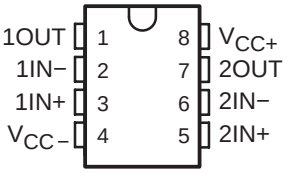
RC4560
DUAL AUDIO OPERATIONAL AMPLIFIER

SLOS457 − JANUARY 2005

- **Operating Voltage . . . ±2 V to ±18 V**
- **Low Noise Voltage . . . 1.2 μVrms (Typ)**
- **Wide GBW . . . 15 MHz (Typ)**
- **Low THD . . . 0.05% (Typ)**
- **Slew Rate . . . 5.5V/μsec (Typ)**
- **Suitable for Applications Such as Audio Preamplifier, Active Filter, Headphone Amplifier, Industrial Measurement Equipment**

D (SOIC), DGK (VSSOP/MSOP), P (PDIP), OR PW (TSSOP) PACKAGE (TOP VIEW)



description/ordering information

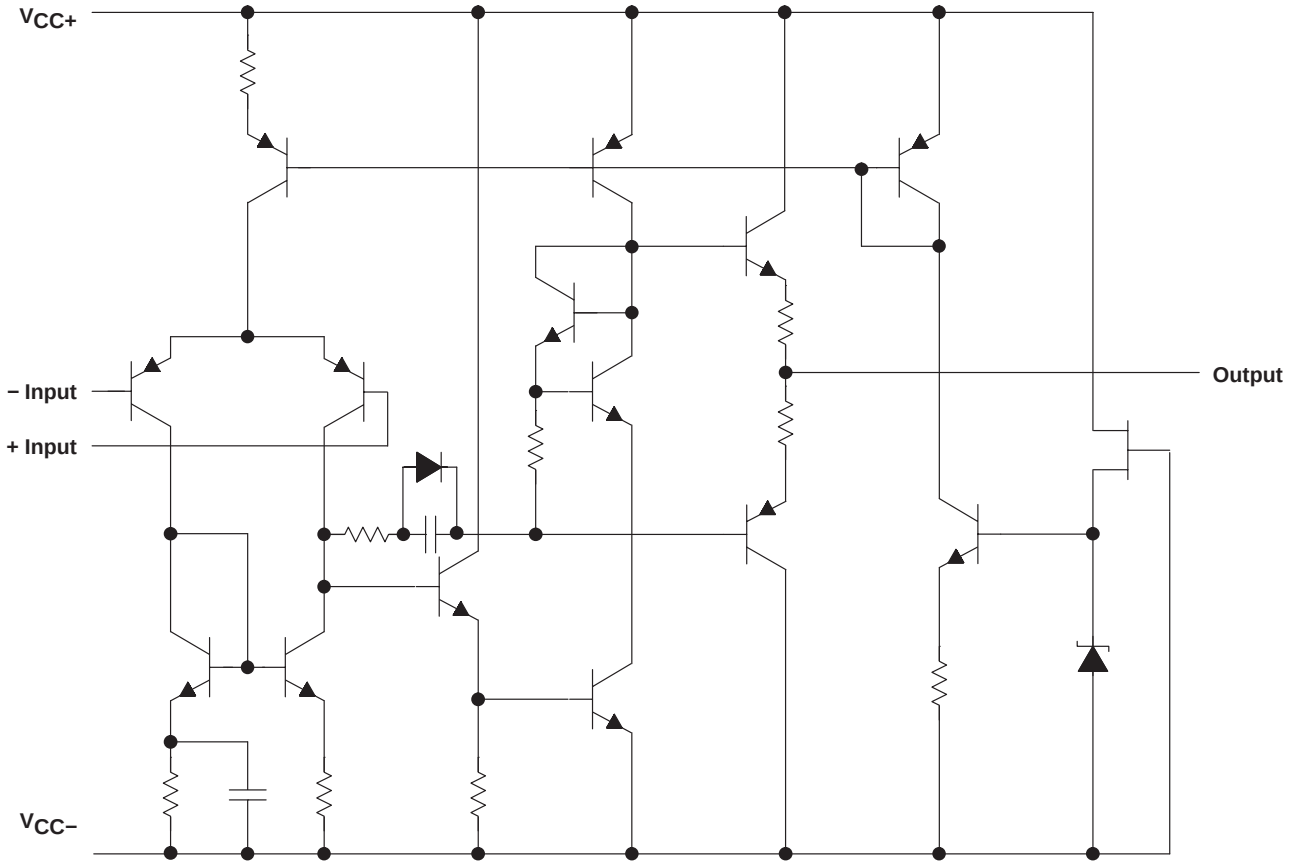
The RC4560 is a high-gain, wide-bandwidth, dual operational amplifier capable of driving 20 V peak-to-peak into 400-Ω loads. The RC4560 combines many of the features of the RC4558, but with wider bandwidth and higher slew rate, making this device ideal for active filters, data and telecommunications, and many instrumentation applications.

ORDERING INFORMATION

T_A	PACKAGE†		ORDERABLE PART NUMBER	TOP-SIDE MARKING
−40°C to 85°C	MSOP/VSSOP (DGK)	Reel of 2500	RC4560IDGKR	PREVIEW
		Reel of 250	RC4560IDGKT	
	PDIP (P)	Tube of 50	RC4560IP	RC4560IP
	SOIC (D)	Tube of 75	RC4560ID	R4560I
		Reel of 2500	RC4560IDR	
	TSSOP (PW)	Tube of 150	RC4560IPW	R4560I
		Reel of 2000	RC4560IPWR	

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

equivalent circuit



absolute maximum ratings over operating free-air temperature range (unless otherwise noted)†

Supply voltage, $V_{CC\pm}$	±18 V
Input voltage (any input)	±15 V
Output current	±50 mA
Package thermal impedance, θ_{JA} (see Notes 1 and 2): D package	97°C/W
DGK package	172°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

† 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 $T_J(max)$, θ_{JA}, and T_A. The maximum allowable power dissipation at any allowable ambient temperature is $P_D = (T_J(max) - T_A)/\theta_{JA}$. 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_{ID}	Differential input voltage		±30	V
V_{ICR}	Input common mode range	−14	14	V
T_A	Operating free-air temperature range	−40	85	°C

electrical characteristics, $V_{CC\pm}$ = ±15 V, T_A = 25°C (unless otherwise noted)

PARAMETER		TEST CONDITIONS	MIN	TYP	MAX	UNIT
V_{IO}	Input offset voltage	$R_S \le 10$ kΩ		0.5	6	mV
I_{IO}	Input offset current			5	200	nA
I_{IB}	Input bias current			40	500	nA
A_{VD}	Large-signal differential voltage amplification	$R_L \ge 2$ kΩ, V_O = ±10 V	86	100		dB
r_i	Input resistance		0.3	5		MΩ
V_O	Output voltage swing	$R_L \ge 2$ kΩ	±12	±14		V
		I_O = 25 mA	±10	±12.5		
V_{ICR}	Common-mode input voltage range		±12	±14		V
CMRR	Common-mode rejection ratio	$R_S \le 10$ kΩ	70	90		dB
k_{SVR}†	Supply-voltage rejection ratio	$R_S \le 10$ kΩ	76.5	90		dB
I_{CC}	Supply current (all amplifiers)			4.3	5.7	mA

† Measured with $V_{CC\pm}$ differentially varied simultaneously from ±4 V to ±15 V

operating characteristics, $V_{CC\pm}$ = ±15 V, T_A = 25°C (unless otherwise noted)

PARAMETER		TEST CONDITIONS	MIN	TYP	MAX	UNIT
SR	Slew rate at unity gain			5.5		V/μs
GBW	Gain bandwidth product			15		MHz
THD	Total harmonic distortion	V_O = 5 V, R_L = 2 kΩ, f = 1 kHz, A_{VD} = 20 dB		0.05		%
V_n	Equivalent input noise voltage	RIAA, $R_S \le 2$ kΩ, 30 kHz LPF		1.2		μVrms

PACKAGING INFORMATION

Orderable Device	Status (1)	Package Type	Package Drawing	Pins	Package Qty	Eco Plan (2)	Lead/Ball Finish	MSL Peak Temp (3)
RC4560ID	ACTIVE	SOIC	D	8	75	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
RC4560IDE4	ACTIVE	SOIC	D	8	75	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
RC4560IDR	ACTIVE	SOIC	D	8	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
RC4560IDRE4	ACTIVE	SOIC	D	8	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
RC4560IP	ACTIVE	PDIP	P	8	50	Pb-Free (RoHS)	CU NIPDAU	Level-NC-NC-NC
RC4560IPE4	ACTIVE	PDIP	P	8	50	Pb-Free (RoHS)	CU NIPDAU	Level-NC-NC-NC
RC4560IPW	ACTIVE	TSSOP	PW	8	150	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
RC4560IPWE4	ACTIVE	TSSOP	PW	8	150	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
RC4560IPWR	ACTIVE	TSSOP	PW	8	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
RC4560IPWRE4	ACTIVE	TSSOP	PW	8	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM

(1) The marketing status values are defined as follows:
ACTIVE: Product device recommended for new designs.
LIFEBUY: TI has announced that the device will be discontinued, and a lifetime-buy period is in effect.
NRND: Not recommended for new designs. Device is in production to support existing customers, but TI does not recommend using this part in a new design.
PREVIEW: Device has been announced but is not in production. Samples may or may not be available.
OBSOLETE: TI has discontinued the production of the device.

(2) Eco Plan - The planned eco-friendly classification: Pb-Free (RoHS) or Green (RoHS & no Sb/Br) - please check http://www.ti.com/productcontent for the latest availability information and additional product content details.
TBD: The Pb-Free/Green conversion plan has not been defined.
Pb-Free (RoHS): TI's terms "Lead-Free" or "Pb-Free" mean semiconductor products that are compatible with the current RoHS requirements for all 6 substances, including the requirement that lead not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered at high temperatures, TI Pb-Free products are suitable for use in specified lead-free processes.
Green (RoHS & no Sb/Br): TI defines "Green" to mean Pb-Free (RoHS compatible), and free of Bromine (Br) and Antimony (Sb) based flame retardants (Br or Sb do not exceed 0.1% by weight in homogeneous material)

(3) MSL, Peak Temp. -- The Moisture Sensitivity Level rating according to the JEDEC industry standard classifications, and peak solder temperature.

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