OPA857-DIE

Ultralow-Noise, Wideband, Selectable-Feedback Resistance Transimpedance Amplifier

1 Features

- Internal Midscale Reference Voltage
- Pseudo-Differential Output Voltage
- Wide Dynamic Range
- Closed-Loop Transimpedance Bandwidth:
  - 125 MHz (5-kΩ Transimpedance Gain, 1.5-pF External Parasitic Capacitance)
  - 105 MHz (20-kΩ Transimpedance Gain, 1.5-pF External Parasitic Capacitance)
- Ultralow Input-Referred Current Noise (Brickwall Filter BW = 135 MHz):
  - 15 nA_{RMS} (20-kΩ Transimpedance)
- Very Fast Overload Recovery Time: < 25 ns
- Internal Input Protection Diode
- Power Supply:
  - Voltage: 2.7 V to 3.6 V
  - Current: 23.4 mA
- Extended Temperature Range: –40°C to +85°C

2 Applications

- Photodiode Monitoring
- High-Speed I/V Conversions
- Optical Amplifiers
- CAT-Scanner Front-Ends

3 Description

The OPA857-DIE is a wideband, fast overdrive recovery, fast-settling, ultralow-noise transimpedance amplifier targeted at photodiode monitoring applications. With selectable feedback resistance, the OPA857-DIE simplifies the design of high-performance optical systems. Very fast overload recovery time and internal input protection provide the best combination to protect the remainder of the signal chain from overdrive while minimizing recovery time. The two selectable transimpedance gain configurations allow high dynamic range and flexibility required in modern transimpedance amplifier applications.

The device is characterized for operation over the full industrial temperature range from –40°C to +85°C.

Ordering Information(1)

PRODUCT	PACKAGE DESIGNATOR	PACKAGE	ORDERABLE PART NUMBER	PACKAGE QUANTITY
OPA857-DIE	TD	Bare die in gel pak VR(2)	OPA857TD1	324
			OPA857TD2	10

(1) For the most current package and ordering information, see the Package Option Addendum at the end of this document, or see the TI web site at www.ti.com.

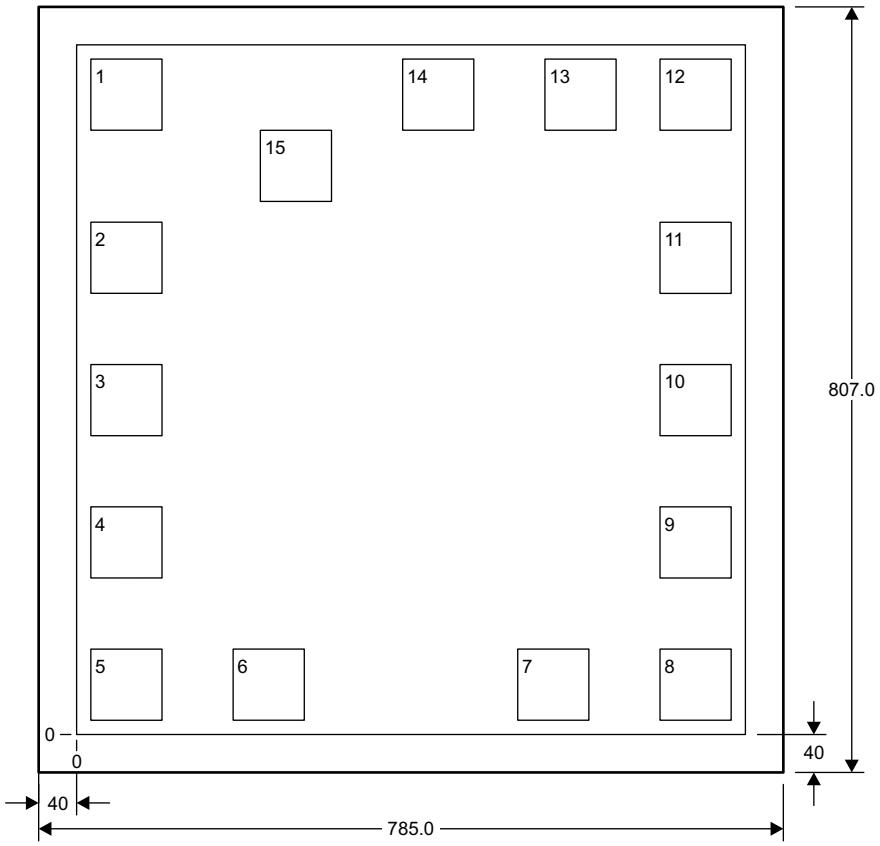
(2) Processing is per the Texas Instruments commercial production baseline and is in compliance with the Texas Instruments Quality Control System in effect at the time of manufacture. Electrical screening consists of DC parametric and functional testing at room temperature only. Unless otherwise specified by Texas Instruments AC performance and performance over temperature is not warranted. Visual Inspection is performed in accordance with MIL-STD-883 Test Method 2010 Condition B at 75X minimum.

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.

4 Bare Die Information

DIE THICKNESS	BACKSIDE FINISH	BACKSIDE POTENTIAL	BOND PAD METALLIZATION COMPOSITION	BOND PAD THICKNESS
15 mils.	Silicon with backgrind	GND	TiW/AlCu (0.5%)	1100 nm



Bond Pad Coordinates in Microns

NAME	PAD NUMBER	X MIN	Y MIN	X MAX	Y MAX	DESCRIPTION
GND	1	15	637	90	712	Ground
CTRL	2	15	465	90	540	Control pin for transimpedance gain. GND, logic 0 = 5-kΩ internal resistance; $+V_S$, logic 1 = 20-kΩ internal resistance.
GND	3	15	315	90	390	Ground
GND	4	15	165	90	240	Ground
OUTN	5	15	15	90	90	Common-mode voltage output reference
GND	6	165	15	240	90	Ground
GND	7	465	15	540	90	Ground
OUT	8	615	15	690	90	Signal output
$+V_S$	9	615	165	690	240	Supply voltage
$+V_S$	10	615	315	690	390	Supply voltage
$+V_S$	11	615	465	690	540	Supply voltage
GND	12	615	637	690	712	Ground
TESD_SD	13	493.7	637	568.7	712	Test mode enable. Connect to GND for normal operation, and connect to $+V_S$ to enable test mode.
TEST_IN	14	343.7	637	418.7	712	Test mode input. Connect to $+V_S$ during normal operation.
IN	15	193.7	561.95	268.7	636.95	Input

PACKAGING INFORMATION

Orderable Device	Status (1)	Package Type	Package Drawing	Pins	Package Qty	Eco Plan (2)	Lead/Ball Finish (6)	MSL Peak Temp (3)	Op Temp (°C)	Device Marking (4/5)	Samples
OPA857TD1	ACTIVE			0	324	TBD	Call TI	Call TI	-40 to 85		Samples
OPA857TD2	ACTIVE			0	120	TBD	Call TI	Call TI	-40 to 85		Samples

(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) **RoHS:** TI defines "RoHS" to mean semiconductor products that are compliant with the current EU RoHS requirements for all 10 RoHS substances, including the requirement that RoHS substance do not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered at high temperatures, "RoHS" products are suitable for use in specified lead-free processes. TI may reference these types of products as "Pb-Free".
RoHS Exempt: TI defines "RoHS Exempt" to mean products that contain lead but are compliant with EU RoHS pursuant to a specific EU RoHS exemption.
Green: TI defines "Green" to mean the content of Chlorine (Cl) and Bromine (Br) based flame retardants meet JS709B low halogen requirements of <=1000ppm threshold. Antimony trioxide based flame retardants must also meet the <=1000ppm threshold requirement.

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

(4) There may be additional marking, which relates to the logo, the lot trace code information, or the environmental category on the device.

(5) Multiple Device Markings will be inside parentheses. Only one Device Marking contained in parentheses and separated by a "~" will appear on a device. If a line is indented then it is a continuation of the previous line and the two combined represent the entire Device Marking for that device.

(6) Lead/Ball Finish - Orderable Devices may have multiple material finish options. Finish options are separated by a vertical ruled line. Lead/Ball Finish values may wrap to two lines if the finish value exceeds the maximum column width.

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