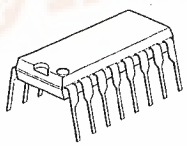
MULTI OUTPUT VOLTAGE REGULATOR

■ 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

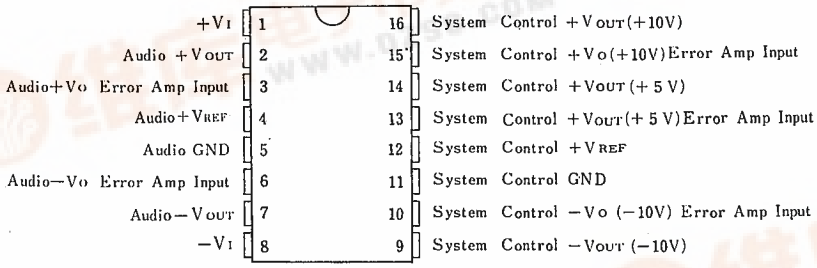


NJM2351D

■ FEATURES

- Operating Voltage (±13V～±21V)
- Dual Supply Operation
- Internal Ripple Filter Circuit
- Package Outline DIP16
- Bipolar Technology

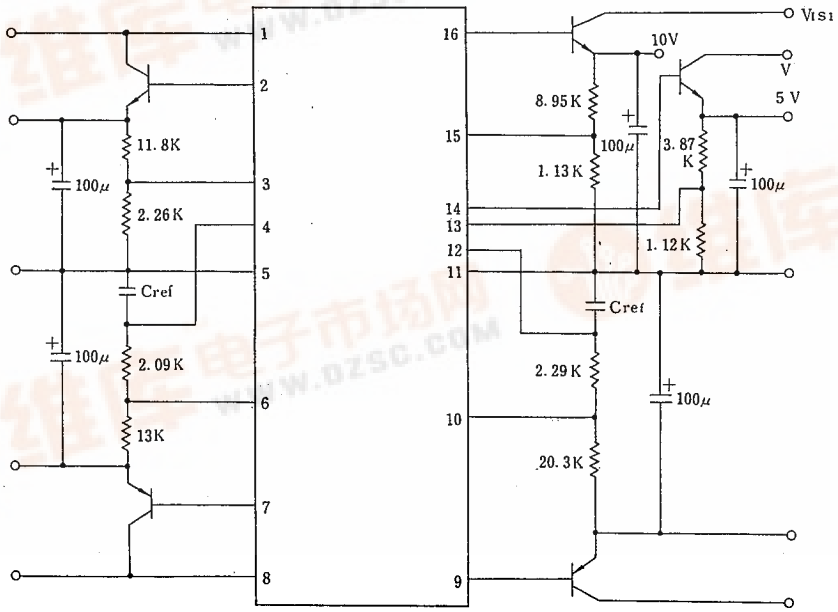
■ PIN CONFIGURATION



NJM2351D

■ TEST CIRCUIT

Fig. 1



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

■ ABSOLUTE MAXIMUM RATINGS

(Ta=25℃)

PARAMETER	SYMBOL	RATINGS	UNIT
Input Voltage	$\pm V_I$	±22	V
Output Current Pin 2	I_{O2}	+4	mA
Pin 7	I_{O7}	−4	mA
Pin 14, 16	$I_{O14,16}$	+8	mA
Pin 9	I_{O9}	−8	mA
Power Dissipation	P_D	700	mW
Operating Temperature Range	T_{opr}	−10~+75	℃
Storage Temperature Range	T_{stg}	−40~+125	℃

■ ELECTRICAL CHARACTERISTICS

[1] Audio System (Ta=25℃, $\pm V_I$=±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	ΔV_O-V_I	V_I=±13~±21V	—	7	100	mV
Load Regulation	ΔV_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	$+I_Q$	V_I=+16V	—	5.1	8	mA
Minimum Output Voltage	V_{OL}	V_I=±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 (Ta=25℃, $\pm V_{IS1}=\pm 15V$, $I_O=200mA$, $\pm V_I=16V$)

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Output Voltage	V_O		±9.5	±10	±10.5	V
Line Regulation	ΔV_O-V_{I1}	$V_{IS1}=\pm 11.5\sim\pm 20V$	—	3	40	mV
Line Regulation	ΔV_O-V_{I2}	$V_I=\pm 13\sim\pm 21V$	—	21	200	mV
Load Regulation	ΔV_O-I_O	$I_O=1\sim 400mA$	—	44	200	mV
Output Noise Voltage	V_{NO}	JISA, $C_{REF}=10\mu F$	—	18	—	μV
Minimum Output Voltage	V_{OL}	$V_{IS1}=11.5V$, $I_O=400mA$	±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/℃

(1) 5V Type (Ta=25℃, $V_{IS2}=10V$, $I_O=200mA$, $\pm V_I=\pm 16V$)

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Output Voltage	V_O		4.7	5.0	5.3	V
Line Regulation	ΔV_O-V_{I1}	$V_{IS2}=6.5\sim 15V$	—	2	20	mV
Line Regulation	ΔV_O-V_{I2}	$V_I=\pm 13\sim\pm 21V$	—	9	100	mV
Load Regulation	ΔV_O-I_O	$I_O=1\sim 400mA$	—	9	100	mV
Output Noise Voltage	V_{NO}	JISA, $C_{REF}=10\mu F$	—	9	—	μV
Minimum Output Voltage	V_{OL}	$V_{IS2}=6.5V$, $I_O=400mA$	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/℃

(note 1) Test circuit: Fig. 1.

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

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

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