

Low Dropout Voltage Regulator with Reset

GENERAL DISCRIPTION

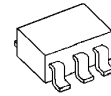
The NJU7272 is a low drop out voltage regulator with input-monitor reset function with delay.

Advanced CMOS technology achieves ultra low current consumption and high accuracy.

It delivers up to 5V/100mA output power with the maximum input voltage of 9V.

The NJU7272 suitable for MPU applications.

PACKAGE OUTLINE

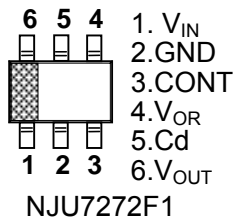


NJU7272F1

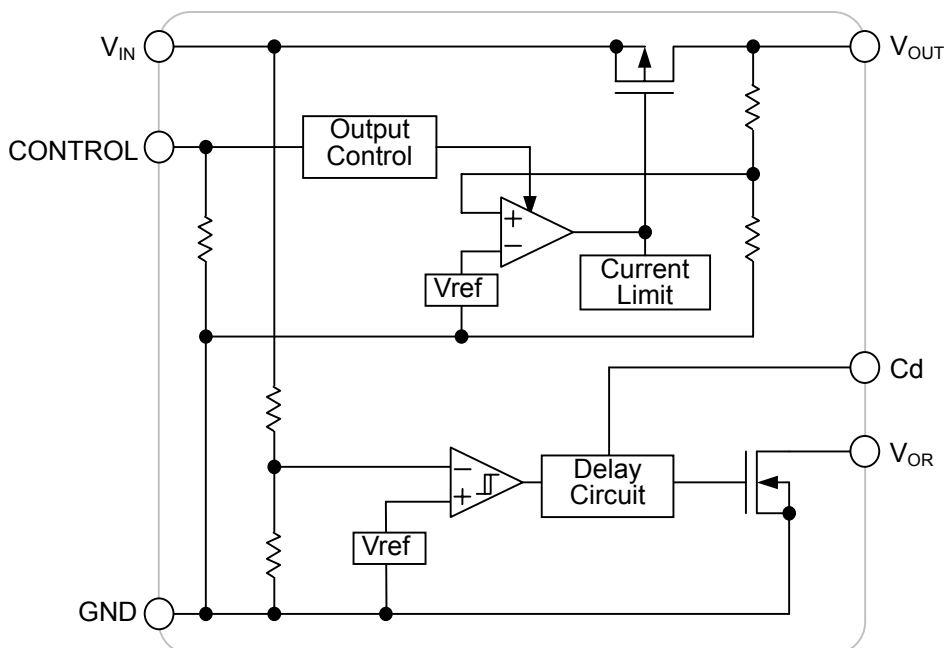
FEATURES

- Ultra Low Quiescent Current $I_q = 3.5\mu\text{A typ. (I}_o = 0\text{mA)}$
- Output Voltage Accuracy $V_o = \pm 1.0\%$
- Reset Voltage Accuracy $V_{RT} = \pm 1.0\%$
- Input Voltage Monitor type
- Adjustable delay time with external capacitor
- Output Current $I_o(\text{max.}) = 100\text{mA}$
- Output capacitor with 0.1 μF ceramic capacitor
- Nch Open Drain Output
- Internal Short Circuit Current Limit
- CMOS Technology
- Package Outline SOT-23-6

PIN CONFIGURATION



EQUIVALENT CIRCUIT



NJU7272

■ OUTPUT VOLTAGE/ DETECTION VOLTAGE

Device Name	Output Voltage	Detection Voltage
NJU7272F1-1502A	1.5V	2.0V
NJU7272F1-3342A	3.3V	4.2V
NJU7272F1-0555A	5.0V	5.5V

Output voltage options available : 1.8 ~ 5.0V (0.1V step)

Detection voltage options available : 1.3 ~ 4.5V (0.1V step)

■ ABSOLUTE MAXIMUM RATINGS

(Ta=25°C)

PARAMETER	SYMBOL	RATINGS	UNIT
Input Voltage	V_{IN}	+11	V
Control Voltage	V_{CONT}	+11	V
Cd Pin Input Voltage	V_{Cd}	+11	V
V_{OR} Pin Output Voltage	V_{OR}	GND - 0.3 ~ +11	V
V_{OR} Pin Output Current	I_{OR}	50	mA
Power Dissipation	P_D	200(*1) 400(*2)	mW
Operating Temperature Range	Topr	-40 ~ +85	°C
Storage Temperature	Tstg	-40 ~ +125	°C

(*1): Device itself

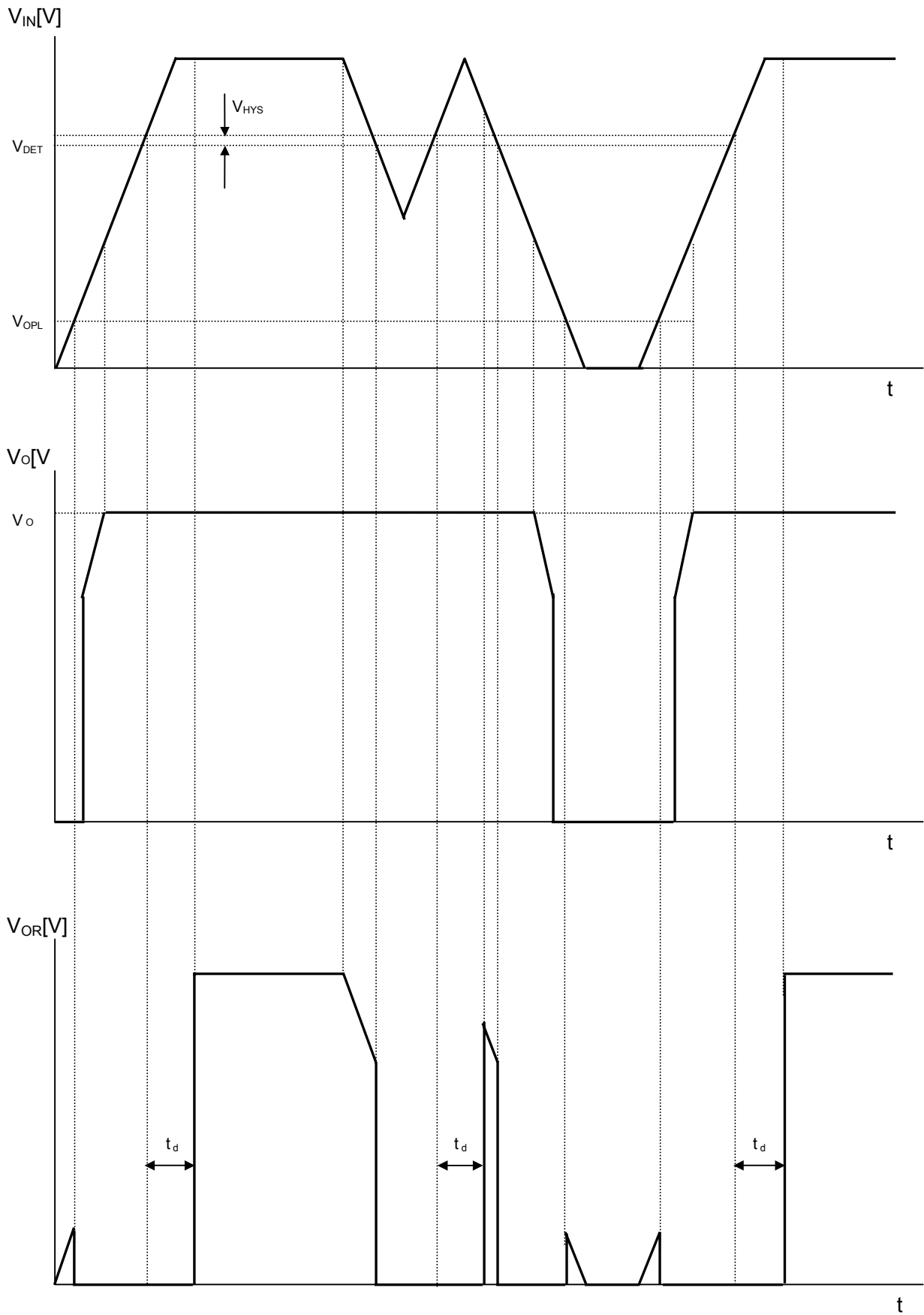
(*2): Mounted on glass epoxy board based on EIA/JEDEC. (114.3x76.2x1.6mm: 2Layers)

■ ELECTRICAL CHARACTERISTICS (V_{IN}=V_O+1, C_{IN}=0.1μF, C_O=0.1μF, Ta=25°C)

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT	
General Characteristics							
Quiescent Current	I _Q	V _{IN} =V _O +2, V _{CONT} =V _{IN} , I _O =0mA	-	3.5	8.2	μA	
Quiescent Current at Control OFF	I _{Q(OFF)}	V _{IN} =V _O +2, V _{CONT} =0V, I _O =0mA	-	1.0	2.0	μA	
Regulator Block							
Output Voltage	V _O	I _O =30mA	-1.0%	-	+1.0%	V	
Output Current	I _O	V _O - 0.3V	100	-	-	mA	
Line Regulation	ΔV _O /ΔV _{IN}	V _{IN} =V _O +1V ~ V _O +6V (V _O < 3.0V) V _{IN} =V _O +1V ~ 9V (V _O ≥ 3.0V) I _O =30mA	-	-	0.3	%/V	
Load Regulation	ΔV _O /ΔI _O	I _O =0 ~ 100mA	-	-	0.15	%/mA	
Output Voltage Temperature Coefficient	ΔV _O /ΔTa	Ta=0 ~ 85°C, I _O =10mA	-	±100	-	ppm/°C	
Control Voltage for ON-State	V _{CONT(ON)}		1.6	-	V _{IN}	V	
Control Voltage for OFF-State	V _{CONT(OFF)}		0	-	0.3	V	
Pull-down Resistance	R _{CONT}		2	5	10	MΩ	
Short Circuit Limit	I _{LIM}	V _O =0V	-	25	-	mA	
Input Voltage	V _{IN}		-	-	9	V	
Dropout Voltage	ΔV _{I-O}	I _O =40mA	1.5V ≤ V _O ≤ 2.0V	-	0.19	0.60	V
			2.1V ≤ V _O ≤ 2.4V	-	0.19	0.29	V
		I _O =60mA	2.5V ≤ V _O ≤ 2.7V	-	0.18	0.27	V
			2.8V ≤ V _O ≤ 3.3V	-	0.17	0.26	V
			3.4V ≤ V _O ≤ 5.0V	-	0.16	0.24	V
			5.1V ≤ V _O ≤ 6.0V	-	0.15	0.22	V
Reset Block							
Detection Voltage	V _{DET}		-1.0%	-	+1.0%	V	
Hysteresis Voltage	V _{HYS}		70	90	130	mV	
V _{OR} Pin Output Current	I _{OR}	Nch, V _{DS} =0.5V V _{CONT} =0V	V _{IN} =1.2V 4.50	2.00 7.00	- -	mA mA	
Output Leak Current	I _{LEAK}	V _{IN} =V _{OR} =V _{CONT} =9V	-	-	0.1	μA	
Detection Voltage Temperature Coefficient	ΔV _{DET} /ΔTa	Ta=0 ~ 85°C	-	±100	-	ppm/°C	
Delay Time	td	V _{IN} =V _{DET} +1, Cd=4.7nF	8	10	12	ms	
Operating Voltage(*4)	V _{OPL}	R _L =100kΩ	-	-	0.8	V	

(*3): The value condition that V_{OR} become 10% or less of V_{IN}.

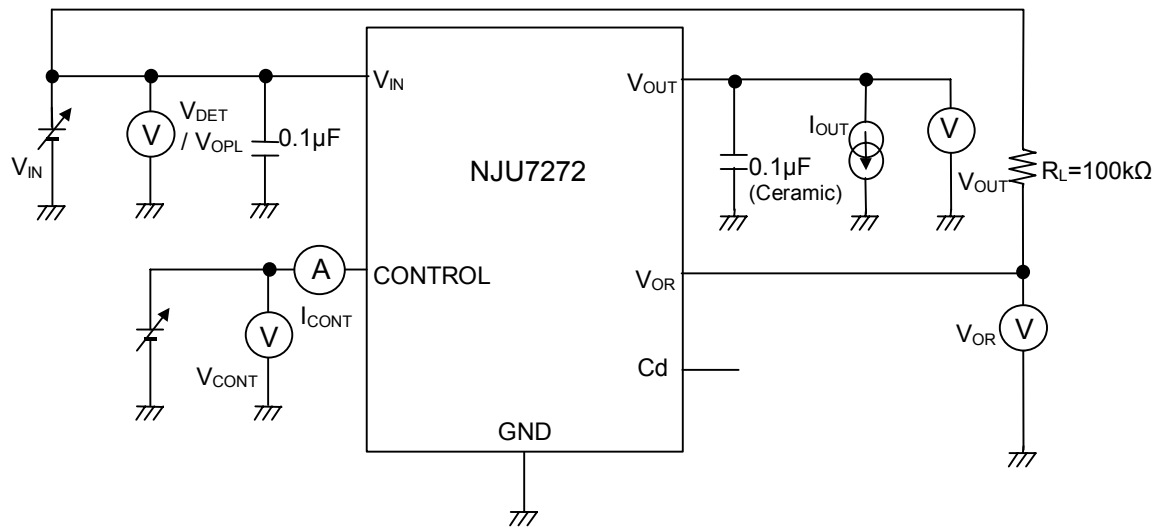
■ TIMING CHART



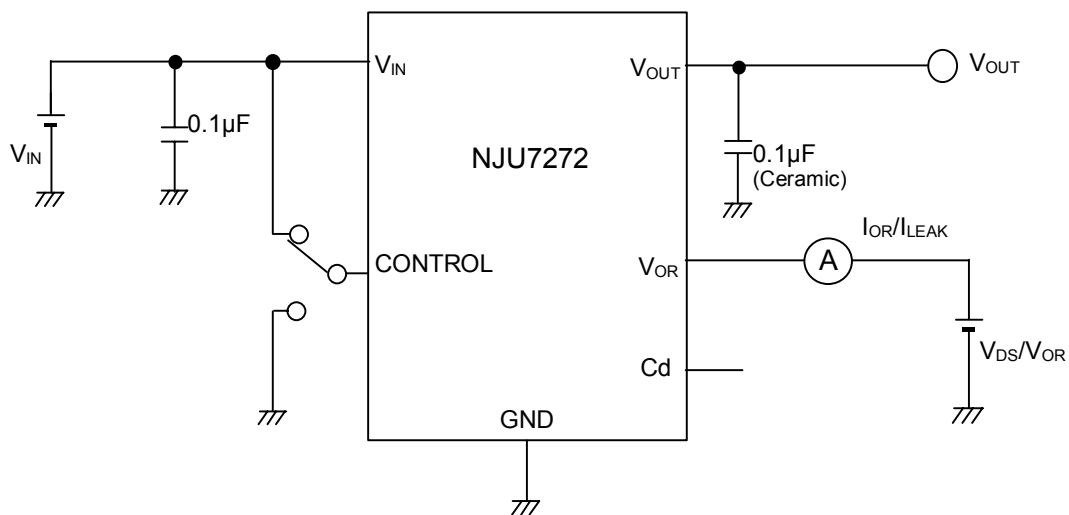
* V_{OR} is the case where a pull-up is carried out to V_{IN} through resistance.

■ TEST CIRCUIT

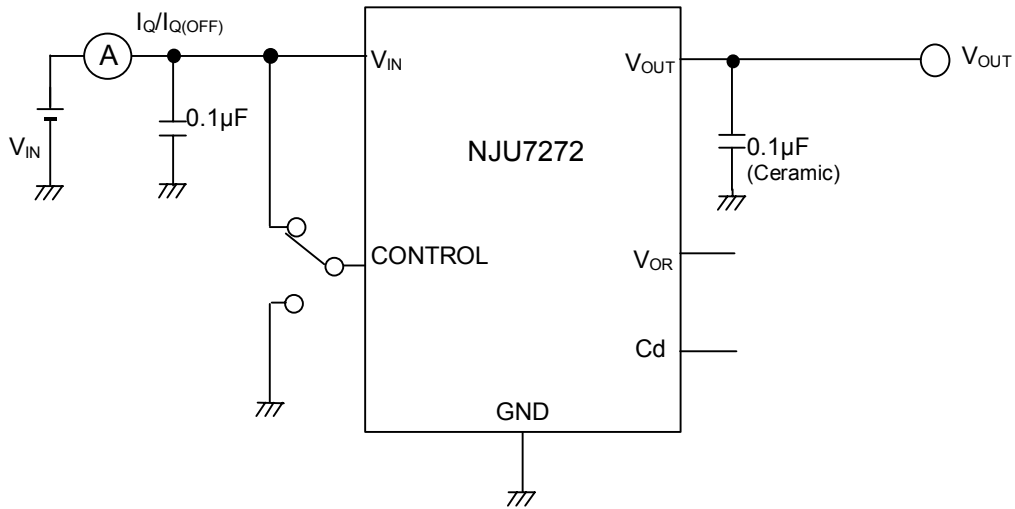
① COMMON TEST CIRCUIT



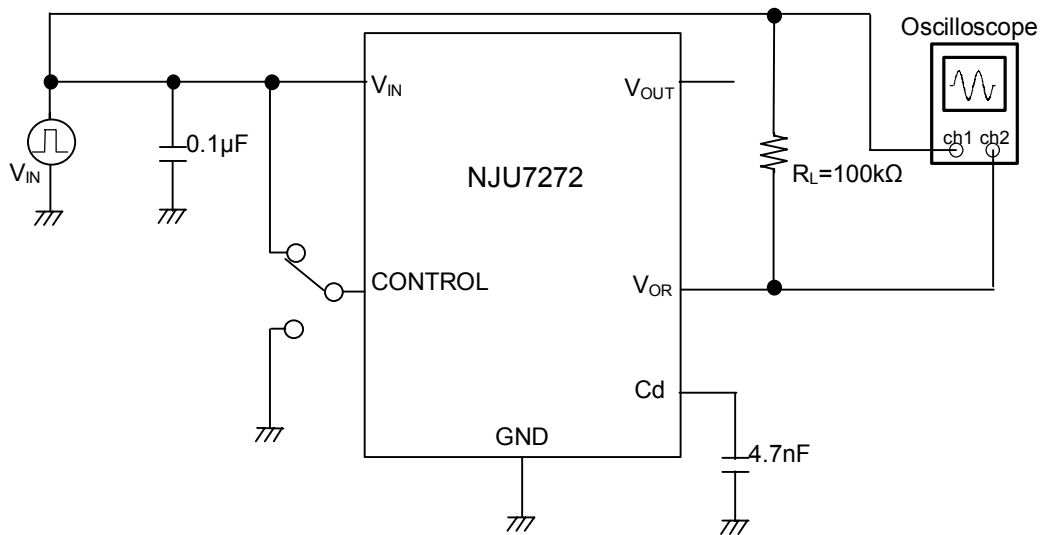
② OUTPUT CURRENT/OUTPUT LEAK CURRENT TEST CIRCUIT



③ QUIESCENT CURRENT TEST CIRCUIT

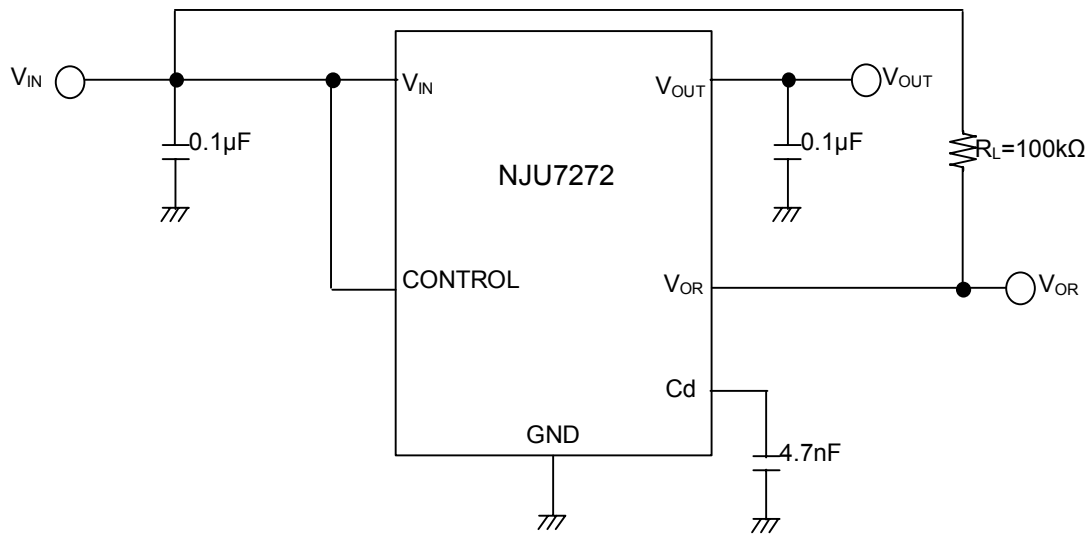


④ DELAY TIME TEST CIRCUIT



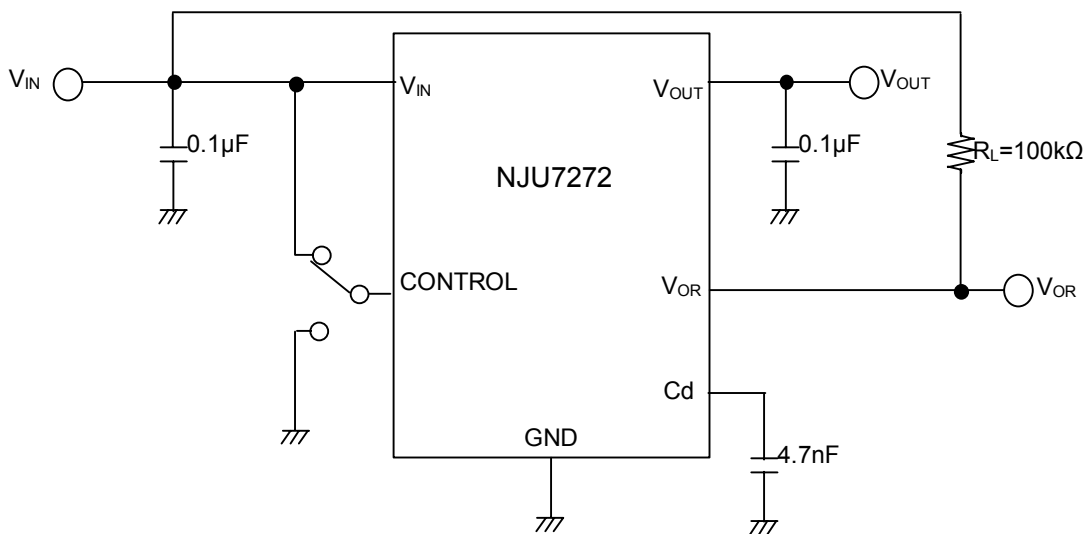
■ TYPICAL APPLICATION

① In case that ON/OFF Control is not required:



Connect control terminal to V_{IN} terminal.

② In use of ON/OFF Control:



State of control terminal:

- "H" → output is enabled.
- "L" or "open" → output is disabled.

*Input Capacitance C_{IN}

Input Capacitance C_{IN} is required to prevent oscillation and reduce power supply ripple for applications with high power supply impedance or a long power supply line.

Use the C_{IN} value of $0.1\mu\text{F}$ greater to avoid the problem.

C_{IN} should connect between GND and V_{IN} as short as possible.

*Output Capacitance C_o

Output capacitor (C_o) is required for a phase compensation of the internal error amplifier. The capacitance and the equivalent series resistance (ESR) influence stability of the regulator.

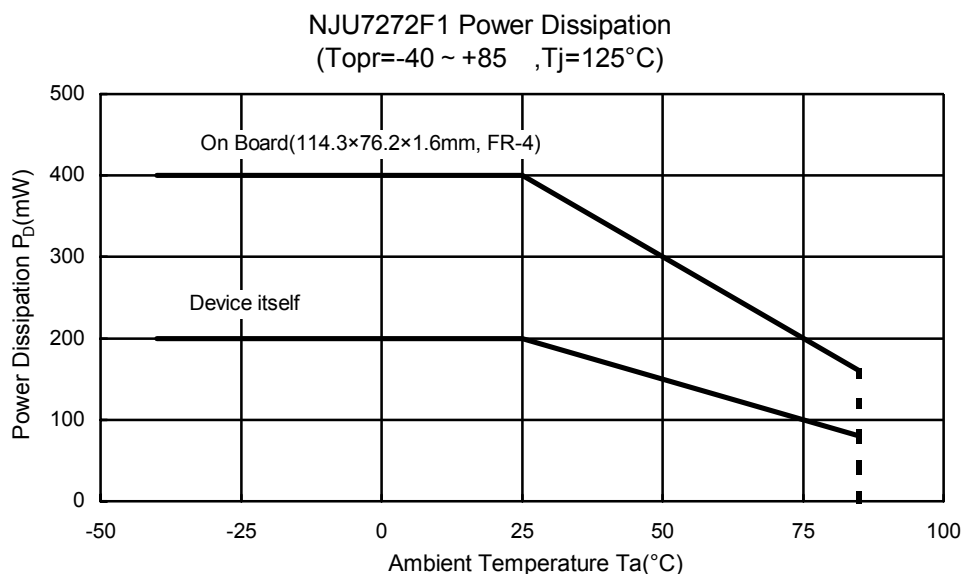
If use a smaller C_o , it may cause excess output noise or oscillation of the regulator due to lack of the phase compensation. Therefore, use C_o with the recommended capacitance or greater value and connect between V_o terminal and GND terminal with minimal wiring.

The recommended capacitance depends on the output voltage. Low voltage regulator requires greater value of the C_o . Thus, check the recommended capacitance for each output voltage.

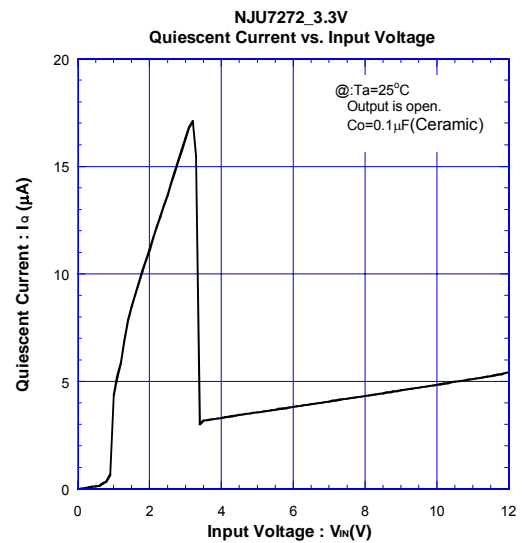
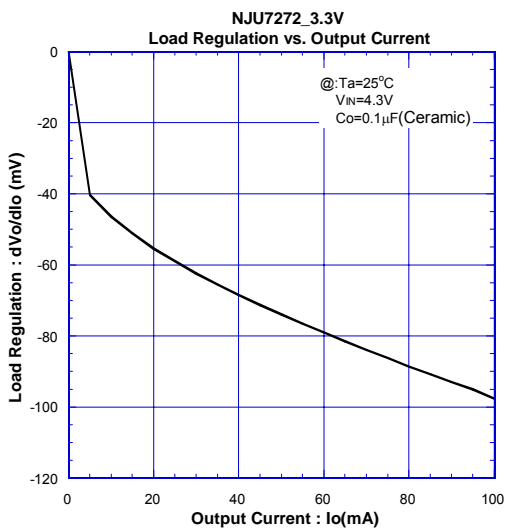
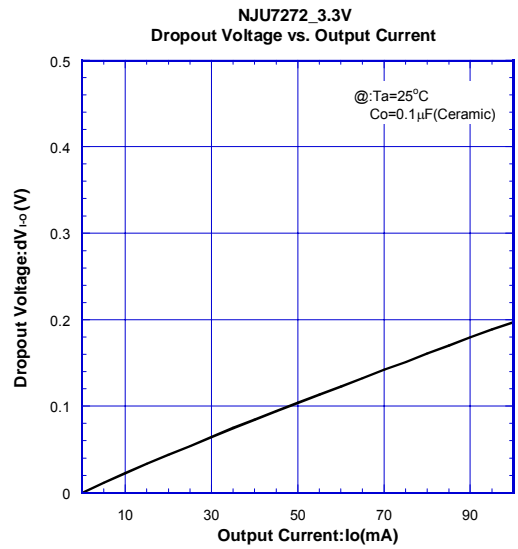
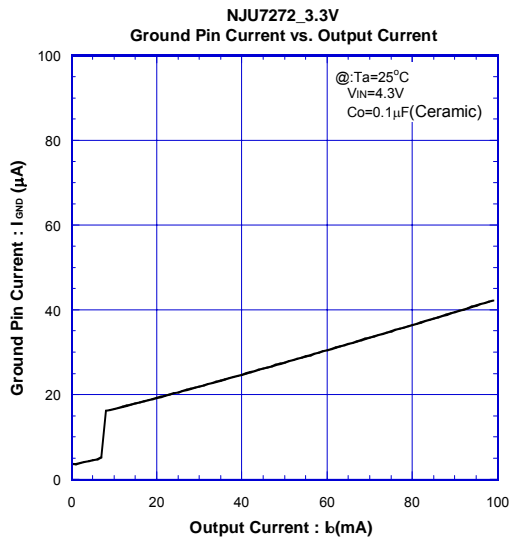
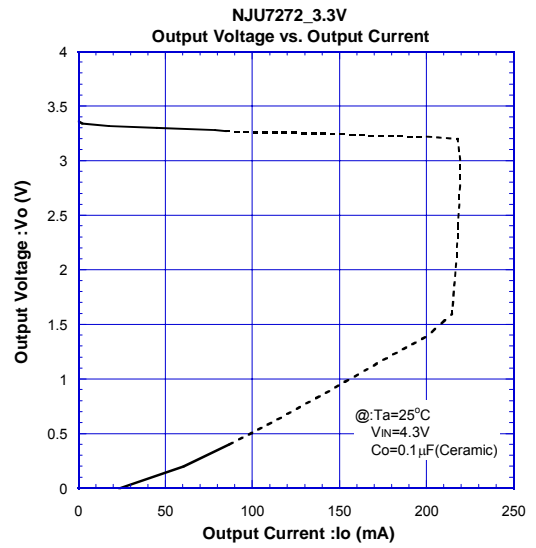
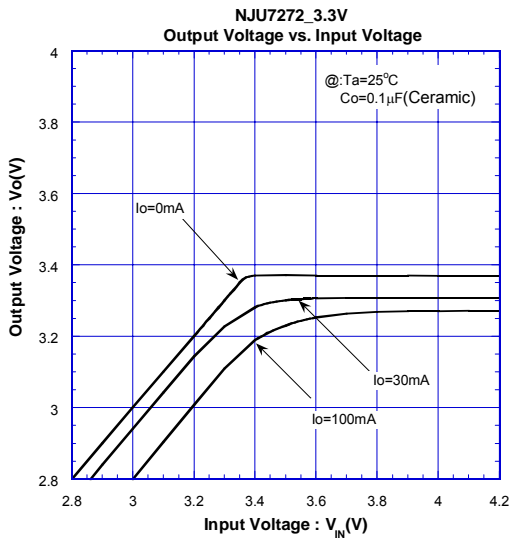
Use of a greater C_o reduces output noise and ripple output, and also improves transient response of the output voltage against rapid load change.

This product is designed to work with any capacitor including a low ESR capacitor for the C_o ; however, refer "Equivalent Series Resistance vs. Output Current" and choose suitable capacitor.

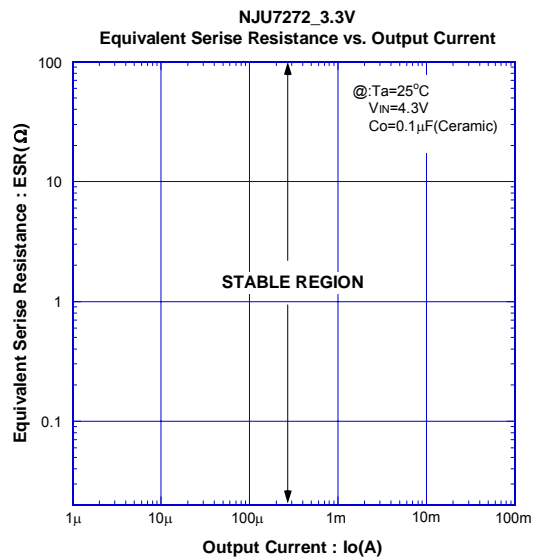
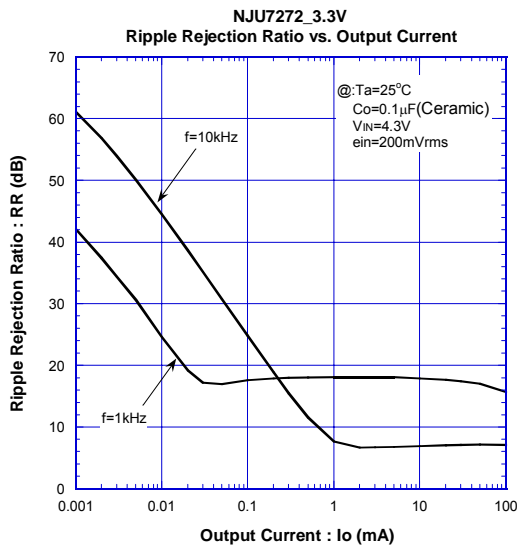
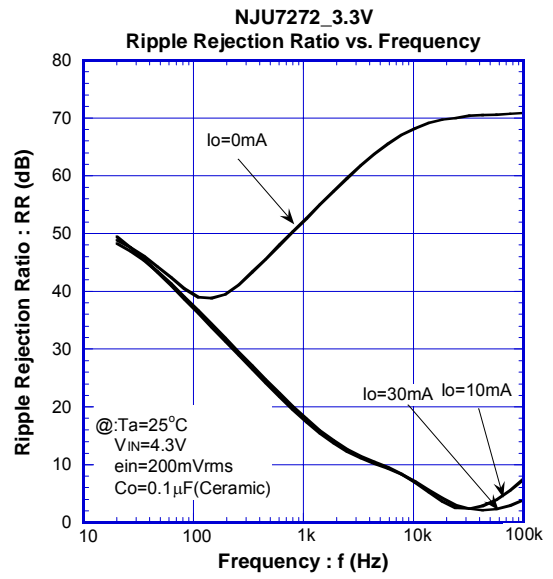
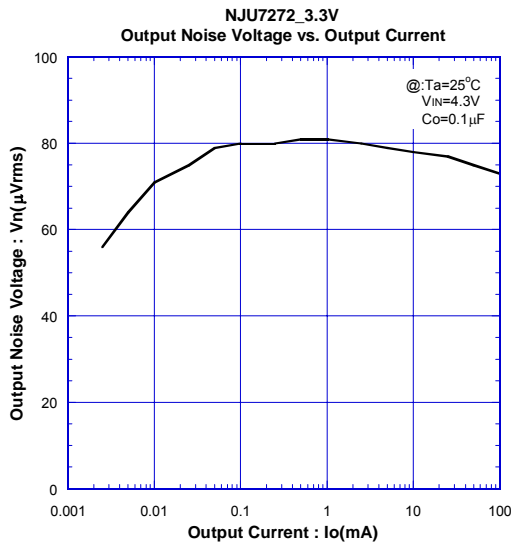
■ POWER DISSIPATION vs. AMBIENT TEMPERATURE



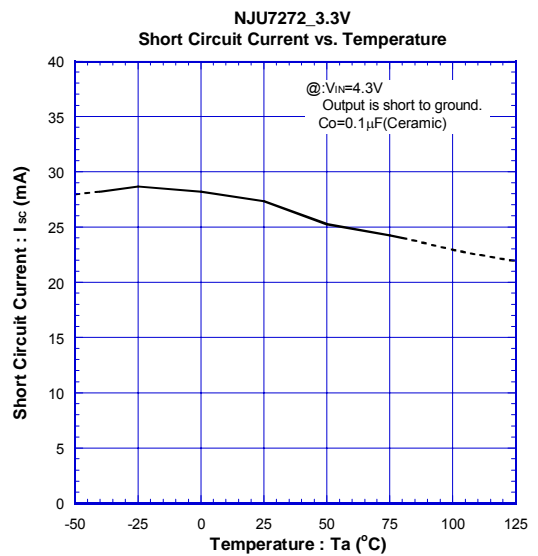
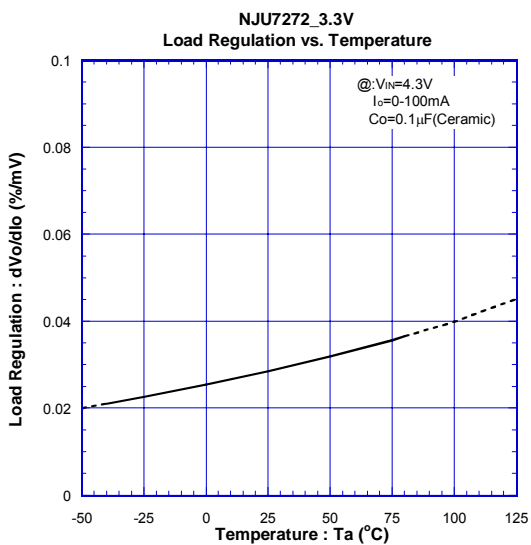
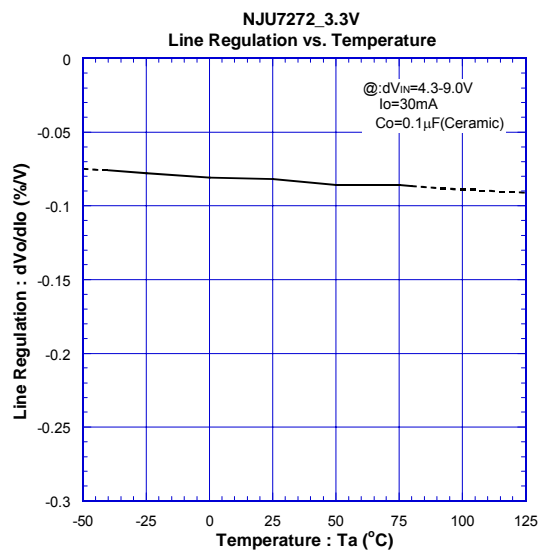
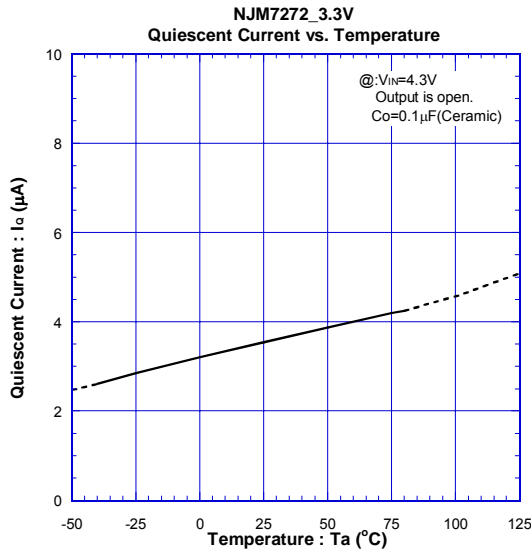
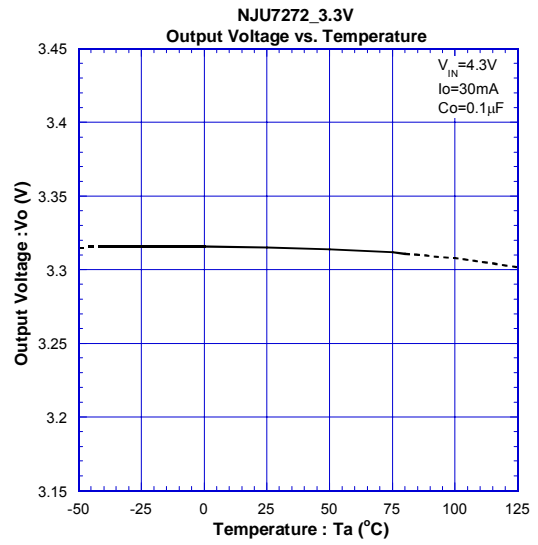
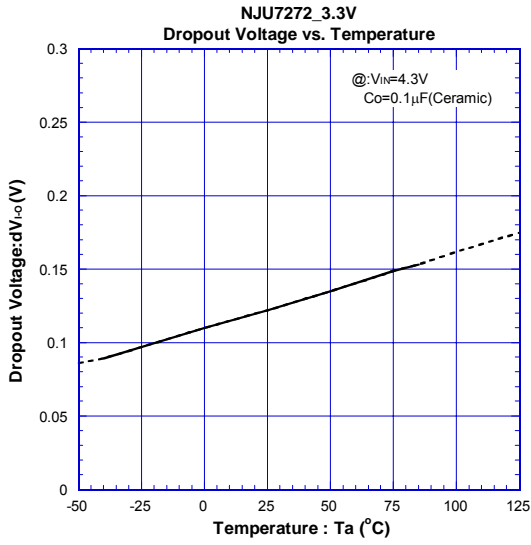
■ TYPICAL CHARACTERISTICS (LDO BLOCK)



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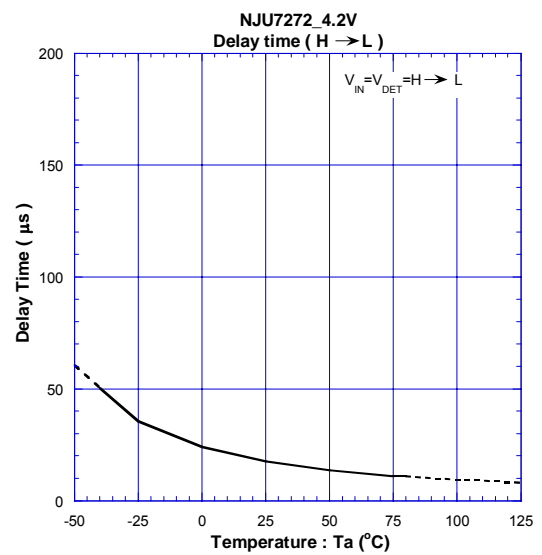
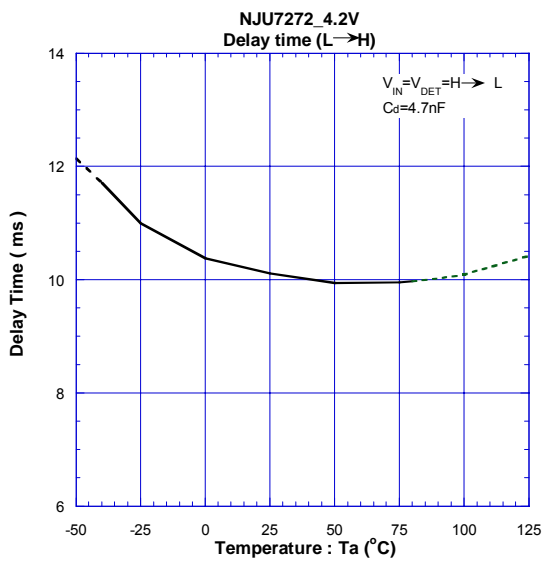
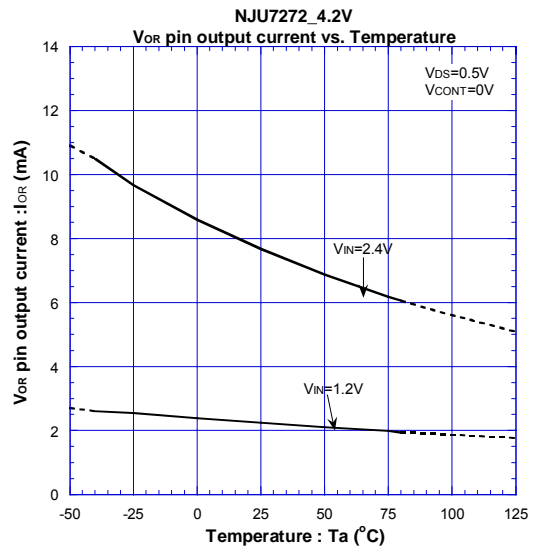
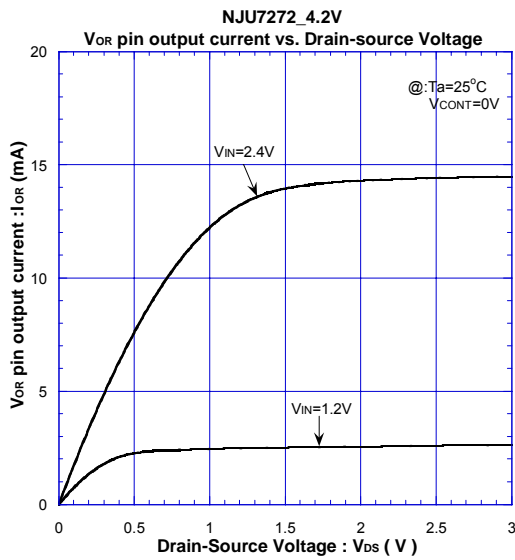
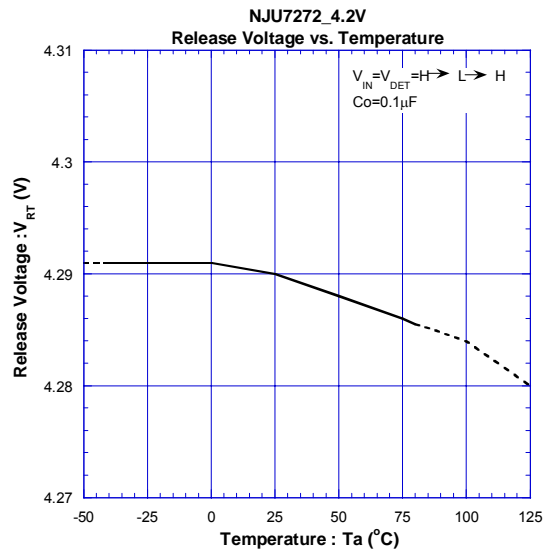
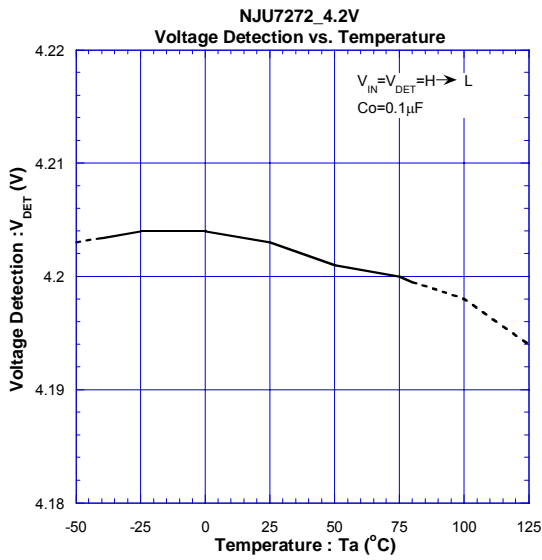


■ TYPICAL CHARACTERISTICS (LDO BLOCK)



NJU7272

■ TYPICAL CHARACTERISTICS (RESET BLOCK)



[CAUTION]

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