

LOW DROPOUT VOLTAGE REGULATOR

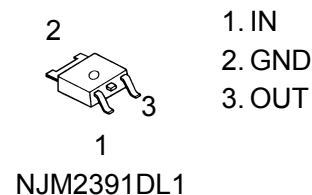
■ GENERAL DESCRIPTION

The NJM2391 is low dropout voltage regulators featuring high precision voltage.

It is suitable for Notebook PCs, PC cards and hard disks where 3.3V need to be generated from 5V supply.

A small TO-252 package is adopted for the space saving.

■ PACKAGE OUTLINE



■ FEATURES

- Output Current $I_o(\text{max.})=1\text{A}$
- High Precision Output Voltage $V_o \pm 1\%$
- Low Dropout Voltage $\Delta V_{I-O} = 1.1\text{V typ. At } I_o=1\text{A}$
- Internal Excessive Voltage Protection Circuit
- Internal Short Circuit Current Limit
- Internal Thermal Overload Protection
- Bipolar Technology
- Package Outline TO-252

■ ABSOLUTE MAXIMUM RATINGS

($T_a=25^\circ\text{C}$)

PARAMETER	SYMBOL	RATINGS	UNIT
Input Voltage	V^+	+10	V
Power Dissipation	P_D	TO-252 8 ($T_c=25^\circ\text{C}$) 0.8 ($T_a \leq 25^\circ\text{C}$)	W
Operating Temperature	T_{opr}	$-40 \sim +85$	$^\circ\text{C}$
Storage Temperature	T_{stg}	$-50 \sim +125$	$^\circ\text{C}$

■ OUTPUT VOLTAGE RANK LIST

Device Name	V_{OUT}
NJM2391DL1-25	2.5V
NJM2391DL1-26	2.6V
NJM2391DL1-28	2.85V
NJM2391DL1-03	3.0V
NJM2391DL1-33	3.3V
NJM2391DL1-35	3.5V
NJM2391DL1-05	5.0V

■ ELECTRICAL CHARACTERISTICS ($C_{IN}=0.1\mu F$, $C_O=10\mu F$, $T_J=25^\circ C$)

Measurement is to be conducted is pulse testing

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Vo=2.5V Version Output Voltage	V_O	$V_{IN}=5.5V$, $I_O=0.01A$	2.475	2.5	2.525	V
Line Regulation	ΔV_O-V_{IN}	$V_{IN}=4V\sim 9V$, $I_O=1A$	–	–	50	mV
Load Regulation	ΔV_O-I_O	$V_{IN}=5.5V$, $I_O=0\sim 1A$	–	–	50	mV
Quiescent Current	I_Q	$V_{IN}=5.5V$, $I_O=0A$	–	2.3	4.0	mA
Ripple Rejection	RR	$V_{IN}=5.5V$, $e_{in}=2V_{P-P}$ $f=120Hz$, $I_O=0.5A$	53	63	–	dB
Dropout Voltage	ΔV_{I-O}	$I_O=1A$	–	1.1	1.2	V
Output Noise Voltage	V_{NO}	$V_{IN}=5.5V$, $I_O=0.5A$ $BW=10Hz\sim 100kHz$	–	85	185	μV
Vo=2.6V Version Output Voltage	V_O	$V_{IN}=5.6V$, $I_O=0.01A$	2.574	2.60	2.626	V
Line Regulation	ΔV_O-V_{IN}	$V_{IN}=4.1V\sim 9.1V$, $I_O=1A$	–	–	52	mV
Load Regulation	ΔV_O-I_O	$V_{IN}=5.6V$, $I_O=0\sim 1A$	–	–	52	mV
Quiescent Current	I_Q	$V_{IN}=5.6V$, $I_O=0A$	–	2.3	4.0	mA
Ripple Rejection	RR	$V_{IN}=5.6V$, $e_{in}=2V_{P-P}$ $f=120Hz$, $I_O=0.5A$	53	63	–	dB
Dropout Voltage	ΔV_{I-O}	$I_O=1A$	–	1.1	1.2	V
Output Noise Voltage	V_{NO}	$V_{IN}=5.6V$, $I_O=0.5A$ $BW=10Hz\sim 100kHz$	–	87	187	μV
Vo=2.85V Version Output Voltage	V_O	$V_{IN}=5.85V$, $I_O=0.01A$	2.82	2.85	2.88	V
Line Regulation	ΔV_O-V_{IN}	$V_{IN}=4.35V\sim 9.35V$, $I_O=1A$	–	–	57	mV
Load Regulation	ΔV_O-I_O	$V_{IN}=5.85V$, $I_O=0\sim 1A$	–	–	57	mV
Quiescent Current	I_Q	$V_{IN}=5.85V$, $I_O=0A$	–	2.3	4.0	mA
Ripple Rejection	RR	$V_{IN}=5.85V$, $e_{in}=2V_{P-P}$ $f=120Hz$, $I_O=0.5A$	53	63	–	dB
Dropout Voltage	ΔV_{I-O}	$I_O=1A$	–	1.1	1.2	V
Output Noise Voltage	V_{NO}	$V_{IN}=5.85V$, $I_O=0.5A$ $BW=10Hz\sim 100kHz$	–	90	190	μV
Vo=3V Version Output Voltage	V_O	$V_{IN}=6V$, $I_O=0.01A$	2.97	3.00	3.03	V
Line Regulation	ΔV_O-V_{IN}	$V_{IN}=4.5V\sim 9.5V$, $I_O=1A$	–	–	60	mV
Load Regulation	ΔV_O-I_O	$V_{IN}=6V$, $I_O=0\sim 1A$	–	–	60	mV
Quiescent Current	I_Q	$V_{IN}=6V$, $I_O=0A$	–	2.3	4.0	mA
Ripple Rejection	RR	$V_{IN}=6V$, $e_{in}=2V_{P-P}$ $f=120Hz$, $I_O=0.5A$	52	62	–	dB
Dropout Voltage	ΔV_{I-O}	$I_O=1A$	–	1.1	1.2	V
Output Noise Voltage	V_{NO}	$V_{IN}=6V$, $I_O=0.5A$ $BW=10Hz\sim 100kHz$	–	95	195	μV

■ ELECTRICAL CHARACTERISTICS ($C_{IN}=0.1\mu F$, $C_O=10\mu F$, $T_j=25^\circ C$)

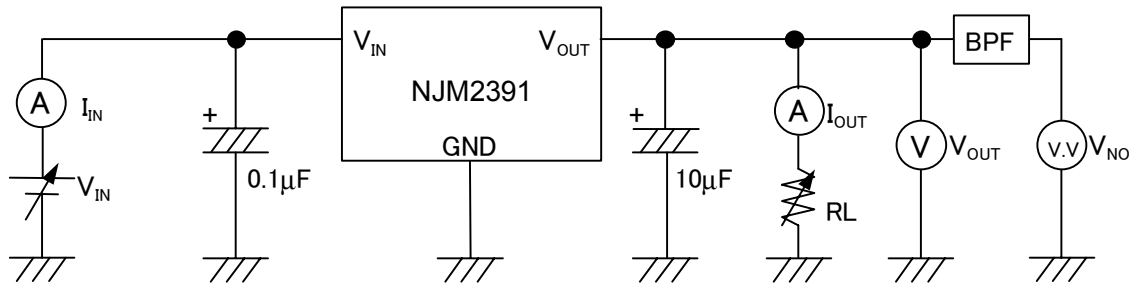
Measurement is to be conducted is pulse testing

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Vo=3.3V Version Output Voltage	V_O	$V_{IN}=6.3V$, $I_O=0.01A$	3.267	3.30	3.333	V
Line Regulation	ΔV_O-V_{IN}	$V_{IN}=4.8V\sim 9.8V$, $I_O=1A$	—	—	66	mV
Load Regulation	ΔV_O-I_O	$V_{IN}=6.3V$, $I_O=0\sim 1A$	—	—	66	mV
Quiescent Current	I_Q	$V_{IN}=6.3V$, $I_O=0A$	—	2.3	4.0	mA
Ripple Rejection	RR	$V_{IN}=6.3V$, $e_{in}=2V_{P-P}$ $f=120Hz$, $I_O=0.5A$	52	62	—	dB
Dropout Voltage	ΔV_{I-O}	$I_O=1A$	—	1.1	1.2	V
Output Noise Voltage	V_{NO}	$V_{IN}=6.3V$, $I_O=0.5A$ $BW=10Hz\sim 100kHz$	—	100	200	μV
Vo=3.5V Version Output Voltage	V_O	$V_{IN}=6.5V$, $I_O=0.01A$	3.465	3.50	3.535	V
Line Regulation	ΔV_O-V_{IN}	$V_{IN}=5V\sim 10V$, $I_O=1A$	—	—	70	mV
Load Regulation	ΔV_O-I_O	$V_{IN}=6.5V$, $I_O=0\sim 1A$	—	—	70	mV
Quiescent Current	I_Q	$V_{IN}=6.5V$, $I_O=0A$	—	2.3	4.0	mA
Ripple Rejection	RR	$V_{IN}=6.5V$, $e_{in}=2V_{P-P}$ $f=120Hz$, $I_O=0.5A$	52	62	—	dB
Dropout Voltage	ΔV_{I-O}	$I_O=1A$	—	1.1	1.2	V
Output Noise Voltage	V_{NO}	$V_{IN}=6.5V$, $I_O=0.5A$ $BW=10Hz\sim 100kHz$	—	105	205	μV
Vo=5V Version Output Voltage	V_O	$V_{IN}=8V$, $I_O=0.01A$	4.95	5.00	5.05	V
Line Regulation	ΔV_O-V_{IN}	$V_{IN}=6.5V\sim 9.5V$, $I_O=1A$	—	—	60	mV
Load Regulation	ΔV_O-I_O	$V_{IN}=8V$, $I_O=0\sim 1A$	—	—	100	mV
Quiescent Current	I_Q	$V_{IN}=8V$, $I_O=0A$	—	2.3	4.0	mA
Ripple Rejection	RR	$V_{IN}=8V$, $e_{in}=2V_{P-P}$ $f=120Hz$, $I_O=0.5A$	50	60	—	dB
Dropout Voltage	ΔV_{I-O}	$I_O=1A$	—	1.1	1.2	V
Output Noise Voltage	V_{NO}	$V_{IN}=8V$, $I_O=0.5A$ $BW=10Hz\sim 100kHz$	—	150	260	μV

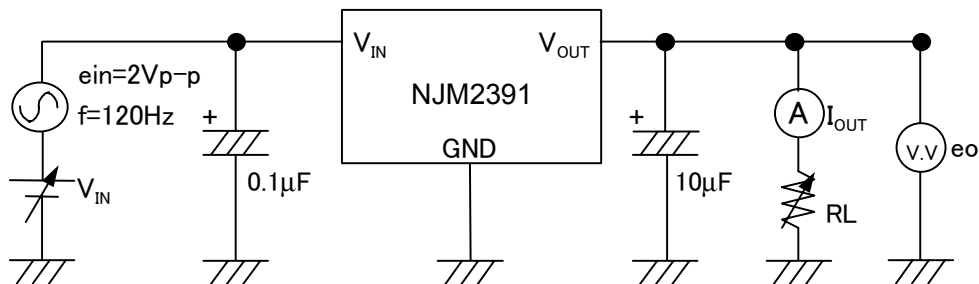
■TEST CIRCUIT

1. Output Voltage / Line Regulation / Load Regulation

Quiescent Current / Dropout Voltage / Output Noise Voltage

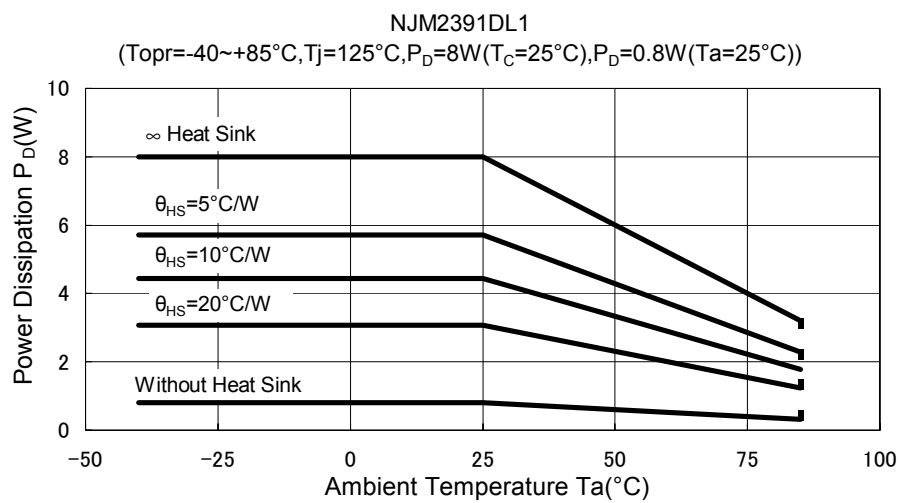


2. Ripple Rejection

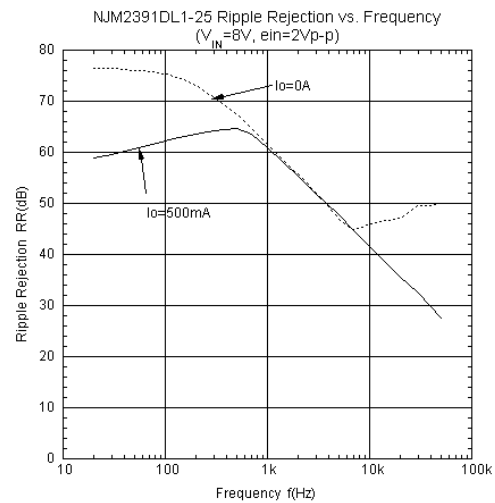
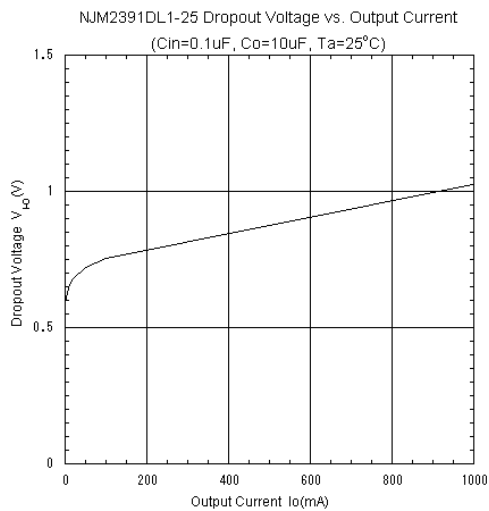
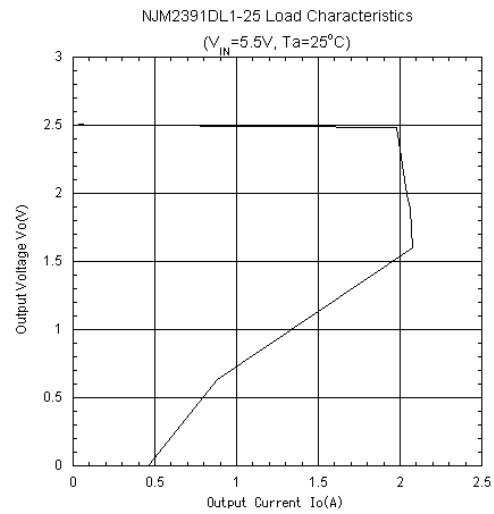
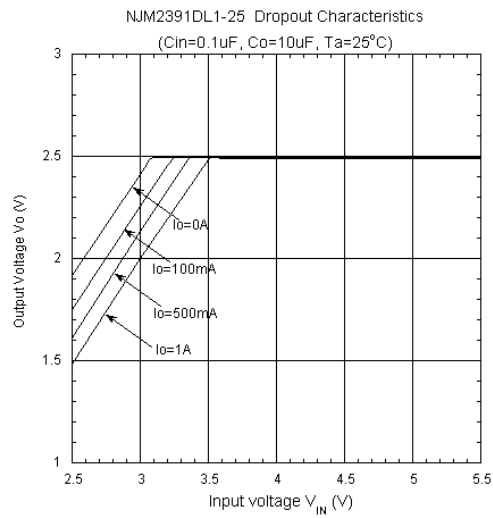


$$RR = 20 \log_{10} [e_{in}/e_o] \quad (\text{dB})$$

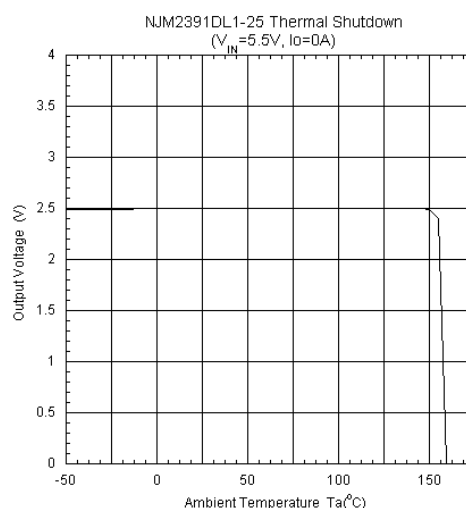
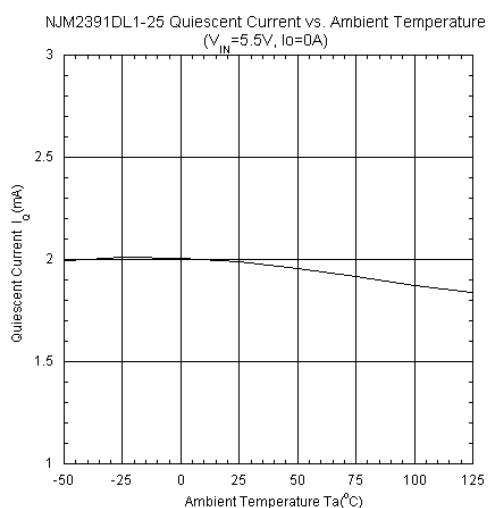
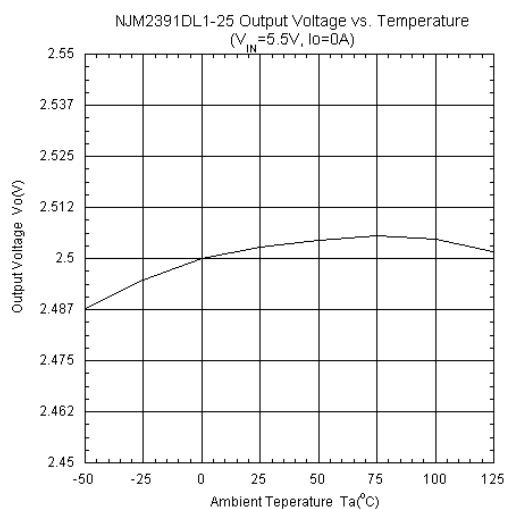
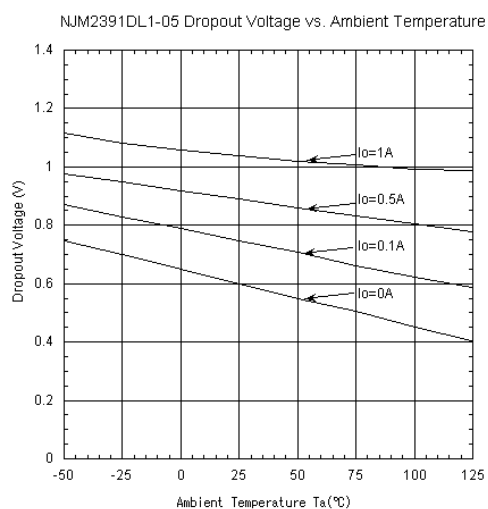
■POWER DISSIPATION vs. AMBIENT TEMPERATURE



ELECTRICAL CHARACTERISTICS



ELECTRICAL CHARACTERISTICS



[CAUTION]

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