

Designated client product

This product will be discontinued its production in the near term.
And it is provided for customers currently in use only, with a time limit.
It can not be available for your new project. Please select other new or existing products.

For more information, please contact our sales office in your region.

New Japan Radio Co.,Ltd.

<http://www.njr.com/>

Low Dropout Voltage Regulator with Reset

■ GENERAL DISCRIPTION

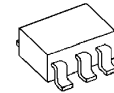
The NJU7270 is a low drop out voltage regulator with input-monitor reset function.

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 NJU7270 is suitable for MPU applications.

■ PACKAGE OUTLINE

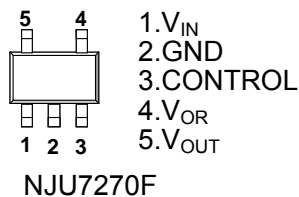


NJU7270F

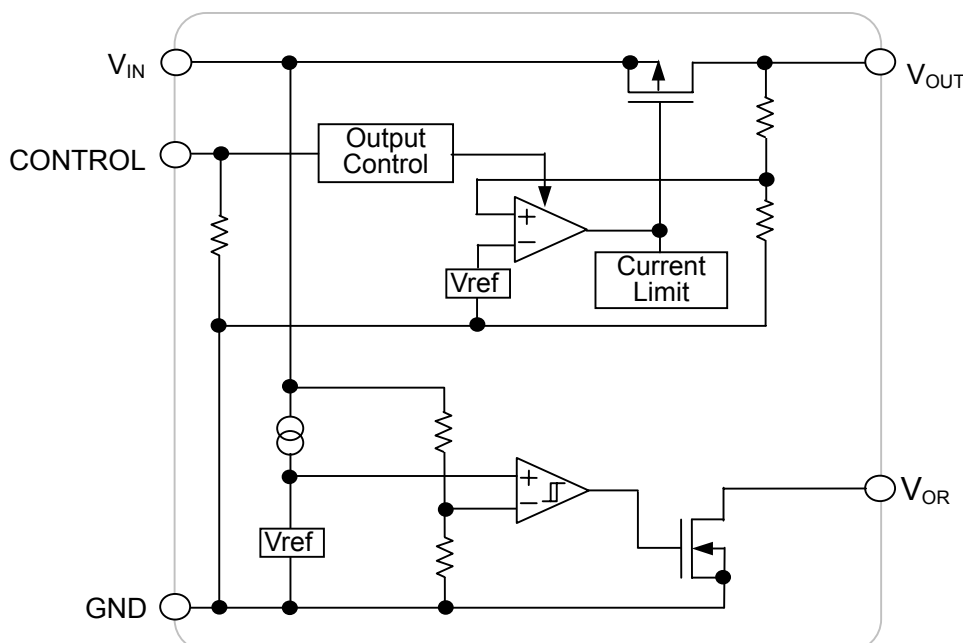
■ FEATURES

- Ultra Low Quiescent Current $I_q = 3.0\mu\text{A typ. (I}_o = 0\text{mA)}$
- Output Voltage Accuracy $V_o = \pm 1.0\%$
- Reset Voltage Accuracy $V_{RT} = \pm 1.0\%$
- Input Voltage Monitor type
- 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-23-5

■ PIN CONFIGURATION



■ EQUIVALENT CIRCUIT



■ OUTPUT VOLTAGE/ DETECTION VOLTAGE

Device Name	Output Voltage	Detection Voltage
NJU7270F1520A	1.5V	2.0V
NJU7270F3145A	3.1V	4.5V
NJU7270F3342A	3.3V	4.2V
NJU7270F0555A	5.0V	5.5V

Output voltage options available : 1.5 ~ 5.0V (0.1V step)

Detection voltage options available : 2.0 ~ 6.0V (0.1V step)

■ ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

PARAMETER	SYMBOL	RATINGS	UNIT
Input Voltage	V_{IN}	+11	V
Control Voltage	V_{CONT}	+11(*1)	V
V_{OR} Pin Output Voltage	V_{OR}	$V_{SS} - 0.3 \sim +11$	V
V_{OR} Pin Output Current	I_{OR}	50	mA
Power Dissipation	P_D	200(*2) 350(*3)	mW
Operating Temperature	T_{opr}	-40 ~ +85	°C
Storage Temperature	T_{stg}	-40 ~ +125	°C

(*1): Device itself

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

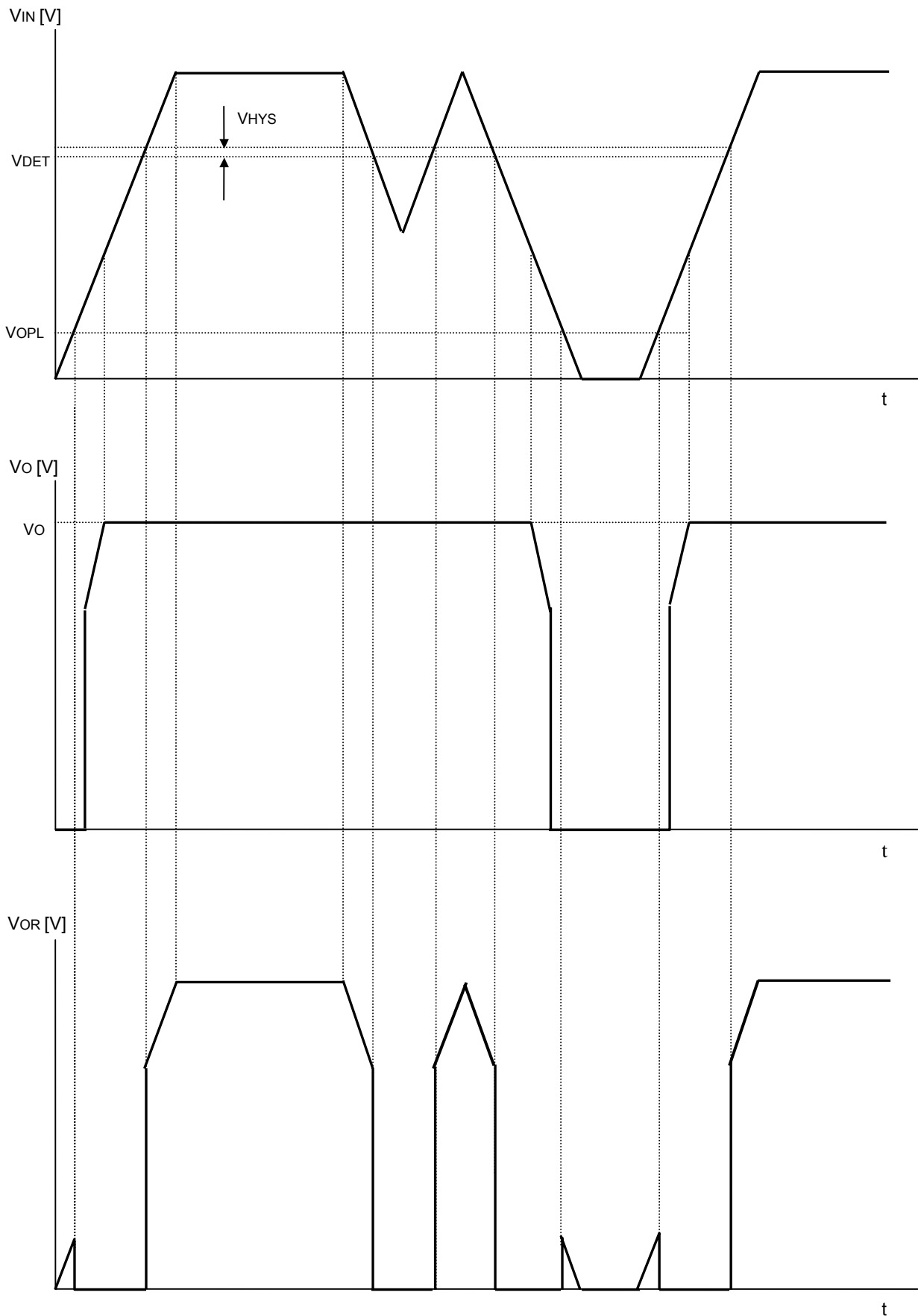
■ ELECTRICAL CHARACTERISTICS ($V_{IN}=V_O+1$, $C_{IN}=0.1\mu F$, $C_O=0.1\mu F$, $T_a=25^\circ C$)

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT	
General Characteristics							
Quiescent Current	I_Q	$V_{IN}=V_O+2$, $V_{CONT}=V_{IN}$, $I_O=0mA$	-	3.0	7.8	μA	
Quiescent Current at Control OFF	$I_{Q(OFF)}$	$V_{IN}=V_O+2$, $V_{CONT}=0V$, $I_O=0mA$	-	0.8	1.8	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	$\Delta V_O/\Delta V_{IN}$	$V_{IN}=V_O+1V \sim V_O+6V(3.0 > V_O)$ $V_{IN}=V_O+1V \sim 9.0V(3.0 \leq V_O)$ $I_O=30mA$	-	-	0.30	%/V	
Load Regulation	$\Delta V_O/\Delta I_O$	$I_O=0 \sim 100mA$	-	-	0.15	%/mA	
Output Voltage Temperature Coefficient	$\Delta V_O/\Delta T_a$	$T_a=0 \sim 85^\circ C$, $I_O=10mA$	-	± 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}		2.0	5	10	M Ω	
Short Circuit Limit	I_{LIM}	$V_O=0V$	-	25	-	mA	
Input Voltage	V_{IN}		-	-	9	V	
Dropout Voltage	ΔV_{I-O}	$I_O=40mA$	$1.5V \leq V_O \leq 2.0V$	-	0.19	0.60	V
			$2.1V \leq V_O \leq 2.4V$	-	0.19	0.29	V
			$2.5V \leq V_O \leq 2.7V$	-	0.18	0.27	V
		$I_O=60mA$	$2.8V \leq V_O \leq 3.3V$	-	0.17	0.26	V
			$3.4V \leq V_O \leq 5.0V$	-	0.16	0.24	V
			$5.1V \leq V_O \leq 6.0V$	-	0.15	0.22	V

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT	
Reset Block							
Detection Voltage	V_{DET}		-1.0%	-	+1.0%	V	
Hysteresis Voltage	V_{HYS}		$V_{DET} \times 0.03$	$V_{DET} \times 0.05$	$V_{DET} \times 0.08$	V	
V_{OR} Pin Output Current	I_{OR}	Nch, $V_{DS}=0.5V$ $V_{CONT}=0V$	$V_{IN}=1.2V$	0.75	2.0	-	mA
			$V_{IN}=2.4V$ ($V_{DET} \geq 2.7V$ Version)	4.5	7.0	-	mA
Output Leak Current	I_{LEAK}	$V_{IN}=V_{OR}=V_{CONT}=9V$	-	-	0.1	μA	
Detection Voltage Temperature Coefficient	$\Delta V_{DET}/\Delta Ta$	$Ta=0 \sim 85^{\circ}C$	-	± 100	-	ppm/ $^{\circ}C$	
Operating Voltage(*4)	V_{OPL}	$R_L=100k\Omega$	-	-	0.8	V	

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

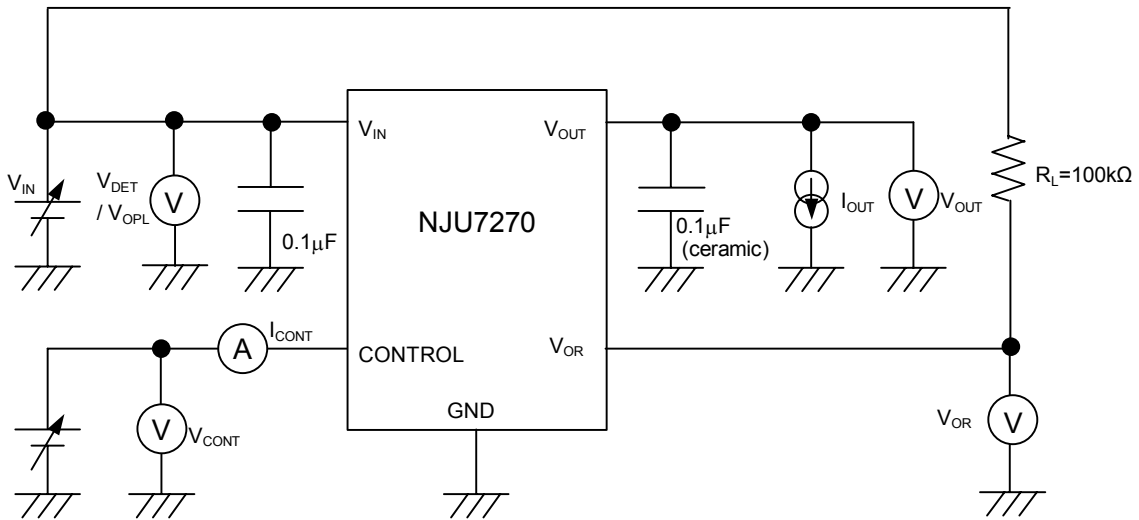
■ TIMING CHART



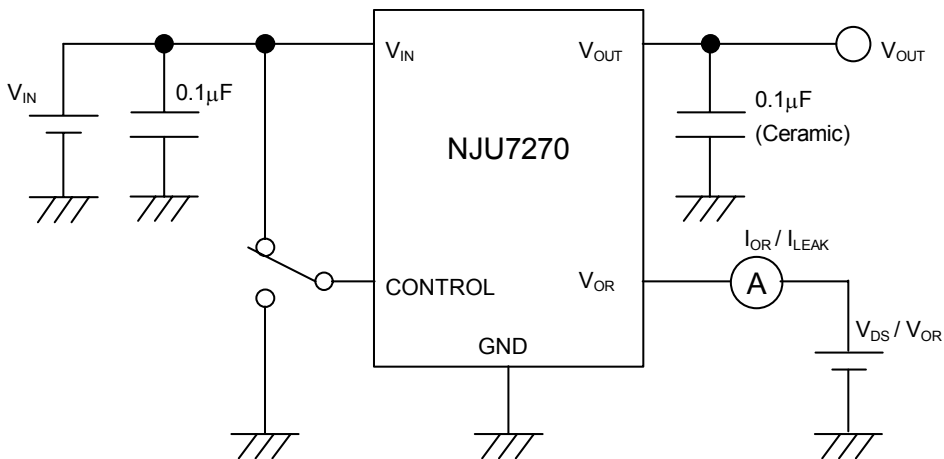
* V_{OR} is the case where a pull-up is carried out to V_{IN} through resistance.

■ TEST CIRCUIT

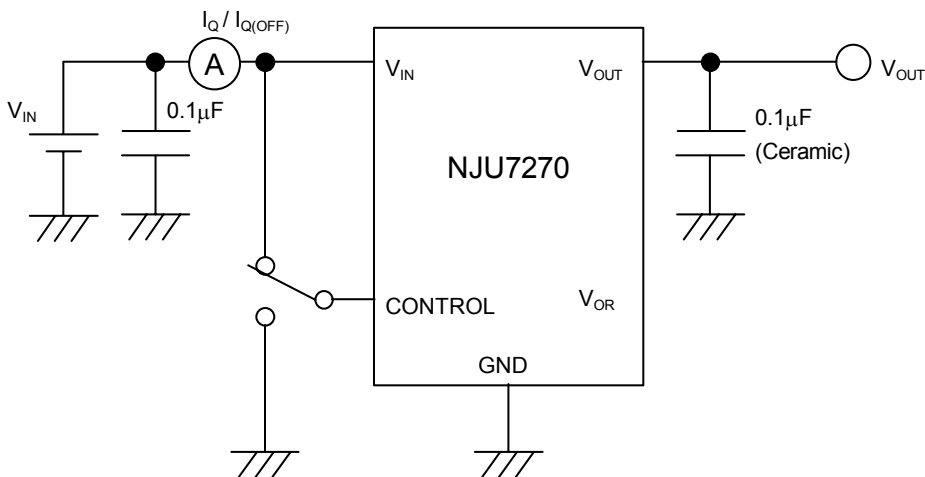
① COMMON TEST CIRCUIT



② OUTPUT CURRENT/OUTPUT LEAK CURRENT TEST CIRCUIT

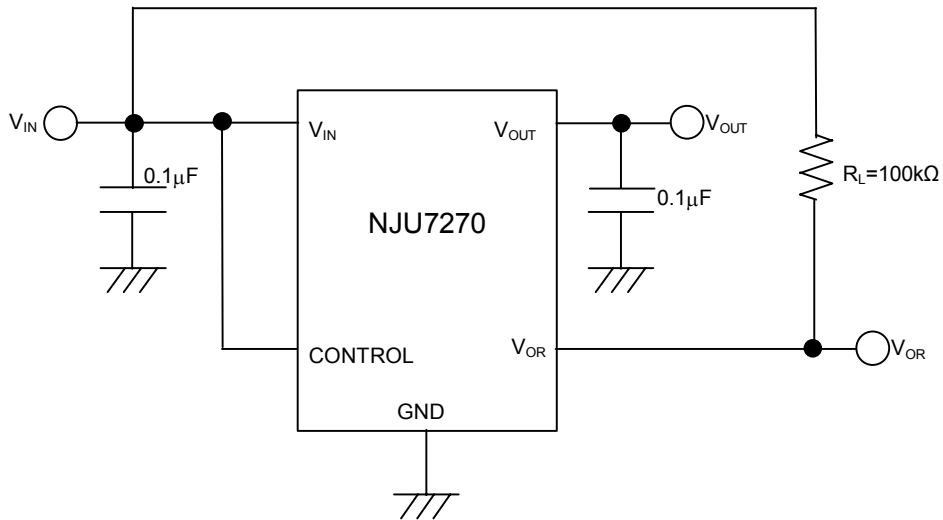


③ QUIESCENT CURRENT TEST CIRCUIT



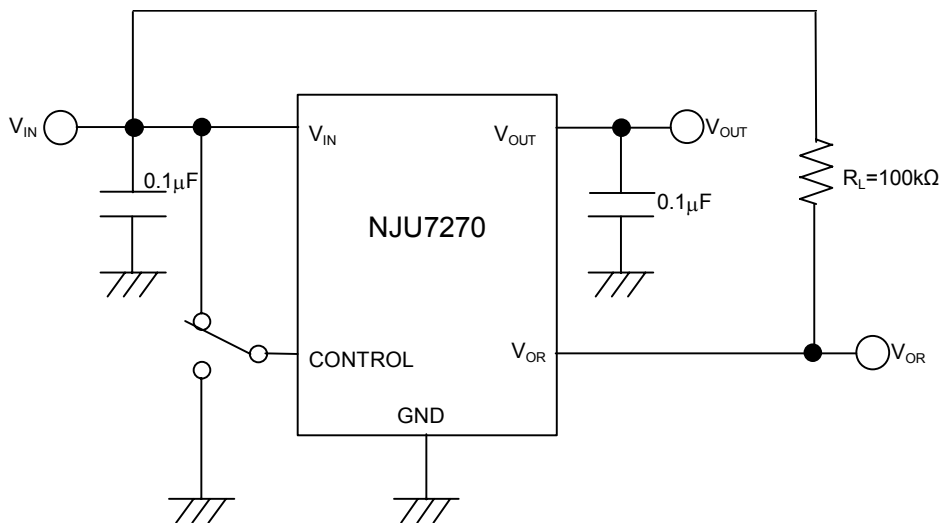
■ TYPICAL APPLICATION

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 μF 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.

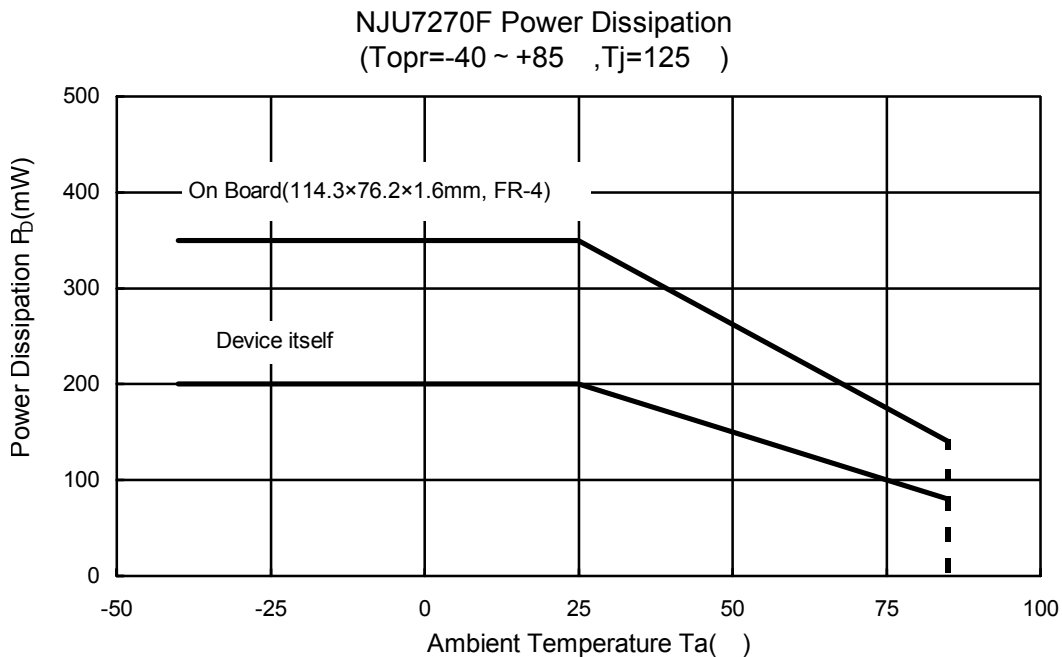
If use a smaller C_o , it may cause excess output noise or oscillation of the regulator due to lack of the phase compensation. Therefore, use C_o with the recommended capacitance or greater value and connect between V_o terminal and GND terminal with minimal wiring.

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.

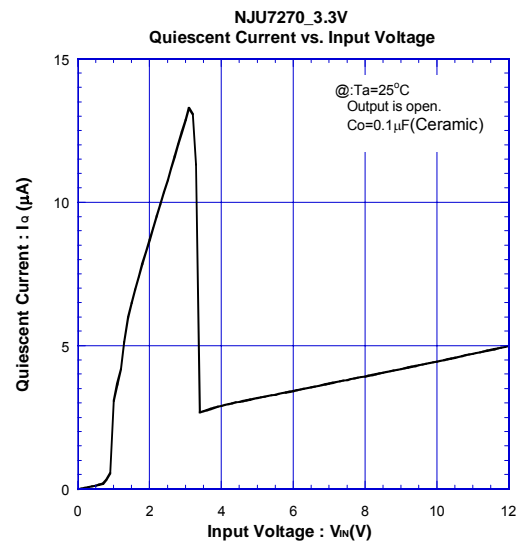
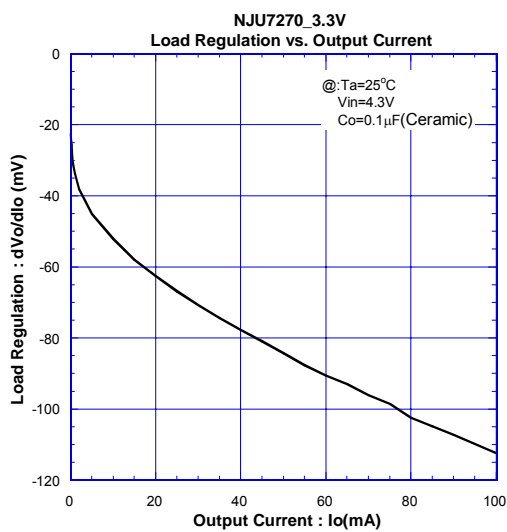
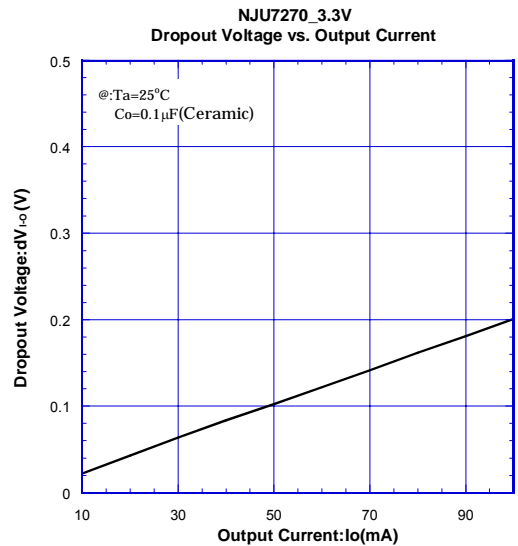
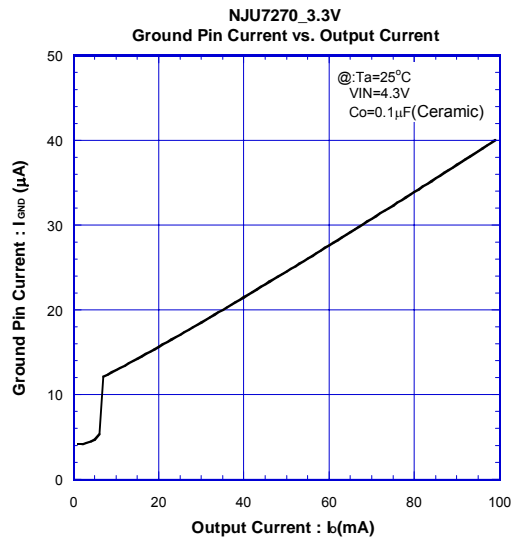
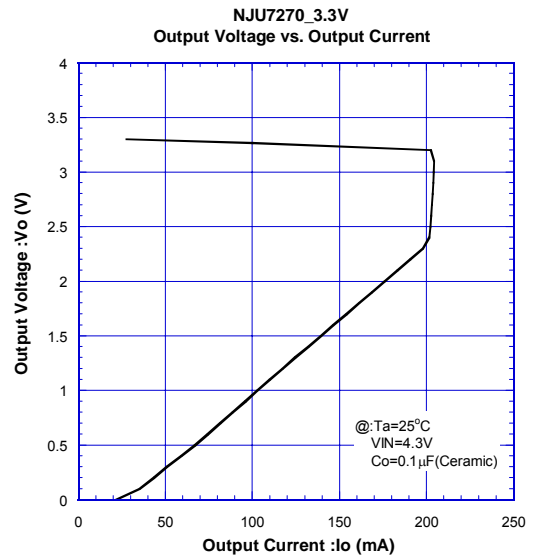
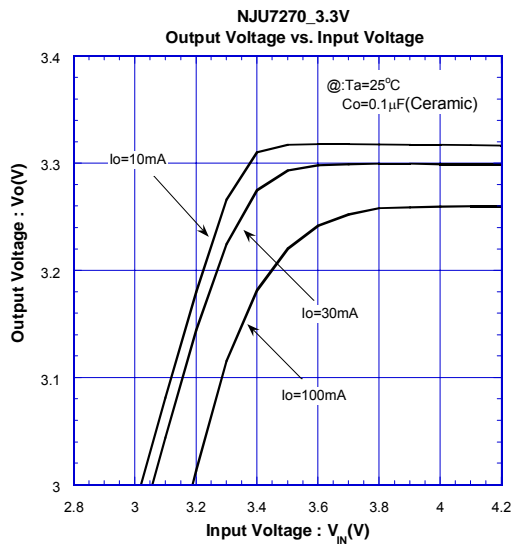
Use of a greater C_o reduces output noise and ripple output, and also improves transient response of the output voltage against rapid load change.

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.

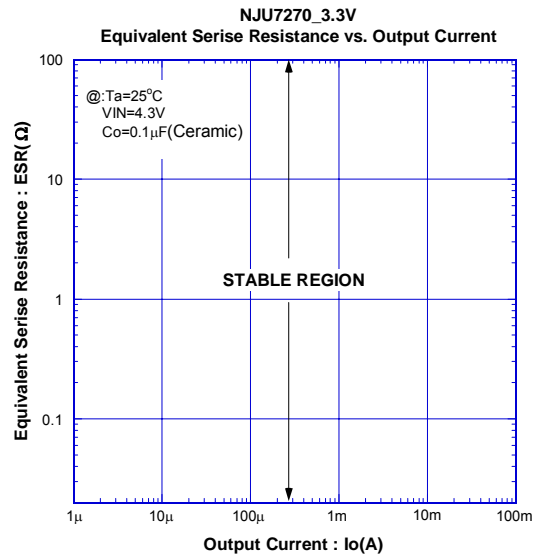
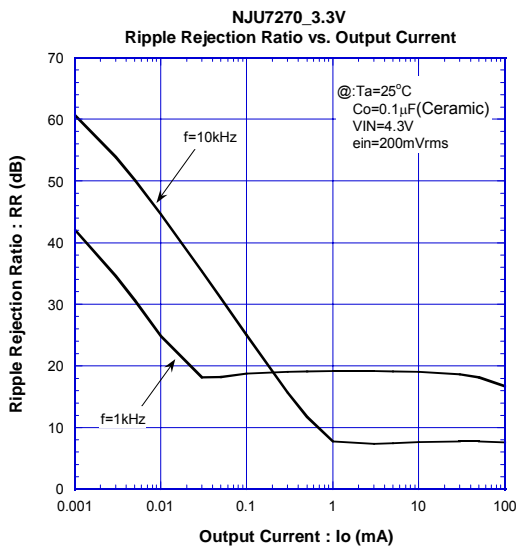
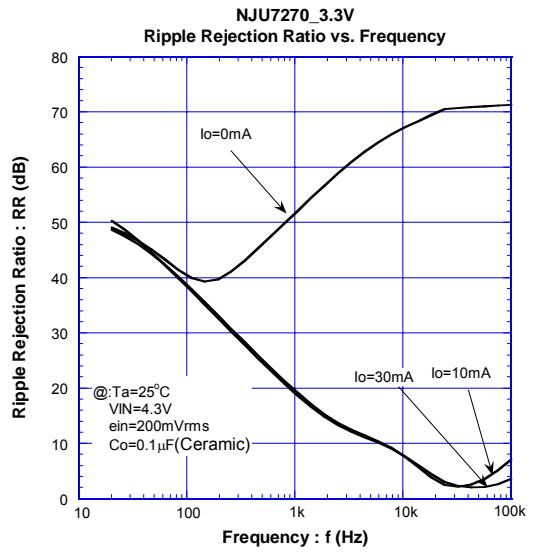
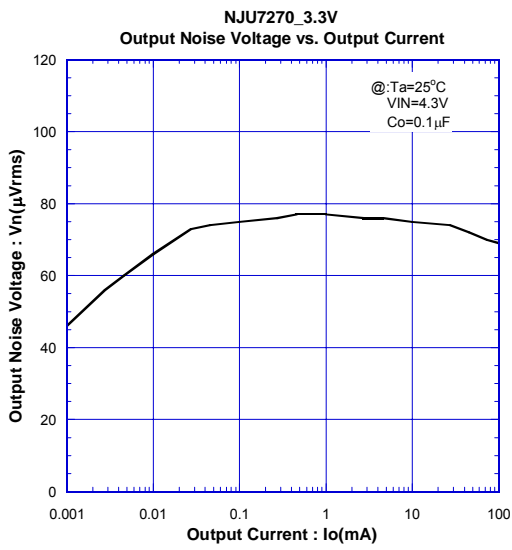
■ POWER DISSIPATION vs. AMBIENT TEMPERATURE



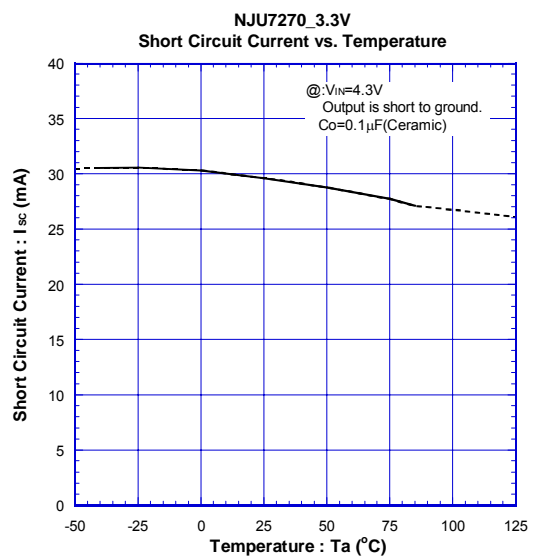
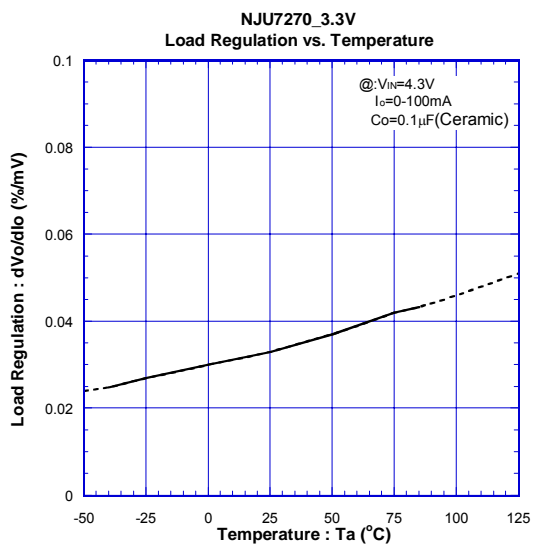
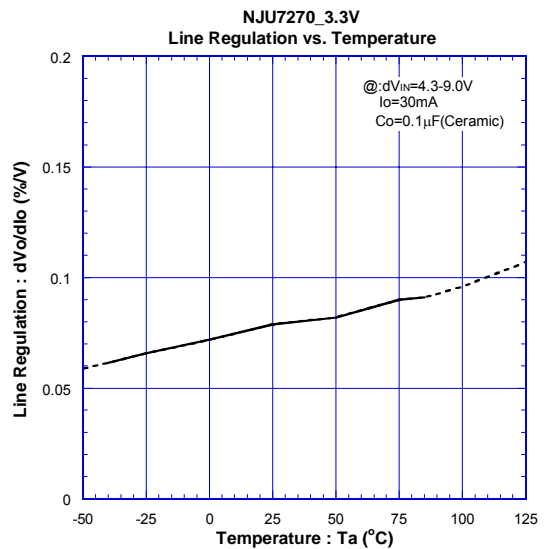
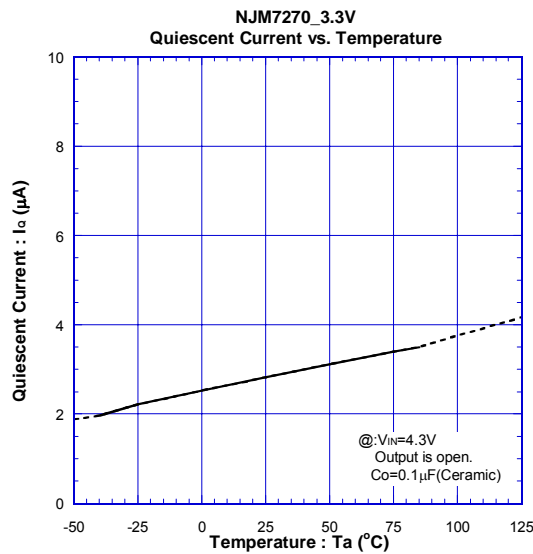
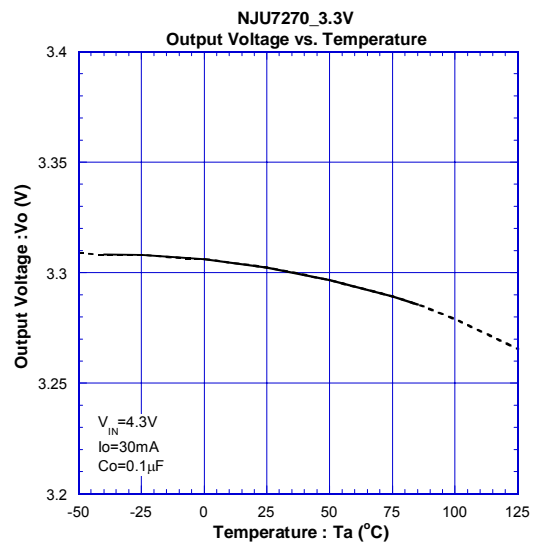
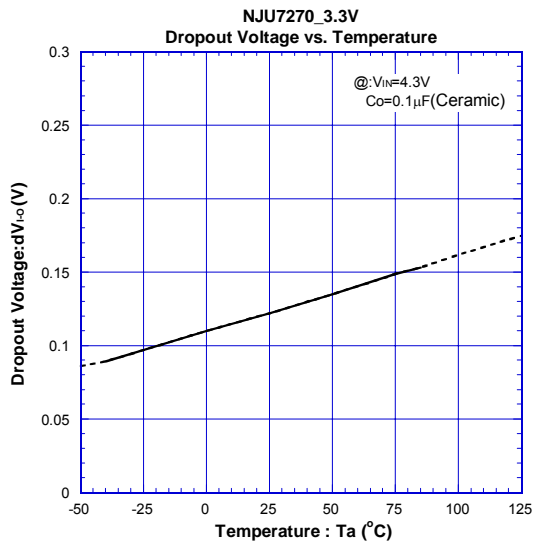
■ TYPICAL CHARACTERISTICS (LDO BLOCK)



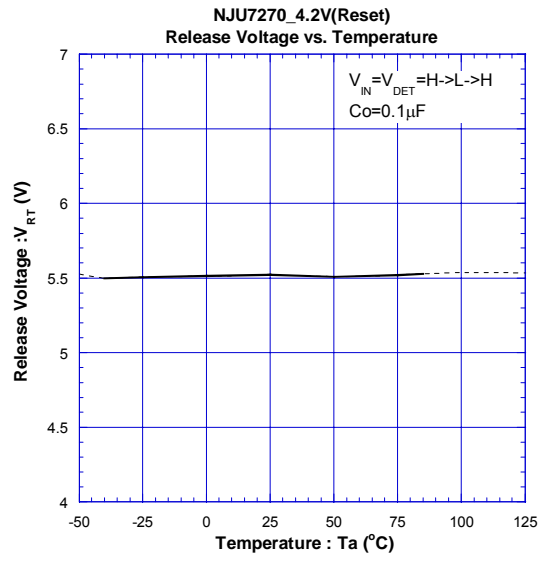
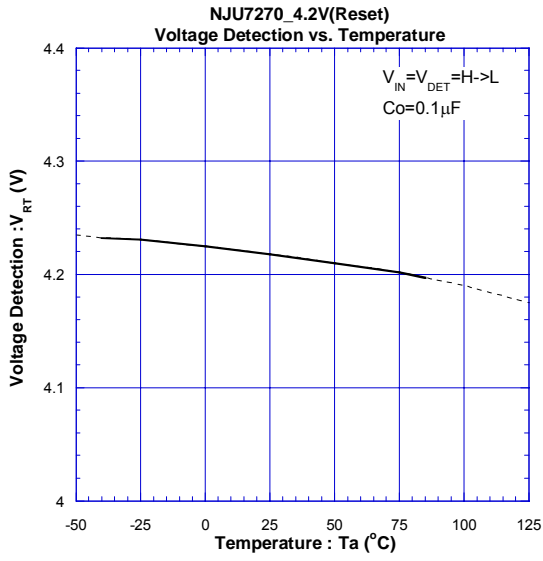
■ TYPICAL CHARACTERISTICS (LDO BLOCK)



■ TYPICAL CHARACTERISTICS (LDO BLOCK)



■ TYPICAL CHARACTERISTICS (RESET BLOCK)



[CAUTION]
 The specifications on this databook are only given for information, without any guarantee as regards either mistakes or omissions. The application circuits in this databook are described only to show representative usages of the product and not intended for the guarantee or permission of any right including the industrial rights.