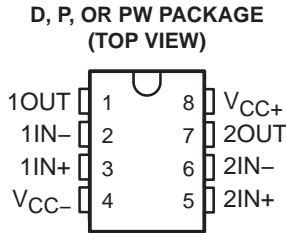


RC4580  
DUAL AUDIO OPERATIONAL AMPLIFIER

SLOS412C – APRIL 2003 – REVISED MARCH 2004

- Operating Voltage . . .  $\pm 2\text{ V}$  to  $\pm 18\text{ V}$
- Low Noise Voltage . . .  $0.8\text{ }\mu\text{Vrms}$  (TYP)
- Wide GBW . . .  $12\text{ MHz}$  (TYP)
- Low THD . . .  $0.0005\%$  (TYP)
- Slew Rate . . .  $5\text{ V}/\mu\text{s}$  (TYP)
- Suitable for Applications Such As Audio Preamplifier, Active Filter, Headphone Amplifier, Industrial Measurement Equipment
- Drop-In Replacement for NJM4580
- Pin and Function Compatible With LM833, NE5532, NJM4558/9, and NJM4560/2/5



description/ordering information

The RC4580 is a dual operational amplifier that has been designed optimally for audio applications, such as improving tone control. It offers low noise, high gain bandwidth, low harmonic distortion, and high output current, all of which make the device ideally suited for audio electronics, such as audio preamplifiers and active filters, as well as industrial measurement equipment. When high output current is required, the RC4580 also can be used as a headphone amplifier. Due to its wide operating supply voltage, the RC4580 also can be used in low-voltage applications.

ORDERING INFORMATION

TA	PACKAGE†		ORDERABLE PART NUMBER	TOP-SIDE MARKING
-40°C to 85°C	PDIP (P)	Tube of 50	RC4580IP	RC4580IP
		Tube of 75	RC4580ID	R4580I
	SOIC (D)	Reel of 2500	RC4580IDR	
		Tube of 150	RC4580IPW	R4580I
	TSSOP (PW)	Reel of 2000	RC4580IPWR	

† Package drawings, standard packing quantities, thermal data, symbolization, and PCB design guidelines are available at [www.ti.com/sc/package](http://www.ti.com/sc/package).



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PRODUCTION DATA information is current as of publication date. Products conform to specifications per the terms of Texas Instruments standard warranty. Production processing does not necessarily include testing of all parameters.



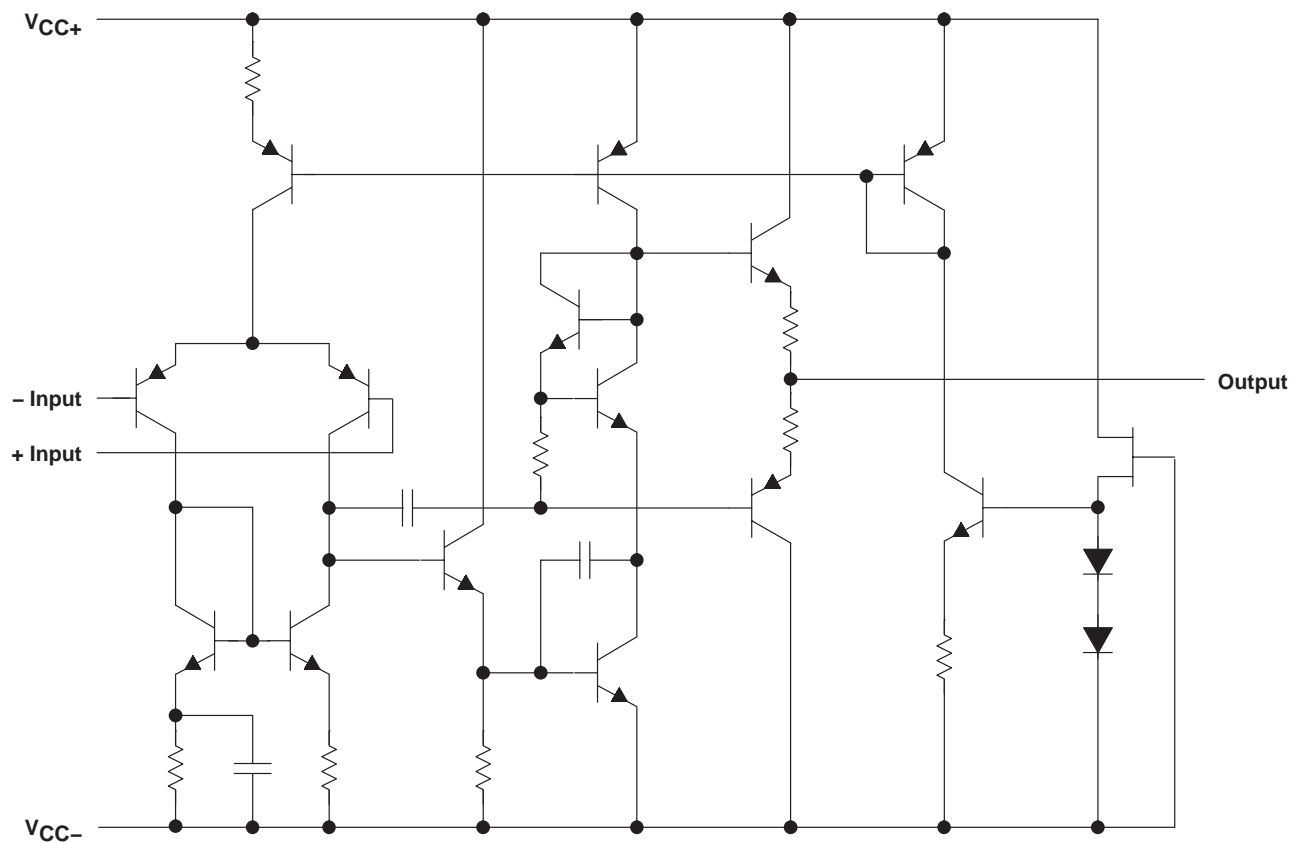
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# RC4580 DUAL AUDIO OPERATIONAL AMPLIFIER

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## equivalent schematic



# RC4580

## DUAL AUDIO OPERATIONAL AMPLIFIER

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### absolute maximum ratings over operating free-air temperature range (unless otherwise noted)<sup>†</sup>

Supply voltage, $V_{CC+}$	±18 V
Input voltage (any input)	±15 V
Differential input voltage, $V_{ID}$	±30 V
Output current	±50 mA
Package thermal impedance, $\theta_{JA}$ (see Notes 1 and 2): D package	97°C/W
P package	85°C/W
PW package	149°C/W
Operating virtual junction temperature, $T_J$	150°C
Storage temperature range, $T_{stg}$	–60°C to 125°C

<sup>†</sup> Stresses beyond those listed under “absolute maximum ratings” may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under “recommended operating conditions” is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

NOTES: 1. Maximum power dissipation is a function of  $T_J(\text{max})$ ,  $\theta_{JA}$ , and  $T_A$ . The maximum allowable power dissipation at any allowable ambient temperature is  $P_D = (T_J(\text{max}) - T_A)/\theta_{JA}$ . Operating at the absolute maximum  $T_J$  of 150°C can affect reliability.  
2. The package thermal impedance is calculated in accordance with JESD 51-7.

### recommended operating conditions

		MIN	MAX	UNIT
$V_{CC+}$	Supply voltage	2	16	V
$V_{CC-}$		–2	–16	
$V_{ICR}$	Input common-mode voltage range	–13.5	13.5	V
$T_A$	Operating free-air temperature range	–40	85	°C

### electrical characteristics, $V_{CC\pm} = \pm 15$ V, $T_A = 25^\circ\text{C}$ (unless otherwise noted)

PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNIT
$V_{IO}$ Input offset voltage	$R_S \leq 10\text{ k}\Omega$		0.5	3	mV
$I_{IO}$ Input offset current			5	200	nA
$I_{IB}$ Input bias current			100	500	nA
$A_{VD}$ Large-signal differential-voltage amplification	$R_L \geq 2\text{ k}\Omega$ , $V_O = \pm 10\text{ V}$	90	110		dB
$V_{OM}$ Output voltage swing	$R_L \geq 2\text{ k}\Omega$	±12	±13.5		V
$V_{ICR}$ Common-mode input voltage range		±12	±13.5		V
CMRR Common-mode rejection ratio	$R_S \leq 10\text{ k}\Omega$	80	110		dB
$k_{SVR}^\ddagger$ Supply-voltage rejection ratio	$R_S \leq 10\text{ k}\Omega$	80	110		dB
$I_{CC}$ Supply current (all amplifiers)			6	9	mA

<sup>‡</sup> Measured with  $V_{CC\pm}$  varied simultaneously

### operating characteristics, $V_{CC\pm} = \pm 15$ V, $T_A = 25^\circ\text{C}$ (unless otherwise noted)

PARAMETER	TEST CONDITIONS	TYP	UNIT
SR Slew rate at unity gain	$R_L \geq 2\text{ k}\Omega$	5	V/μs
GBW Gain-bandwidth product	$f = 10\text{ kHz}$	12	MHz
THD Total harmonic distortion	$V_O = 5\text{ V}$ , $R_L = 2\text{ k}\Omega$ , $f = 1\text{ kHz}$ , $A_{VD} = 20\text{ dB}$	0.0005%	
$V_n$ Equivalent input noise voltage	RIAA, $R_S \leq 2.2\text{ k}\Omega$ , 30-kHz LPF	0.8	μVrms



# RC4580

## DUAL AUDIO OPERATIONAL AMPLIFIER

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### TYPICAL CHARACTERISTICS

MAXIMUM OUTPUT VOLTAGE SWING  
vs  
LOAD RESISTANCE

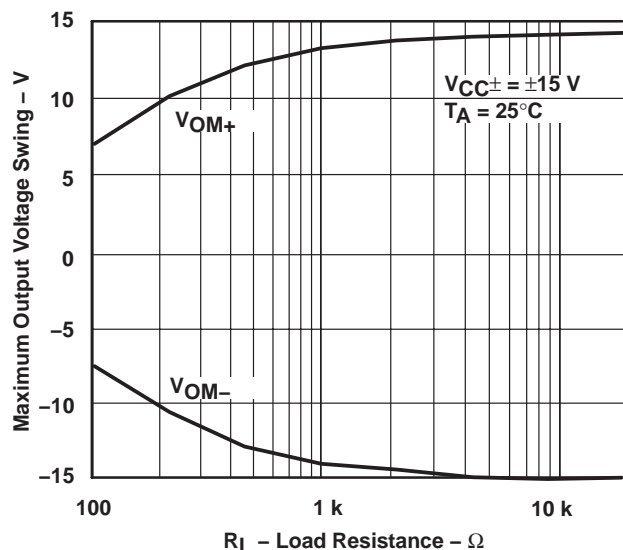


Figure 1

MAXIMUM OUTPUT VOLTAGE SWING  
vs  
FREQUENCY

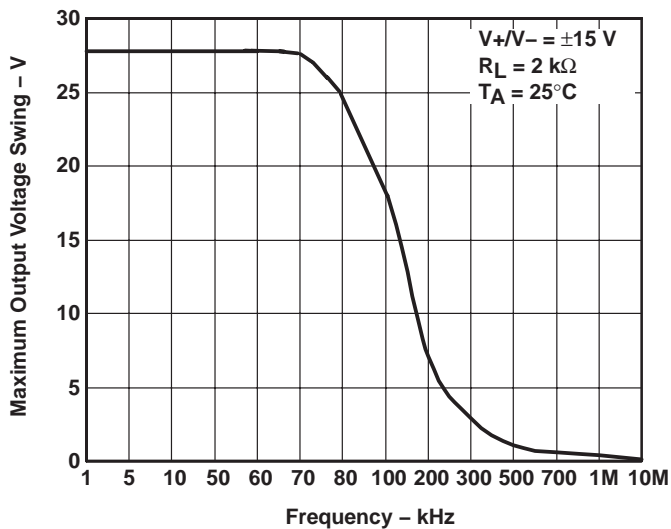


Figure 2

OUTPUT VOLTAGE SWING  
vs  
OUTPUT CURRENT

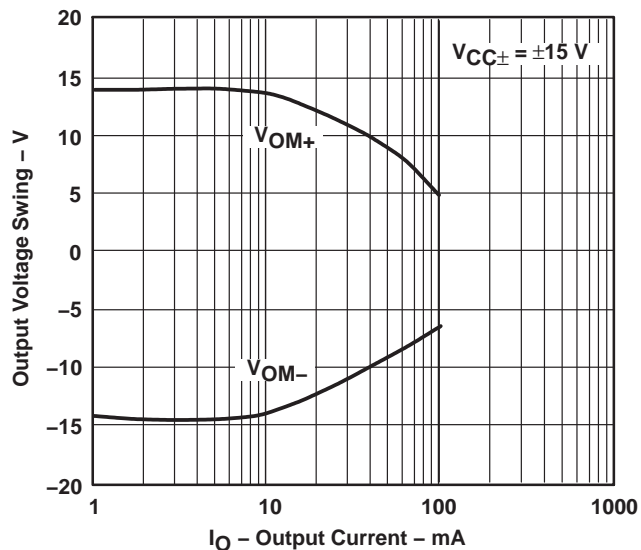


Figure 3

EQUIVALENT INPUT NOISE VOLTAGE  
vs  
FREQUENCY

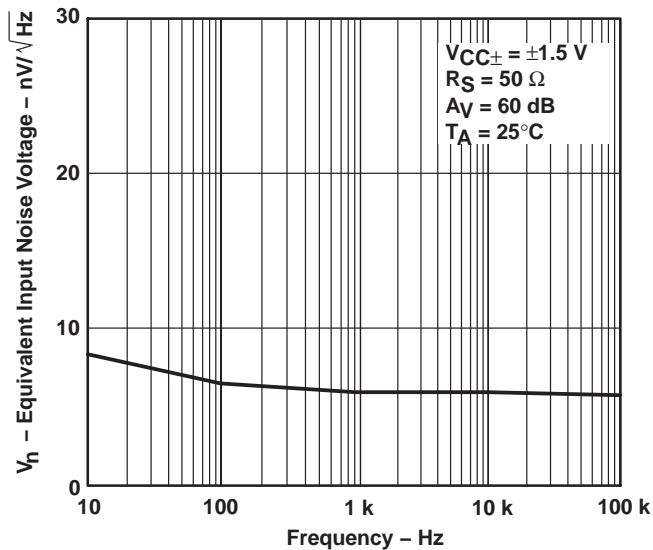
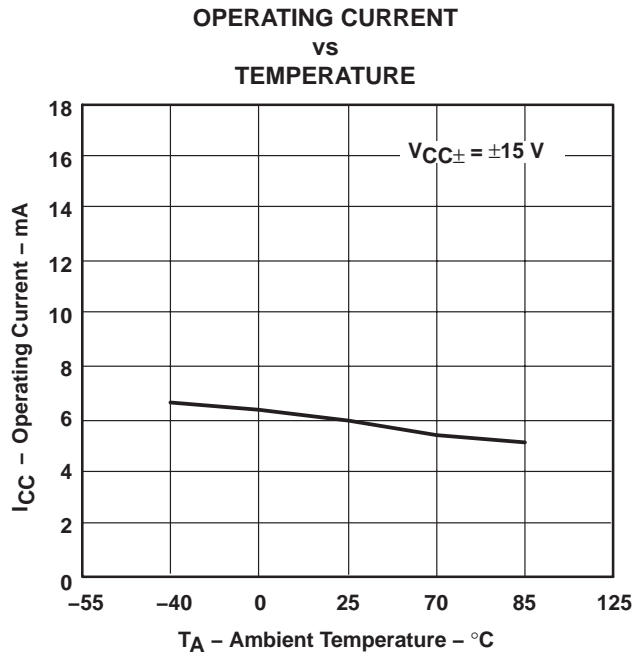
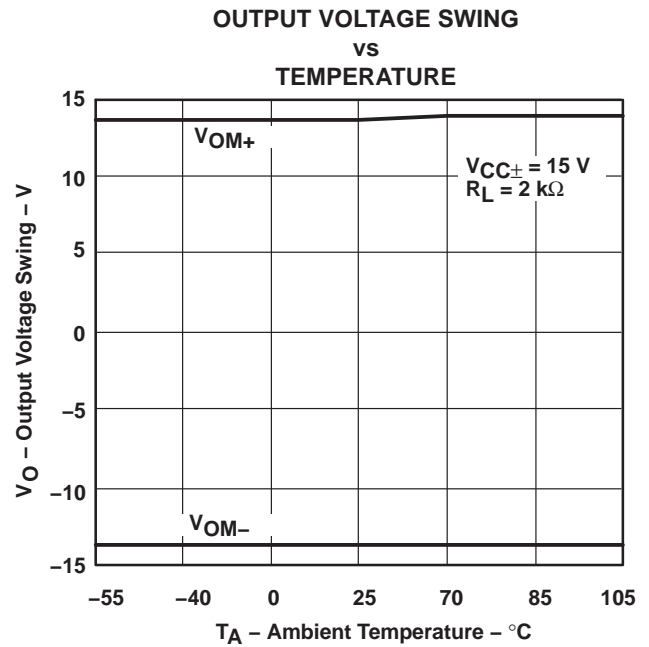


Figure 4

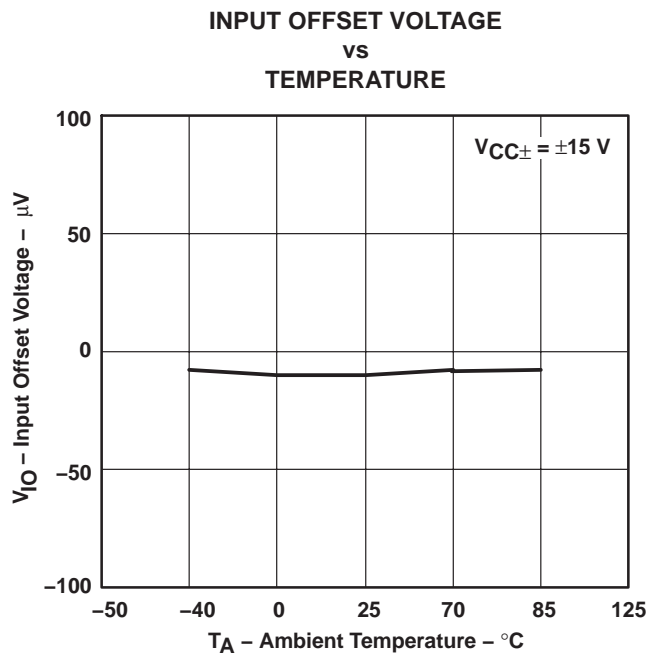
**TYPICAL CHARACTERISTICS**



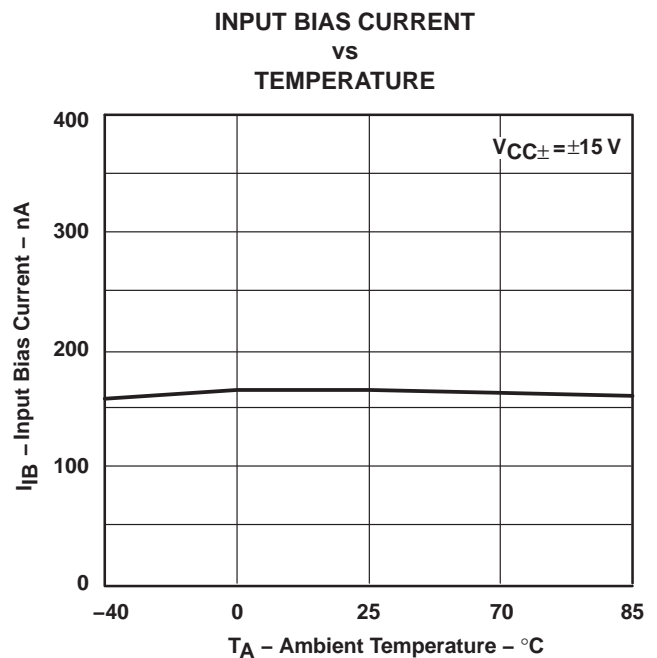
**Figure 5**



**Figure 6**



**Figure 7**



**Figure 8**

# RC4580

## DUAL AUDIO OPERATIONAL AMPLIFIER

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### TYPICAL CHARACTERISTICS

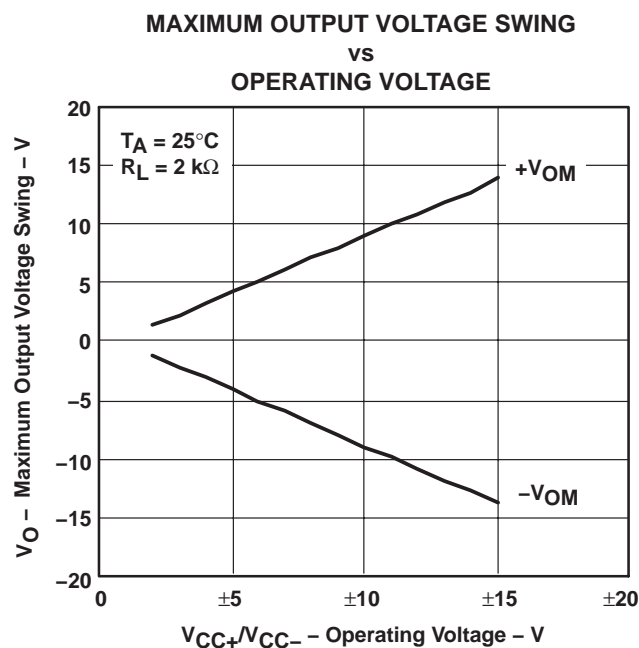


Figure 9

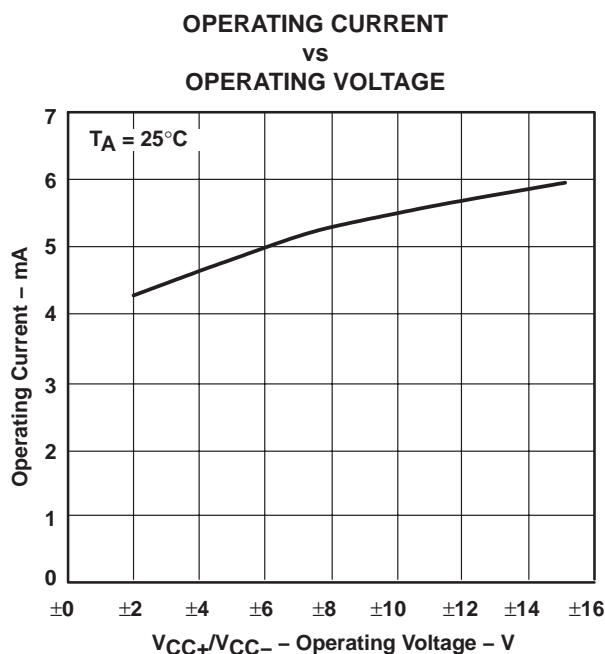


Figure 10

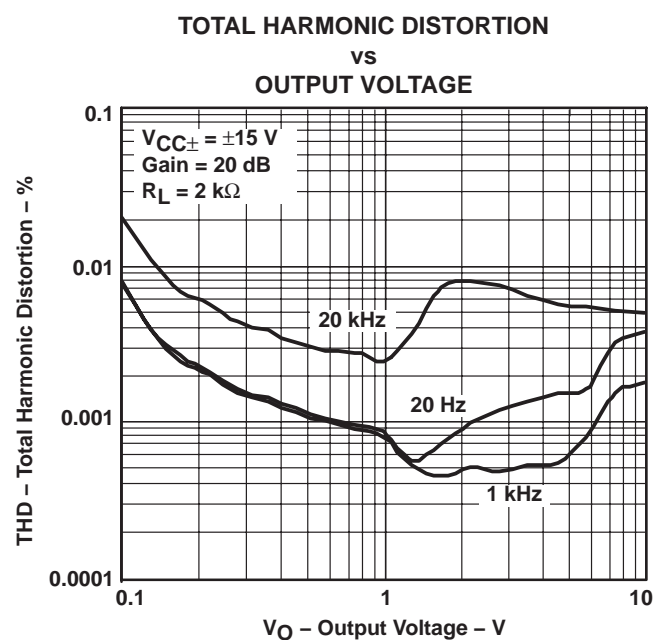


Figure 11

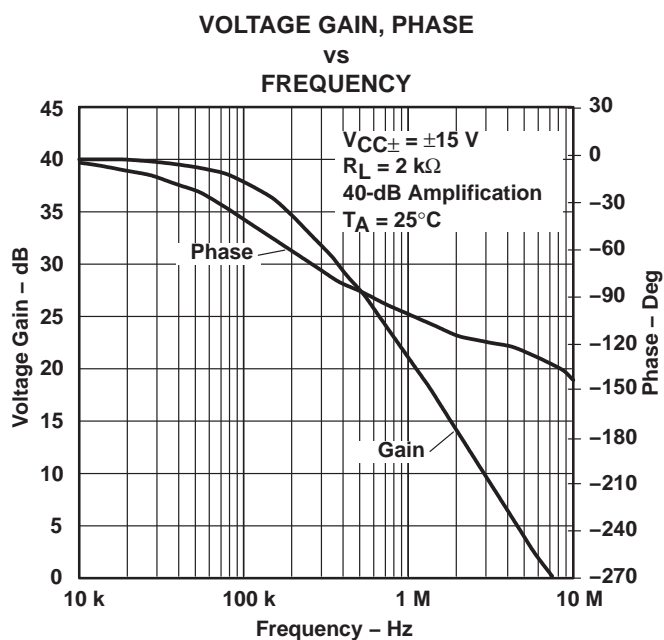
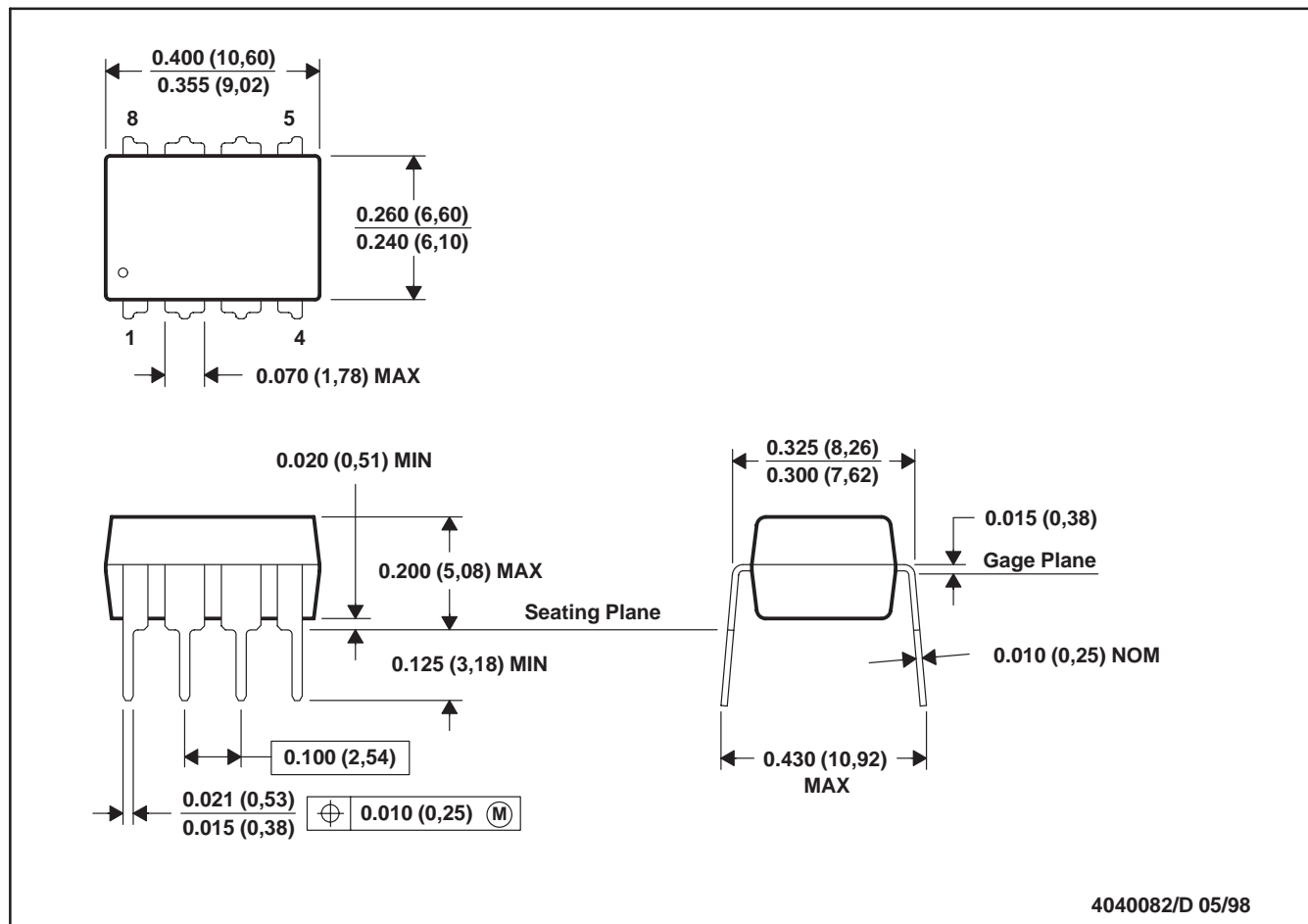


Figure 12

## P (R-PDIP-T8)

## PLASTIC DUAL-IN-LINE

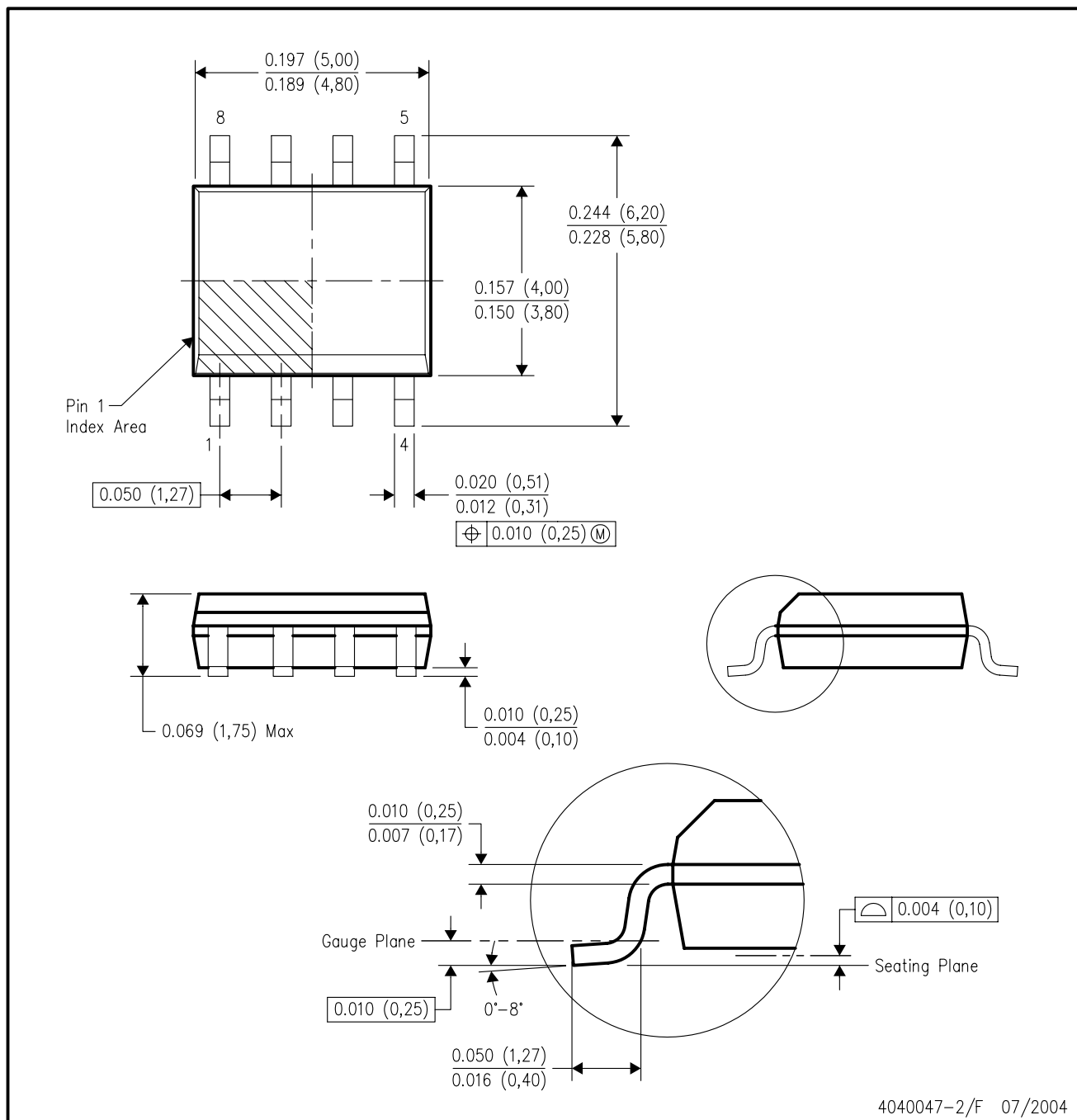


- NOTES: A. All linear dimensions are in inches (millimeters).  
 B. This drawing is subject to change without notice.  
 C. Falls within JEDEC MS-001

For the latest package information, go to [http://www.ti.com/sc/docs/package/pkg\\_info.htm](http://www.ti.com/sc/docs/package/pkg_info.htm)

## D (R-PDSO-G8)

## PLASTIC SMALL-OUTLINE PACKAGE

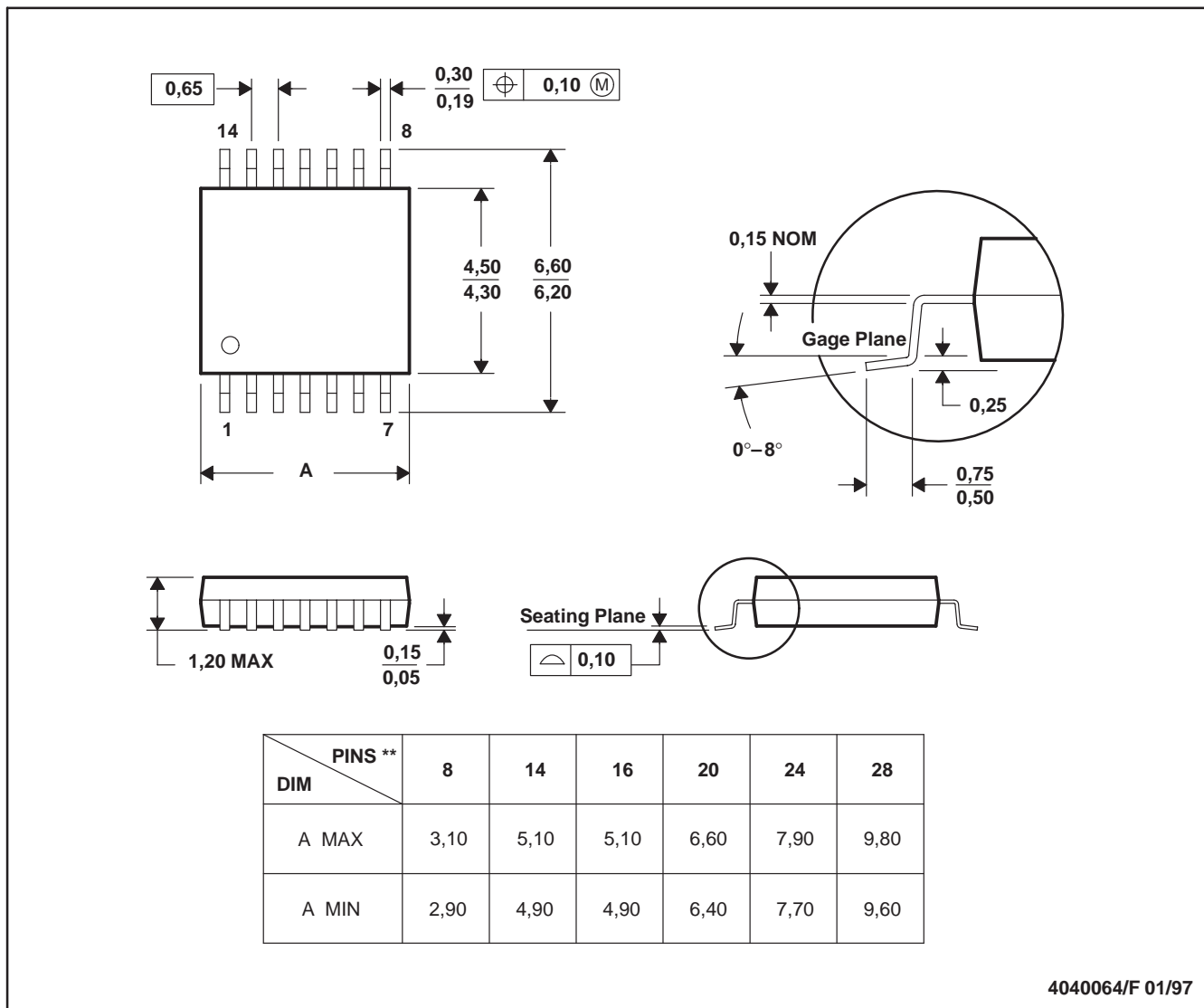


- NOTES:
- All linear dimensions are in inches (millimeters).
  - This drawing is subject to change without notice.
  - Body dimensions do not include mold flash or protrusion not to exceed 0.006 (0,15).
  - Falls within JEDEC MS-012 variation AA.

## PW (R-PDSO-G\*\*)

## PLASTIC SMALL-OUTLINE PACKAGE

14 PINS SHOWN



- NOTES: A. All linear dimensions are in millimeters.  
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 D. Falls within JEDEC MO-153

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