

LOW DROPOUT VOLTAGE REGULATOR

■ GENERAL DESCRIPTION

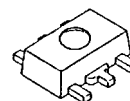
The NJU7780/81 is a low dropout voltage regulator with ON/OFF Control.

Advanced CMOS technology achieves low quiescent current.

It is suitable for battery operating applications.

NJU7781 features shunt switch which improves turn off response of output voltage when ON/OFF control is used.

■ PACKAGE OUTLINE

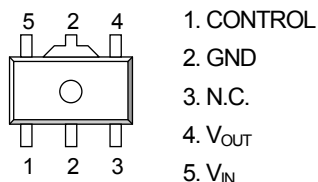


NJU7780/81U1

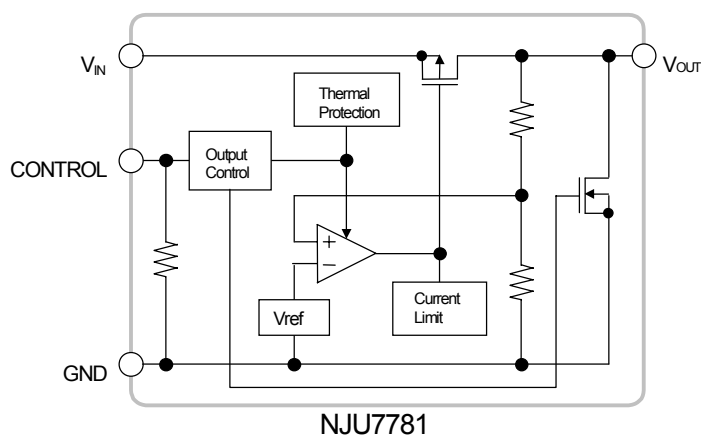
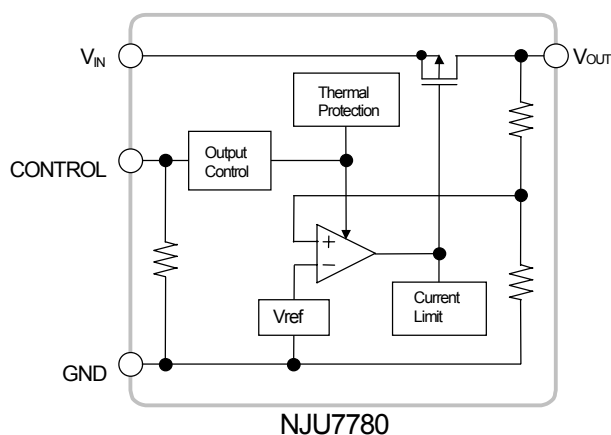
■ FEATURES

- High Ripple Rejection 65dB typ. ($f=400\text{Hz}$, $V_o=3\text{V}$)
- Low quiescent Current $I_q=20\mu\text{A}$ ($I_o=0\text{mA}$, $V_{\text{CONT}}=V_{\text{IN}}$)
- Output capacitor with $1.0\mu\text{F}$ ceramic capacitor
- Output Current $I_o(\text{max})=300\text{mA}$
- High Precision Output $V_o\pm 1.0\%$
- Low Dropout Voltage 0.15V typ. ($I_o=150\text{mA}$, $V_o=3.0\text{V}$)
- ON/OFF Control (Active High)
- Shunt Switch Only NJU7781
- Internal Over Current Protection
- Internal Thermal Overload Protection
- CMOS technology
- Package outline SOT-89-5

■ PIN CONFIGURATION



■ EQUIVALENT CIRCUIT



NJU7780/81

■ OUTPUT VOLTAGE RANK LIST (1.5V~5.0V : 0.1V step)

Device Name	V _{OUT}	Device Name	V _{OUT}	Device Name	V _{OUT}
NJU778xU1-15	1.5V	NJU778xU1-28	2.8V	NJU778xU1-04	4.0V
NJU778xU1-18	1.8V	NJU778xU1-29	2.9V	NJU778xU1-05	5.0V
NJU778xU1-21	2.1V	NJU778xU1-03	3.0V		
NJU778xU1-25	2.5V	NJU778xU1-33	3.3V		

■ ABSOLUTE MAXIMUM RATINGS

(Ta=25°C)

PARAMETER	SYMBOL	RATINGS	UNIT
Input Voltage	V _{IN}	+10	V
Control Voltage	V _{CONT}	+10(*1)	V
Power Dissipation	P _D	350(*2)	mW
Operating Temperature	T _{opr}	-40 ~ +85	°C
Storage Temperature	T _{stg}	-40 ~ +125	°C
OFF-state Output Sink Current (*3)	I _o	10	mA

(*1): When input voltage is less than +10V, the absolute maximum control voltage is equal to the input voltage.

(*2): Device itself.

(*3): This maximum rating is applied to NJU7781.

■ Operating voltage

V_{IN}=+2.3 ~ +9V (In case of V_o<2.1V version)

■ ELECTRICAL CHARACTERISTICS

(V_{IN}=V_o+1V, C_{IN}=0.1μF, C_o=0.1μF, Ta=25°C)

PARAMETER	SYMBOL	TEST CONDITION		MIN.	TYP.	MAX.	UNIT
Output Voltage	V _O	I _O =30mA		-1.0%	-	+1.0%	V
Input Voltage	V _{IN}			-	-	9	V
Quiescent Current	I _Q	I _O =0mA, V _{CONT} =V _{IN}		-	20	40	μA
Quiescent Current at Control OFF	I _{Q(OFF)}	V _{CONT} =0V		-	-	1	μA
Output Current	I _O	V _O - 0.1V(V _O <2.1V) V _O - 0.3V(V _O ≥2.1V)		300	-	-	mA
Short Current Limit	I _{LIM}	V _O =0V		-	120	-	mA
Line Regulation	ΔV _O /ΔV _{IN}	V _{IN} =V _O +1V~V _O +6V(V _O <3.0), V _{IN} =V _O +1V~V _O +9V(V _O ≥3.0), I _O =30mA		-	-	0.10	%/V
Load Regulation	ΔV _O /ΔI _O	I _O =0~300mA		-	-	0.015	%/mA
Dropout Voltage(*4)	ΔV _{I-O}	I _O =150mA	2.1 ≤ V _O ≤ 2.6V	-	0.18	0.25	V
			2.7 ≤ V _O ≤ 3.3V	-	0.15	0.22	
			3.4 ≤ V _O ≤ 5.0V	-	0.12	0.2	
Ripple Rejection	RR	e _{in} =200mVrms, f=400Hz, I _O =10mA, V _O =3.0V		-	65	-	dB
Average Temperature Coefficient of Output Voltage	ΔV _O /ΔT _a	T _a =0~85°C, I _O =10mA		-	±100	-	ppm/°C
Output Noise Voltage	V _{NO}	F=10Hz~80kHz, I _O =10mA, V _O =3.0V		-	80	-	μVrms
Pull-Down Resistance	R _{CONT}			1.5	5	10	MΩ
Control Voltage for ON-state	V _{CONT(ON)}			1.6	-	-	V
Control Voltage for OFF-state	V _{CONT(OFF)}			-	-	0.3	V
Pull-down Resistance at OFF-state(*5)	R _{O(OFF)}	V _{CONT} =0V (V _O =3.0V Version)		-	190	-	Ω

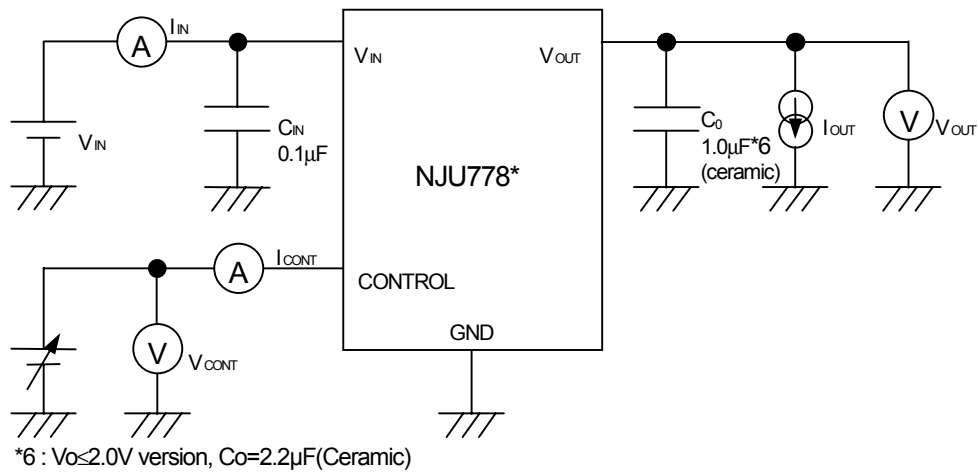
(*4): The output voltage excludes under 2.1V.

(*5) This electrical characteristics is applied to NJU7781.

The above specification is a common specification for all output voltages.

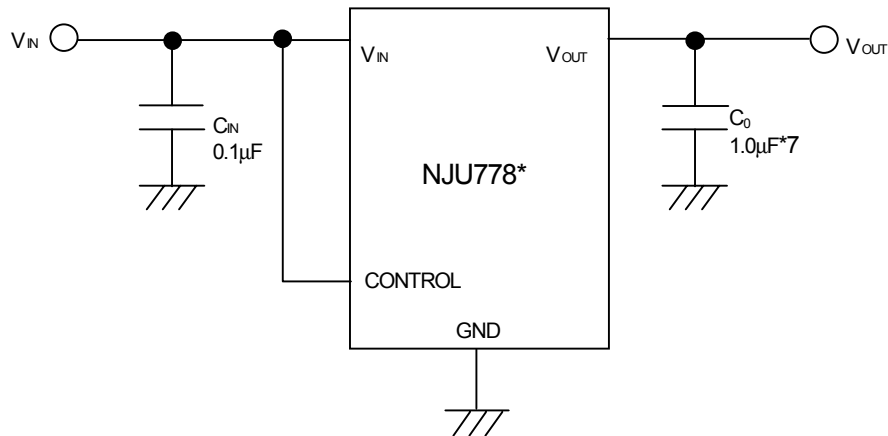
Therefore, it may be different from the individual specification for a specific output voltage.

■ TEST CIRCUIT



■ TYPICAL APPLICATION

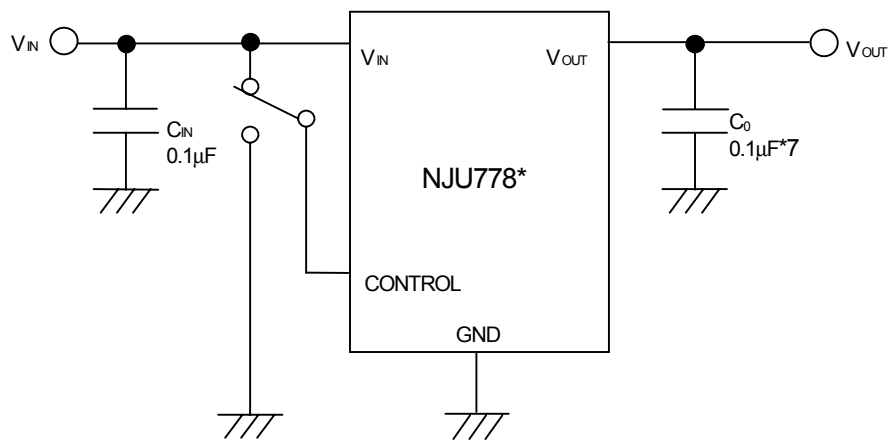
① In the case where ON/OFF Control is not required:



*7: $V_O \leq 2.0V$ version, $C_O = 2.2 \mu F$

Connect control terminal to V_{IN} terminal

② In use of ON/OFF CONTROL:



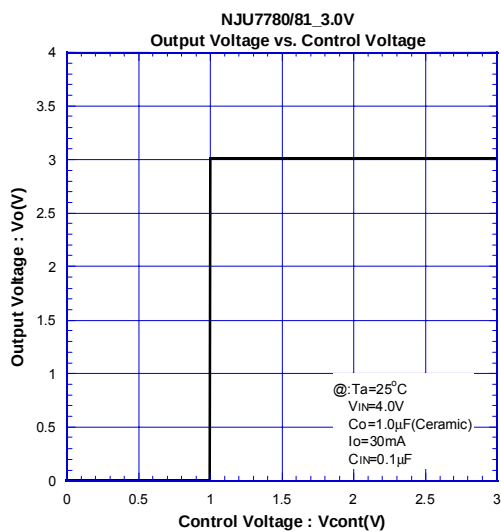
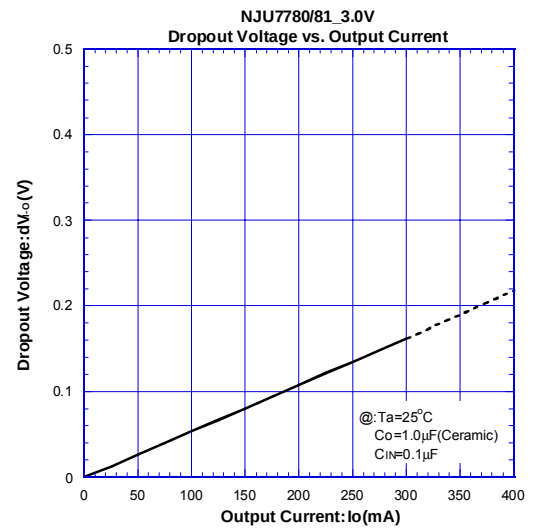
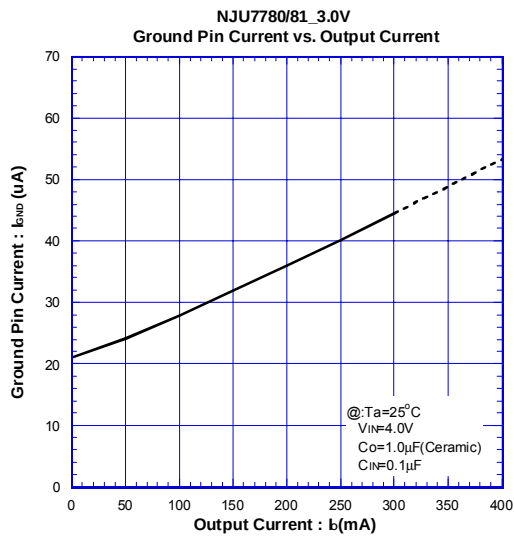
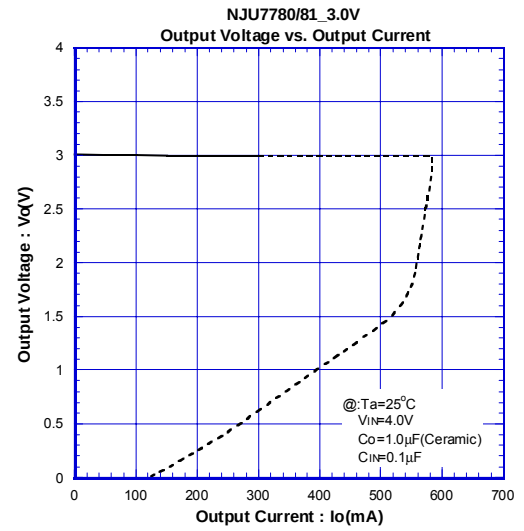
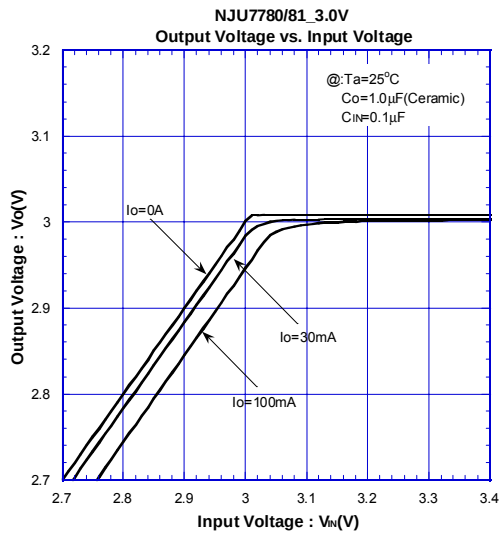
*7: $V_O \leq 2.0V$ version, $C_O = 2.2 \mu F$

State of control terminal:

- "H" $\rightarrow$ output is enabled.
- "L" or "open" $\rightarrow$ output is disabled.

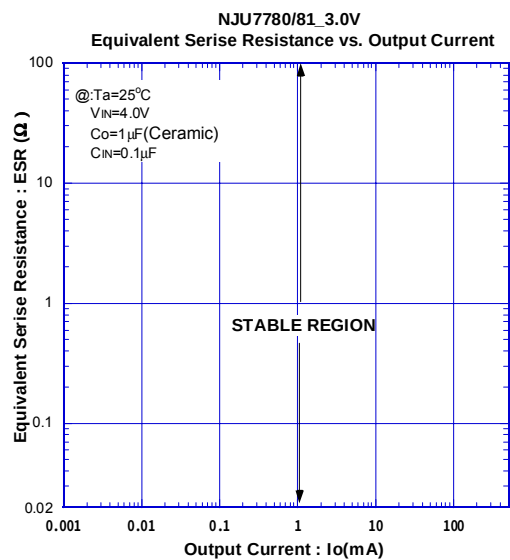
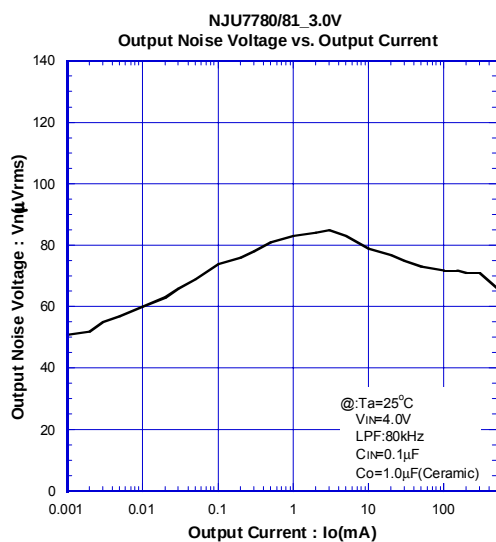
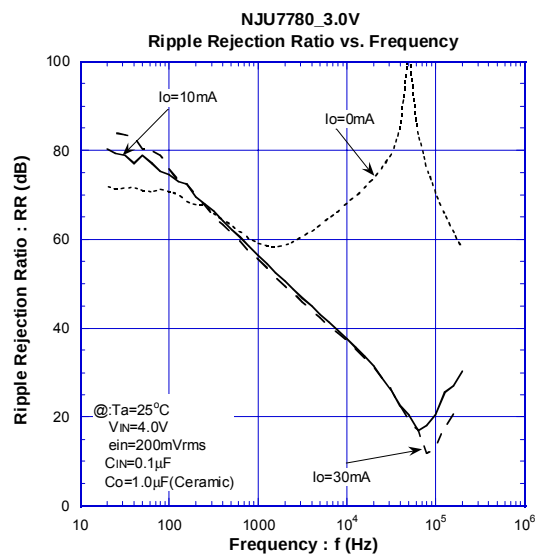
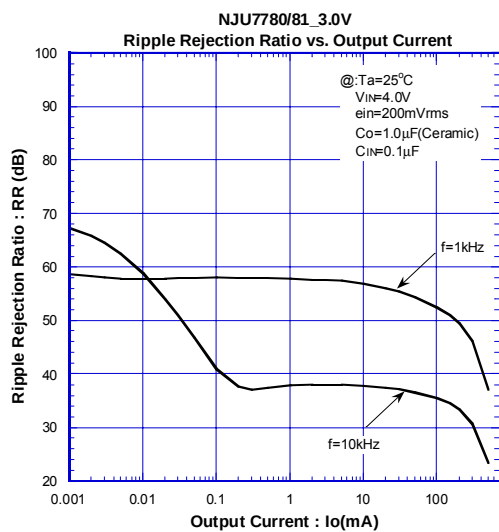
■ ELECTRICAL CHARACTERISTICS

● DC CHARACTERISTICS



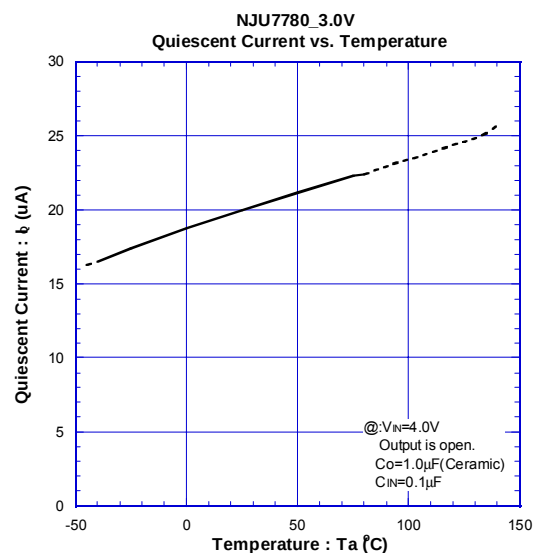
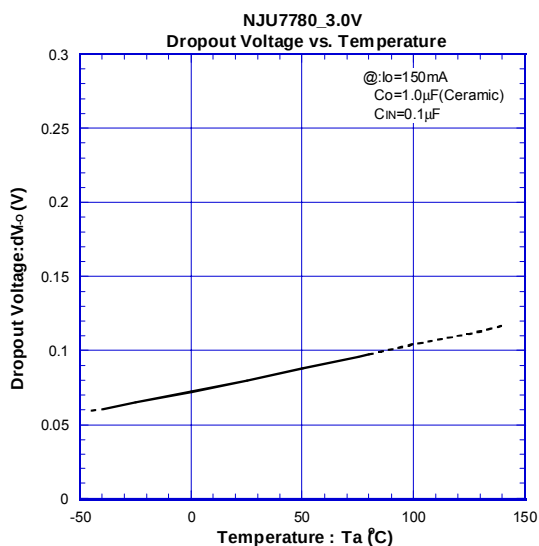
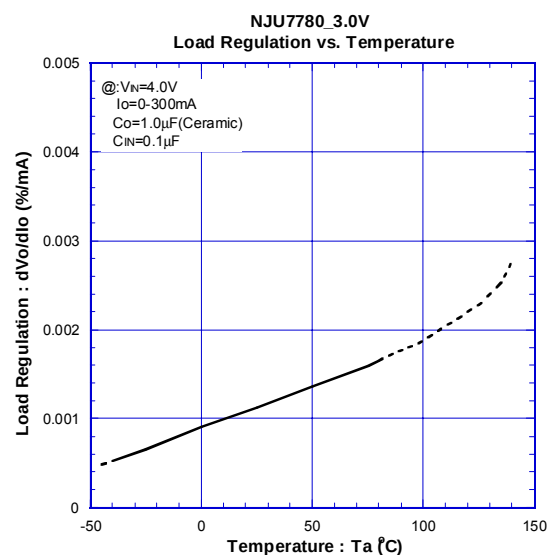
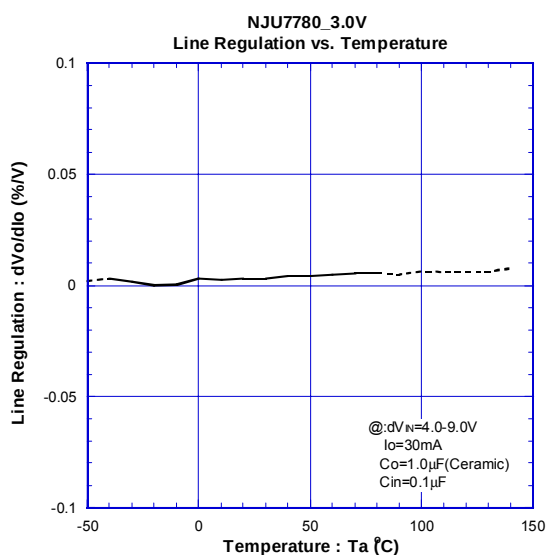
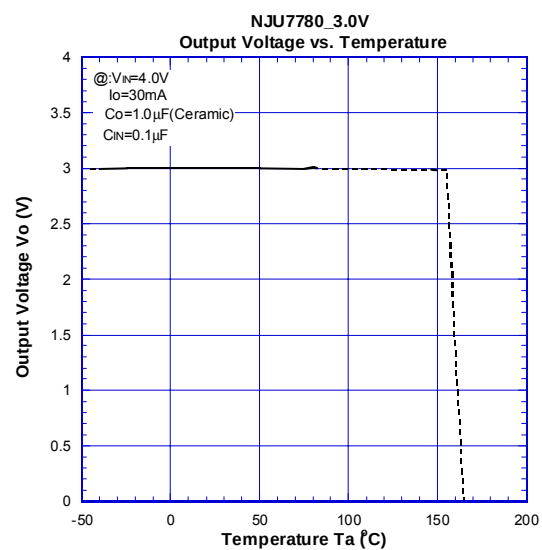
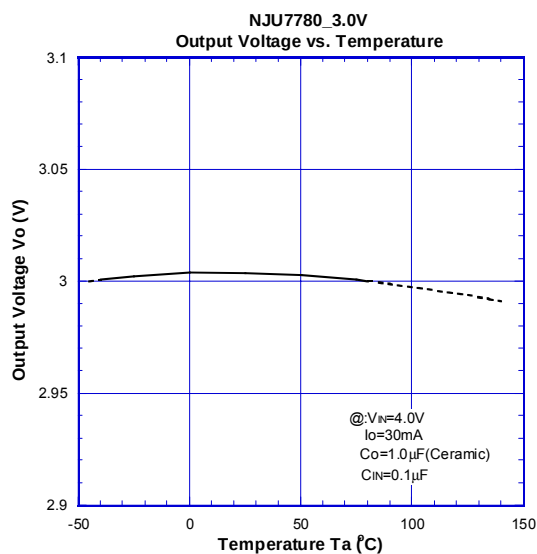
■ ELECTRICAL CHARACTERISTICS

● AC CHARACTERISTICS



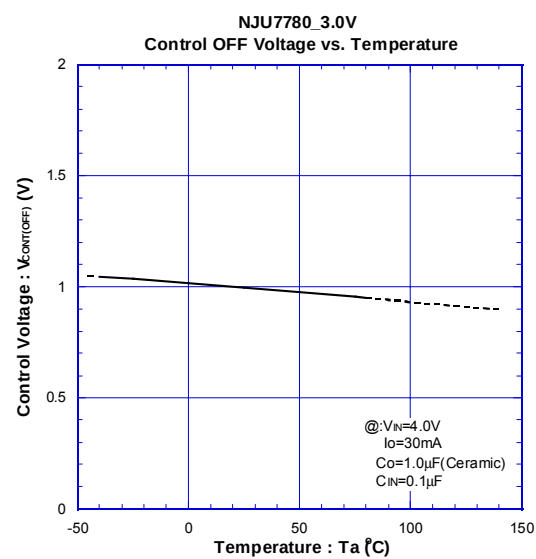
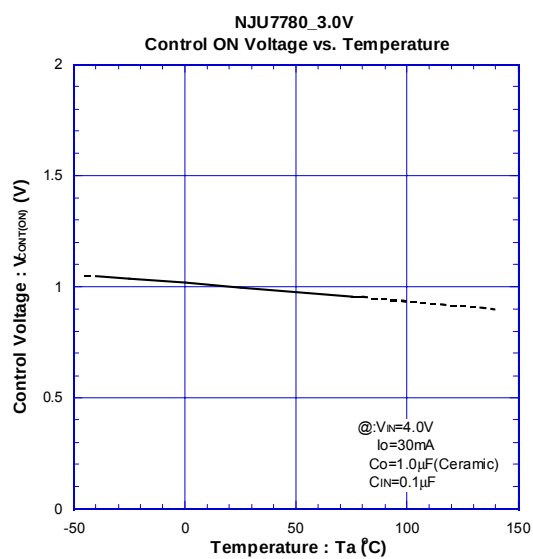
■ ELECTRICAL CHARACTERISTICS

● TEMPERATURE CHARACTERISTICS



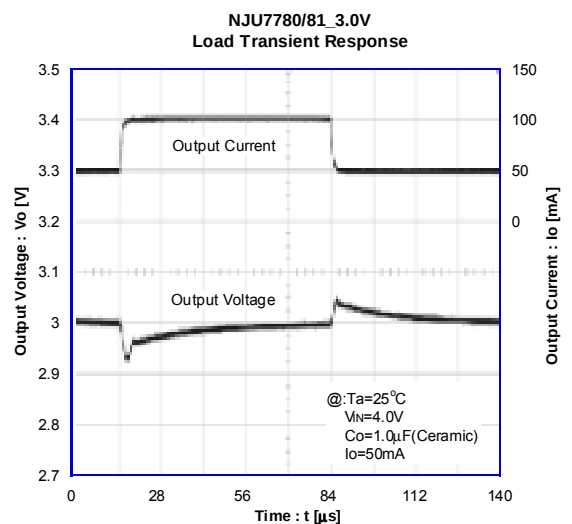
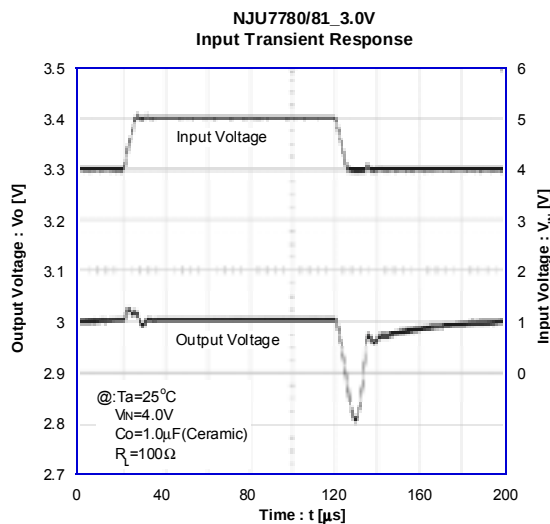
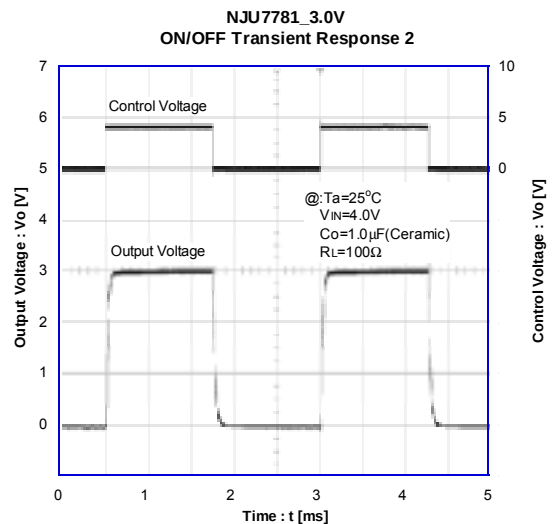
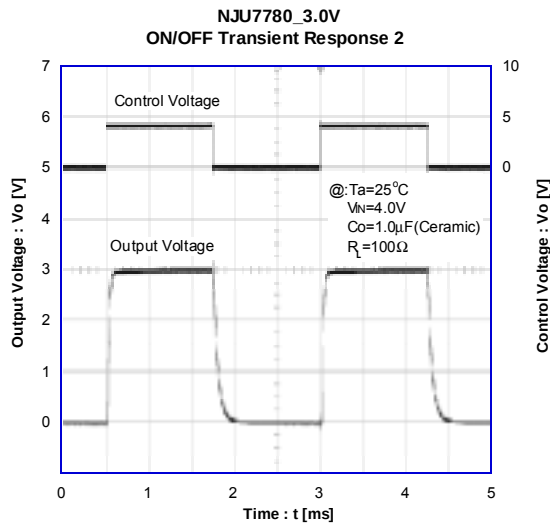
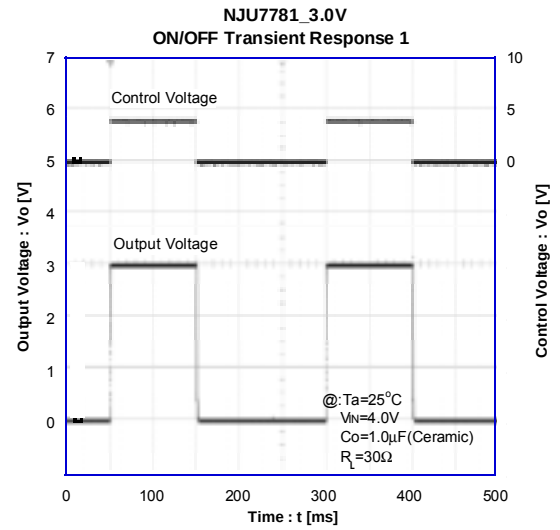
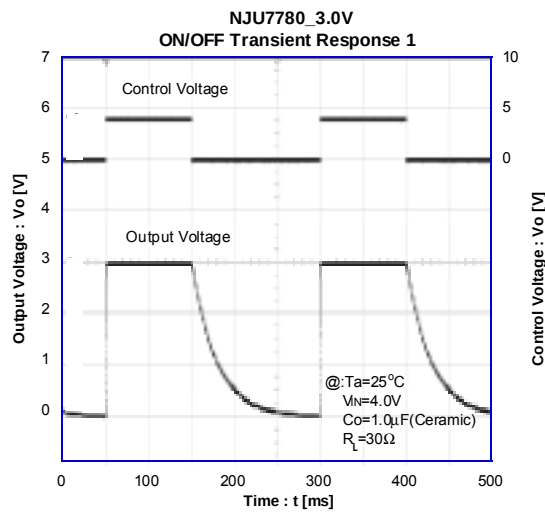
■ ELECTRICAL CHARACTERISTICS

● TEMPERATURE CHARACTERISTICS



■ TYPICAL CHARACTERISTICS

● TRANSIENT RESPONSE



[CAUTION]

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