

500mA Low Dropout Voltage Regulator

■ GENERAL DESCRIPTION

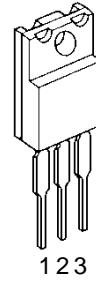
The NJU7223 series is a high precision output voltage, low drop output, low current consumption and high output current 3-terminal positive voltage regulator with a over current protection and a thermal shutdown.

Low dropout voltage is realized at high current output.

■ FEATURES

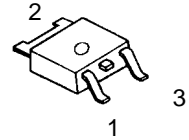
- High Precision Output $\pm 2.0\%$
- Output Current $I_o(\text{max.})=500\text{mA}$
- Low Current Consumption $I_q=30\mu\text{A}$
- Low Dropout Voltage $0.4\text{V typ. } (I_o=500\text{mA}, V_o=5.0\text{V})$
- Internal Over Current Protection
- Internal Thermal Shutdown Protection
- CMOS Technology
- Package Outline TO-220F, TO-252

■ PACKAGE OUTLINE



1 2 3

NJU7223F



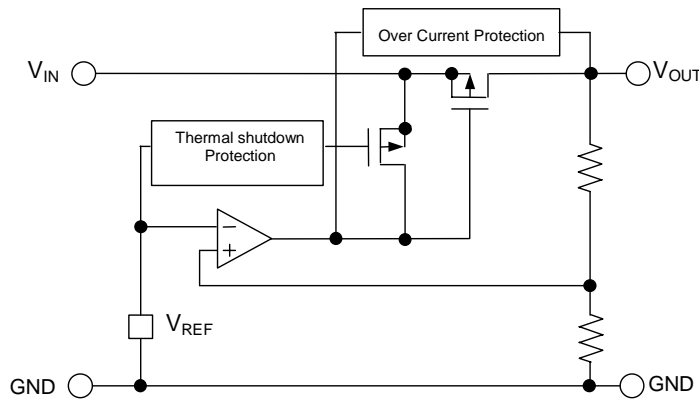
1 2 3

NJU7223DL1

■ PIN CONFIGURATION

1. V_{OUT}
2. V_{IN}
3. GND

■ EQUIVALENT CIRCUIT



■ OUTPUT VOLTAGE RANK LIST

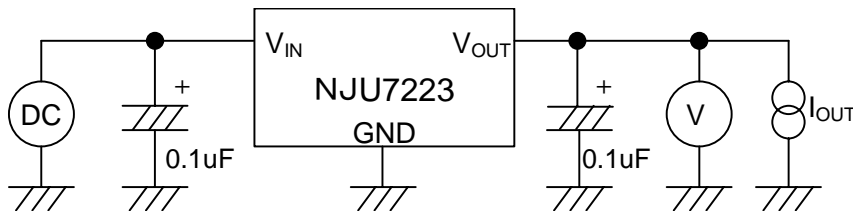
V_{OUT}	TO-220F	TO-252
+1.8V	NJU7223F18	NJU7223DL1-18
+2.5V	NJU7223F25	NJU7223DL1-25
+3.0V	NJU7223F30	NJU7223DL1-30
+3.3V	NJU7223F33	NJU7223DL1-33
+5.0V	NJU7223F50	NJU7223DL1-50

NJU7223

■ ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

PARAMETER	SYMBOL	RATINGS	UNIT
Input Voltage	V_{IN}	+18	V
Output Voltage	V_{OUT}	GND-0.3 ~ $V_{IN} + 0.3$	V
Output Current	I_{OUT}	700	mA
Power Dissipation	P_D	TO-220F 7.5($T_c \leq 85^\circ\text{C}$) TO-252 7.5($T_c \leq 56^\circ\text{C}$) 1.0($T_a = 25^\circ\text{C}$)	W
Operating Temperature Range	T_{opr}	-40 ~ 85	°C
Storage Temperature Range	T_{stg}	-55 ~ 150	°C

■ TEST CIRCUIT



■ ELECTRICAL CHARACTERISTICS (C_{IN}=C_O=0.1μF, T_j=25°C)

Measurement is to be conducted in pulse testing.

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Vo=1.8V Version						
Output Voltage	V _O	V _{IN} =3.8V, I _o =300mA	1.764	1.80	1.836	V
Input Voltage	V _{IN}		-	-	14	V
Dropout Voltage	ΔV _{IO}	I _o =150mA	-	0.4	0.6	V
Line Regulation	ΔV _o /ΔV _{IN} ·V _o	V _{IN} =2.8V ~ 12.0V	-	0.10	-	%/V
Load Regulation	ΔV _o /ΔI _o	V _{IN} =3.8V, I _o =1 ~ 500mA	-	120	160	mV
Quiescent Current	I _{DD}	V _{IN} =3.8V	-	30	60	μA
Ripple Rejection	RR	V _{IN} =3.8V, e _{in} =1V _{P-P} f=120Hz, I _o =300mA	-	57	-	dB
Output Noise Voltage	V _{NO}	V _{IN} =3.8V, I _o =300mA BW=10Hz ~ 100kHz	-	65	-	μV
Vo=2.5V Version						
Output Voltage	V _O	V _{IN} =4.5V, I _o =300mA	2.45	2.50	2.55	V
Input Voltage	V _{IN}		-	-	14	V
Dropout Voltage	ΔV _{IO}	I _o =300mA	-	0.4	0.6	V
Line Regulation	ΔV _o /ΔV _{IN} ·V _o	V _{IN} =3.5V ~ 12.0V	-	0.10	-	%/V
Load Regulation	ΔV _o /ΔI _o	V _{IN} =4.5V, I _o =1 ~ 500mA	-	120	160	mV
Quiescent Current	I _{DD}	V _{IN} =4.5V	-	30	60	μA
Ripple Rejection	RR	V _{IN} =4.5V, e _{in} =1V _{P-P} f=120Hz, I _o =300mA	-	57	-	dB
Output Noise Voltage	V _{NO}	V _{IN} =4.5V, I _o =300mA BW=10Hz ~ 100kHz	-	110	-	μV
Vo=3.0V Version						
Output Voltage	V _O	V _{IN} =5.0V, I _o =300mA	2.94	3.00	3.06	V
Input Voltage	V _{IN}		-	-	14	V
Dropout Voltage	ΔV _{IO}	I _o =300mA	-	0.4	0.6	V
Line Regulation	ΔV _o /ΔV _{IN} ·V _o	V _{IN} =4.0V ~ 12.0V	-	0.10	-	%/V
Load Regulation	ΔV _o /ΔI _o	V _{IN} =5.0V, I _o =1 ~ 500mA	-	120	160	mV
Quiescent Current	I _{DD}	V _{IN} =5.0V	-	30	60	μA
Ripple Rejection	RR	V _{IN} =5.0V, e _{in} =1V _{P-P} f=120Hz, I _o =300mA	-	57	-	dB
Output Noise Voltage	V _{NO}	V _{IN} =5.0V, I _o =300mA BW=10Hz ~ 100kHz	-	115	-	μV

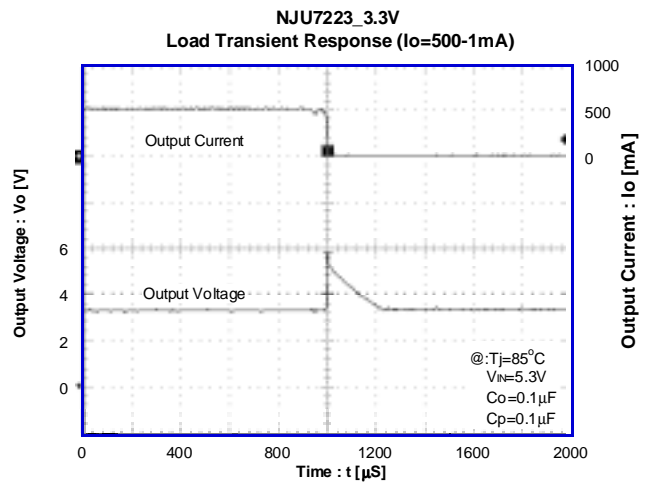
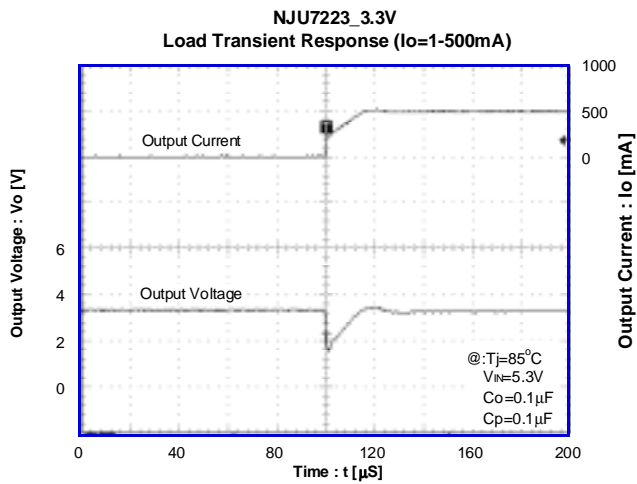
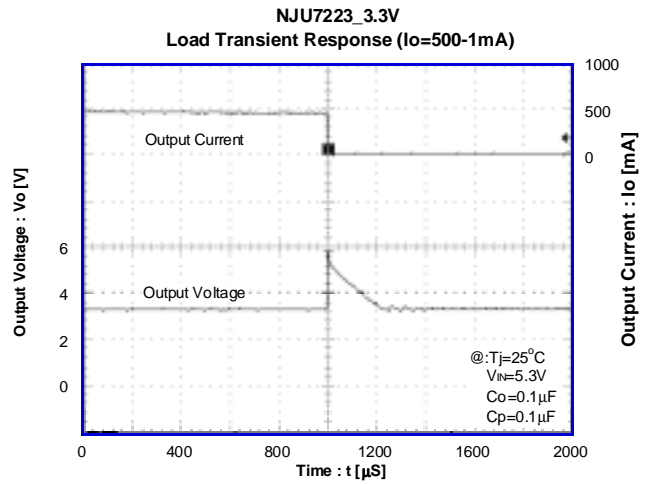
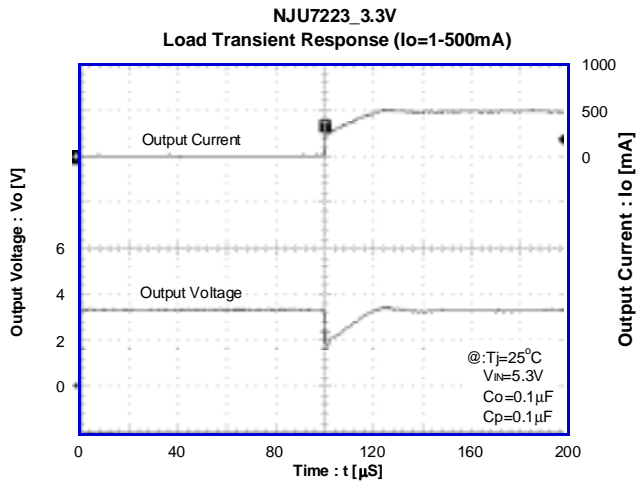
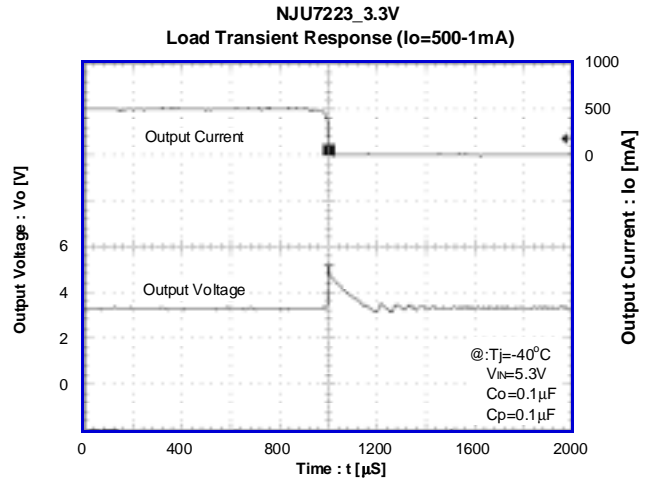
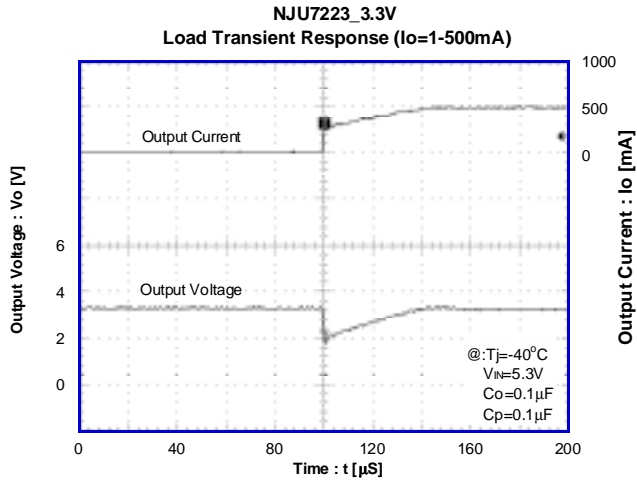
■ ELECTRICAL CHARACTERISTICS ($C_{IN}=C_O=0.1\mu F$, $T_j=25^\circ C$)

Measurement is to be conducted in pulse testing.

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Vo=3.3V Version Output Voltage	V_O	$V_{IN}=5.3V$, $I_o=300mA$	3.234	3.30	3.366	V
Input Voltage	V_{IN}		-	-	14	V
Dropout Voltage	ΔV_{IO}	$I_o=300mA$	-	0.4	0.6	V
Line Regulation	$\Delta V_o/\Delta V_{IN} \cdot V_o$	$V_{IN}=4.3V \sim 12.0V$	-	0.10	-	%/V
Load Regulation	$\Delta V_o/\Delta I_o$	$V_{IN}=5.3V$, $I_o=1 \sim 500mA$	-	120	160	mV
Quiescent Current	I_{DD}	$V_{IN}=5.3V$	-	30	60	μA
Ripple Rejection	RR	$V_{IN}=5.3V$, $e_{in}=1V_{P-P}$ $f=120Hz$, $I_o=300mA$	-	56	-	dB
Output Noise Voltage	V_{NO}	$V_{IN}=5.3V$, $I_o=300mA$ $BW=10Hz \sim 100kHz$	-	117	-	μV
Vo=5.0V Version Output Voltage	V_O	$V_{IN}=7.0V$, $I_o=500mA$	4.90	5.00	5.10	V
Input Voltage	V_{IN}		-	-	14	V
Dropout Voltage	ΔV_{IO}	$I_o=500mA$	-	0.4	0.6	V
Line Regulation	$\Delta V_o/\Delta V_{IN} \cdot V_o$	$V_{IN}=6.0V \sim 12.0V$	-	0.10	-	%/V
Load Regulation	$\Delta V_o/\Delta I_o$	$V_{IN}=7.0V$, $I_o=1 \sim 500mA$	-	120	160	mV
Quiescent Current	I_{DD}	$V_{IN}=7.0V$	-	30	60	μA
Ripple Rejection	RR	$V_{IN}=7.0V$, $e_{in}=1V_{P-P}$ $f=120Hz$, $I_o=300mA$	-	55	-	dB
Output Noise Voltage	V_{NO}	$V_{IN}=7.0V$, $I_o=300mA$ $BW=10Hz \sim 100kHz$	-	122	-	μV

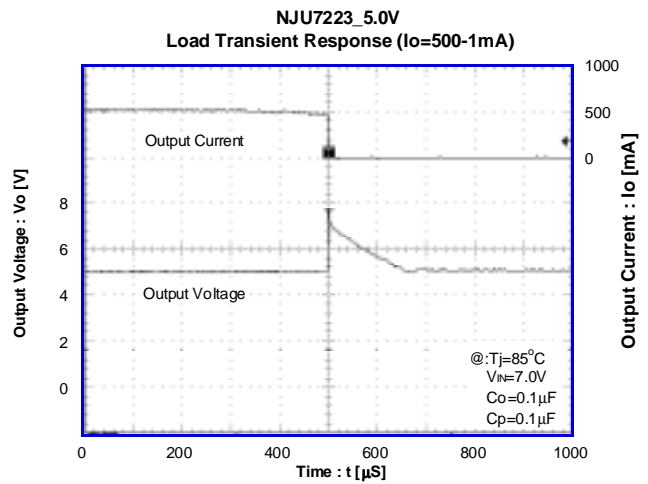
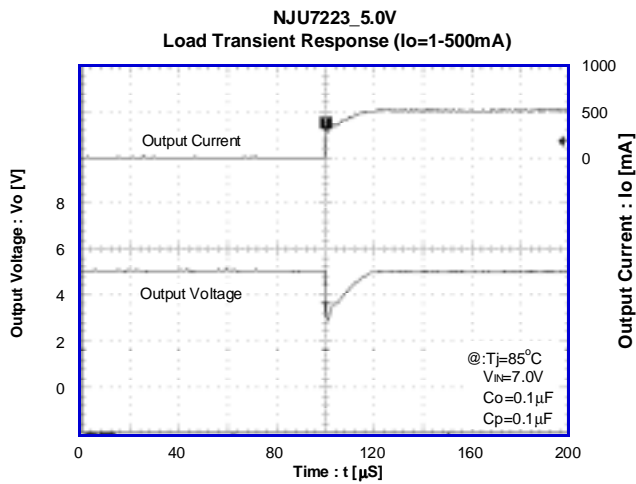
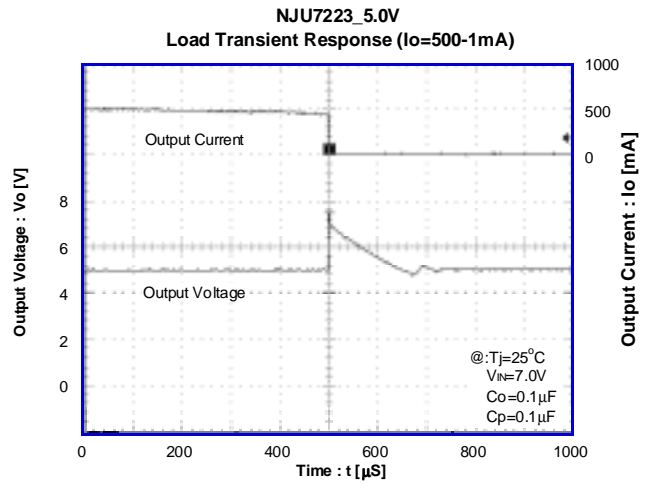
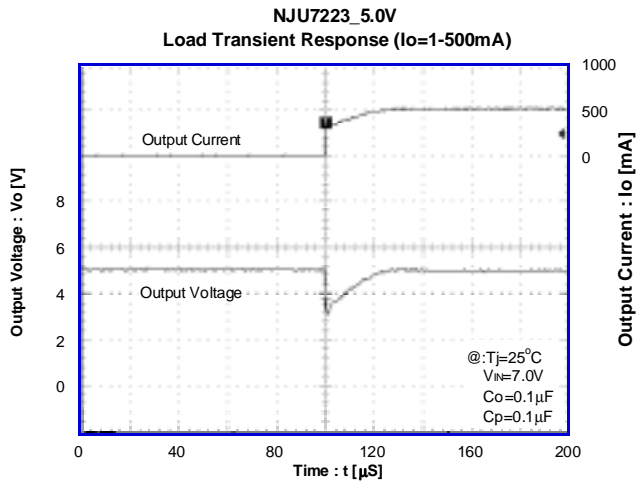
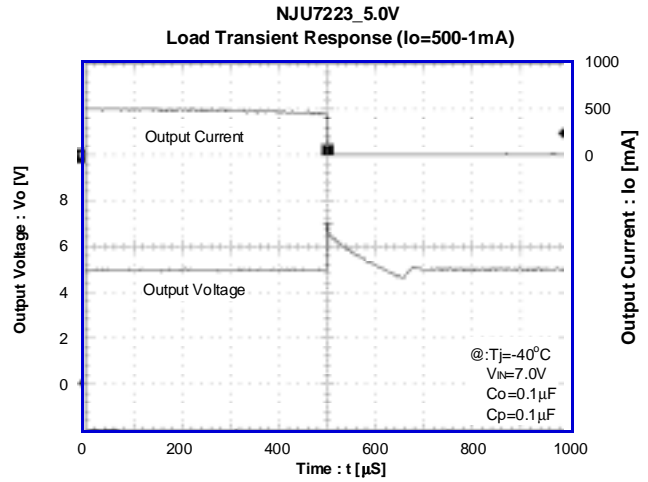
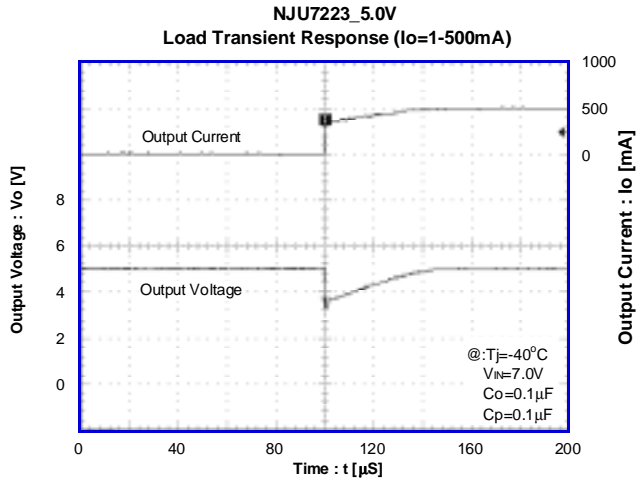
TYPICAL CHARACTERISTICS

Load Transient Response (Vo=3.3V version)



■ TYPICAL CHARACTERISTICS

Load Transient Response (Vo=5.0V version)



[CAUTION]

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