

CCGS15-24-xxD

EVALUATION DATA

型式データ

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使用記号 Terminology used

定義 Definition		
V _{in}		入力電圧 Input voltage
+V _o , -V _o		出力電圧 Output voltage
COM		出力共通GND Output common GND
V _{RC}		RC電圧 RC voltage
I _{in}		入力電流 Input current
+I _o , -I _o		出力電流 Output current
T _a		周囲温度 Ambient temperature
f		周波数 Frequency

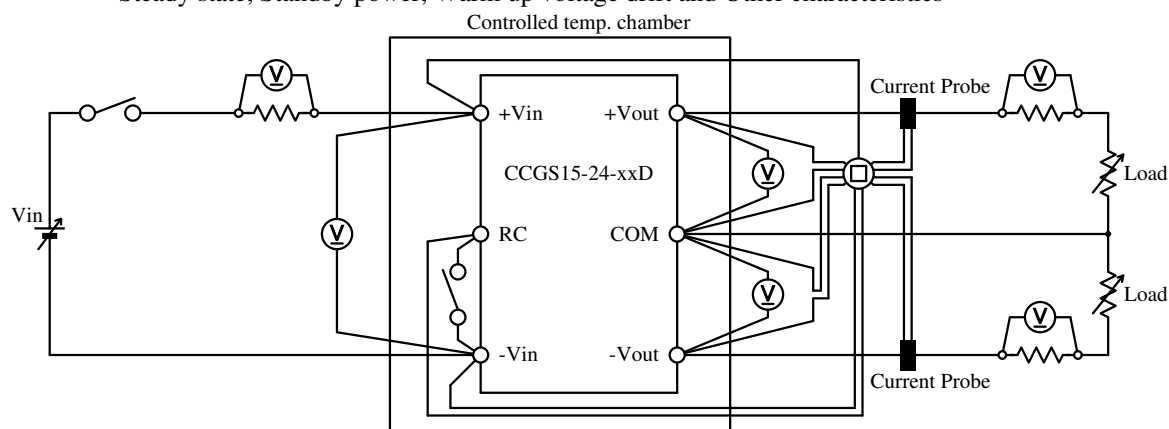
※ 当社測定条件における結果であり、参考値としてお考え願います。
Test results are reference data based on our measurement condition.

1. 測定方法 Evaluation Method

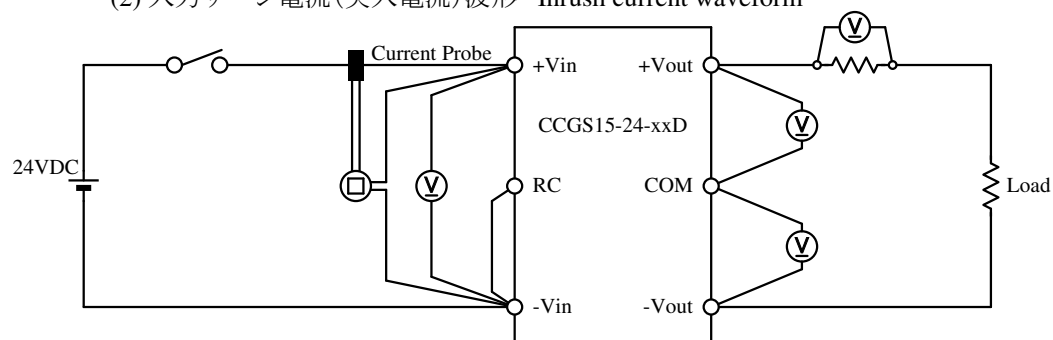
1-1. 測定回路 Measurement Circuits

(1) 静特性、待機電力特性、通電ドリフト特性、その他特性

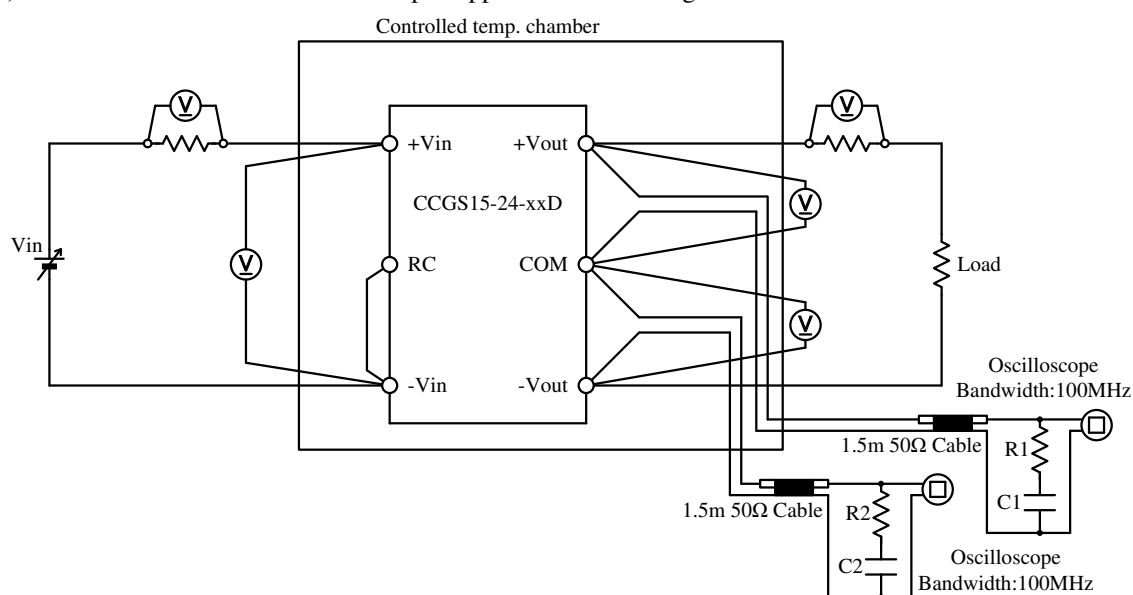
Steady state, Standby power, Warm up voltage drift and Other characteristics



(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



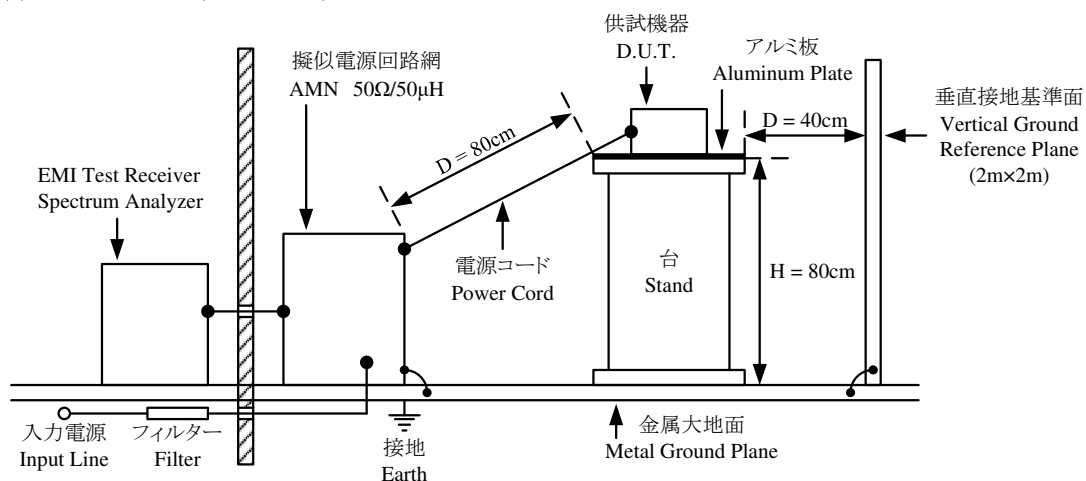
C1, C2 : 4700pF

R1, R2 : 50Ω

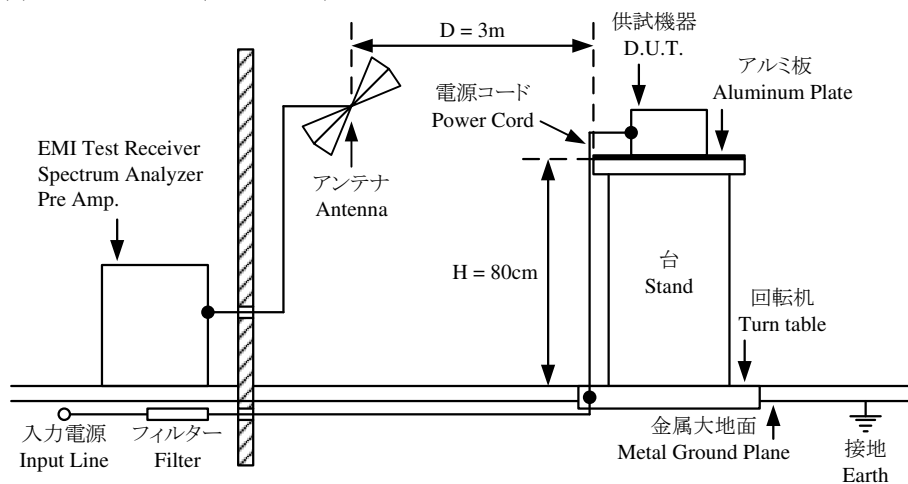
Ceramic Capacitor

(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



1-2. 使用測定機器 List of equipment used

	EQUIPMENT USED	MANUFACTURER	MODEL NO.
1	DIGITAL STORAGE OSCILLOSCOPE	YOKOGAWA ELECT.	DLM2054
2	DIGITAL MULTIMETER	AGILENT	34970A
3	CURRENT PROBE	YOKOGAWA ELECT.	70193
4	CURRENT PROBE	HIOKI	3273
5	SHUNT RESISTER	YOKOGAWA ELECT.	2215
6	DYNAMIC DUMMY LOAD	TAKASAGO	FK-200L
7	DYNAMIC DUMMY LOAD	KIKUSUI	PLZ-164WL
8	CVCF	NF	ES10000S
9	DC POWER SUPPLY	TDK-Lambda	Z+100-8
10	CONTROLLED TEMP. CHAMBER	ESPEC	SU-261
11	EMI TEST RECEIVER / SPECTRUM ANALYZER	ROHDE & SCHWARZ	ESR3
12	PRE AMP.	SONOMA	310N
13	AMN	KIKUSUI	KNW-242C
14	ANTENNA	SCHWARZBECK	BBA9106
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

$\pm 12V$

1. Regulation - line and load

Condition Ta : 25 °C

・+Vo to COM

Io \ Vin	9VDC	12VDC	24VDC	36VDC	Line regulation	
0%	12.138V	12.133V	12.115V	12.120V	23.2mV	0.193%
50%(0.325A)	12.151V	12.152V	12.151V	12.151V	1.4mV	0.012%
100%(0.65A)	12.153V	12.153V	12.152V	12.152V	1.3mV	0.011%
Load regulation	14.5mV	20.2mV	36.7mV	31.8mV		
	0.121%	0.168%	0.306%	0.265%		

・-Vo to COM

Io \ Vin	9VDC	12VDC	24VDC	36VDC	Line regulation	
0%	-12.132V	-12.141V	-12.159V	-12.153V	26.9mV	0.224%
50%(0.325A)	-12.114V	-12.116V	-12.117V	-12.117V	3.3mV	0.028%
100%(0.65A)	-12.111V	-12.113V	-12.114V	-12.115V	3.6mV	0.030%
Load regulation	20.5mV	28.1mV	44.7mV	37.7mV		
	0.171%	0.234%	0.372%	0.314%		

・+Vo to -Vo

Io \ Vin	9VDC	12VDC	24VDC	36VDC	Line regulation	
0%	24.270V	24.273V	24.274V	24.272V	3.7mV	0.015%
50%(0.325A)	24.265V	24.268V	24.268V	24.267V	3.1mV	0.013%
100%(0.65A)	24.264V	24.266V	24.266V	24.266V	2.3mV	0.010%
Load regulation	5.9mV	7.7mV	8.0mV	6.0mV		
	0.025%	0.032%	0.033%	0.025%		

2. Temperature drift

Conditions Vin : 24 VDC

Io : 100 %

Ta	-20°C	25°C	70°C	Temperature stability	
+Vo to COM	12.137V	12.152V	12.170V	33.4mV	0.278%
-Vo to COM	-12.099V	-12.114V	-12.130V	31.3mV	0.261%
+Vo to -Vo	24.235V	24.266V	24.300V	64.7mV	0.270%

3. Load Regulation - Unbalance load

Conditions Ta : 25 °C

-Io : 100 %

・+Vo to COM

+Io \ Vin	9VDC	12VDC	24VDC	36VDC
20%(0.13A)	12.035V	12.037V	12.036V	12.036V
100%(0.65A)	12.150V	12.151V	12.150V	12.151V
Load regulation	114.3mV	113.8mV	114.9mV	114.1mV
	0.953%	0.948%	0.957%	0.951%

Conditions Ta : 25 °C

+Io : 100 %

・-Vo to COM

-Io \ Vin	9VDC	12VDC	24VDC	36VDC
20%(0.13A)	11.997V	11.999V	12.002V	12.002V
100%(0.65A)	12.109V	12.111V	12.113V	12.115V
Load regulation	111.5mV	111.7mV	111.6mV	112.7mV
	0.929%	0.931%	0.930%	0.939%

±15V

1. Regulation - line and load

Condition Ta : 25 °C

• +Vo to COM

Io \ Vin	9VDC	12VDC	24VDC	36VDC	Line regulation	
0%	15.124V	15.128V	15.131V	15.136V	11.5mV	0.077%
50%(0.25A)	15.119V	15.121V	15.123V	15.122V	4.4mV	0.029%
100%(0.5A)	15.118V	15.120V	15.121V	15.122V	4.0mV	0.027%
Load regulation	6.2mV	7.1mV	9.9mV	13.7mV		
	0.041%	0.047%	0.066%	0.091%		

• -Vo to COM

Io \ Vin	9VDC	12VDC	24VDC	36VDC	Line regulation	
0%	-15.137V	-15.142V	-15.139V	-15.134V	8.6mV	0.057%
50%(0.25A)	-15.140V	-15.143V	-15.143V	-15.143V	3.1mV	0.021%
100%(0.5A)	-15.142V	-15.143V	-15.143V	-15.143V	1.5mV	0.010%
Load regulation	4.5mV	0.9mV	4.2mV	9.7mV		
	0.030%	0.006%	0.028%	0.065%		

• +Vo to -Vo

Io \ Vin	9VDC	12VDC	24VDC	36VDC	Line regulation	
0%	30.261V	30.270V	30.270V	30.269V	9.0mV	0.030%
50%(0.25A)	30.259V	30.265V	30.267V	30.266V	7.4mV	0.025%
100%(0.5A)	30.260V	30.264V	30.265V	30.265V	5.3mV	0.018%
Load regulation	2.3mV	6.2mV	5.8mV	4.4mV		
	0.008%	0.021%	0.019%	0.015%		

2. Temperature drift

Conditions Vin : 24 VDC

Io : 100 %

Ta	-20°C	25°C	70°C	Temperature stability	
+Vo to COM	15.088V	15.121V	15.153V	64.6mV	0.431%
-Vo to COM	-15.108V	-15.143V	-15.179V	70.6mV	0.471%
+Vo to -Vo	30.197V	30.265V	30.332V	135.3mV	0.451%

3. Load Regulation - Unbalance load

Conditions Ta : 25 °C

-Io : 100 %

• +Vo to COM

+Io \ Vin	9VDC	12VDC	24VDC	36VDC
20%(0.1A)	15.010V	15.017V	15.019V	15.018V
100%(0.5A)	15.126V	15.127V	15.128V	15.129V
Load regulation	116.1mV	110.2mV	109.7mV	110.7mV
	0.774%	0.735%	0.731%	0.738%

Conditions Ta : 25 °C

+Io : 100 %

• -Vo to COM

-Io \ Vin	9VDC	12VDC	24VDC	36VDC
20%(0.1A)	15.025V	15.033V	15.033V	15.034V
100%(0.5A)	15.142V	15.144V	15.145V	15.145V
Load regulation	116.0mV	111.0mV	111.7mV	110.7mV
	0.773%	0.740%	0.745%	0.738%

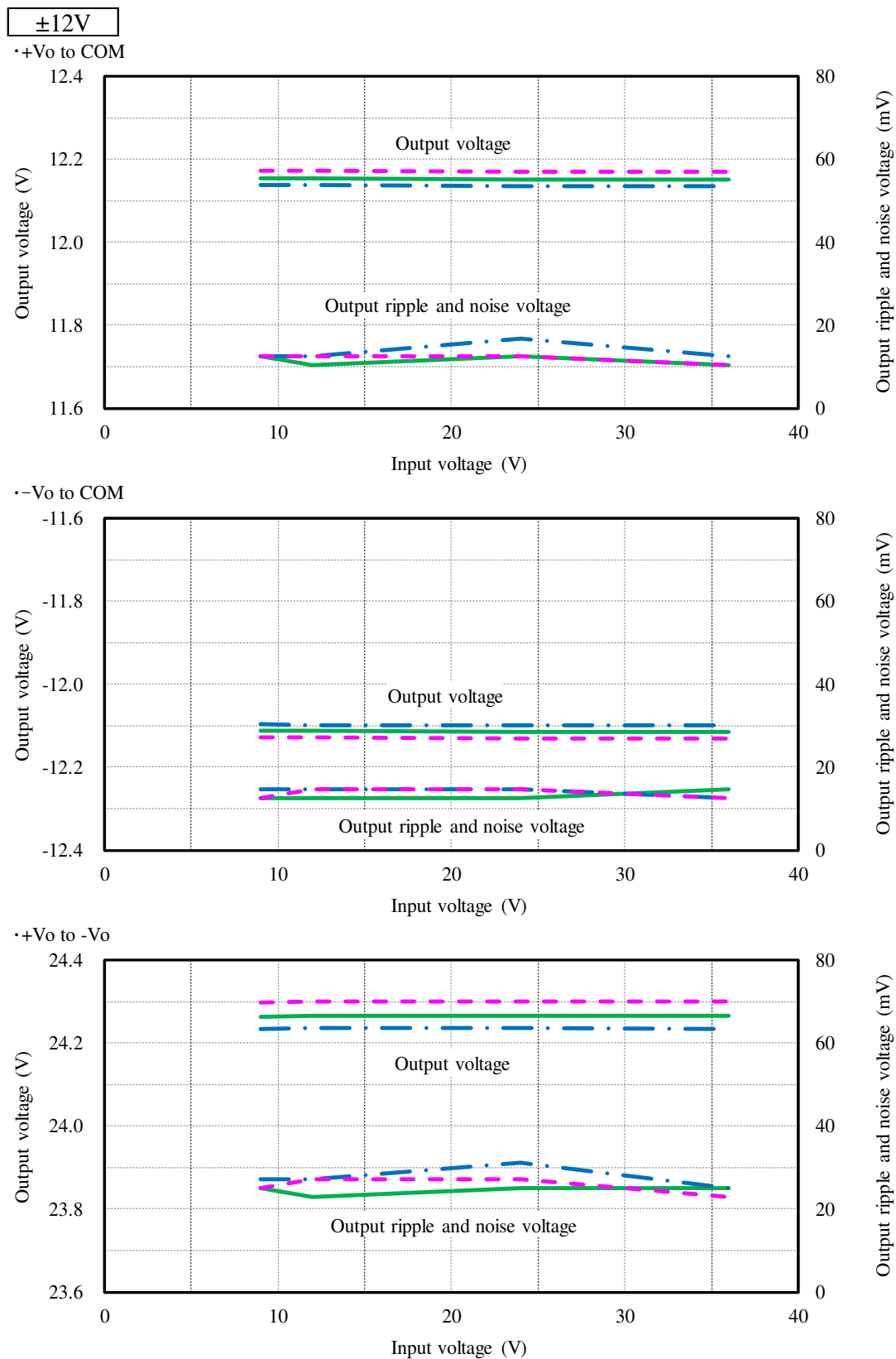
(2) 出力電圧・出力リップルノイズ電圧 対 入力電圧

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

Conditions I_o : 100 % T_a : -20 °C

: 25 °C

: 70 °C



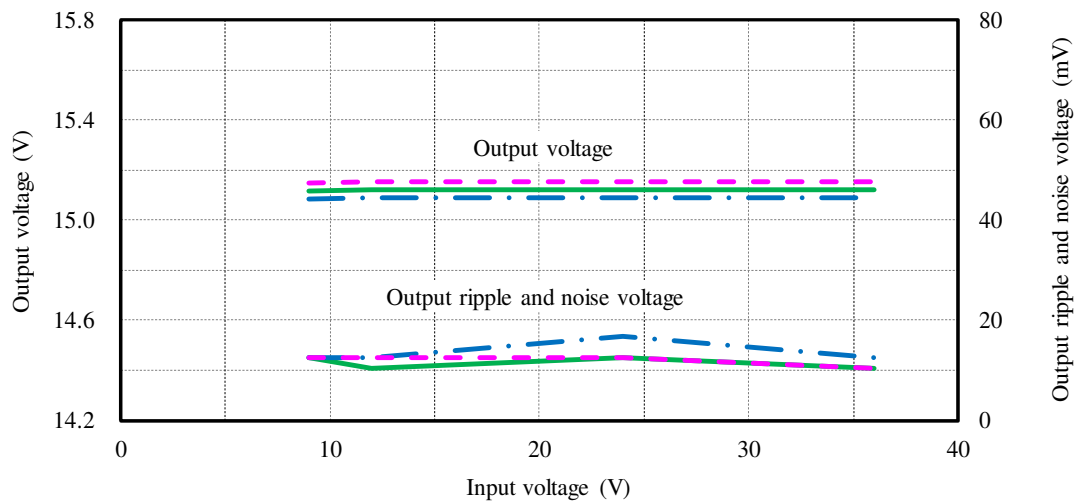
Conditions I_o : 100 % T_a : -20 °C

: 25 °C

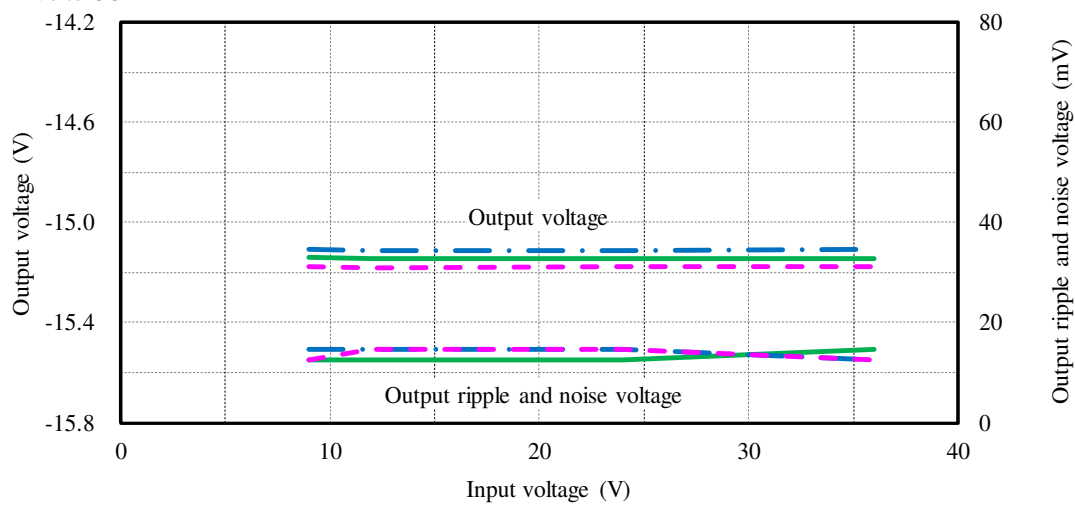
: 70 °C

±15V

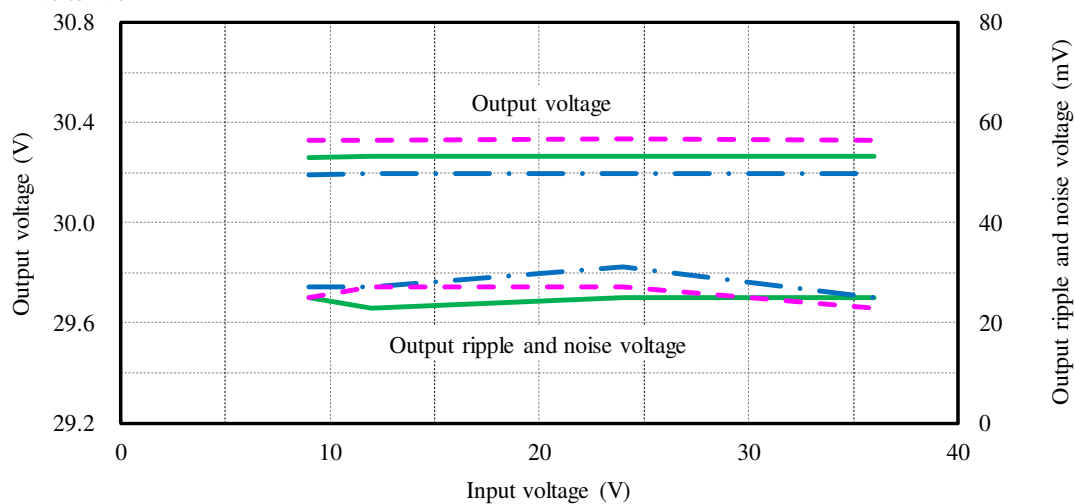
• +Vo to COM



• -Vo to COM



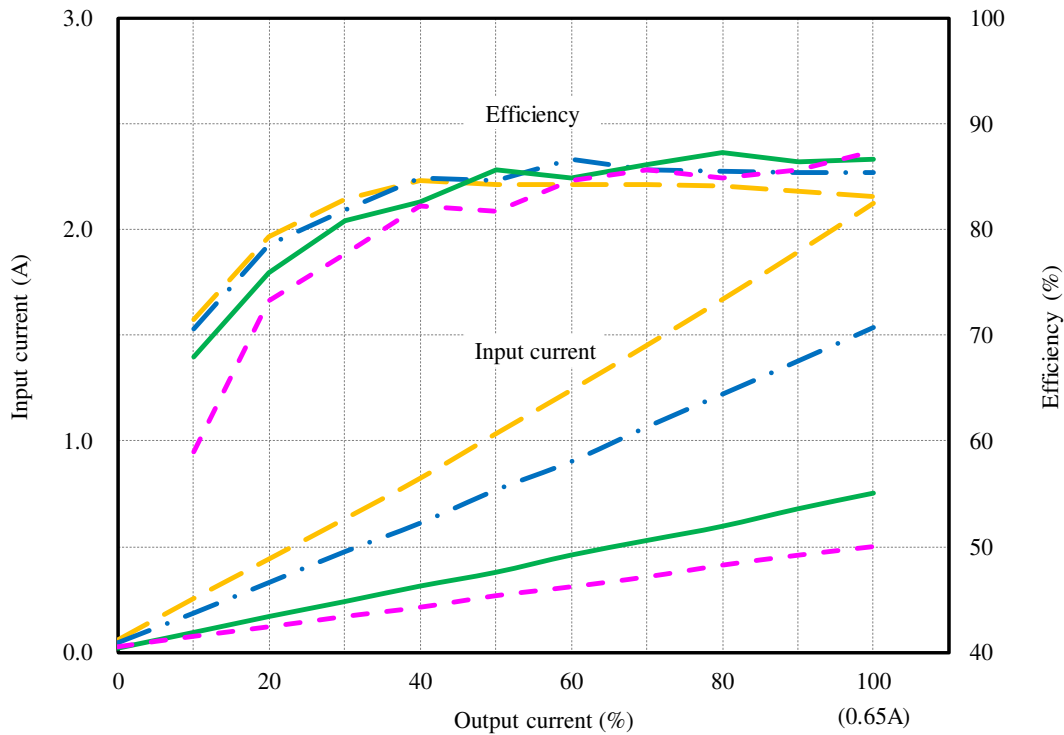
• +Vo to -Vo



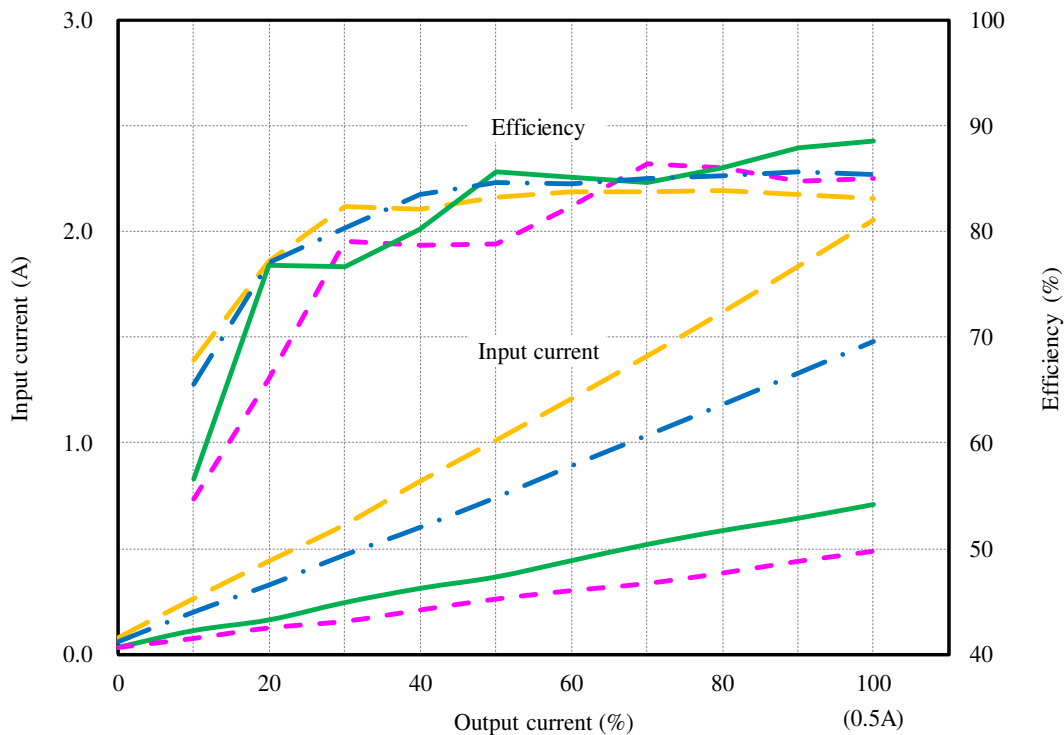
(3) 入力電流・効率 対 出力電流 Input current and Efficiency vs. Output current

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

±12V



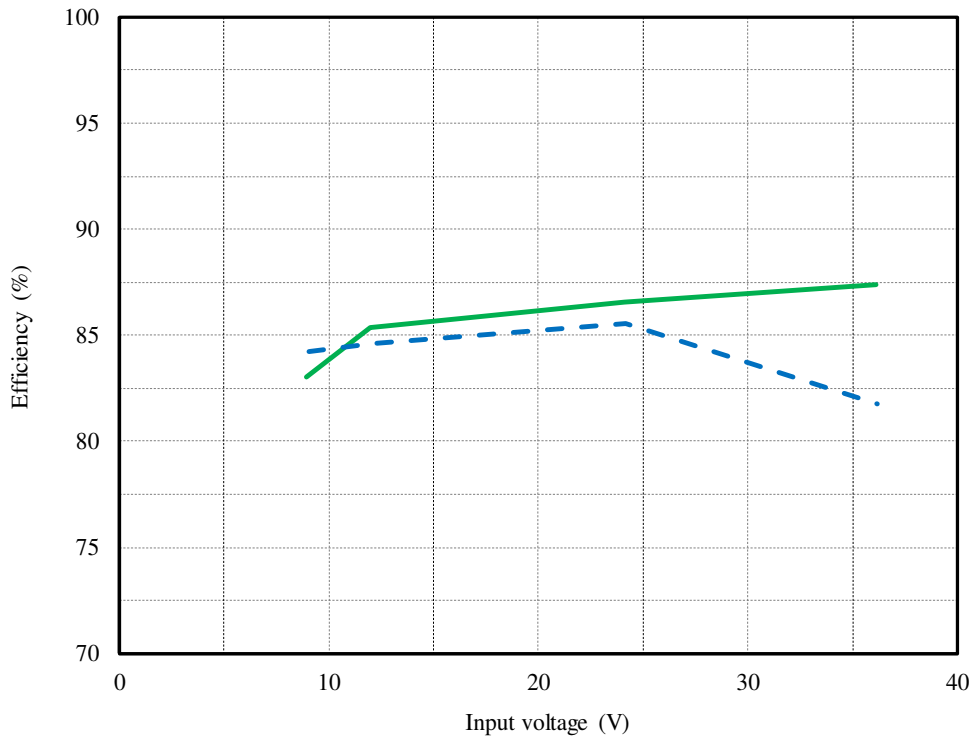
±15V



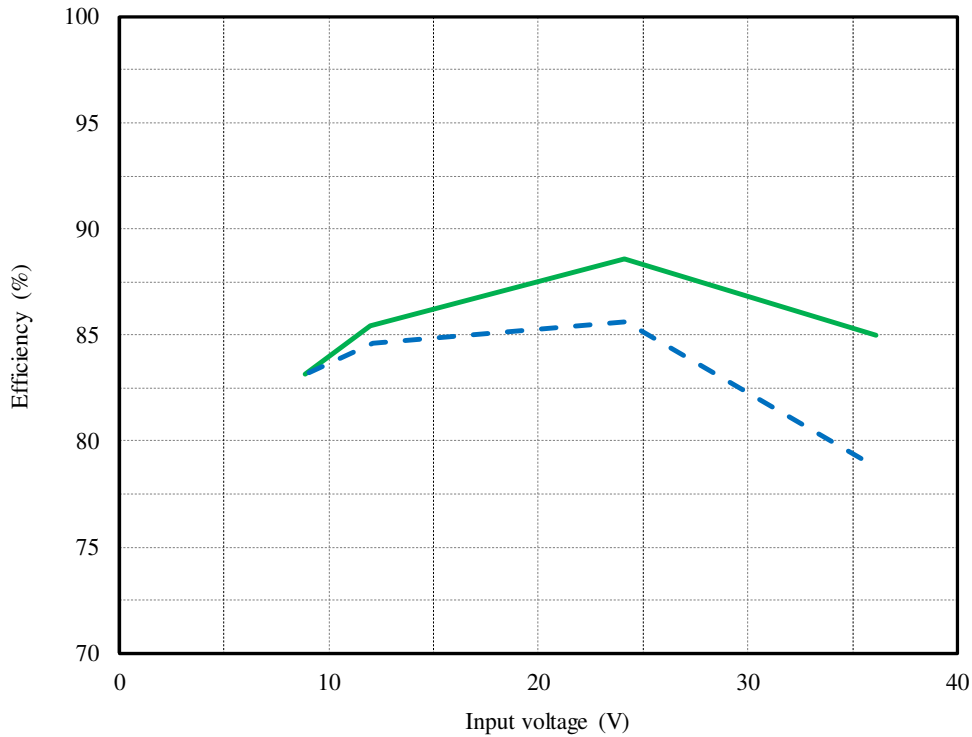
(4) 効率 対 入力電圧 Efficiency vs. Input voltage

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

±12V



±15V



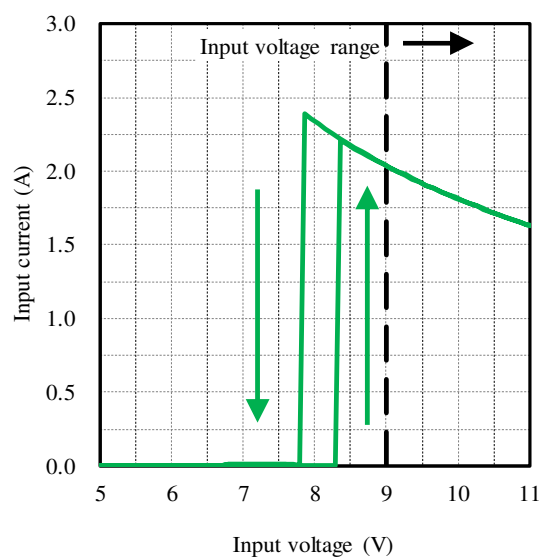
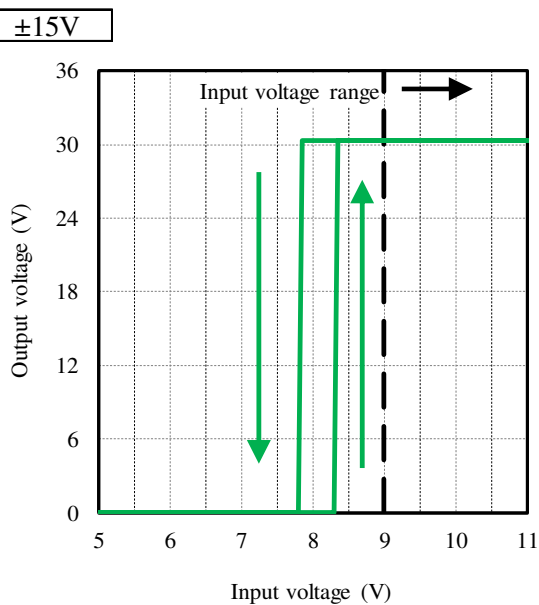
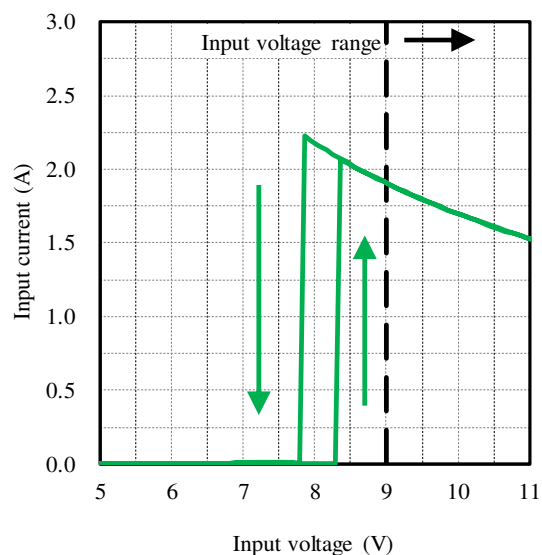
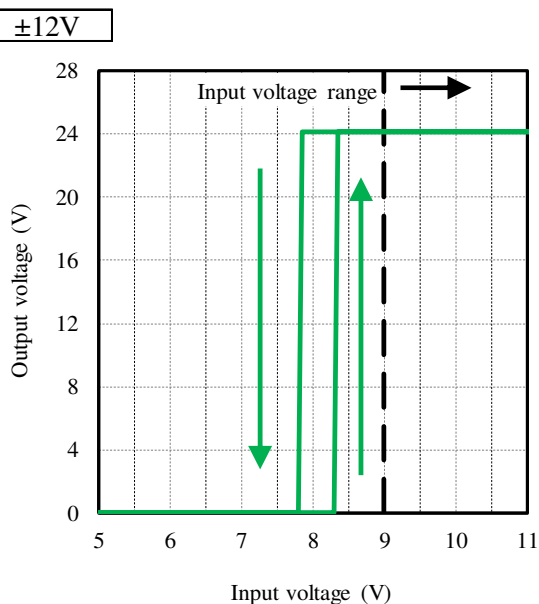
(5) 起動・遮断電圧特性 Start up and Drop out voltage characteristics

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

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

Conditions I_o : 100 %
 T_a : 25 °C

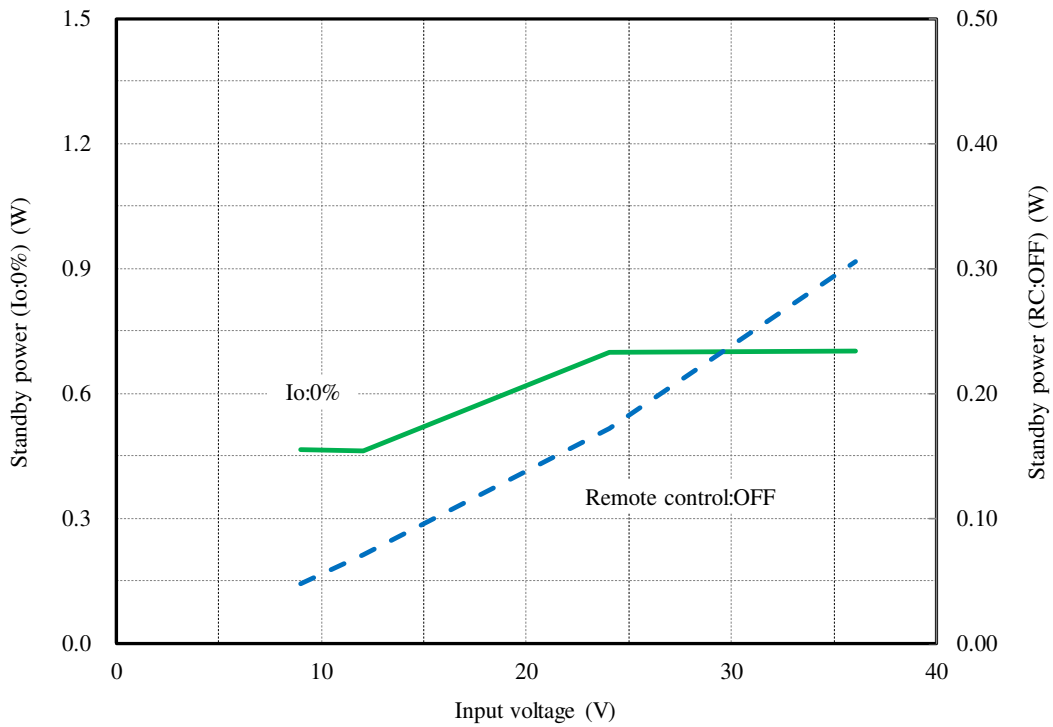
Conditions I_o : 100 %
 T_a : 25 °C



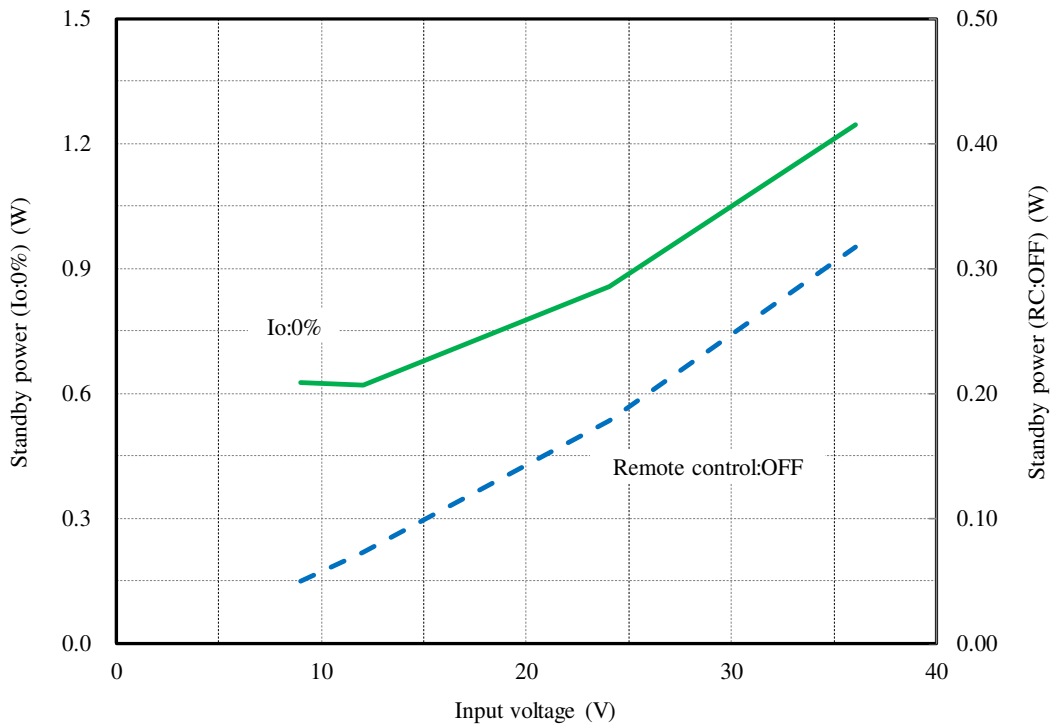
2-2. 待機電力特性 Standby power characteristics

Condition Ta : 25 °C

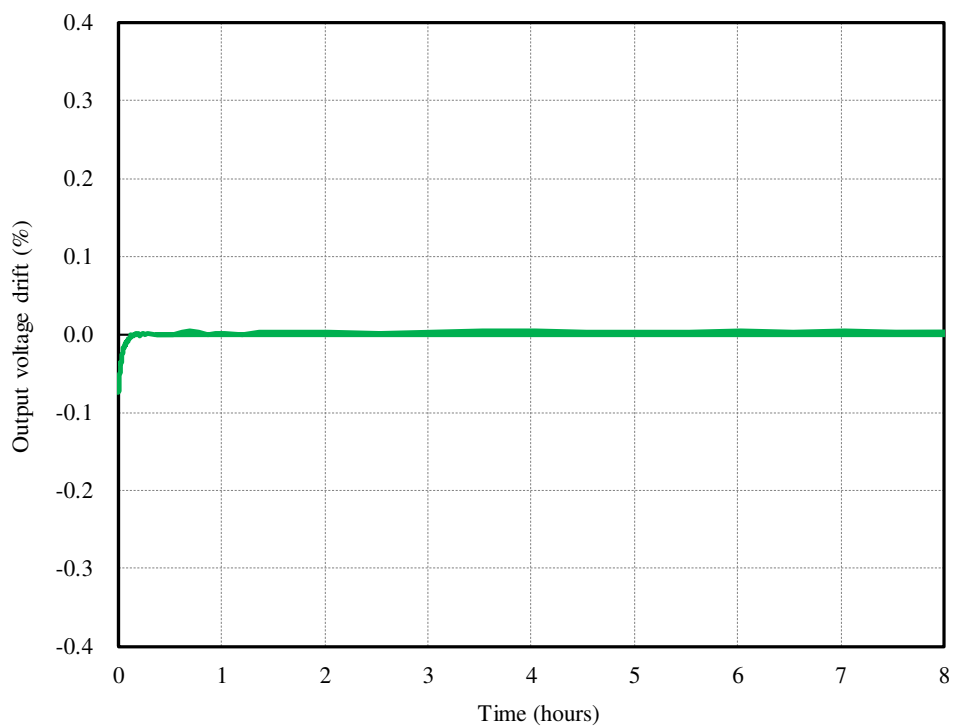
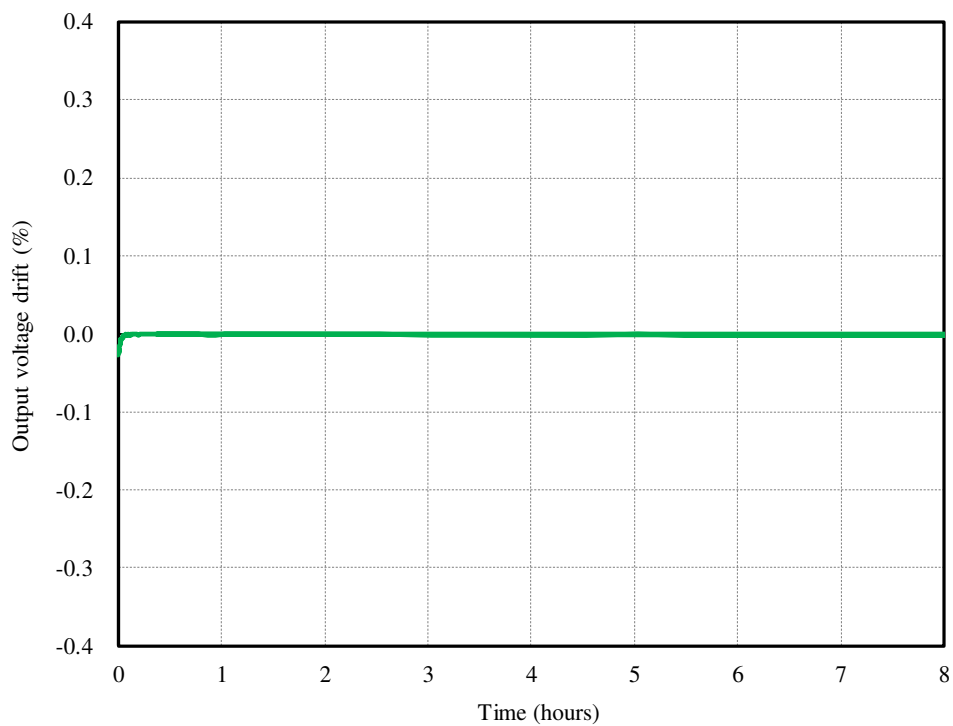
±12V



±15V



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

Conditions V_{in} : 24 VDC I_o : 100 % T_a : 25 °C $\pm 12V$  $\pm 15V$ 

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

入力電圧依存性

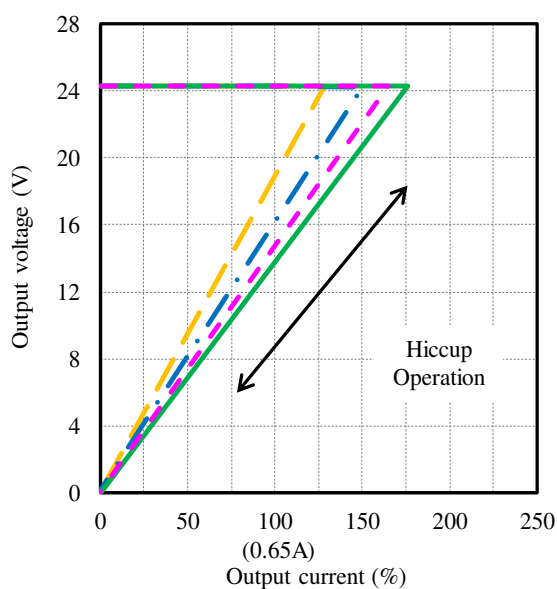
Input voltage dependence

周囲温度依存性

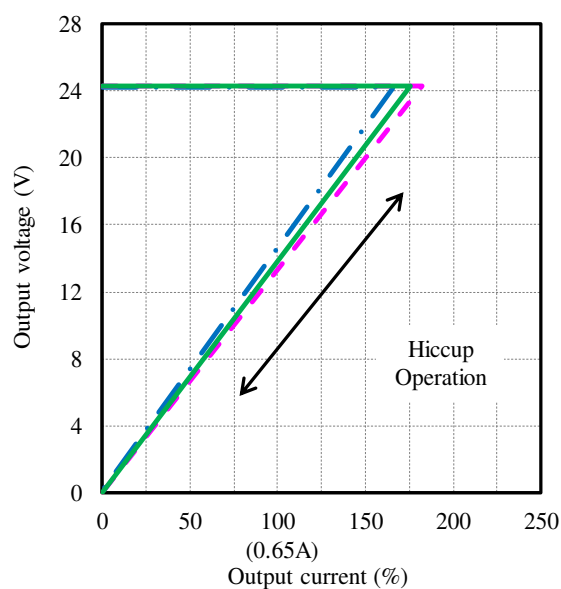
Ambient temperature dependence

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

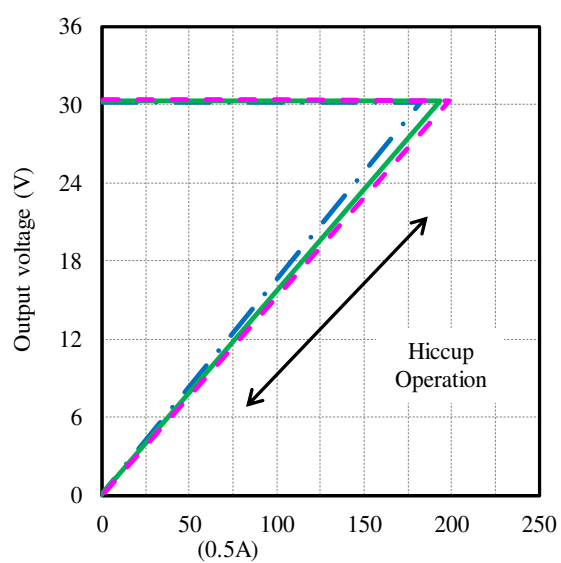
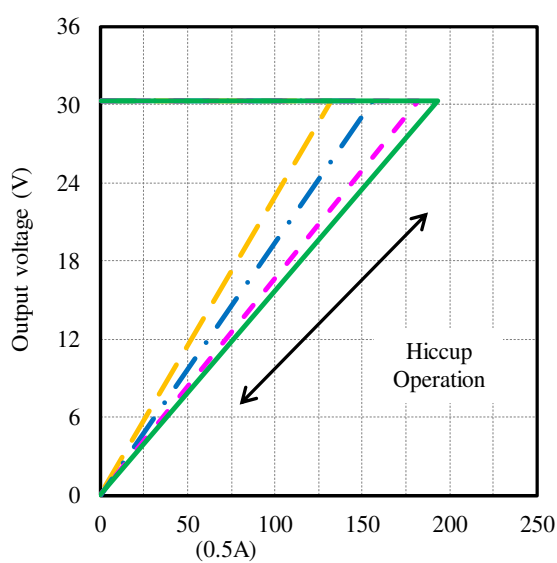
±12V



Conditions Vin : 24 VDC
 Ta : -20 °C —
 : 25 °C —
 : 70 °C —



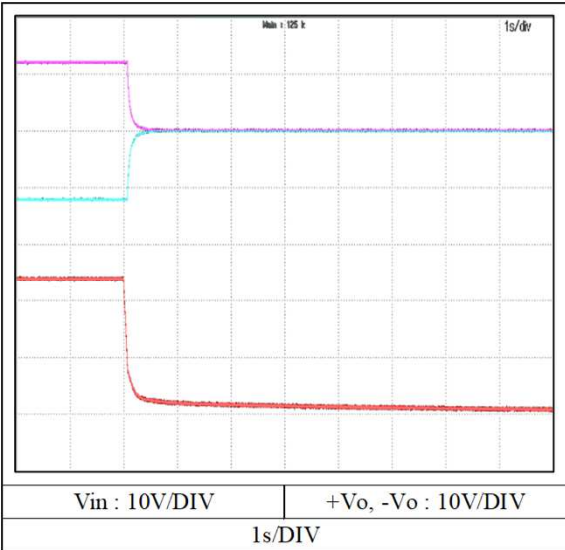
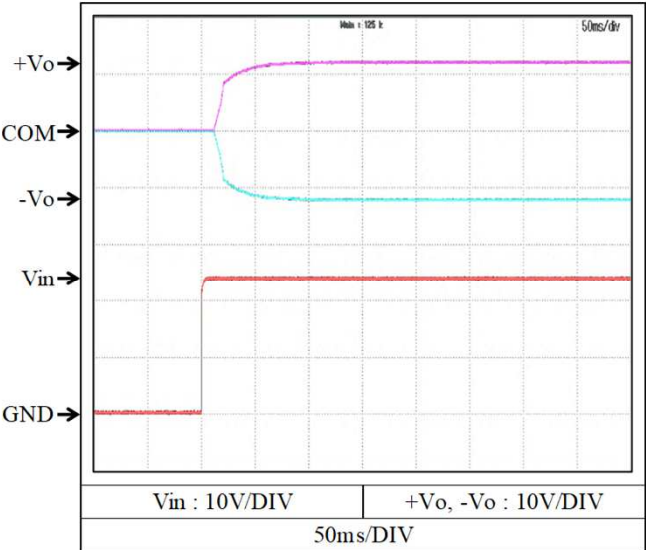
±15V



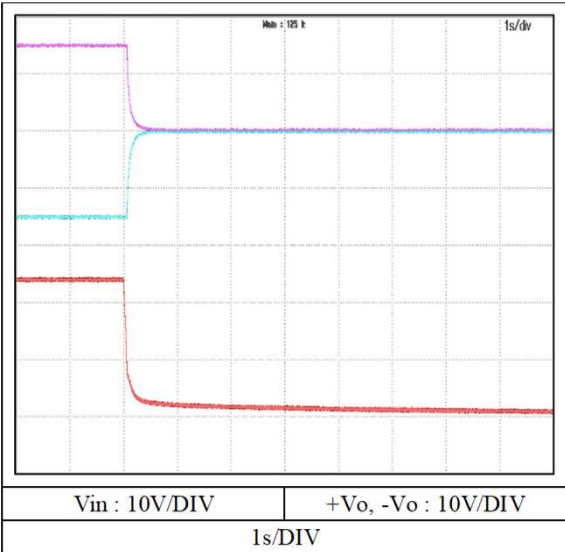
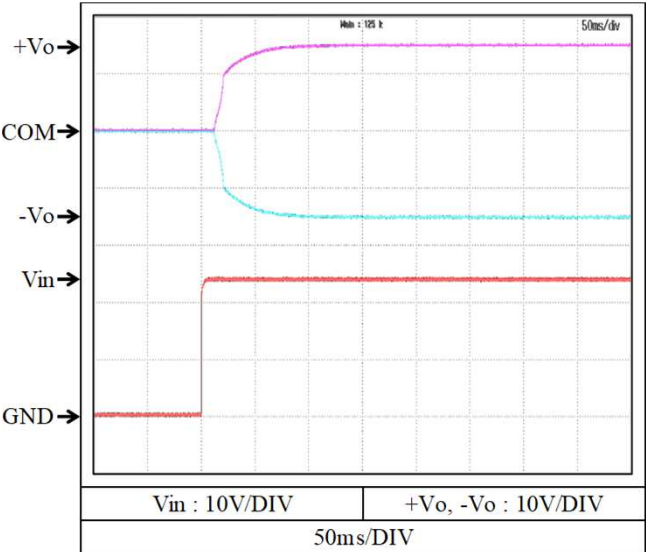
2-5. 出力立ち上がり・立ち下がり特性 Output rise and fall characteristics

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

±12V

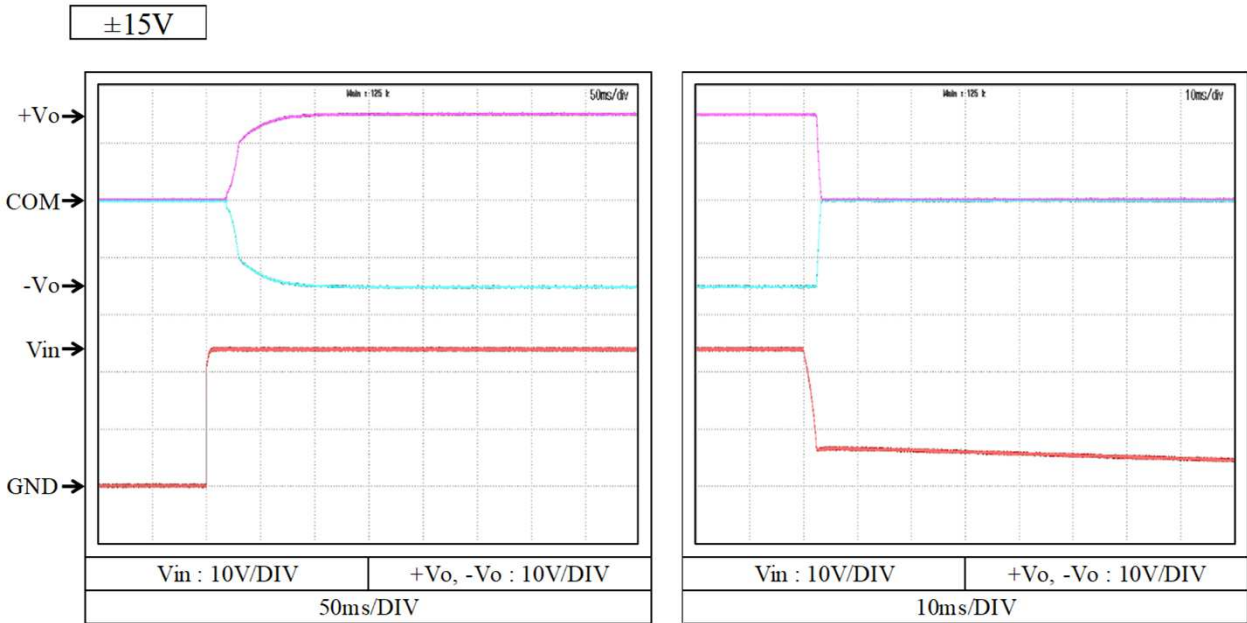
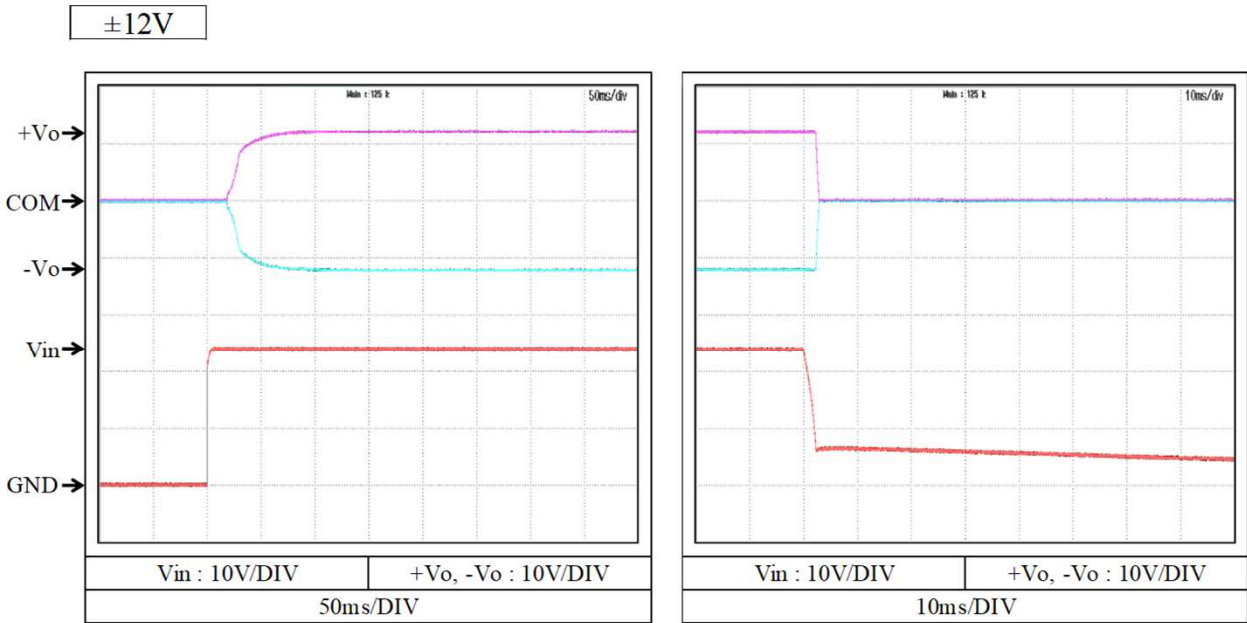


±15V



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

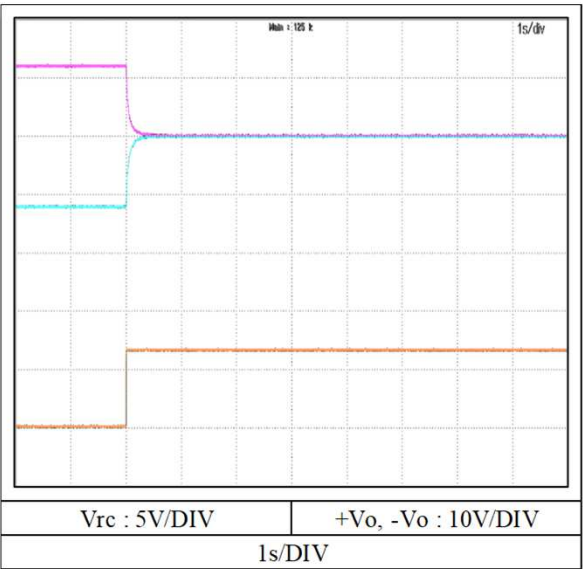
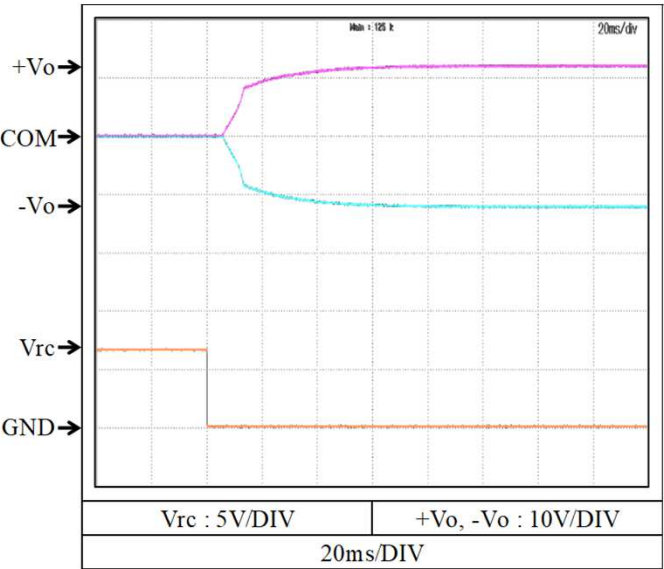
Conditions Vin : 24 VDC
Io : 100 %
Ta : 25 °C



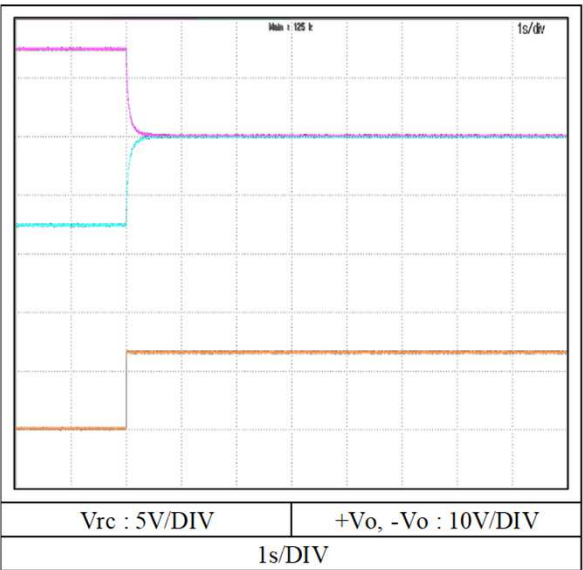
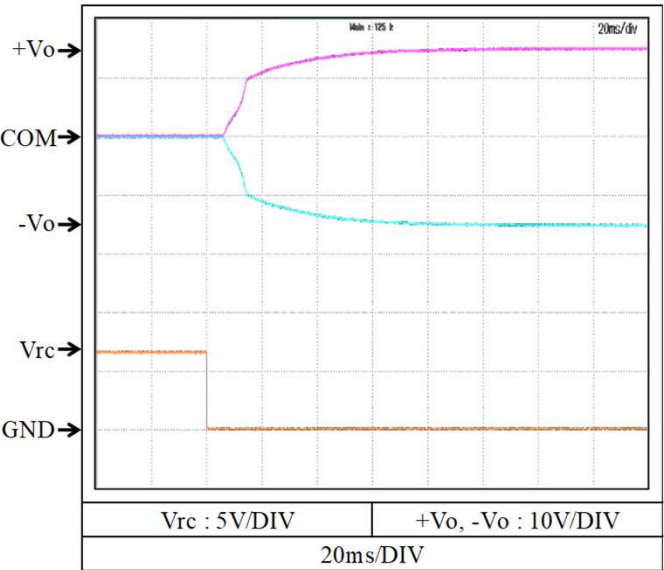
2-5. 出力立ち上がり・立ち下がり特性 (リモートON/OFFコントロール時)
Output rise and fall characteristics with REMOTE ON/OFF CONTROL

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

±12V



±15V

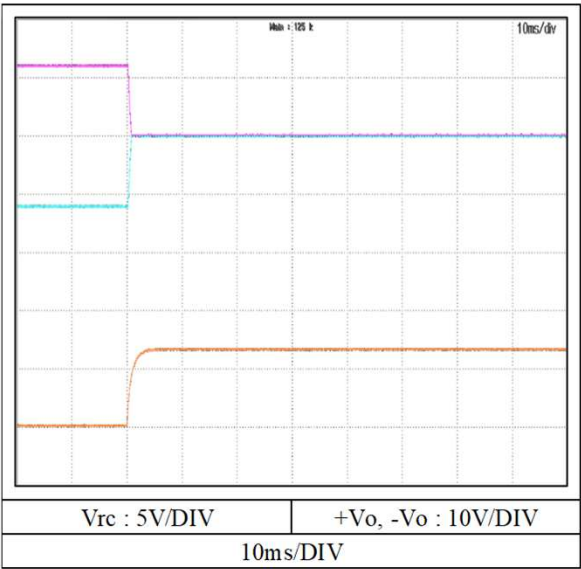
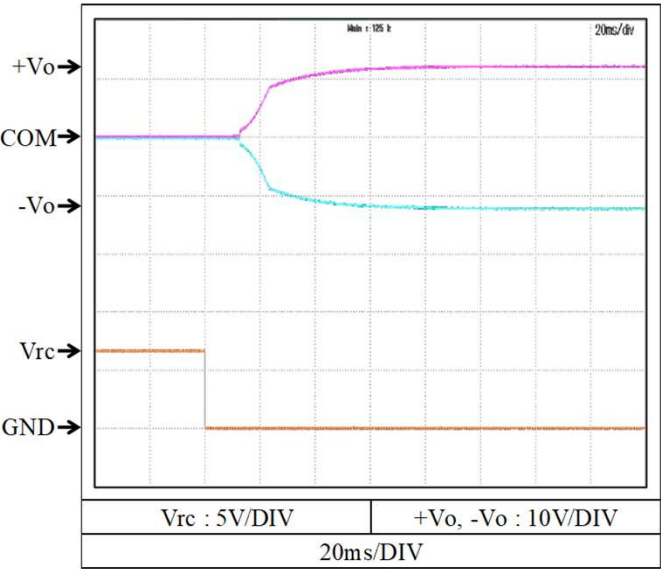


2-5. 出力立ち上がり・立ち下がり特性 (リモートON/OFFコントロール時)

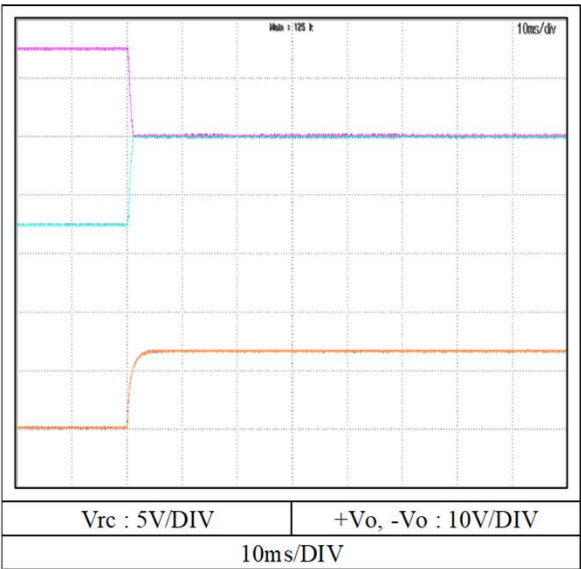
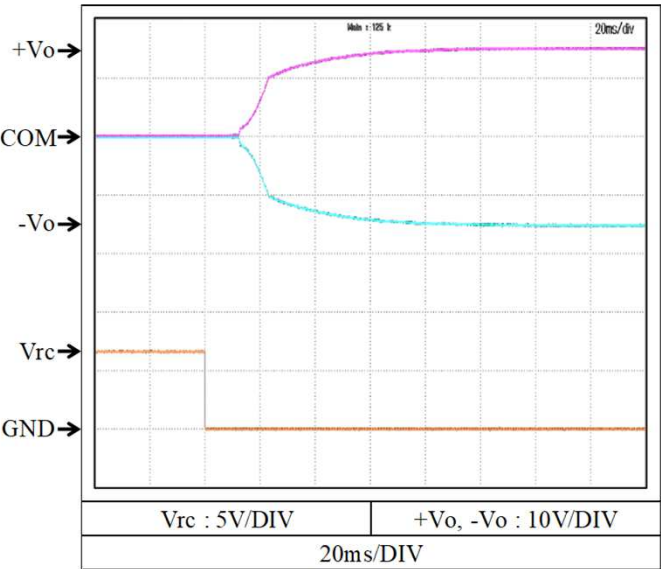
Output rise and fall characteristics with REMOTE ON/OFF CONTROL

Conditions V_{in} : 24 VDC
 I_o : 100 %
 T_a : 25 °C

±12V

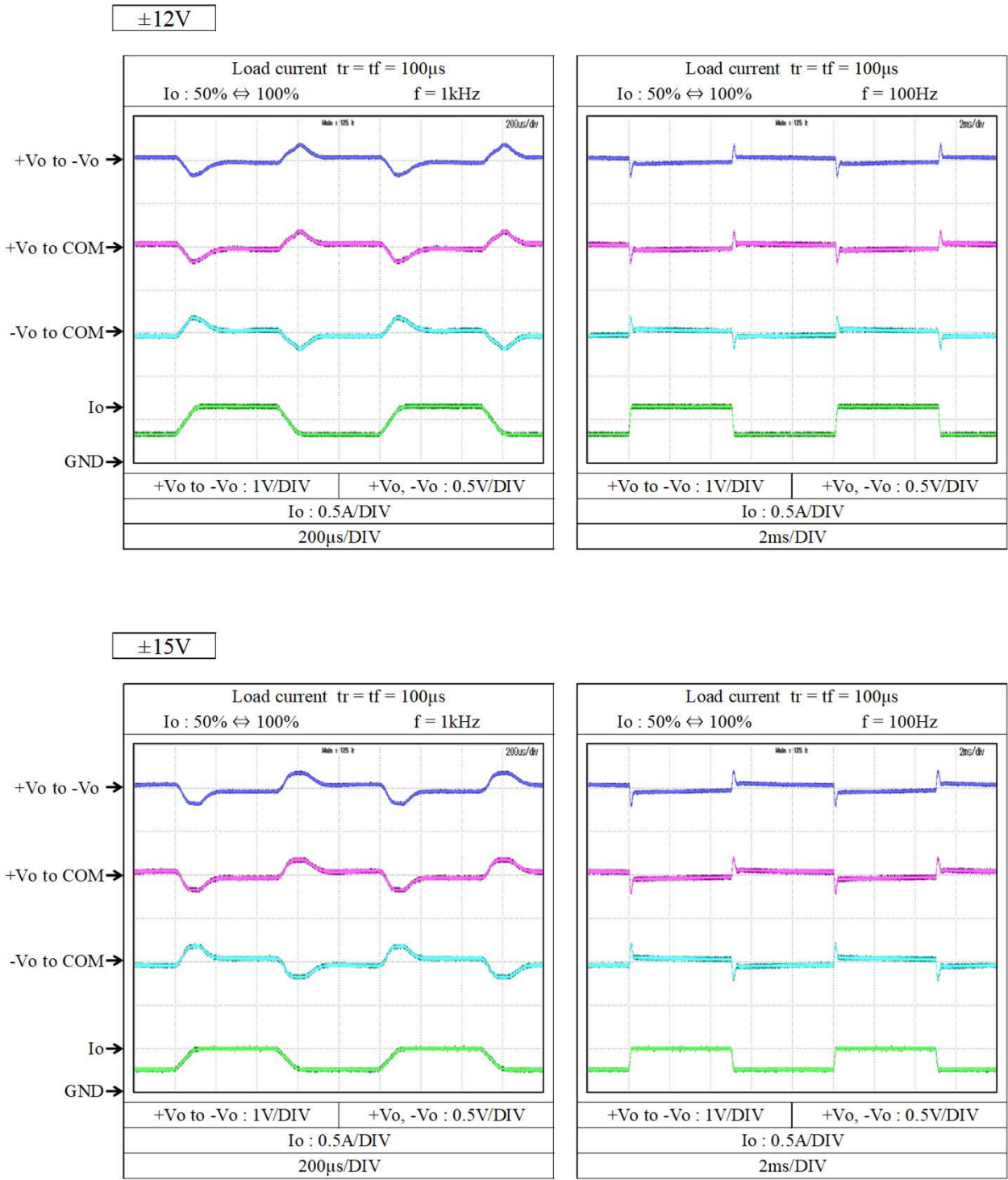


±15V



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

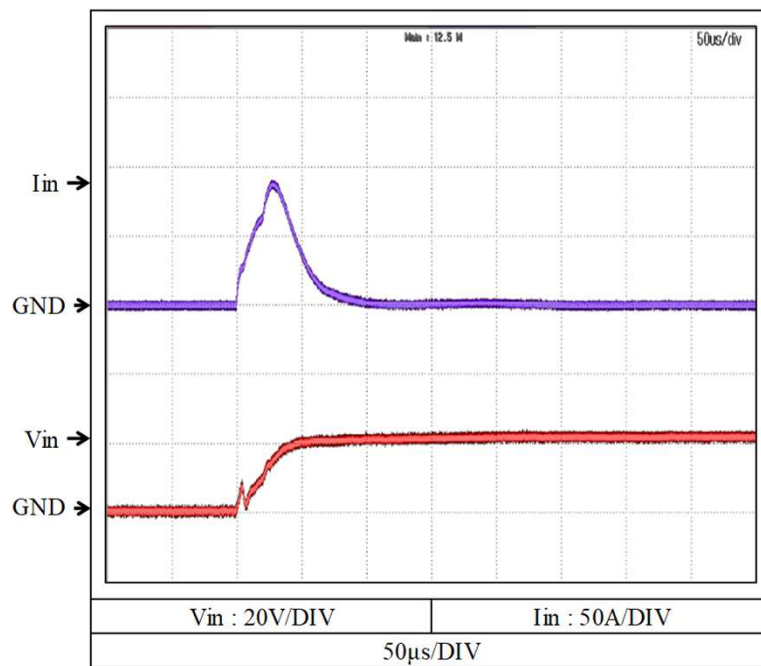
Conditions Vin : 24 VDC
 Ta : 25 °C



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

Conditions V_{in} : 24 VDC
 I_o : 100 %
 T_a : 25 °C

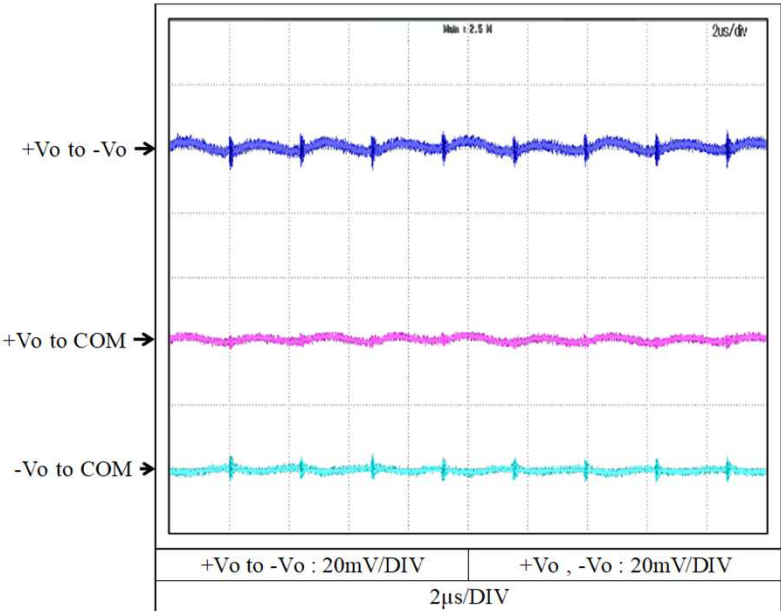
±12V



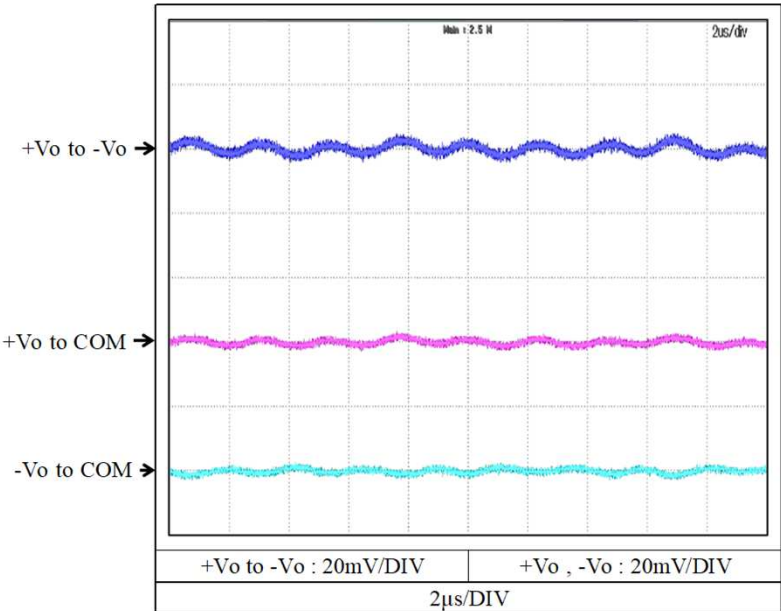
2-8. 出力リップルノイズ波形 Output ripple and noise waveform

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

±12V



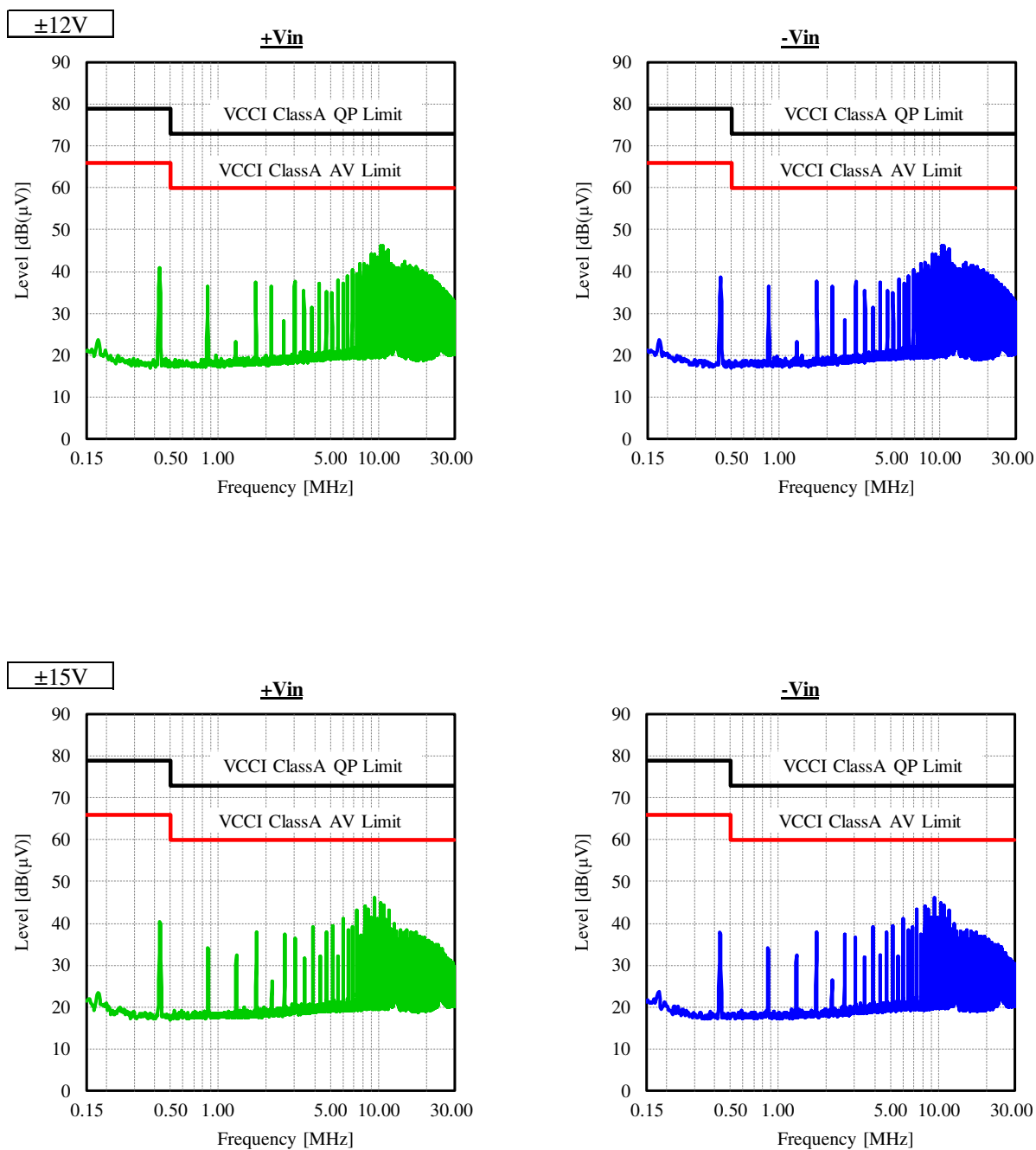
±15V



2-9. EMI特性 Electro-Magnetic Interference characteristics

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

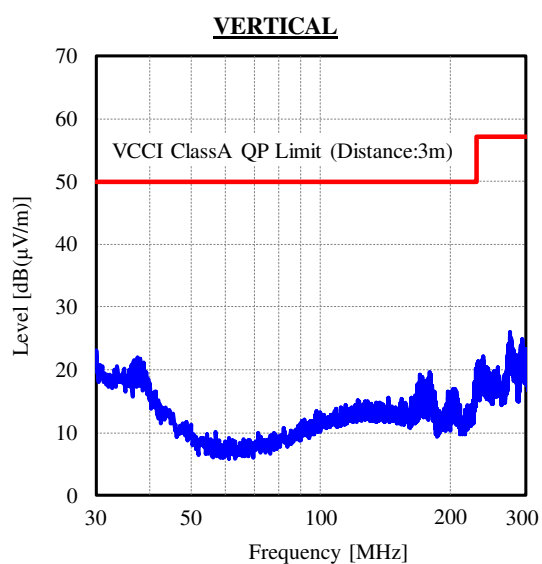
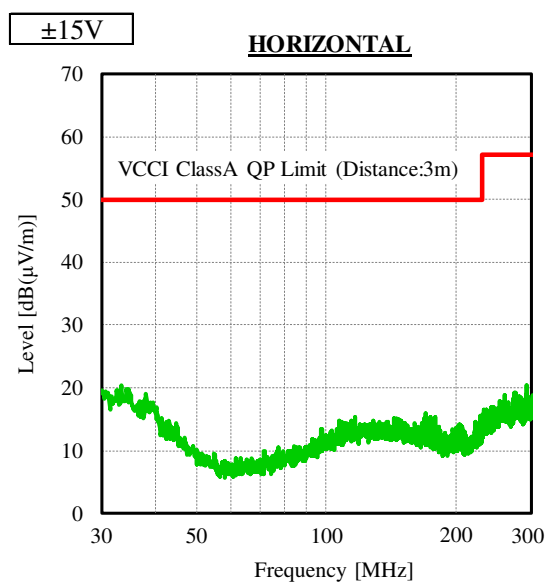
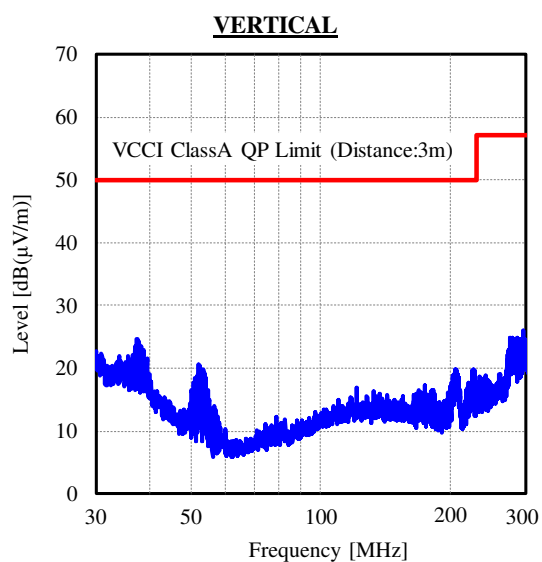
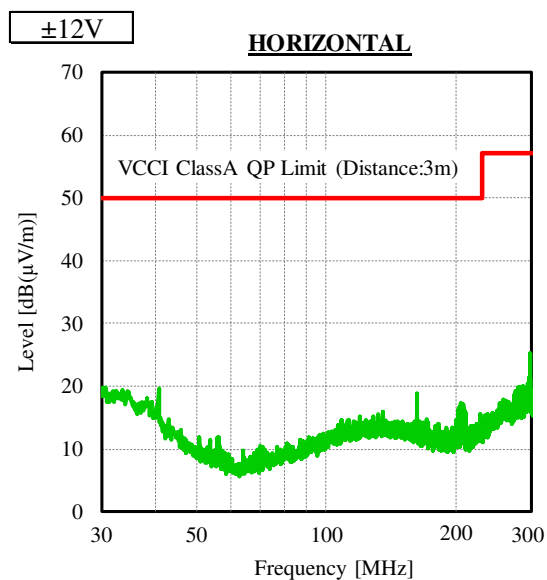
Conditions V_{in} : 24 VDC
 I_o : 100 %
 T_a : 25 °C



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 V_{in} : 24 VDC
 I_o : 100 %
 T_a : 25 °C



表示はピーク値
 Indication is peak values.