LOW DROPOUT VOLTAGE REGULATOR

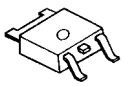
■ GENERAL DESCRIPTION

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

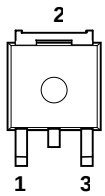


NJM2391DL1

■ FEATURES

- ●Output Current Io(max.)=1A
- ●High Precision Output Voltage Vo±1%
- ●Low Dropout Voltage ΔV_{I-O} =1.1V typ. At Io=1A
- ●Internal Excessive Voltage Protection Circuit
- ●Internal Short Circuit Current Limit
- ●Internal Thermal Overload Protection
- ●Bipolar Technology
- ●Package Outline TO-252

■ PIN CONFIGURATION



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

NJM2391DL1

■ ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

PARAMETER	SYMBOL	RATINGS	UNIT
Input Voltage	V^+	+10	V
Power Dissipation	P_D	TO-252 8 (Tc=25°C) 0.8(Ta≤25°C)	W
Operating Temperature	Topr	–40 ~ +85	°C
Storage Temperature	Tstg	–50 ~ +125	°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}=0.1μF, Co=10μF, Tj=25°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, Io=0.01A	2.475	2.5	2.525	V
Line Regulation	$\Delta Vo/\Delta V_{IN}$	V_{IN}=4V~9V, Io=1A	–	–	50	mV
Load Regulation	$\Delta Vo/\Delta Io$	V_{IN}=5. 5V, Io=0~1A	–	–	50	mV
Quiescent Current	I_Q	V_{IN}=5.5V, Io=0A	–	2.3	4.0	mA
Ripple Rejection	RR	V_{IN}=5.5V, ein=$2V_{P-P}$ f=120Hz, Io=0.5A	53	63	–	dB
Dropout Voltage	ΔV_{I-O}	Io=1A	–	1.1	1.2	V
Output Noise Voltage	V_{NO}	V_{IN}=5.5V, Io=0.5A BW=10Hz~100kHz	–	85	185	μV
Vo=2.6V Version Output Voltage	V_O	V_{IN}=5.6V, Io=0.01A	2.574	2.60	2.626	V
Line Regulation	$\Delta Vo/\Delta V_{IN}$	V_{IN}=4.1V~9.1V, Io=1A	–	–	52	mV
Load Regulation	$\Delta Vo/\Delta Io$	V_{IN}=5.6V, Io=0~1A	–	–	52	mV
Quiescent Current	I_Q	V_{IN}=5.6V, Io=0A	–	2.3	4.0	mA
Ripple Rejection	RR	V_{IN}=5.6V, ein=$2V_{P-P}$ f=120Hz, Io=0.5A	53	63	–	dB
Dropout Voltage	ΔV_{I-O}	Io=1A	–	1.1	1.2	V
Output Noise Voltage	V_{NO}	V_{IN}=5.6V, Io=0.5A BW=10Hz~100kHz	–	87	187	μV
Vo=2.85V Version Output Voltage	V_O	V_{IN}=5.85V, Io=0.01A	2.82	2.85	2.88	V
Line Regulation	$\Delta Vo/\Delta V_{IN}$	V_{IN}=4.35V~9.35V, Io=1A	–	–	57	mV
Load Regulation	$\Delta Vo/\Delta Io$	V_{IN}=5.85V, Io=0~1A	–	–	57	mV
Quiescent Current	I_Q	V_{IN}=5.85V, Io=0A	–	2.3	4.0	mA
Ripple Rejection	RR	V_{IN}=5.85V, ein=$2V_{P-P}$ f=120Hz, Io=0.5A	53	63	–	dB
Dropout Voltage	ΔV_{I-O}	Io=1A	–	1.1	1.2	V
Output Noise Voltage	V_{NO}	V_{IN}=5.85V, Io=0.5A BW=10Hz~100kHz	–	90	190	μV
Vo=3V Version Output Voltage	V_O	V_{IN}=6V, Io=0.01A	2.97	3.00	3.03	V
Line Regulation	$\Delta Vo/\Delta V_{IN}$	V_{IN}=4.5V~9.5V, Io=1A	–	–	60	mV
Load Regulation	$\Delta Vo/\Delta Io$	V_{IN}=6V, Io=0~1A	–	–	60	mV
Quiescent Current	I_Q	V_{IN}=6V, Io=0A	–	2.3	4.0	mA
Ripple Rejection	RR	V_{IN}=6V, ein=$2V_{P-P}$ f=120Hz, Io=0.5A	52	62	–	dB
Dropout Voltage	ΔV_{I-O}	Io=1A	–	1.1	1.2	V
Output Noise Voltage	V_{NO}	V_{IN}=6V, Io=0.5A BW=10Hz~100kHz	–	95	195	μV

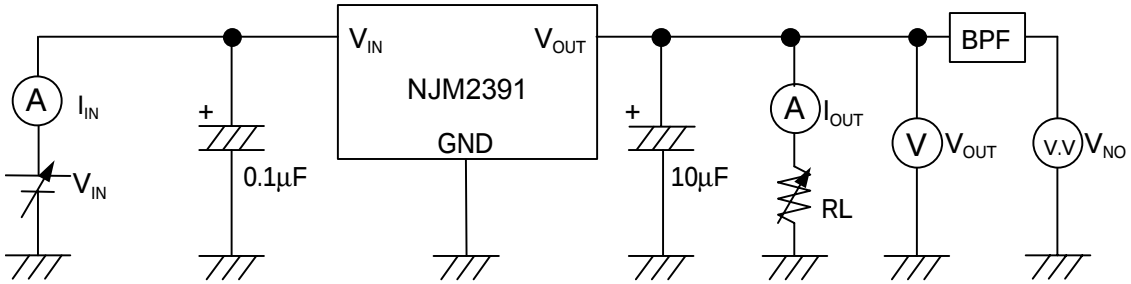
■ ELECTRICAL CHARACTERISTICS (C_{IN}=0.1μF, Co=10μF, Tj=25°C)

Measurement is to be conducted is pulse testing

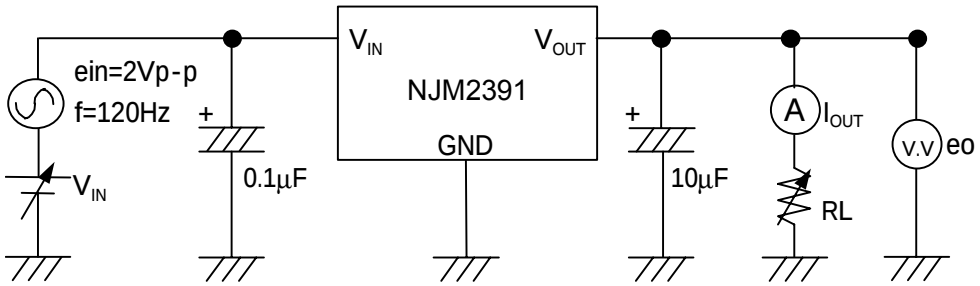
PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Vo=3.3V Version Output Voltage	V_O	V_{IN}=6.3V, Io=0.01A	3.267	3.30	3.333	V
Line Regulation	$\Delta Vo/\Delta V_{IN}$	V_{IN}=4.8V~9.8V, Io=1A	–	–	66	mV
Load Regulation	$\Delta Vo/\Delta Io$	V_{IN}=6.3V, Io=0~1A	–	–	66	mV
Quiescent Current	I_Q	V_{IN}=6.3V,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

■TEST CIRCUIT

1.Output Voltage / Line Regulation / Load Regulation
Quiescent Current / Dropout Voltage / Output Noise Voltage

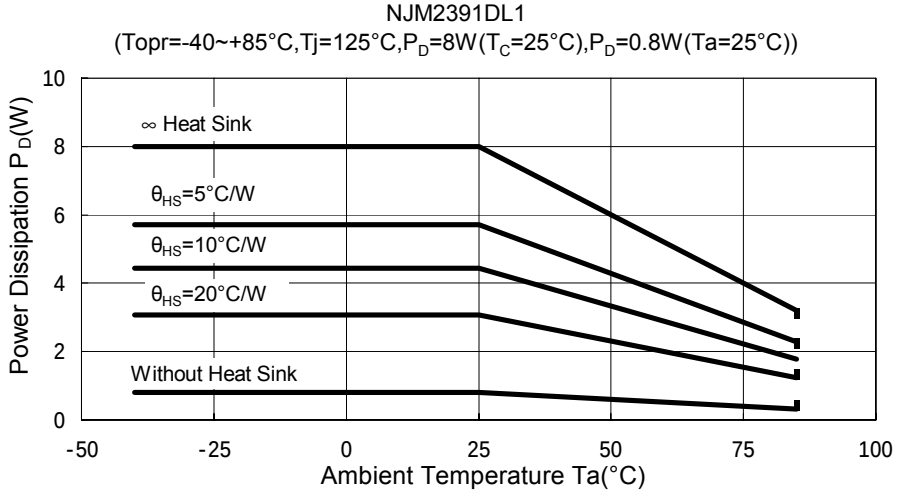


2.Ripple Rejection



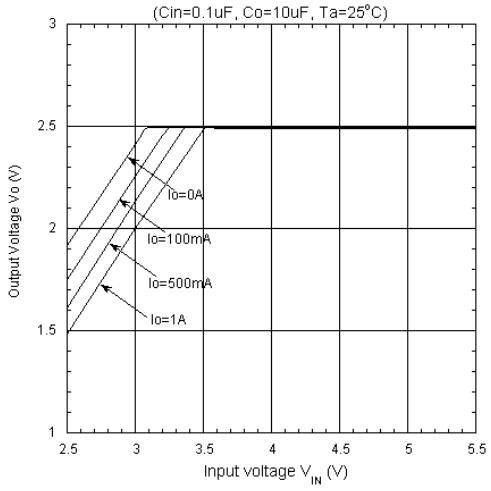
$RR=20\log_{10}[ein/eo]$ (dB)

■POWER DISSIPATION vs. AMBIENT TEMPERATURE

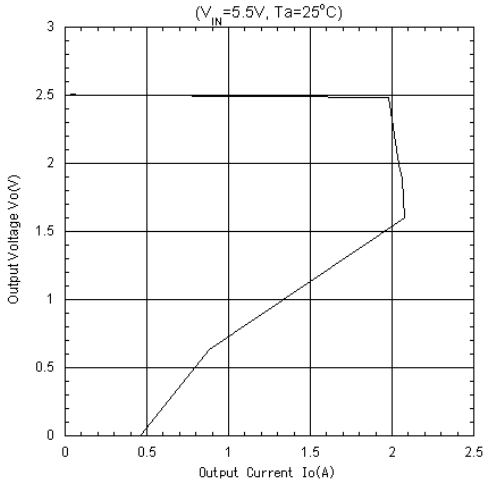


■ELECTRICAL CHARACTERISTICS

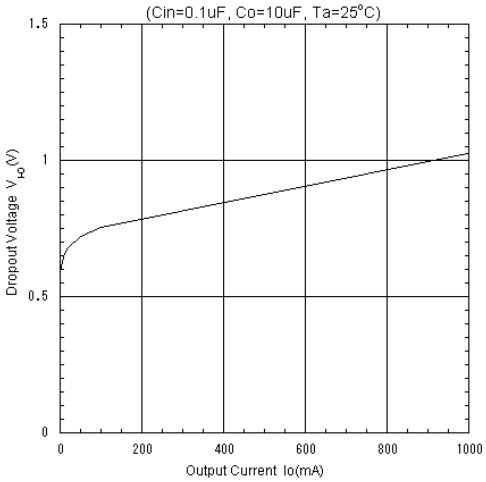
NJM2391DL1-25 Dropout Characteristics
(Cin=0.1uF, Co=10uF, Ta=25°C)



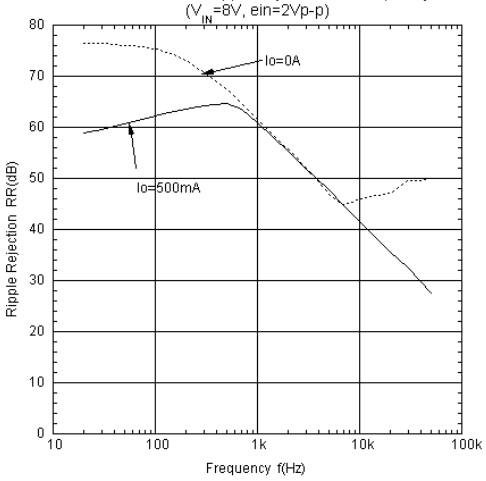
NJM2391DL1-25 Load Characteristics
(V_{IN}=5.5V, Ta=25°C)



NJM2391DL1-25 Dropout Voltage vs. Output Current
(Cin=0.1uF, Co=10uF, Ta=25°C)

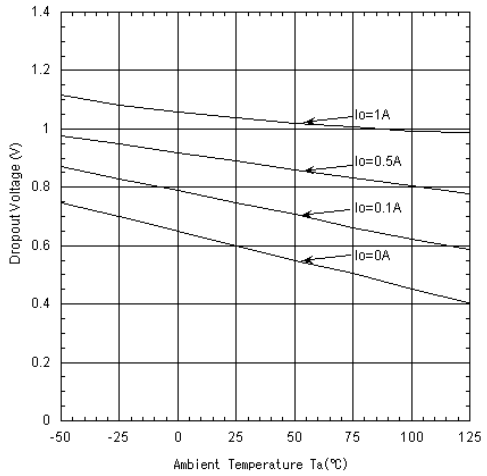


NJM2391DL1-25 Ripple Rejection vs. Frequency
(V_{IN}=8V, ein=2Vp-p)

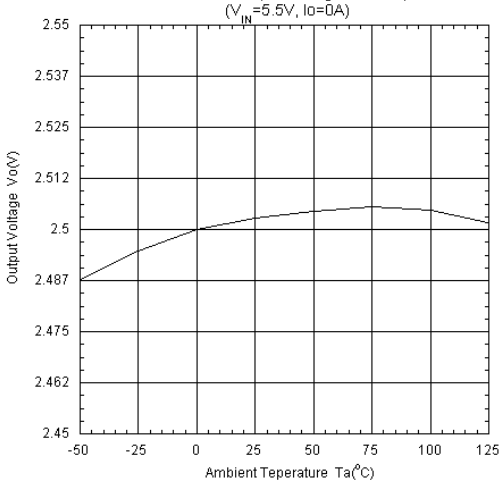


■ELECTRICAL CHARACTERISTICS

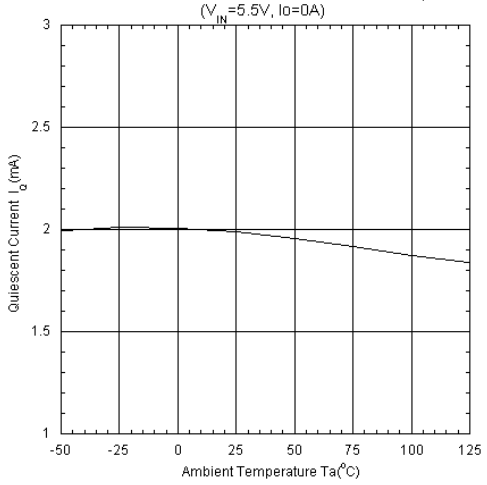
NJM2391DL1-05 Dropout Voltage vs. Ambient Temperature



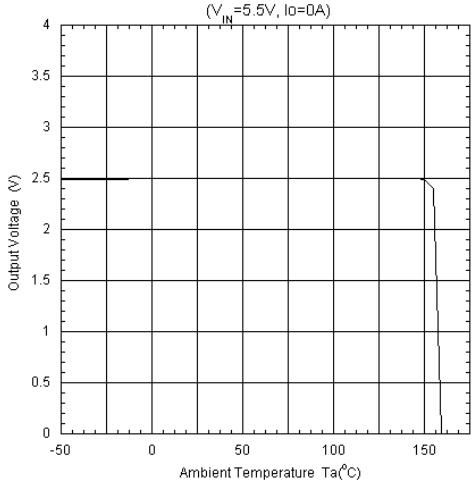
NJM2391DL1-25 Output Voltage vs. Temperature
(V_{IN}=5.5V, Io=0A)



NJM2391DL1-25 Quiescent Current vs. Ambient Temperature
(V_{IN}=5.5V, Io=0A)



NJM2391DL1-25 Thermal Shutdown
(V_{IN}=5.5V, Io=0A)



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