

## LOW SATURATION DUAL OPERATIONAL AMPLIFIER

### ■ GENERAL DESCRIPTION

The NJM2140 is a low saturation output voltage dual operational amplifier in small packages. It features a low voltage operation of  $\pm 1.0V$  (min.) and low saturation output voltage of  $\pm 2.0V_{p-p}$  (at supply voltage  $\pm 2.5V$ ). The NJM2140 is available in both 8-lead MSOP and thin type MSOP packages.

### ■ FEATURES

- Operating Voltage  $\pm 1V$  to  $\pm 7V$
- High Slew Rate  $4V/\mu s$  typ.
- Wide Band  $12MHz$  typ.
- Low Saturation Output Voltage  $\pm 2.4V$  typ. (at  $V^+V^- = \pm 2.5V, R_L = 10k\Omega$ )
- Package Outline MSOP8 (VSP8) MEET JEDEC MO-187-DA  
MSOP8 (TVSP8) MEET JEDEC MO-187-DA / THIN TYPE
- Bipolar Technology

### ■ PACKAGE OUTLINE

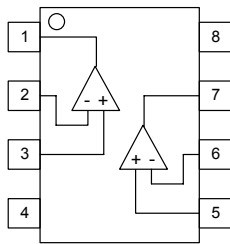


**NJM2140R**  
(MSOP8 (VSP8))



**NJM2140RB1**  
(MSOP8 (TVSP8))

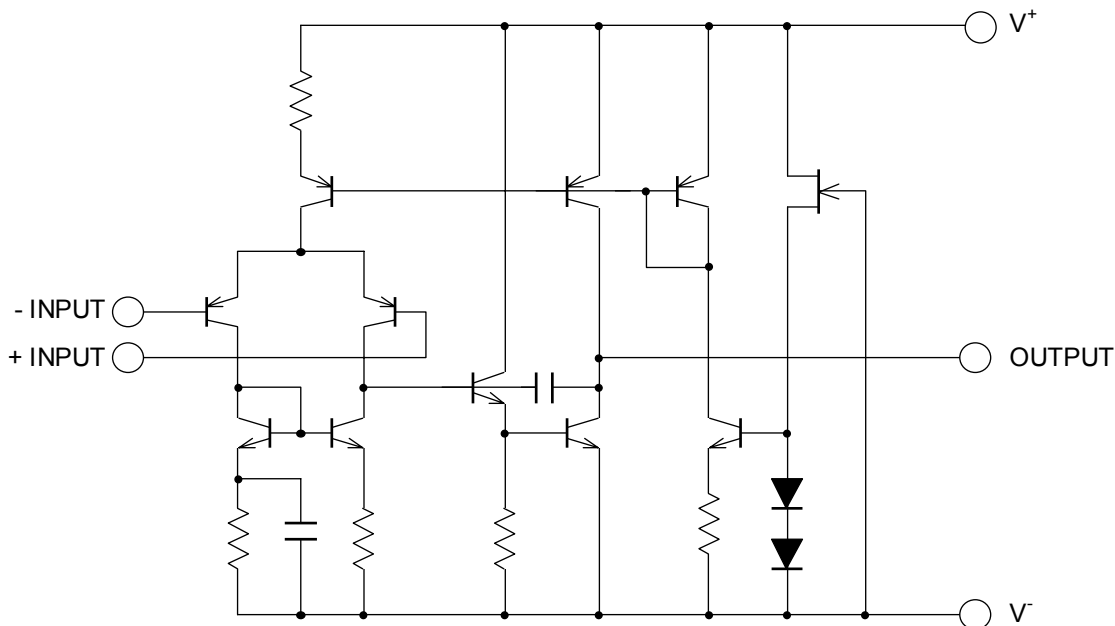
### ■ PIN CONFIGURATION



- PIN FUNCTION**
- 1.A OUTPUT
  - 2.A -INPUT
  - 3.A +INPUT
  - 4.V<sup>-</sup>
  - 5.B +INPUT
  - 6.B -INPUT
  - 7.B OUTPUT
  - 8.V<sup>+</sup>

**NJM2140R/RB1**

### ■ EQUIVALENT CIRCUIT



# NJM2140

## ■ ABSOLUTE MAXIMUM RATINGS

(Ta=25°C)

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	V <sup>+</sup> /V	± 7.0	V
Differential Input Voltage	V <sub>ID</sub>	± 14	V
Power Dissipation	P <sub>D</sub>	(MSOP8(VSP/TVSP8)) 320	mW
Operating Temperature Range	T <sub>opr</sub>	-40~+85	°C
Storage Temperature Range	T <sub>stg</sub>	-40~+125	°C

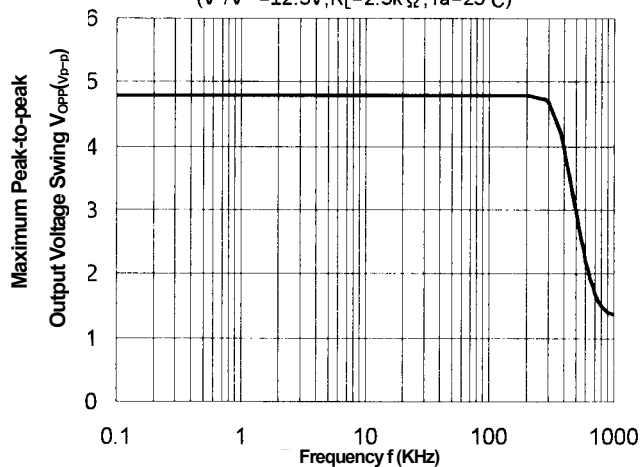
## ■ ELECTRICAL CHARACTERISTICS

(V<sup>+</sup>/V<sup>-</sup>=±2.5V, Ta=25°C)

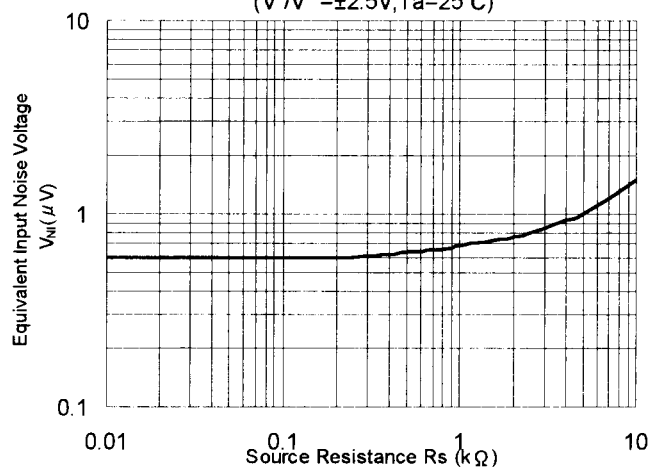
PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Input Offset Voltage	V <sub>IO</sub>	R <sub>S</sub> ≤10kΩ	-	1	6	mV
Input Offset Current	I <sub>IO</sub>		-	10	200	nA
Input Bias Current	I <sub>B</sub>		-	100	300	nA
Large Signal Voltage Gain	A <sub>V</sub>	R <sub>L</sub> ≥10kΩ	60	80	-	dB
Maximum Output Voltage Swings 1	V <sub>OM1</sub>	R <sub>L</sub> =2.5kΩ	± 2.0	± 2.2	-	V
Maximum Output Voltage Swings 2	V <sub>OM2</sub>	R <sub>L</sub> ≥10kΩ	± 2.3	± 2.4	-	V
Input Common Mode Voltage Range	V <sub>ICM</sub>		± 1.5	-	-	V
Common Mode Rejection Ratio	CMRR		60	74	-	dB
Supply Voltage Rejection Ratio	PSRR		60	80	-	dB
Operating Current	I <sub>CC</sub>		-	3.5	5	mA
Slew Rate	SR		-	4	-	V/μs
Unity Gain Frequency	f <sub>T</sub>		-	12	-	MHz

## ■ TYPICAL CHARACTERISTICS

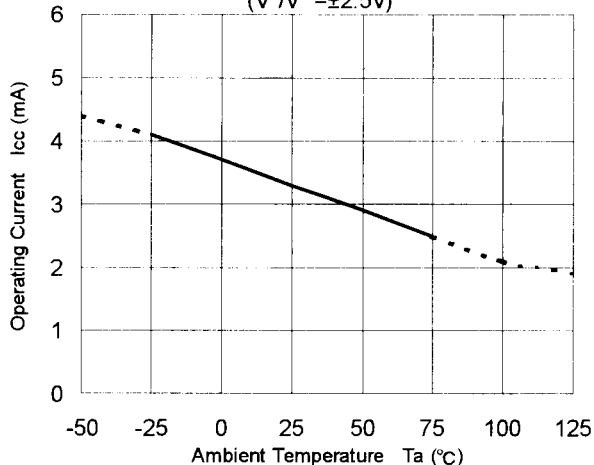
Maximum Peak-to-peak Output Voltage Swing vs. Frequency  
( $V^+/V^- = \pm 2.5V, R_L = 2.5k\Omega, T_a = 25^\circ C$ )



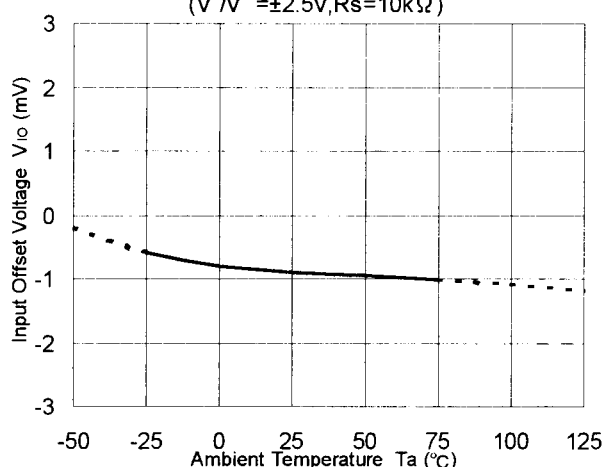
Equivalent Input Noise Voltage vs. Source Resistance  
( $V^+/V^- = \pm 2.5V, T_a = 25^\circ C$ )



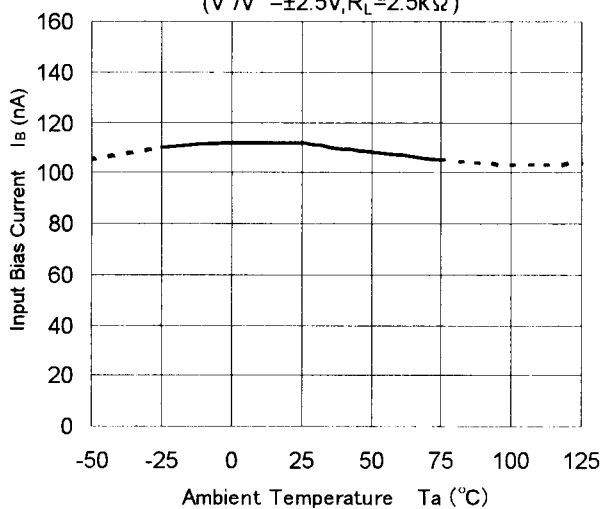
Operating Current vs. Temperature  
( $V^+/V^- = \pm 2.5V$ )



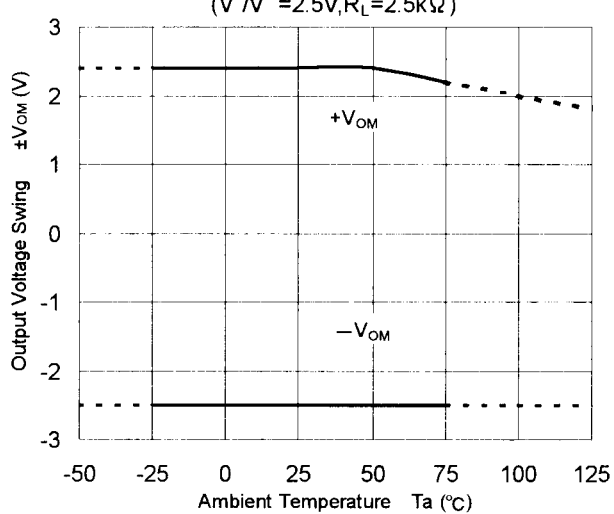
Input Offset Voltage vs. Temperature  
( $V^+/V^- = \pm 2.5V, R_s = 10k\Omega$ )



Input Bias Current vs. Temperature  
( $V^+/V^- = \pm 2.5V, R_L = 2.5k\Omega$ )

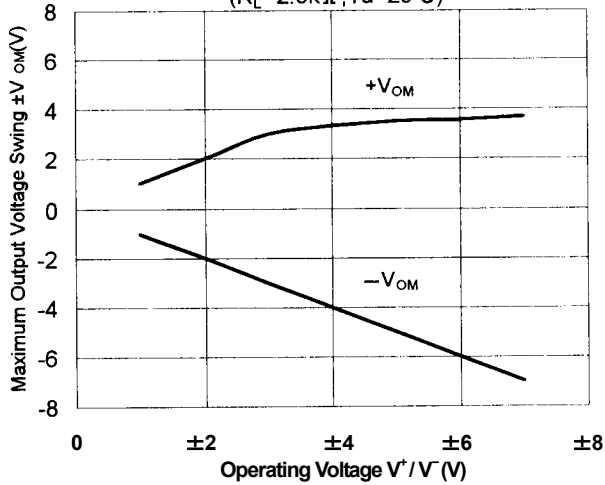


Output Voltage Swing vs. Temperature  
( $V^+/V^- = 2.5V, R_L = 2.5k\Omega$ )

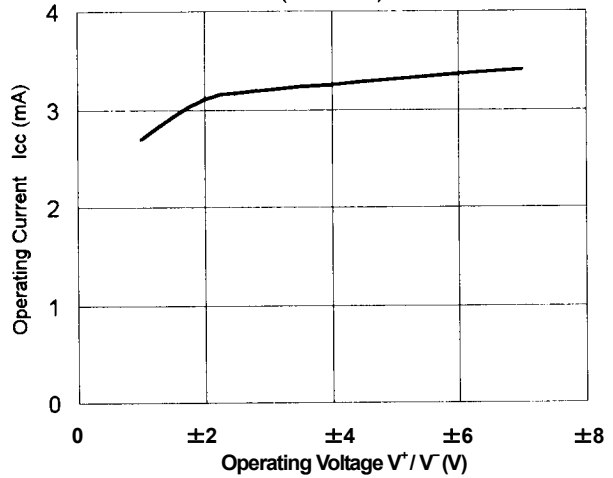


## ■ TYPICAL CHARACTERISTICS

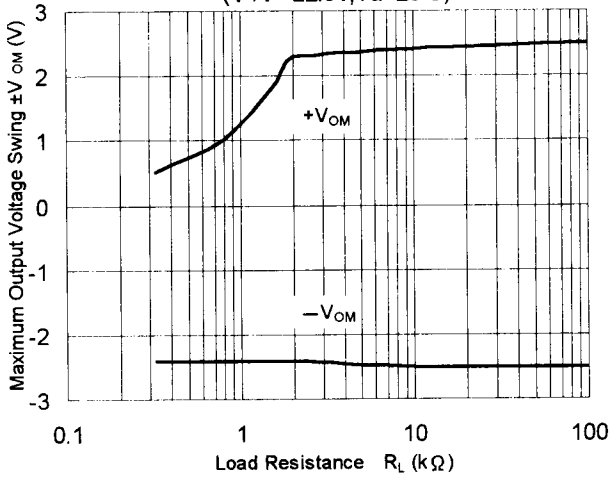
Maximum Output Voltage Swing vs. Operating Voltage  
( $R_L=2.5k\Omega, T_a=25^\circ C$ )



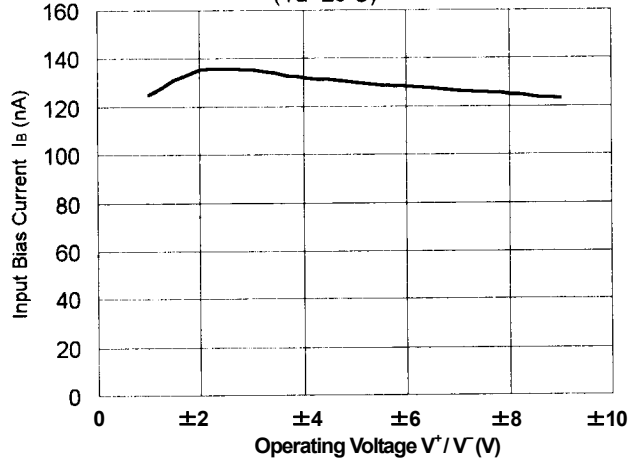
Operating Current vs. Operating Voltage  
( $T_a=25^\circ C$ )



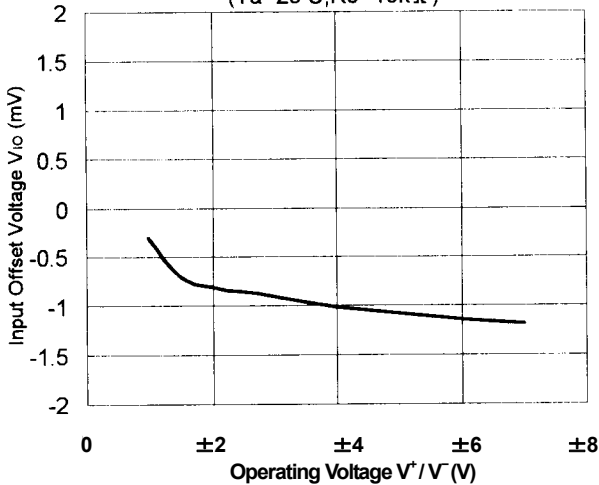
Maximum Output Voltage Swing vs. Load Resistance  
( $V^+/V^-=\pm 2.5V, T_a=25^\circ C$ )



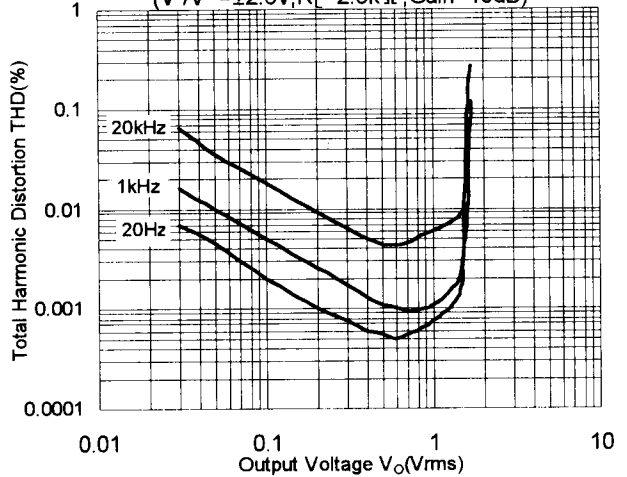
Input Bias Current vs. Operating Voltage  
( $T_a=25^\circ C$ )



Input Offset Voltage vs. Operating Voltage  
( $T_a=25^\circ C, R_s=10k\Omega$ )



Total Harmonic Distortion vs. Output Voltage  
( $V^+/V^-=\pm 2.5V, R_L=2.5k\Omega, \text{Gain}=10\text{dB}$ )



**[CAUTION]**  
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