



## OPA657-DIE 1.6-GHz, Low-Noise, FET-Input Operational Amplifier

### 1 Features

- High Gain Bandwidth Product: 1.6 GHz
- High Bandwidth 275 MHz (G = 10)
- Slew Rate 700 V/ $\mu$ s (G = 10, 1-V Step)
- Low-Input Offset Voltage:  $\pm 250$   $\mu$ V
- Low-Input Bias Current: 2 pA
- Low-Input Voltage Noise: 4.8 nV/ $\sqrt$ Hz
- High-Output Current: 70 mA
- Fast Overdrive Recovery

### 2 Applications

- Wideband Photodiode Amplifiers
- Wafer Scanning Equipment
- ADC Input Amplifiers
- Test and Measurement Front Ends
- High Gain Precision Amplifiers
- Optical Time Domain Reflectometry (OTDR)

### 3 Description

The OPA657 device combines a high gain-bandwidth, low-distortion, voltage-feedback operational amplifier with a low voltage noise JFET-input stage to offer a very high dynamic range amplifier for high-precision analog-to-digital converter (ADC) driving or wideband transimpedance applications. Photodiode applications achieve improved noise and bandwidth using this decompensated, high gain-bandwidth amplifier.

Very low level signals can be significantly amplified in a single OPA657 gain stage with exceptional bandwidth and accuracy. The very low input bias current and capacitance supports this performance even for relatively high source impedance. Broadband photodetector applications benefit from the low voltage noise JFET inputs for the OPA657. The JFET input contributes virtually no current noise, which makes the device ideal for high-gain photodiode applications.

#### Ordering Information<sup>(1)</sup>

PRODUCT	PACKAGE DESIGNATOR	PACKAGE	ORDERABLE PART NUMBER	PACKAGE QUANTITY
OPA657	TD	Bare Die in Gel Pak VR <sup>(2)</sup>	OPA657TD1	324
			OPA657TD2	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](http://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.



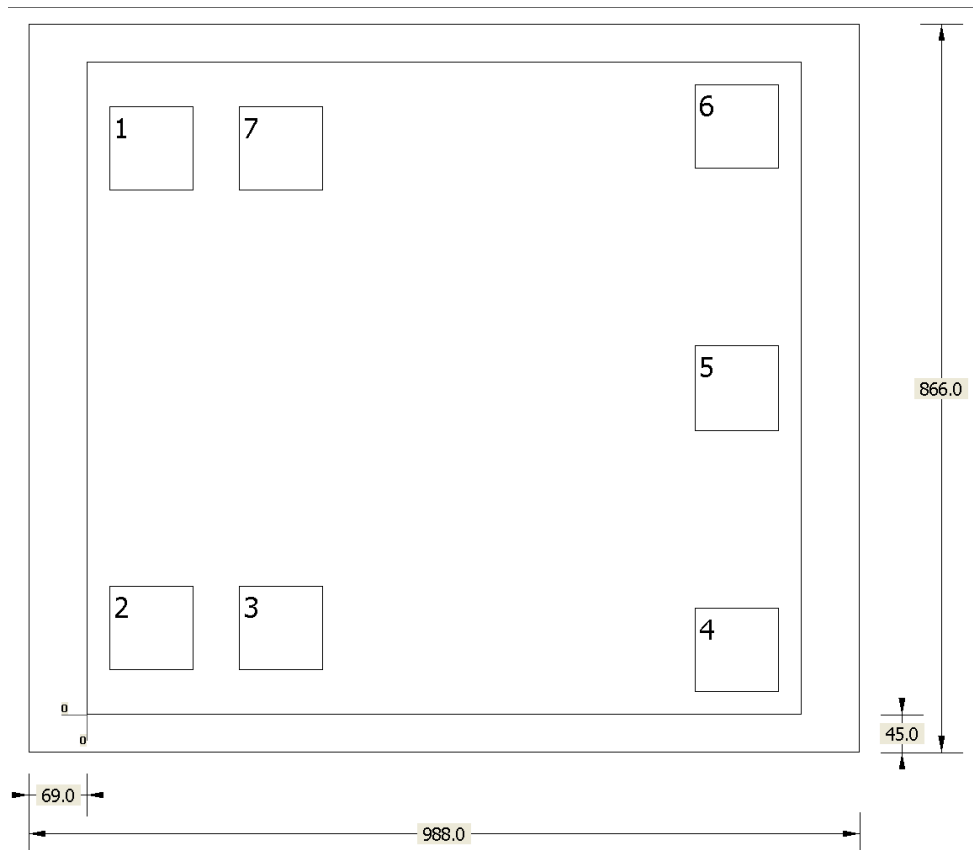


This integrated circuit can be damaged by ESD. Texas Instruments recommends that all integrated circuits be handled with appropriate precautions. Failure to observe proper handling and installation procedures can cause damage.

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	V <sub>S-</sub>	TiW/AlCu (0.5%)	1100 nm



**Bond Pad Coordinates in Microns<sup>(1)</sup>**

DESCRIPTION	PAD NUMBER	X MIN	Y MIN	X MAX	Y MAX
Inverting input	1	27	623	127	723
NonInverting input	2	27	53	127	153
N/C	3	181	53	281	153
Output	4	723	27	823	127
V <sub>S-</sub>	5	723	337	823	439
V <sub>S+</sub>	6	723	649	823	749
N/C	7	181	623	281	723

(1) Substrate is V<sub>S-</sub>.

**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
OPA657TD1	ACTIVE			0	324	TBD	Call TI	Call TI	-40 to 85		<a href="#">Samples</a>
OPA657TD2	ACTIVE			0	120	TBD	Call TI	Call TI	-40 to 85		<a href="#">Samples</a>

(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.

**OBSELETE:** 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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