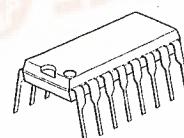


## MULTI OUTPUT VOLTAGE REGULATOR

### ■ 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

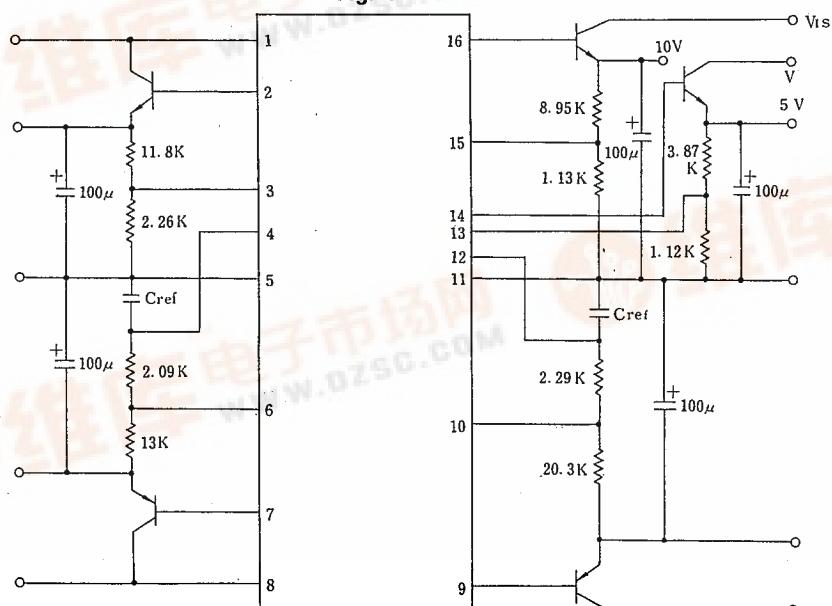
### ■ PIN CONFIGURATION

+Vi	1	16	System Control + Vout(+10V)
Audio + Vout	2	15	System Control + Vo(+10V) Error Amp Input
Audio+Vo Error Amp Input	3	14	System Control + Vout(+5V)
Audio+Vref	4	13	System Control + Vout(+5V) Error Amp Input
Audio GND	5	12	System Control + Vref
Audio-Vo Error Amp Input	6	11	System Control GND
Audio-Vout	7	10	System Control -Vo(-10V) Error Amp Input
-Vi	8	9	System Control -Vout(-10V)

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### ■ 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.

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## ■ ABSOLUTE MAXIMUM RATINGS

(Ta=25°C)

PARAMETER	SYMBOL	RATINGS	UNIT
Input Voltage	$\pm V_i$	$\pm 22$	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	°C
Storage Temperature Range	$T_{stg}$	- 40 ~ +125	°C

## ■ ELECTRICAL CHARACTERISTICS

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

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Output Voltage	$V_O$		$\pm 6.65$	$\pm 7.0$	$\pm 7.35$	V
Line Regulation	$\Delta V_O \cdot V_i$	$V_i=\pm 13 \sim \pm 21V$	—	7	100	mV
Load Regulation	$\Delta V_O \cdot I_O$	$I_O=1 \sim 200mA$	—	16	100	mV
Ripple Rejection	RR	$f=120Hz$ , $C_{REF}=100\mu F$	67	77	—	dB
Output Noise Voltage	$V_{NO}$	JISA, $C_{REF}=100\mu F$	—	14	—	$\mu V$
Positive Quiescent Current	$+I_Q$	$V_i=+16V$	—	5.1	8	mA
Minimum Output Voltage	$V_{OL}$	$V_i=\pm 13V$ , $I_O=200mA$	$\pm 6.5$	—	—	V
Reference Voltage	$V_{REF}$		1.070	1.125	1.180	V
Temperature Coefficient of Reference Voltage	$\Delta V_{REF}/\Delta T$		—	0.1	—	$mV/^{\circ}C$
Output Resistance	$R_O$	$f=1kHz$	—	86	—	$m\Omega$

## ■ ELECTRICAL CHARACTERISTICS

### [II] System Control

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

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Output Voltage	$V_o$		$\pm 9.5$	$\pm 10$	$\pm 10.5$	V
Line Regulation	$\Delta V_o - V_{I1}$	$V_{IS1}=\pm 11.5 \sim \pm 20V$	—	3	40	mV
Line Regulation	$\Delta V_o - V_{I2}$	$V_1 = \pm 13 \sim \pm 21V$	—	21	200	mV
Load Regulation	$\Delta V_o - I_o$	$I_o = 1 \sim 400mA$	—	44	200	mV
Output Noise Voltage	$V_{NO}$	JISA, $C_{REF}=10\mu F$	—	18	—	$\mu V$
Minimum Output Voltage	$V_{OL}$	$V_{IS1}=11.5V$ , $I_o=400mA$	$\pm 9.2$	—	—	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/ $^{\circ}C$

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

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Output Voltage	$V_o$		4.7	5.0	5.3	V
Line Regulation	$\Delta V_o - V_{I1}$	$V_{IS2}=6.5 \sim 15V$	—	2	20	mV
Line Regulation	$\Delta V_o - V_{I2}$	$V_1 = \pm 13 \sim \pm 21V$	—	9	100	mV
Load Regulation	$\Delta V_o - I_o$	$I_o = 1 \sim 400mA$	—	9	100	mV
Output Noise Voltage	$V_{NO}$	JISA, $C_{REF}=10\mu F$	—	9	—	$\mu V$
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/ $^{\circ}C$

(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  $80 \sim 100$  in Fig. 1.

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## MEMO

[CAUTION]  
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