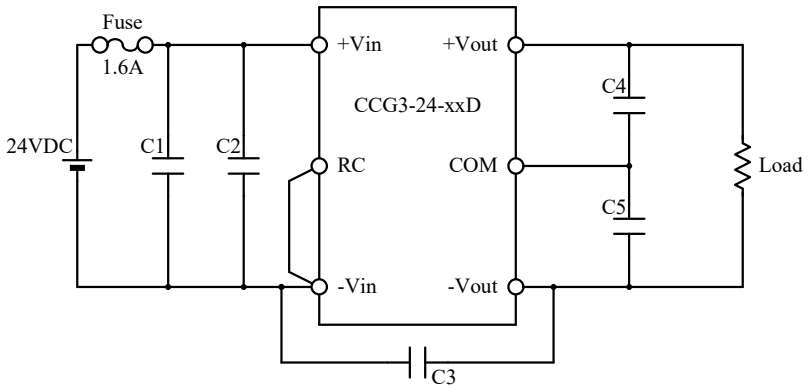
(a) 雑音端子電圧(帰還ノイズ) Conducted Emission Noise



(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	: 50V	10μF	Ceramic Capacitor	(C3216X7R1H106K, TDK)
C2	: 50V	10μF	Ceramic Capacitor	(C3216X7R1H106K, TDK)
C3	: 2kV	1000pF	Ceramic Capacitor	(C4520X7R3D102K, TDK)
C4	: 25V	10μF	Ceramic Capacitor	(C3216X7R1E106K, TDK)
C5	: 25V	10μF	Ceramic Capacitor	(C3216X7R1E106K, TDK)

1-2. 使用測定機器 List of equipment used

	EQUIPMENT USED	MANUFACTURER	MODEL NO.
1	DIGITAL STORAGE OSCILLOSCOPE	YOKOGAWA ELECT.	DL1740E / DL1740EL
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	KIKUSUI	PLZ-164WL
7	CVCF	NF	ES10000S
8	DC POWER SUPPLY	TDK-Lambda	GEN80-9.5 / GENH80-9.5
9	DC POWER SUPPLY	TAKASAGO	EX-750H2
10	CONTROLLED TEMP. CHAMBER	ESPEC	SU-261 / SU-262
11	EMI TEST RECEIVER / SPECTRUM ANALYZER	ROHDE & SCHWARZ	ESR3
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

±12V 1. Regulation - line and load Condition Ta : 25 °C

・+Vo

Io \ Vin	9VDC	12VDC	24VDC	36VDC	Line regulation	
0%	11.9797V	11.9784V	11.9779V	11.9786V	1.8mV	0.015%
50%(0.065A)	11.9971V	11.9961V	11.9917V	11.9879V	9.2mV	0.077%
100%(0.13A)	12.0004V	11.9990V	11.9961V	11.9923V	8.1mV	0.068%
Load regulation	20.7mV	20.6mV	18.2mV	13.7mV		
	0.173%	0.172%	0.152%	0.114%		

・−Vo

Io \ Vin	9VDC	12VDC	24VDC	36VDC	Line regulation	
0%	-12.0098V	-12.0108V	-12.0117V	-12.0110V	1.9mV	0.016%
50%(0.065A)	-11.9920V	-11.9930V	-11.9976V	-12.0016V	9.6mV	0.080%
100%(0.13A)	-11.9888V	-11.9904V	-11.9936V	-11.9971V	8.3mV	0.069%
Load regulation	21.0mV	20.4mV	18.1mV	13.9mV		
	0.175%	0.170%	0.151%	0.116%		

・+Vo to −Vo

Io \ Vin	9VDC	12VDC	24VDC	36VDC	Line regulation	
0%	23.9895V	23.9893V	23.9896V	23.9896V	0.3mV	0.001%
50%(0.065A)	23.9891V	23.9890V	23.9893V	23.9896V	0.6mV	0.002%
100%(0.13A)	23.9892V	23.9894V	23.9897V	23.9894V	0.5mV	0.002%
Load regulation	0.4mV	0.4mV	0.4mV	0.2mV		
	0.002%	0.002%	0.002%	0.001%		

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

Ta	-40°C	25°C	85°C	Temperature stability	
+Vo	11.9668V	11.9961V	11.9731V	29.3mV	0.244%
-Vo	-11.9641V	-11.9936V	-11.9702V	29.5mV	0.246%
+Vo to -Vo	23.9308V	23.9897V	23.9432V	58.9mV	0.245%

3. Load Regulation - Unbalance load Condition Ta : 25 °C

・+Vo (-Io : 100%)

+Io \ Vin	9VDC	12VDC	24VDC	36VDC
20%(0.026A)	12.1138V	12.1075V	12.1075V	12.0975V
100%(0.13A)	12.0002V	11.9987V	11.9987V	11.9922V
Load regulation	113.6mV	108.8mV	108.8mV	105.3mV
	0.947%	0.907%	0.907%	0.877%

・−Vo (+Io : 100%)

-Io \ Vin	9VDC	12VDC	24VDC	36VDC
20%(0.026A)	-12.1082V	-12.1051V	-12.1051V	-12.1153V
100%(0.13A)	-11.9892V	-11.9906V	-11.9906V	-11.9974V
Load regulation	119.0mV	114.5mV	114.5mV	117.9mV
	0.992%	0.954%	0.954%	0.982%

±15V 1. Regulation - line and load Condition Ta : 25 °C

・+Vo

Io \ Vin	9VDC	12VDC	24VDC	36VDC	Line regulation	
0%	14.8938V	14.8914V	14.8899V	14.8897V	4.1mV	0.027%
50%(0.05A)	14.8890V	14.8955V	14.9000V	14.8980V	11.0mV	0.073%
100%(0.1A)	14.8671V	14.8813V	14.8933V	14.8953V	28.2mV	0.188%
Load	26.7mV	14.2mV	10.1mV	8.3mV		
regulation	0.178%	0.095%	0.067%	0.055%		

・−Vo

Io \ Vin	9VDC	12VDC	24VDC	36VDC	Line regulation	
0%	-14.9281V	-14.9305V	-14.9324V	-14.9325V	4.4mV	0.029%
50%(0.05A)	-14.9329V	-14.9264V	-14.9225V	-14.9245V	10.4mV	0.069%
100%(0.1A)	-14.9554V	-14.9417V	-14.9298V	-14.9278V	27.6mV	0.184%
Load	27.3mV	15.3mV	9.9mV	8.0mV		
regulation	0.182%	0.102%	0.066%	0.053%		

・+Vo to −Vo

Io \ Vin	9VDC	12VDC	24VDC	36VDC	Line regulation	
0%	29.8219V	29.8220V	29.8223V	29.8222V	0.4mV	0.001%
50%(0.05A)	29.8220V	29.8220V	29.8225V	29.8225V	0.5mV	0.002%
100%(0.1A)	29.8225V	29.8229V	29.8231V	29.8232V	0.7mV	0.002%
Load	0.6mV	0.9mV	0.8mV	1.0mV		
regulation	0.002%	0.003%	0.003%	0.003%		

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

Ta	-40°C	25°C	85°C	Temperature stability	
+Vo	14.8600V	14.8933V	14.8846V	33.3mV	0.222%
-Vo	-14.8885V	-14.9298V	-14.9225V	41.3mV	0.275%
+Vo to -Vo	29.7485V	29.8231V	29.8072V	74.6mV	0.249%

3. Load Regulation - Unbalance load Condition Ta : 25 °C

・+Vo (-Io : 100%)

+Io \ Vin	9VDC	12VDC	24VDC	36VDC
20%(0.02A)	15.0173V	15.0075V	15.0075V	14.9908V
100%(0.1A)	14.8670V	14.8814V	14.8814V	14.8953V
Load	150.3mV	126.1mV	126.1mV	95.5mV
regulation	1.002%	0.841%	0.841%	0.637%

・−Vo (+Io : 100%)

-Io \ Vin	9VDC	12VDC	24VDC	36VDC
20%(0.02A)	-15.0764V	-15.0523V	-15.0523V	-15.0367V
100%(0.1A)	-14.9566V	-14.9422V	-14.9422V	-14.9280V
Load	119.8mV	110.1mV	110.1mV	108.7mV
regulation	0.799%	0.734%	0.734%	0.725%

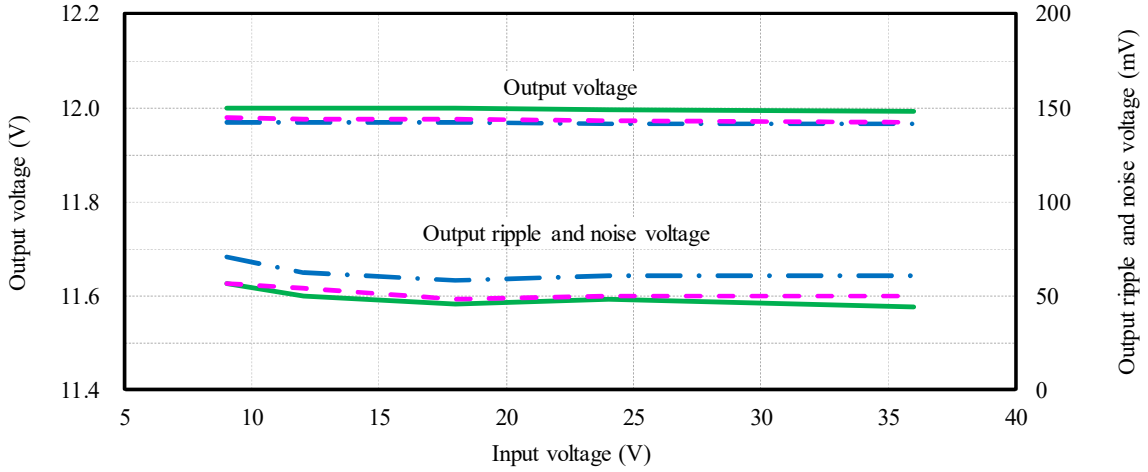
(2) 出力電圧・出力リップルノイズ電圧 対 入力電圧

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

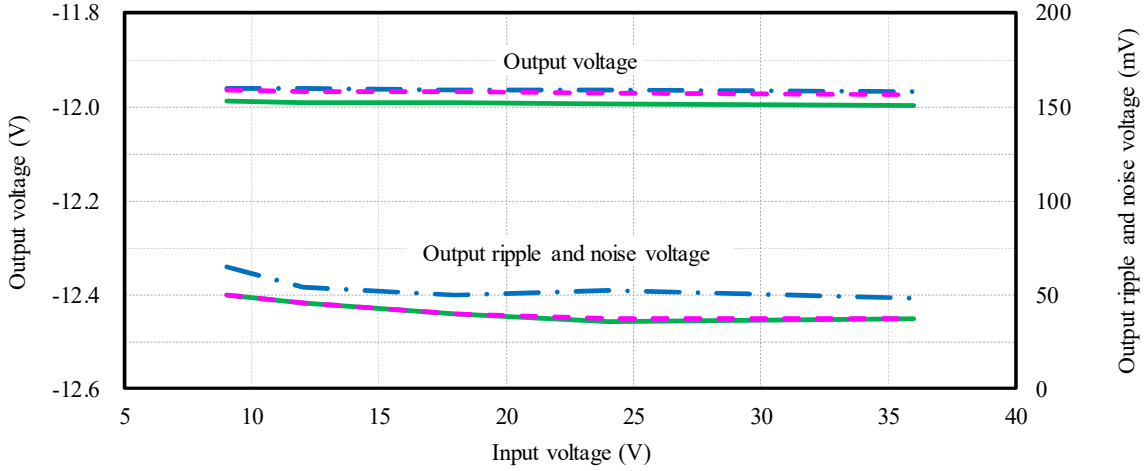
Conditions Io : 100 %
Ta : -40 °C
: 25 °C
: 85 °C

±12V

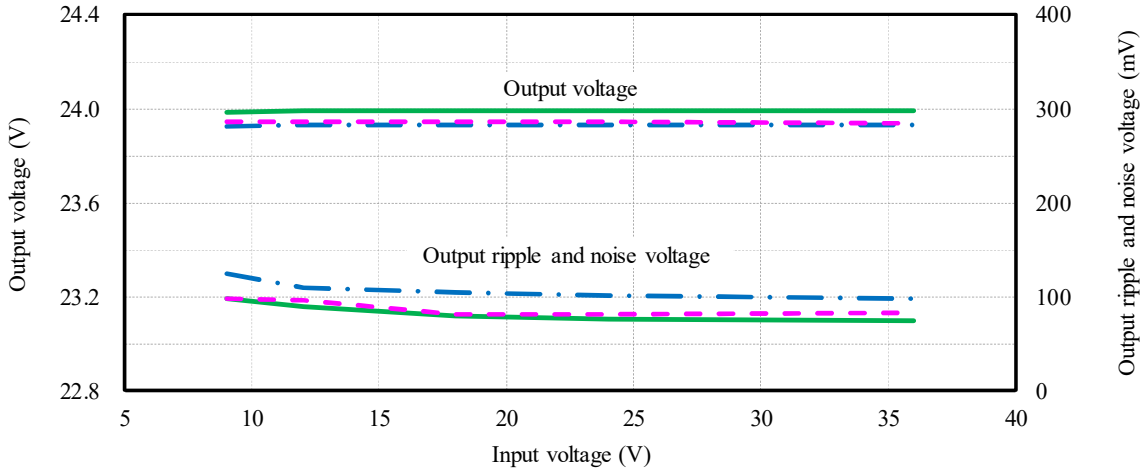
・+Vo



・−Vo



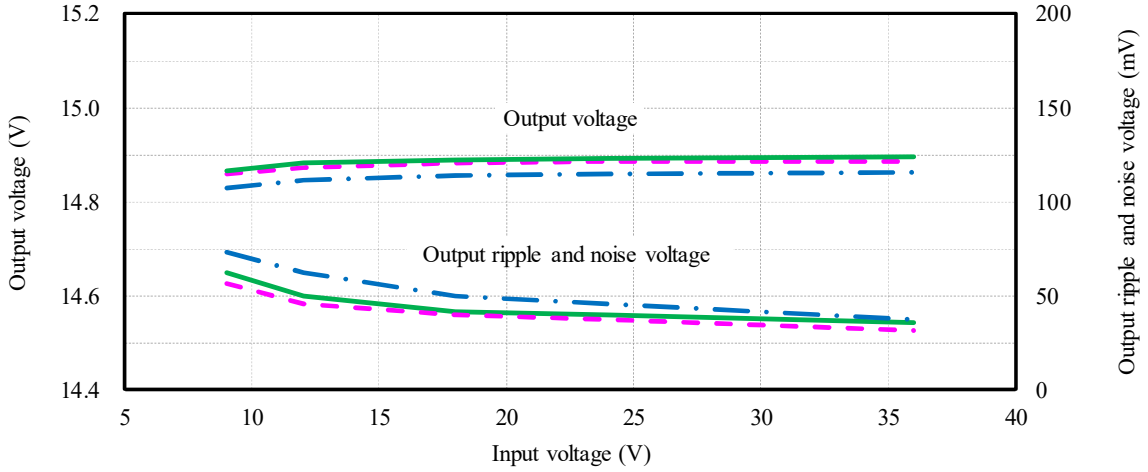
・+Vo to -Vo



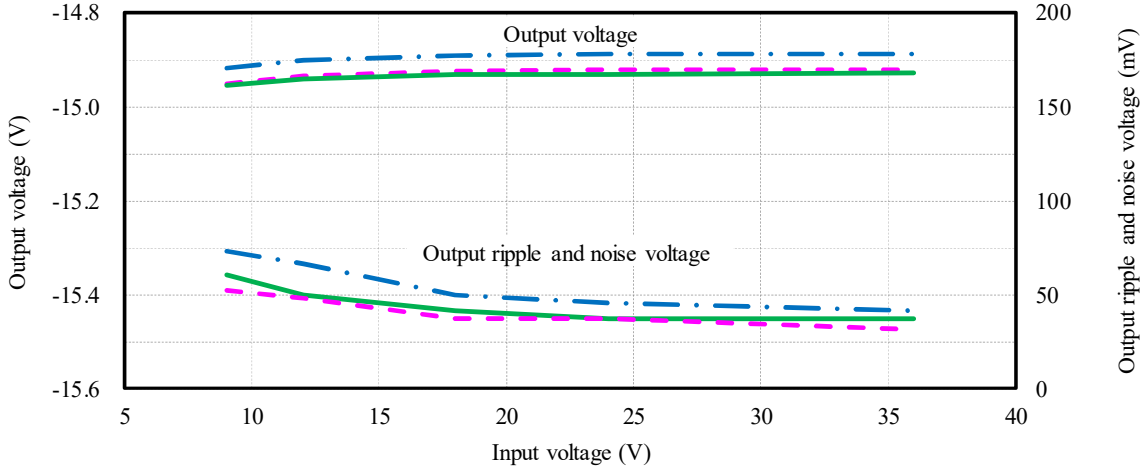
Conditions Io : 100 %
Ta : -40 °C
: 25 °C
: 85 °C

±15V

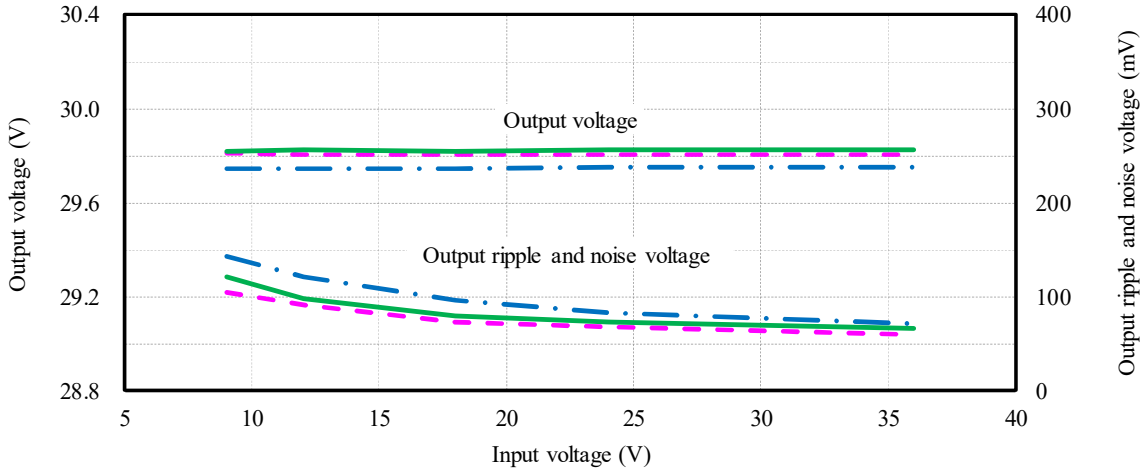
・+Vo



・−Vo



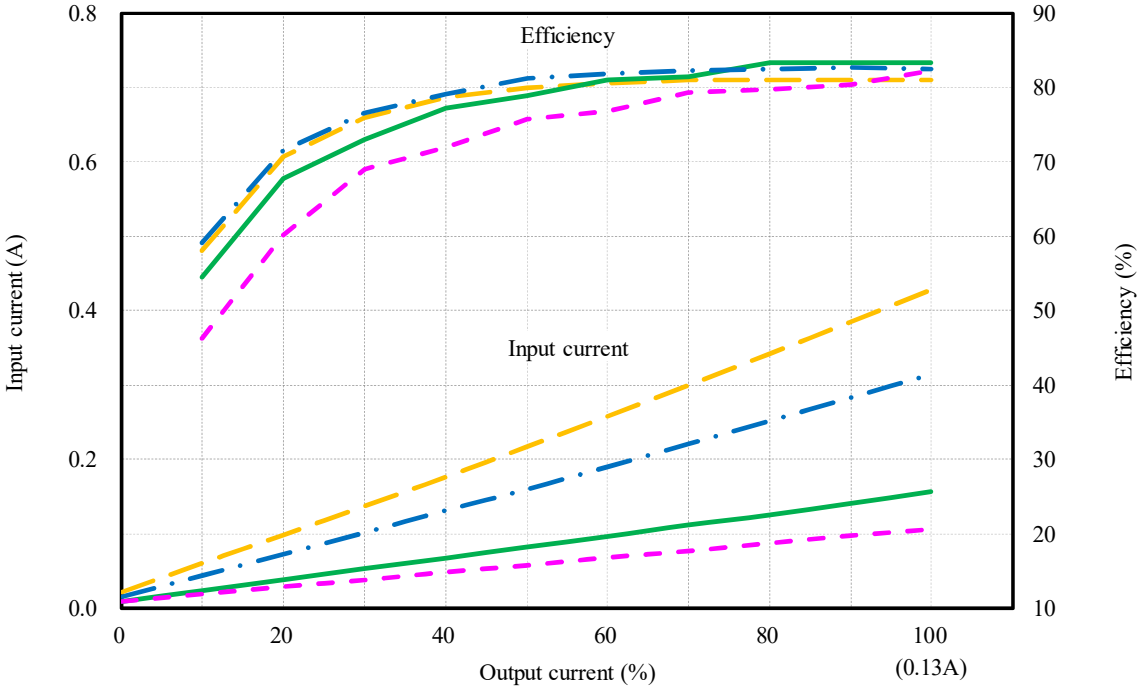
・+Vo to -Vo



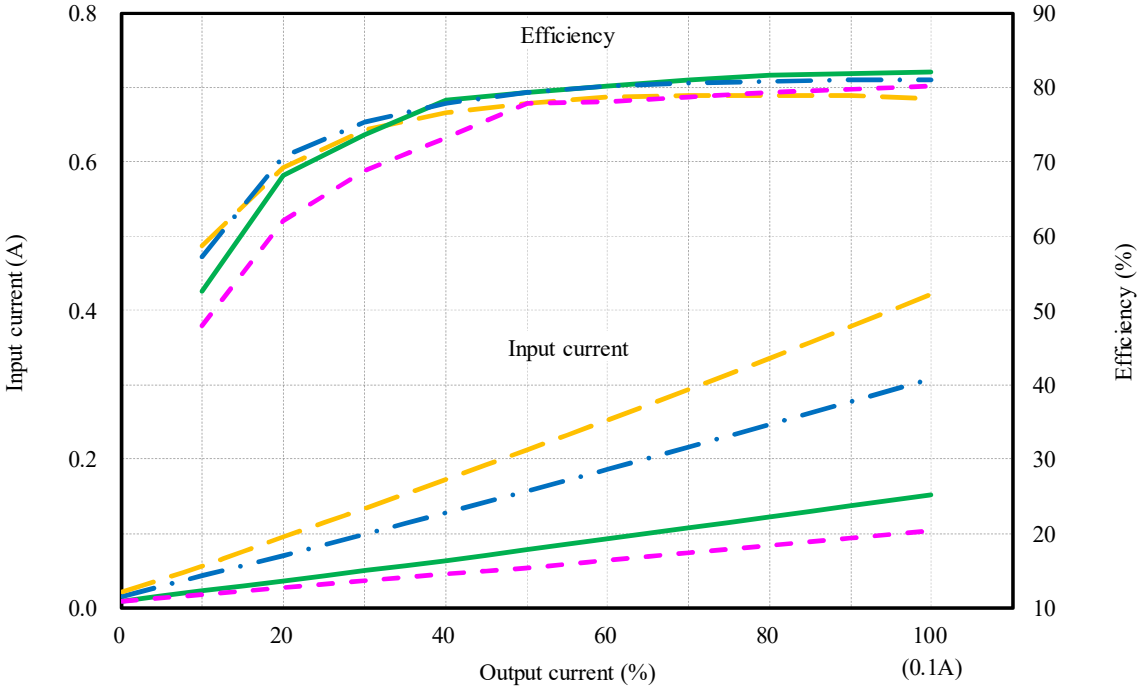
(3) 入力電流･効率 対 出力電流 Input current and Efficiency vs. Output current

Conditions Vin : 9 VDC
: 12 VDC
: 24 VDC
: 36 VDC
Ta : 25 °C

±12V



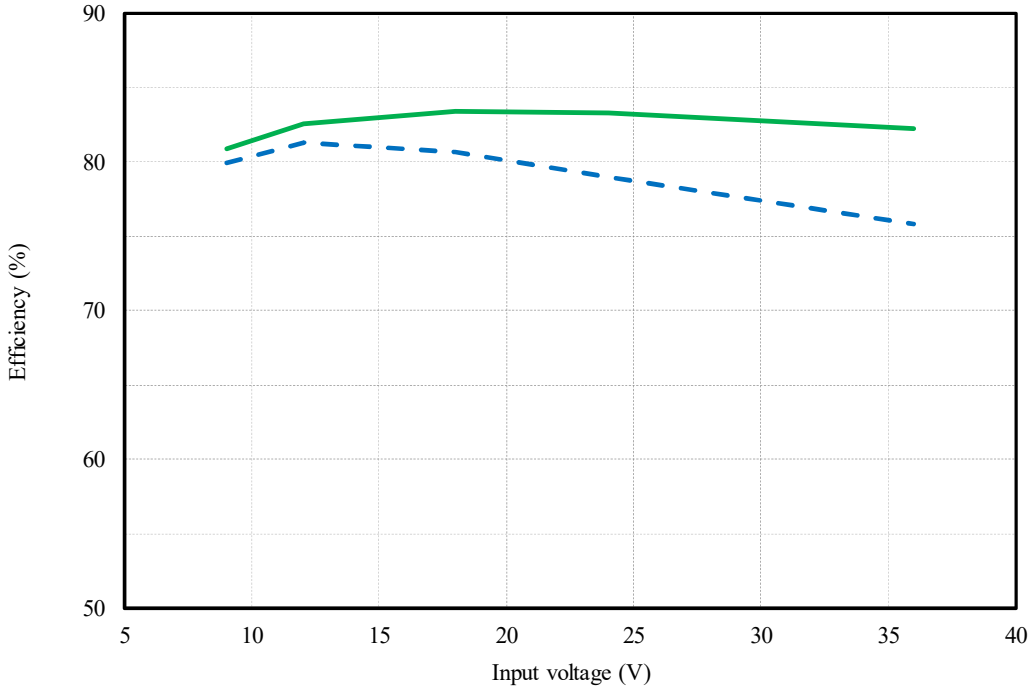
±15V



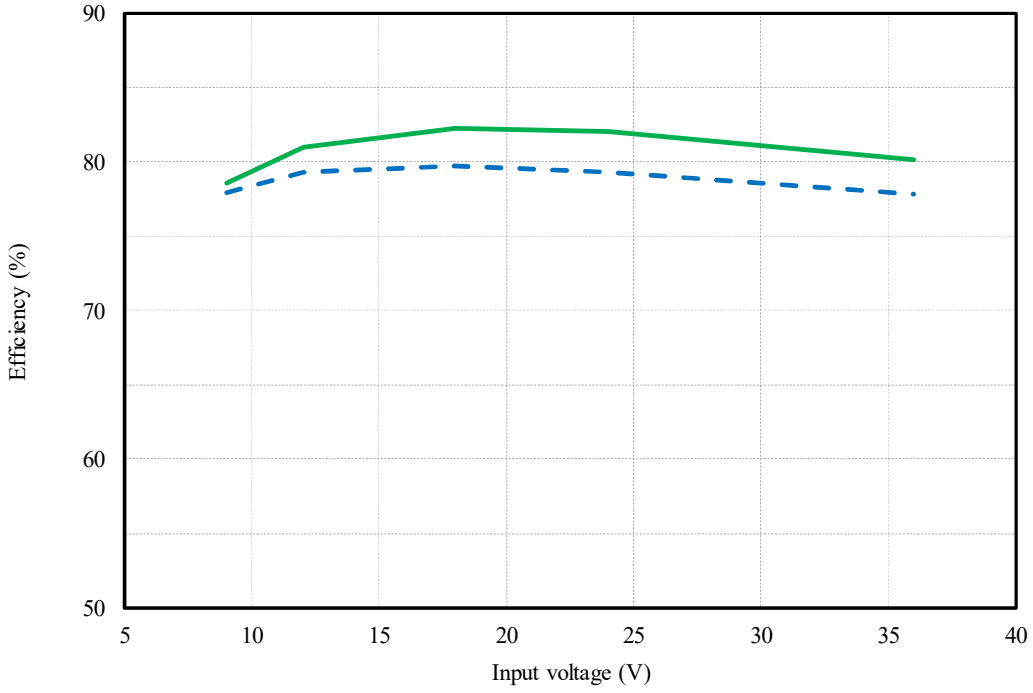
(4) 効率 対 入力電圧 Efficiency vs. Input voltage

Conditions Io : 50 %
: 100 %
Ta : 25 °C

±12V



±15V



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

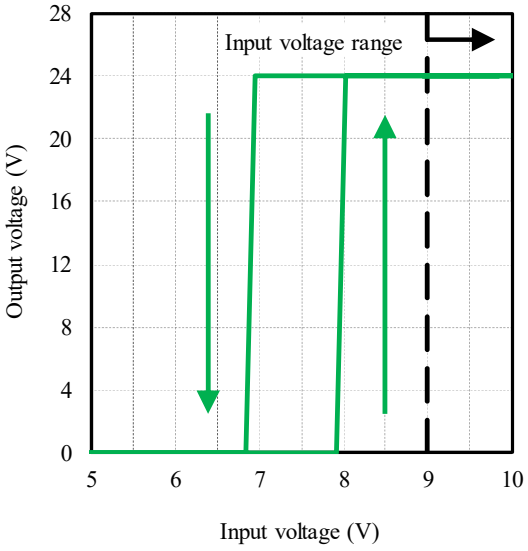
出力電圧 対 入力電圧
Output voltage vs. Input voltage

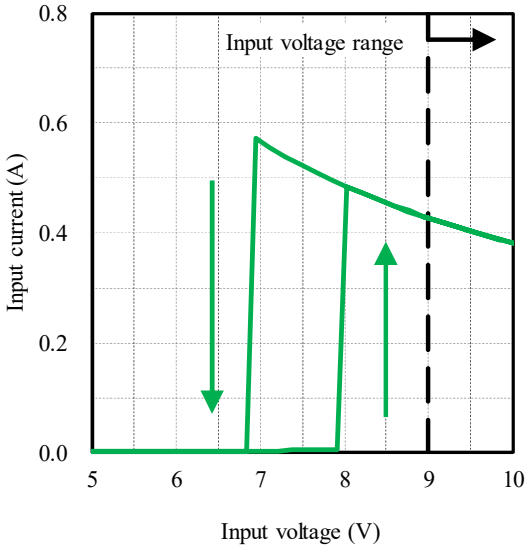
Conditions Io : 100 %
Ta : 25 °C

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

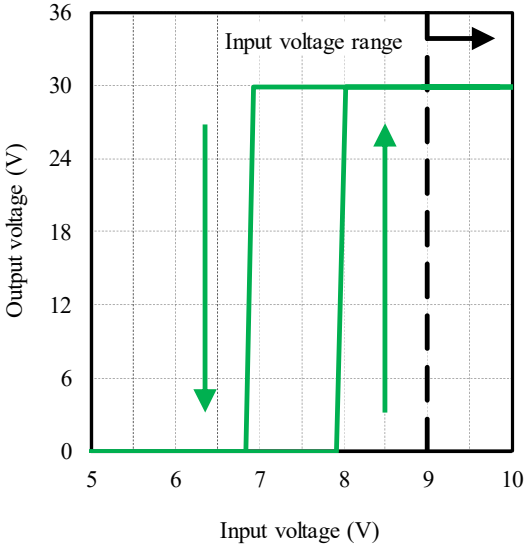
Conditions Io : 100 %
Ta : 25 °C

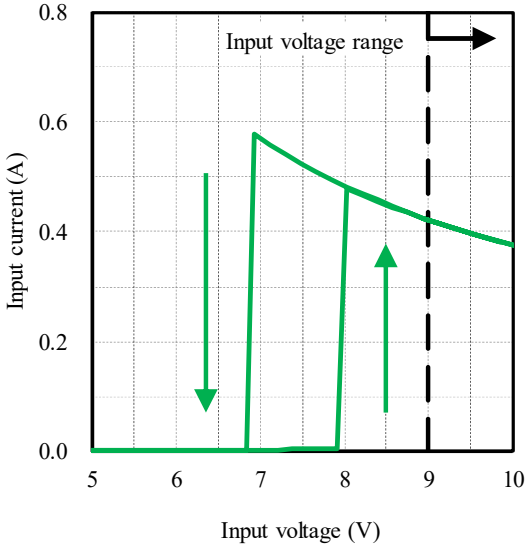
±12V





±15V

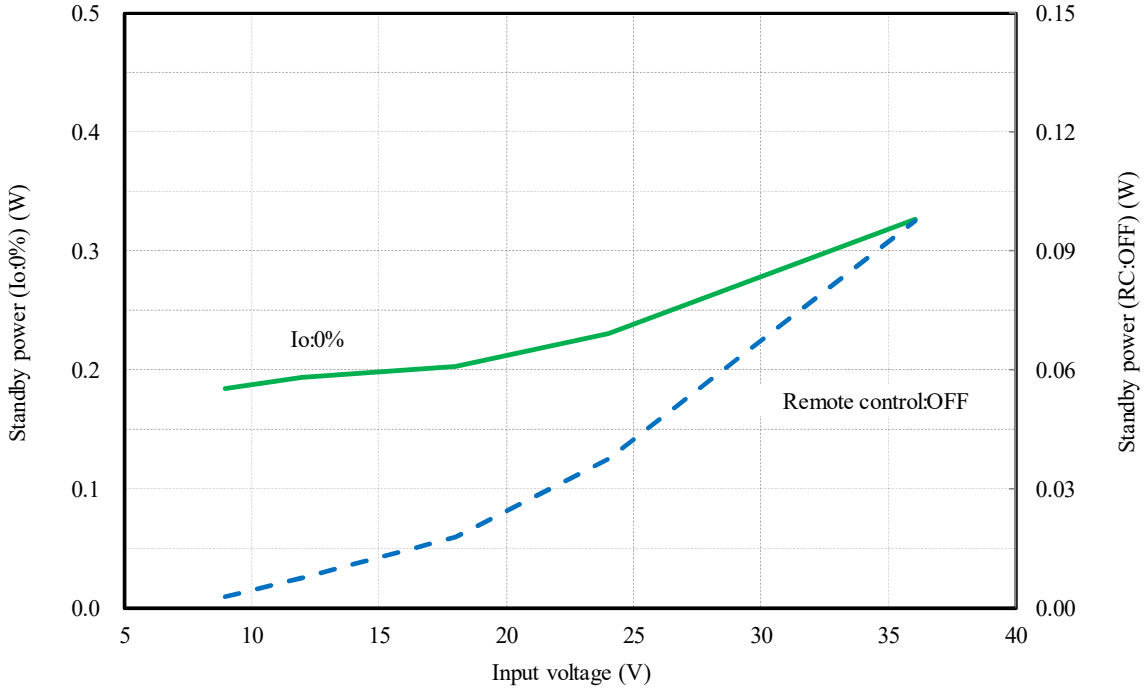




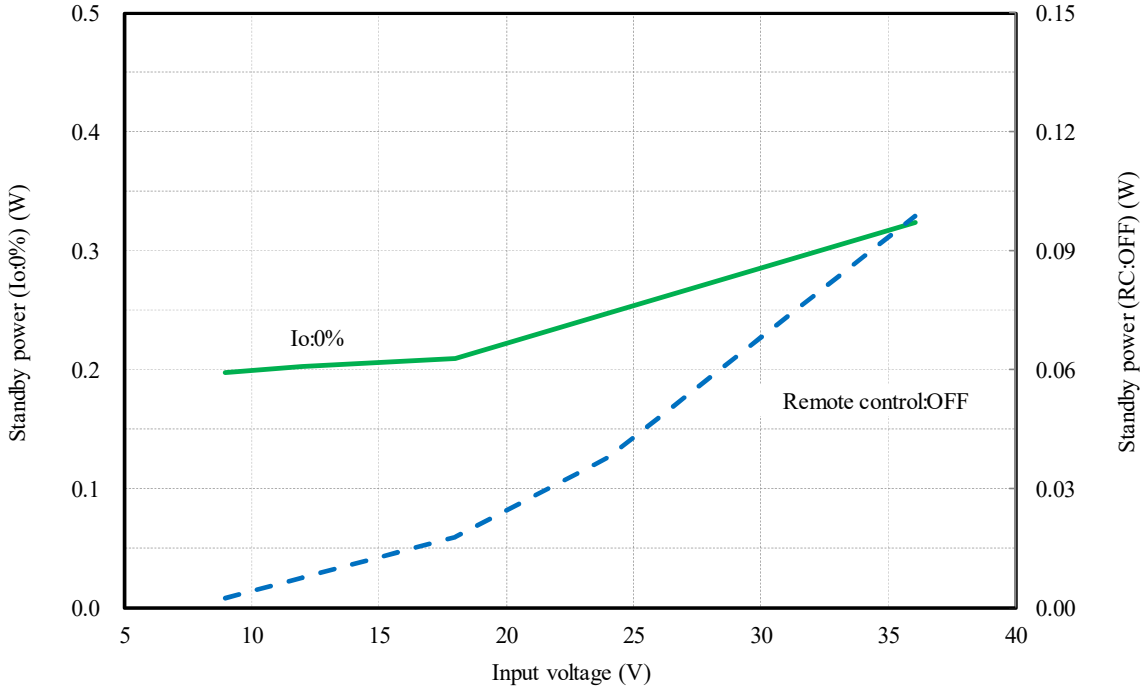
2-2. 待機電力特性 Standby power characteristics

Condition Ta : 25 °C

±12V



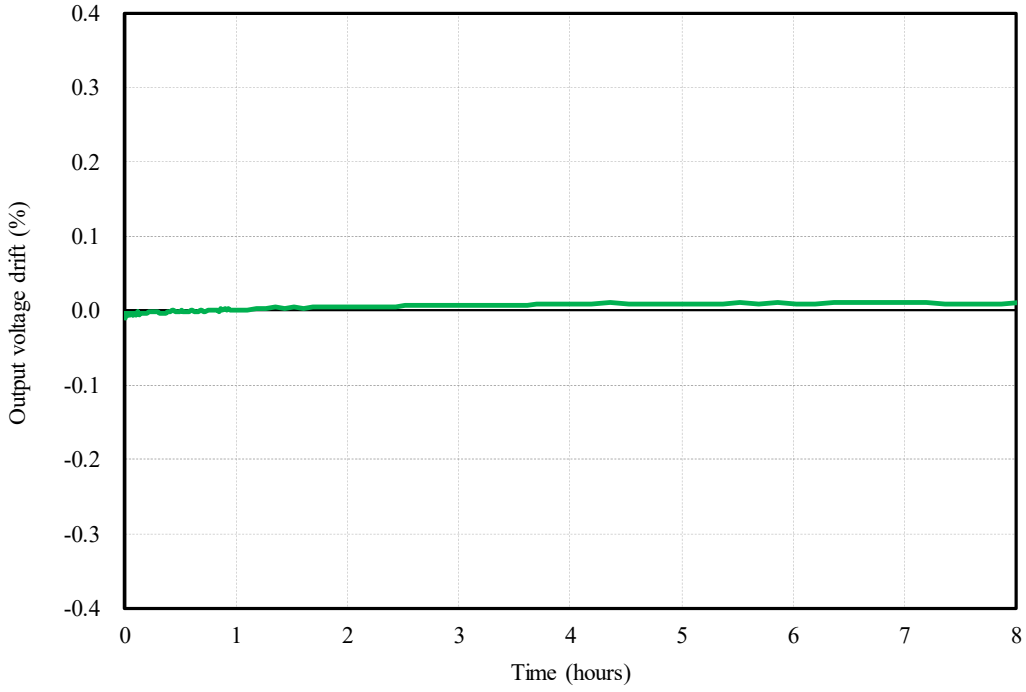
±15V



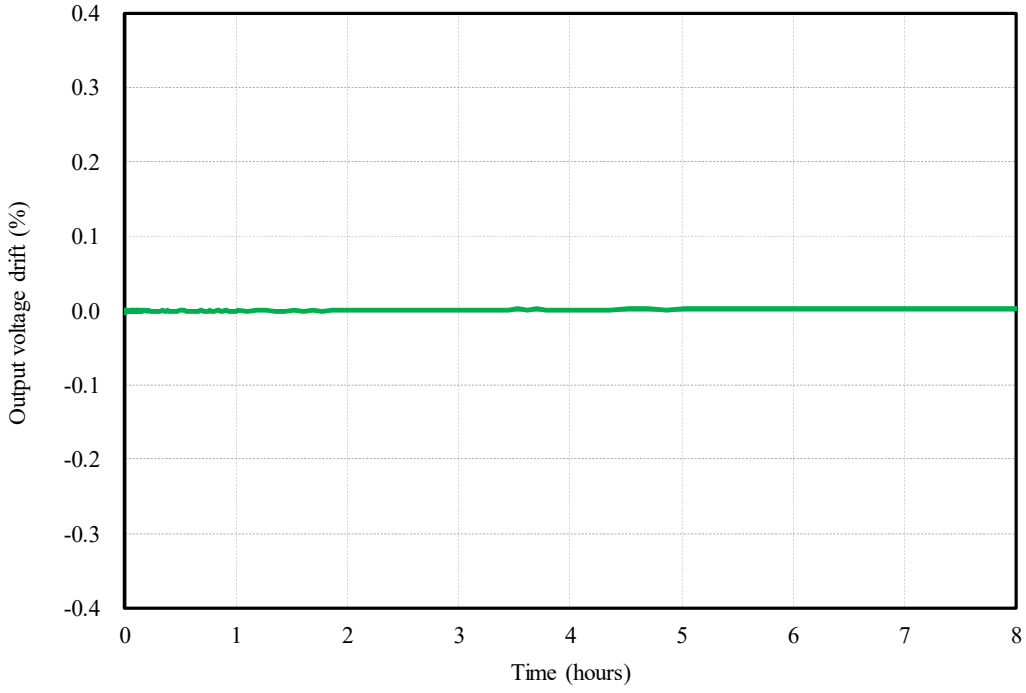
2-3. 通電ドリフト特性 Warm up voltage drift characteristics

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

±12V



±15V



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

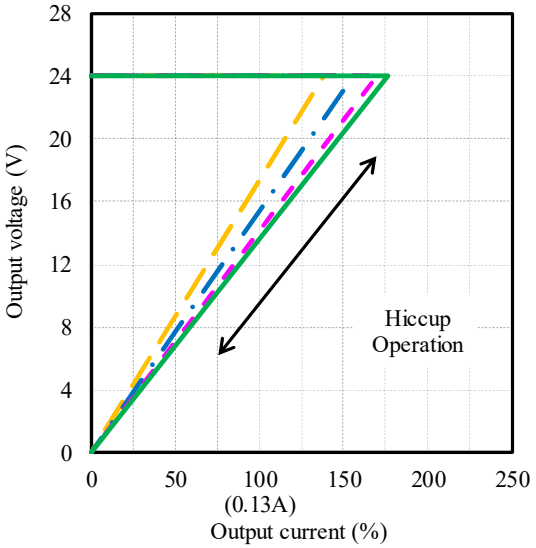
入力電圧依存性
Input voltage dependence

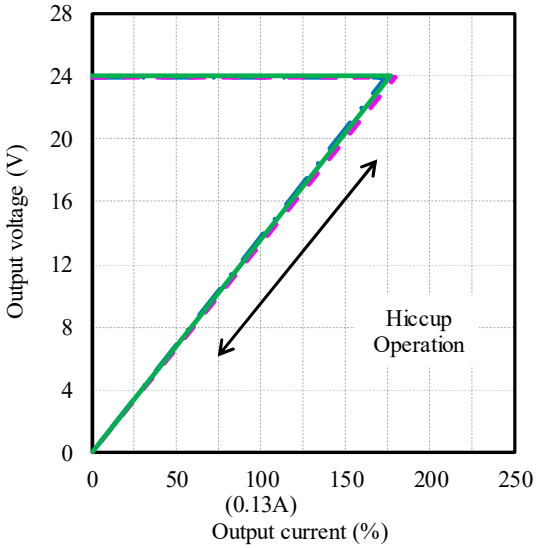
Conditions Vin : 9 VDC
: 12 VDC
: 24 VDC
: 36 VDC
Ta : 25 °C

周囲温度依存性
Ambient temperature dependence

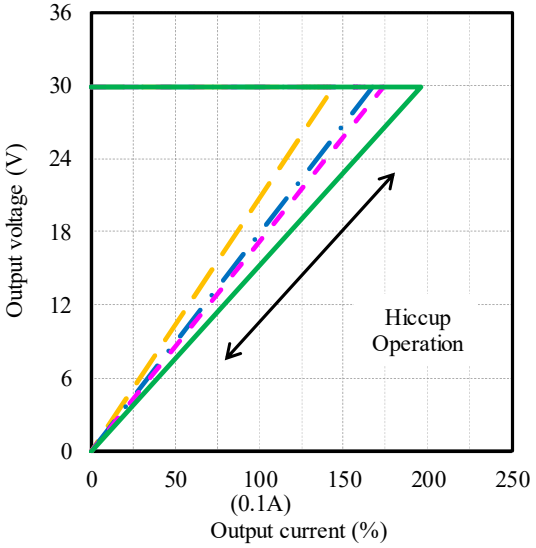
Conditions Vin : 24 VDC
Ta : -40 °C
: 25 °C
: 85 °C

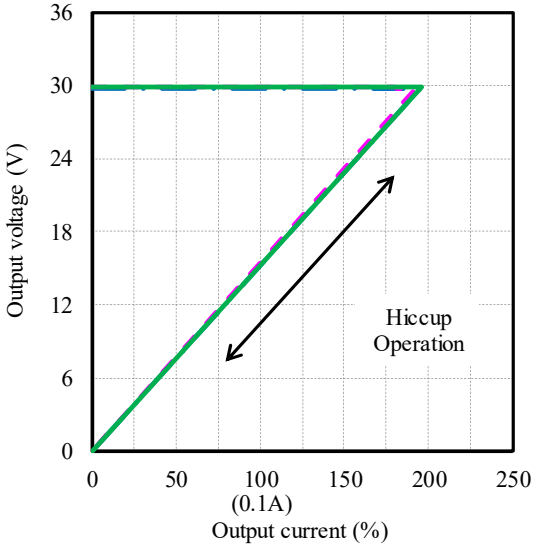
±12V





±15V

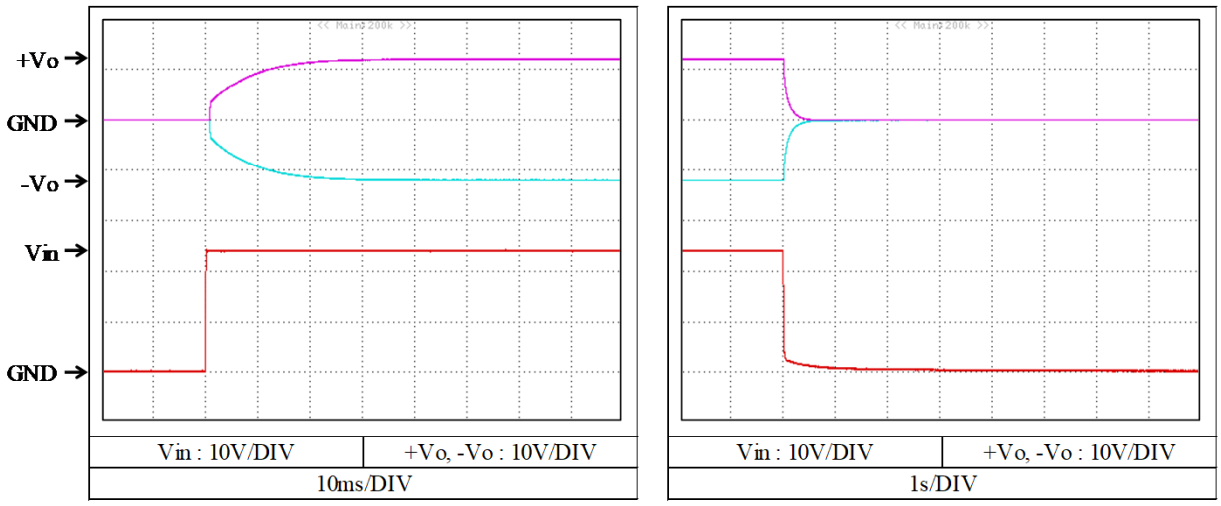




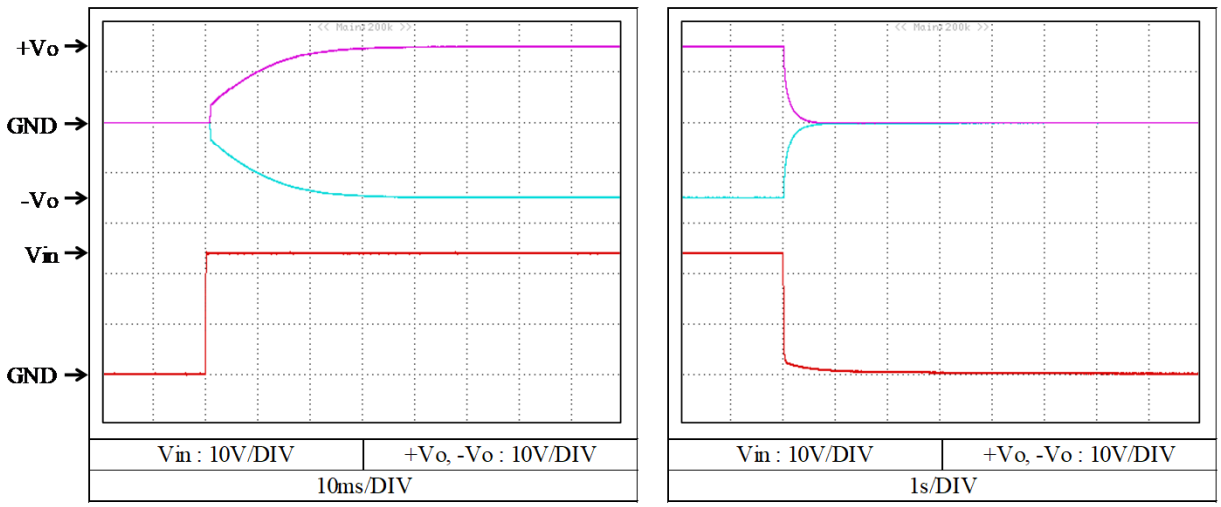
2-5. 出力立ち上がり・立ち下がり特性 Output rise and fall characteristics

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

±12V



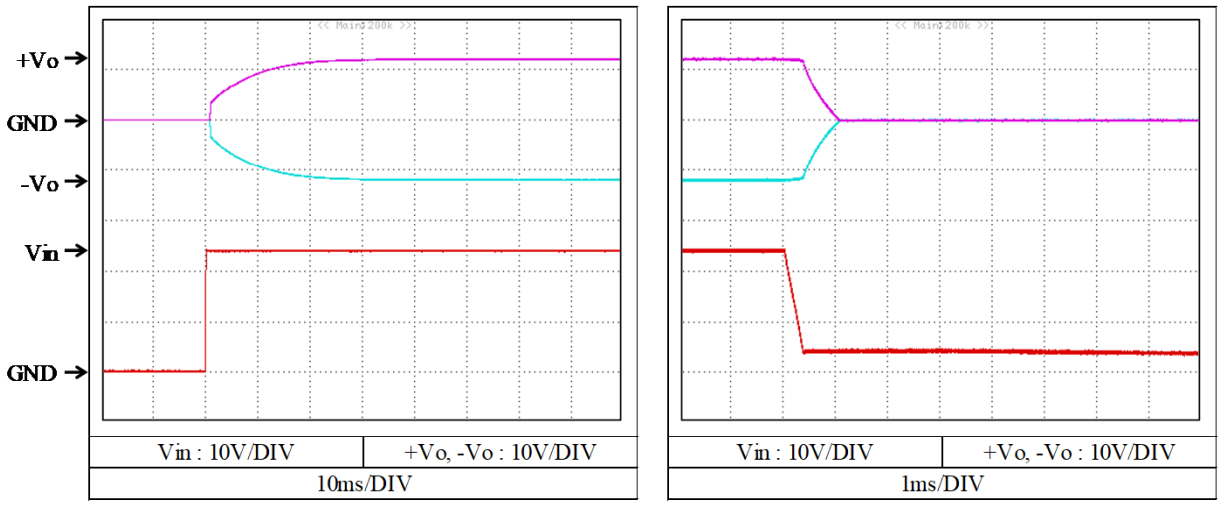
+15V



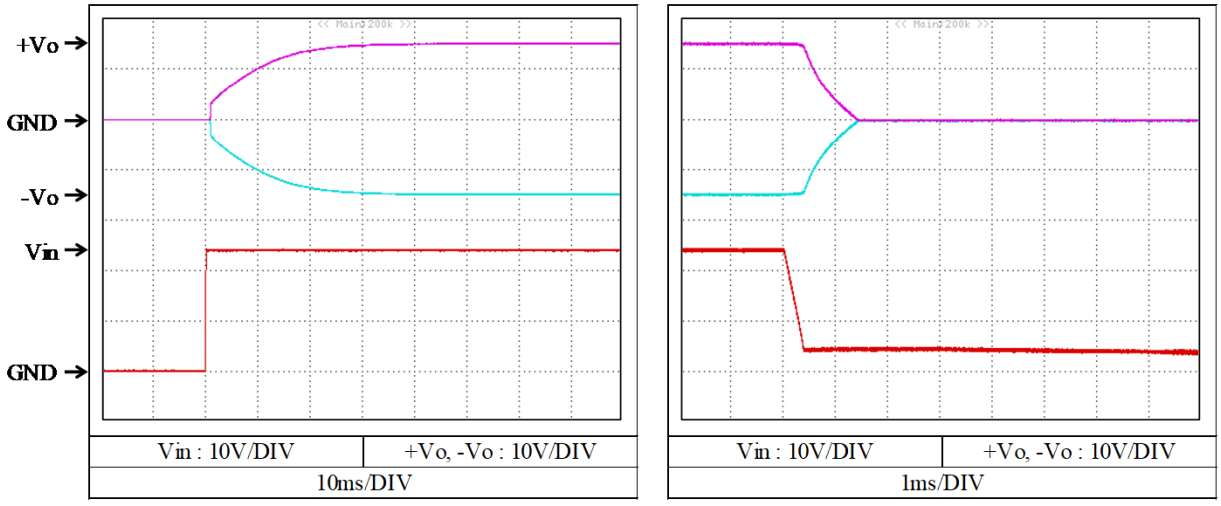
2-5. 出力立ち上がり・立ち下がり特性 Output rise and fall characteristics

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

±12V



+15V

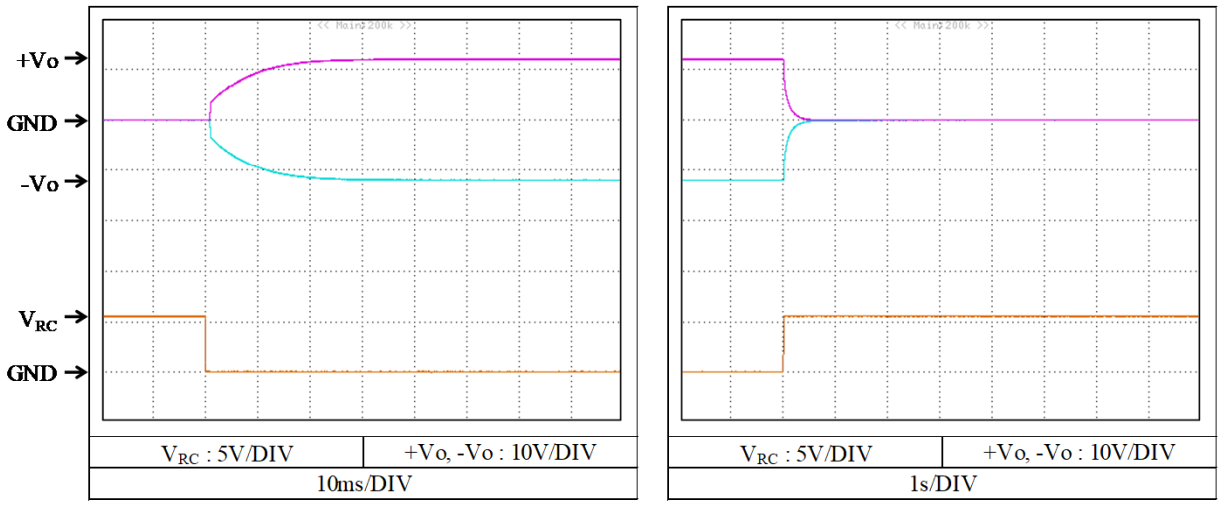


2-5. 出力立ち上がり・立ち下がり特性 (リモートON/OFFコントロール時)

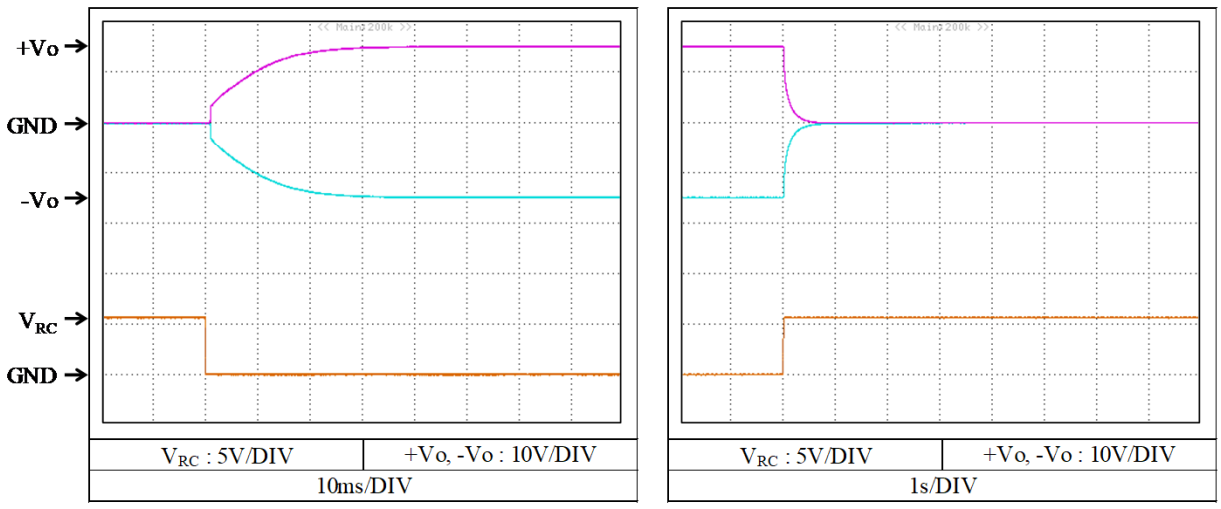
Output rise and fall characteristics with REMOTE ON/OFF CONTROL

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

±12V



+15V

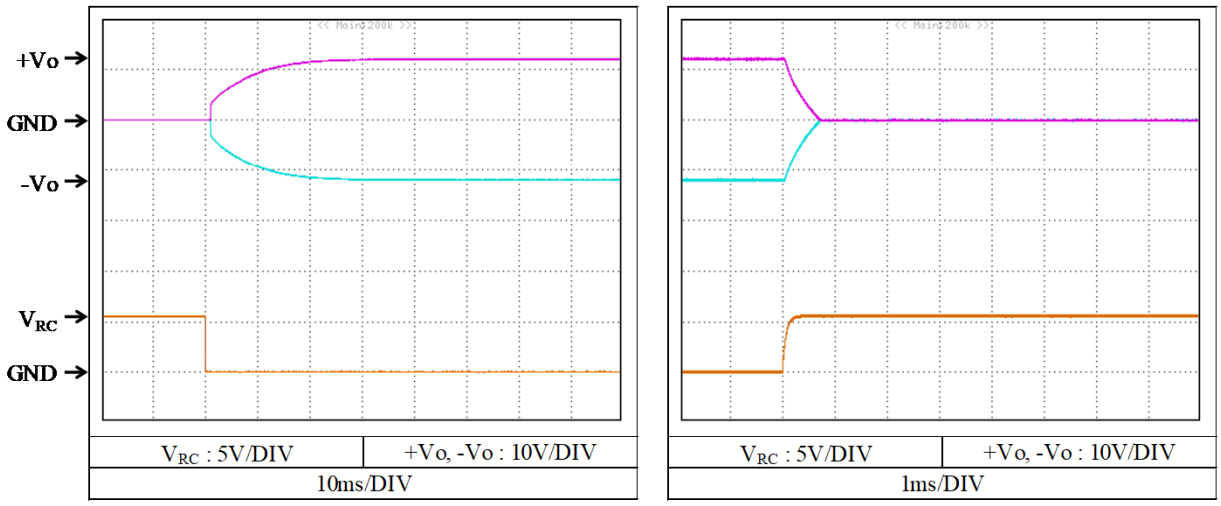


2-5. 出力立ち上がり・立ち下がり特性 (リモートON/OFFコントロール時)

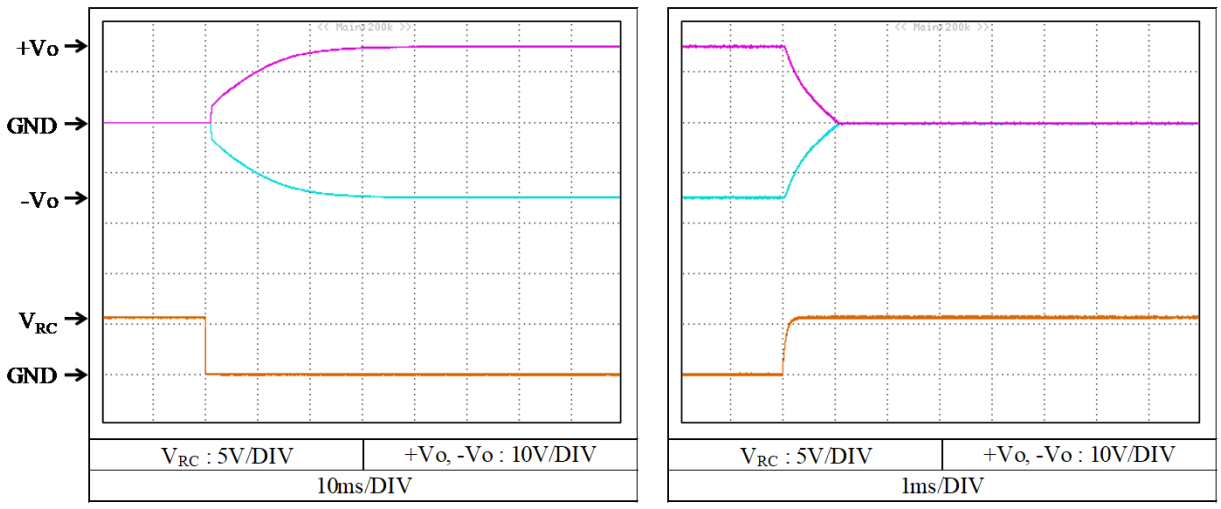
Output rise and fall characteristics with REMOTE ON/OFF CONTROL

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

±12V



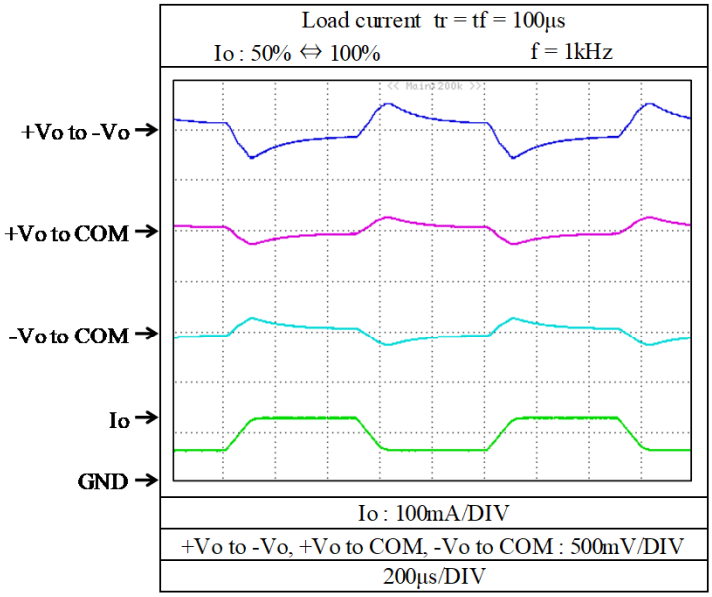
+15V



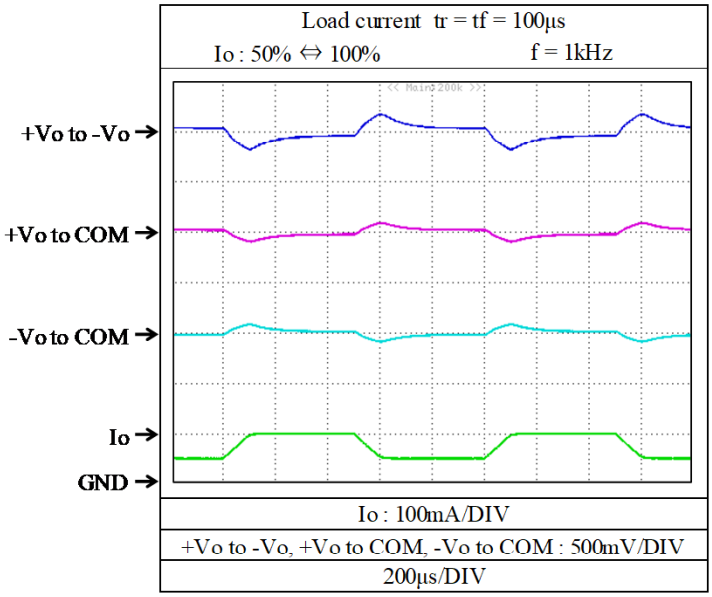
2-6. 過渡応答(負荷急変)特性 Dynamic load response characteristics

Conditions Vin : 24 VDC
Ta : 25 °C

±12V



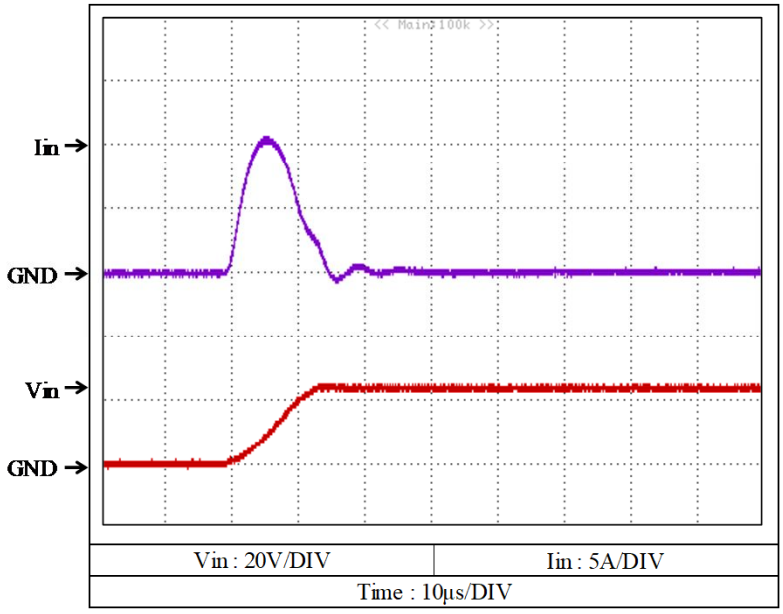
+15V



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 °C

CCG3-24-05S

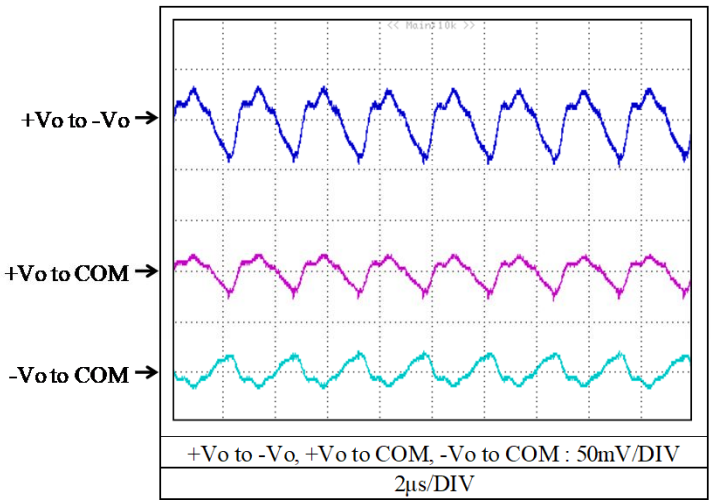


CCG3-24-xxDの入力サージ電流特性は CCG3-24-05S と同等です。
CCG3-24-xxD have the same Inrush current characteristics as CCG3-24-05S data.

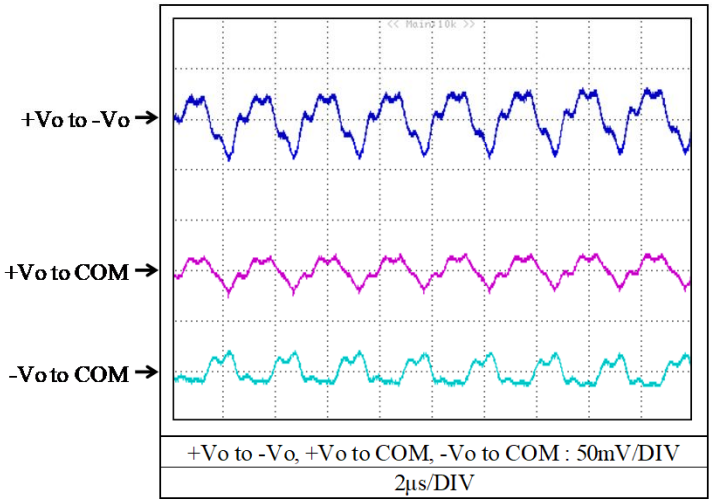
2-8. 出力リップルノイズ波形 Output ripple and noise waveform

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

±12V



+15V

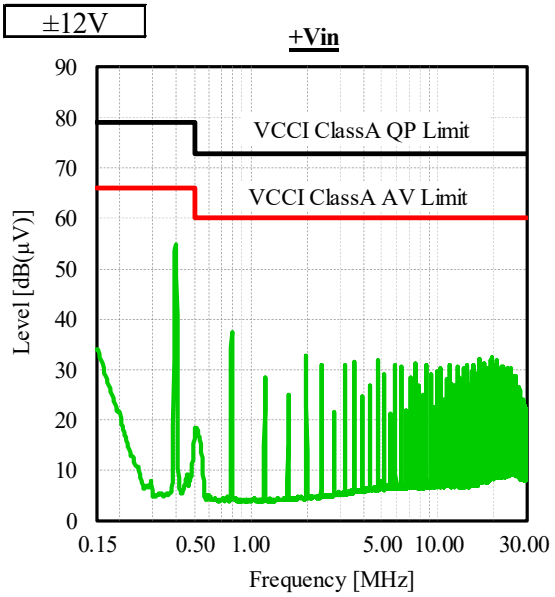


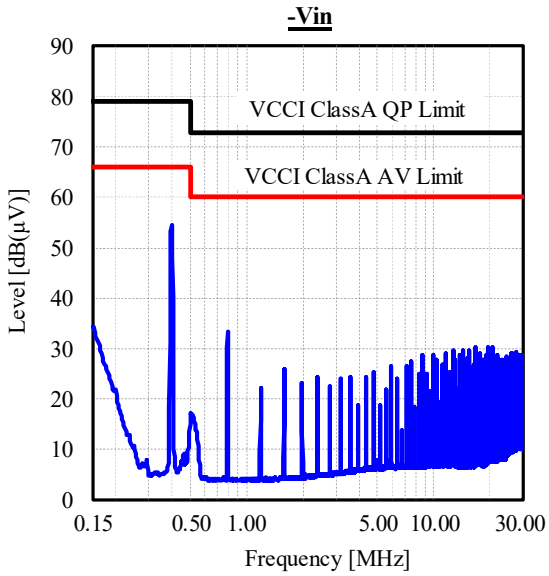
2-9. EMI特性 Electro-Magnetic Interference characteristics

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

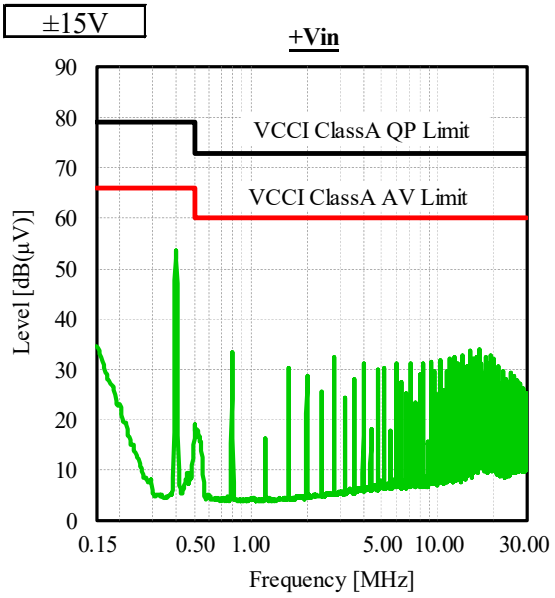
Conditions Vin : 24 VDC
Io : 100 %
Ta : 25 ºC

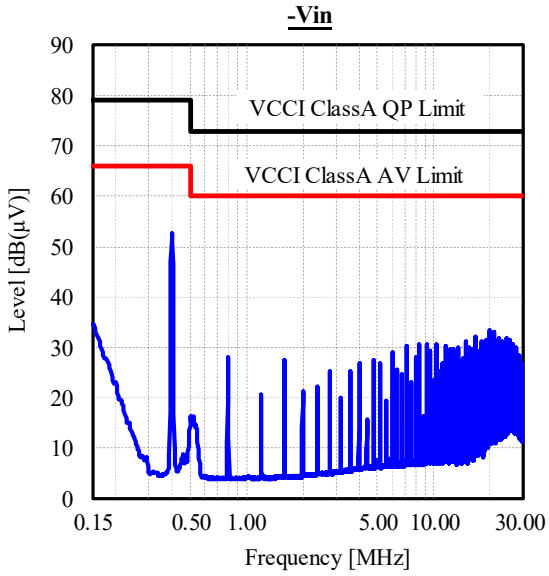
±12V





±15V





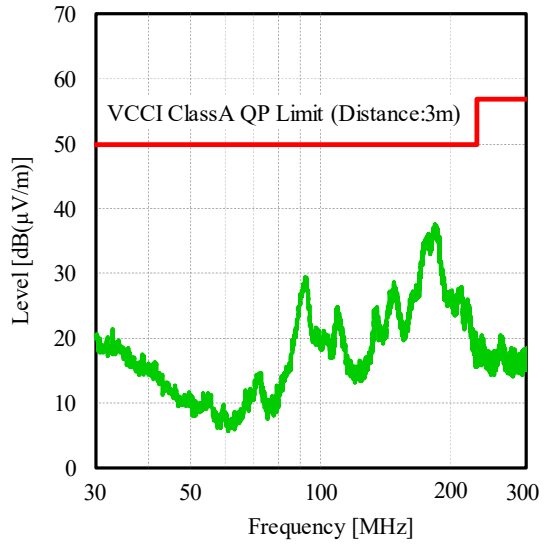
表示はQP値
Indication is QP values.

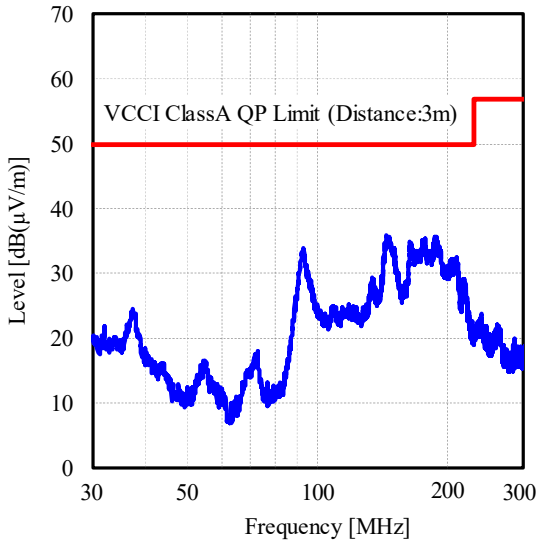
2-9. EMI特性 Electro-Magnetic Interference characteristics

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

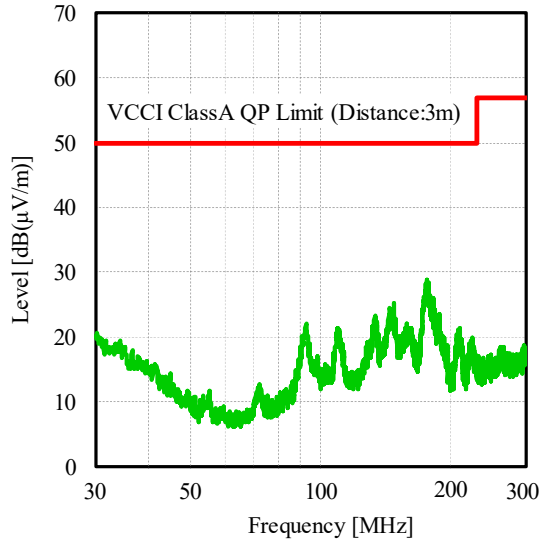
Conditions Vin : 24 VDC
Io : 100 %
Ta : 25 ºC

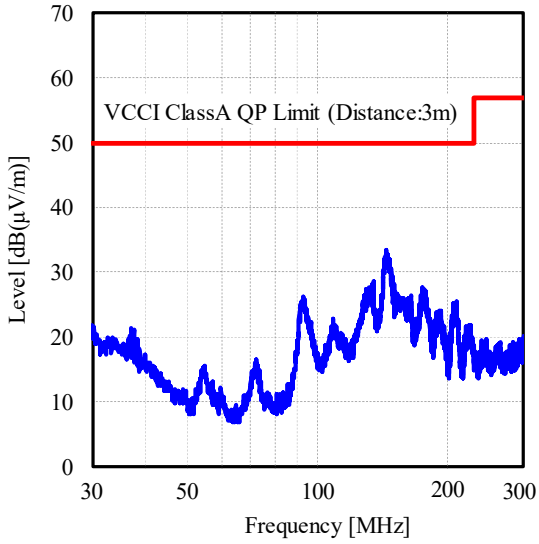
±12V





±15V





表示はピーク値
Indication is peak values.