LOW DROPOUT VOLTAGE REGULATOR

■ GENERAL DESCRIPTION

The NJU7777 is a 150mA output low dropout voltage regulator with ON/OFF control.

Advanced CMOS technology achieves high ripple rejection and low quiescent current.

Small packaging and 1μF small decoupling capacitor make the NJU7777 suitable for space conscious applications.

■ PACKAGE OUTLINE

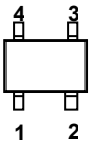


NJU7777F4

■ FEATURES

- High Ripple Rejection 65dB typ. (f=1kHz,Vo=3.0V version)
- Low quiescent Current Iq=18μA (Io=0mA)
- Output Current Io(max.)=150mA
- High Precision Output Vo±1.0%
- Output capacitor with 1.0μF ceramic capacitor (Vo≥2.1V version)
- Low Dropout Voltage 0.13V typ. (Io=100mA,Vo=3.0V)
- ON/OFF Control
- Internal Short Circuit Current Limit
- Internal Thermal Overload Protection
- CMOS Technology
- Package Outline SC-82AB

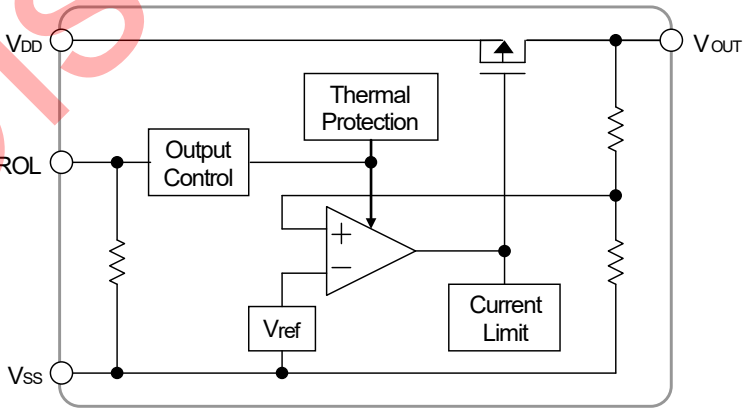
■ PIN CONFIGURATION



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

NJU7777F4

■ EQUIVALENT CIRCUIT



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■ OUTPUT VOLTAGE RANK LIST

Device Name	V_{OUT}	Device Name	V_{OUT}
NJU7777F4-15	1.5V	NJU7777F4-33	3.3V
NJU7777F4-18	1.8V	NJU7777F4-05	5.0V
NJU7777F4-21	2.1V		
NJU7777F4-24	2.4V		
NJU7777F4-03	3.0V		

■ ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

PARAMETER	SYMBOL	RATINGS	UNIT
Input Voltage	V_{IN}	+9	V
Control Voltage	V_{CONT}	+9(*1)	V
Power Dissipation	P_D	250(*2)	mW
Operating Temperature	Topr	–40 ~ +85	°C
Storage Temperature	Tstg	–40 ~ +125	°C

(*1) : When input voltage is less than +9V, the absolute maximum control voltage is equal to the input voltage.
(*2) : Mounted on glass epoxy board based on EIA/JEDEC. (114.3x76.2x1.6mm: 2Layers)

■ Operating voltage

V_{IN}=+2.3 ~ +8V (In case of Vo<2.1V version)

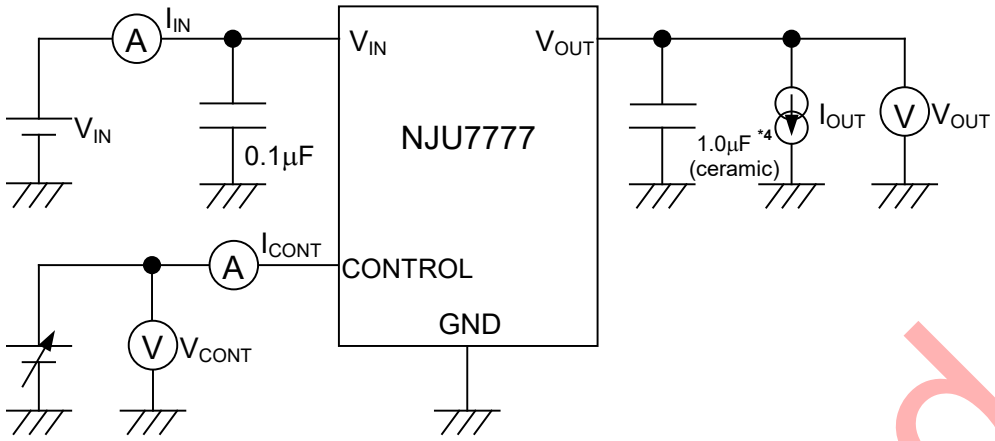
■ ELECTRICAL CHARACTERISTICS (V_{IN}=Vo+1V, C_{IN}=0.1µF, Co=1.0µF(Co=2.2µF: Vo≤2.0V), Ta=25°C)

PARAMETER	SYMBOL	TEST CONDITION		MIN.	TYP.	MAX.	UNIT
Output Voltage	Vo	Io=30mA		-1.0%	–	+1.0%	V
Input Voltage	V_{IN}			2.3	–	8	V
Quiescent Current	I_Q	Io=0mA, V_{CONT}=V_{IN}		–	18	35	µA
Quiescent Current at Control OFF	$I_{Q(OFF)}$	V_{CONT}=0V		–	0.1	1.0	µA
Output Current	Io	Vo-0.1V (Vo≤2.0V Version) Vo-0.3V (Vo≥2.1V Version)		150	–	–	mA
Short Current Limit	I_{LIM}	Vo=0V		–	40	–	mA
Line Regulation	$\Delta Vo/\Delta V_{IN}$	V_{IN}=Vo+1V ~ Vo+6.0V (Vo<2.0V Version) V_{IN}=Vo+1V ~ 8.0V (Vo≥2.0V Version), Io=30mA		–	–	0.20	%/V
Load Regulation	$\Delta Vo/\Delta Io$	Io=0 ~ 100mA		–	–	0.03	%/mA
Dropout Voltage(*3)	ΔV_{I-O}	Io=100mA	2.1V≤Vo≤2.4V	–	0.17	0.22	V
			2.5V≤Vo≤2.7V	–	0.15	0.20	V
			2.8V≤Vo≤3.3V	–	0.13	0.18	V
			3.4V≤Vo≤5.0V	–	0.11	0.16	V
Ripple Rejection	RR	ein=200mVrms,f=1kHz,Io=10mA, Vo=3.0V Version		–	65	–	dB
Average Temperature Coefficient of Output Voltage	$\Delta Vo/\Delta Ta$	Ta=0 ~ 85°C, Io=10mA		–	±100	–	ppm/°C
Output Noise Voltage	V_{NO}	f=10Hz ~ 80kHz,Io=0mA,Vo=3.0V Version		–	75	–	µVrms
Pull-down Resistance	R_{CONT}			2	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

(*3): Except output voltage less than 2.1V.
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.

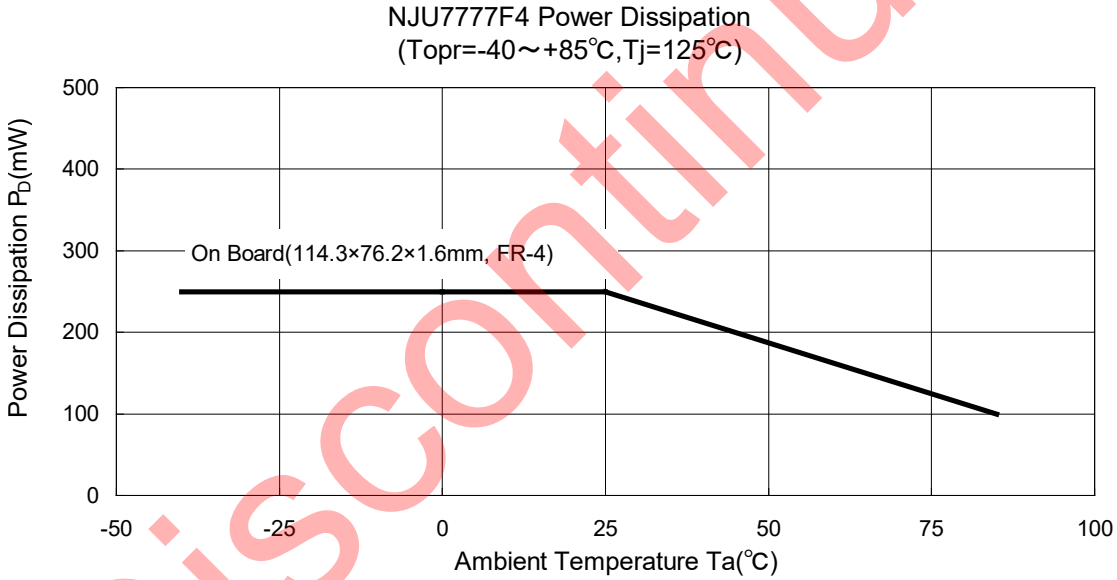
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■ TEST CIRCUIT



*4 Vo≤2.0V version: Co=2.2μF(ceramic)

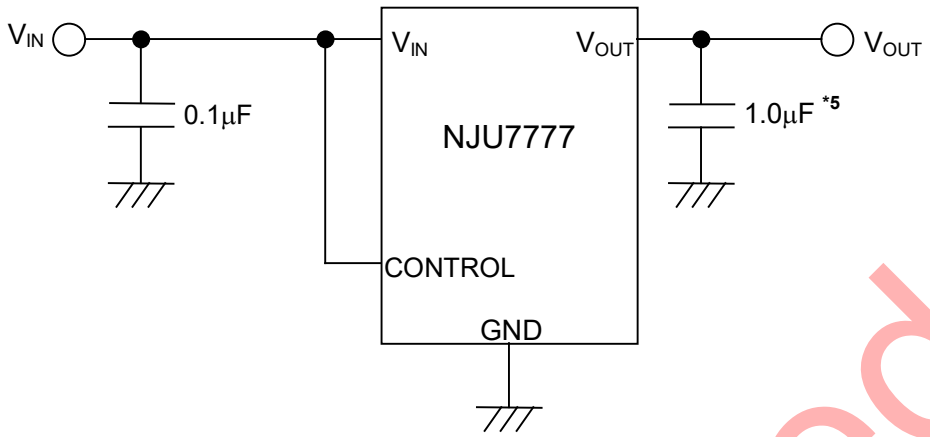
■ POWER DISSIPATION vs. AMBIENT TEMPERATURE



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■ TYPICAL APPLICATION

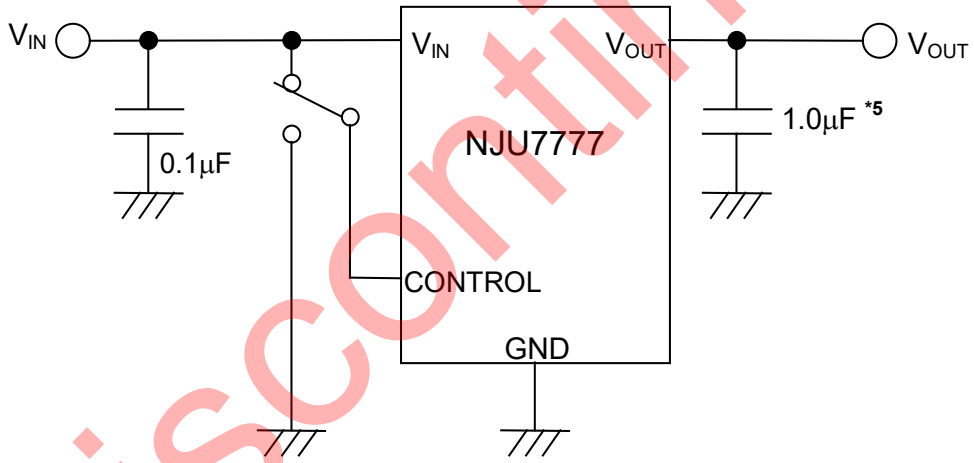
① In case that ON/OFF Control is not required:



*5 Vo≤2.0V version: Co=2.2μF

Connect control terminal to V_{IN} terminal.

② In use of ON/OFF Control



*5 Vo≤2.0V version: Co=2.2μF

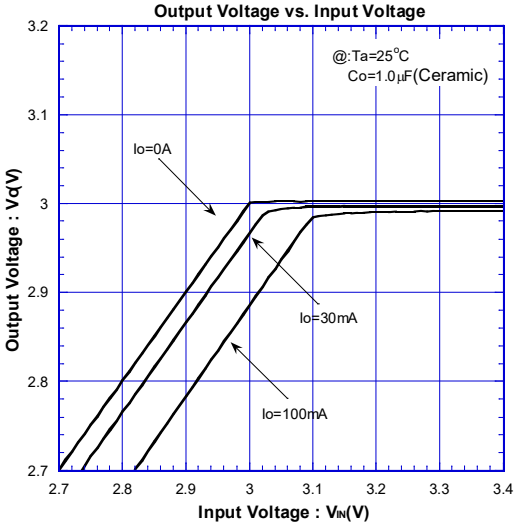
State of control terminal:

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

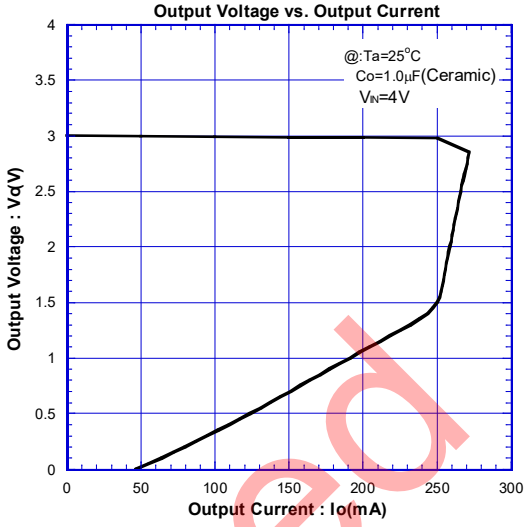
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■ TYPICAL CHARACTERISTICS

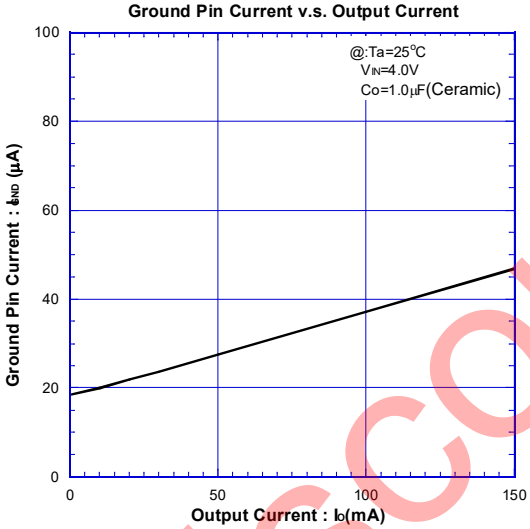
NJU7777_3.0V
Output Voltage vs. Input Voltage



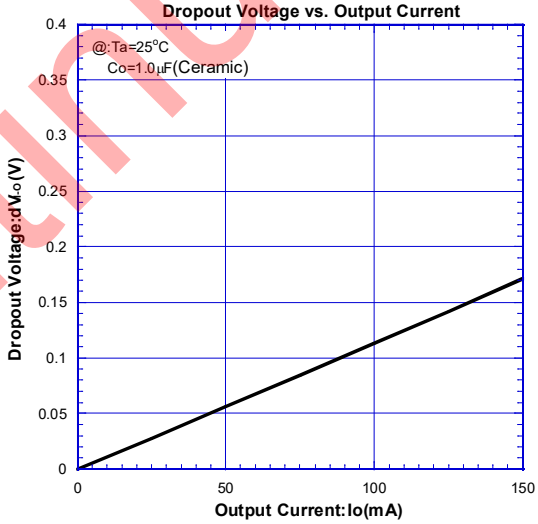
NJU7777_3.0V
Output Voltage vs. Output Current



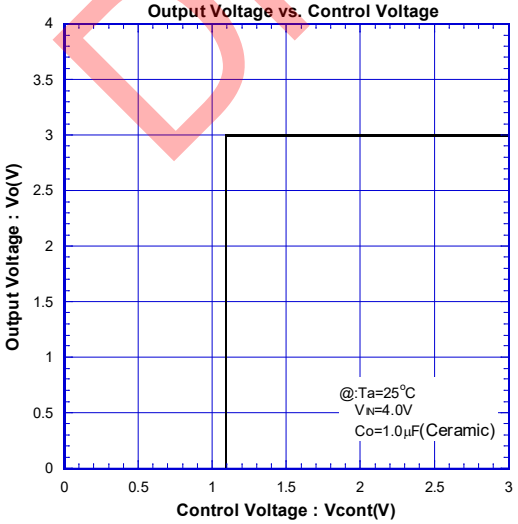
NJU7777_3.0V
Ground Pin Current v.s. Output Current



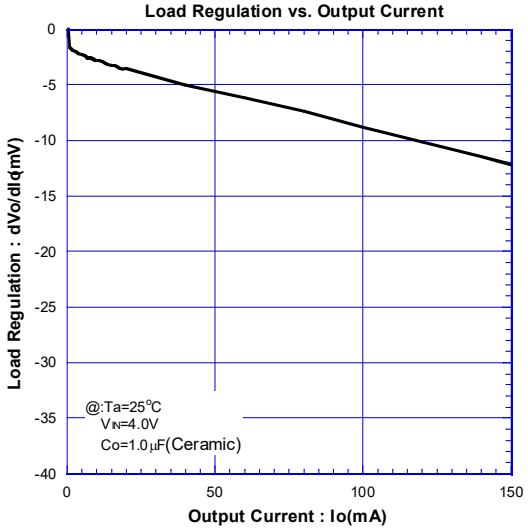
NJU7777_3.0V
Dropout Voltage vs. Output Current



NJU7777_3.0V
Output Voltage vs. Control Voltage



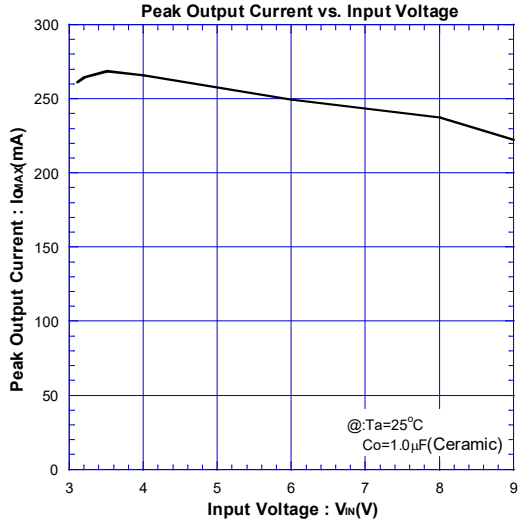
NJU7777_3.0V
Load Regulation vs. Output Current



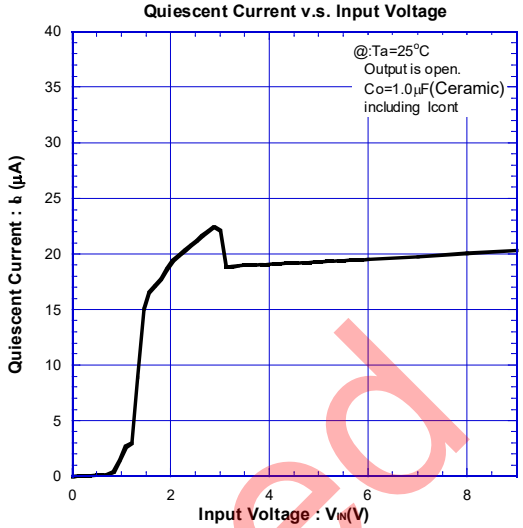
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■ TYPICAL CHARACTERISTICS

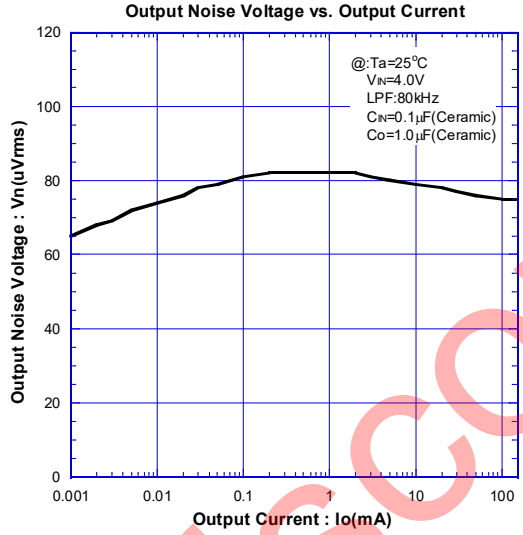
NJU7777_3.0V
Peak Output Current vs. Input Voltage



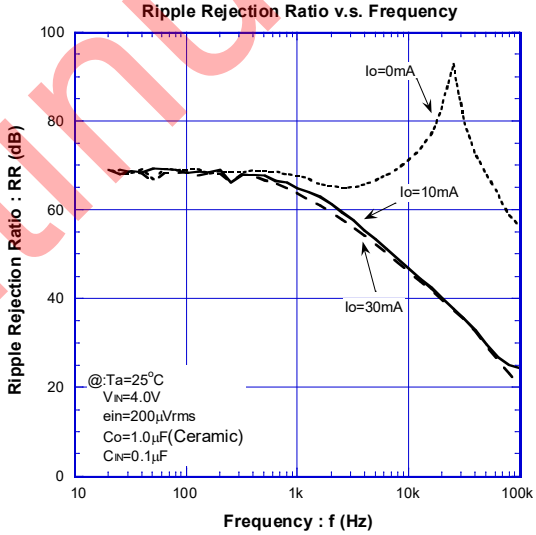
NJU7777_3.0V
Quiescent Current v.s. Input Voltage



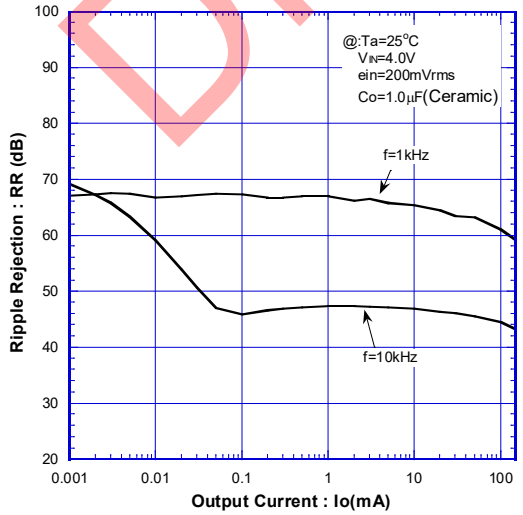
NJU7777_3.0V
Output Noise Voltage vs. Output Current



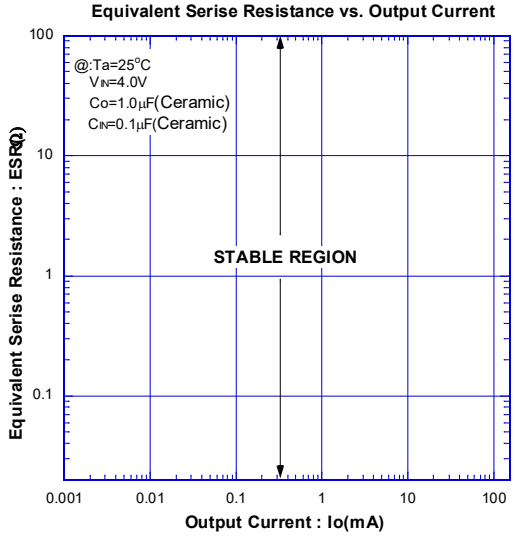
NJU7777_3.0V
Ripple Rejection Ratio v.s. Frequency



NJU7777_3.0V
Ripple Rejection vs. Output Current

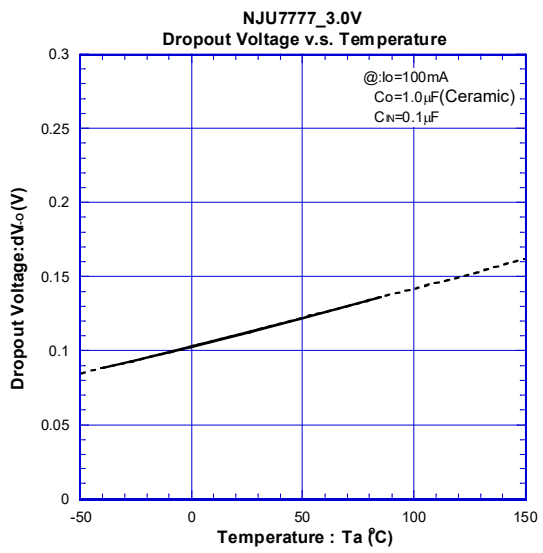


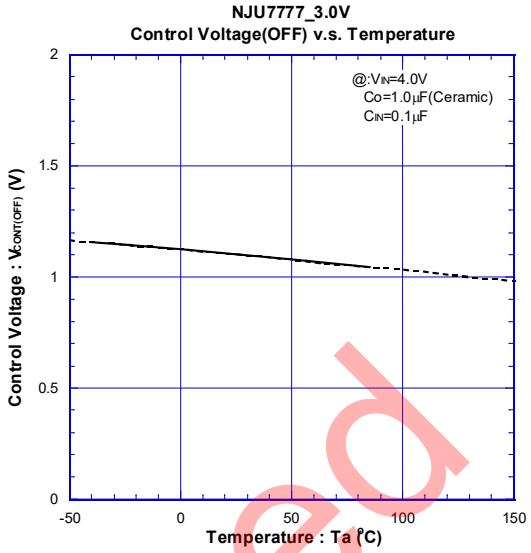
NJU7777_3.0V
Equivalent Serise Resistance vs. Output Current

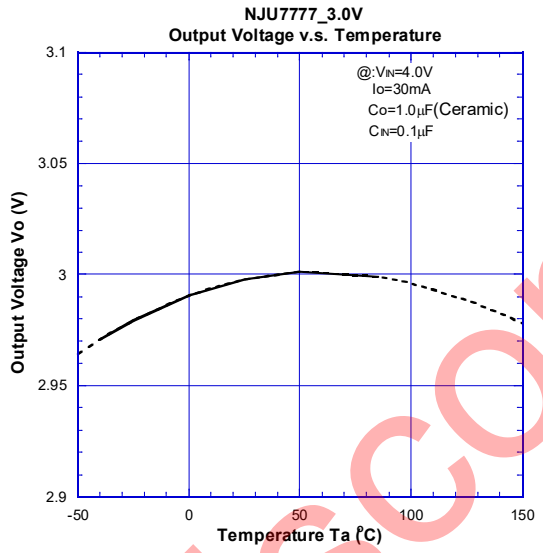


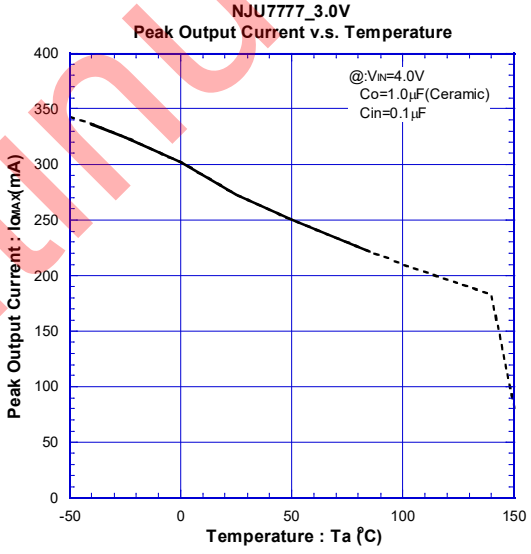
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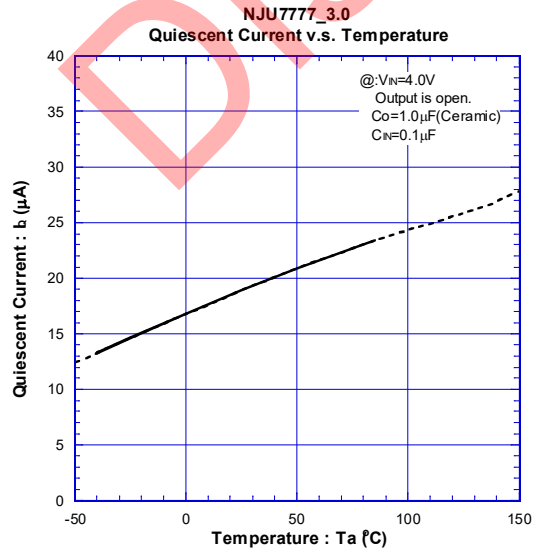
■ TYPICAL CHARACTERISTICS

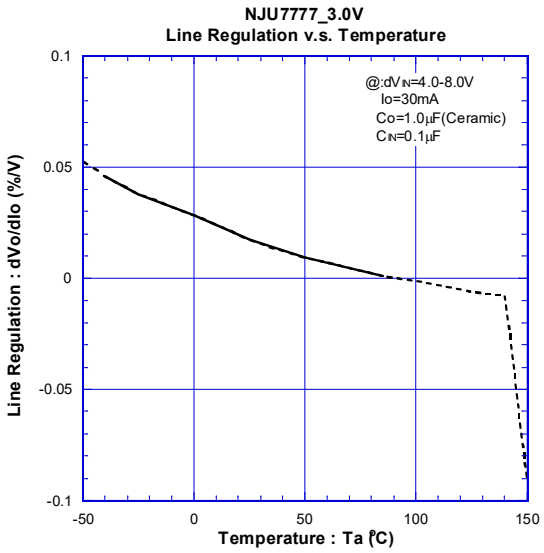






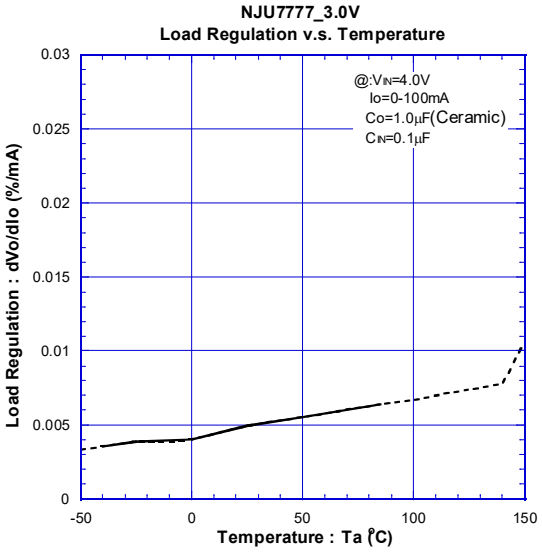


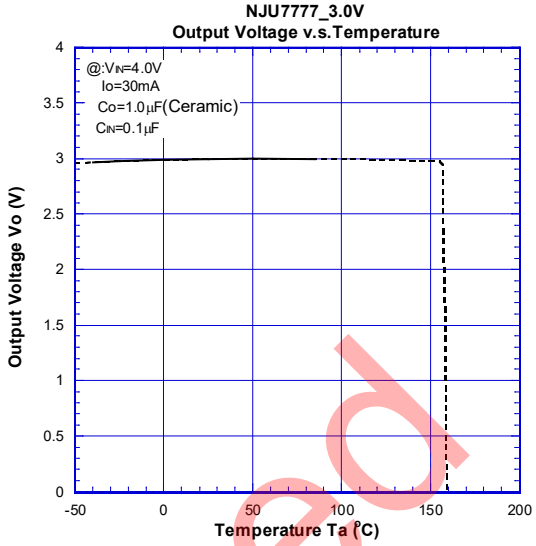


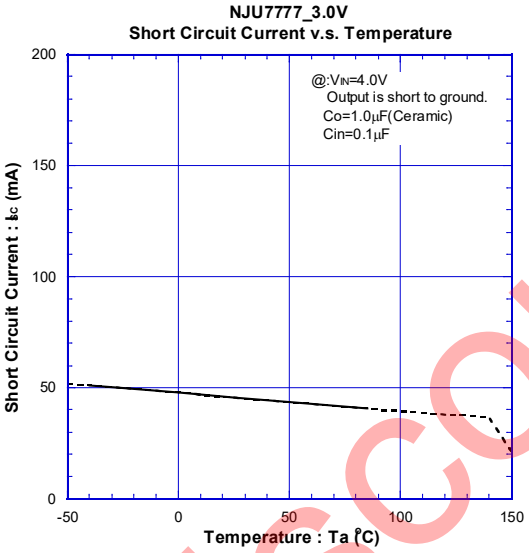


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■ TYPICAL CHARACTERISTICS



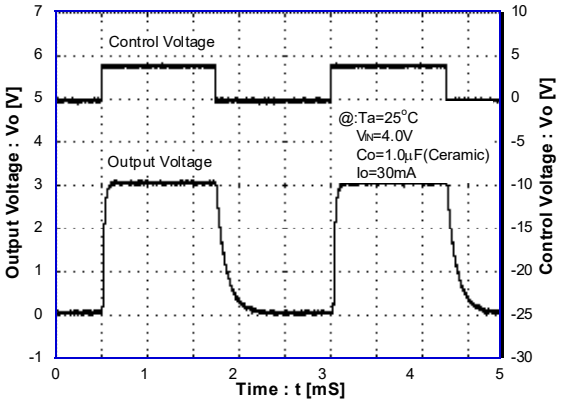




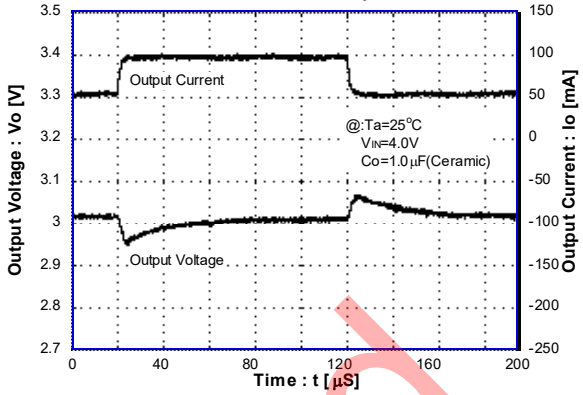
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■ TYPICAL CHARACTERISTICS

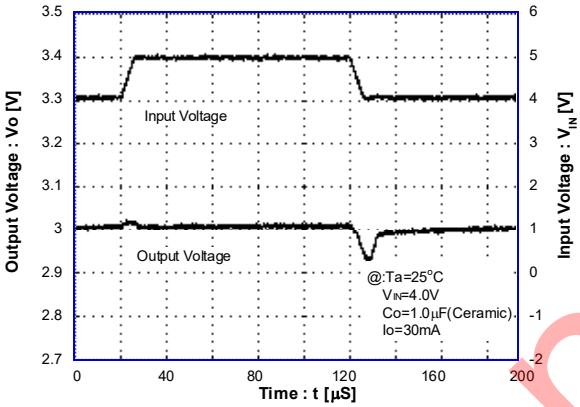
NJU7777_3.0V
ON/OFF Transient Response



NJU7777_3.0V
Load Transient Response



NJU7777_3.0V
Line Transient Response



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