CCG30-24-**D

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
Vrc	・・・・・	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

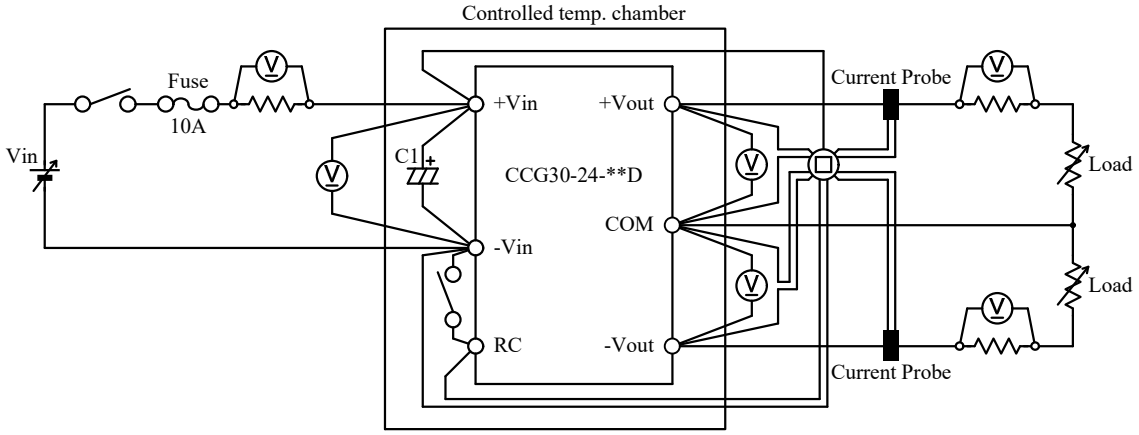
※ 当社測定条件における結果であり、参考値としてお考え願います。
Test results are reference data based on our measurement condition.

1. 測定方法 Evaluation Method

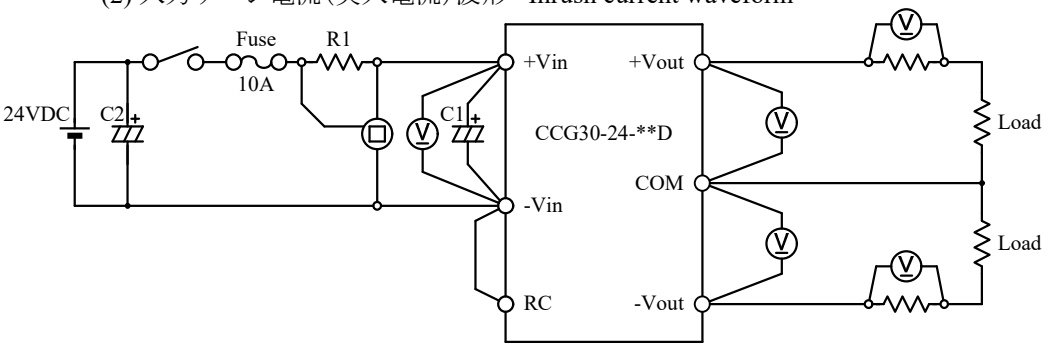
1-1. 測定回路 Measurement Circuits

(1) 静特性 、待機電力特性、通電ドリフト特性、その他特性

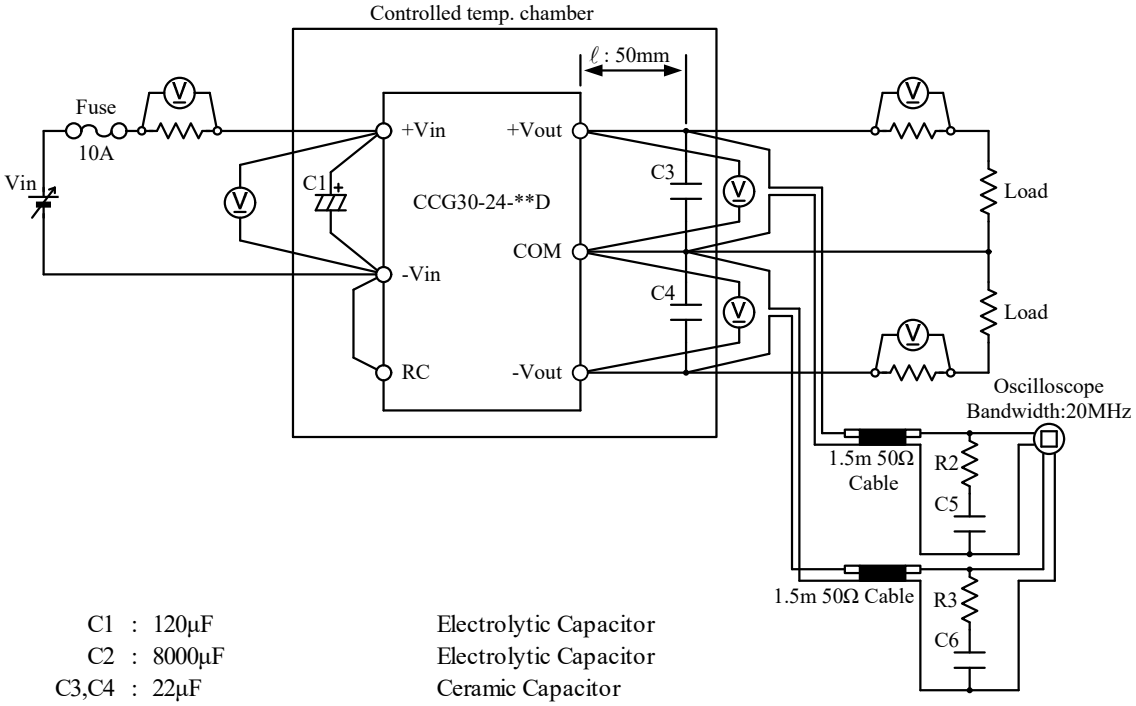
Steady state, Standby power, Warm up voltage drift and Other characteristics



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



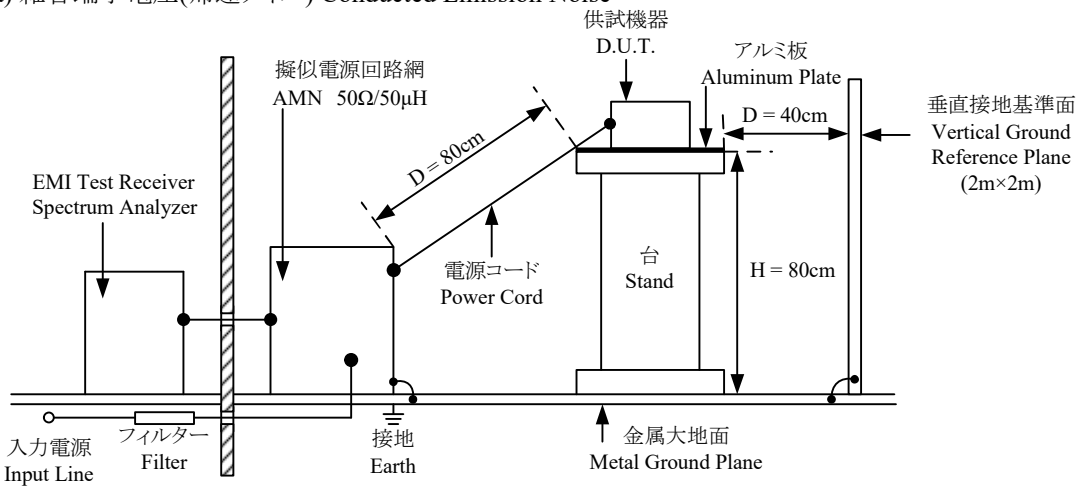
(3) 出力リップル、ノイズ電圧、波形 Output ripple and noise voltage and waveform



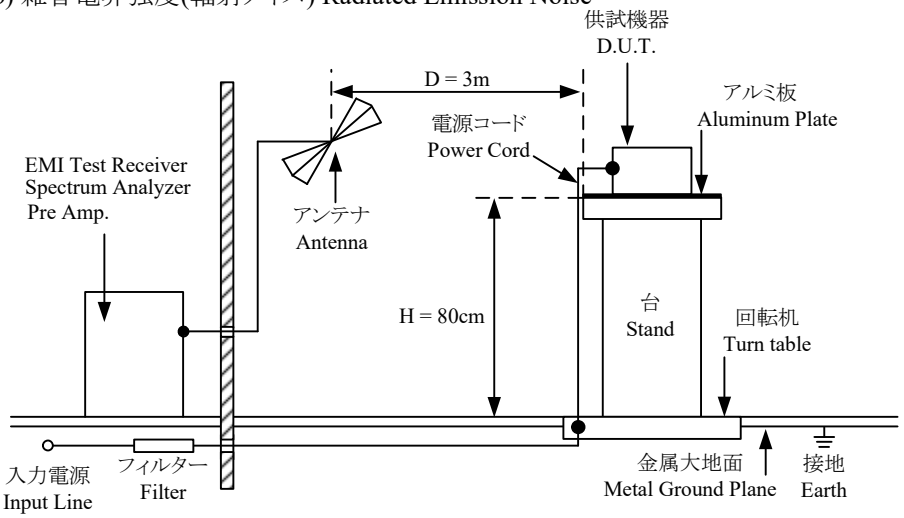
C1	: 120μF	Electrolytic Capacitor
C2	: 8000μF	Electrolytic Capacitor
C3,C4	: 22μF	Ceramic Capacitor
C5,C6	: 4700pF	Ceramic Capacitor
R1	: 0.01Ω	
R2,R3	: 50Ω	

(4) EMI特性　Electro-Magnetic Interference characteristics

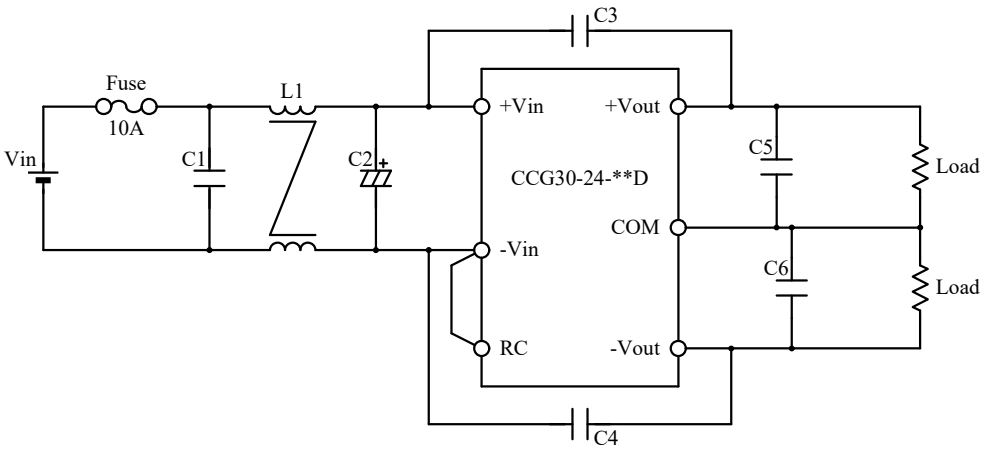
(a) 雑音端子電圧(帰還ノイズ) Conducted Emission Noise



(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,C4	: 1000pF×2parallel	Ceramic Capacitor
C5,C6	: 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

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

・+Vo

Io \ Vin	9VDC	12VDC	24VDC	36VDC	Line regulation	
0%	12.078V	12.079V	12.078V	12.079V	1mV	0.008%
50%	12.076V	12.077V	12.077V	12.076V	1mV	0.008%
100%	12.066V	12.075V	12.082V	12.081V	16mV	0.133%
Load	12mV	4mV	5mV	5mV		
regulation	0.100%	0.033%	0.042%	0.042%		

・-Vo

Io \ Vin	9VDC	12VDC	24VDC	36VDC	Line regulation	
0%	-12.094V	-12.095V	-12.096V	-12.094V	2mV	0.017%
50%	-12.093V	-12.093V	-12.092V	-12.092V	1mV	0.008%
100%	-12.102V	-12.094V	-12.087V	-12.085V	17mV	0.142%
Load	9mV	2mV	9mV	9mV		
regulation	0.075%	0.017%	0.075%	0.075%		

・+Vo to -Vo

Io \ Vin	9VDC	12VDC	24VDC	36VDC	Line regulation	
0%	24.171V	24.173V	24.174V	24.174V	3mV	0.025%
50%	24.169V	24.170V	24.169V	24.169V	1mV	0.008%
100%	24.167V	24.169V	24.170V	24.166V	4mV	0.033%
Load	4mV	4mV	5mV	8mV		
regulation	0.033%	0.033%	0.042%	0.067%		

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

Ta	-40°C	25°C	85°C	Temperature stability	
+Vo	12.078V	12.082V	12.098V	20mV	0.167%
-Vo	-12.071V	-12.087V	-12.106V	35mV	0.292%
+Vo to -Vo	24.149V	24.170V	24.204V	55mV	0.458%

3. Load Regulation - Unbalance load Conditions Ta : 25 ºC

・-Io : 100%

+Io \ Vin	9VDC	12VDC	24VDC	36VDC
20%	12.219V	12.214V	12.215V	12.213V
100%	12.071V	12.081V	12.087V	12.084V
Load	148mV	133mV	128mV	129mV
regulation	1.233%	1.108%	1.067%	1.075%

・+Io : 100%

-Io \ Vin	9VDC	12VDC	24VDC	36VDC
20%	-12.278V	-12.274V	-12.271V	-12.268V
100%	-12.106V	-12.096V	-12.089V	-12.087V
Load	172mV	178mV	182mV	181mV
regulation	1.433%	1.483%	1.517%	1.508%

±15V 1. Regulation - line and load

Condition Ta : 25 ºC

・+Vo

Io \ Vin	9VDC	12VDC	24VDC	36VDC	Line regulation	
0%	15.101V	15.102V	15.102V	15.100V	2mV	0.013%
50%	15.095V	15.096V	15.095V	15.094V	2mV	0.013%
100%	15.096V	15.096V	15.096V	15.092V	4mV	0.027%
Load	6mV	6mV	7mV	8mV		
regulation	0.040%	0.040%	0.047%	0.053%		

・-Vo

Io \ Vin	9VDC	12VDC	24VDC	36VDC	Line regulation	
0%	-15.089V	-15.091V	-15.090V	-15.090V	2mV	0.013%
50%	-15.092V	-15.094V	-15.092V	-15.091V	3mV	0.020%
100%	-15.090V	-15.092V	-15.093V	-15.089V	4mV	0.027%
Load	3mV	3mV	3mV	2mV		
regulation	0.020%	0.020%	0.020%	0.013%		

・+Vo to -Vo

Io \ Vin	9VDC	12VDC	24VDC	36VDC	Line regulation	
0%	30.190V	30.193V	30.192V	30.189V	4mV	0.027%
50%	30.187V	30.190V	30.187V	30.184V	6mV	0.040%
100%	30.186V	30.188V	30.188V	30.181V	7mV	0.047%
Load	4mV	5mV	5mV	8mV		
regulation	0.027%	0.033%	0.033%	0.053%		

2. Temperature drift

Conditions Vin : 24 VDC
Io : 100 %

Ta	-40°C	25°C	85°C	Temperature stability	
+Vo	15.088V	15.096V	15.121V	33mV	0.220%
-Vo	-15.088V	-15.093V	-15.116V	28mV	0.187%
+Vo to -Vo	30.176V	30.188V	30.237V	61mV	0.407%

3. Load Regulation - Unbalance load

Conditions Ta : 25 ºC

・-Io : 100%

+Io \ Vin	9VDC	12VDC	24VDC	36VDC
20%	15.262V	15.257V	15.258V	15.254V
100%	15.107V	15.106V	15.105V	15.101V
Load	155mV	151mV	153mV	153mV
regulation	1.033%	1.007%	1.020%	1.020%

・+Io : 100%

-Io \ Vin	9VDC	12VDC	24VDC	36VDC
20%	-15.246V	-15.246V	-15.246V	-15.241V
100%	-15.098V	-15.101V	-15.102V	-15.098V
Load	148mV	145mV	144mV	143mV
regulation	0.987%	0.967%	0.960%	0.953%

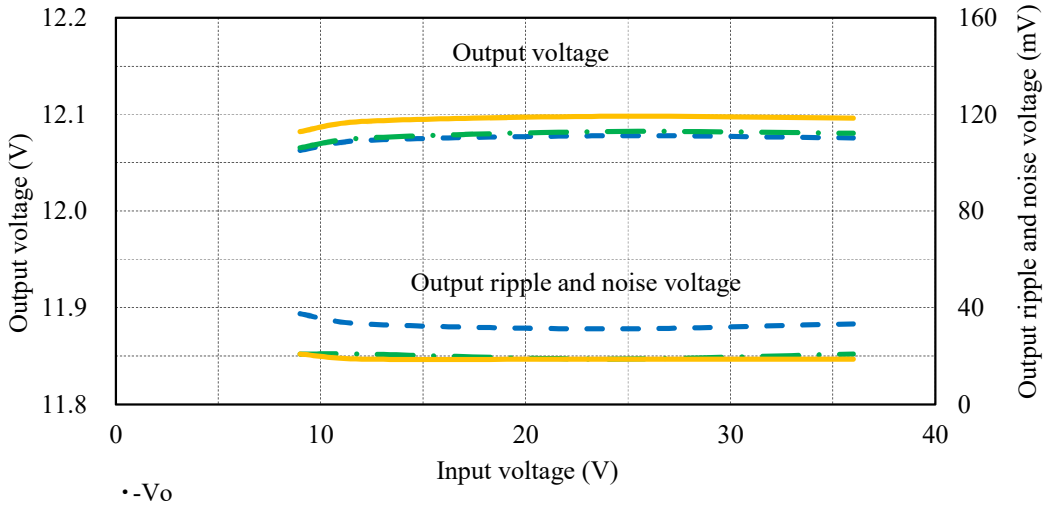
(2) 出力電圧・出力リップルノイズ電圧 対 入力電圧

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

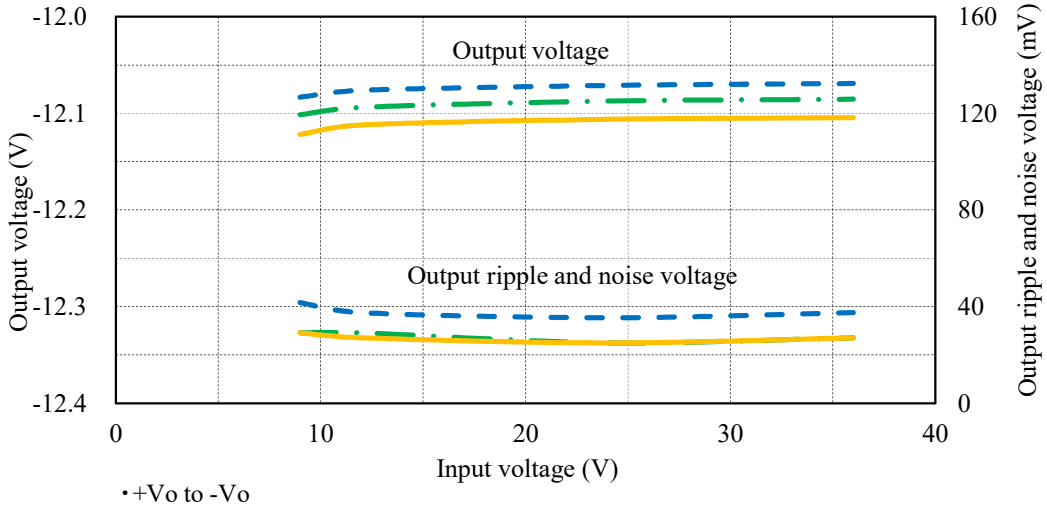
Conditions Io : 100 %
Ta : -40 ºC
: 25 ºC
: 85 ºC

±12V

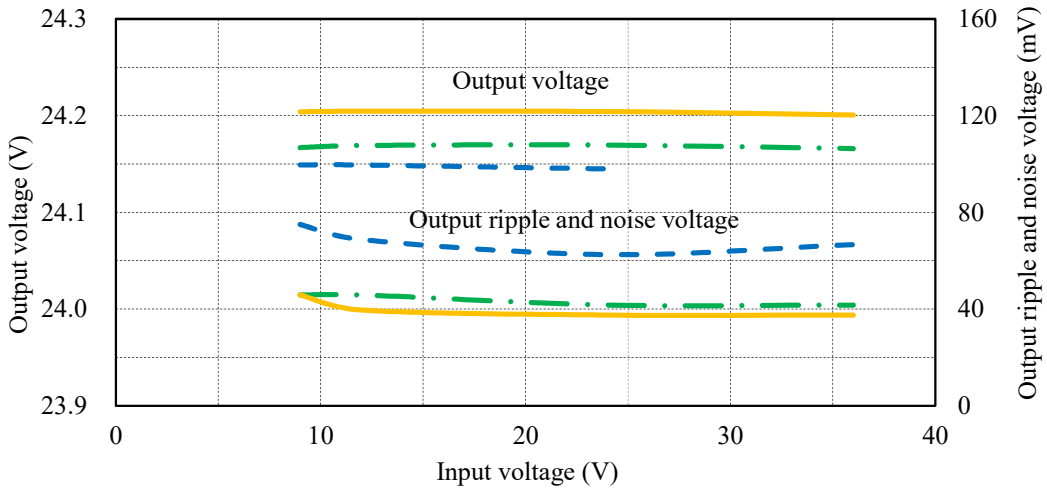
・+Vo



・-Vo



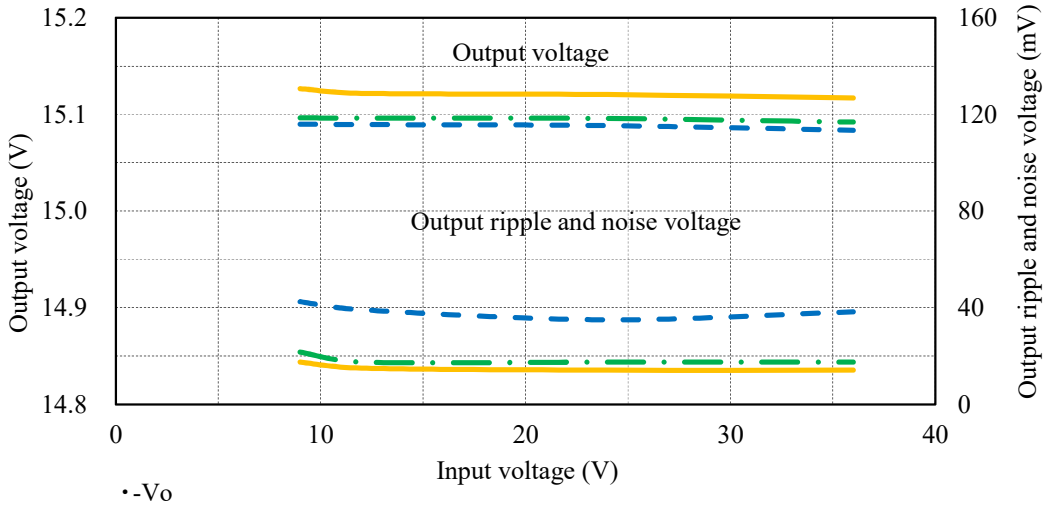
・+Vo to -Vo



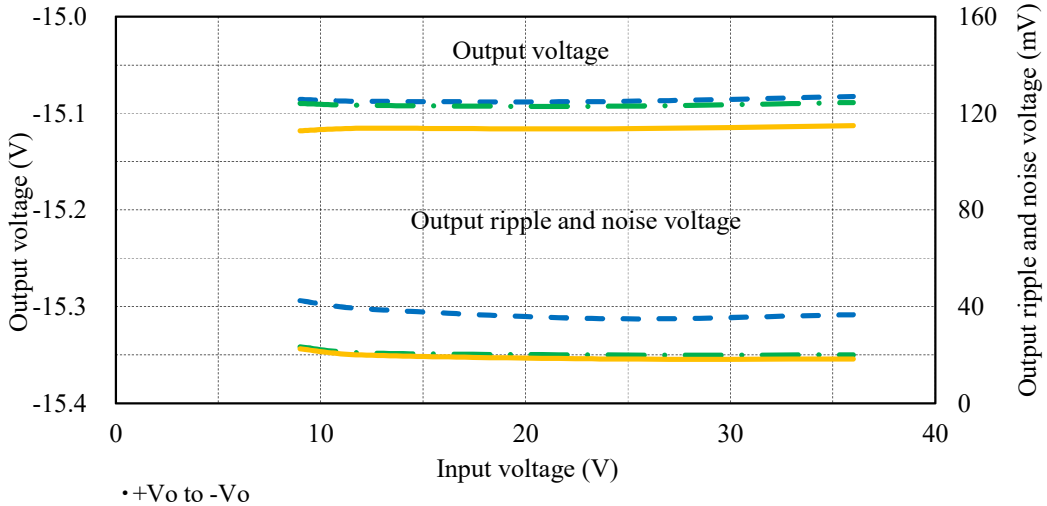
Conditions Io : 100 %
Ta : -40 ºC
: 25 ºC
: 85 ºC

±15V

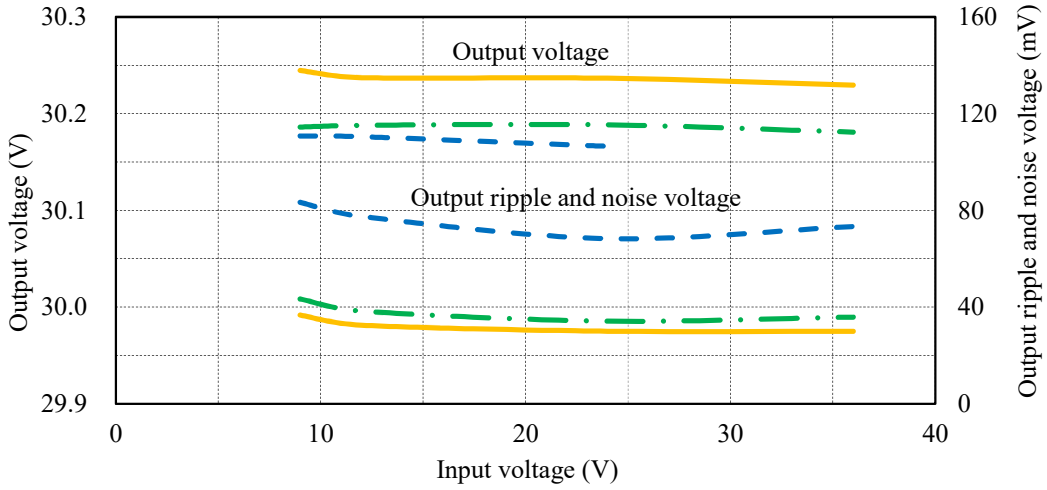
・+Vo



・-Vo



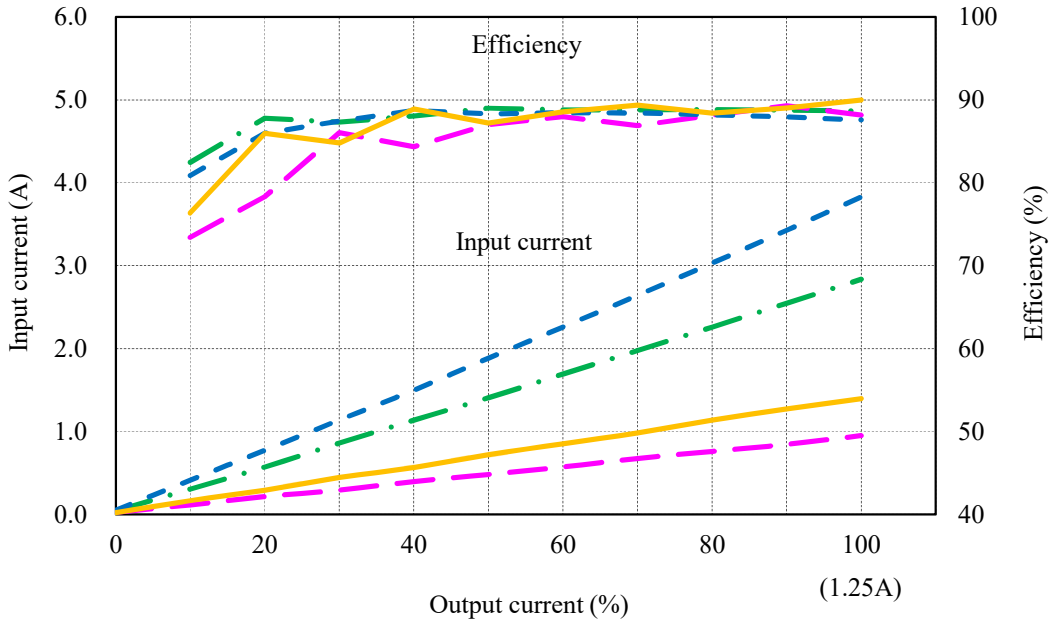
・+Vo to -Vo



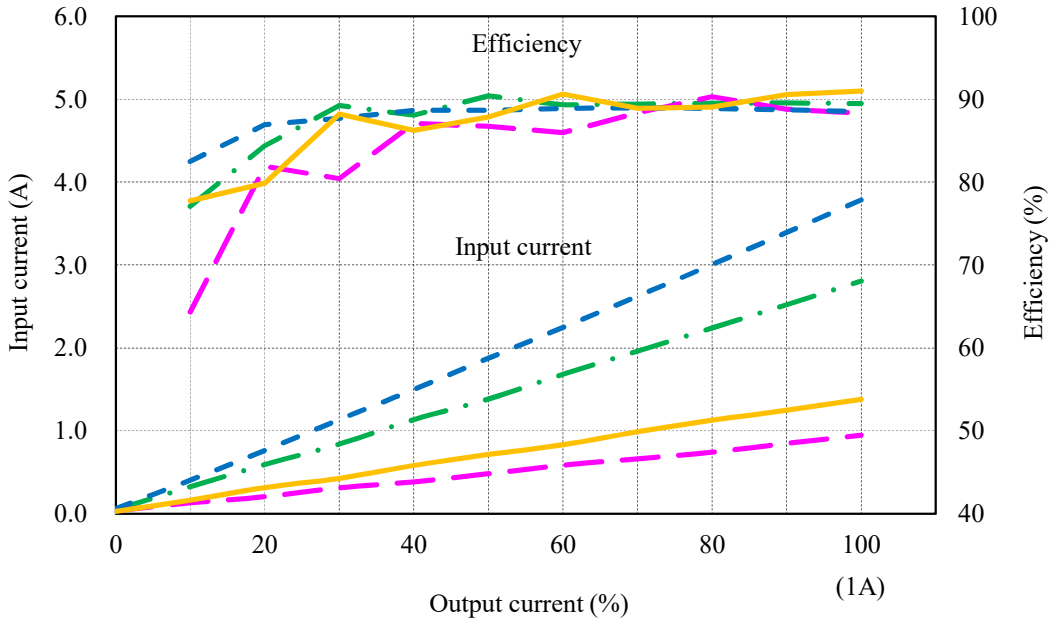
(3) 入力電流･効率 対 出力電流　Input current and Efficiency vs. Output current

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

±12V



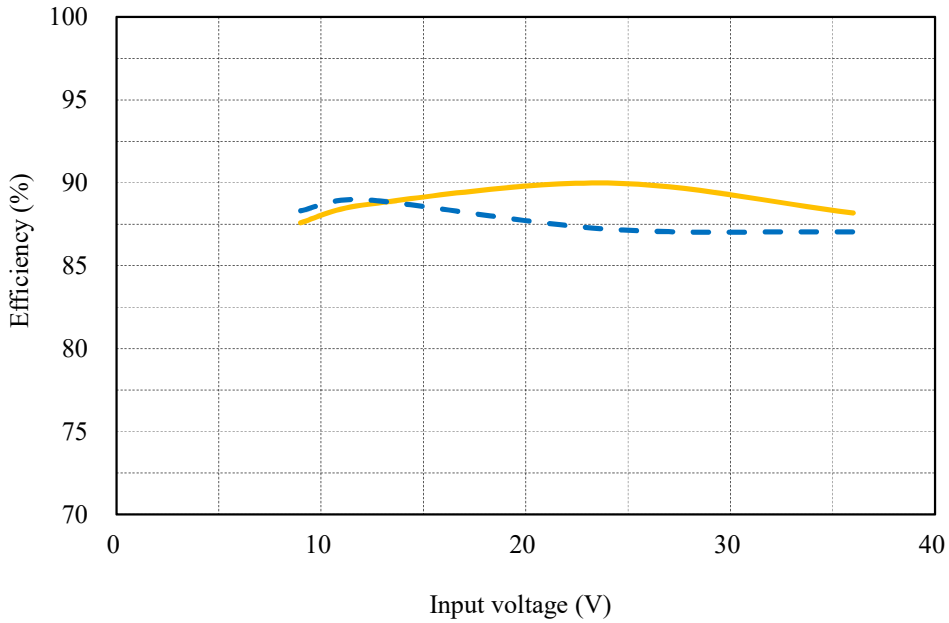
±15V



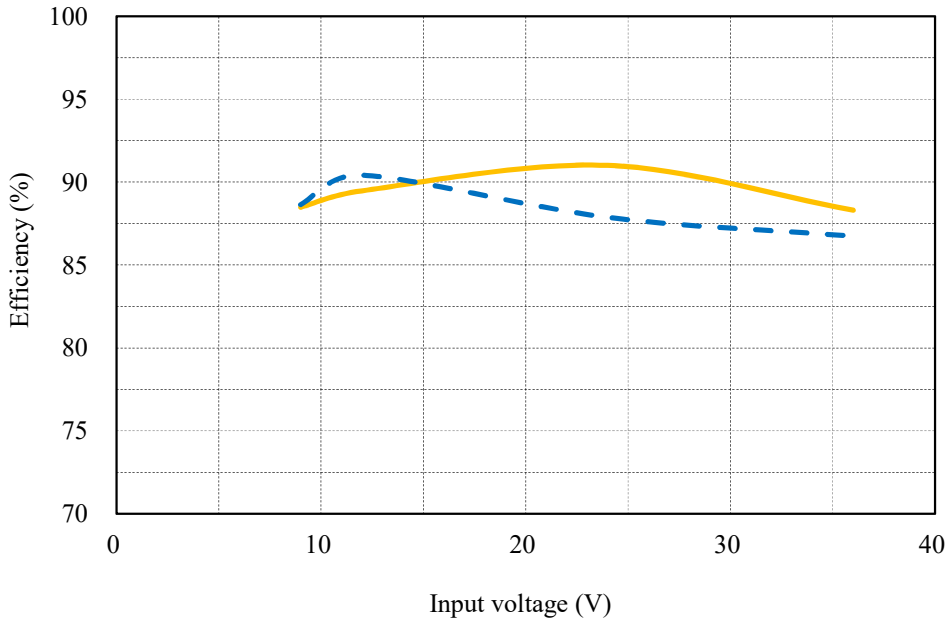
(4) 効率 対 入力電圧 Efficiency vs. Input voltage

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

±12V



±15V



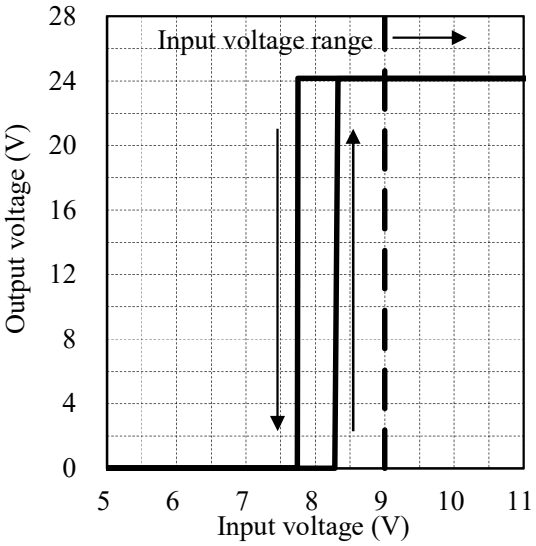
(5) 起動・遮断電圧特性 Start up and Drop out voltage characteristics

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

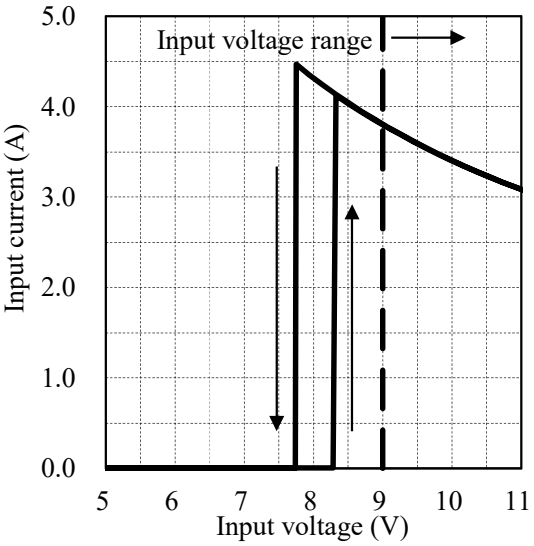
入力電流 対 入力電圧
Input current vs. Input voltage

Conditions Io : 100 %
Ta : 25 ºC

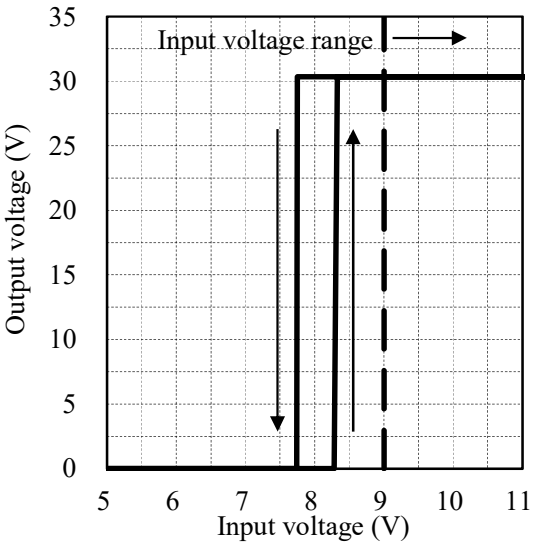
±12V



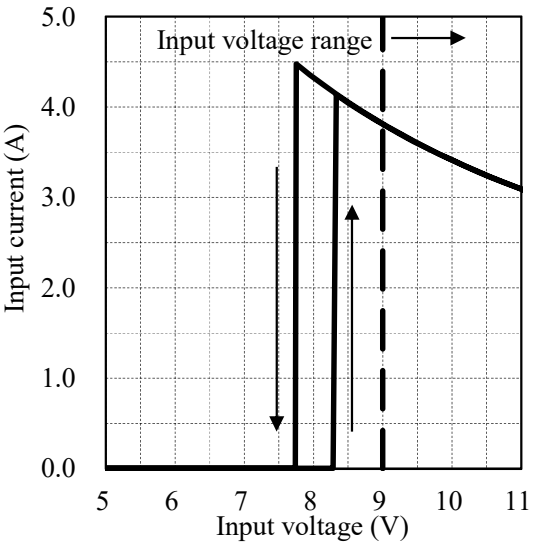
±12V



±15V



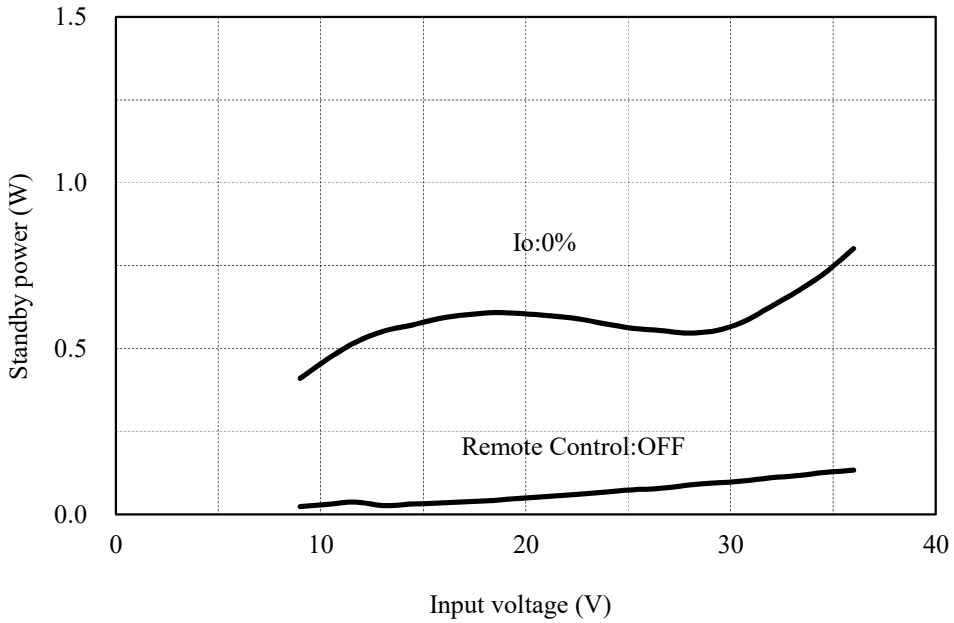
±15V



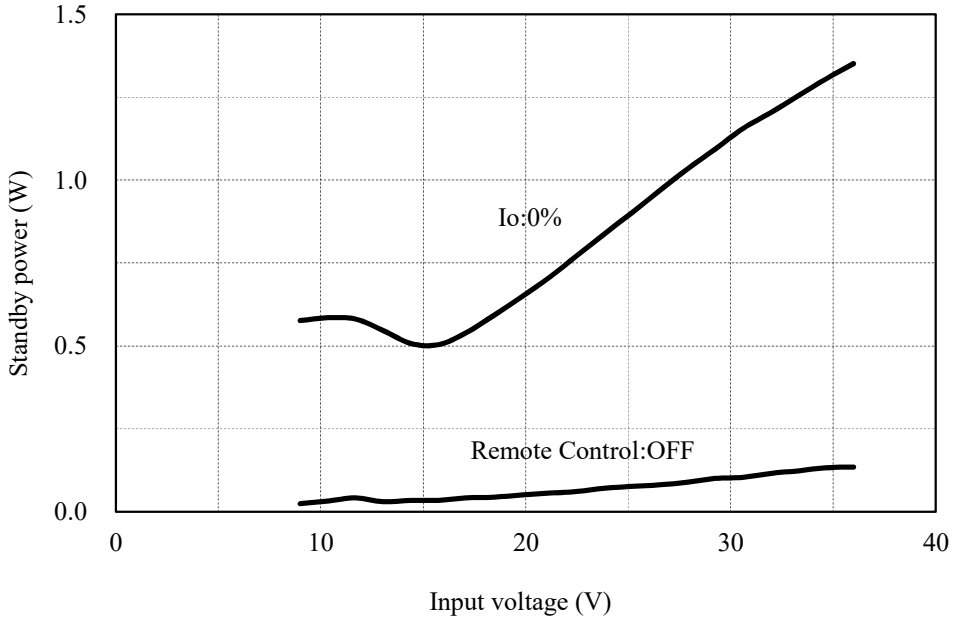
2-2. 待機電力特性 Standby power characteristics

Conditions Ta : 25 ºC

±12V



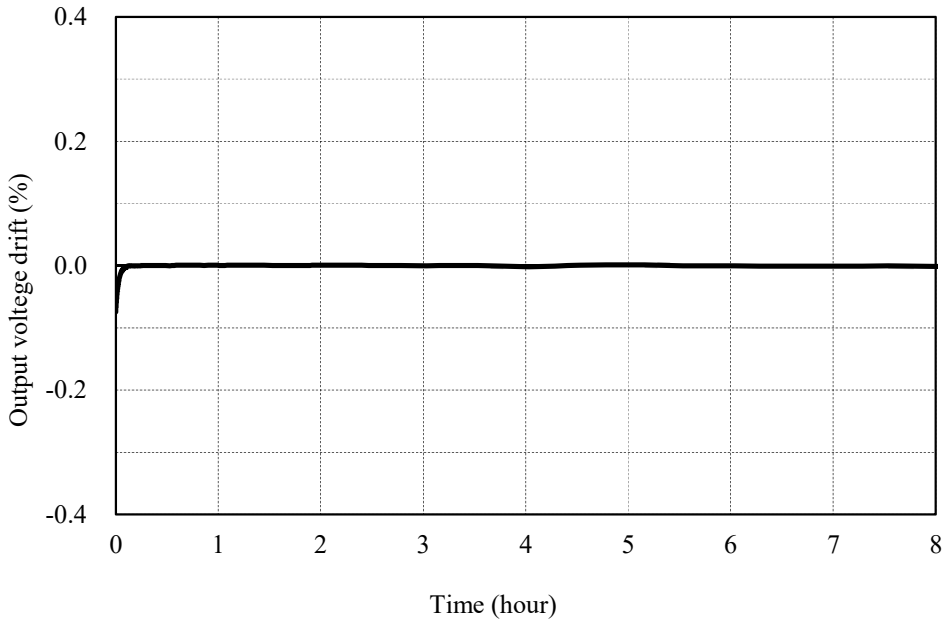
±15V



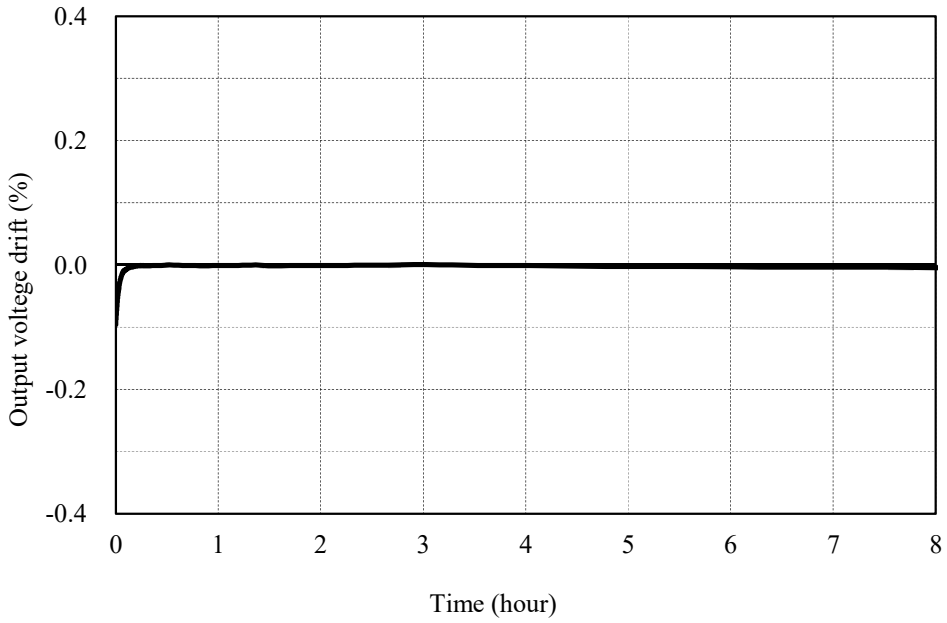
2-3. 通電ドリフト特性 Warm up voltage drift characteristics

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

±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

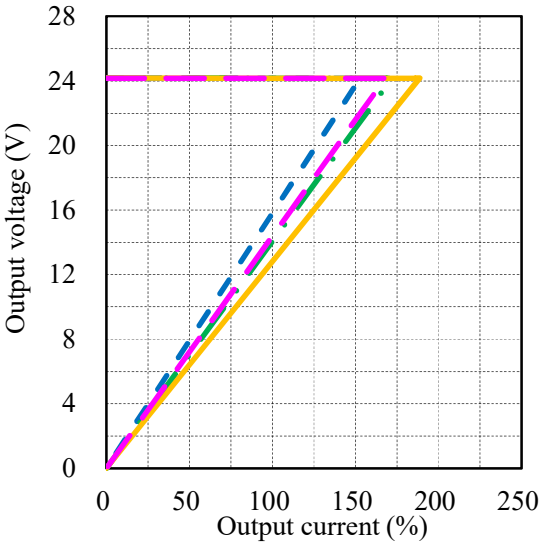
Conditions Vin : 9 VDC
: 12 VDC
: 24 VDC
: 36 VDC
Ta : 25 ℃

周囲温度依存性

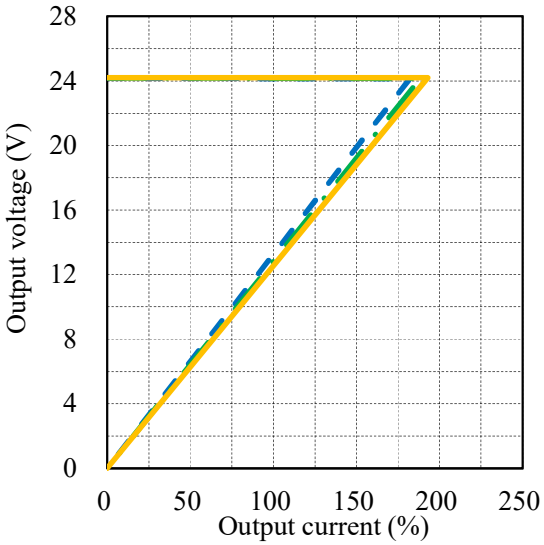
Ambient temperature dependence

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

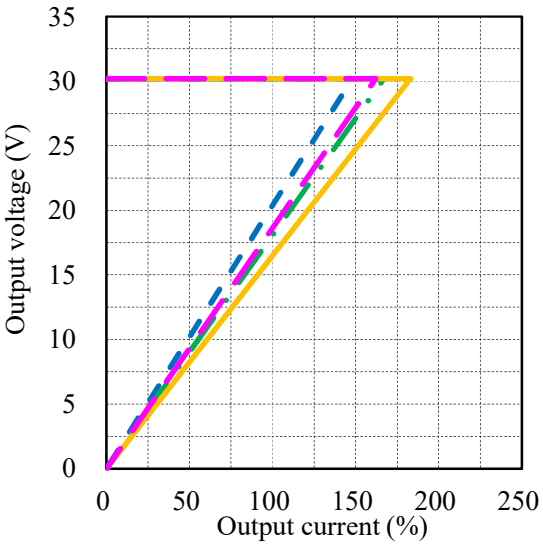
±12V



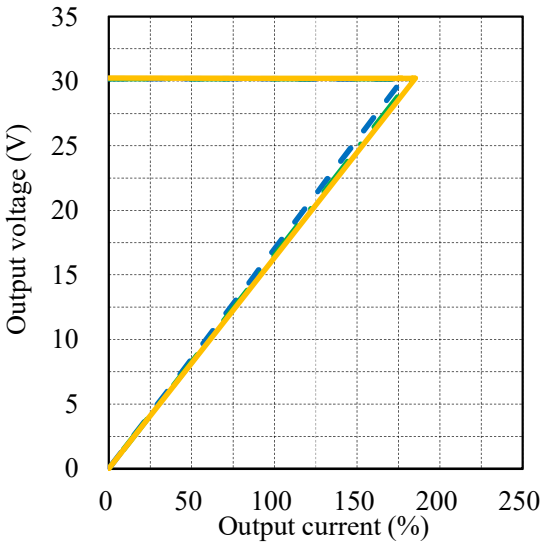
±12V



±15V



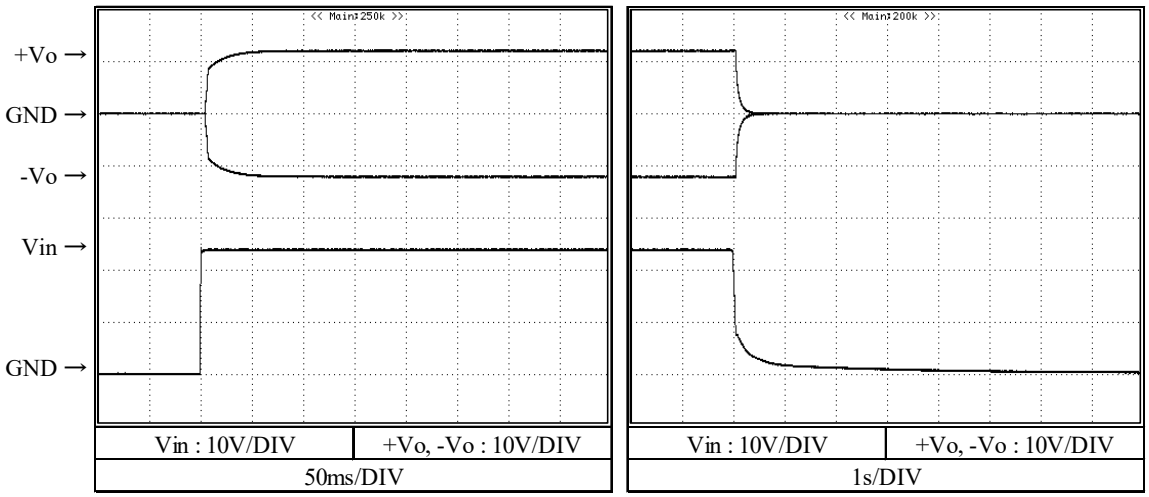
±15V



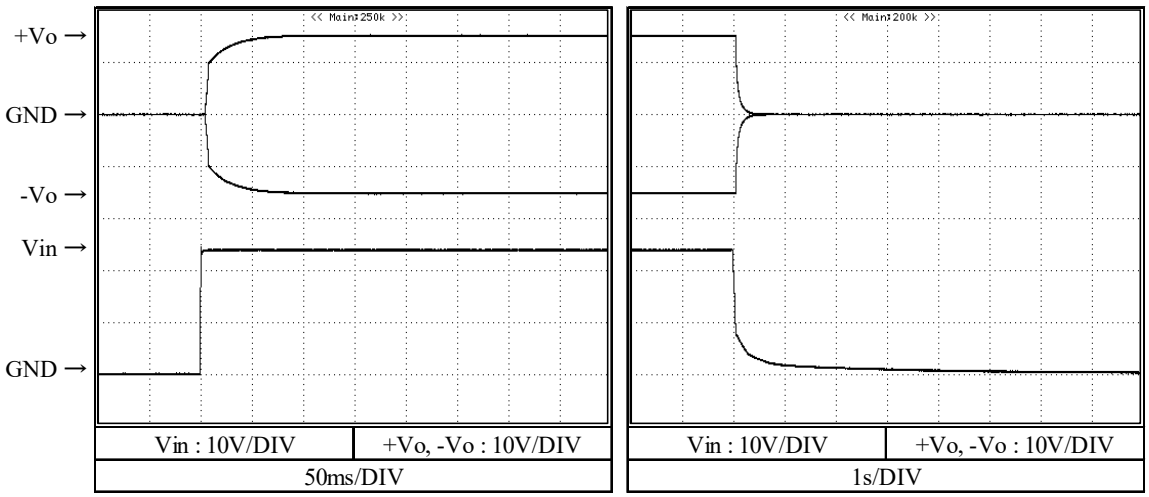
2-5. 出力立ち上がり・立ち下がり特性 Output rise and fall characteristics

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

±12V



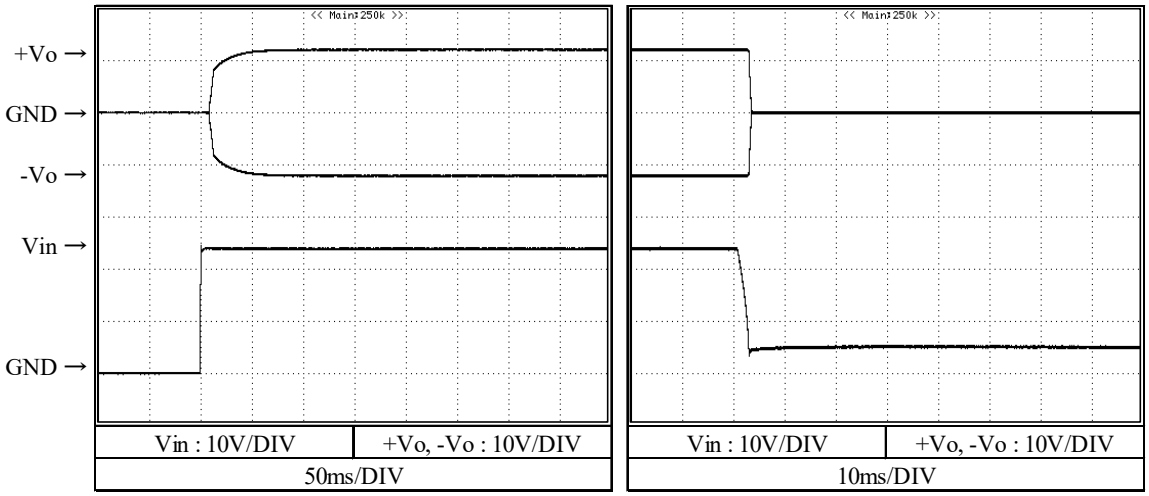
±15V



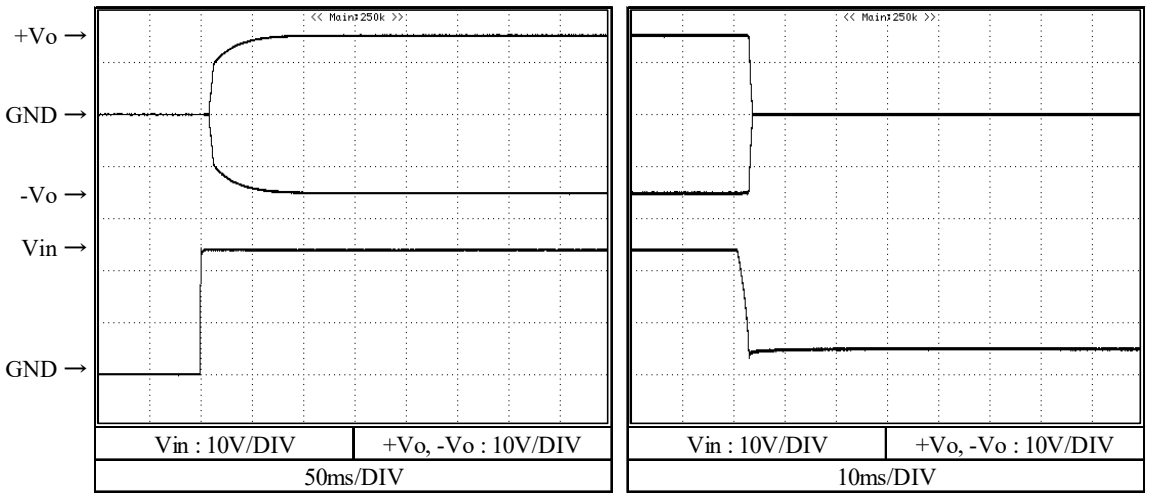
2-5. 出力立ち上がり・立ち下がり特性 Output rise and fall characteristics

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

±12V



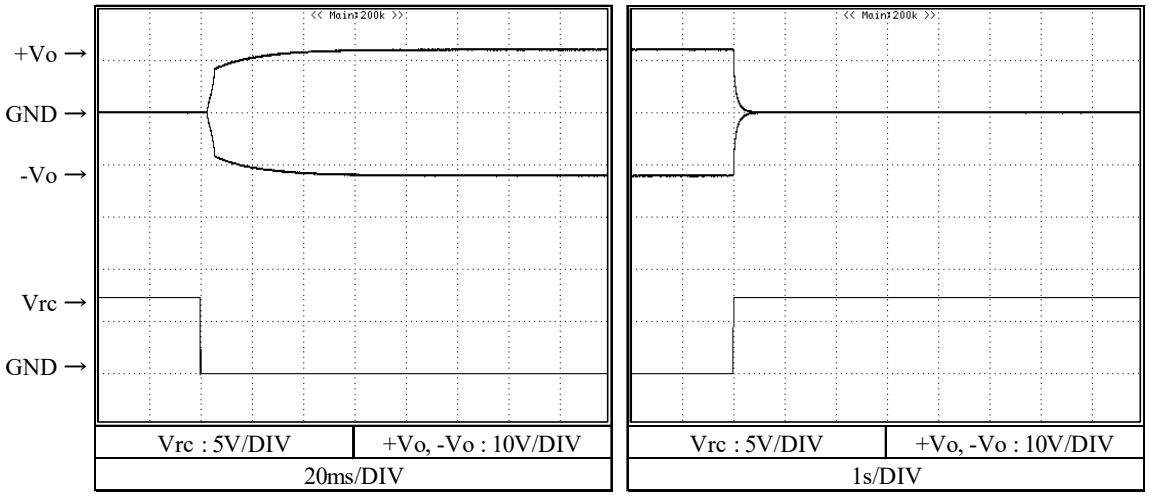
±15V



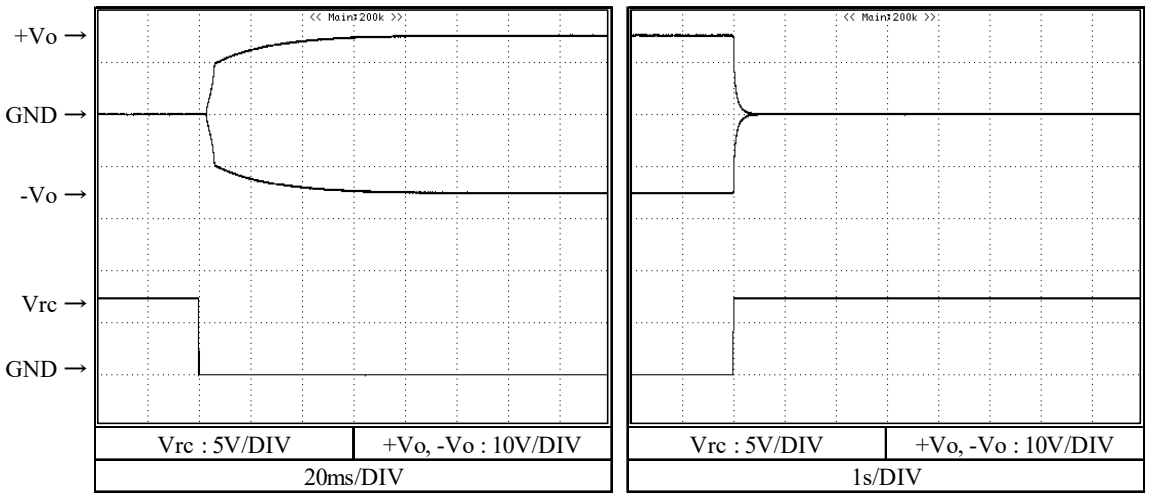
2-5. 出力立ち上がり・立ち下がり特性 (リモートON/OFFコントロール時)
Output rise and fall characteristics with REMOTE ON/OFF CONTROL

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

±12V



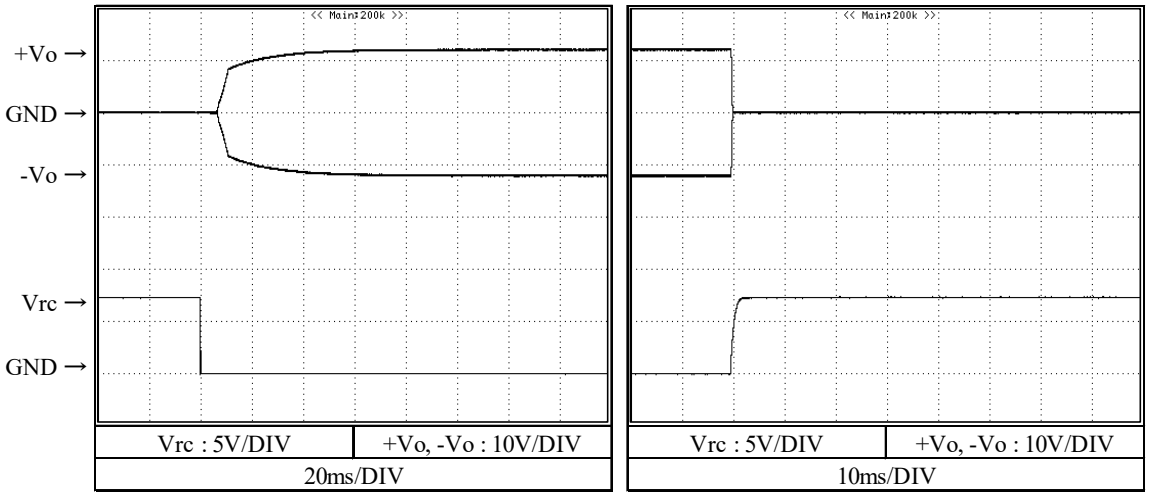
±15V



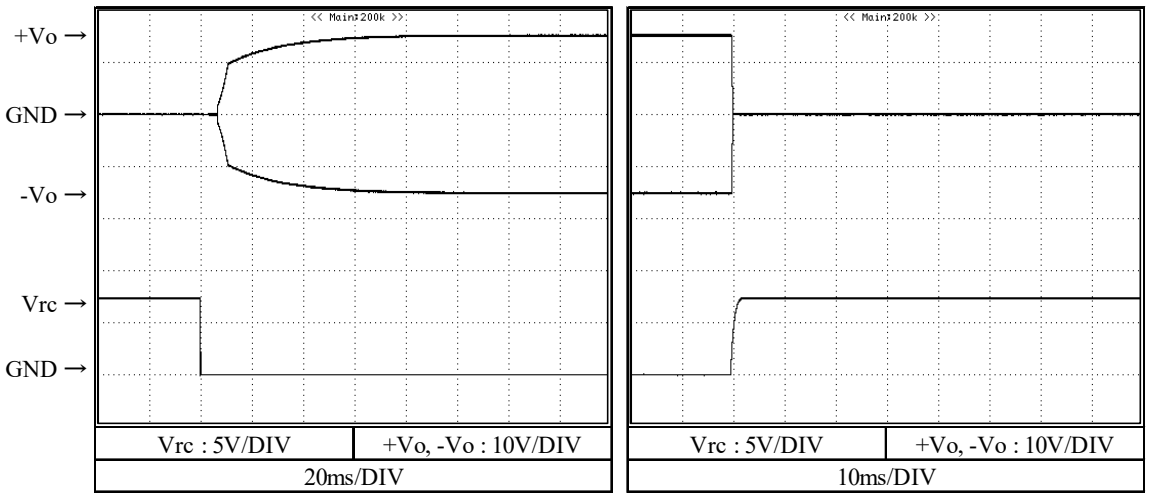
2-5. 出力立ち上がり・立ち下がり特性 (リモートON/OFFコントロール時)
Output rise and fall characteristics with REMOTE ON/OFF CONTROL

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

±12V



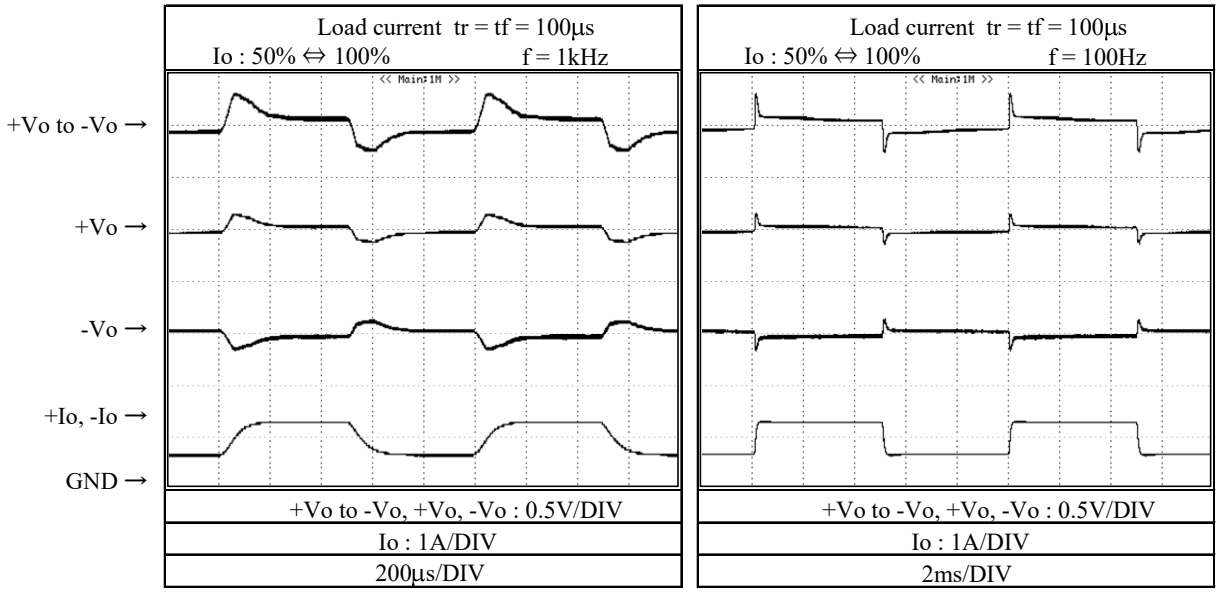
±15V



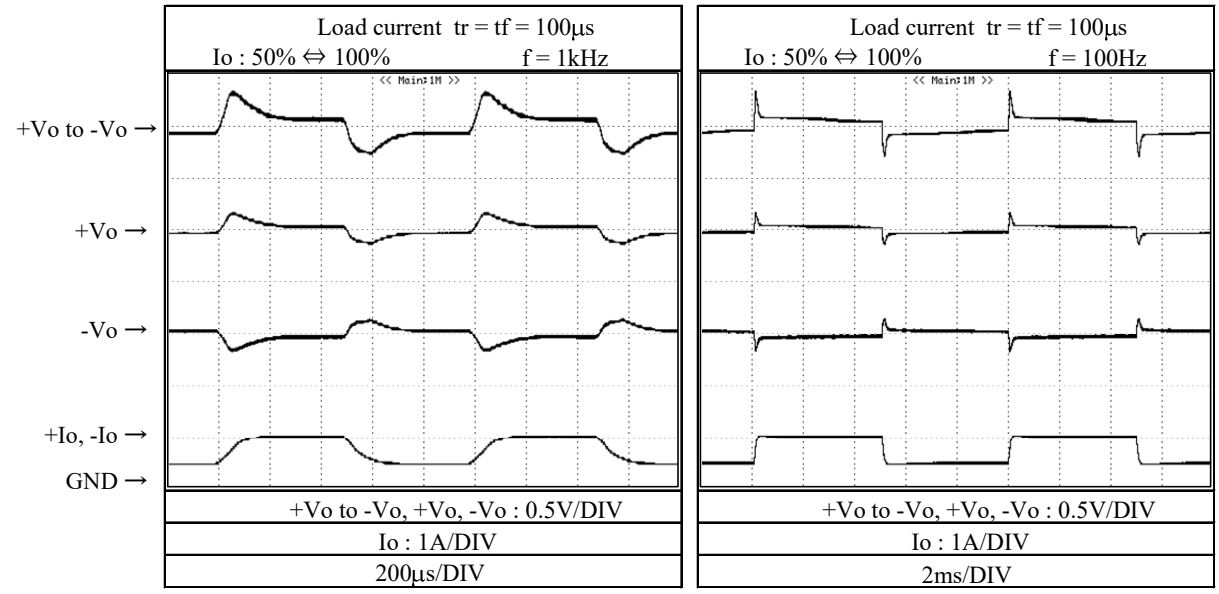
2-6. 過渡応答(負荷急変)特性 Dynamic load response characteristics

Conditions Vin : 24 VDC
Ta : 25 ºC

±12V



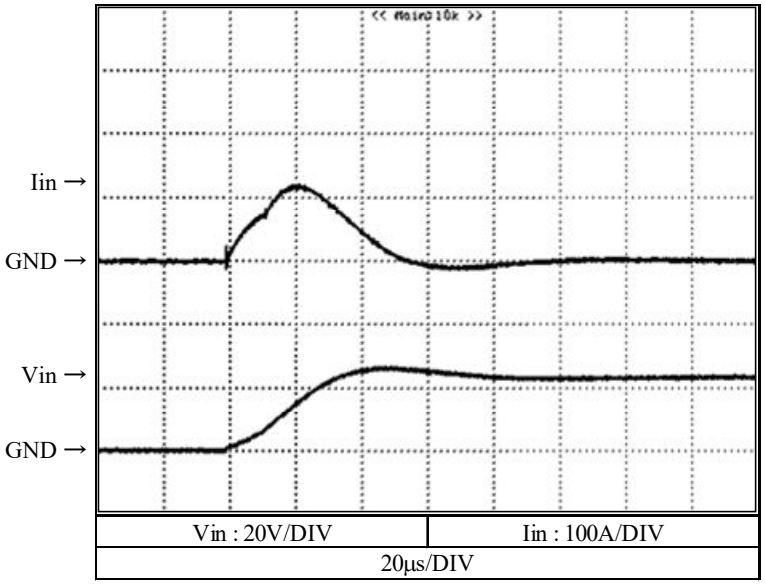
±15V



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

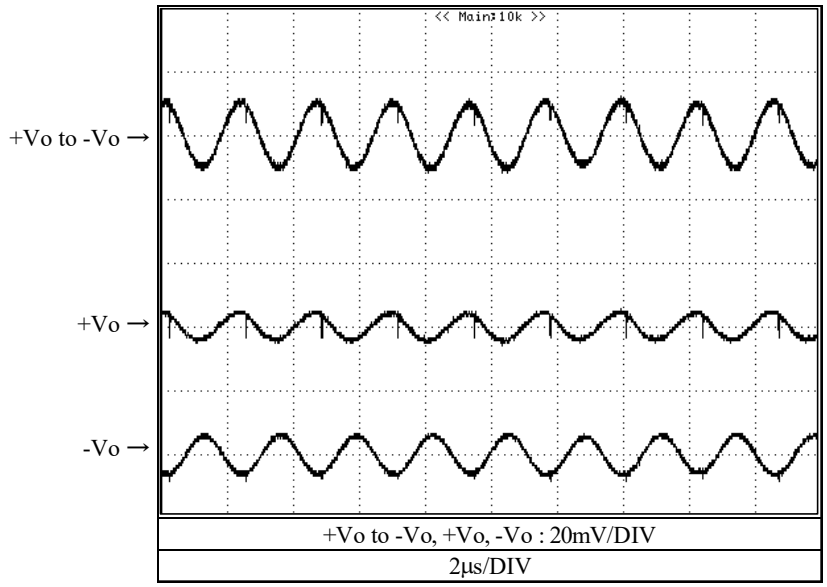
±12V



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

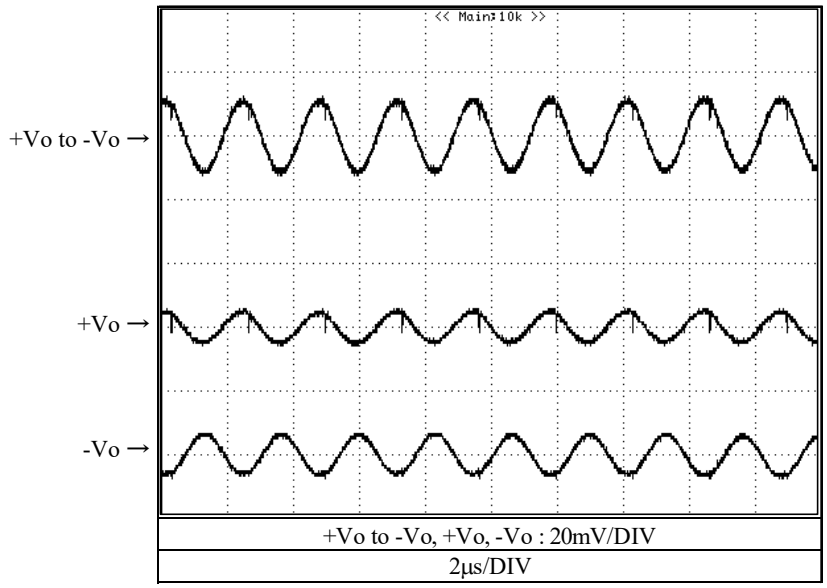
Conditions Vin : 24 VDC
Io : 100 %
Ta : 25 ºC

±12V



+Vo to -Vo, +Vo, -Vo : 20mV/DIV
2μs/DIV

±15V



+Vo to -Vo, +Vo, -Vo : 20mV/DIV
2μs/DIV

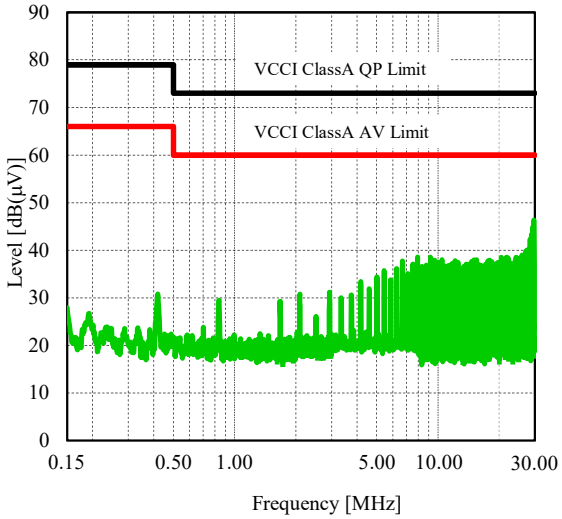
2-9. EMI特性 Electro-Magnetic Interference characteristics

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

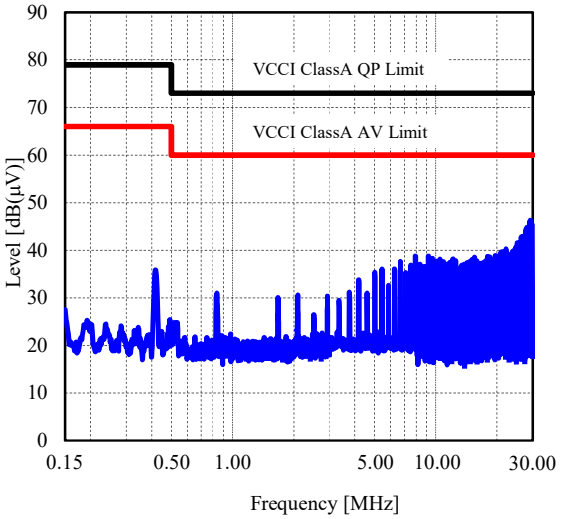
Conditions Vin : 24 VDC
Io : 100 %
Ta : 25 ºC

±12V

+Vin

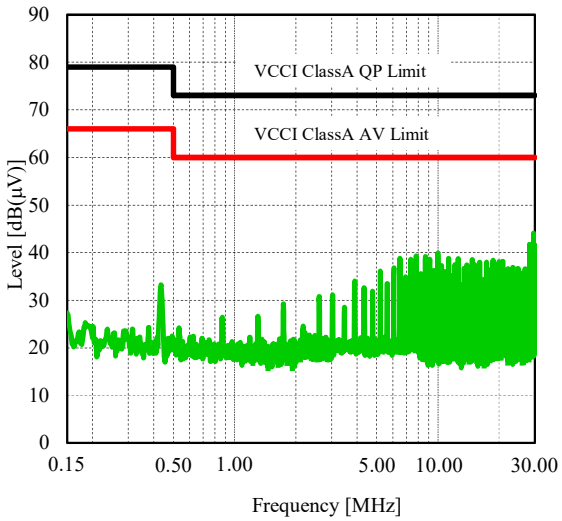


-Vin

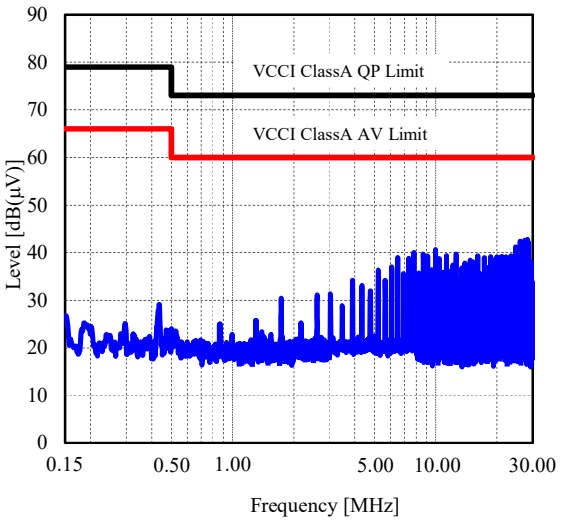


±15V

+Vin



-Vin



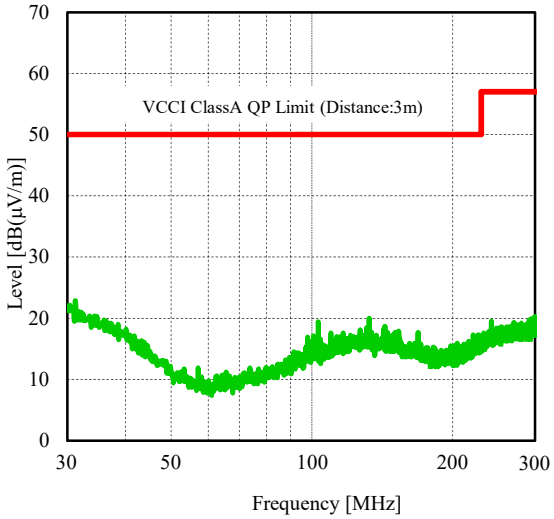
2-9. EMI特性 Electro-Magnetic Interference characteristics

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

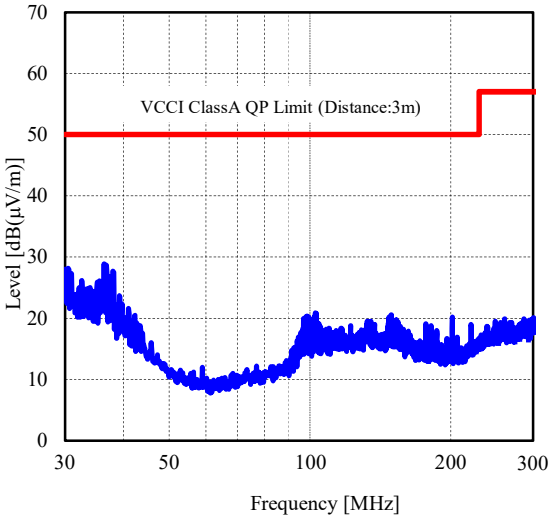
Conditions Vin : 24 VDC
Io : 100 %
Ta : 25 ºC

±12V

HORIZONTAL

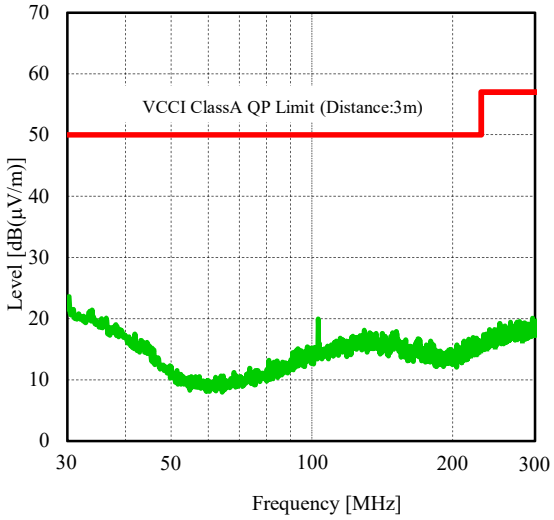


VERTICAL



±15V

HORIZONTAL



VERTICAL