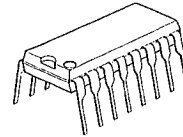


MULTI OUTPUT VOLTAGE REGULATOR

GENERAL DESCRIPTION

NJM2351 is series regulator with positive output, negative output and positive five peices output, which can deliver up to 200mA output current with additional external transistors. System A in positive and negative output have ripple filter internally for audio system. System B positive output is applied for other system control.

PACKAGE OUTLINE

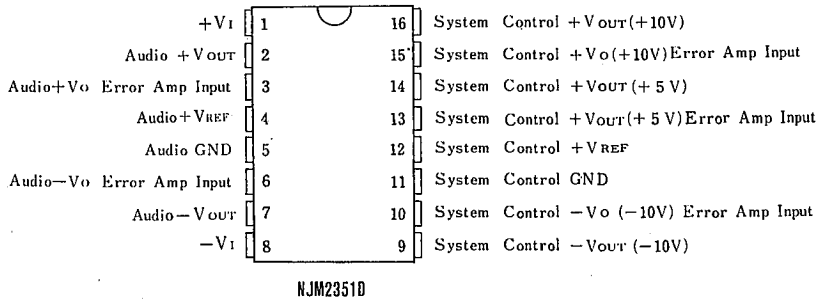


NJM2351D

FEATURES

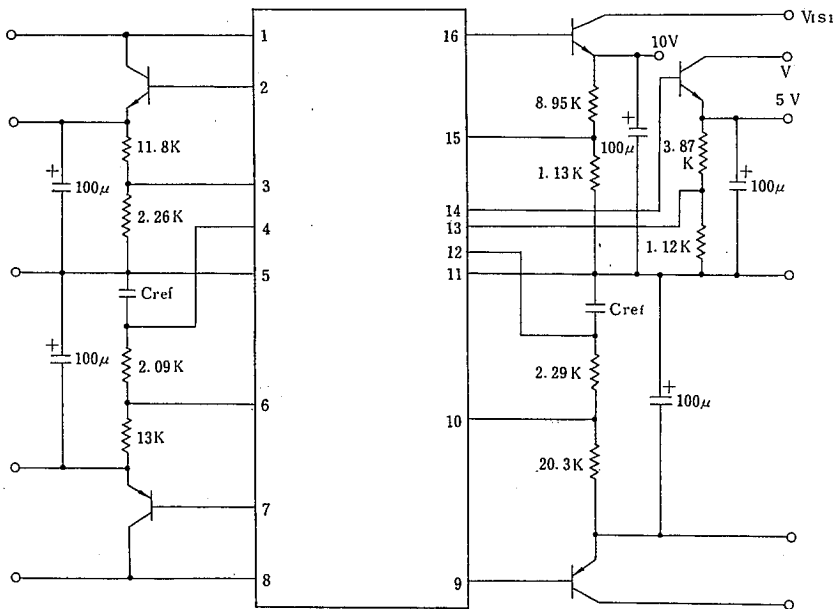
- Operating Voltage ($\pm 13V \sim \pm 21V$)
- Dual Supply Operation
- Internal Ripple Filter Circuit
- Package Outline DIP16
- Bipolar Technology

PIN CONFIGURATION



TEST CIRCUIT

Fig. 1



- Note: 1. The accuracy of all resistors should be $\pm 1\%$.
 2. The h_{FE} value of all transistors is 80 ~ 100.

■ ABSOLUTE MAXIMUM RATINGS

(Ta=25°C)

PARAMETER	SYMBOL	RATINGS	UNIT
Input Voltage	$\pm V_1$	± 22	V
Output Current Pin 2	I ₀₂	+4	mA
Pin 7	I ₀₇	-4	mA
Pin 14, 16	I _{014,16}	+8	mA
Pin 9	I ₀₉	-8	mA
Power Dissipation	P _D	700	mW
Operating Temperature Range	T _{opr}	-10~+75	°C
Storage Temperature Range	T _{sig}	-40~+125	°C

■ ELECTRICAL CHARACTERISTICS

[1] Audio System (Ta=25°C, $\pm V_1=\pm 16V$, I_o=100mA)

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Output Voltage	V _O		±6.65	±7.0	±7.35	V
Line Regulation	$\Delta V_O - V_1$	V ₁ = ±13~±21V	—	7	100	mV
Load Regulation	$\Delta V_O - I_O$	I _O = 1~200mA	—	16	100	mV
Ripple Rejection	RR	f = 120Hz, C _{REF} = 100μF	67	77	—	dB
Output Noise Voltage	V _{NO}	JISA, C _{REF} = 100μF	—	14	—	μV
Positive Quiescent Current	+I _O	V ₁ = +16V	—	5.1	8	mA
Minimum Output Voltage	V _{OL}	V ₁ = ±13V, I _O = 200mA	±6.5	—	—	V
Reference Voltage	V _{REF}		1.070	1.125	1.180	V
Temperature Coefficient of Reference Voltage	$\Delta V_{REF} / \Delta T$		—	0.1	—	mV/°C
Output Resistance	R _O	f = 1kHz	—	86	—	mΩ

■ ELECTRICAL CHARACTERISTICS

[II] System Control

(1) 10V Type ($T_a=25^\circ\text{C}$, $\pm V_{IS1}=\pm 15\text{V}$, $I_0=200\text{mA}$, $\pm V_1=16\text{V}$)

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Output Voltage	V_O		± 9.5	± 10	± 10.5	V
Line Regulation	$\Delta V_O - V_{I1}$	$V_{IS1} = \pm 11.5 \sim \pm 20\text{V}$	—	3	40	mV
Line Regulation	$\Delta V_O - V_{I2}$	$V_1 = \pm 13 \sim \pm 21\text{V}$	—	21	200	mV
Load Regulation	$\Delta V_O - I_O$	$I_0 = 1 \sim 400\text{mA}$	—	44	200	mV
Output Noise Voltage	V_{NO}	JISA, $C_{REF} = 10\mu\text{F}$	—	18	—	μV
Minimum Output Voltage	V_{OL}	$V_{IS1} = 11.5\text{V}$, $I_0 = 400\text{mA}$	± 9.2	—	—	V
Reference Voltage	V_{REF}		1.065	1.115	1.175	V
Temperature Coefficient of Reference Voltage	$\Delta V_{REF}/\Delta T$		—	0.2	—	mV/ $^\circ\text{C}$

(1) 5V Type ($T_a=25^\circ\text{C}$, $V_{IS2}=10\text{V}$, $I_0=200\text{mA}$, $\pm V_1 = \pm 16\text{V}$)

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Output Voltage	V_O		4.7	5.0	5.3	V
Line Regulation	$\Delta V_O - V_{I1}$	$V_{IS2} = 6.5 \sim 15\text{V}$	—	2	20	mV
Line Regulation	$\Delta V_O - V_{I2}$	$V_1 = \pm 13 \sim \pm 21\text{V}$	—	9	100	mV
Load Regulation	$\Delta V_O - I_O$	$I_0 = 1 \sim 400\text{mA}$	—	9	100	mV
Output Noise Voltage	V_{NO}	JISA, $C_{REF} = 10\mu\text{F}$	—	9	—	μV
Minimum Output Voltage	V_{OL}	$V_{IS2} = 6.5\text{V}$, $I_0 = 400\text{mA}$	4.4	—	—	V
Reference Voltage	V_{REF}		1.065	1.115	1.175	V
Temperature Coefficient of Reference Voltage	$\Delta V_{REF}/\Delta T$		—	0.2	—	mV/ $^\circ\text{C}$

(note 1) Test circuit: Fig. 1.

(note 2) Unless otherwise specified C_{REF} should be $100\mu\text{F}$.

(note 3) Use a transistor having a h_{FE} of 80 ~ 100 in Fig. 1.

MEMO

[CAUTION]

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