

LOW DROPOUT VOLTAGE REGULATOR

■ GENERAL DESCRIPTION

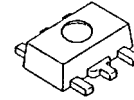
The NJU7780/81 is a low dropout voltage regulator with ON/OFF Control.

Advanced CMOS technology achieves low quiescent current.

It is suitable for cellular phone and other portable items.

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

■ PACKAGE OUTLINE

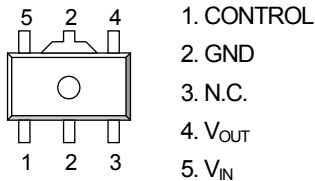


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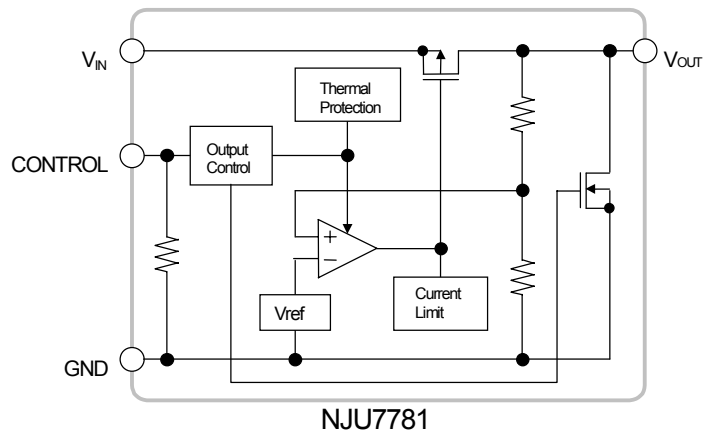
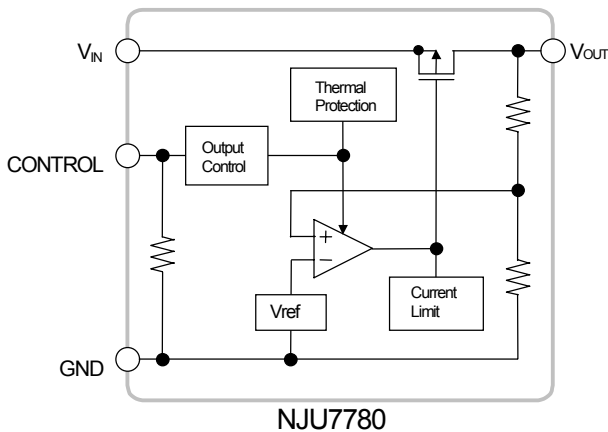
■ FEATURES

- High Ripple Rejection 65dB typ. (f=400Hz, Vo=3V)
- Low quiescent Current Iq=20μA (Io=0mA, V_{CONT}=V_{IN})
- Output capacitor with 1.0μF ceramic capacitor
- Output Current Io(max)=300mA
- High Precision Output Vo±1.0%
- Low Dropout Voltage 0.15V typ. (Io=150mA, Vo=3.0V)
- ON/OFF Control (Active High)
- Shunt Switch Only NJU7781
- Internal Short Circuit Current Limit
- Internal Thermal Overload Protection
- CMOS technology
- Package outline SOT-89-5

■ PIN CONFIGURATION



■ EQUIVALENT CIRCUIT



NJU7780/81

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■ 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 Vo<2.1V version)

■ ELECTRICAL CHARACTERISTICS

(V_{IN}=Vo+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 =0.3V	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 _{LO}	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 /ΔTa	Ta=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	

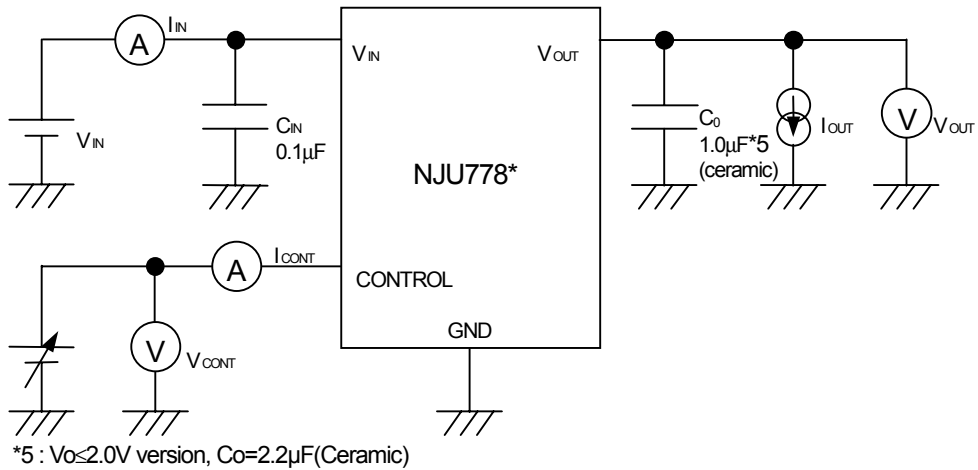
(*4): The output voltage excludes under 2.1V.

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

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

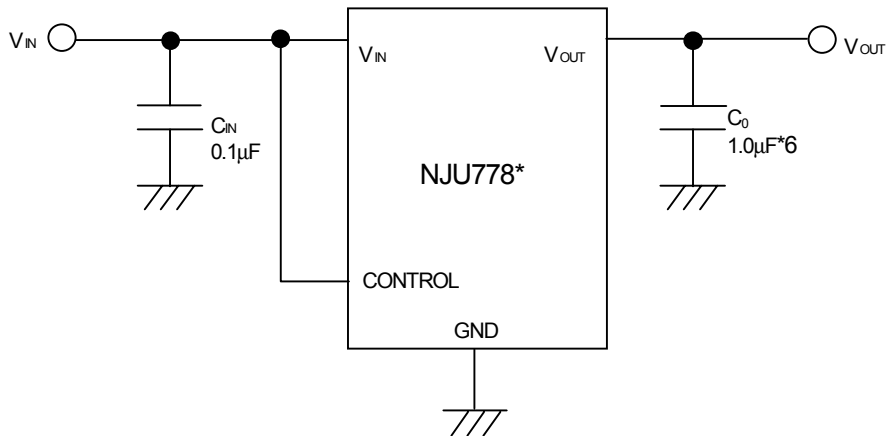
Therefore, it may be different from the individual specification for a specific output voltage.

■ TEST CIRCUIT



■ TYPICAL APPLICATION

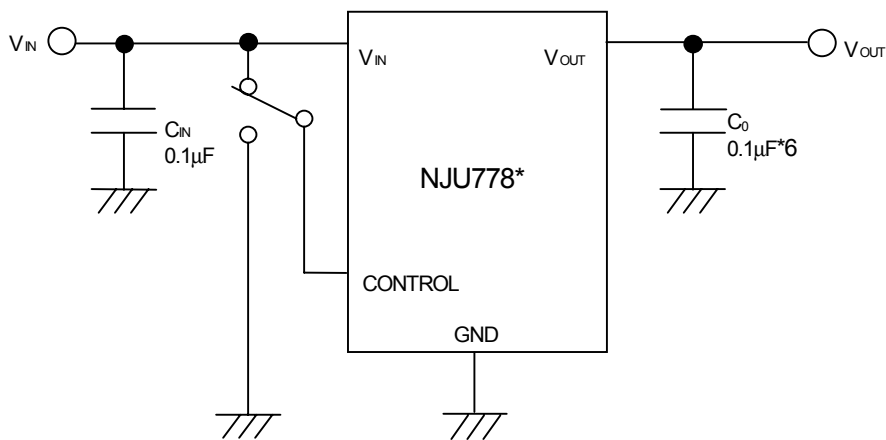
① In the case where ON/OFF Control is not required:



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

Connect control terminal to V_{IN} terminal

② In use of ON/OFF CONTROL:



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

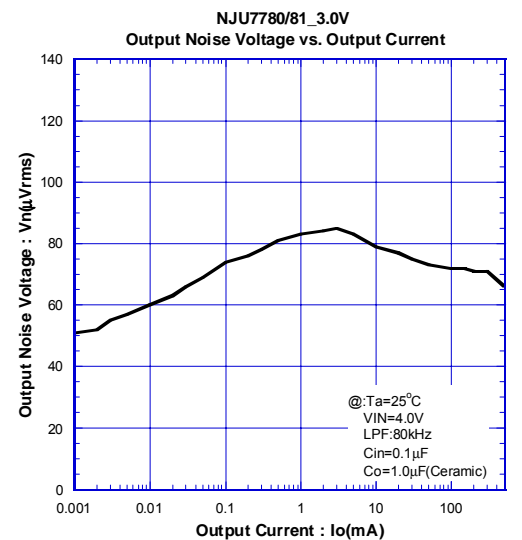
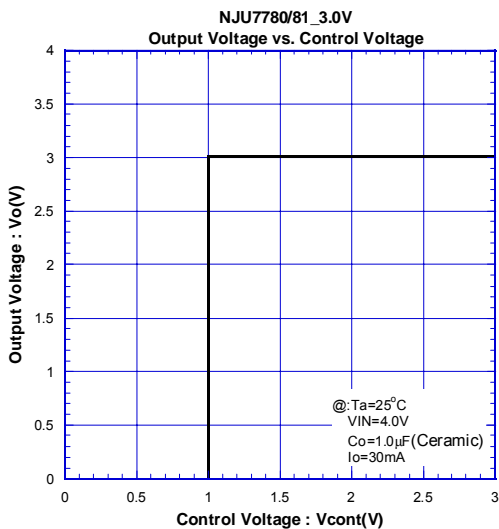
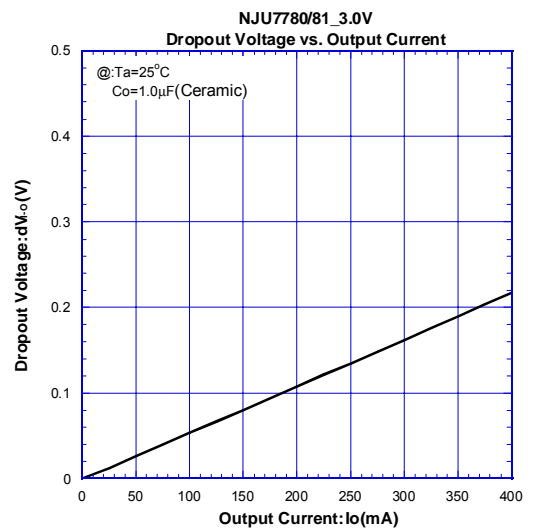
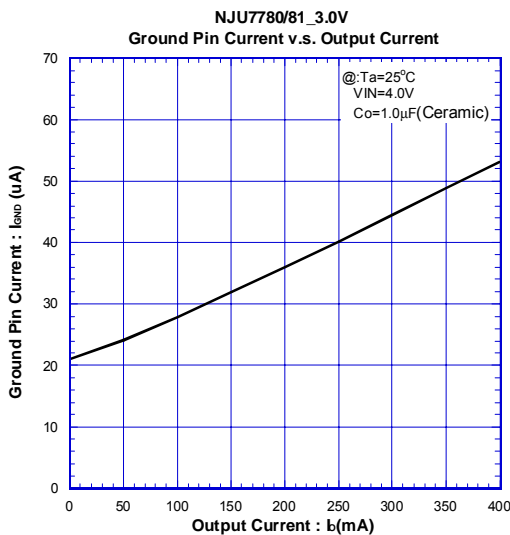
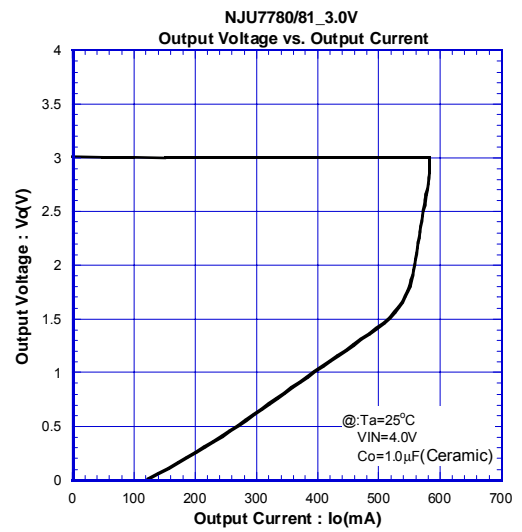
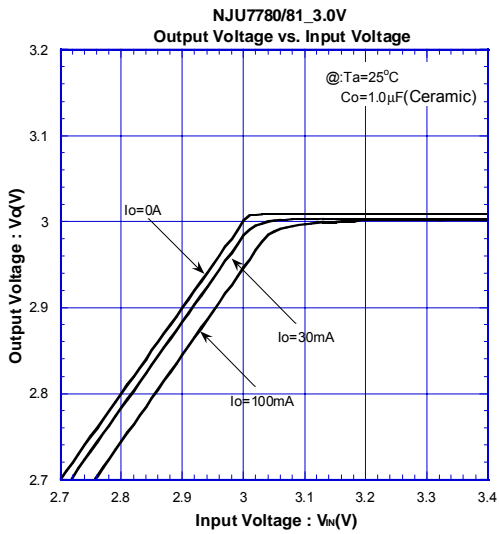
State of control terminal:

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

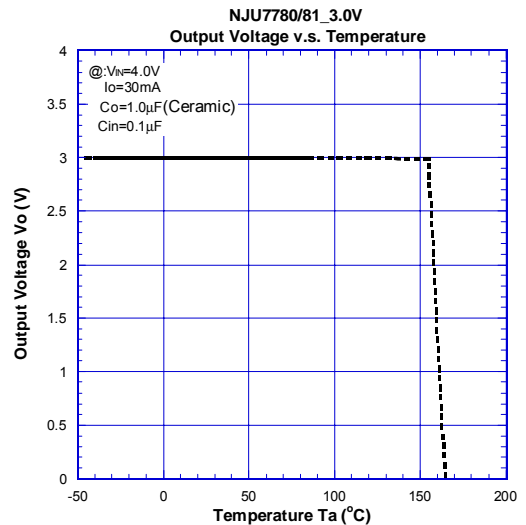
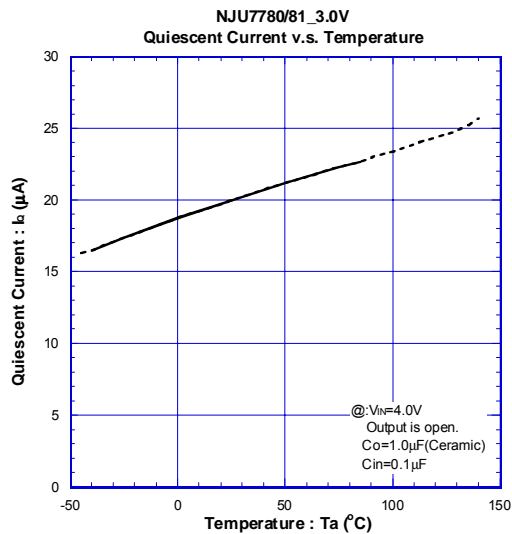
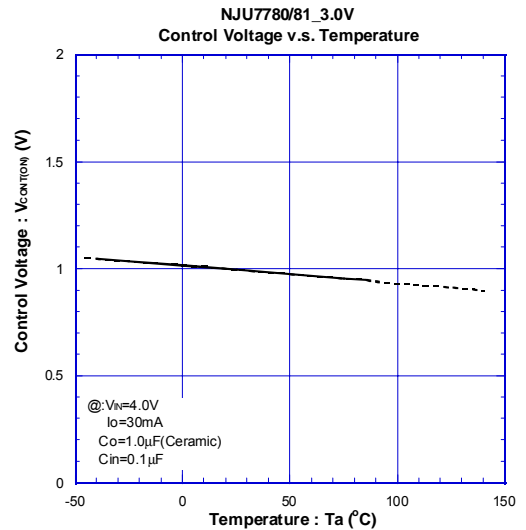
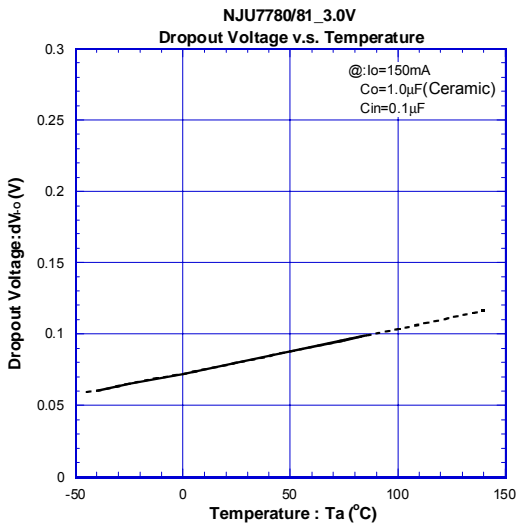
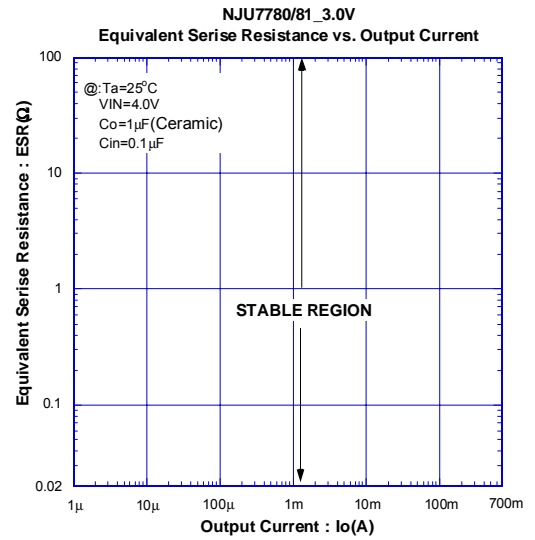
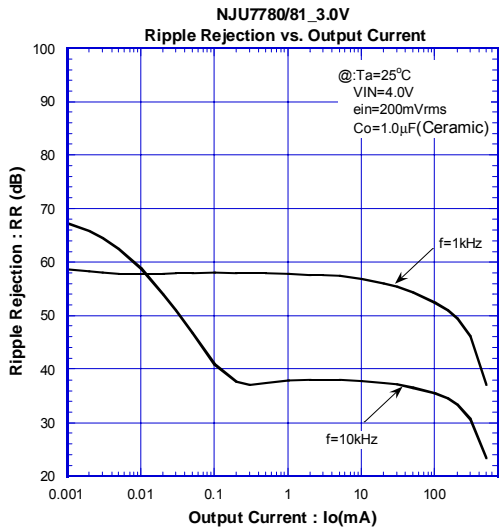
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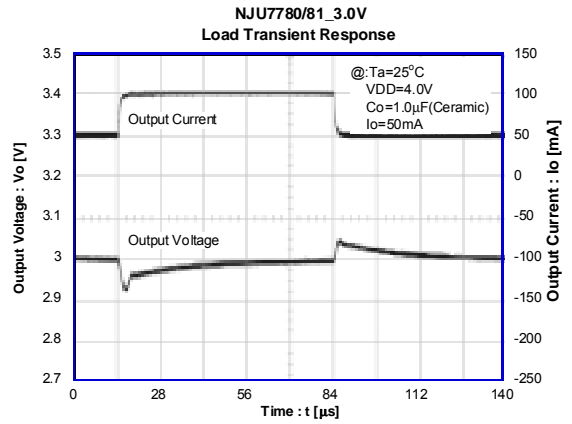
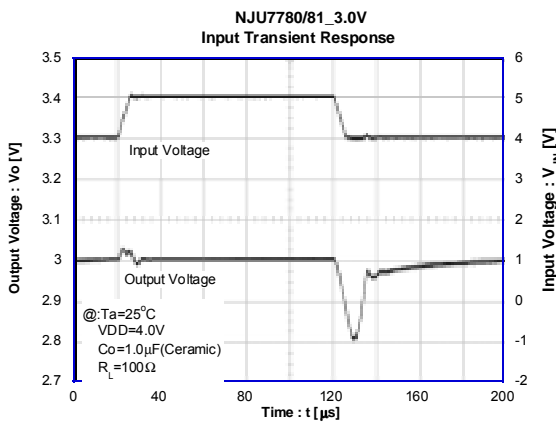
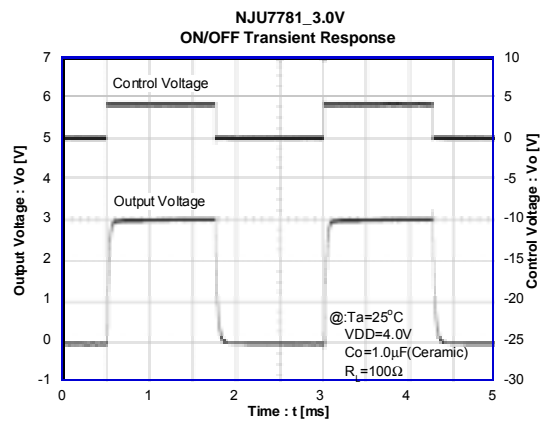
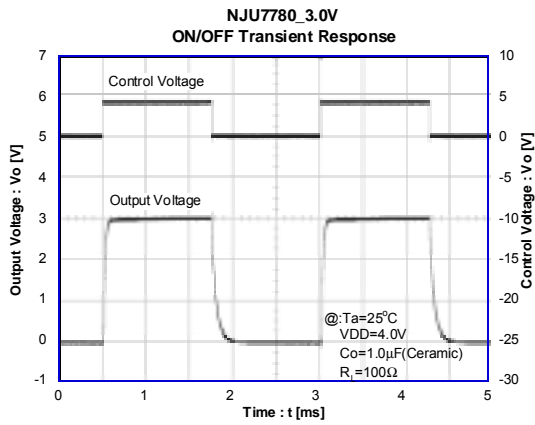
■ ELECTRICAL CHARACTERISTICS



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■ ELECTRICAL CHARACTERISTICS



[CAUTION]
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