DUAL-PORT, LOW-POWER DIFFERENTIAL xDSL LINE DRIVER AMPLIFIERS

FEATURES

- **Trimmed Low-Power Consumption**
  - **4.2-mA/amp Full Bias Mode ; 4.8 mA Max**
  - **3.2-mA/amp Mid Bias Mode ; 3.7 mA Max**
  - **2.15-mA/amp Low Bias Mode ; 2.5 mA Max**
  - **Shutdown Mode and I_{ADJ} Pin for Variable Bias**
  - **Stable Down to 1.6-mA/amplifier**
- **Low Noise**
  - **2.9-nV/$\sqrt{Hz}$ Voltage Noise**
  - **5.7-pA/$\sqrt{Hz}$ Inverting Current Noise**
  - **0.8-pA/$\sqrt{Hz}$ Noninverting Current Noise**
- **Low MTPR Distortion**
  - **–74 dB with ADSL and ADSL2**
  - **–71 dB with ADSL2+ and –70 dB with ADSL2++**
- **–83 dBc THD (1 MHz, 100-Ω Differential)**
- **High Output Current: >410 mA (25-Ω Load)**
- **Wide Output Swing: 44 Vpp (±12-V, 200-Ω Differential)**
- **Wide Bandwidth: 45 MHz (Gain = +5)**
- **Wide Power Supply Range: ±2.25 V to ±16.5 V**

APPLICATIONS

- **Ideal For Power Sensitive, High Density ADSL, ADSL2, ADSL2+, and ADSL2++ Systems**

DESCRIPTION

The THS6184 is a dual-port, low-power current feedback differential line driver amplifier system ideal for xDSL systems. Its extremely low-power dissipation is ideal for ADSL, ADSL2, ADSL2+, and ADSL2++ systems that must achieve high densities in ADSL central office rack applications by combining two ports, or four amplifiers, into one package.

The unique architecture of the THS6184 allows the trimmed quiescent current to be much lower than existing line drivers while still achieving high linearity. Distortion at these low-power levels is good with –73 dBc THD at 1 MHz with the low bias mode of 4.3 mA/port. Fixed and variable multiple-bias settings of the amplifiers allows for enhanced power savings for line lengths where the full performance of the amplifier is not required.

The wide output swing of 44-Vpp differentially with ±12-V power supplies coupled with over 410-mA current drive allow for wide dynamic headroom, keeping distortion minimized. The THS6184 output stage incorporates extra catch-diodes to the power supply to minimize the external protection required in CO systems. With a low 2.9-nV/$\sqrt{Hz}$ voltage noise coupled with a low 5.7-pA/$\sqrt{Hz}$ inverting current noise, the THS6184 increases the sensitivity of the receive signals allowing for better margins and reach.

PRODUCT PREVIEW

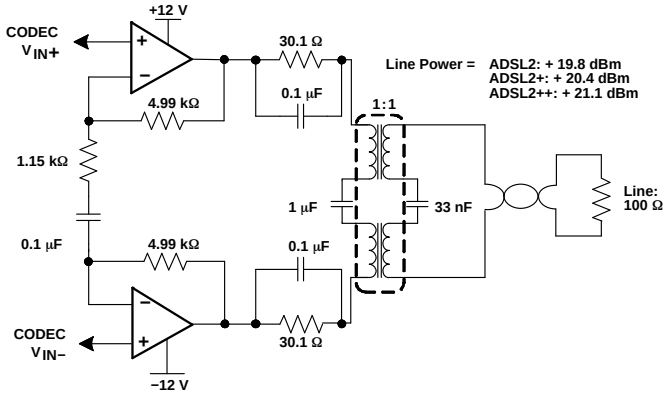


Figure 1. Typical Line Driver Circuit Using One Port of THS6184

This integrated circuit can be damaged by ESD. Texas Instruments recommends that all integrated circuits be handled with appropriate precautions. Failure to observe proper handling and installation procedures can cause damage.

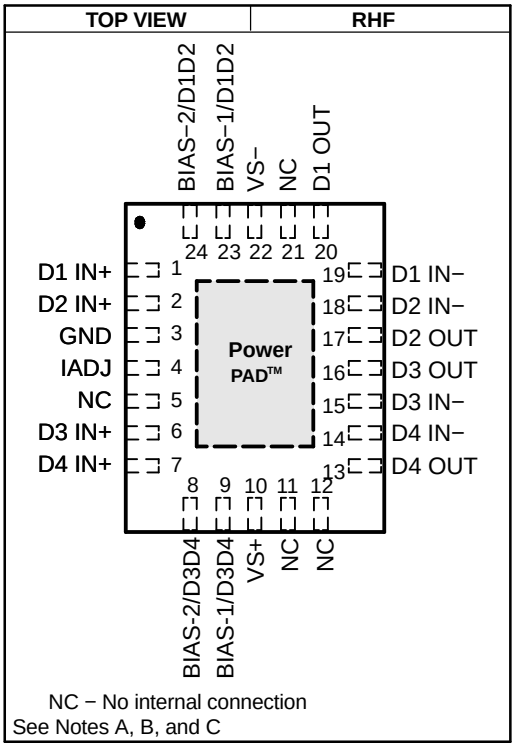
ESD damage can range from subtle performance degradation to complete device failure. Precision integrated circuits may be more susceptible to damage because very small parametric changes could cause the device not to meet its published specifications.

PACKAGING/ORDERING INFORMATION(1)

PACKAGED DEVICES(2)	DEVICE MARKING	PACKAGE TYPE	TRANSPORT MEDIA, QUANTITY
THS6184RHFT	6184	Leadless MSOP	Tape and Reel, 250
THS6184RHFR			Tape and Reel, 3000

(1) For the most current package and ordering information, see the Package Option Addendum at the end of this document, or see the TI website at www.ti.com.
(2) The PowerPAD is electrically Isolated from all other pins.

PIN CONFIGURATION



A. The THS6184 defaults to the FULL BIAS state if no signal is present on the BIAS pins.

B. The PowerPAD is electrically isolated from all other pins and can be connected to any potential voltage range from V_{S-} to V_{S+}. Typically, the PowerPAD is connected to the GND plane as this plane tends to be physically the largest and able to dissipate the most amount of heat.

C. The GND pin range is from Vs- to (Vs+ – 2.5 V).

Please contact Texas Instruments for full data sheet.

PRODUCT PREVIEW

PACKAGING INFORMATION

Orderable Device	Status (1)	Package Type	Package Drawing	Pins	Package Qty	Eco Plan (2)	Lead/Ball Finish	MSL Peak Temp (3)
THS6184RHFR	ACTIVE	QFN	RHF	24	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-2-260C-1 YEAR
THS6184RHFRG4	ACTIVE	QFN	RHF	24	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-2-260C-1 YEAR
THS6184RHFT	ACTIVE	QFN	RHF	24	1000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-2-260C-1 YEAR
THS6184RHFTG4	ACTIVE	QFN	RHF	24	1000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-2-260C-1 YEAR

(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), Pb-Free (RoHS Exempt), 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.
Pb-Free (RoHS Exempt): This component has a RoHS exemption for either 1) lead-based flip-chip solder bumps used between the die and package, or 2) lead-based die adhesive used between the die and leadframe. The component is otherwise considered Pb-Free (RoHS compatible) as defined above.
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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